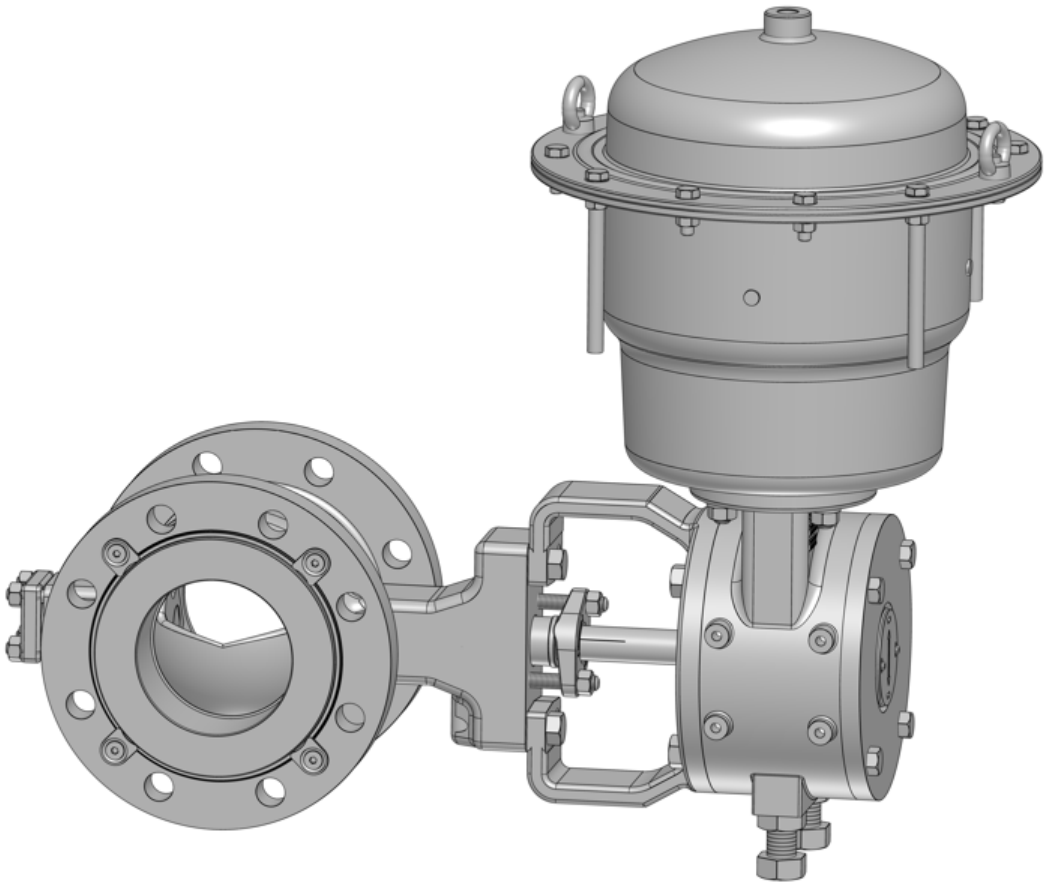
FLOWSERVE

USER INSTRUCTIONS

Valtek® ShearStream™ Control Valve
Segmented V-Port Ball Valve

⚠ These instructions must be read prior to installing, operating and maintaining this equipment.



Experience In Motion

Valtek ShearStream Control Valves

The ShearStream control valve is a high performance, segmented ball-valve design, which is used in low-pressure, high-capacity applications. The ShearStream segmented ball is characterized to give high rangeability and a shearing action to slice or displace fibrous particles in non-homogenous fluid streams. Fluid pressure assists the seat to seal tightly against the surface of the ball in either shaft upstream or shaft downstream orientations. A splined shaft connected to a clamped actuator lever and a pinned shaft/ball connection provides excellent throttling control at a lower comparative cost. The ShearStream control valve with a cylinder or diaphragm actuator is rated for ANSI/FCI 70.2 Class IV (metal seat) or Class VI (soft seat) shutoff.

The following instructions are designed to assist in unpacking, installing, and performing maintenance as required on Flowserve Valtek ShearStream high performance control valves. This instruction manual does not include specific product design data. Such data can be found on the valve's serial plate or specification documents; additionally, dimensional information can be found in the ShearStream Technical Bulletin. Procure needed documents as necessary before you begin any work on the valve.

User Instructions cannot deal with all possible situations and installation options. It is required that only trained and qualified technicians are authorized to adjust, repair, or work on control valves, actuators, positioners, and other accessories. Review this bulletin prior to installing, operating, or performing any maintenance on the valve. Additional Installation, Operation, and Maintenance Instructions (IOMs) cover other features (such as special trim, actuators, handwheels, packing and positioners).

To avoid possible injury to personnel or damage to valve parts, DANGER, WARNING, CAUTION and NOTICE indicators must be strictly followed. Modifying this product, substituting non-factory parts, or using maintenance procedures other than outlined could drastically affect performance and be hazardous to personnel and equipment and may void existing warranties. This manual should be used in conjunction with applicable local and national laws. Failure to comply with User Instructions will render the manufacturer's guarantee and liability null and void. Unless otherwise agreed, the manufacturer's general terms and conditions of sale shall apply.

Read the user instructions carefully before use.
Keep for future reference.

CONTENTS

1 Scope of Manual

The following user information covers Flowserve ShearStream, rotary control valve:

- English ASME Units - Class 150-600, NPS 1 - 16
- Assembled with a pneumatic or electric rotary actuator.
- Comes with or without ancillary equipment.
- As an option an electric rotary actuator can be installed.
- End Connection,
  ASME Units, Integral Flange style:
  Class 150 - 600, NPS 1 - 16
- Face to Face, ANSI/ISA 75.08.02, NPS 1 - 16

1.1 Disclaimer

⚠WARNING These instructions cannot claim to cover all details of all possible product variations, nor can they provide Information for every possible example of installation, operation, or maintenance. This means that the instructions include only the directions to be followed by qualified personal using the product for its defined purpose. If any uncertainties, clarification must be obtained via Flowserve sales office. Sales office can be found in www.flowserve.com.

2 Intended Use

⚠WARNING Rotary control valves are pressure vessels designed and rated for specific application conditions. Before installation, check the serial number and / or the tag number to ensure that the valve and actuator being installed are correct for the intended application. Do not use the valve outside of its rated design limits. Exceeding the design limits may cause hazardous conditions including leakage of the process media resulting in possible process loss, equipment or environmental damage, or serious personal injury or death.

The specific product design data can be found on the valve's serial plate, data sheet and the calculation sheet.

The Valtek ShearStream handles a wide variety of applications, while offering high flow capacity. It consists of the body, trim, transfer case and actuator.

The product offering may include optional ancillary equipment, such as positioners, air-filter regulators, solenoid valves, limit switches or boosters. Digital, I/P, or pneumatic positioners can be mounted directly, with a mounting bracket or according to NAMUR standards.

Refer to the relevant manufacturer's user instructions for information regarding other ancillary equipment.

3 Product Identification

Each Valtek ShearStream control valve comes with an attached serial plate which includes key information specific to the control valve.

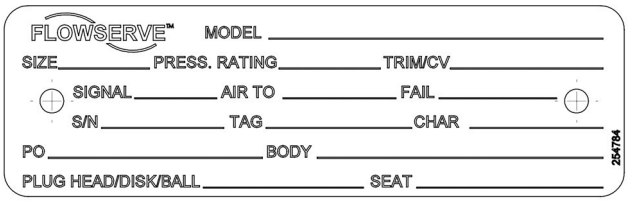


Figure 1: Valve Serial Plate

The same serial number shown on the plate will appear on all Valtek ShearStream data sheets, dimensional drawings, bills of material, and spare parts lists. Other information located on the serial plate is self-explanatory for the Valtek ShearStream control valve.

