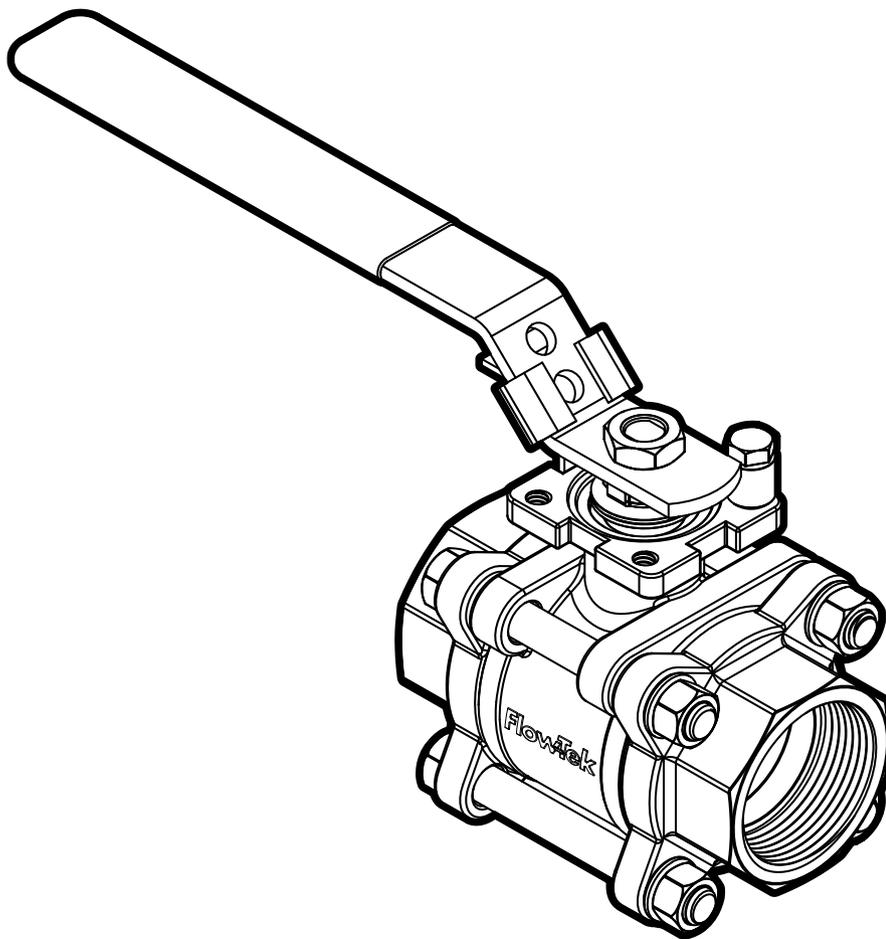

FLOW-TEK SERIES 7000/8000

3 PIECE FULL PORT BALL VALVES

Installation, Operation, and Maintenance Manual



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

1.0 DEFINITION OF TERMS

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.



DANGER

Indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.



WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION

Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.



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.

2.0 INTRODUCTION

The design features of this valve include three piece construction and a “free floating” ball allowing ease of maintenance without special tools. The ball is not fixed, but is free to move with the line pressure. As a result of this feature, these valves are capable of tight shut-off with flow in either direction regardless of the position of the valve in the line.

The downstream seat, opposite the pressurized side of a closed valve, must carry the load exerted by the line pressure on the ball, while the upstream seat is subject to little load or wear. For this reason, it is sometimes possible to increase useful seat life by turning the valve end-for-end in the pipeline.

