

# INSTALLATION, OPERATION AND MAINTENANCE MANUAL

## 30" & 36" Figures 250-D and 250-U Drawing C-1008 Air-Cushioned Lever & Weight Swing Check Valves

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# INSTALLATION, OPERATION and MAINTENANCE

## 30" & 36" Figures 250-D and 250-U Air-Cushioned Lever & Weight Swing Check

### INTRODUCTION

This manual will provide the information to properly install, operate and maintain the valve to ensure a long service life. The Figure 250 Swing Check Valve is ruggedly constructed to provide years of trouble-free operation with minimal maintenance.

#### CAUTION

The valve is NOT recommended for use with toxic or highly corrosive fluids, fuels or fluids containing hazardous gases

The Shop Order (SO) Number, Figure Number, size and pressure rating are stamped on a nameplate attached to the valve. Please refer to the SO number when ordering parts.

### DESCRIPTION OF OPERATION

The Figure 250 Swing Check Valve is an air-cushioned, counter-weighted rubber-seated check valve designed to permit flow in one direction and close to prevent reverse flow. The valve opens when the inlet pressure exceeds the outlet pressure. The degree of opening depends on the fluid velocity through the valve. The valve will swing closed as fluid velocity decreases and be fully seated before flow reversal precluding slam and bang.

### RECEIVING AND STORAGE

Inspect the valve upon receipt for damage during shipment. Carefully unload all valves to the ground without dropping.

The valves should remain in a clean, dry, and weather protected area until installed. For long term storage (greater than 6 months) the rubber surfaces of the seat should be coated with a non-toxic lubricant such as "SuperLube" made by Synco Chemical. Do not expose the rubber parts to sunlight or ozone.

### INSTALLATION

Figure Numbers suffixed with "D" indicated the valve has ANSI Class 125 flanged connections, Figure Numbers suffixed with "U" indicate the valve has ANSI Class 250 flanged connections. An "A" in the Figure Number (e.g., 250-DA, 250-UA) indicates the valve is configured for installation in a vertical pipe.

Prior to installation ensure all debris, packing material or other foreign material has been removed from both ports.

The valve can be installed in a horizontal or vertical (upward flow direction) pipe. In either case the counterweight arm(s) must be horizontal when the valve is closed. Ensure there is sufficient clearance above the valve to allow the counterweight arm(s) to swing fully open.

Install the valve in the proper flow direction. Forward flow should tend to open the valve.

If installed outdoors, below ground in a vault or in an unheated area, adequate freeze protection must be provided.

Adequate isolating valves should be installed between the valve and the pipeline or system to facilitate maintenance.

Installation immediately downstream of an elbow or a significant increase in pipe size may produce uneven or turbulent flow through the valve and lead to premature wear. Consult factory for recommendations

The valve is not designed to support adjacent equipment, piping loads should not be imposed on the valve and large valves should be properly supported. Ensure mating flanges are square and parallel to the valve flanges before tightening flange bolts.

Flat-faced flanged valves should be mated with flat-faced flanges and full-face gaskets. If ring gaskets are used the bolt material shall be ASTM A307 Grade B (or equivalent). Higher strength bolting should only be used with full-face gaskets.

Lower heavy valves using slings or chains around the valve body and/or the lifting eye. Lubricate the bolts or studs and insert around flange. Lightly tighten bolts until gaps are eliminated. Torque bolts in an alternating pattern in graduated steps. If leakage occurs wait 24 hours and re-torque the bolts but do not compress the gasket more than 50% or exceed bolt maximum torque rating.

## VALVE CONSTRUCTION

The standard Figure 250 Swing Check Valve has a cast iron body, bronze or stainless steel (designated by an "S" in the Figure Number) body seat, stainless steel hinge shaft and cast iron disc with a rubber disc seat. Refer to the List of Materials submitted for the order if non-standard materials were provided.

The standard valve is supplied with one counterweight arm, but extreme operating conditions may require two counterweight arms. Consult the drawings of record to verify the configuration supplied and installed.

Refer to Page 5 for details of construction and parts location.

## START-UP

The valve generally does not require any calibration or adjustment prior to start-up. The counterweights should be initially placed at the far end of the arm and secured by tightening the set screw (44). If the valve has dual counterweight arms the weights should be at the same position on both arms.

The valve should smoothly swing open as flow through the valve increases. The amount of opening depends on the flow velocity through the valve and can be observed by watching the external counterweight arm. The valve is "full ported" at about 25 degrees of swing but can swing open as much as 60 degrees.

Shut down the pump and observe the valve's closure. If the valve was less than 60 degrees open and the closure was smooth and quiet, then the weight(s) may be moved incrementally toward the shaft. Repeat these steps to the point where the valve opens to the extent possible but still closes quietly.

