

PRELIMINARY

INSTALLATION AND OPERATION MANUAL



Gas-Fired Pool and Spa Heater

Bronze ASME and Polymer Low NOx
Heat Exchanger Models
207A, 266L, 267A, 337A, 399L, and 407A



ASME units only

WARNING: If the information is not followed exactly, a fire or explosion may result causing property damage, personal injury or death.

- 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.
- WHAT TO DO IF YOU SMELL GAS
 - Do not try to light any appliance.
 - Do not touch any electrical switch; do not use any phone in your building.
 - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
 - If you cannot reach your gas supplier, call the fire department.
- Installation and service must be performed by a qualified installer, service agency or the gas supplier.

This manual should be maintained in legible condition and kept adjacent to the heater or in a safe place for future reference.

Effective: 10-29-21
Replaces: 10-24-20
P/N 241793 Rev. 8

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QUICK START GUIDE

CLEARANCES

- Space required: See page **11**.
- Minimum and service clearances: See page **7** for clearances table. Note that local codes prevail.

PIPING

- Pressure relief valve: See page **17** for recommended PRV orientation.
- Flow rates: See page **15** for flow rate values.

GAS

- Distance to regulator (pipe lengths) and gas inlet sizes: See page **14**.
- Required pressure for Natural Gas:
Min = 5" WC, Max = 10.5" WC
- Sediment trap is required for all installations:
See page **13**.

WATER CHEMISTRY

- Water chemistry requirements: See page **5**.

POWER

- Supply voltage: See page **20** for acceptable input voltages.

VENTING

- Materials: See pages **8, 10** and **12**.
- D-2 Power Vent Kit: See page **12**.
- Indoor Stack kit: See page **9**.

CONTROLS INTERFACE

- Wiring diagram: See page **21**.
- User interface: See page **22**.
- Remote operation: See page **26**.

Revision 8 reflects the following changes:

Updated both coversheet CSA logos. Added "recommendation" notice to the Installation section. Table O: Added "Is Open" to High Limit cells. Added new section "High Limit Events" and supporting Figure 45 to "Status and Diagnostics" section. Added additional service kit information support for Troubleshooting's "Harmonics and Whining" section. IPL: Removed "Units manufactured from 12/2019" from item "3-M", Removed the "PRV 125 PSI" option in its entirety.

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NOTE: ProTek Shield Adapter and assembly for ASME models shown in Figures, but not available until end of Q3 2020.

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.
NOTE	Indicates special instructions on installation, operation, or maintenance which are important but not related to personal injury hazards.

▲ DANGER: Failure to install the draft hood on indoor installation and properly vent the heater to the outdoors as outlined in the venting section of this manual can result in unsafe operation of the heater. To avoid the risk of fire, explosion, or asphyxiation from carbon monoxide, never operate this heater unless it is properly vented and has an adequate air supply for proper operation. Be sure to inspect the vent system for proper installation at initial start-up, and at least annually thereafter. Refer to the venting section of this manual for more information regarding vent system inspections.

▲ WARNING: To minimize the possibility of improper operation, serious personal injury, fire, or damage to the heater:

- Always keep the area around the heater free of combustible materials, gasoline, and other flammable liquids and vapors.
- Heater should never be covered or have any blockage to the flow of fresh air to the heater.

▲ WARNING: This unit contains refractory ceramic fiber (RCF) insulation in the combustion chamber. RCF, as manufactured, does not contain respirable crystalline silica. However, following sustained exposure to very high temperatures [greater than 2192°F (1200°C)], the RCF can transform into crystalline silica (cristabolite). The International Agency for Research on Cancer (IARC) has classified the inhalation of crystalline silica (cristabolite) as carcinogenic to humans.

When removing the burners or heat exchangers, take precautions to avoid creating airborne dust and avoid inhaling airborne fibers. When cleaning spills, use wet sweeping or High Efficiency Particulate Air (HEPA) filtered vacuum to minimize airborne dust. Use feasible engineering controls such as local exhaust ventilation or dust collecting systems to minimize airborne dust. Wear appropriate personal protective equipment including gloves, safety glasses with side shields, and appropriate NIOSH-certified respiratory protection, to avoid inhalation of airborne dust and airborne fiber particles.

▲ WARNING: Improper installation, adjustment, alteration, service, or maintenance can cause property damage, personal injury or loss of life. Installation and service must be performed by a qualified installer, service agency, or the gas supplier.

▲ WARNING: Gasoline, as well as other flammable materials and liquids (adhesives, solvents, etc.), and the vapors they produce, are extremely dangerous. Do not handle, use, or store gasoline or other flammable or combustible materials in the vicinity of a heater.

▲ WARNING: Both natural gas and propane have an odorant added to aid in detecting a gas leak. Some people may not physically be able to smell or recognize this odorant. If you are unsure or unfamiliar with the smell of natural gas or propane, ask your local gas supplier. Other conditions, such as “odorant fade,” which causes the odorant to diminish in intensity, can also hide, camouflage, or otherwise make detecting a gas leak by smell more difficult.

▲ WARNING: UL-recognized fuel gas detectors are recommended in all enclosed propane and natural gas applications wherein there is a potential for an explosive mixture of fuel gas to accumulate and their installation should be in accordance with the detector manufacturer’s recommendations and/or local laws, rules, regulations, or customs.

▲ WARNING: Do not install within 3 feet (0.9 m) of a heat pump or an outdoor condensing unit. Strong air intake from this type of equipment can disturb the combustion process and cause damage or personal injury.

▲ WARNING: The heater shall not be located in an area where water sprinklers, or other devices, may cause water to spray through the cabinet louvers and into the heater. This could cause internal rusting or damage electrical components. Such damage is not covered under warranty.

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⚠ 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. Pregnant women should stick to the 100°F (38°C) maximum rule.
4. Before entering the spa or hot tub, users should check the water temperature with an accurate thermometer; spa or hot tub thermostats may err in regulating water temperatures by as much as 4°F (2.2°C).
5. Persons 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.

NOTE: It is recommended that the pump be run at least 5 minutes after the heater has been turned off. This helps in taking away residual heat from the heat exchanger, thus prevents the safety hi-limits from tripping due to residual heat after the heater is turned off.

⚠ WARNING: Risk of fire. It is recommended that CO monitor and fire alarm be utilized in rooms that contain gas fired appliances

2. WATER CHEMISTRY

Chemical imbalance can cause severe damage to your heater and associated equipment. Maintain your water chemistry according to **Table A**. If the mineral content and dissolved solids in the water become too high, scale

forms inside the heat exchanger tubes, reducing heater efficiency and damaging the heater. If the pH drops below 7.2, this will cause corrosion of the heat exchanger and severely damage the heater. **Heat exchanger damage resulting from chemical imbalance is not covered by the warranty.**

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

NOTE: Damage due to poor water chemistry is not a warrantable defect.

⚠ CAUTION: Free chlorine must not exceed 5 ppm which can damage the heater and is not covered under warranty.

- 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.

Automatic Chlorinators and Chemical Feeders

All chemicals must be introduced and completely diluted into the pool or spa water before being circulated through the heater. Do not place sanitizing chemicals in the skimmer. High chemical concentrations will result when the pump is not running (e.g. overnight).

Chlorinators must feed downstream of the heater and have an anti-siphoning device to prevent chemical backup into the heater when the pump is shut off.

See "Plumbing Diagram" on page 18.

Recommended Level(s)	Fiberglass Pools	Fiberglass Spas	Other Pool and Spa Types
Water Temperature	68-88°F (20-31°C)	89-104°F (31-40°C)	68-104°F (20-40°C)
pH	7.3-7.4	7.3-7.4	7.6-7.8
Total Alkalinity (ppm)	120-150	120-150	80-120
Calcium Hardness (ppm)	200-300	150-200	200-400
Salt (ppm)	4500 Maximum	4500 Maximum	4500 Maximum
Free Chlorine (ppm)*	2-3	2-3	2-3
Total Dissolved Solids (ppm)	3000 Maximum**	3000 Maximum**	3000 Maximum**

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

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

NOTE: High chemical concentrates from feeders and chlorinators that are out of adjustment will cause rapid corrosion to the heat exchanger. Such damage is not covered under the warranty.

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THE MODEL AND SERIAL NO. CAN ALSO BE FOUND INSIDE THE BEZEL ABOVE THE DISPLAY

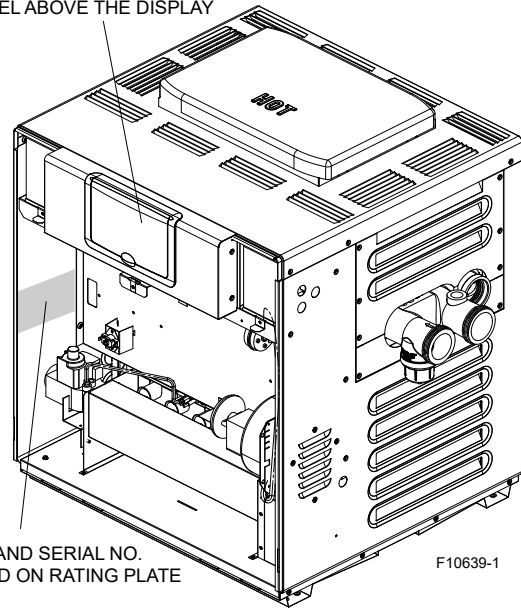


Figure 1. Rating Plate Location

3. BEFORE INSTALLATION

Receiving equipment

The manufacturer recommends that this manual be reviewed thoroughly before installing the pool/spa heater. If there are any questions that this manual does not answer, please contact the factory or your local representative.

On receipt of your equipment it is suggested that you visually check for external damage to the carton. If the carton is damaged, a note should be made on the Bill of Lading when signing for the equipment. Remove the heater from the carton. If it is damaged, report the damage to the carrier immediately. Save the carton.

These items are shipped inside a box in the carton with the heater:

Standard Unit (POLYMER HEADERS)

1. "Pagoda" top
2. 2" CPVC union half with "O" rings (2)
3. Plastic pipe finish flange for gas line
4. Bonding lug with mounting screw

ASME Unit (BRONZE HEADERS)

1. "Pagoda" top
2. 2" CPVC union half with "O" rings (2)
3. Plastic pipe finish flange for gas line
4. Bonding lug with mounting screw
5. Pressure Relief Valve
6. Protek Shield™ Adapter with Protek Shield Assy, O-ring and wing nut (end of Q3 2020 onward)

Be sure that you receive the number of packages indicated on the Bill of Lading.

Rating and certifications

These heaters are design-certified and tested under the latest requirements of the ANSI Z21.56 / CSA 4.7 Standard for Gas-Fired Pool Heaters. All heaters can be used either indoor or outdoors when appropriate venting is installed. The appropriate top designated for each type of use is required. If necessary, the top can be changed at a later date to change from outdoor to indoor or vice versa.

Elevation

Rated inputs are suitable for up to 5,000 feet (1524 m) elevation. For elevations above 5,000 feet (1524 m), consult the factory.

Ambient Temperature Rating

Heater Components

Electronic Ignition Heater* -32°F to 175°F (-35°C to 79°C)

*Requires 120 or 240VAC, 1 Ph, 60 Hz Power Supply

4. INSTALLATION

▲WARNING: This unit contains refractory ceramic fiber (RCF) insulation in the combustion chamber. RCF, as manufactured, does not contain respirable crystalline silica. However, following sustained exposure to very high temperatures (>2192°F), the RCF can transform into crystalline silica (cristabolite). The International Agency for Research on Cancer (IARC) has classified the inhalation of crystalline silica (cristabolite) as carcinogenic to humans.

When removing the burners or heat exchangers, take precautions to avoid creating airborne dust and avoid inhaling airborne fibers. When cleaning spills, use wet sweeping or High Efficiency Particulate Air (HEPA) filtered vacuum to minimize airborne dust. Use feasible engineering controls such as local exhaust ventilation or dust collecting systems to minimize airborne dust. Wear appropriate personal protective equipment including gloves, safety glasses with side shields, and appropriate NIOSH-certified respiratory protection, to avoid inhalation of airborne dust and airborne fiber particles.

▲WARNING: Improper installation, adjustment, alteration, service or maintenance may damage the equipment, creating a hazard resulting in asphyxiation, explosion or fire. Such damage is not covered under warranty.

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IMPORTANT NOTICE: These instructions are intended only for the use by qualified personnel, specifically trained and experienced in the installation of this type of heating equipment and related system components. Installation and service personnel may be required by some states to be licensed. If your state is such, be sure your contractor bears the appropriate license. Persons not qualified shall not attempt to fix the equipment nor attempt repairs according to these instructions.

NOTE: The heater should not be located in an area where possible water leakage will result in damage to the area adjacent to the heater or to the structure. When such locations cannot be avoided, it is recommended that a suitable drain pan, with adequate drainage, be installed under the heater. The pan must not restrict combustion air flow.

RECOMMENDATION: For regions with snow, Raypak recommends installing these units indoors.

Location	Indoor Installation
Top *	30" (762 mm) Drafthood
Front	Alcove (Open)
Vent	6" (152 mm)
Floor **	0"
Back	6" (152 mm)
Right Side	12" (305 mm) Water Side
Left Side	6" (152 mm) Opposite Water Side

Location	Outdoor Installation
Top *	Unobstructed (Outdoor Stack)
Top ***	36" (914 mm) (Stackless Top)
Floor	0"
Back	6" (152 mm)
Right Side	12" (305 mm) Water Side
Left Side	6" (152 mm) Opposite Water Side

* Clearance from top of vent terminal
 ** Do not install on carpeting
 *** Clearance from top of heater

Table B. Minimum Clearances from Combustible Surfaces

Installation Codes

Installation must be in accordance with local codes, or, in the absence of local codes, with the latest edition of the National Fuel Gas Code, ANSI Z223.1/NFPA54 and National Electrical Code, ANSI/NFPA 70, and for Canada, the latest edition of CAN/CSA-B149 Installation Codes, and Canadian Electrical Code, CSA C22.1 Part 1 and Part 2.

Clearances

All Heaters

For indoor and outdoor clearances from combustible surfaces, see **Table B**.

When installed according to the listed minimum clearances from combustible construction, the pool heater can still be serviced without removing permanent construction around the heater.

However for ease of servicing, we recommend a clearance of at least 24" (610 mm) in the front, and at least 18" (457 mm) on the water connection side. This will enable the heater to be serviced in its installed location, that is, without movement or removal of the heater.

Clearances less than these may require removal of the heater to service either the heat exchanger or the burner tray. In either case, the heater must be installed in a manner that will enable the heater to be serviced without removing any structure around the heater.

Flooring

This heater can be installed on combustible flooring. The combustible clearances listed can be reduced by protecting the exposed combustible surfaces as shown in **Table C**.

Outdoor Heater Installation

These heaters are design-certified for outdoor installation, when equipped with the approved tops designated for outdoor use.

⚠ WARNING: The heater shall not be located in an area where water sprinklers, or other devices, may cause water to spray through the cabinet louvers and into the heater. This could cause internal rusting or damage electrical components. Such damage is not covered under warranty.

⚠ WARNING: Do not install within 3' (0.9 m) of a heat pump or an outdoor condensing unit. Strong air intake from this type of equipment can disturb the combustion process and cause damage or personal injury.

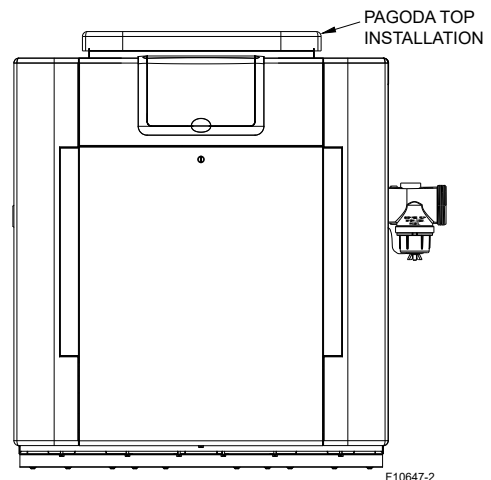


Figure 2. Heater with Outdoor Stackless Top

PRELIMINARY

Description	Location	Distance in. (mm)
a. 3-1/2" (89 mm) thick masonry walls without ventilated air space	Back	9 (229)
	Right	9 (229)
	Left	9 (229)
	Vent	5 (127)
	Indoor Top	39 (991)
	Outdoor Top	Unobstructed
b. 1/2" (13 mm)insulation board over 1" (25 mm) glass fiber or mineral wool batts	Back	6 (152)
	Right	6 (152)
	Left	6 (152)
	Vent	3 (76)
	Indoor Top	30 (762)
	Outdoor Top	Unobstructed
c. 0.024 sheet metal over 1" (25 mm) glass fiber or mineral wool batts reinforced with wire on rear face with ventilated air space	Back	4 (102)
	Right	4 (102)
	Left	4 (102)
	Vent	3 (76)
	Indoor Top	24 (610)
	Outdoor Top	Unobstructed
d. 3-1/2" (89 mm) thick masonry wall with ventilated air space	Back	6 (152)
	Right	6 (152)
	Left	6 (152)
	Vent	6 (152)
	Indoor Top	39 (991)
	Outdoor Top	Unobstructed
e. 0.024 sheet metal with ventilated air space	Back	4 (102)
	Right	4 (102)
	Left	4 (102)
	Vent	2 (51)
	Indoor Top	24 (610)
	Outdoor Top	Unobstructed
f. 1/2" (13 mm) thick insulation board with ventilated air space	Back	4 (102)
	Right	4 (102)
	Left	4 (102)
	Vent	3 (76)
	Indoor Top	24 (610)
	Outdoor Top	Unobstructed
g. 0.024 sheet metal with ventilated air space over 0.024 sheet metal with ventilated air space.	Back	4 (102)
	Right	4 (102)
	Left	4 (102)
	Vent	3 (76)
	Indoor Top	24 (610)
	Outdoor Top	Unobstructed
h. 1" (25 mm) glass fiber or mineral wool batts sandwiched between two sheets 0.024 sheet metal with ventilated air space	Back	4 (102)
	Right	4 (102)
	Left	4 (102)
	Vent	3 (76)
	Indoor Top	24 (610)
	Outdoor Top	Unobstructed

surface of the heater shall be at least 3' (0.9 m) above any forced air inlet, or intake ducts located within 10' (3 m) horizontally.

For Canadian installations, pool heaters shall not be installed with the top of the vent assembly within 10' (3 m) below, or to either side, of any opening into the building. Refer to the latest revisions of CAN/CSA-B149.

A minimum of 6' (1.8 m) is required from the heater to an inside corner wall for proper outdoor venting.

For installations in Florida and Texas, that must comply with the Florida or Texas Building Code, follow the directions shown in **Figure 7** for the installation of hurricane tie-down brackets for all models.

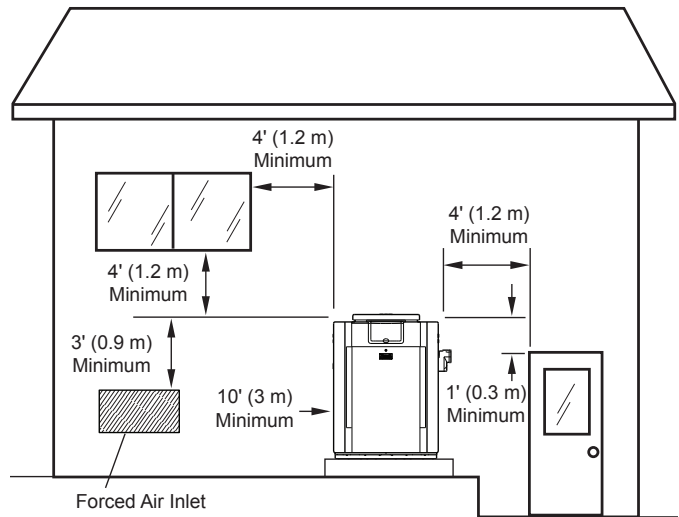


Figure 3. Clearances

Pagoda Top Installation

1. Insert tabs into keyhole (4 places). See **Figure 4**, detail A.
2. Snap tabs into keyholes so as not to pull out. See **Figure 4**, detail B.

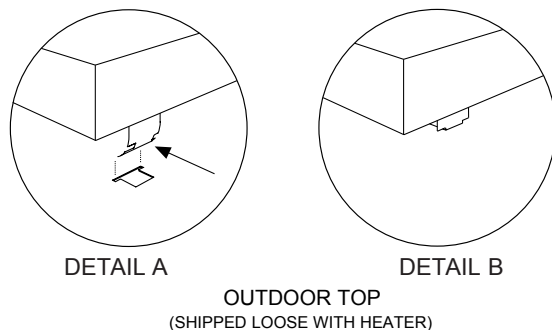


Figure 4. Outdoor Top Installation

Indoor Heater Installation

The heater is also design-certified for indoor installation when equipped with the approved drafthood.

Derived from National Fuel Gas Code, Table 10.2.3

Table C. Reduction of Clearances to Protected Surfaces

Heaters must not be installed under an overhang of less than three 3' (0.9 m) from the top of the heater. Three sides must be open in the area under the overhang. Roof water drainage must be diverted away from the heaters installed under overhangs with the use of gutters.

For U.S. installations, the point from where the flue products exit the heater must be a minimum of 4' (1.2 m) below, 4' (1.2 m) horizontally from, or 1' (0.3 m) above any door, window or gravity inlet into any building. The top

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For Canada, indoor installation is restricted to an enclosure that is not occupied and does not directly communicate with an occupied area. Refer to the latest edition of CAN/CSA-B149 for specific requirements. Locate heater as close as is practical to a chimney or gas vent. Heater must always be vented to the outside. See section "Vent Piping" on page 12 for details. Minimum allowable space is shown on the nameplate.

or Canada CAN/CSA-B149) and any local codes that may have jurisdiction. The most common approach is the "2-opening" method, with combustion air opening no more than 12" from the floor and the ventilation opening no more than 12" from the ceiling. For opening sizes using this method, see below.

⚠ WARNING: Indoor heaters require a draffhood that must be connected to a vent pipe and properly vented to the outside. Failure to follow this procedure can cause fire or fatal carbon monoxide poisoning.

All Air from Inside the Building:

Each opening shall have a minimum net free area as noted:

Model	Sq. in. (m ²)
207A	200 (0.13)
266L/267A	266 (0.17)
337A	333 (0.21)
399L/407A	399 (0.26)

Outdoor and Indoor Stacks

The outdoor and indoor stacks are optional equipment and do not come standard with the heater. Refer to installation instructions inside box for instructions on how to install outdoor/indoor stack.

