# TANKLESS PRODUCT GUIDE

A. O. Smith®
Innovation has a name.



AOSBG80000 R October 2013 | 

Energy-efficient, plentiful, and endless supply of hot water.

## SAVE ENERGY.

Compact size and wall-mounted to free up valuable floor space.

## SAVE SPACE.


The smart choice that will save you a substantial amount of energy.

# SAVE MONEY.

AO Smith®
Innovation has a name.

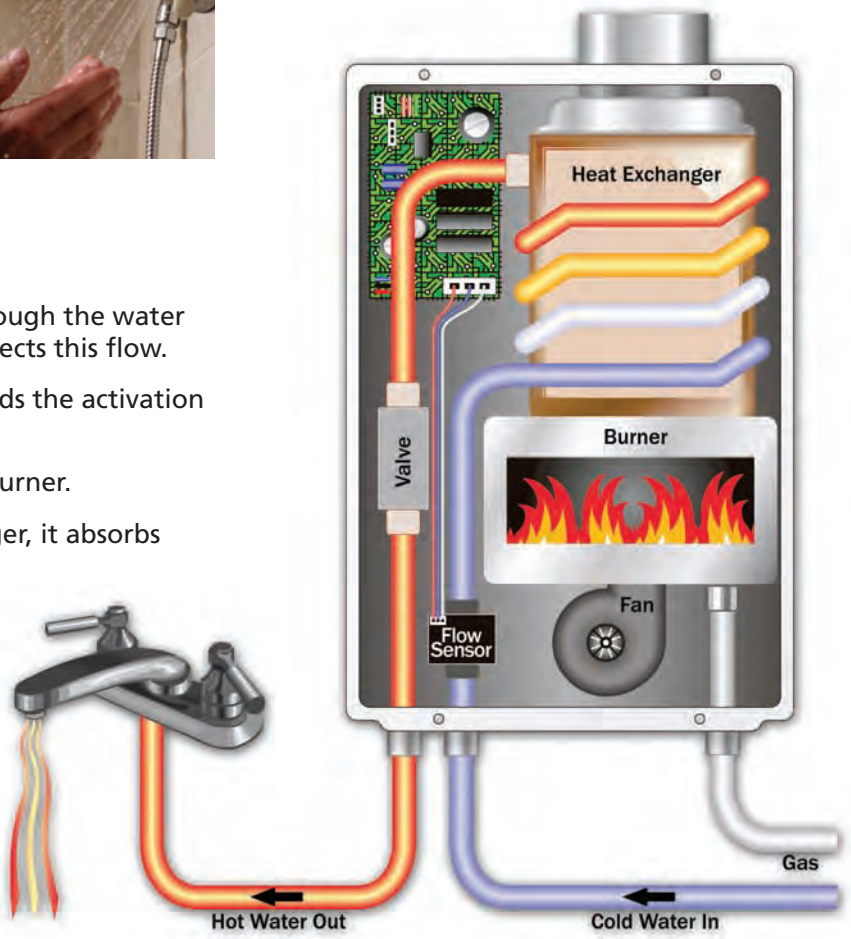
The A. O. Smith brand has delivered innovative hot water solutions for over 70 years and is sold exclusively by plumbing wholesalers and plumbing contractors. A. O. Smith's selection of residential and commercial tank-type, tankless & hybrid water heaters, boilers and storage tanks is unmatched for quality and diversity. Anywhere hot water is needed, A. O. Smith provides an energy-efficient solution with long-lasting value for years after it's installed. A. O. Smith stands behind its products and customers with world-class service, combining cutting-edge technology with committed people who take pride in being the very best.

A. O. Smith is headquartered in Ashland City, Tennessee, home of the world's largest water heater factory. The A. O. Smith network includes five manufacturing facilities in North America, plus plants in Nanjing, China and Veldhoven, The Netherlands.

# Tankless Advantage

**HOW IT WORKS** – The Process:

- A hot water tap is opened.
- The opened tap allows water to flow through the water heater. An internal water flow sensor detects this flow.
- Upon flow detection, the flow sensor sends the activation signal to the computer board.
- The computer automatically ignites the burner.
- As water flows through the heat exchanger, it absorbs heat from the burner.
- By the time the water exits the heater, it has reached the designated set temperature.
- When the hot water tap is closed, the water heater automatically turns off.




## ENDLESS HOT WATER*

Heating water only as it's being used means you will never run out of hot water again. After the few seconds it takes for the water to reach the designated set temperature, our water heaters will continually provide a steady flow of hot water for as long as your application needs it.

*A. O. Smith tankless water heaters provide endless hot water when sized appropriately for your homes needs.

## ENERGY CONSERVATION

Provides you with continuous hot water... in one of the most energy-efficient ways possible. Conventional tank-type water heaters will heat and store a set volume of water, regardless of whether someone is using that hot water or not. Because our water heaters only activate when hot water is being used, no standby energy losses are incurred, providing efficient heating and conserving gas energy.

## COMPACT SIZE

On top of all this, an A. O. Smith tankless water heater takes up much less space than your conventional tank-type water heater or boiler. With no tank or boiler to steal valuable storage space, A. O. Smith's wall-mount design allows for additional storage and flexibility.



