Raypak®
A Rheem® Company

AVIA™ Pool & Spa Heater

Tool Box Quick Reference Guide

Water Chemistry

For your health and the protection of your pool equipment, it is essential that your water be chemically balanced[1].
The following levels must be used as a guide for balanced water.

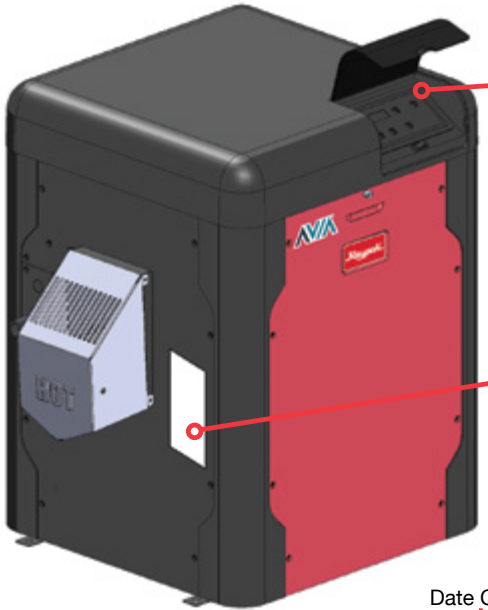
Recommended Levels	Fiberglass Pools	Fiberglass Spas	Other Pool & Spa Types
Water Temp.	68 to 88°F (20 to 31°C)	89 to 104°F (31 to 40°C)	68 to 104°F (20 to 40°C)
pH	7.3 to 7.4	7.3 to 7.4	7.6 to 7.8
Total Alkalinity (PPM)	120 to 150	120 to 150	80 to 120
Calcium Hardness (PPM)	200 to 300	150 to 200	200 to 400
Salt (PPM)	4500 MAXIMUM	4500 MAXIMUM	4500 MAXIMUM
Free Chlorine (PPM)[2]	2 to 3	2 to 3	2 to 3
Total Dissolved Solids (PPM)	3000 MAXIMUM[3]	3000 MAXIMUM[3]	3000 MAXIMUM[3]

[1] Damage from corrosive water is not covered under warranty. Consult your product manual for more information.
[2] Free Chlorine MUST NOT EXCEED 5PPM.
[3] In salt water chlorinated pools, the total TDS can be as high as 6000PPM.

- Occasional chemical shock dosing of the pool or spa water should not damage the heater providing the water is balanced.
- 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.
- Check valve should be installed between the heater outlet and a chlorinator or other chemical dosing device.
- Further advice should be obtained from your pool or spa builder, accredited pool shop, or chemical supplier for the correct levels for your water.
- **Warning: Electrolytic Corrosion and pH instability may be present with salt chlorinated pools.**

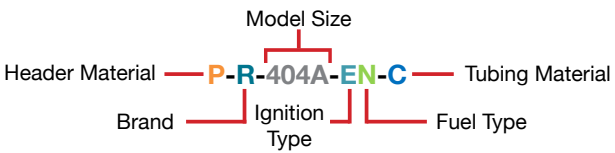
Model Number and Serial Number Location

Model & Serial Number located on carton label.



Model & Serial Number can also be found inside the bezel above digital display.

Model & Serial Number located on rating plate.



Before you call Raypak service, make sure you have the MODEL NUMBER and SERIAL NUMBER.

Minimum Clearances

Location	Indoor Installation
Top	Unobstructed
Front	0”
Floor	0”
Back	0”
Right Side	3” (76 mm) from Panel - Water Side
Left Side	3” (76 mm) from Panel - Vented Side

Location	Outdoor Installation
Top	Unobstructed
Front	0”
Floor	0”
Back	0”
Right Side	3” (76 mm) from Panel - Water Side
Left Side	6” (152 mm) from Vent Cap

See product manual for more information.

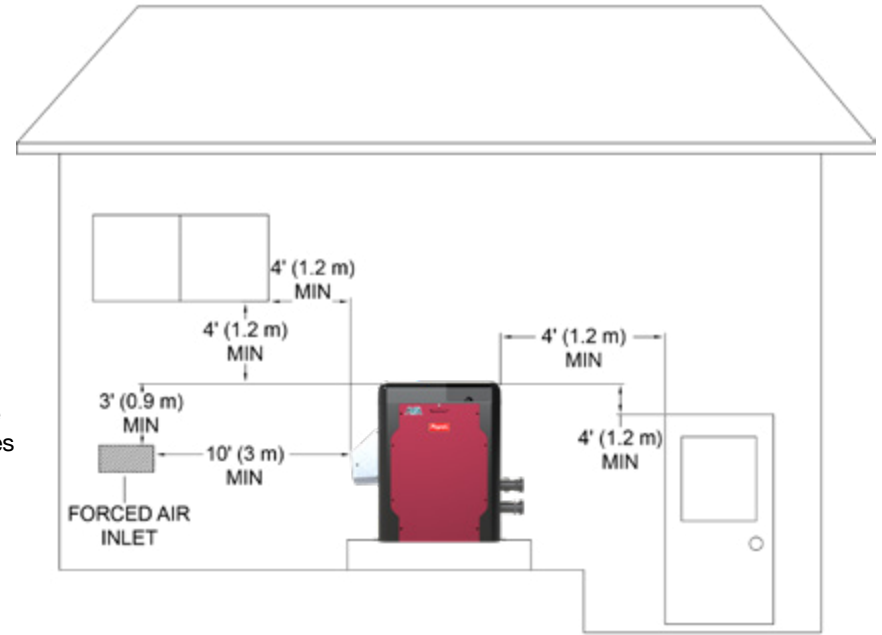
FLOORING: THIS UNIT **CAN** BE INSTALLED ON COMBUSTIBLE FLOORING.

Minimum Clearances* – Outdoor

DO NOT install near sprinklers.

DO NOT install within 3 feet (0.9 m) of a heat pump or an outdoor condensing unit.

*Check state and local codes before proceeding. The minimum clearances provided are defined by NFGC (National Fuel Gas Code).



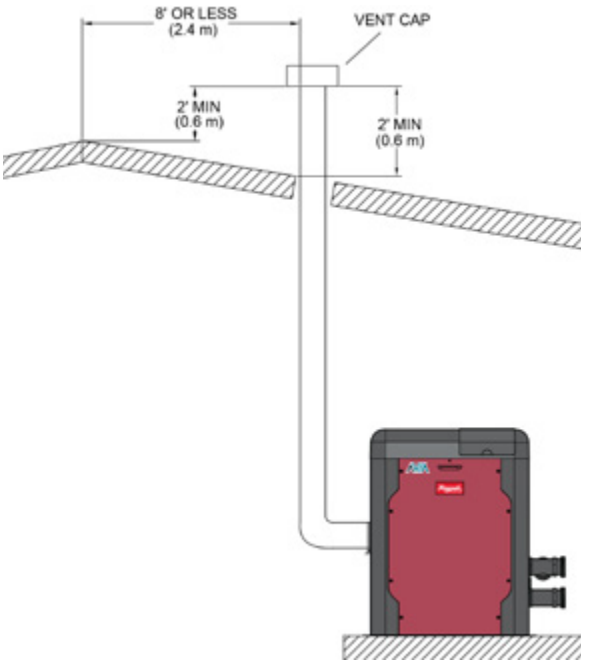
Minimum Clearances – Indoor

The heater must have **both** combustion air and ventilation air.

- Ventilation air opening 12”(305 mm) max from the ceiling
- Combustion air opening 12”(305 mm) max from the floor

All air from outdoors, each opening shall have a net free area as shown in table.

Model	Unrestricted Opening Sq. In. (m^2)	Typical Screened or Louvered opening Sq. In. (m^2)	Typical Screened and Louvered opening Sq. In. (m^2)
264A	66 (0.04)	99 (0.06)	132 (0.09)
404A	100 (0.06)	150 (0.1)	200 (0.13)



Check state and local codes before proceeding. Some states do not recognize the NFGC and require larger openings.

