SYPRIS TECHNOLOGIES
Tube Turns Products

2612 Howard Street
Louisville, KY 40211 USA
Phone 502-774-6011
Fax 502-774-6300
Website: www.TubeTurns.com
For genuine Tube Turns Closure parts please consult factory:
ttaftermarket@sypris.com

Bulletin **TT725**
Revised Jan 2017

Threaded Closures Installation, Operation & Maintenance

Caution: Operating a closure can be a hazardous activity and certain precautions should be exercised. Proper installation and maintenance of Tube Turns Hinged Closures have a direct bearing on the safety of the operator. All instructions should be read carefully by personnel engaged in installation, operation and maintenance.

Unpacking

Tube Turns Threaded Closures are generally shipped on a pallet, secured by metal banding to keep the closure from moving. The following steps and precautions should be used before installing the closure to prevent damage.

Upon receipt, inspect the closure for any damage, including signs of impact where the pallet may have been dropped. There should be no bent parts (Davit Assembly, Davit Post, Pressure Warning Screw, Head Turning Lugs, etc.) or signs of the closure being impacted. If the product is damaged, contact Tube Turns.

Do not remove the metal bands from the closure. The closure should remain attached to the pallet until it is ready to be welded to the vessel or pipe. At that time, cut the bands and dispose of them. Be careful when cutting and handling the bands as the cut ends will be sharp and could cause injury. When moving a large closure from the pallet, ensure the closure is secure and lift by the Head Lugs.

Do not attempt to remove the Head from the Hub while the closure is on the pallet. This should be done only after the closure has been moved from the pallet to a more stable location in its intended orientation. Attempting to open the closure while on the pallet could damage the threads of the Head and Hub.

Installation

The Threaded Closure is joined to the pipe end or vessel shell by a circumferential butt-weld, employing standard welding techniques appropriate to the particular installation. Welding of the closure Hub to the pipe or vessel can cause detrimental distortion in the Hub unless suitable precautionary measures are taken.

1. Remove the Pressure Warning Device (optional on the 2" thru 4" sizes) to protect the seal from welding heat.
2. Open the closure in its intended orientation and remove the O-ring. Ensure that the Head and Hub are properly aligned and that there is no binding as the Head is removed from the Hub. Ensure that no bending loads are applied to the Head or threads. This may require removal of the Davit assembly and external support of the Head. Forcing the Head to turn when out of alignment or under a bending load will likely result in galling of the threads. Remove the O-ring.
3. Taking the same precautions with the closure as in Step #2 above, thread the Head on the Hub until metal-to-metal contact is achieved. This will help protect the O-ring seating and threaded surfaces from weld spatter and prevent distortion of the Hub. Tape the gap between the Head and Hub after closing to prevent spatter from entering the Head to Hub gap further preventing thread galling.
4. Ends of matching pipe or vessel must line up squarely with Hub so that there is a uniform gap. Place several small tack welds around the closure Hub at the point of attachment. The number of tacks required to retain the Hub in correct shape during welding operation will depend on the closure size and mounting position.
5. Welding should be performed in accordance with applicable codes/procedures. Heat input should be kept as low as practical.

Stress Relieving/Post Weld Heat Treatment: When the closure attachment weld must be stress relieved, localized stress relief treatment is recommended. Careful control is required during this operation to assure that the fabricator does not warp the closure. The use of proven procedures is required. If care is exercised, local stress relief can eliminate the need for closure disassembly and reassembly.

When it is necessary to stress relieve the entire vessel, the following is recommended: (1) Remove Head with the Davit attached to it, O-ring, and Pressure Warning Device; (2) Coat Hub threads and sealing surfaces with an oxidation resistant coating suitable for the temperature range of the PWHT; (3) After stress relieving, clean and grease the threads and sealing surfaces; reassemble Head and Davit.

Note: The Davit must be supported during PWHT or galling of the threads may result as the weight of the Davit could exert an unbalanced force on the head and closure threads.

Seal: Closures are shipped with a standard Buna-N O-ring installed which should be removed during all welding operations. Special compound O-rings are packed separately. The O-ring should be installed after all welding or stress relieving of the closure is completed. The O-ring is made intentionally smaller than its groove and must be stretched to effect a "snap fit" when properly positioned. If it is necessary to perform more than one hydrostatic test the O-ring should inspected for damage before each test. If it is damaged, it should be replaced.

