

INSTALLATION & OPERATION MANUAL



Side-Discharge Heat Pump Pool Heater



Models:

TWPH-H50HC

TWPH-H70HC

TWPH-H90HC



FOR YOUR SAFETY: Do not store or use gasoline or other flammable vapors and liquids or other combustible materials in the vicinity of this or any other appliance. To do so may result in an explosion or fire.

NOTE: The instructions in this manual are for the use of qualified individuals specially trained and experienced in the installation and maintenance of this type of equipment and related system components. Installation and service personnel are required by some states to be licensed. Persons not qualified shall not attempt to install, service, or maintain this equipment.

NOTE: This manual should be maintained in legible condition and kept adjacent to the heat pump pool heater or in a safe place for future use.

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Replaces: 07-30-26
P/N 100-10009063 Rev. 02

QUICK START GUIDE

CLEARANCES

- ☐ Installation Considerations Page 6.
- ☐ Installation Clearances Page 8

PIPING

- ☐ Water Connections Page 10.
- ☐ Flow Rate & Pressure Drop Page 11
- ☐ Plumbing Diagrams Page 10.
- ☐ Freeze Protection Page 38.

WATER CHEMISTRY

- ☐ Water Chemistry Page 6.
- ☐ Table A. Water Chemistry Page 6.

POWER

- ☐ Electrical Connections Page 11.
- ☐ Table D. Electrical Power Requirements Page 11

CONTROLS INTERFACE

- ☐ Wiring Diagram - Page 12
- ☐ Heater Control Display Page 14.
- ☐ External Control Page 23.
- ☐ Connect to Wi-Fi Page 25.

TABLE OF CONTENTS

1. WARNINGS	4	9. FAULT CODES AND TROUBLESHOOTING	20
Pay Attention to These Terms	4	10. EXTERNAL CONTROL	23
2. INTRODUCTION	5	11. CONNECT TO WI-FI WITH RAYMOTE	25
3. WATER CHEMISTRY	6	12. SEASONAL START-UP OR ANNUAL CHECK	38
4. INSTALLATION CONSIDERATIONS	6	13. SUMMER SHUTDOWN	38
Installation Requirements	6	14. FREEZE PROTECTION	38
Installation Clearances	8	15. MAINTENANCE	39
Hurricane Tie Down Instructions	9	16. TROUBLESHOOTING	39
Water Connections	10	17. SERVICE CALL VERIFICATION	40
Flow Rate and Pressure	11	18. TECHNICAL PARAMETERS	42
5. ELECTRICAL CONNECTIONS	11	Specifications and Dimensions	43
6. WIRING DIAGRAM	12	Internal Components	44
7. CONTROL DISPLAY	14	19. REPLACEMENT PARTS	45
Main Screen	14	20. ILLUSTRATED PARTS LIST	46
8. OPERATING INSTRUCTIONS	20		
Before Start-up	20		
After Start-up	20		

THIS INSTALLATION MANUAL MAY NOT BE THE LATEST REVISION PRINTED AT THE TIME OF PRODUCT SHIPMENT. VISIT THE RAYPAK WEBSITE TO VERIFY THE MANUAL DELIVERED WITH YOUR RAYPAK UNIT IS THE MOST UP-TO-DATE VERSION.

1. WARNINGS

Pay Attention to These Terms

⚠ DANGER	Indicates the presence of immediate hazards which will cause severe personal injury, death or substantial property damage if ignored.
⚠ WARNING	Indicates the presence of hazards or unsafe practices which could cause severe personal injury, death or substantial property damage if ignored.
⚠ CAUTION	Indicates the presence of hazards or unsafe practices which could cause minor personal injury or product or property damage if ignored.
CAUTION	CAUTION used without the warning alert symbol indicates a potentially hazardous condition which could cause minor personal injury or product or property damage if ignored.
NOTICE	Indicates special instructions on installation, operation, or maintenance which are important but not related to personal injury hazards.

⚠ CAUTION

Elevated water temperature can be hazardous. The U.S. Consumer Product Safety Commission has these guidelines:

1. Spa 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.
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 over 102°F (39°C) can cause fetal damage during the first three months of pregnancy resulting in the birth of a brain-damaged or deformed child.
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 with a medical history of heart disease, circulatory problems, diabetes, or blood pressure problems should obtain a physician's advice before using pools or hot tubs.
6. Persons taking medications which induce drowsiness, such as tranquilizers, antihistamines, or anticoagulants, should not use spas or hot tubs.

⚠ CAUTION

Please do not place hands into the outlet of the pool heater, and do not remove the heater fan screen at any time.

⚠ CAUTION

Improper chemical content in a swimming pool or spa can damage the heater. DO NOT add pool/spa chemicals to the pool/spa via the skimmer or any other apparatus (feeder, chlorinator, etc.) That is on the influent side (i.e. inflow side) of the heater. This will damage the heater, and such damage is not covered under warranty. ALWAYS follow the product manufacturer's directions when adding any chemicals to your pool.

⚠ CAUTION

These heat pump pool heaters are charged with R-32 refrigerant. Ensure that all service work is done with gauges and equipment suitable for R-32.

⚠ WARNING

This heat pump is an electromechanical machine that incorporates a pressurized refrigerant gas in a sealed system. ONLY trained and qualified service personnel are authorized to install or service this equipment. Without proper training and knowledge of such equipment, any attempt to install or service the unit could result in serious injury or even death.

NOTICE

EFFICIENCY TESTING NOTICE: For purposes of verifying or testing efficiency ratings, the test procedure in Title 10 APPENDIX P to Subpart B of Part 430 (Uniform Test Method for Measuring the Energy Consumption of Pool Heaters) and the clarifying provisions provided in the AHRI Operations Manual 1160 that were applicable at the date of manufacture should be used for test set up and performance. Charging Chart are available at <https://www.raypak.com/customer-support/heat-pump-charging-charts>. These should only be used by certified technicians to check or adjust refrigerant charge for proper operation.

CAUTION

The appliance is not to be used 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. Do not allow children to play near or with appliance, severe damage can occur from moving parts.

2. INTRODUCTION

⚠ WARNING

Installation and service must be performed by qualified personnel in accordance with all applicable federal, state, and local regulations. This unit contains a sealed, pressurized refrigeration system. Any work involving the refrigerant circuit must be performed by properly trained personnel holding the appropriate EPA certification. Failure to follow these requirements may result in equipment damage, personal injury, or voiding of the product warranty.

⚠ WARNING

Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This manual contains important information on the use, maintenance and troubleshooting of your new heat pump pool heater. This unit must be properly installed, maintained and operated for optimal performance.

This heater is an extremely efficient, economical machine designed specifically for heating swimming pools. It is similar in design and operation to a typical residential air conditioning system. The unit employs a hermetic motor/compressor operating in a refrigeration cycle to extract heat from ambient air and deliver it to the circulating pool water.

All heat pump pool heaters have a lower BTU/hr heating capacity than a gas-fired or oil-fired heater for the same pool and will have to operate more hours per day to keep the pool at setpoint. It may operate up to 24-hours a day at certain times. It is designed to do so. Even with long runtime hours, it will heat the pool at less cost than other heaters using fossil fuel.

Since evaporation is the main cause of heat loss from a pool, keeping the pool covered whenever it is not in use will greatly reduce the cost of keeping the pool heated. Even during warmer weather, Raypak recommends keeping the pool covered at night.

ATTENTION: Please Take This Opportunity to Quickly Register Your Unit!!

While your unit is being installed by your professional and licensed installer of choice, Please Take This Opportunity to Quickly Register Your Unit!! With the necessary information in hand, Registering your new Heat Pump Pool Heater only takes a few moments and is the only way to assure any verifiable warranty procedures during the span of your unit's period of protection.

Please locate and record your model and serial number. Once you have done this, please make sure you also have the following information on hand:

- Name, phone number, and email address of homeowner

- Physical address of where the unit is installed; please include any 'subdivision' or similar information
- Any service challenges present at the house/neighborhood: gated community, locked access at house, guard dog, etc.
- Date of installation of the new unit
- Name and phone number of the professional and licensed entity that performed the installation for you

With all of the above information in hand, please contact Raypak and ask to register your brand new heat pump Online at:

https://www.raypak.com/support/registration_warranty/

You will be given a Warranty Registration Confirmation number which you should notate and keep in one location along with your Installation & Owner's Manual, a copy of your warranty (provided with your manual) and the above information.

This would also be a good time to review both the manual and the warranty so that you are aware of how to correctly operate your new equipment as well as how to keep from voiding any aspects of your warranty. During the life of your unit, please feel free to use the phone number conveniently located right on the unit, to contact us with any questions you may have about operation, warranty, and/or service.

Thank you very much choosing Raypak to satisfy your pool heating needs!!

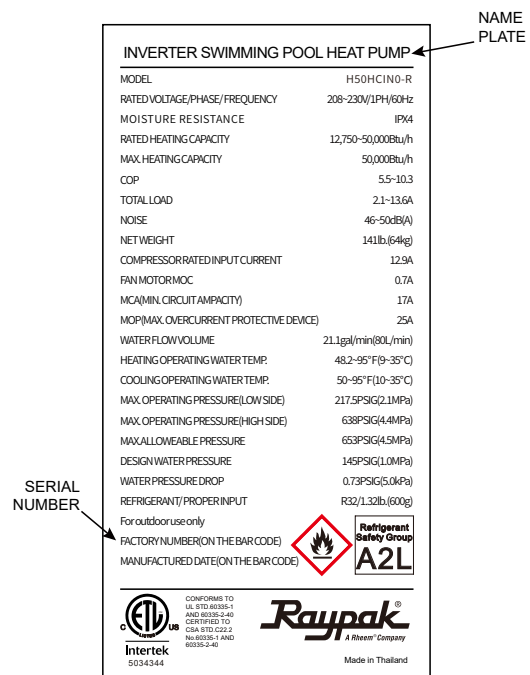


Figure 1. Model and Serial Number Location

Warranty Registration Confirmation #:

3. WATER CHEMISTRY

IMPORTANT: Corrosive water voids all warranties.

For your health and the protection of your pool equipment, it is essential that your water be chemically balanced. The following levels in **Table A** must be used as a guide for balanced water.

- Occasional chemical shock dosing of the pool or spa water should not damage the heater providing the

water is balanced. However, it is highly recommended that the heat pump pool heater is isolated via shut off valves before any aggressive chemical treatment.

- Automatic chemical dosing devices and salt chlorinators are usually more efficient in heated water. Unless controlled, they can lead to excessive chlorine level which can damage your heater.
- Further advice should be obtained from your pool or spa builder, accredited pool shop, or chemical supplier for the correct levels for your water.

Recommended Level(s)	Fiberglass Pools	Fiberglass Spas	Other Pool & Spa Types
Water Temp.	68 °F to 88 °F (20°C to 31°C)	89 °F to 104 °F (32°C to 40°C)	68 °F to 104 °F (20°C to 40°C)
pH	7.3 to 7.4	7.3 to 7.4	7.6 to 7.8
Total Alkalinity (PPM)	120 to 150	120 to 150	80 to 120
Calcium Hardness (PPM)	200 to 300	150 to 200	200 to 400
Salt (PPM)	4500 MAXIMUM	4500 MAXIMUM	4500 MAXIMUM
Free Chlorine (PPM)*	2 to 3	2 to 3	2 to 3
Total Dissolved Solids (PPM)	3000 MAXIMUM**	3000 MAXIMUM**	3000 MAXIMUM**
Water Pressure (psi/kPa)	5 MIN. - 70 MAX. (35 MIN. - 483 MAX.)	5 MIN. - 70 MAX. (35 MIN. - 483 MAX.)	5 MIN. - 70 MAX. (35 MIN. - 483 MAX.)

*Free Chlorine **MUST NOT EXCEED 5 PPM!**

** In salt water chlorinated pools, the total TDS can be as high as 6000 ppm.

Table A. Water Chemistry

4. INSTALLATION CONSIDERATIONS

Locate the heater carefully to minimize installation costs while providing maximum efficiency of operation, and to allow adequate service access, as follows:

For unrestricted air intake and service access, position each side of the unit according to **Figure 2**.

⚠ WARNING

This unit is designed for outdoor installation. It is NOT certified for indoor installation. DO NOT install it in an enclosed area such as a shed or garage, or under a porch or deck.

To minimize water piping, locate the unit as close as possible to the existing pool pump and filter.

Irrigation water should be directed away from the heater as irrigation water spray can damage the heater.

Rain water runoff - the unit is designed to operate outdoors and can be exposed to rain. However, rain water run off falling directly onto the unit can cause damage and/or shorten the life of your unit. Such damage is not covered under warranty. Install rain gutters or rain diverters on your roof if the unit is installed in a position where contact with rain runoff may occur.

⚠ WARNING

Do not install the unit within 3 ft (0.9 m) of fossil-fuel-burning heaters. Air intake along the sides of this heater could disturb the combustion process of the unit, and could cause damage or personal injury. Mount the unit on a level, sturdy base, preferably a concrete slab. The size of the base should be at least 3 ft by 3 ft (0.9 m x 0.9 m). The unit includes four (4) rubber feet and fasteners for rack-mounted installations. For ground-mounted installations, use appropriate ground-mounting screws.

Installation Requirements

The heater must be installed by a pool professional. End users are not qualified to install the heater. Damage may occur to the heater or threaten the safety of the user.

- The heater must be installed OUTSIDE in a well ventilated area to avoid air recirculation, and in a place with adequate room for both installation and maintenance. Please refer to the following illustration.
- This unit requires specific clearance from walls, shrubbery, equipment, and other objects around the entire perimeter of the heater. See **"Figure 2. Installation Clearances"** on page 7, for more information. This allows for ample air intake. Ample clearance around the air outlet is required to prevent recirculation of air. We recommend not placing the unit underneath eaves, decks, or porches, as this causes recirculation of discharged air, thereby reducing the efficiency of the heater, or even stopping it.

3. Do not stack anything that will block air flow near the inlet or outlet areas, or have any barrier within 20" (508 mm) behind the main heater, or the efficiency of the heater will be reduced.
4. The heater needs a pool pump (to be supplied by the user). For recommended pump flow rates, see **Table C**.
5. When the heater is running, there will be condensation water discharged at the base. Place the drainage nozzle into the condensation outlet and attach it securely, then contact a drainage pipe from it to the drain.
6. The piping between pool and the heater should be less than 30 ft (9.1 m), or heater performance cannot be ensured.
7. For best results, insulate the pipes between the pool and heater.
8. It is important to keep the area next to the heater clear of shrubs, bushes and chemical containers. These could prevent air from circulating fully through the heater, and will affect the operation of the heater or damage the heater.
9. When installed in areas where freezing temperatures can be encountered, drain the water circuit to prevent possible freeze-up damage. See **"Freeze Protection" on page 38** for cold weather operation procedures.
10. If the heater is below the water line of the pool, an external Water Flow Switch might be needed.

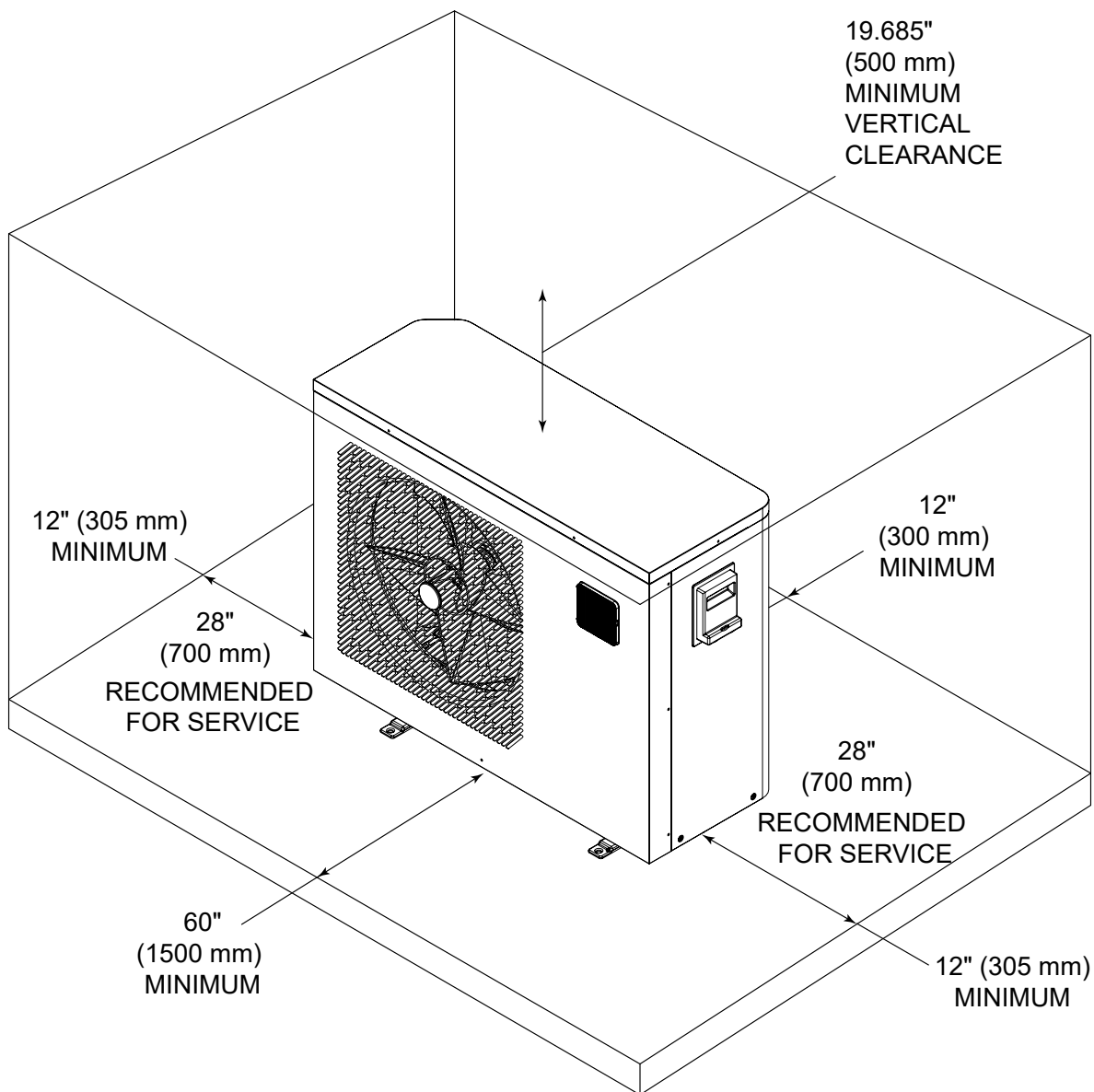


Figure 2. Installation Clearances

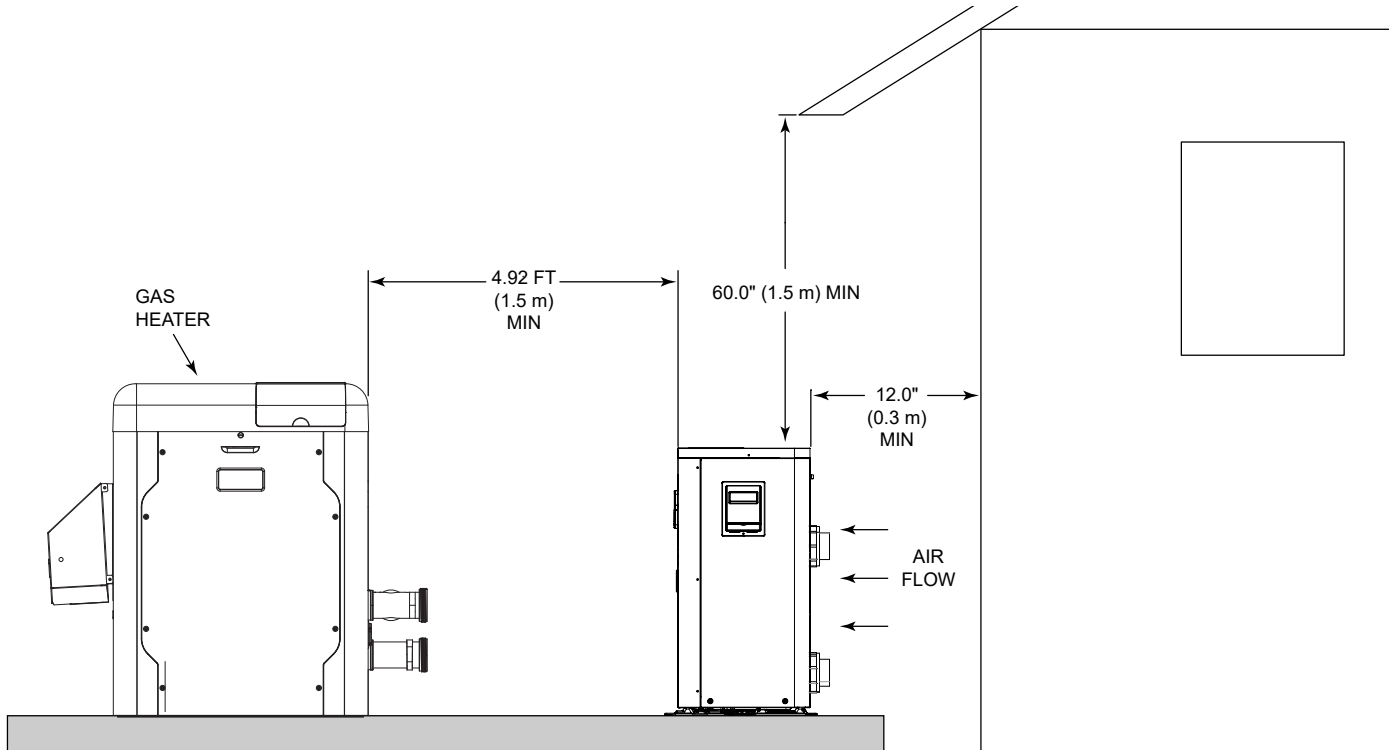


Figure 3. Installation Clearances

Models	Raypak Part Number	Rheem Part Number
TWPH-H50HC	H50HCIN0-R	H50HCIN0-M
TWPH-H70HC	H70HCIN0-R	H70HCIN0-M
TWPH-H90HC	H90HCIN0-R	H90HCIN0-M

Table B. Model Identification

RAYPAK, INC.

