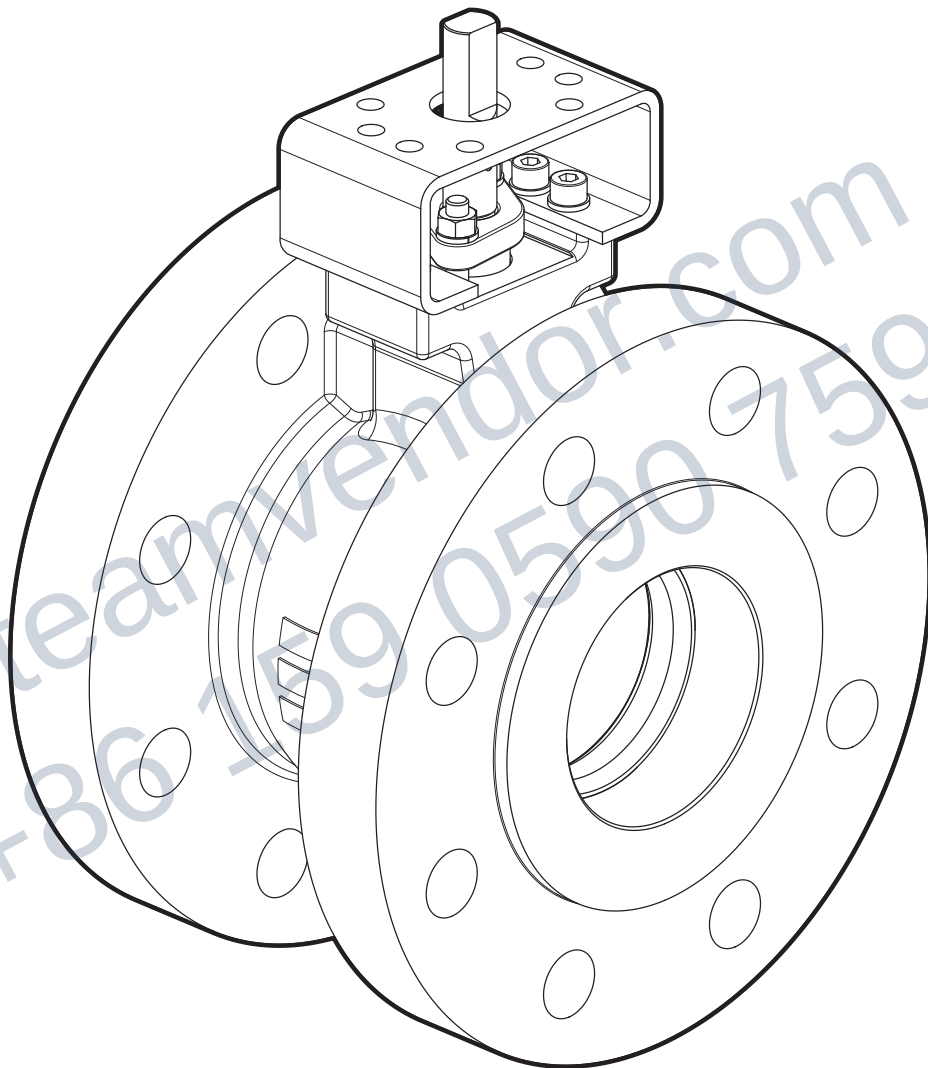

SERIES 19

SEGMENTED BALL VALVE

Installation, Operation, and Maintenance Manual



Bray[®]

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

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

- 2.1** Information provided in this manual is for **S19** segmented ball valves only. Specific instructions for non-standard materials of construction, temperature range, etc. should be referred to the factory.
- 2.2** This manual covers **S19** valves in the following range:
- > NPS 1 to 16 | DN 25 to 400
 - > ASME Class 150, 300, 600 | PN 10, 16, 25, 40
 - > Body Style: Flanged, Flangeless
- 2.3** Additional product information (such as application data, engineering specifications, actuator selection, etc.) is available from your local Bray distributor or sales representative, or online at **BRAY.COM**
- 2.4** For a detailed list of product certifications please contact your local Bray representative.
- 2.5** The **S19** segmented ball valve is designed per ASME B16.34.

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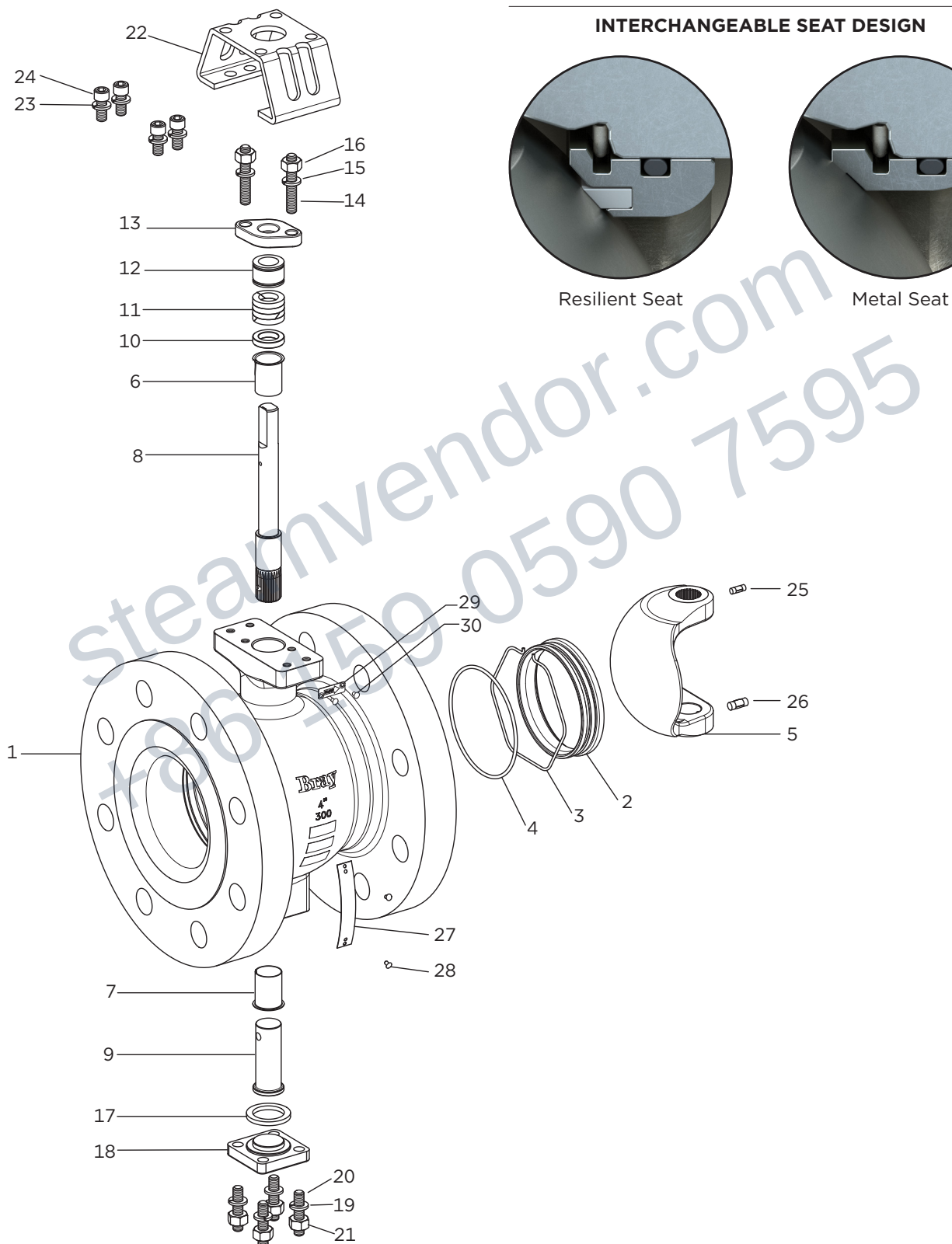
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3.0 PARTS IDENTIFICATION

3.1 Parts Callout (S19 ASME 150, 300 | PN 10, 16, 25, 40)



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3.2 Parts List (S19 ASME 150, 300 | PN 10, 16, 25, 40)

