



SERVICE BULLETIN

Title: 19XL Linear Floats
Models Affected: 19XL

Number: C9629
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Purpose:

- To advise the field of the evolution of the linear floats used on design II 19XL chillers.
- Provide distinguishing features concerning each of the different float valves to assist in identification.
- Provide a cross reference for replacement float valve part numbers and discuss some of the operating characteristics and troubleshooting recommendations.

File: Cooler–Condenser–Economizer

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Background:

Since the introduction of the 19XL line of centrifugal chillers there have been several iterations of refrigerant controls used. In design I chillers a more traditional style float valve was used similar to what was used on 19FA chillers. With the advent of design II chillers a different style linear float valve has been used. The function of the linear float is identical to that of the float ball device but the construction is significantly different.

The basic construction consists of a float shell attached to an inner sleeve. The outer sleeve has a series of slots machined around the perimeter (see [figure 1](#)). The identification of each of the different design float valves will focus on the size, shape and number of slots or holes machined in the outer sleeve.

Functionally the valve meters the flow of refrigerant from the condenser to the cooler. The cooler level is maintained by the level of the refrigerant in the float chamber. As the level of liquid refrigerant goes up in the float chamber the shell and inner sleeve move up exposing the slots machined in the outer sleeve. Refrigerant then flows from the float chamber through the slots to the inside diameter of the outer sleeve to the liquid line on the bottom of the chiller to the distribution system in the cooler. As the level decreases the shell and sleeve slide down covering the slots allowing less refrigerant to flow into the cooler. Unlike the ball style float valve buoyancy is created by feeding a small amount of discharge gas to the underside of the shell creating a pocket of gaseous refrigerant under the shell allowing the shell and sleeve to rise and fall with the level.

Evolution:

The first generation linear float valve (part number 09XB4001001) was for HCFC-22 in the capacity range of 300 to 500 tons. The valve is characterized by a series of 12 1.51" x .16" (38.4mm x 4.1mm) slots. (see [figure 2](#))

The next generation valve is an HFC-134a valve (part number 09XB4001002). The construction of the valve is similar to the 09XB4001001. The primary difference is that in addition to the 12 1.51" x .16" (38.4mm x 4.1mm) slots there are 4 equally spaced .19" (4.8mm) holes drilled below the machined slots (see [figure 2](#)). The intent of the additional holes is to provide the additional volume flow rate necessary for HFC-134a.

The third generation valve was implemented to expand the capacity range of the 19XL's up to 600 tons for HCFC-22 machines (part number 09XB4001003). Testing was also done using this valve on HFC-134a machines with success. This allowed the use of one valve on all machines. The identifying characteristics are a series of 12 .76" x .32" (19.3mm x 8.1mm) slots machined in the outer sleeve.

The fourth generation valve which is in process of being implemented in 19XL machines is for HFC-134a machines only (part number 09XB04005101). This is also the float valve that is currently on the new 19XR line of chillers. This valve provides for better control over a wide range of operating conditions and it allows for one valve on all HFC-134a machines. The characteristics of the slots are that there are 12 slots at 1.01" x .23" (25.7mm x 5.8mm).

The fifth valve (part number 09XB04004901) is currently being implemented in 19XL HCFC-22 machines. The intent is to provide for better flow control over the range of operating conditions. The quantity and dimensions of the slots machined in the outer slide are 12 slots at 1.08" x .16" (27.4mm x 4.1mm).

Replacement Parts:

9XB04005101 Replaces all float valves used for HFC-134a

9XB04004901 Replaces all float valves used for HCFC-22

Replacement float valves are available through RCD. The later generation valves can replace any earlier generation valve as long as the application is consistent with the current application (see table above).

Dimensional characteristics outlined above are the best attributes by which to identify the valve used in the application. Some valves are stamped R-22 or R-134A. This does not necessarily describe the application and should not be used as the sole identifying characteristic.

Troubleshooting:

If the linear float is suspected to be causing low refrigerant temperature by restricting refrigerant flow, check for the following:

Alignment of bubbler tube with the float shaft connecting the shell and inner sleeve
(see [figure 1](#))

Misalignment imparts a tilting force on the shell allowing interference between the inner and outer sleeve.

A kinked or obstructed bubbler tube

Inadequate flow of discharge gas to the shell of the float valve will not give it the buoyancy required to function properly.

Mechanical interference of the inner and outer sleeve

The shell and inner sleeve should slide freely along the outer sleeve.

