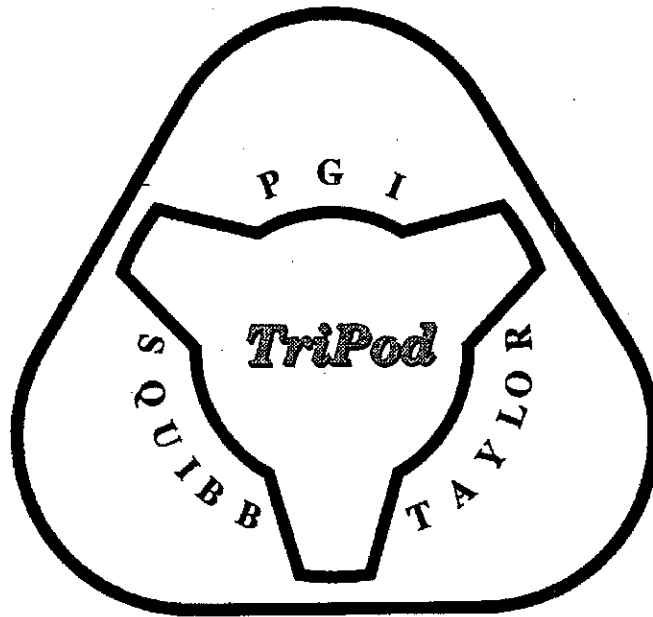


TriPod™

Safety Coupler

For Propane and Anhydrous
Bulkhead Applications
(Vapor Line)



INSTALLATION & OPERATING INSTRUCTIONS



(800) 345-8105

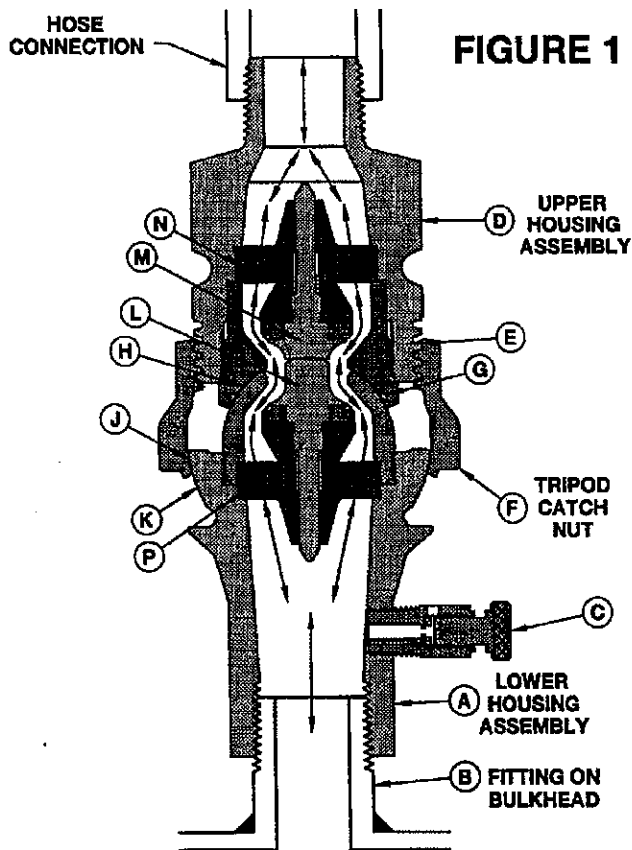
(214) 357-4591

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Principles of Operation:

The Tripod safety coupler is designed to provide pull-away protection between the vapor hose and the bulkhead. It's non-destructive releasing mechanism will operate reliably with a pull-away force in any generally horizontal direction. In addition, the torque needed to release the liquid and vapor Tripods is only 500 Ft./Lbs total, therefore the bulk head does not normally require additional structural bracing. So, in most cases, the Tripod can quickly be installed in existing bulkhead applications.

All SS construction ensure long trouble free operating life.



