valution

GL Series
Globe Control Valves
Instructions

Valution Inc.
Tel. 82-43-877-7798, Fax. 82-43-877-8821, www.valution1.com
27642, #284-81, Geumil-ro, Geumwang-eup, Eumseong-gun, Chungcheongbuk-do, Korea

TABLE OF CONTENT

1. Introduction

The following instructions should be thoroughly reviewed and understood prior to installing, operating or performing maintenance on this equipment.
Throughout the text, safety and/or caution notes will appear and must be strictly adhered to, otherwise, serious injury or equipment malfunction could result.

Valution has a highly skilled After Sales Department available for start-up, maintenance repair of our valves and component parts. Arrangements for this service can be and made through your local Valution Representative or After Sales Department When performing maintenance use only Valution replacement parts.
Parts are obtainable through your local Valution Representative or Spare Parts Department.
When ordering parts always include Model and Serial Number of the unit being repaired.

2. General

These installation and maintenance instructions apply to all sizes and ratings of the GL Series control valves regardless of the type of trim used.
GL Series single ported top guided control valves are designed with built in versatility making them well-suited to handle a wide variety of process applications.
Standard construction offers a contoured plug with a threaded seat ring or a quick change seat ring.
The heavy top plug guiding provides maximum support to ensure plug stability.
to ensure plug stability.
A series of reduced area trim is available to provide wide flow range capabilities in all valve sizes.

Tight Shutoff Class IV leakage is standard. Optional constructions meet IEC 534-4 and ANSI/FCI 70.2 Class V and VI.
An optional Low Emission Packing is available to assure compliance with the fugitive emission containment requests.
Replacing the conventional plug with the single stage MULTI-HOLE design provides excellent noise attenuation or cavitation control.

*Numbering System

V10	-	GL	1	1	2	1

Actuator Type	Model	Body Type	Trim Type	Flow Characteristics	Plug Type
V10. Spring Diaphragm V20. Spring Cylinder V30. Double Acting Cylinder V90. Electric Motor V01. Other Type	GL	1. Single Seat Un-balanced 2. Single Seat Cage Balanced 3. 3-way 4. Angle Pattern 5. Double Seat 9. Custom Pattern	0. Undefined 1. Un-balanced 2. Conven. Cage 3. Hani, 1-stage (Multi-hole) 4. Hani, 2-stage 7. Breeze Trim (Disk Stack) 9. Custom Trim	0. Undefined 1. Linear 2. Equal % 3. Modified % 4. Quick Open 9. Custom Char.	0. Undefined 1. Contoured 2. Cylinderical 3. Pilot 4. Cascade 5. Micro Cv 6. V-port 9. Custom

3. Unpacking

Care must be exercised when unpacking the valve to prevent damage to the accessories and component parts. Should any problems arise, contact the local Valution Representative or After Sales Department.

4. Installation

4.1 Before installing the valve in the line, clean piping and valve of all foreign material such as welding chips, scale, oil, grease or dirt. Gasket surfaces should be thoroughly cleaned to insure leak-proof joints.

4.2 To allow for in-line inspection, maintenance or removal of the valve without service interruption, provide a manually operated stop valve on each side of the GL Series valve with a manually operated throttling valve mounted in the by-pass line.

4.3 The valve must be installed so that the controlled substance will flow through the valve in the direction indicated by the flow arrow located on the body.

4.4. In case of a heat-insulated installation, do not insulate the valve bonnet and take protection measures related to personal safety.

5. Air Piping

The actuators are designed to accept 1/4” NPT air supply piping. Use 1/4” OD tubing (4 x 6 mm) or equivalent for all air lines. If the supply air line exceeds 25 feet in length (7meters) or if the valve is equipped with volume boosters, 3/8”tubing (6 x 8 mm) is preferred. AII connections must be free of leaks.

Caution : Do not exceed supply pressure indicated on serial plate on the yoke of actuator.

6. Body Disassembly

Access to the internal components of the body should be accomplished with the actuator removed. To remove the actuator from the body, refer to the actuator instruction type V10 spring diaphragm actuator.

Caution : Prior to performing maintenance on the valve, isolate the valve and vent the process pressure. Shut off supply air line and pneumatic or electric signal line.

6.1 Threaded Trim

After removing the actuator, disassemble the body using the following procedure :

A. If a leak detection circuit is connected on the lateral NPT port of the bonnet, disconnect the pipe from this one.

B. Remove body stud nuts (11).

C. Remove bonnet (2), plug stem (3) and plug (17) as one unit.

Note : Spiral wound body gaskets (12) are standard in the GL Series design and it is imperative that a new gasket be installed each time the valve is disassembled.

D. Remove packing flange stud nuts (5), packing flange (6) and packing follower (7).

E. Remove plug (17) and plug stem (3) from the bonnet(2).

Caution : Care must be taken to avoid damage to the plug and plug guide.

F. Remove old packing (8) [and optional lantern ring (9A)
if a leak detection circuit has been installed]. Refer to Figure 5.

