

Refrigerant Recovery, Evacuation and Charging Procedure

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GOALS AND OBJECTIVES

The goal of this Job Aid is to provide information that will enable the In-Home Service Professional to properly perform repair procedures for Single and Dual Evaporator Systems.

The objectives of this Job Aid are to:

- Understand and follow proper safety precautions.
- Successfully perform necessary repairs.
- Successfully return the refrigerator to its proper operational status.

WHIRLPOOL CORPORATION assumes no responsibility for any repairs made on our products by anyone other than authorized In-Home Service Professionals.

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NOTICE TO THE TECHNICIAN

It is the responsibility of the Service Technician to comply with all EPA Regulations and Standards and possess all necessary State and Federal licenses when servicing refrigerators.

Federal regulations and Standards can be found on the United States Government EPA Web Site.

State Regulations and Standards and licensing requirements, in most cases, can be found on the State Government Web Site.

Notes

SAFETY FIRST

Your safety and the safety of others are very important.

We have provided many important safety messages in this manual and on your appliance. Always read and obey all safety messages.



This is the safety alert symbol.

This symbol alerts you to potential hazards that can kill or hurt you and others.

All safety messages will follow the safety alert symbol and either the word "DANGER" or "WARNING."

These words mean:

 **DANGER**

You can be killed or seriously injured if you don't immediately follow instructions.

 **WARNING**

You can be killed or seriously injured if you don't follow instructions.

All safety messages will tell you what the potential hazard is, tell you how to reduce the chance of injury, and tell you what can happen if the instructions are not followed.

Representative Examples of Equipment, Tools and Supplies:



4 port manifold gauge set **1**



Recovery pump **2**



134A Recovery Cylinder **3**



dual stage Vacuum pump **4**



Heated Charging Cylinder and Charging Hose **5**



Refrigerant Charging Scale **6**



Tank heater blanket **7**



Heat Gun **8**



Temporary Access Valves **9**



Brazing Equipment **10**



Welding Blanket **11**



Fire Extinguisher **12**



Ultraviolet Light & Glasses **13**



Eye Protection **14**



Tubing Cutters **15**



Assorted Hand Tools **16**



Shraeder Tool and Extra Valves **17**



Process Tube Valves **18**



90 Degree Shut off valves **19**



VOM /AMP Probe **20**



Dye Drier **21**

Equipment, Tools and Supplies:

1. 4 port manifold gauge set
2. Recovery pump
3. 134A Recovery Cylinder
4. High Capacity dual stage Vacuum pump (4 cf. or greater)
5. 134A Heated Charging Cylinder and Charging Hose
6. Refrigerant Charging Scale
7. Tank heater blanket
8. Heat Gun
9. Temporary access Valves
10. Brazing Equipment
11. Welding Blanket and Metal heat Shield
12. Fire Extinguisher
13. Ultraviolet Light and Glasses
14. PPE - Personal Protection Equipment - Approved Eye Protection
15. Tubing Cutters
16. 1/2" wrench, 7/16" wrench, Pliers, Triangle File and Assorted hand Tools
17. Shraeder Tool and Extra Valves
18. Extension Tube with Schraeder Valve (For insertion into process tube)
19. 90 Degree Shut off valves
20. VOM /AMP Probe
21. Dye Drier

Additional Tools and Supplies:

- Sandpaper
- 1/4" and 5/16" Swedges
- Brazing alloy and Flux
- UV Drier with Schraeder Valve
- Shut Off hand Valves

Key Components



4-Way Manifold Gauge



90 Degree Shut Off Valves



Dye Drier with Schraeder Valve



Process Stub Schraeder Valve

Note: When handling refrigerant, ANSI certified Personal Eye Protection is recommended.

Note: Always follow the Manufactures' instructions shipped with tools and Equipment .

Equipment, Tools and Supplies:

Everything depicted in this process is currently used in the refrigeration industry. If you already perform sealed system repairs you may have some or all of these items. If not, this equipment is readily available from most refrigeration supply houses.

Note: There are a number of different manufactures of this equipment. Whirlpool is not endorsing specific brands.

Key Components

The key components used in this process are:

The 4 way manifold gauge set

Shut off valves.