WIND LOAD EVALUATION OF HEAT PUMP CROSSWIND MODELS: AT GRADE MOUNTED APPLICATIONS

APPROVED DESIGN
CRITERIA:

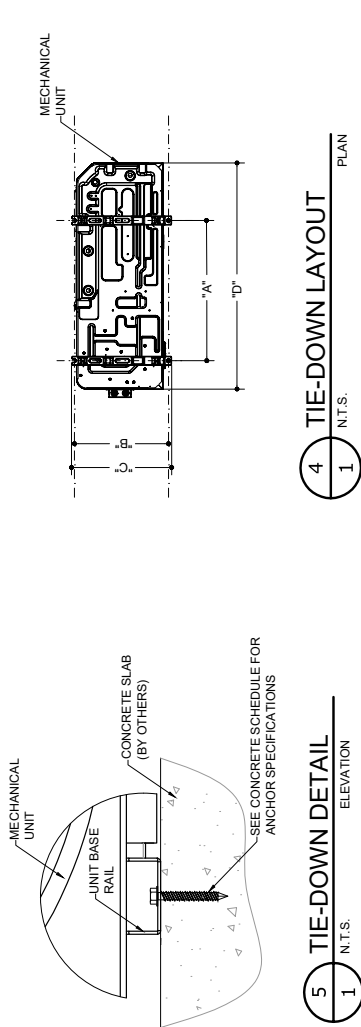
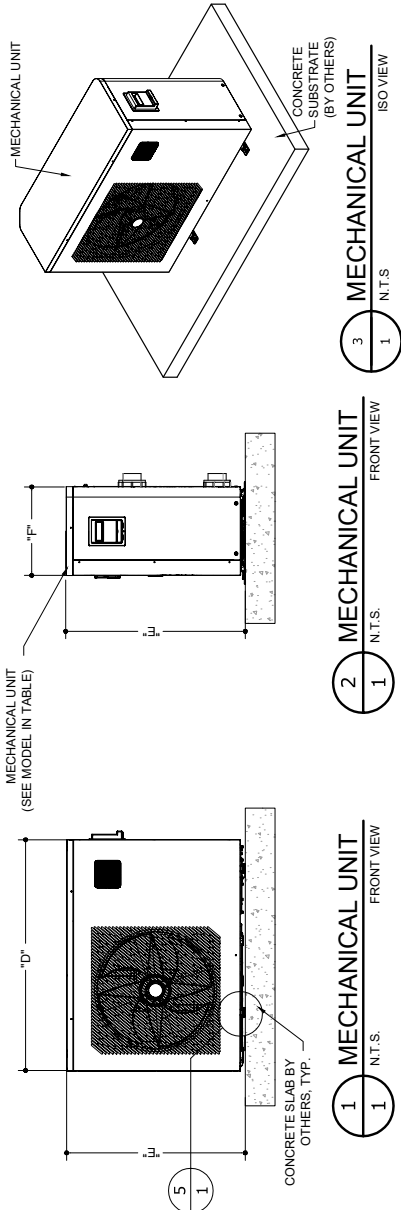
50.2 PSF LATERAL
41.2 PSF UPLIFT
WIND LOAD

DESIGN NOTES:

SITE-SPECIFIC PRESSURE REQUIREMENTS AS DETERMINED IN ACCORDANCE WITH ASCE 7-10 AND CHAPTER 16 OF THE FLORIDA BUILDING CODE SHALL BE LESS THAN OR EQUAL TO THE DESIGN PRESSURE CAPACITY VALUES LISTED HEREIN FOR ANY ASSEMBLY AS SHOWN. DESIGN PRESSURE REQUIREMENTS SHALL BE DETERMINED BY A REGISTERED DESIGN PROFESSIONAL ON A JOB-SPECIFIC BASIS IN ACCORDANCE WITH THE GOVERNING CODE.

GENERAL NOTES:

1. THIS SYSTEM HAS BEEN DESIGNED AND SHALL BE FABRICATED IN ACCORDANCE WITH THE REQUIREMENTS OF THE FLORIDA BUILDING CODE SIXTH EDITION (2017). THIS SYSTEM MAY BE USED WITHIN AND OUTSIDE THE HIGH VELOCITY HURRICANE ZONE. THIS DESIGN IS NOT INTENDED TO CERTIFY IMPACT RESISTANCE OF THE MECHANICAL UNIT CABINETRY.
2. NO 33-43% INCREASE IN ALLOWABLE STRESS HAS BEEN USED IN THE DESIGN OF THIS SYSTEM.
3. ALL DIMENSIONS AND THE MAXIMUM WEIGHT (100 LB MINIMUM) OF MECHANICAL UNIT SHALL CONFORM TO LIMITATIONS STATED HEREIN. ALL MECHANICAL SPECIFICATIONS (CLEAR SPACE, TONNAGE, ETC.) SHALL BE AS PER MANUFACTURER RECOMMENDATIONS AND ARE THE EXPRESS RESPONSIBILITY OF THE CONTRACTOR.
4. ANCHORS REFERRED TO HEREIN SHALL BE ELCO ULTRACON SS4 OR ANY EQUIVALENT RATED CAPACITY ANCHOR, INSTALLED TO 3000 PSI MIN CONCRETE. SEE ANCHOR SCHEDULE FOR ANCHOR REQUIREMENTS. ALL FASTENERS SHALL HAVE APPROPRIATE CORROSION PROTECTION TO PREVENT ELECTROLYSIS.
5. ALL CONCRETE SPECIFIED HEREIN IS NOT PART OF THIS CERTIFICATION. AS A MINIMUM, ALL CONCRETE SHALL BE STRUCTURAL CONCRETE 4" MIN. THICK AND SHALL HAVE MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI, UNLESS NOTED OTHERWISE.
6. THE CONTRACTOR IS RESPONSIBLE TO INSULATE ALL MEMBERS FROM DISSIMILAR MATERIALS TO PREVENT ELECTROLYSIS.
7. ELECTRICAL GROUND, WHEN REQUIRED, TO BE DESIGNED & INSTALLED BY OTHERS.
8. THE ADEQUACY OF ANY EXISTING STRUCTURE TO WITHSTAND SUPERIMPOSED LOADS SHALL BE VERIFIED BY THE ON-SITE DESIGN PROFESSIONAL AND IS NOT INCLUDED IN THIS CERTIFICATION, EXCEPT AS EXPRESSLY PROVIDED HEREIN. NO ADDITIONAL CERTIFICATIONS OR AFFIRMATIONS ARE INTENDED.
9. THE SYSTEM DETAILED HEREIN IS GENERIC AND DOES NOT PROVIDE INFORMATION FOR A SPECIFIC SITE. FOR SITE CONDITIONS DIFFERENT FROM THE CONDITIONS DETAILED HEREIN, A LICENSED ENGINEER OR REGISTERED ARCHITECT SHALL PREPARE SITE SPECIFIC DOCUMENTS FOR USE IN CONJUNCTION WITH THIS DOCUMENT.



ANCHOR SCHEDULE:

SUBSTRATE	DESCRIPTION
CONCRETE: (4" THICK MIN. 3000 PSI MIN.)	(1)-1/4" ELCO ULTRACON SS4, 1.75" EMBEDDED INTO 3 KSI CONCRETE, 2.5" MIN. EDGE DISTANCE, 3" MIN. SPACING TO ANY ADJACENT ANCHOR OR ANY EQUIVALENT RATED CAPACITY ANCHOR.

See "Table J. Basic Product Data - in. (mm)"
on page 43 for dimensions and weights.

Figure 4. Hurricane Tie Down Instructions

Water Connections

NOTICE

The union lock rings and O-rings are connected to the inlet and outlet of the heat exchanger. For proper installation of the drainage hose, it may be necessary to install the three-hole caps included in the accessory bag. See **Figure 5**.

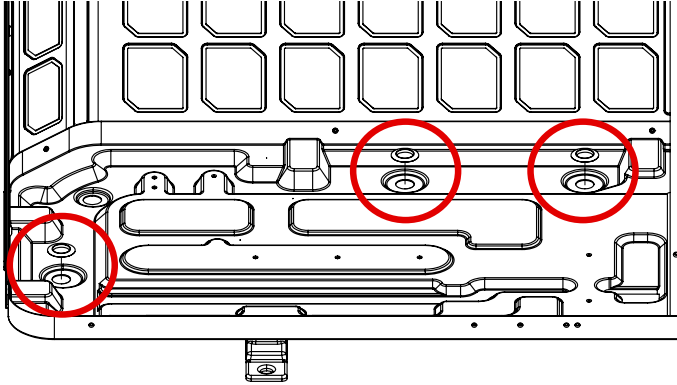


Figure 5. Recommended Hole Cap Locations

CAUTION

The heater Inlet and Outlet connections are NOT interchangeable. They must be connected as instructed below in **Figure 6**.

WARNING

Chemical feeders can result in serious damage to, or premature failure of the heater and may void the heater warranty. Install a check valve and/or a Hartford loop AFTER the heater and BEFORE any chlorinating devices. Install any automatic chemical feeders AFTER the heater.

1. Connect the heater in the return water line between the filter and the pool/spa. See the piping layout shown in **Figure 6**.
2. Connect the filter outlet to the fitting marked at the bottom front of the unit.
3. Connect the fitting marked to the return piping to the pool/spa. The inlet/outlet connection fittings of the unit are 2 inch unions.

Water connections from the heater to the main return line can be PVC pipe or flexible pipe approved for the purpose and, in either case, should be at least equal in size to the main pool/spa circulation piping.

1. Shutoff diverter valves, preferably three-way valves which allows for a bypass route, on the inlet and outlet lines of the heater are required:
 - a. to protect (completely bypass) the heater from any harmful chemical treatments (i.e. acid wash, back-to-back super chlorinators, stain treatments, etc.); or
 - b. to isolate the heater for service/repair or freeze preparation and still allow pool/spa circulation to continue.

Install any automatic chemical feeders downstream of the heater. See the piping layout shown in **Figure 6**.

Note that some municipalities do not allow the use of a shutoff valve on the effluent/outlet side of any heating equipment, especially when there is one on the inlet side. These entities typically instead allow a PVC tee and spring check valve on the effluent/outlet side. This is acceptable and can also double as your protection from chemical feeders and chlorinators that are downstream of the unit.

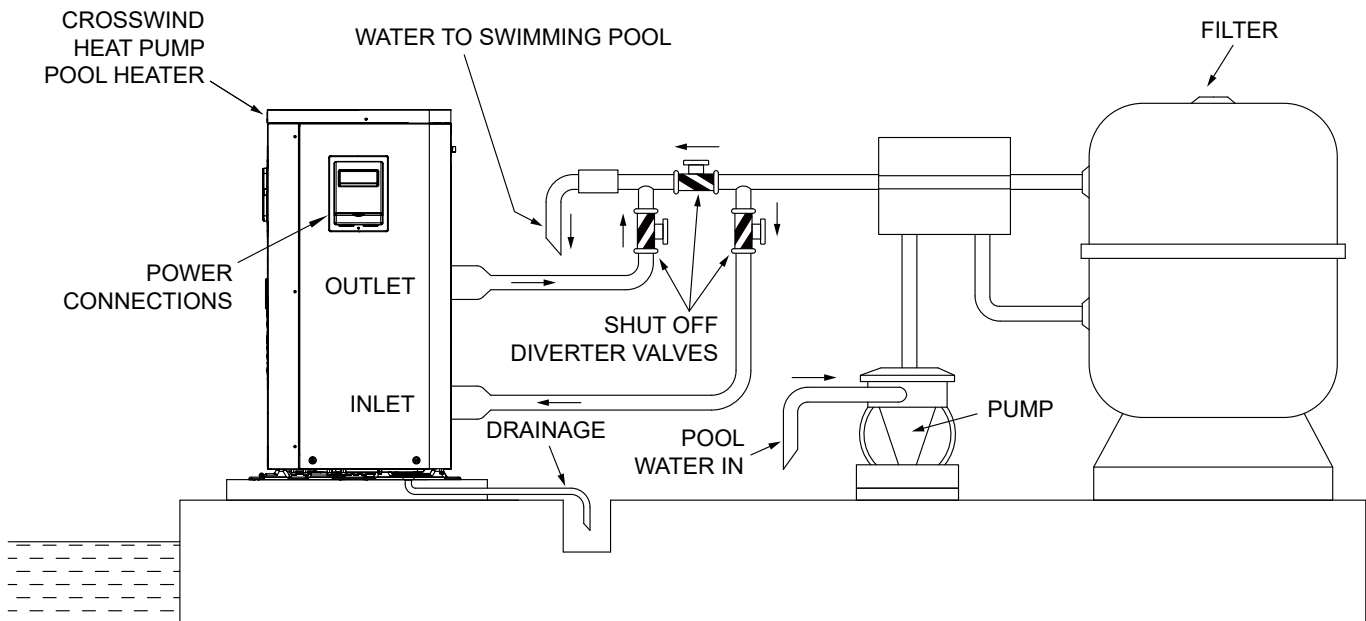


Figure 6. Piping Layout

Flow Rate and Pressure

Operate the pump and check the system for leaks. For more information regarding Water Pressure Drops Specification, see **Table I on page 42**.

FLOW (GPM)	PRESSURE DROP (PSI)			MIN. FLOW RATE (GPM)		
	MODELS			MODELS		
	50HC	70HC	90HC	50HC	70HC	90HC
20	0.5	-	-	21	29	39
30	1	1	-			
40	1.5	1.5	4			
50	2	3	5			
60	3	4	8			
70	4	5	10			
80	5	6	13			

Table C. Pressure Drop and Flow Rate

5. ELECTRICAL CONNECTIONS

Electrical installation should be performed by a licensed electrician only.

1. Make sure the power supply is at the rated voltage of the appliance.
2. Ground the heater.
3. Wiring must be installed by a professional installation technician and follow the circuit diagram.

Electrical installation should be done by a licensed electrician only.

Refer to the unit rating plate below the control panel for precise power requirements for your unit, and for ampacity and over-current protection requirements.

All wiring must be in accordance with the National Electrical Code, NFPA No. 70, latest edition, and all applicable state and local codes. The wiring diagram is located on **page 12**.

⚠ WARNING

*This heater **MUST** be installed using flexible conduit for supply wiring to the unit. This will allow movement of the conduit whenever the junction box is removed for service.*

Locate the equipment disconnect means within 3 ft. (0.9 m) of the heater's electrical enclosure, or as close to the heater as possible. Always satisfy applicable codes and standards.

In sizing power wiring, be especially aware of up-sizing requirements necessary due to wiring distances. Always satisfy applicable codes and standards.

NOTICE

Refer to the National Electrical Code, Article 680, for general requirements for swimming pools and equipment, and to Article 440 for special considerations necessary for circuits supplying hermetic refrigeration motor/compressors.

Connect electrical Line 1 (L1), Line 2 (L2), and Ground (⊕) to the terminals indicated in **Figure 7** for proper wiring. Electrical installation must be performed only by a licensed electrician.

This unit is compatible with external control systems, heat-on-demand options, and other external time-clock overrides. Refer to the external control system's instructions and to **"Remote Mode Selector" on page 23** of this manual for installation information.

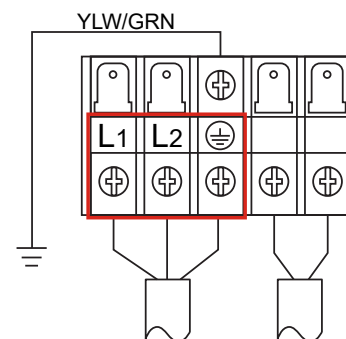


Figure 7. Electrical Connections

Models	Power	Min. Circuit Ampacity	Breaker Size (AMP)		Recommended Wire Length from Breaker to Heater*, ft. (m)			
			MIN.	MAX.	12 AWG	10 AWG	8 AWG	6 AWG
TWPH-H50HC	208-230VAC 60HZ/1PH	17A	20A	25A	65 (20)	105 (32)	165 (50)	260 (79)
TWPH-H70HC		22A	25A	35A	NR**	95 (29)	140 (42)	220 (67)
TWPH-H90HC		28A	30A	45A	NR**	NR**	125 (38)	195 (38)

* Reference only - see National Electrical Code or local codes for wire gauge length limits.