User can download .pdf versions of the Valtek ShearStream documentation including a sales brochure, technical bulletin, and user instructions at **www.flowserve.com**. It is the user's responsibility to keep this and related documentation on file and accessible for the Valtek ShearStream product.

4 Valtek ShearStream Modification

The Valtek ShearStream control valves are generally delivered as tested and assembled units,

Unauthorized modification of the Valtek ShearStream control valve voids the product test certification and product warranties, could drastically affect product performance, and could be hazardous to personnel and equipment.

⚠WARNING Before Valtek ShearStream re-use, all necessary tests must be repeated and recorded in compliance with all test routines, guidelines, and engineering standards.

5 Safety

Safety terms – DANGER, WARNING, CAUTION and NOTICE - are used to highlight specific dangers and / or provide additional information that may not be readily apparent in the User Instructions.

DANGER **DANGER Indicates that death, severe personal injury and/or substantial property damage will occur if proper precautions are not taken**.

WARNING or ⚠ **WARNING indicates that severe personal injury, death, and substantial property damage can occur if proper precautions are not taken.**

CAUTION **CAUTION Indicates that potential injury (minor or moderate) or equipment damage can occur if proper precautions are not taken.**

NOTICE NOTICE indicates practices or provides additional technical information.

Grey fields indicate safety-related information.

5.1 General Hazard Sources

5.1.1 Mechanical Hazards

a) Lifting limits and Guidelines

WARNING The center of gravity may be above the lifting point. Support must be given to prevent the valve assembly to rotate during removal. Do not stand under suspended loads. Failure to do so can cause serious personnel injury, damage to the valve and nearby equipment.

Many precision parts have sharp corners which require appropriate personal protective equipment during handling. Prior to any attempt to lift an item, employees must first verify the shipping marks for the weight.

- Unstable, or non-ergonomic loads should always be handled with the assistance of additional personnel or appropriate mechanical means.
- Loads exceeding of 23kg (50 lb.) should only be lifted by appropriate mechanical means and in accordance with current local legislation or with the assistance of additional personnel.
- Lifting items less than 23kg (50 lb.) may be prohibited without assistance if the lift is repetitive or non-ergonomic (i.e., away from the body, above the shoulders or below the knees) thus placing excessive stress on the personnel.

b) Tips to avoid issues and Hazards.

WARNING **Crushing hazard! Keep hands clear of pinch points.**

- Install valve assembly with ball in the closed position during installation at site.
- Ensure seat retainer clips are adequately tight.
- Ensure ball pins are assembled and peened/tack welded.

5.2 Responsibility of the Operating Company

- Ensure that the personnel have read and understand all applicable instructions specified in the document.
- Provide training to the necessary personnel in regular intervals.
- Provide the appropriate personal protective equipment.

5.3 Qualified Personnel

Qualified personnel are people who, on account of their training, experience and instruction and their knowledge of relevant standards, specifications, accident prevention regulations and operating conditions, have been authorized by those responsible for the safety of the plant to perform the necessary work and who can recognize and avoid possible dangers. Only trained and qualified technicians are authorized to adjust, repair, or work on control valves, actuators, positioners and other accessories. Contact your local Flowserve representation for a schedule of training schools.

5.4 Protective Equipment

DANGER **Flowserve products are often used in demanding applications (e.g., under extremely high pressures with dangerous, toxic, or corrosive mediums). When performing service, inspection, or repair operations, ensure that the valve and actuator are depressurized and that the valve has been cleaned and is free from harmful substances. Appropriate personal protective equipment must be used, and service personnel must be properly instructed in performing the repair procedure.**

6 Design

Body

The body will be integral (double) flange and compliant with ASME B16.34 and ASME B16.5.

Ball/shaft/bearings

The ball is designed for maximum flow and minimum deflection at maximum shutoff pressures. The shaft is two pieces and affixed to the ball with 2 tapered pins peened or welded in place. The shaft head acts as an anti-blowout component to prevent accidental ejection of the shaft under pressure, in the unlikely event of pin failure. A splined shaft connection to the actuator facilitates precise control. Metal or PTFE lined bearings are interchangeable within the body without special tools.

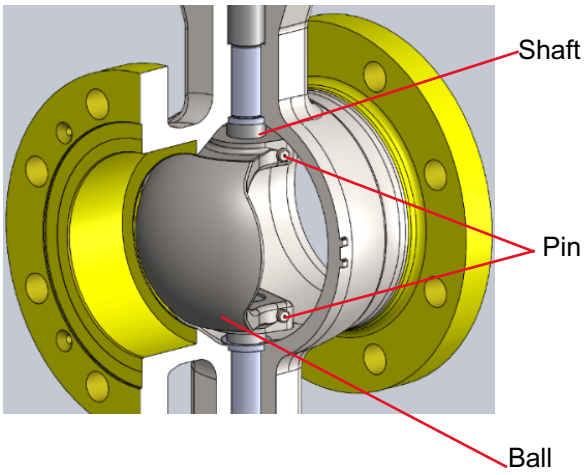


Figure 2: Ball, Shaft & Pin

Shaft End Flange

A shaft end flange with a minimum of four bolts provides a pressure tight seal through the use of a spiral wound metal or PTFE gasket.

Packing

The Valtek ShearStream packing boxes are designed to permit a wide verity of packing configurations, including twin seal packing.

Some typical packing configurations are,

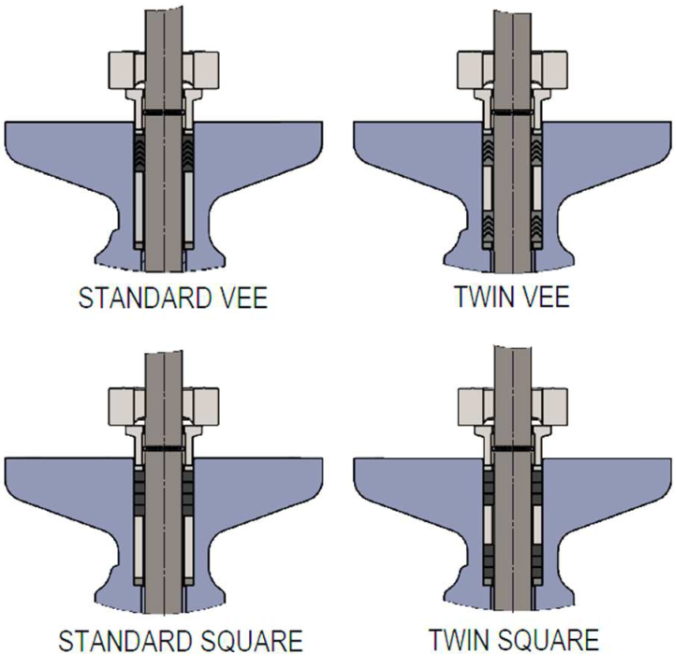


Figure 3: Packing Configurations

6.1 Connections

6.1.1 Mechanical connections

The Valtek ShearStream is connected in line through a integral flange style

In some sizes, blind hole line bolt connections are used near body/shaft necks.

6.2 Accessories

6.2.1 Electrical Connections

The valve may be fitted with electrical accessories, such as solenoids or positioners. Electro-pneumatic digital positioners require a low voltage, 4-20 mA connection. Solenoids and electric valve actuators also require an electrical connection. Follow appropriate IOM instructions (positioners, solenoids, electrical actuators) as applicable.

