



Ref Tec
INTERNATIONAL SYSTEMS LLC

ENVIRO PURGE HP™

PORTABLE HIGH PERFORMANCE
PURGE FOR USE ON R11,113,114,123
MEDIUM & LOW PRESSURE
REFRIGERANTS



OPERATION MANUAL

(VERSION 4.0)
2.0 HP 220VAC 50HZ

******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:

208-220 VAC, 50 Hz., 1-Phase, 20 Amperes

Operating Environment:

32° F to 120° F; 5% to 95% relative humidity, noncondensing.

Storage Environment:

-40° F to 150° F; 5% to 95% RH, noncondensing.

REV DATE (12/17/07)

HPLP-1-20-99

Portable Cart On Pneumatic Tires

Dimensions (Approximate):

45" high x 24" wide x 32" deep.

Weight:

240 pounds (shipping: 440 pounds).

Notice

RefTec International Systems LLC. 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.

WARNING!!

When the purge unit is used to control a machine or process where personal injury or equipment damage might occur as a result of a failure of any electric or other timer function, the user is urgently recommended to insist on installation of safeguards which would protect the operator and/or machine in the event of any unexpected operation of the machine or process.

APPLICATION

The **EnviroPurge HP™** purge unit is designed to be used as a portable accessory for new or existing chiller units and storage tanks. Non-condensibles (air, water vapor, etc.) which are drawn into the chiller through small leaks in the subatmospheric pressure areas of the chiller, or introduced in service procedures, generally accumulate in the chiller condenser. This accumulation decreases the overall efficiency of the chiller. Operation of the Portable EnviroPurge HP™ purge unit efficiently removes and separates noncondensibles from the chiller's condensible 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.

The EnviroPurge HP™ purge unit only needs to be connected to a **30-amp power source or receptacle** of 220-volt AC. This condition requires the user to verify the amount of load (volts and amperes) that may be safely connected to a circuit breaker, safety disconnect or receptacle for the purge unit to operate safely.

It is very important that all aspects of the operation and use be thoroughly studied and that appropriate tools be on hand before beginning to connect and operate the portable purge unit.

Furnished with each unit are:

- Portable Cart
- Liquid return drier
- Filter drier & cores
- Sight glass
- One 20' 1/2"
- One 25' 220 VAC cord
- One 20' 3/8" Hose

The installer may need to only provide (as noted in text):

- Hose adapters
- Wrenches and hand tools

Operation Preparation

Uncrate the portable purge unit and inspect for visible damage or indications of rough handling. Do not attempt to operate an obviously damaged unit. Set aside the furnished loose-ship parts for later use. The purge unit, being very heavy, is best safely handled with the assistance of two people. Refer to Figure 1 for typical location for use.

NOTE: Best locations for the portable purge unit are as close to the chiller as possible and with shortest refrigerant hoses as possible. This will help the overall performance of the purge unit.

Refrigerant Hose Connections

Connect the liquid return refrigerant hose as shown in **Figure 1**. Install a 3/8" or 1/4" refrigerant hose from the portable purge liquid return isolation valve and the other end to chiller evaporator 3/8" or 1/4" isolation valve.

Connect the supplied vapor inlet refrigerant hose as shown in **Figure 1**. Connect furnished 1/2" refrigerant hose from the portable purge vapor inlet isolation valve and the other end to chiller condensor isolation valve.

IMPORTANT: Ensure that there are no liquid traps in the refrigerant hose connected from the chiller condensor to the portable purge vapor inlet port. Condensed liquid must flow back to the chiller barrel by gravity. If liquid enters the portable purge unit vapor inlet this may cause damage to the purge compressor. When possible connect a refrigerant hose

from the purge unit noncondensable discharge line to an outdoor vent line.

Filter-Drier Installation Refer to **Figure 1**. Remove the filter-drier cover bolts and install the furnished cores after all refrigerant piping is complete. Do not remove the core element from its moisture-proof container until ready to install. This prevents premature saturation from the ambient air. Ensure that the filter drier cover gasket is properly positioned, cover bolts are torqued from **14 to 16 ft-lbs**, and that the cover drain port is in the lowest possible position.

Final Preparation

Open the purge isolation valves and isolation valves on the chiller. Check both the chiller and purge unit and hose connections for leaks. Do not proceed until all leaks are repaired.

Purge Unit Wiring Connections

Connect furnished 25' water resistant SOW flexible portable cable from the purge control panel to a 220 VAC power supply or receptacle. Circuit must be a 30-amp minimum feed, 30-amp maximum time-delay fuse circuit.

The **2-ampere, 220-volt AC** fault output relay may be connected from the purge unit control panel terminals on terminal block **TB1- 7 & 8** to either the chiller or some type of alarm circuit, if desired, as shown in **Figures 3 & 4**. See the electrical specifications on page 12 for the load ratings of this solid-state relay.

Quick Purge Start-up

Turn the power supply "on" to the purge unit, open the isolation valves and press the "ON" button on the operator keypad. Select 2 for PARAMETERS then enter password 406 and select type of refrigerant being processed, then select 1 for normal automatic running mode.

Watch the sight glass and make sure that liquid refrigerant begins to freely flow back to the chiller (this may take a few minutes).

Note: You will also see liquid in the purge tank.

The purge unit may perform several long purge cycles. This depends on how much noncondensable vapor or gas is in the chiller and purge unit following refrigerant hose connections. This is considered normal.

The maximum purge time is factory set at 4 minutes per pumpout cycle, but if 4 minutes is exceeded, the purge unit will go into a FAULT. To reset a FAULT, select OFF, then ON, and then reselect RUN mode to continue operations.

