



MANUAL

ONE WAY ROLLING BLADE

GATE

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1 MANUAL OVERVIEW

1.1 MANUAL CONTENTS

This Section of the manual will familiarize you with the contents of the other manual sections. This manual is general in approach and may not include everything you want to know about the specifics of your particular application. Specific technical information can be found on the drawings which are a part of this manual.

If you have any questions, which cannot be answered by the written material provided, call **PEBCO®** (270) 442-1996 or FAX (270) 442-5214.

1.2 STORAGE RECOMMENDATIONS

Section 2 covers recommendations for proper storage. In some cases, scheduling requirements or construction delays result in the equipment being stored prior to installation. The guidelines suggested in this Section are to aid the installer in selection of proper storage conditions. Because of variability in site conditions/facilities, proper equipment storage/protection is the responsibility of the purchaser or his agent.

PEBCO® is not responsible for any equipment damage which results from inadequate storage/protection efforts.

1.3 GENERAL INSTALLATION

Section 3 covers installation and start-up procedures. Pay special attention to the **!!! WARNING !!!** in **Section 3.2**. Generally, gates which are other than manually operated will revert to a fail-safe position if power to the directional valve controlling the gate/valve is interrupted. Information is included on installation of manually, pneumatically or hydraulically operated gates. Carefully consider the information dealing with the installation of manual operators.

1.4 MAINTENANCE RECOMMENDATIONS

Section 4 covers recommendations for maintenance procedures. Information is presented on gate/valve lubrication, pneumatic system maintenance, gate/valve seal adjustment or replacement and pneumatic system troubleshooting. If the equipment you are installing is powered by a **PEBCO®** supplied Hydraulic Power Unit, see the detailed separate manual covering hydraulic system installation, operation and maintenance.

1.5 WARRANTY

Section 5 is **PEBCO®**'s Warranty to the purchaser of a One-Way Rolling Blade Gate.

2 STORAGE RECOMMENDATIONS

2.1 GENERAL REQUIREMENTS

If PEBCO® equipment is to be stored for a period of time longer than three weeks prior to installation, the following procedures are recommended:

- Equipment should be stored in enclosed areas. Indoor storage area should be clean and dry. Storage should be off of the floor, preferably on skids or pallets.
- Storage area should be free from rapid temperature changes. If necessary, an additional heat source should be used.
- Storage area should not subject equipment to vibration.
- All interior and exterior surfaces of the spout must be thoroughly coated with Cosmoline. Any unpainted surfaces, such as shafts, rollers, bearings, and pins should be given special attention to ensure a thorough covering of Cosmoline.
- Storage must be above any possible water or snow line.
- All bearings must be fully charged with grease.
- Periodic inspections should be made, checking the covering, any moisture present, cleanliness and general appearance to ensure the absence of corrosion and the integrity of the Cosmoline coating.
- If outdoor storage is necessary, the equipment should be fully covered with weather-proof material, vented so as not to trap moisture, but drip-proof so the water cannot enter or splash up into it.

2.2 ELECTRICAL EQUIPMENT

- All electrical device enclosures must be opened and coated with CRC Stor & Lube.
- All electrical connections (terminations) must be coated with CRC Stor & Lube.
- All electrical openings must be capped or plugged as necessary to be sealed to atmosphere.
- Electrical junction boxes included with the equipment should be opened and any exposed wire and terminations should be coated with CRC Stor & Lube. Open conduit connections should be plugged or capped to atmosphere and the enclosure door should be securely tightened to ensure sealing integrity.

2.3 ACTUATORS

2.3.1 Hydraulic and Pneumatic linear actuators

- Hydraulic and pneumatic cylinders must be filled with 10 wt. oil. Assurances must be taken to assure complete filling of the cylinders with oil. As an alternate, the hydraulic cylinders may be filled with the same fluid the hydraulic system will operate with.
- The hydraulic or pneumatic cylinder rod must be fully retracted within the cylinder body.
- The hydraulic or pneumatic cylinder must be removed and stored in a vertical orientation with the rod end up. All external surfaces of the cylinder, along with clevises and pins, must be thoroughly coated with Cosmoline.
- A relief valve shall be installed in the cylinder ports to allow for fluid expansion as the result of increases in ambient temperatures.
- Pneumatic Direction Valves should be filled with Parker F442002 lubricating fluid. After filling, a small amount should be drained out and the ports should be plugged. This includes removal of the mufflers and plugging to assure sealing from atmosphere.

2.3.2 Electric Actuators

- The actuator rod must be fully retracted within the actuator body.
- The electrical enclosure must be opened and coated with CRC Store and Lube.
- All conduit opening must be plugged or capped as required to seal to atmosphere.
- All external surfaces of the actuator shall be coated with Cosmoline. Special attention should be paid to assure coating of pins, clevises and any unpainted surfaces.

2.1 ADDITIONAL REQUIREMENTS

Prior to long-term storage, and start-up after storage, please refer to any and all applicable instructions published by individual component manufacturers.

