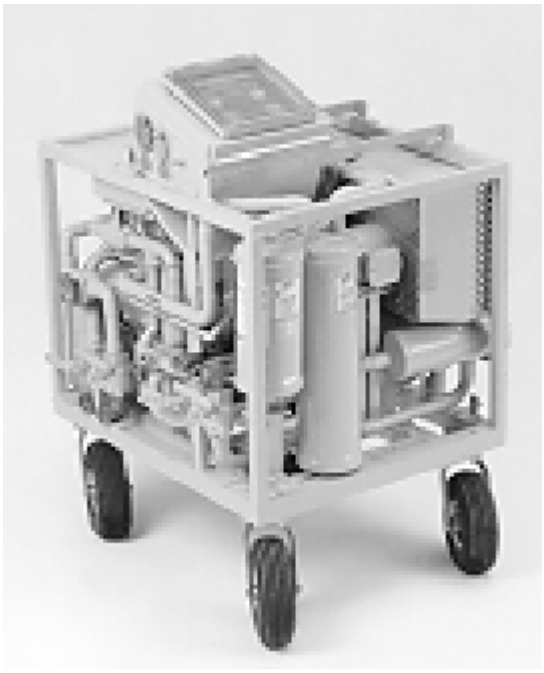
SERVICEFIRST™

Installation
Operation
Maintenance

EVAC Industrial

High Pressure Industrial Refrigerant Recovery System



Model Numbers: RREA124C0A0, RREA124D0A0, RREA324C0A0, RREA324D0A0

RREA-IOM-1

Table of Contents

General Information

Warnings and Cautions

Warnings and Cautions appear at appropriate locations throughout this manual. Read these carefully.

⚠WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may be used to alert against unsafe practices and where property-damage-only accidents could occur.

Model number description

R	R	E	A	1	1	1	A	0	A	0
1	2	3	4	5	6	7	8	9	10	11

Refrigerant Recovery

Digits 1, 2 - Product Description
RR = Refrigerant Recovery

Digit 3 - Model Identifier
A = MicroVac
B = HandiVac
C = MityVac
D = EVAC Commercial
E = EVAC Industrial
F = LoVac
G = AllVac

Digit 4 - Development Sequence
A = First Development

Digit 5 - Condenser Type
1 = Air Cooled
2 = Water Cooled
3 = Air/Water Cooled

Digit 6 - Control Type
1 = Electromechanical
2 = Microprocessor

Digit 7 - Connection Type
1 = 1/4” flare
2 = 1/2” flare
3 = 3/4” flare
4 = 1.25” pipe thread fitting w/ball valve
5 = Quick Connects on unit and hoses

Digit 8 - Unit Voltage (voltage/hz/phase)
A = 115/60/1, 110/50/1
B = 230/60/1, 220/50/1
C = 460/60/3, 415/50/3
D = 575/60/3, 220/50/3
E = 230/60/3, 220/50/3
F = 575/60/3
G = 230-460/60/1, 220-415/50/1
H = 460-575/60/3, 415-550/50/3

Digit 9 - Safety Features
0 = Open
1 = Float Cable Connection
2 = Low Pressure Shut-Off
3 = Float cable connection, LP shut-off

Digits 10, 11 - Design Sequence
A0 = First Design Sequence

Literature History

RREA-IOM-1 (October 2000)

Original issue of manual. Describes the Installation, Operation and Maintenance procedures for this unit.

General Information

Electrical power requirements

Recovery main components:

- 460 VAC, 50/60 Hz, 7.5-Hp, 3-Phase, 20-Amperes
- 575 VAC, 50/60Hz, 7.5-Hp, 3-Phase, 20-Amperes

For controls:

115 VAC, 50/60 Hz, 1-Phase, 20-Amperes

Dimensions (approximate)

- 54” high x 40” wide x 40” deep

Weight

- 400-lbs (550-lbs shipping)

Notice

The Trane Company urges that all HVAC servicers working on Trane 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 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 service and safety procedures published in Trane General Service Bulletin CTV-SB-81. The information and procedures provided in CTV-SB-81 supersedes those published in this manual. Copies of this bulletin may be obtained by contacting your local Trane commercial representative.

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.

General Information

Product description

The Industrial EVAC recovery system provides automated recovery of most high pressure refrigerants and blends.

The unit consists of a 7.5-hp compressor with suction accumulator, oil separator, dual high capacity air cooled condensers, microprocessor control system, and actuated valving system. Unit connections are 1-1/4” male pipe with isolation valves.

