

Technical Information

Float gauge LT5

Mechanical tank gauge for accurate and reliable level measurement



Application

LT5 float gauges have been developed for use in all types of industry. Many years of operation of LT11/12/14/16 in a wide variety of applications has proven their reliability.

Major applications

1. Petroleum products, such as crude oil, kerosene, light oil and heavy oil
2. Cooking oil, such as vegetable oil, palm oil, seed oil and animal oil
3. Highly viscous fluid, such as liquid asphalt
4. Chemical products (for corrosive products and toxic vapors a liquid seal pot can be used to achieve airtightness)
5. Measurement of liquid gases contained in spherical tanks

Features and benefits

1. No electrical power is required to perform the measurements.
2. Reproducibility can be checked with a check handle.
3. Direct tank side reading allows tank contents to be checked quickly and easily.
4. It can be installed on a wide variety of tanks, including fixed roof, floating roof, covered floating roof and spherical tanks.
5. It can also be used in conjunction with analog/digital transmitters to perform tank inventory management.





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About this document

Symbols






Safety symbols

Symbol	Meaning
	DANGER! This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury, as well as a risk of fire or explosion.
	WARNING! This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in a risk of serious or fatal injury, fire or explosion.
	Note This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in a risk of minor or moderate injury and damages to property.
	NOTE! This symbol contains information on procedures and other facts that do not result in personal injury.
















Electrical symbols

Symbol	Meaning
	Direct current
	Alternating current
	Direct current and alternating current
	Ground connection A grounded terminal that, as far as the operator is concerned, is grounded via a grounding system
	Protective ground connection A terminal that must be connected to the ground prior to establishing any other connections
	Equipotential connection This connects with the grounding system at the plant. It includes equipotential line and single-point ground systems, depending on the norms of each country or company.




Tool symbols

Symbol	Meaning
 A0013442	Torx screwdriver
 A0011220	Flat-blade screwdriver
 A0011219	Phillips screwdriver
 A0011221	Allen key
 A0011222	Hexagonal wrench



Symbols for certain types of information

Symbol	Meaning
	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 page
	Reference to graphic
	Notice or individual step to be noted
	Series of steps
	Result of operation or commissioning
	Help in the event of a problem
	Visual inspection
	Operation via local display
	Operation via operating tool
	Write-protected parameter

Symbols in graphics

Symbol	Meaning
1, 2, 3 ...	Item numbers
	Series of steps
A, B, C, ...	Graphics
A-A, B-B, C-C, ...	Cross-sections
	Hazardous area Indicates a hazardous area
	Safe area (non-hazardous area) Indicates a non-hazardous area

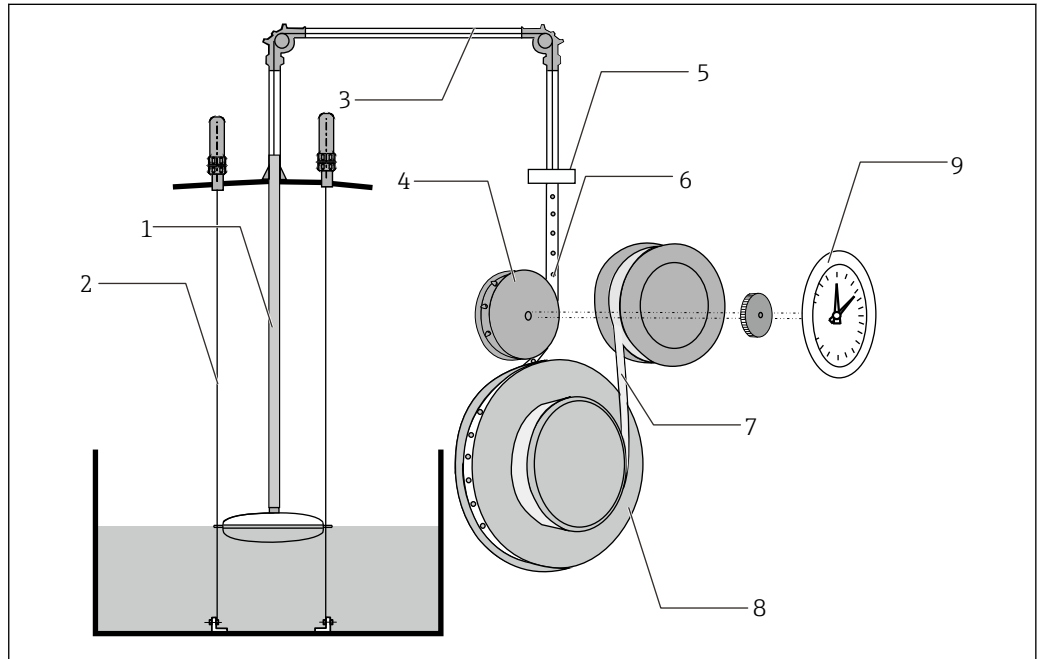
Device symbol

Symbol	Meaning
	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.

Function and system design

Operating principle

The liquid level measured by the float is transmitted to the gauge head through the measuring tape. A change in liquid level is converted to the rotational angle of the sprocket. The measuring tape has small holes at equal intervals, and it operates the gear mechanism in an extremely precise manner to indicate the liquid level. Afterwards, the measuring tape is wound by the tape drum. A conster is directly linked to the tape drum, and it applies steady 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 principle

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

Combining with an analog transmitter

AT1

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

 Refer to AT1 technical information for details.

Combining with a digital transmitter

TMD1

- 2 wire bi-serial pulse (V1 protocol) output
- 4 to 20 mA output
- Max. 8 points alarm signal output

 Refer to TMD1 technical information for details.

Input/Output

Measuring range	Spec.	Range
	LT5	0 to 2.5, 5, 10, 16, 20, 30 m 0 to 60 ft, 100 ft

Accuracy	Spec.	Range
	φ400 mm float	± 2 mm (0.08 in) (density limit 1 g/cm ³ measuring range 10 m (32.80 ft))
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

The lengths of the measuring tape and wire are longer (extra length) than the actual measurement length and vary depending on each option. The following tables show the actual lengths according to options in 060 for each option of specification 070. However, note that the maximum length that can be displayed on the display of the LT5 gauge head simply corresponds to the measurement range. See 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

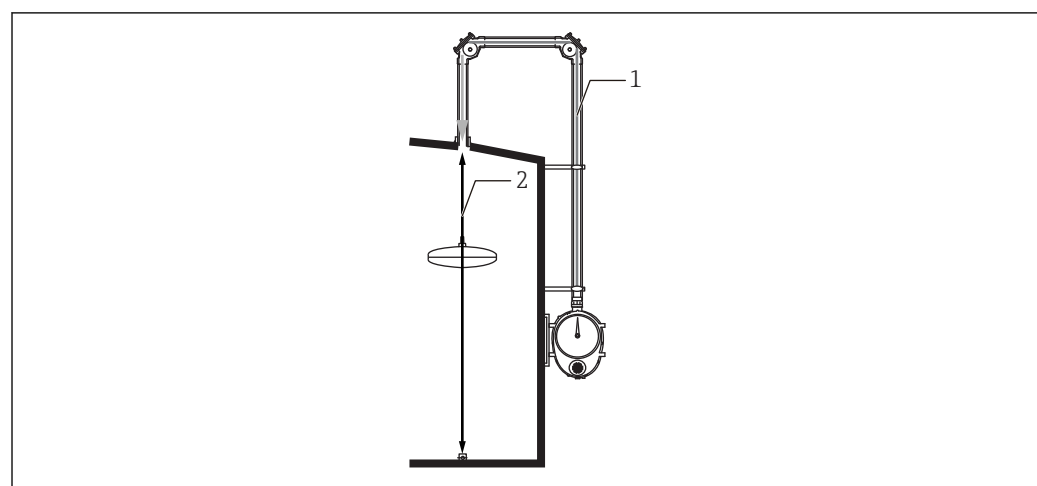
060 measurement range		Length (total length)	Perforated tape (measurement length)	Non-perforated tape	Spare parts
1	2.5 m	24 m	7 m	17 m	Contact Endress+Hauser
2	5 m	24 m	7 m	17 m	Contact Endress+Hauser
3	10 m	35 m	12 m	23 m	Contact Endress+Hauser
4	16 m	55 m	22 m	33 m	Contact Endress+Hauser
5	20 m	55 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 above diagram, the maximum measurement distance is 22 m and the maximum clearance is 23 m. Because of this, the total length of the measuring tape is 45 m.

List of sealing materials Wetting liquid and gas parts

Products	Units	Parts name	Name of sealing parts	Packing materials / o-ring
LT5-1	Gauge head	Rear cover	Rear packing	V#6502
		Check shaft	O-ring	FKM
		Sprocket shaft	Oil seal	FKM
		Blind board	Packing	NBR
	90 ° sheave elbow	Aluminum sheave elbow	Rear packing	V#6502
		Stainless steel sheave elbow		
		Bearing	O-ring	Silicon rubber
	Liquid seal unit	Aluminum sheave elbow	Rear packing	V#6502
			Bearing o-ring	Silicon rubber
		Stainless steel sheave elbow	Rear packing	V#6502
			Bearing o-ring	Silicon rubber
		PVC sheave elbow	Rear packing	V#6502
			Bearing o-ring	PTFE
	Top anchor	Aluminum threaded type	Rear packing	V#6502
		Stainless tank welding type		
	Top anchor	Aluminum flange threaded type	Spring holder packing	V#6502
Stainless flange welding type				
LT5-4/LT5-6	Gauge head	Rear cover	Rear packing	PTFE
		Check handle part	Gland packing	PTFE/CR
		Internal magnet cover	O-ring	PTFE
		External magnet cover	O-ring	NBR (*when selecting copper-free type, the material of o-ring is CR.)
		Coupling	O-ring	PTFE
	Gate valve	Shaft	Shaft packing	PTFE
		Cap nut	Packing	PTFE
LT5-4	90° sheave elbow	Cover	Rear packing	PTFE
		Bearing	O-ring	PTFE
	135° sheave elbow	Cover	Rear packing	PTFE
		Bearing	O-ring	PTFE
	Top anchor	Aluminum flange integrated type	Spring holder packing	PTFE
		Stainless flange welding type		
LT5-6	90° sheave elbow	Cover	Rear packing	PTFE
		Bearing	O-ring	PTFE
	135° sheave elbow	Cover	Rear packing	PTFE
		Bearing	O-ring	PTFE
	Top anchor	Rolled steel flange welding type	Spring holder packing	PTFE
		Stainless flange welding type		

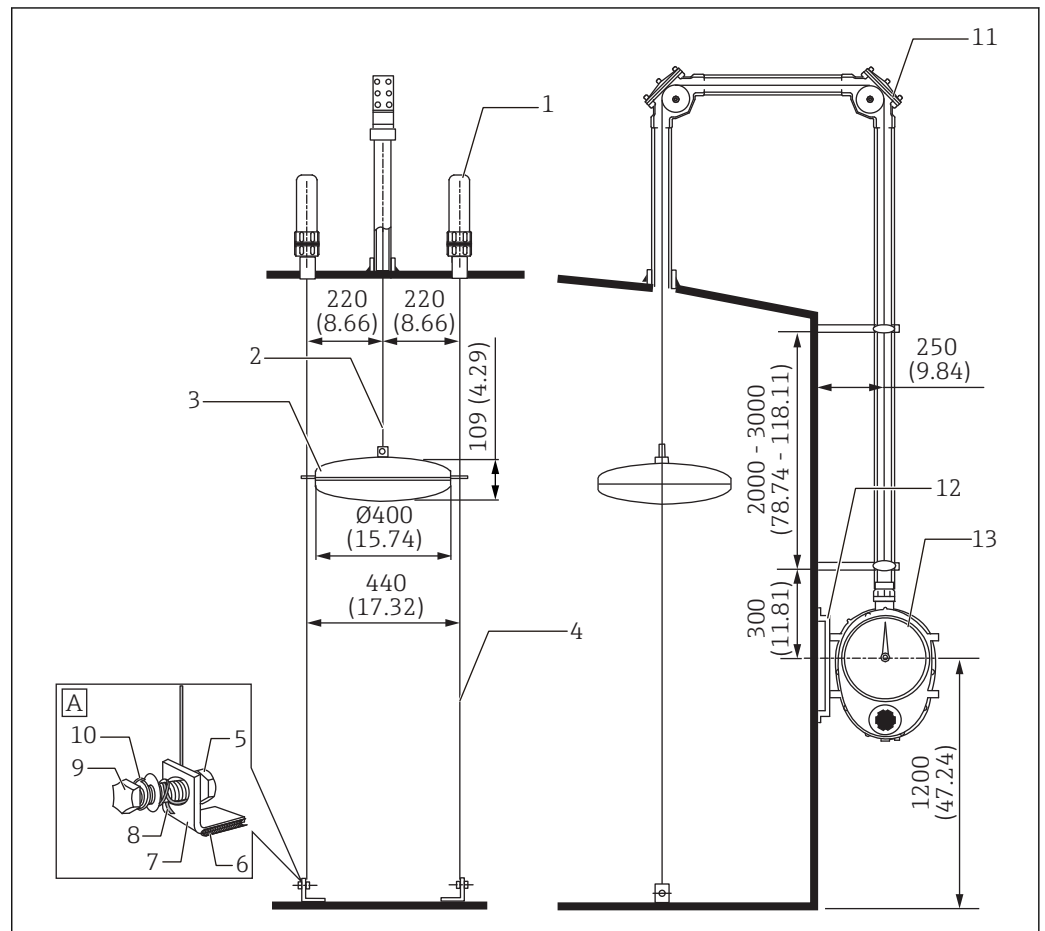
Inspection certificate

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

- Iron high-pressure gauge head (the flange is the same, as it is integrated with the main body), cover, magnet cover, check shaft (with no hoisting), plug
- Stainless steel measuring tape and wire (excluding PFA-coated wire)
- Stainless steel float
- Stainless steel or iron high-pressure top anchor main body, cover, flange
- Stainless steel guide wire (excluding PFA-coated wire)
- Stainless steel anchor hook
- Iron high-pressure sheave elbow main body (the flange is the same, as it is integrated with the sheave elbow main body), cover
- Stainless steel gate valve

