

General Information

HLT-Series

Float Actuation Type
Tank Level Gauge



HITROL CO., LTD.



General

The HLT series of float tank gauges has been developed for use in all areas of industry. Many years of operation in a wide variety of applications have proven its reliability.

Operating Principle

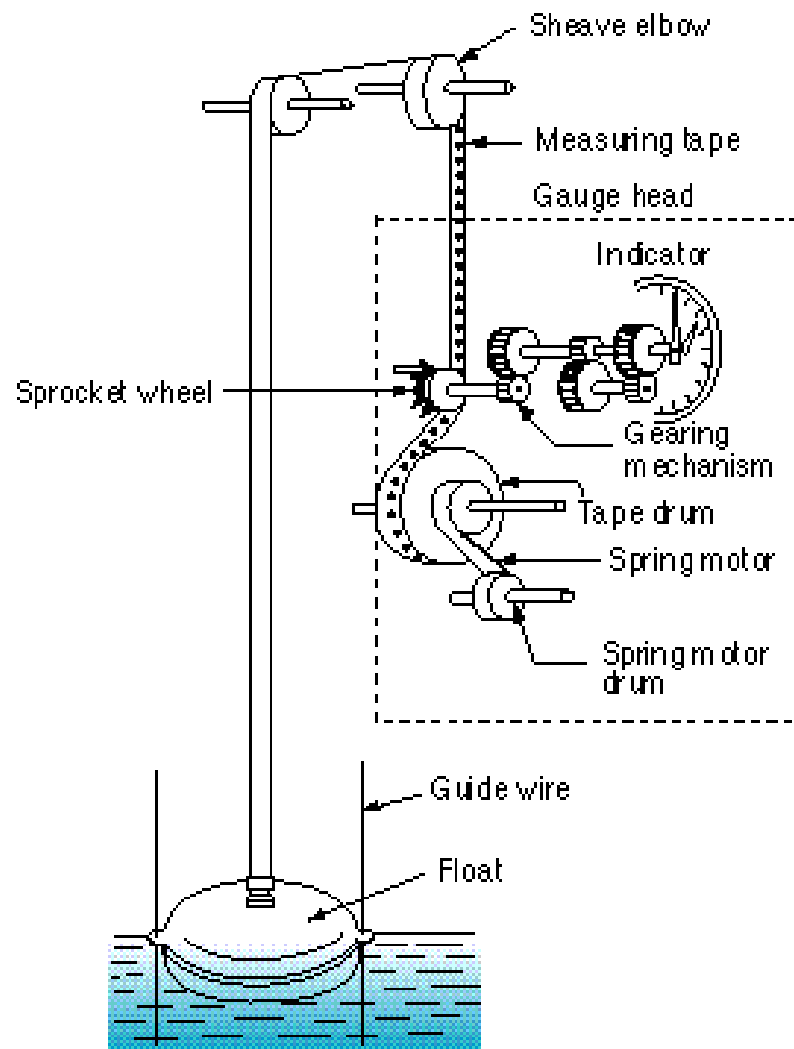
The float gauge consists of a float, a sheave elbow, measuring tape and the gauge head. When the float is immersed in the liquid, it is balanced by its own buoyancy and the tension of the measuring tape. This measuring tape is wound around a drum which is located inside the tank gauge head and is tensioned by the spring motor.

When the liquid level changes, the change in the float buoyancy is detected and the spring motor adjusts the measuring tape to maintain the float

position on the surface of the liquid. The measuring tape has a series of holes set at regular intervals and as the tape rotates the sprocket, it in turn operates the display indicator.

The positioning of the measuring tape holes on the sprocket compensates for the tape weight and prevents the tape from slipping.

To provide an analog or a digital output, a transmitter can be coupled directly to the sprocket wheel and attached to the rear of the gauge head.



Application

HLT, an economical mechanical gauge provides a high accuracy in mm. Largely used in Refineries, Oil-Depots, Chemical & Fertilizer Industries. Useful for medium and large size charged or empty tanks.

It may be cone roof, floating roof, underground or gas holding tank.

It covers critical applications like corrosive & aggressive acids (using non-metallic wetted parts) & liquids with fumes (using vapor seal).

By coupling TRANSMITTER on the back of the gauge, level alarm output & current output corresponding to measuring range can be obtained.

Digital readout using mechanical counter is also available on request.

