



**RefTec**  
INTERNATIONAL SYSTEMS LLC

# EVAC™

commercial  
**CRH-500**



High  
Pressure  
Electromechanical  
Commercial  
Refrigerant  
Recovery  
System

## OPERATION MANUAL

Electromechanical Version 4.0 Starting S/N:35629

MODEL NUMBERS: CRH-A-230-3-E, CRH-A-240-1-E, CRH-A-460-3-E, CRH-A-D24-1-E, CRH-A-575-3-E,  
CRH-W-230-3-E, CRH-W-240-1-E, CRH-W-460-3-E, CRH-W-575-3-E, CRH-W-D24-1-E ,

**\*\*\*\*ATTENTION\*\*\*\***

**\*\*\*WARNING\*\*\***

**IF OIL LEVEL IS SEEN  
IN SIGHT GLASS  
OF DORIN  
COMPRESSOR – OIL  
LEVEL IS LOW –PLEASE  
ADD OIL !!!!!!!!**

**THANK YOU  
REFTEC**



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# SPECIFICATIONS

## Electrical Power Requirements

Recovery Main Components & Controls:  
115VAC, 50/60 Hz, 1-Phase, 20-Amperes  
MIN CKT 15.0 AMP, MAX FUSE 20 AMPS.

**Models W&A- D24-1-E** Compressor 230/460 VAC,  
50/60Hz, 1 Phase MIN CKT 20.0 AMP, MAX FUSE 30 AMPS.

**Models W&A- 240-1-E** Compressor 220/240VAC,  
50/60Hz, 1 Phase MIN CKT 20.0 AMP, MAX FUSE 30 AMPS.

**Models W&A- 230-3-E** Compressor 230 VAC,  
50/60Hz, 3 Phase MIN CKT 10.0 AMP, MAX FUSE 20 AMPS.

**Models W&A-460 -3-E** Compressor 460 VAC,  
50/60Hz, 3 Phase MIN CKT 10.0 AMP, MAX FUSE 15 AMPS.

**Models W&A-575 -3-E** Compressor 575 VAC,  
50/60Hz, 3 Phase MIN CKT 10.0 AMP, MAX FUSE 15 AMPS.

## Dimensions (approximate)

42" high x 24" wide x 22" deep

## Weight

340-lbs. (500-lbs. shipping)

REV.DATE (01/15/09)

## FURNISHED WITH EVAC

One 48 cu.in. drier core

80% Tank Float Cable.

2-10" 3/4" Hoses with isolation valves

1-20" 3/4" Hoses with isolation valves

### Notice

RefTec International, Inc. urges that all HVAC servicers working on RefTec 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:

RefTec's EVAC recovery system provides efficient and safe recovery of most high pressure refrigerants.

The unit consists of a 3 or 5-hp open drive compressor, high capacity 1200 cfm air cooled condenser, system pressure gauge, tank pressure gauge, a valving system consisting of one manually operated 3-way valve, oil return valve and one 2-way evacuation valve. Unit connections are 3/4" male flare with isolation valves. After hoses are connected and evacuated, user simply configures hoses for liquid push/pull mode, opens all lines at A/C System and recovery tank, and turns EVAC on. EVAC then starts recovery by letting refrigerant migrate from the A/C System to the recovery tank. It then draws vapor off the recovery tank, lowering tank vapor pressure, heats vapor and increases pressure via compression, and injects it back into the A/C System condenser, thus creating a pressure differential for a push/pull liquid transfer.

Two onboard gauges display A/C System pressure and recovery tank pressure. When liquid has finished transferring and sight glass on liquid line indicates liquid refrigerant has been transferred, user simply reconfigures hoses to vapor recovery mode, allowing EVAC to pull vapor from A/C System evaporator being recovered. EVAC compressor begins recovering vapor which is first cleansed by an 48 cu inch filter drier. Discharged hot compressed refrigerant passes through an oil separator where the oil is extracted and returned to the compressor. Refrigerant is then condensed by the air-cooled condenser and sent to the recovery tank.

Transfer stops when an internal pressure switch indicates the A/C system is under a 15" Hg vacuum. If pressure should again rise above 0 Psig, the EVAC will restart to pull refrigerant from A/C system until a 15" Hg vacuum is restored.

## SAFE OPERATIONS AND TIPS:

***To ensure your safety as well as others, before attempting to recover a A/C System, proper and thorough preparation must take place:***

Make sure you have a recovery tank with a minimum 3/4" male flare vapor port and a minimum 3/4" male flare liquid port, or larger ports if possible. This tank or series of tanks must be able to hold the entire refrigerant charge at 80 % full and also must be pressure rated for the specific refrigerant being recovered.

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

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

- ï Finally, the recovery tank or tanks must be pulled into a 29" Hg vacuum before recovery commences. Failure to follow these above stated procedures will decrease the likelihood of EVAC performing at its highest possible effectiveness.

## PEAK PERFORMANCE:

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

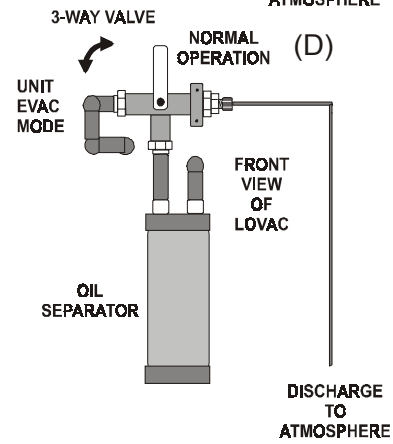
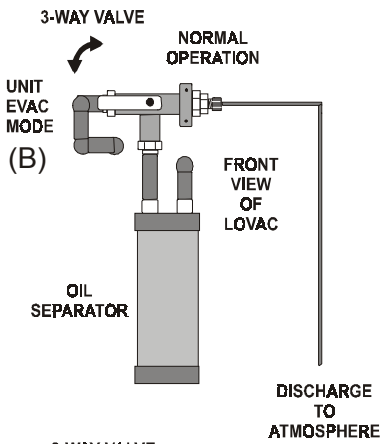
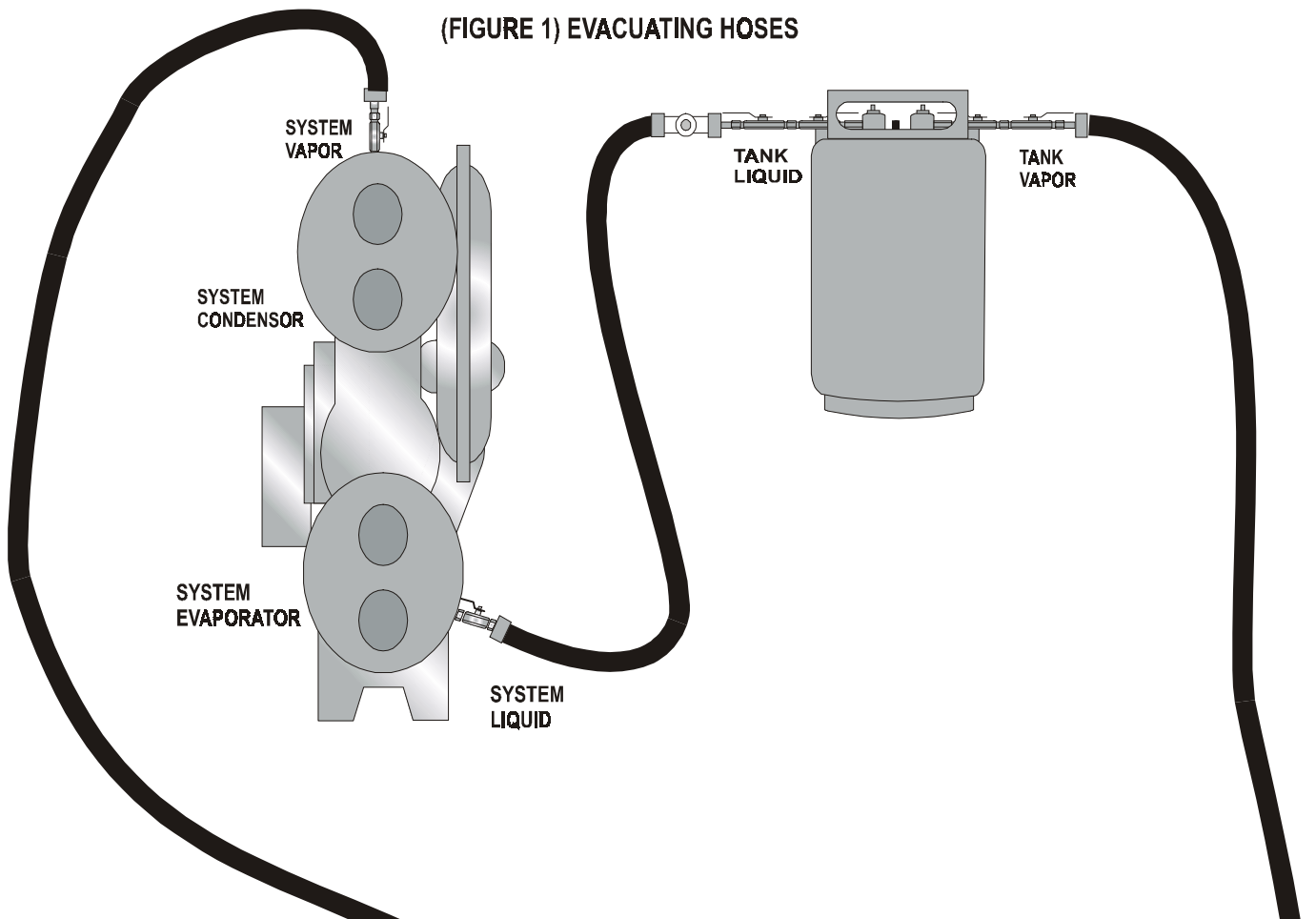
Connect to 3/4" evaporator and 3/4" condenser ports on the A/C System and to recovery tanks with 3/4" ports whenever possible.