G. Bonnet (2), plug (17), bushing (13) and seat ring (15) may now be inspected for wear and service damage. After determining the maintenance required, proceed to the appropriate Section of these instructions.

6.2 Quick-Change Trim

After removing the actuator, disassemble the body using the following procedure :

A. If a leak detection circuit is connected on the lateral NPT port of the bonnet, disconnect the pipe from this one.

B. Remove body stud nuts (11).

C. Remove bonnet (2), plug stem (3) and plug (17) as one unit.

D. Since the cage (14), seat ring (15) and seat ring gasket(16) are held in place by the bonnet, they may now be removed.

Note : Spiral wound gaskets (12 & 16) are standard in the GL Series design and it is imperative that new gaskets be installed each time the valve is disassembled.

E. Remove packing flange stud nuts (5), packing flange(6) and packing follower (7).

F. Remove plug (17) and plug stem (3) from the bonnet(2). plug and plug guide.

G. Remove old packing (8) [and optional lantern ring (9A) if a leak detection circuit has been installed].

H. All components may now be inspected for wear and service damage. After determining the maintenance required, proceed to the appropriate Section of this instruction manual.

7. Maintenance/Repair

The purpose of this section is to assist maintenance personnel by suggesting methods of component maintenance which is largely dependent on the tools and machine shop equipment available.

7.1 Threaded Seat Ring Removal

Threaded seat rings (15) are installed tightly at the point of manufacture and after years of service, they are often difficult to remove to facilitate removal, seat ring wrenches can be fabricated to engage the seat ring lugs and adapted to a shock wrench. If the ring is exceptionally resistant to removal, the application of heat or penetrating oil should be helpful.

Caution : When using heating devices, insure that proper safety practices are observed. the flammability and toxicity of the controlled substance must be considered and proper precautions taken.

7.2 Bushing Removal

The bushing (13) is a press fit into the bonnet and does not normally require replacement.

If necessary, it may be pulled or machined out. When machining the bushing out, care must be taken to maintain proper dimensions and tolerances. These will be furnished upon request.

7.3 Lapping Seats

Lapping is the process of working the valve plug against the seat ring, with an abrasive, to produce a close fit. When valve leakage becomes excessive, lapping becomes necessary. The plug and seat ring seating surfaces should be free of large scratches or dents and the contact surfaces of the seats should be as narrow as possible. This may require dressing both parts in a lathe. The seat surface of the plug is 28 degrees and that of the seat ring is 30 degrees, both from centerline axis. For the lapping operation, a good grade of fine grinding compound is required.

The compound should be mixed with a small quantity of lubricant such as graphite. This will slow the cutting rate and prevent tearing of the seating surfaces. The amount of lapping required depends on the materials, condition of seating surfaces and accuracy of machining. If a short period of lapping does not visibly improve seating, there is usually no advantage in continuing as too much lapping may result in rough seats. The only remedy is replacement or re-machining of one or both parts.

When lapping new plug and seat ring, begin with medium compound and finish with fine.

Caution : Before lapping, plug and stem must be true.(See pinning operation, item 7.5).

7.3.A Threaded Trim

(1) CIean body gasket surface areas.
(2) When seat has been removed, insure that the sealing surface in the body bridge and the threads are thoroughly cleaned.
Note : A sealant such as John Crane Plastic Lead No. 2 or a sealant compatible with the process should be applied sparingly to the seat ring threads and sealing shoulder.
(3) lnstall and tighten seat ring using fabricated wrench used for removal.
Caution : Do not over-tighten. Do not strike directly seat ring lugs.
This could distort the seat ring resulting in unwarranted seat leakage.
(4) Apply lapping compound at several spots equally spaced around the seating area of the plug.
(5) lnsert the stem and plug assembly carefully into the body until it is seated.
(6) Place bonnet (2) on the body and using four body stud nuts (11), spaced equally apart, fasten the bonnet to the body using only slight pressure and tighten evenly.
Caution : Do not tighten nuts to torque specifications at this time.
The bonnet is used temporarily for guiding purposes.
(7) lnsert two or three pieces of packing (8) into the packing box to assist in guiding the stem and plug during lapping.
(8) Screw a drilled and tapped rod with a T-handle on to the plug stem and secure with a locknut. (See Figure 4).
Note : As an alternative, drill a hole through a flat piece of steel and fasten to the plug stem using two locknuts.
(9) Applying a slight pressure on the stem, rotate the stem in short oscillating strokes, 8 to 10 times. Repeat this step until satisfaction.
Note : The plug should be lifted and turned 90° between repeating Step (9).
This intermittent lifting is required to keep the plug and seat ring concentric during lapping.
(10) After completion of the lapping operation, remove bonnet and plug.
The seat area of the seat ring and the plug must be cleaned of all lapping compound in preparation for reassembly. Don’t remove seat ring.

