

Float & Tape Gauge – FTG



Every Techtrol product should be installed properly, maintained regularly and used within its specified limits to ensure accurate & trouble free performance with extended working life.

1. Introduction

It is used to measure and indicate liquid level in tanks under atmospheric pressure.

Operating Principle:

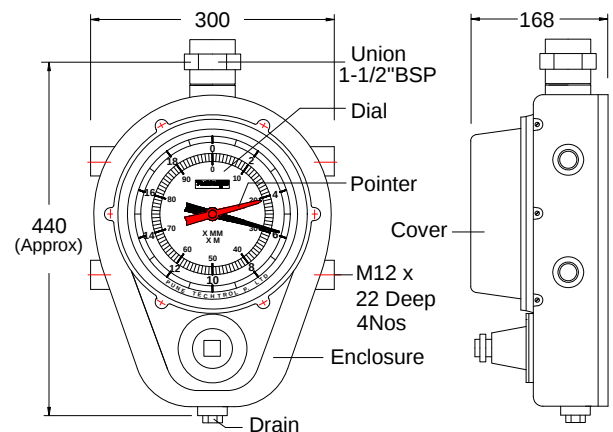
It consists of float attached to perforated steel tape wound on storage wheel carrying constant torque spring to maintain tape under continuous tension and gear mechanism for moving pointer. The float accurately follows liquid level in vertical direction during rise in liquid. Precisely perforated tape engages pins on a sprocket pulley and tape is wound on storage drum. Rotation of sprocket pulley is transferred to pointer wound on storage drum. Rotation of sprocket pulley is transferred to pointer through gear mechanism to show accurate liquid level in tank. Gauge is provided with guide ropes firmly anchored to tank bottom to restrict horizontal float movement.



Fig 1

2. Pre- Installation Check

- Ensure that all the gauge components are received in good condition.
- Ensure that, received gauge is as per required range and purchase order.
- Find the float clamp attached to tape. Pull out and release the tape slowly to check the movement of pointer on dial.



Dimensional drawing

3. Precautions for Installation

1. During installation tank should be completely empty
2. Selection of Location
 - There should be no objects which shall hinder the float.
 - Ensure that the float position inside the tank should be such that agitation on it will be minimum.
 - The position of mounting nozzle should be far away from the liquid fill pipe to protect the float from damage and faulty readings due to turbulence.

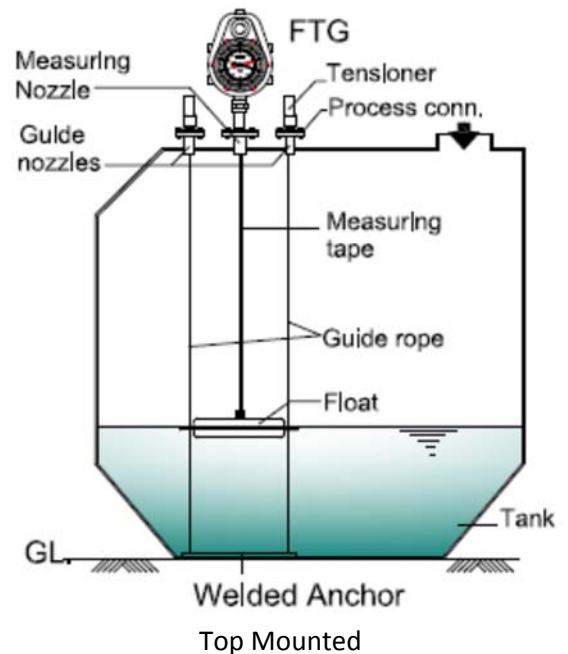
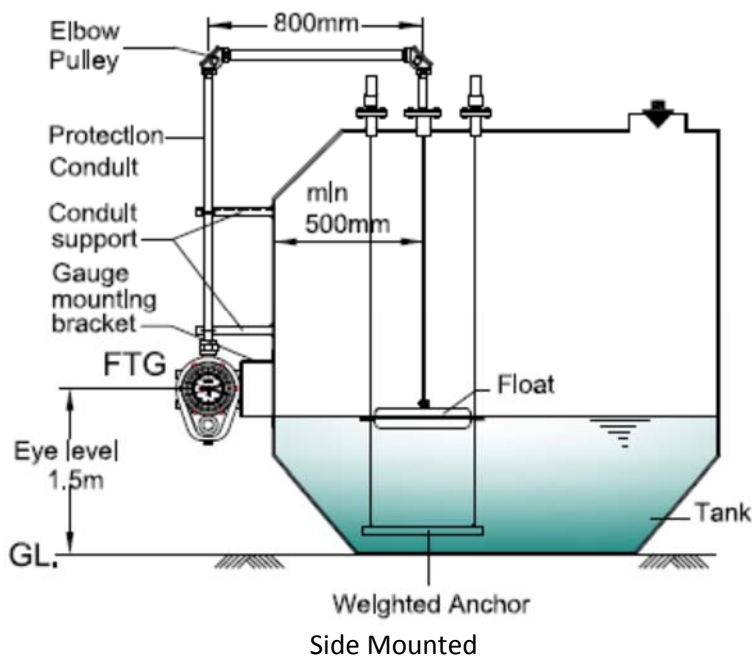
4. Installation

