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IMPORTANT - READ CAREFULLY

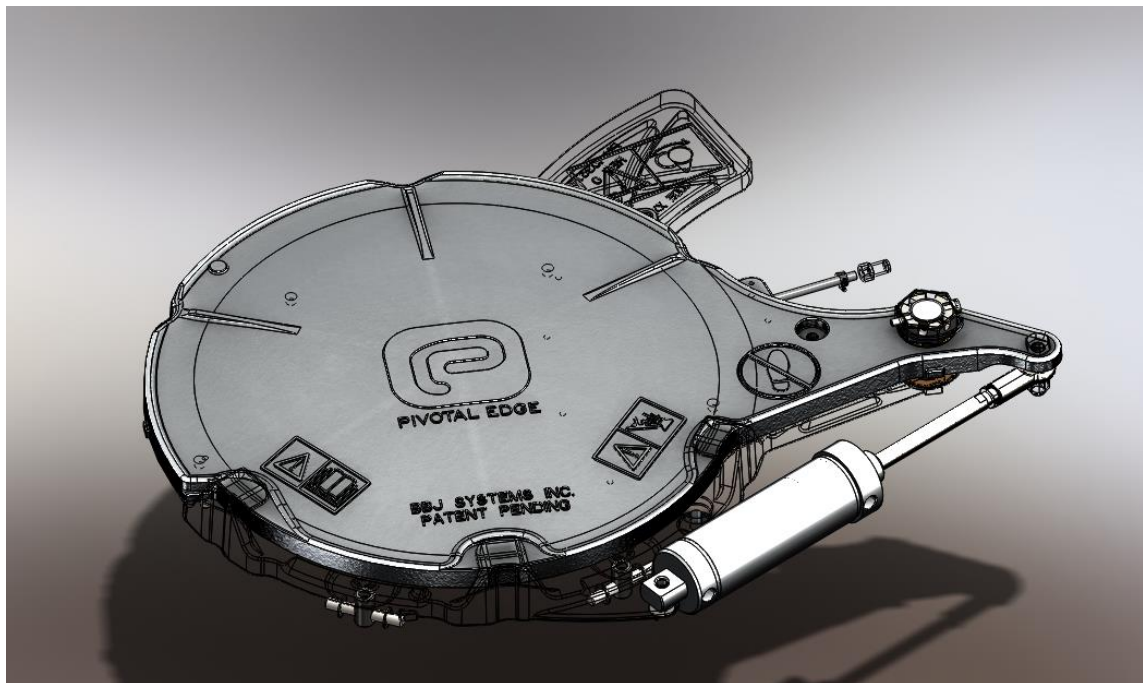
The Pivotal Edge® is simple to operate. However, as with any powered equipment, it must be operated properly to be safe. Before using the Pivotal Edge®, read this Operator's Manual carefully. It contains valuable information that is necessary for safe operation. Observe all safety rules and become completely familiar with the controls.

For warranty service, parts and repairs or to answer any questions you may have contact us at:

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P.O. Box 2636
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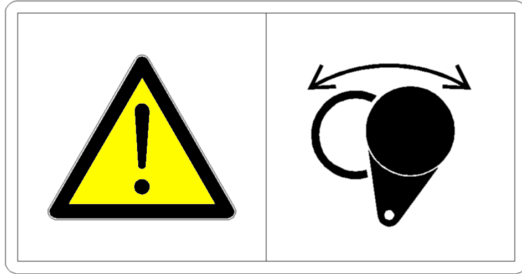


Safety and Warnings

Note: Improper operation of powered equipment can cause serious injury or death.

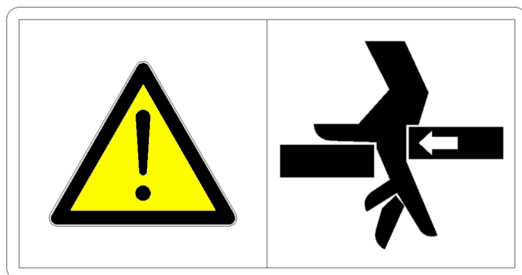
Pictured below are operations and actions that require attention by the Pivotal Edge® operator. Please read and understand the manual to avoid injuries.

Warning – Rotating Equipment Hazard



The operator should be aware that the Pivotal Edge® is designed to rotate when opening and closing. Under no circumstances should a person be near the manhole when it is being opening or closing.

Warning – Pinch Point Present



During the opening and closing of the manhole cover, pinch points exist near the actuator and cover of the Pivotal Edge®. The operator must make sure that no one is near the manhole during operation.

Warning – Contents under Pressure



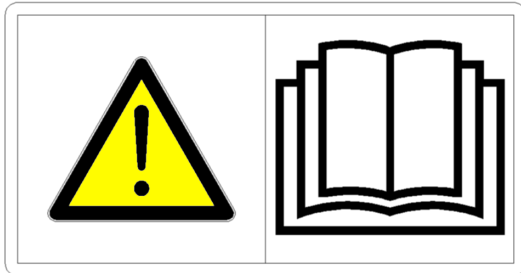
All persons working near the Pivotal Edge® should be aware that opening the cover while contents are under pressure will cause a sudden release of pressure. Tank must be depressurized before opening.

