

Technical Information

Float level gauge LT5

Mechanical tank gauge for measuring liquid level



Application

The Float Tank Gauge LT5 plays an important role in all areas of industry. Operation of LT11/12/14/16 in a wide variety of applications over many years has proven their reliability.

Common applications

- Petroleum products, such as crude oil, kerosene, diesel fuel, and heavy oil
- Cooking oils, such as vegetable oil, palm oil, seed oil, and animal oil
- Highly viscous liquids, such as asphalt
- Chemical products (for corrosive products and toxic vapors, a liquid seal pot can be used to achieve airtightness)
- Measurement of liquefied gas in spherical tank

Your benefits

- It is a mechanical level gauge that requires no electrical power.
- Reproducibility can be checked with a check handle.
- Direct tank-side reading allows tank contents to be checked quickly and easily.
- It can be installed on a wide variety of tanks, including cone roof tanks, floating roof tanks, covered floating roof tanks, and spherical tanks.
- It can also be used in conjunction with analog/digital transmitters to perform tank inventory management.

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Document information

Symbols used

Safety symbols

 **DANGER**

This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.

 **WARNING**

This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury.

 **CAUTION**

This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or medium injury.

 **NOTICE**

This symbol contains information on procedures and other facts which do not result in personal injury.

Electrical symbols



Alternating current



Direct current and alternating current




Direct current



Ground connection

A grounded terminal which, as far as the operator is concerned, is grounded via a grounding system.

 **Protective earth (PE)**

Ground terminals that must be connected to ground prior to establishing any other connections.

The ground terminals are located on the interior and exterior of the device:

- Interior ground terminal: protective earth is connected to the mains supply.
- Exterior ground terminal: device is connected to the plant grounding system.

Tool symbols



Phillips head screwdriver



Flat blade screwdriver



Torx screwdriver



Allen key



Open-ended wrench


Symbols for certain types of information and graphics

 **Permitted**

Procedures, processes or actions that are permitted

 **Preferred**

Procedures, processes or actions that are preferred

 **Forbidden**

Procedures, processes or actions that are forbidden

 **Tip**

Indicates additional information



Reference to documentation



Reference to graphic



Notice or individual step to be observed

1., 2., 3.

Series of steps



Result of a step



Visual inspection



Operation via operating tool



Write-protected parameter

1, 2, 3, ...

Item numbers

A, B, C, ...

Views



Safety instructions

Observe the safety instructions contained in the associated Operating Instructions



Temperature resistance of the connection cables

Specifies the minimum value of the temperature resistance of the connection cables

Documentation

The following documents can be found in the Download area of our website (www.endress.com/downloads).



For an overview of the scope of the associated Technical Documentation, refer to the following: *W@M Device Viewer* (www.endress.com/deviceviewer): Enter the serial number from nameplate

Technical Information (TI)

Planning aid

The document contains all the technical data on the device and provides an overview of the accessories and other products that can be ordered for the device.

Brief Operating Instructions (KA)

Guide that takes you quickly to the 1st measured value

The Brief Operating Instructions contain all the essential information from incoming acceptance to initial commissioning.

Operating Instructions (BA)

The Operating Instructions contain all the information that is required in various phases of the life cycle of the device: from product identification, incoming acceptance and storage, to mounting, connection, operation and commissioning through to troubleshooting, maintenance and disposal.

Safety Instructions (XA)

Depending on the approval, the following Safety Instructions (XA) are supplied with the device. They are an integral part of the Operating Instructions.

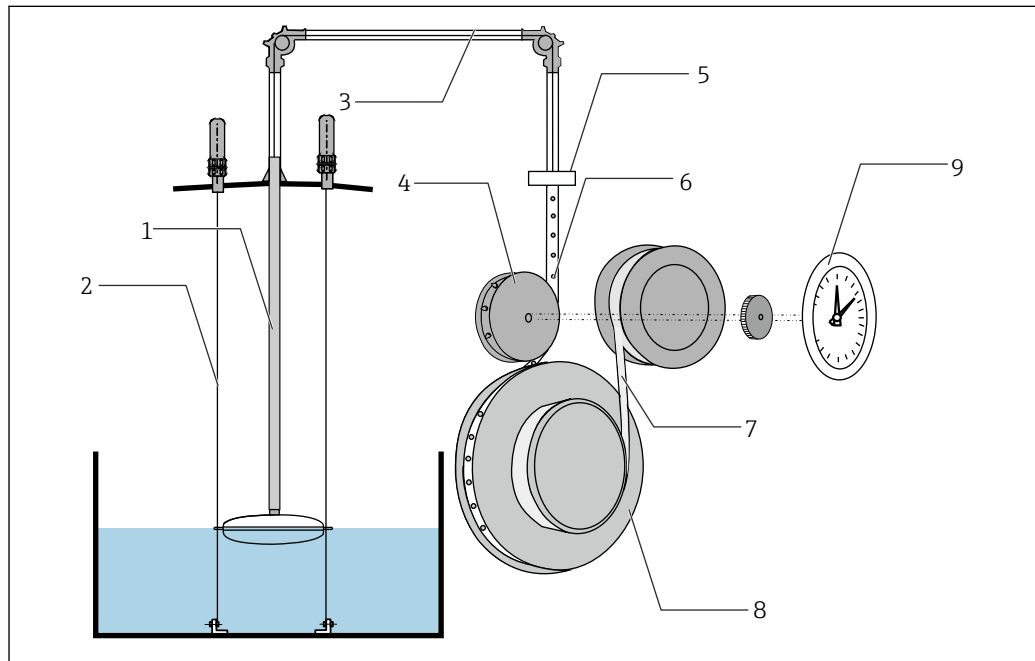


The nameplate indicates the Safety Instructions (XA) that are relevant to the device.

Function and system design

Operating principles

The liquid level detected by the float is transmitted to the gauge head through a measuring tape. This change in liquid level is converted to the sprocket's angle of rotation. The measuring tape has uniformly spaced small holes, and it indicates the liquid level by driving the gear mechanism in an extremely precise manner. The measuring tape is subsequently wound up by the tape drum. A conster is directly attached to the tape drum, constantly giving a certain amount of tension to the measuring tape. This ensures that the float and the measuring tape are always in equilibrium, and the amount of float travel associated with changes in the liquid level is continuously indicated.



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1 Operating principles

- 1 Measuring tape
- 2 Guide wire
- 3 Guide pipe
- 4 Sprocket
- 5 Gauge head connection
- 6 Measuring tape (with sprocket driving holes)
- 7 Conster
- 8 Tape drum
- 9 Scale

Combination with an analog transmitter

AT1

- 4 to 20 mA output
- Max. 6 points alarm signal output

 For details, refer to the technical information of AT1.

Combination with a digital transmitter

TMD1

- Two-wire transmission (V1 protocol) output
- 4 to 20 mA output
- Max. 8 points alarm signal output

 For details, refer to the technical information of TMD1.

Input/Output

Measuring range	Spec.	Range
		LT5

Accuracy	Spec.	Range
		φ400 mm float
	φ140 mm float	± 30 mm (1.18 in) (density limit 1 g/cm ³ measuring range 10 m (32.80 ft))

Installation

Measuring tape and wire lengths

For piping purposes, measuring tapes and wires are made slightly longer than their actual measurable lengths. The lengths of measuring tapes and wires will vary depending on the option. The tables below show actual lengths for 060 specification options for each 070 specification option. Note that the maximum display on the gauge head display simply corresponds to the measurement range. Refer to the following tables and select the appropriate length accordingly.

1. Measuring tape SUS316, CRT

060 measurement range		Length (total length)	Perforated tape (measurement length)	Non-perforated tape	Spare parts
1	2.5 m	13 m	7 m	6 m	56004412
2	5 m	13 m	7 m	6 m	56004412
3	10 m	24 m	12 m	12 m	017860-5302
4	16 m	45 m	22 m	23 m	017860-5304
5	20 m	45 m	22 m	23 m	017860-5304
6	30 m	65 m	32 m	33 m	017860-5305
F	60 ft	134.50 ft	69.89 ft	65.61 ft	Contact Endress+Hauser
H	100 ft	216.52 ft	108.26 ft	108.26 ft	Contact Endress+Hauser

2. Measuring tape SUS316, tank top installation

060 measurement range		Length (total length)	Perforated tape (measurement length)	Non-perforated tape	Spare parts
1	2.5 m	7.15 m	7 m	0.15 m	017860-5306
2	5 m	7.15 m	7 m	0.15 m	017860-5306
3	10 m	12.15 m	12 m	0.15 m	017860-5307
4	16 m	22.15 m	22 m	0.15 m	017860-5309
5	20 m	22.15 m	22 m	0.15 m	017860-5309
6	30 m	32.15 m	32 m	0.15 m	017860-5310
F	60 ft	72.17 ft	69.89 ft	3.28 ft	Contact Endress+Hauser
H	100 ft	111.54 ft	108.26 ft	3.28 ft	Contact Endress+Hauser

3. Measuring tape SUS316, seal pot/BT

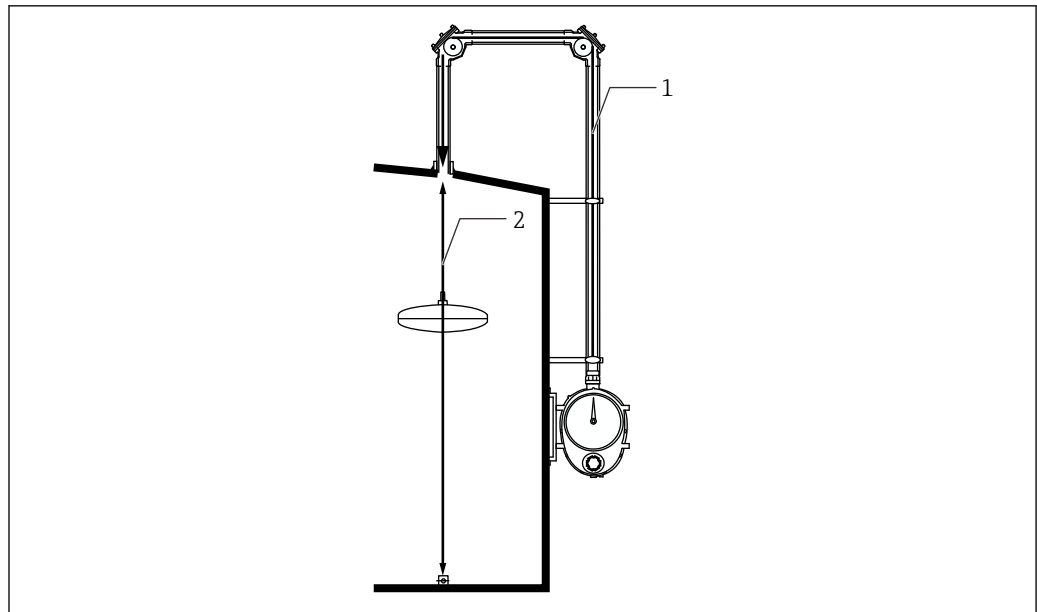
060 measurement range		Length (total length)	Perforated tape (measurement length)	Non-perforated tape	Spare parts
1	2.5 m	24 m	7 m	17 m	Contact Endress+Hauser
2	5 m	24 m	7 m	17 m	Contact Endress+Hauser
3	10 m	35 m	12 m	23 m	Contact Endress+Hauser
4	16 m	55 m	22 m	33 m	Contact Endress+Hauser
5	20 m	55 m	22 m	33 m	Contact Endress+Hauser
6	30 m	75 m	32 m	43 m	017860-5210
F	60 ft	167.31 ft	69.89 ft	98.42 ft	Contact Endress+Hauser
H	100 ft	249.33 ft	108.26 ft	141.07 ft	Contact Endress+Hauser

4. Measuring tape SUS316 + wire SUS316, FRT

060 measurement range		Length (total length)	Perforated tape (measurement length)	Non-perforated tape	Wire	Spare parts
1	2.5 m	16 m	6.7 m	0.3 m	9 m	017860-0005
2	5 m	16 m	6.7 m	0.3 m	9 m	017860-0005
3	10 m	26 m	11.7 m	0.3 m	14 m	017860-0007
4	16 m	46 m	21.7 m	0.3 m	24 m	017860-0011
5	20 m	46 m	21.7 m	0.3 m	24 m	017860-0011
6	30 m	66 m	31.7 m	0.3 m	34 m	017860-0013
F	60 ft	147.63 ft	67.91 ft	67.91 ft	78.74 ft	Contact Endress +Hauser
H	100 ft	219.80 ft	107.28 ft	67.91 ft	111.54 ft	Contact Endress +Hauser

5. Measuring tape SUS316 + PFA-coating SUS316 wire, seal pot/CRT

060 measurement range		Length (total length)	Perforated tape (measurement length)	Non-perforated tape	Wire	Spare parts
1	2.5 m	18 m	6.7 m	0.3 m	11 m	017860-0006
2	5 m	18 m	6.7 m	0.3 m	11 m	017860-0006
3	10 m	28 m	11.7 m	0.3 m	16 m	017860-0008
4	16 m	48 m	21.7 m	0.3 m	26 m	017860-0012
5	20 m	48 m	21.7 m	0.3 m	26 m	017860-0012
6	30 m	68 m	31.7 m	0.3 m	36 m	017860-0014
F	60 ft	154.19 ft	67.91 ft	67.91 ft	86.30 ft	Contact Endress +Hauser
H	100 ft	226.37 ft	107.28 ft	67.91 ft	118.11 ft	Contact Endress +Hauser



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2 Measuring tape and wire (example: option 1 for specification 070 and option 5 for specification 060)

1 Perforated tape

2 Non-perforated tape / wire

i In the diagram above, the maximum measurement distance is 22 mm and the maximum excess is 23 m. For this reason, the total length of the measuring tape is 45 m.