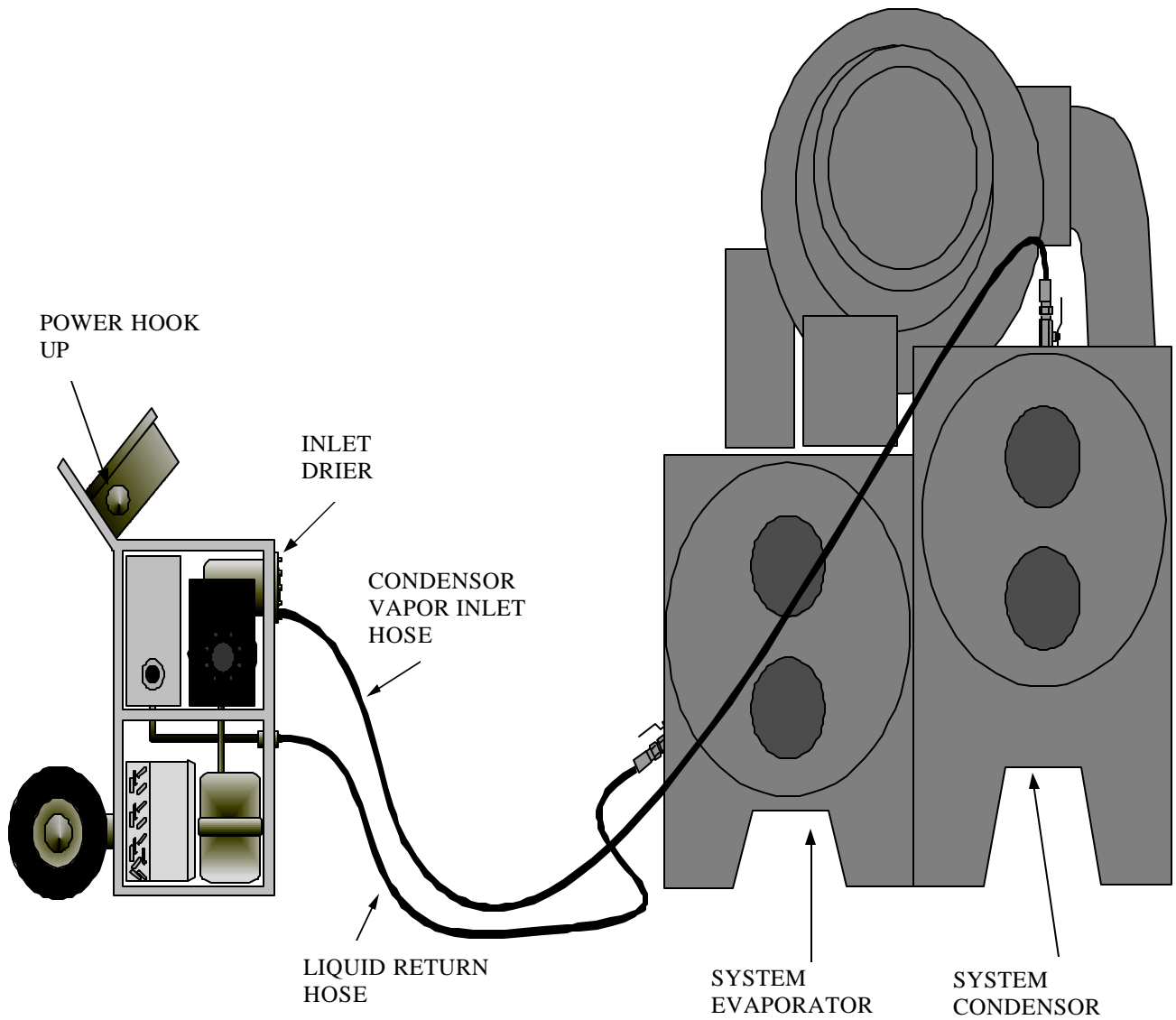
To avoid continuously resetting faults, the maximum purge time can be adjusted from 1 to 24 minutes using **CHANGE PARAMETERS** mode. Select "OFF", then "ON", and then "**CHANGE PARAMETERS**" mode to reset the default for PURGE MAXIMUM time to a value between 01 and 24 minutes. See page 9 **Mode Selection** and page 10 **CHANGE PARAMETERS Mode** for more information on entering **CHANGE PARAMETERS** mode and changing operating and safety parameters.

Refer to pages 18 and 19 at the back of this manual for diagrams of keypad and display actions for quick, easy start-up procedures. CHANGE PARAMETERS mode adjustments are also included.

PURGE UNIT PROCESSING SYSTEM

A purge system is desirable and necessary for removing acid, moisture, noncondensibles and other debris that may leak into or be present in a chiller system. Portions of certain chiller systems frequently operate at below atmospheric pressures (vacuum) and intrusion of noncondensibles often happens during service procedures. When leaks are present, contaminants enter the chiller, migrate to, and finally collect in, low turbulence areas of the chiller condenser. When these contaminants are present, the operating efficiency of the chiller is diminished. Also, damage can occur to chiller components caused by the presence

FIGURE 1
PURGE TO CHILLER CONNECTIONS
&
DRIER ASSEMBLIES



of moisture-activated acids.

The **RefTec International, Inc. Portable Enviro-Purge HP™** thermal-pressure purge unit is specifically configured to remove these noncondensable contaminants both efficiently and very rapidly. Refer to **Figure 2** for the following explanation of the methods used to

IMPORTANT!

When the pumpout cycles are less than 4 minutes long, select OFF, then ON, and then CHANGE PARAMETERS mode to reset the default for PURGE MAXIMUM to 02 minutes

accomplish this task.

Noncondensable Collection

Hot, gaseous, higher pressure, contaminated chiller refrigerant vapor passes through an isolation valve, 1/2" refrigerant hose, 1/2" isolation valve on the inlet of the purge, a double core filter drier, heated accumulator, pressure regulator, then into a 2 HP open drive air cooled compressor where it is then compressed, sent through a heated oil separator, check valve, upstream regulator and forced into the purge separation vessel. As the vapor passes through the filter drier, moisture, acid and debris are trapped in the replaceable-core elements.

Once inside the purge vessel, the now dry, clean vapors are flooded across a constant 40°F - 60°F, R-134a evaporator coil. The vapor now begins to condense, liquify and collect in the bottom of the purge vessel.

As the liquid level starts to form at the bottom of the purge vessel, a float liquid switch monitors the level of the refrigerant being condensed in the purge vessel. When the level of condensed liquid reaches the float 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 hot, gaseous, condensable refrigerant vapor liquifies 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 pumpout 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.