** NR= Not Recommended

Table D. Electrical Power Requirements

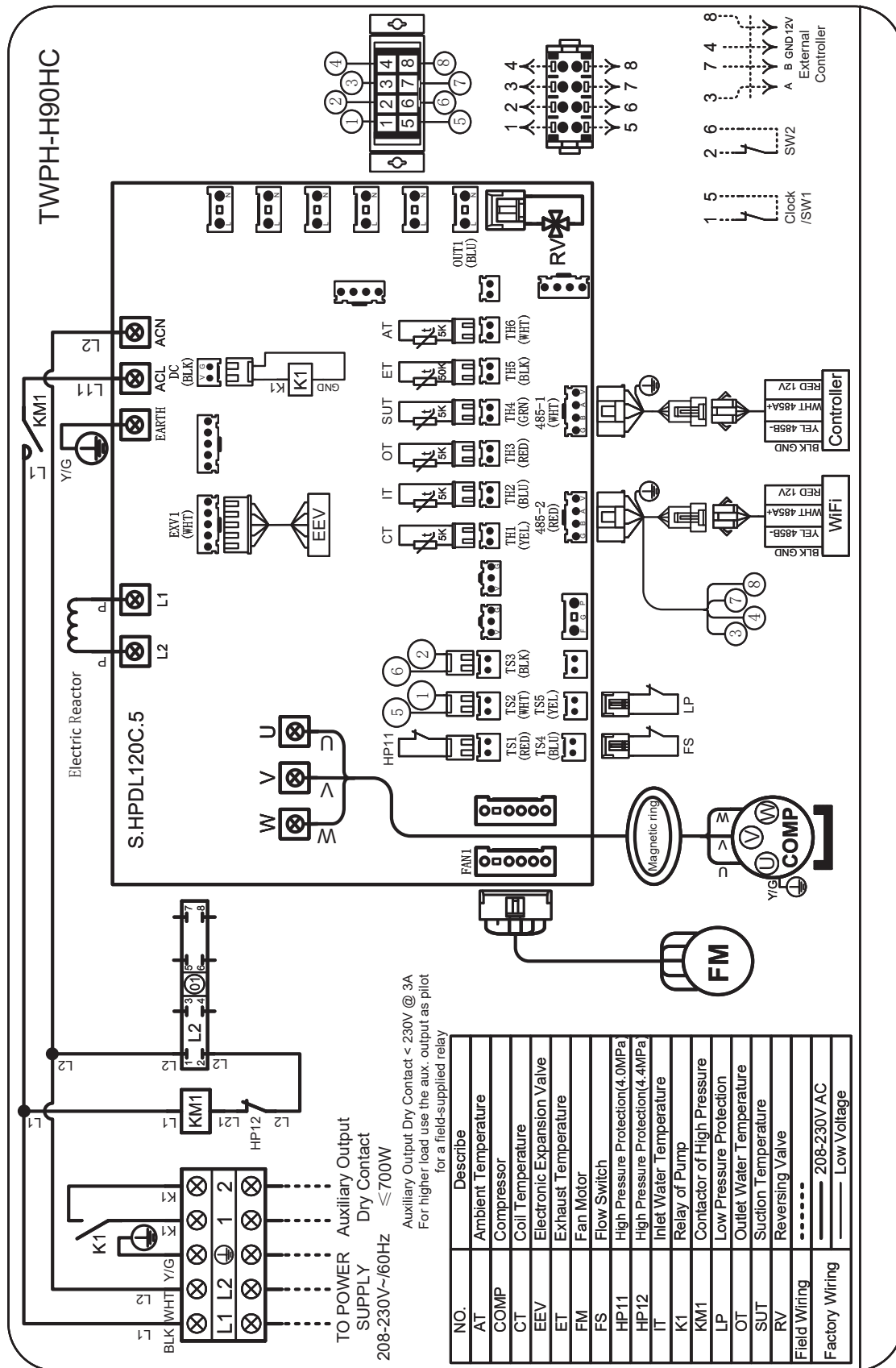


Figure 9. TWPH-90HC Wiring Diagram

7. CONTROL DISPLAY

The heater display is located on the top-right side of the front panel and is protected by a cover bezel. See **Figure 10**.

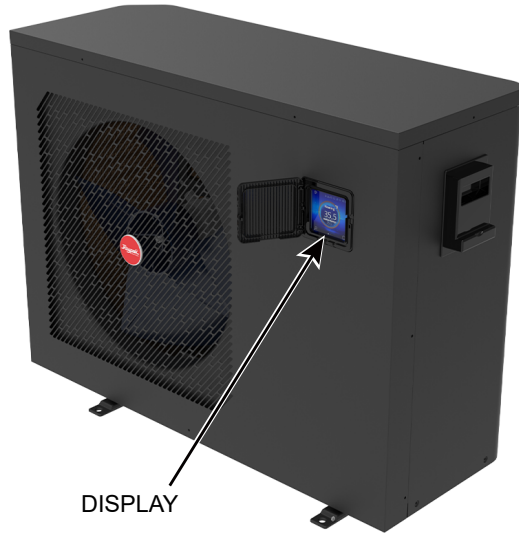


Figure 10. Display Location

All operating, configuration, and service information can be accessed using the 4-inch color touchscreen. The following sections describe the heater's operating modes, functions, and configuration through use of the touchscreen.

Main Screen

The Main screen shows all the basic elements required to control and monitor the operation of the heater.

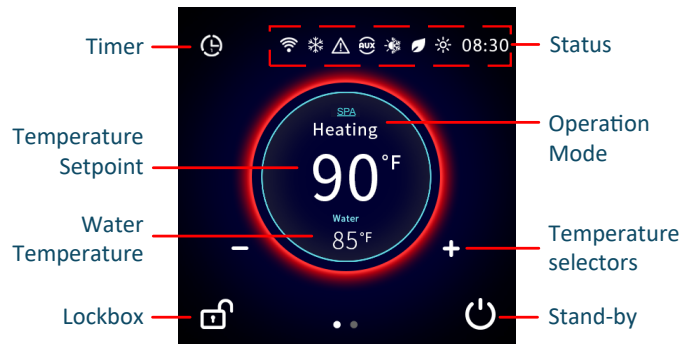


Figure 11. Heater Control Interface (Main Screen)

Water Temperature

The water temperature is measured at the unit's water inlet. The unit uses this temperature as the thermostat reference to start or stop heating or cooling operation.

Temperature Setpoint

This value indicates the target temperature set for the unit. The unit operates in heating or cooling mode until this temperature is reached. Use the "Temperature Selectors" to adjust the temperature setpoint.

Operation Mode

This indicator shows the current operating mode and the status of the unit. Pool Heat, Cool, Auto, and Spa modes can be selected by pressing the central circle.

- In Pool Heat and Spa modes, the temperature setpoint range is 48°F to 104°F.
- In Pool Cool mode, the setpoint range is 50°F to 90°F.
- In Pool Auto mode, the setpoint range is 50°F to 104°F.

Refer to the Mode and Setpoint screen. See **Figure 12**.

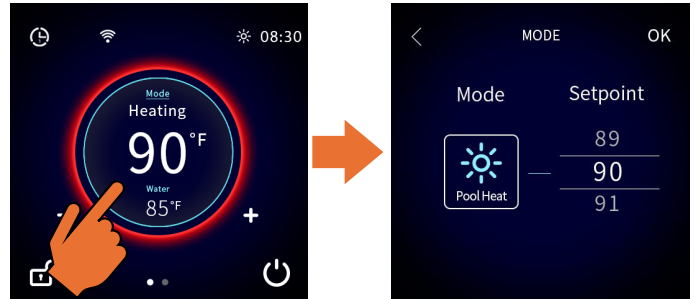


Figure 12. Mode and Setpoint Screen

Standby Mode

Pressing the Standby icon toggles the unit between ON and Standby. When the unit is in Standby ("STBY"), the controls remain energized, but operation is disabled. See **Figure 13**.

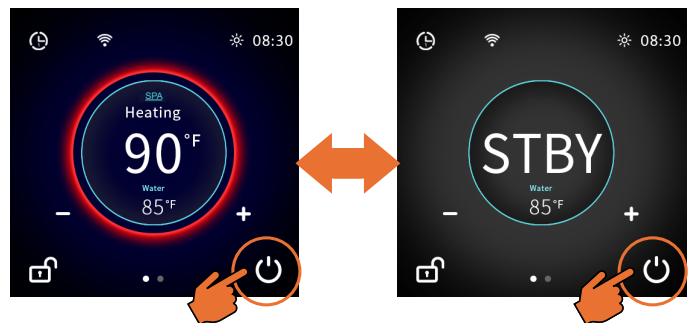


Figure 13. Set and Remove Stand-By

Status Bar

The status bar displays the clock and status icons that represent the unit's operating conditions and active functions. None, one, or multiple status icons may be shown at the top of the screen. See **Figure 14**.

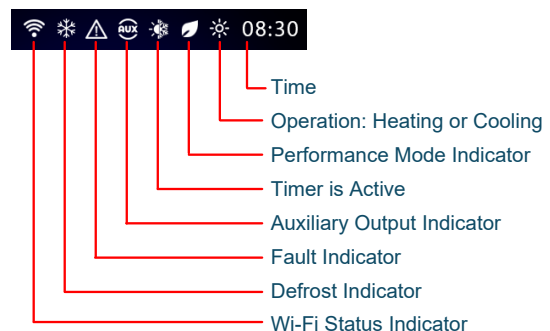


Figure 14. Status Bar Indicators

Additionally, when the unit reports a fault code, a yellow ribbon appears displaying the error code along with a brief description of the fault. For more information, refer to **"Fault Codes and Troubleshooting" on page 20.**

Timer

The Timer icon opens the Timer screen.

The Timer screen allows you to set a countdown timer to limit unit operation for a specified period. The timer can be set from 15 minutes up to 6 hours. During this period, the unit operates normally in the selected operating mode. When the timer expires, the unit is automatically set to Standby.

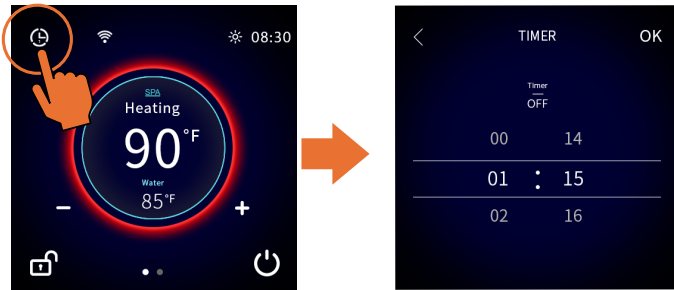


Figure 15. Set Timer

Lockbox

The Lockbox feature prevents unauthorized access to the heater's control settings. To activate the lockout, press the Lock icon. The Lockbox screen is displayed. See **Figure 16.** Select a three-digit PIN and confirm your selection using the numeric keypad. Record your PIN for future reference.

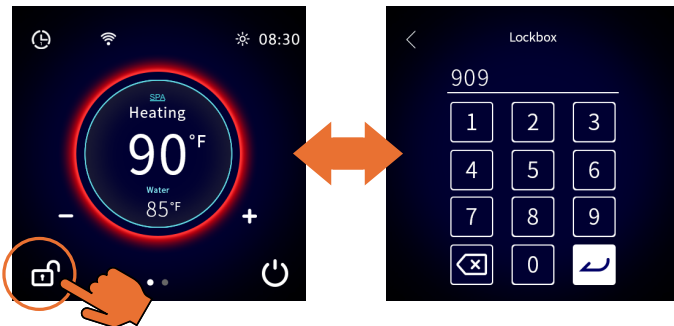


Figure 16. Lockbox Protection

While Lockbox is enabled, the "Operation Mode" and "Temperature Setpoints" cannot be changed. The Inverter, Program, Schedule, Time, and Brightness menus are also disabled.

To unlock the controls, press the Lock icon again and enter the three-digit PIN that was previously used to lock the controls. Note that power cycling the unit will not clear the lockout.

If the correct PIN is entered, "LOCKBOX CLEARED" is displayed. If an incorrect PIN is entered, "INVALID PIN" is displayed.

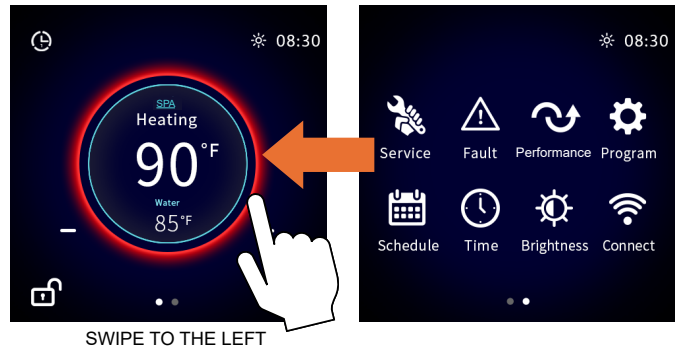
If the user-selected PIN is lost or does not clear the control lockout, code "101" can be used to override the lock and set a new PIN.

Configurations Menu

To access the Configurations Menu, swipe left from the Main screen. This screen provides access to multiple functions and configuration options. See **Figure 17.**

NOTICE

Some functions and configuration settings may alter the unit's operation. Read the instructions in this manual carefully before making changes to ensure they are appropriate for your installation and pool configuration. Some adjustments must be performed by qualified pool professionals.



SWIPE TO THE LEFT

Figure 17. Accessing Configurations Screen

The following sections describe the Menu screen options.

Service Screens



Figure 18. Service Icon

The "Service" and "About" screens display the status of the heater's inputs and outputs without disrupting operation. This option provides access to a comprehensive set of parameters that support operation monitoring, diagnostics, and troubleshooting.



Figure 19. Service and About Screens

Faults Screen



Figure 20. Faults Icon

The Fault screen displays a historical fault list, with up to 12 faults stored in non-volatile memory. Each fault is logged with an error code, fault name, and time stamp of the event.

The fault list can be cleared by pressing the Bin icon in the top-right corner of the screen. For more information on fault codes and troubleshooting, refer to **"Fault Codes and Troubleshooting"** on page 20.

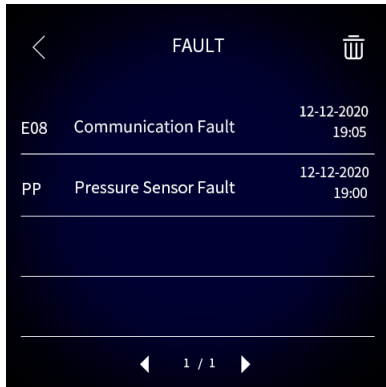


Figure 21. Fault Screen

Performance Mode Screen



Figure 22. Performance Mode Icon

The Performance mode screen provides user-selectable configurations for inverter and compressor operation. The factory default settings are optimized to ensure smooth operation under mid-to-low noise conditions while heating or cooling toward the desired water temperature. The Performance modes are designed to provide different operating scenarios in which the compressor runs at a constant speed until the water temperature setpoint is reached. Please refer to the scenarios and operation descriptions in **Table E**.

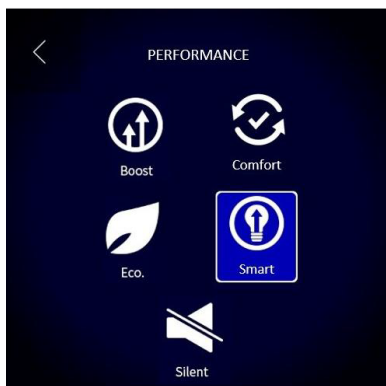


Figure 23. Performance Mode Screen

Icon	Mode	Function	Performance
 Boost	Boost mode is best for prioritizing faster heating or when the water temperature is far from the desired setpoint.	When selected, the unit operates at full speed.	Full Speed
 Comfort	Comfort mode provides the best experience in performance and quite operation, before or while using the pool.	The heater operates at mid-high speed, prioritizing performance at moderate noise levels.	High Speed
 Eco.	Eco mode is recommended for maintaining the water temperature while the pool is not in use. Use it in combination with a pool cover. Energy efficiency is prioritized.	The heater operates at low speed with low energy consumption. Heat output is reduced to maintain warmth in unused pools.	Low Speed
 Smart	Smart mode adjusts heater performance based on the water temperature and setpoint, prioritizing optimal performance.	The heater determines the best operating speed based on the temperature gap to the desired setpoint.	Automatic Speed Selection
 Silent	Silent mode is best for maintaining the water temperature while the pool is in use. It can be used while other modes are active to "mute" the unit.	The heater operates at mid speed to provide heating or cooling while minimizing noise.	Mid Speed

Table E. Performance Modes

Program Screen



Figure 24. Program Icon

The Program screen contains a set of adjustable parameters used to adapt heater operation to specific installation conditions. **Table F** lists the parameters, usage, and selectable value ranges.

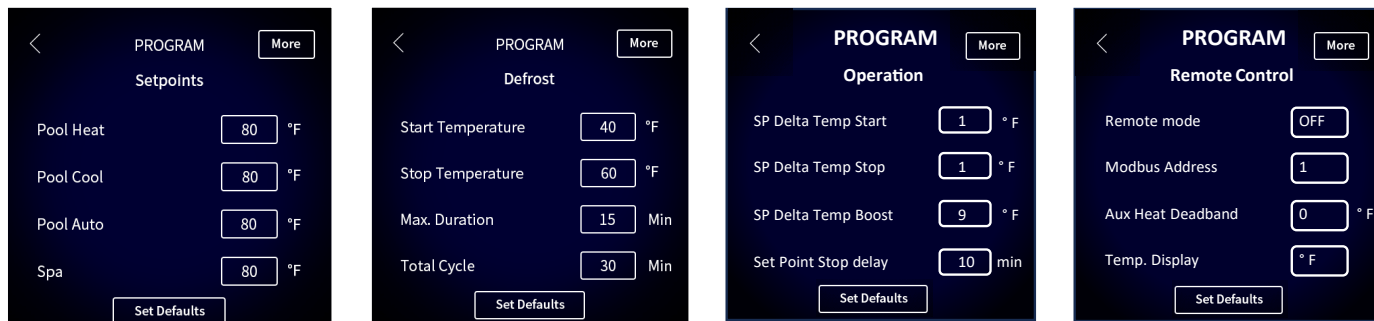


Figure 25. Program Screens

Parameter	Default	Range	Usage
Pool Heat	80°F (26.5°C)	48~104°F (9~40°C)	Temperature setpoint for Pool Heat.
Pool Cool	80°F (26.5°C)	50~90°F (10~32°C)	Temperature setpoint for Pool Cool.
Pool Auto	80°F (26.5°C)	50~104°F (10~40°C)	Temperature setpoint for Pool Auto.
Spa	80°F (26.5°C)	48~104°F (9~40°C)	Temperature setpoint for Spa.
Start Defrost	19.5°F (-7°C)	-22~41°F (-30~5°C)	Coil Temperature that triggers defrost.
Stop Defrost	55.5°F (13°C)	32~86°F (0~30°C)	Coil Temperature that stops defrost.
Max. Duration	8 Min.	1 to 20 Min.	Maximum defrosting cycle duration.
Total Cycle	45 Min.	30 to 90 Min.	Total time under defrost conditions before starting a defrost cycle.
SP Delta Temp Start	1°F (0.5°C)	0~18°F (0~10°C)	The heater starts operation when the water temperature is below (setpoint - "SP Delta Temp Start").
SP Delta Temp Stop	1°F (0.5°C)	0~18°F (0~10°C)	The heater stops operation when the water temperature is above (setpoint + "SP Delta Temp Stop") or after the "Setpoint Stop Delay" timeout expires.
SP Delta Temp Boost	± 9°F (5°C)	1~18°F (0~10°C)	The heater is set to maximum speed if the initial water temperature is below (setpoint - "Delta Temp Boost").
Setpoint Stop Delay	1 Min.	1 to 30 Min.	The heater continues to run after reaching the setpoint until the "Setpoint Stop Delay" timeout expires and while the water temperature is below (Setpoint + "Delta Temp Stop").
Remote Mode	OFF	OFF / ON	Enables or disabled remote mode.
Modbus Address	1	1~8	Sets the Modbus address for external control via RS-485 terminals.
Aux Heat Deadband	± 0°F (0°C)	0~18°F (0~10°C)	When Aux. Output is in "Aux. Heat" mode, the output is set to ON if: Heating: Water temperature < setpoint – deadband Cooling: Water temperature > setpoint + deadband
Temperature Display	°F	°F or °C	Display Temperature in Fahrenheit or Celsius.

Table F. Program Parameters

Configuration Backup and Restore

The heater controls include a special feature for backing up and restoring factory-default or user-defined configurations.

- The "Upload" function backs up the current configuration to the display board's non-volatile memory. The initial backup stored on the display board is preset at the factory.
- The "Download" function transfers the configuration stored in the display board's non-volatile memory to the main controller. This function can be used to restore the factory-default configuration if the "Upload" function has not been used, or to apply a user-defined configuration previously saved using the "Upload" function.

To access the Upload and Download functions, enter the Program screen and press the "More" button.