Correct installation of all mounting accessories on the tank is very important for accurate indication of level.

Mostly FTG is mounted on the side of the tank (fig 2) and top mounted for small tank heights as shown in fig 3

Fig 2

Fig 3



Please check and ensure that all the accessories are mounted correctly as shown in the installation diagram, as no alteration will be possible once the tank is filled with liquid

4.1 Welding operation on tank

Nozzle welding

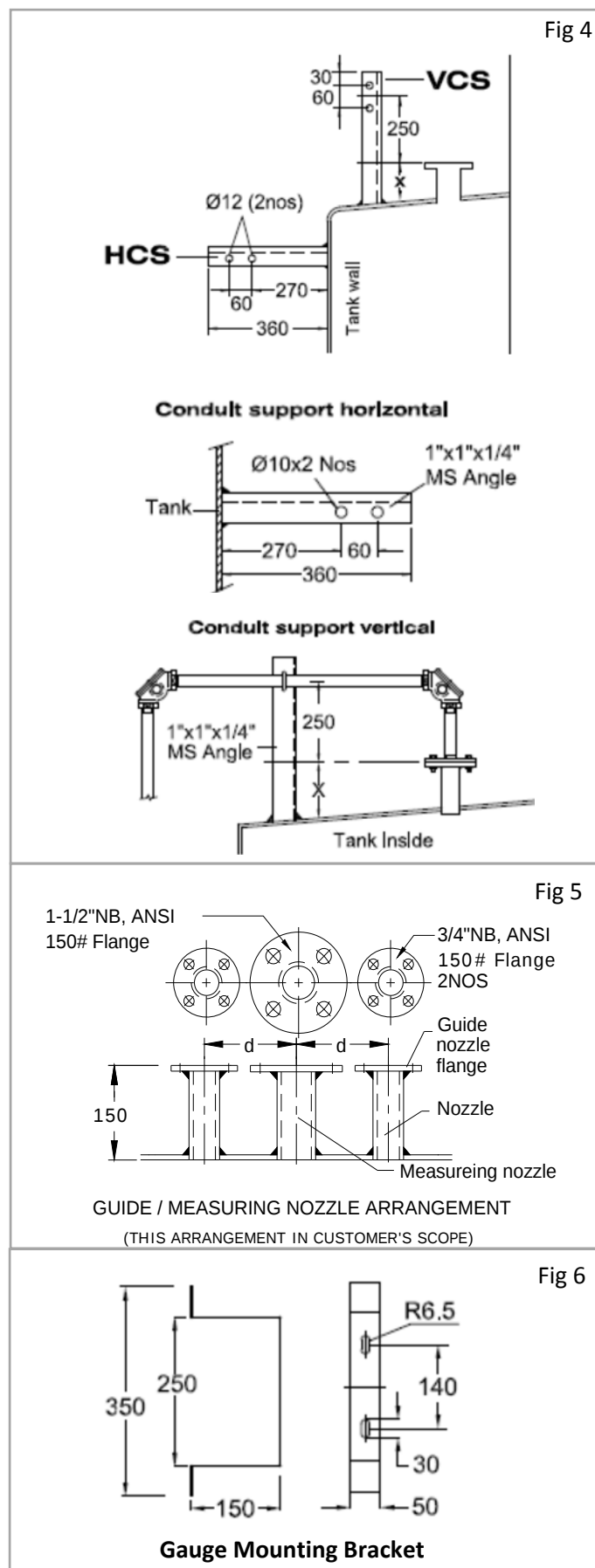
- Locate position of the measuring nozzle at least **500 mm** from the tanks inner wall maintaining 800 mm distance from measuring nozzle and conduit pipe and ensure that there is a clearance of min 100 mm between the float & other internal parts. (Fig 4)
- In case of guided float, addition to measuring nozzle, locate mounting position for guide nozzles ensuring distance 'd1' between them is maintained 225 mm (Refer fig 5)
- Bore appropriate holes at located positions & weld nozzles in upright position.

