



Worcester Control Valves

14932-D

High Pressure Series H71 (C0214, C0222, C0224) Ball Valves Installation, Operation and Maintenance Instructions

CAUTION: Flowserve recommends that all product that 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.

Worcester's H71 valves will operate to 6000 psi at normal ambient temperature (-40° to 185°F, -20° for carbon steel). If used on liquid medias at these pressures, caution must be practiced. Most liquid medias will flash or cavitate severely when the pressure drop exceeds approximately 40% of the system pressure. Severe valve and valve seat damage can result.

Free discharge at these pressures is not recommended.

- e. Tighten and torque body bolts evenly and diagonally opposite each other, alternating in a criss-cross pattern. Use torque figures shown.

CARBON STEEL BOLTS - B7

STAINLESS STEEL BOLTS - B8 CL2/2B

Bolt Dia.	In.-Lbs.	Ft.-Lbs.	Bolt Dia.	In.-Lbs.	Ft.-Lbs.
3/8"	480-540	40-45	3/8"	420-480	35-40
7/16"	680-720	55-60	7/16"	600-680	50-55
1/2"	984-1044	82-87	1/2"	960-984	80-82
5/8"	2100-2136	175-178	5/8"	1980-2040	165-170
3/4"	2940-3000	245-250	3/4"	2520-2580	210-215

NOTE: Stainless steel bolts and nuts are generally used in all three-piece valves with stainless steel bodies.

- f. Cycle the valve three times to break in the seats.

INSTALLATION

- H71 valves may be installed for flow in either direction. Use care to exclude pipe sealants from the valve cavity. Valves with upstream relief hole in ball (V3 option) are one-way valves.
- Weld End Valves:

NOTE: Prior to welding, THOROUGHLY CLEAN ALL JOINT SURFACES to prevent contamination.

For all weld valves (SW, BW, End Connections):

- Tack weld valve in place.
- With valve open, remove all but one body bolt, loosen it and swing out body. Close valve, remove ball, seats and body seals. Return body to its original position and temporarily secure it with two body bolts diagonally opposite each other.
- Weld valve in line (when gas welding or brazing, do not play flame on valve body).
- Allow valve to cool, lubricate ball and seat with Lubriplate 930AA and reassemble valve.

OPERATION

- The operation consists of turning the handle and/or stem a quarter-turn clockwise to close and a quarter-turn counter-clockwise to open. When the handle and/or stem flats are in line with the pipeline, the valve is open.
- These valves will provide bubble-tight shut-off when used in accordance with Worcester's published pressure/temperature chart.
- 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.
- As shipped from the factory, all valves may contain a silicone-based lubricant (H71 valves also contain a lithium based grease). 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.
- 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 the Worcester Actuator Sizing Manual.

MAINTENANCE

Tighten retaining nut if seepage is noted at stem.

CAUTION: For maximum stem seal life, proper stem adjustment procedure must be followed. Excessive tightening causes higher torque and shorter stem seal life.

For 1/2"-1 1/2" Valves with two Stem Nuts and a Lockwasher (Manual Valves):

1. Tighten retaining nut (lower nut) until Belleville washers are flat, the nut will "bottom".
2. Back off retaining nut 1/6 turn.
3. Tighten top nut securely to lock retaining nut in place.

For 1/2"-1 1/2" Valves with Self-Locking Stem Nut and four Belleville washers (Automated Valves):

1. Tighten self-locking stem nut until Belleville washers are flat, the nut will "bottom".
2. Back off 1/3 turn.

CAUTION: The self-locking stem nut is difficult to tighten, and must fully flatten Belleville washers before backing off.

For 2" Valves

1. Tighten retaining nut 1/6 turn at a time until seepage stops.

REBUILDING

▲ WARNING: Ball valves can trap high-pressure 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. (See Caution, page 1, paragraph 2.)
- All persons involved in the removal and disassembly of the valve should wear the proper protective clothing such as face shield, gloves, apron, etc.

1. A standard repair kit may be ordered for these valves, consisting of seats and body seals, two or four Belleville washers, stem seals, and thrust bearings. Specify the material of seats and body seals, size, Series and R number (revision number) of valve or for non-standard valve, the "P", "T", "C", or similar number, as found on the valve nameplate or on the actuator bracket nameplate. If valve body is stainless steel, place a "6" after valve size in repair kit ordering code.

To Order:

Valve Size/HRK71/Material/Rev. Number or P, T, C, etc. Number

Example: 1" 6 HRK71 XV C0222

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.