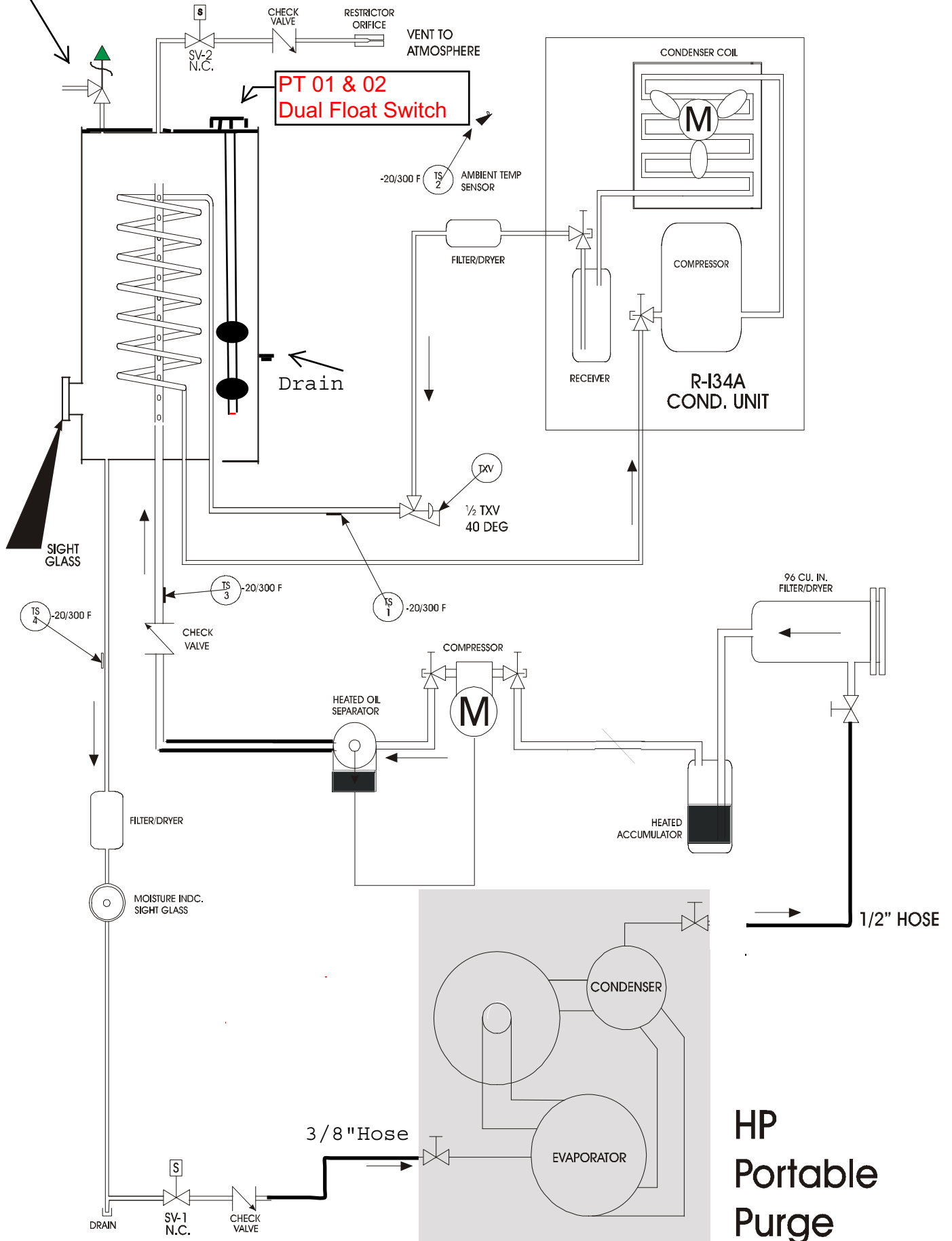
When a predetermined pressure in the vessel has been reached, based on Ideal Perfect Gas Laws for the specific refrigerant being separated from noncondensibles, purge discharge will stop and solenoid valve SV-2 will be deenergized.

R-134a System Refrigeration Controls

An R-134a liquid receiver is included in the RefTec International, Inc. Portable EnviroPurge HP™ purge unit to enable full efficiency of operation of compressor loading levels.

Pressure Relief 300 Psi

FIGURE 2 PROCESS & IDENTIFICATION DRAWING



An automatic thermal expansion valve is used to maintain the optimum vapor condensing temperature needed in the purge vessel's evaporator for high speed processing of the chillers refrigerant.

Chiller Interface Controls

A safety liquid prism switch located half way up the purge vessel, is to ensure that the purge vessel will not over-fill and purge raw refrigerant to the atmosphere. In addition, should pressure in purge vessel reach too high of a pressure, a mechanical pressure relief valve will release and the microprocessor will shut system down.

EnviroPurge HP™ Unit Electronic Controls

The operator interface module includes an LED backlit liquid crystal display (LCD) that contains two separate lines of 40 characters for displaying messages and status of the purger.