Warning – Fall - Trip Hazard



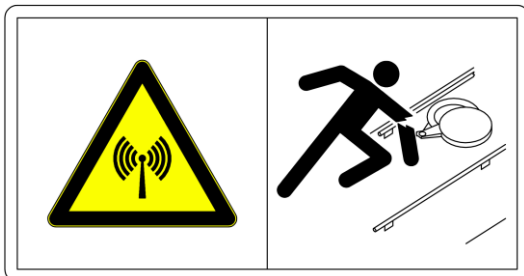
Care should be taken when servicing the Pivotal Edge® that appropriate fall protection in place.

Warning – Read Operator's Manual



Before operating the Pivotal Edge®, read and understand the safety and operating instructions.

Warning – Remote Operation

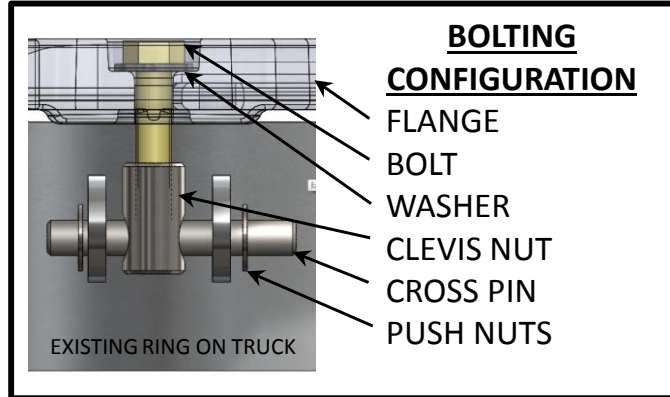


All persons working near the Pivotal Edge® should be aware that operation is controlled remotely. Under no circumstances should the operator activate the manhole when someone is on top of the trailer.

SHIPPING TAGS

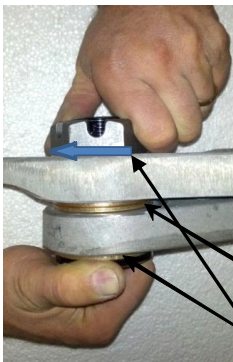
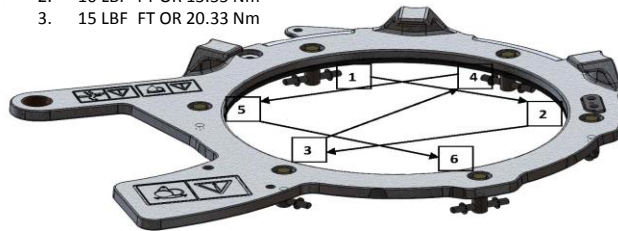
The following tags were attached to the cover for a quick reference.

THIS HOLE
TOWARDS FRONT



TORQUE IN PATTERN SHOWN IN 3 STEPS

1. 5 LBF-FT OR 6.77 Nm
2. 10 LBF-FT OR 13.55 Nm
3. 15 LBF-FT OR 20.33 Nm



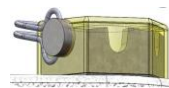
PIVOT PIN INSTALLATION

1. FIT COVER TO FLANGE INTO CLOSED POSITION
2. INSERT PIVOT PIN WITH HARDWARE AS SHOWN
3. **HAND TIGHTEN** AND PIN WITH PROVIDED HARDWARE

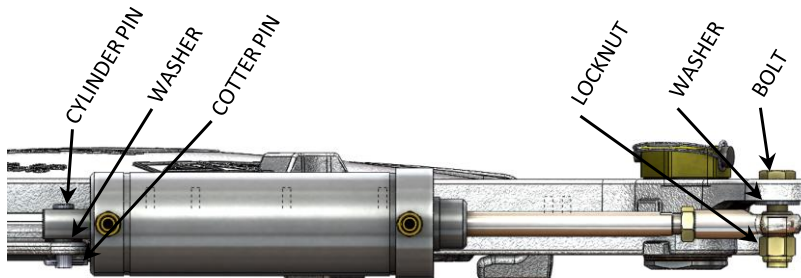
DO NOT OVERTIGHTEN!!

