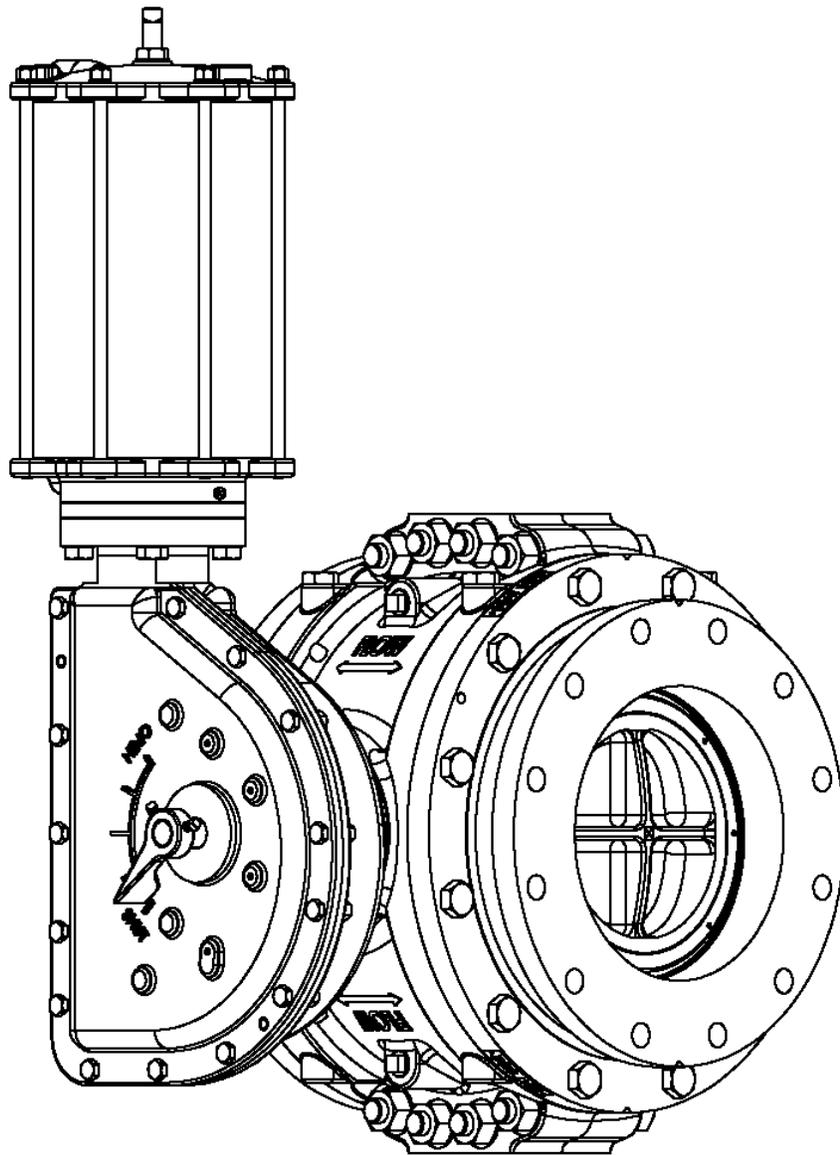


WILLAMETTE AWWA METAL SEATED BALL VALVES



Instruction **D12001**
January 2022

Instructions

These instructions are for use by personnel who are responsible for the installation, operation and maintenance of DeZURIK valves, actuators or accessories.

Safety Messages

All safety messages in the instructions are identified by a general warning sign and the signal word CAUTION, WARNING or DANGER. These messages indicate procedures to avoid injury or death.

Safety label(s) on the product indicate hazards that can cause injury or death. If a safety label becomes difficult to see or read, or if a label has been removed, please contact DeZURIK for replacement label(s).

⚠WARNING

Personnel involved in the installation or maintenance of valves should be constantly alert to potential emission of pipeline material and take appropriate safety precautions. Always wear suitable protection when dealing with hazardous pipeline materials. Handle valves which have been removed from service with suitable protection for any potential pipeline material in the valve.

Inspection

Your DeZURIK product has been packaged to provide protection during shipment; however, items can be damaged in transport. Carefully inspect the unit for damage upon arrival and file a claim with the carrier if damage is apparent.