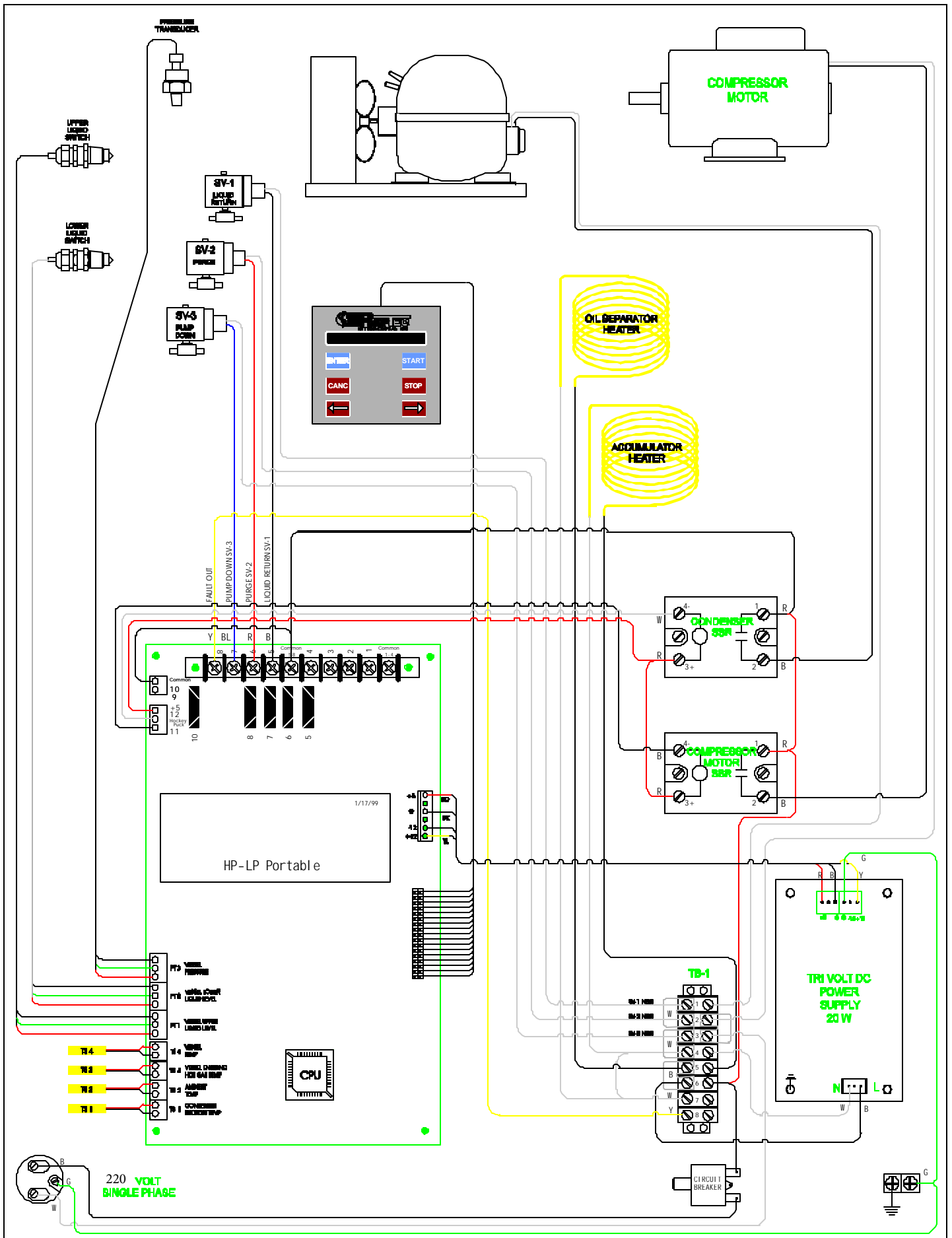
NOTE: There are no user serviceable nor adjustable items located inside the electrical control panel (**Figure 3**).

Microprocessor Control System Introduction

Several timers, event logs, alarm and operating set point logs, together with four temperature sensors, are continuously monitored, and depending on the operating mode selected, will cause the purger to operate as previously described.

A special nonvolatile "battery-free" memory device internally stores all operating data from both the purger and the chiller. This means that a loss of power will not destroy the accumulated times, dates, events and historical data, operator-entered selections or set point values that are necessary for customized operation.

FIGURE 3 CONTROL PANEL ELECTRICAL BLOCK DIAGRAM



PURGE UNIT OPERATIONS

Mode Selection

Mode selection for the purge unit operation is done at the keypad immediately after the unit is turned "ON". Modes of operation include RUN and CHANGE PARAMETERS. CHANGE PARAMETERS mode allows operation set points to be adjusted for RUN operation. Each is described under separate sections of this manual.

Mode selection into the RUN (or OFF) modes can be performed at any time from the keypad. To initially set up and enter the CHANGE PARAMETERS mode or change the set point value selections, a password is required to be entered. When the purger is turned ON, the display shows 1 = RUN and 2 = CHANGE PARAMETERS. If 2 is selected, the password: 4-0-6-ENTER will have to be entered. If the password is incorrect or not entered, the purger will return to the main display.

Power-up Mode and Display

When power is applied to the purger, the display backlight turns on and the screen indicates "**REFTEC INTERNATIONAL, INC. HIGH PERF PORTABLE LOW PRESSURE PURGE**". This means that the first level of diagnostic internal tests have been passed. When the ON key is pressed, the operator is prompted to enter either a 1 for RUN mode or 2 for CHANGE PARAMETERS (set point adjustment) mode. When a mode is selected, the controller verifies that all of its systems and temperatures are okay and begins operation.

Note: If the purger has just been shut down for some reason, a restart delay timer will postpone actual compressor starting for 3 minutes. This will allow the R-134a unit condenser compressor and the 2 HP open drive compressor pressures to equalize, preventing a "hard" start from occurring! A restart message will be displayed during this time period. In addition, any time the

purge unit is shut off for any reason other than a power failure, an automatic pumpdown will occur, provided that the chiller condenser isolation valve is closed or optional SV-3 has been installed on condenser. Also note that if power is interrupted to the purger after it has been running, it will automatically go back to main screen.

Run Mode

When in the RUN mode (Sleep mode = OFF), the purger will operate if the ambient temperature is above 32°F or below 120°F. If "Sleep mode" has already been enabled through a prior CHANGE PARAMETERS mode operation, the purge unit will operate under the SLEEP mode conditions.

RUN mode is designed for normal chiller operating conditions. The purge unit will operate to eliminate all noncondensibles, moisture and acid on a continuous or intermittent processing basis, depending on "SLEEP" setting.

To prevent the purger from accidentally being left in this mode for long periods of time, a four (4) hour (default value) timer will shut the purger off and requires reselecting MANUAL mode to reset the timer. The four (4) hour timer may be adjusted within CHANGE PARAMETERS mode to values between one and twenty-four (1-24) hours as desired.

