



INSTALLATION MANUAL

Environmental Pool Systems Inc.

**Model
GEO-HGR-CL-R-RA**

Installation & Maintenance Manual

Table of Contents

2	General
3-4	Ductwork and delivery systems
5-6	Chemicals, Warranty & pipe sizing
7	Plumbing Diagram
8-11	Air by-pass information
12-14	Three way valve assembly, plumbing & electrical
15	Pump high voltage (HCR series) & plate heat exchanger install
16	Pool to heat exchanger plumbing diagram
17-18	Outdoor fluid cooler (condenser) installation
19	EM series Pump high and low voltage
20-21	Low voltage control wiring
22	Inline gas duct heater low voltage wiring
23-27	Service, System check out, start up & trouble shooting
	Sequence of operation
28	Temperature and humidity settings
29	Swimming Pool Chemistry
30-31	Warranty
32-33	Owner Maintenance Responsibilities
34	Space heating options explanations
35	Negative Pressure requirements
36	Warranty mail in sheet
37	Glossary

**INSTALLING
CONTRACTOR**
Go to page 17
before proceeding.

Dehumidification, Space Heating, Pool Water Heating & Air Conditioning

3.15.06

Environmental Pool Systems Inc. Tel 800-671-9629 Fax 248/634-7579

GENERAL DESCRIPTION:

The DRY-AIR reclaim dehumidifier provides the best combination of performance and efficiency available. Safety devices are built into each unit to provide the maximum system protection possible when equipment is properly installed and maintained.

All DRY-AIR reclaim dehumidifiers are ETL Listed, or Underwriters Laboratories (UL) listed and Canadian Standards Association (CSA) certified for safety. They are designed to operate with entering liquid temperatures between 45 degrees F and 120 degrees F.

SAFETY CONSIDERATIONS:

Installation and servicing of this system can be hazardous due to system pressure and electrical components. Only trained and qualified service personnel should install, repair, or service equipment. Untrained personnel can perform basic functions of maintenance such as cleaning coils and replacing filters.

WARNING: Before performing service or maintenance operations on system, turn off main power to unit. Electrical shock could cause personal injury or death.

When working on this equipment, always observe precautions described in the literature, tags, and labels attached to the unit. Follow all safety codes. Wear safety glasses and work gloves. Use a quenching cloth for brazing operations and place a fire extinguisher close to the work area.

MOVING AND STORAGE:

Move units in the normal "up" orientation as indicated by the arrows on each carton. Horizontal units may be moved and stored per the information on the carton. "Do Not Stack More Than 3 Units in Total Height". Vertical units are not to be moved, but may be stored one upon another at a maximum height of two units. When the equipment is received all items should be carefully checked against the bill of lading to be sure all crates and cartons have been received. Examine units for shipping damage, removing the units from the cartons if necessary. Units in question should also be internally inspected. If unit is damaged, the carrier should make the proper notation on the delivery receipt acknowledging the damage.

LOCATION:

Locate the unit in an indoor area that allows easy removal of the filter and access panels, and has enough space for service personnel to perform maintenance or repair. Provide sufficient room to make water, electrical, and duct connections. If the unit is located in a confined space such as a closet, provisions must be made for return air to freely enter the space. On horizontal units, allow adequate room below the unit for a condensate drain trap and do not locate the unit above supply piping. These units are not approved for outdoor installation and therefore must be installed inside the structure being conditioned. Do not locate in areas subject to freezing.

INSTALLATION:

MOUNTING VERTICAL UNITS.

Vertical units are available in left, right, back or front air return configurations. Vertical units should be mounted level on a vibration-absorbing pad slightly larger than the base to provide isolation between the unit and the floor. It is not necessary to anchor the unit to the floor. Vertical units larger than five tons are available with front or back air return configurations. These units should be vibrations isolated according to the design engineer's specifications.

MOUNTING HORIZONTAL UNITS:

Horizontal units are available with side or end discharge. Horizontal units are normally suspended from a ceiling by threaded rods. The rods are usually attached to the unit corner by hanger bracket kits. The rods must be securely anchored to the ceiling. Horizontal units installed above the ceiling must conform to all local codes. An auxiliary drain pan, if required by code, should be at least four inches larger than the bottom of the unit.

Some applications require an attic floor installation of horizontal units. In this case the unit is set in a full size secondary drain pan on top of a vibration absorbing mesh. The secondary drain pan prevents possible condensate overflow or water leakage damage to the ceiling. The secondary drain pan is usually placed on a plywood base isolated from the ceiling joists by additional layers of vibration absorbing mesh. In both cases, a 3/4" drain connected to this pan should be run to the eave at a location that will be noticeable. If the unit is located in a crawl space, the bottom of the unit must be at least 4" above grade to prevent flooding of electrical parts due to heavy rains.

CONDENSATE DRAIN"

A drain line must be connected to the unit and pitched away from the unit a minimum of 1/8" per foot to allow the condensate to flow away from the unit. A trap must be installed in the condensate line to ensure free condensate. This connection should be in conformance to local plumbing codes.

DUCTWORK OR AIR DELIVERY SYSTEM:

EPS requires a high standard of ductwork for these projects. All engineering & sizing of ductwork is provided by EPS, or co-piloted when others have completed the sizing. EPS will not be held liable for any over sized or undersized ductwork when provided with our specifications for installation. Air Delivery is critical to the enclosure. A peripheral loop around the poolroom is recommended (continuous loop). Return is located at the highest point in the room, not at the deck level. Diffusers must be directed at all glass surfaces to keep from reaching Dew Point Temperature. Diffusers built into the walls between windows and blowing across an open pool is not recommended. This only increases the evaporation rate causing excessive operational costs. Flow. A vertical air vent tube is sometimes required to avoid air pockets. The length of the trap depends on

the amount of positive or negative pressure on the drain pan. A second trap must not be installed. Any questions regarding airflow requirements, outside air or required CFM, contact EPS immediately. EPS will not be responsible for systems not operating properly due to ductwork oversizing/undersizing or not completed to EPS specifications.

Due to the nature of a dehumidifying system, a high standard air duct installation is required. Uneven and turbulent air to the DRY-AIR unit causes dehumidifier coil freeze up. Windows will condense if not completely blanketed with supply air. Inside square throats will create turbulence and, therefore, create excess pressure loss and noise. Sharp edged fittings always require turning vanes. All elbows should be designed according to SMACNA or contain turning vanes.

Air distribution duct systems shall be sized for nominal unit air volume as per conventional methods for Low Pressure Low Velocity installations, such as Air-conditioning Systems.

A supply air outlet collar and return air duct flange are provided on all units to facilitate duct connections. Refer to the DRY-AIR individual data specification sheet for physical dimensions of the collar and flange.

A flexible connector is recommended for supply and return air duct connections on metal duct systems. All ductwork should be insulated when installed in an unconditioned area.

Field wiring must comply with local and national fire safety and electrical codes. Power to the unit must be within the operation voltage range indicated on the nameplate or on the performance data sheet. On three phase units, phases must be balanced within 2%.

CAUTION: Operation of unit on improper line voltage or with excessive phase imbalance will be hazardous to the unit and constitutes abuse and is not covered by warranty.

Properly sized fuses or HACR circuit breakers must be installed for branch circuit protection. See equipment-rating plate for maximum size.

The unit is supplied with an opening for attaching conduit. Connect the ground lead to the ground lug in the control box. Connect the power leads as indicated on the wiring diagram.

PIPING: EPS DOES NOT PROVIDING ANY PLUMBING OR GLYCOL.

Supply and return piping must be at least as large as the unit connections on the unit pump (larger on long runs). Units are furnished with plate heat exchangers to isolate the pool or spa water from the copper to Freon heat exchanger in the refrigeration circuit. Y strainers must be installed on inlet side of the plate heat exchangers. All manual flow valves used in the system must be ball or gate valves. Full flow zone valves must be used when system is tied to a boiler.

Improper heat exchanger water flow due to piping, valving, or improper pump operation is hazardous to the unit and constitutes abuse, which will void heat exchanger and compressor warranty. Do not exceed recommended condenser water flow rates. Serious damage or erosion of the heat exchanger surfaces could occur. All cold-water discharge lines must be insulated to prevent damage from condensation.

CAUTION: Galvanized pipe or fittings are not recommended for use with these units due to the possible galvanic corrosion.

WATER FLOW:

For efficient operation, pool water flow through the heat exchanger is critical. Therefore, balancing valves must always be installed in the main return line and adjusted to provide some backpressure to divert water through the heat exchanger. To adjust, open the valve, start the pool water-circulating pump. Check pressure on the filter tank. Slowly close the balancing valve to increase the pressure by 20 pounds. Wait one minute to make sure all the air is forced out of the heat exchanger and water flow is established. Re-open the balancing valve, and then slowly close it to increase the water pressure to approximately 5 PSI above normal pressure. Remove the handle on the balancing valve.

NOTE: On applications where a dedicated pool pump is provided, this procedure is not applicable.

NOTE: ON ALL FLUID COOLER INSTALLATION: AUTOMOTIVE ANTI-FREEZE MUST NOT BE USED IN THESE SYSTEMS. IT WILL DESTROY PIPING, SEALS & PUMPS. EPS WILL NOT BE HELD LIABLE FOR DAMAGES ON ANY SYSTEM USING AUTOMOTIVE ANTI-FREEZE.

CHEMICALS:

ALTHOUGH THE DRY-AIR HEAT EXCHANGERS ARE VERY RESISTANT TO AGGRESSIVE WATER, AN IMBALANCE IN THE POOL WATER pH CAN CAUSE FAILURE.

CAUTION: 1. Chemical levels in the pool water must be maintained within acceptable limits at all times to avoid health hazards and/or possible equipment damage. Chlorine levels in excess of 6 PPM (parts per million) are to be avoided. pH levels below 7.2 and above 7.6 are to be avoided.

2. The stainless steel plate heat exchangers should not be used on salt-water pools with a level of salt in excess of 5000 PPM. Doing so will void the warranty and the manufacturer will take no responsibility for pool, dehumidification system and /or heat exchanger damage.

3. Automatic chemical feeders should never be installed up stream of the system' s heat exchangers. Super chlorinated water, such as produced by such feeders, can destroy the heat transfer surface within the exchanger. When automatic chemical feeders are installed downstream of the heat exchanger, certain precautions must be taken to prevent heat exchanger damage. A check valve (non-metallic) must be installed in the water piping between the heat exchanger and the chemical feeder. This will prevent the super chlorinated water in the chemical feeder from draining back into the heat exchanger when the pool water pump is shut off.

IMPORTANT WARRANTY INFORMATION

IMPORTANT: ANY **DRY-AIR** SYSTEM NOT INSTALLED BY A LICENSED MECHANICAL CONTRACTOR WILL BE VOID OF ANY WARRANTIES.

IMPORTANT: WARRANTIES DO NOT START FROM DAY OF INSTALLATION. ALL **DRY-AIR** PRODUCT WARRANTIES START 30 DAYS AFTER IT LEAVES THE FACTORY.

IMPORTANT: THE WARRANTY MAIL IN SHEET MUST BE SENT TO EPS INC. WITHIN 30 DAYS OF INSTALLATION TO ACTIVATE WARRANTIES.

IN-WARRANTY MATERIAL RETURN

When contacting your DRY-AIR representative for service or replacement parts, refer to the model and serial number of the unit as stamped on the data plate attached to the unit. If replacement parts are required, mention the date of installation of the unit and the date of failure along with an explanation of the malfunctions and a description of the replacement parts required.

