



**RefTec**  
INTERNATIONAL, INC.

# BULLDOG



## WHERE THE BIG DOGS PLAY! **Operation Manual**

Version 2.0 (Revision Date: 1/10/12)  
For Bulldog Model:

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## Specifications

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<b>Power requirements:</b>	BullDog 460 Model: <ul style="list-style-type: none"><li>• 460VAC</li><li>• 50/60 Hz</li><li>• 5-Hp</li><li>• 3-phase</li><li>• MIN CKT 10 AMP</li><li>• MAX CKT 20 AMP</li></ul>
<b>Dimensions (L x W x H):</b>	45 ½ in x 35 in x 40 ½ in (Not including Strainer)
<b>Weight:</b>	1,350 lbs / 614 Kg (shipping 1,500 lbs / 682 Kg)
<b>Safety limit switches:</b>	High pressure = 275 psi High pressure Blow Off = 300 psi
<b>Included Items</b>	(1) 12ft Float Cable (1) 25ft 460V power cord
<b>Accessories</b>	MPS-115: Portable Minipurge Unit BDSC001 Sub Cooler (208/230V 1Ph) Good for all three models of BullDog Desiccant Bed (Moisture Removal for Reclaim) Good for all three models of BullDog Drier

### HVAC TECHNICIAN

Must be licensed and be using certified hoses, cylinders & manifold made of the proper material & meets all requirements by law.

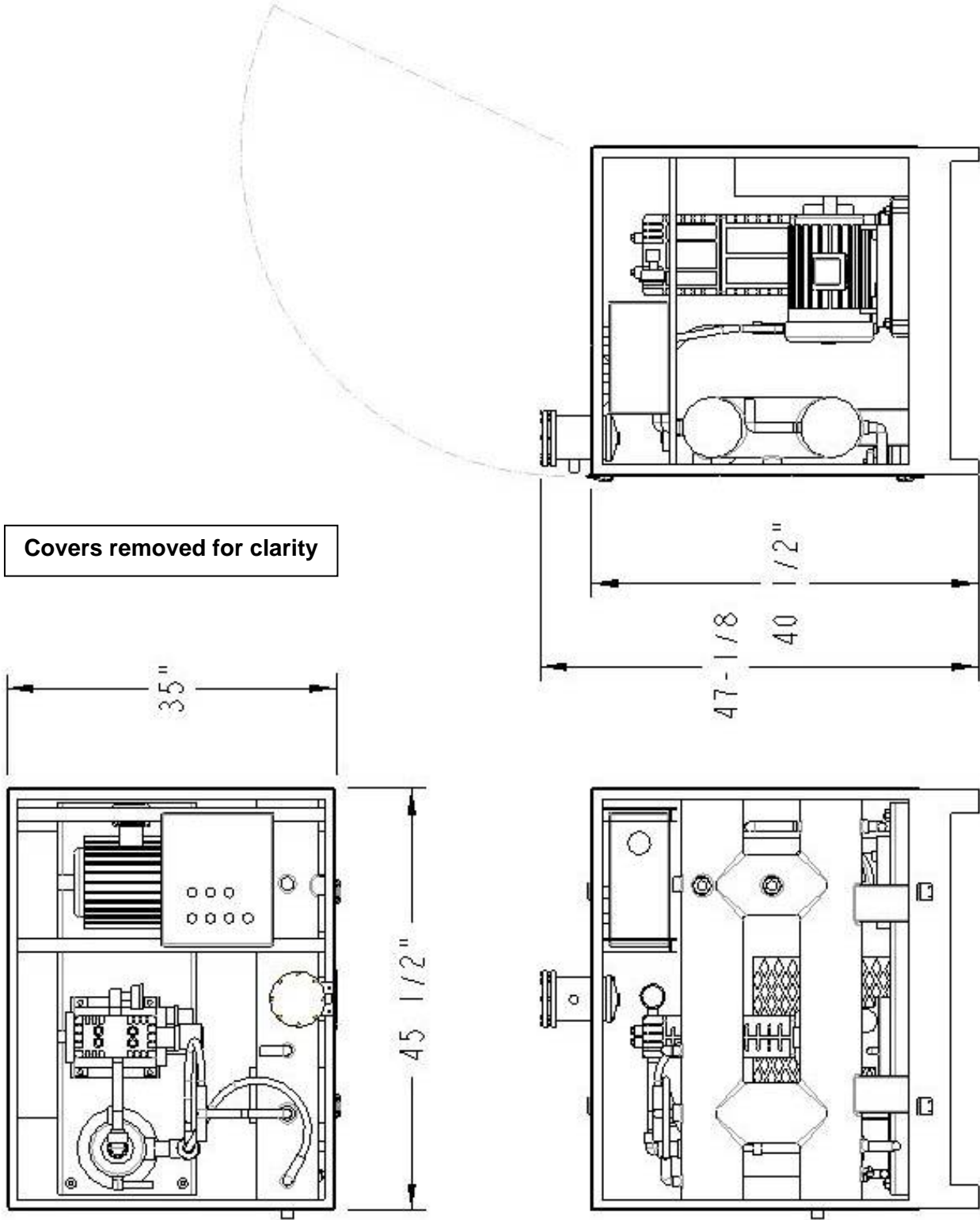
### Notice

*RefTec International Systems LLC, urges all HVAC technicians utilizing RefTec or any manufacturer's product to make every effort to eliminate or vigorously reduce CFC, HCFC and HFC refrigerant emissions during installation, operation or maintenance of cooling 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 safety procedures described in the refrigerant's Material safety Data Sheet and to all labels on refrigerant containers. Certain procedures common to refrigeration system service may expose personnel to liquid or vaporous refrigerant.*

# Specifications (Continued)



**WARNING: Waste Oil Must be Stored in an Approved & Marked Storage Container!**

## Safety Precautions

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BullDog Recovers Class III, IV, & V refrigerants: R12, R22, R134A, R401A, R401B, R401C, R402A, R402B, R404A, R406A, R407A, R407B, R407C, R407D, R408A, R409A, R410A, R411A, R411B, R412A, R500, R502, R507, R509.

BullDog is EPA certified in accordance with Section 608 of the Clean Air Act. It is certified by ETL to meet UL-1963 standards for safety as well as ARI Standard 700/740-1998 for refrigerant recovery/recycling equipment.

**CAUTION: Only EPA certified technicians should utilize BullDog to perform maintenance, service, repair, or disposal practices that could be reasonably expected to release refrigerants into the atmosphere.**

Always wear proper clothing and eye protection while operating the BullDog and working with refrigerants.

Do not fill refrigerant tanks beyond 80% of their liquid volume. Only use tanks that meet DOT specifications 4BA or 4BW.

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**WARNING: To reduce the risk of fire, use a minimum 12AWG power cord no longer than 25-feet. Failure to comply may result in the cord overheating. BullDog should be used in a location with mechanical ventilation that provides at least 4 air changes per hour.**

**BullDog should not be operated in the vicinity of spilled or open containers of gasoline or other flammable liquids or gases. As well BullDog should NOT be used in wet locations only in dry areas! Refrigerant vapor can be hazardous. Review the refrigerant type's Material Safety Data Sheet for proper handling requirements. Work only in well ventilated areas.**

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## Product Description:

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RefTec's BullDog Recovery/Recycle/Reclaim system provides efficient and safe recovery of most high pressure refrigerants.

The unit consists of a 5-hp open drive Corken Compressor, suction pressure gauge, Discharge pressure gauge, a valving system consisting of a manually operated 2-way valves, oil removal valve and 3-way valve at discharge.

Unit connections are 1/2" 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 BullDog on. BullDog 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 Suction pressure and Discharge 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 BullDog to pull vapor from A/C System evaporator being recovered. BullDog compressor begins recovering vapor.

Discharged hot compressed refrigerant passes through a Sub Cooler Condenser where it is condensed and returned to the Refrigerant Recovery Tank.

Transfer stops when an internal pressure switch indicates the Refrigerant Source is under 10" Hg vacuum. If pressure should again rise above 0 Psig, BullDog will need to be restarted to pull refrigerant from Refrigerant Source until a 10 Hg vacuum is restored.

## Safe Operations and Tips:

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

Make sure you have a recovery tank with a minimum 1/2" male flare vapor port and a minimum 1/2" 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 BullDog 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 BullDog 24-VAC control circuit. All BullDog units come with safety float connection and bypass switch.

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 BullDog performing at its highest possible effectiveness.

## Peak Performance:

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

- Connect to 1/2" evaporator and 1/2" condenser ports on the refrigerant source.
- Use recovery tanks with 1/2" ports whenever possible.

## **Procedure for Evacuating Hoses and BullDog:**

---

1. Turn the A/C system off; make sure that the chiller cannot restart.
2. When connecting BullDog connect as follows:
  - Connect the 25-ft 230/460-VAC 3-phase power cord to a minimum 10 amp, maximum 20 amp circuit breaker or fused disconnect and plug the quick connect Hubbell into BullDog's control box. Failure to select proper volt-age 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 high pressure refrigerant hoses, as shown in (Figure 1) on page 8. At this time, connect safety float cable from BullDog 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 BullDog to run.
4. Open isolation valves on BullDog and Hoses (Figure 1) (A). And turn compressor discharge 3-way valve to Push Pull Position.

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**DO not open isolation valves on Recovery Cylinder or Refrigerant Source, until evacuation on Bulldog and Hoses is Complete!**

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5. Connect vacuum pump to 1/4" access fittings located on Outlet side & Compressor Suction (Figure 1) (B) on page 8. Pull to 29" Hg. Disconnect Vacuum Pump after 29" Hg is reached!
6. Open liquid valve on refrigerant source to purge air from liquid line between refrigerant source and recover cylinder. Open liquid valve on recovery cylinder and vapor valve on refrigerant source.
7. Turn BullDog power switch on, then open Vapor Valve on recovery tank. **Do not turn sub cooler on!**

8. Push Pull Recovery is now in process.
9. Continue to monitor liquid sight glass on liquid line between refrigerant source and recovery tank. Once all of the liquid has been completely removed, close isolation valves on recovery tank.
10. Close vapor & liquid access valves on refrigerant source and turn off BullDog!
11. Close all hose isolation valves on BullDog and proceed to vapor recovery.

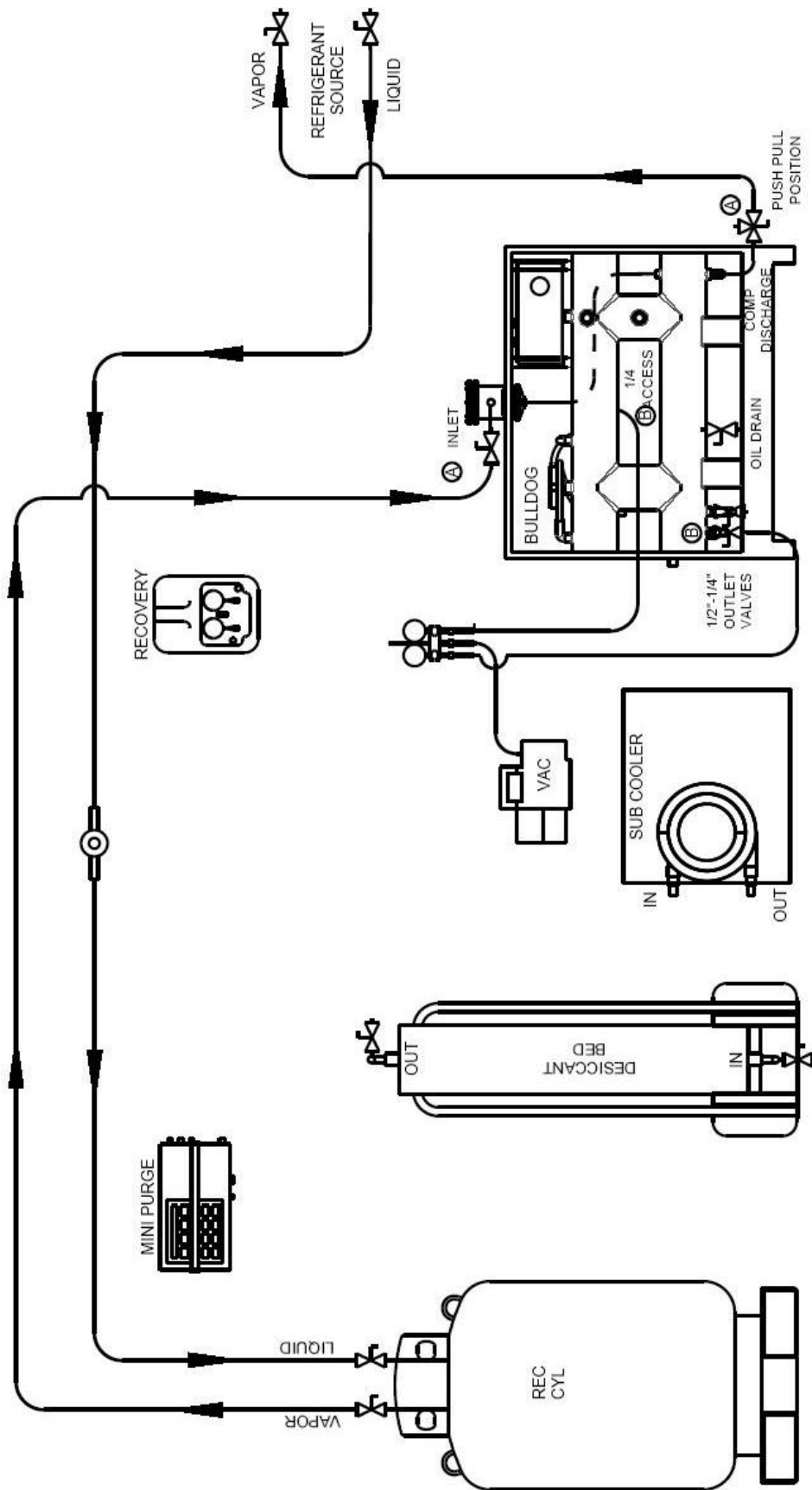


FIGURE 1: PUSH PULL



## Procedures for Vapor Recovery Mode:

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**WARNING:** Before attempting to operate this unit in vapor mode, make absolutely sure that the hoses on unit (Figure 2) (A) page 10 are hooked up correctly!

