

1618 Mechanical Gauge

Installation, Operation, and Maintenance Instructions

The 1618 Mechanical Gauge is designed to be used to measure liquid level in an aboveground storage tank. The gauge mounts to the side of the tank and is activated by a float connected to a cable.



Failure to follow any or all of the warnings and instructions in this document could result in a hazardous liquid spill, which could result in property damage, environmental contamination, fire, explosion, serious injury or death.

NOTE: The most accurate method to calibrate the tank is with fluid in it. This will take into account variables associated with the float position, the mechanism, and the fluid density.

Installation



WARNINGS

- **Fire Hazard** – Death or serious injury could result from spilled liquids.
- Any modification to this gauge other than those stated in these installation instructions will void the product warranty.
- This device is intended to be used as a liquid level indicator to the operator and should not be the only system in place to prevent a tank from overflowing. It is the sole responsibility of the operator to continuously prevent any spillage regardless of the situation or status of the gauge.
- Install in accordance with all applicable local, state and federal laws.
- For your safety, it is important to follow local, state, federal and/or OSHA rules that apply to working inside, above, or around the storage tank and piping area. Use all personal protective equipment required for working in the specific environment.
- Tanks could be under pressure. Vapors could be expelled from tank vents, piping, valves or fittings while performing installation. Vapors could catch fire or cause an explosion. Avoid sparks, open flame, or hot tools when working on gauge.
- Use a dampened cloth when cleaning the clear front cover of the gauge to prevent static buildup and discharge.
- In the event of malfunction, contact Morrison Bros. Customer Service.

Steps

1. Verify contents of box. You should have received the gauge, float, pulley assemblies (2), one base and a small tube of adhesive (See Figure 1). Inspect the items for shipping damage. **DO NOT** use if damage is found. See page 7 for a list of items not supplied.

2. Remove the front cover of gauge and remove foam under cover. **NOTE:** The phillips screws in the front cover are captive fasteners that aren't meant to be removed. Place the front cover back on gauge, the gauge should be reading approximately 11' 1." If not the gauge could be damaged or dysfunctional. Inspect the internals for any damage. **DO NOT** use if damage is found. Find the cable inside the conduit body of the gauge. Slowly pull on cable to ensure gauge is functioning properly. **DO NOT** pull and release cable uncontrollably. This can cause damage to the internal mechanism and render the gauge inoperable. **ALWAYS** hold onto cable and allow it to move in a slow steady motion.

3. Remove the red warning tag.

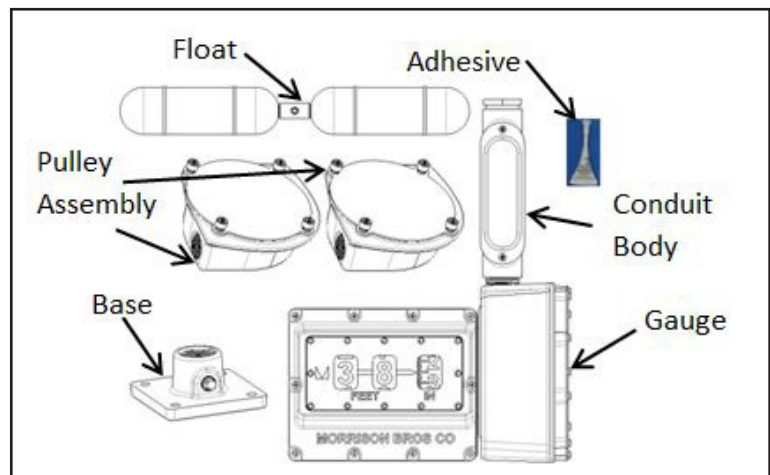


Figure 1

4. The 1618 gauge is to be mounted at eye level using the supplied base (See Figure 2.) Cut pipe “A” to a length that positions gauge at eye level and then thread both ends of pipe, refer to table 1 for pipe thread size, inside diameter of pipe must be free of burrs. Apply PTFE tape to the male threads on both ends of the pipe. **DO NOT use any pipe dope as this may get on the gauge cable and cause a malfunction.** Thread pipe into the based and then thread the gauge onto pipe “A”.
5. Position gauge next to tank in the desired location, see Figure 2. Once the gauge is in position anchor the base, using the holes in the base (See Figure 3) and concrete anchor bolts (not supplied). You can also use an optional tank bracket to anchor the gauge to the side of the tank (See Figure 7.) If you choose this method you will not use the base.