All foreign material must be removed from the O-ring, the groove and the seating surfaces before the seal is installed. The O-ring should be coated with a suitable lubricant (Vaseline for ambient-temperature service and a silicone grease for higher temperatures) before it is placed in position.

Installation - It is important that the O-ring be installed in the following manner to provide equal distribution of the O-ring in the groove.

a. Push the O-ring into the groove in (4) sequential steps as shown in Figure 1.

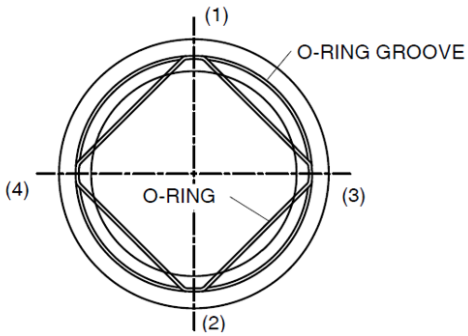

FIGURE 1

b. "Split the difference" between these (4) points and push the O-ring into the groove as shown in Figure 2.

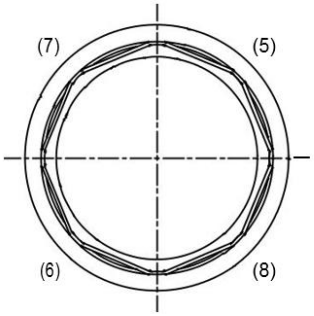

FIGURE 2

c. Complete the installation by pushing the O-ring into the groove in between the initial installation points above. If the O-rings are of a high hardness (90 durometer) or are being installed in cold weather it may be necessary to use a block of soft wood and a small hammer to tap the O-ring into its fully seated position in the groove.

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Operation

Closing: To close the Threaded Closure, first inspect the O-ring and seating surface and remove any foreign material, then close the Head by threading it on the Hub. Tighten the Head with a wrench on the 2" through 4" sizes and with the Special Opening Wrench on the 6" through 12". Use the "Tugger Operating Tool" on sizes 14" through 36". The PWD Lug must go past the PWD opening for the head to be considered "tight" (reference corresponding figure below). Install the Pressure Warning Device and tighten to 10 to 15 ft-lbs.

Opening:
Caution: Do not attempt to open the closure until all incoming pressure lines have been closed off and the pipe or vessel has been relieved of all internal pressure. Opening under pressure may result in injury to persons and damage to property.
Each closure 6" and larger is equipped with a Pressure Warning Device (optional on the 2" thru 4") that will produce a whistling sound when loosened if the internal gas pressure has not been completely relieved or will leak if there is fluid in the vessel. THESE DEVICES ARE NOT BLEEDER PLUGS AND ARE NOT DESIGNED TO RELIEVE INTERNAL PRESSURE.
After the internal pressure or vacuum has been relieved, unscrew the Pressure Warning Device and loosen the head with a wrench on the smaller sizes or with the opening devices on the larger sizes.

Maintenance
Seal: The O-ring should be inspected prior to every closing.
Variations in service conditions will determine its useful life.

Frequency of replacement will depend upon such factors as operating pressure and temperature, shrinkage and swelling caused by product absorption, the corrosiveness of the product in the system and frequency of operation.

The materials most often used for closure O-rings are discussed below. Technical information as to properties and usages of seal materials are based on data and recommendations of the manufacturers of the materials.

Determination of the compatibility, of the O-ring material is the responsibility of the purchaser or the end user of the closure.

"Buna-N"- General Service. Resistant to petroleum-base hydraulic and lubricating oils; animal and vegetable oils: gases such as butane, propane, acetylene and natural gas, aromatic and nonaromatic fuels such as gasoline, kerosene, diesel fuel and fuel oils; anhydrous ammonia, and water. Temperature limits **-30°F to 250°F**; special compounds suitable for **-65°F**.

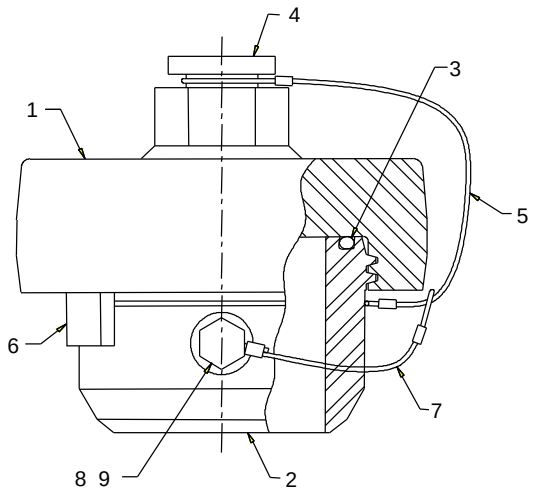
"Viton" - Generally used for high-temperature services. Resistant to synthetic lubricants, petroleum-base products, some chlorinated solvents, benzene, toluene, and many acids and alkalis. Temperature limits **-15°F to 400°F.**