3 GENERAL INSTALLATION

3.1 RECEIVING INSPECTION

Upon receipt of the equipment, a thorough inspection of the equipment should be made. The following points should be noted:

- Condition of the shipping crate/skid that would indicate rough handling or possible equipment damage
- Condition of the equipment itself; obvious dents, bent flanges, loose or broken accessories, oil leaks, etc. Dents in the housing can cause the blade(s) to bind or jam. Bent flanges will defeat the sealing capability of the gate.
- If the equipment is supplied with an actuating system (pneumatic, electrical, or hydraulic), inspect the hosing/tubing for punctures, uncapped or disconnected lines. Insure that all parts are included.
- Check packing list to see if any parts were shipped loose, and if they are packed with the equipment

REPORT ANY DAMAGE OR MISSING COMPONENTS TO THE DELIVERING CARRIER.

3.2 INSTALLATION WARNING

!!! WARNING !!!

It is important to remember that the installation of a pneumatically or hydraulically operated gate should be done with the air and/or fluid lines completely shut off to the directional valve operating the gate. Should the installation or inspection work during installation be carried out on an open gate, and an electrical power failure occurs, the gate blade will automatically go to its closed position.

It is imperative to remember that AUTOMATIC CLOSING will occur and that the directional valve(s) must be isolated. It is also important to remember that any air and/or fluid trapped between the directional valve(s) and the cylinder(s) should be released to atmosphere or returned to tank whichever the case may be.

IT IS RECOMMENDED THAT A MANUAL ISOLATION VALVE BE INSTALLED IN THE SUPPLY AIR OR HYDRAULIC LINE IMMEDIATELY BEFORE THE GATE, FOR MAINTENANCE PURPOSES.

3.3 GATE MOUNTING

PEBCO® Bulk Material Handling Gates are generally designed with flange type mounting at the inlet and outlet openings. This facilitates easy and simple installation on a wide range of material storage and transfer systems. The following steps will aid the installer in completing the installation.

1. Straighten any bends in the top and bottom flanges. Also, straighten the flanges on which the gate is to be mounted. Remove any old sealing material or materials that would prevent a flush contact between new and old flanges.

2. Check the alignment of the bolt holes to determine if the bolt holes will match correctly. Do not attempt to correct alignment by drilling through the gate flange as this will possibly weaken the flange and result in a poor seal.
3. Attach the gasket material or sealing compound. Use a sealant that is compatible with the particular system and material requirements.
4. Position the gate relative to the adjoining flanges. Depending on the size of the gate/valve and the position in which the gate/valve is to be installed, this may be done manually, or it may require that the gate/valve be hoisted mechanically. Practice safe lifting when installing the gate/valve, or removing the gate/valve for maintenance purposes. When rigging the gate/valve to be lifted mechanically, attach rigging to the lifting lugs provided on the gate/valve. Avoid lifting from any nonstructural components of the gate/valve. This includes, but is not limited to, hydraulic or pneumatic cylinders, and electrical components. Attempting to lift from nonstructural components may result in damage, injury, or death.
5. Install the mounting bolts. Use only a high grade hex head bolt with an equal grade of nut, flat and lock washer. A thread locking compound is suggested if vibration is present.

NOTE: Bevel washers are recommended on flanges in structural channels.

It is required that flanges mating to PEBCO® equipment are flat, true, and square. This will avoid induced distortion of the Gate/valve.

3.3.1 Manually Operated Gates and Valves

If the gate is equipped with a manual operator such as a lever, "T"-handle, ratchet handle, handwheel or chainwheel, the operator may have been shipped loose because of size or to reduce the possibility of shipping damage.

Proper field installation of the operating device is very important.

PEBCO®'s general attachment designs are discussed in the following paragraphs. It is possible that more than one retention method may be employed for a particular application. No attempt is made to describe attachment combinations.

See the relevant PEBCO® Mechanical Drawing for your particular job to determine specific operator installation requirements. If you have any questions regarding manual operator attachment, call PEBCO®'s Production Manager at (270) 442-1996 or fax (270) 442-5214.

Regardless of which operator attaching method is used, check for pinch points or interference between the manual operator and the gate frame or body or nearby structures. If an obvious problem exists do not operate the gate until it is corrected. During the very first cycling of the gate, carefully observe gate operation and watch for interference or other problems.

WELDED MANUAL OPERATORS

Welding the operator to the gate/valve operating shaft is a permanent and secure attaching method. The rod to use, type of weld to make, and weld location will be specified on the relevant drawing.

SET SCREW RETAINED MANUAL OPERATORS

In light duty applications, one or more set screws may be all that is required to transmit torque and secure the operator to the shaft. When screwed in, the set screw may rest on the “normal” shaft surface or occupy some type of “hole” (slot, groove, dimple, hole, etc.) in the gate operating shaft. If a “hole” is provided in the gate operating shaft, make sure the set screw and “hole” mate when the parts are assembled.

NOTE: Loctite 242 is to be applied to every threaded fastener used in operator installation. This applies to not only the set screws being discussed in this paragraph, but to any threaded fastener used in all operator installations. Follow all Loctite instructions regarding cleaning/priming and cure times.

