

APCO SRA-3000A SURGE RELIEF ANGLE VALVES



Instruction **D12037**
July 2020

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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APCO SRA-3000A Surge Relief Angle Valves

Description

The APCO SRA-3000A Angle Surge Relief Valve is designed to protect pipelines against excessive overpressures. It is basically a spring loaded “pop-off” type valve which will open quickly when system pressure exceeds setting of spring(s) and will close slowly at an adjustable rate when system pressure returns to normal.

The APCO SRA-3000A Angle Surge Relief Valve is held closed against normal line pressure by means of the externally mounted spring(s), which is preset at the factory to open at the relief pressure setting specified by the customer.

The APCO SRA-3000A Angle Surge Relief Valve is also provided with a Flow Control Valve (refer to Figure 2, A35) to control the rate of closure of the valve. The rate of closure may be adjusted in the field to suit the particular hydraulic conditions of the system.

Handling and Storage

Lifting the valve improperly may damage it. Do not fasten lifting devices through the inlet or discharge openings of the body. Lift the valve with slings, chains or cables fastened around the valve body or cover, or fastened to bolts or rods through bolt holes in the flanges. Use a sling, cable or chain around the spring compression pipe assembly only as a secondary means of balancing or steadying the valve. Do not lift the full weight of the valve solely by the spring compression pipe assembly.

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

- The SRA-3000A Angle Surge Relief Valve may be installed in any position. The discharge can be piped back to the wet well or to the atmosphere.
- 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.
- Tighten the flange bolts or studs in a crisscross pattern in a minimum of four stages.

Fusion/Powder Coated Valves



CAUTION!

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

Maintenance

Through the course of operation, the assembly must be checked for leaks. The valve should be examined for leaks at the vent hole in the cover (A02), which is an unthreaded hole drilled on an angle into the cover. This creates a vented air gap inside the cover, insuring that there is always atmospheric air between the hydraulic oil in the cover's integral cylinder chamber and the media inside the valve body. This is accomplished via a drilled hole through the side of the lower shaft bushing (A04). A relief on the lower shaft between the two lower shaft o-rings (A26) is connected via the hole in the lower shaft bushing to a relieved portion of the lower shaft bushing, located between the two bushing o-rings (A25), which lines up with the aforementioned vent hole in the cover. If hydraulic oil and/or piping system media is detected at the vent hole, then there is a problem with the corresponding o-ring seals (A25) and/or lower shaft o-ring (A26). The cover also features four radially-oriented, cast-in window slots immediately beneath the lower flange of the spring compression pipe assembly (A23). Looking into these slots with a flashlight should provide visual indication of any leakage from the upper shaft o-ring (A27). Lastly, any sign of pipeline media leakage between the body (A01) and the cover, would be indicative of a faulty cover o-ring (A03).

The oil level in the cover (A02) should always be up to the oil fill pipe plug (A49). (recommended oil listed below) Depending on valve orientation (except if the valve is installed with its inlet flange facing upward) at least one of the oil fill pipe plugs or the flow control valve (A35) should be adequately positioned to top off the oil in the cover's integral cylinder chamber.

The SRA-3000A Surge Relief Angle Valve is also provided with an inspection hole pipe plug (A29) located on the back side of the valve body for draining purposes or for checking for any leaks past the valve seat. Depending on the valve orientation, it may be necessary to open the drain plug from time to time to drain any water that might have accumulated.

Recommended Oil: Mobil DTE 24, Castrol Hyspin AWS 32 or equal.



WARNING!

Servicing the Surge Relief Valve while the pipeline is under pressure can cause personal injury or equipment damage. Relieve pipeline pressure or shut off isolation valve before servicing the Surge Relief Valve.

Replacement part instructions

See Figure 3 for part identification.

Follow instruction sets 1, 1A and 1B to replace these parts:

Cover o-ring (A03)

Body seat o-ring (A33)

Disc seat (A06)

Follow instruction set 2 to replace these parts:

Piston seal (A08)

Bushing o-ring (A25)

Rod wiper (A28)

Piston seal energizing o-ring (A09)

Lower shaft o-ring (A26)

Upper shaft o-ring (A27)

Cylinder chamber cap o-ring (A14)

Reassembly: Instruction sets 3 and 4.

