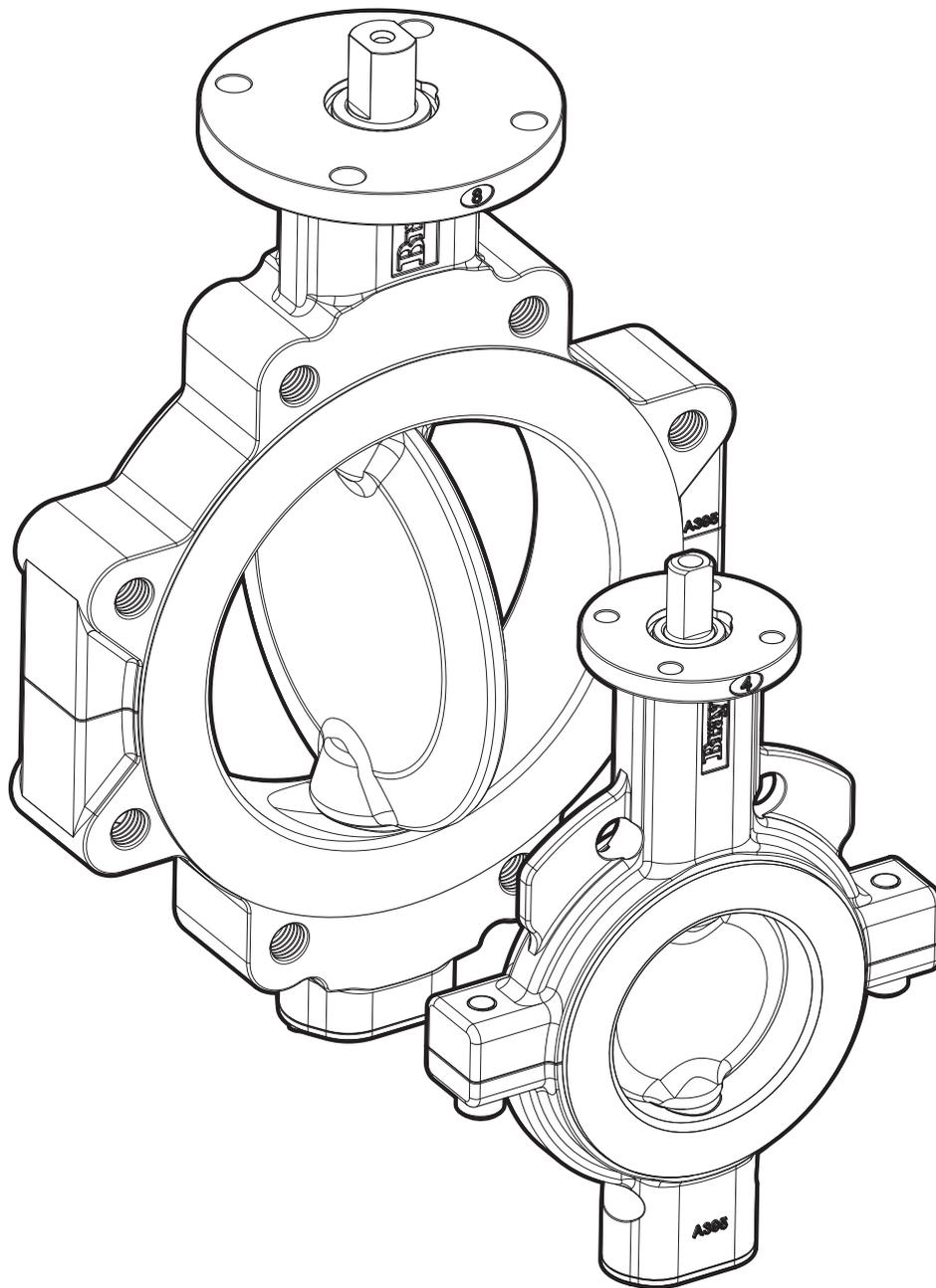

ACRIS® SERIES 24/25

PFA LINED BUTTERFLY VALVE

Installation, Operation, and Maintenance Manual



 **Bray**®

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1.0 DEFINITION OF TERMS

1.1 All information within this manual is relevant to the safe operation and proper care of your Bray valve. Please understand the following examples of information used throughout this manual.

X.X IDENTIFIES CHAPTER HEADING

X.XX Identifies and explains sequential procedure to be performed.

NOTE: Provides important information, useful tips, and recommendations related to a procedure.

SAFETY STATEMENTS

The terms DANGER, WARNING, CAUTION, and NOTICE are used in this document to prevent unwanted consequences. Standard symbols and classifications are:



DANGER

Indicates an immediate hazardous situation which, if not avoided, **will** result in death or serious injury and/or property damage.



WARNING

Indicates a potentially hazardous situation which, if not avoided, **could** result in death or serious injury and/or property damage.



CAUTION

Indicates a potentially hazardous situation which, if not avoided, **may** result in minor or moderate injury and/or property damage.



NOTICE

Indicates and provides additional technical information which may not be obvious, even to qualified personnel. The term is not used for personal injury hazards or warnings, but can be used to indicate possible equipment or property damage.

1.2 Compliance with other notes — regarding transport, assembly, operation & maintenance, and about technical documentation (e.g., in the operating instructions, product documentation, or on the product itself) — is essential, to avoid faults which can directly or indirectly cause severe personal injury or property damage.

2.0 INTRODUCTION



NOTICE

Failure to follow these procedures could affect product warranty.

Read and follow these instructions carefully, and keep this manual in a safe place for future use.

Based on over thirty years experience in the butterfly valve industry, Bray can state without question the majority of all field problems for PFA lined butterfly valves are directly related to poor installation procedures. For this reason, it is very important all distributors educate their customers regarding proper installation of PFA lined butterfly valves.

2.1 Butterfly Valve Liner/Disc Function

The PFA over-molded disc and PFA liner are the chemically resistant barrier to the flowing media. The only wetted parts of the valve are the PFA disc and liner. The valve body, back-up liner, packing, springs, bearings, stems, etc. are all isolated from the flowing media and are non-wetted parts.

The PFA liner extends over the face of the valve body and functions as the flange gasket. Additional gaskets are not normally required in installations where the flange strength allows maximum bolting torque (steel and alloy flanges for example). If sufficient bolting torque cannot be achieved due to flange type or material strength limits (FRP for example), a gasket may be required for proper flange sealing. Gaskets may be used when pipeline flange faces exhibit excess unevenness due to poor machining or weld distortion.

