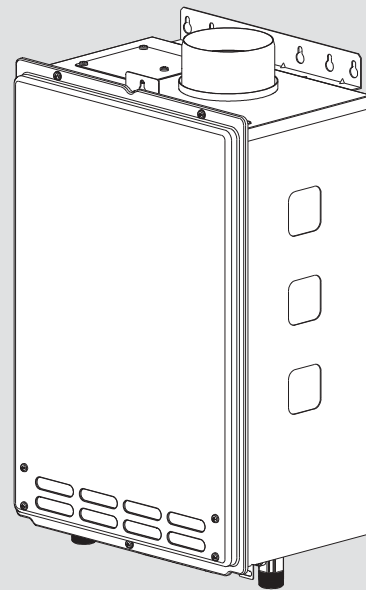


# OPERATION AND INSTALLATION UTILISATION ET INSTALLATION

Non-Condensing Gas Micro-boiler

- » HydroShark 115NG
- » HydroShark 115LP



Conforms to ANSI Z21.10.3/CSA 4.3  
Conforme à la norme ANSI Z21.10.3/CSA 4.3

**STIEBEL ELTRON**

# HydroShark 115 Gas Micro Boiler

## Installation Manual and Owner's Guide

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

### Models:

HydroShark 115NG  
HydroShark 115LP

### Featuring

- Efficiency: 83 %
- Wall Hung
- Flow Activated: .75 GPM
- Copper Heat Exchanger
- Temperature Range: 99°-167° F\*
- Freeze Protection
- Power Vent
- CAT III Stainless Steel Venting

\*Max Water Temp of 167° F at 2.4 GPM



**Do not return. Damages or repairs call  
800.805.5384**

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

-Do not store or use gasoline or other flammable vapors and liquids 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**

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# Installation Manual

## 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		HydroShark 115	
Natural Gas Input (Operating Range)		Min: 19,500 Btu/h Max: 140,000 Btu/h	
Propane Input (Operating Range)		Min: 19,500 Btu/h Max: 140,000 Btu/h	
Gas Connection		¾" NPT	
Water Connections		¾" NPT	
Water Pressure		15 - 150 psi*	
Natural Gas Inlet Pressure		Min. 5.0" WC Max. 10.5" WC	
Propane Inlet Pressure		Min. 8.0" WC Max. 14.0" WC	
Manifold Pressure**	Natural	2.0" WC	
	Propane	2.5" WC	
Weight		33 lbs.	
Dimensions		H20.5" x W13.8" x D6.7"	
Ignition		Electric Ignition	
Electric	Supply		120 VAC / 60 Hz
	Consumption	Operation	73.1 W / 0.61 A
		Standby	6.2 W / 0.05 A
		Freeze- Protection	111 W / 0.93 A

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

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

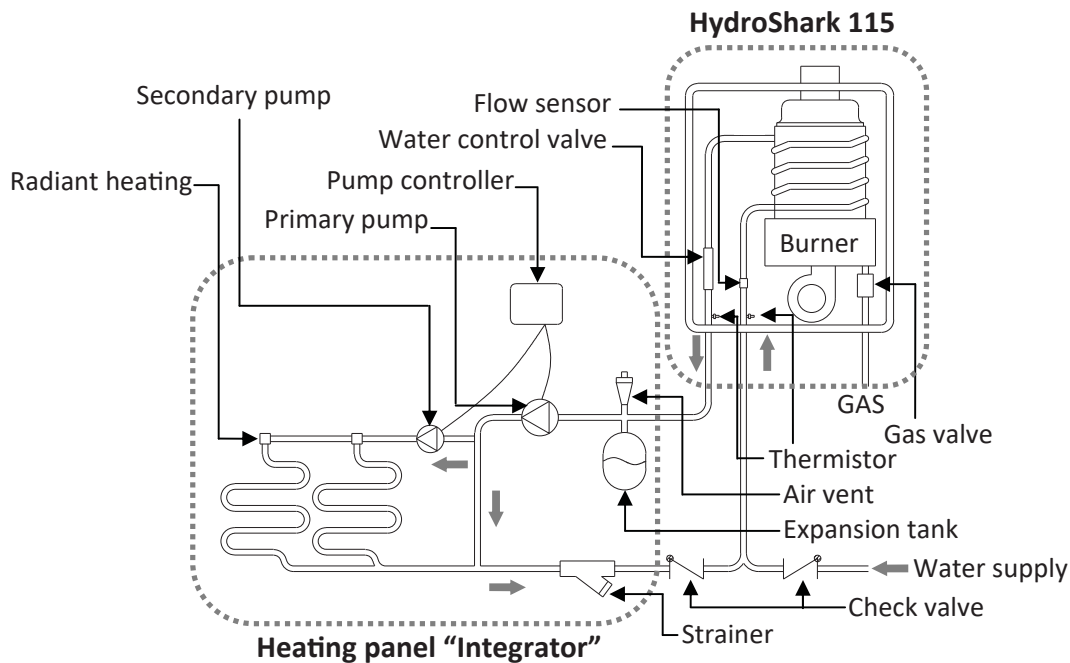
## NOTE:

- 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 HydroShark DHW Integrator 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 DHW Integrator 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



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



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



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

## 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, 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 National Electrical Codes: 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 micro boiler. Please ensure:
  - Your micro boiler will have enough combustible air and proper ventilation
  - Locate your micro 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.**
5. \*If this unit does not match your requirements, **do not install and consult with the manufacture.**
6. If any problem should occur, turn off the unit and unplug the zone controls for the space heating and/or DHW Integrator Panel system zone controls and turn off the gas. Then call a trained technician or the Gas Company or the manufacture.



- Water temperature 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. If using micro boiler with HydroShark DHW Integrator Panel, always check the water temperature. Always verify emitter water delivery temperature requirements to avoid damage.
- Do not store or use gasoline or other flammables, vapors, or liquids in the vicinity of this appliance.
- Do not reverse the fluid and/or gas connections as this will damage the gas valves and can cause sever injury or death.
- Do not use this appliance if any part has been in contact with or been immersed in water. Immediately call a licensed plumber, a licensed gas fitter, or a professional service technician to inspect and/or service the unit if necessary.
- 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, Propane Installation Code in Canada.
2. All gas micro 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. Refer to the “Clearances” section for proper clearance.
5. The micro 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 connections requires a means of disconnections, to terminate power to the micro boiler for servicing and safety purposes.
7. Do not install the unit where the exhaust vent is pointing into any opening in the building or where the noise may disturb your neighbors. Make sure the vent termination meets the required distance by local code from any doorway or opening to prevent exhaust from entering a building.
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 micro boiler. Regularly ensure that the area around the unit is dust or debris free. Regular maintenance is recommended for these types of environment.
9. If you will be installing the micro boiler in a contaminated area with a high level of dust, sand , flour, aerosols or other contaminates/chemicals, they can become airborne and enter and build up within the fan and burner causing damage to the micro boiler.
10. For the HydroShark 115:
  - This unit may be converted to a direct-vent appliance by installing a direct-vent conversion kit. (TK-TV10) which will bring in all required combustible air from outside the building. When installing the direct-vent conversion kit, please follow all instructions included with the kit.
  - If the boiler is used as a direct vent appliance, the unit requires 3” combustible air supply pipe. The intake pipe must be sealed airtight. Air supply pope can be made of ABS, PVC, galvanized steel, corrugated aluminum , corrugated stainless steel or Category III stainless steel.
  - Terminating the venting through a sidewall is recommended for the direct-vent system.
  - Running the exhaust vent and the intake pipe parallel is recommended.
  - Terminate the exhaust and intake on the same wall / surface is recommended. Terminating the same pressure zone allows for pressure balancing, which prevents nuisance shutdowns.





## WARNING

- **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 for the micro boiler and for compliance with all national, state / provincial, and local codes.**
- **The manufacturer does not recommend installing the micro 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 clothes dryer, that can cause debris to be trapped inside the combustion chamber, unless the system is direct vented.
- **The manufacturer does not recommend installing the micro boiler in an attic due to safety issues.** If you install the micro boiler in an attic:
  - Make sure the unit will have enough combustion air and proper ventilation.
  - Keep the area around the micro boiler clean. When dust collects on the flame sensor, the micro boiler will shut down on 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 to be installed under the micro boiler in case of leaks.

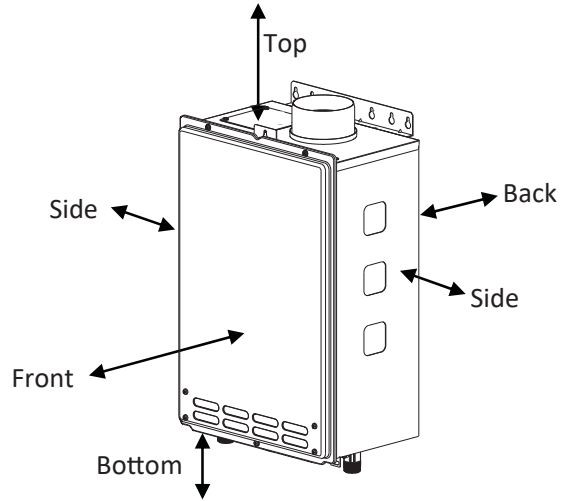
## NOTICE

- **The warranty will not cover damage cause by water quality.**
  - Only distilled water or distilled water/glycol mixtures can be used with this micro boiler, unless when used in-conjunction with Stiebel Eltron DHW Integrator Panel system. Do not introduce pool or spa water, or any chemically treated water into the micro boiler.
  - Water hardness levels must not exceed 7 grains per gallon (120 ppm) for single family 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 micro 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 no install the micro boiler where water, debris, or flammable vapors may get into the flue terminal.
- Although the micro 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



Maintain all clearances around the micro boiler. Failure to do so could create a fire hazard, potentially leading to death, serious injury, and/or property damage.





