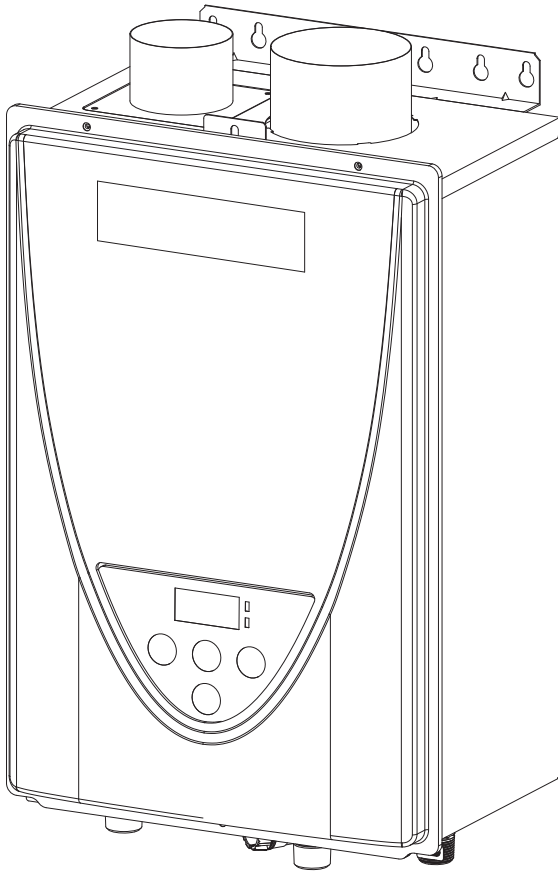


# Hydro Shark 115 PLUS Gas Micro Boiler Installation Manual and Owner's Guide



## NG/LP

*Boiler is set up for  
NG, includes LP  
Conversion Kit*



**Do not return. Damages or repairs call  
800-805-5384**

M-F 8 AM - 5 PM

Sat 8 AM - Noon

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

The **Hydro Shark 115 PLUS** Gas Micro Boiler is a compact and powerful residential unit with a versatile BTU modulating range.

### Featuring

- Flow Activated: .75 GPM
- Wall Hung
- Copper Heat Exchanger
- Temperature Range: 99°-140° F
- Freeze Protection
- Power Vent
- CAT III Stainless Steel Venting
- Built in Boiler Remote
- Includes LP Conversion Kit

-Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

-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.

-Installation and service must be performed by a qualified installer, service agency or the gas supplier.

**Hydro Shark**

# CONTENTS

## Installation Manual/Owners Guide

SPECIFICATIONS.....	4
INTRODUCTION.....	5
SAFETY GUIDELINES.....	6
INSTALLATION (GENERAL).....	7
CLEARANCES.....	9
HIGH ALTITUDE INSTALLATIONS.....	10
VENTING INSTRUCTIONS (GENERAL).....	11
GAS SUPPLY & PIPE SIZE.....	13
PRESSURE RELIEF VALVE/ELECTRICAL CONNECTIONS.....	15
APPLICATIONS.....	16
INITIAL OPERATION.....	18
OPERATING SAFETY.....	19
NORMAL OPERATION.....	21
TEMPERATURE SETTINGS.....	22
FLOW/FREEZE PROTECTION.....	24
MAINTENANCE AND SERVICE.....	25
ADDITIONAL FEATURES.....	26
VENTING AND CLEARANCES.....	27
ERROR CODES.....	37
TROUBLESHOOTING.....	40
COMPONENTS DIAGRAM.....	42
PARTS LIST.....	46
OUTPUT TEMPERATURE CHART.....	48
NOTES.....	49

# Installation Manual & Owners Guide

## CONGRATULATIONS

Congratulations and thank you for choosing our micro boiler. Before use, we recommend that you read through this installation manual carefully. Keep this manual for future reference.

If you need an additional manual, contact the manufacturer or your local distributor. When you call, please tell us the product name and the serial number of your unit written on the rating plate of the boiler.

# Hydro Shark®

# SPECIFICATIONS

Model		HS115 PLUS			
Natural Gas Input (Operating Range)	BTU/h	Min.: 15,000 Max.: 140,000			
Gas Connection		3/4" NPT			
Supply/Return Connections		3/4" NPT			
Water Pressure*	psi (Mpa)	18-25 PSI (For Radiant Only Systems), Up to 150 with DHW			
Natural gas Inlet Pressure	" W.C. (kPa)	Min. 4.0 (1.00) Max. 10.5 (2.61)			
Weight	lbs. (kg)	37.5 (17.0)			
Dimensions		H 20.5 x W 13.8 x D 9.1 (Inch) H 520 x W 351 x D 231 (mm)			
Ignition		Electric Ignition			
Electric Consumption	Supply	VAC / Hz	120 / 60		
	Operation	W / A	54 / 0.64	79 / 0.99	82 / 1.02
	Standby	W / A	2 / 0.06	2 / 0.06	3 / 0.07
	Freeze- Protection	W / A	96 / 0.82	96 / 0.82	97 / 0.82

\*18-25 PSI is recommended for maximum flow (Space Heating)

\*\*The Manifold Pressure is the factory setting and generally **should not need adjustment.**

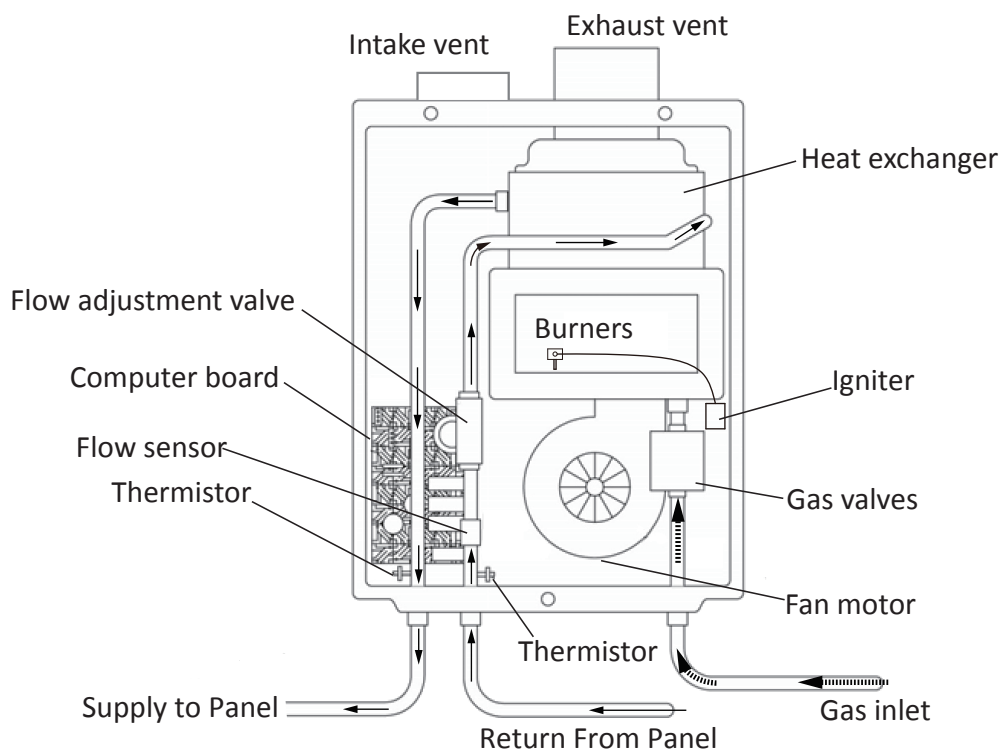
**NOTE:**

- Check the rating plate to ensure this product matches your specifications.
- **The manufacture reserves the right to discontinue, or change at any time, specifications, or designs without notice and without incurring obligation.**

\*When using boiler in-conjunction with Hydro Shark Combi panel, system pressure may be much higher on your domestic water side. Your space heating side should still reflect the recommended 18-25 PSI for system pressure.

# INTRODUCTION

- This manual provides information necessary for the installation, operation, and maintenance of the boiler.
- The model description is listed on the rating plate which is attached to the side panel of the boiler.
- Please read all instructions completely before installing this product.
- If you have any problems or questions regarding this equipment, consult the manufacturer or its local representative.
- This equipment is a micro boiler designed to efficiently supply endless hot water for your needs. (Radiant Heating, or Domestic Water used in-conjunction with Radiant Heating) See Combi panel for more information on integrating domestic water with your radiant heating system.
- These boilers are only to be installed indoors.
- The principle behind micro boilers is easy:



\*This diagram illustrates micro boiler design concepts only and does not accurately represent the boiler's physical description.

1. Your thermostat indicates a need for heat and turns on the circulator pump(s).
2. Water flows through the boiler.
3. The flow sensor detects the water flow.
4. The computer initiates the fan motor and sends a signal to the igniter to create an ignition spark.
5. The gas ignites and flames appear within the burner chamber.
6. Water circulates through the heat exchanger and then gets hot.
7. Using thermistors to measure temperatures throughout the micro-boiler, the computer modulates the gas and water valves to ensure proper output water temperature.
8. When your room reaches desired temperature the pumps turn off and the boiler shuts down.

# SAFETY GUIDELINES

## SAFETY DEFINITION



**DANGER**

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



**WARNING**

Indicates an imminently hazardous situation which, if not avoided, could result in death or serious injury.



**CAUTION**

Indicates an imminently hazardous situation which, if not avoided, could result in minor or moderate injury.

**NOTICE**

## GENERAL

1. Follow all local codes, or in the absence of local codes, follow the current edition of the National Fuel Gas Code: ANSI Z223.1/NFPA 54 in the USA or B149.1 Natural Gas and Propane Installation code in Canada.
2. Properly ground the unit in accordance with all local codes, or in the absence of local codes, with the current edition of the National Electrical Code: ANSI/NFPA 70 in the USA or CSA standard C22.1 Canadian Electrical Code Part 1 in Canada.
3. Carefully plan where you intend to install the boiler. Please ensure:
  - Your boiler will have enough combustion air and proper ventilation.
  - Locate your boiler where water leakage will not damage surrounding areas.
4. Check the rating plate for the correct **GAS TYPE, GAS PRESSURE, WATER PRESSURE and ELECTRIC RATING**. If this unit does not match your requirements, **do not install and consult with the manufacturer**. The boiler is configured only for use with Natural Gas at the factory. If the appliance is used with propane gas, conversion to propane gas with an included conversion kit (**LP Conversion Kit**) is required. The conversion must be done by a qualified service agent or a gas utility serviceman in accordance with this instruction and all codes and requirements of the authority having jurisdiction. Failure to follow instructions could result in serious injury or property damage. The agent performing this work assumes responsibility for this conversion. (Refer to the gas conversion leaflet.)
5. If any problem should occur, turn off all hot water fixtures and turn off the gas. Then call a trained technician or the Gas Company or the manufacturer.



**WARNING**

*DHW Use*

- Water temperatures over 125 °F (52 °C) can cause severe burns instantly or death from scalding. The water temperature is set at 120 °F (50 °C) from the factory to minimize any scalding risk. Before bathing or showering, always check the water temperature.
- Do not store or use gasoline or other flammables, vapors, or liquids in the vicinity of this appliance.
- Do not reverse the water and/or gas connections as this will damage the gas valves and can cause severe injury or death.
- The conversion to propane must be done by a qualified service agent or a gas utility serviceman in accordance with the gas conversion instructions and all codes and requirements of the authority having jurisdiction. Failure to follow instructions could result in serious injury or property damage. The qualified agent performing this work assumes responsibility for this conversion.
- Do not use this appliance if any part has been under water. Immediately contact a qualified installer or service agency to replace a flooded boiler. Do not attempt to repair the unit! It must be replaced!
- Do not disconnect the electrical supply if the ambient temperature will drop below freezing. The Freeze Protection System only works if the unit has electrical power. The warranty will not be covered if the heat exchanger is damaged due to freezing.

# ***INSTALLATION***

## **GENERAL**

1. Follow all local codes, or in the absence of local codes, follow the current edition of the National Fuel Gas Code: ANSI Z223.1/NFPA 54 in the USA or B149.1 Natural Gas and Propane Installation Code in Canada.
2. All gas boilers require careful and correct installation to ensure safe and efficient operation. This manual must be followed exactly. Read the “Safety Guidelines” section.
3. The manifold gas pressure is preset at the factory. It is computer controlled and should not need adjustment.
4. Maintain proper space for servicing. Install the unit so that it can be connected or removed easily.
5. The boiler must be installed in a location where the proper amount of combustible air will be available to it at all times without obstructions.
6. The electrical connection requires a means of disconnection, to terminate power to the water heater. This is necessary for servicing and safety purposes.
7. Do not install the unit where the exhaust vent is pointing into any opening in a building or where the noise may disturb your neighbors. Ensure that the vent termination meets the minimum distance requirements set by code, including minimum clearances from doorways or openings.
8. Particles from flour, aerosols, and other contaminants may clog the air vent, build up and reduce the functions of the rotating fan, cause improper burning of the gas, or cause damage to the water heater. Regularly ensure that the area around the unit is dust- or debris-free. Regular maintenance is recommended for these types of environments. Direct Venting is recommended.
9. Venting:
  - If the boiler is used as a direct-vent appliance, the unit requires a 3 in. (76 mm) combustible air supply pipe. The intake pipe must be sealed airtight.
  - Terminating the venting through a sidewall is recommended for the direct-vent system.
  - Running the exhaust vent and the intake pipe parallel is recommended.
  - Terminating the exhaust and intake on the same wall/surface is recommended. Terminating in the same pressure zone allows for pressure balancing, which prevents nuisance shutdowns.
  - Only install the boiler in a heated area where below freezing temperatures cannot occur. The warranty does not cover damage caused by freezing.
  - The boiler must be securely mounted to a wall or other suitable structure.



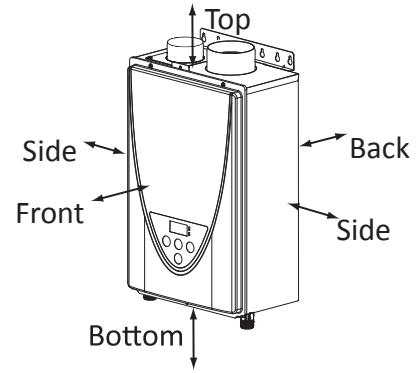
- Installation and service must be performed by a qualified installer (for example, a licensed plumber or gas fitter). Otherwise, the warranty will be void.
- The installer (licensed professional) is responsible for the correct installation of the boiler and for compliance with all national, state / provincial, and local codes.
- The manufacturer does not recommend installing the boiler in a pit or location where gas and water can accumulate.
- Do not have the vent terminal pointing toward any operating window, door, or opening into a building.
- Do not install next to any source of airborne debris, such as a clothes dryer, that can cause debris to be trapped inside the combustion chamber, unless the system is direct-vented.
- **The manufacturer does not suggest installing the boiler in an attic due to safety issues.** If you install the water heater in an attic:
  - Make sure the unit will have enough combustion air and proper ventilation.
  - Keep the area around the boiler and its termination clean. When dust collects on the flame sensor, the water heater will shut down and produce an error code.
  - Place the unit for easy access for service and maintenance.
  - A drain pan, or other means of protection against water damage, is recommended to be installed under the boiler in case of leaks. The manufacturer is not responsible for damage due to water leaks.