## PROCEDURES FOR EVACUATING HOSES AND EVAC:

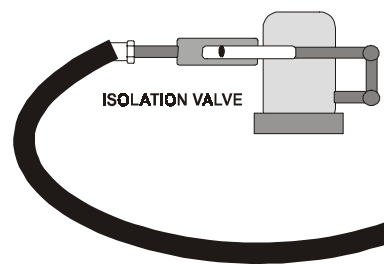
**NOTE:** Close oil return valve between oil separator and compressor before evacuating refrigerant lines and EVAC.

- 1 Turn the A/C system off; make sure that the chiller cannot restart.
- 2 When using dual voltage model CRH-A-D24-1-E connect has follows: For 230-VAC 1-phase power connect the 50-ft 230/460-VAC 1-phase power cord to a minimum 20 amp, maximum 30 amp circuit breaker or fused disconnect and plug the quick connect Hubbell into EVAC's control box. When using 460-VAC 1-phase power connect the 50-ft 230/460-VAC 1-phase power cord to a minimum 10 amp, maximum 20 amp circuit breaker or fused disconnect and plug the quick connect Hubbell into EVAC's control box. Connect the 100-ft 120-VAC 1-phase power cord for controls. At this time, switch voltage selector switch to desired 1-phase voltage 230 or 460, failure to select proper voltage will result in major damage to compressor motor. All other models connect to proper voltage and required amperage as rated on equipment label.
- 3 Connect the three high pressure refrigerant hoses, as shown in **(Figure 1)** on page 4. At this time, connect safety float cable from EVAC to recovery tank or use a suitable scale. If a scale is to be used instead of float safety cutout, the 80% full bypass switch will need to be set to the "On" position for EVAC to run.
- 4 Open isolation valves on top of EVAC recovery unit **(Figure 1) (A)**.
- 5 Turn 3-way valve located on front of EVAC to unit **EVAC MODE**, as shown in **(Figure 1) (B)** on page 4.
- 6 Turn EVAC power switch on, EVAC will start evacuating recovery tank vapor side hose. EVAC will pull hose into a 15" vacuum, then automatically shut down. After EVAC shuts down, proceed to next step.
- 7 Turn 2-way **EVACUATION BYPASS VALVE** located on side of EVAC to **OPEN POSITION**, as shown in **(Figure 1) (C)** on page 4. Once the EVAC restarts, the discharge hose from the EVAC to the A/C System condenser will be pulled into a 15" vacuum, then EVAC will automatically shut down. After EVAC shuts down, proceed to next step.
- 8 Return 3-way valve on front of unit to **NORMAL OPERATION** **(Figure 1) (D)** and turn the 2-way **EVACUATION BYPASS VALVE** located on side of EVAC to **CLOSED POSITION**, as shown in **(Figure 1) (E)** on page 4. Open oil return valve between oil separator and compressor. Now proceed to **Liquid Push/Pull** method on page 5.

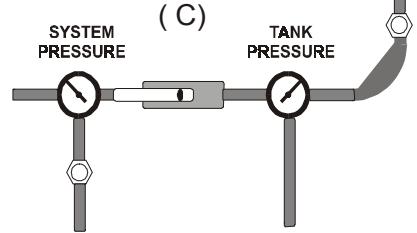
(FIGURE 1) EVACUATING HOSES



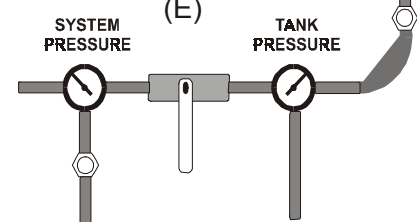
TOP VIEW OF EVAC ISOLATION VALVE (A)



SIDE VIEW OF EVAC 2-WAY VALVE OPEN POSITION (C)



SIDE VIEW OF EVAC 2-WAY VALVE CLOSED POSITION (E)





## PROCEDURES FOR LIQUID PUSH/

### PULL METHOD:

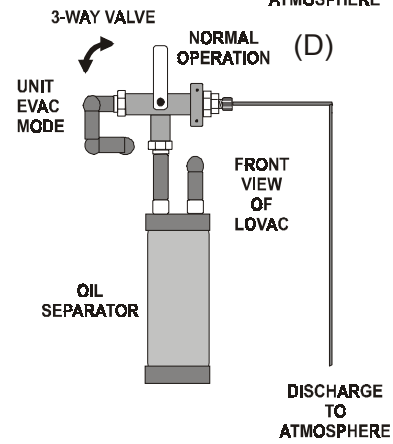
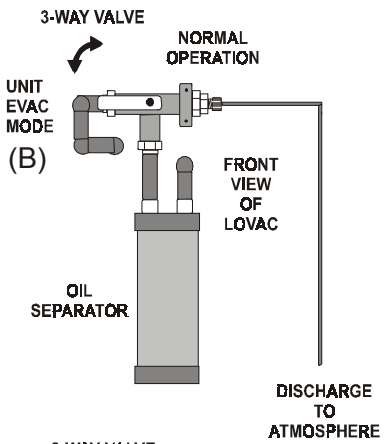
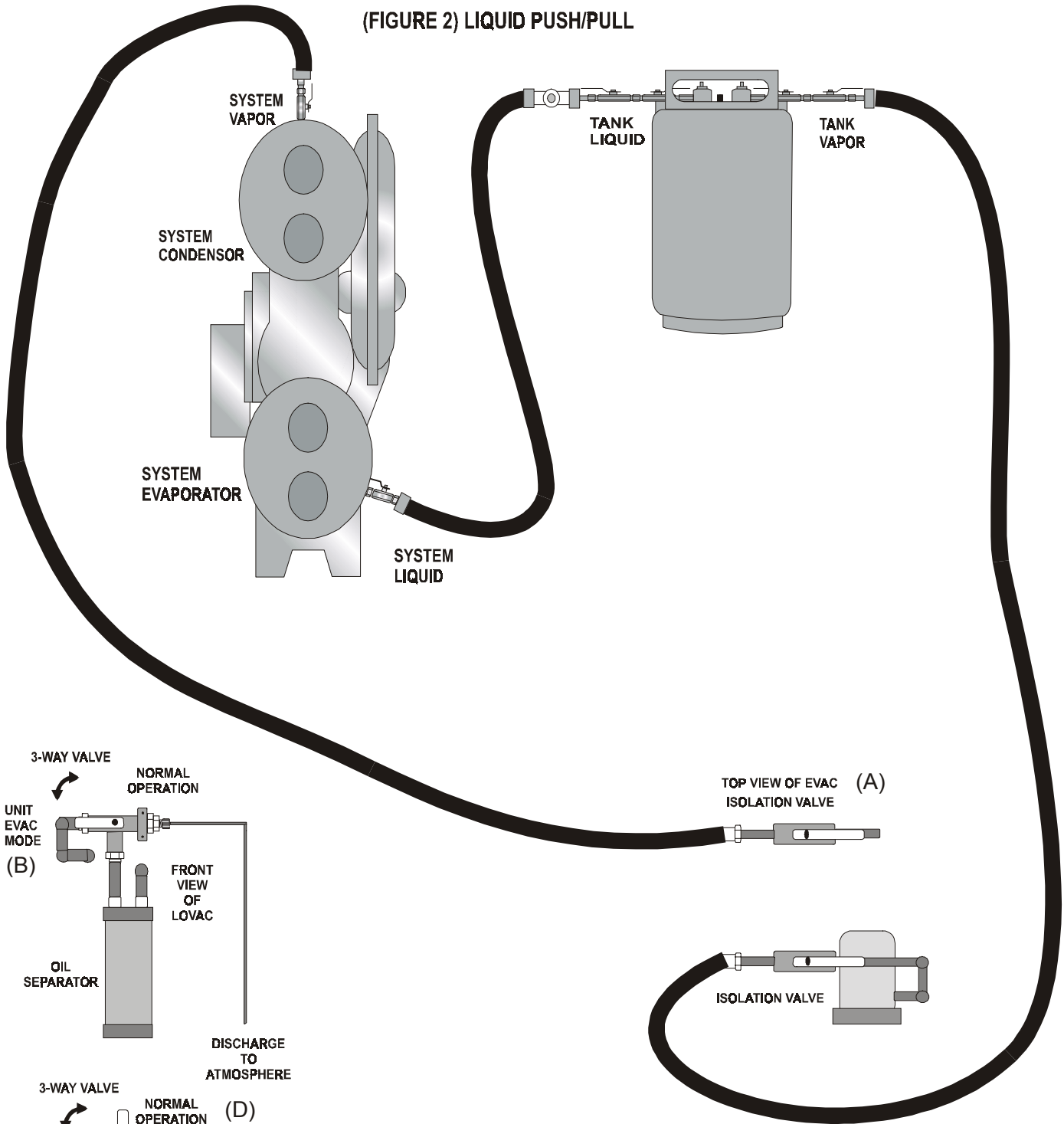
#### **WARNING!**

