Installation, Operation & Maintenance Manual

IOMM RRU134
Group: Refrigerant
Effective: December 2000
Supersedes: New

Refrigerant Recovery Unit, Model RRU134

McQuay® Air Conditioning

Table of Contents

Specifications

Electrical Power Requirements

Recovery Main Components and Controls

115 Vac, 50/60 Hz, 1-Phase, 20-Amps

Minimum Circuit Amp 17.5, Maximum Fuse 20 Amps

240Vac, 50/60Hz, 1-Phase, 15-Amps

Minimum Circuit Amp 10.0, Maximum Fuse 15 Amps

Dimensions (approximate): 19 in. high x 14 in. wide x 18 in. deep

Weight: 100-lbs. (130-lbs. shipping)

Furnished with RRU134

Two ½in. Female Flare Unions

Two 0.73-Litre Disposable In-line Filter Driers

Cable for 80% Full Safety Switch

NOTICE

McQuay International urges that all HVAC servicers working on McQuay equipment or any manufacturer's products, make every effort to eliminate, if possible, or vigorously reduce the emission of CFC, HCFC, and HFC refrigerants to the atmosphere resulting from installation, operation, routine maintenance, or major service of 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 service and safety procedures.

WARNING

To avoid injury or death due to inhalation of, or skin exposure to refrigerant, closely follow all safety procedures described in the Material Safety Data Sheet for the refrigerant and to all labels on refrigerant containers. Certain procedures common to refrigeration system service may expose personnel to liquid or vaporous refrigerant.

Product Description

McQuay's RRU134 recovery system provides the efficient and safe recovery of most positive-pressure refrigerants and blends.

The unit consists of a 1.5-hp open drive compressor, high capacity 700 cfm air-cooled condenser, system pressure gauge, tank pressure gauge and a valving system consisting of three manually operated 3-way valves. Unit connections are ⅛in. male flare with isolation valves. After four hoses are connected and purged or evacuated, the user simply turns three 3-way valves to the liquid mode position, opens all lines at the system being recovered, purges lines and turns the RRU134 on. The RRU134 starts recovery by letting refrigerant migrate from the A/C system to the recovery tank. It then draws vapor off the recovery tank, heats it via compression, and injects it back into the A/C system high side, thus creating a pressure differential for a push/pull liquid transfer.

Two onboard gauges display system pressure and recovery tank pressure. When liquid has finished transferring and the sight glass on side of the RRU134 is clear of liquid refrigerant, the user turns all three 3-way valves to vapor recovery mode, allowing the RRU134 to pull vapor from both sides of the A/C system being recovered. The RRU134 compressor begins recovering vapor which is first cleansed by an external filter drier. The discharged hot refrigerant gas is then condensed by the air-cooled condenser and sent to the recovery tank as a liquid.

Transfer stops when an internal pressure switch indicates that the A/C system is under a 15 in. vacuum. If pressure should again rise above 0 psig, the RRU134 will restart to pull all remaining gas from the A/C system.

Safe Operations and Tips

To ensure your safety as well as others, before attempting to recover an A/C or refrigeration system, proper and thorough preparation must take place.

Make sure that you have a recovery cylinder with a minimum ½in. male flare vapor port and a minimum ⅛in. male flare liquid port with ⅛in. internal dip tube, or larger ports if possible. This tank or series of tanks must be able to hold the entire refrigerant charge at 80 % full.

Reminder: Refrigerant full weight is 80% of water capacity weight determined as follows: Maximum allowable gross weight = 80% of water capacity weight + cylinder tare weight.

In addition, a suitable scale should be used to weigh the refrigerant charge in case RRU134 needs to be shut down to prevent overfilling the tanks. If a scale is not available, the tanks can be equipped at time of purchase with a float switch that will deactivate the RRU134's 120-VAC control circuit. All RRU134 units come with safety float connection and cable.

Finally, the recovery cylinder or cylinders must be pulled into a 29 in. vacuum before recovery commences. Failure to follow these above stated procedures will decrease the likelihood of the RRU134 performing at its highest possible effectiveness.

Peak Performance

To get the highest performance from your RRU134 unit, we recommend that you connect to ½in. evaporator and ½in. condenser ports on the A/C system and to recovery cylinders with ½in. ports and dip tubes whenever possible.