Gas Line Sizing

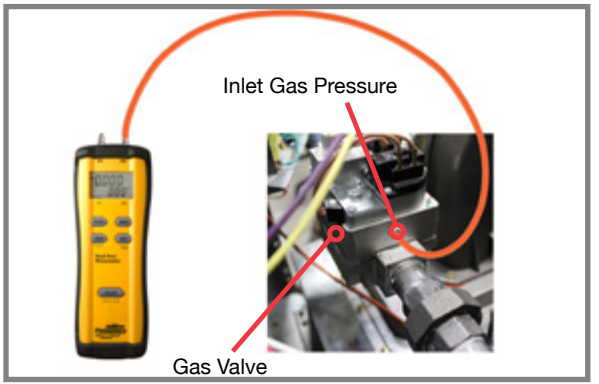
Maximum Equivalent Pipe Length ft (m)								
Natural Gas 1000 BTU/FT³ 0.60 Specific Gravity @ 0.5 in. WC Pressure Drop								
Propane Gas 2500 BTU/FT³ 1.53 Specific Gravity @ 0.5 in. WC Pressure Drop								
Model No.	**Size 3/4”**		**Size 1”**		**Size 1-1/4”**		**Size 1-1/2”**	
	NAT	**PRO**	**NAT**	**PRO**	**NAT**	**PRO**	**NAT**	**PRO**
264A	15 (4.6)	35 (10.7)	50 (12.2)	125 (38.1)	210 (64.0)	480 (146.3)	445 (135.6)	
404A	*	15 (4.6)	20 (8.8)	55 (16.8)	95 (29.0)	225 (68.6)	215 (65.5)	280 (85.3)

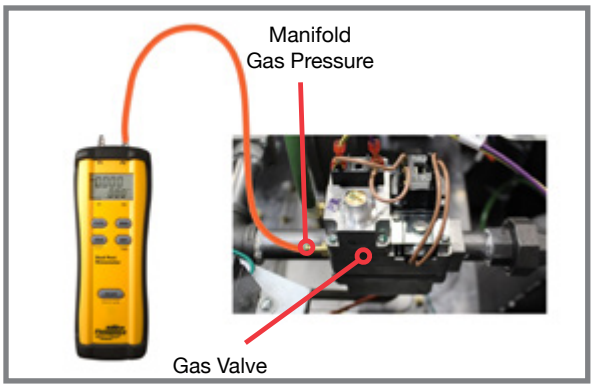
*A 3/4” gas line can be used for up to 5’ (1.5 m) maximum length from the gas valve in addition to the sediment trap.

EFFECTS OF LOW GAS PRESSURE

- Pulsating burner flame/Flame lost
- Delayed Ignition/Hard light off
- Exposure to condensation
- Emissions not at compliance levels
- Damage burner
- Sooting
- Ignition failure

Gas Pressure Test



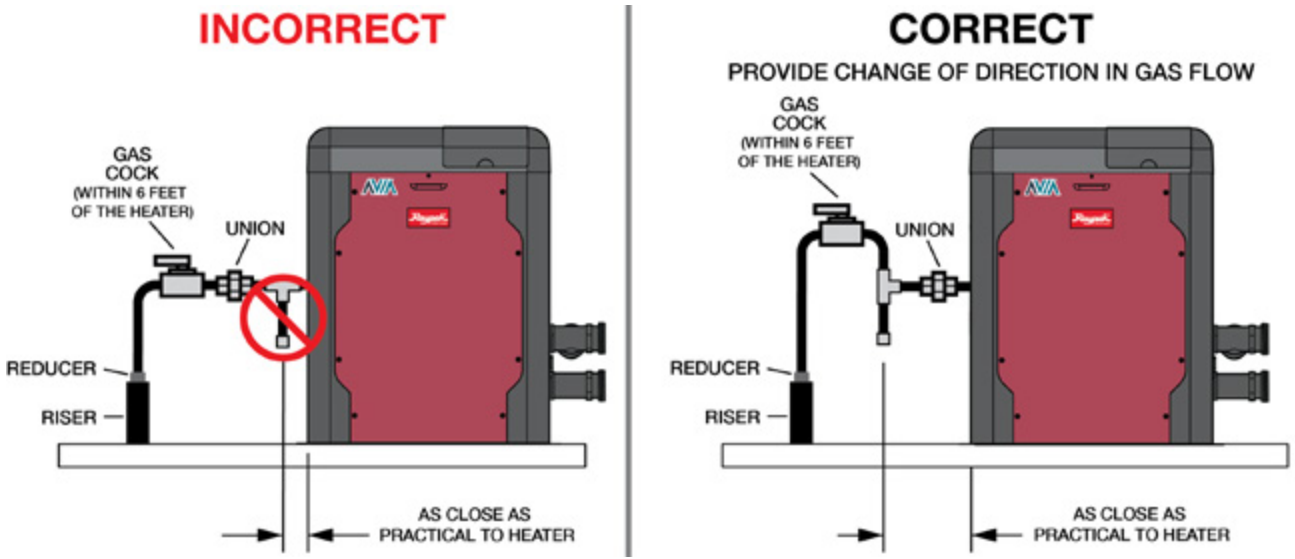


Gas	Required Pressure		Manifold Pressure
	Min.	Max.	
Natural Gas	3.5” (Dynamic)	10.5” (Static)	-0.3”
Propane Gas	8.0” (Dynamic)	13.0” (Static)	-0.3”

- Propane requires an external “pounds to inches” regulator

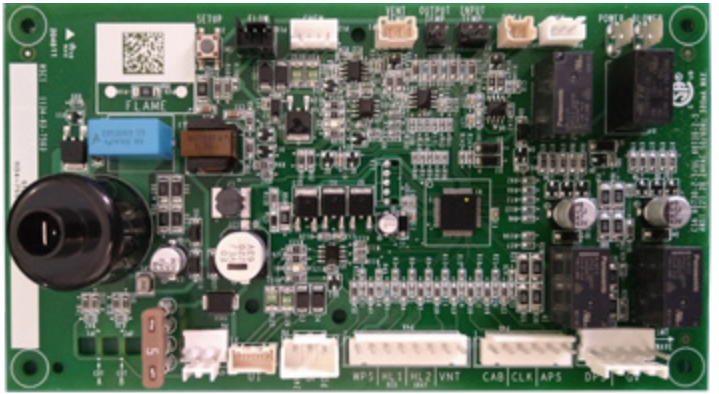
Gas Line Sediment Trap

Sediment Trap should be located as close to the inlet of the appliance as practical.

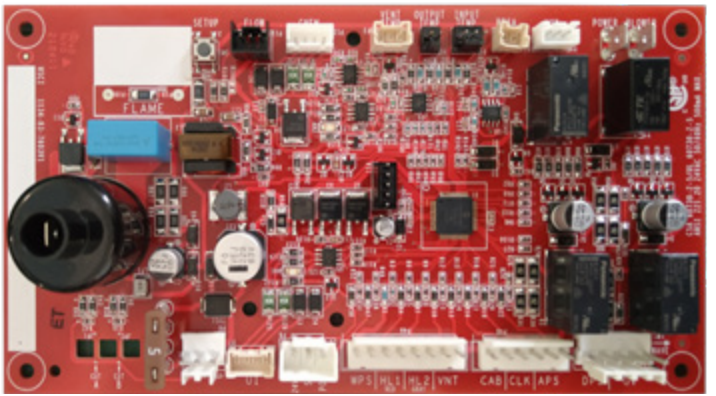


Check state and local codes before proceeding. Some states do not recognize the NFGC.

Circuit Board



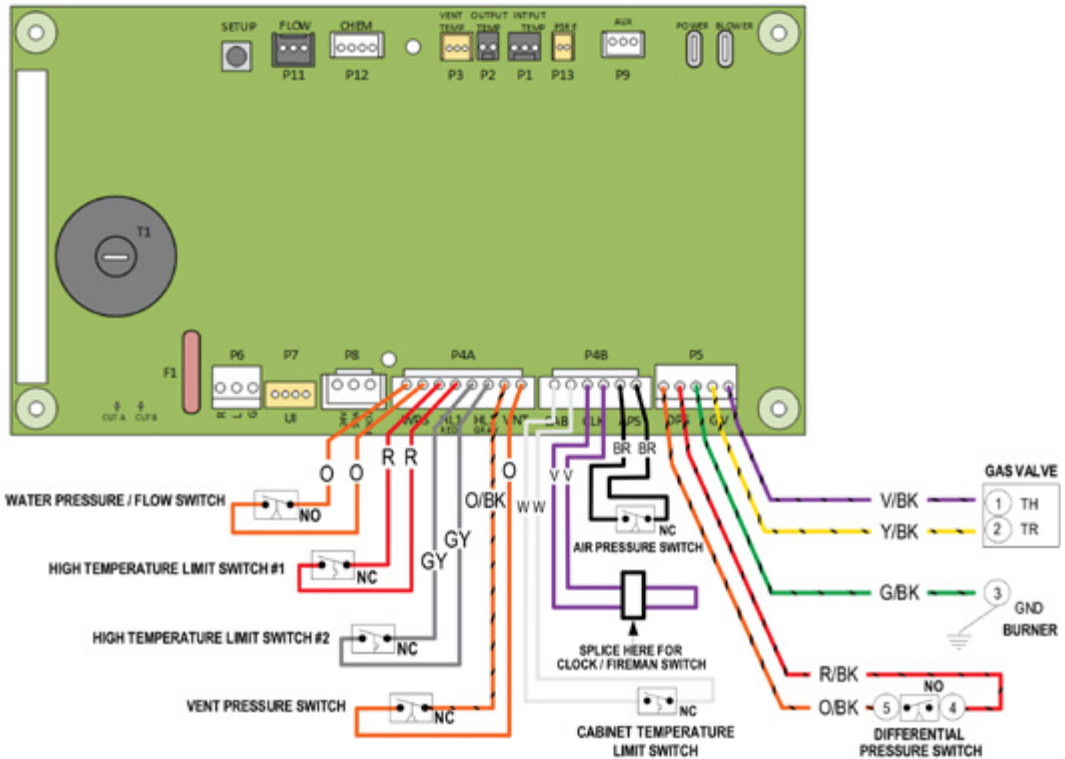
Model 264A



Model 404A

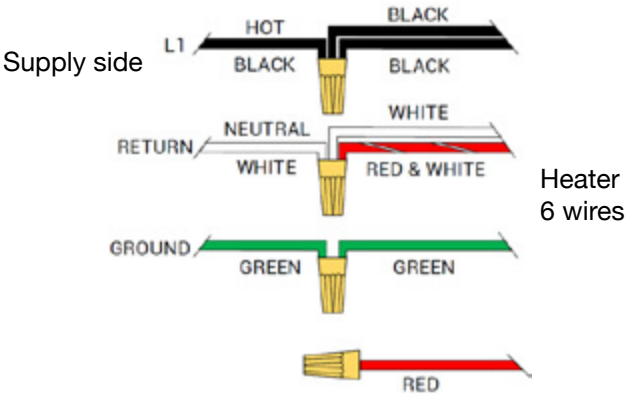
Printed circuit board. Boards cannot be interchanged.

