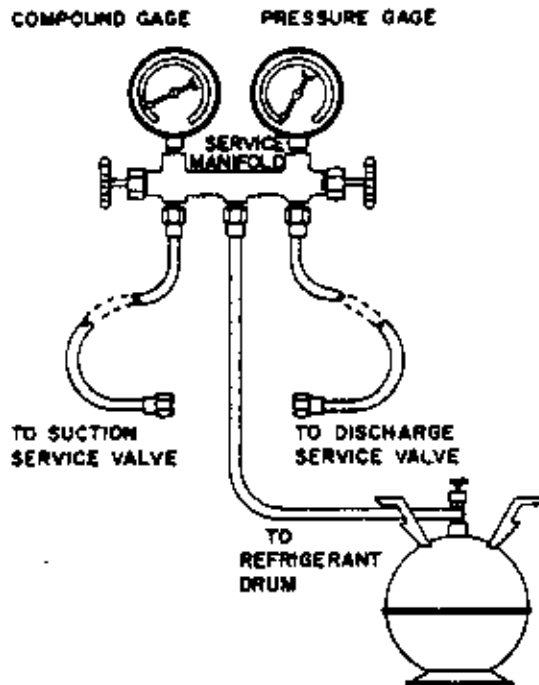


PROCEDURE FOR LEAK TEST-EVACUATION-CHARGING

GAUGE MANIFOLD

A necessary instrument in checking and servicing air conditioning and heat pump equipment is the gauge manifold. Its purpose is to determine the operating refrigerant pressures in order for the serviceman to analyze the condition of the system.

The valving on the manifold is so arranged that when the valves are closed (front-seated) the center port on the manifold is closed to the gauges and gauge ports. With the valves in the closed position, the gauge ports are still open to the gauges, permitting the gauges to register system pressures. Opening either valve opens the center port to that side of the manifold and system.



ATTACHING GAUGE MANIFOLD

For leak testing, purging, checking charge, charging liquid or evacuating, connect high pressure side of gauge manifold to Schrader valve on liquid or discharge line. Connect suction side of gauge manifold to Schrader valve on suction line. On heat pumps the suction line is between compressor and reversing valve.

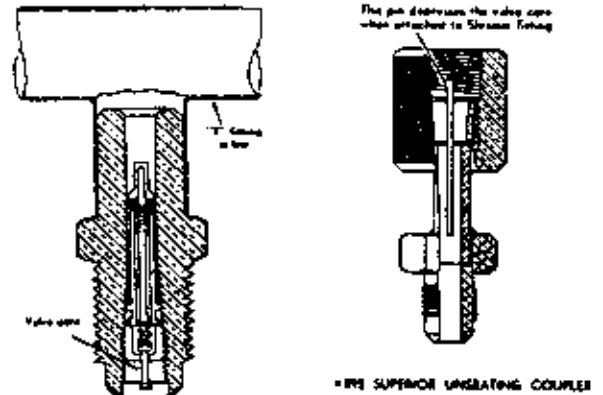
ATTACHING MANIFOLD HOSE TO SCHRADER VALVE

WARNING

As a safety measure, it is wise to attach refrigerant hoses at the lowest pressure readings on the system. To do this:

- (a) Put High pressure hose (B) on first. (Unit should not be running).
- (b) Put low pressure hose (A) on second. (Unit should be running).

1. Remove cap from valve.
2. Make sure gauge manifold valves are closed.
3. If hose does not have an unseating pin, a number 395 Superior or equivalent unseating coupler must be used.



4. Make sure coupler is lined up straight with Schrader valve. Screw coupler on to valve.
5. Open gauge manifold valve slightly and purge air from hose with refrigerant.
6. Read the suction pressure on compound gauge and heat pressure on pressure gauge.
7. To remove, push end of hose tight against end of Schrader valve and hold in place while quickly unscrewing coupler nut from Schrader valve.
8. Remove coupler from Schrader valve. Replace caps on valve.

WARNING

As a safety measure, it is wise to detach refrigerant hoses at the lowest pressure readings on the system. To do this:

- (a) Remove the suction pressure hose (A) first. (Unit is running).
- (b) Remove the High pressure hose (B) next. (Unit is not running).

LEAK TEST

1. Remove gauge port cap from suction and liquid service valve ports and attach manifold gauge hoses. Connect an upright R22 drum to center port of gauge manifold. Open refrigerant drum valve and manifold high pressure gauge valve to pressurize system. Pressurize the complete system with R22 until the pressure reaches 100 psig. DO NOT exceed 150 psig.
2. Close manifold high pressure gauge valve. Check all soldered joints, including those on the evaporator coil with an Electronic Leak Detector. If a leak is found which requires soldering, pressure in the system must be bled off since it is impossible to solder with unit pressurized. Be sure all leaks are located and marked before bleeding pressure from system.
3. Close drum valve and disconnect from center port. Release refrigerant into the atmosphere through suction line of gauge manifold.
4. Correct any leaks and recheck. When leaks, if any have been repaired, system is ready to be evacuated and charged. Relieve all pressure from the system down to 0 psig.