IN-WARRANTY RETURN MATERIAL PROCEDURE

An authorized factory representative may return material only with permission. A "Returned Goods" tag will be forwarded and attached to the returned material. Enter the information as called for on the tag in order to expedite handling and ensure prompt issuance of credits. All parts shall be returned to the factory as designated on the "Returned Goods" tag, freight charges prepaid. The return of the part does not constitute an order for replacement. Therefore, a purchase order must be entered through your nearest representative. The order should include the part number, model number, and the serial number of the unit involved. Following our personal inspection of the returned part and, if it is determined that the failure is due to faulty material or workmanship, credit will be issued on customer's purchase order.

No part may be returned after 30 days; the factory will not accept back warranty parts after 30 days, and the client may be billed for the part. Warranty does not include freight or shipping of any parts that are being replaced. These shipping costs are billed to the client.

All warranties are based on following all EPS specifications for installation, operation, ducting, and pool balancing (chlorine). If any parts of the DRY-AIR System are found to be defective due to chlorine/pH balance problems, the affected parts may not be covered under warranty. All peripherals (inline gas duct furnaces, duct heaters, coils, etc.) that are provided by other manufacturers carry that manufacturer's warranty based on the above. We do not warranty contractors or installers work.

PIPE SIZING, DRY-AIR UNIT TO PLATE EXCHANGER AND EARTH LOOP

HC-018 TO HC-072 use 1" HC-096 TO HC-144 use 1 1/4"

EM-180 TO EM-210 use 1.5" EM-240 TO EM-360 use 2"

Use copper or SCH-80 pipe. MB series, contact factory

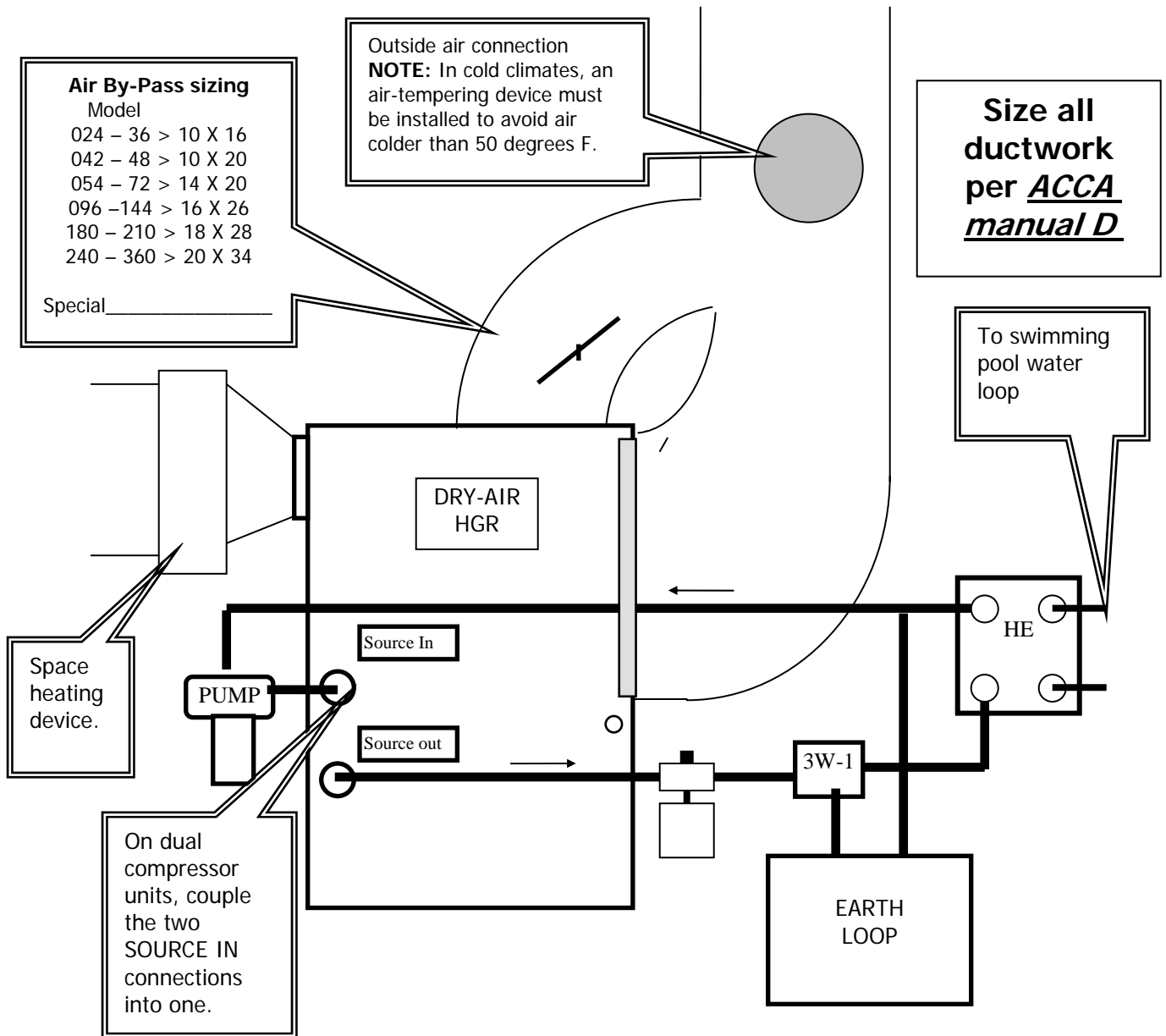
For distances of more than 50 feet, consult the factory.

PIPE SIZING FROM PLATE EXCHANGER TO THE SWIMMING POOL CIRCUIT.

Match the MPT on the plate heat exchanger. Install Y strainers on incoming water connections.

Use SCH-40 or better. For distances of more than 50 feet, consult the factory.

DRY-AIR -HGR Series reclaim dehumidifier



HE- Heat exchanger (pool heat recovery)
3W- Three way valve

NOTE: Install isolation valves, fittings and unions applicable to local plumbing codes.

NOTE: To charge loop with glycol and water, install a temporary fill device. Disconnect when system is purged.

Return Air By-Pass

THIS IS NOT AN OPTION, IT IS MANDATORY.

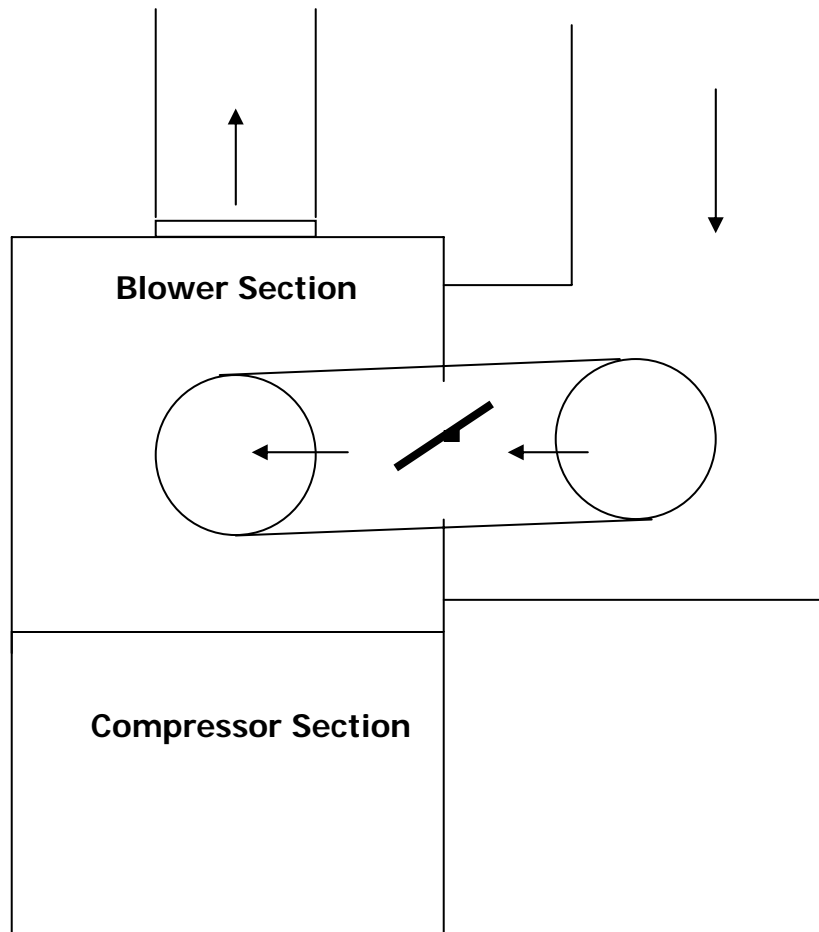
There are two primary requirements to consider when selecting an energy recycling DRY-AIR dehumidifier to effectively condition an indoor swimming pool. Air movement capability and system latent capacity. The parameters set out by ASHRAE for indoor swimming pool environments is sometimes difficult to meet with conventional equipment due to some extreme variables. The room volume dictates the airflow rate/blower requirements of a dehumidifier. The latent load (the amount of moisture that has to be removed from the air) is dictated by the water surface area, pool, spa and room temperatures. The ASHRAE air turnover rate in a commercial pool enclosure with spectators is 6 to 8 per hour, which is determined by the volume within the space to be conditioned. The first objective is to achieve the proper air turnover rate required for a specific envelope. Example: Let us assume that the CFM required is 4000 and the pool and spa surface area requires a nominal 6-ton compressor section to achieve an envelope of 50 to 60 percent relative humidity at 80/67. To match the compressor capacity, the internal air coil is sized by the manufacture for 2400 CFM (400 CFM per ton). Therefore we must add the return air by-pass, a piece of duct with a damper from the return airdrop directly into the fan housing. The result is a perfectly matched compressor to the evaporation load, and air handler to the desired air turnover rate, without sacrificing efficiency and risking inadequate air movement.

The second objective is to maximize the latent capacity of the dehumidifier.

The latent capacity of any evaporator coil is based on surface area, air velocity and coil temperature. The return air by-pass is adjusted to reduce the airflow across the evaporator that will maintain a coil temperature just above the freezing level. When properly adjusted, DRY-AIR dehumidifier is able to achieve it's maximum **latent capacity** without any refrigeration component adjustments and maintaining 100% of the air flow requirements.