"Ethylene Propylene" - Superior resistance to phosphate-ester type fluids, Skydrol, Pydrol, Cellulubes and glycol type coolants. Excellent resistance to mild acids and alkalis. Can be used in steam service. Replacing butyl rubber in most applications. Temperature limits **-70°F to 250°F.**

"Silicone Rubber" - Good resistance to high and low temperature dry gases, air, oxygen and ozone. May be satisfactory in high-aniline oils, but not recommended for use with most petroleum base products. Temperature limits **-65°F to 450°F.**

Cleaning & Lubrication**: When closure** is opened, clean head and hub **sealing faces, head and hub threads, O-ring and O-ring groove** and thoroughly lubricate all of these items. **Lubricate all grease** fittings at hinge locations and threads on Pressure Warning Device.

Paint: If the closure is to be painted, this should be done with the head in the closed position to prevent paint from being applied to the threads and the O-ring contact surfaces of the head and hub.



HORIZONTAL AND VERTICAL
THREADED CLOSURE W/O DAVIT
Sizes 2" thru 4" Class 150-900
Note - Shown with Optional Pressure Warning Device

1. Head
2. Hub
3. O-Ring
4. Head Nut
5. Head Retaining Cable
6. PWD Lug
7. PWD Retaining Cable
8. Pressure Warning Device (PWD)
9. PWD O-Ring

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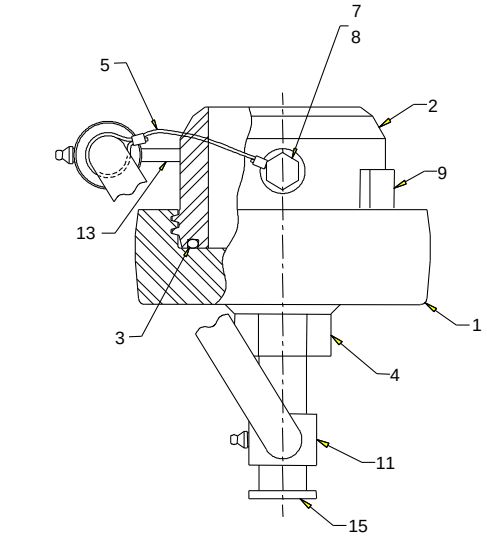
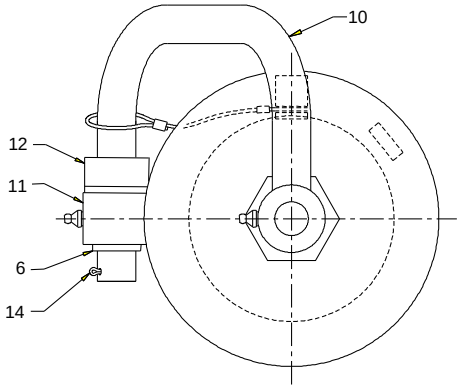
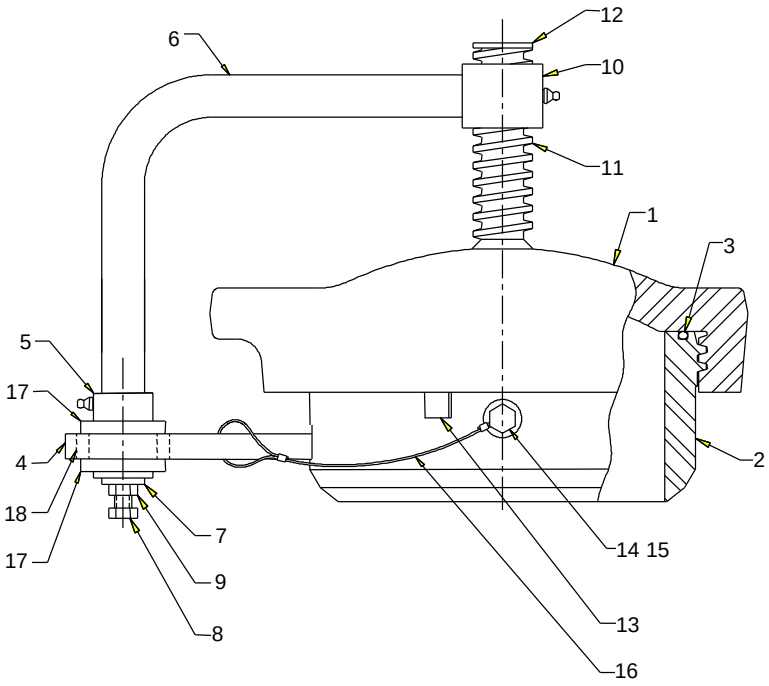




