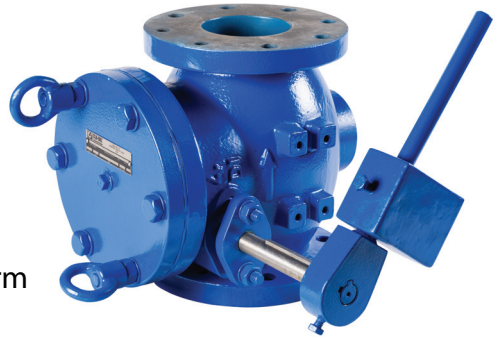
CLA-VAL™

585 Series
Swing Check Valves

Air Cushioned

585 Series

Spring-Loaded Lever



Lever with Counter-Weight Arm

Instruction Manual

N-585_(R-03/2016)

Instructions

These instructions provide installation, operation and maintenance information for Cla-Val 585 Series Swing Check Valves.

Safety Messages

All safety messages in the instructions are flagged with an exclamation symbol and the words 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.

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 585 Series 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 Cla-Val sales agent or distributor. When ordering parts please choose from the following:

If the valve has a Cla-Val nameplate please include the part number and serial number located on the data plate attached to the valve assembly. Also include the part name, the assembly drawing number as shown herein, the part's callout 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 Cla-Val Salesman or Sales Agent to help you identify your valve.

Cla-Val Field Service

Cla-Val service personnel are available to maintain and repair all Cla-Val products. Cla-Val also offers customized training programs and consultation services. For more information, visit our website at www.cla-val.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 valve is equipped with either a (weighted counterweight arm and air cushion cylinder), a (weighted counterweight arm) or a (spring loaded counterweight arm) to assist with closing the valve.

Handling and Storage

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

- The Cla-Val 585 Series Swing Check Valve may be installed in a horizontal or vertical position (with the flow upward). In either case, the Counterweight Arm (B19) should be set in horizontal position. Unless otherwise specified, the valves are shipped for horizontal installation.
    - To change the counterweight arm position, loosen the Setscrew (B55), slide the counterweight arm assembly off the Pivot Shaft (A13), rotate the counterweight arm assembly and slide it back onto the Pivot Shaft (A13) using the appropriate keyway shown in Figure 1. See Figure 2 for component identification.