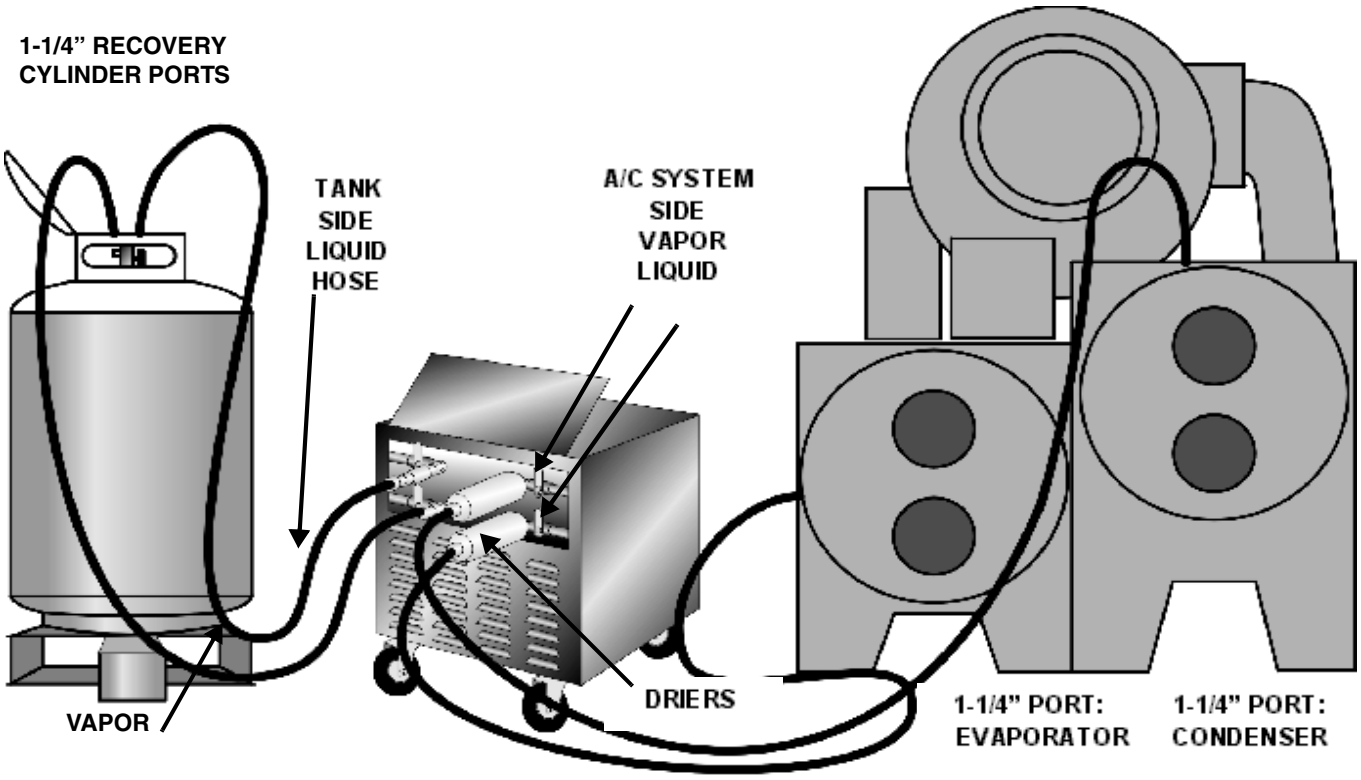
After hoses are connected and purged or evacuated, Industrial EVAC starts automated recovery by letting refrigerant migrate from the A/C system to the recovery tank. It then draws vapor off the recovery tank, heats it via compression, and injects it back into the A/C system high side, thus creating a pressure differential before commencing liquid transfer.

When a pressure transducer determines that pressure differential is below 20 Psig and the liquid sensor determines that liquid transfer has been completed, Industrial EVAC will switch from liquid push/pull mode to vapor recovery. Recovery unit then begins removing vapor from both sides of A/C system, vapor refrigerant is first cleansed by the 96 cu inch inlet drier, then travels through coalescent oil separator, then through a suction accumulator, through a crankcase pressure regulator, then finally into compressor where refrigerant is then compressed. Discharged hot gas from the compressor is then sent through an oil separator where oil is extracted from hot gas and returned to the compressor. Refrigerant is then condensed by the dual air-cooled condensers and sent to the recovery tank.

The Industrial EVAC can be programmed to stop transfer at 0 psi or 15” Hg vacuum. Transfer stops when a pressure transducer indicates the A/C system reaches the programmed pressure. The unit then confirms the vacuum level by monitoring pressure for two minutes. Should pressure in the A/C system rise, Industrial EVAC energizes again to achieve A/C system vacuum.

General Information

Figure 1. Industrial EVAC Connections



General Information

Furnished with Industrial EVAC are:

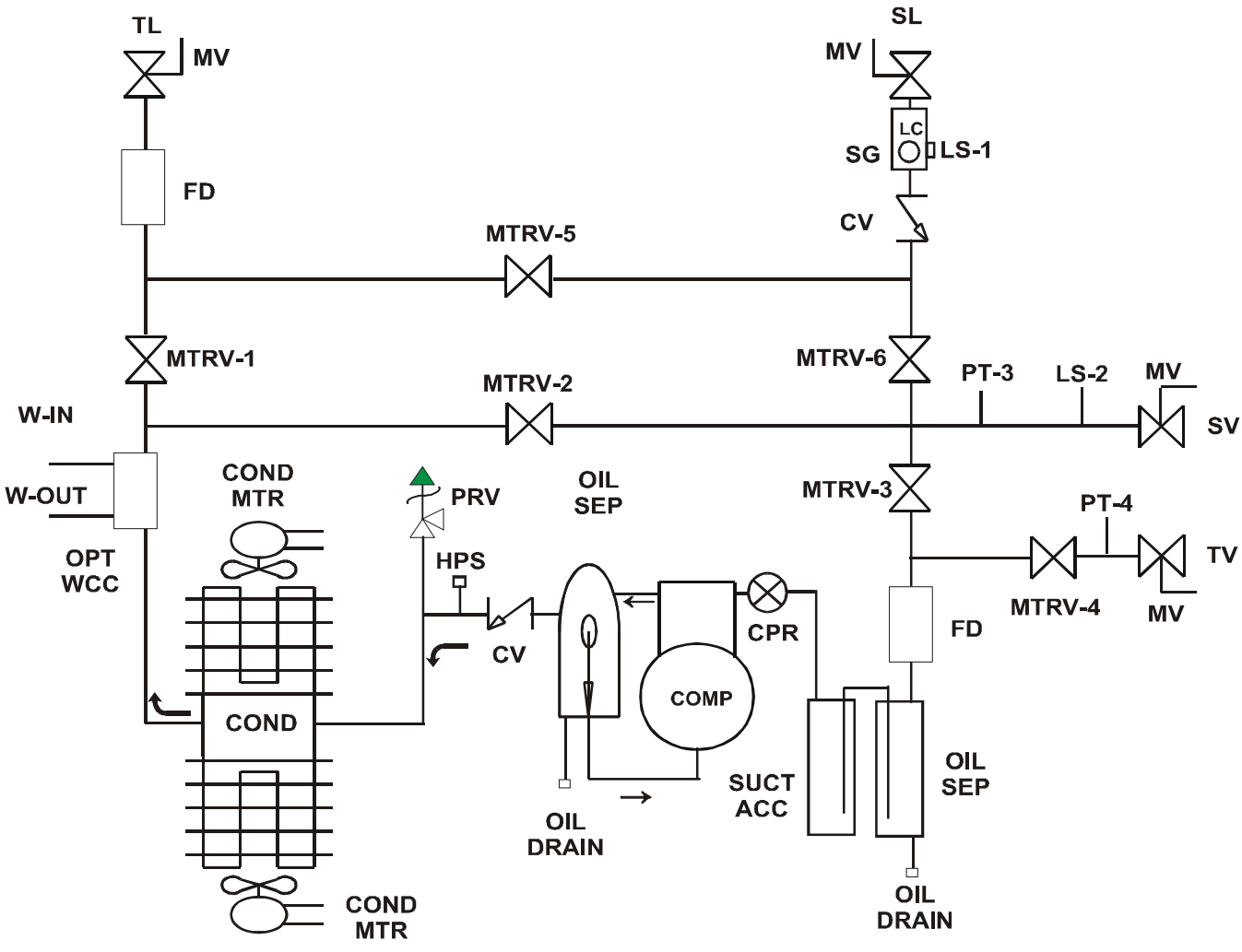
- 100-ft 3 phase-VAC power cord
- 100-ft 120-VAC power cord
- Two 96cu in drier shells
- Four Filter Cores

Please follow the recommended procedures outlined in this manual for regular changing of compressor fluid and coalescent oil filter. Before every recovery job install new drier cores.

Peak Performance

To get the highest performance from your Industrial EVAC unit, we recommend that you:

- Connect to 1-1/4" evaporator and condenser ports on the chiller or A/C system and to recovery cylinders with 1-1/4" ports whenever possible.



Operation

Operating Procedures

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

- Make sure you have a recovery cylinder with a minimum 1-1/4" male flare vapor port and a minimum 1-1/4" male flare liquid port. This tank or series of tanks have to be able to hold the entire charge.

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 tanks in case Industrial EVAC needs to be shut down to prevent overfilling tanks. If a scale is not available, the tanks can be equipped at time of purchase with a float switch that will work with Industrial Evacs microprocessor control circuit.
- Finally, the recovery cylinder or cylinders must be pulled into a 29" vacuum before recovery commences. Failure to follow these above stated procedures will decrease the likelihood of Industrial EVAC performing at its highest possible effectiveness.

1. Turn the chiller, refrigeration or A/C system off; make sure that the system cannot restart.
2. Connect the 100-ft 3-phase power cord to a proper size breaker or fused disconnect and plug it into Industrial EVAC's control box. Connect the 100-ft 120-VAC 1-phase power cord for controls. Connect at this time if equipped, with the 80% safety shut off float cable.
3. At this point, the display lights up indicating the unit has power and prompting you to press Start.

An additional feature can be accessed at this time, by pressing the M *key. This display will show you total compressor run time as well as give you a historical maintenance schedule. In addition, at every 10 hours of cumulative operating run time for the compressor, an automatic message will appear each time you start the Industrial EVAC until maintenance is performed. After changing oil, then press Enter key which records that maintenance has been performed. Message will then not appear until the next 10 hours of compressor run time is accumulated. The system will retain a log of each maintenance event recorded.*

4. Industrial EVAC then asks you to Select Refrigerant being recovered. Scroll to the desired refrigerant using the M V keys then press Enter.
5. Industrial EVAC then prompts you to check selection by displaying **"Selected Refrigerant R___, Is This Correct? Enter = Yes, Canc = No"**. Industrial EVAC then prompts you to select the vapor transfer shutdown pressure with "**USE M V to select 0 PSI or 15 Hg Shutdown".** Select desired shutdown pressure, then press **"ENTER"**.