Model	Top	Bottom	Front	Back	Sides
HydroShark 115*	12"	12"	24"	1"	2 "

\*Standard indoor installations and direct-vent indoor installations have the same clearances.

## INCLUDED ACCESSORIES

Check that these items below are included with the micro boiler.

<p><b>1. Installation Manual and Owner's Guide</b></p>  <p>Qty: 1</p>	<p><b>2. Remote controller 900766605 (TK-RE02)</b></p>  <p>Qty: 1</p>
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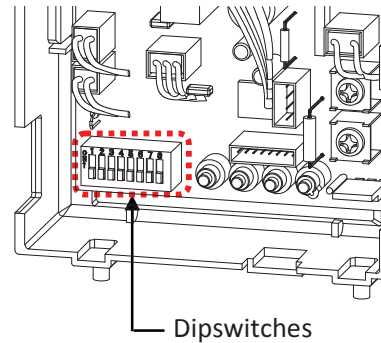
## HIGH-ALTITUDE INSTALLATIONS

Check the elevation where your micro boiler is installed. Set DIP switches shown in the table below depending on the altitude.

Altitude	0 to 2,000 ft (DEFAULT)	2,000 to 4,000 ft	4,000 to 6,000 ft	Over 6,000 ft
Switch No.3	OFF	ON	OFF	
Switch No.4	OFF	OFF	ON	



The dark squares indicate the direction the dipswitches should be set to.



## VENTING INSTRUCTIONS

### **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.

This appliance 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 in the United States and/or Section 8 of the B149.1 Natural Gas and Propane Installation Code in Canada, as well as applicable local building codes. The manufacturer recommends NovaVENT or Z-Vent Category III, single wall, stainless steel venting.

The boiler can obtain its combustion air from the space that it is installed in or it can be direct vented using the direct vent conversion kit (TK-TV10). Ensure the location has sufficient, clean combustion air.

#### **General rules for venting micro boilers are:**

- Place the micro boiler as close as possible to the vent termination.
- The vent collar of the micro boiler must be fastened directly to an unobstructed vent pipe.
- Do not weld the vent pipe to the micro boiler's vent collar.
- Do not cut 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.
- The micro boiler vent must not be connected to any other gas appliance or vent stack except an approved common venting system.
- Avoid using an oversized vent pipe or using extremely long runs of the pipe unless it is part of an approved common vent system.
- For rooftop venting, a rain cap or other form of termination that prevents rain water from entering into the micro boiler must be installed.
- Do not terminate vent into chimney. If the vent must go through the chimney, the vent must run all the way through the chimney with approved vent pipe.

#### **General rules for vent terminations:**

- Avoid locating the micro boiler vent termination near any air intake devices. These fans can pick up the exhaust flue products from the micro 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 be at least 12 in. (305 mm) above grade, but the installer may determine if it should be higher depending on the job site condition and applicable codes.
- A proper sidewall termination is recommended when the micro boiler is vented through a sidewall.
- Be sure to check the clearance from the exhaust termination to the air inlet or opening in the vent termination clearances section.

## Combustion Air Supply

### NOTICE

- The guidelines in this section apply to installations within the United States. All U.S. installation must conform to the National Fuel Gas Code, ANSI Z223.1/ NFPA 54 (current edition) and local codes.
- Canadian requirements differ from the guidelines in this section. In Canada, follow the requirements of B149.1 (Natural Gas and Propane Installation Code, current edition) as well as local and provincial codes. Contact your local code enforcement agency for direction.



### WARNING

This micro 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 an 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.

### Check for Chemicals:

Air for combustion and ventilation must be clean and free of corrosive chemicals. If corrosive chemicals, such as sulfur, flouring, or chlorine are present, the boiler must be direct vented. Failure due to these corrosive chemicals is not covered by the warranty.

### WARNING!

In all cases, ensure that corrosive chemicals are not present at the air intake. Presence of such chemicals at the air intake could result in death, personal injury, or property damage. 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, varnish removers, and refrigerants should not be stored or used near the micro boiler.

## Exhaust Venting

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. For best results, a vent system should be as short and straight as possible.

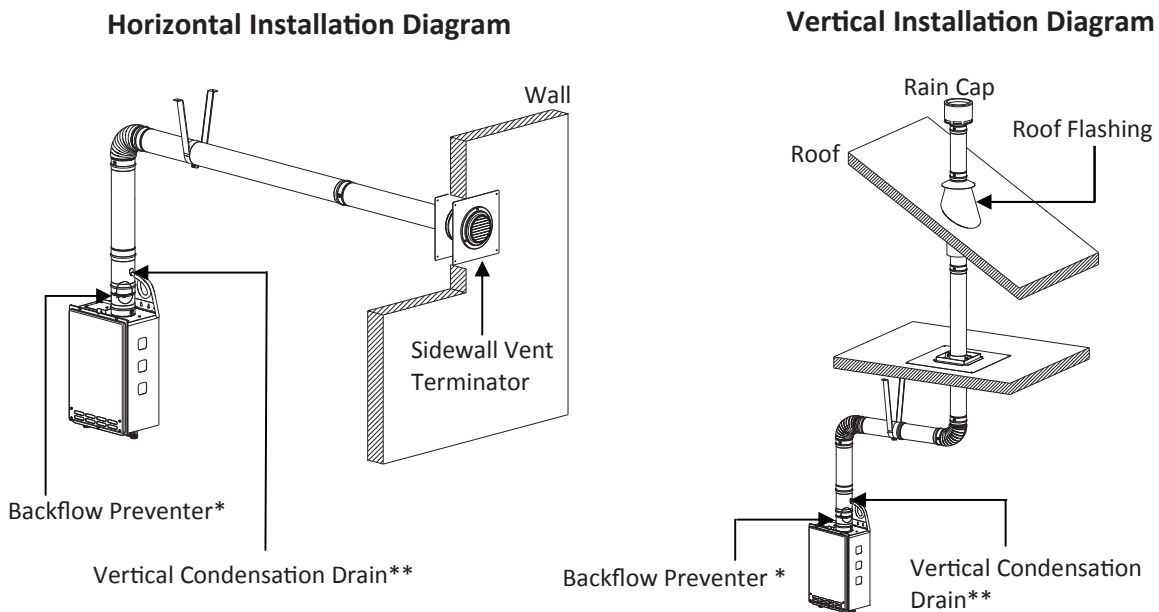
- This boiler is a Category III appliance and must be vented accordingly with any 4" vent approved for use with Category III or Special BH type gas vent.
- **Follow the vent pipe manufacturer's instructions when installing vent pipe.**
- **Do not common vent this appliance with any other vented appliance.** (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.
- When the vent run exceeds 5 ft. (1.5 m), a condensate drain is recommended. It should be installed as close to the boiler as possible.
- The maximum length of exhaust vent piping must not exceed 50 ft. (15.2 m) (deducting 5 ft. (1.5 m) for each elbow used in the venting system.) Do not use more than 5 elbows.

Diameter	Max. No. of Elbow	Max. Vertical and Horizontal (Total) Vent Length
4"	5	50 ft.

\*For each elbow added, deduct 5 ft. from max. Vent length.

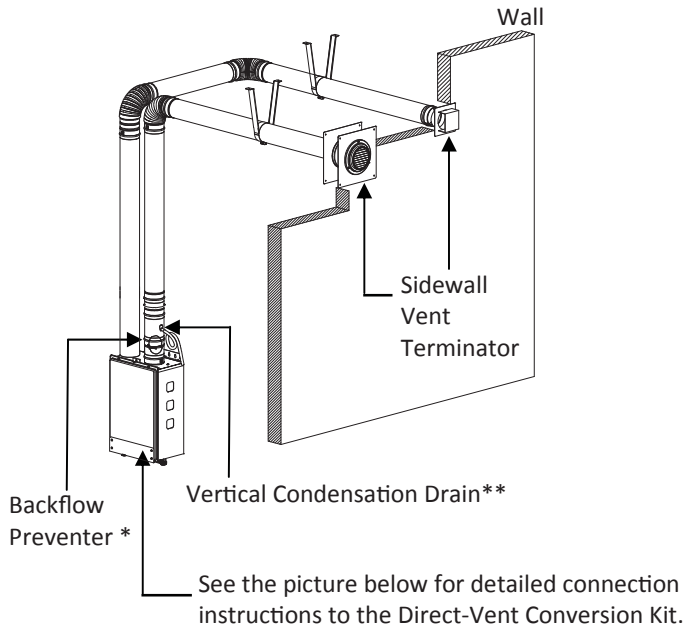
No. of Elbows	Max. Vertical or Horizontal Length
0	50 ft.
1	45 ft.
2	40 ft.
5	25 ft.

