Phillips® REFRIGERATION

VALVES • VESSELS • SYSTEMS • CONTROLS

270A SERIES
HIGH-SIDE FLOAT VALVES
BULLETIN 270A-SB25-02
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)

Maximum Operating Pressure Differential: 250 psi (17 bar)

Temperature Rating: -20°F to 240°F (-29°C to 116°C)

The 270A Series valves are low-capacity, high-side float valves. These valves open on a rise in liquid level and throttle flow with a "needle and seat" mechanism. The valves are available with or without a float chamber and may be installed on ammonia or halocarbon systems (270A or 270AF, respectively). Used primarily as oil drain valves, they can also be used as low-capacity control valves to meter refrigerant from higher to lower pressure.

INSTALLATION INSTRUCTIONS

The 270A valves are available without a chamber (Figure 1), with a cast iron chamber (Figure 2) or with a welded steel chamber (Figure 3). Two different, optional mounting flanges are available for mounting the valve without a chamber (Figure 4).

Figure 1: 270A Valve without Chamber

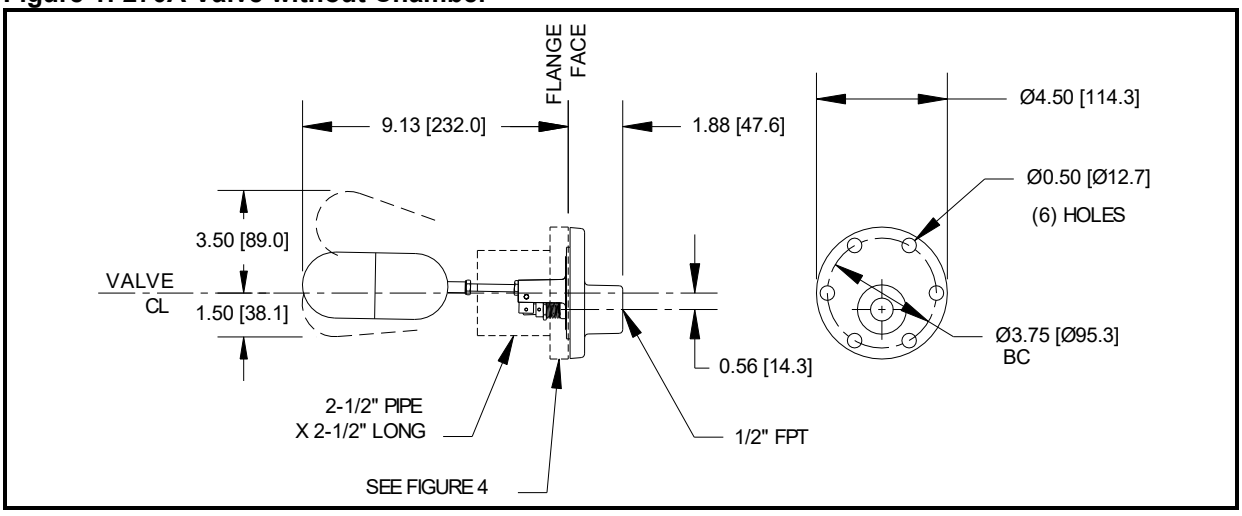


Figure 2: 270A Valve with Cast Iron Chamber

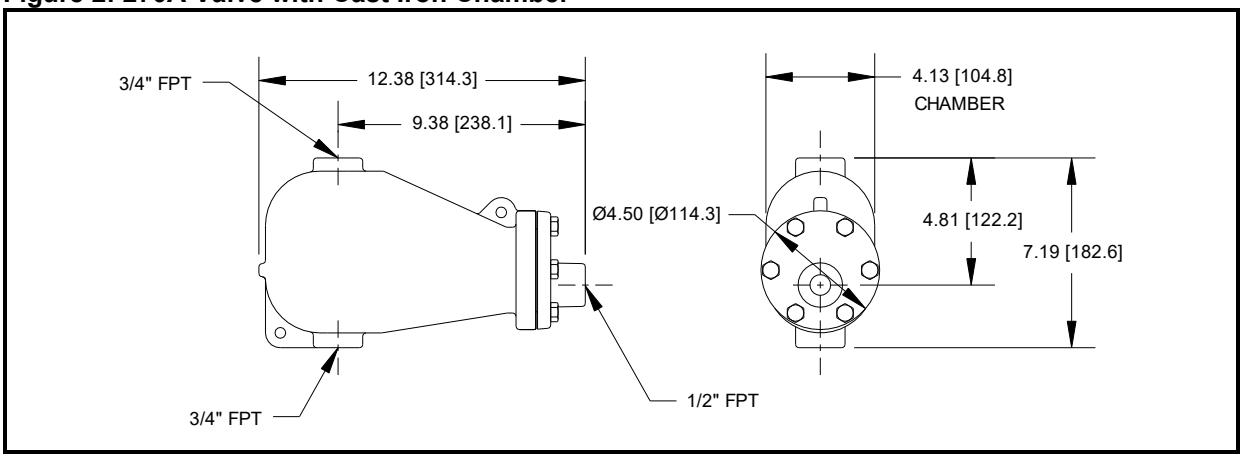
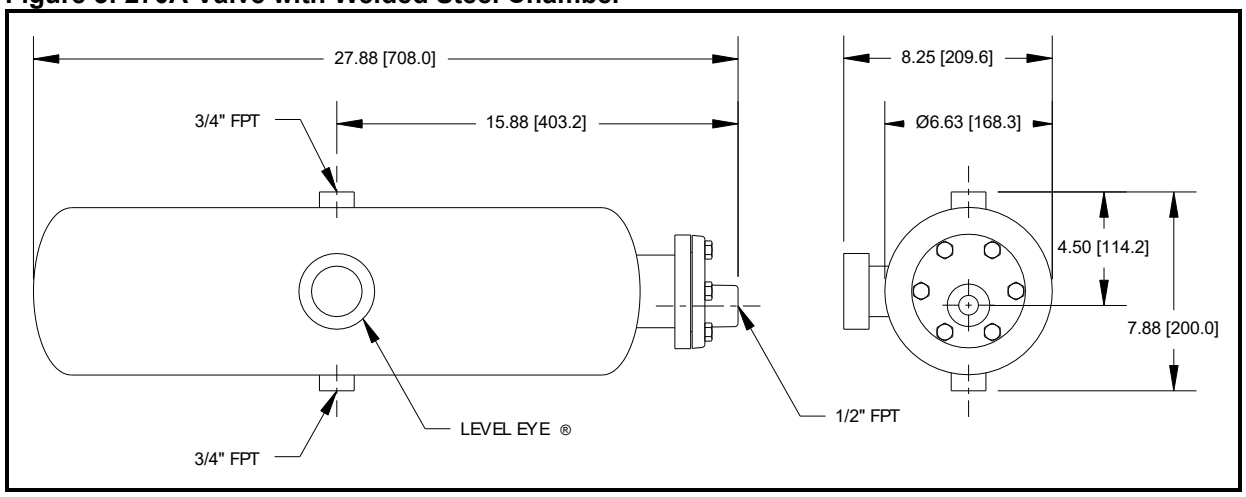


Figure 3: 270A Valve with Welded Steel Chamber



Model	Weight (lbs)
270A/270AF	5.1
270A/270AF with Cast Chamber	25
270A/270AF with Steel Chamber	47

The valve should always be oriented such that the ½" FPT outlet connection is toward the bottom of the valve and the front face is vertical to ensure that it opens and closes appropriately with changes in liquid level.

Typical installation examples are shown for oil drain and refrigerant feed applications (Figures 5 & 6, respectively). If the valve was supplied without a chamber (to be mounted directly on a vessel) allow sufficient space inside the vessel for full float movement. If the valve was supplied with the cast or welded chamber, the ¾" FPT inlet port on the top of the chamber should be connected to the liquid supply. Note that a ¾" NPT plug should be installed in the lower chamber port if that port is not used (Figure 5).