- **The warranty will not cover damage caused by water quality.**
  - Only potable water can be used with this boiler. Do not introduce pool or spa water, or any chemically treated water into the boiler.
  - Water hardness levels must not exceed 7 grains per gallon (120 ppm) for single family domestic applications or more than 4 grains per gallon (70 ppm) for all other types of applications. Water hardness leads to scale formation and may affect / damage the boiler. Hard water scaling must be avoided or controlled by proper water treatment.
  - Water pH levels must be between 6.5 and 8.5
  - Well water must be treated.
- Do not install the unit where water, debris, or flammable vapors may get into the flue terminal.
- **The manufacturer recommends direct venting when the boiler is installed in beauty salons, dry cleaners or any other locations in which such chemicals are present in the air.** Some chemicals used in beauty salons or dry cleaners may affect the flame sensor. In such cases, the boiler may not work properly.
- Although the boiler is designed to operate with minimal sound, **the manufacturer does not recommend installing the unit on a wall adjacent to a bedroom, or a room that is intended for quiet study or meditation, etc.**
- Locate your boiler close to a drain where water leakage will not do damage to surrounding areas. As with any water heating appliance, the potential for leakage at some time in the life of the product does exist. The manufacturer will not be responsible for any water damage that may occur. If you install a drain pan under the unit, ensure that it will not restrict the combustion air flow.


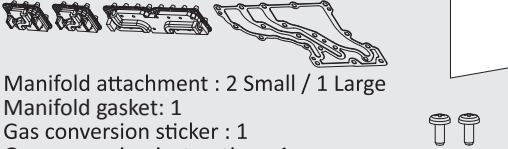


## CLEARANCES



Model	Top	Bottom	Front	Back	Sides
HS115 PLUS (NG/LP)	12 in. (305 mm)	12 in. (305 mm)	4 in.** (102 mm)	1.0 in. (25 mm)	3 in. (76 mm)

\*\*24 inches recommended for maintenance.

Installation Manual	LP Conversion Kit
 Qty: 1	 <p>             Manifold attachment : 2 Small / 1 Large              Manifold gasket: 1              Gas conversion sticker : 1              Gas conversion instruction : 1              Spare Screw : 2           </p>

## HIGH-ALTITUDE INSTALLATIONS

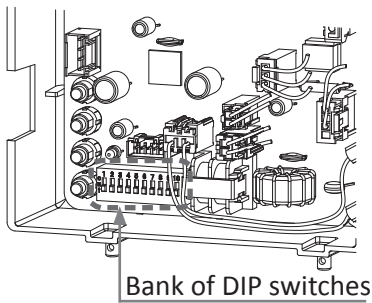
Check the elevation where your boiler is installed. Set your DIP switches according to altitude as shown below.

### DIP Switch Settings

Altitude DIP switches	0 to 2,000 ft. (0 to 610 m) (DEFAULT)	2,001 to 3,000 ft. (611 to 914 m)	3,001 to 5,000 ft. (915 to 1,524 m)	5,001 to 7,500 ft. (1,525 to 2,286 m)	7,501 to 10,100 ft. (2,287 to 3,078 m)
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**NOTE:** The dark squares indicate the correct DIP switch positions.

### HS115 PLUS Computer board



#### Installation altitude

The maximum certified or allowable installed altitude is 10,100 ft. (3,078 m)

# VENTING INSTRUCTIONS

## *For indoor models*

### **-General-**



- Improper venting of this appliance can result in excessive levels of carbon monoxide which can result in severe personal injury or death.
- Improper installation can cause nausea or asphyxiation, severe injury or death from carbon monoxide and flue gases poisoning. Improper installation will void product warranty.



When installing the vent system, all applicable national and local codes must be followed. If you install thimbles, fire stops or other protective devices and they penetrate any combustible or noncombustible construction, be sure to follow all applicable national and local codes.

The boiler must be vented in accordance with the section "Venting of Equipment" of the current edition of the National Fuel Gas Code: ANSI Z223.1/NFPA 54, as well as applicable local building codes.

**The manufacturer recommends NovaVENT™ or Z-Vent® category III, single wall, stainless steel venting.** See "Approved Category III, Single Wall, Stainless Steel Venting and Part Numbers" on the next page.

#### **General rules for air intake:**

The boiler can obtain its combustion air from the space that it is installed in or it can be direct vented.

- The air intake can use 3" PVC (solid core), CPVC (solid core), ABS, or category III vent.
- Use of cellular core PVC (ASTM F891), cellular core CPVC, or Radel® (polyphenylsulfone) in non-metallic venting systems is prohibited. Covering non-metallic vent pipe and fittings with thermal insulation is prohibited.
- Ensure that the installation location has sufficient, clean combustion air. If unsure, direct vent the boiler or refer to the Combustion Air Supply section below.

#### **Direct venting installation:**

- The maximum length of intake air piping must not exceed 60 ft. (18.3 m). Deduct 5 ft. (1.5 m) for each 90° elbow or 2.5 ft (0.76 m) for each 45° elbow used in the venting system. Two 45° elbows when connected together are equivalent to one 90° elbow. Refer to the tables on p. 19.
- When the horizontal air intake exceeds more than 5 ft., support the pipe every 3 ft. with pipe hangers.
- Vertical air intake pipe must be supported with pipe hangers. Ensure that the weight of the pipe is not carried by the water heater.

#### **Combustion air from the room:**

- Install a 3" elbow into the air intake collar.

#### **General rules for venting water heaters are:**

- Place the boiler as close as possible to the vent termination.
- The vent collar of the boiler must be fastened directly to an unobstructed vent pipe.
- Do not weld the vent pipe to the boiler's vent collar.
- Do not cut or alter the shape of the vent collar of the unit.
- The vent must be easily removable from the top of the boiler for normal service and inspection of the unit and vent system.
- The boiler vent must not be connected to any other gas appliance or vent stack.
- Avoid using an oversized vent pipe or using extremely long runs of pipe.
- For rooftop venting, a rain cap or other form of termination that prevents rain water from entering into the boiler must be installed.
- Do not common vent or connect any vent from other appliances to the boiler vent.

- A condensate collector is required for horizontal and/or vertical vent runs exceeding 5 ft. of equivalent length (not including sidewall terminations).
- A backflow preventor should be installed in the exhaust when the heater is installed in climates subject to freezing temperatures.

**General rules for vent terminations:**

- Avoid locating the boiler vent termination near **any air intake devices**. These fans can pick up the exhaust flue products from the boiler and return them to the building. This can create a health hazard.
- Locate the vent termination so that it cannot be blocked by any debris, at any time. Most codes require that the termination must be at least 12 in. (305 mm) above grade and anticipated snow level, but the installer may determine if it should be higher depending on the job site condition and applicable codes.
- A proper sidewall termination is required when the boiler is vented through a sidewall.
- Refer to the following pages for exhaust termination and air inlet clearances.

**WARNING!** Do not mix parts or fittings of different material types, and do not mix pipe, fittings, or joining methods from different manufacturers. Combustion exhaust can contain carbon monoxide and must be properly vented outside. Breathing abnormal amounts of carbon monoxide can result in serious injury or death.

# GAS SUPPLY AND GAS PIPE SIZING

## *-General-*



### WARNING

- Do not use this boiler with any gas other than the one listed on the rating plate unless the boiler has been properly converted.
- Ensure that any and all gas regulators used are operating properly and providing gas pressures within the specified range shown below. Excess gas inlet pressure may cause serious accidents.
- If your boiler needs a gas conversion, refer to the instructions supplied with the boiler and included with the conversion components.

- Minimum and maximum inlet gas pressures:

Gas type	Inlet gas pressure
Natural Gas	Min. 4.0" W.C. (1.00 kPa) – Max. 10.5" W.C. (2.61 kPa)
Propane	Min. 8.0" W.C. (1.99 kPa) – Max. 14.0" W.C. (3.48 kPa)

- Inlet gas pressures that fall outside the range of values listed above may adversely affect the performance of the water heater. These pressures are measured when the boiler is in full operation and when it is in standby.
- Inlet gas pressure must not exceed the above maximum values; gas pressure above the specified range will cause dangerous operating conditions and damage to the unit.
- Until testing of the main gas line supply pressure is completed, ensure the gas line to the boiler is disconnected to avoid any damage to the boiler.
- If the gas supply pressure to the heater is greater than the specified maximum, a field-supplied regulator is required. The regulator must lower the gas pressure within the approved range.
  - Install the gas regulator according to the manufacturer's instructions.
  - The regulator must be sized for the water heater input and provide the specified pressures that are listed on the rating plate.
  - In the absence of minimum install distance, it is recommended that the gas regulator be installed no closer than 3 ft. (1 m) from the boiler's inlet gas connection.

## *-Gas connections-*

1. Install a full port, manual gas shutoff valve between the boiler and the gas supply line.
2. When the gas connections are completed, it is necessary to perform a gas leak test either by applying soapy water to all gas fittings and observing for bubbles or by using a gas leak detection device.
  - The boiler and its individual shutoff valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of 1/2 psi (3.5 kPa).
  - The boiler must be isolated from the gas supply piping system by closing its individual manual shutoff valve during any pressure testing of the gas supply piping system at test pressures equal to or less than 1/2 psi (3.5 kPa).
3. Always purge the gas line of any inert gas, debris, and/or water before connecting to the gas inlet.

### NOTICE

Size the gas pipe to supply the necessary volume of gas for the boiler. Refer to and follow the requirements listed in the current edition of ANSI Z223.1/NFPA 54 (USA), B149.1 (Canada), or local codes. Otherwise, flow capabilities and output temperatures will be limited.

## -Natural Gas Supply Piping-

Maximum delivery Capacity of Cubic Feet of Gas per Hour of IPS Pipe carrying Natural Gas with 0.60 Specific Gravity Based on Pressure Drop of 0.5" W.C.

Based on Energy Content of 1,000 BTU/Cubic ft.: The boiler requires 140 Cubic ft./hr.

The following tables are from NFPA 54

Unit: Cubic feet per hour

Pipe Size	Length: ft. (m)												
Diameter: in.	10' (3.0)	20' (6.1)	30' (9.1)	40' (12.2)	50' (15.2)	60' (18.3)	70' (21.3)	80' (24.4)	90' (27.4)	100' (30.5)	125' (38.1)	150' (45.7)	200' (61.0)
1/2"	172	118	95	81	72	65	60	56	52	50	44	40	34
3/4"	360	247	199	170	151	137	126	117	110	104	92	83	71
1"	678	466	374	320	284	257	237	220	207	195	173	157	134
1 1/4"	1,309	957	768	657	583	528	486	452	424	400	355	322	275
1 1/2"	2,090	1,430	1,150	985	873	791	728	677	635	600	532	482	412
2"	4,020	2,760	2,220	1,900	1,680	1,520	1,400	1,300	1,220	1,160	1,020	928	794

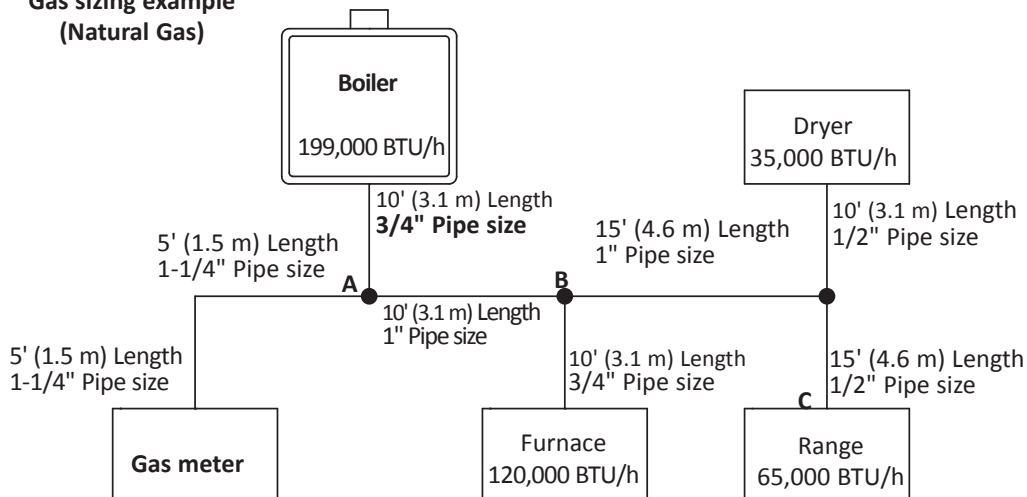
## -Propane (LP) Supply Piping-

Maximum Capacity of Propane (LP) Based on 11" W.C. supply pressure at a 0.5" W.C. pressure drop

Unit: kBtu per hour

Pipe Size	Length: ft. (m)												
Diameter	10' (3.0)	20' (6.1)	30' (9.1)	40' (12.2)	50' (15.2)	60' (18.3)	70' (21.3)	80' (24.4)	90' (27.4)	100' (30.5)	125' (38.1)	150' (45.7)	200' (61.0)
1/2"	268	184	148	126	112	101	93	87	82	77	68	62	53
3/4"	567	393	315	267	237	217	196	185	173	162	146	132	112
1"	1,071	732	590	504	448	409	378	346	322	307	275	252	213
1 1/4"	2,205	1,496	1,212	1,039	913	834	771	724	677	630	567	511	440
1 1/2"	3,307	2,299	1,858	1,559	1,417	1,275	1,181	1,086	1,023	976	866	787	675
2"	6,221	4,331	3,465	2,992	2,646	2,394	2,205	2,047	1,921	1,811	1,606	1,496	1,260

### Gas sizing example (Natural Gas)



Based on Energy Content of 1,000 BTU/Cubic ft:

Divide each appliance's BTU/h requirement by 1,000 BTU/ft<sup>3</sup> to get the appliance's ft<sup>3</sup>/h requirement.

Take into account the distance from the appliance to the gas meter, then look in the above gas chart to properly size the line.

For sections of the

gas line supplying gas to more than one appliance (Ex: Point A to Point B), add up the cubic ft. per hour requirements of the appliances that are being supplied by that section, and size to the farthest appliance.

For Example: The section from A to B supplies gas to the furnace, range and dryer. Adding up the BTU/h requirements and dividing by 1,000 yields a cubic ft. per hour requirement of 220 cubic ft. of gas per hour. The farthest appliance is the range, which is 50 ft. (15.2 m) away from the meter. According to the chart above, the 50-ft. (15.2 m) column shows that Section A to B must be 1" in order to supply 220 cubic ft per hour.

### ***-Pressure relief valve- (DHW Applications)***

The boiler has a high-temperature shutoff switch built in as a standard safety feature (called a Hi-Limit switch). Therefore, a “**pressure only**” relief valve is required.

- This unit does not come with an approved pressure relief valve.
- An approved pressure relief valve must be installed on the hot water outlet.
- The pressure relief valve must conform to the current edition of **ANSI Z21.22** or **CAN 1-4.4** and installation must follow local codes.
- The discharge capacity must be at least 140,000 BTU/h for DHW applications.
- The pressure relief valve must be rated for a maximum of 150 psi (1 MPa).
- The discharge piping for the pressure relief valve must be directed so that the hot water cannot splash on anyone or on nearby equipment.
- Attach the discharge tube to the pressure relief valve and run the end of the tube to within 6 in. (152 mm) from the floor. This discharge tube must allow free and complete drainage without any restrictions.
- If the pressure relief valve installed on the water heater discharges periodically, this may be due to a defective thermal expansion tank or defective pressure relief valve.
- The pressure relief valve must be manually operated periodically to check for correct operation.  
**WARNING! Hot water will be released. The contact of discharge may cause property damage and/ or bodily harm. Before operating the pressure relief valve manually, check that it will discharge in a safe place. If water does not flow freely from the end of the discharge pipe, turn the gas supply OFF and call a qualified person to determine the cause.**
- No valve shall be placed between the relief valve and the water heater.