Enter passcode "855" to access the Special Settings menu. See **Figure 26**.

Use the Upload and Download functions as required.

NOTICE

Important:

- The unit saves any configuration changes in its main memory. The Upload and Download functions are not required unless the user wants to back up the configuration to the display board memory.
- Use the "Upload" function before replacing the main board to back up the current configuration to the display board. After installing the new main board, use the "Download" function to restore the configuration.
- When replacing a display board, make sure to use the "Upload" function to back up the current configuration to the new display board.



Figure 26. Upload and Download Options

Schedule Screen



Figure 27. Schedule Icon

The Schedule screen is intended to create basic automation routines without the need for an internet connection.

The "Heat Pump" option can be used to set two independent scheduled routines for heater operation by selecting the desired operating mode and the start and stop times.

The "Auxiliary" option can be used to control the Auxiliary Output in three different modes:

- **Manual:** This is the default mode and allows control of the output from the Raymote app.
- **Timer:** This mode is used to set a daily ON and OFF schedule for the output.
- **Auxiliary Heat:** In this mode, the auxiliary output turns ON and OFF when the heater has an active heating or cooling cycle. The output turns ON 10 seconds after the heater compressor starts. Use the Auxiliary Heat Deadband parameter (see **Table F**) to define the conditions for enabling Auxiliary Heat mode.



Figure 28. Schedule Screen Options

Date and Time Screen



Figure 29. Time Icon

Use the Time screen to set the current date and time. These parameters are used by the functions configured on the Schedule screen and to display the correct time on the Main screen. When the unit is connected to Wi-Fi, the time is updated automatically.

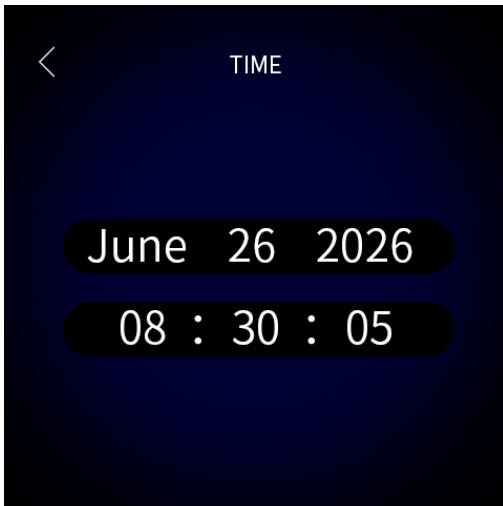


Figure 30. Date and Time Screen

Brightness Screen



Figure 31. Brightness Icon

Use the Brightness screen to adjust the display backlight intensity for optimal visibility based on the heater's location.

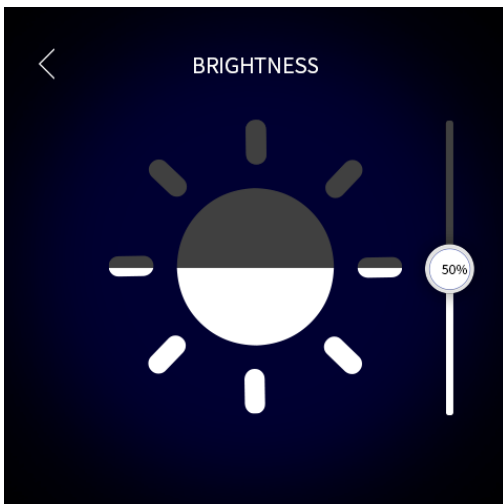


Figure 32. Adjust Screen Brightness

Connect



Figure 33. Connect Icon

The Connect screen displays the connectivity status and other information related to the Wi-Fi module. Use this screen to confirm the connection status when connecting your heater to Wi-Fi using the Raymote App.

The Wi-Fi status may display one of the following messages:

- **Ready to configure:** The Wi-Fi module is ready to be connected to the internet using the Raymote App.
- **Connecting:** This status is displayed while the Raymote App is configuring the Wi-Fi connection or when the heater is reconnecting to a Wi-Fi network.
- **Connected:** This status indicates that the Wi-Fi module is connected to the internet and the Raymote cloud. The unit is fully visible and can be controlled using the Raymote App.
- **Signal not found:** This status is displayed when the Wi-Fi module cannot establish communication with the Wi-Fi network due to low signal strength, no signal, or a change in the network name or password.

If the internet connection needs to be updated, use the Reset button to clear the Wi-Fi credentials and restore the status to Ready to configure.

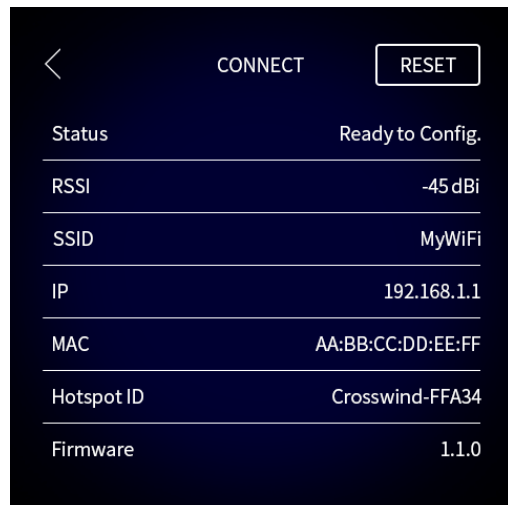


Figure 34. Connect Status Screen

8. OPERATING INSTRUCTIONS

Start-Up Procedures

If your heater has been installed correctly, operating the heater is an easy task. The display allows you to turn the heater ON or OFF and adjust the temperature settings for the pool or spa. The temperature range is factory-set from 48°F (9°C) to 104°F (40°C) - for Pool Heat and Spa modes. 50°F (10°C) to 90°F (32.2°C) - for Pool Cool and Pool Auto modes.

Before Start-Up

Model Identification

The model number of the heater can be found on the rating plate. See **Figure 1**.

Water Flow

Water must be flowing through the heater during operation. Ensure that the system is filled with water and that the pump is operating. Refer to **Table C on page 11** for details of flow rate and pressure. See **Figure 6**.

WARNING

Operation of the heater without water circulation will cause rapid and severe damage to the heater, and will void the warranty.

Starting Sequence

NOTICE

The user MUST start the pool pump before the heater and turn off the heater before the pool pump to ensure proper operation and protect the integrity of the unit's heat pump system.

The user should start the pool pump, and check for any leakage of water; power on and set a suitable operation mode and temperature.

In order to protect the heater, the heater is equipped with a time-delay starting function. When starting the heater, the blower will run for 1-minute before the compressor.

After the heater starts up, check for any abnormal noise from the heater.

After Start-Up

Feel the inlet and outlet pipes. The outlet pipe should be only slightly warmer than the inlet. It should not be hot.

When the unit has been operating in heating mode for a few minutes, check that the discharge air temperature is approximately 8°F–10°F (4.4°C–5.5°C) cooler than the air entering the unit.

When the unit has been operating in cooling mode for a few minutes, the discharge air temperature should be

approximately 8°F–10°F (4.4°C–5.5°C) warmer than the air entering the unit.

NOTICE

Heating is more efficient during warmer daylight hours, while cooling is more efficient during cooler nighttime hours. To speed up the cooling process, turn off the pool/spa blanket and turn on any fountains, sprays, or other water features at night.

9. FAULT CODES AND TROUBLESHOOTING

If the solutions below do not correct your issue, contact your dealer. **Do not attempt to repair the heater yourself.**

Failure	Reason	Solution
Heat Pump Does Not Run	Main power off	Wait for the power to be restored
	Display shows STBY	Unit is in "Stand-by" mode. Select an operation mode.
	Pool Pump	Turn ON pool pump or increase pump speed
	Circuit breaker tripped	Turn circuit breaker back on
Heat Pump Runs but Does Not Heat	Air inlet blocked	Remove obstructions from the air intake
	Air outlet blocked	Remove obstructions from the air outlet
	Frosting	Check for proper weather temperatures. Check for air obstructions.
	Temperature is set too low	Set the temperature to a higher value to create demand for heat.

Table G. Common Faults

A failed unit may report a fault code generated by the self-diagnostics performed by the main control board. While a fault code is present, the display board shows a yellow banner at the top of the screen with the error code and an abbreviated description of the fault.

In addition, up to 12 faults are logged in memory and can be reviewed from the Faults screen. The following table lists the fault codes along with troubleshooting guidance.

WARNING

Servicing this equipment requires specialized HVAC, electrical, and mechanical expertise, as well as proper tools and equipment. If you do not possess the required qualifications, it is not recommended to attempt servicing this equipment.

NOTICE

All units in this manual are single-phase. See Electrical Power Requirements in Table D.

Code	Display Message	Potential Cause	Troubleshooting
P01	Inlet Temp. Sensor Fault	The temperature sensor is disconnected or broken.	Check terminals and wires of the temperature sensor. Replace if required.
P02	Outlet Temp. Sensor Fault		
P04	Ambient Temp. Sensor Fault		
P05	Coil 1 Temp. Sensor Fault		
P07	Suction Temp. Sensor Fault		
P81	Exhaust Temp. Sensor Fault		
E01	High Pressure Protection	The high-pressure switch is open.	Check the pressure switch, refrigerant charge and for low water flow.
E02	Low Pressure Protection	The low-pressure switch is open.	Check the pressure switch and refrigerant charge. Check for refrigerant leaks.
E03	Flow Switch Protection	Very low or no water flow.	Check valves and pool pump operation. Check the water pressure switch.
E06	Excess Water In/Out Temp. Differential Protection		
E05	Waterway Anti-freezing Protection	Water or ambient temperature are too low.	Check for low outdoor temperatures. Do not operate the unit at low temperatures.
E07	Anti-freezing Protection		
E19	Primary Anti-freezing Protection		
E29	Sec. Anti-freezing Prot.		
TP	Low Ambient Temperature Protection		
P82	Exhaust Air over-Temp Protection	The compressor is overloaded.	Check if fan and compressor are running normally. Check refrigerant charge. Check water flow and ambient conditions.
E51	Compressor Overcurrent Protection		
E08	Communication Fault	Communication issue with display and main board.	Check terminals and harness connections between the main board and the display.
E081	Communication Fault (Mainboard-DC Fan)	Speed control module and main board issue.	Check terminals and harness connections between the main board and the DC motor.

Table H. Fault Codes

Code	Display Message	Potential Cause	Troubleshooting
F01	Drv1 MOP alarm	Inverter board faulted due to loose connection, power supply or power distribution issue.	Check if fan and compressor are running normally. Remove any obstructions to the air intake and exhaust. Check the power supply voltage, wiring gauge and length. Deenergize the unit and remove excessive dust from control board. Check for loose connections from reactor, fan and compressor to the main board. Set factory default values or replace the main board.
F02	Inverter offline		
F03	IPM protection		
F04	Comp. Driver Failure		
F05	DC Fan Fault		
F06	IPM Input Overcurrent Prot.		
F07	Inv. DC Over-volt.		
F08	Inv. DC Under-volt.		
F09	Inv. Input Under-volt.		
F10	Inv. Input Over-volt.		
F11	Inv. Sampling Volt. Fault		
F12	Comm. Err DSP-PFC		
F26	Input Over Cur.		
F27	PFC Fault		
F15	IPM Superheat Prot.		
F17	Inv. Input Out of Phase		
F18	IPM Sampling Cur.		
F19	Inv. Temp. Probe Fault		
F20	Inverter Overheat Prot.		
F22	Inv. Superheat Warn		
F23	Comp. Over Cur. Warn		
F24	Input Over Cur. Warn		
F25	EEPROM Error Warn		
F28	V15V Over/Under-Volt. Prot.		
F16	Weak Magnetic Warn	Compressor performance.	Power-cycle the unit. Replace the compressor if the fault is persistent.
F031	Fan Motor Fault	Motor is locked or DC-fan motor module and fan connection issue.	Check if fan motor is locked, blades broke, or motor is damaged.

Table H. Fault Codes (Continued)

10. EXTERNAL CONTROL

Remote Mode Selector

The Remote mode allows you to select *Pool Heat*, *Pool Cool*, *Pool Auto*, and *Standby* by connecting the remote terminals to a third-party automation controller.

To enable Remote mode, go to the Program screen. Swipe left until you locate the Remote mode parameter. Click the OFF/ON selector to set the function to ON. See **Figure 35**.

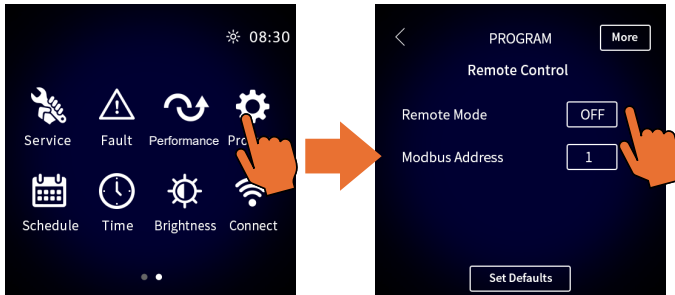


Figure 35. Enable Remote Mode

Locate the remote terminals next to the power terminals. See **Figure 36**.

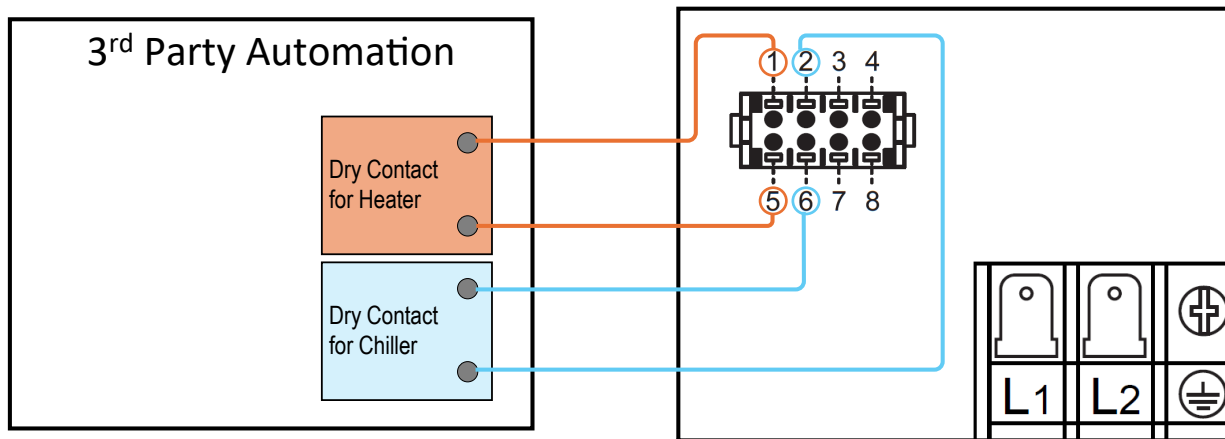


Figure 36. Remote Wiring

Auxiliary Output

The heater is equipped with one general-purpose dry-contact relay output. The control provides a terminal block with screw connections located next to the power terminals, labeled "1" and "2".

The auxiliary output can control one or multiple external devices or ON/OFF electrical circuits. These auxiliary relay terminals do not supply voltage and act only as power interrupters.

Before using this auxiliary output, consider the following:

- Use the auxiliary output to switch power from an external power source to an external device or electrical circuit.
- The auxiliary output is rated for loads up to 700 watts.

⚠ WARNING

The remote terminals supply their own voltage. Use them in combination with a standard selector switch or dry-contact relays from an automation controller.

Remote mode wiring is determined by using terminals 1, 2, 5, and 6. Wire these terminals as needed according to the following logic:

- **Remote Heat** - Connect terminals 1 with 5 to set **Pool Heat**.
- **Remote Cool** - Connect terminal 2 with 6 to set **Pool Cool**.
- **Remote Auto** - Connect terminal 1 with 5 and 2 with 6 to set **Pool Auto**.
- **Remote Off** – Open terminals 1, 2, 5 and 6 to set **Stand-by**.

For loads exceeding 700 watts, install a larger relay or contactor in cascade with the auxiliary output. See **Figure 37** and **Figure 38** on page 24.

- The auxiliary output functions as a Single Pole, Single Throw (SPST) relay with Normally Open (NO) contacts, meaning the circuit remains open until the relay is commanded to close.

The default setting for the Auxiliary Output is Manual mode. This allows you to control the output from the Raymote app. In addition, it can be controlled from the display screen for testing and troubleshooting.

The auxiliary output can also be configured using a timer or set to Auxiliary Heat mode. Refer to the "**Schedule Screen**" on page 18 for more information.

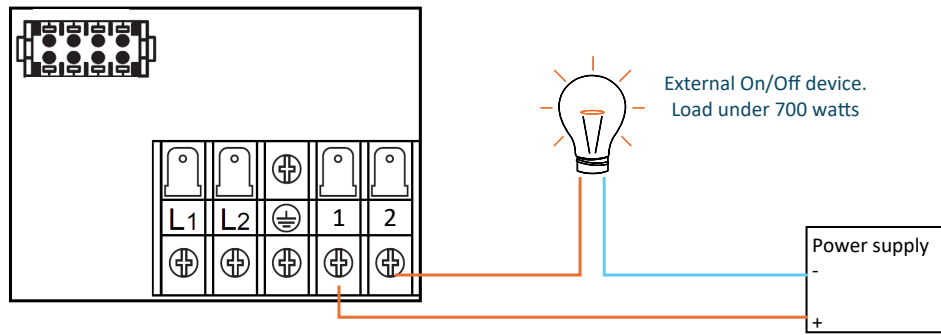


Figure 37. Auxiliary Output Wiring - Below 700 watts

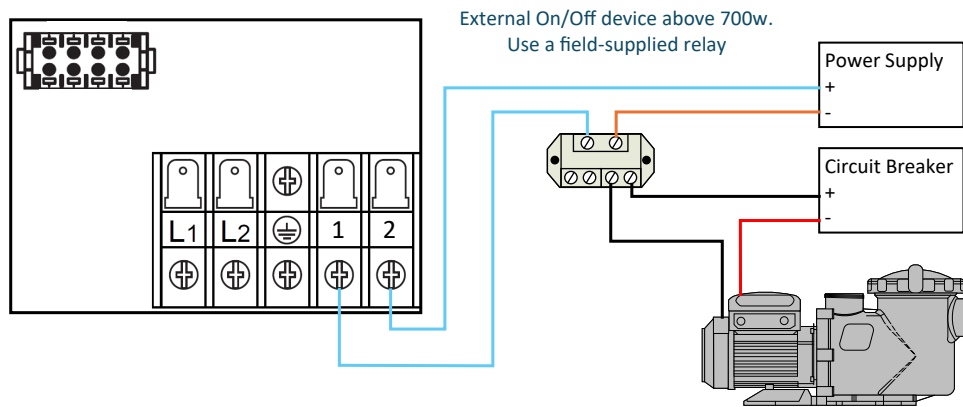


Figure 38. Auxiliary Output Wiring - Above 700 watts

Variable Speed Pump

A Raypak-compatible variable-speed pump, such as AquaStar Smart Pipeline Pumps®, can be connected to the heater and controlled using the Raymote app.

Make sure that:

- The Wi-Fi module is installed and connected to Raymote. Refer to Section 11, “Connect to Wi-Fi with Raymote,” for details.
- The variable-speed pump is Raypak-compatible (such as AquaStar Smart Pipeline Pumps®).

- On the pump, the RS-485 address is set to “2” and the baud rate is set to 9600. Refer to the pump user manual for details.
- The variable-speed pump RS-485 cable is connected to the heat pump as shown in **Figure 39**.

NOTICE

IMPORTANT: The heater must be connected to Raymote, and the pump RS-485 address must be set to “2.”