* Oil refinery

Crude oil, gasoline,
heavy oil, kerosene,
naphtha, organic liquids,
inorganic liquids,
asphalt, sulfur, etc

* Petrochemistry

Benzol, toluene, xylene,
methanol, ethanol, etc

* Dam

Liquid level meter,
through valve opening meter, etc

* Food industry

Beer, whisky, soy source,
molasses, mayonnaise, etc

* Chemistry

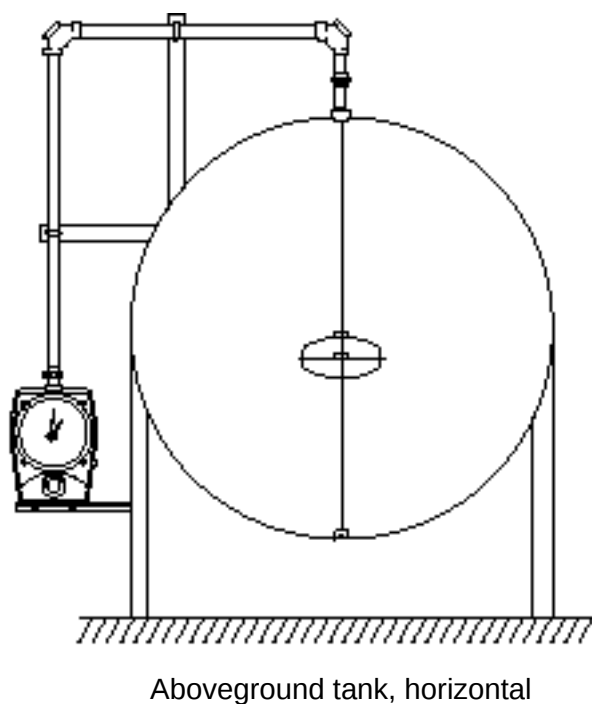
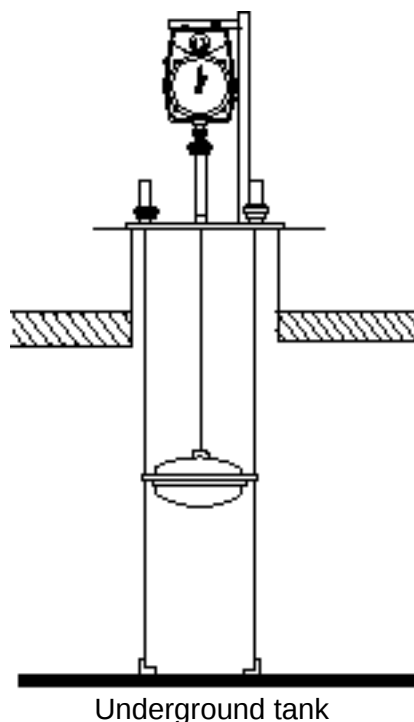
Paint, asphalt,
caustic soda,
hydrochloric acid,
sulfuric acid, etc

* Electricity

Heavy oil,
water reservoir,
distilled water, etc

* Water treatment

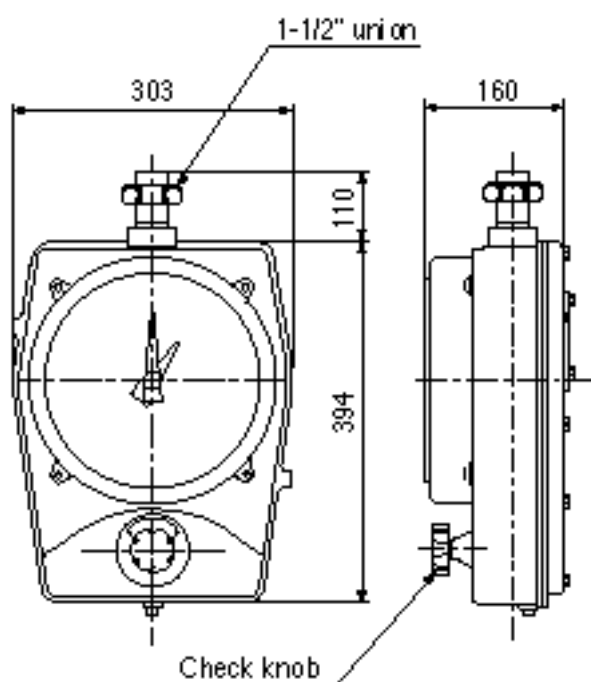
Water works
and sewage system,
waste liquid, drinking water,
elevated water tanks, etc