## Venting Illustrations

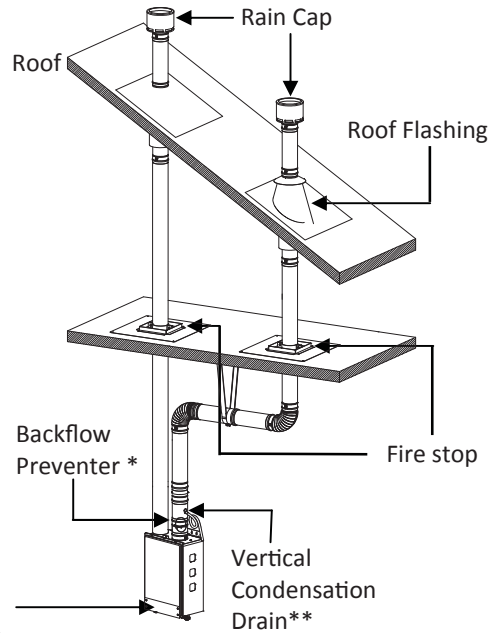


## Venting Illustrations

**Horizontal Installation Diagram  
(With direct-venting)**



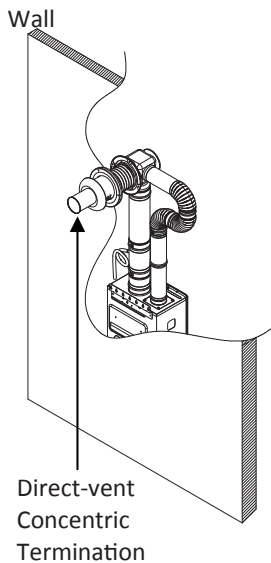
**Vertical Installation Diagram  
(With direct-venting)**



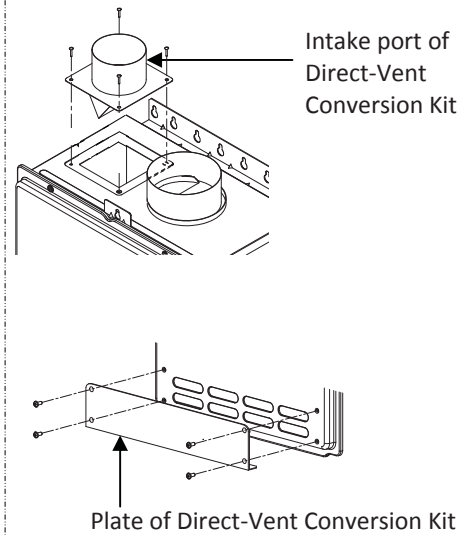
\*Backflow Preventer (Recommended for freezing weather conditions: 36°F and below)

\*\*Vertical Condensation Drain must be installed accordance with local codes.

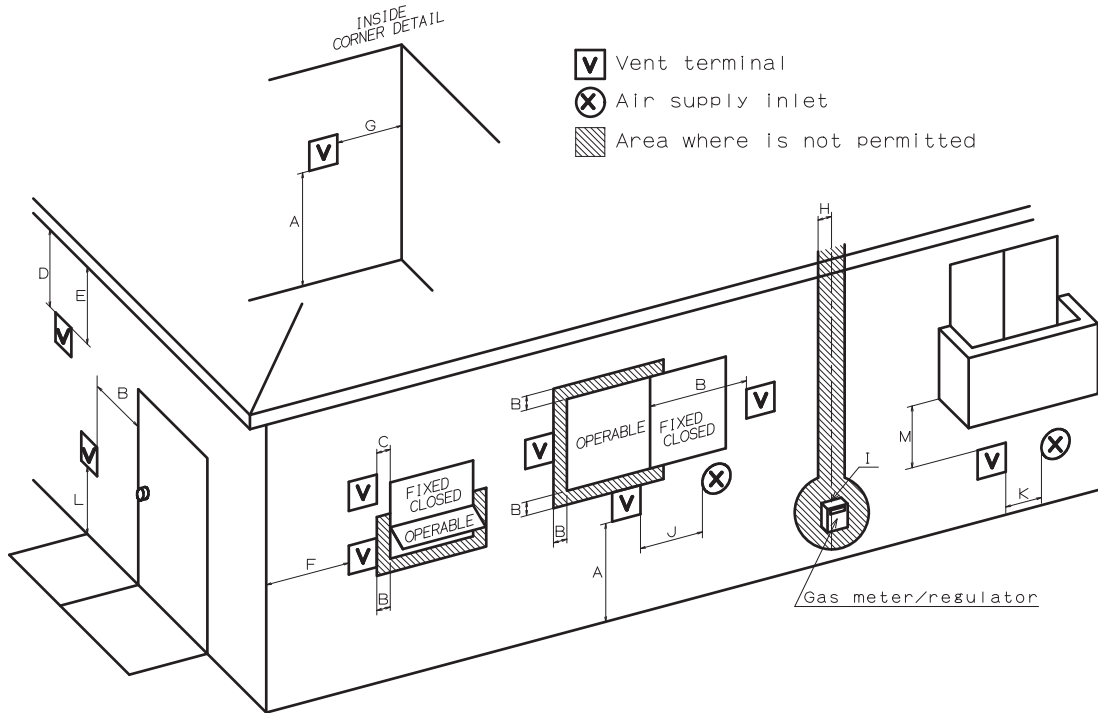
**Horizontal Installation Diagram  
With Direct-Vent Concentric  
Termination**



**Installation Diagram of Direct-Vent  
Conversion Kit**



## Vent Termination Clearances



		Canada	U.S.A	
		Direct vent and other than Direct Vent	Direct vent	Other than Direct Vent
A	Clearance above grade, veranda, porch, deck, or balcony.	1 foot	1 foot	1 foot
B	Clearance to window or door that may be opened.	3 feet	1 foot	4 feet from below or side opening. 1 foot 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	*	*	*
H	Clearance to each side of center line extended above meter/regulator assembly	3 feet	*	*
I	Clearance to service regulator vent outlet.	3 feet	*	*
J	Clearance to non-mechanical air supply inlet to building or the combustion air inlet to any other application.	3 feet	1 foot	4 feet from below or side opening. 1 foot from above opening.
K	Clearance to mechanical air supply inlet.	6 feet	3 feet	3 feet
L	Clearance above paved sidewalk or paved driveway located on public property.	7 feet	*	7 feet
M	Clearance under veranda, porch deck, or balcony.	1 foot	*	*

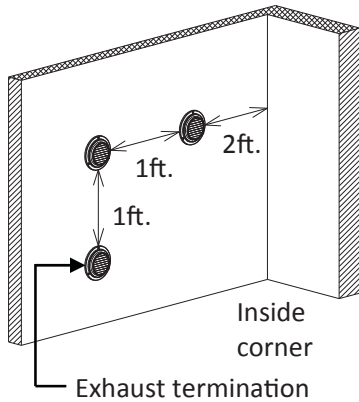
\*For clearances not specified in ANSI Z223.1 / NFPA 54 or CAN/CSA-B149.1, please use clearances in accordance with local installation codes and the requirements of the gas supplier.



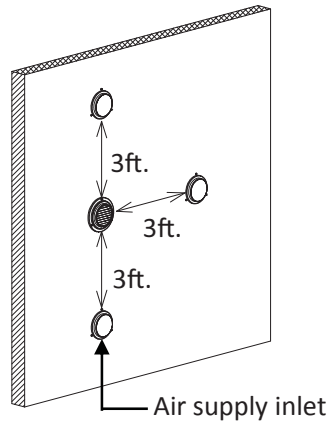


Please follow all local and national codes in regards to proper termination clearances. In the absence of such codes, the following clearances can be used as guidelines. Local codes supersede these guidelines.

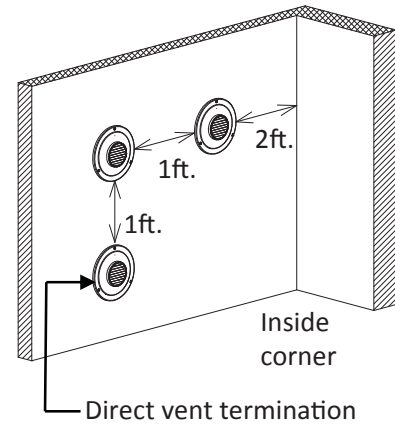
### For sidewall terminations



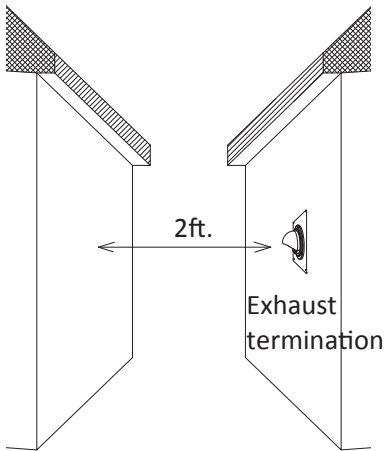
For multiple sidewall exhaust terminations (e.g. multi-unit systems), an exhaust termination must be at least 1 ft. away from another exhaust termination. An exhaust termination must also be at least 2 ft. away from an inside corner (if the adjacent wall is less than 2 ft. of length, the minimum required 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. away from each other, no matter the orientation.