The air-cushion chamber cannot retard the valve's closure or prevent the valve from being slammed shut due to the tremendous forces of the reversing water. Non-slam operation is achieved when the counterweight closes the valve prior to flow reversal. In extreme cases, it may be necessary to install additional counterweight(s) to effect non-slam closure.

The cushion chamber will minimize the slam tendency when the valve closes too quickly due to its own counterweight action. An inward adjustment of the adjusting sleeve (26) will increase this cushioning effect.

## PREVENTIVE MAINTENANCE

Figure 250 Swing Check Valves require no scheduled lubrication, adjustment, or preventive maintenance.

A monthly inspection should be performed for the first 6 months of operation to ensure the valve is functioning properly and there is no external fluid leakage or audible evidence of water leaking backwards through the closed valve.

Thereafter, a quarterly visual inspection should be performed.

## TROUBLESHOOTING

- Shaft packing leakage  
Tighten packing gland nuts equally just enough to stop leakage, no more than ½ turn at a time. DO NOT OVER-TIGHTEN!  
Replace packing if necessary.
- Leakage past seat when closed  
Inspect valve for debris, clean  
Inspect seating surfaces for damage, replace as necessary
- Leakage past cover or flange gaskets  
Tighten cover or flange bolts
- Disc oscillating when open  
Move counterweight(s) toward shaft
- Valve slams upon closing  
Move counterweight(s) toward end of arm  
Ensure shaft packing is not too tight  
Ensure cushion chamber and linkage operates freely  
Install additional counterweight(s)

### WARNING

Removing the valve from the line or disassembling the valve while there is pressure in the valve body may result in injury or damage to the valve

### WARNING

Follow all applicable safety regulations and codes and read and understand all instructions before undertaking disassembly.

## DISASSEMBLY

All Figure 250 valves can be serviced while the body remains connected to the pipeline. A skilled technician should perform all work. No special tools are required.

First ensure there is no pressure within the valve and operating equipment is tagged and locked out. Refer to page 4 for parts location and identification.

To move counterweight and/or air-cushion chamber to opposite side of valve, disassemble valve through Step 3. Remove cushion chamber screws (25) and cushion chamber assembly and install on opposite side of valve.

It is not necessary to disassemble the entire valve to replace the shaft packing, follow steps 1 to 4. To install new packing follow steps 5a and 6a.

1. Ensure there is no pressure within the valve and operating equipment is locked out.
2. Mark the position of the counterweight(s) on the arm. Loosen the counterweight set screw (44) and slide the weight(s) off the arm. Remove the lever cotter pin (34), lever pin washer (34A) and lever pin (45). Loosen the lever screw (19) and slide the chamber

- lever (29) off the shaft, being careful not to lose the key (47).
3. Loosen the counterweight arm set screw (18) and slide arm off the shaft, being careful not to lose the key (48).
  4. Loosen and remove the gland stud nuts (16), slide off the gland cover (15A). Install a ¼"-20 screw into the two threaded holes and pull out the gland (15). Using a pick, pull out the packing rings (17).
  5. Remove the cover bolts and nuts (10) end plate bolts (35), the end plate (34) being careful not to lose or damage the end plate seal (36) unless it is to be replaced
  6. Remove the cover bolts (10) and lift off the cover (9) by installing 2 - ¾" eye-bolts in the holes provided. If necessary, carefully pry the cover off using a cold chisel between the body and cover. Be careful not to damage or lose the cover gasket (8) unless it is to be replaced.
  7. With the disc and disc arm properly supported to prevent it from dropping inside the valve, loosen the disc arm set screws (12) and pull the shaft (11) out of the valve. It may be necessary to drive out the shaft from the opposite end.

NOTE: Depending on which direction the shaft is removed, either the inner (13) or outer (14) bushing and disc arm key (49) should come out with the shaft. Be careful not to lose the disc arm key. After the shaft is out, remove the other bushing from the opposite side.

8. Carefully lift the disc arm assembly out of the body. Remove the seat follower screws (5B), the seat follower (5A) and the renewable seat (5) from the disc (3).
9. To separate the disc (3) from the disc arm (4), remove the disc hinge cotter pin (41), disc hinge pin washer (42) and the disc hinge pin (3A).
10. Pull the plunger (22) from the cushion chamber using the chamber link (28).
11. In the unlikely event it's necessary to remove the body seat (2), the spring pins holding it into the body must be compressed until they no longer "bite" into the body. This is best accomplished by compressing the seat pins (5C) using "vice-grips" and pulling the pins in a radial direction towards the valve centerline. Remove seat seal (5D).

Inspect all parts for wear and damage. Replace damaged parts.