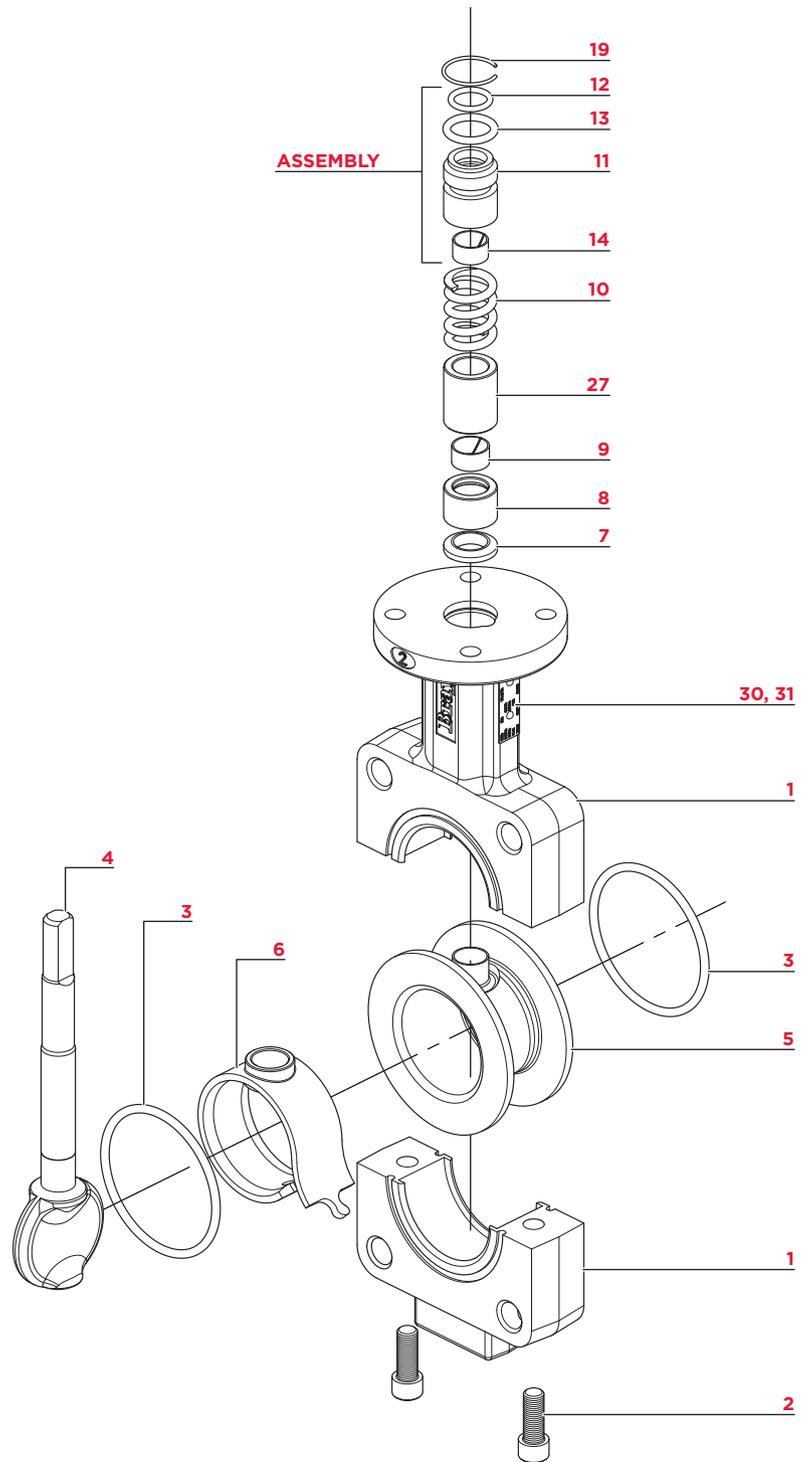
The PFA liner has a 360 degree, full width resilient back-up liner (Silicone or Viton), which provides the energy for proper sealing. The sealing force of the back-up liner is not dependent on flange compression and acts independently from the pipeline flanges. The PFA liner is the chemically resistant membrane that separates the media from the back up liner. Upstream/downstream sealing is achieved by an interference fit between the disc and liner, which in turn compresses the back-up liner.

Finally, the disc of a butterfly valve extends beyond the face-to-face dimension of the valve as it cycles towards the full open position. It is important to follow the recommended minimum and maximum flange inside diameters in the mounting instructions to avoid piping interference with the disc, and achieve proper sealing on the PFA flange face.

3.0 PARTS IDENTIFICATION

3.1 Parts Callout NPS 2 to 2½ | DN 50 to 65

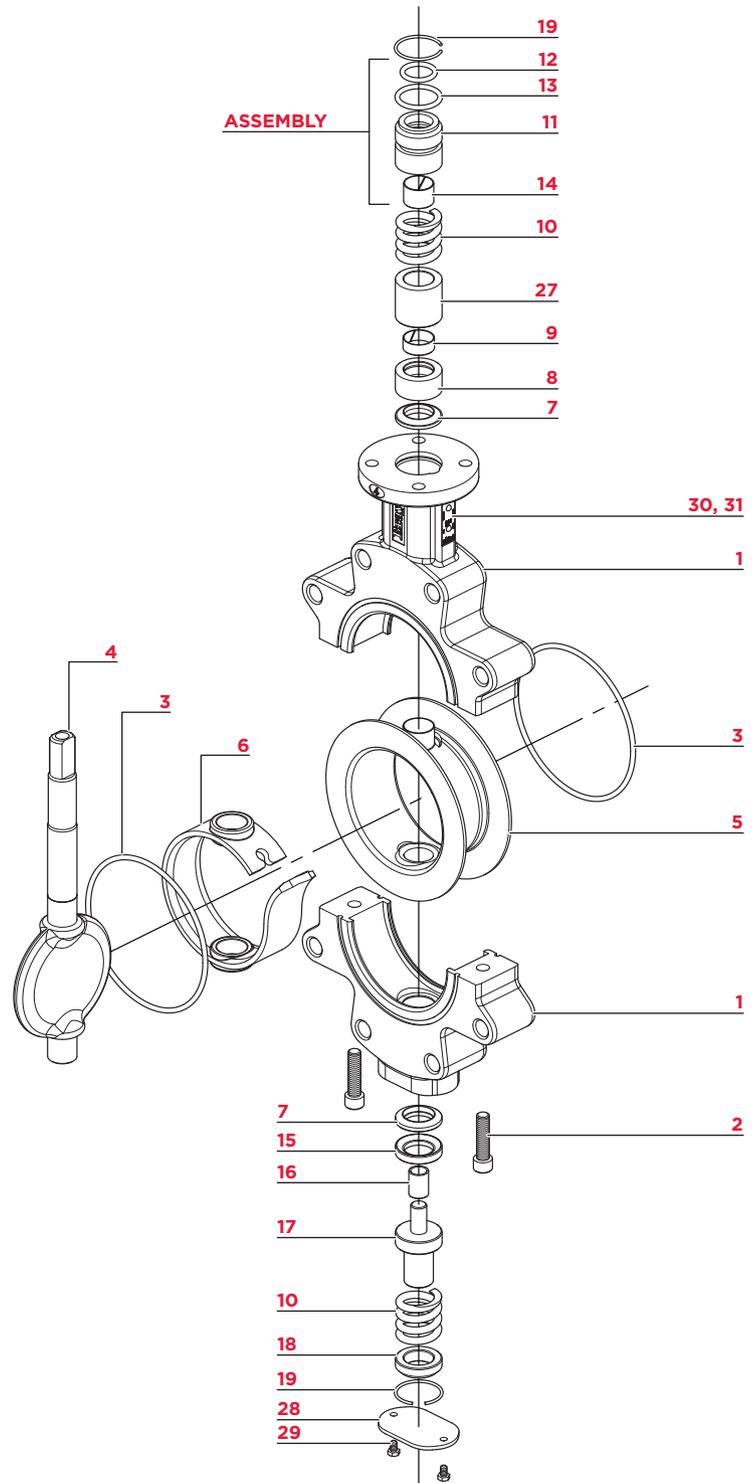
ITEM	DESCRIPTION
1	Body
2	Body Bolt
3	Body Face O-ring
4	Disc/Stem Assembly
5	Liner
6	Backup Liner
7	Packing
8	Lower Bushing
9	Bearing Strip
10	Spring
11	Atmospheric Seal
12	O-ring
13	O-ring
14	Bearing Strip
19	Retaining Ring
27	Stem Spacer
30	Name Plate
31	Drive Screw