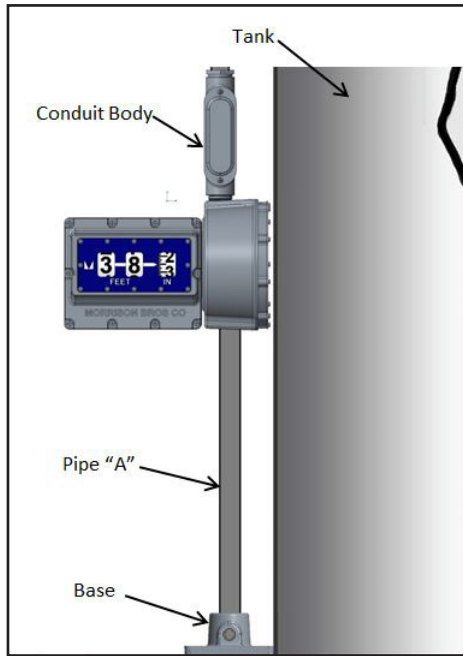


Figure 2

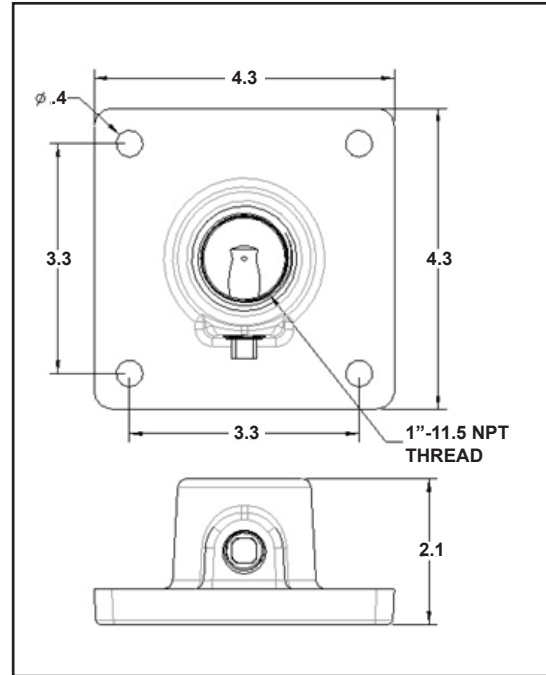


Figure 3

6. Locate the opening on the top of the tank where the gauge is to be installed (minimum opening size is 2” schedule 40 pipe). If possible, select a location away from the fill port to avoid excessive turbulence that could affect the float. Also make certain that there are no objects inside the tank, near the selected opening, upon which the float and cable could get tangled and that the gauge location will not interfere with normal operation of the tank.

NOTE: Once an opening is selected, use a tank stick or gauging tape to determine the current liquid level height in the tank. Record this liquid level as you need it to set the gauge once it is installed.

Pipe	Size
“A”	1” NPT
“B”	¾” NPT
“C”	¾” NPT
“D”	¾” NPT
“E”	¾” NPT

Table 1

7. Thread Pipe "B" onto gauge (before cutting or adding to the desired length pipe "B" is to be used to determine the length of pipe "D.") Pipe "B" will have to be long enough to be able to measure the center to center distance from Pipe "B" to tank opening. (See Figure 4.)

8. Cut pipe "D" to a length that is 7" less than that value. This pipe is then to be threaded on both ends and should not exceed 7' in length; inside diameter of pipe must be free of burrs. Apply PTFE tape to the male threads on both ends of the pipe. **DO NOT use any pipe dope as this may get on the gauge cable and cause a malfunction.**

9. Thread a pulley assembly onto each end of pipe "D", making sure pulley assemblies are aligned with one another (See Figure 4.)

