



## ADDENDUM to IOM – Tech Notes

# Flood Valve or Head Master

(Not a Head Pressure Control - *exactly*)

**Warning:** Not to be used in Lieu of IOM Manuals included with the unit.

Specials units or construction may or may not differ.

**Caution:** *This information is for Standard Coolers and Freezers with a Flooded System, or when with an 180psig Headmaster or 3-way valve piped around the condenser coil. Special controls (such as the "Sierra" Model) may allow for different settings. This manual is for techs that service equipment where theories fear to tread and understanding is the key to a good or bad install. Also, I am taking liberties of being overly simplistic for general purposes of understanding and system feel.*

### Basic Info – Flood Valve = Flooded System

The Flooded system exists for a number of reasons, but the main result is to maintain a steady or minimum liquid temperature to the TXV (Thermal Expansion Valve or Metering Valve).

*Tech Note: Without this control, as the condensing temperature keeps dropping to follow the outside ambient temperature, the liquid temp follows and at the same time increases the performance of the compressor causing "hunting" (slamming open and close) on the TXV sized for a higher liquid temperature (for summer) and a certain compressor capacity (minimum at summer). This, not only can cause the box temperature to vary accordingly, but liquid back to the compressor will kill, or at a minimum, significantly reduce the life of a compressor.*

### Basic Info – Flood Valve – How's it work?

*Tech Note: This note goes a lot deeper, so if you don't catch it no problem.*

One way the valve controls this minimum liquid pressure/temperature, is that the hot discharge gas is bypassed to the drain line to the receiver hitting the liquid and boiling off to maintain a minimum pressure. Another purpose is to flood the condenser coil with liquid effectively reducing the "capacity" of the coil and causing the head pressure to increase, like having a dirty or blocked off coil. This also helps to bring up the liquid pressure to maintain the minimum setting temperature.

### Flood Valve Purpose

The Flood Valve is used to maintain a set "minimum" of liquid pressure/temperature to the TXV during the so-called "winter months" of operation or anytime it gets below around 70degF ambient (outside temperature). This causes these "flooded" systems to require an additional liquid charge to the system past the cleared sight glass. The "Winter Charge" is a calculation of the capacity and the expect low ambient. This "Winter Charge" floods the receiver and coil with liquid and so the meaning of "Flooded Condenser Coil System" or now just called "Flooded System".

*Tech Note: I need to say this here; as you will see I don't like to call this control a Head Master or Head Pressure Control. This is because it only affects the head pressure indirectly or "backs-up" to affect the discharge pressures. It measures and maintains a liquid pressure not head pressure.*

### How do you tell if the flood valve is open or closed?

You can tell by feel or temperature gauge. (**Caution: Be careful not to touch the compressor discharge line.**) Use your hand (or gauge) to feel the condenser coil outlet "drain" line and the "drain" line feeding down to the inlet of the receiver. These should be the same temperature or within a few degrees F if the valve is closed. If the drain line leading to the receiver is "much hotter", then the headmaster is open in "bypass" and allowing hot discharge gas through.

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### Indication of Flood Valve Closed

The flood valve normally fails closed. Meaning if failed that all the discharge gas will pass thru the condenser causing lower than the valve settings discharge pressure to be indicated (Russell= 180psig +/-10% or 162-198psig). (See charging below. hint: 200psig)

*Tech note: So if the valve is Open" or "Discharge Gas Bypass" mode, don't cut the cap tube, as I will explain below. (I have seen in all my calls only about 1 or 2 failures a year and, in my view, the Flood Valve is the most mis-diagnosed component in the refrigeration industry.)*

### Extremely Rare Failure of Flood Valve Open –Need to Know Only

A flood valve can "hang open" when the pressure exceeds rated pressure for only a few reasons (higher than 198 psig at max for HTPG units). One cause would be that the pressure difference on both sides of the valve is higher than the 15psig (*usual cause*). One reason this can happen is if the valve opens and not enough liquid is present behind it.

*Tech note: Good news is that is that the valve is working as designed. - Add some charge or shut the system down and let the pressure equalize.*

Another reason for the valve to "hang" open would be if foreign matter were jamming it open. By foreign I mean copper chips, junk or liquid causing a kind of hydraulic lock. Most times this can be lightly "tapped out" using a rubber mallet.

### HTPG Equipment Flood Valve Setting - Charging

The Flood Valve we use as standard is 180psig (*Sierra Units use a 70psig setting and is not a flooded system*). The vendor Tolerance is plus (+) or minus (-) 10%, so our valves will operate from 162psig to 198psig. This is why when charging a system to the sight glass the head pressure must be above 200psig to make sure the valve is closed, and then you look at the sight glass to clear (or even a bubble or two left) and only then add the "Winter Charge". Winter charges are calculated for each coil we make and remember it is a value based on the capacity/internal coil volume & design lowest ambient. (*See Sporlan Literature for more*)

### Remote Condensers

HTPG sells remote condensers where they can be quite long run lines from the compressors. The psig differential is measured by the piping of the discharge line (in the building) to the condenser and the coil itself. There may be times when this will exceed the 15psig standard that we ship with the units. Sporlan offers other higher differential pressure valves that may be necessary for your application (*rarely*). If the valve refuses to close contact the application engineer of your site and have them calculate the actual pressure drop or for even more accuracy, add taps to both sides and measure it yourself. (*Contact Sporlan with your actual pressure drop that needs to be allowed for if this 15psig is exceeded. Not warranty, sorry- ASHREA standards should be used in the design of the building piping.*)

### Extra Winter Charge Info

After you have achieved the so-called "summer charge" of charging to the clear sight glass above 200psig, the addition of the "Winter Charge" is required. Prior to this and if you blocked the coil to maintain the 200psig minimum head pressure, you can remove the block on the coil (to prevent nuisance High pressure switch tripping while adding the winter charge).

### Actual Extra Charge Amount

For HTPG-Condensing-Units get the winter charge weight from the tag on the coil, or if a remote condenser, look to the IOM Manual the came with the unit. For Multi-Compressor units (Multi-compressor CZ Racks) only: you will need to add the extra charge required for winter conditions as follows, on **Medium Temperature (+10sst or above)** systems, you will need to **add 3 lbs** of refrigerant per actual compressor horse power and **4 lbs** of refrigerant **per** horsepower for **Low Temperature**. **Final:** See our website for even more info [www.russellcoil.com](http://www.russellcoil.com) .

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