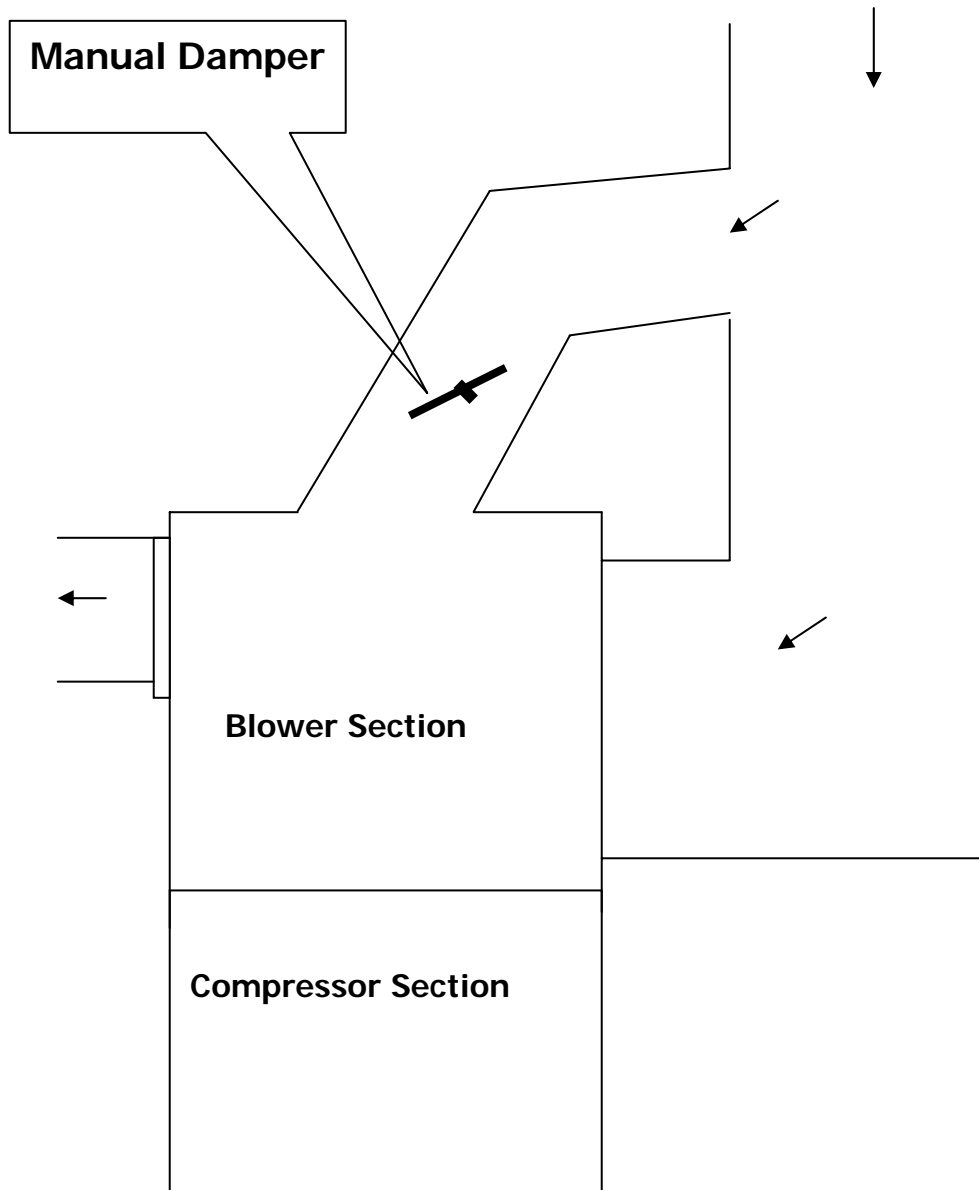
TOP DISCHARGE WITH BY-PASS

By-pass can be flex duct, galvanized spiral or rectangular with manual damper. See installation manual for sizing.



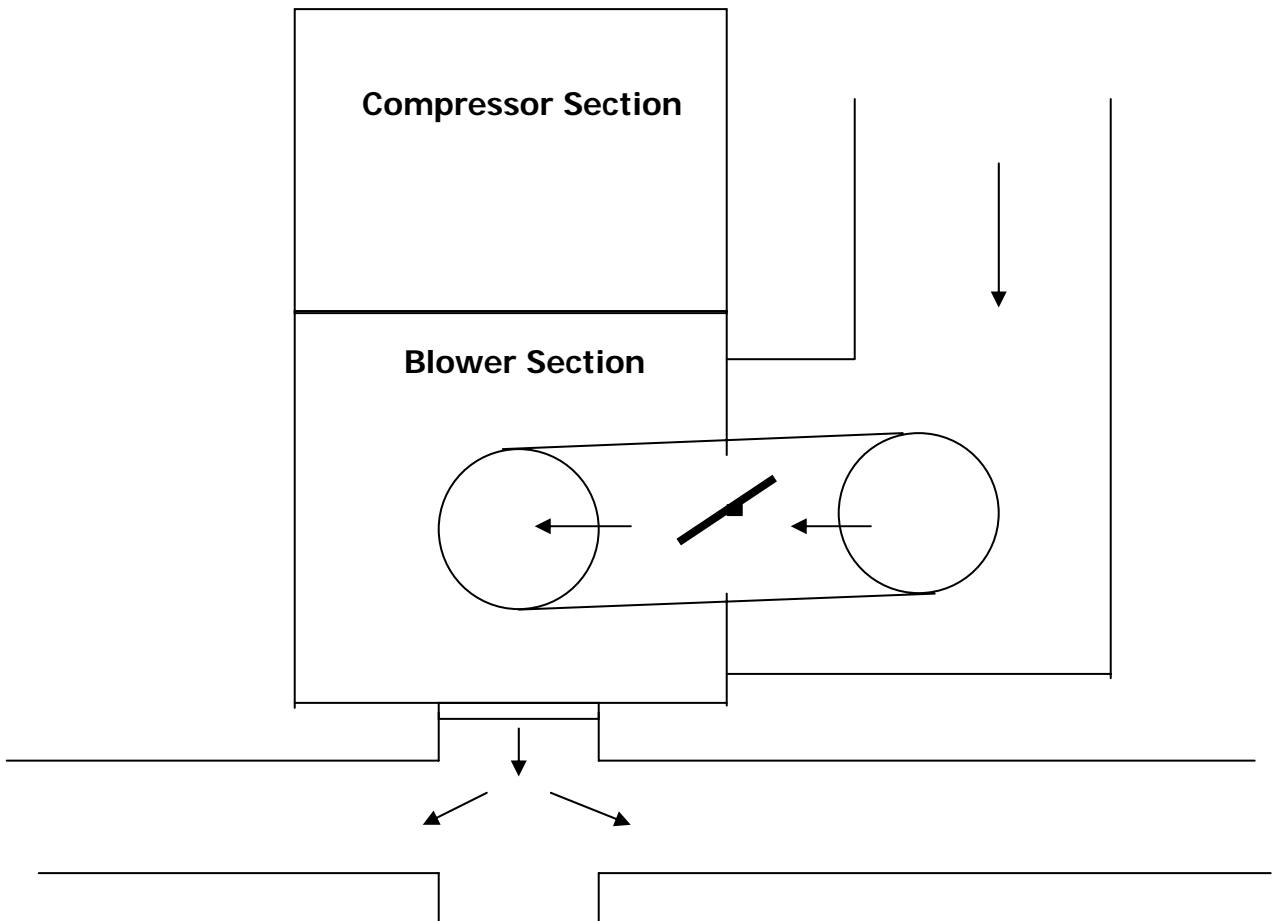
SIDE DISCHARGE WITH BY-PASS

By-pass can be flex duct, galvanized spiral or rectangular with manual damper. See installation manual for sizing.



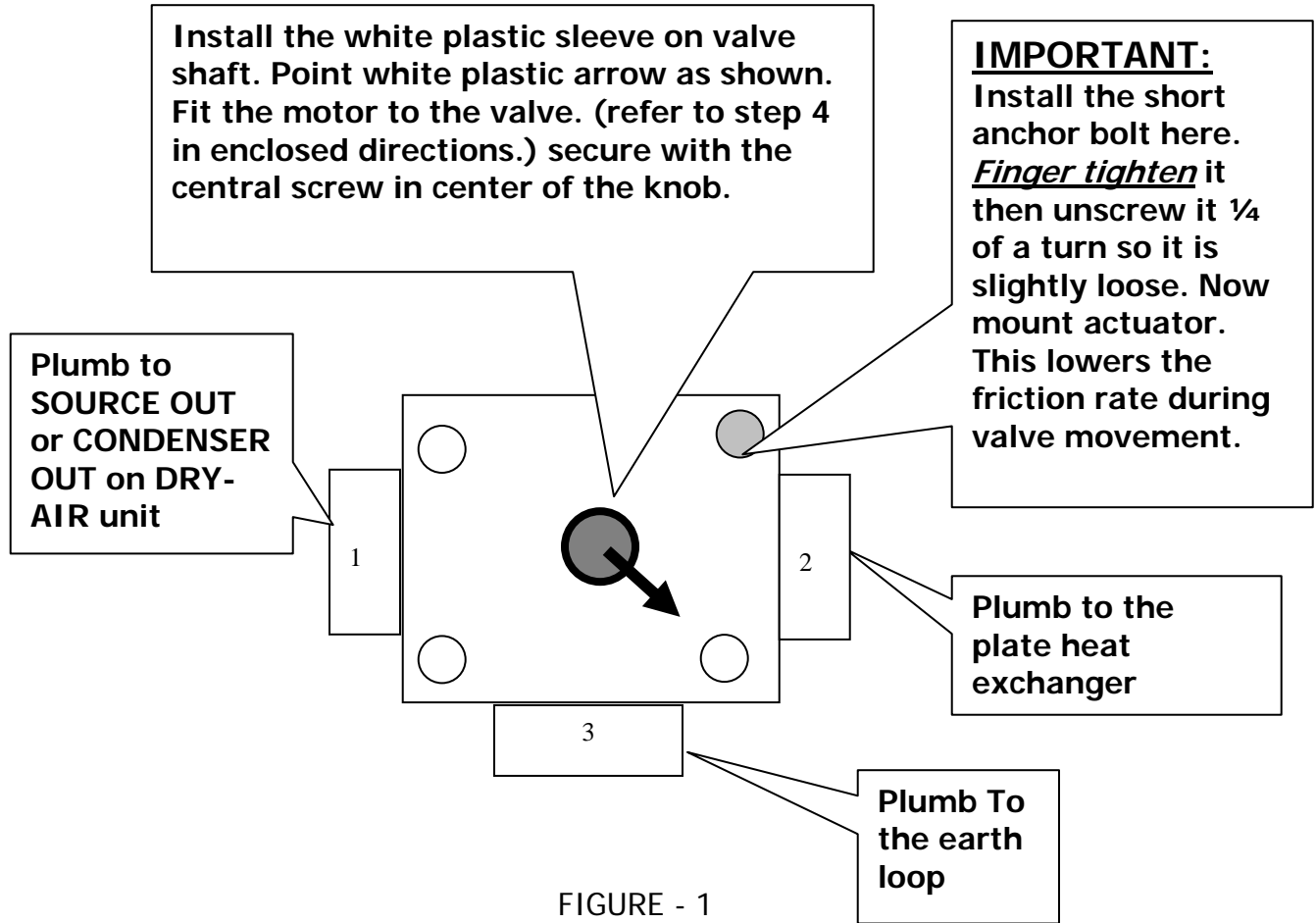
BOTTOM DISCHARGE WITH BY-PASS

By-pass can be flex duct, galvanized spiral or rectangular with manual damper. See installation manual for sizing.



ESBE 3 WAY VALVE PLUMBING ASSEMBLY

NOTE: The SOURCE or CONDENSER OUT line must be plumbed to either port #1 or #2. Any other configuration will not work. Figure 1 shows port #1 as the source connection. Figure 2 shows port #2 show port #2 as the source connection.



Electrical connections.

When energized:

Brown Lead – CLOCKWISE: Directs fluid to the plate heat exchanger

Black Lead - COUNTER CLOCKWISE: Directs fluid to the earth loop.

