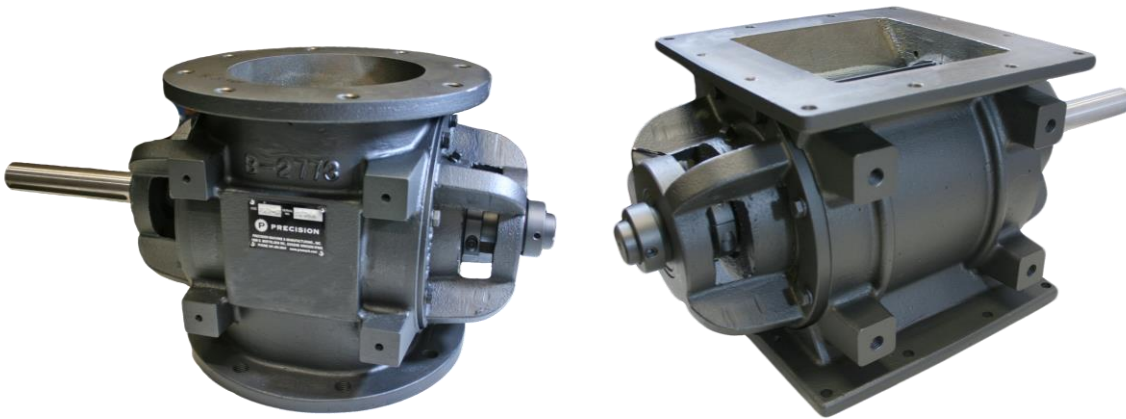


PMX Rotary Valve

Service & Maintenance Manual



Size: _____

S/N: _____

Temperature: _____

Congratulations!

You have purchased the most rugged and durable rotary valve on the market, and you should experience long, reliable service from the Precision PMX rotary valve.

We stand ready to answer any questions and assist you as necessary to help you get the optimum performance from your PMX rotary valve. Please contact our office in Eugene, Oregon USA at (541) 484-9841.

Please carefully review all of the material in this Service & Maintenance Manual. It contains important information about the start-up and run-in of the PMX, descriptions of simple maintenance procedures, and information on ordering replacement parts.

By fully understanding how your valve is constructed, assembled, and operated, you will be able to properly install and maintain it for long and trouble-free service.

If there is anything further that we can do to assist you, please contact us. Your feedback is important to us.

Thanks for your business!

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Safety

Safety is a primary concern at Precision Machine and Mfg., and we encourage our customers to make it their top priority also.

State and local rules vary from location to location, and it is the user's responsibility to follow those standards. These procedures are a must for the safe operation and maintenance of the Precision PMX rotary valve:

- A. Personal Protection Equipment must be worn while working on the valve.*
- B. All guards and safety devices must be in place while the valve is in operation.*
- C. If maintenance is performed with the valve in place, all appropriate lockout and tag-out devices must be in place to prevent power to the valve.*
- D. Normal operation of the valve may create burrs and sharp edges. Caution must be taken when handling the valve and its components.*
- E. The valve and many of the components are very heavy. Sufficient manpower and/or hoists must be used when they are moved.*

The safety decals, shields, and other protective features designed into the PMX rotary valve and furnished with it or recommended for it are there for your protection.

The operation and maintenance of the PMX should be restricted to only those personnel trained in its use.

The various precautions and recommendations detailed in this Manual are not necessarily all inclusive. This manual is designed to provide general safety and operational guidance relating to typical installations with which we are familiar.

If you have any safety or operational questions pertaining to the design, operation, or application of your PMX rotary valve, we encourage you to contact Precision for assistance.

Warnings

1. Lockouts required for this equipment should be installed prior to initial start-up and operation.

→ *These lockouts are **not** the responsibility of Precision Machine & Manufacturing, Inc.*

2. Rotary valves can cause severe physical injury if proper safety procedures are not observed during the course of operation, maintenance, inspection, or clearing of an equipment jam.