Wiring Diagram – Common Wiring

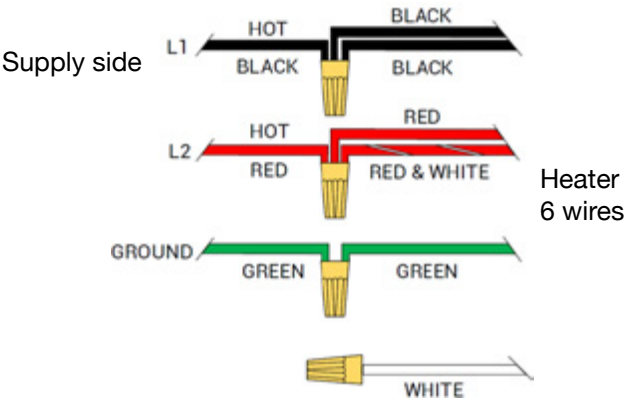


Power Connections

120VAC

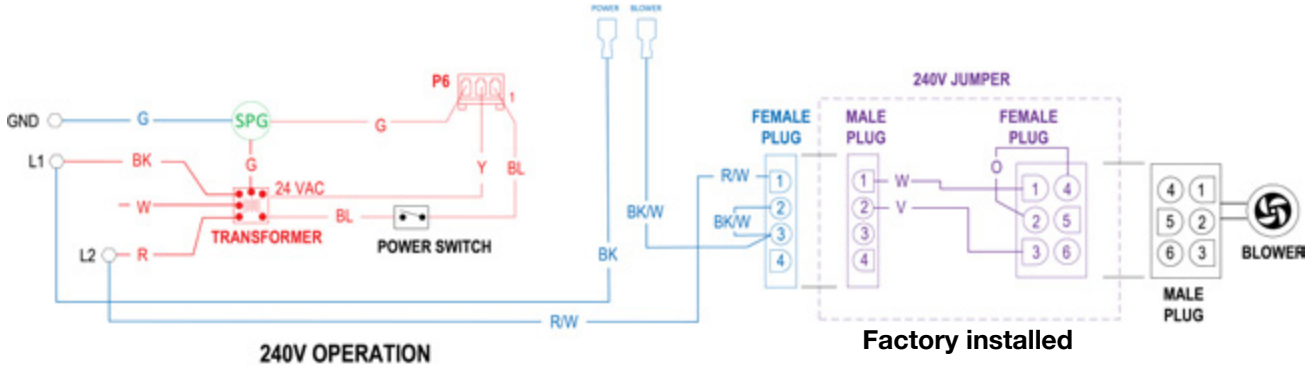


240VAC



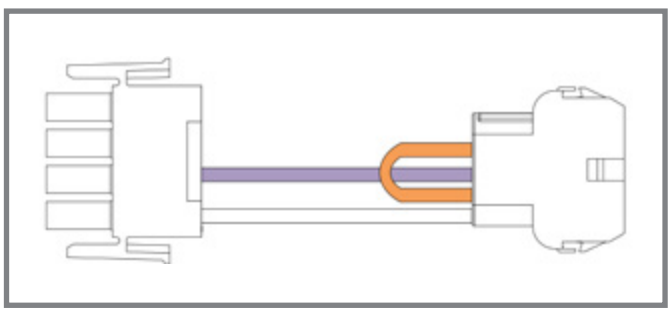
***NOTE: Heater will not work properly if wired to a 208VAC power source.**

Wiring Diagram – 240V



240V OPERATION

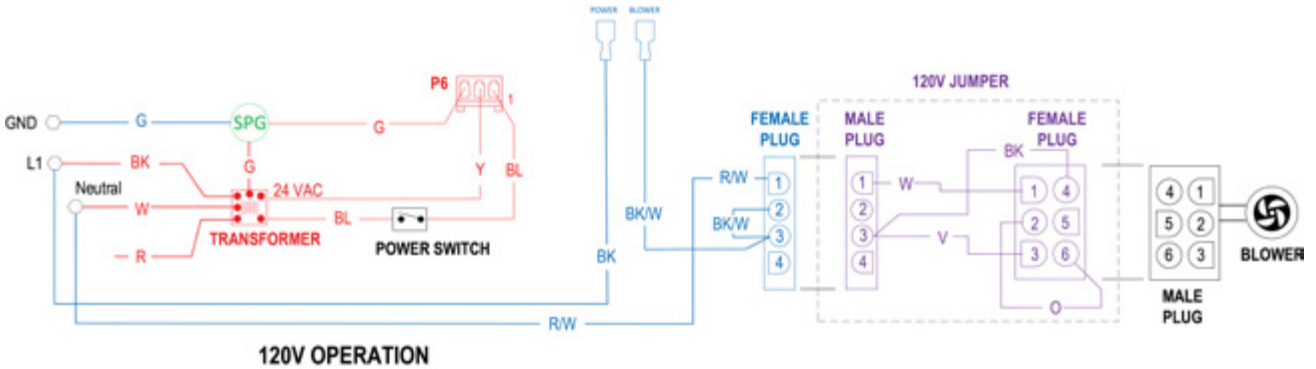
Factory installed



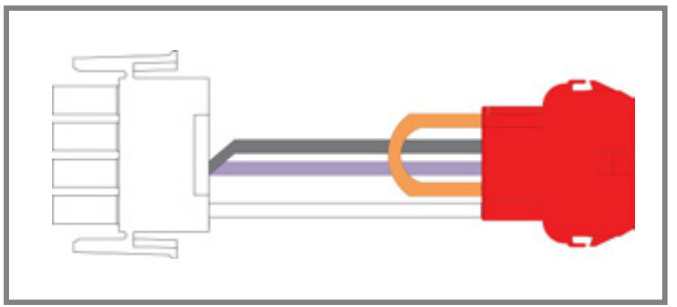
240V Blower Jumper

CAUTION: The heater is pre-wired with a 240V connector (white connector) to the blower. Using the wrong corresponding connector will cause electrical damage.

Wiring Diagram – 120V



120V OPERATION



120V Blower Jumper

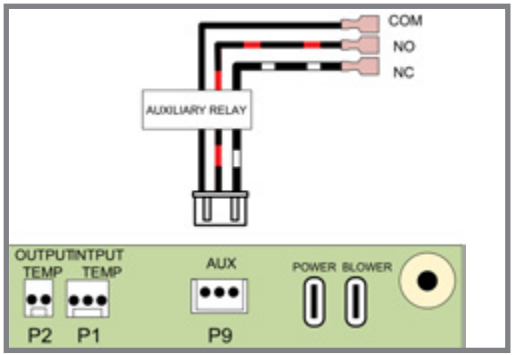
CAUTION: The heater is pre-wired with a 240V connector to the blower. If the supply voltage is 120V, replace the connector with the supplied 120V (red connector). Using the wrong corresponding connector will cause electrical damage.

Auxiliary Output

The AVIA heater offers an integrated dry contact relay for local and remote control of ON/OFF devices like pumps, water features, valves and lights.

Auxiliary output is available in terminal P9 “AUX”. Use the supplied harness to control ON/OFF functions or power switching.

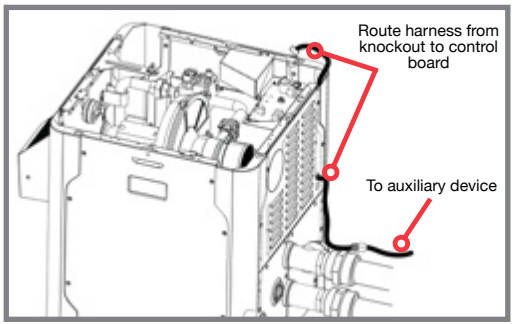
AUX terminal can be used as direct control or as pilot relay to a higher rating relay or power contactor.