3.0 PARTS IDENTIFICATION

3.2 Parts Callout NPS 3 to 6 | DN 80 to 150

ITEM	DESCRIPTION
1	Body
2	Body Bolt
3	Body Face O-ring
4	Disc/Stem Assembly
5	Liner
6	Backup Liner
7	Packing
8	Lower Bushing
9	Bearing Strip
10	Spring
11	Atmospheric Seal
12	O-ring
13	O-ring
14	Bearing Strip
15	Spacer Washer
16	Stem Bushing
17	Stub Shaft
18	Stopper
19	Retaining Ring
27	Stem Spacer
28	Bottom Plate
29	Hex Bolt
30	Name Plate
31	Drive Screw



ACRIS® SERIES 24/25 PFA LINED BUTTERFLY VALVE

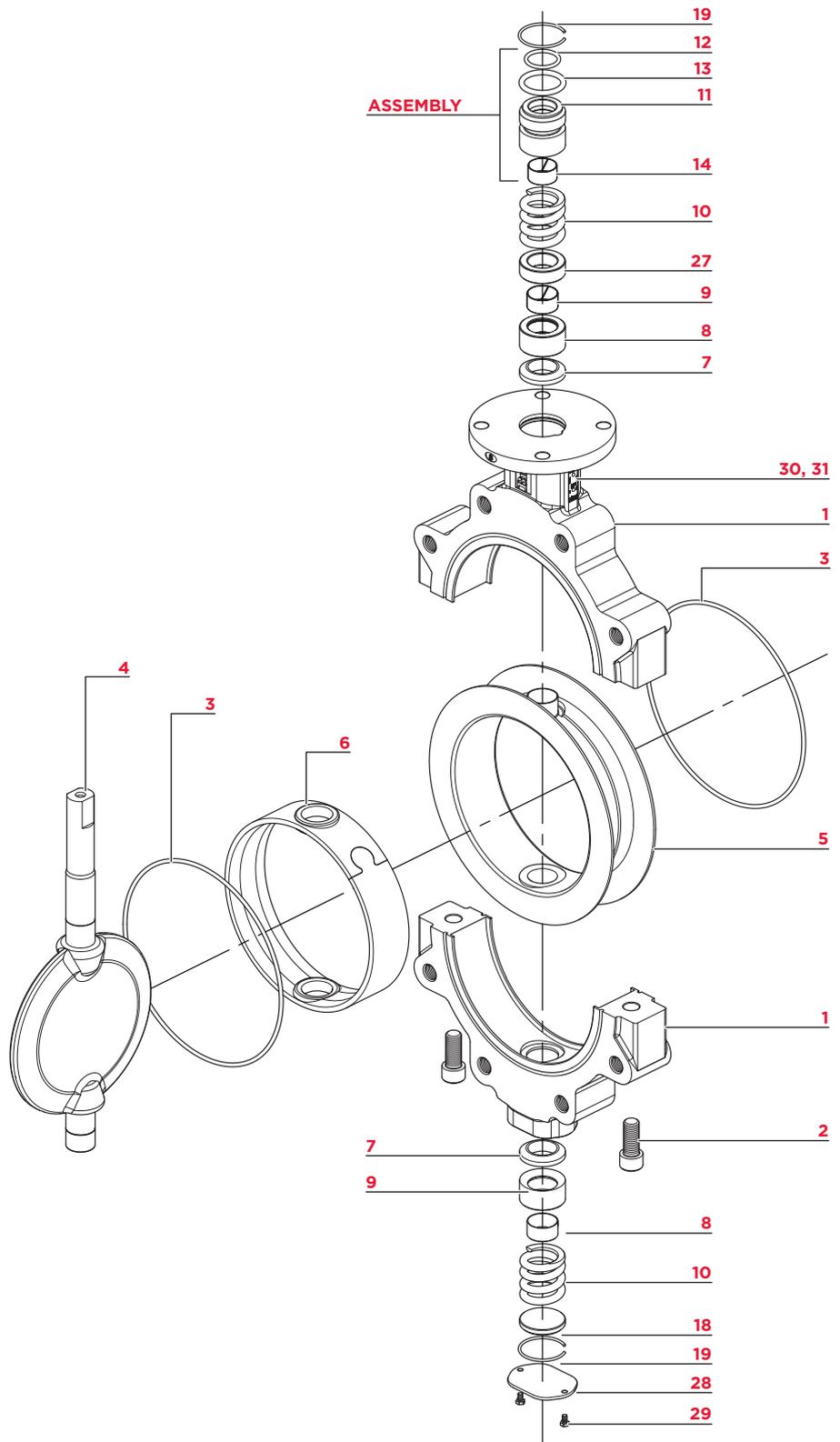
Installation, Operation, and Maintenance Manual