→ *The drive motor must be locked out before inspection or service of this equipment.*

3. Welding or burning on any part of the rotary valve is not recommended. Any distortion of the valve caused by welding or burning could cause the rotor to seize in the housing.
4. Power and control wiring should be installed by a licensed and experienced electrician to assure safe and productive operation of the PMX rotary valve.

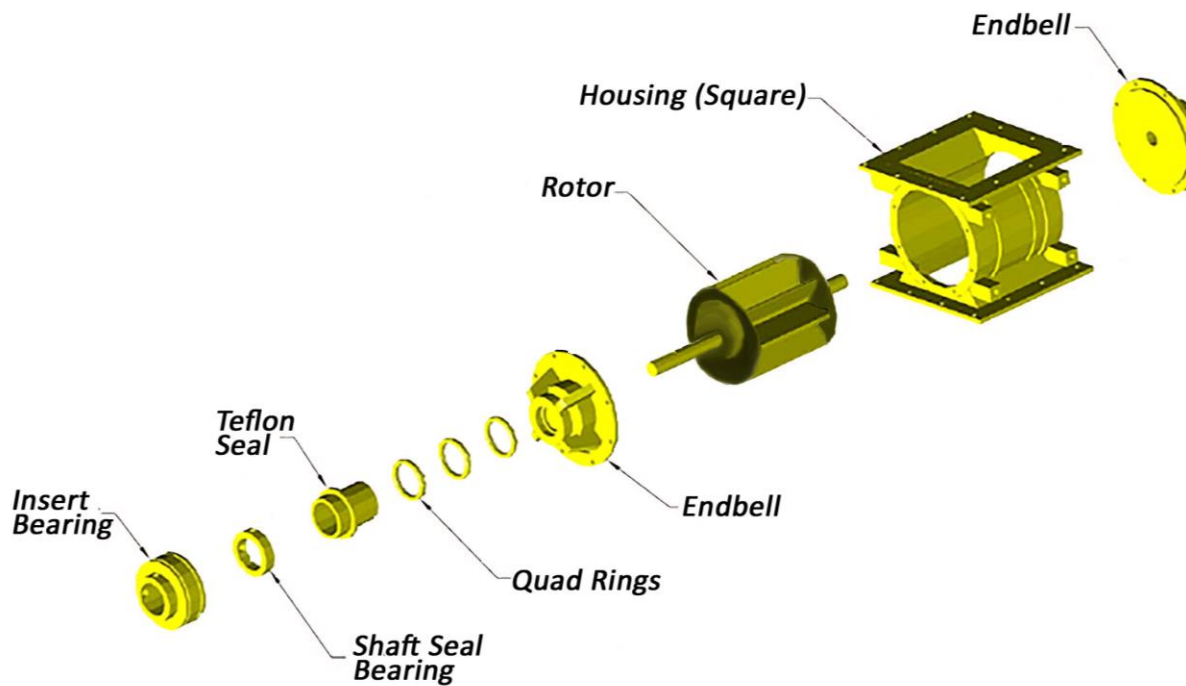
Introduction

The Precision PMX rotary valve is designed for a long service life, and ease of operation with low maintenance. Familiarization with the valve and its function is a must along with a routine maintenance plan. A rigorous maintenance schedule will optimize the efficiency and life of the valve.

The system operator should fully understand the function of the PMX rotary valve to know its proper operation. The unit serves primarily as a feeder, to feed a bulk product into process equipment or conveying equipment, or as an Rotary Valve to segregate differential pressures above and below the rotary valve.

It is advisable for operators and service technicians to become familiar with the Precision PMX before operation. The PMX design is meant to be simple to operate and repair if required.

Precision's terminology for the various PMX components is as follows:



- A. The PMX is offered in two standard configurations, **square** and **round**.
- B. The **endbells** are made of cast iron.
- C. The **housing** is cast iron with an industrial chrome overlay.
- D. A closed-end, 8-vane, mild steel **rotor** as shown above is Precision's standard.
- E. Precision PMX **rotors** are designed for the installation of a Radicon C0621/Baldor drive package.

Precision's sizing system for the PMX's refers to the inlet and discharge openings. Other rotary valve manufacturers commonly refer to some other dimension in their terminology. Care should be exercised in sizing and specifying rotary valves to assure that like capacities are being described.