KEYED MANUAL OPERATORS

A keyed attachment design uses a key-way in both the operator and the gate operating shaft. A key (rectangular block of metal) is usually squarely placed in the key-way on the operating shaft. The key-way in the operator is aligned with the key in the operating shaft and the operator is slid over the key. Generally two set screws are used with keyed operators. One set screw hole is in line with the key. The other set screw hole is usually 90° from the first. The set screws are turned in against the key/shaft and prevent the operator from sliding longitudinally on the gate operating shaft.

In addition to the set screws, when possible, a large fender washer is bolted to the end of the gate operating shaft. This washer prevents the operator from sliding off of the shaft should the set screws loosen (See **Figure 1**).

DO NOT FORGET THE LOCTITE 242 ON BOTH THE SET SCREW THREADS AND THE WASHER RETAINING BOLT THREADS.

THRU-BOLTED MANUAL OPERATORS

The thru-bolted design (**Figure 2**) is simple and effective at both transmitting torque and retaining the operator to the gate operating shaft. A hole is drilled thru both the operator and the gate operating shaft. The holes are aligned and a bolt

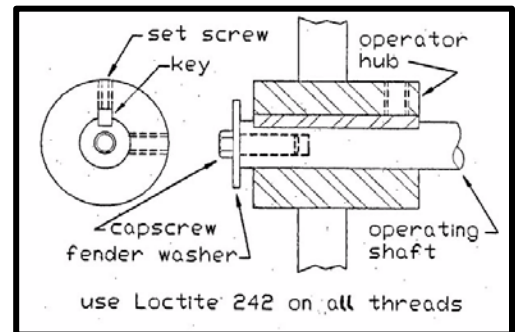


Figure 1: Keyed Manual Operator

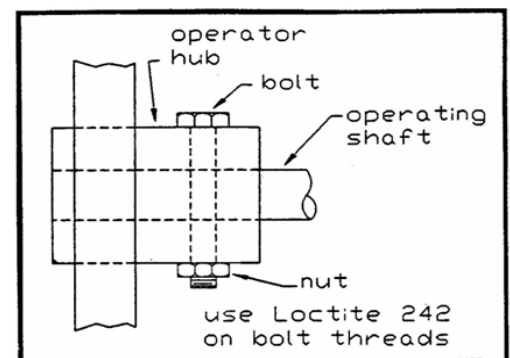


Figure 2: Thru-bolted Manual Operator

is inserted thru the opening. A nut on the end of the bolt prevents the bolt from sliding from the hole.

THRU-PINNED MANUAL OPERATORS

The thru-pinned design is like the thru-bolted design. A pin (generally a spring pin) is used instead of a bolt. An interference fit holds the pin in place.

TAPERED LOCKING BUSHING MANUAL OPERATORS

Another attachment design is a locking bushing. A hub attached to the operator contains an integral key and tapered bushing. This assembly is slipped onto the gate operating shaft. Depending on shaft size, two or more screws are turned into the hub. The screws wedge the bushing inward and securely lock it to the gate operating shaft.

BONDED MANUAL OPERATORS

The final design is bonding. The operator is permanently attached to the gate operating shaft with a high strength bonding compound. When this design is used, **PEBCO®** specifies LOCTITE 680.

3.3.2 Pneumatically Operated Gates and Valves

1. If the gate is equipped with pneumatic actuators, air pressure should be connected to the directional control valves. Most pneumatic actuation systems supplied by **PEBCO®** are piped at the factory and require only checking of the connections for tightness. Only one connection is required to the directional valve. An FRL Trio should be installed in the air pressure source line if air is not conditioned and contains moisture and contaminants. Air pressure should not exceed 100 psig.

NOTE: A manual isolation valve should be installed just before the FRL Trio.

2. If the gate is not supplied with directional valves mounted, the installer should mount the valves as close as possible to the gate.
3. Hook electrical power to the directional valves and limit switches.

NOTE: On totally enclosed slide gates, a conduit hole will have to be drilled in the housing to accommodate a flexible conduit entry to the limit switches. Insure that the conduit will not interfere with the blade movement.

4. When piping and electrical connections have been made, apply air pressure and electrical power.
5. On directional control valves provided by **PEBCO®**, muffler speed controls are installed on the exhaust port(s) of the valve. Refer to Maintenance **Section 4.12**.
6. Cylinder cushions are adjusted at the factory, but a check should be made before operation. Refer to Maintenance **Section 4.7**.

7. During final checkout of the system, the muffler speed control(s) should be adjusted. To adjust the muffler speed control, loosen the retainer nut on the adjustment screw. Turn the adjustment screw all the way in until it seats and then back it out approximately 3 turns. Select either open or closed. When the cylinder starts to operate, adjust the adjustment screw until the desired speed is obtained. Tighten the retainer nut. On some systems, this procedure may have to be repeated for both the open and closed function.
8. Standard air cylinder cycling calls for either full open or full closed operation. This, normally, is accomplished through the use of a 4-way, 2-position, single solenoid directional control valve. One coil controls the spool inside the control valve body and, therefore, the direction of air flow. When the coil is momentarily energized, air flow is diverted to the rod end cylinder port, causing the cylinder rod to retract. When the coil is de-energized, air flow is diverted to the cap end cylinder port, causing the cylinder rod to extend and air in the opposing port is exhausted to atmosphere.
9. It is always best to operate a gate on the lowest possible air pressure while still maintaining proper sealing, sufficient gate speed, etc. The exact pressure can best be established as a result of preliminary trial operation under normal operational conditions. Gates that are equipped with double acting air cylinders should be operated on 80 to 100 psi of lubricated and filtered air. Every application is different and generally requires its optimal regulated air pressure. The time spent determining the minimum operational pressure will pay off in maximum gate service life.

