



USER INSTRUCTIONS

Valtek Valdisk

High Performance Butterfly Control Valves

VAIOM000286 EN

Original Instructions

Installation Operation Maintenance

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





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1 General Information

1.1 Scope of manual

The following instructions are designed to assist in unpacking, installing and performing maintenance as required on Flowserve products. Product users and maintenance personnel should thoroughly review this bulletin prior to unpacking, installing, operating, or performing any maintenance. In most cases, Flowserve valves, actuators and accessories are designed for specific applications (e.g. with regard to medium, pressure, and temperature). For this reason, they should not be used in other applications without first contacting the manufacturer. The product Installation, Operation, and Maintenance Instructions provides important additional safety information



Failure to comply with the information provided in the User Instructions is considered to be misuse. Personal injury, product damage, delay in operation, or product failure caused by misuse are not covered by the Flowserve warranty.

1.2 Applicability

The following instructions are applicable to the maintenance and installation of the Flowserve Valtek Valdisk rotary control valve¹:

- English ASME Units - Class 150, NPS 3 – 60 & Class 300 / 600, NPS 3 – 24

End Connection -
Wafer style: Class 150 / 300 / 600, NPS 3 – 12
Lug & Integral-flange style: Class 150, NPS 3 – 60 & Class 300 / 600, NPS 3 – 24
- Metric DIN Units – PN 10 / 16 / 25 / 40, DN 80 – 600

End Connection -
Lug - PN 10 / 16 / 25 / 40, DN 80 – 600

- Assembled with a pneumatic or electric rotary actuator
- Comes with or without ancillary equipment

1.3 Disclaimer

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 normally include only the directions to be followed by qualified personal using the product for its defined purpose. If there are any uncertainties in this respect, particularly in the event of missing product-related information, clarification must be obtained via the appropriate Flowserve sales office. All Flowserve User Manuals are available at www.flowserve.com.

1.4 Certification instruction

It is a legal requirement that machinery and equipment put into service within certain regions of the world shall conform to the Marking Directives applicable to Flowserve products (i.e. Machinery Directive, Low Voltage Directive, Electromagnetic Compatibility (EMC) Directive, Pressure Equipment Directive (PED), Equipment for Potentially Explosive Atmospheres (ATEX), etc.).

NOTE: Certificates defined in the Contract requirements are provided with these instructions where applicable. Examples of the certificates can be found in the Annex of this document. If required, copies of other certificates sent separately to the Purchaser should be obtained from the Purchaser for retention with this User Instruction.

¹ Additional sizes and pressure classes available as engineer to order. Contact your Flowserve representative for additional information.

2 Safety Information

2.1 Intended use

WARNING: Rotary control valves are 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 in-tended 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.

2.2 Safety symbols and description

The safety terms **⚠ DANGER**, **⚠ WARNING**, **⚠ CAUTION** and **📌 NOTE** are used in these instructions to highlight particular dangers and/or to provide additional information on aspects that may not be readily apparent.

Table 1: Definition of safety symbols and markings

Symbol	Description
⚠ DANGER	Indicates that death, severe personal injury and/or substantial property damage will occur if proper precautions are not taken.
⚠ WARNING	Indicates that death, severe personal injury and/or substantial property damage can occur if proper precautions are not taken.
⚠ CAUTION	Indicates that minor personal injury and/or property damage can occur if proper precautions are not taken.
📌 NOTE:	Indicates, and provides, additional technical information, which may not be obvious.

2.3 General hazard sources

2.3.1 Mechanical Hazards

a) Lifting limits and guidelines

WARNING: When lifting a valve be aware that the centre of gravity may be above the lifting point. Accordingly, support must be given to prevent the valve from rotating. Failure to do so can cause serious injury to personnel and 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 determine the approximate weight and stability of the load.

- Large, unstable, or awkward loads should always be handled with the assistance of additional personnel or appropriate mechanical means.
- Loads in excess 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 and/or awkward (i.e., away from the body, above the shoulders or below the knees) thus placing excessive stress on the personnel.
- Repetitive lifting of any kind should be evaluated as part of a documented end-user safety program.

b) Other tips to avoid issues and hazards

WARNING: Keep hands clear of pinch points. Follow the instructions below to avoid hazardous pinch

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

2.4 Responsibility of the operating company

- Complete a risk assessment of the site where the product/system will be in operation, by observing the working conditions.
- Create site specific work instructions for the operation of the product
- Ensure that the personnel have read and understand all applicable instructions
- Provide regular training to the necessary personnel in regular intervals
- Provide the required personal protective equipment

2.5 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. Contact your local Flowserve representation for a schedule of training schools.