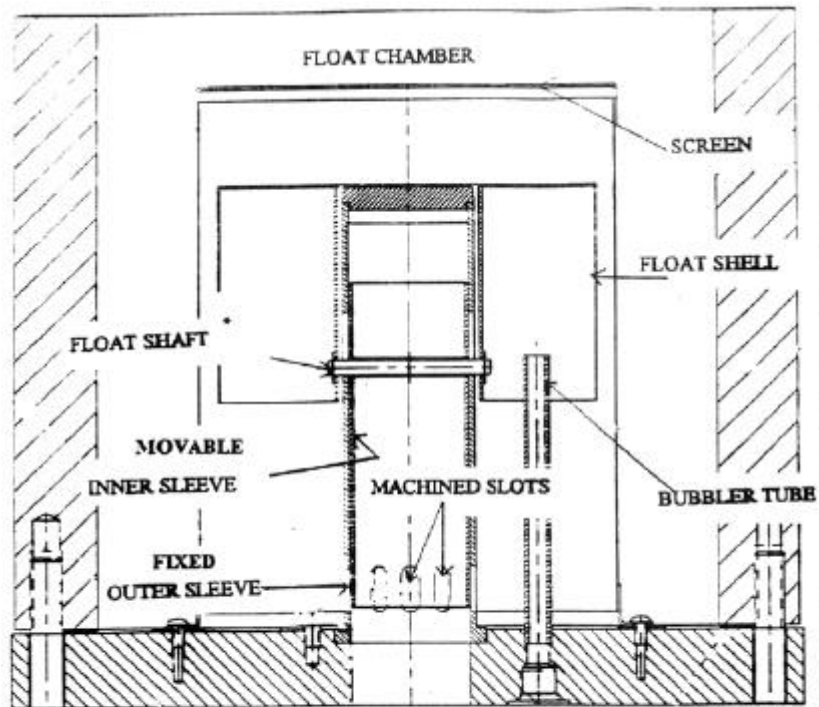
Obstructions in the slots

There is a screen above the float chamber which should be inspected for voids or excessive debris.

Distortion in the shell

The top of the shell surface should be perpendicular to the sleeve. Any distortion can create an uneven force causing the valve to hang up.

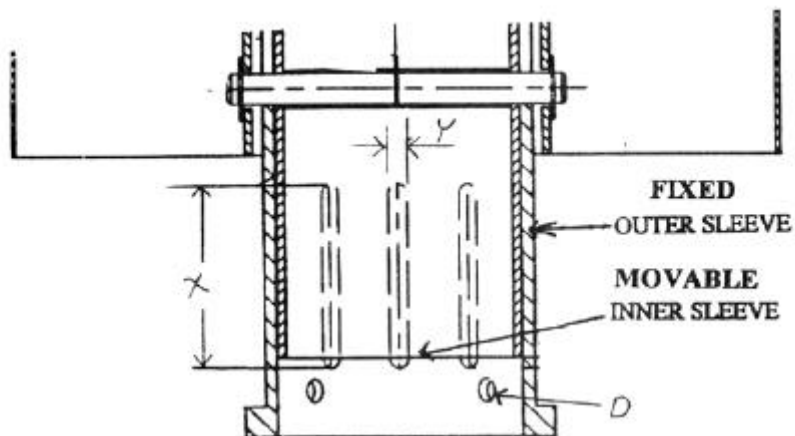
Occasionally, a whooshing sound can be heard near the float chamber of HCFC-22 machines because of hot gas bypassing through the float. This situation can be rectified by closing the liquid valve a little until the noise is alleviated. Design four and five are designed to rectify this problem.



* NOTE: FLOAT SHAFT AND BUBBLER TUBE SHOWN IN CORRECT ORIENTATION

FIGURE 1

TYPICAL LINEAR FLOAT VALVE ASSEMBLY



PART NUMBER	SLOT HEIGHT "X"	SLOT WIDTH "Y"	DIAMETER "D"
09XB04001001	1.51" (38.4 mm)	0.16" (4.1mm)	N/A
09XB04001002	1.51" (38.4 mm)	0.16" (4.1mm)	0.19" (4.8 mm)
09XB04001003	0.76" (19.3 mm)	0.32" (8.1 mm)	N/A
09XB04005101	1.01" (25.7 mm)	0.23" (5.8 mm)	N/A
09XB04004901	1.08" (27.4 mm)	0.16" (4.1mm)	N/A

FIGURE 2
MACHINED SLOTS AND HOLES DETAIL