

Operating Instructions

Float level gauge LT5

Tank gauging





A0023555

Table of contents

1	Document information	4	7.2	Hoist handle (optional)	76
1.1	Document function	4	8	Diagnostics and troubleshooting	79
1.2	Symbols	4	9	Maintenance	80
1.3	Additional documentation	6	9.1	Before performing maintenance	80
2	Safety-related basic instructions	7	9.2	Periodic inspection	81
2.1	Basic safety instructions	7	9.3	Replacement of O-ring for transmitter (LT5-4/LT5-6)	82
2.2	Intended use	7	9.4	Replacement of the check handle unit (LT5-4/LT5-6)	83
2.3	Workplace safety	7	10	Repair	85
2.4	Operational safety	7	10.1	General information on repairs	85
2.5	Product safety	8	10.2	Spare parts	85
3	Product description	9	10.3	Endress+Hauser services	85
3.1	Intended use	9	10.4	Return	86
3.2	List of material specifications	9	10.5	Disposal	86
3.3	Delivery examples	10	11	Accessories	87
4	Incoming acceptance and product identification	11	11.1	Seal pot	87
4.1	Incoming acceptance	11	11.2	Gauge supporter	88
4.2	Product identification	11	11.3	Guide pipe	90
4.3	Manufacturer address	12	11.4	Mounting and enclosed accessories	91
4.4	Storage and transport	12	11.5	Anchor weight	92
5	Installation	13	11.6	Wire guide metal and wire guide socket	93
5.1	Dimensions of LT5	13	Index		94
5.2	Installation preparation	20			
5.3	Tools	21			
5.4	Welding gauge supporter	22			
5.5	Guide pipe	24			
5.6	Top anchor and anchor hook	26			
5.7	Measuring tape and wire lengths	27			
5.8	Sealing materials for wetted liquid and wetted gas parts	29			
5.9	Material certificates	30			
5.10	Reference installation diagrams and order codes	31			
5.11	Mounting guide wires	51			
5.12	Mounting the measuring tape and measuring wire	53			
5.13	Liquid sealant for seal pot	64			
6	Commissioning	67			
6.1	Dial display	67			
6.2	Counter display	68			
6.3	Indicator adjustment	69			
6.4	Precautions for water-filling and airtightness tests and handling of gauge at startup	74			
7	Operation	75			
7.1	Check handle (standard)	75			

1 Document information

1.1 Document function

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

1.2 Symbols

1.2.1 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 potentially dangerous situation. Failure to avoid this situation can result in serious or fatal injury.

CAUTION

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

NOTICE

This symbol alerts you to a potentially harmful situation. Failure to avoid this situation can result in damage to the product or something in its vicinity.

1.2.2 Electrical symbols

Symbol	Meaning
	Direct current
	Alternating current
	Direct and alternating 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.

1.2.3 Tool symbols



Phillips head screwdriver



Flat blade screwdriver



Torx screwdriver



Allen key



Open-ended wrench

1.2.4 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



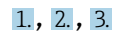
Reference to documentation



Reference to graphic



Notice or individual step to be observed



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

1.3 Additional documentation

The following documentation types are available in the Downloads area of the Endress+Hauser 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 on the nameplate.

1.3.1 Technical Information (TI)

Planning aid

This document contains all technical data related to the device, as well as an overview of accessories and other products that can be ordered for the device.

1.3.2 Brief Operating Instructions (KA)

Instructions for using the system for the first time

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

1.3.3 Operating Instructions (BA)

Operating Instructions contain all the information required for all stages in the device life cycle (from product identification, incoming acceptance, storage, mounting, connection, operation, and setting to troubleshooting, maintenance, and disposal).

2 Safety-related basic instructions

2.1 Basic safety instructions

2.1.1 Requirements for the personnel

The personnel for installation, commissioning, diagnostics and maintenance must fulfill the following requirements:

- ▶ Trained, qualified specialists must have a relevant qualification for this specific function and task.
- ▶ Are authorized by the plant owner/operator.
- ▶ Are familiar with federal/national regulations.
- ▶ Before starting work, read and understand the instructions in the manual and supplementary documentation as well as the certificates (depending on the application).
- ▶ Follow instructions and comply with basic conditions.

The operating personnel must fulfill the following requirements:

- ▶ Are instructed and authorized according to the requirements of the task by the facility's owner-operator.
- ▶ Follow the instructions in this manual.

2.2 Intended use

Applications and measured materials

Equipment intended for use in hazardous locations, sanitary applications, or high-risk applications due to process pressure have the corresponding label attached to their nameplates.

To ensure that the device remains in proper condition for the operation time:

- ▶ Only use the device in full compliance with the data on the nameplate and the general conditions listed in the Operating Instructions and supplementary documentation.
- ▶ Check the nameplate to ensure that the ordered equipment has the correct specifications for the certification-related area (example: explosion proof, safety of pressure vessels).
- ▶ If the device is not operated at an atmospheric temperature, compliance with the relevant basic conditions specified in the relevant device documentation is absolutely essential.
- ▶ Provide permanent protection for the equipment against corrosion caused by environmental effects.
- ▶ Do not exceed the limit values in "Technical Information."

The manufacturer is not liable for damage caused by improper or non-designated use.

2.3 Workplace safety

For work on and with the device:

- ▶ Wear the required personal protective equipment according to local/national regulations.

2.4 Operational safety

Risk of injury!

- ▶ Operate the device only if it is in proper technical condition, free from errors and faults.
- ▶ The operator is responsible for interference-free operation of the device.

Modifications to the device

Unauthorized modifications to the device are not permitted and can lead to unforeseeable dangers:

- ▶ If modifications are nevertheless required, consult with the manufacturer.

Repair

To ensure continued operational safety and reliability:

- ▶ Carry out repairs on the device only if they are expressly permitted.
- ▶ Observe federal/national regulations pertaining to the repair of an electrical device.
- ▶ Use only original spare parts and accessories from the manufacturer.

Hazardous area

To eliminate danger to persons or the facility when the device is used in the hazardous area (e.g. explosion protection):

- ▶ Check the nameplate to verify if the device ordered can be put to its intended use in the hazardous area.
- ▶ Observe the specifications in the separate supplementary documentation that is an integral part of these instructions.

2.5 Product safety

This device was designed in accordance with GEP (Good Engineering Practice) to meet state-of-the-art safety requirements, has been tested, and left the factory in a condition in which it is safe to operate. It meets the general safety standards and legal requirements.

2.5.1 CE mark

This measuring system meets the legal requirements of the applicable EU Directive. These are listed in the corresponding EU Declaration of Conformity along with the standards applied.

Endress+Hauser affixes the CE mark to this equipment as a sign of guarantee that this equipment has successfully passed testing.

3 Product description

3.1 Intended use

Float level gauge LT5 is an important measuring instrument in the process industry. With its mechanical construction that does not require a power supply, it is easy to install. Since it can be used for high-precision liquid level measurement and remote indication detection, it is ideal for the following operations.

- Inventory management
- Batch processing
- Process task control
- Safe tank operation

3.2 List of material specifications

Aluminum

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

Stainless steel

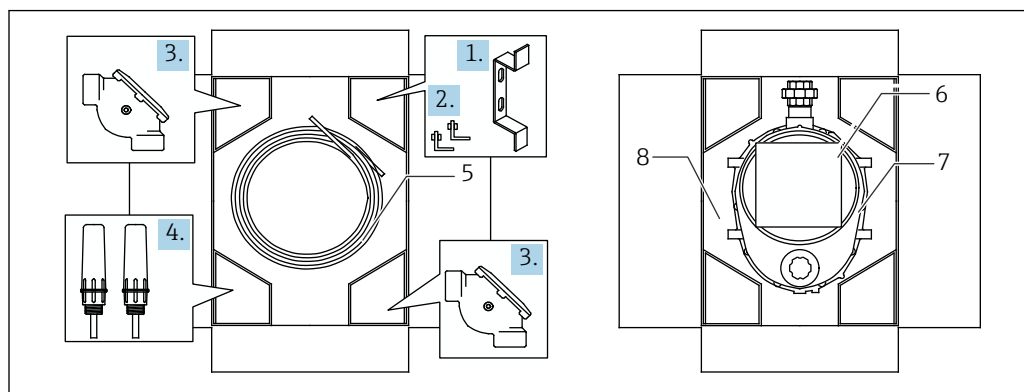
Code	Description
SUS304	Stainless steel (18Cr-8Ni)
SUS316	Stainless steel (18Cr-12Ni-2.5Mo)
SCS13	Cast stainless steel equivalent to SUS304
SCS14	Cast stainless steel equivalent to SUS316

Others

Code	Description
SCPL1	Cast carbon steel
SGP	Steel gas pipes
SGPW	Steel gas pipe water
PVC	Polyvinyl chloride
SS400	Carbon steel

3.3 Delivery examples

The packaging method will vary depending on the order code, etc. For the flange type, sheave elbows will be packed in a separate box.



A0039945

1 Packaging

- 1 Gauge supporter
- 2 Anchor hook
- 3 Sheave elbow
- 4 Top anchor
- 5 Guide wire
- 6 Measuring tape
- 7 Gauge head
- 8 Float (below the gauge head)

4 Incoming acceptance and product identification

4.1 Incoming acceptance

Upon receipt of the goods, check the following.

- Are the order codes on the delivery note and the product label identical?
- Are the goods undamaged?
- Do the nameplate data match the ordering information on the delivery note?
- If required (see nameplate): Are the Safety Instructions (XA) enclosed?

 If one or more of these conditions are not satisfied, contact your Endress+Hauser Sales Center or distributor.

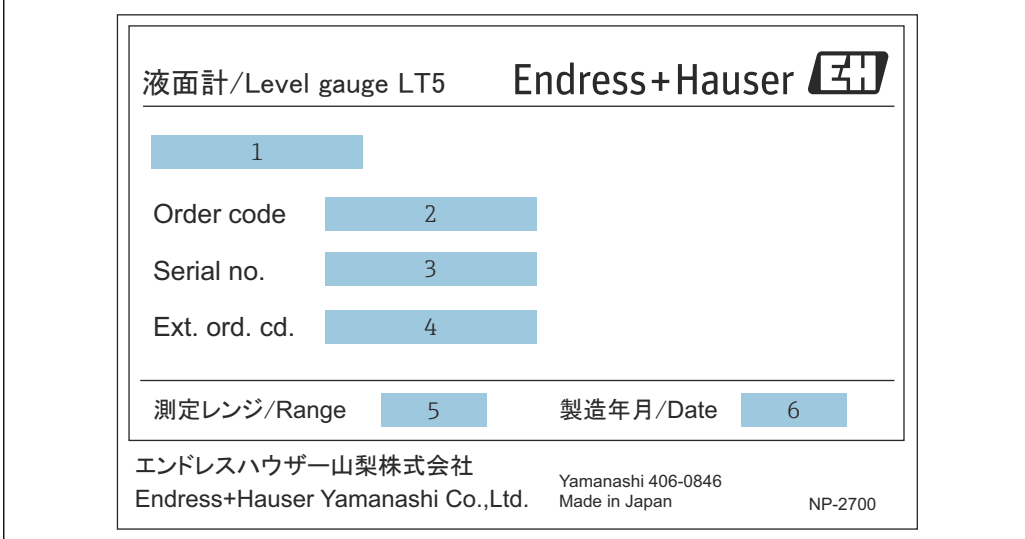
4.2 Product identification

The following options are available for identification of the device.

- Nameplate specifications
- Extended order code on the delivery note (including details of the device specification codes)
- Entering the serial number from the nameplate in *W@M Device Viewer* (www.endress.com/deviceviewer) will display all the information about the device.

 Note that the information on a nameplate may be changed without notice when credentials and certificates are updated.

4.2.1 Nameplate specifications



液面計/Level gauge LT5		Endress+Hauser 	
1			
Order code	2		
Serial no.	3		
Ext. ord. cd.	4		
測定レンジ/Range	5	製造年月/Date	6
エンドレスハウザー山梨株式会社 Endress+Hauser Yamanashi Co.,Ltd.		Yamanashi 406-0846 Made in Japan NP-2700	

 2 LT5 nameplate

- 1 Instrument code (optional)
- 2 Order code
- 3 Serial No.
- 4 Extended code
- 5 Measurement range
- 6 Manufacturing year and month

A0039931

4.3 Manufacturer address

Endress+Hauser Yamanashi Co., Ltd.
406-0846
862-1 Mitsukunugi, Sakaigawa-cho, Fuefuki-shi, Yamanashi

4.4 Storage and transport

4.4.1 Storage conditions

- Storage temperature: -20 to +70 °C (-4 to 158 °F)
- Store the device in its original packaging.

4.4.2 Transport

NOTICE

The housing may become damaged or dislodged.

Risk of injury

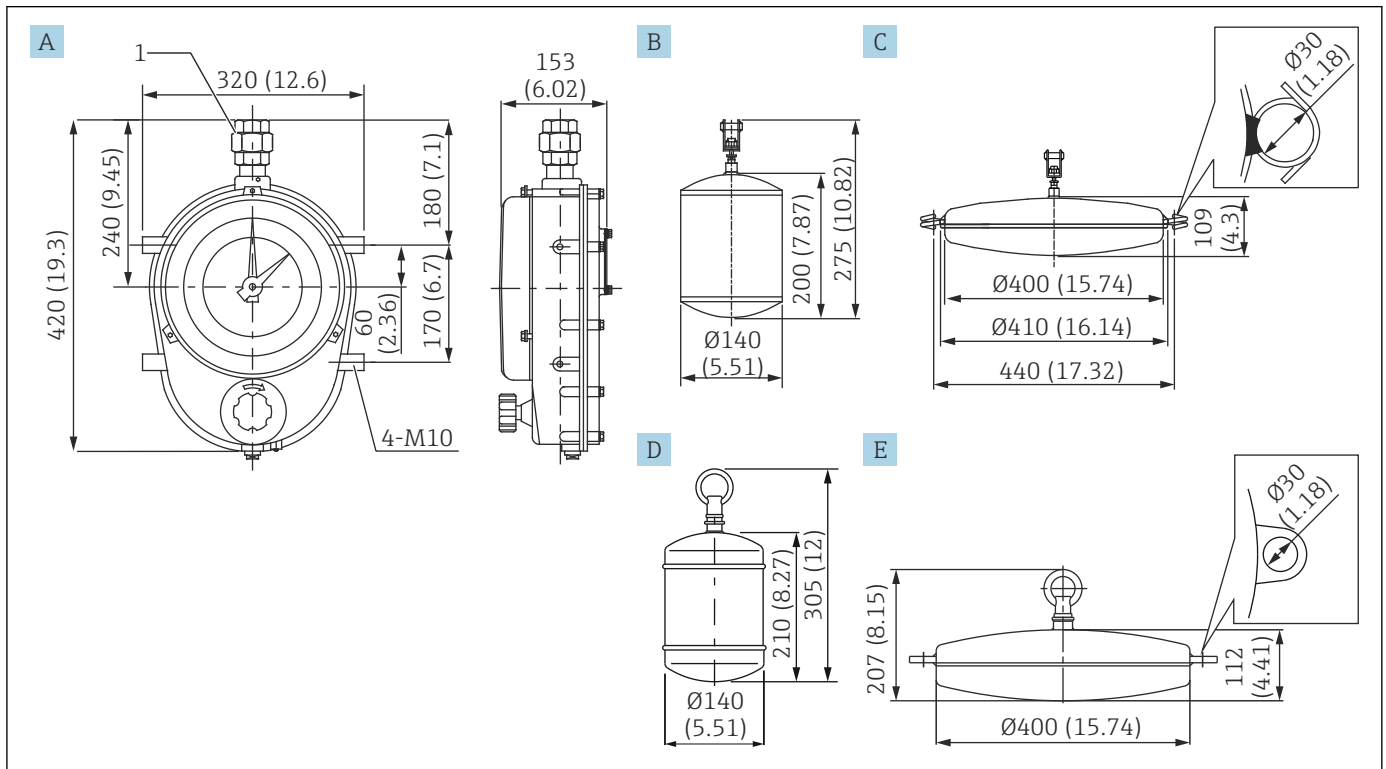
- ▶ When transporting the device to the measuring point, either use the device's original packaging or hold by the process connector.
- ▶ Secure a hoisting device (such as a hoisting ring or a lifting eye bolt) to the process connector, not to the housing. Pay attention to the device's center of gravity to prevent unexpected tilting.
- ▶ Comply with the safety precautions and transportation conditions for devices that weigh 18 kg (39.6 lbs) or more (IEC61010).

5 Installation

5.1 Dimensions of LT5

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

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



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

A Gauge head (ADC12)

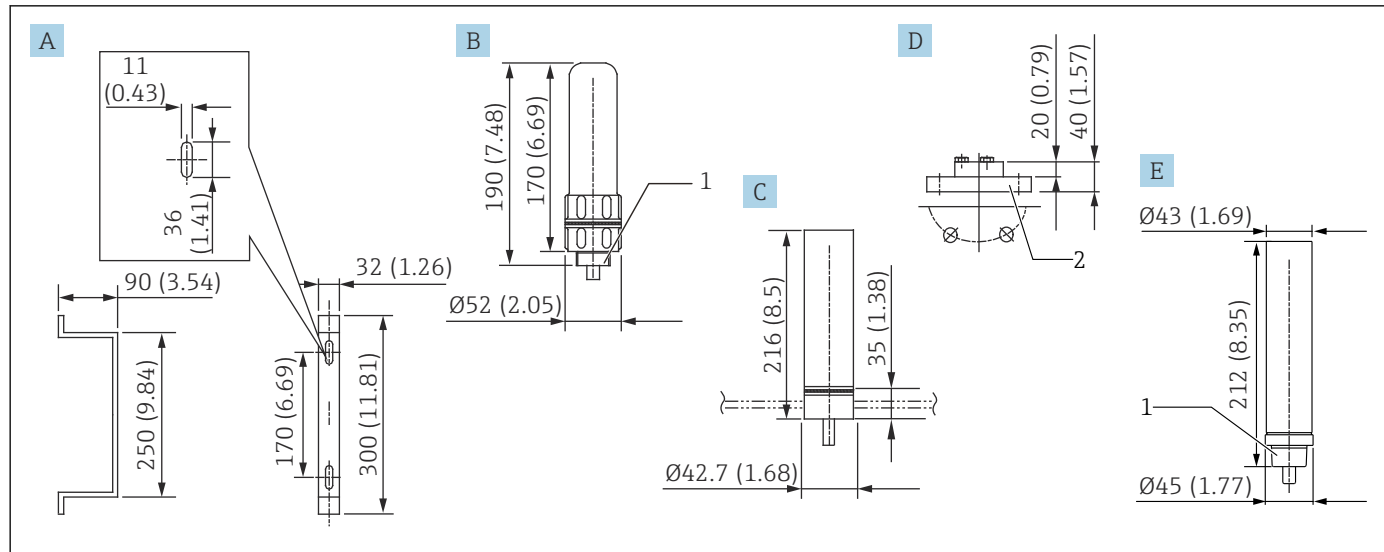
B Float $\phi 140$ (SUS316)

C Float $\phi 400$ (SUS316)

D Float $\phi 140$ (PVC)

E Float $\phi 400$ (PVC)

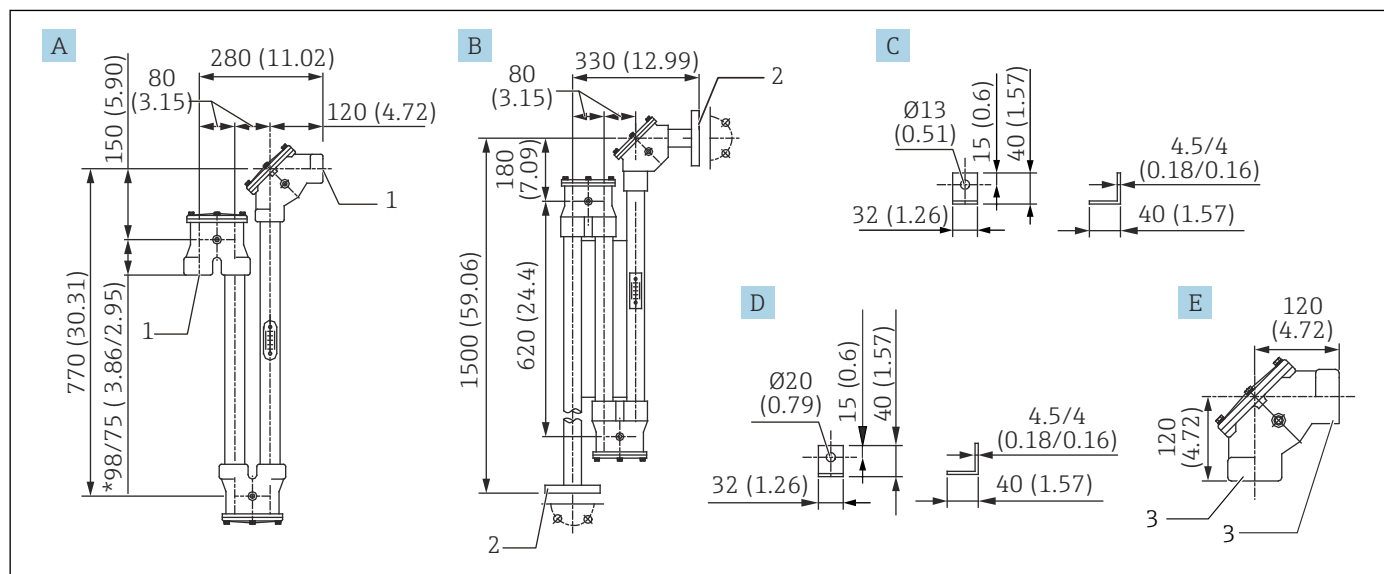
1 Union nut (select from JIS Rc 1-1/2 / ANSI NPT 1-1/2; select Rp 1-1/2 if there is no union nut)



A0041188

4 Accessory 1. Unit of measurement mm (in)

- A Gauge supporter (select from iron (SS400, t: 4.5 mm (0.18 in)) / SUS304, t: 4 mm (0.16 in))
 B Top anchor (ADC6)
 C Top anchor (SUS316 with socket welding type)
 D Top anchor (PVC: select from JIS 10K 40A FF / ASME NPS 1-1/2" Cl. 150 FF / JPI 40A 150 lbs FF)
 E Top anchor (SUS316)
 1 Select from JIS R1 / ANSI NPT 1



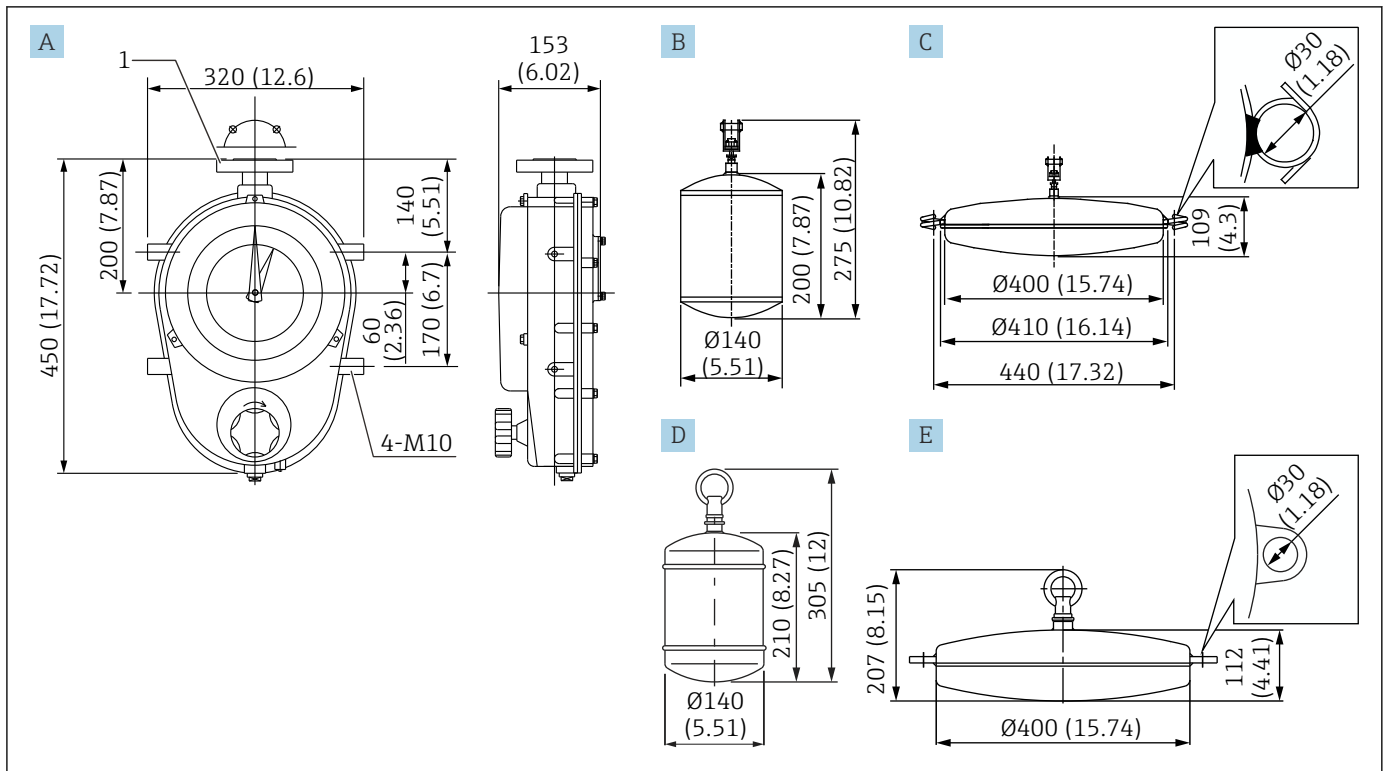
A0041189

5 Accessory 2. Unit of measurement mm (in)

- A Seal pot (select from aluminum + iron / SCS14+SUS316)
 B Seal pot (PVC: flange type only)
 C Anchor hook (main unit: select from iron / SUS316; bolt: SUS316L)
 D Anchor hook (main unit: select from iron / SUS316; bolt: PVC)
 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)
 3 Screw-in type (select from Rp 1-1/2 / NPT 1-1/2 as options)

- i** For seal pot 98 / 75, 98 mm (3.86 in) is the dimension of an aluminum seal pot while 75 mm (2.92 in) is the dimension of a stainless steel seal pot.
- For anchor hook 4.5 / 4, 4.5 mm (0.18 in) is the thickness of an iron anchor hook while 4 mm (0.16 in) is the thickness of a stainless steel anchor hook. Anchor hooks come with bolts, nuts, and washers.