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APCO SRA-3000A Surge Relief Angle Valves

Maintenance *(continued)*

1. Separation of spring compression pipe assembly, cover assembly, and body assembly:

- A. Remove inspection hole pipe plug (A29) and drain any standing water. Depending on valve orientation and piping arrangement, additional factors related to the draining of inlet and/or outlet piping may be required.
- B. Remove the mechanical counter's (A42) lever and tie a length of string to the lever to allow for retrieval of the mechanical counter wire (A45) wire during reassembly. Tighten the screw in the mechanical counter's lever so it doesn't get lost. Length of string should be at least 6" inches longer than the length of the (long) pipe assembly upper screws (A21).
- C. Mark height of anti-rotation set screw (A19) along slot in spring compression pipe assembly (A23).



WARNING!

To de-energize the valve spring compression before disassembly of the Surge Relief Valve, prior to the loosening of the pipe assembly upper screws, steps D, E & F must be followed in order. This will de-energize the spring compression applied by the spring compressor and spring compression guide. Without first de-energizing the additional compression imposed by the spring compressor, the pipe assembly upper screws are not long enough to completely de-energize the full compression of the spring. Premature loosening and removal of the pipe assembly upper screws can cause serious personal injury or equipment damage. If the spring compressor fails to turn for any reason, STOP, do not apply excess force to break threads loose. Contact DeZurik.

- D. Loosen lock nut (A38).
- E. Loosen spring compressor (A22), by turning in the clockwise direction, until anti-rotation set screw (A19) reaches the top of its slot in the spring compression pipe assembly (A23). *Note that for two largest spring compression pipe assemblies (those with flange diameters of 17.50" or 21.00"), the loosening and tightening torque for the spring compressor (A22) may be quite high (ranging as high as 1430 ft-lbs for a 16" valve with a relief pressure setting of 200 psi.) For this reason, a torque wrench with a long handle or a hydraulic torque wrench may be the best tool to use in such cases.*
- F. Remove anti-rotation set screw (A19). Keep turning spring compressor (A22) in clockwise direction until spring compression guide comes in contact with pinned heavy hex nut (or threaded stop collar) on spring compressor. This insures that spring compression will be fully de-energized after next step is complete.
- G. Loosen pipe assembly upper screws (A21) evenly to de-energize remaining spring compression. Verify all of the spring compression is de-energized before unthreading pipe assembly upper screws from spring compression pipe assembly (A23) completely.

Maintenance *(continued)*

- H. Carefully remove spring compression top flange (A17) with assembled spring compression guide (A18), spring compressor (A22), and mechanical counter (A42) from the spring compression pipe assembly (A23). **NOTE: For any reason the parts mentioned in this step need to be replaced or repaired due to damage or wear, contact DeZURIK directly.**
- I. Remove compression spring(s) (A24).
- J. Loosen and remove pipe assembly lower screws (A20), separating spring compression pipe assembly (A23) from cover (A02).
- K. Remove screws (A34) and uninstall cover (A02) from body (A01). The cover o-ring (A03) may now be examined and replaced as needed.

1A. Replacement of disc seat (as necessary)

- A. Loosen and remove disc seat retaining screws (A32). *Note that the disc seat (A06) on valve sizes 2" and 3" is retained by a single central retaining screw. The 2" valve size uses a single washer as a disc seat retaining ring, while the 3" valve size uses a stack of two washers for this purpose.*
- B. Remove disc seat retaining ring (A31).
- C. Disc seat (A06) may be removed, examined and replaced as necessary.
- D. To reinstall disc seat (A06), place disc seat back on disc (A10), and disc seat retaining ring (A31) back on disc seat. Line up the screw holes in all parts.
- E. Install the disc seat retaining screws (A32). For valve sizes 2" and 3" use Loctite 263 High-Strength Threadlocker on the screw.
- F. Tighten the screws until the outside diameter of the disc seat (A06) is tight against the mating register on the disc (A10). Tightening torque should be approximately 30-50 in-lbs, but may be slightly more for valve sizes 2" and 3".

1B. Replacement of body seat (as necessary)

- A. Loosen and remove body seat retaining screws (A30).
- B. Temporarily thread in four hex head cap screws into the holes in the body seat (A05) from which the body seat retaining screws (A30) were removed. The screws should be installed to depth of just less than the thickness of the body seat. The thread size is 1/4"-20 for 2-4" valve sizes and 3/8"-16 for 6-16" valve sizes.
- C. As evenly as possible, tap on the heads of the screws to uninstall the body seat (A05) from the body (A01). Afterwards, remove the temporary screws.
- D. Body seat o-ring (A33) may be removed, examined, and replaced as necessary.
- E. Install body seat o-ring (A33) into groove on body seat (A05), lubricating o-ring with a light coat of Dow Corning 111 or other suitable lubricant.