Before attempting to operate this unit, make absolutely sure that the 3-way valve on front of unit and the 2-way valve on side of unit are set to their **NORMAL OPERATION AND CLOSED POSITIONS** respectively. Also open oil return valve between oil separator and compressor.

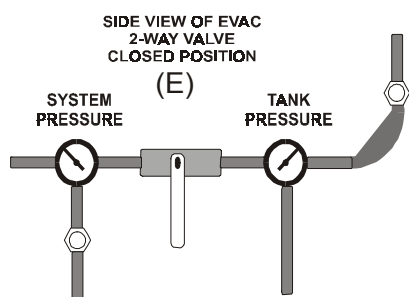
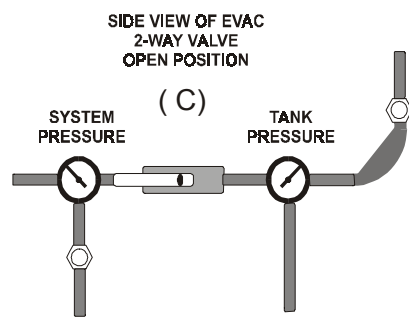
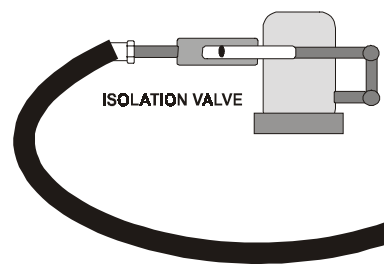
- 1 Turn the A/C system off; make sure that the A/C system cannot restart.
- 2 When using dual voltage model CRH-A-D24-1-E connect has follows: For 230-VAC 1-phase power connect the 50-ft 230/460-VAC 1-phase power cord to a minimum 20 amp, maximum 30 amp circuit breaker or fused disconnect and plug the quick connect Hubbell into EVAC's control box. When using 460-VAC 1-phase power connect the 50-ft 230/460-VAC 1-phase power cord to a minimum 10 amp, maximum 20 amp circuit breaker or fused disconnect and plug the quick connect Hubbell into EVAC's control box. Connect the 100-ft 120-VAC 1-phase power cord for controls. At this time, switch voltage selector switch to desired 1-phase voltage 230 or 460, failure to select proper voltage will result in major damage to compressor motor. All other models connect to proper voltage and required amperage as rated on equipment label.
- 3 Verify that all hoses are connected as shown on page 6 (**Figure 2**) and that they have been evacuated as previously described in **Procedures for Evacuating Hoses and EVAC** on page 3.
- 4 Open vapor & liquid access valves on A/C System being recovered.

- 5 Open isolation valves on top of EVAC recovery unit (Figure 2) (A).
- 6 Open vapor & liquid isolation valves on recovery tank .
- 7 Turn EVAC power switch on, EVAC will automatically start drawing vapor off the recovery tank and forcing compressed refrigerant back into the condenser of the A/C System. Liquid push/pull is now in process.
- 8 Continue to monitor liquid sight glass on liquid line between A/C System evaporator and recovery tank. Once all of the liquid has been completely removed, close isolation valves on recovery tank.
- 9 Close vapor & liquid access valves on A/C System being recovered and proceed to next section.

(FIGURE 2) LIQUID PUSH/PULL



TOP VIEW OF EVAC ISOLATION VALVE (A)



## PROCEDURES FOR VAPOR RECOVERY MODE:

### **WARNING!**

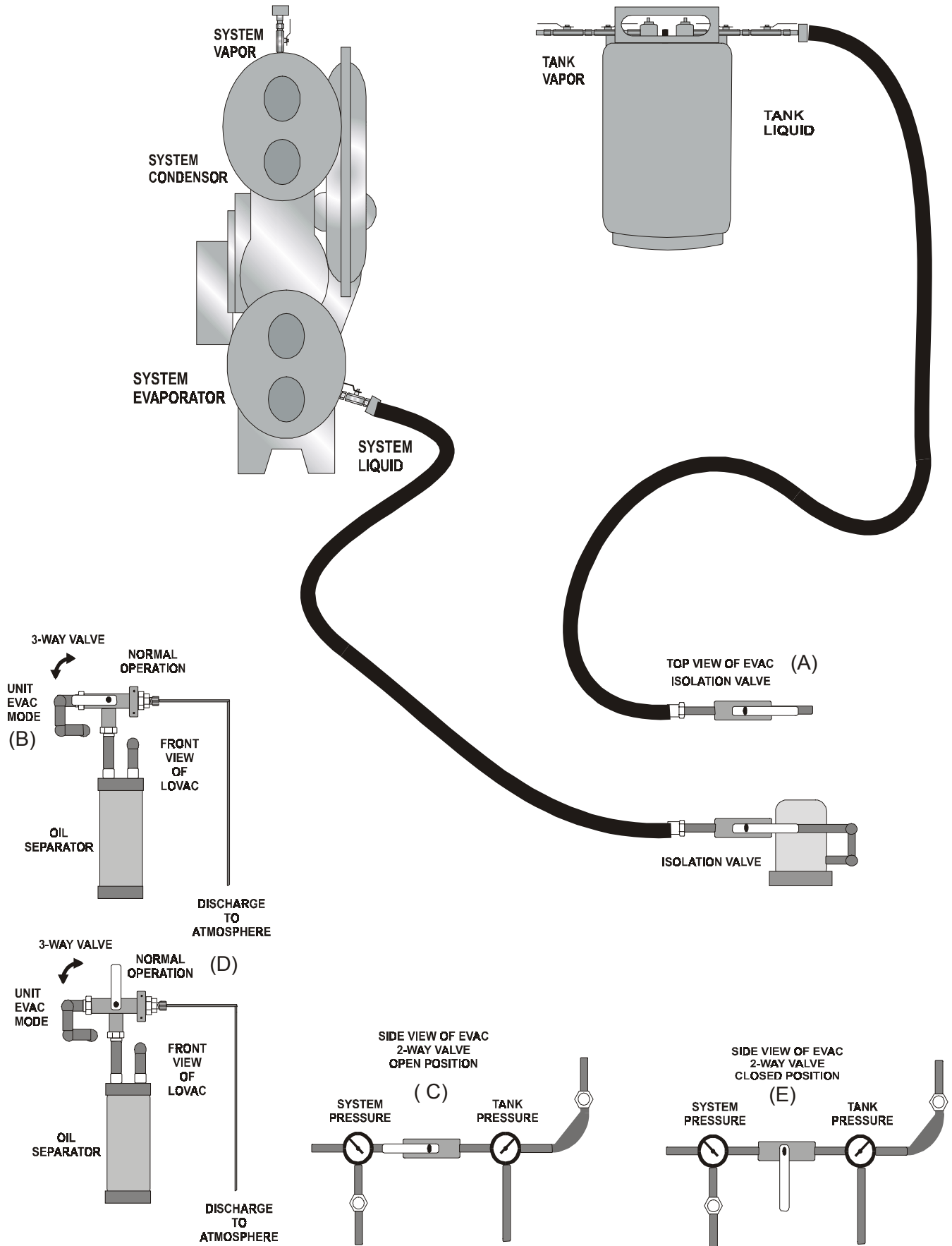
Before attempting to operate this unit, make absolutely sure that the 3-way valve on front of unit (Figure 3) (D) page 8 and the 2-way bypass valve on side of unit (Figure 3) (E) page 8 are set to their **NORMAL OPERATION AND CLOSED POSITIONS**, respectively. Also open oil return valve between oil separator and compressor.