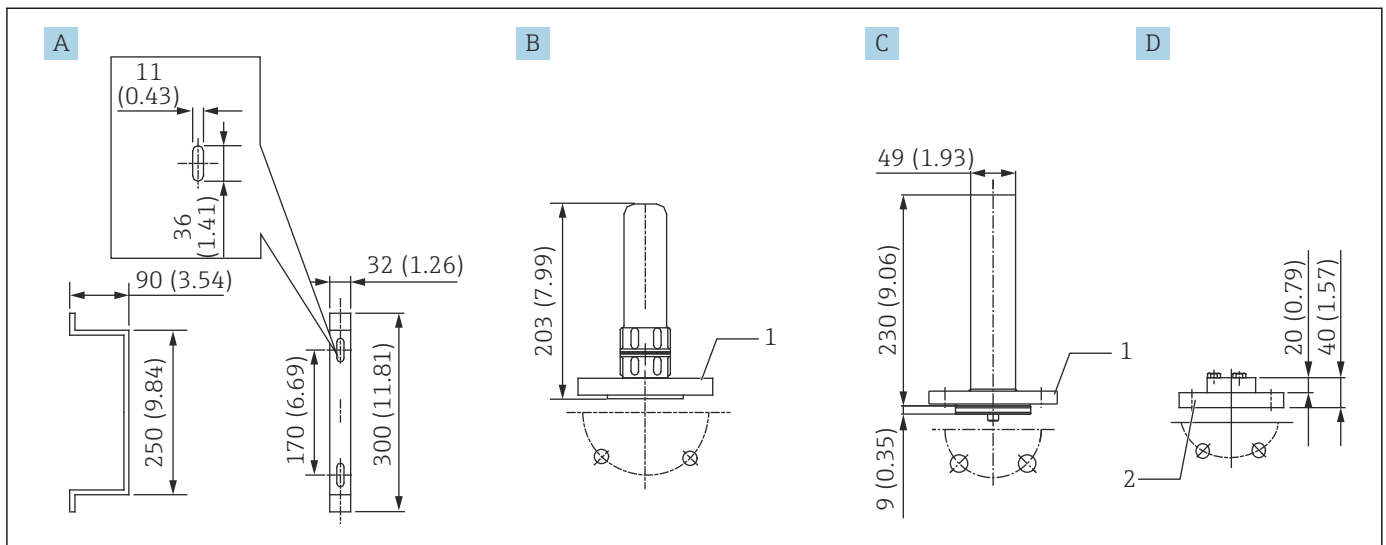
5.1.2 Dimensions of LT5-1 (flange, low-pressure type)



A0041187

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

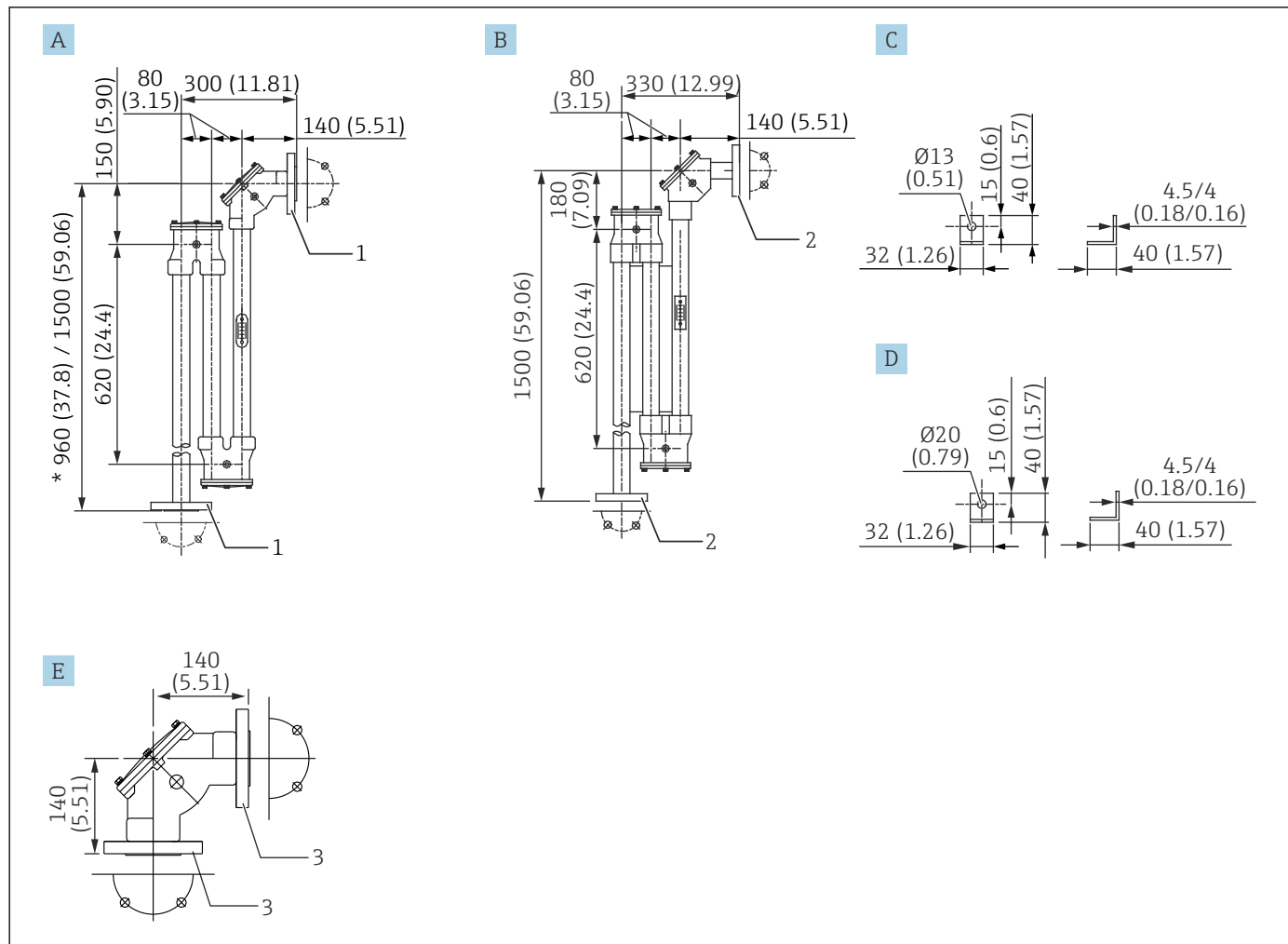
- A Gauge head (ADC12)
- B Float $\phi 140$ (SUS316)
- C Float $\phi 400$ (SUS316)
- D Float $\phi 140$ (PVC)
- E Float $\phi 400$ (PVC)
- 1 Flange (select from JIS 10K 40A RF / ASME NPS 1-1/2" Cl. 150 RF / JPI 40A 150 lbs RF)



A0041191

7 Accessory 1. Unit of measurement mm (in)

- A Gauge supporter (select from iron (SS400), t: 4.5 mm (0.18 in) / SUS304, t: 4 mm (0.16 in))
- 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)



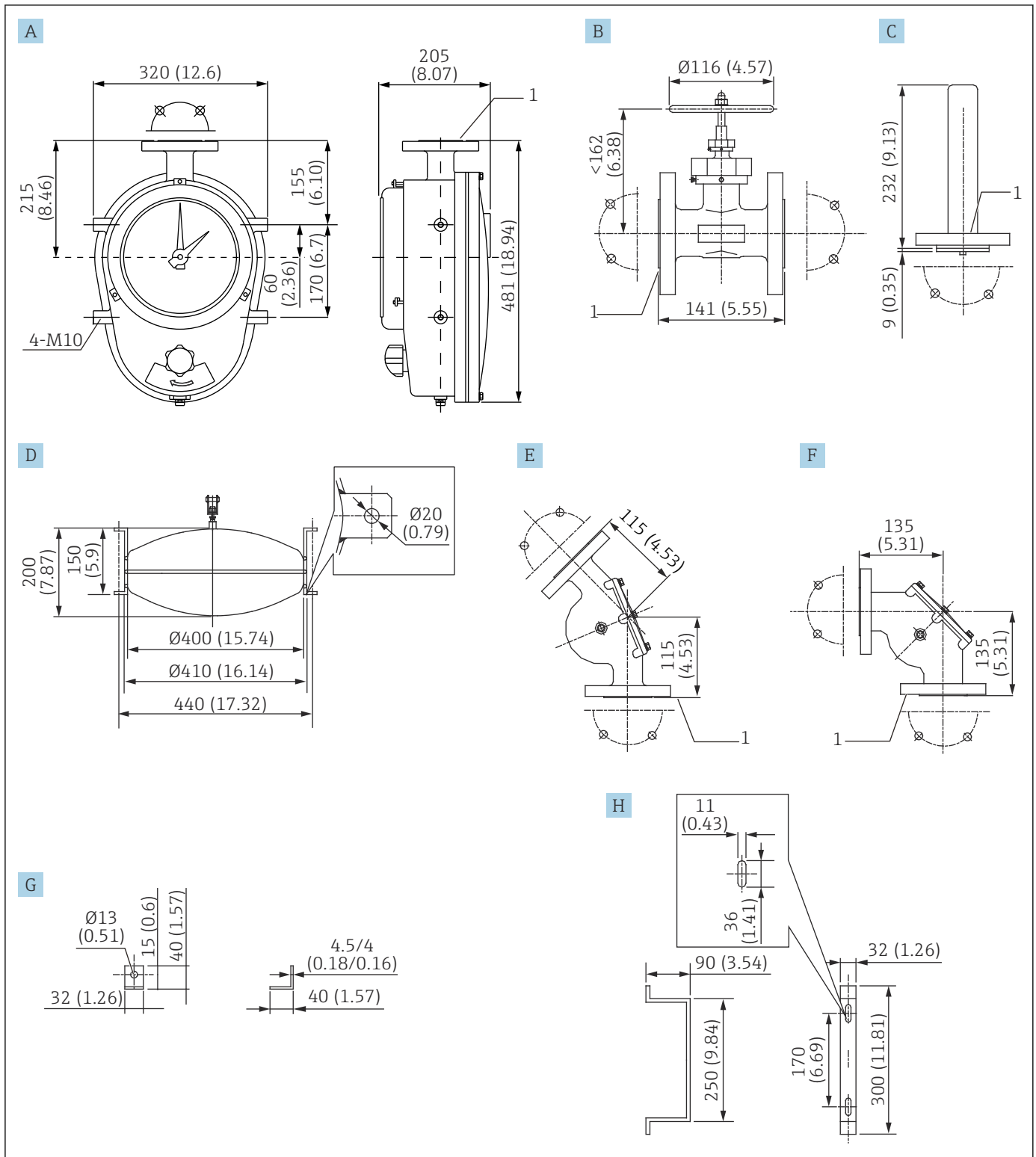
A0041192

8 Accessory 2. Unit of measurement mm (in)

- A Seal pot (select from aluminum + iron / SCS14+SUS316; see notes below)
 B Seal pot (PVC: flange type only)
 C Anchor hook (main unit: select from iron / SUS316; bolt: SUS316L)
 D Anchor hook (main unit: select from iron / SUS316; bolt: PVC)
 E 90° sheave elbow (select from ADC6+AC4A / SCS14+SUS316)
 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)
 3 Flange (select from JIS 10K 40A RF / ASME NPS 1-1/2" Cl. 150 RF / JPI 40A 150 lbs RF)

- i** ■ Seal pot: 960 / 1 500: 960 mm (37.8 in) is the dimension of a seal pot with a measuring tape alone while 1 500 mm (59.06 in) is the dimension of a seal pot with a tape and wire.
 ■ Seal pot: 98 / 75: 98 mm (3.86 in) is the dimension of an aluminum seal pot while 75 mm (2.95 in) is the dimension of a stainless steel seal pot.
 ■ For anchor hook 4.5 / 4, 4.5 mm (0.18 in) is the thickness of an iron anchor hook while 4 mm (0.16 in) is the thickness of a stainless steel anchor hook. Anchor hooks come with bolts, nuts, and washers.

5.1.3 Dimensions of LT5-4 (flange, medium-pressure type)



9 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 Ø400 (SUS316)
- E 135° sheave elbow (AC4C-T6)
- F 90° sheave elbow (AC4C-T6)

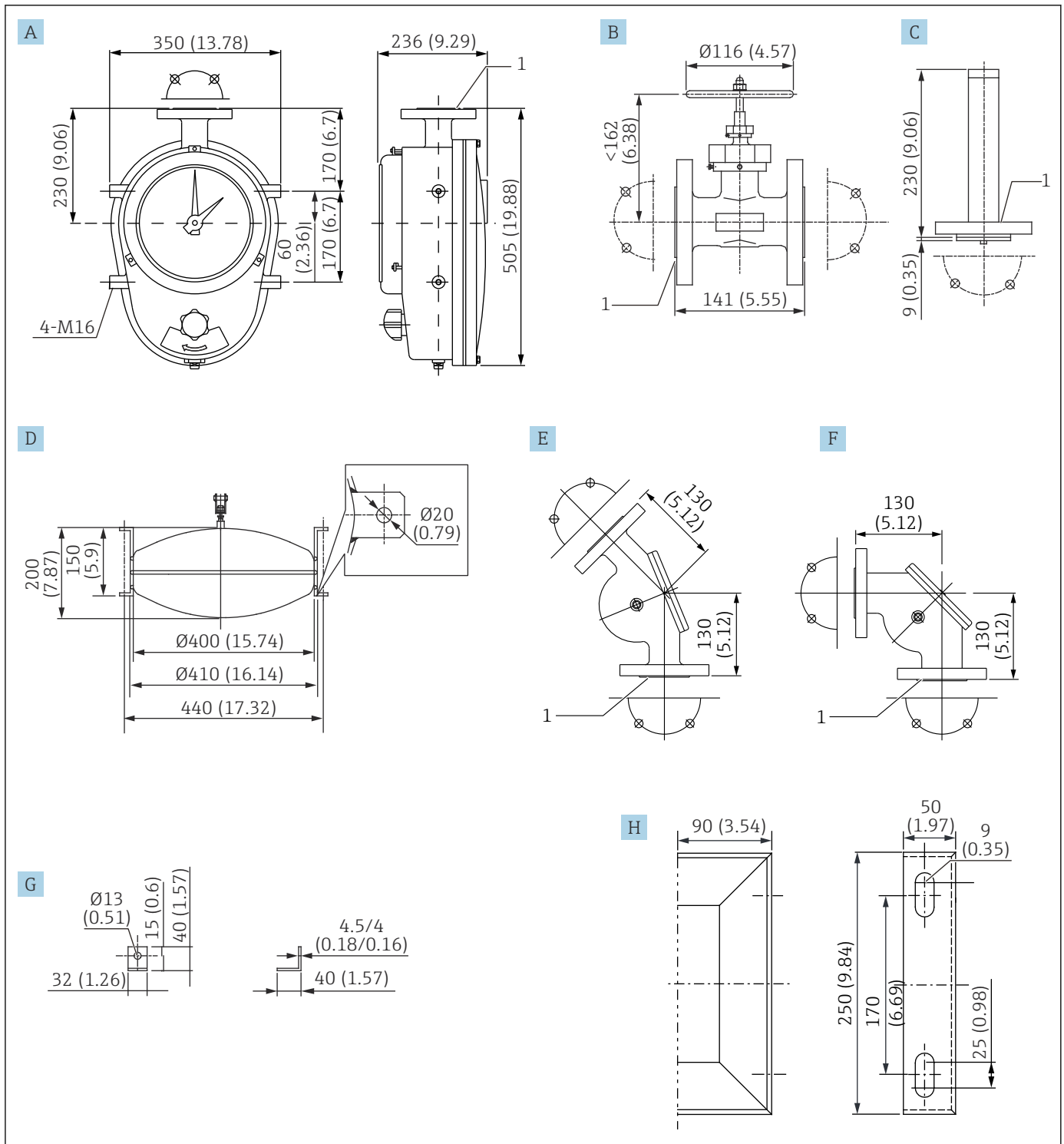
- G* Anchor hook (main unit: select from iron / SUS316; bolt: SUS316L)
H Gauge supporter (select from iron (SS400), t: 4.5 mm (0.18 in) / SUS304, t: 4 mm (0.16 in))
1 Flange (select from JIS 10K 40A RF / ASME NPS 1-1/2" Cl. 150 RF / JPI 40A 150 lbs RF)



For anchor hook 4.5 / 4, 4.5 mm (0.18 in) is the thickness of an iron anchor hook while 4 mm (0.16 in) is the thickness of a stainless steel anchor hook.

Anchor hooks come with bolts, nuts, and washers.

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



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

- A Gauge head (iron (SCPL1))
- B Gate valve (SCS13)
- C Top anchor (select from iron (STPL/S25C) / SUS316)
- D Float Ø400 (SUS316)
- E 135° sheave elbow (iron (SCPL1))
- F 90° sheave elbow (iron (SCPL1))

- G* Anchor hook (main unit: select from iron / SUS316; bolt: SUS316L)
H Gauge supporter (select from iron (SS400), t: 4 mm (0.16 in)) / SUS304, t: 4 mm (0.16 in))
1 Flange (select from JIS 10K/20K 40A RF / ASME NPS 1-1/2" Cl. 150/300 RF / JPI 40A 150/300 lbs RF)



For anchor hook 4.5 / 4, 4.5 mm (0.18 in) is the thickness of an iron anchor hook while 4 mm (0.16 in) is the thickness of a stainless steel anchor hook.

Anchor hooks come with bolts, nuts, and washers.

5.2 Installation preparation

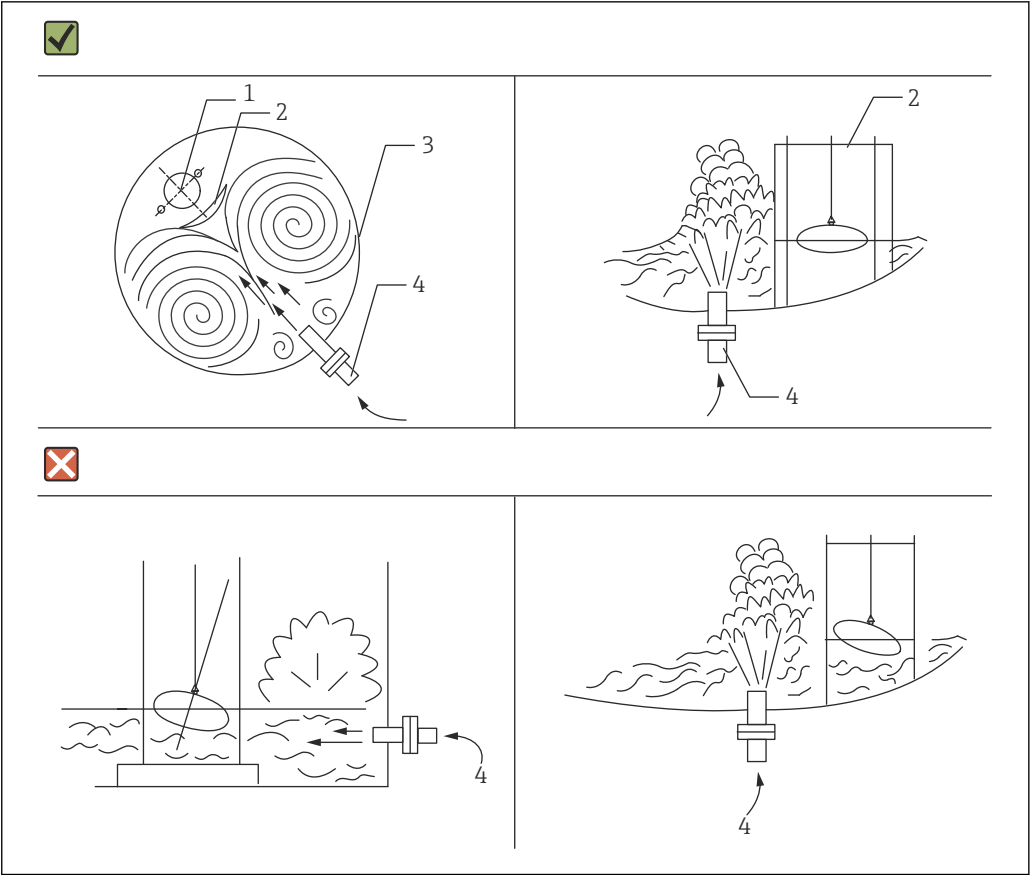
When installing LT, exercise the following precautions.

- When mounting the gauge head, select a location where it is the easiest to read the meter.
- The float must be installed so that it is positioned near the tank sidewall.
- In a spherical tank, the float must be installed so that it is positioned near the center of the tank.
- If the roof of a dome-roof tank has a steep incline, the float must be installed so that it is positioned near the center of the tank.
- Use an appropriate gasket on the flange connection to maintain airtightness.

CAUTION

Risk of tape severing

- ▶ Place the float as far away as possible from the tank's liquid inlet or stirrer, and install the float so that it is not impacted directly by waves. If there is no choice but to position the float where it is subjected to waves or liquid flow, install a wave guard to protect the float. Sudden injection of liquid near the float may cause the tape to sever.



A0039946

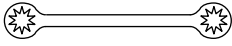
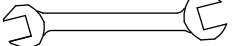
11 Installation conditions

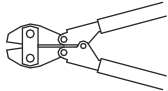
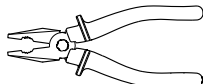
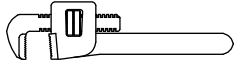
- 1 Center of the float
- 2 Wave guard installation
- 3 Tank
- 4 Liquid inlet

5.3 Tools

When installing LT5, prepare the following tools.

Required tools

Tools	Intended use	LT5-1 (screw-in)	LT5-1 (flange)	LT5-4	LT5-6
 12 Box-end wrench	13 mm: For sheave elbow cover	●	●	●	-
	24 mm: For sheave elbow cover	-	-	-	●
	17 mm: For gauge head on device supporter	○	○	○	-
	24 mm: For gauge head on device supporter	-	-	-	●
	24 mm: JIS flange (M16 x 2)	-	◎	◎	◎
	21 mm: 150 lbs flange (1/2" x 2)				
	32 mm: 300 lbs flange (3/4" x 2)				
 13 Wrench	19 mm: For tightening guide wire and compressing tension spring	●	●	●	●

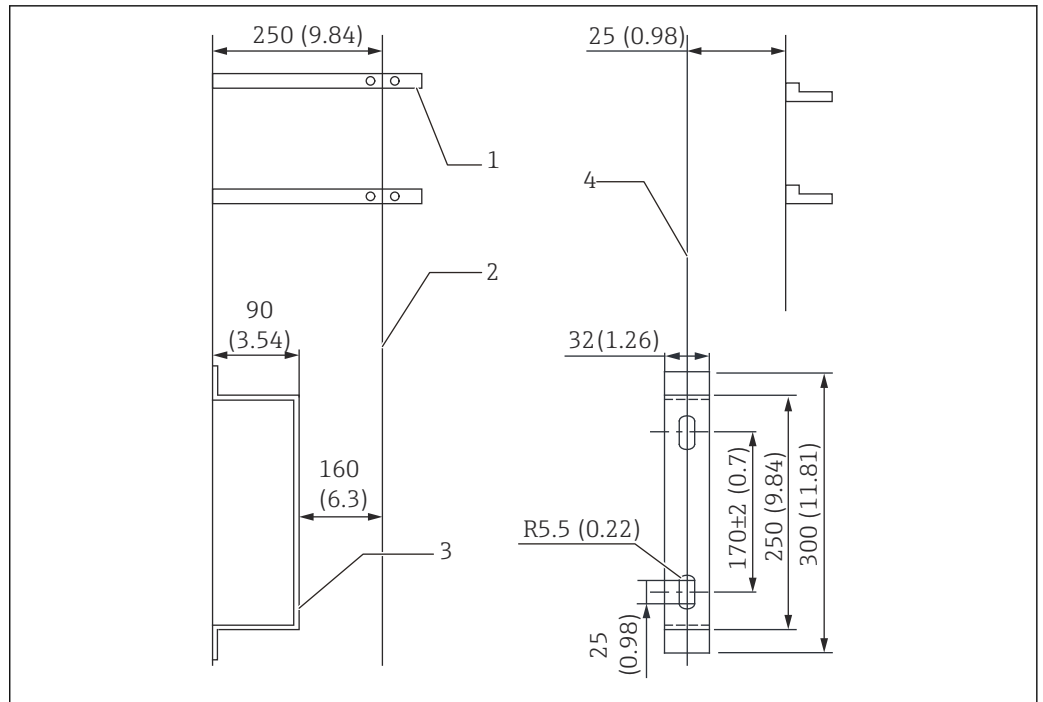
Tools	Intended use	LT5-1 (screw-in)	LT5-1 (flange)	LT5-4	LT5-6
  14 Water pump pliers	25 mm or more: For screw-in top anchor	●	-	-	-
  15 Wire rope cutter	For cutting excess guide wire	●	●	●	●
  16 Phillips head screwdriver	For tape clamps and adjusting the tape clamp counter-type display	○	○	-	○
  17 Nut driver	5.5 mm: For tape clamp and dial-type display 8 mm: For display cover	○	○	○	○
  18 Pliers	For screws for mounting tape clamps	○	○	○	○
  19 Sheet metal scissors	For cutting excess measuring tape	○	○	○	○
  20 Pipe wrench	600 mm or more: For guide pipes of a screw-in gauge head	○	-	-	-

-  ●: Use on tank roof
 ○: Use at ground level
 ◎: Use on tank roof and at ground level
 —: Do not use

5.4 Welding gauge supporter

When welding the gauge supporter, refer to the diagram below. Note that pipe supporters are not supplied.

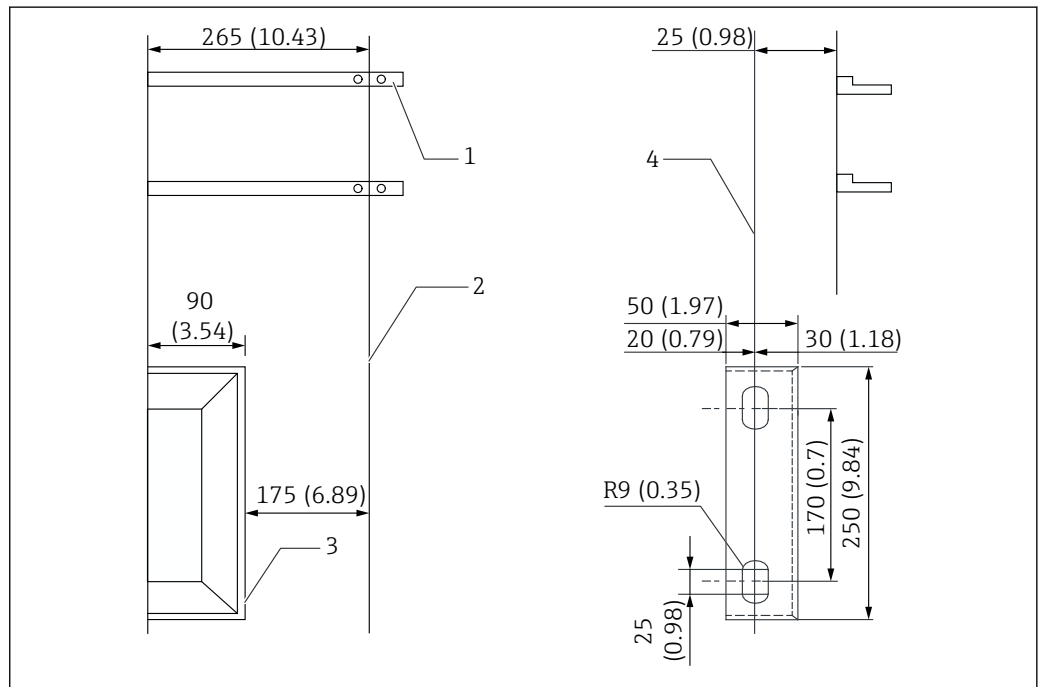
-  The distance from the outer tank wall to the gauge head center is 15 mm (0.59 in) longer for LT5-6 (high-pressure gauge head) compared to LT5-1 (low-pressure gauge head) and LT5-4 (medium-pressure gauge head).



A0041179

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

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



A0041180

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

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

5.5 Guide pipe

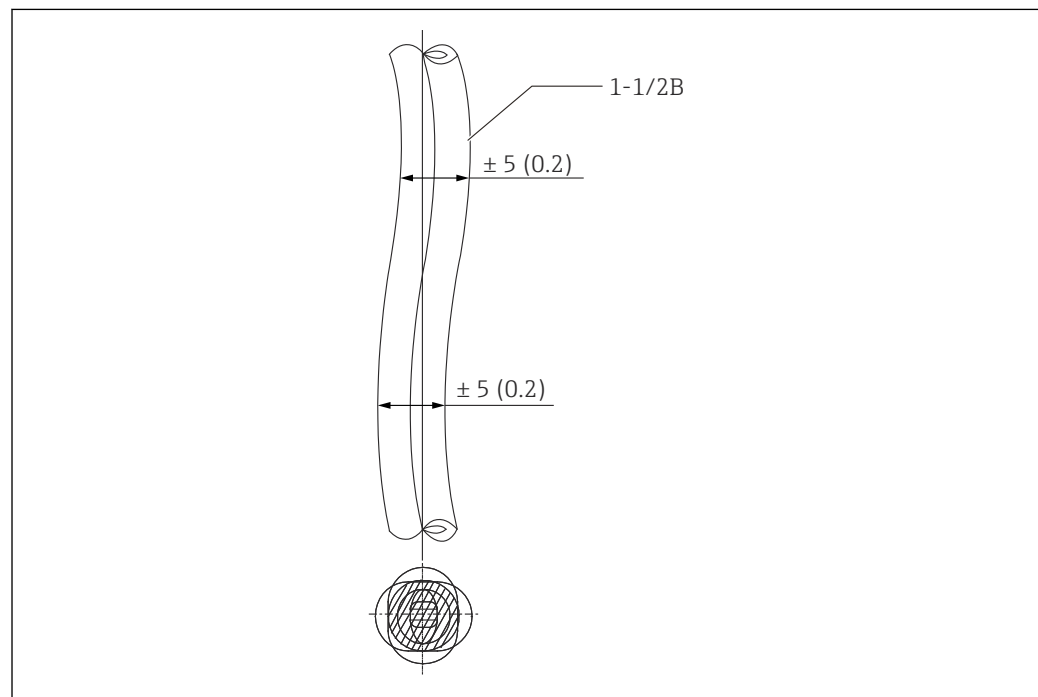
5.5.1 Guide pipe selection and mounting

Guide pipe mounting 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 mounting

- Guide pipes and pipe supporters are not supplied by Endress+Hauser.
- Keep the bend in the 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).



