DeZURIK

APCO SRG-6500 SURGE RELIEF GLOBE VALVES

Instruction **D12020**
December 2012

DeZURIK | APCO | HILTON | WILLAMETTE

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.

Table of Contents

Description

The Surge Relief Globe valve consists of a Body, Disc, Seat, Counterweights and a Cushion Cylinder. Surge pressure above that for which the valve was set, will open the disc, causing the counterweight arm and cylinder piston to rise to the up position. As the piston rises in the cushion cylinder, oil is drawn into the cushion chamber from the oil reservoir through the flow control valve. The amount that disc will open depends on the surge pressure and velocity of the media flowing through the valve.

Handling and Storage

Lifting the valve improperly may damage it. Do not fasten lifting devices to the cylinder 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 valve 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

- All Surge Relief valves are delivered to the jobsite, factory adjusted and ready for installation. It should always be installed with the replaceable resilient seat of the disc facing the system pressure. The valve outlet must be piped to discharge into the wet well or into a spillway.
- Valve may be installed in a horizontal or vertical position with the flow upward. In either case, counterweight arm (44) should always be in the horizontal position and the oil reservoir (58), in the vertical position. The counterweight (29) is set at the factory for the relief pressure setting specified by the customer.
- Adjustments within the design range of the valve can be made in the field by moving the counterweights along the counterweight arms. Moving the counterweights away from the pivot shaft will increase relief pressure setting and vice versa.
- 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 manufacture'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.

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

Once the valve has been correctly adjusted and placed into operation, it should require no attention except periodic inspection of oil level in the oil reservoir.

Disassembly

See Figure 4 for part identification

WARNING!

These valves may open or close, swinging the counterweight/spring loaded arm without warning due to flow changes from pumps starting and stopping. Servicing or working around these valves while the pipeline is under pressure can cause personal injury or equipment damage.

Workers must be cautious when working around these valves.

Relieve pipeline pressure and lockout the pumps before servicing the valve.

1. Relieve the pressure in the pipeline.
2. If it is necessary to remove valve from pipeline, set valve standing on its inlet flange.
3. Support counterweight (29), then unscrew counterweight set screw (36) and remove counterweight assembly (44).
4. Loosen nut (56) holding counterweight arm assembly to pivot shaft (13) and remove counterweight arm assembly.
5. Disconnect the pin between cushion lever (27) and cylinder (20).
6. Unscrew eye bracket mounting bolts (25) to remove cylinder (20).
7. Loosen cushion lever set screw (35) to remove cushion lever (27).
8. Remove cover (2) by unscrewing cover bolts (4).
9. Unscrew disc arm set screws (14).
10. Remove pivot shaft cover (15) and seal retainer (37) at both ends of the shaft.
11. Pull pivot shaft from the right side of the valve (facing inlet).
12. Remove bushing (12), key (33), and seals (17) & (18).
13. Remove disc pin retaining rings (41) and pull out disc pins (8).
14. Pull out disc arm (9).
15. Remove disc seat (6) and seat retaining ring (31) by unscrewing all screws (32).
16. Unscrew the seat retaining screws (40) located inside the body seat ring (5).
17. Evenly pry the body seat ring (5) out of the body (1).