2.6 Protective equipment

DANGER: Flowserve products are often used in problematic applications (e.g. under extremely high pressures with dangerous, toxic or corrosive mediums). When performing service, inspection, or repair operations, always ensure that the valve and actuator are depressurized and that the valve has been cleaned and is free from harmful substances. In such cases, pay particular attention to personal protection (e.g. protective clothing, gloves, glasses etc.).

3 Product Description

3.1 General product description

The Valdisk, double offset, high performance, butterfly control valve provides high capacity flow at a low pressure drop. ANSI/FCI Class IV and VI shutoff are achievable with metal and polymer seats, respectively. A simplified yet precise design provides rigid, precise, throttling service while allowing for efficient maintenance and parts interchangeability.

3.2 Design

Body

The body may be lug style, wafer or integral (double) flange. The design is compliant with ASME B16.34, ASME B16.5 and API 609. A lug style DIN body is also available compliant with DIN EN 558 and EN 1092. Various body styles are designed to accept the same internal parts to maintain consistent Cv and performance.

Disk/shaft/bearings

The disk is designed for maximum flow and minimum deflection at maximum shutoff pressures. The shaft is two piece on a few small sizes and one piece on most sizes. The shaft is affixed to the disk with 2 or 4 tapered pins peened or welded in place. The shaft has a anti-blowout ring to prevent accidental ejection of the shaft under pressure, in the event of pin failure. A splined or keyed shaft connection to the actuator provides precise control. Metal or PTFE lined bearings are interchangeable within the body.

Shaft End flange

A shaft flange with a minimum of four bolts provides a pressure tight seal through use of a high purity graphite or metal seal.

Packing

Multiple types of packing sets can be applied to a packing box. A stress equalizing gland flange provides uniform packing compression for optimal sealing. The gland flange also provides external indication of the disk position.

3.3 Connections

3.3.1 Mechanical connections

The Valdisk butterfly valve is connected in line through a:

- 1) lug style (threaded, single flange)
- 2) wafer style (clamped between two pipeline flanges) or
- 3) integral flange style (double through hole flanges)

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

3.4 Accessories

3.4.1 Electrical connections

The valve may be configured with electrical accessories, such as solenoids or positioners. Electro-pneumatic digital positioners require a 4-20 mA connection. Solenoids typically require a 24 VDC connection. Electric valve actuators also require an electrical connection. Follow all appropriate IOM instructions for each component as applicable.

3.4.2 Pneumatic connections

A pneumatic actuator typically requires a ¼ inch air supply of at least 60 psi (4 bar). Larger actuators will require a 3/8 inch air supply. Flow boosters will require a 1/2 inch to ¾ inch independent air supply from the positioner. Limit switches or position indicators may be mounted external to a positioner. See OEM IOM literature for their connection and adjustment instructions.

4 Packaging, Transportation and Storage

4.1 Consignment receipt

Immediately after receipt of the product/system it must be checked against the delivery/shipping documents for its completeness and that there has been no damage in transportation. Any shortage and/or damage must be reported immediately to Flowserve and must be received in writing within one month of receipt of the equipment. Later claims cannot be accepted.

4.2 Unpacking

- 4.2.1 While unpacking the valve, check the packing list against the materials received. Lists describing the valve and accessories are included in each shipping container.
- 4.2.2 When lifting the valve from shipping container, use straps through the lifting lugs. Take care to position lifting straps to avoid damage to tubing, and mounted accessories. Valves up through 14-inch may be lifted by the actuator lifting ring. On larger valves equipped with a VR cylinder actuator, lift the valve using lifting straps or

hook through the yoke legs and outer end of the body.