VALVE NAMEPLATE

Figure 4: Optional Mounting Flange

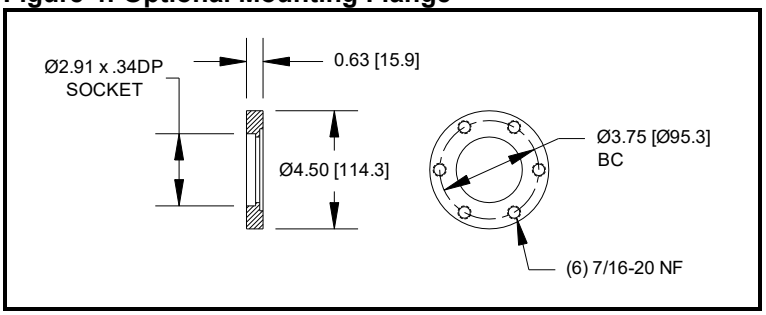


Figure 5: Three 270A Oil Drain Applications

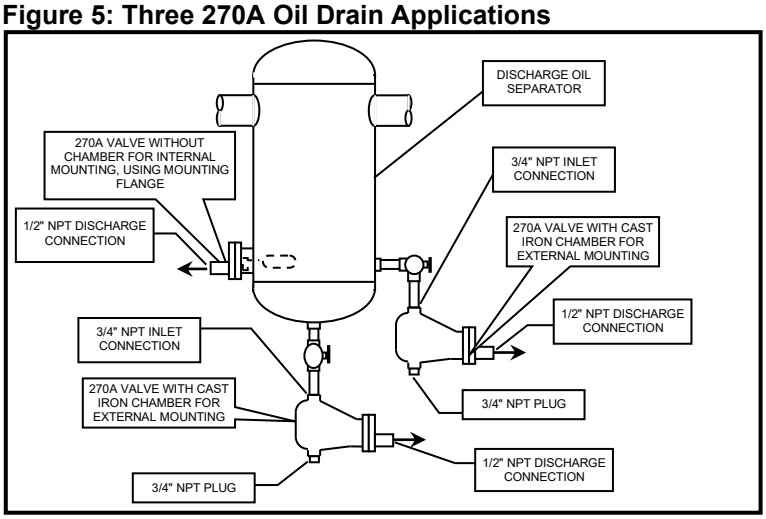
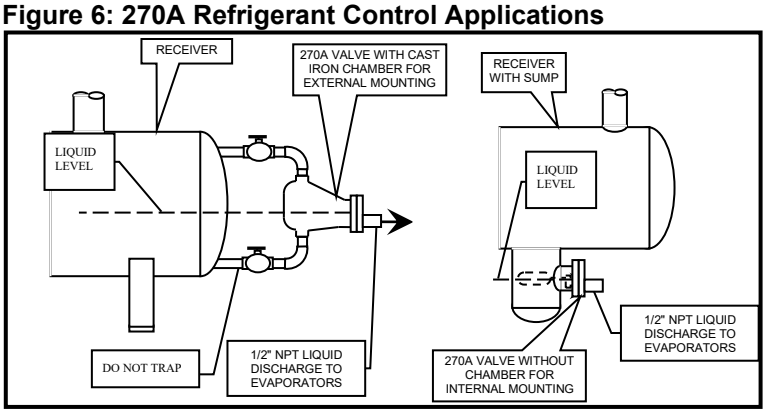


Figure 6: 270A Refrigerant Control Applications



REPLACEMENT PARTS

Basic replacement parts are illustrated in Figure 7 and listed in Table 1. The needle and seat should always be replaced as a matched set (see Table 2). Springs for ammonia and oil drain applications are also listed in Table 2. Halocarbon valves (270AF) do not require a spring.

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: "270AF-AZA" is a complete valve model, and "990105" is a complete serial number.

