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VALVE
SOLUTIONS - PBV

INSTALLATION, MAINTENANCE & OPERATING INSTRUCTIONS

6" - 12" REDUCED PORT/ FULL PORT (5700/6700) ANSI CLASS 150/300/600/900/1500/2500 TRUNNION BALL VALVES

Read these entire instructions carefully before installation or servicing

GENERAL INFORMATION

DESIGN

PBV-USA series Reduced Port (5700) & Full Port (6700) trunnion mounted ball valves are a three piece bolted body design. The valves are non-directional and can be installed with either end upstream. These valves are designed and manufactured in strict accordance with API 6D. Flanged end valves NPS 2" to 24" (except 22") have flange dimensions in accordance with ASME/ANSI B16.5. Size 22" and sizes 26" and larger have flange dimensions conforming to MSS SP-44, or the customers specifications. Face-to-face and end-to-end dimensions conform to API 6D.

The Series 5700/6700 ball valves are API monogrammed under authorization of API license Number 6D-0129.

DOUBLE BLOCK & BLEED

PBV-USA valves 5700/6700 series are designed for double block & bleed service. Each valve is equipped with a drain valve in the lower portion of the body. Valves 6" and larger also include a vent in the upper quadrant of the body.

EMERGENCY SEALANT SYSTEM

All Series 5700/6700 valves have fittings at the stem which can be used to inject a sealant in the unlikely event of leakage in the stem area. Valves NPS 6" and larger have provisions for emergency sealant injection in the seating areas through 1/2" NPT giant buttonhead fittings at the midpoint of the end closures

Each injection port has an internal check valve installed as an added safety precaution. Valves NPS 6" through 12" have two emergency sealant fittings on the front of the valve; Valves 14" and larger have four fittings, two in front and two in back.

FIELD WELDABILITY WELDING END VALVES

PBV-USA series 5700/6700 ball valves with ASME B16.25 welding end connection(s) are readily field weld-able. Installation welding should be done by qualified personnel using approved welding procedures in accordance with applicable codes and jurisdictional regulations.

Check welding end surfaces for cleanliness. The welding ends should be free from paint, oil or rust which may be detrimental to welding.

BODY PRESSURE RELIEF

In PBV-USA 5700/6700 series, independent spring loaded seat design eliminates excess pressure build-up in the body cavity by automatic pressure release through the downstream seat.

A 1/2" NPT body relief valve may be furnished as an option to further protect the body from thermal over-pressuring when the valve is in the fully closed position. A relief valve is recommended when the line pressure is expected to be very close to the valve maximum rated operating pressure.

If a relief valve is installed, an appropriate relief drain system should be considered for safety and environmental purposes.

STORAGE

While in storage, protect valves from the effects of weather. Ideally, valves should be kept indoors in a clean, well ventilated area with the temperature maintained above the dew point. If valves are stored outdoors, support them off the ground or pavement and provide a watertight cover.

Valves are shipped in the open position to protect the ball surface. End protectors are placed on the valve for protection from damage and deterioration and to prevent entrance of dirt or debris. Do not remove the end protectors except for inspection or installation.

INSTALLATION

Handling equipment is required for the weight involved. Refer to the PBV-USA catalog for approximate weights. Take care to avoid damage to the valves while handling. Sling or rig the valve carefully. The end flange may be used to lift smaller valves. Larger valves are provided with lifting lugs to facilitate handling.

Verify the valve is correct as shown on the piping arrangement. Look at the identification plate, tags, and markings on the valve for size, pressure class, maximum operating pressure and temperature, and materials.

WARNING

SAFETY FIRST! FOR YOUR SAFETY, TAKE THE FOLLOWING PRECAUTIONS BEFORE REMOVING THE VALVE ASSEMBLY FROM THE LINE, OR BEFORE ANY DISASSEMBLY:

- 1. WHAT'S IN THE LINE?**
BE SURE YOU KNOW WHAT FLUID IS IN THE LINE. IF THERE IS ANY DOUBT, DOUBLE CHECK WITH THE PROPER SUPERVISOR.
- 2. ARE YOU PROTECTED?**
WEAR ANY PROTECTIVE CLOTHING AND EQUIPMENT NORMALLY REQUIRED TO AVOID INJURY FROM THE PARTICULAR FLUID IN THE LINE.
- 3. IS THE LINE DEPRESSURIZED?**
DEPRESSURIZE THE LINE AND DRAIN THE SYSTEM FLUID. CYCLE THE VALVE SEVERAL TIMES TO RELIEVE ANY PRESSURE STILL INSIDE THE VALVE.

