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INSTRUCTION MANUAL

TANK LEVEL GAUGE

HLT-1110 Series



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You should be well-informed of the contents where **WARNING** is marked before carrying out the work.



You should be careful where **CAUTION** is marked to carry out the work.

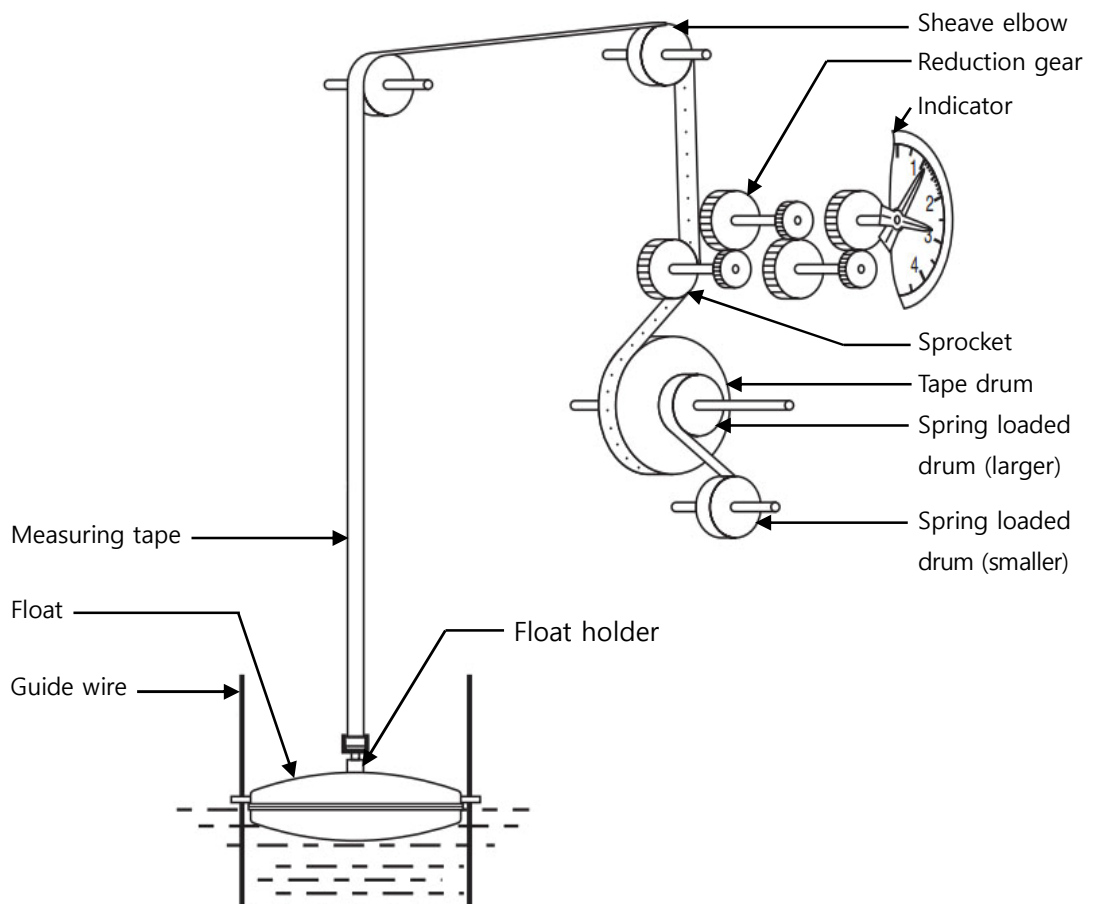


You should be aware of where **NOTICE** is marked to carry out the work.

Overview The HLT-1110 Series level gauge is an instrument used to measure the level of fluid stored in the tank using a spring as the float moves. It can be used in a variety of industries such as crude oil, oil refining, petrochemicals, food industries, power plants, and water treatment.

Operating Principles It consists of a measuring tape and a gauge head connected to the float. The float floats on the liquid surface in the tank as sinking until the point where the weight of the float and the buoyancy of the float are balanced. When the float is submerged, it is balanced by its own buoyancy and tension on the measuring tape. The measuring tape is wound to a tape drum located inside the tank gauge head and transmits tension to a spring drum. This instrument uses a spring to measure the level of fluid stored in the tank as the float moves.

- Characteristics**
- Gauge using spring balance which can be read in [mm]
 - No power required
 - Checking the operation of the gauge by an operating checker
 - Can be installed in a variety of tanks (e.g. Fixed Roof, Spherical Tank)
 - Can be read on the ground or at the tank
 - Additional function of transmitters for remote instruction, control, and alarm
 - Suitable for corrosive and toxic fluids