Parts

Replaceable wear parts are listed on the assembly drawing. These parts can be stocked to minimize downtime. Order parts from your local DeZURIK sales representative or directly from DeZURIK. When ordering parts please provide the following information:

If the valve has a data plate: please include the 7-digit part number with either 4-digit revision number (example: 9999999R000) or 8-digit serial number (example: S1900001) whichever is applicable. The data plate will be attached to the valve assembly. Also, include the part name, the assembly drawing number, the balloon number and the quantity stated on the assembly drawing.

If there isn't any data plate visible on the valve: please include valve model number, part name, and item number from the assembly drawing. You may contact your local DeZURIK Representative to help you identify your valve.

DeZURIK Service

DeZURIK service personnel are available to maintain and repair all DeZURIK products. DeZURIK also offers customized training programs and consultation services. For more information, contact your local DeZURIK sales representative or visit our website at DeZURIK.com.

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Description

General

DeZURIK's Willamette AWWA Metal Seated Ball Valve (VBL) is a ball type, quarter-turn valve with a full-ported circular waterway through the body and ball in the open position. Each ball valve typically consists of four (4) main elements: a pressure vessel (body), a rotatable closing element (ball), a torque unit, and an operator. The "standard" material of construction for the body is ductile iron; standard ball materials are ductile iron, carbon steel or 316 stainless steel. Ball valve construction is in complete accordance with **AWWA Standard C507 for Ball Valves 6 In Through 60 In**.

Body

The standard body has ASME B16.42 Class125/150 or Class 250/300 flanges and houses the ball. The body has integrally cast trunnions and provides rigid means for supporting the torque unit (without the necessity of additional supports). There are two (2) pipe connections, one for an air vent and the other for drain. The body has rigidly attached corrosion resistant metal seat(s).

Ball

The ball has bronze-bushed trunnions. An extension of one trunnion, called the operating shaft, passes through a sealing device (o-ring retainer) and connects to the torque unit. The operating shaft is stainless steel or chrome plated carbon steel. The sealing device is capable of being removed and having its seals replaced without removing the valve from the line.

The ball has corrosion resistant metal seat(s) rigidly attached and fully adjustable to provide tight sealing in accordance with AWWA standard C507 in one direction or both directions, as an option. The ball shaft is designed for a factor of safety for all combined stresses of at least five to one.

Torque Unit (Valve Operating Mechanism)

The torque unit employs a traveling crosshead to impart positive rotary movement to the ball by means of a link and lever connected to the ball shaft. A ball shaft support bearing is supplied on the cover. The torque unit is designed such that during the first 50 percent of stroke in closing, the flow area is reduced by approximately 81 percent. The remaining flow area is gradually reduced to a complete shutoff throughout the last 50 percent of closing stroke. Likewise, when opening, the first 50 percent of the stroke gradually opens the first 19 percent. The last half of the stroke opens the valve completely. All materials of the torque unit subject to rubbing are of different hardness. The torque unit is capable of being inspected, lubricated, removed and repaired without removing the valve from the pipeline.

Handling and Storage

Lifting the valve improperly may damage it. Do not fasten lifting devices to the actuator, ball or through the seat opening in the body. Lift the valve with slings, chains or cables fastened around the valve body, or fastened to bolts or rods through bolt holes in the flanges.

If installation will be delayed, place valve indoors in secure, weather tight storage. If temporary outside storage is unavoidable, make sure a vermin proof rain cover (water shedding tarp, etc.) is secured around/over the equipment to keep off rain and mud. Skid and set the assembly on a flat, solid, and well drained surface for protection from ground moisture, runoff and pooled rain water.

Installation

- Before installation, remove foreign material such as weld spatter, oil, grease, and dirt from the pipeline.
- Prepare pipe ends and install valves in accordance with the pipe manufacturer's instructions for the joint used.



CAUTION!

Do not deflect the pipe-valve joint. Minimize bending stresses in the valve end connection with pipe loading.

If excessive seat leakage occurs during start-up, recheck the installation and eliminate any distortion to the valve body.

