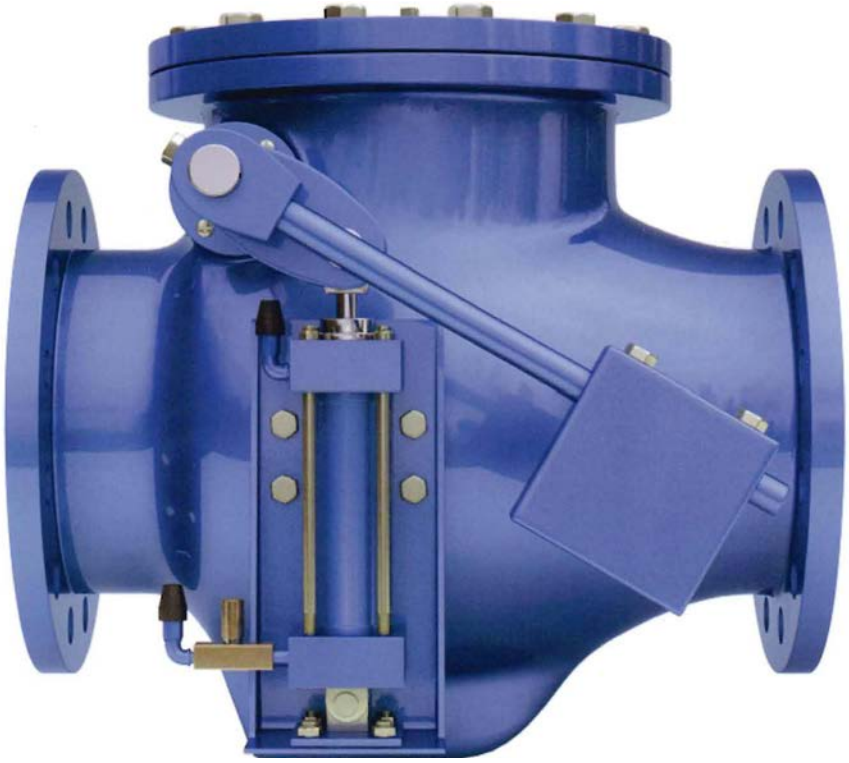
DeZURIK

APCO CVS-6000
SWING CHECK VALVES



Instruction D12006
December 2012

DeZURIK | APCO | HILTON | WILLAMETTE

Instructions

These instructions provide installation, operation and maintenance information for APCO CVS-6000 Swing Check Valves. They are for use by personnel who are responsible for installation, operation and maintenance of APCO CVS-6000 Swing Check Valves.

Safety Messages

All safety messages in the instructions are flagged with an exclamation symbol and the word Caution, Warning or Danger. These messages indicate procedures that must be followed exactly to avoid equipment damage, personal injury or death. Safety label(s) on the product indicate hazards that can cause equipment damage, personal injury or death.

Safety label(s) on the product indicate hazards that can cause equipment damage, personal 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 APCO CVS-6000 Swing Check Valve has been packaged to provide protection during shipment; however, it 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

Recommended spare parts are listed on the assembly drawing. These parts should be stocked to minimize downtime. Order parts from your local DeZURIK sales representative, or directly from DeZURIK. When ordering parts please choose from the following:

If the valve has a DeZURIK APCO nameplate please include the 7-digit part number and 4-digit revision number (example: 9999999R000) located on the data plate 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 nameplate visible on the valve, please include Valve Model number, the part name, and item number from the assembly drawing. You may contact your local DeZURIK APCO 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 www.dezurik.com.

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Description

A swing check valve consists of a valve body, a bonnet, and a disk that is connected to a hinge. The disk swings away from the valve-seat to allow flow in the forward direction, and returns to valve-seat when upstream flow is stopped, to prevent backflow.

The CVS-6000 valve is equipped with a weighted counterweight arm and Air Cushion Cylinder, the CVS-6000B valve is equipped with a weighted counterweight arm and Oil Control Bottom Buffer and the Series 6100 valve is equipped with a weighted counterweight arm and Oil Cushion Cylinder to assist with closing 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

- The APCO CVS-6000 Swing Check Valves may be installed in a horizontal or vertical position (with the flow upward). In either case, the Counterweight Arm (44) should be set 25°-30° below the horizontal line. Unless otherwise specified, the valves are shipped for horizontal installation.
- On the Series CVS-6000B and CVS-6100 valves, the Oil Reservoir (58) and on the Series 6000B valve, the Hydro-pneumatic Accumulator (73) must be mounted vertically regardless of the valve installation position.
- 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

CVS-6000 and CVS-6100 Valves

A periodic (approximately 6 months) lubrication of the cylinder lever pin and eye bracket pin to keep the valve in good operating condition. For the CVS-6000 Air Cushion Cylinder, a few drops of oil should be applied to the top and bottom ports of the cylinder by removing the breather caps. Recommended lubricants: SAE 10W/20, WD 40.