A0041181

23 Mounting guide pipes. Unit of measurement mm (in)

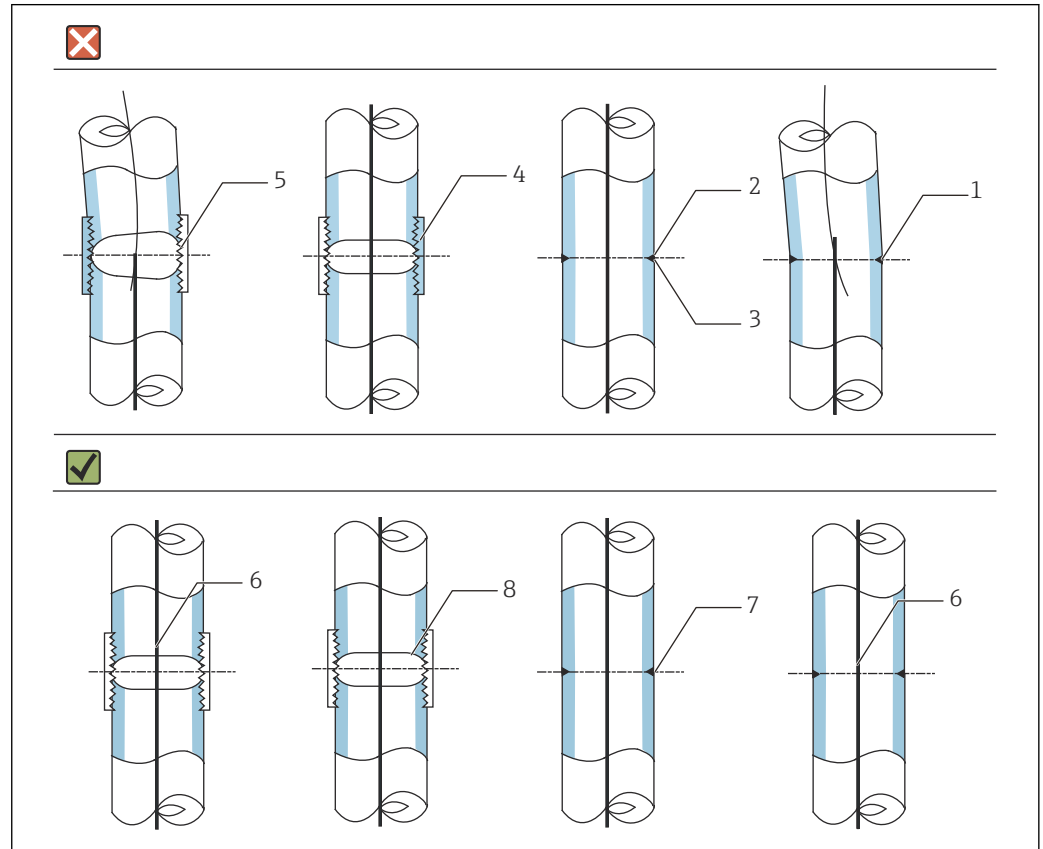
NOTICE

Recommended materials for guide pipes

- Only use galvanized SGP (white pipe) or SGPW 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.

5.5.2 Connecting guide pipes

- Use PTFE sealing tape and gaskets on the unions and flanges in order to maintain airtightness against gas and rain.
- Ensure that the joint is sealed completely to prevent rain water from penetrating into the gauge.
- When connecting the pipes, watch out for nonlinearity caused by a bent screw in a socket connection, internal protrusion of the cut section of the pipe, bending of the joint caused by welding, and the presence of welding burrs on the inside.



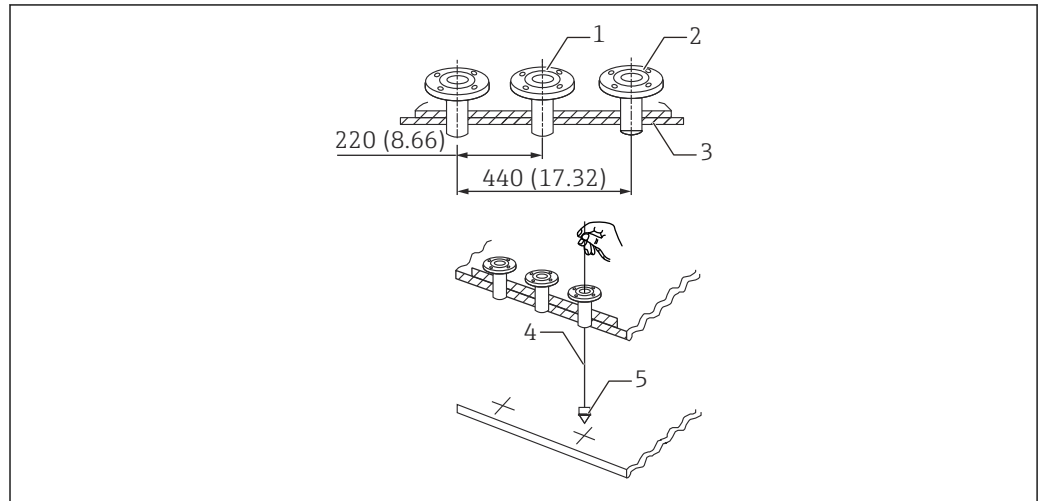
24 Connecting guide pipes

- 1 Bend due to welding
- 2 Weld
- 3 Welding burr
- 4 Burr
- 5 Bent screw
- 6 Vertical
- 7 Ensure that there is no welding burr in the inside
- 8 Chamfering

5.6 Top anchor and anchor hook

When installing an anchor hook, lower it so that it is perpendicular to the top anchor of a tank top and use a plumb to determine the position accurately.

 The flange will be a socket type depending on specifications.

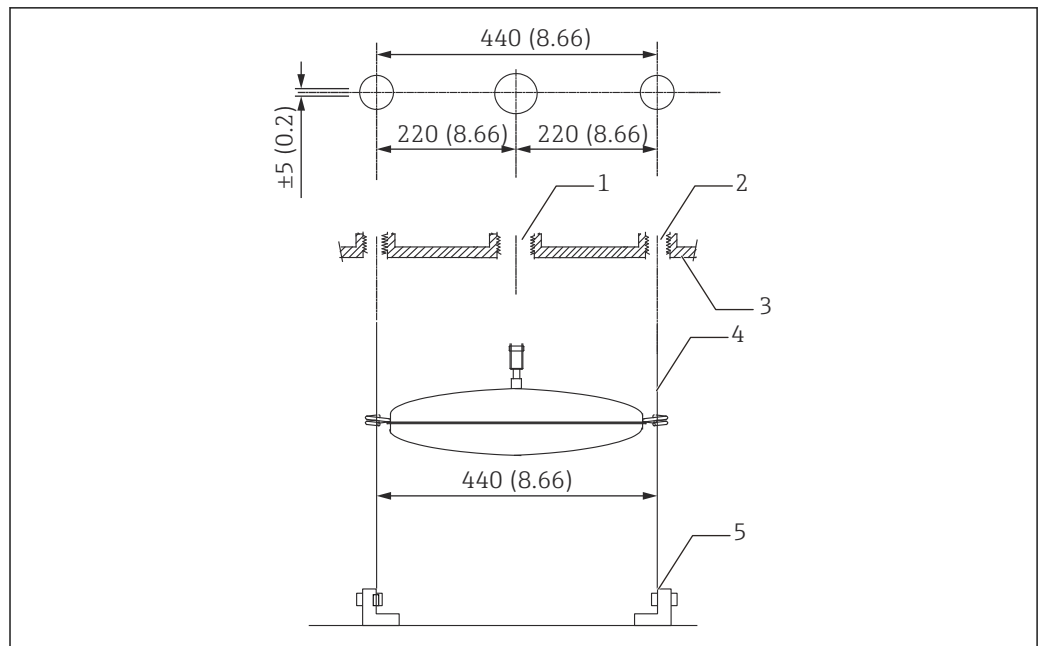


A0041183

 25 Top anchor pre-installation check. Unit of measurement mm (in)

- 1 Nozzle flange for gauge head
- 2 Nozzle flange for top anchor
- 3 Tank top
- 4 Leveling line
- 5 Plumb

Socket (screw-in type)



A0041185

 26 Mounting anchor hooks. Unit of measurement mm (in)

- 1 1-1/2B socket
- 2 1B socket
- 3 Tank top
- 4 Guide wire (single wire)
- 5 Anchor hook

5.7 Measuring tape and wire lengths

The lengths of the measuring tape and wire are longer than the actual measurable lengths for piping purposes. The length of the measuring tape and wire will vary depending on the specifications. The table below shows the actual length for each selection option of specification code 070 (measuring tape), depending on the selection options for specification code 060 (measuring range). Note that the maximum measured value that can be displayed on a gauge head corresponds to the measuring ranges. Refer to the table to select the appropriate length accordingly.

1. Code 070 (Option 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



(Example) If Option 1 of specification code 070 and Option 5 of specification code 060 (CRT: 20 m (65.62 ft)) are selected, the measuring tape will have a 22 m (72.18 ft) perforated portion, a 23 m (75.46 ft) non-perforated portion, and a total length of 45 m (147.63 ft).

2. Code 070 (Option 2): Measuring tape SUS316/tank-top mounting

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. Code 070 (Option 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

060 measurement range		Length (total length)	Perforated tape (measurement length)	Non-perforated tape	Spare parts
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. Code 070 (Option 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. Code 070 (Option 5) Measuring tape SUS316 + PFA-coated 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

5.8 Sealing materials for wetted liquid and wetted gas parts

List of materials

Product name	Component name	Name of sealing material	Type of sealing material	Packing and 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	Silicone rubber
	U-seal pot	Aluminum sheave elbow	Cover packing	V#6502
			Bearing O-ring	Silicone rubber
		Stainless steel sheave elbow	Cover packing	V#6502
			Bearing O-ring	Silicone 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 specifications CR
		Coupling unit	O-ring	PTFE
	Gate valve	Shaft	Shaft packing	PTFE
		Cap nut unit	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, flange welding type	Spring retainer packing	PTFE
		Stainless steel, flange welding type		

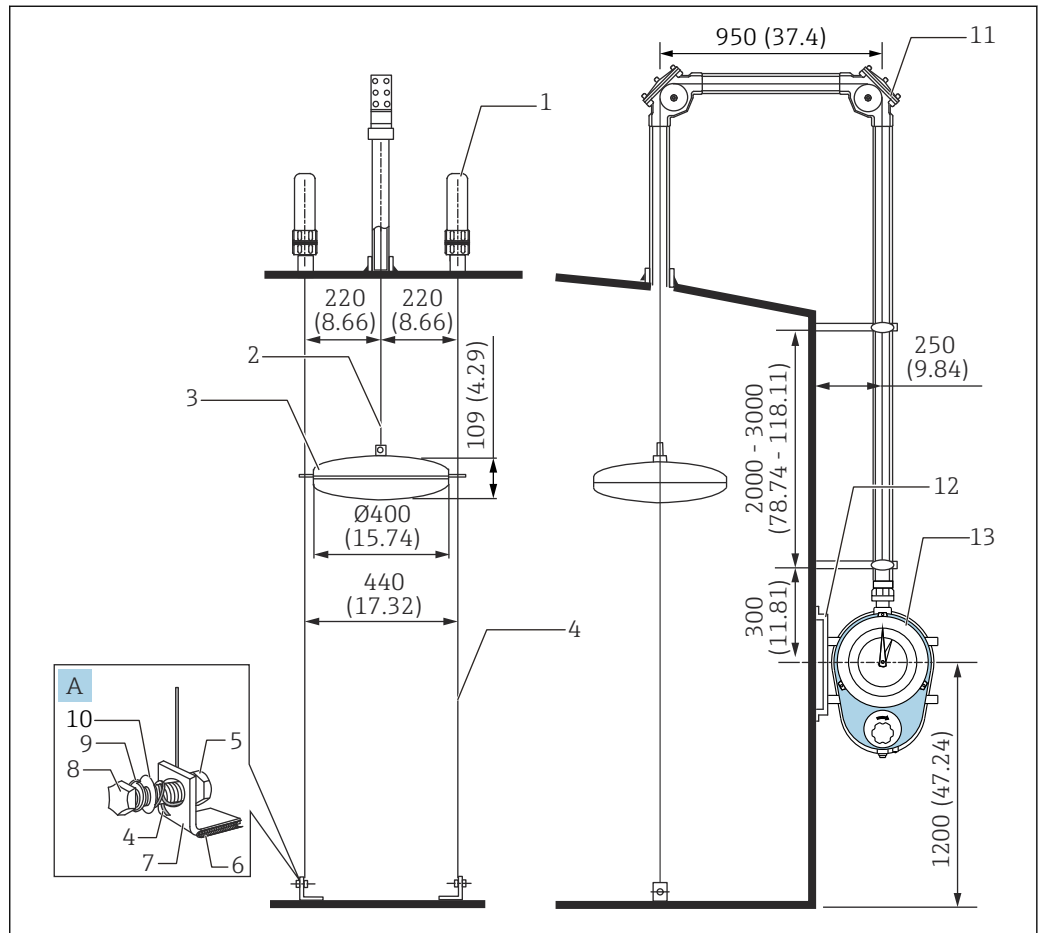
5.9 Material certificates

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

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

5.10 Reference installation diagrams and order codes

5.10.1 Cone roof tank (CRT)



A0041196

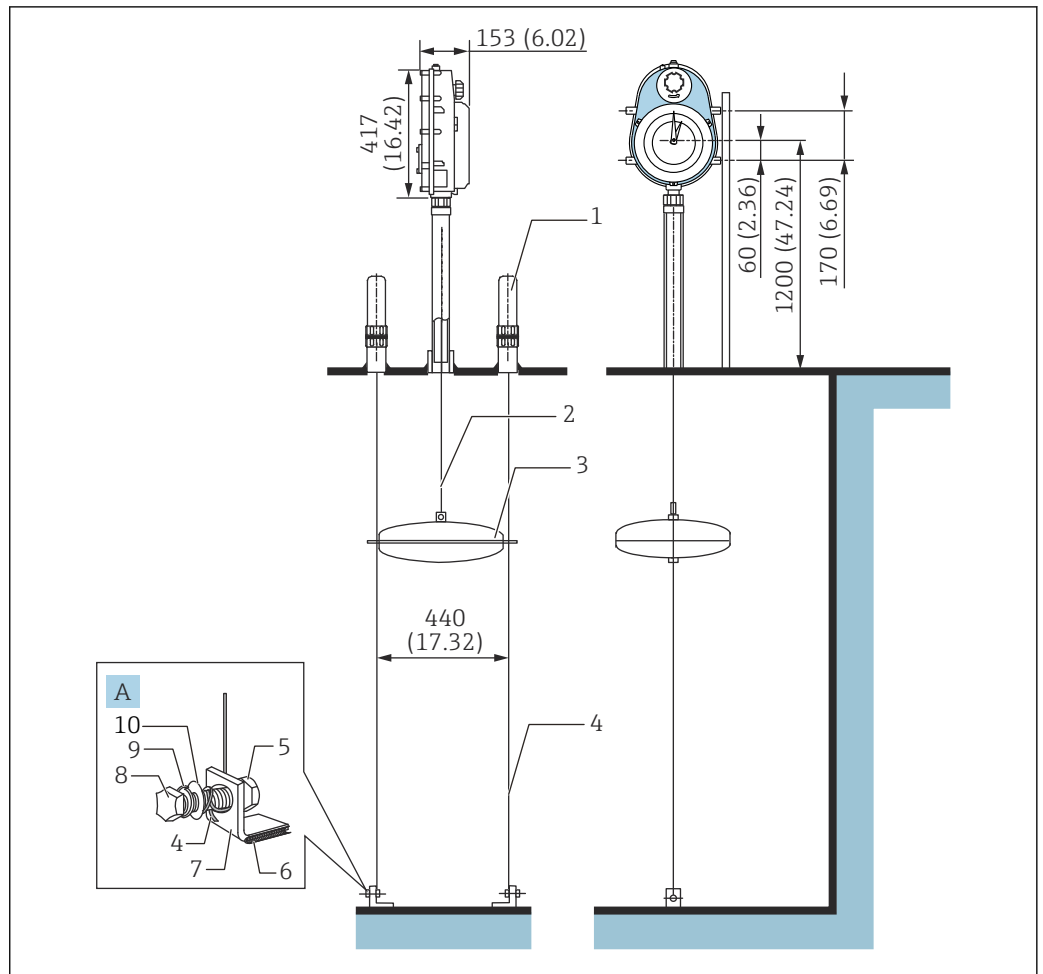
27 Mounting on a cone roof tank. Unit of measurement mm (in)

- A Anchor hook
- 1 Top anchor
- 2 Measuring tape
- 3 Float
- 4 Guide wire
- 5 Nut
- 6 Tank bottom (where anchor hook is welded to tank bottom)
- 7 Anchor hook
- 8 Bolt
- 9 Spring washer
- 10 Flat washer
- 11 90° sheave elbow
- 12 Gauge supporter
- 13 Gauge head

Order code example (LT5-111A031B11A111200000+PA)

Item	Target	Code	Specification	Quantity
020	Gauge head	1	0 to 0.1961 bar / 0.01961 MPa / 2.84 psi, aluminum (ADC12), low pressure	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 SUS316, 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	2
100	Guide wire	A	3 mm-diameter single wire, SUS316	
110	Anchor hooks; mounting bolts	1	Iron; SUS316 (mounting bolt) SUS316L	
120	90 ° sheave elbow	112	2x Rp 1-1/2, 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, iron, low-pressure/medium-pressure gauge head	1

5.10.2 Tank top mounting (for an underground tank)



A0041197

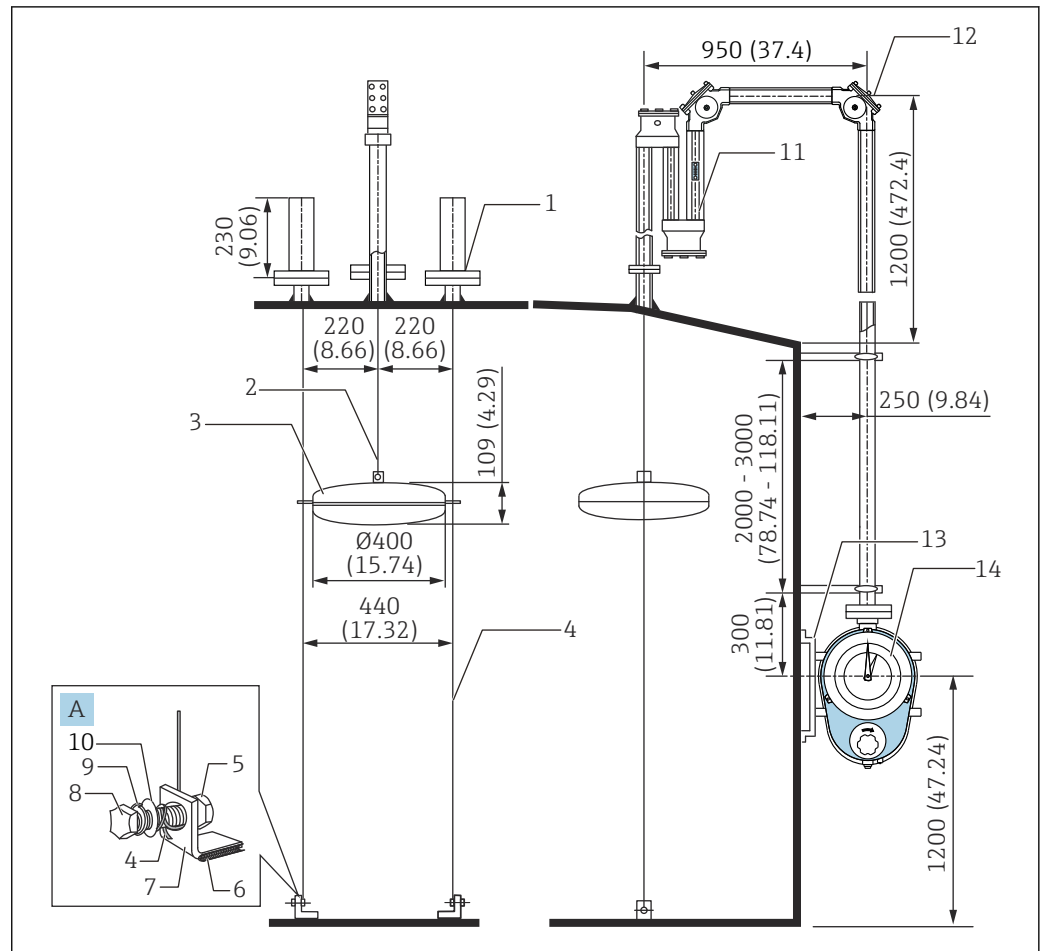
■ 28 Mounting on an underground tank. Unit of measurement mm (in)

- A Anchor hook
- 1 Top anchor
- 2 Measuring tape
- 3 Float
- 4 Guide wire
- 5 Nut
- 6 Tank bottom (where anchor hook is welded to tank bottom)
- 7 Anchor hook
- 8 Bolt
- 9 Spring washer
- 10 Flat washer

Order code example (LT5-111C022B11A100000000)

Item	Target	Code	Specification	Quantity
020	Gauge head	1	0 to 0.1961 bar / 0.01961 MPa / 2.84 psi, aluminum (ADC12), low pressure	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 SUS316, 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	2
100	Guide wire	A	3 mm-diameter single wire, SUS316	
110	Anchor hooks; mounting bolts	1	Iron; SUS316 (mounting bolt) SUS316L	
120	90 ° sheave elbow	000	None	-
130	135 ° sheave elbow	000	None	
140	Seal pot	0	None	
150	Gate valve	0	None	

5.10.3 Cone roof tank (with seal pot for CRT)



A0041198

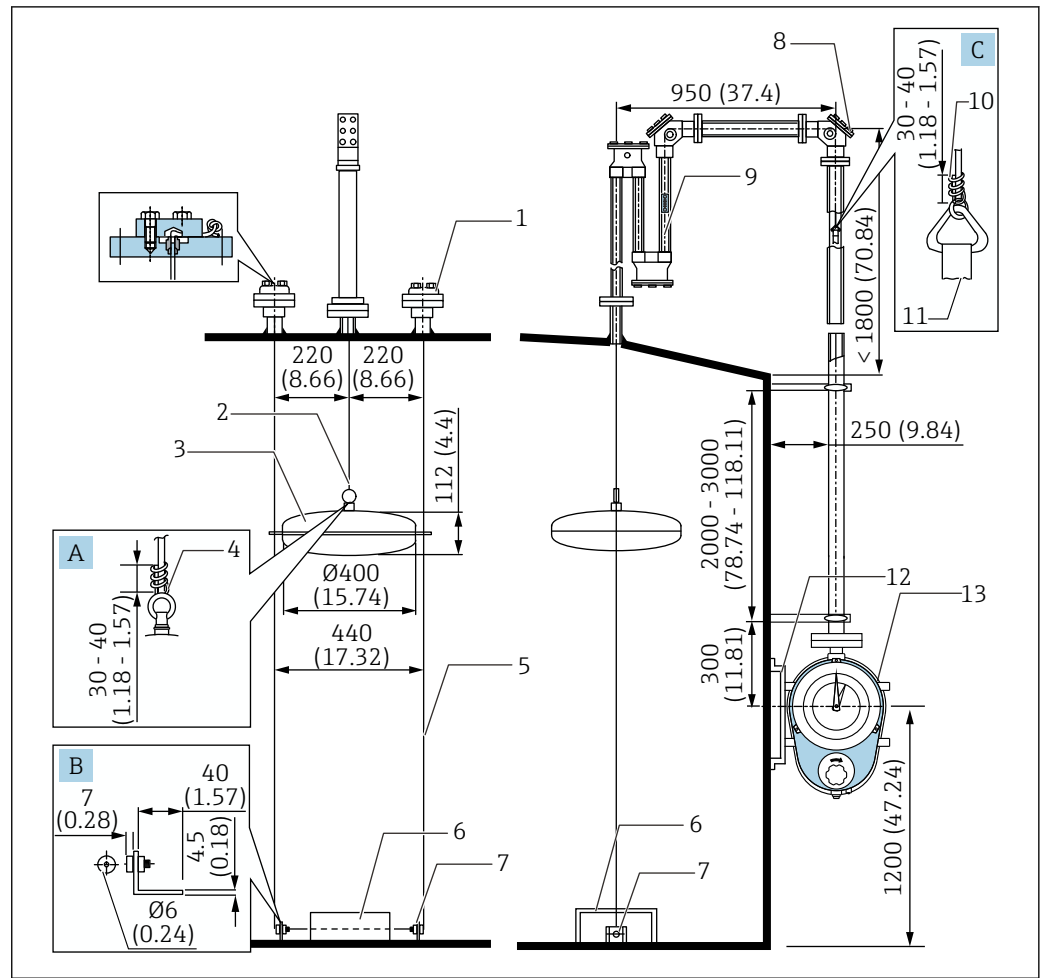
29 Mounting with seal pot for CRT. Unit of measurement mm (in)

- A Anchor hook
- 1 Top anchor
- 2 Measuring tape
- 3 Float
- 4 Guide wire
- 5 Nut
- 6 Tank bottom (where anchor hook is welded to tank bottom)
- 7 Anchor hook
- 8 Bolt
- 9 Spring washer
- 10 Flat washer
- 11 Seal pot
- 12 90° sheave elbow
- 13 Gauge supporter
- 14 Gauge head

Order code example (LT5-11AA023B1BA21A1000F0+PA)

Item	Target	Code	Specification	Quantity
020	Gauge head	1	0 to 0.1961 bar / 0.01961 MPa / 2.84 psi, aluminum (ADC12), low pressure	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 SUS316, 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	2
100	Guide wire	A	3 mm-diameter single wire, SUS316	
110	Anchor hooks; mounting bolts	2	SUS316; SUS316 (mounting bolt) SUS316L	
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, iron, low-pressure/medium-pressure gauge head	1

5.10.4 Cone roof tank (with seal pot PVC for CRT)



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

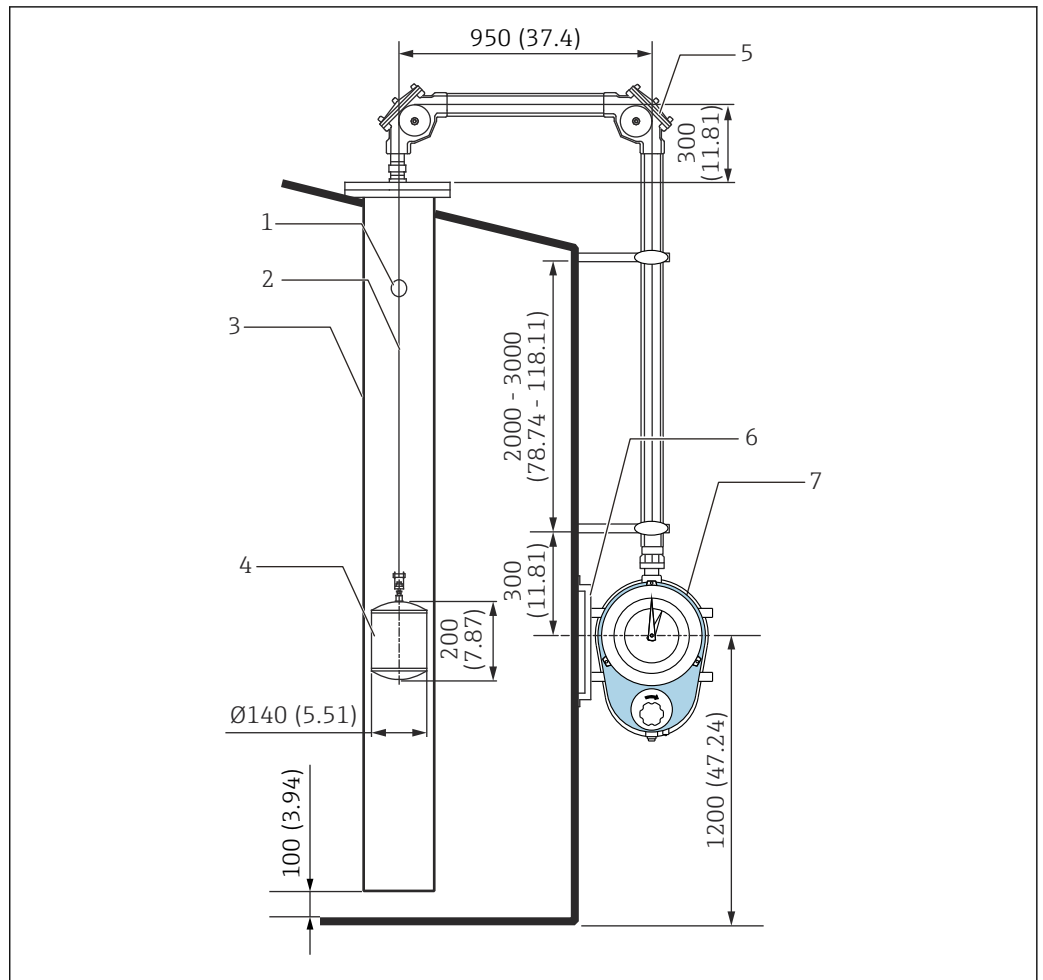
- A Float tip
- B Anchor hook details
- C Measuring tape, measuring wire connection
- 1 Top anchor
- 2 Measuring wire
- 3 Float
- 4 Teflon tube
- 5 Guide wire (PFA-coated wire)
- 6 Wire protection stand (not supplied)
- 7 Anchor hook
- 8 90° sheave elbow
- 9 Seal pot
- 10 Support wire (stainless steel,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

- i** ■ Wrap the provided Teflon-coated tube 10 to 15 times around the measuring wire.
- 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) above the gauge head when the liquid level is at its maximum.