Procedures for Liquid Push Pull Method

1. Turn the refrigeration or A/C system off; make sure that the system cannot restart.
2. Connect the 120-VAC power cord to the RRU134's control box and a 120-VAC 1-phase minimum 17.5 amp maximum 20-amp outlet.
3. Connect all refrigerant hoses, as shown in Figure 1. Connect two ½in. hoses to the RRU134'S recovery tank side liquid and vapor ports and to liquid and vapor ports on the recovery cylinder. Connect the other two ½in. hoses to ports on the A/C system or refrigeration unit evaporator and condenser as well as on the RRU134 system liquid and vapor ports. At this time connect safety float cable from the RRU134 to recovery tank or use a suitable scale. If a scale is to be used instead of float safety cut out, the 80% full bypass switch will need to be set to the "on" position for the RRU134 to run.
4. Turn all three 3-way valves on the RRU134 to LIQUID MODE.
5. Open vapor and liquid access valves on A/C system being recovered.
6. Next open system vapor and liquid hand valves on the RRU134 recovery unit.
7. Next open tank vapor and liquid valves on the RRU134 recovery unit.
8. Turn upper left hand three way valve to PURGE MODE.
9. Purge both refrigerant lines at recovery tank, then turn upper left hand three way valve back to LIQUID MODE.
10. Next open vapor and liquid hand valves on the recovery tank.
11. Turn the RRU134 power switch on and the RRU134 will automatically start drawing vapor off of recovery tank and forcing higher compressed gas back into the condenser of the A/C system. Liquid push/pull is now in process.
12. Continue to monitor the liquid sight glass on side of the RRU134. Once all of the liquid has been completely removed and you are absolutely sure that all of the liquid has been removed, proceed to next section.