- 4.2.3 Contact the shipper immediately if there is shipping damage.
- 4.2.4 **Should any problem arise, contact your Flowserve representative.**

4.3 Packaging and Transport

Careful packing, loading and transport arrangements are required to prevent products from being damaged during transport. Standard packaging includes a cardboard box, with or without a wooden pallet base as needed. Special packaging may include a wooden box. Packaging may use cardboard, plastic wrap, foam, or paper as packing material. Filling material may be a carton type or paper.

Shipping marks display and package dimensions and weight. Packing guidelines for export follow HPE standards.

4.4 Storage

NOTE: Typical packaging used for delivery will begin to break down over time. Leakage may develop.

Upon arrival on site, 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.

5 Installation

5.1 Inspection and preparation

NOTE: Before installation check the purchase order number, serial number, and/or the tag number to ensure that the valve and actuator being installed are correct for the intended application.

Before installing the valve, clean the line of dirt, scale, welding chips, and other foreign material. Clean the line gasket surfaces thoroughly to insure leak-proof joints.

5.2 Mounting

NOTE: Selecting the proper fastener material is the responsibility of the customer. Typically, the supplier does not know what the valve service conditions or environment may be. Flowserve's standard body bolting material is B7/2H. 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. As with any mechanical equipment, periodic inspection and maintenance is required. For more information about fastener materials, contact your Flowserve representative.

5.3 Installation

5.3.1 Check flow direction indicator on the body to be sure valve is installed correctly. The valve should be installed in the shaft upstream or downstream configuration specified on the datasheet. Failure to install the valve as specified may result in incorrect valve performance. 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 certain the flange face gasket covers both seat retainer and body surfaces. Failure to do so will cause excessive leakage. Refer to Figures 1: A, B and C for seat retainer options and line gasket position.

5.3.2 Fully close the valve before and during the installation process with pneumatic supply or handwheel (if provided) Ensure that the disk is parallel with the seat retainer when 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 equi-distant from the body surface.

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

CAUTION: Because of the Valdisk 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.

5.3.3 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. Both Valtek cylinders and positioners are suitable for 150 psi air supply. An air regulator is not required unless the supply pressure exceeds 150 psi. 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.

5.3.4 Make sure proper clearance exists internally in the mating piping to permit proper disk rotation.

5.3.5 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.

NOTE: Lug style valves should have at least 1 diameter of thread engagement in all holes. 2/3 diameter thread engagement or more is allowed on line holes adjacent to body neck and shaft flange neck on lug, wafer and double flange.

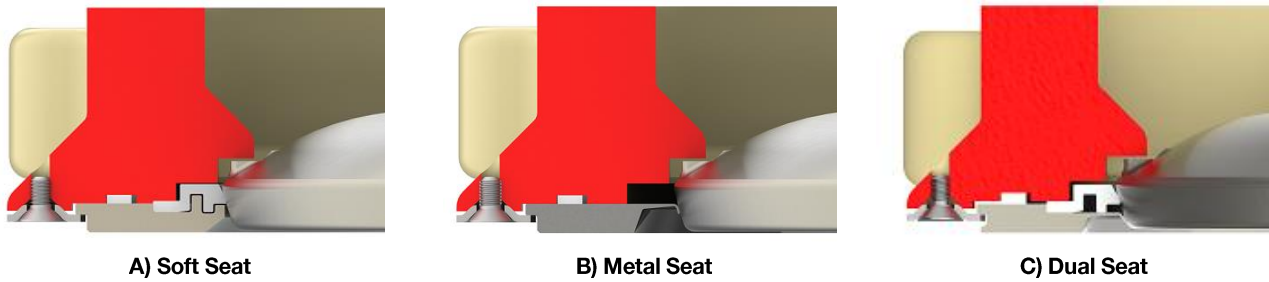


Figure 1: Cross-sections of seat retainer configurations

6 Commissioning

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

1. Check for full stroke by making the appropriate instrument signal change. Observe disk position indicator plate mounted on the transfer case or the disk position indicator symbols shown on the gland flange and shaft. The disk should change position in a smooth, rotary fashion and should rotate 90 degrees.

2. Check all air connections for leaks. Tighten or replace any leaky lines.

3. Evenly tighten the packing nuts to slightly over finger-tight.

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

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

4. 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 indicator plate, the disk should either fail open or closed. If incorrect, refer to the Reversing the Actuator section in the appropriate Actuator Maintenance Instructions.