Auxiliary Terminal

Terminal	Wire	AC Rating	DC Rating
Common	Black	250V Max, 3A	30V Max, 3A
Normally Open	Black and Red		
Normally Closed	Black and White		

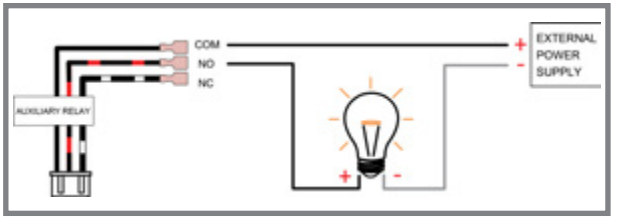
CAUTION: Do not exceed Auxiliary relay rating. Check power requirements of any electric component connected to this device, following the applicable installation norms and requirements.



Route Communication Harness

Auxiliary Output - Wiring

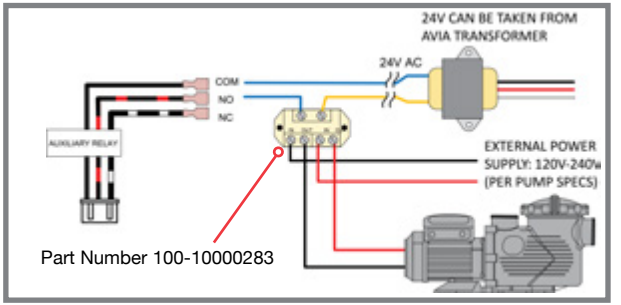
1



1. P9 Auxiliary is a dry contact output: It requires external power supply to energize connected devices.
2. Load on P9 must not exceed 3 Amps. If the load is larger than 3 Amps, use P9 auxiliary output to drive a field-installed contactor. For blowers, and other applications rated up to 10 Amps, use field-supplied relay OMRON LY2F 24AC (Raypak kit# 008784F). For on/off devices like single speed pumps rated up to 25 Amps, use field-supplied relay OMRON G7L-2A-BUBJ-CB AC24.
3. Use the Normally Closed (NC) and Normally Open (NO) terminals of field-supplied relay OMRON LY2F 24AC (Raypak kit# 008784F), to drive a 3-way valve. This configuration typically uses an external 24VAC supply.

Raymote
Scheduling AUX Outputs Control

2



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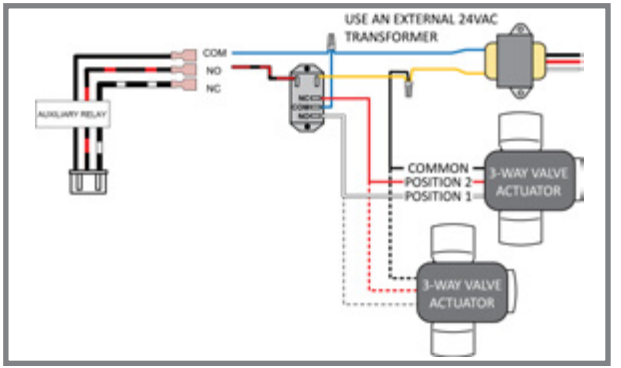


Start-Up Operating Displays

1

2

3a

3b

4

5a

5b

6

1. Power on, all digits display 1 second.
2. Software revision displays 1.5 seconds.
3. Normal display indicates mode of operation and inlet water temperature from “Pool” or “Spa”.
4. Press MODE button to Select “Pool” or “Spa” temperature setpoint, press UP or DOWN arrows to adjust temperature between 50°F (10°C) minimum and 104°F (40°C) maximum.
5. Blower “Pre-Purge” for 45 seconds, Spark and Ignite.
6. Heater temperature setpoint, water temperature and “Heating” is displayed.

Operating Displays

7 

8 

9a 

9b 

7. Unit Heating until demand is satisfied, water temperature reached.
8. Blower “Post-Purge” for 3 minutes.
9. When Pool/Spa SET temperature is satisfied “No Demand” will display.

Sequence of Operation

SUPPLY (Power to Heater)

1. 120/240 VAC from circuit breaker to transformer and blower relay (see on page 12).
2. 24 VAC out of transformer, toggle switch ON.
3. 24 VAC to PC board, and user interface.
4. LCD display ON.

APPLY 24 VAC to Ignition/Gas Control

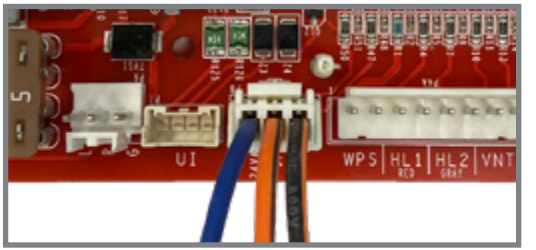
1. Call for Heat... Pool/Spa selected, TEMP set above water temp.
2. Differential pressure switch open
3. ALL SAFETIES SATISFIED (Pressure/Air Switches, High Limit Switch 1 and 2, Cabinet Limit Sensor).
4. Control powers blower. Differential pressure switch closes within 10 seconds
5. Pre-purge sequence initiated. “Pre-purge” displayed for 45 seconds.

HEATING (Spark and 24 VAC to Gas Valve)

1. Control Board produces SPARK and Gas Valve energized.
2. Spark stops, and FLAME SENSING (Rectification) OCCURS.
3. “Heating” Displayed with steady Flame Sensing.

Remote Wiring Connections and Setup

Remote harness provided with heater



Wire Harness Connection

A remote may be wired to provide an “On-Off” switching function (two wire) or as a three-way “Pool-Off-Spa” selector switch (three wire).

Modern automation systems use a two-wire configuration and can operate the heater in either Pool or Spa mode (see remote wiring “Remote Error Displays” on page 22). Water temp will not exceed the setting on the heater, regardless of the automation set temp.

To access the full range of temp settings with the remote, the heater should be set (at the control pad) to the maximum safe temperature.

Remote Operation

1a


1b


3a


3b


3c


3d


1. Pre-set Pool/Spa Set temperature (Set at 104°F, if the remote controller has an independent thermostat).

2. Turn Power OFF to heater, wire REMOTE to 3-wire harness, turn Power ON.

3. Set heater mode to OFF on touch pad. Press UP and DOWN buttons simultaneously for 3 seconds until REMOTE displays on LCD. (This will ENABLE remote operation and DISABLE the arrow keys and MODE button.)

4. Remote Pool or Remote Spa Displays when remote is activated.

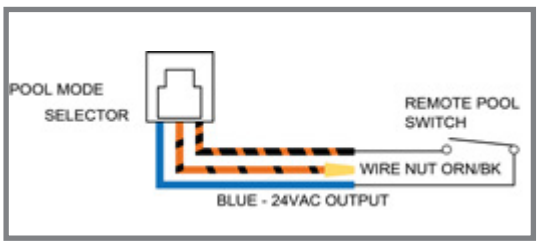
Remote Error Displays

1 

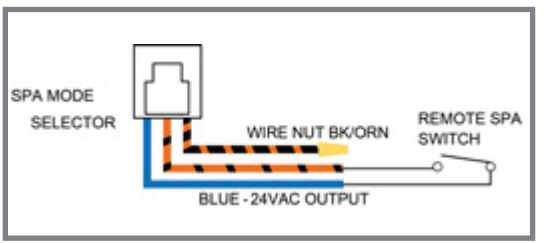
3 

1. Remote Error - Remote is wired improperly. Orange/black (Spa) and black/orange (Pool) are receiving power at the same time.
2. Remote operation has been initiated and UP and DOWN arrows and MODE key on the touchpad are disabled
3. Exit Remote Mode to adjust Pool/Spa set temperature. Press UP and DOWN buttons for 3 seconds to disable Remote mode.

Correct ways to connect remote wiring



POOL



SPA

User Interface – Self-Diagnostics

1 

2 

3 

Can Be Displayed in Pool, Spa, & Remote

LCD Message	Description	Troubleshooting	Recovery
Internal Fault	Bad RAM, ROM, flame circuit, A/D converter, or safety variable corruption	Check for board defects Replace board	Internal error cleared
EEPROM Fault	Memory failure		EEPROM Fault cleared
Low Voltage	Controller is receiving a voltage below 23 VAC	Check voltage in power line Check transformer voltage Check Ignition board	Increase voltage level

Temperature Sensors

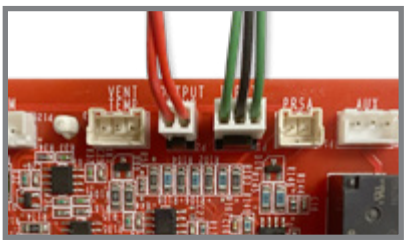
1

2a

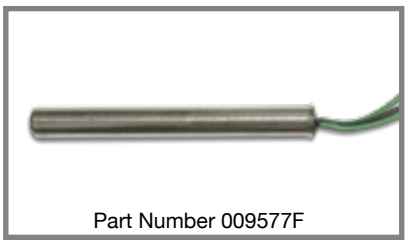
2b

2c

1. Heat Demand is when water temperature is 1°F (0.5°C) or more below Pool/Spa SET Temperature
2. Sensor Failure
   Temperature readings more than 3°F (1.5°C) different from each sensor see (2a)
   Sensor Open (cut wire/bad connection) see (2b)
   Sensor Short (bare wire touching cabinet) see (2c)