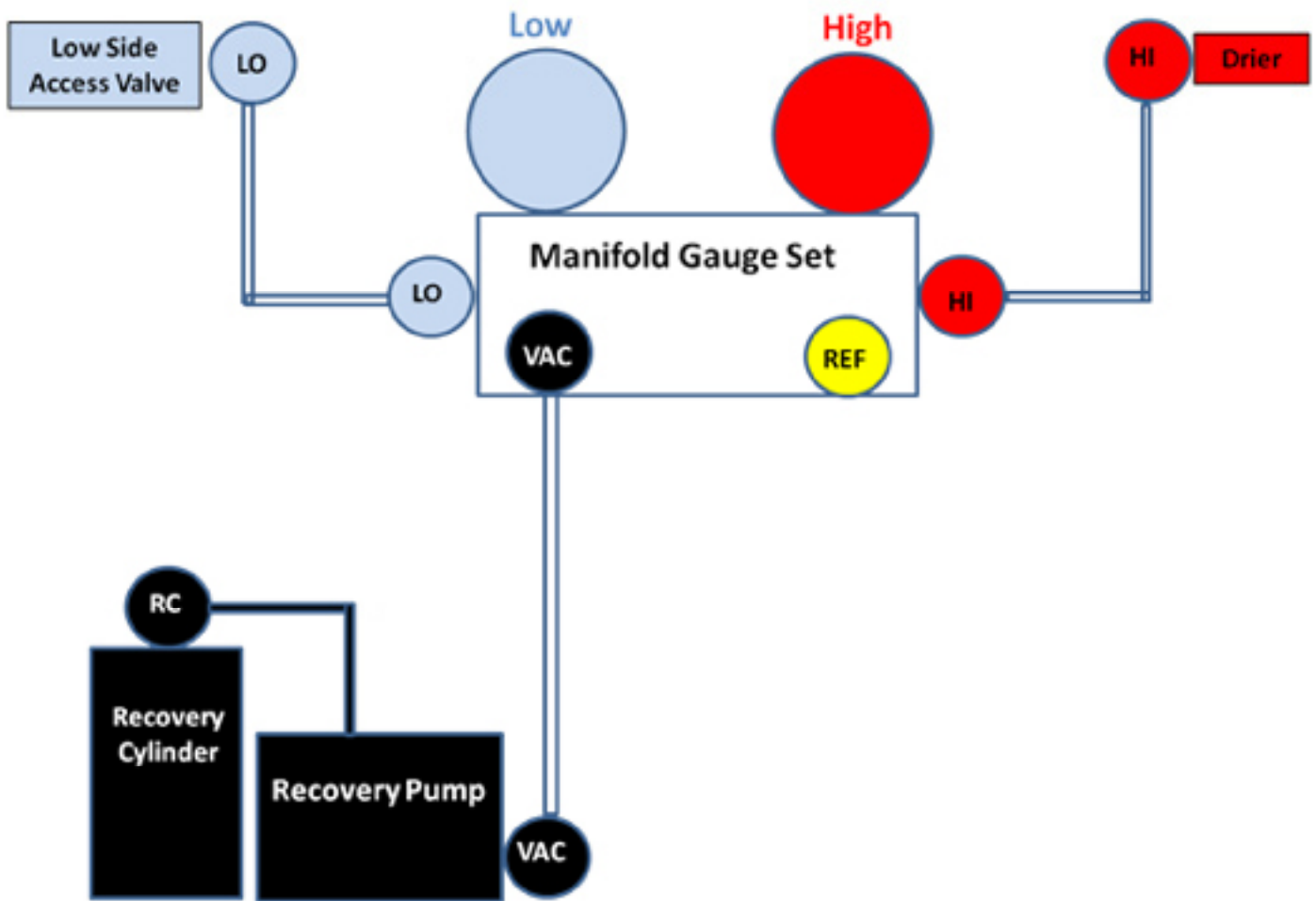
Dye drier with schraeder valve.

Process stub extension with schraeder valve.

These items are critical for accurate charging and efficiency.