6.2.2 Pneumatic Connections

A pneumatic actuator typically requires a ¼ inch to ¾ inch air supply of at least 60 psi (4 bar). Flow boosters will require a 1/2 inch to ¾ inch independent air supply. Limit switches or position indicators may be mounted external to a positioner. Follow appropriate IOM instructions for accessories and actuators.

7 Packaging, Transportation and Storage

7.1 Unpacking

While unpacking the valve, check the packing list against the materials received.

- When lifting the valve from shipping container, use straps through the lifting lugs. Position lifting straps to avoid damage to tubing and mounted accessories. Valves equipped with a VR cylinder / NR diaphragm actuator, lift the valve using lifting straps or hook through the yoke legs and outer end of the body.
- Contact the shipper immediately if there is shipping damage.
- Call your Flowserve representative if you experience any problem.

7.2 Packaging and Transport

Packaging includes a cardboard box (with or without a wooden pallet) or wooden box as needed. Packaging may use cardboard, plastic wrap, foam, or paper as packaging material.

Filling material may be a carton type or paper.

Shipping marks display packaging dimensions and weight.

Packaging guidelines for export follow HPE standards.

7.3 Storage

Maximum storage time for control valves is six months.

NOTICE The packing box begins to break down after 6 months. Leakage may develop.

Store the valve on a solid base in a cool, dry closed room. Until its installation, the valve must be protected from the weather, dirt, and other potentially harmful influences. Do not remove the protective covers from the body flanges of the control valve or from the instrument ports of the actuator and accessories until the valve is ready for installation at the site.

8 Installation

8.1 Inspection and Preparation

Ensure that the valve and actuator are being installed as per the serial number, purchase order and/or the tag number for the intended application.

To ensure leak-proof joints, clean the line of dirt, scale, welding chips, and other foreign material. Clean the line gasket surfaces thoroughly.

8.2 Mounting

Selecting the proper fastener material is the responsibility of the customer. Flowserve ‘s standard body bolting material is A193 B7/2H. A193 B8/8 (stainless steel) is optional for applications more than 800° F / 425° C and with stainless steel or alloy body valves. The customer therefore must consider the material ‘s resistance to stress corrosion cracking in addition to general corrosion. Periodic inspection and maintenance are required to ensure fasteners are in proper condition without corrosion. For more information about fastener materials, contact your Flowserve representative.

8.3 Valve Installation

- Ensure the valve is installed correctly as per the flow direction indicator on the body. The valve should be installed in the shaft upstream or downstream configuration specified on the datasheet. Consult the factory if the valve must be mounted in a manner other than what is specified on the datasheet.

⚠ WARNING **When installing the valve in-line between flanges, make sure the flange face gasket covers both seat retainer and body surfaces. Failure to do so will cause excessive leakage. Refer to Figure 4: A, B and C for seat retainer options and line gasket position.**

- Fully close the valve before and during the installation process with pneumatic supply or handwheel (if provided) Ensure that the ball is in the fully closed position. If it is not, adjust the closing stop in the actuator. Tighten the seat retainer screws to hold the seat retainer in place and ensure that the seat retainer sealing surface is equidistant from the body surface.

⚠ WARNING **Keep hands, hair, clothing, away from the rotating ball and the seat when operating the valve. Failure to do so could cause serious injury.**

⚠ CAUTION **Because of the Valtek ShearStream self- centering seat, there is no reason to open the valve at any time during installation. Therefore, the valve should remain closed until the valve is fully installed.**

- Connect air supply and instrument signal. Throttling valves are usually equipped with valve positioners. Two connections are marked for the air supply and for the instrument signal. Most Valtek cylinders and positioners are suitable for 150 psi air supply. An air

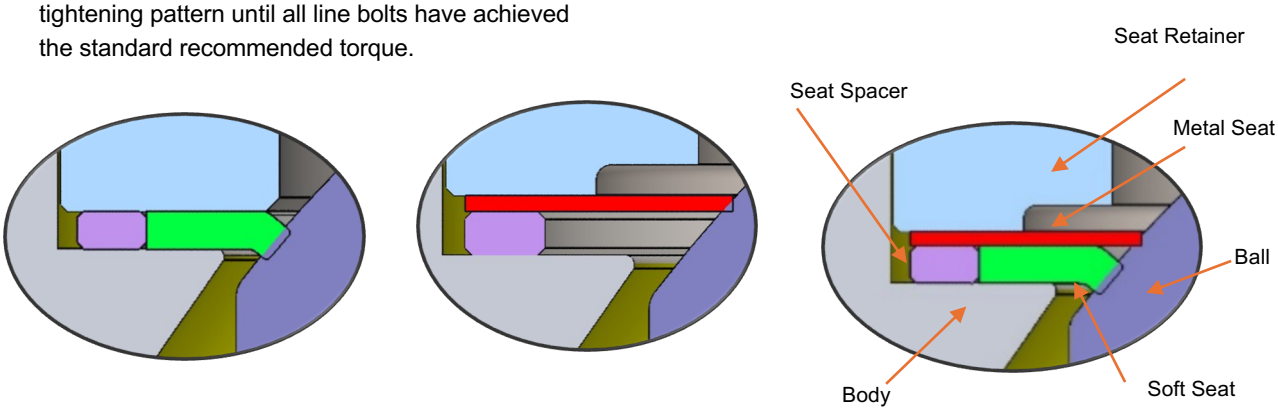
regulator is required based on the maximum supply pressure specified on the actuator and data sheet. An air filter is recommended unless the supply air is unusually clean and dry. All connections must be free of leaks.

⚠CAUTION On valves equipped with air filters, the air filter bowl must point down; otherwise, the air filter will not perform properly.

- Install valve in line by tightening opposite line bolts together in a minimum of 25% increments of the total recommended torque while alternating the tightening pattern until all line bolts have achieved the standard recommended torque.

If the valve has been in operation for a brief time, check the torque on the packing nuts. If packing leaks occur, tighten the packing nuts only enough to stop the leakage.

To observe the valve failure mode in case of air failure, position the valve to mid-stroke and shut off the air supply or disconnect the instrument signal. By observing the position indicator on the gland flange the ball should either fail open or closed.



A) Soft Seat **B) Metal Seat** **C) Dual Seat**

Figure 4: Cross-Sections of Seat Configurations

9 Commissioning

9.1 Preparatory Activities

- Check for full stroke by making the appropriate instrument signal change. Observe ball position indicator plate mounted on the transfer case or the ball position indicator symbols shown on the gland flange and shaft. The ball should change position in a smooth, rotary fashion and should rotate 90 degrees.
- Check all air connections for leaks. Tighten or replace any leaky lines.
- Evenly tighten the packing nuts to slightly over finger tight.

⚠CAUTION Do not overtighten packing. This can cause excessive packing wear, high stem friction that may impede plug movement and can damage the packing. Over-tightening the packing will not reduce the stem seal leakage if the packing has been previously damaged. Damaged packing should be replaced.

9.2 Operation Test

⚠WARNING Keep hands, hair, and clothing away from all moving parts when operating the valve. Failure to do so can cause severe injury.

Activate the valve.

- Check for full 90-degree rotation by making appropriate instrument signal changes.
- Check all air connections for leaks.

9.3 Start-up

Prior to start-up, check the control valve by following these steps:

- Check for process leakage past the shaft flange gasket.
- Adjust actuator limit stops as necessary. If possible, check for seat leakage when the valve is in the closed position.

- Check for any packing leakage. Tighten if necessary.
- Make sure the valve fails in the correct direction in case of air failure. This is done by turning off the air supply and observing the failure direction.