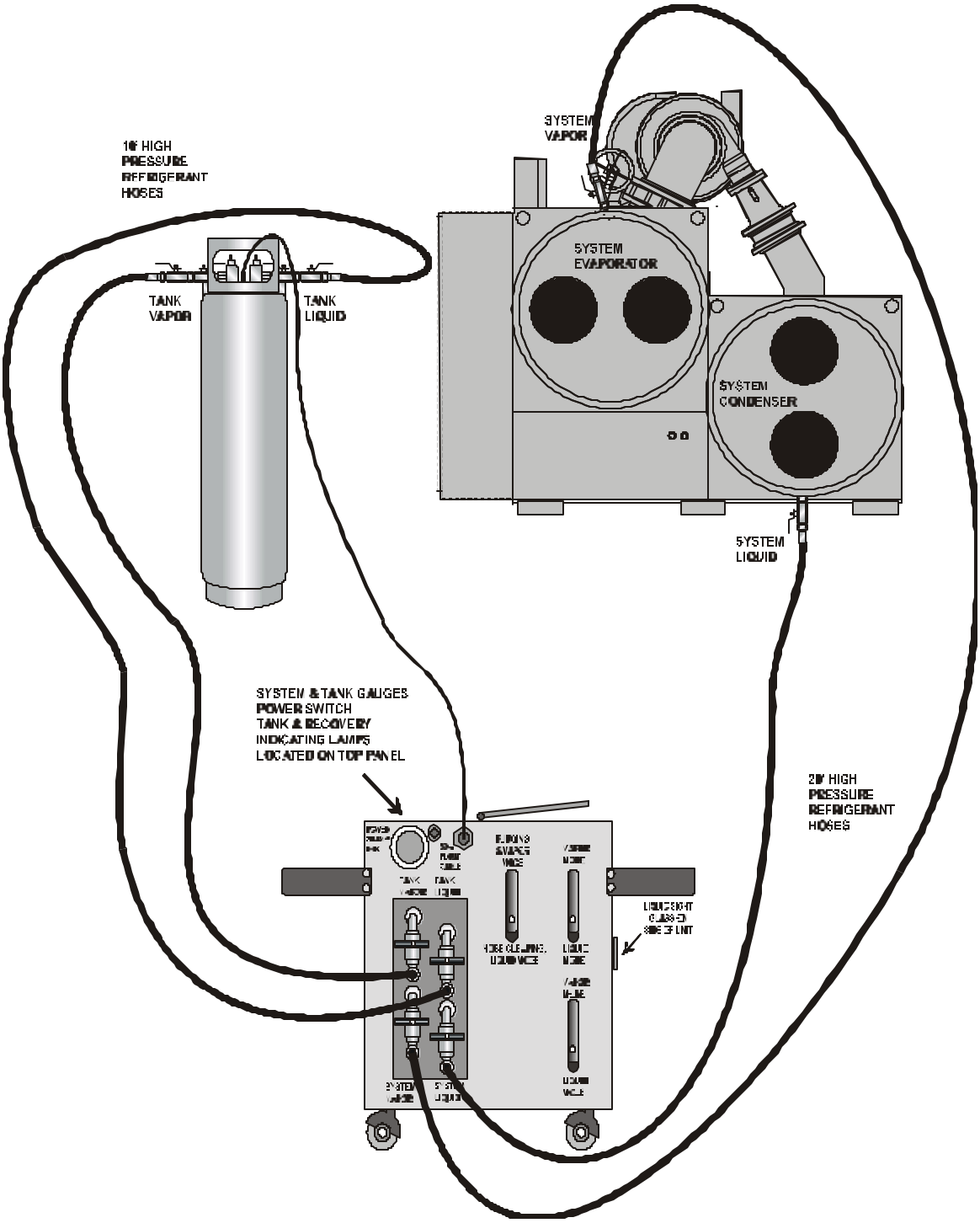
WARNING

It is absolutely imperative that all of the liquid has been removed before switching into the vapor recovery mode. Failure to do so may result in liquid slugging to the compressor and causing major damage to the compressor.

Vapor Recovery Method

13. Once liquid site glass is completely clear of all liquid, turn all three, 3-way valves to VAPOR RECOVERY MODE as shown in Figure 1. The RRU134 will now recover all of the remaining gas and vapor from both sides of the A/C system and pull entire system into a 15 in. vacuum.
14. Once the A/C system has been completely recovered to a 15 in. vacuum, the RRU134 will shut down and "recovery complete" light will illuminate. Should pressure in the the A/C system again rise above 0 psig, the RRU134 will restart and pull A/C system back into a 15 in. vacuum.
15. When recovery is finished, close both condenser and evaporator isolation valves on the A/C system as well as the system vapor and liquid isolation valves on the RRU134 recovery unit. To clear remaining refrigerant from the recovery tank hoses and RRU134 recovery unit, proceed to the REFRIGERANT CLEARING PROCEDURES on page 7.

Figure 1, Liquid Push/Pull Mode and Vapor Mode



Note: There will still be a small, residual amount of refrigerant in the RRU134. This amount must be removed if you want to change to a different type of refrigerant. An explanation on how to remove this residual amount of refrigerant is explained in next section.

Refrigerant Clearing Procedures

1. Make sure that the A/C system side isolation valves are closed and that the recovery tank vapor and liquid side isolation valves on the RRU134 and recovery tank are still open.
2. Turn the 3-way valve marked “hose clearing” to its hose clearing position. The RRU134 unit will automatically restart.
3. Close the vapor valve on the recovery tank. Watch both the tank gauge and the system gauge on the RRU134 unit. The system gauge will pull all the way to a 15 in. vacuum and shut the unit down. Once the RRU134 shuts down, immediately close the liquid valve on the recovery tank.
4. Disconnect the tank vapor hose, then slowly disconnect the tank liquid hose. There will still be a minute amount of refrigerant left in this hose. Purge off and unit will be ready for next recovery job.

Note: After recovery is complete and all the refrigerant has been removed or purged from the hoses, the RRU134 may still have a residual amount of refrigerant in the unit. To remove this refrigerant, connect an evacuated recovery cylinder to the compressor suction and discharge ¼in. Schrader valves on the side of unit. Allow the remaining refrigerant to be pulled into cylinder. This procedure needs to be performed whenever a different type of refrigerant is to be recovered.

Changing Replaceable Cores

Make sure you replace the disposable filter driers after each recovery job. Simply remove the used filter drier assembly and replace. Driers should be used on the system vapor and liquid inlet ports located on the RRU134. Failure to use driers on each and every recovery may result in damage to the recovery compressor.

Changing Compressor Oil

The compressor's charge of Polyol Ester oil should be regularly replaced with an identical fluid or, at a minimum, after any of the following events:

1. After a maximum of 10 hours of run time.
2. When changing recovery jobs that involve different refrigerants.
3. After recovering a system with a burnt out compressor.

WARNING

When changing oil, it is highly recommended that the same type of oil being used with the refrigerant being recovered be used in the rru134 compressor. This will help ensure that cross-contamination does not occur.

