51300102101 RevB

HAYWARD®

Heat Pump

For In-Ground Pool & Spa Installations

Installation and Operation Manual



Contents

Safety Instructions.....1
Before You Begin.....4
Installation.....9
Electrical Wiring.....14
Operation.....15
Maintenance & Service.....21
Troubleshooting.....24
Replacement Parts.....27

R-410A

Hayward Industries
1415 Vantage Park Dr., Suite 400
Charlotte, NC 28203
Phone: (908) 355-7995
www.hayward.com

IMPORTANT SAFETY INSTRUCTIONS

READ AND FOLLOW ALL INSTRUCTIONS

Basic safety precautions should always be followed, including the following: Failure to follow instructions can cause death and/or severe injury.

⚠ This is the safety-alert symbol. When you see this symbol on your equipment or in this manual, look for one of the following signal words and be alert to the potential for personal injury.

⚠ **WARNING** - Warns about hazards that could cause death and/or severe injury or major property damage and if ignored presents a potential hazard.

⚠ **CAUTION** - Warns about hazards that could cause minor or moderate personal injury and/or property damage and if ignored presents a potential hazard. It can also make consumers aware of actions that are unpredictable and unsafe.

NOTICE - Indicates special instructions that are important but not related to hazards.

All Heat Pumps must be installed in accordance with all applicable National and Local codes. In the absence of local codes, refer to the latest edition of NSI / NFPA 70 - National Electric Code (NEC) in the United States and of CSA C22.1 - Canadian Electric Code (CEC) in Canada.

This product must be installed and serviced by authorized personnel, qualified in pool/spa heater installation. **Improper installation and/or operation can cause death, serious injury and/or property damage.**

See product rating plate for manufacturer information.

Conformance With Codes: The heater shall be installed in accordance with all local and state codes and with the requirements of the authority having jurisdiction of the installing site. The heater installation must conform to the latest edition of the installation codes.

SAVE THESE INSTRUCTIONS

HAYWARD®

WARNING - Read, Understand, and Follow all Instructions in this manual and on the equipment. Failure to follow instructions can cause death, severe injury and/or serious property damage.

WARNING - **Suction Entrapment Hazard.** Suction in suction outlets and/or suction outlet covers which are, damaged, broken, cracked, missing, or unsecured can cause death and/or severe injury due to the following entrapment hazards:

Hair Entrapment - Hair can become entangled in suction outlet cover.
Limb Entrapment - A limb inserted into an opening of a suction outlet sump or suction outlet cover that is damaged, broken, cracked, missing, or not securely attached can result in a mechanical bind or swelling of the limb.
Body Suction Entrapment - A negative pressure applied to a large portion of the body or limbs can result in an entrapment.
Evisceration/ Disembowelment - A negative pressure applied directly to the intestines through an unprotected suction outlet sump or suction outlet cover which is, damaged, broken, cracked, missing, or unsecured can result in evisceration/ disembowelment.
Mechanical Entrapment - There is potential for jewelry, swimsuit, hair decorations, finger, toe or knuckle to be caught in an opening of a suction outlet cover resulting in mechanical entrapment.

WARNING - To Reduce the risk of Entrapment Hazards:

- When outlets are small enough to be blocked by a person, a minimum of two functioning suction outlets per pump must be installed. Suction outlets in the same plane (i.e. floor or wall), must be installed a minimum of three feet (3') [1 meter] apart, as measured from near point to near point.
- Dual suction fittings shall be placed in such locations and distances to avoid "dual blockage" by a user.
- Dual suction fittings shall not be located on seating areas or on the backrest for such seating areas.
- The maximum system flow rate shall not exceed the flow rating of as listed on Table 2.
- Never use Pool or Spa if any suction outlet component is damaged, broken, cracked, missing, or not attached.
- Replace damaged, broken, cracked, missing, or not securely attached suction outlet components immediately.
- In addition two or more suction outlets per pump installed in accordance with latest ASME, APSP Standards and CPSC guidelines, follow all National, State, and Local codes applicable.
- Installation of a vacuum release or vent system, which relieves entrapping suction, is recommended.

WARNING - Failure to remove pressure test plugs and/or plugs used in winterization of the pool/spa from the suction outlets can result in an increase potential for suction entrapment as described above.

WARNING - Failure to keep suction outlet components clear of debris, such as leaves, dirt, hair, paper and other material can result in an increase potential for suction entrapment as described above.

WARNING - Suction outlet components have a finite life, the cover/grate should be inspected frequently and replaced at least every seven years or if found to be damaged, broken, cracked, missing, or not securely attached.

CAUTION - Components such as the filtration system, pumps and heater must be positioned so as to prevent their being used as means of access to the pool by young children. To reduce risk of injury, do not permit children to use or climb on this product. Closely supervise children at all times. Components such as the filtration system, pumps, and heaters must be positioned to prevent children from using them as a means of access to the pool.

WARNING - **Hazardous Pressure.** Pool and spa water heating and circulation systems operate under hazardous pressure during start up, normal operation, and after pump shut off. Stand clear of circulation system equipment during pump start up. Failure to follow safety and operation instructions could result in violent separation of the pump housing and cover, and/or filter housing and clamp due to pressure in the system, which could cause death, severe personal injury and/or property damage, Before servicing pool and spa water circulation system, all system and pump controls must be in off position and filter manual air relief valve must be in open position. Before starting system pump, all system valves must be set in a position to allow system water to return back to the pool. Do not change filter control valve position while system pump is running. Before starting system pump, fully open filter manual air relief valve. Do not close filter manual air relief valve until a steady stream of water (not air or air and water) is discharged.

WARNING - **Separation Hazard.** Failure to follow safety and operation instructions could result in violent separation of pump and/or filter components. Strainer cover must be properly secured to pump housing with strainer cover lock ring. Before servicing pool and spa circulation system, filters manual air relief valve must be in open position. Do not operate pool and spa circulation system if a system component is not assembled properly, damaged, or missing. Do not operate pool and spa circulation system unless filter manual air relief valve body is in locked position in filter upper body. Never operate or test the circulation system at more than 50 PSI. Do not purge the system with compressed air. Purging the system with compressed air can cause components to explode, with risk of severe injury or death to anyone nearby. Use only a low pressure (below 5 PSI), high volume blower when air purging the pump, filter, or piping.

WARNING - **Risk of Electric Shock.** All electrical wiring MUST be in conformance with applicable local codes, regulations, and the National Electric Code (NEC). Hazardous voltage can shock, burn, and cause death or serious property damage. To reduce the risk of electric shock, do NOT use an extension cord to connect unit to electric supply. Provide a properly located electrical receptacle. Before working on any electrical equipment, turn off power supply to the equipment. To reduce the risk of electric shock replace damaged wiring immediately. Locate conduit to prevent abuse from lawn mowers, hedge trimmers and other equipment. Do NOT ground to a gas supply line.

WARNING - **Risk of Electric Shock.** Failure to ground all electrical equipment can cause serious or fatal electrical shock hazard. Electrical ground all electrical equipment before connecting to electrical power supply.

WARNING - **Risk of Electric Shock.** Failure to bond all electrical equipment to pool structure will increase risk for electrocution and could result in injury or death. To reduce the risk of electric shock, see installation instructions and consult a professional electrician on how to bond all electrical equipment. Also, contact a licensed electrician for information on local electrical codes for bonding requirements. Means for contact separation on all poles must be incorporated in the fixed wiring in accordance with NEC.

Notes to electrician: Use a solid copper conductor, size 8 or larger. Run a continuous wire from external bonding lug to reinforcing rod or mesh. Connect a No. 8 AWG (8.4 mm2) [No. 6 AWG (13.3 mm2) for Canada] solid copper bonding wire to the pressure wire connector provided on the electrical equipment and to all metal parts of swimming pool, spa, or hot tub, and metal piping (except gas piping), and conduit within 5 ft. (1.5 m) of inside walls of swimming pool, spa, or hot tub. IMPORTANT - Reference NEC codes for all wiring standards including, but not limited to, grounding, bonding and other general wiring procedures.