2 THRUST WASHERS

1 THRUST WASHER



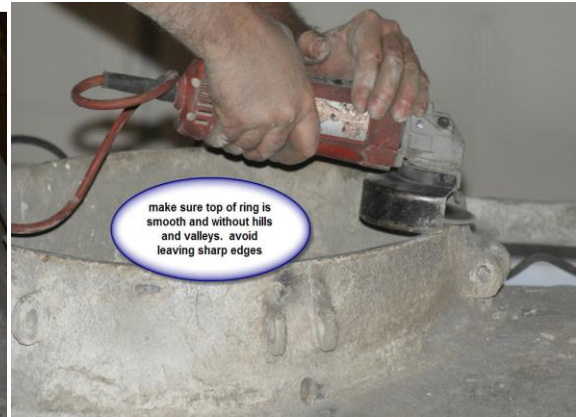
CYLINDER INSTALLATION



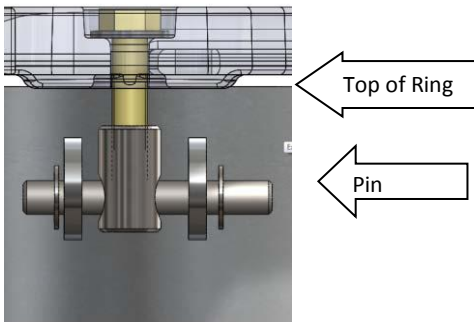
INSTALLATION GUIDE

RETRO FITTING PREPERATION

1. Remove existing cover
2. Remove existing latch and hardware.
3. Clean top mating surface (ring)

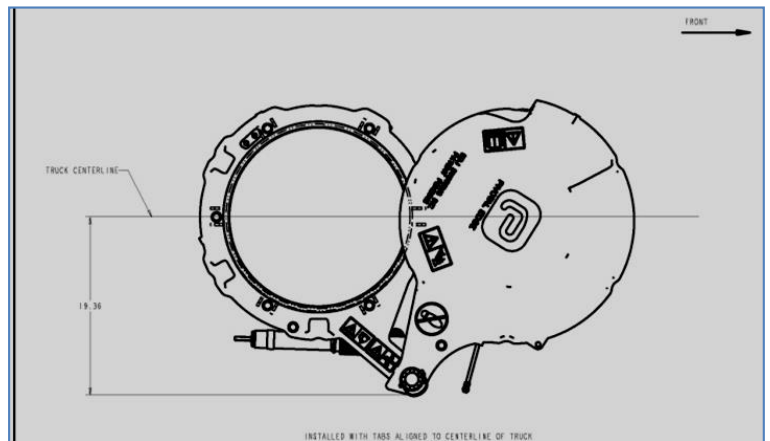
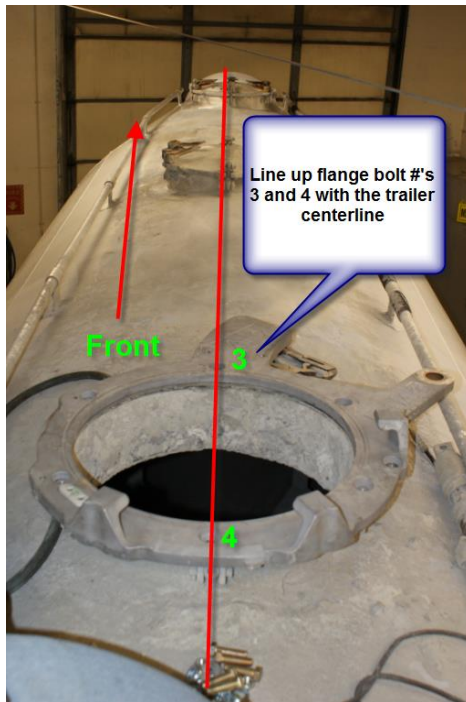


Refer to picture below and measure distance from top of pin to top of ring to determine if the bolts supplied will work or if a different length is needed. The bolts are $\frac{1}{2}$ " fine thread. Make sure the pin is raised up to the top of the tab holes when measuring.



Measurement	Minimum Bolt length	Maximum Bolt length
< 1 1/2	Call for non-standard installation kit.	
1 1/2	1 3/4	2 + extra washer
1 5/8	2	
1 3/4	2	2 1/4 + extra washer
1 7/8	2 1/4	
2	2 1/4	2 1/2 + extra washer
2 1/8	2 1/2	
2 3/8	2 1/2	2 3/4 + extra washer
2 1/2	2 3/4	
2 5/8	2 3/4	3 + extra washer
2 3/4	3	
	3	3.25 + extra washer
	3 1/4	
3 1/8	3 1/4	3.5 + extra washer

FLANGE POSITION

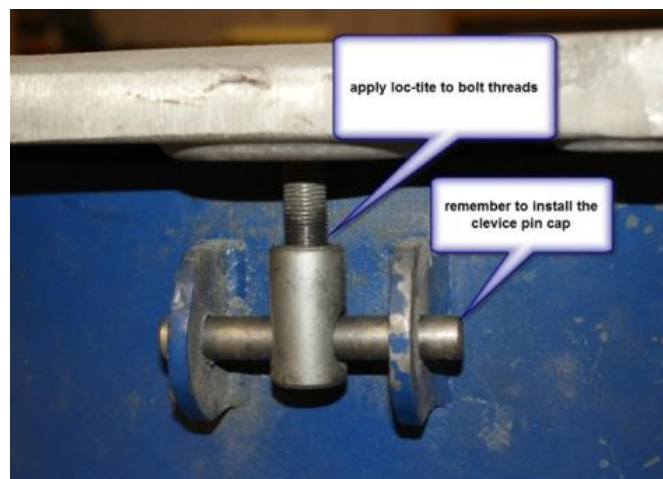
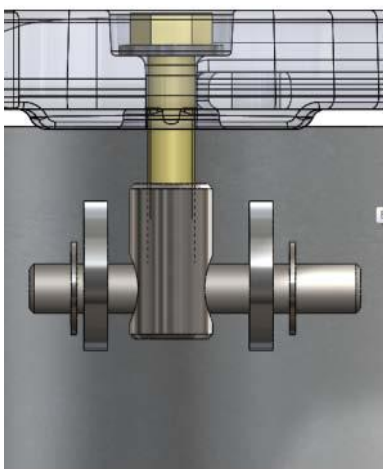


Base Flange and Cover

4. Align hole 3 to the front of trailer, centering flange over the ring.
5. Install clevis nut, cross pin and cap nuts.
6. Align clevis bolts with cast holes (actuator to the rear or trailer)
7. Apply loctite to threads. Insert and finger tighten $\frac{1}{2}$ x 20 bolts (Fig. 2).