Sealing materials for wetting liquid and gas parts List of materials

Product name	Component name	Sealing material application site	Sealing material type	Packing/O-ring materials
LT5-1	Gauge head	Rear cover	Cover packing	V#6502
		Check shaft	O-ring	FKM
		Sprocket shaft	Oil seal	FKM
		Blind board	Packing	NBR
	90 ° sheave elbow	Aluminum sheave elbow	Cover packing	V#6502
		Stainless steel sheave elbow		
		Bearing	O-ring	Silicon rubber
	U-seal pot	Aluminum sheave elbow	Cover packing	V#6502
			Bearing O-ring	Silicon rubber
		Stainless steel sheave elbow	Cover packing	V#6502
			Bearing O-ring	Silicon rubber
		PVC sheave elbow	Cover packing	V#6502
			Bearing O-ring	PTFE
	Top anchor	Aluminum, screw-in type	Cover packing	V#6502
		Stainless steel, tank welding type		
	Top anchor	Aluminum, flange, screw-in type	Spring retainer packing	
Stainless steel, flange welding type				
LT5-4/LT5-6	Gauge head	Rear cover	Cover packing	PTFE
		Check handle unit	Gland packing	PTFE/CR
		Internal magnet cover	O-ring	PTFE
		External magnet cover	O-ring	NBR *ammonia specification CR
		Coupling	O-ring	PTFE
	Gate valve	Shaft	Shaft packing	PTFE
		Cap nut part	Packing	PTFE
LT5-4	90 ° sheave elbow	Cover	Cover packing	PTFE
		Bearing	O-ring	PTFE
	135 ° sheave elbow	Cover	Cover packing	PTFE
		Bearing	O-ring	PTFE
	Top anchor	Aluminum, flange integrated type	Spring retainer packing	PTFE
		Stainless steel, flange welding type		
LT5-6	90 ° sheave elbow	Cover	Cover packing	PTFE
		Bearing	O-ring	PTFE
	135 ° sheave elbow	Cover	Cover packing	PTFE
		Bearing	O-ring	PTFE
	Top anchor	Iron (SCPL1), flange welding type	Spring retainer packing	PTFE
		Stainless steel, flange welding type		

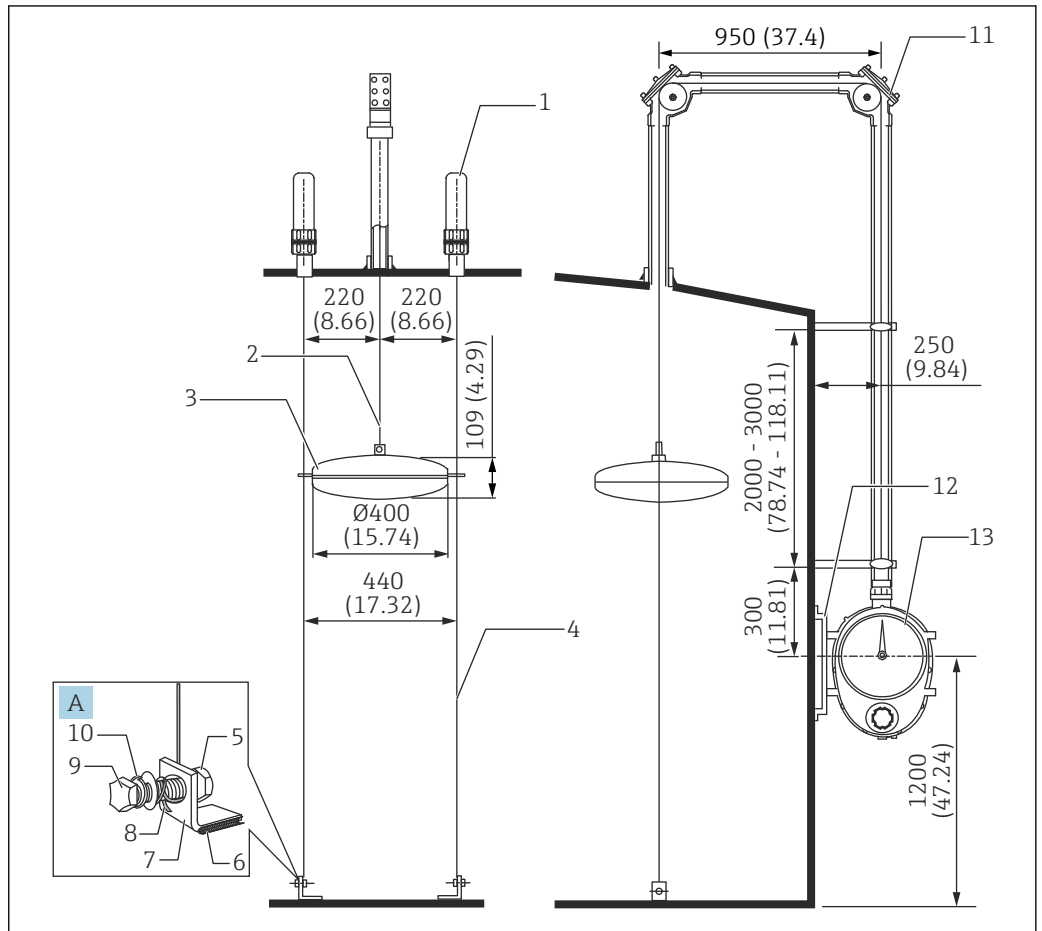
Material certificates

When material certificates are required, order them when ordering the products. Certificates can be provided for the following parts:

- High-pressure specification gauge head made of iron (the certificate for the flange is the same because it is an integrated type casting with the gauge head), cover, magnetic cover, check shaft (only for those without hoisting), plug
- Stainless steel measuring tapes and wires (excluding PFA-coated wires)
- Stainless steel float
- Stainless steel or iron high-pressure specification top anchor main unit, cover, flange
- Stainless steel guide wires (excluding PFA-coated wires)
- Stainless steel anchor hook
- Main unit of high-pressure specification sheave elbow made of iron (the certificate for the flange is the same because it is an integrated type casting with the main unit of the sheave elbow), cover
- Stainless steel gate valve

Reference diagrams and order codes for installation

For cone roof tanks (CRT)



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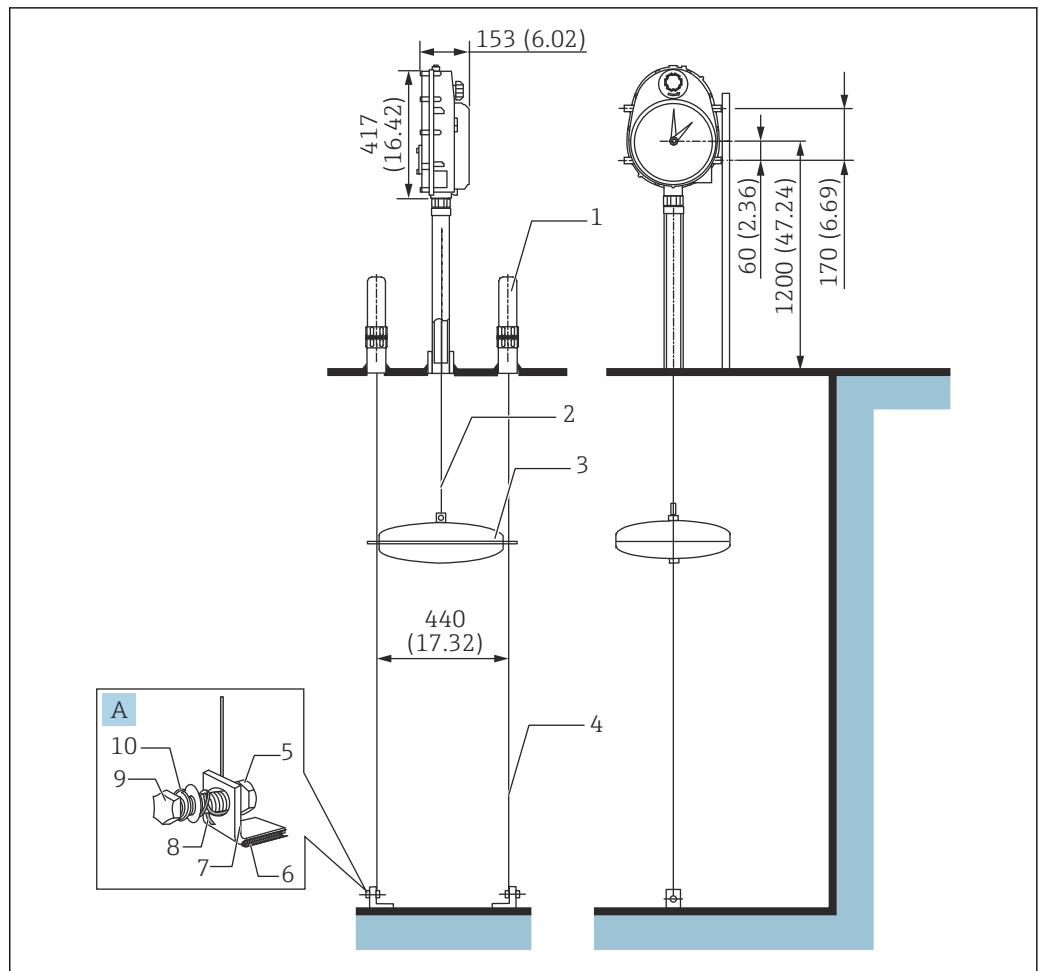
3 Mounting on a cone roof tank. Unit of measurement mm (in)

- A Anchor hook
- 1 Top anchor
- 2 Measuring tape
- 3 Float
- 4 Guide wire
- 5 Nut
- 6 Wetted part (welded to the tank)
- 7 Anchor hook
- 8 Guide wire
- 9 Bolt
- 10 Washer
- 11 90° sheave elbow
- 12 Gauge supporter
- 13 Gauge head

Example of target order code (LT5-111A031B11A111200000+PA)

Item	Target	Code	Specification	Quantity
020	Gauge head	1	0.01961 MPa/2.84 psi, aluminum (ADC12)	1
030	Gauge head process connection	11	Rc 1-1/2, union nut, SUS316, screw JIS B0203	
040	Display; cover	A	Dial display: acrylic	
050	Crank unit	0	None	
060	Measurement range	3	10 m	
070	Measuring tape	1	Measuring tape, CRT	
080	Float	B	D400 mm SUS316 tape connection 5.0 kg, $0.65 \leq \text{density} 1.05$, with ring	
090	Top anchor	11	2x R1, aluminum (ADC6), screw JIS B0203	
100	Guide wire	A	Solid wire with a diameter of 3 mm x 2 wires	
110	Anchor hook; mounting bolt	1	Iron (SCPL1); SUS316	
120	90 ° sheave elbow	112	2x Rp1-1/2, aluminum (ADC6), screw JIS B0203	
130	135 ° sheave elbow	000	None	
140	Seal pot	0	None	-
150	Gate valve	0	None	
620	>>Enclosed accessories	PA	Gauge supporter SS400 low/medium-pressure gauge head	1

Tank top mounting (for underground tank)



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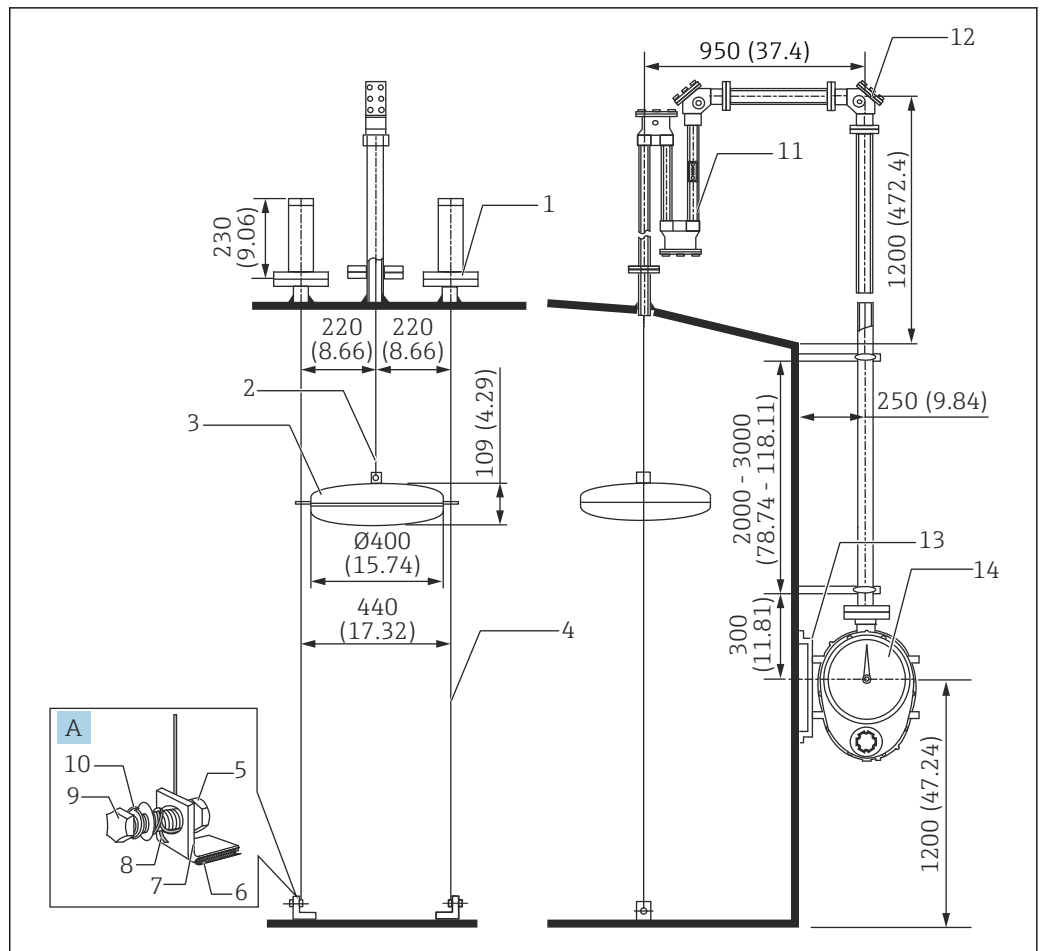
4 Mounting on underground tank. Unit of measurement mm (in)

- A Anchor hook
- 1 Top anchor
- 2 Measuring tape
- 3 Float
- 4 Guide wire
- 5 Nut
- 6 Wetted part (welded to the tank)
- 7 Anchor hook
- 8 Guide wire
- 9 Bolt
- 10 Washer

Example of target order code (LT5-111C022B11A10000000)

Item	Target	Code	Specification	Quantity
020	Gauge head	1	0.01961 MPa/2.84 psi, aluminum (ADC12)	1
030	Gauge head process connection	11	Rc 1-1/2, union nut, SUS316, screw JIS B0203	
040	Display; cover	C	Reverse mounting, dial display, acrylic	
050	Crank unit	0	None	
060	Measurement range	2	5 m	
070	Measuring tape	2	Measuring tape, tank top mounting	
080	Float	B	D400 mm SUS316 tape connection 5.0 kg, $0.65 \leq \text{density} 1.05$, with ring	
090	Top anchor	11	2x R1, aluminum (ADC6), screw JIS B0203	
100	Guide wire	A	Solid wire with a diameter of 3 mm x 2 wires	
110	Anchor hook; mounting bolt	1	Iron (SCPL1); SUS316	
120	90 ° sheave elbow	000	None	-
130	135 ° sheave elbow	000	None	
140	Seal pot	0	None	
150	Gate valve	0	None	

Cone roof tank (with seal pot for CRT)



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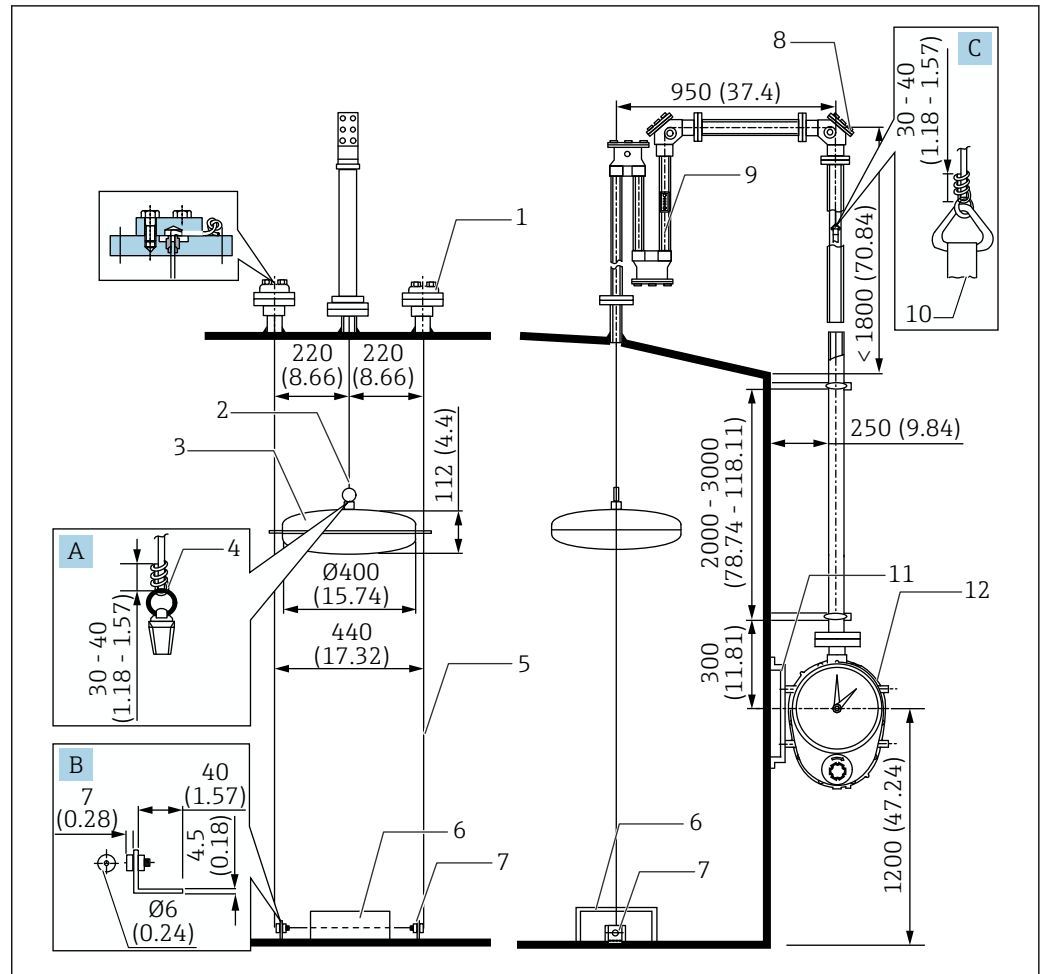
5 Mounting seal pot for CRT. Unit of measurement mm (in)