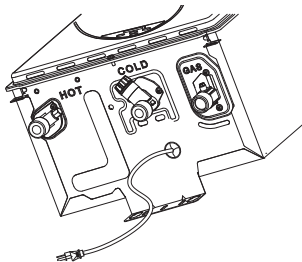
NOTE: Hydro Smart Radiant Panel systems include a pressure relief valve for the radiant application.

## **ELECTRICAL CONNECTIONS**



**WARNING**

- Ensure that circuit power is turned OFF before you complete the following steps.
- Follow the electrical code requirements of the local authority having jurisdiction. In the absence of such requirements, follow the current edition of the National Electrical Code ANSI/NFPA 70 in the U.S. or the current edition of CSA C22.1 Canadian Electrical Code Part 1 in Canada
- When servicing or replacing parts within the water heater, label all wires prior to disconnection to facilitate an easy and error-free reconnection. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing.
- Failure to follow these instructions can result in fire, electrical shock, or death.



# INITIAL OPERATION

## FOR YOUR SAFETY, READ BEFORE OPERATING

- Check the **GAS and WATER CONNECTIONS** for leaks before firing the unit for the first time.
- Open the main gas supply valve to the unit using only your hand to avoid any spark. Never use tools. If the knob will not turn by hand, do not try to force it; call a qualified service technician. Forced repair may result in a fire or explosion due to gas leaks.
- Be sure to check for the presence of leaking gas toward the bottom of the unit because some gases are heavier than air and may settle toward the floor.
- **Check the GAS PRESSURE**
- Do not try to light the burner manually. It is equipped with an electronic ignition device which automatically lights the burner.
- Check for **PROPER VENTING and COMBUSTIBLE AIR** to the boiler.
- **Purge the GAS and WATER LINES** to remove any air pockets.
- Do not use this boiler if any part has been submersed under water. Do not attempt to repair the unit. It must be replaced. Failure to follow these instructions could lead to property damage, personal injury, or loss of life.



**WARNING**

### IF YOU SMELL GAS:

- Do not try to start the boiler.
- Do not touch any electric switches; 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.

Operation (With Radiant & DHW Applications)		
1.	Once the above checks have been completed, please clean the filter (Y-Strainer) of any debris.	
2.	Fully open the manual water control valve on the water supply line.	
3.	Open a hot water tap to verify that water is flowing to that tap. Then close the hot water tap.	
4.	Fully open the manual gas control valve.	
5.	Turn on the 120 VAC, 60 Hz power supply to the water heater.	
6.	Now you are ready to enjoy hours of endless hot water and/or radiant heating.	

For radiant only applications, turn up the thermostat to call for heat and initiate flow through the boiler.



# OPERATING SAFETY

## FOR YOUR SAFETY READ BEFORE OPERATING

**WARNING:** If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.

B. BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to 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 turn the gas shutoff valve. Never use tools. If the valve will not turn by hand, don't 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 contact a qualified installer or service agency to replace a flooded water heater. Do not attempt to repair the unit! It must be replaced!

## OPERATING INSTRUCTIONS

1. STOP! Read the safety information above on this label.
2. Turn off all electric power to the appliance.
3. Do not attempt to light the burner by hand.
4. Turn the gas shutoff valve located on the outside of the unit to the closed position.
5. Wait five (5) minutes to clear out any gas. If you then smell gas, STOP! Follow "B" in the safety information above on this label. If you don't smell gas, go to the next step.
6. Turn the gas shutoff valve located on the outside of the unit to the open position.
7. Turn on all electrical power to the appliance.
8. If the appliance will not operate, follow the instructions in "To Turn Off Gas to Appliance," and call your service technician or gas supplier.

## TO TURN OFF GAS TO APPLIANCE

1. Turn off all electric power to the appliance if service is to be performed.
2. Turn the gas shutoff valve located on the outside of the unit to the closed position.



**Vapors from flammable liquids will explode and catch fire causing death or severe burns.**

Do not use or store flammable products such as gasoline, solvents or adhesives in the same room or area near the water heater.



Do not install water heater where flammable products will be stored or used unless the main burner is at least 18" above the floor. This will reduce, but not eliminate the risk of vapors being ignited by the main burner.

**FLAMMABLES**

**Read and follow water heater warnings and instructions. If the owner's manual is missing, contact the retailer or manufacturer.**

**Keep flammable products:**

1. Far away from heater.
2. In approved containers.
3. Tightly closed and out of reach of children.
4. Water heater has a main burner, which may come on at any time and will ignite flammable vapors.

**Vapors:**

1. Cannot be seen.
2. Are heavier than air.
3. Go a long way on the floor.
4. Can be carried from other rooms to the main burner by air currents.

**⚠ DANGER**

1. Water temperature over 125°F (52°C) can cause severe burns instantly or death from scalds.
2. Children, disabled and elderly are at highest risk of being scalded.
3. Feel water before bathing or showering.
4. Temperature limiting valves are available. See manual.
5. The outlet temperature of the water heater is set at 120°F (50°C). If you require water temperatures below this setting, follow the instruction manual.
6. Use this heater at your own risk. Test the water before bathing or showering. Do not leave children or an infirm person unsupervised. See your local water supply company [plumbing hardware retailer] for temperature limiting valves that are available.

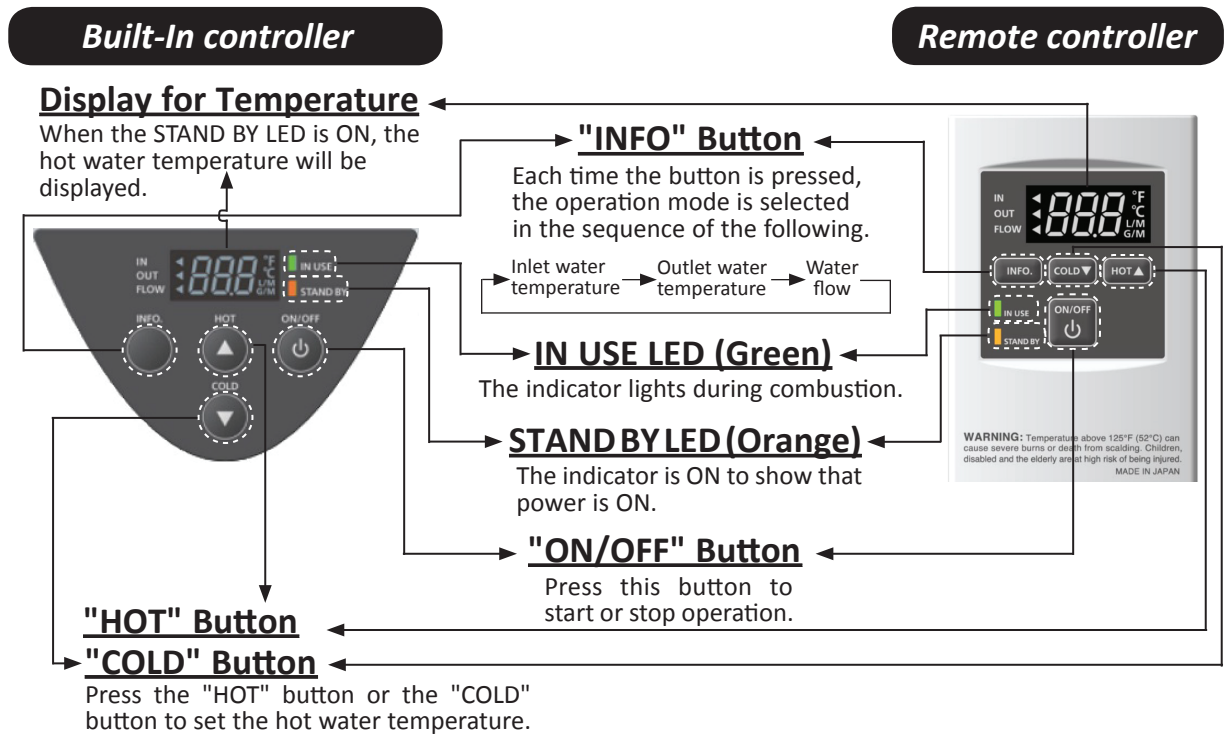


A pressure relief valve listed as complying with the standard for Relief Valve and Automatic Gas Shutoff Devices for Hot Water Supply System, ANSI Z21.22 • CSA 4.4, shall be installed at the time of installation of the water heater in the location specified by the manufacturer. Local codes shall govern the installation of relief devices for safety operation of the water heater. The relief valve must not be removed or plugged. No valve shall be placed between the relief valve and the water heater. The relief from the discharge of the pressure relief valve shall be disposed of in a suitable place where it will cause no damage. Also, there shall be no other reducing coupling or other restrictions installed on the discharge line to restrict flow. See Installation Manual heading "PRESSURE RELIEF VALVES" for installation and maintenance of relief valve discharge line and other safety precautions.

# NORMAL OPERATION

## BUILT-IN CONTROLLER and REMOTE CONTROLLER

The illustrations below show examples of the displays of the controller. The exact display may differ from examples.



- When the remote controller is installed, it will take priority over the built-in controller.
- The controller has an energy saving mode. Five minutes after the water heater stops operating, the backlight of the controller turns off.
- The backlight of the remote will turn back on once the boiler begins firing again.

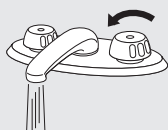
## GENERAL (DHW)



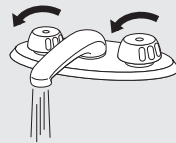
**WARNING**

Temperature above 125 °F (52 °C) can cause severe burns or death from scalding. Children, disabled and the elderly are at high risk of being injured.

1. Open a cold water fixture.



2. Mix hot water with the cold water to get the correct temperature water.



3. When finished, close the water fixture.




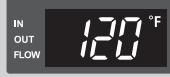










**NOTICE**

- Flow rate to activate the boiler: 0.5 gallon per minute at the default set temperature (1.9 L/min).
- Flow rate to keep the boiler running: 0.4 gallon per minute (1.5 L/min).

## TEMPERATURE SETTINGS

### **-Set temperature-**

	Operation	Screen on the controller	
		Built-in controller	Remote controller
1.	Turn on the 120 VAC power supply to the unit.		
2.	Press the <b>"ON/OFF"</b> button on the controller in order to turn the controller on.		
3.	When ON, the STAND BY LED is lit.		
4.	It shows the set temperature on its display as shown in the picture on the right. (EX.: 120 °F)	 (EX.: 120 °F)	
5.	Press the <b>"HOT"</b> button or the <b>"COLD"</b> button to set the temperature setting of the unit.	 	 
	<b>Increasing temperature from 120 °F (50 °C) to 125 °F (52 °C) :</b> 1. The boiler must be in Stand By to increase the temperature. 2. Press the "HOT" button to set 120 °F (50 °C). 3. Press and hold the "INFO" button and the "HOT" button for at least 3 seconds. The remote will emit a beep and change to 125 °F (52 °C). 4. To increase the set temperature further, press the "HOT" button. You can increase the temperature setting up to 140 °F (60 °C).	 	 

### **-Temperature table of controller-**

Following are the temperature set points that are available with your built-in controller or remote controller:

°F	100	105	110	115	120*	125	130	135	140
°C	38	40	43	45	50*	52	55	57	60

\*Factory setting (Default): 120 °F

## TEMPERATURE SETTINGS ON THE PCB WITHOUT CONTROLLER

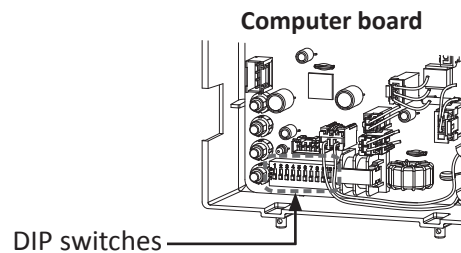


- Turn off the power supply to the boiler before changing the DIP switch settings.

There are two preset temperatures, 120 °F (50 °C) and 140 °F (60 °C), that you can select by changing the DIP switch settings on the computer board without the controller. See the table below. When the controller is in normal operation, the set temperature of the controller is given priority over the set temperature of the DIP switch settings.

- The temperature has been preset at the factory to 120 °F (50 °C).

120 °F (50 °C) DEFAULT	140 °F (60 °C)
ON 1 2 3 4 5 6 7 8 9 10 OFF <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	ON 1 2 3 4 5 6 7 8 9 10 OFF <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
No. 9 : OFF	No. 9 : ON



**NOTE:** The table above shows the correct DIP switch position for each temperature setting. (Each black square represents a switch.)

Only adjust DIP switch No. 9.

Do not adjust the other DIP switches for temperature adjustment.

## FLOW (DHW Applications)

- The flow rate through the boiler is limited to a maximum of 6.6 GPM
- The temperature setting, along with the supply temperature of the water, will determine the flow rate output of the unit.
- Please refer to the temperature vs. gallons per minute charts to determine the likely flow rates based on your local ground water temperature and your desired outlet water temperature.
- Based on the United States Department of Energy method of testing water heater output, the boiler is rated for gallons per minute (GPM) (liters per minute (L/min)) for Natural Gas and Propane, when raising the water temperature by 77 °F (43 °C) (from 58 °F to 135 °F (14 °C to 57 °C)). See the chart on the right.

**Household Flow Rates**

Appliance/Use	Flow rate	
	GPM (US)	L/min
Lavatory Faucet	1.0	3.8
Bath Tub	4.0 – 10.0	15.2 - 37.8
Shower	2.0	7.5
Kitchen Sink	1.5	5.6
Dishwasher	1.5	5.6
Washing machine	4.0	15.2

Taken from UPC 2006

- Refer to the table to the top right for typical household plumbing fixture flow rates to determine what the water heater can do in a household application.

Unit: GPM (L/min)

Model	Flow rate
HS115 PLUS	3.0 (11.4)

## FREEZE PROTECTION SYSTEM

- This unit comes equipped with heating blocks to protect it against damages associated with freezing.
- For this freeze protection system to operate, there has to be electrical power to the unit. Damage to the heat exchanger caused by freezing temperatures due to power loss is not covered under the warranty. In cases where power losses can occur, consider the use of a backup power supply.
- The freeze protection system will activate when the air temperature inside the case or water in the heat exchanger is less than 36.5 °F (2.5 °C).
- In any areas subject to freezing temperatures, the manufacturer highly recommends an indoor installation with an indoor model. In such an installation, freezing issues can occur if cold air enters through the venting into the heat exchanger, whether by negative pressures within the installation location or by strong outside winds.
- The manufacturer also highly recommends the use of a backflow preventer (sold separately) to minimize the amount of cold air entering through the exhaust venting when the boiler is off.
- It is the installer's responsibility to be aware of freezing issues and take all preventative measures. The manufacturer will not be responsible for any damage to the heat exchanger as a result of freezing.
- If you will not be using your heater for a long period of time:
  1. Completely drain the water out of the unit.
  2. Disconnect power to your heater.
 This will keep your unit from freezing and being damaged.