Order code example (LT5-11AA025H1NC41A1000N0+PA)

Item	Target	Code	Specification	Quantity
020	Gauge head	1	0 to 0.1961 bar / 0.01961 MPa / 2.84 psi, aluminum (ADC12), low pressure	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	Measuring tape SUS316+PFA coated SUS316 wire, seal pot / CRT	
080	Float	H	D400 mm SUS316 wire connection 5.0 kg, 0.65 ≤ density 1.05, with ring	
090	Top anchor	1N	2x 10K 40A RF, PVC, flange JIS B2220	2
100	Guide wire	C	4.6 mm-diameter stranded wire, PFA-coated SUS316	1
110	Anchor hooks; mounting bolts	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, iron, low-pressure/medium-pressure gauge head	1

5.10.5 Compact cone roof tank (guide pipe method)



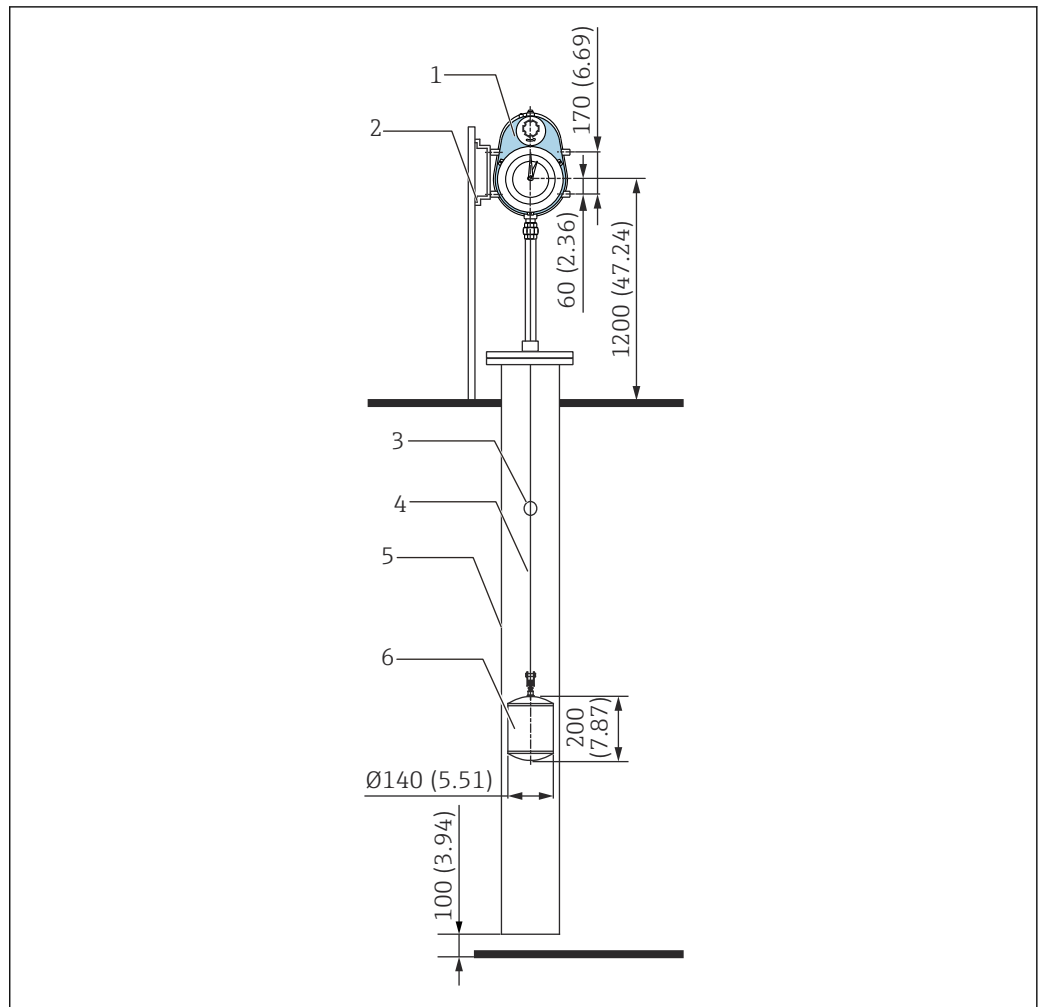
31 Mounting on a compact cone roof tank. Unit of measurement mm (in)

- 1 Ventilation hole
- 2 Measuring tape
- 3 Guide pipe (stilling well, not supplied)
- 4 Float
- 5 90° sheave elbow
- 6 Gauge supporter
- 7 Gauge head

Order code example (LT5-111A021L000011200000+PA)

Item	Target	Code	Specification	Quantity
020	Gauge head	1	0 to 0.1961 bar / 0.01961 MPa / 2.84 psi, aluminum (ADC12), low pressure	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 SUS316, 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 hooks; mounting bolts	0	None	
120	90 ° sheave elbow	112	2x Rp 1-1/2, 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, iron, low-pressure/medium-pressure gauge head	1

5.10.6 Tank top mounting (guide pipe method)



A0041201

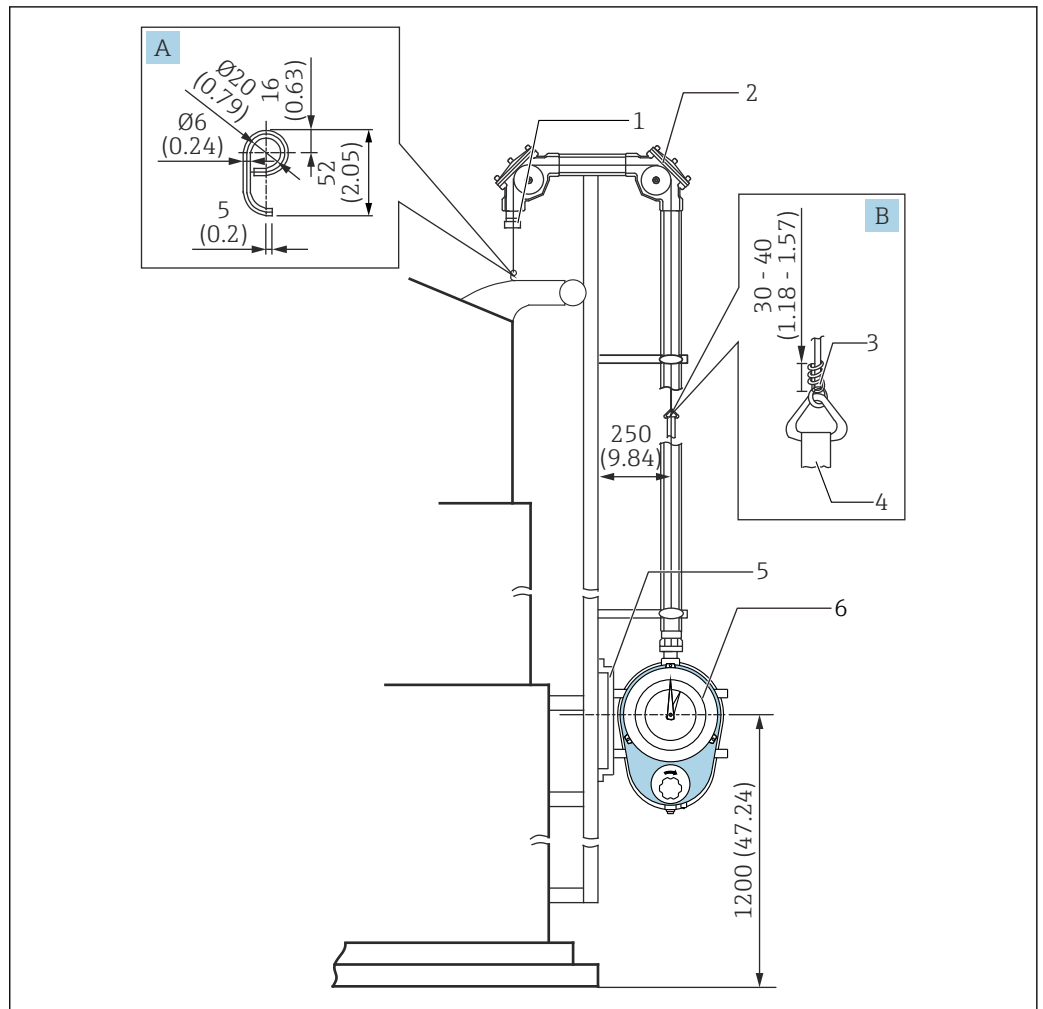
32 Tank top mounting, unit. Unit of measurement mm (in)

- 1 Gauge head
- 2 Gauge supporter
- 3 Ventilation hole
- 4 Measuring tape
- 5 Guide pipe (stilling well, not supplied)
- 6 Float

Order code example (LT5-111C022L000000000000+PA)

Item	Target	Code	Specification	Quantity
020	Gauge head	1	0 to 0.1961 bar / 0.01961 MPa / 2.84 psi, aluminum (ADC12), low pressure	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 SUS316, tank top mounting	
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 hooks; mounting bolts	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, iron, low-pressure/medium-pressure gauge head	1

5.10.7 Gas holder



A0041202

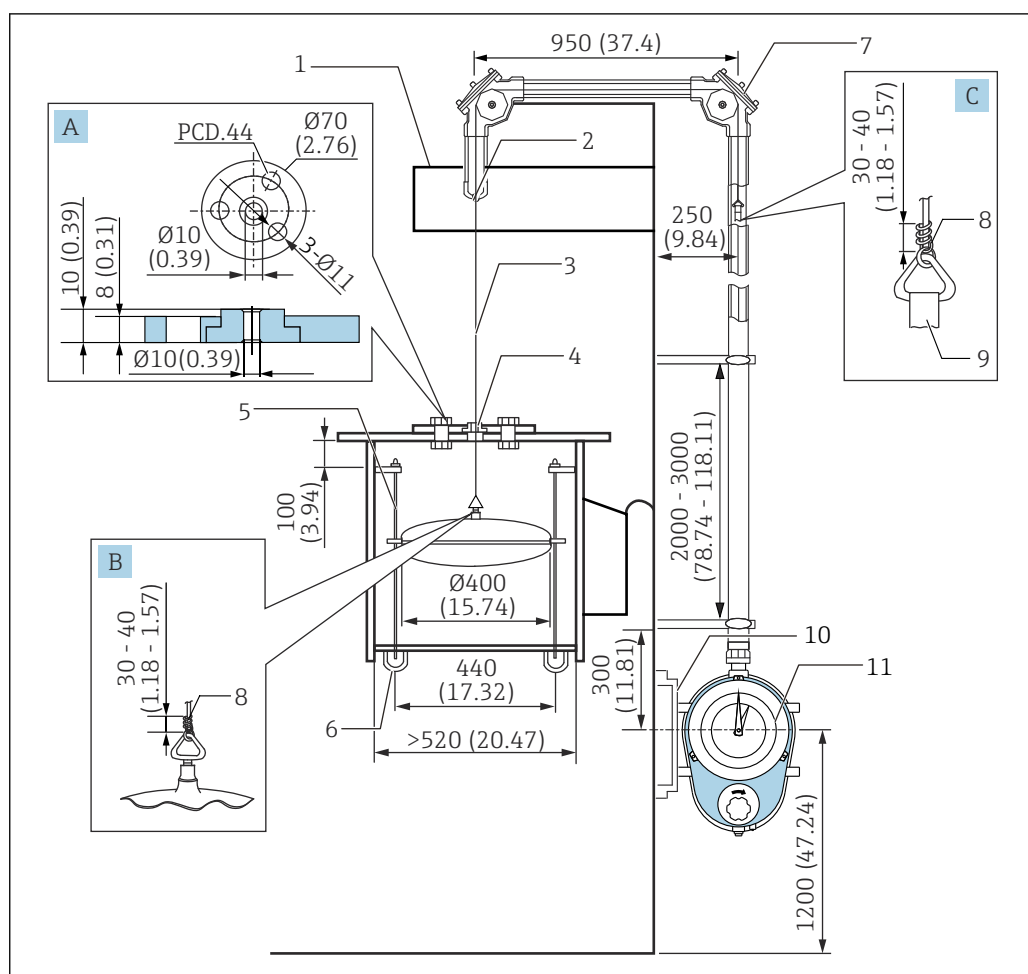
33 Mounting a gas holder. Unit of measurement mm (in)

- A Gas holder wire hook
- B Measuring tape, measuring wire connection
- 1 Wire guide socket
- 2 90° sheave elbow
- 3 Support wire (stainless steel, supplied)
- 4 Measuring tape
- 5 Gauge supporter
- 6 Gauge head

Order code example (LT5-111A0340000011200000+PAPFPH)

Item	Target	Code	Specification	Quantity
020	Gauge head	1	0 to 0.1961 bar / 0.01961 MPa / 2.84 psi, aluminum (ADC12), low pressure	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	Measuring tape SUS316+wire SUS316, FRT	
080	Float	0	None	-
090	Top anchor	00	None	
100	Guide wire	0	None	
110	Anchor hooks; mounting bolts	0	None	
120	90 ° sheave elbow	112	2x Rp 1-1/2, 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, iron, low-pressure/medium-pressure gauge head	1
620	>>Enclosed accessories	PF	Wire guide socket, Rc 1-1/2, iron main unit, metal PVC	
620	>>Enclosed accessories	PH	Gas holder wire hook, iron	

5.10.8 Floating roof tank (FRT)



A0041203

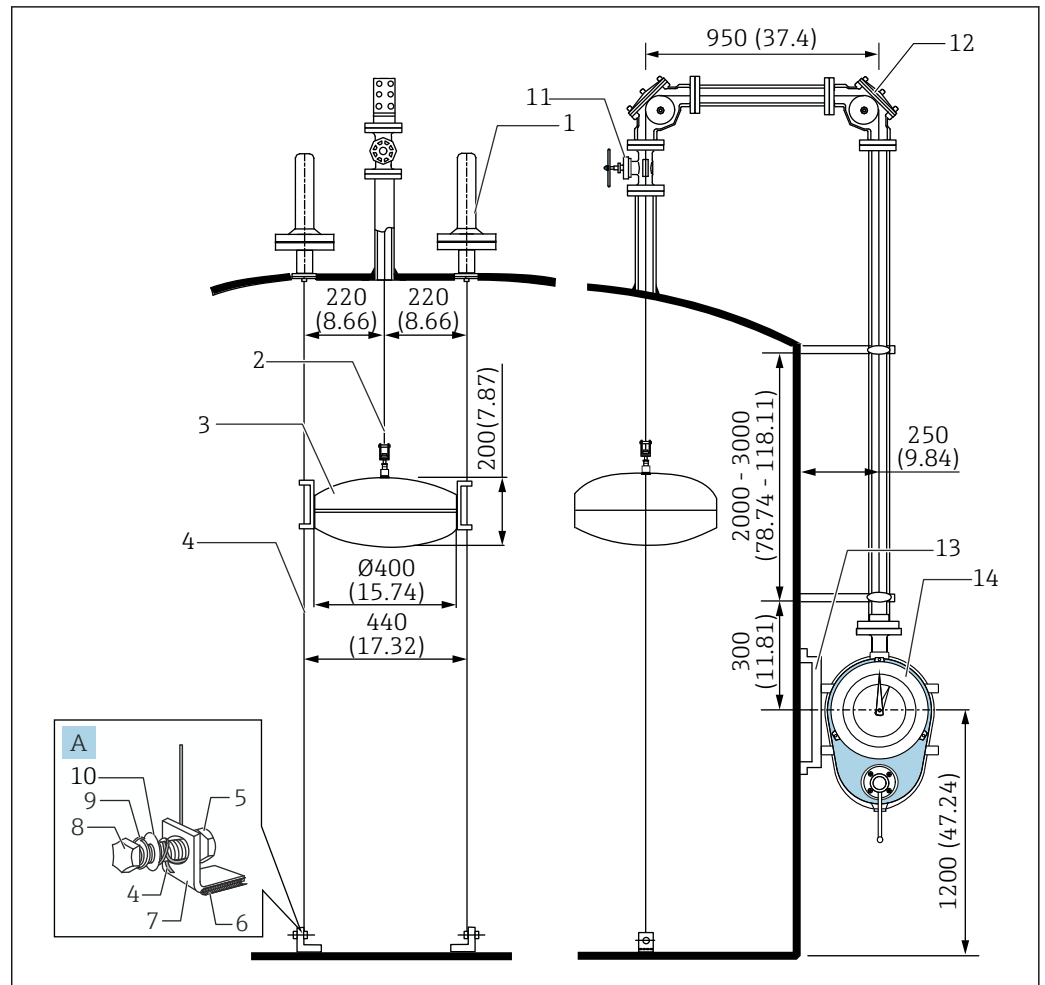
34 Mounting on a floating roof tank. Unit of measurement mm (in)

- | | |
|----|--|
| A | Wire guide metal |
| B | Top of the float |
| C | Measuring tape, measuring wire connection |
| 1 | Roof stand (not supplied) |
| 2 | Wire guide socket |
| 3 | Measuring wire |
| 4 | FRT wire guide metal |
| 5 | Guide bar: $\phi 16$ mm (0.63 in) (not supplied) |
| 6 | Pipe end: 1 ^B Sch 40 to 80 (not supplied) |
| 7 | 90° sheave elbow |
| 8 | Support wire (stainless steel, supplied) |
| 9 | Measuring tape |
| 10 | Gauge supporter |
| 11 | Gauge head |

Order code example (LT5-111A054E000011200000+PAPEPF)

Item	Target	Code	Specification	Quantity
020	Gauge head	1	0 to 0.1961 bar / 0.01961 MPa / 2.84 psi, aluminum (ADC12), low pressure	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	Measuring tape SUS316+wire SUS316, 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 hooks; mounting bolts	0	None	
120	90 ° sheave elbow	112	2x Rp 1-1/2, 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-pressure/medium-pressure gauge head	1
620	>>Enclosed accessories	PE	FRT wire guide metal, main unit SS400, metal, PTFE, bolt SUS316L	
620	>>Enclosed accessories	PF	Wire guide socket, Rc 1-1/2, iron main unit, metal PVC	

5.10.9 Medium-pressure dome roof tank



A0041204

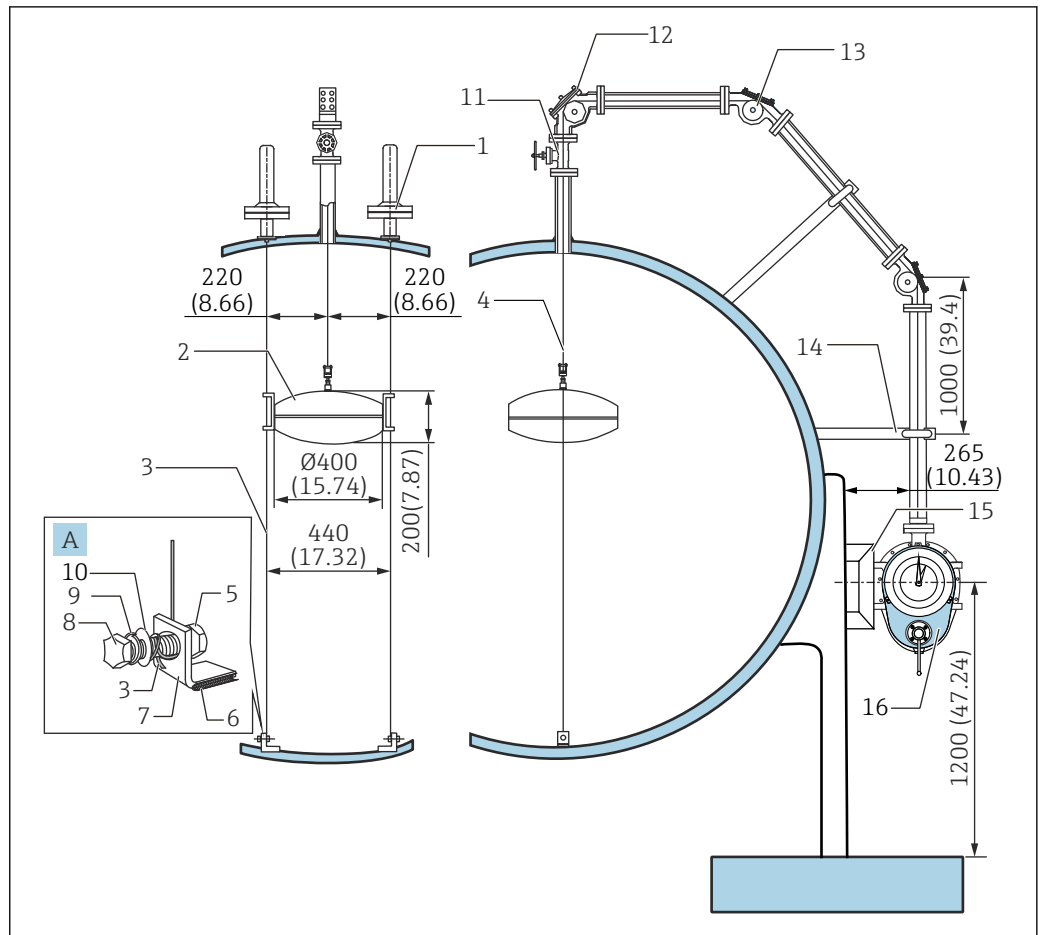
35 Mounting on a medium-pressure dome roof tank. Unit of measurement mm (in)

- A Anchor hook
- 1 Top anchor
- 2 Measuring tape
- 3 Float
- 4 Guide wire
- 5 Nut
- 6 Tank bottom (where anchor hook is welded to tank bottom)
- 7 Anchor hook
- 8 Bolt
- 9 Spring washer
- 10 Flat washer
- 11 Gate valve
- 12 90° sheave elbow
- 13 Gauge supporter
- 14 Gauge head

Order code example (LT5-44AB151R4AA24A200001+PA)

Item	Target	Code	Specification	Quantity
020	Gauge head	4	0 to 0.9807 bar / 0.09807 MPa / 14.22 psi, aluminum (AC4C-T6), medium pressure	1
030	Gauge head process connection	4A	10K 40A RF, aluminum (AC4C-T6), flange JIS B2220	
040	Display; cover	B	Dial display; glass + iron	
050	Crank unit	1	Available	
060	Measurement range	5	20 m	
070	Measuring tape	1	Measuring tape SUS316, CRT	
080	Float	R	D400 mm SUS316 tape connection 8.3 kg, $0.5 \leq \text{density}$ 0.7, with ring	
090	Top anchor	4A	2x 10K 40A RF, aluminum (AC4C-T6), flange JIS B2220	2
100	Guide wire	A	3 mm-diameter single wire, SUS316	
110	Anchor hooks; mounting bolts	2	SUS316; SUS316 (mounting bolt) SUS316L	
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	1
620	>>Enclosed accessories	PA	Gauge supporter, iron, low-pressure/medium-pressure gauge head	

5.10.10 High-pressure spherical tank



A0041205

36 Mounting on a high-pressure spherical tank. Unit of measurement mm (in)

- A Anchor hook
- 1 Top anchor
- 2 Float
- 3 Guide wire
- 4 Measuring tape
- 5 Nut
- 6 Tank bottom (where anchor hook is welded to tank bottom)
- 7 Anchor hook
- 8 Bolt
- 9 Spring washer
- 10 Flat washer
- 11 Gate valve
- 12 90° sheave elbow
- 13 135° sheave elbow
- 14 Pipe supporter (not supplied, see notes)
- 15 Gauge supporter
- 16 Gauge head

i Mount pipe supporter [14] 1000 mm (39.38 in) below 135° sheave elbow [13] to support the pipes.

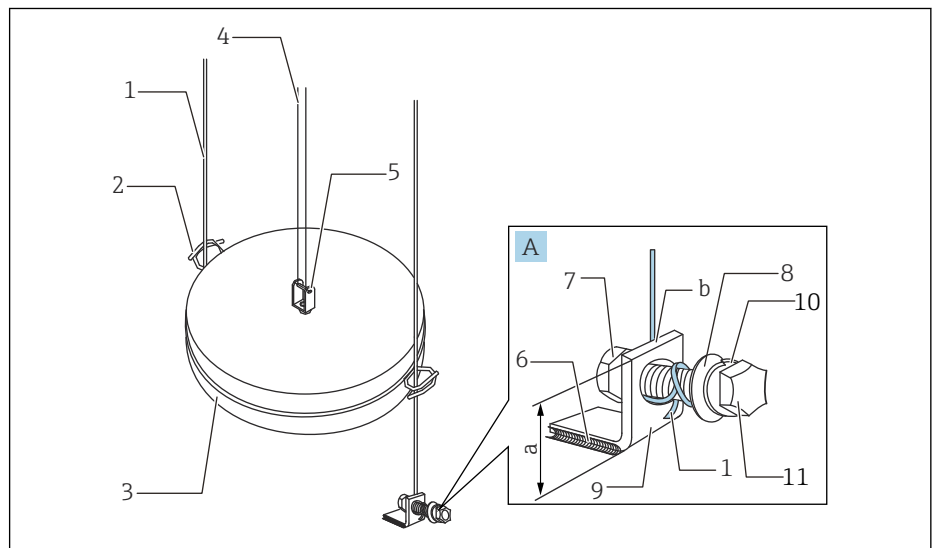
Order code example (LT5-66GB153R6GA26G16G204+PC)

Item	Target	Code	Specification	Quantity
020	Gauge head	6	0 to 24.5 bar / 2.45 MPa / 355.25 psi, iron (SCPL1), high pressure	1
030	Gauge head process connection	6G	20K 40A RF, iron (SCPL1), flange JIS B2220	
040	Display; cover	B	Dial display; glass + iron	
050	Crank unit	1	Available	
060	Measurement range	5	20 m	
070	Measuring tape	3	Measuring tape SUS316, seal pot / BT	
080	Float	R	D400 mm SUS316 tape connection 8.3 kg, $0.5 \leq \text{density}$ 0.7, with ring	
090	Top anchor	6H	2x 20K 40A RF, SUS316, flange JIS B2220	2
100	Guide wire	A	3 mm-diameter single wire, SUS316	
110	Anchor hooks; mounting bolts	2	SUS316; SUS316 (mounting bolt) SUS316L	
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, iron, for high pressure	

5.11 Mounting guide wires

Mounting procedure

- i ■ Do not bend the guide wires.
 - Pull the two guide wires, one in the perpendicular direction and the other in the parallel direction.
 - Insert two washers in the packing between the top anchor and the mounting flange on the tank side. Check before placing the guide wires.
 - Ensure that the guide wires and the anchor hooks at the bottom of the tank are strong enough, as they are difficult to fix once actual liquid has been injected.
1. Open the cover of the top anchor located at the top of the tank.
 2. Pass the guide wire through the float's guide ring at the tank bottom and secure it tightly to the anchor hook using a nut and a bolt.
 3. Cut and bend the tip of the guide wire so that it does not get caught on the float.
 - ↳ The tip of the guide wire is connected to (b) so that it is smaller than the dimension of the anchor hook (a).
Coil the guide wire once or twice from the inside of the anchor hook, and then pass it through the hole and coil it once or twice on the outside. Adjust the number of coils as necessary.



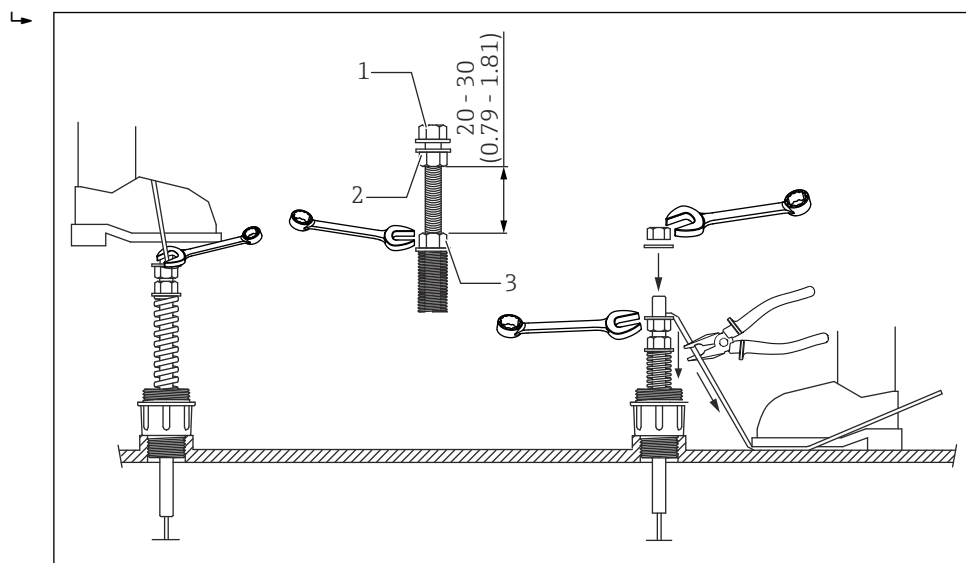
A0041206

37 Guide wire mounting 1

- A Anchor hook
- 1 Guide wire
- 2 Guide ring
- 3 Float
- 4 Measuring tape
- 5 Universal joint
- 6 Tank bottom (where anchor hook is welded to tank bottom)
- 7 Nut
- 8 Flat washer
- 9 Anchor hook
- 10 Spring washer
- 11 Bolt

4. Secure the guide wire in place while extending it to the tank top again.
5. Bend the tip of the guide wire along the shaft and then cut it off, leaving an excess of approximately 100 mm (3.94 in).
6. Tighten the end nuts [1] and [2].

