Phillips REFRIGERATION

VALVES • VESSELS • SYSTEMS • CONTROLS

300H SERIES
DIRECT-FEED LOW-SIDE FLOAT VALVE
BULLETIN 300H-SB18-01
SERVICE BULLETIN

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 [17 bar]

Temperature Rating: -20ºF to 240ºF [-29ºC to 116ºC]

The 300H and 300HM Series of direct-feed low-side float valves are fixed-level modulating controls which open with a drop in liquid level. Valves in the 300H Series include the 300A, 300H, and 300HD for ammonia systems. Valves in the 300HM Series include the 300AM, 300HM, and 301HMD for ammonia systems. The suffix "F" is added to designate valves for halocarbon applications. (Example: 300HMF) All of these valves incorporate a replaceable cartridge, which contains the working needle and seat that can be changed without pumping down the surge drum or evaporator through the use of the manual stem.

The 300HM Series valves differ from the 300H Series in that the HM incorporates a hinged float rod. The hinged rod allows the valve to be mounted in smaller surge drums and in float chambers.

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 surge drum. High pressure liquid enters an inlet cavity containing the cartridge through either of two 1/2" FPT connections on the sides of the valve body. If the liquid level in the surge drum is low, the float ball falls causing the float block to press the cam needle against the pusher (Figure 1). The pusher assembly, in turn, pushes the needle within the cartridge off the seat. This allows liquid to flow from the inlet cavity through the cartridge, past the pusher, through holes in the boss, and into the surge drum. When the liquid level inside the surge drum rises, the float ball rises and a spring inside the cartridge pushes the needle against the seat and stops flow.

The manual stem is provided to allow the cartridge to be changed without the need for pumping down the vessel. The procedure for changing the cartridge is described in more detail later in this bulletin. Screwing the manual stem completely inward forces the cam needle to fully seat into the boss, isolating the cartridge. The manual stem should not be used as a means for limiting cartridge movement during normal operation or as a bypass. Doing so can result in premature cartridge wear.

INSTALLATION

When mounting the valve on a vessel, care should be taken that the float can move freely and is shielded from incoming liquid by an internal baffle. Overall valve dimensions are shown in Figure 2. The valve is typically mounted to the vessel by a flange on the end of a 3" pipe.

A typical installation arrangement for a 300H or HM Series valve is shown in Figure 3 for a refrigerated wall tank. Note the hand valve upstream of the 500 Series strainer. When this hand valve is closed to service the float valve, the hand expansion valve may be opened to feed the surge drum.

REPLACEMENT PARTS

Basic replacement parts are shown in Figure 4 and listed in Table 1. 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: 300HMF-GZZ is a complete model number, and 990105 is a complete serial number.