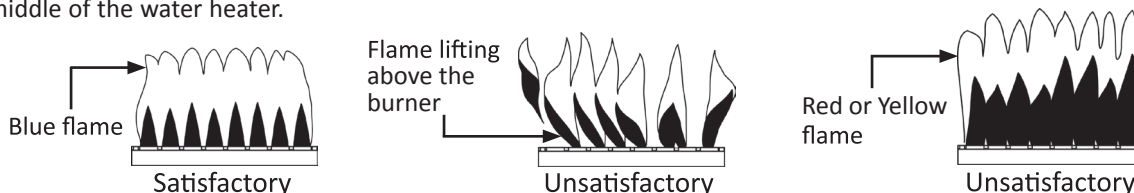
Only pipes within the boiler are protected by the freeze protection system. Any water pipes (hot or cold) located outside the unit will not be protected. Properly protect and insulate these pipes from freezing.

## MAINTENANCE AND SERVICE



Turn off the electrical power supply and close the manual gas shutoff valve and the manual water control valve before servicing.

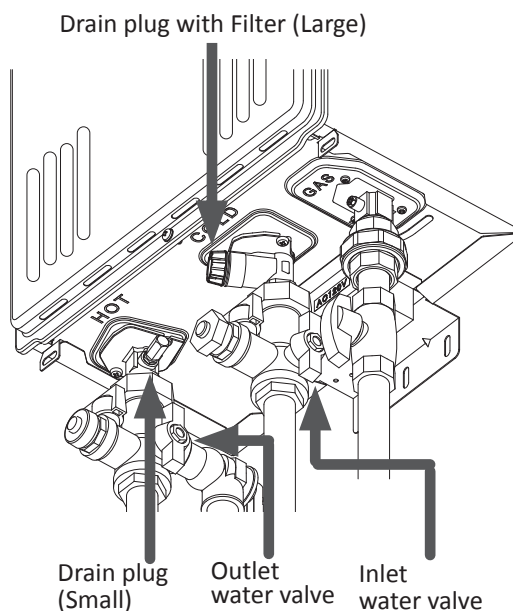
- Clean the filter (Strainer) on the system.
- Be sure that all openings for combustion and ventilation air are not blocked.
- The venting system should be checked annually for any leaks, corrosion, blockages or damage.
- The burner should be checked annually for dust, lint, grease or dirt.
- Keep the area around the water heater and terminations clear. Remove any combustible materials, gasoline, flammable vapors, and liquids.
- In accordance with all local codes and common safety practices, water discharged from the pressure relief valve can cause severe burns instantly from scalding. DO NOT touch the pressure relief valve.
- If the relief valve discharges periodically, it may be due to thermal expansion in a closed water supply system. Contact the water supplier or local plumbing inspector on how to correct this situation.
- Visual check of burner flames (see below) through the burner window in the burner assembly located at the middle of the water heater.



The manufacturer recommends having the unit checked once a year or as necessary by a licensed technician. If repairs are needed, any repairs should be done by a licensed technician.



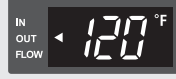
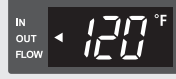




## UNIT DRAINING and FILTER CLEANING

1. Close the manual gas shutoff valve.
2. Turn off power to the unit and wait a couple of seconds. Turn on again.
3. Wait 30 seconds, and then turn off power to the unit.
4. Close the **inlet** water shutoff valve.
5. Open all hot water taps in the house. (When using Radiant System with DHW. When the residual water flow has ceased, close all hot water taps.)
6. Have a bucket or pan to catch the water from the unit's drain plugs. If isolation valves are installed, open the drains to drain the water. If isolation valves are not installed, **unscrew** the two drain plugs (large and small) to drain the water out of the unit. Do not lose the o-rings that will be on the two drain plugs.
7. Wait a few minutes to ensure all water has completely drained from the unit.
8. **Clean the filter:** Check the filter (strainer) located on the DHW panel or plumbing that was installed and clean filter.
9. Securely screw the drain plugs back into place.  
**Hand-tighten only.**












**-Additional features-  
Information mode**

You can get some information about the boilers condition by pressing the "INFO" button. For more information, follow the procedures below:

INFO Button	Operation	Screen on the controller	
		Built-in controller	Remote controller
1st. press	Inlet water temperature will be displayed on the remote controller by pressing the "INFO" button.		
2nd. press	Outlet water temperature will be displayed on the remote controller by pressing the "INFO" button.		
3rd. press	Water flow will be displayed on the remote controller by pressing the "INFO" button.		
4th. press	Press the "INFO" button to finish information mode.		

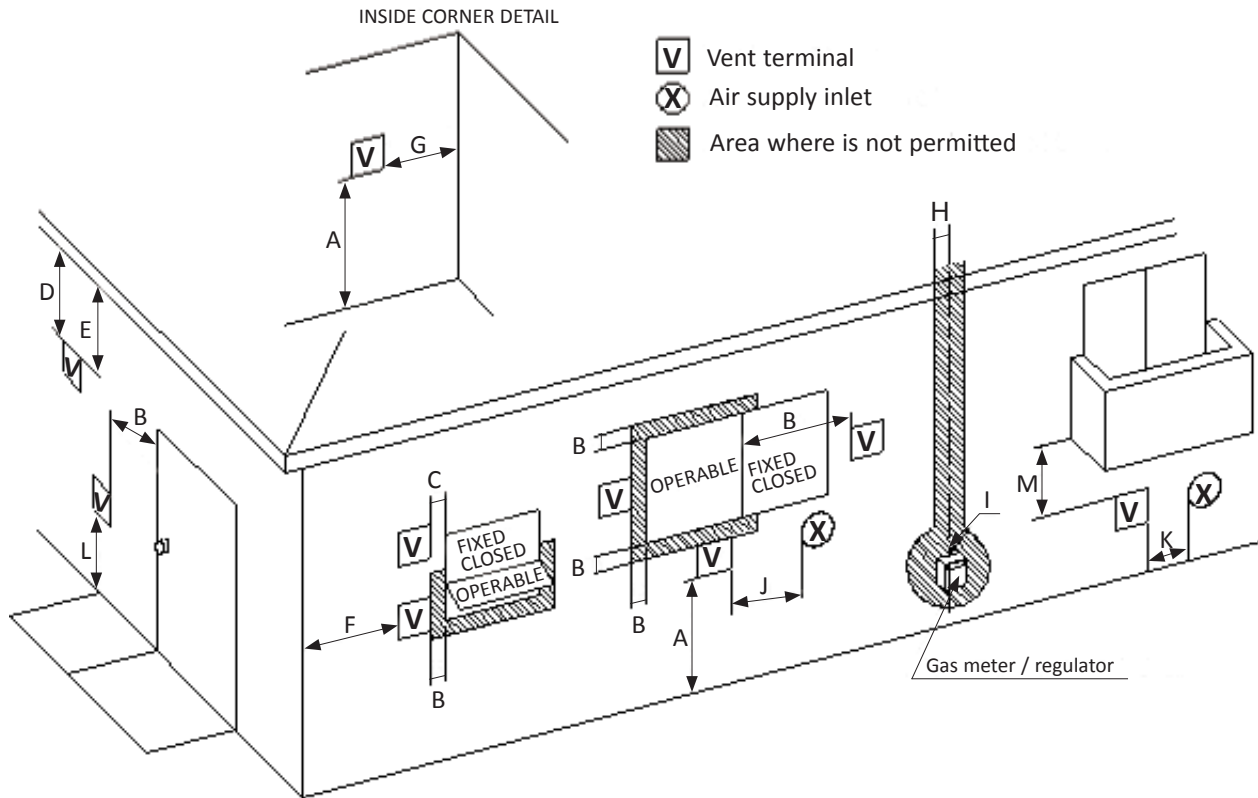
**Unit conversion mode**

The controller has a function that can change units of temperature and flow rate from °F to °C and from gallon per minute to liter per minute and vice versa. Please follow the procedures below:

	Operation	Screen on the controller	
		Built-in controller	Remote controller
1.	Press the "ON/OFF" button on the controller in order to turn the controller on.		
2.	When ON, the orange LED is lit.		
3.	The previous set temperature will be displayed on the screen.		
4.	Press the "INFO" button for at least 3 seconds.		
5.	The set temperature should now be displayed in the alternate unit of measurement.		



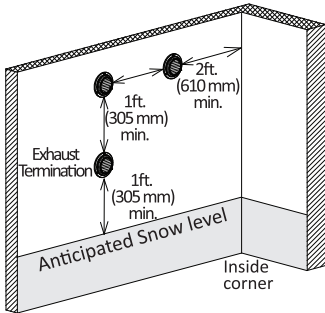
## -Vent termination clearances-



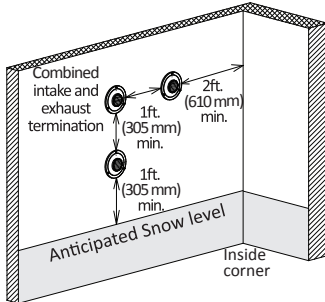
		Canada		U.S.A	
		Direct-vent and other than Direct-vent	Direct-vent	Direct-vent	Other than Direct-vent
A	Clearance above grade, veranda, porch, deck, or balcony	1 foot (30 cm)	1 foot (30 cm)	1 foot (30 cm)	1 foot (30 cm)
B	Clearance to window or door that may be opened	3 feet (91 cm)	1 foot (30 cm)	4 feet (122 cm) from below or side opening. 1 foot (30 cm) from above opening.	
C	Clearance to permanently closed window	*	*	*	
D	Vertical clearance to ventilated soffit located above the vent terminator within a horizontal distance of 2 feet (61cm) from the center line of the terminator	*	*	*	
E	Clearance to unventilated soffit	*	*	*	
F	Clearance to outside corner	*	*	*	
G	Clearance to inside corner	2 feet (61 cm)	2 feet (61 cm)	*	
H	Clearance to each side of center line extended above meter/regulator assembly	3 feet (91 cm)	*	*	
I	Clearance to service regulator vent outlet	3 feet (91 cm)	*	*	
J	Clearance to non-mechanical air supply inlet to building or the combustion air inlet to any other application	3 feet (91 cm)	1 foot (30 cm)	4 feet (122 cm) from below or side opening. 1 foot (30 cm) from above opening.	
K	Clearance to mechanical air supply inlet.	6 feet (1.83 m)	3 feet (91 cm)	3 feet (91 cm)	
L	Clearance above paved sidewalk or paved driveway located on public property	7 feet (2.13 m)	*	7 feet (2.13 m)	
M	Clearance under veranda, porch deck, or balcony	1 foot (30 cm)	*	*	

\*For clearances not specified in ANSI Z223.1 / NFPA 54 (USA) or B149.1 (Canada), please use clearances in accordance with local installation codes and the requirements of the gas supplier.

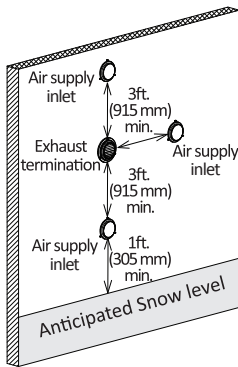
## -Clearances for multiple sidewall terminations-



For multiple sidewall exhaust terminations (e.g. multi-unit systems), an exhaust termination must be at least 1 ft. (305mm) away from another exhaust termination. An exhaust termination must also be at least 2 ft. (610 mm) away from an inside corner. If the adjacent wall is less than 2 ft. (610 mm) of length, the minimum required distance away from the inside corner will be equal to the length of that adjacent wall.

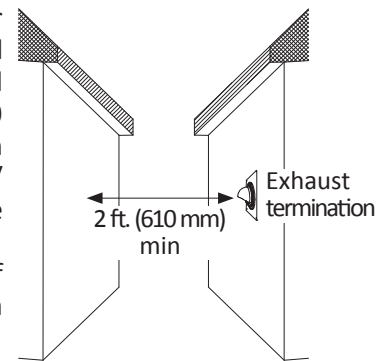


For multiple-unit, direct-vent sidewall terminations that combine the intake and exhaust into a single penetration, space each direct-vent termination at least 1 ft. (305 mm) away from each other, no matter the orientation. A direct-vent termination must also be at least 2 ft. (610 mm) away from an inside corner. If the adjacent wall is less than 2 ft. (610 mm) of length, the minimum required distance away from the inside corner will be equal to the length of that adjacent wall.

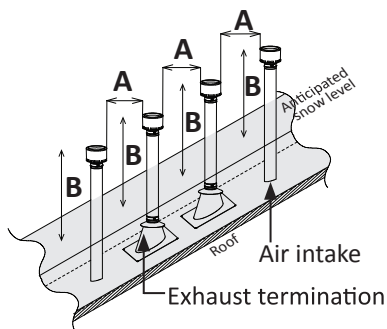


For direct-vent sidewall terminations that use two separate penetrations for the intake and exhaust, distance the intake and exhaust terminations at least 3 ft. (915 mm) away from each other, no matter the orientation unless they follow case 1 and 2 on p. 23.

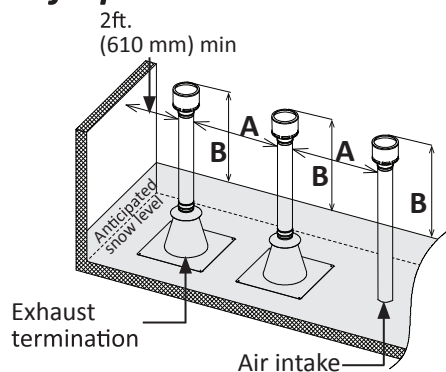
Exhaust and/or direct-vent sidewall terminations should be at least 2 ft. (610 mm) away from an opposite surface/wall. Do not place the termination directly in front of an opening into a building.



## -Clearances for multiple rooftop terminations-



**A & B-** In accordance with local codes



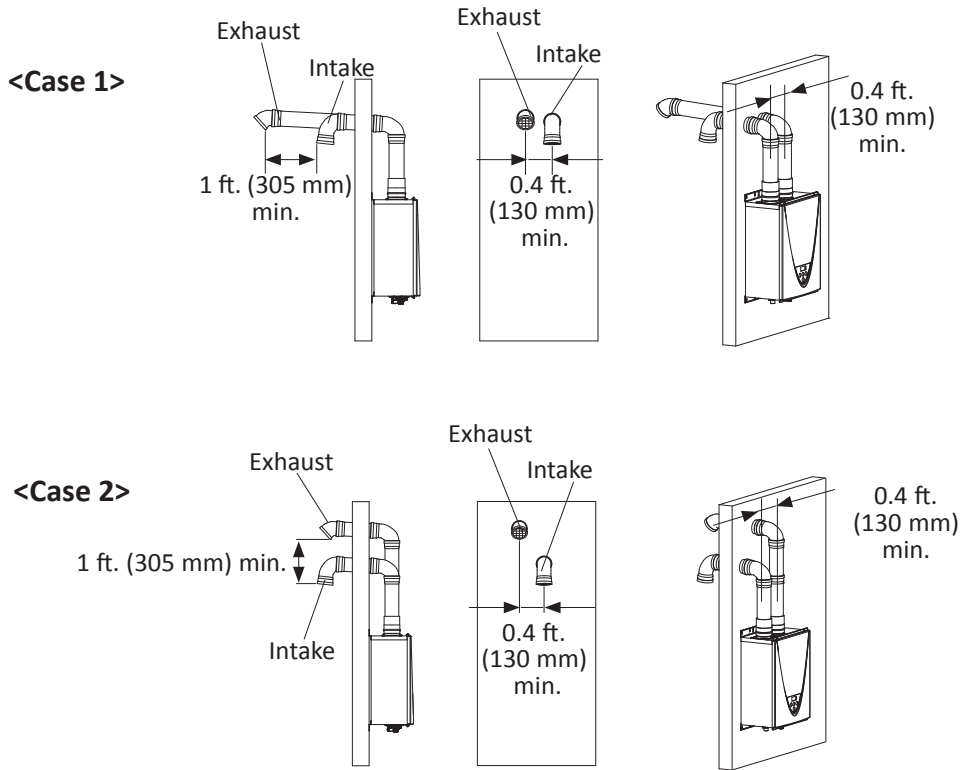
For multiple-unit rooftop terminations (whether for standard or direct-vent installations) space all exhaust and intake terminations in accordance with local codes. An exhaust termination must be spaced from a wall or surface in accordance with local codes as well. In the absence of such a code, an exhaust termination must be a horizontal distance of at least 2 ft. (610 mm) away from a wall or surface.



