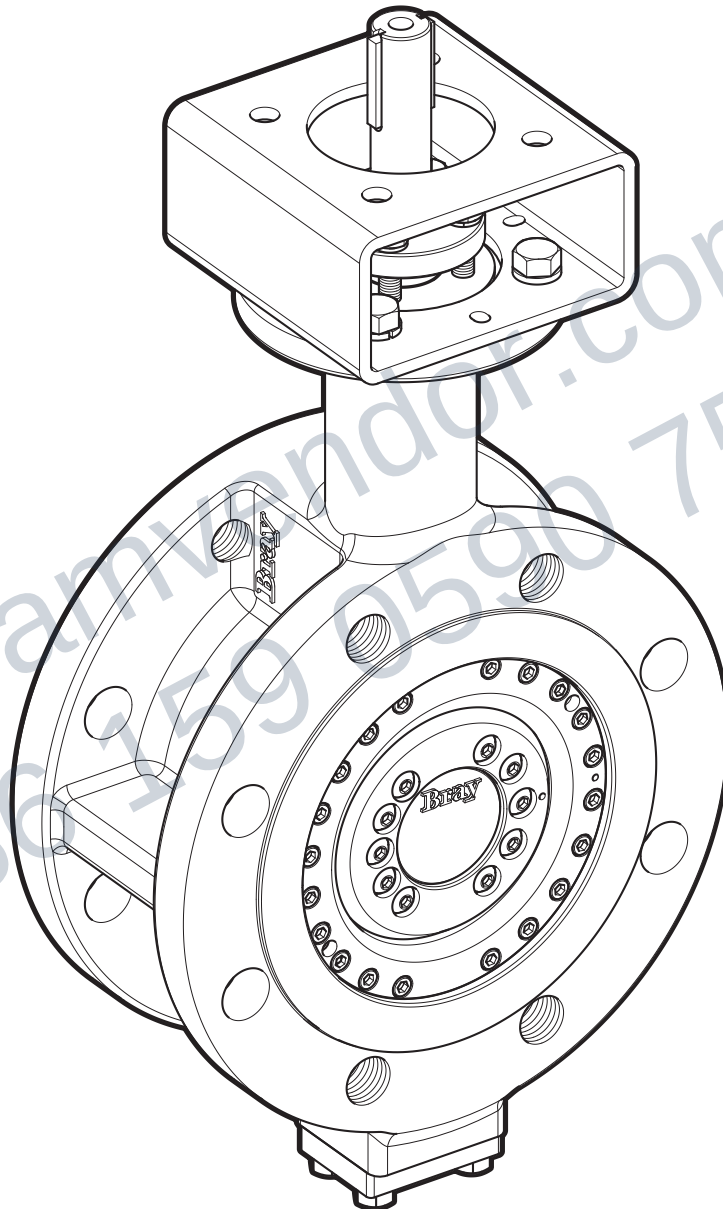

TRI LOK®

TRIPLE OFFSET VALVE

Installation, Operation and Maintenance Manual
(EU-Version)



Bray®

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For information on this product and other Bray products please visit us at our web page - www.bray.com

**READ AND FOLLOW THESE INSTRUCTIONS CAREFULLY
SAVE THIS MANUAL FOR LATER USE.**

1.0 DEFINITION OF TERMS

 WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury to personnel or severe damage to the piping system.

 CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury to personnel or severe damage to the piping system.

NOTICE

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.

0.00 Identifies and explains sequential procedure to be performed.

NOTE: Provides important information related to a procedure.

2.0 INTRODUCTION

- 2.1** Information provided in this manual is for standard Tri Lok® configuration only. Specific instructions for non-standard materials of construction, temperature range, etc. should be referred to the factory.

Additional information on certification documentation is available on the Bray website or by contacting your local Bray Sales Representative.

- 2.2** This manual covers Tri Lok® valves in the following range:

Nominal Pressure	Sizes	Body Style
PN10 and PN40	DN80 - DN1200	Wafer, Lug, Double Flange, Gate

- 2.4** The Tri Lok® metal seated valve is fully rated to EN 12516, and complies with EN593.

- 2.5** 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.