General view of standard specifications and order codes

Cone roof tank (CRT)



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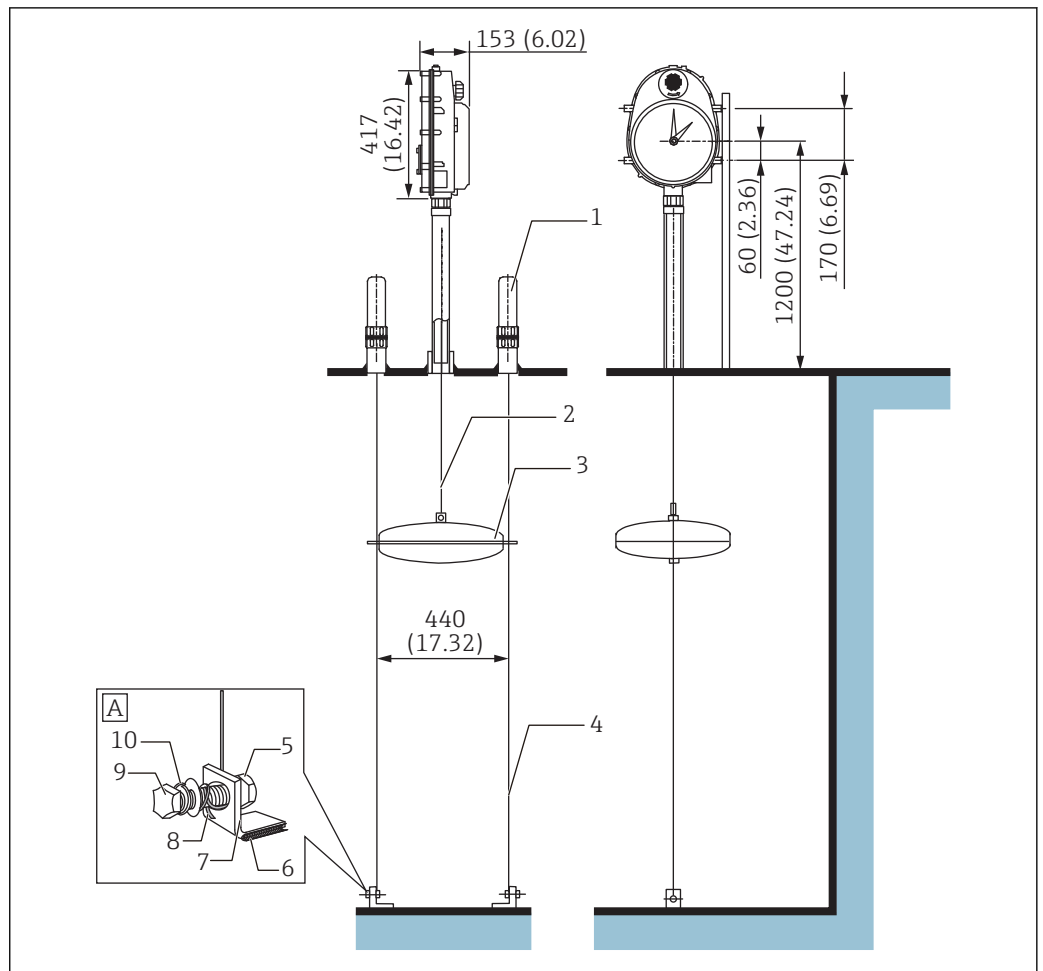
3 Installation on a cone roof tank (CRT). Unit of measurement mm (in)

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

Order code (LT5-111A031B11A111200000+PA)

Items	Purpose	Code	Spec.	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, thread JISB0203	
040	Display; cover	A	Dial display: acrylic	
050	Crank unit	0	None	
060	Measuring range	3	10 m	
070	Measuring tape	1	Measuring tape, CRT	
080	Float	B	D 400 mm SUS316 tape connection 5.0 kg, 0.65 ≤ density 1.05, with ring	
090	Top anchor	11	2x R1, aluminum (ADC6), thread JIS B0203	
100	Guide wires	A	Diameter 3 mm single wire x 2	
110	Anchor hook; installation bolt	1	Iron; SUS316	
120	90 ° sheave elbow	112	2x Rp1-1/2, aluminum (ADC6), thread 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-pressure/medium-pressure gauge head	1

Installation at tank top for underground tank



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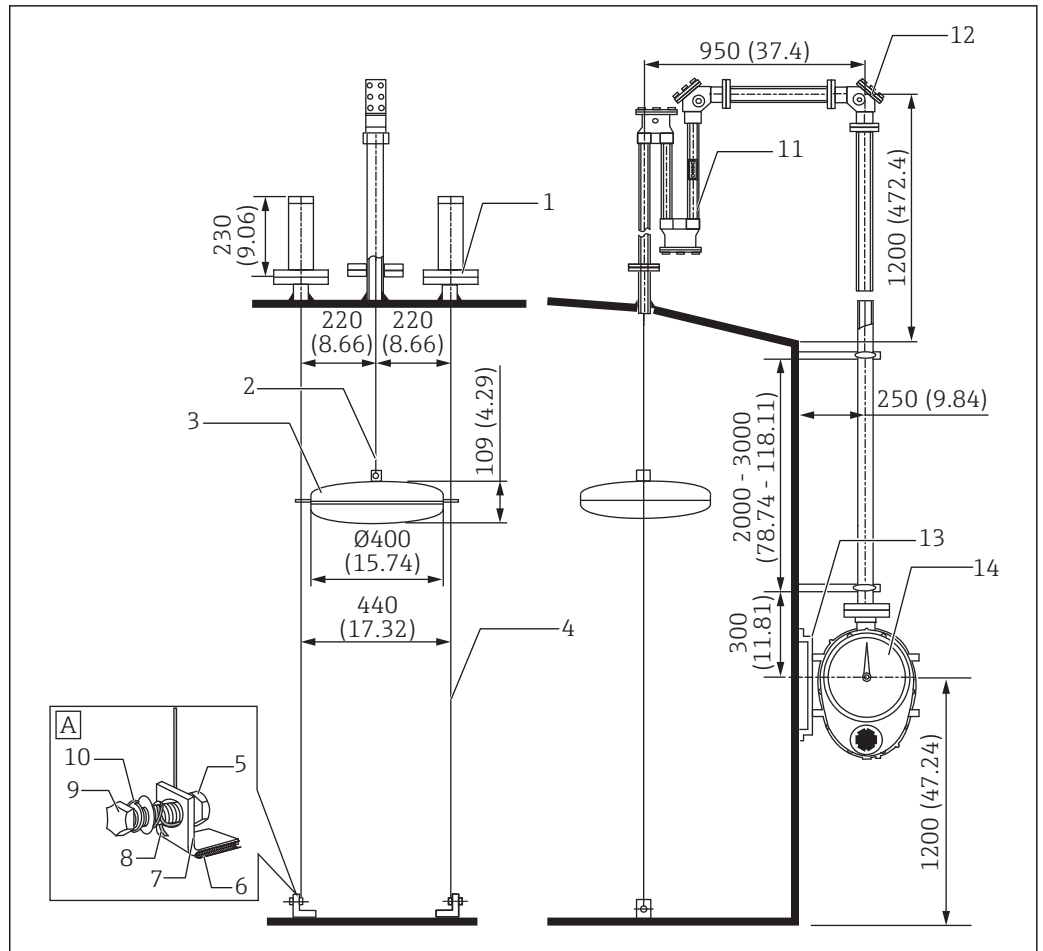
4 Installation for underground tank, unit. Unit of measurement mm (in)

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

Order code (LT5-111C022B11A100000000)

Items	Purpose	Code	Spec.	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, thread JISB0203	
040	Display; cover	C	Reverse installation, dial display, acrylic	
050	Crank unit	0	None	
060	Measuring range	2	5 m	
070	Measuring tape	2	Measuring tape, tank top installation	
080	Float	B	D 400 mm SUS316 tape connection 5.0 kg, $0.65 \leq \text{density} 1.05$, with ring	
090	Top anchor	11	2x R1, aluminum (ADC6), thread JIS B0203	
100	Guide wires	A	Diameter 3 mm single wire x 2	
110	Anchor hook; installation bolt	1	Iron; 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



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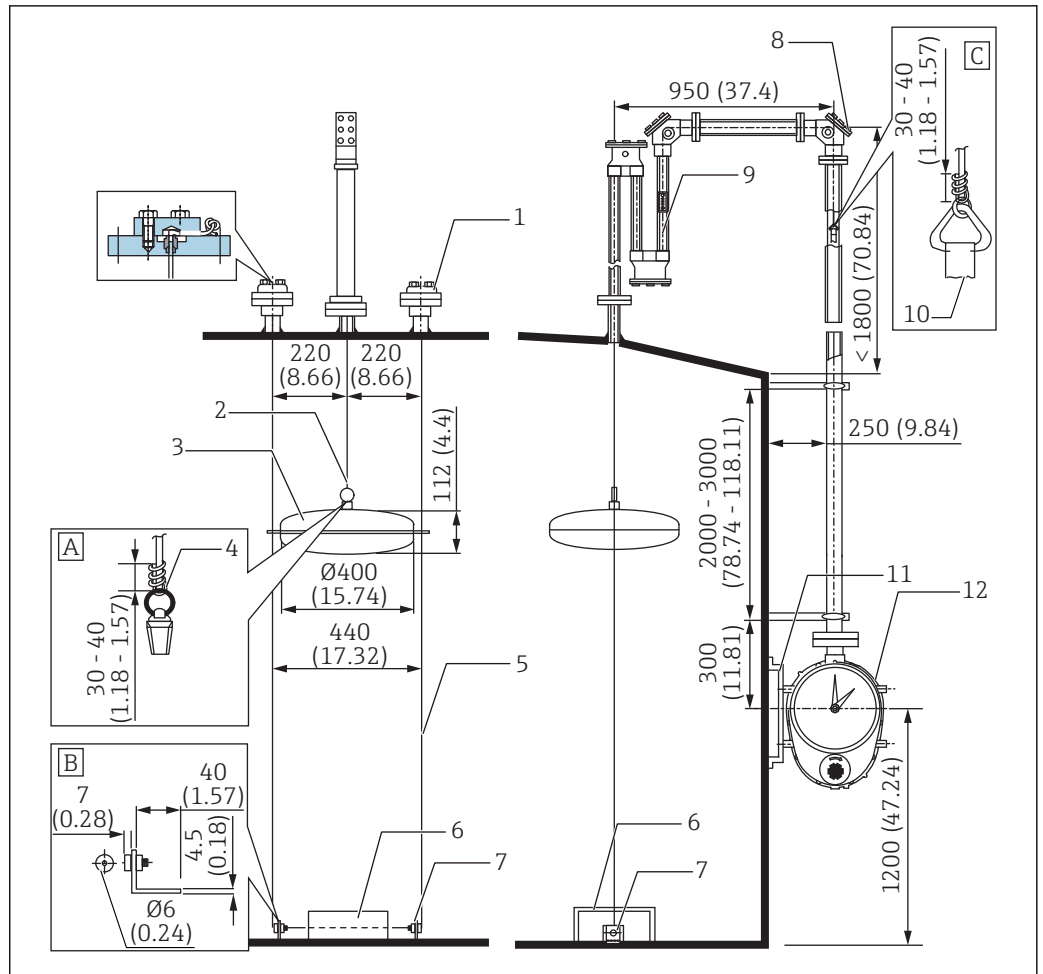
5 Installation of seal pot for CRT. Unit of measurement mm (in)

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

Order code (LT5-11AA023B1BA21A1000F0+PA)

Items	Purpose	Code	Spec.	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	Measuring range	2	5 m	
070	Measuring tape	3	Measuring tape, seal pot /BT	
080	Float	B	D 400 mm SUS316 tape connection 5.0 kg, $0.65 \leq \text{density} 1.05$, with ring	
090	Top anchor	1B	2x10K 40A RF, SUS316, flange JIS B2220	2
100	Guide wires	A	Diameter 3 mm single wire x 2	
110	Anchor hook; installation 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-pressure/medium-pressure gauge head	1


