

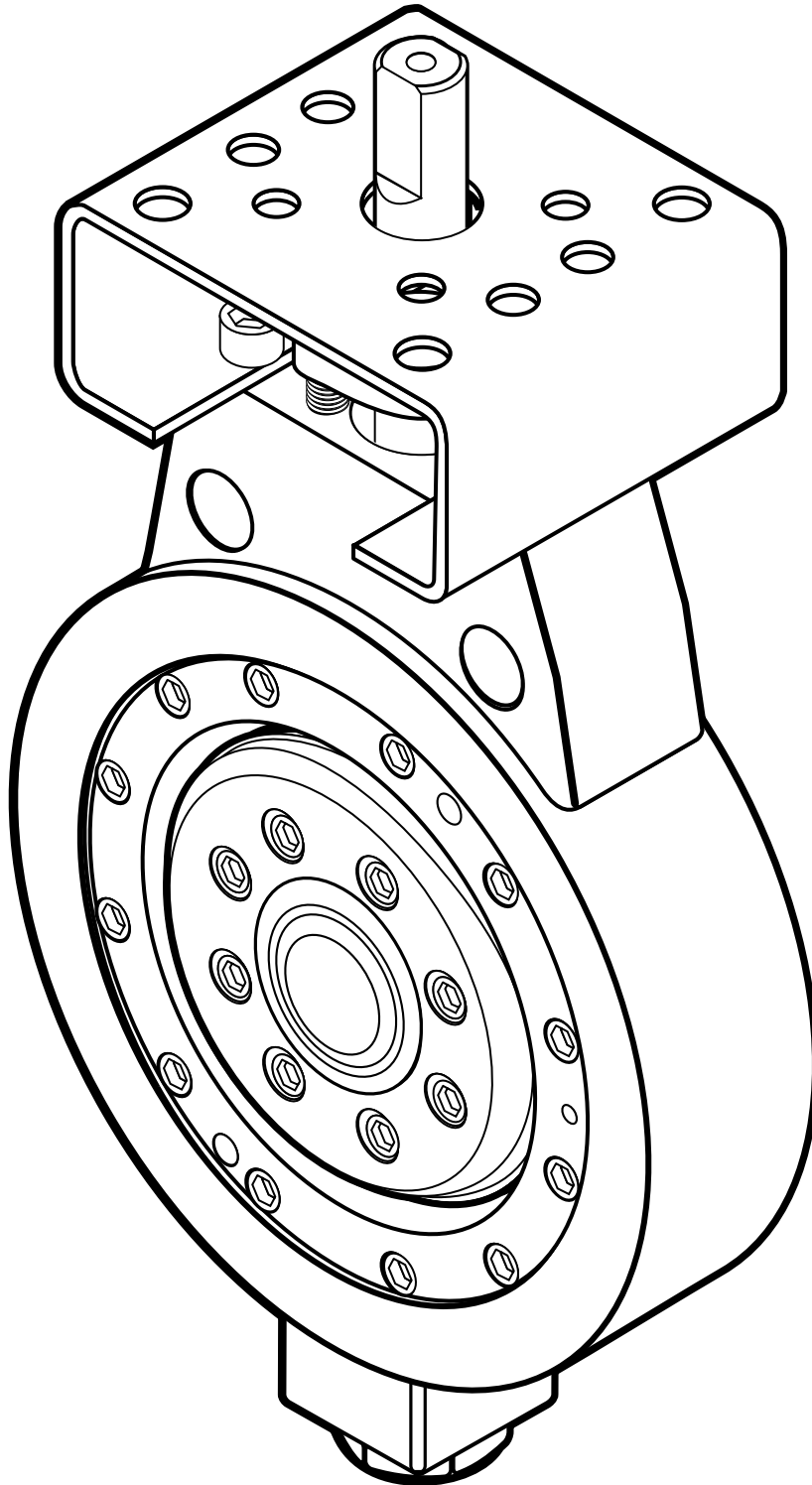
# Bray TRI LOK

## TRIPLE OFFSET VALVE



### OPERATION AND MAINTENANCE MANUAL

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## 1.0 SAFETY INFORMATION

### 1.1 DEFINITION OF TERMS

	<b>WARNING</b>	indicates a potentially hazardous situation which, if not avoided, <b>could</b> result in death or serious injury.
	<b>CAUTION</b>	indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
	<b>NOTICE</b>	used without the safety alert symbol indicates a potential situation which, if not avoided, may result in an undesirable result or state, including property damage.

### 1.2 ATEX DIRECTIVE 94/9/EC



#### WARNING

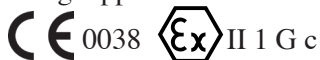
When using this product in hazardous environments, the national directives and laws which apply in your country for hazardous areas must be followed. The specifications of the examination certificate valid in country of operation must be also observed.

