

**INSTALLATION, OPERATION AND  
MAINTENANCE MANUAL**

**FIGURE 990**

**VACUUM BREAKING VALVES  
FOR CLEAN FLUIDS**

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# INSTALLATION, OPERATION and MAINTENANCE

## Figure 990 Vacuum Breaking Valve

### INTRODUCTION

This manual will provide the information to properly install, operate and maintain the valve to ensure a long service life. The Figure 990 is ruggedly constructed to provide years of trouble-free operation with a minimal maintenance.

The Figure 990 is designed to open to admit air into the system when the pressure on the system side of the valve falls below atmospheric thereby limiting the negative pressure within the system to minimize damage or other consequences of excessive vacuum.

The Figure 990 is not intended for use with fluids containing suspended solids such as wastewater and sewage. The GA Industries Figure 991 Vacuum Breaking Valve is recommended for such applications.

**CAUTION:** The valve is NOT recommended for use with toxic fluids 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.

### RECEIVING AND STORAGE

Inspect the valve upon receipt for damage during shipment. Unload all valves carefully to the ground without dropping. The valve should be lifted by the body and not by the protective hood.

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

The valve must be installed in an upright vertical orientation, normally at a high point in the system. If installed within a vault or building, sufficient ventilation **MUST** be provided to allow air to enter the valve without restriction.

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.

An isolating valve should be installed between the valve and the system to facilitate maintenance. If a butterfly valve is used, verify there is ample clearance between the butterfly valve disc and the fully open vacuum breaking valve stem. This clearance is usually sufficient for 10" (250mm) and smaller valves but a short spacer may be need to be installed between the vacuum valve and butterfly valve for larger sizes.

Lower the valve over the mating flange using slings or chains around the valve body. 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.

### DESCRIPTION OF OPERATION

The valve cracks open when the pressure at its flanged connection drops sufficiently **BELOW** atmospheric pressure to overcome the closing force of the internal spring, approximately -1/2 PSIG (-3.5kPa). Air then flows from outside the valve into the system. The valve only opens as far as needed to admit air into the system at the same volumetric rate at which liquid is leaving the system. The valve closes when the pressure at the valve flange connection rises

above the cracking pressure. The operation is automatic and requires no manual action.

**VALVE CONSTRUCTION**

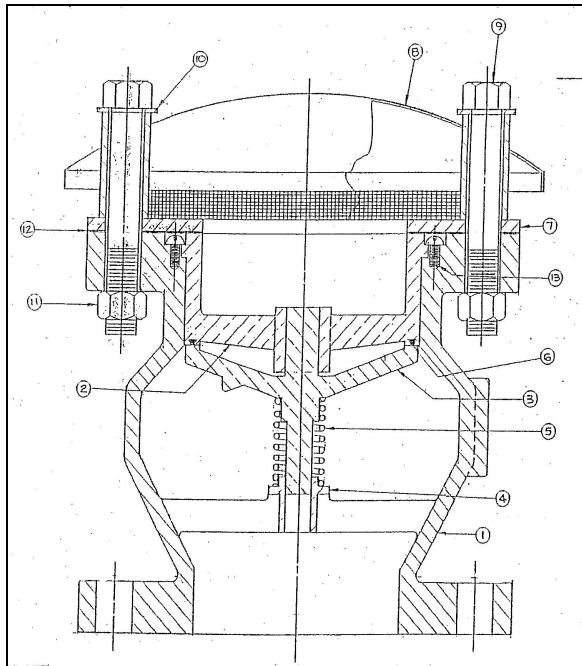
The standard Figure 990 Vacuum Breaking Valve has a cast iron body and bronze internals. Optional materials such as ductile iron body can be provided for higher working pressures. Refer to the List of Materials submitted for the order if non-standard materials were provided.

The disc and spring are the only moving parts and require no lubrication or routine maintenance. The general details of construction are shown in Figure 1 and Table 1 lists the parts.