Figure 1: Valve Operation

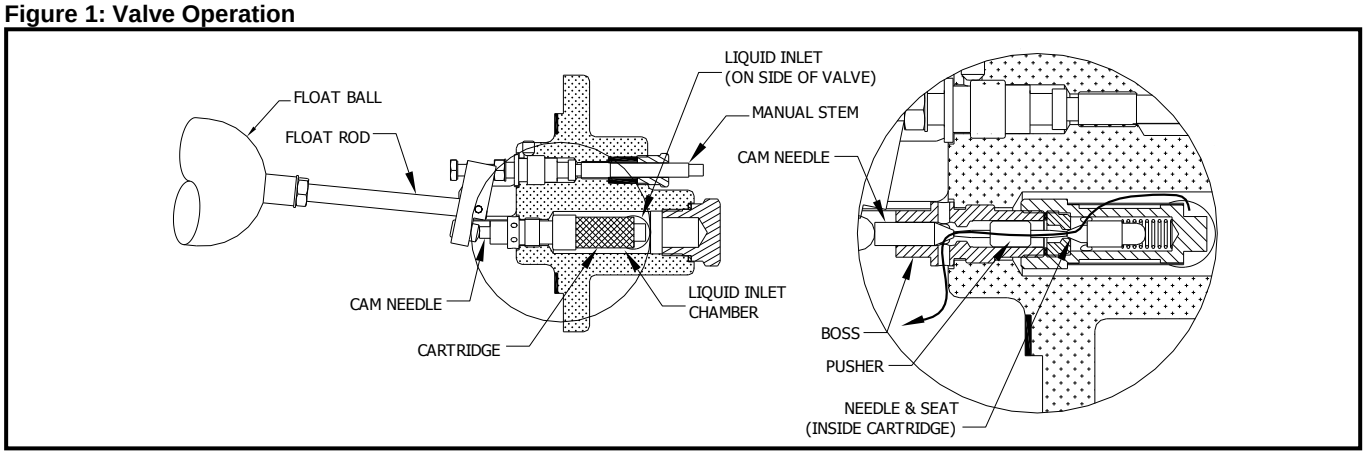