7.3.B Quick-Change Trim

(1) CIean body gasket surface areas.
(2) Install a new seat ring gasket (16) and insert seat ring (14) in the body.
Note : Gasket (16) is temporarily placed to hold the seat ring during lapping.
It is imperative to use a new gasket or a false part having the same geometrical characteristics in order to insure the correct position of the seat ring during lapping.
This gasket (or similar part) can be kept after lapping for a future identical repair.
The gasket used for lapping must not be reused for the body reassembly.
(3) Apply grinding compound at several spots equally spaced around the seating area of the seat ring.
(4) lnsert the cage (14) into the body.
(5) lnsert the stem and plug assembly carefully into the body until it is seated.
(6) PIace bonnet (2) on the body.
Caution : Insure that the seat ring (15), cage (14) and bonnet (2) are properly aligned.
(7) Using four body stud nuts (11), spaced equally apart, fasten the bonnet to the body using only slight pressure and tighten evenly.
Caution : Do not tighten nuts to torque specifications at this time.
The bonnet is used temporarily for guiding purposes.

(8) Insert two or three pieces of packing into the packing box to assist in guiding the stem and plug during lapping.
(9) Screw a drilled and tapped rod with a T-handle on to the plug stem and secure with a locknut.
Note : As an alternative, drill a hole through a flat piece of steel and fasten to the plug stem using two locknuts.
(10) Applying a slight pressure on the stem, rotate the stem in short oscillating strokes 8 to 10 times. Repeat this step until satisfaction.
Note : The plug should be lifted and turned 90° between repeating Step (10).
This intermittent lifting is required to keep the plug and seat ring concentric during lapping.
(11) After completion of the lapping operation, remove bonnet and internal parts.
The seat area of the seat ring and the plug must be cleaned of all lapping compound in preparation for reassembly.

7.4 Multi-hole Piug

The procedures used for performing maintenance on a valve equipped with Multi-hole pug are the same as those used for Threaded or Quick Change Trim.
Caution : Maintenance of the plug should be limited to cleaning of the ports and the maintenance or machining which may be required under Section 7.3, Lapping and Pinning.

7.5 Plug Stem Pinning

Plug stem pinning during field assembly may be divided into two parts :
— Replacing old plug and old stem,
— Replacing only old stem,

Replacing Plug and Stem

If it is necessary to replace the plug, it is necessary to replace the plug stem at the same time. Indeed, the original pin hole in an old stem prevents satisfactory results and might seriously impair strength of the assembly.

A. Reference Marking on the Plug Stem
Measure the depth of the pilot recess in the plug
and make a reference mark to the plug stem at the same distance, from the thread.
Note : While pinning is being performed, care must be taken not to damage the seating surface or plug guide. Always use a soft metal or plastic vise jaws with a cylindrical machining to hold the plug guide area.
B. Screwing Stem into Plug
• Hold the plug guide in a vise.
• Lock one nut against another one to the end of the new plug stem and, using a wrench on the upper nut, screw the stem solidly into the plug.
When properly assembled, the reference mark should be flush with the end of the guide section.
C. Drilling the New Parts
• If the plug is already full drilled, (in case of 440 C stainless steel, hardened material or solid stellite), drill the stem to the same diameter than the plug skank hole.
• If the plug guide area has a center mark, PIace the plug guide on a V-block and, using a size of drill bit suitable to either,
• If the plug guide area hasn’t any hole or any center mark,

D. Pinning the Plug-Stem Assembly

1. Select the correct size pin according to plug guide diameter and stem diameter .
Apply a small amount of grease on it, and hand place the pin to the hole inlet.

2. By means of an hammer, introduce the pin into the hole. Complete the pinning operation, aking care to ensure that the pin is recessed by the same amount at both sides,

3. After the plug has been pinned, it should be placed in a lathe to insure it is running true.
The stem should be placed in a collet with the plug guide against it and the plug should be struck.
Alignment of plug stem can be performed by means of a soft faced mallet.

Replacing Only Old Stem

A. Removing Old Pin and Stem From the Plug
1. Place the plug guide on a V-block, and using a drift punch, drive out the old pin.
Note : If it is necessary to drill out the pin, a drill bit somewhat smaller than the pin should be used and the remainder of the pin driven out.
2. Hold the plug guide in a vise, (see bordered note in the above paragraph A.
3. Lock one nut against another one to the end of the plug stem and, using a wrench on the lower nut, unscrew the stem from the plug. The stem is removed by turning it anticlockwise.

B. Screwing Stem to Plug
Refer to paragraph B of the above chapter “REPLACING PLUG AND STEM”.

C. Drilling the New Stem
PIace the plug guide on a V-block and, using a suitable size drill bit,
drill the stem using the hole in the plug as a guide.
Note : If the hole in the plug guide has been slightly damaged while removing of the old pin, choose a drill bit and a pin with a diameter somewhat larger than the normal pin.

D. Pinning
Select the correct size pin according to plug guide diameter and pin hole diameter.
Proceed as described in the above paragraph D2, taking care not to damage the plug guide area.
Ensure plug stem alignment as indicated in the above paragraph D3.