The Tripod is typically installed on the bulkhead between the storage tank and the transport or bobtail. **Figure 1** shows a TP1 Tripod in cross section. The Tripod lower housing assembly **A** is tightened into the bulkhead **B**. The Tripod must be installed in the vertical position for a horizontal pull to release the coupling. The lower housing assembly has an integral bleeder **C**. Which is used to vent trapped liquid after a pull-away. The upper housing **D** is threaded into the hose connection. The upper housing assembly is threaded at **E** to receive the catch nut **F**, which when tightened traps the Tripod upper and lower housing assemblies into sealing engagement.

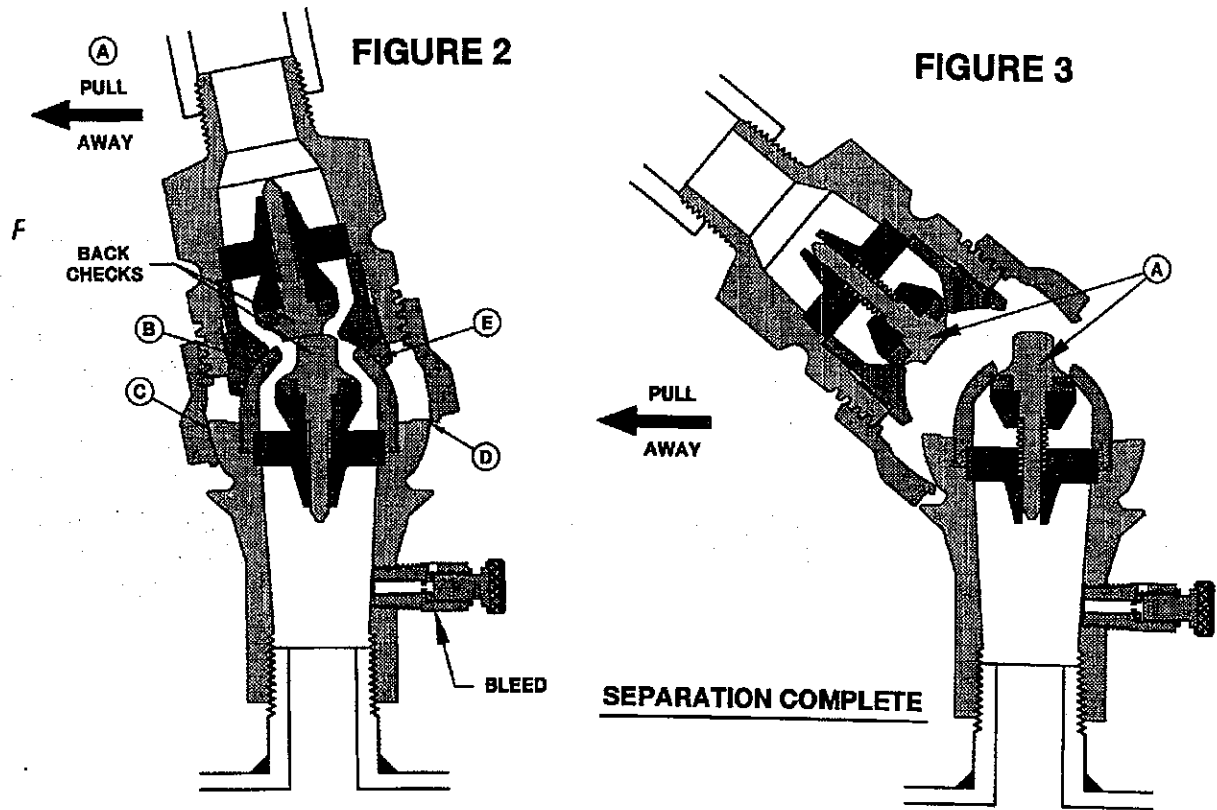
The upper housing to lower housing assembly seal is made by O-ring **G** which is located on the hardened stainless steel ball socket joint **H**. The female half is part of the upper housing assembly and the male half is part of the lower housing assembly.