2. To replace seats and seals:
 - a. Place valve in open position, remove all but one of the body nuts and bolts, loosen remaining one, swing out center section from between pipe ends with valve open.
 - b. With valve in closed position, remove old seats, body seals, and ball.
 - c. For 1/2"-1" valves remove handle nut, lockwasher, one-piece handle and stop (if manual valve). (This step is not applicable to valves with self-locking stem nut.)

For 1-1/2" valves only, remove handle nut, lockwasher, one-piece wrench/stop and extension (if manual valve). This step is not applicable to valves with self-locking stem nut.

For 2" manual valves only, remove handle assembly (wrench block and extension), by removing hex head screw.
 - d. Using handle or a wrench to prevent stem from turning, remove retaining or self-locking stem nut, stop (2" manual valve only, or stem spacer if automated valve), Belleville washers (1/2"-1 1/2" only), and follower from stem. Remove stem through body cavity.
 - e. Remove thrust bearing(s) from body or stem, stem seals, and stem seal protector from recess in top of body.
 - f. Clean all sealing surfaces of valve including the ball.

NOTE: The ball and the surfaces against which the seats and seals 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. The stem and body surfaces that the thrust bearings and stem seals contact must be undamaged, clean, and free from pit marks and scratches.

- g. Lightly lubricate the ball, seats, body seals, stem seals, stem seal protector, and thrust bearings with a lubricant compatible

with the media being handled. White petroleum jelly is a good general purpose lubricant.

- h. For stem area rebuilding, refer to the illustrations on the following page.

Order of Assembly:

Place new thrust bearing(s) on stem and insert assembly through body cavity. Place new stem seals, stem seal protector and the follower in position. Peek thrust bearing and stem seal protectors are placed outside of seals and bearings. The seals/bearings must contact the body.

Stem seals, stem seal protectors and thrust bearings that are the same size and color are interchangeable.

- i. For 1/2"-1 1/2" manual valves, place two new Belleville washers in position with the larger diameter sides touching each other. For automated valves with single self-locking stem nut, place four new Belleville washers in position (two pairs of washers with larger diameter sides touching each other).
- j. For 1/2"-1 1/2" valves, place retaining or self-locking stem nut on stem and using handle or a wrench to prevent rotation, tighten nut to make snug and firm. Follow Section C - Maintenance - for proper stem adjustment.
- k. For 1/2"-1" manual valves, replace one-piece handle and stop, and for 1 1/2" manual valves replace one-piece wrench/stop and extension, lockwasher and handle nut on stem. (This step is not applicable to valves with self-locking stem nut).
- l. For 2" valves, replace stop (manual valves only) or stem spacer (automated valves only) and retaining nut. Follow Section C- Maintenance-for proper stem adjustment. For 2" manual valves, replace wrench block and extension and secure with hex head screw.

- m. With valve in closed position (stem flats going across pipeline), replace ball and seats. With valve in open position, carefully insert new body seals and place center section between pipe ends.

NOTE: Smaller body seals included in repair kit are for earlier version valves with smaller seal grooves only.

NOTE: Valves with a pressure relief hole in the ball (V3) must be assembled and installed with the hole upstream, when the valve is closed to insure that cavity relief is upstream. Any valve with a relief hole 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.

Replace and tighten body bolts and nuts per torque figures and method found in Section A.2.e. Cycle valve three times to break in the seats after the rebuild.

CAUTION: Do not scratch body seals when replacing valve body.

When ordering parts, please provide the part name and the following information as found on the valve nameplate or mounting bracket nameplate: The terminology shown in the exploded view Parts Listing on next page is standard.

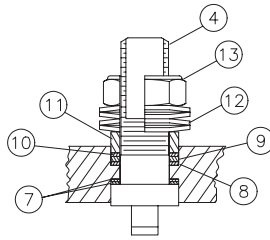
1. Valve Size, Style and Revision Number.