#### 1.2.1 MARKING

**Certificate Number:** LRVL 10ATEX0003X

**Certification Code:**

Non-Mining Applications



Mining Applications



**Ambient Range:** TX See Special Conditions for Safe Use

**Serial Number:** As appropriate

**Year of Manufacture:**

**Warnings:**

#### 1.2.2 SPECIAL CONDITIONS FOR SAFE USE

The following factors must be carefully considered in order to ensure the valve is compatible with the atmosphere in which it is applied. The system designer and/or end user should be formally address each item and carefully document the reasoning behind specific measures taken to ensure continued compliance throughout the life of the Tri Lok valve.

### MATERIAL CONSIDERATIONS

Titanium is not to be used in Group I, mining applications due to the potential of ignition due to mechanical sparks from impacts such as a spanner being dropped on the valve. Please see ES11A-0736 for details regarding material limitations.

### TEMPERATURE CONSIDERATIONS

The surface temperature of the Tri Lok valve is wholly dependent on the ambient temperature in combination with the temperature of the process medium. The maximum surface temperature of the Tri Lok valves may be calculated from the maximum ambient temperature plus the maximum process medium temperature as shown below:

#### Equation 1 - Surface Temperature Calculation

$$T_{s(max)} = T_{a(max)} + T_{p(max)}$$

The system designer is responsible for ensuring the maximum temperature, either inside the valve body or on the external surface, will remain well below the ignition temperature of the atmosphere. Additional protective devices may be required to ensure a sufficient thermal safety margin, including but not limited to: thermal shut-off devices, cooling devices.

### STATIC ELECTRICITY CONSIDERATIONS

Where the process medium is a liquid or semi-solid material with a surface resistance in excess of 1 G-ohms, special precautions should be taken to ensure the process does not generate electro-static discharge. This may be done through ensuring the flow rate of the process media remains below 1 m/s or providing sufficient discharge

points along the process path to eliminate electro static build-up. Consultation to EN 50404 is recommended.

Appropriate grounding may be necessary through the use of grounding straps or other means.

### **STRAY ELECTRIC CURRENT CONSIDERATIONS**

Where the Tri Lok valve is used near sources of high current or magnetic radiation, provisions shall be made to ensure a secure bonding to earth ground so as to prevent ignition due to inductive currents or a rise in temperature due to these currents.

### **FILTRATION OF PROCESS MEDIUM CONSIDERATIONS**

Special consideration should be made regarding the filtration of the process medium if there is a potential for the process medium to contain solid particulates. The process medium is recommended to be filtered to allow particles no greater than 1.0 mm in diameter through the valve assembly where there is a high probability of solid particulates. Larger particulate sizes may be deemed appropriate based on the possibility of particulates within the process medium and the area classification. The decision regarding filtration levels and limits should be well-documented by the system designer and/or end user to ensure continued compliance through the life of the valve.

## **2.0 INTRODUCTION**

This manual covers Tri Lok valves in the following range:

**ASME Classes:** 150 and 300

**Sizes:** 3" - 24" (800 mm - 600 mm)

**Body Style:** Wafer, Lug, Double Flange and Gate face-to-face configuration

The Bray Tri Lok metal seated valve is fully rated to ASME B16.34.

The design of the valve complies with ASME B16.34 and API 609.

Tri Lok is torque-seated. Torque must be continually applied by an actuation device (manual gearbox or power valve actuator) to the valve stem to ensure the valve seals against the line pressure.



### **WARNING**

Do not remove or de-energize actuation devices while the valve is under line pressure.

The valve is inherently fire safe, and has been qualified to ISO 10497 and API 607, fifth edition standards.

Tri Lok is suitable for bi-directional zero leakage tight shutoff. More actuation torque is required to seal the valve in the non-preferred direction.

The preferred direction of valve installation is with the upstream line pressure on the stem side and the body seat on the downstream side. The non-preferred direction of valve installation is with the upstream line pressure on the body seat side and the stem on the downstream side.

The preferred direction of flow is indicated by an arrow on the valve nameplate.

## **3.0 INSTALLATION**

1. Tri Lok is designed to be installed between ASME B16.5 and ISO 7005 flanges. When the valve is open, a portion of the disc may protrude into the pipe. Wafer and lug configurations will protrude on both sides of the valve. In the double flange version and some gate sizes, the open disc may protrude into the pipe on the seat side of the valve. Adjacent piping must be large enough to allow the open disc to clear the pipe.

Table 1 (Pg. 4) shows both the minimum allowable pipe ID and standard pipe ID. In general, Class 150 valves will clear Schedule 40 pipe, and Class 300 will clear Schedule 80 pipe adequately.

2. The valve closes with clockwise rotation of the stem, and opens with counterclockwise rotation.



### **CAUTION**

Avoid uncontrolled rotation of the disc beyond fully-open position (counterclockwise) as this could damage the sealing surfaces.

Over-rotation into closed position (clockwise) is not possible, as the disc will stop against the seat in the normal operating manner.