To remove and change the oil in the compressor and the oil separator:

a. Make sure that the RRU134 unit has no refrigerant in its internal parts.

b. Connect a manifold set to dry nitrogen and to the suction and discharge service ¼ in. access ports located on the side of the RRU134.

c. Connect another ¼ in. hose to the access fitting on the bottom of the RRU134 oil separator fitting and the other end to a suitable disposable oil container.

d. Gradually allow dry nitrogen to go into the discharge port on the RRU134 unit until all oil has been forced out of the oil separator. **Note**: 10 to 15 psi will be more than adequate.

e. Connect another ¼ in. hose to the access fitting on the bottom of the RRU134 compressor fitting and the other end to a suitable disposable oil container.

f. Gradually allow dry nitrogen to go into the suction port on the RRU134 unit until all oil has been forced out of the compressor.

g. To add new oil to the RRU134 compressor, connect a vacuum pump to the ¼ in. access port on the suction side of the compressor. Pull down into a minimum 29 in. vacuum.

h. Connect the other hose to the ¼ in. access port on the bottom of the compressor and into the new oil container. **Note**: Fill compressor with exactly 14 oz. of oil.

i. After the compressor has been filled, connect the other hose to the ¼ in. access port on the bottom of the oil separator and into the new oil container. **Note**: Fill oil separator with exactly 4 oz. of oil.

j. Once this procedure is finished, remove all hoses and pull entire RRU134 into a 29 in. vacuum. Dispose of old oil properly.

WARNING

Failure to follow the above procedures for recharging oil in compressor with the exact amount of oil may result in major damage to the compressor.