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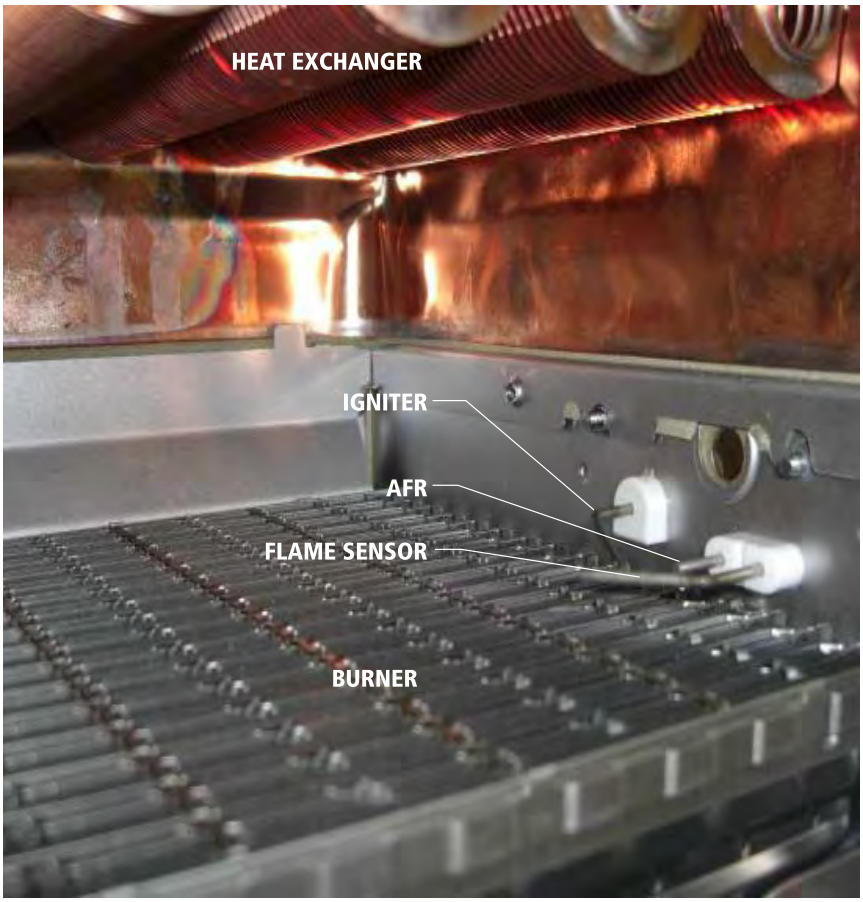
# Safety

At A. O. Smith, we place the safety and reliability of our products above all else. By incorporating technologically advanced safety features into every model, we provide the assurance and peace-of-mind that can only come from an A. O. Smith quality product.




## Air-Fuel Ratio (AFR) Sensor

A. O. Smith's unique AFR sensor monitors and maintains proper combustion at all times. Together with the onboard computer, this system will adjust the fan motor speed to ensure that air and fuel have a proper mixture ratio, minimizing emissions and maximizing efficiency.

## Additional Safety Features

### Freeze Protection:

Every heater in A. O. Smith's tankless lineup has an internal freeze protection system, which is rated to protect the heaters when installed in sub-freezing conditions. This system ensures that water temperatures within the heat exchanger never fall below a certain level, preventing freeze damage.

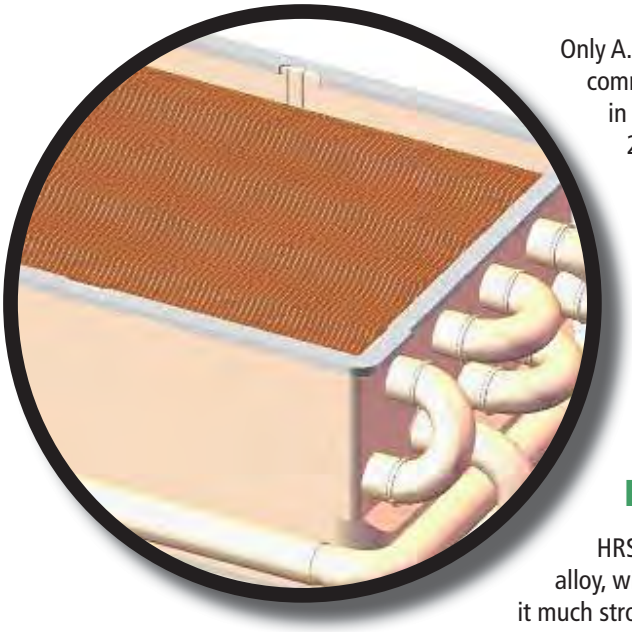
### Hi-Limit Switch:

Ensures that water temperatures do not exceed unsafe levels. Before the water temperature can even reach these unsafe levels, the hi-limit switch activates by disengaging the gas valves, effectively shutting down the water heater.

### Overheat Cutoff Fuse:

Ensures that there are no breaches in combustion. In cases where enough physical damage might have been done to the water heater to lead to a breach in combustion, the overheat cutoff fuse reacts by shutting down the water heater if the surface of the heat exchanger retains too much heat.

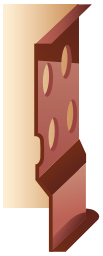
# Durability
## Heat Exchanger HRS35



Only A. O. Smith incorporates true commercial-grade heat exchangers in our tankless heaters. (NOTE: 240H Series, 340H Series, 510 Series, 510U Series, 540H Series, 710 and 910 Series non-ASME models) All aspects of the heat exchanger were designed to add the durability and reliability that is vital to any successful commercial organization or business.

Competitor Heat Exchanger Drum

Standard Thickness



A. O. Smith Commercial & Light-Commercial Heat Exchanger Drum

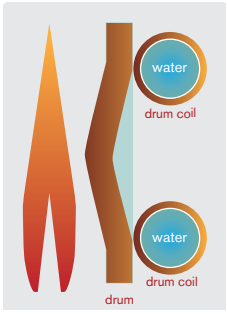
25% Thicker

### HRS35 Copper Alloy

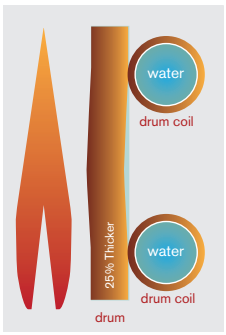
HRS35 is a heat-resistant copper alloy, with additive elements that make it much stronger and harder than the standard C1220 copper used in most other heat exchangers. HRS35 has 8 times the tensile strength of regular copper. Even at high temperatures, HRS35 maintains a fine grain and high strength. HRS35 provides resistance to the damaging effects of erosion that can cause heat exchangers to leak.