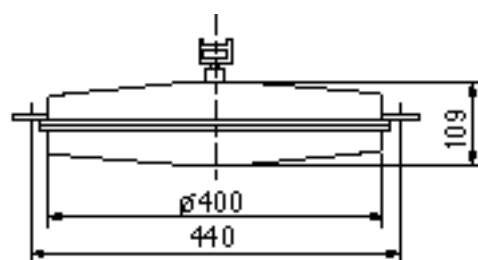
Specifications

Measuring ranges	0...2.5 m, 0...5 m, 0...10 m, 0...16 m,		
	0...20 m, 0...30 m(counter type)		
Accuracy	+/-2 mm		
Maximum operating pressure	ATM.		
Operating temp. limits			
Wetted parts	0 +200		
Gauge head	0 +70		
Process connection	HLT-1110 : Thread connection PT 1-1/2 " / NPT 1-1/2 " HLT-1210 : Flange JIS 10K 40A RF ANSI 1 1/2 "150# RF		
Display			
0...20 m	2 Pointer & dial(inside: mm, outside:m)		
0...30 m	Numeric counter		
Protection	Weather proof IP 65		
Material			
Gauge head	Aluminum cast		
Top anchor	Aluminum cast		
Sheave elbow	Aluminum diecast		
Float	Stainless steel SUS 316 / SUS 304		
Measuring tape	Stainless steel SUS 316 / SUS 304		
Float Diameter	400 mm		
Specific gravity of liquid weight	0.5...0.64	0.65...1.04	1.05...2.0
	4.2 kg	5 kg	8 kg
Guide wire	Stainless steel 3 mm diameter SUS 316 / SUS 304		
Wire hook	Steel or Stainless steel 316 / SUS 304		
Paint finish	Silver		