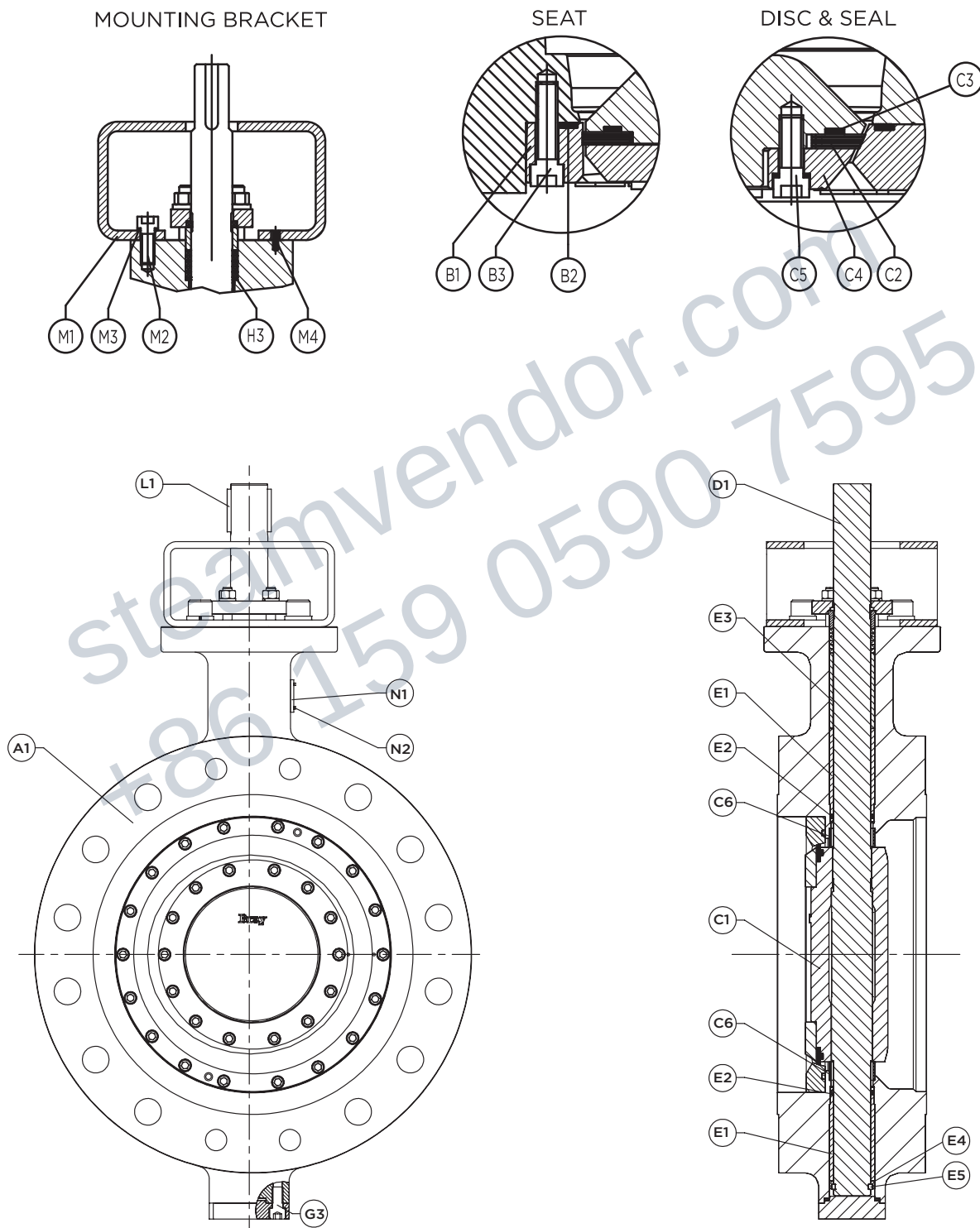
WARNING

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

- 2.6** The valve is inherently fire safe, and has been qualified to ISO 10497 and API 607 standards.
- 2.7** The preferred direction of valve installation is with the upstream line pressure on the stem side and the body seat on the downstream side.
- 2.8** The preferred direction of flow is indicated by an arrow on the valve nameplate.