9.4 Operation

Check to ensure that the temperature and pressures of the process do not exceed the limits of the rating of the valve.
Make sure stable air supply is present to the positioner/actuator. If valve body is insulated, ensure that body neck and actuator is exposed to environment.

9.5 Shut down

Prior to working on valve, the valve will need to be removed from line. Ensure that the precautions listed in section 11.1 are followed.

10 Valve Maintenance

10.1 Maintenance Schedule

At least once in every six months, check for proper operation by following the preventive maintenance steps outlined in 10.2. These steps can be performed while the valve is in line and, in some cases, without interrupting service. If an internal problem is suspected, refer to the sections 11.1 and 11.2 for Disassembly and Reassembly.

10.2 Required Replacement Parts for Maintenance

See Table 2 and 3 for parts that are required to be replaced during maintenance or are recommended spare parts.

10.3 Ordering Spare Parts and Accessories

Use only Flowserve original spare parts. Flowserve cannot accept responsibility for any damages that occur from using spare parts or fastening materials from other manufactures. If Flowserve products (especially sealing materials) have been on store for long periods of time check them for corrosion or deterioration before putting them into use. If products have been stored longer than the manufacturer recommended storage life, discard, and replace with new parts.

⚠ WARNING **Unauthorized modification of the Valtek ShearStream rotary control valve voids the product test certification and product warranties, could drastically affect product performance, and could be hazardous to personnel and equipment.**

When ordering spare part, the following information should be provided to Flowserve:

a) Product serial number.
b) Product size.
c) Part name – taken from the parts list/sectional drawing.
d) Part number – taken from the parts list/sectional drawing.
e) Number of the parts required.

The product size and serial number are provided on the nameplate.

10.4 Recommended Maintenance Actions

1. Look for signs of gasket leakage through body and line gaskets. Tighten flange bolting if necessary.
2. Check for corrosion and damages on the valve.
3. Clean valve and paint any areas of severe oxidation.

⚠ CAUTION **Do not overtighten packing. Sudden exposure of the control valve to full working pressure and temperature may cause stress cracks.**

4. Check packing box bolting for proper tightness. Tighten as necessary to prevent stem leakage.
5. If valve is supplied with a lubricator, check lubricant supply, and add lubricant if necessary.
6. If possible, stroke the valve and check for smooth, full stroke operation by observing the ball position indicator plate mounted on the transfer case or the gland flange. Unsteady movement of the ball could indicate an internal valve problem (stick-slip breakout motion is normal whenever graphite packing is used).
7. Check positioner calibration by observing the gauges and the ball position. Make sure the positioner is calibrated to the correct range.
8. Remove transfer case cover plate and make sure the positioner linkage and internal actuator parts are securely fastened. Also, check for air leaks through actuator stem seal, using a soap solution.

⚠CAUTION **Never apply air to the actuator without the cover plate installed; otherwise, the unsupported shaft may sustain damage.**

9. Be sure that all the accessories like positioner, limit switch, solenoids and Air filter regulators are securely fastened.
10. If possible, remove air supply and observe stroke indication for correct fail-safe action.
11. Spray soap solution around the cylinder retaining ring and the adjusting screw to check for air leaks through the O-rings.
12. Clean any dirt or other foreign material from the exposed portion of the shaft.
13. If an air filter is supplied, check cartridge, and replace if necessary and ensure correct vertical orientation.

11 Disassembly and Reassembly

The Valtek ShearStream control valve is allowed to be disassembled and reassembled only by qualified staff - personnel who are familiar with disassembling, reassembling, installation and commissioning of this product, and possess the relevant qualifications in their field of activity.

When performing repairs, personnel are to follow these instructions using only original equipment manufacturer (OEM) spare parts and recommended special tools to ensure the reliability of the Valtek ShearStream control valve.

Only Flowserve trained and authorized personnel are allowed to repair (disassemble and reassemble) the Valtek ShearStream in hazard areas.

Valves are provided for oil and grease-less service, or oxygen service may only disassembled and reassembled in clean rooms (ISO 14644- ISO-8, US FED STD 209 E - M 6.5, or equivalent).

11.1 Disassembly

If an internal problem is suspected with the valve and disassembly is required, remove the valve from the line by proceeding as follows:

⚠WARNING **To carry out this operation, it is essential to disconnect the valve from the pipework. Depressurize line to atmospheric pressure and drain all fluids before working on the valve. Failure to do so can cause serious injury.**

1. Make sure valve (Ball) is fully closed.

NOTICE **On valves with fail-open action, air pressure must be supplied under the actuator piston to close the valve. If the valve is supplied with a handwheel, it can be used to close the valve.**

2. Attach a hoist or some means to support the valve. If lifting holes are provided in the body, properly installed shouldered eye bolts or hoist rings to be used along with a strap around the actuator to balance the entire valve weight safely.
3. Remove the line bolting. Do not attempt to pry line flanges apart by pushing or pulling on valve actuator.
4. Slide the valve carefully from the line. To avoid damage to gasket surfaces, do not twist the valve.
5. After the valve is completely removed from the line and the ball can freely rotate without obstruction, slowly relieve air pressure from the actuator. For fail open valves, protect the ball sealing surface.

Removing Actuator from Body

To remove the actuator, proceed as follows (refer to the Valtek VR or Valtek NR actuator IOMs for additional information):

1. Support actuator assembly before disconnecting it from the body assembly. Refer to Figure 5.
2. Remove the transfer case cover bolts. Carefully pry or slide the cover plate from the end of the shaft.
3. On Valtek actuators with a clamping lever arm design, loosen the linkage bolt.
4. Loosen the actuator adjusting screw on VR cylinders to release spring load.
5. Remove the bolts connecting yoke to the body subassembly.
6. Slide entire actuator assembly off the shaft. For Valtek actuators with a clamping lever-arm design, wedge the halves of splined lever arm apart to loosen it from the shaft splines.

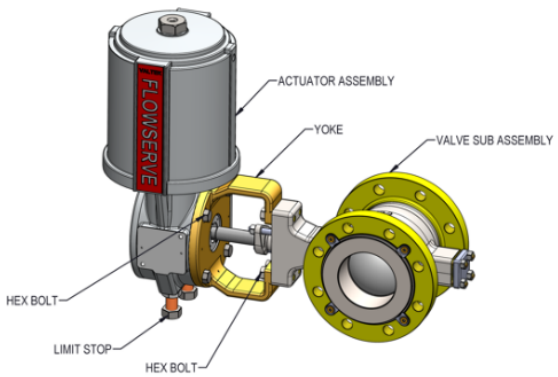


Figure 4: VR Actuator on Body

⚠ WARNING Control valves are pressure vessels.
Improper opening of the valve or actuator can result in bodily injury.

⚠ Prior to disassemble and reassemble, we require, that you check the following conditions to reduce the risk of malfunction and safety-related incidents.