Anchor welding

- Locate the position of anchor by lowering a plumb line through guide nozzles and weld anchor to tank bottom in metal tanks. In case of non-metallic tank, use weighted anchor.

Welding of Conduit Supports and Gauge Mounting Support

- For **side mounted installation**, weld conduit supports along the tank length at suitable intervals for fitting of conduit pipes (fig. 6).
- In case of non-metallic tank erect a pole along the tank side wall and weld conduit support to it.
- Weld gauge mounting support to tank at 'eye level' approx. 1.5 mtrs from the ground level. (fig 2)
- Pipe work should be held rigidly in place and it should be aligned, so that tape does not touch/ rub inside the pipe.



4.2 Guide Wire Fixing

- Pass the guide rope through guide nozzles and tie its upper end of the guide rope to spring tension rod by a fastener as shown in figure 7 and bolt tensioner flange on guide nozzle flange.
- Pass the open end of the guide ropes through the rope guide nozzle provided on the tank to prevent horizontal movement of float. Tie the lower end of guide rope to the anchor welded to the tank bottom fig 7
- Now remove both spring housings from tensioner and tighten the tension adjuster nut to provide the guide rope adequate tension & refit spring housing.

Note: In case of floating roof tank, guide wire fixing is not required

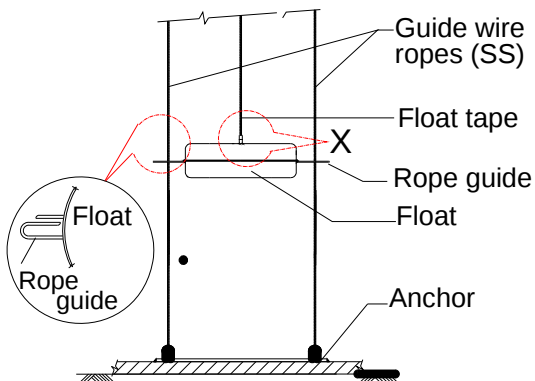


CAUTION

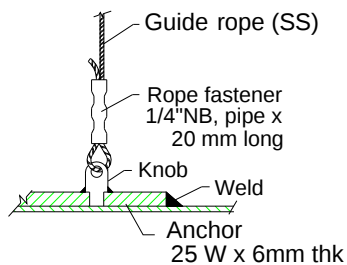
Take care not to fold or kink the guide wires

- Both the guide ropes must be stretched vertically parallel to each other
- Ensure proper fastening of guide wire ropes with bottom anchor. It should not be easily re-fastened in a filled tank