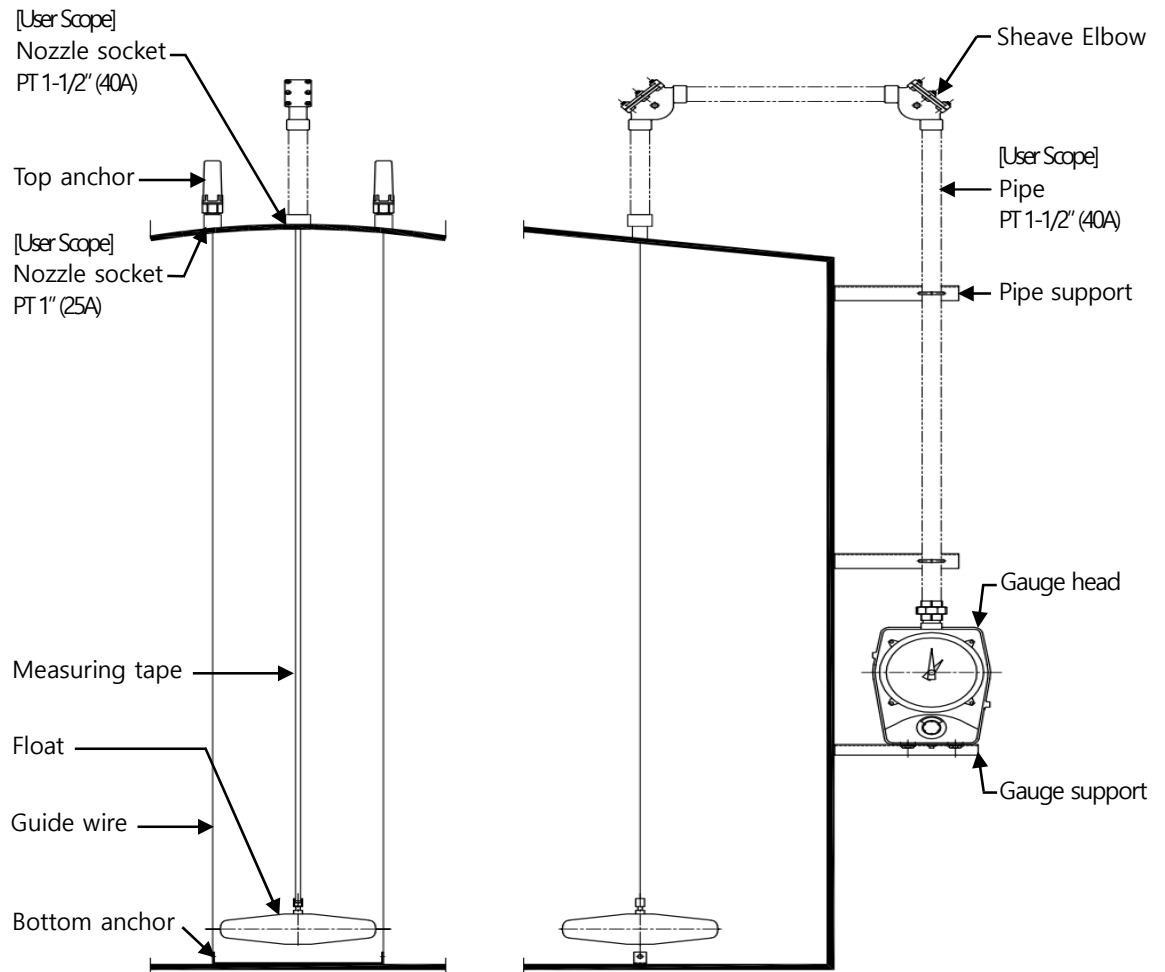


Specification

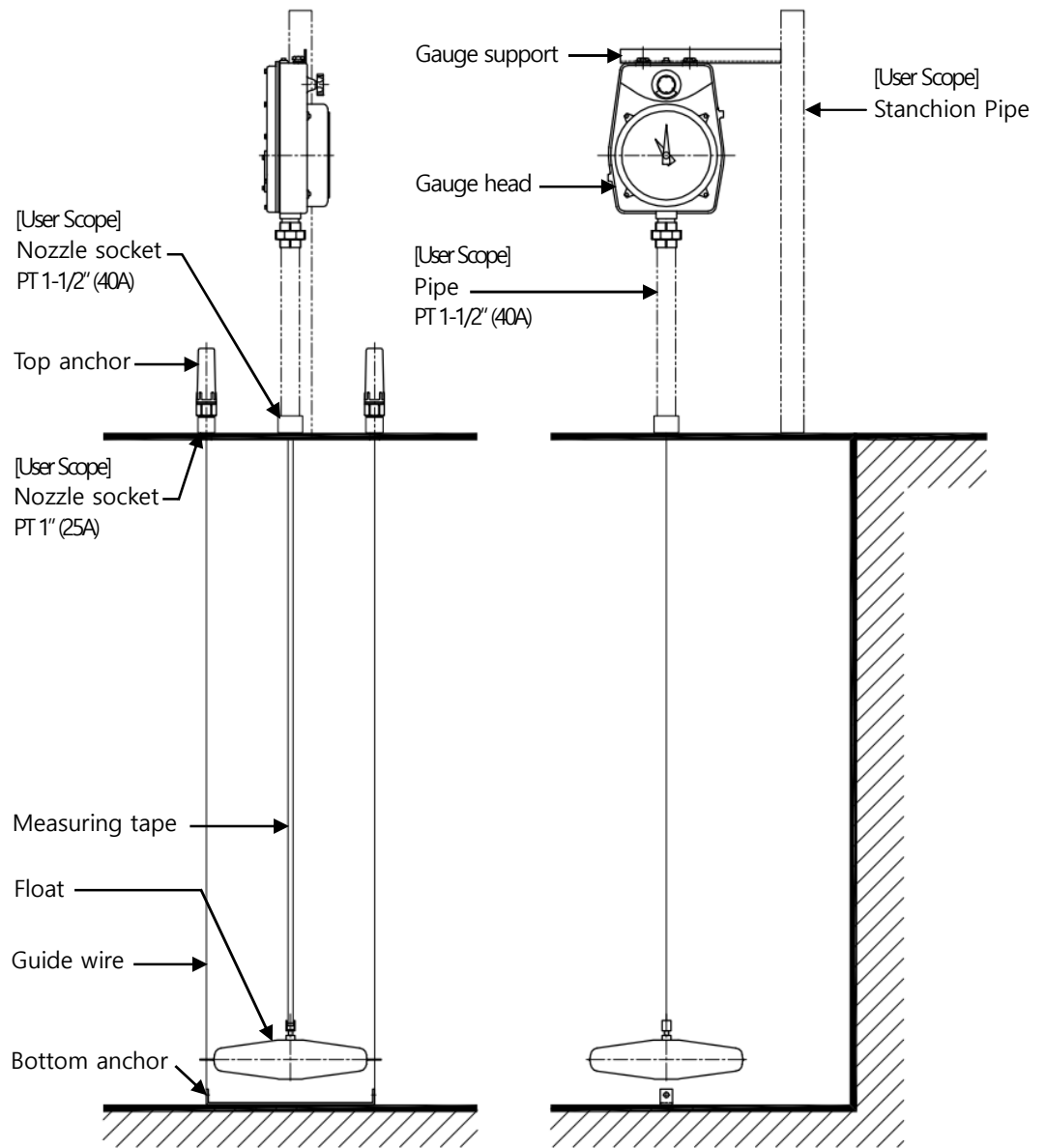
Type	Screw Type: HLT-1110
	Flange Type: HLT-1210
Installation	Top or Side mounting
Indicator	2-point dial
Ambient Temp.	-20°C ~ 60°C
Fluid Temp.	Max. 150°C
Operation Press.	ATM
Enclosure	Weather-proof (IP65)
Applications	Liquid
Gauge Range [m]	2.5 / 5 / 10 / 16 / 20 / 30
Specific Gravity	0.6 ~ 2.0
Accuracy	±2mm
Combination Transmitter	HAT Series
Process Conn. Size	Screw Type: PT 1-1/2"(F) Socket (Std.)
	Flange Type: 1-1/2"(40A) Flange (Std.)