- Ensure the valve and pipeline flanges are concentric to ensure proper flange sealing and seat leakage control.
- Tighten the flange bolts or studs in a crisscross pattern and minimum of four stages.
- Do not anchor support legs or pads of the valve. The integral valve supports are intended to support the weight of the valve and actuator only. The connecting piping must be self-supporting and a flexible connector be installed on the valve's seat side.
- Single-seated valves will have an arrow indicating the direction of flow. The direction of flow refers to the flow coming from the pump.
- Pump control is the primary use of single-seated VBL and the seat is always on the pump side of the valve. When the pump is off, there is low or zero pressure on the pump side of the valve. At the same time, there is full pressure on the system side. The system pressure holds the ball tight against the seat to prevent backflow. The valve does not operate when the pump is turned off and there is system pressure. When the pump turns on, it generates pressure higher than the system pressure, causing enough differential pressure to unseat the ball and the valve can begin opening.
- Properly adjusted pump control valves will close while the pump is still running and creating pressure. There is always pressure from the pump pushing the ball away from the seat. When the valve finally closes, then the pump turns off. The system pressure takes over and holds the ball tight against the seat.

Fusion/Powder Coated Valves



CAUTION!

Valves with fusion/powder coated exterior paint require flat washers to be installed under the flange nuts when installing the valve to the pipeline flange to prevent the paint from cracking or chipping.

Maintenance and Operation

All valves should be stored in the open position and should remain open until they are installed in the line. The valve should only be opened or closed using the supplied actuator. Do not use any other manual or mechanical means to open or close the valve. **If the ball does not rotate freely – see troubleshooting section.** When the valve is bolted into the line, the bolts should be retightened after the first week of service. Periodically check tightness of the bolts connecting the operator support brackets to the valve body.

Operator

All bearings and moving parts are carefully lubricated during assembly and should give years of trouble-free operation without further maintenance under normal service conditions.

Basic Valve and Torque Unit

The basic ball valve is equipped with water lubricated trunnion bearings and requires no maintenance. The torque unit is lubricated at assembly and should give years of trouble-free operation under normal service conditions.

Shaft Seal Replacement (Closed Position)

See figure 1 and table 1 for basic valve assembly component identification. See figure 2 and table 2 for basic torque unit component identification.

The operating shaft of the valve is equipped with o-ring seals. The O-Rings may be replaced while the valve is installed. The procedure for replacing rings with the valve in the closed position is as follows:



WARNING!

Servicing the valve while the pipeline is under pressure can cause personal injury or equipment damage. Relieve pipeline pressure before servicing the valve.

1. Relieve the pressure in the pipeline and close the valve.
2. Drain oil, if any, from the torque unit housing (B02) and remove indicator (B11) and cover (B01).
3. Tighten the plug adjusting set screw (A16) by turning it ½ turn maximum, pushing the ball (A05) against the thrust washers (A13). This accomplishes two things: it seals leakage and it locks the ball in position
4. Remove link pin (B19).
5. Run crosshead (B15) to top of stroke in order to get links (B14) out of the way.



WARNING!

Accidental operation of power actuator can cause personal injury or equipment damage. Disconnect and lock out power to actuator before servicing.

6. If the actuator is powered, disconnect and lock out the pneumatic, hydraulic, or electrical power to prevent accidental operation of the actuator.
7. Loosen clamp bolts (B24) in lever (B20) and remove lever (B20) from operating shaft (A06). Carefully de-burr sharp edges of dowel pin hole in shaft (A06) and all other surfaces over which o-rings will pass during disassembly and assembly.

Maintenance and Operation *(Continued)*

8. Remove retaining ring (A21) from housing and retract o-ring retainer (A14).
9. Install new o-rings (A26, A27), re-insert o-ring retainer (A14) and retaining ring (A21) and re-install lever (B20).
10. After lever (B20) is reinstalled, connect power to the actuator, and run crosshead (B15) back to closed position. Make sure all mechanisms are in proper alignment.
11. Replace link pin cotters (if used) and be sure to bend over ends of pin.
12. Release adjusting screw (A16) just enough so the ball can turn freely and retighten sealing and locknut (A29) on plug adjusting screw (A16).

Shaft Seal Replacement *(Open Position)*

See figure 1 and table 1 for basic valve assembly component identification. See figure 2 and table 2 for basic torque unit component identification.

The valve can be packed in the open position using the following procedure:



WARNING!