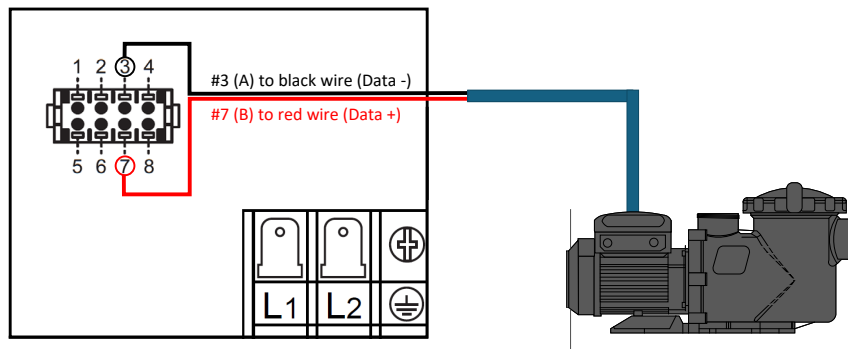


Figure 39. Variable Speed Pump Wiring

11. CONNECT TO WI-FI WITH RAYMOTE

Before initiating the provisioning process, make sure a reliable Wi-Fi access point is located near the unit or control room and a Wi-Fi network password is available.

Date: _____
Wi-Fi Network Name (SSID): _____
Wi-Fi Password: _____

Downloading the Raymote Mobile App

1. Download and install the Raymote mobile app from the Google Play ([Android](#)), or App Store ([iOS](#)), on your mobile device.
2. Find the Raymote mobile app icon on your device. See **Figure 40**.

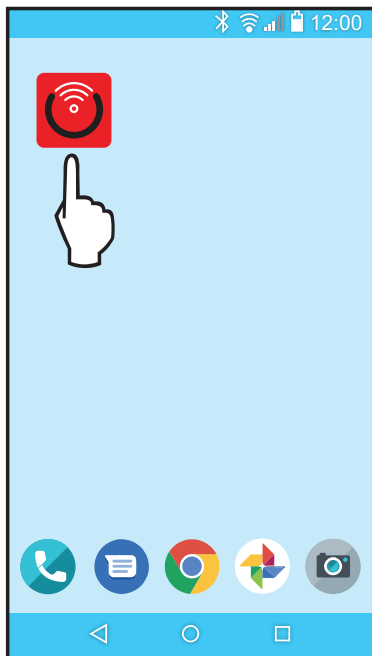


Figure 40. Find your Raymote Mobile App Icon

3. Open the Raymote mobile app and log in with your user name and password. See **Figure 41**.

EMAIL	your.email@email.com
PASSWORD	Password

Figure 41. Log in the Raymote Mobile App

Raymote User Registration

Download Raymote app and sign up from your mobile device.

Client Account

With a Raymote Client account, you can add 1 or multiple heaters to your virtual organization, invite other users to your organization, and assign contractors for remote control and monitoring of your heater(s).

Partner Account

A Raymote Partner account is ideal for contractors, installers, and distributors. With this professional account, you can view multiple client organizations and their units. This account type allows you to create Raymote accounts for your clients, add heaters to their accounts, and provide remote support.

Figure 42. Client or Partner Accounts Sign Up

Use your email to create a new account. You'll receive an email confirmation. See **Figure 43**.

NOTICE

Check your email spam if you do not receive an email within 5-minutes in your inbox.

Use your email address as the Raymote user, then create a secure password. See **Figure 44**.

Once the user registration is complete, you can begin to add your heaters via the Raymote mobile app.

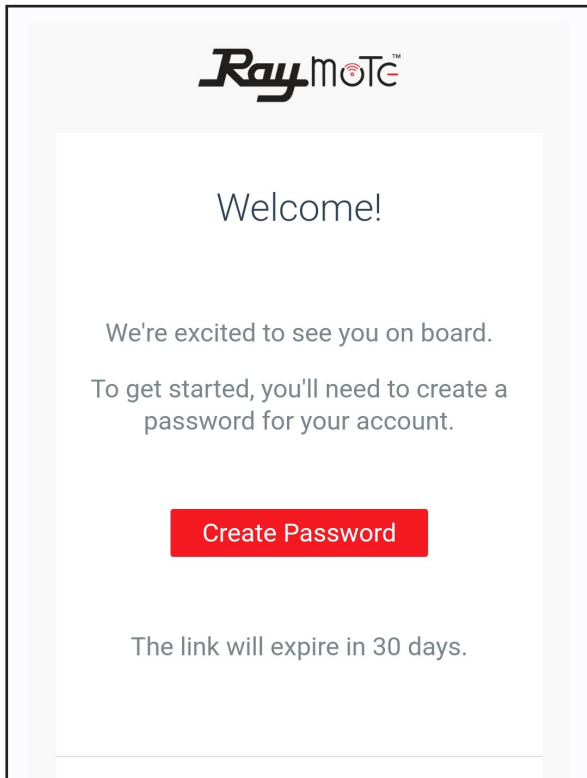


Figure 43. Welcome Raypak Dashboard

Create a password which is hard to guess.

PASSWORD

Password ☐

VERY WEAK

- ☒ Make it longer than 8 symbols
- ☒ Use uncommon words
- ☒ Use non-standard uPPercaSing
- ☒ Use creatif spellllllling
- ☒ Use non-obvi0u\$ number\$ & symbo1s

Continue

Figure 44. Create Password

Preparing the Unit for Connection

1. Stand near the display of the Crosswind unit. On the touchscreen, swipe left to access the menu screen, then locate the “Connect” icon. See **Figure 45**.

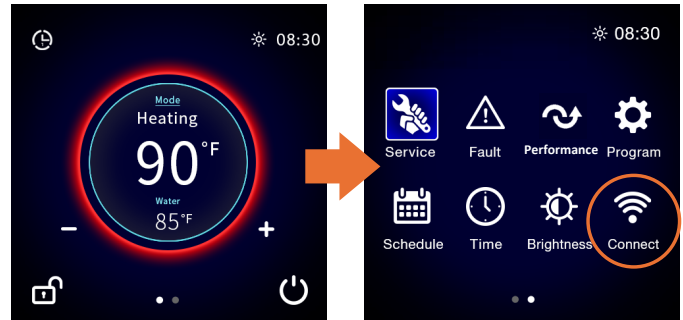


Figure 45. Connect Screen

2. Click the “Connect” icon. The Connect screen displays the Wi-Fi state, indicating a “Ready to Config” wireless connection, as well as the Hotspot ID. See **Figure 46**.

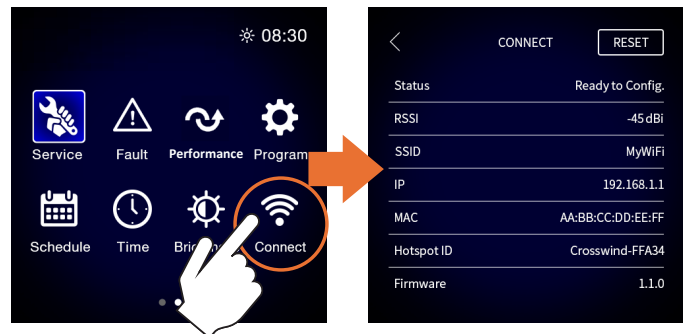


Figure 46. Wi-Fi Ready to Configure and HOTSPOT Identifier

3. At this point your unit is ready for connection.

NOTICE

The following sections provide the instructions for Android and iPhone devices.

Add a New Heater to Raymote

1. In the Raymote app, press the menu button  located at the top left corner of the screen, then press "+ Add new device". See **Figure 47**.

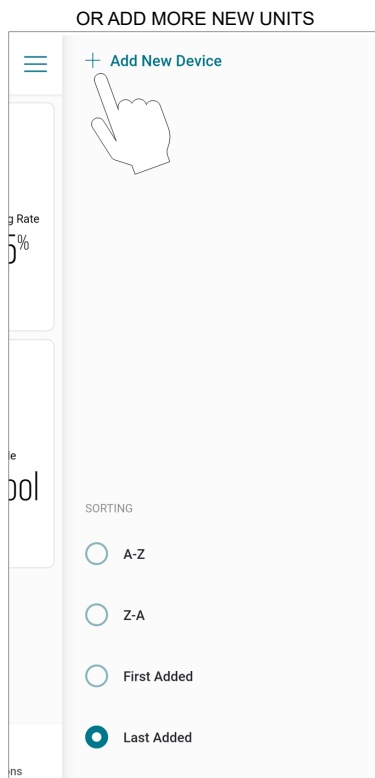
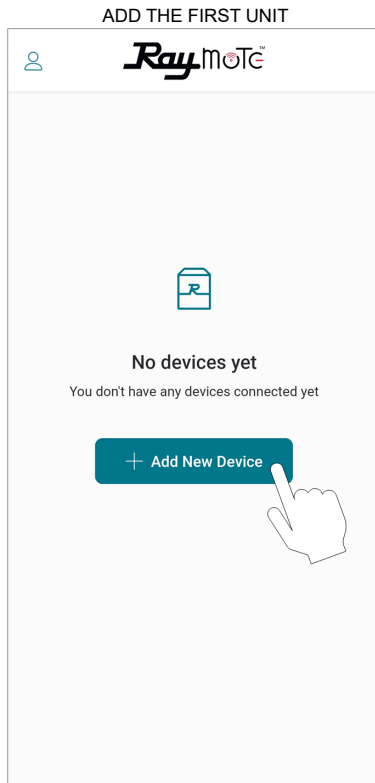
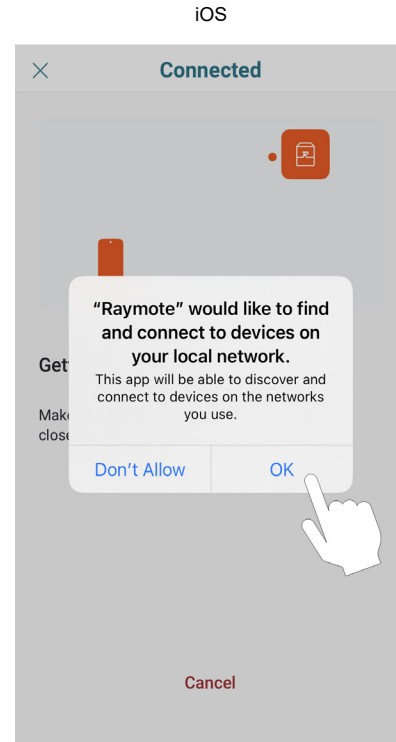


Figure 47. Add New Device

NOTICE

The first time you use a new phone, the Raymote mobile app may require you grant permission to access data. See **Figure 48**.



ANDROID

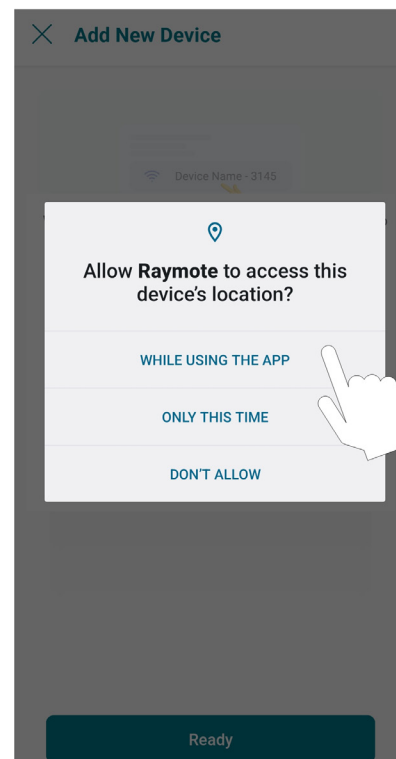


Figure 48. Grant Permission

2. "Add New Device" screen will appear. Ensure to have Heat Pump Pool Heater powered and Wi-Fi signal available in the area, then press "Find devices nearby" button. See **Figure 49**.

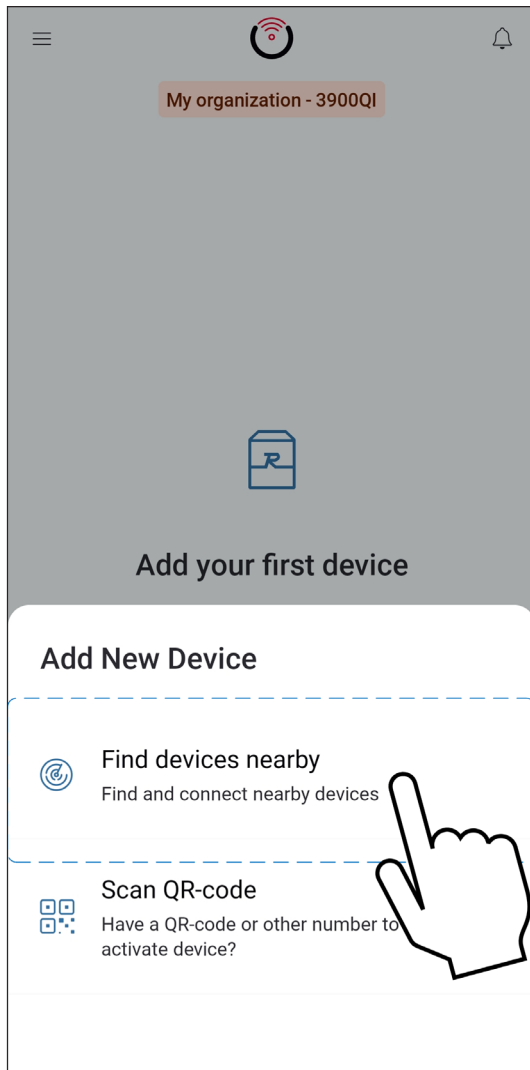


Figure 49. Add New Device

3. **In Android:** Depending on your configuration, one or more devices will appear on the app. Select the HOTSPOT identifier that matches the unit's display as shown in **Figure 50**.

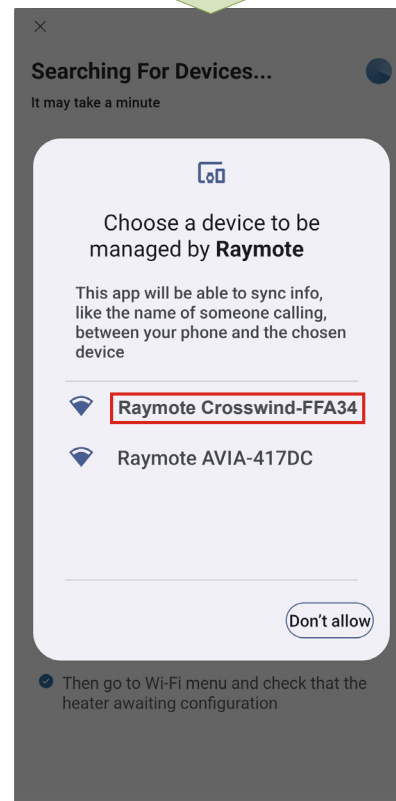
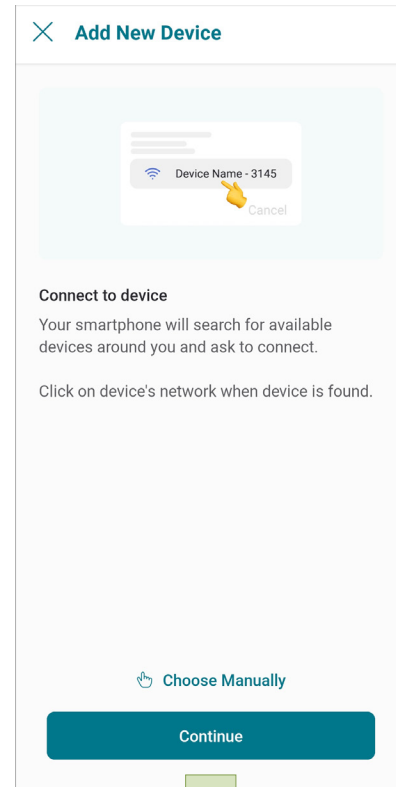


Figure 50. Connect with Android Smart Phone

4. In iPhone: Raymote app will start to scan nearby heaters. If you have multiple units ready to connect, stand closer to the unit you want to connect first. Press "Join" to select the displayed heater that matches the HOTSPOT identifier, or press "Cancel" to start the process again. See **Figure 51**.
5. The "Wi-Fi setup" screen will appear. Select or enter the Wi-Fi network you want your unit to be connected to and enter the network password. See **Figure 52**.
6. Press the "Continue" button to proceed with unit connection.

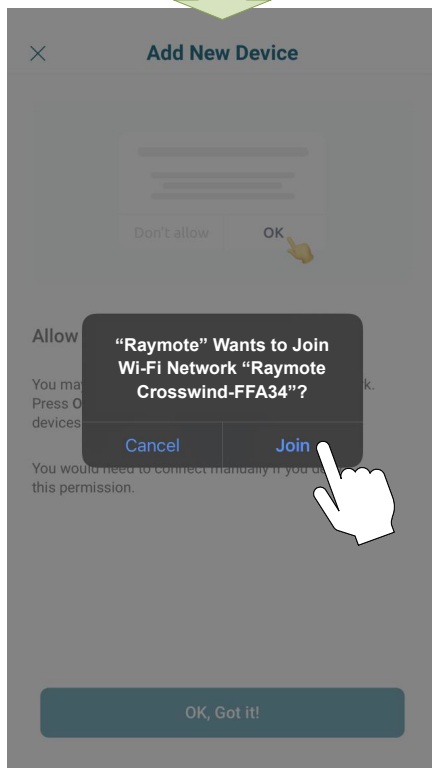
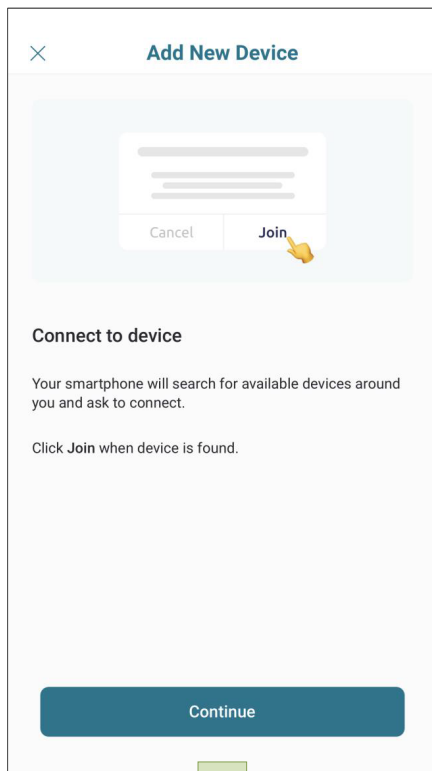


Figure 51. Connecting with iPhone

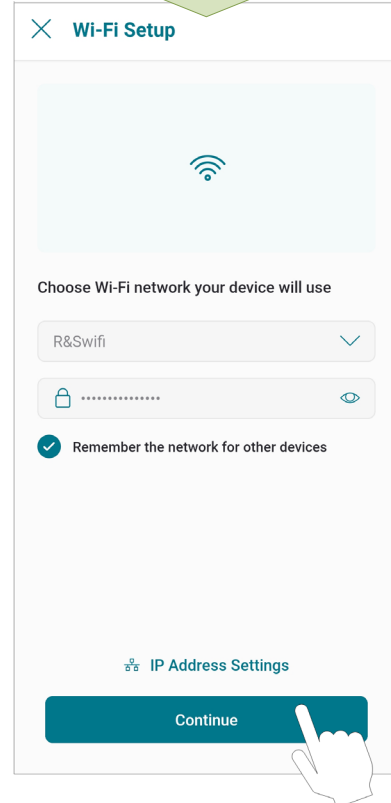
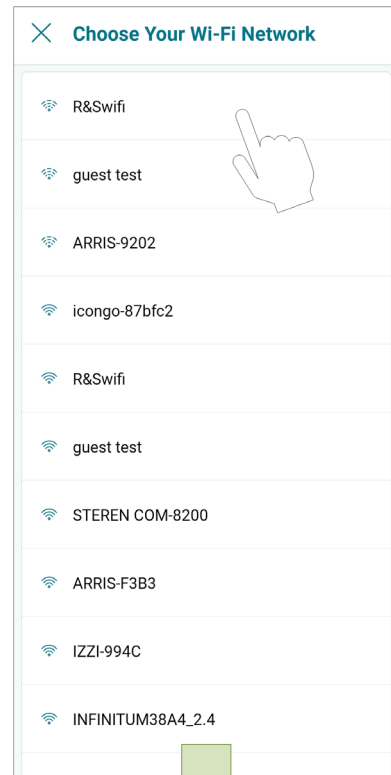


Figure 52. Wi-Fi Setup

NOTICE

IMPORTANT: Raymote Wi-Fi module works with 2.4GHz Wi-Fi signals only.