Maintenance *(continued)*

- F. Carefully slide the body seat (A05) all the way into its counterbore on the body (A01). Even tapping on the seat may be required. This should be done with a non-marring hammer or by using a block of wood against the seat. Take care not to damage the body seat o-ring (A33) during installation.
- G. Put a bead of Loctite 263 High-Strength Threadlocker on the seat retaining screws (A30), and install them tightly into their holes on the body seat (A05) using a hex key.

2. Disassembly of cover assembly:

- A. Remove flow control valve (A35) from side of cover (A02). Drain oil from valve. To remove the flow control valve, its adjustment knob and lock knob will need to first be removed by loosening the set screw in the adjustment knob, and unthreading the lock knob.
- B. Slide spring pressure plate guide (A16) off of upper shaft (A12) past mechanical counter hook (A44).
- C. Slide upper shaft (A12) up and out from cylinder chamber cap (A13).
- D. Loosen and remove cylinder chamber cap screws (A15). Match-mark the cylinder chamber cap (A13) to the cover (A02) so that the cap can easily aligned to the same position during reinstallation.
- E. Remove cylinder chamber cap (A13), upper shaft o-ring (A27) and cylinder chamber cap o-ring (A14). O-rings may be removed from cylinder chamber cap, examined and replaced as necessary.
- F. Loosen and remove piston assembly screw (A41) while preventing lower shaft (A11) from rotating with its wrench flats, which are located just above its connection to the disc (A10).
- G. Remove the piston assembly {piston (A07), piston seal (A08) and piston seal energizing o-ring (A09)} from cover (A02). The thru hole in the piston is internally threaded to facilitate removal and reinstallation. The threads size is: 1/2"-20 for 2-4" valve sizes; 3/4"-10 for 6" valve size; 1-1/8"-12 for 8-10" valve sizes; and 1-3/4"-5 for 12-16" valve sizes. Seal may be examined, and replaced if necessary. *Note, that removing the seal from the piston will likely damage it beyond usefulness. Therefore it should only be removed from the piston if needs to be replaced. The o-ring can only be examined and replaced if the seal is removed.*
- H. Using a flathead screwdriver, expand lower shaft retaining ring (A39) and lift above its groove, sliding it up and off lower shaft (A11). *Note that the lower shaft should only be removed from the cover (A02) to examine and possibly replace the lower shaft bushing (A04), the bushing o-rings (A25), the lower shaft o-rings (A26) or the rod wiper (A28). This is because the rod wiper will tend to interfere with the o-ring grooves and retaining ring groove on the lower shaft if an attempt is made to reinstall the lower shaft from the bottom. Thus, if removed, the lower shaft should be reinstalled from the top, meaning that it must first be unthreaded from the disc (A10).*
- I. Remove lower shaft (A11) from cover (A02). Lower shaft o-rings (A26) may now be examined and replaced as necessary. Rod wiper (A28) may also now be examined, removed from the cover, and replaced as necessary.
- J. Using a flathead screwdriver, pry bushing retaining ring (A40) inward and remove from cover (A02).

Maintenance *(continued)*

- K. Remove lower shaft bushing (A04) from cover (A02). Bushing o-rings (A25) may now be removed and examined and replaced as necessary.