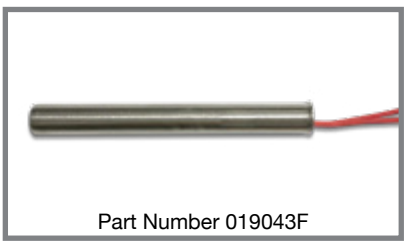


Sensor Connection



Part Number 009577F

100K Dual Thermistor
(Inlet Temp Sensor)



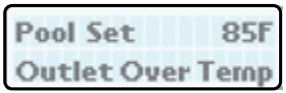
Part Number 019043F

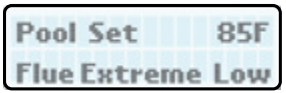
10K Dual Thermistor
(Outlet Temp Sensor)

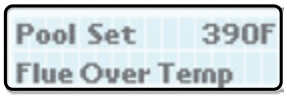
Temperature Sensor – Lockout

1a 

1b 

2 

3 

4 

1. Low-Temp Lockout - a. Inlet Water Temperature below 36ºF (2ºC). Heater will not operate (Prolonged operation with inlet temperatures below 50ºF (10ºC) will create condensation that will damage the heater). b. For cold weather operation, consider maintaining a preset temperature of 50ºF to 70ºF (10ºC - 21ºC), or the lowest point at which condensation does not occur. Set temperature can then be raised to the desired swim temp.

2. Over-Temp Fault - Outlet Temp was higher than 180°F (82.0°C). Check water flow. Check unit status

3. Flue Extreme Low - Flue temperature is below 140ºF (60ºC). Service required.

4. Flue Over Temp - Flue temperature is higher than 390ºF (199ºC). Service attention is required.

Control Logic - Flow Chart

START

Power On

Is the Display lit?

NO

- Check On/Off switch (under lid on control panel)
- Check for 240 or 120 volts to the transformer (time clock, circuit breaker, wire connections)
- Check for 24 volts to Circuit Board (P6 connector)

YES

Push MODE
Select “Pool” or “Spa”

Push UP or DOWN arrows to adjust Temperature

Is Water Setpoint and Water Temperature displayed?

NO

	Check for damaged or loose wires and terminals.
In Sensor Fault Inlet , Outlet or Flue Sensor [Open/Short]	Verify sensor per “Temperature-Resistance” table: - Replace Sensor if readings are out of range. - Replace Ignition board if sensor readings are right.
Gas Valve Flame w/o CFH	Check voltage at valve terminals. If terminals are energized replace control boards, check gas valve.
Low Voltage	Replace transformer if voltage is below 23VAC.

YES

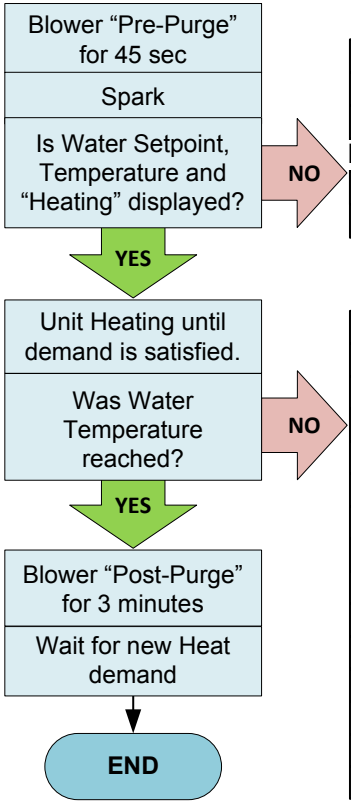
Is a Fault Message displayed?

NO

“Remote” and Water Temperature displayed?
If Remote mode is set to control the heater,
Exit Remote control by pressing UP + DOWN.

YES

Control Logic - Flow Chart



	Check for damaged or loose wires and terminals.
Diff Sw Closed	Check Blower and Air Pressure switch: - Replace Pressure switch if failing open or close. - Replace Blower if operation is intermittent.
Diff Sw Open	
Fan Lockout	
Ign Try Failure	Check Gas valve, Gas supply and spark igniter: - Check gas supply and valve operation. - Check Igniter and wire. Replace if damaged.
Ign 60 min Delay	
Ignition Lockout	

	Check for damaged or loose wires and terminals.
Clock/Fireman Sw	Switch connected to safety loop is in OFF mode.
Water Sw Open	Verify water flow / pressure. Clean Filter/Strainer.
Vent Sw Open	Vent switch open. Troubleshoot extractor if installed.
Hi Limit 1 Fault	Temperature Limit switch open. Verify water flow. Inspect internal thermostat (Unitherm Governor) and bypass valve.
Hi Limit 2 Fault	
Cabinet Temp Lm	
Air SW Open	Air Pressure Switch failed in operation. Verify Blower operation. Check for air inlet/outlet obstructions. Verify air pressure.
Diff Sw Fault	
Fan Lockout	
Flame Lost	Verify gas supply. Verify gas valve operation. Cut power, verify and clean igniter rods.
Flame Flickering	
Flue Over Temp	Verify obstructions. Troubleshoot extractor if installed.
Outlet Over Temp	Verify water flow. Verify gas supply and combustion.
Low Flow Fault	Verify water flow. Verify Pump operation. Adjust Flow as necessary. Verify filter pressure and clean if needed.
High Flow Fault	

Safety Circuit – Components

Part numbers below apply to polymer header models. For part numbers applicable to specific models, refer to the parts list in your Instructions and Operation manual.

Part Number 019054F (264A), 019056F (404A)

Bypass Assembly

Part Number 018853F

Cabinet Limit Switch

Part Number 019046F

Vent Temprature Sensor

Part Number 006737F

Water Pressure Switch

Part Number 019045F

High Limit Switch #1

Part Number 019044F

High Limit Switch #2

Part Number 019062F

Unitherm Governor

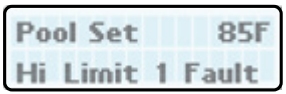
Part Number 018929F

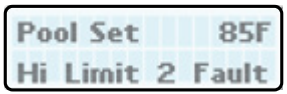
Air Pressure Switch

(on page 45)

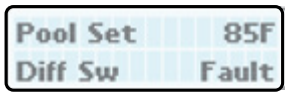
Safety Circuit

1 

2a 

2b 

3 

4 

5 

6 

1. Water Pressure Switch - Verify adequate water flow and pressure (Clean Pool Filter/ Strainer basket).

2. High Limit Switches 1 and 2 Fault - Verify adequate water flow. Adjust (partially close) external bypass. Check Unitherm Governor and internal bypass. Inspect for scale, restricted flow.

3. Cabinet Limit Switch - Verify vent connection and all other sealing points of contact to combustion chamber.

4. Differential Pressure Switch Fault - Check fan operation and fan power supply.

5. Air Pressure Switch Open - Check air inlet obstruction.

6. Vent Air Switch Open - Check vent obstructions.

Safety Circuit

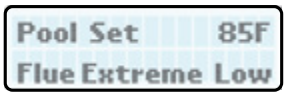
1


2a


2b


2c


2d


2e


1. Fireman's Switch - When used with mechanical time clock, a Fireman's switch turns the heater OFF about 15 minutes before the pump is turned off. This is a function of the switch, not the circuit. Recommended for single speed pumps. Circuit can also be used as heater enable/disable signal, when needed.

2. Vent Temperature Sensor - Monitors flue vent temperature.
   a. short. b. open - check wiring integrity. c. over temp (will shut down the unit). d. low temp. e. extreme low (will shut down the unit).

Service Menus

1a 

1b 

1c 

1d 

1. Service menus provide service and diagnostic information. Press the SERVICE key once to access the basic Service Menu. The second button press can occur at any time while viewing the basic service menu. Scroll the list with UP and DOWN arrows. a. Flame Strength (< 1.0 microamps is weak), b. Supply Voltage (Voltage from the transformer, 24 to 30 volts), c. Run Time (Total run hours and on-off cycles), d. Fault History (see next page).

2a 

2b 

2c 

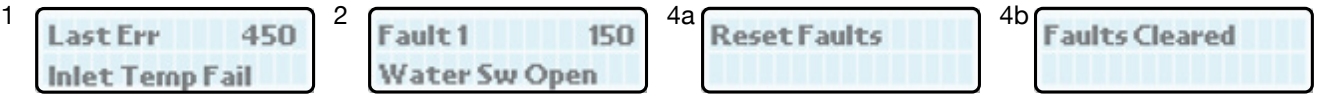
2d 

2e 

2f 

2. Press the SERVICE key twice to access the Advanced Service Menu. a.Inlet/Outlet Temperatures (Live reading from the inlet and outlet Temp sensors), b. Vent Temperature (Live reading from the Vent Temp Sensor), c. Flow Monitoring (“Flow Sensor” must be enabled from the PROGRAM MENU), d. Estimate Volume/Heat Time, e. Protégé Pump Status, f. Auxiliary Output status (press the SERVICE and MODE keys together for 3 seconds to change status)

Service Menus – Fault History



The ability to recall the MOST RECENT Service Displays can be read ANY TIME heater is operational in Off, Pool, Spa and Remote modes by pressing SERVICE key 1 time and then DOWN key 3 times. Press UP or DOWN keys to scroll through displays to see the last 10 Faults.