Example: 1/2" H7166 XM SW RO Stem

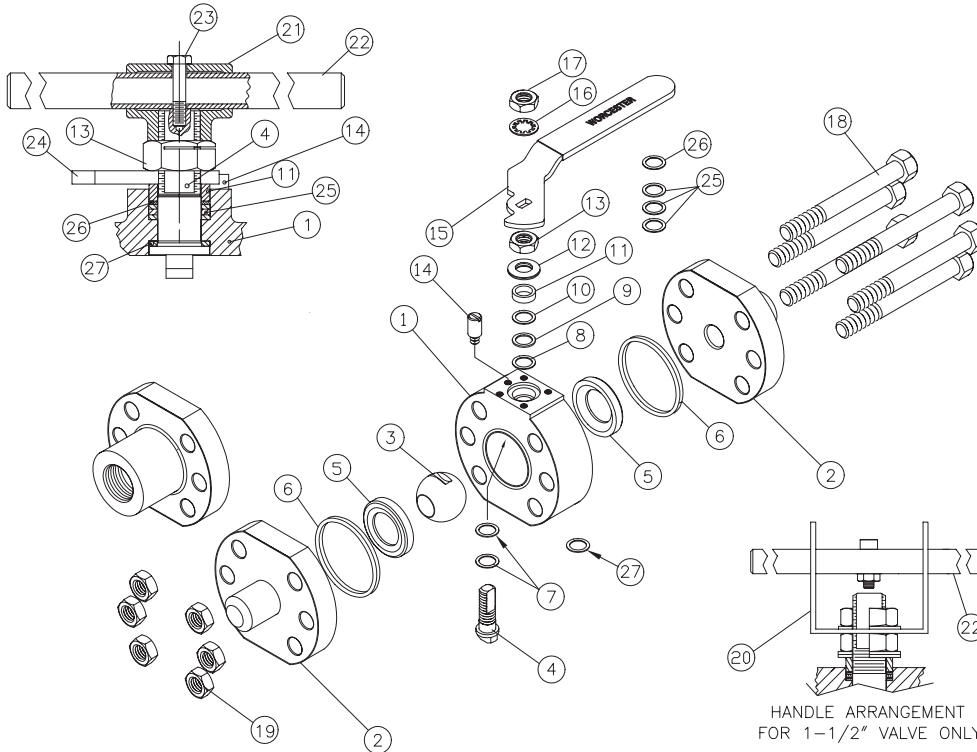
2. Size, Style and Five-Character Code (known as a "P", "T", "C", or similar number), the designation for a non-standard product.

Example: 3/4" H7146 XV SW C0222 Ball

STEM BUILD FOR
1/2" - 1-1/2" SERIES H71 VALVES
AUTOMATED SHOWN



STEM BUILD FOR
2" SERIES H71 VALVES
MANUAL SHOWN



ITEM	QTY.	DESCRIPTION
1	1	BODY
2	2	PIPE END
3	1	BALL
4	1	STEM
5	2	SEAT
6	2	BODY SEAL
7	2	THRUST BEARING (.030 PEEK-TAN)
8	1	STEM SEAL (.030 POLYFILL-BLACK) *
9	1	STEM SEAL (.050 POLYFILL-BLACK)
10	1	STEM SEAL PROTECTOR (.030 PEEK-TAN)
11	1	FOLLOWER
12	2/4	BELLEVILLE WASHER
13	1	RETAINING NUT
14	1/2	STOP PIN (MANUAL VALVE ONLY)
15	1	HANDLE (MANUAL VALVE ONLY) 1/2" - 1"
16	1	LOCKWASHER (MANUAL VALVE ONLY) 1/2" - 1-1/2"
17	1	NUT, HANDLE (MANUAL VALVE ONLY) 1/2" - 1-1/2"
18	6	BODY BOLT
19	6	BODY NUT
20	1	WRENCH (MANUAL VALVE ONLY) 1-1/2"
21	1	WRENCH BLOCK (MANUAL VALVE ONLY) 2"
22	1	WRENCH EXTENSION (MANUAL VALVE ONLY) 1-1/2" & 2"
23	1	HEX HEAD SCREW (MANUAL VALVE ONLY) 2"
24	1	STOP
25	3	STEM SEAL (.095 POLYFILL-BLACK)
26	1	STEM SEAL PROTECTOR (.095 PEEK-TAN)
27	1	THRUST BEARING (.095 PEEK-TAN)

* - .050 FOR 1-1/2" VALVE

1/2" - 2" SERIES H71 ASSEMBLY

Flowserve Corporation has established industry leadership in the design and manufacture of its products. When properly selected, this Flowserve product is designed to perform its intended function safely during its useful life. However, the purchaser or user of Flowserve products should be aware that Flowserve products might be used in numerous applications under a wide variety of industrial service conditions. Although Flowserve can (and often does) provide general guidelines, it cannot provide specific data and warnings for all possible applications. The purchaser/user must therefore assume the ultimate responsibility for the proper sizing and selection, installation, operation, and maintenance of Flowserve products. The purchaser/user should read and understand the Installation Operation Maintenance (IOM) instructions included with the product, and train its employees and contractors in the safe use of Flowserve products in connection with the specific application.

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