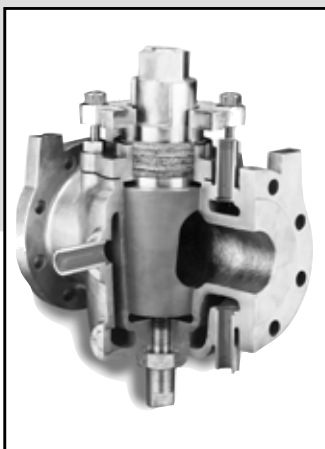


# XOMOX®

**brands you trust.**

## Installation and Operation Instructions



**XOMOX® Parks-Cramer**

**CRANE**

ChemPharma Flow Solutions

[www.cranechempharma.com](http://www.cranechempharma.com)

## XOMOX<sup>®</sup> Parks-Cramer Important Information/Safety

### TROUBLE-FREE OPERATION

CRANE ChemPharma's Xomox<sup>®</sup> valves have proven long-term, trouble-free service. Properly installed, adjusted, and operated, these valves require minimal attention.

### QUESTIONS?

If there are any questions, contact your CRANE ChemPharma, Xomox representative, Xomox Service Center, or the Factory.

CRANE ChemPharma, Xomox Automation and Service Center addresses and phone numbers are listed on the back cover.

You may also contact the Factory at 513-745-6000.

### READ CAREFULLY

The following procedures have been prepared to assist you in the maintenance and repair of your Xomox valves. Please read these instructions carefully.



#### WARNING

READ INSTRUCTIONS BEFORE SERVICING VALVE. Failure to follow instructions could result in death or serious injury. If there is any question, contact the Factory at 513-745-6000.



#### WARNING

This valve should not be used in service conditions where materials of construction are not suitable. Failure to heed this warning could result in death, serious injury, or property damage.



#### WARNING

MASSIVE LEAKAGE. DO NOT attempt to repair valve or its accessories while pressurized. Death or serious injury could result.



#### NOTICE

These instructions have been prepared for valves as they are currently manufactured. If you have an older design valve that needs repair, contact either the factory or your nearest Service Center to make sure you have the correct repair parts and instructions.

### FIELD REPAIR OR FACTORY REPAIR



#### CAUTION

**PARTS DAMAGE.** Customer assumes all responsibility for valve performance on valves rebuilt in the field by non-CRANE ChemPharma, Xomox personnel. Warranty of repair parts is limited to replacement of parts due to defects in material and workmanship of the parts themselves.

Proper installation of repair parts plays an important role in their performance. These parts may be damaged if improper installation occurs.

Field repair of valves may be performed by carefully following the instructions in this book. However, this should be weighed against the advantages of returning valves to a CRANE ChemPharma, Xomox Service Center for repair.

Because of the specialized equipment available at service centers, repairs can often be performed more economically, even considering transportation costs.