3.0 PARTS IDENTIFICATION

3.3 Parts Callout NPS 8 to 12 | DN 200 to 300

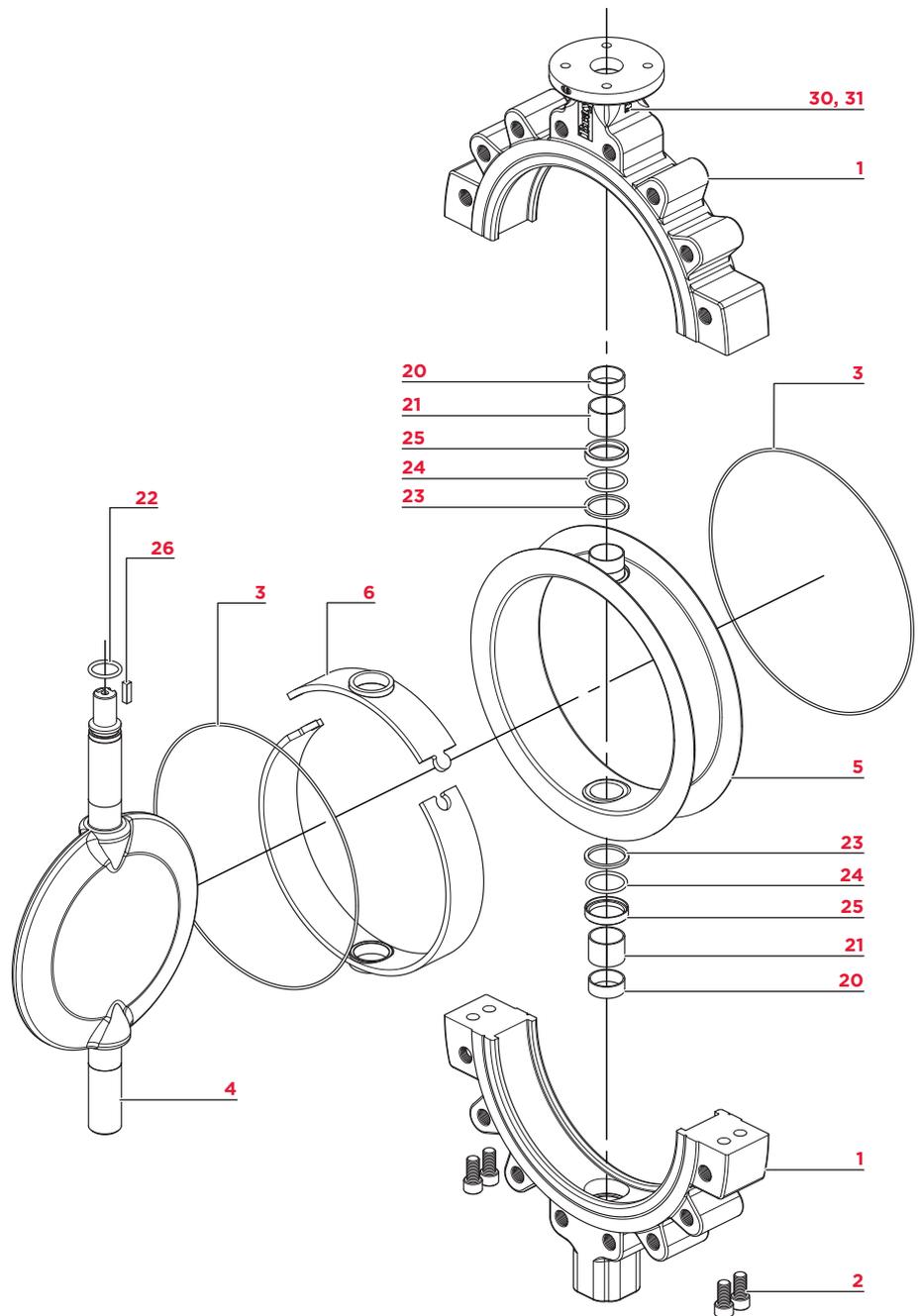
ITEM	DESCRIPTION
1	Body
2	Body Bolt
3	Body Face O-ring
4	Disc/Stem Assembly
5	Liner
6	Backup Liner
7	Packing
8	Lower Bushing
9	Bearing Strip
10	Spring
11	Atmospheric Seal
12	O-ring
13	O-ring
14	Bearing Strip
18	Stopper
19	Retaining Ring
27	Stem Spacer
28	Bottom Plate
29	Hex Bolt
30	Name Plate
31	Drive Screw



3.0 PARTS IDENTIFICATION

3.4 Parts Callout NPS 14 to 24 | DN 350 to 600

ITEM	DESCRIPTION
1	Body
2	Body Bolt
3	Body Face O-ring
4	Disc/Stem Assembly
5	Liner
6	Backup Liner
20	Sleeve Bearing
21	Sleeve Bearing
22	O-ring
23	Washer
24	Garter Spring
25	Spring Carrier
26	Key
30	Name Plate
31	Drive Screw



4.0 SHIPMENT, HANDLING, AND STORAGE

- 4.1 All Bray PFA lined valves are shipped with polyethylene or wooden flange protectors securely fastened to the valve bodies. The valves may also be wrapped in a polyethylene or “shrink wrap” plastic, depending on what valve model was ordered.



NOTICE

It is very important that the PFA surfaces of the valve (both the liner and disc/stem) be protected prior to installation. The flange protectors should remain fastened to the valves, until just prior to installation.

- 4.2 Use care when handling the valve. Do not drop or throw down the valves, as damage to the PFA could result. PFA offers the highest resistance to corrosion (in the pipeline), but can be damaged prior to installation by improper handling. Do not contact the PFA surfaces with any sharp or blunt object (knives, box cutters, screwdrivers, punches, etc.) as damage to the PFA could occur.
- 4.3 The disc should be placed in the partially open position (approximately 10 to 15 degrees open) during storage when possible. Valves with spring return actuators can be stored prior to installation as-is. Extra precautions should be taken with a fail-open assembly to protect the open position disc.
- 4.4 Valves should be preferably stored indoors in a safe (clean and dry) environment, in or on their original shipping container or pallet prior to installation. Store away from any workshop activities such as grinding, sand blasting, welding or painting, for example.
- 4.5 Ship and store the valves so that no heavy loads are applied to the valve bodies.
- 4.6 When moving the valves, use nylon straps around the valve neck or use lifting eyes attached to body lugs. Never lift a gear operated valve by the handwheel. **(Figure 01)**

4.7 Lifting



WARNING

A potential hazard exists with handling valves. Failure to handle valves properly may cause a valve to shift, slip, or fall — causing serious injury or death and/or equipment damage.



NOTICE

The following information is for reference purposes only.