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**TABLE 1 - MINIMUM ALLOWABLE PIPE ID FOR TRI LOK INSTALLATION -  
STANDARD PIPE ID GIVEN FOR REFERENCE.**

Valve Size Pipe Size In (mm)	Min. Pipe ID. Class 150 In (mm)	Min. Pipe ID. Class 300 In (mm)	Nom. Pipe ID. Schedule 40 In (mm)	Nom. Pipe ID. Schedule 80 In (mm)	Nom. Pipe ID. Schedule 100 In (mm)
3 (80)	2.0 (50.8)	2.0 (50.8)	3.1 (77.9)	2.9 (73.7)	-
4 (100)	3.1 (77.7)	3.1 (77.7)	4.0 (102.3)	3.8 (97.2)	-
6 (150)	5.0 (127.8)	4.8 (120.7)	6.1 (154.1)	5.8 (146.3)	-
8 (200)	6.8 (171.7)	6.5 (164.6)	8.0 (202.7)	7.6 (193.7)	7.4 (189.0)
10 (250)	8.7 (220.5)	8.6 (218.9)	10.0 (254.5)	9.6 (245.2)	9.3 (236.6)
12 (300)	10.6 (270.0)	10.9 (276.9)	11.9 (303.2)	11.4 (289.0)	11.1 (281.0)
14 (350)	11.8 (300.0)	11.6 (293.9)	13.1 (333.3)	12.5 (317.5)	12.1 (308.0)
16 (400)	13.8 (349.5)	13.2 (335.0)	15.0 (381.0)	14.3 (363.6)	13.9 (354.0)
18 (450)	15.5 (392.4)	15.0 (380.7)	17.0 (428.7)	16.1 (409.6)	15.7 (398.5)
20 (500)	17.7 (450.3)	16.8 (427.2)	18.8 (477.9)	17.9 (455.6)	17.4 (442.9)
24 (600)	21.1 (539.9)	20.7 (526.5)	22.6 (574.7)	21.6 (547.7)	20.9 (531.8)

\*See Notes below

3. To benefit from the most favorable low operating torque and best sealing conditions, install the valve with the stem on the upstream (pressure side) of the installation. The valve tag is marked with an arrow indicating the preferred direction of the flow in the line.
4. Whenever possible, install the Tri Lok with the stem in horizontal position with respect to the ground. If this installation is not possible, Bray recommends orienting the stem at an inclined angle with respect to the ground, with the actuator above the horizontal centerline. This will prevent process debris from accumulating in the stem bearing area. In addition, with the valve stem horizontal, the weight of the disc will be supported along the full length of bearing journals. These positions will minimize operational wear.
5. Flange gaskets should conform to the requirements of ASME B16.20 (supersedes API Standard 601) for ASME B16.5 flanges. Spiral wound gaskets, such as Flexitallic® CG or CGI series, conforming to ASME B16.20 are recommended.
6. When bolting the valve into the line, use standard bolting torque as recommended by respective piping standards. The valve body seat is independent of the flange bolting, hence additional force from the flange bolts is not required.

**Notes for Table 1:**

- a. Minimum allowable ID of pipe with recommended clearances (per API 609) have been calculated by adding the minimum recommended diametric clearance to the larger chordal dimension of the disc at the valve face.
- b. This table assumes that the valve is perfectly centered in the pipe flanges.
- c. A minimum of 1/16" (1.6 mm) thick gasket is used between the pipe flange and the face of the valve body.
- d. When using a pipe whose ID is smaller than the recommended minimum allowable ID of pipe with adequate clearance, a spacer of appropriate thickness and a proper gasket could be used at the flange face to clear the disc. Alternately, for butt-welded pipe flanges, a 45 degree chamfer of required size to clear the disc edge could be provided. Chamfering which would cut into the internal weld at the flange ID is not allowed in slip-on pipe flanges.

## 4.0 MAINTENANCE



### WARNING

Reasonable precaution should be taken before beginning any work on the valve.

Protective clothing, as required by specific line fluid and appropriate safety codes, should be worn.

Depressurize the line and close the valve before removing the actuation device from the valve.

Depressurize the line before loosening any packing gland nuts.

Do not pressurize the line without an actuation device properly installed and working on the valve.



### CAUTION

The Tri Lok valve must be in closed position to be removed from the line. Otherwise, the sealing edge could be damaged.

1. When replacing the body seat and/or disc seal ring with the valve in the line in dead-end installation, or with the piping on the body seat side removed, depressurize the line and marginally crack-open the disc before loosening any of the valve trim fasteners.

2. Begin all work on a valve that has been removed from the line by cleaning the valve, removing any grit or scale. When handling the valve, care should be taken not to scratch the disc seal ring, the body seat, and gasket faces on both sides of the valve.
3. Replacement body seats, disc seal rings, and other parts are available from authorized distributors. Contact your Bray distributor or sales representative for details on price and delivery.