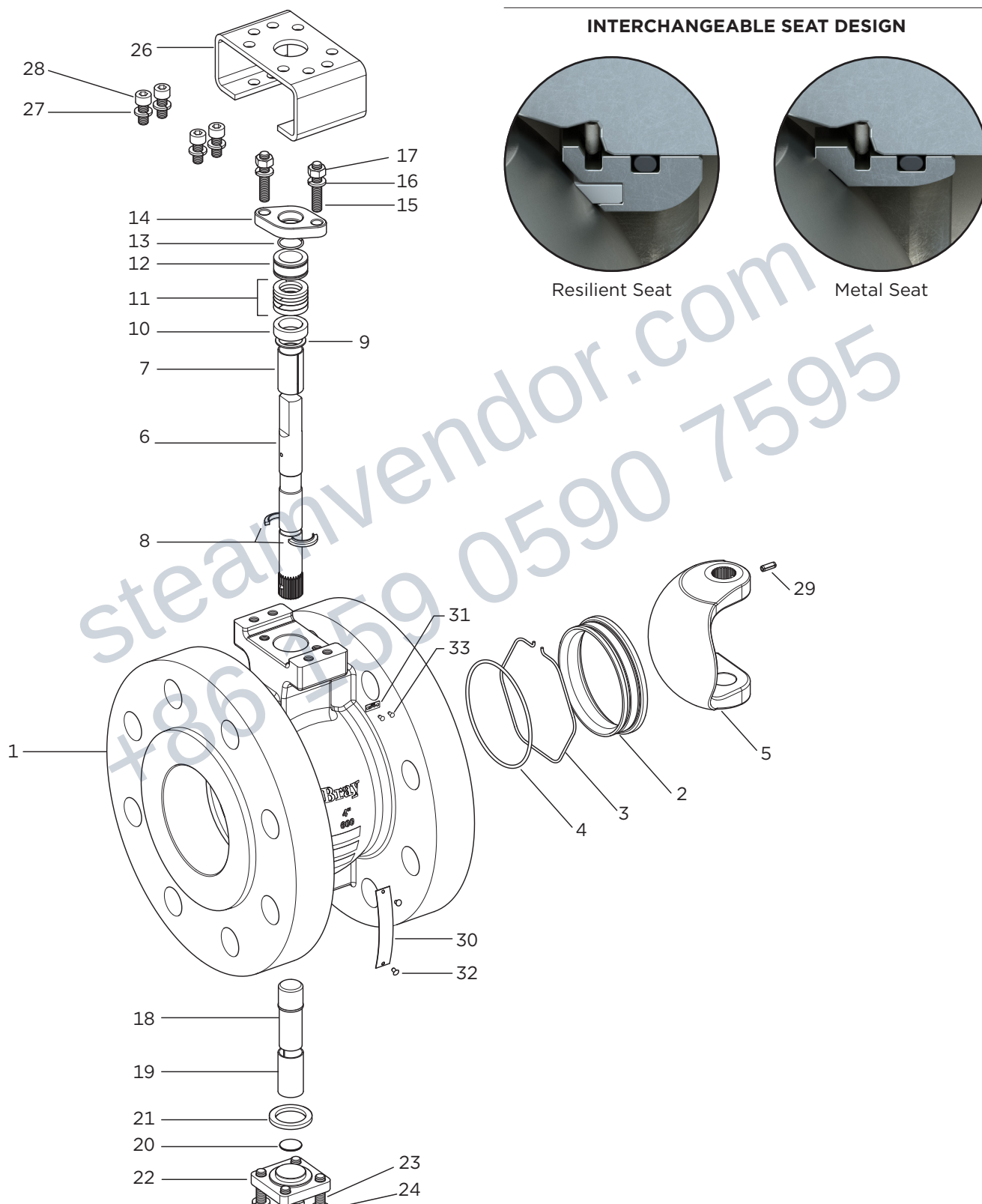
ITEM	DESCRIPTION	RECOMMENDED SPARE PARTS
1	Body	
2	Seat	■
3	Seat Spring	■
4	Seat O-Ring	■
5	Segment	■
6	Stem Bearing	■
7	End Post Bearing	■
8	Stem	
9	End Post	
10	Thrust Washer	
11	Stem Seal Kit	■
12	Gland Ring	
13	Gland Retainer	
14	Gland Stud	
15	Gland Lock Washer	
16	Gland Nut	
17	Post Cover Gasket	■
18	Post Cover	
19	Post Cover Washer	
20	Post Cover Stud	
21	Post Cover Nut	
22	Mounting Bracket	
23	Bracket Washer	
24	Bracket Screw	
25	Stem Pin	
26	End Post Pin	
27	Identification Plate	
28	Identification Plate Drive Screw	
29	Arrow Plate	
30	Arrow Plate Drive Screw	

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3.3 Parts Callout (S19 ASME 600)



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Installation, Operation, and Maintenance Manual



3.4 Parts List (S19 ASME 600)

ITEM	DESCRIPTION	RECOMMENDED SPARE PARTS
1	Body	
2	Seat	■
3	Seat Spring	■
4	Seat O-Ring	■
5	Segment	■
6	Stem	
7	Stem Bearing	■
8	Split Ring	
9	Thrust Washer	
10	Packing Spacer	
11	Stem Seal Kit	■
12	Gland Ring	
13	Retaining Ring	
14	Gland Retainer	
15	Gland Stud	
16	Gland Lock Washer	
17	Gland Nut	
18	End Post	
19	End Post Bearing	■
20	End Post Thrust Washer	
21	Post Cover Gasket	■
22	Post Cover	
23	Post Cover Stud	
24	Post Cover Lock Washer	
25	Post Cover Nut	
26	Mounting Bracket	
27	Mounting Bracket Lock Washer	
28	Mounting Bracket Cap Screw	
29	Stem Pin	
30	Identification Plate	
31	Arrow Plate	
32	Identification Plate Screw	
33	Arrow Plate Screw	

4.0 VALVE IDENTIFICATION

4.1 Identification Tag

All valves, actuators, or control products are provided with a permanently affixed identification tag meeting the requirements of applicable standards and certifications for the product.

As each product is unique, data may vary.

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5.0 GENERAL INFORMATION

5.1 Use

The following instructions are designed to assist in the unpacking, installation, operation, and maintenance as required for Bray segmented ball control valves.

Product users and maintenance personnel should thoroughly review this manual prior to installing, operating, or performing any maintenance.

In most cases, Bray valves, actuators, and accessories are designed for specific applications (e.g. with regard to medium, pressure and temperature). For this reason, they should not be used in other applications without first contacting the manufacturer.



WARNING

Before installing the equipment, confirm that it is suitable for the intended service. The identification tags describe the maximum allowable service conditions for this product. Be sure that the installation is protected by appropriate pressure control and safety devices to ensure that acceptable limits are not exceeded.

5.2 Operation

Operation of the valve is done by turning the stem a quarter-turn (90 degree turn). Clockwise to close, counter-clockwise to open.



CAUTION

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

5.3 Applicability

The following instructions are applicable to the maintenance and installation of Bray segmented ball control valves. These instructions cannot claim to cover all details of all possible product variations, nor can they provide information for every possible example of installation, operation, or maintenance.

This means that the instructions normally include only the directions to be followed by qualified personal using the product for its defined purpose. If there are any uncertainties in this respect, particularly in the event of missing product related information, clarification must be obtained via the appropriate Bray sales office.

5.4 General Precautions

Bray products are often used in critical applications (e.g. under extremely high pressures with dangerous, toxic, or corrosive mediums). When performing service, inspection, or repair operations, always ensure that the valve and the actuator are depressurized, the valve has been cleaned, and the valve is free of harmful substances.

In such cases, all personnel operating, inspecting, maintaining, or repairing Bray products shall wear appropriate Personal Protection Equipment (PPE), such as: protective clothing, gloves, safety glasses, steel toes shoes, hard hat, etc.

5.5 Qualified Personnel

A qualified person (in terms of this document) is one who has been authorized by those responsible for the safety of the plant to perform the necessary work, while recognizing and avoiding possible dangers.

