

## Installation Instructions

TFT-5H – SAE 5-Bolt Pattern Non-Displacement Hull Focus Tube  
 TFT-1.5NPT – 1.5" NPT Non-Displacement Hull Focus Tube

TFT-1.25BSP – 1.25" BSP Non-Displacement Hull Focus Tube  
 TFTDBE-5H – Focus Tube with Deadband Eliminator

### Introduction

Focus tubes allow the TLM100/TLM150 ultrasonic tank level monitors to be used for level measurement on vessels with non-displacement hulls at up to 15° of pitch or roll, compared to 6° pitch or roll for the sensor alone. Additionally, the focus tube with deadband eliminator raises the TLM100/TLM150 2" above the top of the tank, allowing accurate level measurement with fluid levels all the way to the top of the tank, and eliminating the 2" deadband of the TLM100/TLM150.

### Packing List

Please find the following items included:

- 1 focus tube
- 1 5-hole gasket
- 5 10-24x3/4 stainless steel machine screws
- 5 #10 stainless steel washers
- 1 focus tube cap with center hole
- 1 packet of epoxy
- 1 wooden mixing stick
- 1 set of installation instruction

### Installation of Focus Tube on a Tank with a SAE J1810 5-Bolt Fitting

This section applies to the TFT-5H (refer to Figure 1).

First, determine the depth of the tank at the location of the tank sensor mounting hole and use a saw with a metal-cutting blade to trim the focus tube so that it reaches 1" (2.54cm) above the tank bottom when mounted. Remove any burrs from the end of the focus tube after trimming. Install the focus tube cap (see below).

Then, place the gasket included with the focus tube over the end of the focus tube, and then drop the focus tube into the hole in the tank fitting so that the bolt holes on the focus tube, focus tube gasket, and tank fitting all line up (WARNING – the gasket must be properly aligned; it only fits one way).

Next, place the gasket included with the TLM100/TLM150 on top of the focus tube so that the bolt holes line up (WARNING – the gasket must be properly aligned; it only fits one way), then place the TLM100/TLM150 sensor component on top of the TLM100/TLM150 gasket so that the bolt holes line up.

Finally, insert mounting screws with washers into the bolt holes on the TLM100/TLM150 sensor component, and thread them into the tank fitting (the tank fitting may instead have studs installed, so in this case, install the nuts (not included) and washers over the studs), tightening them to a torque of 10-15 in-lbs (1.1-1.7 N-m). Do not use threadlocking compounds containing methacrylate ester, such as Loctite Red (271), as they will cause stress cracking of the plastic enclosure.

### Installation of Focus Tube with Deadband Eliminator on a Tank with a SAE J1810 5-Bolt Fitting

This section applies to the TFTDBE-5H (refer to Figure 2).

First, determine the depth of the tank at the location of the tank sensor mounting hole and use a saw with a metal-cutting blade to trim the focus tube so that it reaches 1" (2.54cm) above the tank bottom when mounted. Remove any burrs from the end of the focus tube after trimming. Install the focus tube cap (see below).

Then, place the gasket included with the focus tube over the end of the focus tube, and then drop the focus tube into the hole in the tank fitting so that the bolt holes on the lower flange of the focus tube, focus tube gasket, and tank fitting all line up (WARNING – the gasket must be properly aligned; it only fits one way).

Next, insert mounting screws with washers into the bolt holes on the lower flange of the focus tube, and thread them into the tank fitting (the tank fitting may instead have studs installed, so in this case, install nuts (not included) and washers over the studs), tightening them to a torque of 10-15 in-lbs (1.1-1.7 N-m).

Next, place the gasket included with the TLM100/TLM150 on top of the focus tube so that the bolt holes line up (WARNING – the gasket must be properly aligned; it only fits one way), then place the TLM100/TLM150 sensor component on top of the TLM100/TLM150 gasket so that the bolt holes line up.

Finally, insert mounting screws with washers into the bolt holes on the TLM100/TLM150 sensor component, and thread them into the focus tube upper flange, tightening them to a torque of 10-15 in-lbs (1.1-1.7 N-m). Do not use threadlocking compounds containing methacrylate ester, such as Loctite Red (271), as they will cause stress cracking of the plastic enclosure.

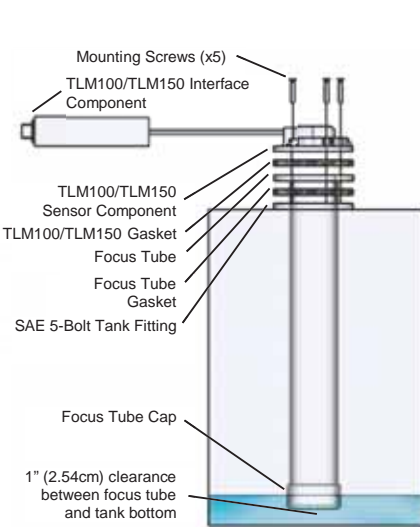


Figure 1 – Mounting TLM100/TLM150 and Focus Tube (TFT-5H) to SAE 5-Hole Tank Fitting

