

REDI CONTROLS, INC.

Installation, Operation & Maintenance Manual

Literature No. 1131-02-230V

Redi-Purge™ High Efficiency Purger Model HPP-3-230V



AUTOMATIC AIR PURGER

For Application On

High Pressure Refrigeration Systems

R-12, R-22, R-134a and similar refrigerants

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GENERAL INFORMATION

***YOU ARE URGED TO READ THIS MANUAL COMPLETELY BEFORE
INSTALLING AND/OR OPERATING THIS UNIT***

Upon Receiving Your Unit

Inspect the unit for possible damage caused during shipping. **Contact Equipment Servicing before attempting to use a damaged unit.**

WARNINGS and Cautions

NOTE: WARNINGS and **Cautions** appear in highlighted boxes as illustrated below at appropriate points throughout this manual. Give special attention to these items.

WARNINGS: Provided to alert you to special situations that could result in serious personal injury, damage to your equipment, or cause your equipment not to work properly. Warnings may appear in this manual or on the equipment. Heed all Warnings.

Cautions: Designed to alert you to situations that may result in damage to your equipment.

Personal safety and the proper operation of your equipment require strict observance of these precautions.

**EQUIPMENT SHOULD BE INSTALLED AND OPERATED ONLY BY
QUALIFIED PERSONNEL**

WARNING: Certain servicing procedures may expose you to harmful materials and dangerous conditions. To minimize the possibility of injury, follow safety procedures and instructions described in this manual, on product labels and provided in material safety data sheets.

NOTE: The manufacturer has a continuous equipment improvement policy and reserves the right to change specifications and design of it's products without notice .

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SPECIFICATIONS

Electrical Power Requirements:	230 VAC, 60 Hz, 1-Phase, 20 Amp Fused Circuit
Remote Alarm Relay (RLY 6)	SPDT 10 Amps
Operating Environment:	0°F to 120°F
Storage Environment:	0°F to 120°F
Dimensions (approximate):	35" H x 33" W x 8" D
Weight (approximate):	80 lbs
Shipping weight (approximate):	120 lbs

Contents of Installation Kit

Each "kit" includes:	One Model HPP-3-230V Purge Unit One Installation, Operation and Maintenance Manual Two ¼ inch SS Strainers
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Field-Provided Items

To be furnished by the installer:	Purge Unit mounting hardware Electrical conduit and wiring materials 1/4-inch copper refrigerant tubing 5/8-inch copper refrigerant tubing One 5/8-inch ball valves (if needed) Two 1/4-inch ball valves (if needed) Fittings
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Preliminary "Kit" Inspection

Before installing the new Model HPP-3-230V Redi-Purge™ Unit, check the data on the new purge unit nameplate and verify that the model is correct for the application.

OPERATIONAL OVERVIEW

The **Redi-Purge™ Model HPP-3-230V Automatic Air Purger** is designed and constructed for both indoor and outdoor application. All components are constructed of either, copper, brass, stainless steel or powder coated metal. The standard electrical enclosure is a NEMA Type 4. Other NEMA Type enclosures, including explosion proof, are available on request. The HPP-3-230V Purger utilizes pressurized liquid refrigerant from the Chiller to provide the required refrigeration effect for efficient purger operation. Since the HPP-3-230V Purger does not utilize a mechanical compressor of its own it is **operable only while the chiller is running**. Purging efficiency (ability to minimize the amount of refrigerant expelled to the atmosphere) is dependant upon refrigerant type and operating temperature & pressure. For example, an R-134a chiller operating at -30 degrees F. evaporator temperature and 90 degrees F. condensing temperature purging efficiency would be approximately .5 pounds of refrigerant exhausted per pound of non-condensables (air) exhausted. This is about the equivalent efficiency of a typical **high efficiency thermal purger**.

Purger refrigeration circuit: Anytime the chiller is running a small amount of high pressure liquid refrigerant from the chiller's condenser is diverted through the outer circuit of the HPP-3-230V tube-in-tube heat-exchanger via an inlet flow metering orifice. The metering orifice creates a pressure drop across the heat-exchanger. The outlet of the heat-exchanger is connected to the low side (evaporator) of chiller. Evaporator temperature within the Heat-exchanger is controlled by an adjustable evaporator pressure regulator. The regulator is set at a pressure 10 psig higher than chiller operating evaporating pressure.

Non-condensable purge cycle: air laden refrigerant vapor (foul gas) from the chiller condenser is continually metered through the inlet flow restrictor into the HPP-3-230V purge chamber (inner tube of tube of tube heat-exchanger). The refrigerant vapor component condenses to liquid immediately upon entering the cold purge chamber and falls to the bottom into the **liquid drainer** where it is returned to the chiller evaporator.

Non-condensables (air) entering the purge chamber are trapped and accumulate in the purge chamber. As non-condensables accumulate the pressure in the purge chamber rises. When the pressure rises to the pressure setting of the **Purge Exhaust Pressure Switch (PS-1)** a non-condensable exhaust cycle is initiated. When the pressure drops below the differential cut-out setting of PS-1 the exhaust cycle is terminated. This cycle continues as long as power is applied to the HPP-3-230V Purger and the chiller is operating.

The HPP-3-230V Purger incorporates an exhaust solenoid valve test which automatically verifies that the primary exhaust solenoid valve has properly re-closed following each non-condensable exhaust cycle. In the event the exhaust solenoid valve fails to re-close or develops a leak a second **fail-safe solenoid valve** closes preventing inadvertent refrigerant discharge to the atmosphere.

As a means of preventing moisture accumulation in the Liquid Drainer an automatic **Drain-down cycle** is initiated every six hours during which **Drain-down Solenoid Valve (SOL-3)** is

energized (opened) for five minutes allowing the entire content to drain from the liquid drainer through the in-line filter/dryer back to the chiller evaporator. If moisture is allowed to accumulate in the drainer sufficient to form free standing water freezing can occur impeding operation of the drainer's float mechanism. It is therefore recommended that an in-line **high moisture capacity** filter/drier be included in the liquid return line. (See Figure 3 Flow Schematic page 19.)

INSTALLATION

Mounting and Location

The Model HPP-3-230V Purger is designed to be mounted on a vertical wall or supporting framework near the chiller condenser. The Purger **must** be mounted in a **vertical position** in order for the liquid drainer to function. The closer the purger is located relative to the non-condensable pick-up point on the chiller condenser the better. However, a non-condensable pick-up line length up to 15 feet is acceptable. The unit may be located higher or lower than the non-condensable pick-up point and/or higher or lower than the chiller evaporator. Location in this regard is not a factor. Only the length of the foul gas pick-up line is a consideration when installing.

Electrical Requirements

The HPP-3-230V control circuit operates on 230 VAC single phase power supplied via an external 20 amp fused disconnect device furnished and installed by the installer. The HPP-3-230V purger can **only operate while the chiller is running** therefore either a 230 or 115 volt chiller "Run Signal" **must** be provided to the HPP-3-230V logic board.

