

System drawings shown in this bulletin are for illustration purposes only. Refrigeration systems should only be serviced by a qualified technician. Always observe proper safety procedures when servicing a refrigeration system. For more information see the latest revision of Phillips Safety Bulletin SGRV.

GENERAL INFORMATION

Pressure Rating: 300 psig [21 bar, gauge]

MOPD: 230 psi [16 bar]
(120 psi [8 bar] 301J w/ 9/32" cartridge)

Temperature Rating: -20°F to 240°F
[-29°C to 116°C]

The 301E Series low-side float valves are fixed-level modulating controls which open with a drop in liquid level. Valves in this series include the 301E, G, J, and K valves for ammonia systems, and the 301EF, GF and JF for halocarbon systems. These valves incorporate a replaceable cartridge, which contains the working needle and seat.

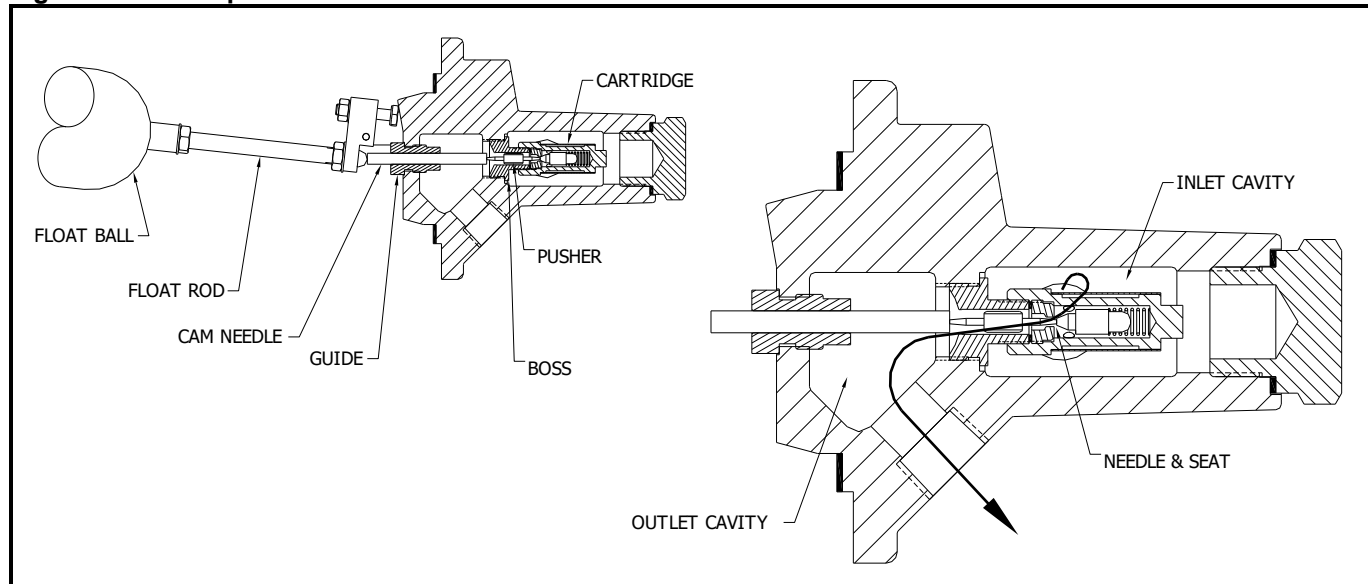
The valve is typically installed in a welded steel chamber that includes a Phillips Level Eye Sight Glass for a visual check of liquid level. The valve and chamber can be mounted on a unitary surge drum, evaporator, intercooler, or other application requiring an external level control. A remote feed line is required from the valve outlet to the vessel or evaporator.

The 301E Series valves are used alone on small capacity applications. When greater capacities are required, these valves can be used as pilot float valves with Phillips 701S Series pilot operated valves. See Bulletin 701S for engineering data.

VALVE OPERATION

The valve is operated by the movement of a float ball, which rises and falls in response to the changing liquid level inside the float chamber. High pressure liquid enters an inlet cavity containing the cartridge through one of two connections on the sides of the valve body. If the liquid level in the surge drum is low, the float ball falls causing the end of the float rod to press the cam needle against the pusher. See Figure 1. The pusher pushes the needle within the cartridge off the seat and allows liquid to flow from the inlet chamber through the cartridge and into the liquid outlet chamber. Liquid then flows out through the remote feed connection, into the surge drum. When the liquid level inside the float chamber rises, the float ball rises and a spring inside the cartridge pushes the needle against the seat and stops flow.