3.0 VALVE PART DIAGRAM

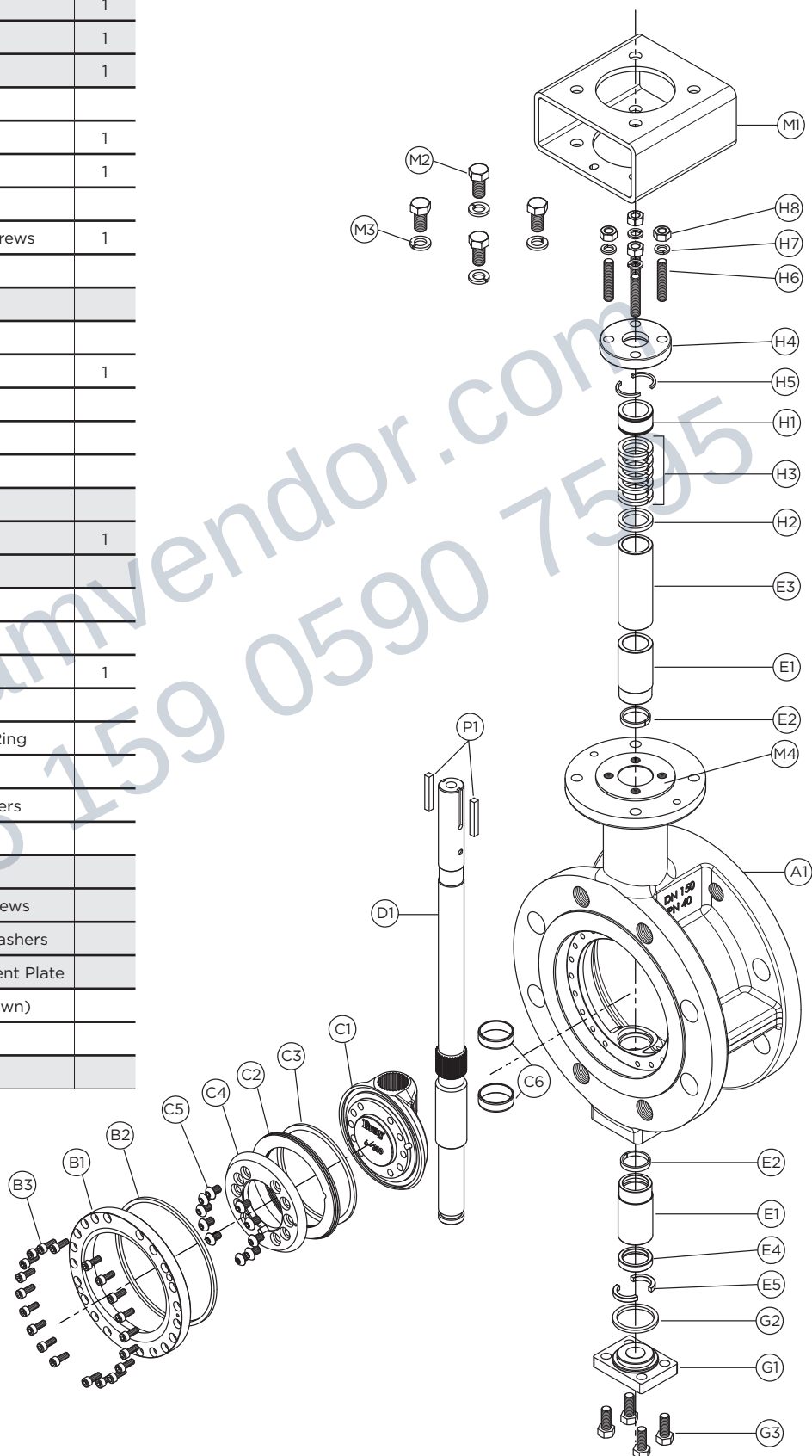
Sectional Drawing Standard Configuration Tri Lok® Valve



4.0 EXPLODED VIEW

Item	Component Description	Note
A1	Body	
B1	Seat	1
B2	Seat Gasket	1
B3	Seat Cap Screws	1
C1	Disc	
C2	Seal Ring	1
C3	Seal Ring Gasket	1
C4	Seal Ring Retainer	
C5	Seal Ring Retainer Cap Screws	1
C6	Disc Spacer	
D1	Stem	
E1	Stem Bearing	
E2	Bearing Protector Gasket	1
E3	Upper Spacer	
E4	Thrust Bearing	
E5	Thrust Bearing Washer	
G1	Bottom Plate	
G2	Bottom Plate Gasket	1
G3	Bottom Plate Cap Screws	
H1	Packing Gland Ring	
H2	Anti-Extrusion Ring	
H3	Stem Packing	1
H4	Gland Retainer	
H5	Anti Blow-Out Retaining Ring	
H6	Packing Gland Studs	
H7	Packing Gland Lock Washers	
H8	Packing Gland Hex Nuts	
M1	Mounting Bracket	
M2	Mounting Bracket Cap Screws	
M3	Mounting Bracket Lock Washers	
M4	Mounting Bracket Alignment Plate	
N1	Identification Tag (not shown)	
N2	Drive Screws (not shown)	
P1	Stem Keys	

Note 1: Suggested Spare Part



5.0 SAFETY INFORMATION

5.1 ATEX Directive 2014/34/EU



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.

5.2 Marking

Certificate Number: LRV 14ATEX0001X

Certification Code:

Non-Mining Applications



II 1G Ex h IIC Tx Ga

Mining Applications



I M1 Ex h Tx Ma

Ambient Range: TX See Special Conditions for Safe Use

Serial Number: As appropriate

Year of Manufacture:

Warnings:

5.3 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 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.