Plumbing the HPP-3-230V Purger

Installation of the Model HPP-3-230V Redi-Purge™ unit requires certain wiring and hardware modifications to the chiller. **To insure proper installation, it is important that the installer thoroughly read and understand the following instructions**

1. Mount the HPP-3-230V Purger **vertically** on wall or suitable framework near the chiller condenser. The actual position of the purger relative to the chiller's condenser and/or evaporator is not important. However, the foul gas pick-up line should be limited to about 15 feet for optimum performance.

2. Using ¼" O.D. copper tubing, plum from a point on the chiller condenser, pipe or other appropriate location having an isolation valve capable of supplying high pressure liquid refrigerant to the Purger's ***inlet metering orifice***. In this line install one of the two ¼" Stainless Steel Strainers furnished with the purger. (See Figure 3 page 19).
3. Using 5/8" O.D. copper tubing, plum from the outlet fitting of evaporator pressure regulator (EPR-1) to the low side of chiller (evaporator). Either the chiller must have an appropriate isolation valve to which to connect, or a ball valve must be provided in the line between the chiller and the purge unit (See Figure 1 Page 10).
4. Using ¼" O.D. copper tubing, plum from the purger's liquid drainer outlet fitting to the chiller low side (evaporator). This can be accomplished by connecting to a spare valve or fitting on the evaporator or by teeing into the 5/8" O.D. vapor return line already plumed to the low side of chiller. In either case, this line must also include an isolation valve, either at the chiller or in the line itself (See Figure 1 Page 10).
5. Using ¼" O.D. copper tubing, plum from the chiller condenser foul gas pick-up point to the Purger's ***inlet flow restrictor*** located at the bottom of the purge chamber. (See fig. 3 page 19) Install the second ¼" Stainless Steel Strainer, provided with the purge unit, in the pick-up line near the inlet port. An isolation valve must either be provided at the chiller condenser itself or in the foul gas line between the condenser and the purger (See Figure 1 Page 10).

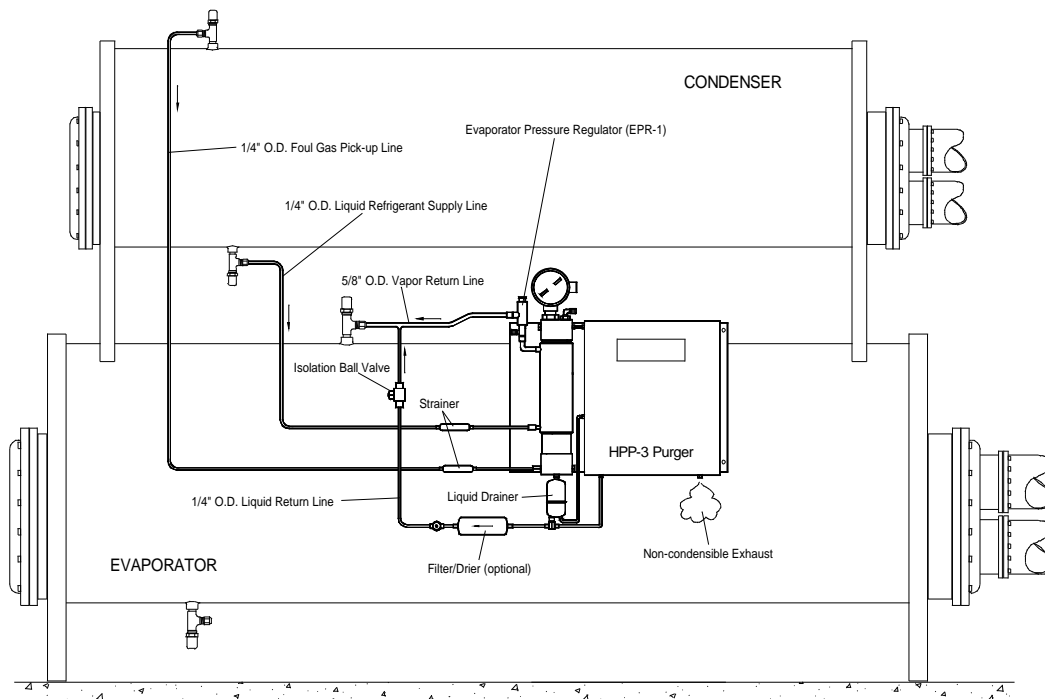
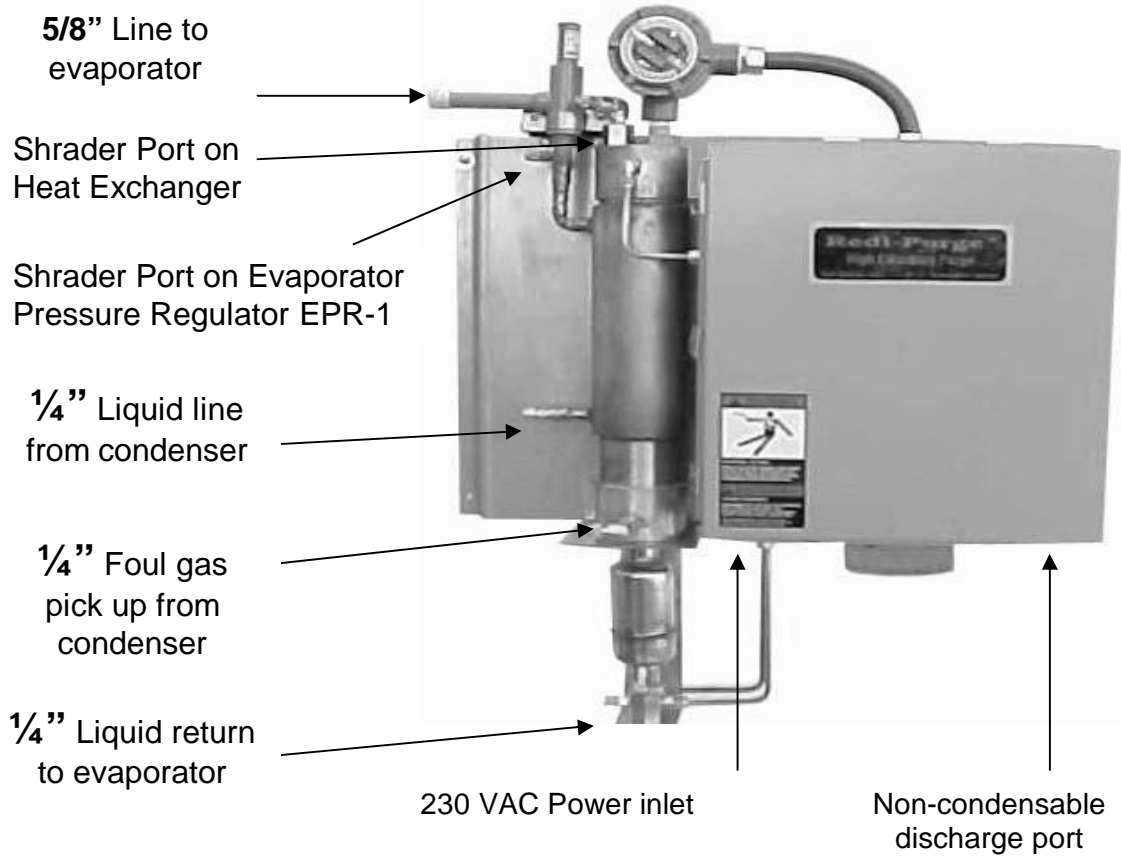


Figure 1 – Connections, Sizes, Typical Piping Hook-up

ELECTRICAL CONNECTIONS

WARNING: Be sure to open and lock-out all electrical disconnects to prevent possible injury or death caused by electrical shock.