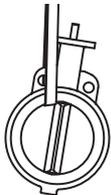
- > Always use safe and proper techniques for lifting and support.
- > Lift with properly rated lifting equipment.
- > DO NOT lift valves with any adjoining pipe or other equipment attached.
- > Follow jurisdictional safety requirements.

Figure 01: Approved lifting configurations.

NOTES:

- > Keep body level when lifting.
- > Ensure strap is secure around valve.
- > Ensure strap is not twisted.

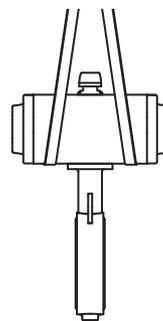
 **INCORRECT**
 Straps through seat opening.



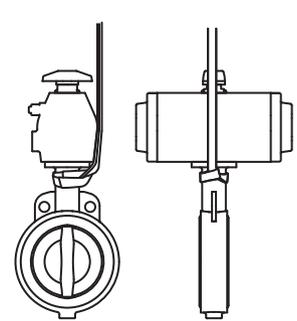
 **CORRECT**
 Straps around body or neck.



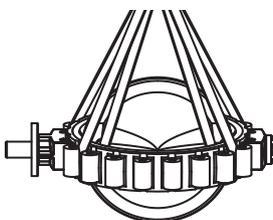
 **INCORRECT**
 Straps around actuator body.



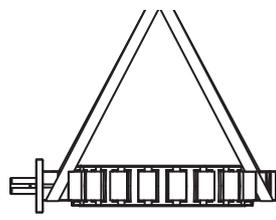
 **CORRECT**
 Straps around body or neck.



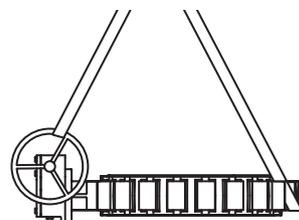
 **INCORRECT**
 Straps through seat opening.



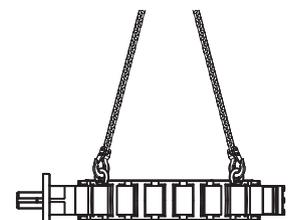
 **CORRECT**
 Straps around body.



 **INCORRECT**
 Straps through gear handwheel.



 **CORRECT**
 Chains with lifting lugs.



5.0 INSTALLATION CONSIDERATIONS, PIPING AND VALVE ORIENTATION AND PLACEMENT



CAUTION

It is very important before installation to ensure the critical chordal dimension of the disc at the full open position is less than the adjacent pipe flange I.D.

Before Installation

- > Verify that pipeline flanges are free from metallic chips and weld splatter.
- > Verify that pipeline flanges are located on the same centerline and are parallel.
- > Verify flange facing flatness is as follows:
 - ≤ 0.004 inches on a 4 inch length for valves ≤ NPS 4 in size
 - ≤ 0.008 inches on a 4 inch length for valves ≥ NPS 5 in size
- > Verify that the flange face finish is ≤ 250 micro-inch roughness.
- > Verify that the inside diameter of pipeline flanges is in accordance with Bray documentation. This is necessary to prevent any valve disc/pipeline flange contact upon valve opening. **(Table 01).**

Table 01: ISO Series Flange Inside Diameters

Inside Diameters (NPS)			Inside Diameters (DN)		
Valve Size	Ø Minimum	Ø Maximum	Valve Size	Ø Minimum	Ø Maximum
NPS	(inches)	(inches)	DN	(mm)	(mm)
2	1.56	2.40	50	40	60
2½	2.07	2.95	65	53	74
3	2.79	3.57	80	71	90
4	3.56	4.53	100	91	115
5	4.64	5.75	125	118	146
6	5.70	6.68	150	145	169
8	7.66	8.78	200	195	223
10	9.69	10.90	250	247	276
12	11.51	12.90	300	293	327
14	13.11	14.64	350	333	371
16	15.00	16.65	400	381	422
18	16.85	18.58	450	428	471
20	18.76	20.62	500	477	523
24	22.43	24.56	600	570	623

5.1 Piping and Flange Compatibilities

5.1.1 Piping

These valves have been engineered so that the critical disc chordal dimension at the full open position will clear the adjacent inside diameter of most types of piping, including Schedule 40, lined pipe, heavy wall, etc.

Note: It is important to verify valve disc clearance with adjacent piping prior to installation.

5.1.2 Metal Flanges

Bray's PFA lined butterfly valves have been designed to be suitable for all types of flanges (ASME, DIN, JIS and other international flange standards), whether flat-faced, raised face, slip-on, weld-neck, etc. Proper alignment of any butterfly valve between flanges is critical to good performance of the valve. The flange bolts must also be evenly tightened around the circumference of the valve, providing consistent flange compression of the molded profile on the seat face.

Note: A uniform flange face is critical to proper valve sealing. Most weld-neck and slip-on flanges conforming to ASME specifications have an appropriate flange face.

5.1.3 Non-Metallic Flanges

When non-metallic flanges, such as plastic or PVC, are used with PFA lined butterfly valves, care must be taken not to over-tighten the flange bolts. The inherent flexibility of these non-metallic flange materials allow them to be over-tightened relatively easily. Flexing caused by this overtightening can actually reduce the compression of the valve between the flanges, causing leaks between the valve and the flange face. Proper alignment and firm, even, but not excessive tightening of flange bolts is especially important with non-metallic flanges. In some cases, nonmetallic flanges of low quality will not mate tightly with butterfly valves, regardless of the care taken during installation.

Note: If PFA lined butterfly valves are installed between non-metallic flanges (FRP for example), follow the flange manufacturer's recommended maximum bolt torque.

5.2 Valves with Spring Return Actuators**5.2.1 Fail Closed Assemblies**

If the valve is supplied with an actuator, the butterfly valve is shipped in the full closed position (as no air pressure is present to compress the springs and open the disc).

5.2.2 Fail Open Assemblies

If the valve is supplied with an actuator, the butterfly valve disc is shipped in the full open position (as no air pressure is present to compress the springs and close the valve disc.) The sealing surface, or disc edge, is therefore exposed. Damage to disc edge or liner may cause leakage.

**CAUTION**

Use caution installing the valve, being careful not to damage the disc edge. It is recommended to:

- > Remove the actuator. Be sure to scribe the valve and actuator to ensure the re-installed actuator is in the exact same quadrant as originally configured.
- > Rotate disc to the closed position.
- > Install the valve per the attached installation tag instructions.
- > Rotate disc to fully open position.
- > Re-install the actuator ensuring it is in the proper quadrant.