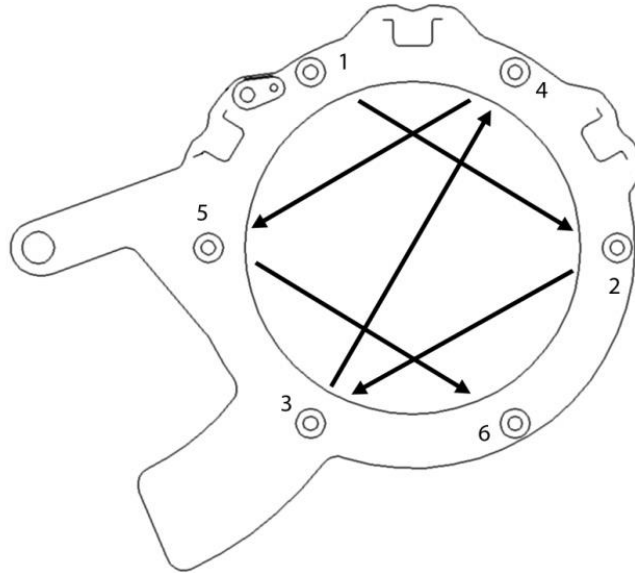
Note: Once hardware is properly tightened, rotating the pins **should not be possible**.

Figure 2



8. Using a torque wrench, tighten the bolts beginning with 5 ft-lbs or 6.77Nm. Increase by increments of 5 ft/lbs or 6.7Nm until a final torque setting of 15 ft/lbs or 20.33Nm is achieved. When tightening the hardware, always use a “star” pattern sequence (Fig. 3).

Figure 3

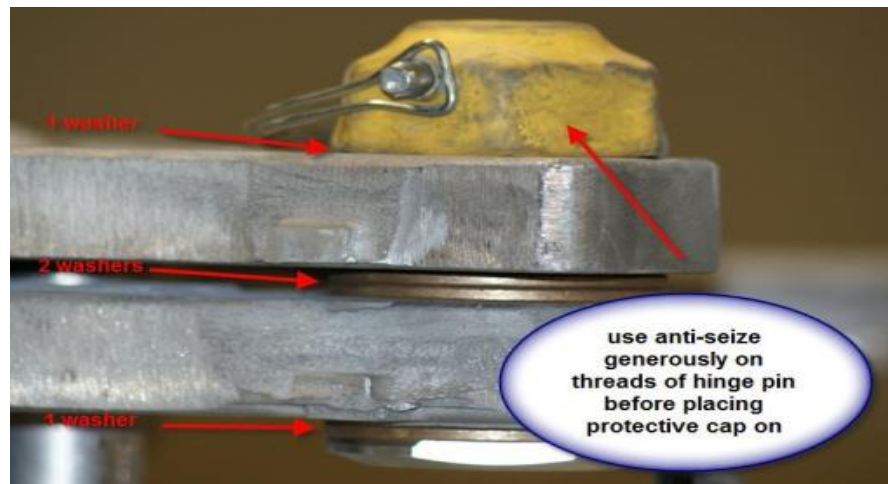
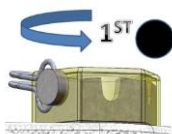


While tightening the mounting bolts, make sure the flange gasket is seated properly in the underside groove. Typically the inside edge of the gasket will be flush with the inside of the flange opening.

Note: As the hardware is being tightened, check that bolts are not bottomed out against the clevis pins.

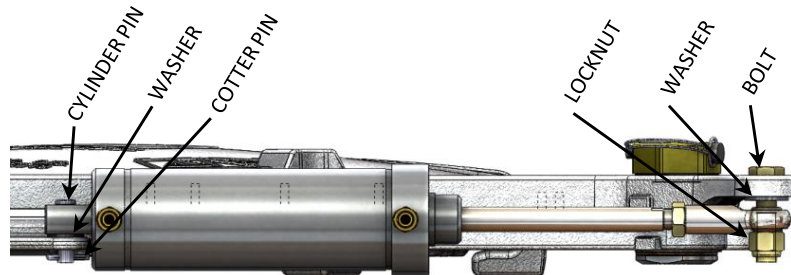
HINGE PIN CONNECTION

Fit the cover to the flange and move into the closed position. Insert the hinge-pin with one thrust washer on the bottom, two washers between the flange and cover and one on the top of the cover. Apply anti-seize on the threads of the hinge-pin. Hand tighten the castle nut and insert the lock pin. (If necessary loosen to the first available hole.) Check the cover for smooth operation.



CYLINDER INSTALLATION

CYLINDER INSTALLATION

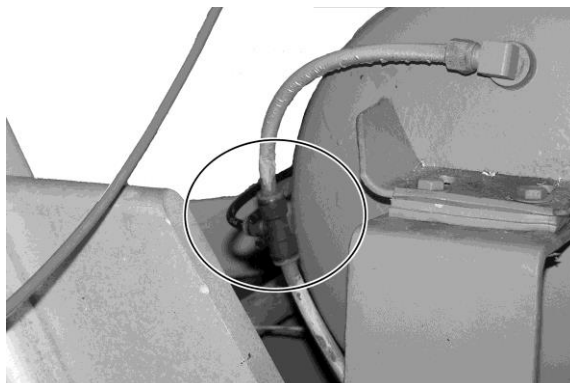


AIR-LINE ROUTING

Connect air supply From Trailer to the supply on the control box (Fig. 8). We recommend a trailer protection valve be used. Run 3/8" air from the supply tank to the control box, a DOT approved 3-way Tee has been provided. Typical connection is after the trailer protection valve. There must be constant air to the control box for proper operation and seal inflation.