Table E. Opening Minimum Net Free Requirements - Indoor Air

Model	Outdoor Stack	Indoor Stack
	Part No	Part No.
207A	009834	009838
266L/267A	009835	009839
337A	009836	009840
399L/407A	009837	009841

All Air from Outdoors:

When air is supplied directly from outside the building, each opening shall have a minimum net free area as noted:

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)
207A	50 (0.03)	75 (0.05)	100 (0.1)
266L/267A	67 (0.04)	101 (0.06)	134 (0.09)
337A	84 (0.05)	126 (0.08)	168 (0.11)
399L/407A	100 (0.06)	150 (0.1)	200 (0.13)

Table D. Outdoor and Indoor Stack Kit Number

NOTE: The outdoor draffhood kit does not require any additional vent pipe for proper operation. This draffhood functions as the vent termination.

Table F. Opening Minimum Net Free Requirements - Outdoor Air

Combustion and Ventilation Air

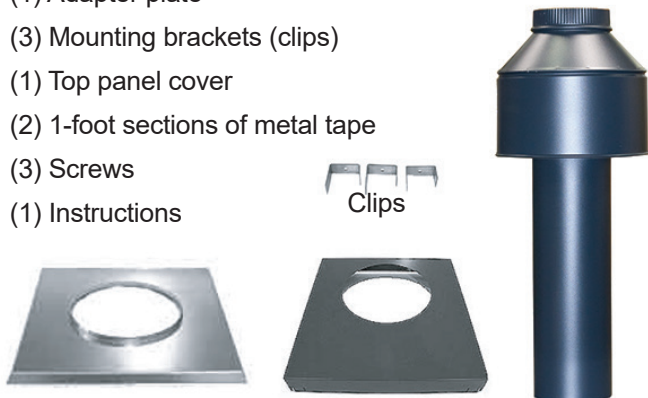
Indoor Units Only

The heater must have both combustion and ventilation air. The minimum requirements are listed in the latest edition of the National Fuel Gas Code (U.S. ANSI Z223.1

⚠ CAUTION: Combustion air must not be contaminated by corrosive chemical fumes which can damage the heater. Such damage will not be covered by the warranty

OUTDOOR STACK KIT

- (1) Outdoor stack, painted
- (1) Adapter plate
- (3) Mounting brackets (clips)
- (1) Top panel cover
- (2) 1-foot sections of metal tape
- (3) Screws
- (1) Instructions



INDOOR STACK KIT

- (1) Draffhood, unpainted
- (1) Adapter plate
- (3) Mounting brackets (clips)
- (3) Screws
- (1) Instructions

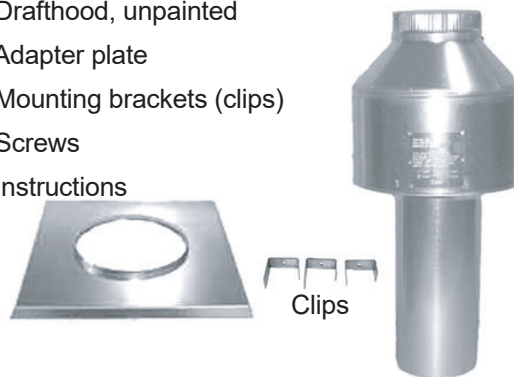


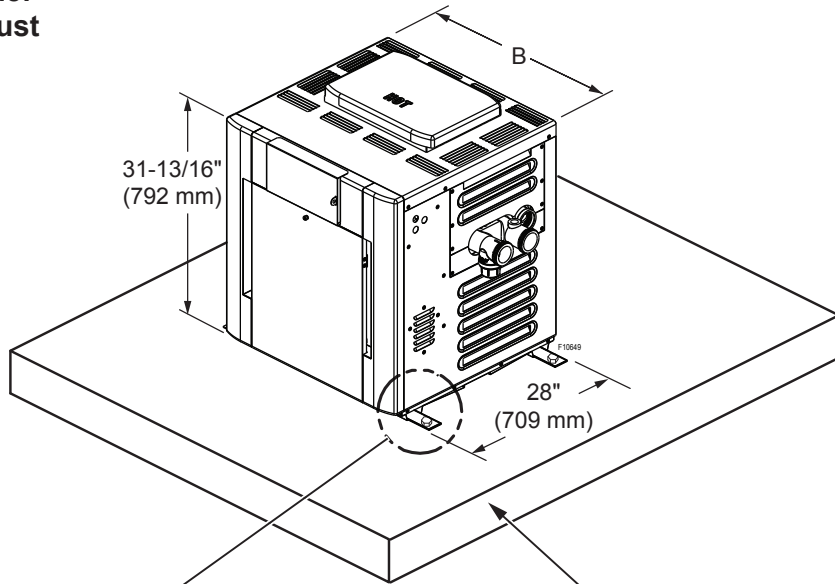
Figure 5. Outdoor Stack Kit Components

Figure 6. Indoor Stack Kit Components

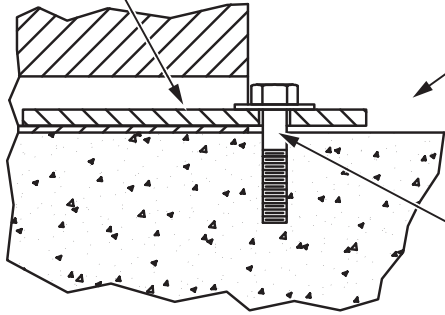
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Florida and Texas Building Code:
 Wind Speed = 150 mph 3 sec gust
 Exposure = C

Model	B in. (mm)
207A	20 (508)
266L/267A	23 (584)
337A	26 (660)
399L/407A	29 (737)

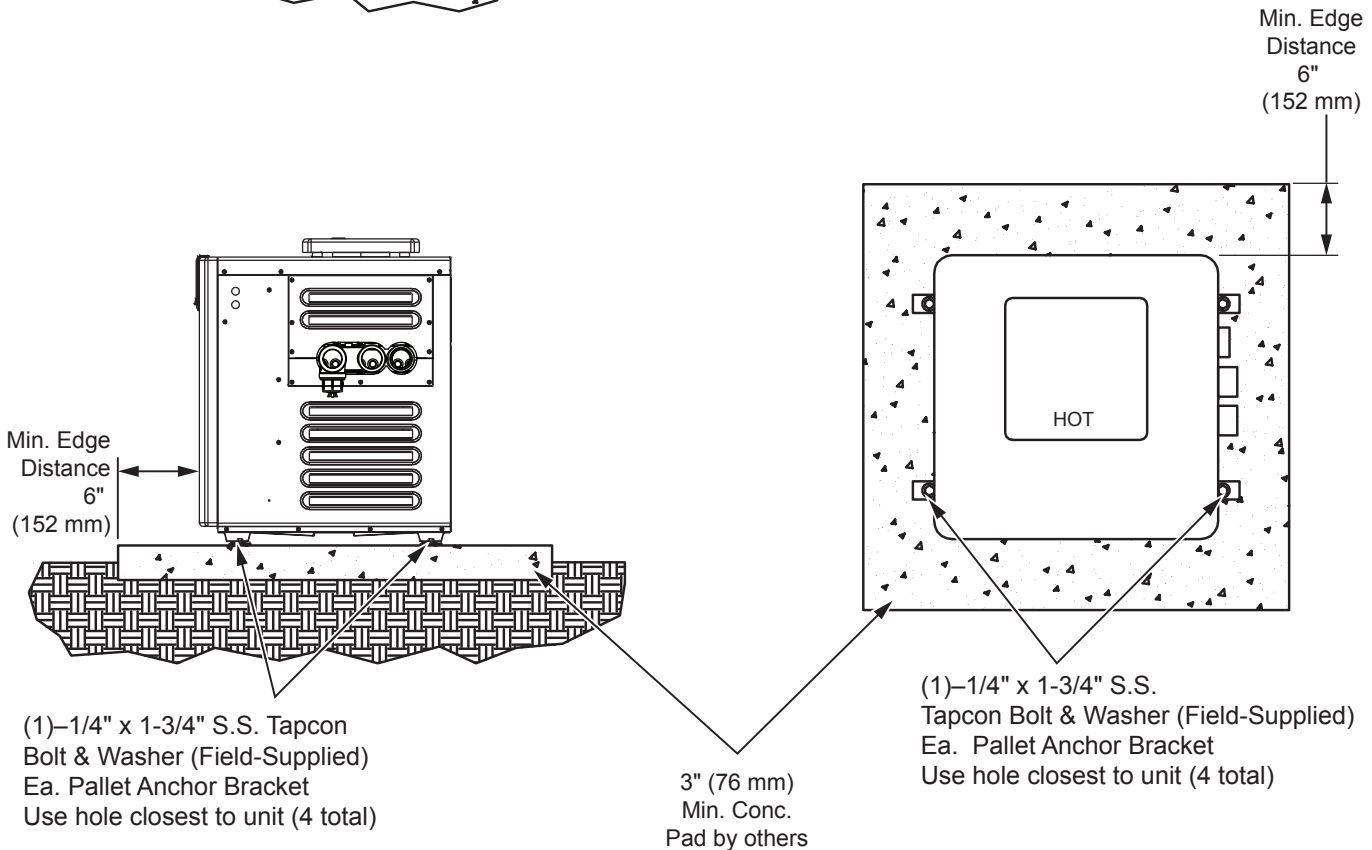


2" x 6" x 1/8" Pallet
 Anchor Bracket (4 Total) (Kit# 011636)



1/4" x 1-3/4" S.S.
 Tapcon Bolt and Washer (Field-Supplied)
 NOTE: Use hole closest to unit with
 washer overlapping edge of unit.

3" (76 mm)
 Min. Conc.
 Pad by others



Min. Edge
 Distance
 6"
 (152 mm)

Min. Edge
 Distance
 6"
 (152 mm)

(1)-1/4" x 1-3/4" S.S. Tapcon
 Bolt & Washer (Field-Supplied)
 Ea. Pallet Anchor Bracket
 Use hole closest to unit (4 total)

3" (76 mm)
 Min. Conc.
 Pad by others

(1)-1/4" x 1-3/4" S.S.
 Tapcon Bolt & Washer (Field-Supplied)
 Ea. Pallet Anchor Bracket
 Use hole closest to unit (4 total)

Figure 7. Hurricane Tie-Down Bracket Installation
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PRELIMINARY

Specifications and Dimensions

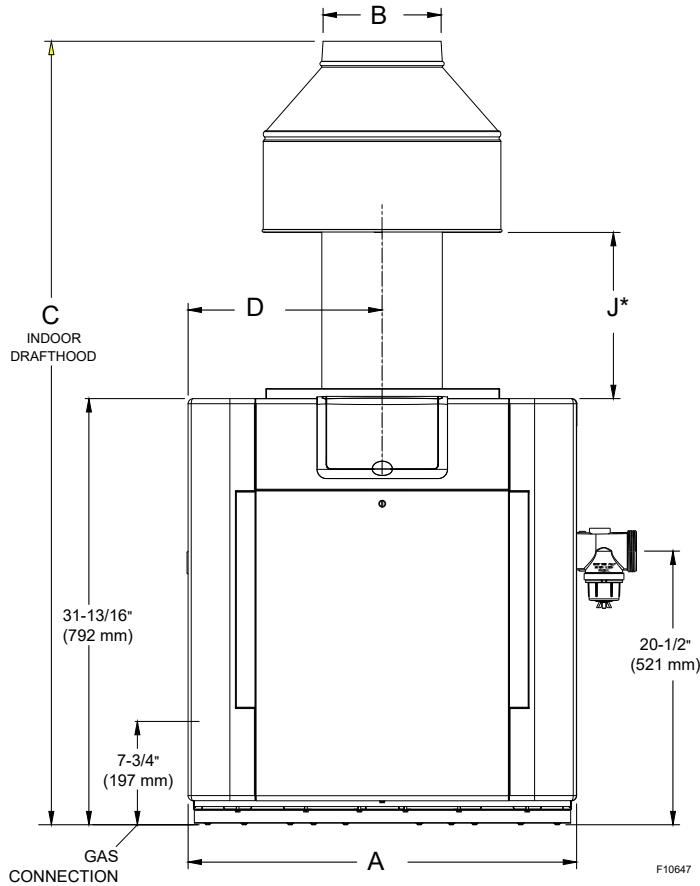


Figure 8. Front View

Amp Draw	
120 VAC, 1 Ph, 60 Hz	240 VAC, 1 Ph, 60 Hz
6	3

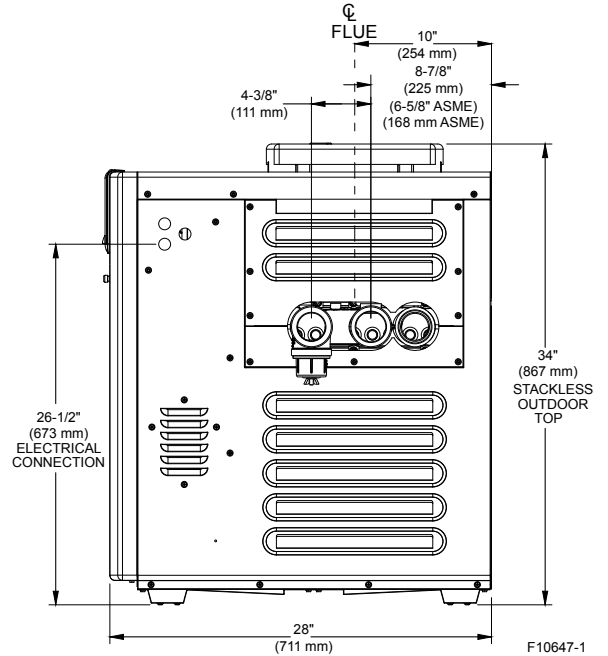


Figure 9. Side View

*Note: For outdoor stack, use J dimension in the table below for appropriate size **plus 6"** (152 mm).

Heater Model	BTUH Input (kwh)	(A) Cabinet Width in. (mm)	(B) Flue Dia. in. (mm)	(C) Indoor Draft Hood in. (mm)	(D) in. (mm)	(J)* in. (mm)	Gas Conn. in. (mm)	Water Conn. in. (mm)	Shipping Weights - lbs (kg)		
									Standard Heater w/Stackless Top	ASME Heater w/Stackless Top	Indoor Draft-Hood
207A	199.5 (58.4)	20 (508)	6 (152)	55-5/8 (1413)	10.0 (254)	11-3/4 (298)	3/4 (19)	2 (51)	174 (79)	193 (88)	14 (6.4)
266L	266.0 (77.9)	23 (584)	7 (178)	56 (1422)	11.5 (292)	11 (279)	3/4 (19)	2 (51)	197 (89)	216 (98)	16 (7.3)
267A											19 (8.6)
337A	332.5 (97.4)	26 (660)	8 (203)	57 (1448)	13.0 (330)	10-5/8 (270)	3/4 (19)	2 (51)	219 (99)	238 (108)	19 (8.6)
399L	399 (116.9)	29 (737)	9 (229)	58-1/2 (1486)	14.5 (368)	12-1/2 (318)	3/4 (19)	2 (51)	237 (108)	256 (116)	21 (9.5)
407A											19 (8.6)

Table G. Heater Specifications and Dimensions

PRELIMINARY

Flue materials must be certified to CATEGORY I or better. Type "B" double-wall or equivalent vent pipe is recommended. A draft of -0.01" to -0.08" WC must be maintained. However single-wall metal vent pipe may be used as specified in the latest edition of the National Fuel Gas Code, ANSI Z223.1 (Canada - CAN/CSA-B149).

Vent Piping

⚠ WARNING: Indoor heaters require a drafthood that must be connected to a vent pipe and properly vented to the outside. Failure to follow this procedure can cause fire or fatal carbon monoxide poisoning.

When properly installed outdoors, only the outdoor stackless top, provided, is required. If installed indoors, a drafthood is required, connected to a CATEGORY I (a heater that operates with a non-positive vent static pressure and a vent gas temperature that avoids excessive condensate production in the vent) vent per the National Fuel Gas Code and local requirements.

Vent piping the same size as the drafthood outlet is recommended, however, when the total vent height is at least 10 ft (3 m) (drafthood relief opening to vent terminal), the vent pipe size may be reduced by no more than one size as specified in Chapter 13 of the National Fuel Gas Code, ANSI Z223.1 (Canada - CAN/CSA-B149).

As much as possible, avoid long horizontal runs of vent pipe and too many elbows. If installation requires horizontal runs, the vent pipe must have a minimum of 1/4 in. per ft rise (20.8 mm per meter rise) and should be supported at not more than 5 ft (1.5 m) intervals.

Plumber's tape, criss-crossed, will serve to space both horizontal and vertical piping. Gas vents supported only by the flashing and extending above the roof more than 5 ft (1.5 m) should be securely guyed or braced to withstand snow and wind loads. We recommend use of insulated vent pipe spacers through the roof and walls.

For protection against rain or blockage by snow, the vent pipe must terminate with a vent cap which complies with the local codes or, in the absence of such codes, to the latest edition of the National Fuel Gas Code, ANSI Z223.1 (Canada - CAN/CSA-B149).

The discharge opening must be a minimum of 2' (0.6 m) vertically from the roof surface and at least 2' (0.6 m) higher than any part of the building within 8' (2.4 m). Vent stack shall be at least 5' (1.5 m) in vertical height above the drafthood outlet. The vent cap location shall have a minimum clearance of 4' (1.2 m) horizontally from, and in no case below, unless a 4' (1.2 m) horizontal distance is maintained, from electric meters, gas meters, regulators and relief equipment.

The weight of the vent stack or chimney must not rest on the heater drafthood. Support must be provided in compliance with applicable codes. The heater top and drafthood must be readily removable for maintenance and inspection. Vent pipe should be adequately supported to maintain proper clearances from combustible construction.

D-2 Power Vent Kit

Another option for an installation that requires horizontal runs is using the D-2 power vent kit option.

Model	120 VAC P/N	240 VAC P/N
207A	010744	009832
266L/267A	010744	009832
337A	010745	009833
399L/407A	010745	009833

Table H. Power Vent Kit Part Numbers

NOTE: The D-2 Power Vent operates with a positive vent static pressure and with a vent gas temperature that prevents excessive condensate production in the vent, and as such, is a CATEGORY III appliance. For more information consult the D-2 Power Vent manual, Catalog P/N 241243. CATEGORY I vent material such as B-vent must not be used under CATEGORY III conditions.

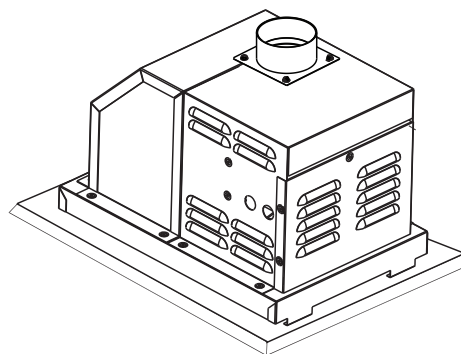


Figure 10. D-2 Power Vent Option

The power vent system is a fan-assisted vent system designed for application used on models 207A-407A.

The power vent system, when installed as directed, is capable of operating in applications such as through-the-wall venting with reduced horizontal and vertical vent pipe sizes in new and current installations. The unit is factory-wired for 240 VAC, with capability of field-rewiring for 120 VAC.

For more information consult the D-2 Power Vent manual, (P/N 241243).

PRELIMINARY

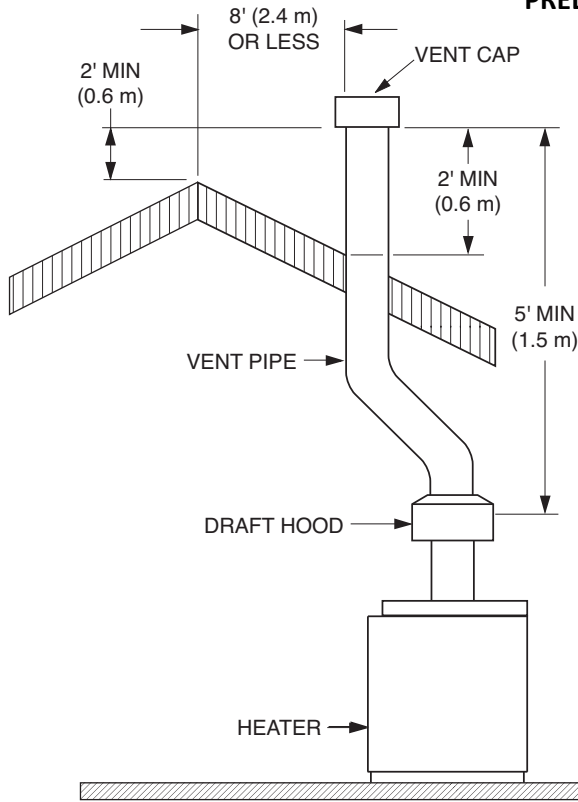


Figure 11. Venting Clearances

NOTE: With venting application of two or more heaters, contact the factory.

CAUTION: The heater and its manual shutoff valve must be disconnected from the gas supply during any pressure testing of that system at test pressures in excess of 1/2 psi (3.45 kPa). Dissipate test pressure in the gas supply line before reconnecting the heater and its manual shutoff valve to gas supply line. **FAILURE TO FOLLOW THIS PROCEDURE MAY DAMAGE THE GAS VALVE. OVER-PRESSURIZED GAS VALVES ARE NOT COVERED BY WARRANTY.** The heater and its gas connections shall be leak tested before placing the appliance in operation. Use soapy water for leak test. **DO NOT** use open flame.

Supply Pressure

CAUTION: Do not use Teflon tape on gas line pipe thread. Only sealant tape or a pipe compound rated for use with natural and propane gases is recommended. Apply sparingly only on male pipe ends, leaving the two end threads bare.

A minimum of 5 in. WC and a maximum of 10.5 in. WC upstream pressure under load and no-load conditions must be provided for natural gas.

Gas Pressure Regulator

The gas pressure regulator is preset at 3.1 in. WC for natural gas. The pressure at the gas valve, taken with a manometer, should be about 3.1 in. WC natural gas. If an adjustment is needed, remove seal and turn adjustment screw clockwise ↻ to increase pressure or counter-clockwise ↻ to decrease pressure.