HRS35 copper tubing

A thinner drum strains more under heat stress




A thicker drum creates less strain on the heat exchanger




Comparison between HRS35 copper alloy and C1220 standard copper

| | Cu | Co | Sn | Zn | Ni | P |
|---|---|---|---|---|---|---|
| **HRS35** | 99.5% | 0.18% | 0.10% | 0.05% | 0.04% | 0.05% |
| **C1220** (Standard Copper) | >99.9% | --- | --- | --- | --- | 0.015% - 0.04% |

*HRS35 copper alloy utilized in non-ASME models only

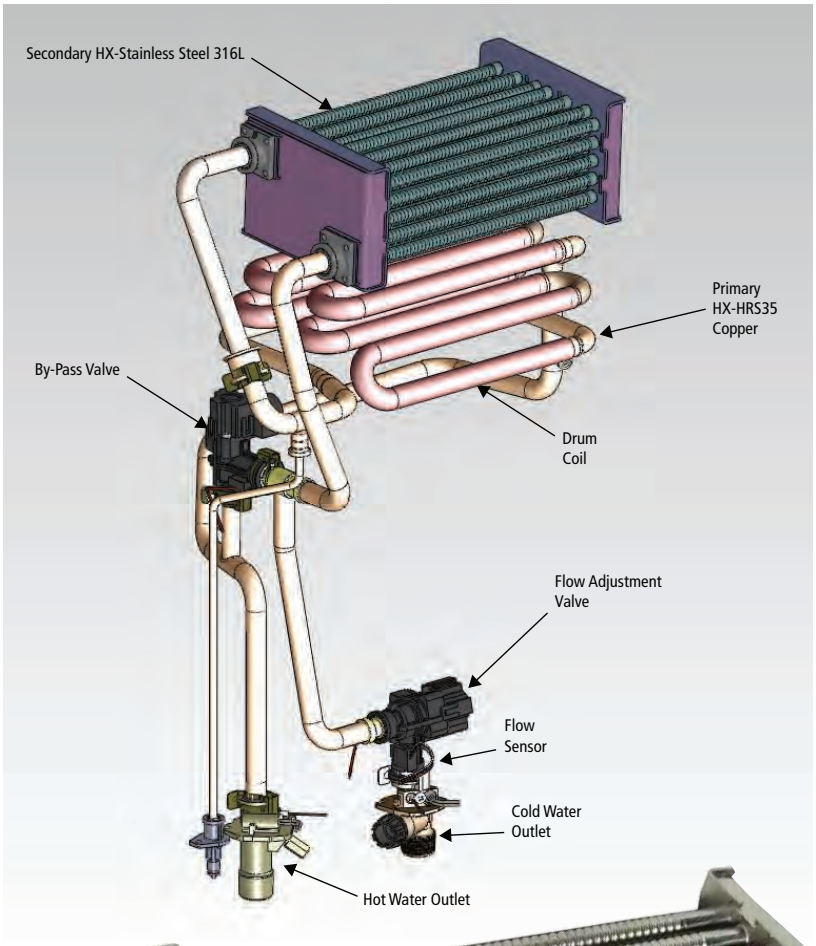
### Drum Thickness

During every ignition cycle, thermal expansion causes all heat exchangers to undergo heat stress. After the thousands of ON/OFF cycles typically seen in a commercial application, this heat stress can prove damaging. This is why the heat exchangers in our commercial and light commercial products utilize drums that are 25% thicker, ensuring the longevity of our products. A thicker drum creates less strain on the heat exchanger.

# Secondary Heat Exchanger 316L Stainless Steel (Condensing Models Only)

The secondary condensing heat exchanger is made of high quality 316L stainless steel. This is where the rest of the heat transfer occurs. Due to the lower temperature, acidic condensation occurs, and stainless steel is required in order to avoid corrosion

For condensing heat exchangers, it is more suitable to use 316L stainless steel because of the extreme environment (heat, acidic condensation, chloride) that the material is subjected to.