### **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.**

- 1 Turn the A/C system off; make sure that the A/C system cannot restart.
- 2 When using dual voltage model CRH-A-D24-1-E connect has follows: For 230-VAC 1-phase power connect the 50-ft 230/460-VAC 1-phase power cord to a minimum 20 amp, maximum 30 amp circuit breaker or fused disconnect and plug the quick connect Hubbell into EVAC's control box. When using 460-VAC 1-phase power connect the 50-ft 230/460-VAC 1-phase power cord to a minimum 10 amp, maximum 20 amp circuit breaker or fused disconnect and plug the quick connect Hubbell into EVAC's control box. Connect the 100-ft 120-VAC 1-phase power cord for controls. At this time, switch voltage selector switch to desired 1-phase voltage 230 or 460, failure to select proper voltage will result in major damage to compressor motor. All other models connect to proper voltage and required amperage as rated on equipment label.
- 3 Verify that all hoses are connected as shown on page 8 (**Figure 3**) and that they have been evacuated as previously described in **Procedures for Evacuating Hoses and EVAC** on page 3.
- 4 Open evaporator access valve on A/C System being recovered.
- 5 Open isolation valves on top of EVAC recovery unit (Figure 3) (A).
- 6 Open liquid side isolation valve on recovery tank .
- 7 Turn EVAC power switch on, EVAC will automatically start recovering all of the remaining vapor refrigerant in the A/C System and pull the entire system into a 15 $\hat{}$  Hg vacuum. **To help ensure that EVAC pulls A/C System into a 15 $\hat{}$  Hg vacuum as quickly and efficiently as possible, monitor EVAC's system pressure gauge and oil in compressor. When gauge reads below a 5 $\hat{}$  Hg vacuum and if vapor recovery seems to be abnormally slow and you are sure that there is sufficient oil in the compressor, user may close compressor oil return valve to speed up the process. If compressor begins to lose oil, open oil return valve occasionally to help lubricate the compressor.**
- 8 Once A/C System has been completely recovered to a 15 $\hat{}$  Hg vacuum, EVAC will shut down and  $\hat{}$ Recovery Complete $\hat{}$  light will illuminate. Should pressure in A/C System again rise above 0 $\hat{}$  Hg vacuum, EVAC will restart and pull A/C System back into a 15 $\hat{}$  Hg vacuum.
- 9 When recovery is finished, close isolation valve on A/C System and recovery tank as well as isolation valves on EVAC recovery unit. Close isolation valves on hoses and disconnect.

(FIGURE 3) VAPOR RECOVERY MODE



*There may still be a small, residual amount of refrigerant in EVAC. This amount must be removed if you want to change to a different type of refrigerant. An explanation of how to remove this residual amount of refrigerant is explained in next section.*

## **REFRIGERANT CLEARING PROCEDURES:**

### **NOTE:**

After recovery is complete and all refrigerant has been removed from refrigerant lines EVAC may still have a very small amount of residual refrigerant in the unit. To remove this refrigerant, connect an evacuated recovery tank to both the compressor suction and discharge service 1/4" access valves on top of compressor. Allow remaining refrigerant to be pulled into tank. This procedure needs to be performed whenever a different type of refrigerant is going to be recovered. In addition, the filter core and oil will need to be changed whenever changing types of refrigerant.

### **CHANGING REPLACEABLE CORES:**

Make sure you replace disposable filter cores after each recovery job. Failure to use new cores on each and every recovery may result in damage to the open drive compressor.

Remove the inlet filter-drier unit cover by removing the cover bolts, remove old element, inspect and clean where necessary. Install new filter-drier element and the cover gasket. Replace the filter-drier tank cover and torque the cover bolts to 14-to-16 ft.-lbs.

Driers and compressor fluid are available from RefTec. Please call 1-800-214-4883.

## Changing Compressor Fluid

The compressor's charge of oil should be regularly replaced with an identical fluid and, 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 EVAC COMPRESSOR. THIS WILL HELP ENSURE THAT CROSS-CONTAMINATION DOES NOT OCCUR.**

### ***Procedures to remove and change the oil in the compressor and the oil separator***

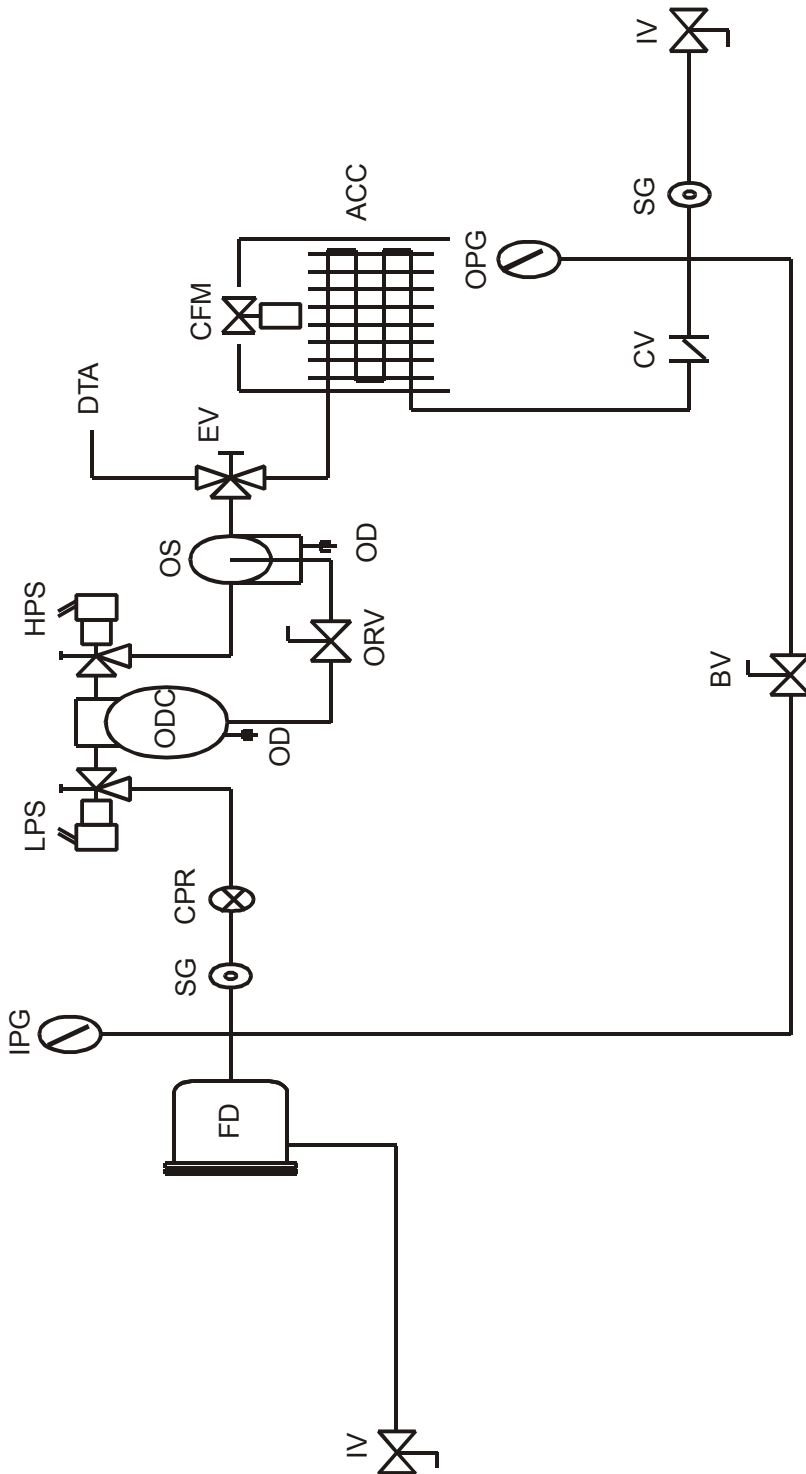
- a). Make sure EVAC unit has no refrigerant in its internal parts.
- b). Connect a manifold set to dry nitrogen and to the suction and discharge service 1/4" access valves located on the top of the EVAC compressor.
- c). Connect another 1/4" hose to the access fitting on the bottom of the EVAC oil separator and the other end to a suitable disposable oil container.
- d). Gradually allow dry nitrogen to go into the discharge port on the EVAC compressor until all oil has been forced out of the oil separator. **Note: 10 to 15 psi will be more than adequate.**