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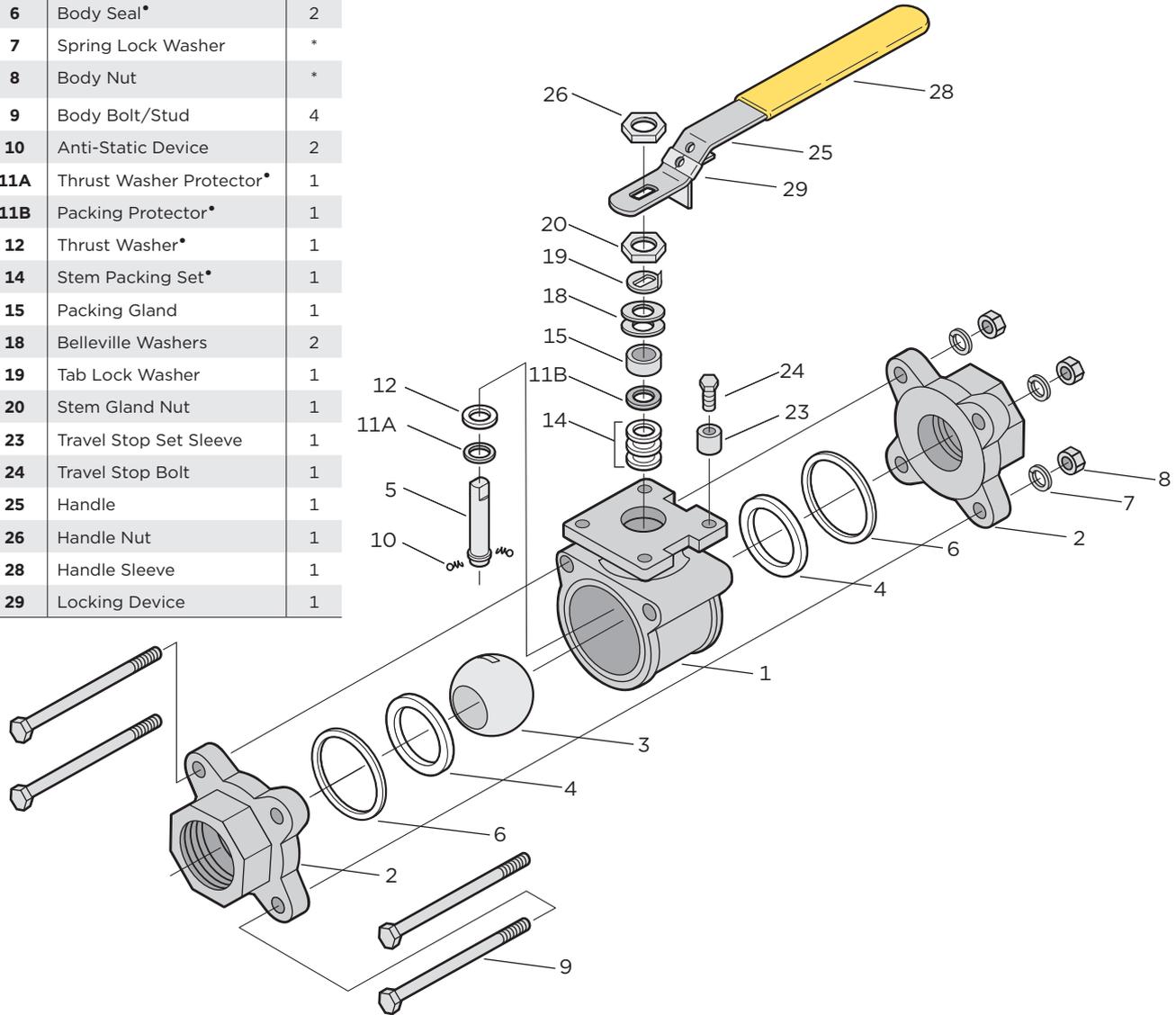
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3.0 PARTS IDENTIFICATION

ITEM	NAME	QTY
1	Body	1
2	End Cap	2
3	Ball	1
4	Seat*	2
5	Stem	1
6	Body Seal*	2
7	Spring Lock Washer	*
8	Body Nut	*
9	Body Bolt/Stud	4
10	Anti-Static Device	2
11A	Thrust Washer Protector*	1
11B	Packing Protector*	1
12	Thrust Washer*	1
14	Stem Packing Set*	1
15	Packing Gland	1
18	Belleville Washers	2
19	Tab Lock Washer	1
20	Stem Gland Nut	1
23	Travel Stop Set Sleeve	1
24	Travel Stop Bolt	1
25	Handle	1
26	Handle Nut	1
28	Handle Sleeve	1
29	Locking Device	1

1/4" - 2-1/2" Valves



* Recommended spare parts that are available as a packaged repair kit.

* Quantity of Body Nuts and Spring Lock Washers per valve size:
1/4" to 2" Valves - 4
2-1/2" Valves - 8