Servicing the valve while the pipeline is under pressure can cause personal injury or equipment damage. Relieve pipeline pressure before servicing the valve.

1. Relieve the pressure in the pipeline.
2. Drain oil, if any, from the torque unit housing (B02) and remove indicator (B11) and cover (B01).
3. Tighten up the plug adjusting screw (A16) by turning it ½ turn maximum, pushing the ball (A05) against the thrust washers (A13).
4. Loosen the clamp bolts (B24) in lever (B20) and remove key, or dowel (B23).
5. Run crosshead (B15) down to closed position.
6. Remove link pin (B19).
7. Run crosshead (B15) back to top of stroke in order to get links (B14) out of way.



WARNING!

Accidental operation of power actuator can cause personal injury or equipment damage. Disconnect and lock out power to actuator before servicing.

8. If the actuator is powered, disconnect and lock out the pneumatic, hydraulic, or electrical power to prevent accidental operation of the actuator.
9. Remove lever (B20) from operating shaft (A06). Carefully de-burr sharp edges of dowel pin hole in shaft (A06) and all other surfaces over which o-rings will pass during assembly and disassembly.
10. Remove retaining ring (A21) and o-ring retainer (A14) and install new o-rings (A26, A27) using same procedure as described in *Shaft Seal Replacement (Closed Position)*.
11. Re-install lever (B20), connect power to the actuator, run crosshead (B15) back to closed position and reconnect links (B14). Replace link pin cotter (if used) and be sure to bend over ends of pin.

Maintenance and Operation *(Continued)*

12. Run complete operating mechanism to open position, rekey and tighten clamp bolts (B24) on lever (B20). Make sure all operating mechanisms are properly aligned.
13. Release adjusting screw (A16) just enough so that ball (B05) can turn freely and retighten sealing and locknut (A29) on plug adjusting screw (A16).

