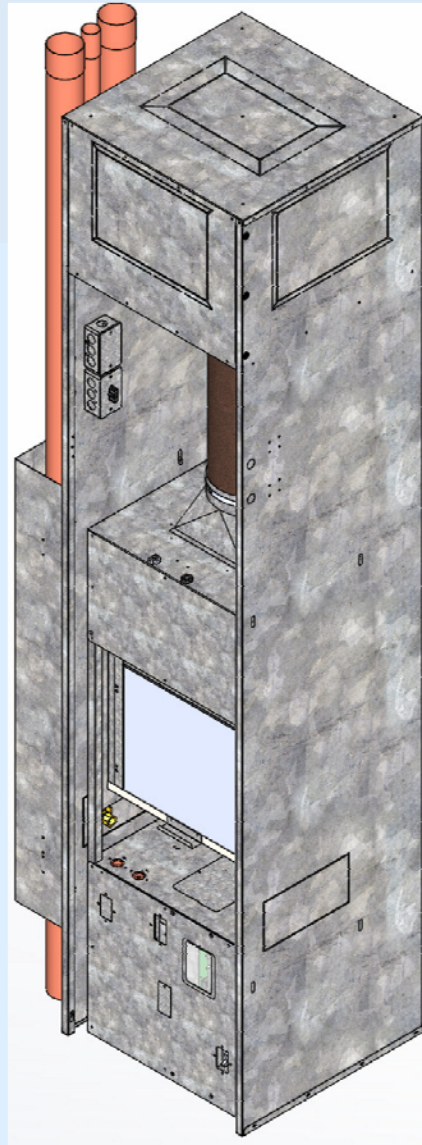


# **HYBRID (HHP) HEAT PUMPS**

**INSTALLATION - OPERATION - MAINTENANCE**



MANUFACTURERS OF ULTRA-QUIET

[omegaheatpumps.com](http://omegaheatpumps.com) | T. 905.670.3200 | F. 905.670.3822



## SAFETY

### WARNING

This information is intended for use only by qualified personnel with background of Electrical and Mechanical experience. Installation or Servicing the equipment may result in personal injury and/or property damage. Manufacturer cannot be responsible or liable for any scenario.

### WARNING

Unit Contains R-410A Refrigerant. R-410A operating pressure are greater than R22. Proper service equipment is required for installation/Service. Failure to use R-410A compatible tools may result in equipment damage and Personal Injury

### WARNING

The Unit contains live electrical components. Qualified personnel must follow all electrical safety precautions during installation, testing, servicing and troubleshooting of this product. Failure to follow these safety precautions may result in serious injuries or death.



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## 1. PRODUCT OVERVIEW

The entire Omega HHP (Hybrid Heat Pump) product line is engineered to provide the quietest vertical stacking water-source hybrid heat pump in the industry—and thousands of installed units have proven this in the field. Properly applied and installed, all our units easily meet NC 36 - 40 within the suite.

### Dependable

Our Water-source Hybrid Heat Pump systems provide easy and reliable year round heating and cooling to the occupants of your Apartments and Condominiums. Simply set the desired temperature and the hybrid heat pump will maintain it.

### Energy Efficient

Unlike Fan Coil systems, the Hybrid (HHP) system can transfer energy from one zone to another. During moderate weather, the sunny side of a building may require cooling while the shady side requires heating. In addition, Hybrid Heat Pump system is designed to use compressor (Refrigerant Circuit) only for Cooling purposes. Therefore, unit saves additional energy by running as conventional Fan Coil unit for Heating.

### Serviceability

Each HHP unit has its own compressor and fan which are easily accessible through the Return air panel. If repairs are required, a spare chassis can be inserted into the unit, allowing it to continuously operate while the damaged chassis is repaired offsite.

### Customizable

Omega Heat Pump units can be easily customized to meet the specific requirements of any project. Some options include: choice of supply air discharge locations and sizes, ultra quiet Acoustic Return Air Panel, and remote Thermostat control.

### Elegant phased installation

The equipment is shipped to the site in two stages to integrate nicely with the phases of construction. This reduces on-site damage and allow mechanical units to be installed indoors, out of the weather.

During the initial stages of construction, the outer casing and plenum are installed. As construction progresses, these become part of the interior wall structure. The final chassis is delivered for installation after the majority of construction is complete and becomes fully integrated into the interior of the unit.