As the catch nut is tightened it "catches" or contacts the outer tip of each of the three Tripod legs at area **J** which pulls the Tripod lower housing into contact with the upper housing. The extent to which the catch nut is tightened will largely determine the force required, in the horizontal direction, to disengage the coupling.

The outer surface of the Tripod lower housing legs **K** and the inner surface of the catch nut at **J** also defines a ball socket that is larger than the inner sealing ball socket. The center point of the ball sockets are identical which allows the Tripod lower housing to rotate without jamming until disengaged from the catch nut.

The center section of the Tripod contains two spring loaded backchecks **L** and **M**. They hold each other open in normal operation and are suspended in the flow stream by back check support members **N** and **P** which have thin legs to support the back check valves yet allow flow to occur around the stem supports.

The mechanical operation of the Tripod during release is shown in **figure 2**. A release is initiated when a horizontal force at point **A** (Due to a pull away) over comes the frictional forces at both the inner and outer ball sockets **B** and **C** respectively. The amount of frictional force present was determined by the tightness of the catch nut.



As the Tripod upper housing pivots, the catch nut will rotate out of contact with one or two of the three Tripod legs at **D**. While rotation is occurring the O-ring **E** on the inner ball socket **B** maintains the product seal until release occurs. After a maximum rotation of 25 degrees the Tripod upper housing and catch nut assembly will separate from the lower housing assembly.

After release occurs the two all stainless steel spring assisted back check valves **A** will close very quickly to minimize product release as shown in **figure 3**. The back check's viton / Teflon seat provides a pressure tight seal. The Tripod upper housing and catch nut, with the back check closed, remains attached to the vapor hose and follows the pull away vehicle until stopped. After proper bleed down of the system as described under "Operating Instructions" the upper housing and hose can quickly be reconnected to the lower housing assembly returning the fill station to operation.

INSTALLATION INSTRUCTIONS

Bulkhead requirements:

Before starting installation close the liquid and vapor ESV or main shut off valves between the bulk head and storage tank and vent all lines.

The bulkhead, see figure 4, must be equipped with a **vertical** connection for installing the liquid and vapor Tripods. The connections should be a minimum of 10 inches apart. These connections must be secured to the bulkhead, and able to withstand a minimum pullaway torque of 500 Ft./ Lbs. This would be an equivalent of a 500 Lb. horizontal load on the TP1 fitting at the bulkhead connection A in figure 4.

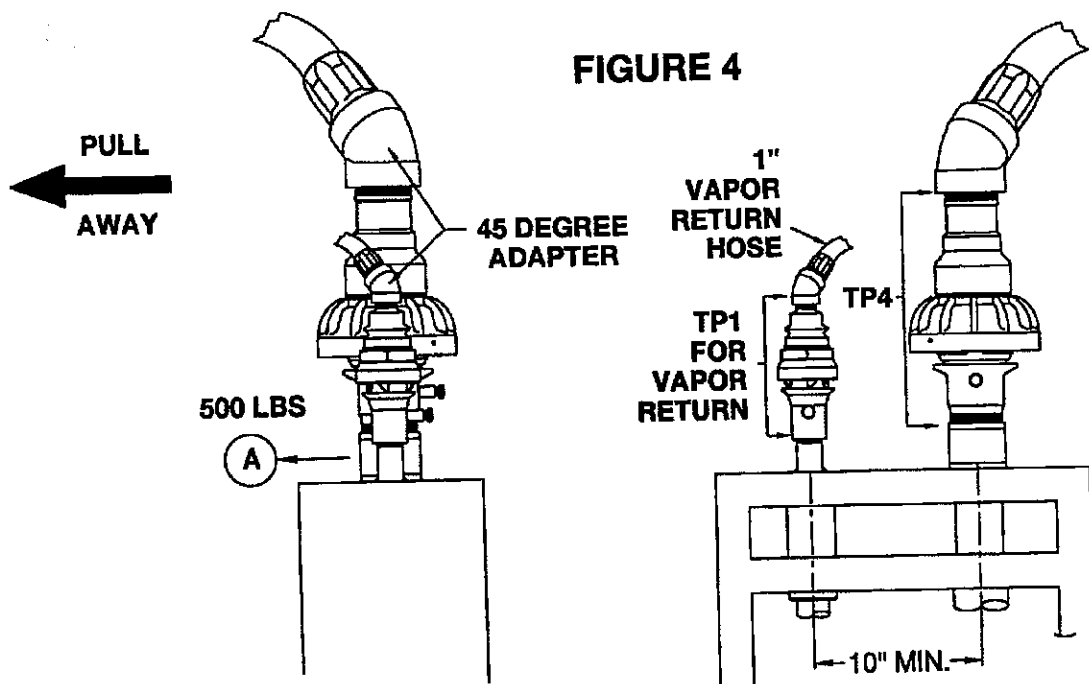
NOTE: It is recommended that a 45 degree Tripod to hose adapter is used for both liquid and vapor Tripods as seen in figure 4. This will reduce the chances of the housing becoming entangled with obstacles during a pullaway.