7 Operation

7.1 Preparatory activities

7.1.1 Activate the valve

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

7.1.2 Check for full 90 degree rotation by making appropriate instrument signal changes.

7.1.3 Check all air connections for leaks.

7.2 Start-up

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

7.2.1 Check for process leakage past the shaft flange gasket.

7.2.2 Adjust actuator limit stops as necessary. If possible, check for seat leakage when the valve is in the closed position.

7.2.3 Check for any packing leakage. Tighten if necessary.

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 packing will not improve the stem seal unless the packing has been previously damaged. Damaged packing should be replaced.

7.2.3 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.

7.3 Normal operation

Check to ensure that the temperature and pressures do not exceed the limits of the rating of the valve.

Make sure stable air supply is present to the positioner/actuator and that the.

If valve body is insulated, ensure that body neck and actuator is exposed to environment.

7.4 Shut-down

Prior to working on valve, the valve will need to be removed from line. Ensure that the precautions listed in section 8.3 are followed

8 Maintenance

8.1 Schedule

At least once every six months, check for proper operation by following the preventive maintenance steps outlined below. 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 Disassembly and Reassembly section.

1. Look for signs of gasket leakage through body and line gaskets. Tighten flange bolting if necessary.
2. Note if any corrosive fumes or process drippings are damaging the valve.
3. Clean valve and paint any areas of severe oxidation.
4. Check packing box bolting for proper tightness. Tighten as necessary to prevent stem leakage.
⚠ CAUTION: Do not overtighten packing.
5. If valve is supplied with a lubricator, check lubricant supply and add lubricant if necessary.
6. If possible, stroke valve and check for smooth, full-stroke operation by observing the disk position indicator plate mounted on the transfer case or the gland flange. Unsteady movement of the disk could indicate an internal valve problem (Some 'stick-slip' breakout motion is normal whenever graphite packing is used).
7. Check positioner calibration by observing the gauges and the disk 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 accessories, brackets and bolting 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 and replace cartridge if necessary and ensure correct vertical orientation.

8.2 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.

8.3 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: Depressurize line to atmospheric pressure, drain all process fluids and decontaminate the valve (if caustic or hazardous materials are present). Failure to do so can cause serious injury.

1. Make sure valve (disk) is fully closed.
➡ NOTE: 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 should 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 disk can freely rotate without obstruction, slowly relieve air pressure from the actuator. For fail open valves, protect the disk sealing surface.

Removing Actuator from Body

In most cases, both the body assembly and the actuator are easier to disassemble with the pneumatic actuator removed from the body. To remove the actuator, proceed as follows (refer to the VR or NR actuator IOMs for additional information):

1. Support actuator assembly before disconnecting it from the body assembly.
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 to release spring pressure.
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, it may be necessary to wedge the halves of splined lever arm apart to loosen it from the shaft splines.

Disassembling the Body

To disassemble the body, refer to Figures 1 - 3, orient the body with the seat retainer gasket surface horizontal and proceed as follows:

1. On Valdisk valves supplied with seat retainer clips, remove the seat retainer screws and retainer clips. Lift the seat retainer out of the valve body. (Refer to Figures 1: A, B, 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 disk by tapping on the small end of the pins using a punch and hammer. If the pins are welded, carefully grind the welds off first.
 5. Remove the shaft flange nuts and then remove the shaft flange and shaft flange gasket.
 - 6.a) For single shaft designs, remove the shaft by inserting a press or a nylon rod (or similar material) into the shaft flange end of the body, and using a hammer, carefully tap the shaft through the body.
 - 6.b) For two piece shaft designs, remove the post shaft by inserting an eye bolt into the threads on the end of the post and pull. Pull the actuator shaft out.
- ⚠ CAUTION:** Take special care not to damage the splined end of the shaft during disassembly. To prevent scratching the sealing surface of the disk while removing the shaft, place supports underneath the disk. 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 disk will likely drop out of position.
7. Push the packing and bearings out of the body using a dowel of appropriate diameter. Push the packing from the center of the valve.
 8. Remove the anti-blowout snap ring or half rings from the shaft using a screwdriver and/or pliers.