CAUTION - These heaters are intended for use with permanently-installed pools and may be used with hot tubs and spas if so marked. Do not use with storable pools. A permanently-installed pool is constructed in or on the ground or in a building such that it cannot be readily disassembled for storage. A storable pool is constructed so that it is capable of being readily disassembled for storage and reassembled to its original integrity.

WARNING - The appliance is not intended for use by persons (including children) with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

WARNING - Children should be supervised to ensure that they do not play with the appliance.

WARNING - **Risk of Hyperthermia.** To avoid hyperthermia the following "Safety Rules for Hot Tubs" are recommended by the U.S. Consumer Product Safety Commission.

1. Spa or hot tub water temperatures should never exceed 104°F [40°C]. A temperature of 100°F [38°C] is considered safe for a healthy adult. Special caution is suggested for young children. Prolonged immersion in hot water can induce hyperthermia.
2. Drinking of alcoholic beverages before or during spa or hot tub use can cause drowsiness, which could lead to unconsciousness and subsequently result in drowning.
3. Pregnant women beware! Soaking in water above 100°F [38°C] can cause fetal damage during the first three months of pregnancy (resulting in the birth of a brain-damaged or deformed child). Pregnant women should adhere to the 100°F [38°C] maximum rule.
4. Before entering the spa or hot tub, users should check the water temperature with an accurate thermometer; spa or hot tub thermostats may err in regulating water temperatures by as much as 4°F (2.2°C).
5. Persons taking medications, which induce drowsiness, such as tranquilizers, antihistamines or anticoagulants, should not use spas or hot tubs.
6. If the pool/spa is used for therapy, it should be done with the advice of a physician. Always stir pool/ spa water before entering the pool/ spa to mix in any hot surface layer of water that might exceed healthful temperature limits and cause injury. Do not tamper with controls, because scalding can result if safety controls are not in proper working order.
7. Persons with a medical history of heart disease, circulatory problems, diabetes or blood pressure problems should obtain a physician's advice before using spas or hot tubs.
8. Hyperthermia occurs when the internal temperature of the body reaches a level several degrees above normal body temperature of 98.6°F [37°C]. The symptoms of Hyperthermia include: drowsiness, lethargy, dizziness, fainting, and an increase in the internal temperature of the body.

   The effects of Hyperthermia include:
   - Unawareness of impending danger.
   - Failure to perceive heat.
   - Failure to recognize the need to leave the spa.
   - Physical inability to exit the spa.
   - Fetal damage in pregnant women.
   - Unconsciousness resulting in danger of drowning.

Before You Begin

What to Expect When Operating Your Pool Heater

INSTALLATION
- Verify that the installation was done according to owner's manual instructions.

FIRST TIME OR SPRING STARTUP
- Route all pool water piping, but do not connect to heater.

Verify and Balance Pool Chemicals

Pool Chemicals OK?

NO

YES

Connect Water Piping to Heater

Set Required Water Temperature on Touch Pad

IMPORTANT FOR THE HEALTH OF YOUR FAMILY AND FOR YOUR POOL HEATER
- Verify Chlorine or Bromine level every 2-3 days.
- Verify pH level once a week.
- Verify Alkalinity level every 3-4 weeks (more often if you own an automatic Chlorine or Bromine feeder).
  NOTE: Above tests can easily be done by yourself with a do-it-yourself kit.
- Verify Hardness and Total Dissolved Solids (TDS) once a month.
  NOTE: Above test must be done by your dealer.

Will Heating Be Needed Within a Week's Time?

YES

INSTALLATION
When heating is required for less than a week, you MUST leave the bypass valve closed (Figure B) to let the water circulate in the unit. If the heat exchanger is deprived of water circulation for more than 72 hours, high chlorine gas could cause excessive corrosion.

NO

Open Bypass (Figure A) and Drain the Heater

Heating Needed?

YES

NO

Pool Closing Time?

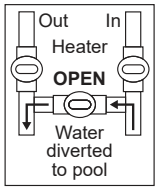
NO

YES

Close Pool
Protect Heater by Covering it

FIGURES

A



B

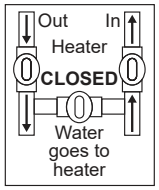


FIGURE 1: Name of Heat Pump Components

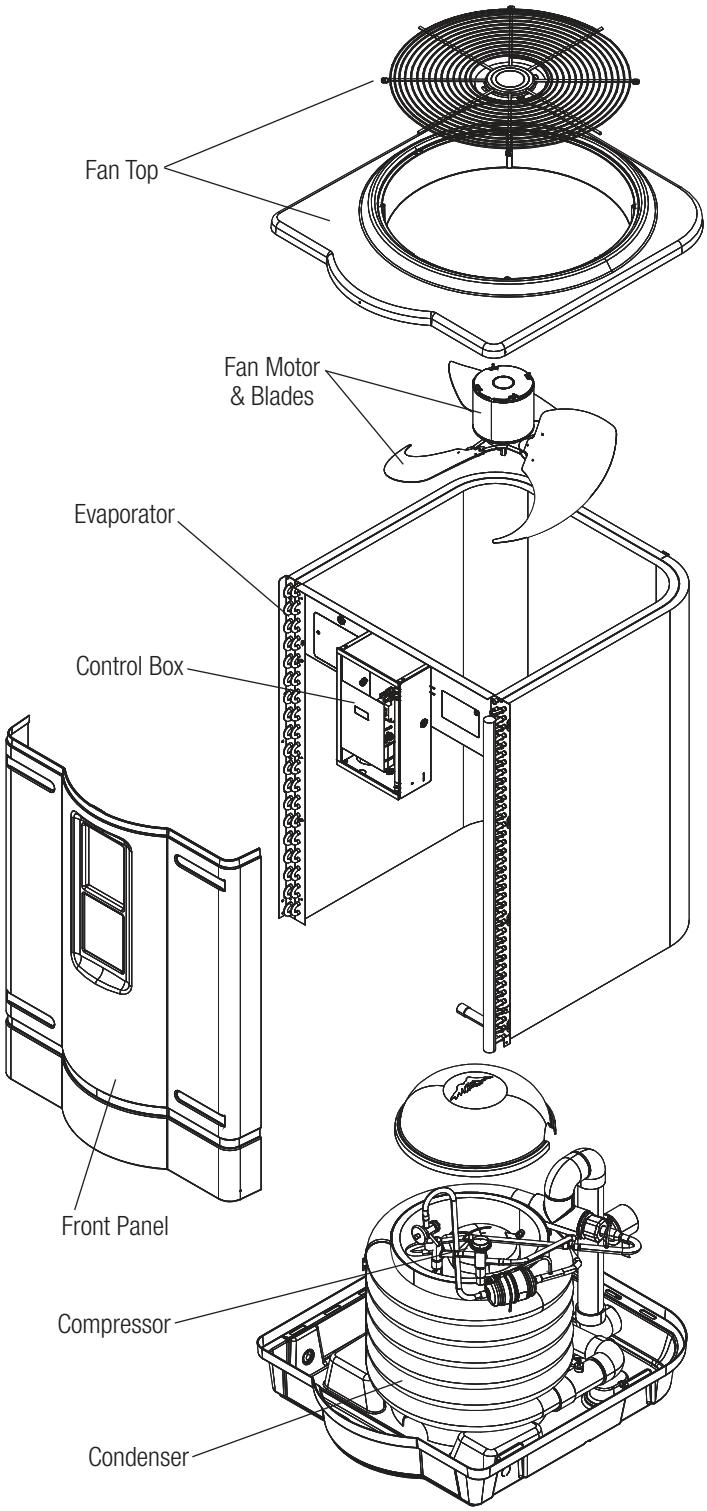
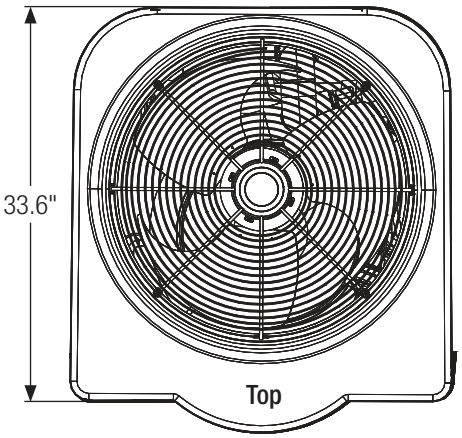
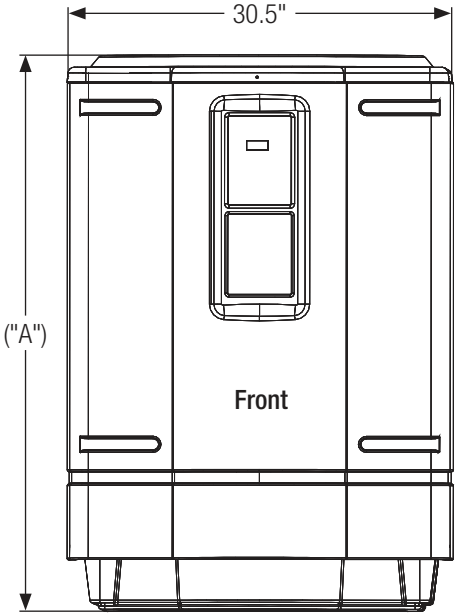
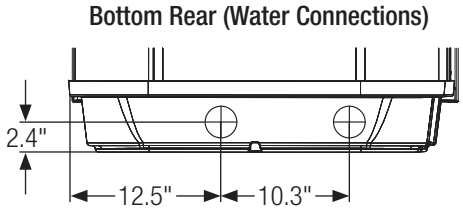