The body (1) has a flange at the bottom where the valve connects to the system and a screened hood at the top where air enters the valve. The seat (2) is retained in the body by screws (13) except for 2-1/2" (65mm) and 10" (250mm), which are threaded-in. The screws will not retain the seat when there is pressure in the valve. Do not remove the cowl bolts (9) while there is pressure in the valve body.

**WARNING**

Removing the cowl bolts while there is pressure in the valve body may result in injury or damage to the valve



**FIGURE 1**

**MAINTENANCE**

Figure 990 Vacuum Breaking Valves require no scheduled lubrication, adjustment or preventive maintenance.

Periodic visual inspection to ensure the air inlet screen is not clogged or obstructed and to verify there is no fluid leakage.

Internal maintenance and/or replacement of parts can be performed without removing the valve body from the pipeline.

**TROUBLESHOOTING**

- Fluid Leakage  
Verify debris has not collected on the seat preventing tight closure

Verify rubber or metal seating surface is not damaged

Verify internal spring is not broken or damaged

Verify disc stem is not bent or binding in bushing

- Valve Slams Shut  
Push down on disc and verify it freely returns to the closed position

Verify internal spring is not broken or damaged

Verify disc stem is not bent or binding in bushing

PARTS LIST		
Item	Name	Material
1.	Body	Cast or Ductile Iron
2.	Seat	Bronze or SS
3.	Disc	Bronze or SS
4.	Bushing	Bronze or SS
5.	Spring	SS
6.	Rubber Seat	Buna-N (Std)
7.	Retainer Plate	Steel
8.	Cowl Assembly	Steel
9.	Cowl Bolts	Steel
10.	Cowl Washer	Steel
11.	Cowl Nuts	Steel
12.	Gasket	Composition
13.	Seat Screws	SS

**TABLE 1**

## **DISASSEMBLY**

While small valves may be more easily serviced by removing it from the line, all valves can be serviced while the body remains bolted to the mating flange.

First ensure there is no pressure within the valve. Remove the cowl bolts, washers and nuts (9, 10 & 11) and lift off cowl assembly (8).

Lift off retainer plate (7) and gasket (12).

Remove the seat retaining screws (13) or unscrew seat (2-1/2" and 10" only) and remove the seat (2) from the body.

Carefully lift the disc (3) out of the body ensuring the spring (5) does not fall. Remove spring (5) and bushing (4).

Remove o-ring (6) from seat.

Inspect all parts for wear and damage. Minor scratches and dents and some discoloration are normal. Gouges and deep dents on the disc's seating surface may cause leakage. Ensure the disc's stem is not bent and there is clearance between it and the guide bushing. Replace damaged parts.

## **REASSEMBLY**

Clean all parts especially seating and sealing surfaces before reassembling valve. Worn parts, gaskets and seals should be replaced during re-assembly.

Insert bushing (4) into hole in body guide spokes and fit the spring (5) over it. Insert lower stem of disc (3) into bushing, the spring retains the bushing in place.

Lubricate and install new O-ring (6) into groove in seat, ensuring it is flat and not pinched or buckled. Fit seat (2) over upper stem of disc and push down to compress spring while inserting seat screws. Larger valves may require C-clamps to compress spring.

Install new gasket (12) and position retainer (7) and cowl assembly (8) so all the holes align. Insert cowl bolts (9), washers (10) and nuts (11).

Tighten cowl bolts and nuts.

## **REPLACEMENT PARTS**

Genuine replacement parts are available from your local GA Industries, Inc. representative or from the factory:

GA INDUSTRIES, INC.  
9025 Marshall Road  
Cranberry Township, PA 16066 USA  
Telephone: 724-776-1020  
Fax: 724-776-1254  
E-mail: [parts@gaindustries.com](mailto:parts@gaindustries.com)

Please have the nameplate data available when ordering parts.