3. Reassembly of cover assembly:

- A. Install bushing o-rings (A25) into their grooves in cover (A02). Lubricate o-rings with light coating of Dow-Corning 111 or other suitable lubricant.
- B. Install lower shaft bushing (A04) into cover (A02), taking care to make sure the end with the chamfer on the outside diameter is the end inserted into the bore.
- C. Install bushing retaining ring (A40) into its groove, making sure that it is in the groove in all locations around the circumference.
- D. Install rod wiper (A28) into its groove in cover (A02). The rod wiper's lip should face downward. It will not fit into the groove properly if installed upside down.
- E. Unthread lower shaft (A11) from disc (A10) by using the wrench flats on the lower shaft. Use a wire brush to clean dried Loctite thread-locker compound from the threads on both parts.
- F. Stretch lower shaft o-rings (A26) onto lower shaft (A11) and position them into their grooves. Lubricate o-rings with light coating of Dow-Corning 111 or other suitable lubricant.
- G. Install lower shaft (A11) into bore in lower shaft bushing (A04) from the top side. *Note that trying to install lower shaft from the bottom side of the cover (A02) will cause interference with the rod wiper's (A28) lip.*
- H. Run a bead of Loctite 263 High-Strength Threadlocker around the circumference of the external threads on the end of the lower shaft (A11). Then, hold wrench flats on lower shaft (A11) while spinning disc (A10) onto lower shaft. Wipe away any excess Loctite.
- I. Install lower shaft retaining ring (A39) into its groove on the lower shaft (A11), making sure that it is in the groove in all locations around the circumference.
- J. Stand cover (A02) up so that the disc (A10) is on the bottom and the cover's cylinder chamber bore is facing upward.
- K. If piston seal (A08) and piston seal energizing o-ring (A09) were removed from piston (A07), replace them now, snapping the seal into the shallow groove on the outside diameter of the piston.
- L. Fill the bottom of the cylinder chamber with hydraulic oil (see recommended oil on page 5). The level should be approximately an inch below the bottom of the upper flow control valve port.
- M. Install piston (A07) into the cover. If necessary, the internal threads of the piston (mentioned above in step 2.G) may be used to get the piston and its seal started into the bore. Once started, slide the piston down by hand allowing air to escape through the center hole of the piston. Eventually oil will flow through this hole. Seat the piston down onto the top of the lower shaft (A11).

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Maintenance *(continued)*

- N. Install the piston assembly screw (A41) while preventing lower shaft (A11) from rotating with its wrench flats. Tighten screw according to the following approximate torque ranges:
- | | |
|---------------------|----------------|
| 2-3" valve sizes: | 25-30 ft-lbs |
| 6" valve size: | 48-75 ft-lbs |
| 8-10" valve sizes: | 125-320 ft-lbs |
| 12" valve size: | 250-560 ft-lbs |
| 14-16" valve sizes: | 435-975 ft-lbs |
- O. Install the flow control valve (A35) into the cover (A02). Then, temporarily install upper shaft (A12) into counterbore on piston (A07). Fill cylinder chamber with oil up to a level about $\frac{1}{2}$ " below the top of the cylinder chamber bore. Remove the upper shaft.
- P. Install cylinder chamber cap o-ring (A14) and upper shaft o-ring (A27) into their grooves on cylinder chamber cap (A13). Lubricate o-rings with light coating of Dow-Corning 111 or other suitable lubricant. Install upper shaft into cylinder chamber cap from the top side so that the chamfered edge is the first to contact the upper shaft o-ring. Install shaft until the shoulder on the top end is flush with the top of the cylinder chamber cap.
- Q. Install the end of the upper shaft (A12) into counterbore on piston (A07). Then, slide cylinder chamber cap down upper shaft until the cylinder chamber cap o-ring (A14) begins to enter the chamfer on the top of the cover's (A02) cylinder chamber.
- R. Spin the cylinder chamber cap (A13) until the match-mark from step 2.D above lines up, and its holes line up with their corresponding holes on the cover (A02).
- S. Install the cylinder chamber cap screws (A15) and tighten. This may cause the upper shaft (A12) to eject slightly.
- T. Tip the cover assembly over on its side with the flow control valve (A35) facing upward. Uninstall the flow control valve and ensure that the upper shaft (A12) is firmly installed into the piston (A07). Top off the oil in the flow control valve port, which will fill the chamber on both sides of the piston. When topping off, leave room for the flow control valve's threads to prevent spilling oil during reinstallation of the flow control valve. Reinstall the flow control valve. Manually cycle the disc back and forth several times. Then, remove the flow control valve again and recheck the oil level. If it hasn't changed reinstall the flow control valve, otherwise top off the oil, look for any signs of leakage, and repeat this procedure until the oil level does not change.

4. Combination of spring compression pipe assembly, cover assembly, and body assembly:

- A. Install inspection hole pipe plug (A29) into port in body (A01) using PTFE pipe thread compound or tape.