THREADED CLOSURE WITH DAVIT
Sizes 2” thru 4” Class 150-900
Note - Shown with Optional Pressure Warning Device

1. Head
2. Hub
3. O-Ring
4. Head Nut
5. PWD Retaining Cable
6. Davit Bushing
7. Pressure Warning Device (PWD)
8. PWD O-Ring
9. PWD Lug
10. Davit Arm
11. Davit Sleeve
12. Davit Collar
13. Davit Support Bar
14. Cotter Pin
15. Washer



VERTICAL THREADED CLOSURE
Sizes 6” thru 12 Class 150-900

1. Head
2. Hub
3. O-Ring
4. Hub Davit Support Bar
5. Hub Davit Sleeve
6. Davit
7. Davit Adjustment Plate
8. Adjusting Screw
10. Head Support Nut
11. Head Support Shaft
12. Washer
13. PWD Lug
14. Pressure Warning Device (PWD)
15. PWD O-Ring
16. PWD Retaining Cable
17. Davit Guide Plate

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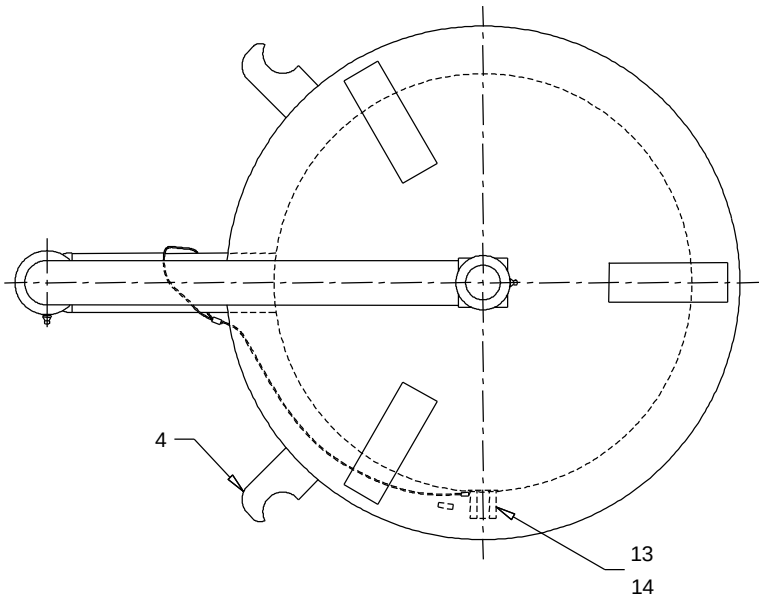