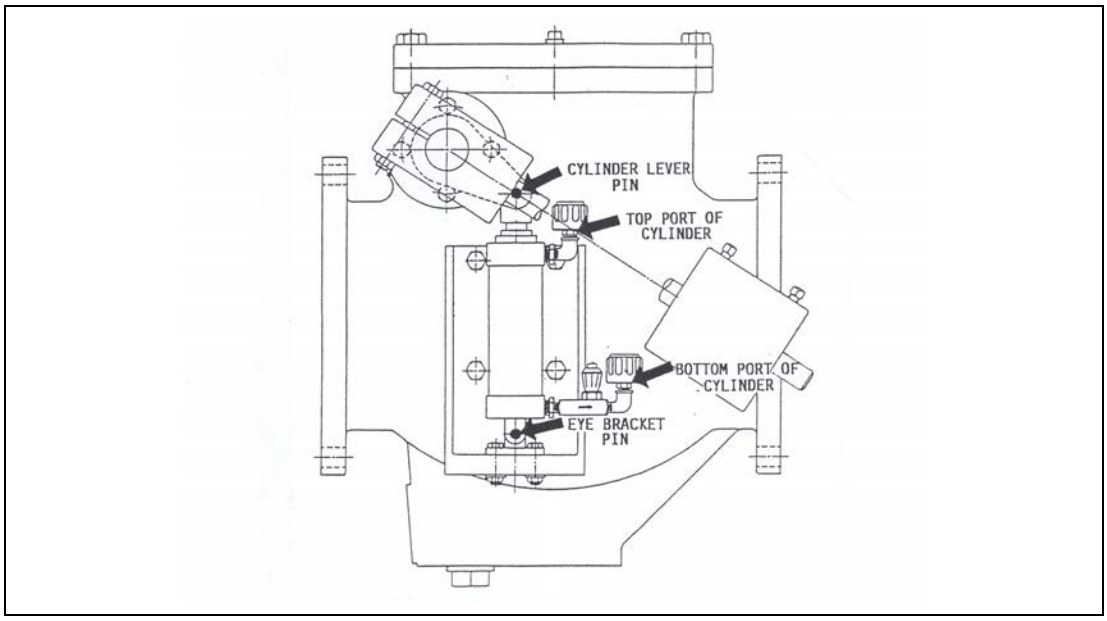


Figure 1 – Lubrication of Cylinder

Series CVS-6000B Valves

A periodic (approximately 6 months) lubrication of the exposed area of buffer rod is required to keep the valve in good operating condition.

Through the course of normal operation, the Hydro-pneumatic Accumulator (73) must be checked for loss of pressure. It is normal for the Gage (58) to indicate a decrease in pressure when the valve opens due to the transfer of oil from the accumulator to the cylinder.

Special care should be taken to the exposed area of the buffer rod if repainting the valve is required. It should be fully masked to prevent even a small amount of paint to get on the buffer rod, which could damage the cylinder rod seal and cause the cylinder to leak.

Disassembly

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. **Series 6000 and 6100 valves only:** 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).

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).

Maintenance *(Continued)*

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. **Series 6000 and 6100 valves only:** Insert cushion lever key (34) on the pivot shaft (13) and position cushion lever (27) in line with cylinder (20) and tighten set screw (35).
16. **Series 6000 and 6100 valves only:** 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).

Disc Seat Replacement

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. 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

The flow from the pump opens the Disc (10) and raises the Counterweight Arm (44). When the pump is shut off, backflow pressure pushes the Disc (10) to close against the Body Seat Ring (5). As the disc is closing, the cushion cylinder is pushed downward controlling the closing speed of the valve and can be adjusted to suit the best performance for the installation.

CVS-6000 Valves

The side mounted pneumatic dashpot has two adjustable controlling stages. The primary control is the Flow Control Valve (30). The second control is the internal cushion adjustment and is located in the cylinder and provides additional control over the last 10% of disc travel.

CVS-6000B Valves

Bottom Mounted Dashpots are used when a free open and a partial control of the disc movement during the closing cycle is required. This unique arrangement allows the valve disc to close freely for 90% of its stroke. The disc then comes in contact with the buffer plunger, which controls the speed of closing over the last 10% of disc travel. This type of control enables the adjustment to suit the best performance for the installation.

The bottom mounted dashpot unit has two (2) controlling stages. The primary control is the Flow Control Valve (C1), which is located in the external piping at the cap end of the cylinder. The secondary control is located in the head of the cylinder itself, which is the internal cushion adjustment, which provides additional control over the last 5% of disc closing movement.

The oil operated dashpot cylinder (20) incorporates the use of a Hydro-pneumatic accumulator (50), a device that activates and pushes the Buffer Rod (84) into the valve body. The dashpot cylinder is self-contained and uses oil as a controlling media, creating a completely closed system which eliminates problems of corrosion, electrolysis and mineral deposits typically present in water operated dashpots.

CVS-6100 Valves

The side mounted oil dashpot has three adjustable controlling stages. The primary control is the Timing Valve (45). The secondary control is the Flow Control Valve (30). The third control is the internal cushion adjustment and is located in the cylinder and provides additional control over the last 10% of disc travel.

The dashpot cylinder is self-contained and uses oil as a controlling media, creating a completely closed system which eliminates problems of corrosion, electrolysis and mineral deposits typically present in water operated dashpots.