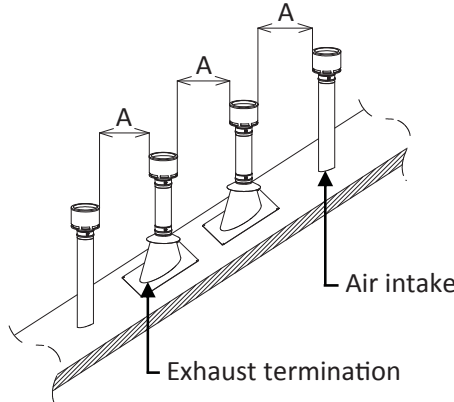


For multiple-unit, direct-vent sidewall terminations that combine the intake and exhaust into a single penetration, space each direct-vent termination at least 1 ft. away from each other, no matter the orientation. A direct-vent termination must also be at least 2 ft. away from an inside corner (if the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

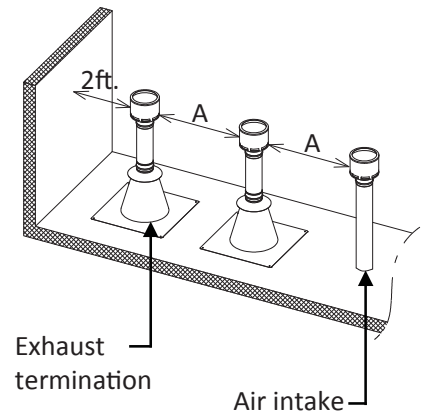


Exhaust and/or direct-vent sidewall terminations should be at least 2 ft. away from an opposite surface/wall. Do not place the termination directly in front of an opening into a building.

### For rooftop terminations



A: In accordance with local codes



For multiple-unit rooftop terminations (whether for standard indoor 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. away from a wall or surface.

## GAS SUPPLY AND GAS PIPING SIZE



CAUTION

- Check that the type of gas matches the rating plate first.
- Ensure that any and all gas regulators are operating properly and providing gas pressures within the specified range shown below. **Excess gas inlet pressure may cause serious accidents.**
- Conversion of this unit from natural gas to propane or vice versa will void all warranty. Contact your local distributor to get the correct unit for your gas type. **The manufacturer is not liable for any property and/or personal damage resulting from gas conversions.**

- The minimum and maximum inlet gas pressures are:

Gas type	Inlet gas pressure
Natural Gas	Min. 5.0" WC – Max. 10.5" WC
Propane	Min. 8.0" WC – Max. 14.0" WC

- Inlet gas pressures that fall outside the range of values listed above may adversely affect the performance of the micro boiler. These pressures are measured when the micro boiler is in full operation.
- Inlet gas pressure must not exceed the above maximum values; gas pressure above the specified range will cause dangerous operating conditions and damages to the unit.
- Until testing of the main gas line supply pressure is completed, ensure the gas line to the micro boiler is disconnected to avoid any further damage.

### **Gas connections**

1. Install a manual gas shutoff valve between the micro boiler and the gas supply.
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 bubble or by using a gas leak detection device.
  - The micro boiler and its individual shutoff valve must be disconnected from the gas supply piping system during any pressure testing of that system at the test pressures in excess of 1/2 psi (3.5kPa).
  - The micro 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 debris and/or water before connecting to the gas inlet.

**NOTICE**

Size the gas pipe appropriately to supply the necessary volume of gas required for the micro boiler using ANSI Z223.1/NFPA 54 in the USA or B149.1 in 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 micro boiler requires 140 Cubic ft./hr.**

Unit: Cubic Feet per Hour

Pipe Size	Length												
Diameter	10'	20'	30'	40'	50'	60'	70'	80'	90'	100'	125'	150'	200'
¾"	363	249	200	171	152	138	127	118	111	104	93	84	72
1"	684	470	377	323	286	259	239	222	208	197	174	158	135
1 ¼"	1,404	965	775	663	588	532	490	456	428	404	358	324	278
1 ½"	2,103	1,445	1,161	993	880	798	734	683	641	605	536	486	416
2"	4,050	2,784	2,235	1,913	1,696	1,536	1,413	1,315	1,234	1,165	1,033	936	801

## Propane (LP) Supply Piping

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

Unit: kBtu per Hour

Pipe Size	Length												
Diameter	10'	20'	30'	40'	50'	60'	70'	80'	90'	100'	125'	150'	200'
¾"	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 ¼"	2,205	1,496	1,212	1,039	913	834	771	724	677	630	567	511	440
1 ½"	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

For more information, please see the below.

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

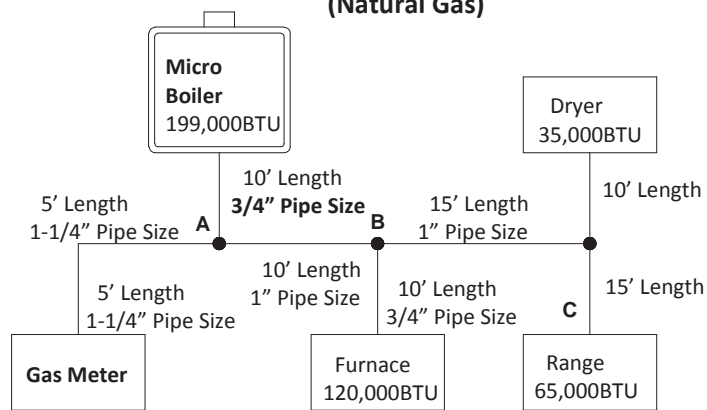
Divide each appliance's BTU/h requirement by 1,000 BTU/ft<sup>3</sup> to get the appliances ft<sup>3</sup>/h requirement.

Take into account the distance the appliance is from the gas meter, 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 requirements of 220 cubic ft. of gas per hour. The farthest appliance is the range, which is 50 ft. away from the meter. Looking at the above chart, and under column of 50 ft., Section A to B needs to be 1" in order to supply 220 cubic ft.

### Gas Sizing Example (Natural Gas)



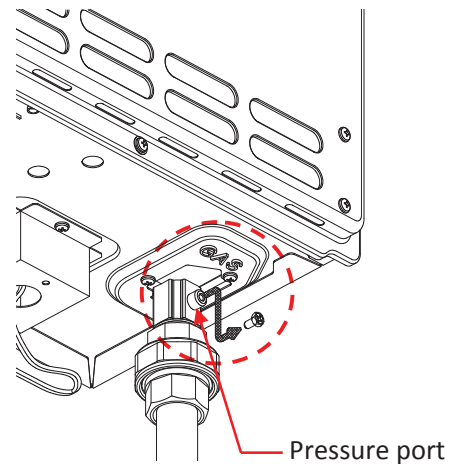
## Measuring inlet gas pressure



1. Turn off all electric power to the micro boiler if service is to be performed.
2. Turn the manual gas valve located on the outside of the unit clockwise to the off position.
3. Failure to follow these steps could lead to a fire or explosion, resulting in personal injury or death.

The micro boiler cannot perform properly without sufficient inlet gas pressures. Below are instructions on how to check the inlet gas pressure. **THIS IS ONLY TO BE DONE BY A LICENSED PROFESSIONAL.**

1. Shut off the manual gas valve on the gas supply line.
2. Remove the screw for the pressure port located on the gas inlet of the micro boiler shown in the diagram on the right.
3. Connect the manometer to the pressure port.
4. Re-open the manual gas valve. Check to see that there are no gas leaks.
5. Check inlet gas pressure. When the micro boiler is on maximum and minimum burn, the manometer should read from 5.0" W.C. to 10.5" W.C. (1.24 to 2.61 kPa) for Natural Gas, from 8.0" to 14.0" W.C. (1.99 to 3.48 kPa) for Propane.



## WATER CONNECTIONS



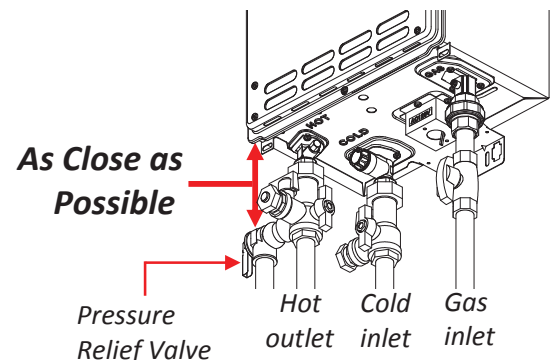
Do not use the micro boiler if any part has been under water. Immediately contact a qualified installer or licensed professional to inspect the boiler to determine if it needs to be replaced.



Do not reverse the hot outlet and cold inlet connections to the micro boiler. This will not properly activate the micro boiler.

All pipes, pipe fittings, valves and other components, including soldering materials, must be suitable for potable water systems (when using DHW Integrator Panel), or distilled water or distilled water/glycol mix.