3.3.3 Hydraulically Operated Gates and Valves

1. If the gate/valve is equipped with hydraulic actuators, these will normally be shipped without connection to the solenoid valve.
2. If **PEBCO®** has supplied a hydraulic power unit with this order; refer to the installation and start-up procedure described in the hydraulic system manual.
3. If an existing power unit is to be utilized, make the hydraulic connection from the solenoid valve to the hydraulic actuator on the gate/valve.
4. If the gate is not supplied with directional valve mounted, the installer should mount the valves as close as possible to the gate/valve.

3.3.4 Electrically Operated Gates and Valves

1. If the gate is equipped with an electric drive (rotary or linear), refer to the manufacturers data in the associated cut sheet.
2. If the actuator is shipped mounted to the gate, the internal limit switches have been preset. HOWEVER, as a precaution, these should be checked prior to applying power to the electric actuator. Refer to manufacturers' procedure in the associated cut sheet.

4 MAINTENANCE RECOMMENDATIONS

4.1 MAINTENANCE PROGRAM IMPORTANCE

An inspection and maintenance program should be established to ensure the successful operation of the equipment during its working life.

One of the most important aspects of any maintenance program lies in establishing a good set of operating records. Daily log sheets should be set up to record all important operating parameters of the equipment. Inspection at predetermined intervals is essential. The frequency of inspections may vary with operating conditions and the environment of operation. Complete records will also indicate spare parts used and on-hand, and the historical details of any maintenance or overhaul which takes place.

The purpose of a good maintenance program is to achieve maximum operating performance while holding down maintenance costs.

4.2 WEAR PARTS

Parts exposed to high frictional forces, whether due to the sliding of two parts against each other, or due to exposure to the product flow, are expected to wear and may need to be replaced. **PEBCO®** does not consider the wearing of Seals, Retainers, Liners, or Blades due to friction to be a defect as covered under the product warranty, and replacement of said parts is considered to be the responsibility of the purchaser.

4.3 MAINTENANCE SCHEDULE

Scheduled inspection of equipment and active preventive maintenance are essential for optimum performance and long equipment life. This section lists suggested schedules for maintenance. However, actual service conditions and environment greatly affect equipment reliability and such schedules should be adjusted as necessary to suit the specific requirements of the installation

4.3.1 Suggested Maintenance Schedule

	Weekly	Monthly	Quarterly	Yearly
All Systems		Check for Dust Leakage <input type="checkbox"/>		Check for Frayed/ Exposed Wiring <input type="checkbox"/>
		Lubricate Flange Bearings <input type="checkbox"/>		Inspect Mounting Bolts <input type="checkbox"/>
Pneumatic Systems	Check System Pressure <input type="checkbox"/>	Clean/Replace FRL Trio Filter <input type="checkbox"/>	Check/Clean Muffler <input type="checkbox"/>	Check Air Circuitry for Leakage <input type="checkbox"/>
	Drain Air Receiver (Manual Units Only) <input type="checkbox"/>	Check Drain (Automatic Units Only) <input type="checkbox"/>		
	Check Lubricator <input type="checkbox"/>	Check Cylinder Clevis Pins <input type="checkbox"/>		
Hydraulic Systems	Check System Pressure <input type="checkbox"/>	Check Cylinder Clevis Pins <input type="checkbox"/>	Tool Check for Loose Hardware <input type="checkbox"/>	
	Visually Check for Loose Hardware <input type="checkbox"/>			

4.3.2 Spare Part Installation Log

Date	Part	Qty.	Comments

4.4 SAFETY PRECAUTIONS

Basic common sense and extraordinary safety precautions should be followed at all times.

!!! WARNING !!!

It is important to remember that the installation of a pneumatically or hydraulically operated gate should be done with the air and/or fluid lines completely shut off to the directional valve operating the gate. Should the installation or inspection work during installation be carried out on an open gate, and an electrical power failure occurs, the gate blade will automatically go to its closed position.

It is imperative to remember that AUTOMATIC CLOSING will occur and that the directional valve(s) must be isolated. It is also important to remember that any air and/or fluid trapped between the directional valve(s) and the cylinder(s) should be released to atmosphere or returned to tank whichever the case may be.

IT IS RECOMMENDED THAT A MANUAL ISOLATION VALVE BE INSTALLED IN THE SUPPLY AIR OR HYDRAULIC LINE IMMEDIATELY BEFORE THE GATE, FOR MAINTENANCE PURPOSES.

4.5 LUBRICATION

General recommendation is for lubrication every 100 hours of operation using NLGI #2 Lithium based grease

4.5.1 Flange Bearings

The lubrication of flange bearings is necessary only if the bearing has a grease fitting installed. Most bearings utilized are bushing type of a bronze material, and require only light oiling. Upon installation of the gate/valve, lubrication is not necessary. All lubrication points are lubricated at the factory.