Start-up Procedure (CVS-6000 Valves)

1. Set outside lever arm 25°-30° below horizontal (not to interfere with cylinder).
2. Throttle down mainline valve on discharge side of the Swing Check Valve to approximately 1/3 open to prevent severe slamming during initial pump shutdown testing.
3. Position Counterweight (29) midway on the lever and lock in place.
4. Open flow control valve (30) two complete turns counter-clockwise from fully closed position. See “ADJUSTMENT OF FLOW CONTROL VALVE”.
5. Turn cushion adjustment screw one complete turn counter-clockwise from fully closed position. See “OPERATION OF INTERNAL CUSHION”.
6. Start and stop pump and observe rate of closing.

Start-up Procedure (CVS-6000 Valves) *(Continued)*

Speed Control Adjustment

- Increase cushioning - Turn adjusting screw of Needle Valve clockwise.
- Decrease cushioning - Turn adjusting screw of Needle Valve counterclockwise
- Faster Disc closing - Move Counterweight away from the pivot shaft.
- Slower Disc closing – Move Counterweight towards pivot shaft.

Condition	Adjustment
Check valve slams	Turn adjusting screw of Needle Valve one-half (1/2) turn clockwise. Repeat start and stop. If slam persists, continue turning adjusting screw in ½ turn increments. Be careful not to fully close Needle Valve.
Slam persists	Move weight towards end of lever a couple of inches. Repeat start and stop.
Slam still persists	Continue repeating above steps until satisfactory closing is achieved. Then increase opening main discharge valve to ½ open. Repeat start and stop pump sequence and above steps until main discharge valve is full open.

Note: Testing must be conducted carefully and adjustments small increments to arrive at the optimum where the Swing Check Valve shuts off prior to or at zero reverse flow.

The Series 6000 Swing Check Valve is not a silent closing check valve.

Start-up Procedure (CVS-6000B Valves)

1. Position counterweights (29) midway on the lever.
2. Remove pipe plug on top of oil reservoir (58) and install Air Breather, which is shipped with the valve.
3. Check for proper oil levels. Make sure oil tanks are in vertical position.
    a. Hydro-pneumatic Tank (50): Release air pressure and remove pipe plug on the side of the tank. Oil should be visible in the elbow, which is the oil fill level. Add if necessary. (See "Oil Filling Procedure").
    b. Oil Reservoir (58): The oil level should be checked when the valve is **open**. Oil should be visible in the elbow, which is the oil fill level. Add if necessary. (See “Oil Filling Procedure")
4. Make initial adjustments to the following speed controls;
   Flow Control Valve (C1) = 3 turns open (See "Adjustment of Flow Control Valve")
   Flow Control Valve connected to Oil Reservoir = Full open
   Internal Cushion Needle Valve = 1-1/2 turns open (See "Operation of Internal Cushion").
5. Pressurize Hydro-pneumatic tank to a pressure according to the formula;

   Tank pressure = (Line pressure/4) + 5 psi

   This is the pressure necessary to push and extend the buffer rod into the valve body which will keep it in a position to cushion the closing of the disc when it comes in contact with the buffer rod.

Start-up Procedure (CVS-6000B Valves) *(Continued)*

6. Start pump. While valve is opening, visually verify that Buffer Rod (84) fully extends into the valve body. If not, pressurize Hydro-pneumatic tank until it does. Table A shows the maximum stroke length of the Buffer Rod.

Table A: Maximum Stroke Length of Buffer Rod

Valve Size	10”	12”	14”	16”	18”	20”	24”	30”	36”	42”	48”	54"	60”	66”
Stroke, (inches)	2	2	3	4	5	6	4	5	6	7	6	9	10	11

7. Shut-off pump and observe rate of closing.
8. Using the above trial run as a basis, make necessary adjustments on the internal cushion and Flow Control Valve connected to the hydro-pneumatic accumulator to suit pipeline requirements. Turning the knob clockwise slows down rate of closure of the disc, and turning it counterclockwise increases the speed of closing of the valve.
9. Tighten lock nut or set screw under flow control valve knob when final setting is made to prevent tampering of settings.

Start-up Procedure (CVS-6100 Valves)

1. Position counterweights (29) midway on the lever.
2. Remove pipe plug on top of oil reservoir (58) and install Air Breather, which is shipped with the valve.
3. Check for proper oil levels. Make sure oil tank is in vertical position. The oil level should be checked when the valve is closed. Oil should be visible in the elbow, which is the oil fill level. Add if necessary. (See “Oil Filling Procedure").
4. Open flow control valve (30) three complete turns counter-clockwise from fully closed position. See “ADJUSTMENT OF FLOW CONTROL VALVE”.
5. Turn cushion adjustment screw two complete turn counter-clockwise from fully closed position. “SEE OPERATION OF INTERNAL CUSHION”
6. Set timing valve cam (47) so that arrow on cam is pointing to the center line of the timing valve roller while the disc is in closed position. See “TIMING VALVE OPERATION”.
7. Start and stop pump and observe rate of closing. Throttle down mainline gate valve (furnished by others) on discharge side of the Swing Check Valve to approximately 1/2 open to minimize full column reversal on pump stop.
8. Using the above trial run as a basis, make necessary adjustments to the Timing Valve, Flow Control Valve and the internal cushion of the cylinder to establish smooth three stage closure. During this sequence of pump start and stops, gradually open the mainline gate valve downstream until it is full open.
9. When shut-down sequence is established resulting in a closure of the disc without excessive pressure surge or slam, lock the Flow Control Valve knob and tighten Timing Valve set screws to prevent tampering of settings.