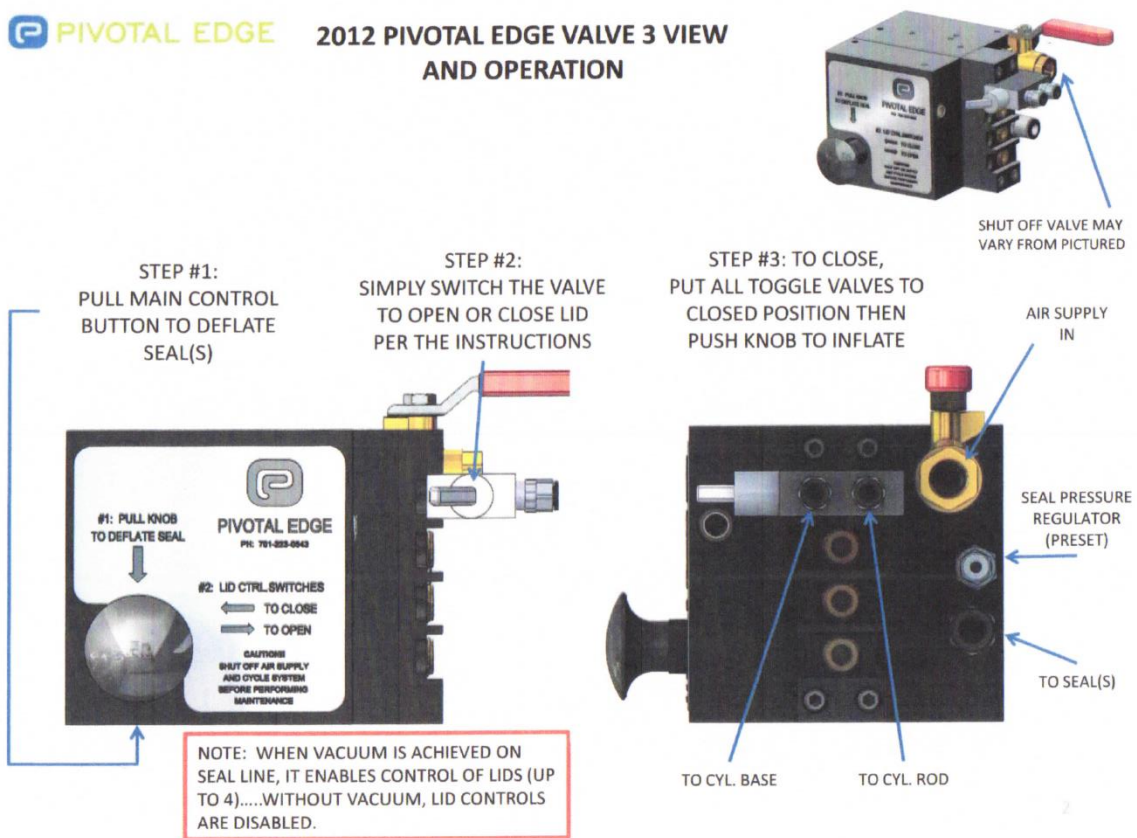
Figure 8



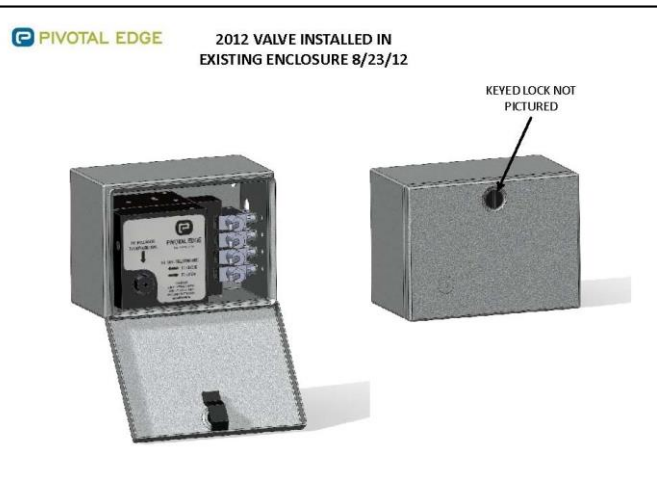
CONTROL BOX MOUNTING



2012 PIVOTAL EDGE VALVE 3 VIEW AND OPERATION



The control box has 4 holes with 1/4-20 thread in the rear of the box.
OR The optional mounting plate can be used for mounting or template.