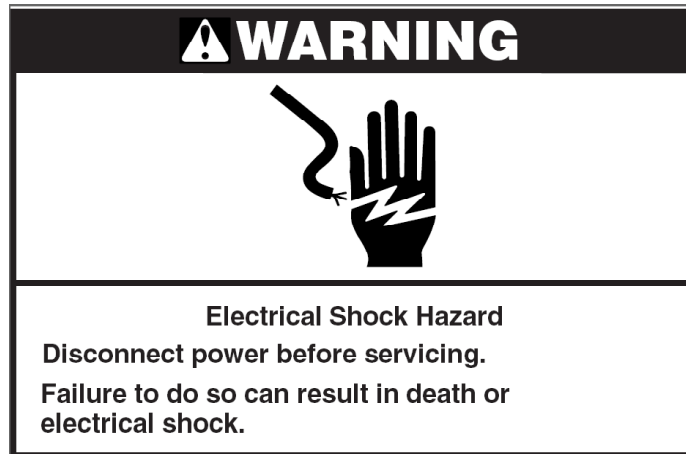
Notes

Phase One: Initial Hook Up



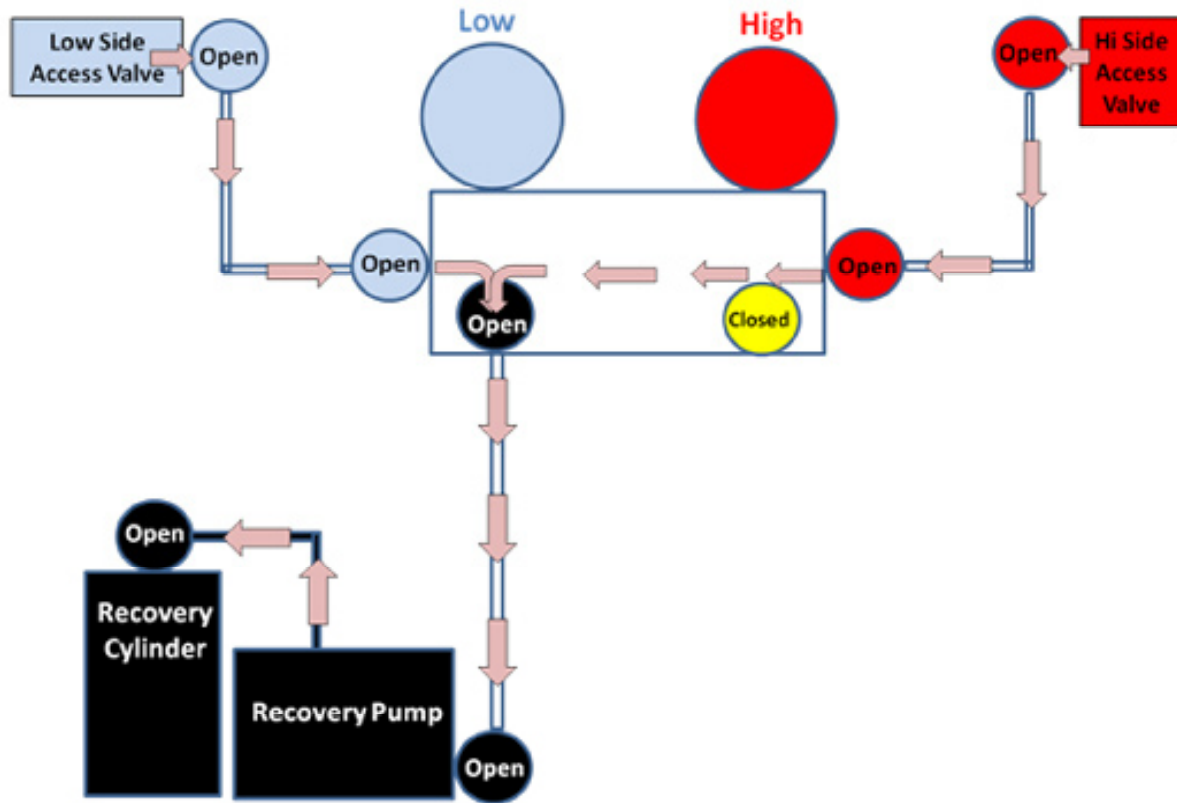
Phase One: Initial Hook Up - Continued

1. Verify Failure.
2. (For dual evaporator products) Enter the refrigerator diagnostic service mode and advance to step 4 for 1 minute to insure the 3-way valve is open to both RC and FC capillary tubes.



3. Unplug or disconnect power to refrigerator, this will lock both sides of the 3-way valve in the open position in order to service sealed system.
4. Remove the machine compartment cover.
5. Install High and Low side temporary access valves.
6. Install shut off valves on access valves.
7. Connect high side manifold gauge hose to high side shut off valve.
8. Connect low side manifold gauge hose to low side shut off valve.
9. Connect evacuation hose to recovery pump inlet hand valve.
10. Connect hose from recovery pump outlet valve to recovery cylinder hand valve.