Figure 1: Valve Operation



INSTALLATION

A typical installation arrangement is shown in Figure 2. Note that the 301E Series valves do not include a manual shut-off stem, as on the 300H and 301H Series valves. It is therefore necessary that the upper and lower chamber equalizing lines include shut-off valves to facilitate pumping down the float chamber.

Liquid may be fed horizontally into either the left or right side of the valve. The unused liquid inlet is sealed with a pipe plug. The remote feed line exits at a 45° angle below the valve centerline.

Overall valve dimensions are shown in Figure 3.

Figure 2: Typical Application

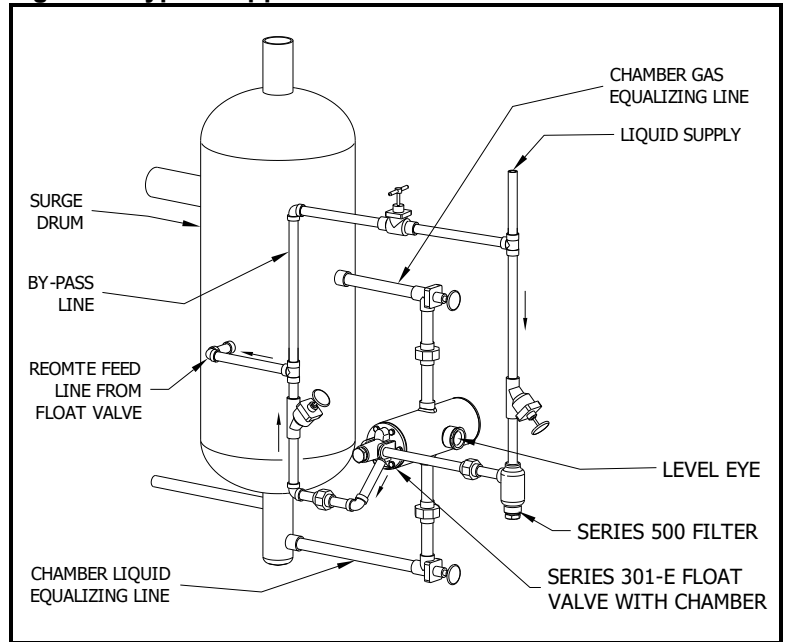
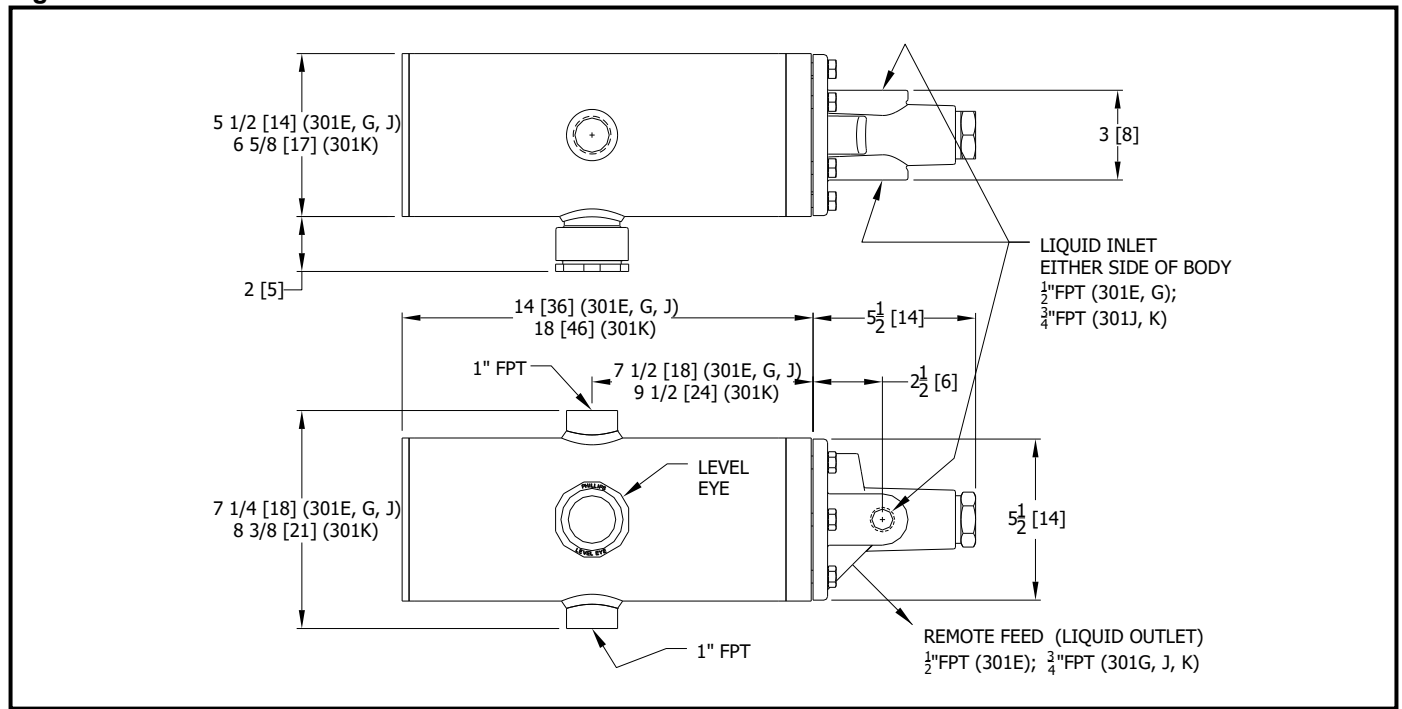