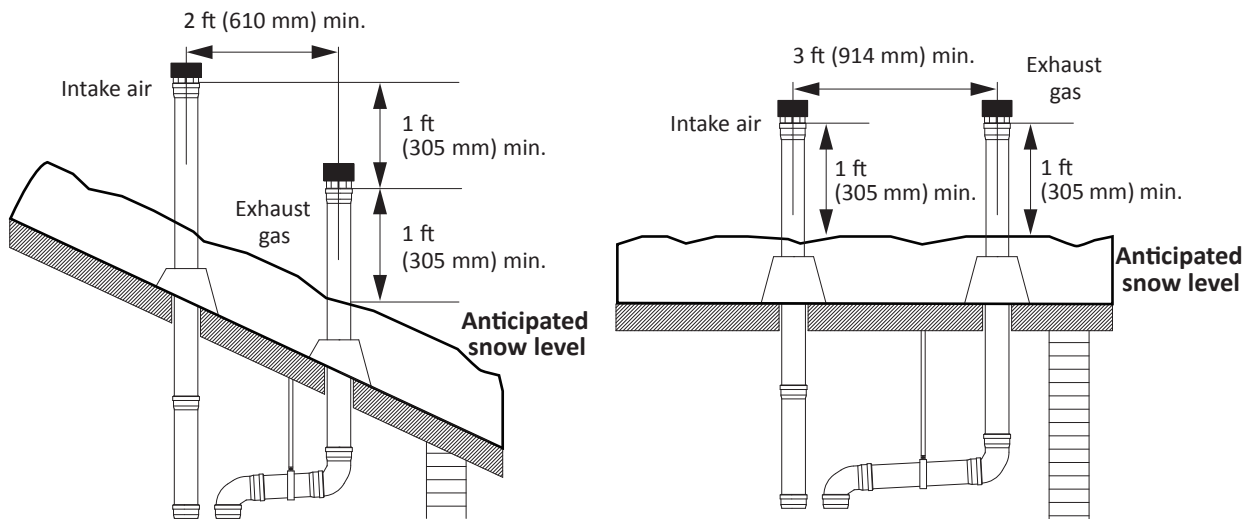
Please follow all local and national codes in regards to proper termination clearances. In the absence of such codes, the above clearances can be used as guidelines. Local codes supersede these guidelines.

## ***-Clearances for sidewall terminations-***

For direct-vent sidewall terminations that use two separate penetrations for the intake and exhaust, comply with the minimum clearances shown in the diagrams below.



## ***-Clearances for rooftop terminations-***



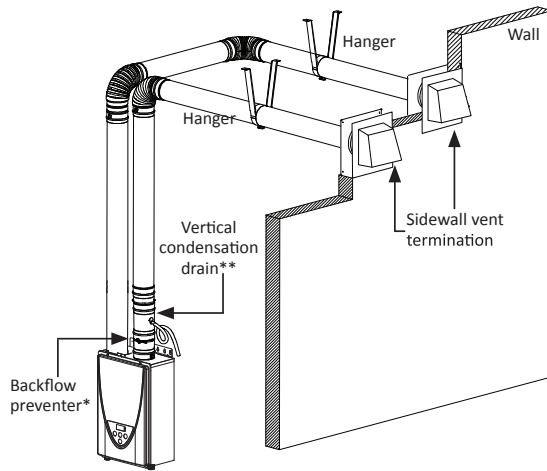
- Exhaust terminations must be at least 1 ft. (305 mm) away from any obstructions.
- In lieu of using roof caps, a 90 degree elbow and 45 degree elbow can be used for the exhaust, and two 90 degree elbows can be used for the air intake.

## Two-Pipe, Direct-Vent Installation Examples

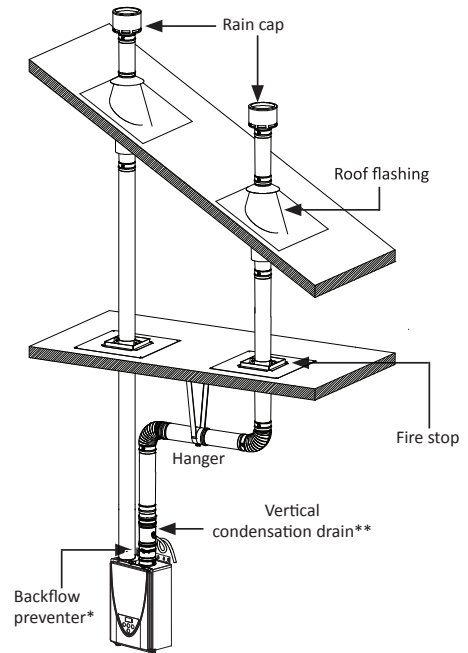
### DIP switch settings for direct vent installation

HS115 PLUS		Vent length
ON 1 2 3 4 5 6 7 8 9 10 OFF <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	No. 6 : O N No. 7 : OFF No. 8 : OFF	<b>0 to 20 ft.</b> <b>(0 to 6.1 m)</b>
ON 1 2 3 4 5 6 7 8 9 10 OFF <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	No. 6 : OFF No. 7 : OFF No. 8 : OFF	<b>21 to 40 ft.</b> <b>(DEFAULT)</b> <b>(6.2 to 12.2 m)</b>
ON 1 2 3 4 5 6 7 8 9 10 OFF <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	No. 6 : O N No. 7 : O N No. 8 : OFF	<b>41 to 60 ft.</b> <b>(12.3 to 18.3 m)</b>

### Horizontal Installation



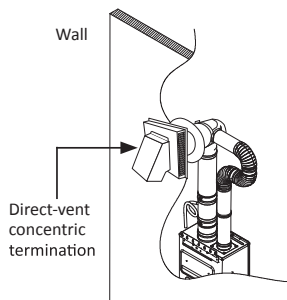
### Vertical Installation



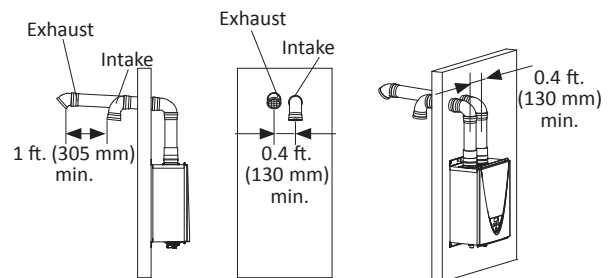
\*Backflow preventer (Recommended for freezing weather conditions: 36 °F (2 °C) and below).

\*\*Vertical condensation drain must be installed in accordance with local codes. It is required to be installed in the venting system when there is more than 5 ft. (1.5 m) of equivalent vent length, not including the sidewall termination. 90° elbow is equivalent to 5 ft. (1.5 m) of vent length.

### Horizontal Installation with direct-vent concentric termination



### Direct-vent sidewall Installation



## -DIP Switch Settings for Vent Length-



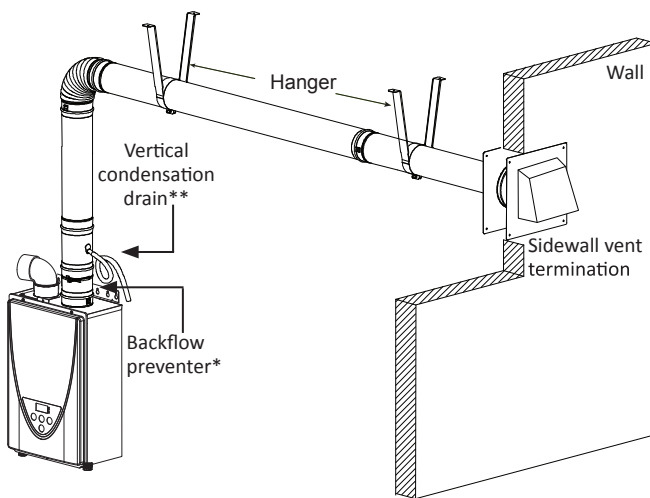
- Improper venting of this appliance can result in excessive levels of carbon monoxide which can result in severe personal injury or death.
- Improper installation can cause nausea or asphyxiation, severe injury or death from carbon monoxide and flue gases poisoning. Improper installation will void product warranty.
- Specific DIP switch settings are required depending on the length of your vent run and the type of vent installation. Refer to the following sections for details:
  - Single Pipe with Room Air
  - Two-pipe Direct Vent
  - Venting Clearances

### Single Pipe with Room-Air Intake

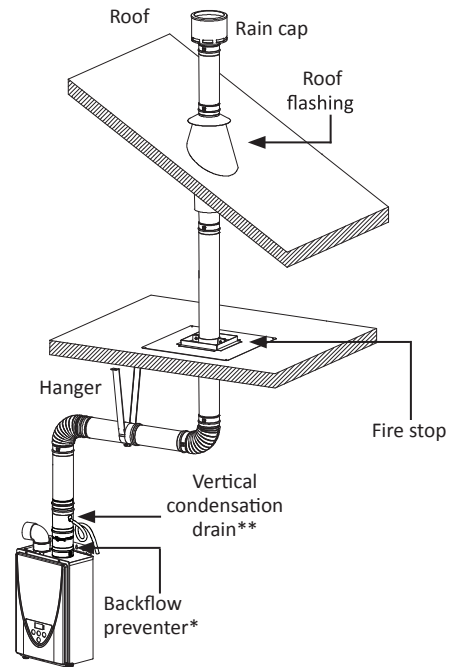
#### DIP switch settings for single pipe with room-air intake

HS115 PLUS	Vent length
ON <span style="font-size: small;">1 2 3 4 5 6 7 8 9 10</span>  OFF	No. 6 : ON No. 7 : OFF No. 8 : OFF  <b>0 to 60 ft.</b> <b>(0 to 18.3 m)</b>

#### Horizontal Installation



#### Vertical Installation



\*Backflow preventer (Recommended for freezing weather conditions: 36 °F (2 °C) and below).

\*\*Vertical condensation drain must be installed in accordance with local codes. It is required to be installed in the venting system when there is more than 5 ft. (1.5 m) of equivalent vent length, not including the sidewall termination. 90° elbow is equivalent to 5 ft. (1.5 m) of vent length.

## -Vent length and No. of Elbows-

This is a Category III appliance and must be vented accordingly. The vent system must be sealed airtight. All seams and joints **without gaskets** must be sealed with high heat resistant silicone sealant or UL listed aluminum adhesive tape having a minimum temperature rating of 350 °F (177 °C). For best results, a vent system should be as short and straight as possible.

- This boiler is a Category III appliance and must be vented accordingly with any 4 in. (102 mm) vent approved for use with Category III or Special BH type gas vent.
- **Follow the vent pipe manufacturer's instructions when installing the vent pipe.**
- **Do not common vent this appliance with any other vented appliance.** (Do not terminate vent into a chimney. If the vent must go through the chimney, the vent must run all the way through the chimney with Category III approved or Special BH vent pipe.)
- When the horizontal vent run exceeds 5 ft. (1.5 m), support the vent run at 3 ft. (0.9 m) intervals with overhead hangers.
- The maximum length of exhaust vent piping must not exceed **60 ft. (18.3 m).**\* Deduct 5 ft. (1.5 m) for each 90° elbow used in the venting system. Do not use more than **6 elbows**. A 45° elbow is equivalent to 2.5 ft. of vent length.

\*If vent termination kit is used in the installation, the maximum length of **exhaust** vent pipe must not exceed **55 ft. (16.8 m)**, and the vent run must not exceed 5 elbows. Vent termination kit also has specific DIP switch settings.

### Standard Vent Terminations

Vent type	Diameter	Max. No. of Elbows	Max. Vertical and Horizontal (Total) Vent Length
Intake	3 in. (76 mm)	6	60 ft. (18.3 m)*
Exhaust	4 in. (102 mm)	6	60 ft. (18.3 m)*

\*For each 90° elbow added, deduct 5 ft. (1.5m) from max. vent length.

No. of Elbows	Max. Vertical or Horizontal Vent Length	No. of Elbows	Max. Vertical or Horizontal Vent Length
0	60 ft. (18.3m)	4	40 ft. (12.2 m)
1	55 ft. (16.8 m)	5	35 ft. (10.7 m)
2	50 ft. (15.2 m)	6	30 ft. (9.1 m)
3	45 ft. (13.7 m)		

Excludes elbow termination, rain caps, or the 4 in. (102 mm) Concentric termination.

### Installation with vent termination kit

Vent type	Diameter	Max. No. of Elbows	Max. Vertical and Horizontal (Total) Vent Length
Intake**	3 in. (76 mm)	6**	60 ft. (18.3 m)*
Exhaust	4 in. (102 mm)	5	55 ft. (16.8 m)*

\*For each 90° elbow added, deduct 5 ft. (1.5m) from max. vent length.

\*\*For Intake vent, refer to the above table of the installation of 6 elbows and 60 ft.

No. of Elbows	Max. Vertical or Horizontal Vent Length	No. of Elbows	Max. Vertical or Horizontal Vent Length
0	55 ft. (16.8 m)	3	40 ft. (12.2 m)
1	50 ft. (15.2 m)	4	35 ft. (10.7 m)
2	45 ft. (13.7 m)	5	30 ft. (9.1 m)

Excludes sidewall termination.