Figure 2, Process and Identification Schematic - Purge Mode

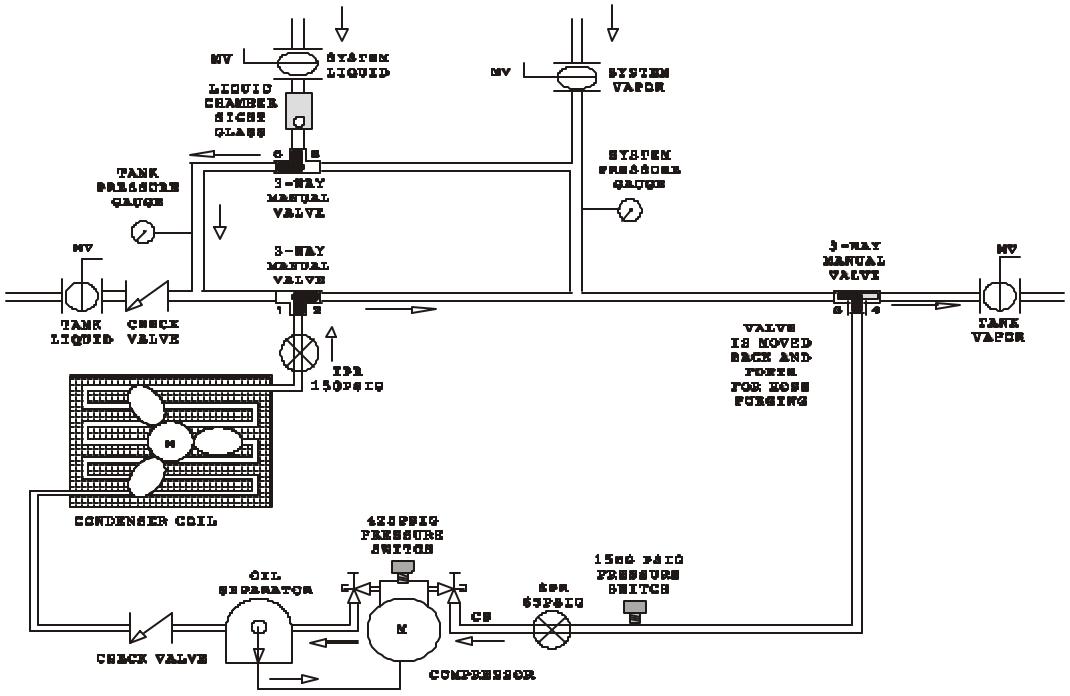


Figure 3, Process and Identification Schematic - Liquid Mode