7. Tighten nut [3] to fully activate the spring.



A0041207

38 Guide wire mounting 2. Unit of measurement mm (in)

- 1 Nut 1
- 2 Nut 2
- 3 Nut 3

This completes the guide wire mounting process.

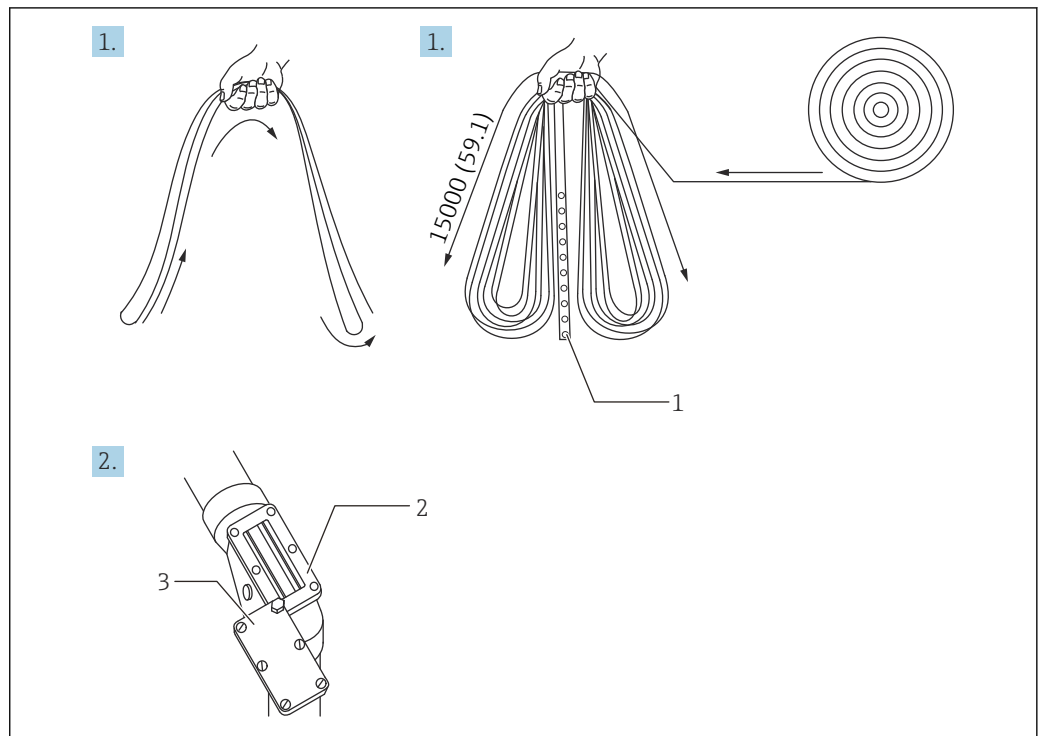
5.12 Mounting the measuring tape and measuring wire

- i ■ Never bend or damage the measuring tape.
- Ensure that the measuring tape does not become twisted inside the tank or while the pipes are being laid out.
- There are small holes at intervals of 20 mm (1 in (inch) if using feet as a unit) along approximately half of the entire length of the measuring tape. Mount the measuring tape so that the perforated side is wound by the gauge.
- During this process, ensure that the measuring tape and the measuring wire do not come off the sheave elbow roller, and inspect them once the process has been completed.
- If it is necessary to pass the measuring tape through a 135 ° sheave elbow, perform the mounting after ensuring that the work area is safe, as poor footing can be extremely dangerous.
- Since the joint between the float and the measuring tape cannot be repaired once actual liquid is injected, inspect the joint carefully when the connection process has been completed.

Mounting procedure

1. Extend the measuring tape while folding it back and forth in your hand approximately every 1.5 m (4.92 in) to ensure that the tape does not become twisted.
2. Open the sheave elbow cover and the gauge head cover.
3. Mount the measuring tape while ensuring that it does not become twisted inside the guide pipe.

This completes the mounting preparation.



i 39 Measuring tape preparation. Unit of measurement mm (in)

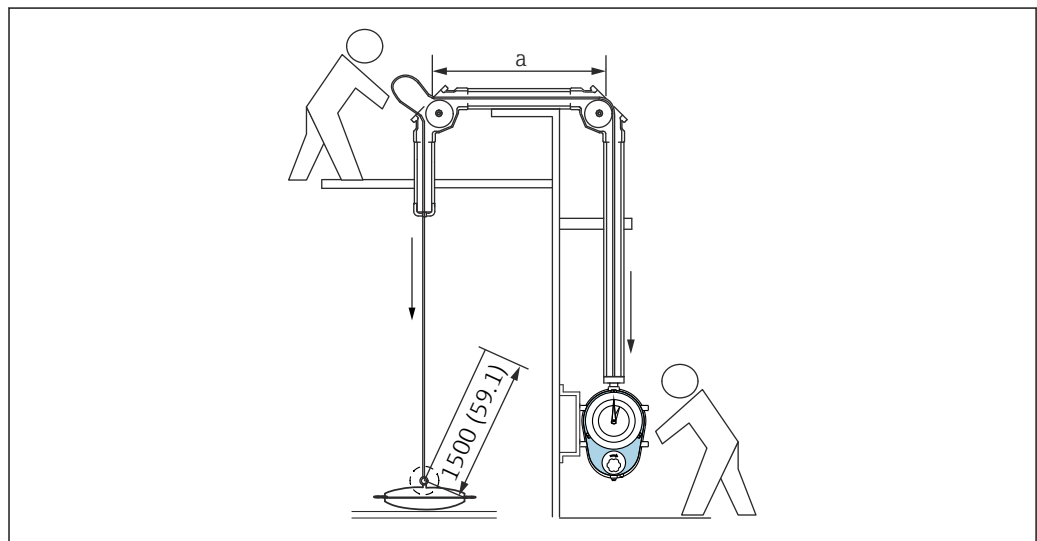
- 1 Perforation
- 2 Sheave elbow
- 3 Cover

5.12.1 Cone roof tank

Mounting procedure

1. Insert one end of the measuring tape (non-perforated side) into the tank from the sheave elbow on that tank roof.
2. Pass the other end of the tape (perforated side with a looped end) through the sheave elbow on the gauge head to insert it into the gauge head.
3. Secure the end of the measuring tape to the tape drum. Wrap it around the tape drum twice, and then pull the measuring tape inside the tank.
4. As for the length to the float, cut off the measuring tape, leaving an excess of approximately 1.5 m (4.92 in).
5. Connect the measuring tape to the float.

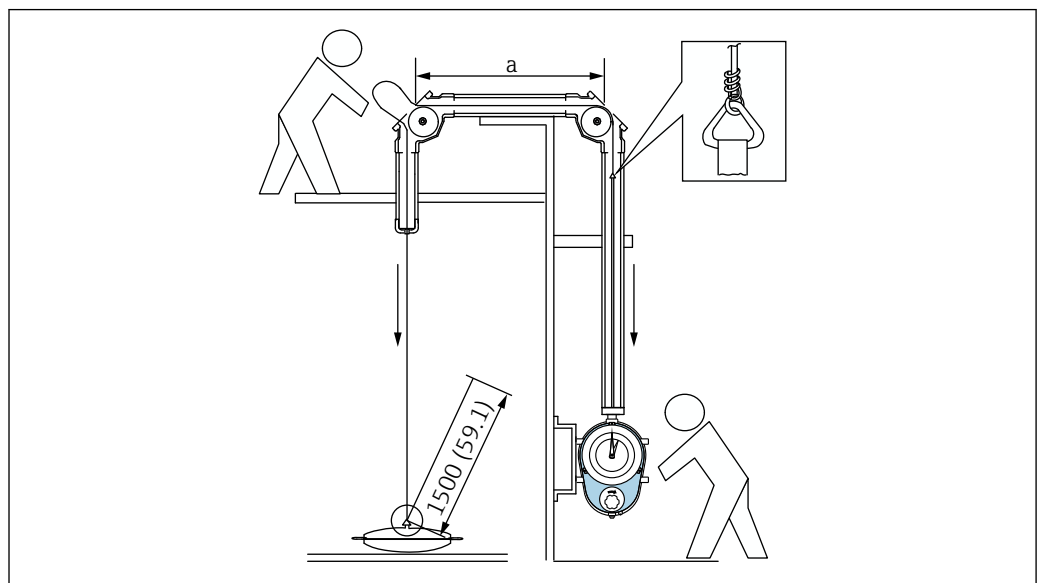
➔ For more information on the connection procedure, see →  55



A0041209

 40 Mounting the measuring tape: Measuring tape. Unit of measurement mm (in)

a Guide pipe



A0041210

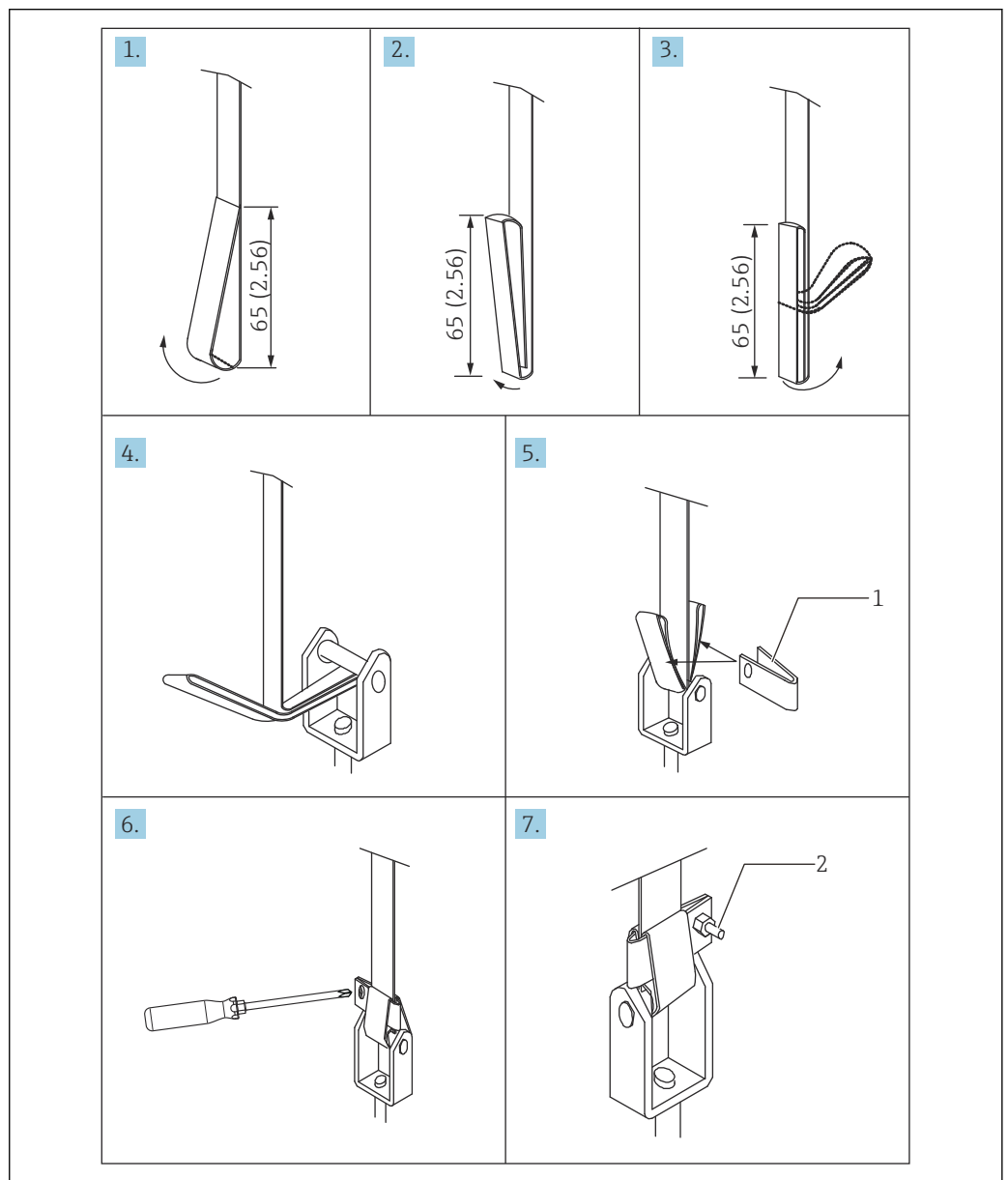
 41 Mounting the measuring tape and measuring wire: Measuring tape + measuring wire. Unit of measurement mm (in)

a Guide pipe

5.12.2 Measuring tape and float connection procedure

1. Bend the measuring tape at 65 mm (2.56 in).
2. Bend the measuring tape again at 65 mm (2.56 in).
3. Bend the twice-folded measuring tape at the center.
4. Pass the folded measuring tape through the joint shaft.
5. Secure the tape clamp in place by tightening the screw and nut.
6. Crush the screw's thread protruding from the nut side by pinching it with pliers to prevent loosening.

This completes the connection procedure.



A0041211

42 Measuring tape and float connection. Unit of measurement mm (in)

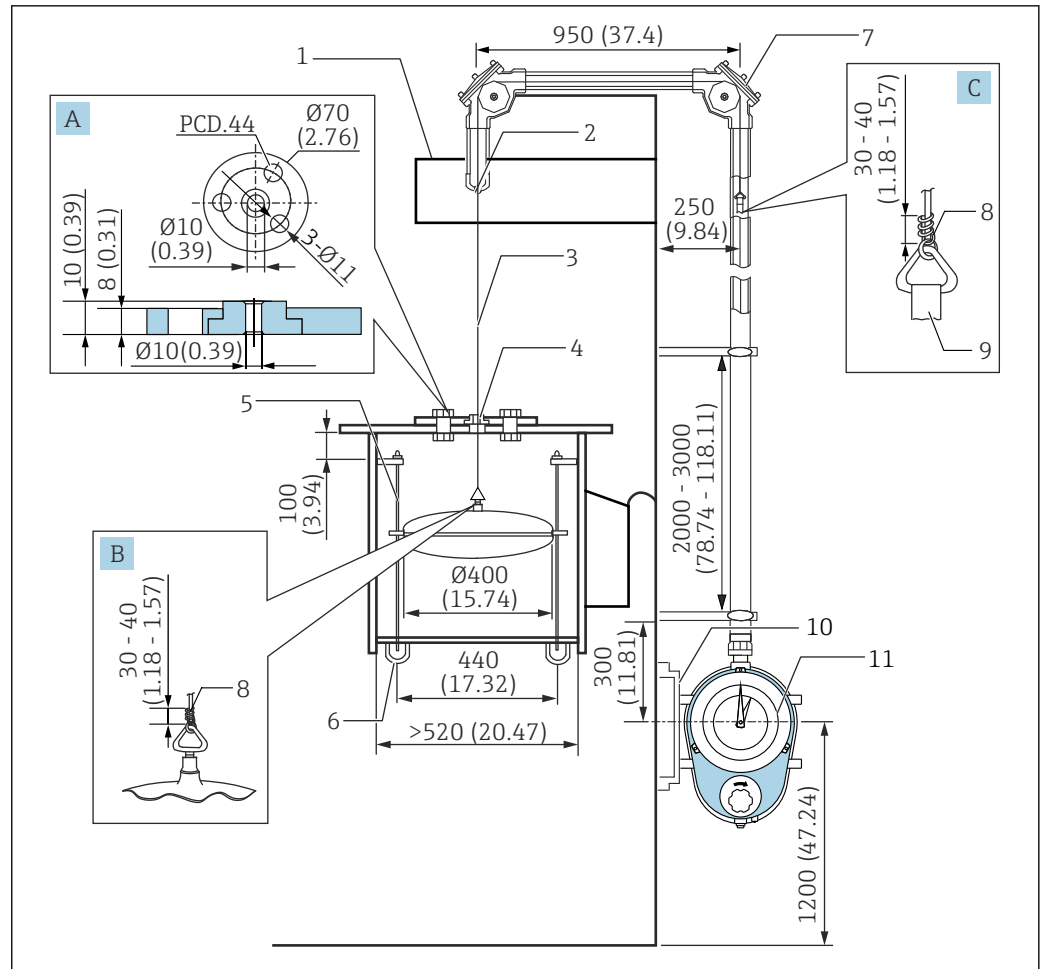
- 1 Measuring tape clamp
2 Screw thread

5.12.3 Floating roof tank

Mounting procedure

1. Pass the measuring wire through the sheave elbow on the tank roof from the 90° sheave elbow on the gauge head, and feed one end of the measuring wire into the tank.
2. Temporarily secure the other end in place.
3. Connect the measuring wire to the float inside the tank.
4. Wind the $\varnothing 0.5$ mm (0.02 in) support wire [8] (see Fig. B) onto the measuring wire approximately 10 times.
5. Reconnect the measuring wire and the measuring tape at the top of the tank.
 - ↳ When the liquid level is 0, this connection should be approximately 100 mm (3.94 in) below the sheave elbow, and approximately 100 mm (3.94 in) above the gauge head when the tank is full.
6. Wind the $\varnothing 0.5$ mm (0.02 in) support wire [8] (see Fig. C) onto the measuring wire approximately 10 to 15 times.
7. Feed the measuring tape towards the gauge head.
8. Check to ensure that the measuring tape is not twisted.
9. Close the sheave elbow cover.

This completes the mounting procedure.



A0041203

43 Mounting the measuring tape. Unit of measurement mm (in)

- A Wire guide metal
- B Top of the float
- C Measuring tape, measuring wire connection
- 1 Roof stand (not supplied)
- 2 Wire guide socket
- 3 Measuring wire
- 4 FRT wire guide metal
- 5 Guide bar: $\phi 16$ mm (0.63) (not supplied)
- 6 Pipe end: 1^B Sch 40-80 (not supplied)
- 7 90° sheave elbow
- 8 Support wire (stainless steel, supplied)
- 9 Measuring tape
- 10 Gauge supporter
- 11 Gauge head

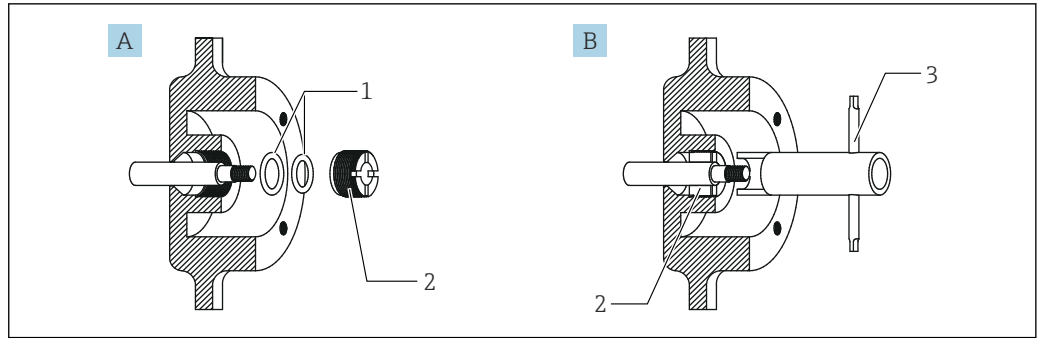
5.12.4 Medium/high-pressure tank

-  ■ Never bend or damage the measuring tape.
- Ensure that the measuring tape does not become twisted inside the tank or while the pipes are being laid out.
- Approximately half of the measuring tape is perforated with small holes at 20 mm (1 in) intervals. Mount the measuring tape so that the perforated side is wound by the gauge.
- During this process, ensure that the measuring tape and the measuring wire do not come off the sheave elbow roller, and inspect them once the process has been completed.
- If it is necessary to pass the measuring tape through a 135 ° sheave elbow, perform the mounting after ensuring that the work area is safe, as poor footing can be extremely dangerous.
- Since the joint between the float and the measuring tape cannot be repaired once actual liquid is injected, inspect the joint carefully when the connection process has been completed.

Mounting procedure

1. Turn the gate valve handle counterclockwise to open it completely, and remove the sheave elbow cover and the gauge's rear cover.
 - ↳ Using the provided gland fixing tool, remove the gland on the gauge head rear cover.
Remove the O-rings (two locations).
2. Remove the tape guide and the lock screw.
3. Insert one end of the measuring tape (non-perforated side) into the tank from the sheave elbow on top of the tank.
4. Pass the other end of the tape (perforated, looped side) through the sheave elbow on the gauge's side and insert it into the gauge.
5. After passing the measuring tape that has been inserted into the gauge through the dust guard slit, secure it to the tape drum using a tape securing screw, and then wrap it twice around the tape drum.
6. Loosen the mounting screws (two locations) and adjust the position so that the measuring tape does not interfere with the dust guard slit.
7. Pull the measuring tape inside the tank.
8. Cut the measuring tape to the length of the float, leaving an excess of approximately 1.5 m (4.92 ft).
9. Connect the measuring tape to the float.
 - ↳ For details on the connection procedure, refer to →  55
10. Check to ensure that the measuring tape is not twisted.
11. Close the sheave elbow cover.
12. Tighten the gland by following the diagram below.

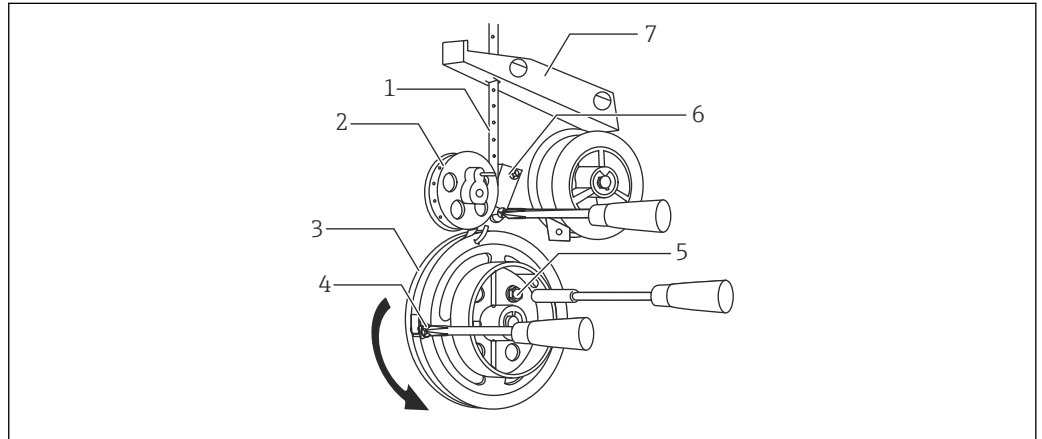
This completes the mounting procedure.



A0041212

44 Gland fixing tool

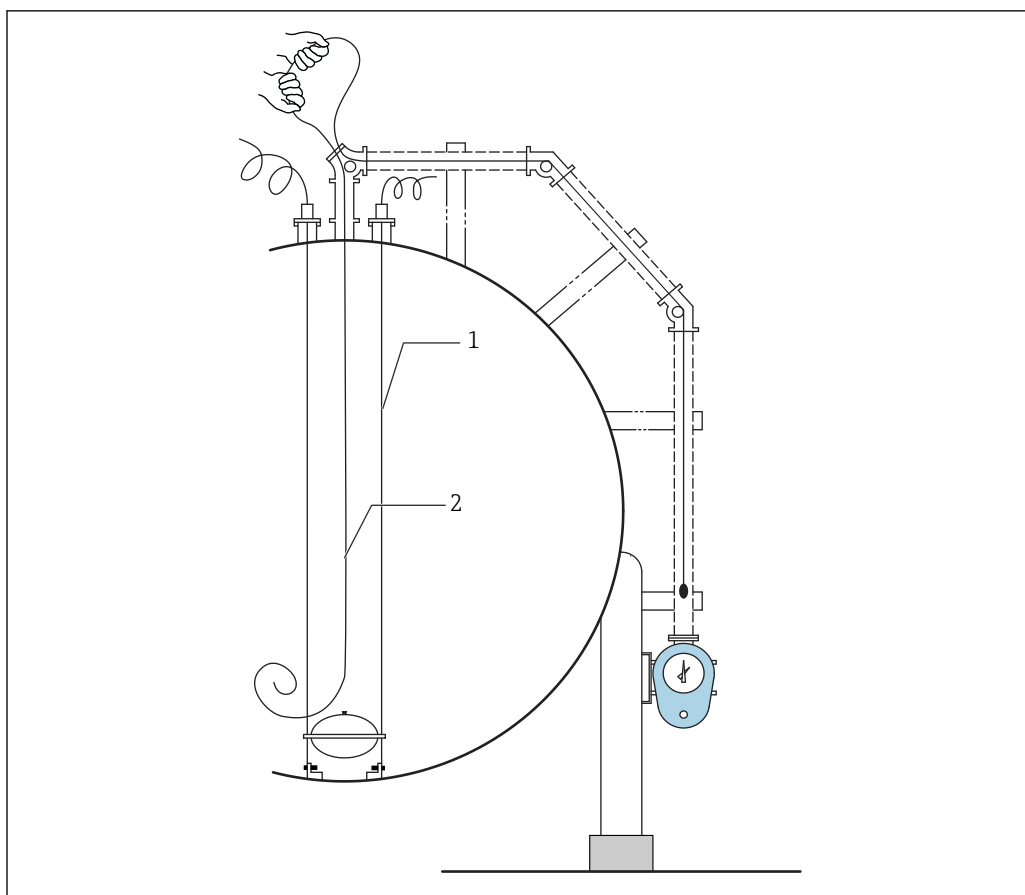
- A Before tightening
- B After tightening
- 1 O-ring
- 2 Gland
- 3 Gland fixing tool



A0041213

45 LT components

- 1 Measuring tape
- 2 Sprocket
- 3 Tape drum
- 4 Tape-holding screw
- 5 Locking screw
- 6 Tape guide
- 7 Dust guard (optional for low-pressure specification)



A0041214

 46 Mounting the measuring tape

- 1 Guide wire
- 2 Measuring tape

 Cut the measuring tape after connecting it to the gauge head, leaving approximately 1.5 m (4.92 ft) from the connection to the float.

5.12.5 Internal adjustments

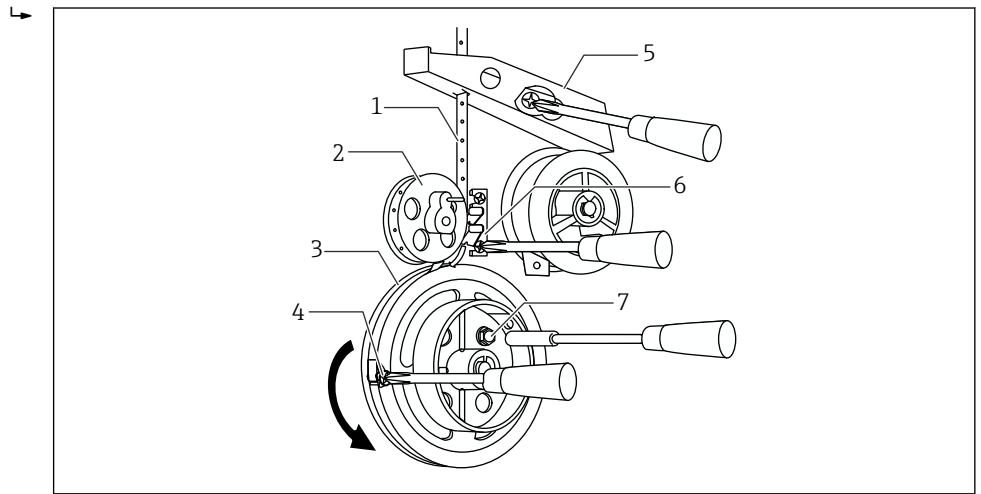
There are two types of tape guides.

- Stainless steel (for low pressure)
- Aluminum (for medium and high pressure)

If NC in specification 610 was selected, it would be aluminum (for medium and high pressure). The figure below shows a stainless steel tape guide as an example.

Tape guide adjustment procedure

1. Turn the tape drum inside the gauge head in the direction of the arrow in the diagram below to draw the measuring tape taut.