7.6 Packing Box
Packing box maintenance is one of the principle chores of routine servicing. Tightness of the packing is maintained by packing compression. Compression is achieved by evenly tightening the packing flange nuts (5) against the packing flange (6). Care must be taken not to over tighten as this could prevent smooth operation of the valve. If all compression is used up and the valve leaks, new packing is required.
Caution : Valve must be isolated an the pressure vented before performing packing box maintenance.

Proceed as follows :

7.6.1 Aramid PTFE Rings (Standard)

Note : The Aramid PTFE packing rings have a skive cut allowing packing replacement without disconnect the plug stem from actuator connector or actuator stem.

A. Loosen and remove packing flange nuts (5).

B. Raise packing flange (6), and packing follower (7) up the valve stem.
Note : They may be taped in place to keep them out of the way before proceeding.

C. By means of a hook remove packing (8), insuring not to damage the sealing surface of packing box or plug stem.
Note : On valve equipped with an optional leak detection connection, remove also the lantern ring (9A).

D. Replace packing rings (8).
Note : Cram rings one by one into packing box.
The skive cut of each packing ring must be placed about 120 degrees apart.
Note : On valve equipped with an optional leak detection connection, refer to Figure 10 for correct amount of rings to place under the lantern ring (9A).

E. Replace packing follower (7) and packing flange (6).

F. Replace and tighten packing stud nuts (5).
Caution : Do not overtighten.

G. Put valve back in service and tighten packing only as much as is necessary to stop leaking.
Note : In an emergency, string packing may be used as a temporary repair only.
It must be replaced with the correct packing as soon as possible.

7.6.2 Expanded Graphite Rings (Optional)

Note : Expanded graphite packing rings replacement requires to disconnect the plug stem from actuator connector or actuator stem and removing of actuator.

A. Remove actuator from the body assembly.

B. Loosen and remove packing flange nuts (5).

C. Remove packing flange (6), and packing follower(7) from the plug stem.

D. By means of a hook remove packing (8), insuring not to damage the sealing surface of packing box or plug stem.
Note : On valve equipped with an optional leak detection connection, remove also the lantern ring (9A).

E. Replace new packing set (8); first one back-up ring(Carbon/Graphite/Inconel braided ring), then expanded graphite rings (smooth rings), at last, one other braided back-up ring.
Note : Cram rings one by one into packing box.
Note : On valve equipped with an optional leak detection connection, refer to Figure 10 for correct arrangement according to valve size.

F. Place packing follower (7) and packing flange (6).

G. Place and tighten packing stud nuts (5).
Caution : Do not overtighten.

H. Proceed to appropriate instructions for actuator to body assembly and plug stem adjustment.

I. Place valve back in service and tighten packing only as much as is necessary to stop leaking.

7.6.3 VOC PACKING(Optional)

The Valution VOC Packing is a high performance packing system capable of containing fugitive emissions well below the specifications of the most severe recommendations.
It is also available in a firesafe design.

The packing is provided as a set of five pieces. It consists of two adapter rings and three V-rings, an alternating pattern of Perfluoro elastomer (PFE) and long carbon fiber filled
Teflon (PTFE) V-rings are used.
This packing, applied properly, exhibits very little cold flow (or creep). Consequently, it can abate the predominate cause of fugitive emissions from a control valve. The LE Packing system can directly retrofit conventional packing, requiring no modification to the control valve or actuator.

A spring loaded, two-piece follower assembly is used to maintain a constant load on the packing, and is necessary for thermal cycling applications. As the definition of thermal cycling can vary, and processes are potentially subject to unpredicted thermal gradient, LE Packing is only available with the spring loaded follower.

Installation should be performed as detailed in the following Sections 7.6.3.

7.6.3.1. Preparation

7.6.3.1.1 Stem

Inspect stem for any nicks or scratches and quality of finish.
Reject the stem for any of these reasons as they may damage packing.

Note : A properly etched part number on the stem in the packing area will have no adverse effect on the performance of this packing. Stem finish should be conform to the 3-7 AARH finish degree, (Ra 0,1/0,2).

7.6.3.1.2 Packing Box

Note : Bonnets that have a leak detection hole or lube hole are unacceptable for use with the preferred packing arrangement shown in Figure 2.
Packing box should be clean and free of burrs, rust and any foreign matter.
Parts can be cleaned with denatured alcohol.

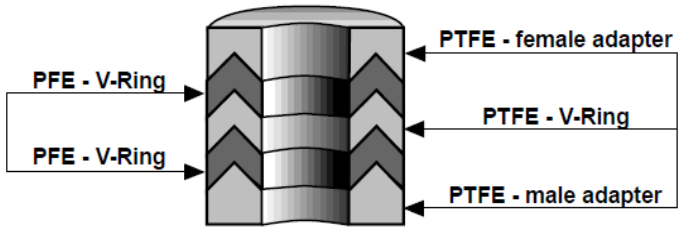
Note : Packing box finish should be conform to 125 AARH finish degree (Ra 3,2), or a lower finish degree.

The packing box may be bored or honed oversize by up to 0,38 mm (0.015”) above the nominal diameter to improve the finish. For instance, a nominal 22,22mm (0.875) packing box may be bored or honed up to 22,60 mm (0.890”) and the LE Packing will seal.