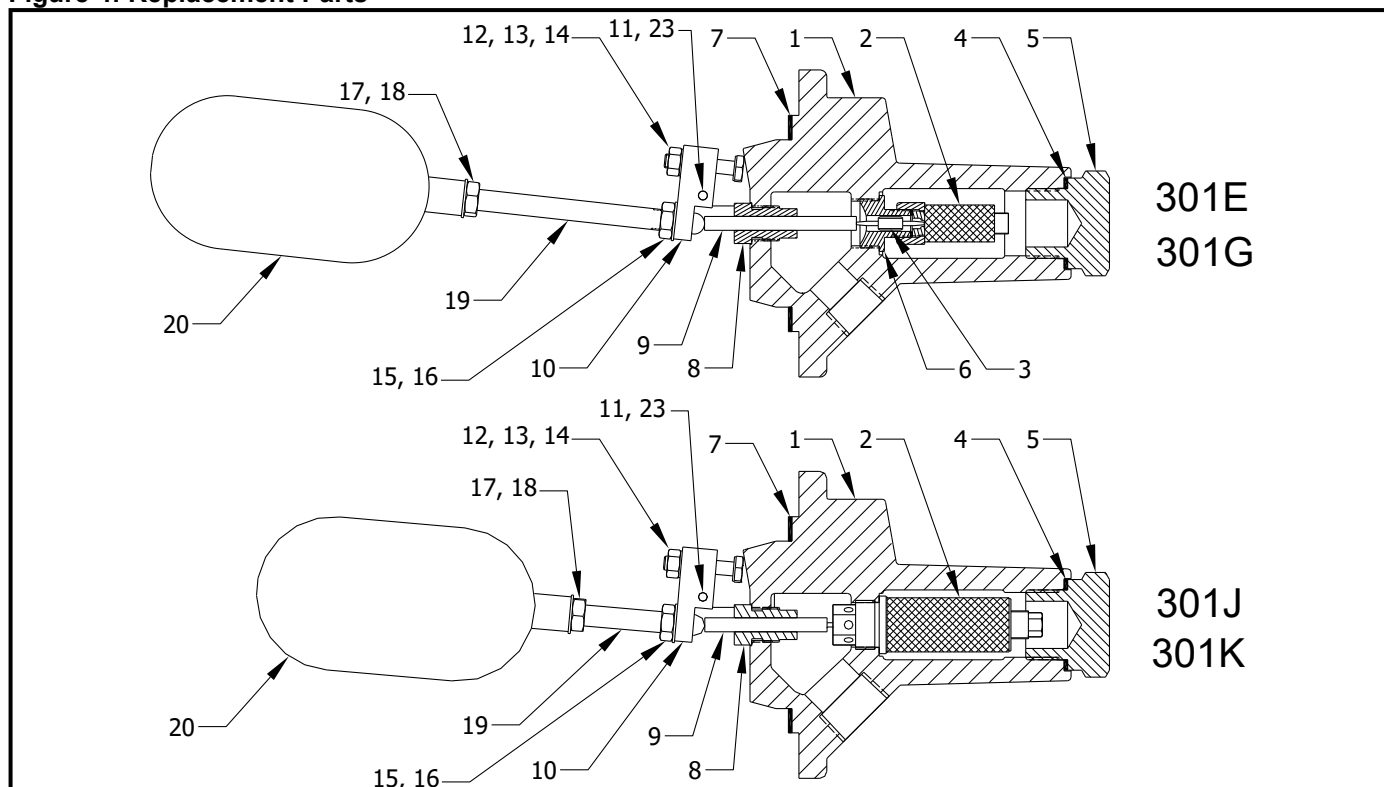
Figure 3: Dimensions



REPLACEMENT PARTS

Basic replacement parts are shown in Figure 4 and Table 1. (See Engineering Bulletin 1100 for Level Eye replacement parts.) When contacting Phillips for replacement parts, have the complete valve model and serial number (shown on the valve nameplate) available to ensure you receive the correct components. For example: 301EF-CZB is a complete model number, and 990105 is a complete serial number. The cartridge size can be determined from this information.

Figure 4: Replacement Parts



SERVICE INSTRUCTIONS

Refrigeration systems should only be serviced by a qualified technician. Always observe proper safety procedures. To replace parts other than the cartridge and the pusher (as described below), it is necessary to remove the valve from the chamber.

Table 1: Replacement Parts

	Description	301E	301G	301J	301K
1	Valve Body	301E-VB	301G-VB	301J-VB	301K-VB
2	Cartridge*	310	310A	355	355
3	Pusher*	308	308A	-	-
4	Gasket*	365	365	365	365
5	Access Plug	363	363	363	363
6	Boss	307E	307G	-	-
7	Gasket	326	326	326	326
8	Gland	328E	328E	328E	328E