### Testing & quality

To maintain the highest level of quality control, each unit is checked in our state-of-the-art test facility before being shipped to the job site. Large scale production accommodates short lead-times and economies of scale enable low costs without sacrificing quality.

State-of-the-art manufacturing and rigorous quality control systems guarantees every HHP is manufactured with the highest degree of reliability and consistency. In the chassis production line, a 6-station QC system ensures that every stage of chassis production is tested and re-tested, and that each unit complies with ARI published guidelines. Lean Six Sigma procedures result in efficient and cost effective manufacturing that drives a high quality—and highly competitive—product.



# 1. PRODUCT OVERVIEW

## 1.1 Key Features

### Energy Efficient Design

- High efficiency compressors
- Optimum circuited air to refrigerant coils
- Custom sized thermal expansion systems
- High efficiency blower motors
- COP/EER meets or exceeds Ashrae 90.1

### Space Considerations

- Quiet operation
- Mould resistant insulation
- Heavy duty cabinet for vibration free operation
- Architecturally pleasing covers and grilles
- Elastomer vibration isolators on compressors
- Air filter
- Choice of air openings
- Riser flexibility

### Service

- Easy slide out chassis removal and replacement
- Allows spare chassis to be kept in stock for instant replacement
- Controls components in one location
- Plug-in controls
- Run capacitor in front of unit
- Low clog coaxial coil design
- Quick disconnecting water connections
- Simple LED diagnostics on control board

### Reliability

- Spot welded centrifugal blower
- Rotary or scroll compressors by major manufacturers
- Cased air to refrigerant coil

### Environment

- Environmentally friendly refrigerants
- All materials used in the unit are recyclable



## 2. TRANSPORTATION AND STORAGE

- Each Omega Heat Pump unit is checked in our state-of-the-art test facility before being shipped to the job site. For ease of transportation and safety of equipment, Units are shipped in secured packaging. Nevertheless, Units must be handled by care to avoid any damage.
  - Upon receipt of the equipment, check packaging for visible damage and notify Shipper about any such damages before signing delivery ticket. If there is any evidence of rough handling, immediately open the cartons to check for hidden damage. In case of damaged equipment, it is receiver's responsibility to notify the carrier within 48 hours to establish claim and request their inspection and report. Contact Omega's Warranty Claims Department only after notifying carrier.
  - All cartons should be transported and stored in their upright position. If it is necessary to place units in other than their upright position for on-site transfer, the units must be placed in their normal upright position for at least 24 hours before attempting to start them.
  - All Omega Heat pump units must be stored indoor in non-corrosive environment where it is completely sheltered from rain, snow, etc. Excessively high or low temperatures and humidity may deteriorate certain unit components causing permanent damage. It is recommended to place chassis in room conditions before installation.
-



3. MODEL NOMENCLATURE

HHP-30

Type: Hybrid Heat Pump

Unit Size

Unit Size	Tonnage	CFM
HHP-20	1/2 Ton	230
HHP-30	3/4 Ton	300
HHP-40	1 1/4 Tons	400
HHP-50	1 3/4 Tons	500
HHP-60	1 1/2 Tons	600
HHP-80	2 Tons	800
HHP-100	2 1/2 Tons	1000
HHP-120	3 Tons	1200





## 4. INSTALLATION

### General

1. To prevent damage this equipment should not be operated for supplementary heating and cooling during the construction period.
2. Inspect the cartons and pallets for any specific tagging numbers indicated by Omega per request from the installing contractor. At this time the voltage, phase and capacity should be checked against the plans.
3. Check tagging numbers against the plans to ensure unit installation in the correct location.
4. The installing contractor will find it beneficial to confer with piping, sheet metal, ceiling and electrical foremen, together, before installing any conditioners.

### Chassis

1. Remove chassis from its carton. Connect supply and return water hoses to the ball valves on heat pump. Connect supply and return water hoses to the chassis. Observe industry standard for tightening of flare fittings. (See Start up Procedure for further detail)
2. Connect electrical quick connect plug to matching receptacle on the cabinet mounted control box.
3. Slide the chassis into the cabinet until the outside flanges are flush with the front. Install the coil block off panel

### Return Air

1. Screw architectural acoustical front panel to the dry wall furring as per detail in shop drawings.





## 5. START-UP PROCEDURE

The following is designed to guide you through the process of flushing the HHP system. Failure to perform any of the steps below will result in the termination of the manufacture's warranty.