Packing box must be finished to bottom of bore.

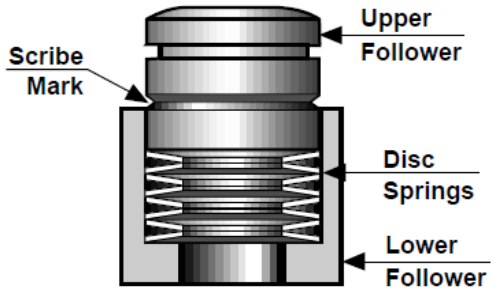
7.6.3.1.3 Packing

Inspect packing rings. Do not use packing if any nicks or scratches on packing are observed.
Check packing and ensure that it is in the proper arrangement (see Figure below).
PFE material can be identified by the gloss black molded finish.
PTFE material has a dull black machined finish.



7.6.3.1.4 Spring Loaded Follower

The spring loaded follower consists of an upper and lower follower and eight (8)disc springs (see Figure below). The springs are installed inside the lower follower and positioned alternately. The assembly is held together by tape, which must be removed before installation.



7.6.3.2 Packing Installation

a. The packing must be lubricated with Krytox ® fluorinated grease prior to installation (Krytox GPL206 or equivalent).
b. Packing should be lubricated as a set (not individually) to minimize getting lubricant into the V's of the packing.
c. Packing will be lubricated with a generous application to the O.D. and I.D. of the packing.
Note : All exposed surfaces of the packing set must be covered with the lubricant.
d. PFE/PTFE is to be installed as a set. Carefully slide the packing set down the stem.
Do not cock or force the packing on the threads.
If packing set separates while on the stem, do not remove. To put the set back together, continue installing the remaining pieces.

7.7 Soft Seat Plug

The soft seat plug used in the GL Series valve has a replaceable insert.
To remove and replace the insert, proceed as follows.

A. Loosen set screw until the head of the set screw is flush with the OD of the shank.
Note : On 3/4 - 2 valve, the plug tip has a machined groove into which a bar can be inserted for removal. On 3- 8 valves, the plug tip has two machined holes into which a tool, fabricated with appropriate size pins, can be inserted for removal.

B. Carefully place plug sub-assembly into a soft jaw vice, holding the plug by the flats provided on the upper end of the shank.

C. Using the appropriate tool, unscrew plug tip(counter-clockwise) from the shank sub-assembly.

D. Remove insert O-ring (3”- 8” only) and insert retainer (3”- 8” only) and discard old insert and O-ring.

E. Thoroughly clean all remaining metallic components and install new insert and O-ring as following, according to valve size :

For 3/4”- 2” valves :
a. Place new insert on shank and insert retainer as shown in Figure 4.
b. Install plug tip into shank sub-assembly hand tight, insuring plug tip seats evenly against insert.

For 3” - 8” valves :
a. Apply a light coat of lubricant to the O-ring and install on insert retainer.
b. Install new insert on insert retainer, facing as shown in Figure 4.
c. Install plug tip into insert retainer sub - assembly insuring the plug tip seats evenly on the insert.

F. Carefully place the plug sub-assembly into a soft jaw vise, holding the plug by the flats provided on the upper end of the shank.

G. Using the appropriate tool used during disassembly, firmly tighten the plug tip.

H. After following the above tightening sequence, securely tighten set screw.
Plug is ready for assembly into valve.

8. Valve Body Reassembly

After completion of the required maintenance the valve should be reassembled using the following procedures :
Note : If any of the following steps were completed during maintenance, proceed to the next step.

8.1 Threaded Trim

A. CIean all gasketed surfaces.

B. Apply a small amount of sealant to the seat ring threads and sealing shoulder and install.
Note : A sealant such as John Crane Plastic Lead No. 2 or a sealant compatible with the process should be applied sparingly

C. Install and tighten seat ring using wrench used for removal.
Caution : Do not over-tighten. Do not strike directly seat ring lugs.
This could distort the seat ring resulting in unwarranted seat leakage.
Note : Valve should be lapped before final assembly. See Section 7.3.A.

D. Carefully install plug and stem assembly.

E. Install body gasket (12).
Note : Spiral wound body gaskets (12) are standard in the GL Series design and it is imperative that a new gasket be installed each time the valve is disassembled.

F. Install bonnet (2) and body stud nuts (11). Bonnet must be positioned so the packing flange studs are at a right angle to the flow center line.
Caution : Tighten nuts (11) until metal to metal contact is obtained with proper bolt torque.
Refer to Figure 11 for proper bolt torque and tightening sequence specifications.

G. Insert packing (8) and lantern ring (9A) on valve equipped with an optional leak detection connection. Refer to Section 7.6 to apply proper order and procedure for packing box filling, according to standard or optional design.

H. Install packing follower (7), and packing flange (6).

I. Install packing flange stud nuts (5).
Caution : Do not overtighten (See Section 7.6 “Packing Box”).

J. If a leak detection circuit was installed, connect it on the lateral NPT port of the bonnet.
If not, insure that the 1/4” NPT plug is remained in place. (Figure 5).