Operation

6. Industrial EVAC then asks you to **"Connect all Refrigerant Hoses"** then press ***"Enter".*** Connect two hoses to Industrial EVAC's recovery side liquid and vapor ports and to liquid and vapor ports on the recovery cylinder. Connect other two hoses and 96cu in. drier shells to system side ports on the Industrial EVAC and to the chiller evaporator and condenser or A/C system. As shown in Figure 1 on page 6.
7. **"Open Vapor & Liquid Access Valves on A/C System Being Recovered"** then press ***"Enter".***
8. **"Open System Vapor & Liquid Hand Valves on Industrial EVAC Recovery Unit"** then press ***"Enter".***
9. **"Open Recovery Vapor & Liquid Hand Valves on INdustrial EVAC Recovery Unit"** then press ***"Enter".***

Note: If recovery hoses have isolation valves, open them now.

10. Industrial EVAC then asks you to **"Purge Both Refrigerant Lines at the Recovery Tank"** then press ***"Enter".***
11. Next **"Open Vapor and Liquid Hand Valves on Recovery Tank"** then press ***"Enter".***
12. Industrial EVAC then displays **"Liquid Transfer!"** and displays the A/C system and recovery tank pressures. Industrial EVAC now begins automated recovery while continuously displaying A/C system & revocery tank pressures.

Note: Industrial EVAC is equipped with a coalescent oil separator, designed to remove oil from the dirty recovered refrigerant. during recovery periodically drain the oil from this separator into a suitable container, failure to drain this separator will allow contaminated oil to be passed through system and will remain in recovered refrigerant.

13. Once pressure between the cooling system and recovery tank are within 20-psi of each other and a liquid sensor indicates that all liquid from liquid transfer has been removed, the unit switches to vapor recovery, displaying "Vapor Recovery in Process" and continues to display the A/C system & recovery tank pressures. If industrial evac does not switch to vapor recovery and you are absolutely sure that all of the liquid has been removed, it may be because lines to the recovery tank or to the cooling system are restricted. in this case, a bypass feature can be accessed that forces the unit to begin vapor recovery. to perform this task, press the enter key two times in a row during liquid recovery mode and vapor recovery will commence.

Operation

It is absolutely imperative that all liquid has been transferred before using this override feature. Failure to do so may result in liquid slugging to the compressor and causing major damage.

14. When a 15" vacuum has been achieved in the A/C system, the unit compressor shuts off and the display reads **"Vapor Recovery 2 Minute Wait State"** and displays the time remaining. At this point, the microprocessor continues to monitor A/C system pressure. Should pressure rise, Industrial EVAC restarts to again achieve a 15" vacuum.
15. Then the display will read **"Vapor Recovery Finished!** press **Enter".** Upon pressing "Enter", Industrial EVAC prompts you to perform the following valve manipulations 16-22:
16. **"Close Access Valves on A/C System Being Recovered"** then press **"Enter".**
17. **"Close Both Hand Valves on Industrial EVAC Unit A/C System Side"** press ***"Enter".***
18. Industrial EVAC compressor then restarts and begins to force remaining liquid in Industrial EVAC as well as liquid in hose into the recovery tank. Displaying "**Liquid Refrigerant Clearing in** Process".
19. **"Close Both Liquid & Vapor Hand Valves on Recovery Tank"** press ***"Enter".***
20. Industrial EVAC then begins evacuating the recovery tank vapor hose, displaying **"Hose Evacuation in Process".**
21. When hose evacuation is complete the unit displays **"Close Both Liquid & Vapor Tank Hand Valves on Industrial EVAC unit"** then press ***"Enter".***
22. Finally, the unit displays **"System Recovery Completed! Disconnect all Hoses and Power"**. At this time, close all four refrigerant hose isolation valves located on the ends of therefrigerant hoses connected from Industrial EVAC to the recovery tank.

There will still be a small, residual amount ofrefrigerant in Industrial EVAC. 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 described in next paragraph.

Operation

Removing Remaining Residual Refrigerant

A) Connect the center tap of a manifold set to a suitable vacuum pump inlet and discharge side of pump to a 50 lb. evacuated recovery cylinder . Connect the low & high side of the manifold set to the 1/4" compressor suction and discharge access ports located on the side of Industrial EVAC unit.
B) Open valve on 50 lb. recovery tank and turn on the vacuum pump. Open the low & high side manifold valves and wait until a 29" vacuum has been achieved on your manifold gauge .
C) Close both manifold valves, shut down vacuum pump and close recovery tank valve. If you intend to use Industrial EVAC on a different type of refrigerant, make sure to change compressor fluid and disposable driers.