The optional enclosure is available in a stainless steel box Part N. 103900-1-E

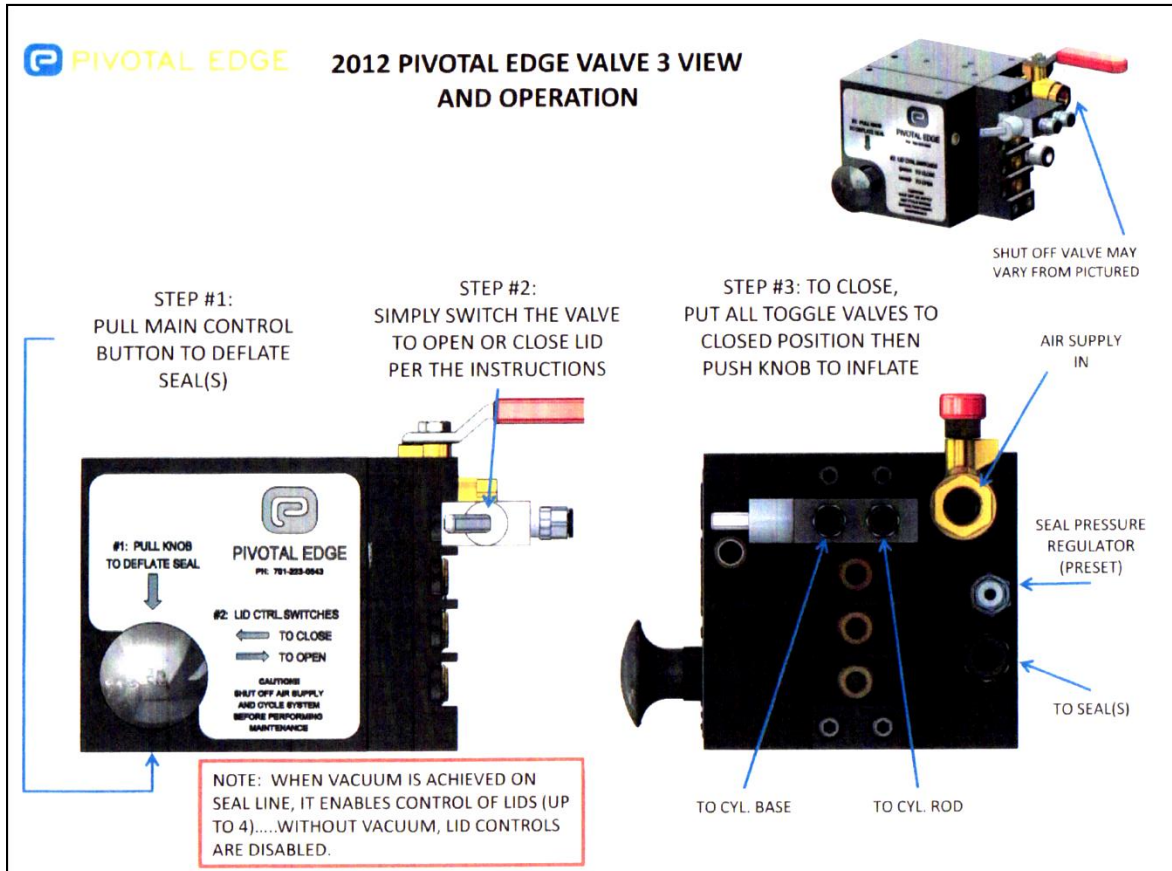
Airline color coding:

- Red =Rod-end
- Yellow =Base-end
- 3/8" black is supply
- 3/8" black is the seal Line.

The seal line is a single black (3/8") airline that runs from the control box to all covers, simply "T" them together on top of the trailer. It works best to place the "T" under the first pivot pin on the first cover then use a short "leash" to the first inflatable seal. Do the same for subsequent covers.

DRIVER CARDS

Driver Training





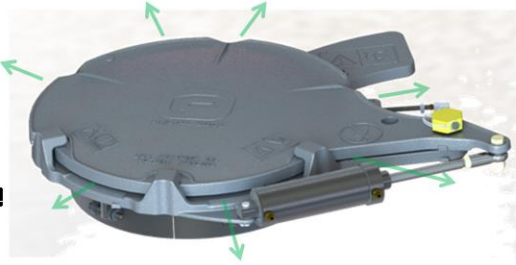
AIR PURGE FLANGE CLEANING

A FAST AND EASY WAY TO KEEP YOUR LID
OPERATING WELL DAY IN AND OUT

PERFORM EVERY TIME AFTER OFF LOADING!

INSTRUCTIONS:

1. AFTER OFF LOADING IS COMPLETE
2. DECREASE TANK PRESSURE TO 0.5 - 1.0 BAR
3. PULL PIVOTAL EDGE CONTROL BOX KNOB TO DEFLATE SEAL
4. OPEN TRAILER SAFETY BLOW DOWN VALVE
5. RESEAL COVER BY PUSHING IN THE PIVOTAL EDGE CONTROL BOX KNOB



THESE STEPS WILL ALLOW THE PRESSURE TO PURGE BETWEEN THE COVER AND THE
FLANGE CLEARING EXCESS MATERIAL FROM THE OPENING



TROUBLE SHOOTING TIP:

AIR OR DUST IS LEAKING THROUGH THE SEAL WHEN
PRESSURIZING THE TANK WHILE OFF LOADING

FOLLOW THE AIR PURGE PROCEDURE

INSTRUCTIONS:

1. NOTE AIR OR DUST LEAKING
2. STOP PRESSURIZING THE TRUCK ONCE IT REACHES 0.7 TO 1 BAR
3. PULL PIVOTAL EDGE CONTROL BOX KNOB TO DEFLATE SEAL
4. AIR WILL BLOW THROUGH THE OPENING REMOVING DUST FROM THE FLANGE
5. RESEAL COVER BY PUSHING IN THE PIVOTAL EDGE CONTROL BOX KNOB



IF THIS DOES NOT WORK **REPEAT THE PROCEDURE UNTIL IT SEALS.**

PNEUMATIC COVER OPERATION INSTRUCTIONS

Opening the Pivotal Edge Cover:

Pull out the knob on the control valve. Activates the vacuum system and will deflate the inflatable seal. Once the vacuum has been satisfied, the cylinder will be energized and you will be able to open it by flipping the appropriate switch.