Product Configuration and Technical Data

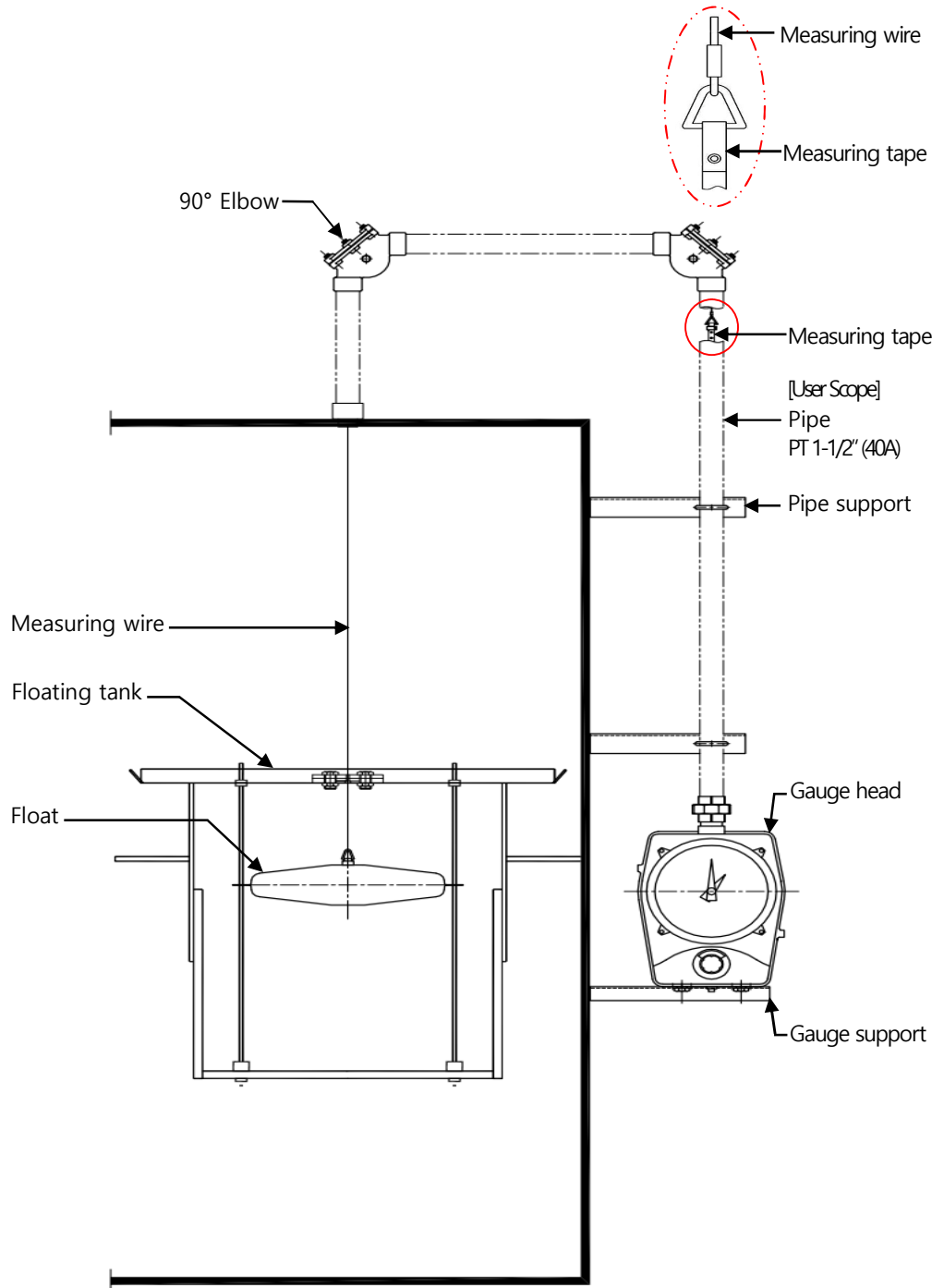
■ HLT-1110 Series for Cone Roof Tank



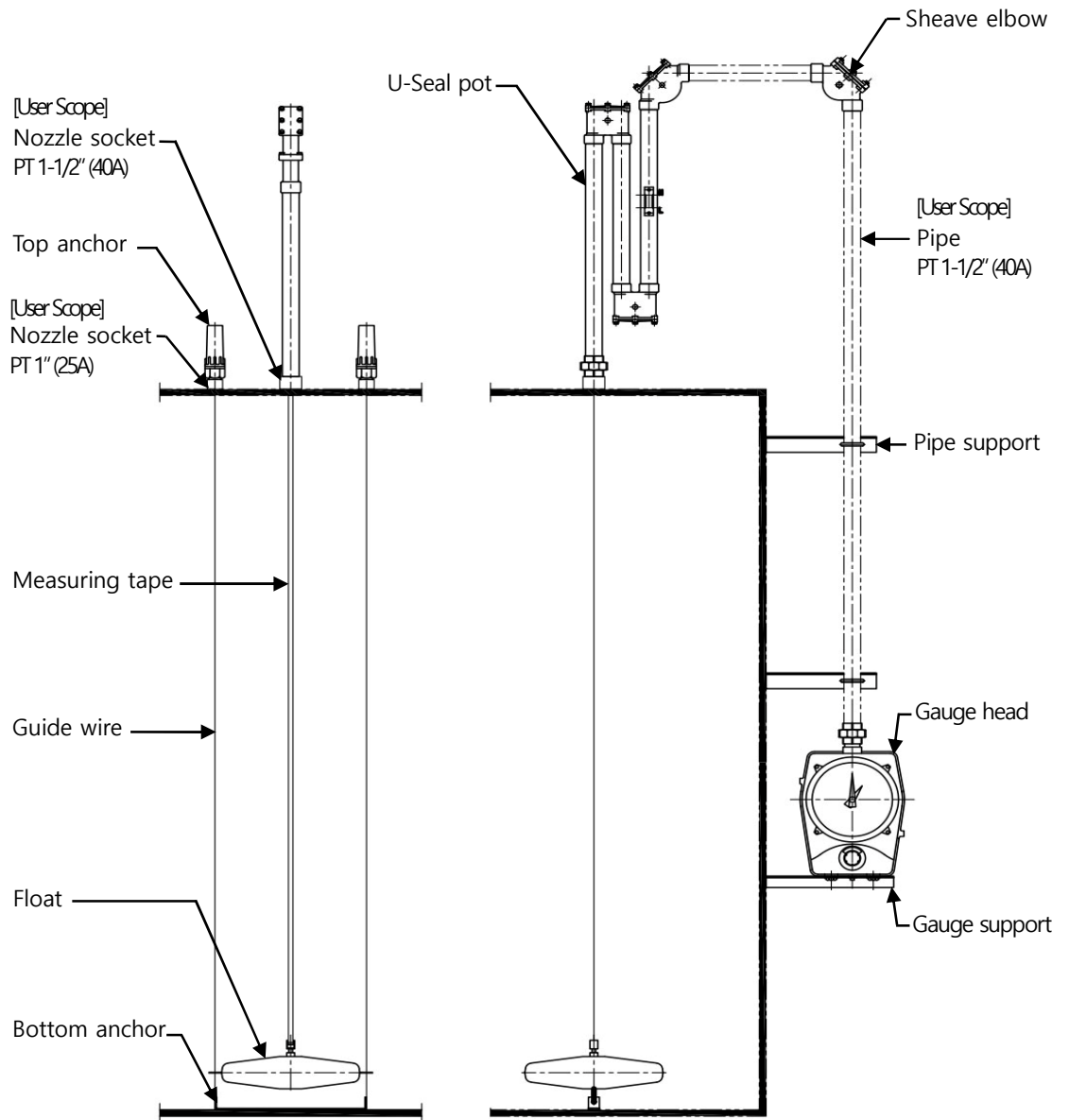
■ HLT-1110 Series for Underground Tank



■ HLT-1110 Series for floating Tank

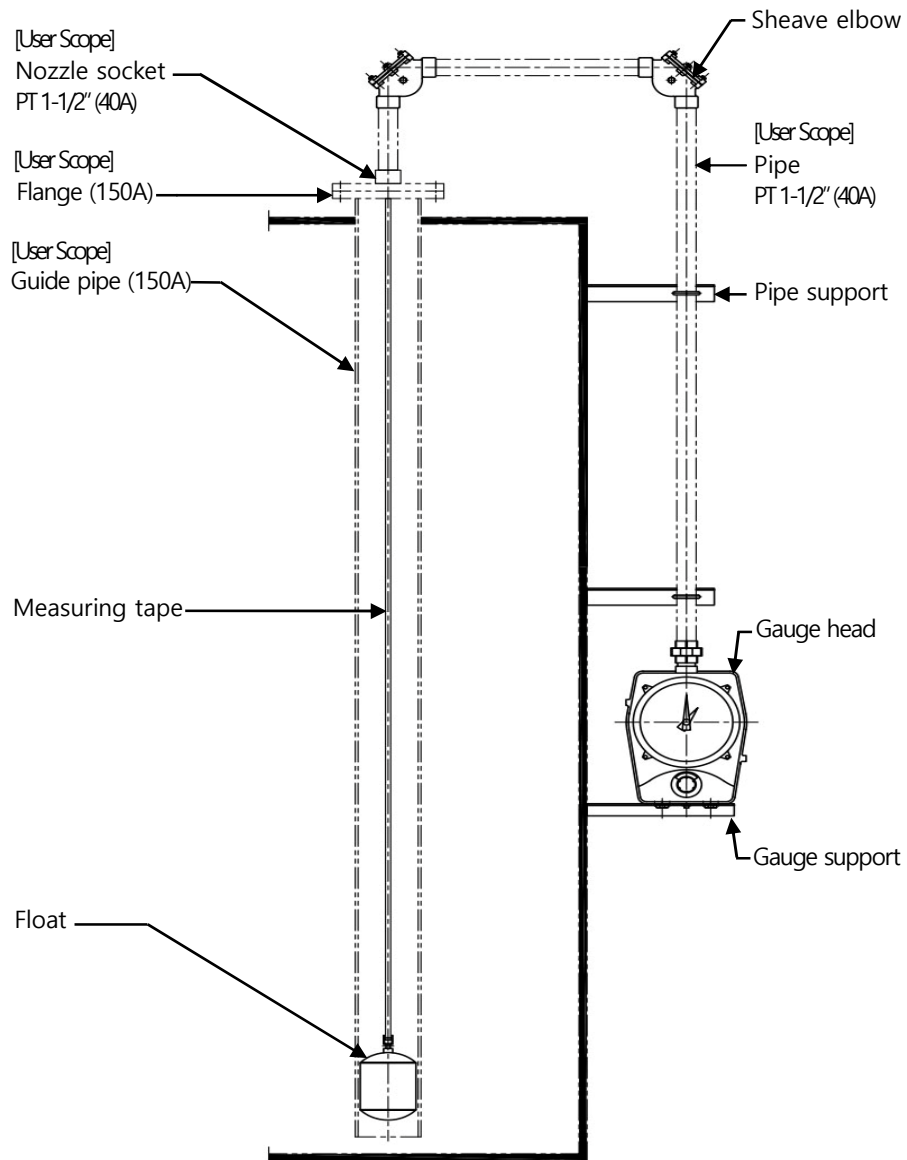


■ HLT-1110 Series for with U-Seal Pot



Sealing liquid is a customer scope because it cannot be shipped to site due to policy for dangerous object of Air and/or Sea international transportation.