4.5.2 Gear Boxes

Refer to manufacturer's recommendations listed on specific component data sheet(s) for gear boxes (reducers, etc.).

4.5.3 Rod End Bearings

If the rod end has zerk grease it should be serviced at this time.

4.6 FRL TRIO INSPECTION/MAINTENANCE

1. Air pressure to the pneumatic circuit, 80 to 100 psi should be the normal operating range. Adjust the pressure regulator if necessary.
2. Clean or replace the filter element every month, or when abnormal contaminant buildup is evident. Refer to the manufacturer's data in the associated cut sheet for filter removal.
3. Check the lubricator daily to insure that lubrication is always present to the pneumatic parts.

4. Drain the air receiver of water daily. If automatic drain is used, disregard this step.
5. Check air circuitry for leakage annually.
6. Filter, regulator and lubricator (FRL Trio) maintenance is as follows: The filter assembly will have either an automatic or manual drain. If the filter is equipped with an automatic drain, the filter will automatically purge itself of fluids and contaminants on a periodic basis. This drain should be checked periodically because the automatic drains do fail occasionally. If the filter is equipped with a manual drain, the drain should be purged on a regular basis. The filter also requires changing or cleaning of the filter element. The type of filter media varies from one manufacturer to another; most are of the serviceable type and require only cleaning and oiling. If the filter becomes clogged, there will be a pressure reduction to the air circuit and will result in slower gate movement.

The regulator assembly requires no maintenance other than periodic checks of the system pressure. Air pressure should range from 80 to 100 psig.

The lubricator is used to inject lubricating oil into the air line. The injection of lubrication occurs only during the time when air is drawn into the cylinders. This lubrication is used to insure free operation of directional valves and cylinders. This assembly should be checked frequently in heavy use to insure that lubrication is present at all times to the air circuit. Removal of the lubricator bowl is usually necessary to refill the assembly. It is suggested that for cold weather operation (below freezing), the additive KILL-FROST be used in the lubricator in place of the regular lubrication petroleum based fluid. This particular product will prevent freeze-ups of the valve and cylinder as well as providing the necessary lubrication to the components.

KILL-FROST can be used year round; however, the expense is usually prohibitive.

4.7 CYLINDER CUSHION ADJUSTMENT

Most hydraulic and some pneumatic cylinders supplied with **PEBCO®** gates have cushions in each cylinder head. The cushion adjustment is by means of an Allen head set screw. Turning this set screw in increases the cushion effect at the end of travel of the cylinder. Turning this set screw out reduces the cushion effect. The optimum setting is made at the factory by adjusting the set screw to be flush with the face of the cylinder head, and this setting should not have to be adjusted except in cases of disassembly for maintenance.

4.8 CYLINDER REPLACEMENT

Remove all supply lines and isolate prior to cylinder replacement

4.9 SEAL REPLACEMENT

Replacement of dust seals should be performed when signs of abnormal leakage and dust concentrations are evident. In some cases, replacement seals are furnished from the factory as blank sections of seal material slightly larger than the item they are to replace. This is necessary so that field fit up can be made to provide the optimum seal arrangement. In most cases, however, replacement seals are provided precut and ready for installation.

!!! WARNING !!!

The appropriate Lock-Out Tag-Out procedure should be followed before performing any maintenance on the unit to ensure that the gate is isolated from all electrical, hydraulic, and pneumatic systems. Likewise, all necessary steps should be taken to prevent any material from entering the gate during maintenance or inspection.

4.9.1 Shaft Seal Replacement

1. Depending on the location of the gate, it may or may not be necessary to remove the gate from its operating position. If removal is necessary, refer to **Section 3.3** for mounting procedures.
2. To remove the seal on the lever arm side of the gate, the lever arm must be removed. Disconnect the arm from the actuator, loosen the set screws on the arm, and slide the arm from the shaft.
3. Remove the bearing and seal.
4. Replace the seal and reinstall the bearing.
5. Reinstall the lever arm, and reapply Loctite 262 (567 for stainless steel applications) to the set screws.

4.9.2 Packing (Adjustment and Replacement)

Models that use packing to seal the shaft can be adjusted when signs of dust leakage become evident. To adjust the packing, tighten the bolts on the pusher plate evenly until the dusting problem has stopped or the volumetric compression reaches 30%. Adjustment past this point may result in binding and could indicate system or equipment problems which should be further investigated.

To replace packing, loosen the bolts on the pusher plate until the plate slides freely on the shaft (see **Figure 3**). Remove the existing packing, paying particular attention to any that may have been extruded past the packing gland and into the gate cavity. Remove any product build-up, and install individual wraps of replacement packing, available from **PEBCO®**, compatible with the process application. In most circumstances, three layers of packing is correct. In most cases, the packing will not go in the gland straight off the roll; it will need slightly flattened on one side by a dead blow hammer. For ease of installation, lay packing on a flat surface, and use a rubber hammer to slightly flatten the packing in one direction. - This will allow the packing to be pushed in the gland by hand. Slide the pusher plate back into place, and tighten the bolts evenly until snug.