**WARNING:** It is absolutely imperative that all of the liquid has been removed before switching into the vapor recovery mode to prevent prolonged recovery time.

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1. Turn the A/C system off; make sure that the A/C system cannot restart.
2. Connect hoses as shown in Figure 2(A). Turn 3-way valve to Normal Operation Figure 2(B). Open all Isolation Valves on hoses, Recovery Cylinder Bulldog Unit, Sub-Cooler and Refrigerant Source.
3. Turn BullDog and sub-cooler power switches on, when 10" HG vacuum is reached BullDog will shut down, at this point turn BullDog and sub-cooler power switches off.
4. Close liquid and vapor ports on both refrigerant source and recover cylinder. Disconnect hoses when complete.

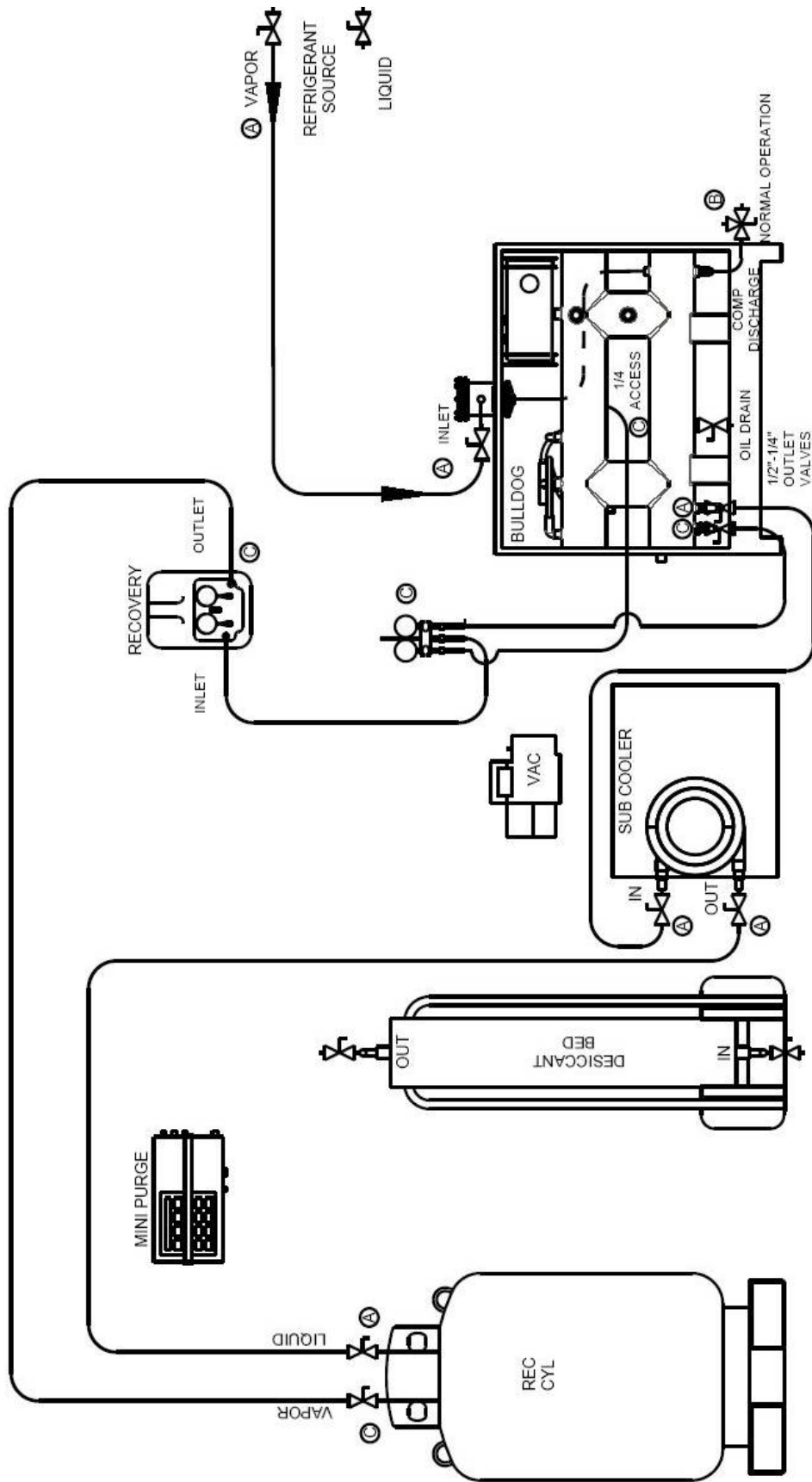


FIGURE 2: VAPOR RECOVERY

## **Safety Precautions**

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BullDog is EPA certified in accordance with Section 608 of the Clean Air Act. It is certified by ETL to meet UL-1963 standards for safety as well as ARI Standard 700/740-1998 for refrigerant recovery/recycling equipment.

**CAUTION: Only EPA certified technicians should utilize BullDog to perform maintenance, service, repair, or disposal practices that could be reasonably expected to release refrigerants into the atmosphere.**

Always wear proper clothing and eye protection while operating the BullDog and working with refrigerants.

Do not fill refrigerant tanks beyond 80% of their liquid volume. Only use tanks that meet DOT specifications 4BA or 4BW.

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**WARNING: To reduce the risk of fire, use a minimum 12AWG power cord no longer than 25-feet. Failure to comply may result in the cord overheating. BullDog should be used in a location with mechanical ventilation that provides at least 4 air changes per hour.**

**BullDog should not be operated in the vicinity of spilled or open containers of gasoline or other flammable liquids or gases. As well BullDog should NOT be used in wet locations only in dry areas! Refrigerant vapor can be hazardous. Review the refrigerant type's Material Safety Data Sheet for proper handling requirements. Work only in well ventilated areas.**

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**WARNING: Waste Oil Must be Stored in an Approved & Marked Storage Container!**

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## **Product Description:**

---

RefTec's BullDog Recovery/Recycle/Reclaim system provides efficient and safe recovery of most high pressure refrigerants.

The unit consists of a 5-hp open drive Corken Compressor, suction pressure gauge, discharge pressure gauge, a valving system consisting of a manually operated 2-way valves, oil removal valve and 3-way valve at discharge.

Unit connections are 1/2" male flare with isolation valves. After hoses are connected and evacuated, user simply configures hoses. Transfer stops when an internal pressure switch indicates the Refrigerant Source is under 10" Hg vacuum. If pressure should again rise above 0 Psig, BullDog will need to be restarted to pull refrigerant from Refrigerant Source until a 10 Hg vacuum is restored.

## **Safe Operations and Tips:**

---

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

Make sure you have a recovery tank with a minimum 1/2" male flare vapor port and a minimum 1/2" 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 BullDog 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 BullDog 24-VAC control circuit. All BullDog units come with safety float connection and bypass switch.

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 BullDog performing at its highest possible effectiveness.

## **Peak Performance:**

---

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

- Connect to 1/2" evaporator and 1/2" condenser ports on the refrigerant source.
- Use recovery tanks with 1/2" ports whenever possible.

## **Procedure for Evacuating Hoses and BullDog:**

---

1. Turn the A/C system off; make sure that the chiller cannot restart.
2. When connecting BullDog connect as follows:
  - Connect the 25-ft 230/ 460-VAC 3-phase power cord to a minimum 10 amp, maximum 20 amp circuit breaker or fused disconnect and plug the quick connect Hubbell into BullDog's control box. 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 high pressure refrigerant hoses, as shown in (Figure 3) on page 14. At this time, connect safety float cable from BullDog 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 BullDog to run.
4. Open isolation valves on BullDog and hoses (Figure 3) (A). And turn compressor discharge 3-way valve to NORMAL Position.

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**DO not open isolation valves on Recovery Cylinder or Refrigerant Source, until evacuation on BullDog and hoses is complete!**

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5. Connect vacuum pump to 1/4" Access fittings Located on Outlet side and Compressor Suction (Figure 3) (B) on page 13 – Pull 29" Hg Disconnect Vacuum Pump after 29" Hg is reached!

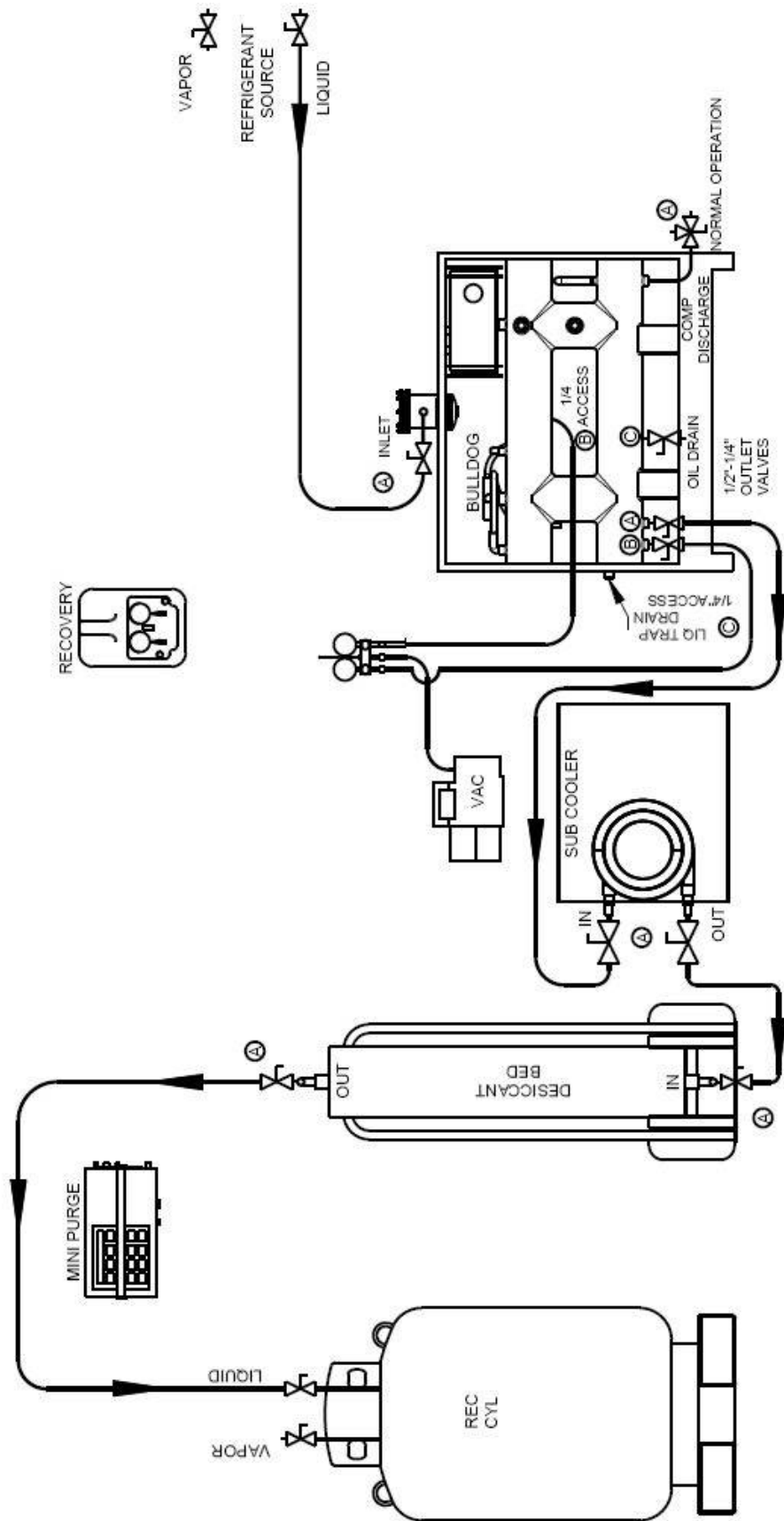


FIGURE 3: RECLAIM

## **Procedures for Reclaim Mode:**

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**WARNING: Before attempting to operate this unit in vapor mode, make absolutely sure that the hoses on unit (Figure 3) (A) page 16 are hooked up correctly!**

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1. After Bulldog System and hoses have been evacuated, turn selector switch on Sub-Cooler to auto. The Sub-Cooler will start only when head pressure reaches 225 psi. Then open liquid valves on Recovery Cylinder and Refrigerant Source.
2. Turn power on for BullDog & Sub-Cooler, reclaim is now in process.
3. For the first 2 hours of operation, User must check for waste oil at the liquid trap. Then every 1/2hr and drain as needed. To drain oil, close Inlet valve on BullDog, when suction pressure reaches 10psi turn power off to sub-cooler and BullDog. Drain oil at still & liquid trap (Figure 3) (C) page 16.