Figure 7: Replacement Parts

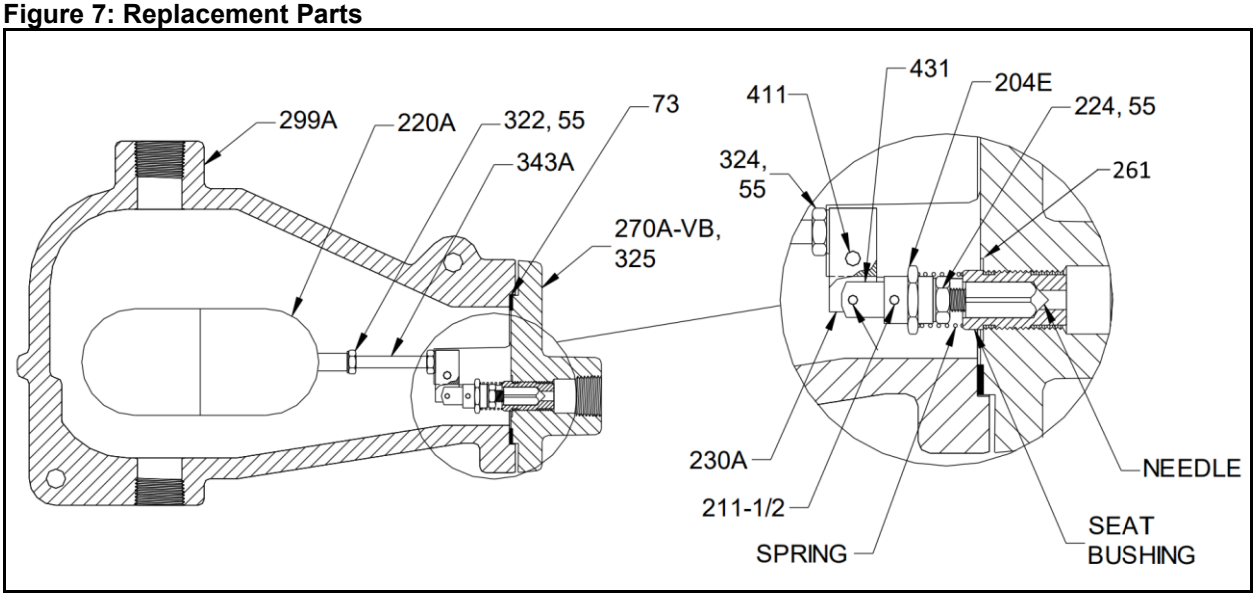


Table 1: Replacement Parts

Description	Part Number	Description	Part Number	Description	Part Number
Chamber, Cast Iron	299A	Float Nut	322	Spacer	11S
Chamber, Steel (not shown)	B-10985	Float Block Nut	324	Spring	See Table 2
Valve Body	270A-VB	Lock Washer (3)	55	Seat Bushing & Aluminum Crush Washer*	
Gasket*	73	Roll Pin (2)	211-1/2	Needle*	
Cap Screw (6)	325	Float Block	230A	*Spare Parts Kit (Includes needle, seat bushing & gasket) Specify orifice size when ordering	K270A1 (1/16, 5/64, 3/32 orifice)
Float Ball	220A	Link	431		
Float Rod	343A	Lever Pin	411		K270A2 (1/8, 3/16 orifice)
Lock Nut	224	Adjusting Nut	204E		

Table 2: Needle, Seat, & Spring Selection

Needle & Seat Bushing w/ Crush Washer (261)		Spring	
Orifice Size (in.)	**Part Number**	**270A (R-717)**	**270AF (Halocarbons)**
1/16	262403S-1/16	265E	No Spring Required
5/64	262403S-5/64	265E	
3/32	262403S-3/32	265E	
1/8	262A263A-1/8	265C	
3/16	262A263A-3/16	265C	