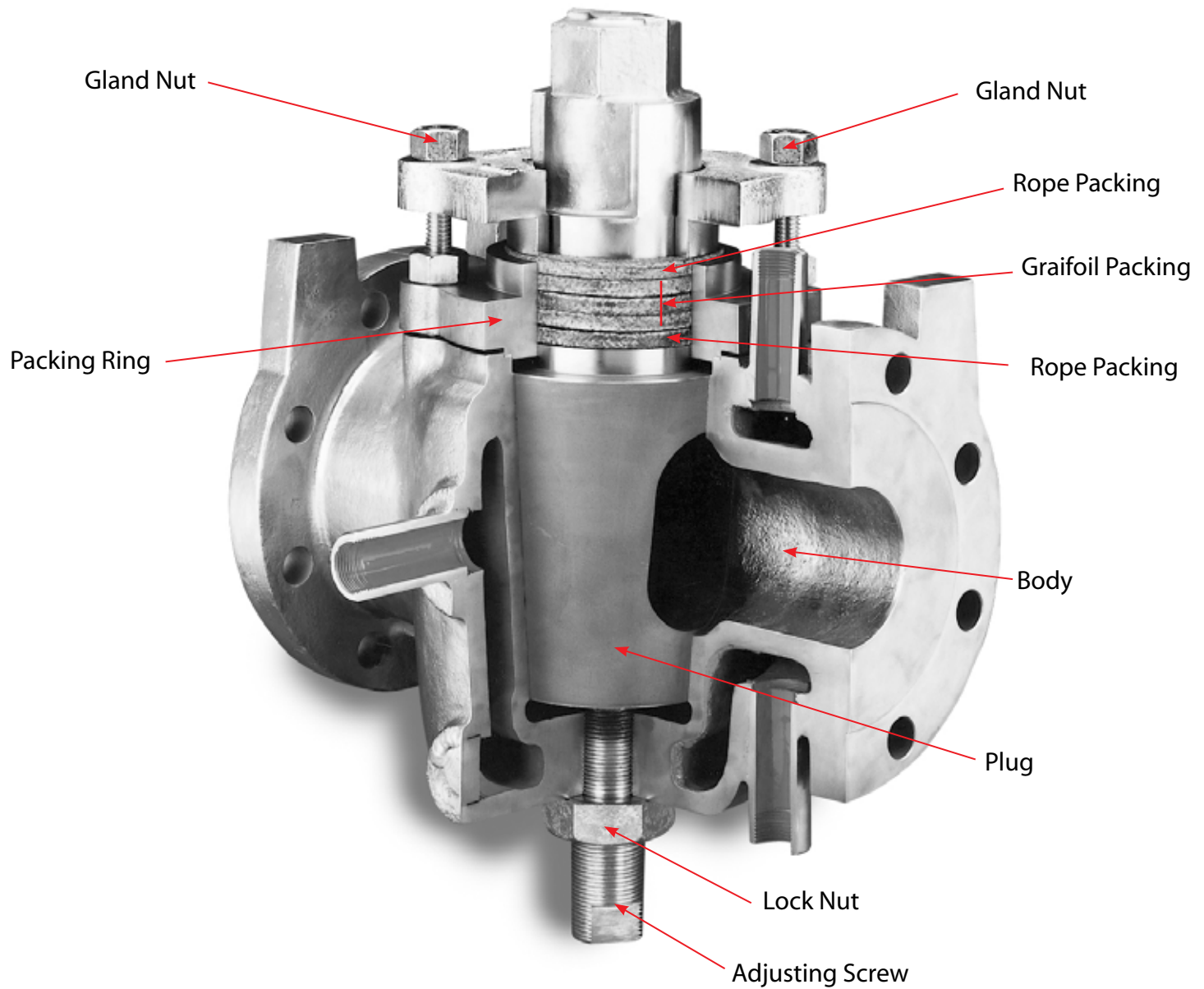
Further, Factory and Service Center repaired valves are tested to the same specifications as new valves and carry the standard new valve warranty.



#### WARNING

**MEDIA EXPOSURE.** Depressurize, clean, and neutralize any media that may remain in the valve and pipeline. If the valve is in the pipeline, you must follow your line entry procedures. Always wear appropriate safety attire. Failure to follow this warning could result in death, personal injury, or property damage.

## XOMOX® Parks-Cramer Cutaway View of Key Parts



## XOMOX<sup>®</sup> Parks-Cramer Adjustment and Operation

### 1. GENERAL

The Parks-Cramer metal-to-metal seated tapered plug valves have been designed and manufactured to provide excellent service at elevated temperatures. This is accomplished by precise lapping of the plug and body as a unit. The valve provides tight shutoff but is still able to rotate. In a properly adjusted valve, the clearance between the plug and body is less than one thousandth of an inch.

- A. This clearance between the body and the plug must be filled with a viscous substance. If the product flowing through the valve is a liquid with a viscosity of 100 centipoise (at operating temperature) or higher, it will normally provide the necessary lubricant/seal. If the viscosity of the liquid product is less, an external lubricant may be required in order to achieve satisfactory shutoff. If the product is a gas, an external lubricant must be used.

These valves have been adjusted and tested at ambient temperatures prior to shipment. Further adjustments must be made in the field after the valve is at operating temperature (see valve adjustment).

### 2. INSTALLATION OF VALVE. DURING THE INSTALLATION OF THE VALVE, CARE SHOULD BE TAKEN TO ENSURE:

- A. A minimum of stress is placed on the valve flanges from pipe alignment and/or thermal expansion.
- B. If the valve is insulated, provision must be made to have access to the Jack Screw (located on the bottom of the valve) and the packing gland nuts.
- C. All Jump Overs are installed and tight.
- D. The location on the jacket selected for inlet and for the outlet of the heating media will provide good circulation for liquid phase media (Hot Oil) or good drainage for vapor phase media (Steam).