# Combustion Air Supply Options

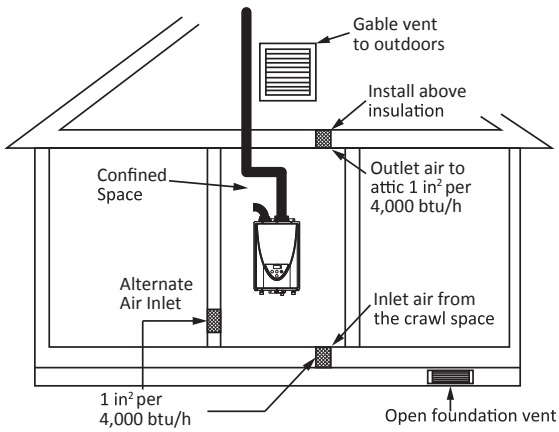


Figure 1 - Direct to outdoors openings

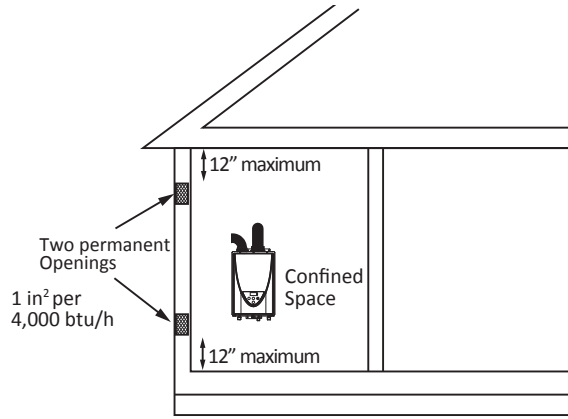


Figure 2 - Direct to outdoors openings  
Two permanent openings

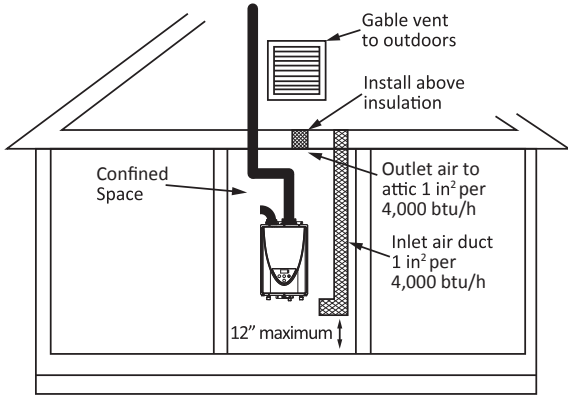


Figure 3 - Vertical duct openings

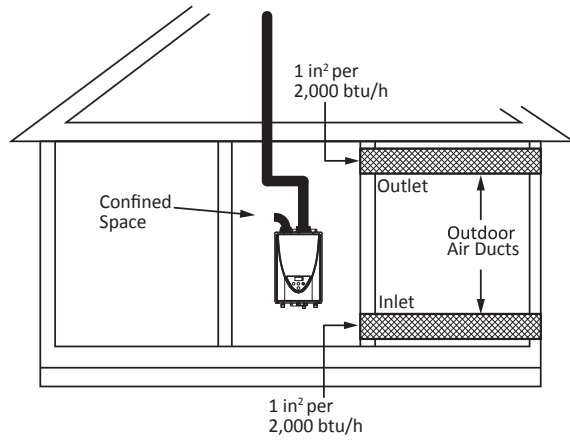


Figure 4 - Horizontal duct openings

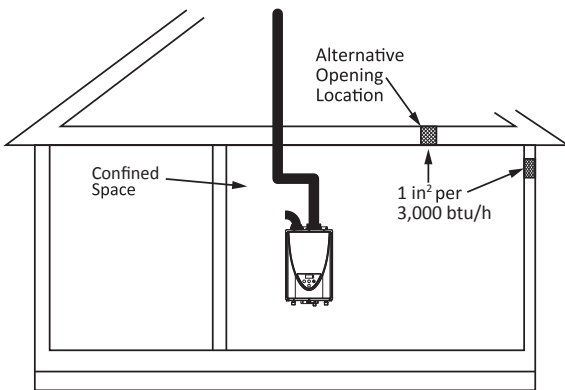


Figure 5 - Single opening

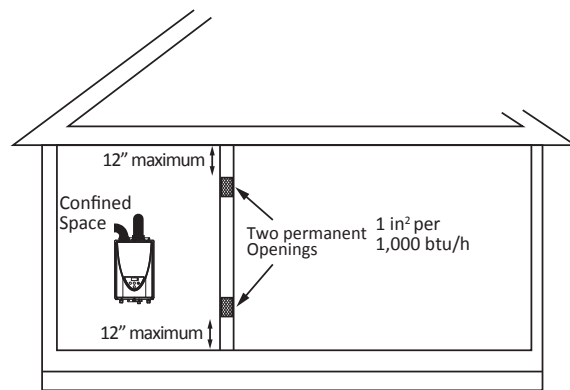


Figure 6 - Two permanent openings

## -Combustion Air Supply-



- This gas boiler requires an adequate source of clean air for combustion and ventilation. Without sufficient air, your boiler may not operate properly and may emit excessive and abnormal amounts of carbon monoxide which may result in carbon monoxide poisoning or death.

Before installing the boiler, you must determine the amount of air needed to supply this boiler and any other gas appliances in the same area and provide adequate air for combustion and ventilation. Consult a qualified person if you're unsure of the proper way to supply air to your boiler.

### Before beginning

Calculate total BTU/h rating of all appliances.

To calculate the combustion air and ventilation required, add up the total BTU/h ratings of all gas burning appliances (e.g., boiler, furnaces, clothes dryers) in the same area. Do not include appliances that are direct vented. Refer to the following example.

**Your boilers's BTU/h rating is on the rating plate. The BTU/h ratings should be on the other appliances' rating plates. If you have trouble determining the BTU/h ratings, contact the manufacturer or have a qualified person determine the ventilation requirements.**

**NOTICE:** If you are replacing your old boiler with one that has a higher BTU/h rating, the amount of ventilation required may be greater.

Example:

Gas Burning Appliance	BTU/h Rating
Gas Boiler	140,000
Furnace	75,000
Dryer	20,000
<b>Total</b>	<b>235,000</b>

Your appliances:

Gas Burning Appliance	BTU/h Rating
Gas Boiler	
<b>Total</b>	

### Does your installation space have sufficient combustion air?

Ventilation with outside air is recommended for all installations. Even if the boiler is installed in a large, open room inside the house, outdoor air is usually needed because modern homes are very tightly sealed and often do not supply enough air to the boiler. However, when installed in a large indoor space, it may be possible to provide enough air without outside ventilation. If you are unsure if your installation location has enough ventilation, contact your local gas utility company or code officials for a safety inspection or direct vent.

The following instructions will help determine if it may be possible to install the boiler without outside ventilation.

Check for Chemicals:

Installations where corrosive chemicals may be present require the boiler to be direct vented. Air for combustion and ventilation must be clean and free of corrosive or acid-forming chemicals such as sulfur, fluorine, and chlorine. Ventilation with outside air will reduce these chemicals, but it may not completely eliminate them. Failure due to corrosive chemicals is not covered by the warranty. Examples of locations that require outside air due to chemicals include:

- Beauty salons
- Photo processing labs
- Indoor pools
- Laundry, hobby, or craft rooms
- Chemical storage areas

Products such as aerosol sprays, detergents, bleaches, cleaning solvents, gasoline, air fresheners, paint and varnish removers, and refrigerants should not be stored or used near the boiler.



### Calculate the air volume of the room

Air requirements depend on the size of the room.

$$\text{Room Volume (ft.}^3\text{)} = \text{Floor Area (ft.}^2\text{)} \times \text{Ceiling Height (ft.)}$$

If there are large objects in the room (e.g., refrigerator, furnace, car), subtract their volume from the volume of the room to get a better estimate of the air available.

$$\text{Air Volume} = \text{Room Volume} - \text{Object Volume}$$

NOTE: Adjoining rooms with permanently opened doorways can be counted as part of the calculation.

### Calculate required air volume

A boiler installed in an unconfined attic, garage, or space requires that the space be at least 50 cubic feet per 1,000 BTU/h of the total input for all gas burning appliances in the same area.

$$\text{Required Air Volume (ft}^3\text{)} = \text{Total Appliance Energy Rating (btu/h)} \times 50 \text{ ft}^3 / 1000 \text{ (btu/h)}$$

Example:

$$(235,000 / 1000) \times 50 = 11,750$$

If the air volume of the room is less than the required air volume, you must direct vent the water heater or provide permanent outside air openings that draw in sufficient air. Go to “Install with outside ventilation” if you want to provide combustion air with outside ventilation.

If the air volume of the room is greater than the required air volume, it may be possible to install the boiler without outside ventilation. However, be sure to consider the effects of exhaust fans. Exhaust fans can affect the amount of combustion air that is available in your home. Appliances such as furnaces, whole house fans, and clothes dryers draw air out of your home. If they draw air out faster than it can be replaced, your boiler may not have enough oxygen to fire properly. Back-drafting may also result, which is when negative air pressure pulls air backwards through chimneys or appliance vents. These events can cause unsatisfactory boiler performance. The best solution is to direct vent the boiler or install an adequate number of make-up air vents. (See “Install with outside ventilation.”) For more information, consult a qualified technician or your local gas utility.

### Install with outside ventilation

Ventilation with outside air is recommended, and, for most installations, is needed. There may be existing ventilation that is adequate, or you may need to add more ventilation.

Supplying outside air to the boiler typically requires two openings. One opening must be within 12 inches from the floor and the second opening must be within 12 inches from the ceiling. Although a single opening is not preferred, you may use a single opening to outside air if the minimum free area is sized according to **Table 1**. Two openings must be used when ventilating with air from another room.

The outside air can be taken from a crawl space or attic open to the outdoors and adequately ventilated. You may use vertical or horizontal ducts.

### Determine type of ventilation

There are several types of ventilation that can be used :

1. Direct to outdoors
2. Vertical ducts
3. Horizontal ducts
4. Single opening (not recommended; must be at least 100 square inches. Not appropriate for confined spaces smaller than 50 cubic feet per 1,000 BTU/h or when getting air from another room.)
5. From a larger room inside the house (not recommended – refer to "Calculate the air volume of the room" above to determine if the combined volume of the rooms may be adequate).

### Determine minimum free area required for each vent opening

The size of the vent openings depends on the total BTU/h rating of all appliances in the space (use your calculation from “Before beginning”) and the type of vent used. **Table 1** provides the minimum free area for each vent opening depending on the type of ventilation.

### Calculate minimum size of vent openings and ducts

The vent cross-sectional area needed to provide the free area depends on the covering on the vent openings. Typical vents use louvers or grilles to protect the opening. The louver or grill itself blocks some of the free area, so the opening may need to be larger to meet the minimum free area requirements.

Use the following formula to calculate the required cross-sectional area:

$$\text{Cross-sectional area} = \text{minimum free area required} \div \text{percent free area of covering (in decimals – e.g., 60\% = 0.6)}$$

For example, an installation area that requires openings with 100 square inches of free area would need 134 square inch openings if using metal louvers rated at 75% free area ( $100 \text{ sq. in.} \div 0.75 = 134 \text{ sq. in.}$ ).

If you do not know the % free area for your louver or grill, use the following values:

- For wood louvers or grilles: 25%
- For metal louvers or grilles: 75%

Follow these rules to ensure that vents and ducts provide adequate air flow:

- Each vent opening must be no smaller than 100 square inches .
- Ducts must have the same cross-sectional area as free area of the opening.
- Rectangular ducts must have a minimum dimension of no less than three inches .
- All screens must have mesh ¼” or larger.
- Moveable louvers must be locked open or interconnected with the equipment so that they open automatically during operation.
- Keep louvers and grilles clean and free of debris or other obstructions.

### Check that air source is clean and free of chemicals

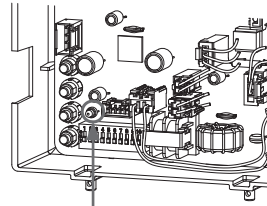
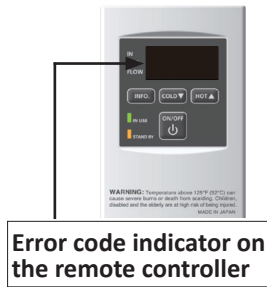
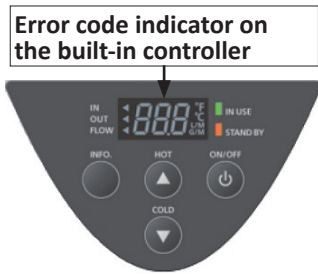
Air for combustion and ventilation must be clean and free of corrosive or flammable chemicals. A failure due to corrosive chemicals in the air is not covered by the warranty. Combustion air must be free of acid-forming chemicals such as sulfur, fluorine, and chlorine. Be sure that air at the vent inlets is free of such chemicals.

<b>Table 1</b>	
Minimum Free Area of Permanent Openings for Ventilation and Combustion Air Supply – Air from outdoor or indoor spaces.	
Based on the total BTU/h input rating for all gas burning appliances within a confined space.	
Opening Source	Minimum Free Area
Direct to outdoors*	1 sq. in. per 4,000 BTU/hr (see Figure 1, 2)
Vertical ducts	1 sq. in. per 4,000 BTU/hr (see Figure 3)
Horizontal ducts	1 sq. in. per 2,000 BTU/hr (see Figure 4)
Single Opening	1 sq. in. per 3,000 BTU/hr (see Figure 5)
Two permanent openings to another room**	1 sq. in. per 1,000 Btu/hr (see Figure 6) Opening: 100 in. <sup>2</sup> MIN. Minimum dimension of air openings: no less than 3 in.
*These openings connect directly with the outdoors through a ventilated attic, a ventilated crawl space, or through an outside wall.	
** For direction on combining spaces in different stories within the structure, refer to the current edition of the National Fuel Gas Code ANSI Z223.1/NFPA 54.	

See graphics on pg. 33.

## -General-

- The units have self-diagnostic functions for safety and convenience when troubleshooting.
- If there is a problem with the installation or the unit, the error code will be displayed on the built-in controller or remote controller.
- Consult the table on the following pages for the description of each error code.



Green LED flashes error code

## -Single unit Installations-

**Example:** If your unit has the “321” error code (which signifies an inlet thermistor failure)

- **Indicator on the built-in controller and/or remote controller:** “321” will be displayed on the screen in its entirety.
- **Green LED on the computer board:** The green LED on the computer board will indicate this code with two flashes every 1/2 second. The pattern will repeat with a three second delay between patterns.