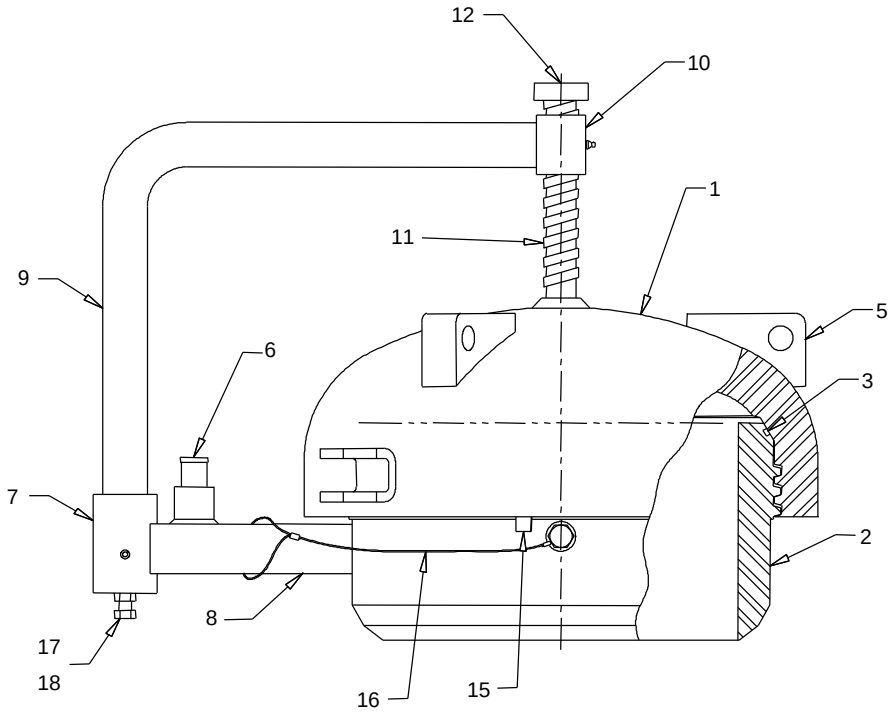

VERTICAL THREADED CLOSURE
Sizes 14” and 16” Class 150-900 TV

1.	Head	10.	Head Nut
2.	Hub	11.	Head Shaft
3.	O-Ring	12.	Head Shaft Collar
4.	Head Turning Lug	13.	Pressure Warning Device (PWD)
5.	Head Lug	14.	PWD O-Ring
6.	Anchor Bar	15.	PWD Lug
7.	Davit Socket	16.	PWD Retaining Cable
8.	Hub Davit Sppt Bar	17.	Adjusting Screw
9.	Davit	18.	Jam Nut

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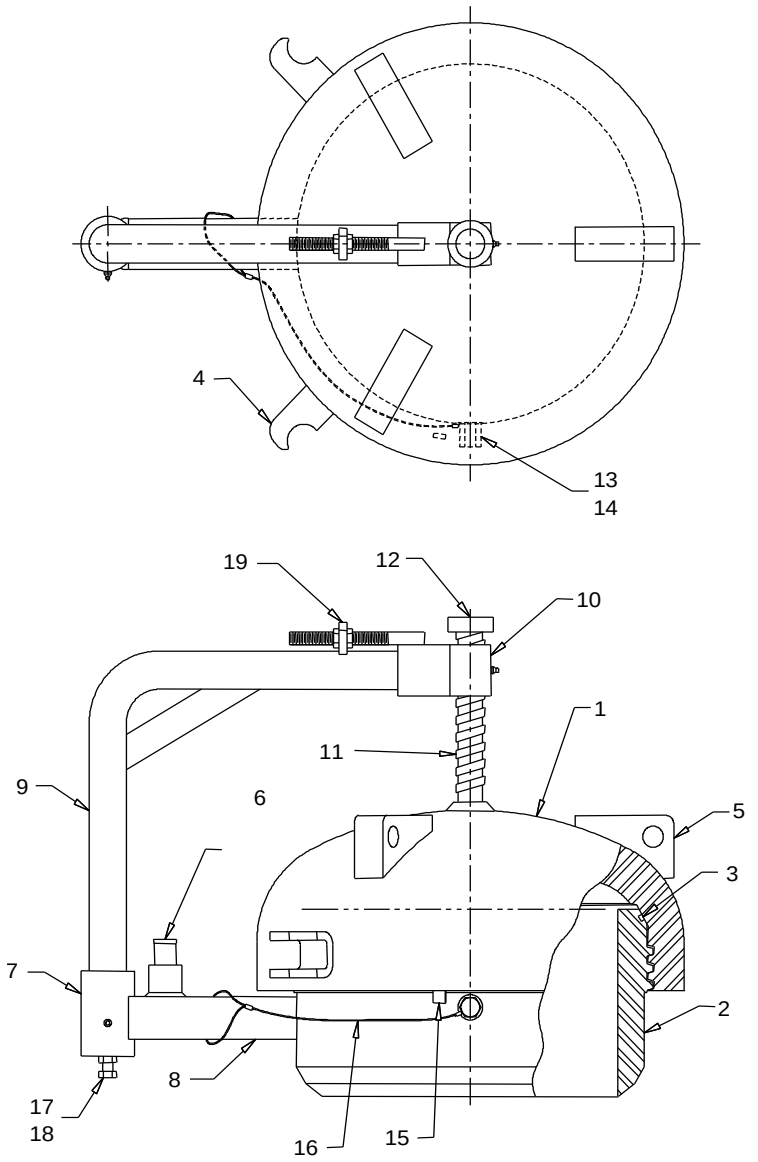

VERTICAL THREADED CLOSURE
Sizes 18” thru 24” Class 150-900 TV
Sizes 26” thru 36” Class 150-600 TV