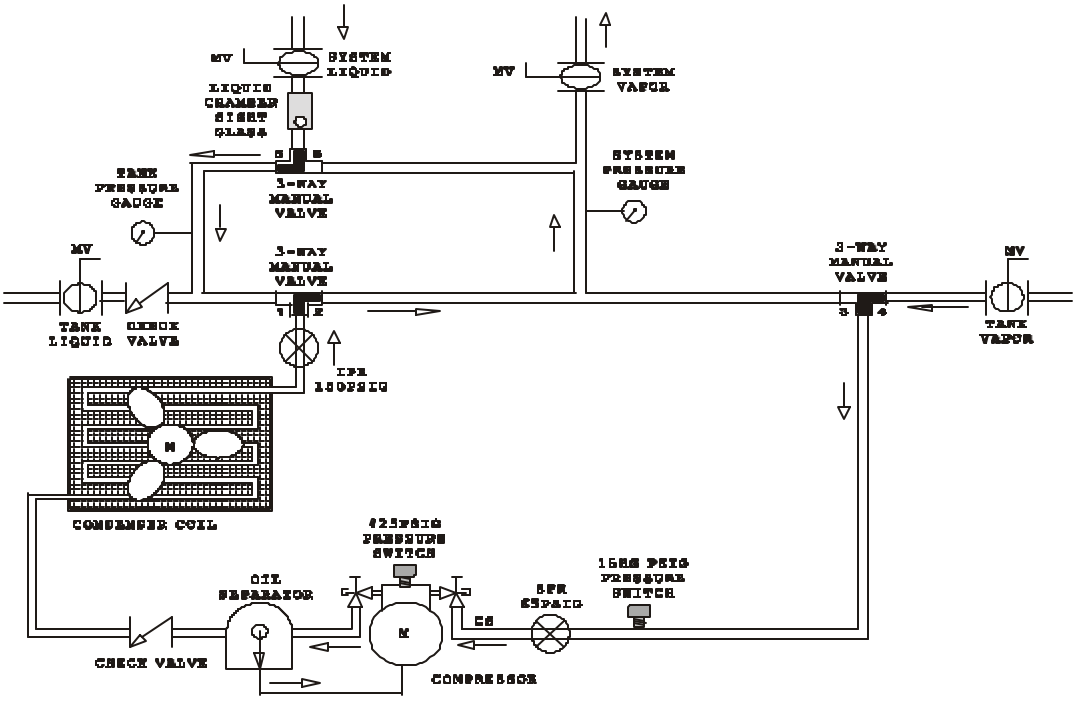


Figure 4, Process and Identification Schematic - Vapor Mode

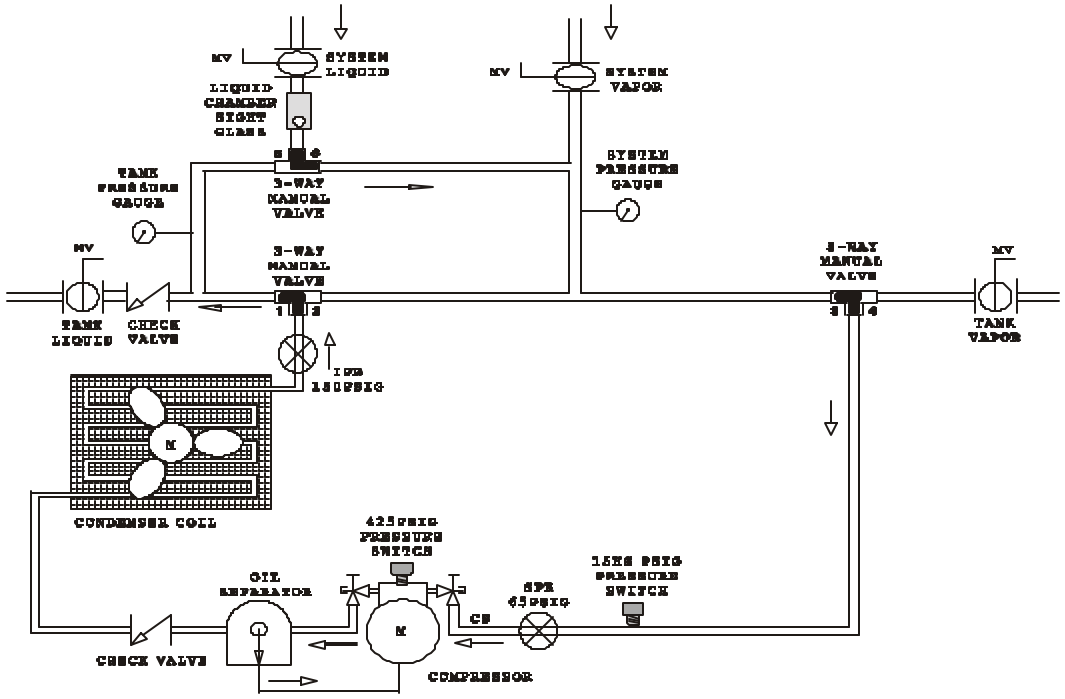
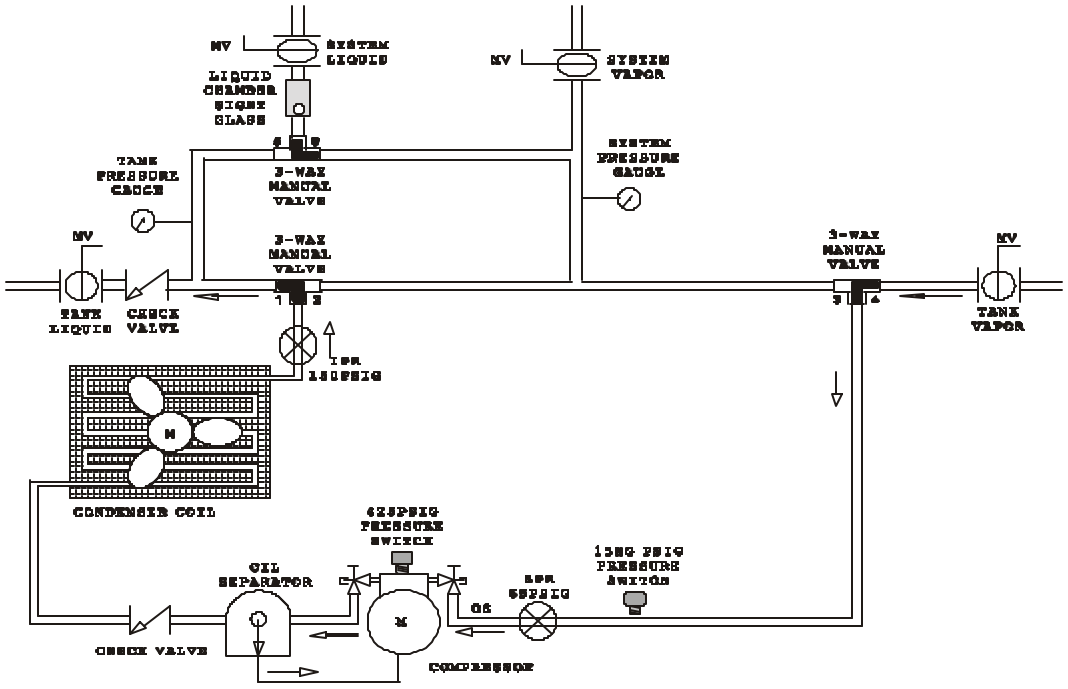


