

INSTALLATION, OPERATION AND MAINTENANCE MANUAL

Figures 250-D, 250-U, 250-DS and 250-US Drawing C-1018, 2½” to 20” Air-Cushioned Lever & Weight Swing Check Valves

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9025 Marshall Road • Cranberry Township, PA 16066 USA
Telephone (724) 776-1020 • Fax (724) 776-1254
E-mail: info-ga@vag-group.com



WARNING: Cancer and Reproductive Harm – www.Prop65Warnings.ca.gov

INSTALLATION, OPERATION and MAINTENANCE

Figures 250-D, 250-DS, 250-U, 250-US 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- or metal-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.

Consult the drawings of record to verify the configuration supplied and installed.

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 must be horizontal when the valve is closed.

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.

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 (indicated by Figure Number suffixed with "S") body seat, stainless steel hinge shaft and cast iron disc with a rubber disc seat. An "M" suffixed to the Figure Number (e.g., 250-DM, 250-USM) indicates optional metal-to-metal seating was supplied. Refer to the List of Materials submitted for the order if non-standard materials were provided.

Refer to Page 4 for details of construction and parts location.

START-UP

The valve generally does not require any calibration or adjustment prior to start-up. The counterweight(s) should be initially placed at the far end of the arm and secured by tightening the set screw (31A).

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.

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 identification.

It is not necessary to disassemble the entire valve to replace the shaft packing, follow steps 1 to 3 and 5a.

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 (31A) and slide the weight(s) off the arm. Remove the lever cotter pin (29C) and lever pin (29B). Loosen the counterweight arm set screws (30A) and the lever set screw (29A) and slide the arm (30) and lever (29) off the shaft, being careful not to lose the key (30B).
3. Loosen and remove the gland stud nuts (16), slide off the gland (15) and remove the shaft packing (17).
4. Remove the 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
5. Remove the cover bolts (10) and lift off the cover (9). 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.

6. Remove the shaft lock pin (18) by threading a screw into the tapped hole.
7. With the disc and disc arm properly supported, loosen the disc arm set screw (12) and pull the shaft (11) out of the valve. It may be necessary to drive out the shaft from the opposite end.
NOTE: The outer bushing (14) and disc arm key (19) should come out with the shaft. Be careful not to lose the disc arm key. After the shaft is out, remove the inner bushing (13) from the opposite side.
8. Carefully lift the disc arm assembly out of the body. Remove the disc nut pin (6B), disc nut (6) and disc nut washer (6A).
9. Remove the seat screws (5C), the seat follower (5B) and the renewable seat (5A) or metal seat washer (5D).
10. Remove the link (28) and pull the plunger (22) from the cushion chamber.
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 (2B) using "vice-grips" and pulling the pins in a radial direction towards the valve centerline.

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

ASSEMBLY

The valve is reassembled 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. Ensure the disc arm key slides inside the disc arm before installing the shaft lock pin (18). Ensure the shaft lock pin has dropped into the groove provided for it on the shaft.
- 3a. Lift the disc assembly several times to ensure free closure with no metal-to-metal contact.
- 4a. Install the inner and outer bushings then install the shaft packing. Install the end plate (34) with seal (36). Install and tighten the end plate bolts (35) while ensuring the end plate seal (36) remains in the groove provided for it in the end plate
- 5a. Wrap the packing around the shaft and cut on a 45-degree angle, staggering the cuts with each ring.
- 6a. Tighten gland bolts evenly until packing is slightly compressed. After pressure has been introduced into the valve, re-tighten evenly until leakage stops.

- 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. Re-install the lever (29) and counterweight arm (30) with key (30B) and tighten counterweight set screws (30A).
- 9a. Connect lever (29) to the link (28) using pin (29B) and secure with cotter pin (29C). Tighten lever set screw (29A).
- 10a. Slide counterweight(s) onto shaft and lock in place using set screws (31A). Lift counterweight arm and allow it to fall to ensure free movement.

REPLACEMENT PARTS

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

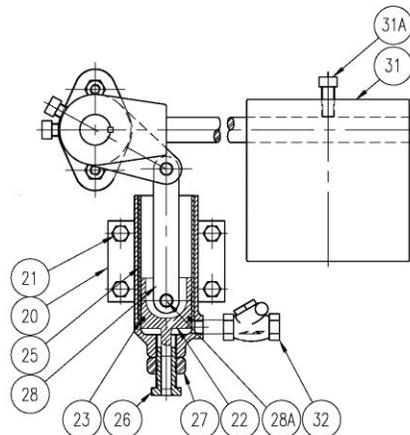
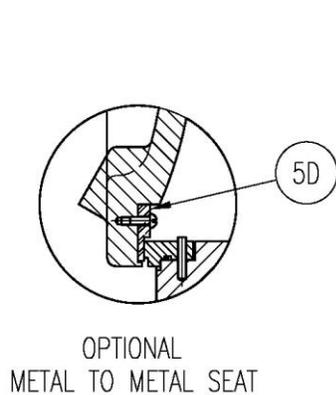
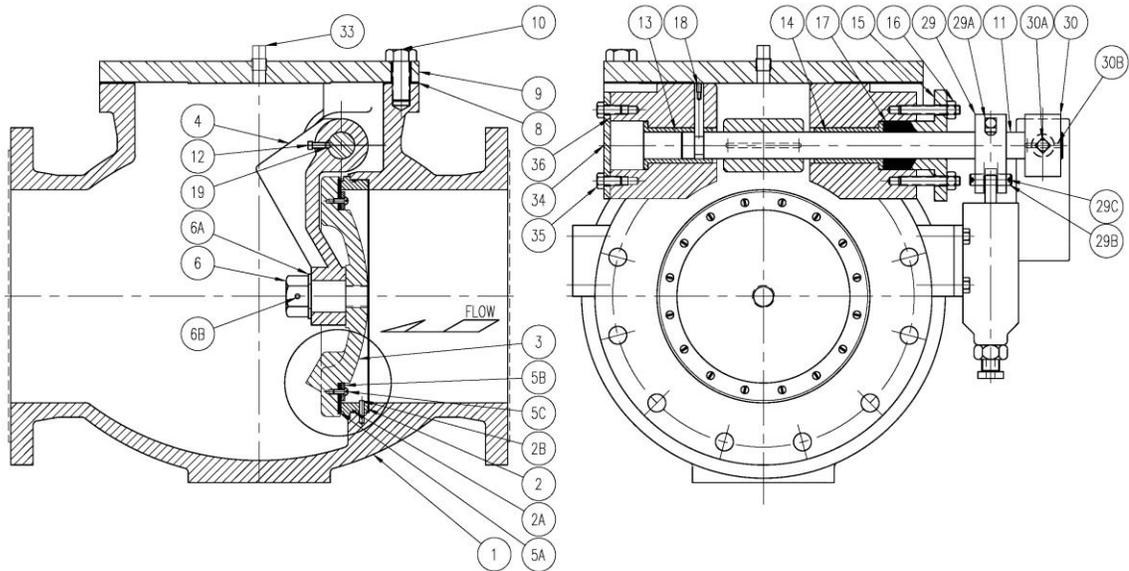
VAG USA, LLC
9025 Marshall Road
Cranberry Township, PA 16066 USA
Telephone: 724-776-1020
Fax: 724-776-1254
E-mail: info-ga@vag-group.com