K. For actuator to body assembly and plug stem adjustment, proceed to the actuator instruction type V10 spring diaphragm actuator.

8.2 Quick-Change Trim

A. CIean all gasketed surfaces.

B. Install seat ring gasket (16) and seat ring (15).
Note : Spiral wound gaskets (12&16) are standard in the GL Series design and it is imperative new gasket that a be installed each time the valve is disassembled.

C. Install cage (14).

D. Carefully install plug and stem assembly.
Note : Valve should be lapped before final assembly. See Section 7.3.B.

E. Install body gasket (12).

F. Install bonnet (2) and body stud nuts (11) and tighten. Bonnet must be positioned so the packing flange studs are at a right angle to the flow center line.
Caution : Care must be taken to assure that the cage, seat and bonnet are properly aligned in the body. Tighten nuts (11) until metal to metal contact is obtained with proper bolt torque.
Refer to Figure 11 for proper bolt torque and tightening sequence specifications.

G. Insert packing (8) [and lantern ring (9A) on valve equipped with an optional leak detection connection] Refer to Section 7.6 to apply proper order and procedure for packing box filling, according to standard or optional design.

H. Install packing follower (7) and packing flange (6).

I. Install packing flange stud nuts (5).
Caution : Do not overtighten (See Section “7.6.Packing Box”).

J. If a leak detection circuit was installed, connect it on the lateral NPT port of the bonnet. If not, insure that the 1/4”
NPT plug is remained in place.

K. For actuator to body assembly and plug stem adjustment, proceed to the actuator instruction type V10 spring diaphragm actuator

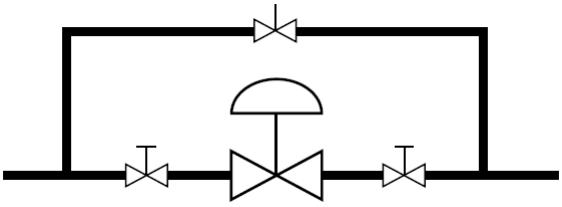
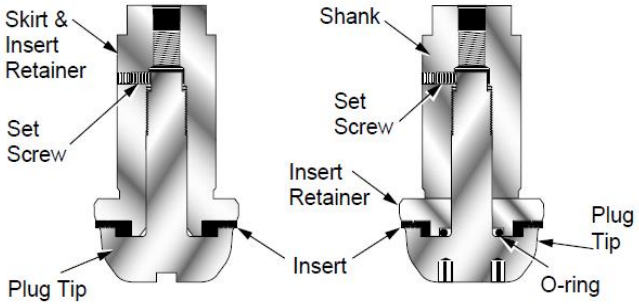


Figure 2–Typical Installation



3/4” ~ 2” Valve Sizes 3” ~ 8” Valve Sizes

Figure 3–Soft Seat Plugs (Optional)