Ensure to have a strong signal near the heater, the Wi-Fi password and to use a 2.4 GHz network. (IEEE 802.11, 802.11b/g/n/ax).

2. Raymote app will provide the Wi-Fi credentials to your unit. This process may take a few seconds. See **Figure 53**.

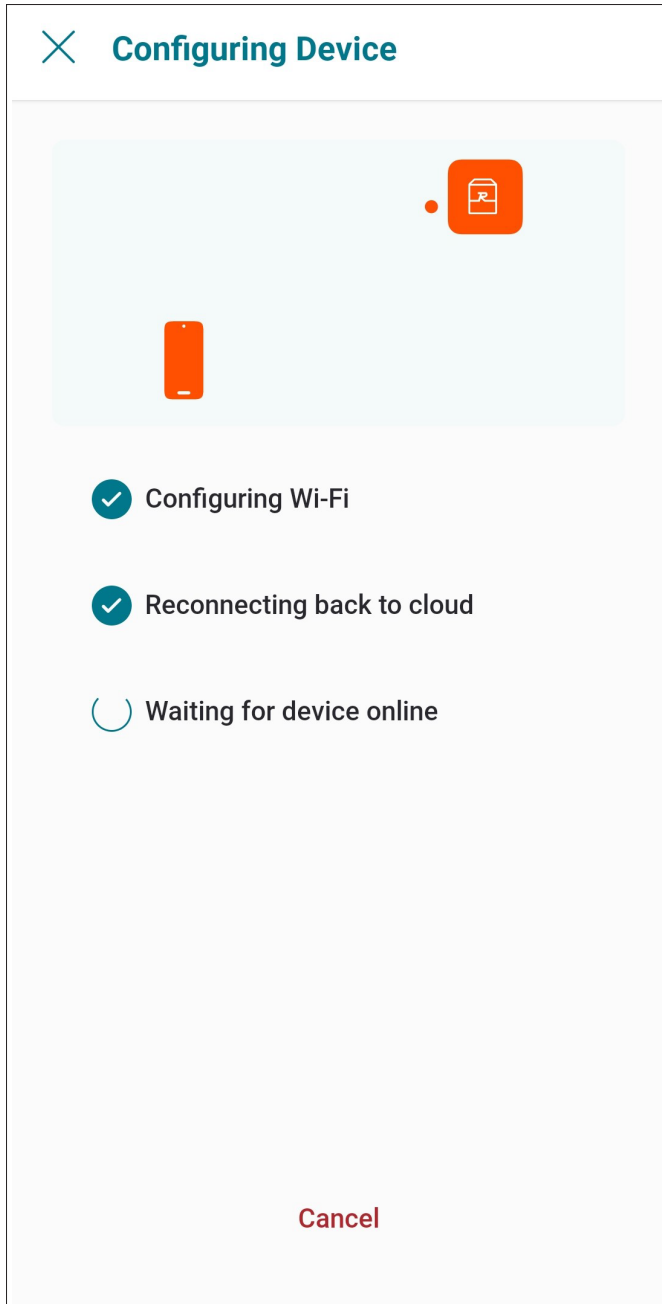


Figure 53. Configuring Device

3. Continue to the next section to setup Crosswind Heat Pool Pump Heater.

Crosswind Heat Pool Pump Heater Setup

1. Your device is now connected to Wi-Fi. You can change the name of your device here. See **Figure 54**.

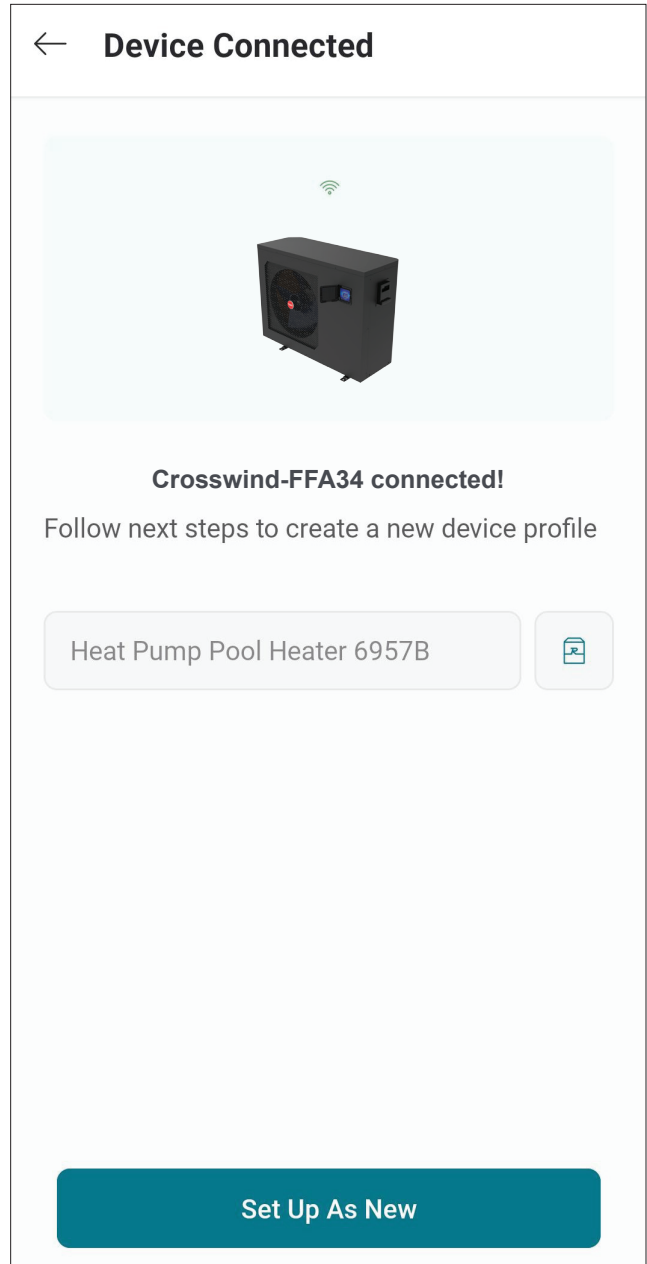


Figure 54. Name Your Unit

4. Press the "Set up as new" button to enter heater location, and other helpful info for future references. Press the "Apply recently used profile" button to use information previously applied to other heaters.

5. During device configuration, basic reference information about the heater will be requested, including service provider, site location, Pool and Spa size. See **Figure 55**.

NOTICE

This information can be added at any time from the Raymote mobile app. It is strongly recommended to make sure this information is completed.

6. After completing the Raymote configuration, the unit will start broadcasting data to the Raymote cloud.

← Review



NAME
Crosswind Heat Pump >

 LOCATION
... >

 SPA SIZE
1000 >

 POOL SIZE
25000 >

 SERVICE PROVIDER
Add +

+ Add More Devices

Finish

Figure 55. Device Setup Review

Main View

- The main view of Raymote display a list of the heaters added in to your Raymote Organization.
- Each heater is represented by a tile with its name and an overview of the heater operation parameters.
- Raymote organization list can handle 1 or multiple Commercial and Residential Raypak heaters equipped with Raymote. See **Figure 56**.

Heater Name

- Heater name is defined during the heater connection and setup, but it can be changed anytime from the heater settings.

Water Temp

- The water temperature measured by the heater is displayed in this field. Water Temp varies with the ambient temperature, pumps and heater's operation.

Setpoint

- Setpoint is the goal temperature for the heater. It can be adjusted from the Crosswind V control board or directly from Raymote.
- Heater start a call-for-heat when Water Temp is 1 degree Fahrenheit or more, below the setpoint and operation Mode is POOL or SPA.
- In heat/cool models, Pool cool mode, heater starts to cool when water is 1°F above temperature setpoint.
- In heat/cool models, Pool auto mode, heater starts to cool when water temp is above temperature setpoint + cooling deadband. In this mode, unit call-for-heat if water temperature is 1°F below temperature setpoint.
- Heater terminates heat when Water Temp is equal or greater the setpoint temperature, or when Mode is changed to OFF.

Mode

- Mode field displays the current operation mode selected.
- POOL mode use an independent setpoint. Heat/Cool models include POOL COOL and POOL AUTO modes.
- SPA and TIMED SPA modes use an independent setpoint.
- In OFF mode the heater is operational but is maintained in standby until mode changes to POOL or SPA.

Offline Indicator

- The offline indicator is displayed only when the heater can not be detected online.
- Offline status can be cause by a heater disconnected from power, Wi-Fi signal weak or not available, or due to any change in Wi-Fi signal name or password.
- Check the Connectivity Troubleshooting section for details on how to recover or reconnect a heater to Raymote.

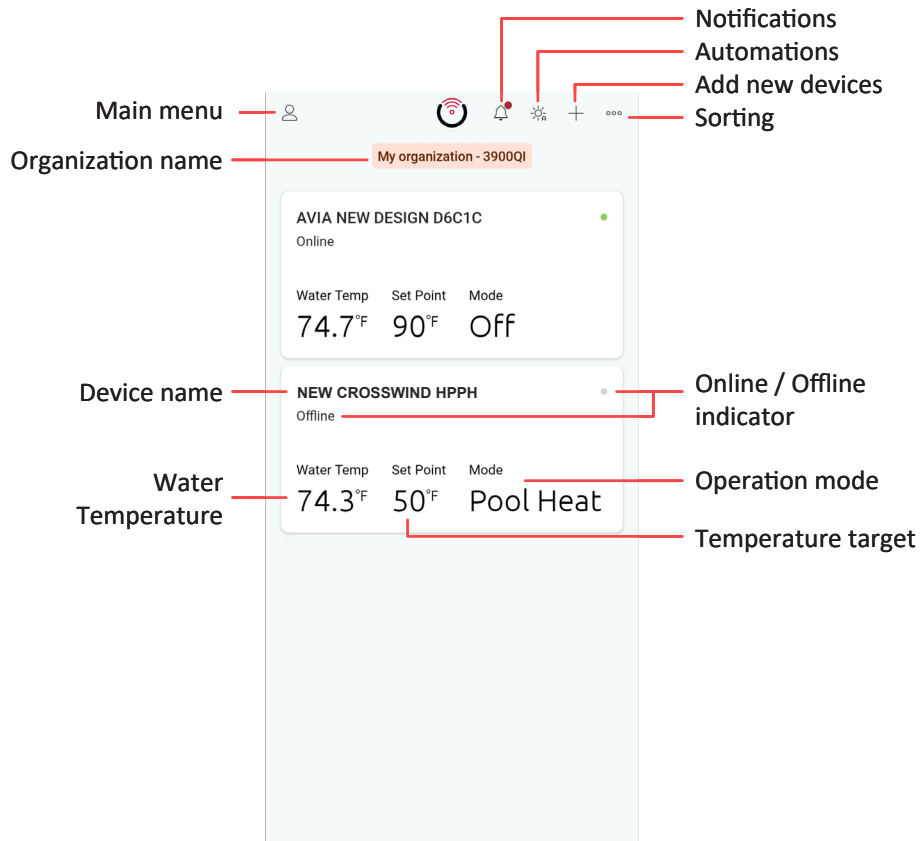


Figure 56. Main View - Heaters List

Automation

Raymote automation offers the ability to create automatic routines to control the heater and compatible devices like pumps and valve actuators. See **Figure 57** and **Figure 58**.

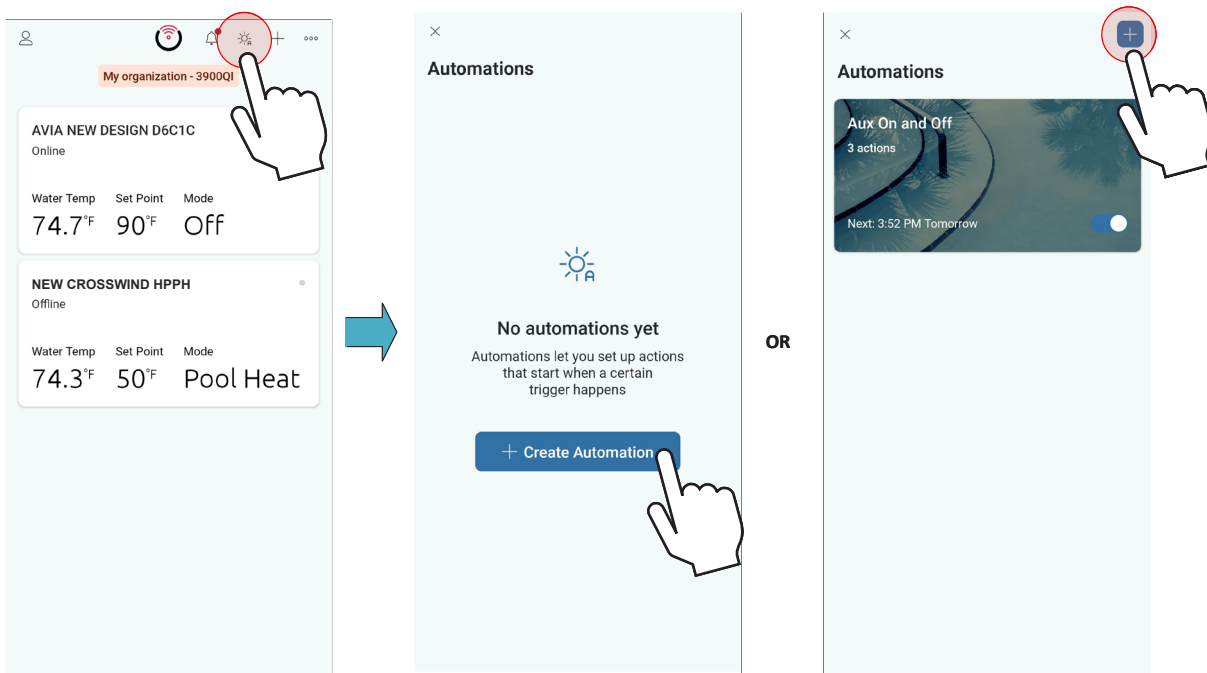
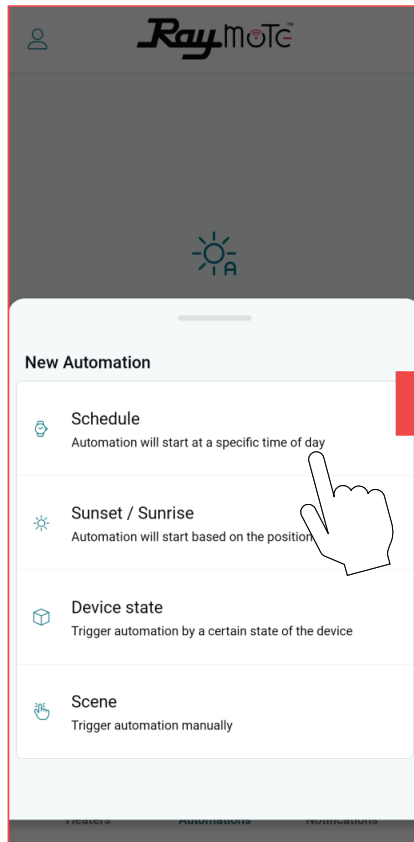
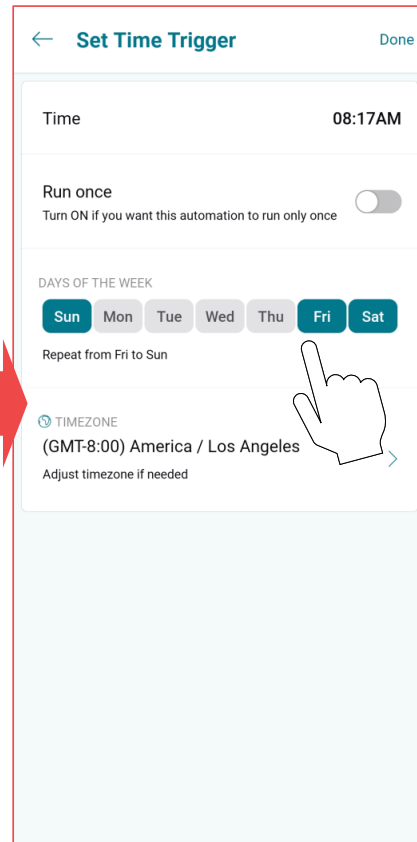


Figure 57. Automation

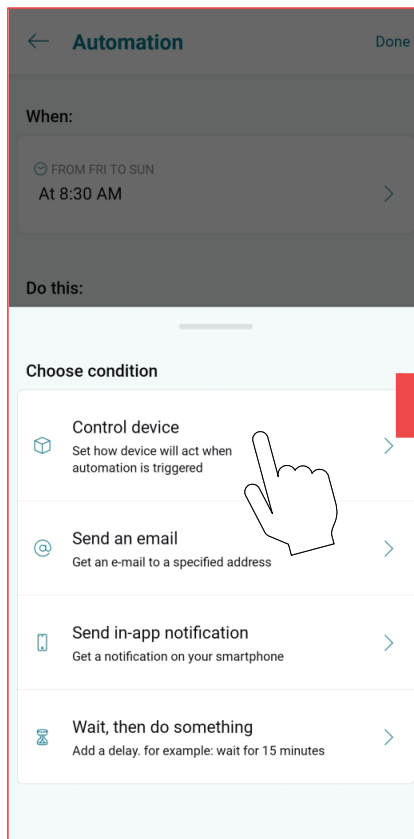
SELECT A TRIGGER



CONFIGURE TRIGGERING



SELECT AN ACTION



CONFIGURE THE ACTION

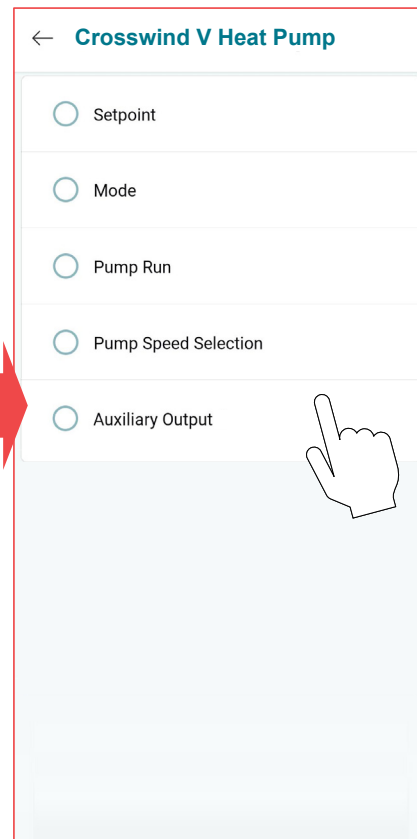


Figure 58. Set New Automation

Pool-Spa Screen

The Mode Screen contains the main controls for the heater. Operation mode and setpoint can be selected from this screen.

This screen also provides the water temperature sensed by the heater, as well as its current operation status. See **Figure 59**.

NOTICE

When OFF is selected, the setpoint slider is disabled.

NOTICE

When unit is controlled with remote mode, the buttons OFF, Pool and Spa are disabled in the App.