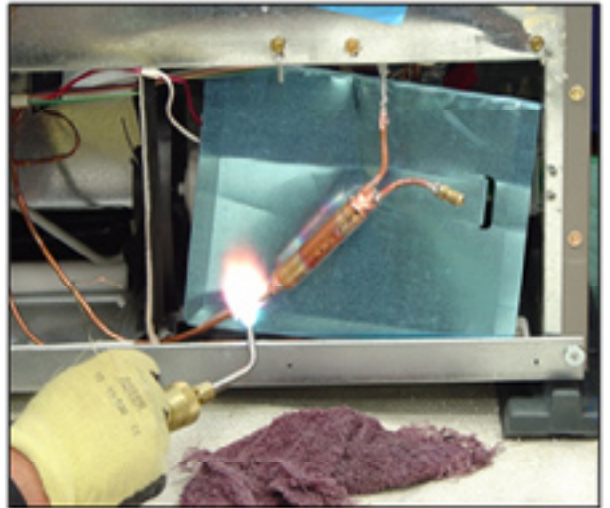
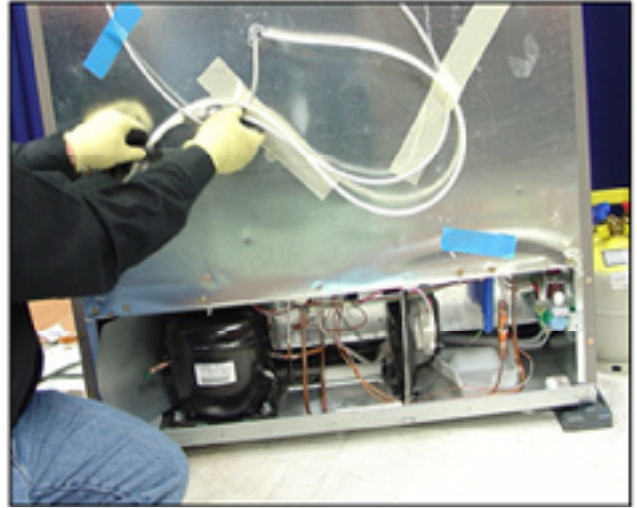
Phase Two: Refrigerant Recovery



Note: If the evaporator is cold, open the door and allow it to warm or use a heat gun to heat the evaporator

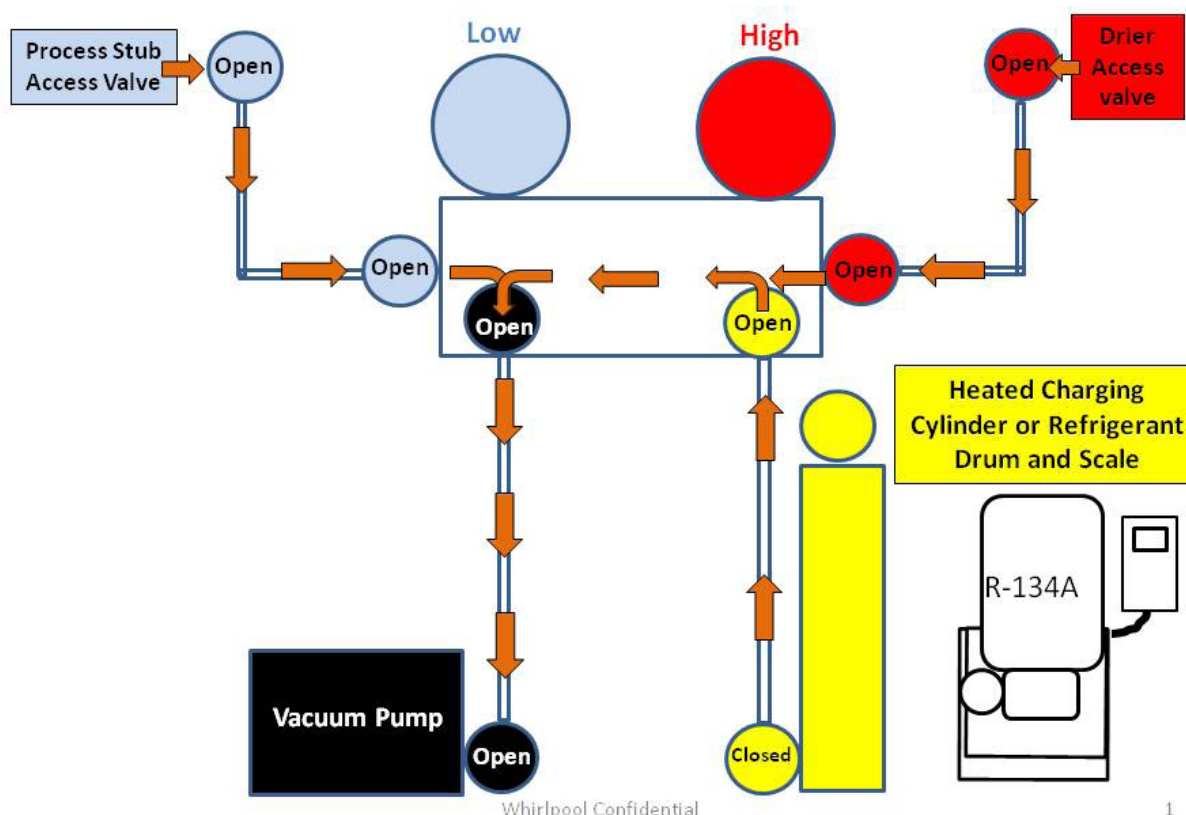
1. Start recovery pump.
2. Open recovery pump inlet valve.
3. Open recovery pump outlet valve.
4. Open inlet valve on recovery cylinder.
5. Open evacuation manifold valve.
6. Open low side manifold valve.
7. Open high side manifold valve.
8. Open high side shut off valve.
9. Open Low side shut off valve.
10. Recover refrigerant from both the high and low side of the system.
11. When the gauges indicate a 4" HG system vacuum has been achieved, close the recovery cylinder hand valve and shut off the recovery pump.
12. Remove the high and low side hoses and shut off valves from the access valves and attach to the manifold ports.