Dimensions and capacities of the PMX rotary valves are as follows:

	CFR	Shaft Diameter	Height	Width or Outer Dia.	Inlet Opening	Approx. Weight
PMX-8S	0.20	1-1/2"	10.50"	12.00"	8.0" x 8.0"	188
PMX-8R	0.20	1-1/2"	12.50"	13.50"	8.0" Diameter	230
PMX-10S	0.40	1-1/2"	12.75"	15.25"	10.0" x 10.0"	264
PMX-10R	0.40	1-1/2"	15.00"	16.00"	10.0" Diameter	306
PMX-12S	0.75	1-1/2"	15.50"	17.25"	12.0" x 12.0"	404
PMX-12R	0.75	1-1/2"	18.375"	19.00"	12.0" Diameter	514

Installation and Startup

NOTE: BEFORE ANY INSPECTION OR MAINTENANCE, YOU MUST FOLLOW STANDARD ‘LOCK-OUT/TAG-OUT’ PROCEDURES FOR ALL POWER SOURCES AS DEFINED BY OSHA. SEE WARNINGS

Check clearance between rotor tips and valve housing. Clearance should not be greater than that specified on the invoice.

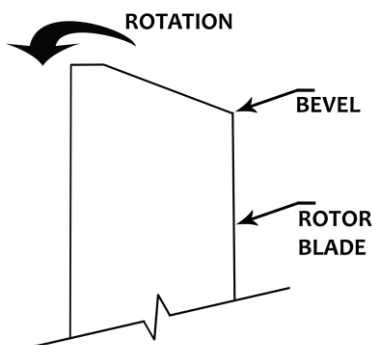
Numerous types of bulk materials feeding devices can be connected to the inlet opening of a rotary valve. Bins, hoppers, mixers, sifters, screw conveyors, etc. all can be adapted for attachment to the rotary valve. In all cases, except sifters, rigidly attach the feeding device to the rotary valve flange, using silicone caulk to obtain an air-tight connection. Be sure all seams in the feeding device are air-tight.

If the Rotary Valve package is to be hung from a hopper, storage tank, etc. it may be necessary for some type of structural steel support. However, in most cases, the hopper or tank flange will have sufficient strength to support the weight of the Rotary Valve package.

Normally, it is not a good practice to use the Rotary Valve to support equipment loads either in compression on the top flange or in tension from the bottom flange. Excessive loads will cause the housing to distort, which will result in the loss of precise clearances. Loss of clearance between the rotor and housing can result in excessive noise, binding and galling.

Flanges of components, which attach to the Rotary Valve must be flat and “square” with the Rotary Valve flanges. The machines flanges of cast Rotary Valve housing must not be forced or conform to warped or twisted fabricated flanges. This practice can result in broken Rotary Valve housing or loss of clearance as noted above.

- A. Rotation** – PMX’s equipped with beveled rotor vanes must turn with beveled vane edge as the trailing edge; Precision installs a directional sticker on the PMX to indicate the direction. The PMX should be installed and wired per this directional instruction.



For PMX's without beveled rotor vanes, the valve may be rotated in either direction.

- B. Clearances** – The clearance between the rotor and the barrel sides is set at Precision's factory and no field adjustment is possible.

Shipping and/or installation may cause the rotor to shift side-to-side. A rubbing noise or binding of the rotor may be an indication that the rotor has shifted and is contacting one of the endbells. The clearance can be adjusted in the field by loosening the set screws on the bearing collars and repositioning the rotor to center it in the inlet opening and then re-tightening the set screws in their proper position.

Rotor-to-Barrel Clearances		
Model & Size	<u>Standard Temperature Application</u>	<u>High Temperature Application</u>
8 x 8 10 x 10 12 x 12	.004" - .007"	.007"-.010"

- C. Lubrication** – Each PMX ships from Precision's factory pre-lubricated.
- D. Wiring** – Power and control wiring of the PMX rotary valve should be completed by a qualified electrician with careful attention paid to the rotation direction if the PMX is equipped with a beveled rotor.
- E. Air Purge Kit** – See Appendix #1 on page 18 for more details on the Air Purge Kit.
- F. Temperature** – When an order is placed with Precision for a PMX rotary valve, the customer must specify a temperature for the material that will be passing through the valve. Most commonly, this is "ambient" meaning that material will be at roughly the same temperature as the valve's surroundings. However, if the material is to arrive at the valve in an elevated temperature then that should be noted at the time the order is placed.