- A Anchor hook
- 1 Top anchor
- 2 Measuring tape
- 3 Float
- 4 Guide wire
- 5 Nut
- 6 Wetted part (welded to the tank)
- 7 Anchor hook
- 8 Guide wire
- 9 Bolt
- 10 Washer
- 11 Seal pot
- 12 90° sheave elbow
- 13 Gauge supporter
- 14 Gauge head

Example of target order code (LT5-11AA023B1BA21A1000F0+PA)

Item	Target	Code	Specification	Quantity
020	Gauge head	1	0.01961 MPa/2.84 psi, aluminum (ADC12)	1
030	Gauge head process connection	1A	10K 40A RF, aluminum (AC4A), flange JIS B2220	
040	Display; cover	A	Dial display: acrylic	
050	Crank unit	0	None	
060	Measurement range	2	5 m	
070	Measuring tape	3	Measuring tape, seal pot / BT	
080	Float	B	D400 mm SUS316 tape connection 5.0 kg, $0.65 \leq \text{density} 1.05$, with ring	
090	Top anchor	1B	2x 10K 40A RF, SUS316, flange JIS B2220	
100	Guide wire	A	Solid wire with a diameter of 3 mm x 2 wires	
110	Anchor hook; mounting bolt	2	SUS316; SUS316	
120	90 ° sheave elbow	1A1	1x 10K 40A RF, aluminum (ADC6+AC4A), flange JIS B2220	1
130	135 ° sheave elbow	000	None	-
140	Seal pot	F	10K 40A RF, SUS316, flange JIS B2220	1
150	Gate valve	0	None	-
620	>>Enclosed accessories	PA	Gauge supporter SS400 low/medium-pressure gauge head	1


Cone roof tank (with PVC seal pot for CRT)



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6 Mounting PVC seal pot for CRT. Unit of measurement mm (in)

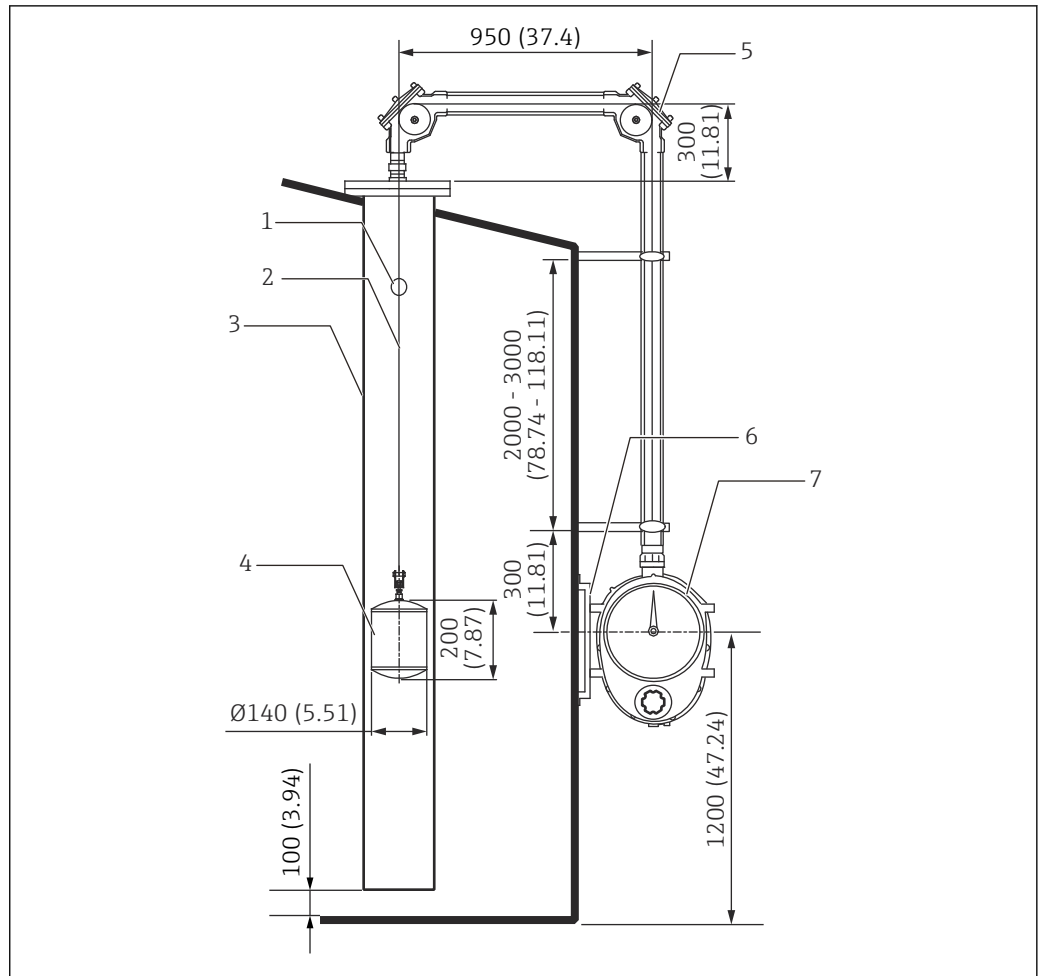
- A Float tip
- B Anchor hook details
- C Triangle bracket for measuring wire
- 1 Top anchor
- 2 Measuring wire
- 3 Float
- 4 Teflon tube
- 5 Guide wire (PFA-coated wire)
- 6 Wire protection stand (not supplied)
- 7 Anchor hook
- 8 90° sheave elbow
- 9 Seal pot
- 10 Measuring tape
- 11 Gauge supporter
- 12 Gauge head

-  Wrap the included Teflon tube around the measuring wire 10 to 15 times.
- Coat the anchor hook if necessary.
- Position connection C in the diagram so that it is approximately 10 mm (0.39 in) below the sheave elbow when the liquid level is 0 and approximately 100 mm (3.94 in) away from the gauge head when the tank is full.

Example of target order code (LT5-11AA025H1NC41A1000N0+PA)

Item	Target	Code	Specification	Quantity
020	Gauge head	1	0.01961 MPa/2.84 psi, aluminum (ADC12)	1
030	Gauge head process connection	1A	10K 40A RF, aluminum (AC4A), flange JIS B2220	
040	Display; cover	A	Dial display: acrylic	
050	Crank unit	0	None	
060	Measurement range	2	5 m	
070	Measuring tape	5	Tape + PFA-coated wire, seal pot/CRT	
080	Float	H	D400 mm SUS316 tape connection 5.0 kg, $0.65 \leq \text{density} 1.05$, with ring	
090	Top anchor	1N	2x 10K 40A RF, PVC, flange JIS B2220	
100	Guide wire	C	PFA-coated stranded wire with a diameter of 4.6 mm x 1 wire	1
110	Anchor hook; mounting bolt	4	SUS316; PVC	2
120	90 ° sheave elbow	1A1	1x 10K 40A RF, aluminum (ADC6+AC4A), flange JIS B2220	1
130	135 ° sheave elbow	000	None	-
140	Seal pot	N	10K 40A FF, PVC, flange JIS B2220	1
150	Gate valve	0	None	-
620	>>Enclosed accessories	PA	Gauge supporter SS400 low/medium-pressure gauge head	1

Compact cone roof tank (guide pipe type)



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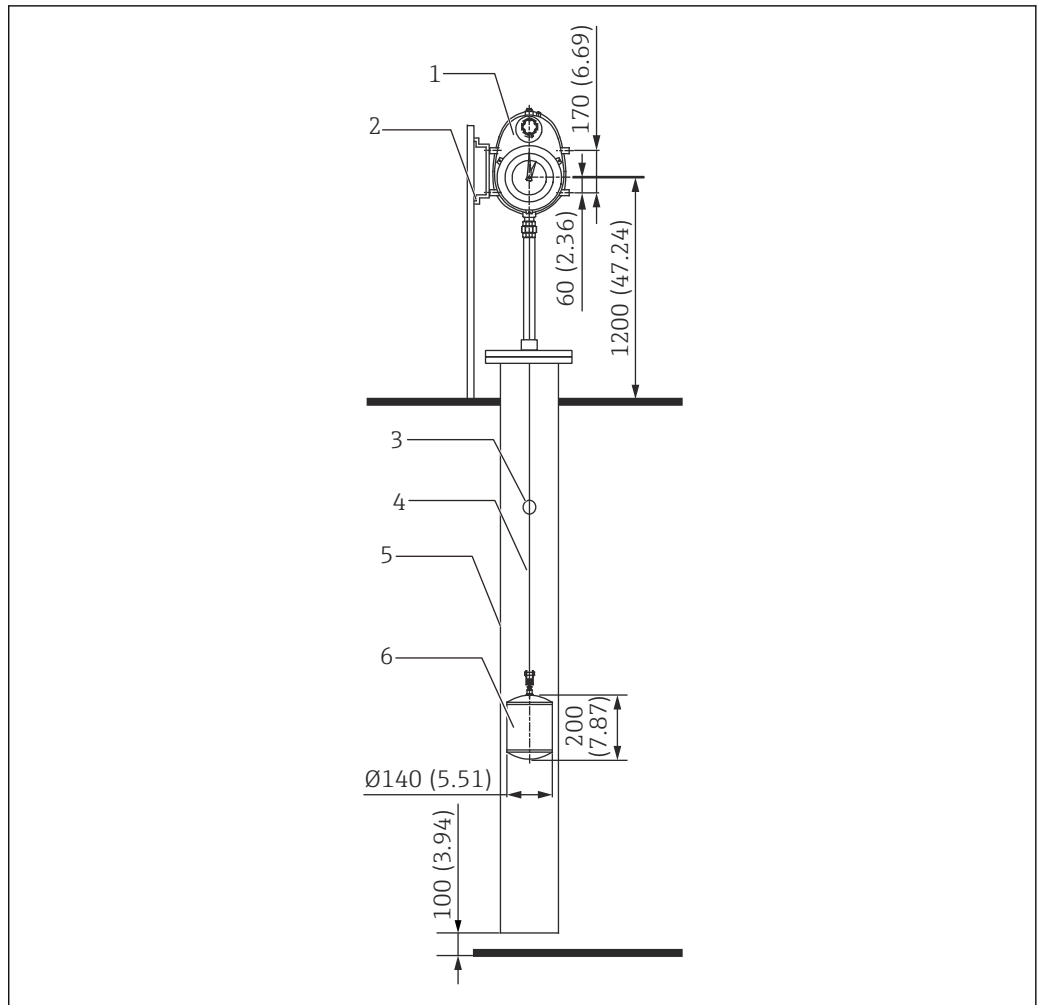
7 Mounting on a compact cone roof tank. Unit of measurement mm (in)

- 1 Vent hole
- 2 Measuring tape
- 3 Guide pipe (stilling well)
- 4 Float
- 5 90° sheave elbow
- 6 Gauge supporter
- 7 Gauge head

Example of target order code (LT5-111A021L000011200000+PA)

Item	Target	Code	Specification	Quantity
020	Gauge head	1	0.01961 MPa/2.84 psi, aluminum (ADC12)	1
030	Gauge head process connection	11	Rc 1-1/2, union nut, SUS316, screw JIS B0203	
040	Display; cover	A	Dial display: acrylic	
050	Crank unit	0	None	
060	Measurement range	2	5 m	
070	Measuring tape	1	Measuring tape, CRT	
080	Float	L	D140 mm SUS316 tape connection 2.4 kg, $0.94 \leq \text{density} 2.0$, without ring	
090	Top anchor	00	None	
100	Guide wire	0	None	
110	Anchor hook; mounting bolt	0	None	
120	90 ° sheave elbow	112	2x Rp1-1/2, aluminum (ADC6), screw JIS B0203	2
130	135 ° sheave elbow	000	None	-
140	Seal pot	0	None	
150	Gate valve	0	None	
620	>>Enclosed accessories	PA	Gauge supporter SS400 low/medium-pressure gauge head	1

Tank top mounting (guide pipe type)



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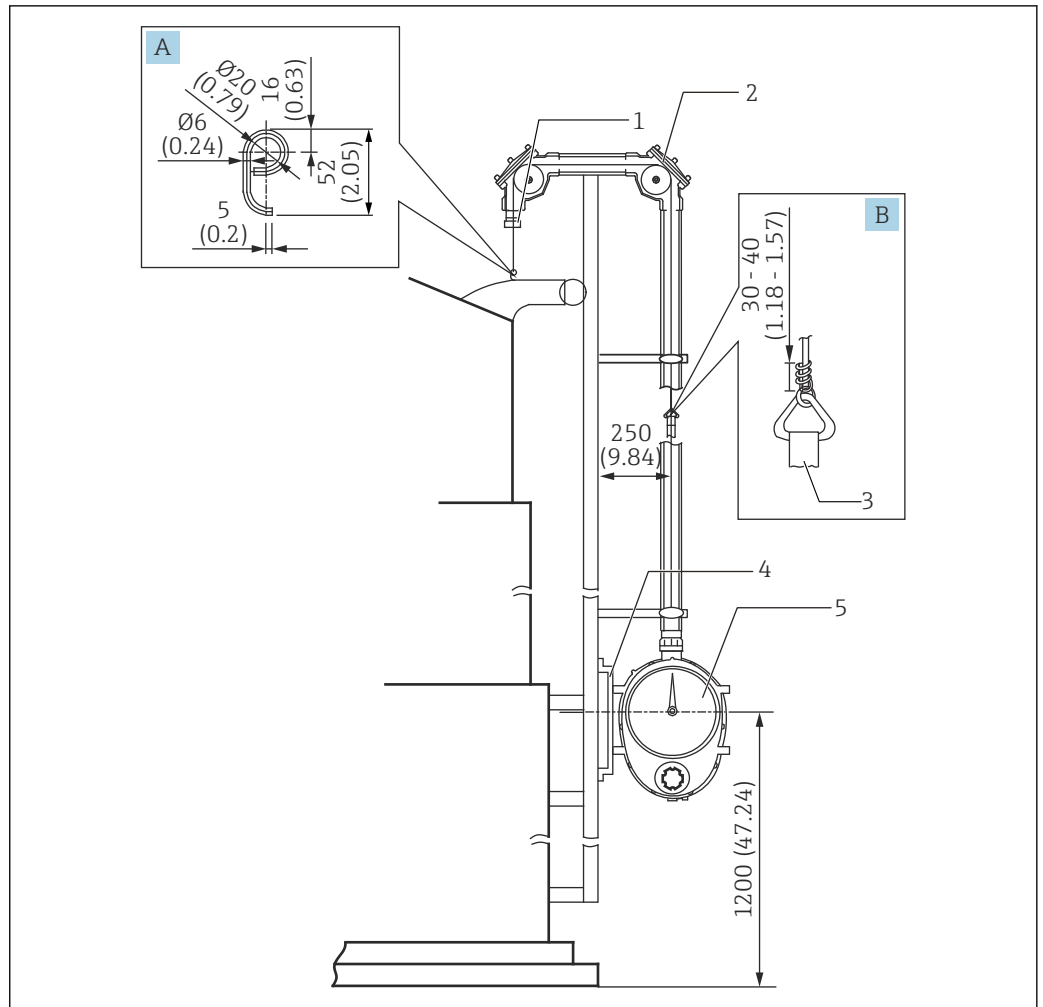
8 Mounting on tank top, unit. Unit of measurement mm (in)