5.4 Material Considerations

Titanium is not to be used in Group I mining applications and Group II Category 1 equipment, due to the potential of ignition from sparks caused by mechanical impacts. Please consult factory for details regarding material limitations.

5.5 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® valve 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 and cooling devices.

For operating temperatures above 200°C Bray recommends thermal insulation of the valve body.

5.6 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 electrostatic build-up. Consultation to EN 50404 is recommended.

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

5.7 Stray Electric Current Considerations

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

5.8 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.

6.0 HAZARD-FREE USE

- 6.1** This device left the factory in proper condition to be safely installed and operated in a hazard-free manner. The notes and warnings in this document must be observed by the user if this safe condition is to be maintained and hazard-free operation of the device assured.
- 6.2** Take all necessary precautions to prevent damage to the valve due to rough handling, impact, or improper storage. Do not use abrasive compounds to clean the valve, or scrape metal surfaces with any objects
- 6.3** The control systems in which the valve is installed must have proper safeguards to prevent injury to personnel, or damage to equipment, should failure of system components occur.
- 6.4** The upper limits of permitted pressure and temperature (depending on the housing and liner materials) are shown on the valve plate and identified with PS and TS.
- 6.5** The valve must not be operated until the following documents have been observed:
- 6.5.1 Declaration on EU Directives
 - 6.5.2 IOM-Manual, which are supplied with the product.

7.0 QUALIFIED PERSONNEL

- 7.1** A qualified person in terms of this document is one who is familiar with the installation, commissioning, and operation of the device and who has appropriate qualifications, such as:
- 7.1.1 Is trained in the operation and maintenance of electrical equipment and systems in accordance with established safety practices.
 - 7.1.2 Is trained or authorized to energize, de-energize, ground, tag, and lock electrical circuits and equipment in accordance with established safety practices.
 - 7.1.3 Is trained in the proper use and care of personal protective equipment (PPE) in accordance with established safety practices.
 - 7.1.4 In cases where the device is installed in a potentially explosive (hazardous) location – is trained in the commissioning, operation, and maintenance of equipment in hazardous locations.
- 7.2** Additional information about Tri Lok Valves — including application data, engineering specifications, and actuator selection — is available from your local Bray distributor or sales representative.

8.0 HANDLING REQUIREMENTS

8.1 Packed Valves

1. Crates: Lifting and handling of the packed valves in crates will be carried out by a fork lift truck, by means of the appropriate fork hitches.
2. Cases: The lifting of packed valves in cases will be carried out in the lifting points and in the center of gravity position which have been marked. The transportation of all packed material must be carried out safely and following the local safety regulations.

8.2 Unpacked Valves

1. Lifting and handling of valves should be carried out by using appropriate means and observing the carrying limits. Handling must be carried out on pallets, protecting all machined surfaces to avoid any damage.
2. With large bore valves, rigging the load must be carried out by using the appropriate tools to prevent the valve from falling or moving during the lifting and handling.



For valve handling and/or lifting, the lifting equipment (fasteners, hooks, etc.) must be sized and selected while taking into account the valve weight indicated in our packing list and/or delivery note. Lifting and handling must be made only by qualified personnel.

Fasteners must be protected by plastic covers in sharp corner areas. Caution must be taken during the handling to avoid this equipment passing over the workers or over any other place where a possible fall could cause injury or damage. In any case, local safety regulations must be respected.

9.0 LONG TERM STORAGE

9.1 If valves are to be stored before installation, storage must be carried out in a controlled manner as follows:

1. Valves must be stored in a closed, clean and dry environment.
2. Valve disc to be in closed position and the body end faces must be covered with appropriate flange protection. Flange protectors should only be removed at the time of installation.
3. Valves should be stored indoors with a preferred temperature range from 4°C to 29°C.
4. The valves should be checked to ensure the above conditions are maintained every three months.
5. These are general guidelines for valve storage. Please consult the factory for information regarding specific requirements.

10.0 INSTALLATION

10.1 Tri Lok® is designed to be installed between DIN EN 1092-1 flanges. When the valve is open, a portion of the disc may protrude into the pipe. Wafer, lug and some double flange configurations will protrude on both sides of the valve. In double flange and some gate configurations, 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** shows the minimum allowable pipe ID.

10.2 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.

10.3 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 flow.

10.4 Whenever possible, install with the stem horizontal. If this installation is not possible, orient the stem at an inclined angle above the horizontal centerline.

10.5 Flange gaskets should conform to the requirements of ASME B16.5/DIN EN 1092-1 flanges. Spiral wound gaskets are recommended.