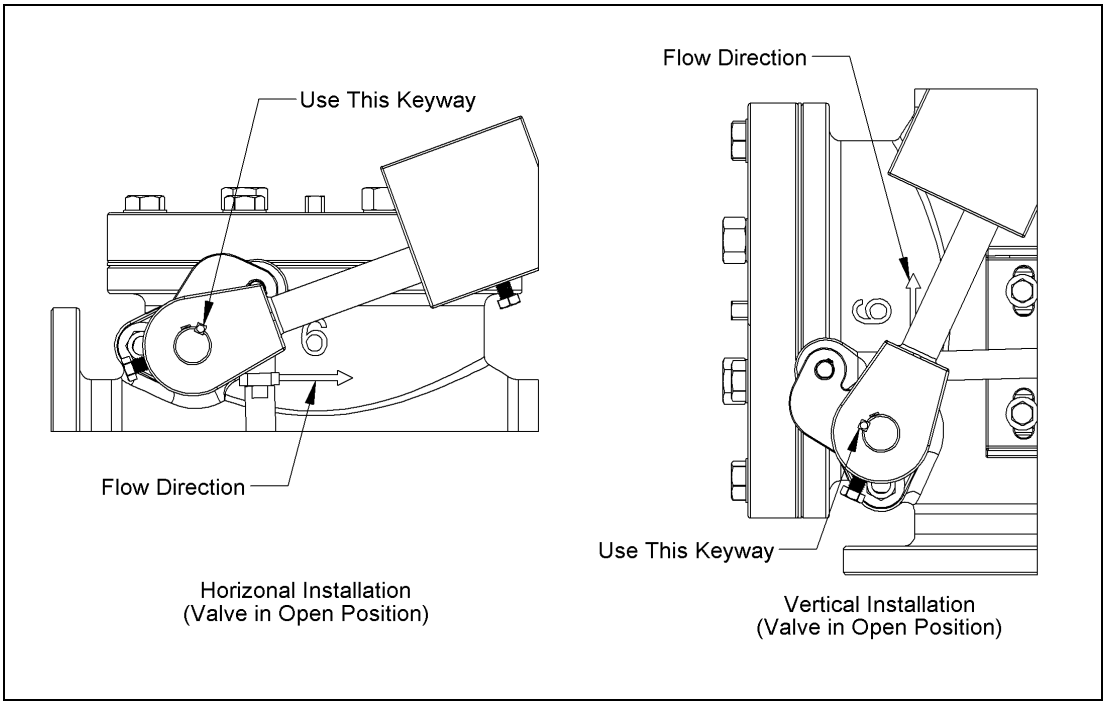

Figure 1 – Counter Arm Position

Installation *(Continued)*

- 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

It is suggested that these valves, which do not require routine scheduled maintenance, be included as part of the normal facility equipment inspections for any malfunction while under normal usage conditions.

Shaft Packing Adjustment

Packing adjustment may be needed to optimize packing life on initial start-up.

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.

Tighten the gland nuts (A54) evenly only until the packing leak stops.

Caution: Do not over-tighten Packing Gland. Valve can remain open during operation if packing is too tight. After packing adjustments are made and pipeline is pressurized, visually inspect valve stroke to ensure proper operation.

Note: Do not continue tightening after leak stops. If packing leak cannot be stopped by tightening the gland nuts, the packing must be replaced.

Maintenance *(Continued)*

Shaft Packing Replacement

Removal of the valve from the line for shaft packing replacement is not required as long as the shaft is accessible.

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 Counter Weight Arm Assembly (B19), Cushion Lever (B27), Packing Gland Nuts (A54) and Packing Gland (A37) from Pivot Shaft (A13).
3. Remove the packing (A17) with a flexible packing hook or similar tool. Clean the packing area, being careful not to damage it.
4. Obtain the proper size packing from the parts list. Cut the packing rings to fit around the shaft. Install one ring at a time. Make sure it is clean and has not picked up any dirt in handling before installing it. Lubricate I.D. of each packing ring. Joints of successive rings should be staggered at least 90 degrees apart. Each ring should be firmly seated with a tamping tool. Do not depend on the packing gland entirely to seat the set of rings properly. This practice will jam the last rings installed but leave the first ones loose in the box.
5. See “Shaft Packing Adjustment” section to adjust packing after replacing.

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 (A31) from Disc (A10).
4. Remove old Disc Seat (A06) and replace with new Disc Seat.
5. Re-install Seat Retaining Ring (A31).
6. Re-install valve in pipeline.

Maintenance *(Continued)*

Changing Counterweight Assembly to Opposite Side of Valve

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. Loosen the Screw (B55) and remove the Counter Weight Arm (B19) and Weight (B29) assembly or Spring (B59).
3. If the valve is equipped with an Air Cylinder (B20):
    a. Remove the Retaining Rings (B60) and Clevis Pin (B61) from the cylinder rod eye.
    b. Remove the Cushion Cylinder (B20) and Bracket (B24) assembly from the Body (A01).
    c. Remove the Cushion Lever (B27) from the Pivot Shaft (A13).
4. Remove the Packing Gland (A37), Packing (A17) and Studs (A49) from the Body (A01).
5. Remove the Screws (A16) and Pivot Shaft Cover (A15) from the Body (A01)
6. Remove the Eye Nuts (A64), Nuts (A52), Screws (A04), Washers (A51) and Cover (A02) from the Body (A01).
7. Loosen the Screws (A14) in the Disc Arm (A09).
8. Insert a threaded bolt (1/4-20) into the Pivot Shaft Retaining Pin (A60) and remove the pin from the pin hole in the top of the Body (A01).
9. Remove the Pivot Shaft (A13) from the Body (A01). The Packing (A17), Flanged Bushing (A12, on 4” and larger valves) and the Pivot Shaft Disc Key (A33) will be removed along with the shaft.
10. Remove the Straight Bushing (A11, on 4” and larger valves) from the Body (A01) and install it on the opposite side of the body aligning it with the pin hole in the top of the body.
11. Align the Disc Arm (A09) with the holes in the Body (A01) for the Pivot Shaft (A13); insert the pivot shaft (with the Pivot Shaft Disc Key (A33) with the groove and shorter keyway end first into the opposite side of the body, thru the disc arm and align the pivot shaft retaining groove with the pin hole in the body.
12. Insert the Pivot Shaft Retaining Pin (A60) thru the hole in the top of the Body (A01) so the pin goes thru the Straight Bushing (A11, on 4” and larger valves) in into the groove in the Pivot Shaft (A13). The pin should be flush with the top of the body.
13. Center the Disc (A10) assembly and the Body Seat (A05).
14. Tighten the Screws (A14) in the Disc Arm (A09).
15. Slide the Flanged Bushing (A12, on 4” and larger valves) over the Pivot Shaft (A13) and into the Body (A01).