- 1 Gauge head
- 2 Gauge supporter
- 3 Vent hole
- 4 Measuring tape
- 5 Guide pipe (stilling well)
- 6 Float

Example of target order code (LT5-111C022L000000000000+PA)

Item	Target	Code	Specification	Quantity
020	Gauge head	1	0.01961 MPa/2.84 psi, aluminum (ADC12)	1
030	Gauge head process connection	11	Rc 1-1/2, union nut, SUS316, screw JIS B0203	
040	Display; cover	C	Reverse mounting, dial display, acrylic	
050	Crank unit	0	None	
060	Measurement range	2	5 m	
070	Measuring tape	2	Measuring tape, tank top mounting	
080	Float	L	D140 mm SUS316 tape connection 2.4 kg, 0.94 ≤ density 2.0, without ring	
090	Top anchor	00	None	
100	Guide wire	0	None	
110	Anchor hook; mounting bolt	0	None	
120	90 ° sheave elbow	000	None	
130	135 ° sheave elbow	000	None	
140	Seal pot	0	None	
150	Gate valve	0	None	
620	>>Enclosed accessories	PA	Gauge supporter SS400 low/medium-pressure gauge head	1

Gas holder



A0041202

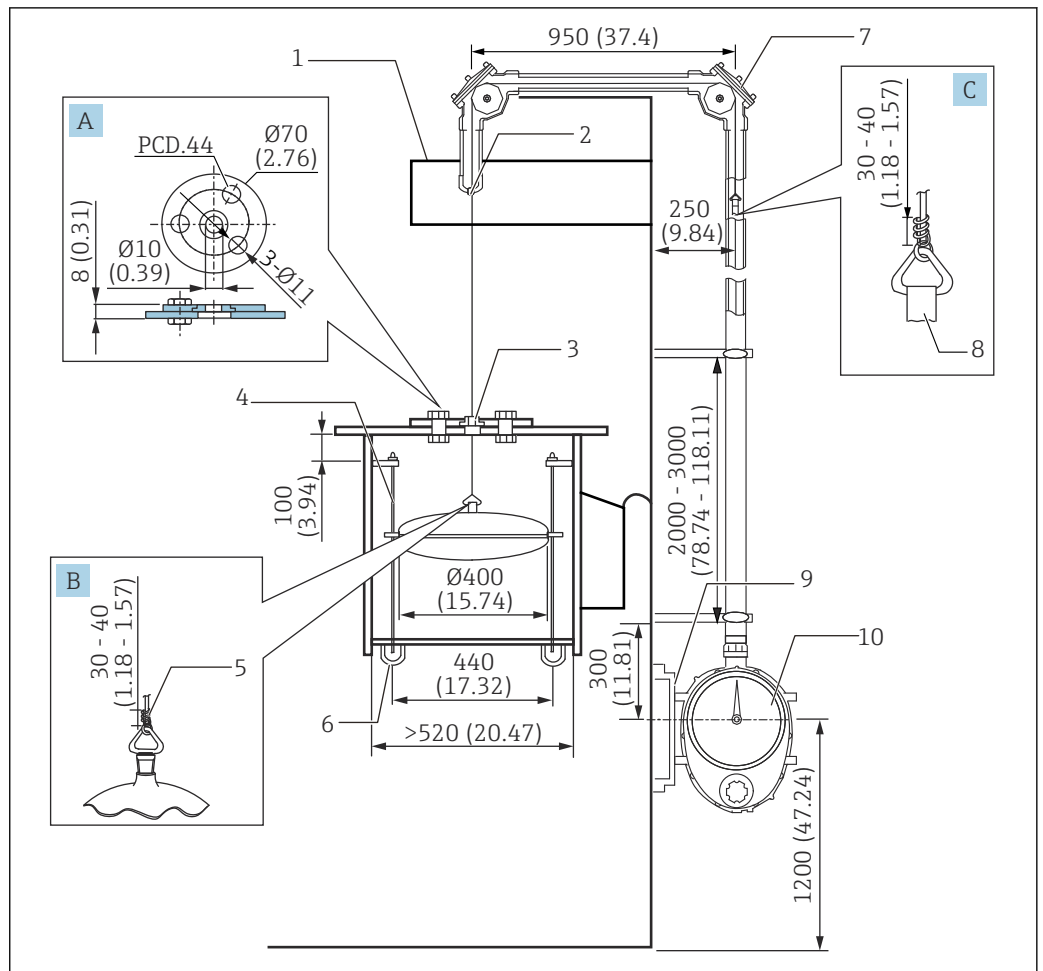
9 Mounting a gas holder. Unit of measurement mm (in)

- A Gas holder wire hook
- B Triangle bracket for measuring wire
- 1 Wire guide socket
- 2 90° sheave elbow
- 3 Measuring tape
- 4 Gauge supporter
- 5 Gauge head

Example of target order code (LT5-111A0340000011200000+PAPFPH)

Item	Target	Code	Specification	Quantity
020	Gauge head	1	0.01961 MPa/2.84 psi, aluminum (ADC12)	1
030	Gauge head process connection	11	Rc 1-1/2, union nut, SUS316, screw JIS B0203	
040	Display; cover	A	Dial display: acrylic	
050	Crank unit	0	None	
060	Measurement range	3	10 m	
070	Measuring tape	4	Tape + wire, FRT	
080	Float	0	None	
090	Top anchor	00	None	
100	Guide wire	0	None	
110	Anchor hook; mounting bolt	0	None	
120	90 ° sheave elbow	112	2x Rp1-1/2, aluminum (ADC6), screw JIS B0203	2
130	135 ° sheave elbow	000	None	-
140	Seal pot	0	None	
150	Gate valve	0	None	
620	>>Enclosed accessories	PA	Gauge supporter SS400 low/medium-pressure gauge head	1
620	>>Enclosed accessories	PF	Wire guide socket, Rc 1-1/2	
620	>>Enclosed accessories	PH	Gas holder wire hook	

For floating roof (FRT)



A0041203

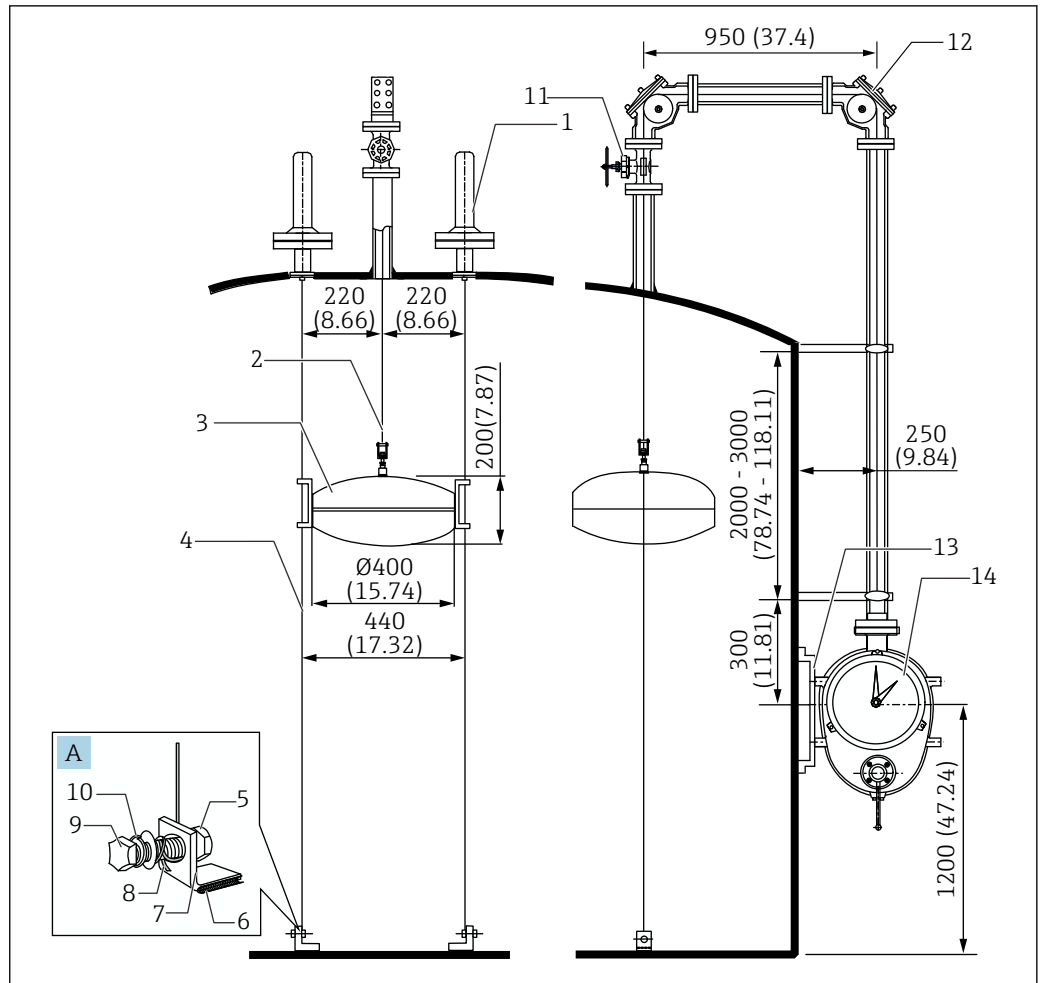
10 Mounting on a floating roof tank. Unit of measurement mm (in)

- A Wire guide metal
- B Top of the float
- C Triangle bracket for measuring wire
- 1 Roof stand
- 2 Wire guide socket
- 3 FRT wire guide metal
- 4 Guide bar: $\phi 16$ mm (0.63 in)
- 5 Stainless steel wire (accessory)
- 6 Pipe end: 1^B Sch 40 to 80
- 7 90° sheave elbow
- 8 Measuring tape
- 9 Gauge supporter
- 10 Gauge head

Target order code (LT5-111A054E000011200000+PAPEPF)

Item	Target	Code	Specification	Quantity
020	Gauge head	1	0.01961 MPa/2.84 psi, aluminum (ADC12)	1
030	Gauge head process connection	11	Rc 1-1/2, union nut, SUS316, screw JIS B0203	
040	Display; cover	A	Dial display: acrylic	
050	Crank unit	0	None	
060	Measurement range	5	20 m	
070	Measuring tape	4	Tape + wire, FRT	
080	Float	E	D400 mm SUS316 wire connection 5.0 kg, $0.65 \leq \text{density} 1.05$, with ring	
090	Top anchor	00	None	
100	Guide wire	0	None	
110	Anchor hook; mounting bolt	0	None	
120	90 ° sheave elbow	112	2x Rp1-1/2, aluminum (ADC6), screw JIS B0203	2
130	135 ° sheave elbow	000	None	-
140	Seal pot	0	None	
150	Gate valve	0	None	
620	>>Enclosed accessories	PA	Gauge supporter SS400 low/medium-pressure gauge head	1
620	>>Enclosed accessories	PE	FRT wire guide metal	
620	>>Enclosed accessories	PF	Wire guide socket, Rc 1-1/2	

Dome roof tank for medium pressure



A0041204

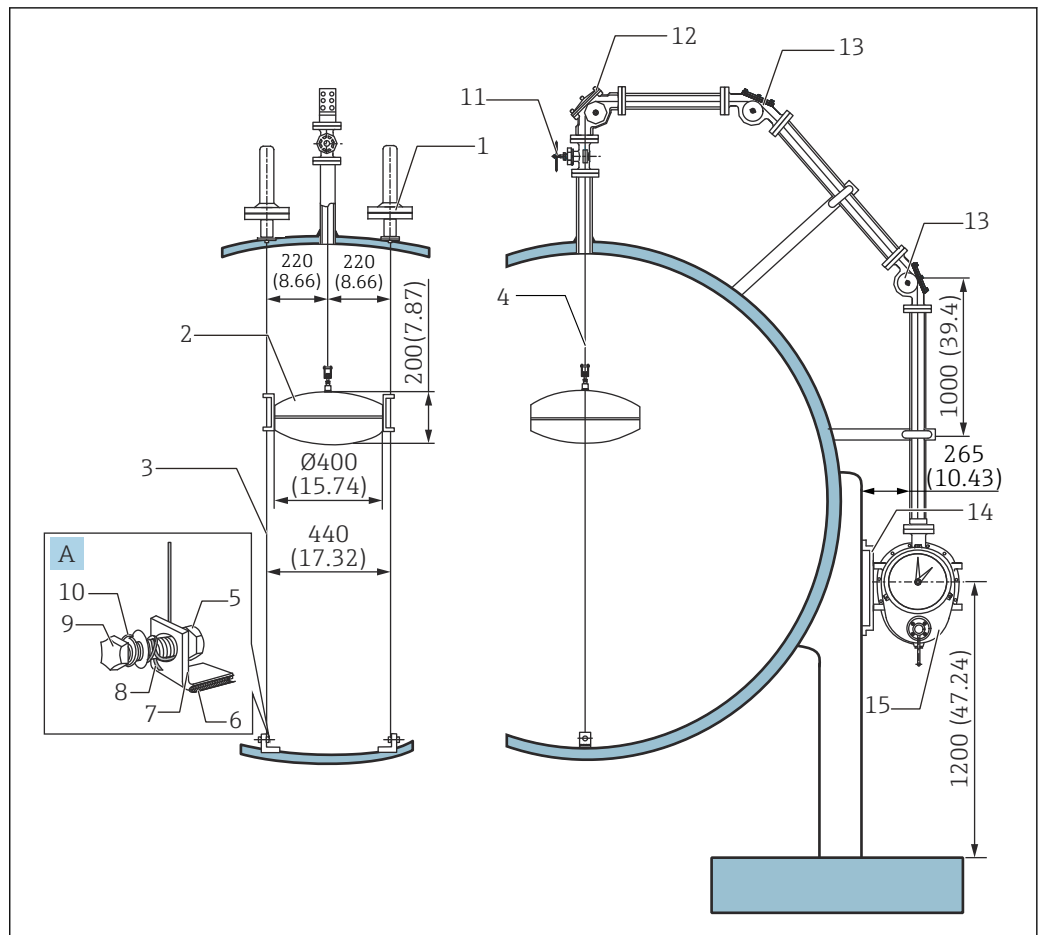
11 Mounting on a dome roof tank for medium pressure. Unit of measurement mm (in)

- A Anchor hook
- 1 Top anchor
- 2 Measuring tape
- 3 Float
- 4 Guide wire
- 5 Stainless steel wire (accessory)
- 6 Nut
- 7 Anchor hook
- 8 Guide wire
- 9 Bolt
- 10 Washer
- 11 Gate valve
- 12 90° sheave elbow
- 13 Gauge supporter
- 14 Gauge head

Example of target order code (LT5-44AB151R4AA24A200001+PA)

Item	Target	Code	Specification	Quantity
020	Gauge head	4	0.09807 MPa/14.22 psi, aluminum (AC4C-T6)	1
030	Gauge head process connection	4A	10K 40A RF, aluminum (AC4C-T6), flange JIS B2220	
040	Display; cover	B	Dial display; glass + iron (SCPL1)	
050	Crank unit	1	Selected	
060	Measurement range	5	20 m	
070	Measuring tape	1	Measuring tape, CRT	
080	Float	R	D400 mm SUS316 wire connection 8.3 kg, 0.5 ≤ density 0.7, with ring	
090	Top anchor	4A	2x 10K 40A RF, aluminum (AC4C-T6), flange JIS B2220	
100	Guide wire	A	Solid wire with a diameter of 3 mm x 2 wires	
110	Anchor hook; mounting bolt	2	SUS316; SUS316	
120	90 ° sheave elbow	4A2	2x 10K 40A RF, aluminum (AC4C-T6), flange JIS B2220	
130	135 ° sheave elbow	000	None	
140	Seal pot	0	None	-
150	Gate valve	1	10K 40A RF, SCS13, flange JIS B2220	
620	>>Enclosed accessories	PA	Gauge supporter SS400 low/medium-pressure gauge head	