Changing Replaceable Cores

Make sure you replace filter cores after each recovery job. Simply unscrew bolts on drier shells and replace cores in the filter assembly.

Calibration

Pressure Transducer Calibration Procedure

Industrial EVAC unit is equipped with a sensitive pressure transducer which needs to be calibrated prior to running the Industrial EVAC. This will take into account variations in atmospheric pressure at various altitudes and locations. RefTec recommends that this calibration procedure be performed if any of the following events occur:

A) Any time a new pressure transducer is installed on the unit.
B) Any time that the unit is moved to a substantially different altitude or is exposed to significantly different atmospheric pressure.
C) Any time that pressure readings appear to be questionable or there is any reason to doubt the accuracy of the transducer readings.

Calibration Procedure Steps

1 At power up, the Industrial EVAC Recovery Unit will display: **“INDUSTRIAL EVAC COMMERCIAL RECOVERY UNIT” “ HAS POWER (PRESS START)“**

2. At this screen you must press “**CANCEL**” twice within 5 seconds to enter the CALIBRATION mode. The display will then show the following: **"OPEN PRESSURE TRANSDUCERS TO ATMOSPHERE " “ (THEN PRESS ENTER KEY)"**
3. Now, with no hoses connected, open the liquid and vapor, system and recovery tank, valves on the Industrial EVAC to the atmosphere and press **“ENTER”**.
4. The screen will then display the following message:**"SYSTEM PRESSURE xx PSI" "PRESS ENTER TO CALIBRATE THIS TRANSDUCER"** The system is displaying the raw, uncalibrated reading from the transducer. If you press **“ENTER”**, it will calculate a calibration value and store it in the computer’s nonvolatile memory. If you press **“CANCEL”**, a new calibration factor will not be calculated.
5. It will then display the following message: **"RECOVERY TANK PRESSURE xx HG" "PRESS ENTER TO CALIBRATE THIS TRANSDUCER"**

The system is once again displaying the raw, uncalibrated reading from the transducer. Once you press ENTER, it will calculate a calibration value for this transducer and store it in memory. If you press **“CANCEL”,** a new calibration factor will not be calculated. It will then display the following message and be ready for operation: **“INDUSTRIAL EVAC COMMERCIAL RECOVERY UNIT” “HAS POWER (PRESS START) “**

Maintenance

Changing Compressor Fluid

The compressor's charge of Polyol Ester fluid should be regularly replaced with an identical fluid or, at a minimum, after these 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.

When changing oil, it is highly recommended that the same type of oil being used with the refrigerant being recovered, be used in the industrial evac compressor. this will help ensure that cross contamination does not occur.
To remove and change the oil in the compressor and the oil separator:

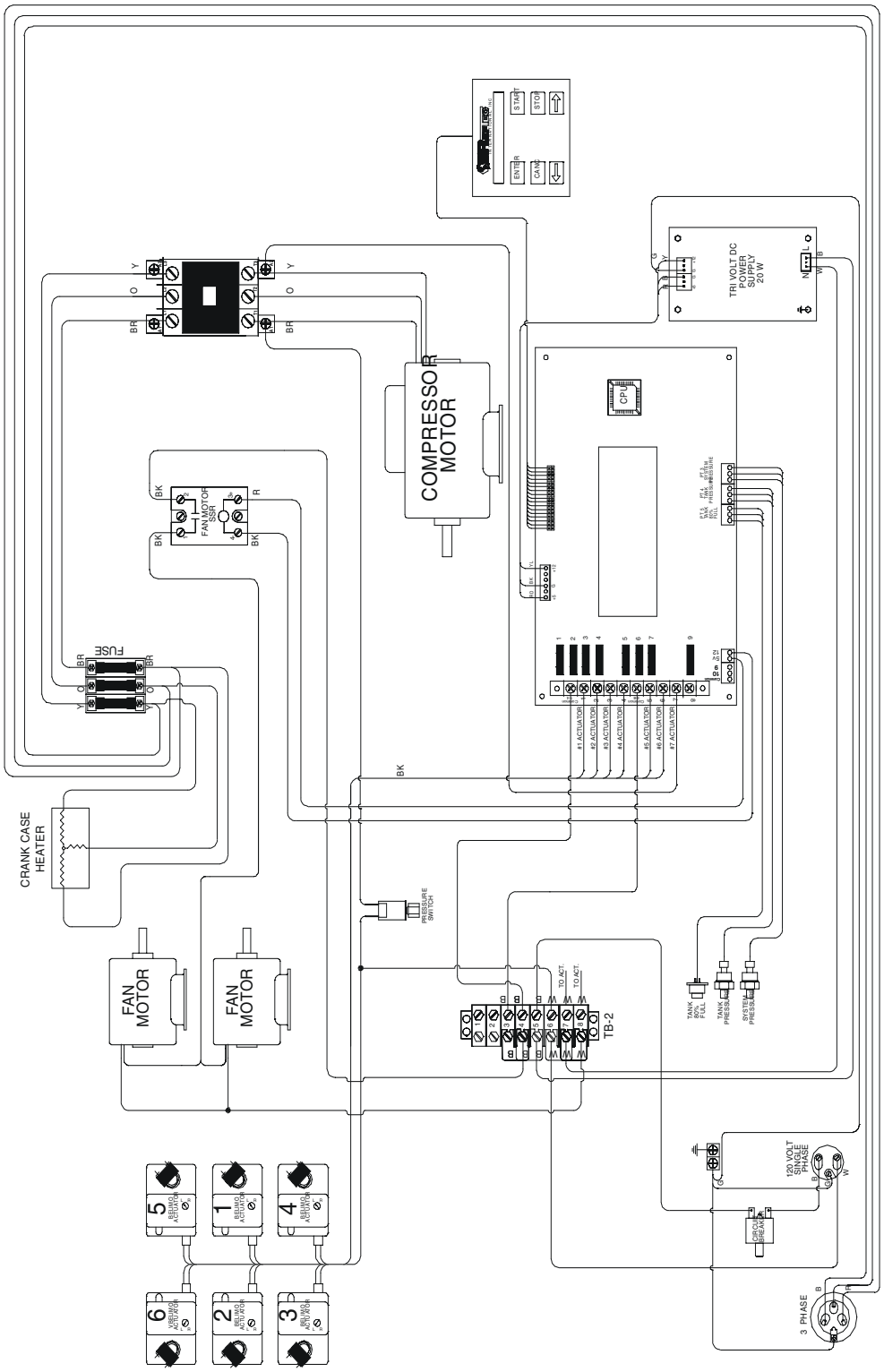
A) Make sure Industrial EVAC unit has no refrigerant in its internal parts.
B) Connect a manifold set to dry nitrogen and to the suction and discharge service 1/4" access ports located on the side of the Industrial EVAC.
C) Connect another 1/4" hose to the access fitting on the bottom of the Industrial EVAC 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 Industrial EVAC unit until all oil has been forced out of the oil separator.
Note: 10 to 15 PSI will be more than adequate.