Adjustment of Flow Control Valve

The Flow Control Valve 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.

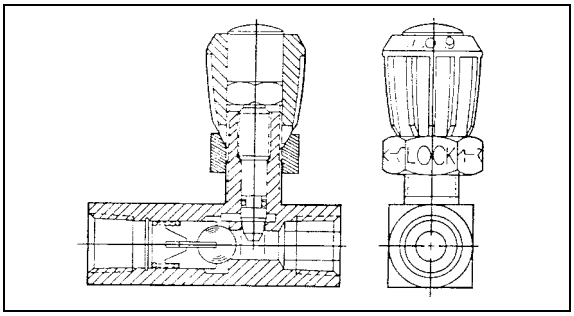


Figure 2 – Flow Control Valve

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 3, 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 4, 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).

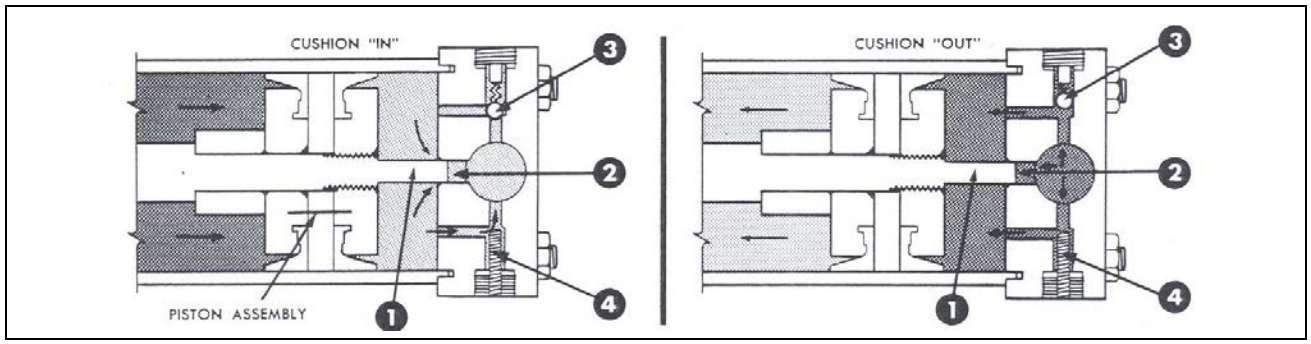


Figure 3 – Cushion "IN" Stroke

Figure 4 – Cushion "OUT" Stroke

Timing Valve Adjustment (Series 6100 Valves)

The Timing Valve is an extremely reliable and convenient means to automatically open or close the oil passage. The built-in roller is activated by the Timing Valve Cam, causing a resultant movement of the Timing Valve stem to open or close the oil passage. The Timing Valve is closed when the roller is fully extended and it is open when the roller is depressed.

The Timing Valve roller when depressed, permits oil to flow directly from the Dashpot Cylinder (20) to the atmospheric Oil Reservoir bypassing the Flow Control Valve (30). The unrestricted flow of oil, allows virtually instant movement of the piston and extremely rapid closure of the Disc (10). The time period of disc closure is achieved by adjusting the contact distance between the Timing Valve cam and the Timing Valve roller.

- Turning the cam **counter-clockwise** will **increase** the length of contact between the cam roller and the cam, permitting the disc to close at a **fast** rate from its full open position.
- Turning the cam **clockwise** will **decrease** the length of contact, permitting the disc to close at a slower rate from its full open position.
- If the cam and cam follower are adjusted so as not to make contact with each other, the secondary control which is the Flow Control Valve will fully control the disc movement from full open to 90% closed.

Figure 5 shows position of cam in relation to cam follower with check valve in closed position. Cam is set to rapidly close from full open to 50% open. Check valve disc opens and turns counterclockwise. The cam which is fastened to the same pivot shaft as disc arm also turns in the same direction.