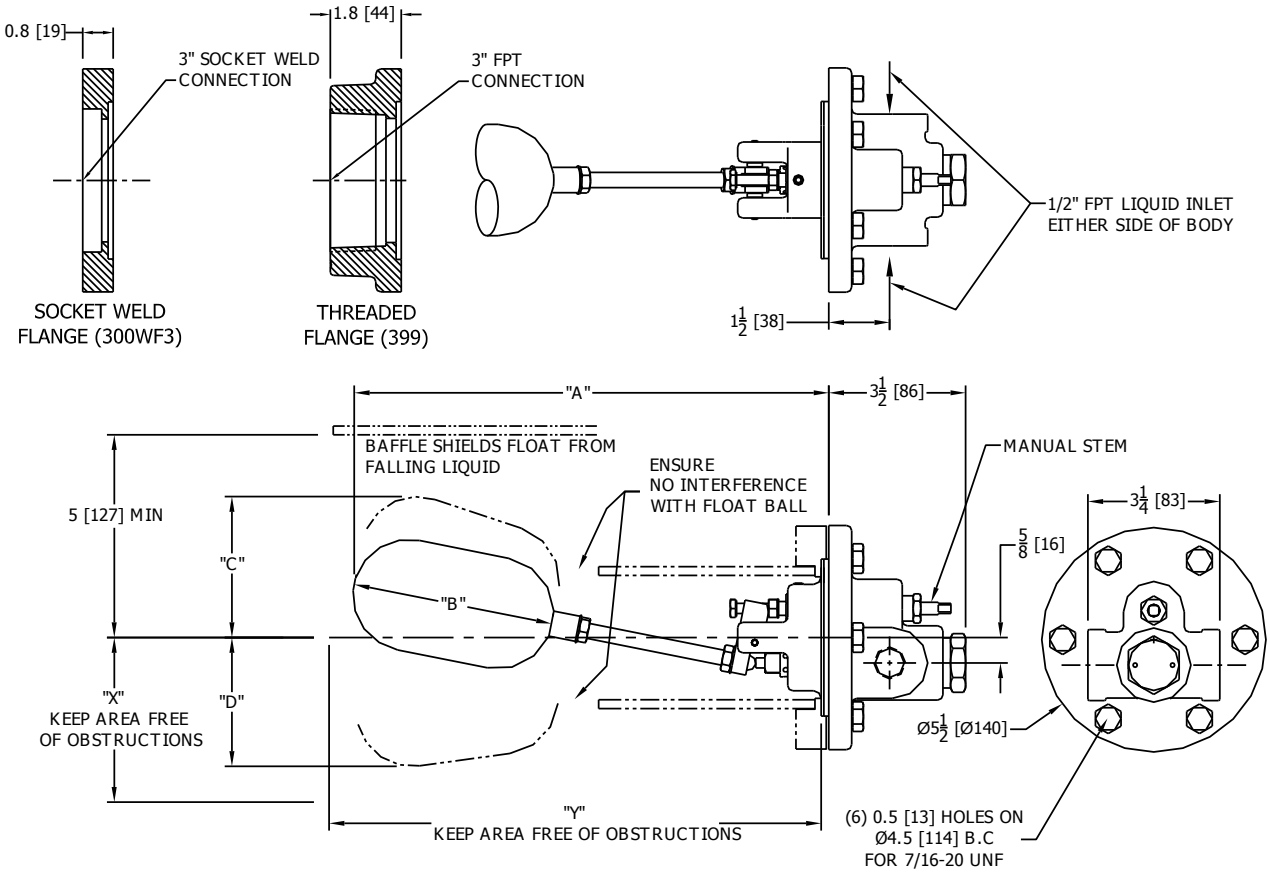
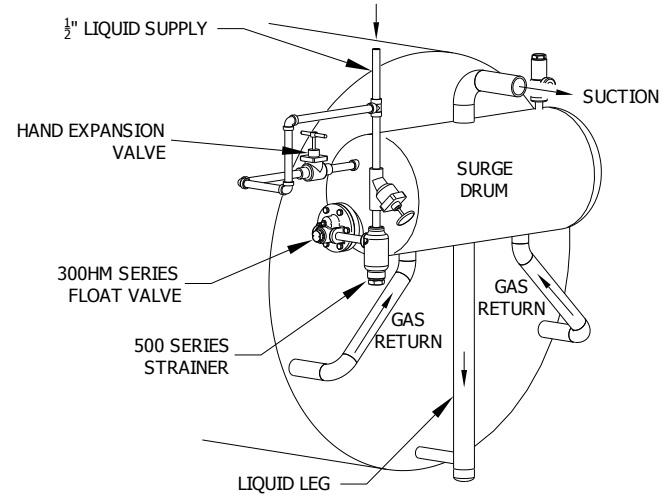