 (Non-evaporating liquids, i.e. Silicone Oil, Spindle Oil, Paraffin Oil, etc. are recommended.)

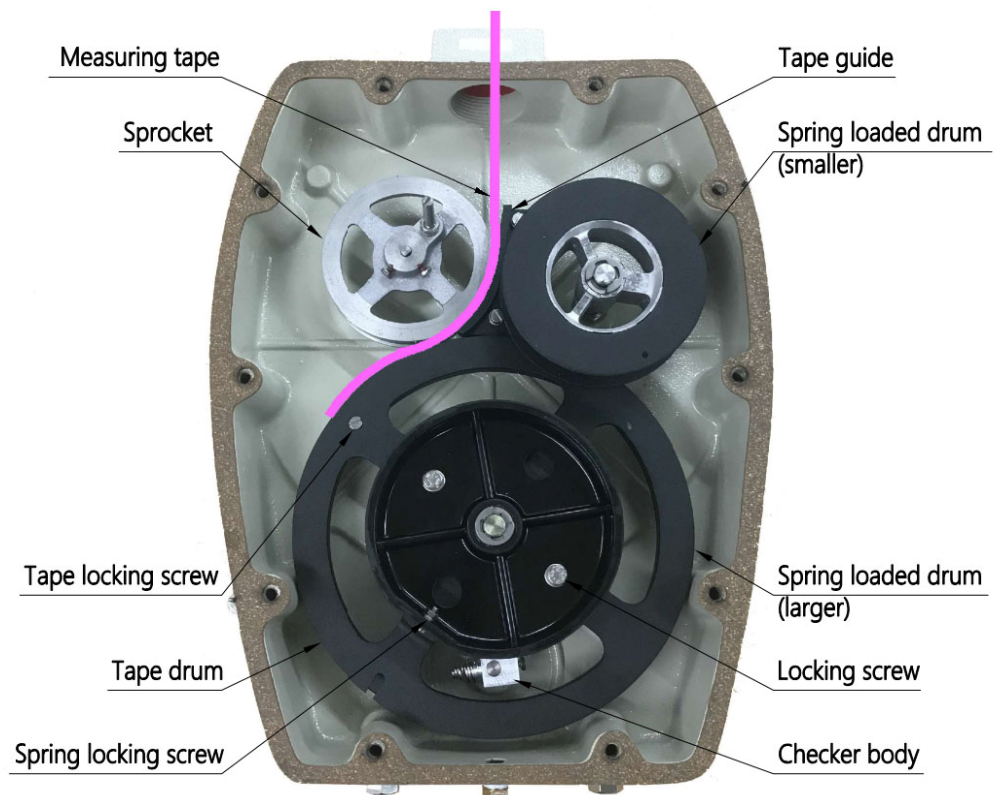
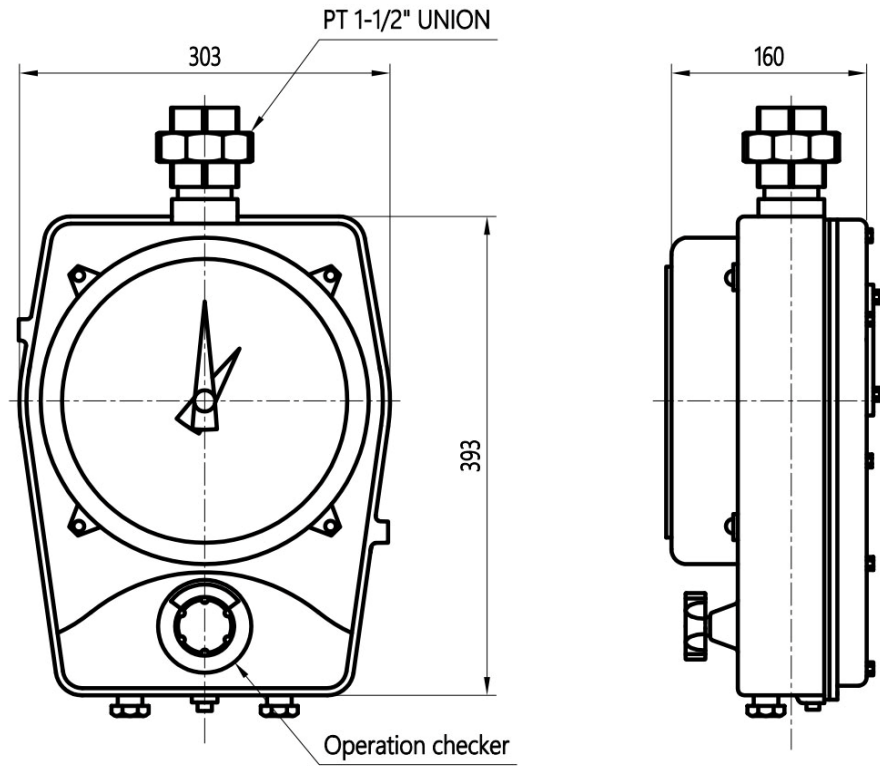
■ HLT-1110 Series for with Guide Pipe



■ Part Name and Dimensions

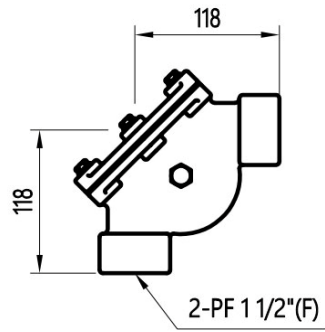
The dimensions on the following pages are indicated in [mm]

[Gauge head]

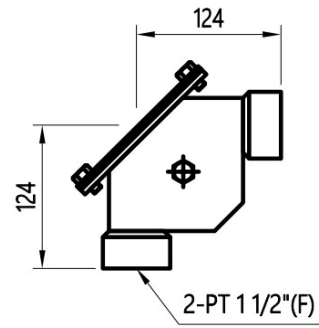


[Part]

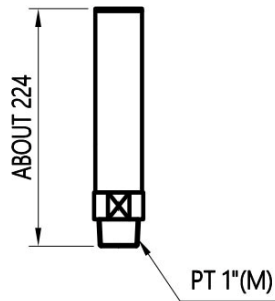
Sheave elbow (AL)



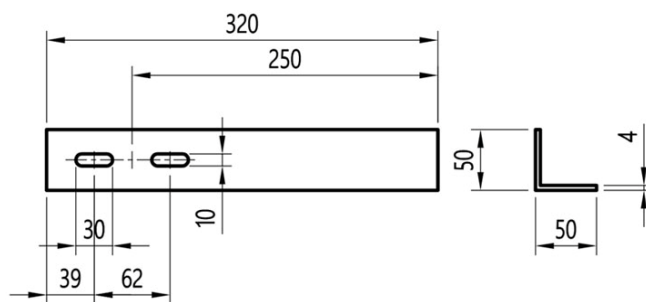
Sheave elbow (SUS)