Cone roof tank with seal pot PVC



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

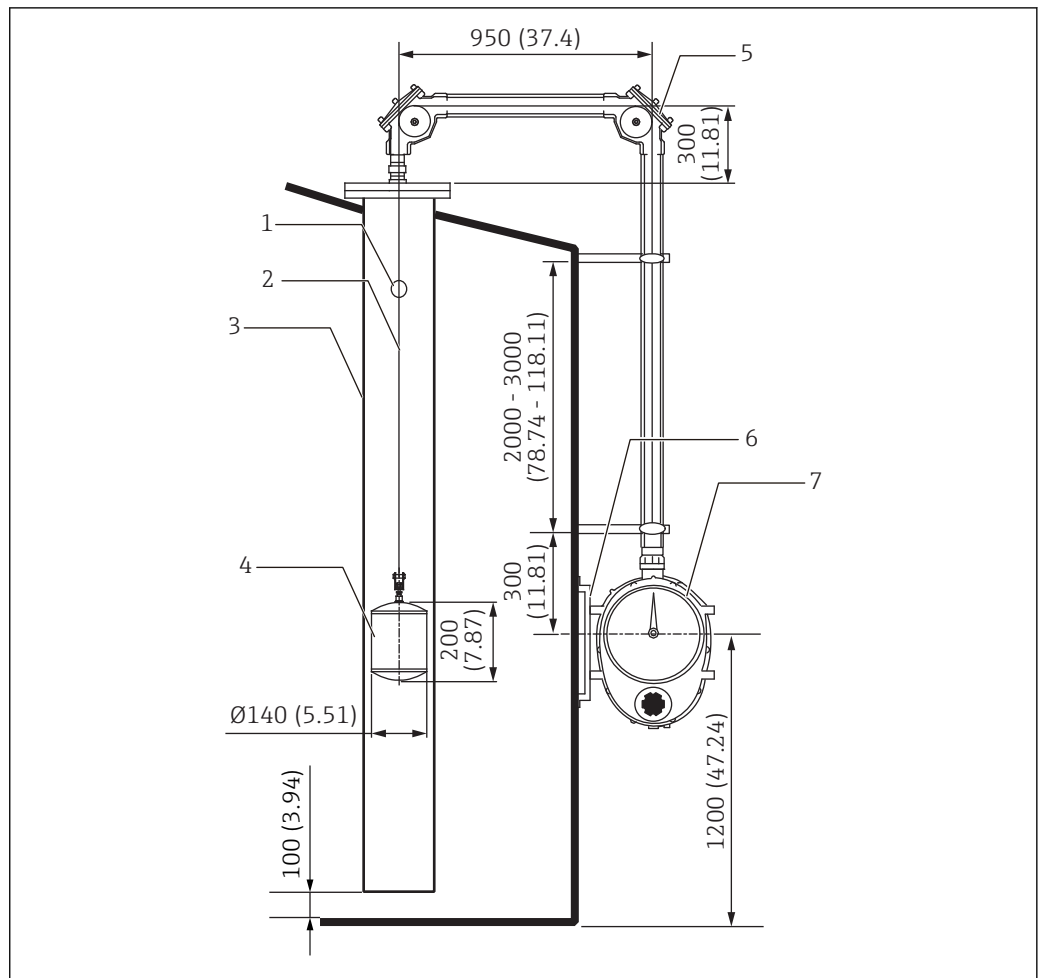
- A Float tip
- B Anchor hook details
- C Triangle bracket for measuring wire
- 1 Top anchor
- 2 Measuring wire
- 3 Float
- 4 Teflon tube
- 5 Guide wire (PFA-coated wire)
- 6 Wire protection stand (not supplied)
- 7 Anchor hook
- 8 90° sheave elbow
- 9 Seal pot
- 10 Measuring tape
- 11 Gauge supporter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

- 
 - Coil the enclosed teflon tube around the measuring wire 10 to 15 times.
 - Coat the anchor hook if necessary.
 - Adjust contact point 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) in relation to the gauge head when full.

Order code (LT5-11AA025H1NC41A1000N0+PA)

Items	Purpose	Code	Spec.	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	Measuring range	2	5 m	
070	Measuring tape	5	Measuring tape + PFA coated wire, seal pot/CRT	
080	Float	H	D 400 mm SUS316 tape connection 5.0 kg, $0.65 \leq \text{density} 1.05$, with ring	
090	Top anchor	1N	2x10K 40A RF, PVC, flange JIS B2220	2
100	Guide wires	C	From diameter 4.6 mm, PFA-coated wire x 1	1
110	Anchor hook; installation 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-pressure/medium-pressure gauge head	1

Compact cone roof tank for guide pipe method



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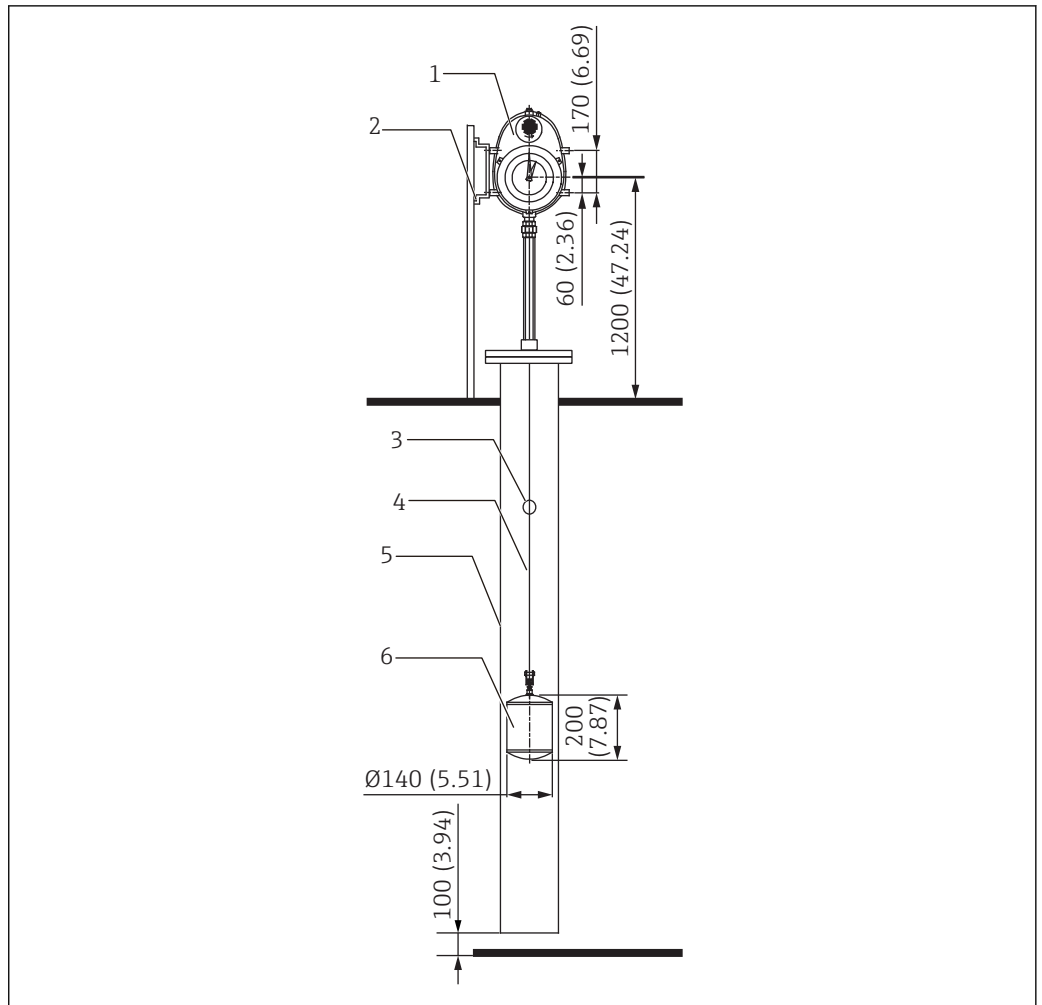
7 Installation on a compact cone roof tank. Unit of measurement mm (in)

- 1 Ventilation hole
- 2 Measuring wire
- 3 Guide pipe (stillwell)
- 4 Float
- 5 90° sheave elbow
- 6 Gauge supporter
- 7 Gauge head

Order code (LT5-111A021L000011200000+PA)

Items	Purpose	Code	Spec.	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, thread JISB0203	
040	Display; cover	A	Dial display: acrylic	
050	Crank unit	0	None	
060	Measuring range	2	5 m	
070	Measuring tape	1	Measuring tape, CRT	
080	Float	L	D 140 mm SUS316 tape connection 2.4 kg, 0.94 ≤ density 2.0, without ring	
090	Top anchor	00	None	
100	Guide wires	0	None	
110	Anchor hook; installation bolt	0	None	
120	90 ° sheave elbow	112	2x Rp1-1/2, aluminum (ADC6), thread 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-pressure/medium-pressure gauge head	1

Tank top installation using guide pipe method



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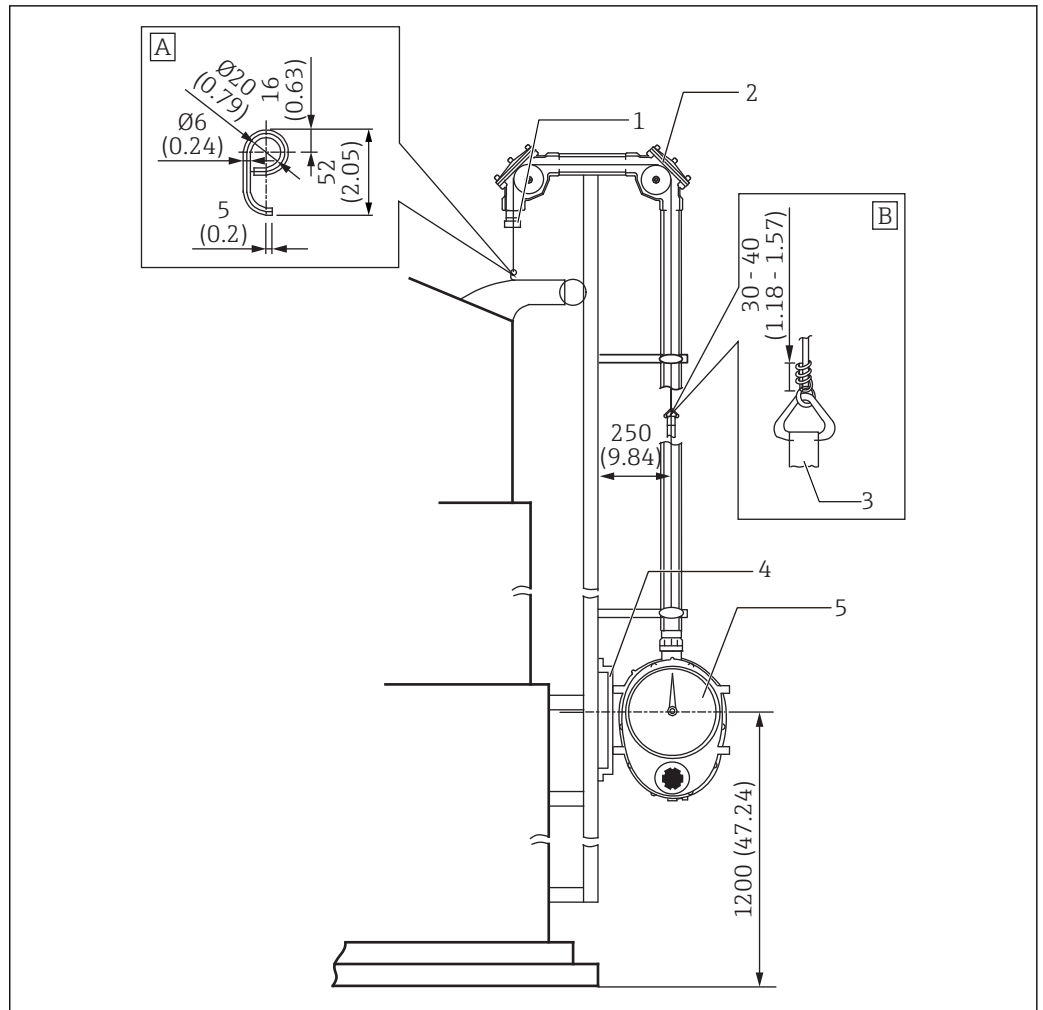
8 Tank top installation, unit. Unit of measurement mm (in)

- 1 Gauge head
- 2 Gauge supporter
- 3 Ventilation hole
- 4 Triangle bracket for measuring wire
- 5 Guide pipe (stillwell)
- 6 Float

Order code (LT5-111C022L000000000000+PA)

Items	Purpose	Code	Spec.	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, thread JISB0203	
040	Display; cover	C	Reverse installation, dial display, acrylic	
050	Crank unit	0	None	
060	Measuring range	2	5 m	
070	Measuring tape	2	Measuring tape, tank top installation	
080	Float	L	D 140 mm SUS316 tape connection 2.4 kg, 0.94 ≤ density 2.0, without ring	
090	Top anchor	00	None	
100	Guide wires	0	None	
110	Anchor hook; installation 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-pressure/medium-pressure gauge head	1

Gas holder



A0041202

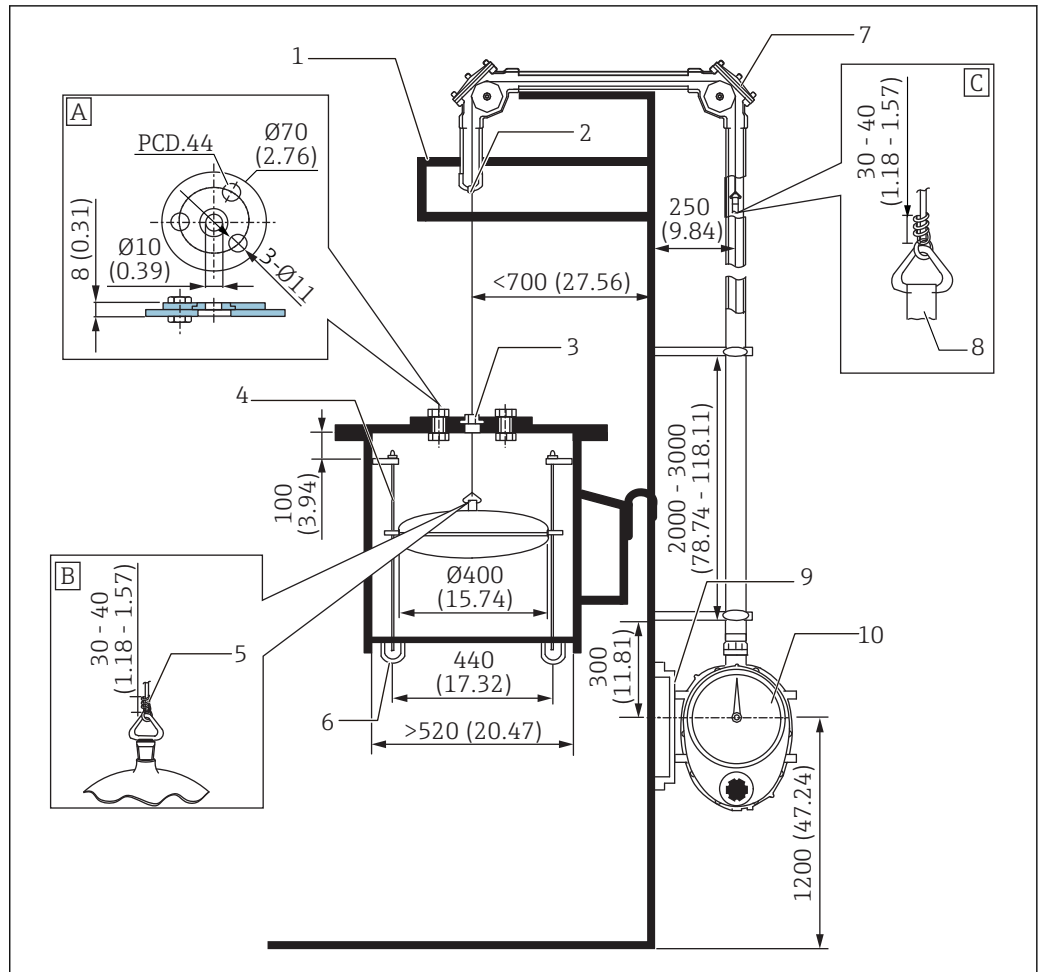
9 Installing gas holder. Unit of measurement mm (in)