**WARNING: WAIST OIL MUST BE DRAINED INTO APPROVED AND MARKED CONTAINER**

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4. After oil is drained, open inlet and restart Sub-Cooler and Bulldog. Repeat process as needed. If excessive amounts of oil is being processed, meter inlet valve to keep safeties from shutting down unit.
5. RECLAIM PROCESS IS COMPLETE WHEN UNIT SHUTS DOWN
6. When complete, turn power off to Sub-Cooler, Bulldog!
7. Close liquid valves on recovery cylinder and refrigerant source close isolation valves on hoses (FIGURE 4) (A)
8. Unit must be recovered to prevent any loss of Refrigerant. By connecting manifold set to 1/4" access ports and to a small recovery unit as shown in Figure 4 (B)
9. After Recovery of BullDog Systems, close liquid & vapor ports on recovery cylinder and remove hoses

10. To complete the Reclaim Process non-condensables must be removed from clean refrigerant
11. For this process you must use a purge unit (EX: Minipurge) by pulling vapor off the top of the cylinder processing the refrigerant and removing the non-condensables to Ahri Specifications - then returning liquid refrigerant back to cylinder thru the liquid port

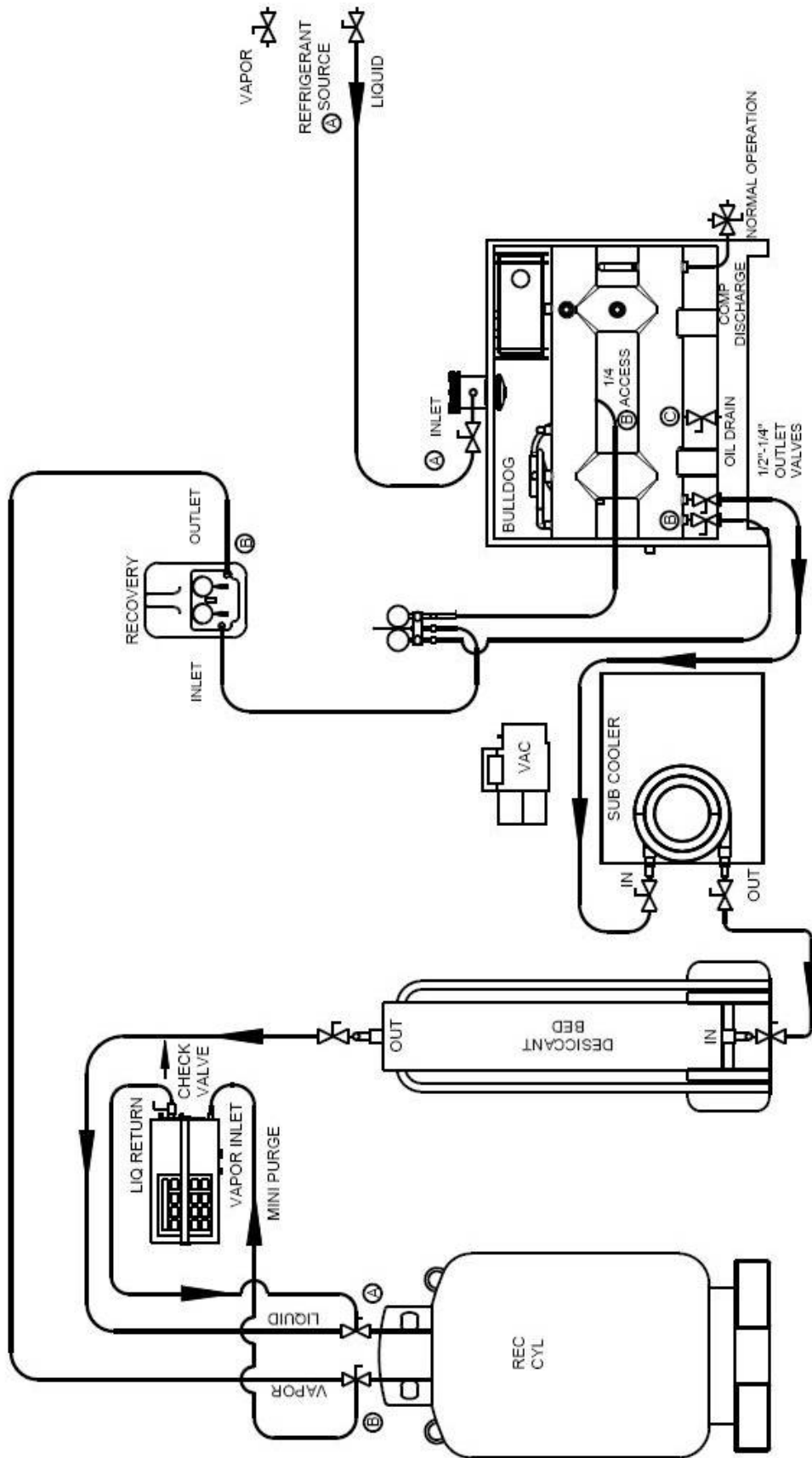


FIGURE 4: RECLAIM



## Safety Precautions

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Always wear proper clothing and eye protection while operating the BullDog and working with refrigerants.

Do not fill refrigerant tanks beyond 80% of their liquid volume. Only use tanks that meet DOT specifications 4BA or 4BW.

---

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**BullDog should not be operated in the vicinity of spilled or open containers of gasoline or other flammable liquids or gases. As well BullDog should NOT be used in wet locations only in dry areas! Refrigerant vapor can be hazardous. Review the refrigerant type's Material Safety Data Sheet for proper handling requirements. Work only in well ventilated areas.**

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**WARNING: Waste Oil Must be Stored in an Approved & Marked Storage Container!**

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## Product Description:

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RefTec's BullDog Recovery/Recycle/Reclaim system provides efficient and safe recovery of most high pressure refrigerants.

The unit consists of a 5-hp open drive Corken Compressor, suction pressure gauge, discharge pressure gauge, a valving system consisting of a manually operated 2-way valves, oil removal valve and 3-way valve at discharge.

Unit connections are 1/2" male flare with isolation valves. After hoses are connected and evacuated, user simply configures hoses. Transfer stops when an internal pressure switch indicates the Refrigerant Source is under 10" Hg vacuum. If pressure should again rise above 0 Psig, BullDog will need to be restarted to pull refrigerant from Refrigerant Source until a 10 Hg vacuum is restored.

## Safe Operations and Tips:

---

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

Make sure you have a recovery tank with a minimum 1/2" male flare vapor port and a minimum 1/2" 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 BullDog 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 bulldog 24-VAC

control circuit. All BullDog units come with safety float connection and bypass switch.

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 BullDog performing at its highest possible effectiveness.

## Peak Performance:

---

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

- Connect to 1/2" evaporator and 1/2" condenser ports on the refrigerant source.
- Use recovery tanks with 1/2" ports whenever possible.

**NOTE: In Recycle Process it is an option to use Desiccant Bed for Excessive Moisture Removal!**

## **Procedures for Evacuating Hoses and BullDog:**

---

1. Turn the A/C system off; make sure that the chiller cannot restart.
2. When Connecting BullDog connect as follows:
  - Connect the 25-ft 230/460-VAC 3-phase power cord to a minimum 10 amp, maximum 20 amp circuit breaker or fused disconnect and plug the quick connect Hubbell into BullDog's control box. 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 high pressure refrigerant hoses, as shown in (Figure 5) on page 19. At this time, connect safety float cable from BullDog 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 BullDog to run.
4. Open isolation valves on BullDog and Hoses (Figure 5) (A). And turn compressor discharge 3-way valve to NORMAL Position.

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**DO not open isolation valves on Recovery Cylinder or Refrigerant Source, until evacuation on BullDog and hoses is complete!**

---

5. Connect vacuum pump to 1/4" Access fittings Located on Outlet side & Compressor Suction (Figure 5) (B) on page 20 – Pull 29" Hg. Disconnect Vacuum Pump after 29" Hg is reached!

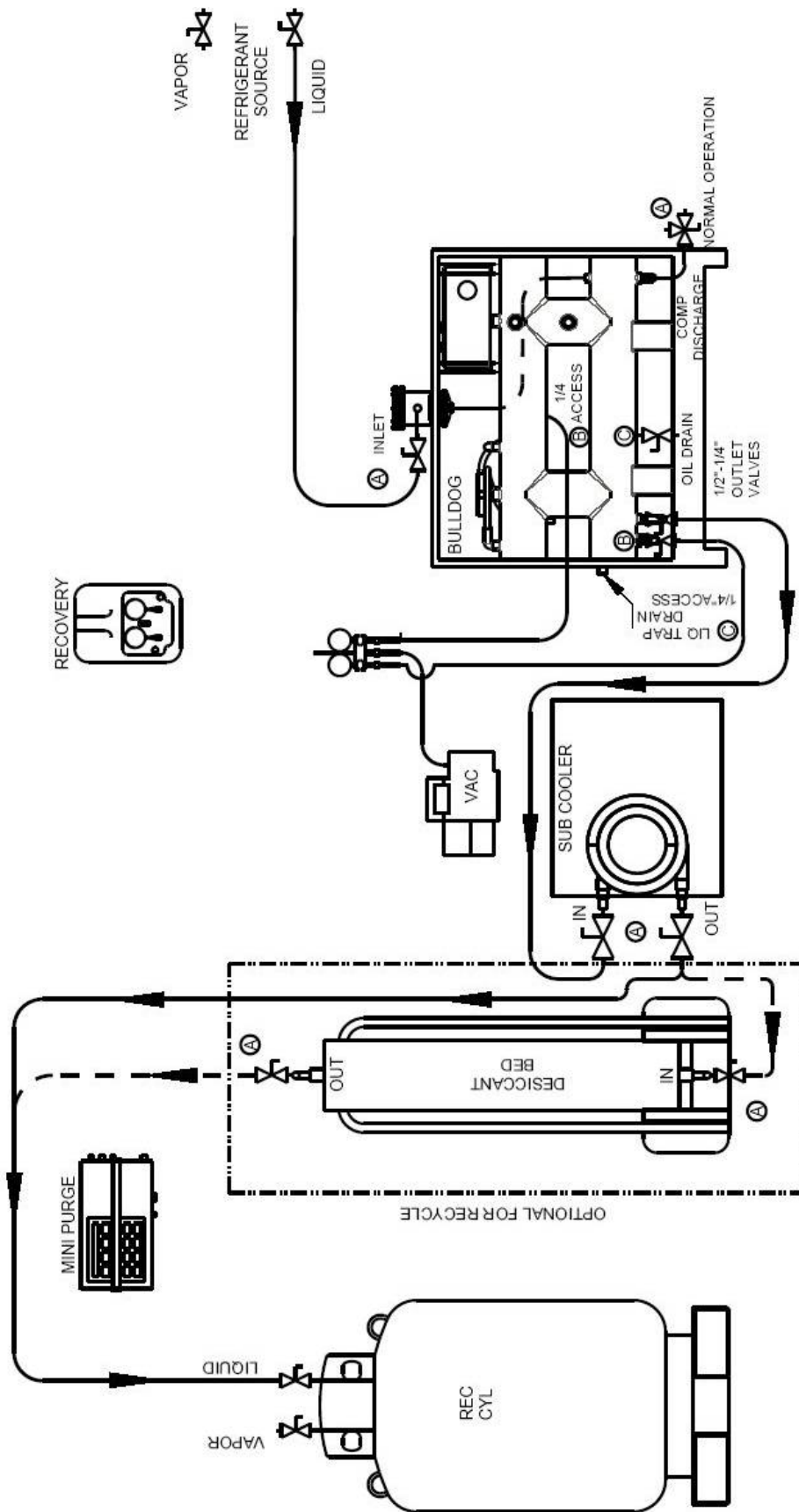


FIGURE 5: RECYCLE

## **Procedures for Recycle Mode:**

**WARNING: Before attempting to operate this unit in vapor mode, make absolutely sure that the hoses on unit (Figure 5) (A) page 20 are hooked up correctly!**

1. After Bulldog System and hoses have been evacuated. Open liquid valves on Recovery Cylinder and Refrigerant Source.
2. Turn power on for BullDog & Sub-Cooler, recycle is now in process.

(For excessive presents of oil in refrigerant: Inlet ball valve must be metered to keep compressor from short cycling on high level.)

3. For the first 2 hours of operation, user must check for waste oil at the liquid trap. Then every ½ hr and drain as needed. To drain oil, close inlet valve on BullDog, when suction pressure reaches 10 psi turn power off to sub-cooler and BullDog. Drain oil at still & liquid trap (Figure 5) (C) page 20.