Closing the Pivotal Edge Cover:

Flip the appropriate switch to the closed position, after the cover is closed, push in the knob on the control valve. **DO NOT PUSH KNOB TO INFLATE THE SEAL UNTIL COVER IS FULLY CLOSED**

Purging the Pivotal Edge Cover:

To help minimize cleaning time and frequency of required cleaning, after unloading and before the operator would normally blow down the excess pressure in the vessel, pull the inflatable seal knob out. This will deflate the inflatable seal. The remaining tank pressure will blow out any excess product that has accumulated between the cover and flange. Give it 10-15 seconds then push in the inflatable seal knob again to re-inflate the seal. This can be done at any pressure but 4 -8 psi is sufficient.

GENERAL MAINTENANCE

Servicing the Pivotal Edge Cover:

Turn off the supply line valve. Pull the inflatable seal knob and flip the cover switch to de-energize the cylinder. Disconnect the yellow and red ¼" lines from either the control box or the cylinder. The cover should now move freely to allow for servicing. When done servicing manually close the cover, make sure the control valve switch is in the closed position, push in the control box knob and turn on the supply line to the control valve. Cycle the cover a couple times to test the system before returning to service.

Troubleshooting:

1. The operation of the cover should be smooth and easy.
 - a. If not clean buildup on and around the flange and cover.
2. Leaks when starting to pressurize the tank.
 - a. Deflate the seal by pulling the control valve knob to deflate the seal, thereby purging the tank pressure, wait a few seconds and push the knob back in to inflate the seal.
 - b. Reduce unloading pressure. Check seal integrity when possible.

Cleaning

Moisture will result in product bonding between the cover and flange. Purging will not remove this hardened material and it will continue to build up over time. We recommend opening the lid and inspecting the entire surface of the flange for product buildup that needs to be scraped away. This should be done weekly at first. Then adjust accordingly to what is necessary based on your loading conditions

PREVENTIVE MAINTENANCE

PIVOTAL EDGE- PNEUMATIC HATCH (Assembly # 103843)

Part No. / Task Description	Frequency			
	Pre-trip	Bi-weekly	First at 6 months	Thereafter every 12 months
Air lines and control box - Check operation	X			
Cover build-up / Cleanliness - Conditional		X		
Remove and Inspect cover			X	X

Tools and materials that may be required:

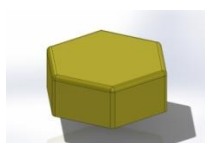
2 x Channel lock pliers, rubber or plastic hammer, 14" pipe wrench, anti-seize, dry lubricant, wire brush, emery cloth, small pry bar, 2- 15/16" wrenches, scraper (putty knife).

Maintenance Procedure – Remove & Inspect Cover

- Close the supply air ball valve and deflate the seal by pulling the control box button out. Cycle the switches several times to relieve all accumulated pressure on the system.
- Disconnect the airline at the control box for the rod, and base line
- Disconnect the seal airline at the quick-connect by the cover
- Remove the actuator at the rod end of the cylinder (two 15/16" wrenches)
- Remove the hinge pin D ring, yellow plastic cover and 1.5" castle nut
- Pry the cover up using equal pressure
- Remove the 3/8" fitting and hose clamp on the end of the seal inflation tube
- Remove the seal
- Clean all surfaces, check and replace any visibly worn parts
- Reassemble: the Seal (**see note 1**) and connections, hinge pin, use anti-seize on threads, set tension hand tight loosen to closest hole if necessary, check for smooth operation prior to connecting actuator
- Connect airline and check for clearance
- Connect the actuator
- Open and close the cover by hand checking for smooth operation
- Connect the airlines and cycle the cover.
- Check functionality of optional lock-out pin by apply a minimum of 5psi (**see note 2**)

Replacement parts list:

Preventive Maintenance Parts Recommendations		
Part		Recommended Action
No.	Description	
103755	Hinge pin cap	Replace every 12 months
103731	Cover Bushing	Replace every 12 months
103730	Flange Bushing	Replace every 12 months
103679	Hinge Pin	Visually assess and replace if necessary
103678	Thrust washers	Replace every 12 months
102665	Cover Slider	Visually assess and replace if necessary
102664	Flange Slider	Visually assess and replace if necessary
102419	Inflatable seal	Visually assess and replace if necessary