FLOW-TEK SERIES 7000/8000 3-PIECE FULL PORT BALL VALVES

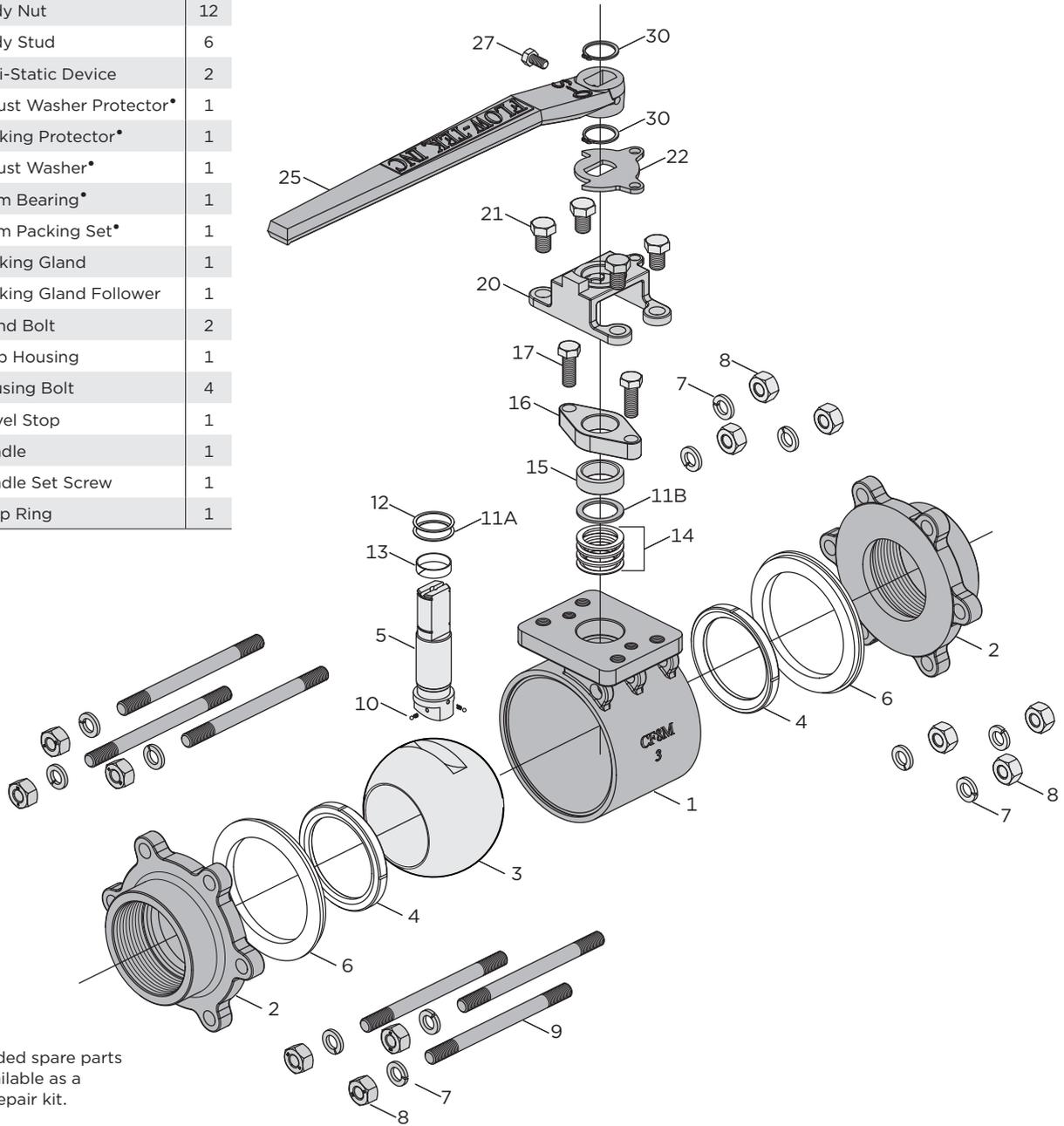
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3.0 PARTS IDENTIFICATION (Continued)

ITEM	NAME	QTY.
1	Body	1
2	End Cap	2
3	Ball	1
4	Seat*	2
5	Stem	1
6	Body Seal*	2
7	Spring Lock Washer	12
8	Body Nut	12
9	Body Stud	6
10	Anti-Static Device	2
11A	Thrust Washer Protector*	1
11B	Packing Protector*	1
12	Thrust Washer*	1
13	Stem Bearing*	1
14	Stem Packing Set*	1
15	Packing Gland	1
16	Packing Gland Follower	1
17	Gland Bolt	2
20	Stop Housing	1
21	Housing Bolt	4
22	Travel Stop	1
25	Handle	1
27	Handle Set Screw	1
30	Snap Ring	1

3" - 4" Valves



* Recommended spare parts that are available as a packaged repair kit.