Blue Lead – Common

ESBE 3 WAY VALVE PLUMBING ASSEMBLY

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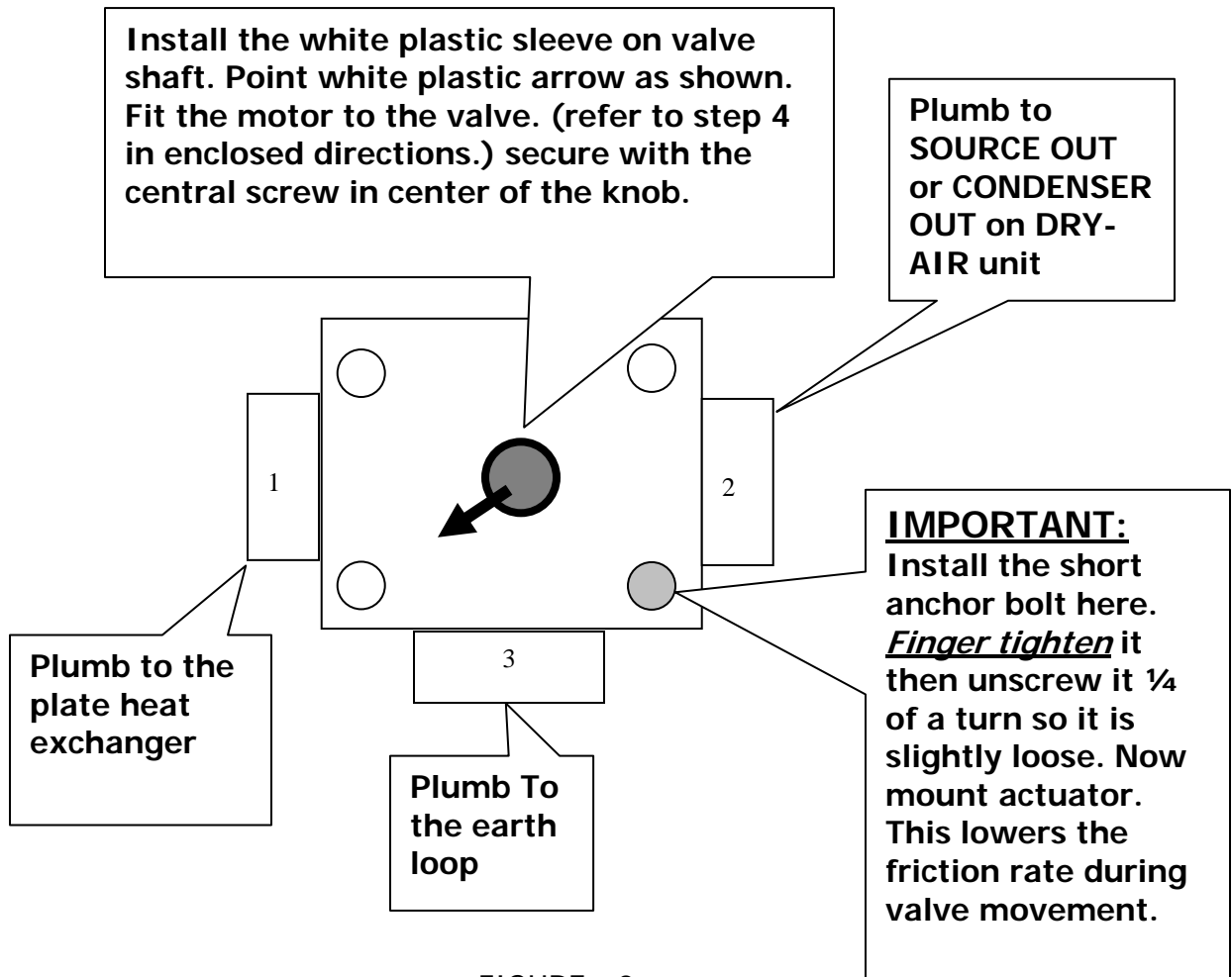


FIGURE - 2

Electrical connections.

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Blue Lead - Common

The function of the Ranco - ESBE Three-way modulating valve.

The three-way modulating valve is exclusive to DRY-AIR dehumidification systems. It allows the simultaneous rejection of heat to three separate devices while in the dehumidification mode. It operates based on the temperature in the internal refrigerant to liquid heat exchanger condenser.

The Ranco's temperature sensor is attached to the leaving liquid side of the condenser to constantly monitor the liquid temperature. In the dehumidification mode, the refrigerant in the evaporator is absorbing both sensible and latent heat with compressor heat being added as well. Some of this heat is sent to the hot gas reheat coil to reheat the air that has been cooled by the evaporator. The excess heat is being sent to liquid heat exchanger condenser. As the Ranco controller senses an increase in liquid temperature, it begins to modulate open sending heated liquid to the swimming pool heat exchanger. As the swimming pool temperature begins to rise, the Ranco controller senses the approaching set point and modulates to allow the excess heat to be sent to the earth loop.

If the pool pump is shut off, the Ranco controller now senses an immediate rise in temperature, modulates to again allow more excess heat to the earth loop.

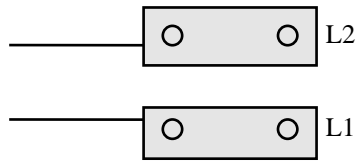
In the cooling mode with the pool pump off, the Ranco controller will modulate to allow 100% of the heated liquid to be channeled to the earth loop.

This very unique system captures and reclaims every BTU of heat, rejecting them back to the pool and space while maintaining a perfectly balanced refrigeration system. Since it is done externally vs. internally on the refrigerant side, service and maintenance is virtually eliminated.

The temperature setting on the Ranco controller controls pool water temper

NOTE: There are two plumbing and actuator configurations involving the three-way valve. Read carefully before installing.

HCR SERIES High voltage wiring for circulating pump



Located in the electrical pane and controlled by the P terminal on the low voltage terminal block.

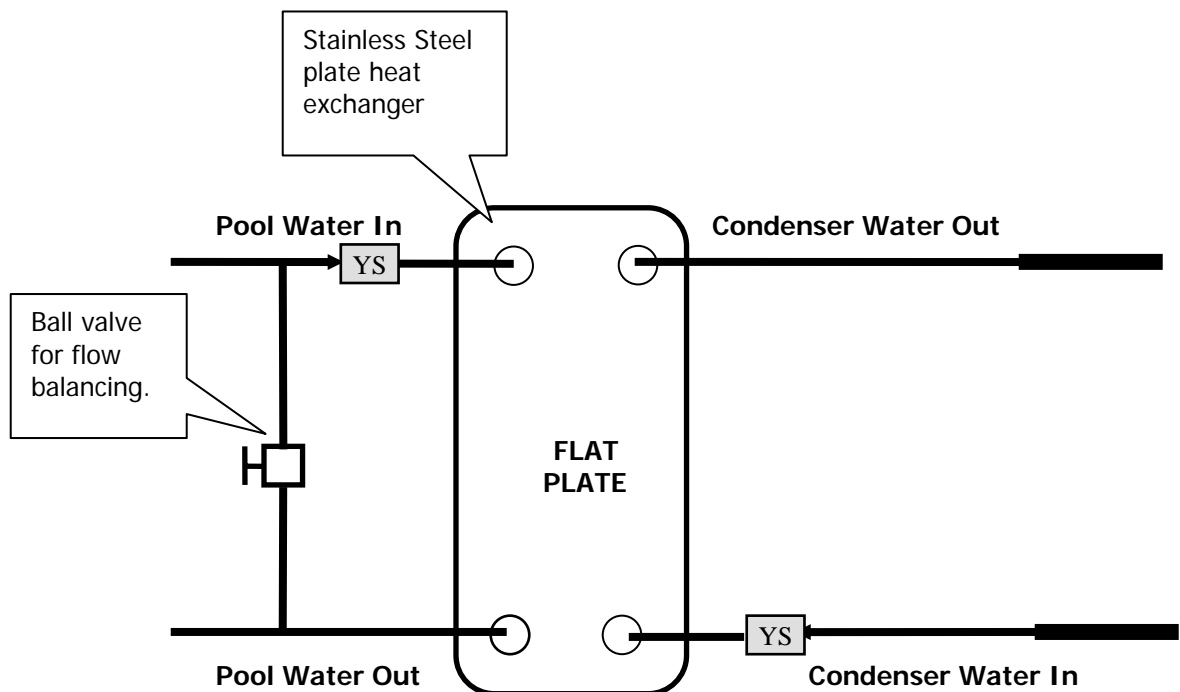
FLAT PLATE

INSTALLATION INSTRUCTIONS

Plate Heat Exchanger

Flat plate heat exchangers can be mounted in any position. The water flows should always be connected counter current. By wrongly connecting the flow configuration, heat exchanger performance will be reduced significantly.

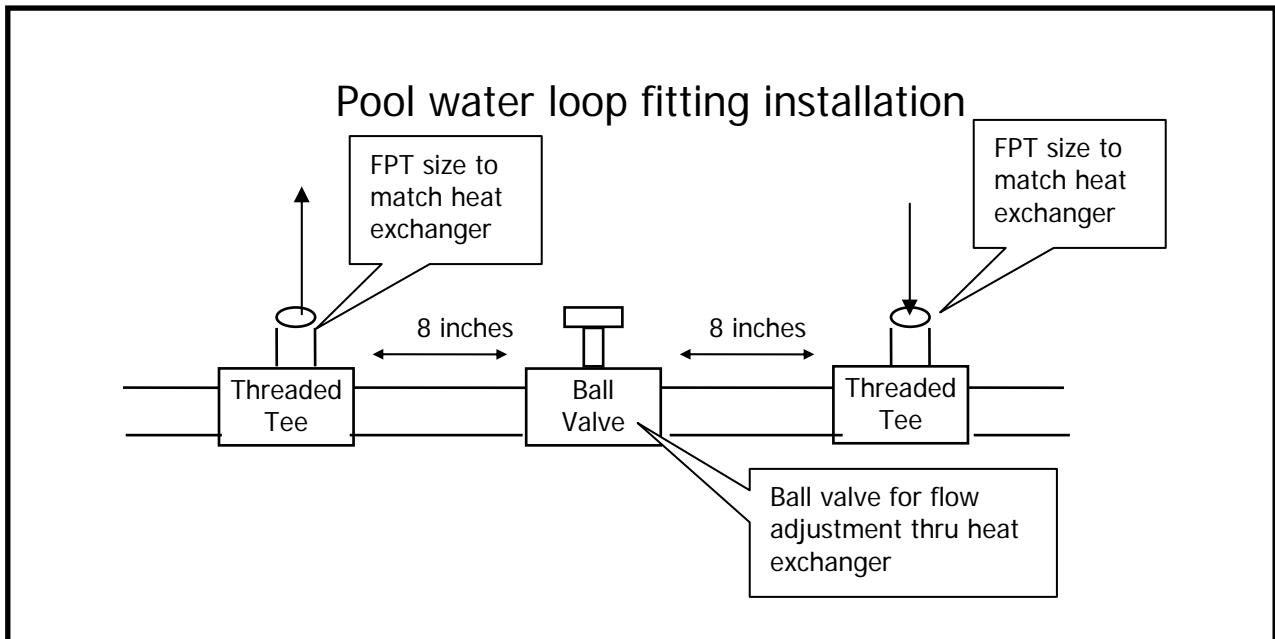
NOTE: Always install Y strainers on the incoming water lines to the heat exchanger. Failure to do so can cause fouling and reduce efficiency.