1. Head
2. Hub
3. O-Ring
4. Head Turning Lug
5. Head Lug
6. Anchor Bar
7. Davit Socket
8. Hub Davit Sppt Bar
9. Davit
10. Head Nut Assembly
11. Head Shaft
12. Head Shaft Collar
13. Pressure Warning Device (PWD)
14. PWD O-Ring
15. PWD Lug
16. PWD Retaining Cable
17. Adjusting Screw
18. Jam Nut
19. Head Nut Adjusting Device

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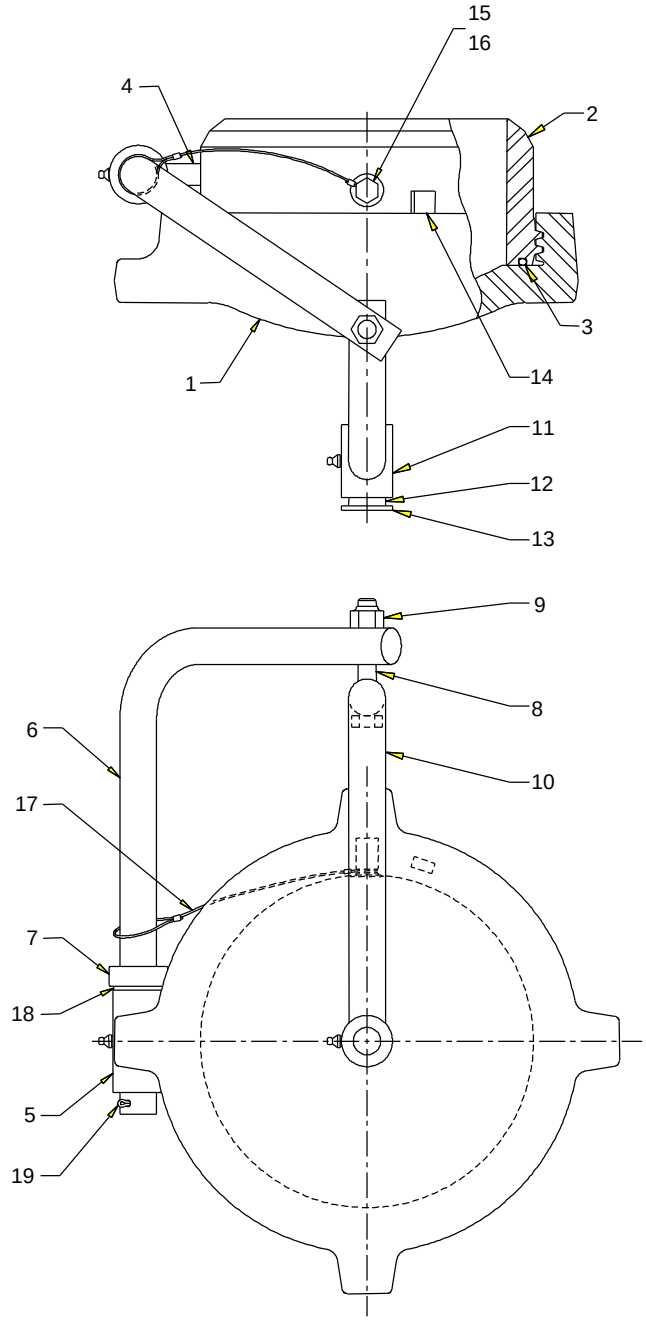

HORIZONTAL THREADED CLOSURE
Sizes 6” thru 12” Class 150-900 TH

1. Head
2. Hub
3. O-Ring
4. Davit Sleeve Support
5. Hub Davit Sleeve
6. Hub Davit
7. Davit Collar
8. Davit Bolt
9. Hex Lock Nut
10. Head Davit
11. Head Davit Sleeve
12. Head Support Bar
13. Washer
14. PWD Lug
15. Pressure Warning Device (PWD)
16. PWD O-Ring
17. PWD Retaining Cable
18. Bearing
19. Cotter Pin