Gas Supply Connections

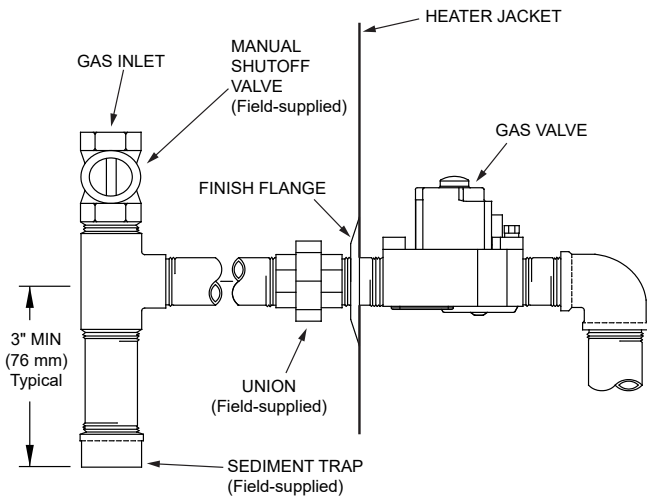


Figure 12. Gas Supply Plumbing

Gas piping must have a sediment trap ahead of the heater gas controls, and a manual shutoff valve located outside the heater jacket. All gas piping should be tested after installation in accordance with local codes.

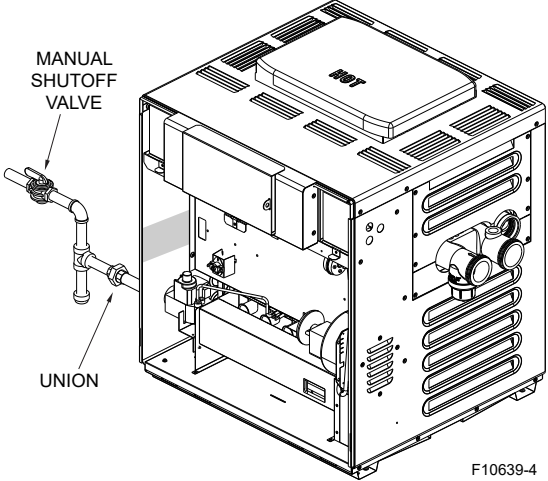


Figure 13. Manual Shutoff Valve Installation

PRELIMINARY

Gas Pressure Adjustment Locations

Gas Pressure Adjustment

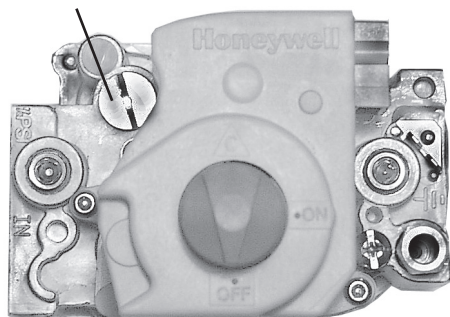


Figure 14. Honeywell VR8340

Pipe Sizing for Gas Connection

The capacities shown below are based on using SCH 40 black iron pipe. For capacities using other materials, consult local codes.

Maximum Equivalent Pipe Length (ft) (m)				
Natural Gas 1000 BTU/FT ³ 0.60 Specific Gravity @ 0.5 in. WC Pressure Drop				
Model	3/4"	1"	1-1/4"	1-1/2"
207A	25 (7.6)	90 (27.4)	360 (109.7)	
266L/267A	15 (4.6)	50 (15.2)	210 (64.0)	445 (135.6)
337A	10 (3.0)	30 (9.1)	140 (42.7)	290 (88.4)
399L/407A	*	20 (6.1)	95 (29.0)	215 (65.5)

* 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.

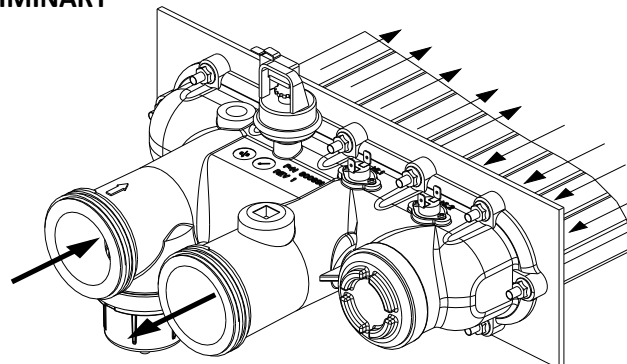
Table I. Gas Pipe Sizing

Flow Rates

Model	Pipe Size	Min. GPM (lpm)	Max. GPM (lpm)
207A	1-1/4"-1-1/2"-2"	20 (75)	100 (378)
266L/267A	1-1/4"-1-1/2"-2"	25 (95)	100 (378)
337A	1-1/4"-1-1/2"-2"	35 (132)	100 (378)
399L/407A	1-1/4"-1-1/2"-2"	40 (151)	100 (378)

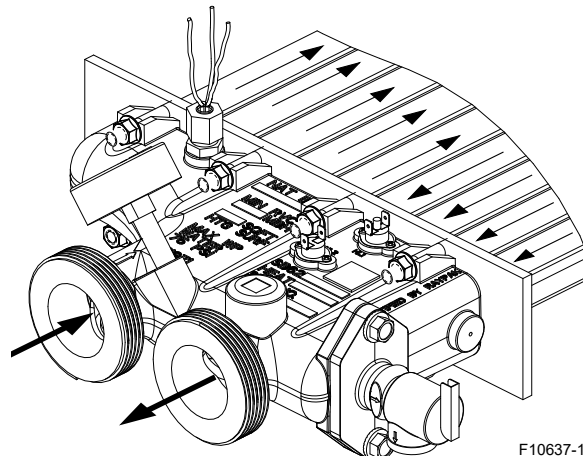
* When flow rates exceed maximum GPM an external auxiliary bypass valve is required. See external bypass valve section for details.

Table J. Min/Max Flow Rates



F10638-1

Figure 15. Polymer Headers Water Flow



F10637-1

Figure 16. Bronze Headers (ASME) Water Flow

Flow GPM (lpm)	Pressure Drop Ft. of Head (m of Head)			
	207A	266L/267A	337A	399L/407A
20 (75)	4.0 (1.2)			
25 (95)	4.0 (1.2)	4.6 (1.4)		
30 (113)	4.0 (1.2)	5.2 (1.6)		
35 (132)	4.0 (1.2)	5.8 (1.8)	5.2 (1.6)	
40 (151)	4.6 (1.4)	5.8 (1.8)	5.2 (1.6)	5.2 (1.6)
50 (189)	4.6 (1.4)	6.3 (1.9)	6.9 (2.1)	6.9 (2.1)
60 (227)	4.6 (1.4)	6.9 (2.1)	6.9 (2.1)	6.9 (2.1)
70 (265)	4.6 (1.4)	8.1 (2.5)	9.2 (2.8)	9.2 (2.8)
80 (303)	4.6 (1.4)	9.2 (2.8)	9.8 (3.0)	9.8 (3.0)
90 (340)	6.9 (2.1)	10.4 (3.2)	10.4 (3.2)	10.4 (3.2)
100 (378)	8.1 (2.5)	11.0 (3.4)	12.1 (3.7)	12.1 (3.7)

Table K. Polymer Heat Exchanger Pressure Drop - Residential Models (UG Fully Open)

PRELIMINARY

Flow GPM (lpm)	Pressure Drop Ft. of Head (m of Head)			
	207A	267A	337A	407A
20 (75)	8.2 (2.5)			
30 (113)	9.5 (2.9)	9.5 (2.9)		
40 (151)	9.7 (2.95)	9.7 (2.95)	11 (3.3)	13.4 (4.1)
50 (189)	10 (3.0)	9.8 (2.98)	12.2 (3.7)	13.4 (4.1)
60 (227)	11 (3.3)	10.4 (3.2)	13.7 (4.2)	13.5 (4.1)
70 (265)	11.5 (3.5)	10.9 (3.3)	14.3 (4.35)	14 (4.3)
80 (303)	12.6 (3.8)	12 (3.7)	15.5 (4.7)	15 (4.6)
90 (340)	14 (4.3)	13 (4.0)	16.2 (4.9)	16.2 (4.9)
100 (378)	15 (4.6)	14.2 (4.32)	17.5 (5.3)	16.7 (5.1)

Table L. Bronze Heat Exchanger Pressure Drop - ASME Models (UG Closed)

NOTE: Table capacity is based on Schedule 40 black iron pipe. For capacity using other material, consult local codes.

Bronze Headers (ASME Models)

Heater must be located so that any water leaks will not damage the structure of adjacent area. Before attaching the ProTek Shield Adapter to the inlet connection and the 2-inch unions, make sure the O-rings are properly seated in the grooves. Use Aqualube or equivalent non-petroleum-based lubricant on the O-ring. **Hand tighten the unions.** Glue PVC piping directly to the unions.

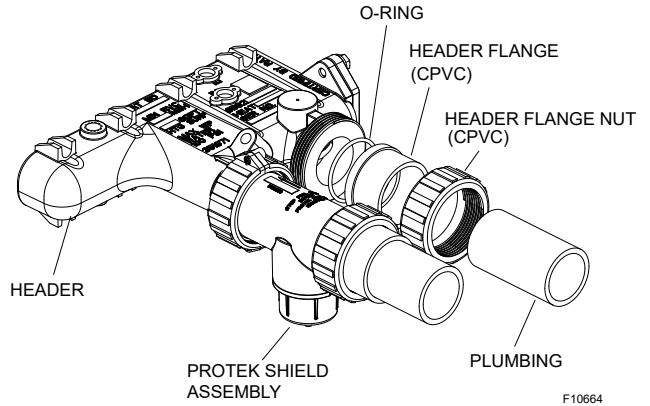


Figure 18. Inlet/Outlet Header – Bronze

NOTE: Some jurisdictions require the addition of a flow switch on ASME installations. Kit # 015889F for flange connection or 015890F for NPT connection can be ordered that will allow a standard ASME unit to comply with the code requirements.

Polymer Headers (Residential Models)

Before attaching the 2-inch unions to the inlet/outlet header, make sure the O-rings are properly seated in the grooves. Use Aqualube or equivalent non-petroleum-based lubricant on the O-ring. **Hand tighten the unions.** Glue PVC piping directly to the unions.

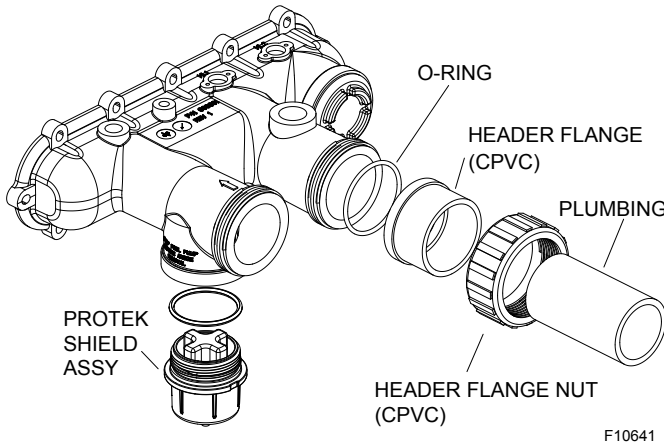


Figure 17. Inlet/Outlet Header – Polymer

High temperature CPVC header flanges and header flange nuts are provided. If there is any possibility of back-siphoning when the pump stops, it is suggested that a check valve (or valves) also be installed in the system.

ProTek Shield Assembly

This heater is equipped with a ProTek Shield Assembly (located under the inlet connection on polymer headers and in the ProTek Shield Adapter assembly shipped loose in the accessory carton for field installation on bronze ASME headers).

NOTE: ProTek Shield not available on ASME models until end of Q3 2020.

This component provides protection to the heat exchanger against galvanic corrosion, when properly bonded to the heat exchanger. It should be replaced when the weight of the ProTek Shield is reduced to about 40% of the original weight (1.46 #).

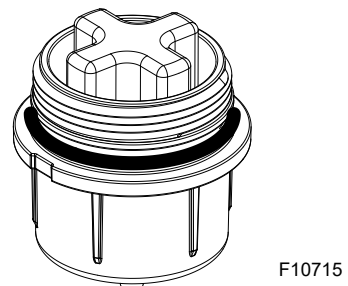


Figure 19. ProTek Shield Assy

PRELIMINARY

CAUTION: STOP the pool pump before attempting to remove ProTek Shield Assembly. 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.

Follow the steps below to replace the ProTek Shield Assy:

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 Assy 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.

NOTE: Make sure the O-ring is properly seated in the O-ring groove before installation.

Unitherm Governor Operation

CAUTION: The patented Unitherm Governor is a thermostatic mixing valve specifically designed to maintain constant heater internal temperature between 105°F (41°C) and 115°F (46°C) despite continually changing flow rates from the filter and changing pool temperatures. This narrow range is needed to prevent damaging condensation on the burners which will occur if the heater runs for any length of time below 100°F (38°C). It is also needed to inhibit scale formation in the tubes by maintaining temperatures well below accelerated scaling temperatures.

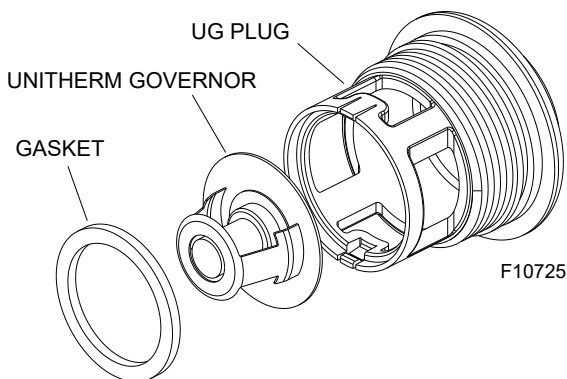


Figure 20. Unitherm Governor – Polymer

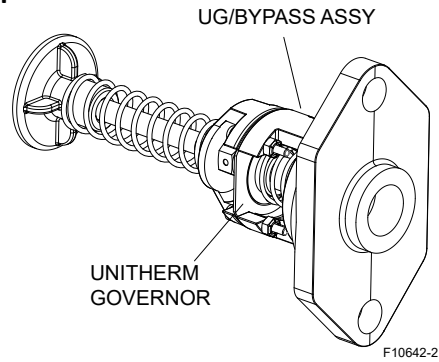


Figure 21. Unitherm Governor – Bronze

Internal Automatic Bypass Valve

In addition to the Unitherm Governor, a built-in automatic bypass valve is provided in the In/Out header. While the Unitherm Governor responds to the changes in water temperature in the heater, the internal bypass valve automatically responds to changes in water pressure in the piping system. Proper amount of water flow is maintained through the heater under varying pressures dictated by the conditions of the pump and filter.

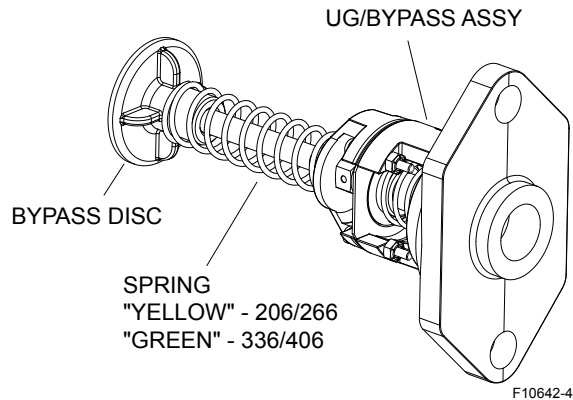
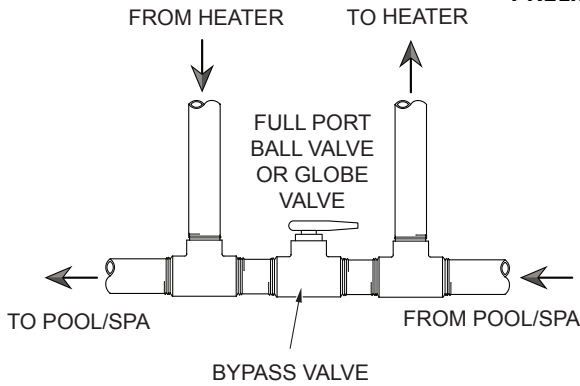


Figure 22. Internal Automatic Bypass Valve ASME

NOTE: The Unitherm Governor and Bypass Valve Assy are not individually replaced components on ASME units. If either needs to be replaced, the entire UG/Bypass assy must be replaced. The "yellow" spring is used on models 207A, 267A. The "green" spring is used on models 337A, 407A.

External Auxiliary Bypass Valve

Where Required - An auxiliary bypass valve should be used when flow rates exceed 100 GPM (378 lpm). Usually a high-performance pump size larger than two horsepower will exceed this flow rate. This valve is required to complement the function of the automatic bypass valve, particularly when starting the heater in winter or early spring when the spa or pool temperature is below 50°F (10°C). It also serves to eliminate needless pressure drop through the heater and accompanying reduction in the flow rate to the spa jets, etc.



Do not use gate valve.

Figure 23. Auxiliary Bypass Valve

Auxiliary Bypass Valve Adjustment

To set bypass - With clean filter, adjustment is made by feeling the inlet and outlet pipes at the heater. Outlet pipes should be slightly warmer than inlet and comfortable to the touch. If pipe is hot, close bypass; if cold, open bypass.

Pressure Relief Valve Installation

To conform to local building codes, it may be necessary to install a pressure relief valve. A 3/4" pressure relief valve, having a capacity equal to or greater than the BTU output of the model to be installed, is recommended for this heater.

A 3/4" NPT connection is provided in the Polymer header for installation of a pressure relief valve. The valve shall be installed in a vertical position. Do not over-tighten. Install pressure relief valve hand tight plus 1/2 turn.

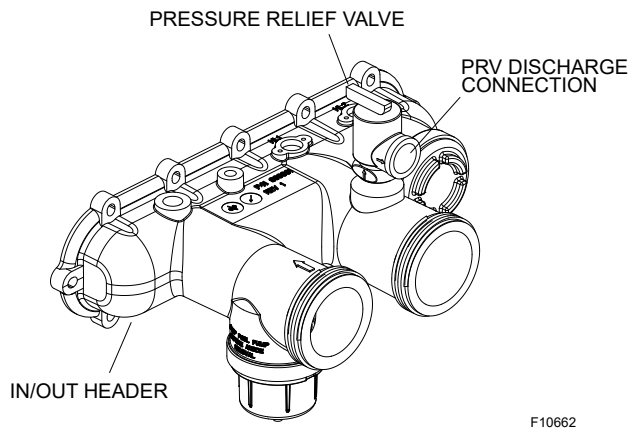


Figure 24. Field-Supplied Pressure Relief Valve Polymer Header (Residential Units)

A 3/4" NPT connection is provided in the header for installation of a 75 PSI (517 kPa) pressure relief valve. The PRV is shipped loose in the accessory carton with the pagoda top. The valve pressure relief shall be installed in a vertical position.

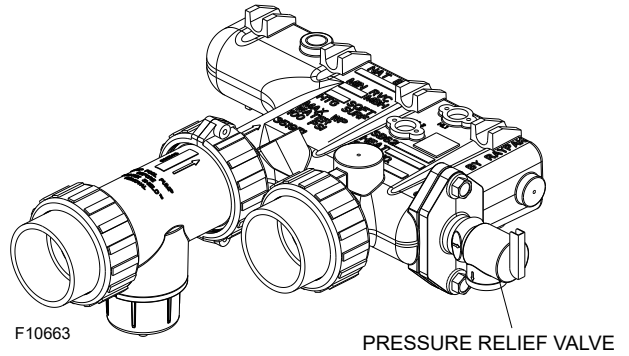


Figure 25. Pressure Relief Valve Bronze Header (ASME Models)

NOTE: To avoid water damage or scalding due to valve operation, drain pipe must be connected to valve outlet and run to a safe place of discharge. Drain pipe must be the same size as the valve discharge connection throughout its entire length and must pitch downward from the valve. No shutoff valve shall be installed between the relief valve and the drain line. Valve lever should be tripped at least once a year to ensure that waterways are clear.

The heater requires water flow and positive pressure to fire and operate properly. It must therefore be installed downstream of the discharge side of the filter pump. See **Figure 29** and **Figure 30**.

A typical installation is plumbed as follows:

1. The inlet side of the filter is plumbed directly to the discharge side of the filter pump;
2. The outlet side of the filter is then plumbed to the inlet of the heater; and
3. The outlet of the heater is plumbed to the return line to the pool or spa. The pump, filter and heater are thus plumbed in series (Salt generators and chemical feeders must be down stream of the pool heater).

Plumbing from the heater back to the pool or spa must not have any valves or restriction that could prevent flow when the pump is operating.

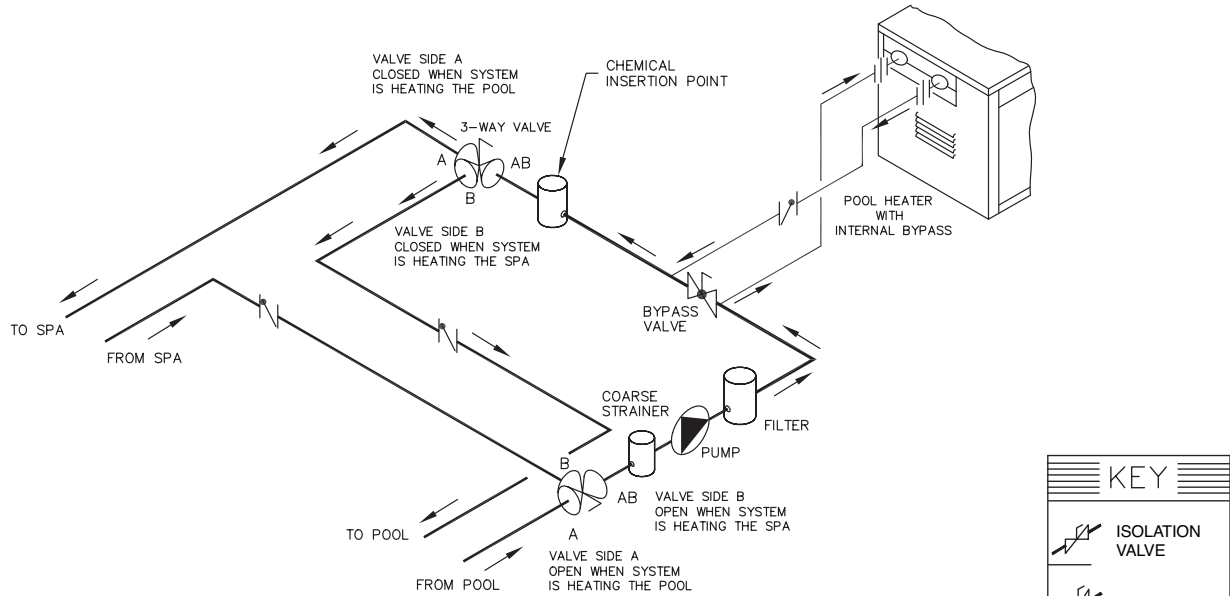
CAUTION: An additional source of heated water, e.g. a solar system, must be connected to the main line ahead of the heater inlet pipe in order for it to act as the primary heat source. If the primary system provides adequate heat to maintain setpoint, the heater will not fire. Be advised that the control panel will then display sensed water temperatures downstream of the primary heating system, rather than the temperature of the water exiting the pool.