- 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

Order code (LT5-111A0340000011200000+PAPFPH)

Items	Purpose	Code	Spec.	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, thread JISB0203	
040	Display; cover	A	Dial display: acrylic	
050	Crank unit	0	None	
060	Measuring range	3	10 m	
070	Measuring tape	4	Measuring tape + wire, FRT	
080	Float	0	None	
090	Top anchor	00	None	
100	Guide wires	0	None	
110	Anchor hook; installation bolt	0	None	
120	90 ° sheave elbow	112	2x Rp1-1/2, aluminum (ADC6), thread 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-pressure/medium-pressure gauge head	1
620	>>Enclosed accessories	PF	Wire guide socket, RC1-1/2	
620	>>Enclosed accessories	PH	Gas holder wire hook	

Floating roof tank (FRT)



A0041203

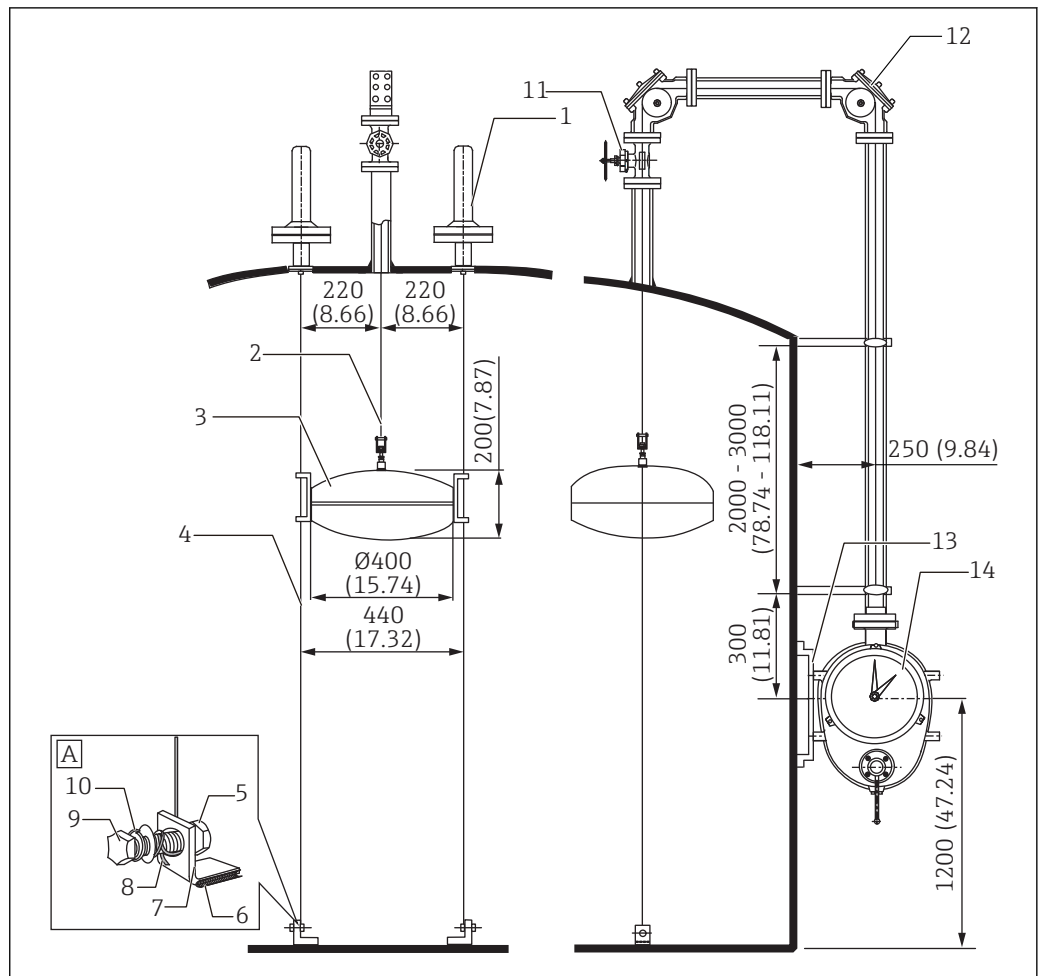
10 Installing on a floating roof tank. Unit of measurement mm (in)

- 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

Order code (LT5-111A054E000011200000+PAPEPF)

Items	Purpose	Code	Spec.	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, thread JISB0203	
040	Display; cover	A	Dial display: acrylic	
050	Crank unit	0	None	
060	Measuring range	5	20 m	
070	Measuring tape	4	Measuring tape + wire, FRT	
080	Float	E	D 400 mm SUS316 wire connection 5.0 kg, 0.65 ≤ density 1.05, with ring	
090	Top anchor	00	None	
100	Guide wires	0	None	
110	Anchor hook; installation bolt	0	None	
120	90 ° sheave elbow	112	2x Rp1-1/2, aluminum (ADC6), thread 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-pressure/medium-pressure gauge head	1
620	>>Enclosed accessories	PE	FRT wire guide metal	
620	>>Enclosed accessories	PF	Wire guide socket, RC1-1/2	

Dome roof tank for medium pressure



A0041204

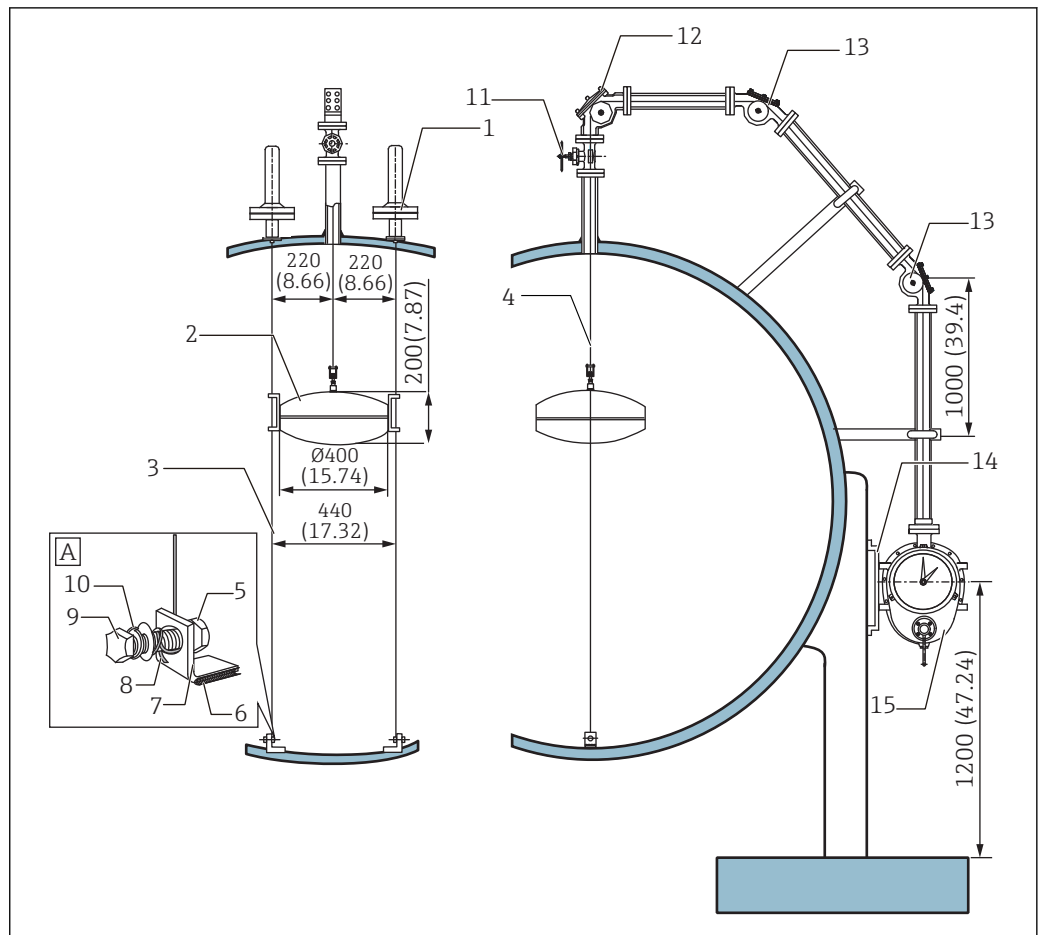
11 Installation on a dome roof tank for medium pressure. Unit of measurement mm (in)

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

Order code (LT5-44AB151R4AA24A200001+PA)

Items	Purpose	Code	Spec.	Quantity
020	Gauge head	4	0.09807 MPa/14.22 psi, aluminum (AC4CT6)	1
030	Gauge head process connection	4A	10K 40A RF, aluminum (AC4CT6), flange JIS B2220	
040	Display; cover	B	Dial display; glass + iron	
050	Crank unit	1	Selected	
060	Measuring range	5	20 m	
070	Measuring tape	1	Measuring tape, CRT	
080	Float	R	D 400 mm SUS316 wire connection 8.3 kg, 0.5 ≤ density 0.7, with ring	
090	Top anchor	4A	2x10K 40A RF, aluminum (AC4CT6), flange JIS B2220	
100	Guide wires	A	Diameter 3 mm single wire x 2	
110	Anchor hook; installation bolt	2	SUS316; SUS316	
120	90 ° sheave elbow	4A2	2x 10K 40A RF, aluminum (ADC6), 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-pressure/medium-pressure gauge head	

Spherical tank for high pressure



A0041205

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

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

Order code (LT5-66GB153R6GA26G16G204+PC)

Items	Purpose	Code	Spec.	Quantity
020	Gauge head	6	2.45 MPa/355.25 psi, iron (SCPL1)	1
030	Gauge head process connection	6G	20K 40A RF, iron, flange JIS B2220	
040	Display; cover	B	Dial display; glass + iron	
050	Crank unit	1	Selected	
060	Measuring range	5	20 m	
070	Measuring tape	3	Measuring tape, seal pot / BT	
080	Float	R	D 400 mm SUS316 wire connection 8.3 kg, 0.5 ≤ density 0.7, with ring	
090	Top anchor	6G	2x20K 40A RF, iron, flange JIS B2220	
100	Guide wires	A	Diameter 3 mm single wire x 2	
110	Anchor hook; installation bolt	2	SUS316; SUS316	
120	90 ° sheave elbow	6G1	1x 20K 40A RF, iron, flange JIS B2220	1
130	135 ° sheave elbow	6G2	2x 20K 40A RF, iron, 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

Operating temperature limits	Spec.	Range
	LT5-1	Joint: -200 to 200 °C (-328 to 392 °F) Body: -20 to 70 °C (-4 to 157 °F)
	LT5-4/LT5-6	Joint: -45 to 80 °C (-49 to 176 °F) Body: -20 to 70 °C (-4 to 157 °F)

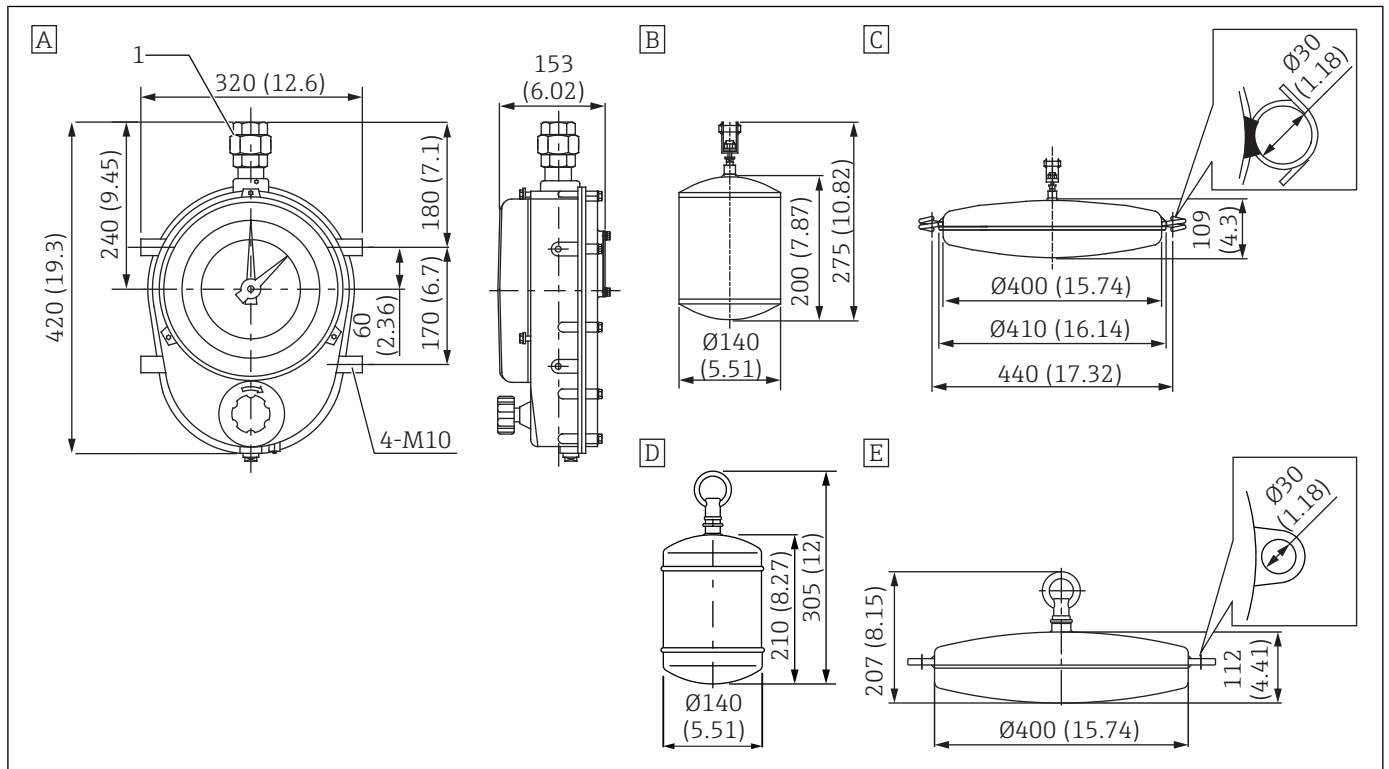
Process

Maximum operating pressure	Spec.	Range
	LT5-1	0.01961 MPa/2.84 psi
	LT5-4	0.09807 MPa/14.22 psi
	LT5-6	2.45 MPa/355.25 psi