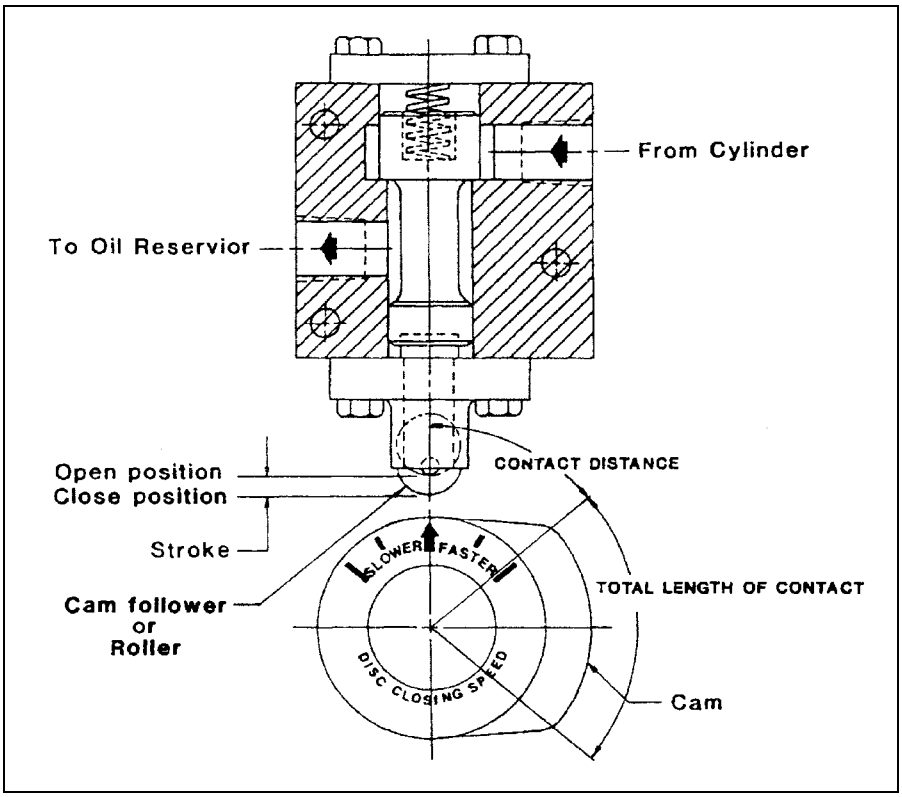


Figure 5 – Timing Valve

Oil Filling Procedure

See Figure 6 for part identification. Recommended Oils: Motor oil SAE 20, Mobil DTE 24, Castrol Hyspin AW 32.

Series 6000B Valves

Step 1: Hydro-pneumatic tank (32)

1. Shut down pump.
2. Release pressure of hydro-pneumatic tank and remove pipe plug located on the side of the tank and also either the Pressure gage (32B) or Air Valve (32A).
3. Fully open Flow Control Valve (41) and slowly fill cylinder with oil until it spills out of the side port. This is the oil fill level.
4. Replace both fittings and pressurize tank according to the formula;

$$\text{Tank pressure} = \frac{\text{Line pressure}}{4} + 5 \text{ psi}$$

5. Set flow control valve three (3) turns counterclockwise from fully closed position.
6. Start pump and observe if buffer rod (33) extends. If not, while valve is still open add more pressure in increments of 5 PSI until rod fully extends.

Step 2: Oil Reservoir (27)

1. Start pump.
2. Fully open Flow Control Valve (41A).
3. Remove side pipe plug and Breather Cap (26) and slowly fill with oil until it spills out of the side port.
4. Replace both fittings.
5. Shut down pump.

NOTE: The Oil Reservoir should always be under atmospheric condition at all times.