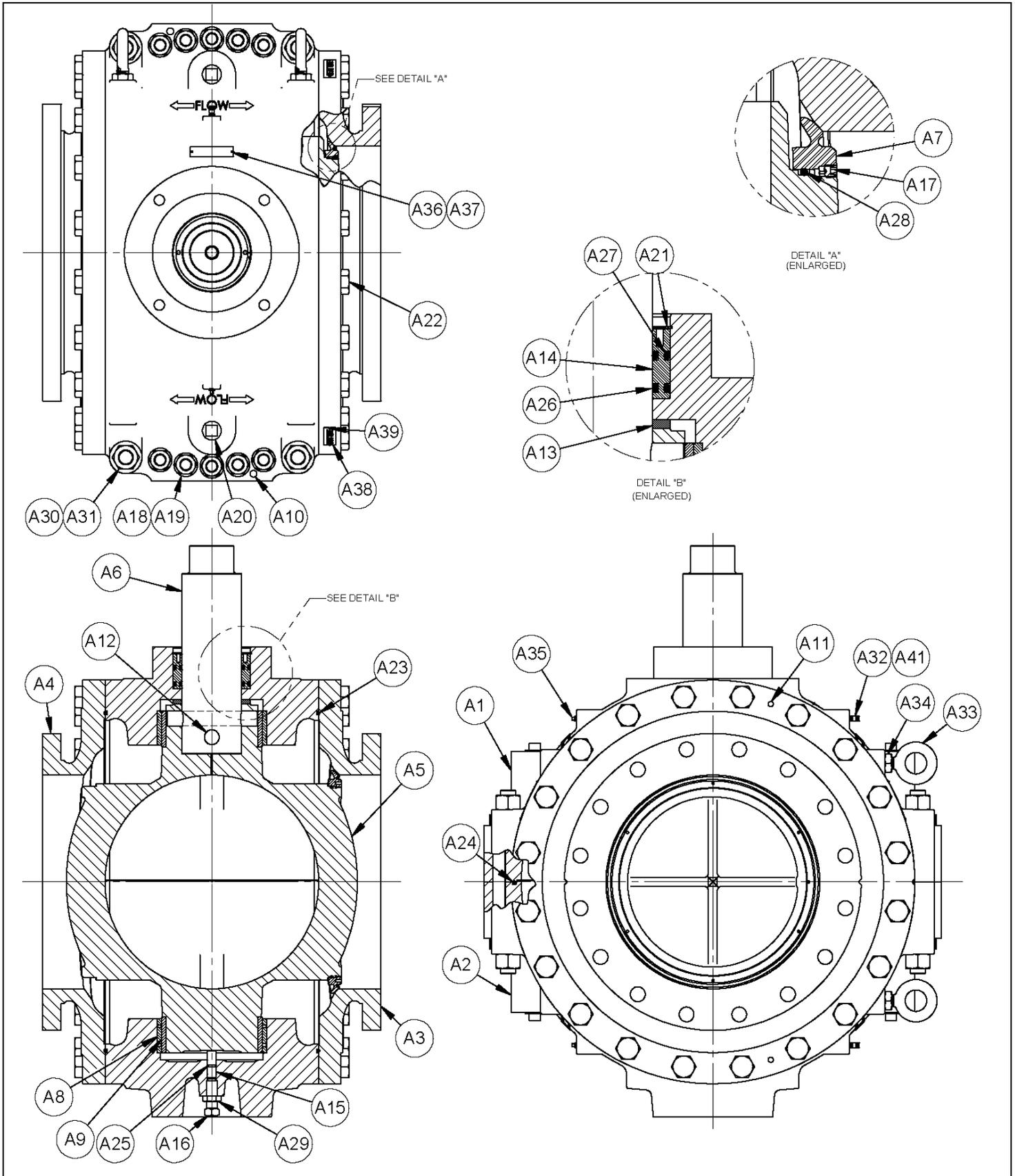


Figure 1: Basic Valve Assembly

Table 1: Basic Valve Assembly Components

A01	BODY HALF (OPERATOR END)
A02	BODY HALF (TRUNNION END)
A03	ADAPTOR (WITH SEAT)
A04	ADAPTOR (WITHOUT SEAT)
A05	BALL
A06	SHAFT
A07	SEAT RING
A08	BODY BUSHING
A09	BALL JOURNAL
A10	TAPER PIN
A11	DOWEL PIN
A12	DOWEL PIN
A13	THRUST WASHER
A14	O-RING RETAINER
A15	THRUST PIN
A16	SET SCREW
A17	SET SCREW
A18	STUD
A19	NUT
A20	PIPE PLUG
A21	RETAINING RING
A22	SCREW
A23	O-RING (ADAPTOR)
A24	O-RING (BODY HALF)
A25	O-RING (THRUST PIN)
A26	O-RING (O-RING RETAINER, INSIDE)
A27	O-RING (O-RING RETAINER, OUTSIDE)
A28	O-RING (SEAT RING)
A29	JAM NUT
A30	STUD
A31	NUT
A32	LUBE FITTING
A33	EYE BOLT
A34	JAM NUT
A35	PIPE PLUG
A36	DATA PLATE
A37	DRIVE SCREW
A38	SEAT SIDE TAG
A39	DRIVE SCREW
A41	BUSHING