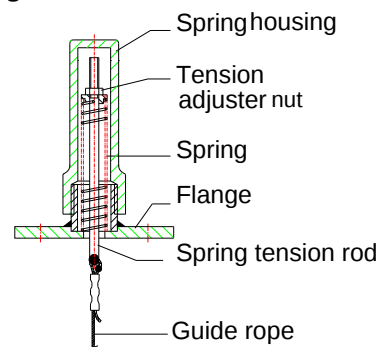
Fig 7



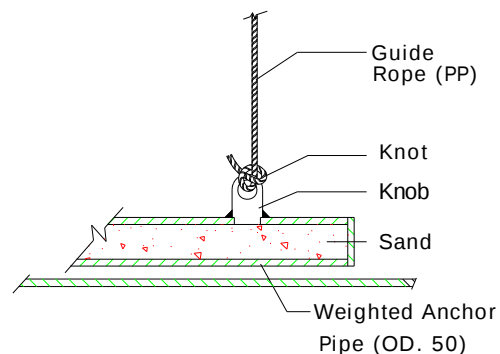
Guided float arrangement



Welded Anchor



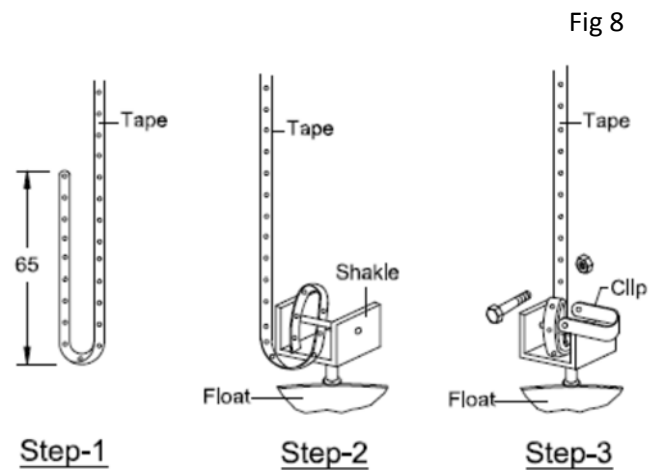
Tensioner



Weighted Anchor

4.3 Fixing of Measuring Tape

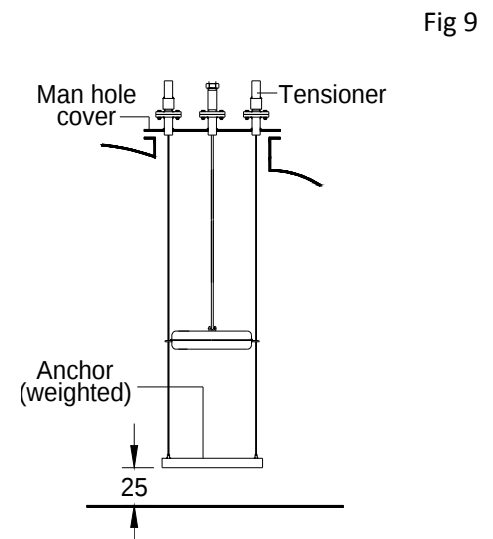
- Remove elbow pulley covers
- Pass free end of the measuring tape through the conduit pipes and over the elbow pulleys and then through the measuring nozzle inside the tank.
- Pull the measuring tape inside the tank to the bottom and then for fastening tape to the float follow step as shown in fig 8
- Ensure smooth movement of tape on pulley.



Note : During assembly and commissioning of gauge, float tape should be handled carefully so that it does not get bent

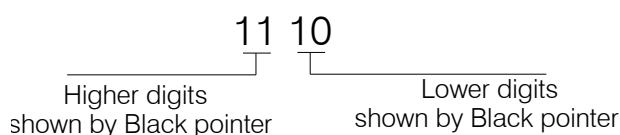
4.4 Retrofit on Existing Tank

- Locate position for measuring & guide nozzles on manhole of tank or near to manhole. Carry out welding operation of nozzles and conduit support. When fluid is present in the tank and welding is not possible, so weighted anchor is used.
- Pass the guide rope through guide nozzle and tie one end of its to spring tension rod by fastener fig 7. Fasten other end of guide rope to the anchor weight by passing it through rope guide provided on float.
- Open end of measuring tape is passed through the measuring nozzle and is tied to the float. (refer fig 8)
- Carefully lower weighted anchor along with float through manhole up to the tank bottom by releasing guide wires and measuring tape gradually.
- Fix manhole cover at its position. Bolt measuring / tensioner flange on their respective nozzles. Open spring housing of tensioner & tighten the tension adjuster nut to provide the guide rope, adequate tension and weighted anchor is lifted about 25 mm from resting surface & refit spring housing.



4.5 Indicator Setting

- Measure actual liquid level to set indicator.
- Loosen the bolt on the front cover of gauge to remove it. The longer black pointer is for 'mtr' indication and shorter red pointer is for 'mm' indication. Both pointer can be loosen by align key.
- First set the shorter pointer at the division on the inner scale corresponding to the two lower digits of the liquid level
- Then set the longer pointer at the division corresponding to higher digits plus the two lower digits. Example to set readings.