Precision will machine the rotor to a known diameter for a specified material temperature as part of the manufacturing process. This is to allow for thermal expansion in operation so that the rotor does not contact the barrel sides.

If the temperature was not correctly specified, it is possible that a rotor-to-barrel side contact can take place and this will often show up within the first few hours of operation. The most common symptom will be a regular scraping or ticking sound as the rotor turns. In more serious cases where the temperature is considerably different, it can result in the valve locking up.

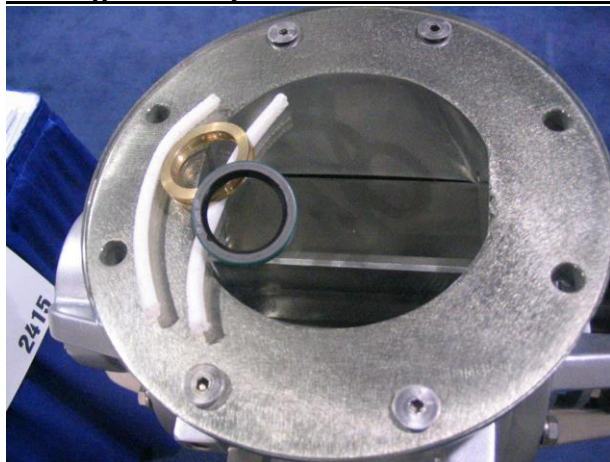
G. Shaft Packing & Seal Run-In – T4 Glandless Teflon® Shaft Seal

T4 Shaft Seal



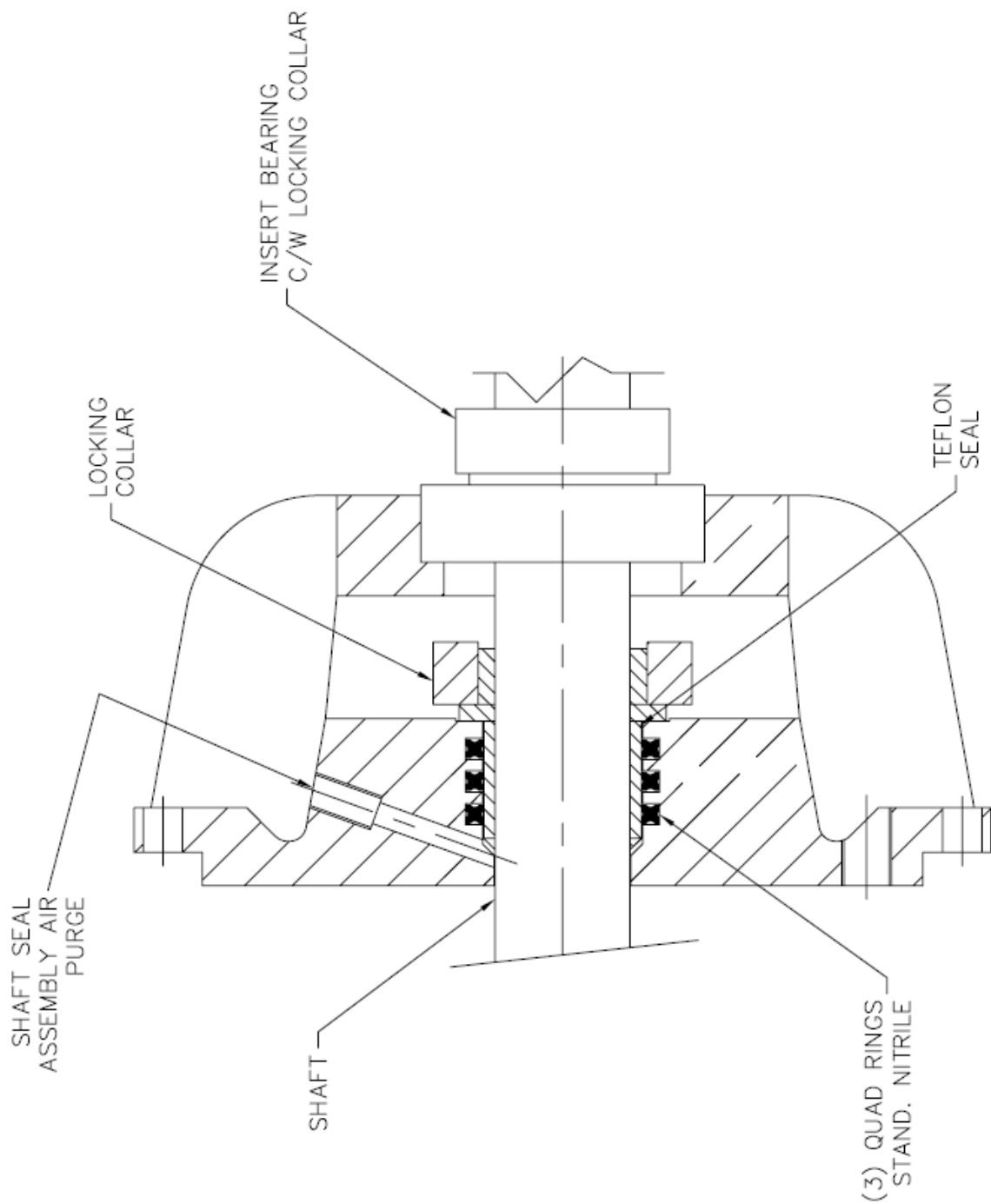
1. T4 shaft seals are used on both ends of the rotor shaft for superior sealing
2. Each shaft seal assembly consists of one virgin Teflon sleeve and three quad rings, which fit snugly over the Teflon sleeve
3. The Teflon sleeve has a smooth self-lubricated surface creating a tight seal with the quad rings

