



Worcester Controls

WCAIM2020
(Part 13458)

818/828 Series 150# and 300# Flanged 2" - 8" Two-Piece Ball Valves

Installation, Operation and Maintenance Instructions

CAUTION: Flowserve recommends that all product which must be stored prior to installation be stored indoors, in an environment suitable for human occupancy. Do not store product in areas where exposure to relative humidity above 85%, acid or alkali fumes, radiation above normal background, ultraviolet light, or temperatures above 120°F or below 40°F may occur. Do not store within 50 feet of any source of ozone.

A. INSTALLATION

1. Standard valves may be installed for flow or vacuum in either direction. Valves with upstream relief hole in ball (V3 option) are one-way valves. Use care to exclude pipe sealants from the valve cavity.
2. When installing, use standard gaskets suitable for the specific service. Tighten flange bolts or studs evenly. Follow ANSI standards for flange bolt torques.

B. OPERATION

1. The operation consists of turning the handle and/or stem $\frac{1}{4}$ turn clockwise to close, and $\frac{1}{4}$ turn counterclockwise to open. The stop plate has a pointer, and when it points and/or the stem groove and flats are in line with the pipeline, the valve is open. These valves may also be automated.
2. These valves will provide bubble-tight shutoff when used in accordance with Worcester's published Pressure-Temperature Chart.
3. It is not good practice to leave a ball valve partly open (throttling operation) without knowledge of the pressure drop and flow at that position. These conditions should be checked with Worcester's Control Valve Brochure.
4. As shipped from the factory, valves (except oxygen prepared V20, V33 or prefix code "X", and valves with V38 or V46 options) contain a silicone-based lubricant. This is for break-in purposes

and may be removed, if it is objectionable for a particular application, by disassembling and solvent washing. Lacquer thinner will remove the lubricant.

5. Media which can solidify, crystallize or polymerize should not be allowed to stand in ball valve cavities.
6. Torque Requirements: Operating torque requirements will vary depending on the length of time between cycles, line pressure, type of valve seats, and the media in the system. For a detailed analysis of valve torque requirements, see Worcester's Actuator Sizing Manual.

NOTE: Media which contain fine powders (25 microns or less) will significantly raise ball valve torque requirements.

CAUTION: The fluoropolymer body seal (T) and the graphite body seal (Z) make excellent seals. However, some points of caution in their use need emphasizing.

7. a. No fluoropolymer part (except seats) is reusable. Graphite body seals are also not reusable. Upon disassembly of the valve, they should be discarded and replaced with new parts.
- b. Care must be taken to avoid scratching the fluoropolymer during installation. Light lubrication of these seals can help to prevent damage.

C. MAINTENANCE

If seepage is noted at stem, tighten retaining nut $\frac{1}{8}$ turn at a time until seepage stops. Caution: For maximum stem seal life, proper stem adjustment procedure must be followed. Excessive tightening causes higher torque and shorter stem seal life.

D. REBUILDING

▲ WARNING: BALL VALVES CAN TRAP PRESSURIZED FLUIDS IN BALL CAVITY WHEN CLOSED.

If the valve has been used to control hazardous media, it must be decontaminated before disassembly. It is recommended that the following steps be taken for safe removal and disassembly:

- Relieve the line pressure. Operate the valve prior to attempting removal from line.
- Place valve in half-open position and flush the line to remove any hazardous material from valve.
- All persons involved in the removal and disassembly of the valve should wear the proper protective clothing such as face shield, gloves, apron, etc.

CAUTION: If the seats and seals installed differ from those removed, the valve nameplate or stop must be replaced or remarked to indicate the altered materials and ratings or valve tagged to so indicate.

1. A standard repair kit may be ordered for the valve. Specify the size, series, material of seats and body seal and R# (revision number) of valve, or for non-standard valves, the "P" number, "T" number, "C" number, or similar number, as found on the nameplate. Some series, such as AF and FZ have their own repair kits, which are ordered by the prefix. (Use Series 818 or 828 designation.)

Examples:

Valve Size	Prefix (if required)	RK	Series	Material	Rev. #	P, T, C or similar #
3"	AF	RK	818	TZ	R3	—
2"		RK	828	T	R3	—
4"		RK	818	RZ	—	T0914

2. Special handling and cleaning procedures are necessary for oxygen and vacuum service valves. Refer to industry practices when overhauling these units.
3. To Disassemble 2"-8" Two-Piece Valves:
 - a. Valve should be placed with the end connector (smaller body section) uppermost and on a clean surface, the valve preferably clamped or bolted down. To disassemble end connector from body, remove body stud nuts from mid-flange.