EVACUATION

1. Evacuate the system to less than 1000 microns, using a good vacuum pump and an accurate high vacuum gauge. Operate the pump below 1000 microns for 60 minutes and then close valve to the vacuum pump. Allow the system to stand for 30 additional minutes to be sure a 1000 micron vacuum or less is maintained.
2. An alternate method of removing moisture and noncondensables from the system is:
 - a) Evacuate system to 29 inches vacuum for ten minutes per ton of system. Break vacuum with refrigerant to be used for final charging of system and vapor charge to 35-50 lbs. gauge pressure. Leave vapor charge in system for a minimum of five minutes. Reduce pressure to five to zero gauge pressure.
 - b) Repeat step (a) two more times.
 - c) Evacuate system to 30 inches vacuum for twenty minutes per ton. Charge system with the specified kind and quantity of refrigerant (charge into vacuum).

WARNING

At no time use the compressor to evacuate the system or any part of it.

3. Disconnect charging line at vacuum pump and connect to refrigerant supply. (Dial-A-Charge Cylinder) crack valve and purge charging line at center on manifold. Then close valve.
4. The system is now ready for the correct operating charge of Refrigerant R22.

CHARGING

1. **SINGLE PACKAGE UNITS** - Refer to the unit serial plate for the full operating charge.
2. **SPLIT SYSTEMS** - The outdoor unit factory charge is shown on the unit serial plate. The total system charge required to recharge the system after service repairs should be marked on the serial plate under TOTAL R22 CHARGE. This is normally marked by the installer and is determined from the R22 System Charge Table located on the inside of the outdoor unit access panel.
3. **CTO ADAPTER KITS** - When using CTO adapters and field tubing, use the procedure outlined on the bottom of page 3, Manual 2100-002. This determines the correct ounces of R22 for the tubing only.
4. **FILTER-DRIER CHARGES** - If a liquid line filter-drier is used, either in conjunction with field tubing and a CTO adapter kit, or as part of procedure for system clean-up after a compressor burn-out, additional R22 must be added to the system when recharging. This is in addition to the amount determined from the R22 System Charge Table.

PART NO.	MODEL NO.	OZ. of R22
5202-001	C-083S	8
5202-002	C-163S	10
5201-009	BFK-083S	7
5201-010	BFK-163S	13

PRELIMINARY CHARGING STEPS

If the system has been open to the atmosphere, it should be first evacuated. Then proceed as follows:

1. Attach a drum of proper, clean refrigerant to the center part of the charging manifold with one of the charging hoses.
2. Attach a second charging hose to the suction gauge (low pressure) side of the gauge manifold.
3. Remove the cap from the suction line valve.
4. Loosely attach the suction gauge hose to the line valve. Open the valve on the refrigerant drum and the suction valve on the charging manifold slightly to purge the air from the manifold and hoses before tightening the fitting.
5. Attach the third hose to the high pressure side of the manifold and the liquid line valve. Repeat steps 3 and 4 above.