10.6 When bolting the valve into the line, use standard bolting torque as recommended by applicable piping standards. The valve body seat is independent of the flange bolting. Additional force from the flange bolts is not required.

Table 1 - Minimum Allowable Pipe ID for Tri Lok Installation

Valve/Pipe Size	Minimum Pipe ID	
	PN10	PN40
DN	mm	mm
80	61	64
100	84	91
150	135	137
200	180	185
250	228	244
300	278	297
350	310	315
400	359	371
450	403	417
500	454	467
600	554	528
700	616	613
750	686	729
800	747	737
900	846	889
1000	834	925
1050	992	Consult Factory
1200	1140	

Notes for Table 1

- > Minimum allowable ID of pipe with recommended clearances (per API 609).
- > This table assumes that the valve is centered in the pipe flanges.
- > A minimum of 1.6 mm thick gasket is used between the pipe flange and the face of the valve body.

11.0 ACTUATION AND TRAVEL STOP SETTING INSTRUCTIONS

- 11.1** Tri Lok® is a quarter turn, metal-seated triple offset valve. There is no mechanical stop in the valve at the “closed” position.
- 11.2** When installing ANY type of actuator on a Tri Lok® valve, the following general instructions should be followed closely. These general instructions include all actuation types: manual gear, pneumatic, hydraulic and electric actuators.
1. Select a desired orientation for the actuator mounting relative to the valve. The disc should be oriented with the disc indicator marked on the stem.
 2. Rotate BOTH valve and actuator to either the full “open” or full “closed” position to establish a common reference point.
 3. Mount actuator to the valve and secure.

Notes:

- > With valve/actuator in the closed position, it may be necessary to loosen the “closed” mechanical stop to allow the mounting holes to align properly.
- > Special applications may require more specific instructions. Please consult the factory for further instruction.



CAUTION

Valves can be damaged if proper care is not exercised during the setting of Open and /or Closed stops.

11.3 Actuator Stop Settings

The Tri Lok® valve is a torque seated valve. During normal operation, only the open mechanical stop on the actuator should function. Set the opening stroke stop to stop the disc rotation in the fully open (90°) position.

For safety reasons, the closed mechanical stop shall be set as follows:

1. Unscrew the closing stroke mechanical stop.
2. Close the valve applying the correct end-to-close torque required for the particular service. Check that the mechanical stop is free.
3. Adjust mechanical stop until engagement.
4. Loosen the mechanical stop 1-1½ turns to ensure there is enough travel for the valve to receive the required torque and to protect the valve from excessive torque.
5. Tighten the stop lock nut with the torque specified in the actuator operating manual.
6. Mark the closing stop set position.

12.0 VALVE IDENTIFICATION

NOTICE

Ensure the box is not damaged externally. Remove the valve from the packaging and check for any damage to the valve and its components during transit. Report any damage or discrepancies immediately.

12.1 All Tri Lok (EU-Version) valves are provided with an identification tag (**Figure 1**) printed with the following data:

- > **DN:** Valve size (e.g. DN150).
- > **PN:** Pressure rating of mating flange (e.g. PN 40).
- > **TS:** Maximum permissible temperature in degree Celsius (e.g. -10/250°C).
- > **PS:** Maximum permissible pressure in bar(g) at room temperature.
- > **P/N:** Full part number of the valve assembly.
- > **FLG DRILLING:** Flange Drilling Standard (e.g. EN-1092-1).
- > **BODY:** Material grade of body (e.g. 1.0619).
- > **SEAT:** Material grade of seat (e.g. 1.4001+N).
- > **DISC:** Material grade of disc (e.g. 1.0619).
- > **SEAL:** Material grade of seal (e.g. 1.4462+GR).
- > **STEM:** Material grade of stem (e.g. 1.4006).
- > **S/N:** Unique serial number of valve.
- > **YEAR MFG:** Month and year of manufacture MM/YY.

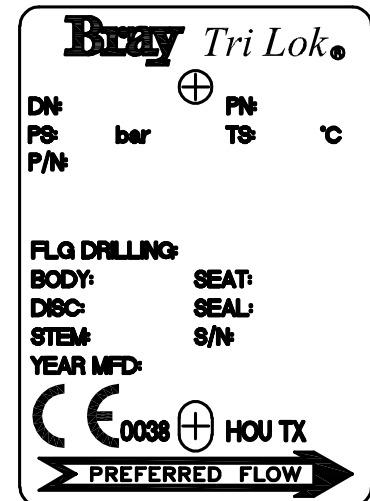


Figure 1 - Identification Tag

13.0 STANDARD MAINTENANCE

WARNING

- > Precautions should be taken before beginning any work on the valve assembly.
- > Protective clothing, as required by appropriate safety codes, should be worn.
- > Relieve line pressure and close valve before:
 - > Removing any actuation
 - > 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 the closed position to be removed from the line to prevent damaging the disc seal ring.