10. Note there are three pipe "C"s, cut all to a length of 4" and thread both ends of pipes; inside diameter of pipe must be free of burrs. Apply PTFE tape to the male threads on both ends of the pipe. **DO NOT use any pipe dope as this may get on the gauge cable and cause a malfunction.**

11. Thread two "C" pipes into each of the pulley assemblies. Thread one half of a 3/4" pipe union onto one pipe "C". Thread the other complete 3/4" pipe union on to the other Pipe "C." Leave the pipe union loose. Apply PTFE tape to the male threads on both ends of the pipe. **DO NOT use any pipe dope as this may get on the gauge cable.**

12. Thread the last Pipe "C" onto the full pipe union. Thread tank opening bushing onto Pipe "C." (See figure 4.) Apply PTFE tape to the male threads on both ends of the pipe. **DO NOT use any pipe dope as this may get on the gauge cable**

13. Thread pulley assembly into tank opening.

14. Verify assembly is level; once level measure or mark the needed length for Pipe "B." Cut or add that value to Pipe "B." Apply PTFE tape to the male threads on both ends of the pipe. **DO NOT use any pipe dope as this may get on the gauge cable and cause a malfunction.**

15. Thread the other half of the 3/4" NPT union on top of pipe "B." Thread pipe "B" into conduit body of gauge. (See Figure 4.)

16. Connect the pipe union from Pipe "B" to the pulley assemblies.

17. Unthread pipe opening bushing and swing entire assembly out of the way of the tank opening.

18. Remove the covers from both pulley assemblies. With the covers off unscrew the bolt located in the center of the housing. Remove the washers and pulleys; be sure not to lose any hardware.