5.3 Valve Location

5.3.1 PFA lined butterfly valves should be installed, if possible, a minimum of six pipe diameters from other line elements, i.e., elbows, pumps, valves, etc. When six pipe diameters are not practical, it is important to achieve as much straight pipe distance as possible.

5.3.2 Where the PFA lined butterfly valve is connected to a check valve or pump, use an expansion joint between them to ensure the disc does not interfere with the adjacent equipment.

5.4 Valve Orientation

5.4.1 In general, Bray recommends PFA lined valves be installed with the stem in the vertical position and the actuator mounted directly above the valve; however, there are those applications as discussed below where the stem should be horizontal.

5.4.2 For slurries, sludge, mine tailing, pulp stock, dry cement, and any media with sediment or particles, Bray recommends the PFA lined valve be installed with the stem in the horizontal position with the lower disc edge opening in the downstream direction.

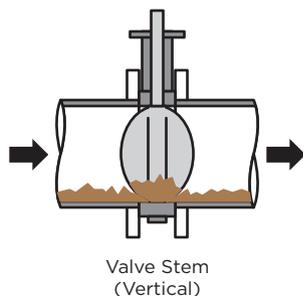
(Figure 02)

Figure 02: Valve orientation for media with sediment.



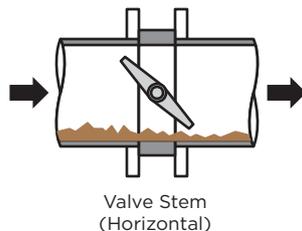
INCORRECT

Sediment buildup around lower disc and hub.



CORRECT

Sediment passes under disc.

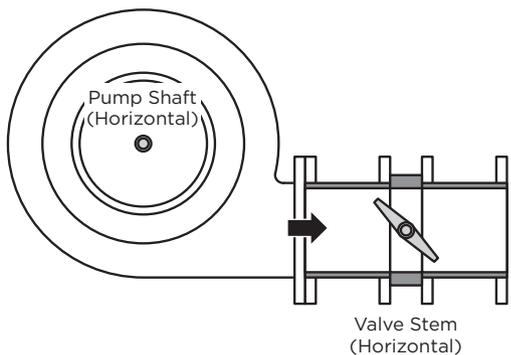


Valve Orientation (continued)

5.4.3 Butterfly valve located at the discharge of a pump should be oriented as follows:

Figure 03: Centrifugal pump (with pump shaft horizontal).

✗ INCORRECT
Valve stem horizontal.



✓ CORRECT
Valve stem vertical.

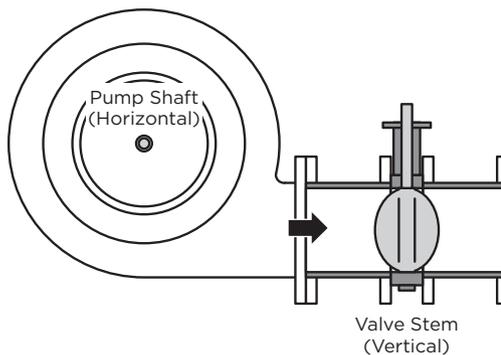
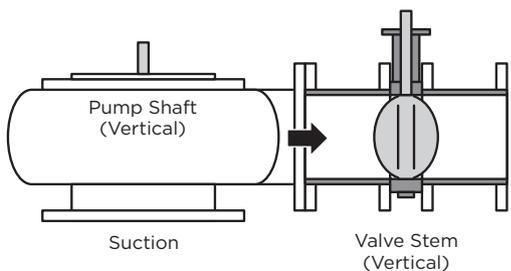


Figure 04: Centrifugal pump (with pump shaft vertical).

✗ INCORRECT
Valve stem vertical.



✓ CORRECT
Valve stem horizontal.

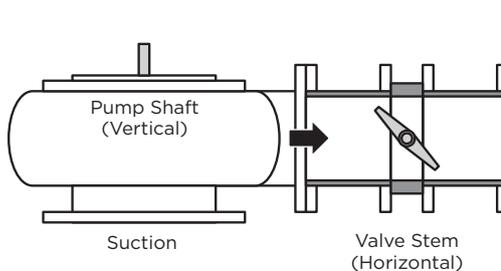
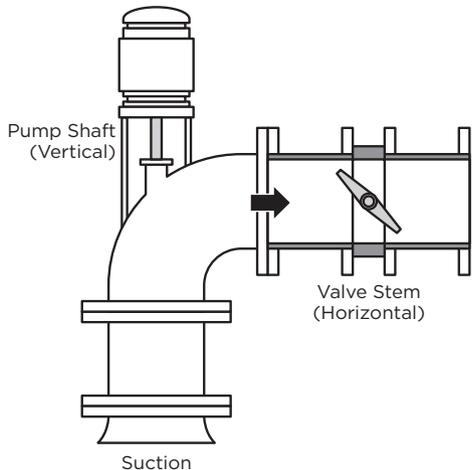
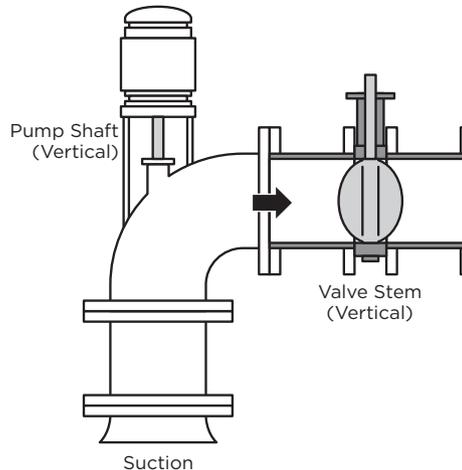


Figure 05: Axial pump (with pump shaft vertical).

✗ INCORRECT
Valve stem horizontal.



✓ CORRECT
Valve stem vertical.

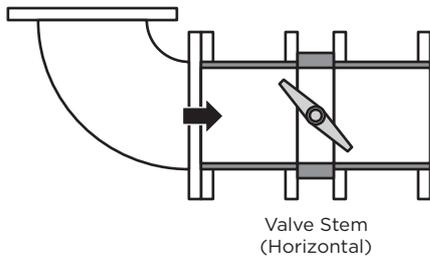


Valve Orientation (continued)

5.4.4 Butterfly valve located downstream of a bend or reducer should be oriented as follows:

Figure 06: Bend.