- e). Connect another 1/4" hose to the access fitting on the bottom of the EVAC compressor and the other end to a suitable disposable oil container.
- f). Gradually allow dry nitrogen to go into the suction port on the EVAC unit until all oil has been forced out of the compressor.
- g). To add new oil to the 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 the other hose to the 1/4" access port on the bottom of the compressor and into the new oil container. Note: fill compressor with exactly 34 oz. of oil.
- i). After compressor has been filled, connect the other hose to the 1/4" access port on the bottom of the oil separator and into the new oil container. Note: fill oil separator with exactly 16 oz. of oil.
- j). Once this procedure is finished, remove all hoses and pull entire EVAC into a 29" vacuum. Dispose of old oil properly.

### **WARNING !!**

**FAILURE TO FOLLOW ABOVE PROCEDURES FOR RECHARGING OIL IN COMPRESSOR WITH THE EXACT AMOUNT OF OIL MAY RESULT IN MAJOR DAMAGE TO THE COMPRESSOR**

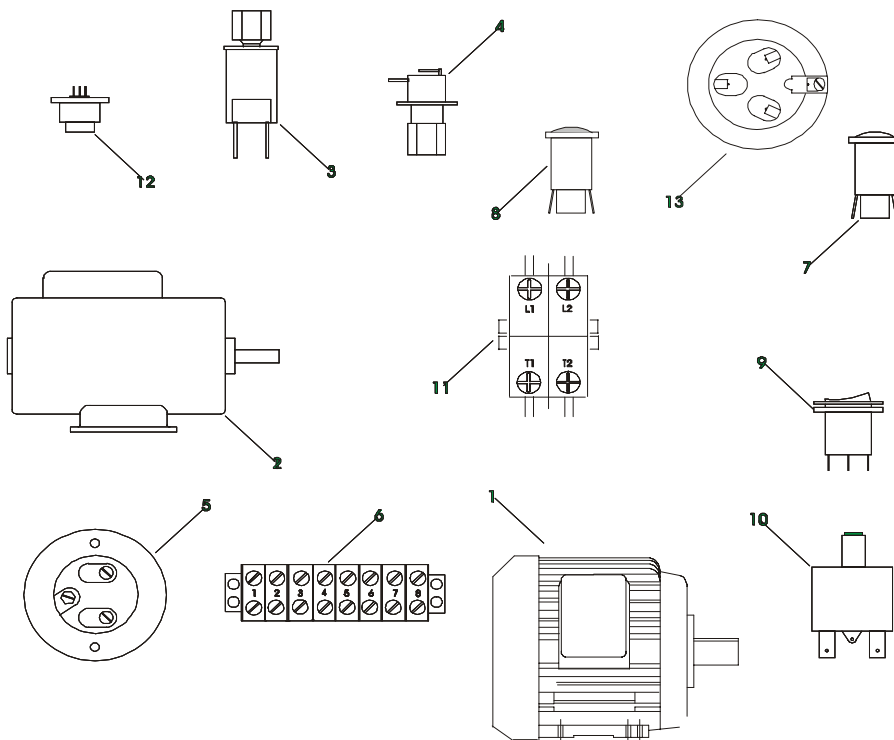
**EVAC ELECTROMECHANICAL CRH-500**  
 PROCESS & IDENTIFICATION SCHEMATIC



ITEM	MANUFACTURER DESCRIPTION
CPR	CRANKCASE PRESSURE REG
OPG	OUTLET PRESSURE GAUGE
IPG	INLET PRESSURE GAUGE
BV	EVACUATION BYPASS VALVE
ORV	OIL RETURN VALVE
ODC	OPEN DRIVE COMPRESSOR
OS	OIL SEPARATOR
EV	EVACUATION VALVE
CFM	COND FAN MOTOR
ACC	AIR COOLED CONDENSER
IV	ISOLATION VALVE
LPS	LOW PRESSURE SWITCH
HPS	HIGH PRESSURE SWITCH
DTA	DISCHARGE TO ATMOSPHERE
OD	OIL DRAIN
FD	FILTER DRIER
SG	SIGHT GLASS
CV	CHECK VALVE