### 4.1 STEM SEAL RING REPLACEMENT

Refer to the parts diagram for parts identification by reference numbers in parentheses. ( Pg. 13 )

1. If the valve is installed in the line, depressurize the line. Remove operator or actuator from the valve. Remove socket head cap screws and lock washers (25). Remove mounting bracket or mounting plate (26), depending on valve size. Note assembly positions of the operator or actuator and the mounting hardware for subsequent reinstallation.
2. Remove packing gland retainer nuts (24) and lock washers (23). Remove gland retainer (22), anti-blowout retaining ring or split ring (21) depending on valve size and gland ring (19).
3. Extract all stem seals (18A and 18B), taking care not to scratch the stem or the bore of the stuffing box.

**TABLE 2. - NUMBER AND TYPE OF STEM SEAL RINGS AND TORQUE VALUES  
FOR GLAND RETAINING NUTS.**

Valve Size in (mm)	Number of Rings Class 150	Number of Rings Class 300	Gland Nut Torque Class 150 lb-in. (Nm)	Gland Nut Torque Class 300 lb-in. (Nm)
3 (80)	2 B plus 2 F	2 B plus 2 F	35 (4.0)	45 (5.1)
4 (100)	2 B plus 2 F	2 B plus 2 F	35 (4.0)	45 (5.1)
6 (150)	2 B plus 2 F	2 B plus 2 F	45 (5.1)	65 (7.3)
8 (200)	2 B plus 2 F	2 B plus 2 F	45 (5.1)	80 (9.0)
10 (250)	2 B plus 2 F	2 B plus 2 F	65 (7.3)	100 (11.3)
12 (300)	2 B plus 2 F	2 B plus 2 F	65 (7.3)	100 (11.3)
14 (350)	2 B plus 4 F	2 B plus 6 F	80 (9.0)	125 (14.1)
16 (400)	2 B plus 4 F	2 B plus 7 F	100 (11.3)	150 (16.9)
18 (450)	2 B plus 7 F	2 B plus 7 F	100 (11.3)	150 (16.9)
20 (500)	2 B plus 7 F	2 B plus 8 F	100 (11.3)	150 (16.9)
24 (600)	2 B plus 8 F	2 B plus 6 F	150 (16.9)	200 (22.6)

B = braided carbon yarn packing stem seal ring, F = solid formed graphite stem seal ring.

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Do not remove the thrust washer (17) unless further valve disassembly is required.

4. Examine the stuffing box bore and the stem and clean as necessary to remove any corrosion or foreign matter before installing new stem seals.
5. Install new stem seals in stuffing box one at a time. The number and type of stem seal rings for individual valve sizes and pressure class are listed in Table 2. Insert bottom braided packing ring stem seal (18A) into the stuffing box. The splice in this ring has to be oriented perpendicular to flow direction. Using packing tube, tamp the braided packing ring stem seal firmly into position.
6. Insert all solid graphite stem seal rings (18B). If the rings are not endless, stagger splices at 180 degrees intervals, making sure the splices remain located perpendicular to the flow direction. Use a packing tube to set individual rings firmly, but without excessive effort as not to crush the graphite.
7. Insert top braided packing ring stem seal ring (18A) into the stuffing box. The splice in this ring must be oriented perpendicular to the flow direction, and at 180 degrees to the splice in the ring immediately below. Using a packing tube, tamp the top ring firmly into position.
8. Reinstall gland ring (19), anti-blowout retaining ring (21) and gland retainer (22). Re-install lock washers (23) and nuts (24). Tighten gland nuts (24) evenly and alternately to the proper torque value given in Table 2.
9. Reinstall mounting bracket or mounting plate (26) with cap screws and lock washers (25). Remount actuation device on top of the valve.
10. Operate the valve open and closed several times to check for binding and to set the stem seal rings. Loosen gland nuts (24) and retighten to torque value given in Table 2.

### 4.3 BODY SEAT REPIACEMENT:

Refer to the parts diagram for parts identification by reference numbers in parentheses. ( Pg. 13 )

Bray recommends that both the body seat (8) and the disc seal ring (13) be replaced at the same time. However,

individual components are not matched in pairs and can be replaced separately if desired.



#### CAUTION

Exercise extra care when handling the body seat and disc seal ring to avoid damage to the sealing areas.

Close the valve and remove the operator or actuator as applicable. Place the valve on a flat stable surface, with the body seat (8) facing up.

1. Carefully clean the surface of the body seat and remove all foreign matter from the hex sockets of the seat retaining cap screws (9). Blow out the gap between the body seat OD and the wall of the retaining cavity in valve body (6). Apply a suitable penetrant (WD40, etc.) into the gap between the body seat OD (8) and the body (6) to help in extracting of the body seat (8) from the body cavity.
2. Using a suitable wrench, remove all body seat retaining socket cap screws (9).
3. Using a hard wood or aluminum drift and a light hammer, tap the top of the body seat (8) lightly all around to loosen the body seat in the retaining cavity.
4. Using full-threaded bolts or suitable threaded rod matched to the threads in all tapped jacking holes, commence jacking the body seat (8) evenly out from the retaining cavity. Tap the body seat lightly with the drift as necessary to keep it in alignment with the walls of the retaining cavity in the body (6) while jacking. Remove the body seat (8) from the body (6).