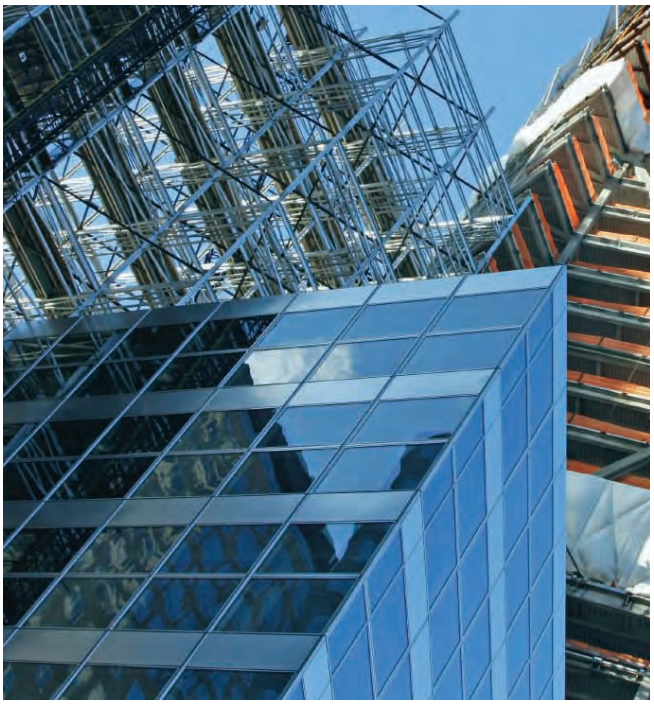

## Primary Heat Exchanger: Copper vs Stainless Steel

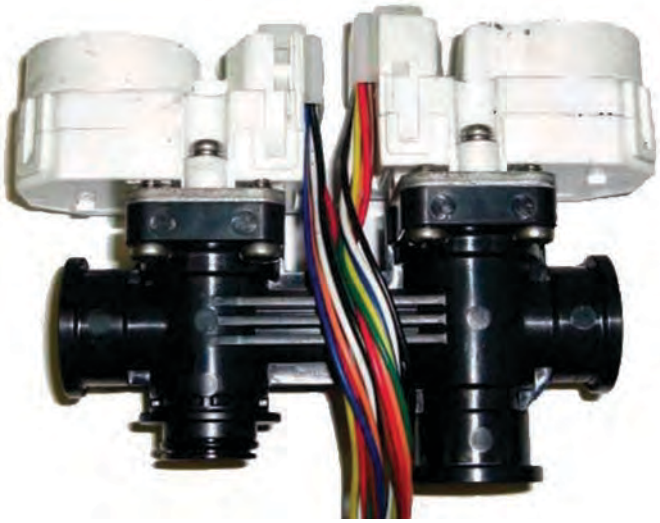
- Heat transfers 25 times more readily through copper than stainless steel. Consequently, for the same amount of heat transfer, stainless steel heat exchangers need to be larger than copper heat exchangers, leading to a larger pressure loss.
- At higher temperatures, it is the nature of stainless steel to become prone to a number of problems not usually experienced at room temperature. It is vulnerable to pitting corrosion and stress corrosion cracking (SCC).
  - Stainless steel is **NOT** better for durability because it is harder. Hardness causes the material to become brittle. Stainless steel will crack after numerous cycles of thermal expansion/contraction, especially with chloride in the water. Copper heat exchangers are less brittle and better suited for expansion/contraction without cracking. Copper is also better with heat transfer.
  - In a *dual* heat exchanger design, corrosion is not a big concern in the non-condensing primary heat exchanger because no condensation forms on the exterior of the pipes. Stainless steel is unnecessary for this stage.

# Water Valves

Making true commercial-grade water heaters involves more than just redesigning our heat exchangers - every internal component has to measure up to A. O. Smith's commercial standards. Just like our advanced heat exchangers, the longevity and functionality of components such as our water valves and flow sensors are also of great importance.

Our heavy-duty commercial water heaters (510/U, 540H, 710 series & 910 series) feature a bypass & flow adjustment valve, which not only provide the optimal control and precision essential for commercial usage, they offer the durability needed to handle tough, high-volume conditions.



Stepper Motor Water Valves

By-pass Valve - 510/U and 540H Models

Flow Adjustment - 510/U and 540H Models

# Water Flow

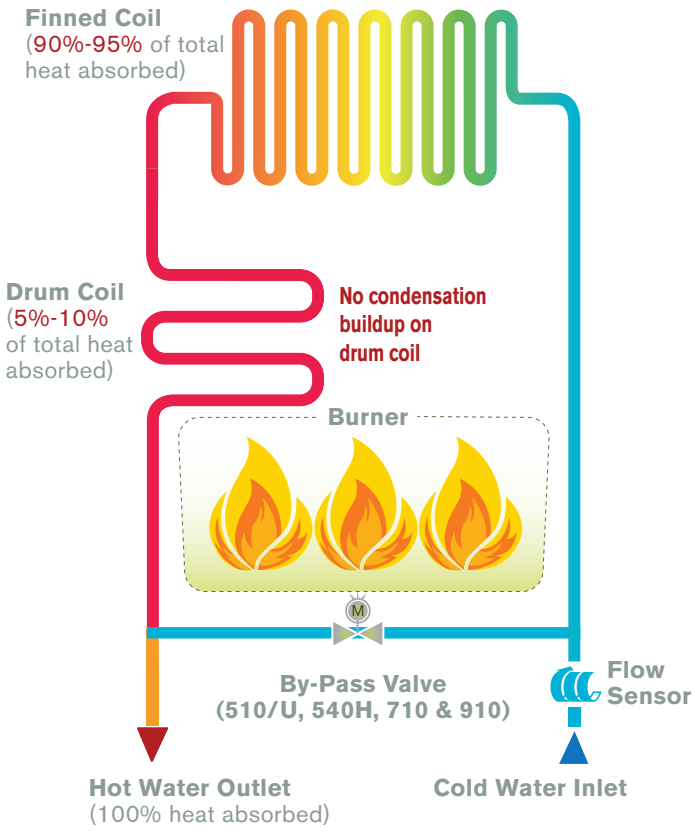
Condensation can build up over time in any heat exchanger, causing damage and premature leaks. A. O. Smith's heavy-duty commercial models (710 series & 910 series) include condensation reduction features that safeguard against these types of damaging effects.

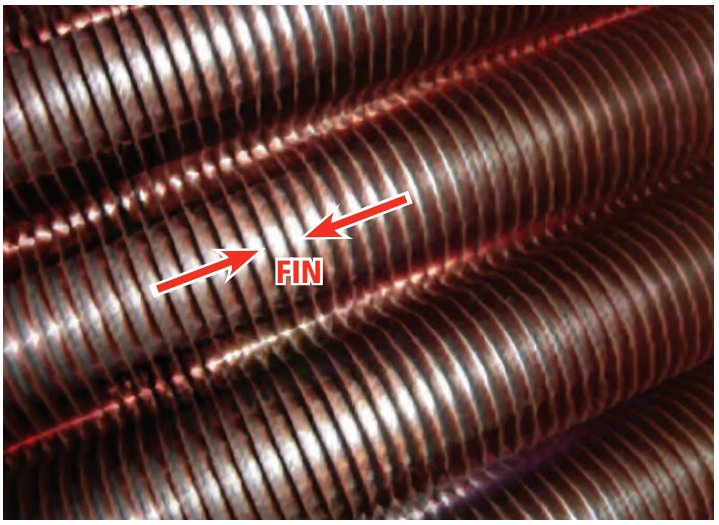
## Better Water Pathway Design

By redesigning and redirecting the flow of water, the temperature of the heat exchanger drum and finned coils stays elevated above dew point, making it much more difficult for condensation to build.