#### ASSEMBLY

The valve is reassembled using replacement parts as needed and by reversing the disassembly sequence with consideration of the following:

- 1a. Clean and polish all machined bearing and sealing surfaces. Apply a light coat of lubricant to assist in the assembly.
- 2a. Mark the orientation of the disc arm key on the end of the shaft to assist in aligning with keyway in disc arm during assembly.
- 3a. As soon as the shaft extends beyond the disc arm install the bushings on both sides to support and center the shaft. Slowly rotate the shaft until the disc arm key (49) slides into the disc arm keyway. Ensure both ends of the shaft (11) extend equidistant from the valve body so the disc arm key (49) is centered in the disc arm keyway.
- 4a. Lift the disc assembly several times to ensure free closure with no metal-to-metal contact.
- 5a. Wrap the packing around the shaft and cut on a 45-degree angle, staggering the cuts with each ring.
- 6a. Tighten gland nuts evenly until packing is slightly compressed. After pressure has been introduced into the valve, re-tighten evenly until leakage stops. Do not over-tighten!
- 7a. Ensure cover gasket sealing surfaces are clean and apply a thin coat of Permatex™ #2 to both surfaces. Tighten cover nuts in an alternating pattern. Re-tighten as needed after pressure has been introduced.
- 8a. Replace plunger O-ring (23) if necessary, lubricate and install plunger (22) into cushion chamber (20) being careful not to damage O-ring. Move it up and down several times to ensure free movement.

#### REPLACEMENT PARTS

Genuine replacement parts are available from your local VAG/GA Industries representative or from the factory:

VAG USA, LLC  
 234 Clay Avenue  
 Mars, PA 16046 USA  
 Telephone: 724-776-1020  
 Fax: 724-776-1254  
 E-mail: [quotes-ga@vag-group.com](mailto:quotes-ga@vag-group.com)

Please have the nameplate data available when ordering parts. Identify needed part(s) by Shop Order (SO) Number, Figure Number, valve size and individual part number.

#### WARRANTY:

The Warranty for GA Industries valves is included in our Terms and Conditions which can be found here: <https://gaindustries.com/terms>

Part No.	Part Name	Std. Material
1	Body	Cast Iron
2	Body Seat	Bronze or SS
3	Disc with Center Pin	Cast Iron/Steel
3A	Disc Hinge Pin	Stainless Steel
4	Disc Arm	Ductile Iron
5	Renewable Seat	Buna-N
5A	Seat Follower	Bronze or SS
5B	Seat Screws	Stainless Steel
5C	Body Seat Retaining Pins	Stainless Steel
5D	Seat Seal	Buna-N
8	Cover Gasket	Fiber
9	Cover	Steel
10	Cover Bolt and Nut	Steel
11	Shaft	Stainless Steel
12	Disc Arm Set Screws	Stainless Steel
13	Inner Bushing	Bronze
14	Outer Bushing	Bronze
15	Gland	Steel
15A	Gland Cover	Steel
16	Gland Stud & Nut	Steel
17	Packing	Teflon
18	C'weight Arm Set Screw	Steel
19	Lever Set Screw	Steel
20	Cushion Chamber	Cast Iron
21	Cushion Chamber Liner	Bronze
22	Plunger	Bronze
23	Plunger O-Ring	Buna-N
24	Plunger Rod	Brass

Part No.	Part Name	Std. Material
25	Cushion Chamber Bolt	Steel
26	Adjusting Sleeve	Brass
27	Adjusting Sleeve Locknut	Brass
28	Chamber Link	Steel
29	Chamber Lever	Cast Iron
30	Counterweight Arm	Ductile Iron/Steel
31	Counterweight(s)	Cast Iron
32	Check Valve	Brass/Bronze
33	Link Pin	Stainless Steel
34	Lever Pin Cotter Pin	Stainless Steel
35	Disc Hinge Brckt/Bearing	Ductile Iron/Bronzel
36	Disc Hinge Screw	Stainless Steel
37	Disc Hinge Dowel Pin	Stainless Steel
38	Lower Disc Guide	Steel
39	Upper Disc Guide	Steel
40	Disc Guide Screw	Stainless Steel
41	Disc Hinge Cotter Pin	Stainless Steel
42	Disc Hinge Washer	Stainless Steel
44	Counterweight Set Screw	Steel
45	Lever Pin	Stainless Steel
47	Lever Key	Stainless Steel
48	Counterweight Arm Key	Stainless Steel
49	Disc Arm Key	Stainless Steel
50	Pipe Nipple	Brass
51	Cushion Chamber Cover	Steel
52	Cushion Chamber Bolt	Steel
53	Cushion Chamber Nut	Steel
54	Cushion Chamber Seal	Buna-N