Maintenance *(continued)*

- B. Install cover o-ring (A03) into groove on body. Install cover into its register on body, and hand tighten cover screws (A34). Tighten cover screws gradually in a cross-over pattern, using several stages to arrive at final approximate torque:

2" valve size:	30 ft-lbs
3", 4" and 6" valve sizes:	127 ft-lbs
8" and 10" valve sizes:	204 ft-lbs
12", 14" and 16" valve sizes:	306 ft-lbs

These torque values are acceptable for valves with the optional 316 stainless steel bolting. For the standard zinc-plated alloy steel screws, the tabulated tightening torques are also acceptable, but they also range as high as double these tabulated values without overstressing the screws.

- C. Install spring pressure plate guide (A16) onto upper shaft (A12), over mechanical counter hook (A44).
- D. Install spring compression pipe assembly (A23) onto cover (A02), aligning the slot in the pipe assembly with the flow control valve. Install pipe assembly lower screws (A20), and tighten them in a cross-over pattern to the following approximate torque, as tabulated by pipe assembly flange outside diameter:

9.00", 10.38" or 21.00" flange diameter	71 ft-lbs
13.38" or 17.50" flange diameter	127 ft-lbs

These torque values are acceptable for valves with the optional 316 stainless steel bolting. For the standard zinc-plated alloy steel screws, the tabulated tightening torques are also acceptable, but they also range as high as double these tabulated values without overstressing the screws.

- E. Install the compression spring(s) (A24) into the spring compression pipe assembly (A23), aligning them down onto the spring pressure plate guide (A16) and fishing the mechanical counter wire (A45) and its string through the center of the spring(s)
- F. Place the spring compression top flange (A17) with assembled spring compression guide (A18), spring compressor (A22), and mechanical counter (A42) atop the spring(s) (A24), directly above the top flange of the spring compression pipe assembly (A23). Fish the string on the end of the mechanical counter wire (A45) up through the hole in the spring compression guide and then the hole in the spring compression top flange. Make sure that these holes are aligned and that the hole for the anti-rotation set screw (A19) is in line with the slot on the spring compression pipe assembly (A23).
- G. Install and evenly tighten the pipe assembly upper screws (A21) to provide the initial spring compression. Keep string slack tight on the end of mechanical counter wire. Once the spring compression top flange (A17) comes in contact with the top flange of the spring compression pipe assembly (A23), tighten the screws in accordance with the torque in step 4.D above.
- H. Install and tighten anti-rotation set screw (A19). If threaded hole in spring compression guide (A18) is not visible, turning counterclockwise on the spring compressor (A22) may be necessary to bring threaded hole into view through slot in spring compression pipe assembly (A23). Insure spring compression guide is not rotating when turning on spring compressor.

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Maintenance *(continued)*

- I. Temporarily remove the mechanical counter (A42) from the spring compression top flange (A17) by loosening and removing the mechanical counter mounting screws (A43). Carefully remove the length of string from the mechanical counter's lever and slide the lever onto the mechanical counter's shaft. Position the mechanical counter and lever so that the lever is at roughly the one o'clock position on the shaft (when looking at the end of the shaft with the mechanical counter's mounting surface at six o'clock). Tighten the screw to lock the lever onto the mechanical counter's shaft. Reinstall the mechanical counter onto the spring compression top flange (A17) with the mounting screws. In doing so, the counter should activate to register a "half count". Reset the counter.
- J. Tighten the spring compressor (A22) by turning in the counterclockwise direction, until anti-rotation set screw (A19) reaches the mark along the slot in the spring compression pipe assembly (A23) made in step 1.C.
- K. Tighten lock nut (A38).

Operation

The Surge Relief Angle Valve (SRA) is held normally closed by a compression spring(s) (A24). When the system pressure rises above the relief pressure setting of the springs(s), the disc (A10) moves quickly to the open position, raising the piston (A07) inside the integral oil cylinder of the cover (A02). This allows hydraulic oil from the top of the piston to flow freely through the flow control valve (A35) to the bottom of the piston.

As the system pressure subsides below the relief pressure setting, the surge relief valves closes at a slow adjustable rate. The spring(s) moves the disc toward the seated position as oil is metered from the bottom of the piston to the top of the piston by the adjustable flow control valve.

Start-up Procedure



WARNING!

These valves may open or close 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. Turn Flow Control Valve (A35) one complete turn counterclockwise from fully closed position. See "Adjustment of Flow Control Valve".
2. Start pump.
3. Check for leaks on the valve body seat (A05) by removing the inspection hole pipe plug (A29) from the back of the valve body (A01). If leak exists, loosen lock nut (A38), tighten spring compressor (A22) until leak stops, and then tightened lock nut (A38).