**WARNING: WAIST OIL MUST BE DRAINED INTO APPROVED AND MARKED CONTAINER**

4. After oil is drained, open inlet and restart Sub-Cooler and Bulldog. Repeat process as needed. If excessive amounts of oil is being processed, meter inlet valve to keep safeties from shutting down Unit.
5. RECYCLE PROCESS IS COMPLETE WHEN UNIT SHUTS DOWN
6. When complete, turn power off to Sub-Cooler, Bulldog!
7. Close Liquid valves on recovery cylinder and refrigerant source close Isolation valves on Hoses (FIGURE 6) (A)
8. Unit must be recovered to prevent any loss of Refrigerant. By connecting manifold set to 1/4" access ports and to a small recovery unit as shown in Figure 6 (B)

9. After Recovery of BullDog Systems, Close liquid & vapor ports on recovery cylinder and remove hoses
10. To complete the Recycle Process non-condensables must be removed from clean refrigerant
11. For this process you must use a purge unit (EX: Minipurge) by pulling vapor off the top of the cylinder processing the refrigerant and removing the non-condensables to Ahri Specifications - then returning liquid refrigerant back to cylinder thru the liquid port

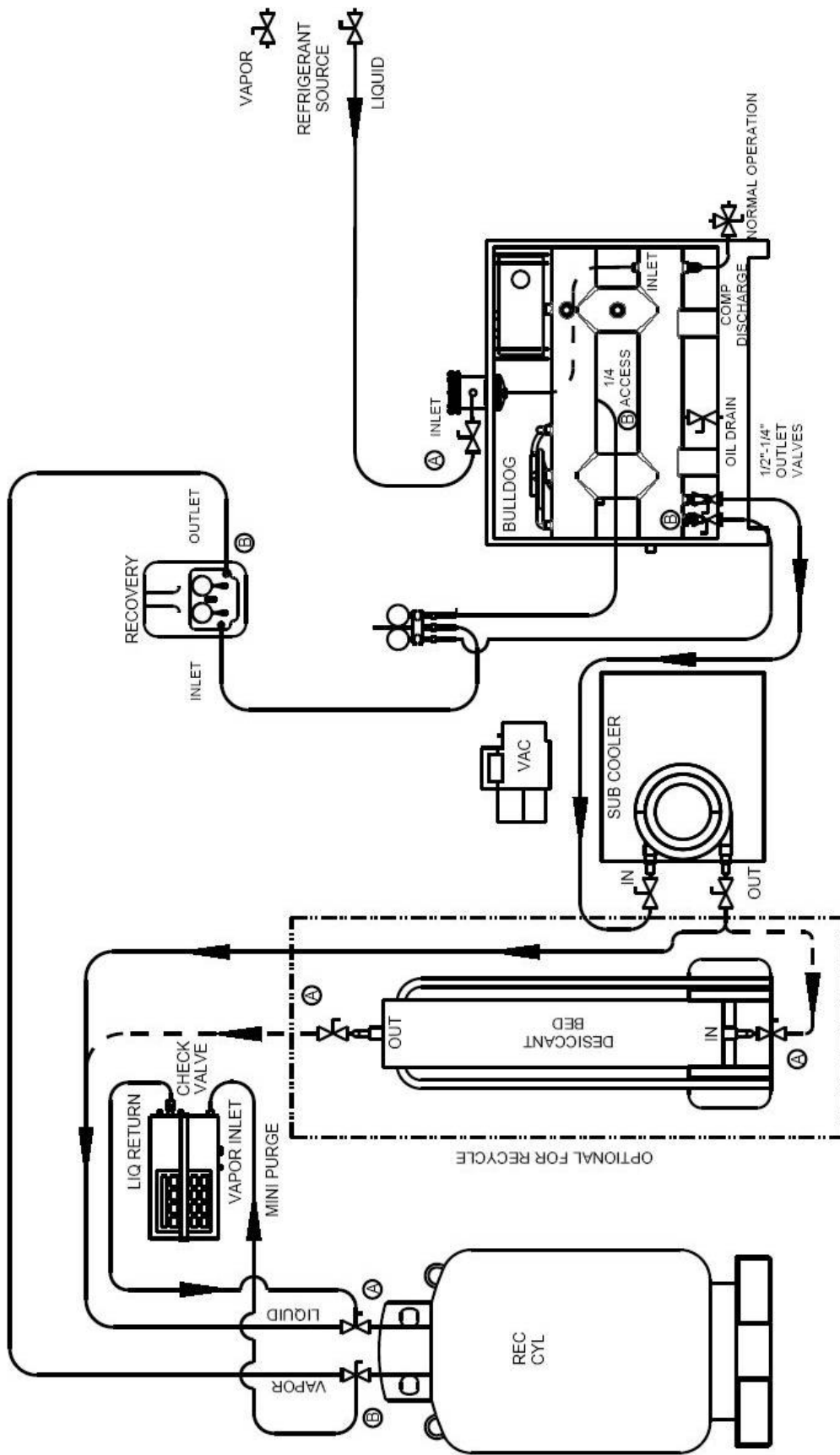


FIGURE 6: RECYCLE

## **Procedures for Final Recovery and Evacuation:**

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To recover processed gas from desiccant bed, hoses must be connected as shown in Figure 7 (MiniPurge must be isolated from recover cylinder during recovery process). All valves must be closed.

1. Turn recovery machine inlet and outlet valves to recover. Open manifold set then loosen hose on vapor side of recovery cylinder and slowly open valve "C" at the bottom of desiccant bed to purge air out of hoses. When air is purged, retighten hose on vapor side of recovery cylinder.
2. Open vapor valve and turn recovery unit on. Unit will turn off when recovery is complete.
3. After recovery, any non-condensables must be removed by MiniPurge

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***WARNING: This processed gas recovery MUST be performed first before the BullDog and Sub-Cooler Recovery***

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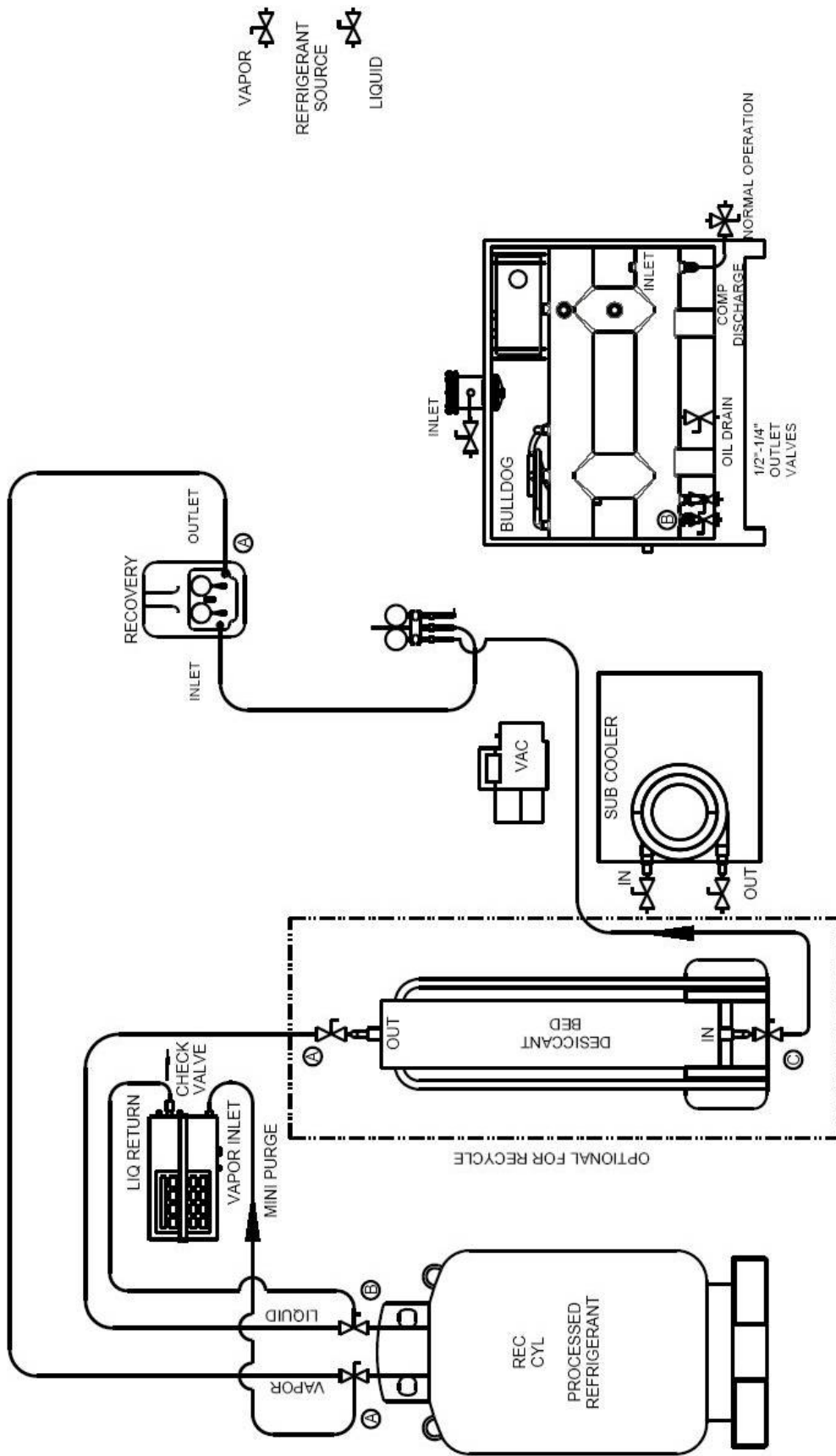


FIGURE 7: RECOVERY OF PROCESSED REFRIGERANT



## **Procedures for Final Recovery and Evacuation:**

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To remove unprocessed gas from BullDog and Sub-Cooler, Hoses must be connected as shown in Figure 8.

1. Set Inlet and outlet valves to recover on recovery unit.
2. Loosen hose on liquid side of dump tank, open valves "B" on BullDog and Sub-Cooler and then manifold set to purge air from hoses.
3. Tighten hoses on liquid side of dump tank and open valve "C" then turn Recovery unit on, unit will turn off when recovery is complete.

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***WARNING: The unprocessed gas recovery MUST be performed last to prevent contamination of the clean gas.***

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When dump tank is full, gas can be reprocessed through BullDog.