Figure 2: Torque Unit Assembly

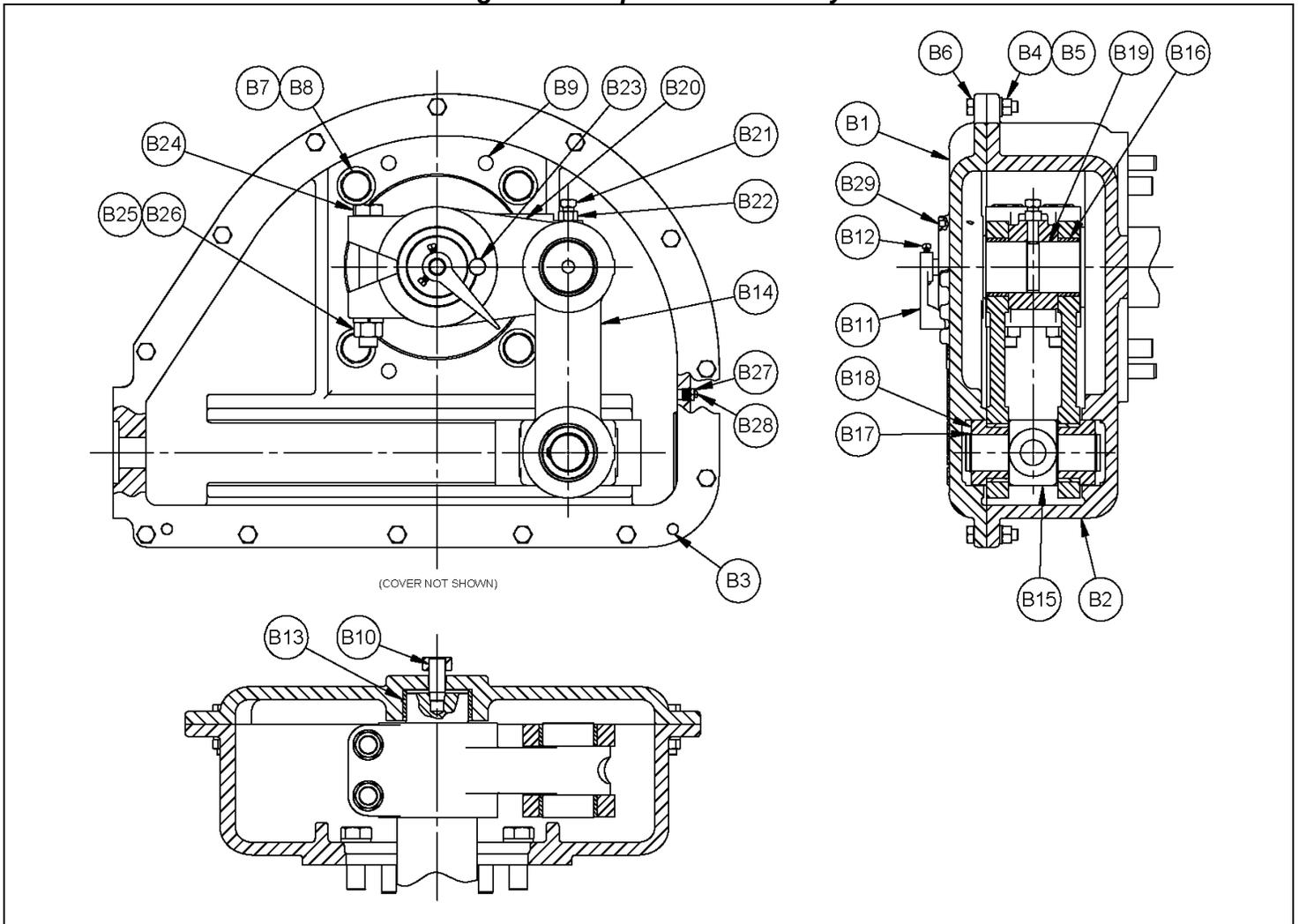


Table 2: Torque Unit Assembly Components

B01	COVER	B16	BUSHING
B02	HOUSING	B17	RETAINING RING
B03	PIN	B18	SIDE MEMBER
B04	NUT	B19	LINK PIN
B05	LOCKWASHER	B20	LEVER
B06	SCREW	B21	SET SCREW
B07	SCREW	B22	NUT
B08	LOCKWASHER	B23	PIN
B09	PIN	B24	SCREW
B10	INDICATOR SHAFT	B25	NUT
B11	INDICATOR	B26	LOCKWASHER
B12	SET SCREW	B27	BUSHING
B13	BUSHING	B28	VENT PLUG
B14	LINK	B29	SET SCREW
B15	CROSSHEAD		

Lubrication

General

Trunnion bronze bushings receive a significant amount of water lubrication from the media itself. For those ball valves equipped with grease fitting lubrication points on the body assembly – each lubrication point should be greased with a hand-pump gun (**Caution!** do not use air-operated grease guns). Use one of the approved lubricants from Table A.

Table A: Approved Lubricants

<i>Manufacturer</i>	<i>Type</i>	<i>NSF Approved</i>
DowDupont	Molykote 111	Yes
Mobil	Mobilgrease FM221	No
Fiske Brothers	Lubriplate #110	No
Fiske Brothers	Lubriplate # 130A	No
Richfield	Rocolub # 1	No
Shell	Alvania #1	No
Texaco	Marfak # 1	No
Stewart Warner Co.	Alernite Temprite #1	No
Standard Oil Co., (Ind)	Stanolith Grease #42	No

Ball Valve

Lubricate twice annually (more often if valve is operated frequently or in harsh service conditions) using one of the approved lubricants from Table A. Use approximately 4 ounces of grease per bushing per re-lubrication event. Check with the factory in the event that a special application prevents the use of the approved lubricants.