IT IS IMPORTANT TO REFER TO THE IDENTIFICATION PLATE FASTENED TO EACH VALVE FOR MAXIMUM PRESSURE RATINGS AND MATERIAL DESCRIPTION. IN CASE THERE IS ANY QUESTION CONCERNING THE VALVE, REFER TO PBV-USA FOR MAXIMUM RATINGS.

WARNING: AT ALL TIMES KEEP HANDS OUT OF THE BALL CAVITY. A REMOTELY ACTUATED VALVE COULD CLOSE AT ANY TIME AND RESULT IN SERIOUS INJURY.

INSTALLATION cont.

Remove end protectors when ready for installation. Check valve interior and connecting pipe to assure they are reasonably clean and free of foreign material.

Install in line with either end upstream.

On valves having extensions, check all extension piping and fittings to ensure that all are tight prior to placing valve in service.

Do not inject sealant into the stem or seat grease fittings. These are for emergency only.

Be sure that flange end gasket surfaces are free from dirt or irregularities, which may affect sealing performance. Confirm gasket materials and bolting material, size and length. Series 5700/6700 ball valves Sizes 2" through 4" Class 150/300 require threaded studs.

Align bolt holes of valve flanges and pipe flanges. Insert gasket and bolts. Alignment must be accurate to prevent unbalanced tightening and subsequent excessive stress on bolting.

Use suitable lubricants on bolt threads. Tighten the bolts gradually and uniformly in a crosswise pattern in accordance with standard piping practices. The ends of the studs should extend equally beyond the nuts.

After installing the valve, be sure to check the studs and nuts of the Body-Closure flanges and retighten if necessary.

ON STREAM MAINTENANCE

This section covers maintenance and repair which can be performed without removing valve from the line.

When performing any work on this valve, use normal safety precautions to protect yourself against any residual fluid or trapped pressure in the line.

BLOCK AND BLEED

With the line under pressure the valve body cavity can be vented to the atmosphere and completely drained down with the ball in **CLOSED POSITION ONLY.**

STEM SEAL REPLACEMENT

(Refer to Assembly Illustration on the last page for part identification and location.)

The PBV-USA 5700/6700 series has 2 stem seals, one primary seal backed up by second independent seal.

If the primary o-ring seals become faulty, sealant may be injected to reduce leakage before replacing the seals.

Upper stem seals may be replaced by the following procedure:

1. Turn valve to fully closed position.
2. Release body cavity pressure through relief/drain valve and leave that valve open.
3. With valve in fully closed position, mark vertical line(s) on, adapter plate, gland and body to insure correct alignment of these parts after re-assembly.
4. Remove mounting NUTS [48] holding GEAR OPERATOR [57] to ADAPTER PLATE [12] and lift operator off plate.
5. Remove STEM KEY [20], and clean stem and key surfaces.

STEM SEAL REPLACEMENT cont.

6. Remove faulty upper STEM O-RING [34] and replace it with new, lubricating as required with a silicone lubricant.
7. Reassemble ADAPTER PLATE [12] and tighten it to the body.

NOTE: Make sure that vertical line marks on the body and adapter plate are in alignment.

8. Replace STEM KEY [20].
9. For gear operated valves, replace the gear operator, making certain that the vertical line mark on the body, adapter plates and gear operator are in alignment.
10. Replace the MOUNTING NUTS [48] and tighten evenly all around.

EMERGENCY SEAT SEALANT SYSTEM

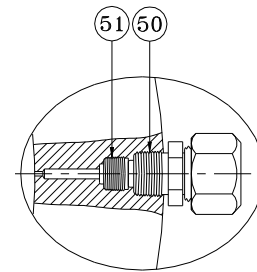
1/2" NPT steel fittings with giant buttonheads are installed in the mid-section of both end closures

EMERGENCY SHUT-OFF

The seat seals of all PBV-USA 5700/6700 series valves are designed not to require sealants. However, in the presence of excessive line contaminants, the possibility of leakage due to erosion is greater than when valve is used for normal on-off service. If the primary seal and the secondary metal-to-metal seal are damaged, an emergency shut-off may be obtained with a sealant injected through grease fittings. PBV-USA valves are equipped with fittings for emergency sealant injection.

SEALANT INJECTION INSTRUCTION

First purge the sealant passages by injecting valve cleaner, Sealweld Total-Lube #911 or Val-Tex Valve Flush or Engineering approved cleaner. This operation purges old greases and residual build-up which contributes to seat leakage and excessive operating torque. With valve in the fully closed position slowly inject Sealweld #5050 or Val-Tex 700 ball valve sealant through the large BUTTONHEAD FITTING [50] provided on the upstream end closure. If possible, move ball slightly during injection to insure sealant is evenly distributed over the seating surfaces of the seat ring and ball. A damaged grease fitting may be removed and replaced while the valve is under pressure by first injecting a small amount of sealant to insure the tightness of the BALL CHECK VALVE [51] installed in the sealant passage under the grease fitting. (See Figure 3)



GREASE FITTING & CHECK VALVE
DETAIL

Figure 3

OFF STREAM MAINTENANCE

Major repairs which necessitate removing the valve from the line.