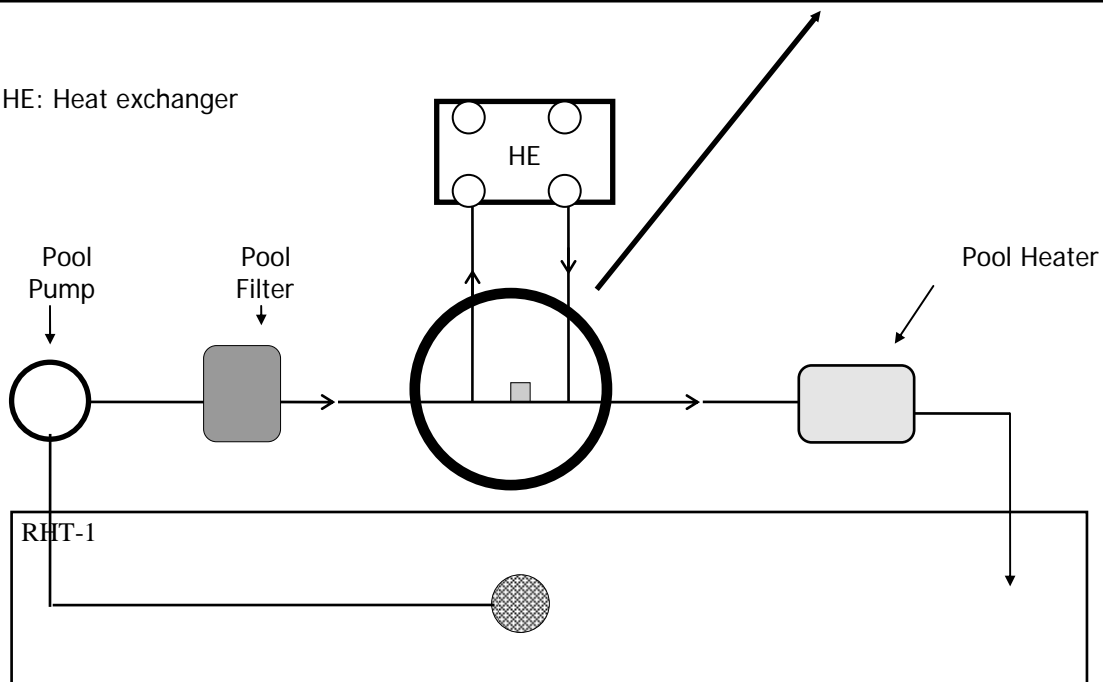
YS -Y Strainer

NOTICE TO INSTALLING CONTRACTOR: Discuss immediately these fittings needed with the pool contractor. Our connections will have no effect on the pool circulation system. If questions arise, call our engineering dept.

Installation guidelines for swimming pool contractors when coupling to a DRY-AIR reclaim dehumidifier.



HE: Heat exchanger



Y STRAINERS

Y strainers must be installed on all plate heat exchangers. They are used to screen out any debris in any water loop such as glue, tape, dirt etc. Plate heat exchangers are very sensitive to this due to the small passageways within and can easily get fouled causing large pressure drops and loss of efficiencies. Therefore a Y strainer is install on the INCOMING water on both sides of the plate heat exchanger furnished with each DRY-AIR unit. After start up, these strainers should be checked to make sure any debris that has been collected is cleaned for continued efficient operation.

CAPACITIES

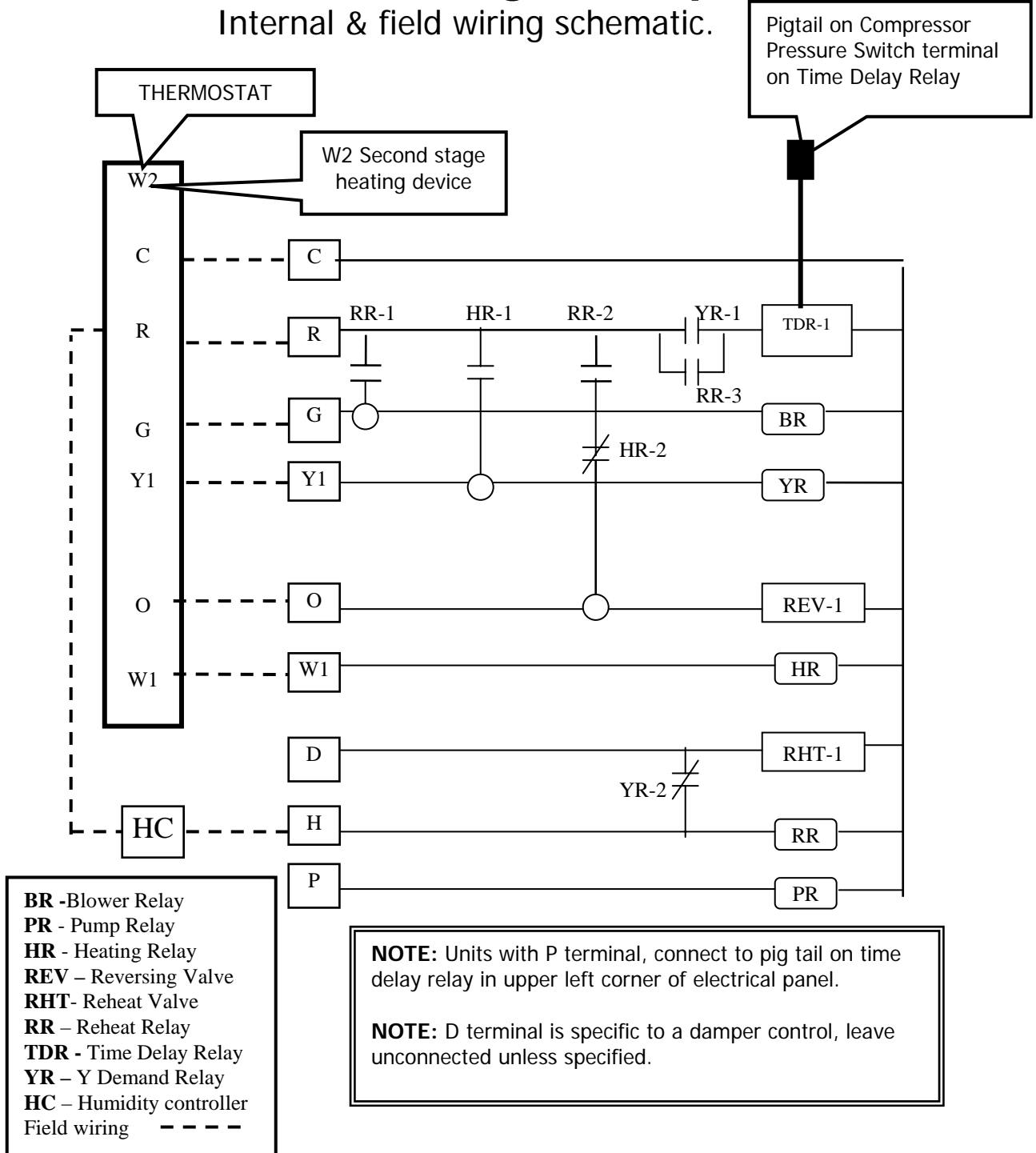
Use .5 gallons per ton on DRY-AIR units.

Gallons of water per 100 feet of pipe:

$\frac{1}{2}$ " = 1 $\frac{3}{4}$ " = 2.25 1" = 4 1.5" = 9

DRY-AIR-GEO HCR *Single Compressor*

Internal & field wiring schematic.



HC - Humidity Controller is a 2-wire control. Makes on humidity rise.

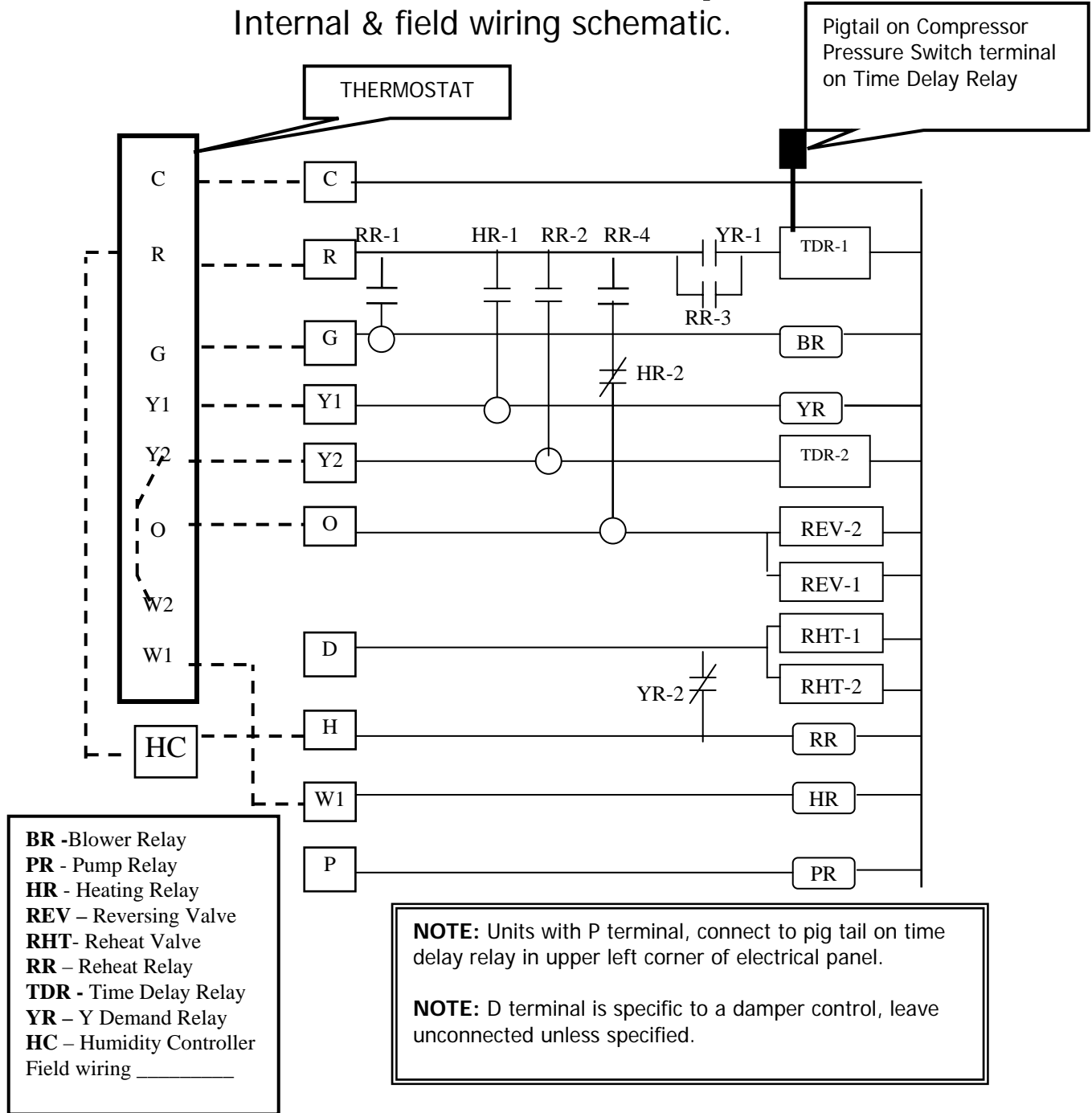
T - Thermostat

DAU Low voltage terminal block

Field wiring — — — —

HCR-D DRY-AIR GEO *Dual Compressor*

Internal & field wiring schematic.