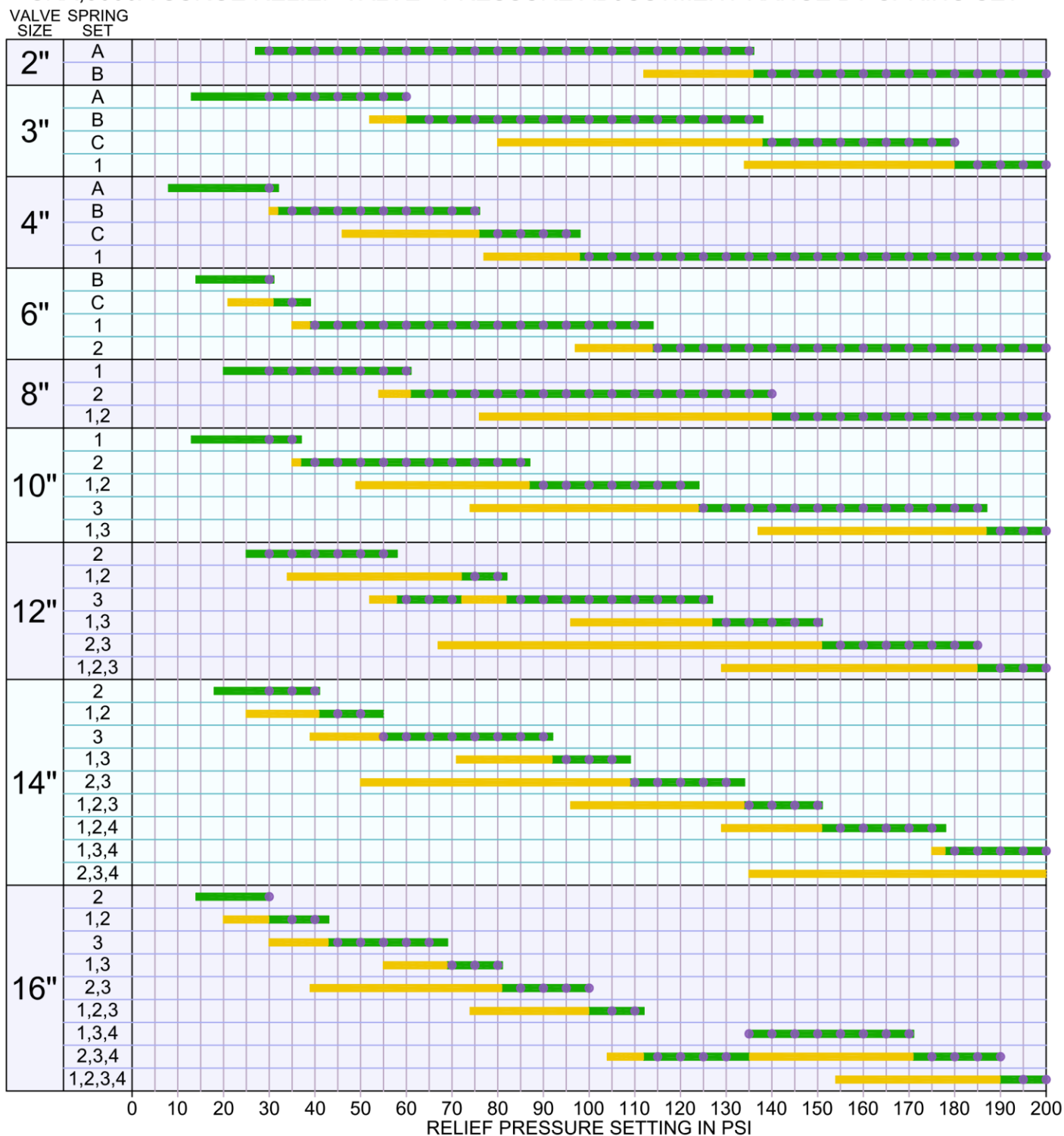
Spring Adjustment

Spring is adjusted at factory for specified pressure relief setting. To increase relief pressure setting, first loosen lock nut (A38). Then tighten spring compressor (A22) in the counterclockwise direction one full turn at a time. To decrease relief pressure setting, first loosen lock nut (A38). Then loosen spring compressor by turning in the clockwise direction. *Note that for two largest spring compression pipe assemblies (those with flange diameters of 17.50" or 21.00"), the loosening and tightening torque for the spring compressor (A22) may be quite high (ranging as high as 1430 ft-lbs for a 16" valve with a relief pressure setting of 200 psi). For this reason a torque wrench with a long handle or a hydraulic torque wrench may be the best tool to use in such cases, especially if substantial adjustment is required.* After the spring is adjusted to the desired setting, tighten lock nut (A38).

