TRANE™

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Subject: RTAA 70-400 Refrigerant pumpdown/evacuation procedures, connection points, and oil circuit repair.

Introduction:

This bulletin describes the preferred methods of refrigerant handling when performing service work on the RTAA 70-400 Ton chillers. This bulletin also includes information on servicing the oil circuit of these chillers. With the procedures described in this bulletin, the service technician should be able to make repairs in an expeditious manner.

Discussion:

There are three areas of isolation on the chiller. They are the *high side*, *low side*, and *compressor.*

1. The *high side* is from the compressor discharge valve to the liquid line shutoff valve (King valve). This includes the oil separator(s), condenser coil, oil cooler, and the interconnecting piping.
2. The *low side* begins just after the King valve and extends to the compressor suction service valve. The low side includes the filter-drier, sight glass, electronic expansion valve(s) (EXV), evaporator, and the suction line.
3. The *compressor isolation area* includes the compressor, and the oil circuit just downstream of the oil line shutoff valve. The oil circuit includes the oil filter, differential oil pressure switch, and master oil solenoid valve, if so equipped.

Recovery tanks are not needed when making repairs to any one of these areas. Either the condenser or the evaporator can store the entire refrigerant charge.

The steps involved in recovering the refrigerant from any of these areas varies depending on the size of the chiller and, in one instance, the manufacturing date. Some of these differences are due to manufacturing changes in the orientation of the King valve. The following figures illustrate these design changes.

Figure 1
Orientation Liquid Line Shutoff Valve (King Valve)
RTAA 130-215 Prior to serial # U94B01584
RTAA 240-400 All

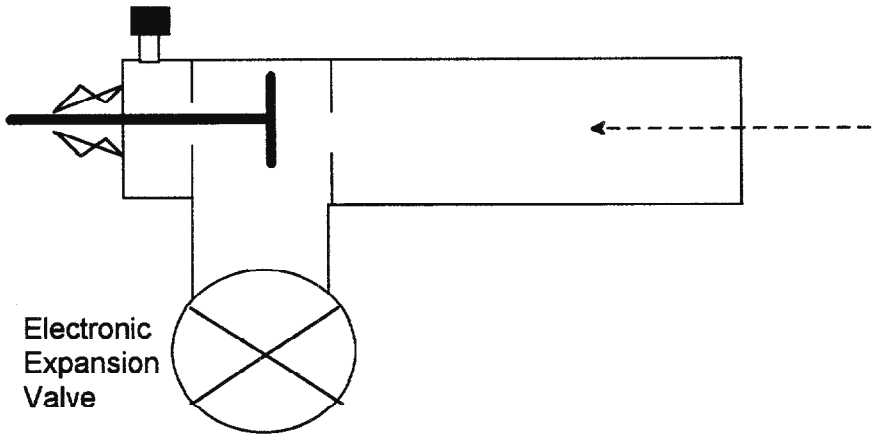
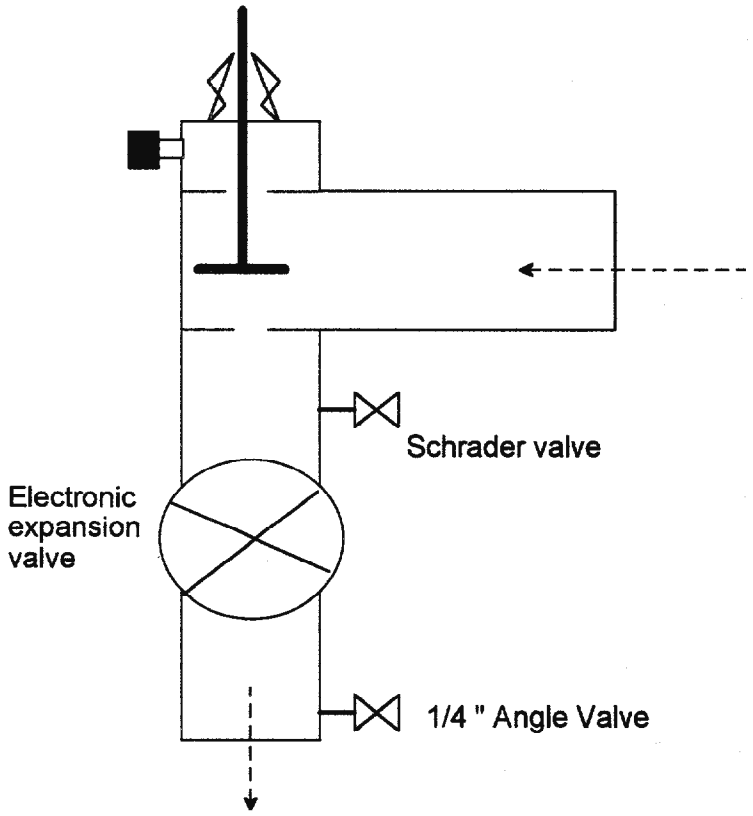