Figure 2: 300H/HM Installation Dimensions



	DIMENSIONS, INCHES [MM]						WEIGHT, LB [KG]
	A	B	C	D	X	Y	
300H, 300HD	12 [305]	5 [127]	3-1/2 [89]	3-1/4 [83]	4 [101]	12-1/2 [318]	13 [5.9]
300HM, 300HMD	12 [305]	5 [127]	2-3/4 [70]	2-3/4 [70]	3 [76]	12-1/2 [318]	13 [5.9]
300A	13 [330]	7-1/2 [190]	3-3/4 [95]	3-1/2 [89]	4 [101]	13-1/2 [343]	14 [6.4]
300AM	13 [330]	7-1/2 [190]	2-3/4 [70]	2-3/4 [70]	3 [76]	13-1/2 [343]	14 [6.4]

Figure 3: Typical Application



SERVICE

Refrigeration systems should only be serviced by a qualified technician.

Replacing parts other than the Cartridge and Pusher

To replace parts other than the cartridge and pusher, the evaporator must be fully evacuated and the valve removed from the vessel.

If the float rod and manual stem come out of adjustment, the following procedure will restore proper valve operation. Adjustment of the 300H and 300A valves is given first, followed by adjustment of the 300HM and 300AM.

Figure 4: Replacement Parts

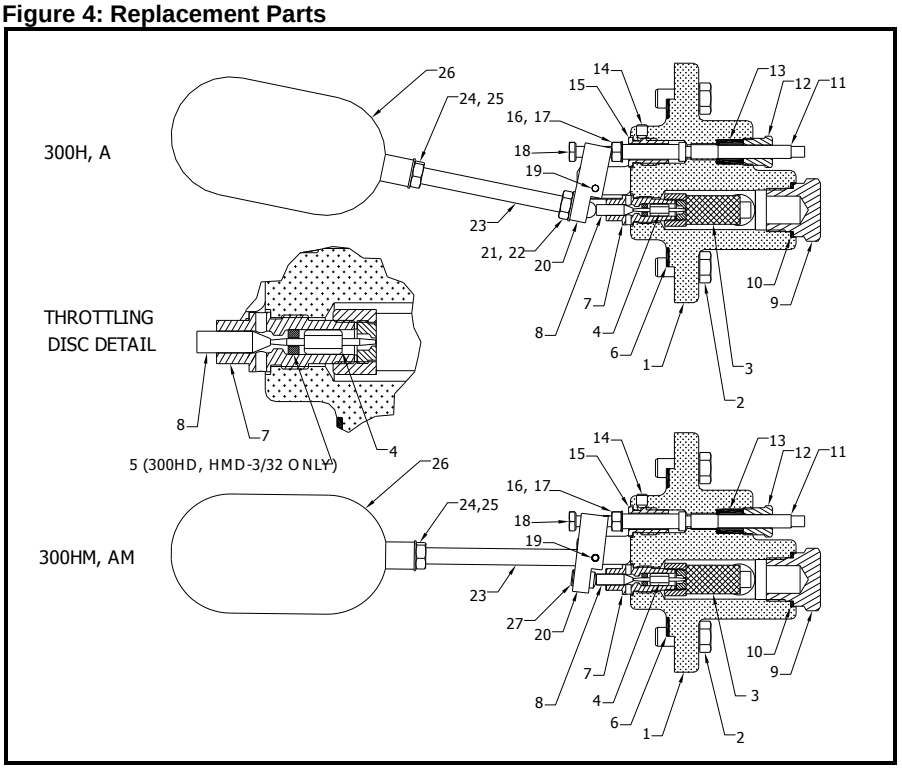


Table 1: Replacement Parts

Item	Description	300H	300HM	300A	300AM
1	Valve Body	300-VB	300-VB	300A-VB	300A-VB
2	Cap Screw (6)	325	325	325	325
3	Cartridge*	310	310	310A	310A
4	Pusher*	308	308	308A	308A
5	Throttling Disk* *(300HD-3/32/300HMD-3/32 only)*	302D	302D	-	-
6	Gasket	326	326	326	326
7	Boss	307	307	307A	307A
8	Cam Needle	314	314	314A	314A
9	Access Plug	14	14	363	363
10	Gasket*	19	19	365	365
11	Manual Stem	327P	327P	327P	327P
12	Gland	8	8	8	8
13	Packing Ring	775	775	775	775
14	Set Screw	316	316	316	316
15	Stem Stop	318P	318P	318P	318P
16	Nut	324	324	324	324
17	Lock Washer	55	55	55	55
18	Cap Screw	319P	319P	319P	319P
19	Lever Pin	411	411	411	411
20	Float Block	315PA	315PM	315PA	315PM
21	Nut	87	-	87	-
22	Lock Washer	55A	-	55A	-
23	Float Rod	313R	313HM	313A	313AM
24	Nut	88	88	88	88
25	Lock Washer	55A	55A	55A	55A
26	Float Ball (Ammonia)	321M	321M	370M	370M
	Float Ball (Halocarbon)	321MF	321MF	370MF	370MF
27	Set Screw	-	87S	-	87S
28	SW Mounting Flange (Fig 2)	300WF3	300WF3	300WF3	300WF3
29	Thrd. Mounting Flange (Fig 2)	399	399	399	399
-	*Spare Parts Kit (Includes items 3, 4, 5, 10) Specify orifice size when ordering	K310**	K310**	K310A	K310A

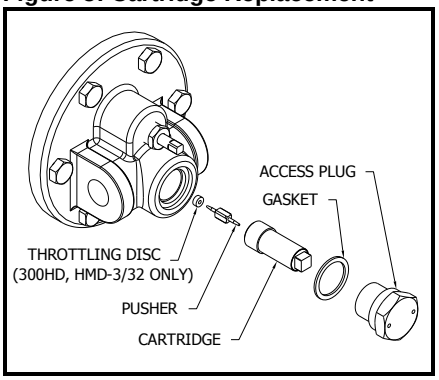
** K310 kits include both the 19 and the 365 gaskets. Only (1) is needed. The 300H and 300HM valves use the 19 gasket. The 365 gasket can be tossed.