Maintenance *(Continued)*

16. Install one Packing Ring (A17) at a time. Make sure it is clean and has not picked up any dirt in handling before installing it. Lubricate I.D. of each packing ring. Joints of successive rings should be staggered at least 90 degrees apart. Each ring should be firmly seated with a tamping tool.
17. Install the Studs (A49), Packing Gland (A37), Washers (A50), Nuts (A54) and adjust packing.
18. Install the Pivot Shaft Cover (A15) with Screws (A16) and Washers (A50).
19. Install the Cover (A02) to the Body (A01) with Eye Nuts (A64), Nuts (A52), Screws (A04) and Washers (A51).
20. If the valve is equipped with an Air Cylinder (B20):
    a. Install the Cushion Lever (B27) and Key (B34) on the Pivot Shaft (A13).
    b. Install the Cushion Cylinder (B20) and Bracket (B24) assembly to the Body (A01).
    c. Install the Retaining Rings (B60) and Clevis Pin (B61) to the cylinder rod eye.
21. Install Counter Weight Arm (B19) and Weight (B29) or Spring (B59) to the Pivot Shaft (A13).

Operation

The flow from the pump opens the Disc (A10) and raises the (weighted or spring loaded) Counterweight Arm (B19). If the valve is equipped with an air Cushion Cylinder (B20), the cylinder piston is pulled upward drawing air into the cylinder through the small needle valve.

When the pump is shut off, backflow pressure pushes the Disc (A10) to close against the Body Seat Ring (A05). If the valve is equipped with an air Cushion Cylinder (B20), as the disc is closing, the cylinder piston is pushed downward trapping the air in the cylinder. The compressed air can only escape through the needle valve at the bottom of the cylinder and can be adjusted to suit the best performance for the installation.

Speed Control Adjustment (Valves with Weighted Counterweight Arm)

- Faster Disc closing - Move Counterweight away from the pivot shaft.
- Slower Disc closing – Move Counterweight towards pivot shaft.

Speed Control Adjustment (Valves with Cushion Cylinder)

- 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.

Start-up Procedure

1. Set Counterweight Arm Assembly (B19) in horizontal position.
2. Throttle down mainline gate valve (furnished by others) on discharge side of Swing Check Valve to approximately 1/3 open to prevent severe slamming during initial pump shutdown testing.
3. Position Counterweight (B29) midway on the lever and lock in place.
4. If valve has an air **Cushion Cylinder**: Turn adjusting screw of needle valve two (2) turns counterclockwise from fully close position.
5. Start and stop pump and observe rate of closing.

Adjustment (Valves with Cushion Cylinder)

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 discharge Gate Valve to ½ open. Repeat start and stop pump sequence and above steps until Gate 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 585 Series Swing Check Valve is not a silent closing check valve.