Before adjusting the spring(s) refer to the Spring Adjustment Ranges on the next page. Determine from the valve's data plate, what the factory-set relief pressure setting is, and find the corresponding dot in the graph to determine which spring set is used in the valve. The valve may be adjusted to a relief pressure setting anywhere in the yellow or green bands identified for the particular combination of valve size and spring set. If adjustment is required beyond the bounds of these bands, determine which spring set is needed and consult the factory for further direction.

Spring Adjustment Ranges

SRA,3000A SURGE RELIEF VALVE - PRESSURE ADJUSTMENT RANGE BY SPRING SET



Oil Filling Procedure

Periodically the oil in the valve may need to be topped off. Hydraulic oil can be topped off without removing the valve from the pipeline, regardless of the installed orientation of the valve. This should be done in accordance with the procedure that follows. If however, the oil is leaking a significant amount, or if there is oil detected in the vent hole as described in the beginning of the “Maintenance” section, then any leaking seals should be examined and replaced by following the disassembly replacement part procedures provided in the “Maintenance” section.

1. Shut down and lock-out the pump
2. Determine which port will be used to top off the cover's (A02) integral cylinder chamber. If the valve is installed with its inlet horizontal, this may be one of the oil fill pipe plugs (A49) or the port for the flow control valve (A35), whichever is pointing upward. If valve is installed with its inlet vertical (with flow entering upward into the valve), then the oil fill pipe plug directly opposite the flow control valve should be used.
3. Loosen and remove the oil fill pipe plug (A49) or flow control valve (A35) identified in step 2. (If the flow control valve is to be removed its adjustment knob and lock knob will need to be removed by loosening the set screw in the adjustment knob and unthreading the lock knob)
4. Top off the hydraulic oil (see recommended oil on page 5).
5. Reinstall the oil fill pipe plug (A49) or flow control valve (A35). If it was an oil fill pipe plug, apply PTFE pipe thread compound to the threads before reinstalling.

Adjustment of Flow Control Valve

The Flow Control Valve (A35) as shown in Figure 2 has a micrometer type adjustment designed to provide variable flow restriction in one direction with free flow in the opposite direction.

A lock knob (A35-1) is provided on the Flow Control Valve (A35) for locking the valve setting. Turning the adjustment knob (A35-2) clockwise closes the flow control valve further and increases the closure time of the SRA-3000A Surge Relief Angle Valve; likewise turning counterclockwise opens the flow control valve and decreases the closure time of the SRA-3000A Angle Surge Relief Valve.