EQUIPMENT

Handling equipment as required for the weight involved. Also a plywood sheet is required to press in large seat rings.

DISASSEMBLY PROCEDURE

(Refer to Assembly Illustration on last page for part identification and location.)

1. If the valve is in line, isolate the valve from the line pressure.
2. Release the pressure from the inlet and outlet ports.
3. Open the DRAIN VALVE [54] to relieve body cavity pressure.
4. Place the valve in the open position.
5. Remove the valve from the line.
6. Remove the GEAR OPERATOR [57] per the previous instructions.
7. Remove the ADAPTER PLATES [58]-[12].
8. Position the valve so that it rests on one port/flange face.
9. Scribe witness marks across the interface of the BODY [1] and both END CLOSURES [2]. Also across the TRUNNION [9] FLANGE and BODY, and the GLAND PLATE [12] and BODY.
10. Remove the NUTS [40] from the bottom end CLOSURE [2], lift up body/upper closure unit and place it on a clean solid surface.
11. Remove the NUTS [40] from the upper end CLOSURE [2], lift up the upper end
12. closure from the body and place on a clean solid surface.

13. Hang the BALL [4] with a strap through the bore, so that the weight of the ball is supported by the strap. Do not lift the whole valve. Remove the TRUNNION [9] and STEM/GLAND [5] [10] sub assemblies.
14. Lift the BALL [4] carefully out from the BODY [1] and place it on a clean solid surface.
15. From the end CLOSURES [2], disassemble SEAT UNITS [6], SEALS [33] [36], CHECK VALVES [51], GREASE FITTINGS [50], and SPRINGS [31].
16. Disassemble the TRUNNION [9] by removing the O-RING [35] and GASKET [71].
17. To disassemble the gland [10], carefully remove the STEM [5] from the GLAND [10]. Remove the STEM and GLAND O-SEALS [34] [35] [71]. Remove the STEM THRUST WASHER [25].

INSPECTION AND CLEANING

1. Wipe off metal parts with a soft cloth, using petroleum solvent. Re-mark parts if necessary.
2. Inspect metal parts for damage or burrs on all moving surfaces.
3. Replace defective parts.

NOTE: O-rings are made to stretch with a certain tension around metal shoulder. Any stretching or swelling of o-ring may cause cutting on re-assembly. Do not re-use o-rings unless their dimensions are carefully checked against new parts.

LUBRICATION

Lubricate all moving surfaces with silicone lubricant Dow Corning DC 111.

RE-ASSEMBLY

1. Re-assemble SEAT SUB ASSEMBLY [6].
 - a. Place SEAT [6] on a clean solid surface.
 - b. Replace the outer SEAT O-RINGS [34] [35], lubricate them with silicone lubricant.
2. Reassemble end closures.
 - a. Place both CLOSURES [2] on a clean, solid surface being careful not to damage the sealing surface on flanged closure.
 - b. Install the CHECK VALVES [51] and button head GREASE FITTINGS [50] into the sealant passages of the closures. Surfaces must be dry and clean.

Apply sealant to the threads.

Fill lubrication cavities through the grease fittings with recommended sealant until sealant just appears in the seat ring recess. This process serves to lubricate check valves, assuring pressure tightness.

- c. Replace BODY O-RING [32] and GASKET [70] over the shoulder of the closure. Lubricate o-rings with silicone lubricant.
- d. Insert SPRINGS [31] in the CLOSURES [2] and position the SEAT RINGS [6] in the CLOSURE.

NOTE: Seat ring assembly must be pressed into the closure recess. This may be done by using the ball as a press.

CAUTION: Be sure pressure is applied evenly, seat rings must be properly aligned.