Changing the Cartridge (Needle & Seat)

When wear of the needle and seat justifies 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.

1. Shut off the hand valve in the liquid line and let the compressor run until the liquid level in the surge drum or chamber is below the float valve.
2. Turn the float valve manual stem into the valve until firm. DO NOT USE A HEAVY WRENCH. The manual stem bears against the float block and seats the cam needle. This isolates the cavity containing the cartridge without requiring a full pump down of the vessel.
3. Unscrew the access plug, venting refrigerant as necessary. Unscrew the cartridge using a 3/8" square socket (Figure 5).
4. The pusher assembly can be removed with long-nosed pliers for inspection. The pusher should be replaced if it shows signs of wear.
5. On 300HD/HMD-3/32 valves, remove the old throttling disc. Slip a new disc onto the pusher.
6. Insert the pusher into valve as shown in Figure 5. Be sure the part slides freely in the boss.
7. Install new cartridge, and tighten firmly. Replace the access plug using a new gasket.
8. Back the manual stem out fully. The valve is now ready to be put back in service.

Figure 5: Cartridge Replacement



300H/A Float Rod / Manual Stem Adjustment

1. Orient valve body as shown in Figure 6. Loosen set screw (316), and back stem stop (318P) out of body several turns. With manual stem (327P) fully back-seated in the body, adjust hex head screw (319P) until float rod is horizontal. Loosen (319P) 1/4 turn so float rod drops slightly below horizontal. Lock the hex screw 319P in place with nut (324) and washer (55).
2. Put a 1/16" (1.5mm) shim between round end of float rod, and cam needle (314/314A) Screw float rod in or out of float block until the cam needle is fully seated. (See Figure 7) Lock float rod in place with nut (88) and washer (55A). Remove shim.
3. Screw stem (327P) into valve body until cam needle is seated. Screw the stem 1/4-turn further in to assure tight seal. (See Figure 8.) Screw the stem stop (318P) in until it butts hard against the stem. Lock the stem stop in place with set screw (316).
4. Back stem (327P) out fully. Be sure the float block continues to move smoothly, and the cam needle slides freely.
5. Proceed to install pusher, cartridge, and access plug.

Figure 6: 300H/A Float Rod Adjustment (Step 1)

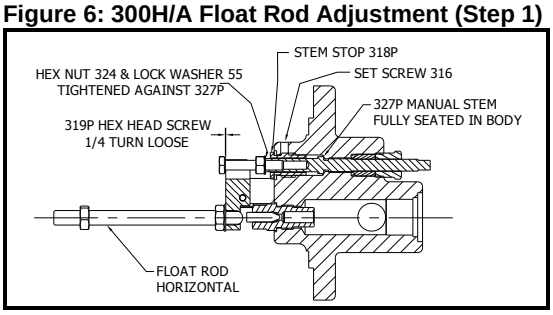


Figure 7: 300H/A Float Rod Adjustment (Step 2)

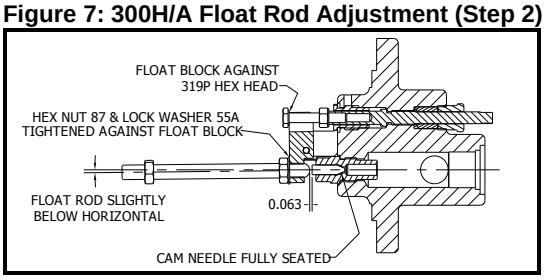
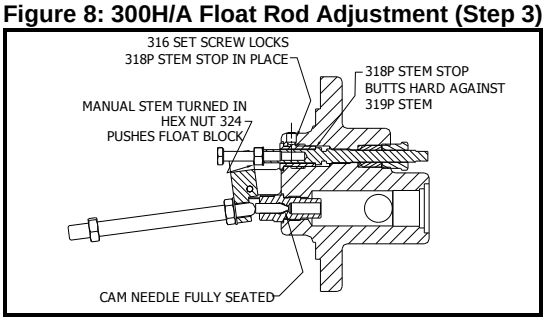