Figure 5, Process and Identification Schematic - Hose Clearing Mode



Electrical Parts Breakdown

1	Compressor Motor
	1.5 HP, 120 VAC, 50/60 Hz, 1Ph 3450 RPM
	2.0 HP, 240 VAC, 50/60 Hz, 1Ph 3450 RPM
2	Condenser Fan Motor
	35W, 115V, 50/60 Hz
	35W, 230V, 50/60 Hz
3	High Pressure Switch 350 Psig
4	Low Pressure Switch 15 Hg
5	Male Inlet - 20A, 125V, 2 P, 3W GRD
	Male Inlet - 20A, 250V, 2 P, 3W GRD
6	Terminal Block
7	Yellow Indicating Lamps 120 VAC
8	Red Indicating Lamps 120 VAC OR 220 VAC
9	Power Switch 250 VAC
10	Circuit Breakers- 20 Amp, 250 VAC, 28 VDC
11	120 VAC Contactor or 240 VAC Contactor
12	Tank Safety Float Connector

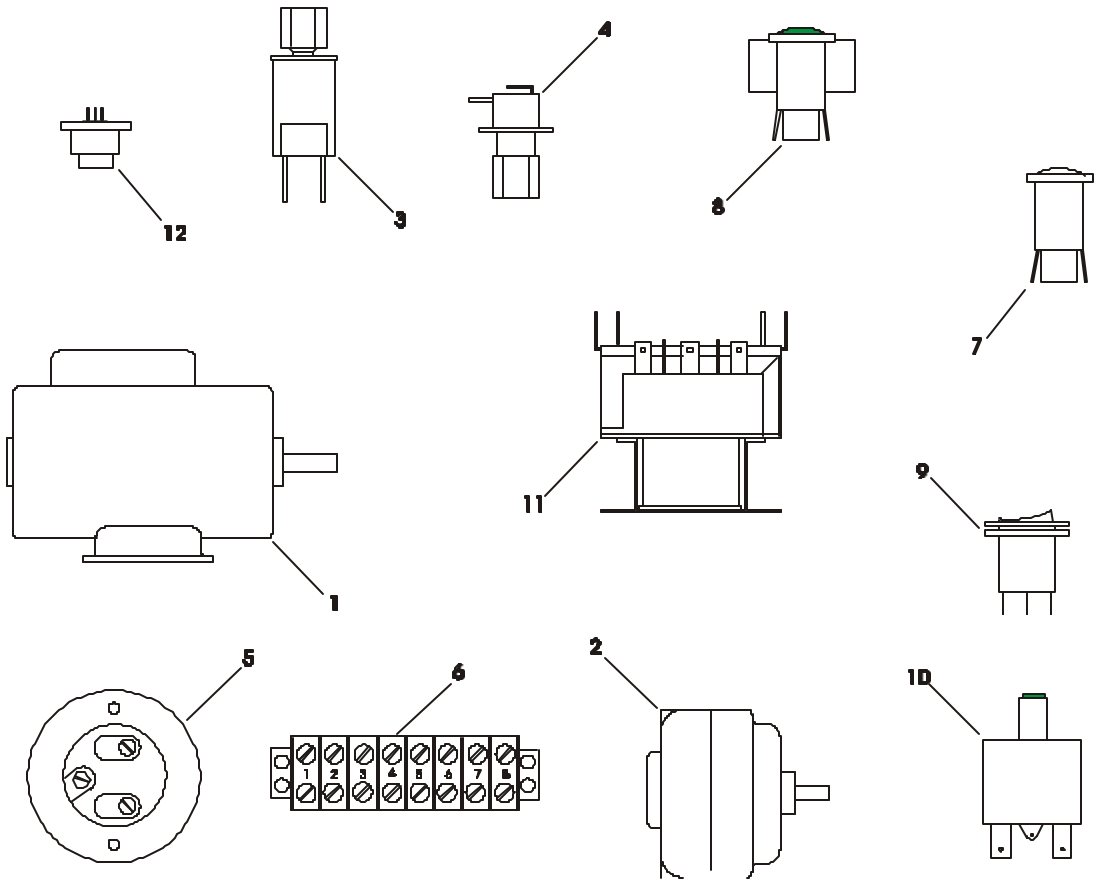
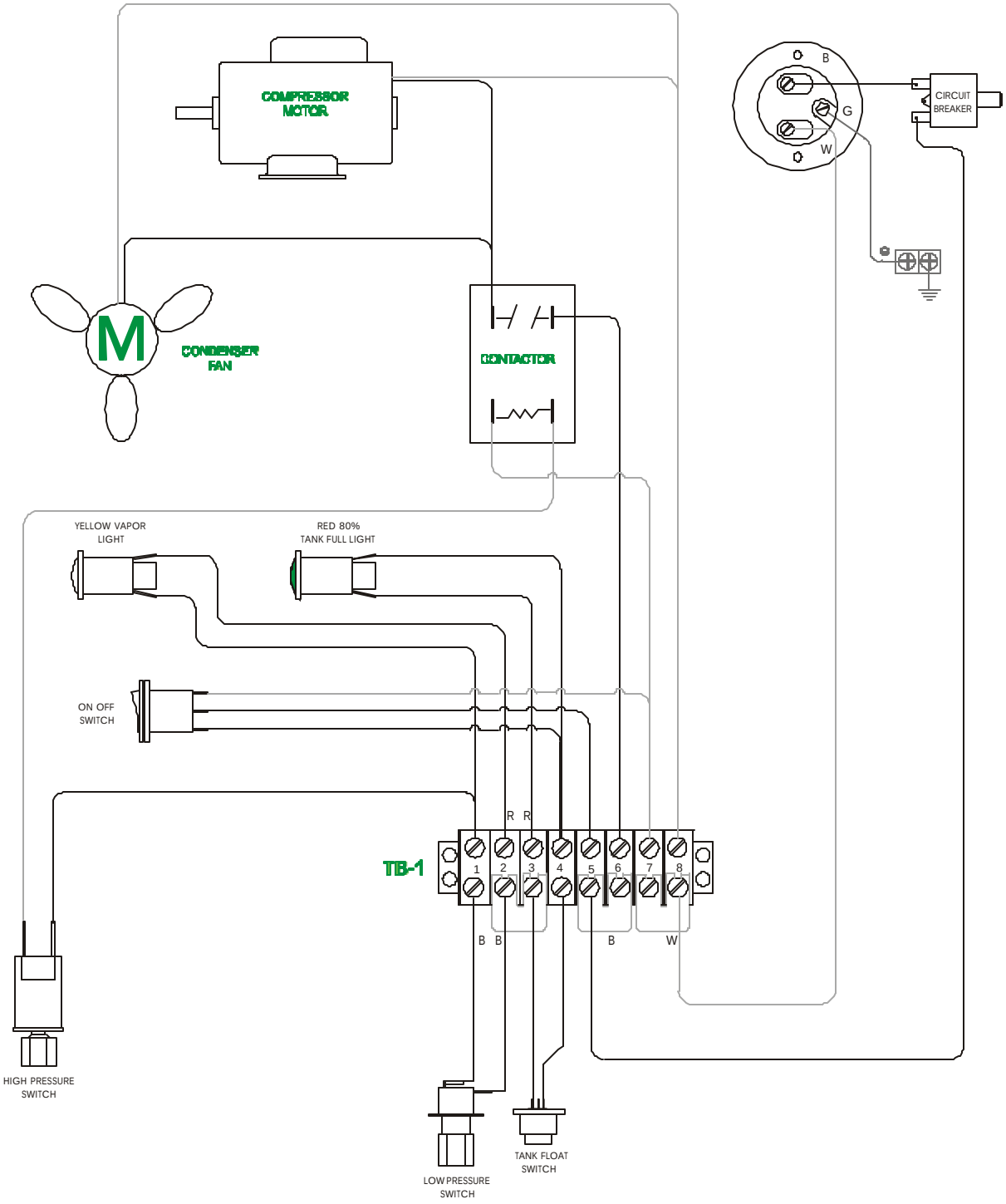