Qualifications include appropriate education, training, experience, and knowledge of relevant standards, specifications, operating conditions, and accident prevention.

5.6 Spare Parts

Use only Bray original spare parts.

Recommended spare parts are identified in the Parts Identification drawing and list for each product model.

Bray cannot accept responsibility for any damages that occur from using spare parts or fastening materials from other manufacturers. If Bray products (especially soft good materials) have been stored for long periods of time, check them for corrosion or deterioration before putting them into use.

5.7 Service & Repair

To avoid possible injury to personnel or damage to products, safety terms must be strictly adhered to. Modifying this product, substituting non-factory parts, or using maintenance procedures other than those outlined in these Installation, Operation and Maintenance instructions could drastically affect performance, be hazardous to personnel and equipment, and may void existing warranties.

Apart from the operating instructions and the obligatory accident prevention directives valid in the country of use, all recognized regulations for safety and good engineering practices must be followed.



NOTICE

Before products are returned to Bray for repair or service, Bray must be provided with a certificate confirming that the product has been decontaminated and is clean.

6.0 HANDLING REQUIREMENTS

6.1 Packed Valves

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.

Cases: The lifting of packed valves in cases will be carried out in the lifting points and in the center of gravity position which has been marked. The transportation of all packed material must be carried out safely and following the local safety regulations.



NOTICE

When lifting the valve from shipping container, use straps through valve body. Take care to position lifting straps to avoid damage to the tubing and mounted accessories.

6.2 Unpacked Valves

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.

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.



CAUTION

For handling and/or lifting, the lifting equipment (fasteners, hooks, etc.) must be sized and selected while considering the product weight indicated in our packing list and/or delivery note.

Lifting and handling must be performed only by qualified personnel.

Fasteners must be protected by plastic covers in sharp corner areas.

Caution must be taken during handling to avoid this equipment passing over workers, or over any other place where a possible fall could cause injury or damage. In all cases, local safety regulations must be respected.

6.3 Packing List

Check the packing list against the materials received. Lists describing the valve and accessories are included in each shipping container and general assembly drawing as applicable.



WARNING

Never lift the valve or valve package by the actuator, positioner, limit switch or their piping. When lifting a valve, be aware that the center of gravity may be above the lifting point. Therefore, support must be given to prevent the valve from rotating. Failure to do so can cause serious injury to personnel and damage to the valve and nearby equipment.

Contact your shipper immediately if there is shipping damage. Should any problem arise, contact your Bray representative.

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7.0 STORAGE



NOTICE

Failure to follow these procedures could affect product warranty.

The packaging is designed to protect the product only during shipping. If the product is not installed immediately after delivery, then it must be stored according to these requirements.

These are general guidelines for valve storage. Storage guidelines for accessories fitted on valves shall be as per respective Installation, Operation and Maintenance manual. Please consult the factory for information regarding specific requirements.

7.1 Short-Term Storage

Short-term storage is defined as storage of products and/or equipment to be used in the construction of a project within a relatively short amount of time (**typically one to three months**).

During short-term storage, the following is required:

- 7.1.1 The preferred storage location is a closed, clean, and dry environment. Do not expose the product to temperature extremes.
- 7.1.2 Valve should be stored in **closed** position.
- 7.1.3 End protectors shall remain on valve ends to prevent the entrance of dirt, debris, or insects/wildlife.
- 7.1.4 Product shall remain in the original shipping container with the original packaging materials. (This packaging method will not protect products that will be stored outside, uncovered, and unprotected.)
- 7.1.5 Storage of products in an open, uncovered area is permissible, but requires provisions for inclement weather. The product must be elevated from the ground on a pallet, a shelf, or other suitable surface, and must be covered with a secure, waterproof tarp.



CAUTION

Do not stack the products on top of each other.

- 7.1.6 Manually actuated valves may be stored in the vertical or horizontal position. For air or hydraulically actuated valves, the preferred orientation is with the valve and cylinder in the vertical position. Access ports should be secured to prevent unauthorized entry and prevent contamination.

7.2 Long-Term Storage

Long-term storage is defined as storage of products and/or equipment for periods **longer than three months**.

During long-term storage, the following is required:

- 7.2.1 The preferred storage location is a closed, clean, and dry environment. Do not expose the product to temperature extremes.



NOTICE

The preferred temperature range is 40°F (4°C) to 100°F (38°C). For long-term storage in temperatures lower or higher than the preferred range, please consult the factory for information regarding specific requirements.

- 7.2.2 Valve should be stored in **closed** position.

- 7.2.3 End protectors shall remain on the valve ends to prevent the entrance of dirt, debris, or insects/wildlife.

- 7.2.4 Product shall remain in the original shipping container with the original packaging materials.



CAUTION

Do not stack the valves on top of each other.

- 7.2.5 Manually actuated valves may be stored in the vertical or horizontal position. For air or hydraulically actuated valves, the preferred orientation is with the valve and cylinder in the vertical position. Access ports should be secured to prevent unauthorized entry and prevent contamination.

- 7.2.6 Valves and equipment containing elastomers, including O-rings, must be stored in a climate-controlled warehouse with these conditions:
- > The ambient relative humidity to be less than 75%.
 - > No exposure from direct ultraviolet or sunlight.
 - > Protection from ozone generating equipment or combustible gases and vapors.
 - > Storage at temperatures below 100°F (38°C), away from direct sources of heat.
 - > No exposure to ionizing radiation.

7.3 Storage Inspection

A visual inspection (with results recorded) shall be performed every three months to ensure the above conditions are maintained.

- 7.3.1 Inspection, as a minimum, shall include reviewing the following:
- > Packaging.
 - > Flange covers.
 - > Dryness.
 - > Cleanliness.

8.0 INSTALLATION

8.1 Position

Bray's segmented ball valve is designed to be mounted between ASME or PN flanges. (Follow the direction of the **flow arrow plate** attached to body.)

NOTE: For flangeless design, the segment may extend into piping when operated to the **OPEN** position. Piping must be large enough to allow the segment to clear the pipe when operated. (Refer to the appropriate general assembly drawing for clearances.)



WARNING

To avoid serious injury, keep hands, hair, clothing, etc. away from the segment and seat when the valve is working.



CAUTION

If handle or actuator has been removed, do not rotate segment beyond fully open or closed position, as this could cause damage to sealing surfaces.

Provide proper overhead clearance to allow for disassembly of the actuator from the valve body. (Refer to the appropriate **General Assembly Drawing** for proper clearances.)

Provide necessary support for accessories when center of gravity for complete assembly is further off from pipe center line. (Refer to the appropriate **General Assembly Drawing** for center of gravity position.)

8.2 Cleaning

Before installing the valve, clean the pipeline of all contamination, carbon deposits, welding chips, and other foreign material. Carefully clean gasket surfaces to ensure a tight seal. Pipelines must be correctly aligned to ensure that the valve is not fitted under tension.



CAUTION

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

Check the direction of fluid flow to ensure that the valve is correctly installed. (Flow direction is indicated by the arrow on the body.)

8.3 Orientation

With the segment in the **closed** position, carefully center the valve between the pipe flanges. For **flanged end valves**, ensure holes are aligned between valve and pipe flanges. For **flangeless valves**, ensure gaskets and valve end connections are centered and aligned with respect to serrations provided on the valve ends and the piping connection.

8.3.1 The **S19** is to be installed in line per the flow arrow tag attached to the body with the seat ring in the **upstream** flow position.

8.3.2 Installation orientation may vary with certain applications and the flow arrow should be referenced prior to installation.



NOTICE

Bray segmented ball valves may be installed with the bore in the horizontal or vertical orientation. When installed with the bore in the horizontal orientation, it is recommended to also place the stem in the horizontal position, resulting in the segment opening towards the top of the body cavity.

8.4 Gaskets

Gaskets should conform to the requirements of API 601 for ASME B16.5 class flanges. Spiral wound gaskets, such as Flexitallic CG or CGI series, conforming to ASME B16.20 or EN 1514-2 are acceptable.

8.5 Bolting

Use standard flange bolting torques in accordance with the gasket manufacturers recommendations for gasket compression when bolting valve into the line. (Tighten alternately according to good practice. Torque should be applied incrementally to evenly load the end flange gasket.)