### 3. VALVE ADJUSTMENT

- A. Heat up. In order to provide optimum performance from this metal-to-metal seated plug valve, it must be adjusted AT OPERATING TEMPERATURE.
  1. Prior to energizing the heating system, rotate

rotate. If the plug is not free, screw in Jack Screw until plug is free. NOTE: If product is in valve passages DO NOT ATTEMPT TO ROTATE PLUG.

2. Energize heating system. Observe temperature or pressure AT the valve to be adjusted. After the temperature of the heating media rises to the specified temperature or pressure, wait 30 minutes if the valve is insulated or 45 minutes if not, to allow the entire valve to come up to operating temperature prior to any attempt to adjust the valve.
3. During the warm up period, rotate the plug occasionally to ensure expansion has not caused plug to bind. If plug will not rotate, screw in Jack Screw ½ turn and try again. A slight tap with a hammer on the side of the plug stem may help to free a plug which is binding.

### B. ADJUSTMENT

#### 1. PACKING

- A. If new packing. After replacing the lattice braid type of packing it is necessary to ensure that no voids exist and that the packing conforms to the dimensions of the stuffing box.

1. Adjust Jack Screw to contact bottom of the plug and turn ¼ additional rotation.
2. Adjust packing nuts to a high level of compression while rotating stem.
3. Loosen packing nuts.
4. Repeat above two steps three times.

#### B. Packing Adjustment

1. Adjust Jack Screw to ensure it is not in contact with the plug.
2. Adjust packing gland nuts to a moderate level of compression while rotating stem. As you do this there should be a significant increase in torque to rotate plug. This indicates the plug has made metal-to-metal contact with the body. The packing is now adjusted. Make

# XOMOX® Parks-Cramer Adjustment and Operation

additional adjustments only to prevent leakage.

## 2. PLUG ADJUSTMENT

- A. Rotate Jack Screw until contact is made with the bottom of the plug.
- B. While rotating plug, rotate Jack Screw 1/8 additional turn. You should note a decrease in torque required to rotate the plug during this final 1/8 turn of the Jack Screw as the plug is lifted from the metal-to-metal contact.
- C. Hold Jack Screw and tighten lock nut.
- D. Plug is now adjusted to provide a tight seal with minimum torque.

No valves should remain unoperated for long periods of time as the seating surfaces tend to become more firmly locked together and require abnormally high breakout forces. We recommend that all valves be operated at least once a month – which is good practice for any valve regardless of the design.

It is often helpful, when operating valves that are not in frequent use, to rap the side of the hex plug head with the operating wrench. The vibrations tend to free the plug in the body and break any hardened or dried product around the stem. Breakout torque requirements can be substantially reduced in most cases by this simple operation.

## 4. OPERATION REPAIR AND OVERHAUL

Valves that have been in use for a number of years or in very severe service sometimes call for major overhaul. Badly scored plugs and bodies are conveniently and economically repaired by returning the entire valve to the factory. All worn or broken parts are replaced and the valve is returned completely re-built and with the same guarantee as a new valve.

**NOTE:** When returning a valve for repair, it must be clean; that is, all product residue must be removed. It is impossible for the manufacturer to have available solvents for all products used in jacketed valves or heating facilities to melt solidified products.

Valve repairs may also be done by the customer in the field providing he has available proper machine shop facilities and skilled labor.

If repairs are to be made by the purchaser, we can furnish plugs "as-cast", or rough turned to .500" oversize for fitting to the re-bored body. Detailed drawings of any valve are available for this work.

The proper sequence of operations for re-working the valve are as follows:

1. Order oversize plug, rough turned, and set of packing and gaskets.
2. Remove the valve from the line, clean, de-grease, and remove all product residue.
3. Disassemble the valve completely. Remove the operator, if used, then the gland nuts, and pull the gland off over the head of the plug. The packing ring if used, is removed the same way.

The plug may be removed by tapping the head with a wrench while exerting an upward force on it. If the plug is frozen in the body then the adjusting screw on the bottom of the valve must be used as a jack. Loosen the locknut and turn the adjusting screw in against the bottom of the plug, raising it from the seat. Rapping the top of the plug while exerting force on the bottom will assist in easy removal. The adjusting screw can then be removed and all parts cleaned.