Table 3 lists the thread sizes of jacking bolts for individual valve sizes. ( Pg. 9 )

5. Using soft tools and suitable wire brush, carefully clean any remnants of old gasket and foreign matter within the retaining cavity. Blow out all threaded holes and gasket grooves with compressed air.
6. Remove the disc seal ring retaining screws (10) and lock washers (11) from the disc seal ring retainer (12). Remove the disc seal ring retainer (12). If the old disc seal ring (13) is to be reinstalled, extract it carefully. Wipe the disc seal ring (13) clean, removing

all remnants of old gasket and foreign matter. Place the old disc seal ring (13) aside for reinstallation (if not replacing the disc seal ring with a new one).

7. Using soft tools and suitable wire brush, carefully clean any remnants of old gasket and foreign matter from the face of the disc (15). Blow out all threaded holes and the gasket groove with compressed air.
8. Place a new disc gasket (14) into the groove on the disc face (15). The mating side of the disc gasket can be lightly sprayed with adhesive to improve retention in the groove. Place the disc seal ring (13) onto the disc, making sure the alignment line on the disc seal ring matches the locating dimple in the disc face. Place the disc seal retainer (12) over the disc seal ring. Apply anti-seize compound to the disc seal ring retaining cap screws (10). Install all disc seal ring retaining cap screws (10) with lock washers (11). The disc seal retaining cap screws (10) should to be fully threaded into the disc (15), but remain only finger-tight at this time.
9. Place the body seat gasket (7) into the groove in the body seat (8). It is highly recommended to apply a light film of spray adhesive to the mating side of the body seat gasket to secure its position in the groove. Apply a suitable lubricant to the sealing surfaces of the body seat (8) and disc seal ring (13). Insert the body seat (8) into the body (6) over the disc seal ring (13), making sure the alignment dimples in the body seat (8) and the retaining cavity in the body (6) both match. Apply anti-seize compound to body seat retaining cap screws (9) and install the screws (9) finger-tight.
10. Verify that all four alignment marks match (body, body seat, disc seal ring and disc seal ring retainer) and then tighten the body seat retaining cap screws (9) evenly and firmly using a crisscross pattern when tightening. The tightening torque is specified in the Table 3 (Pg. 9).
11. Using a suitable wrench at the end of the splined stem (5), partially open and quickly close the disc (15) seating it firmly into the body seat (8) a few times.
12. Close the valve. Tighten all the disc seal ring retainer

screws (10) using a crisscross pattern. Tighten all the disc seal retainer screws (10) to the torque specified in Table 3 (Pg. 9).

13. Re-apply lubricant to the sealing surfaces of the valve. Reinstall actuation device and test the valve.

#### **4.4 DISC SEAL RING REPLACEMENT:**

Refer to the parts diagram for parts identification by reference numbers in parentheses.

Bray recommends that both the disc seal ring (13) and the body seat (8) be replaced at the same time. However, individual components are not matched in pairs, and can be replaced separately.



#### **CAUTION**

Exercise extra care when handling the body seat and disc seal ring to avoid damage to the sealing areas.

The disc seal ring (13) can only be replaced in two ways: replacing the disc seal ring (13) without removing the body seat (8); or replacing the disc seal ring (13) with the body seat (8) removed.

To remove the disc seal ring (13) without removing the body seat (8) requires the valve actuation device be removed from the valve and the valve flipped over to allow access to both sides of the valve. For that reason, this procedure is not suitable for occasions where the disc seal ring (13) needs to be replaced in a valve installed in the pipeline. In addition, this procedure is not recommended for large Tri Lok valves where flipping the valve over may be more difficult than removing the body seat (8) and installing the disc seal ring (13) solely from the body seat side.

#### **Disc Seal Ring replacement with the Body Seat in the valve:**

1. Remove the valve from the pipeline. Remove the actuator or operator from the valve.
2. Clean the surface of the valve, blow out all debris around the disc seal ring retainer (12) and clean out the hex sockets of the disc seal ring retaining cap screws (10).