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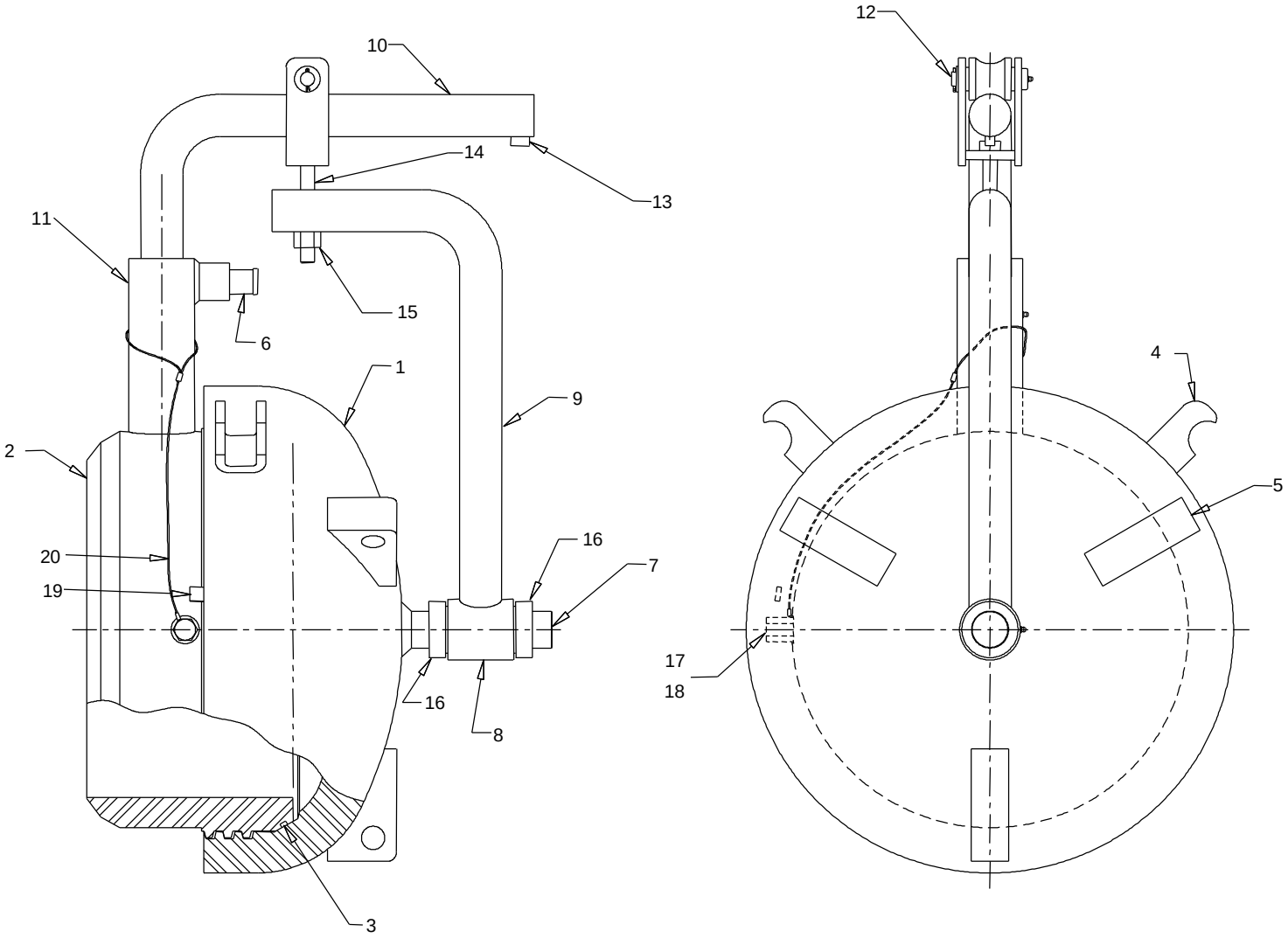

HORIZONTAL THREADED CLOSURE
Sizes 14” thru 22” Class 150-900 TH

1.	Head	11.	Hub Davit Tube
2.	Hub	12.	Carriage Assembly
3.	O-Ring	13.	Carriage Stop
4.	Head Turning Lug	14.	Carriage Hex Cap Screw
5.	Head Lug	15.	Carriage Bolt Lock-Nut
6.	Anchor Bar	16.	Set Screw Collar
7.	Head Shaft	17.	Pressure Warning Device (PWD)
8.	Journal with Bearings	18.	PWD O-Ring
9.	Head Davit	19.	PWD Lug
10.	Hub Davit	20.	PWD Retaining Cable