## Fin Pitch

By widening the pitch of the heat exchanger fins, not only do we improve durability by reducing occurrences of blockage, we also maintain higher temperatures on the upper finned coils. Keeping these coils at elevated temperatures reduces the likelihood of condensation buildup.



# BASIC SIZING GUIDELINES

The flow rate capacity of tankless water heaters depends on the temperature difference between the desired output and incoming water temperature. The flow rate comparison chart and table shown here summarizes the flow rate charts found in the specifications of each model.

A. O. Smith water heaters are sized according to the peak flow rate requirements, worst-case temperature-rise scenarios, and types of applications. Once these factors have been determined, refer to either the flow rate comparison here or the flow rate charts found in each model's specifications. Select the appropriate water heater as well as the amount of water heaters required.

Application designers/engineers can decide whether to size for full flow, expected flow, or utilize probability models such as the modified "Hunter Curve". For large scale applications such as hotels, apartment complexes, and large restaurants, Hunter Curves are commonly used to estimate the peak flow rate demand when given the total amount of fixture units within an application. It is up to the application designer/ engineer to determine the amount of fixture units within any given application.

## Match the Unit to Your Needs

| | **Warmer Climates** 70°F Incoming Groundwater Temperature | **Cooler Climates** 50°F Incoming Groundwater Temperature |
|---|---|---|
| | **Capacity – Number of Shower Heads** | |
| **ATIO-110/U** | 2 Showers | 1 Shower |
| **ATIO-310/U** | 3 Showers | 2 Showers |
| **ATIO-240H** | 2 Showers | 1 Shower |
| **ATIO-340H** | 3 Showers | 2 Showers |
| **ATIO-540H** | 4 Showers | 3 Showers |
| **ATIO-510/U** | 4 Showers | 2 Showers |
| **ATIO-710** | 4 Showers | 3 Showers |
| **ATIO-910** | 6 Showers | 4 Showers |