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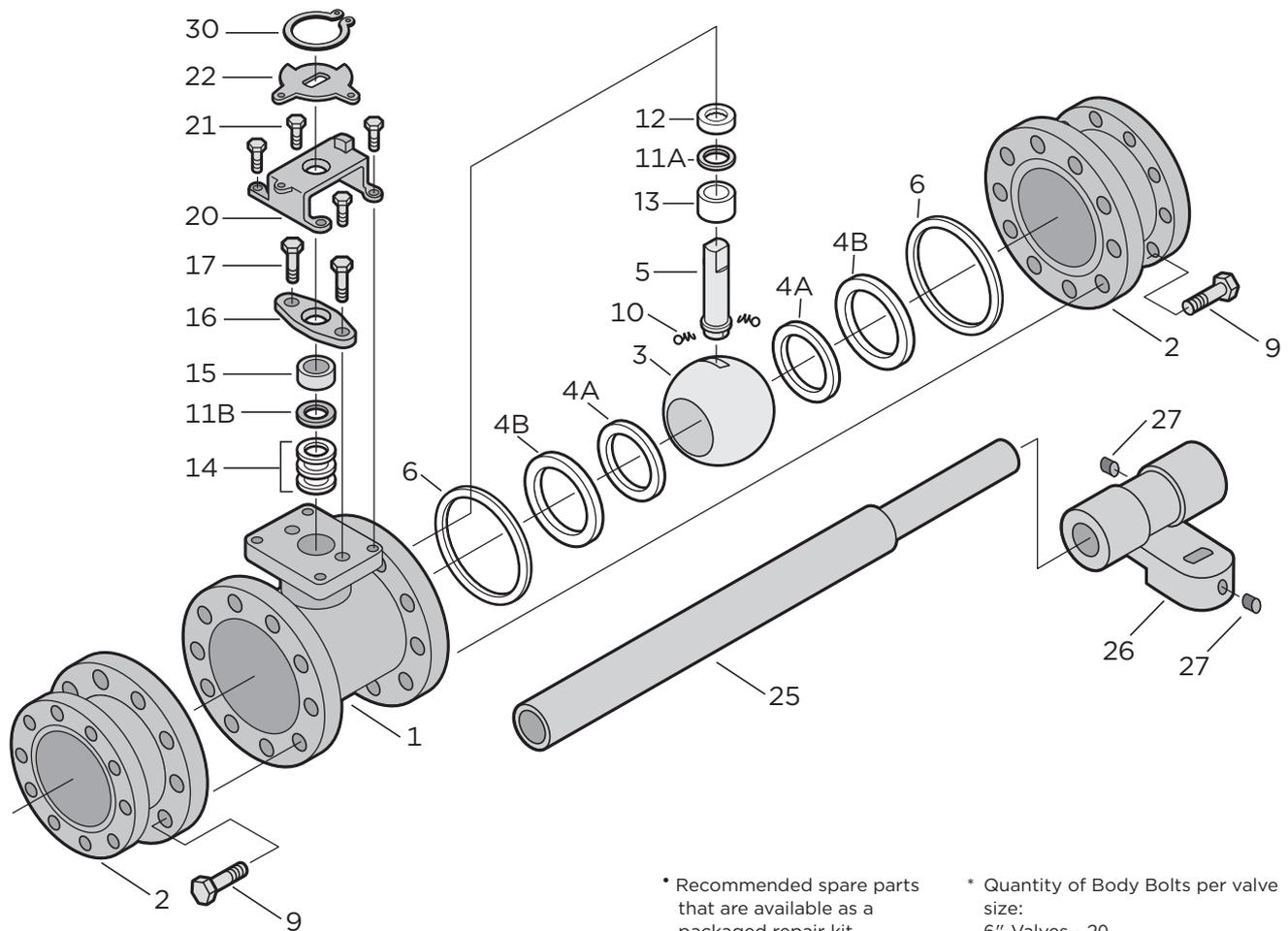
3.0 PARTS IDENTIFICATION (Continued)

ITEM	NAME	QTY.
1	Body	1
2	End Cap	2
3	Ball	1
4A	Seat*	2
4B	Seat Support	2
5	Stem	1
6	Body Seal*	2
9	Body Bolts	*
10	Anti-Static Device	2

ITEM	NAME	QTY.
11A	Thrust Washer Protector*	1
11B	Packing Protector*	1
12	Thrust Washer*	1
13	Stem Bearing*	1
14	Stem Packing Set*	1
15	Packing Gland	1
16	Packing Gland Follower	1
17	Gland Bolts	2
20	Stop Housing	1

ITEM	NAME	QTY.
21	Housing Bolts	4
22	Travel Stop	1
25	Handle	1
26	Handle Junction	1
27	Handle Setscrew	2
30	Snap Ring	1

6" - 12" Valves



* Recommended spare parts that are available as a packaged repair kit.

* Quantity of Body Bolts per valve size:
 6" Valves - 20
 8" Valves - 24
 10" Valves - 32
 12" Valves - 40

4.0 GENERAL INFORMATION FOR ON-SITE INSTALLATION

The valve may be installed in any orientation on the pipeline and should be installed in the full open position. Ensure the adjoining pipe on each end of the valve is aligned to prevent external piping loads. Piping misalignment may cause excessive external loads on the valve resulting in body joint leaks.

Before installing the valves, the pipes must be flushed clean of dirt, burrs, and welding residues, or the seats and ball surface will be damaged. If for any reason the valve is installed prior to flushing of the piping system, the valve must remain in the full open position until the piping system has been fully flushed clean of debris.

For hydrostatic testing of the piping system, the valves must be placed in the full or half open position prior to pressurizing the system.