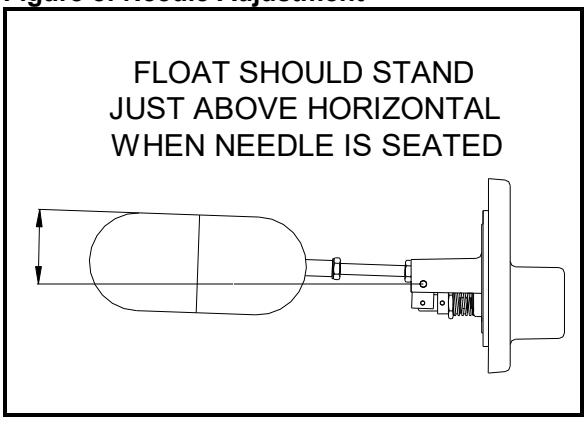
SERVICE INSTRUCTIONS

Lever pin / float block removal and replacement: If it is necessary to remove the lever pin (411) during servicing, first cut one end of the pin flush with the casting. Then either pull the pin out with pliers or carefully drive it out with a punch. Retain the spacers (11S) for re-assembly. After re-assembly, peen the lever pin to retain in place and check for free movement of valve components.

Needle and seat replacement: The needle and seat bushing are lapped in the factory to create a matched set. If either the needle or seat bushing show signs of wear or damage, both parts must be replaced. To inspect or replace the needle and seat:

1. Remove the lever pin and float block as described above. Retain the spring for final assembly.
2. Remove the old seat bushing and crush washer and install new ones. Slip the crush washer (261) around the seat bushing, then use PTFE tape or other pipe sealant on the threads.
3. Remove the old needle from the adjusting nut (204E), lock washer (55), and lock nut (224). Reassemble these parts loosely on the new needle.
4. Install the float block / float assembly (without the spring or spacers) loosely in the valve body with the lever pin. **DO NOT PEEN THE LEVER PIN AT THIS TIME.**
5. Secure the valve body so the float rod is approximately horizontal. (Do not damage the gasket surface.) Turn the needle in or out of the adjusting nut until the float is horizontal when the needle is seated in the bushing.

Figure 8: Needle Adjustment



6. Then unscrew the needle ½-turn from the adjusting nut so the float is slightly above horizontal when the needle is seated in the bushing (Figure 8). Tighten the lock nut to secure needle position.
7. Remove the lever pin and pull the needle from the bushing. Replace the spring on the adjusting nut and reassemble the float block to the valve body using the lever pin and spacers (11S) to ensure the float block (230A) is centered on the link (431). **Two of the spacers may need to be slightly compressed before installing for proper fitment.**
8. Check to be sure the float is still slightly above horizontal when the needle is seated, and that entire mechanism pivots freely.
9. Peen the lever pin to retain in place and check again for free movement of the mechanism.
10. Reinstall the valve using cap screws (325), tightening in a star pattern to 45 ft-lbs for even gasket compression.

TROUBLESHOOTING

Problem: Valve does not close fully at low liquid level.
Causes/Solutions:
High side refrigeration valves are more susceptible to needle/seat leakage than oil drain valves because oil (being more viscous) helps to create a positive seal between the needle and seat. In addition, the high velocities and "flashing" that occur when saturated liquid refrigerant passes to a lower pressure result in wear known as "wire drawing".
Needle/seat wear: Remove lever pin (411) and float ball assembly. Examine needle (403S/263A) and seat bushing (262/262A) for wear. Replace parts as described in service instructions.
Jammed or worn linkage parts: Examine float and needle movement, verify that parts move freely. Check for excessive float block (230A) and/or lever pin (411) wear. Remove any debris, replace worn or damaged parts.

Problem: Valve does not open with rise in liquid level.
Causes/Solutions:
Jammed needle or worn linkage parts: The needle may be sufficiently worn to become jammed in bushing. Examine float and needle movement. All parts should move freely, without excessive play. Remove any debris, replace worn or damaged parts.
Hole in float: Liquid refrigerant leaking into the float will prevent it from rising properly with changes in liquid level. Warming the float will cause any refrigerant inside it to vaporize. Observe any vapor leakage from the float to confirm a leak. To replace a defective float, secure the float rod (343A) in a vise and unscrew the float (220A) WITHOUT DISTURBING THE SETTING OF THE NUTS (322, 324). Install new float snugly, again without disturbing the nut positions.

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