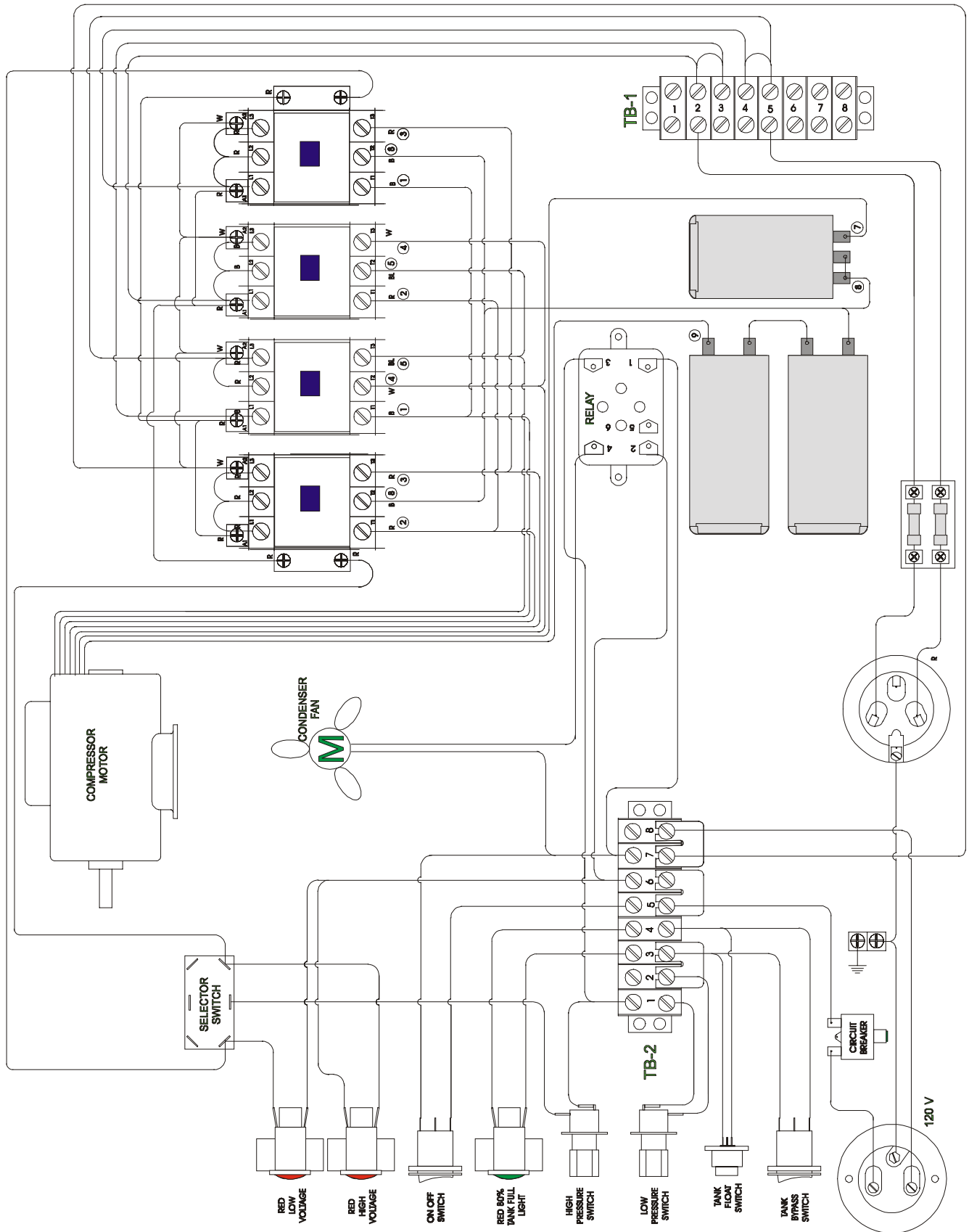
# EVAC ELECTROMECHANICAL CRH-500 ELECTRICAL PARTS BREAKDOWN

- |  |   |
|--|---|
| <p>1 Model CRH-A-D24-1-E, Compressor Motor 5 Hp, 230/460 VAC, 50/60 Hz, 1Ph 1725 RPM.</p> <p>1 Models CRH-A-230-3-E, CRH-A-460-3-E, Compressor Motor 3 Hp, 230/460 VAC, 50/60 Hz, 3Ph 1725 RPM.</p> <p>1 Model CRH-A-575-3-E, Compressor Motor 3 Hp, 230/460 VAC, 50/60 Hz, 1Ph 1725 RPM.</p> <p>2 Condenser Fan Motor 115/230 VAC 50/60Hz 1/4 Hp.</p> <p>3 High Pressure Switch 350 Psig.</p> <p>4 Low Pressure Switch 15 Hg.</p> <p>5 Male Inlet - 15A, 125V, 2 P, 3W GRD.</p> | <p>6 Terminal Block.</p> <p>7 Amber Indicating Lamp 120 VAC.</p> <p>8 Red Indicating Lamp 120 VAC.</p> <p>9 (2) Switches 120 VAC.</p> <p>10 Circuit Breakers- 20 Amp, 250 VAC, 28 VDC.</p> <p>11 Contactor-115 VAC coil 50/60Hz 40A, FL 600 VAC.</p> <p>12 Tank Safety Float Connector.</p> <p>13 Male Inlet - 50A,480V, 1Ph or 3Ph, 4 Wire.</p> <p>13 Model CRH-A-575-3-E, Male Inlet - 50A,600V, 3Ph, 4 Wire.</p> |
|--|---|