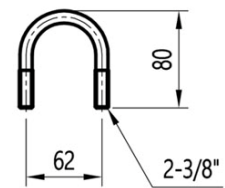
Top anchor



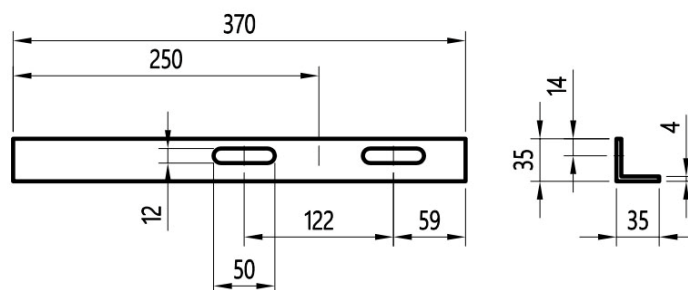
Pipe support



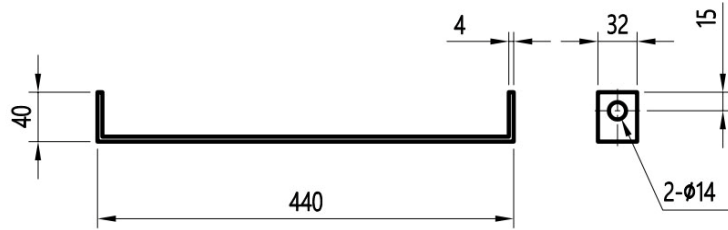
U-bolt



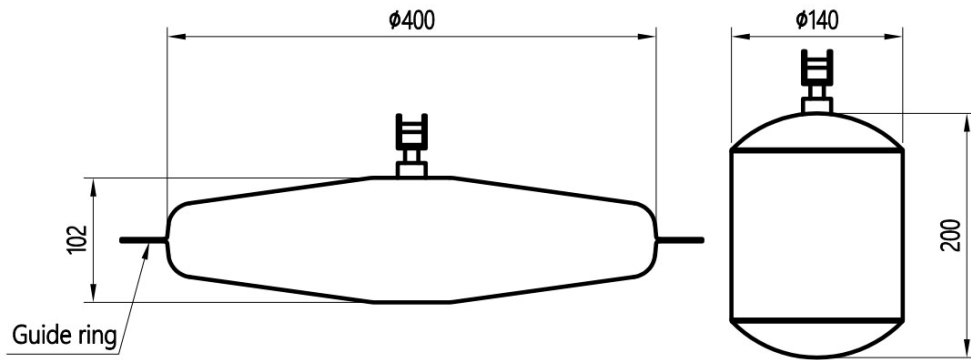
Gauge support



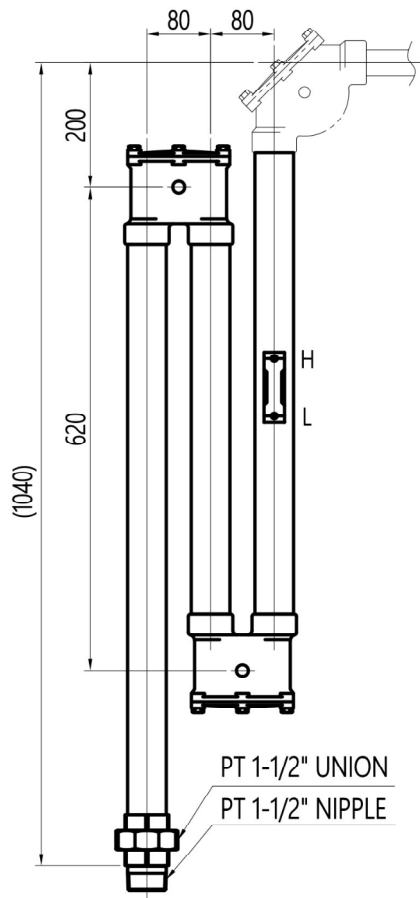
Bottom anchor



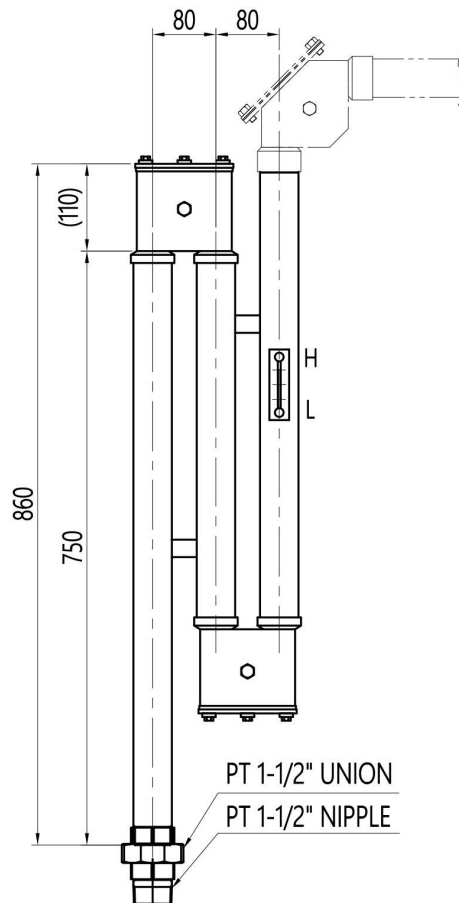
Float



U-seal pot (CS+AL)



U-seal pot (SUS)



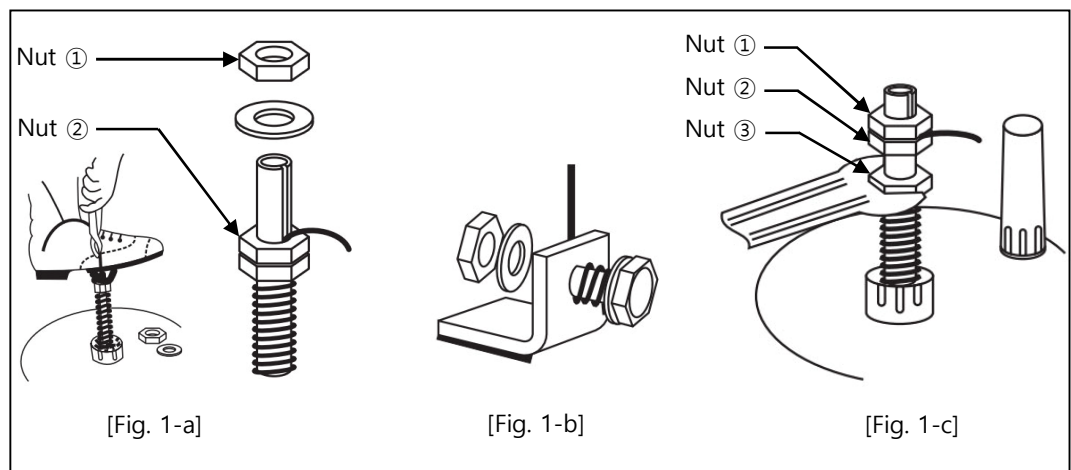
Installation 1. Conditions for Installation and Adjustment

- 1) Make sure that the pipes and bottom anchor are ready.
- 2) It doesn't matter if you install the pipes and Sheave elbow first.
- 3) The inside of the tank should be empty and there should be no interference in instrument installation.
- 4) The nozzle of the tank should be installed in accordance with the connections and specifications of our instruments and should not pose any risk of internal operation.
- 5) Install the gauge head in a position that is easily visible. (e.g. approximately 1500mm from the ground.)
- 6) There should be no fluid leaks.
- 7) The environment should be in place to ensure that installation and adjustment can be performed safely.
- 8) If used in toxic gases, the U-Seal pot should be used as there is a concern of product damage.