Figure 2
Orientation Liquid Line Shutoff Valve (King Valve)
RTAA 70-125 & RTAA 130-215 Serial # U94B01584 and later.



CAUTION: Before performing a Service Pumpdown procedure always attach, and monitor a suction pressure gauge. Never allow suction pressure to fall below 20 p.s.i.g. . Never enable Service Pumpdown two or more consecutive times. If, during the Service Pumpdown procedure, suction pressure does drop below 20 p.s.i.g. immediately unscrew the control power fuse-1F15.

CAUTION: When recovering refrigerant, chilled water should always be flowing through the chiller barrel. Failure to do so can result in catastrophic damage to evaporator tubes.

CAUTION: When operating refrigerant recovery, or transfer equipment, always follow the guidelines stated in the literature of that unit's manufacturer.

Low Side Repairs

The Service Pumpdown feature in the chiller's UCM considerably shortens the recovery process. This feature moves approximately 90% of the circuit's charge into the condenser.

To ensure complete, and rapid recovery, the technician must recover from the line between the King valve and EXV. This requires that the technician gain access to this line. RTAA 130-215 built prior to U94B01584 and all RTAA 240-400 ton chillers were built with the King valve's backseat port accessing the downstream side of the valve, as in figure 1.

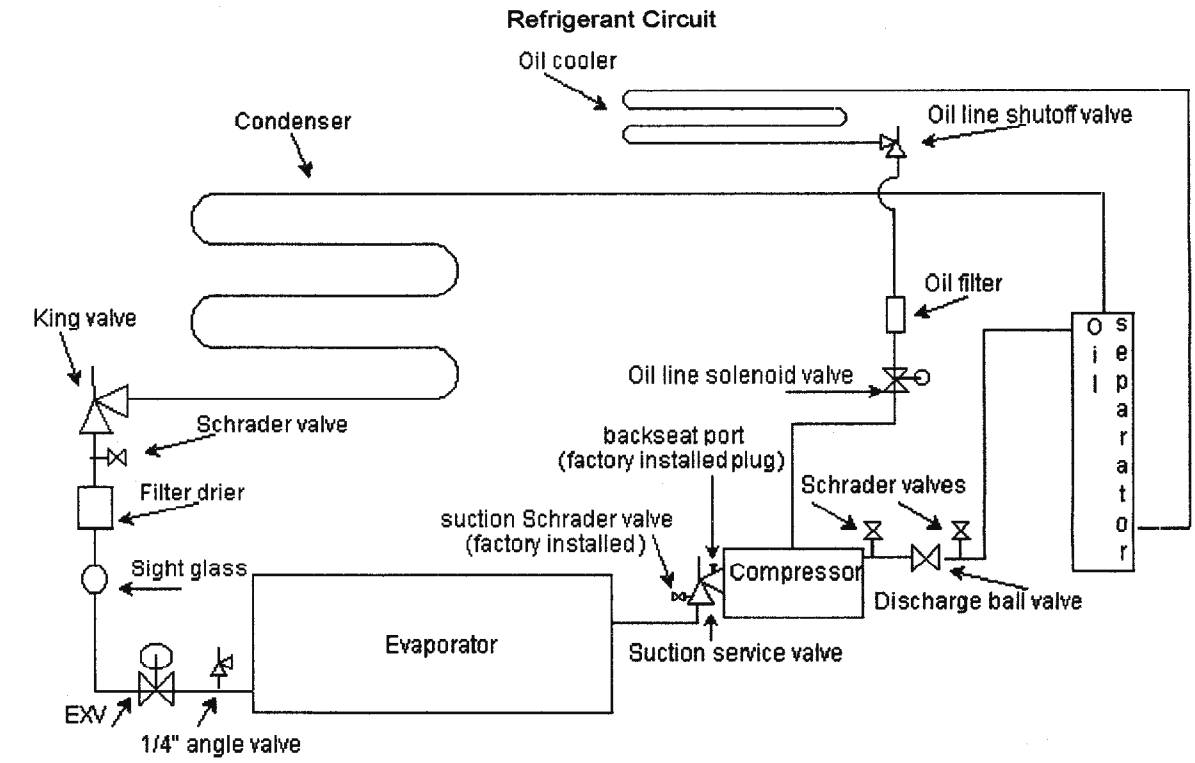
On any RTAA 130-215 ton with a serial number of **U94B01584** and greater, and all RTAA 70-125 ton, the King valve's backseat port accesses the upstream side, as in figure 2. To account for an EXV failing in the closed position a Schrader valve was installed just upstream of the EXV. It permits recovering the refrigerant trapped in the line between the King valve and EXV. A 1/4" angle valve was also installed in the line downstream of the EXV.