E) Remove oil plug from rear of compressor located just below heater junction box. Drain into a suitable disposable oil container.
F) Gradually allow dry nitrogen to go into the suction port on the Industrial EVAC unit until all oil has been forced out of the compressor.
G) To add new oil to the Industrial EVAC compressor, connect a vacuum pump to the 1/4" access port on the suction side of the compressor. Pull down into a minimum 29" vacuum.
H) Connect other hose to the 1/4" access port on the top rear of the compressor and into the new oil container. Note: fill compressor with exactly 50 oz. of oil.
I) Connect other hose to the 1/4" access port on the bottom of the oil separator and into the same new oil container. Note: fill separator with exactly 16 oz. of oil.
J) Once this procedure is finished, remove all hoses and pull entire Industrial EVAC into a 29" vacuum. Dispose of old oil properly.
Note: After approximately 20 hours of continuous recovery replace coalescent filter in the oil separator. This procedure can be accomplished by removing oil separator side panel unscrewing bolts on oil separator body and replacing coalescent)"

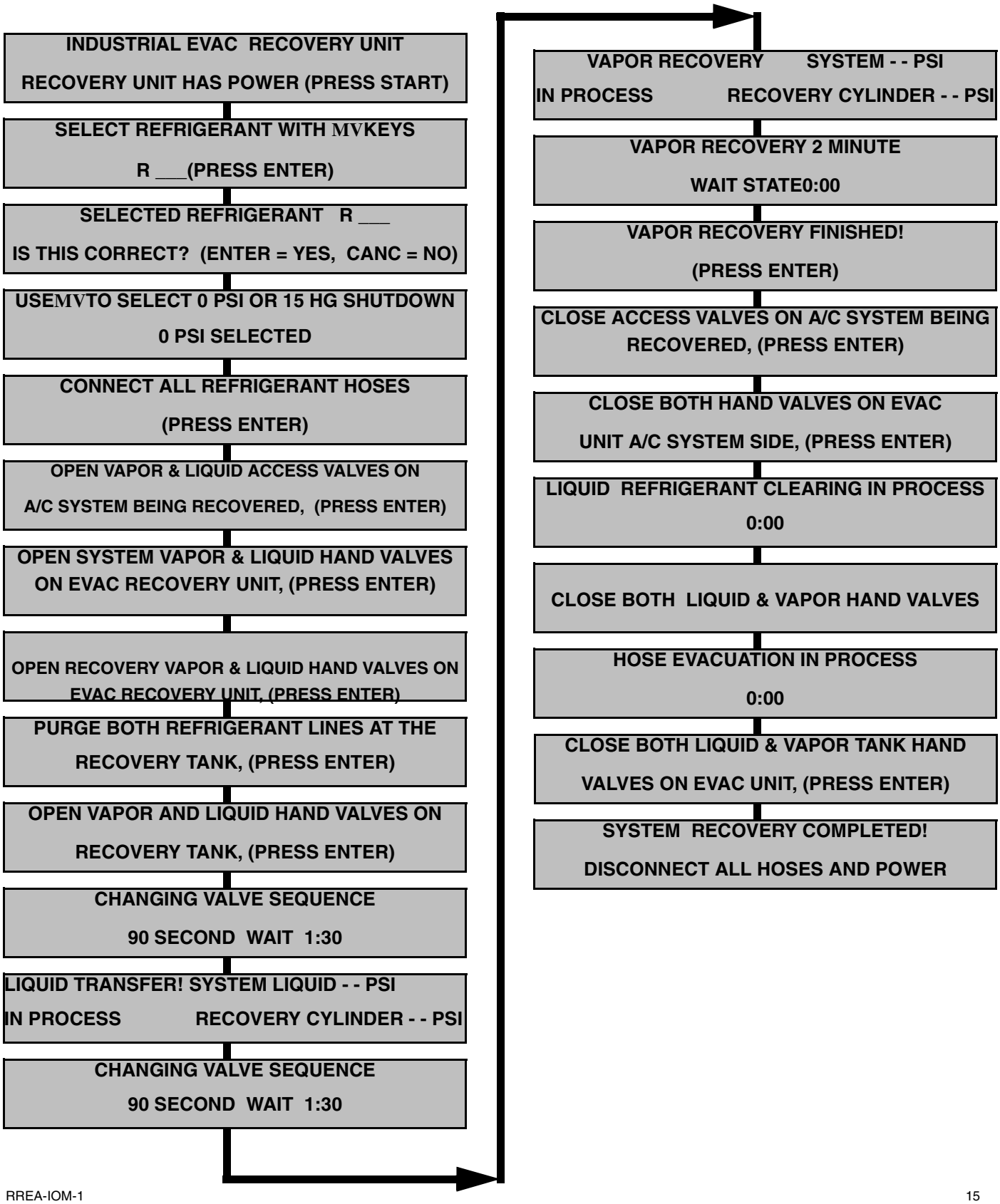
Failure to follow above procedures for recharging oil in compressor with the exact amount of oil may result in major damage to the compressor