 **INCORRECT**
Valve stem horizontal.



 **CORRECT**
Valve stem vertical.

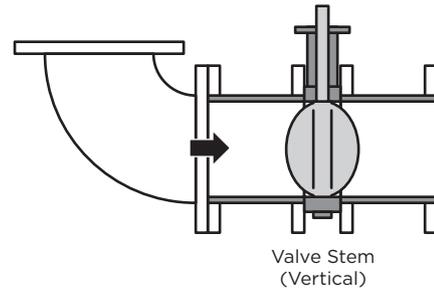
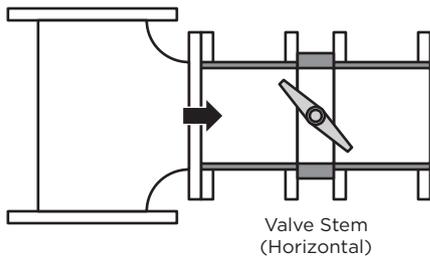


Figure 07: Tee.

 **INCORRECT**
Valve stem horizontal.



 **CORRECT**
Valve stem vertical.

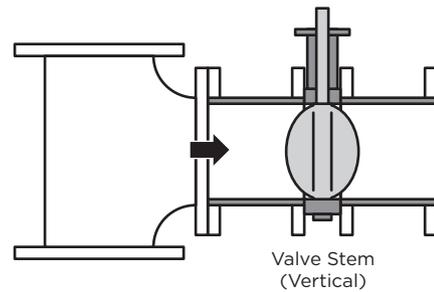
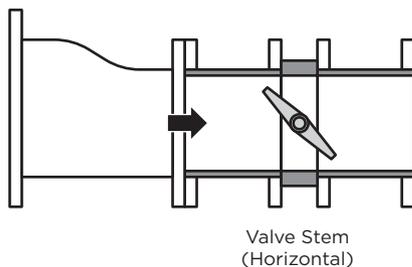
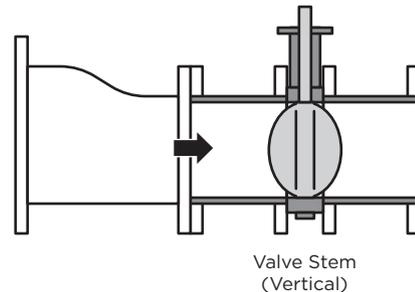


Figure 08: Reducer.

 **INCORRECT**
Valve stem horizontal.



 **CORRECT**
Valve stem vertical.



Valve Orientation (continued)

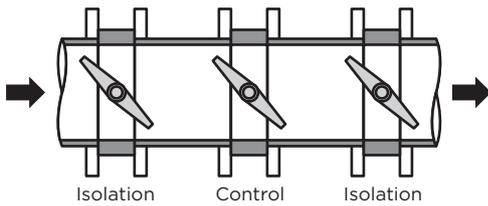
5.4.5 Butterfly valves in combination for control/isolation applications should be installed as follows:

Figure 09: Control/Isolation combination.



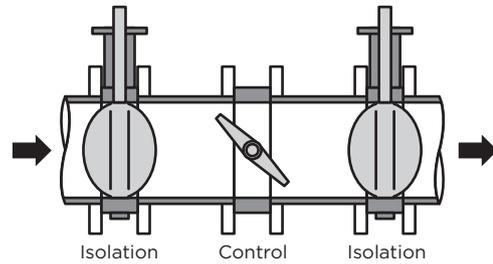
INCORRECT

Combination with all valve stems in the same direction accelerates possible noise, vibration, and erosion problems.



CORRECT

Combination with the stem of the control valve at right angle to those of other valves tends to cancel the drift of the fluid, and reduces noise, vibration, and erosion.



6.0 INSTALLATION PROCEDURE

6.1 General Installation

- 6.1.1 Make sure the pipeline and pipe flange faces are clean. Any foreign material such as pipe scale, metal chips, welding slag, welding rods, etc., can obstruct disc movement or damage the disc or liner.
- 6.1.2 The PFA liner extends over the face of the valve body and functions as the flange gasket. Additional gaskets are not normally required in installations where the flange strength allows maximum bolting torque (steel and alloy flanges for example). If sufficient bolting torque cannot be achieved due to flange type or material strength limits (FRP for example), a gasket may be required for proper flange sealing. Gaskets may be used when pipeline flange faces exhibit excess unevenness due to poor machining or weld distortion.
- 6.1.3 Ensure that the valve disc has been positioned to a partially open position (approximately 10° open) with the disc edge about ½ to ¾ inch (13 to 10 mm) inside the face of the seat.
Note: See **Section 5.2** for special consideration for valves with spring return actuators.
- 6.1.4 Align the piping, then spread the pipe flanges a distance apart to permit the valve body to be easily placed between the flanges without contacting the pipe flanges. **(Figure 10)**



WARNING

Never pick up a valve, actuator, or gear assembly by the actuator or gear. Instead, use the valve locating holes, or nylon straps around the neck of the valve to pick up the entire assembly.

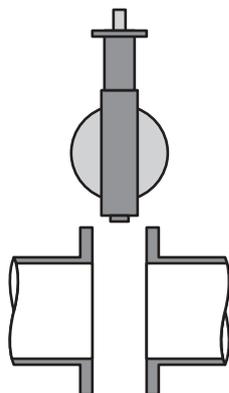
Figure 10: Spread flanges apart for valve clearance.



INCORRECT

Pipe not spread; disc opened beyond valve body face.

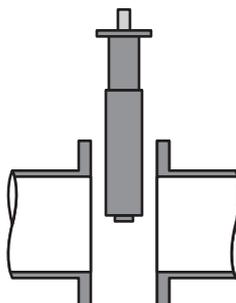
Results: Disc edge damaged when it hits pipe flange.



CORRECT

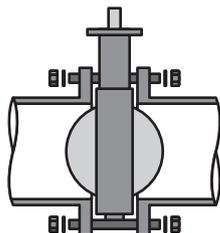
Pipe spread and aligned; disc rotated within body face.

Results: No undesirable beginning seating/unseating torque; disc edge protected.



6.1.5 Insert the valve between the flanges, taking care not to damage the liner faces. Install flange bolts or studs to center the valve, but do not tighten, ensuring the disc has clearance for centering. **(Figure 11)**

Figure 11: Insert and center valve.



6.1.6 To check for proper alignment, carefully open the disc to the full open position, making sure the disc does not hit the adjacent pipe I.D. **(Figure 12)**

Figure 12: Check for proper alignment of valve and flanges.



INCORRECT

Piping misaligned.

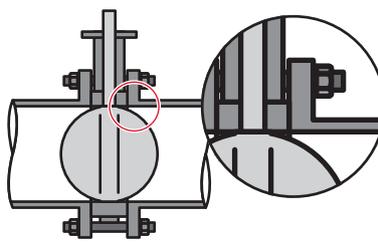
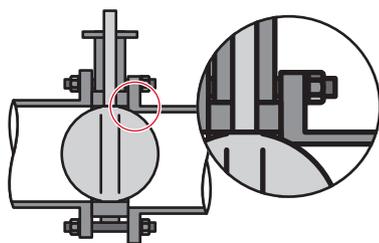
Results: Disc O.D. strikes pipe I.D. causing disc edge damage, increased torque, and leakage.