Maintenance *(Continued)*

Assembly

1. If valve is removed from pipeline, set body standing on its inlet flange.
2. Install body seat seal (43) groove of body seat ring (5).
3. Install body seat ring (5) evenly inside the counterbore of the body (1) until it bottoms out.
4. Screw and tighten the body seat ring set screws (40) into the body seat ring (5).
5. Set disc (10) with seat side up, install disc seat (6) and disc seat retaining ring (31) and fasten with disc seat retaining screws (32).
6. Connect disc arm (9) assembly to disc (10) by inserting disc pins (8) and secure with disc pin retaining rings (41).
7. Set disc (10) and disc arm (9) assembly on top of body seat ring (43).
8. Slip the pivot shaft flanged bushing (12) on the pivot shaft (13) with the flanged side against shaft (13) collar.
9. Insert pivot shaft key (33) in keyway on pivot shaft (13).
10. Install pivot shaft (13) from right side of body (1) through disc arm (9) until pivot shaft collar is flush with body.
11. Insert pivot shaft straight bushing (11) into the body (1) at the other end.
12. Insert pivot shaft seal (17) and pivot shaft cover seal (18) in their respective grooves.
13. Insert pivot shaft seal retainer (37) on pivot shaft cover and install on both ends of pivot shaft (13). Screw on pivot shaft cover screws (16).
14. Install gasket or O-ring (3) and cover (2), then fasten with cover screws (4).
15. Insert cushion lever key (33) on the pivot shaft (13) and position cushion lever (27) in line with cylinder (20) and tighten set screw (35).
16. Connect cushion lever (27) to cylinder (20).
17. Insert counterweight arm key on pivot shaft (13) if provided and slip counterweight arm assembly in place. Set arm at an angle approximately 25º - 30º below horizontal axis and secure with lever arm bolts (55) and Nuts (56).
18. Install counterweight (29) at desired setting and secure with set screws (36).

Maintenance *(Continued)*

Disc Seat Replacement

WARNING!

These valves may open or close, swinging the counterweight/spring loaded arm without warning due to flow changes from pumps starting and stopping. Servicing or working around these valves while the pipeline is under pressure can cause personal injury or equipment damage.

Workers must be cautious when working around these valves.

Relieve pipeline pressure and lockout the pumps before servicing the valve.

1. Relieve the pressure in the pipeline and close the valve.
2. Remove valve from pipeline.
3. Remove Seat Retaining Ring Screws (32) and Seat Retaining Ring (31) from Disc (10).
4. Remove old Disc Seat (6) and replace with new disc seat.
5. Re-install Seat Retaining Ring Screws (32) and Seat Retaining Ring (31) in Disc (10).
6. Re-install valve in pipeline.

Operation

Surge pressure above that for which the valve was set, will open the disc (10), causing the counterweight arm and cylinder piston to rise to the up position. As the piston rises in the cushion cylinder (20), oil is drawn into the cushion chamber from the oil reservoir through the flow control valve (59). The amount that disc will open depends on the surge pressure and velocity of the media flowing through the valve.

When surge pressure has been relieved and pressure in the system drops to normal, the disc will close.

The speed at which the disc returns to the closed position is controlled by adjusting the flow control valve. Opening the flow control valve will result in faster closing, and throttling down on control valve will give a longer closing time.

Start-up Procedure

1. With the Surge Relief Valve disc completely closed and the oil reservoir in a vertical position, check the oil level. Fill system up to the street elbow located on the side of the oil reservoir with oil as specified in the “Oil Filling Procedure”. The oil reservoir is provided with a breather cap so that it remains at atmospheric pressure at all times.

NOTE: The valve is shipped from the factory with a ¼ NPT pipe plug on top of the oil reservoir. Remove this plug and install the air breather cap provided.

2. Open flow control valve three complete turns counter-clockwise from fully closed position. See “Adjustment of Flow Control Valve”.
3. Turn cushion adjustment screw two complete turns counter-clockwise from fully closed position. See “Operation of internal Cushion”.

Oil Filling Procedure

Recommended Oil: Motor oil SAE 20, “Mobil” DTE 24, “Castrol” Hyspin AW 32

1. With Surge Relief Valve in closed position, open flow control valve.
2. Remove pipe plug located on the side of the oil reservoir.
3. Fill oil reservoir slowly until oil level is flush with the street elbow and then replace pipe plug.

Adjustment of Flow Control Valve

The Flow Control Valve-Figure 1, has a micrometer type adjustment which incorporates a color coded reference scale to simplify setting, resetting and adjusting.

A set screw on the knob is provided for locking the valve setting. Turning the knob clockwise closes the valve and turning counterclockwise opens the valve and increases rate of closure of the Check Valve.