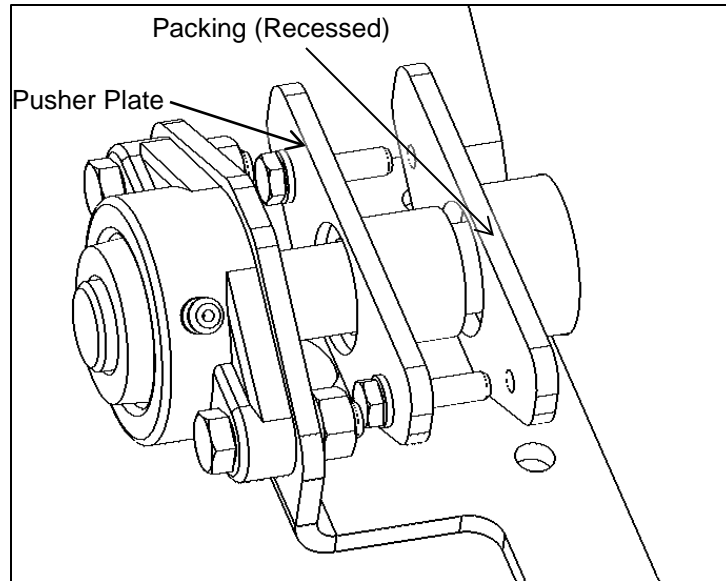


Figure 3: Packing Gland Access

4.9.3 Blade Seal Replacement

1. Remove the gate from its operational position, and place it in an area that allows easy access to the seals. (For mounting procedures, see **Section 3.3.**)
2. Disconnect the actuator from the lever arm to allow for manual movement of the blade.
3. Remove the seal retainers and old seal material. (See **Figure 4-Figure 6**)

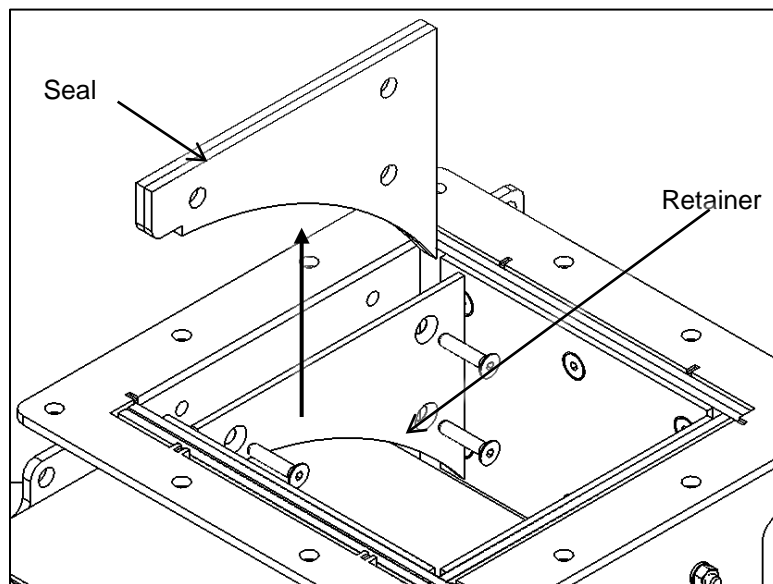


Figure 4: Side Retainer and Seal Removal. NOTE: Depending on the application, systems may use either a Single Seal or a Double Seal (Pictured). Retainer removal and seal replacement procedures are the same for each case.