The user must, in all cases, confirm the capacity of the bolts to ensure a sufficiently tight gasket seal for the expected service conditions.

8.6 Actuator

8.6.1 If possible, install the valve so that the actuator can be disconnected without removing the valve from the piping.

8.6.2 The actuator must not touch the pipeline, because pipeline vibration may damage it or interfere with its operation. In some cases (for instance when a large-size actuator is used, or when the pipeline vibrates heavily) supporting the actuator is recommended.

8.7 Air Supply

For valves with pneumatic actuator & accessories, connect the air supply and instrument signal lines.

8.7.1 Throttling control valves are equipped with a valve positioner. Connections are marked for the air supply and the instrument signal. Check that the actuator and positioner can withstand the maximum air supply from the network. The required air supply is indicated on a sticker located on the actuator. An air regulator will be necessary (in certain cases) to limit the air supply pressure to the actuator, if the supply exceeds the maximum allowable pressure of the actuator.

8.7.2 An air filter is recommended unless the air supplied is exceptionally clean and dry (air quality without humidity, oil, or dust as per IEC 770 and ISA-7.0.01).

8.7.3 All connections must be completely tight.



CAUTION

On valves equipped with air filters, the air filter must point down to perform properly.

8.8 Pre-Commissioning Check

Before commissioning, check the valve by following these steps:

8.8.1 Check for full stroke by varying the instrument signal settings appropriately. Observe the segment position indicator located on the actuator or the positioner. The segment should change position with a smooth turning movement.

8.8.2 For valves with pneumatic actuator & accessories, check all air connections for leaks. Tighten or replace any leaking lines.

8.8.3 Check packing gland retainer bolting for proper tightness.



CAUTION

Do not over tighten packing. This can cause excessive packing wear and high stem friction that may impede stem movement.

After the valve has been in service for a short period, recheck the packing gland retainer nuts. If packing leaks exist, tighten the gland nuts until leak stops. Do not exceed maximum torque values. (Refer to **Tables in Appendix A.**)

8.8.4 Ensure the valve fails in the proper direction if actuating medium supply is lost. This is done by positioning the valve at mid stroke, then shutting off the actuating medium supply to observe the failure direction.

If the action is incorrect, refer to the appropriate actuator Installation, Operation, and Maintenance manual for instructions.

9.0 OPERATION

9.1 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.

9.2 Indication

The valve open and closed position are indicated by the position of indentation on the stem.

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



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.

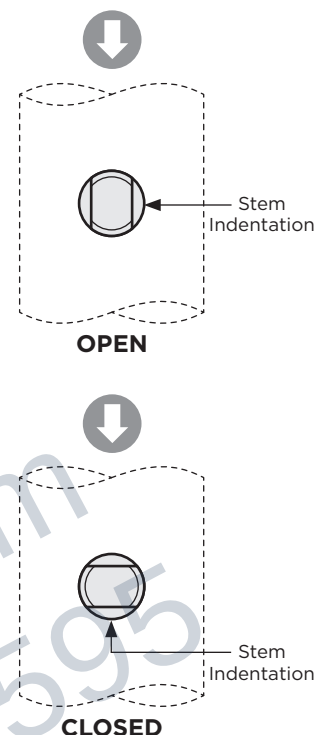


Figure 1: Indication of valve Open and Closed position.

10.0 PREVENTATIVE MAINTENANCE

- 10.1** At least once every six months, check for proper operation by following the preventative maintenance steps outlined below. These steps may be performed while the valve is in line and without interrupting service. If an internal problem is suspected, refer to **Troubleshooting** section in this document.
- 10.2** Look for signs of gasket leakage through the end flanges and post. If necessary, re-torque end flanges and post cover.
- 10.3** Examine the valve for damage caused by corrosive fumes or process drippings.
- 10.4** Clean the valve and repaint areas of severe oxidation.
- 10.5** Check packing gland retainer bolting for proper tightness. If there is a persistent leak that cannot be stopped by tightening of the gland nuts, replace the packing. (Refer to **Disassembly/Assembly** section in this document.)



CAUTION

Do not over tighten packing. This can cause excessive packing wear and high stem friction that may impede stem movement.

Reference **Tables in Appendix A** for recommended and maximum torque values. Do not exceed maximum torque values.

- 10.6** If possible, stroke the valve – checking for smooth, full stroke operation. Unsteady stem movement may indicate an internal valve problem.
- 10.7** Check the calibration of the positioner/controller if available. For further preventative maintenance, see the instructions in the Installation, Operation, and Maintenance manual for the applicable positioner/controller.
- 10.8** Ensure all accessories, brackets and bolting are securely fastened.
- 10.9** If possible, remove power source (air supply/electrical signal) and observe actuator for correct fail-safe action.
- 10.10** Check the actuator and all air connections for leaks.
- 10.11** If an air filter is supplied, check and replace the cartridge if necessary.

11.0 ACTUATOR REMOVAL AND REMOUNTING

11.1 Removing Actuator

- 11.1.1 Refer to relevant actuator installation, operation, and maintenance instructions before proceeding.
- 11.1.2 Neutralize all energy sources (electrical, pressure and mechanical).
- 11.1.3 Support the actuator assembly before disconnecting it from the body assembly.
- 11.1.4 Unbolt the actuator assembly from valve mounting bracket.
- 11.1.5 Lift actuator assembly off stem.

11.2 Remounting Actuator

- 11.2.1 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.
- 11.2.2 Bolt the bracket onto the body (if it has been removed.)
- 11.2.3 Slide the entire actuator assembly onto the stem.
- 11.2.4 Bolt actuator assembly to valve mounting bracket.
- 11.2.5 Verify and set actuator stops..



NOTICE

Refer to the actuator IOM for necessary adjustments.

12.0 REMOVING VALVE FROM PIPELINE

- 12.1** If an internal problem is suspected with the valve and disassembly is required, remove the valve from the pipeline by proceeding as follows.



WARNING

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

Make sure the valve is in closed position.

- 12.2** Neutralize all energy (electrical, pressure and mechanical) sources.

- 12.3** Attach a hoist or some means to support the valve.

- 12.4** Remove line bolting.



CAUTION

Do not attempt to pry line flanges apart by pushing or pulling on the valve or actuator.

- 12.5** Slide the valve carefully from the pipeline.



CAUTION

To avoid damage to the gasket surfaces, do not twist the valve.

- 12.6** After the valve is completely removed from the line, slowly relieve actuating medium pressure from the actuator.



WARNING

Ensure hands and/or any other items are removed from the bore of the valve.

13.0 SEAT REPLACEMENT (S19 ASME 150, 300 | PN 10, 16, 25, 40)



NOTICE

These instructions apply to resilient seat and metal seat designs.

13.1 Removing the Seat

- 13.1.1 The valve must be removed from the pipeline. (Refer to section **Removing Valve From Pipeline.**)
- 13.1.2 Rotate the segment so that it does not touch the seat (i.e., beyond operating 90 degrees.)
- 13.1.3 Tap the seat with a soft spindle all around the circumference through the upstream bore until the seat is pushed from the seat pocket into the valve body.
- 13.1.4 Rotate the segment so that the seat may be removed from the body through the downstream bore.

13.2 Installing the Seat

- 13.2.1 Remove any burrs, round off the edges using a fine abrasive paper, and clean the flow port carefully prior to installing the seat.
- 13.2.2 Place the seat o-ring onto the seat.
- 13.2.3 Lubricate the flow port, seat, seat o-ring, and the seat spring(s) with a volatile, light lubricant.

NOTE: Ensure the lubricant is compatible with the process medium. (Prior to using any lubricant, review the product safety data sheet for compatibility and safety protocols.)

- 13.2.4 Place the seat spring on the seat.
- 13.2.5 Place the seat assembly into the body.

NOTE: When the valve is opened, the ends of the spring must be by the V-shaped opening of the segment.

- 13.2.6 Check that the spring angles extend to the control face.
- 13.2.7 Place a screwdriver on each visible spring angle to compress and move the spring into the seat pocket spring groove.
- 13.2.8 Rotate the segment 180° clockwise and press the remaining spring angles into the seat pocket spring groove.
- 13.2.9 Use a plastic spindle to ensure that the seat is correctly placed and can move freely.