1. A manual shutoff valve must be installed on the cold water inlet to the micro boiler between the main water supply line and the micro boiler.
2. In addition, a manual shutoff valve is also recommended on the hot water outlet of the unit. If the micro boiler is installed within, or subjected to, a closed loop system (recommended), a thermal expansion tank or code approved device to handle the thermal expansion must be installed.
3. Before installing the micro boiler, flush the water line to remove all debris, and after installation is complete, purge the air from the line. Failure to do so may cause damage to the boiler.



## ***Pressure relief valve***

The micro 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 relieve vale must conform to 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.
- The pressure relief valve needs to 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 relive valve installed on the micro boiler 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.
- No valve must be placed between the relief valve and the micro boiler.

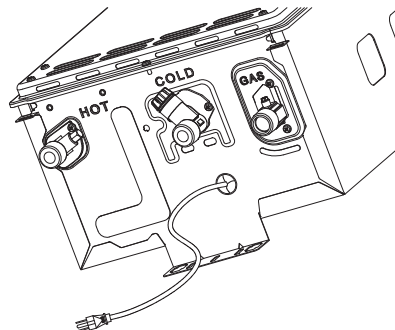
## **ELECTRICAL CONNECTIONS**



**WARNING**

- 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 with the micro boiler, 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 observe these warnings could result in personal injury or loss of life.

**This unit comes with a power plug instead of a junction box.**



## REMOTECONTROLLERCONNECTIONS

### <How to connect the remote controller to the micro boiler>

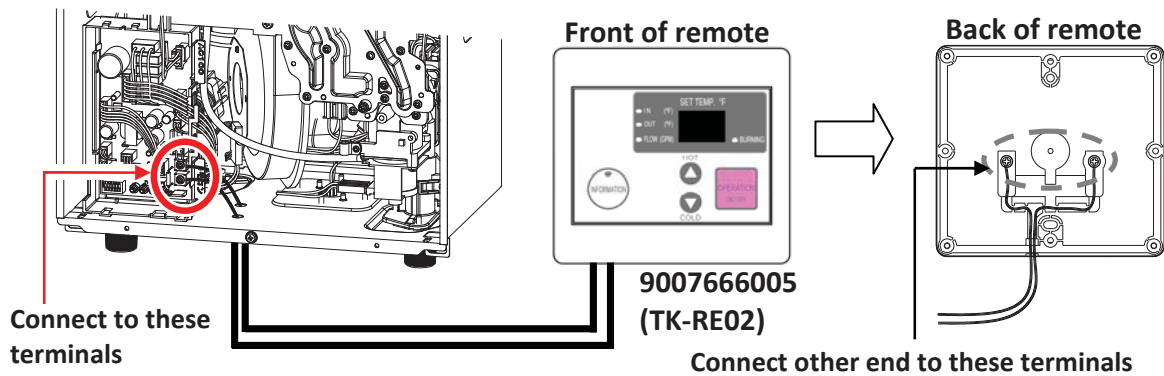
1. Disconnect power supply from the micro boiler.
2. Take off the micro boiler front cover.
3. Locate the remote controller terminal, pictured below (located around the lower right-hand side of the computer board).
4. Open the plastic cover of the remote controller, and then attach the two fork terminals to connector base of the backside the remote controller with two screws. Make sure the terminals are firmly fixed.
5. Pull the remote's wires through the hole at the bottom of the water heater's casing.
6. Properly attach the remote's wires to the remote controller terminal on the computer board.  
(No polarity)

**\*Do NOT jump or short-circuit the wires or computer will be damaged.**

7. Replace Front Cover securely.
8. Wires used for the remote controller connection must be:  
Minimum 18AWG wire (No polarity)  
Maximum 400 feet long

\*For detailed connection instructions to the remote controller, refer to the instructions that are packaged with the remote controller.

### Remote controller terminal inside micro boiler





# APPLICATIONS

## *Space Heating Applications*



**WARNING**

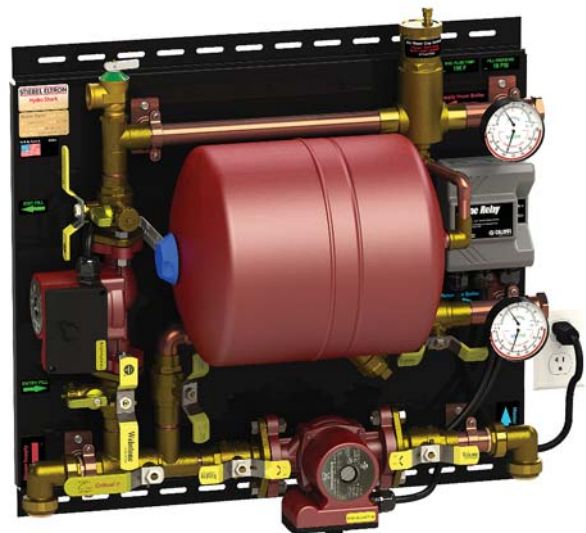
- In order to purge air in water pipes within a closed loop system, an air vent, air separator, and expansion tank should be installed in the system. **(Hydro-Shark pre-built space heating panels incorporate all of these features).**
- Water temperature over 125° F (52° C) can cause severe burns instantly or death from scalding.
- Chemicals such as diluted Glycol can be used for radiant floor, Hydro/fan coil air or Baseboard heating only. The diluted solution of glycol must contain between 25% and 55% of Glycol. Be aware that in a closed loop system, low pressure in the heat exchanger can cause low-temperature boiling, resulting in excessive noise and damage to the micro boiler. Consult with the glycol maker for specifications prior to use.

### *HydroShark Pre-Built Space Heating Panels*

HydroShark per-plumbed panels help make space heating easy and reliable. These panels are professionally engineered and use proven Primary/Secondary hydronic practices. Call Tech Support (800.805.5384) for assistance.

### **Sample:**

Master Panel Single:

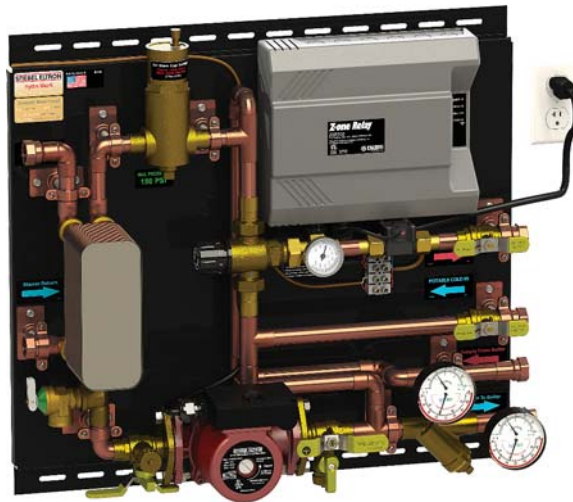


For more information on HydroShark pre-plumbed panels and zoning options for this boiler please visit [www.hydro-shark.com](http://www.hydro-shark.com) or call 800.805.5384

## ***Dual-purpose hot water heating***

### ***(Domestic and Space Heating)***

Insert a HydroShark DHW Integrator Panel to provide potable heated water and Hydronic Heating (with space heating panel(s)) with one heat source.



The HydroShark DHW Integrator Panel integrates with a wide variety of boilers and delivers “Priority” potable heated water with no storage tank and hydronic space heating in a small reliable package.

#### **NOTICE**

Follow all local codes, or in the absence of local codes, follow the most recent edition of the National Standard Code, ANSI Z21.10.3.

For more information on HydroShark DHW Integrator Panels and integrating space heating and domestic water for this boiler please visit [www.hydro-shark.com](http://www.hydro-shark.com) or call 800.805.5384.



# INITIAL OPERATION

- 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 a 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 towards the floor.
- Check the Gas Pressure.
- Do not try to light the burner manually. It is equipped with an electric ignition device which automatically lights the burner.
- Check for proper venting and combustible air to the micro boiler.
- Purge the gas and water lines to remove any air pockets.
- Do not use this micro boiler if any part has been under water. Immediately call a qualified installer or service technician to inspect the micro boiler to determine if it needs replacement.



**WARNING**

## **IF YOU SMELL GAS:**

- Do not try to start the micro 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.

# Owner's Guide

## CONGRATULATIONS

Congratulations and thank you for choosing our micro boiler. Before use, we recommend that you read through this owner's guide 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®

# 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.

1. The micro boiler does not have a pilot. It is equipped with an ignition device that automatically lights the burner. Do **NOT** try to light the burner by hand.
2. Before operating smell all around the micro boiler area for evidence of leaking 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 suppliers instructions. If gas supplier cannot be reached, call fire dept.
3. 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.
4. Do not use this micro boiler if any part has been under water. Immediately call a qualified service technician to inspect the micro boiler and to replace the unit if needed.

## OPERATING INSTRUCTIONS

1. STOP! Read the safety information above or in the Owner's Manual.
2. Turn off all electric power to the micro boiler.
3. Do not attempt to light the burner by hand.
4. Turn the manual gas valve located on the outside of the unit clockwise to the OFF 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 next step.
6. Turn the manual gas valve located on the outside of the unit counterclockwise to the ON position.
7. Turn on all electrical power to the micro boiler.
8. If the micro boiler will not operate, follow the instructions "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 micro boiler if service is to be performed.
2. Turn the manual gas valve located on the outside of the unit clockwise to the OFF position.