9	Cam Rod	314E	314E	317J	317J
10	Float Block	315R	315R	315R	315R
11	Lever Pin	11	11	11	11
12	Adjusting Screw	369	369	369	369
13	Nut	324	324	324	324
14	Lock Washer	55	55	55	55
15	Nut	88	88	88	88
16	Lock Washer	55A	55A	55A	55A
17	Nut	87	87	87	87
18	Lock Washer	55A	55A	55A	55A
19	Float Rod	313R	313A	343H	343H
20	Float Ball (Ammonia)	321M	370M	370M	370A
	Float Ball (Halocarbons)	321MF	370MF	370MF	-
21	Chamber (Not Shown)	398A	398A	398A	398B
22	Cap Screw (6) (Not Shown)	325	325	325	325
23	Spacers (2-4)	11S	11S	11S	11S
-	*Spare Parts Kit (Includes items 2, 3 & 4) Specify orifice diameter when ordering	K310**	K310A	K355	K355

**K310 kits include both the 19 and 365 gaskets. Only (1) is needed. The 301E valve uses the 365 gasket. The 19 gasket can be tossed.

Changing the Cartridge (Needle & Seat)

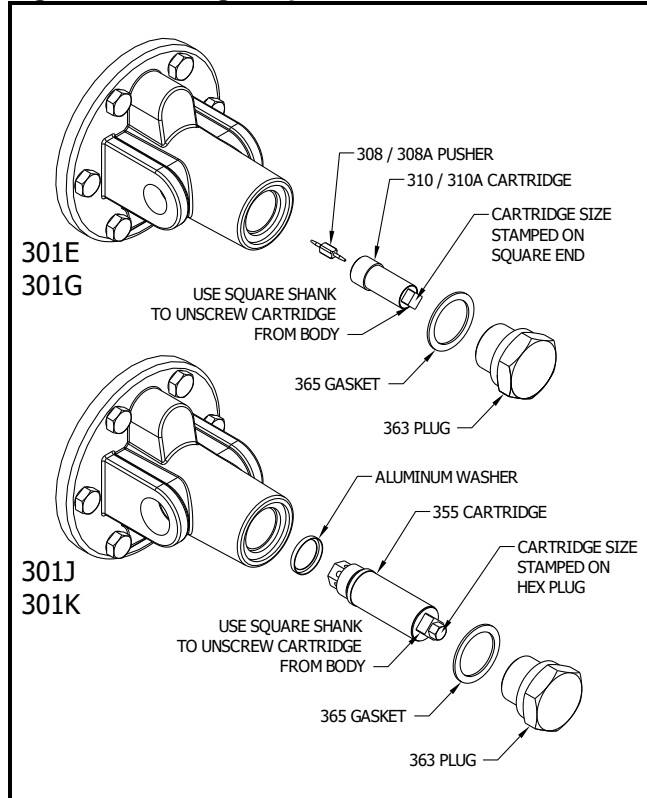
When wear of the needle and seat justifies part replacement, it is recommended that a completely new cartridge be obtained. These are assembled and tested at the factory for pressure tightness. Cartridge removal for replacement or cleaning is accomplished as follows. Refer to Figure 5.