1. First Line displays the actual fault that occurred, followed by numerical listing in the order they occurred: Last Err,1,2,3,4,5,6,7,8,9 (oldest). Run time hours at the moment of the fault are displayed at the end of line one.

2. Second line displays the fault. Press UP or Down keys to scroll through operating history of heater.

3. To EXIT Service Mode and return to previous display press MODE button or wait 15 seconds.

4. To CLEAR Fault History see “Reset Faults” operation on page 33.

Helps to identify chronic/repeat problems that may not be evident while servicing heater.

Program Mode

To access PROGRAM menu, press and hold SERVICE and MODE keys simultaneously for 5 to 7 seconds until “Language” appears on the display. Press the SERVICE key sequentially until the desired program event is reached.

1 

2 

3 

4 

5a 

5b 

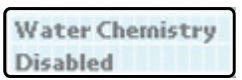
6 

7 

8 

9 

10 

11 

LCD Message	Operation	LCD Message	Operation
Language	The UP and DOWN keys will select English, Spanish or French language.	WiFi Reset	Hold SERVICE and MODE keys together for 3 to 5 seconds until “Wi-Fi Initialized” appears.
Set Defaults	Hold SERVICE and MODE keys together for 3 to 5 seconds until “Defaults Set” appears	Automation Mode	The UP or DOWN keys will select Enabled or Disabled Automation mode Functionality.
Reset Faults	Hold SERVICE and MODE keys together for 3 to 5 seconds until “Faults Cleared” appears.	Flow Monitoring	The UP or DOWN keys will select “Estimation” or “Flow Sensor” on the Flow Monitoring function.
Temp Display	The UP or DOWN keys will select Fahrenheit or Celsius on the temperature display.	Altitude	The UP or DOWN keys will select “Normal” or “High” on the Altitude display. (Optional Indicator)
Spa Max Temp	Use Up or Down Keys to set maximum Spa temperature (≤ 107° F or 42°C)*.	Pump Control	The UP or DOWN keys will select “Enabled” or “Disabled” Raypak Protégé pump control.
Pool Max Temp	Use Up or Down Keys to set maximum Pool temperature (≤ 107° F or 42°C)*.	Water Chemistry	The UP or DOWN keys will select “Enabled” or “Disabled” Raypak Water Chemistry and expansion board (coming soon).

*** Temperatures above 104° F are not recommended.**

Control Lockout

The heater is equipped with a Control Lockout feature to prevent unauthorized tampering or adjustment of the control settings.

To lock out the controls

1. Press the MODE and DOWN keys simultaneously for 5-seconds.

2. Choose a three-digit PIN, using the UP and DOWN keys to select the digits and the MODE key to lock in selections.

3. Confirm your selection and record your PIN.

1

3

To unlock the controls

1. Press MODE, UP or DOWN key to bring up the ENTER PIN menu.

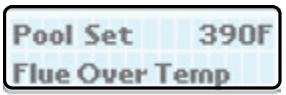
2. Enter the PIN that was used to lock the control. (PIN code 101 will disable the lockbox until the power is cycled off and on.)

3. Successfully unlocking the control will display “LOCKBOX CLEARED”. Failure to enter the correct PIN will display “INVALID PIN”.

***NOTE:** In the event that the user-selected PIN is lost or does not clear the Control Lockout, use the Program Menu to SET FACTORY DEFAULTS (see page 33). This will clear the PIN and allow normal operation and selection of a new PIN if desired.

“Call Service” Lockout

“Call Service” message will appear when any of the following errors occur 3 times in the same 48 run hours:

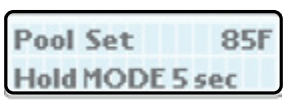


To clear “Call Service” message

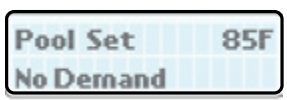
1. Press and hold SERVICE button for 20 seconds.
2. Press and hold MODE button for 5 seconds.
3. Lockout is cleared. You can now troubleshoot.

1

2



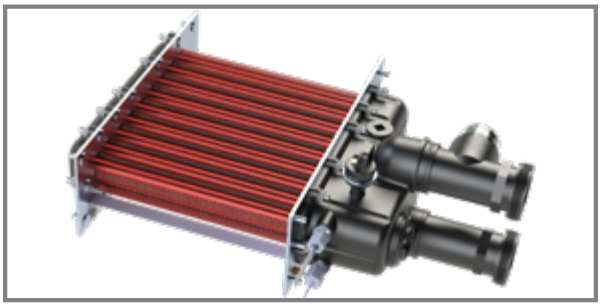
3*



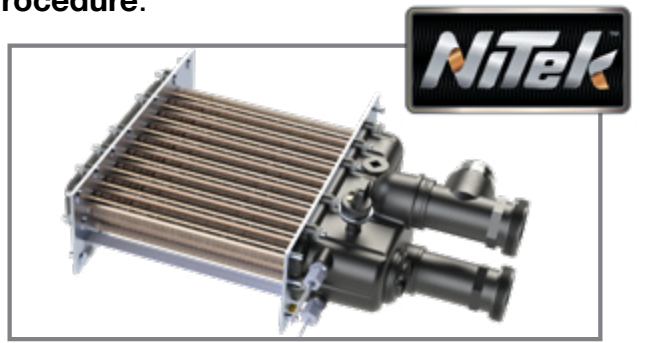
AVIA and AVIA HD Heat Exchangers

AVIA
Operation Instructions

For tube bundle care, see the AVIA Installation & Operation Manual sections for **Heat Exchanger Removal**, **Tube Cleaning Procedure***, or **Desooting Procedure**.



AVIA (Standard Model)



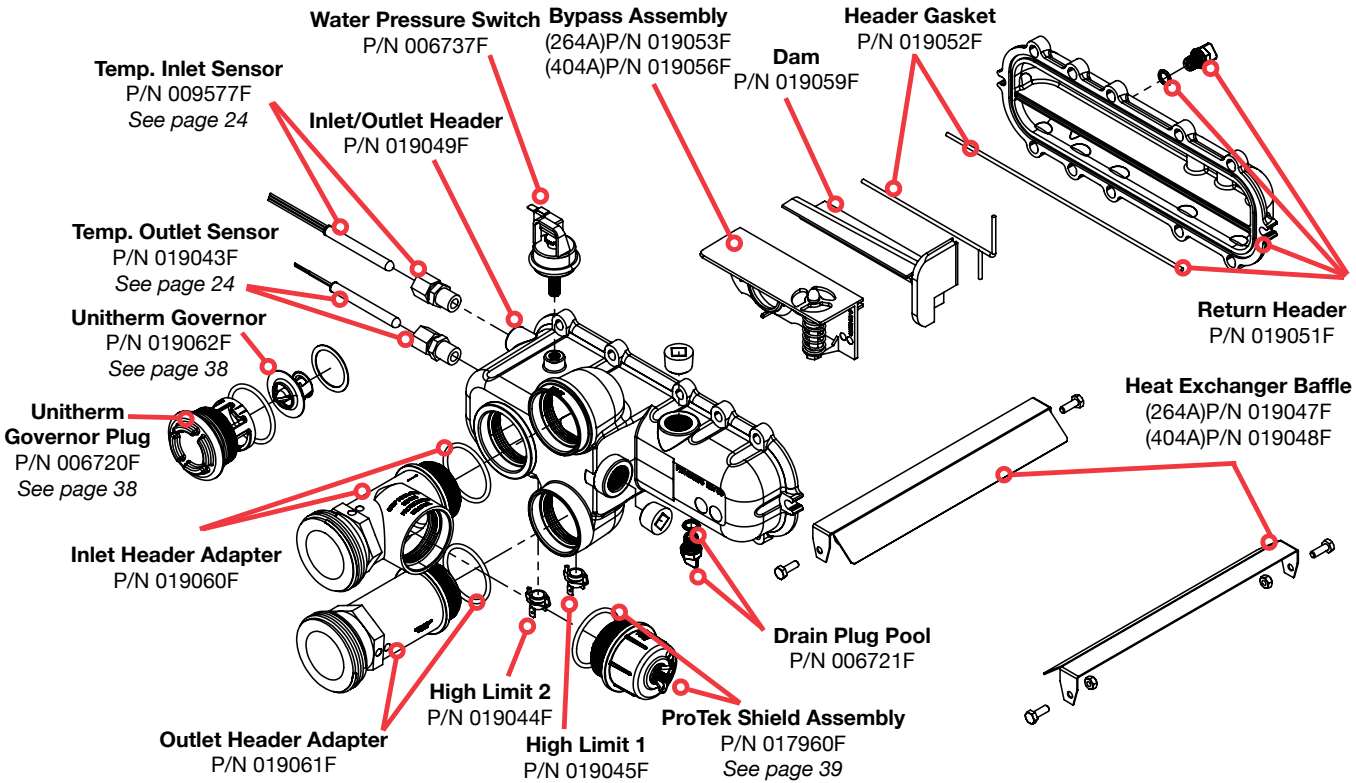
AVIA with NiTek (HD Model)

