

# INSTALLATION, OPERATION AND MAINTENANCE MANUAL

## 4" Figure 945

Combination Air Valves for Water

Drawing ECAV-7134



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

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WARNING: Cancer and Reproductive Harm – [www.Prop65Warnings.ca.gov](http://www.Prop65Warnings.ca.gov)

# INSTALLATION, OPERATION and MAINTENANCE

## 4" Figure 945 Combination Air Valves

### INTRODUCTION

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

Figure 945 Combination Air Valves are not intended for use with fluids containing suspended solids such as wastewater and sewage. GA Industries Figure 942, 955 or 957 Combination Air Valves are recommended for such applications.

#### CAUTION

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

#### CAUTION

The valve will not function if used at a pressure higher than the maximum working pressure indicated on the nameplate.

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 945 Combination Air Valve performs the following functions:

- Vents air through the large orifice ahead of the incoming water as the system is filled then closes tightly to prevent the escape of water.
- Automatically opens and closes the small orifice as often as needed to release air that has accumulated in the valve while the system is pressurized and operational
- Opens automatically to admit air through the large orifice to limit vacuum pressure within the pipe or system.

### 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

The 4" Figure 945 is standard with NPT screwed connections. An optional flange pipeline connection is available.

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

The valve must be installed in an upright vertical orientation, normally at a high point in the system.

If installed outdoors, below ground in a vault or in an unheated area, adequate freeze protection must be provided. Some discharge of water may occur during operation so the valve outlet should be piped to an adequate drain.

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

Carefully screw threaded end valves onto pipe nipple using compatible thread sealant. Tighten valve using wrench flats. DO NOT OVERTIGHTEN.

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 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.

The valve is standard with an NPT screwed outlet connection. It is recommended that the outlet be piped away in a manner that directs the high velocity air discharge away from personnel. An optional "cowl" can be provided to deflect the air discharge.

### VALVE CONSTRUCTION

The standard Figure 945 Combination Air Valve has an iron body, stainless steel float and linkage mechanism and a rubber seat. Optional materials can be provided so refer to the List of Materials submitted for the order if non-standard materials were provided.

Refer to Figure 1 for details of construction and parts location.

The inlet connection is at the center of the bottom where the valve attaches to the system and the outlet connection through which air leaves the valve is at the opposite end on the rectangular cover

### 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

### PREVENTIVE MAINTENANCE

Figure 945 Combination Air Valves require no scheduled lubrication, adjustment or preventive maintenance.

A periodic visual inspection should be performed to ensure the outlet piping is not obstructed and to verify there is no fluid leakage.

### TESTING

Valve operation can be easily tested. Close the inlet isolation valve and remove or loosen the pipe plug nearest the inlet to drain the water from the valve. The floats should drop as the water leaves the valve. NOTE: A ball or gate valve can be installed in place of the pipe plug to facilitate testing.

Replace or tighten the pipe plug and slowly open the inlet isolating valve. The valve should float closed and seat tightly.

### TROUBLESHOOTING

- Valve Does Not Close / Fluid Leakage  
Verify debris has not collected on the seats preventing tight closure

Verify rubber orifice button and/or orifice seating surfaces are not damaged

Verify floats have buoyancy

Verify linkage mechanism operates freely without binding or sticking

- Valve Does Not Open  
Verify debris in the valve is not preventing the floats from freely falling when fluid is drained from valve

Verify linkage mechanism operates freely without binding or sticking

### DISASSEMBLY

While small valves may be more easily serviced by removing it from the line, all valves can be serviced while the body remains connected to the pipeline. A skilled technician with proper tools should perform all work. No special tools are required.

First ensure there is no pressure within the valve. Remove the air vacuum valve cover bolts (5) and lift off cover (2). It may be necessary to pry off the cover or tap upward with a mallet and cold chisel at the cover/body juncture.

Lift out the air/vacuum float (3), cushion (6) and guide bearing (26) being careful not to drop these small parts. If needed, unscrew the float ball guide (7) from the float (3).

Remove the air release valve cover bolts (25) and lift off the air release cover (4). It may be necessary to pry off the cover or tap upward with a mallet and cold chisel at the cover/body juncture. Remove O-ring (19) from the cover and retain unless being replaced.