A feature of all modes is that one or more, manual, continuous pumpouts can be requested. Manual pumpouts are limited to 15 minutes in length, but may be reselected and repeated again and again if needed. This feature is available by pressing ENTER. When the 1=PURGE ON and 2=PURGE OFF appears, select 1 to initiate a 15 minute purge pumpout. Anytime that 2 is selected, during or after a pumpout, the purger returns to normal operations.

Change Parameters Mode

WARNING!!

Operating in the manual pumpout mode can cause a "false" purge to be initiated. During this condition, liquid chiller refrigerant can be released to the atmosphere through the purge pumpout system. Ensure that the purger is closely monitored whenever operating in the manual pumpout mode.

This customizable mode affects the monitoring of several operating parameters of the purger and enables adjustment of several operating set points. These adjustments allow the purge unit to be customized for operations around specific chiller, operating or system needs.

The six values that may be adjusted include:

- 1). Purge Pumpout Maximum Time
- 2). Manual Mode Maximum Running Time
- 3).
- 4). Pumpout Cycle Optimizer On/Off
- 5). Select Refrigerant
- 6). Clear Discharge

NOTE: Optimizer use is not recommended when chiller leak rate is high; long pumpouts could cause unnecessary faults.

The value ranges for settings are as follows:

ITEM	DEFAULT	LOW	HIGH	UNIT
Purge	04	01	24 min.	
Manual	04	01	24 hour	

Event Logs and Reports

Although much of the data needed for operations monitoring is scrolled continuously on the top line of the LCD screen, historical averages of pumpout intervals and set point values are stored for analysis or reference in making judgment about set point revisions or changing chiller conditions.

To request reports of historical data, initiate the REPORT mode by pressing the **DECIMAL** key. The data will begin scrolling on line #2 of the display. The REPORT mode may be canceled at any time by pressing the **CANC.** key.

Available reports include:

- PUMPOUT AVG.: LAST 30 DAYS
- PUMPOUT AVG.: LAST 7 DAYS
- PUMPOUT AVG.: LAST 24 HOURS
- PUMPOUT AVG.: LAST 4 HOURS
- PUMPOUT CYCLE COUNT TOTAL
- PUMPOUT TIME TOTAL
- MANUAL MODE RUN TIME PER LAST 30 DAYS

Since all historical log data is based on cumulative sets of timed events—not a particular day and since computations are stored in a nonvolatile memory device, the necessary trend data will still be retained

following a power loss. Operations in the MANUAL PUMPOUT Mode are also included in the pumpout averages, so some values may have to be taken into consideration following periods of lengthy manual pumpout operations.

Alarms and Trouble Indications

Abnormal conditions are immediately reported on the lower display line. This report will indicate both the nature and the value of the trouble condition, as well as the current purger operations status. Some trouble conditions will temporarily stop the purger, but it will restart when they are cleared. Cleared trouble conditions disappear from the display.

Alarm conditions, determined by the software to be critical to safe or proper operations, will shut down the purger condensing unit, compressor and deenergize the SV-1, SV-2 and SV-3 solenoid valves. The user fault output will energize. This is reset by pressing the OFF key.

Simultaneous alarm or trouble conditions will display only the first condition received. Once cleared, the next condition received will be displayed.

General Operations and Displays

During normal operation, the display's top line continuously scrolls several system temperatures, the current total pumpout time and cycle count. This enables maintenance personnel to make a hands-free log of the operating mode, purger status, and purge rates while making regular rounds of the equipment room. The scrolling values of temperatures can be stopped on any one value with the touch of the "ON" key for times when a certain value needs to be watched.

The display will then stop scrolling the other values and update the selected value every three seconds until the "ON" key is again pressed. The display will then resume scrolling all of the values. The display's second line is used to provide automatic or requested purger mode and status reports, alarm indication and identification, as well as provide a visual indication of manually entered set point values or entry error messages.

False Purge Safety System

One temperature sensor, TS-4 is monitored for a range of conditions and will fault and shut down the purger. In addition to these safety features, a float switch is used to shut down the purge unit if the purge tank becomes full of liquid.

Fault Control and Output Contact

Refer to **Figure 3 & 4**. The customer fault output will be energized during critical shut-down conditions only. When the OFF key is pressed, the fault is reset and the purger can be started again, unless the fault condition has not been corrected.

The user fault output (TB1-7 and TB1-8) is available for use by the customer. It can be

used to provide visual or audible indication of a fault condition. This output energizes during a fault condition and de-energizes again when the fault is reset.

The solid-state output is rated:

- Electrical Loads: 0.025 to 2 amps, 220-volts AC, sine.
- Peak Current: 1-cycle at 20-amps, 50 Hz, 25 °C
- Leakage Current: 1ma RMS "Off" State or less

