



ADDENDUM to IOM – Tech Notes

BASIC UNIT CHARGING PROCEDURE FOR FLOODED UNITS ONLY

Warning: Not to be used in Lieu of IOM Manuals included with the unit. Specials units or construction may or may not differ.

Caution: Please verify if the unit, you are charging, is a Flooded or a Floating Head System. The following is meant for Flooded System with an 180psi Headmaster or 3-way valve (with a 180 marking) piped around the condenser coil. This procedure will not work on a floating head System (Like Sierra or High Sierra Units) and could damage equipment.

Basic Info

Tech note: You can speed read (not skip) this paragraph, the good stuff to follow.

Once the system has been energized for 24 hours and a proper vacuum has been accomplished, be sure the compressor discharge valve is open and the suction valve is open 2 or 3 turns with a valve stem wrench attached for quick throttle adjustments if needed (Valves are usually at mid-seat to accommodate brazing. but not all).

Compressor Start-up

Tech Note: Some little "old school meets new school" stuff in here.

With gauges attached charge the unit with 50 to 60% of the system charge into the receiver (mandatory R-404A and R507 must be charged as liquid) before the start up of the compressor. Once started, it may be necessary to throttle the compressor suction valve to keep suction pressure reasonable to prevent trip outs during charging and pull down. If necessary to add liquid refrigerant to the suction side, a full control ball valve must be used in the charging line to **slowly meter refrigerant into the system.**

Tech Note: You know to keep the L.P. switch from tripping or prevent slugging and stuff.

Flooded Systems Require Extra Winter Charge

Tech Note: Here's the meat and potato and gravy.

When charging the unit it will be necessary to bring the head pressure to a minimum of 200 PSIG only then **just** barely clearing the sight glass (a bubble or two is ok). This is to insure the headmaster is closed and simulate a summer charge. In low ambient conditions it may be necessary to block off part of the condenser coil (or shut off the condenser fans) to achieve this 200 PSIG minimums.

Tech Note: If you're a touchy-feely kind of tech: You can verify this, by feeling, or using a temperature gauge, the condenser coil outlet drain line and the line feeding down to the receiver. (Caution: Be careful not to touch the compressor discharge line.) These should be the same temperature or within a few degrees F. If the pipe leading to the receiver is "much hotter" then the headmaster is open and allowing hot discharge gas through. When you're over 200# this could be because the pressure drop across the valve is too high (+12psi). You may need to add charge or shut the system down and let the pressure equalize or if debris tap it with a rubber mallet. Headmasters' fail closed. Therefore, causing the entire refrigerant charge feed to the condenser coil, with very few exceptions. (See the Tech Note for Headmasters for more info.)

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Extra Winter Charge Info

Now that you have achieved the summer charge, addition of the "winter charge is required for the "Flooded" System. 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).

Tech Note: The winter charge is necessary and if not added you can lose the system liquid seal causing gas & liquid to feed the TXV. The box will warm and could damage the compressor with high superheat; hopefully it will trip the high-pressure switch.

When the outside ambient starts getting below approx. 70degF or when the head pressure starts dropping below 200#. The headmaster will start opening to send hot discharge gas into the drain line to the receiver. This "hot discharge gas" will hit the liquid present and expand to maintain 180+/-10% PSIG. Also it will begin to "back-up" liquid refrigerant in the condenser coil tubes to "block-off" the effective area, causing the head pressure to rise. You can feel by touch, as mentioned above. (The purpose for this type of control can be found in the Tech Notes –Headmaster page.)

Actual Extra Charge Amount

For Russell units = get the "extra" winter charge weight from the tag on the condenser coil or the IOM Manual that came with the unit.

For CZ or Multi-Compressor units (small HP/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**.

Wait, your not done!!

The Last thing to do is set the superheat on your system and you can go home.

SUPERHEAT SETTING

Superheat setting at the compressor should be between 25 and 35 degrees F and is adjusted at the Evap expansion valve (TXV). Measured on the suction line six (6) to eight (8) inches from the compressor and subtracted from the suction pressure when converted to degree F. Make sure you leave at least four (4) to six (6) degF superheat at the evaporator minimum measured around the TXV bulb.

Tech Note: Superheat at the compressor has a direct effect to the life of the compressor. Frost line is an indicator, but not an exact science and your compressor needs you. At the same time we need to make sure that the "change of state" from liquid to gas is being done inside the evaporator coil, (plus a little additional superheat) hence the "4-6degF minimum" superheat, as noted above. I know, you were taught and in a perfect world the evaporator is "supposed to be adjusted for 10degF superheat but the piping in a building is rarely perfect or other addition loss is encountered. Also the compressor performance may not be an exact one to one match up to the evaporator design. Superheat, at the Evap, for Low temp systems usually is around 6-12degF and med temp systems are usually 8-14degF. Some systems may have been designed for even higher/lower superheat and TD setting for moisture control in the box. Bottom line is; the compressor must be protected. (See Tech Note for Superheat for more)

Final: This should provide years of trouble free performance and money in your pocket, but don't forget to adjust your condenser fan controls to your region if available. Thanks for putting up with the humor. See our website for even more info www.russellcoil.com under "Products and Literature" or "Tech Tips".

Thank you for helping, us help, our Customer.

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