FIGURE 2: Heat Pump Dimensions







Features

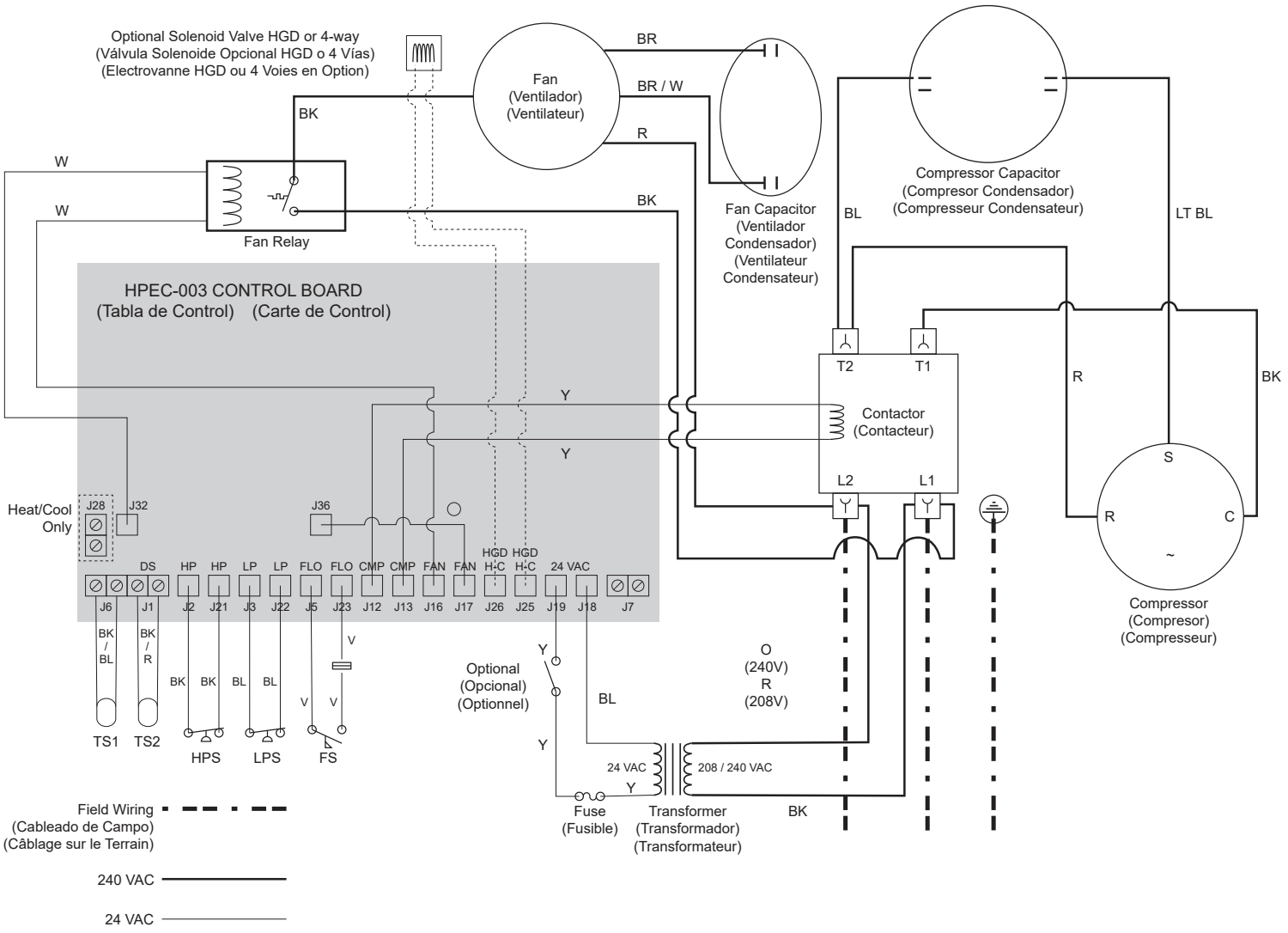
- Titanium heat exchanger for harshest water conditions
- Quiet/Reliable R410A Scroll compressors on most models
- Digital Electronic Control with
  - Easy to read display
  - Dual thermostats for independent pool and spa temperature control
  - Display of diagnostic codes
- UV resistant cabinet for long life
- Defrost function to manage evaporator coil frosting for low ambient temperature operation
- High (590PSI) and low (80PSI) refrigerant pressure switches monitoring extreme operation
- Compressor sound blanket
- Corrosion resistant evaporator fins

TABLE 2: SPECIFICATIONS

Models	100	112	120 H/C	125	140	140 H/C
Voltage/Phase/Hz	240/1/60	240/1/60	240/1/60	240/1/60	240/1/60	240/1/60
					208-230/3/60	
Power Input (kW) 80A-80RH-80W	4.63	5.66	6.18	6.43	7.2	7.2
Total Load	30.7	34.5	39.3	34.5	34.5	34.5
Compressor/Fan/ System RLA (A)	28.3/2.4/30.7	32.1/2.4/34.5	36.9/2.4/39.3	32.1/2.4/34.5	32.1/2.4/34.5	32.1/2.4/34.5
Compressor/Fan/System LRA (A)	178/4.3/182.3	148/4.3/152.3	185/4.3/189.3	185/4.3/189.3	185/4.3/189.3	185/4.3/189.3
Min. Circuit Ampacity (A)	37.8	42.5	48.5	42.5	42.5	42.5
Recommended Breaker Size (A)	40	50	50	50	50	50
Max Fuse/Breaker Size (A)	60	70	70	70	70	70
Capacity (Btu/hr) 80A-80RH-80W	90000	110000	120000	125000	140000	140000
COP 80A-80RH-80W	5.7	5.7	5.7	5.7	5.7	5.3
Capacity (Btu/hr) 80A-63RH-80W	85000	107000	110000	120000	130000	130000
COP 80A-63RH-80W	5.5	5.4	5.4	5.5	5.5	5.2
Capacity (Btu/hr) 50A-63RH-80W	5800	7500	75000	80000	85000	85000
COP 50A-63RH-80W	4	4	4	4	4	4
Water Operating Temperature (°F)	55 - 104					
Air Operating Temperature (°F)	40 - 115					
Recommended Water Flow (gpm)	38.25	48.2	50	54	58.5	58.5
Minimum Water Flow (gpm)	30					
Waximum Water Flow (gpm)	75					
Water Connector Diameter (in)	2"					
Water Inlet to Outlet Distance (in)	10.25					
Max Operating Pressure, High Side (psi)	590					
Max Operating Pressure, Low Side (psi)	360					
Max Allowable Pressure (psi)	615					
Refrigerant Type	R410A					
Refrigerant Safety Classification	A1					
Weight (lbs)	230	245	245	245	280	288
Shipping Weight (lbs)	270	285	285	285	320	328
Height (A)	37	44	37	37	44	44
Shipping Dimensions L x W x H (in)	36.5 x 31 x 42	36.5 x 31 x 49	36.5 x 31 x 42	36.5 x 31 x 42	36.5 x 31 x 49	36.5 x 31 x 49
Approved for Installation	Outdoor Use					