If possible, the EXV should be open while recovering refrigerant from the low side. To ensure that the valve is open, perform the following:

1. Move the chiller switch to **Stop/Reset** or press the **Stop** key on the clear language display .
2. Enable the **Expansion Valve Test** [Menu **P2**, item 26 (w/o CLD), in **Service Test Menu** (with CLD)].
3. After enabling this test, the expansion valve should make a clicking sound for up to 15 seconds. After the 15 seconds of clicking, the valve should become quiet as it begins to drive open. The second time the valve begins to click, pull the expansion valve plug at the 1U3 Stepper Module. This should leave the valve in an open position.

The RTAA 70 - 400 ton chillers are equipped with a suction service valve. In addition, the RTAA 70 - 125 ton chillers are equipped with this same valve on the discharge side of the compressor. The valve has two ports. The first is a backseat port with a plug factory installed. The other port has a factory installed Schrader valve fitting. It is always exposed to gas pressure in either the suction line or discharge line, regardless of the position of the valve. To speed refrigerant recovery, the plug in the backseat port can be replaced with a free flowing fitting. RTAA 130-400 chillers use a ball valve on the discharge line.

Figure 3
RTAA 130-215 Serial # U94B01584 and later



Refrigerant Recovery Connection Points

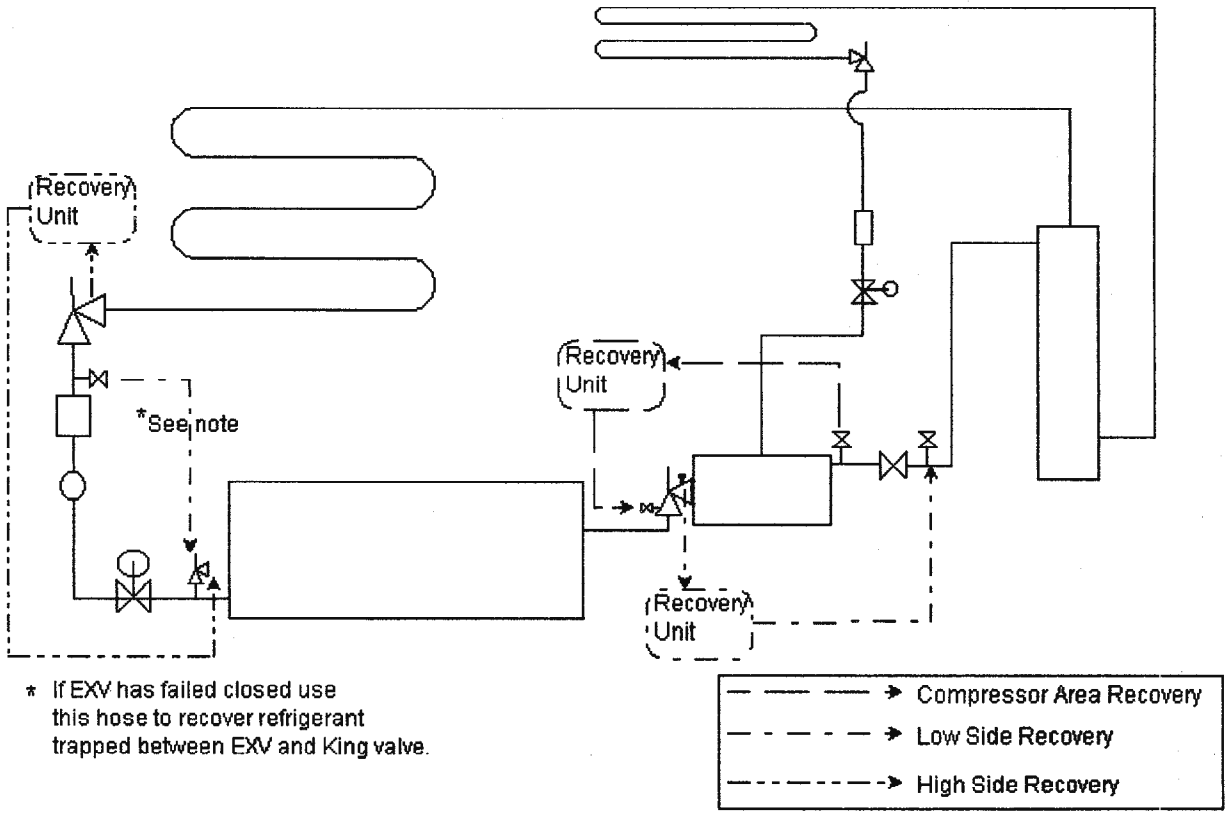
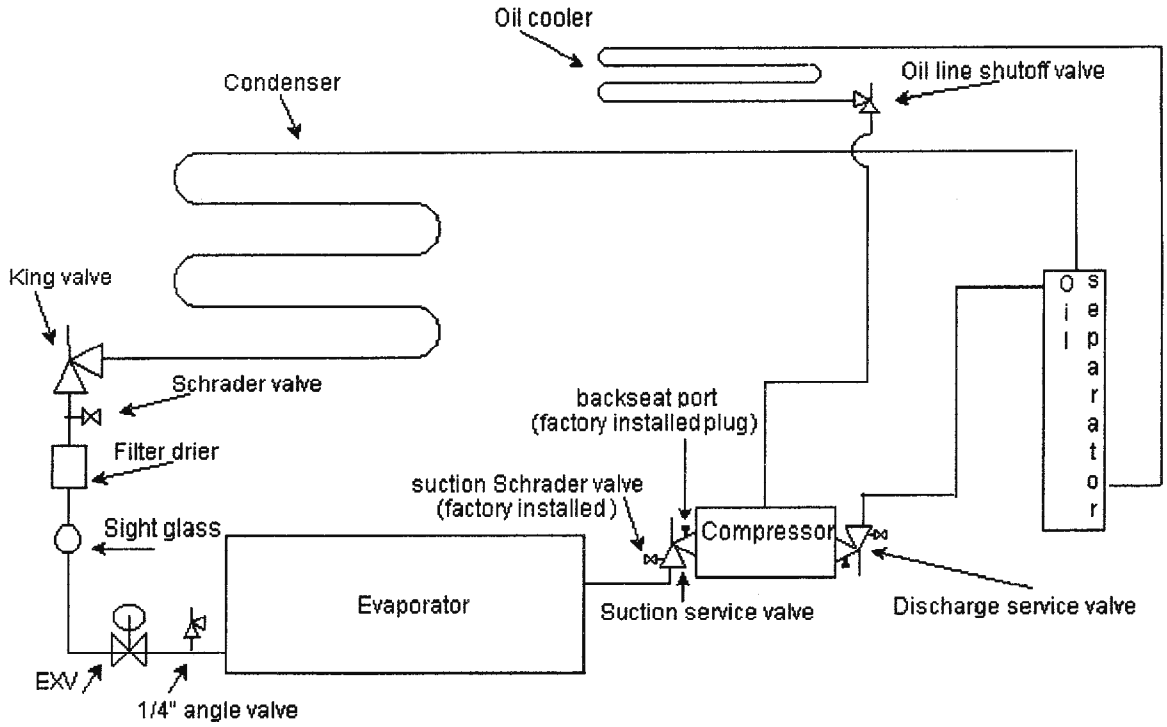