Mechanical construction

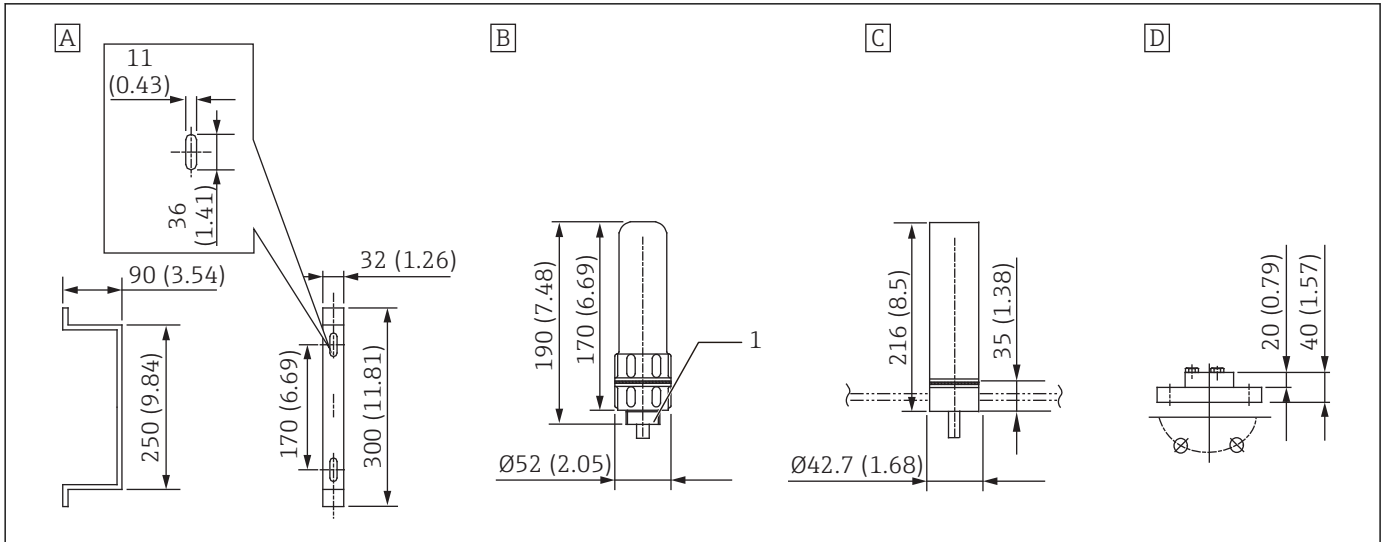
Dimensions of LT5-1

Dimensions of threaded/low-pressure type



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

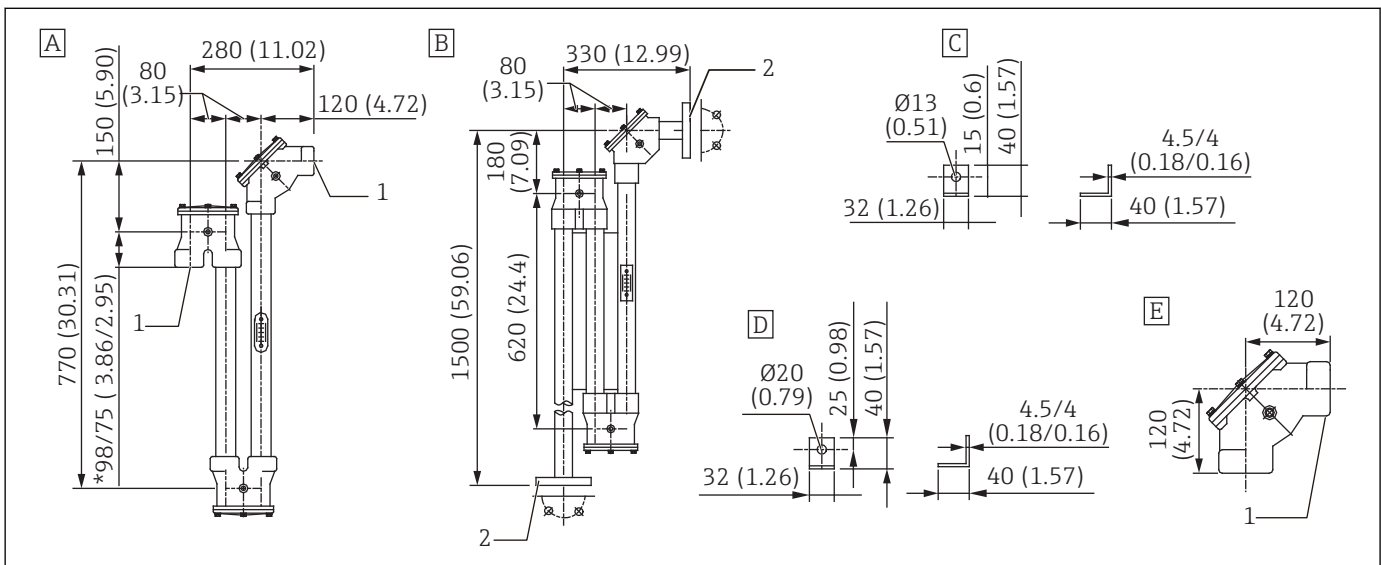
- A Gauge head (ADC12)
- B Float φ140 (SUS316)
- C Float φ400 (SUS316)
- D Float φ140 (PVC)
- E Float φ400 (PVC)
- 1 1 union nut (select from JIS Rc 1-1/2 / ANSI NPT 1-1/2; select Rp 1-1/2 if there is no union nut)



A0041188

14 Accessory 1. Unit of measurement mm (in)

- A Gauge supporter (select from iron / SUS304)
- B Top anchor (ADC6)
- C Top anchor (SUS316 / socket welded type)
- D Top anchor (PVC) (only flange type is available for PVC.)
- 1 Select from JIS R1 / ANSI NPT1



A0041189

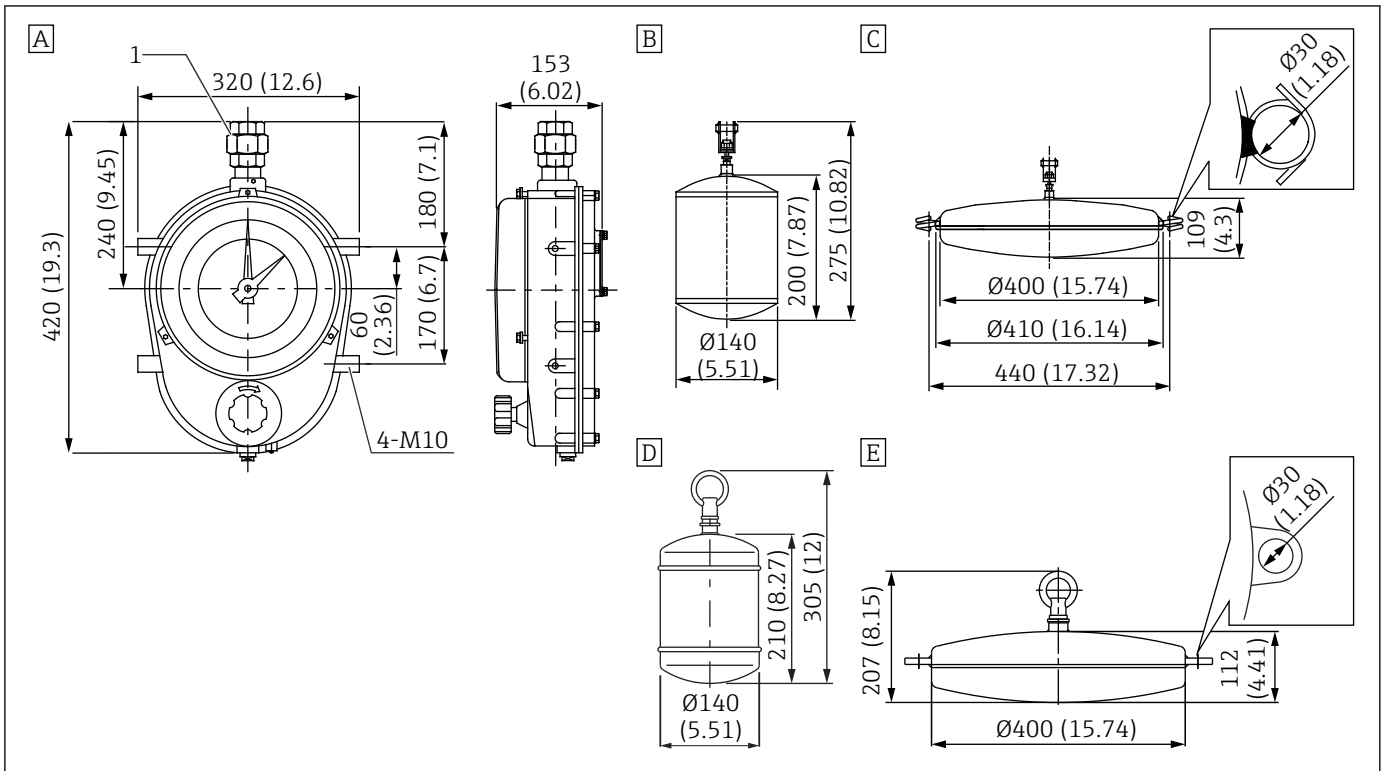
15 Accessory 2. Unit of measurement mm (in)

- A Seal pot (select from aluminum / SUS316)
- B Seal pot (PVC) (only flange type is available for PVC.)
- C Anchor hook (select from iron / SUS316)
- D Anchor hook (PVC bolt)
- E 90° sheave elbow (select from ADC6 / SCS14)
- 1 Thread (select from Rp1-1/2 / NPT1-1/2 options)
- 2 Flange (select from JIS 10K 40A FF / ASME NPS 1-1/2" Cl.150 FF / JPI 40A 150 lbs FF)

i The 75 mm for seal pot 98/75 is the dimension for SUS316 specification.