Heater must be located so that any water leaks will not damage the structure of adjacent area. PVC pipe may be glued directly into the headers unions.

PRELIMINARY

Plumbing Diagram

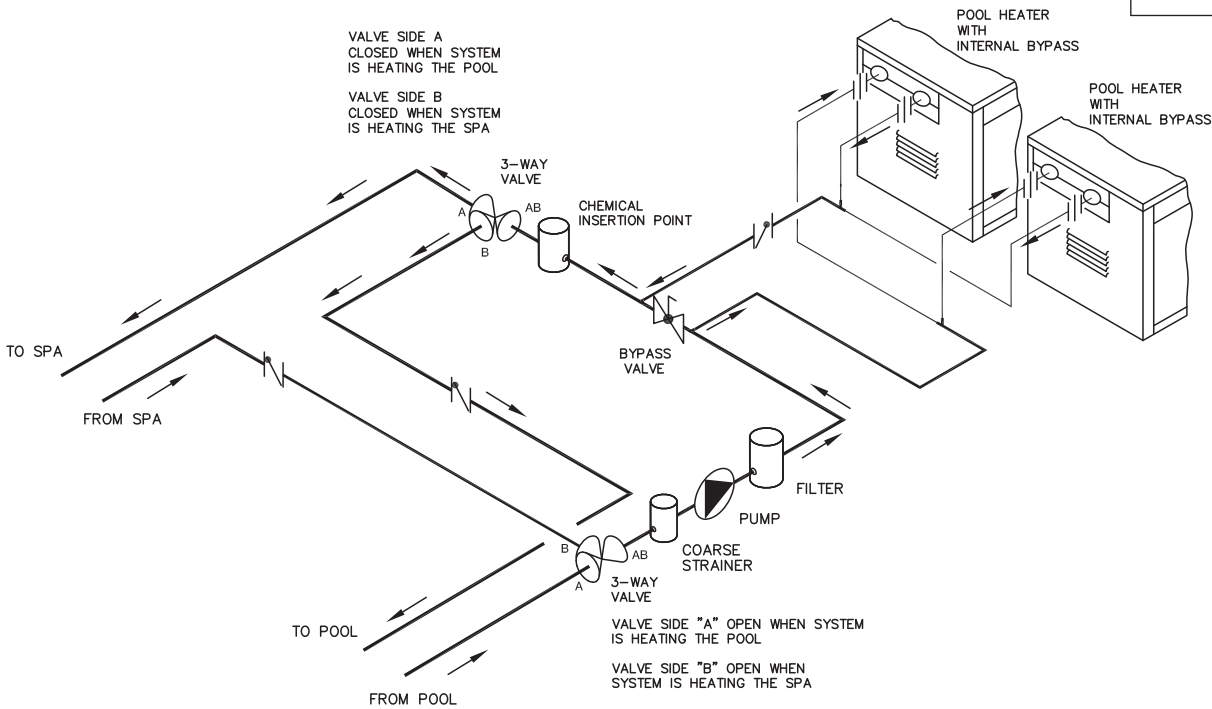
Water Connection



THIS DIAGRAM IS A RECOMMENDATION AND IS NOT INTENDED TO REPLACE AN ENGINEERED PIPING SYSTEM BY A PROFESSIONAL ENGINEER

Figure 29. Single Pool Heater Installation

KEY	
	ISOLATION VALVE
	BALL VALVE
	PRESSURE RELIEF VALVE
	PUMP
	UNION
	CHECK VALVE



THIS DIAGRAM IS A RECOMMENDATION AND IS NOT INTENDED TO REPLACE AN ENGINEERED PIPING SYSTEM BY A PROFESSIONAL ENGINEER

Figure 30. Multiple Pool Heater Installation

Heat Exchanger Reversal

Procedure for Residential Models

1. Remove right and left side access panels. See **Figure 26**.

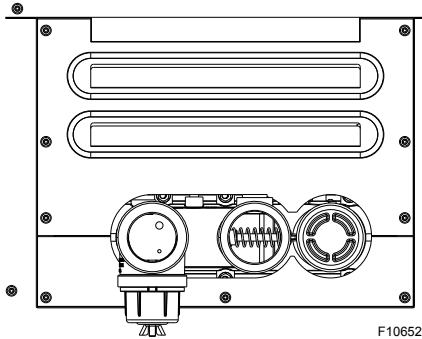


Figure 26. Access Panels

2. Disconnect wires at high limit, AGS (automatic gas shut-off), water pressure switch on the in/out header, and ProTek Shield bonding wire. See **Figure 27**.

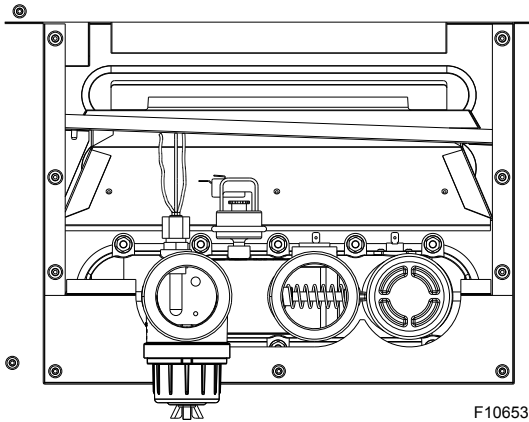


Figure 27. Component Wiring Locations - In/Out Header

3. Remove the thermostat temperature sensor by loosening the compression fitting nut. Re-route the sensor to left side of the heater. See **Figure 28**.

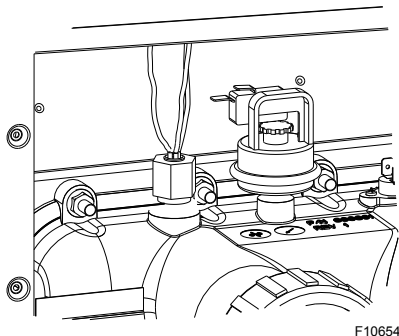


Figure 28. Thermostat Temperature Sensor Location

4. Remove (12) nuts holding the inlet/outlet and return headers to the tube sheets. Clean off tube sheet area where the gasket seats. Also clean off the header and the gasket. Apply a non-petroleum-based lubricant to the gasket such as Aqualube.

Re-attach the headers to the opposite sides, making sure they are installed in an upright position. Do not over-tighten. Torque should not exceed 7 ft/lb. See **Figure 27**.

5. Reconnect high limit, AGS, water pressure switch wires, and ProTek Shield bonding wire.
6. Insert the temperature sensor into the compression fitting, so that the sensor is flush with the top of the fitting. Tighten 1/2 turn past hand-tight.
7. Allow for water flow through the heater and check for leaks.
8. Re-attach access panels to the opposite sides.

For instructions on reversing the heat exchanger connections on ASME models, call your factory representative.

5. ELECTRICAL WIRING

NOTE: If it is necessary to replace any of the original wiring, use 105°C wire or its equivalent, and/or 150°C wire or its equivalent, like the original wiring.

⚠ WARNING: Digital heaters are factory-wired for 240 VAC, 1Ph, 60Hz power supply. **DO NOT** attempt to operate at 208 VAC.

The standard field-wiring connection is on the right side of the heater.

To wire the heater from the left side, follow these steps:

1. Remove the two (2) screws that hold the front door to the heater. Remove and set aside door for better access to wiring.
2. Remove the four (4) screws that hold down the junction box to the sway brace.
3. Remove the transformer cover located on the far right by removing one (1) screw.
4. Remove the two (2) screws that hold down the transformer.
5. Remove the one (1) screw that holds down the ground wires.
6. Disconnect P6 connector from PC board.
7. Remove transformer from its current location and relocate it on the far left side of the heater.
8. Re-route all high-voltage wires and ground wires through the left jacket side of heater.
9. Re-install P6 connector, ground wires (SPG), transformer, junction box, front door, and plug right side with the left side's grommet plug.

NOTE: 7/8" diameter holes not utilized on jacket and control box can be used for fireman switch, auxiliary control interface or power vent (D-2) wiring.

Electrical Power Draw

CAUTION: Heater must be electrically grounded and bonded. Bonding lug is provided loose with the heater. Install bonding lug on lower right or left side of jacket as necessary for bonding the heater. Mounting hole is provided on the jacket.

NOTE: Failure to ground the heater electrically could affect the heater's electronics.

NOTE: See "Time Clock/Fireman's Switch" on page 28 for further instructions if using a time clock/fireman's switch.

The Electronic Intermittent Ignition Device automatically lights the pilot and main burners upon a call for heat. The heater is supplied with a dual-voltage transformer for 120 VAC or 240 VAC input power hookup.

When operating on 120VAC power, units draw 6 amps. When operating on 240VAC units draw 3 amps.

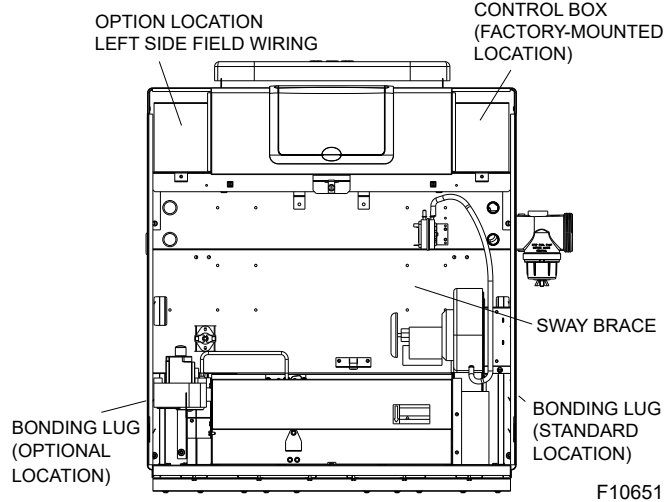


Figure 31. Heater Wiring Locations

Transformer Wiring

120 VAC Wiring

For 120 VAC input power to the unit, connect the black wire to the L1 or hot leg of the power supply. Connect the white wire to the "Ret" or neutral leg of the power supply. **There should be no connection to the red wires for 120 VAC operation.** Attach a wire nut to each red wire independently.

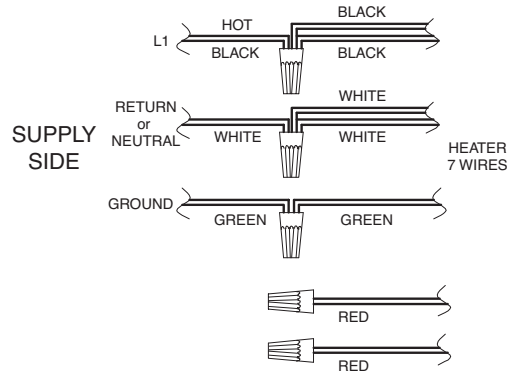


Figure 32. 120 VAC Wire Connection Models

240 VAC Wiring

For 240 VAC input power to the unit, connect the black wire to the L1 or hot leg of the power supply. Connect the red wire to the "L2" or second hot leg of the power supply. **There should be no connection to the white wires for 240 VAC operation.** Attach a wire nut to each white wire independently.

WARNING: DO NOT attempt to operate the heater at 208 VAC.

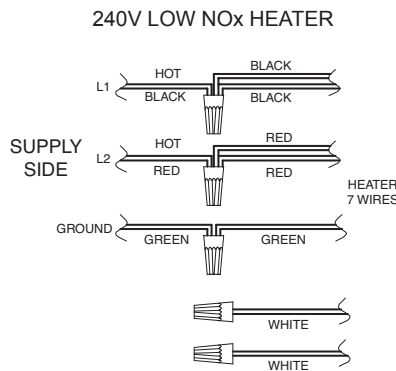


Figure 33. 240 VAC Wire Connection

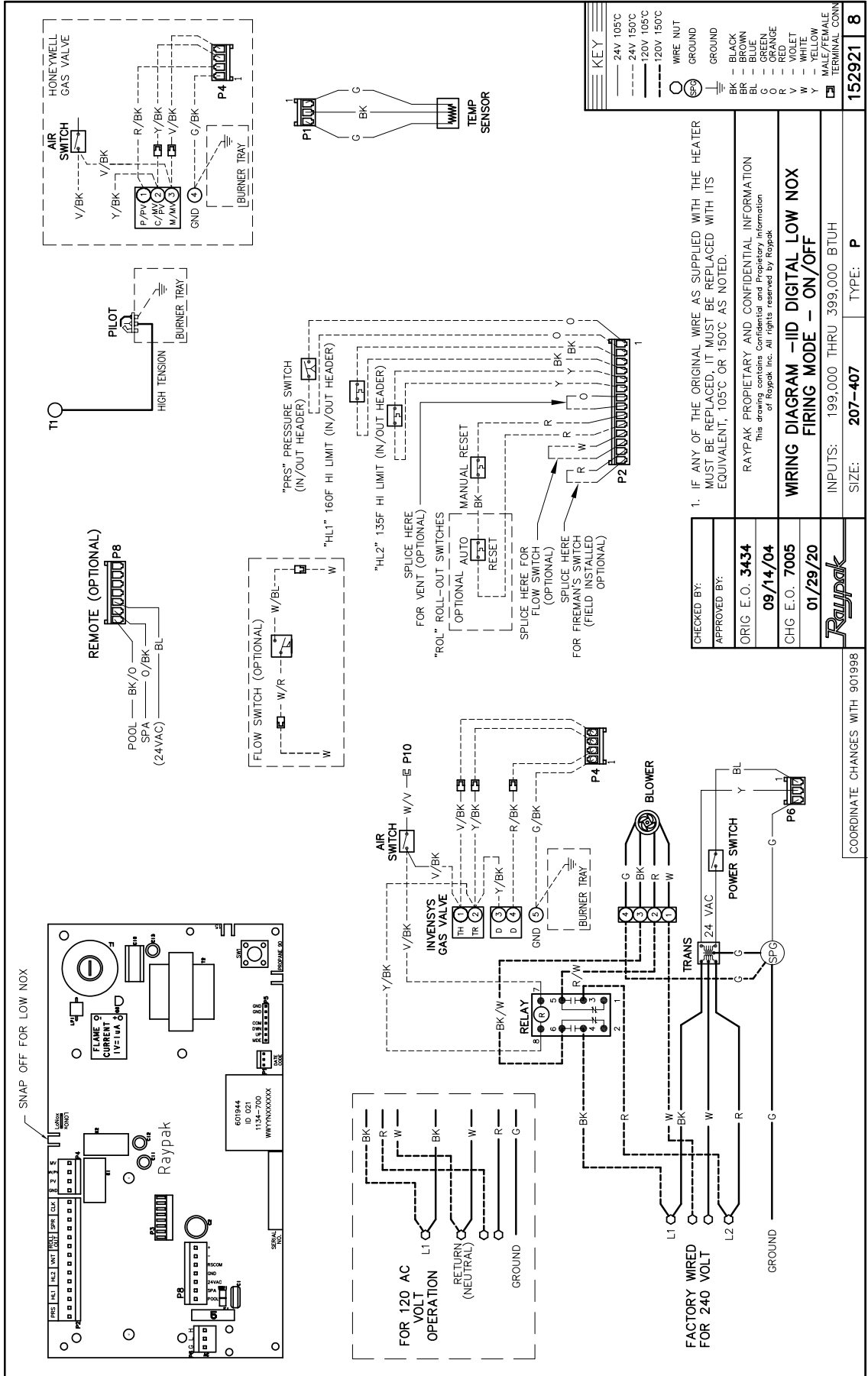
The heater must be electrically grounded and bonded in accordance with local codes, or, in the absence of local codes, with the latest edition of the National Electrical Code, ANSI/NFPA 70. (Canada - Canadian Electrical Code, CSA C22.1, Part 1 and Part 2.)

CAUTION: If the transformer's primary side is wired for 120 VAC and 240 VAC is applied, damage to the transformer and PC board may result. Such damages are not covered under manufacturer's limited warranty.

NOTE: Input power to the heater (120 or 240 VAC) can be supplied from the load (pump) side of time clock or directly from the GFCI power source. **It is preferred that full-time power be supplied to the heater from the GFCI power source, and that the heater be controlled by the fireman's switch connection or using a two or three-wire remote.** If using a switched GFCI power source, the heater could display false service indicators on the display panel if the pump is turned off.

6. WIRING DIAGRAM

PRELIMINARY



UNCONTROLLED DOCUMENT IF PRINTED

7. CONTROLS

PRELIMINARY

NOTE: Caution must be used to not damage controls or wiring.

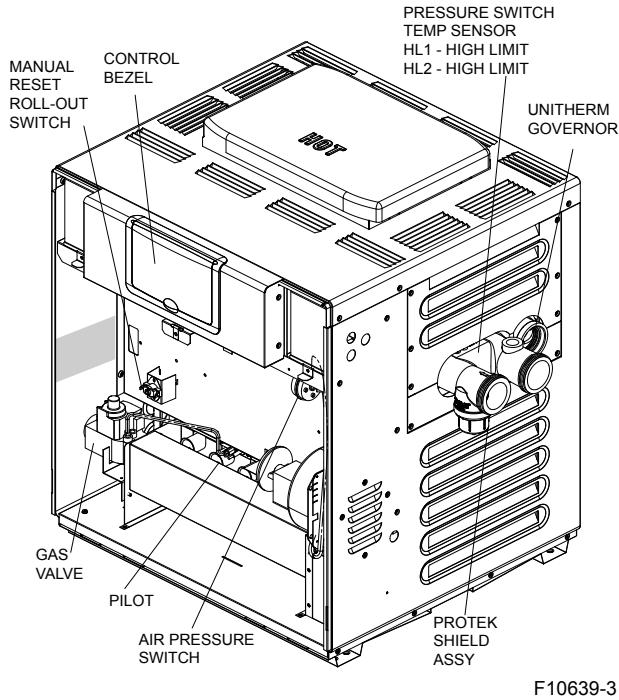


Figure 34. Location of Controls (View One)

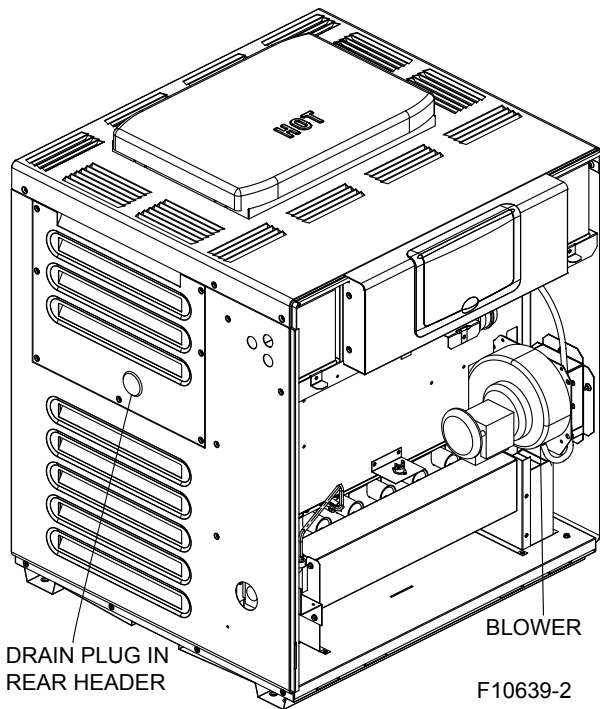


Figure 35. Location of Controls (View Two)

Control Panel Removal

1. Remove screw from front door. Set aside door for serviceability.
2. Remove (4) screws from sides of control panel.
3. Rotate control panel down until panel stops. Do not force.

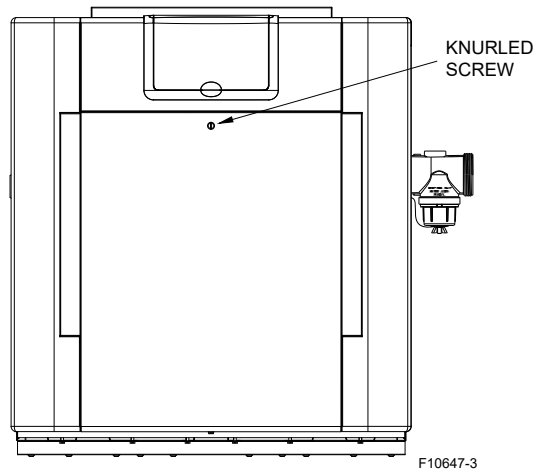


Figure 36. Knurled Screw Location

Control Adjustments

The pool heater touchpad, located on the upper front panel of the heater, allows the user to select either POOL or SPA operation, and to adjust the setpoint temperature. The LCD display window indicates the mode (OFF, SPA, POOL) and the actual water temperature. A manual power switch provided below the touchpad turns the control power ON or OFF. See **Figure 37**.

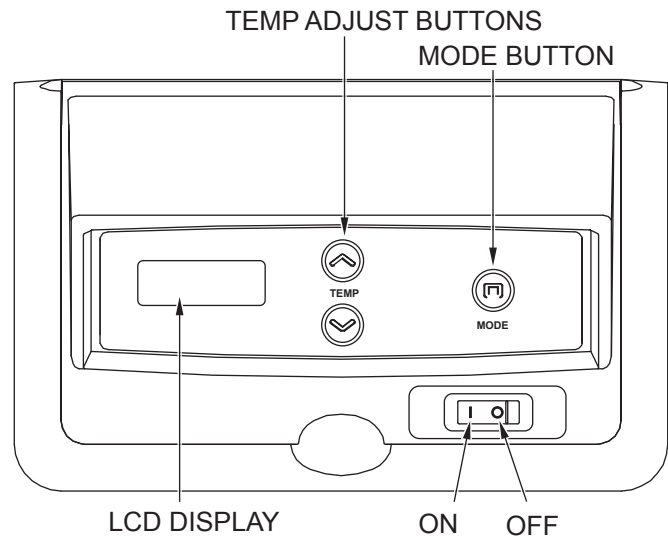


Figure 37. Control Adjustments

PRELIMINARY

Mode Button

The Mode button is used to select POOL or SPA operation. It allows the user to turn the heater off electronically. The LCD remains energized and displays OFF, while continues to show the actual water temperature.