Heat Exchanger Replacement Parts

Model	264A	404A
AVIA (Standard Model)	018900F	018901F
AVIA with NiTek (HD Model)	019383F	019384F

***NOTE:** Do not use the De-Liming Kit on the NiTek heat exchanger, to prevent unnecessary damage.

Inlet-Outlet Header – Polymer

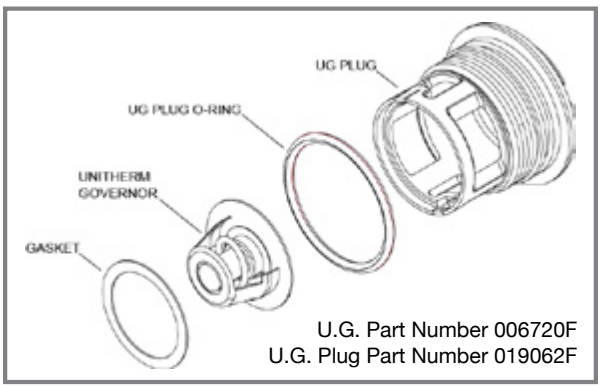


Unitherm Governor

The UNITHERM GOVERNOR (U.G.) helps prevent condensation and scale. It is a thermostatic mixing valve used to control and regulate the water temperature in the heat exchanger.

Low temperatures in the exchanger can cause condensation.

This indicates that the heat exchanger is running cool. This may be caused by too much flow. Make sure the pump is not supplying more than 100GPM. Adjust flow accordingly. Also check the U.G. to make sure it is working properly and not damaged from chemical corrosion or stuck.



Residential U.G. Assembly

Tech Tip: Test a U.G by placing it in a bowl of hot water (water temp 120ºF / 49ºC or higher). If working properly, it will open as it warms up.

***NOTE:** Do NOT heat U.G. using open flame.

ProTek Shield Assembly

This heater is equipped with a ProTek Shield Assembly (located on the inlet connection). This component provides protection to the heat exchanger against galvanic corrosion, when properly bonded to the heat exchanger. It should be replaced when the size of the ProTek Shield annode is reduced to about 40% of the original size.

***NOTE:** Make sure the O-ring is properly seated in the O-ring groove before installation.
CAUTION: STOP the pool pump before attempting to remove ProTek Shield Assy. Failure to do so may result in damage to ProTek Shield Assy, loss of pool water, or personal injury.
CAUTION: Do not use tools to remove (twist) the ProTek Shield Assy or the wing nut on the stud of the ProTek Shield Assy. Non-warrantable damage may occur.

Part Number 017960F

Follow the steps below to replace the ProTek Shield Assembly:

1. Shut off the pool pump and bleed pressure from the system.
2. Close isolation valves to minimize pool/spa water loss.
3. Remove wing nut from bottom stud on ProTek Shield Assy.
4. Remove bonding wire ring terminal from stud.
5. Rotate ProTek Shield assembly counter-clockwise (by hand) to unscrew it from the assembly.
6. Inspect/replace as necessary and reverse above procedure to reinstall. Hand tighten only! **Do not use tools.**

Flow Rates and Pressure Drops

Heat Exchanger Pressure Drops		
Flow GPM (lpm)	Pressure Drop Ft of Head (m of Head)	
	264A	404A
40 (151)	7.2 (2.2)	13.4 (4.1)
50 (189)	10.0 (3.1)	16.5 (5.0)
60 (227)	12.6 (3.8)	19.5 (5.9)
70 (265)	17.0 (5.2)	23.7 (7.2)
80 (303)	24.0 (7.3)	28.3 (8.6)
90 (341)	30.3 (9.2)	33.2 (10.1)
100 (379)	36.0 (10.9)	37.0 (11.3)

***NOTE:** Table capacity is based on 2” Schedule 40 piping.

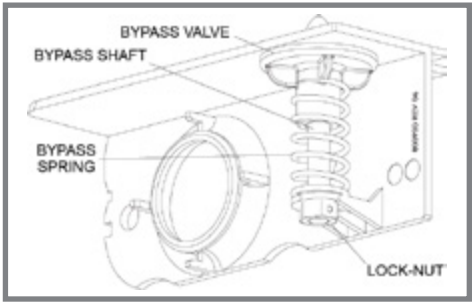
Min/Max Flow Rates			
Model	Pipe Size in. (mm)	Min GPM	Max GPM
264A/404A	2 (50.8)	40 (151)	100 (379)

Internal Bypass Valve

The Automatic Bypass Assembly allows the heater to be connected to a wide variety of pumps.

With every job site having different flow rates, the Bypass automatically adjusts to provide the proper flow rate to the heater, up to 100GPM max. If the flow rate exceeds 100GPM condensation may form and erosion of the copper tubes may occur. It is then recommended that an external bypass be installed before the heater.

If the heater is making a knocking noise or cycling the high limits, it may be that the Bypass is missing, stuck open or damaged. It is also possible that the wrong Bypass spring is installed. See table for correct bypass spring assignment.

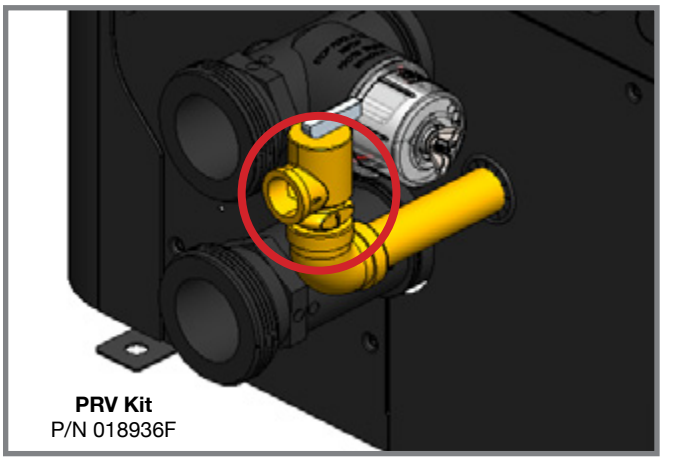


Model	264A	404A
Spring Color	Orange	Blue
Part Number	019054F	019056F

PRV Installation

Polymer Header
(Residential Models)

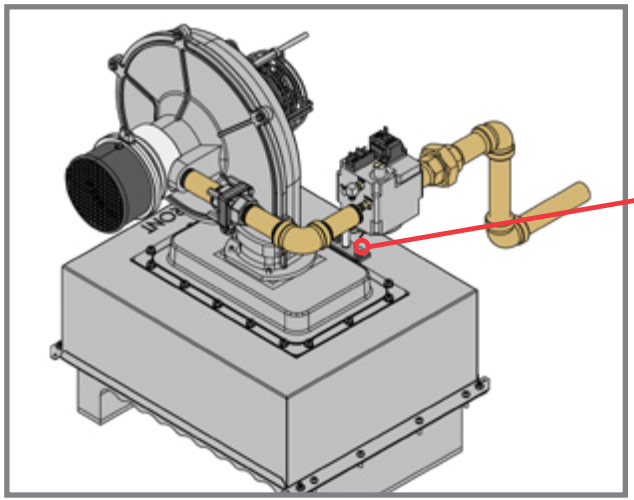
These illustrations depict the correct installation of a pressure relief valve (PRV). All piping must be of suitable metal construction by applicable code.

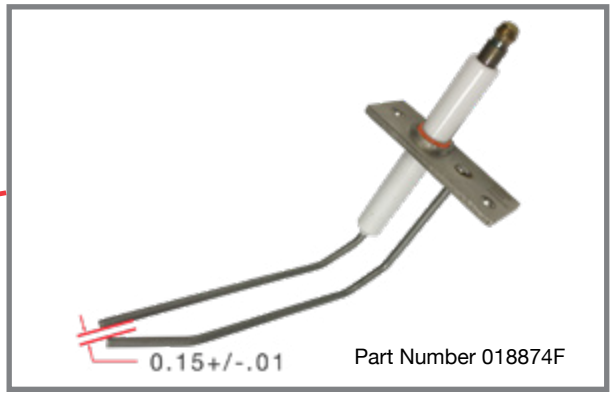


PRV Kit
P/N 018936F

Be sure to consult your local building code regarding distance of effluent from floor.

Igniter/Flame Sensor





Igniter

Igniter Removal.