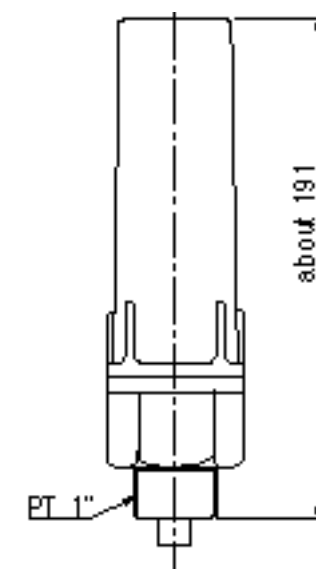
Dimensions



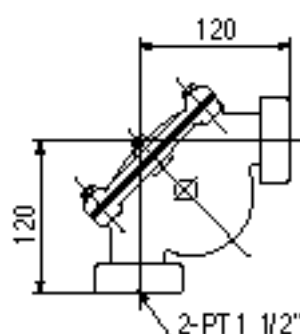
Gauge head



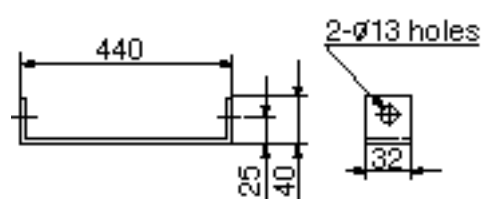
Float



Top anchor



Sheave elbow 90°



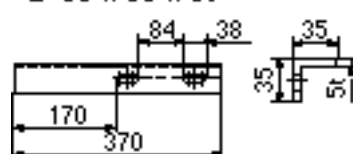
Bottom anchor

"L" 50 x 50 x 4t

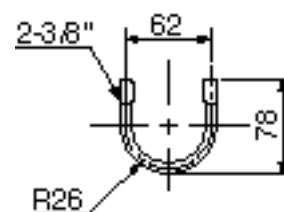


Pipe support

"L" 35 x 35 x 5t



Gauge support



1 1/2 "U-Bolt

Installation

- * The dial installation point for the HLT gauge is as far away from the product inlet or tank stirrer as possible. This will limit the effects of turbulence and prevent flow directly hitting the float.
- * The gauge head is normally mounted on the tank side however, if the gauge is to be mounted on the top of the tank or in an underground tank, the float gauge head can be mounted upside down(optional).
- * Pipe work is required from the gauge head to the top of the tank to protect the measuring tape.(Pipe work is not included in standard scope of supply.)
- * For a fixed roof tank, two 90 degree sheave elbows are used, and for a spherical tank, two 135 degree sheave elbows and one 90 degree sheave elbow are used.
- * Guide wires for the float are secured in the bottom of the tank by either a tank weight or welded anchor. At the top of the tank the guide wires are secured by top anchors screwed into the socket of the tank roof.
- * The fixing of the pipes to the gauge head, sheave elbows and tank roof is done by screwing to the socket or union nut(HLT 1100) or flanges(HLT 1200).
- * The measuring tape and float are only set up after all mechanical construction has finished. The measuring tape is set from one of the sheave elbows located above the gauge head into the gauge head and the tank. One end of the measuring tape is connected to the float whilst the other end is connected to the float whilst the other end is connected to the tape drum. The spring motor is set last.

Mounting Tank Level Gauge

The float should be arranged as far from the oil inlet or stirrer of the tank as possible so that the float will be free from direct influence due to surges.

For installing the tank level gauge in its standard form, arrange the component units as shown in Figs. 1 and 2.

1) Piping:

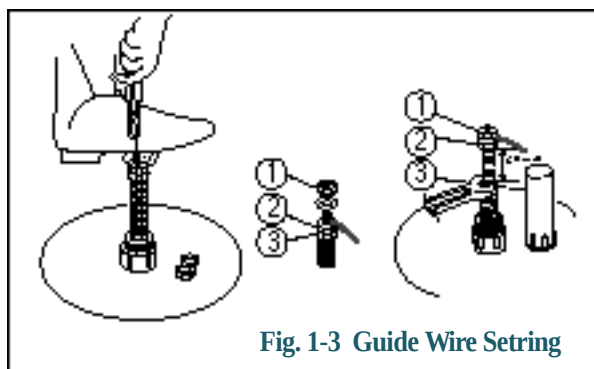
Refer to Figs. 1 and 2.

2) Guide Wire Setting (Refer to Fig. 1)

CAUTIONS

- * Take care not to fold or kink the guide wires.
- * The two guide wires must be stretched vertically and parallelly with each other.
- * Check connections between the guide wires and bottom anchors at the tank bottom for sufficient strength since the connections can hardly be repaired after the tank is filled with liquid.

- (1) At the top of the tank, open the cover of the top anchor. Pass the guide wire through the center hole of the top anchor into the tank, and temporarily fix the upper end of the guide wire to the top anchor.
- (2) At the bottom of the tank, pass the guide through the guide ring of the float, and fix it firmly to the wire anchor with the bolt and nut as shown in Fig. 1-1. Then, cut off excessive length and bend the guide wire to prevent it from being caught by the float.
- (3) Again at the top of the tank, fix the guide wire as shown in Fig. 1-3 while pulling it tensely. Bend the upper end of the guide wire along the shaft and cut it off with about 100 mm of surplus length left. Clamp the upper end of the guide wire with nuts (1) and (2). Finally, tighten nut (3) to make the spring sufficiently effective.



Remarks on piping

- Use pipe internally galvanized or stainless steel.
- For a highly corrosive liquid, use pipe which is lined with Kanaigen or resin.
- Non linearity due to flexure of pipe must be limited within ± 5 mm