Spherical tank for high pressure



A0041205

12 Mounting on a spherical tank for high pressure. Unit of measurement mm (in)

- A Anchor hook
- 1 Top anchor
- 2 Float
- 3 Guide wire
- 4 Measuring tape
- 5 Nut
- 6 Wetted part (welded to the tank)
- 7 Anchor hook
- 8 Guide wire
- 9 Bolt
- 10 Washer
- 11 Gate valve
- 12 90° sheave elbow
- 13 135° sheave elbow
- 14 Gauge supporter
- 15 Gauge head

Example of target order code (LT5-66GB153R6GA26G16G204+PC)

Item	Target	Code	Specification	Quantity
020	Gauge head	6	2.45 MPa/355.25 psi, iron (SCPL1)	1
030	Gauge head process connection	6G	20K 40A RF, iron (SCPL1), flange JIS B2220	
040	Display; cover	B	Dial display; glass + iron (SCPL1)	
050	Crank unit	1	Selected	
060	Measurement range	5	20 m	
070	Measuring tape	3	Measuring tape, seal pot / BT	
080	Float	R	D400 mm SUS316 wire connection 8.3 kg, 0.5 ≤ density 0.7, with ring	
090	Top anchor	6G	2x 20K 40A RF, iron (SCPL1), flange JIS B2220	
100	Guide wire	A	Solid wire with a diameter of 3 mm x 2 wires	
110	Anchor hook; mounting bolt	2	SUS316; SUS316	
120	90 ° sheave elbow	6G1	1x 20K 40A RF, iron (SCPL1), flange JIS B2220	1
130	135 ° sheave elbow	6G2	2x 20K 40A RF, iron (SCPL1), flange JIS B2220	2
140	Seal pot	0	None	-
150	Gate valve	4	20K 40A RF, SCS13, flange JIS B2220	1
620	>>Enclosed accessories	PC	Gauge supporter SS400 high pressure gauge head	

Environment

Permissible temperature	Specifications	Range
	LT5-1	Wetted parts (stainless steel): -200 to 200 °C (-328 to 392 °F) Wetted parts (PVC): -20 to 60 °C (-4 to 140 °F) Main unit: -20 to 70 °C (-4 to 157 °F)
LT5-4/LT5-6	Wetted parts: -45 to 80 °C (-49 to 176 °F) Main unit: -20 to 70 °C (-4 to 157 °F)	

Process

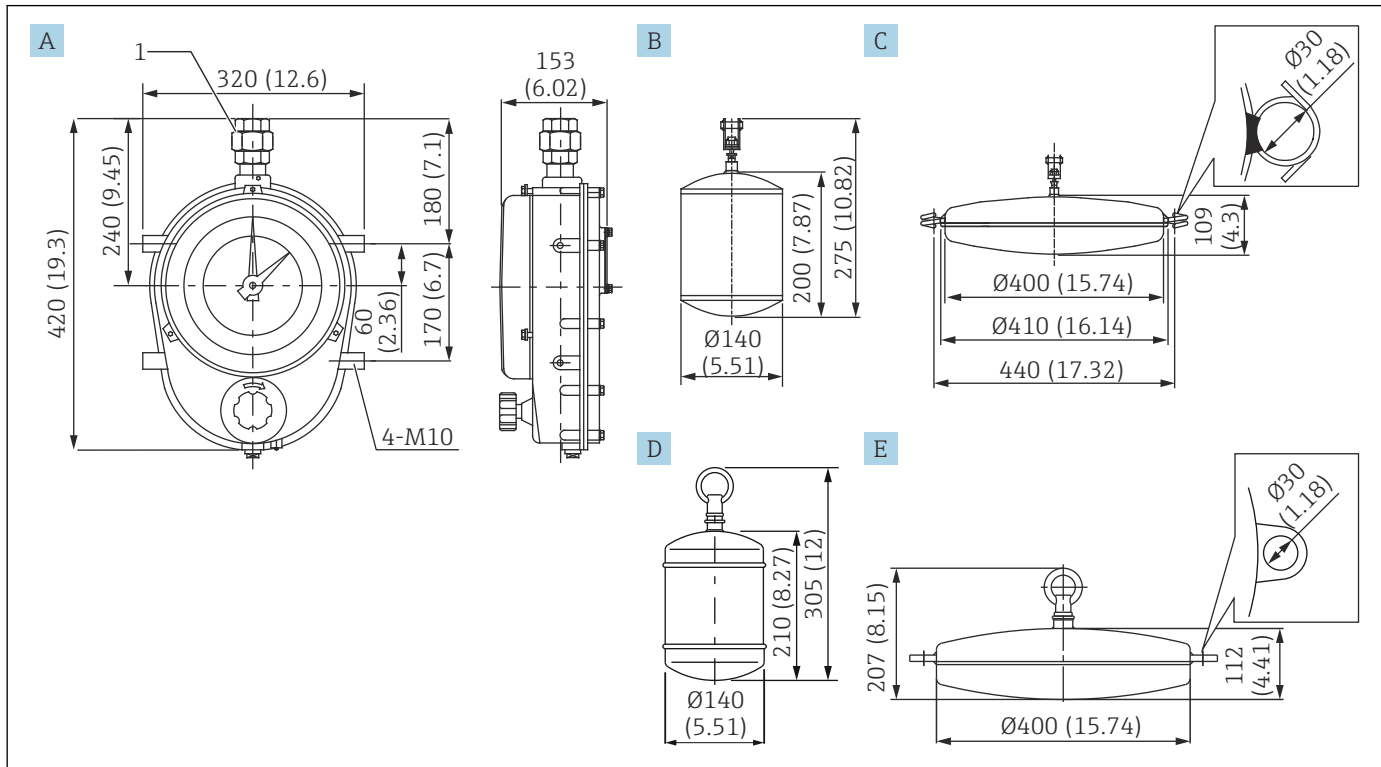
Process pressure range	Specifications	Housing materials	Process pressure range				
	LT5-1 (low pressure)	Aluminum	0.1961 bar/0.01961 MPa/2.84 psi				
LT5-4 (medium pressure)	Aluminum	0.9807 bar/0.09807 MPa/14.22 psi					
LT5-6 (high pressure)	Iron	Standard	Specifications	bar	MPa	psi	
		JIS	10K	9.8	0.98	142.13	
			20K	24.5	2.45	355.33	
		ASME	Cl.150	9.8	0.98	142.13	
			Cl.300	24.5	2.45	355.33	
		JPI	150 lbs	9.8	0.98	142.13	
300 lbs	24.5		2.45	355.33			

Mechanical construction

Dimensions of LT5

Dimensions of common components are used for the installation conditions. For other components, contact your Endress+Hauser Sales Center or distributor.

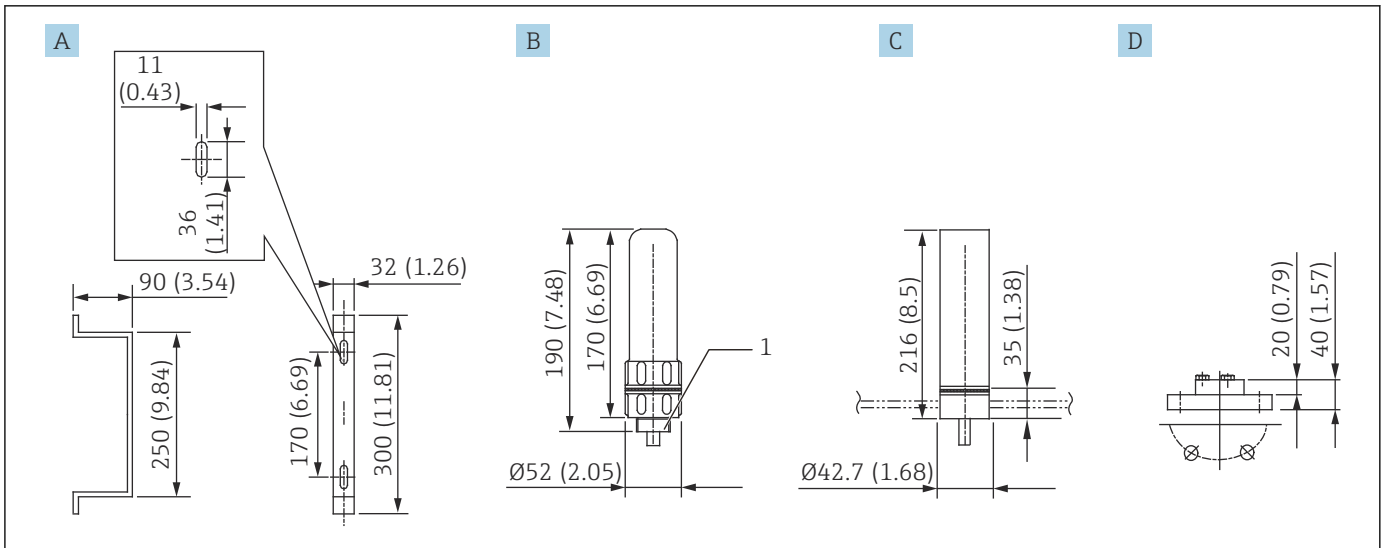
Dimensions of LT5-1 (screw-in type / low-pressure type)



A0041186

13 LT5-1 / float dimensions. Unit of measurement mm (in)

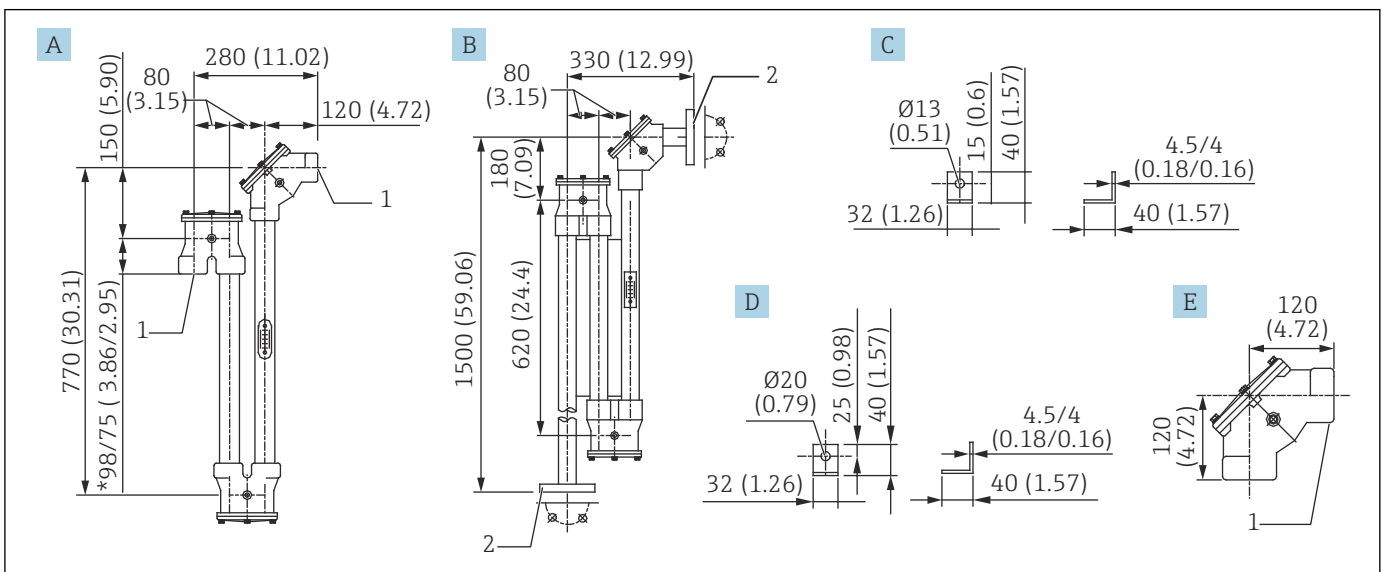
- A Gauge head (ADC12)
- B Float ϕ 140 (SUS316)
- C Float ϕ 400 (SUS316)
- D Float ϕ 140 (PVC)
- E Float ϕ 400 (PVC)
- 1 Union nut (select from JIS Rc 1-1/2 / ANSI NPT 1-1/2; select Rp 1-1/2 if there is no union nut)



A0041188

14 Accessory 1. Unit of measurement mm (in)


- A Gauge supporter (select from iron (SCPL1) / SUS304)
- B Top anchor (ADC6)
- C Top anchor (SUS316 with socket welding type)
- D Top anchor (PVC) (PVC is only available for flange type)
- 1 Select from JIS R1 / ANSI NPT 1



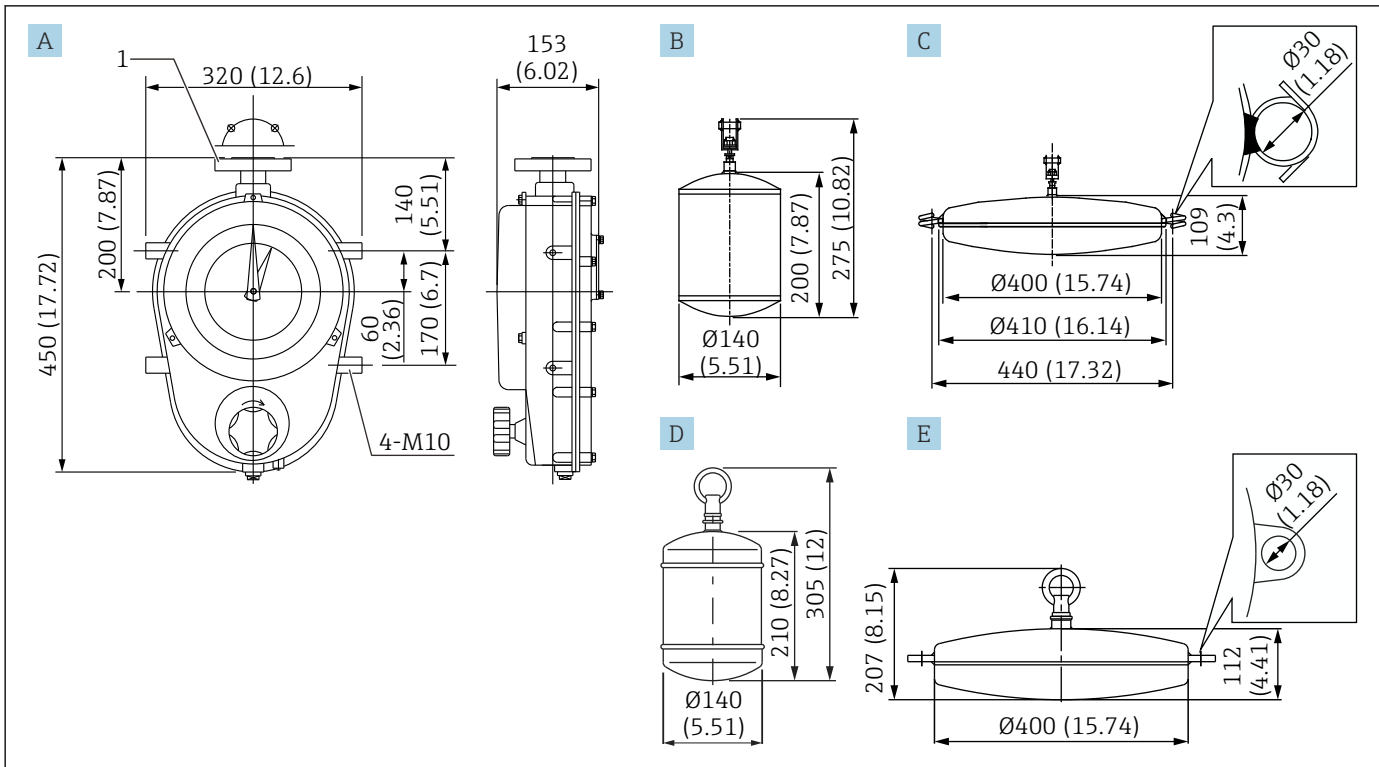
A0041189

15 Accessory 2. Unit of measurement mm (in)

- A Seal pot (select from aluminum / SUS316)
- B Seal pot (PVC) (PVC is only available for flange type)
- C Anchor hook (select from iron (SCPL1) / SUS316)
- D Anchor hook (PVC bolt)
- E 90 ° sheave elbow (select from ADC6 / SCS14)
- 1 Screw-in type (select from Rp 1-1/2 / NPT 1-1/2 as options)
- 2 Flange (select from JIS 10K 40A FF / ASME NPS 1-1/2" CL.150 FF / JPI 40A 150 lbs FF)

 The 75 mm of seal pot 98/75 indicates the dimension for SUS316 specifications.