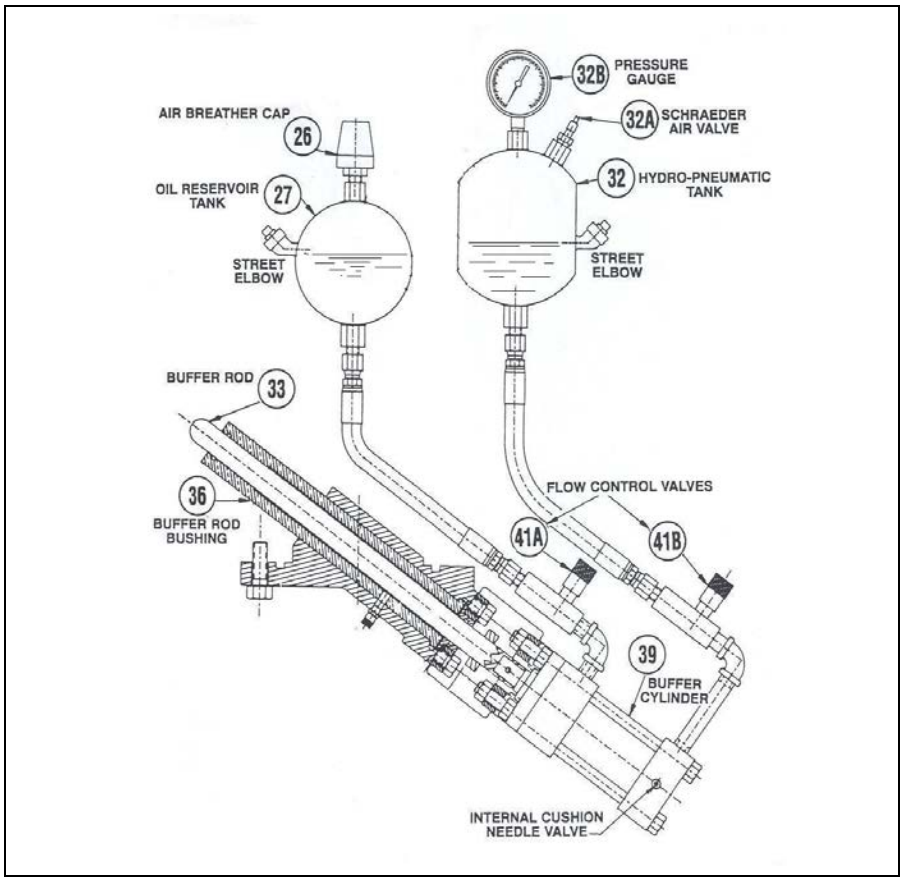
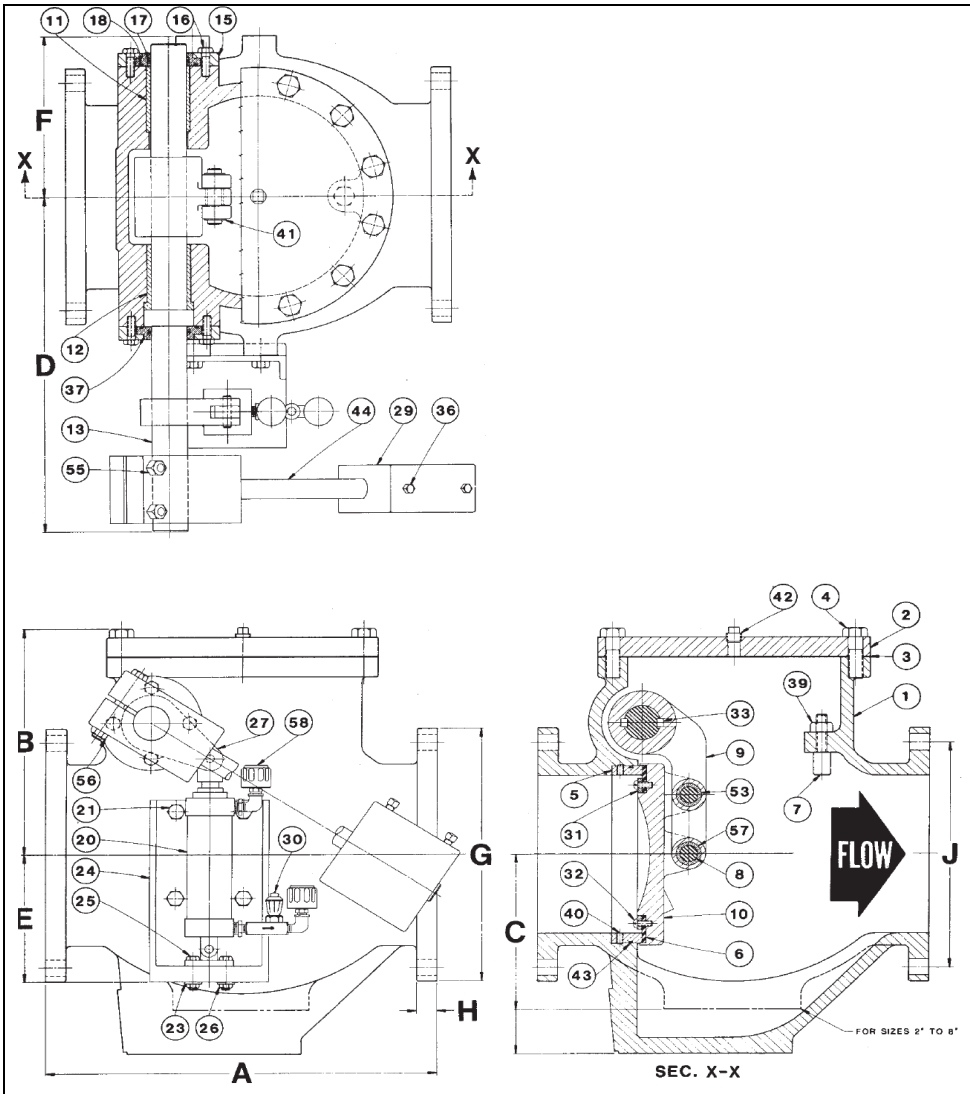


Figure 6 – Bottom Buffer

CVS-6100 Valves

1. Fully close swing check valve.
2. Fully open Flow Control Valve (30). (Make note of setting before turning knob.)
3. Manually lift roller of Timing Valve (45) and hold in that position until step 5.
4. Remove pipe plug in street elbow located on side of Oil Reservoir (58) and slowly fill with oil until oil level is visible in street elbow, then replace pipe plug.
5. Manually open and close swing check valve by lifting Counterweight Arm (44) at least three times to force out any entrapped air in the cylinder(s).
6. Remove pipe plug in street elbow located on side of Oil Reservoir (58) and check oil level. Refill if necessary and repeat step 5 until proper oil level is maintained when the swing check valve is fully closed.
7. Check system for any entrapped air by manually opening the swing check valve by lifting Counterweight Arm (44), then closing the Flow Control Valve while still on the open position. The valve Disc (10) should remain in the open position, otherwise, repeat steps 2 thru 7.
8. Re-set Flow Control Valve to original setting noted in Step 2.