2. Installation Sequence

2.1 Guide wire Installation

- 1) Open the cover of the top anchor at the top of the tank.
- 2) Insert the guide wire from the top anchor and tighten it with a nut^① and nut^② to secure it to the top anchor, giving a margin of at the end of the guide wire approximately 100mm. [Refer to Figure.1-a]
- 3) Insert the guide wire into the guide ring of the float at the bottom of the tank and secure the guide wire to the bottom anchor using bolts and nuts. [Refer to Figure.1-b]
- 4) Cut and bend the end of the guide wire to prevent the float being caught.
- 5) Tighten Nut^③ to adjust the tension of the guide wire. [Refer to Figure.1-c]

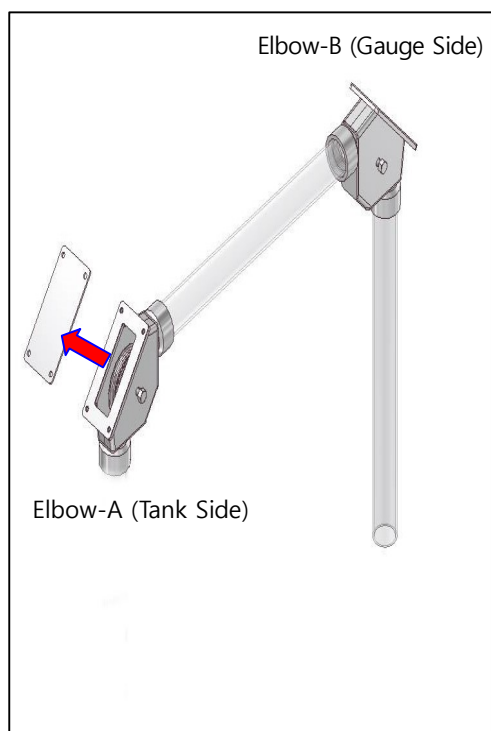


[Figure. 1] Guide Wire Installation

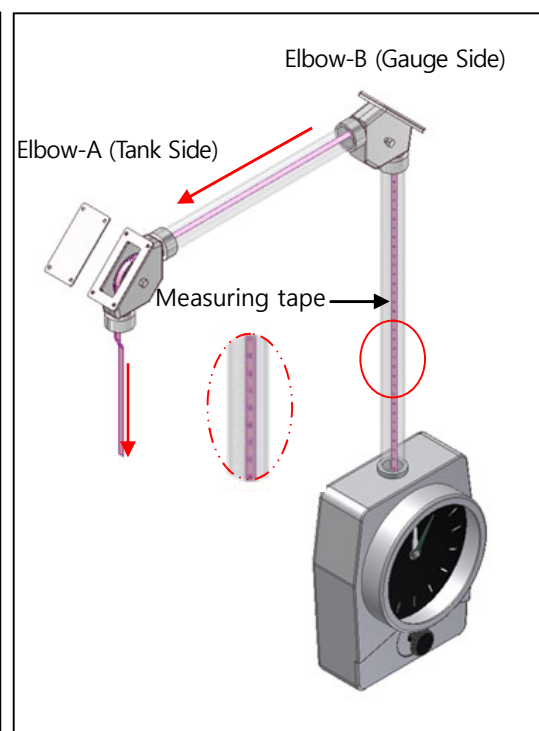
2.2 Measuring Tape Installation

2.2.1 Installation Sequence of Measuring Tape (Head Part)

- 1) Insert the measuring tape into the sheave elbow.
 - ① Uncover both Elbow-A and Elbow-B. [Refer to Figure.2]
 - ▶ At this point, elbows and pipes should be installed first.
 - ② Pass the measuring tape in the direction A at Elbow-B. [Refer to Figure.3]
 - ▶ Install the measuring tape with holes in the direction of the gauge head (Outside the tank).
 - ▶ Be sure that the hole processing boundary marked on the measuring tape is located between Elbow-A and B.



[Figure. 2] Measuring Tape Installation (1)



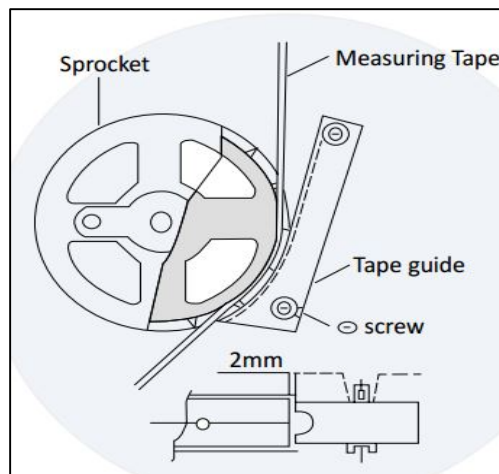
[Figure. 3] Measuring Tape Installation (2)



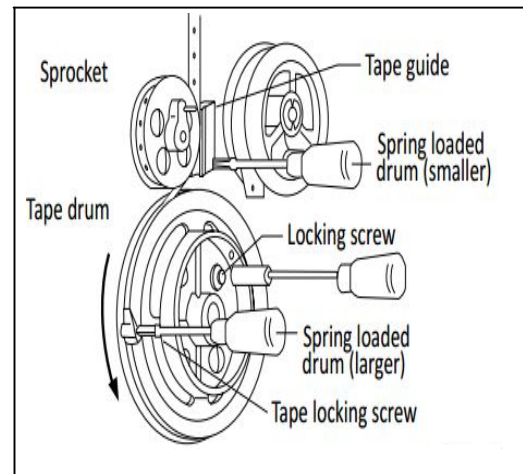
The measuring tape is supplied without being installed on the gauge head, so it must be installed directly on site.

2) Install the measuring tape to the gauge head.

- ① Open the back cover of the head.
- ② Pull the measuring tape out of the upper elbow through the hole in the connection section above the gauge head downwards.
- ③ Align the measuring tape well between the sprocket groove and the tape guide.
 - ▶ Make sure that not to allow the tape to deviate from the sprocket.
 - ▶ At this point, the sprocket and tape guide intervals are adjusted by means of a screw. [Refer to Figure.4]
- ④ Bolt the tape to the tape locking screw on the tape drum. [Refer to Figure.5]
- ▶ However, the part without holes of the tape should not be allowed into the head.
- ▶ Refer to [Table. 1] for measuring tape supply length.



[Figure. 4] Measuring Tape Installation (3)



[Figure. 5] Measuring Tape Installation (4)

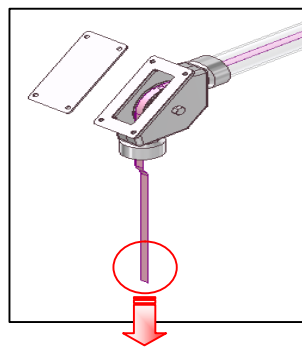
Scale Range [m]	2.5	5	10	16	20	30
Measuring Tape Supply Length [m]	11	16	26	38	46	66

[Table. 1] Measuring Tape Supply Length.

- ▶ The supply length of the measuring tape is twice the length of the scale range, plus the extra (6m).
e.g. When the scale range is 10m, the length of the measuring tape supply length is 26m.
- ▶ Drill holes so that the scale range + 6m can be wound into the sprocket.
e.g. When the scale range is 10m, the length of the part of the holes of the measuring tape is 16m.
- ▶ Depending on the on-site scale range, the supplied measuring tape can only cut the clearance length in the area where the holes are not machined.
- ▶ The measuring tape (with holes) connected to the head should never be cut.