## DANGER

**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 micro boiler.



**Read and follow micro boiler warnings and instructions. If the owner's manual is missing, contact the manufacturer.**

Keep flammable products:

1. Far away from boiler.
2. In approved containers.
3. Tightly closed and out of reach of children.
4. Micro boiler 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

**When using micro boiler with DHW Integrator Panel for Domestic Hot Water:**

1. Water temperature over 125° F 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 on the DHW Integrator Panel(s). Adjust these mixing valves accordingly.
5. The outlet temperature of the micro boiler is set at 120° F (50° C). If you require water temperatures below this setting, follow the instruction manual.
6. Test the boiler before bathing or showering. Do not leave children or an infirm person unsupervised.

# NORMAL OPERATION

## TEMPERATURE CONTROLLER AND REMOVE CONTROLLER

The illustration below shows an example of the controllers. The exact display may differ from examples.

### GENERAL



- Water temperatures over 125° F (52° C) can cause severe burns instantly or death from scalding.
- The outlet hot water temperature of the boiler is factory set at 120° F.



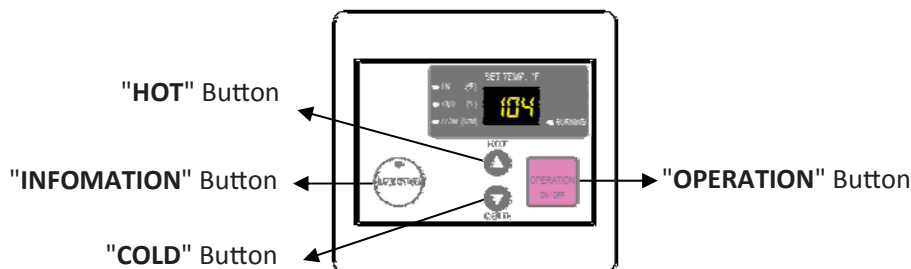
- Flow rate to active micro boiler: 0.75 gallon per minute at the default set temperature
- Flow rate to keep the micro boiler running: 0.4 gallon per minute.

### OPERATION

#### <Set temperature>

1. Turn on the 120 VAC power supply to the micro boiler.
2. Press the "OPERATION" button on the remote in order to turn the remote controller on. It shows the set temperature on its display as shown in the picture below.
3. Press the "HOT" button or the "COLD" button to set the temperature setting of the unit.
4. You can set the temperature from 99°F (38°C) to 167°F (75°C).

#### <Exterior view of the remote controller>



#### <The temperature options>

99	100	102	104	106	108	110	111	113	115	117	122	131	140	158	167
----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----



Temperature above 122°F (50°C) can cause severe burns or death from scalding. Children, disabled and the elderly are at high risk of being injured.

# TEMPERATURE SETTINGS

## Set Temperature

### ***-Without remote controller-***

There are 4 temperatures that you can select from by changing the dipswitch settings on the computer board without the remote controller. See the table below.

Temperatures available			
<b>113°F</b>	<b>122°F</b>	<b>131°F</b>	<b>140°F</b>

For detailed dipswitch settings for each temperature see below.

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

If temperatures other than the ones listed above are required, the remote controller can provide several more temperature options.

### ***-Dipswitch settings for each temperature on the computer board-***

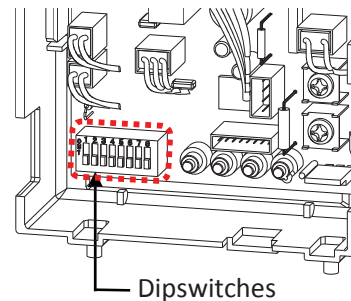
Temperature Settings			
113°F ON (45°C) OFF	122°F ON (50°C) DEFAULT OFF	131°F ON (55°C) OFF	140°F ON (60°C) OFF



**WARNING**

Turn off the power supply to the micro boiler before changing the dipswitch settings.

Only change the switches with the dark squares. The dark squares indicate which direction the dipswitch should be set to.



## FLOW

- The flow rate through the micro boiler is limited to a maximum of 6.6 GPM (38 L/min).
- The temperature setting, along with the supply temperature of the water will determine the flow rate output of the unit.

## 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 a power loss is not covered under warranty. In cases where power losses can occur, consider the use of a backup power supply.
- The freeze protection system will activate when the surrounding and/or outside temperature drop below 36.5°F (2.5° C).
- It is the installer's responsibility to be aware of freezing issues and take all preventive measures. The manufacture will not be responsible for any damage to the heat exchanger as a result of freezing.
- In any area subject to freezing temperatures, freezing issues can occur if cold air enters through the venting into the heat exchanger by either negative pressures within the installation location or by strong outside wind. The manufacturer highly recommends the use of a back flow preventer (sold separately) to minimize the amount of cold air entering through the exhaust venting when the micro boiler is off.
- It is the installer's responsibility to be aware of freezing issues and take all preventive measures. The manufacture will not be responsible for any damage to the heat exchanger as a result of freezing.
- If you will not be using your boiler for a long period of time:
  1. Completely drain the water out of the unit.
  2. Disconnect power to your boiler.

This will keep your unit from freezing and being damaged.



### **CAUTION**

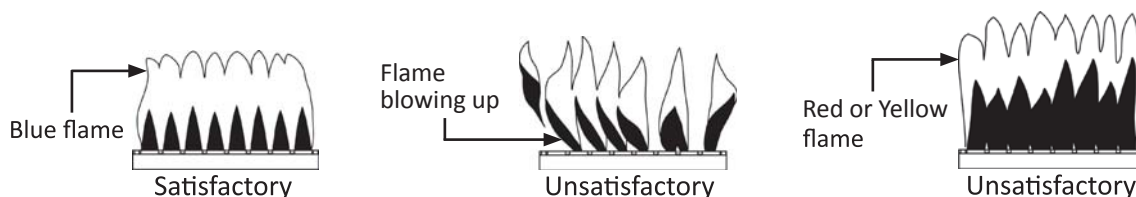
Only pipes within the micro boiler are protected by the freeze protection system. Any water pipes (hot or cold) located outside the unit will no be protected. Properly protect and insulate these pipes from freezing.

## MAINTENANCE AND SERVICE



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

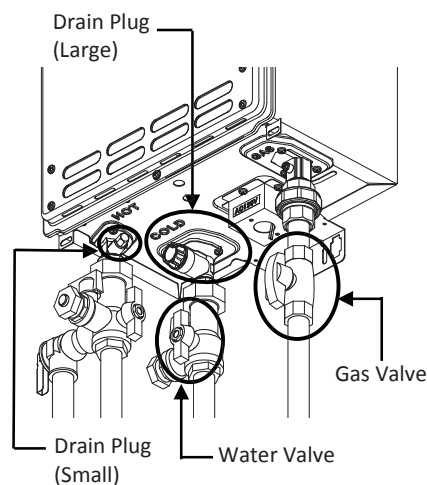
- Be sure that all openings for combustion and ventilation air are not blocked.
- The venting system should be checked annually for any leaks, corrosion, blockages or damage.
- The burner should be checked annually for dust, lint, grease or dirt.
- Keep the area around the micro boiler clear. Remove any combustible materials, gasoline or any 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 micro boiler.



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

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, yet again.
4. Close the water shut off valve.
5. Have a bucket or pan to catch the water from the unit's drain plugs. Unscrew the two drain plugs (large and small) to drain all the water out of the unit.
6. Wait a few minutes to ensure all water has completely drained from the unit.





# TROUBLESHOOTING

## General

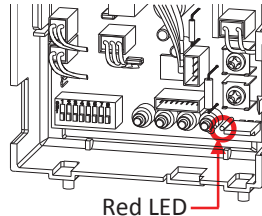
-TEMPERATURE and AMOUNT OF HOT WATER-	PROBLEM	SOLUTIONS
	It takes long time to get hot water at the fixtures.	<ul style="list-style-type: none"> <li>• The time it takes to deliver hot water from the micro boiler to your fixtures depends on the length of piping between the two.</li> <li>• The longer the 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 enough?</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.	<ul style="list-style-type: none"> <li>• Make sure the unit has 120 VAC / 60 Hz power supply.</li> <li>• If you are using the remote controller, is the power button turned on?</li> <li>• Is the gas supply valve fully open?</li> <li>• Is the water supply valve fully open?</li> <li>• Is the hot water fixture sufficiently open to draw at least 0.5 GPM through the micro boiler?</li> <li>• Is the unit frozen?</li> <li>• Is there enough gas in the tank / cylinder? (For Propane models)</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 micro boiler running?</li> <li>• Does the recirculation line have enough check valves?</li> <li>• Is the gas supply valve fully open?</li> <li>• Are the fixtures clean of debris and obstructions?</li> <li>• Check if the flow rate is too low.</li> </ul>
	Fluctuation in hot water temperature.	<ul style="list-style-type: none"> <li>• Is the gas line sized properly?</li> <li>• Is the supply gas pressure sufficient?</li> <li>• Check for cross connection between cold water lines and hot water lines.</li> </ul>

## Troubleshooting (Cont'd)

	<b>PROBLEM</b>	<b>SOLUTIONS</b>
<b>- Micro Boiler -</b>	Unit does not ignite when water goes through the unit.	<p>Is the flow rate over 0.5 GPM?            Check for reverse connection and cross connection.            If you use the remote controller, is the power button turned on?            Check if the inlet temperature is too high.</p>
	The fan motor is still spinning after operation has stopped.	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.
	Unit sounds abnormal while in operation	Contact <b>Hydro-Shark at 800-805-5384</b>
<b>-Remote controller- (OPTIONAL)-</b>	Remote controller does not display anything when the power button is turned on.	<p>Make sure the unit is supplied with power.            Make sure the connection to the unit is correct.</p>
	An ERROR code is displayed.	Refer to fault analysis codes to determine the problem.