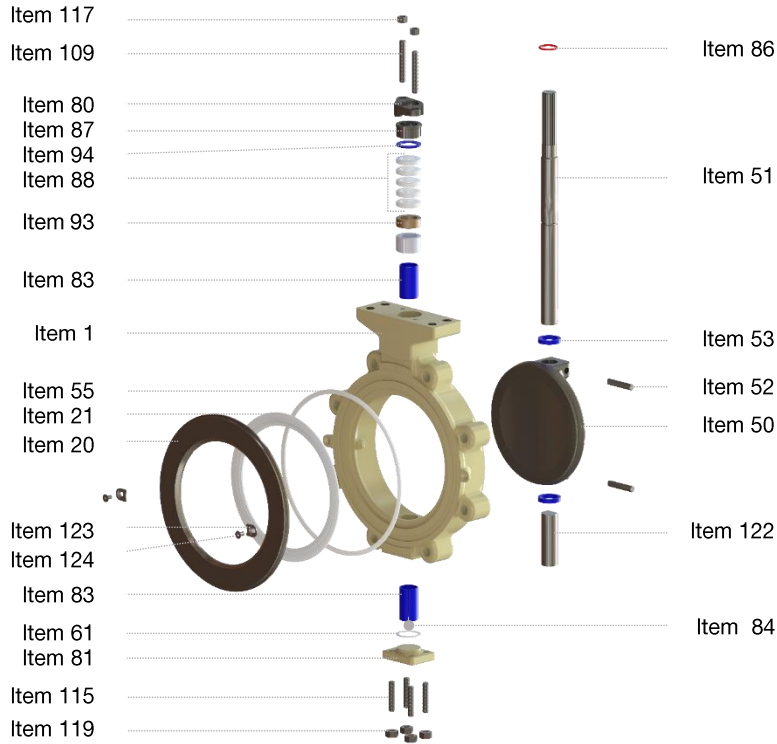


Figure 2: Exploded view of lug style valve

Table 2: Lug style split shaft with dual seat parts list

Item	Description
1	Body (Lug Style Shown)*
20	Metal Seat
21	Soft Seat
50	Disk [°]
51	Shaft
52	Shaft Pin
53	Thrust Bearing [°]
55	Seat Gasket ^{°°} ‡
61	Shaft Flange Gasket ^{°°}
80	Gland Flange
81	Shaft Flange
83	Bearing [°]
84	Bearing Spacer**
86	Snap Ring ⁺⁺
87	Packing Spacer
88	Packing Set ^{°°}
93	Packing Spacer
94	Packing Spacer
95	Packing Spacer
96	Packing Spacer
109	Packing Stud
115	Shaft Flange Stud
117	Packing Nut
119	Shaft Flange Nut
122	Post Shaft***
123	Seat Clip
124	Clip Screw
126	Flow Arrow Plate

* Double flange and wafer body styles also available in select styles

** Select Double flange sizes utilize a bearing spacer in location indicated

*** Post shaft applicable in the following sizes and pressure classes:

3" CL150 – 600 4" CL150 – 300

6" CL150 8" CL150

[°] Recommended spare parts

^{°°} Required spare parts

⁺⁺ Half rings are used on most valves over 14"

[‡] Seat gasket with a soft seat is optional except on double flange bodies larger than 16"