No.	Important information	Possible malfunction or safety related incident
1	Disregarding these instructions may bring serious or harmful consequences.	Failure to comply with these user instructions will render the manufacturers guarantee and liability null and void. Unless otherwise agreed, the manufacturers general terms and conditions of sale shall apply.
2	⚠ Always observe system safety instructions when preparing for and performing the repair procedure.	Potential hazards and their sources are under the operators influence. The operator must observe national and international environmental regulations for control valve removal from the pipe and cleaning. Permissible exposure limits must be maintained, appropriate personal protective equipment must be used and service personnel must be properly instructed in performing the repair procedure.
3	⚠ Make sure the pipeline is depressurized an in ambient state, also a suitable rigging (e.g., endless sling) and securing devices (e.g., vee trough with stands / vise) are readily available.	Remove the valve from the pipeline in a depressurized and ambient state. Failure to do so can cause serious personal injury. The control valve is not equipped with integral stands, therefore guard against the valve from tipping over. Bodily injuries can be the result. Use appropriate clamps, blocking or other stabilizing support. Attachment to overhead crane can ensure stability.
4	Confirm that you have the required spare parts at the site.	Not having the full complement of parts, accessories and tools can slow or stop repair work.
5	⚠ Confirm that you have the required tools available to manage the disassembly and reassembly	Improper tools and / or improper use of tools can result in personal injury or damage to the parts.
6	Review the serial plate information to identify the valve. The serial number and the part numbers needed are required when ordering spare parts.	A serial plate used for product identification is attached on every control valve (See Section 3: Product Identification).
7	Do not damage any valve surfaces during repair.	Damaging the stem surface and / or packing area may lead to premature leakages in the packing area.
8	Check all parts for damage such as scoring, deformities, corrosion, or overexpansion.	If in doubt, replace faulty parts. Never reuse gaskets.

Table 1: Basic safety messages for repairing the control valve

Disassembling the Body

To disassemble the body, refer to Figure 6 - 8, orient the body with the seat retainer gasket surface horizontal and proceed as follows:

1. On Valtek ShearStream valves supplied with seat retainer clips (CL 150/300) / socket screws (CL600), remove the seat retainer screws and retainer clips. Lift the seat retainer out of the valve body. (Refer to Figure 5: A, B and C).
2. On valves supplied with seat retainer socket screws, remove all the screws.
3. Remove the gland flange by removing both packing nuts. It is not necessary to remove the studs.
4. Drive the taper pins out of the ball by tapping on the small end of the pins using a center punch and hammer. If the pins are welded, carefully grind and remove the welds.
5. Remove the shaft flange nuts and then remove the shaft flange and shaft flange gasket.

6. Remove the post by inserting a nylon rod (or similar material) into the shaft flange end of the body and using a hammer, carefully tap the post towards the flow path for size 3” & above. Refer fig. 5(a)

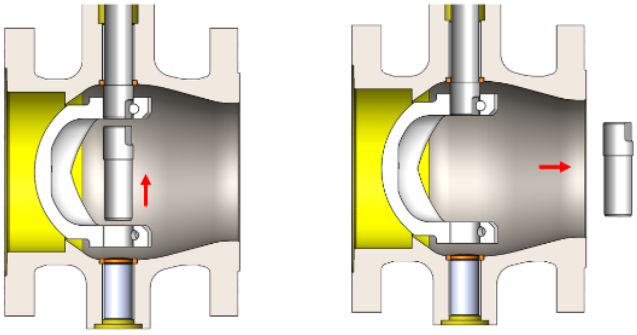


Fig. 5 (a)

7. Remove the post side bearing and thrust berating carefully before removing the shaft. Refer Fig. 5(b)

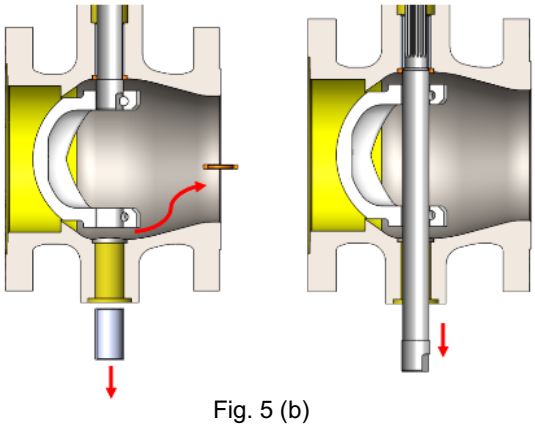


Fig. 5 (b)

8. Remove the post side bearing and thrust bearing carefully before removing post for size 1” & 1.5” & connect the appropriate tool with post (tap on the bottom surface) & remove the post by the pulling towards shaft flange side. Refer Fig. 5(c)

9. Remove the shaft by inserting a press or a nylon rod (or similar material) into the shaft side of the body and using a hammer, carefully tap the shaft through the post bore.

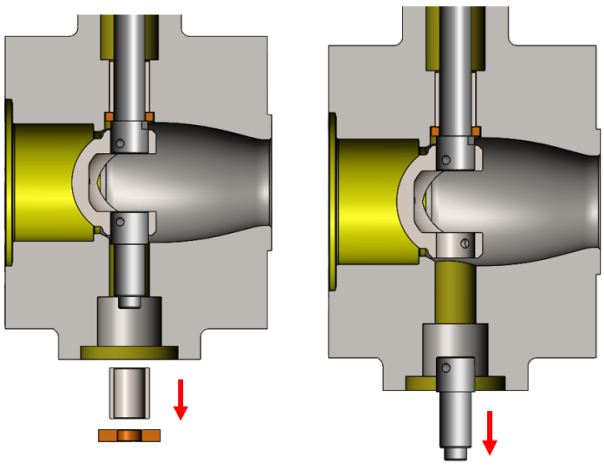


Fig. 5 (c)

⚠ CAUTION **Take special care not to damage the splined end of the shaft & body bearing surface during disassembly. To prevent scratching the sealing surface of the ball while removing the shaft, place supports underneath the ball. This also prevents the shaft from binding in the body as the shaft comes off the bearing surfaces. As the shaft and post come out of the body, the thrust bearings and ball will likely drop out of position.**

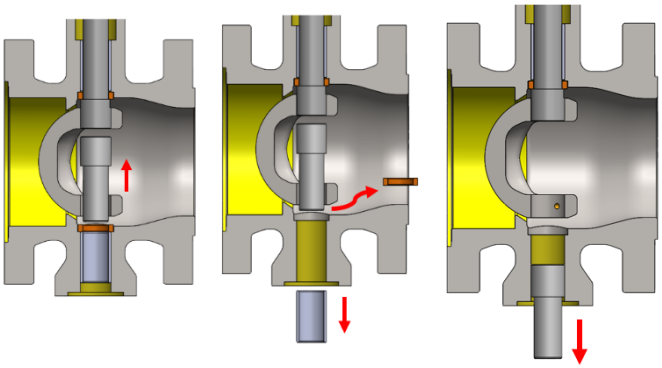
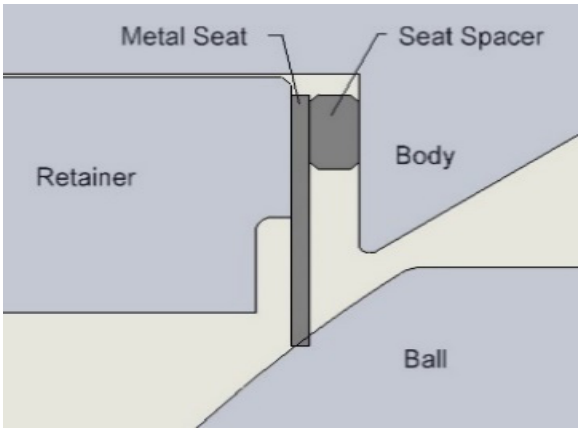


Fig. 5 (d)

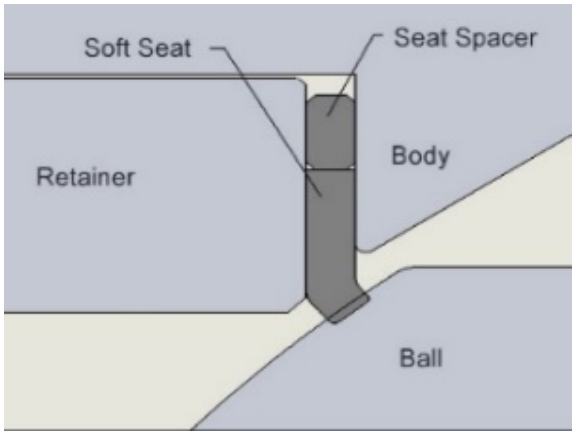
10. Remove the ball from the body, through seat side port for the valve size 1 & 1.5”, above 2” remove through opposite to the seat side port of the valve.