Dimensions of LT5-1

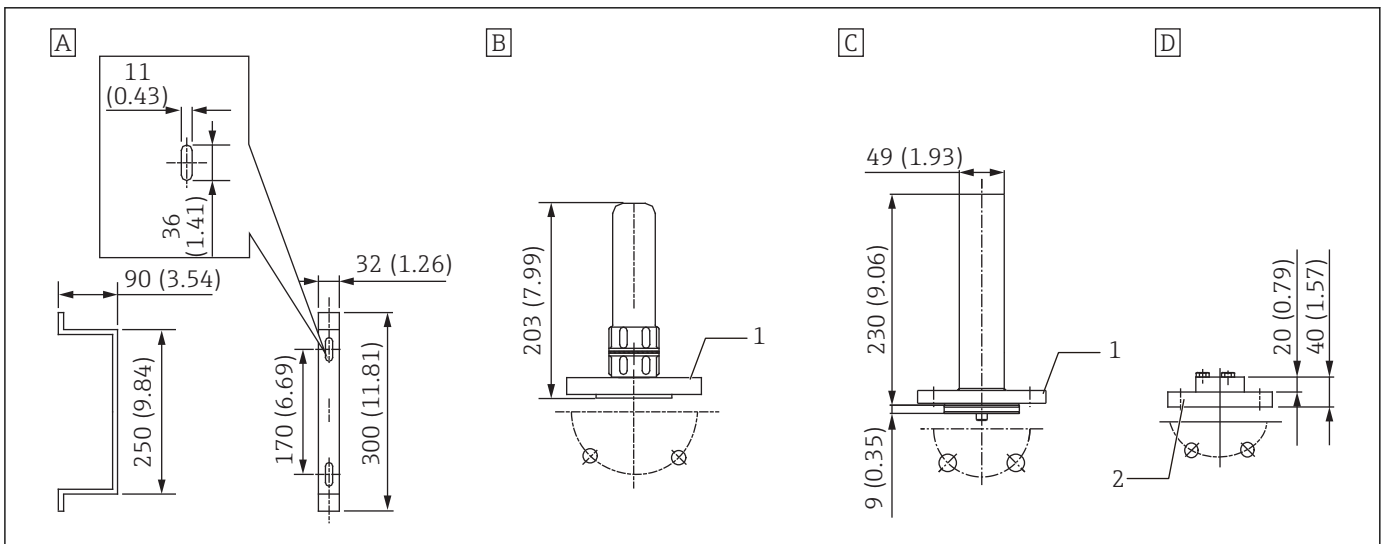
Dimensions of flange/low-pressure type



A0041187

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

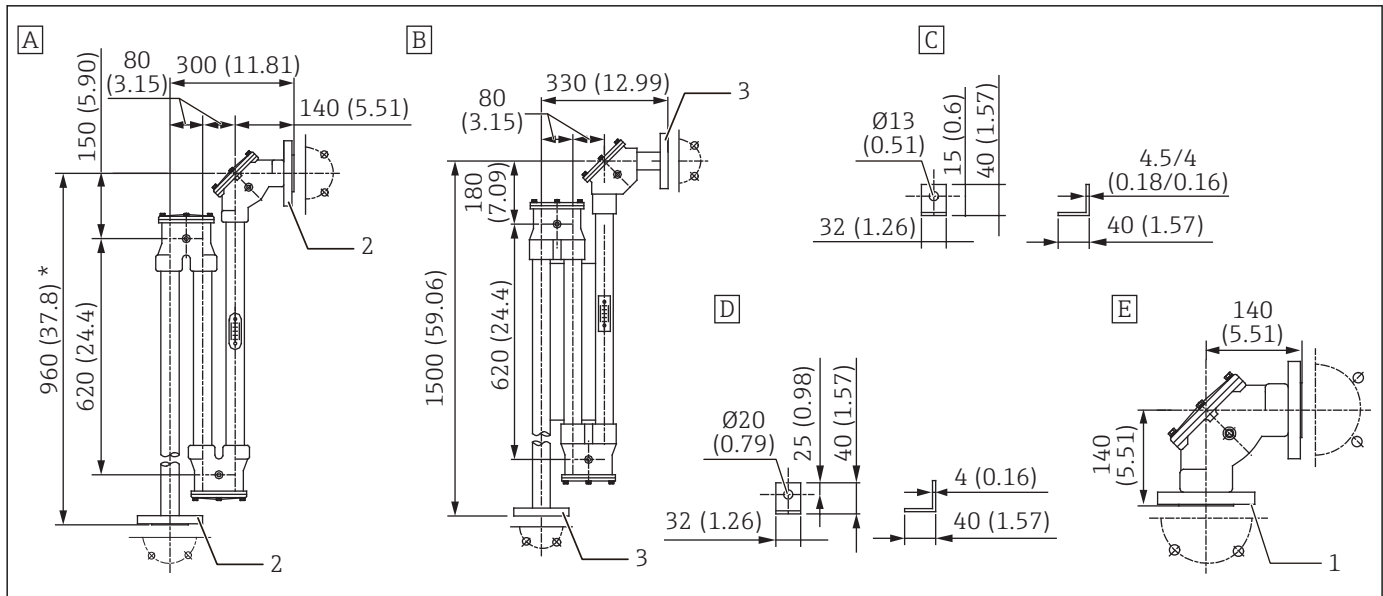
- A Gauge head (ADC12)
- B Float ϕ 140 (SUS316)
- C Float ϕ 400 (SUS316)
- D Float ϕ 140 (PVC)
- E Float ϕ 400 (PVC)
- 1 Flange (select from JIS 10K 40A RF / ASME NPS 1-1/2" Cl.150 RF / JPI 40A 150 lbs RF)



A0041191

17 Accessory 1. Unit of measurement mm (in)

- A Gauge supporter (select from iron / 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

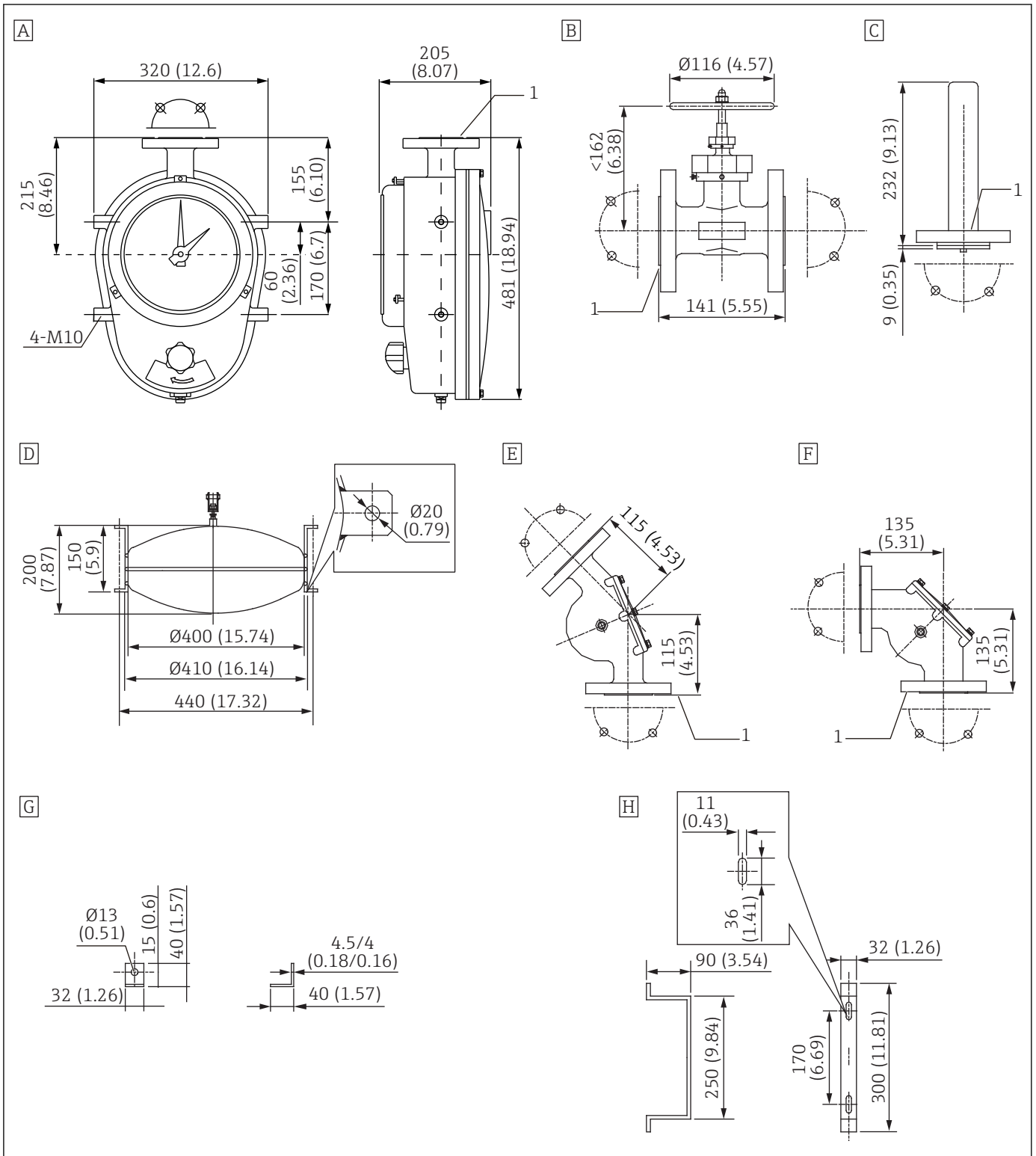
18 Accessory 2. Unit of measurement mm (in)

- A Seal pot (select from aluminum + iron / SUS316; see notes below)
- B Seal pot (PVC)
- C Anchor hook (select from iron / SUS316)
- D Anchor hook (PVC bolt)
- E Select from 90° 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

Dimensions of flange/medium-pressure type

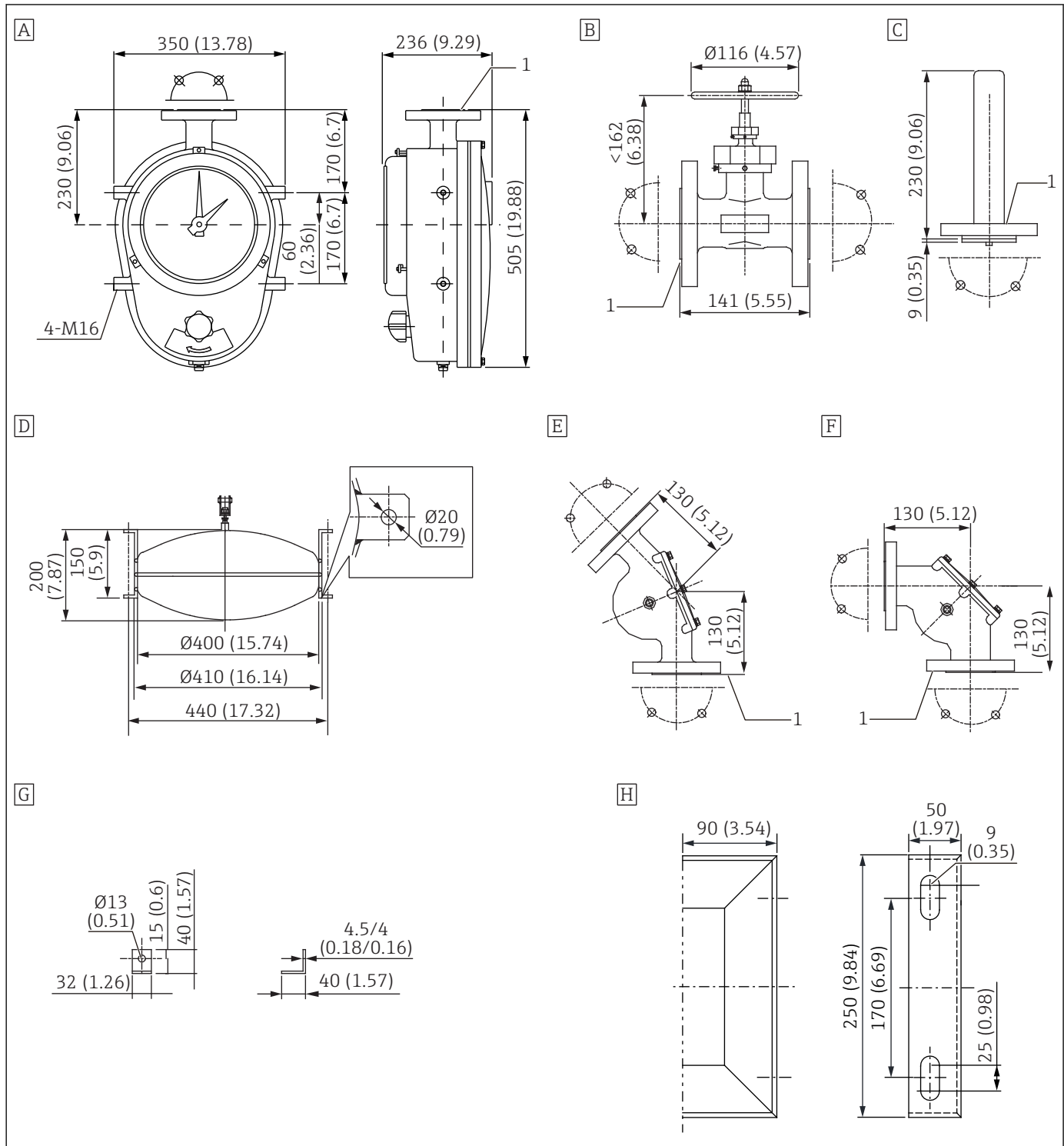


19 Dimensions of LT5-4. Unit of measurement mm (in)

- A Gauge head (AC4CT6)
- B Gate valve (SCS13)
- C Top anchor (AC4CT6)
- D 135° sheave elbow (AC4CT6)
- E 90° sheave elbow (AC4CT6)
- G Anchor hook (select from iron / SUS316)
- H Gauge supporter (select from iron / 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

Dimensions of flange/high-pressure type



A0041194

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

- A Gauge head (iron)
- B Gate valve (SCS13)
- C Top anchor (select from iron / SUS316)
- D Float (SUS316)
- E 135° sheave elbow (iron)
- F 90° sheave elbow (iron)
- G Anchor hook (select from iron / SUS316)
- H Gauge supporter (select from iron / 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

Spec.		Description
LT5-1	(Threaded type, low-pressure type)	Rp 1-1/2, w/o union nut, thread JIS B0203 Rc 1-1/2, union nut, SUS316, thread JIS B0203 NPT 1-1/2, union nut, SUS316, thread ANSI
LT5-1	(Flange type, low-pressure type) Flange spec./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 150lbs RF, aluminum (AC4A), flange JPI 7S-15 40A 150lbs RF, SUS316, flange JPI 7S-15 10K 150A RF, SUS316, flange JIS B2220 NPS 6" Cl.150 RF, SUS316 flange ASME B16.5 150A 150lbs RF, SUS316, flange JPI 7S-15
LT5-4	(Flange type, medium-pressure type) Flange spec. / main body material	10K 40A RF, aluminum (AC4CT6), flange JIS B2220 NPS 1-1/2" Cl.150 RF, aluminum (AC4CT6) flange ASME B16.5 40A 150lbs RF, aluminum (AC4CT6), flange JPI 7S-15
LT5-6	(Flange type, high-pressure type) Flange spec. / main body material / bolt material	10K 40A RF, iron, flange JIS B2220 NPS 1-1/2" Cl.150 RF, iron flange ASME B16.5 40A 150lbs RF, iron, flange JPI 7S-15 20K 40A RF, iron, flange JIS B2220 NPS 1-1/2" Cl.300 RF, iron flange ASME B16.5 40A 300lbs RF, iron, flange JPI 7S-15

Display method

Dial 2-needle type / counter type (minimum readable scale: 1 mm)

 30 m and 100 ft use the counter type.