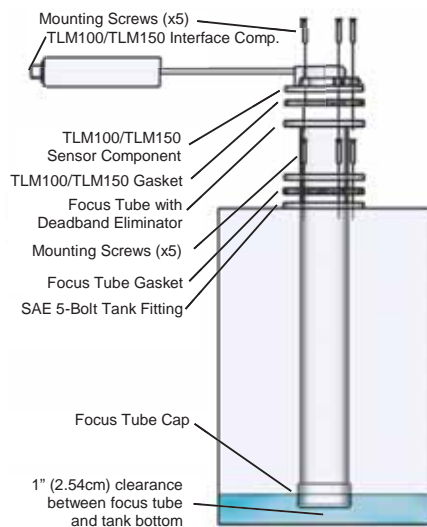


Figure 2 – Mounting TLM100/TLM150 and Focus Tube with Deadband Eliminator (TFTDBE-5H) to SAE 5-Hole Tank Fitting

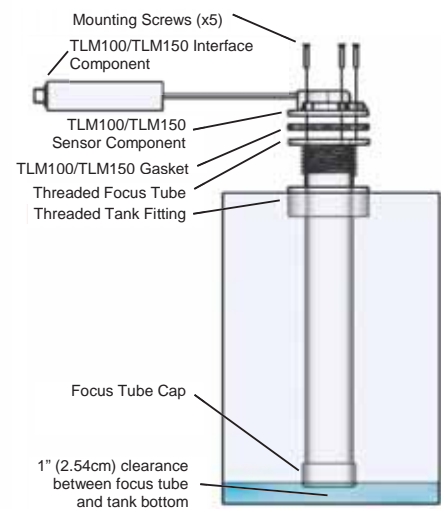


Figure 3 – Mounting TLM100/TLM150 and Focus Tube (TFT-1.5NPT or TFT-1.25BSP) on Threaded Tank Fitting

## Installation on a Tank with a 1.25" BSP or 1.5" NPT Threaded Tank Fitting

This section applies to the TFT-1.5NPT and TFT-1.25BSP (refer to Figure 3).

First, determine the depth of the tank at the location of the tank sensor mounting hole and use a saw with a metal-cutting blade to trim the focus tube so that it reaches 1" above the tank bottom when mounted. Remove any burrs from the end of the focus tube after trimming. Install the focus tube cap (see below).

Then, thread the focus tube into the tank opening and tighten to a torque of 3-5 ft-lbs (4.1-6.8 N·m).

Next, place the TLM100/TLM150 gasket on top of the focus tube so that the bolt holes on the gasket line up with the bolt holes on the focus tube (WARNING – the gasket must be properly aligned; it only fits one way). Place the TLM100/TLM150 sensor component on top of the focus tube so that the bolt holes on the TLM100/TLM150 sensor component line up with the bolt holes on the focus tube.

Place the included mounting screws with washers through the bolt holes on the TLM100/TLM150 sensor component, and thread them into the focus tube, tightening them to a torque of 10-15 in-lbs (1.1-1.7 N·m). Do not use threadlocking compounds containing methacrylate ester, such as Loctite Red (271), as they will cause stress cracking of the plastic enclosure.

## Installation of the Focus Tube Cap

The focus tube cap must be installed over the end of a focus tube that is used with a Maretron TLM100/TLM150 ultrasonic tank level monitor. The focus tube cap helps when the tank bottom is not flat below the location of the focus tube to ensure that the ultrasonic signal is reflected back to the TLM100/TLM150 when the tank is empty. The focus tube cap is also of benefit in black water applications, helping to keep solids away from the transducer.

*Note that when the fluid is below the level of the focus tube cap, the ultrasonic signals will be reflected by the focus tube cap and not the liquid surface, and so the reported tank level will not reflect the actual tank level.*

Please refer to Figure 4 while following these instructions to install the focus tube cap onto a focus tube.

1. Cut the focus tube to length as described above.
2. Test-fit the focus tube cap on the end of the focus tube and ensure that it can completely slide onto the focus tube. You may need to use a rubber mallet to completely seat the focus tube cap.
3. Mix the epoxy according to the instructions on the epoxy packet using the included wooden mixing stick.
4. Use the wooden mixing stick to apply a thin coat of epoxy to the inside curved edge of the focus tube cap as well as the outside 1" of the bottom of the focus tube.

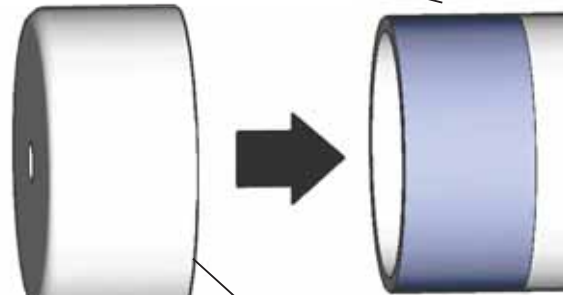


### WARNING

The epoxy included with the Focus Tube Cap is compatible with water and diesel fuel, but is not intended for use with gasoline. If you plan to use the Focus Tube Cap in a gasoline tank (i.e., with the TLM150), use an adhesive that is suitable for use in gasoline, such as PC Products PC-11 Marine Epoxy ( <http://www.pcepoxy.com/our-products/paste-epoxies/pc-11.php> ).

5. Insert the end of the focus tube into the focus tube cap. Ensure that the focus tube is fully inserted into the cap.
6. Wait 24 hours before immersing the focus tube with attached cap into liquid.

Clean and Apply Epoxy to Bottom 1" (2.54cm) of the Outside Surface of Focus Tube



Clean and Apply Epoxy to Curved Inside Surface of Focus Tube Cap

Figure 4 – Focus Tube Cap Installation

For installation support, please contact:

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