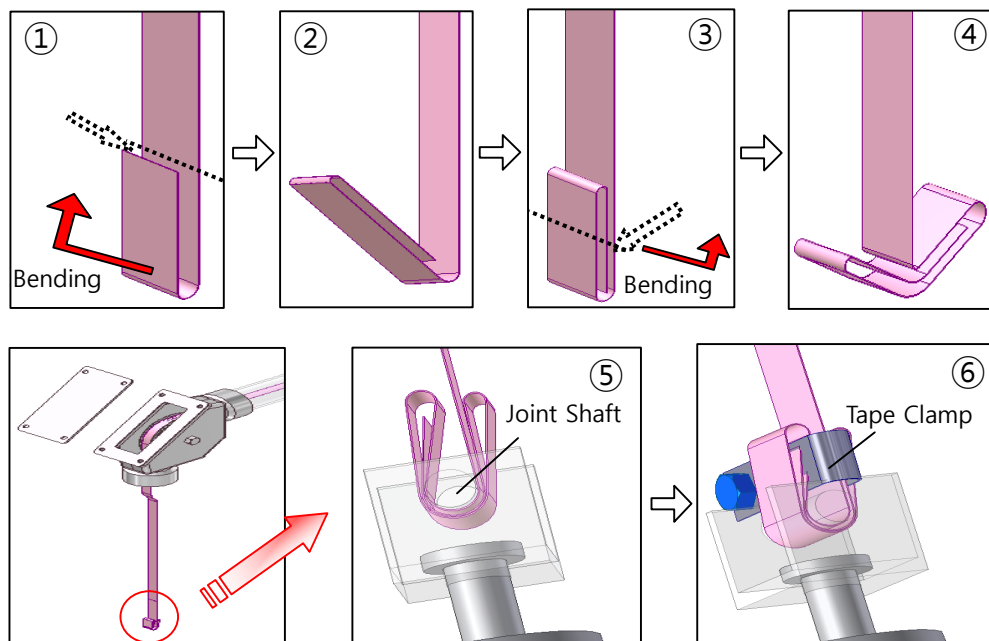
2.2.2 Installation Sequence of Measuring Tape (Float Part)

- 1) Fold the end of the measuring tape on side Elbow-A in order ① to ⑥ and connect it to the float. [Refer to Figure.6]
 - ① Fold the end of the measuring tape about 60~70mm.
 - ② Fold the measuring tape again.
 - ③ Fold the center of the measuring tape.
 - ④ Make sure that it is folded properly.
 - ⑤ Insert the folded measuring tape into the joint shaft.
 - ⑥ Insert the tape clamp into the measuring tape loop and secure it with a bolt and nut.
- ▶ At this point, use a bolt that is not longer than 10mm.



※ Measuring Tape and Float Part Installation Cautions

- ▶ Make sure that the tape is secured temporary from the top of the sheave elbow to prevent it from falling out. (Fixed to the site situation).
- ▶ Depending on the scale range, cut the remaining tape after installation by using a metal cutting snips.
- ▶ When folding the measuring tape, take care not to bend it.



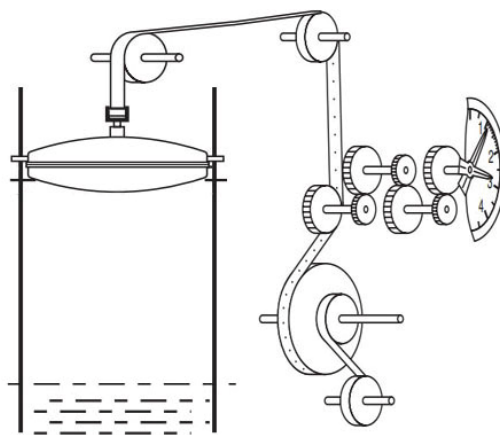
[Figure. 6] Measuring Tape Installation (5)

2.3 Spring Installation

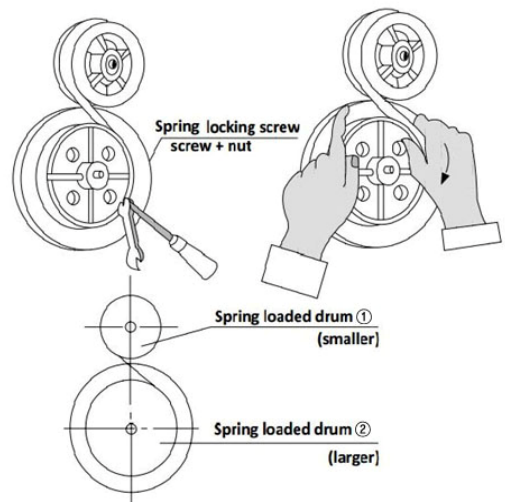
- 1) Secure the measuring tape to the tape drum using a tape locking screw, then turn the tape drum counter-clockwise to wind the measuring tape so that the float is placed on the top of the tank. [Refer to Figure.7]
- 2) Bolt the spring on the spring loaded drum① onto the spring locking screw on the spring loaded drum②. [Refer to Figure.8-1]
 - ▶ At this point, you should place the spring locking screw to the right side of you because the spring will be wound in a clockwise. [Refer to Figure.8-2]
- 3) Wind about 2~3 turns clockwise to prevent the fixed spring from escaping.
- 4) After wind the spring, bolt the spring loaded drum② into the tape locking screw on the tape drum.
- 5) After that, fasten the spring loaded drum with the stop ring at the top of the axis to finish.
 - ▶ Fix both spring loaded drum① and ②.

※ To Inspect Assembly

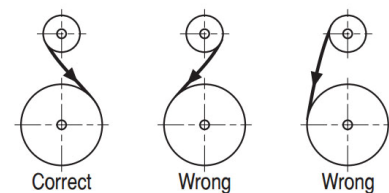
- ▶ If both the measuring tape and the spring are installed, move the float which outside the head to make sure that the measuring tape is not jammed or dislodged.
- ▶ At this point, when the spring is wound, the tape is untangled.
- ▶ In addition, if the tape is pulled and there is a jam or break, fine-tune it with the screw on the tape guide. [Refer to Figure.4]



[Figure. 7] Spring Installation (1)



[Figure. 8-1] Spring Installation (2)



[Figure. 8-2] Spring Installation (2)

2.4 Gauge Adjustment and Completion

- 1) Adjust the gauge to the current level of tank.
- 2) After adjusting the float position and gauge, make sure that the measuring tape is not dislodged from the roller of the sheave elbow.
- 3) If there is no problem, close the cover of the sheave elbow to finish the assembly.

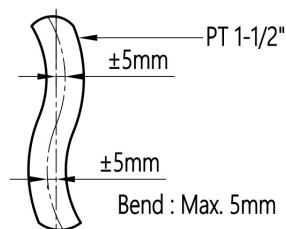
3. Installation Summary

- 1) Install guide wire, float, bottom anchor, top anchor, gauge & pipe support, gauge head on the tank.
- 2) Open the cover of the sheave elbow and insert the measuring tape.
- 3) Open the back cover of the gauge head and secure the measuring tape to the tape locking screw.
- 4) Connect the measuring tape to the float.
- 5) Install the spring on the spring loaded drum ① and ② which inside the gauge head.
- 6) Open the front cover of the gauge head and set the indicator to zero.