Temp Buttons

If the heater is in POOL or SPA mode, the desired water temperature (SETPOINT) will be displayed and may be adjusted using the UP or DOWN buttons.

Operation

In the POOL or SPA modes, the actual water temperature is displayed along with the desired water temperature (SETPOINT). When the water temperature is above the setpoint, "Water Temp" will alternate with "No Demand." When the water temperature is below the setpoint and the heater is firing, "Water Temp" will alternate with "Heating."

To adjust the setpoint temperature, make sure the control is in the appropriate mode (POOL or SPA) and push the UP or DOWN buttons.

By default, the setpoint range is 50-104°F (10-40°C). See 24 to increase the MAX setting, if necessary.

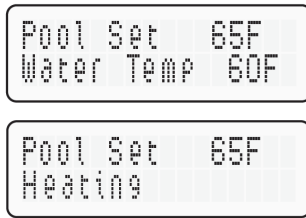


Figure 38. Alternating Display During Heating

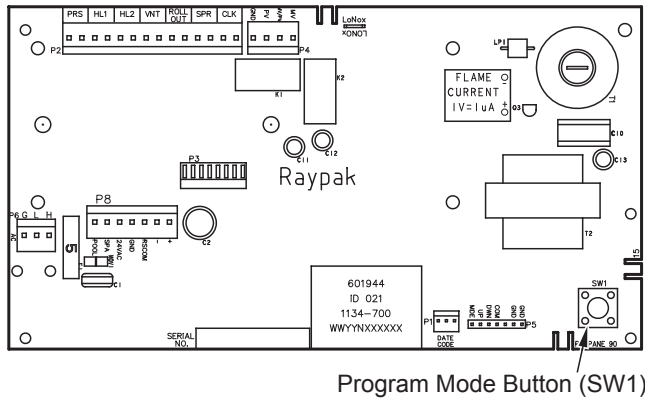


Figure 39. Thermostat Program Button (SW1)

Service Menu and Fault History

To access the Service Menu and fault history, press the MODE and UP buttons simultaneously for 3 to 5 seconds. The heater will continue to operate while in the Service Menu. The first screen displayed is the Flame Strength indicator, which indicates the pilot flame current using a bar graph and numerical display. A signal of less than 4 bars indicates a weak flame signal and may require service. Refer to the Troubleshooting section for possible causes and corrections.



Figure 40. Flame Strength Indicator

Press the DOWN button. The Supply Voltage screen indicates the voltage supplied to the control board. Normal readings range from 24 to 29 volts.

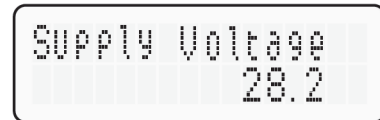


Figure 41. Supply Voltage Indicator

Press the DOWN button. The Run Time indicates the total hours of operation for the pool heater, as measured by the amount of time that the main gas valve has been powered. The Cycle count indicates the number of on/off cycles of the heater, as measured by the number of times the pilot valve has been powered.

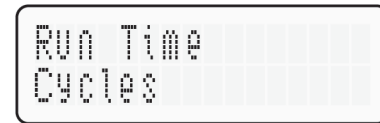


Figure 42. Run Time/Cycles

Press the DOWN button. The Fault History displays up to ten faults in memory. The order of the faults begins with "Fault Last," which is the most recent fault, and proceeds through ten most recent messages in chronological order. The second line of the display shows the fault message. If there are no faults in the history buffer, the second line reads "All Faults Clear."



Figure 43. Fault History Indicator

PRELIMINARY

Program Button

1. Remove the four screws holding the control cover, and swing the panel down so the back side of the board is visible. Locate the Program Mode button (SW1) as shown in **Figure 39**. Press and hold the button for 5-7 seconds until SET FACTORY DEFAULTS appears on the display. Release the program button.
2. Press the MODE button sequentially until the desired program event is reached. There are 5 different events that can be programmed. They appear in the sequence listed in **Figure 44** below.

Set Factory Defaults	Resets board to factory default settings.
Defaults Set	
Clear Faults	Resets faults in the History File.
Faults Cleared	
Fahrenheit	Change from Fahrenheit to Celsius.
Celsius	
Spa Max Temp 104F	SPA setpoint maximum adjustment.
Pool Max Temp 104F	POOL setpoint maximum adjustment.

Figure 44. Programmable Events

Set Factory Defaults

Refer to step one above to access the program screen. SET FACTORY DEFAULTS should appear on the screen. If it does not, press the MODE button until it appears on the digital display. Press and hold both UP and DOWN buttons for 5-7 seconds until DEFAULTS SET appears. This operation resets the operating program to its factory default values.

Both the POOL and SPA setpoints will revert to 65°F (18°C) and both POOL and SPA maximum temperature settings will be 104°F (40°C). The Control Lockout PIN will be cleared and the control will resume normal operation.

Clear Faults

Refer to step one above to access the program screen. Press the MODE button until CLEAR FAULTS appears on the digital display. Press and hold both UP and DOWN buttons for 5-7 seconds until FAULTS CLEARED appears. This operation resets the Fault History file to "0" and clears all the stored faults.

Fahrenheit or Celsius

Refer to step one above to access the program screen. Press the MODE button until FAHRENHEIT or CELSIUS appears on the digital display. The UP or DOWN buttons will select FAHRENHEIT or CELSIUS on the temperature display. Choose the desired temperature scale.

Spa Max Temp – Spa Setpoint Maximum Adjustment

Refer to step one above to access the program screen. Press the MODE button until SPA MAX TEMP appears on the digital display. Using the UP and DOWN buttons will change the Maximum Temperature Setting to your desired value. The control can be set for a maximum of 107°F (42°C).

Pool Max Temp – Pool Setpoint Maximum Adjustment

Refer to step one above access into the program screen. Press the MODE button until POOL MAX TEMP appears on the digital display. Using the UP and DOWN buttons will change the Maximum Temperature Setting to your desired value. The control can be set for a maximum of 107°F (42°C).

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, press the DOWN button and MODE button for 5 seconds. Choose a three digit PIN, using the UP and DOWN buttons to select the digits and the MODE button to lock in selections. Confirm your selection and record your PIN.

To unlock the controls, press any button to bring up the ENTER PIN menu. Enter the PIN that was used to lock the control. Note that power cycling will not clear the lockout. Successfully unlocking the control will display LOCKOUT CLEARED. Failure to enter the correct PIN will display INVALID PIN.

In the event that the user-selected PIN is lost or does not clear the Control Lockout, use the Program Button to SET FACTORY DEFAULTS. This will clear the PIN and allow normal operation and selection of a new PIN if desired. See the "**Program Button**" on page 24 for details.

NOTE: Both the POOL and SPA setpoints will revert back to 65°F (18°C) and the POOL and SPA maximum temperature settings will be 104°F (40°C). These setpoints will need to be readjusted to desired settings.

NOTE: The LCD temperature display may not agree with the temperature reading of your pool or spa thermometer. The heater reads the water temperature at the inlet. Due to the circulation characteristics of any pool or spa, the water temperature at the inlet to the heater may differ from that observed at a given location in the pool or spa.

Status and Diagnostics

The digital models are programmed to display a variety of status and diagnostic messages, depending on the operating conditions.

The following heat status messages are displayed in Pool, Spa, and Remote modes when there are no active fault conditions.

Display	Condition
Heating	Call for heat established, flame present.
Spark	Spark operating.
No Demand	Heat demand is satisfied.

Table M. Heater Status Messages - No Active Faults

The following conditions are displayed in Pool, Spa and Remote modes when there are active fault conditions.

Display	Condition
Sensor Failure	Thermistor temperatures disagree by more than 2°F (1°C)
Sensor Open	Thermistor sensor failed open. Below -20°F (-29°C).
Sensor Short	Thermistor sensor failed short. Above 217°F (103°C).
Flame w/o CFH	Board is sensing flame when both main and pilot valves are commanded shut.
MV Output Fault	Main gas valve output is not in commanded state.
Lo NOx Tab Fault	Voltage is sensed at the Lo NOx terminal on a non-Lo NOx Heater (Lo NOx tab is intact)
Internal Fault	Board fault, replace board.
EEPROM Fault	Memory fault, reset setpoints, replace board if fault does not clear.
Clock/Fireman Sw	Time clock/fireman switch circuit is open.
Low Temp Lockout	Water temperature below 36°F (2°C).

Table N. Heater Status Messages - Active Faults

The following conditions are displayed only while there is a demand for heat present.

Display	Condition
Water Sw Open	Water pressure switch open.
Vent/Field Sw #1	Vent spill switch/field switch #1 open.
Hi Limit 1 is open	High limit 1 open.
Hi Limit 2 is open	High limit 2 open.
Rollout Sw Open	Rollout switch open.

Display	Condition
Flow/Field SW #2	Field-supplied flow switch/field switch #2 open.
Fan Lockout	3 fan switch faults within same heat demand cycle, power must be cycled to clear the fault
Fan 5 Min Delay	Heater shut down for 5 minutes because LoNOx fan switch didn't close
Ignition Lockout (Propane Tab Broken)	Alternating with "No pilot sensed" - Pilot flame not established within the required time (15 sec or 90 sec). Alternating with "Main Ign Failure" - Pilot flame lost during the 8 second trial to ignite the main burner.
Ignition Failure (Propane Tab Not Broken)	Alternating with "No pilot sensed" - Pilot flame not established within 90 seconds.
Ign 60 min Delay (Propane Tab Not Broken)	Alternating with "Main Ign Failure" - Pilot flame lost 4 times within the 8 second trial to ignite the main burner. Heater will lockout for 60 minutes before retrying.

Table O. Heater Status Messages - Demand for Heat

High Limit Events

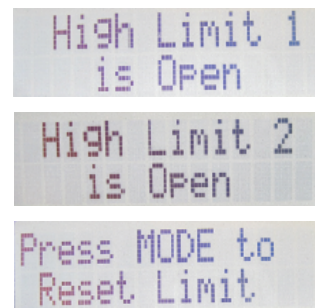


Figure 45. High Limit Events

HIGH LIMIT EVENT NOTICE
High Limit events require a manual-reset: To reset unit press MODE.
Helpful tips to prevent High Limit events:
1. Confirm circulation pump is running during heating cycle.
2. Pump should shutoff a minimum of 5 minutes after heating cycle ends.
Failure to follow these steps may cause residual heat buildup - triggering a High Limit event.
If issues persist, contact your service installer.

PRELIMINARY

Remote Control Installation and Operation

⚠ CAUTION: Before installing remote controls to the heaters, read the following: The digital thermostat model is remote-ready in most cases. The digital liquid crystal display (LCD) shows the actual pool temperature, operating status, and service codes. See Figure 45. The touch pad on the control panel allows you to select the desired pool or spa temperature. It also indicates when a remote system is controlling the heater by displaying **Remote** in the display. When connecting the heater to a remote system, identify whether it is a two- or three-wire remote system. Select the appropriate instruction listed below to properly install the remote to the heater.

Remote Operation

The heaters are equipped with the ability to work with external remote controls. The supplied 7-pin remote wiring connector supplies power out to either a toggle switch or the switch contacts of a third-party remote. The remote works by either making or breaking the circuit created by the remote wiring. Typically, a remote does not supply power to the heater, it only provides a switching function to turn the heater On or Off. **If your remote is supplying its own voltage to the heater, it will not work with this heater and may damage the digital circuit board.**

For operation of the heater using the onboard thermostatic controls with a time clock. See "Time Clock/Fireman's Switch" on page 28.

```
Off
Water Temp 69F
```

OFF Mode

```
Off
No Demand
```

```
Pool Set 65F
Water Temp 60F
```

Heating in the POOL Mode

```
Pool Set 65F
Heating
```

```
Spa Set 65F
Water Temp 60F
```

Heating in the SPA Mode

```
Spa Set 65F
Heating
```

```
Remote
Water Temp 69F
```

Remote Mode

```
Remote
No Demand
```

Figure 46. Remote Control Menu - Remote Operation

Activating the Remote

To activate or deactivate the remote function:

1. Press and hold the UP and DOWN arrow buttons for 3 to 5 seconds.

The second line of the display will alternate even when the unit is off ("No Demand").

NOTE: When in remote operation, the keypad mode and temp buttons are disabled.

```
Remote Pool 65F
Water Temp 60F
```

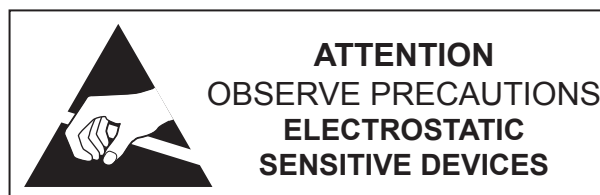
```
Remote Spa 65F
Water Temp 60F
```

```
Remote Pool 65F
Heating
```

```
Remote Spa 65F
Heating
```

Figure 47. Remote Control Menu - Activation

Remote Control Wiring



⚠ CAUTION: Electrostatic Discharge (ESD) damage can be caused by direct or indirect contact with the wiring or circuit board. When one walks to the heater area, an electrostatic charge accumulates on the body. Contact of a finger allows the body to discharge, possibly causing device damage. This damage can be limited if the service person discharges himself, following ESD preventive/removal practices, and holds on to the heater enclosure for 5 seconds before proceeding.

Important Installation Notes for Remote or External Wiring Configuration:

- Remote wiring must be run in a separate conduit.
- Remote wiring must not be run parallel to high voltage lines.
- For runs of under 30' (9 m), remote wiring should have stranded conductors with a minimum of 22 AWG, 600V, cable twisting 1.5" to 2.5" (3.8 to 6.4 cm) lay and jacketed.
- For runs over 30' (9 m), the conductors should be a minimum of 20 AWG, 600V, cable twisting 1.5" to 2.5" (3.8 to 6.4 cm) lay that is shielded and jacketed.
- Maximum cable length is 200' (61 m).
- For both two- and three-wire remote systems, the provided 7-pin wiring connector must be utilized.

PRELIMINARY

NOTE: The remote wires must be connected to the 7-pin connector before the connector is plugged into the board.

2-Wire Remote Control (On-Off)

This application assumes that only one heating function (pool or spa) is required.

1. Turn on power to the heater.
2. For a 2-Wire Remote Control from a remote without its own sensor, push the MODE button to the "POOL" or "SPA" mode and set the desired setpoint (eg. 102°F (39°C) for Spa).
3. For a 2-Wire Remote Control from a remote with its own sensor, push the MODE button "POOL" or "SPA" mode and set the temperature to the highest setting available on the control. The actual setpoint will be controlled by the remote control.
4. Turn the MODE button to "OFF" and remove power from the heater.
5. On the "Remote Interface Harness", connect the BLUE wire to one side of the "REMOTE" switch and connect the other side to either the ORANGE/BLACK wire for "SPA" operation or the BLACK/ORANGE wire for "POOL" operation. See **Figure 47**.

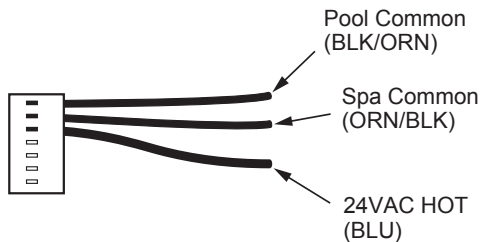


Figure 48. 7-Pin Remote Interface Harness

6. Attach wire nut on unused wire to the "Remote Interface Harness."
7. Install the "7-Pin Remote Interface Harness" to the P8 connector and turn power "ON" to the heater. See **Figure 48**.

For activation of the remote control, see section on page 26.

3-Wire Remote Control Using Three-Position Switch (Pool-Off-Spa, or Low-Off-High)

This application assumes that both heating functions (pool and spa) are required.

1. Turn on power to the heater.
2. Push the MODE button to the "POOL" or "SPA" mode and set the desired temperature for each (eg. 80°F (27°C) for Pool and 102°F (39°C) for Spa).
3. Turn the MODE button to OFF and remove power from the heater.

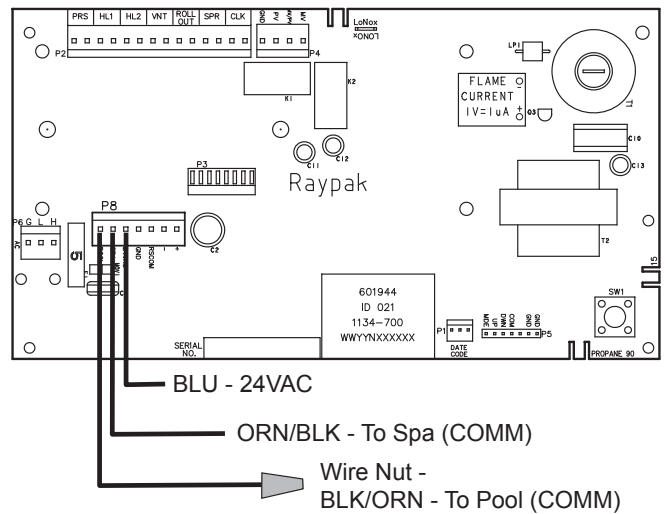


Figure 49. 2-Wire Remote Harness Installation on the P8 Connector of the Board

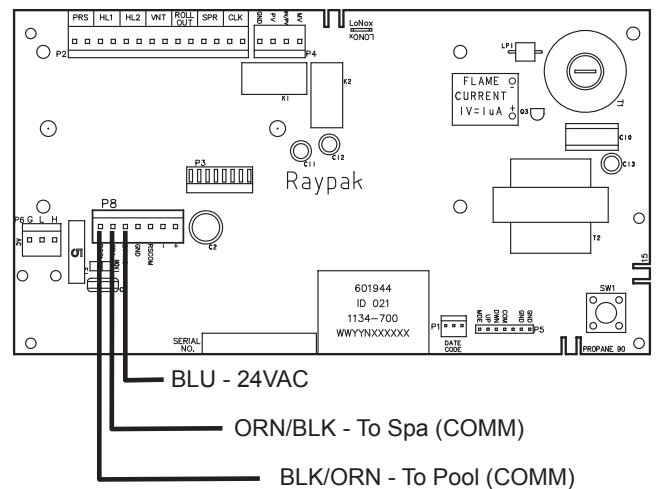


Figure 50. 3-Wire Remote Harness Installation on the P8 Connector of the Board

4. On the "Remote Interface Harness" connect the BLUE wire to one side of the "REMOTE" switch and connect the ORANGE/BLACK wire for "SPA" operation and the BLACK/ORANGE wire for the "POOL" operation. See **Figure 47**.
5. Install the "Remote Interface Harness" to the P8 connector and turn power ON to the heater. See **Figure 49**.

For activation of the remote control, see section on page 26.

Time Clock/Fireman's Switch

To operate the heater with a time clock, connect the timer to the fireman's switch connection in the heater's wiring. The time clock should be of the dual-switch type and set to shut off the call for heat to the pool heater 15 to 20 minutes prior to shutting down the pool pump.

The fireman's switch connection is located on the 14-pin header connected to the digital control board. Splice into the red wire jumper tagged "Where necessary add 'Fireman's' switch circuit here" to connect the time clock.

The fireman's switch connection must be a dry contact and must not supply power to the heater. Powering the fireman's switch connection externally may damage the heater, and is not covered by warranty.

Do not exceed 50' (15 m) of total wiring using 18 AWG stranded copper wire rated for 105°C minimum.

NOTE: When using a time clock, the heater will display "Clock/Fireman Sw" when the fireman's switch is open, indicating that the time clock has shut off the call for heat.

Water Pressure Switch

The water pressure switch ensures that the heater operates only when the filter pump is in operation. It is located on the In/Out header. It is factory-set at 1.75 PSI for deck level installation.

Water Pressure Switch Adjustment

When the heater is located below the level of the spa or pool, it may be necessary to adjust the pressure switch to compensate for the no-flow static head. If it is necessary to adjust the water pressure switch, do the following:

1. Make sure the pool filter is clean before adjusting the switch.
2. Set the heater control to the OFF mode.
3. Turn the filter pump ON and confirm that the pressure switch is closed (use a multimeter to check). If the pressure switch fails to close, either the switch setting is too high or not enough pressure is being supplied by the filter pump.
4. Turn the heater ON.
5. Manually turn the pressure adjustment knob clockwise until the heater shuts off. (A flat screwdriver may be necessary if knob is too tight.)
6. Slowly turn the adjustment knob counter-clockwise until the heater calls for heat again.
7. Turn an additional 1/2 turn counter-clockwise.
8. While the heater is running, check the adjustment by turning the pump off and on several times. The burners should shut off immediately when the pump is turned off. If it does not, repeat the above steps until proper operation is observed.

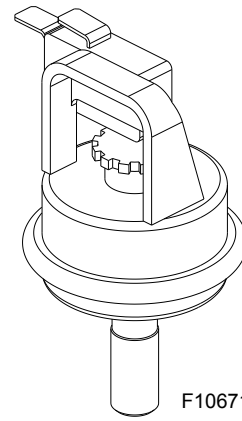


Figure 51. Water Pressure Switch Assembly

NOTE: The sheet metal access panels should be in place at all times to protect the water pressure switch from rain and other environmental factors.

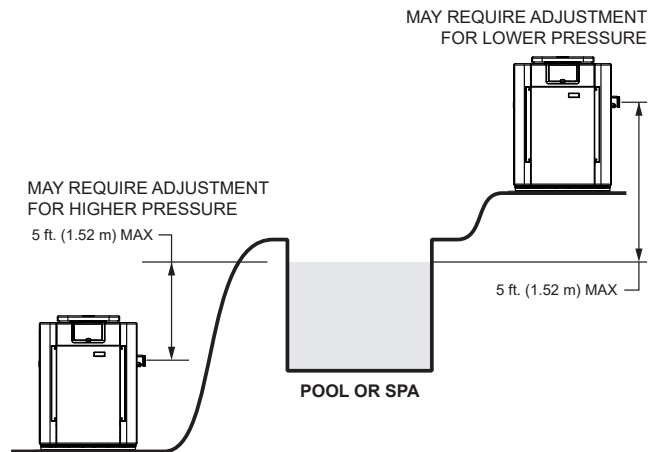


Figure 52. Pressure Switch Adjustment Requirements

NOTE: If heater is installed outside of the limits shown, a higher pressure rated (11 psi / 76 kPa) switch may be used. A flow switch, mounted and wired adjacent to the heater, may be used in place of the factory-mounted pressure switch. See "ILLUSTRATED PARTS LIST" on page 40 for 11 psi / 76 kPa water pressure switch.