## ERROR CODES

- The units are self-diagnostic 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 temperature controller and remote controller.
- Consult with the table on the following pages for the description of each error code.



Error code on the computer board



Error code on the remote controller 9007666005 (TK-RE02)

### Single unit installations

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

- **Indicator on the temperature controller 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 be blinking two times.

## Fault Analysis of Error Codes

If the error code is displayed on the computer board of the micro boiler or remote controller and/or temperature controller, please check the following. After checking, **Consult with the manufacturer.**

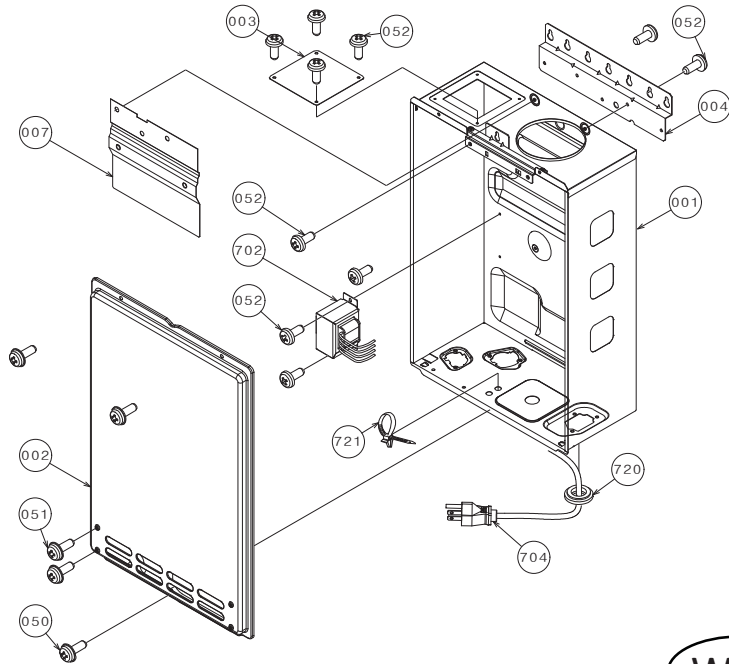
Red LED	Remote	Malfunction description	Diagnosis
One Time	03	Incorrect dipswitch setting	<ul style="list-style-type: none"> <li>• Check the dipswitch settings on the PCB. (Part #701)</li> </ul>
Five Times	10	Warning for the "991" error code	<ul style="list-style-type: none"> <li>• Check the gas type of the micro boiler.</li> <li>• Check if there is any blockage in the intake air and/or exhaust.</li> <li>• If the micro boiler is installed as a direct-vent system, check whether there is enough distance between the intake air terminal and the exhaust terminal.</li> <li>• Check the altitude/elevation of area of where the micro boiler 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 micro boiler has been installed in a contaminated area.</li> </ul>
Three Times	11	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 #413, 708, 709, 710, 712), burn marks on the computer board (Part #701), and/or soot on the flame rod (Part #108).</li> <li>• Check if there is a buzzing spark ignition sound coming from the burner (Part #101) when micro boiler prepares for combustion.</li> <li>• Listen for the double "clunk" sound coming from gas valve assembly (Part #102) when micro boiler goes into combustion.</li> <li>• Check if there is leaking from heat exchanger. (Part #401)</li> </ul>
Three Times	12	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 #413, 708, 709, 710, 712), burn marks on the computer board (Part #701), and/or soot on the flame rod (Part #108).</li> <li>• Check if there is leaking from heat exchanger. (Part #401)</li> </ul>
Two Times	31	Outlet thermistor failure	<ul style="list-style-type: none"> <li>• Check for connection/breakage of wires and/or debris on thermistor. (Part #407, 408)</li> </ul>
	32	Inlet thermistor failure	
Two Times	39	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 #108)</li> </ul>

## Fault Analysis of Error Codes cont'd

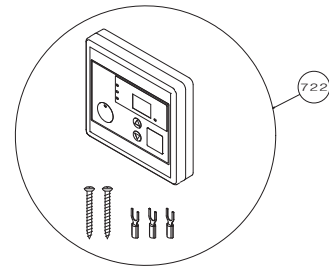
Red LED	Remote	Malfunction description	Diagnosis
Six Times	51	Abnormal Gas Solenoid Valve	<ul style="list-style-type: none"> <li>• Check for connection/breakage of wires (Part #708) and/or burn marks on the computer board (Part #701).</li> </ul>
Six Times	55	Abnormal Main Gas Valve	<ul style="list-style-type: none"> <li>• Check for connection/breakage of wires (Part #708) and/or burn marks on the computer board (Part #701).</li> </ul>
Four Times	61	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>
One Time	70	Computer board Fault	<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> <li>• Check the power supply of the micro boiler.</li> </ul>
Six Times	72	False Flame Detection	<ul style="list-style-type: none"> <li>• For indoor models, check if condensate drain is installed on the vent collar of the micro boiler.</li> <li>• Check if there is leaking from heat exchanger (Part #401).</li> </ul>
N/A	74	Miscommunication between Micro boiler and remote controller	<ul style="list-style-type: none"> <li>• Check the model type of the remote controller.</li> <li>• Inspect the connections between the micro boiler and remote controller.</li> <li>• Check the power supply of the micro boiler.</li> </ul>
Five Times	99	Imperfect combustion	<ul style="list-style-type: none"> <li>• Check the gas type of the micro boiler.</li> <li>• Inspect the environment around the micro boiler.</li> <li>• Determine how long the unit has been installed.</li> <li>• Check the altitude/elevation of the area of where the micro boiler installed.</li> <li>• Check if there is any blockage in the intake air and/or exhaust.</li> <li>• If the micro boiler is installed as a direct-vent system, check whether there is enough distance between the intake air terminal and the exhaust terminal.</li> <li>• Check if there is grease and/or dirt in the burner (Part # 101) and the fan motor (Part # 104), especially if the micro boiler has been installed in a contaminated area.</li> </ul>

# COMPONENTSDIAGRAM

## Case assembly

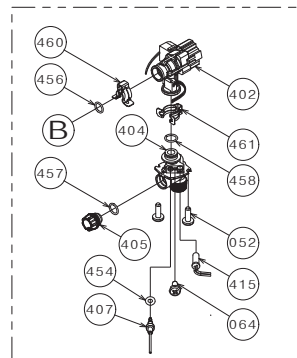
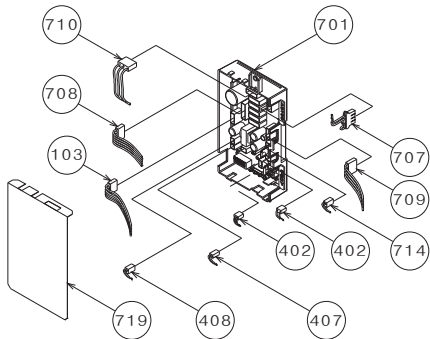