- Prior to first operation of any HHP unit the water circulating system must be cleaned and flushed of all construction dirt and debris. The chassis cannot be connected to system when flushing is being conducted. Supply and return pipes must be interconnected with factory supplied hoses to properly flush system. This will prevent the introduction of dirt into the chassis.
- Before filling installer should ensure all flare fitting connections to the heat pumps meet industry standards. (Finger tight plus 1/4 turn with wrench.)
- Fill system at city water makeup connection with all air vents open. After filling close all air vents assure that boiler and heat rejecter are off but flow is allowed through each. The installer/contractor should start main circulating pump with pressure reducing makeup valve open. Check vents in sequence to bleed off any trapped air, assuring circulation through all components of the system.
- Shut off circulating pump and open all drains and vents to completely drain the system. Short circuited supply and return runouts should now be connected to the HHP unit with factory supplied supply and return hoses. Teflon tape is recommended instead of pipe dope for pipe thread connections. Use no sealers at the swivel flare connections of hoses.
- Trisodium phosphate is recommended as a cleaning agent during flushing. However, many localities prohibit the introduction of phosphates into their sewage systems. The current recommendation is to contact your local water treatment specialist.
- Refill the system with clean water. Test with litmus paper for acidity, and treat as required to leave the water slightly alkaline (pH 7.5 to 8.5). The specified percentage of antifreeze may also be added at this time. Use commercial grade antifreeze designed for HVAC systems only. Do not use automotive grade antifreeze.
- Installing contractor to provide written confirmation that the system was properly flushed and balanced. An independent flushing & balancing agency must be used. Once this is complete a proper start can be completed by HHP start-up contractor by attaching other chassis to the system.
- Set the system heat add set point and the heat rejection set point as required. Supply power to all motors and start the circulating pumps. After full flow has been established through all components including the heat rejecter (regardless of season) and air vented and loop temperatures stabilized, each of the HHP units will be ready for check, test and start-up and for air and water balancing.



## 6. OPERATION LIMITS AND ELECTRICAL DATA

This equipment is designed for indoor installation only. Sheltered locations such as attics, garages, etc., generally will not provide sufficient protection against extremes in temperature and/or humidity, and equipment performance, reliability, and service life may be adversely affected.

### 4.1 Water Temperature

- Recommended Water loop SUPPLY temperature:
  - For Heating: 90°F to 110°F
  - For Cooling: 86°F to 105°F

### 4.2 Air Temperature

- Standard Entering Air Dry Bulb Temperature: 80°F for Cooling and 68°F for Heating
- Standard Entering Air Wet Bulb Temperature: 67°F for Cooling and 59°F for Heating
- Minimum Ambient Air: 50°F for Cooling and Heating
- Maximum Ambient Air: 110°F for Cooling and 85°F for Heating