NOTE: Use Class 1, 12 AWG copper wire and metal conduit. All field installed wiring must comply with all applicable electrical codes.

Electrical Hook-up (230 VAC Power Supply)

1. From an appropriate 20 amp fused disconnect device connect 230 volt line power to the purge unit terminal block TB-1. Connect **L1** to terminal 1 and **L2** to terminal 5. Also, see **Chiller “Run Signal”** below.

Chiller “Run Signal”

The HPP-3-230V Purger can only operate while the chiller is running; therefore either a 115 or 230 volt chiller “Run Signal” **must** be supplied from the chiller control to input terminals IN6 & terminal J22 on the HPP-3-230V Logic Board. If this signal is not provided the purge unit will shut-down when the chiller cycles off.

Run either a 115 or 230 volt line from an appropriate place in the chiller control circuit that will supply voltage to Logic Board “Run Signal” inputs IN6 and J22 when the chiller is operating. On 115 volt signal connect neutral leg to input terminal J22. **(See Fig 6 Wiring Schematic Page 26 for terminal location).**

Remote “Purge Fault” Enunciation

A Form-C relay is provided on the purger Logic Board for **remote purge fault enunciation**. The fault relay is designated as RLY-6 on the board. Any time the purge unit shuts-down in a purge fault condition RLY-6 is energized. To reset the purger following a purge fault and de-energize RLY-6 press the reset button located inside the purge control panel.

An alternate method of resetting purge operation following a purge fault condition is to remove and reapply line power to the purger.

INITIAL START-UP

Before starting unit leak check entire installation. This can be accomplished by momentarily opening all valves to the purge unit then re-closing. This will pressurize the entire purger with refrigerant. The unit can then be leak tested and evacuated. Open all valves to purge unit. Apply power to purge unit. The HPP-3 purge unit is now in operation. **YOU MUST NOW CALIBRATE Evaporator Pressure Regulator EPR-1 and Purge Exhaust Switch PS-1** per the following instructions:

Calibrating Evaporator Pressure Regulator (EPR-1) (See Fig. 2 Page 18 for location)

Purge evaporator pressure regulator (**EPR-1**) controls purge tank pressure (condensing temperature). Purge tank pressure **MUST** be set higher than chiller evaporator pressure (temperature) in order to maintain sufficient pressure differential to assure proper draining of condensed refrigerant back to evaporator.

With both chiller and purger operating: Connect the low side hose of an accurate refrigeration manifold gauge set to the schrader port located at the inlet of evaporator pressure regulator (EPR-1). Remove brass cap from top of EPR valve and (using the appropriate hex wrench) adjust purge tank operating **pressure 10 psig higher than chiller operating evaporator pressure.**

Calibrating Purge Exhaust Initiate Switch (PS-1)

WARNING: Purge Exhaust Initiate Switch PS-1 MUST be calibrated to proper setting for the application. Failure to properly calibrate PS-1 will result in either no non-condensables being purged or raw refrigerant inadvertently exhausted to atmosphere.

NOTE: Do not rely on calibration dials provided on the pressure switch. These dials are inaccurate. You must set the PS-1 pressure switch using an accurate pressure gauge. Refer to Setting & Calibrations, page 17.

Purge Exhaust Initiate Switch (PS-1) is a low pressure switch with SPDT contacts.

PS-1 cut-in set-point (contacts 1 & 4 closing on pressure rise) **must be set at a pressure 20 psig higher than the EPR-1 evaporator pressure regulator setting.** Set cut-out differential at approximately 10 psig, i.e. switch contacts 1 & 4 open on pressure drop at approximately 10 psig above EPR-1 pressure setting.

Example setting 1: For an R-134a chiller operating at 0° F evaporator temperature the settings would be as follows:

EPR-1 setting: (0°F) 6.5 psig +10 psig = 16.5 psig purge tank operating pressure.

PS-1 setting: 16.5 psig purge tank pressure + 20 psig = **36 psig PS-1 cut-in setting** (exhaust initiate) with a 10 psig cut-out differential = **26 psig cut-out** (exhaust terminate pressure).

Example setting 2: For an R-22 chiller operating at 25°F evaporator temperature the settings would be as follows:

EPR-1 setting: (25°F) 49 psig + 10 psig = 59 psig purge tank operating pressure.

PS-1 setting: 59 psig purge tank pressure + 20 psig = **79 psig PS-1 cut-in setting** (exhaust initiate) with a 10 psig cut-out initiate differential = **69 psig cut-out** (exhaust terminate pressure).

PURGE OPERATING SEQUENCE

Non-condensable accumulation Cycle

On initial power-up the **Green LED** designated **D5** on the purger Logic Board will blink continuously indicating the purger is active. If there are no non-condensables in the chiller the purger will simply condense refrigerant and return it to the evaporator. This process continues non-stop as long as power is applied to the purger and the **chiller is operating**.

When non-condensables are present they are drawn into the purge chamber along with refrigerant vapor via the inlet flow restrictor. The inlet flow restrictor maintains a pressure differential between the chiller condenser and the purge chamber. As the refrigerant vapor enters the refrigerated purge chamber it immediately condenses to a liquid and falls to the bottom of the purge chamber into the float valve drainer and returned to the chiller evaporator.

Non-condensable Exhaust Cycle

The non-condensable component of the entering foul gas mixture is trapped in the purge chamber where it accumulates. As non-condensables accumulate purge tank pressure rises toward chiller condensing pressure. When pressure in the purge tank reaches the **exhaust cut-in pressure setting** (as set on *Purge Exhaust Initiate Switch (PS-1)*) a non-condensable exhaust cycle is initiated.

Upon initiation of an exhaust cycle the first thing that occurs is a **pre-exhaust test of fail-safe exhaust solenoid valve SOL-2**. During the pre-exhaust test primary exhaust solenoid valve (SOL-1) is momentarily energized (opened) for 6 seconds then de-energized (closed). This allows time for the volume between SOL-1 and SOL-2 to become pressurized. The logic board then monitors this pressure, via *Exhaust Test Switch (PS-2)*, for 15 fifteen seconds to verify that SOL-2 is seating properly and holding pressure. If SOL-2 passes the pre-exhaust

test the exhaust cycle is completed (both SOL-1 and SOL-2 are energized (opened)), and non-condensables exhausted to atmosphere.

The exhaust cycle is terminated when purge chamber pressure drops below the cut-out pressure setting of PS-1.

Upon termination of the exhaust cycle a **post-exhaust test** is conducted on **primary exhaust solenoid valve SOL-1** to verify proper operation. First, SOL-1 de-energizes (closes) immediately. SOL-2 remains energized (opened) for an additional 30 seconds to allow time for pressure between the two solenoid valves to dissipate to atmospheric pressure. After 30 seconds SOL-2 de-energizes (closes). The logic board monitors the Exhaust Test Switch PS-2 for pressure rise, if there is no pressure rise, indicating proper valve closure; the purger continues normal operation.