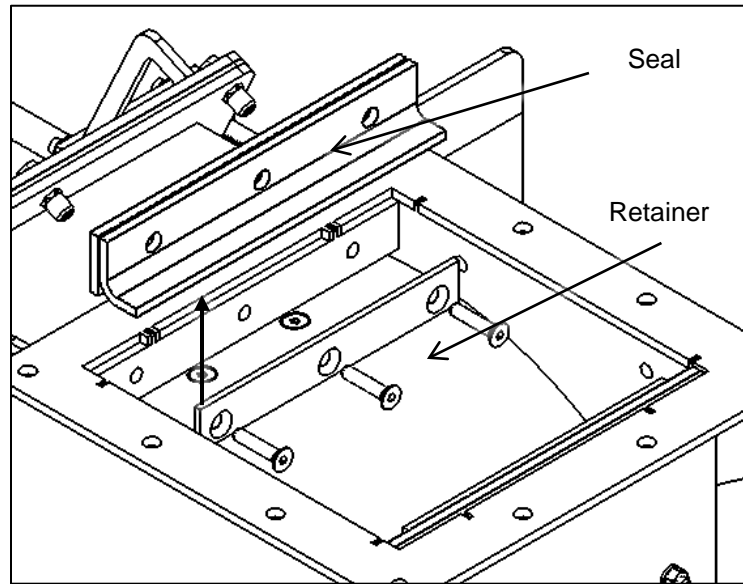


Figure 5: Wiper Retainer Seal Removal

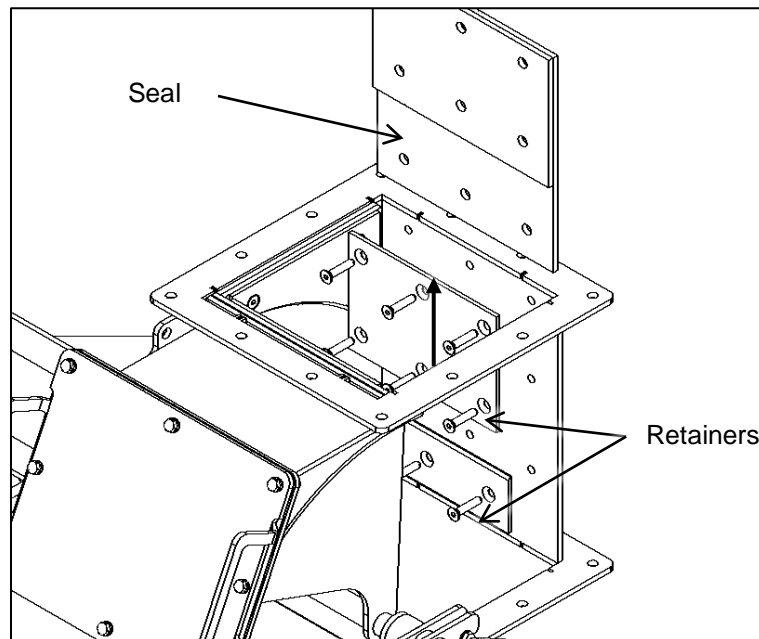


Figure 6: Front Retainer and Seal Removal.

4. Once the old seals have been removed, install the Front Seal, followed by the Wiper Seal, and finally, the Side Seals. Ensure that the Side Seals make full contact with the blade in its closed position.
5. Reconnect the actuator, applying Loctite 262 (567 for stainless steel applications) to all threaded fasteners.
6. The gate should now be cycled to observe new seal engagement.

!!! WARNING !!!

Beware of pinch point/amputation hazard in the blade area; remove all energy sources before attempting seal adjustment.

- a. Securely clamp the outlet flange.
 - b. Adjust mufflers on the directional valve to control minimal blade speed (See **Section 4.12**). Stand clear for the initial activation until blade speed is safely adjusted.
 - c. Adjust seal positioning as necessary to ensure full and firm contact. Remember to fully isolate the gate from all hydraulic, pneumatic, and electrical systems before performing any maintenance in the blade area.
 - d. Once seal adjustment is sufficient, reapply Loctite 243 (567 for stainless steel applications) to all threaded fasteners.
 - e. Readjust muffler speed control to its original setting.
7. Remount the unit. (Refer to **Section 3.3** for mounting procedures.)

4.10 BLADE REPLACEMENT

1. Upon receipt of the new blade be sure to review the receiving inspection covered in **Section 3.1**.
2. Remove the gate from service to allow access to all sides. (Refer to **Section 3.3** for mounting procedures.)
3. Remove the inspection panel. (This will allow easier access to the blade.)
4. Disconnect the actuator from the lever arm to allow for manual movement of the blade (This step is not required for manually operated gates.) and move the blade to a mid-stroke position.
5. Remove the blade (**Figure 7**) by removing the bolts that secure the curved blade to the blade arms. The bolts nearest the inspection panel must be removed from the retract area of the gate. The bolts nearest the forward wall of the gate must be removed from the product area.

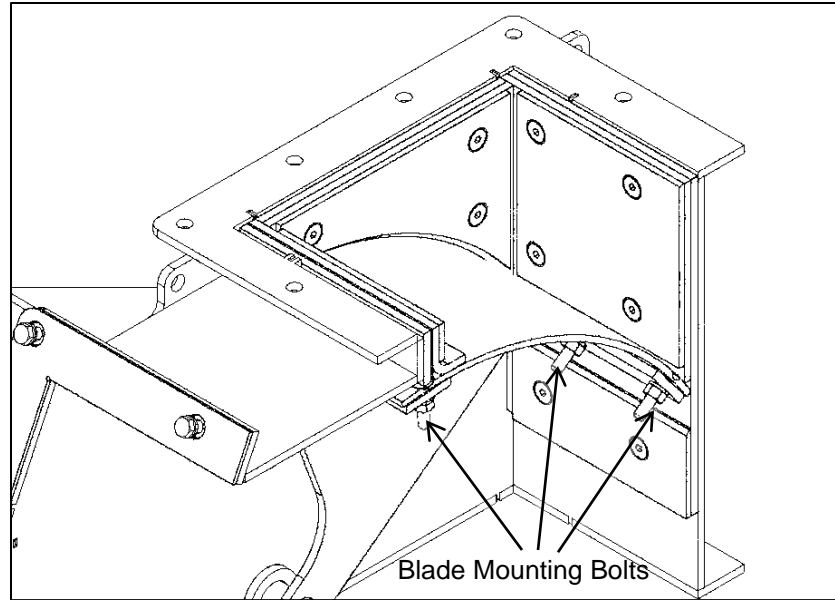


Figure 7: Blade Removal

6. Install the new blade, applying Loctite 262 (567 for stainless steel applications) to all threaded fasteners.
7. The gate should now be cycled to observe new seal engagement.

!!! WARNING !!!

Beware of pinch point/amputation hazard in the blade area; remove all energy sources before attempting seal adjustment.