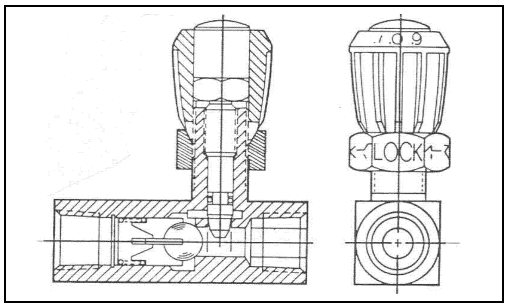


Figure 1 – Flow Control Valve

Operation of Internal Cushion

As illustrated below, the cushioning of a pneumatic/hydraulic cylinder stroke is obtained by trapping the exhaust air/oil as the piston assembly nears the end of its stroke. In Figure 2, as the Cushion Plunger (1) enters Cushion Cavity (2), the exhaust air/oil is almost completely trapped by the Ball Check (3) and the Adjusting Screw (4) creating a back pressure against Piston Assembly. The back pressure cushions and slows the final part of the Piston stroke thus, reducing the high impact hammering of the Piston Assembly against the Cylinder Cap.

Turning the Adjusting Screw to allow more or less air/oil to escape regulates the degree of cushioning as desired.

In Figure 3, when air/oil enters the Cylinder Cap End to stroke the Piston Assembly in the opposite direction, the air/oil moves the Ball Check (3) off it seat, opening the passage for more air/oil to act against the Piston, thus speeding its start-up movement as the Cushion Plunger (1) is immediately forced out of its cavity (2).

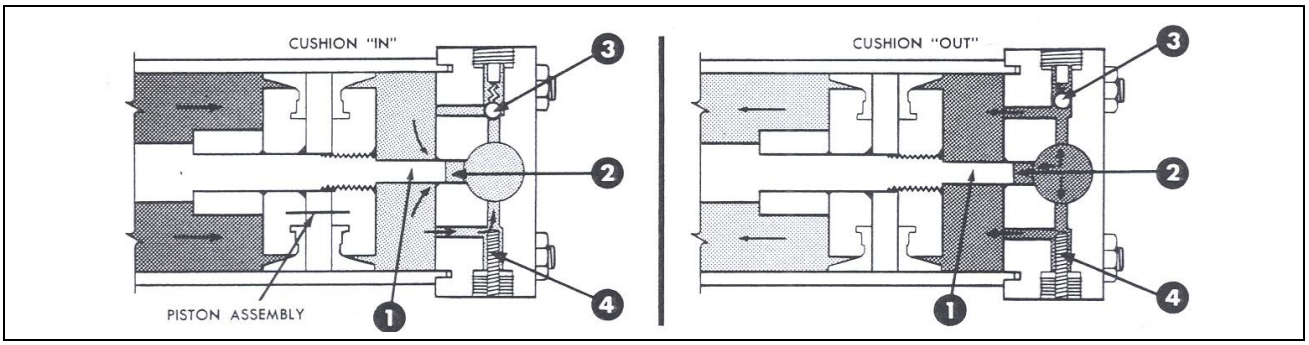
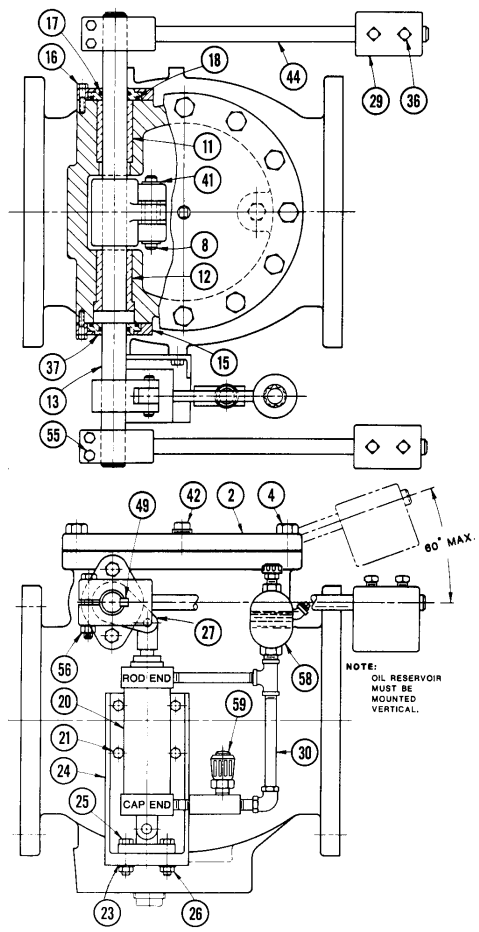
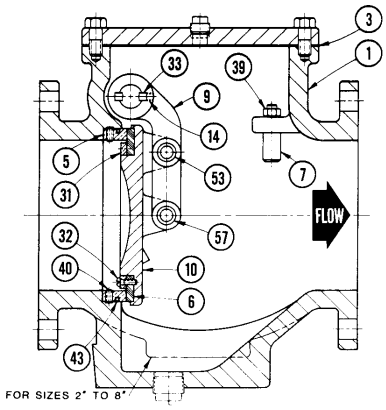