Remove the two spring pins connecting the leverage arm (11) and float arm (12) to the bracket (9). The float and linkage will be free from the cover.

Remove the spring pin connecting the pivot link (13) to the float arm (12) and remove the float screw (24) and lock washer (23). Remove the hex nut (17) and lock washer (23) and unscrew the orifice button (16) from the lever arm (11).

Remove the bracket screw (14) to remove the leverage bracket (9).

If the orifice (10) is being replaced, use a ½" socket to remove the orifice. The orifice was factory installed using Loctite® so it may be necessary to apply some heat to remove.

Inspect all parts for wear and damage. Minor scratches and dents in the float are normal. Some floats may contain sand for added weight but if water is detected replace the float. Carefully clean the orifice of scale. Remove all vestiges of the cover gasket from the body and cover surfaces. Clean gasket sealing surfaces with emery cloth. Replace damaged parts.

### **REASSEMBLY**

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

Position the leverage bracket (9) and install the lock washer (23) and bracket screw (14) but do not tighten. If a new orifice is being installed, apply Loctite® PST thread sealant to orifice (10) and thread into cover but do not tighten. Tighten the locating screw. Torque the orifice to maximum 22 ft-lbs.

Thread orifice button (16) all the way into leverage arm (11) and install hex nut (17) and lock washer (23) but do not tighten. Connect the leverage arm (11) and float arm (12) to the bracket (9) using two spring pins (22).

Adjust the orifice button (16) so that the end of the leverage arm (11) nearest the orifice button is about 1/16" (1.6mm) farther from the cover than the opposite end when the orifice button (16) is gently resting on the orifice (10). Secure by tightening hex nut (17).

Secure air release float (18) to pivot link (13) using float screw (24) and lock washer (23). Attach pivot link (18) to float arm (12) using spring pin (22). Verify free movement of linkage mechanism and that the orifice button (16) presses against the orifice (10) when the float is lifted and pulls away when falls.

Install O-ring (19) in groove on bottom of air release cover (4) using lubricant to retain the O-ring. Carefully invert the cover and place on the valve body. Install air release bolts (25) and tighten in an alternating pattern.

Install the guide bearing (26) and place the cushion (6) on top of the guide bearing so its hole lines up with that of the guide bearing. Apply a small

amount of Loctite® to the float guide threads and install float guide (7) into one of the threaded holes in the air/vacuum float (3) and carefully tighten.

Carefully lower the float ball into the body so that the float guide is inserted into the guide bearing without dislodging the cushion.

Place the air & vacuum seat (8) centered on the raised machined surface so its neck extends into the outlet. Place the cover over the seat, install cover bolts (5) and tighten in an alternating pattern.

Carefully introduce pressure and check for leaks

Allow valve to remain under pressure for 24 hours then check again for leaks and tighten cover bolts if necessary.

### **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)

### **REPAIR KITS**

Soft Goods Kit A945-4 (P/N 2-80-11000-434)  
contains Items 6, 8, 16, 19 and 26

Linkage Kit AL945-4 (P/N 2-80-11000-602)  
contains Items 9, 11, 12, 13, 14, 15, 21 and 23

Other parts are ordered individually

### **WARRANTY**

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

**PARTS LIST**  
(Refer to Figure 1)

Item	Name	Material	Item	Name	Material
1.	Body	Cast Iron	14.	Bracket Screw	304 Stainless Steel
2.	Air/Vacuum Cover	Cast Iron	15.	Lock Washer	410 Stainless Steel
3.	Air/Vacuum Float	316 Stainless Steel	16.	Orifice Button	Buna-N & Stainless
4.	Air Release Cover	Cast Iron	17.	Hex Nut	304 Stainless Steel
5.	Air Vacuum Bolts	Zinc Plated Steel or 316SS	18.	Air Release Float	316 Stainless Steel
6.	Cushion	EPDM Rubber	19.	O-Ring	Buna-N Rubber
7.	Ball Guide	316 Stainless Steel	20.	Pipe Plug	Steel
8.	Seat	Buna-N & 316 Stainless Steel	21.	Valve Link	316 Stainless Steel
9.	Leverage Bracket	316 Stainless Steel	22.	Spring Pin	316 Stainless Steel
10.	Orifice	316 Stainless Steel	23.	Lock Washer	410 Stainless Steel
11.	Lever Arm	316 Stainless Steel	24.	Float Screw	304 Stainless Steel
12.	Float Arm	316 Stainless Steel	24.	Float Guide	316 Stainless Steel
13.	Pivot Link	316 Stainless Steel	25.	Air Release Bolts	Zinc Plated Steel or 316SS
			26.	Guide Bearing	Self-lubricating Copolymer