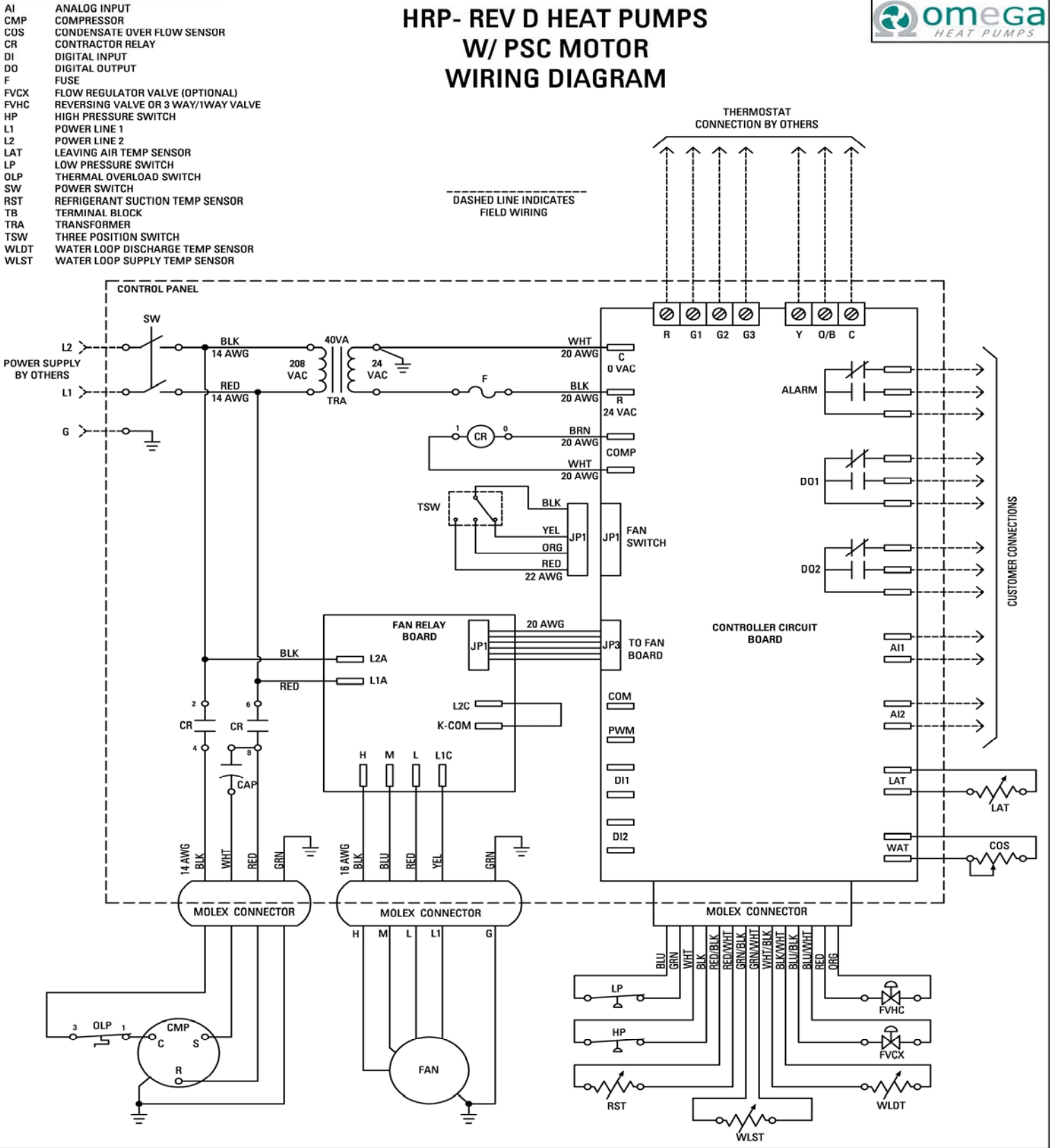
### 4.3 ELECTRICAL DATA

Unit Size	Volts/Phase/Cycle	Breaker (Amps)
HHP-30	208/1/60	15A
HHP-40	208/1/60	15A
HHP-60	208/1/60	20A
HHP-80	208/1/60	25A
HHP-100	208/1/60	30A
HHP-120	208/1/60	35A