CORRECT

Piping aligned properly when bolts tightened; disc in full open position.

Results: Disc clears adjacent pipe I.D.; liner face seals properly; no excessive initial torque.



- 6.1.7 Now systematically remove jack bolts or other flange spreaders, and hand-tighten the flange bolts.
- 6.1.8 Very slowly close the valve disc to ensure disc edge clearance from the adjacent pipe flange I.D.
- 6.1.9 Open the disc to full open, then tighten all flange bolts per specification as shown in **Table 02** and **Figure 13**.

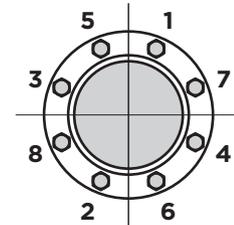
Table 02: Flange Bolt Tightening Torque

Valve Size		Maximum Torque ¹	Valve Size		Maximum Torque ¹
NPS		lbf-ft	DN		N m
2		29	50		39
2½		37	65		50
3		44	80		60
4		37	100		50
5		52	125		71
6		74	150		100
8		96	200		130
10		125	250		169
12		147	300		199
14		162	350		220
16		147	400		199
18		206	450		279
20		199	500		270
24		258	600		350

Notes:

¹ Maximum bolt torques shown for steel or alloy flanges. If installed between non-metallic flanges (FRP for example), follow the flange manufacturer’s recommended bolt torque.

Figure 13: Flange Bolt Tightening Pattern.



- 6.1.10 Finally, repeat a full close to full open rotation of the disc to ensure proper clearances.

7.0 OPERATION

7.1 Operation

Operation of the valve is done by turning the stem a quarter-turn (90 degree turn).

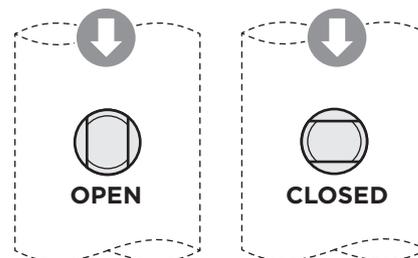
- > The stem is turned clockwise to close, counter-clockwise to open.

7.2 Valve Open/Closed Indication

Indication (≤ NPS 12 | DN 300)

- > Valve **OPEN** position: Flats of Double-D stem are **parallel** to pipeline.
- > Valve **CLOSED** position: Flats of Double-D stem are **perpendicular** to pipeline.

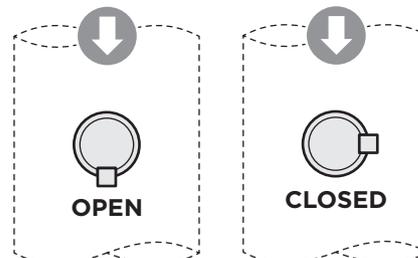
Figure 14: Indication of valve Open and Closed position. (≤ NPS 12 | DN 300)



Indication (≥ NPS 14 | DN 350)

- > Valve **OPEN** position: Key is **parallel** to pipeline.
- > Valve **CLOSED** position: Key is **perpendicular** to pipeline.

Figure 15: Indication of valve Open and Closed position. (≥ NPS 14 | DN 350)



CAUTION

Valves with actuators should be inspected for actuator/valve alignment. Misalignment will result in high operational torque and damage to valve stem and seals.

8.0 ACTUATOR REMOVAL AND REMOUNTING

8.1 Removing Actuator

- 8.1.1 Refer to relevant actuator installation, operation, and maintenance instructions before proceeding.
- 8.1.2 Neutralize all energy sources (electrical, pneumatic or hydraulic pressure, and mechanical).
- 8.1.3 Support the actuator assembly before disconnecting it from the body assembly.
- 8.1.4 Unbolt the actuator assembly from valve body.
- 8.1.5 Lift actuator assembly off stem.

8.2 Remounting Actuator

- 8.2.1 Before mounting an actuator on the valve body, verify that the segment rotation matches the actuator rotation and complies with the actuator failure mode requirements.
- 8.2.2 Slide the entire actuator assembly onto the stem.
- 8.2.3 Bolt actuator assembly to valve body.
- 8.2.4 Verify and set actuator stops.



NOTICE

Refer to the actuator IOM for necessary adjustments.

9.0 TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSE	RECOMMENDED SOLUTION
Flange leakage	Insufficient pressure on PFA faces	Tighten flange bolts to recommended torque value.
	No gasket on non-metallic flanges	Use a low-torque gasket and tighten flange bolts to non-metallic flange manufacturer's recommended torque values.
	Damage to PFA flange faces prior to or during installation	Remove valve and inspect. Replace valve if liner is damaged.
Leakage from stem area or body halves	Disc hitting the flange inside diameter, exposing the base metal	Remove valve and inspect. Replace valve if parts were damaged or exposed to media.
	Liner damage	Remove valve and inspect. Replace valve if parts were damaged or exposed to media.
	Valve over-pressurized	Remove valve and inspect. Replace valve if parts were damaged or exposed to media.
Through-bore leakage	Disc not fully closed	Adjust closed stop on gear or actuator.
	Damage to PFA disc or liner	Remove valve and inspect. Replace valve if parts were damaged or exposed to media.
High valve torque	Damage to PFA disc or liner	Remove valve and inspect. Replace valve if parts were damaged or exposed to media.
	Over-compression of PFA liner	Remove and inspect. Replace valve if liner is damaged.
	Disc blockage	Verify sufficient clearance from adjacent flange inside diameters. Replace valve if there is any PFA damage.
	Media buildup in valve	Cycle valve on a regular basis to clear liner of buildup.

Note: The Acris® Series 24/25 is not intended to be field repairable. For further troubleshooting and repair options and information, please contact your local Bray representative.

10.0 RETURN MERCHANDISE AUTHORIZATION

10.1 All products that are returned require a Return Merchandise Authorization (RMA). Contact a Bray representative for instructions and RMA forms to be completed prior to return of any product.

10.2 The following information must be provided when submitting RMA.

- > Serial number
- > Part number
- > Month and year of manufacture
- > Actuator specifics
- > Application
- > Media
- > Operating temperature
- > Operating pressure
- > Total estimated cycles (since last installation or repair)

NOTE: Product information is provided on identification tag attached to device.



NOTICE

Materials must be cleaned and sanitized prior to return. MSDS sheets and Declaration of Decontamination are required.

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