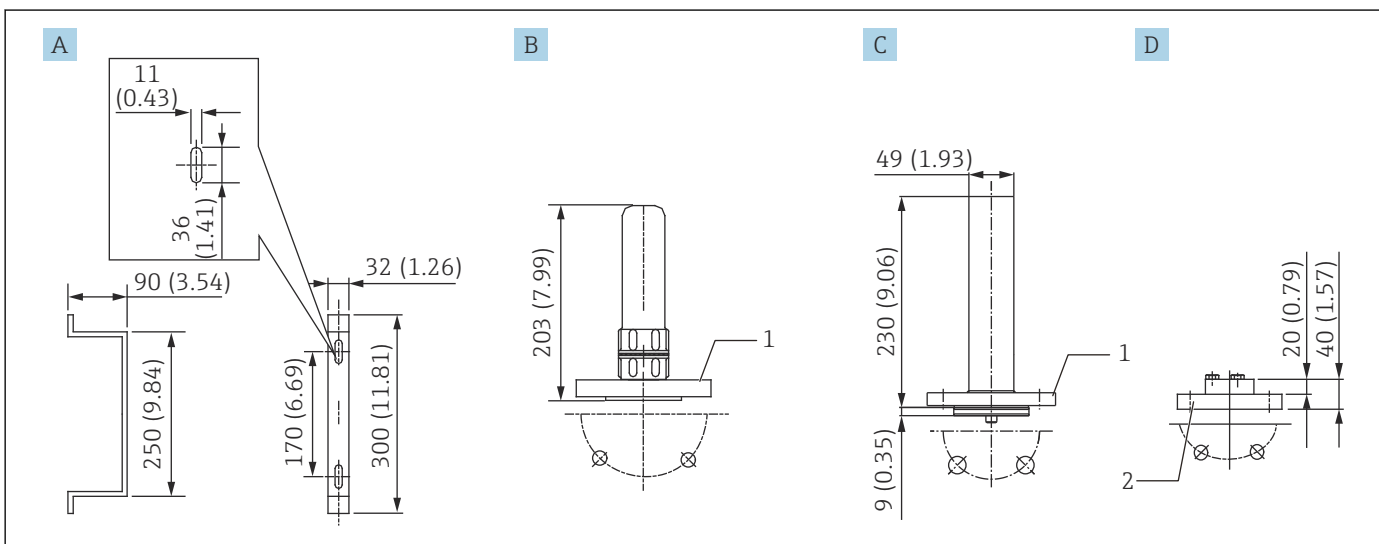
Dimensions of LT5-1 (flange type / low-pressure type)



A0041187

16 Dimensions of LT5-1. Unit of measurement mm (in)

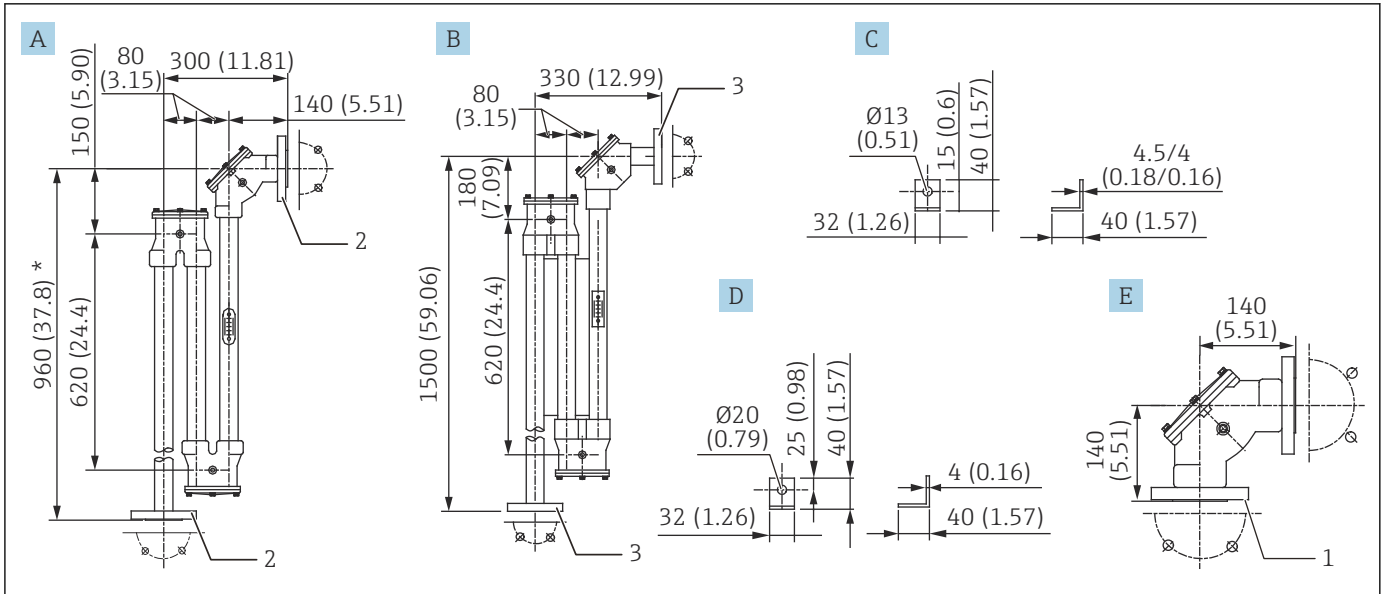
- A Gauge head (ADC12)
- B Float φ140 (SUS316)
- C Float φ400 (SUS316)
- D Float φ140 (PVC)
- E Float φ400 (PVC)
- 1 Flange (select from JIS 10K 40A RF / ASME NPS 1-1/2" Cl.150 RF / JPI 40A 150 lbs RF)



A0041191

17 Accessory 1. Unit of measurement mm (in)

- A Gauge supporter (select from iron (SCPL1) / SUS304)
- B Top anchor (ADC6+AC4A)
- C Top anchor (SUS316)
- D Top anchor (PVC)
- 1 Flange (select from JIS 10K 40A RF / ASME NPS 1-1/2" Cl.150 RF / JPI 40A 150 lbs RF)
- 2 Flange (select from JIS 10K 40A FF / ASME NPS 1-1/2" Cl.150 FF / JPI 40A 150 lbs FF)



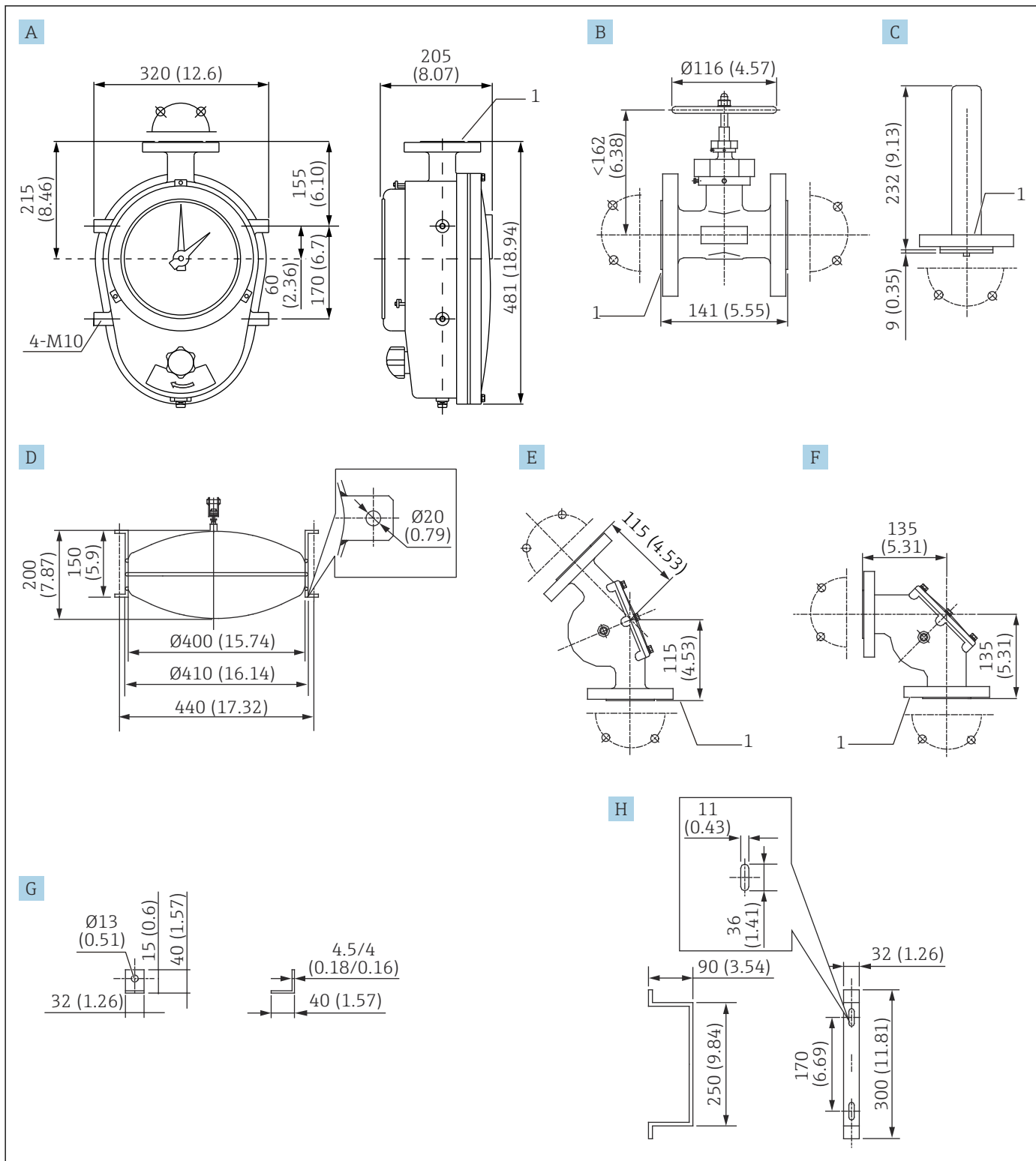
A0041192

18 Accessory 2. Unit of measurement mm (in)

- A Seal pot (select from aluminum + iron (SCPL1) / SCS14+SUS316; see notes below)
- B Seal pot (PVC)
- C Anchor hook (select from iron (SCPL1) / SUS316)
- D Anchor hook (PVC bolt)
- E 90° sheave elbow (select from ADC6+AC4A / 5CS14+SUS316)
- 1 Flange (select from JIS 10K 40A RF / ASME NPS 1-1/2" RF / JPI 40A 150 lbs RF)
- 2 Flange (select from JIS 10K 40A RF / ASME NPS 1-1/2" Cl.150 RF / JPI 40A 150 lbs RF)
- 3 Flange (select from JIS 10K 40A FF / ASME NPS 1-1/2" Cl.150 FF / JPI 40A 150 lbs FF)

- i** ■ Tape only: 960 mm (37.8 in)
- Tape + wire: 1500 mm (59.06 in)

Dimensions of LT5-4 (flange type / medium-pressure type)



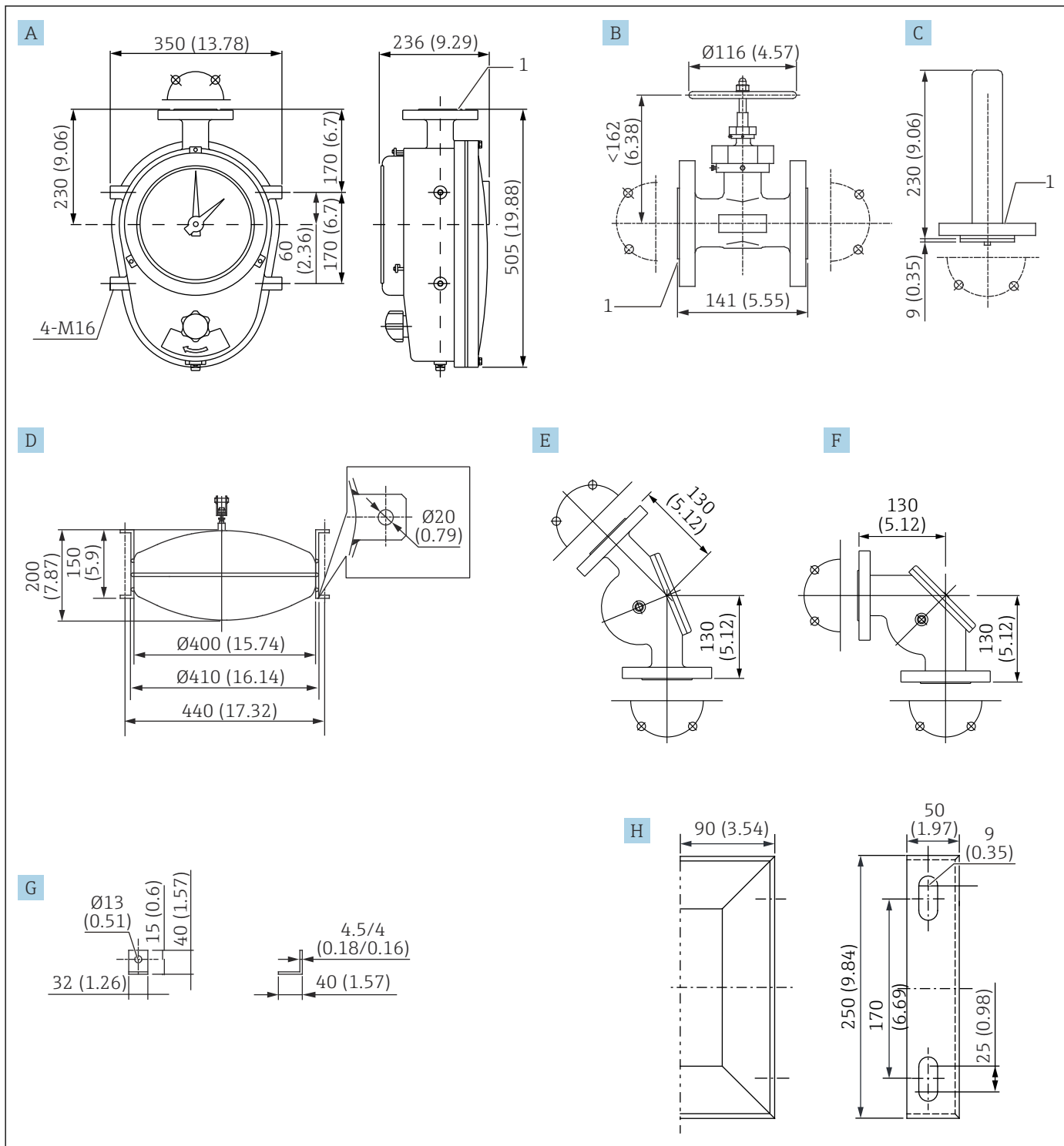
A0041193

19 Dimensions of LT5-4. Unit of measurement mm (in)

- A Gauge head (AC4C-T6)
- B Gate valve (SCS13)
- C Top anchor (AC4C-T6)
- D Float $\phi 400$ (SUS316)
- E 135° sheave elbow (AC4C-T6)
- F 90° sheave elbow (AC4C-T6)

- G* Anchor hook (select from iron (SCPL1) / SUS316)
- H* Gauge supporter (select from iron (SCPL1) / SUS304)
- 1* Flange (select from JIS 10K 40A RF / ASME NPS 1-1/2" Cl.150 RF/ JPI 40A 150 lbs RF)