Figure 4
RTAA 70-125

Refrigeration Circuit



Refrigerant Recovery Connection Points

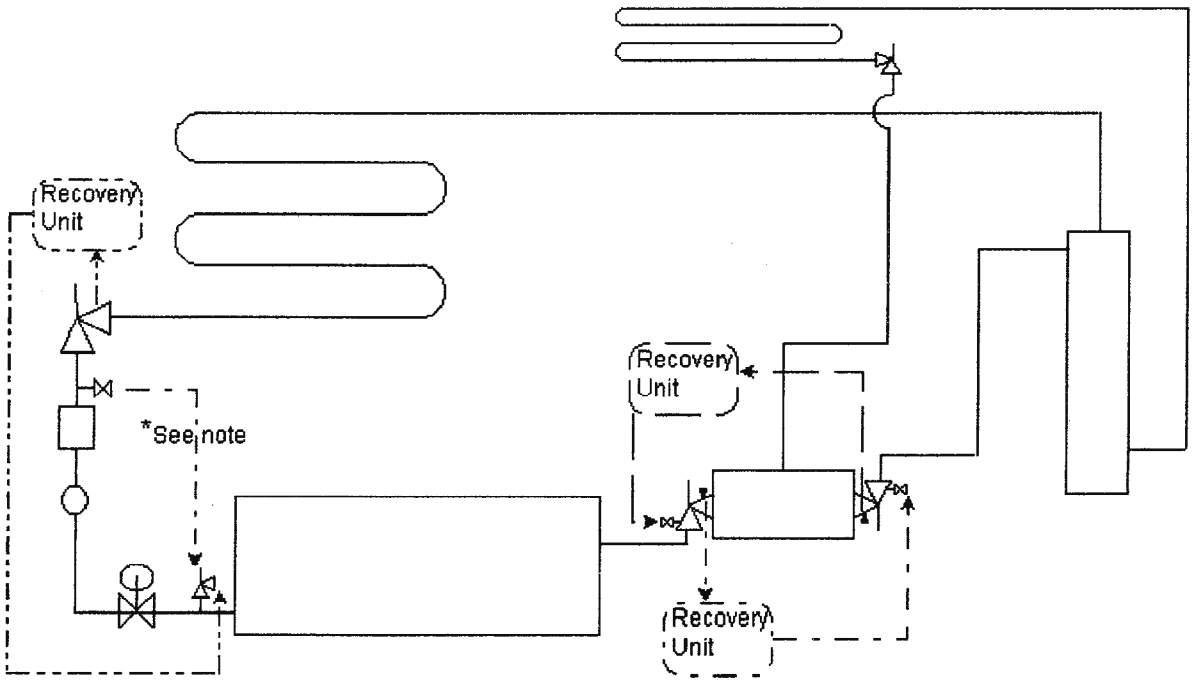
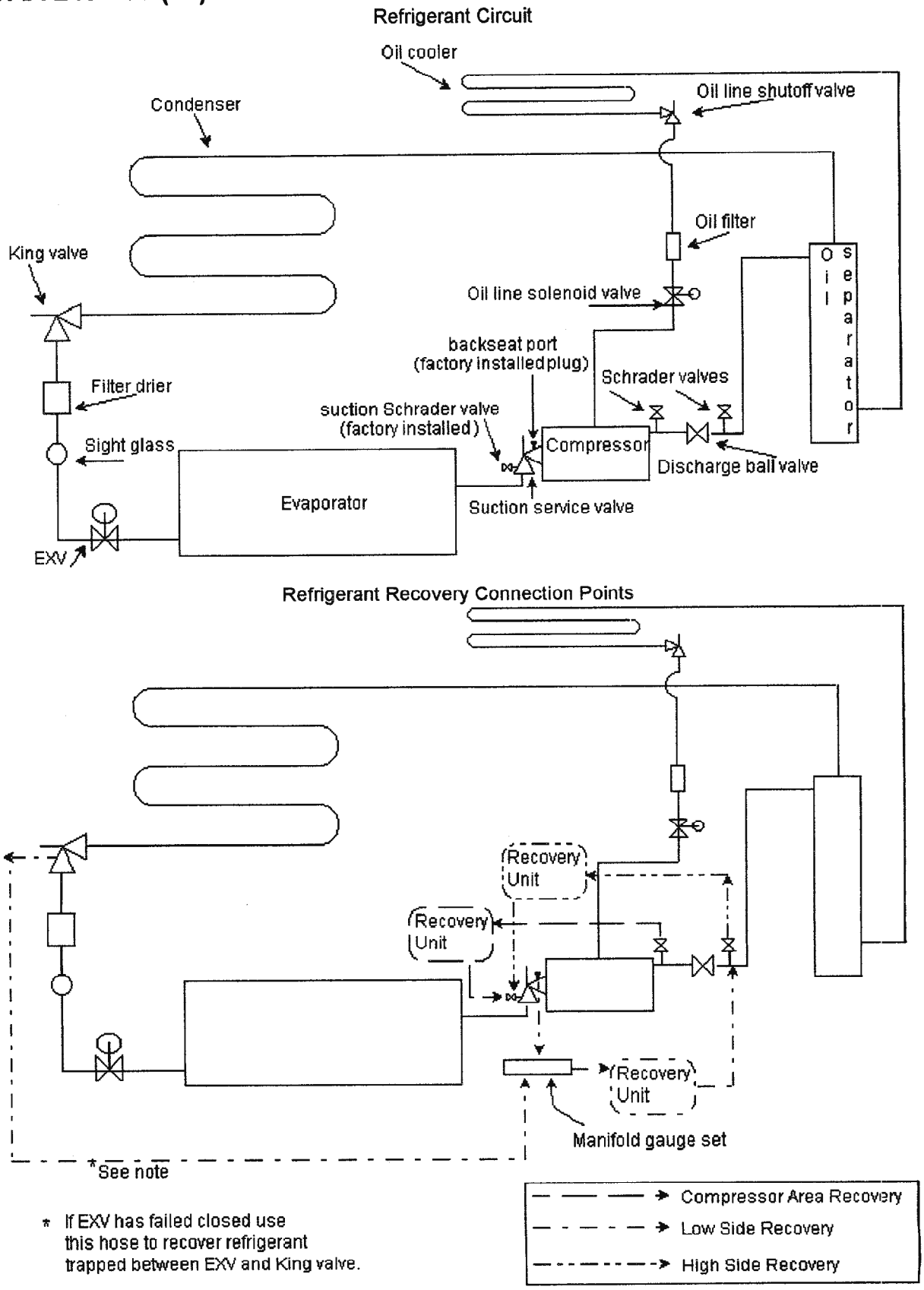


Figure 5
RTAA 130-215 Prior to serial # U94B01584
RTAA 240-400 (all)



Low Side Recovery Procedure

1. Move the chiller switch to **Stop/Reset** or press the **Stop** key on the clear language display.
2. Attach gauge to suction line and verify suction pressure greater than 20 p.s.i.g.
3. Verify chilled water flow.
4. Attach recovery hoses according to figure 3, 4, or 5.
5. Front seat King valve
6. Recheck suction pressure gauge. If pressure is greater than 20 p.s.i.g. enable **Service Pumpdown**. Compressors will run for 1 minute and then shut off automatically.
7. After the chiller module has stopped the compressors, quickly close the discharge valve, and shutoff oil supply to the compressor. Crack the suction service valve to expose the backseat port to the low side.
8. Verify that the compressor sump heaters are energized.
9. Turn all fans on by jumping 115 VAC to the fan contactors coil according to the particular machines wiring diagrams.
10. Move the remaining vapor into the condenser. Refer to the recovery unit's operations guide for the proper procedure.
11. Pull the evaporator pressure down to the proper level.