Indicator Coupling

Coupling of the indicator and the internal parts of the gauge head

Spec.		Description
LT5-1	(Threaded or flange type, low-pressure type)	Coupling: Penetration shaft
LT5-4	(Flange type, medium-pressure type)	Coupling: Pressure bulkhead magnet coupling
LT5-6	(Flange type, high-pressure type)	Coupling: Pressure bulkhead magnet coupling

Float

Coupling of the indicator and the internal parts of the gauge head

Spec.		Mass	ρ : Liquid density (g/cm ³)
LT main body ϕ 400	Low-pressure type	4.2 kg	$0.5 \leq \rho < 0.65$
	Low-pressure type	5.0 kg	$0.65 \leq \rho < 1.05$
	Low-pressure type	8.0 kg	$1.05 \leq \rho < 2.0$
	High-pressure type	8.3 kg	$0.5 \leq \rho < 0.7$
LT main body ϕ 140	Low-pressure type	2.1 kg	$0.5 \leq \rho < 0.94$
	Low-pressure type	2.4 kg	$0.94 \leq \rho < 2.0$

 For low-pressure type, select either SUS316 or PVC for the material.

Mass	Spec.		Description
	LT5-1	(Threaded or flange type, low-pressure type)	Approximately 8 kg
	LT5-4	(Flange type, medium-pressure type)	Approximately 22 kg
	LT5-6	(Flange type, high-pressure type)	Approximately 100 kg

- Color**
- Gauge head: Blue
 - Other parts: Silver

List of material specifications *Aluminum*

Symbol	Description
ADC12	Aluminum alloy die casting (Si-Si-Cu)
AC4CT6	Aluminum alloy casting (Si7Mg)
AC4A	Aluminum alloy casting (Si10Mg)

Stainless steel

Symbol	Description
SUS304	Stainless steel (18Cr-8Ni)
SUS316	Stainless steel (18Cr-12Ni-2.5Mo)
SCS13	Stainless steel cast steel equivalent to SUS304
SCS14	Stainless steel cast steel equivalent to SUS316

Others

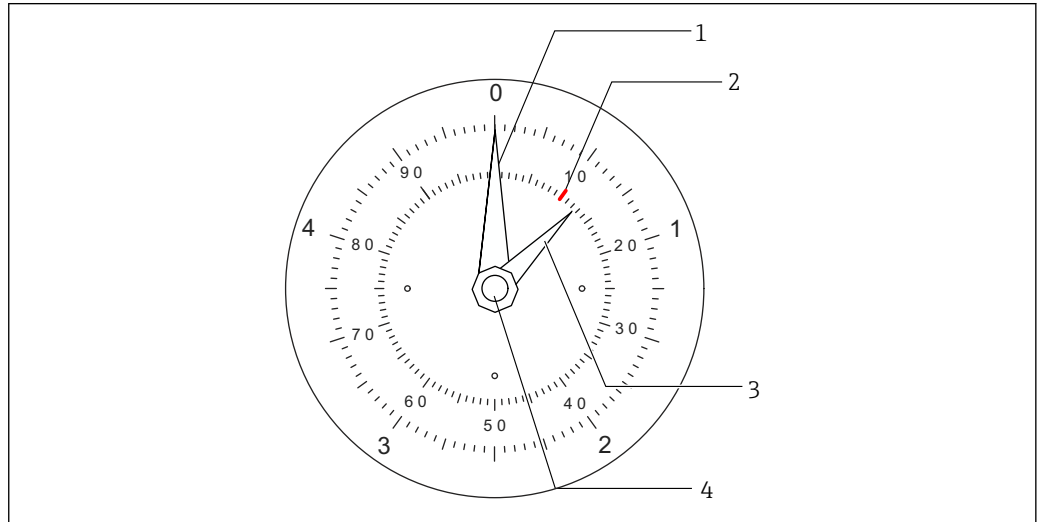
Symbol	Description
SGP (galvanized pipe)	Carbon steel pipe
PVC	Polyvinyl chloride

Operability

Display

Dial 2-needle type and counter type are available for the gauge head display. Use a dial display if the tank height is up to 20 m or 60 ft, and use a counter type if the tank is taller.

Dial display

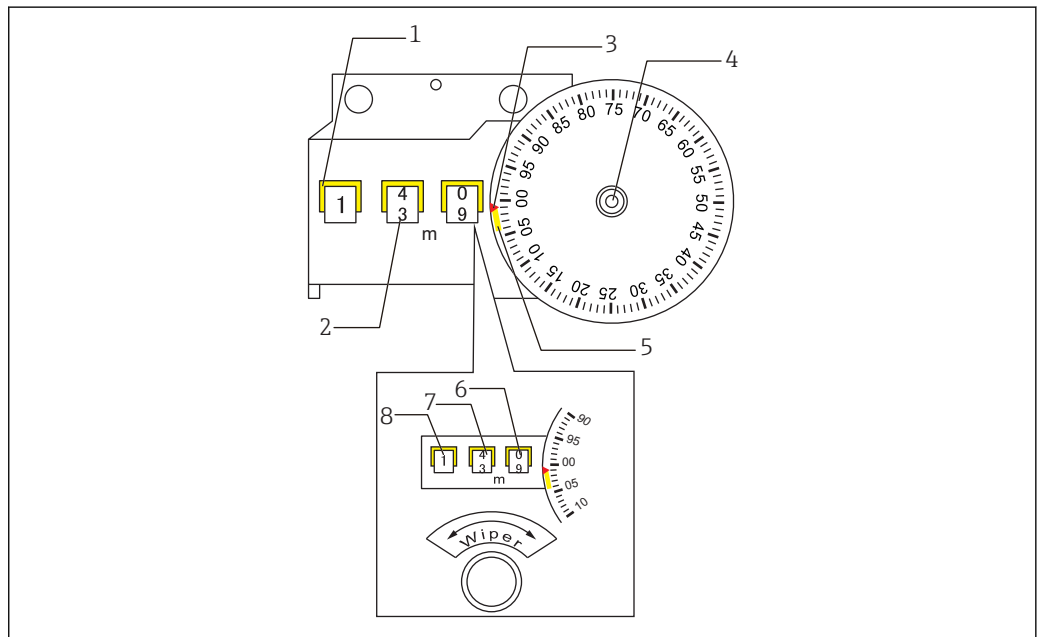


A0041231

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

- 1 Long needle (white)
- 2 Example: 10 mm (0.34 in) location
- 3 Short needle (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



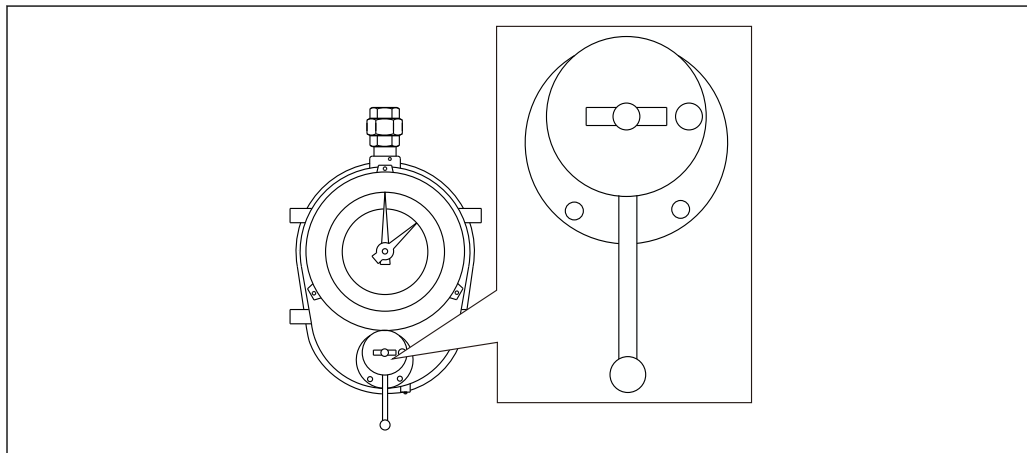
Product Configurator - the tool for individual product configuration

- 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

Hoist handle

A hoist handle is attached to the gauge head and enables the float to be raised or lowered manually. This prevents the float and measuring tape from becoming damaged in areas with poor measuring conditions, such as a tank with a stirrer, by hoisting it up before the measurements are taken.



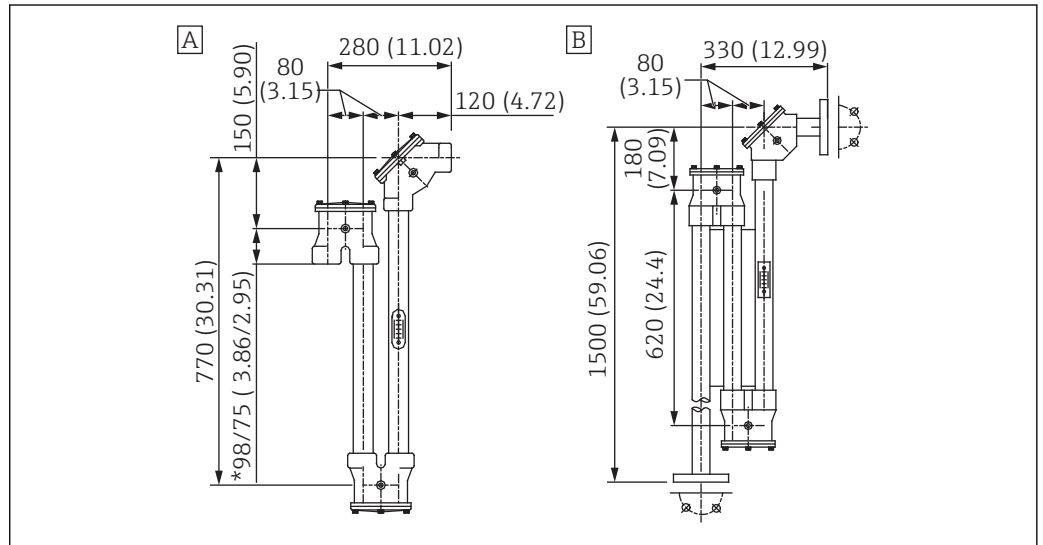
A0041258

 23 Hoist handle

Seal pot

Seal pots are filled with liquid sealant, and they prevent toxic or corrosive vapors from escaping the tank.

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



24 Seal pot. Unit of measurement mm (in)

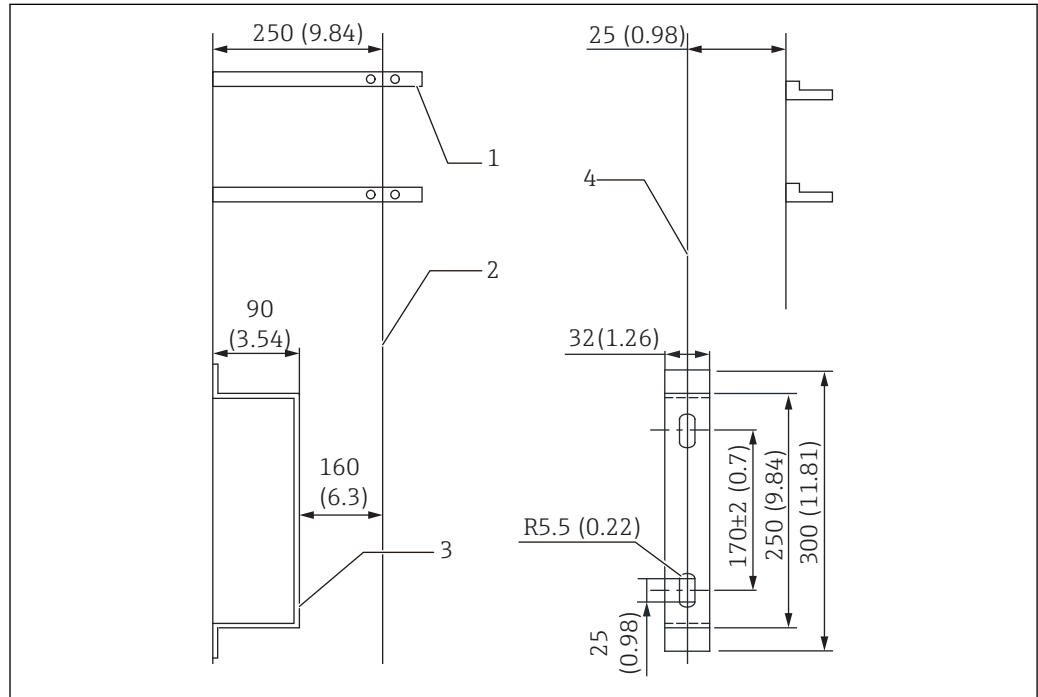
- A Seal pot (SUS316/SGP/AC4A)
- B Seal pot (PVC)

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

Gauge supporter

A gauge supporter is used for attaching to the outer wall of the tank. Note that pipe supporters are not supplied.