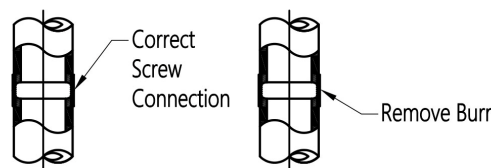
Precautions for Installation

■ Pipe (User Scope)

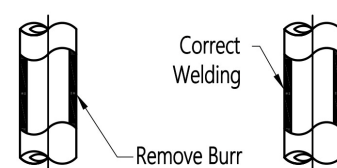
- The pipes should be galvanized or stainless.
- The bending degree of the pipe should not be over than 5mm when installing. [Refer to Figure.9]
- If the contents of the tank are highly corrosive liquids, coated should be used.
- When connecting pipes, ensure proper connection is made to prevent leakage of gas in the tank or rainwater from entering the tank. [Refer to Figure.10]



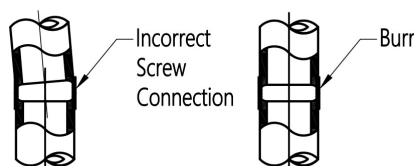
[Figure. 9] Pipe Material



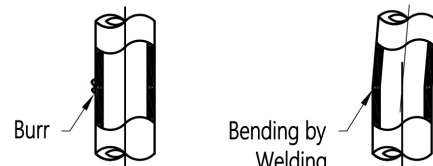
[Figure. 10-1] Proper Pipe-Screw Connection



[Figure. 10-2] Proper Pipe-Welding Connection



[Figure. 10-3] Wrong Pipe-Screw Connection

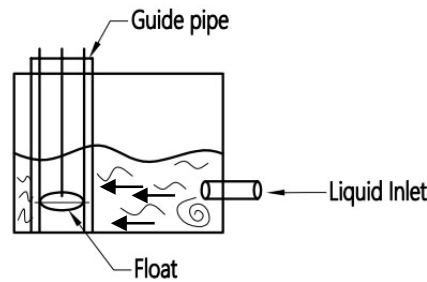


[Figure. 10-4] Wrong Pipe-Welding Connection

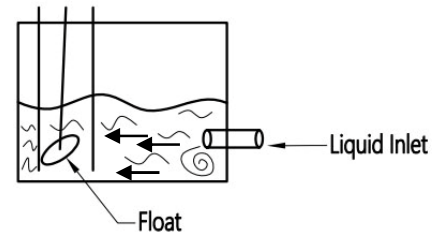
■ Float

- Make sure that float holder which is connected with the measuring tape is facing upward, when installing the float.
- The position of the float should be located away from the inlet of the fluid entering the tank to prevent the float from being affected by the fluid flow or swirling. If the float is inevitably to be installed at the inlet of the fluid, the guide pipe should be installed to protect the float. [Refer to Figure.11]

Recommended Installation



Not Recommended Installation

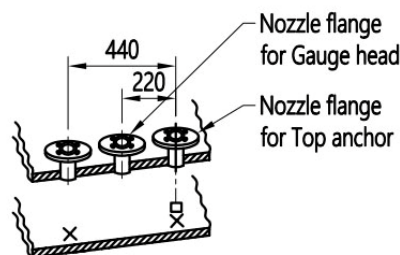


[Figure. 11] Float Installation Site

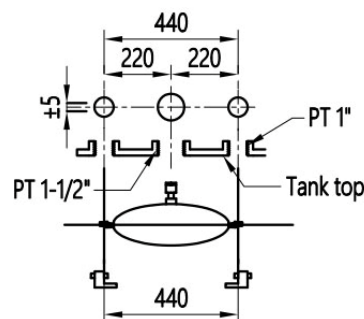
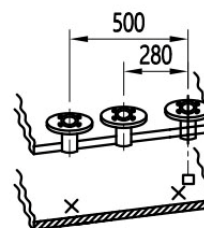
■ Top Anchor, Guide Wire

- Hang the anchor on the guide wire and set the location of the bottom anchor. Ensure that the top anchor and flange are positioned vertically to each other. [Refer to Figure.12]
- Since the distance between the bottom anchor and guide wire is 440mm, the distance from the center line of the top anchor should be set to 440mm.

Recommended Installation



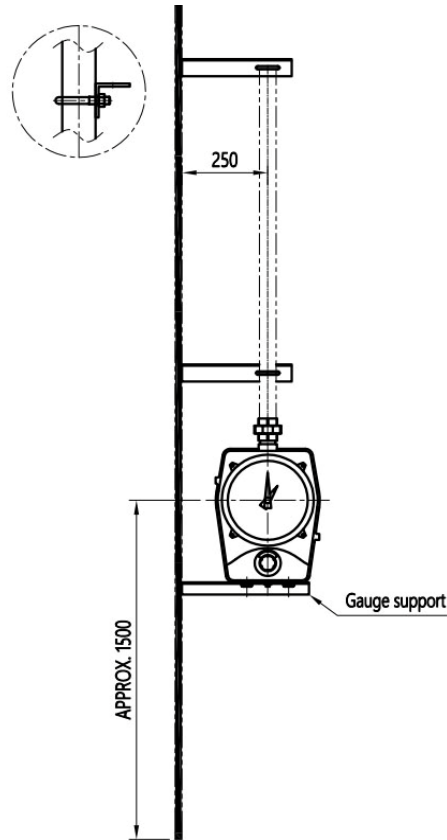
Not Recommended Installation



[Figure. 12] Top Anchor Installation Cautions

■ Gauge Support

- Install the gauge support on the outside wall of the tank.
- When securing the gauge head to the gauge support, it should be installed in the center of the mounting of the gauge support as it is bolted. [Refer to Figure.13]



[Figure. 13] Gauge Support Installation

■ Gauge Head

- Make sure that the measuring tape does not twist or fold.
- Make sure that the measuring tape does not deviate from the sheave elbow while installing and that it is properly located in the groove of the sheave elbow after installation.
- Do not loosen the spring locking screw. If not, it may result in the spring escaping, causing the spring drum to rapidly tangled, which may damage human life.



The float, measuring tape, and guide wire shall be installed vertically and also tightly.

Otherwise, the product may have a tolerance more than usual.

**Gauge
Operation**

The tank level gauge is installed and ready for use right away when properly adjusted.

No special use procedures or sequences are required for the user.

The operating checker is on the front surface of the gauge head and turns in clockwise 90 degrees (1/4 turns) to lift the float slightly. This operation allows the user to observe that all parts of the



However, use of excessive force may damage the operating checker.

Maintenance The life of the key parts depends in user's environment and can be used optimally through periodic checks. Therefore, the user should perform periodic maintenance at least once a year. When using the U-Seal pot, make sure that the oil (Silicon oil) is charged inside. When used in highly viscous liquids, the float is covered with foreign substances, which results in a difference in buoyancy, and should be cleaned periodically.

**Other
Precautions**

- Precautions While Using
 - Check the level of tank and presence of the measured materials in the tank before disconnecting the product.
 - Seal properly the screws and packing parts during installation to prevent leakage of the product.
 - Be careful not to damage the packing or gasket parts when assembling/disassembling the product.
 - Disassembly is performed in the reverse order of installation.


- Disposal of the Product
 - If the product is not available and need to be discarded, separate it according to the material and discard.



When moving or transporting the product, do not cause any serious impact on it.

Marking

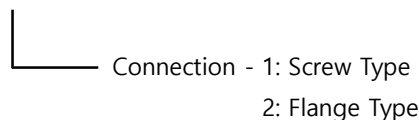
- Product Identification
 - The product identification mark is attached to the housing and shows the model name, serial number, workable temperature, working pressure and matters regarding output.
 - Serial numbers are unique manufacturing numbers for the identification of products.

PRODUCT	RANGE	mm
TAG NO.		
SER. NO.		
ENCLOSURE		
 HITROL CO., LTD.		

**Model
Notation**

The model configuration of the HLT Series is shown below.

HLT-1*10



**Warranty
and Contact
Information**

- Warranty and Service

The warranty period of this product is two years after shipment of the product and after sales service will be provided free of charge during this period for problems that would have occurred during normal use. If after sales service is requested for matters other than product issues, charges may be requested regardless of the warranty period. A/S can be requested through our website or below head office.

- Head office · Factory · Laboratory Contact Number

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