A0041215

47 Tape drum

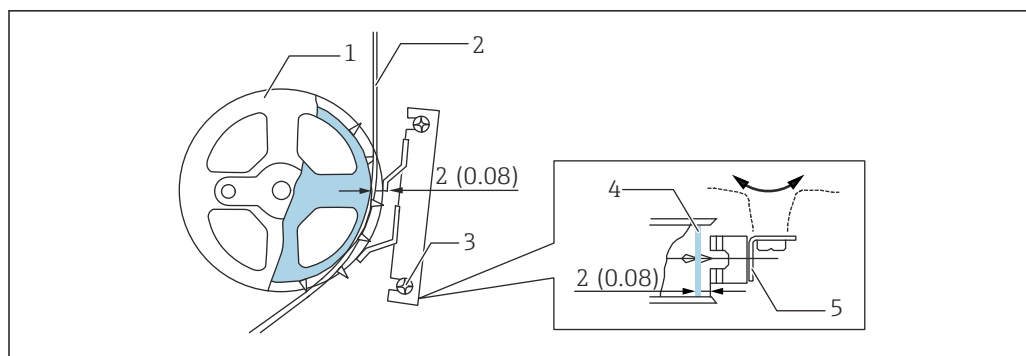
- 1 Measuring tape
- 2 Sprocket
- 3 Tape drum
- 4 Tape-holding screw
- 5 Dust guard
- 6 Tape guide
- 7 Locking screw

2. Once taping is completed, set the tape so that both ends of the tape guide are positioned approximately 2 mm (0.08 in) from the measuring tape surface as shown in the figure below.

➤ The measuring tape may come off the sprocket pins due to sudden movement caused by waves of the liquid, which may affect the reading. The tape guide prevents this from happening.

3. If it is fitted with a dust guard, loosen the mounting screws (2 locations) and adjust the position so that the measuring tape does not interfere with the dust guard slit.

This completes the adjustment procedure.



A0041216

48 Tape guide adjustment. Unit of measurement mm (in)

- 1 Sprocket
- 2 Measuring tape
- 3 Mounting screw
- 4 Measuring tape
- 5 Tape guide

5.12.6 Mounting the conster

Mounting procedure

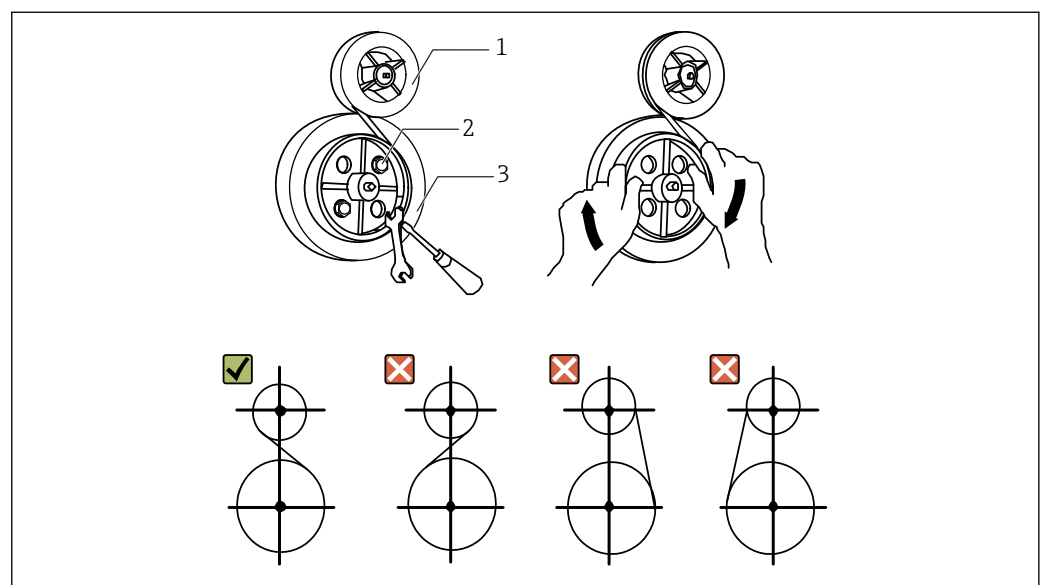
Mount the conster after mounting the measuring tape.

- i ■ Never remove your hand when winding the conster. The force from the spring may result in injury.
 - Removing the conster from the large conster drum or applying excessive force to the conster will cause uneven torque generation, resulting in inaccurate readings. Handle with care.
 - When winding the conster from the small conster drum to the large conster drum, keep a firm grip on the large conster drum until force has been transmitted to the measuring tape at the end.
1. Ensure that the locking screw has been removed before securing the conster end to the large conster drum with a screw and a nut.
 2. Rotate the large conster drum in the direction indicated by the arrow.
 3. When securing the conster drum in place, turn the tape drum counterclockwise to ensure that the tape is taut before securing it in place.
 4. If the tank is empty, wrap the tape around the small conster drum twice and secure it to the tape drum with a locking screw.
 - ↳ If the tank contains actual liquid, measure the surface level of the liquid and calculate the number of windings using the following equation. Wind the tape based on the calculation result using the large conster drum and secure it in place.
 5. Close the gauge head cover.
 6. For LT5-4/LT5-6, close the cover's gland.

This completes the conster mounting procedure.

$$\text{Number of turns} = \frac{\text{Tank height (measuring span)} - \text{Actual liquid level}}{0.6 \text{ (unit: m)}}$$

A0041217-EN



A0041218

 49 Mounting the conster

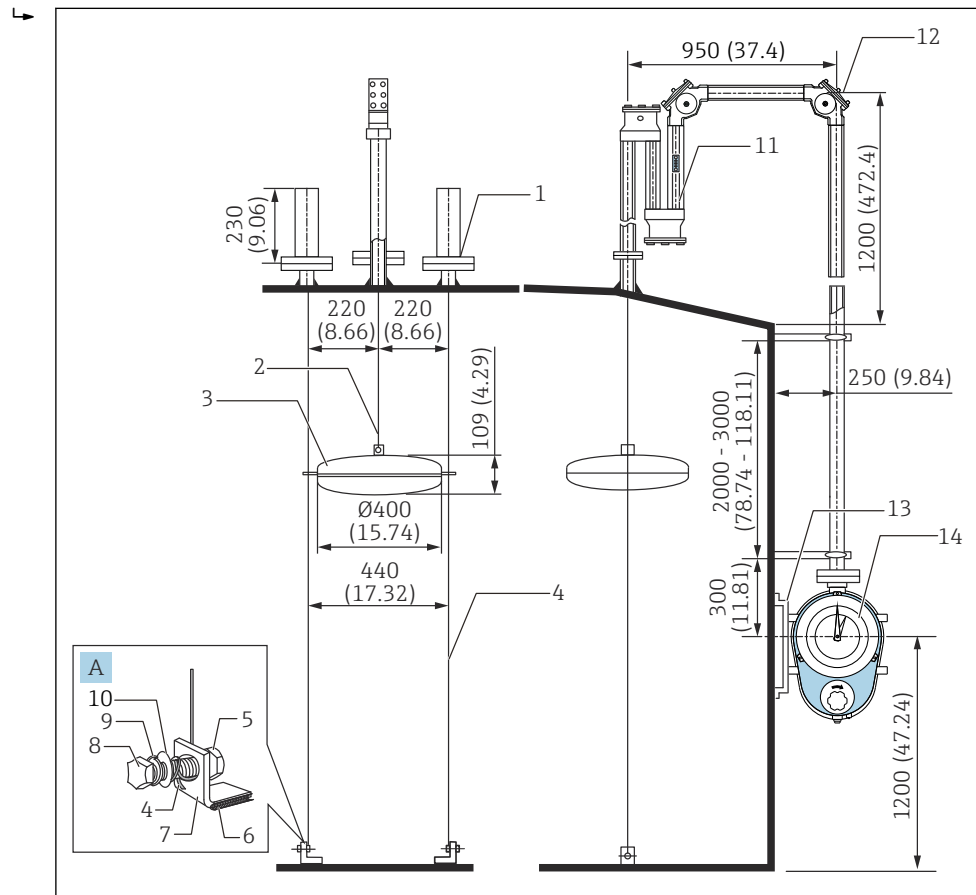
- 1 Small conster drum
- 2 Locking screw
- 3 Large conster drum

5.13 Liquid sealant for seal pot

5.13.1 Filling seal pot with liquid sealant (when installing a new gauge)

Liquid sealant filling procedure

1. Install the entire LT unit, including the seal pot and float, into the tank.
↳ Parts shown in the figure may be different depending on the selected order code.
2. Hoist the float up and down manually to confirm that the dial (or counter) display changes accordingly.

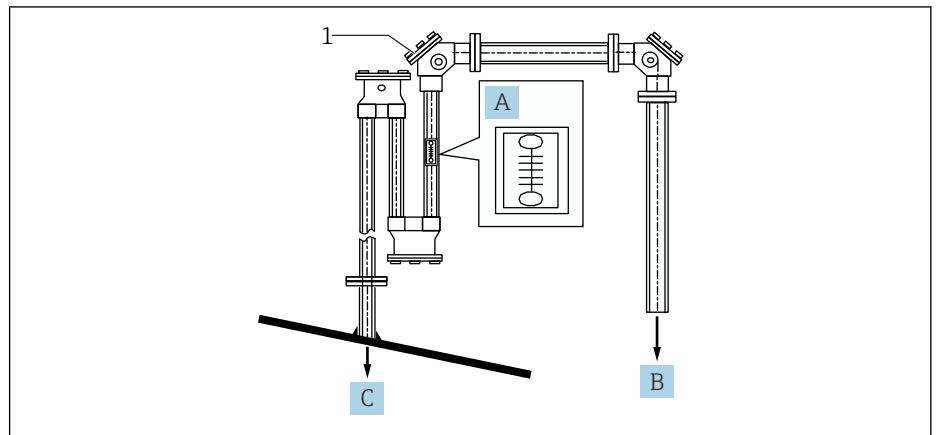


A0041198

50 LT with a seal pot. Unit of measurement mm (in)

- A Anchor hook
- 1 Top anchor
- 2 Measuring tape
- 3 Float
- 4 Guide wire
- 5 Nut
- 6 Tank bottom (where anchor hook is welded to tank bottom)
- 7 Anchor hook
- 8 Bolt
- 9 Spring washer
- 10 Flat washer
- 11 Seal pot
- 12 90° sheave elbow
- 13 Gauge supporter
- 14 Gauge head

3. After checking the operation of LT, remove the cover of the 90 ° sheave elbow for the seal pot and inject the liquid sealant.
 - ↳ Note that checking the operation of LT after filling it with liquid sealant may cause the liquid sealant to leak through the measuring tape.



A0041219

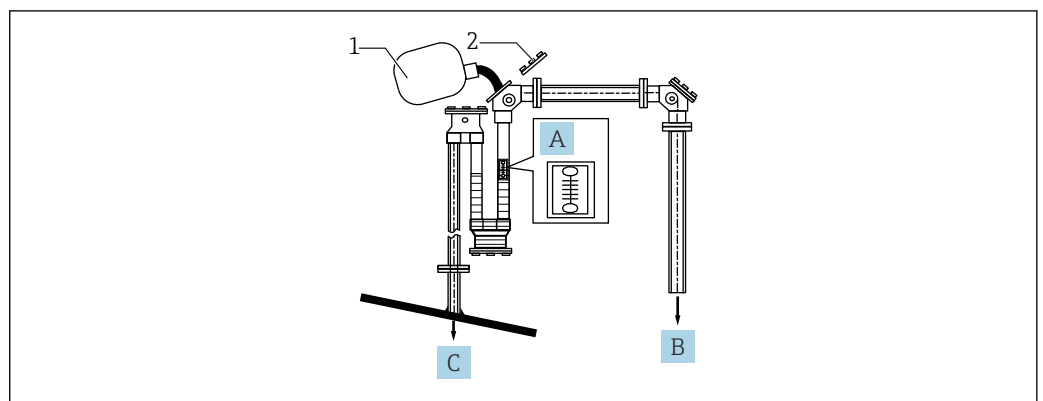
51 Filling with liquid sealant

- A Scale for liquid sealant
 B To the LT5 side
 C To inside the tank
 1 90 ° sheave elbow

4. Fill up to the middle of the scale for liquid sealant.
5. Close the 90 ° sheave elbow cover.

This completes the liquid sealant filling procedure.

- i** Approximately 2 L (liters) of liquid sealant is included in the kit. This means that there will be a small amount of leftover once the seal pot has been filled with the prescribed amount. Do not discard this leftover sealant, as it will be used after the tank is in operation when refilling is required.



A0041220

52 Amount of liquid sealant

- A Scale for liquid sealant
 B To the LT5 side
 C To inside the tank
 1 Liquid sealant
 2 90 ° sheave elbow cover

- i** Operating the tank without filling it with liquid sealant will cause corrosion of the LT, the sheave elbow packing, and O-rings, due to the gas components inside the tank, which will result in malfunctioning. Always fill with liquid sealant.

5.13.2 Filling seal pot with liquid sealant (for an installed gauge)

Liquid sealant filling procedure

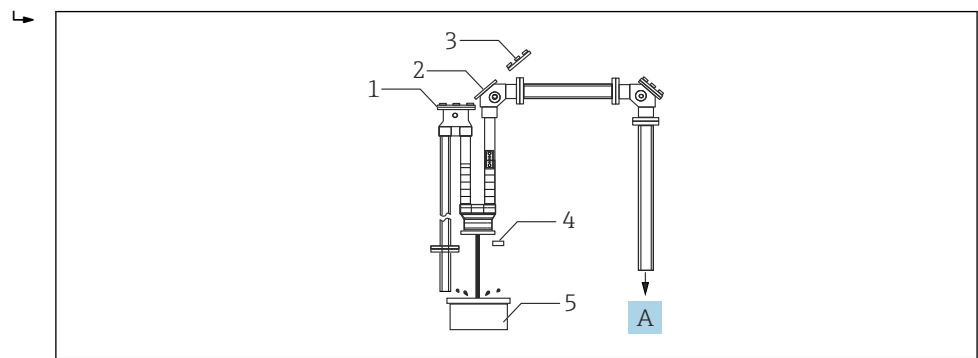
CAUTION

Used liquid sealant may have become mixed with liquids in the tank, turning it into a hazardous substance.

► Never touch used liquid sealant with bare hands.

i Carefully select the material for the container that can catch the liquid sealant.

1. Place a container that can hold at least 2 L (liters) under the drain.
2. Check the surrounding area for safety, and then remove the seal pot drain plug.
3. Drain the liquid sealant from the seal pot.
4. Open the 90 ° sheave elbow cover.



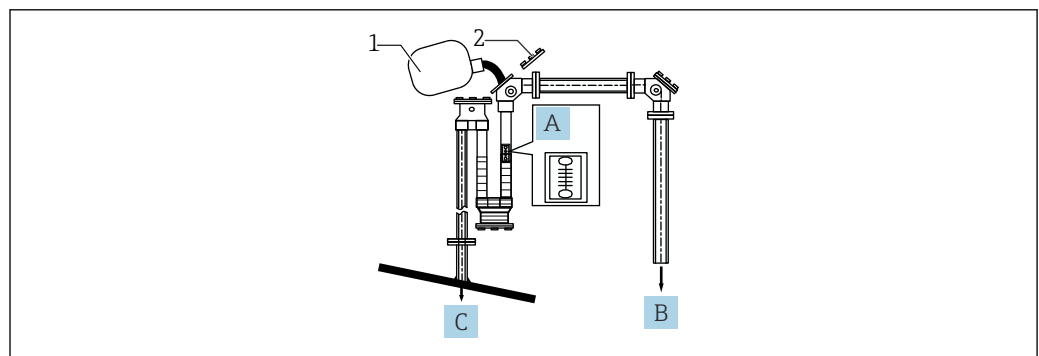
A0041230

53 Draining liquid sealant

- A To the LT5 side
- 1 Sheave elbow
- 2 90 ° sheave elbow
- 3 90 ° sheave elbow cover
- 4 Drain plug
- 5 Container that can hold at least 2 L

5. Close the drain plug and inject liquid sealant until it reaches the middle of the scale on the side of the seal pot.
6. Close the sheave elbow cover.

This completes the filling procedure of liquid sealant.



A0041220

54 Filling with liquid sealant

- A Scale for liquid sealant
- B To the LT5 side
- C To inside the tank
- 1 Liquid sealant
- 2 90 ° sheave elbow cover

6 Commissioning

6.1 Dial display

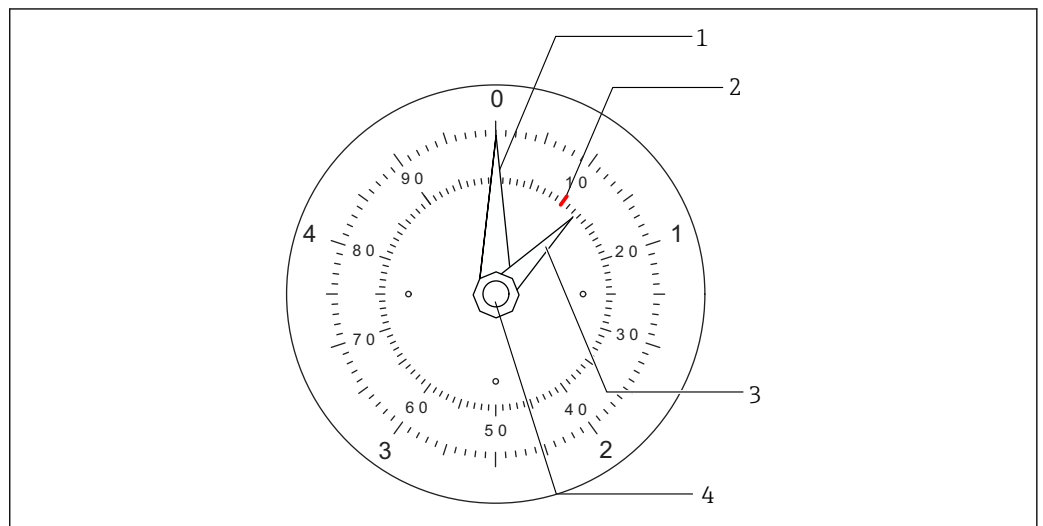
Pointer setting and scale reading procedure

When calibrating (pointer setting) to a value that has been determined as a calculated value or a measured value, the calibration procedure will be different for a dial display and a counter display. If the tank height is under 20 m or 60 ft, select a dial display; for taller tanks, select a counter display.

1. Remove the indicator cover and loosen the cap nut.
 - ↳ The long needle (white) can move freely and the short needle (yellow-green) can be freed by pulling it forward. Align the short needle with the inner scale (1 mm (0.04 in) increments) so that it corresponds to the last two digits of the liquid level.
2. Align the long needle with the outer scale.
 - ↳ Since each increment of the outer scale corresponds to 100 mm (3.94 in) of liquid level, visually align the needle based on the last two digits of the liquid level.
3. After aligning the needles, tighten the cap nut firmly.
 - ↳ Read the indicator by using the outer scale and the long needle to determine the 10 000 mm (393.7 in), 1 000 mm (39.37 in), and 100 mm (3.94 in) digits while using the inner scale and the short needle to determine the 10 mm (0.34 in) and 1 mm (0.04 in) digits.

Tightening torque: 0.315 N/m

This completes the indicator setting and scale reading procedure.



A0041231

55 Dial display (5 m (16.4 ft) scale plate)

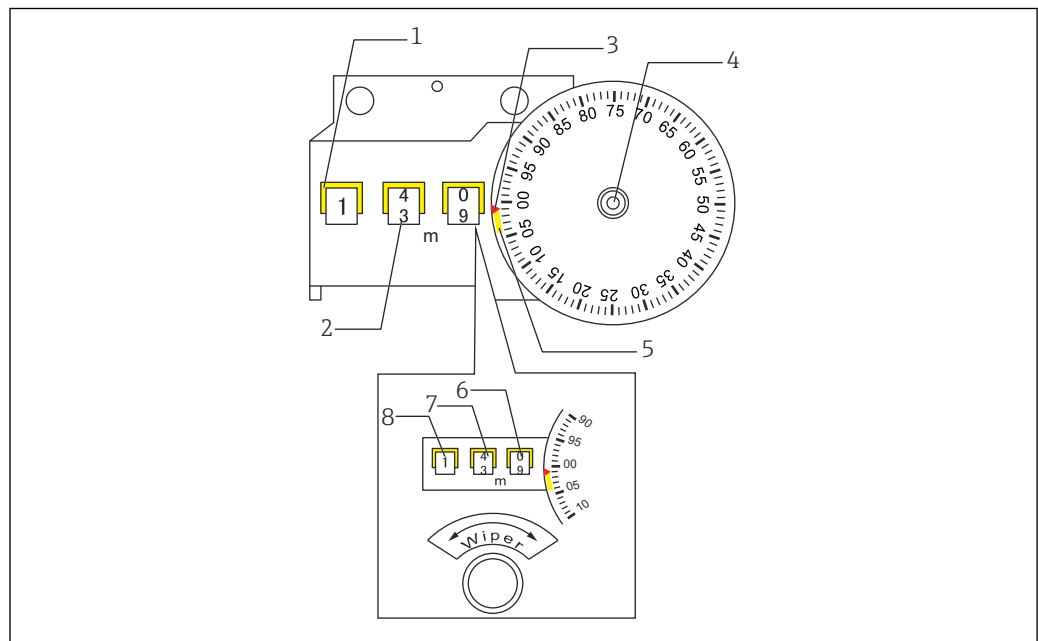
- 1 Long needle (white)
- 2 Example: 10 mm position
- 3 Short needle (green)
- 4 Cap nut

6.2 Counter display

Counter display procedure

- The scale plate (1 mm (0.04 in) increments) can rotate freely.
 - On the counter drum, the number on the No. 1 drum changes each time the scale plate makes one full rotation (100 mm (3.94 in)).
1. Remove the indicator cover.
 2. Loosen the screw at the center of the scale plate.
 3. Turn the scale plate so that the number on the counter drum corresponds to the first three digits of the liquid level.
 4. Align the scale plate so that the pointer corresponds to the last two digits of the liquid level.
 - ↳ If the pointer is between 97 and 03 on the scale plate, the number on the counter drum will not change instantly. It will change gradually while maintaining a constant relationship with the rotation of the scale plate. This will result in the counter indicating half values. In order to eliminate reading errors, the counter window and parts of the scale plate are color coded.

This completes the display procedure.



A0041232

56 Counter display

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

i When the pointer (red) is pointing towards the yellow section, read the value on the yellow side of the counter, and when it is pointing towards the black section, read the value on the black side.

(Example)

- Yellow: 14 000 mm (551.18 in)
- Black: 13 999 mm (551.14 in)

6.3 Indicator adjustment

There are three ways to adjust the indicator on a liquid level gauge as described below, but operation of the indicator unit is handled using the same procedure.

- Fill the tank with actual liquid and calibrate the indicator based on the measured value
- Calibrate the indicator based on a calculation when the tank is empty
- Fill the tank with water and calibrate the indicator based on the measured value

6.3.1 Indicator adjustment procedure using actual liquid

In order to obtain accurate data, measure the liquid level two to three times using a measuring tape which has been officially tested to have a tolerance equivalent to ± 0.3 mm (0.01 in) (however ± 1.2 mm (0.05 in)/10 m (32.81 ft)), and then use the data for calibration.

6.3.2 Indicator adjustment procedure using an empty tank

- Determine L_f from the equation below when the tank is empty and set the indicator to that value.
- When the liquid level reaches L_f , the float will gain buoyancy and the gauge will begin to operate, continuing to indicate an accurate liquid level.

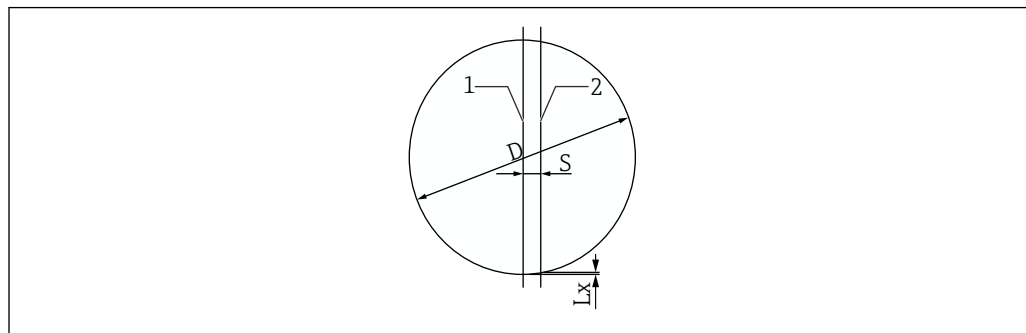
1.	Liquid level at which float gains buoyancy (in water)	
$L_f = \left(\frac{h}{2} + \frac{\frac{W - T}{\rho} - \frac{V}{2}}{S} \right) \times 10 \text{ mm (0.39 in)}$		
Tape tension	T	1200 g (2.65 lb)

Specification	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	$0.5 \leq \rho < 0.65$
			5 000 g (11.02 lb)				$0.65 \leq \rho < 1.05$
			8 000 g (17.64 lb)				$1.05 \leq \rho \leq 2.0$
		PVC	4 200 g (9.26 lb)	1 257 cm ²	11.2 cm (4.41 in)	10 870 cm ³	$0.5 \leq \rho < 0.65$
			5 000 g (11.02 lb)				$0.65 \leq \rho < 1.05$
			8 000 g (17.64 lb)				$1.05 \leq \rho \leq 2.0$
	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	$0.5 \leq \rho < 0.94$
			2 400 g (5.29 lb)				$0.94 \leq \rho \leq 2.0$
		PVC	2 100 g (4.63 lb)	154 cm ²	21.0 cm (8.27 in)	2 946 cm ³	$0.5 \leq \rho < 0.94$
			2 400 g (5.29 lb)				$0.94 \leq \rho \leq 2.0$
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	$0.5 \leq \rho \leq 0.7$

 L_f can be calculated by substituting density into the above equation.

If a float is being installed to a spherical tank away from the tank center line, add L_x , which can be determined from the following equation, to L_f in 2 above.

$L_x = \frac{D}{2} - \sqrt{\frac{D^2}{4} - S^2}$	L_x	Correction amount for level indication for deviation caused by float installation
	D	Diameter of a spherical tank, etc.
	S	Deviation distance from the center of the tank to the center of the float (mm)



A0041235

57 Indicator adjustment on a spherical tank

- 1 Center of the tank
2 Center of float installation

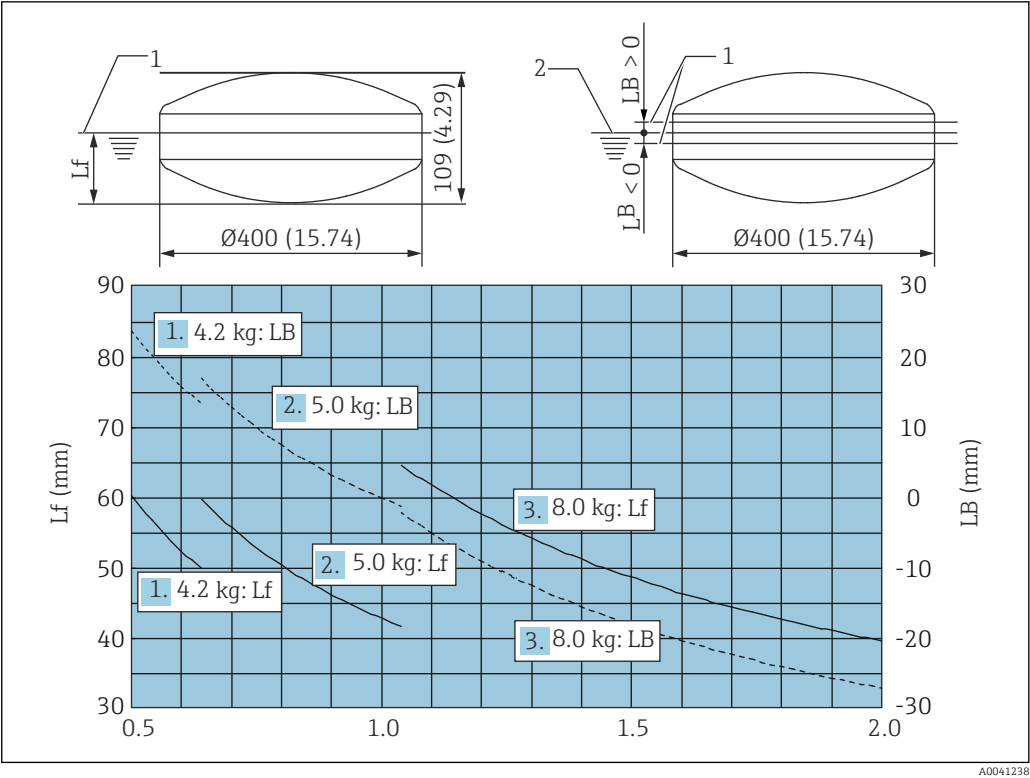
6.3.3 Indicator adjustment procedure with a water-filled tank

When a tank is completed, a water-filling test is generally performed. Since it is difficult to take measurements once the tank has been filled with actual liquid, the indicator can be adjusted when the tank is filled with water and then re-adjusted once the tank has been filled with actual liquid. In this case, the following equation is used to determine the difference in the initial floating position of the float when the tank is filled with water and actual liquid in order to correct the value that is indicated when the tank is filled with water.

i After calibrating the gauge indicator to the measured value with water, determine L_b from the following equation. If L_b is a positive value, it is added to the measured indicator value; if it is a negative value, the subtracted value becomes the final indicator value.