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3. Loosen up all the disc seal ring retaining cap screws (10), but leave them in the valve with the disc seal ring retainer (12) attached to the disc (15).
4. Using a suitable wrench, rotate the valve splined stem (5) counterclockwise passed the fully open position far enough only such that the disc is in a position that will facilitate extraction of the disc seal ring retainer (12) and the disc seal ring (13). Be careful not to over-rotate the splined stem (5) to the point where the disc seal ring (13) or disc edge (15) would contact the body (6). Make sure the packing gland retainer nuts (24) are tight enough to prevent the valve splined stem (5) to rotate on its own under the eccentric weight of the disc (15).
5. Remove the disc seal ring retaining cap screws (10) and lock washers (11), and extract the disc seal ring retainer (12) and the disc seal ring (13).
6. Rotate the disc (15) as necessary to access the seal face on the disc (15). Using soft tools and suitable wire brush, carefully clean any remnants of old gasket and foreign matter from the face of the disc (15). Blow out all threaded holes and the gasket groove with compressed air.
7. Rotate the disc (15) back to the position required to facilitate installation of the disc seal ring (13). Place a new disc (15) seal ring gasket (14) into the groove on the disc face (15). The mating side of the disc seal ring gasket can be lightly sprayed with adhesive to improve retention in the groove. Place the disc seal ring (13) onto the disc (15) making sure the alignment line on the disc seal ring matches the locating dimple in the disc face. Place the disc seal ring retainer (12) over the disc seal ring. Apply anti-seize compound to the disc seal ring retaining cap screws (10). Install all retaining cap screws (10) with lock washers (11). The cap screws (10) need to be fully threaded into the disc (15), but remain only finger-tight at this time.
8. Lubricate the sealing surfaces of the disc seal ring (13) and the body seat (8). Using a suitable wrench, rotate the valve splined stem (5) clockwise until the disc seal ring (13) approaches closed position. Do not force the disc seal ring (13) into the body seat (8).
9. Flip the valve over such that the seat side faces upward. Verify that all four alignment marks (body, body seat, disc seal ring, disc seal ring retainer) are aligned (i.e. verify that the body seat (8) and disc seal ring (13) are in proper positions). Using the wrench, slowly rotate the disc (15) into the body seat (8) making sure that the sealing edges line up properly without binding. The disc seal ring retaining cap screws (10) should still be only finger tight at this time.
10. Using a suitable wrench at the end of the splined stem (5), partially open and quickly close the disc (15) firmly into the body seat (8) a few times. Close the valve. Tighten the disc seal ring retainer cap screws (10) using a crisscross pattern. Occasionally open and quickly close the valve while tightening the disc seal ring retainer cap screws (10) to the torque specified in the Table 3 (Pg. 9).
11. Re-apply lubricant to the sealing surfaces of the valve. Reinstall operator or actuator and test the valve.

### **Disc Seal Ring replacement with the Body Seat removed from the valve:**

This procedure follows the procedure for replacing the body seat (8) described above. If the old body seat (8) is to be reused, exercise extra care when extracting it from the retaining cavity in the valve body (6). When using the jacking bolts to extract the body seat, avoid forcing the jack screws unevenly which could result in permanent deformation (pretzel twist) of the body seat (8). If the old body seat (8) is to be reused, make absolutely certain that the body seat (8) slides out of the retaining cavity easily in a balanced and level manner.

**TABLE 3. - TIGHTENING TORQUE VALUES FOR BODY SEAT RETAINING CAP SCREWS  
AND DISC SEAL RING RETAINING CAP SCREWS (Lbf-in).**

Valve Size In (mm)	Class 150 Valves			Class 300 Valves		
	Seat Torque lb-in (Nm)	Seal Torque lb-in (Nm)	Jacking Bolt	Seat Torque lb-in (Nm)	Seal Torque lb-in (Nm)	Jacking Bolt
3 (80)	50 (5.6) - 60 (6.8)	40 (4.5) - 45 (5.1)	1/4-20 NC	50 (5.6) - 60 (6.8)	40 (4.5) - 45 (5.1)	1/4-20 NC
4 (100)	100 (11.3) - 120 (13.6)	60 (6.8) - 70 (7.9)	1/4-20 NC	100 (11.3) - 120 (13.6)	60 (6.8) - 70 (7.9)	1/4-20 NC
6 (150)	100 (11.3) - 120 (13.6)	100 (11.3) - 110 (12.4)	5/16-18 NC	170 (19.2) - 180 (20.3)	110 (12.4) - 120 (13.6)	5/16-18 NC
8 (200)	170 (19.2) - 180 (20.3)	120 (13.6) - 130 (14.7)	5/16-18 NC	300 (33.9) - 320 (36.2)	160 (18.1) - 180 (20.3)	5/16-18 NC
10 (250)	300 (33.9) - 320 (36.2)	170 (19.2) - 190 (21.5)	5/16-18 NC	300 (33.9) - 320 (36.2)	210 (23.7) - 230 (26.0)	5/16-18 NC
12 (300)	300 (33.9) - 320 (36.2)	220 (24.9) - 240 (27.1)	5/16-18 NC	300 (33.9) - 320 (36.2)	230 (26.0) - 250 (28.2)	5/16-18 NC
14 (350)	300 (33.9) - 320 (36.2)	230 (26.0) - 250 (28.2)	5/16-18 NC	500 (56.5) - 530 (59.9)	320 (36.2) - 340 (38.4)	5/16-18 NC
16 (400)	300 (33.9) - 320 (36.2)	310 (35.0) - 330 (37.3)	5/16-18 NC	500 (56.5) - 530 (59.9)	360 (40.7) - 380 (42.9)	5/16-18 NC
18 (450)	500 (56.5) - 530 (59.9)	330 (37.3) - 350 (39.5)	5/16-18 NC	500 (56.5) - 530 (59.9)	440 (49.7) - 470 (53.1)	5/16-18 NC
20 (500)	500 (56.5) - 530 (59.9)	400 (45.2) - 430 (48.6)	3/8-16 NC	800 (90.4) - 840 (94.9)	470 (53.1) - 500 (56.5)	3/8-16 NC
24 (600)	500 (56.5) - 530 (59.9)	470 (53.1) - 500 (56.5)	3/8-16 NC	800 (90.4) - 840 (94.9)	540 (61.0) - 570 (64.4)	3/8-16 NC