However, if pressure is detected between the two solenoid valves the logic board will repeat the post-exhaust test two more times. If SOL-2 fails the third post-exhaust test the logic board will lock-out purge operation on “**Purge Exhaust Fault**”. **Fail-Safe Solenoid Valve SOL-2 remains closed** preventing refrigerant from escaping to the atmosphere.

Drain Cycle

Condensed refrigerant is automatically returned to the chiller evaporator via a SS float valve located at the bottom of the purging chamber.

The float valve chamber is provided with an automatic **drain-down Solenoid Valve (SOL-3)**. The drain-down solenoid valve is automatically energized (opened) for 5 five minutes every six hours allowing complete vacating of contents. This prevents excessive moisture build-up in the float chamber which could freeze resulting in float valve mechanism failure. This is indicated by LED D3 ON blinking.

The purger is also provided with a “**High Liquid Level**” Switch (LLS-1). LLS-1 terminates purge unit operation in the event the purge chamber overfills with liquid refrigerant, a condition that can occur should the liquid drainer fail to open or if the valve in the liquid return line is inadvertently left closed.

Anytime “**High Liquid Level**” switch LLS-1 senses an overfill condition the logic board will lock-out purge operation on “**Purge Fault**” preventing further purge activity until the cause of the problem has been corrected.

LOGIC BOARD LED INDICATORS

The HPP-3-230V logic board has **6 LED status indicators**, labeled on the board **D1** through **D6**. Green LED's **D1** thru **D5** serve dual functions of indicating both various operational as well as various purge fault conditions. **Red LED D6** indicates the purger is

OFF in a **FAULT** condition. All six LED's have three indicating states; **OFF**, **ON** and **ON-blinking**.

An **OFF** LED simply indicates that its respective function is currently inactive. An **ON – Blinking LED** indicates its respective function is currently active. Anytime the purger is **OFF** in a **FAULT** condition **Red LED D6** will be **ON-Blinking** in conjunction with a **non-blinking Green LED**. The non-blinking Green LED identifies the particular function at fault.

Normal Operation (Green LED ON – Blinking)

D1 ON...indicates Exhaust Solenoid Valve (SOL-1) is energized (opened)
D2 ON...indicates Exhaust Solenoid Valve (SOL-2) is energized (opened)
D3 ON...Indicates Blow Down Solenoid Valve (Sol-3) is energized (opened)
D4 ON...indicates SOL-2 valve under leak test (approx. 66 seconds)
D5 ON...indicates Purger active and operating

Normal Operation (Green LED ON – Not Blinking)

D5 ON but not blinking... indicates purger is in a HOLD condition waiting for a chiller “RUN SIGNAL”.

Purge OFF in Fault Condition (Red LED ON – Blinking)

When the purge unit is **OFF** in a **FAULT** condition **Red LED D6** will be **ON-blinking** in conjunction with a **non-blinking Green LED**. The non-blinking Green LED identifies the particular function at fault.

Red LED ON-blinking with one of the following Green LEDs ON not-blinking:

D6 +D1...indicates exhaust solenoid valve SOL-1 failed post-exhaust test.
D6 +D2...indicates fail-safe solenoid valve SOL-2 failed the pre-exhaust test.
D6 +D3...indicates excessive exhaust time.
D6 +D4...indicates high liquid level in purge tank.

PURGE FAULT DESCRIPTIONS

“Post-exhaust Test” FAULT:

At the conclusion of each non-condensable exhaust cycle the logic board tests **Exhaust Solenoid Valve SOL-1** for proper operation and closure via exhaust test switch PS-2”. If SOL-1 fails the post exhaust test the purge unit is locked out on **“Post-exhaust Test” FAULT**” and all further purge activity halted until the problem is corrected. This is indicated by LED D6 on blinking and LED D1 on NOT blinking.

“Pre-exhaust Test” FAULT:

Prior to each non-condensable exhaust cycle the logic board tests **Fail-Safe Solenoid Valve SOL-2** for proper operation and closure via exhaust test switch PS-2. If SOL-2 fails the pre-exhaust test the purge unit is locked out on **“Pre-exhaust Test” FAULT** and all further purge activity halted until the problem is corrected. This is indicated by LED D6 on blinking and LED D2 on NOT blinking.

“Excessive Exhaust Time” FAULT:

A normal exhaust cycle will rarely exceed 30 seconds duration and an exhaust cycle lasting longer than this is usually indication of an exhaust problem. Therefore, as a means of preventing excessive discharge of refrigerant to the atmosphere in the event of exhaust circuit malfunction the logic board will automatically lock-out purge operation on **“Excessive Exhaust Time” FAULT** anytime an exhaust cycle exceeds a maximum of **60 seconds**. The unit will remain locked-out until the problem has been corrected. This is indicated by LED D6 on blinking and LED D3 on NOT blinking.

“High Liquid Level” FAULT:

If for any reason the liquid level in the purge tank rises to actuate **Level Switch (LLS-1)** the purger will lock-out on **“High Liquid Level” FAULT** and remain so until the cause of the problem has been determined and remedied. This fault condition is indicated by LED D6 on blinking and LED D4 on NOT blinking.

How to “RESET” purge operation after a “Purge Fault”

NOTE: Anytime a FAULT condition occurs and before resetting the Purger be sure to first record LED indicator status (ON, OFF or blinking). This will tell you the reason for the fault and will allow you to utilize the Troubleshooting Chart to diagnose the problem.

There are two ways to RESET the purger following a fault. One is to press the momentary “RESET” switch located inside the purge unit electrical control enclosure. The other method is to remove and reapply line power to the purger.

However, simply resetting the unit does not correct the cause of the purge fault. **Repeated resetting IS TO BE AVOIDED.** When a Purge Fault occurs the cause for the fault must be immediately determined and the appropriate corrective action taken. Failure to heed a purge fault can result in significant loss of refrigerant!

PURGE EXHAUST CYCLE COUNTER

The purpose of the Purge Exhaust Cycle Counter is to provide a means of tracking daily purge activity. By monitoring daily exhaust cycle counts it is possible to track purging activity and detect when a leak may be developing. This information is helpful in scheduling chiller leak testing and repairs.

SETTINGS & CALIBRATIONS

There are (3) three devices on the HPP-3 Purger that have specific operational settings which are critical to proper and efficient operation. The settings of these devices should be verified and/or calibrated annually.

Evaporator Pressure Regulator (EPR-1) Calibration:

Connect an accurate pressure gauge (pressure range 0 -100 psig) to the schrader port on the inlet side of the EPR-1 (**See Fig. 2 Page 18**). Monitor purger evaporating pressure. This pressure should be 10 psi higher than the chiller evaporator pressure. Adjust the EPR -1 regulator setting as necessary to achieve proper purge tank evaporating pressure.