Phase Three: Make Repairs



1. Remove temporary access valves.
2. Remove any wiring harnesses, starting components, water tubes or related components that could be damaged during repair.
3. Install heat shields to protect the refrigerator cabinet and adjacent components before brazing.
4. Make necessary repairs.
5. Remove schraeder valve from dye drier and install drier.
6. Remove schraeder valve from the process stub extension tube and install (or braze on saddle valve on suction line and install).
7. After brazing is completed install the schraeder valves.

Phase Four: Evacuation



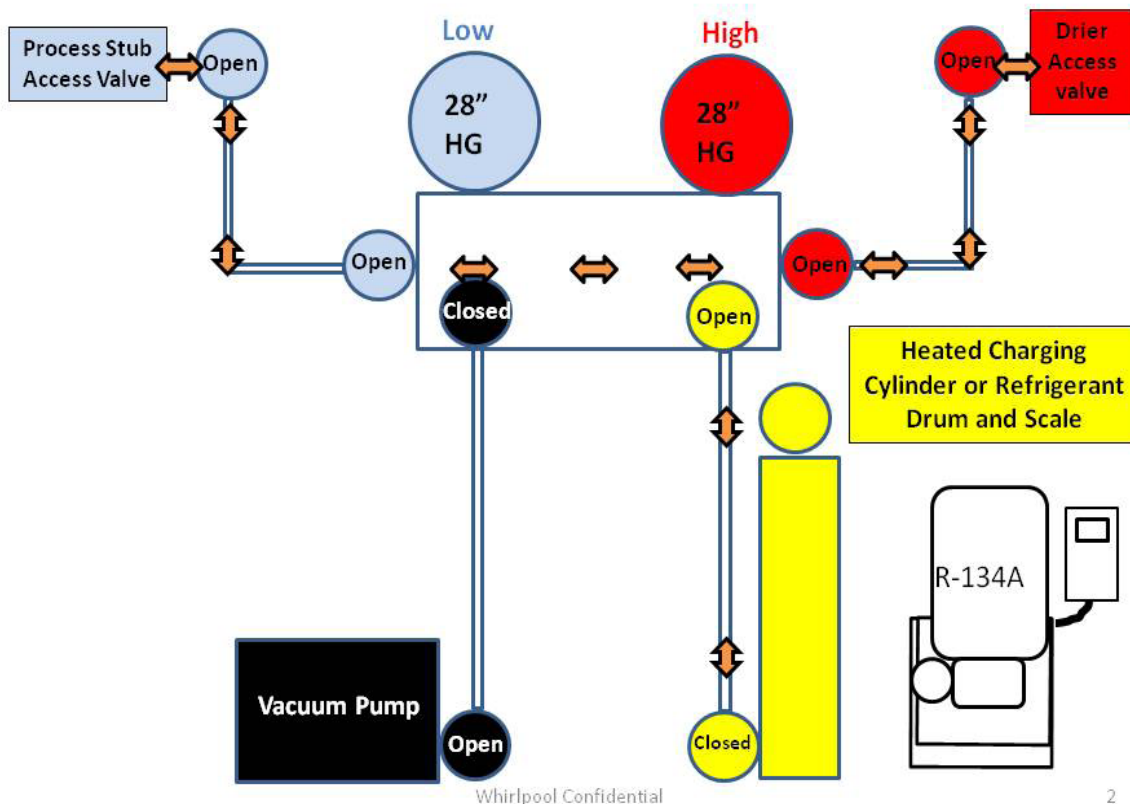
Phase Four: Evacuation

1. Connect high and low side manifold hoses to the drier and process tube shut off valves.
2. Connect a hose from evacuation manifold gauge valve to the inlet of the vacuum pump.
3. **(Charging Cylinder)** Fill the charging cylinder with an additional ounce of R134A than is listed on the model number plate and plug in the cylinder. Heat the refrigerant until the pressure is 30# higher than the equivalent ambient pressure would be.
- 3a. **(Electronic scale)** If using a charging scale and refrigerant cylinder in a cold ambient, install a heat blanket on the refrigerant tank and set the tank on the scale; begin to heat the refrigerant. Follow the instructions and observe the safety warnings shipped with the blanket.
4. **(Charging Cylinder)** Connect a hose from the charging cylinder to the Refrigerant port on the manifold.
- 4a. **(Electronic scale)** Connect a hose from the shut off valve attached to the refrigerant cylinder to the Refrigerant port on the manifold.
5. Close all valves.
6. Open vacuum pump vent and start the vacuum pump..
7. Open the inlet valve on the vacuum pump.