Packing Gland Style Shaft Seal with Lantern Ring

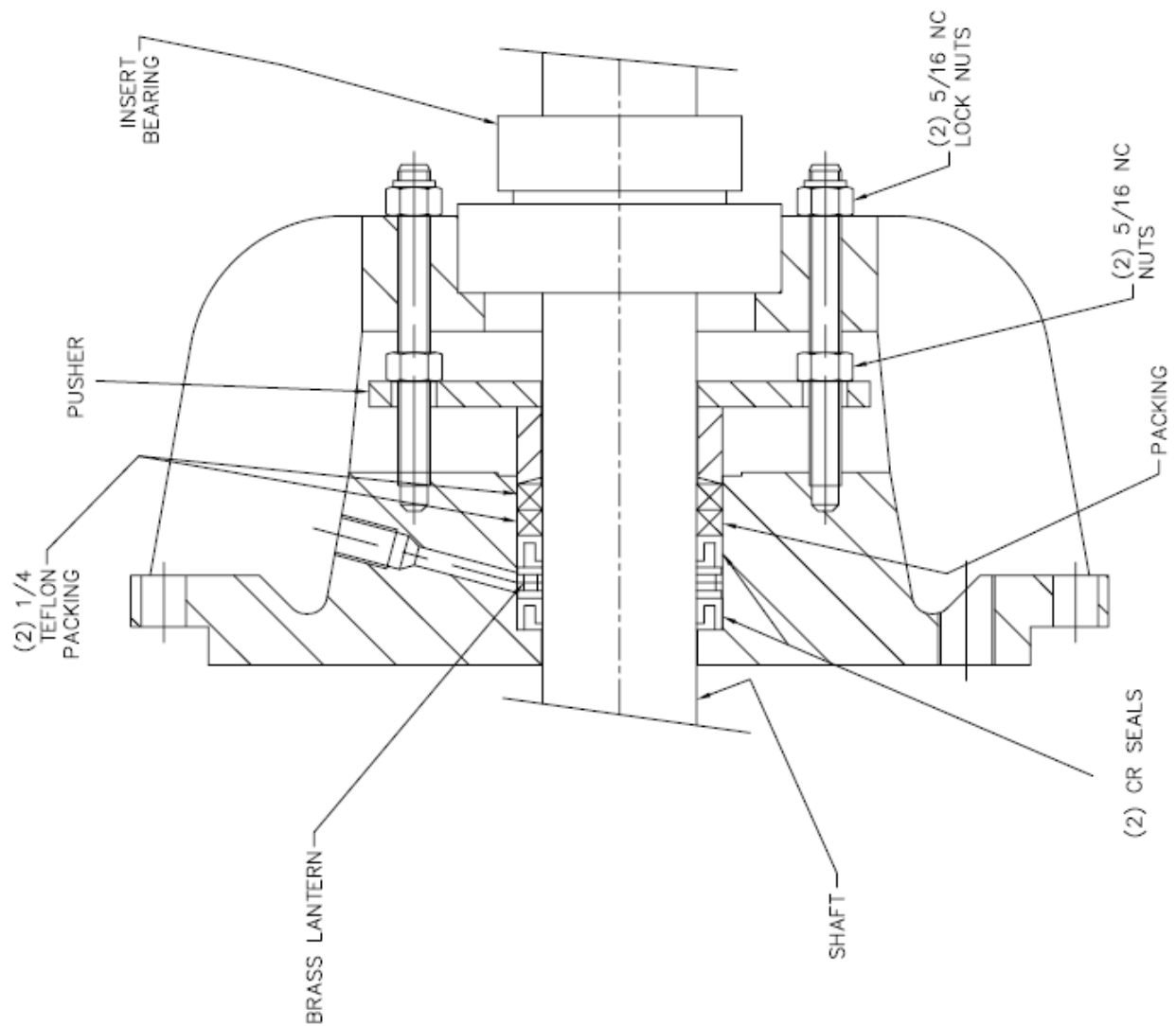


1. Also, available in a packing gland style shaft seal air purge assembly consisting of a lantern ring, 2 lip seals, lot Teflon packing and an adjusting pusher plate. Typically, this configuration is used for applications exceeding 500°F.

T4 Shaft Seal Assembly



Packing Gland Shaft Seal Assembly



Inspection and Preventative Maintenance

NOTE: BEFORE ANY INSPECTION OR MAINTENANCE, YOU MUST FOLLOW STANDARD 'LOCK-OUT/TAG-OUT' PROCEDURES FOR ALL POWER SOURCES AS DEFINED BY OSHA. SEE WARNINGS

- A. Daily Inspection** – A short visual inspection of the PMX rotary valve each day will result in the early detection of any possible maintenance or operational issues so that the user will experience reliable, trouble-free performance for a long time.

The daily inspection should include looking for: 1) any evidence of material or air escaping around the shafts, 2) any evidence of material or air escaping around the inlet or discharge flanges of the rotary valve, 3) any evidence of increasing temperature in the valve, for example discolored paint or areas that are hot to the touch.

A number of issues may also be detected by listening carefully to the valve while it is operating. Scraping or regular ticking may be an indication that the rotor has shifted. Listen carefully to the valve in operation; if the sound of metal-on-metal scraping or knocking is heard, discontinue operation, lock-out the drive, and visually inspect all components for wear or misalignment.

- B. Lubrication** – The bearings are sealed-for-life and don't require lubrication.

Maintenance Procedures

NOTE: BEFORE ANY INSPECTION OR MAINTENANCE, YOU MUST FOLLOW STANDARD 'LOCK-OUT/TAG-OUT' PROCEDURES FOR ALL POWER SOURCES AS DEFINED BY OSHA. SEE WARNINGS

A. Maintenance and Adjustment

Rotary valve maintenance is just as important as the unit is to the system. Rotary valves are assembled with sealed bearings, therefore requiring no lubrication.

Rotor-to-housing clearance should be checked as part of the maintenance program. Clearance should be within the allowable clearance range of the appropriate service. (See table, pg. 9) Each rotary valve is built to a standard, which is determined by its size and design operating conditions. The appropriate standard established for any rotary valve can be determined by checking the order acknowledgement.