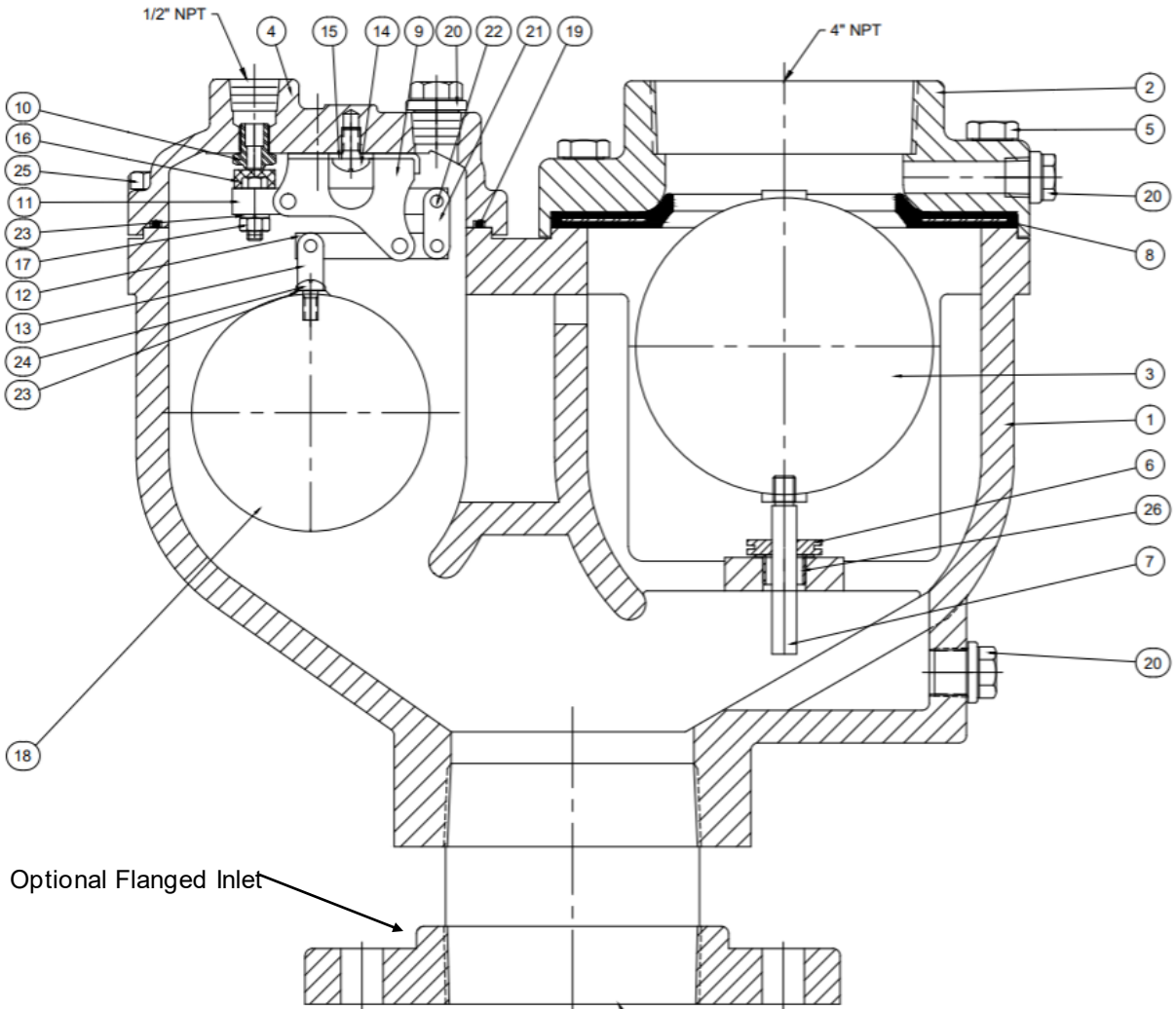


Figure 1