NOTICE

Hydrostatic system testing with the valve in the closed position may result in damage to the valve seats, affecting their ability to create a proper seal. Failure to implement the installation and testing instructions as outlined, resulting in a valve failure, will void the warranty coverage of the product.

As shipped from the factory, valves may contain silicone based lubricant. This is for break-in and may be removed by disassembly and solvent washing, if it is objectionable for a particular application.

4.1 Use

The valve should be maintained as part of a preventative maintenance program and in accordance with manufacturer's recommended pressure, temperature and corrosion limits to ensure a long service life. During shipment, storage, and in operation, the valve should be fully open or fully closed ("open" is preferred for shipping and storage). Do not use in throttling service without investigating flow and pressure conditions.



WARNING

Before installing this 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.

5.0 SAFETY TIPS AND WARNINGS

1. Read completely and understand all instructions provided prior to beginning installation or maintenance.
2. Follow all instructions as described using the correct tools for the job.
3. Before installing this equipment, confirm that it is suitable for the intended service.
4. The identification tags describe the maximum allowable service conditions for this product.
5. Be sure that the installation is protected by appropriate pressure control and safety devices to ensure that acceptable limits are not exceeded.
6. Remove actuation air and power connections and confirm that there is no stored energy in the actuation such as compressed springs or trapped air before beginning. Stored energy devices can cause serious injury if the energy is released without warning.
7. Confirm that line pressure has been removed and that there is no pressure trapped within the valve prior to beginning service. Do not attempt to remove any packing components or other fittings before confirming that pressure has been completely removed!
8. Do not begin service work without proper tools and protective safety measures.
9. The work area should be clear of obstructions and other safety hazards.

6.0 SHORT AND LONG-TERM STORAGE

6.1 Short-Term Storage

Short-term storage is defined as storage of products and equipment to be used in the construction of a project for periods of one to three months. Short-term storage must be carried out in a controlled manner as follows:

1. Valves must be stored in a closed, clean, and dry environment.
2. Ball valves should be stored in the fully open position to protect the ball and seats.
3. Ball valves should remain in the original shipping container and be placed on pallets of wood or other suitable materials. End protectors should remain on the valve ends to prevent the entrance of dirt, and removed only at time of installation.

6.2 Long-Term Storage

Long-term storage is defined as storage of products and/or equipment for periods longer than three months. Long-term storage must be carried out in a controlled manner as follows:

1. Valves must be stored in a closed, clean, and dry environment.
2. Ball valves should be stored in the fully open position to protect the ball and seats.
3. Ball valves should remain in the original shipping container and be placed on pallets of wood or other suitable materials. End protectors should remain on the valve ends to prevent the entrance of dirt, and removed only at time of installation.
4. Periodically, the valves should be checked to ensure the above conditions are maintained.

These are general guidelines for valve storage. Please consult the factory for information regarding specific requirements.

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7.0 OPERATION

Operation of the valve is done by turning the handle a 1/4 turn (90 degree turn). Clockwise to close, counter clockwise to open.

7.1 Valve Open Position

The handle is parallel with the pipeline.

7.2 Valve in Closed Position

The handle is perpendicular to the pipeline.

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

8.0 STEM SEAL ADJUSTMENT

For 1/2" - 2 1/2", if slight leakage is noticed at the stem, straighten lock washer tab, tighten stem gland nut in 1/4 turn increments to compress the Belleville washers. If Belleville washers are compressed flat, back stem gland nut off 1/4 turn. Once tightening is complete, secure the lock washer tabs against the stem gland nut.

For sizes larger than 2 1/2", simply tighten gland bolts evenly in 1/4 turn increments until the leak stops. Be careful to not over tighten the packing as this can result in excess operating torque and accelerated wear of the packing. See Table 1 for recommended stem gland nut and gland bolt torque for a new valve assembly. When making packing adjustments while the valve is in service, torque values may vary due to cycle frequency, temperature, and other operating conditions.



WARNING

DO NOT remove stem gland nut, gland bolts, or any other pressure containing parts while line is under pressure!

Stem seal leakage may be corrected without disassembly of the valve by tightening the stem gland nut or gland bolts (dependent on valve size) until such leakage stops. If the leakage continues or valve operating torque becomes excessive, the seals are worn and replacement will be necessary.

Table 1 - Recommended Stem Gland Nut/Gland Bolt Torque

Valve Size NPS	Recommended Torque lb-in	Valve Size DN	Recommended Torque N m
1/4	50	8	5.65
1/2	50	15	5.65
3/4	50	20	5.65
1	90	25	10.16
1-1/4	90	32	10.16
1-1/2	170	40	19.20
2	170	50	19.20
2-1/2	240	65	27.11
3	180	80	20.33
4	180	100	20.33
6	200	150	22.60
8	200	200	22.60
10	220	250	24.86
12	220	300	24.86

9.0 INSTALLATION

9.1 Installation of Threaded End Valves

The use of a thread sealant is recommended; use conventional sealant, such as hemp core, Teflon, etc;

Apply wrench only on the hex/octagon nearest the valve end being tightened. Do not tighten by applying torque to the opposite end cap or other valve component. Tightening by using the valve body, handle or the opposite end cap can seriously damage the valve; use a wrench on both the near end cap and pipe to avoid applying torque to the body through the bolting.