B. Remove Rotor:

1. Determine which side rotor is to be pulled from. Normally clearance permitting, drive side is pulled to avoid dismantling of drive.
2. Loosen and remove bearing lock-collar at bearing opposite the drive side.
 - a) Remove allen set screw from collar and peen down groove formed by set screw using a small flat punch.
 - b) Loosen collar by rotating collar in the same direction as the shaft rotation. Use drift pin in the plain hole (not threaded set screw hole) and tap with hammer to rotate collar.
 - c) Slide collar off shaft.
4. PMX for rotary valves with packing gland seals, loosen the packing gland bolts (2 ea.) opposite the drive side.
5. Loosen the shaft seal collar, located within the end plate bearing port.
6. Remove the bolts on end cover (side to be pulled).
7. On all models place wheel puller at end opposite the drive end, hooking it at back of bearing port. Place puller bolt at the shaft and push rotor through until it slides freely.
8. Remove rotor from housing gently to keep from forming burrs on rotor or housing.

C. Replacing Rotor

1. Carefully check to see if rotor or housing have burrs. (Blade tips, shrouds, and housing matching surfaces). If burrs are found, file them smooth using a fine file and then polish with emery paper.

2. Check rotor shaft, file and use emery paper on any rough surface found.
3. Blow off rotor and shaft to clean any foreign material. Also, check end cover to see that matching edges to housing are clean.
4. Gently slide rotor into housing. Rotor normally will not slide the last few inches easily. Use a large rubber hammer to pound rotor far enough to start end cover bolts, and tighten evenly.
5. Make sure rotor is centered in housing. If not, loosen bearing lock collars, and centre with rubber mallet by tapping end of shaft.
6. Tighten bearing lock collars in the direction opposite to shaft rotation.
7. Tighten packing gland bolts evenly or tighten shaft seal collar.
Note: If rotor does not turn freely, loosen end cover bolts. Centre rotor with feeler gauges and retighten bolts evenly.
8. Turn rotor by hand. Check clearances and see that rotor turns freely in housing.

D. Removing End Covers

1. Remove bolts that attach end cover to housing
2. Loosen and remove bearing lock collar
 - a) Remove allen set screw from collar and peen down groove formed by set screw using a small flat punch.
 - b) Loosen collar by rotating collar in direction opposite shaft rotation. Use drift pin in the plain hole (not threaded set screw hole) and tap with hammer to rotate collar.
 - c) Slide collar off shaft.
3. Loosen packing gland bolts or shaft seal collar, if applicable.
4. Attach wheel puller.
5. Tighten slowly until cover slides off shaft. If cover tends to bind on shaft, tap puller bolt with rubber mallet as you tighten.

E. Bearing Replacement

1. Remove end cover.
2. Press bearing in the appropriate direction to remove from end plate.

Replacing Press-Fit Bearings

1. Align bearing with machined hole in end cover.
2. Be sure the eccentrically machined end of the inner bearing ring will be at the outer face of the endplate so that matching bearing lock collar can be properly installed.
3. Press the bearing in place.

Installing Press-Fit Bearing Lock Collar

1. Check to see that bearing has been pressed into endplate with eccentrically machined face of inner bearing ring facing outward toward the end of the shaft.
2. Slide collar on shaft with eccentrically machined, recessed face against the inner bearing ring. Rotate the collar in the opposite direction of shaft rotation until eccentric faces of collar and inner bearing ring engage.
3. Continue to rotate the collar in the opposite direction of shaft rotation until snug. Complete tightening by inserting pin in drift pin hole of the collar and tap with lightweight hammer.
4. Tighten allen set screw.

Precision Machine & Mfg, Inc. Standard Warranty

WARRANTY

Precision Machine and Manufacturing, Inc. warrants products of its manufacture to be free from defects in material and workmanship if properly installed, maintained, and operated under normal conditions with competent supervision.