Electrical

Figure 2. Model IRH-1000, Block Wiring Diagram



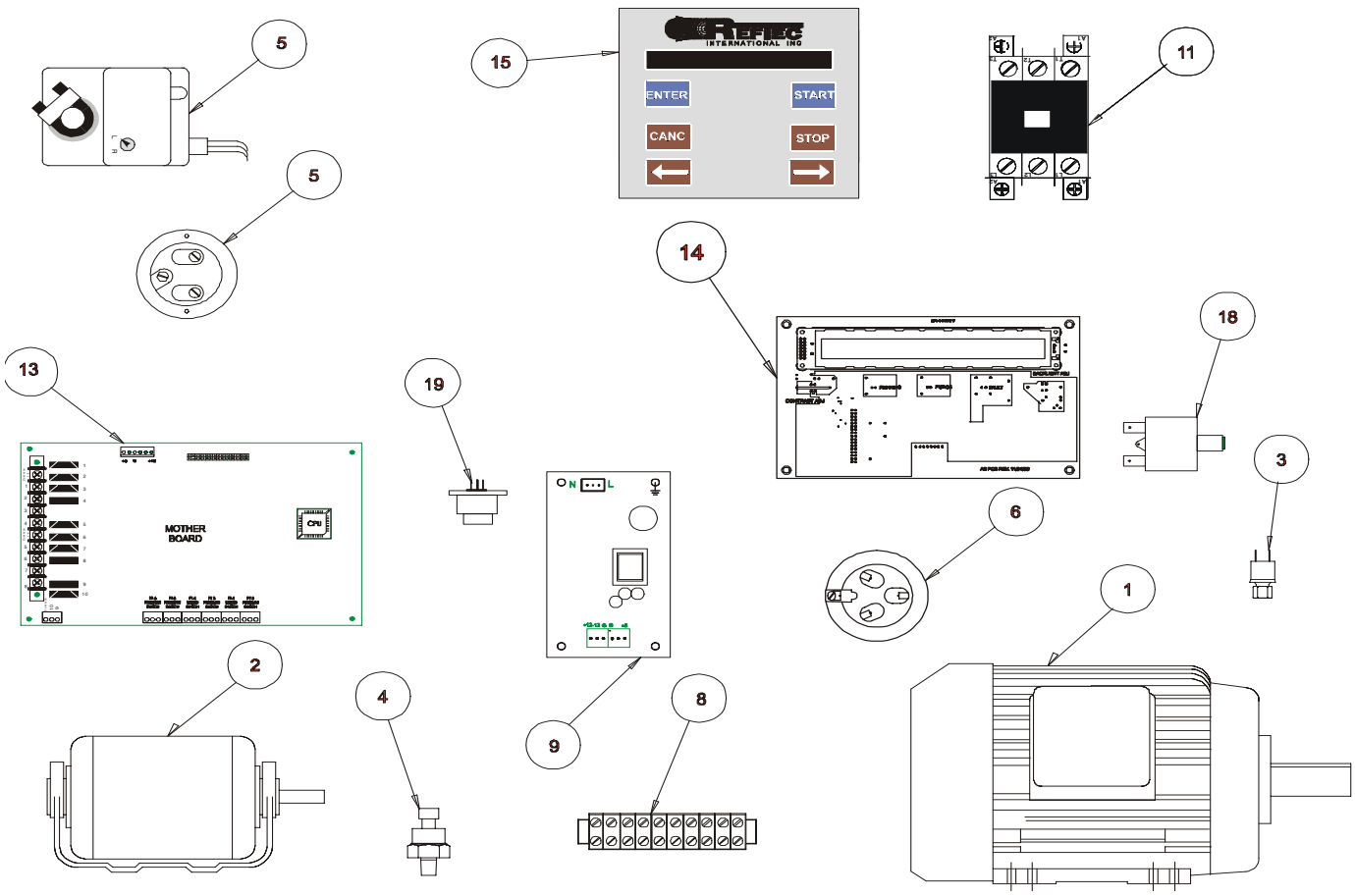
DISPLAY SEQUENCE
HIGH Pressure Refrigerant Recovery Only