Caution: The Transport or Bobtail piping must be strong enough to support Tripod pull away torque of 500 Ft./Lbs.

Caution: Check that area is free and clear of obstacles that hoses could hang on during a pull away from any direction.

Tripods currently come in four models for use in bulkhead applications:
(Refer to liquid propane bulkhead IO&M manual when installing TP4)

Model	Flow Capacity	Application	Separation Torque Bulkhead/Transport
TP1	300 GPM of LP at 10 PSI differential	Vapor line	100 Ft./Lbs.
TP2		Vapor line	200 Ft./Lbs.
TP3		Vapor line	200 Ft./Lbs.
TP4		Liquid line	350 Ft./Lbs.



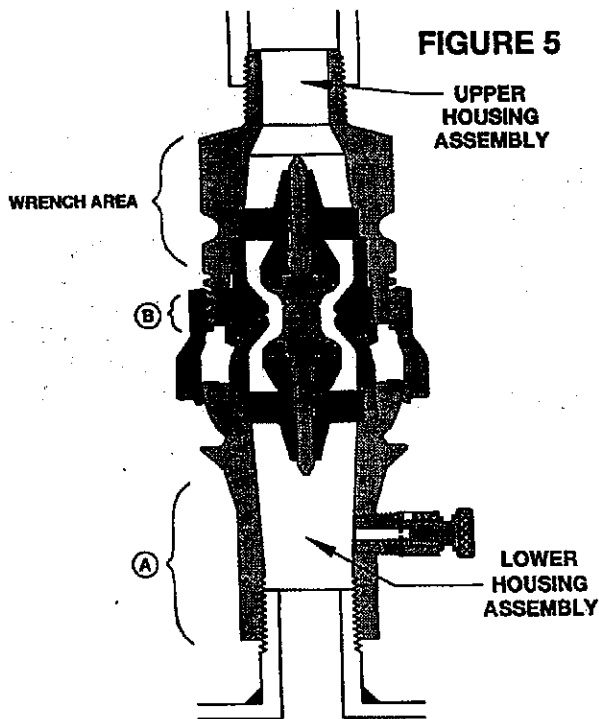
Initial Installation:

Properly installed bulkhead piping must have an excess flow valve installed to protect the liquid and vapor lines. The flow capacity of a Tripod installed to protect a line must exceed the rating of the excess flow valve protecting that line.

1. Screw the lower housing assembly into the bulkhead. If possible position bleed valve port opposite direction of disconnect see **figure 2**. Tighten at location **A** in **figure 5** with a pipe wrench, take care to not damage bleed valve 1/4 NPT threads.

Caution: The Lower housing must be attached to the bulkhead. The Tripod will not operate properly if the upper housing is attached to the bulkhead.