HAYWARD®

FIGURE 4: 240 VAC / 60 Hz Singe Phase Wiring Diagram



TS1 Water Temp Sensor (Sonda de agua) (Sonde d'eau)

TS2 Defrost Temp Sensor (Sonda de descongelación) (Sonde de dégivrage)

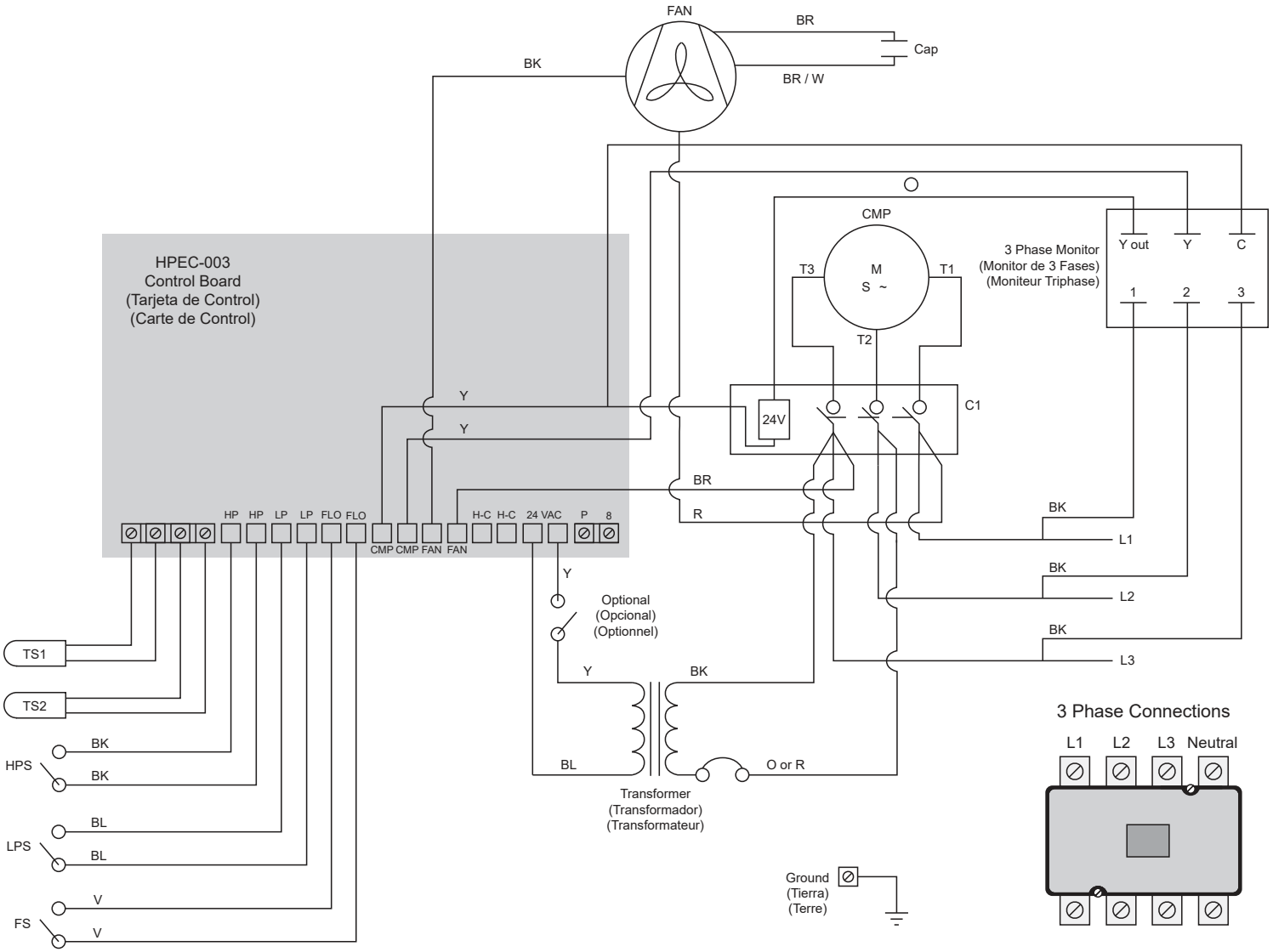
HPS High Pressure Switch (Interrupteur de alta presión) (Interrupter de haute pression)
Closed (Granja) (Ferme) = OK.
Open (Abierto) (Ouvert) = High Pressure (Alta presión) (Haute pression)

LPS Low Pressure Switch (Interrupteur de baja presión) (Interrupter de basse pression)
Closed (Granja) (Ferme) = OK.
Open (Abierto) (Ouvert) = Low Pressure (Baja presión) (Basse pression)

FS Flow Switch (Interruptor de presión de agua) (Interrupteur de pression d'eau)
Closed (Granja) (Ferme) = OK.
Open (Abierto) (Ouvert) = No Water Flow (Sin flujo) (Sans débit)

BK Black (Negro) (Nor)
BL Blue (Azul) (Bleu)
BR Brown (Marrón) (Marron)
G Green (Verde) (Vert)
GY Gray (Gris) (Gris)
O Orange (Naranja) (Orange)
R Red (Rojo) (Rouge)
V Violet (Violeta) (Violet)
W White (Blanco) (Blanc)
Y Yellow (Amarillo) (Jaune)
P Pink (Rosado) (Rose)

FIGURE 5: 208/230 VAC / 60 Hz Three Phase Wiring Diagram



TS1 Water Temp Sensor (Sonda de agua) (Sonde d'eau)
TS2 Defrost Temp Sensor (Sonda de descongelación) (Sonde de dégivrage)
HPS High Pressure Switch (Interrupteur de alta presión) (Interrupter de haute pression)
Closed (Granja) (Ferme) = OK.
Open (Abierto) (Ouvert) = High Pressure (Alta presión) (Haute pression)
LPS Low Pressure Switch (Interrupteur de baja presión) (Interrupter de basse pression)
Closed (Granja) (Ferme) = OK.
Open (Abierto) (Ouvert) = Low Pressure (Baja presión) (Basse pression)
FS Flow Switch (Interruptor de presión de agua) (Interrupteur de pression d'eau)
Closed (Granja) (Ferme) = OK.
Open (Abierto) (Ouvert) = No Water Flow (Sin flujo) (Sans débit)

CMP Compressor (Compresor) (Compresseur)
FAN Fan (Ventilador) (Ventilateur)
CAP Capacitor (Condensador) (Condensateur)
C1 Contactor (Contactor) (Contacteur)

BK Black (Negro) (Nor)
BL Blue (Azul) (Bleu)
BR Brown (Marrón) (Marron)
G Green (Verde) (Vert)
GY Gray (Gris) (Gris)
O Orange (Naranja) (Orange)
R Red (Rojo) (Rouge)
V Violet (Violeta) (Violet)
W White (Blanco) (Blanc)
Y Yellow (Amarillo) (Jaune)
P Pink (Rosado) (Rose)

Installation

Read through instructions thoroughly before installation. Installation instructions are intended for use by a qualified technician, specifically trained and experienced in the installation of this type of heating equipment. Some states or provinces require that the installer be licensed. If this is the case in the state or province where the heater is located, the contractor must be properly certified.