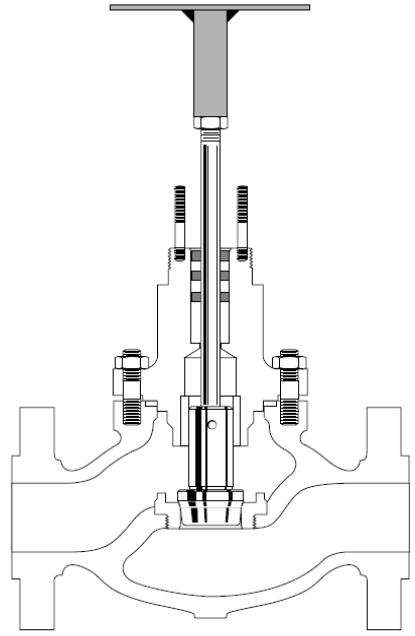


Figure 4–Lapping Seats Device

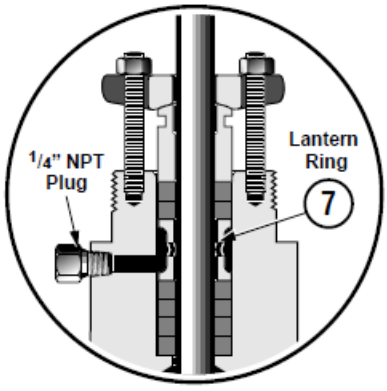


Figure 5–Leak Detection Connection

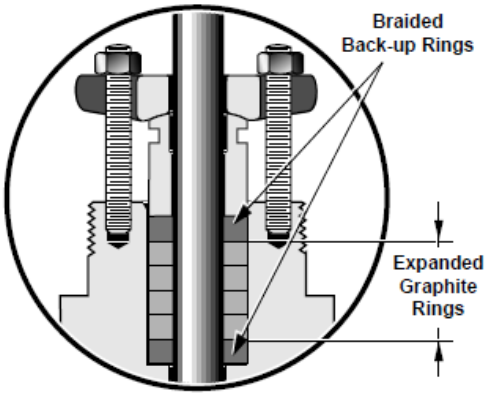
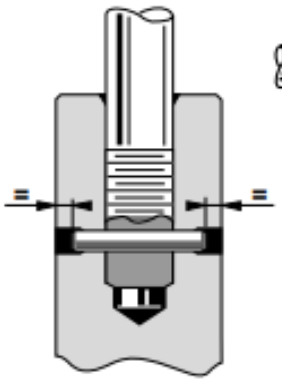
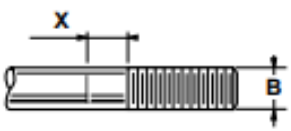
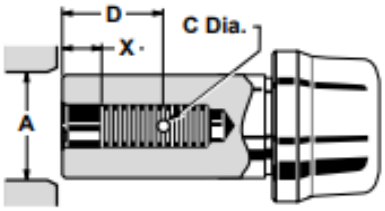


Figure 6–Expanded Graphite Rings Arrangement







Plug Guide Dia. "A"		Plug Stem Dia. "B"		Pin Hole Dia. "C"		"D"		"X"	
mm		mm	in.	mm	in.	mm	in.	mm	in.
22,22		12,70	1/2	3,50	.138	32	1.25	13	.50
38,10		12,70	1/2	3,50	.138	32	1.25	13	.50
60,32		19,05	3/4	5,00	.197	47,5	1.88	19	.75
69,85		19,05	3/4	5,00	.197	47,5	1.88	19	.75

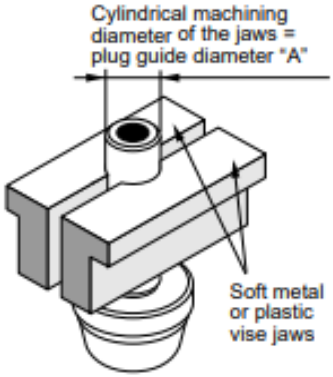
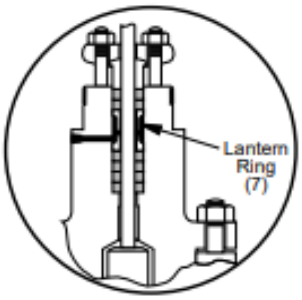


Figure 9
Plug Stem Pinning

Packing box with Kevlar/PTFE packing rings



Valve Dia.		Quantity of Packing Rings (6)					
		Kevlar/PTFE			Expanded Graphite w/ backup Rings		
mm	in.	Above Lantern Ring (7)	Below Lantern Ring (7)	Total	Above Lantern Ring (7)	Below Lantern Ring (7)	Total
20 to 100	3/4 to 4			6			6
150	6			7			7
200	8			8			8

Packing box with Expanded Graphite packing rings and Back-up rings

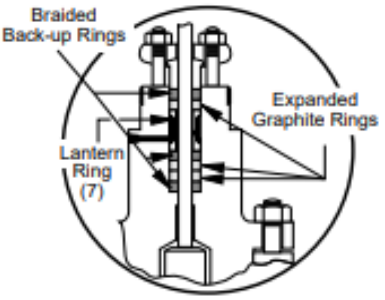


Figure 10 – Packing Rings Arrangements on Packing Box with Optional Leak Detection Connection

Valve Dia.		ANSI Class	Stud (9)		Req'd. Torque							
					Carbon Steel Studs				Stainless Steel Studs			
					Min.		Max.		Min.		Max.	
mm	in.		Size	Qty	Ft.Lbs.	*daN.m*	Ft.Lbs.	*daN.m*	Ft.Lbs.	*daN.m*	Ft.Lbs.	*daN.m*
25-40	1-1 1/2	900	1"-8NC-2A	4	230	*31*	250	*34*	170	*23*	184	*25*
		1500			260	*35*	295	*40*				
		2500			295	*40*	370	*50*				
20 to 50	3/4 to 2	150-300	1/2"-13NC-2A	8	33	*4,5*	37	*5*	26	*3,5*	30	*4*
		400-600			40	*5,5*	48	*6,5*				
80	3	150	5/8"-11NC-2A	6	60	*8*	63	*8,5*	33	*4,5*	37	*5*
		300	5/8"-11NC-2A	6	60	*8*	63	*8,5*	66	*9*	74	*10*
		400-600	3/4"-10NC-2A	8	140	*19*	148	*20*				
100	4	150-300	5/8"-11NC-2A	8	63	*8,5*	70	*9,5*				
		400-600	1"-8NC-2A	8	207	*28*	220	*30*	170*	*23**	184*	*25**
150	6	150-300	5/8"-11NC-2A	12	63	*8,5*	66	*9*	52	*7*	59	*8*
		400-600	1"-8NC-2A	12	207	*28*	221	*30*	207	*28*	221	*30*
200	8	150-300	11/4"-8NC-2A	12	192	*26*	207	*28*	192	*26*	207	*28*

* Only on 21000 threaded trim valves. For quick-change trim valves, use following torques..... | 207 | *28* | 221 | *30*