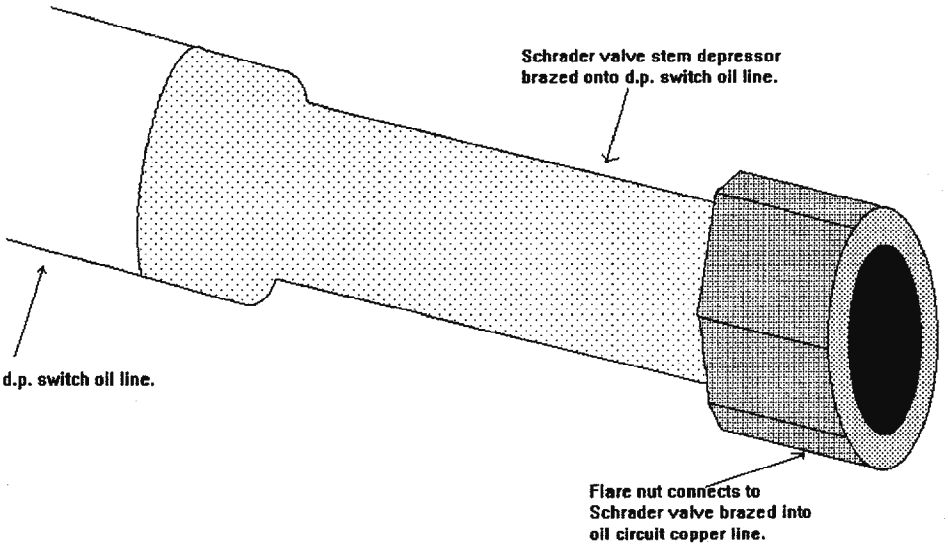
High Side Repairs

If the expansion valve is open, the liquid refrigerant will flow down into the evaporator due to gravity and pressure differential. The refrigerant will flow until the pressures equalize. A cold evaporator and/or warm condenser will reduce the time it takes to transfer the liquid refrigerant. To ensure the expansion valve is open, follow the procedure beginning on page 3.

High Side Recovery Procedure

1. Move the chiller switch to **Stop/Reset** or press the **Stop** key on the clear language display.
2. Verify that the compressor sump heaters are energized.
3. Backseat the King valve.
4. Close the suction service valve.
5. Allow the liquid refrigerant to flow down into the evaporator. On all RTAA 70-125 and the RTAA 130-215 chillers built after the design change, use a liquid refrigerant transfer pump, if it is available. Connect the inlet of the pump to the King valve's backseat port, outlet to the 1/4" angle valve on the liquid line, and midseat the King valve.
6. Once the sight glass bubbles, recover remaining vapor. Connect recovery hoses according to figure 3, 4, or 5. If a liquid pump was used disconnect the pump then proceed.
7. Frontseat King valve.
8. Move the remaining vapor into the evaporator. Refer to the recovery unit's operations guide for the proper procedure. Pull the condenser pressure down to the proper level.

Figure 6
Oil DP Switch Schrader Valve and Flare Fitting



Compressor Area Repairs

The following is a partial list of service work that requires isolating the compressor and oil circuit: replacement of oil filter, interconnecting oil line components, load and/or unload solenoid valve(s), and compressor, and differential oil pressure switch calibration/replacement.