13.3 Seat Test

- 13.3.1 After reassembly, perform a seat test to ensure proper operation.

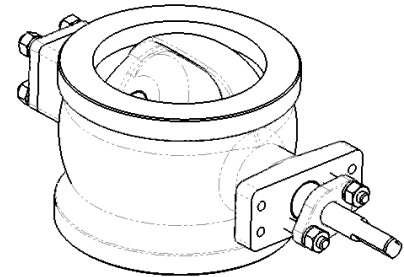


Figure 2: Segment position during seat replacement.

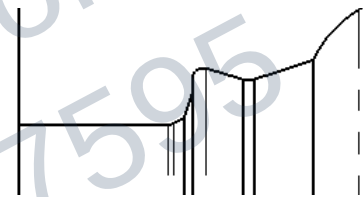


Figure 3: Flow port in body that houses the seat & spring.

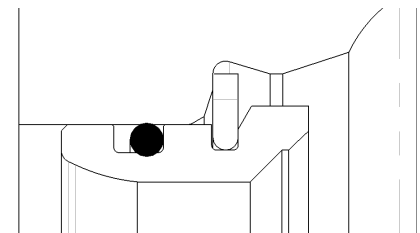


Figure 4: Seat placement.

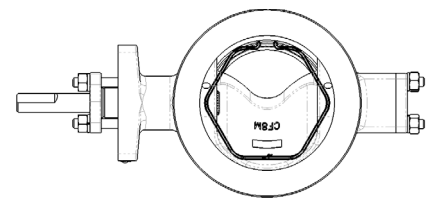


Figure 5: Spring position.

14.0 DISASSEMBLY AND INSPECTION (S19 ASME 150, 300 | PN 10, 16, 25, 40)



NOTICE

These instructions apply to resilient seat and metal seat designs.

14.1 Dismantling the Valve

- 14.1.2 The valve must be removed from the pipeline. (Refer to section **Removing Valve From Pipeline.**)
- 14.1.3 Neutralize all energy sources (electrical, pressure and mechanical).
- 14.1.4 Rotate the valve to the closed position.
- 14.1.5 Remove actuator assembly. (Refer to section **Actuator Removal and Remounting.**)
- 14.1.6 Remove the gland retainer from the stem by dismantling packing nuts and washers. (Removing the studs is not necessary.)
- 14.1.7 Remove the post cover from the end post by dismantling post cover nuts and washers. Carefully insert a screwdriver between the post cover and the body to remove the post cover and gasket.
- 14.1.8 Using a punch and mallet, drive the stem pin and end post pin into the center of the stem and end post until the outward end of the pin clears the segment. Be careful not to damage the stem or end post.
NOTE: The pins can be removed from the stem and end post by driving them out of the through-holes with a mallet and punch once the segment has been removed.
- 14.1.9 Remove the end post.
NOTE: Inserting a bolt in the jack screw hole (tapped in the post) will help in removing the post.
- 14.1.10 Remove the stem, along with gland ring, stem seal kit, and thrust washer by pulling out through packing box side.



CAUTION

Take special care to not damage the splined end of stem during disassembly.

- 14.1.11 Remove the segment by rotating the segment inside the body so the non-splined end of the segment is toward the downstream port of the body. Remove the segment straight out of the body.



CAUTION

Be extremely careful not to gall or scratch the sealing surface of the segment when removing it from body. Scratches may later cause excessive leakage and seal wear.

- 14.1.12 Remove the stem and end post bearings, and clean the bearing housing spaces.
- 14.1.13 Remove the seat. (Refer to section **Seat Replacement.**)

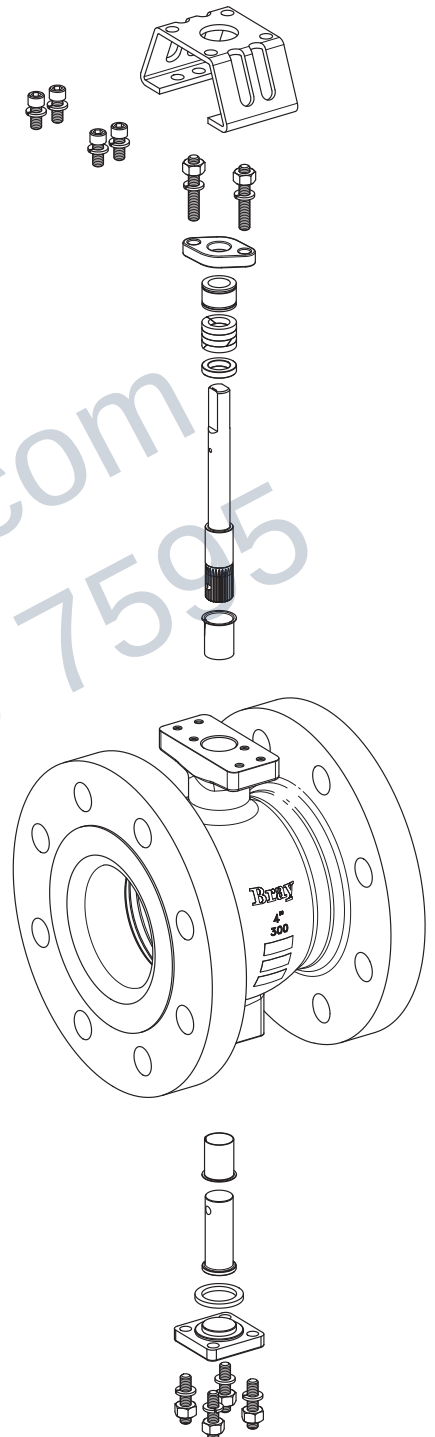


Figure 6: Dismantling the valve.

14.2 Inspection of Removed Parts

14.2.1 Clean the removed parts.



NOTICE

Cleaning should be done with acetone or equivalent product.

14.2.2 Visually inspect the stem and bearings for abnormal wear or damage.

14.2.3 Visually inspect the sealing surface of the segment and seat for abnormal wear or damage.

14.2.4 If necessary, replace the parts with new. (See section **Parts Identification** for spare parts list.)

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15.0 REASSEMBLY (S19 ASME 150, 300 | PN 10, 16, 25, 40)



NOTICE

These instructions apply to resilient seat and metal seat designs.

15.1 Seat installation

- 15.1.1 Install the seat. (Refer to section **Seat Replacement**.)

15.2 Segment assembly

- 15.2.1 Check the segment sealing surface to make sure it is smooth and free of scoring and scratches.



CAUTION

Damaged or dirty seal surfaces can cause excessive seat wear and high torque requirements. Damaged segment should be replaced.

- 15.2.2 Insert the segment into the body through the downstream bore, splined shaft hole first, towards the upstream seat pocket. Once the segment is fully in the body cavity, rotate the segment, placing the splined segment hole in alignment with the packing box.

- 15.2.3 Hold the segment inside the body so that it does not remain unsupported. (Larger sizes may require overhead lift with slings.)



CAUTION

Be extremely careful not to gall or scratch the sealing surface of the segment when lowering it in the body. Scratches may later cause excessive leakage and seal wear.

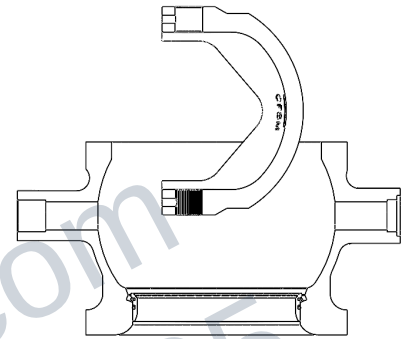


Figure 7: Segment inserted into body.

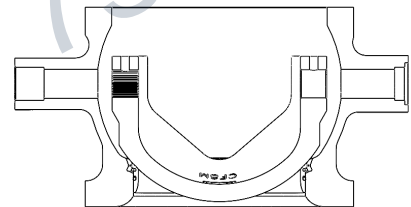


Figure 8: Segment after rotation.