# 7. ELECTRICAL CONTROLS

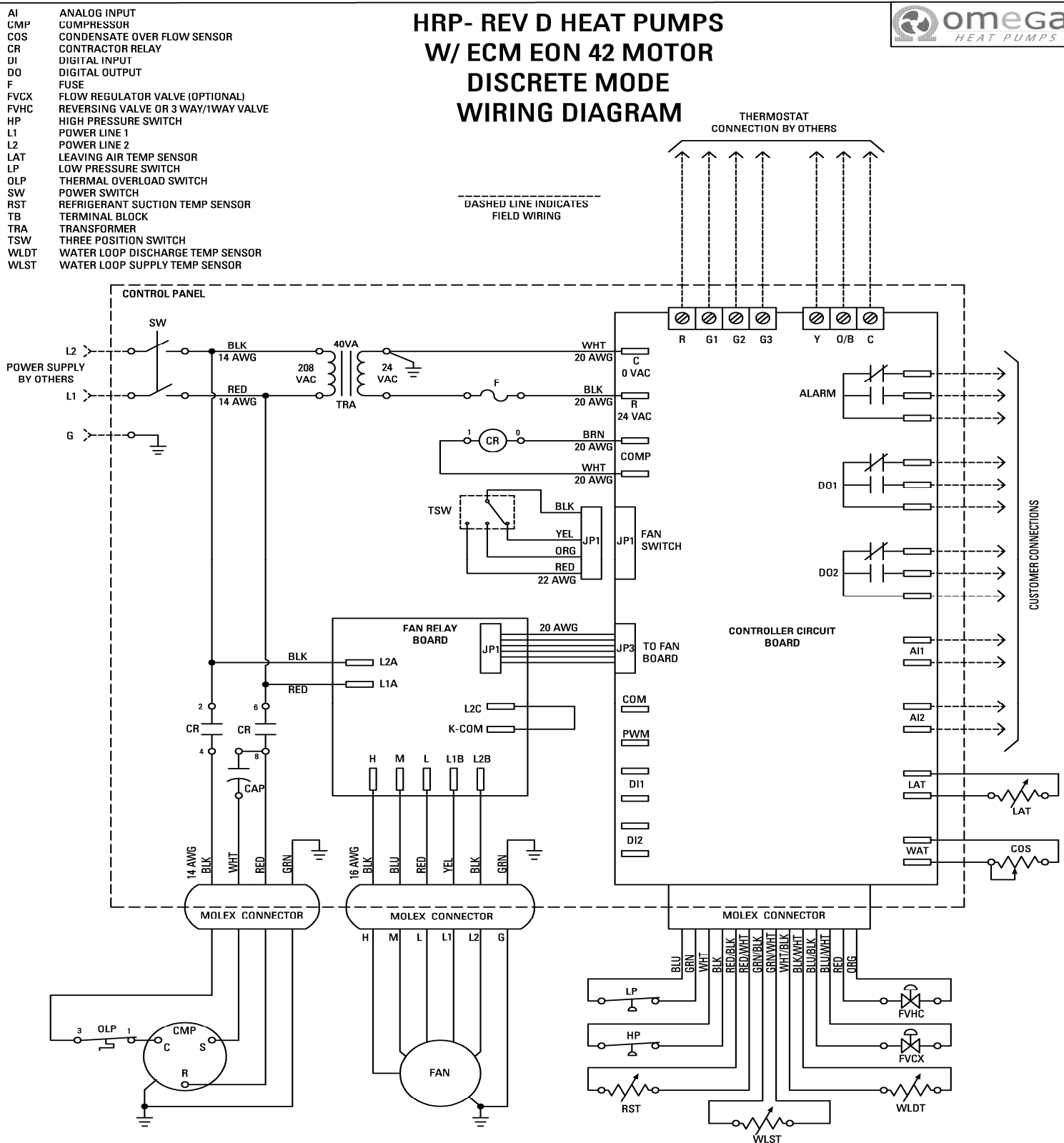
## HRP- REV D HEAT PUMPS W/ PSC MOTOR WIRING DIAGRAM





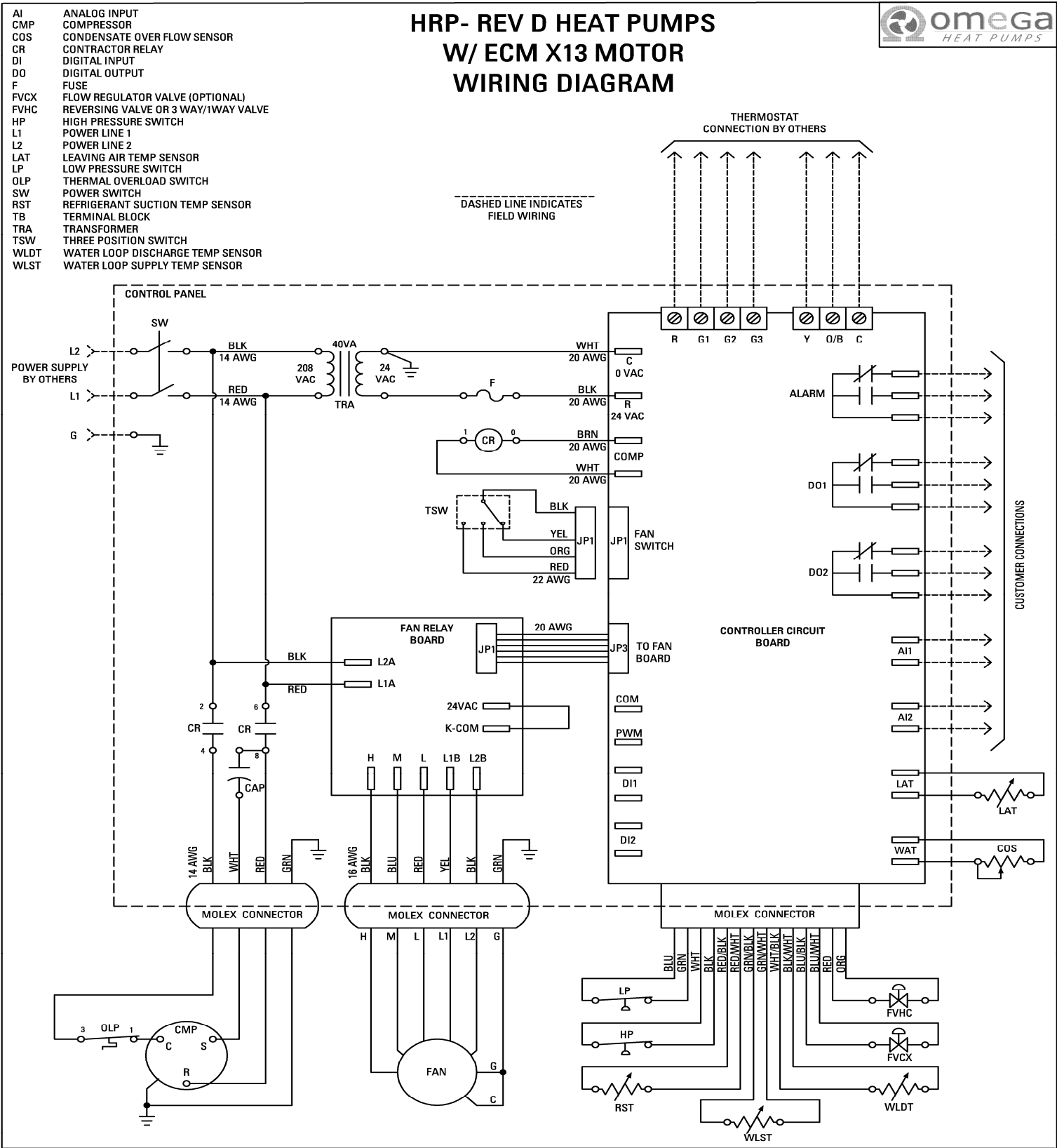
## 7. ELECTRICAL CONTROLS

### HRP- REV D HEAT PUMPS W/ ECM EON 42 MOTOR DISCRETE MODE WIRING DIAGRAM





## 7. ELECTRICAL CONTROLS

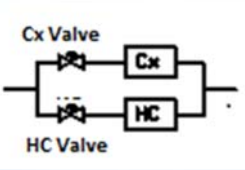




## 7. ELECTRICAL CONTROLS

### 7.2.1 STANDARD HYBRID HEAT PUMP DIP SWITCH CONFIGURATION

Following are the Configurations available for DIP SWITCHES on Hybrid Heat Pump Control Boards.

	Thermostat Type	Heat Pump Type	Flow Type	Coax Valve Control Action	Heat Coil Valve Control Action	Fan Mode
	DIP1-1	DIP1-2	DIP1-3	DIP1-4	DIP1-5	DIP1-6
	Heat Pump Thermostat DIP1-1=ON <b>DEFAULT</b>	Standard HP DIP1-2=ON	Constant Flow DIP1-3=ON	NC Valve DIP1-4=ON <b>DEFAULT</b>	NC Valve DIP1-5=ON <b>DEFAULT</b>	Automatic Fan speed control using Thermostat DIP1-6=ON
	Conventional Heat/Cool Thermostat DIP1-1=OFF	Hybrid HP DIP1-2=OFF <b>DEFAULT</b>	Variable Flow DIP1-3=OFF <b>DEFAULT</b>	NO Valve DIP1-4=ON	NO Valve DIP1-5=ON	Manual Fan Speed control through Switch DIP1-6= OFF <b>DEFAULT</b>

Unless specified by Customer, the “**DEFAULT**” Dip Switch setting shown in above table will be set on Control Boards for Hybrid Heat Pumps

### 7.2.2 FAN MOTOR CONTROL AND CONNECTIONS

#### [Fan Control of PSC Motors](#)

Omega utilizes standard 3 speed PSC motors across its entire product line. The PSC Fan Relay Pack is utilized to enable individual fan motor speeds. See diagram.

#### [Fan Control of ECM EON42 Motors](#)

Omega utilizes the EON 42 ECM motor for its smaller sized heat pumps. The EON 42 ECM motor uses DISCRETE speed mode. In DISCRETE mode, the EON-42 motor is factory programmed with a specific speed for each of its 3 taps. EON-42 taps are selected by applying 208VAC on the required TAP. The EON 42 ECM motor utilizes the Fan Relay Pack for discrete mode. See diagram.



## 7. ELECTRICAL CONTROLS

### 7.3 SEQUENCE OF OPERATION

#### Fan Control

In AUTO fan control mode (DIP1-6 = ON), thermostat inputs G1, G2 and G3 control fan speeds Low, Medium and High speed.