In some applications, threaded end valves may be back-welded on site. Confirm that the end cap bolt holes are aligned with the body bolt holes on both ends and that the end caps are parallel and correctly spaced to fit the valve body before re-assembly or back welding. Make up both of the threaded connections normally and then remove the body assembly as described in Section 9.2 for weld-end connections before back welding the threaded connection.

Do not use the body bolts/studs to pull the pipe ends together or into alignment.

9.2 INSTALLATION OF WELD-END VALVES (7200, 7300, 8200 & 8300 Series)

Ensure that weld procedures are implemented that are compatible with the materials used.

Tack weld the valve to the pipe at four points on both end caps.

With the valve in open position, (the valve is in the open position when the handle is parallel to the axis of the valve and pipe), loosen all body bolts and remove the body from between the end caps.

Turn the handle to the half open position. Remove the seats and body gaskets.

Turn handle to the closed position and remove ball.

Place all removed parts in a clean and secure place.

Replace the body and all body bolts between the end caps and tighten them slightly. This operation is very important, so that the body and end caps remain perfectly parallel, thus preventing any leakage at the body joint after welding.

Finish welding both end caps onto the pipe.

When cool, remove the body, clean end caps, and reassemble per instructions in Section 12.



NOTICE

Use a spare body gasket for reassembly as the original body gasket will have been compressed during the original assembly and tightening of the body bolts.

Place body between the two end connections; then replace all body bolts and cross tighten per the torque values in Table 2.

9.3 Installation of Extended Weld End Valve

Ensure that weld procedures are implemented that are compatible with the materials used.

Weld end valves with 3 inch or longer extended weld ends do not require disassembly for installation welding.

Ensure that ball is in the full open position, and perform normal welding procedures, using care that the valve body does not reach a temperature above 200°F. Use a temperature indicator stick to monitor the body temperature, especially near the body to end cap joint.

Table 2 - Recommended Torque for Body Bolts/Body Nuts

Valve Size NPS	Recommended Torque lb-in	Valve Size DN	Recommended Torque N m
1/4	70	8	7.90
1/2	130	15	14.69
3/4	130	20	14.69
1	130	25	14.69
1-1/4	200	32	22.60
1-1/2	200	40	22.60
2	200	50	22.60
2-1/2	820	65	92.65
3	530	80	59.88
4	996	100	112.53
6	996	150	112.53
8	996	200	112.53
10	1800	250	203.37
12	2880	300	325.40



NOTICE

Body bolts/body nuts must be tightened in a cross or star pattern, depending on the quantity of bolts, to prevent uneven loading of the body seal.

10.0 DISASSEMBLY PROCEDURE



CAUTION

Line must be depressurized before disassembly. Valve should be cycled after draining the system to relieve any pressure trapped in valve cavity. Ball valves can trap pressurized media when closed. Flush line with valve 1/2 open to remove hazardous media. If the valve has been used to control hazardous media, it must be decontaminated before disassembly.



WARNING

DO NOT attempt to remove packing components or any other valve parts while line is under pressure!



CAUTION

Properly support the valve before removing or loosening any body bolts. The larger sizes are heavy and may cause injury if allowed to swing or fall freely.

Remove actuation air and power connections and confirm that there is no stored energy in the actuation such as compressed springs or trapped air before beginning. Stored energy devices can cause serious injury if the energy is released without warning.

10.1 Disassembly for Stem and Seal Service

It is not necessary to remove the flanges from the pipeline. Removing any actuation and controls may make service easier.

For valves sizes up to and including 4", you may remove one of the upper body bolts and loosen the remaining bolts. The center body will swing out for service, leaving the end caps in place on the pipe ends. It is not recommended to perform in-line service for valves 6" and larger by swinging the center section out due to the size and weight of the body center section.

To completely remove the valve from the pipeline, remove the remaining upper body bolt and the body will lift free. Gently support the body in a vise to complete the remainder of the disassembly. To avoid damage to the seal surfaces, hold the body horizontally across its diameter, not across the end faces.

Remove the seats, body seals, and seat supports (if applicable).

1/2" thru 2-1/2" sizes; Remove the handle nut and handle. Straighten the tab on the tab lock washer and remove the stem gland nut. Remove the tab lock washer, Belleville washers, and packing gland.