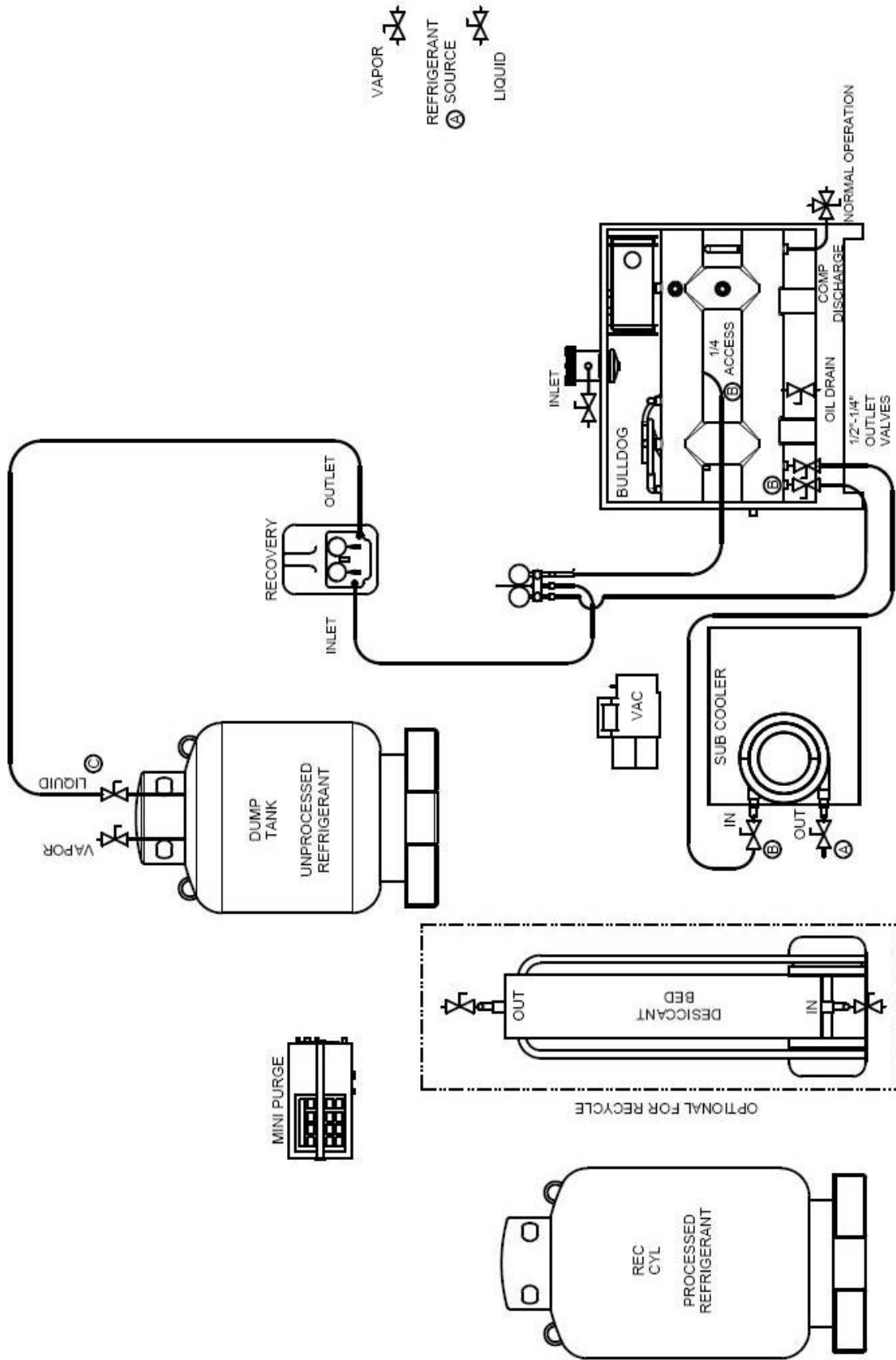
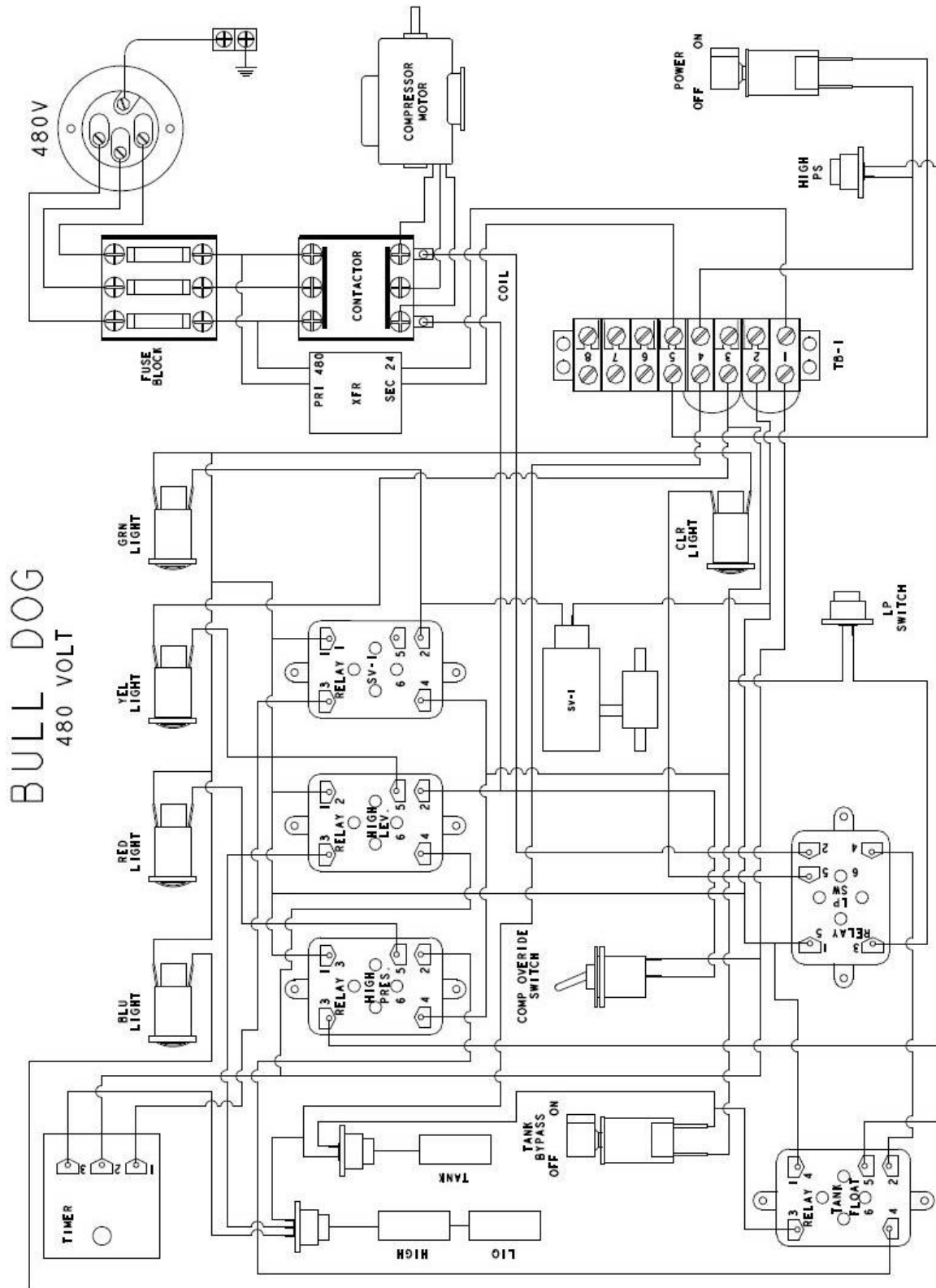


FIGURE 8: RECOVERING BULLDOG

BullDog Refrigerant Recovery / Recycle Unit  
**Electrical Schematic**



## **Maintenance**

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### Cleaning System

1. After Each use - The BullDog unit must be cleared out of any residual oil & refrigerant left in bottom of still. This can be achieved by using nitrogen or air. Begin by hooking up to 1/4" access port on the suction side of compressor. Hook a 3/4" hoses to oil drain on still. Then connect 1/4" hose to liquid trap drain. Apply pressure using nitrogen/air, open drain valves - drain oil into an approved marked container (dispose of lawfully).

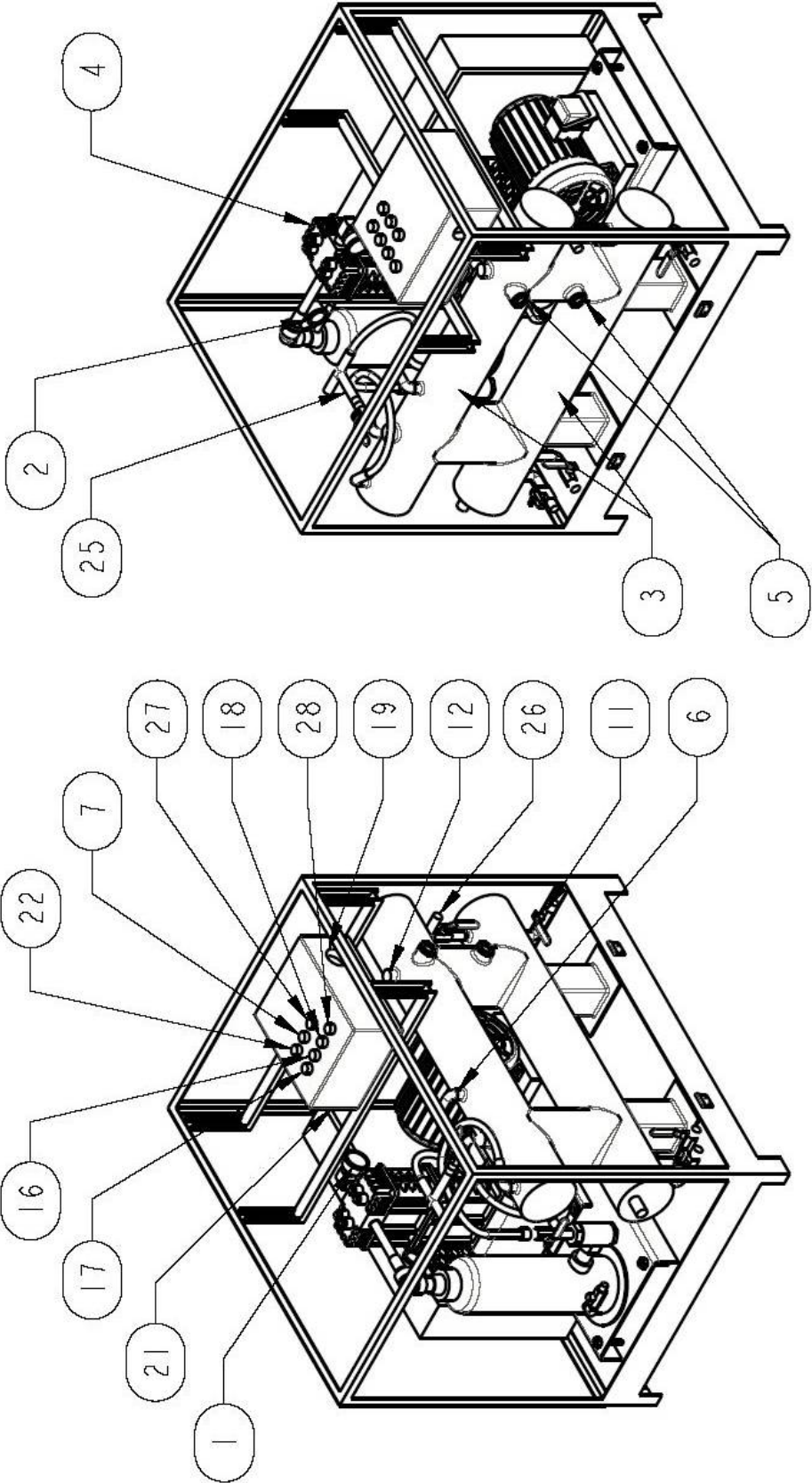
### Compressor Oil

1. Crankcase oil must be changed every one hundred hours of operation along with oil filter.
2. Check oil lever before each use.

## Replacement Parts List

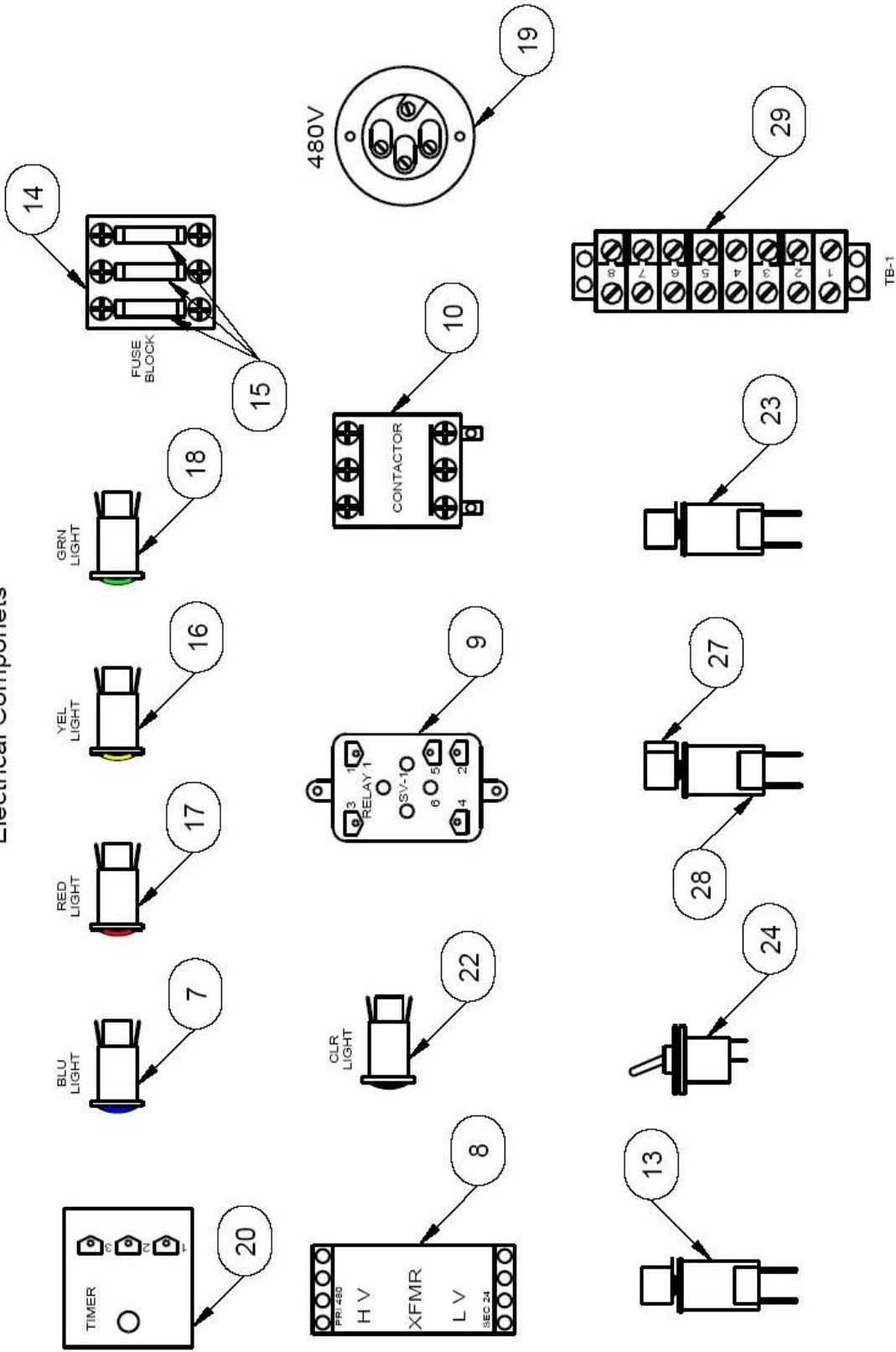
<i>Reference Number</i>	<i>RefTec Part</i>		<i>Manufacturer Description</i>
1	RGA002		Suction Pressure Gauge
2	RGA007H		Discharge Pressure Gauge
3	SANPV006		BULLDOG STILL
4	RCP-D191		D191 Compressor
5	RSG008		1" MPT SIGHT GLASSe
6	RVR300		300PSI BLOW OFF
7	ELT009		BLUE 24V LIGHT
8	XTR850		Transformer multi tap
9	ERY024		24V 12A RELAY
10	EMS006		40AMP 3 POLE CONTACTOR
11	RVA050		3-WAY Evacuation Valve
12	TFS008		STILL FLOAT SWITCH
13	XSW275		Pressure switch
14	EFB001		600V 30A FUSE BLOCK
15	EFS008		600V 20A FUSES
16	ELT006		Yellow 24v Light
17	ELT007		RED 24V LIGHT
18	ELT008		GREEN 24V LIGHT
19	EMI401		Inlet Power Locking Connector
20	ECP392		TIME DELAY RELAY
21	ETC005		Float Interface Connector
22	ELT010		CLEAR 24V LIGHT
23	XSW010		LOW Pressure Switch
24	ESW003		15A TOGGLE SWITCH
25	RPR004		SPR VALVE 1/2"
26	RSV024		24V VALVE
27			Switch
28			Switch

# Primary Components Diagram



# Electrical Components Diagram

Electrical Components



**WARNING!**

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## Troubleshooting Procedures

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If functional difficulties are experienced, refer to the following troubleshooting chart for assistance.