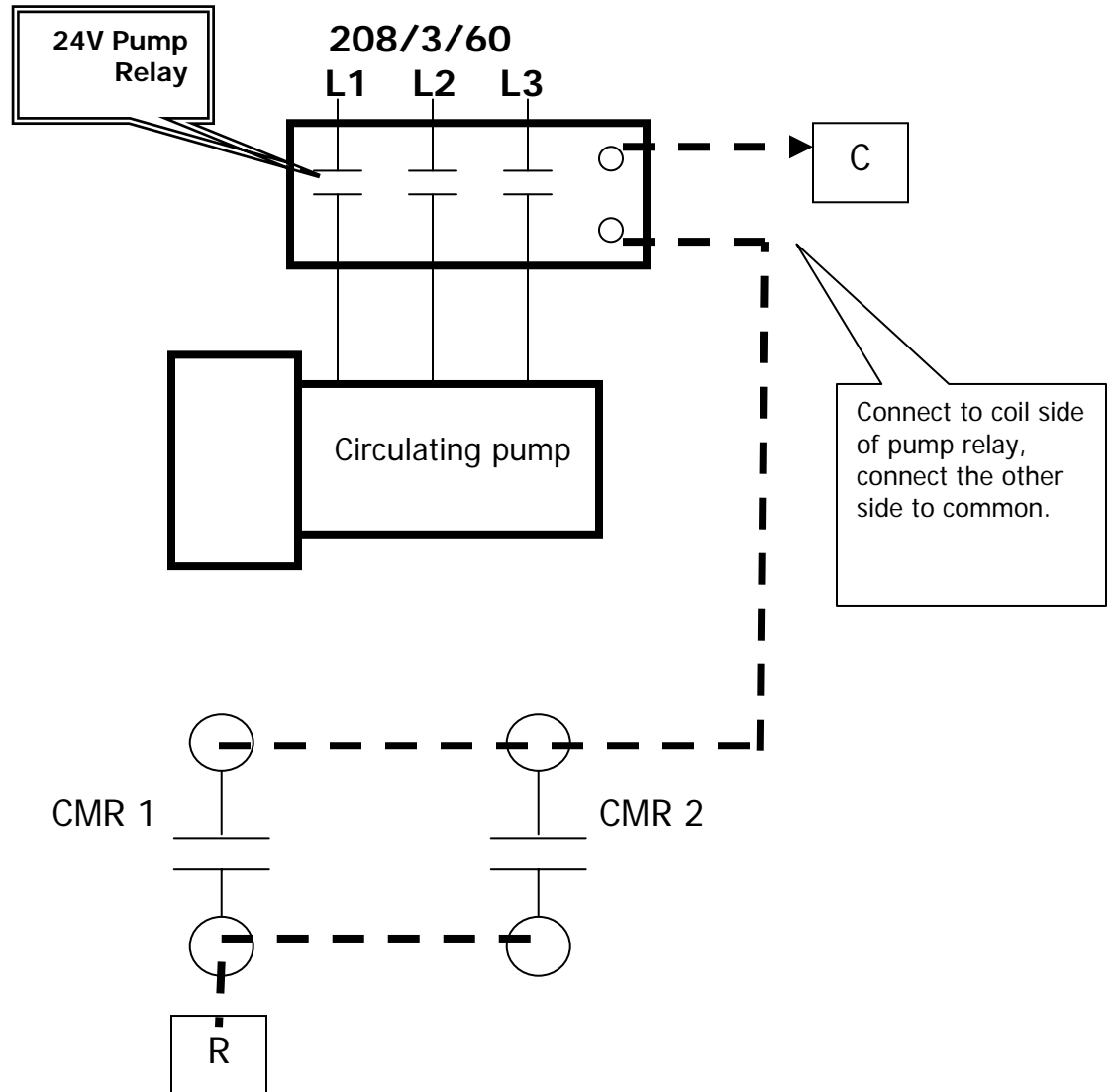
HC - Humidity Controller is a 2-wire control. Makes on humidity rise.

T - Thermostat

DAU Low voltage terminal block

Field wiring **— — — —**

EM SERIES High & Low voltage wiring for pump and pump relay control.



LOW VOLTAGE CONTROL FOR CIRCULATING PUMP (DUAL COMPRESSOR)

Connect one side of CMR 1 & CMR 2 to the R terminal, connect the other side to pump control relay. NOTE: This energizes the pump when either compressor comes on line.

CMR Compressor Monitor Relay

Field Wiring — — — —

SC2811 Temperature controller configuring instructions.

[1] To configure the SC2811, remove the cover of the thermostat by gently pulling on one of the corners.

[2] Under the R & C terminals are two switches labeled MODE & PROG also referred to as SW5 & SW6 in the applications guide.

[3] Simultaneously hold both switches down for 5 seconds while the SC2811 is in the OFF mode.

[4] Press the up and down buttons to change settings with each screen.

[5] Press the PROG button to advance to the next screen. NOTE: the MODE button will return you to the previous screen.

[6] To exit the configuration mode, slide the HEAT/COOL selector button to HEAT or COOL.

There are 15 set up screens, you will only need to change following 5.

Number 1 to read **HP 0 (non heat pump mode)**

Number 2 to read **HS E (electric heat mode)**

Number 10 to read **74 (min cool set point)**

Number 11 to read **88 (max heat set point)**

Number 15 to read **1 (status indicator)**

Slide the Mode switch to Heat or Cool to exit configuration.

Set heating to 82, set cooling to 84, set humidistat to 55%, set controller to AUTO.

Follow check out procedures in DRY-AIR manual.

SEQUENCE: The pool temperature is controlled by the Ranco set point. Heating and cooling have priority. On a call for dehumidification, the Ranco controller modulates the three way valve to direct heat to the pool heat exchanger. As the pool temperature increases, the controller starts directing some of the heat back to the earth loop or discharge line. If the pool pump is OFF, the temperature increase will modulate the three way valve to reject any excess heat not rejected to the space by the internal hot gas reheat coil to the earth loop or discharge line. On a call for either space heating or cooling, the Ranco controller is disengaged and the 3-way valve is powered to allow 100% flow to the earth loop or discharge line.

IMPORTANT

IMPORTANT NOTE #1: BEFORE ADDING OR REMOVING REFRIGERANT, A SUB-COOLING READING MUST BE TAKEN IN THE COOLING MODE. SUB-COOLING SHOULD BE 12-15 DEGREES.

IMPORTANT NOTE#2: WITH THE BLOWER RUNNING, CHECK THE AMPERAGE DRAW AGAINST THE DATA PLATE TO ENSURE IT IS WITHIN FACTORY LIMITS. IF IT EXCEEDS RATED AMPERAGE DRAW, SHUT POWER OFF, ADJUST THE DRIVE SHEAVE TO A SMALLER DIAMETER, AND RE-CHECK AFTER START UP.

SYSTEM CHECKOUT:

After completing the installation, and before energizing the unit, the following checks must be made.

- [] Verify that the supply voltage to the unit is in accordance with the nameplate ratings.
- [] Make sure that all electrical connections are tight and secure
- [] Check that the field wiring and the electrical fusing are the correct size.
- [] Verify that the low voltage wiring between the primary controllers and the unit are correct.
- [] Verify that that water piping is complete and correct and flow is in proper direction.
- [] All access panels are in place
- [] Be certain that the unit is serviceable, and all access panels are secured in place.
- [] Check Thermostat dipswitches and option settings.
- [] Turn the Humidistat to the OFF position.
- [] Set ESBE modulating actuator temperature settings stated in manual.
- [] Turn the manual by-pass damper to FULL OPEN
- [] **NOTE:** This DRY-AIR-HGR unit when installed has an external air by-pass and manual damper. This damper is adjusted based on refrigeration suction pressure. Attach a set of refrigerant manifold gauges before start up.
- NOTE:** Do not attempt to make this adjustment until the entering air temperature reaches a minimum of 80 F.
- [] **IMPORTANT: Adjust pool water balancing valve (see page 5 then leave the pump running.**
- [] Attach a set of refrigerant manifold gauges on the compressor.

SYSTEM START UP:

- 1 Turn power on to unit and observe the ESBE modulating valve actuator, it should immediately start to turn clockwise.
- 2 Program thermostat per installation manual instructions. Raise heating set point 4 degrees above room temperature. Unit fan and space heating device should energize. Let system run until room temperature reaches 80 degrees.
- 3 When room reaches 80 degrees F, turn Humidistat to 20, Compressors, fan and circulating pump should start. Unit is in the dehumidification mode. Let run for a few minutes then adjust external by-pass damper to achieve a 50-55 pounds suction pressure on manifold gauges. (opening damper lowers pressure, closing damper raises pressure)
- 4 With the unit still running in this mode, switch system to cooling, lower cooling set point 5 degrees below room temperature and shut off the pool pump. The hot gas diverter valve is de-energized and the loop will start to get warmer. The ESBE modulating actuator will start to turn counter clock wise diverting all the heat to the earth loop.
- 5 Turn the pool pump on again and notice the ESBE modulating actuator will start to turn clockwise rejecting some heat back to the pool water.
- 6 Check blower motor amperage draw to verify it is within specified limits.
- 7 Shut off high voltage power to the unit and remove the manifold gauges.
- 8 Set space heating temperature to 84 F and cooling to 86. Set humidity setting to 55
- 9 Set FAN to ON. (commercial applications only)
- 10 Turn power on.

Start up completed by (print name) _____

Date _____ Signed _____

Sequence of operation

The DRY-AIR unit is a refrigeration based heat pump reclaim dehumidifier. The heat captured by this process and the added compressor heat is absorbed by a mechanical refrigeration system and distributed as specified herein.

Priorities are. *1- Space heating 2- Space cooling*
 3- Space dehumidification 4- Pool heat reclaim.

- 1 On a call for space heating, the fan is energized along with the heating source, i.e. electric, steam, gas, hot water coil etc. This is controlled by the space heating digital temperature controller.
- 2 On a call for space cooling, the compressor, fan, reversing valve, and three-way valve are energized. Warm humid air is passed through the evaporator. This heat along with the compressor heat is transferred to a coaxial condenser where heat is rejected to the earth loop.
- 3 On a call for space dehumidification, the compressor and fan are and hot gas diverter valve and the three-way valve are energized. The evaporator removes the moisture while cooling the air, the air is then reheated with the hot gas air coil directly down stream with the heat absorbed from the space and the added compressor heat.
- 4 Pool heat is always being added when the unit is running. The absorbed heat from the room plus the compressor heat are transferred to a plate heat exchanger through a modulating 3-way valve, which is coupled to the pool water circuit and the earth loop. When the pool reaches its set point, the three-way valve diverts all the heated liquid to the earth loop.

TROUBLE SHOOTING

PROBLEM	PROBABLE CAUSE	CHECKS AND CORRECTIONS
Entire unit does not run	Power supply off	Apply power, close disconnect
	Blown fuse	Replace fuses or reset circuit breaker. Check for correct fuses.
	Broken or loose wires	Replace or tighten the wires
	Voltage supply low	If voltage is below minimum voltage specified on unit data plate, contact local power company.
COMPRESSOR RUNS FOR 30 SECONDS AND SHUTS DOWN	Lack of water flow	Check circulating pump and water supply. Jumper out flow switch to verify lack of water flow. Air in the system. Energize pump and purge air from loop.
BLOWER OPERATES BUT COMPRESSOR DOES NOT	Thermostat	Check setting, calibration and wiring
	Wiring	Set the fan to "ON" the should run. Set thermostat to "COOL" and lowest temperature.
	Safety controls	Check red lockout light, if lit, (see problem for possible cause)
	Compressor overload open	If compressor is cool and the overload will not reset, replace compressor.
	Compressor motor grounded	Internal winding grounded to the compressor shell. Replace compressor and liquid line drier. If compressor burnout, install suction drier.
	Compressor windings open	After compressor has cooled, check continuity of the compressor windings. If the windings are open, replace the compressor and liquid line drier.
	Defective time delay	Jump or bypass relay, if defective, replace.
LOCK OUT LIGHT IS ON UNIT OFF ON HIGH PRESSURE CONTROL	Discharge pressure to high	In "COOLING" lack of water flow. Entering water temperature to warm. Scaled or plugged condenser.
	Refrigerant charge	The unit is overcharged with refrigerant. Check sub-cooling, reclaim refrigerant until system has a sub-cooling between 12-15 degrees.
	High pressure switch	Check for defective or improperly calibrated high-pressure switch.
	Three way valve	Check for proper 3 way valve setting. Check actuator wiring and operation.
	Return air bypass damper open to far	Check damper adjustment in cooling mode to maintain 50 PSI suction pressure.
	Circulating pump	Check high and low voltage feed for pump operation. Check for dirt or obstructions in impeller flutes.
LOCK OUT LIGHT IS ON UNIT OFF ON LOW PRESSURE CONTROL	Suction pressure too low	In "COOLING" mode: lack of air flow. Entering air temperature too cold. Blower inoperative, clogged filter or restrictions in ductwork. In "HEATING" mode: Lack of water flow. Entering water temperature to warm. Scaled or plugged condenser.
	Refrigerant charge	The unit is low on refrigerant. Check for refrigerant leak, repair, evacuate and recharge with factory recommend charge.
	Low pressure switch	Check for defective or improperly calibrated low-pressure switch.
	Return air bypass damper open to far	Check damper adjustment in cooling mode to maintain 50 PSI suction pressure.