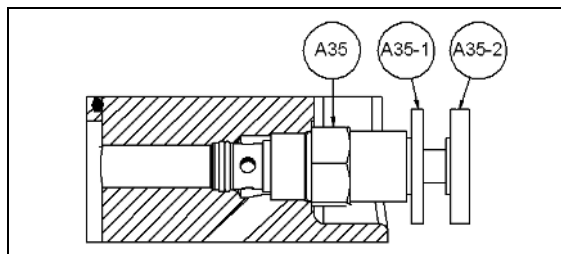


Figure 2: Flow Control Valve

DeZURIK

APCO SRA-3000A Surge Relief Angle Valves

Drawing

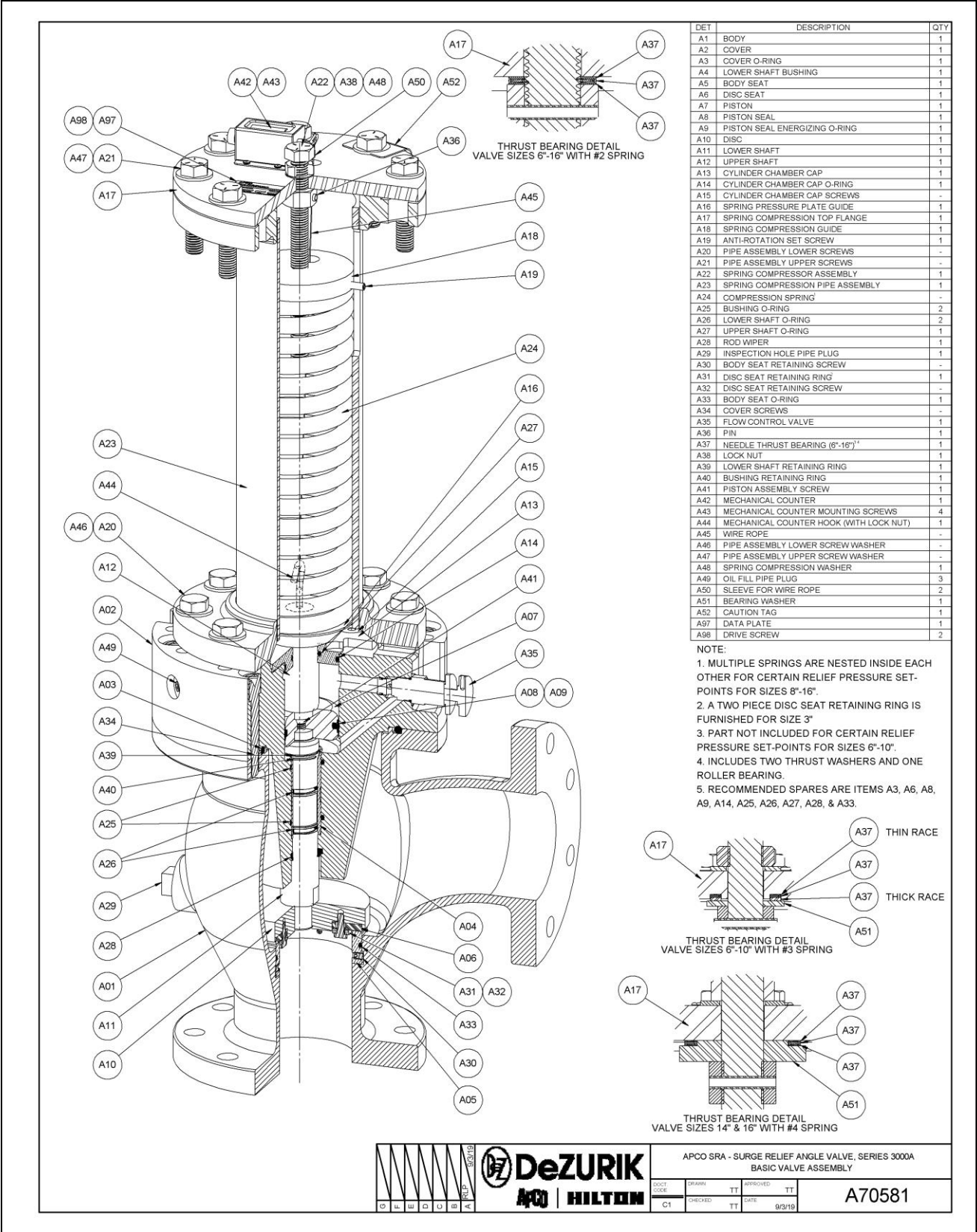


Figure 3: SRA-3000A Surge Relief Angle Valves

Troubleshooting

Condition	Possible Cause	Corrective Action
Valve leaks excessively from one side of the disc to the other.	Foreign matter caught between disc and seat.	Clean disc and seat.
	Disc seat, body seat, or body seat o-ring is worn or damaged.	Replace disc seat, body seat, or body seat o-ring
	Spring force is insufficient.	Adjust spring accordingly.
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 faces or improper flange connections.	Repair flange, replace valve body or adjust flange connections.
Valve leaks at cover flange	Damage to cover o-ring.	Replace cover o-ring.
Water/media leak at vent hole in cover	Damage to bushing o-ring (lower) or the lower shaft o-ring (lower).	Examine and replace damaged o-rings.
Hydraulic oil leak at vent hole in cover	Damage to bushing o-ring (upper) or the lower shaft o-ring (upper).	Examine and replace damaged o-rings.
Hydraulic oil leak visible in the cast-in "windows" of the cover	Damage to cylinder chamber cap o-ring or upper shaft o-ring.	Examine and replace damaged o-rings.

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