Figure 8: 300H/A Float Rod Adjustment (Step 3)



300HM/AM Float Rod / Manual Stem Adjustment

1. Orient valve body as shown in Figure 9. Loosen set screw (316), and back stem stop (318P) out of body several turns. With manual stem (327P) fully back-seated in the body, adjust hex head screw (319P) until float ball hangs 2-1/4" (571mm) below valve centerline. Lock the hex screw (319P) in place with nut (324) and washer (55).
2. Put a 5/64" (2mm) shim between tip of set screw (87S) and cam needle (8), and screw set screw in or out of float block until the cam needle is fully seated. Remove shim
3. Screw stem (327P) into valve body until cam needle is seated. (Figure 10) Screw the stem 1/4-turn further in to assure tight seal.
4. Screw the stem stop (318P) in until it butts hard against the stem. Lock the stem stop in place with set screw (316). (Figure 11)
5. Back stem (327P) out fully. Be sure the float block continues to move smoothly, and the cam needle slides freely.
6. Proceed to install pusher, cartridge, and access plug.

Figure 9: 300HM/AM Float Rod Adjustment (Step 1)

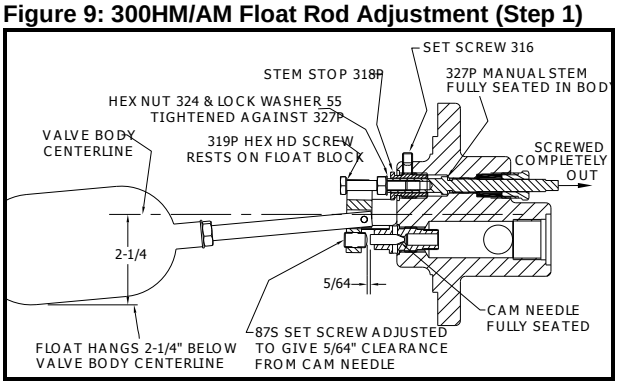


Figure 10: 300HM/AM Float Rod Adjustment (Step 2)

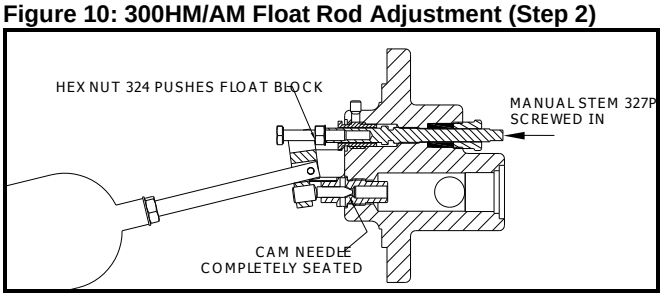
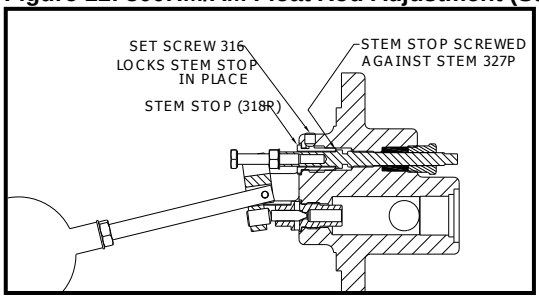


Figure 11: 300HM/AM Float Rod Adjustment (Step 3)



TROUBLESHOOTING

Problem: Valve overfeeds, flooding the vessel.
Causes/Solutions:

- Cartridge worn, will not shut off properly. Replace cartridge.
- Pusher assembly 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:

- Pusher assembly worn/jammed, will not allow cartridge to open. Replace pusher assembly.

Problem: Back-seating arrangement does not operate correctly.
Causes/Solutions:
Parts worn or out of adjustment. Vessel must be pumped down for servicing. Obtain new parts and install as directed above, under *Float Rod / Manual Stem Adjustment*.

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