- a. Securely clamp the outlet flange.
 - b. Adjust mufflers on the directional valve to control minimal blade speed (See **Section 4.12**). Stand clear for the initial activation until blade speed is safely adjusted.
 - c. Adjust seal positioning as necessary to ensure full and firm contact. Remember to fully isolate the gate from all hydraulic, pneumatic, and electrical systems before performing any maintenance in the blade area.
 - d. Once seal adjustment is sufficient, reapply Loctite 243 (567 for stainless steel applications) to all threaded fasteners.
 - e. Readjust muffler speed control to its original setting.
8. Reconnect the actuator, applying Loctite 262 (567 for stainless steel applications) to all threaded fasteners.
 9. Mount the unit in its operating position. (Refer to **Section 3.3** for mounting procedures.)

4.11 MOUNTING BOLT INSPECTION

Check gate/valve mounting bolts. Replace and/or tighten any loose or missing bolts. Use the same quality of bolts used in installation. This should be done annually.

4.12 MUFFLER SPEED CONTROLS

Check and adjust muffler speed control when the cylinder operates slowly or if the muffler shows excessive contamination. Maintenance of the muffler speed control should only be necessary when the muffler becomes restricted. This will be evident due to a slowing of the gate speed.

As a preventive measure, the speed control should be checked every three months and cleaned if necessary.

Cleaning can be done with a bath of cleaning solvent. Submerge the muffler in the solvent. After the muffler has soaked for a few minutes, remove it from the solution and blow off the solvent and any residual contaminants.

To adjust the muffler speed control, loosen the retainer nut on the adjustment screw (**Figure 8**). Turn the adjustment screw all the way in until it seats and then back it out approximately 3 turns. Select either open or closed. When the cylinder starts to operate, adjust the adjustment screw until the desired speed is obtained. Tighten the retainer nut. On some systems, this procedure may have to be repeated for both the open and closed function.

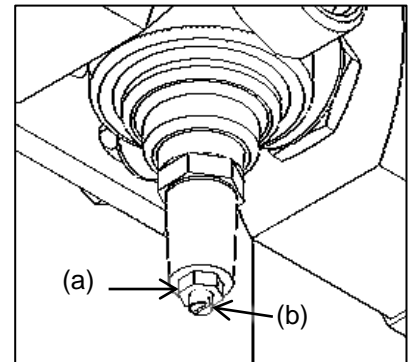


Figure 8: Muffler Retainer Nut (a) and Adjustment Screw (b).

4.13 TROUBLESHOOTING PNEUMATIC ACTUATORS

Pneumatic cylinder operates slowly

- Check air supply pressure-should be 80 to 100 psi
- Muffler speed control restricted, or dirty
- Excessive cylinder leakage
- Tubing to cylinder
- Cushions improperly adjusted

Pneumatic cylinder will not operate

- Air pressure turned off
- Solenoid coil open
- Muffler speed control restricted
- Directional valve spool seized in valve body
- No electrical power to the directional valve coil circuit
- Gross air leakage

Pneumatic cylinder drifts

- Internal cylinder leakage
- Directional valve spool worn
- Loose connection to cylinder ports

Water comes from directional valve exhaust port

- Air source too wet, dew point too low
- Auto drain not functioning
- Drain filter regulator
- Replace air dryer desiccant

Directional valve will not operate when coil is energized

- Coil open
- Valve spool seized
- Internal valve leakage

4.14 HYDRAULIC SYSTEMS

Refer to manufacturer's data sheets on items furnished on this order.

If Hydraulic Power Unit is supplied on this order by **PEBCO®**, refer to the Hydraulic System Manual for detailed operation.

5 WARRANTY

WARRANTY: PEBCO® ONE-WAY ROLLING BLADE GATE

WARRANTY

PEBCO® warrants to purchaser, upon the terms set forth, that the equipment purchased, so far as the same is of PEBCO®'s manufacture, is free from defects in material and workmanship under normal use and service for a period of twelve (12) months from the date of shipment. All equipment, including motors, manufactured by others, is warranted solely and exclusively by their manufacturers and not by PEBCO®, and PEBCO® hereby assigns to purchaser without recourse to PEBCO® such warranty as is given by the manufacturer.

TERMS

PEBCO®'s obligation under this warranty is limited to and shall be fully discharged by PEBCO® repairing or at its option replacing f.o.b. point of manufacturer any part which is shown to PEBCO®'s satisfaction to have been defective as to material or workmanship, provided that written notice of defect is delivered to PEBCO®'s office in Paducah, Kentucky, within sixty (60) days after defect is discovered, and in no event more than twelve (12) months and sixty (60) days after shipment.

PURCHASER'S ACTS VOIDING WARRANTY

The warranty furnished by PEBCO® herein will be rendered void by improper erection or installation, if executed by other than PEBCO®, misuse, unauthorized alteration, substitutions, repairs or modifications, neglect or accident, or damage to the equipment caused by improper storage, abrasion, corrosion, and/or operation outside the rated load limitations for use of the equipment. PEBCO® shall not be liable for any repairs, replacements or adjustments to the equipment or any cost of labor performed by the purchaser or others without PEBCO®'s prior written approval.

EXCLUSION OF ALL OTHER WARRANTIES AND LIMITATION OF CONSEQUENTIAL AND INCIDENTAL DAMAGES.

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