Phase Four: Evacuation (continued)

- Open the VAC valve on the manifold.
- Open the REF valve on the manifold.
- Open the high side manifold valve.
- Open the high side shut off valve.
- Open the low side manifold valve.

Maintain 28" HG vacuum for 5 minutes

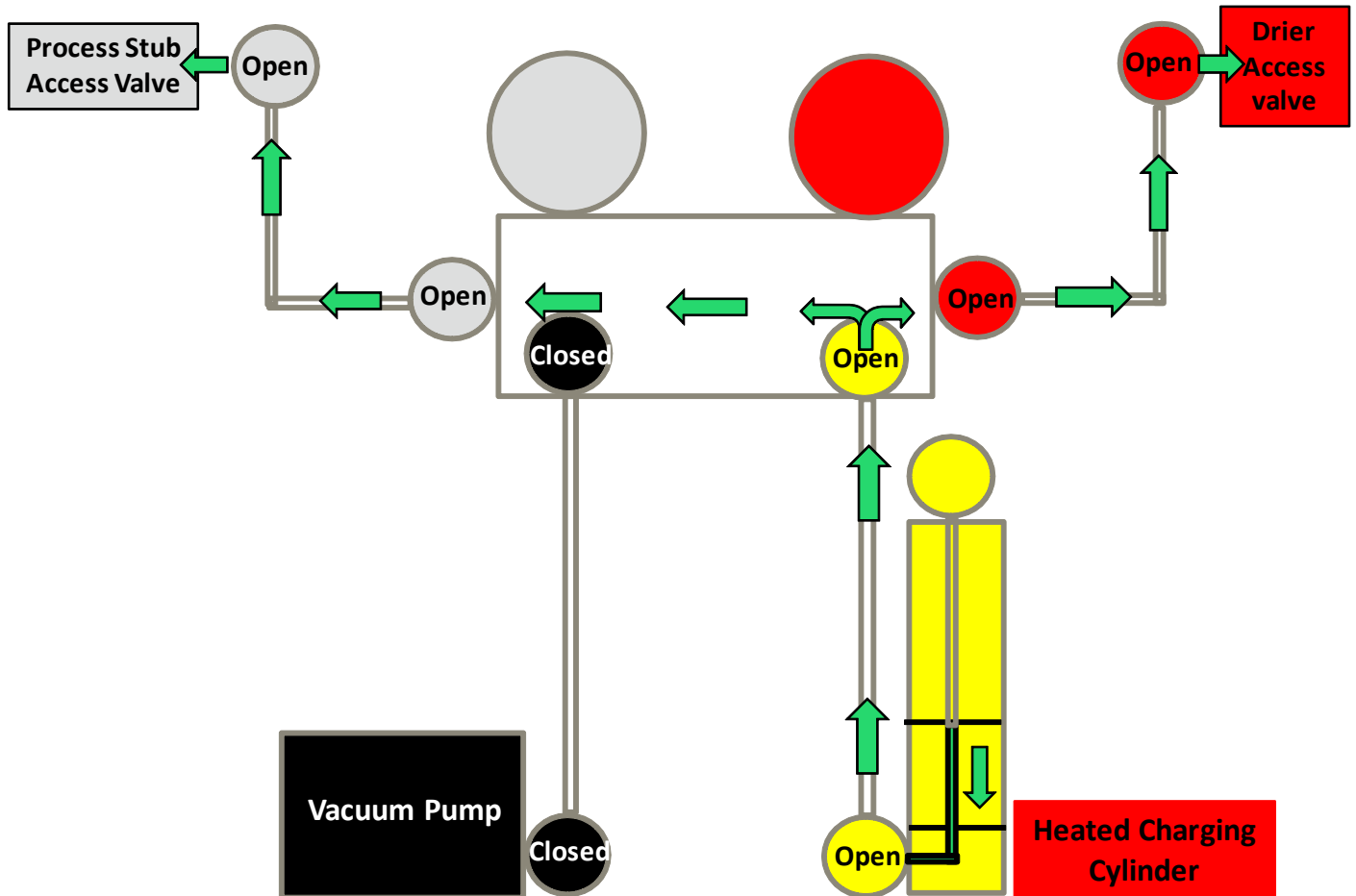


- Open the low side shut off valve – Close vacuum pump vent.
- Evacuate from both the high and low side of the system.
Note: If the evaporator is cold open the door and allow to warm or use a heat gun to heat the evaporator
- Evacuate the system until the pressure drops to a minimum of 28" HG.
- Close the VAC valve on the gauge manifold and shut off the vacuum pump.
- The 28" HG vacuum should remain constant – any increase in pressure indicates moisture in the system or a system or equipment leak.
- If the vacuum remains at a minimum of 28" HG for 5 minutes proceed to the charging phase.