Two-Speed Pumps

In some cases, the flow on the low-speed is insufficient to operate the heater. This is apparent when the water pressure switch cannot be further adjusted or if the heater makes banging noises or shuts off on high limit. In these cases, the pump must be run at high speed when heating the water.

CAUTION: Do not operate the heater without the function of a properly adjusted water pressure switch or flow switch.

Flame Roll-Out Safety Switch

Heaters are equipped with a thermal cutoff device to prevent flame roll-out in the event the heat exchanger becomes blocked. It is a “manual reset” type roll-out switch that must be reset by a service technician after any over-temperature conditions have been fixed. Excessive restriction in the heat exchanger flue passage may cause the switch to disable the heater.

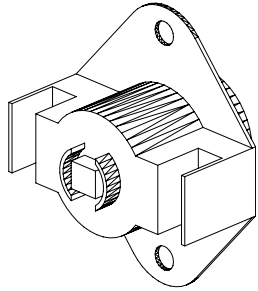


Figure 53. Flame Roll-out Switch – Manual Reset

High Limits

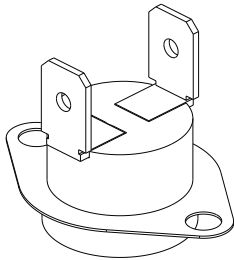
The heater is equipped with two high limits.

On units with polymer headers, both are automatic and are located in the inlet/outlet header. Both are set at 135°F (57°C).

On units with bronze header, both are located on the inlet/outlet headers. HL1 is manual reset and set to open at 160°F (71°C). HL2 is automatic and set to open at 135°F (57°C).

NOTE: An erratic high limit is often characteristic of an internal heat exchanger problem, e.g. scale build-up, defective bypass. Refer to "TROUBLESHOOTING" on page 35.

AUTO RESET



MANUAL RESET
(ASME ONLY)

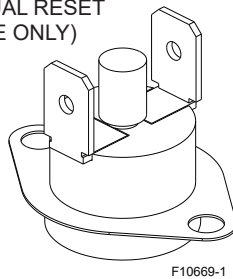


Figure 54. High Limit Switches

High Limit Removal

1. Shut off main electrical power switch to heater.
2. Remove inlet/outlet sheet metal access panel.
3. Remove defective high limit and replace with the correct, new high limit.
4. Replace access panel.

Pilot Safety

The heater employs a pilot safety which closes the main gas valve within 8/10ths of a second whenever the pilot flame is interrupted. The pilot flame is automatically lit when the device is powered. The heater performs its own safety check and opens the main valve only after the pilot is proven to be lit.

Burner Tray Removal

1. Shut off main electrical power switch to heater.
2. Shut off gas upstream of heater.
3. Remove front door.
4. Disconnect gas line from gas valve.
5. Remove (2) screws that mount burner tray to the base of the unit, (2) screws that mount the blower box to the burner tray, and (1) screw that secures the anti-rotation bracket to the heater.
6. Disconnect wires that terminate at gas valve.
7. Unscrew (4) screws that secure the control box.
8. Disconnect pilot wire from the pilot assembly.
9. Disconnect wire connector from the combustion blower.
10. Carefully slide out the burner tray assembly.
11. Reverse above procedure to reinstall.

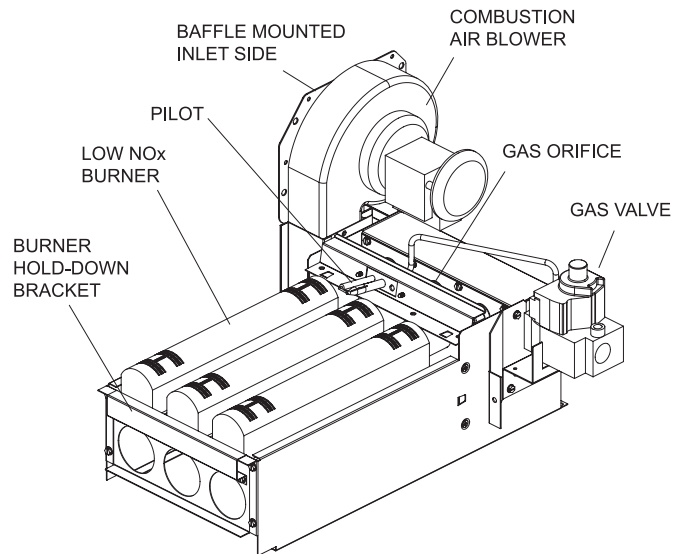


Figure 55. Burner Tray Assembly

PRELIMINARY

Gas Valve Removal

1. Shut off gas supply to the heater. Remove gas piping to gas valve inlet.
2. Remove burner tray, following above procedure.
3. Disconnect, pilot tubing from gas valve.
4. Remove (2) screws that mount anti-rotation bracket to the burner tray.
5. Turn vertical gas pipe from manifold slightly and unscrew gas valve.
6. Reverse above procedure to reinstall.

Main Burner And Orifice Removal

1. Remove burner tray, following above procedure.
2. Remove pilot. See pilot removal procedure.
3. Remove (8) total screws from the burner hold-down brackets, front and rear of tray.
4. Remove (8) total screws from the left and right sides of the manifold assembly. Detach the air/gas manifold assembly from the burner tray assembly.
5. Remove burners by raising them straight up off the rear end slots.
6. Use a long 9/16" socket wrench to remove orifice from the gas manifold.
7. Reverse above procedure to reinstall.

Pilot Removal

1. Disconnect pilot tubing from gas valve.
2. Remove the pilot wire from the pilot assembly.
3. Remove (2) screws that mount the pilot assembly to the burner tray.
4. Pull the pilot assembly downwards and outwards.
5. Reverse above procedure to reinstall.

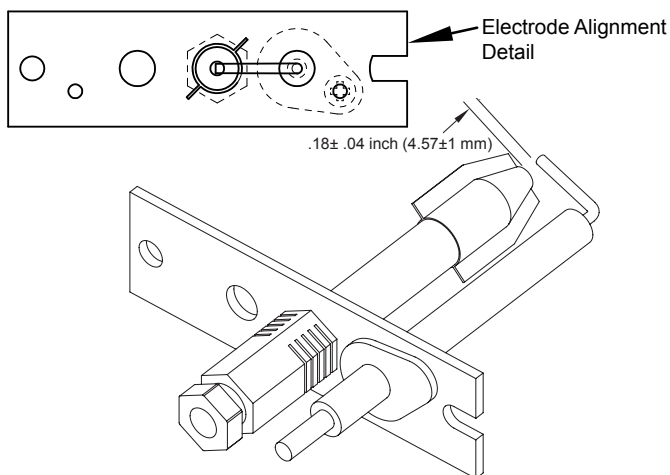


Figure 56. Lo NOx Pilot

Combustion Blower Removal

1. Remove the (2) screws that secure the blower box to the burner tray.
2. Remove (2) screws that mount the blower box to the base of the heater.
3. Disconnect wire connector from the combustion blower.
4. Carefully remove blower box with combustion blower.
5. Remove (2) screws that secure combustion blower to blower box.
6. Reverse above procedure to reinstall.

Heat Exchanger Removal

1. Shut water, gas and electricity off, close valves and relieve pressure, then remove relief valve. Remove side access panels.
2. Remove top jacket holding screws.
3. Remove rear top panel.
4. Remove screws mounting the rain shield to the rear panel. Also remove the screws that mount the rain shield to the sway brace. Remove rain shield.
5. Remove the four (4) screws holding down the flue collector. Remove the flue collector.
6. If a ProTek Shield Assy is attached to the heater; disconnect flange nuts on Inlet/Outlet header, remove ProTek Shield Assy bonding wire from heat exchanger stud, loosen union(s) at gas pipe and slide heater away from piping.
7. Lift heat exchanger straight up using caution not to damage refractory.
8. Reverse above procedure to reinstall. Make sure the insulation strips are properly replaced on top of the refractory retainer.

Tube Cleaning Procedure

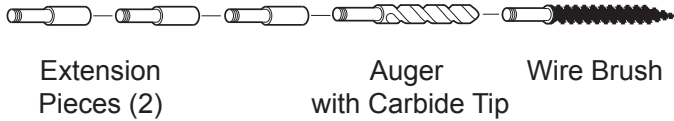
Establish a regular inspection schedule, the frequency depending on the local water conditions and the severity of service. Do not let the tubes clog up solidly. Clean out deposits over 1/16" in thickness.

The heater may be cleaned from the return header side, without breaking pipe connections. It is preferable, however, to remove both headers for better visibility through the tubes and to be sure the ground-up lime dust does not get into the system. Note that you do not remove the top panel or the heater exchanger, generally.

After reaming, mount the wire brush in place of the auger and clean out debris remaining in the tubes.

Another method is to remove the heat exchanger, ream tubes and immerse heat exchanger in non-inhibited de-scale solvent for severe scale build-up.

PRELIMINARY



Extension Pieces (2)

Auger with Carbide Tip

Wire Brush

Figure 57. Tube Cleaning Kit

Desooting Procedure

⚠ WARNING: Soot Is Combustible. Exercise Extreme Care.

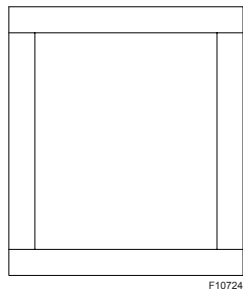
Soot will clog areas between fins and cause eventual tube failure. Any sign of soot at the base of the burners or around the outer jacket indicates a need for cleaning.

1. Remove top and flue collector from cabinet.
2. Remove "V" baffles from heat exchanger.
3. Remove burner tray. See 29.
4. If a ProTek Shield Assy is attached to the heater, remove ProTek Shield Assy bonding wire from heat exchanger stud.
5. Remove heat exchanger from the heater and wash with a garden hose, making sure soot is removed from spaces between fins.
6. Reverse above procedure to reinstall.

NOTE: In extreme cases it may be necessary to do steam cleaning at the local car wash. DO NOT WIRE BRUSH.

Combustion Chamber Removal

To remove combustion chamber, you must first have removed the heat exchanger.



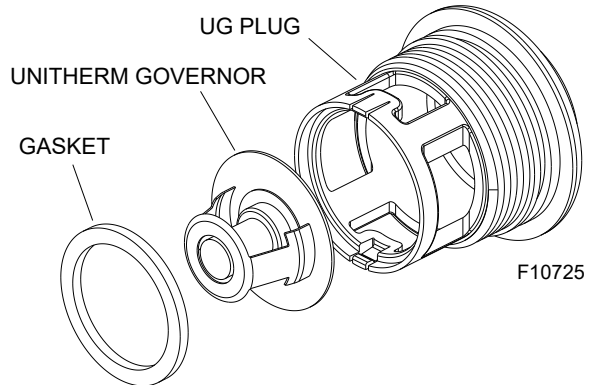
F10724

Figure 58. Refractory Panels

⚠ WARNING: When removing the burners or heat exchangers, take precautions to avoid creating airborne dust and avoid inhaling airborne fibers. When cleaning spills, use wet sweeping or High Efficiency Particulate Air (HEPA) filtered vacuum to minimize airborne dust. Use feasible engineering controls such as local exhaust ventilation or dust collecting systems to minimize airborne dust. Wear appropriate personal protective equipment including gloves, safety glasses with side shields, and appropriate NIOSH-certified respiratory protection, to avoid inhalation of airborne dust and airborne fiber particles.

Unitherm Governor (U.G.) Replacement

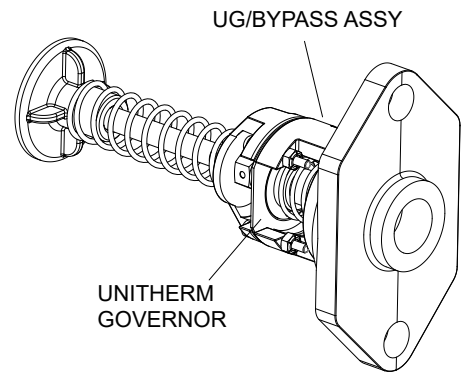
1. Shut water, gas and electricity off, close valves and relieve pressure.
2. Drain heat exchanger.
3. Remove retainer plug located next to the outlet pipe connection on polymer header models.
4. Unsnap old U.G. to remove from retainer plug. Snap in new U.G.
5. Reinstall retainer plug, taking care to lubricate gasket with a non-petroleum based grease such as AquaLube.



F10725

Figure 59. Unitherm Governor – Polymer

To test the operation of the Unitherm Governor, place in hot water (over 110°F [43°C]) and watch for movement against spring. If there is no movement, replace unit.



F10642-2

Figure 60. Unitherm Governor/Bypass Valve Assy – ASME

NOTE: The U.G. on ASME models (bronze headers) can only be replaced by replacing the entire Unitherm Governor/Bypass Valve Assembly.

8. OPERATING INSTRUCTIONS

Before Start-Up

Burners

Keep heater area clear and free from combustibles, flammable liquids and chemicals. Do not obstruct the flow of combustion and ventilation air.

Water

Water must be flowing through the heater during operation. Ensure that the system is filled with water and that the pump is operating.

Start-Up Procedures

Your pool/spa heater has been designed for years of safe and reliable pool/spa water heating. It is available with only electronic ignition. ASME-certified units typically used in commercial applications, are also available. This manual provides installation, operation, maintenance, and service information for these heaters.

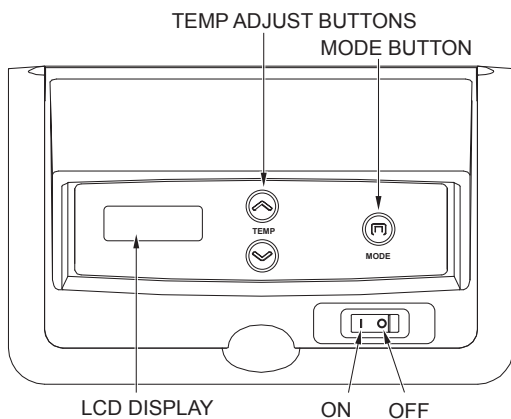


Figure 61. Heater Control Toggle Switch

If your digital heater has been installed correctly, operating the heater is an easy task. The upper front panel of the heater contains the control center that 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 65°F (18°C) to 104°F (40°C). See **Figure 60** for location of toggle switch to turn the heater On and Off.

See **Section 7** for additional details about the use of the controls in the Control Adjustments subsection.

After Start-Up

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

WARNING: Should overheating occur or the gas supply fail to shut off, turn off the manual gas control to the appliance.

PRELIMINARY

Visual Inspection

Flames can be observed through the opening below the plenum. Flame color is blue and evenly spread on the top surface of the burner. At least every three months a visual inspection should be made of the burners.

Water Pressure Switch

A water pressure switch is provided in the heater to shut off the burners in the event that water supply is interrupted. It is very important to verify that the switch electrically opens and shuts off the gas valve when water flow to the heater is interrupted. Otherwise rapid and severe damage will likely occur to the heater.

The water pressure switch should be checked and adjusted for proper operation by a qualified service person at the time of installation and periodically checked thereafter. Refer to "**Water Pressure Switch Adjustment**" on page 28.

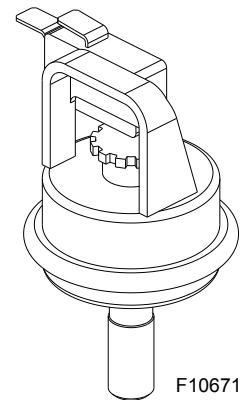


Figure 62. Water Pressure Switch

WARNING: Operation of the heater without water circulation will cause rapid and severe damage to the heater. Such damage is not covered under warranty.

Blower Adjustment

This heater is equipped with a combustion air plate (baffle) mounted on the air intake to the combustion air blower. The baffle has a hole that is utilized to control the air inlet to the blower.

When the combustion air setting is proper, there will be some lifting of the flames on some areas of the burner deck under cold-start conditions. After about five minutes of operation, the flames should settle down and blue tips should become visible. Lifting of flames beyond five minutes would indicate too much combustion air.

PRELIMINARY

OPERATING INSTRUCTIONS AND SHUT-OFF PROCEDURES
ALL MODELS
(AUTOMATICALLY-LIGHTED PILOT)

FOR YOUR SAFETY READ BEFORE LIGHTING

- A. This appliance is equipped with an ignition device which automatically lights the pilot. Do not try to light the pilot by hand.
- B. BEFORE OPERATING, smell all around the appliance area for gas. Be sure to smell near the floor because some gas is heavier than air and will settle on the floor.

WHAT TO DO IF YOU SMELL GAS:

- *Do not try to light any appliance.
- *Do not touch any electric switch; do not use any phone in your building.
- *Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.

*If you cannot reach your gas supplier, call the fire department.

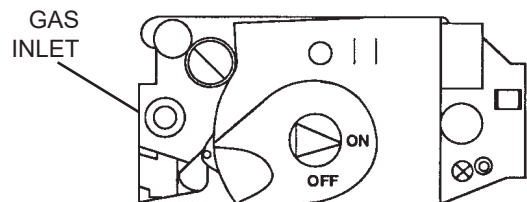
- C. Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, do not try to repair it. Call a qualified service technician. Force or attempted repair may result in a fire or explosion.
- D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

LIGHTING INSTRUCTIONS

1. **STOP!** Read the safety information above.
2. Set the thermostat to the lowest setting.
3. Turn off all electrical power to the appliance.
4. This appliance is equipped with an ignition device which automatically lights the pilot. Do not try to light the pilot by hand.
5. Remove heater door panel.
6. Turn gas control knob clockwise ↻ to "OFF".
7. Wait 5 minutes to clear out any gas. If you then smell gas, **STOP!** Follow "B" in the safety information above. If you don't smell gas, go to the next step.
8. Turn gas control knob counter-clockwise to "ON."
9. Replace heater door panel.
10. Turn on all electrical power to the appliance.

11. Set thermostat to desired setting.
12. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier.

HONEYWELL VR8340 GAS VALVE IID



TO TURN OFF GAS TO APPLIANCE

1. Set the thermostat at the lowest setting.
2. Turn off all the electrical power to the appliance if service is to be performed.
3. Remove heater door panel.
4. Turn gas control knob clockwise ↻ to "OFF". Make sure knob rests against stop.
5. Replace heater door panel.

9. MAINTENANCE AND CARE

Cold Weather Operation

▲ WARNING: Check the heater for possible rodent nests after long periods of non-use.

To be followed one month after start-up and then semi-annually.

1. Inspect top of heater and drafhood for soot, a sticky black substance around finned tubes and "V" baffles, and open flue gas passageways. Any visible soot should be cleaned for proper operation.

▲ CAUTION: Soot may be combustible. Wet sooted surfaces completely prior to cleaning. Do not use steel wire brush.

2. The Low NOx burners and orifice areas should be inspected annually. Dirt and debris can affect the operation of the heater and could damage the burners or prevent the heater from firing. DO NOT clean the burners with a wire brush.
3. Inspect and operate all controls, gas valve and pressure relief valve (if equipped).
4. Make visual check of the burner and pilot flames. Flame color is blue and evenly spread on the top surface of the burner.
5. On indoor heaters, clean room intake openings to ensure adequate flow of combustion and ventilation air.

▲ CAUTION: Combustion air must not be contaminated by corrosive chemical fumes which can damage the heater. Such damage is not covered under warranty.

6. Keep area around heater clear and free from combustible materials, gasoline and other flammable and corrosive vapors and liquids.

If Heater Will Not Fire:

If you have no electrical power, it may be that your "circuit breaker" has tripped. Try re-setting it.

If you have electrical power but the heater will not fire check the following or see **"TROUBLESHOOTING"** on page 35:

1. The time clock must be in the ON position.
2. Your pump strainer basket may be full. If so remove debris.
3. Your filter may be dirty. If so, backwash or clean filter. (To tell if your filter is dirty, look to see if the filter pressure is higher than usual).
4. The pump may have lost its prime and be running dry. Check the pressure on the filter. If there is no pressure; then you are not moving water (or your gauge is broken). Try to get the pump to run at its normal flow rate.

Important Freeze Information

MODERATE CLIMATE: Heater operation can continue during short-term cold spells. When temperatures are between 0°F (-18°C) and 32°F (0°C), flow (continuous pump operation) must be maintained.

▲ CAUTION: Do not use the heater to maintain water temperatures just above freezing or for freeze protection. When heater is used during freezing weather, care must be taken to avoid freeze-ups. Continuous pump operation is a must. Additional protection may be required. The heater is not warranted against freeze-ups.

COLD CLIMATE: Prolonged operation with water temperatures below 50°F (10°C) is not recommended. When starting the heater with water temperatures below 50°F (10°C), operate the heater continuously until higher temperatures are reached. Operating the heater for prolonged periods with pool water below 50°F (10°C) can seriously damage the heater, and is not covered by the warranty. For cold climate areas, please follow the winterizing procedures listed below.

Winterizing the Pool and Spa Heater

Heaters installed outdoors in freezing climate areas may be shut down for the winter. Observe the following procedure for winterizing the heater:

1. Turn off gas valve, manual gas valve, and electrical supply to the heater.
2. Remove the ProTek Shield Assy (if attached). Remove the heat exchanger inspection panel on the side opposite water piping to gain access to the drain plug on the return header. Open drain plug on return header. See **Figure 62** and **Figure 63**.

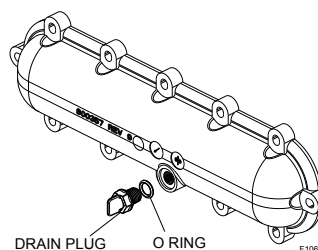


Figure 63. Return Header Drain Plug, Polymer ("P" Prefix Model)

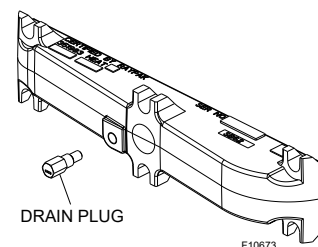


Figure 64. Return Header Drain Valve, Bronze ("B" Prefix Models)

10. TROUBLESHOOTING PRELIMINARY

IMPORTANT NOTICE: These instructions are intended for the use of qualified personnel who are specifically trained and experienced in the installation of this type of heating equipment and related system components. Installation and service personnel may be required by some states to be licensed. Persons not qualified shall not attempt to install this equipment nor attempt repairs according to these instructions.