103755 HINGE PIN CAP



103731 BUSHING COVER



103730 BUSHING FLANGE



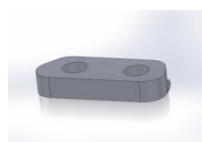
103689 HINGE PIN



103678 HINGE PIN THRUST WASHER



102665 SLIDER COVER



102664 SLIDER FLANGE



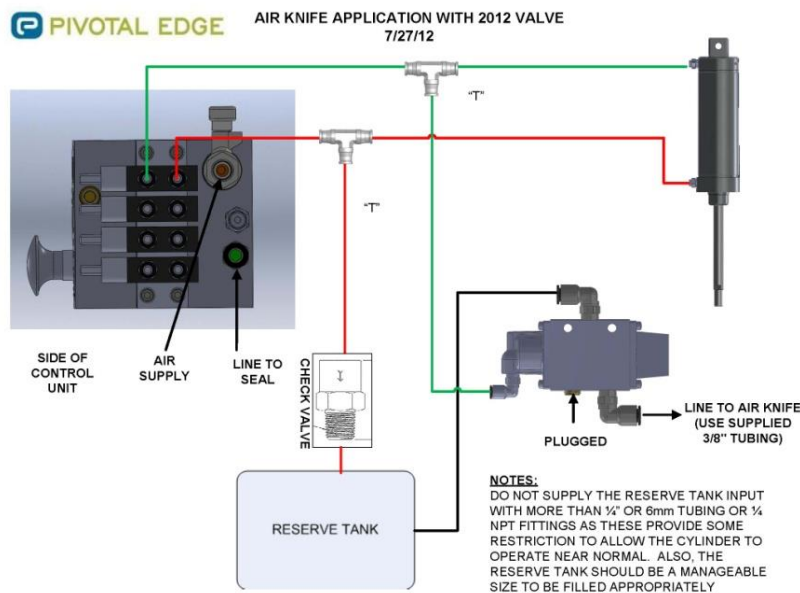
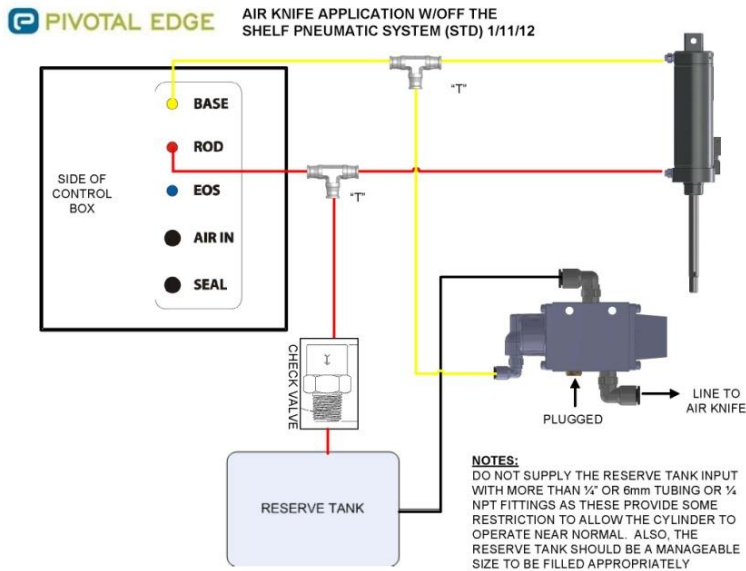
102419 SEAL, INFLATABLE

NOTE 1 Seal installation: The ring that the seal seats into needs to be clean. It is helpful to use an air powered needle scaler. Start by feeding the inflation tube through the hole, a small amount of soapy water on the tube and seal will help this process. Press the seal into the groove at four equal points around the seal. Work the seal into the groove using your fingers and thrust washer. Upon completion the seal should be flush or slightly recessed with the cover edge.

OPTIONS AND SUPPLIMENTS

Automatic air-knife Part NO 103885

The automatic air knife uses high pressure air from an independent air reservoir tank. The tank is charged when the cover is in the open position. It releases the trapped air while the cover is closing. The high pressure air is blown out around the inflatable seal to clean the area.



Manual air-knife

The manual air-knife uses high pressure air from the trailer reservoir tanks to blow clean the area around the inflatable seal. It is activated by a spring loaded push button. Part No. 103884

Multi cover operation

18" ring adaptor

24" ring adaptor

Hydrostatic Test Procedures

Tanker Operating Pressure	Required Seal Operating Pressure
2.0 Bar (29.0 PSI)	3.3 Bar or (48 PSI)
2.5 Bar (36.3 PSI)	3.7 Bar (54 PSI)
Hydrostatic Testing	
3.0 Bar	4.15 Bar (60 PSI)
3.5 Bar	4.8 Bar (70 PSI)

The seal will need to be inflated using a independent regulator. Factory setting of the seal is 50-PSI or (3.44 BAR) Bring the pressure up to stop any leaking. The maximum seal pressure is 4.8 bar or 70 psi.

FACTORY TESTING

SETUP AND PRESSURE TEST PROCEDURE

Covers are visually inspected for shipping damage.

Flange setup

The hinge pin bushing and slide are installed. The lower flange is bolted to the set stand following the cross torque pattern. The flange is mounted to the test stand and the mounting bolts are torque in 5lbs increments to a torque of 15ft/lbs.

Cover setup

The seal retainer is installed and the hinge pin bushing is installed. The cover slider is mounted. The inflatable seal is installed and condition of the seal groove and seal are checked. The cover is mated to the lower flange on the test stand and hinge pin is installed.

Operation Check

The cover is checked for smooth operation and clearance. Actuation is installed and connections are made to the control box. A minimum of 15 cycles are run. The cover is closed with the seal inflated to a pressure of 60psi. Pressure is applied to the test chamber to 51 psi and the supply line is shut off. A soap and water solution is sprayed between the cover and flange. Pressure loss and leaks are monitored for a period of 2 minutes.

The cover is disassembled and stamped with a serial number and put into inventory or prepared for shipping.

If you have any questions our website www.thepivotaledge.com will generally provide your answer.

Please call Jason at 701-391-2284

Roger at 701-400-1934

Jay at 701-220-2889