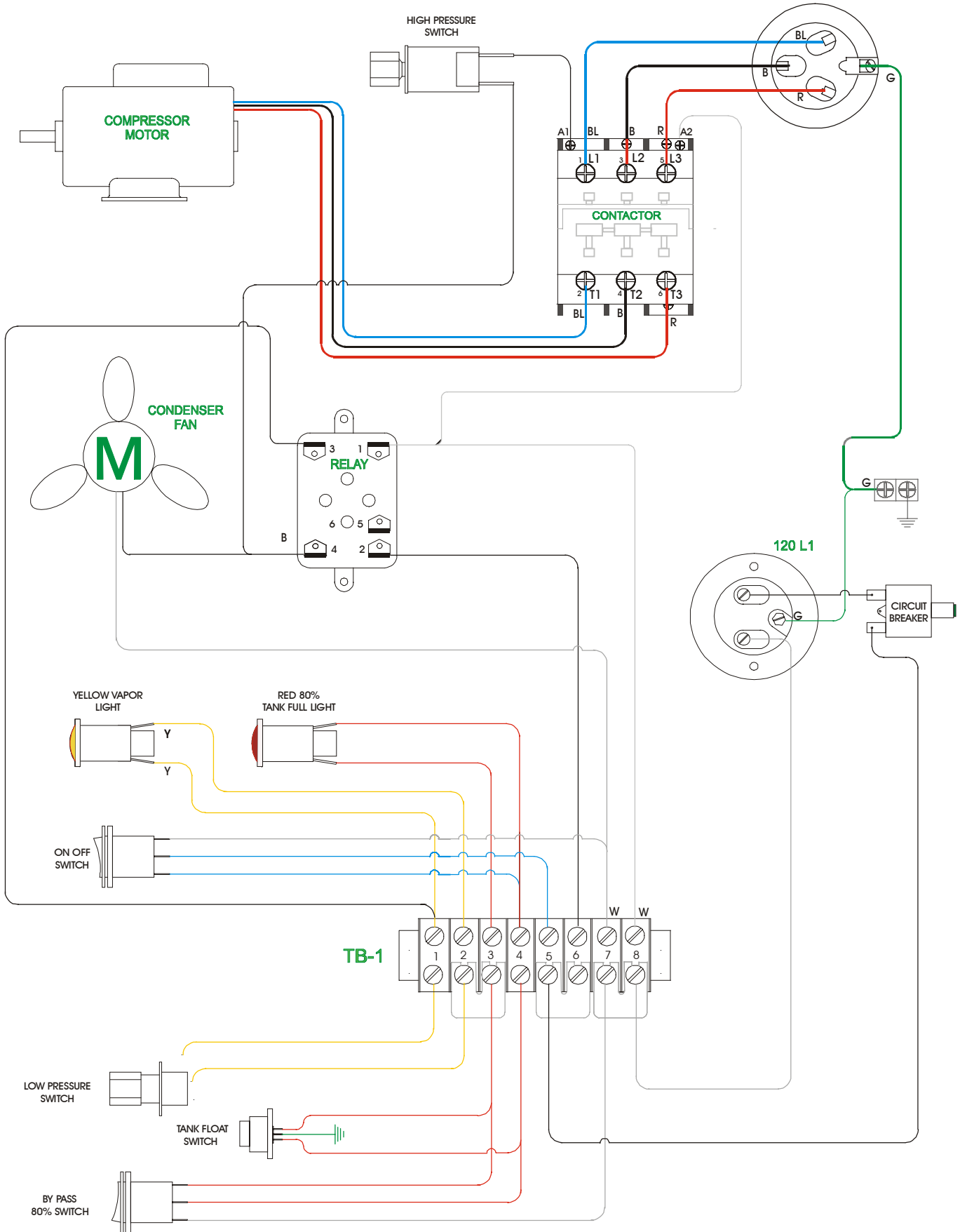




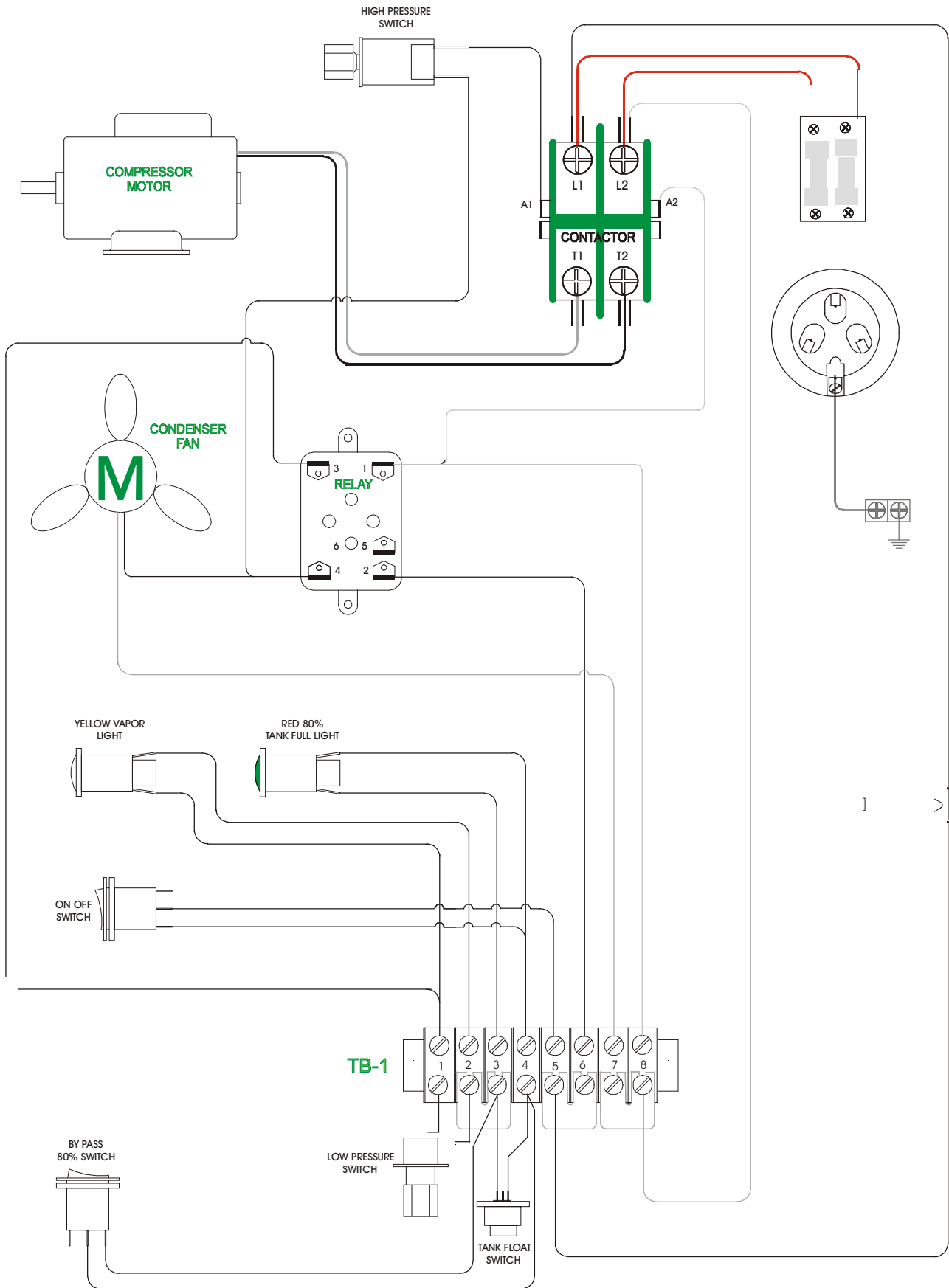
# EVAC ELECTROMECHANICAL CRH-500 ELECTRICAL BLOCK WIRING DIAGRAM MODELS CRH-A-D24-1-E, CRH-W-D24-1-E



**EVAC ELECTROMECHANICAL CRH-500 ELECTRICAL BLOCK WIRING DIAGRAM MODELS  
 CRH-A-230-3-E, CRH-A-460-3-E, CRH-A-575-3-E,  
 CRH-W-230-3-E, CRH-W-460-3-E, CRH-W-575-3-E**

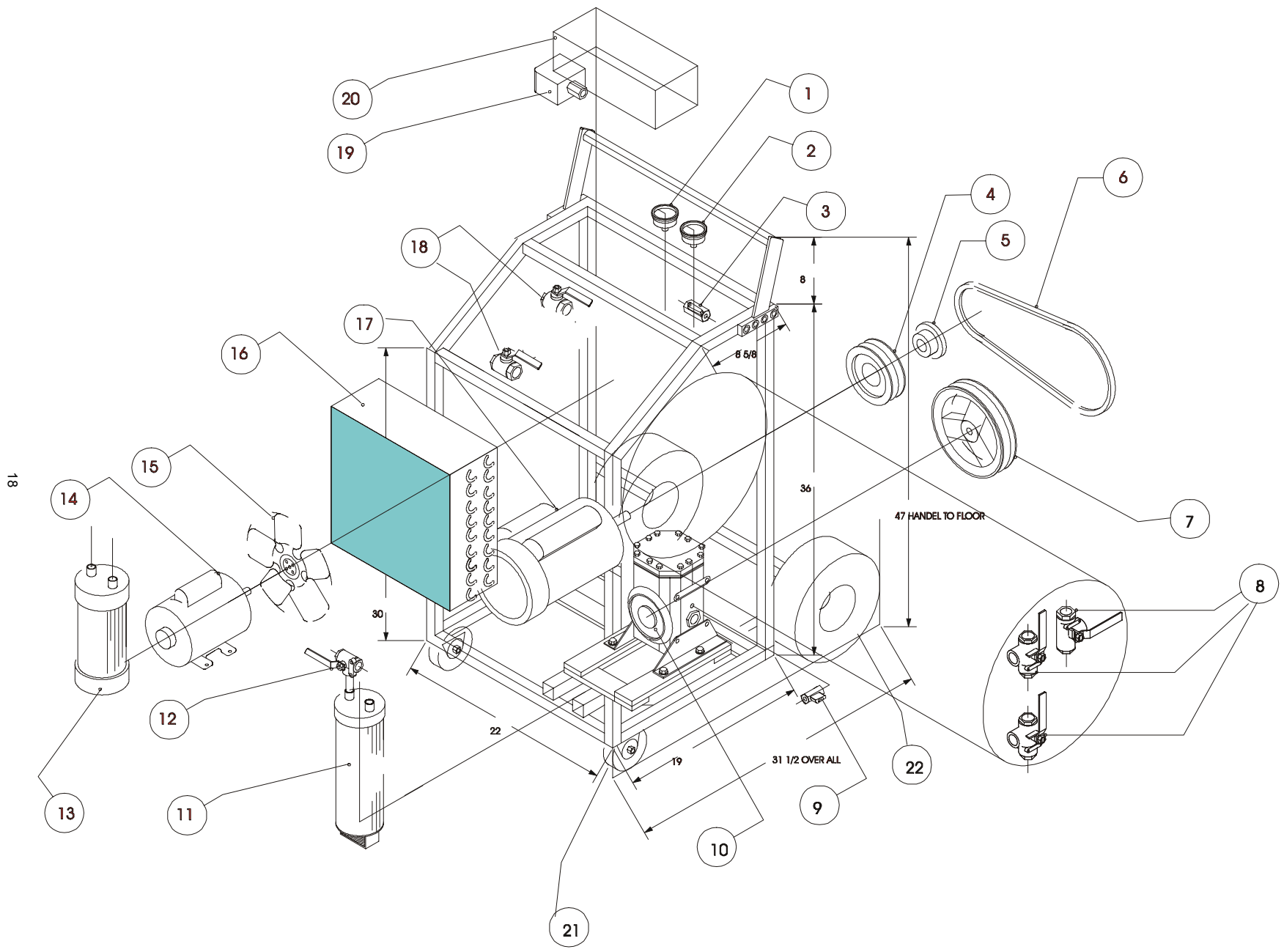


# EVAC ELECTROMECHANICAL CRH-500 ELECTRICAL BLOCK WIRING DIAGRAM MODELS CRH-A-240-1-E, CRH-W-240-1-E,



**EVAC ELECTROMECHANICAL  
CRH-500  
ALL MODELS  
REPLACEMENT PARTS LIST**

REFERENCE NUMBER	REFTEC PART NUMBER	MANUFACTURER DESCRIPTION	QTY
1	RGA300	SYSTEM PRESSURE GAUGE	1
2	RGA600	TANK PRESSURE GAUGE	1
3	RV-004	EVACUATION BYPASS VALVE	1
4	HPY295	MOTOR PULLEY	1
5	HBU905	PULLEY BUSHING	1
6	HBT139	V-BELT	2
7	HPY085	COMPRESSOR PULLEY	1
8	RV-304	3 WAY HAND VALVE	3
9	RVM012	OIL BYPASS VALVE	1
10	RCP999A	COMPRESSOR	1
11	ROS005	VAPOR COMPR OIL SEPARATOR	1
12	RVA304	DISCHARGE EVACUATION VALVE	1
13	ROS007	SUCTION ACCUMULATOR	1
14	EMO112	FAN MOTOR	1
15	HFB125	FAN BLADE	1
16	RCC014	CONDENSOR COIL	1
17	EMO215	Compressor Drive Motor 230/460VAC 1PH	1
17	EMO233	Compressor Drive Motor 230/460VAC 3PH	1
17	EMO575	3HP 1725RPM 575Vac 3PH	1
18	RVX006	HAND BALL VALVES FOR TANK AND SYSTEM	2
19	XSW015	LOW PRESSURE SWITCH	1
20	EBX125	ELECTRICAL CONTROL BOX	1
21	HWH018	4" Swivel Caster	2
22	HWH463	Pneumatic Tires	2
Not Shown	EMI400	50Amp 480V Receptical	1
Not Shown	EMI452	50Amp 230V Locking Connector	1
Not Shown	EMI459	50Amp 600V. Flanged Inlet	1
Not Shown	EMI200	50aMP 230V Male Inlet	1
Not Shown	EMI401	50 Amp 480V male Inlet	1
Not Shown	EMI460	50Amp 600V. Locking Connector	1
Not Shown	EMI115	Male Inlet 115V	1
Not Shown	RHX200	2 Ton Heat Exchanger Optional	1
Not Shown	RST005	Y STRAINER	1



**EVAC ELECTROMECHANICAL CRH-500**  
**ALL MODELS ISOMETRIC DRAWING**

**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, refer to the following troubleshooting chart for assistance.

**Troubleshooting Guide**

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

i Symptom: Describes what is happening:

i Cause: Suggests possible sources:

i Solution: Describes what must be done.