The RTAA 70-125 and RTAA 130-400 have distinctly different oil circuits. The oil filter in the RTAA 70-125 is integrated into the compressor casting. RTAA-IOM-4 describes the procedure for changing the oil filter element on the RTAA 70-125. On the RTAA 130-400, the filter is externally circuited

Only the RTAA 130-400 ton chillers have an oil differential pressure switch--or d.p. switch. The d.p. switch monitors the pressure drop across the oil filter(s), and master oil solenoid valve. The switch is a normally closed switch. If the differential oil pressure exceeds 50 p.s.i.d. the switch opens to signal the UCM of a Low Oil Flow diagnostic. On the first chillers built, the capillary tube on the high pressure side of the switch was connected to a port on the oil line shutoff valve. The capillary tube on the low pressure side of the switch was brazed into the copper line that feeds oil to the rotors. On later chillers, a Schrader valve was added upstream of the oil line shutoff valve. The d.p. switch's high side capillary tube was modified to include a stem depressor and flare fitting. The d.p. switch flare fitting connects to this Schrader valve. Later, a Schrader valve and stem depressor was also added to the low side capillary tube of the d.p. switch. Figure 6 above illustrates how the oil line will appear if the chiller **does** have a Schrader valve and stem depressor brazed in.

Compressor Area Recovery Procedure

1. Move the chiller switch to **Stop/Reset** or press the **Stop** key on the clear language display.
2. Connect recovery hoses according to figure 3, 4, or 5.
3. **RTAA 130 - 400 only.** Close oil line shutoff valve. Use a jumper to energize the oil line master solenoid valve. This will relieve oil line pressure into the compressor.
   RTAA 70-125 only. Isolate the compressors oil circuit. Depending on when the chiller was built, either disconnect Aeroquip quick connect valve, or the close oil line angle valve.
4. Close suction service valve.
5. Close discharge service valve.
6. Move the remaining vapor into the evaporator. Refer to the recovery unit's operations guide for the proper procedure.
7. Pull the compressor pressure down to the proper level.

Parts Ordering: This service bulletin is informational only and does not authorize any parts or labor.

Refrigerant Emission Control

Evidence from environmental scientists indicates that the ozone in our upper atmosphere is being reduced, due to the release of CFC fully halogenated compounds.

The Trane Company encourages every effort to eliminate, if possible, or vigorously reduce the emission of CFC, HCFC and HFC refrigerants into the atmosphere that result from installation, operation, routine maintenance, or major services on this equipment. Always act in a responsible manner to conserve refrigerants for continued use, even when acceptable alternatives are available.

Conservation and emission reduction can be accomplished by following recommended Trane operation, maintenance and service procedures, with specific attention to the following:

1. Refrigerant used in any type of air conditioning or refrigerating equipment should be recovered for reuse, recovered and/or recycled for reuse, reprocessed (reclaimed) properly destroyed, whenever it is removed from equipment by an EPA certified Type II or Universal technician. Never release refrigerant into the atmosphere.

2. Always determine possible recycle or reclaim requirements of the recovered refrigerant before beginning recovery by any method. Questions about recovered refrigerants and acceptable refrigerant quality standards are addressed in ARI Standard 700.

3. Use approved containment vessels and safety standards. Comply with all applicable transportation standards when shipping refrigerant containers.

4. To minimize emissions while recovering refrigerant, use recycling equipment. Always use methods which will pull the required vacuum while recovering and condensing refrigerant into containment.

5. When leak checking with trace refrigerant and nitrogen, use HCFC-22 (R-22), rather than CFC-12 (R-12) or any other fully halogenated refrigerants. Be aware of any new leak test methods which eliminate refrigerant as a trace gas.

6. When cleaning system components or parts, avoid using CFC-11 (R-11) or CFC-113 (R-113). Refrigeration system clean up methods which use filters and dryers are preferred. Do not use solvents which have ozone depletion factors. Properly dispose of used materials.

7. Take extra care to properly maintain all service equipment that directly support refrigeration service work, such as gauges, hoses, vacuum pumps and recycling equipment.

8. Stay aware of unit enhancements, conversion refrigerants, compatible parts and manufacturer's recommendations which will reduce refrigerant emissions and increase equipment operating efficiencies. Follow manufacturer's specific guidelines for conversion of existing systems.

9. In order to assist in reducing power generation emissions, always attempt to improve equipment performance with improved maintenance and operations that will help conserve energy resources.