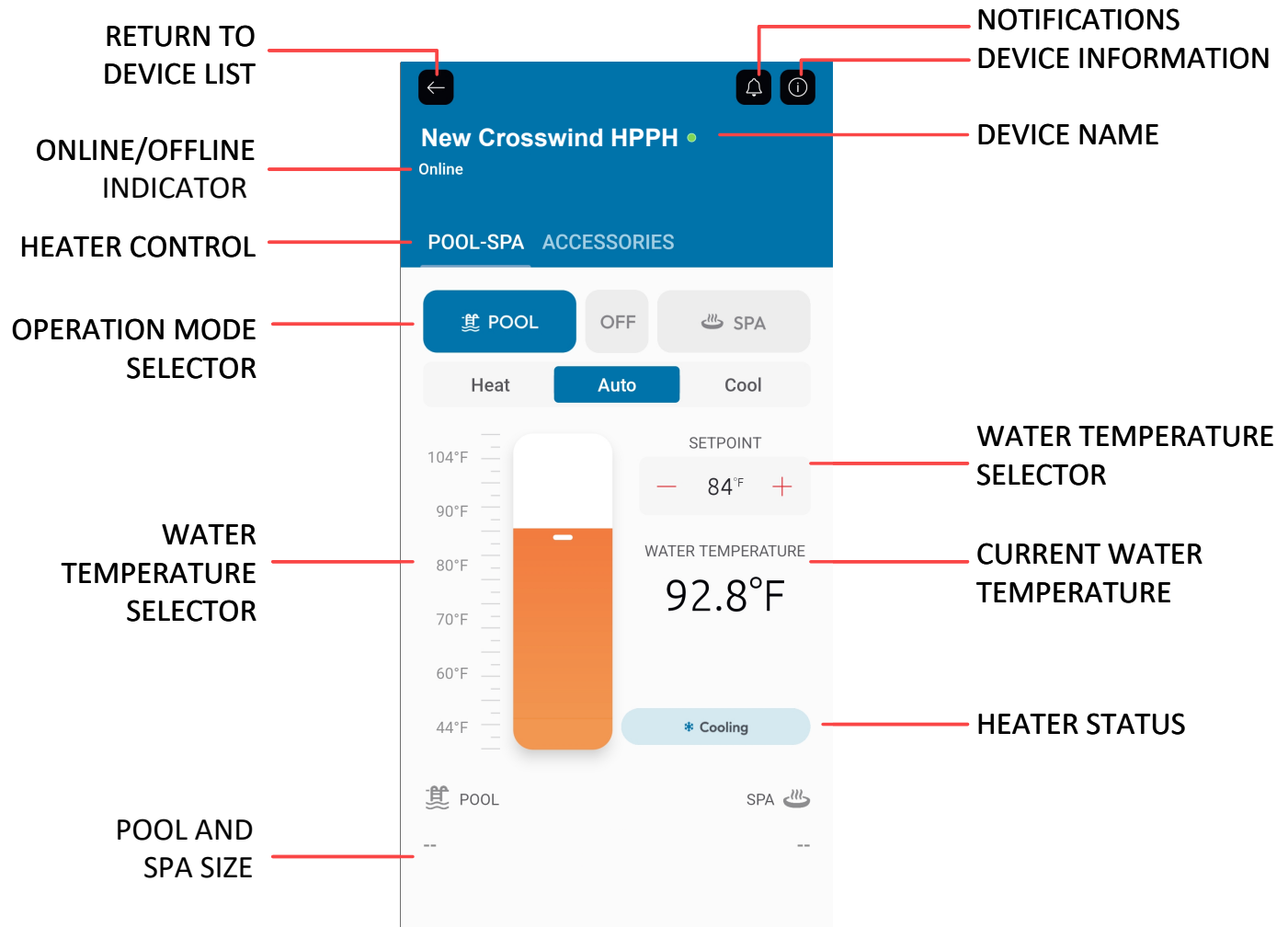


Figure 59. Crosswind Controls

Heater Name

- Heater name is defined during the heater connection and setup. It can be changed anytime from the heater settings.

Exit Heater

- Press X to close heater view and return to heater's list.

Heater Settings

- The 3-dot icon opens heater settings.
- Use this option to edit the parameters defined during heater configuration.

Pool-Spa page

- Displays the page to control the operation mode and water temperature target.

Accessories page

- Displays the page to control heater accessories.

Operation Mode selector

- This 3-button selector can be used to change the operation mode in the heater.
- Use OFF option to stop heating. In this mode the heater is operational but is maintained in standby until mode changes to POOL or SPA.
- Use POOL or SPA mode to set a water temperature target.
- POOL and SPA mode use an independent temperature target for each mode.
- Pool mode selector is enabled in Heat/Cool models.

Heater Status

- This display shows the current operational status of heater.
- No Demand is displayed when the unit is in OFF mode or when Water Temperature is equal or above the temperature target.
- Heating is displayed when the unit is heating. In Heat/Cool models, Cooling is displayed when pool cool or pool auto is selected and the unit is cooling.

Water Temperature

- The water temperature measured by the heater is displayed in this field.

Setpoint or Target Temperature

- The water temperature setpoint display and selector shows the water temperature target.
- Heater start to heat when Water Temperature is 1 degree Fahrenheit or more, below the setpoint and operation Mode is POOL or SPA.
- Heat/Cool models, Pool Cool mode: Heater starts to cool when water temperature is 1F or more above the setpoint.
- Heat/cool models, Pool Auto mode: Heater starts to cool when water temperature is above the temperature setpoint + cooling deadband. Heater start to heat when Water Temperature is 1 degree Fahrenheit or more, below the setpoint

Setpoint slider selector

- The setpoint slider can be used to make quick changes to the water temperature target.
- Selection can be fine-tuned with the [+] and [-] buttons in the setpoint display and selector.

Pool and Spa size

- The Pool and Spa size displays shows the size selected in the configuration of the heater when connected to Raymote.
- These parameters can be updated from the Heater Settings page.

Accessories Screen

The accessories screen includes the auxiliary and extended heater controls in the Raymote mobile app. These controls allow users to command an Auxiliary relay that can be wired to turn on and off a pump, lights or water features.

This screen also provides control to Raypak Protege variable-speed pump when connected to the heater. See **Figure 60**.

WARNING

Only authorized users have access to remotely control the heater, do not provide access to unauthorized users.

NOTICE

Check section "10. EXTERNAL CONTROL" on page 23 for details of wiring and rating of the built-in auxiliary relay.

Some controls are application dependent and may not be available on all units. When a control or set of controls are not available, these will be grayed out.

Raymote controls will reflect the actual status of the value on the local unit. When a change is applied to any control item, the position of the selector will reflect the confirmation value of the setting. See **Figure 60**.

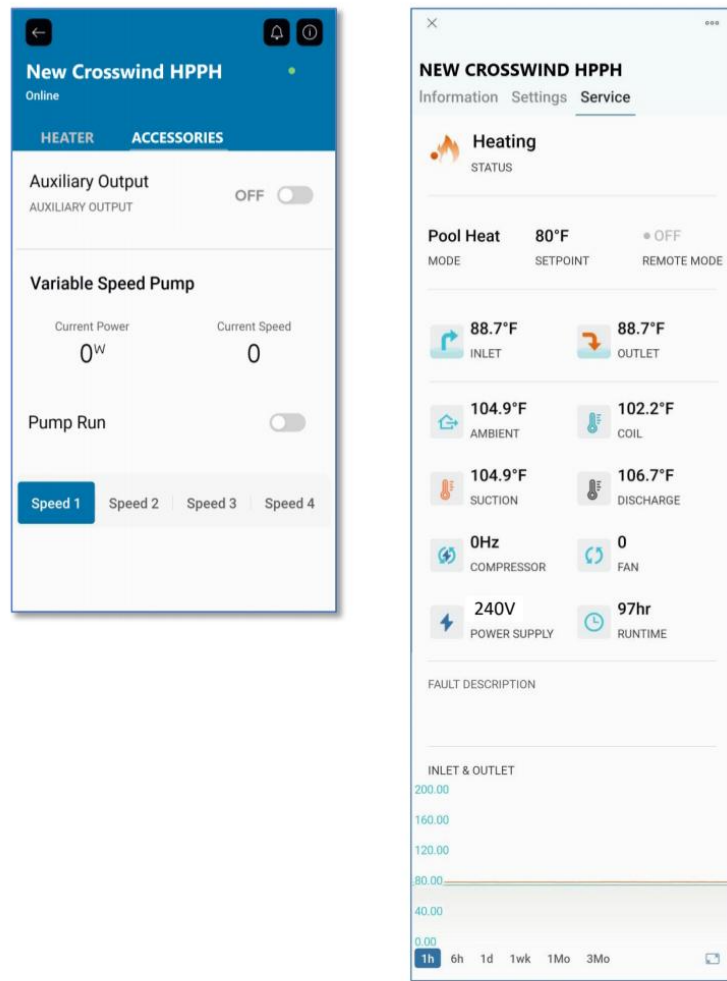


Figure 60. Crosswind Accessories and Service

NOTICE

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator & your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

NOTICE

Use your smartphone camera to open QR link below to access the latest instructions and detailed technical support for Raymote and Crosswind Heat Pool Pump Heater:

<https://www.raypak.com/support/tech-corner/raymote/>



Connectivity Troubleshooting

- With your cellphone check that Wi-Fi signal is available next to the unit. Ensure that your Wi-Fi network meets these specifications:
 - Supported networks - Wi-Fi 2.4GHz (802.11 b/g/n).
 - Password encryptions - WEP, WPA, WPA2.
 - Wi-Fi signal icon of 2 bars (-60dB) or better at heater location. See **Figure 61**.

	Signal [dB]	Quality
	≥ -30	Excellent
	-50	Very Good
	-60	Good
	-70	Limited
	-80	Bad
	-90	Unreliable

Figure 61. Wi-Fi Signal

- Use the built-in Wi-Fi network options in your cellphone or use a Wi-Fi network scanner app, like Fing Network Scanner for iPhone or Wi-Fi Analyzer for Android smart phones, to check signal strength.

If you are having troubles connecting your heater to the Raymote app, try these common solutions:

- Check that Wi-Fi signal name and password are correct.
- In case of a change, proceed to reset Wi-Fi credential from heater touchscreen and reconnect the heater with Raymote app. See **Figure 62**.



Figure 62. Reset Wi-Fi Credential

- Check that your Wi-Fi signal strength is strong enough to reach the heater.
 - Reduce distance between Wi-Fi router and the heater.
 - Add a Wi-Fi range extender to cover heater zone or enable a new Wi-Fi access point. See **Figure 63**.
- Update Raymote app to the latest version.

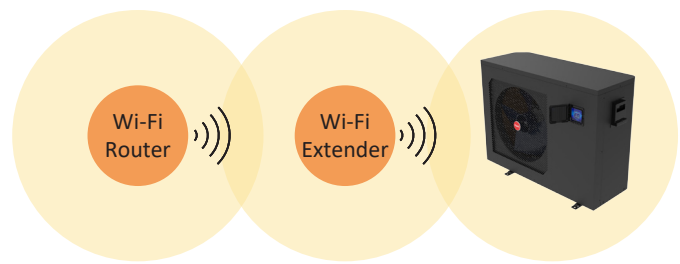


Figure 63. Wi-Fi Extender

- Power-cycle your heater and restart Raymote app.



Figure 64. Update Application

- Check the settings on your router or Wi-Fi access point.
 - If needed, enable a dedicated 2.4 GHz network. 5GHz signals are not compatible with Raymote.
 - When applicable, ensure to have the permissions from IT or Building Manager.
 - Check if MAC address whitelisting is required.
 - Check if Static IP is required.



Figure 65. Wi-Fi Access Point Settings

12. SEASONAL START-UP OR ANNUAL CHECK

NOTICE

At the beginning of the heating season or whenever the pool water temperature is to be raised several degrees, the pool pump and heat pump pool heater may need to operate continuously for several days. During summer months, only a few hours per day may be necessary or none at all.

1. Remove leaves, pine needles, etc., from the evaporator coil. Clean the coil by gently applying a mild solution of household liquid soap and water.
2. Remove the side louvered panel by removing the single screw at the top and the two (2) screws on the middle part of the panel. Lift and pull the bottom out. The panel will easily come away from the cabinet giving access to the coil for cleaning.
3. Gently rinse the coil with water; DO NOT use high pressure.
4. Re-install the side panels and secure each with the screws removed in Step 2.
5. Backwash or otherwise clean the pool filter. If necessary, clean the skimmer basket and pump strainer.
6. Set the valves to ensure proper water flow through the unit.

NOTICE

If the pool pump and heat pump pool heater shut OFF before the water temperature is raised to the desired level, you must lengthen the running time of both. To do this, reset the time clock dial for the longer running time, or manually operate the pump with the timer override switch. Since the heater capacity and efficiency are both greater at higher ambient air temperatures, run time should be set to take advantage of all daylight hours, when the air is generally warmer.

13. SUMMER SHUTDOWN

If you do not plan to use the heater during the summer months, secure and protect it as follows:

1. Turn the unit circuit breaker or disconnect switch to OFF.
2. Leave the valves set the way they are unless additional circulation is required. DO NOT stop all flow through the heater.

NOTICE

IMPORTANT: Remember to reset the valves before the next heating season, or the unit will not operate properly.

14. FREEZE PROTECTION

If the unit is installed in a location subject to freezing conditions, it is important to protect the water circuit from freezing, just as should be done for the pump and filter.

System Drain-Down

1. Turn the unit circuit breaker or disconnect switch to OFF.
2. Unscrew the water union on the outlet pipe (top) to allow water to flow out. Drain the remaining water from the heater by removing the piping connections on both the inlet and outlet sides. See **Figure 66**.

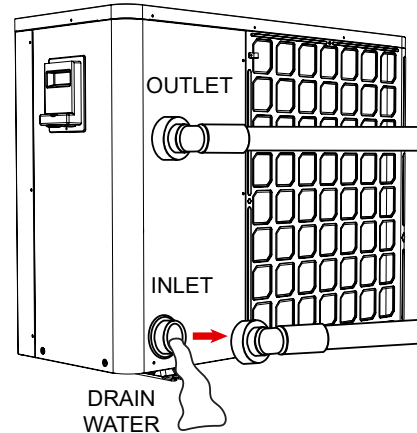


Figure 66. Inlet and Outlet Connections

3. Use a wet/dry vacuum or air pressure to remove excess water, as necessary.
4. After draining the water, reconnect the inlet and outlet unions.
5. Disable all pump operation and/or close the inlet and outlet valves to bypass water flow.

CAUTION

If water is left in the system during freezing weather, the titanium heat exchanger may be damaged.

7. Cover the unit with a waterproof cover.

Continuous Pump Operation

It is also possible in some areas to prevent unit freeze damage by operating the pump continuously during freezing weather. However, this results in significantly higher pump operating costs. Further, if a sustained power failure occurs, the unit **MUST** be drained anyway, or freeze damage could result.

NOTICE

The heater manufacturer is not responsible for maintenance adjustments.

15. MAINTENANCE

The following maintenance procedures are designed to keep your unit operating at a high-level of reliability. Maintenance must be performed on a periodic basis to maintain warranty coverage and prevent system failures and performance degradation.

CAUTION

Turn off the heater power supply before performing any service work, including cleaning, inspection, or repair. Do not touch any electronic components until the display is OFF. Test all electrical connections to ensure the unit is de-energized.

CAUTION

To clean the fins, remove the side panels and spray gently with a garden hose. DO NOT pressure wash. Doing so will bend the fins and can void the warranty.

Air Coil Cleaning

Efficient operation depends on free circulation of air through the thin and tightly-spaced fins of the evaporator coil(s). The evaporator must be cleaned whenever it has a buildup of dirt or debris.

Cabinet Care (optional)

⚠ WARNING

Shut OFF electricity to the unit before cleaning.

The powder-coated cabinet is designed for outdoor use and requires little care. However, you can clean it if you wish. Clean the cabinet with a damp cloth. Do not use abrasive or flammable cleaning products.

16. TROUBLESHOOTING

Before troubleshooting the system, ensure that:

- All mechanical and electrical connections are secure and tight.
- All system wiring is correct.
- That a system ground is properly connected to the heater. Nuisance shutdowns are often caused by a poor or erratic ground.

The service display can be accessed from the Menu screen. Swipe left and select the "Service" option.

The Service screen does not affect unit operation, which continues to run in the background. While in this menu, swipe left or right to navigate through the various information displayed. For more details about the Service menu, refer to the "Service Screen" section.

If your unit does not operate, or simply does not heat your pool water, fault messages on the front control panel can provide valuable clues as to what is wrong, and may even

indicate precisely what the problem is. Always observe these messages before calling a service representative. By reporting on the telephone the fault messages that are showing, the service representative may be able to solve the problem without the expense of a service call.

A. Unit Is Running, But Not Heating

- Is water flow through the unit adequate? Check the unit for obstructions, such as a clogged filter pump strainer, a dirty filter, or valves not positioned correctly.
- Is the ejected air from the unit 8°–10°F (4.4°C–5.5°C) cooler than incoming air? If so, the unit is extracting heat from the air and transferring it to the pool.
- Is water condensing on the evaporator and internal copper pipes? This is also evidence of heat removal from the air. When the air is cool with low humidity, condensation may not be evident.
- How long has the unit been operating? During initial pool heating in cold weather, it may require a week to elevate the water temperature to a comfortable level. Normally, it takes about 4-days.
- How many hours per day is the unit operating? **Remember that the heater only operates while the pool pump is running.** Set the time clock to permit 24-hour per day operation. After the desired temperature is reached, return the unit to normal operation of 8–10 hours per day.
- Is airflow through the unit being obstructed? Restrictions such as shrubbery, tall grass, dirty coils, or any other obstruction to airflow will reduce performance.
- Is the pool blanket/cover being used? Uncovered pools can lose up to 10°F (5.5°C) per night compared to 4°F (2.2°C) or fewer when a blanket is used. Without a blanket, the total heat gained during the day can be lost overnight.
- Are rapid heat losses occurring in some other way, such as high-wind, spillage, rainfall, flow through solar panels at night, or a high water table?

NOTICE

If the heat pump pool heater shuts off before the water temperature is raised to the desired level, you must increase the running time. To do this, reset the time clock dial for a longer running time or manually operate the pump with the timer override switch. Since the unit capacity and efficiency are greater at higher ambient air temperatures, the run time should be set to take advantage of all daylight hours when the air is generally warmer.

B. Unit Is Not Running

- Is the temperature display ON? If not, the circuit breaker may be shut OFF or tripped. Reset the breaker by switching it OFF, and then back ON. Verify that the breaker is set and operating properly before calling for service.

- Are the Pool/Spa settings correct? Verify that the temperature has been properly set on the thermostat, and that it is higher than the current water temperature.
- Have you waited approximately 3-minutes for the time delay? After the unit has been running and then shut OFF for any reason, there is a delay before operation can begin again. The display will read "Comp Start Delay" when this 3-minute delay is active.

NOTICE

The heater will not run when the Remote position is selected on the pool/spa control and there is no remote control system attached.

C. Condensation Seems Excessive

Heat pump pool heaters can produce a large amount of condensation (water) during operation. If you suspect that the unit is leaking:

- Shut the unit OFF and leave the filter pump running to see if the water stops dripping. If the water stops dripping, the unit is not leaking.

NOTICE

Use a pool chemistry test kit to confirm there is no chlorine in the water.

17. SERVICE CALL VERIFICATION

NOTICE

The Service number is located on the front of the heater at the brand label.

Before you make a service call, **first** determine if the problem is:

- Warranty Service - must have model number, serial number and date of installation or Warranty Registration confirmation number.
- Unit operation (power supply, water flow, or time clock adjustment).

NOTICE

The manufacturer is not responsible for these adjustments.

Power Supply

- Verify that all circuit breakers are reset and working properly.
- If the temperature display on the control panel still does not light, contact the installing dealer, since it may be a power problem requiring an electrician.

Water Flow

- Verify that the pool filter is clean to provide good flow.
- Verify that valves are properly positioned to allow adequate water flow through the unit.