Phase Five: Charging – Charging Cylinder

1. Set the barrel on the charging cylinder to align with the refrigerant pressure.
2. Subtract the refrigerant system charge from the amount of refrigerant in the cylinder and mark the level using a rubber band on the barrel.
3. Open the charging cylinder hand valve and dump in the refrigerant into both the high and low side of the system. Stop when the exact charge has been added.

Charging Cylinder

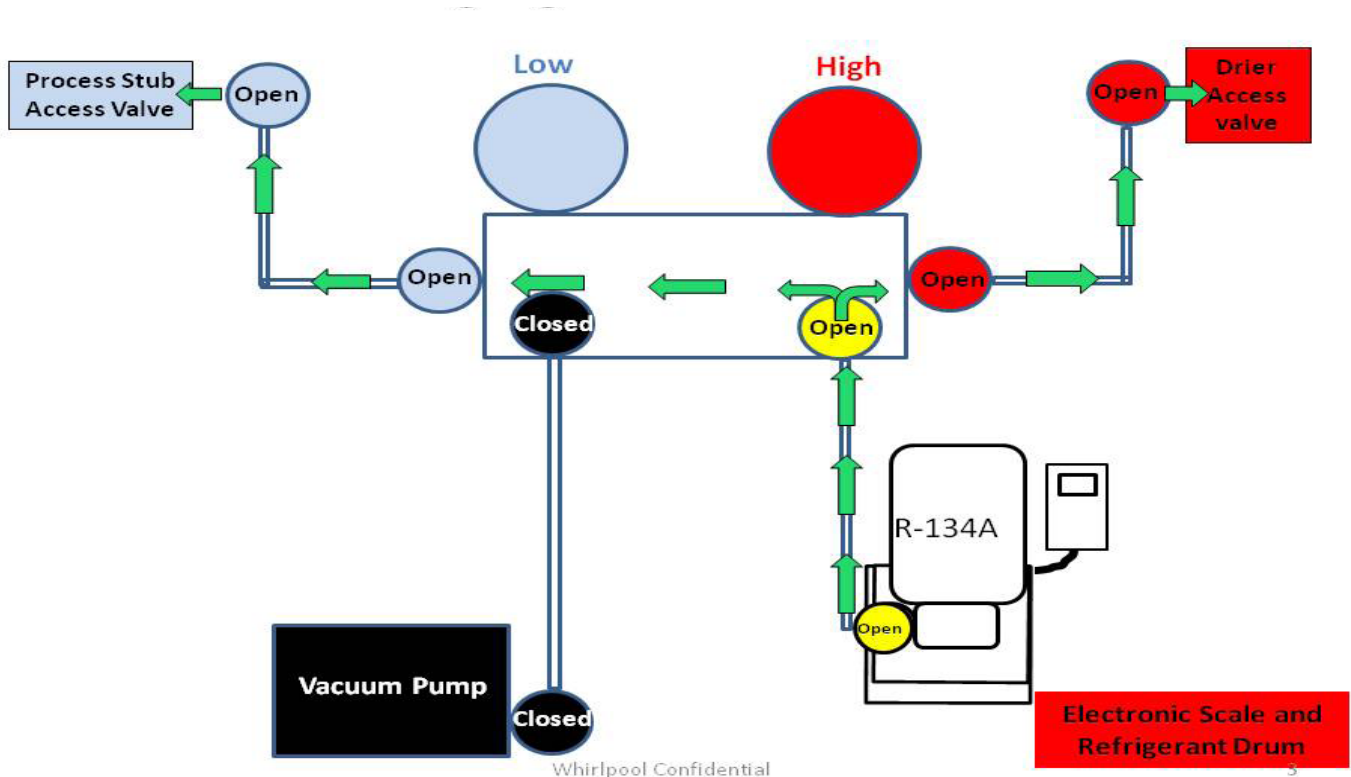


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Phase Five: Charging – Electronic Scale

1. Zero the scale display
2. Set the refrigerant cylinder on the scale and wait until the display equalizes.
3. Open the 90 degree shut off valve connected to the refrigerant cylinder and dump the refrigerant into both the high and low side of the system. Close the shut off valve on the refrigerant cylinder when the exact charge has been added.