CHARGING THE SYSTEM BY WEIGHT*

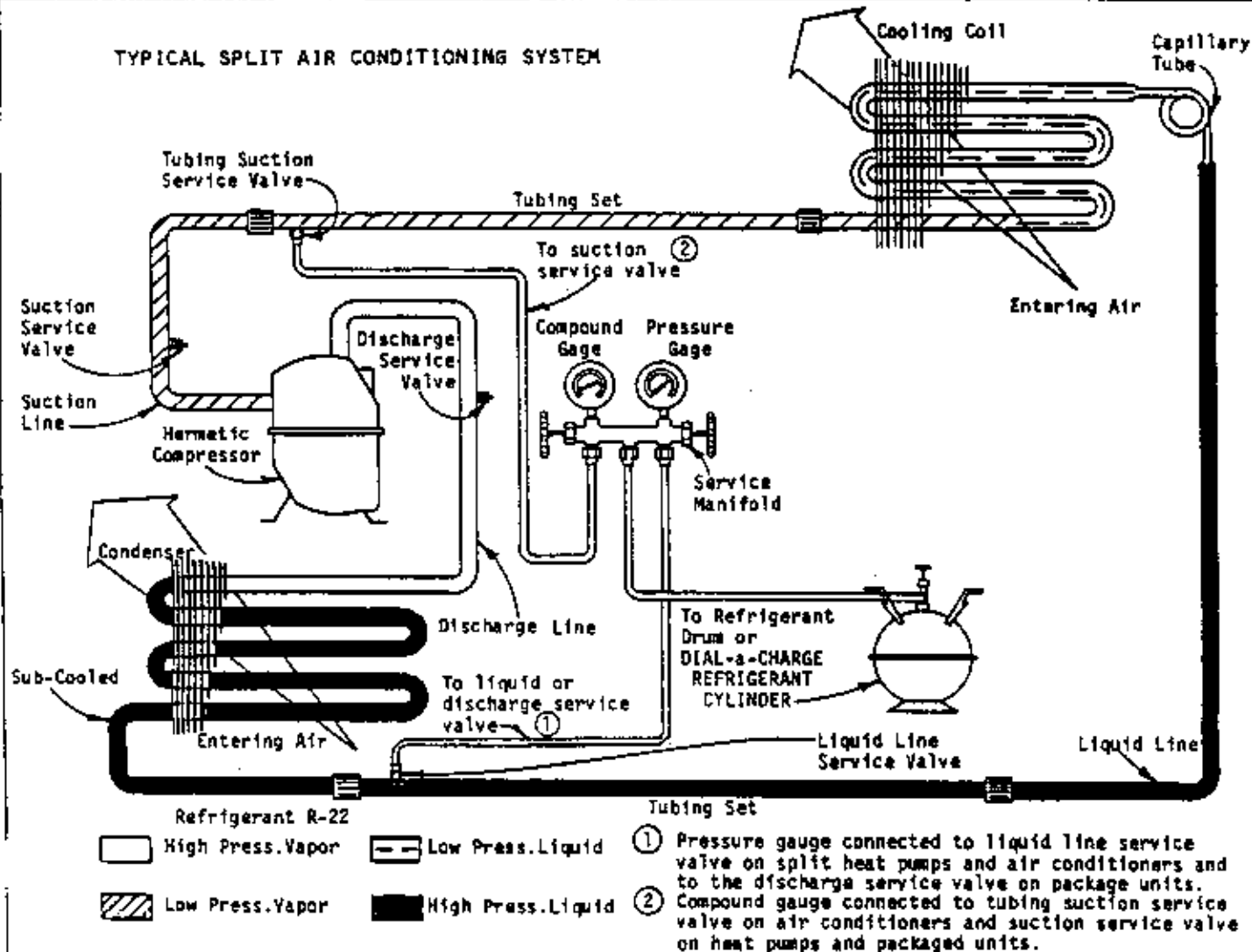
1. Connect manifold as instructed.
2. Place refrigerant drum upright on scale and determine exact weight of the refrigerant and cylinder or use a Dial-A-Charge cylinder.
3. With manifold suction valve closed and manifold discharge valve open, open refrigerant cylinder valve and allow pressure in system to balance with pressure of cylinder. For charging in the liquid phase, drum is placed upside down (valve down).
4. When there is approximately a full charge, front seat (close) the discharge manifold valve and let the system stabilize for about five minutes.
5. Start compressor by setting thermostat.
6. Finish charging with vapor by placing drum upright (valve up). Open drum valve and manifold low pressure valve to allow refrigerant to flow into the system. Throttle refrigerant drum valve to keep pressure about 100 psig for R22.
7. When the correct weight of refrigerant has been added to the unit, close refrigerant cylinder valve and allow unit to run for 30 minutes. Refer to Start-Up Procedure and Check List for further start-up details. Check the charge against the allowable head pressure as shown in the Head Pressure Chart and correct if needed.
8. Front seat gauge manifold valves, disconnect charging and gauge hoses and replace all valve caps.

WARNING

To speed refrigerant flow, it may be necessary to place refrigerant drum in a pan of warm water (not greater than 130°F). Remember to either consider the total weight of the pan of water or remove the drum for weighing frequently to keep track of the charging process.

*This charging method requires the scales or Dial-A-Charge cylinder to be extremely accurate since the charge in this type of system is quite critical.

TYPICAL SPLIT AIR CONDITIONING SYSTEM



AIR CONDITIONING AND HEAT PUMP ON COOLING CYCLE

TROUBLESHOOTING — SYSTEM PRESSURE CHECK

Low Suction — Low Head Pressure

1. Restricted air flow over indoor coil.
2. Defective indoor fan motor.
3. Low indoor and outdoor temperature.
4. Iced indoor coil.
5. Restricted liquid line, drier, or capillary tube.
6. Low charge.

High Suction — Low Head Pressure

1. Defective or broken valves.
2. IPRV valve open.

Low Suction — High Head Pressure

1. Partial restriction and then over-charged.

Note: On a split heat pump the vapor line should be within 10 psig of the pressure in liquid line on heating mode and within 10 psig of suction line on cooling mode. If not, check for sticking, check valves.

High Suction — High Head Pressure

1. High ambient.
2. Low outdoor air flow
3. Overcharged.
4. Air in system.
5. Restricted condenser.