Sprinkler Heads: Be sure that there are no sprinkler heads near the heater that will spray on or into the unit. Many sprinkler systems are connected to a well system whose water is high in minerals, Sulphur, salt and other aggressive contaminates that can cause corrosion and shorten life.

NOTICE: Make sure that sprinklers are placed at a sufficient distance away so that normal wind will not carry the mist to the heat pump.

NOTICE: If located in an oceanfront area, the heat pump should be placed out of direct spray of sand and salt that will clog, damage, and corrode the unit. You may also consider protecting the unit by creating a physical barrier outside of the minimum clearances between the unit and the prevailing beachfront wind.

The Use Of A Pool Cover Is Recommended. A pool cover reduces heat loss, conserves chemicals, lowers the load on filter systems and may provide a valuable safety feature.

Materials Needed For Installation

The following plumbing items are needed.

- 2 inch Isolation Valves qty (3)
- 2 inch Check Valve qty (1)
- 2 x 2 x 2 PVC Tee's qty (2)

For proper installation, appropriate electrical supplies will be needed along with extra hardware items that may be required for anchoring.

NOTICE: Pipe fittings such as reducers, tees, and elbows cause pressure to drop as water flows through them. Plan the plumbing layout carefully, using as few fittings as possible to connect your heat pump. See pad plumbing layout in the Water Piping section for further direction.

Locating The Heater

The installation location of the heat pump is very important for its efficient operation. The heat pump will perform more efficiently when placed in direct sunlight with ample air intake and the avoidance of air re-circulation. Locate the pool heater in an area where its condensation will not result in damage to the area adjacent to the heater or a nearby structure.

NOTICE: DO NOT install the heat pump in a fully enclosed space (i.e. garage, shed etc.).

All criteria given in the following sections reflect minimum clearances. However, each installation must also be evaluated on prevailing local conditions such as proximity and height of walls and public access areas.

Outdoor Installation And Service Clearances: The heater must be installed outdoors such that the installation and service clearances shown in Table 3 and Figure 6 are maintained. Additional installation requirements are as listed:

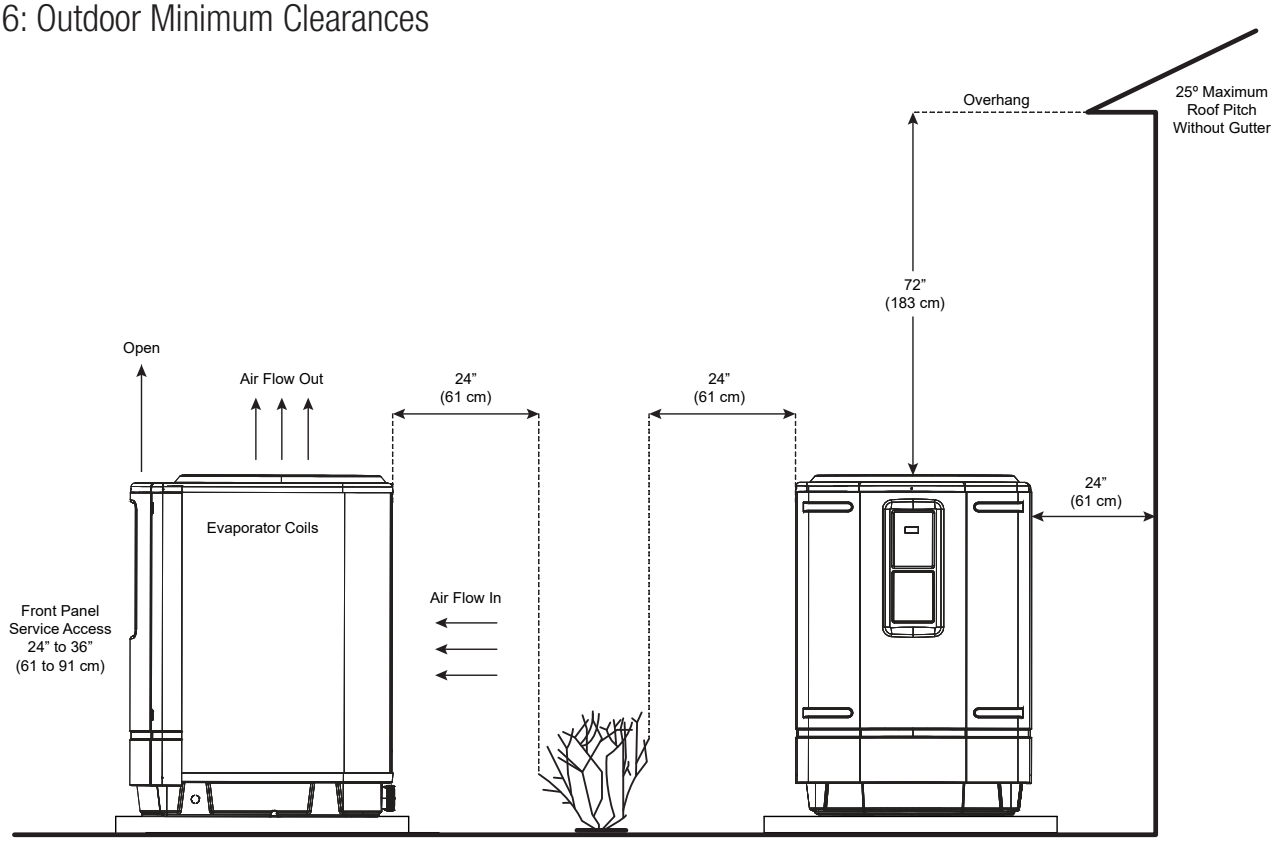
1. Level surface for proper draining.
2. Suitable electrical supply line. See rating plate on the heat pump units for electrical specifications. A junction box is not needed at the heat pump; connections are made inside the heat pump electrical compartment. Minimum wire size to be selected per NEC based on unit MCA.
3. Electric disconnect switch that will interrupt all power to the unit. This switch MUST be within line of sight to the heat pump.
4. Do not install in a location where growing shrubs may in time obstruct a heater's air flow areas (sides or top).
5. Do not install this appliance under an overhang less than 72in from the top of the appliance. The area under the overhang must be open on (3) sides.
6. Do not install the heater where water spray from ground level can contact the heater. The water could damage coil or reach the controls causing electrical damage.
7. Do not install under a deck.
8. Do not install within 24" of any outdoor HVAC equipment.
9. Do not install where water may run-off a roof into the heater. A gutter may be needed to protect the heater.

CAUTION: Make sure the heat pump is not located where large amounts of water may run-off from the roof into the unit. Sharp sloping roofs without gutters will allow massive amounts of rainwater, mixed with debris from the roof to be forced through the unit (see diagram).

1. A minimum of 24in [61cm] of clearance on all sides.
2. If the heat pump is to be installed under a cover or vertical overhang, the unit must have a minimum of 72in. [183cm] of clearance from the top of the heat pump to the bottom of the cover or overhang.
3. Install the heat pump a minimum of 60in. [1.5m] from the inside wall of the pool, spa, solid fence, or permanent barrier. (not shown in Figure 6) Canadian installations require a minimum of 120in. [3m] of clearance from pool water.

TABLE 3: Installation Required Clearances	
Heater Panel	Outdoor Clearance
Top	Unobstructed
Front (control)	24-36"
Rest of Perimeter*	24"

FIGURE 6: Outdoor Minimum Clearances



NOTE: The clearances shown above are for best practice and we encourage the use of the best practice clearances when the space is available. Exceptions can be made where the size of the lot or the configuration of fences, walls or other associated structures do not allow for the best practice clearances. Testing has shown our heat pumps can be installed as close as 12" (coil sides) from a restriction (Wall, fence, etc.).

Equipment Pad: Place the heat pump on a level surface such as concrete or a fabricated slab (pad). This allows proper drainage of condensation and rainwater from the base of the unit. If possible, the pad should be placed at the same level or slightly higher than the filter system equipment pad.