13.1 When handling the valve, care should be taken not to scratch the seal ring, seat and gasket faces on both sides of the valve. Replacement seat, disc seal ring, and other parts are available from authorized Tri Lok sales and service locations.

13.2 Recommended Lubricants

Molykote® Plus CU-7439 (grease) or equivalent for fasteners; Molykote® Spray 321 R (dry lubricant) or equivalent for Disc Seal Ring; light mineral oil for Packing and Gasket interface areas (Disc Seal Ring and gasket grooves).

13.3 Packing Replacement

Refer to **Part Diagram 3.0**

- 13.3.1** If the valve is installed, relieve line pressure. Remove actuator from the valve. Remove the Keys (P1). Remove socket head cap screws and lock washers (M2 & M3). Remove mounting bracket (M1). Note assembly positions of the actuator and the mounting hardware for reinstallation.
- 13.3.2** Remove packing gland retainer nuts (H8) and lock washers (H7). Remove gland retainer (H4), anti-blowout retaining ring/split ring (H5) and gland ring (H1). Remove all packing (H3), taking care not to scratch the stem or the bore of the valve body. Do not remove the anti-extrusion ring (H2) unless further valve disassembly is required.
- 13.3.3** Examine the valve body packing bore and the stem surface. Clean as necessary to remove any corrosion, foreign matter and minor surface imperfections.
- 13.3.4** Apply a small amount of grease to the stem end. Lubricate each packing ring (H3) install them in to the valve body packing bore one at a time. First the external ring (H3), then internal rings (H3) and last the second external ring (H3).

- 13.3.5 Reinstall gland ring (H1), anti-blowout retaining ring (H5) and gland retainer (H4). Re-install lock washers (H7) and nuts (H8). Tighten gland nuts (H8) utilizing a cross bolting technique to the proper torque value given in **Table 2**. Reinstall mounting bracket (M1) with cap screws and lock washers (M2 & M3). Tighten them according to the torque specified in **Table 5**. Install the key (P1) and remount actuation device on top of the valve, paying attention that the actuator is properly oriented.
- 13.3.6 Operate the valve open and closed several times to check for binding and to set the seal rings. Loosen gland nuts (H7) and retighten, utilizing a cross bolting technique, to torque value given in **Table 2**.

13.4 Seat & Seal Replacement

Refer to **Part Diagram 3.0 and 4.0**

- 13.4.1 It is highly recommended that both the seat (B1) and seal ring (C2) be replaced at the same time. However, individual components are not matched in pairs and may be replaced separately if desired.



Exercise extra care when handling the seat and seal ring to avoid damage to the sealing surfaces.

13.4.2 Both Seat & Seal ring Replacement

- 13.4.2.1 Remove the valve with the disc in the closed position from line. Place the valve on a flat stable surface with the body seat (B1) facing up.
- 13.4.2.2 If valve is actuated with fail close or fail open pneumatic/hydraulic actuator (without manual override), remove it from the valve. A suitable gearbox must be installed to perform maintenance on the valve.
- 13.4.2.3 Carefully clean the surface of the seat and remove all foreign matter from the hex sockets of seat cap screws (B3). Use compressed air to blow out the gap between the seat OD and the wall of the retaining cavity in valve body (A1). Apply a suitable penetrant into the gap between the seat outside diameter (B1) and the body (A1) to help in extracting the seat (B1) from the body cavity.
- 13.4.2.4 Open the valve a few degrees until the seal ring is disengaged from the seat using a wrench, remove all seat cap screws (B3).