No person, agent, representative or dealer is authorized to give any warranties on behalf of Precision Machine and Manufacturing, Inc. nor to assume for Precision Machine and Manufacturing, Inc. any other liability in connection with any of Precision Machine and Manufacturing, Inc. products

This warranty shall extend for one (1) year from date of installation provided this equipment has been put into service within ninety (90) days after shipment from Precision Machine and Manufacturing, Inc. factory. If repairs or replacements are made by the Purchaser without Precision Machine and Manufacturing, Inc. prior written consent, Precision Machine and Manufacturing, Inc. warranty shall cease to be in effect. No allowance will be granted for any repairs or alterations made by the Purchaser without Precision Machine and Manufacturing, Inc. prior written consent.

Machinery, equipment and accessories furnished by Precision Machine and Manufacturing, Inc. but manufactured by others, are warranted only to the extent of the original manufacturer's warranty to Precision Machine and Manufacturing, Inc.

Precision Machine and Manufacturing, Inc. agrees at its option to repair at the point of shipment or to replace without charge f.o.b. point of shipment, any part or parts of products of Precision Machine and Manufacturing, Inc. manufacture, which within the specified warranty period shall be proved to Precision Machine and Manufacturing, Inc. satisfaction to have been defective when shipped, provided the Purchaser promptly notified Precision Machine and Manufacturing, Inc., in writing, of such alleged defect.

Precision Machine and Manufacturing, Inc. liability to Purchaser, whether in contract or in tort arising out of warranties, representations, instructions, or defects from any cause shall be limited to repairing or replacing of the defective part or parts as aforesaid, f.o.b. point of shipment.

No liability whatsoever shall attach to Precision Machine and Manufacturing, Inc. until said products have been paid for.

EXCEPT AS STATED IN THIS SECTION AND IN THE PRECEDING SECTION TITLED "WARRANTY" AND EXCEPT AS TO TITLE, THERE ARE NO GUARANTEES OR WARRANTIES OF MERCHANTABILITY, FITNESS, PERFORMANCE OR OTHERWISE, EXPRESS, IMPLIED OR STATUTORY, AND PRECISION MACHINE AND MANUFACTURING, INC. SHALL HAVE NO LIABILITY FOR CONSEQUENTIAL, INCIDENTAL OR OTHER DAMAGES, HOWSOEVER CAUSED.

DATE INSTALLED _____
MODEL _____
SERIAL # _____

Appendix #1 – Air Purge Kit

The optional air Purge Kit may be used to provide compressed air the shaft seal area on Rotary Valves with either open or closed end rotors. This kit may also be used to provide compressed air to the end plate cavity on the Rotary Valves with closed end rotors.

The Air Purge Kit should include a Filter/Regulator, 0-30 psi pressure gauge, tubing and miscellaneous fittings. Depending on the PMX rotary valve model and what ports are to be purged, certain fittings supplied in the kit may not be required.

Operation and Maintenance

After installation is complete and while the filter/regulator is shut off completely, the air supply should be turned on. After verifying that all connections are tight the regulator should be adjusted to provide the appropriate purge pressure to the Rotary Valve using the following guidelines.

1. Initial setting, prior to conveying product through the valve or system should be 5 psig.
2. If the rotary valve is either receiving product from or discharging product to a pressure system the regulator should be set at 5 psig above the system conveying pressure.
3. If the rotary is used in a gravity flow application or is receiving or discharging only to a vacuum system the regulator should remain set at 5 psig.

Air Purge Assembly for Rotary Valves With Open or Closed End Rotors

ITEM	QTY	DESCRIPTION
1	1	Filter/Regulator with gauge & bracket
2	1	3/8" Male Branch Tee Poly-Flo fitting
3	4 ft.	3/8" O.D. Nylo-Seal Tubing
*4	2	3/8" Poly-flo to 1/8" MNPT Connector
5	1	0-30 PSI, 2" Face, 1/4" CTR Back Gauge
°6	2	3/8" Poly-flo to 3/8" MNPT Connector
°7	2	3/8" Poly-Flo Union Tee
°8	2	3/4 x 3/8 Hex Bushing
	1	Air Purge Kit (includes items 1 thru 8)

Please Note:

***Fittings for purging shaft seal**

***Fittings for purging end plate cavity**