Time Clock Adjustment

Verify that any timer set for the water pump or heater is configured to allow the unit to run long enough to heat properly.

Set Factory Defaults

If programming is disarranged and no operation can reliably be made, the control board can be reset to Factory Default values. This operation changes all adjustable settings to factory default settings.

NOTICE

Previous settings will be erased and are no longer recoverable. All settings will have to be re-entered by hand to re-establish proper operation.

After restoring the factory defaults, check the Program and Schedule menus as needed to configure the desired operating settings and optional controls.

Service Access to Heaters

If service access to the heater is required, it can be accomplished by removing the top cover and the control service access panel. See **Figure 67**. This provides access to the fan motor, inverter board, relay, flow switch, and sensors (high-pressure sensor and low-pressure sensor).

To gain access, follow the steps below:

1. Shut off all power to the unit to avoid any possibility of electrical shock or damage to components.
2. Remove the heater's top cover by unscrewing the eight (8) screws using a Phillips-head screwdriver.
3. Remove the control service access panel by unscrewing the six (6) screws using a Phillips-head screwdriver.

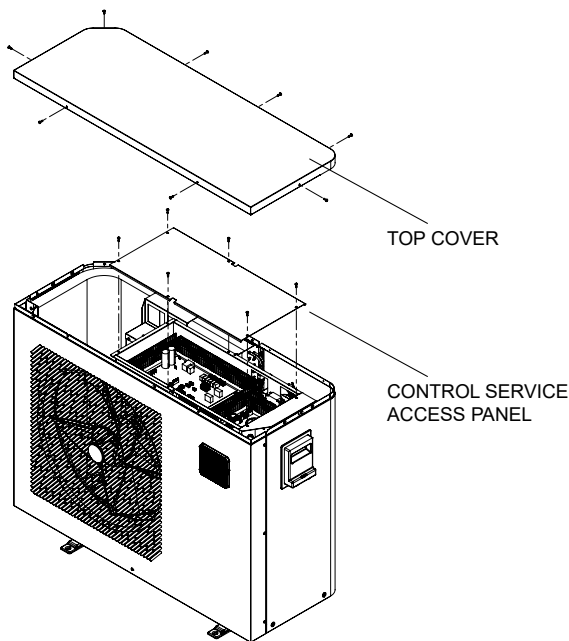


Figure 67. Top Panels Removal

4. Set the control panel cover aside for reinstallation after the service is completed.
5. Reinstall the service access panel, then slide the control panel cover back into place and secure it using the screws removed in Steps 2 and 3.
6. Turn the power ON and start operation as needed.

To gain access to the compressor, TXV, transformer, heat exchanger, fan blade, and relay, follow the steps below:

1. Shut off all power to the unit to avoid any possibility of electrical shock or damage to components.
2. Remove the heater's top cover by unscrewing the eight (8) screws using a Phillips-head screwdriver.
3. Remove the side service panel by unscrewing the seven (7) screws using a Phillips-head screwdriver. See **Figure 68**.

NOTICE

IMPORTANT: Disconnect the user interface wire. The panel is now free for removal.

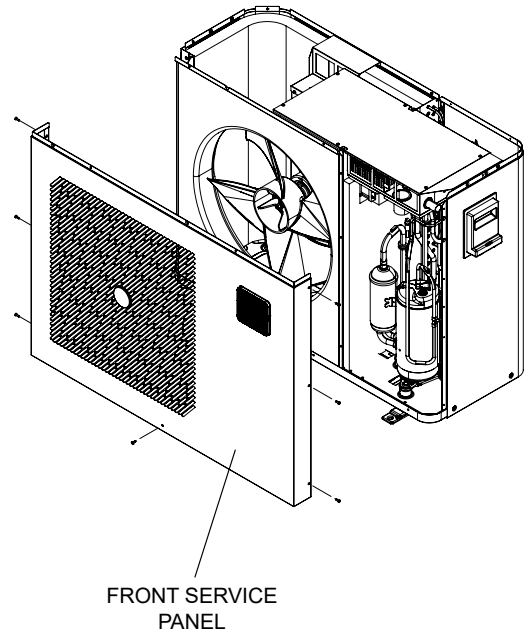


Figure 68. Front Service Panel Removal

4. Set the side service panel aside for reinstallation after service is completed.
5. Reinstall the service panel, connect the user interface wire, and secure the panel using the screws removed in Steps 2 and 3.
6. Turn ON the power and start operation as needed.

18. TECHNICAL PARAMETERS

NOTICE

Technical parameters as published in the AHRI directory.

Parameter	Crosswind Models		
	TWPH-H50HC	TWPH-H70HC	TWPH-H90HC
Performance Condition: Air 80°F (27°C), Water 80°F (26.7°C), Humidity 80%			
Heating capacity (BTUH)	12,750 - 50,000	19,000 - 70,000	26,500 - 90,000
Coefficient of Performance	10.3 - 5.5	10.8 - 5.8	12.5 - 5.9
Performance Condition: Air 80°F (27°C), Water 80°F (26.7°C), Humidity 63%			
Heating capacity (BTUH)	12,000 - 46,200	17,800 - 66,000	24,900 - 83,800
Coefficient of Performance	8.4 - 5.1	9.2 - 5.4	9.7 - 5.6
Performance Condition: Air 50°F (10°C), Water 80°F (26.7°C), Humidity 63%			
Heating capacity (BTUH)	11,800 - 25,000	13,800 - 37,500	19,200 - 45,000
Coefficient of Performance	4.5 - 4.1	4.5 - 4.1	4.6 - 4.1
Performance Condition: Air 95°F (35°C), Water 90°F (32°C), Humidity 80%			
Cooling capacity (BTUH)	25,600	30,800	38,600
Coefficient of Performance	3.2	3.8	3.1
Heating capacity (kW) (80/80/80)	14.65	20.51	26.38
Breaker Size (Min / Max)	20 / 25	25 / 35	30 / 45
Power supply	208-230VAC/ 1 Ph/60Hz		
Refrigerant (R32) in oz.	21.1	35.2	42.3
Water flow GPM (L/min)	21.1 (80)	29.1 (110)	37.8 (143)
Sound pressure 39" (3 m) dBA	46 ~ 50	46 ~ 55	48 ~ 56
Heat exchanger	Titanium in PVC		
Casing	Sheet Metal Casing		
Air discharge	Horizontal		
Water pipe in-out Spec	2" ABS		
Net Dimension	See Table J on page 43.		
Net Weight			

* The values indicated are valid under ideal conditions: Pool is well covered, filtration system running at least 15-hours a day.

Table I. Technical Parameters

UNCONTROLLED DOCUMENT IF PRINTED

Specifications and Dimensions

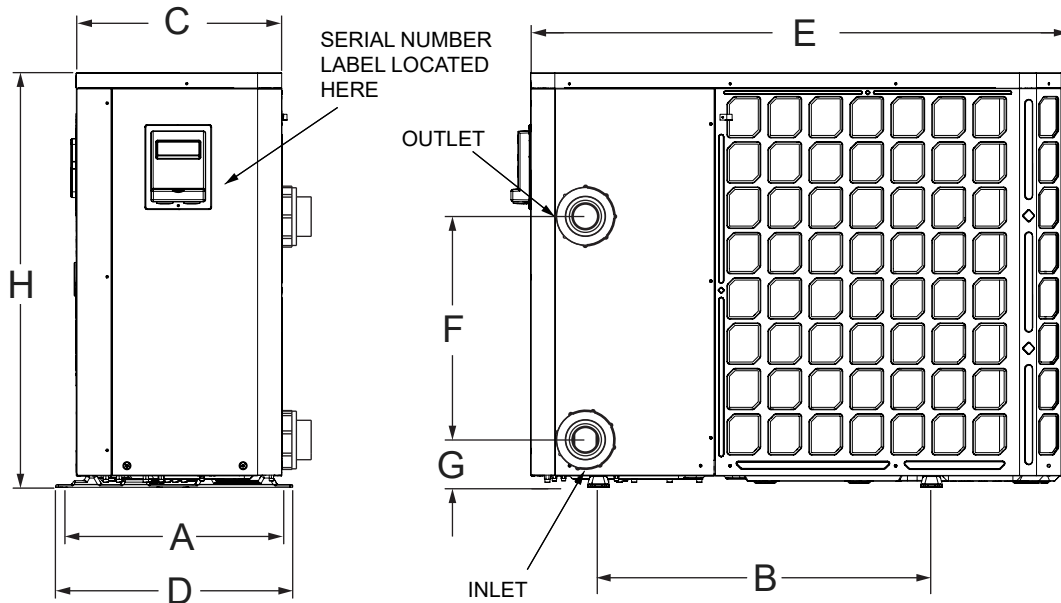


Figure 69. Dimensions

Inverter Models									
Models	A	B	C	D (Width)	E (Length)	F	G	H (Height)	Weight lb. (kg)
TWPH- H50HC	15.6 (395.5)	25.6 (649)	15.3 (390.5)	17.9 (454.6)	39.4 (1000.2)	13.8 (350)	2.9 (74)	30.2 (766.3)	149.9 (68)
TWPH-H70HC TWPH-H90HC	16.9 (430.2)	27.2 (691)	16.8 (426)	19.4 (491.6)	43.9 (1115)	18.3 (465)	2.9 (74)	33.9 (859.8)	211.6 (96)

Table J. Basic Product Data - in. (mm)

Internal Components

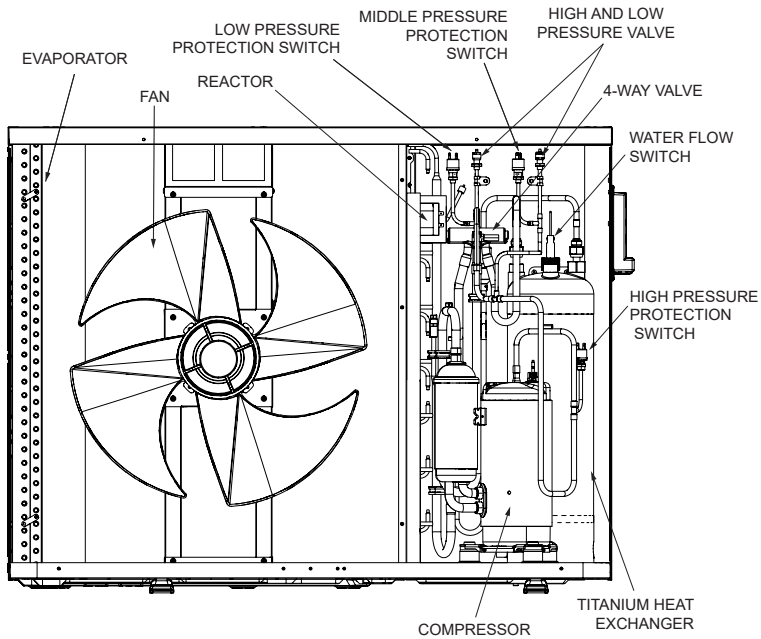


Figure 70. Component Locations, Front Side View without Front Cover

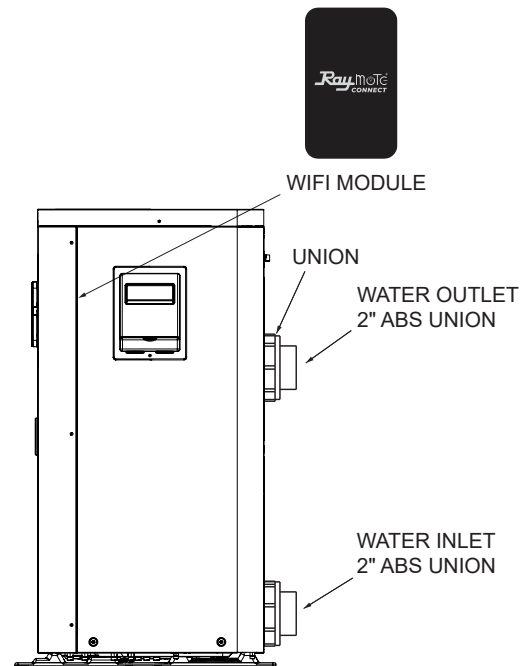


Figure 71. Component Locations, Right Side View

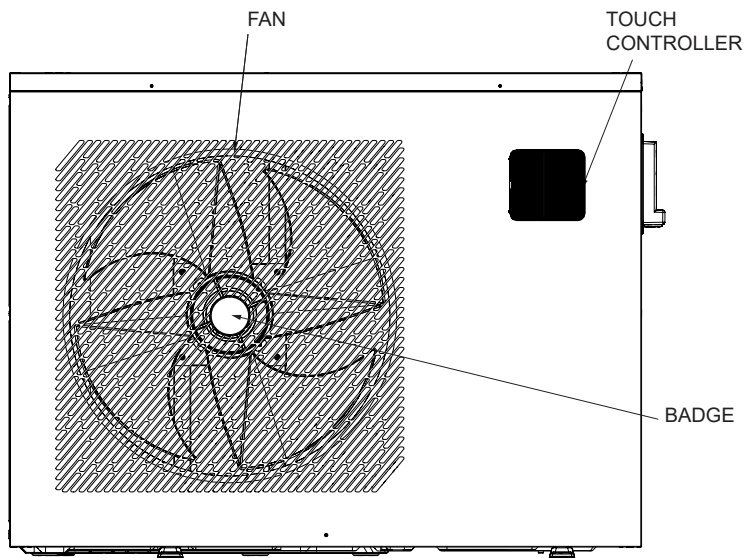


Figure 72. Component Locations, Front Side View with Front Cover

19. REPLACEMENT PARTS

NOTICE

To supply you with the correct part, it is important that you supply the heater model number, serial number and type of gas when applicable.

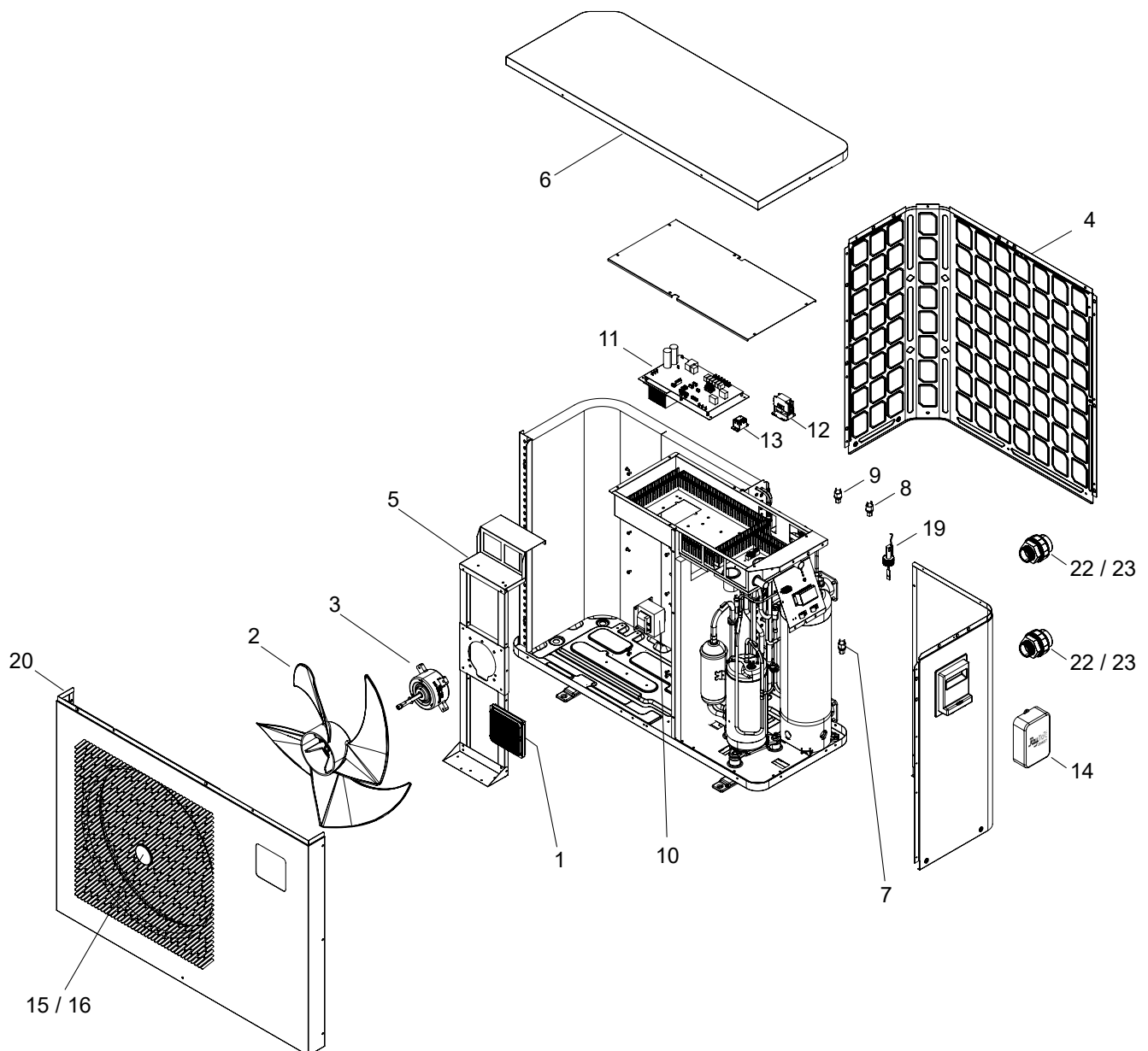
Any part returned for replacement under standard company warranties must be properly tagged with a return parts tag, completely filled in with the heater serial number, model number, etc., and shipped to the Company freight prepaid. If determined defective by the Company and within warranty, a like part or equal substitution will be returned, freight collect. Credit will not be issued.

DISTRIBUTOR:

**Raypak, Inc.
5630 Zip Dr.
Fort Myers, FL 33905**

1-800-260-2758

20. ILLUSTRATED PARTS LIST



Item	Description	TWPH-H50HC	TWPH-H70HC	TWPH-H90HC
1	User Interface	100-10009567	100-10009567	100-10009567
2	Fan Blade	100-10009568	100-10009570	100-10009570
3	Fan Motor	100-10009571	100-10009573	100-10009573
4	Back Guard Bracket	100-10009574	100-10009575	100-10009575
5	Fan Motor Bracket	100-10009576	100-10009578	100-10009578
6	Top Cover Bracket	100-10009579	100-10009580	100-10009580
7	High Pressure Switch	100-10009581	100-10009581	100-10009581
8	Middle Pressure Switch	100-10009582	100-10009582	100-10009582
9	Low Pressure Switch	100-10009583	100-10009583	100-10009583
10	Reactor	100-10009584	100-10009584	100-10009569
11	Inverter Board	100-10009585	100-10009585	100-10009587
12	Contactor	100-10009588	100-10009588	100-10009588
13	Relay	100-10009589	100-10009589	100-10009589
14	Wifi Module	100-10009590	100-10009590	100-10009590
15	Badge Raypak	100-10004474	100-10004474	100-10004474
16	Badge Rheem	100-10004473	100-10004473	100-10004473
17	Accessories Kit (Not Shown)	100-10009593	100-10009593	100-10009593
18	Drain Kit (Not Shown)	100-10009595	100-10009595	100-10009595
19	Flow Switch	100-10009596	100-10009596	100-10009596
20	Front Guard Bracket	100-10009599	100-10009600	100-10009600
21	Full Set of Sensors (Not Shown)	100-10009594	100-10010066	100-10010066
22	2" ABS Unions (2)	100-10010123	100-10010123	100-10010123
23	1-1/2" ABS Unions (2)	100-10010124	100-10010124	100-10010124

NOTES

Revision 01 reflects the following change:.

Updated Figure 2 and 3 clearance callouts; Updated Table D amperage callouts; Updated Table I technical callouts; Updated Figure 71 to replace "PVC" with "ABS". Updated IPL to replace "PVC" with "ABS" for items 22 and 23.