Purge Exhaust Initiate Switch (PS-1) Calibration: (See Fig. 4 Page 20 for location of PS-1)

The best time to perform this procedure is while non-condensable exhaust activity is occurring. Connect an accurate pressure gauge to the **shradar port** at the inlet of the EPR valve (See Fig 2 Page 18). Monitor pressure in the purge chamber and record the pressure at the moment an exhaust occurs. The pressure at which the exhaust cycle was initiated should have been 20 psig higher than the EPR valve pressure setting. If not, adjust PS-1 accordingly. Also, verify that the cut-out differential is set at 10 psig.

Exhaust Test Switch PS-2 Calibration: (See Fig. 4 Page 20 for location of PS-2)

PS-2 should be calibrated to cut-in (contacts close) at between 15 to 20 psig. The cut-out differential should be set at 10 psig. These settings are non-critical and will likely not require adjustment. However, settings and functionality should be verified annually. PS-2 can be calibrated by connecting switch direct to a pressure source and applying the appropriate test pressure.

LOGIC BOARD DIP SWITCHES

The Logic Board has two DIP Switches (SW1 & SW2). These switches are for **factory use only**. The purger is shipped with ALL switches set in the **OFF** position and **MUST remain in the OFF position** for proper purger operation.

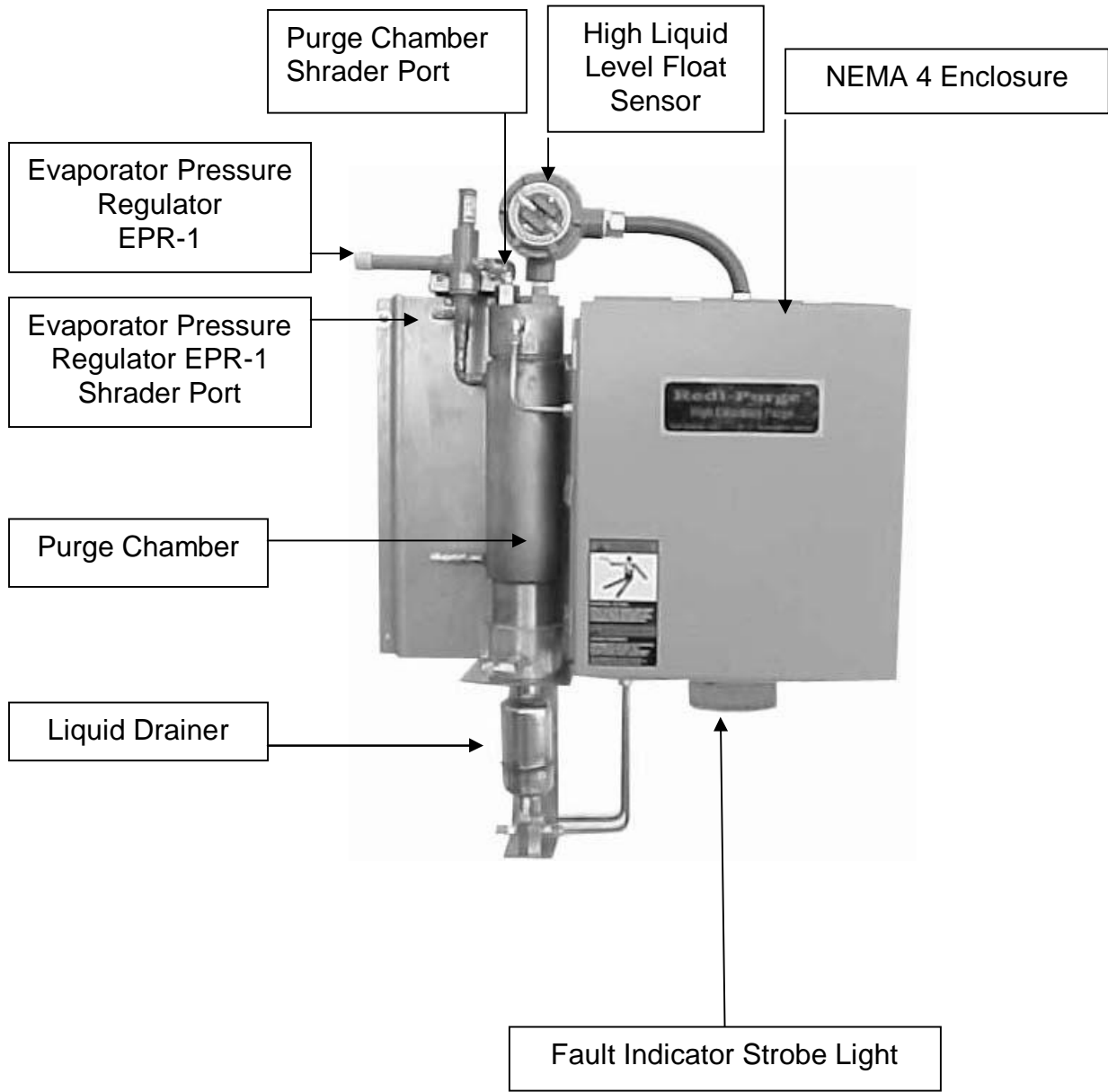


Figure 2 – Major Components (Visual)