Assuming the set point temperature is 120˚F

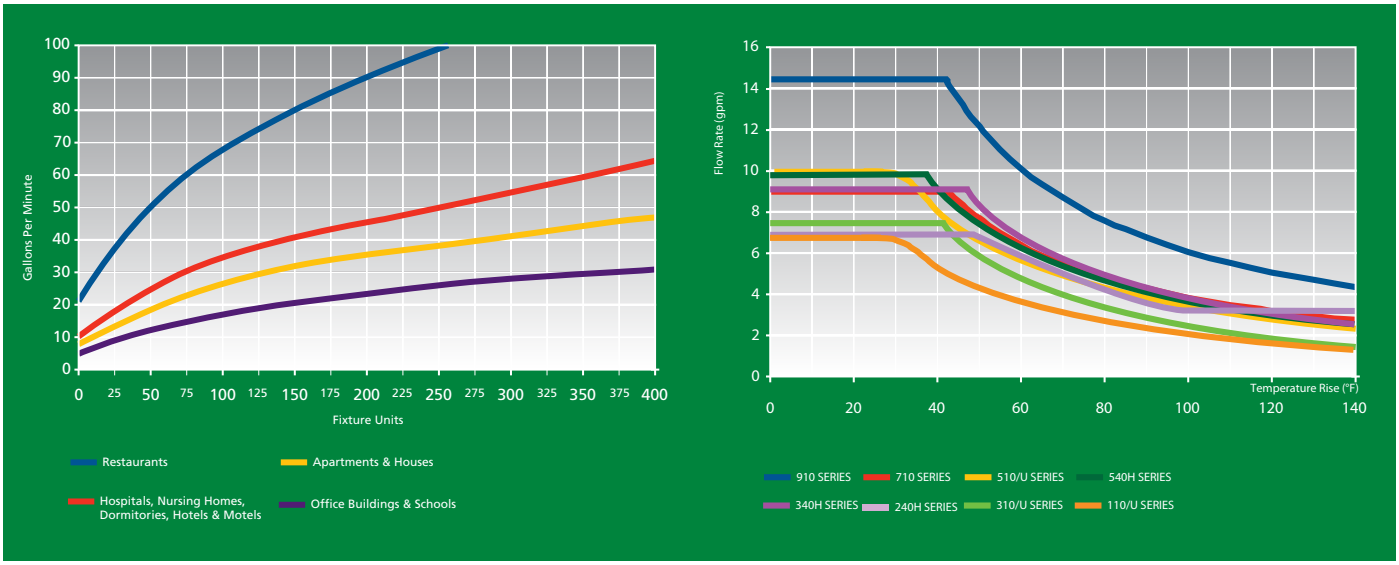
# Flowrate Guide

Temperature Rise vs Gallons per Minute

| Temp Rise | 110/U Series | 310/U Series | 510/U Series | 240H Series | 340H Series | 540H Series | 710 Series | 910 Series |
|---|---|---|---|---|---|---|---|---|
| 30° | 6.6 | 8.0 | 10.0 | 6.6 | 8.0 | 10.0 | 9.0 | 14.5 |
| 35° | 6.6 | 8.0 | 9.3 | 6.6 | 8.0 | 10.0 | 9.0 | 14.5 |
| 40° | 5.7 | 7.8 | 8.1 | 6.6 | 8.0 | 9.5 | 9.0 | 14.5 |
| 45° | 5.1 | 6.9 | 7.2 | 6.6 | 7.6 | 8.4 | 8.5 | 13.5 |
| 50° | 4.6 | 6.2 | 6.5 | 6.1 | 6.8 | 7.6 | 7.7 | 12.2 |
| 55° | 4.2 | 5.7 | 5.9 | 5.5 | 6.2 | 6.9 | 7.0 | 11.1 |
| 60° | 3.8 | 5.2 | 5.4 | 5.1 | 5.7 | 6.3 | 6.4 | 10.1 |
| 65° | 3.5 | 4.8 | 5.0 | 4.7 | 5.3 | 5.8 | 5.9 | 9.4 |
| 70° | 3.3 | 4.4 | 4.7 | 4.3 | 4.9 | 5.4 | 5.5 | 8.7 |
| 75° | 3.1 | 4.1 | 4.3 | 4.1 | 4.6 | 5.0 | 5.1 | 8.1 |
| 80° | 2.9 | 3.9 | 4.1 | 3.8 | 4.3 | 4.7 | 4.8 | 7.6 |
| 85° | 2.7 | 3.7 | 3.8 | 3.6 | 4.0 | 4.4 | 4.5 | 7.2 |
| 90° | 2.5 | 3.5 | 3.6 | 3.4 | 3.8 | 4.2 | 4.3 | 6.8 |
| 95° | 2.4 | 3.3 | 3.4 | 3.2 | 3.6 | 4.0 | 4.0 | 6.4 |
| 100° | 2.3 | 3.1 | 3.3 | 3.0 | 3.4 | 3.8 | 3.8 | 6.1 |

Flow rate is determined by Temperature Rise. To determine your temperature rise, subtract the incoming water temperature from the set output temperature. All units are factory set to 120 or 122°F but can be changed.

## Example of Hunter Curves for Sizing Large Applications




## Comparison of Flow Rates vs. Temperature Rise

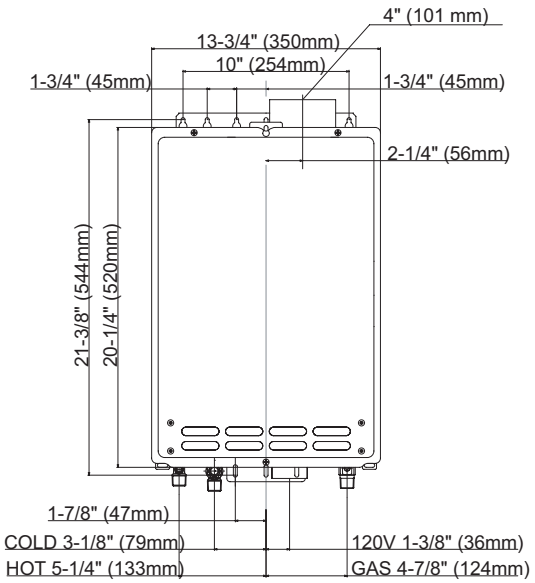
A.O. Smith
Innovation has a name.

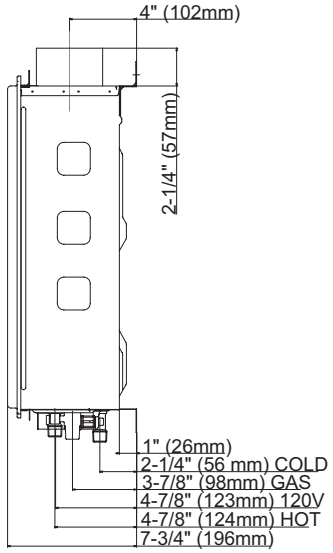
# 110 Series

The 110 Series is great for apartments, one bath homes in cold climates, condos and summer cabins. Remote control included as a standard feature.



## Dimensions



# Specifications

Provides a variety of installation options: indoor, outdoor, and direct vent.

**Warranty Information****

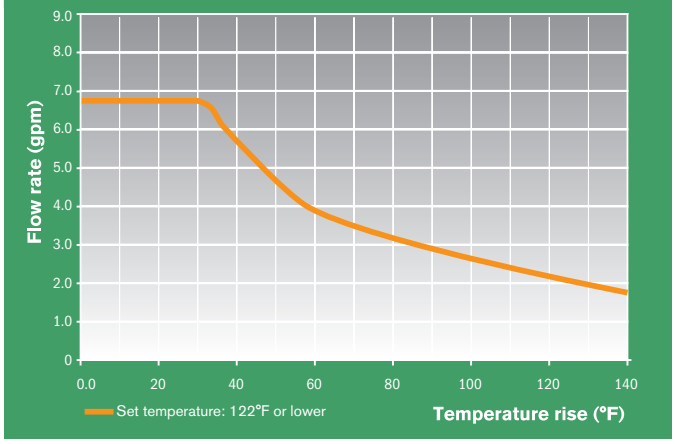
**Residential Use:**
15 yrs limited heat exchanger, 5 yrs limited parts

**Refer to www.hotwater.com for further warranty details.

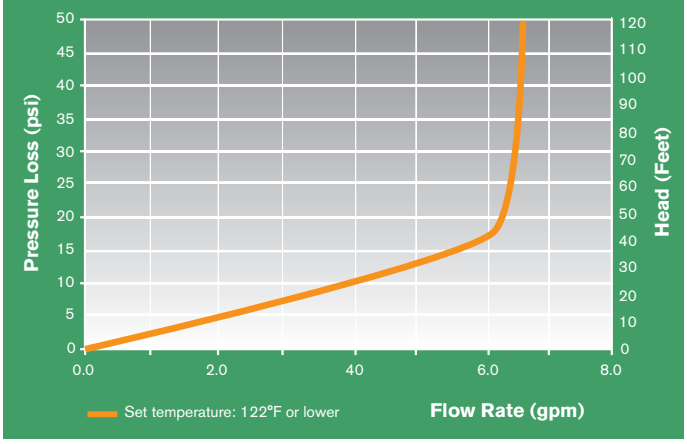
ATI-110 includes both a remote control and power cord as standard features