3. Re-assemble TRUNNION [9].
 - a. Install TRUNNION O-RING [35] AND GASKET [71]. Lubricate o-rings with silicone lubricant.
4. Re-assemble GLAND [10]
 - a. Install GREASE FITTING [49].
 - b. Install STEM AND GLAND O-RINGS [34] [35] and GASKET [71], lubricate o-rings with silicone lubricant.
5. Carefully insert the BALL [4] into the BODY
6. Install the TRUNNION [9] sub assembly carefully into the ball bottom recess through the body bottom hole and slightly tighten the CAP SCREWS [45].
7. Install the STEM [5] with THRUST WASHER [25] into the GLAND [10] sub assembly , lubricating the stem with a thin film of silicone lubricant.
8. Install the STEM/GLAND sub assembly [10] into the BODY [1] making sure that the stem key way is in proper position to receive the gear operator (follow marking made during disassembly), and tighten the GLAND CAP SCREWS [43].
9. Tighten the TRUNNION CAP SCREWS [45].
10. Install and tighten both end CLOSURES [2] to the BODY [1], paying attention to correct alignment (follow marking made during disassembly process) and using care to not damage o-rings or body gasket.
11. Turn the valve assembly upright. Install the upper STEM PACKING [72], BUSHING [11] and ADAPTER PLATE [12] so that the witness mark lines up.

RE-ASSEMBLY cont.

12. Install the GEAR OPERATOR [57] to the valve.
 - a. Grease stem [5].
 - b. Carefully lower the gear with the gear adapter plate over the stem and bolt down to the valve adapter plate so that the witness mark lines up.

TESTING FOR LEAKAGE

1. Close valve fully.
2. Admit 50 - 100 psi air pressure into body cavity through end flange. Open drain valve.
3. If body pressure falls steadily, apply soap solution to closure flange to body interface and to emergency grease injection fitting in end flange. Release pressure, disassemble and repair area of leakage.

INSTALLATION OF WORM GEAR OPERATORS

Before mounting the worm gear operator on the valve, grease the valve stem. Check the key to assure it is the correct length and fits the key slot without excessive play. Check for burrs and scratches and polish to provide smooth sliding surfaces.

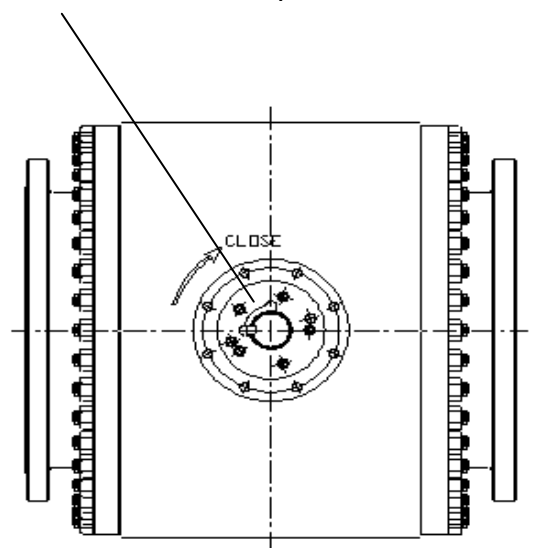
Match position of valve to position of operator. If valve is "OPEN" then operator must in "OPEN" position. Lower the operator over the stem and bolt down to the adapter plate. Tighten bolts securely.

Note: If operator fits tightly over stem, do not force down using the bolts. This will lock up the ball resulting in excessive torque.

The valve external stop is designed as a visual indicator of the ball open and closed position only. The gear operator stops must be set as the actual valve stop position to prevent damage to the key and adapter plate slot.

After the operator has been installed the operator stops can be set as follows:

Top view of valve mounting flange and internal valve position indicator



**INSTALLATION OF WORM GEAR OPERATOR
CONT.**

1. Back off lock nuts and stop screws on both sides of the operator.
2. Turn the operator handwheel counter-clockwise until the bore of the ball lines up visually with the bore of the seat.
3. Turn the OPEN operator stop screw until it can go no further. Tighten the lock nut.
4. Turn the operator handwheel clockwise until the ball is about half closed.
5. From the table below, find the distance "B" for the size of the ball. Measure this distance from the ball bore at the horizontal centerline. Mark both sides at this point.
6. Continue to turn valve towards the closed position until the marks are flush with the bore of the seat.
7. Turn the CLOSED operator stop screw until it can go no further. Tighten the lock nut.



Step 5: Mark distance "B" both sides

Nominal Valve Bore	"B" Distance (in inches)			
	150# - 600#	900#	1500#	2500#
6	7/8	7/8	1-3/16	2-1/4
8	15/16	15/16	1-3/8	2-9/16
10	15/16	15/16	1-5/8	2-3/8
12	1-1/8	1-1/8	1-15/16	3
14	1-1/4	2	2-3/8	
16	1-1/4	2-3/16	2-7/8	
18	1-7/16	2-1/8	3-1/4	
20	1-5/16	2-11/16	2-11/16	
24	1-15/16	3-3/16	3-3/16	

For any questions or comments regarding this product, please contact PBV-USA, Inc.:

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