Equation: SUS316 ϕ 400 mm (15.75 in), 5 000 g (11.02 lb) float

1.	Draft surface Lf (the height of the liquid level from the bottom of the float when the float gains buoyancy)				
$L_f = \left(\frac{h}{2} + \frac{\frac{W - T}{\rho} - \frac{V}{2}}{S} \right) \times 10 \text{ mm (0.39 in)}$					
Float diameter	D	400 mm (15.75 in)	Float height	h	10.9 cm (4.29 in)
Float mass	W	5 000 g (11.02 lb)	Float volume	V	10 520 cm ³
Waterline cross section	S = π D ² /4	1 256.64 cm ²	Tape tension	T	1 200 g (2.65 lb)
Density of measurement liquid	ρ (water)	1 g (0.002 lb)/ cm ³	Calculated draft surface value	Lf (water)	42.9 mm (1.69 in)
	ρ (with actual liquid)	0.8 g (0.002 lb)/ cm ³		Lf (actual liquid)	50.4 mm (1.98 in)
2.	Correction of indicated value with simulated actual liquid		Lb = Lf (water) - Lf (actual liquid)		-7.5 mm (-0.3 in)



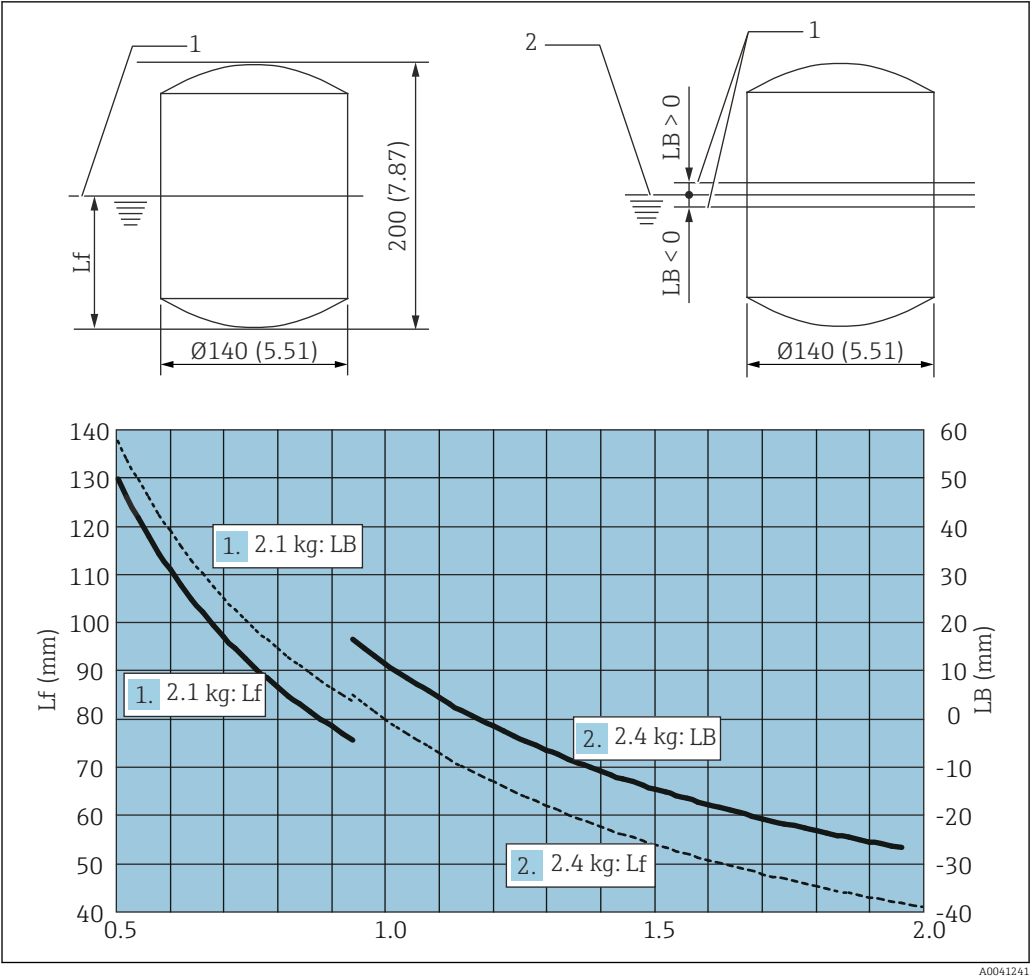
58 Graph of LT5-1 φ400 mm (15.75 in) float: Density of measurement liquid ρ (g/cm³). Measurement unit mm (in)

- 1 Draft surface at density ρ
- 2 Water (draft surface at a density of 1.0 g (0.002 lb)/cm³)

Equation: SUS316 φ140 mm (5.51 in), 2 100 g (4.63 lb) float

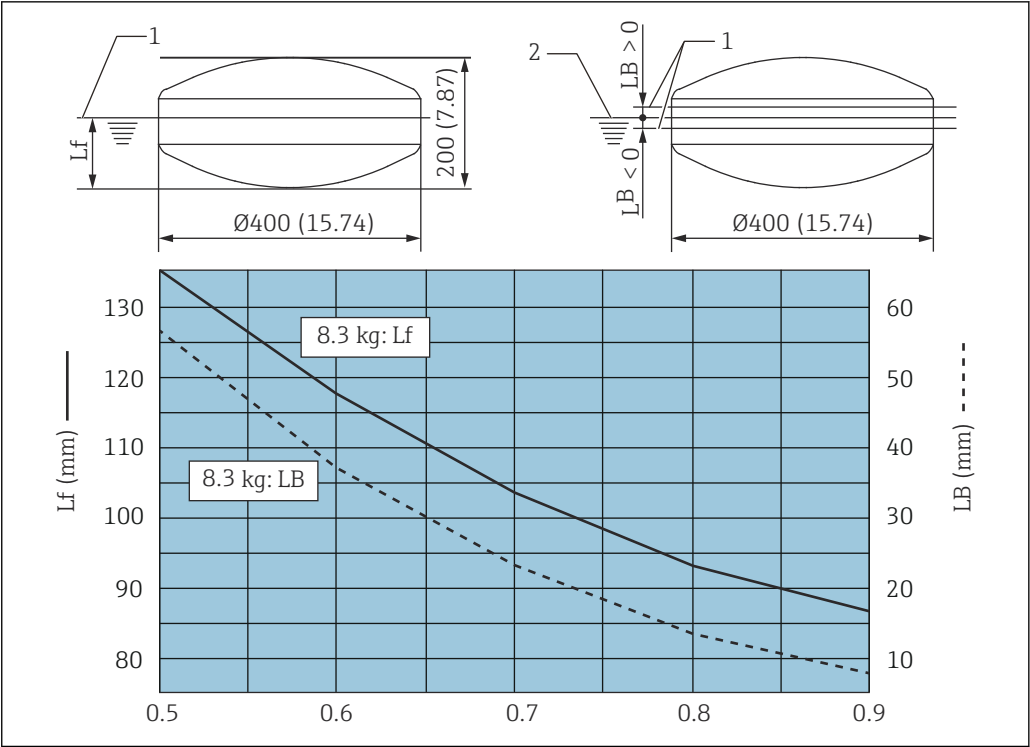
Change the values used in the equation according to the float specifications.

1.	Liquid level at which float gains buoyancy (in water)				
$L_f = \left(\frac{h}{2} + \frac{\frac{W - T}{\rho} - \frac{V}{2}}{S} \right) \times 10 \text{ mm (0.39 in)}$					
Float diameter	D	140 mm (5.51 in)	Float height	h	20 cm (7.87 in)
Float mass	W	2 100 g (4.63 lb)	Float volume	V	2 661.2 cm ³
Waterline cross section	S = π D ² /4	153.94 cm ²	Tape tension	T	1 200 g (2.65 lb)
Density of measurement liquid	ρ	1 g (0.002 lb)/ cm ³	Calculated draft surface value	Lf	72 mm (2.83 in)
	ρ (with actual liquid)	0.8 g (0.001 lb)/ cm ³		Lf (actual liquid)	86.6 mm (3.41 in)
2.	Correction of indicated value with simulated actual liquid		Lb = Lf (water) - Lf (actual liquid)		-14.6 mm (-0.57 in)



Equation: SUS316 ϕ 400 mm (15.75 in), 8300 g (18.30 lb) float

1.	Liquid level at which float gains buoyancy (in water)				
$L_f = \left(\frac{h}{2} + \frac{\frac{W - T}{\rho} - \frac{V}{2}}{S} \right) \times 10 \text{ mm (0.39 in)}$					
Float diameter	D	400 mm (15.75 in)	Float height	h	20 cm (7.87 in)
Float mass	W	8 300 g (18.30 lb)	Float volume	V	19 200 cm ³
Waterline cross section	S = π D ² /4	1 256.64 cm ²	Tape tension	T	1 200 g (2.65 lb)
Density of measurement liquid	ρ (water)	1 g (0.002 lb)/ cm ³	Calculated draft surface value	Lf	80.1 mm (3.15 in)
	ρ (with actual liquid)	0.5 g (0.001 lb)/ cm ³		Lf (actual liquid)	136.6 mm (5.38 in)
2.	Correction of indicated value with simulated actual liquid		Lb = Lf (water) - Lf (actual liquid)		−56.5 mm (−2.22 in)



A0041243

60 Graph of LT5-4/LT5-6 $\varnothing 400$ mm (15.75 in) float: Density of measurement liquid ρ (g/cm³).
Measurement unit mm (in)

- 1 Draft surface at density ρ
- 2 Water (draft surface at a density of 1.0 g (0.002 lb)/cm³)

6.4 Precautions for water-filling and airtightness tests and handling of gauge at startup

In high-pressure tanks, such as liquid gas tanks, damage to the measuring tape and other such accidents have a significant impact on the operation of the tank, and the recovery cost can be extensive. It has been our experience that all issues involving damaged measuring tapes arise during the testing phase or the initial operation of the tank. To prevent such incidents, be sure to implement the following measures. These measures will prevent incidents that occur during the initial operation of the tank.

- For high-pressure tanks, always open the gate valve when performing a water-filling test of the tank and set the LT to measurement mode. Failure to perform this step may result in damage to the measuring tape.
If you notice that the gate valve has not been opened after you have started to fill the tank with water, either drain the water or open the sheave elbow cover and open the gate valve while applying a brake to the measuring tape with your hand, and allow the LT to gradually wind the measuring tape.
- In the water-filling test, partially open the water-feeding valve and fill it with water slowly until a depth of approximately 500 to 1 000 mm (19.69 to 39.37 in) is reached.
- When a large amount of water is injected, the measuring tape may become damaged. If the float is near the water inlet, install a wave guard to protect the float from being affected directly by the water surface.
- If performing an airtightness test of LT with the gate valve open, check to ensure that the following LT components have been firmly tightened before performing the test. Failure to tighten the following components will lead to massive air release, which creates a super high-speed airflow near the gate valve that vibrates and damages the measuring tape.
 - Drain plug under the main unit of LT
 - Rear cover bolts
 - Gland on the gauge head rear cover
 - Covers for the elbows
- When opening the rear cover of LT after the airtightness test is complete, check to make sure that the internal pressure of the tank is atmospheric pressure or that the gate valve is closed before opening LT.
Never open LT or the sheave elbow cover in an attempt to release the compressed air from the airtightness test in a hurry. This will damage the measuring tape.
- Always open the gate valve when injecting actual liquid, such as liquefied gas, into the tank.
Only close the gate valve in case of an emergency or when the liquid surface is stopped.

7 Operation

7.1 Check handle (standard)

A check handle is used to confirm that LT is operating properly.

CAUTION

Handling a hoist handle

Operation during hoisting/lowering and restrictions on the winding direction

- ▶ Do not let go of the handle when hoisting or lowering. Letting go of the hoist handle may cause the float to fall and damage LT. When letting go of the handle during the operation, lock the hoist handle.
- ▶ Do not tilt the hoist handle over 90 ° in the axial direction. This may damage the float, tape, conster, and other components.

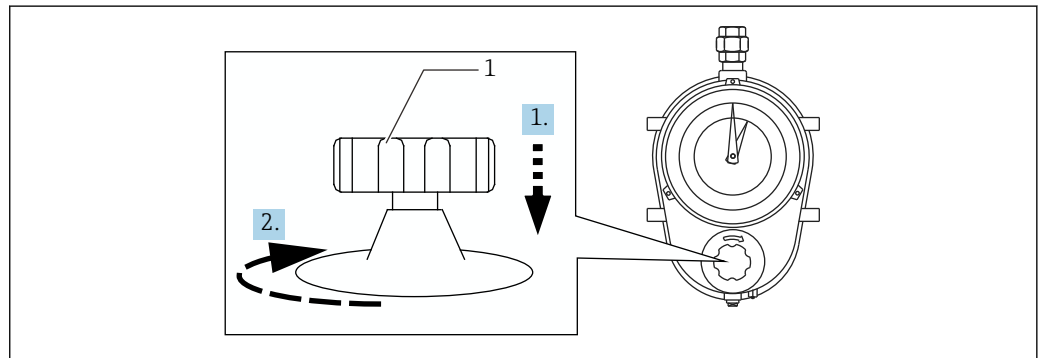


- When checking the operation using a check handle, make sure that the tank has been filled with liquid first.
- A check handle is not a float hoist handle. Do not forcibly hoist the float using the check handle.
- Handling a hoist handle → 76

Check handle operation procedure

1. Locate the check handle found at the bottom of the main unit of LT and push it inside the main unit of LT.
2. Return it to the left side when it points to 4 to 5 mm (0.16 to 0.20) above the indicator on the scale plate, and let go of the check handle.
3. Check the scale plate indicator on the main unit of LT.

This completes the operation procedure.



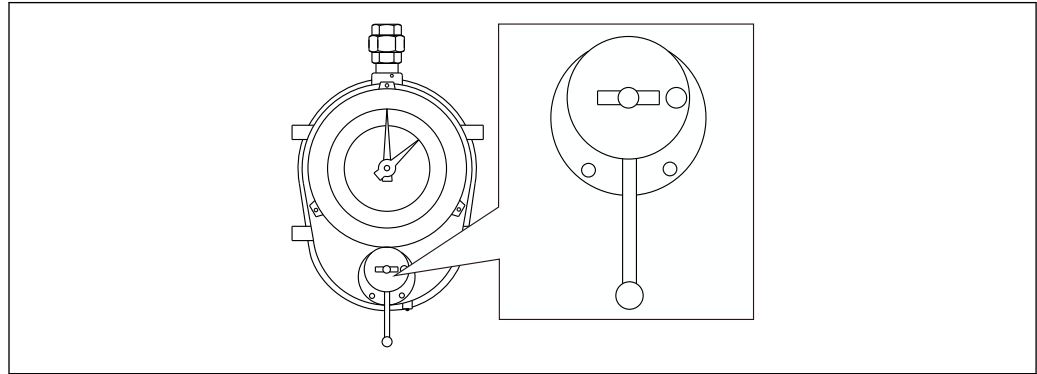
A0041244

61 Check handle

1 Check handle

7.2 Hoist handle (optional)

A hoist handle is attached to the gauge head, and it allows the float to be raised and lowered manually for purposes other than measuring the liquid level. In locations with poor measurement conditions (such as tanks with mixers and tanks for corrosive liquids), hoisting the float and measuring tape in advance helps to prevent them from being damaged, thereby improving the service life of LT.



A0041258

 62 Hoist handle

7.2.1 Handling a hoist handle (for LT5-1)

-  ■ Never let go of the handle when hoisting or lowering the float. Letting go of the hoist handle may cause the float to fall and damage LT.
- Once the float has been lowered enough to reach the liquid level, stop cranking the handle.
- When the hoist handle reaches position A in the following figure, the float will be freed from the handle. Remove the handle while taking measurements.

Hoisting procedure

1. Secure the handle to the knob using a wing bolt.
2. Push in the knob while pulling the puller and release the puller once it has been fully pushed in to position B.
3. After confirming that the knob is securely positioned in position B, rotate it counterclockwise at an approximate rate of 2 seconds per rotation.
4. To stop hoisting in the middle of the procedure, push in the stopper to the deepest level and secure it with a wing bolt.
5. Bring the handle back slowly and place the stopper against the main unit.
 - ↳ The float will no longer fall even if you let go of the handle.
 Remove the handle when it is not being used after the float has been hoisted.

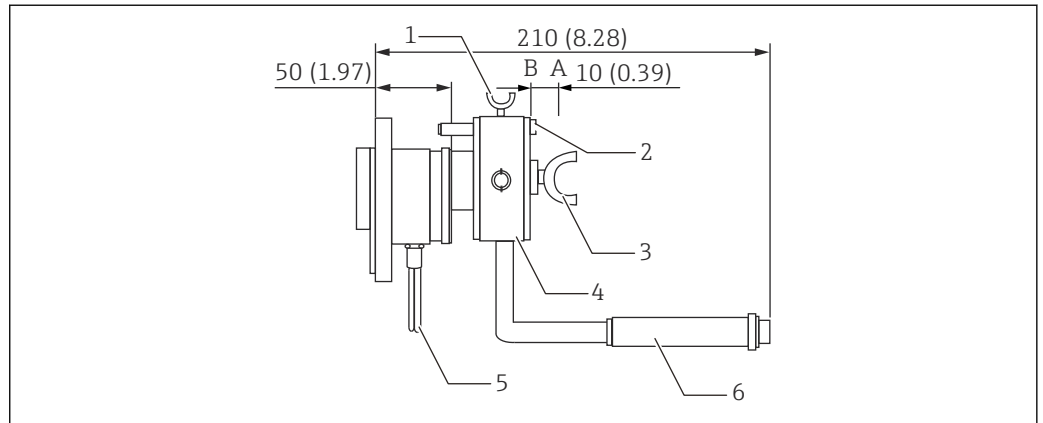
This completes the hoisting procedure.

Lowering procedure

1. Insert the handle into the knob and secure it as shown in the figure. Turn it counterclockwise slightly and then loosen the wing bolt. Return the stopper to its place and secure it with the wing bolt.
2. Rotate the handle clockwise.
 - ↳ The float will be lowered. Once the float reaches the liquid surface, the force on the handle will decrease suddenly and the LT indicator will stop. Do not rotate the handle any further.
3. Once the float has been lowered, pull the knob while pulling on the puller, and then let go of the puller once condition A is reached.

4. Remove the handle when it is not being used after the float has been lowered.

This completes the lowering procedure.



A0041245

63 Handling a hoist handle (LT5-1). Unit of measurement mm (in)

- 1 Wing bolt 1
- 2 Stopper
- 3 Wing bolt 2
- 4 Knob
- 5 Puller
- 6 Handle

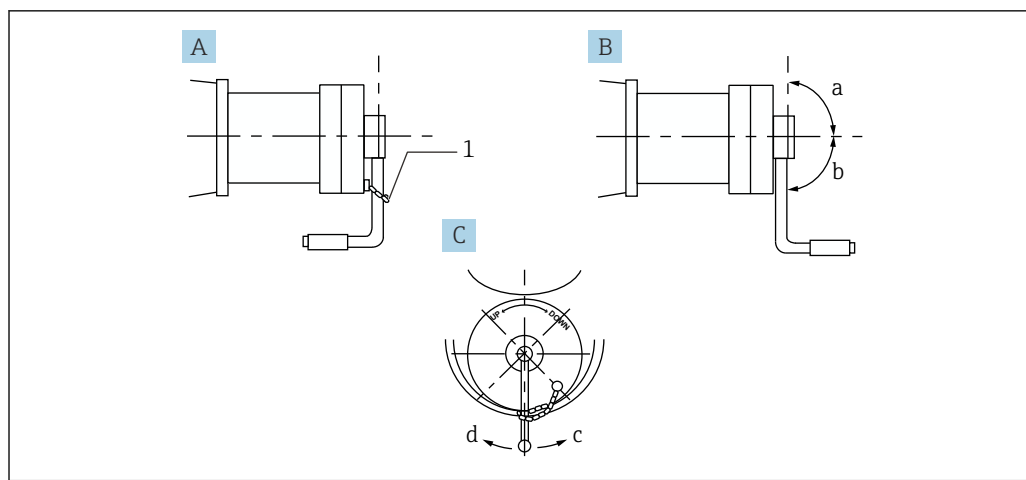
7.2.2 Handling a hoist handle (for LT5-4/LT5-6)

-  Do not let go of the handle when hoisting or lowering. Letting go of the hoist handle may cause the float to fall and damage LT. When letting go of the handle during the operation, lock the hoist handle.
- Do not tilt the hoist handle over 90° in the axial direction. This may damage the float, tape, conster, and other components.

Hoisting and lowering procedure

1. Remove the lock chain.
2. Move the handle slightly in the circumferential direction, and then gradually rotate it 180° in the axial direction.
 - ↳ The tape drum gear and the hoist shaft gear will begin to engage starting from around the 90° position.
3. Once the handle has been rotated to position B, rotate the handle counterclockwise to hoist the float.
4. Once the float has been hoisted, always secure it in place with a lock chain before letting go of the handle (refer to C).
 - ↳ Remove the lock chain when lowering the float.
5. Rotate the handle clockwise to lower the float.
 - ↳ Once the float reaches the liquid surface, the indicator or counter display will stop at the current liquid level.
6. Once the float has been hoisted, rotate the handle 180° in the axial direction to put it in measurement mode.
7. To keep it in measurement mode, wrap the lock chain around the handle once or twice and place the end hook into the ring near the bolt (refer to A).

This completes the hoisting and lowering procedure.



A0041246

64 Hoist handle (LT5-4/LT5-6)

- A During measurement
- B During hoisting or lowering
- C Front
- a Dislodged gear
- b Meshed gear
- c Hoisting
- d Lowering
- 1 Lock chain

8 Diagnostics and troubleshooting

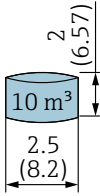
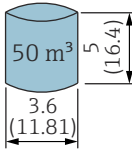
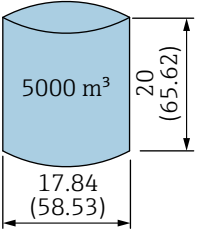
Causes of malfunction and countermeasures

Error	Possible cause	Countermeasure
Indicator does not change at all	Severed measuring tape	Open the tank and replace the measuring tape
	Guide wire is caught on the float	Open the tank and replace the guide wire if necessary
	Broken conster	Replace the conster
	Check handle is caught	Open the gauge rear cover and perform repair and inspection
	Worn transmission gear that is connected to the indicator	Replace the entire reduction gear unit of the indicator
	Improper installment of sprocket or dislodged measuring tape	Open the gauge rear cover and perform an inspection
	Sunken float	Open the tank and replace it
Frequent indicator error	Deterioration of conster	Investigate any variance in the indicated values when operating the check handle and replace if deteriorated
	Corresponding to 2, 4, 5, and 6 in the previous section	Inspect the internal parts of the gauge head
	Loose indicator pointer	Remove the indicator cover and inspect the cap nut of the pointer
	Improper setting of tape guide	Check the gap between the sprocket and tape guide.
	Twisted measuring tape	Open the sheave elbow cover, forcefully pull out the measuring tape to inspect it, and repair it if necessary
Discrepancy between measured values and indicated values	Gauge error	Perform the inspection in the preceding section and implement measures
	No gauge error	Various problems caused by measurement
		Effects of the measurement technique
		Effects of sludge deposit
		Effects of strong wind
		Error in the measuring scale
Check handle does not turn or return to position	The check shaft is rusted	Clean the shaft and replace the entire check handle unit
	The spring in the check unit has deteriorated	Replace the spring
Check handle does not work (LT5-4/LT5-6)	The check handle set screw is loose	Tighten the set screw
	Broken check driver spring	Replace the entire check unit
	Tape drum does not move because a spring is caught in it	Repair manually or replace the entire check unit
Gas leak (LT5-4/LT5-6)	Compromised airtightness of the gauge head rear cover joint surface	Replace the packing or apply an end sealant to the joint surface
	Compromised airtightness at check handle shaft	Replace the seal metal

9 Maintenance

9.1 Before performing maintenance

-  Let tanks rest sufficiently before performing maintenance, especially tanks for flammable liquids (refer to the table below).
- When working on a flammable liquid tank, wear anti-static clothing, safety footwear, and gloves.
- Perform maintenance in the presence of a safety controller.

Conductivity of charged object (S/m)	Flammable liquid examples	Volume of charged object (m ³)			
		10 or less	10 to 50	50 to 5000	5000 or more
10 ⁻⁸ or higher	Acetic acid Ethanol Ethyl chloride Methanol Light oil	1 minute or longer	1 minute or longer	1 minute or longer	1 minute or longer
10 ⁻¹² to 10 ⁻⁸	Vinyl acetate Toluene Benzene Gasoline	2 minutes or longer	3 minutes or longer	10 minutes or longer	30 minutes or longer
10 ⁻¹⁴ to 10 ⁻¹²	Methyl cyclohexane	4 minutes or longer	5 minutes or longer	60 minutes or longer	120 minutes or longer
10 ⁻¹⁴ or lower	Carbon tetrachloride	10 minutes or longer	10 minutes or longer	120 minutes or longer	240 minutes or longer
		 Unit of measurement mm (in)	 Unit of measurement mm (in)	 Unit of measurement mm (in)	

9.2 Periodic inspection

Perform periodic inspection according to the procedures in the table below.

Product / Component	Inspection item	Inspection method
Gauge head (for all LT)	Corrosion check and cleaning of tape protective pipe	Open the rear cover of the gauge head and check the state of rust deposition.
		If necessary, remove rust by tapping the protective pipe with a wooden hammer.
	Bearing and engagement of reduction gear in the indicator	Remove the indicator cover, rotate the reduction gear, and check if the engagement play is within 1 mm (0.04 in).
		Similarly, check the wear on the bearing.
	Friction on tape drum and sprocket	Open the rear cover of the gauge head, check the degree of wear of the bearing in each drum as well as deposition of rust and dust, and clean them.
	Characteristic change of conster	Use the check handle to investigate. If the indicated value is not consistent, remove any deposits on the conster.
		If this does not fix the problem, replace it with a new one.
	Condensation and fogging of indicator window	Check to make sure that the indicator cover is tightened properly and that there is no foreign matter lodged in the packing surface.
Gauge head (LT5-4/LT5-6)	Check handle inspection	Check to make sure that the check handle returns to the original position after it is pushed in and then released.
	Inspection of the check handle unit	Inspect the check spring inside the gauge head for any deformation and check the operation condition as well.
	Magnet coupling inspection	Remove the sprocket and completely remove any rust or debris (once or twice a year).
	Leaky packing inspection for gauge head	Check airtightness using soapy water.
Sheave elbow	Wear on sheave elbow	For the sheave elbow, remove the measuring tape from the roller surface and check to ensure that it rotates smoothly.
		Remove the bearing and check for wear.
		Clean any deposits from the guide roller.

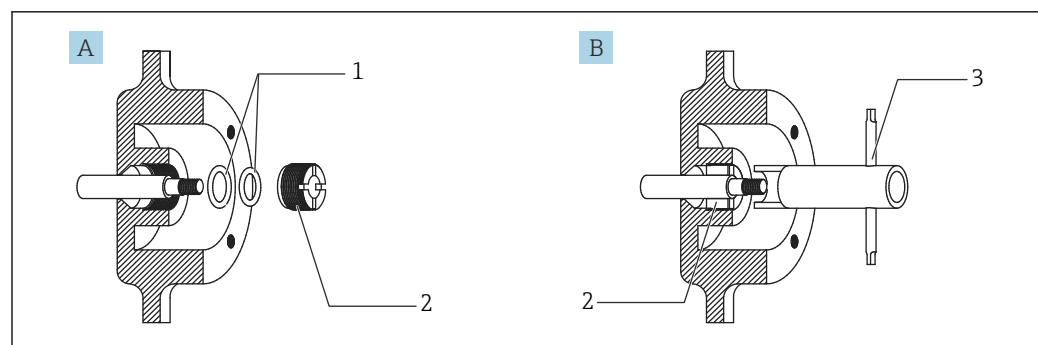
9.3 Replacement of O-ring for transmitter (LT5-4/LT5-6)

If gas begins leaking from the main unit side, sealing O-rings must be replaced. The following procedure must be performed carefully due to the tank being under pressure from within.

Replacement procedure

1. Close the gate valve at the top of the tank.
2. Gradually release all residual pressure inside the LT main unit and pipes.
3. Remove the rear cover of the main unit.
4. Remove the transmitter if attached.
5. Remove the coupling on the LT side. Remove the gland using the included gland fixing tool and remove the two O-rings.
6. When replacing O-rings, replace any other parts that are worn.
7. Replace the O-rings and then tighten the gland. Reassemble the unit by following the above procedure in reverse order.
8. Gradually open the gate valve.
 - ↳ Opening the gate valve abruptly will release a sudden burst of air from the system, which may result in damage to the measuring tape.