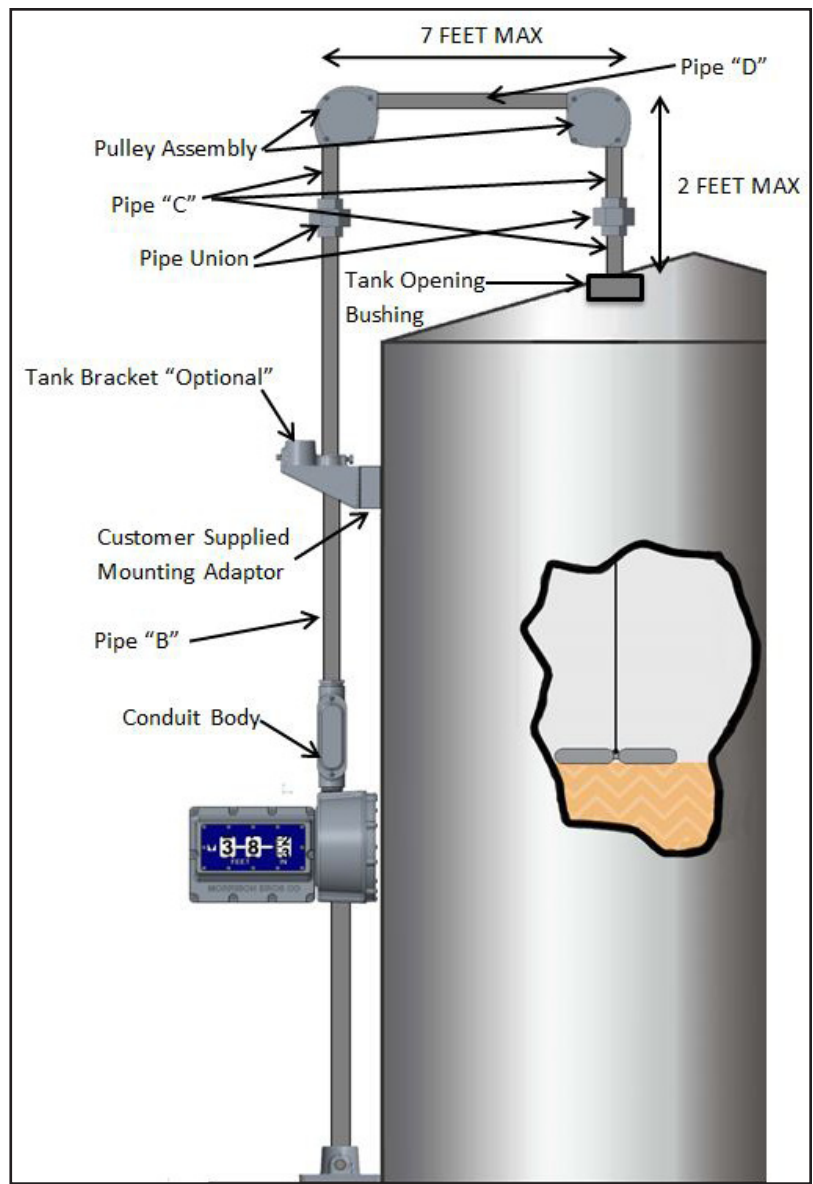


Figure 4

19. With pulleys removed run a fish tape or pull wire through the tank opening bushing, through both pulley housings, and down to the conduit body of gauge. Remove cover of conduit body and connect cable loop onto fish tape/pull wire. Once connected begin to pull up fish tape/pull wire until the end of the gauge cable is through the tank opening bushing. **DO NOT** pull and release the cable uncontrollably. This can cause damage to the internal mechanism and render the gauge inoperable.
20. Next, you need to attach the float to the cable screw on the end of the gauge cable. Unscrew the cable bullet exposing the cable screw threads. Using the small tube of adhesive provided, place a drop or two of the adhesive onto the male threads, of the cable screw. Thread the float onto the cable screw and, while using pliers to carefully hold the float connector, snug the float onto the cable screw (See Figure 5). **NOTE: Make sure to not damage the cable with the pliers.**
21. **SLOWLY** lower the float into the tank. Guide the cable through your fingers letting the cable slide through slowly. **DO NOT** allow the float to free fall into the tank as this will cause the cable to come off of the pulley mechanism and render the gauge inoperable. **NOTE: make certain that when lowering the float, that the cable DOES NOT rub on the edge of the tank.**
22. Once the float is resting on the liquid level (or tank bottom if the tank is empty) apply PTFE tape to the adapter bushing. **DO NOT use pipe dope as this may get on the gauge cable and cause a malfunction.**
23. Swing the pipe assembly over and lift tank opening bushing onto tank opening and thread into place. **Make certain that you do not allow any excess slack in the cable or kink the cable in any way.**
24. Tighten the bushing and pipe unions.
25. Place the pulleys back into the pulley housings lifting the gauge cable onto the groove on the pulley. Reinstall the washers followed by the bolts; use a wrench to tighten bolts.

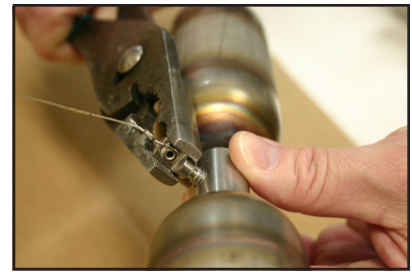


Figure 5

26. Now the gauge can be calibrated to the liquid level you found in step 6. Calibration is done one indicator wheel at a time (See Figure 6). Start with the inch indicator wheel. Grab the indicator wheel and push it to the left to clear the drive gear. The inch indicator wheel must be fully disengaged from the drive gear. The indicator wheel should now freely spin. Spin the wheel UPWARDS so that the numbers are counting up. Once at the correct setting, slowly let indicator wheel seat back into the drive gear. Failure to follow this procedure can cause damage to the internal mechanism and render the gauge inoperable. **Note: desired level reading needs to be in the center of the viewing window.**
27. Calibration for the foot readings is done in a similar manner pushing the indicator wheels to the left so they clear the gears that are offset below the indicator wheels (See Figure 6.) Calibrate the ones' foot indicator wheel and then the tens' foot indicator wheel. **Note: desired level readings need to be in the center of the viewing window.**
28. Slowly pull out about 1' of cable from the conduit body. Pull in a downward motion so you are lifting the float off the liquid level. Slowly let the cable back in. Pull in an upward motion so that the indicator wheels are rotating. Slowly let the cable back in. Make sure there is no binding or hang up in the cable. **DO NOT** pull and release the cable uncontrollably. This can cause damage to the internal mechanism and render the gauge inoperable. Replace the pulley covers insuring the o-rings are still in their machined grooves in the pulley housings.
29. Reinstall the front cover, the correct settings should be clearly centered in viewing windows. If needed, adjust the indicator wheels.
30. The tank manufacturer's chart will be required to translate fluid height into fluid volume.