## XOMOX<sup>®</sup> Parks-Cramer Repair and Overhaul

### RE-MACHINING BODY

1. The valve body can be mounted on an angle iron bolted to the face plate of a lathe, or in a boring mill chuck, or by any other suitable method of clamping to a boring machine having a taper attachment. Be certain that body is not clamped so tightly as to deform or over stress it, as it will relax after removal from machine making plug fitting difficult.

With a dial indicator, adjust the body position so that both the large and small ends of the taper above and below the ports will run true. The run out should not exceed  $\pm .002$ ". If the body is too badly scored to be able to get an accurate indicator reading, then the valve may be lined up to produce the least possible run out at both ends of taper.

2. A standard boring bar may be used to bore the valve and the taper attachment should be set for a taper of .0001" per foot.

An undercut at the bottom of the taper is provided in the body casting so that the boring bar can run out into a recess. However, if much material has to be removed, this recess must be deepened both to provide clearance for the boring tool and to permit the plug to seat properly as it extends into this recess 1/16" to 1/8".

Boring should continue until all score marks, dents, or damaged portions are completely removed.

The steps and shoulders on the top of the body may have to be re-worked if the body required extensive re-machining on the tapered portion. Dimensions of the shoulder and recesses may be found on the work drawings furnished. On some valves these form the stuffing box. On the larger valves, they center the packing ring and gaskets, therefore, the shoulders and steps must be machined at the same time the body is bored so as to ensure concentricity.

3. Body finishing can be done quickly and accurately by grinding either with a tool post grinder or by means of a standard I.D. grinding machine. If these are not available, however, the final boring passes should be as light as possible to achieve the smoothest finish possible and to minimize other problems

such as "tool bounce" as the point of the boring tool passes over the port openings. If extreme care is not taken on the finish cut, fitting the plug will be difficult because the bore will not be round and true.

### RE-MACHINING PLUGS

1. The oversized rough turned plugs should be set up between centers on a lathe and, if possible, should be driven from the small end by means of a pin or other driver extending from the lathe driving plate into a recess which can be drilled in the bottom of the plug. The purpose of this is to eliminate re-adjustment of the taper attachment, if such was used to bore the body. Plugs turned in this way will be turned and tapered in the same direction as was used to bore the body, giving an accurate fit easily.

If this is not possible then the plug may be driven in the usual manner by a dog clamped to the top of plug and the taper attachment position reversed.

The plug taper should be turned using the same care that was exercised boring the body to achieve as smooth a finish as possible and to ensure complete concentricity. Most important, of course, is that the plug fit accurately to the tapered portion of the body. It is more important that the plug and body taper be accurately matched than the standard taper be maintained.

2. If the plug can be finished on an O.D. grinder, matching the plug to the taper of the body will be greatly facilitated and the question of finish and concentricity will be resolved by the grinding operation. If a grinder is not available, then a fine cut and the smoothest possible turned finish is essential.

Hard faced plugs in stainless steel valves must be finished with a "diamond" or silicon carbide wheel as the hard facing material is Tungsten Carbide or equivalent hardness material.

The plug taper should be checked periodically with the body taper with either chalk or Prussian Blue to ensure that the correct taper is actually being duplicated before the finish cut is taken.

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3. The depth of the plug seating in the body on repair jobs is primarily a compromise. Basically the port openings in plug and body should line up, but the plug should extend into the recess in the lower body by 1/16" to 1/8" and the plug shoulder should coincide with the packing recess shoulder in the top of the body. Details of the recesses required around the top of the body for packing space, packing ring gaskets and packing rings will be found by reference to the proper detail drawings.

Details of the plug shoulder and plug shank diameters will be found on the drawing of the particular part as they vary from one size of valve to another.

### LAPPING

1. The plug and body must be lapped together to insure a perfect seal. Prior to the lapping operation, all chips must be removed and the tapered portion of both plug and body thoroughly cleaned. All sharp corners, especially around the port opening, should be rounded to prevent small pieces from breaking off and scoring the plug and body during lapping operation.

If the plug and body have been accurately and smoothly machined and/or ground, lapping on semi-steel or ductile iron valves may be done with a medium fine compound only. We recommend Clover Grade B Grease Base Compound. If it is felt that plug and body fit is not as good as it should be, then a coarser lapping compound such as Clover Grade E Grease Base should be used first.

The recommended lapping compound for hard faced plugs is Norton Company's silicon carbide powder grit No. 180 for rough lapping and finishing with grit No. 280. These powders should be mixed with Mobil 600W cylinder oil to make a smooth paste with the consistency of heavy cream.