Torque Unit

Lubricate twice annually (more often if valve is operated frequently) or any time the cover is removed. Wipe out old lubricant and replace with new lubricant using one of the lubricants from Table A. Spread lubricant on the crosshead side members; crosshead guides, leadscrews, all rotating and sliding areas, bearings, exposed steel or cast iron machined parts, etc. See Table B for recommended amount of lubricant for the various size units.

Table B: Torque Unit Lubrication Requirements

<i>Unit Size</i>	<i>Amount of Lubricant (lbs.)</i>
T-3000	2 ½
T-2000 & T-1100	2
T-578 & T-315	1 ½
T-176, T-70 & T-22	1

Lubrication *(Continued)*

If a hydraulic cylinder is provided, Table C shows the recommended hydraulic fluids.

Table C: Hydraulic Fluids

<i>Manufacturer</i>	<i>Hydraulic Fluid</i>
Atlantic-Richfied Co.	Duro AWS-150
Shell	Tellus #32
Standard of California	Chevron EP-9
Texaco	Rando HD-A
Mobil	DTE 24
Castrol	Hyspin AW32

Power Supply for Operating Valves

It is essential that a continuous and reliable source of power (whether it be liquid, gas or electrical) be provided for operating the valve. The line which conveys the power to the controls must be of ample size so that sufficient pressure and volume can be delivered directly to the power port of the controls. The differential pressure between the top and bottom of the piston in the actuating cylinder causes the piston rod to move. It is essential that both the power and exhaust line be of ample size to provide adequate speed.

The power source must be suitable for cylinder use. Use of a filter or strainer where needed is recommended. In the case of air, a continuous and reliable source of filtered air is required to operate the cylinder. The air should be clean and reasonably dry (free from moisture). A lubricator may be used, if desired for maximum cylinder life. Locate the lubricator as close to the control supply port as practical. Avoid excessive oil flow settings which flood the components with oil. Reduce settings if oil coalesces (form pools in the bottom of the lines) or drips from the exhaust port. Carefully evaluate the need for lubrication prior to installing a lubricator. Most valve installations do not require an exceptional number of cylinder cycles and the factory pre-lubrication will provide years of service without a lubricator.

**CAUTION!**

Many valve positioners, transducers, and other special controls require that instrument quality, dry, oil free air is used. Check all special controls for compatibility with lubricated air prior to its use.

Troubleshooting

<i>Condition</i>	<i>Possible Cause</i>	<i>Corrective Action</i>
Shaft seal leaks.	O-ring is worn.	Replace o-ring.
Valve leaks excessively from one side of the ball to the other.	Foreign matter caught between seats	Fully open valve to remove object.
	Closed position stop is set incorrectly.	Adjust closed position stop.
	Valve body is distorted.	Remove stress to valve body.
	Loss of media's seating pressure.	Apply media pressure.
	Seat is worn or damaged.	Repair seat or replace valve.
Valve leaks at flange joint.	Loose flange bolting.	Tighten flange bolting.
	Blown flange gasket.	Replace flange gasket.
	Misalignment or damage to field piping and supports.	Adjust misalignment or repair piping or supports.
	Damaged flange face/s or improper flange connections.	Repair flange, replace valve body or adjust flange connections.
Valve does not fully close.	Object is wedged between seat and ball.	Fully open valve to remove object.
	Closed position stop is not set correctly.	Adjust closed position stop.
Valve does not fully open.	Open position stop is not adjusted correctly.	Adjust open position stop.
Valve fails to operate from open to close position or from closed to open.	Object is wedged between seat and ball.	Fully open or close valve to remove object.
	Torque unit low on lubricant.	Add lubricant.
	Torque unit component failure.	Repair or replace torque unit.
	Actuator component failure.	Repair or replace actuator.

Limited Warranty

DeZURIK, Inc. ("Seller") manufactured products, auxiliaries and parts thereof that we manufacture for a period of twenty-four (24) months from date of shipment from Seller's factory, are warranted to the original purchaser only against defective workmanship and material, but only if properly stored, installed, operated, and serviced in accordance with Seller's recommendations and instructions.