Dimensions of LT5-6 (flange type / high-pressure type)




A0041194

20 Dimensions of LT5-6. Unit of measurement mm (in)

- A Gauge head (iron (SCPL1))
- B Gate valve (SCS13)
- C Top anchor (select from iron (SCPL1) / SUS316)
- D Float $\text{Ø}400$ (SUS316)
- E 135° sheave elbow (iron (SCPL1))
- F 90° sheave elbow (iron (SCPL1))
- G Anchor hook (select from iron (SCPL1) / SUS316)
- H Gauge supporter (select from iron (SCPL1) / SUS304)
- 1 Flange (select from JIS 10K/20K 40A RF / ASME NPS 1-1/2" CL.150/300 RF / JPI 40A 150/300 lbs. RF)

Process connection		Specifications	Description
LT5-1	Screw-in, low-pressure type		Rp 1-1/2, w/o union nut, screw JIS B0203 Rc 1-1/2, union nut, SUS316, screw JIS B0203 NPT 1-1/2, union nut, SUS316, screw ANSI
LT5-1	Flange, low-pressure type Flange spec. / flange material		10K 40A RF, aluminum (AC4A), flange JIS B2220 10K 40A RF, SUS316, flange JIS B2220 NPS 1-1/2" Cl.150 RF, aluminum (AC4A), flange ASME B16.5 NPS 1-1/2" Cl.150 RF, SUS316, flange ASME B16.5 40A 150 lbs RF, aluminum (AC4A), flange JPI 7S-15 40A 150 lbs RF, SUS316, flange JPI 7S-15
LT5-4	Flange, medium-pressure type Flange spec. / gauge material		10K 40A RF, aluminum (AC4C-T6), flange JIS B2220 NPS 1-1/2" Cl.150 RF, aluminum (AC4C-T6), flange ASME B16.5 40A 150 lbs RF, aluminum (AC4C-T6), flange JPI 7S-15
LT5-6	Flange, high-pressure type Flange spec. / gauge material / bolt material		10K 40A RF, iron (SCPL1), flange JIS B2220 NPS 1-1/2" Cl.150 RF, iron (SCPL1), flange ASME B16.5 40A 150 lbs RF, iron (SCPL1), flange JPI 7S-15 20K 40A RF, iron (SCPL1), flange JIS B2220 NPS 1-1/2" Cl.300 RF, iron (SCPL1), flange ASME B16.5 40A 300 lbs RF, iron (SCPL1), flange JPI 7S-15

Display method Two-pointer dial type / counter type (min. readable scale: 1 mm)

 30 m and 100 ft use the counter method.

Display coupling *Coupling between the internal parts of the gauge head and the indicator*

Specifications		Description
LT5-1	Screw-in / flange, low-pressure type	Coupling: Penetration shaft
LT5-4	Flange, medium-pressure type	Coupling: Pressure bulkhead magnet coupling
LT5-6	Flange, high-pressure type	Coupling: Pressure bulkhead magnet coupling

Float

Specifications	Float (D)	Materials	Weight (W)	Cross-sectional area (S)	Height (h)	Volume (V)	Liquid density (g/cm ³)
Low pressure	400 mm (15.75 in)	SUS316	4 200 g (9.26 lb)	1 257 cm ²	10.9 cm (4.29 in)	10 520 cm ³	0.5 ≤ ρ < 0.65
			5 000 g (11.02 lb)				0.65 ≤ ρ < 1.05
			8 000 g (17.64 lb)				1.05 ≤ ρ ≤ 2.0
		PVC	4 200 g (9.26 lb)	1 257 cm ²	11.2 cm (4.41 in)	10 870 cm ³	0.5 ≤ ρ < 0.65
			5 000 g (11.02 lb)				0.65 ≤ ρ < 1.05
			8 000 g (17.64 lb)				1.05 ≤ ρ ≤ 2.0
	140 mm (5.51 in)	SUS316	2 100 g (4.63 lb)	154 cm ²	20.0 cm (7.87 in)	2 661 cm ³	0.5 ≤ ρ < 0.94
			2 400 g (5.29 lb)				0.94 ≤ ρ ≤ 2.0
		PVC	2 100 g (4.63 lb)	154 cm ²	21.0 cm (8.27 in)	2 946 cm ³	0.5 ≤ ρ < 0.94
2 400 g (5.29 lb)			0.94 ≤ ρ ≤ 2.0				
Medium/high pressure	400 mm (15.75 in)	SUS316	8 300 g (18.3 lb)	1 257 cm ²	20.0 cm (7.87 in)	19 200 cm ³	0.5 ≤ ρ ≤ 0.7

Weight	Specifications		Description
	LT5-1	Screw-in / flange, low-pressure type	Approx. 8 kg
	LT5-4	Flange, medium-pressure type	Approx. 22 kg
	LT5-6	Flange, high-pressure type	Approx. 100 kg

Paint color	<ul style="list-style-type: none"> ■ Gauge head: Blue ■ Other parts: Silver
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List of material specifications *Aluminum*

Code	Description
ADC12	Aluminum die-casting alloy (Si-Si-Cu)
AC4C-T6	Aluminum alloy cast metal (Si7Mg)
AC4A	Aluminum alloy cast metal (Si10Mg)

Stainless steel

Code	Description
SUS304	Stainless steel (18Cr-8Ni)
SUS316	Stainless steel (18Cr-12Ni-2.5Mo)
SCS13	Cast stainless steel equivalent to SUS304
SCS14	Cast stainless steel equivalent to SUS316

Others

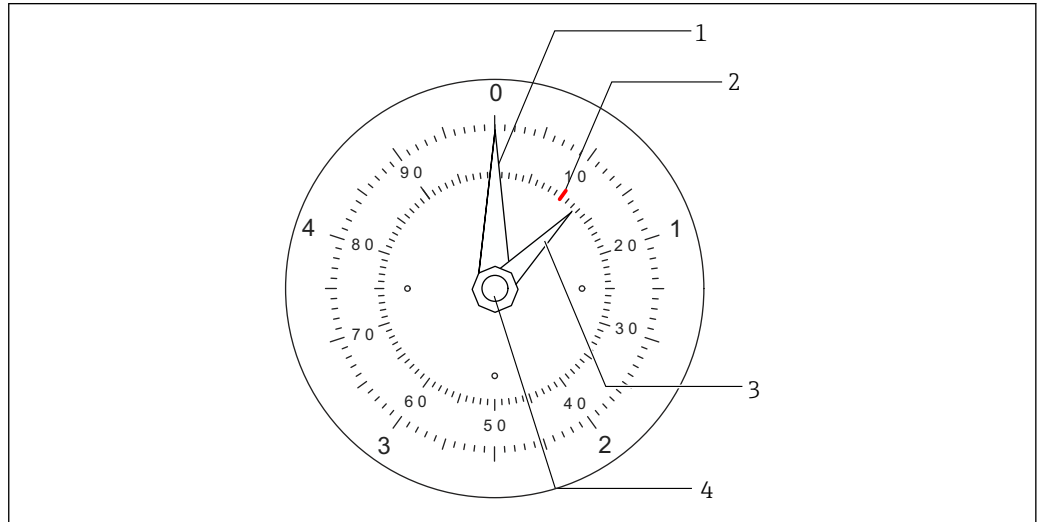
Code	Description
SCPL1	Cast carbon steel
SGP (white gas pipe)	Carbon steel pipe
PVC	Polyvinyl chloride

Operability

Display

There are two types of LT displays: a two-pointer dial type and a counter type. Select the dial display when the tank height is 20 m or 60 ft or lower. For taller tanks, select the counter display.

Dial display

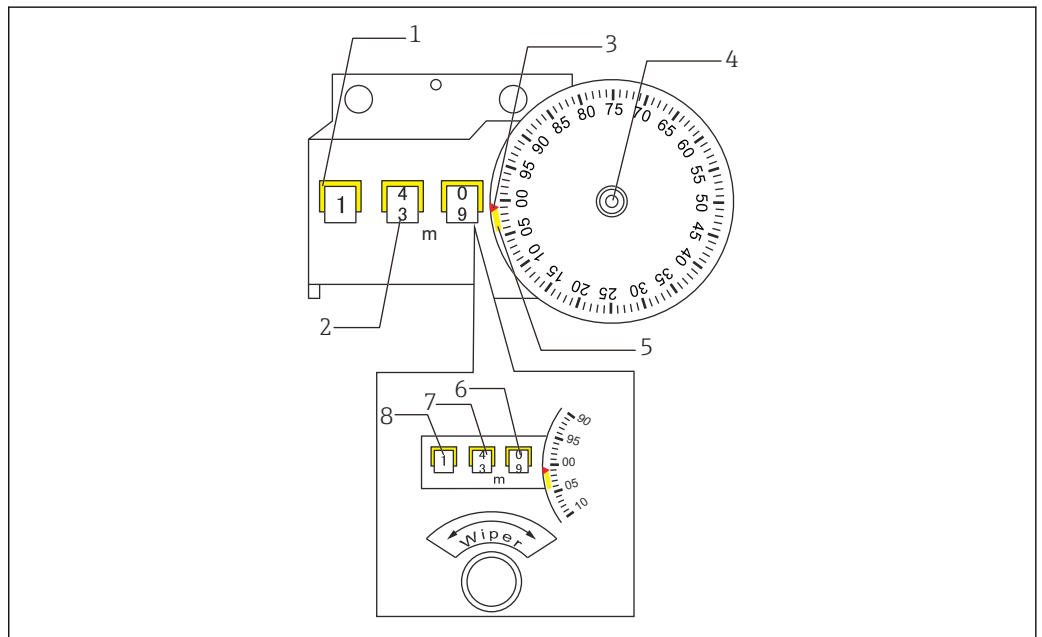


A0041231

21 Dial display (scale plate for 5 m (16.4 ft))

- 1 Long pointer (white)
- 2 Example: 10 mm position
- 3 Short pointer (green)
- 4 Cap nut

Counter display



A0041232

22 Counter display

- 1 Counter (yellow)
- 2 Counter (black)
- 3 Pointer (red)
- 4 Thread
- 5 Range (yellow)
- 6 No. 1 drum
- 7 No. 2 drum
- 8 No. 3 drum

Certificates and approvals

Protection class

Waterproof: IP65

Order information

Detailed ordering information is available from the following sources:

- In the Product Configurator on the Endress+Hauser website: www.endress.com -> Click "Corporate" -> Select your country -> Click "Products" -> Select the product using the filters and search field -> Open product page -> The "Configure" button to the right of the product image opens the Product Configurator.
- From your nearest Endress+Hauser sales organization: www.addresses.endress.com



Product Configurator - the tool for individual product configuration

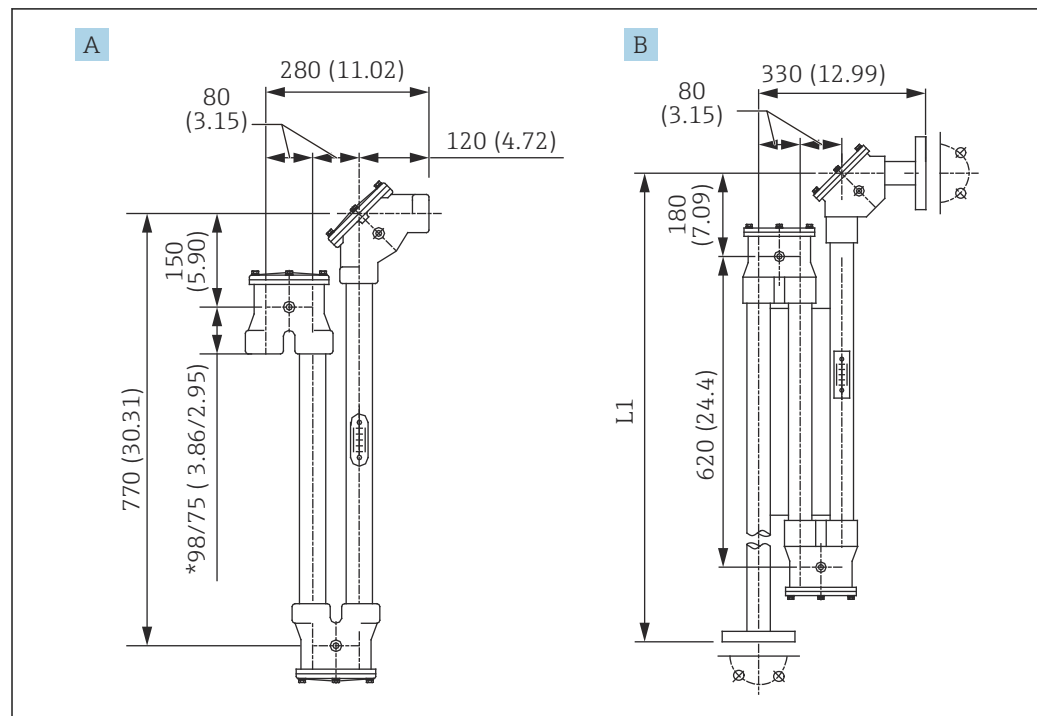
- Up-to-the-minute configuration data
- Depending on the device: Direct input of measuring point-specific information such as measuring range or operating language
- Automatic verification of exclusion criteria
- Automatic creation of the order code and its breakdown in PDF or Excel output format
- Ability to order directly in the Endress+Hauser Online Shop

Accessories

Seal pot

A seal pot is filled with liquid sealant to prevent vapor from escaping the tank.

Liquid sealant	Liquid paraffin (spindle oil): 1 150 cc
Maximum sealing pressure	400 mm H ₂ O
Shape	U-shaped
Connection specification	Screw-in type / flange type
Materials	AC4A+SGP galvanized pipe / SUS316 / PVC



A0041259

23 Seal pot. Unit of measurement mm (in)

A Seal pot (SUS316/SGP/AC4A)

B Seal pot (PVC)

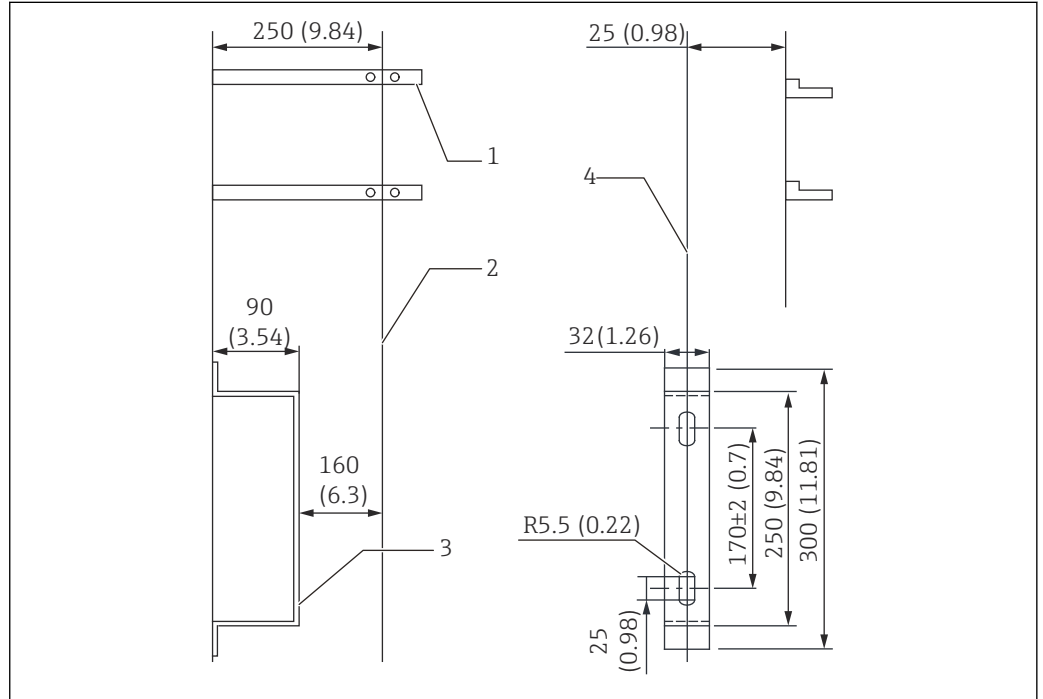
L1 Tape + wire: 1 500 mm (59.06 in) / tape only: 960 mm (37.8 in)

i The 75 mm (2.95 in) of seal pot 98/75 indicates the dimension for SUS316.