## Troubleshooting Guide

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

**Symptom:** *Describes what is happening*

**Cause:** *Suggests possible source*

**Solution:** *Describes what must be done*

<b>Symptom</b>	<b>Cause</b>	<b>Solution</b>
Unit will not start		1. Check to make sure power is flowing to the unit 2. Make sure, if using a scale, that the tank bypass switch is in the on position 3. If unit is in a vacuum and power is on - unit will not start until it see's positive pressure
Unit stopped during refrigerant transfer		1. High liquid level 2. Liquid trap is full and needs drained



## Manufacturers Limited Warranty

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RefTec 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 RefTec under this limited warranty is limited to the supplying of parts (excluding consumables) as hereinabove specifically provided. Parts shall be new or nearly new.

RefTec shall be liable to replace the applicable parts only if (i) RefTec is properly notified by Purchaser upon discovery of the alleged defects, (ii) defective parts are returned to RefTec upon authorization with all transportation charges prepaid by Purchaser, (iii) RefTec'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 RefTec'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.

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THIS WARRANTY CONSTITUTES THE SOLE AND EXCLUSIVE WARRANTY OF REFTEC WITH RESPECT TO THE EQUIPMENT, THERE ARE NO OTHER WARRANTIES, EXPRESS OR IMPLIED, AND REFTEC 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 REFTEC FOR ANY BREACH OF THE FOREGOING LIMITED WARRANTY SHALL BE TO SEEK REPLACEMENT OF THE AFFECTED PARTS. IN NO EVENT WILL REFTEC'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, REFTEC'S NEGLIGENCE, INFRINGEMENT, STRICT LIABILITY, MISREPRESENTATION AND OTHER TORTS AND CONTRACTUAL CLAIMS. EXCEPT FOR THE EXCLUSIVE REMEDY PROVIDED ABOVE FOR REFTEC'S BREACH OF THIS LIMITED WARRANTY, PURCHASER, FOR ITSELF AND ITS SUCCESSORS AND ASSIGNS, HEREBY WAIVES AND RELEASES REFTEC FROM ANY AND ALL OTHER CLAIMS OR CAUSES OF ACTION THEY HAVE AGAINST REFTEC ON ACCOUNT OF OR ASSOCIATED WITH THE EQUIPMENT PURCHASED HEREUNDER OR FOR REFTEC'S BREACH OF THIS LIMITED WARRANTY. IN NO EVENT SHALL REFTEC 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 REFTEC 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 REFTEC TO PURCHASER.

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**RefTec**  
INTERNATIONAL SYSTEMS LLC

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# MINIPURGE

Low & High Pressure  
Portable Commercial  
Noncondensable Purge Unit

HIGH PERFORMANCE  
PURGE FOR USE ON REFRIGERANTS  
R11, R123, R12, R134, R22, 500, 502, 507



OPERATION MANUAL  
(VERSION 1.3) Single Cylinder Compressor  
103-127V-1Ph, 50/60Hz 0.5Hp Model

RefTec International  
Clearwater, FL

Technical Support  
800-214-4883

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## SPECIFICATIONS

### Electrical Power Requirements:

#### Purge unit Main Components & Controls

- 103-127 VAC, 60 Hz, 1-Phase, 15-Amperes  
MIN CKT AMP 10.0, MAX FUSE 15 AMPS
- 200-240 VAC, 50/60 Hz, 1- Phase, 5-amperes  
MIN CKT AMP 5.0, MAX FUSE 15 AMPS

#### Dimensions (approximate)

- 18" length x 10" wide x 14" high

#### Weight

- 65-lbs. (75-lbs. shipping)

## OPTIONAL ACCESSORIES

- 30-lb. & 50-lb. Recovery Tanks
- 5' x 1/4" Red SealRight Tank Hoses
- 5' x 3/8" Red SealRight Tank Hoses

REV. DATE (05/03)  
MINIPURGE 05/03

### Notice

RefTec International, Inc. urges that all HVAC service personnel 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!

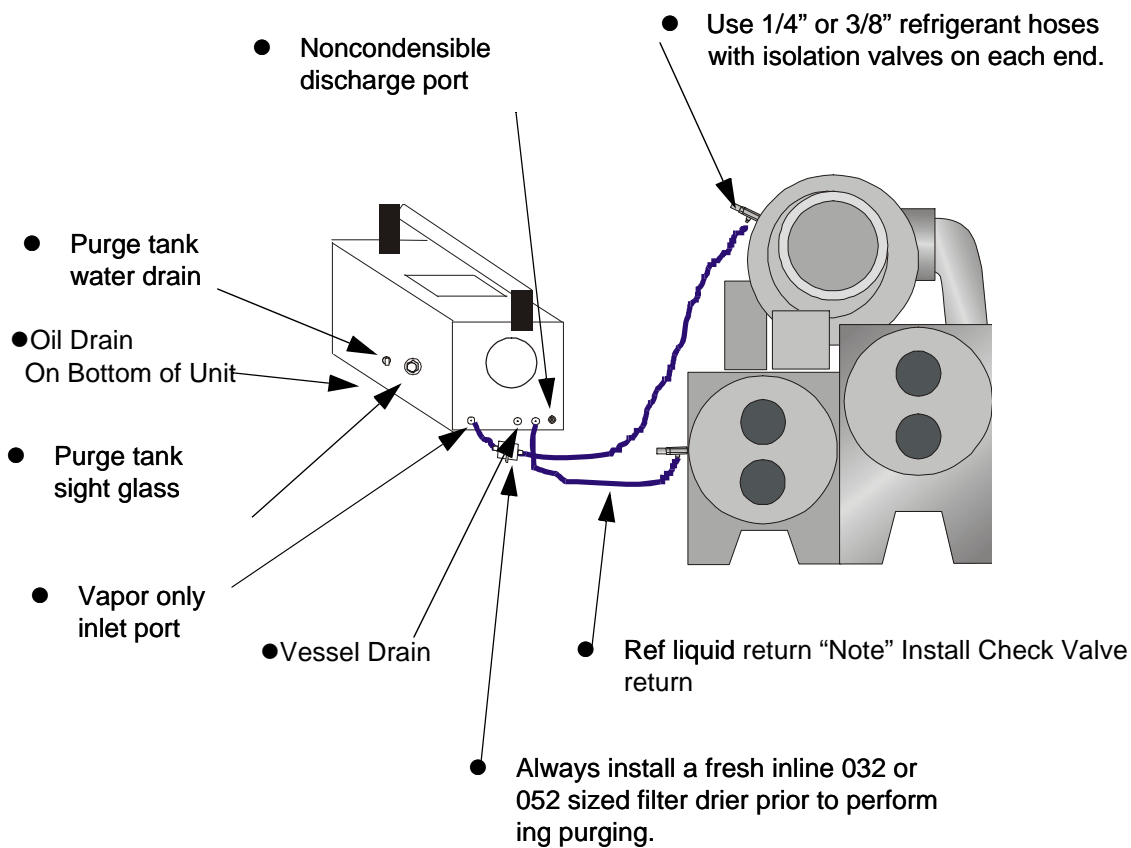
To avoid injury or death due to inhalation of, or skin exposure to refrigerant, closely follow all safety procedures described in the Material Safety Data Sheet for the refrigerant and to all labels on refrigerant containers. Certain procedures common to refrigeration system service may expose personnel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

# Recommended Equipment & Practices for Peak Performance

MiniPurge performs:

- ☑ Noncondensable purging of most high & low pressure refrigerants.
- ☑ Direct hook up to stationary tanks.
- ☑ Direct hook up to operating or idle systems.
- ☑ Calculates discharge rates.
- ☑ Changes between refrigerants easily.

- Always connect a three prong power cord to a 1-Phase power source and that power cord and power source are properly sized for load.



# System Overview

The MiniPurge purge unit is designed to be used as a portable accessory for new or existing low pressure or high pressure A/C systems, centrifugal chillers, high pressure chillers and storage tanks. Whether noncondensibles (air, water vapor, etc.) are drawn into the chiller through small leaks in the subatmospheric pressure areas of the chiller, or introduced in service procedures on most high pressure refrigerants, they must be removed for maximum efficiency of the system in which they are used. Operation of the MiniPurge unit efficiently removes and separates noncondensibles from the condensable refrigerant and releases dry noncondensibles back into the atmosphere. In addition, a (furnished) supplementary inlet filter drier removes moisture, acid and other debris before they enter the purge unit separation vessel.

## Noncondensable Collection

Contaminated refrigerant vapor passes through a filter drier via a 3/8" refrigerant hose, through the inlet of the purge, to an internal pressure regulator, then into an hermetic compressor where it is then compressed, sent through an oil separator, into an air cooled condenser where it is condensed and sent to a purge chamber separation vessel. The liquid refrigerant begins to collect in the bottom of the purge vessel. As the liquid level starts to form at the bottom of the purge vessel, an electric prism liquid switch monitors the level of the refrigerant being condensed in the purge vessel. When the level of condensed liquid reaches the liquid switch, a signal from the switch is sent to the processor, causing a normally-closed liquid return solenoid valve, SV-1, to open, allowing the higher pressurized liquid to be returned via a 3/8" or 1/4" refrigerant hose to the evaporator of the chiller or into a storage tank. Having this liquid seal developed in the bottom of the vessel guarantees separation will occur and prevents noncondensibles from returning to the chiller.

As the condensable refrigerant vapor liquefies and leaves the purge vessel, any noncondensable gasses (air, etc.) that have entered the vessel are left behind and thus trapped in the vessel.

The microprocessor will monitor the proportions and amounts of noncondensibles versus pure refrigerant using the Laws of Partial Pressures and Perfect Gas Laws to calculate the amount of noncondensibles and the minuscule amount of refrigerant being discharged. When the purge vessel is essentially full of noncondensibles, a normally-closed solenoid valve, SV-2, is energized and a noncondensable purge pumped occurs.

## Purge Discharge

During the purge discharge cycle, solenoid valve SV-2 is opened and the noncondensibles are released out of the vessel at a controlled and cyclical rate of flow. Flow control is necessary to prevent any remaining liquid refrigerant from "flashing" back into a gaseous vapor. Once out of the vessel, the noncondensibles are released through a vent to the outside atmosphere.

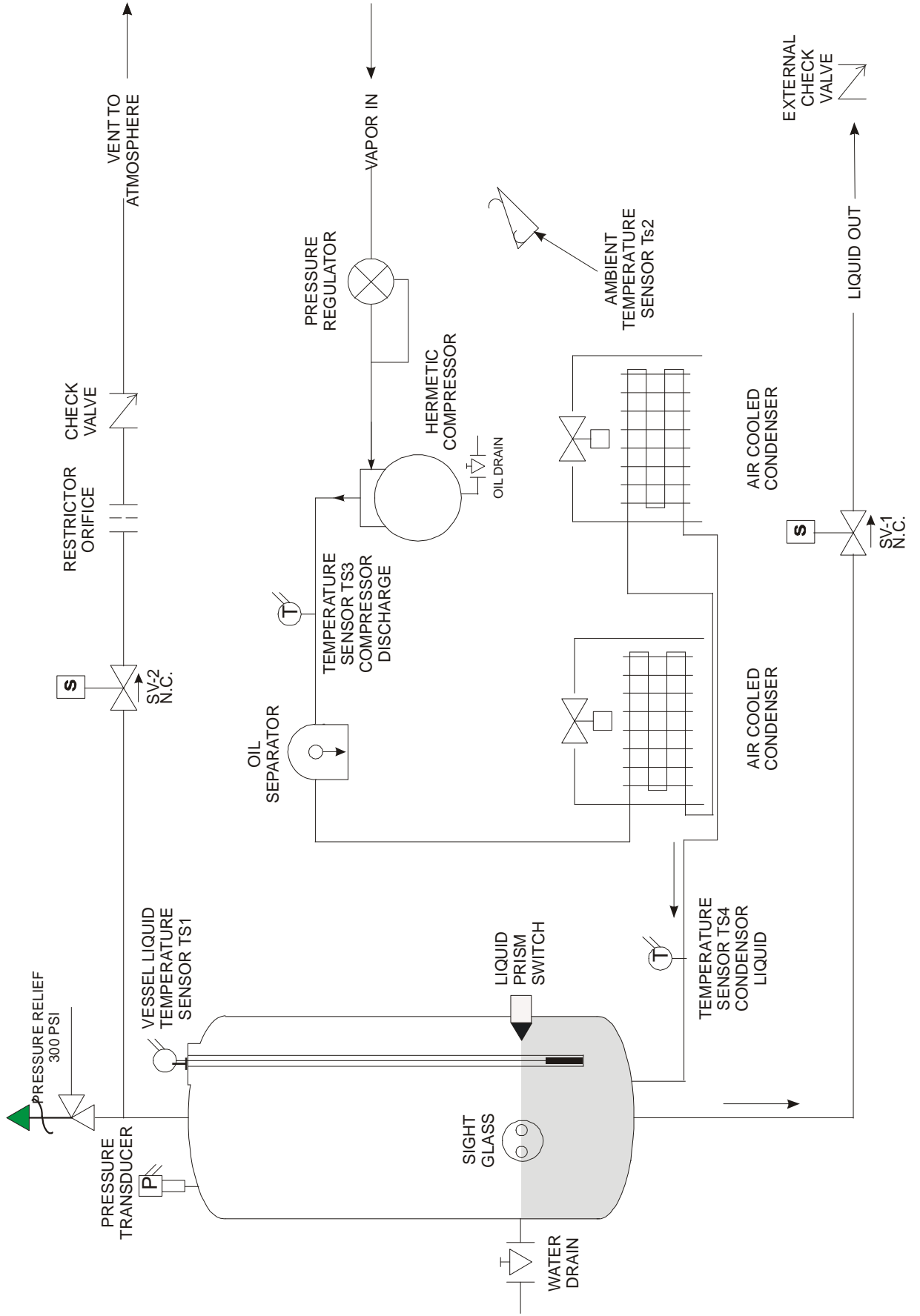
When a predetermined pressure in the vessel has been reached, based on Perfect Gas Laws for the specific refrigerant being separated from noncondensibles, purge discharge will stop and solenoid valve SV-2 will be de energized.