| | | | | |
|---|---|---|---|---|
| **Installation Type** | Indoor, Outdoor, Direct Vent | | | |
| **Dimension** | 20-1/4" (H) X 13-3/4" (W) X 7-3/4" (D), Weight :33 lbs | | | |
| **Electric** | 120 V | 0.77 A (Operation) | 0.052 A (Standby) | **0.93 A (Freeze-Protection)** |
| **Ignition** | Electronic Ignition | | | |
| **Noise Level** | 55 dB at Max output | | | |
| **Fuel** | | NG | LP | |
| **Gas Consumption** | Min. Input | 19,500 BTU/h | 19,500 BTU/h | |
| | Max. Input | 140,000 BTU/h | 140,000 BTU/h | |
| **Energy Factor** | | 0.82 | 0.82 | |
| **Gas Pressure** | | Min 5.0" W.C. | Min 8.0" W.C. | |
| | | Max 10.5" W.C. | Max 14.0" W.C. | |
| **Flow Rate** | 6.6 GPM | Values based on factory testing. 0.4 GPM required for continuous fire after initial ignition | | |
| **Hot/Cold/Gas Connection** | 3/4" NPT | | | |
| **Coil Capacity** | ≈0.2 Gallons | | | |
| **Water Pressure** | 15-150 PSI | Pressure Only Relief Valve Requires (Min 200,000 BTUs. 150 PSI). 40 psi or above recommended for max. flow | | |
| **Multiple Unit Installation** | Easy-Link System | N/A | N/A | |
| | Multi-Unit System | N/A | N/A | |
| **110 Temperature Settings** | Dipswitches | 113°F 122°F (default) 131°F 140°F | | |
| | With 9007666005 remote (max. distance 400' from heater, non-polarized 18 gauge wiring.) | | | |
| | 99°F to 167°F (16 options), 122°F Default Factory Setting | | | |

**110: Flow Rate vs. Temperature Rise**



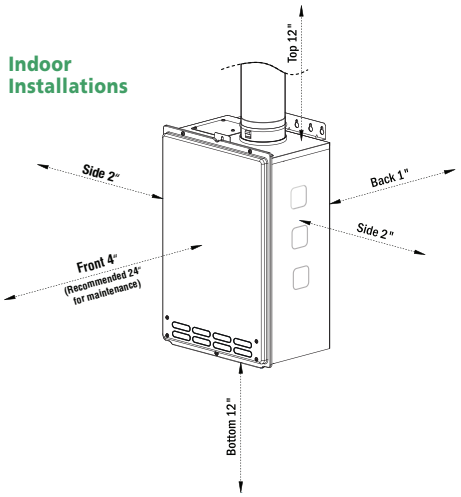

**110: Pressure Loss**



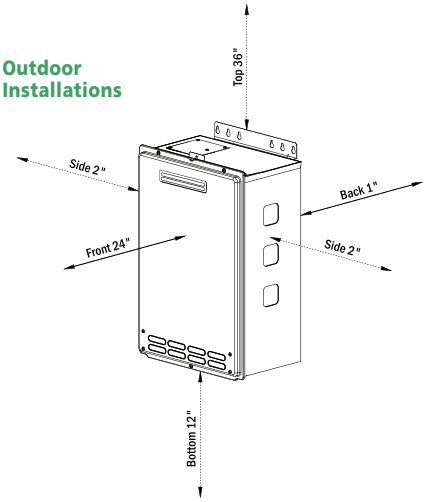

## Clearance

**Clearances to Combustible and Non-Combustible Surfaces**

**Indoor Installations**



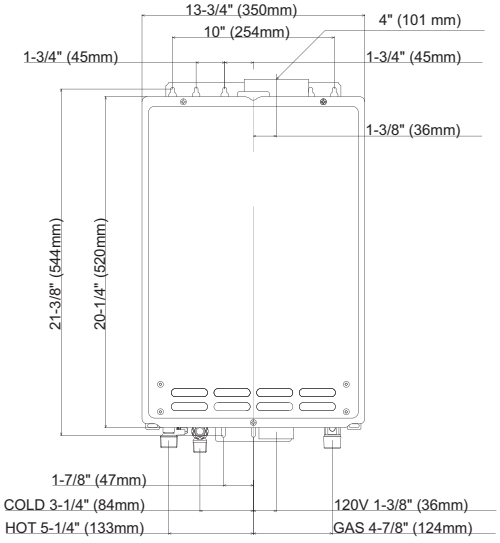

**Outdoor Installations**

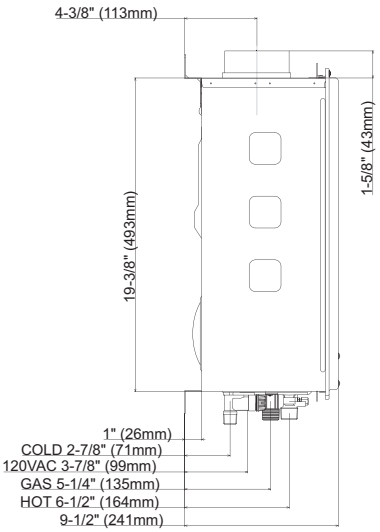


# 310 Series

The 310 Series is the most versatile and popular tankless model we offer. The 310 features a max flow rate of 8.0 gpm providing enough hot water to run three showers at the same time. Remote control included as a standard feature.


## Dimensions



# Specifications

Provides a variety of installation options: indoor, outdoor, and direct vent.