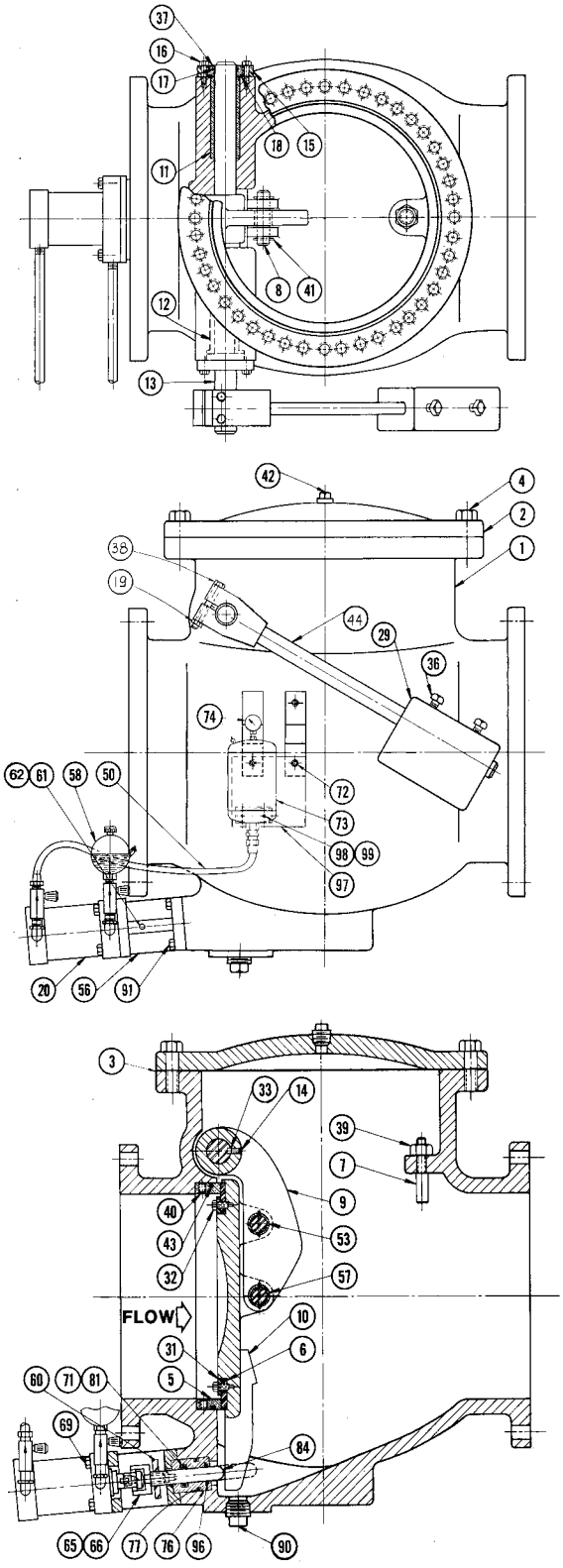
Drawings



No	Description
1	Body
2	Cover
3	Cover Gasket
4	Cover Screw
5	Body Seat Ring
6	Disc Seat
7	Disc Stop
8	Disc Pin
9	Disc Arm
10	Disc
11	Straight Bushing
12	Flanged Bushing
13	Pivot Shaft
14	Disc Arm Setscrew
15	Pivot Shaft Cover
16	Pivot Shaft Cover Screw
17	Pivot Shaft Seal
18	Shaft Cover Seal
20	Cylinder Assembly
21	Cylinder Bracket Mounting Screw
23	Lockwasher
24	Cylinder Bracket
25	Mounting Screw
26	Nut
27	Cushion Lever
29	Counter Weight
30	Flow Control Valve
31	Seat Retaining Ring
32	Seat Retaining Ring Screw
33	Pivot Shaft Key
36	Arm Set Screw
37	Seal Retainer
39	Lock Nut
40	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 Screw
56	Lever Arm Nut
57	Disc Arm Sleeve
58	Air Breather

Figure 7 – CVS-6000 Swing Check Valve (with Air Cushion Cylinder)