Drawings

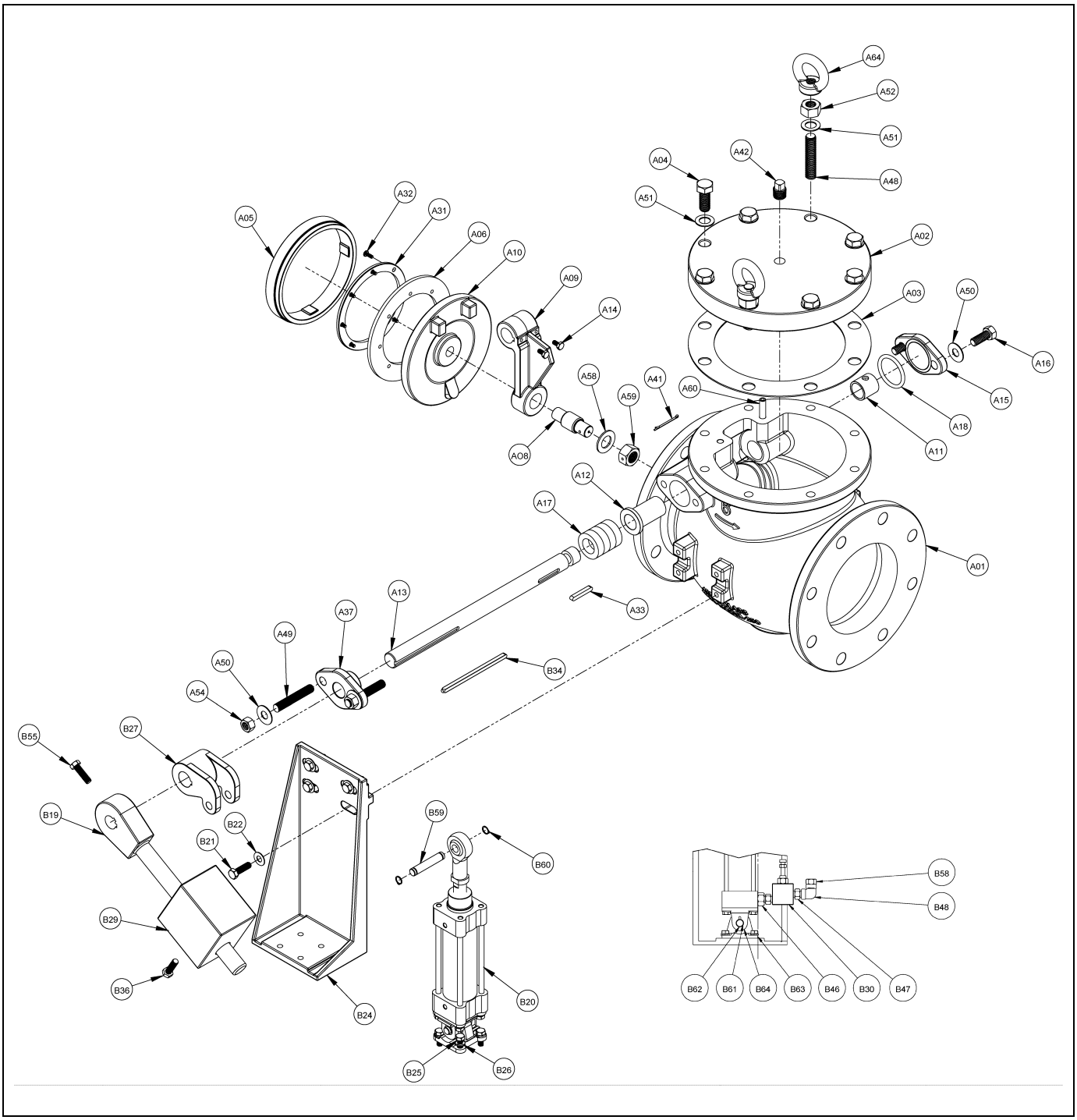

Figure 2 - 585 Series Swing Check Valve (with Air Cylinder)