For items proven to be defective within the warranty period, your exclusive remedy under this limited warranty is repair or replacement of the defective item, at Seller's option, FCA Incoterms 2020 Seller's facility with removal, transportation, and installation at your cost.

Products or parts manufactured by others but furnished by Seller are not covered by this limited warranty. Seller may provide repair or replacement for other's products or parts only to the extent provided in and honored by the original manufacturer's warranty to Seller, in each case subject to the limitations contained in the original manufacturer's warranty.

No claim for transportation, labor, or special or consequential damages or any other loss, cost or damage is being provided in this limited warranty. You shall be solely responsible for determining suitability for use and in no event shall Seller be liable in this respect.

This limited warranty does not warrant that any Seller product or part is resistant to corrosion, erosion, abrasion or other sources of failure, nor does Seller warrant a minimum length of service.

Your failure to give written notice to us of any alleged defect under this warranty within twenty (20) days of its discovery, or attempts by someone other than Seller or its authorized representatives to remedy the alleged defects therein, or failure to return product or parts for repair or replacement as herein provided, or failure to store, install, or operate said products and parts according to the recommendations and instructions furnished by Seller shall be a waiver by you of all rights under this limited warranty.

This limited warranty is voided by any misuse, modification, abuse or alteration of Seller's product or part, accident, fire, flood or other Act of God, or your failure to pay entire contract price when due.

The foregoing limited warranty shall be null and void if, after shipment from our factory, the item is modified in any way or a component of another manufacturer, such as but not limited to; an actuator is attached to the item by anyone other than a Seller factory authorized service personnel.

All orders accepted shall be deemed accepted subject to this limited warranty, which shall be exclusive of any other or previous warranty, and this shall be the only effective guarantee or warranty binding on Seller, despite anything to the contrary contained in the purchase order or represented by any agent or employee of Seller in writing or otherwise, notwithstanding, including but not limited to implied warranties.

THE FOREGOING REPAIR AND REPLACEMENT LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, OBLIGATIONS AND LIABILITIES, INCLUDING, BUT NOT LIMITED TO, ALL WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR OF MERCHANTABILITY OR OTHERWISE, EXPRESSED OR IMPLIED IN FACT OR BY LAW, AND STATE SELLER'S ENTIRE AND EXCLUSIVE LIABILITY AND YOUR EXCLUSIVE REMEDY FOR ANY CLAIM IN CONNECTION WITH THE SALE AND FURNISHING OF SERVICES, GOODS OR PARTS, THEIR DESIGN, SUITABILITY FOR USE, INSTALLATION OR OPERATIONS. NEITHER ANY PERFORMANCE OR OTHER CONDUCT, NOR ANY ORAL OR WRITTEN INFORMATION, STATEMENT, OR ADVICE PREPARED BY SELLER OR ANY OF OUR EMPLOYEES OR AGENTS WILL CREATE A WARRANTY, OR IN ANY WAY INCREASE THE SCOPE OR DURATION OF THE LIMITED WARRANTY.

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Limitation of Liability

IN NO EVENT SHALL SELLER BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, PUNITIVE, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO; DAMAGE TO OR LOSS OF OTHER PROPERTY OR EQUIPMENT, BUSINESS INTERRUPTION, COST OF SUBSTITUTE PRODUCTS, LOSS OF TIME, LOSS OF PROFITS OR REVENUE, COST OF CAPITAL, LOSS OF USE, OR DIMINUTION IN VALUE) WHATSOEVER, AND SELLER'S LIABILITY, UNDER NO CIRCUMSTANCES, WILL EXCEED THE CONTRACT PRICE FOR THE GOODS AND/OR SERVICES FOR WHICH LIABILITY IS CLAIMED. ANY ACTION FOR BREACH OF CONTRACT BY YOU, OTHER THAN RIGHTS RESPECTING OUR LIMITED WARRANTY DESCRIBED ABOVE, MUST BE COMMENCED WITHIN 12 MONTHS AFTER THE DATE OF SALE.

Sales and Service

For information about our worldwide locations, approvals, certifications and local representative:

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Design features, materials of construction and dimensional data, as described in this manual, are provided for your information only and should not be relied upon unless confirmed in writing by DeZURIK, Inc. Certified drawings are available upon request.