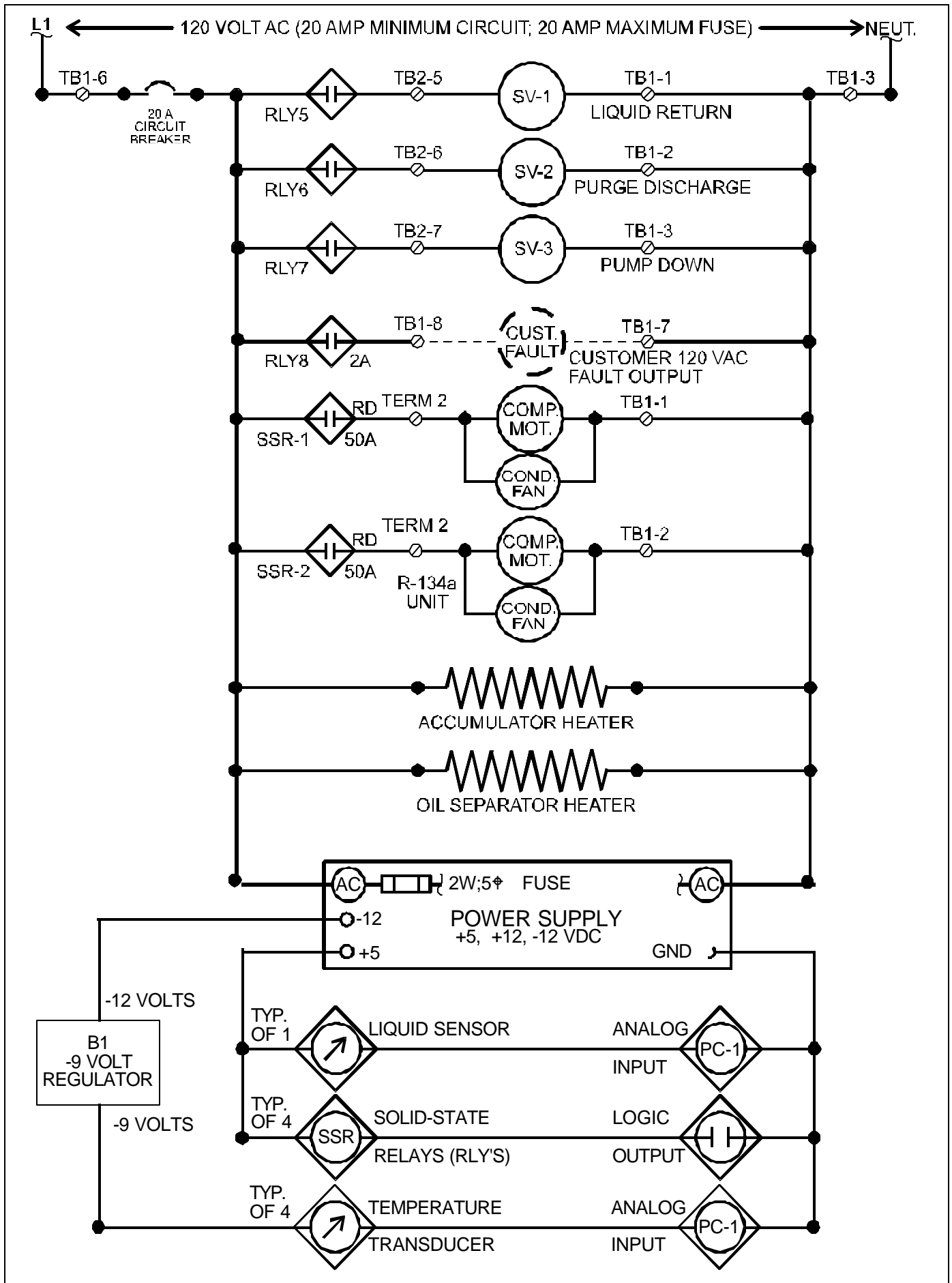
Power Supply Circuit Protection

The 30-ampere Fuses, located on the control panel, will Blow if any of the internal circuits are in short circuit or overloaded. Once a wiring or overload problem has been repaired, Replace Fuses !! Type FLNR30.

PURGE UNIT MAINTENANCE

Periodic Maintenance

FIGURE 4 CONTROL SCHEMATIC WIRING DIAGRAM



RefTec International, Inc. recommends that all described inspections and procedures be conscientiously performed at the indicated intervals.

Unit Nameplate: Model, Serial No.

The unit nameplate is located on the front of the purge unit electrical control box. Always provide the model and serial number from the nameplate when making inquiries, ordering parts or ordering literature for the purge unit.

Maintenance Each Week

Check the purge vessel liquid return rate at the moisture indicator sight glass with both the purge unit and the chiller running. Liquid refrigerant should flow freely whenever the unit is not in a purge pumpout cycle. During purge pumpout cycle, very little or no liquid refrigerant will flow through the sight glass.

When liquid refrigerant flow is not as expected:

- the inlet or return lines are blocked or closed;
- filter drier needs replacing;
- a discharge cycle is necessary;
- a problem exists with the purge refrigeration circuit (R-134a unit condenser, expansion valve or purge vessel coil); or
- a problem exists with purge controls;

Check the purge vessel liquid moisture indication at the moisture indicator sight glass on the purge liquid return line. If "caution" or "wet" is indicated, the filter drier element needs replacing. Refer to "Filter Drier Element Replacement" in this section. The water separator sight glass located on the side of the purge vessel is for viewing the presence of collected condensed water.

Maintenance Every Six Months:

Clean the R-134a unit condenser coil as necessary. Using compressed air or coil cleaner, always clean the coil from the fan

CAUTION!

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 operating personnel to liquid and/or vaporous

side. A partially blocked coil wastes energy and inhibits purge rate.

Maintenance Every Year:

Verify that all electrical controls are in proper working order by carefully monitoring the control sequences described above.

Purge Vessel Water Separator Draining

When the level of water in the sight glass reaches ½" depth, it is time to perform a quick draining process. Begin the process by shutting the purge unit OFF and closing the vapor purge inlet isolation valve. Connect a manifold gauge set to the drain port located on the side of the purge tank. Connect common center tap to a recovery unit. Open the manifold gauge until all refrigerant and water has been removed from purge vessel. Disconnect manifold gauge set and open hot gas isolation valve. Restart Purge.

Moisture Indication and Removal System

A moisture indicator sight glass is installed in the liquid return line. Refer to Figure 2. This indicator is both moisture and temperature

sensitive and will indicate "wet" when a filter drier element core (Figure 2) is saturated and needs replacing.

To operate properly, the purge unit must have fresh filter drier cores and liquid return drier installed. The drier cores dehydrate the refrigerant and remove acid and other debris before it passes through the purge unit. The drier cores will absorb the moisture from normal infiltrating air of average humidity for typically a six month or longer period.

Filter Drier Element Replacement

Begin the process by shutting the purge unit OFF and closing the "hot gas" purge inlet isolation valve. Connect a manifold gauge set to the drain port located on the side of the purge tank. Connect common center tap to a recovery unit. Open the manifold gauge until all refrigerant and water has been removed from purge vessel.

Remove the inlet filter drier unit cover by removing the cover bolts, remove old element (s), inspect and clean where necessary. Install new filter drier element(s) and the cover gasket. Replace the filter drier tank cover and torque the cover bolts to 14-to-16 ft.-lbs. At this time, complete this service procedure by also removing and replacing the drier located prior to the return liquid site glass and the return liquid solenoid valve. Disconnect manifold gauge set and open hot gas valve. Restart Purge.