11. Push the packing and bearings (shaft side) out of the body using a dowel of appropriate diameter. Push the packing from the center of the valve.

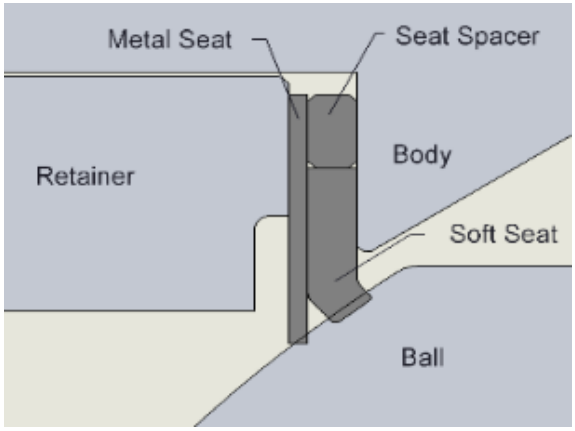
Figure 6:



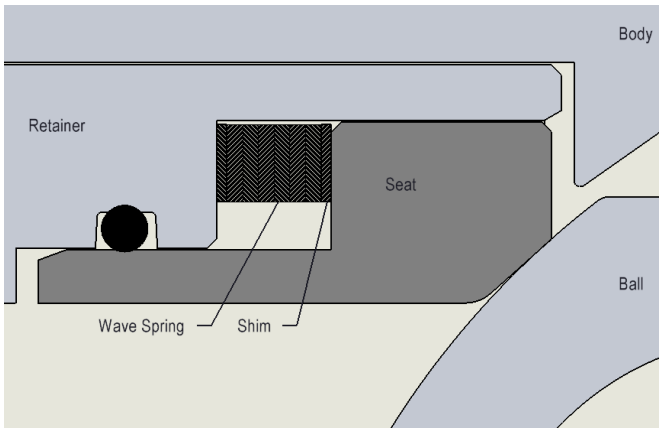
Metal Seat



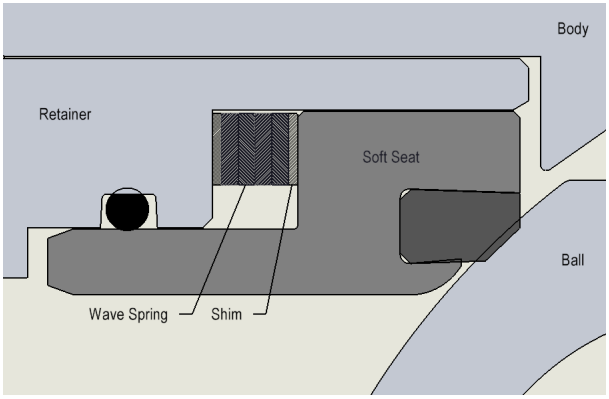
Soft Seat



Dual Seat

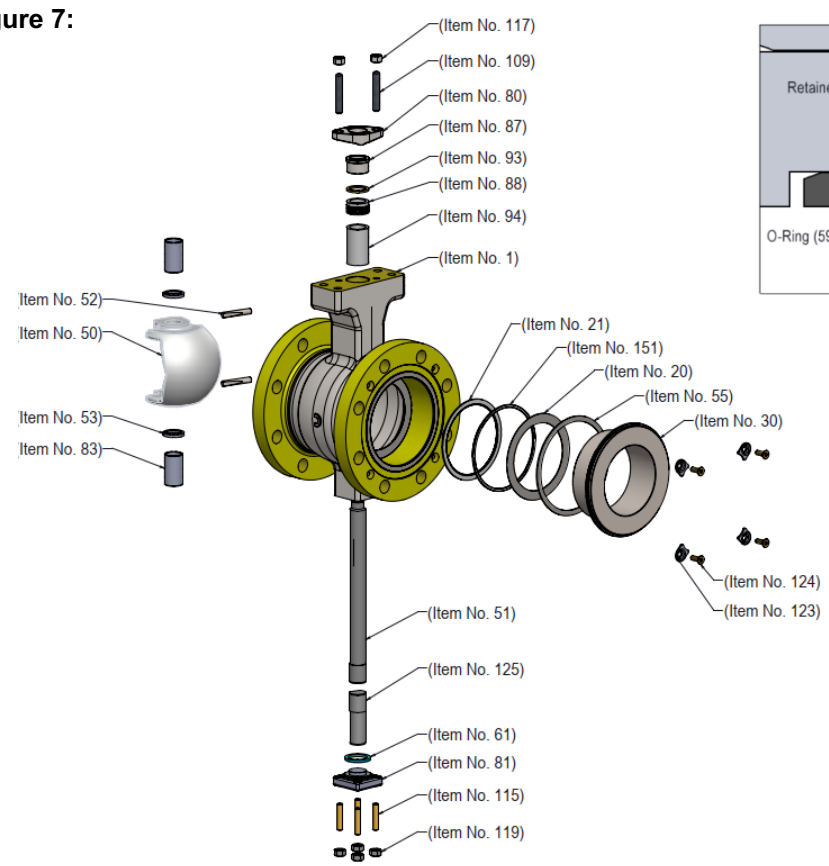


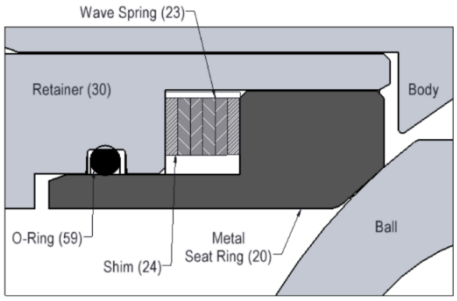
Heavy Duty Metal Seat



Heavy Duty Soft Seat

Figure 7:





HEAVY DUTY SEAT

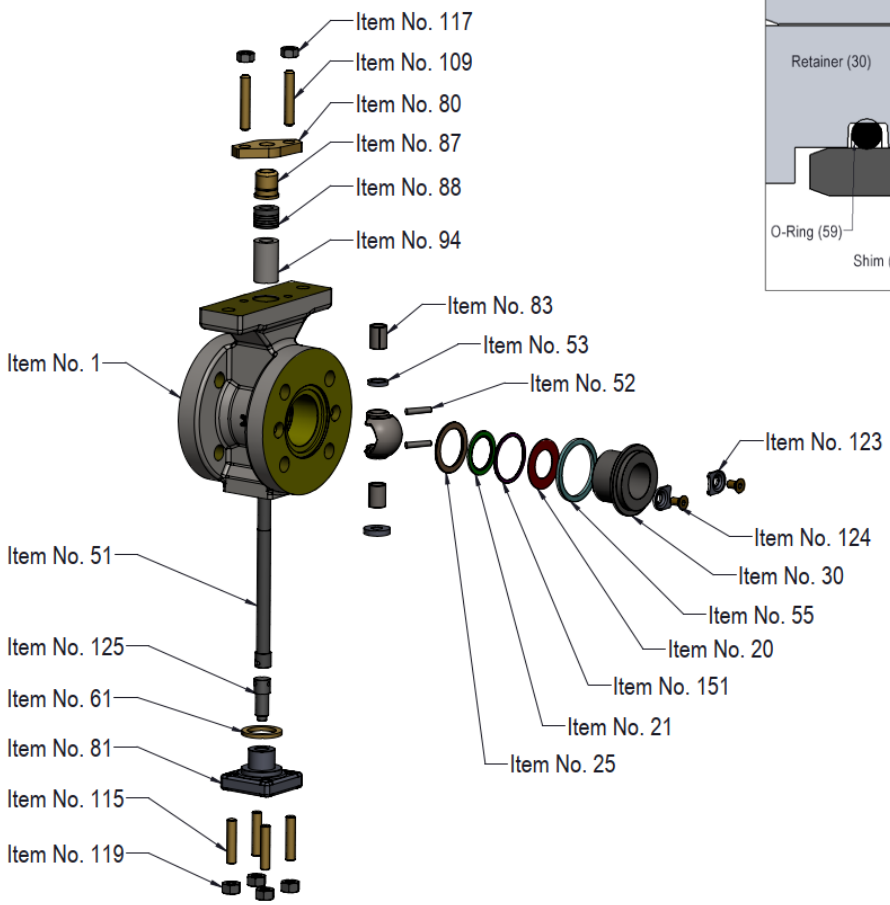
Table 2: size 2”-16”

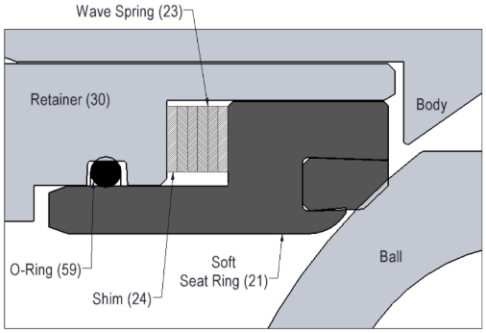
Item	Description
1	BODY
20	METAL SEAT
21	SOFT SEAT
151	SEAT SPACER
30	SEAT RETAINER
50	BALL
51	SHAFT
125	POST
52	SHAFT PIN
53	THRUST BEARING
55	SEAT GASKET
61	SHAFT FLANGE GASKET
80	GLAND FLANGE
81	SHAFT FLANGE
83	BEARING
87	PACKING FOLLOWER
88	PACKING SET

Item	Description
93	PACKING SPACER
94	PACKING SPACER
105	DRIVE SCREW (Not shown)
109	PACKING BOX STUD
117	PACKING BOX NUT
115	SHAFT FLANGE STUD
119	SHAFT FLANGE NUT
126	FLOW ARROW PLATE (Not shown)
123	SEAT CLIP
124	CLIP SCREW

HEAVY DUTY SEAT	
20	SOFT SEAT (HD)
23	WAVE SPRING
24	SHIM
30	RETAINER
59	O-RING

Figure 8:





HEAVY DUTY SEAT

Table 3: Size 1” and 1.5”

Item	Description
1	BODY
20	METAL SEAT
21	SOFT SEAT
25	SEAT BUSH
151	SEAT SPACER
30	SEAT RETAINER
50	BALL
51	SHAFT
125	POST
52	SHAFT PIN
53	THRUST BEARING
55	SEAT GASKET
61	SHAFT FLANGE GASKET
80	GLAND FLANGE
81	SHAFT FLANGE
83	BEARING
87	PACKING FOLLOWER

Item	Description
88	PACKING SET
94	PACKING SPACER
105	DRIVE SCREW (Not shown)
109	PACKING BOX STUD
117	PACKING BOX NUT
115	SHAFT FLANGE STUD
119	SHAFT FLANGE NUT
126	FLOW ARROW PLATE (Not shown)
123	SEAT CLIP
124	CLIP SCREW

HEAVY DUTY SEAT	
20	SOFT SEAT (HD)
23	WAVE SPRING
24	SHIM
30	RETAINER
59	O-RING

11.2 Reassembly

Reassembling the Body

1. Clean all parts.

2. Check the ball seating surface to make sure it is smooth and free of scoring and scratches.

3. To reassemble the body sub-assembly, refer to Figure 7 - 8 and proceed as follows:

⚠CAUTION **Damaged or dirty seat surfaces can cause excessive seat wear and high torque requirements. Damaged ball should be replaced.**

4. Inspect shaft & post for scratches or galled surfaces. For maximum performance, ShearStream shafts are machined to a very smooth finish. If damage exists, replace the shaft, or contact factory representative.

5. Insert new bearings (shaft side only) into the body. The end of the bearing should be flush with the flat face in the inner diameter the of the body. For large, lined shaft bearings, a press or fixture may be required to install.

NOTICE **Do not directly impact the lined shaft bearings with a hammer. A light lubricant may be applied to the shaft bearing bore to assist in lined bearing installation.**

6. Insert the ball though body port (seat side for 1 & 1.5”, for 2” and above opposite to seat side port) Position the ball in the body, making sure it will rotate in the proper direction. Position the shaft side thrust bearing and slide the shaft through the body (post side bore), ball, thrust bearings and bearings (shaft side).

7. Insert new bearing (post side) into the body. The end of the bearing should be flush with the flat face in the inner diameter the of the body. For large, lined shaft bearings, a press or fixture may be required to install. Position the post side thrust bearing. For size 1, 1.5 & 2” step 7 will be performed after step 8 (position the post).

8. Insert the post through the body (flow path) & slide through ball, thrust bearing and bearings. For size 1, 1.5 & 2” inset the post from body bottom bore (post bore).

⚠CAUTION **Exercise care while sliding the shaft into the sliding stem shaft bearings to avoid damage to both the shaft and shaft bearings. For valve size 1, 1.5 & 2” step-7 will be performed after step-8.**

9. Rotate the ball and position the pin hole facing the body port (RF side) turn the shaft flat to allow the taper pins to slide through the ball pin holes and engage the shaft as shown in the Figure 9. Insert new taper pins in the direction towards the seat side of the body port.

10. Turn the post flat (using tap hole provided in the post bottom face) to allow the taper pins to slide through the ball pin holes and engage the post as shown in the Figure 9. Insert new taper pins in the direction that is towards the seat side of the body port.

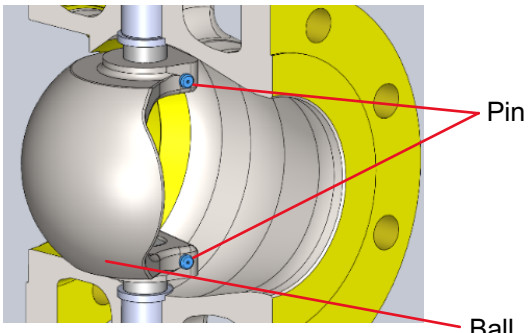


Figure 9: Ball and Pin Engagement

11. Align the ball and body center in eyesight by adjusting the ball in shaft axis direction.

12. Drive the pin firmly into place with a hammer. Peen the ball surface a minimum of 5 locations within 0.06 inch of the taper pin outer diameter. If welding, tack weld between the taper pin and the ball in two opposite locations.

13. Slide the packing spacer, lower packing (if applicable), packing spacer, upper packing, and the follower spacer over actuator end of the shaft and into the body.

⚠CAUTION Since the sealing on V-ring packing takes place at the feather edge as shown in Figure 10. It is important to avoid damage to that edge.