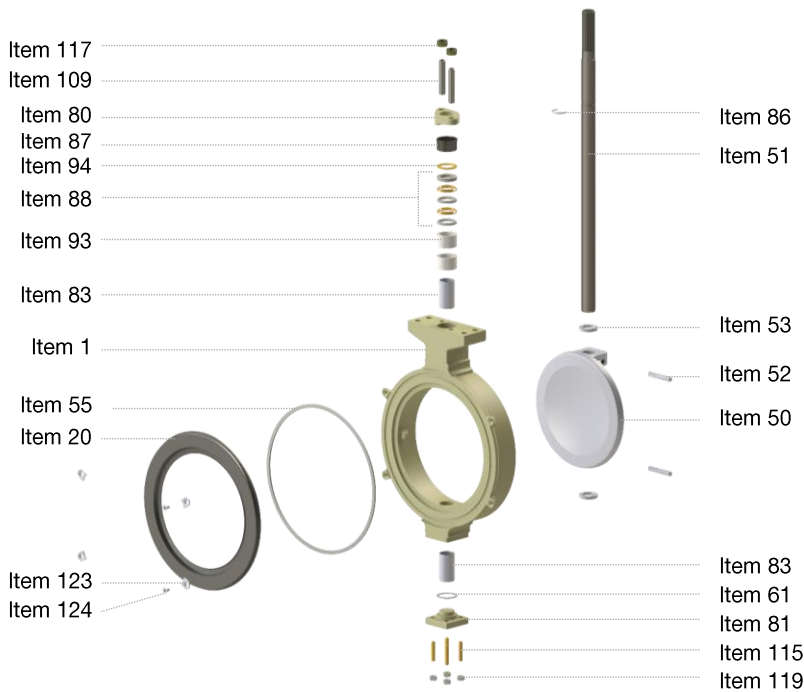


Figure 3: Exploded view of wafer style valve



Figure 4: Metal, soft and dual seat options

Table 3: Wafer style metal seat parts list

Item	Description
1	Body (Wafer Style Shown)*
20	Metal Seat
50	Disk ^o
51	Shaft
52	Shaft Pin
53	Thrust Bearing ^o
55	Soft Seat Gasket ^{oo}
61	Shaft Flange Gasket ^{oo}
80	Gland Flange
81	Shaft Flange
83	Bearing ^o
86	Snap Ring
87	Packing Spacer
88	Packing Set ^{oo}
93	Packing Spacer
94	Packing Spacer
95	Packing Spacer
96	Packing Spacer
109	Packing Box Stud
115	Shaft Flange Stud
117	Packing Box Nut
119	Shaft Flange Nut
122	Post Shaft***
123	Seat Clip
124	Clip Screw
126	Flow Arrow Plate
127	Warning Sticker

* Double flange and wafer body styles also

** Select Double flange sizes utilize a bearing

*** Post shaft applicable in the following sizes and

3" CL150 – 600 4" CL150 – 300

6" CL150 8" CL150

^o Recommended spare parts

^{oo} Required spare parts

** Half rings are used on most valves over 14"

‡ Seat gasket with a soft seat is optional except on

8.4 Reassembly

Reassembling the Body

To reassemble the body sub-assembly, refer to Figures 1 - 3 and proceed as follows:

1. Clean all parts.
2. Check the disk seating surface to make sure it is smooth and free of scoring and scratches.

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

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

4. Insert new shaft bearings into the body. The end of the shaft bearing should be flush with the bearing face on the inner diameter of the body. For large lined shaft bearings, a press or fixture may be required to install. 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.

5. Position the disk in the body, making sure it will rotate in the proper direction with respect to the body's internal disk stop. Position the thrust bearings on either side of the disk and slide the shaft through the body, shaft bearings and disk. The shaft will be in the correct axial position when the shaft end is 0.03 inch (0.8 mm) short of being flush with the end of the post side shaft bearing. Ensure that the post shaft bearing is flush with the thrust bearing.

For two shaft designs slide the actuator shaft and the post shaft through the bearings and into the disk until it stops.

⚠ CAUTION: Exercise care while sliding the shaft into the sliding stem shaft bearings to avoid damage to both the shaft and shaft bearings.

6. Turn the shaft flats to allow the taper pins to slide through the disk pin holes and engage the shaft. Insert new taper pins in the direction that is towards the limit stop in the body. Drive them firmly into place with a hammer. Peen the disk 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 disk in two opposite locations.

7. 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. Be careful not to damage the packing on the anti-blowout groove. Typical packing configurations are shown in Figures 2 and 3. In the uncompressed state, the packing spacer above the packing should be within 0.12 inch of the opening of the packing bore. This will allow sufficient packing compression without the packing follower interfering with the anti-blowout ring(s).

⚠ CAUTION: Since the sealing on V-ring packing takes place at the feather edge, it is important to avoid damage to that edge.

8. Install the snap ring or the half rings into the anti-blowout groove in the shaft and install the packing follower over the top.

9. 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.

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

10. Reinstall the end flange gasket and the end flange and evenly tighten the nuts in an alternating pattern. See Table 4 for recommended torque values.