- 13.4.2.5 Using a hardwood or aluminum drift and a light hammer, tap the top of the seat (B1) lightly all around to loosen the seat in the retaining cavity. Using full-threaded bolts or suitable threaded rod matched to the threads in all tapped jacking holes, begin jacking the seat (B1) evenly out from the retaining cavity. Tap the seat lightly with the drift as necessary to keep it in alignment with the walls of the retaining cavity in the body (A1). Remove the seat (B1) from the body (A1).
- 13.4.2.6 Close the valve, disc face facing parallel to top surface. Remove the seal ring retainer screws (C5) from seal ring retainer (C4). Remove disc seal ring retainer (C4). Remove the seal ring gasket (C3) from the disc groove. Wipe the seal ring (C2) clean, removing all remnants of removed gasket and foreign matter.
- 13.4.2.7 Using soft tools and a suitable wire brush, carefully clean any remnants of removed gasket and foreign matter within the retaining cavity of the body (A1) and face of the disc (C1). Blow out all threaded holes and the gasket groove with compressed air.
- 13.4.2.8 Place a new seal ring gasket (C3) into the groove on the disc face (C1). The mating side of the seal ring gasket may be lightly greased to improve retention in the groove. Apply a suitable lubricant to the sealing surfaces of the seal ring (C2). Place the new seal ring (C2) onto the disc such that the notch is aligned. Place the seal retainer (C4) over the seal ring. Apply anti-seize compound to the seal ring retainer cap screws (C5). Replace the screws if required. The seal retaining flange cap screws (C5) should be fully threaded into the disc (C1), but remain only finger-tight at this time. Open the valve to approximately 20°.
- 13.4.2.9 Place the seat gasket (B2) into the groove of the seat (B1). It is highly recommended to apply grease to the mating side of the seat gasket to secure its position in the groove. Apply a suitable lubricant to the sealing surfaces of the seat (B1). Insert the seat (B1) into the body (A1) making sure the alignment dimples in the seat (B1) and the retaining cavity in the body (A1) match. Apply anti-seize compound to seat retaining cap screws (B3) and install the screws (B3) finger tight. Replace the screws if required. Using a cross bolting technique, to 50% of the torque specified in **Table 3**. Once all screws are tightened, proceed to fully tighten them to 100% of the listed torque value.
- 13.4.2.10 Using a suitable actuation device, close and open the valve 2-3 times, only closing the valve to the point where the seal ring engages with the seat. Check each time that the disc seal ring makes full contact without torqueing into the seat. Attention should be paid in the closing stroke that the seat does not scratch the seal ring. This will allow the seal ring and seat to be properly aligned.

- 13.4.2.11 Close the valve. Tighten at least four screws in the seal ring retainer to prevent the seal ring from further movement. Open the valve sufficient enough to tighten the seal ring retainer screws. Tighten all seal ring retainer screws (C5) using a cross bolting technique, to 50% of the torque specified in **Table 3**. Once all screws are tightened, proceed to fully tighten them to 100% of the listed torque value.
- 13.4.2.12 Re-apply lubricant to the sealing surfaces of the valve. Reinstall actuation device (wherever applicable) and test the valve.
- 13.4.3 **Only Seal Ring replacement**
The seal ring (C2) may be replaced in two ways; without the seat (B1) removal or with the seat (B1) removal.
- 13.4.3.1 **Seal ring replacement without the Seat Removal from the valve**
- 13.4.3.1.2 This procedure is not suitable if the seal ring (C2) is to be replaced while the valve is installed in the pipeline. In addition, this procedure is not recommended for large valves where manipulating the valve may be more difficult than removing the seat (B1) and installing the seal ring (C2) solely from the seat side of the body.
- 13.4.3.1.3 To remove the seal ring (C2) without removing the seat (B1), the actuation device must be removed and the valve oriented in a manner that allows access to both sides.
- 13.4.3.1.4 Remove the valve with the disc in the closed position from line. Clean the surface of the valve with compressed air, blow out all debris around the seal ring retainer (C4) and clean out the hex sockets of the seal ring retainer cap screws (C5).
- 13.4.3.1.5 Open the valve a few degrees until the seal is disengaged from the seat.
- 13.4.3.1.6 Loosen all seal ring retainer cap screws (C5), but leave them in the valve with the seal ring retainer (C4) attached to the disc (C1).
- 13.4.3.1.7 Using a wrench, rotate the valve stem (D1) counterclockwise past the fully open position far enough so the disc's position is able to allow seal ring retainer and seal ring removal (C2). Be careful not to over-rotate the stem (D1) to the point where the seal ring (C2) or disc edge (C1) contact the body (A1). Make sure the packing gland retainer nuts (H8) are tight enough to prevent the valve stem (D1) from rotating on its own under the eccentric weight of the disc (C1).
- 13.4.3.1.8 Remove the seal ring retaining cap screws (C5), disc seal ring retainer (C4), seal ring (C2) and the seal ring gasket (C3).

13.4.3.1.9 Rotate the disc (C1) as necessary to access the seal face on the disc (C1). Using soft tools and suitable wire brush, carefully clean any remnants of removed gasket and foreign matter from the face of the disc (C1). Blow out all threaded holes and the gasket groove with compressed air.