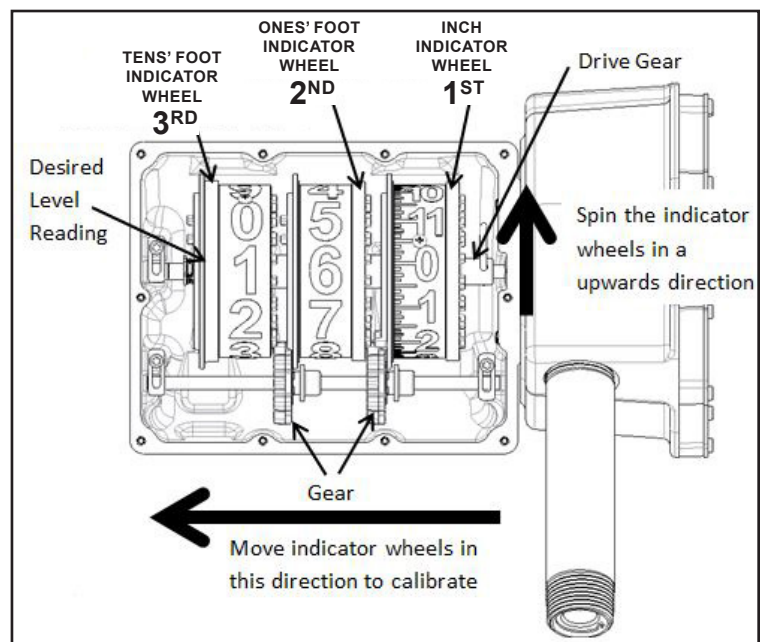


Figure 6

Maintenance

This gauge should be maintained per applicable codes or at least once each year



WARNINGS

- **Fire Hazard** – Death or serious injury could result from spilled liquids.
- You must be trained to maintain this gauge. Stop now if you have not been trained.
- For your safety, it is important to follow local, state, federal and/or OSHA rules that apply to working inside, above, or around the storage tank and piping area. Use all personal protective equipment required for working in the specific environment.
- Tanks could be under pressure. Vapors could be expelled from tank vents, piping, valves or fittings while performing maintenance. Vapors could catch fire or cause an explosion. Avoid sparks, open flame, or hot tools when working on gauge.
- Use a dampened cloth when cleaning the clear front cover to prevent static buildup and discharge.
- In the event of malfunction, contact Morrison Bros. Customer Service.

Steps

1. Visually inspect the gauge for damage or excessive wear. If either is found replace the gauge.
2. If necessary, clean the clear front lens with a damp cloth.
3. Measure the fluid height and verify the gauge reading. If readings do not match adjust the gauge setting according to the installation instructions.
4. Remove pipe plug at base/tank bracket to drain any condensation.



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Optional Tank Bracket (1618--0167 AB)

The 1618 optional tank bracket (see Figure 9) can be used to support the vertical pipe "B" (see Figure 4,7, and 8), or substituted for the supplied base (See Figure 7 and 8.)