11. All metal seat configurations with screw/clip retainers require a gasket (item #55) installed in the appropriate groove. This is accomplished by inserting the gasket into the appropriate body groove.

12. If the seat retainer is the screw/clip type and has a soft or dual seat, press the soft seat into the soft seat retainer or metal seat. (There should be an interference between the soft seat and the retainer.) With the valve (disk) in the closed position, secure the retainer or metal seat in place by tightening the retainer clips and screws. This allows the seat to align with the disk, permitting tight shutoff. Gaskets with a soft seat are optional. If required, place the gasket in the appropriate body groove.

13. On large Valdisk valves supplied with seat retainer screws, install the insert and retainer into

the body with the disk open. Loosely install the retainer screws, then close the disk. Tighten the screws after the closed disk has centered the seat. This allows the seat to align with the disk, permitting tight shutoff.

Table 4: Shaft flange bolting torques

Valve Size (in)	Pressure Class	Torque	
		In-lbs	N-M
3	150	3 ± 0.5	4 ± 0.5
	300	3 ± 0.5	4 ± 0.5
	600	3 ± 0.5	4 ± 0.5
4	150	3 ± 0.5	4 ± 0.5
	300	5 ± 0.7	7 ± 0.5
	600	10 ± 1	13 ± 1
6	150	3 ± 0.5	4 ± 0.5
	300	5 ± 0.7	7 ± 0.5
	600	10 ± 1	13 ± 1
8	150	10 ± 1	13 ± 1
	300	5 ± 0.7	7 ± 0.5
	600	24 ± 2	33 ± 3
10	150	5 ± 0.7	7 ± 0.5
	300	10 ± 1	13 ± 1
	600	48 ± 5	65 ± 6
12	150	10 ± 1	13 ± 1
	300	10 ± 1	13 ± 1
	600	48 ± 5	65 ± 6
14	150	10 ± 1	13 ± 1
	300	10 ± 1	13 ± 1
	600	48 ± 5	65 ± 6
16	150	10 ± 1	13 ± 1
	300	24 ± 2	33 ± 3
	600	85 ± 8	110 ± 11
18	150	24 ± 2	33 ± 3
	300	48 ± 5	65 ± 6
	600	85 ± 8	110 ± 11
20	150	10 ± 1	13 ± 1
	300	24 ± 2	33 ± 3
	600	85 ± 8	110 ± 11
24	150	24 ± 2	33 ± 3
	300	48 ± 5	65 ± 6
	600	140 ± 14	180 ± 18

Contact manufacture for valve sizes and torque values not shown.

Remounting Actuator to Valve

Before mounting a Valtek actuator on the valve body, verify that the disk rotation matches the actuator rotation and complies with the air failure requirements. The procedure for mounting the actuator 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 disk, 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 until the disk is parallel to the seat surface, but not resting on body disk stop.

CAUTION: Actuator stroke stop bolts must be properly adjusted to prevent the valve disk from overstroking. If incorrectly adjusted the valve shaft may be twisted or sheared off when it contacts the body stop.

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

9 Troubleshooting Guide

Table 5: Troubleshooting recommendations

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	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	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 leakage)	Improper adjustment of external stroke stops	See “Adjusting External Stroke Stops” section
	Worn or damaged seat	Replace seat
	Damaged disk seating surface	Replace disk and shaft
	Improper handwheel adjustment acting as limitstop	Adjust handwheel until disk seats properly
Leakage through line gasket	Loose packing box nuts	Tighten packing box nuts to slightly over finger-tight
	Worn or damaged packing	Replace packing
	Dirty or corroded packing	Clean body bore and stem, replace packing
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
	Packing follower contacting the anti-rotation ring	Add a 0.25 spacer or more packing to prevent contact
Disk interferes with body	Disk installed upside down	Reinstall disk
	Worn shaft bearings	Replace shaft bearings
Disk interferes with line	Cement lining or heavy schedule pipe	Modify line to allow proper disk clearance
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, disk 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

10 Returns and Disposal

10.1 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

10.2 Disposal and recycling

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

ⓘ NOTE: Potential hazards and their sources are under the operator’s 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 the relevant manufacturer’s User Instructions.