Drawings *(Continued)*

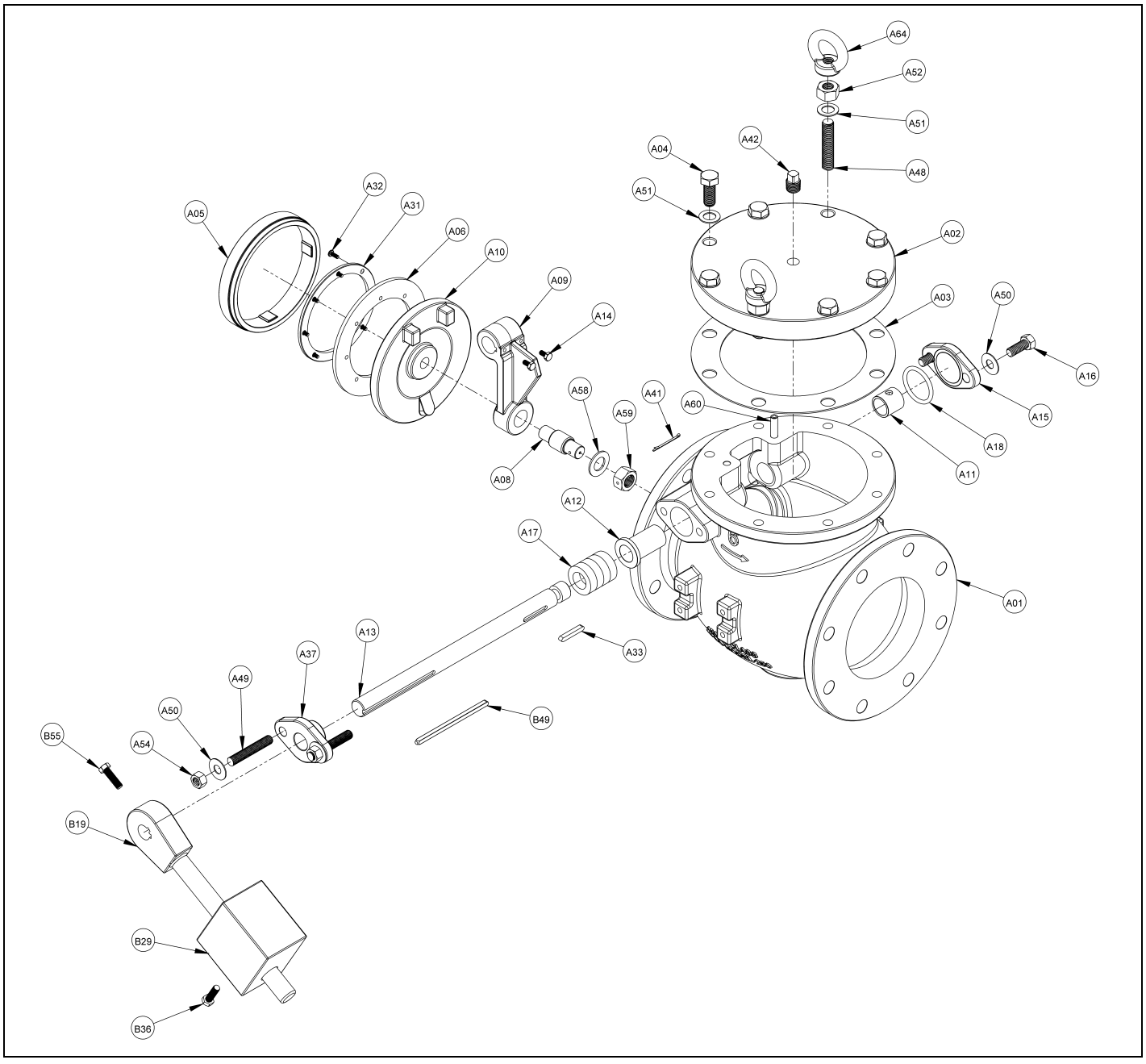

Figure 3 - 585 Series Swing Check Valve (Weighted Lever)

Drawings *(Continued)*

Table 1 - 585 Series Swing Check Valve Parts

Item Number	Description
A01	Body
A02	Cover
A03	Cover Gasket
A04	Hex Bolt
A05	Body Seat Ring
A06	Disc Seat
A08	Disc Stem
A09	Disc Arm
A10	Disc
A11	Straight Bushing
A12	Flanged Bushing
A13	Pivot Shaft
A14	Hex Bolt
A15	Pivot Shaft Cover
A16	Hex Bolt
A17	Packing
A18	Shaft Cover Seal
A31	Seat Retaining Ring
A32	Machine Screw
A33	Pivot Shaft Disc Key
A37	Packing Gland
A41	Cotter Pin
A42	Pipe Plug
A48	Stud
A49	Stud
A50	Washer
A51	Washer
A52	Hex Eye Nut
A54	Hex Nut
A58	Washer
A59	Hex Nut with Drilled Hole
A59	Spring
A60	Pivot Shaft Retaining Pin
A64	Eye Nut
A65	Cover Nut (30” & 36” only)

Note: Items A11 and A12 are not included in the 2” and 3” valve sizes.

Weighted Lever and Cylinder Parts

Item Number	Description
B19	Counter Weight Arm Assembly
B20	Cylinder Assembly (Cushion Cylinder only)
B21	Hex Bolt (Cushion Cylinder only)
B22	Washer (Cushion Cylinder only)
B24	Cylinder Bracket (Cushion Cylinder only)
B25	Hex Bolt
B26	Split Washer
B27	Cushion Lever (Cushion Cylinder only)
B29	Counter Weight
B30	Flow Control Valve
B34	Pivot Shaft Key (Cushion Cylinder only)
B36	Counterweight Arm Retaining Screw
B46	Reducer Bushing (8"-42")
B47	Pipe Nipple
B48	Pipe Elbow
B55	Lever Arm Bolt (Weighted Lever only)
B58	Air Breather
B59	Cushion Lever Clevis Pin (Cushion Cylinder only)
B60	Retaining Ring (Cushion Cylinder only)
B61	Clevis Pin
B62	Retaining Ring (Cushion Cylinder only)
B63	Male Clevis Bracket
B64	Female Clevis Bracket
B65	Yoke