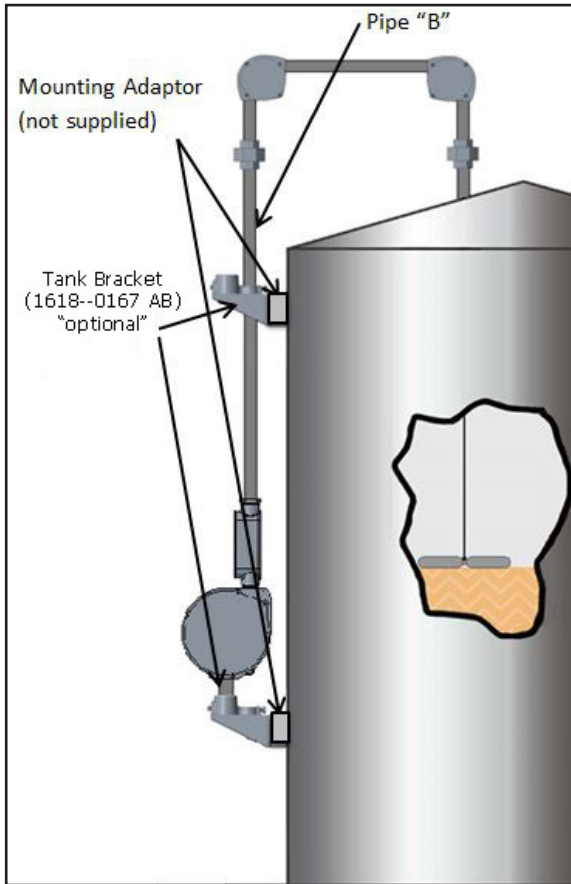


Figure 7

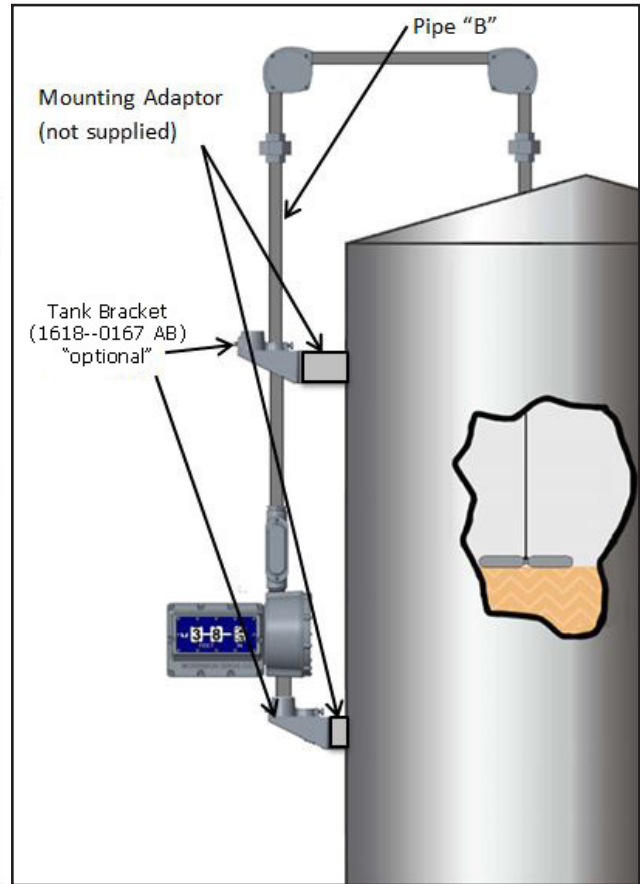


Figure 8

The installation requires mounting adaptors (not supplied) to mount the "optional" tank brackets to the side of the tank. This could be Unistrut or a fabricated bracket fixed to the tank.

Note: If the gauge is positioned with the numbered face perpendicular to the tank as shown in Figure 8, then the mounting adaptor holding pipe "B" will need to be different than the mounting adaptor holding the gauge. It will need to extend 2.4" farther from the tank and be offset .38" to the left of the mounting adaptor holding the gauge.