15.3 Stem assembly

- 15.3.1 Clean splines on stem thoroughly to ensure that splines are free from burrs.
- 15.3.2 Insert stem bearing through the packing box bore.
- 15.3.3 Insert the stem through the packing box bore, into the splined hole of segment.
- 15.3.4 Position stem so that pin holes in stem and segment are in alignment. Spline shall be engaged such that indentation on stem is aligned with segment position.
- 15.3.5 Insert thrust washer over the drive end of the stem into the packing box bore.
- 15.3.6 Insert stem seal kit over the drive end of the stem into stuffing box bore.



NOTICE

When packing set with PTFE rings + carbon fiber ring is used, carbon fiber packing ring shall be installed at last.

Always use new packing whenever rebuilding the packing box.



CAUTION

When V-ring packing is used, it is imperative to avoid damage to the feather edge of the V-ring, as it is the sealing edge.

- 15.3.7 Install the gland ring, gland retainer, studs, lock washers, and nuts.

NOTE: Only tighten the gland nuts hand tight during assembly. The gland nuts will receive final tightening to specified torque values at the shell testing phase.



NOTICE

Before fully tightening the gland nuts for shell testing, cycle the valve at least 5 times to align the segment with the seat. Do not rotate the stem beyond fully open/fully closed position, as the segment will become misaligned with the seat.

Gland nuts should be tightened as necessary to prevent stem leakage. (Refer to **Table 1** for estimated gland torque values.)

- 15.3.8 Attach bracket onto body using screws and washers.

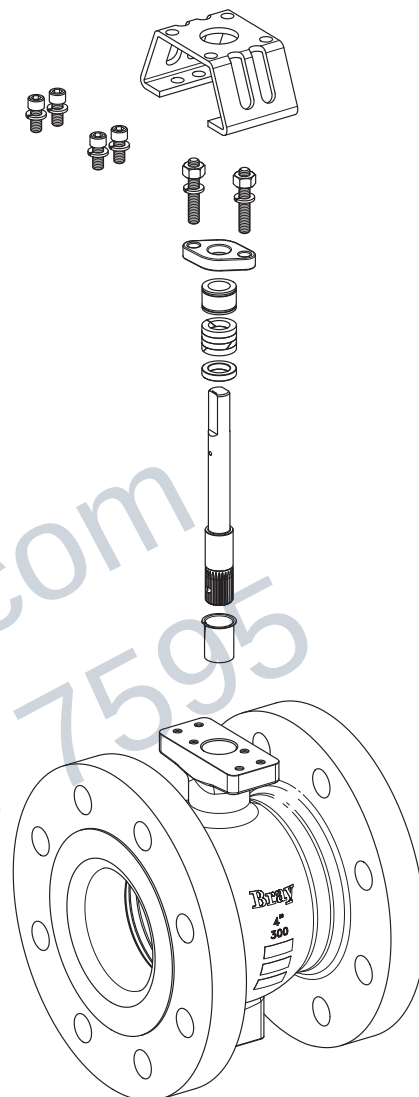


Figure 9: Stem assembly.

15.4 End post assembly

15.4.1 Insert end post bearing.

15.4.2 Insert end post, aligning the post/segment pin holes.

15.4.3 Place the gasket in groove, followed by post cover, stud, washer, and nut.



NOTICE

Post cover stud & nut shall be torqued as per **Table 2**.

15.4.4 Drive the stem pin and end post pin into the stem and end post until the outward end of the pin becomes flush with the segment. Be careful not to damage the stem or end post.



NOTICE

Tools may be necessary to insert the pins, depending on the accessibility and interference fit.

End post pins are not applicable for CL600 rated valves

15.5 Shell and Seat Test

After reassembly, perform a shell and seat test to ensure proper operation.

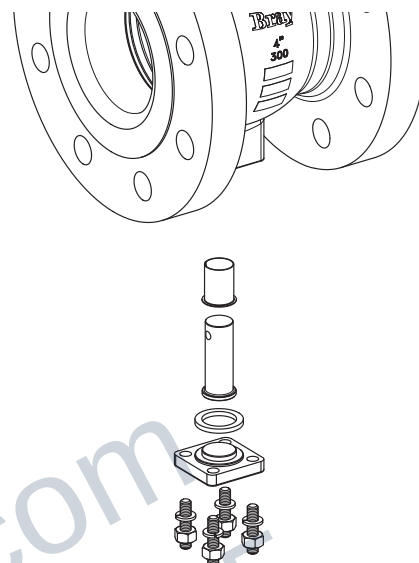


Figure 10: End post assembly.

16.0 SEAT REPLACEMENT (S19 ASME 600)



NOTICE

These instructions apply to resilient seat and metal seat designs.

16.1 Removing the Seat

- 16.1.1 The valve must be removed from the pipeline. (Refer to section **Removing Valve From Pipeline.**)
- 16.1.2 Rotate the segment so that it does not touch the seat (i.e., beyond operating 90 degrees.)
- 16.1.3 Tap the seat with a soft spindle all around the circumference through the upstream bore until the seat is pushed from the seat pocket into the valve body.
- 16.1.4 Rotate the segment so that the seat may be removed from the body through the downstream bore.

16.2 Installing the Seat

- 16.2.1 Remove any burrs, round off the edges using a fine abrasive paper, and clean the flow port carefully prior to installing the seat.
- 16.2.2 Place the seat o-ring onto the seat.
- 16.2.3 Lubricate the flow port, seat, seat o-ring, and the seat spring(s) with a volatile, light lubricant.

NOTE: Ensure the lubricant is compatible with the process medium. (Prior to using any lubricant, review the product safety data sheet for compatibility and safety protocols.)

- 16.2.4 Place the seat spring on the seat.
- 16.2.5 Place the seat assembly into the body.

NOTE: When the valve is opened, the ends of the spring must be by the V-shaped opening of the segment.

- 16.2.6 Check that the spring angles extend to the control face.
- 16.2.7 Place a screwdriver on each visible spring angle to compress and move the spring into the seat pocket spring groove.
- 16.2.8 Rotate the segment 180° clockwise and press the remaining spring angles into the seat pocket spring groove.
- 16.2.9 Use a plastic spindle to ensure that the seat is correctly placed and can move freely.

16.3 Seat Test

- 16.3.1 After reassembly, perform a seat test to ensure proper operation.

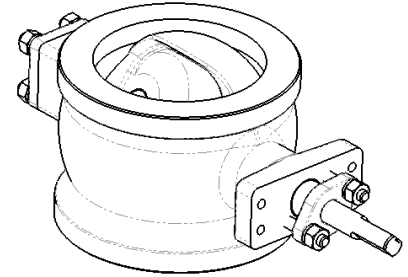


Figure 11: Segment position during seat replacement.

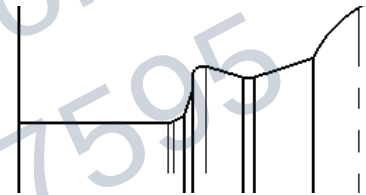


Figure 12: Flow port in body that houses the seat & spring.

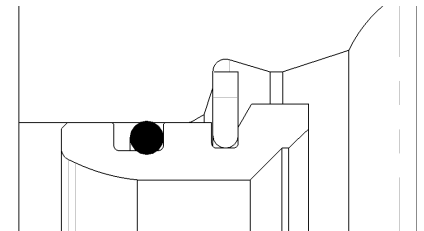


Figure 13: Seat placement.

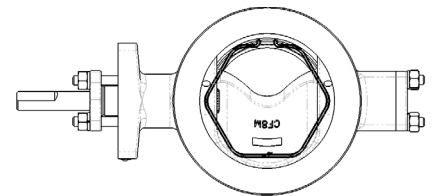


Figure 14: Spring position.

17.0 DISASSEMBLY AND INSPECTION (S19 ASME 600)



NOTICE

These instructions apply to resilient seat and metal seat designs.