	Circulating pump	Check high and low voltage feed for pump operation. Check for dirt or obstructions in impeller flutes.
UNIT SHOT CYCLES	Unit oversized	Recalculate heating and cooling loads
	Thermostat	Thermostat installed near a supply air grill, relocate thermostat. Readjust heat anticipator.
	Wiring and controls	Loose connections in the wiring or a defective compressor contactor. Added relays and controls overloading 24 volt transformer. Install larger transformer
INSUFFICIENT COOLING OR HEATING	Unit undersized	Recalculate heating and cooling loads.
	Loss of conditioned air	Check for leaks in duct work or introduction of ambient air through doors and windows
	Airflow	Lack of adequate air flow or improper distribution system. Replace dirty filter. Check duct sizing.
	Refrigerant charge	Check sub cooling to achieve 10-15 degrees.
	Compressor	Check for defective compressor.
	Reversing valve	Defective reversing valve creating bypass of refrigerant from discharge to suction side. Replace reversing valve and liquid line drier.
	TXV	Check TXV for possible restriction or defect.
	Inline duct heater	Verify 24 volt signal from thermostat. Check gas valve.

REFRIGERANT TROUBLE SHOOTING CHART

Head pressure too high	COOL	Water flow too low or unit is overcharged
	HEAT	Lack of air flow or unit is overcharged
Head pressure too low	COOL	Water flow too high, air flow too low or unit is undercharged
	HEAT	Water flow too low or undercharged
Suction pressure to high	COOL	Overcharged
	HEAT	Air flow too low
Suction pressure to low	COOL	Air flow tool low or unit is undercharged
	HEAT	Water flow is too low or unit is undercharged
Liquid refrigerant flood back	COOL	Overcharged
	HEAT	Overcharged
System runs but inadequate cooling/heating	COOL	Air flow is too low, inadequate water flow or unit is undercharged
	HEAT	Air flow is too low, inadequate water flow or unit is undercharged
Air coil frosting	COOL	Air flow too low or unit is undercharged

WATER IN LOWER CABINET OF UNIT: This is almost always caused by a plugged condensate drain. Open the blower side panel and if drain pan is full, use compressed air or water going the opposite direction. Check every few months and pour hot water with a few ounces of bleach in the drain pan to keep it clean.

Humidity, Room and Pool Water Temperature Settings

Pool Temperature 80 to 84 degrees F [recommended]

Room Temperature 82 to 86 F [recommended]

Humidity 60% during warmer months, 50% in the colder months.

IMPORTANT: WITHOUT A POOL COVER, The thermostat should be programmed to maintain a temperature of 82 degrees in the winter and 84 in the summer- [in all programmable time settings] The mode selection should always remain in the AUTO mode.

WITH A POOL COVER, the room temperature can be set to any desired setting but before removing the cover, the room temperature should be at or above the pool temperature.

NOTE: The humidity setting should **NEVER** be set below **50%**.

The unit is sized to maintain a 50 to 60 percent relative humidity envelope. Setting the Humidistat below 50% to lower the humidity is not achievable since the evaporation rate accelerates as the humidity drops. As a result the unit runs continuously using excessive energy with no benefits.

Once a comfortable setting has been achieved, the room will take time to balance and the controls should not be altered. ***Never turn the room temperature below the water temperature unless a pool cover is in place.***

In warm weather, opening the doors/windows and airing out the pool enclosure is always beneficial as well as economical. When doing so, be sure to turn both the thermostat and Humidistat to the OFF position first.

SWIMMING POOL CHEMISTRY

The following relates to common problems and misconceptions regarding swimming pool odors and chemistry. What is a Chloramine? A Chloramine is the by-product or waste product after it has done it's work. If these are allowed to form, they create typical swimming pool odors.

FACT # 1. Chlorine odors are **NOT** caused by too much chlorine in the water.

FACT # 2. Chlorine odors are caused by **NOT ENOUGH** chlorine in the water.

FACT # 3. The chlorine smell in pool environments is caused by a pH imbalance, which allows the chloramines to form which then evaporate into the air attaching themselves to the walls and ceiling.

FACT # 4. Purging the entire room with fresh outside air **WILL NOT** get rid of the chloramine odor completely. This can only be done by washing down all the surface areas.

FACT # 5. Chlorine odors **are not** related to the dehumidification system.

HOW TO PREVENT CHLORINE ODORS IN POOL ENVIRONMENTS?

NOTE: Regardless of how sophisticated the automated chemical system is, prevention is accomplished only by ***MANUAL MONITORING** to maintain proper **pH** levels FIRST and chemical additives SECOND.

IMPORTANT: REGARDLESS OF THE AMOUNT OF CHEMICALS IN THE WATER, WHEN THE pH LEVEL GETS BELOW 7.4, CHLORAMINES WILL BEGIN TO EVAPORATE TO THE SPACE.

The **FIRST** step is to maintain the ALKALINITY LEVEL!

Where should the ALKALINITY level be? Between 140 - 160 PPM, WHICH IS OFF THE RECOMMENDED LIMITS OF MOST TEST KITS. (You must achieve the 140-160 OR HIGHER - ALKALINITY level before any chemicals are added). It is therefore paramount that in warm water and **high-density usage, close monitoring** is the key. (During high usage, water should be ***MANUALLY** checked every 2 to 3 hours). The steps are simple.(If you keep it there, you will prevent most of the problems.) **SECOND:** CALCIUM HARDNESS: 160-180 PPM. **THIRD:** Shock with chlorine or bromine to proper levels. New water. (1 pound of Cal-Hypo per 10,000 gallons). When the level of chlorine gets to about 3 PPM, Turn on the Chlorinator.

***IMPORTANT:** [DAYTIME MAINTENANCE] If the chlorine level drops below recommended sanitary levels, a booster will be needed. This is done by broadcasting Di-Chloro or liquid chlorine (not recommended), into the water away from the swimmers. during the day. A final check after closing with additives as needed for the next day. If this is done properly, there should not be a trace of chlorine odor in the pool environment.

ENVIRONMENTAL POOL SYSTEMS INC.

LIMITED WARRANTY-

All warranties based on proper installation and wiring, operating according to design conditions, and maintaining pool chemistry.

Subject to the limitations set forth below. ENVIRONMENTAL POOL SYSTEMS INC., hereinafter referred as EPS, warrants all EPS products against defects in material or workmanship under normal use and maintenance for the time periods stated below. The installation must be completed according to all EPS Specifications and Guidelines for warranty to remain in effect. Under this Warranty we will replace any part, or portion thereof, which our examination shall disclose to our satisfaction to be defective, with a new or rebuilt part, within a reasonable time after receipt of the defective part. An exchanged (replacement) part will be warranted for only the unexpired portion of the original part warranty. The installation form must be returned for warranty to take effect. If not returned, the warranty starts from the date of shipment from the factory.

This Limited Warranty does not cover the mechanical firm's cost of diagnosis, transportation or labor involved in the removal of defective parts or the installation of the replacement, or the actual physical removal or reinstallation of parts. The parts may be covered by warranty, replacement and installation and travel time is not covered, nor is it paid by EPS.

TWELVE MONTH/EIGHTEEN MONTH LIMITED WARRANTY

ALL PRODUCTS-EPS warrants all of its products against defects in workmanship or material within twelve (12) months from date of first installation, or eighteen (18) months from date of manufacture, whichever comes first, if a written communication regarding a defect is received by EPS no later than thirteen (13) months from the date of first installation or within nineteen (19) months from the date of manufacture, whichever comes first.

SIXTY MONTH LIMITED WARRANTY-EXTENDED WARRANTY

COMPRESSOR (1-12 TON UNITS) -In addition, the factory provides an additional 9 year warranty for the compressor, from date of manufacture, provided it is found to be inoperative due to defects in factory workmanship or material. We will replace the compressor with a similar or interchangeable one of the same capacity and quality and the original warranty date of the first compressor is the applicable date for the new replacement-- i.e. If replaced after 2 years, you have a remaining 8 year warranty when the replacement is installed. Parts are warranty, freight and labor for re-installation are not part of the EPS warranty costs. Freight costs and labor costs should be billed to the client by the mechanical contractor.

HOW TO OBTAIN WARRANTY SERVICE

In addition to writing to EPS you must timely notify the installer of any problems with the system. If the installer determines the problem lies with a EPS product, you should direct the installer to call us and/or deliver the defective part to us or directly to the factory at the above address, at client's expense.

LIMITATIONS:

THIS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES WHETHER ORAL OR WRITTEN EXPRESS OR IMPLIED. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. The only exception is the warranty of title. Anything in the Warranty notwithstanding, ANY IMPLIED WARRANTY OF MERCHANTABILITY SHALL BE LIMITED TO THE DURATION OF THIS EXPRESS WARRANTY. EPS EXPRESSLY DISCLAIMS AND EXCLUDES ANY LIABILITY FOR SPECIAL, CONSEQUENTIAL OR INCIDENTAL DAMAGE ARISING FROM ANY DEFECT IN THE PRODUCT, BREACH OF ANY EXPRESS OR IMPLIED WARRANTY, BREACH OF CONTRACT, NEGLIGENCE OR ANY OTHER LEGAL THEORY. Such disclaimed damages include, but are not limited to, loss of profit or revenue, loss of use of the equipment or any associated equipment, loss of capital, cost of any substitute equipment, facilities or services and downtime costs or claims of customers of the purchaser for such damages caused by any defect in the product. The agents, dealers and employees of EPS are not authorized to make any modifications to the Warranty or additional

warranties binding on EPS Accordingly, additional statements, whether oral or written, do not constitute warranties and should not be relied upon.

STATUTE OF LIMITATIONS

No suit shall be brought on an alleged breach of this Warranty more than fifteen (15) months following first installation of the product or twenty-one (21) months from the date of manufacture (sixty-three (63) months for the compressor only), whichever occurs first.

APPLICABILITY

THIS WARRANTY DOES NOT APPLY TO:

- (1) Air filter, fuses, refrigerant, and oil.
- (2) Products that have been relocated after original installation (i.e. any components installed outside of the unit that belong on the inside of the system).
- (3) Any portion of the system not supplied by EPS. i.e. - Inline Gas Duct Furnaces, Hot Water Coils, Fluid Coolers, fabric ductwork, electrical wiring, plumbing, glycol, etc. These peripheral items are warranted according to their manufacturers' warranties and are not covered by EPS. We pass these warranties on to the client. The client must notify EPS if any of these peripherals are defective.
- (4) Products or component parts on which the tags or nameplates have been removed, altered, not installed according to EPS specifications or wiring diagrams, or defaced.
- (5) Products on which payment is in default.
- (6) Scratches in or discoloration of decorative finishes.
- (7) The installation, plumbing and wiring, or conduit not provided by EPS.
- (8) Products damaged during shipment or by improper service or installation, damage to system controls when installed with other designed building controls, products which have defects or damage which results from improper installation, wiring, electrical imbalance characteristics or maintenance, improper pH or chlorine balance of pool water, or caused by accident, misuse or abuse, fire, flood, alteration, misapplication or modification of the product, default or delay in performance caused by war, government restrictions or restraints, strikes, material shortages beyond the control of EPS, breakage or rupture of water tubing and or water condenser coil when subjected to freezing conditions, or acts of God.
- (9) Products which have defects or damage which result from a contaminated or corrosive water circuit or supply, contaminated air due to over chlorinating of a pool or spa, improper chemical storage or chemical spill, operation at abnormal temperatures, pressures and or flow rates, unauthorized opening of the refrigerant circuit or any attachment, accessory or component not authorized and approved by EPS.