1. Shut off the hand valve in the liquid line and after allowing this line to empty, close the hand valve in the remote feed line to the vessel.
2. Shut the hand valve in the upper (gas) balance line of the chamber. Allow the formation of gas in the chamber to force the remaining liquid out of the lower (liquid) balance line of the chamber. Close the hand valve.
3. Finish venting the chamber by conventional means.
4. Unscrew the access plug at the head of the valve body and unscrew the cartridge.

SERVICE INSTRUCTIONS (Continued)

5. Replace the Cartridge:
 - **301E / 301G:** Replace both the cartridge (310 / 310A) and the pusher (308 / 308A).
 - **301J / 301K:** Replace cartridge (355) being sure to remove the old aluminum washer. A new aluminum washer is supplied with the cartridge.
6. Replace gasket (363) and reinstall access plug (363). The valve is now ready for operation
7. Open the chamber balance line hand valves and the liquid line hand valves.

Figure 5: Cartridge Replacement



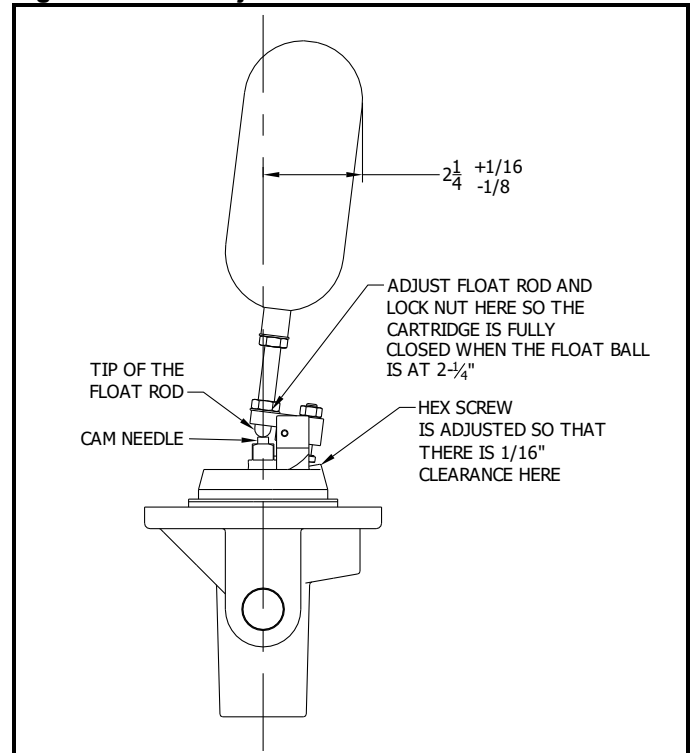
FLOAT ADJUSTMENT IN THE FIELD

If it is necessary to disassemble the valve for servicing, the float travel must be carefully adjusted after re-assembly for the valve to operate properly. To ensure proper float movement, first stand the valve up so the float ball is roughly vertical. The tip of the float rod should lightly touch the cam needle so that the cartridge is closed. Refer to Figure 6.

Next adjust the float rod and lock nut so that the cartridge is fully closed when the dimension shown in the figure is 2-1/4" [57mm].

Finally, adjust the hex screw so there is 1/16" [1.5mm] clearance between the screw head and the valve body.

Figure 6: Float Adjustment



TROUBLESHOOTING (301E Feeding Vessel)

Problem: Valve overfeeds, flooding the vessel.

Causes/Solutions:

- Cartridge worn, will not shut off properly. Replace cartridge.
- Cam rod or pusher assembly (on 301E & 301G) worn/jammed, will not allow cartridge to close. Replace pusher assembly.
- Float ball developed leak, will not allow float rod to rise. Confirm leak by immersing ball in warm water and observing bubbles. Replace float ball.

Problem: Valve underfeeds, starving the vessel.

Causes/Solutions:

- Cam rod or pusher assembly (on 301E & 301G) worn/jammed, will not allow cartridge to open. Replace pusher assembly.

TROUBLESHOOTING (301E Piloting 701S)

- See 701S Service Bulletin