4.6 Taking Gauge into Operation

Do not remove your hold from the float wire otherwise the float will get damaged

- Fill the tank with liquid, check the reading on dial and compare the same with the dip measurement. In case of large error, adjust the level indicating pointer accordingly

Note: Correct installation of all mounting accessories on the tank is very important for accurate indication of level.

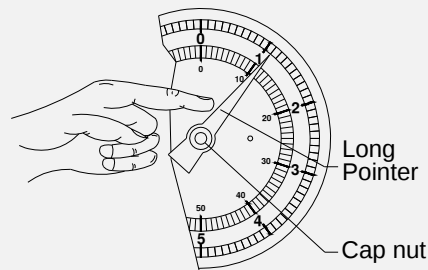
5. Seal Pot Assembly

It is provided for fuming liquids to prevent venting of fumes in air.

- Seal pot is supplied in assembled condition with protection conduit assembly.
- Once all the installation is complete follow the steps below for seal pot.
- First ensure that drain plug and screw for the pulley on seal pot is tightened properly.
- Open the pulley cover and pour non-volatile liquid (silicon oil) in the seal pot completely such that

Fig 10

Set at 1/10 division for liquid level of 100mm



Example:

Long pointer reading = 1.1 M
= 1100mm

Short pointer reading = 10mm

Total = (1100+10)mm = 1110mm

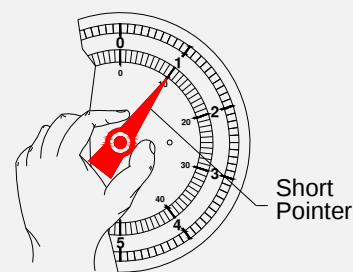
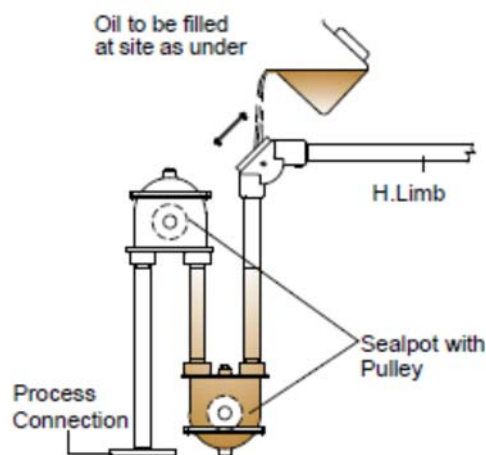


Fig 11



conduit pipe connected to it should also be filled as shown in adjacent figure 11

- Silicon oil required for seal pot is as under

50 mm WC = 1.5 Ltrs 200 mm WC = 2.5 Ltrs

- Fix the pulley cover on its original position.
- Ensure that there is no leakage of oil from the seal pot.

6. Maintenance Guidelines

- Periodic inspection is necessary to keep your gauge in good working condition.
- Wipe the float to remove sediment particles and visually examine for any damages.
- After maintenance, ensure 'IP66' weather proofness by closing enclosure cover with its gasket.
- After detaching measuring tape from elbow pulley, check movement of pulley by removing pulley cover and ensure that it rotates smoothly around its shaft. Check for wear & tear and clean the pulleys if necessary.
- Check for accumulation of liquid inside the gauge head by opening drain plug and allowing to drain out completely and replace the plug.
- **Hoist mechanism** with handle is provided optionally to hoist the float for easy maintenance. It is also used for high viscous liquids or liquids which may solidify at ambient temperature. With this the float is lowered at the time of measuring the level and is hoisted again.

7. Troubleshooting

Problem	Cause	Solution
Indicator showing constant reading	• Measuring tape broken • Transmission gear for indicator worn out. • Disengagement of tape from sprocket pulley. • Float punctured.	• Replace the tape. • Replace worn out gear (consult factory) • Open rear cover and set tape on sprocket pulley thru guide. • Replace the float
Indicator reading deviates from actual	• Setting disturbed • Sludge accumulation on float	• Set the pointer correctly • Remove sludge and clean the float.

Variation in readings	• Guide wire loose • Indicator pointer loosened • Measuring tape is twisted or warped	• Adjust tension on guide rope through tensioner. • Retighten the pointer. • Can be straightened, if not replace it.
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