In Manual fan control mode (DIP1-6 = OFF), any single thermostat input on G1, G2 or G3 directly enables a fan request. When a fan request is made, the fan speed is determined by input of 3 position switch, which is mapped to – low, medium or high speed.

#### Special Considerations

- All G inputs are software debounced for 1 second before registering a change of state.
- It is possible to have all inputs G1, G2 and G3 OFF when switching between Fan speeds. To eliminate nuisance cycling of these fan inputs, all G inputs must be OFF for 3 seconds before a fan request of OFF is registered

#### Calls for Heating and Cooling

Calls for Heating and Cooling are initiated by the thermostat.

If a HEAT PUMP thermostat is used, then DIP1-1 should be set to ON.

Y Terminal Closed = call for compressor.

O/B Terminal Open = reversing valve de-energized = call for **HEATING**.

O/B Terminal Closed = reversing valve energized = call for **COOLING**.

If a HEAT/COOL thermostat is used, then DIP1-1 should be set to OFF.

Y Terminal Closed = call for **COOLING**.

W Terminal Closed = call for **HEATING**.

Note: If both Y and O are closed, a call for **HEATING** is assumed.





## 7. ELECTRICAL CONTROLS

### 7.3 SEQUENCE OF OPERATION

**Call for Cooling:** For Hybrid Heat Pumps when there is call from T-STAT for “Cooling” , request for Compressor is Made.

#### **Request for Compressor**

When a compressor request is **made**, the COAX Flow valve will be opened (if not already open). The compressor contractor will then be energized if the following conditions are met:

- Water flow through the coax exists for a minimum of 3 minutes (adjustable). (INTERLOCK)
- The fan has been running a minimum of 3 minutes (adjustable). (INTERLOCK)
- No High Pressure Alarm (HP\_ALARM)
- No Low Pressure Alarm (LP\_ALARM)
- No Condensate Over Flow Alarm (CO\_ALARM)
- The Compressor Anti-Recycle Timer of 7 minutes (adjustable) has expired. (ARTIMER)
- The Water Loop Temperature is within design range
  - ◇ Greater than 115 DegF (adjustable) on Water Supply WLST (In to Coax)
  - ◇ Greater than 127 DegF (adjustable) on Water Discharge WLDT (Out of Coax)

When a compressor request is **terminated**, the COAX will be flushed for 3 minutes (adjustable) and the fan will remain on for 3 minutes (adjustable) to flush the air coil.

#### **Call for Heating:**

When there is call from T-STAT for “Heating”, the Heating Coil Valve will be Opened. When request is met, fan will remain on for 3 minutes (adjustable) to flush the air coil.

#### **Constant Flow vs Variable Flow**

##### **Constant Flow:**

For a hybrid heat pump with Constant flow, the flow is directed to COAX when the compressor is called ON or there is no call for heating or cooling. If there is a call for heating, the flow is directed through the heating coil.

##### **Variable Flow:**

For hybrid heat pumps with Variable flow, flow is directed to the COAX on a call for cooling, to the heating coils on a call for heating. If there is no call for heating or cooling, flow is disabled.



## 7. ELECTRICAL CONTROLS

### 7.4 ALARMS

**HP Alarm** – High Pressure (Latching Alarm) (NC-opens on fault)

- A high pressure alarm will occur when the HP Switch opens
- The red HP\_LED will be illuminated SOLID when a HP Alarm occurs.
- This is a latching alarm that will clear only if power is cycled to the unit

**LP Alarm** – Low Pressure (Latching Alarm) (NC-opens on fault)

**LP ByPass Mode**

- If the LP switch is open and the compressor is running for less than 3 minutes (adjustable), a Low Pressure ByPass warning will be activated. If the LP Switch closes before 3 minutes (adjustable) expires, the ByPass timer will be reset.
- The red LP\_LED on will set BLINKING when in LP ByPass mode.

**LP Alarm Mode**

- A low pressure alarm will occur when the compressor is running and the LP Switch is open for 3 continuous minutes (adjustable).
- The red LP\_LED will be illuminated SOLID when a LP Alarm occurs.
- This is a latching alarm that will clear only if power is cycled to the unit

Notes:

1. If the LP Switch is open on unit power up, a LP Alarm is triggered IMMEDIATELY ( no 3 minute wait).

**CO Alarm** – Condensate Over Flow (Latching Alarm)

- A condensate over flow alarm will occur if the water sensor input is less than 900 (adjustable) for 30 (adjustable) continuous seconds.
- This is a latching alarm.