Figure 2 – Cushion “IN” Stroke

Figure 3 – Cushion “OUT” Stroke

Drawings





NO	DESCRIPTION
1	Body
2	Cover
3	Cover Gasket
4	Cover Bolt
5	Body Seat Ring
6	Disc Seat
7	Disc Stop
8	Disc Pin
9	Disc Arm
10	Disc
11	Pivot Shaft Bushing
12	Pivot Shaft Flanged Bushing
13	Pivot Shaft
14	Disc Arm Set Screw
15	Pivot Shaft Cover
16	Pivot Shaft Cover Bolt
17	Pivot Shaft Seal
18	Shaft Cover Seal
20	Cylinder Assembly
21	Cylinder Bracket Mounting Screw
23	Eye Bracket Lock Washer
24	Cylinder Bracket
25	Eye Bracket Mounting Screw
26	Eye Bracket Nut
27	Cushion Lever
29	Counter Weight
30	Piping Detail
31	Seat Retaining Ring
32	Seat Retaining Ring Screw
33	Pivot Shaft Key
36	Counter Weight Arm Set Screw
37	Pivot Shaft Seal Retainer
39	Disc Stop Lock Nut
40	Seat Retaining Set Screw
41	Disc Pin Retaining Ring
42	Cover Pipe Plug
43	Body Seat Seal
44	Counter Weight Arm Assembly
53	Pivot Sleeve Bearing
55	Lever Arm Bolt
56	Lever Arm Bolt Nut
57	Disc Arm Sleeve
58	Oil Reservoir
59	Flow Control Valve

Figure 4: APCO SRG-6500 Surge Relief Globe Valve

Troubleshooting

Condition	Possible Cause	Corrective Action
Shaft seal leaks.	Seal is worn.	Replace seal.
Valve leaks excessively from one side of the disc to the other.	Foreign matter caught between disc and seat.	Fully open valve to remove object.
	Disc seat is worn or damaged.	Replace disc seat.
Valve leaks at flange joint.	Loose flange bolting.	Tighten flange bolting.
	Blown flange gasket.	Replace flange gasket.
	Miss-alignment or damage to field piping and supports.	Adjust miss-alignment 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 disc.	Fully open valve to remove object.

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.

Disclaimer

Metric fasteners should not be used with ASME Class 150/300 bolt holes and flange bolt patterns. If you use metric fasteners with ASME Class 150/300 bolt holes and flange bolt patterns, it may lead to product failure, injury, and loss of life. DeZURIK Inc. disclaims all liability associated with the use of metric fasteners with ASME Class 150/300 bolt holes and flange patterns, including but not limited to personal injury, loss of life, loss of product, production time, equipment, property damage, lost profits, consequential damages of any kind and environment damage and/or cleanup. Use of metric fasteners with ASME Class 150/300 bolt holes and flange bolt patterns is a misuse that voids all warranties and contractual assurances. If you use metric fasteners with ASME Class 150/300 bolt holes and flange bolt patterns, you do so at your sole risk and any liability associated with such use shall not be the responsibility of DeZURIK, Inc. In addition to the foregoing, DeZURIK’s Manufacturer’s Conditions apply.

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 INTERUPTION, COST OF SUBSTITUTE PRODUCTS, LOSS OF TIME, LOSS OF PROFITS OR REVENUE, COST OF CAPTIAL, 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:

Web site: www.dezurik.com E-Mail: info@dezurik.com

250 Riverside Ave. N., Sartell, MN 56377 ● Phone: 320-259-2000 ● Fax: 320-259-2227

December 2022