10.3 Serial Plate

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

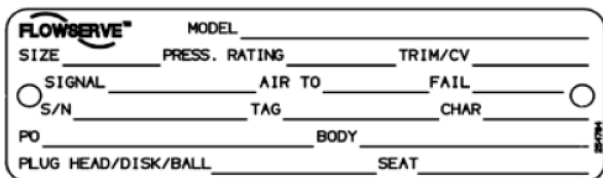


Figure 5: Valve Serial Plate

Annex A: 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.

ⓘ NOTE: Unauthorized modification of the Valtek Valdisk 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.

Annex B: Line Flange Bolting Specification

Valve Size	Pressure Class	Line Bolt Size	Body Style					
			Integral Flange		Lug		Wafer	
			Length	QTY	Length	QTY	Length	QTY
3	150	0.63	3.88	8	2.88	8	5.75	4
	300	0.75	3.25	4	3.38	16	6.38	8
			4.5	12			7.38	8
	600	0.75	3.62	4	3.75	16		
		5.12	12					
4	150	0.62	2.75	4	3	16	6	8
			3.88	12			6.88	8
	300	0.75	3.38	4	3.5	16		
			4.88	12				
600	0.88	4.38	4	4.38	16	8.5	8	
		6	12					
6	150	0.75	4.12	8	3.38	8	6.5	8
			4.38	8				
	300	0.75	3.62	4	3.75	12	7.5	12
			5.25	20				
600	1.00	5	4	5	24	10.12	12	
		7.12	20					
8	150	0.75	4.5	16	3.75	8	7	8
	300	0.88	4	4	4.38	12	8.62	12
			5.88	20				
600	1.13	5.5	4	5.75	24	11.88	12	
		8	20					
10	150	0.88	3.62	4	4	12	7.62	12
			5	20				
	300	1.00	4.38	4	4.88	16	4.12	8
			6.62	28				
600	1.25	5.75	4	6.12	4	5.5	4	
		8.88	28					6.5
				5.5	4	13.38	12	
				5.88	12			
12	150	0.88	3.62	4	4.25	12	8.25	12
			5.12	20				
	300	1.13	5	4	5.38	16	10.62	16
			7.12	28				
600	1.25	6	4	6.25	4	6.25	4	
		9.12	36					6.62
				5.62	4	14.5	16	
				6	16			

Table continued next page.



Valve Size	Pressure Class	Line Bolt Size	Body Style				Wafer	
			Integral Flange		Lug		Length	QTY
			Length	QTY	Length	QTY		
14	150	1.00	5.62	24	4.38	24	NA	
			4.75	4	5.25	20		
	300	1.13	7.38	36	4.88	20		
			6.25	4	6.5	4		
	600	1.38	9.62	36	7	16		
					5.88	4		
				6.38	16			
16	150	1.00	4.25	4	4.38	16	NA	
			5.75	28	4	16		
			5.25	4	5.62	4		
	300	1.25	8	16	5.88	16		
			7.62	20	5.38	20		
			6.88	4	7.25	4		
	600	1.50	10.5	16	7.62	16		
					6.5	4		
		10.12	20	6.88	16			
18	150	1.13	4.62	4	4.88	32	NA	
			6.38	12				
			6	16				
	300	1.25	5.25	4	5.5	4		
			8.25	20	5.88	20		
			7.88	24	5.75	24		
	600	1.63	7.25	4	7.75	4		
			11.25	16	8.12	20		
		10.88	20	8.5	16			
20	150	1.13	4.38	4	4.62	20	NA	
			6.5	36	5	16		
					4.12	4		
	300	1.25	5.38	4	6.12	4		
			8.5	20	6.5	20		
			8.12	24	5.38	4		
	600	1.63			5.75	20		
			7.25	4	8.12	4		
		11.75	20	8.62	20			
		11.38	24	7.75	4			
				7.88	20			
24	150	1.25	5.12	4	5.62	20	NA	
			7.12	16	5	20		
			6.75	20				
	300	1.50	6.12	4	6.62	24		
			9.5	20	7	20		
			9.12	24	6.12	4		
	600	1.88	8.5	4	8.75	24		
			13.25	20	9.25	20		
		12.88	24	8.25	4			

Contact manufacture for valve sizes and bolting specification values not shown.



To find your local Flowserve representative use the Sales Support Locator System found at www.flowserve.com

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