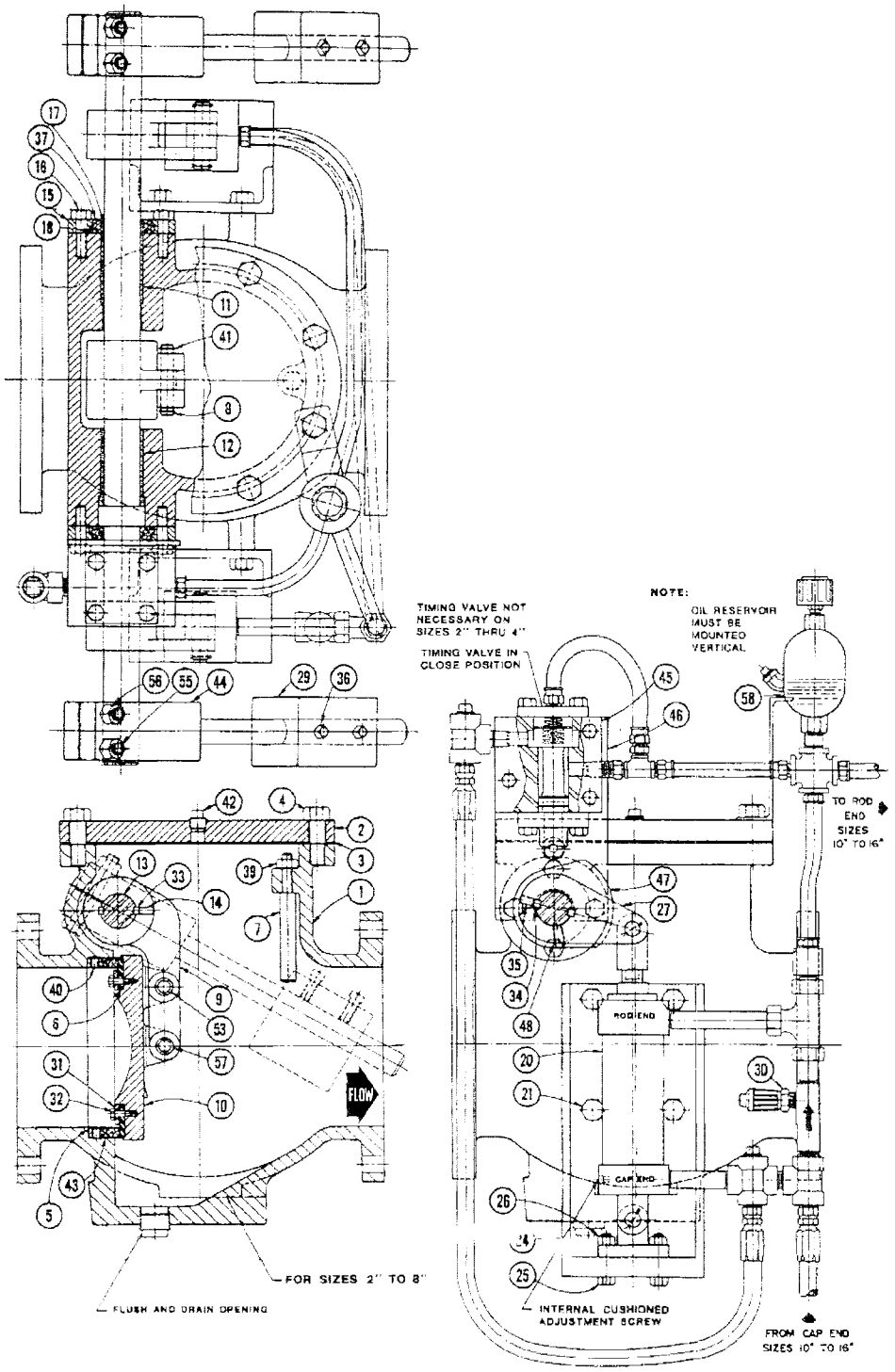
Drawings *(Continued)*



No	Description
1	Body
2	Cover
3	Cover Gasket
4	Cover Screw
5	Body Seat Ring
6	Disc Seat
7	Disc Stop
8	Disc Pin
9	Disc Arm
10	Disc
11	Straight Bushing
12	Flanged Bushing
13	Pivot Shaft
14	Disc Arm Setscrew
15	Pivot Shaft Cover
16	Pivot Shaft Cover Screw
17	Pivot Shaft Seal
18	Shaft Cover Seal
19	Lever Arm Nut
20	Cylinder Assembly
29	Counter Weight
C1	Flow Control Valve
31	Seat Retaining Ring
32	Seat Retaining Ring Screw
33	Pivot Shaft Key
36	Arm Set Screw
37	Seal Retainer
38	Lever Arm Screw
39	Lock Nut
40	Set Screw
41	Disc Pin Retaining Ring
42	Cover Pipe Plug
43	Body Seat Seal
44	Counter Weight Arm Assembly
50	Tubing
53	Pivot Sleeve Bearing
56	Dashpot Spacer
57	Disc Arm Sleeve
58	Oil Reservoir
60	Collar
61	Rod Stop
62	Rod Stop Set Screw
65	Cylinder Rod Coupler
66	Cylinder Rod Adaptor
69	Mounting Screw
71	Buffer Rod Seal
72	Bracket Screw
73	Hydro Pneumatic Tank
74	Pressure Gage
76	Buffer Rod Bushing
77	Buffer Rod Bushing Seal
81	Buffer Rod Bushing Seal Backup Ring
84	Buffer Rod
90	Drain Plug
91	Spacer Screw
96	Buffer Rod Bushing Scraper
97	Bracket (Vertical Position only)
98	Mounting Screw (Vertical Position only)
99	Mounting Nut (Vertical Position only)

Figure 8 – CVS-6000B Swing Check Valve (with Oil Control Bottom Buffer)

Drawings *(Continued)*



No	Description
1	Body
2	Cover
3	Cover Gasket
4	Cover Screw
5	Body Seat Ring
6	Disc Seat
7	Disc Stop
8	Disc Pin
9	Disc Arm
10	Disc
11	Straight Bushing
12	Flanged Bushing
13	Pivot Shaft
14	Disc Arm Setscrew
15	Pivot Shaft Cover
16	Pivot Shaft Cover Screw
17	Pivot Shaft Seal
18	Shaft Cover Seal
20	Cylinder Assembly
21	Cylinder Bracket Mounting Screw
23	Lockwasher
24	Cylinder Bracket
25	Mounting Screw
26	Nut
27	Cushion Lever
29	Counter Weight
30	Flow Control Valve
31	Seat Retaining Ring
32	Seat Retaining Ring Screw
33	Pivot Shaft Key
34	Cushion Lever Key
35	Set Screw
36	Arm Set Screw
37	Seal Retainer
39	Lock Nut
40	Set Screw
41	Disc Pin Retaining Ring
42	Cover Pipe Plug
43	Body Seat Seal
44	Counter Weight Arm Assembly
45	Timing Valve
46	Timing Valve Bracket
47	Timing Valve Cam
48	Set Screw
53	Pivot Sleeve Bearing
55	Lever Arm Screw
56	Lever Arm Nut
57	Disc Arm Sleeve
58	Oil Reservoir

Figure 9 – CVS-6100 Swing Check Valve (with Oil Cushion Cylinder)

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.

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