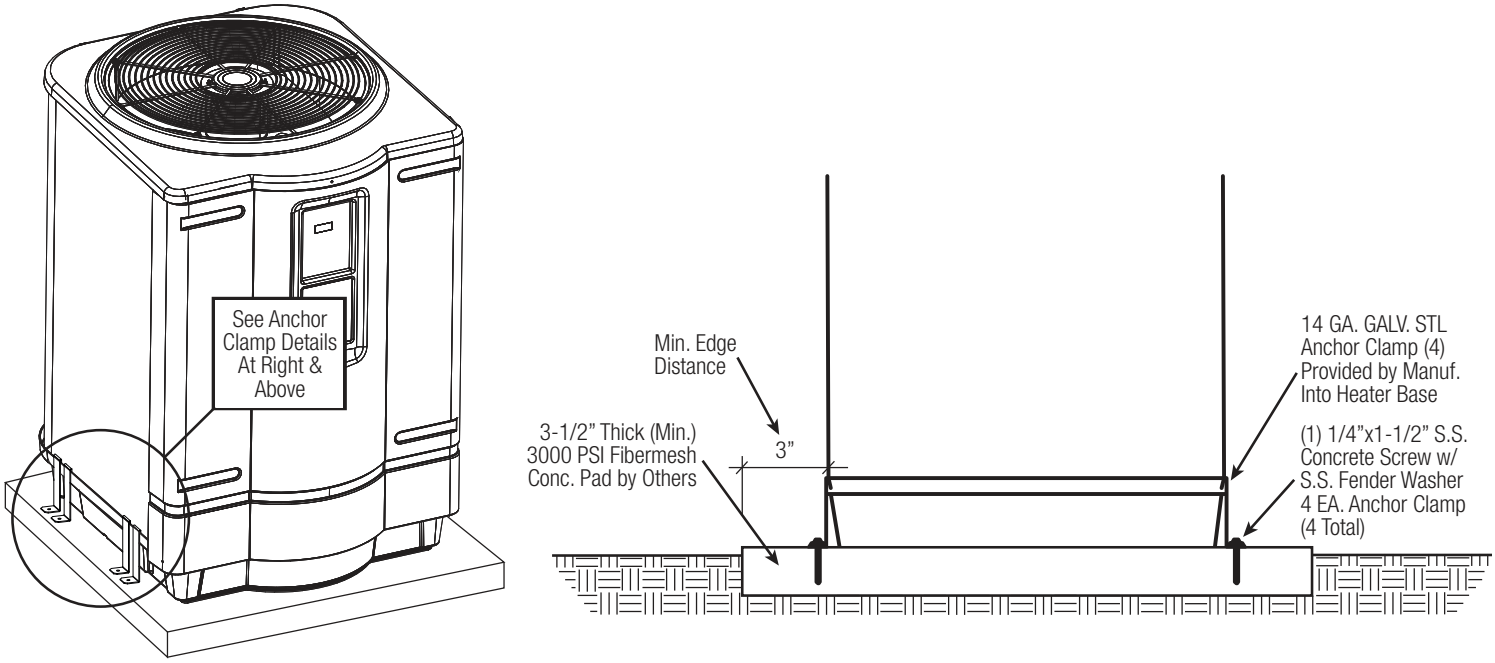
Flooring: This heater may be installed on either non-combustible flooring or combustible flooring that does not reduce the bottom clearance of the heater. Ultralite™ or equivalent concrete-over-foam HVAC pads are acceptable.

Drainage And Condensation: Condensation will be produced by the evaporator coil when the unit is running and drain at a steady rate, usually three to five gallons per hour, depending upon ambient air temperature and humidity. The more humid the conditions, the more condensation will be produced.

Anchoring: The heater is equipped for installation of anchoring screws when required by local codes. Follow all relevant Local, State and National requirements regarding wind load anchoring. When anchoring is required to secure the heat pump to concrete pad, use the specified hardware shown in the Figure 7. To complete the installation use the following:

- Anchor Clamps (Included) qty (8), spaced at least 2½" apart
- Concrete tapping screws (Not Included) qty (8), Tapcons® stainless steel, size to be ¼" diameter with a minimum length of 1½"
- Fender washers (Not Included) qty (8), stainless steel, size to be 1½"

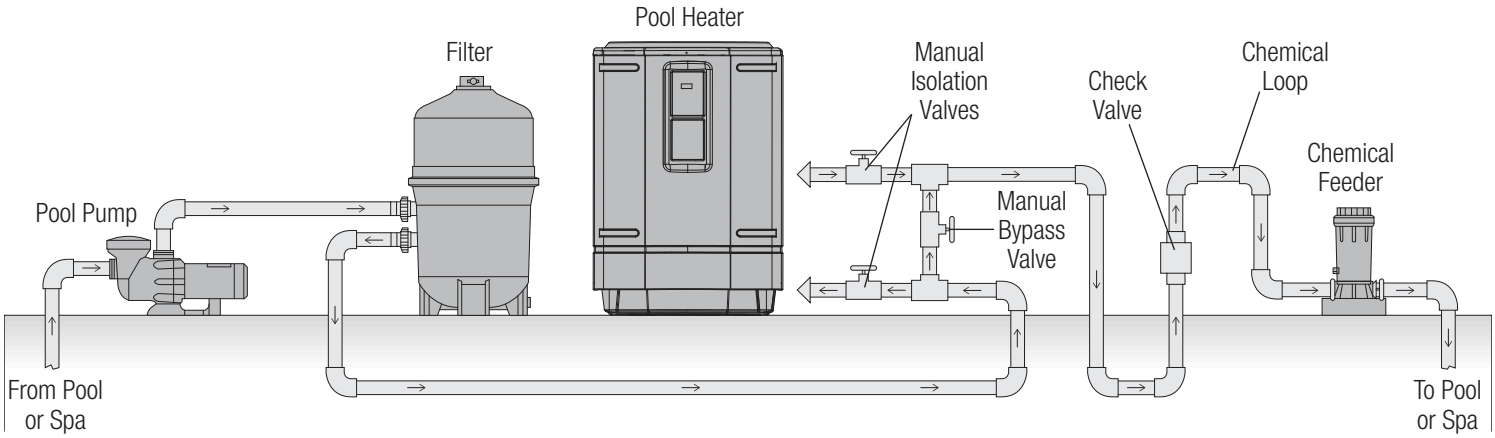
FIGURE 7: Equipment Pad and Anchoring



Water Piping

General: The heater is for use with pool and spa/hot tub water furnished by municipal water distribution systems only. Do not use the heater for mineral water, seawater (PPM>5000), or other non-potable waters. These heat pumps are designed for nominal water flows through the condenser. A minimum flow of 30 gpm is required to ensure sufficient heat removal from the condenser, thus avoiding overheating the unit. The minimum flow rate is to be calculated or measured with the in-floor cleaning system in use, if the pool is so equipped, as well as any other jets or other demands on the water flow. Flow rates above 75 gpm will create excessive pressure drop through the condenser and require unnecessarily high pumping energy. Bypass valve setting may be accomplished by temporarily installing a flow meter on the outlet line of the heater. Then adjust the manual bypass valve until the flowrate through the heater is within the flow rate range specified. Once the manual bypass valve is set, note the position and remove the valve handle to prevent accidental adjustment. Failure to install an External Bypass Assembly with a flow rate of 75 GPM can cause damage . Do not install any restriction in the water pipe between the heater outlet and the pool with the exception of; three-way switching valve, in-line chlorinator and/or chlorinator check valve as shown in Figure 8.

FIGURE 8: General Pad Plumbing Layout



⚠CAUTION: Improperly adjusted manual bypass valves will result in damage to the heater if the flow rates are not maintained under all operating conditions as specified in listed SPECIFICATION.

⚠CAUTION: The heat pump must be protected from back siphoning of water. If there is any chance of back siphoning, provide a check valve between the pool and the filter pump inlet. Failure to follow the instructions may result in property damage due to flooding.