Lapping should be done by hand with an oscillating, motion raising the plug periodically in the body and rotating it to various positions during the operation. The oscillating, or back and forth motion, as opposed to full rotation in a single direction is much more desirable. Lifting the plug periodically during the lapping operation will permit the lapping compound to flow around the parts for faster cutting. Rotating

the plug to various positions while lapping will also ensure that concentricity will be maintained.

Excessive lapping should be avoided because beyond a certain point, lapping destroys a good fit rather than improves it. This is the reason why the best possible machine fit is required before lapping.

2. The plug and body should be periodically washed off with kerosene and examined carefully. A dull, smooth, light gray color all around the plug and body, especially above and below the port openings will indicate the lapping has been complete, providing there are no hard, shiny rings which would indicate a high spot creating pressure. Also any tool marks remaining would indicate that seating has not been correct and full surface contact has not yet been made. Further lapping may remove these spots, but experience must be the guide for, as mentioned above, excessive lapping will ruin the seating surface of both plug and body.

### TESTING

1. When it is determined that the lapped fit is satisfactory, a thin coating of light grease should be spread over the tapered portion of the plug before installing it in the body, and then turn the plug several times to ensure proper seating.

The test plug should be positioned so that one body port is closed off as would be usual when the valve is in a closed position. The plug should be clamped into the body with sufficient pressure to seat it firmly but will still turn with average wrench forces. Excessive pressure may make the valve test tight, but would only leak in the line where it must be operable with wrench handle.

A flange and gasket, with a connection for air hose, should be bolted on to the valve flange upstream of the closed-off port. Air pressure at 60 psi should then be applied against the closed port of the valve. The valve should hold tight against this pressure. The test should be left on a sufficient amount of time so that any fine seepage would show up. A close check should be kept on the adjusting screw hole in the body and around the top of the plug shoulder for evidence of seepage. On 3-way valves it is possible to check on seepage by observation directly through the body ports. If seepage is observed,



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lapping should continue until the valve tests tight.

The conditions on excessive lapping should be observed. There are times when it is better to re-machine the taper rather than to continue lapping.

### REASSEMBLY

1. After the valve has been successfully tested, it may be reassembled and all gaskets and packing should be replaced with new parts. The packing ring, if one is used, should be bolted to the body, drawing down all bolts with equal torque. If a packing ring is not used, the packing is installed between the plug shank and the body recess.
2. Packing should be installed one length at a time to be sure that each piece is firmly seated. The ends of the packing should be cut on an angle and care should be taken that these meet to form a smooth joint. The second and succeeding pieces should have the ends staggered at least 45 degrees from the previous ring. As each ring is installed it should be tamped firmly in the stuffing box.
3. The gland can then be installed over the head of the plug seating in the stuffing box and against the packing. Care should be taken at this point, especially on 3-way valves, that the gland is in the proper position to give the required stop arrangement for various plug positions. Refer to the catalog for stop arrangement desired but if the stop arrangement is not shown, or a catalog is not available, examination will easily determine the proper gland position.

The gland nuts should be drawn down evenly all around until a resistance is felt, indicating the gland has seated against the packing and is applying pressure. The plug should be rotated to ensure that it is not seated too firmly in the body causing it to lock. If it is too loose, the gland nuts may be turned down in equal amount all around until the plug is firmly seated and requires a reasonable force on the wrench handle to operate the valve.

Because plug valves are essentially tapered bodies, it is possible to lock the plug into the body by excessive gland pressure so that the plug will not turn. On the other hand, the large seating surfaces of this type of valve

require an operating torque proportional to the valve size. Thus smaller valves can be operated easily with the plug firmly seated but a larger valve would require considerably more torque even though the plug was seated with the same unit force as the smaller valves.

Experience dictates the proper "feel" of a seated valve plug but remember that the plug must seat firmly enough to close off the ports against full line pressure.

4. The adjusting screw, gasket, and locknut should then be installed in the body until the ball end of the screw touches the plug. An 1/8 turn of the screw will be sufficient beyond this point to form a pivot. The adjusting screw locknut is then brought up firmly against the bottom of the valve to prevent further movement of the adjusting screw.
5. The valve is now properly adjusted and ready for service.
6. If valve leaks when heat is applied after installation further adjustment may be required to compensate for expansion of metals.