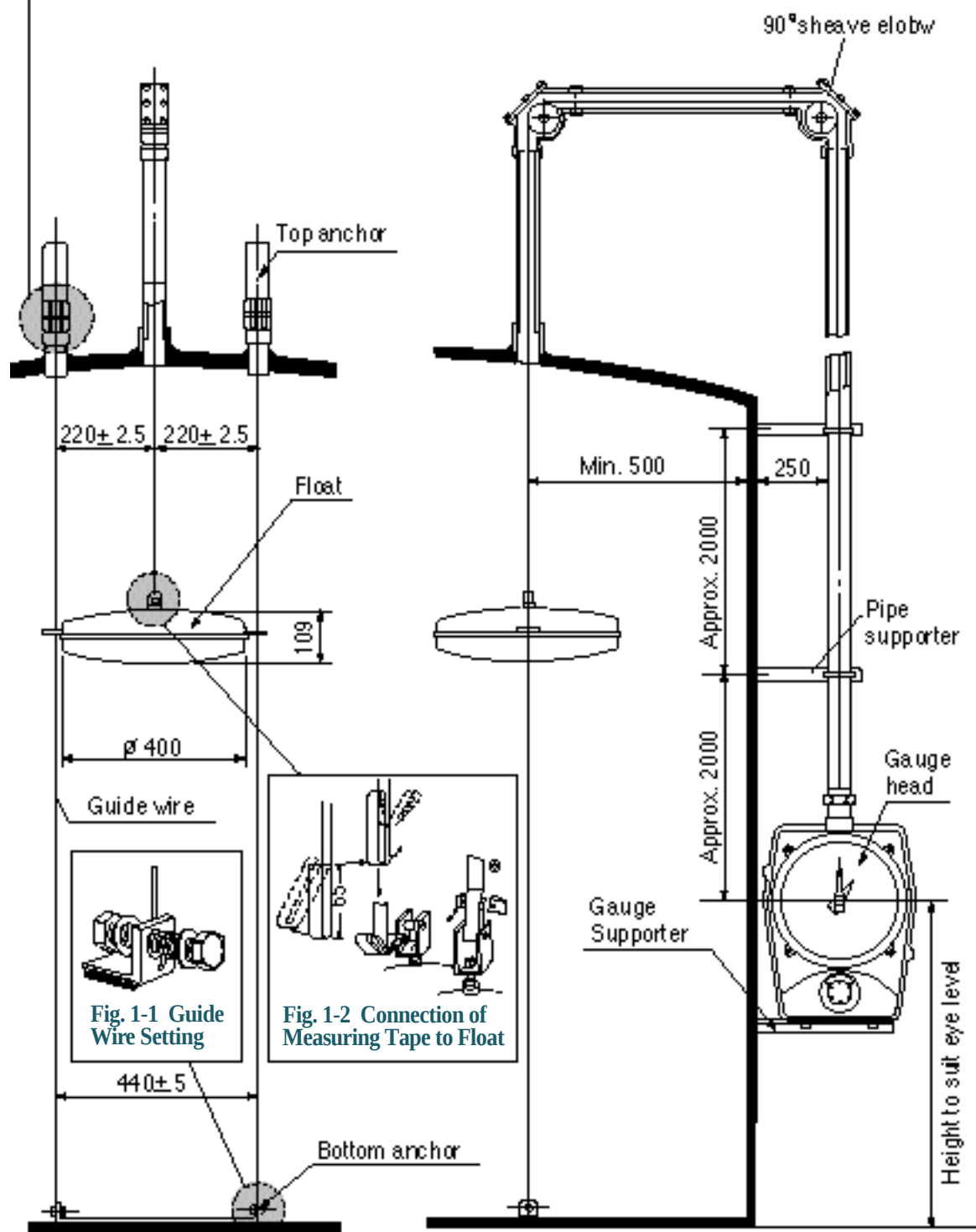


Fig. 1 Installation Form of Series HLT-1100 Tank Level Gauge (for cone roof tank)