NOTE: This Warranty give you specific legal rights, and you may also have other rights which vary from state to state. Some states do not allow exclusion of implied warranties, or limitations on how long an implied warranty lasts, or the limitation of exclusion of consequential or incidental damages, so the foregoing exclusions and limitations may not apply to you.

NOTE: EPS is not responsible for any costs related to electrical or mechanical outside of the equipment quotation provided. We are not installers, mechanical contractors, electricians or plumbers. EPS provides equipment and warranty for equipment only. All peripherals packaged with your system through other manufacturers carry those manufacturers warranties. EPS does not pay mechanical or electrical expenses, contactors, disconnects, (drive time, trip charges, hourly rates to correct improper wiring of system or controls, electrical conduit, piping for plumbing the system, glycol for a/c systems) re-installation of any warranty part, freight for any warranty part) unless it is indicated in the Purchase Agreement.

Note: Although the client may choose to use a mechanical contractor that has installed EPS, or choose his own contractor, EPS is not responsible nor will be held liable for any problems relating to mechanical contractor issues of timely installation, ductwork, improper installation, servicing, wiring, plumbing, glycol etc. These mechanical contracting firms are not employed by EPS, are independent contractors, and we do not warranty their work.

OWNER MAINTENANCE RESPONSIBILITIES FOR WARRANTY

General maintenance on any equipment is handled much like your home or office. Regular checks on furnaces, hot water heaters, etc. to ensure they are operating properly is a must. EPS will ensure your warranty remains in tact if you will follow a few simple procedures for us:

If this is a commercial project with thermostat and humidistat located in the pool room, we recommend that these controls be put under a cover and "locked down" so that the temperature and humidistat settings cannot be changed by customers or staff not allocated to do so.

Owner to set up a regular preventive/maintenance schedule with the installing contractor. There is a one year total warranty on the complete unit and the installing contractor for your project would be the most likely candidate to handle your first year service/warranty agreement.

- 1. OWNER TO CHECK FILTERS ON A REGULAR BASIS (MINIMAL EVERY TWO WEEKS) AND ENSURE FILTERS ARE CLEAN OR REPLACED. If the filters become plugged up this cuts down air flow in the room, and the unit may lock out to protect itself from burning out a compressor or other parts.**
- 2. OWNER TO CHECK FOR ANY KIND OF LEAKS IN PIPING OR PLUMBING, AND IF FOUND, CONTACT MECHANICAL CONTRACTOR, PLUMBER, ETC. TO DETERMINE WHAT IS LEAKING AND TO ENSURE IT IS FIXED AS SOON AS POSSIBLE. (Leaks can cause fluids from system to drain and burn out items if not caught and fixed, please check this on a regular basis as the system "settles" in).**
- 3. If the system doesn't seem to be dehumidifying, check the following: Humidistat and Thermostat settings**
 - a. See if the system is running or if there are any RED LIGHTS appearing on the side panel, and what they say (i.e. "compressor lockout")**
 - b. Did you have a power out recently? If so, shut the system down completely, wait a few moments, and turn it back on. See if that will re-set it.**
 - c. Check to see where your thermostat is set at.
What is the temperature (84 Degrees?)**

- d. What is the humidistat set at? (Between 50-55% Relative Humidity?)

ROOM AND POOL TEMPERATURES – MAKE SURE THEY ARE IN LINE WITH THE DESIGN CONDITIONS FOR YOUR SYSTEM (80-82 POOL TEMPERATURES, 84 DEGREES AIR TEMPERATURE) MAKE SURE YOUR AIR TEMPERATURE DOES NOT FALL BELOW YOUR POOL TEMPERATURE, OR THE DEHUMIDIFIER MAY NOT KEEP UP TRYING TO DEHUMIDIFY THIS ROOM, AND YOU MAY HAVE CONDENSATION PROBLEMS.

- e. If everything is set correctly and the system is still not working, call your mechanical contractor who installed the unit to have him check it. Do not touch anything else at this time. Have your mechanical contractor put a set of gauges on the unit first and check sub-cooling.

4. Owner to maintain proper pH and Chlorine Balance of pool at all times to prevent corrosion and rust of equipment, electrical wiring, parts, relays, contactors, etc. If you can smell chlorine in the pool room, the pool is out of balance. The balancing information is included in this manual. EPS will not warranty parts or equipment that have been destroyed or are deteriorated due to chlorine.

Annual maintenance that should be set up with your mechanical firm or mechanical responsible for the pool room: check belts, blowers, refrigerant, any leaks, check coils to see if they need to be cleaned.

SPACE HEATING DEVICES

The space heating options available with the DRY-AIR dehumidifier are, Inline gas duct heater (Natural or Propane), Hot water coil, Steam Coil or an Electric heat module.

INLINED GAS DUCT HEATERS

When installing an inline gas duct heater, it should be noted, only horizontal airflow through the unit is acceptable. A top supply dehumidifier will have to accommodate a 90-degree transition into the heater. Units with a side supply will go directly into the heater.

HOT WATER & STEAM COILS

Hot water and steam coils can be mounted in either a vertical or horizontal position. A field mounted 24-volt zone valve is connected to the W1 and C terminal on the thermostat for space heating control.

ELECTRIC DUCT HEAT MODULES

The electric duct heaters are generally mounted in the unit. However in some cases where the blower and motor has been oversized to accommodate the proper air turnover rate, space does not allow it. A separate external mount type unit is shipped in its place and is easily mounted in the supply duct.

NOTE: Questions arise regarding the coil sizes being too large for the heat required. In many cases this is true because the unit has been fitted with a much oversized blower package to accommodate the airflow requirements. Therefore, coil over-sizing is required to maintain acceptable pressure drops so as not to choke down the airflow.

NEGATIVE PRESSURE

ASHRAE 1999 HVAC APPLICATIONS MANUAL states:

“Pool and spa areas should be maintained at a negative pressure of 0.05 to 0.15 in. of water relative to adjacent areas of the building to prevent moisture and chloramines odor migration. Active methods of pressure control may prove more effective than static balancing and may be necessary where outdoor air is used as part of an active humidity control strategy. Openings from the pool to other areas should be minimized and controlled. Passageways should be equipped with doors with automatic closers to inhibit migration of moisture and air.”

It is important to install a negative pressure exhaust fan in any high humidity envelope.

SIZING: The required make up air is ½ a CFM per square foot of space. Example: If the room is 1800 square feet, fresh air requirements are 900 CFM. An exhaust fan must equal 900 CFM plus an additional 30% or 1200 CFM to create and maintain a constant negative pressure to avoid moisture migration. This fan can be install anywhere in the structure as long as the intake is in the conditioned space and the exhaust is to the outside of the building. This device should run continuously if there is no pool cover. With a pool cover, the fan speed can be reduced or shut off but close monitoring is required to assure against any moisture migration. Fan-Tech makes various sizes that can be ducted and are also available with speed controls. Grainger carries them.

EXPANSION TANK

An expansion tank is installed in the water and glycol loop. As the liquid is heated by the refrigerant, expansion takes place. Although the amount is small in relationship to the amount of liquid, it is nevertheless important to prevent seal and plumbing leaks. The size of the tank is based on the size of the system and the amount of piping, which relates to the volume of liquid. In most cases a small tank with a 1-gallon expansion capacity will be adequate up to 60 tons.

ANTI-FREEZE

Propylene or ethylene glycol is suitable for freeze protection. **Automotive type anti-freeze should never be used and will void all warranties.** A maximum of 35% glycol to water solution is recommended. Exceeding this amount reduces system efficiency due to the viscosity factor.

**THIS SHEET MUST BE COMPLETED
AND RETURNED WITHIN 30 DAYS OF
INSTALLATION OF DRY-AIR UNIT FOR
WARRANTY TO BE EFFECTIVE.**

CUSTOMER NAME: _____
ADDRESS WHERE EQUIPMENT IS LOCATED: _____

PHONE # _____ TELE _____
EMAIL: _____

MECHANICAL CONTRACTOR THAT PERFORMED INSTALLATION: _____

TELEPHONE: _____ FAX: _____
CELL PHONE: _____ EMAIL: _____

MODEL #DRY-AIR # _____ SN: _____
HEATING: GAS _____ HOT WATER COIL _____ BOILER _____ ELECTRIC _____
COOLING: FLUID COOLER _____ WATER COOLED _____
SINGLE OR THREE PHASE: _____
DATE INSTALLATION WAS COMPLETED: _____
DATE UNIT WAS RECEIVED: _____
START-UP COMPLETED BY: _____
TELEPHONE: _____ FAX: _____

IMPORTANT WARRANTY INFORMATION

IMPORTANT: ANY **DRY-AIR** SYSTEM NOT INSTALLED BY A LICENSED MECHANICAL CONTRACTOR WILL BE VOID OF ANY WARRANTIES.

IMPORTANT: WARRANTIES DO NOT START FROM DAY OF INSTALLATION. ALL **DRY-AIR** PRODUCT WARRANTIES START 30 DAYS AFTER IT LEAVES THE FACTORY.

IMPORTANT: THE WARRANTY MAIL IN SHEET MUST BE SENT TO EPS INC. WITHIN 30 DAYS OF INSTALLATION TO ACTIVATE WARRANTIES.

FAX OR MAIL THIS SHEET TO ENVIRONMENTAL POOL SYSTEMS, INC.
15045 Dixie Highway, Suite B Holly Michigan 48442
800-671-9629 Fax: 248-634-7579

GLOSSARY

AC	Air Cooled
AV	Air Vent (automatic air purging device installed on liquid loop)
CL	Closed Loop (ground coupled systems)
D	Desuperheater (optional UL approved domestic water heater)
DE	Duel Evaporator (patented, exclusive to EPS INC.)
EHM	Electric Heat Module
FS	Flow Switch
GEO	Geothermal based systems either open or closed loop.
HE	Heat Exchanger (referring to the stainless steel plate isolation external heat exchangers for reclaim and 100% pool heating)
HGR	Hot Gas Reheat
HP	Heat Pump
HW	Hot Water (HC series only up to 6 ton: means 100% pool water heating)
HWC	Hot Water Coil
OL	Open Loop (GEO based systems on well, lake, pond as a source)
OEM	Outdoor Energy Module (outdoor liquid to air heat exchanger for heat rejection or absorption)
PC	Pool Cooling (uses pool water for heat rejection)
PG	Pressure Gauge (to monitor loop pressure indicating a leak)
PS	Pool Source (uses pool water as a source for heating and cooling)
R	Reclaim (pool water heat reclaimed in the dehumidification process.)
NC	No Cooling
SU	Standard Unit
WC	Water Cooled

SERIES MODELS

HCR	Stainless Steel packaged units from 1.5 to 12 ton
EM	G-90 packaged units 15 to 30 ton
MB	G-90 Modular units 30 to 60 ton

HP All heat pump units are 2 stage heating. 2nd stage is either electric, hot water or steam.

SU All standard units must have a heat source added. Choices are 4, 5, 6 or 7.