Figure 6, Electrical Block Wiring Diagram



Replacement Parts List

Reference Number	Part Number	Description
1	RCP001	Vapor Recovery Compressor
2	EMO115	Compressor Drive Motor
2	EMO315	Compressor Drive Motor
3	RV-304	3-Way Valves
4	XSW350	High Pressure Switch
5	RVA304	Transfer Valves
6	EMO136	Condenser Fan Motor
6	EMO035	Condenser Fan Motor
7	RCC011	Condenser Coil
8	MFR002	Unit Frame
9	ROS001	Vapor Comp Oil Separator
10	RVH004	Hand Ball Valves Tank and System
11	EMS002	Contactor
11	EMS003	Contactor
12	ELT002	Lamp Red
12	ELT003	Lamp Red
13	ESW002	Power Switch
14	RVC004	Check Valve
15	EMI115	Male Inlet 120V
15	EMI200	Male Inlet 250V
16	RVC003	Check Valve
17	HFB010	Condenser Fan Blade

Troubleshooting

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To avoid injury or death due to inhalation of, or skin exposure to refrigerant, closely follow all of the safety procedures described in the Material Safety Data Sheet for the refrigerant and to all labels on refrigerant containers. Certain procedures common to refrigeration system service may expose personnel to liquid or vaporous refrigerant.

Troubleshooting Procedures

If functional difficulties are experienced and the preceding maintenance checks do not resolve the problem, refer to the following troubleshooting chart for assistance.

Troubleshooting Guide

The following guide is provided to assist in analyzing problems that could occur.

- Symptom: Describes what is happening;
- Cause: Suggests possible sources;
- Solution: Describes what must be done.

Symptom	Cause	Solution
Pressure differential between system and recovery tank becomes too high - greater than 50 psig.	Restrictions in recovery line.	Remove restriction in liquid recovery lines or tank. Tank needs to have minimum ¼in. ID valves and dip tube.
Slow liquid transfer.	Restriction in flow.	Replace restrictive fittings and hoses with appropriate size to expedite transfer.
RRU134 running high head pressure back to recovery tank.	Restriction in hoses going to tank.	Replace with appropriately sized hoses and fittings. Run water over tank or add secondary water cooled condenser on liquid return line going to recovery tank. (McQuay has available secondary water cooled and air cooled condensers.)
	Capacity of recovery tank is too small or tank is overfilled.	Replace with appropriately sized tanks.
	High concentration of noncondensibles.	Remove noncondensibles.
	Condenser fan not working.	Fix fan.
RRU134 compressor won't restart.	Compressor thermal overload open.	Let unit cool down.
	High head pressure.	Open bypass valve and close after restart.
RRU134 slugging with liquid during liquid push/pull.	Recovery hose incorrectly connected. This may cause liquid to be injected into compressor.	Verify that the system vapor and liquid lines are properly connected and that the vapor and liquid lines on recovery tank are connected correctly.
	Improper valves on recovery tank allowing liquid to be injected into compressor.	Verify that the liquid and vapor valves on the recovery tank are separate and that the recovery tank is no more than 80 % full.

McQuay International

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