3" and 4" sizes; Loosen the handle set screw and remove the handle. Remove the snap ring, travel stop, housing bolts and stop housing. Remove the gland bolts, packing gland follower, and packing gland.

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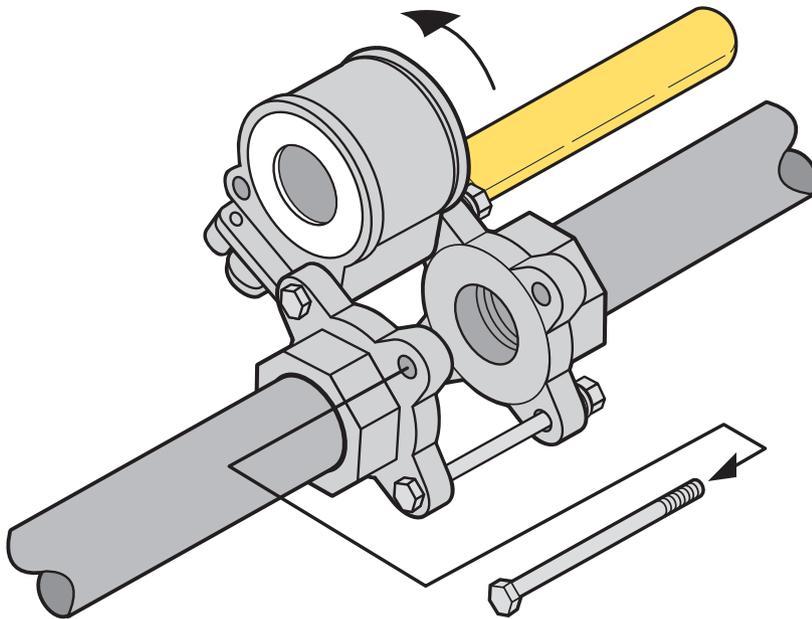
6" thru 12" sizes; Loosen the handle junction set screw and remove the handle assembly. Remove the snap ring, travel stop, housing bolts and stop housing. Remove the gland bolts, packing gland follower, and packing gland.

To remove the ball, rotate the stem so the ball is fully closed. Lift the ball from body, using a strap and lift device if necessary.

NOTE: Extreme caution should be taken to avoid damage to the ball.

The stem must be removed from inside the body - a tap on the top of the stem should loosen it. The thrust washer, thrust washer protector, and stem bearing (if applicable) should come out with removal of the stem. Then remove the stem packing set and packing protector from the packing box. A screw driver or pick may be required to remove the packing rings. Use caution not to scratch the inner diameter of the packing box as this may affect the ability to properly seal.

NOTE: Disassembly for servicing seats and stem seals may be performed without removing the end flanges from the pipeline. This feature allows the removal of the valve from service without disturbing piping connections.



11.0 VISUAL INSPECTION

Clean and inspect metal parts. It is not necessary to replace the ball and stem unless the sealing surfaces have been damaged by abrasion or corrosion. Replacement of all soft parts is strongly recommended whenever the valve is disassembled for reconditioning to protect against subsequent leakage after valve reassembly. The soft good replacement parts can be ordered in kit form.

NOTE: The valve may be assembled and operated dry where no lubricants are allowed in the system; however, a light lubrication of mating parts will aid in assembly and reduce initial operating torque. Lubricant used must be compatible with the intended line fluid.

12.0 VALVE RE-ASSEMBLY

12.1 1/2" - 2½" Valve Re-Assembly Procedures - Refer to page 5

Hold the body horizontally in a vise firmly enough that it will not move but do not crush it.

Put thrust washer protector and thrust washer on valve stem and insert the stem into the stem bore from inside valve body.

Slide the stem packing set onto the stem until they are fully inserted into the packing box.

Put packing protector and packing gland onto the stem on top of the packing set.

Install the Belleville washers, tab lock washer and stem gland nut onto the stem. Tighten hand tight.

Note: The Belleville washers are to be installed in an alternating orientation with the concave side of the washers facing each other.

Turn the stem until the upper stem flat is perpendicular to the valve centerline (closed, so that the ball can fit onto the stem).

Install the ball inside the valve body. The lower stem flats will fit into the slot on top of the ball;

Turn the stem so that the ball is in the open position (the ball will not fall out of the valve);

Install the seats and body seals into the body ends. Make sure the spherical curvature side of the seat will face the ball;

Lift the valve into position between the flanges in the pipeline.

Install the body bolts, spring lock washers and body nuts. Cross tighten all nuts to the values indicated in Table 2.

Note: The use of a bore alignment tool, about 1.0 mm (0.04 inch) less than the internal diameter of the end cap and ball, inserted through the end cap and ball will prevent the ball from turning as the stem gland nut is lightened on the stem.