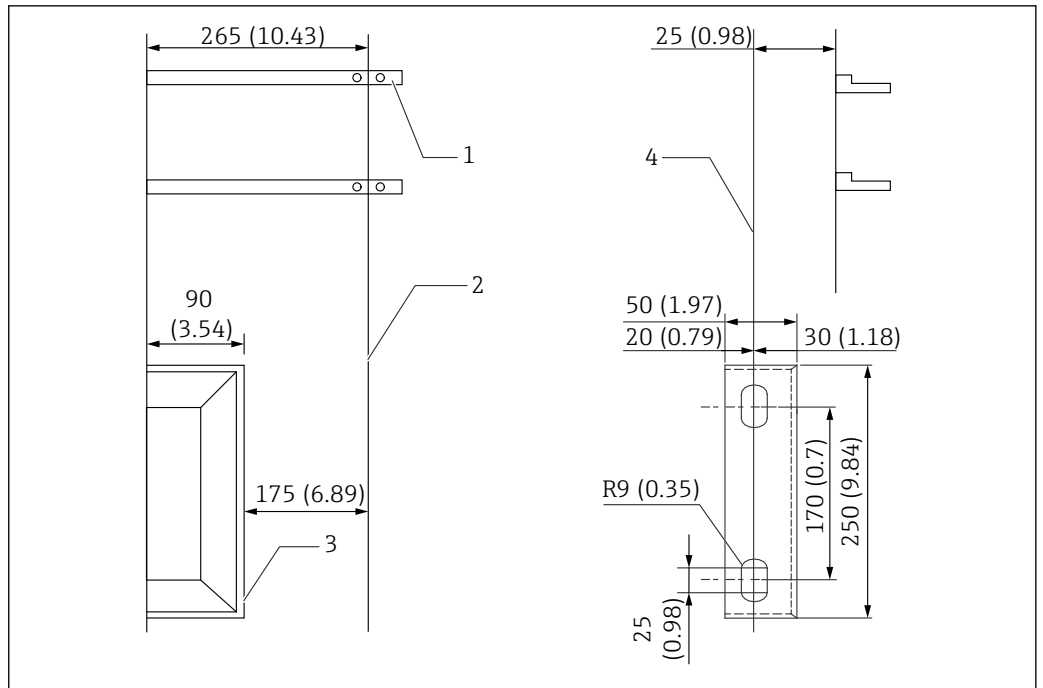
i Compared to LT5-1 (low-pressure gauge head) / LT5-4 (medium-pressure gauge head), the distance between the outer tank wall and the center of the gauge head is 15 mm (0.59 in) longer for LT5-6 (high-pressure gauge head).



A0041179

25 Gauge supporter for low/medium pressure. Unit of measurement mm (in)

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



A0041180

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

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

Guide pipe

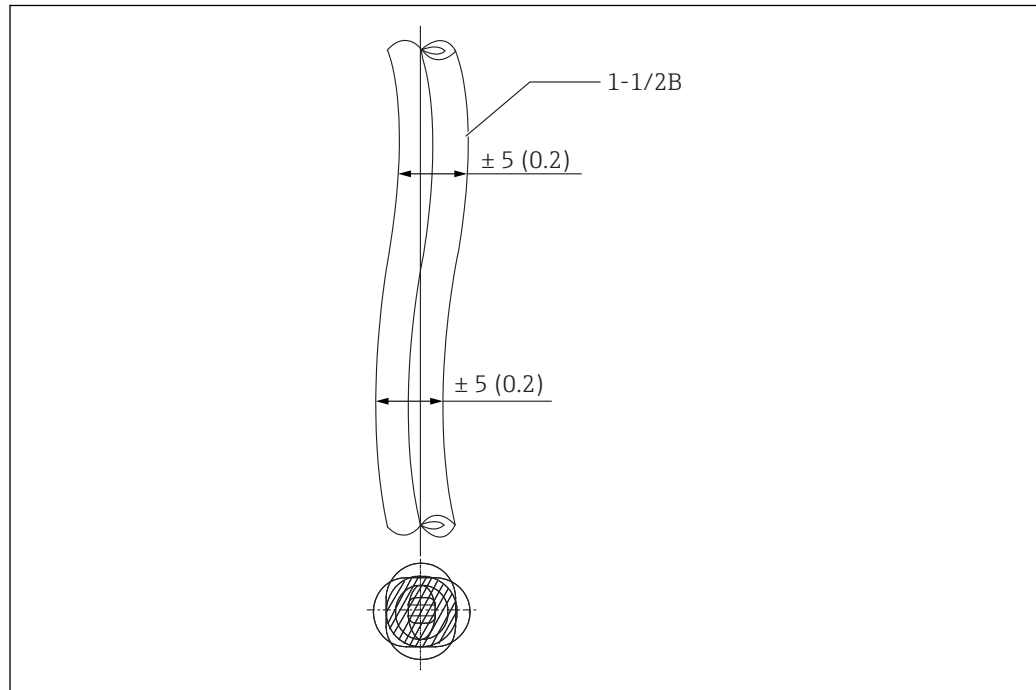
Guide pipe material and installation

Guide pipes are required for most installations, except for tank top or underground applications. Guide pipes are usually used in 3 locations:

- 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.
- The angle of the guide pipe must be 5 mm (0.17 in) or less.
- The maximum distance between two sheave elbows (pipe distance) must be 2.5 m (8.2 ft).



A0041181

27 Installation of guide pipes. Unit of measurement mm (in)

NOTICE

Recommended materials for guide pipes

- ▶ Always use a galvanized carbon steel pipe ("white gas pipe") for the guide pipe. If the application is for extremely corrosive gas, a stainless steel or hard PVC pipe with a resin inner lining is recommended.

Installation / enclosed accessories

Order information: 610 installation accessories

NA	Copper-free gear	Copper in the gear mechanism is replaced with another material, such as aluminum and stainless steel. Sealant for the magnet coupling and drain plug are changed to CR from NBR. Useful for application with ammonium.
NB	Custody transfer seal	In this option, holes are created in the bolts for the gauge head rear cover and display cover. Subsequent to bonded approval, a displacer wire for sealing may be inserted.
NC	Fixed tape guide	This option is for holding down the tape inside so that the tape does not become dislodged. It is useful for applications in which hunting may occur with the float. Supplied as a standard product for LT5-4 and LT5-6.
ND	Dust protector	Prevents dust caused by iron pipe work from entering the gears inside the gauge head. Supplied as a standard product for LT5-4 and LT5-6.
NE	Conster hoisting drum (aluminum)	This is an aluminum conster drum option. It is effective for applications in which bakelite conster drums cannot be used. Aluminum conster drums are standard for LT5-4 and LT5-6.


Ordering information: 620 enclosed accessories

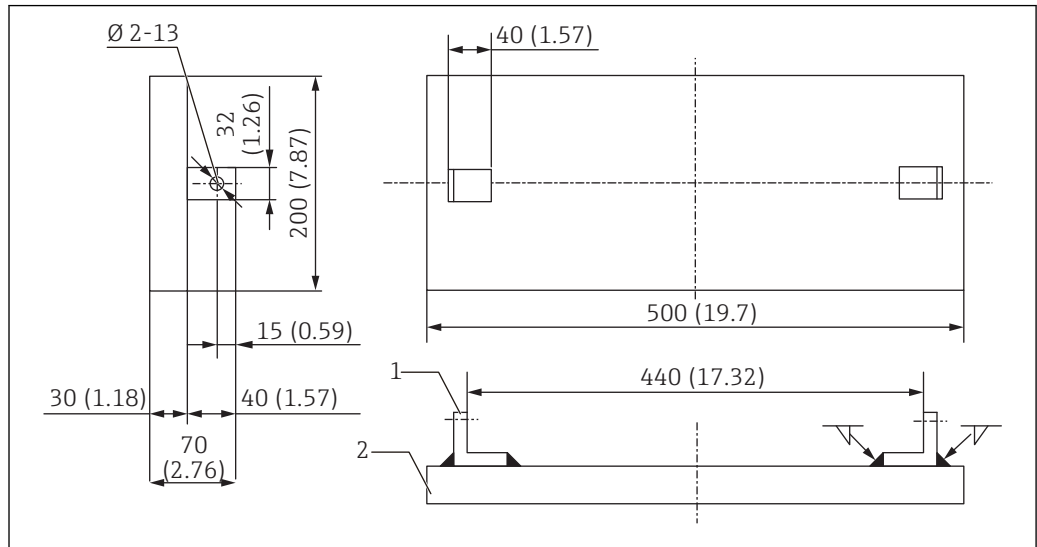
PE	FRT wire guide metal	This wire guide is installed on the floating roof. It prevents the measuring wire from wear due to contact with the roof.
PF	Wire guide socket Rc1-1/2	This socket is installed on pipes in floating roof tanks and gas holder tanks. It prevents the measuring wire from wear due to contact with the pipes.
PG	Wire guide socket NPT1-1/2	
PH	Gas holder wire hook	This hook is welded onto a gas holder tank and connected to a measuring wire.

Anchor weight


An anchor weight is used to keep the guide wire taut when an anchor hook cannot be installed at the bottom of a tank, such as when the tank is filled with liquid.

Material	SS400/SUS316
Mass	Approximately 23 kg (50.71 lb)

 When an anchor weight is required, order it TSP (special order).

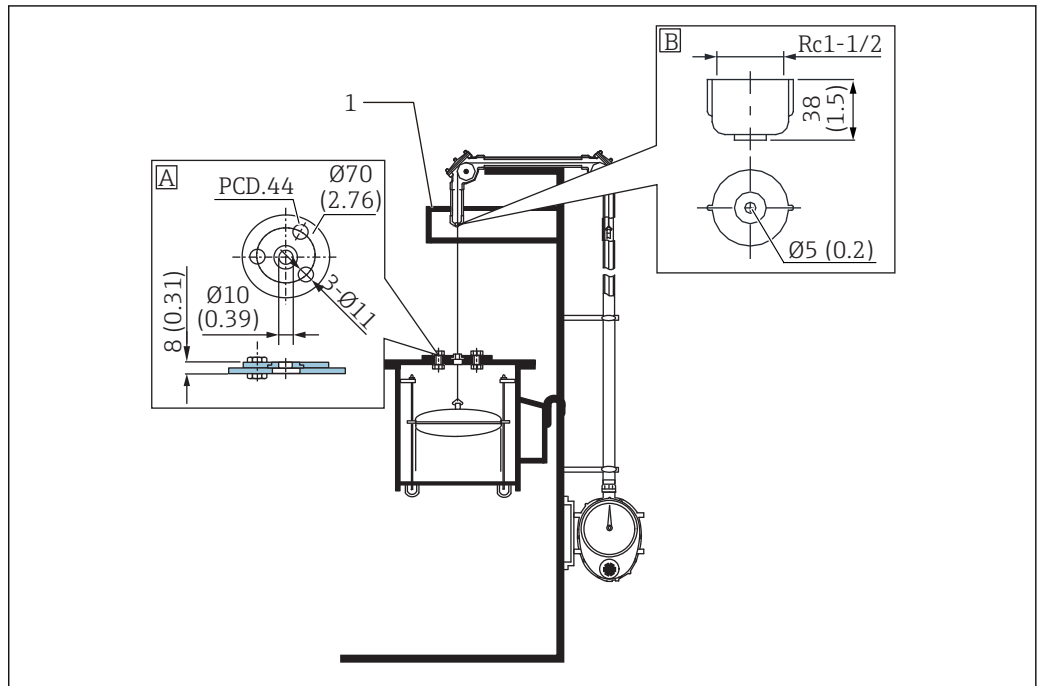


A0041260

 28 Anchor weight. Unit of measurement mm (in)

- 1 Anchor hook
- 2 Anchor weight

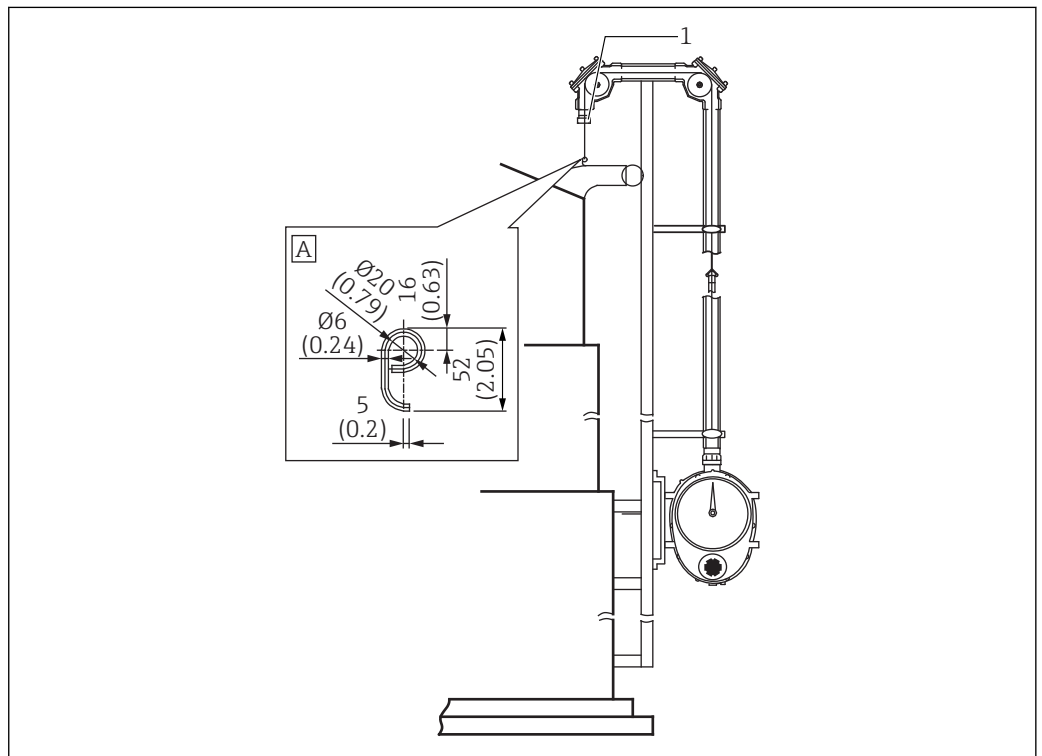
Wire guide metal and wire guide socket



A0041261

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

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



A0041262

30 Wire hook / wire guide socket. Unit of measurement mm (in)

- A Wire hook
- 1 Wire guide socket

Documentation

 For an overview of the scope of the relevant technical documentation included with the product, refer to the following:

The *W@M Device Viewer*: Enter the serial number from the nameplate (www.endress.com/deviceviewer).

Technical information (TI)

Technical information 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.

Instrument	Technical information
Float gauge LT5	TI01167G

Operating instructions (BA)

Operating instructions contain all the information required during 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.

Operating instructions also contain detailed descriptions of each parameter in the operation menu. These descriptions are targeted for those who work with the device over its entire life cycle and perform specific commissioning.

Instrument	Operating instructions
Float gauge LT5	BA01264G



www.addresses.endress.com