## Compressor Maintenance

Change compressor oil to match the refrigerant oil, so that a cross contamination does not occur. Change oil after every 10 hours of use.

To change oil pressurize unit with nitrogen to 5psi on the inlet port and drain oil through oil drain port. To add oil pull vacuum on inlet port and then add 14oz new oil.

# MINPURGE P&ID



# Operating Procedures

- A) Plug in MiniPurge unit.
- B) Connect refrigerant hoses as shown on next page:
- 1) To tank or system condenser or vapor port
  - 2) To tank or system evaporator or liquid port
  - 3) Install in-line drier to vapor side hose and then connect to the "VAPOR ONLY" inlet port of the MiniPurge
  - 4) Connect check valve & liquid hose to the "LIQUID" outlet port on MiniPurge

C) Start-up Procedures:

- 1) MiniPurge display should read  
**REFTEC INTERNATIONAL HIGH PERFORMANCE PORTABLE MINI PURGE**
- 2) Press the ON key.
- 3) Next display should read  
**SELECT: 1 = RUN 2 = RUN PARAMETERS  
3 = SELECT REFRIGERANT**
- 4) Select "3" - the display should read  
**SELECT REFRIGERANT WITH hi KEYS  
Rxxx THEN PRESS ENTER KEY**  
press "ENTER" after selection.
- 5) Next display should read  
**SELECTED REFRIGERANT Rxxx  
IS THIS CORRECT? ENTER = YES,  
CANC = NO**  
press "ENTER" if correct or "CANCEL" to re-select refrigerant.
- 6) Next display should read  
**CLEAR CURRENT DISCHARGE? 00.000 lbs  
1 = YES 2= NO**  
press "1" to clear accumulated discharge or press "2" or "Enter" to continue without clearing.
- 7) Next display should read  
**CLEAR PURGE COUNT AND PURGE TIME?  
1 = YES 2= NO**  
press "1" to clear accumulated count and time or press "2" or "Enter" to continue without clearing display returns to main select menu.

D) Procedures for **SERVICE MODE - SETUP PURGE TIME, RUN TIME, ETC.**

- 8) Next display should read  
**SELECT: 1 = RUN 2 = RUN PARAMETERS  
3 = SELECT REFRIGERANT**

- 9) Select "2" the display should read  
**ENTER NEW VALUE PURGE TIME  
(MINUTES) =**  
press "ENTER" after selection

(Note: this value is maximum continuous purge pumpout value and is in minutes). Factory default time is set to 4 minutes; can be adjusted to a maximum of 24 minutes.

- 10) Next display should read  
**ENTER NEW VALUE  
RUN TIME (HOURS) =**

press "ENTER" after selection. (Note: this value is maximum continuous purge unit run time and is set in hours). Factory default time is set to 4 hours; can be adjusted to a maximum of 24 hours.

- 11) Next display should read  
**REVIEW ENTRIES?  
1 = YES 2 = NO**

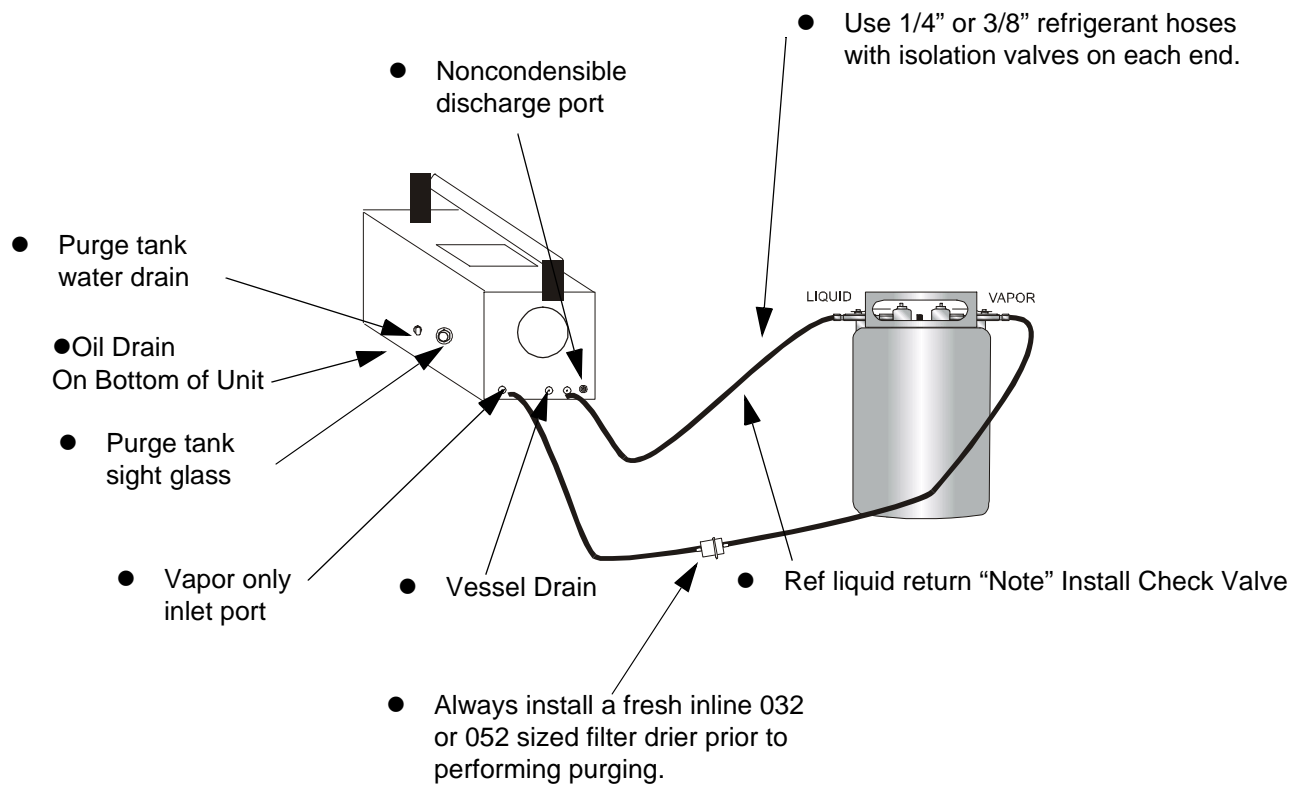
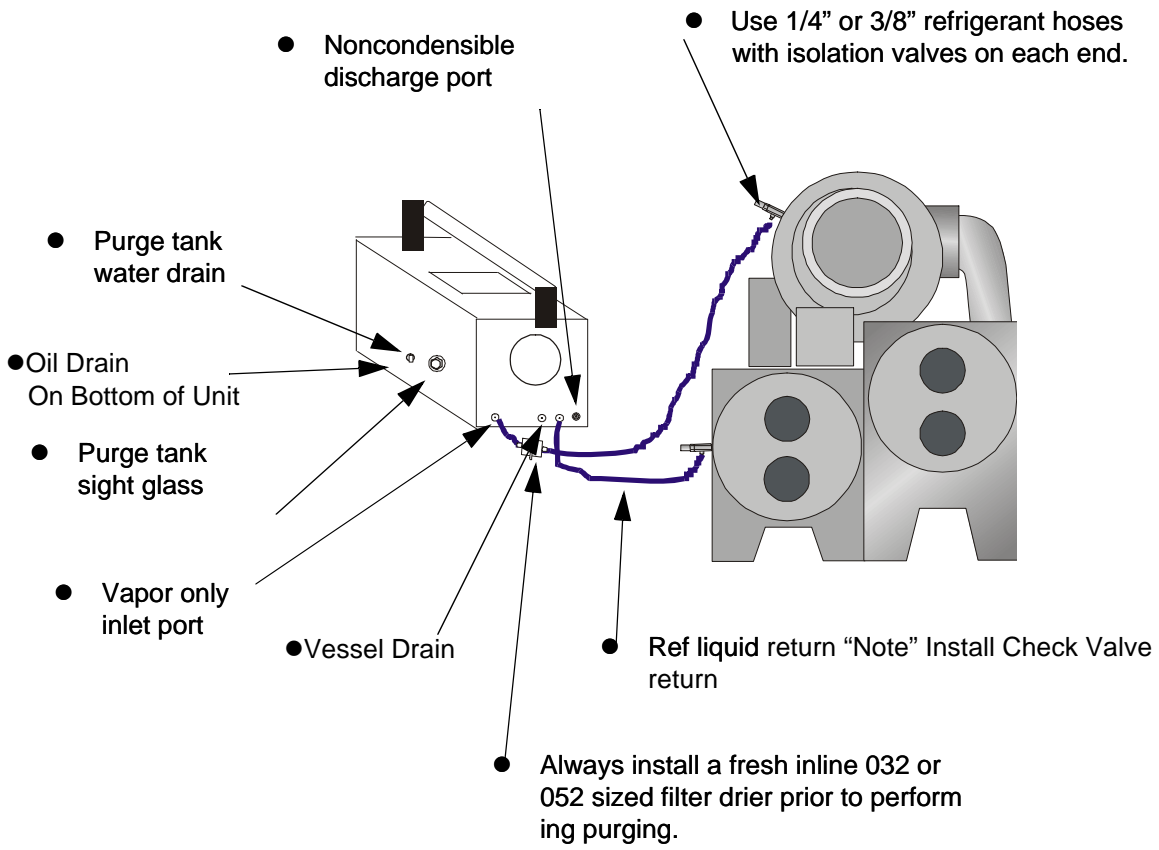
press "ENTER" or "2" if complete. The screen returns to main select menu.

- 12) Next display should read  
**SELECT: 1 = RUN 2 = RUN PARAMETERS  
3 = SELECT REFRIGERANT**

- 13) Select "2" and the MiniPurge starts running and displaying several scrolled values as follows:  
**PURGE COUNT  
PURGE TIME (MINUTES)  
PURGE DISCHARGE RATE (IN POUNDS)  
CONDENSOR OUTLET TEMPERATURE  
AMBIENT TEMPERATURE  
COMPRESSOR DISCHARGE TEMP  
VESSEL LIQUID TEMPERATURE  
PURGE TANK PRESSURE  
RUN TIME REMAINING**

- 14) Once unit begins to run, open both the vapor and liquid ports on tank or system. MiniPurge will run continuously and remove Noncondensibles indefinitely until either the maximum run time has elapsed or until user shuts unit off. When unit shuts down, unit displays "compressor pumpdown in process" while scrolling monitored values. During the pump-down process, close inlet valve to purge unit. Once purge unit has completely stopped running, close liquid port and disconnect hoses.