13.4.3.1.10 Rotate the disc (C1) to its previous position to facilitate installation of the seal ring (C2). Place a new seal ring gasket (C3) into the groove on the disc face (C1). The mating side of the seal ring gasket can be lightly greased to improve retention in the groove. Lubricate the sealing surfaces of the seal ring (C2) and place the seal ring (C2) onto the disc (C1) making sure the alignment line on the disc seal ring matches the locating dimple on the disc face. Place the seal ring retainer (C4) over the seal ring. Apply anti-seize compound to the seal ring retainer cap screws (C5). Replace the screws if required. The cap screws (C5) should be fully threaded into the disc (C1), but remain only finger-tight at this time.

13.4.3.1.11 Lubricate the sealing surfaces of the seat (B1). Using a suitable actuator, close and open the valve 2-3 times, only closing the valve to the point where the seal ring engages the seat. Check each time that the seal ring makes full contact without torquing into the seat. Attention should be paid in the closing stroke that the seat does not scratch the seal ring. This will allow the seal ring and seat to be properly aligned.

13.4.3.1.12 Close the valve. Orient the valve with the seat side facing up.

13.4.3.1.13 Tighten at least four screws in the seal ring retainer to prevent the seal ring from further movement. Open the valve sufficient enough to tighten the seal ring retainer screws. Tighten all seal ring retainer screws (C5) using a cross bolting technique, to 50% of the torque specified in **Table 3**. Once all screws are tightened proceed to fully tighten them to 100% of the listed torque value. Re-apply lubricant to the sealing surfaces of the valve.

13.4.3.2 **Seal ring replacement with the Seat Removal from the valve**

13.4.3.2.1 To replace the seal ring by removing the seat from the valve, refer to section **13.4 Both Seat & Seal Ring Replacement** where the existing seat removed from the valve can be reused. However, the existing seat gasket (B2) has to be replaced. Exercise extra care when extracting the seat (B1) from the retaining cavity in the valve body (A1). When using jacking bolts to extract the seat, avoid forcing the jack screws unevenly which could result in permanent deformation of the seat (B1). Ensure that the seat (B1) slides out of the retaining cavity easily in a balanced and level manner.

13.4.3.3 Only Seat Replacement

- 13.4.3.3.1 To replace the seat and to reuse the existing seal ring, refer to section **13.4 Both Seat & Seal Ring Replacement** where the existing seal ring removed from the valve can be reused. However, the existing seal ring gasket (C3) has to be replaced while using the existing seal ring. Exercise extra care when handling the seal ring to prevent it from any damage.

13.5 Bottom Flange Gasket Replacement

Refer to **Part Diagram 3.0**. Packing gland nuts should be in tightened condition while replacing the bottom plate gaskets during inline maintenance.

- 13.5.1. If the valve is installed, remove line pressure.
- 13.5.2. Completely remove the bottom plate screws (G3). Remove the bottom plate (G1) and the bottom plate gasket (G2). Clean the bearing area of residual gasket and foreign materials.
- 13.5.3. Grease the body/bottom plate gasket groove area. Place the new gasket (G2) on the bottom plate (G1) and install it onto the body.
- 13.5.4. Reinstall the bottom plate screws (G3) and using a cross bolting technique, tighten them according to the torque specified in **Table 3**.

14.0 RETURN MATERIAL AUTHORIZATION (RMA) PROCESS

14.1 The following information must be provided when submitting a RMA:

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

14.2 **NOTE:** Valve information is provided on the identification tag attached to the valve.

NOTICE

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

15.0 TABLES

Table 2 - Torque Values for Packing Gland Hex Nuts

Valve Size	PN10	PN40
DN	Nm	Nm
80	2	2
100	4	4
150	4	5
200	4	7
250	6	9
300	6	16
350	9	29
400	9	31
450	16	34
500	16	37
600	31	37

Table 3 - Torque Values for Seat Retaining Cap Screws and Seal Retainer Cap Screws and Bottom Plate

Valve Size	PN10			PN40		
	Seat	Seal Ring Retainer	Bottom Plate Cap Screw	Seat	Seal Ring Retainer	Bottom Plate Cap Screw
DN	Nm	Nm	Nm	Nm	Nm	Nm
80	2	2	11	2	2	11
100	6	5	11	6	5	11
150	6	5	11	6	14	27
200	6	5	11	12	14	27
250	23	11	19	23	19	48
300	23	19	19	23	19	48
350	23	19	48	23	48	48
400	23	19	48	36	48	96
450	36	19	48	36	48	96
500	36	48	48	56	48	96
600	36	48	96	56	96	96

Table 4- Torque Values for Bracket Fasteners

Valve Size	PN10	PN40
DN	Nm	Nm
80	19	19
100	19	19
150	19	47
200	19	172
250	48	172
300	172	172
350	172	96
400	172	96
450	172	96
500	172	172
600	96	172



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