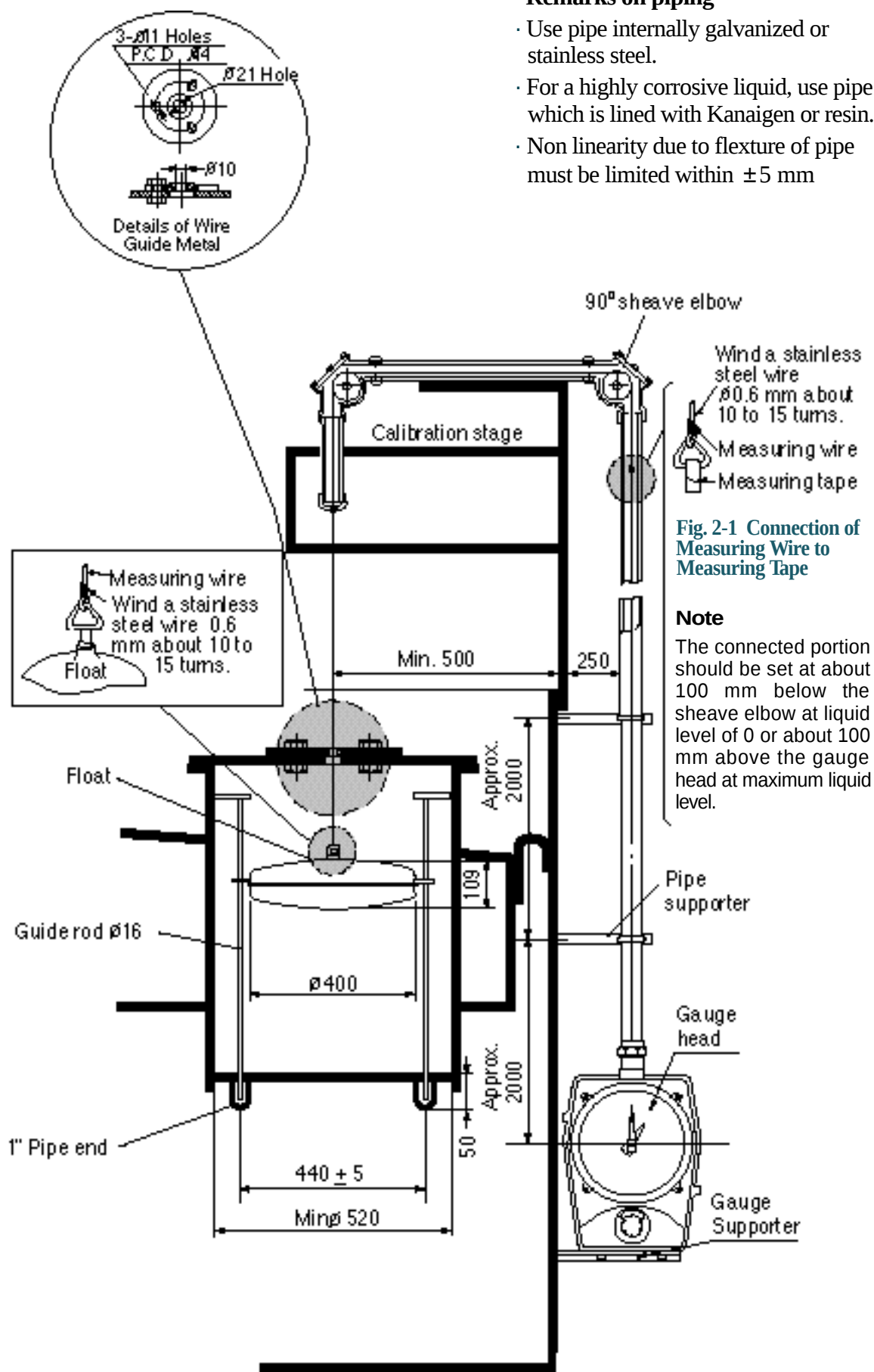


Fig. 2 Installation Form of Series HLT-1100 Tank Level Gauge(for floating roof tank)

Setting Measuring Tape and Measuring Wire

Prior to measuring tape setting, remove the covers from the sheave elbows and gauge head respectively.

CAUTIONS

- * Take care not to bend or give damages of the measuring tape.
- * Do not allow the measuring tape to be kinked inside the tank or pipe.
- * During tape setting, take care not to allow the measuring tape to get out of the sheave elbows or balancer roller.
- * Since the connected portion between the float and measuring tape can hardly be repaired after the tank is filled with liquid, check the connected portion for its strength immediately after connection.

In case of cone roof tank (Refer to Fig.1)

- (1) First, pass one end(not perforated) of the measuring tape into the tank through the sheave elbow located right above the tank. Pass the other

end(Perforated and looped) into the gauge head through the sheave elbow located right above the gauge head. Fix the looped end of the measuring tape with the tape locking screw.

- (2) Inside the tank, pull the measuring tape and cut it off, leaving an excessive length of about 1.5 m as measured from the tape-float connecting point. Fasten the tape to the float(as shown in Fig. 1-2).
- (3) Again in the gauge head, turn the tape drum in the direction indicated by arrow in Fig. 1 to tense the measuring tape.
- (4) The measuring tape may be severely vibrated by surges and disengaged from the sprocket pins, resulting in deviation of level reading.

The tape guide is provided to prevent such a trouble.

After tape setting has been completed, set the tape guide at such a position that its two tips are located about 2 mm from the measuring tape surface as shown in Fig 3.