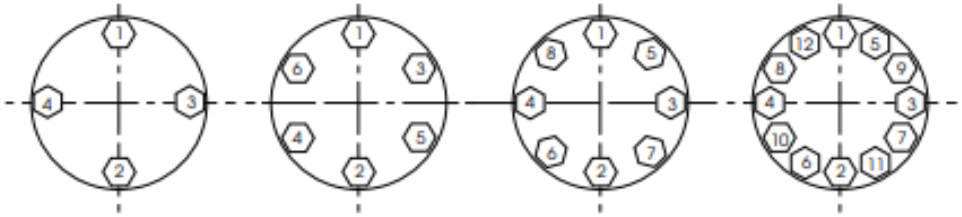


Figure 11 — Torques Sequences and Values for nuts (10)

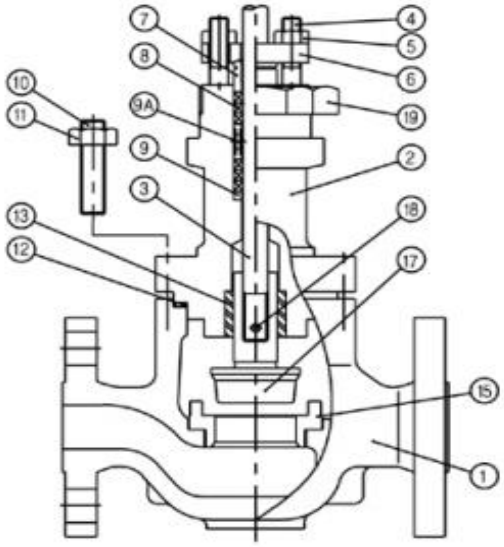


Figure 12–Threded Trim

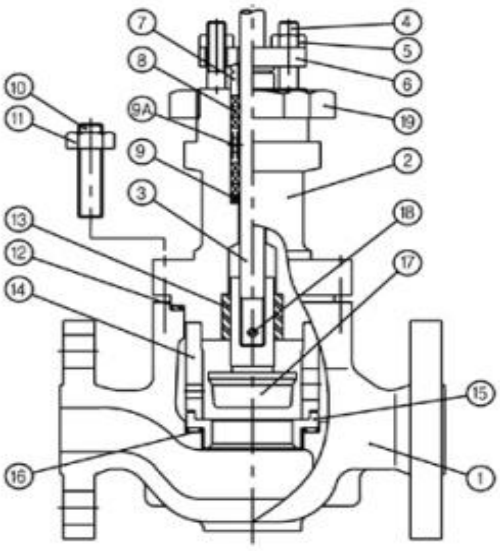


Figure 13–Quick Change Trim

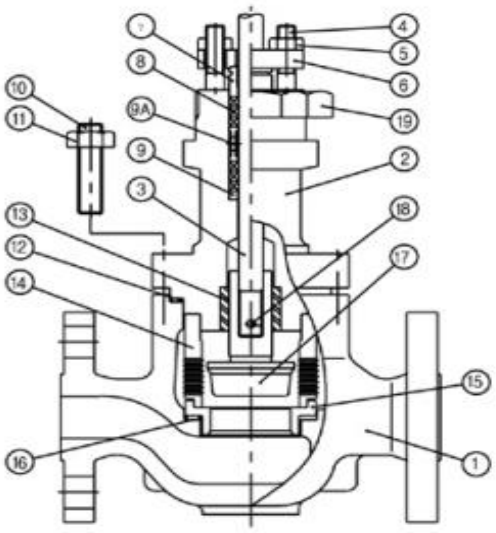


Figure 14–Multi-hole Trim

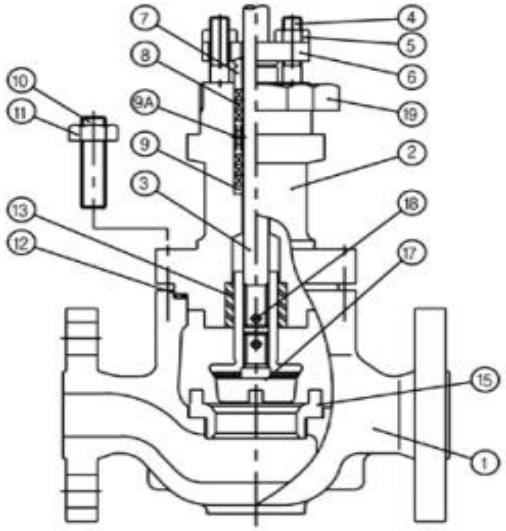


Figure 15–Soft Seat Trim

Part Name	Part Name
1.Body	10.Body Stud
2. Bonnet	11.Body Nut
3.Plug Stem	12.Body Gasket
4.Packing stud	13.Guide Bushing
5.Packing Nut	14.Seat Ring Retainer
6.Packing Flange	15.Seat Ring
7.Gland	16.Seat Ring Gasket
8.Packing	17.plug
9.Packing Spacer	18.Plug Stem Pin
9A.Lantern Ring	19.Yoke Nut