Error code	Green LED
321	

## Error Indication

Error Code on the temperature controller	Green LED	
	The number of flashes	Flash pattern
031 701 711	One	
311 321 331 391 441	Two	
111 121	Three	
611 651 661	Four	
101 991	Five	
510 551 721	Six	

0.5 sec. on, 0.5 sec. off      3 sec. off

## -Fault Analysis of Error Codes-

If the error code is displayed on the computer board of the boiler or the controller, please check the following. After checking, **consult with the manufacturer.**

Remote	Green LED	Malfunction description	Diagnosis
<b>031</b>	One Flash	Incorrect DIP switch setting	<ul style="list-style-type: none"> <li>• Check the DIP switch settings on the PCB (Part #701).</li> </ul>
<b>101</b>	Five Flashes	Warning for the "991" error code	<ul style="list-style-type: none"> <li>• Check the gas type of the boiler.</li> <li>• Check if there is any blockage in the intake air and/or exhaust.</li> <li>• Check if there is enough distance between the exhaust and air intake terminals.</li> <li>• Check the altitude/elevation of area of where the boiler is installed.</li> <li>• Check if there is grease and/or dirt in the burner (Part #101) and the fan motor (Part #103), especially if the boiler has been installed in a contaminated area.</li> </ul>
<b>111*</b>	Three Flashes	Ignition failure	<ul style="list-style-type: none"> <li>• Check if the Hi-limit switch (Part #412) is properly functioning.</li> <li>• Check for connection/breakage of wires (Part #008, 413, 708, 709), burn marks on the computer board (Part #701), and/or soot on the flame rod (Part #107) and the ignitor (Part #108).</li> <li>• Ensure that the gas supply is turned on. If your boiler has been properly converted to use propane, ensure that the tank is not empty.</li> <li>• Check if there is a buzzing spark ignition sound coming from the burner (Part #101) when boiler prepares for combustion.</li> <li>• Listen for the double "clunk" sound coming from the gas valve assembly (Part #102) when the boiler goes into combustion.</li> <li>• Check if there is leaking from heat exchanger (Part #401).</li> </ul>
<b>121*</b>	Three Flashes	Loss of flame	<ul style="list-style-type: none"> <li>• Check if the Hi-limit switch (Part #412) is properly functioning.</li> <li>• Check for connection/breakage of wires (Part #008, 413, 708, 709), burn marks on the computer board (Part #701), and/or soot on the flame rod (Part #107) and the ignitor (Part #108).</li> <li>• Ensure that the gas supply is turned on. If your boiler has been properly converted to use propane, ensure that the tank is not empty.</li> <li>• Check if there is leaking from the heat exchanger (Part #401).</li> </ul>
<b>311*</b>	Two Flashes	Outlet thermistor failure	<ul style="list-style-type: none"> <li>• Check for connection/breakage of wires and/or debris on the thermistor (Part #407, 408, 411, 713).</li> </ul>
<b>321*</b>	Two Flashes	Inlet thermistor failure	
<b>391</b>	Two Flashes	Air-fuel ratio rod failure	<ul style="list-style-type: none"> <li>• Check for connection/breakage of wires (Part #709) and/or soot on the AFR rod (Part #107).</li> </ul>
<b>441</b>	Two Flashes	Flow sensor failure (Only Easy-Link & Multi-Unit System)	<ul style="list-style-type: none"> <li>• Check for connection/breakage of wires and/or debris on the flow sensor impeller (Part #402).</li> <li>• Check water filter. Ensure isolation valves are open.</li> </ul>

Remote	Green LED	Malfunction description	Diagnosis
<b>510</b>	Six Flashes	Abnormal main gas solenoid valve	<ul style="list-style-type: none"> <li>• Check for connection/breakage of wires (Part #708) and/or burn marks on the computer board (Part #701).</li> </ul>
<b>551</b>	Six Flashes	Abnormal gas solenoid valve	<ul style="list-style-type: none"> <li>• Check for connection/breakage of wires (Part #714) and/or burn marks on the computer board (Part #701).</li> </ul>
<b>611*</b>	Four Flashes	Fan motor fault	<ul style="list-style-type: none"> <li>• Check for connection/breakage of wires, dust buildup in the fan motor (Part #103) and/or burn marks on the computer board (Part #701).</li> <li>• Check for frozen/corrosion of connectors (Part #103).</li> </ul>
<b>701*</b>	One Flash	Computer board fault	<ul style="list-style-type: none"> <li>• Check the outlet thermistor (Part #408) as it may need to be cleaned.</li> <li>• Check for connection/breakage of wires (Part #714).</li> </ul>
<b>711*</b>	One Flash	Gas solenoid valve drive circuit failure	<ul style="list-style-type: none"> <li>• Refer to the 111 and 121 error codes.</li> </ul>
<b>721*</b>	Six Flashes	False flame detection	<ul style="list-style-type: none"> <li>• Check if condensate drain is installed on the vent collar of the water heater.</li> <li>• Check if there is leaking from heat exchanger (Part #401).</li> </ul>
<b>741</b>	N/A	Miscommunication between boiler and remote controller	<ul style="list-style-type: none"> <li>• Inspect the connections between the boiler and remote controller.</li> <li>• Check the power supply of the water heater.</li> </ul>
<b>751</b>	N/A	Miscommunication between boiler and built-in controller	<ul style="list-style-type: none"> <li>• Inspect the connections between the boiler and built-in controller.</li> <li>• Check the power supply of the water heater.</li> </ul>
<b>991</b>	Five Flashes	Imperfect combustion	<ul style="list-style-type: none"> <li>• Check the gas type of the boiler.</li> <li>• Inspect the environment around the boiler. Determine how long the unit has been installed.</li> <li>• Check the altitude/elevation of the area of where the water heater is installed.</li> <li>• Check if there is any blockage in the intake air and/or exhaust.</li> <li>• Check whether there is enough distance between the exhaust and air intake terminals.</li> <li>• Check if there is grease and/or dirt in the burner (Part #101) and the fan motor (Part #103), especially if the boiler has been installed in a contaminated area.</li> </ul>

# TROUBLESHOOTING

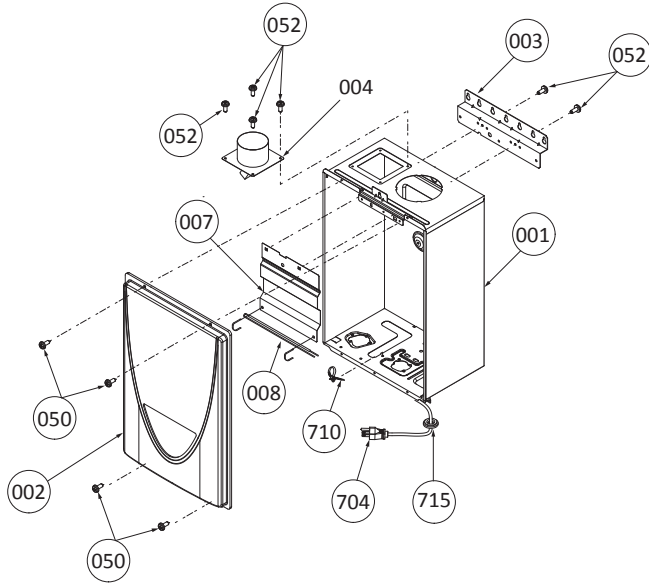
## GENERAL

	PROBLEM	SOLUTIONS
TEMPERATURE and AMOUNT OF HOT WATER	It takes a long time to get hot water at the fixtures. (DHW with Radiant Heating)	<ul style="list-style-type: none"> <li>The time it takes to deliver hot water from the boiler to your fixtures depends on the length of piping between the two. The longer the distance or the bigger the pipes, the longer it will take to get hot water.</li> </ul>
	The water is not hot enough.	<ul style="list-style-type: none"> <li>Compare the flow and temperature.</li> <li>Check cross plumbing between cold water lines and hot water lines.</li> <li>Is the gas supply valve fully open?</li> <li>Is the gas line sized properly?</li> <li>Is the gas supply pressure within specified limits?</li> <li>Is the set temperature set too low?</li> </ul>
	The water is too hot.	<ul style="list-style-type: none"> <li>Is the set temperature set too high?</li> </ul>
	The hot water is not available when a fixture is opened. (DHW with Radiant Heating)	<ul style="list-style-type: none"> <li>Make sure the unit has 120 VAC, 60 Hz power supply.</li> <li>Is the power button on the controller or inside the boiler turned on?</li> <li>Is the gas supply valve fully open?</li> <li>Is the water supply valve fully open?</li> <li>Is the filter on the system clean?</li> <li>Is the hot water fixture sufficiently open to draw at least 0.5 GPM (1.9 L/min) through the boiler?</li> <li>Is the unit frozen?</li> <li>Check for cross plumbing between the hot and cold water lines.</li> </ul>
	The hot water turns cold and stays cold.	<ul style="list-style-type: none"> <li>Is the flow rate enough to keep the boiler running?</li> <li>Is the gas supply valve fully open?</li> <li>Is the filter on the system clean?</li> <li>Are the fixtures clean of debris and obstructions?</li> </ul>
	Fluctuation in hot water temperature.	<ul style="list-style-type: none"> <li>Is the filter on the system clean?</li> <li>Is the gas line sized properly?</li> <li>Is the supply gas pressure within specified limits?</li> <li>Check for cross connection between cold water lines and hot water lines.</li> </ul>

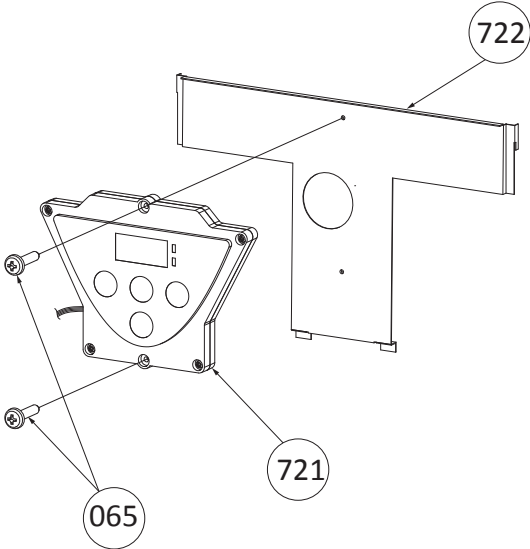
	PROBLEM	SOLUTIONS
Boiler	Unit does not ignite when water goes through the unit.	<ul style="list-style-type: none"> <li>• Is the flow rate over 0.5 GPM (1.9 L/min)?</li> <li>• Check the filter on radiant/dhw plumbing.</li> <li>• Check for reverse connection and cross connection.</li> <li>• If you use the remote controller, is the power button turned on?</li> <li>• Check if the inlet water temperature is too high. If it is too close to the set temperature, the boiler won't work (Shorty Cycling).</li> <li>• Is the gas supply turned on?</li> <li>• Is power available to the unit? If so, is the power button on the controller or inside the water heater turned on?</li> </ul>
	The fan motor is still spinning after operation has stopped.	<ul style="list-style-type: none"> <li>• This is normal. After operation has stopped, the fan motor keeps running from 15 to 70 seconds in order to re-ignite quickly, as well as purge all the exhaust gas out of the flue.</li> </ul>
	Unit sounds abnormal while in operation	<ul style="list-style-type: none"> <li>• Contact the Hydro-Smart Inc. PH: 763-331-3066 or by E-mail: info@hydro-smart.com</li> </ul>
Buit-in controller and remote controller	Built-in and remote controller do not display anything when the power button is turned on.	<ul style="list-style-type: none"> <li>• Make sure the unit is supplied with power.</li> <li>• For the remote controller: Make sure the connection to the unit is correct.</li> </ul> <div style="text-align: center;"> <p>When the controller turned ON, STAND BY LED is lit.</p> </div>
	An ERROR code is displayed.	<ul style="list-style-type: none"> <li>• When the unit has not operated for five minutes or more, the display turns off to conserve energy.</li> <li>• Please see Error Codes section.</li> </ul>

# Components Diagram

## Case Assembly

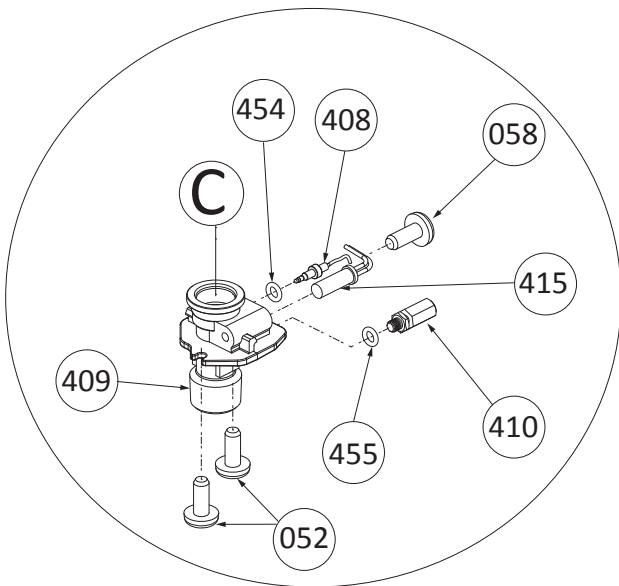
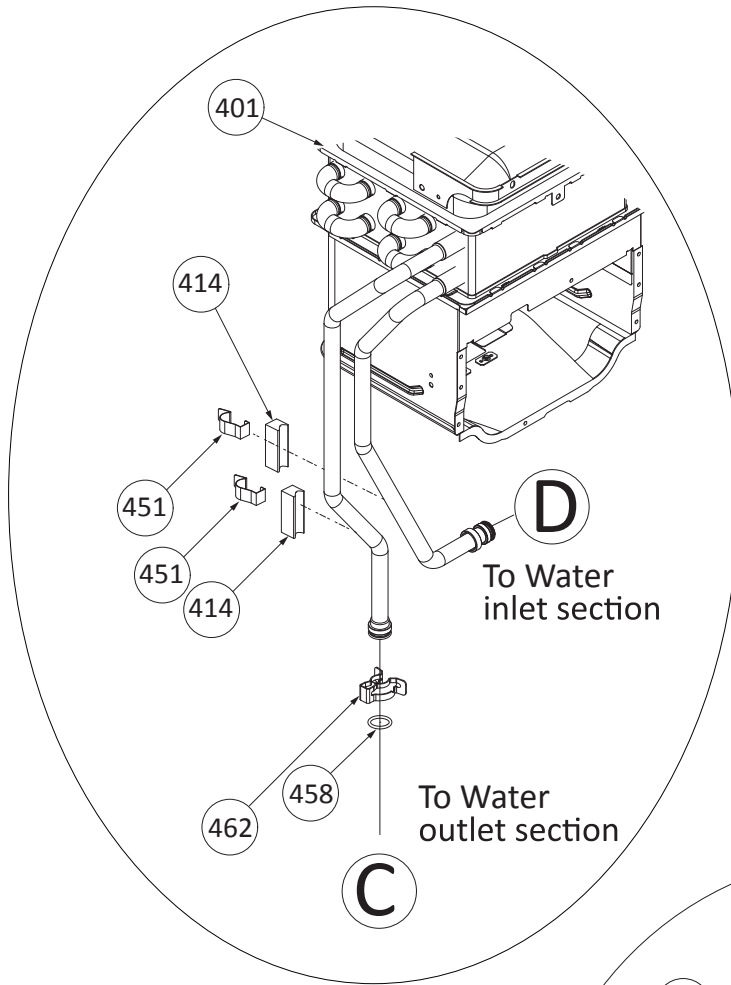