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.

| Part No. | Part Name | Std. Material |
|----------|---------------------------|-----------------|
| 1 | Body | Cast Iron |
| 2 | Body Seat | Bronze or SS |
| 2A | Seat O-Ring | Buna-N |
| 2B | Seat Pins | Stainless Steel |
| 3 | Disc with Center Pin | Cast Iron/Steel |
| 4 | Disc Arm | Ductile Iron |
| 5A | Renewable Seat | Buna-N |
| 5B | Seat Follower | Bronze or SS |
| 5C | Seat Screws | Stainless Steel |
| 5D | Metal Seat Washer (Opt'l) | Bronze or SS |
| 6 | Disc Nut | Steel |
| 6A | Disc Nut Washer | Steel |
| 6B | Disc Nut Cotter Pin | Stainless Steel |
| 8 | Cover Gasket | Fiber |
| 9 | Cover | Steel |
| 10 | Cover Bolt (and Nut) | Steel |
| 11 | Shaft | Stainless Steel |
| 12 | Disc Arm Set Screw | Stainless Steel |
| 13 | Inner Bushing | Bronze |
| 14 | Outer Bushing | Bronze |
| 15 | Gland | Cast Iron |
| 16 | Gland Stud & Nut | Steel |
| 17 | Packing | Teflon |
| 18 | Shaft Lock Pin | Brass |
| 19 | Disc Arm Key | Stainless Steel |

| Part No. | Part Name | Std. Material |
|----------|-----------------------------|--------------------|
| 20 | Cushion Chamber | Cast Iron** |
| 21 | Cushion Chamber Screws | Steel |
| 22 | Plunger | Brass/Bronze |
| 23 | Plunger O-Ring | Buna-N |
| 25 | Cushion Chamber Liner | Bronze** |
| 26 | Adjusting Sleeve | Brass |
| 27 | Adjusting Sleeve Locknut | Brass |
| 28 | Link | Steel |
| 28A | Link Pin | Stainless Steel |
| 29 | Lever | Cast Iron |
| 29A | Lever Set Screw | Stainless Steel |
| 29B | Lever Pin | Stainless Steel |
| 29C | Lever Cotter Pin | Stainless Steel |
| 30 | Counterweight Arm | Ductile Iron/Steel |
| 30A | C'weight Arm Set Screw | Stainless Steel |
| 30B | Counterweight Arm Key | Stainless Steel |
| 31 | Counterweight(s) | Cast Iron |
| 31A | Counterweight Set Screw | Stainless Steel |
| 32 | Check Valve | Brass/Bronze |
| 33 | Cover Plug (18" & 20" only) | Steel |
| 34 | Shaft End Plate | Steel |
| 35 | Shaft End Plate Screws | Steel |
| 36 | Shaft End Plate Seal | Buna-N |

** Older valves have one-piece all bronze cushion chamber



WARRANTY

For a period of one year from the date of shipment, and provided payments for the Products have been made by Buyer to Seller, Seller warrants to Buyer that its Products: (i) substantially conform to Seller's published specifications and (ii) are free from defects in material or workmanship. Specific products may have a warranty period greater than one year. Any Services provided by Seller are warranted to be performed in a good and workmanlike manner. Should a warranted Product or any Services fail to conform to these warranties, Buyer must promptly notify Seller in writing. Seller will, at its discretion and at no charge to the Buyer: (i) repair the Product or Services; (ii) replace the Product or any Services; or (iii) offer a full refund of that portion of the purchase price allocable to the non-conforming Product or Services. Warranty repair or replacement by Seller shall not extend or renew the applicable warranty period. Buyer shall obtain Seller's agreement on the specifications of any tests it plans to conduct to determine whether a non-conformance exists. Buyer shall bear the costs of access for Seller's remedial warranty efforts (including removal and replacement of systems, structures or other parts of Buyer's facility), de-installation, decontamination and re-installation. THE FOREGOING WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. This warranty allocates the risks of Product failure between Seller and Buyer. This allocation is recognized by both parties and is reflected in the price of the goods. Buyer acknowledges that it has read VAG USA, LLC's Terms and Conditions of Sale, understands it, and agrees to and is bound by its terms.

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