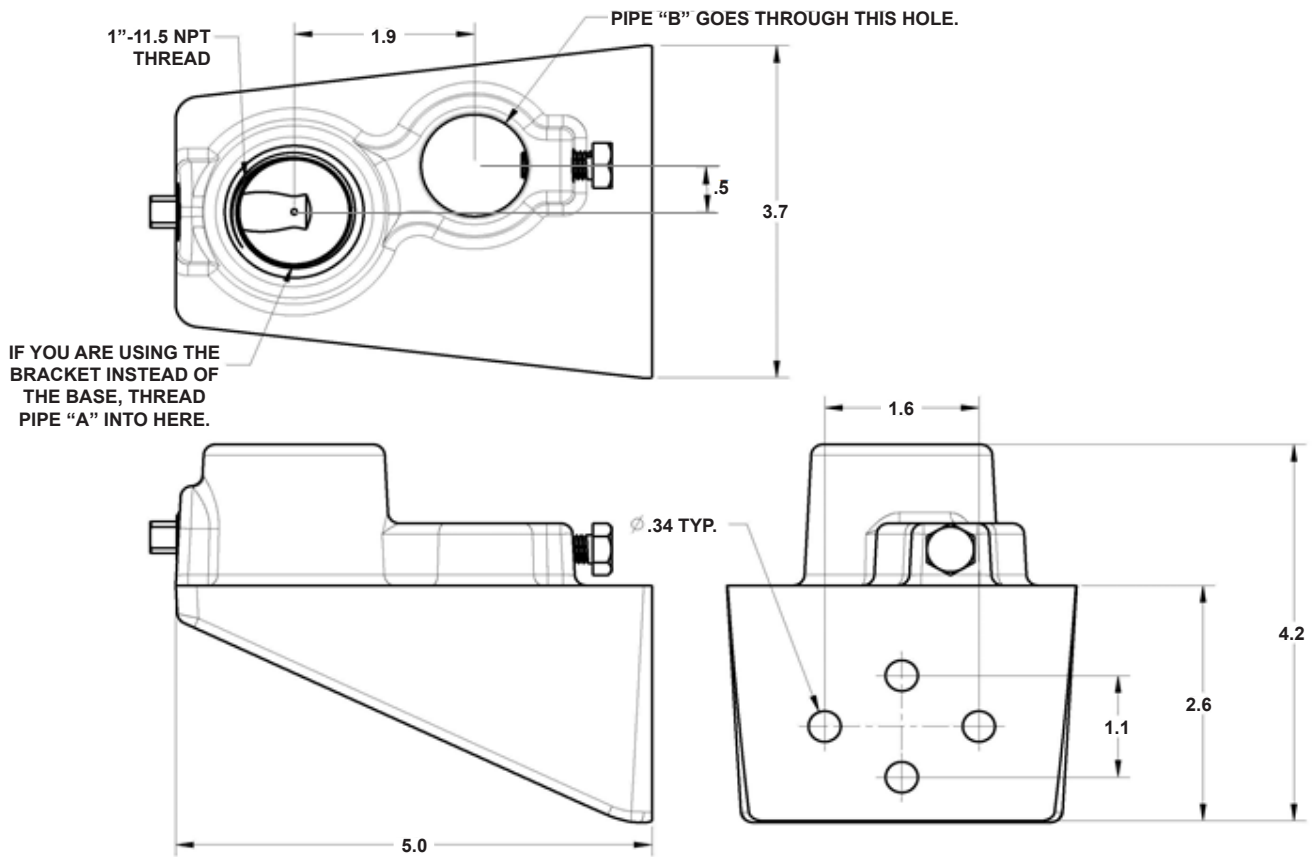


Figure 9

Items Not Supplied

- (1) Tank opening bushing: $\frac{3}{4}$ " Female NPT x Male Tank opening size
- (2) $\frac{3}{4}$ " NPT pipe union
- $\frac{3}{4}$ " Schedule 40 pipe (length required: approximately the height of tank plus $\frac{1}{2}$ of tank diameter-verify to site layout and installation instructions.)

If standard base is used:

- (4) $\frac{3}{8}$ " Concrete Anchors (with bolts or nuts)
- 1" Schedule 40 pipe (length required: approximately 6'-verify to site layout and installation instructions.)

If optional tank bracket is used (per one bracket):

- (4) $\frac{5}{16}$ " bolts
- (1) mounting adaptor, such as Unistrut or fabricated bracket fixed to the tank-See Fig. 7, 8, 9
- 1" Schedule pipe to thread into bracket and gauge (could be a close nipple as long as gauge is eye level.)