Drawings *(Continued)*

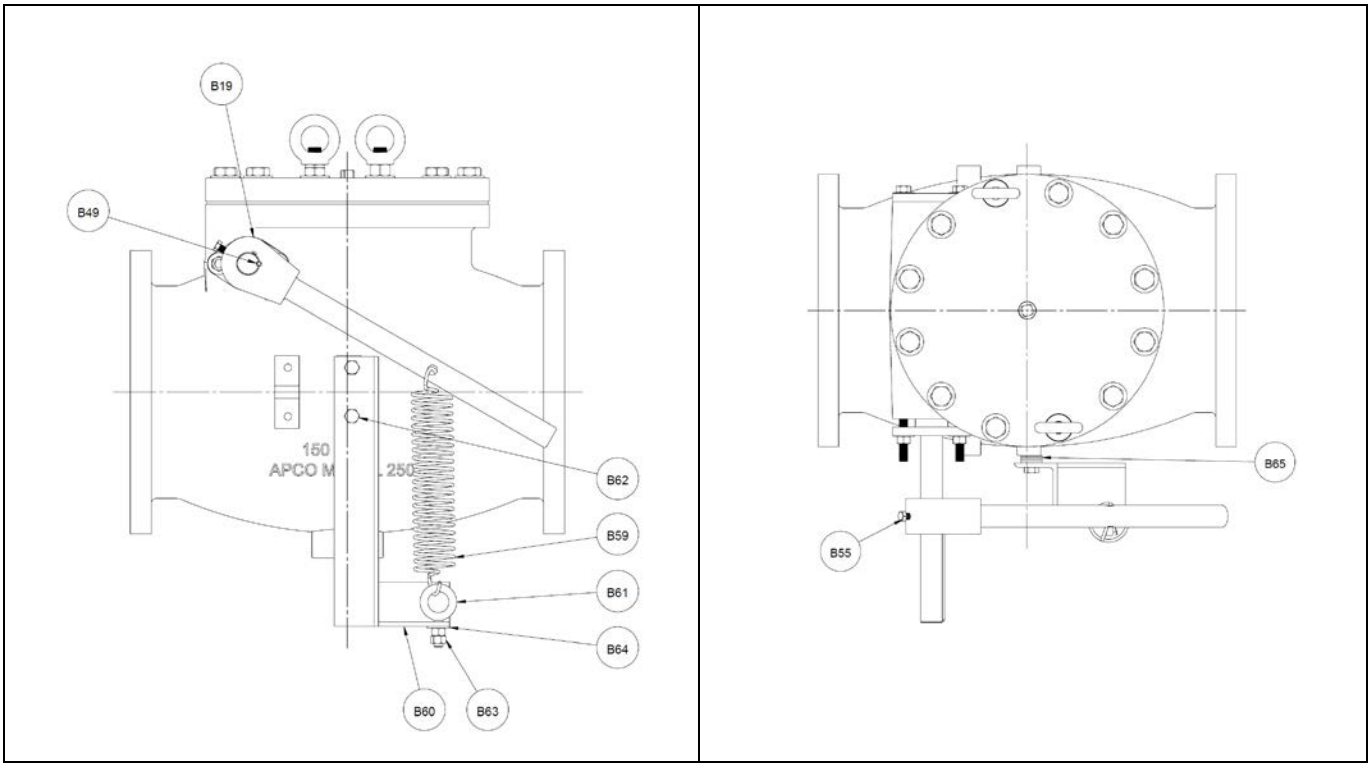

Figure 4 - 585 Series Swing Check Valve (Spring Loaded Lever)

Table 2 – Spring Loaded Lever Parts

Item Number	Description
B19	Lever Arm Fabrication (Spring Only)
B49	Spring Lever Arm Key (Spring Only)
B55	Spring Lever Arm Retainer Screw (Spring Only)
B59	Spring (Spring Only)
B60	Spring Bracket (Spring Only)
B61	Eye Bolt (Spring Only)
B62	Spring Bracket Bolt (Spring Only)
B63	Eye Bolt Retaining Nut (Spring Only)
B64	Spring Bracket Washer (Spring Only)
B65	Washer (Spring Only)

Troubleshooting

Condition	Possible Cause	Corrective Action
Shaft seal leaks.	Packing is worn.	Replace Packing.
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.	Repair disc seat or replace valve.
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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