## 7. ELECTRICAL CONTROLS

### 7.4 ALARMS

To protect the Refrigerant Circuit from high water loop temperatures during “Cooling” mode, following alarms are included :

#### **WLST Alarm** - Water Loop Discharge Temperature (NON-Latching Alarm)

- The water loop SUPPLY temperature is ONLY tested when the COAX Flow Valve is open.
- A water loop SUPPLY temperature greater than 115°F (Cut Out) will trip a WLST Alarm and temperature of 110°F (Cut In) or less will reset the WLST Alarm.
- The WLST LED will be illuminated SOLID on a WLST Alarm.
- This is a NON-LATCHING ALARM, it will lock out compressor operation until the water supply goes below the 110°F (Cut In temperature).

Notes:

- If the WLST Sensor is sensed open (missing) or closed (shorted), a WLST ALARM is triggered.
- The red WLST\_LED will be set blinking.

#### **WLDT Alarm** - Water Loop Discharge Temperature (NON-Latching Alarm)

- The water loop DISCHARGE temperature is ONLY tested when the COAX Flow Valve is open.
- A water loop DISCHARGE temperature greater than 127°F (Cut Out) will trip a WLDT Alarm.
- A water loop DISCHARGE temperature of less than 122°F (Cut In) will reset the WLDT Alarm.
- The WLDT LED will be illuminated SOLID on a WLDT Alarm.
- This is a NON-LATCHING ALARM, it will lock out compressor operation until the water supply goes below the 122°F (Cut In temperature).

Notes:

- If the WLDT Sensor is sensed open (missing) or closed (shorted), a WLDT ALARM is triggered.
- The red WLDT\_LED will be set blinking for this type of alarm.

#### **RST Alarm** – Refrigerant Suction Temperature (NON-Latching Alarm)

- RST temperature is simply monitored for logging and display purposes. It is not actively used in control.
- If the RST Sensor is sensed open (missing) or closed (shorted), a RST ALARM is triggered.
- The red RST\_LED will be set blinking for this type of alarm.
- This is a NON-LATCHING ALARM and not used in any control.



## 8. MAINTENANCE

Omega's water source heat pump has minimum maintenance requirements that should be followed to fully ensure efficient, and proper operation. The following maintenance activities should be timely performed on the specified time intervals.

Important Note: Disconnect Power to the unit before removing Inner Panel to access the Coil.

### Standard Maintenance (Every 60 days)

1. Check and inspect the filter for dirt and clogging, and replace when necessary.
2. Vacuum dust from the unit and air grilles

### Bi-annual Maintenance (Every 6 months)

1. Clean the unit drain pan with a household anti-bacterial detergent.
2. Spray the unit air coil with a household anti-odour spray.

### Annual Maintenance (Once a year)

1. Completely clean the interior of the unit
2. Spray the air coil with a household anti-odour spray.
3. Check the thermostat for proper operation.
4. The condensate drain pan should be checked annually and cleaned and flushed as required.
5. If the unit was equipped with a humidifier, inspect and clean the unit.
6. Thoroughly wash the air coil.

# OMEGA HEAT PUMP INC.



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## *LIMITED PARTS WARRANTY*

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### **GENERAL**

This limited warranty is applicable to the HRP/HHP series Water Source Heat Pumps manufactured by Omega Heat Pump Inc. and used in RESIDENTIAL installations.

### **LIMITED WARRANTY ON PARTS**

Omega Heat Pumps warrants all parts of the HRP/HHP water source heat pump used in Residential applications to be free from defects in workmanship and materials for normal use for the time periods set forth herein. Any part or portion thereof (except air filters) which becomes defective under normal use during the period of this warranty will be repaired or replaced provided the Company's examination shall prove to its satisfaction that the part was or became defective under normal use.

However, Labour charges, shipping charges for replacement parts, replacement of refrigerant or filters and any other service repairs are not covered by this Limited Warranty. It also does not cover any portion or component of the system that is not supplied by Omega Heat Pumps, regardless of the cause of failure of such portion or component.

### **PERIOD OF COVERAGE**

This limited warranty applies for one year from the date of initial operation or 18 months from the date of shipment, whichever is the first to occur, to all parts and components in the Omega Heat Pumps product identified herein, except air filters which are not included in any part of this limited warranty.

OMEGA HEAT PUMP MODEL NUMBER: \_\_\_\_\_

OMEGA HEAT PUMP SERIAL NUMBER: \_\_\_\_\_

DATE OF INITIAL OPERATION: \_\_\_\_\_