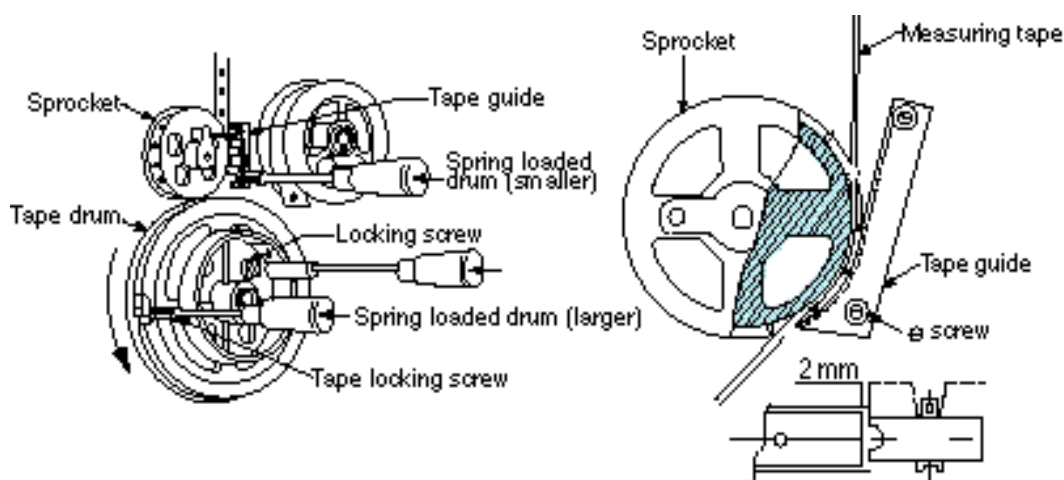


Fig. 3 Measuring Tape Setting in Gauge Head

In case of floating roof tank (Refer to Fig. 2)

- (1) Pass one end of the measuring wire into the tank through the 90° sheave elbow (located right above the gauge head) and that right above the tank. Temporarily fasten the upper end of the measuring tape.
- (2) Inside the tank, connect the measuring wire to the measuring tape as shown in Fig. 2-1, and feed the measuring tape into the gauge head.
- (3) Carry out steps (3) and (4) given for a cone roof tank.

Setting Spring Motor (Refer to Fig. 4)

The spring motor should be set after the measuring tape has been stretched in position.

CAUTIONS

- * When the spring motor gets out of the spring loaded drum(larger) or excessive force is applied to it, it produces non-uniform torque which may be cause of erroneous indication.
Therefore, the spring motor must be handled very carefully.
- * At the stage to wind the spring motor from the smaller drum to the larger one, do not leave your hand from the larger drum until the measuring tape is tensed finally.

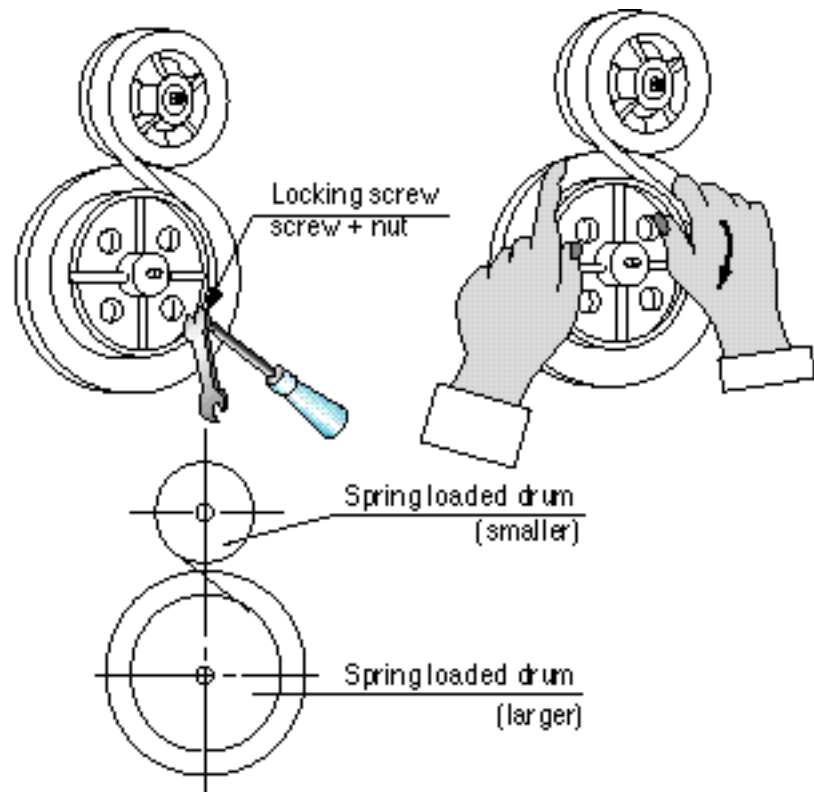


Fig. 4 Winding of spring motor

- (1) After making sure that the locking screw has been removed, fix the spring motor to the spring loaded drum(larger) with the screw and nut.
- (2) Then, turn the spring loaded drum(larger) in the direction indicated by arrow in Fig. 4
- (3) For fixing the spring loaded drum, be sure to turn the tape drum counterclockwise beforehand until the tape is free from looseness.
- (4) When the tank is kept empty, fix the spring motor to the tape drum by using the locking screw with two turns left on the spring loaded drum (smaller). When the tank is filled with a measuring liquid, actually measure liquid level and calculate number of turns to be wound around the spring loaded drum (larger) by the following equation:

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

(unit : m)

Wind the measuring tape around the spring loaded drum(larger) by the number of turns calculated above and fix it.