This completes the replacement procedure.



A0041247

65 Replacement of O-rings

A Before tightening

B After tightening

1 O-ring

2 Gland

3 Gland fixing tool

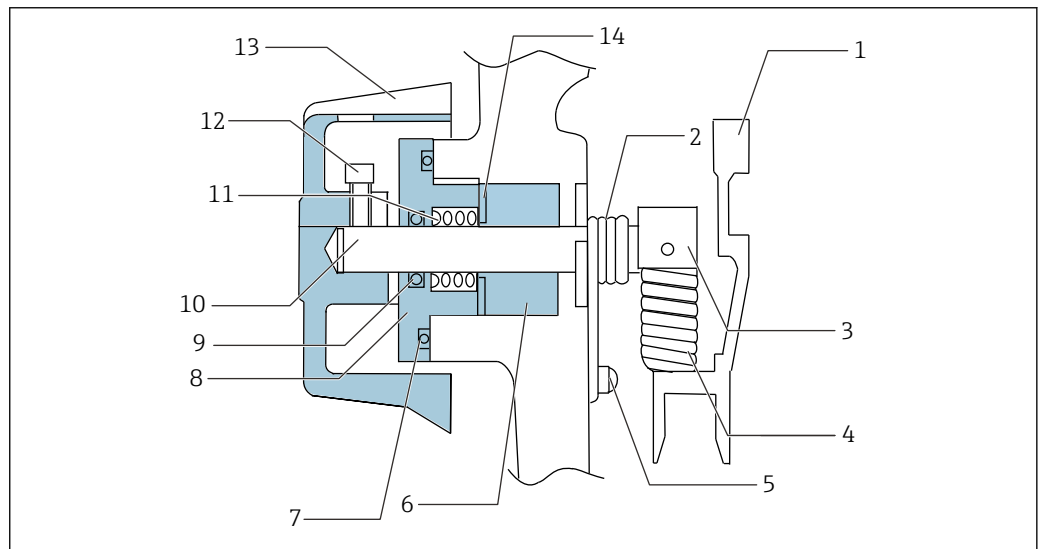
9.4 Replacement of the check handle unit (LT5-4/LT5-6)

The check handle unit is an important mechanism for checking the LT's operation status, and it is prone to wear and tear as it is used frequently. It is designed so that each part can be replaced easily if it becomes worn.

Replacement procedure

1. Remove the LT rear cover and the tape drum.
2. Loosen the socket head screw on the check handle and remove the check handle.
3. Remove the gland clamp with a No. 46 wrench or a monkey wrench.
4. Remove the gland spring, collar, and seal metal.
5. Pull out the check shaft toward the tape drum.
6. Once the part has been replaced, reassemble by following the above procedure in reverse order.

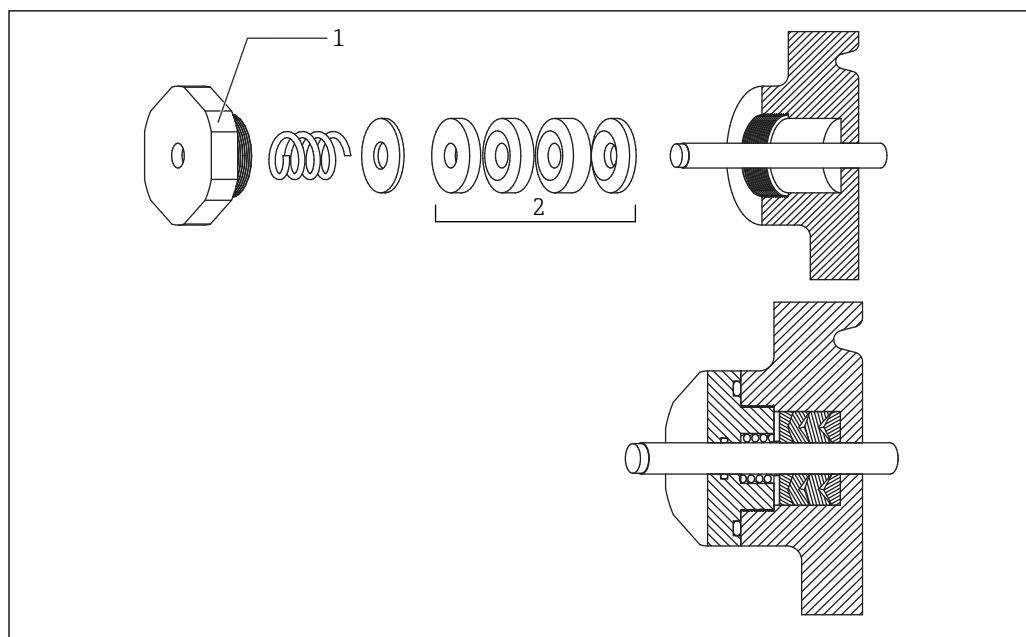
This completes the replacement procedure.



A0041248

66 Names of the check handle unit

- | | |
|----|---------------------|
| 1 | Tape drum |
| 2 | Check spring |
| 3 | Check boss |
| 4 | Spring |
| 5 | Spring holder screw |
| 6 | Seal metal |
| 7 | O-ring |
| 8 | Gland clamp |
| 9 | O-ring |
| 10 | Check shaft |
| 11 | Gland spring |
| 12 | Socket head screw |
| 13 | Check handle |
| 14 | Collar |



A0041249

67 Check handle unit

1 Gland clamp

2 Seal metal

10 Repair

10.1 General information on repairs

10.1.1 Repair concept

The Endress+Hauser repair concept assumes that the devices have a modular design and that repairs can be done by the Endress+Hauser Service Department or specially trained customers.

Spare parts are contained in suitable kits. They also come with relevant replacement instructions.

For more information on service and spare parts, contact the Service Department at Endress+Hauser.

10.1.2 Repairs to Ex-approved devices

WARNING

Incorrect repair can compromise electrical safety!

Explosion hazard!

- ▶ Only specialist personnel or the manufacturer's service team may carry out repairs on Ex-certified devices in accordance with national regulations.
- ▶ Relevant standards and national regulations on hazardous areas, safety instructions and certificates must be observed.
- ▶ Only use original spare parts from the manufacturer.
- ▶ Please note the device designation on the nameplate. Only identical parts may be used as replacements.
- ▶ Carry out repairs according to the instructions.
- ▶ Only the manufacturer's service team is permitted to modify a certified device and convert it to another certified version.

10.2 Spare parts

Some replaceable device components are clearly listed on the overview label found on the terminal unit cover.

The spare parts overview label contains the following information:

- List of major device spare parts (including ordering information for the spare parts)
- URL of *W@M Device Viewer* (www.endress.com/deviceviewer):

All spare parts for the device are listed together with their order codes so that you can order them. If available, users can also download the associated Installation Instructions.

10.3 Endress+Hauser services

Endress+Hauser offers a wide range of services.

 Your Endress+Hauser Sales Center can provide detailed information on the services.

10.4 Return

The requirements for safe device return can vary depending on the device type and national legislation.

1. Refer to the web page for information:
<http://www.endress.com/support/return-material>
↳ Select the region.
2. Return the device if repairs or a factory calibration are required, or if the wrong device was ordered or delivered.

10.5 Disposal

Observe the following notes during disposal:

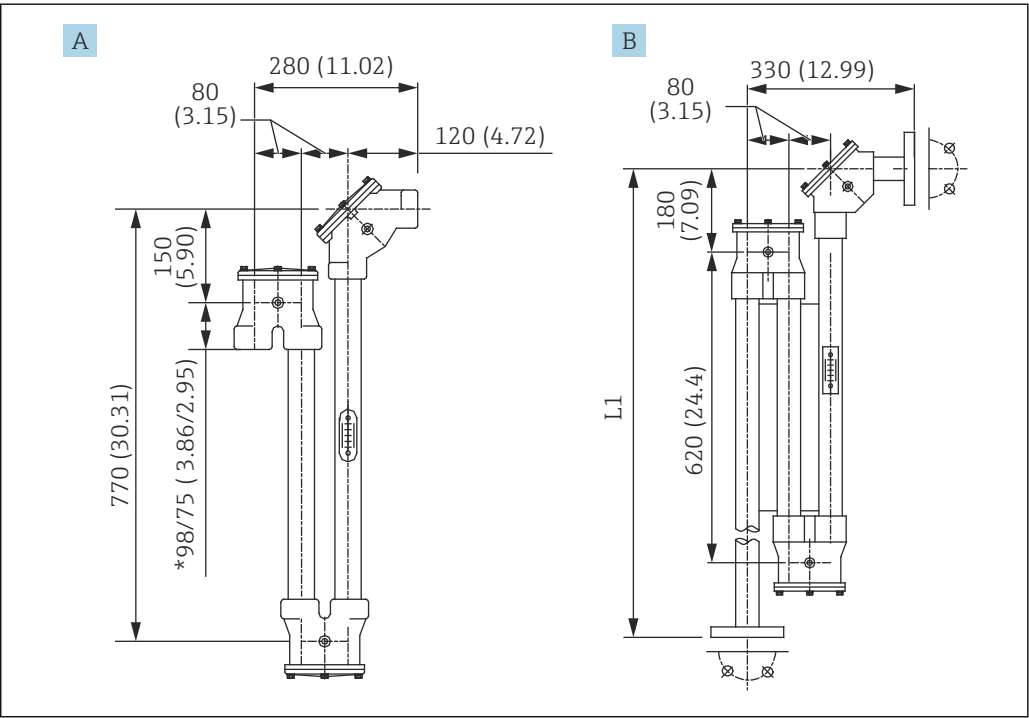
- Observe valid federal/national regulations.
- Ensure proper separation and reuse of the device components.

11 Accessories

11.1 Seal pot

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

Liquid sealant	Flow paraffin (spindle oil): When an LT5 that comes with a 1 150 cc seal pot is selected, liquid sealant is also included.
Maximum sealing pressure	400 mm H ₂ O
Form	U-shaped
Connection specification	Screw-in type / flange type



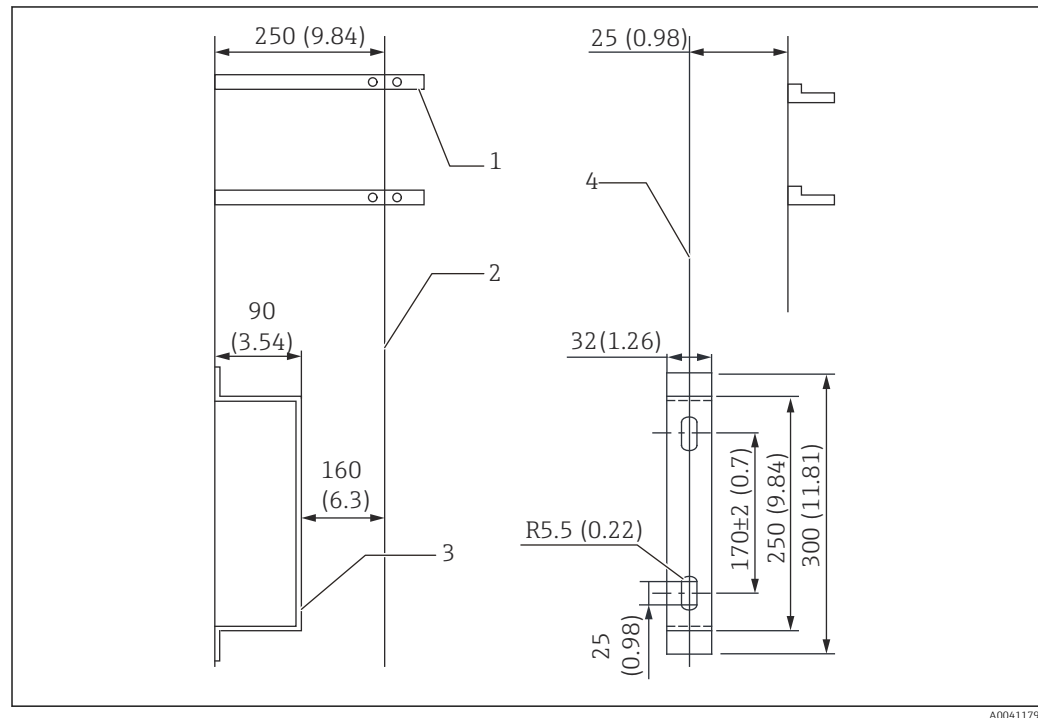
68 Seal pot. Unit of measurement mm (in)
A Seal pot (select from aluminum + iron / SCS14+SUS316)
B Seal pot (PVC: flange type only)
L1 Tape + wire: 1 500 mm (59.06 in) / tape only: 960 mm (37.8 in)

i For seal pot 98 / 75, 98 mm (3.86 in) is the dimension of an aluminum seal pot while 75 mm (2.92 in) is the dimension of a stainless steel seal pot.

11.2 Gauge supporter

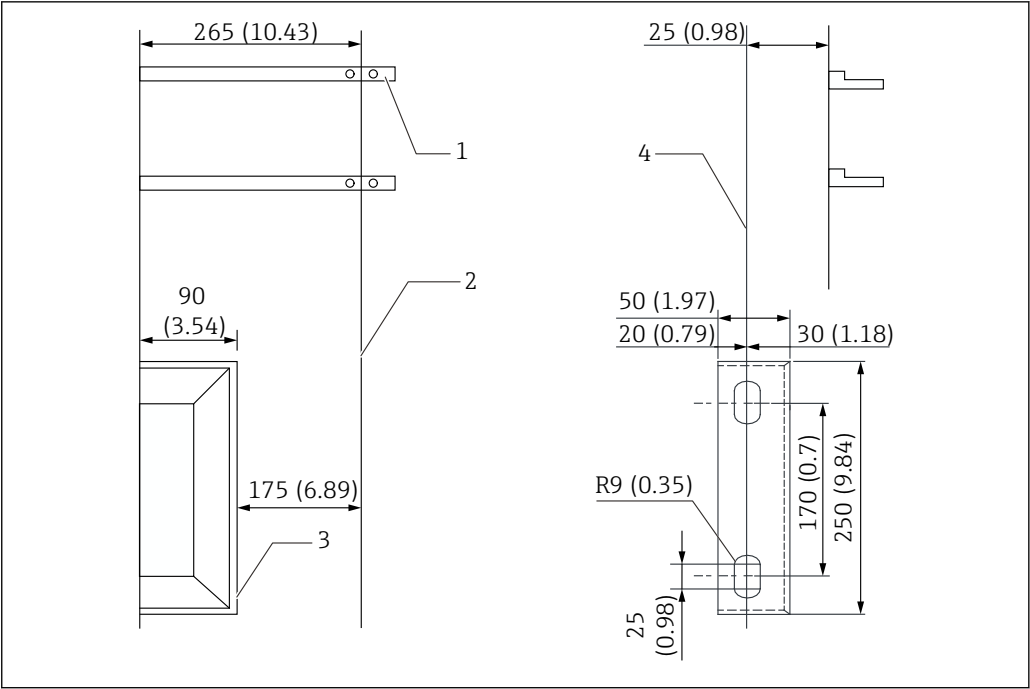
A gauge supporter is used for mounting the gauge on the external wall of a tank. Note that pipe supporters are not supplied.

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).



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

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



A0041180

- 70 Gauge supporter (for high pressure). Unit of measurement mm (in)
- 1 Pipe supporter (not supplied)
 - 2 Center line for mounting
 - 3 Gauge supporter (based on the selected option SS400: t = 4 / SUS304: t = 4.0)
 - 4 Center line of the gauge supporter

11.3 Guide pipe

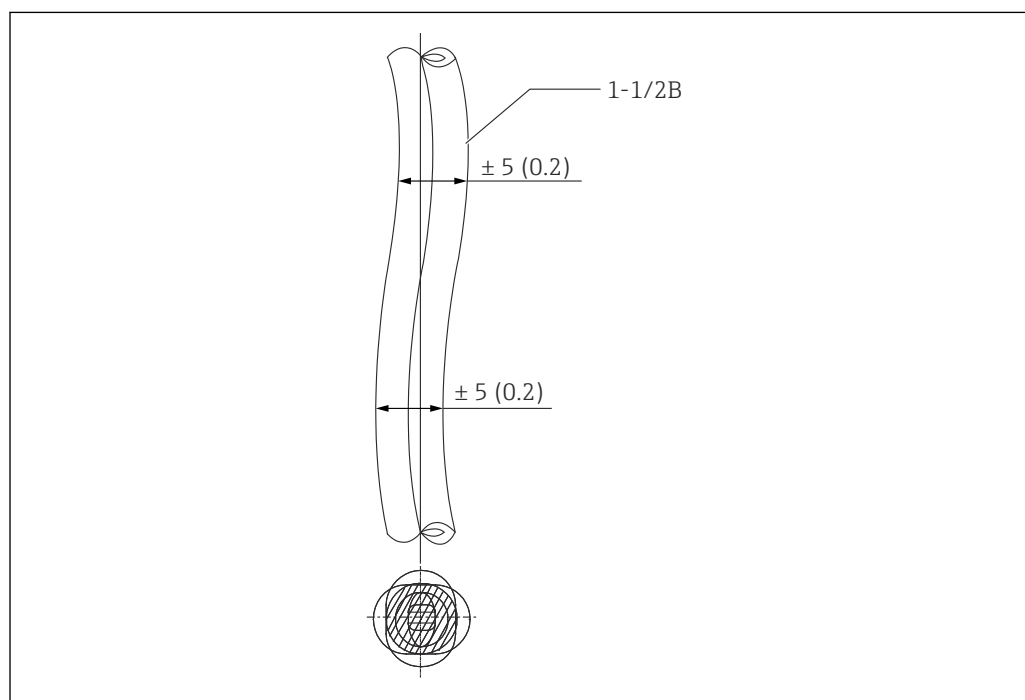
11.3.1 Guide pipe selection and mounting

Guide pipe mounting 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 mounting

- Guide pipes and pipe supporters are not supplied by Endress+Hauser.
- Keep the bend in the 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).



A0041181

71 Mounting guide pipes. Unit of measurement mm (in)

NOTICE

Recommended materials for guide pipes

- Only use galvanized SGP (white pipe) or SGPW 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.

11.4 Mounting and enclosed accessories

Ordering information: 610 mounting accessories

NA	Copper-free gearing	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 (aluminum)	This is an option for securing the tape inside so that it does not become detached. Standard LT5-1 is made of stainless steel. Aluminum LT5-4 and LT5-6 are mounted as a standard item. For applications where there is a risk of hunting on the float, we recommend an aluminum material regardless of the low-, medium-, or high-pressure specifications.
ND	Dust guard	This is an internal component that prevents dust, which is generated when iron pipes are used, from entering the gear inside the gauge head. LT5-4 and LT5-6 are mounted as standard items.
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

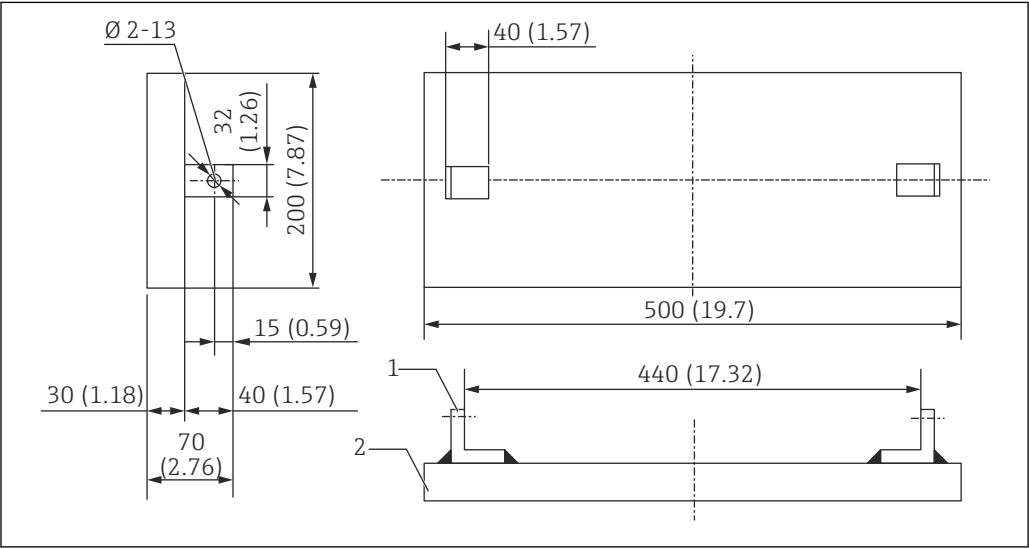
PE	FRT wire guide metal	This wire guide is installed on the floating roof. It protects the measuring wire from wear due to contact with the roof.
PF	Wire guide socket Rc 1-1/2	This is a socket for mounting on the pipes of a floating roof tank or a gas holder tank. It protects the measuring wire from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

11.5 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)

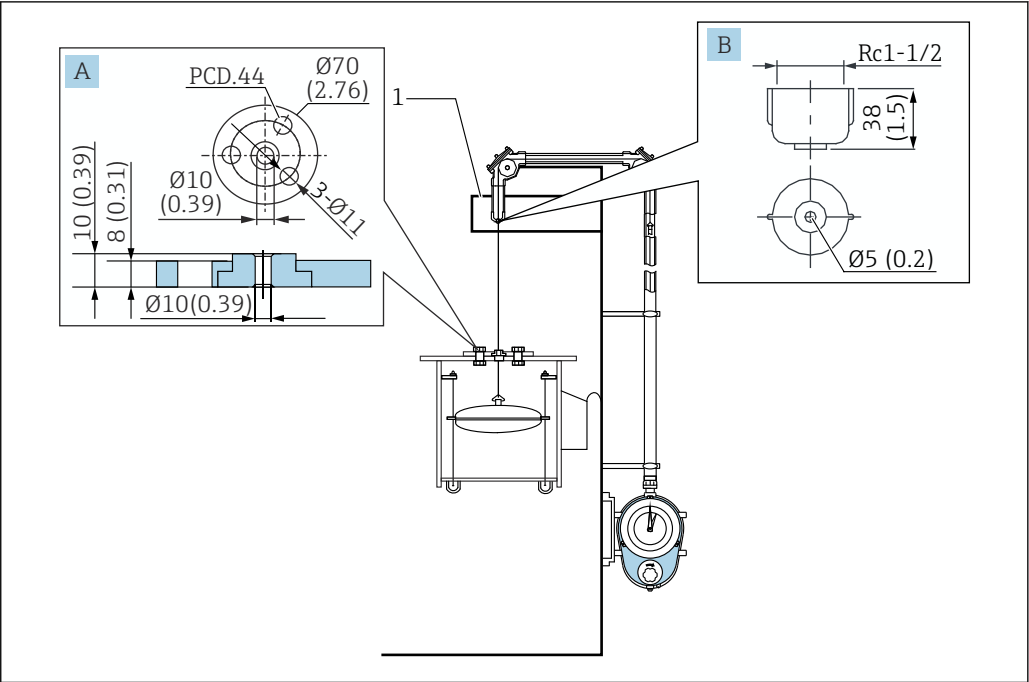
 Special specification is required in order to use this anchor weight.



 72 Anchor weight. Unit of measurement mm (in)
1 Anchor hook
2 Anchor weight

A0041260

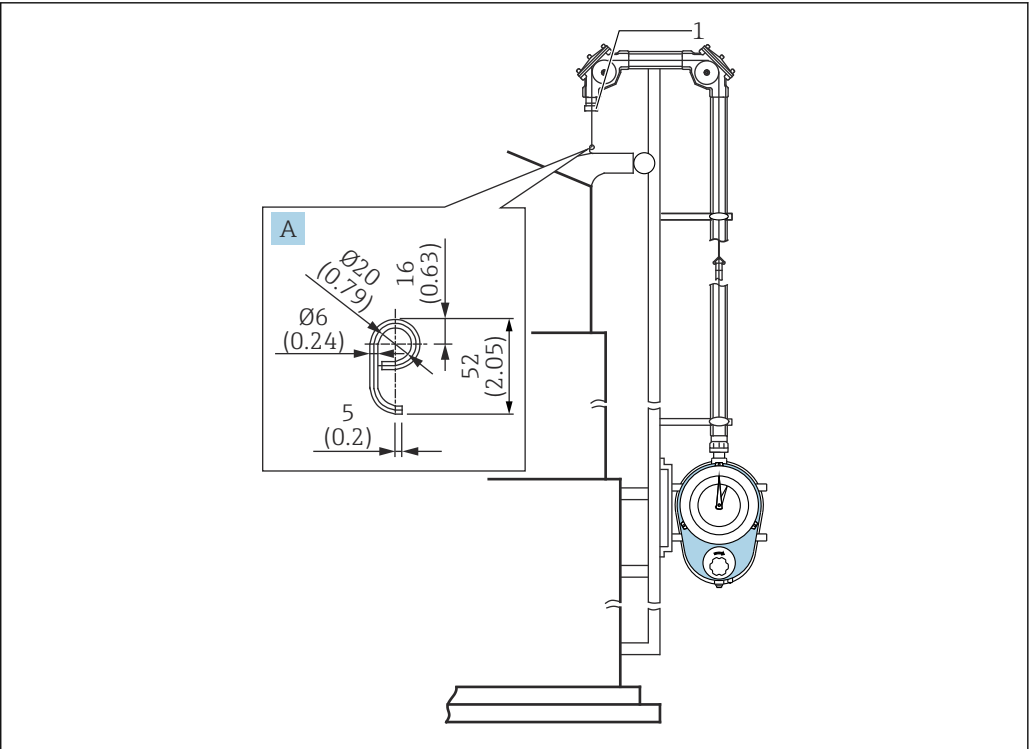
11.6 Wire guide metal and wire guide socket



A0041261

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

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



A0041262

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

- A Wire hook
- 1 Wire guide socket

Index

Symbols

Applications	7
Safety instructions	
Basic	7
Intended use	7
Measured materials	7
Declaration of Conformity	8
Causes of malfunction and countermeasures	79

A

Accessories	87, 91
Airtightness test	74
Anchor hook	26
Anchor weight	92

C

CE mark	8
Certificates	30
Check handle (standard)	75
Commissioning	67
Compact cone roof tank	39
Cone roof tank	35, 37, 54
Cone roof tank (CRT)	31
Conster mounting	63
Counter display	68

D

Delivered contents and product identification	11
Dial display	67
Dimensions	13
Disposal	86
Document	
Function	4
Document function	4
Dome roof tank for medium-pressure	47

E

Endress+Hauser services	
Repair	85

F

Filling seal pot with liquid sealant (for an installed gauge)	66
Filling seal pot with liquid sealant (when installing a new gauge)	64
Flange / high-pressure type LT5-6 dimension	19
Flange and low-pressure type LT5-1 dimension	15
Flange and medium-pressure type LT5-4 dimension ..	17
Float connection procedure	55
Floating roof tank	56
Floating roof tank (FRT)	45

G

Gas holder	43
Gauge supporter	22, 88
General information on repairs	85
Guide pipe	24, 90

Guide pipe method	39, 41
Guide pipe mounting	24
Guide pipe selection and mounting	90
Guide pipes	25
Guide wire	51

H

Handling of gauge at startup	74
Hoist handle (optional)	76

I

Indicator adjustment	69
Indicator adjustment procedure using actual liquid ...	69
Indicator adjustment procedure using an empty tank .	69
Indicator adjustment procedure with a water-filled tank	70
Installation	13
Installation preparation	20

L

Liquid sealant	64
LT5-1 Dimensions (flange, low-pressure type)	15
LT5-1 Dimensions (screw-in / low-pressure type) ...	13
LT5-1 hoist handle	76
LT5-4 Dimensions (flange, medium-pressure type) ...	17
LT5-4/LT5-6 check handle unit	83
LT5-4/LT5-6 hoist handle	77
LT5-4/LT5-6 O-ring for transmitter	82
LT5-6 Dimensions (flange / high-pressure type)	19

M

Maintenance	80
Maintenance work	80
Material	30
Measuring tape connection procedure	55
Measuring tape lengths	27
Measuring tape mounting	53
Measuring wire mounting	53
Medium/high-pressure tank	58

O

Operation	75
Operational safety	7
Order codes	31

P

Periodic inspection	81
Product safety	8

R

Reference installation diagrams	31
Repair	85
Repair concept	85
Replacement	82, 83
Required tools	21
Requirements for personnel	7
Return	86

S

Seal pot	64, 87
Seal pot for CRT	35
Seal pot PVC for CRT	37
Sealing materials	29
Spare parts	85
Spherical tank for high-pressure	49
Storage and transport	12

T

Tank top mounting	33, 41
Tape guide adjustment procedure	61
Top anchor	26
Transport	12
Troubleshooting	79

U

Underground tank	33
----------------------------	----

W

Water-filling	74
Wetted gas	29
Wetted liquid	29
Wire guide metal	93
Wire guide socket	93
Wire lengths	27
Workplace safety	7



www.addresses.endress.com

For more Endress+Hauser product please visit: www.ainstru.com
Mail: Sales@ainstru.com