## 5.0 COMPLETE VALVE DISASSEMBLY:

1. Refer to the parts diagram for parts identification by reference numbers in parentheses.
2. Close the valve. As applicable, remove operator or actuator from the valve. Remove socket head cap screws and lock washers (25). Remove mounting bracket or mounting plate, (26) depending on valve size. Note assembly positions of the operator or actuator and the mounting hardware for subsequent re-installation.
3. Clean all surfaces of the valve and blow out any loose debris and foreign matter. Place the valve on a flat stable surface, with the body seat (8) side facing up.
4. Remove the body seat (8), following the procedure described above in the section "Body Seat Replacement".
5. Remove disc seal ring retainer (12) and disc seal ring (13) following the relevant portion of the procedure described above in the sections "Body Seat Replacement".
6. Remove the stem plug (1) at bottom of the valve body (6).
7. Remove packing gland retainer nuts (24) and lock washers (23). Remove gland retainer (22), anti-blowout retaining ring or split ring, (21) depending on valve size, and gland ring (19). Extract locating dowels (16) if desired.
8. Verify the valve disc (15) is properly supported. Using a rubber mallet or an aluminum drift with a hammer, tap on the top of the splined stem (5) and extract it through the bottom of the body (6). The lower bearing (3) will come out with the splined stem (5). Remove the disc (15) from the valve body (6).
9. Extract all the stem seals (18A and 18B), thrust washer (17) and upper bearing (3), taking care not to scratch the stem or the bore of the stuffing box.
10. Remove all remaining gaskets and stem seals that have not dislodged during the previous disassembly. These items are: bearing gaskets (4), plug gasket (2), disc seal ring gasket (14) and body seat gasket (7).
11. Clean all individual items as required for reassembly.

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## 6.0 VALVE ASSEMBLY:

When reassembling the Tri Lok valve, all gaskets, packing, and seals should be new. Cap screws can be reused if in good condition, but Bray recommends that all lock washers be renewed.



### CAUTION

Exercise extra care when handling the body seat and disc seal ring to avoid damage to the sealing areas.

Make sure the gasket faces on both sides of the valve body (6) are protected from scratching and other damage when handling the valve body (6).

Assembly is essentially the reverse of disassembly with the following notable points:

1. The alignment of the driving flats or keyway of the splined stem (5) with respect to the disc face (15) must be such that the disc face (15) is rotationally about two to three degrees ahead of the splined stem (5) in clockwise direction when viewed from top. This ensures that the disc seal ring (13) lodges into the body seat (8) before the valve operator or actuator reaches 90 degrees travel. Use anti-seize compound in the splined connection between the splined stem (5) and the disc (15).
2. Both bearings (3) should be installed after the disc (15) and splined stem (5) have been placed in the valve body (6). Spray lubricant on the ends of the splined stem (5) and carefully thread the bearing gaskets (4) onto the splined stem (5) ends. Slide the upper bearing (3) over the end of the splined stem (5) pushing the bearing gasket (4) along the splined stem (5). Make sure the bearing gasket (4) does not hang on the flats of the splined stem (5) (or keyway as applicable). Gently push the upper bearing (3) into the body cavity (6). Repeat the procedure, very carefully, when installing the lower bearing (3).
3. Use liberal amount of lubricant on the sealing surfaces of the disc seal ring (13) and the body seat (8) when finalizing the alignment of these parts.
4. Test the valve.