## Temperature remote controller

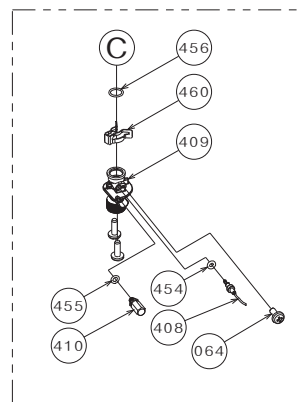


## Water way assembly

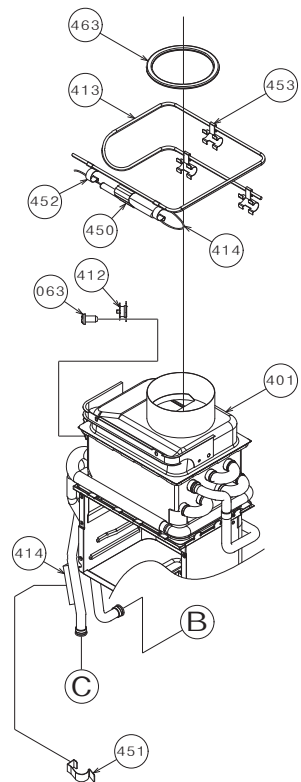
### Computer board Assembly



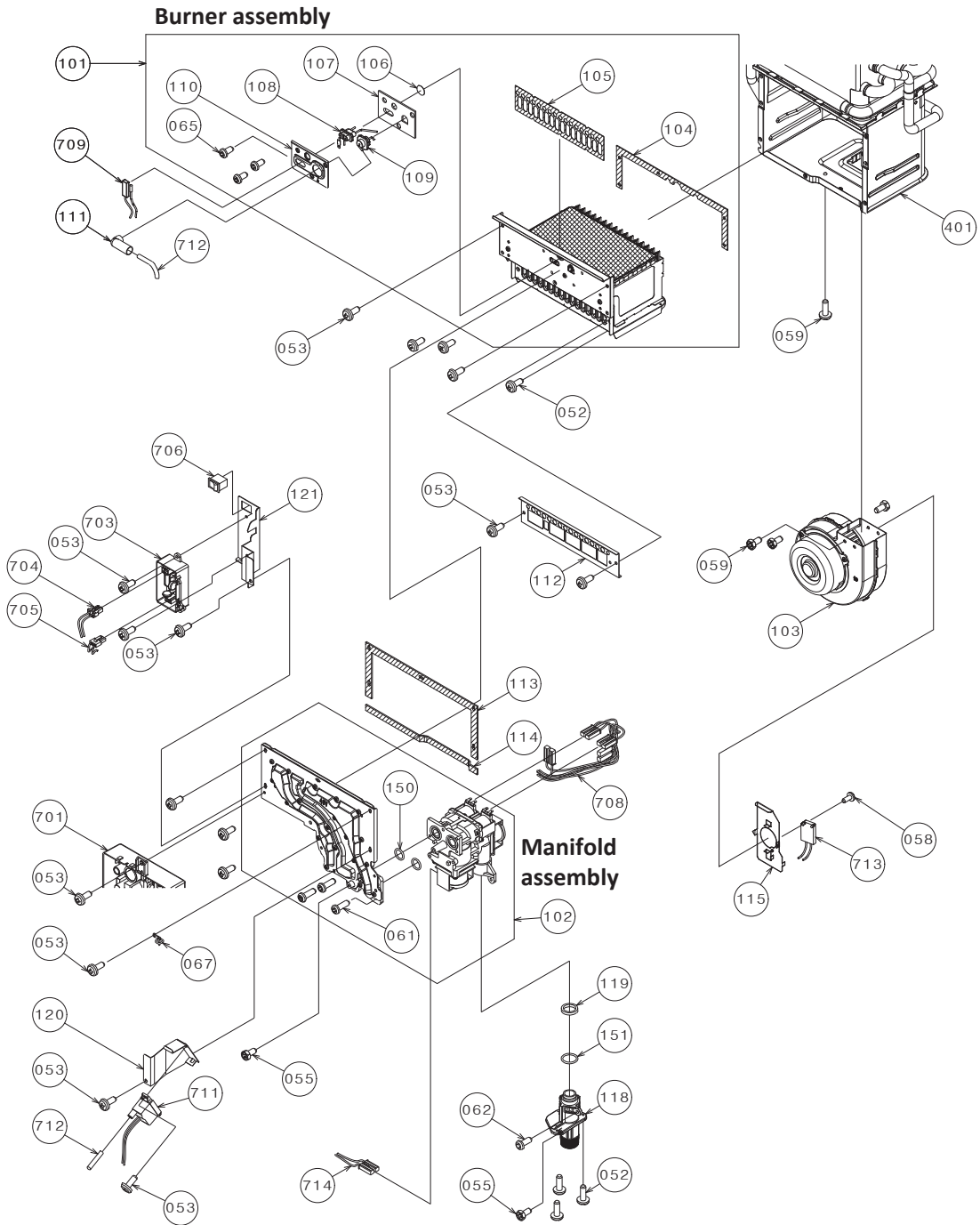
Water inlet section



Water outlet section



# Burner assembly



# PARTSLIST

Item#	Description	Part#
001	Case assembly	319143-159
002	Front cover	319143-163
003	Air blockage plate	319143-150
004	Bracket	319143-184
005	Junction box	319143-014
006	Junction box inner plate	319143-128
007	Back guard panel	319143-338
050	Screw M4x12 (W/Washer)	319143-025
051	Screw M4x10 (W/Washer)	319143-325
052	Screw M4x10 (Coated)	319143-026
053	Screw M4x10	319143-060
055	Hex head screw M4x8	319143-063
056	Screw M4x10	319143-372
058	Screw M3x10	319143-327
059	Pan screw M4x12 (W/Washer)	319143-061
061	Tap tight screw M4x12 FEZN	319143-201
062	Pan screw M4x10	319143-062
063	Screw M3x6	319143-087
064	Screw M4x6	319143-328
065	Pan screw M4x8	319143-059
066	Nylon clamp	319143-143
067	Wire clamp 60	319143-048
101	Burner assembly	319143-161
102	Manifold with gas valve assembly LP	319143-169
	Manifold with gas valve assembly NA	319143-165
103	Fan motor	319143-347
104	Burner holder gasket	319143-341
105	Burner gasket	319143-031
106	Burner window	319143-033
107	Rod holder gasket	319143-034
108	Flame rod	319143-339
109	Igniter rod	319143-373
110	Rod holder	319143-340
111	Rod cap	319143-038
112	Burner damper	319143-170
113	Manifold gasket A	319143-044
114	Manifold gasket B	319143-045
115	Fan damper	319143-160
118	Gas inlet	319143-050
119	Gas inlet ring	319143-049
120	Igniter plate	319143-051
121	Surge box plate	319143-213
150	O-ring P18 NBR (Black)	319143-350
151	O-ring P20 NBR (Black)	319143-057

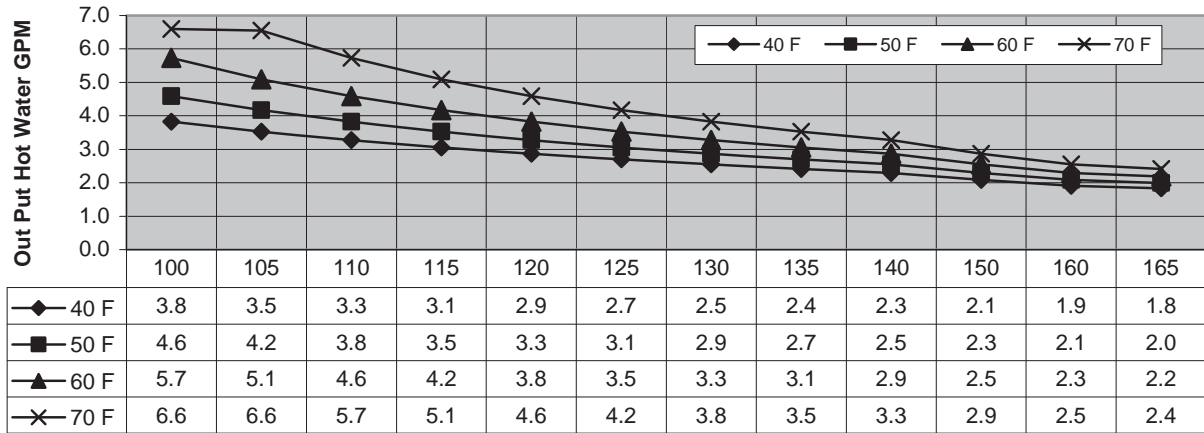


Item#	Description	Part#
401	Heat exchanger assembly	319143-162
402	Flow adjustment valve/Flow sensor	319143-167
404	Water inlet	319143-193
405	Inlet drain plug	319143-197
407	Inlet thermistor	319143-214
408	Outlet thermistor	319143-218
409	Water outlet	319143-194
410	Outlet drain plug	319143-199
412	Hi-Limit switch	319143-228
413	Overheat-cut-off fuse	319143-149
414	Heater	319143-200
415	Inlet heater	319143-078
450	Pipe heater fixing plate	319143-088
451	Heater fixing plate 16	319143-125
452	Fuse fixing plate 18	319143-066
453	Fuse fixing plate 14	319143-146
454	O-ring P4 FKM	319143-082
455	O-ring P6 FKM	319143-080
456	O-ring P14 FKM	319143-100
457	O-ring P15 FKM	319143-091
458	O-ring P16 FKM	319143-083
460	Fastener "14-22"	319143-105
461	Fastener "16A"	319143-226
463	Silicon ring	319143-065
701	Computer board	319143-164
702	Transformer	319143-182
703	Surge box	319143-168
704	AC120V wire	319143-427
705	Transformer wire	319143-155
706	AC120V Power ON-OFF switch	319143-141
707	Switch wire	319143-154
708	Gas valve wire	319143-207
709	Flame rod wire	319143-171
710	EH-IG wire	319143-209
711	Igniter	319143-052
712	High voltage igniter cable	319143-039
713	Freeze protection thermostat	319143-185
714	Proportional gas valve wire	319143-220
719	Computer board cover	319143-212
720	Rubber grommet	319143-426
721	Cable strap	319143-425
722	Temperature remote controller	319143-352

# OUTPUT TEMPERATURE CHART

Chart is based on properly sizes gas line

Output Temperature vs. GPM (Max. 6.6 GPM) with Various Inlet Water Temperature



# NOTES:

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