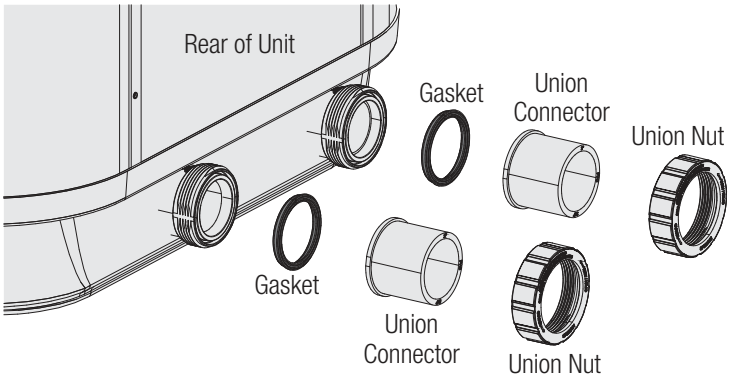
⚠CAUTION: Automatic erosion type chlorinators, if used, must be installed downstream (between the heat pump and the pool) of the heat pump, and a check valve (or Hartford Loop) installed in a manner that will not allow the raw chlorine to drain back to the heat pump when the water pump is off. Failure to follow the instructions may result in property damage.

⚠CAUTION: Do not pour chemicals directly into the skimmer. It could result in damage to your system and heat pump. Arrangement of pool system components other than as illustrated in Figure 8 can affect the operation of the heat pump's water pressure switch. Location of the heat pump above or below the elevation of the pool water surface can also affect operation of the switch. In general, the pressure switch can be adjusted to accommodate this effect if the heat pump water connections are no more than six (6) feet [1,8 m] below the pool water surface or no more than fifteen (15) feet [4,6 m] above it. See instructions for pressure switch adjustment in the START-UP section of this manual. If the heat pump is installed outside of this range, an external pressure switch may need to be installed in the plumbing upstream of the heat pump.

NOTICE: Be advised, that when pool equipment is located below the pool surface, a leak at this lower level can result in large-scale water loss or flooding. Manufacturer is not responsible for water loss or damage it causes.

Unions: The heater is equipped with two detachable union connectors, (2 union nuts and 2 gaskets) included with the heat pump. These fittings must be installed on the heat pump water inlet and outlet to facilitate servicing and winterizing the unit. (See Figure 9). Heat sinks, heat tapes, firemen switches, and check valves are not required on the heater. However, if there is any chance of "back-siphoning" of hot water when the pump stops running, it is suggested that a check valve be used on the heater outlet pipe down stream of bypass system.

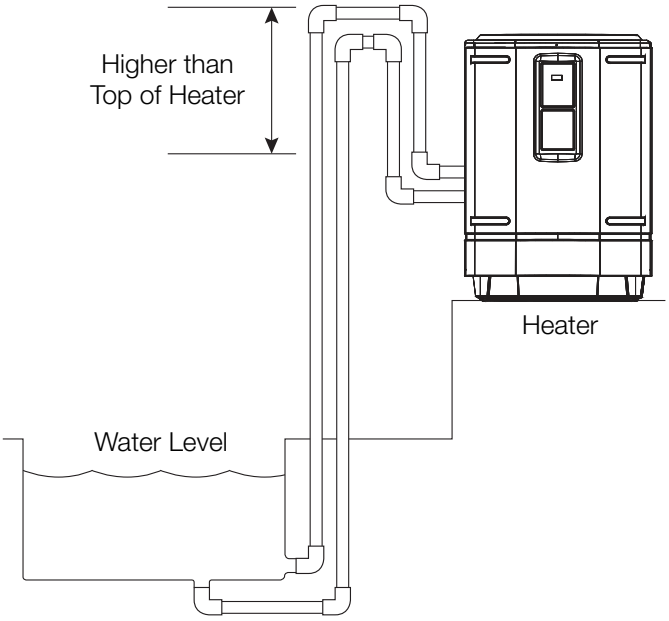
FIGURE 9: Included Union Connectors



Above Pool Installation

The heater is installed less than three (3) feet above the surface of the pool/spa water, install eyeball fittings or directional flow fittings on the end of the return water line to the pool/spa to create adequate back pressure at the heater to operate the pressure safety switch when the pump is running. If the heater is installed more than three (3) feet above the surface of the pool/spa water, install a loop as shown in Figure 10 to prevent drainage of water in the heater during a filter change. For installation above or below the pool/spa surface, refer to START UP section for proper pressure switch setup.

FIGURE 10: Heater Installation Above Pool



Typical Pool Arrangement

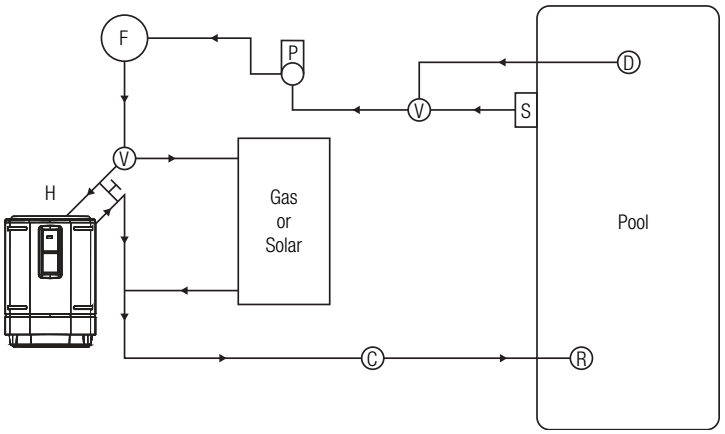
Figure 11 illustrates a typical pool piping diagram and layout for the pool equipment. Also shown is implementation of an optional gas or solar heater system for additional capacity. Other pool heaters, such as gasfired or solar-powered devices must be installed in a parallel circuit and operated independently (only one at a time) for your warranty to be valid.

NOTICE: Because of the intense heat that can be generated by gas and solar units, isolating it with a shut-off valve and a check valve when gas or solar heater is in operation protects the heat pump. Failure to follow the instructions may result in property damage.

Notes:

1. Isolate the heat pump from hot water flow of heating devices such as gas or solar heater.
2. Install bypass loop for heat pump unit.

FIGURE 11: Typical Plumbing to Pool

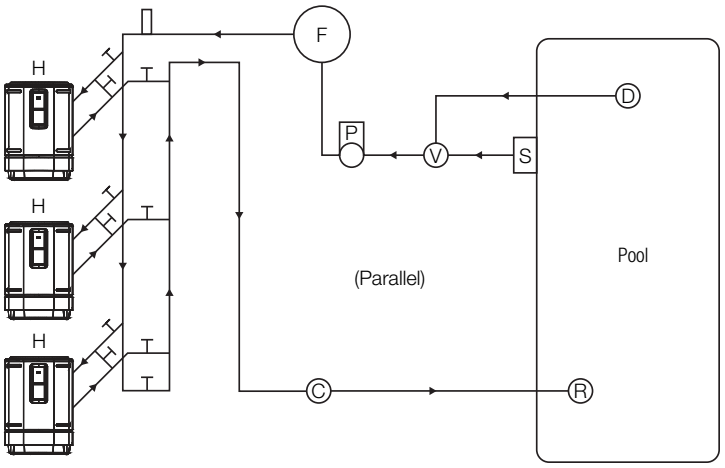


Multiple Heater System

Figure 12 illustrates a multiple heater installation for very large pools with and without a manual bypass valve.

1. Maintain 4-6 ft [1,2-1,8 m] clearance between the units, 2 ft [0,6 m] around perimeter, and at least 6 ft [1,8 m] over them. Refer to Locating the Heater section for more details.
2. Install bypass loops for each unit.
3. Install union style fittings from the heat pump CONSUMER KIT adjacent to the unit to facilitate easy service procedures

FIGURE 12: Multiple Heater System



Automatic Chlorinators and Chemical Feeders

If used, a chlorinator must be installed downstream from the heater in the pool return line and at a lower elevation than the heater as shown in Figure 11. Install a separate positive seal corrosion resistant check valve between the heater outlet and the chlorinator to prevent highly concentrated sanitizer from back siphoning into the heater. Back siphoning may occur when the pump is shut off and a pressure differential is created.