Changing Compressor Fluid

The compressor Polyol Ester or mineral oil should be changed annually or prior to each time EnviroPurge HP™ is switched between HFC and HCFC or CFC systems.

NOTE

IT MAY TAKE SEVERAL HOURS OF NORMAL PURGE UNIT OPERATION FOR A NEW CORE ELEMENT TO ABSORB ENOUGH MOISTURE TO MAKE THE INDICATOR READ "DRY".

Procedure:

- 1 Make sure there is no refrigerant in EHP's compressor, lines, or purge vessel.
- 2 Connect dry nitrogen to the discharge service valve 1/4" access port on the compressor
- 3 Connect another 1/4" hose to the access fitting on the bottom of the oil separator and the other end to a suitable disposable oil container.
- 4 Gradually allow dry nitrogen to go into the discharge port on the compressor until all fluid has been forced out. Note: 10-15-psi will be more than adequate. Release Pressure
- 5 Disconnect the hose from the oil separator and connect it to the fitting on the bottom of the compressor. Repeat step 4.
- 6 To add new fluid to the compressor, connect a vacuum pump to the 1/4" access port on the suction side of the compressor. Pull down to a minimum of 20" Hg vacuum. Connect a hose to the 1/4" access port on the bottom of the compressor and add 34-ounces of oil to compressor.
- 7 To add new fluid to the oil separator connect a vacuum pump to the 1/4" access port on the discharge side of the compressor. Pull down to a minimum of 20" Hg vacuum. Connect a hose to the 1/4" access port on the bottom of the oil separator and add 14-ounces of oil to oil separator.
- 8 Once this procedure is finished, remove all hoses EHP unit is now ready for service.

TROUBLESHOOTING

Troubleshooting Procedures

If functional difficulties are experienced and

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.

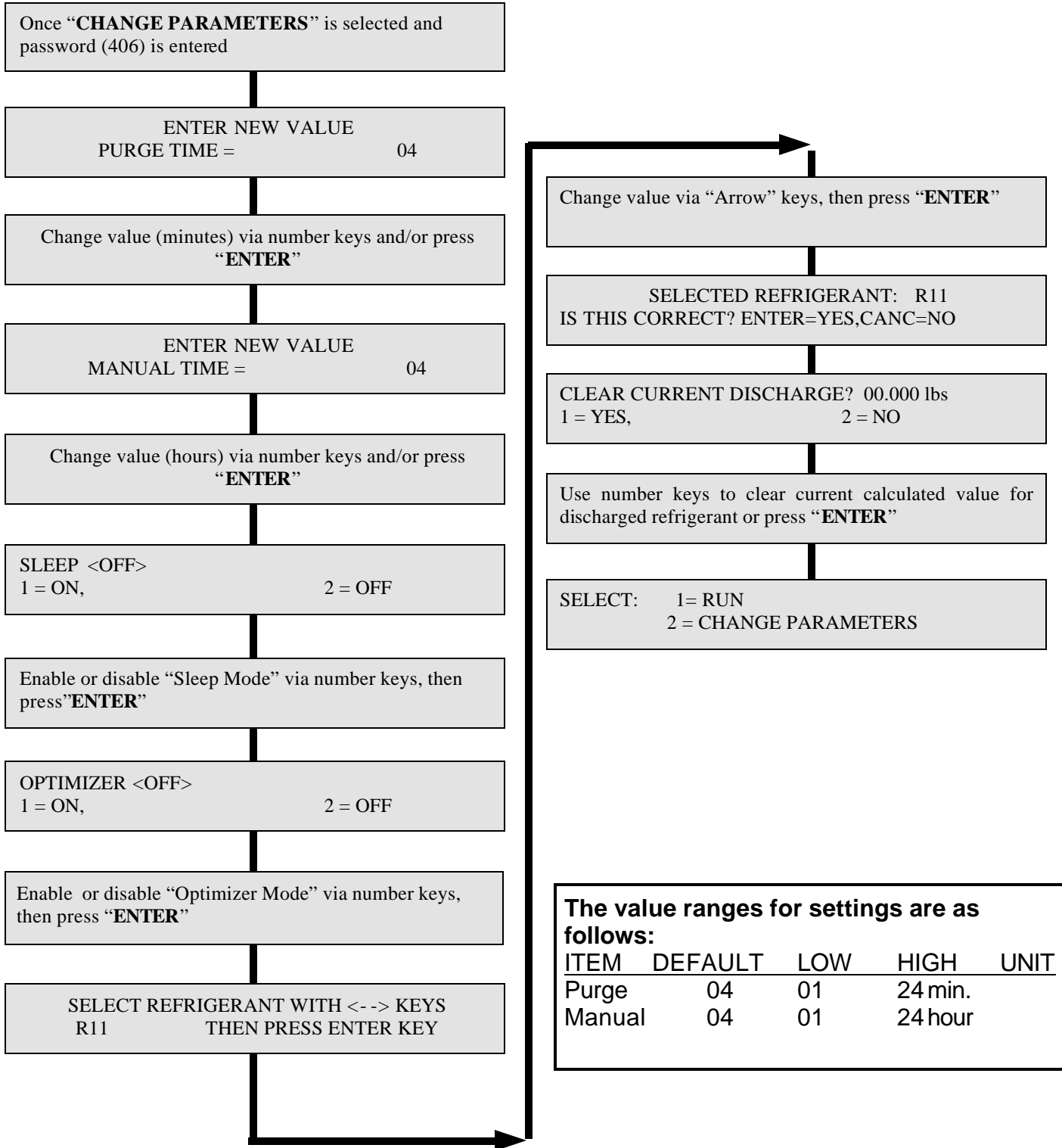
- Symptom: Describes what is happening;
- Cause: Suggests possible sources;
- Solution: Describes what must be done.