Problem	Possible Cause	Corrective Action															
Harmonics, or whining noise	Unitherm governor inoperative.....	Check movement by putting in hot water (110°F [40°C] or higher)															
	*Debris or restriction in system.....	Locate the restriction and remove. Flush system and clean															
	*Debris in gas line.....	Remove debris or blow out gas line															
	Low flow.....	Scale forming in heat exchanger - clean heat exchanger and check pool pH and total alkalinity															
	When the above listed recommendations do not generate acceptable results, the following service kits are recommended:																
	<table border="1"> <thead> <tr> <th>1st recommendation: 105F UG Service Kit</th> <th>2nd recommendation: HX Tube Damper Coil Service Kit</th> <th>Used on Models</th> </tr> </thead> <tbody> <tr> <td>018759F</td> <td>019104F</td> <td>206-207</td> </tr> <tr> <td>018759F</td> <td>019203F</td> <td>266-268</td> </tr> <tr> <td>018758F</td> <td>019204F</td> <td>336-337</td> </tr> <tr> <td>018758F</td> <td>019205F</td> <td>406-408</td> </tr> </tbody> </table>	1st recommendation: 105F UG Service Kit	2nd recommendation: HX Tube Damper Coil Service Kit	Used on Models	018759F	019104F	206-207	018759F	019203F	266-268	018758F	019204F	336-337	018758F	019205F	406-408	
1st recommendation: 105F UG Service Kit	2nd recommendation: HX Tube Damper Coil Service Kit	Used on Models															
018759F	019104F	206-207															
018759F	019203F	266-268															
018758F	019204F	336-337															
018758F	019205F	406-408															
Heater going on and off continuously	Dirty filter	Clean or replace filter															
	Low water level in pool	Raise water level															
	External bypass setting out of adjustment.....	Adjust bypass															
	Pressure switch out of adjustment.....	Adjust pressure switch															
Liming or scale forming in exchanger	Pool water.....	See Water Chemistry on 5															
	Bypassing too much water	Inspect bypass for movement, if no movement, replace															
	Unitherm governor not functioning	Replace if no movement when heated															
Sooting	High flow rates.....	Reduce by adding manual bypass valve Adjust manual bypass valve until heater outlet water temp is between 105°F and 110°F (40°C and 43°C)															
	Unitherm governor inoperative	Check movement by putting in hot water (110°F [43°C] or higher). If no movement, replace															
	*Air starvation	Refer to installation instructions															
	*Improper venting	Follow recommended installation instructions															
	*Insects or debris clogging burner intake ports.....	Clean burners															
Pilot outage or "Weak Flame" signal	Low gas pressure	Adjust gas pressure															
	Restricted/dirty pilot	Clean pilot and/or electrode															
Yellow lazy flame	Low gas pressure	Adjust gas pressure															
	*Insects or debris clogging burner intake ports.....	Clean burners															
Outer jacket very hot (paint blistered)	*Broken refractory caused by shipping damage or improper combustion.....	Replace refractory panels															
	Excessive sooting of heat exchanger	Determine cause of sooting and correct															

* Indicates symptom which usually occurs on initial start-up.

TROUBLESHOOTING (CONT:)

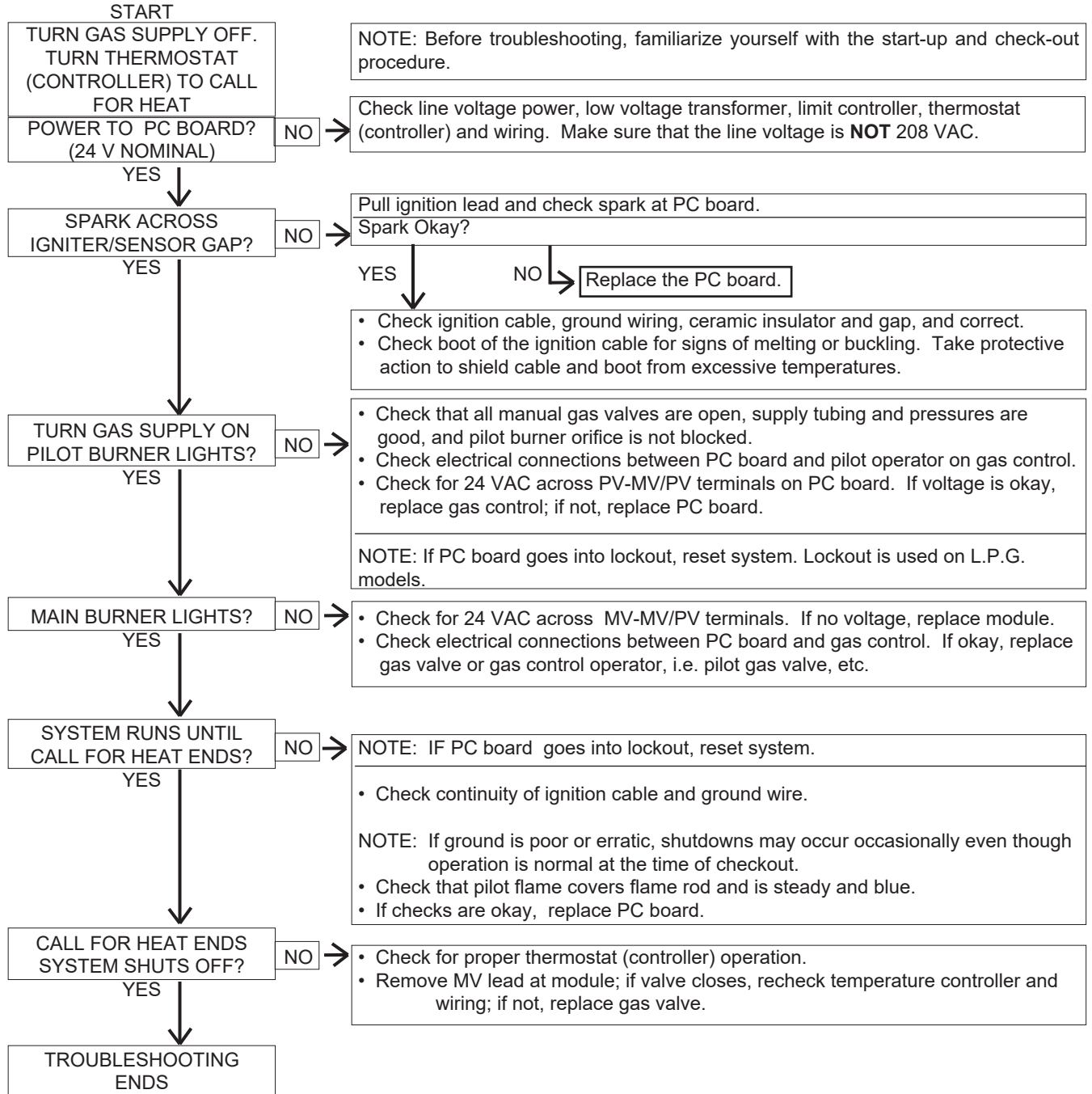
Problem	Possible Cause	Corrective Action
Takes too long to heat pool or spa	Under-sized heater	Calculate heating capacity of heater $\frac{\text{Htr. output (BTUH)}}{\text{Pool gallonage} \times 8.33}$ or refer to heater sizing chart This does not take into account heat loss due to weather
	Filter not running long enough.....	Reset time clock
	Dirty filter	Clean filter
	Gas line or meter undersized	Refer to installation instructions
Leaking at heat exchanger	Overacid	Replace heat exchanger and maintain proper water chemistry
Gasket brittle and leaking - (overheated)	Heater running after pump shuts off.....	See Pressure Switch Adjustment
	Refractory damage	Replace refractory
	Sooted heater	Determine cause of sooting and correct
Combustion fan not running "Fan 5 min Delay" signal or "Fan Lockout" signal	Fan relay.....	Replace fan relay
	Fan	Loose connection or failed motor
	Burned motor.....	Incorrect wiring, replace blower
	Air pressure switch	Replace air switch

PRELIMINARY

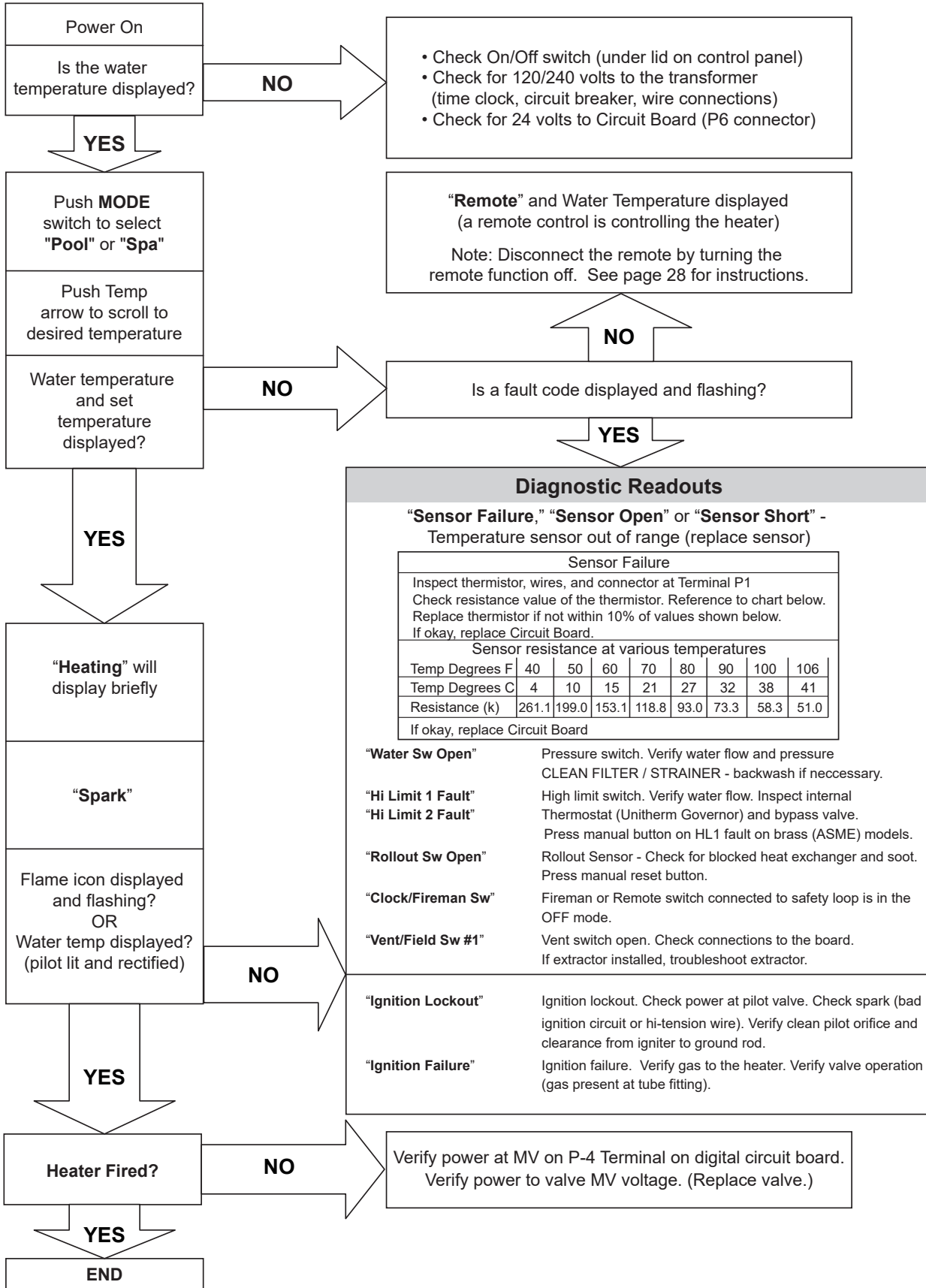
Digital - Flow Chart

⚠ WARNING: HIGH VOLTAGE
For qualified technicians ONLY

NOTE: Some heaters may be equipped with an ignition module that shuts off pilot gas if pilot fails to light. To reset, interrupt power to heater.



Control Logic - Flow Chart



Diagnostic Readouts

“Sensor Failure,” “Sensor Open” or “Sensor Short” - Temperature sensor out of range (replace sensor)

Sensor Failure								
Inspect thermistor, wires, and connector at Terminal P1								
Check resistance value of the thermistor. Reference to chart below.								
Replace thermistor if not within 10% of values shown below.								
If okay, replace Circuit Board.								
Sensor resistance at various temperatures								
Temp Degrees F	40	50	60	70	80	90	100	106
Temp Degrees C	4	10	15	21	27	32	38	41
Resistance (k)	261.1	199.0	153.1	118.8	93.0	73.3	58.3	51.0
If okay, replace Circuit Board								

“Water Sw Open” Pressure switch. Verify water flow and pressure
CLEAN FILTER / STRAINER - backwash if necessary.

“Hi Limit 1 Fault” High limit switch. Verify water flow. Inspect internal
Thermostat (Unitherm Governor) and bypass valve.

“Hi Limit 2 Fault” Press manual button on HL1 fault on brass (ASME) models.

“Rollout Sw Open” Rollout Sensor - Check for blocked heat exchanger and soot.
Press manual reset button.

“Clock/Fireman Sw” Fireman or Remote switch connected to safety loop is in the
OFF mode.

“Vent/Field Sw #1” Vent switch open. Check connections to the board.
If extractor installed, troubleshoot extractor.

“Ignition Lockout” Ignition lockout. Check power at pilot valve. Check spark (bad
ignition circuit or hi-tension wire). Verify clean pilot orifice and
clearance from igniter to ground rod.

“Ignition Failure” Ignition failure. Verify gas to the heater. Verify valve operation
(gas present at tube fitting).

11. REPLACEMENT PARTS

NOTE: 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.

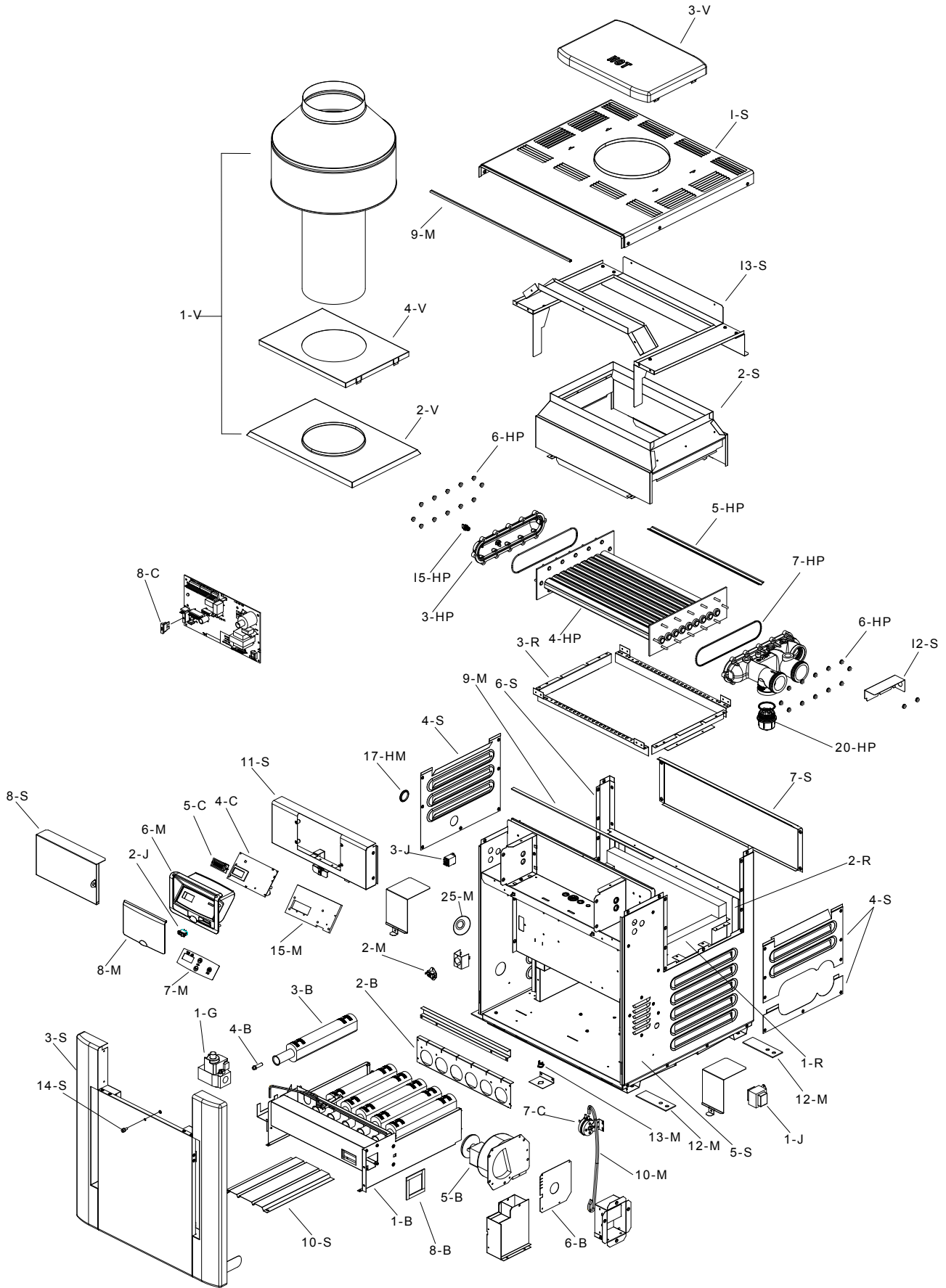
Any part returned for replacement under standard company warranties must be properly tagged with a return parts tag, completely filled in with the heater serial number, model number, etc., and shipped to the Company freight prepaid.

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.

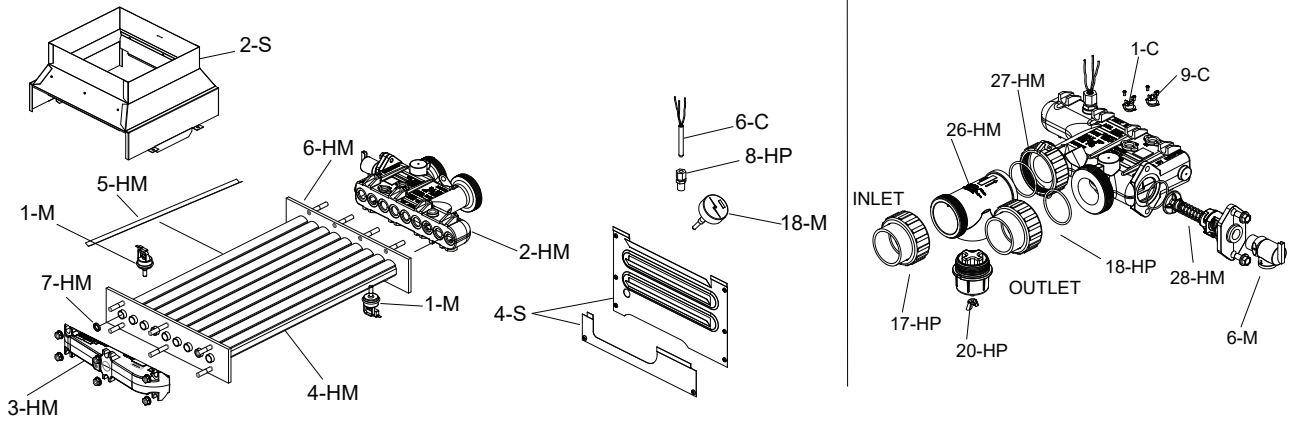
MANUFACTURER:

2151 Eastman Avenue
Oxnard, Ca 93030

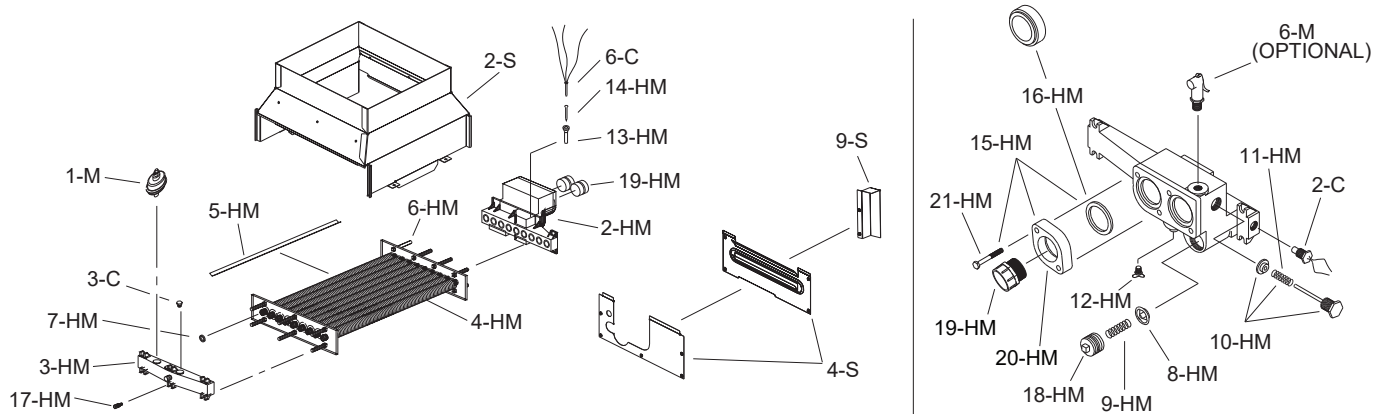
12. ILLUSTRATED PARTS LIST



PRELIMINARY

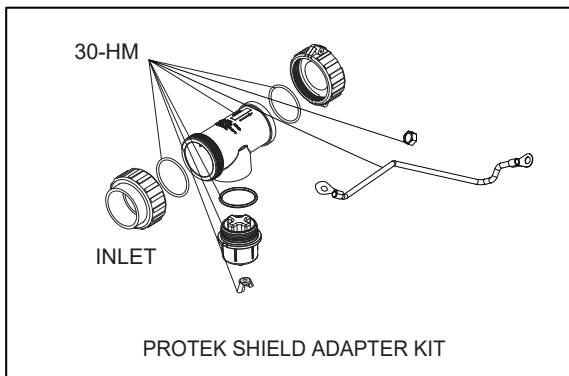
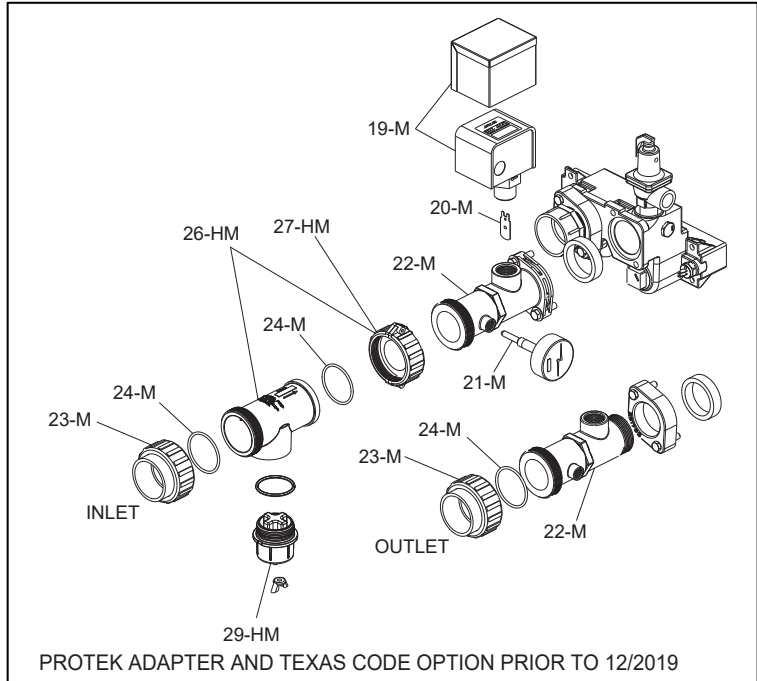
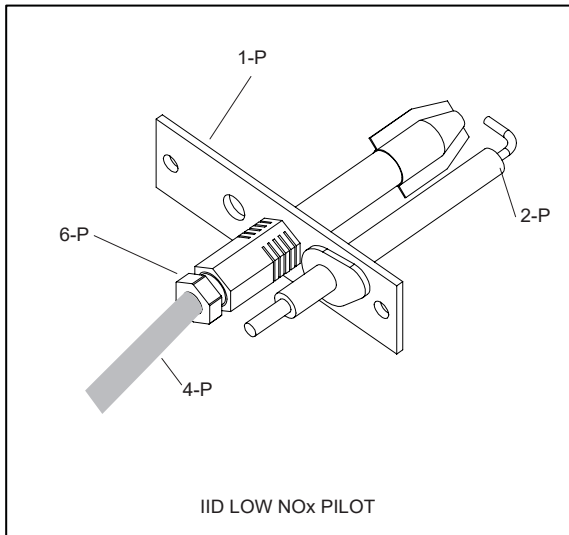
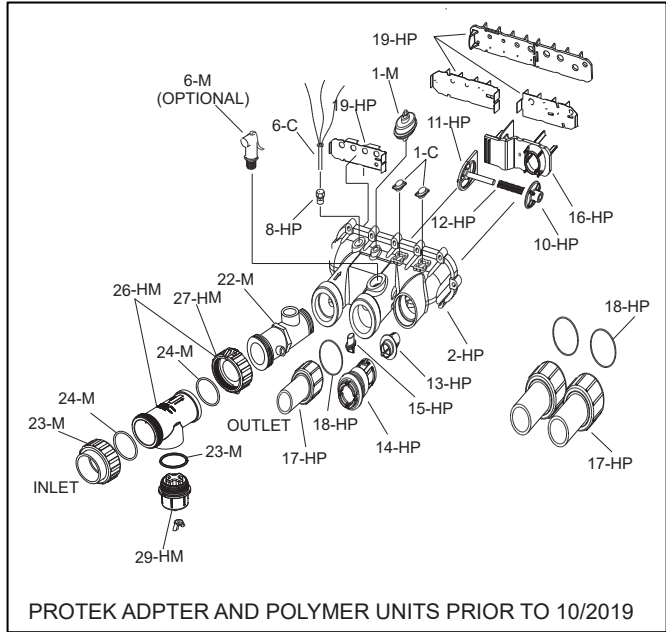
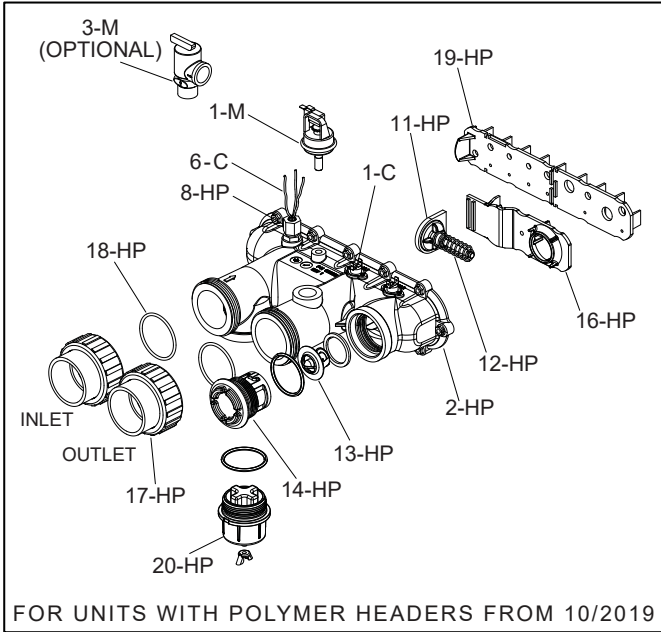


FOR UNITS WITH ASME BRONZE HEADERS FROM 12/2019
 (PROTEK SHIELD NOT AVAILABLE ON ASME HEATERS UNTIL END Q3 2020)



FOR UNITS WITH ASME CAST IRON HEADERS PRIOR TO 12/2019

PRELIMINARY



PRELIMINARY

CALL OUT	DESCRIPTION	207A	266L/267A	337A	399L/407A
BB	BURNER TRAY***				
1-B	Burner Tray w/Burners (0-5000)	010343F	010344F	010345F	010346F
	Burner Tray w/o Burner (0-5000)	010084F	010085F	010086F	010087F
2-B	Burner Hold Down Kit	010254F	010255F	010256F	010257F
3-B	Burner	017045F/3	017045F/4	017045F/5	017045F/6
4-B	Burner Orifice Nat. #26 (0-5000)*	351632/3	351632/4	351632/5	351632/6
	Burner Orifice Nat. #27 (above 5000 ft.)*	351633/3	351633/4	351633/5	351633/6
8-B	Combustion Air Seal Gasket	016361F	016361F	016361F	016361F
5-B	Blower	010042F	010042F	010042F	010042F
7-B	Cooling Fan	010871F	010871F	010871F	010871F
6-B	Combustion Air Orifice Plate	010338F	010339F	010340F	010341F
C	CONTROLS				
1-C	High Limit Auto Reset 135°F Deg Surface Mount	006725F	006725F	006725F	006725F
2-C	AGS 135°F (Auto Gas Shutoff) - Red Epoxy - prior to 12/2019	600892B	600892B	600892B	600892B
3-C	High Limit 140°F - Black Epoxy - prior to 12/2019	600893B	600893B	600893B	600893B
4-C	P. C. Board/Control	013464F	013464F	013464F	013464F
5-C	LCD Display				
	Units manufactured from 5/2011	013640F	013640F	013640F	013640F
8-C	Fuse 5 AMP	013733F	013733F	013733F	013733F
6-C	Temperature Sensor	009577F	009577F	009577F	009577F
7-C	Blower Pressure Switch	008062F	008135F	010354F	010355F
9-C	Thermostat Reset Surface Mount (ASME Only)	018304F	018304F	018304F	018304F
G	GAS VALVE				
1-G	Combination Valve - Gas On/Off -Nat	010329F	010329F	010329F	010329F
HP	HEAT EXCHANGER - POLYMER				
1-HP	Heat Exchanger Assy Copper				
	Units manufactured from 10/2019	017994F	017995F	017996F	017997F
	Units manufactured prior to 10/2019	010043F	010044F	010045F	010046F
	Heat Exchanger Assy Cupronickel ***				
	Units manufactured from 10/2019	017998F	017999F	018000F	018001F
	Units manufactured from 7/2013 thru 9/2019	014926F	014927F	014928F	014929F
	Units manufactured prior to 7/2013	010356F	010357F	010358F	010359F
2-HP	Inlet/Outlet Header Complete				
	Units manufactured from 10/2019	017959F	017959F	017959F	017959F
	Units manufactured from 7/2013 thru 9/2019	006827F	006827F	006827F	006827F
	Inlet/Outlet Header (Includes 6-HP)				
	Units manufactured from 10/2019	017965F	017965F	017965F	017965F
	Units manufactured from 7/2013 thru 9/2019	014648F	014648F	014648F	014648F
3-HP	Return Header (Includes 6-HP)	015095F	015095F	015095F	015095F
4-HP	Tube Bundle Copper **	010059F	010060F	010061F	010062F
	Tube Bundle Cupronickel **				
	Units manufactured from 7/2013	014930F	014931F	014932F	014933F
	Units manufactured prior to 7/2013	010364F	010365F	010366F	010367F
5-HP	Baffle (Copper Heat Exchanger)	010038F	005261F	010040F	010041F
	Baffle (Cupronickel Heat Exchanger)				
	Units manufactured from 6/2013	014934F	014935F	014936F	014937F
	Units manufactured prior to 6/2013	010038F	005261F	010040F	010041F
6-HP	Flange Nut Kit	008259F	008259F	008259F	008259F
7-HP	O Ring Gasket (2)	006713F	006713F	006713F	006713F
8-HP	Sensor Adapter Digital Electronic	006714F	006714F	006714F	006714F
9-HP	Bypass Kit	006715F	006715F	006715F	006715F
10-HP	Bypass Valve	006716F	006716F	006716F	006716F
11-HP	Bypass Dam / Shaft	006717F	006717F	006717F	006717F
12-HP	Bypass Spring (All Sizes Included)	006718F	006718F	006718F	006718F
13-HP	Unitherm Governor	006719F	006719F	006719F	006719F
14-HP	Unitherm Governor Plug	006720F	006720F	006720F	006720F
15-HP	Drain Plug	006721F	006721F	006721F	006721F
16-HP	Inlet/Outlet Header Dam	N/A Use 19-HP	N/A Use 19-HP	N/A Use 19-HP	N/A Use 19-HP
17-HP	2" CPVC Connector & Nut (2)	006723F	006723F	006723F	006723F
18-HP	O Ring (2)	006724F	006724F	006724F	006724F
19-HP	Inlet/Outlet Header Baffle w/Header Dam	006826F	006826F	006826F	006826F
20-HP	ProTek Shield™ Assy	017960F	017960F	017960F	017960F

*FOR INSTALLATIONS AT OVER 5,000 FEET ABOVE SEA LEVEL, CONSULT THE FACTORY

**WARNING: The Hydraulic conditions or water chemistry that caused the tube bundle to fail have very likely also damaged the bypass valve and Unitherm Governor. We recommend you replace the Unitherm Governor and inspect the bypass assembly. Failure to do so could cause premature failure of this replacement part.

***Unless otherwise specified at the time the order is placed, replacement burner trays will be configured for natural gas at sea level.

PRELIMINARY

CALL OUT	DESCRIPTION	207A	267A	337A	407A
HM	HEAT EXCHANGER - METAL				
1-HM	Heat Exchanger Assy Copper ASME				
	Units manufactured from 12/2019 (Bronze)	017983F	017984F	017985F	017986F
	Units manufactured prior to 12/2019 (Cast Iron)	010051F	016193F	010053F	010054F
	Heat Exchanger Assy Cupronickel ASME				
	Units manufactured from 12/2019 (Bronze)	017987F	017988F	017989F	017990F
	Units manufactured prior to 12/2019 (Cast Iron)	010360F	010361F	010362F	010363F
2-HM	Inlet/Outlet Header ASME Complete				
	Units manufactured from 7/2020 (Bronze)	018740F	018740F	018741F	018741F
	Units manufactured from 12/2019 (Bronze)	017961F	017961F	017992F	017992F
	Units manufactured prior to 12/2019 (Cast Iron)	006730F	006730F	006730F	006730F
	Inlet/Outlet Header ASME				
	Units manufactured from 7/2020 (Bronze)	018739F	018739F	018739F	018739F
	Units manufactured from 12/2019 (Bronze)	017966F	017966F	017966F	017966F
	Units manufactured prior to 12/2019 (Cast Iron)	012319F	012319F	012319F	012319F
15-HM	Inlet & Outlet Flange (Complete) - prior to 12/2019	003766F	003766F	003766F	003766F
20-HM	Inlet & Outlet Flange - prior to 12/2019	016166F	016166F	016166F	016166F
21-HM	Flange Bolts - prior to 12/2019	016167F	016167F	016167F	016167F
16-HM	Flange Gasket 1 1/2" Connections - prior to 12/2019	062236B	062236B	062236B	062236B
	Flange Gasket 2" Connections - prior to 12/2019	800080B	800080B	800080B	800080B
3-HM	Return Header ASME				
	Units manufactured from 7/2020 (Bronze)	018738F	018738F	018738F	018738F
	Units manufactured from 12/2019 (Bronze)	017973F	017973F	017973F	017973F
	Units manufactured prior to 12/2019 (Cast Iron)	006731F	006731F	006731F	006731F
4-HM	Tube Bundle Copper ASME **				
	Units manufactured from 12/2019	017974F	017975F	017976F	017977F
	Units manufactured prior to 12/2019	010055F	006733F	010057F	010058F
	Tube Bundle Cupronickel ASME **				
	Units manufactured from 12/2019	017978F	017979F	017980F	017981F
	Units manufactured prior to 12/2019	010368F	010369F	010370F	010371F
5-HM	Baffle	010038F	005261F	010040F	010041F
6-HM	Stud Bolt Kit				
	Units manufactured from 12/2019	017982F	017982F	017982F	017982F
	Units manufactured prior to 12/2019	007870F	007870F	007870F	007870F
7-HM	Header Gasket (9)	800014B	800014B	800014B	800014B
8-HM	Unitherm Governor	062234B	062234B	062234B	062234B
9-HM	U.G. Retainer Spring	013792F	013792F	013792F	013792F
18-HM	U.G. Plug	013738F	013738F	013738F	013738F
10-HM	Bypass Valve	016194F	016194F	016194F	016194F
11-HM	Bypass Spring				
	Units with Plastic Bypass Valve (Units manufactured from 3/5/17 to 12/19)	016196F	016196F	016196F	016196F
	Units with Bronze Bypass Valve (Units manufactured to 3/5/17)	013794F	013794F	013794F	013794F
12-HM	Drain Valve	013793F	013793F	013793F	013793F
13-HM	Sensor Well	003765F	003765F	003765F	003765F
14-HM	Well Retaining Clip	300203	300203	300203	300203
17-HM	Rear Drain Plug & Cover	005264F	005264F	005264F	005264F
19-HM	Adapter CPVC 2"	005393F	005393F	005393F	005393F
26-HM	Adapter - ProTek Shield (Includes 27-HM) from end of Q3 2020	018006F	018006F	018006F	018006F
27-HM	Nut - ProTek Shield Adapter - 2-Pc from end of Q3 2020	018007F	018007F	018007F	018007F
28-HM	U.G./Bypass Assembly (Units manufactured from 12/2019)	017958F	017958F	017962F	017962F
29-HM	ProTek Shield Assembly from end of Q3 2020	018766F	018766F	018766F	018766F
30-HM	ProTek Shield Adapter Assembly - from end of Q3 2020	018006F	018006F	018006F	018006F

**WARNING: The Hydraulic conditions or water chemistry that caused the tube bundle to fail have very likely also damaged the bypass valve and Unitherm Governor. We recommend you replace the Unitherm Governor and inspect the bypass assembly. Failure to do so could cause premature failure of this replacement part.

PRELIMINARY

CALL OUT	DESCRIPTION	207A	266L/267A	337A	399L/407A
J	CONTROL BOX				
1-J	Transformer 120/240/24V	006736F	006736F	006736F	006736F
2-J	Rocker Switch	009493F	009493F	009493F	009493F
3-J	Relay Low Nox	008784F	008784F	008784F	008784F
M	MISCELLANEOUS COMPONENTS				
1-M	Pressure Switch 1.75 PSI	006737F	006737F	006737F	006737F
	Pressure Switch 1.75 PSI Complete Kit (Units manufactured 12/2019 to 6/2020)	018297F	018297F	018297F	018297F
	Pressure Switch 11 PSI Special-See Water Pressure Switch Adj.	009133F	009133F	009133F	009133F
2-M	Roll-Out Switch 300°F	006035F	006035F	006035F	006035F
3-M	PRV - 75 PSI	017957F	017957F	017957F	017957F
4-M	Delimiting Kit	052871F	052871F	052871F	052871F
5-M	Wire/Harness	010347F	010347F	010347F	010347F
6-M	Control Bezel (Includes Switch Decal)				
	Units manufactured from 5/2011	013491F	013491F	013491F	013491F
	Units manufactured prior to 5/2011	009491F	009491F	009491F	009491F
7-M	Switch/Decal-Membrane				
	Units manufactured from 5/2011	013492F	013492F	013492F	013492F
	Units manufactured prior to 5/2011	009492F	009492F	009492F	009492F
8-M	Control Bezel Cover	009487F	009487F	009487F	009487F
9-M	Gasket Insulation (Swaybrace & Jacket Top)	010350F	010350F	010350F	010350F
10-M	Blower / Air Pressure Switch Sample Tube	010348F	010348F	010348F	010348F
11-M	Touch-up Paint				
	Green	750125	750125	750125	750125
	Dark Gray	750126	750126	750126	750126
	Cool Dark Gray	750256	750256	750256	750256
	Warm Dark Gray	750258	750258	750258	750258
12-M	Tie Down Bracket (Optional)	011636	011636	011636	011636
13-M	Roll-Out Switch 250°F (Optional)	011745F	011745F	011745F	011745F
	Roll-Out Switch 250°F (Upgrade)	011733F	011733F	011733F	011733F
14-M	Texas Code Option (ASME Only) - Units manufactured prior to 12/2019				
	Flanged Connection (Not Shown)	015889F	015889F	015889F	015889F
	NPT Connection (Shown)	015890F	015890F	015890F	015890F
18-M	T & P Gauge	014647F	014647F	014647F	014647F
19-M	2" CPVC Connector (Outlet Plumbing)				
	NPT Connection	013795F	013795F	013795F	013795F
	Flanged Connection	015883F	015883F	015883F	015883F
20-M	2" CPVC Connector & Nut (2)	006723F	006723F	006723F	006723F
21-M	O Ring (2)	006724F	006724F	006724F	006724F
15-M	PC Board Shield (Optional)	015557F	015557F	015557F	015557F
25-M	Gas Line Finish Flange	016160F	016160F	016160F	016160F
P	PILOT				
1-P	Pilot Nat. IID Low Nox	010232F	010232F	010232F	010232F
2-P	Pilot Electrode	N/A	N/A	N/A	N/A
3-P	Pilot Mounting Bracket	010233F	010234F	010235F	010236F
4-P	Pilot Tube	011926F	011926F	011926F	011926F
5-P	Hi Tension Wire IID	010349F	010349F	010349F	010349F
6-P	Adapter Nut (Metric)	011927F	011927F	011927F	011927F

PRELIMINARY

CALL OUT	DESCRIPTION	207A	266L/267A	337A	399L/407A
R	REFRACTORY				
1-R	Refractory Common (Left & Right)	010079F	010079F	010079F	010079F
2-R	Refractory Uncommon (Front and Rear)	010080F	010081F	010082F	010083F
3-R	Refractory Retainer Kit	010262F	010263F	010264F	010265F
S	SHEETMETAL				
1-S	Jacket Top (Louvered)	010047F	010048F	010049F	010050F
2-S	Flue Collector (Units with Polymer Header)	010063F	010064F	010065F	010066F
	Flue Collector (Units with Metal Header)	010067F	010068F	010069F	010070F
3-S	Door Assy.				
	Raypak				
	Cool Dark & Warm Dark Gray	013871F	013872F	013873F	013874F
	Green	010267F	010268F	010269F	010270F
	Rheem				
	Cool Dark & Warm Dark Gray	013875F	013876F	013877F	013878F
	Green	010271F	010272F	010273F	010274F
	Ruud				
	Cool Dark & Warm Dark Gray (Units mfd after to 9/2012)	013871F	013872F	013873F	013874F
	Warm Dark Gray (Units manufactured prior to 9/2012)	013879F	013880F	013881F	013882F
	Green	010271F	010272F	010273F	010274F
	Jacuzzi		N/A	N/A	016701F
14-S	Screw & Retainer	006744F	006744F	006744F	006744F
4-S	Access Panel Set (3 Pcs. Units with Polymer Header)	010311F	010311F	010311F	010311F
	Access Panel Set -ASME				
	Access Panel Set (3 Pcs. for BR Header) - from 12/2019	017967F	017967F	017967F	017967F
	Access Panel Set (3 Pcs. for CI Header) - prior to 12/2019	010312F	010312F	010312F	010312F
5-S	Jacket Side Panel Right	010313F	010313F	010313F	010313F
6-S	Jacket Side Panel Left	010314F	010314F	010314F	010314F
7-S	Jacket Rear Panel (2 Pcs.)	010315F	010316F	010317F	010318F
8-S	Poolstat Cover/Lock	009505	009505	009505	009505
9-S	High Limit Cover - prior to 12/2019	010319F	010319F	010319F	010319F
10-S	Base Heat Shield - prior to 10/2019	010320F	010320F	010320F	010320F
11-S	Up Front Control Panel				
	Green	010321F	010322F	010323F	010324F
	Cool Dark Gray	013887F	013888F	013889F	013890F
	Warm Dark Gray	013891F	013892F	013893F	013894F
12-S	High Limit Shield	010342F	010342F	010342F	010342F
13-S	Weather Shield	010325F	010326F	010327F	010328F
V	VENTING				
1-V	Indoor Stack Kit (Includes inner adapter panel)	009838	009839	009840	009841
	Outdoor Stack Kit (Includes inner adapter panel)	009834	009835	009836	009837
2-V	Stack Adapter	010330F	010331F	010332F	010333F
4-V	Outer Stack Adapter	011461F	011462F	011463F	011464F
3-V	"Pagoda" Top				
	Cool Dark Gray	013883F	013884F	013885F	013886F
	Green	010334	010335	010336	010337