14. Install the packing follower over the top.

15. Reinstall the gland flange and packing nuts. Tighten packing firmly and evenly. Ensure that the stroke indicator symbols on the surface of the gland flange align properly with the mark in the shaft.

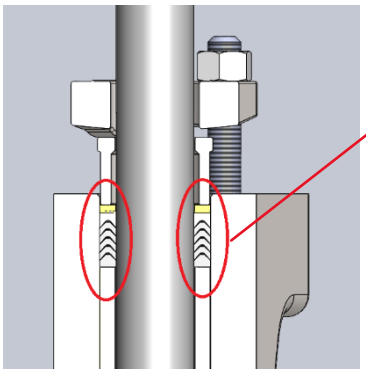


Figure 10: Packing V-ring Configuration

⚠CAUTION Do not overtighten packing. This can cause excessive packing wear and high shaft friction, which may impede shaft rotation.

8. Reinstall the shaft flange gasket and the shaft flange and evenly tighten the nuts in an alternating pattern and ensure the metal-to-metal face contact between body and shaft flange (2”-16”). Recommended torque valves is shown in table 4.

9. Install the seat retainer gasket (item #55) in the appropriate groove in the body face.

10. For standard seat configuration, position the seat spacer into the body, for soft & dual seat option inset the soft seat into the seat spacer prior to positioning the seat spacer. Place the metal seat over the seat spacer (applicable only for metal & dual seat configuration). Refer figure 4 A, B & C for the seat details.

    ⚠CAUTION Ensure the soft seat is assembled as per figure 4. wrong positioning the soft seat will impact the seat performance.

11. For heavy duty metal or soft seat configuration, lubricate the O-ring and install into the O-ring groove on seat/seat retainer (O-ring groove will provided in seat retainer for 1- 4” & seat for 6-16”). Also lubricate the metal surface between the seat &seat retainer, place the one shim in seat retainer followed by all the wave springs and then the remaining shim. Next place the seat into seat retainer, so the seat is resting on the shims and wave springs. For heavy duty metal seats, lubricate the contact surfaces between the seat and ball.

12. Position and secure the seat retainer in place by tightening the retainer clips and screws. This allows the seat to align with the ball, permitting tight shutoff.

Remounting Actuator to Valve

Before mounting a Valtek actuator on the valve body, verify that the ball rotation matches the actuator rotation and complies with the air failure requirements. The procedure for mounting the actuator to the valve is as follows:

1. Slide the entire actuator assembly onto the shaft. If necessary, on Valtek actuator designs with clamping lever arm design, wedge the splined lever arm apart to loosen it on the shaft splines. For full rotation of the ball, marks provided on the end of the shaft and on the lever arm should be aligned.
2. Bolt the actuator yoke to the valve body. Be certain the stroke indicator plate is positioned properly to accurately indicate the valve's rotation.
3. Position the actuator lever arm on the shaft so the actuator stem is centered in the transfer case. Firmly tighten the linkage bolt, on clamping lever arm actuators.

⚠CAUTION On clamping lever-arm actuators, do not apply air to the actuator without the cover plate installed; otherwise, the unsupported shaft may sustain damage.

4. Adjust the actuator stroke stop bolts to get the required stroke.

⚠CAUTION Actuator stroke stop bolts must be properly adjusted to prevent the valve ball from over stroking. If incorrectly adjusted the valve shaft may be twisted or sheared off.

5. Install valve in line as outlined in Installation section.

Table 4: Shaft flange bolting torques

Valve Size (in)	Pressure Class	Torque	
		ft-lbs	N-m
1” – 3”	150-600	5 ± 1	7 ± 1
4	150-300	5 ± 1	7 ± 1
	600	7 ± 1	10 ± 1
6”	150 -300	7 ± 1	10 ± 1
	600	15 ± 1	20 ± 1
8”	150	7 ± 1	10 ± 1
	300-600	15 ± 1	20 ± 1
10”	150-300	7 ± 1	10 ± 1
	600	20 ± 1	27 ± 1
12”	150	15 ± 1	20 ± 1
	300-600	20 ± 1	27 ± 1
16”	150	20 ± 1	27 ± 1
	300-600	22 ± 1	30 ± 1

12 Troubleshooting Guide

Scenario	Causes	Remedies
Valve moves to failure position excessive air bleeding from transfer case	Failure of actuator O-ring	Replace actuator stem O-ring
	Failure of sliding seal assembly	Repair or replace sliding seal assembly
Jerky shaft rotation	Overtightened packing	Retighten packing box nuts to slightly over finger-tight
	Improper adjustment of lever arm on shaft causing arm to contact transfer case	Readjust lever arm (see step 1 in the “Remounting Actuator” section)
	Cylinder wall not lubricated	Lubricate cylinder wall with silicone lubricant
	Worn piston O-ring allowing piston to gall on pneumatic actuator cylinder wall	Replace O-ring: if galling has occurred replace all damaged parts
	Worn actuator stem O-ring causing actuator cylinder stem to gall on stem collar	Replace O-ring: if actuator stem is galled replace it
	Worn (or damaged) shaft bearings, shaft bearings or packing followers	Disassemble and inspect parts; replace any worn or damaged parts
Excessive internal leakage (Shutoff/Seat leakage)	Improper adjustment of external stroke stops	Refer to the installation, operation, and maintenance manual for corresponding actuator
	Worn or damaged seat	Replace seat
	Damaged ball seating surface	Replace ball and shaft
	Improper handwheel adjustment acting as limit stop	Adjust handwheel until ball seats properly
Leakage through pipe flange line gasket	Loose pipe flange bolts	Tighten pipeline bolting to required torque, Refer to Annex A
	Worn or damaged gaskets	Replace pipe flange gaskets
	Dirty or corroded gaskets	Replace pipe flange gaskets
Leakage through packing box	Loose packing box nuts	Tighten packing box nuts
	Worn or damaged packing	Replace packing
	Dirty or corroded packing	Clean body bore and stem, replace packing
Valve slams, won’t open, or causes severe water hammer	Improper valve installation	See step 2 in “Installation” section and correct flow direction
Shaft rotates, ball remains open or closed	Missing or broken taper pins	Replace taper pins
	Broken internal actuator parts	Replace shaft, make sure shaft is not overstressing on external stroke stop
Actuator operates, shaft does not rotate	Broken internal actuator parts	Refer to appropriate actuator Maintenance Instructions

Table 5: Troubleshooting recommendations.

13 Returns and Disposal

13.1 Returns

WARNING **Before products are returned to Flowserve for repair or service, Flowserve must be provided with a certificate that confirms that the product has been decontaminated and is clean. Flowserve will not accept deliveries if a cleaning certificate has not been provided. Return authorization is also required before parts are returned. Contact your local Flowserve representative to obtain return authorization.**

13.2 Disposal and Recycling

Up to 95 % of the Valtek ShearStream control valve is metal. The remaining materials are synthetic rubber, polymers, elastomers, polytetrafluoroethylene (PTFE), graphite, paint, and lubricants.

NOTICE Potential hazards and their sources are under the operators influence. The operator must observe national and international environmental conditions for control valve removal from the pipeline and cleaning. Permissible limit values must be maintained to ensure suitable protective measures; service personnel must be properly instructed in performing the disassembly and reassembly procedure.

The valve should be professionally disassembled and reassembled. Metal parts should be scrapped, with the remaining materials disposed of according the national conditions.

Peripheral units (accessories) should be recycled according to the relevant manufacturer ‘s User Instructions.

Flowserve Corporation
5215 North O'Connor
Blvd. Suite 700
Irving, Texas 75039-5421 USA

VAIOM001530-00 (EN/A4) December 2024