Electrical

Figure 3. Industrial EVAC Electrical Parts Breakdown

1 Compressor Motor;7.5Hp, 460VAC, 50/60Hz, 3Ph or 7.5Hp, 575VAC, 50/60Hz, 3 Ph for 575 Model
2 Condenser Fan Motor;115/230 VAC 60Hz
3 High Pressure Switch
4 (2) Pressure transducer
5 (6) Actuator Ball Valve Assembly;120 VAC 50/60 Hz 133 in-lbs 150s
6 Male Inlet; 50A, 480VAC, 3PH, 4W or 600VAC For 575 Model
7 Male Inlet; 15A,125V, 1PH, 3W GRD
8 Terminal Block
9 Power Supply; 20W, 115V, 1A / 230VAC, 0.6A
11 Contactor-120V 50/60Hz 10Hp 600 VAC
MAX 30A open
13 CPU Mother Board Assembly
14 Display Board Assembly
15 Keypad
17 (2) Liquid Switches; 30 in.lb. Torque
18 Circuit Breakers; 20 Amp, 250 VAC,28 VDC



Replacement Parts

Table 2. Industrial EVAC Replacement Parts List

Reference-Number	Manufacturer Description
1	Motor actuator
2	Actuated ball valve assembly
3	Pressure transducer
4	Check valve
5	Vapor comp oil separator
6	Crankcase pressure regulator
7	Suction accumulator
8	Unit frame
9	Compressor drive motor
9	Compressor drive motor
10	Motor slide base
11	Motor drive pulley
12	Motor drive pulley bushing
13	Motor drive belts
14	Compressor pulley
15	Vapor recovery compressor
16	Cond fan motor
17	Cond fan blade
19	Condenser coil
20	Liquid level sensor
21	Liquid chamber sight glass
23	Liquid check valve
24	Pressure transducer
25	Hand ball valves tank & system
26	6 Button keypad
27	Display board a-2 40x2 lcd
28	Ribbon cable 34 pin assembly
29	Mother board b-1 allvac stuffing
32	Male inlet 230/480
32	Male inlet 600
33	Male inlet 115v
34	Power supply (electronics)
35	10 Position terminal strip
38	Solid state relay
39	Contactor

Troubleshooting

⚠ 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.

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 might be done.

Symptom	Cause	Solution
EVAC will not switch from liquid mode to vapor mode when transferring high pressure refrigerant.	Still have liquid in system	When the pressure differential between system and receiving tank is less than 15 psig, and all liquid has been removed, unit will automatically switch from liquid to vapor mode.
	Possible malfunction	If unit does not automatically switch to vapor mode, make sure that all liquid has been transferred and that no liquid is in the sight glass. Press ENTER key 2 times in a row. This will manually force EVAC into vapor mode. See Manual for further details.
Slow liquid transfer.	Restriction in flow.	Replace restrictive fittings and hoses with appropriate size to expedite transfer.

Troubleshooting

Symptom	Cause	Solution
Pressure differential between system and recovery tank becomes too high - greater than 50 psig.	Restrictions in recovery line	Restriction in liquid recovery lines or tank. Tank needs to have a 1-1/4" ID valve. Many tanks do not have 1-1/4" valves. RefTec provides tanks fitted with properly sized valves for this purpose.
Unit will not pump down to a 15" vacuum on final vapor refrigerant recovery.	pressure transducer not properly calibrated.	Verify that displayed pressure is equal to gauge pressure. If they are different, please follow the calibration procedures enclosed to calibrate the pressure transducer.
Oil separator float is stuck open and feeding refrigerant back to suction side of compressor.		Drain compressor oil separator
EVAC 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 condensor on liquid return line going to recovery tank. RefTec has available secondary water cooled and air cooled condensors.
	Capacity of recovery tank is too small or tank is overfilled.	Replace with appropriately sized tanks.
	High concentration of noncondensibles	Remove noncondensibles.
Automatic actuator valves do not function.	Loss of power to valves	Make sure LED's on A-4 circuit board are working. If LED signal is present at A-4 board, check to verify that 24 VAC is being supplied to actuators. If 24 VAC is not present, replace transformer.

Literature Order Number	RREA-IOM-1
File Number	SV-CAP-RR-RREA-IOM-1-1000
Supersedes	New
Stocking Location	La Crosse

The Trane Company
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