Gauge supporter

A gauge supporter is used for installation on the outer tank wall. Note that pipe supporters are not supplied.

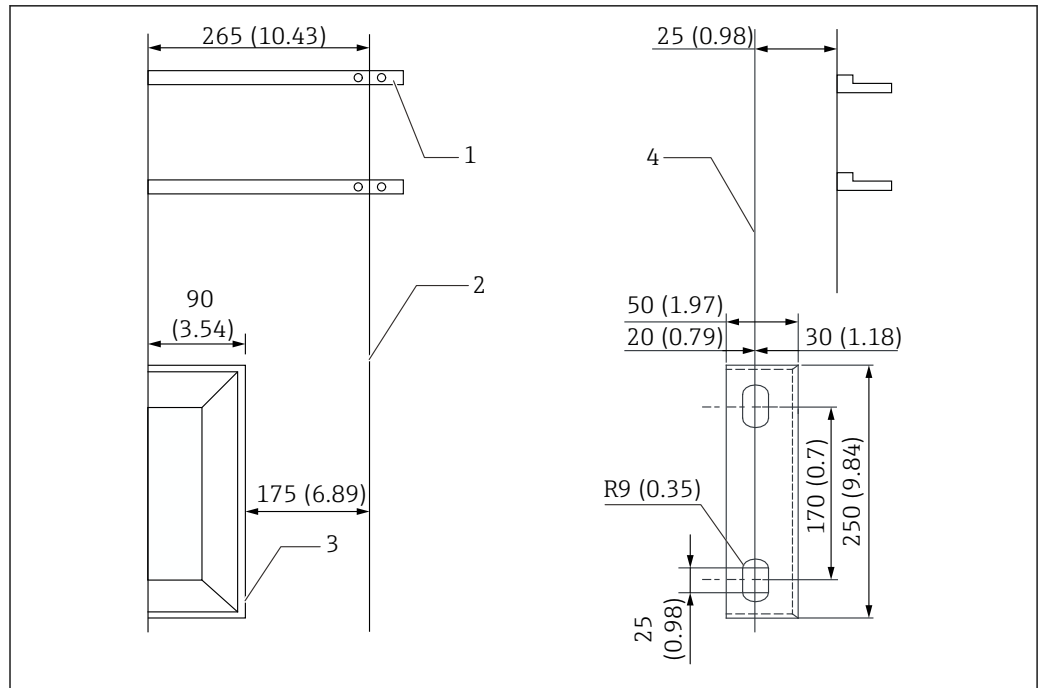
i The distance from the outer tank wall to the gauge head center is 15 mm (0.59 in) longer for LT5-6 (high-pressure gauge head) compared to LT5-1 (low-pressure gauge head) and LT5-4 (medium-pressure gauge head).



A0041179

24 Gauge supporter (for low and medium pressure). Unit of measurement mm (in)

- 1 Pipe supporter (not supplied)
- 2 Center line for installation
- 3 Gauge supporter (depending on the selected option, SS400: t = 4.5 / SUS304: t = 4.0) with mounting bolts
- 4 Center line of the gauge supporter



A0041180

25 Gauge supporter (for high pressure). Unit of measurement mm (in)

- 1 Pipe supporter (not supplied)
- 2 Center line for installation
- 3 Gauge supporter (depending on the selected option, SS400: $t = 4.0$ / SUS304: $t = 4.0$) with mounting bolts
- 4 Center line of the gauge supporter

Guide pipe

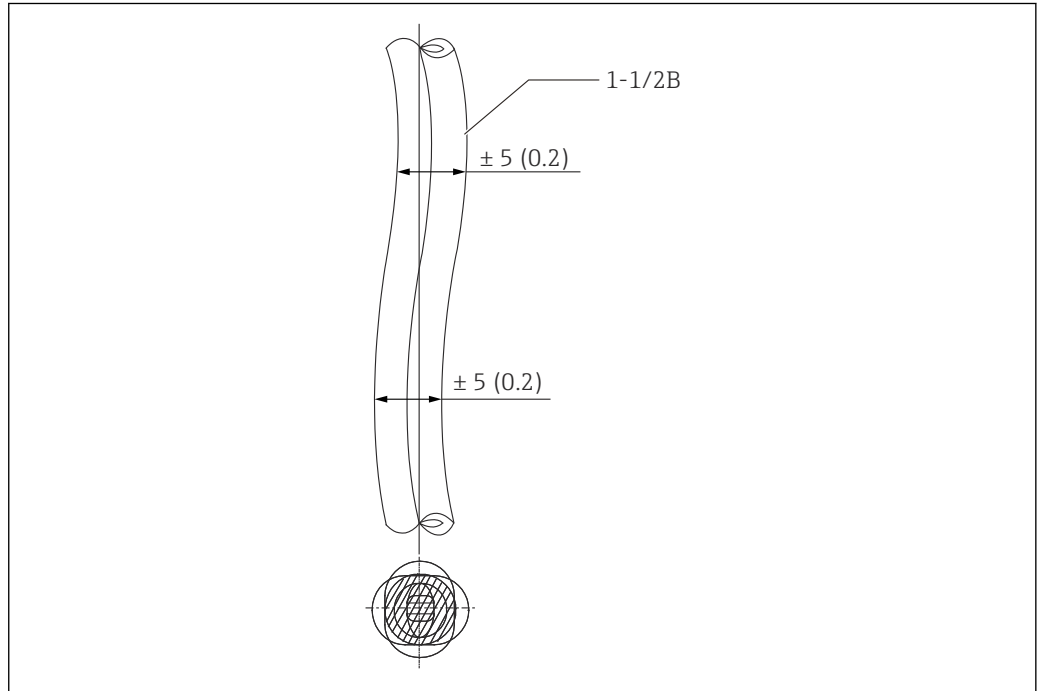
Selection and installation of guide pipe

Guide pipe installation is required for most applications, except for tank top and underground applications. Guide pipes are generally used in three areas:

- Gauge head to sheave elbow
- Sheave elbow to sheave elbow
- Sheave elbow to tank roof

Precautions regarding installation

- Guide pipes and pipe supporters are not supplied by Endress+Hauser.
- Keep the bend in guide pipe to 5 mm (0.17 in) or less.
- The space between two sheave elbows (piping distance) must not exceed 2.5 m (8.2 ft).



26 Guide pipe installation. Unit of measurement mm (in)


A0041181

NOTICE

Recommended materials for guide pipes

- ▶ Always use galvanized carbon steel pipes (white gas pipe) for guide pipes. When the application involves use of a corrosive gas, use of rigid PVC pipes, stainless steel pipes, or resin inner lining is recommended.

Mounting and enclosed accessories*Ordering information: 610 mounting accessories*

NA	Copper-free gear	If copper materials are used in the gear mechanism for whatever reason, the material is switched to something else, such as aluminum or stainless steel. The magnet coupling and drain plug sealant will be changed from NBR to CR. It is effective for applications such as those involving ammonia.  As a general rule, copper materials cannot be used for the gear mechanism.
NB	Custody transfer seal	This is an option in which a hole is created on the rear cover of the main unit and the bolt for the display cover. Subsequent to bonded approval, a displacer wire for sealing may be inserted.
NC	Fixed tape guide	This is an option for securing the tape inside so that it does not become detached. It is useful for applications in which hunting may occur with the float. It comes with LT5-4 and LT5-6 as a standard item.
ND	Dust cover	This is an internal component that prevents dust, which is generated when iron pipes are used, from entering the gear inside the gauge head. It comes with LT5-4 and LT5-6 as a standard item.
NE	Conster winding drum, aluminum	This is a conster winding drum made of aluminum. It is effective when a standard conster winding drum made of Bakelite cannot be used. An aluminum conster winding drum is standard for LT5-4 and LT5-6.


Ordering information: 620 enclosed accessories

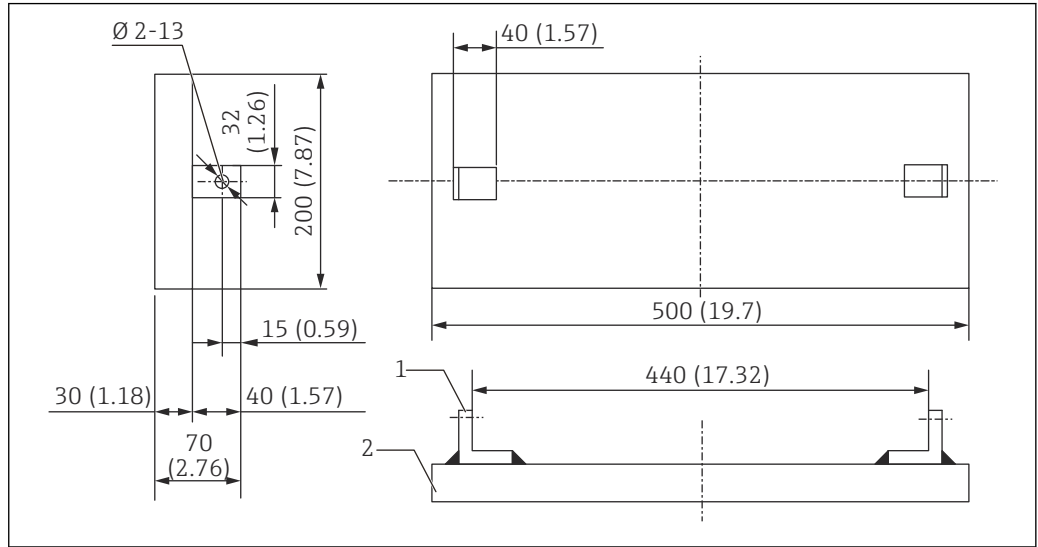
PE	FRT wire guide metal	This wire guide is installed on the floating roof. It protects the measuring wire from wear due to contact with the roof.
PF	Wire guide socket Rc 1-1/2	This is a socket for mounting on the pipes of a floating roof tank or a gas holder tank. It protects the measuring wire from wear due to contact with the pipes.
PG	Wire guide socket NPT 1-1/2	
PH	Gas holder wire hook	This hook is welded onto a gas holder tank and connected to a measuring wire.

Anchor weight

When an anchor hook cannot be installed at the bottom of the tank (such as when there is liquid inside the tank), use an anchor weight to keep the guide wire taut.

Materials	SS400/SUS316
Weight	Approx 23 kg (50.71 lb)

 Special specification is required in order to use this anchor weight.

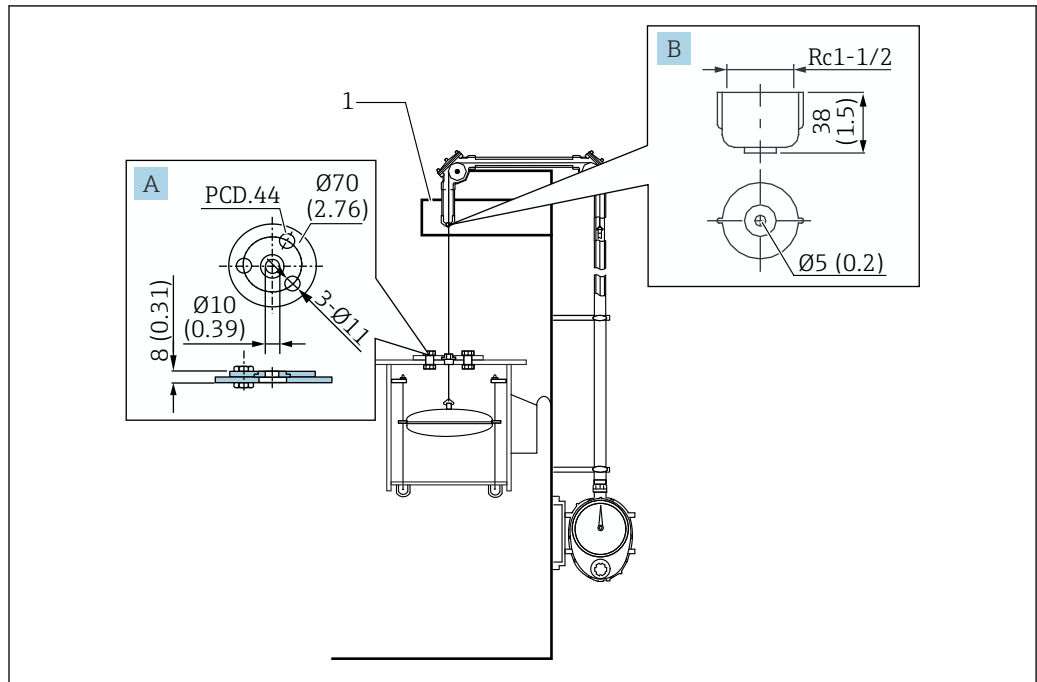


A0041260

 27 Anchor weight. Unit of measurement mm (in)

- 1 Anchor hook
- 2 Anchor weight

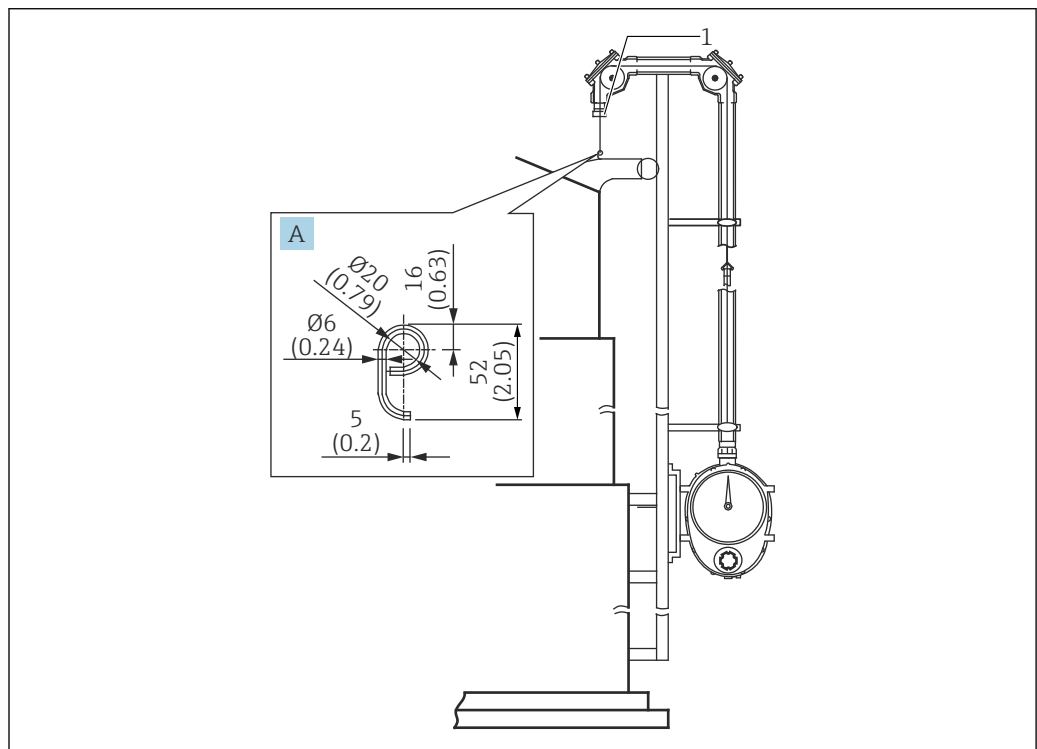
Wire guide metal and wire guide socket



A0041261

28 Wire guide metal and wire guide socket. Unit of measurement mm (in)

- A Wire guide metal
- B Wire guide socket
- 1 Roof stand



A0041262

29 Wire hook and wire guide socket. Unit of measurement mm (in)

- A Wire hook
- 1 Wire guide socket



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