<b>Symptom</b>	<b>Cause</b>	<b>Solution</b>
<b>Pressure differential between system and recovery tank becomes too high - greater than 50 psig.</b>	<b>Restrictions in recovery line</b>	<b>Remove restriction in liquid recovery lines or tank. Tank needs to have minimum 3/4" ID valves.</b>
<b>Slow liquid transfer.</b>	<b>Restriction in flow.</b>	<b>Replace restrictive fittings or lines with appropriate size to expedite transfer.</b>
<b>EVAC running high head pressure back to recovery tank.</b>	<b>Restriction in hoses going to tank.</b>  <b>Capacity of recovery tank is too small or tank is over-filled.</b>  <b>High concentration of non-condensibles.</b>  <b>Condenser fan not running.</b>	<b>Replace with appropriately sized lines and fittings. Run water over tank or add secondary water cooled condenser on liquid return line going to recovery tank. (RefTec has available secondary water cooled and air cooled condensers.)</b>  <b>Replace with appropriately sized tanks.</b>  <b>Remove noncondensibles.</b>  <b>Check fan motor and relay.</b>

Symptom	Cause	Solution
<p><b>EVAC slugging with liquid during liquid push/pull.</b></p>	<p><b>Recovery hose incorrectly connected, this may cause liquid to be injected into compressor.</b></p> <p><b>Improper valves on recovery tank allowing liquid to be injected into compressor.</b></p>	<p><b>Verify that the system vapor and liquid lines are properly connected and that the vapor and liquid lines on recovery tank are connected correctly.</b></p> <p><b>Verify that the liquid and vapor valves on the recovery tank are separate and that the recovery tank is no more than 80 % full.</b></p>

## Manufacturers Limited Warranty

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Manufacturer warrants that the equipment will, under normal and anticipated use, be free from defects in refrigerant related parts for a period of one (1) year from and after the date of shipment, and be free from defects in electrical related parts for a period of ninety (90) days from and after the date of shipment, but in all cases excluding consumables and other matters as hereinafter provided. Labor is NOT covered and shall be the sole cost and responsibility of the Purchaser. The obligation of Manufacturer under this limited warranty is limited to the supplying of parts (excluding consumables and all plastic parts) as hereinabove specifically provided. Parts shall be new or nearly new.

Manufacturer shall be liable to replace the applicable parts only if (i) Manufacturer is properly notified by Purchaser upon discovery of the alleged defects, (ii) defective parts are returned to Manufacturer upon authorization with all transportation charges prepaid by Purchaser, (iii) Manufacturer's examination of the parts discloses to its satisfaction that the defects were not caused by the Purchaser or its agents and (iv) the parts are otherwise covered by Manufacturer's limited warranty.

Purchaser shall be responsible to select the means of transportation and bear the cost of inbound and outbound freight expense associated with any replacement parts, and all risk of loss attendant thereto.

Notwithstanding anything contained in this warranty to the contrary, (i) this limited warranty shall become null and void upon the use of any improper chemicals or in the event any modifications or improper service or installation is performed on the equipment, (ii) this limited warranty does not apply to consumable materials such as, but not limited to, indicator lamps, fuses, all fluids, filters, coatings, etc., and (iii) this limited warranty is applicable only to Purchaser, and no subsequent purchasers of the equipment from Purchaser shall be entitled to any warranty whatsoever from Manufacturer, express or implied.

THIS WARRANTY CONSTITUTES THE SOLE AND EXCLUSIVE WARRANTY OF MANUFACTURER WITH RESPECT TO THE EQUIPMENT, THERE ARE NO OTHER WARRANTIES, EXPRESS OR IMPLIED, AND MANUFACTURER SPECIFICALLY DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING (WITHOUT LIMITATION), ANY AND ALL WARRANTIES AS TO THE SUITABILITY OR MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OF THE EQUIPMENT FURNISHED HEREUNDER.

THE EXCLUSIVE REMEDY OF PURCHASER AGAINST MANUFACTURER FOR ANY BREACH OF THE FOREGOING LIMITED WARRANTY SHALL BE TO SEEK REPLACEMENT OF THE AFFECTED PARTS. IN

NO EVENT WILL MANUFACTURER'S LIABILITY IN CONNECTION WITH THE EQUIPMENT WHICH IS FOUND TO BE DEFECTIVE EXCEED THE AMOUNTS PAID BY PURCHASER TO REFTEC HEREUNDER FOR SUCH EQUIPMENT WHICH IS SPECIFICALLY FOUND TO BE DEFECTIVE. THESE LIMITATIONS APPLY TO ALL CAUSES OF ACTION IN THE AGGREGATE, BOTH AT LAW AND IN EQUITY, AND INCLUDING WITHOUT LIMITATION, BREACH OF CONTRACT, BREACH OF WARRANTY, MANUFACTURER NEGLIGENCE, INFRINGEMENT, STRICT LIABILITY, MISREPRESENTATION AND OTHER TORTS AND CONTRACTUAL CLAIMS. EXCEPT FOR THE EXCLUSIVE REMEDY PROVIDED ABOVE FOR MANUFACTURER'S BREACH OF THIS LIMITED WARRANTY, PURCHASER, FOR ITSELF AND ITS SUCCESSORS AND ASSIGNS, HEREBY WAIVES AND RELEASES MANUFACTURER FROM ANY AND ALL OTHER CLAIMS OR CAUSES OF ACTION THEY HAVE AGAINST MANUFACTURER ON ACCOUNT OF OR ASSOCIATED WITH THE EQUIPMENT PURCHASED HEREUNDER OR FOR REFTEC BREACH OF THIS LIMITED WARRANTY. IN NO EVENT SHALL MANUFACTURER BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL OR PUNITIVE DAMAGES, SUCH AS, BUT NOT LIMITED TO, LOSS OF ANTICIPATED PROFITS, LOST SAVINGS, LOST REVENUES, FINES, OR OTHER ECONOMIC LOSS IN CONNECTION WITH OR ARISING OUT OF THE EXISTENCE, FURNISHING, FUNCTIONING OR USE OF ANY ITEM OF EQUIPMENT PROVIDED UNDER THIS AGREEMENT, EVEN IF MANUFACTURER HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES AND/OR SUCH DAMAGES ARE REASONABLE AND/OR FORESEEABLE. FURTHER, PURCHASER FOR ITSELF AND ITS SUCCESSORS AND ASSIGNS, WAIVES AND RELEASES ANY RIGHTS THEY MAY HAVE TO BRING AN ACTION ARISING OR RESULTING FROM THIS AGREEMENT, REGARDLESS OF ITS FORM, MORE THAN FIFTEEN (15) MONTHS AFTER SHIPMENT OF THE AFFECTED EQUIPMENT BY MANUFACTURER TO PURCHASER.

The provisions of this warranty shall supersede any contrary provisions contained in this agreement, any document supplied by Manufacturer to Purchaser or by Purchaser to Manufacturer, or any other agreement, written or oral, between Purchaser and Manufacturer, notwithstanding the fact that the provisions contained in this warranty directly conflict with other terms or provisions of this agreement or such other documents, or that such other documents or agreements were provided, delivered, made or executed subsequent to this agreement unless such agreements are in writing, specifically refer to this agreement, specifically provide that they are amending this and are signed by the President of Manufacturer.