- b. Strike end connector with mallet and close the valve. The mid-flange connection should break open. Repeat if not successful at first try. The end connector should now be lifted vertically from the body and placed on the clean surface with mid-flange end uppermost.
- c. With the valve still in the closed position the ball may now be lifted from the body cavity, and the seats and body seal are now exposed in either body or end connector. These should now be removed. Care must be taken to avoid scratching the machined faces on which they make contact with valve body and end connector.

General Note: Depending on the valve size and whether a standard, AF or FZ Series valve is being disassembled, stem seals may be seven-piece, six-piece, five-piece, two-piece or one-piece. Also, the 818/828 Series valves have one metal stem washer under the stem seal(s).

- d. Remove handle assembly (if any) by loosening handle screw. Locking plates, if installed, do not need to be removed.
- e. Remove retaining nut. Prevent stem from rotating by holding stem with wrench.
- f. Remove and retain stop (round spacer on 8" valves). Remove and retain the follower.
- g. Push stem into body cavity and remove. Remove and discard stem seal(s) and thrust bearing. Remove and retain stem washer.

4. Visual Inspection:

- a. The ball and the surfaces against which the seats are installed should be undamaged, clean and free of pit marks and scratches. Light marring from the action of the ball against the seats is normal and will not affect the operation of the valve. Flaws which can be seen but barely detected with fingertips are acceptable.
- b. The stem and body surfaces that the thrust bearing(s) and stem seal(s) contact, must be undamaged, clean and free of pit marks and scratches.

5. Reassembly: Refer to exploded view illustration on page 4 for proper reassembly.

NOTE: Care must be used when handling graphite stem seals, thrust bearings, and body seals. These parts can be easily damaged by squeezing the O.D. of the seal. Parts are to be handled on the flat surfaces rather than the O.D. These parts will not work if they are cracked or broken. Light flaking of the material is acceptable. If resistance is encountered when installing stem seals over the stem, use follower to gently push the stem seal down. Metal stem washer furnished on valve must be reused.

Valves with a pressure relief hole in the ball (V3) must be reassembled and installed with the hole upstream (end connector side) to ensure that cavity relief is upstream when valve is closed. Any valve with the V3 option will have an arrow on the body



pointing downstream. This arrow is stamped on the body or on a metal tag welded to the body.

For all valves, lightly lubricate the ball, seats, body seal, stem seal(s), and thrust bearing, with a lubricant compatible with the media being handled, except for valves with V20, V33 or V38 options, which are assembled dry. White petroleum jelly is a good general purpose lubricant. For oxygen-prepared valves (prefix code "X"), use a PTFE-based lubricant such as Fluorolube S-30 or equivalent.

2"-8" Two-Piece Valves:

- a. Insert new seat in body. Make sure seat rests firmly on back surface of recess.
- b. Reassemble stem assembly by putting new thrust bearing onto stem and inserting through body cavity into stem hole. For 3"-8" sizes the thrust bearing can be distinguished from the stem seals by the darker color of the 25% filled fluoropolymer used in the thrust bearing. For the 2" size the stem seals and thrust bearing are the same size and color, and are interchangeable. Put metal stem washer, new stem seal(s), and follower onto stem. Fire-rated valves use graphite stem seal(s), which are metallic silver gray and thicker than the graphite thrust bearing.
- c. Add stop, pointing in correct direction (or round spacer for 8" size), and stem nut. Using a wrench to prevent the stem from turning, tighten the stem nut until stem packing is fully compressed. Then back off 1/8 turn. Excessive tightening causes higher torque and shortens stem seal life.
- d. With valve in closed position (stop pointer and/or stem groove and flats going across pipeline), carefully insert ball into body so that stem slot engages tang on stem.
- e. Install and make sure body seal rests squarely in seal surface of body. Insert new seat in cavity of end connector.

CAUTION: If the body seal is installed on the end connector, it will be damaged.