Handling Drive Checker (Refer to Fig. 5)

The drive checker is used for confirming level indication and operation of the tank level gauge at the time of calibration.

- 1) Turn checker knob clockwise about 90° and leave it free.
Turn knob 1 or 2 times only.
- 2) Note the reading when position is stable.

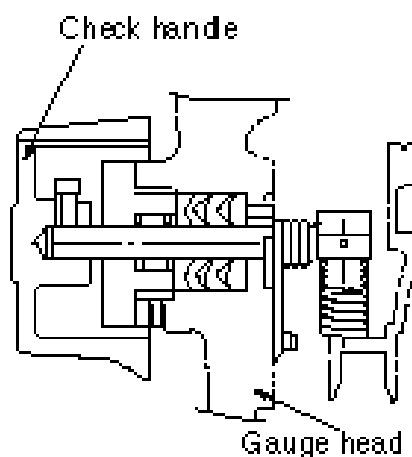


Fig. 5 Drive checker

Seal pot for HLT 1100/1200

Seal pot prevents toxic or corrosive vapours escaping from the tank via the gauge installation.

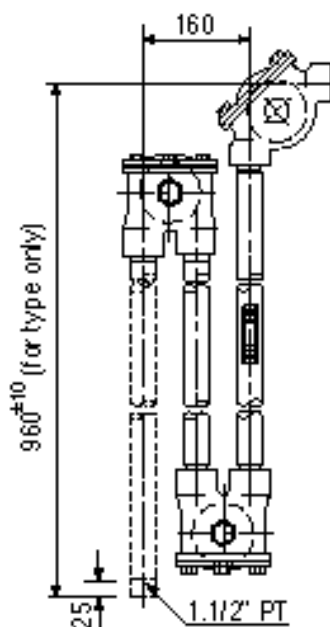
Seal liquid : e.g. liquid paraffin or spindle oil

Max. seal pressure : 0.04 kg/cm² / 1150cc

Shape : U-shape

Process connection : thread or flange

Material : aluminium cast and
stainless steel



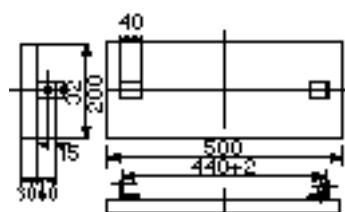
Accessories

Anchor weight

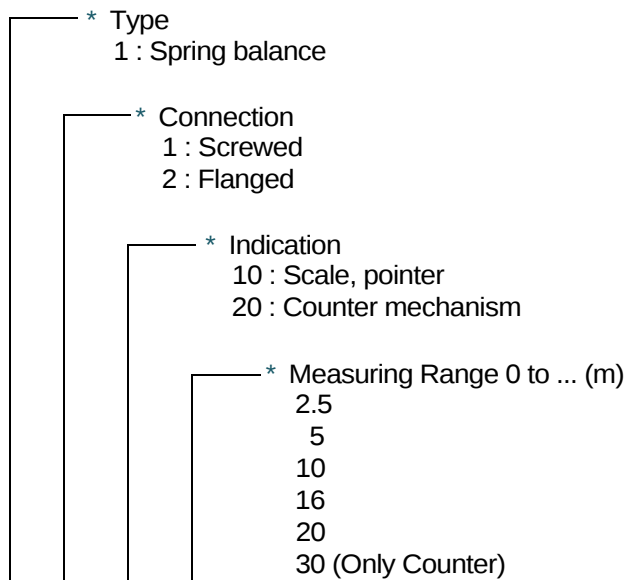
The anchor weight is used for keeping guide wires tense in applications where fixed anchors have not been installed.

Material : Carbon steel or Stainless steel

Weight : 23 kg



ORDER CODES



HLT - ** ** **** **



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