The bore alignment tool should be made from a material softer than 300 Series SS, so that it will not inadvertently scratch the valve end cap or ball. Suggested materials: aluminum T6061. Acetal or other suitable hard polymer/plastic material.

Tighten the stem gland nut to the recommended torque values in Table 1. If a slight leak is noticed at the stem once back in service, continue tightening the stem gland nut in 1/4 turn increments to compress the Belleville washers until a seal is achieved. Secure the tab lock washer by bending tabs up to contact the side of the stem gland nut. Place the handle onto the stem, on top of the stem gland nut.

Secure the handle with the handle nut.

Cycle the valve slowly several times. By cycling slowly, the seats will align with and conform to the ball. A fast turning motion initially may damage the seats before they have a chance to form the proper seal.

Refer to the operation and stem seal adjustment instructions provided to commission the valve after re-installation if necessary.

For automated installations, follow the instructions provided with actuation instrumentation to correctly set up and recalibrate the installation.

12.2 3" & 4" Valve Re-Assembly Procedures - Refer to page 6

Hold the body horizontally in a vise firmly enough so it will not move but do not crush it.

Install the stem bearing, thrust washer protector, and thrust washer onto the valve stem and insert the stem into the stem bore in the valve body.

Slide the stem packing set onto the stem until it is fully inserted into the packing box.

Place packing protector, then packing gland on top of the stem packing.

Install packing gland follower and gland bolts. Lightly tighten the gland bolts to secure the packing gland follower.

Install stop housing and housing bolts hand tight. Install travel stop and snap ring.

Rotate the stem to the closed position (the upper stem flat is perpendicular to the port centerline) and install the ball inside the valve body. The lower stem flats will fit into the slot on top of the ball.

Turn the stem so that the ball is in the open position and the upper stem flat is parallel to the bore centerline. The ball will not fall out of the valve.

Install the seats and body seals into the body ends. Make sure the spherical curvature side of the seat will face the ball.

Lift the valve into position between the flanges in the pipeline.

Install the body studs, tab lock washers, and body nuts. Cross tighten all body nuts to the values indicated in Table 2.

Finish tightening the gland bolts to the recommended gland bolt torques shown in Table 1. Over tightening can result in excess torque and accelerated wear of the packing

Secure the handle with the handle set screw.

Cycle the valve slowly several times. By cycling slowly, the seats will align with and conform to the ball. A fast turning motion initially may damage the seats before they have a chance to form the proper seal.

Refer to the operation and stem seal adjustment instructions provided to commission the valve after re-installation if necessary.

For automated installations, follow the instructions provided with actuation instrumentation to correctly set up and recalibrate the installation.

12.3 6" - 12" Valve Re-Assembly - Refer to page 7

Hold the body horizontally in a vise firmly enough so it will not move but do not crush it.

Install the stem bearing, thrust washer protector, and thrust washer onto the valve stem and insert the stem into the stem bore on the valve body.

Slide the stem packing set onto the stem until it is fully inserted into the packing box.

Place packing protector, then packing gland onto the stem, on top of the stem packing.

Install packing gland follower and the gland bolts. Lightly tighten the gland bolts to secure the packing gland follower.

Install stop housing and housing bolts hand tight. Install travel stop and snap ring.

Rotate the stem to the closed position (the upper stem flat is perpendicular to the port centerline) and install the ball inside the valve body. The lower stem flats will fit into the slot on top of the ball.

Turn the stem so that the ball is in the open position and the upper stem flat is parallel to the bore centerline. The ball will not fall out of the valve.

Install the seats, seat supports and body seals into the body ends. Make sure the spherical curvature side of the seat faces the ball.

Lift the valve into position between the flanges in the pipeline.

Install the body bolts. Tighten the body bolts in a star pattern to the values indicated in Table 2.

Finish tightening the gland bolts to the recommended gland bolt torques shown in Table 1. Over tightening can result in excess torque and accelerated wear of the packing.

Install the handle junction onto the valve stem. Secure in place with one of the handle setscrews provided.

Secure the handle with the remaining handle setscrew.

Cycle the valve slowly several times. The seats will align with and conform to the ball. A fast turning motion initially may damage the seats before they have a chance to form the proper seal.

Refer to the operation and stem seal adjustment instructions provided to commission the valve after re-installation if necessary.

For automated installations, follow the instructions provided with actuation instrumentation to correctly set up and recalibrate the installation.

13.0 RETURN MERCHANDISE AUTHORIZATION

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.

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.

SINCE 1986, BRAY HAS PROVIDED FLOW CONTROL SOLUTIONS FOR A VARIETY OF INDUSTRIES AROUND THE WORLD.

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BRAY INTERNATIONAL, INC.

13333 Westland East Blvd.

Houston, Texas 77041

Tel: +1.281.894.5454

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