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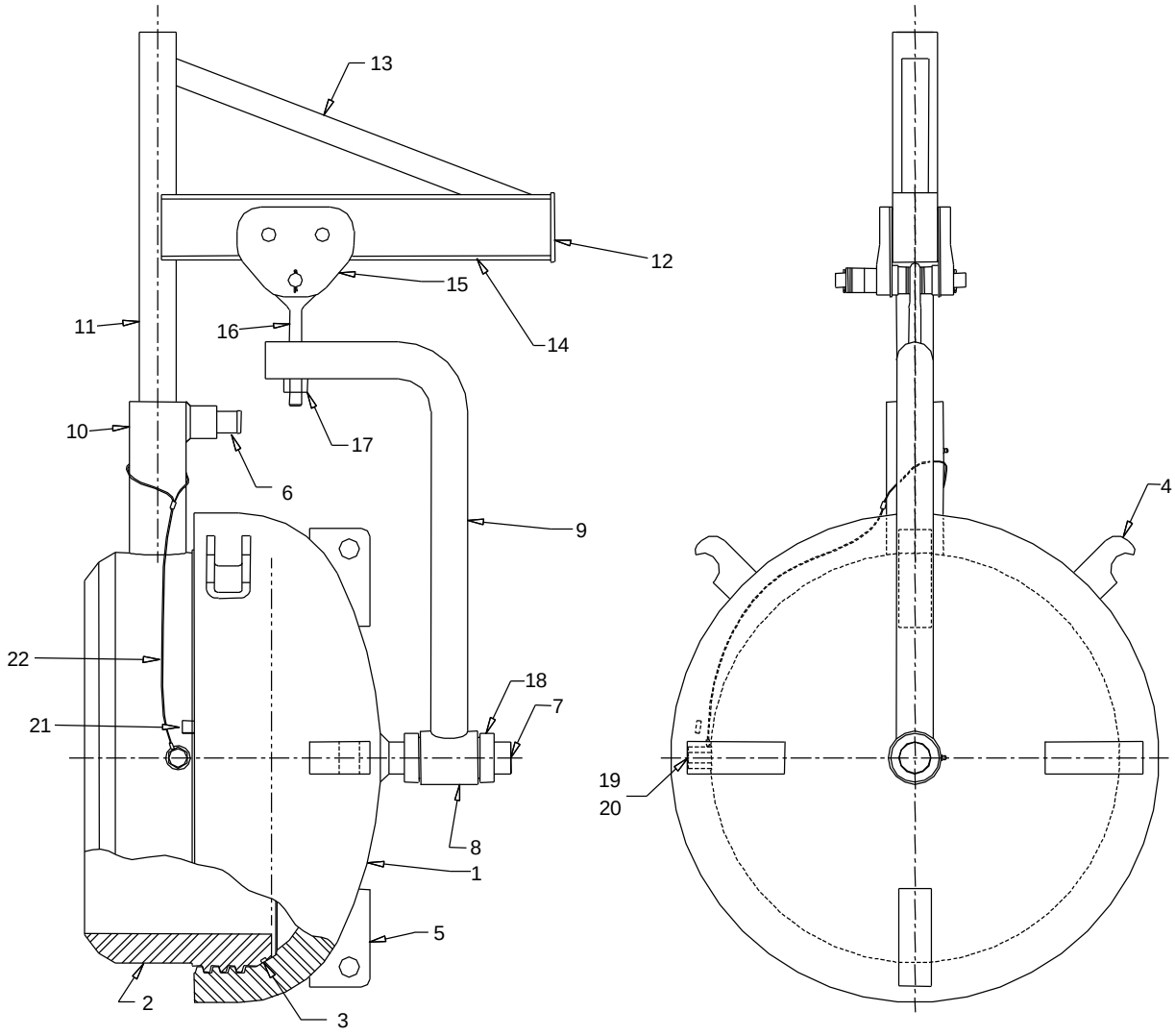

HORIZONTAL THREADED CLOSURE
24” Class 150-900 TH
Sizes 26” thru 36” Class 150-600 TH

1.	Head	12.	Beam End Plate
2.	Hub	13.	Beam Support Bar
3.	O-Ring	14.	Beam
4.	Head Turning Lug	15.	Push Trolley
5.	Head Lug *	16.	Eye Bolt
6.	Anchor Bar	17.	Locknut
7.	Head Shaft	18.	Set Screw Collar
8.	Journal with Bearings	19.	Pressure Warning Device (PWD)
9.	Head Davit	20.	PWD O-Ring
10.	Hub Davit Tube	21.	PWD Lug
11.	Jib Post	22.	PWD Retaining Cable

* 24” Closure Equipped with (3) Lugs