1. Remove top cover.

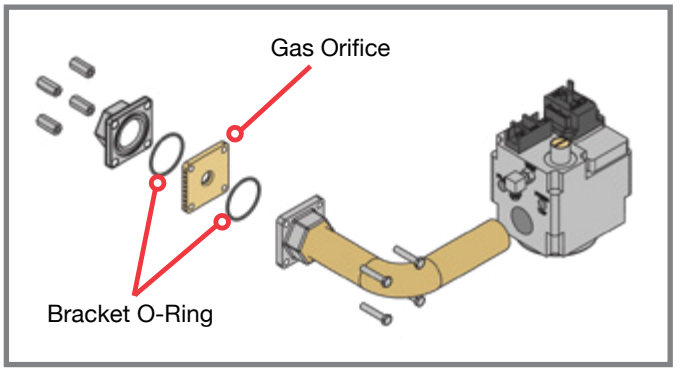
2. Disconnect spark cable from igniter.

3. Use M10 socket, remove the two nuts holding the igniter.

4. Carefully remove igniter and gasket.

5. When replacing igniter, be sure to add a new gasket when installing igniter.

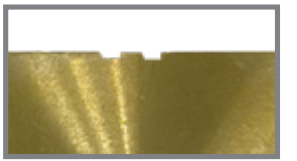
Gas Conversion



Orifice Location

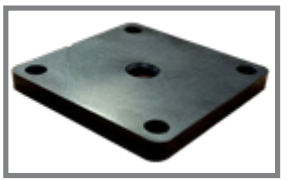
Orifice Usage				
Pockets / Notches	**Model**	**Kit #**	**Gas Type**	**Finish**
1	264A	018866F	Natural	None
2	404A	018867F		
1	264A	018868F	Propane	Black
2	404A	018869F		

1 Pocket/Notch

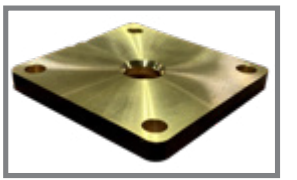


2 Pocketes/Notches

Propane Orifice Finish May Vary



All Black Finish



Black Finish on Edge

***NOTE:** Verify gas type with production order. Wrong gas orifice will cause ignition failure, rumbling or violent ignition.

Air Pressure Switches

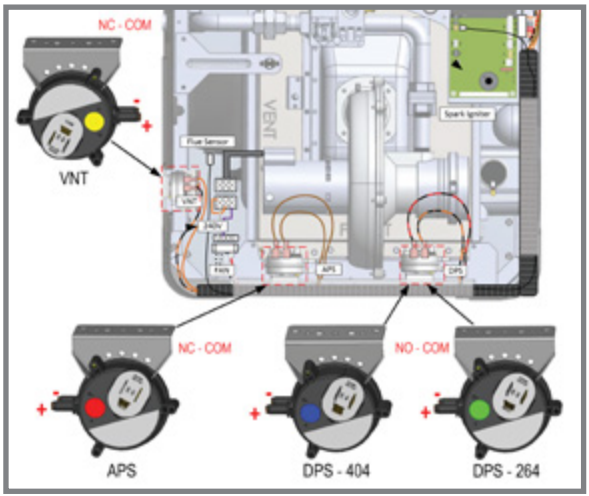
There are 3 different air pressure switches. None of the switches are interchangeable.

1. Vent Switch - Indicates increased vent pressure due to blockage.

2. Differential Pressure Switch - Detects blockage in combustion chamber. Indicates blower activation

3. Air Pressure Switch - Detects blower inlet blockage.

Each switch has a colored decal to help identify the switch. See chart below for proper switch choice.



	Vent Pressure SW	Diff. Pressure SW (264A)	Diff. Pressure SW (404A)	Air Pressure SW
Color	Yellow	Green	Blue	Red
Part Number	018928F	018930F	018931F	018929F
Activation Pressure W.C.	0.90±.05	-2.0±.05	-1.0±.05	-0.80±.05
Default Position	Normally Close	Normally Open	Normally Open	Normally Close

Raymote - Quick Start Guide

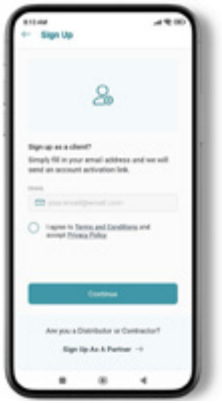
1 Sign-Up with the Raymote App

Available for:

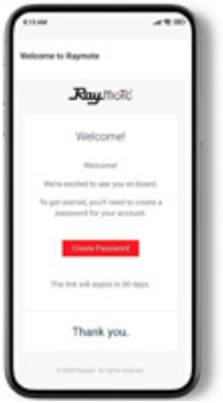
Available on the App Store

GET IT ON Google Play

Sign-up



Create an account



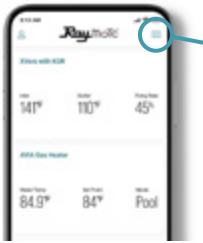
Create a password from email

If you do not receive the invitation email, check your Junk folder.

2 Turn on the AVIA Heater

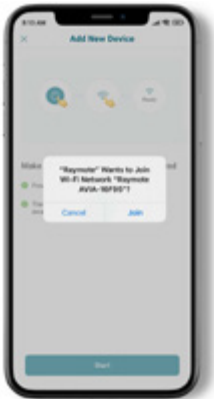
3 On your phone, click add new device

Or



Raymote - Quick Start Guide

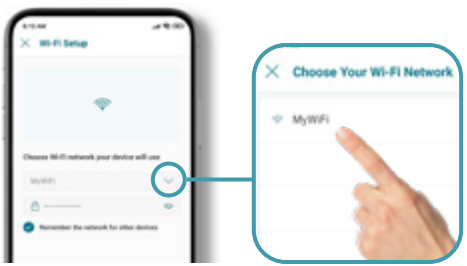
4 Stand close to the AVIA heater to connect to the Raymote app



iOS View

Android View

5 Select your Wi-Fi network and enter your password



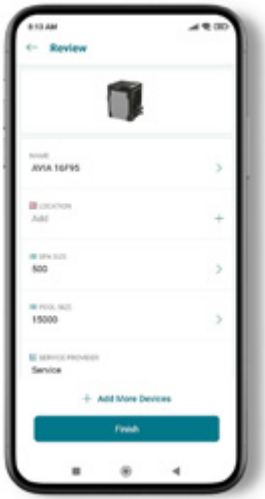
Make sure to have a strong Wi-Fi signal near the heater.

6 The AVIA is connecting to your Wi-Fi

CONNECTIVITY

Raymote - Quick Start Guide

7 Name your heater to complete the setup and enjoy Raymote control



Control your entire pool system with AVIA

Automates heat up time by learning pool size

Raymote mobile app – allows on-the-go control of your pool temperature and so much more

You can invite family members and service suppliers to your Raymote organization

Having trouble connecting your AVIA?

Try these suggestions to improve your Wi-Fi signal:

- Confirm that your Wi-Fi signal strength is strong enough to reach the heater (walls and fences may affect Wi-Fi signal)
- Reduce distance between Wi-Fi router and the heater
- Add a Wi-Fi range extender
- Enable a new Wi-Fi access point

For more support visit: www.raypak.com/raymote

Raypak Technical Support

AVIA
TROUBLESHOOTING
POWERED BY
zingtree

APPLICATIONS ENGINEERING

Support for products sizing and guidance on installation parameters, venting codes for Raypak products.

877-213-3726 805-278-5300

Mon-Fri 6:00 AM TO 4:30 PM PACIFIC TIME

Technical Support	technical-support@raypak.com	Technical troubleshooting and mechanical break-down support for Raypak Products.
Partner Services	partner-services@raypak.com	Whole good orders, parts orders, checking status of existing orders.
Warranty Services	warranty@raypak.com	Warranty inquiries and service/Approved service provider support/Invoice processing/MasterTek in-quiries/Registration related questions/Field Scraps
Service Invoices	serviceinvoices@raypak.com	Invoice submissions (pre-approved only) Payment inquiries/Follow-ups

QR CODES

AVIA Operation Instructions

AVIA Troubleshooting

Raymote Quick Start Guide

Raymote App

Protégé Quick Start Guide

Raymote Automation and Scheduling

Notes

AVA™ Pool & Spa Heater

Tool Box Quick Reference Guide

Check our FAQ and Tech Corner sections on our website for answers to common problems.
EMAIL us with technical questions, we pride ourselves on quick answers.

BEFORE YOU CALL

1. What is the Model Number and Serial Number?
2. Indoor or Outdoor? Natural gas or Propane?
3. What is the incoming power? 120 or 240 VAC? 208 will not work properly.
4. What is the incoming gas pressure?
5. If the unit can fire, what is the pressure at the manifold (burner pressure)?
6. Is the gas line rigid or flex-line?

THIS IS NOT A SUBSTITUTE FOR THE INSTALLATION AND OPERATION MANUAL.
THIS MANUAL IS INTENDED TO HELP THE SERVICE TECHNICIAN WITH BASIC TROUBLESHOOTING.

Learn more at raypak.com/tech-corner

 RP-P-600-5 REV C Effective 11-29-23 Replaces 03-01-23