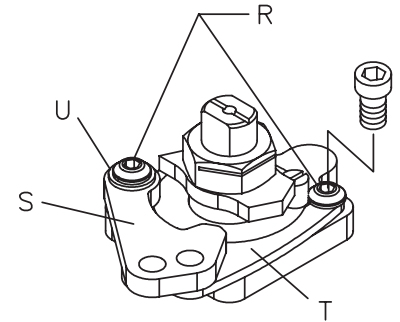
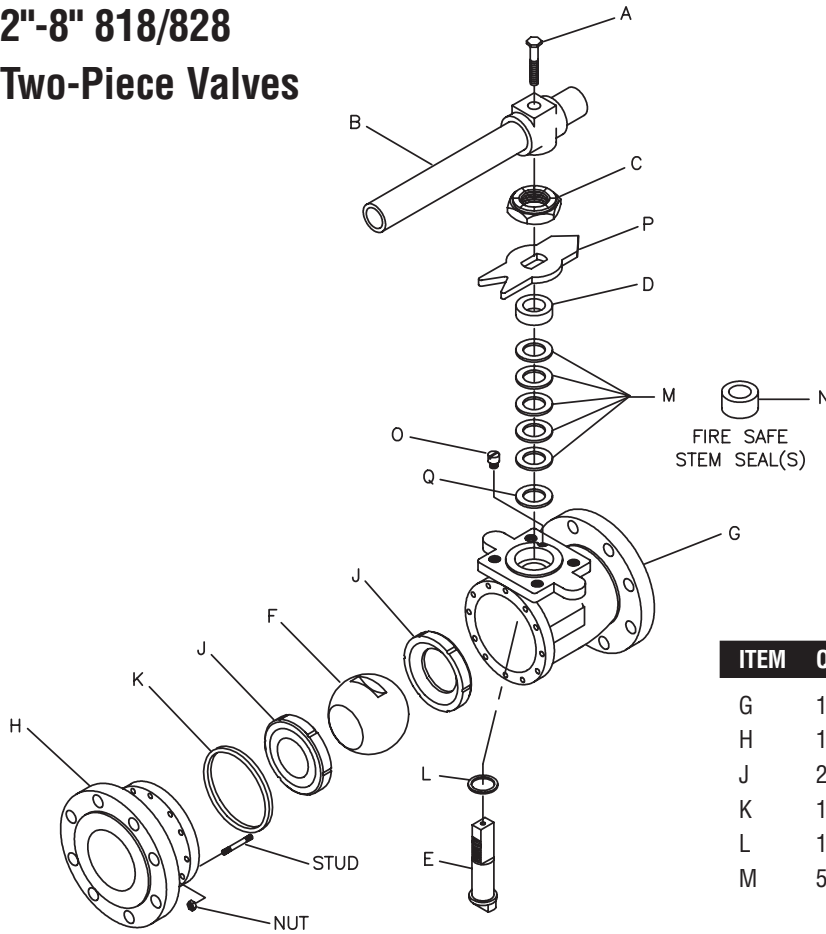
- f. Carefully place the end connector into the body using two or three body studs to align the mid-flange holes. When correctly located, strike the end connector with a mallet to push down the end connector further into the body. Tighten all body nuts to the following torques:

Valve Size	Torque (Ft-Lbs)			
	Stainless Steel Studs		Carbon Steel Studs	
	818-150#	828-300#	818-150#	828-300#
2"	33	33	34	34
3"	33	82	34	87
4"	57	82	60	87
6"	82	170	87	178
8"	170	214	178	253

- g. Replace handle assembly and tighten hex head screw (manual valves only).
Pressure checking of valve is desirable if practical.
6. When ordering parts, please provide the part name and the following information as found on the valve nameplate:
 - a. Valve Size and Style and Revision Number - Examples:
3" - 818 6 66 T 150 - R3 Stem
6" - AF828 4 66 RZ 300 - R3 Ball
OR
 - b. Valve Size, Style and 5 Character Code, known as a "P" Number, "T" Number, "C" Number, or similar number, the designation for a non-standard product.
Example: 6" 828 6 66 T 300 P2577 Ball

The terminology shown in the part listing on the following page is standard. Please use them when ordering parts.

**2"-8" 818/828
Two-Piece Valves**



LOCK KIT
Rotated for better view

ITEM	QTY	DESCRIPTION
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G	1	Body
H	1	End Connector
J	2	Seats
K	1	Body Seal
L	1	Thrust Bearing
M	5	Fluoropolymer Stem Seal (2" 818/828 and 3" 818 uses 6, 6" 828 and 8" 818 uses 7)
N	2	Graphite Stem Seal - AF/FZ only (2" 818/828 uses 1)
O	1	Stop Screw
P	1	Stop (Round Spacer on 8" Valves)
Q	1	Stem Washer
R	2	Button or Socket Head Screw
S	1	Moving Lock Plate
T	1	Fixed Lock Plate
U	1	Washer

ITEM	QTY	DESCRIPTION
A	1	Handle Screw
B	1	Handle Assembly
C	1	Retaining Nut
D	1	Stem Follower
E	1	Stem
F	1	Ball

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