2. Attach the hose or coupling to the upper housing.



3. Screw the catch nut down (off) until the internal threads are slightly exposed, see **B** in **figure 6**.

Note: The catch nut is screwed down to this position so the back checks will not interfere with each other when the upper housing is placed on the lower housing

Caution: Check that hoses connected to the Tripod will pull free in the event of a pull-away in all possible directions.

4. Set the catch nut and upper housing over lower housing legs. While holding the upper housing in position, tighten the catch nut firmly by hand.

Note: Be sure to hold the upper housing in a vertical position while tightening the catch nut or the lower housing will disengage.

5. Tighten the catch nut 1/8 turn with a pipe wrench **B** on it's wrench area as shown in **figure 5**.

Caution: Do not over tighten the catch nut. It must be tight enough to not disengage with normal hose handling but should not be tightened past that point.

6. Grab the hose fitting by hand and try to move the Tripod upper housing. If it can be moved by hand, tighten the catch nut 1/16 turn or less and try again.

Note: Striking the hose fitting with the heel of your hand to see if it will move, is also a technique that can be used

Note: If you are unsure about the tightness simply test what you have done by whipping the hose around to simulate handling and then pull on the hose to test the ease of disconnect. Reconnect, tighten and do a manual pull-away as many times as needed. No harm is done by operating the Tripod.

7. Make sure the Tripod upper housing is straight to the eye with the lower housing. If not, loosen catch nut by turning it counter clock wise. Tap it straight and retighten the catch nut to it's previous point.

Note: If the lower and upper housing are not aligned properly there will be a flow restriction across the ball socket orifices.

8. Using Teflon tape or pipe sealant install bleed valve into lower housing. Close bleed valve.
9. Connect liquid side of bulkhead application by using IO&M manual included with the Tripod used in liquid installations.

Reconnection after pull away

1. Close the liquid and vapor ESV or main shut off valves between the bulk head and storage tank.
2. Close the hose end valves on both the liquid and vapor lines which are still attached to the transport or bobtail.

Caution: Both the liquid and vapor lines are full of product which must be safely bled off.

3. Take the liquid and vapor hose assembly to a water tank (for trapped anhydrous ammonia) and bleed off the trapped product by opening the hose end valves slowly where the valve is held at least 12 inches under water.
4. Bleed down the product trapped between the ESV or main shut off valve and Tripod lower housing by slowly opening the bleeder on the Tripod.

Caution: Leave bleeders and hose end valves open until after Tripod reconnection, otherwise pressure will build up in the cavity and discharge product when the back checks are opened during reconnection.

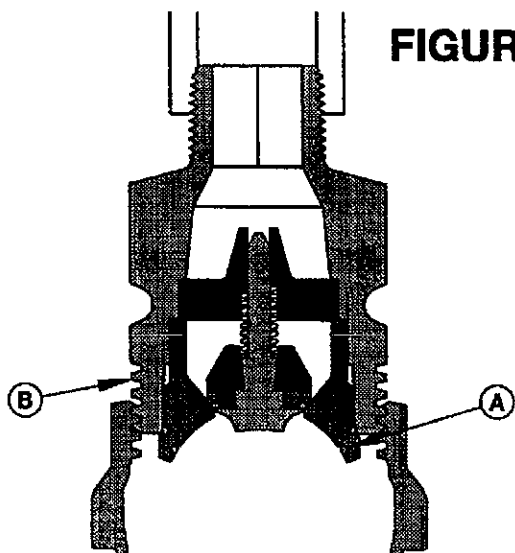


FIGURE 6

5. Inspect the bulkhead, hose end valves and hose for signs of damage or cracking.
6. Inspect for the presence of the sealing O-rings **A** in **Figure 6** If it is missing or cut, replace it.

Note: On a disconnect, it is not unusual for the sealing O-ring to blow out of the ring groove and lodge at the base of the male ball lower housing.

7. Complete steps 3-7 in Initial installation section.