## Built-in Temperature Controller

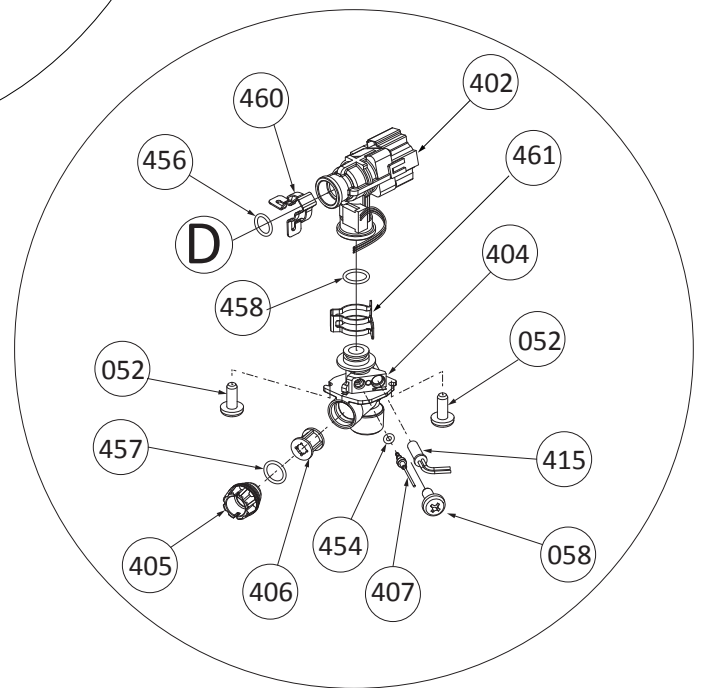




# Water Way Assembly

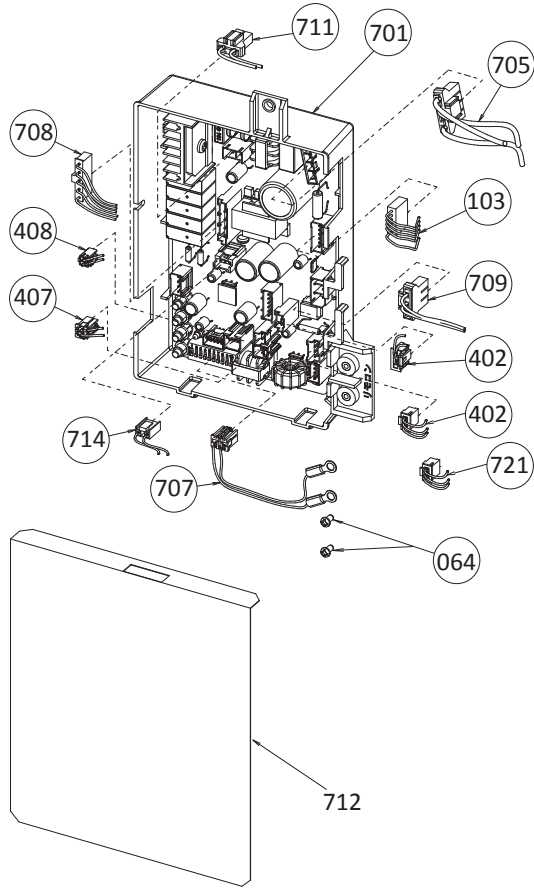


**Water outlet section**

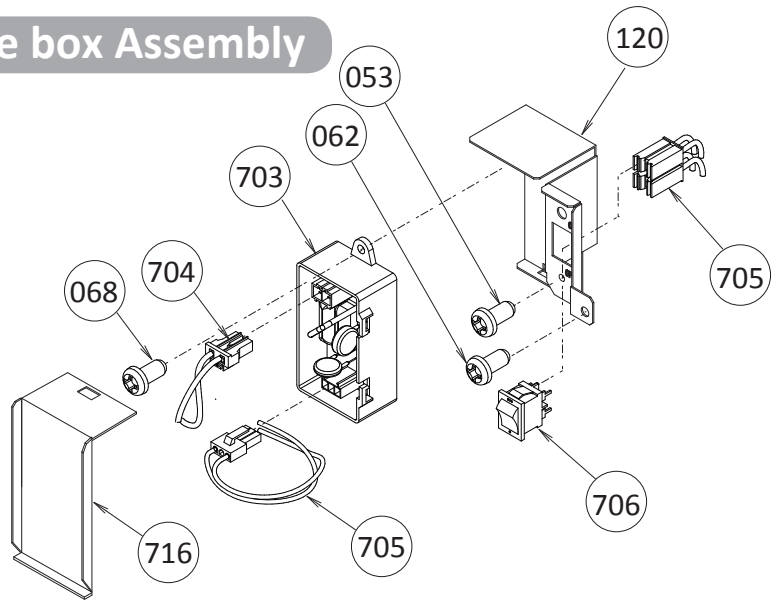


**Water inlet section**

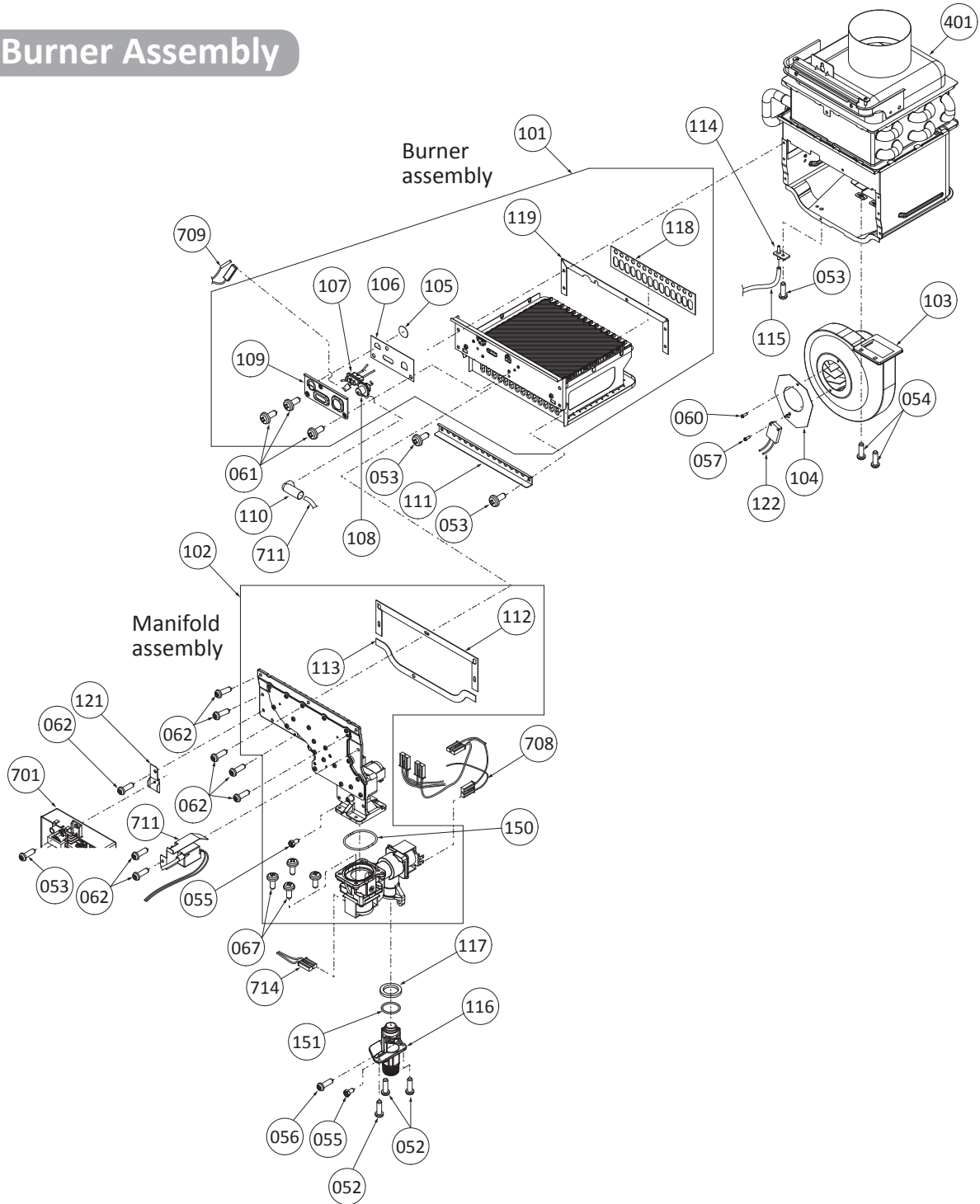
# Computer board Assembly



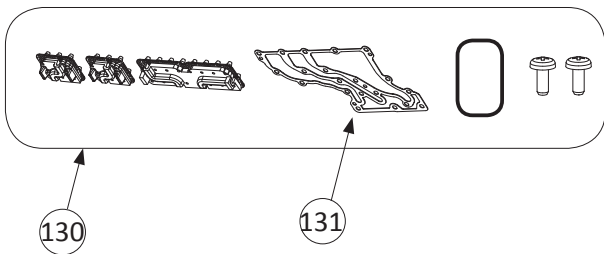
# Surge box Assembly



# Burner Assembly



# LP Conversion Kit



# PARTS LIST

Item #	Description	Part #	
		HS115 PLUS	
001	Case assembly for Indoor models	N/A	EK596
002	Front cover for Indoor models	N/A	EK598
003	Bracket	N/A	EK455
004	Intake air port assembly	N/A	EK600
005	Junction box	319143-510	EK190
006	Power supply cord assembly	319143-437	EKK4D
007	Back guard panel	N/A	EK601
008	Overheat-cut-off fuse for combustion chamber	319143-016	EM484
050	Truss screw M4x12 (W/Washer) SUS410	319143-025	EW000
051	Truss screw M4x10 (W/Washer) SUS410	319143-325	EW001
052	Truss screw M4x10 (Coated) SUS3	319143-026	EW002
053	Truss screw M4x10 SUS	319143-060	EW003
054	Hex head screw M4x12 (W/Washer) SUS3	319143-326	EW004
055	Hex head screw M4x8 FEZN	319143-063	EW005
056	Pan screw M4x10 FEZN	319143-062	EW006
057	Pan Screw M3x10 SUS	319143-327	EW008
058	Tapping screw M4x6 SUS3 Truss head	319143-328	EW009
059	Tapping screw M3x6 SUS3 Pan head	319143-087	EW00A
060	Screw M3x6 SUS3 Binding head	320273-330	EW00B
061	Pan screw M4x8 MFZN	319143-059	EW00D
062	Tapping screw M4x14 SUS410 Truss head	320273-491	EW00E
063	Screw M3x12 BSNI Raised counter sunk head	319143-331	EW00X
064	Screw M3x6 BSNI Binding head	319143-439	EW016
065	Pan screw M4x20 SUS410	N/A	EW018
066	Truss screw M4x8 SUS3	N/A	EW02A
067	Tap tight screw M4x12 FEZN	319143-201	EKK31
068	Truss screw M4x10 MFZN3	319143-372	EX014
101	Burner assembly	319143-555	EK554
102	Manifold with gas valve assembly NA	319143-556	EK555
103	Fan motor for Indoor models	319143-443	EK109
104	Fan motor plate for Indoor models	319143-282	EM381
105	Burner window	320273-625	EKN58
106	Rod holder gasket	319143-560	EK559
107	Flame rod with AFR function	319143-561	EK560
108	Igniter rod	319143-562	EK561
109	Rod holder	319143-563	EK562
110	Rod cap	320273-358	EK462
111	Burner damper	100270556	EK602
112	Manifold gasket A	319143-565	EK564
113	Manifold gasket B	319143-566	EK565
114	Pressure port	319143-042	EKK2D
115	Combustion chamber tube	319143-344	EX019
116	Gas inlet	319143-050	EKK1E
117	Gas inlet ring	319143-049	EKK2Z

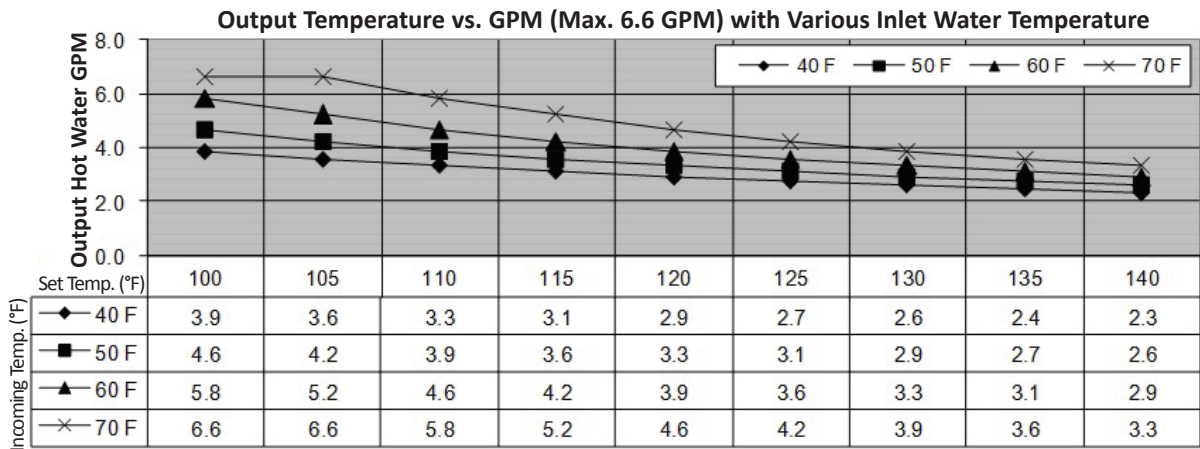
Item #	Description	Part #	
		HS115 PLUS	
118	Burner gasket	319143-568	EK567
119	Burner holder gasket	319143-569	EK568
120	Surge box plate	319143-176	EK436
121	PCB fixing plate	N/A	EK603
122	Thermostat	319143-185	EKJ59
130	LP Conversion kit	100270585	EK604
131	Manifold gasket	319143-581	EK592
150	O-ring P18 NBR (Manifold)	N/A	EK570
151	O-ring P20 NBR (Black)	319143-057	EK042
152	Silicon ring for Outdoor models	319143-206	EKK3G
153	Rain protection plate in Exhaust chamber for Outdoor models	319143-216	EKK53
154	Exhaust port for Outdoor models	319143-219	EKK56
401	Heat exchanger assembly	100270557	EK605
402	Flow adjustment valve / Flow sensor	319143-463	EK129
404	Water inlet	319143-193	EKK1U
405	Inlet drain plug	319143-197	EKK2B
406	Inlet water filter	319143-198	EKK2C
407	Inlet thermistor	319143-214	EKK4J
408	Outlet thermistor	319143-529	EK207
409	Water outlet	319143-466	EK104
410	Outlet drain plug	319143-079	EK239
412	Hi-Limit switch for	319143-228	EM212
413	Overheat-cut-off fuse for heat exchanger	319143-067	EX02A
414	Pipe heater	319143-531	EK209
415	Inlet heater	319143-468	EK105
416	Pipe inlet	100270581	EK609
417	Joint outlet	319143-576	EK577
450	Fuse fixing plate 40	N/A	EK616
451	Heater fixing plate 16	319143-125	EK031
452	Fuse fixing plate 18	N/A	EK476
453	Pipe heater fixing plate	N/A	EK610
454	O-ring P4 FKM	319143-082	EZM04
455	O-ring P6 FKM	319143-080	EZM06
456	O-ring P14 FKM	319143-100	EZM14
457	O-ring P15 FKM	319143-091	EZM15
458	O-ring P16 FKM	319143-083	EZM16
460	Fastener "14-22"	319143-105	EKK24
461	Fastener "16A"	319143-226	EM192
462	Fastener "16-25A"	319143-205	EKK39
463	Silicon ring for Indoor models	319143-065	EKN50

Item #	Description	Part #	
		HS115 PLUS	
701	Computer board	100270582	EK611
703	Surge box	320273-128	EK280
704	120 VAC wire for Indoor models	319143-427	EK146
705	Switch wire	N/A	EK614
706	120 VAC Power ON-OFF switch	N/A	EK590
707	Remote controller wire	319143-490	EK189
708	Gas valve wire	N/A	EK585
709	Flame rod wire	N/A	EK586
710	Cable strap	319143-425	EW022
711	Igniter assembly	319143-479	EK153
712	Computer board cover	319143-274	EM329
714	Proportional gas valve wire	319143-481	EK112
715	Rubber grommet for Indoor models	319143-426	EK184
716	Surge box cover	N/A	EK615
721	Temperature controller	319143-502	EK173
722	Controller fixing plate	N/A	EK588
N/A	Communication cable for linking	320273-585	EKKOJ

## OUTPUT TEMPERATURE CHART

Chart is based on properly sized gas line

### HS115 PLUS



# Boiler Notes:

Hydro Shark®