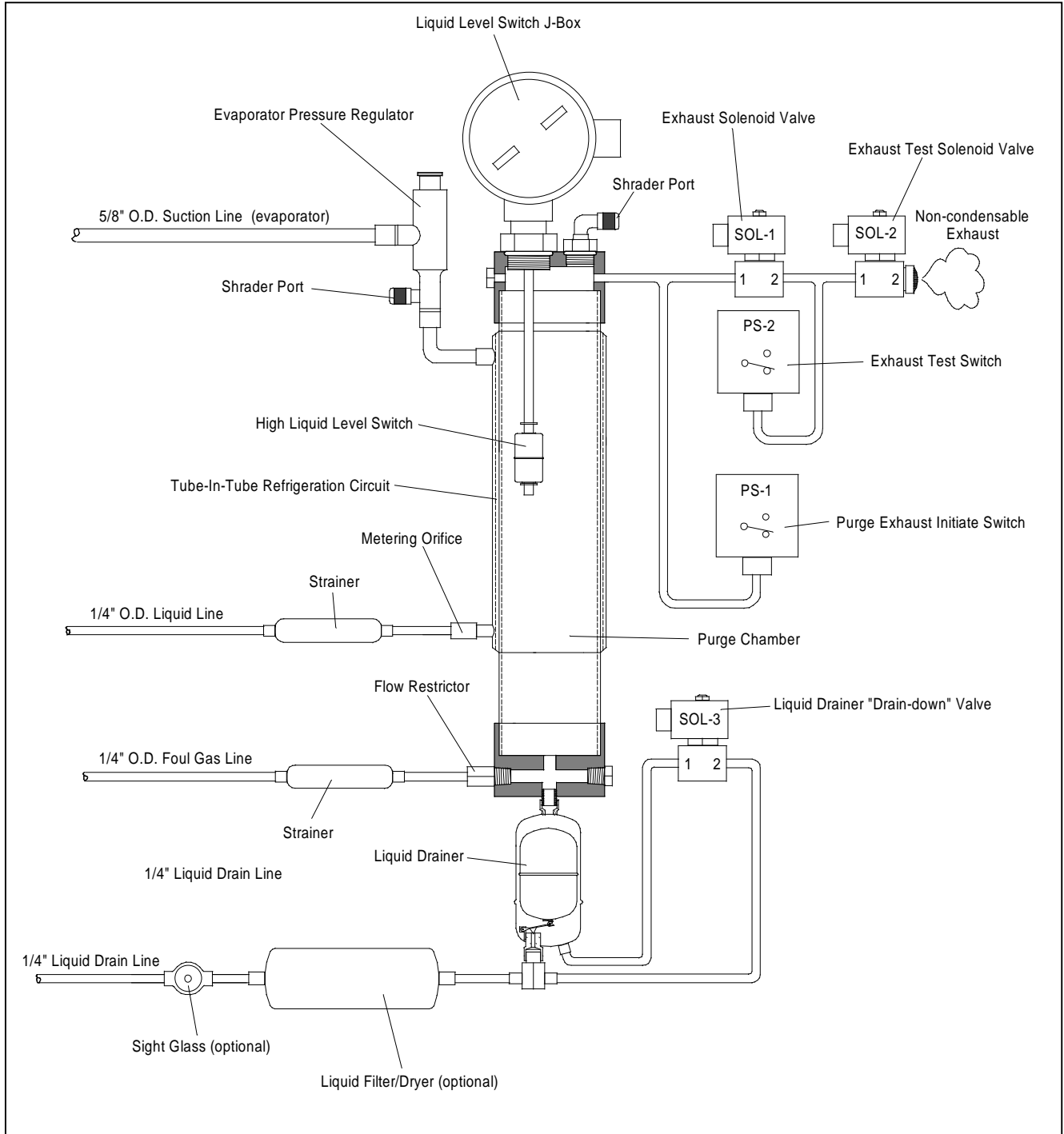


Figure 3 – Flow Schematic

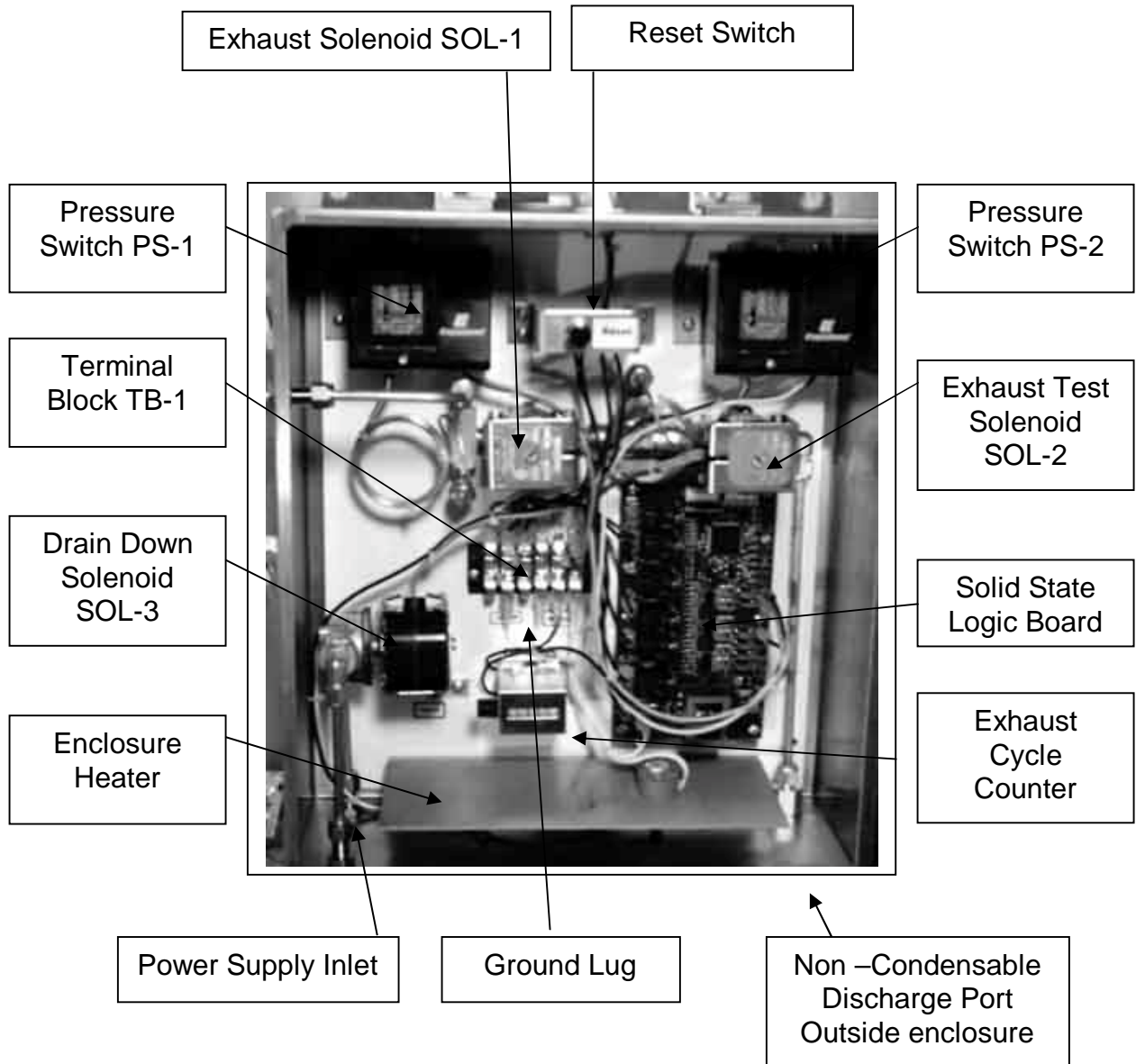


Figure 4 – Major Components Electrical Box (Visual)