Charging – Electronic Scale

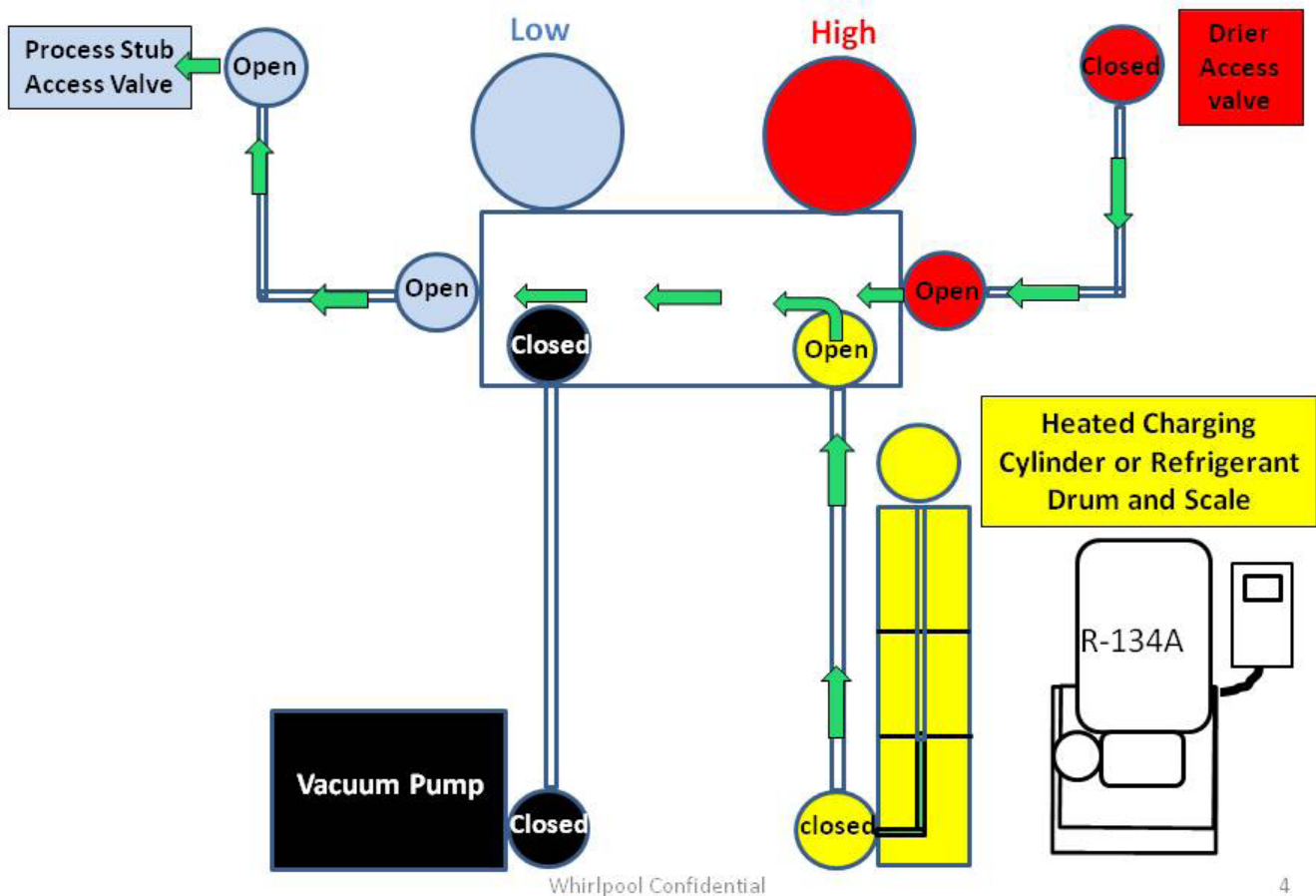


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Phase Five: Evacuation, Leak Checking and Return to Service

4. Close the high side shut off hand valve connected to the drier and the low side shut off hand valve.
5. Plug in the refrigerator and start the compressor and let the compressor run for 1 minute.
6. Crack open the low side shut off valve and remove all the refrigerant remaining in the hoses.
7. When the low side pressure drops to "0" shut off: REF valve on manifold, High side valve on manifold, Low side shut off hand valve.

Removing Refrigerant From Hoses



8. Unplug the refrigerator and remove the high and low side shut off valves.
9. Install teflon tape to schrader valve threads and install caps.
10. Wait 2 minutes and use soap bubble solution to check all high side connections first and then check the low side connections.
11. Plug in the refrigerator and start the compressor.

Phase Five: Evacuation, Leak Checking and Return to Service

12. The system is fully charged and will begin cooling. Check for heat at the compressor discharge line and then the heat loop. Check for cool air from the evaporator.
13. Once it has been determined the unit is cooling unplug the refrigerator.
14. Install all machine compartment components and the cover.
15. Plug in the refrigerator and set temperature.
16. Instruct customer.

Notes

Job Aid - R-112

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