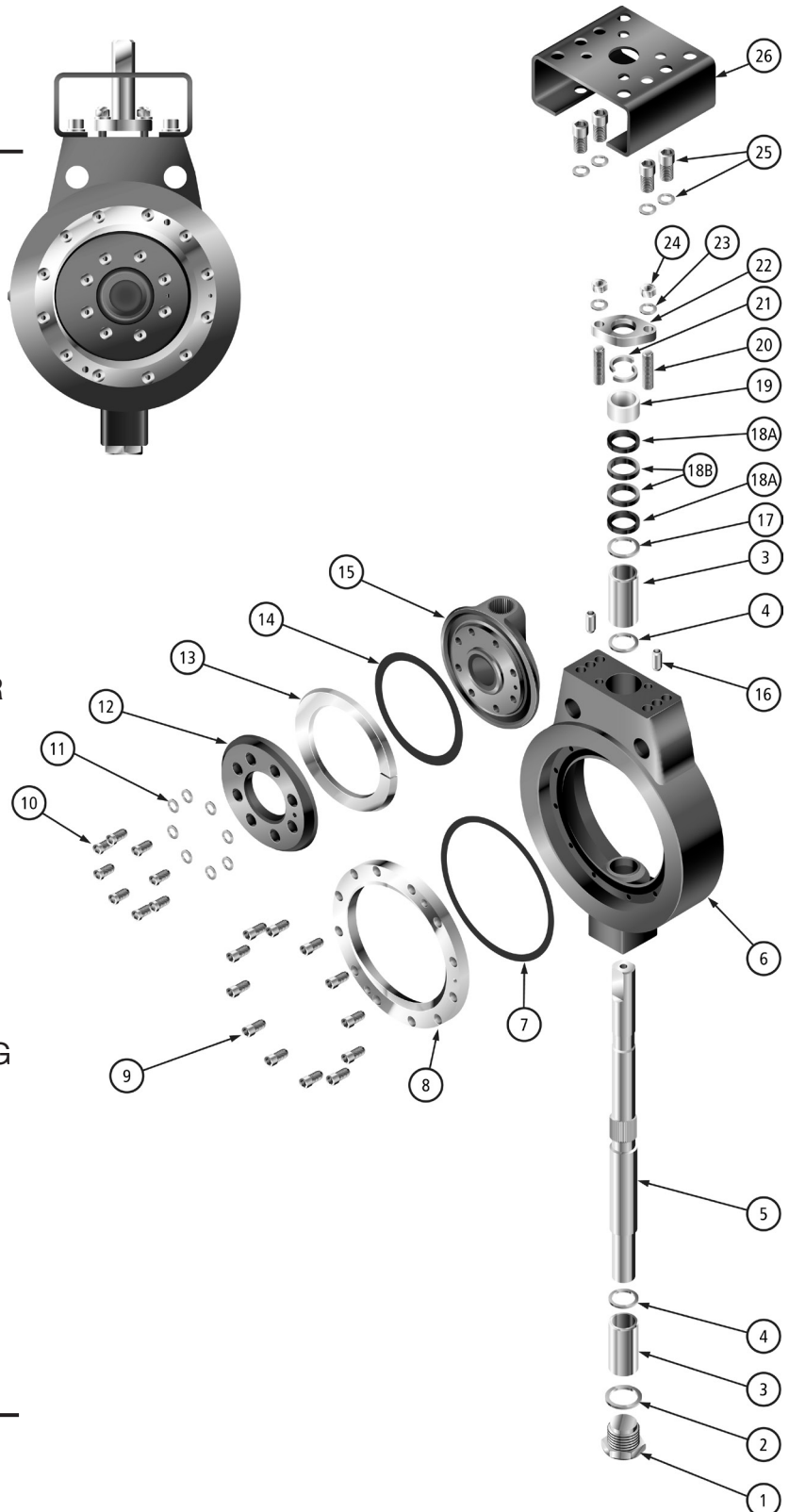
5. Recommended lubricant for valve components during valve assembly and/or disassembly are as follows:

Valve Component	Lubricant
Bearing Area & Shaft Machined Surfaces	Light Spray
Threaded Connections	Anti-Seize
Seat/Seal Contact Surfaces	Dry Graphite Spray

## 7.0 VALVE PART DIAGRAM

### 6" (150MM) TRI LOK WAFER ANSI 150

- 1 STEM PLUG
- 2 PLUG GASKET
- 3 UPPER/LOWER BEARING
- 4 BEARING GASKET
- 5 SPLINED STEM
- 6 VALVE BODY
- 7 BODY SEAT GASKET
- 8 BODY SEAT
- 9 BODY SEAT RETAINING  
CAP SCREWS (HEX)
- 10 DISC SEAL RING  
RETAINING CAP  
SCREWS (HEX)
- 11 LOCK WASHERS
- 12 DISC SEAL RING RETAINER
- 13 DISC SEAL RING
- 14 DISC SEAL RING GASKET
- 15 DISC
- 16 LOCATING DOWELS
- 17 THRUST WASHER
- 18A BRAIDED PACKING RING
- 18B SOLID GRAPHITE RINGS
- 19 GLAND RING
- 20 PACKING GLAND SCREW
- 21 ANTI-BLOWOUT RETAINING  
RING/ SPLIT RING
- 22 GLAND RETAINER
- 23 LOCK WASHERS
- 24 PACKING GLAND  
RETAINER NUTS
- 25 SOCKET HEAD SCREWS  
W/ LOCK WASHERS
- 26 MOUNTING  
BRACKET / PLATE



**NOTES**

**NOTES**

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