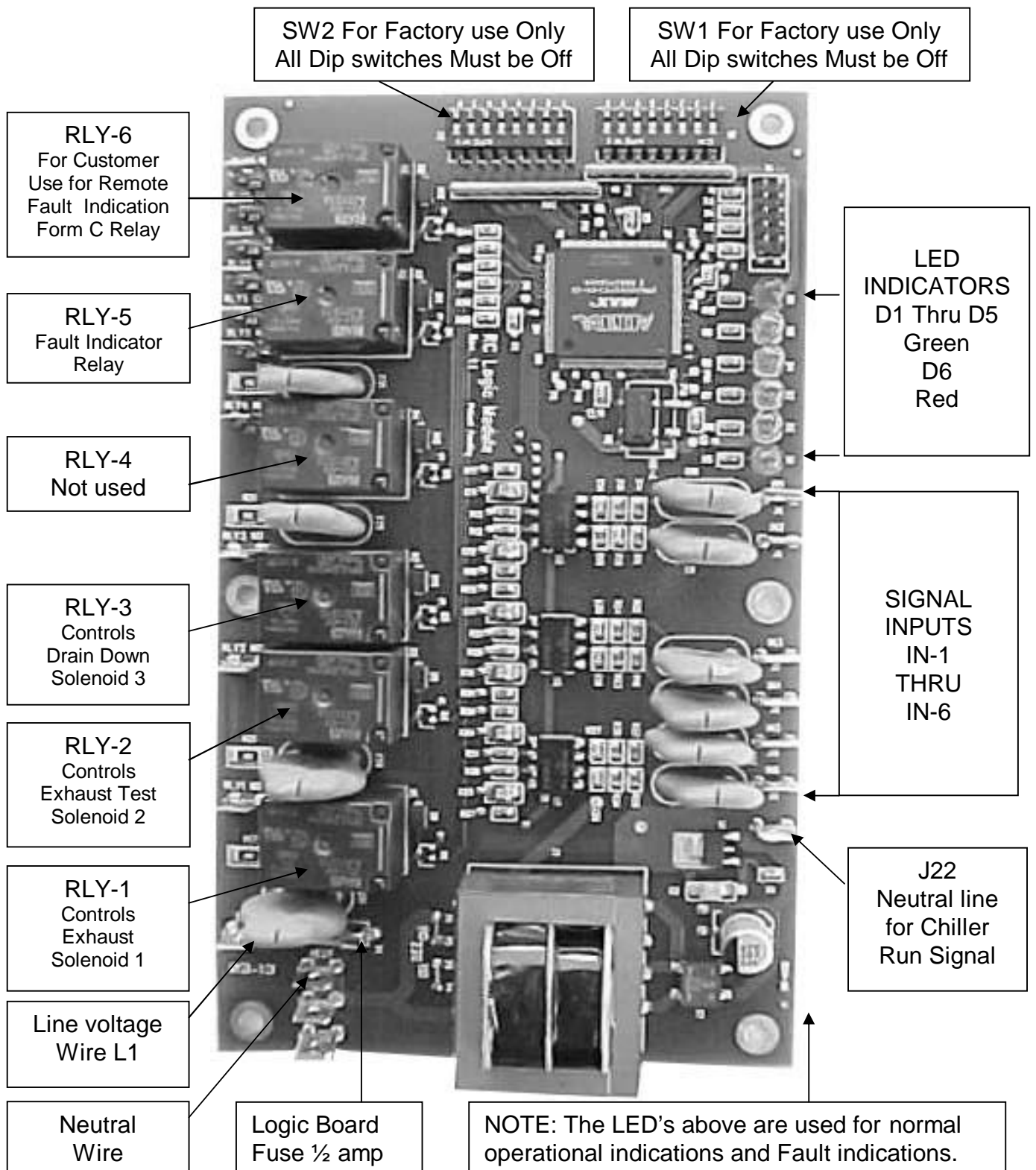


Figure 5 – Solid State Logic Board & Component Use Explanation (Visual)

MAINTENANCE

Monthly:

None, however, if any filter/driers are used in conjunction with the HPP-3-230V Purger they must be attended to according to need.

Annually:

Verify and calibrate control settings (**See Settings & Calibrations Page 17**).

The HPP-3-230V Purger itself does not require any scheduled maintenance. The purger is designed to operate continuously without attention other than monitoring the Purge Exhaust cycle Counter.

The HPP-3-230V is designed to be repaired by the component replacement method.

Example: The *Liquid Drainer* is the component most susceptible to problems due to exposure to acidic conditions. Although the Liquid Drainer is all stainless steel construction it will probably require attention occasionally. The Liquid Drainer is NOT serviceable. It is intended to be replaced with a new part when it fails.

TROUBLESHOOTING

Should an operational difficulty or malfunction occur, the diagnostic chart and checkout procedures on the following pages should help to quickly determine the cause and corrective action. The Troubleshooting Chart has a "Symptom" column which describes what the unit is doing; a "Possible Cause" column which identifies possible sources of the problem; and a "Solution" column which describes what must be done to correct the problem.

Troubleshooting Chart

Symptom	Cause	Solution
<p>All circuit board LED's "OFF"</p> <p>Power "ON" but LED D5 is off</p> <p>LED D5 "ON" Solid but unit not purging.</p> <p>LED D5 "ON and blinking", air in chiller, but unit not purging.</p>	<p>No Power to board</p> <p>Loose power connection to logic board.</p> <p>Defective Logic Board</p> <p>No chiller "RUN SIGNAL" to unit.</p> <p>Foul gas pick-up valve closed.</p> <p>Foul gas line "Strainer" clogged.</p> <p>Foul gas "Inlet Flow Restrictor" clogged.</p> <p>No refrigeration in purge chamber.</p>	<p>Restore power</p> <p>Repair connection</p> <p>Replace Logic Board</p> <p>Purge unit operates only when chiller is operating and a chiller "Run Signal" supplied to purger.</p> <p>Open valve.</p> <p>Replace strainer</p> <p>Clean or replace flow restrictor</p> <p>(See No Refrigeration effect)</p>
<p>No refrigeration effect on refrigeration side of purge chamber.</p>	<p>Liquid refrigerant supply line valve closed.</p> <p>Vapor return line valve closed.</p> <p>Evaporator Pressure Regulator (EPR-1) maladjusted.</p> <p>Liquid refrigerant supply line "Strainer" clogged.</p> <p>Purge chamber inlet orifice clogged</p>	<p>Open valve</p> <p>Open valve</p> <p>Calibrate regulator (See Manual)</p> <p>Replace strainer</p> <p>Clean orifice</p>

Troubleshooting Chart (continued)

Symptom	Cause	Solution
<p>Purger not purging. Pressure in purge chamber same as pressure in chiller condenser and <u>ONLY</u> D5 LED is “ON” and blinking.</p>	<p>Purge Exhaust Pressure switch (PS-1) not responding to pressure.</p>	<p>Calibrate or replace PS-1 switch</p>
<p>Purger not purging. Pressure in purge chamber same as pressure in chiller condenser and LED D5 is “ON” and blinking along with LED’s D1 & D2 blinking.</p>	<p>Either Exhaust Solenoid Valve (SOL-1) or Exhaust Test Solenoid Valve (SOL-2) is not energized or failed to open.</p>	<p>Repair or replace defective solenoid valve. Or, the Logic Board may have a defective RLY-1 or RLY-2 relay. Replace Logic Board.</p>
<p>Purger not purging. Pressure in purge chamber always stays at a pressure close to chiller evaporator pressure.</p>	<p>Liquid Drainer stuck in the open position or leaking past valve seat.</p> <p>Liquid Drain-down Solenoid (SOL-3) valve stuck in open position or leaking past valve seat.</p> <p>Stuck or welded RLY-3 relay contacts on Logic Board.</p>	<p>Replace Liquid Drainer</p> <p>Replace or repair solenoid valve</p> <p>Replace Logic Board</p>

(Troubleshooting chart continued on next page)

Trouble-shooting Chart (continued)