17.1 Dismantling the Valve

- 17.1.2 The valve must be removed from the pipeline. (Refer to section **Removing Valve From Pipeline.**)
- 17.1.3 Neutralize all energy sources (electrical, pressure and mechanical).
- 17.1.4 Rotate the valve to the closed position.
- 17.1.5 Remove actuator assembly. (Refer to section **Actuator Removal and Remounting.**)
- 17.1.6 Remove the gland retainer from the stem by dismantling gland nuts and washers. (Removing the studs is not necessary.)
- 17.1.7 Remove the post cover from the end post by dismantling post cover nuts and washers. Carefully insert a screwdriver between the post cover and the body to remove the post cover, gasket, and end post thrust washer.
- 17.1.8 Using a punch and mallet, drive the stem pin into the center of the stem until the outward end of the pin clears the segment. Be careful not to damage the stem.
NOTE: The pin can be removed from the stem by driving it out of the through-holes with a mallet and punch once the segment has been removed.
- 17.1.9 Remove the end post.
NOTE: Inserting a bolt in the jack screw hole (tapped in the post) will help in removing the post.
- 17.1.10 Remove the stem, along with retaining ring, gland ring, stem seal kit, packing spacer, thrust washer, and split ring by pulling out through packing box side.



CAUTION

Take special care to not damage the splined end of stem during disassembly.

- 17.1.11 Remove the segment by rotating the segment inside the body so the non-splined end of the segment is toward the downstream port of the body. Remove the segment straight out of the body.



CAUTION

Be extremely careful not to gall or scratch the sealing surface of the segment when removing it from body. Scratches may later cause excessive leakage and seal wear

- 17.1.12 Remove the bearings and clean the bearing housing spaces.
- 17.1.13 Remove the seat. (Refer to section **Seat Replacement.**)

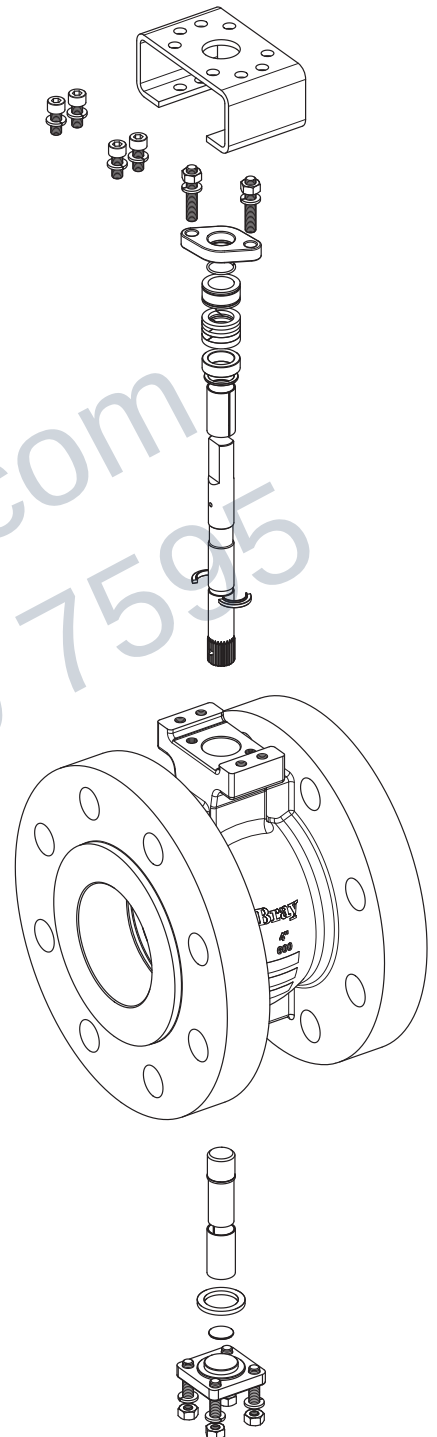


Figure 15: Dismantling the valve.

17.2 Inspection of Removed Parts

17.2.1 Clean the removed parts.



NOTICE

Cleaning should be done with acetone or equivalent product.

17.2.2 Visually inspect the stem and bearings for abnormal wear or damage.

17.2.3 Visually inspect the sealing surface of the segment and seat for abnormal wear or damage.

17.2.4 If necessary, replace the parts with new. (See section **Parts Identification** for spare parts list.)

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18.0 REASSEMBLY (S19 ASME 600)



NOTICE

These instructions apply to resilient seat and metal seat designs.

18.1 Seat installation

- 18.1.1 Install the seat. (Refer to section **Seat Replacement**.)

0.2 Segment assembly

- 18.2.1 Check the segment sealing surface to make sure it is smooth and free of scoring and scratches.



CAUTION

Damaged or dirty seal surfaces can cause excessive seat wear and high torque requirements. Damaged segment should be replaced.

- 18.2.2 Insert the segment into the body through the downstream bore, splined shaft hole first, towards the upstream seat pocket. Once the segment is fully in the body cavity, rotate the segment, placing the splined segment hole in alignment with the packing box.

- 18.2.3 Hold the segment inside the body so that it does not remain unsupported. (Larger sizes may require overhead lift with slings.)



CAUTION

Be extremely careful not to gall or scratch the sealing surface of the segment when lowering it in the body. Scratches may later cause excessive leakage and seal wear.

18.3 Stem sub-assembly

- 18.3.1 Clean splines on stem thoroughly to ensure that splines are free from burrs.
- 18.3.2 Insert bearing onto stem from drive end.



NOTICE

Care shall be taken to ensure PTFE lined fabric on bearing is not damaged during assembly.

- 18.3.3 Ensure bearing is placed below the undercut towards spline. Place the split ring snugly into undercut. Insert thrust washer onto split ring from drive end of stem.

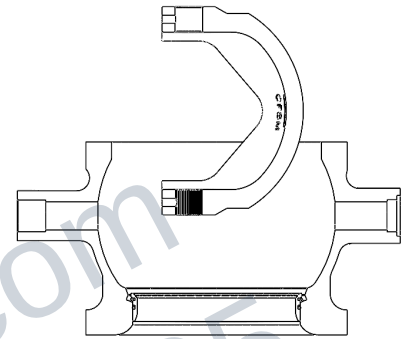


Figure 16: Segment inserted into body.

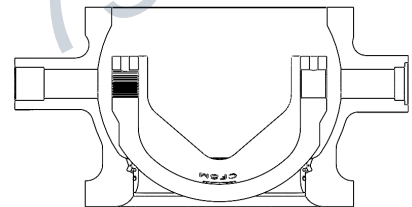


Figure 17: Segment after rotation.

18.4 Stem assembly

18.4.1 Insert the stem sub-assembly through the packing box bore, into the splined hole of segment.

18.4.2 Position the stem so that the pin hole in the stem and segment are in alignment. Spline shall be engaged such that indentation on stem is aligned with segment position.

18.4.3 Insert packing spacer over the drive end of the stem, into the packing box bore, followed by the stem seal kit.



NOTICE

When packing set with PTFE rings + carbon fiber ring is used, carbon fiber packing ring shall be installed at last.

Always use new packing whenever rebuilding the packing box.



CAUTION

When V-packings are used, it is imperative to avoid damage to the feather edge of the V-Ring as it is the sealing edge.

18.4.4 Install the gland ring, retaining ring/split ring, gland retainer, studs, lock washers, and nuts.

NOTE: Only tighten the gland nuts hand tight during assembly. The gland nuts will receive final tightening to specified torque values at the shell testing phase.



NOTICE

Before fully tightening the gland nuts for shell testing, cycle the valve at least 5 times to align the segment with the seat. Do not rotate the stem beyond fully open/fully closed position, as the segment will become misaligned with the seat.

Gland nuts should be tightened as necessary to prevent stem leakage. (Refer to **Table 3** for estimated gland torque values.)

18.4.5 Drive the stem pin into the stem until the outward end of the pin is flush with the segment. Be careful not to damage the stem.



NOTICE

Tools may be necessary to insert the pins, depending on the accessibility and interference fit.