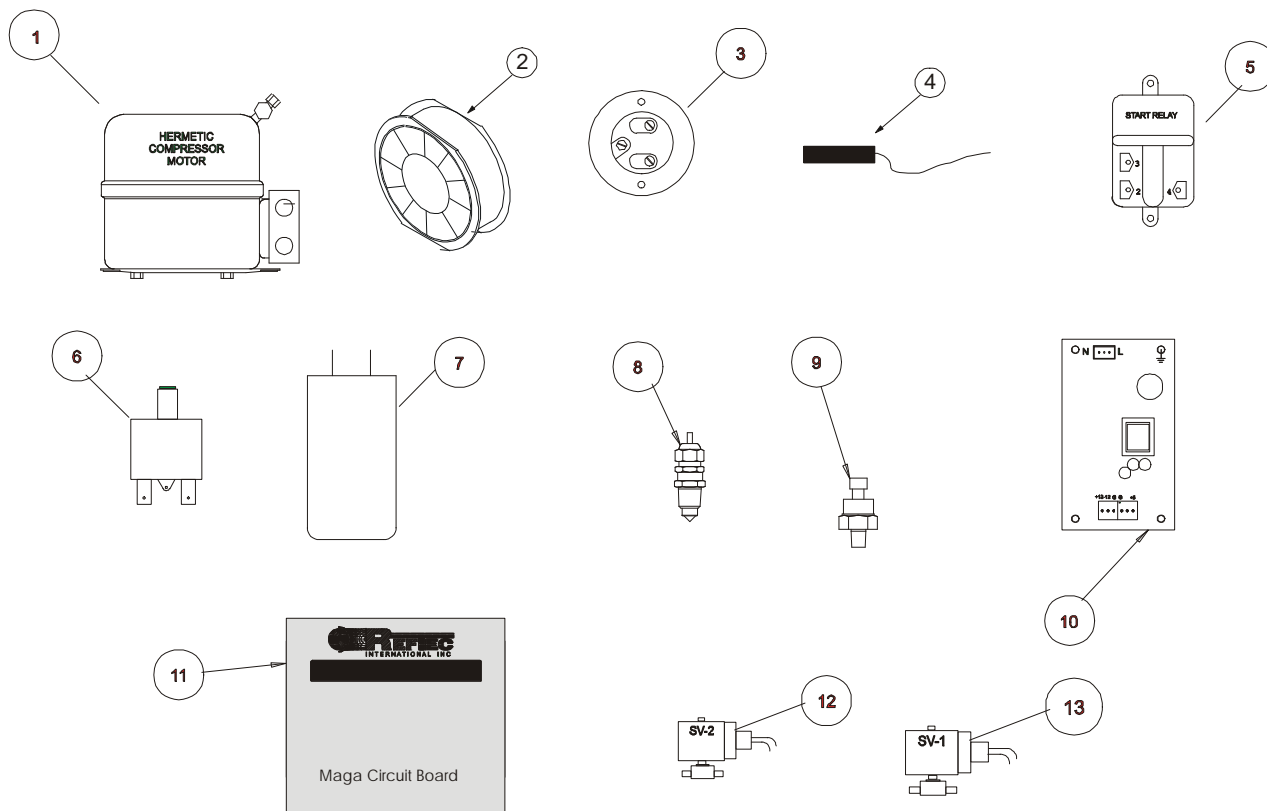
# HOSE CONNECTIONS



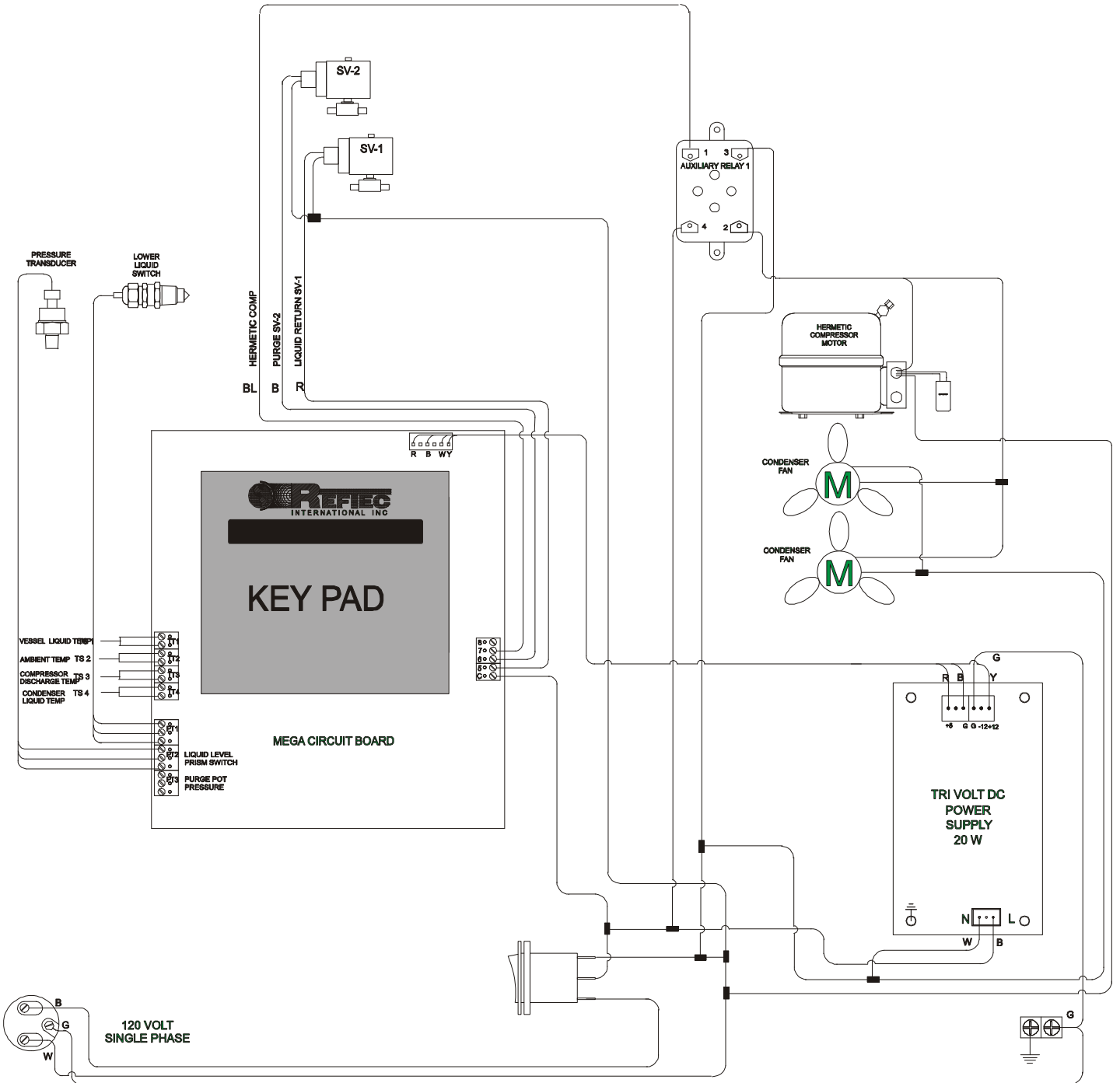


# ELECTRICAL PARTS BREAKDOWN

	Part Description	MPS-115 Part #	Part Description	MPS-240 Part #
1	Compressor Motor -.5 HP,115 VAC, 60 Hz, 1Ph 1725 RPM 9.5/8.5 FLA.	RCP927	Compressor Motor -.5 HP,200-240 VAC, 50/60 Hz, 1Ph 2975/3450 RPM 3.1-2.6 FLA.	RCP928
2	Condenser Fan Motor 36W, 115V, 60 Hz.	EMO136	Condenser Fan Motor 35W, 230V, 50/60 Hz	EMO035
3	Male Inlet - 15A,125V, 2 P, 3W GRD.	EMI115	Male Inlet - 15A,250V, 2 P, 3W GRD.	EMI461
4	Temp Sensor	XTS320	Temp Sensor	XTS320
5	Start Relay 120 VAC.	ERY120	Start Relay 230 VAC.	ERY122
6	Circuit Breakers- 15 Amp, 250 VAC,28 VDC.	EBR115	Circuit Breakers- 15 Amp, 250 VAC,28 VDC.	EBR115
7	Start Capacitor 110 VAC, 50/60 Hz 233-280 Mfd.	ECP108	Start Capacitor 110 VAC, 50/60 Hz 233-280 Mfd.	ECP108
8	Liquid Switch - 30 in.lb. Torque	RSL006	Liquid Switch - 30 in.lb. Torque	RSL006
9	Pressure Transducer	XPT287	Pressure Transducer	XPT287
10	Power Supply - 20W, 115V, 1A / 230V, 0.6A	XPS200	Power Supply - 20W, 115V, 1A / 230V, 0.6A	XPS200
11	CPU Mother Board Assembly	XPC800	Mega Board Assembly	XPC800
12	Solenoid Valve 120V 50/60 Hz 1/4"	RSV112	Solenoid Valve 120V 50/60 Hz 1/4"	RSV113
13	Solenoid Valve 120V 50/60 Hz 3/8"	RSV119	Solenoid Valve 120V 50/60 Hz 3/8"	RSV240

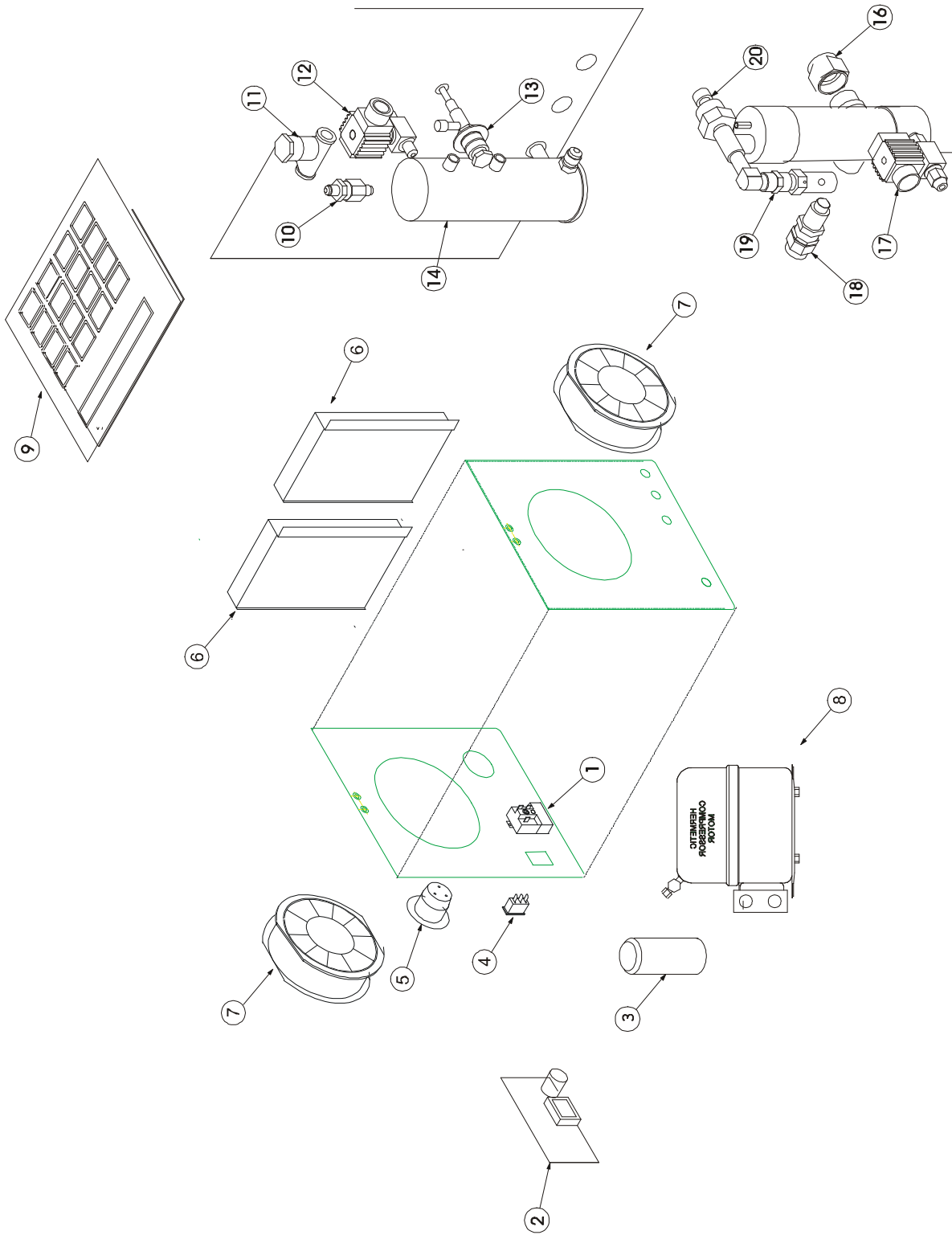


# MINIPURGE BLOCK WIRING DIAGRAM



## SPARE PARTS LIST

<u>No.</u>	<u>Part No.</u> <b>MPS-115</b>	<u>Part No.</u> <b>MPS-240</b>	<u>Item Description</u>
1	ERY120	ERY121	START RELAY
2	XPS200	XPS200	POWER SUPPLY
3	ECP108	ECP108	START CAP 233-280MFD
4	EBR115	EBR115	15 AMP BREAKER
5	EMI115	EMI250	POWER CABLE MALE INLET
6	RCC019	RCC019	9.00 x 6.00 CONDENSOR COIL
7	EMO136	EMO0035	CONDENSOR FAN MOTOR 36W 115VAC
8	RCP927	RCP928	1/2 HP COMPRESSOR
9	XPC800	XPC800	MEGA BOARD
10	RVC002	RVC002	PURGE DISCHARGE CHECK VALVE
11	RVC003	RVC003	OUTLET CHECK VALVE
12	RSV112	RSV113	PUMPOUT SOLENOID VALVE
13	RVX203	RVX203	EXPANSION VALVE
14	MPV013	MPV013	VESSEL
15	XTS320	XTS320	TEMPERATURE SENSOR
16	RSG016	RSG016	SIGHTGLASS
17	RSV119	RSV240	LIQUID RETURN SOLENOID VALVE
18	RSL004	RSL004	LIQUID LEVEL SENSOR
19	RVR300	RVR300	PRESSURE RELIEF VALVE
20	XPT287	XPT287	PRESSURE TRANSDUCER



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# MiniPurge

*“Put an End to  
Slow & Inefficient  
Noncondensable Purging!”*