Symptom	Cause	Solution
<p>Purger “OFF” on Exhaust Solenoid Valve SOL-1 “Leak Test” FAULT. D1 Green LED “ON” with D6 Red LED “ON Flashing”.</p>	<p>SOL-1 valve either failed to re-close or seal properly following an exhaust cycle.</p> <p>Stuck or welded RLY-1 contacts on Logic Board.</p>	<p>Repair or replace SOL-1 valve</p> <p>Replace Logic Board</p>
<p>Purger “OFF” on Exhaust Solenoid Valve SOL-2 “Leak Test” FAULT. D2 Green LED “ON” with D6 Red LED “ON Flashing”.</p>	<p>SOL-2 valve detected to either be open or leaking prior to an exhaust cycle.</p> <p>Stuck or welded RLY-2 contacts on Logic Board.</p> <p>Defective or improperly adjusted Exhaust Test Switch PS-2</p>	<p>Repair or replace SOL-2 valve</p> <p>Replace Logic Board.</p> <p>Re-calibrate or replace PS-2 Switch</p>
<p>Purger “OFF” on “Excessive Purge Exhaust Time” FAULT. D3 Green LED “ON” with D6 Red LED “ON Flashing”. Pressure in purge chamber <u>ABOVE</u> setting of PS-1 switch.</p>	<p>Pressure leak between PS-1 and PS-2 Switches</p> <p>PS-1 switch made but either SOL-1 or SOL-2 Exhaust Solenoid Valve failed to open due to either defective valve or defective RLY-1 or RLY-2 relay on the Logic Board.</p>	<p>Repair leak</p> <p>Repair or replace defective solenoid valve, or replace defective Logic Board.</p>
<p>Same, only pressure in purge chamber <u>BELOW</u> setting of PS-1 Switch.</p>	<p>Exhaust Pressure Switch PS-1 failed to re-open on pressure drop following an exhaust cycle.</p> <p>No refrigeration effect in purge chamber.</p>	<p>Calibrate or replace PS-1 switch</p> <p>(See No refrigeration effect)</p>
<p>Purger “OFF” on “High Liquid Level” FAULT. D4 Green LED “ON” with D6 Red LED “ON Flashing”.</p>	<p>Liquid Refrigerant Return line valve closed.</p> <p>Defective Liquid Drainer</p> <p>Blocked Liquid Filter/Drier (if included)</p>	<p>Open valve</p> <p>Replace Liquid Drainer</p> <p>Replace filter/drier</p>

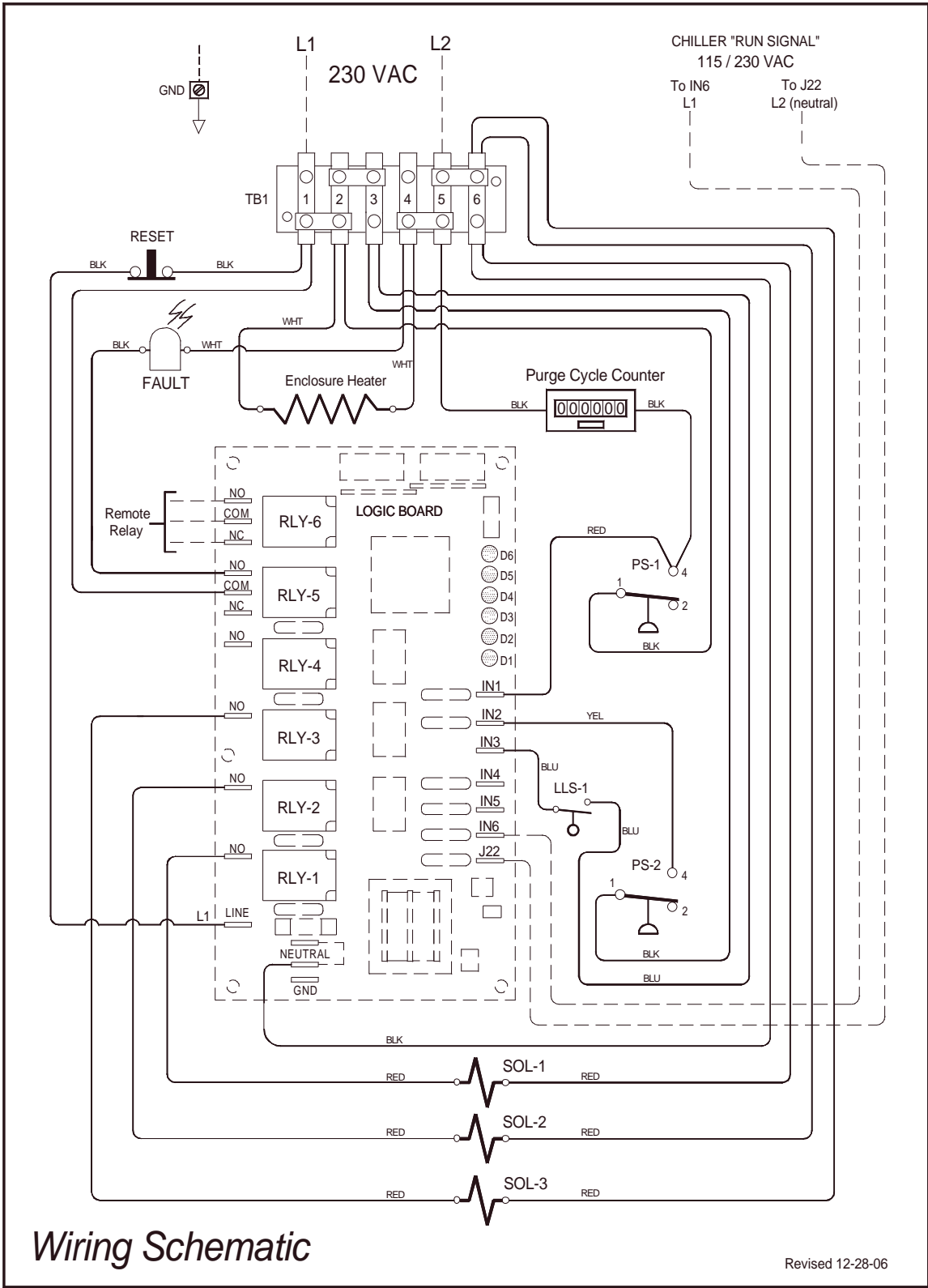


Figure 6 – Electrical Schematic

REDI CONTROLS, INC.

Equipment Warranty

REDI CONTROLS will, within one year after date of purchase, repair any REDI CONTROLS' product being used by the original purchaser, which is defective due to faulty materials or workmanship. REDI CONTROLS has the right to repair or replace a defective part or replace the entire product.

To file a Warranty claim on any system or component, return the defective unit to the address below, or other location as REDI CONTROLS directs, freight prepaid.

This Warranty does not apply to or cover:

- Damages beyond REDI CONTROLS' control.
- Malfunctions that result from failure to properly install, operate or maintain a product in accordance with instructions provided by REDI CONTROLS.
- Failures of equipment due to abuse, accident or negligence.
- Damages from, or part failures due to equipment not being installed per REDI CONTROLS' instructions, per applicable codes or ordinances, or in accordance with good trade practices.
- Labor or other charges incurred in removing or reinstalling any REDI CONTROLS product or part.
- Damages resulting from use of a REDI CONTROLS product for any purpose other than for which it was designed and manufactured.
- Any implied warranty of merchantability or fitness for any particular purpose, occurring after the Warranty Period.
- Loss of use, loss of time, inconvenience, rental for substitute products, loss of business, loss of income, or any other consequential damages resulting from use or failure of any REDI CONTROLS product.

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