Electrical Wiring

General

An external supply of power is required to operate the pool heater system. Review Specifications for this heater in the Before You Begin section to properly size field power connections. All wiring connections to the heater must be made in accordance with the latest edition of the National Electrical Code ANSI/NFPA 70, unless local code requirements specify otherwise. In Canada, follow CSA C22.1 Canadian Electrical Code, Part 1. The heater must be electrically grounded and bonded in accordance with local codes or, in the absence of local codes, with National Electrical Code, ANSI/NFPA 70. Wiring connections must be made as shown in the wiring diagram found inside the heater cabinet, and a copy is provided for convenience in the Before You Begin section at the beginning of the manual. The heater must also have independent ground and bond connections. There is a ground lug inside the control box adjacent to the power connections and a bonding lug on the side of the heater. Use a solid copper conductor, size 8 or larger. Run a continuous wire from external bonding lug to reinforcing rod or mesh. Connect a No. 8 AWG (8.4 mm2) solid copper bonding wire to the grounding lug provided on the heat pump and to all metal parts of swimming pool or spa, and to all electrical equipment, metal piping (except gas piping), and conduit within 5 ft. (1.5 m) of inside walls of swimming pool or spa. IMPORTANT - Reference NEC codes for all wiring standards including, but not limited to, grounding, bonding and other general wiring procedures.

⚠ **WARNING:** Risk of Electric Shock Review all safety information provided in the Before You Begin section of this manual prior to servicing. Always disconnect power circuit before connecting the heat pump, or working on the heat pump. This equipment contains wiring that carries high voltage. Contact with these wires could result in death or personal injury and/or may also cause property damage.

⚠ **WARNING:** All electrical wiring MUST be in conformance with all applicable local codes, regulations and the National Electric Code (NEC), in particular NEC Article 680: Swimming Pools, Fountains & Similar Installations and Article 440: Air-Conditioning & Refrigeration Equipment.

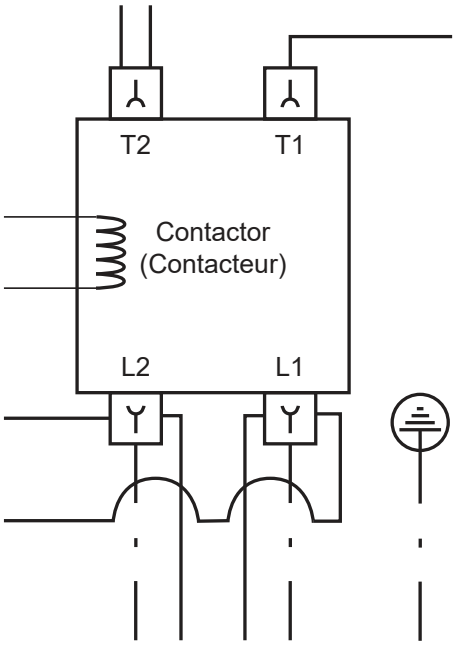
NOTICE: Manufacturer does not recommend the use of ground fault protective devices in conjunction with heat pumps. Most service calls regarding tripping of ground fault devices, are found to be “nuisance” calls.

NOTICE: If voltage drops below 208V, damage may occur. Take proper steps to ensure correct voltage at the heat pump during operation.

Electrical Connections

Turn OFF source power to the heat pump before working on electrical connections. Any unused openings must be plugged and all wiring secured for proper strain relief. The power connections are to be made on the contactor terminals located in the control box (see Figure 13 Power Connections). Plug any unused openings with the supplied caps.

FIGURE 13: Power Connections



Remote Control Connection

The heater is equipped for remote control via independent 2-wire connections. Heat Only models connect the remote relay to terminal J7. Heat/Cool models connect the heating remote relay to terminal J7 and cooling remote relay to terminal J28. (See Figure 14 for remote on/off connections).

1. Connect the Heating remote relay to the J7 connection and the Cooling remote relay to J28 connection L(if applicable) on the control board.

2. Turn the unit on. Press and hold both the “MENU” and the “+” buttons until “bo” appears. This enables the bypass operation.

3. In bypass operation, when the relays are open the heater will be off. When the heating relay (J7) is closed, the heater will operate in heating. When the cooling relay (J28) is closed, the heater will operate in cooling. The temperature control is done remotely through the remote relays.

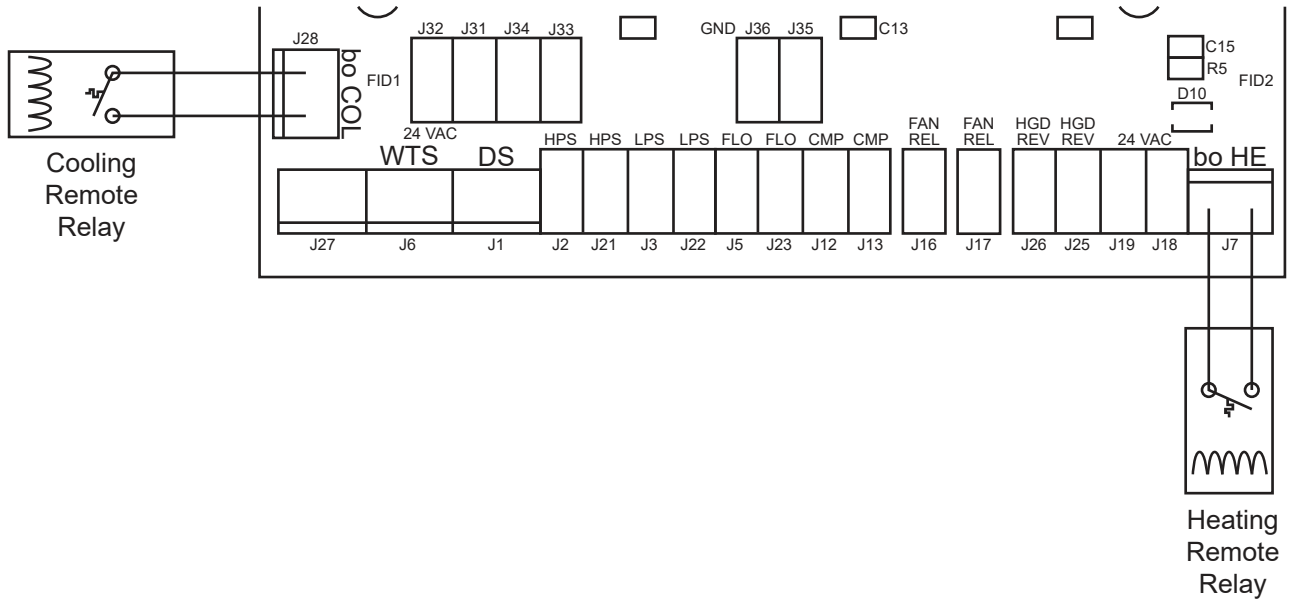
4. The heater will shut off when both relays are open or the inlet temperature exceeds 104°F.

5. If both relays are closed, the heater will operate in heating mode.

Note: The unit must be “On” to operate in bypass mode. In bypass operation “bo” mode, the heater will only respond to the remote relay closure. To return to local set point control at the heater, press and hold both the “MENU” and the “+” buttons until “n” appears. This enables the normal operation mode and the heater will respond to the local set point.

Note: All remote wiring must be run in a conduit separate from incoming power. Use 22 AWG wire for runs less than 30 feet. Use 20 AWG wire for runs over 30 feet. The maximum allowable run is 200 feet.

FIGURE 14: Remote On/Off Control



Operation

General

After completing the installation connections to the pool heater, follow the procedures outlined below to ensure that the pool heater is functioning properly. Before proceeding, MAKE CERTAIN there are no water leaks in any plumbing connections or piping and water flow is within the proper flow rate ranges. The heater is equipped with a control system that automatically monitors the water temperature set points and safety devices. As water conditioning is needed, it turns on the compressor to start the appropriate transfer of heat to the water. Figure 15 provides a summary of heater components and their locations in the system. Check that the pump is operating and the system is filled with water prior to starting the heater.