Symptom	Cause	Solution
Purge cycle clock or counter does not advance or jump ahead.	Microprocessor is faulty.	Replace B-1 circuit board or microprocessor.
Pumpout pump continues to run.	SCR relay has failed in closed position.	Replace B-1 circuit board.
	Microprocessor is faulty.	Replace B-1 circuit board.
Excessive moisture in refrigerant return line.	Damaged or saturated filter drier elements.	See "Filter Drier Element Replacement" in the Maintenance section.
Displayed temperatures are not correct.	Faulty temperature transducer or wiring	Replace transducer or repair wiring.
	Component failure on B-1 board.	Replace B-1 circuit board.
Purge unit will not start.	Power is off.	Verify power source.
	Power supply fuse has blown.	Verify and replace as necessary.
	Microprocessor is faulty.	Replace B-1 or A-2 as necessary.
	Unit is in 3-minute restart delay.	If recently shut off, wait 3-minutes.

Refrigerant does not flow through sight glass after 5 minutes of operation.	Unit condenser evaporator not cool enough for refrigerant condensation	Verify proper R-134a unit condenser operations.
	Isolation valve closed, lines are restricted or have liquid "traps".	Open the valves fully or repair the restriction or "trap".
	Vessel is full of non-condensibles.	Wait for or initiate pumpout.
	Liquid return drier is clogged.	Isolate purger, remove refrigerant from purge, replace drier (<u>note flow</u>)
Purge Unit goes into long purge pumpouts and FAULT every 4 minutes.	Large quantity of non-condensibles in chiller from major leaks in chiller.	Repair chiller leaks.
LCD display is not lighted or not displaying any messages.	Check connections to the display board	Replace display board
	Power supply fuse blown.	Turn off power and replace power supply
	Loose connections to B-1 or 3.	Check all connections; repair.
	Power to unit is off.	Verify power source to unit.
	Microprocessor has failed.	Replace B-1 circuit board.

DISPLAY SEQUENCE

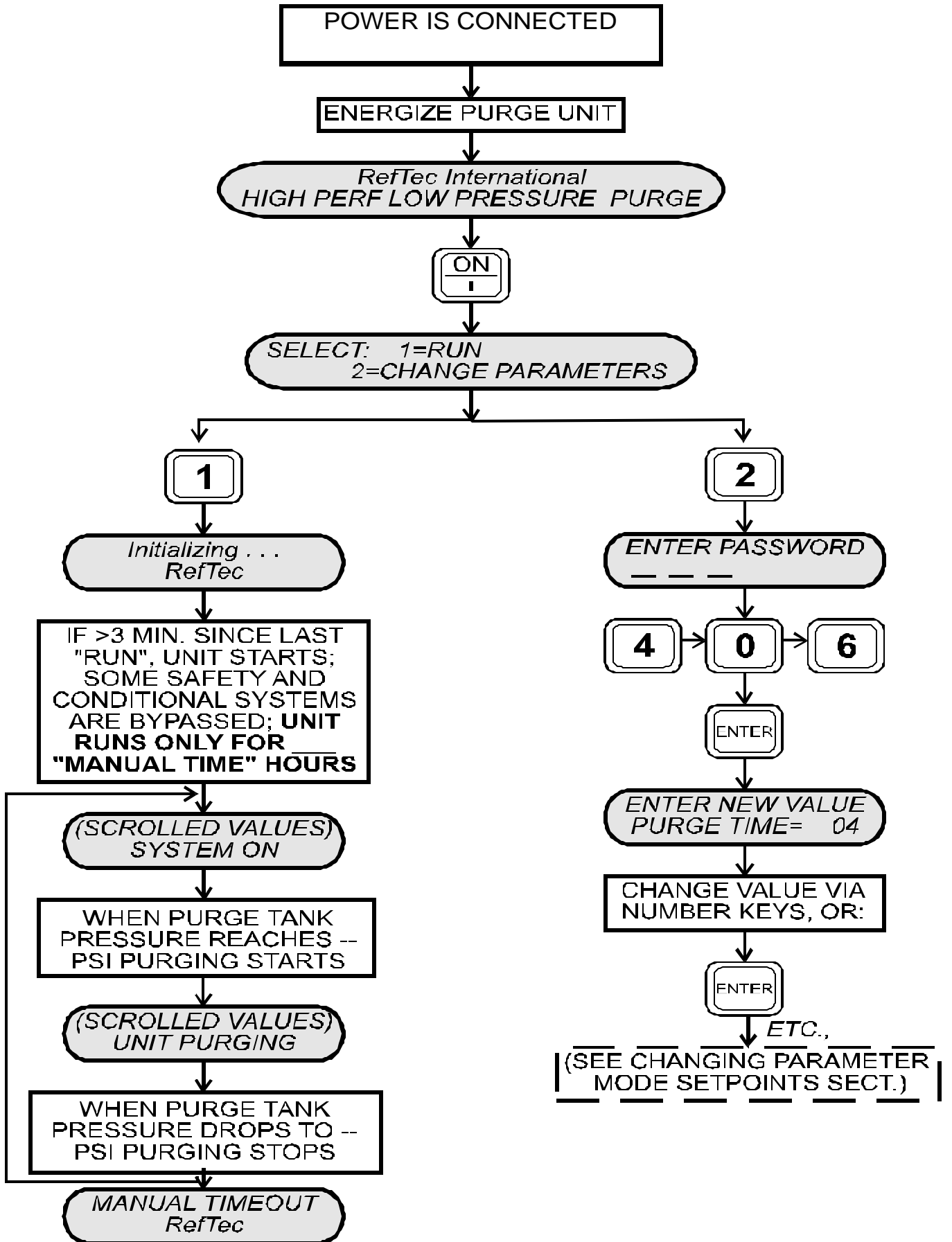
Set Points Adjustments



The value ranges for settings are as follows:

ITEM	DEFAULT	LOW	HIGH	UNIT
Purge	04	01	24 min.	
Manual	04	01	24 hour	

START-UP SEQUENCE DIAGRAM



MANUFACTURERS LIMITED WARRANTY

Limited Warranty. 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.

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 RefTec, express or implied.

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.

The provisions of this warranty shall supersede any contrary provisions contained in this agreement, any document supplied by RefTec to Purchaser or by Purchaser to RefTec, or any other agreement, written or oral, between Purchaser and RefTec, 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 RefTec.