18.4.6 Attach bracket onto body using screws and washers.

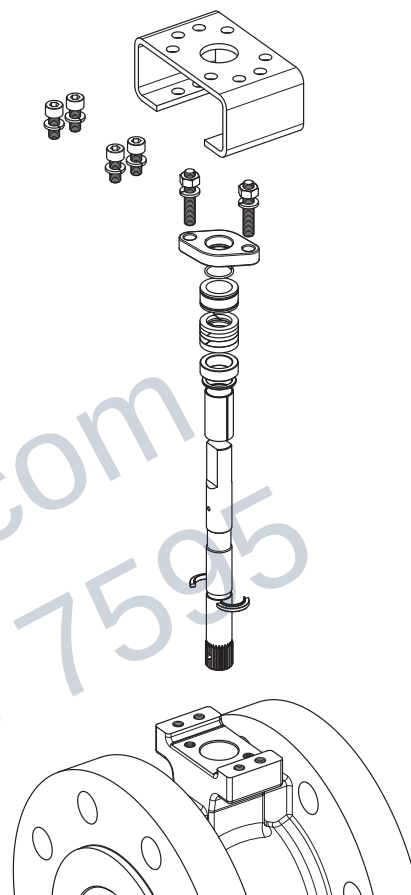


Figure 18: Stem assembly.

18.5 End post assembly

18.5.1 Insert end post into body

18.5.2 Insert bearing onto end post.



NOTICE

Care shall be taken to ensure PTFE lined fabric on bearing is not damaged during assembly.

18.5.3 Place thrust washer on end post.



NOTICE

Small quantity of compatible grease/adhesive may be used to place thrust washer, considering thickness.

18.5.4 Place the gasket in groove. Install post cover using studs, washers, and nuts.



NOTICE

Post cover stud & nut shall be torqued as per **Table 4**.

18.6 Shell and Seat Test

18.6.1 After reassembly, perform a shell and seat test to ensure proper operation.

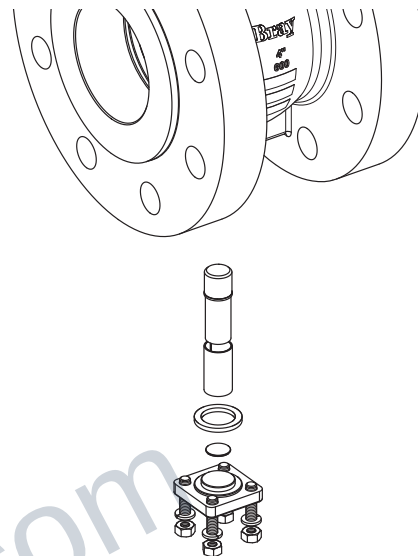


Figure 19: End post assembly.

SERIES 19 SEGMENTED BALL VALVE

Installation, Operation, and Maintenance Manual



19.0 TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSE	RECOMMENDED SOLUTION
Gland packing leak.	Loose gland nuts.	Retorque gland nuts.
	Gland packing wear.	Replace gland packing.
	Corrosion or scoring on stem.	Clean or replace stem and gland packing.
	Corrosion on stuffing box.	Clean stuffing box and replace gland packing. Valve to be replaced if excessive corrosion observed.
Bottom plate gasket leak.	Loose nuts.	Retorque nuts.
	Gasket damage.	Replace gasket.
	Damage/corrosion in sealing area.	Clean or replace bottom plate and/or body based on severity of damage.
Through bore leakage.	Segment not in fully closed position.	Adjust close limit travel stops in actuator or check for backlash in actuator drive.
	Segment and seat misaligned.	Loosen the gland packing and center the segment by cycling valve 3-5 times. Re-tighten the gland packing.
	Media solidified or entrapped.	Clean sealing surfaces and seat spring.
	Seat seal damage (O-ring or flat seals).	Replace seals.
	Seat or segment damage.	Replace segment or seat.
High valve torque.	Gland nuts are over torqued.	Loosen gland nuts to the recommended value.
	Operator/actuator misalignment with valve stem.	Loosen mounting fasteners and adjust mounting base ensuring it is parallel and the operator is centered. Retighten the fasteners.
	Valves are installed in incorrect orientation.	Valves shall be installed per flow indicator tag.
	Media solidified or accumulated.	Remove accumulated media from body cavity, segment, and seat. Clean sealing areas.
	Bearing damage.	Replace bearing.
	Seat and/or segment damage.	Replace seat and/or segment.

NOTES:

- > Bray does not accept any responsibility for the product if wear parts not tested and approved by Bray are used.
- > Bray does not accept any responsibility for the product if maintenance instructions are not followed during maintenance.

20.0 RETURN MERCHANDISE AUTHORIZATION

0.1 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.

0.2 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.

21.0 APPENDIX A - TABLES

Table 1: Gland Nut Torque

S19 ASME 150, 300 | PN 10, 16, 25, 40 (lbf-in)

Valve Size	Nut size	Estimated Torque	Maximum Torque
NPS		lbf-in	lbf-in
1	5/16 UNC	54	177
1½	5/16 UNC	54	177
2	5/16 UNC	54	177
3	5/16 UNC	62	177
4	5/16 UNC	62	177
6	5/16 UNC	89	177
8	3/8 UNC	89	213
10	3/8 UNC	89	213
12	3/8 UNC	98	213
16	M12	239	487

Table 1: Gland Nut Torque

S19 ASME 150, 300 | PN 10, 16, 25, 40 (N m)

Valve Size	Nut size	Estimated Torque	Maximum Torque
DN		N m	N m
25	5/16 UNC	6	20
40	5/16 UNC	6	20
50	5/16 UNC	6	20
80	5/16 UNC	7	20
100	5/16 UNC	7	20
150	5/16 UNC	10	20
200	3/8 UNC	10	24
250	3/8 UNC	10	24
300	3/8 UNC	11	24
400	M12	27	55

Table 2: Post Cover Torque

S19 ASME 150, 300 | PN 10, 16, 25, 40 (lbf-in)

Valve Size	Nut size	Estimated Torque	Maximum Torque
NPS		lbf-in	lbf-in
1	1/4 UNC	45	80
1½	1/4 UNC	45	80
2	1/4 UNC	54	80
3	5/16 UNC	71	177
4	5/16 UNC	71	177
6	3/8 UNC	89	213
8	3/8 UNC	107	213
10	3/8 UNC	124	213
12	3/8 UNC	151	213
16	M16	753	1213

Table 2: Post Cover Torque

S19 ASME 150, 300 | PN 10, 16, 25, 40 (N m)

Valve Size	Nut size	Estimated Torque	Maximum Torque
DN		N m	N m
25	1/4 UNC	5	9
40	1/4 UNC	5	9
50	1/4 UNC	6	9
80	5/16 UNC	8	20
100	5/16 UNC	8	20
150	3/8 UNC	10	24
200	3/8 UNC	12	24
250	3/8 UNC	14	24
300	3/8 UNC	17	24
400	M16	85	137

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Table 3: Gland Nut Torque
S19 ASME 600 (lbf-in)

Valve Size	Nut size	Estimated Torque	Maximum Torque
NPS		lbf-in	lbf-in
1	M08	54	142
1½	M08	54	142
2	M08	54	142
3	M08	80	142
4	M08	80	142
6	M10	62	275
8	M10	71	275
10	M10	89	275
12	M12	116	487
16	M12	239	487

Table 3: Gland Nut Torque
S19 ASME 600 (N m)

Valve Size	Nut size	Estimated Torque	Maximum Torque
DN		N m	N m
25	M08	6	16
40	M08	6	16
50	M08	6	16
80	M08	9	16
100	M08	9	16
150	M10	7	31
200	M10	8	31
250	M10	10	31
300	M12	13	55
400	M12	27	55

Table 4: Post Cover Torque
S19 ASME 600 (lbf-in)

Valve Size	Nut size	Estimated Torque	Maximum Torque
NPS		lbf-in	lbf-in
1	M08	54	142
1½	M08	54	142
2	M08	62	142
3	M08	89	142
4	M08	89	142
6	M10	169	275
8	M10	169	275
10	M10	239	275
12	M12	372	487
16	M16	753	1213

Table 4: Post Cover Torque
S19 ASME 600 (N m)

Valve Size	Nut size	Estimated Torque	Maximum Torque
DN		N m	N m
25	M08	6	16
40	M08	6	16
50	M08	7	16
80	M08	10	16
100	M08	10	16
150	M10	19	31
200	M10	19	31
250	M10	27	31
300	M12	42	55
400	M16	85	137

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