**Warranty Information****

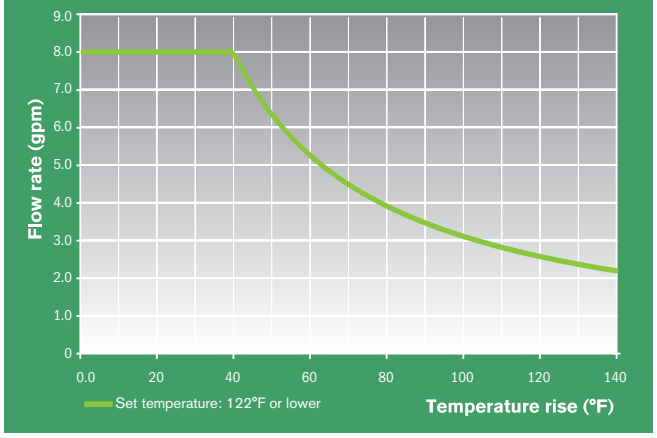
**Residential Use:**
15 yrs limited heat exchanger, 5 yrs limited parts

**Refer to www.hotwater.com for further warranty details.

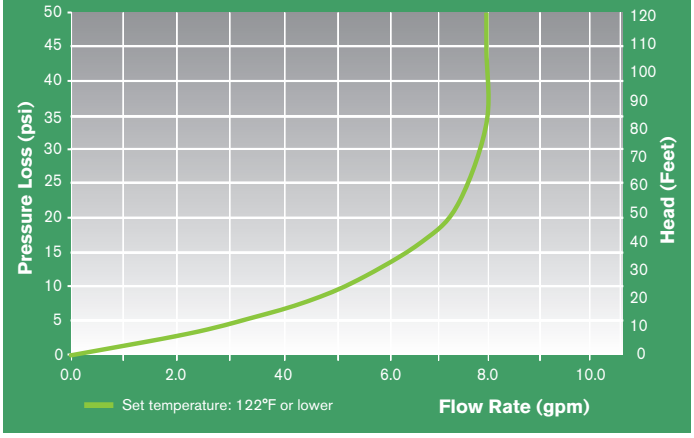
ATI-310 includes both a remote control and power cord as standard features

| | | | | |
|---|---|---|---|---|
| **Installation Type** | Indoor, Outdoor, Direct Vent | | | |
| **Dimension** | 20-1/4" (H) X 13-3/4" (W) X 9-1/2" (D) , Weight :38 lbs | | | |
| **Electric** | 120 V | 0.77 A (Operation) | 0.052 A (Standby) | **0.93 A (Freeze-Protection)** |
| **Ignition** | Electronic Ignition | | | |
| **Noise Level** | 55 dB at Max output | | | |
| **Fuel** | | NG | LP | |
| **Gas Consumption** | Min. Input | 11,000 BTU/h | 11,000 BTU/h | |
| | Max. Input | 190,000 BTU/h | 190,000 BTU/h | |
| **Energy Factor** | | 0.82 | 0.82 | |
| **Gas Pressure** | | Min 5.0" W.C. | Min 8.0" W.C. | |
| | | Max 10.5" W.C. | Max 14.0" W.C. | |
| **Flow Rate** | 8.0 GPM | Values based on factory testing. 0.4 GPM required for continuous fire after initial ignition | | |
| **Hot/Cold/Gas Connection** | 3/4" NPT | | | |
| **Coil Capacity** | ≈0.2 Gallons | | | |
| **Water Pressure** | 15-150 PSI | Pressure Only Relief Valve Requires (Min 200,000 BTUs. 150 PSI). | | |
| | | 40 psi or above recommended for max. flow | | |
| **Multiple Unit Installation** | Easy-Link System | N/A | N/A | |
| | Multi-Unit System | N/A | N/A | |
| **310 Temperature Settings** | Dipswitches | 104°F 113°F 122°F (default) 131°F 140°F 158°F 176°F 185°F | | |
| | With 9007666005 remote (max. distance 400' from heater, non-polarized 18 gauge wiring.) | | | |
| | 99°F to 167°F (16 options), 122°F Default Factory Setting | | | |

**310: Flow Rate vs. Temperature Rise**




**310: Pressure Loss**

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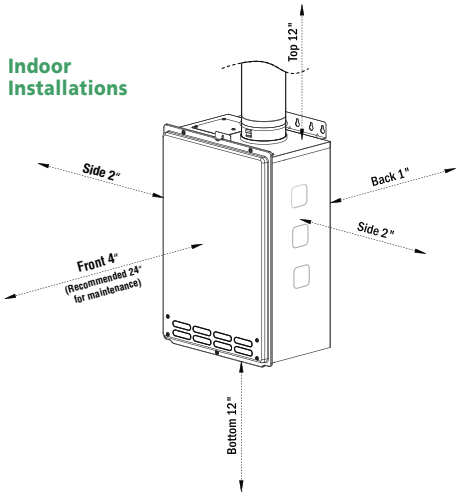
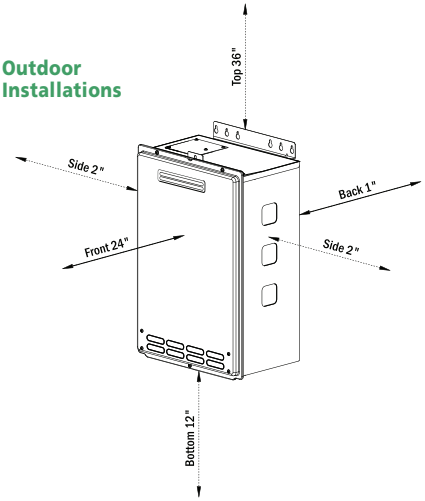
**Clearances to Combustible and Non-Combustible Surfaces**

**Indoor Installations**




**Outdoor Installations**

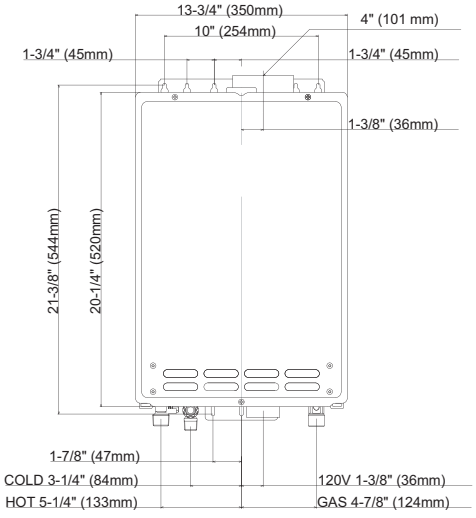


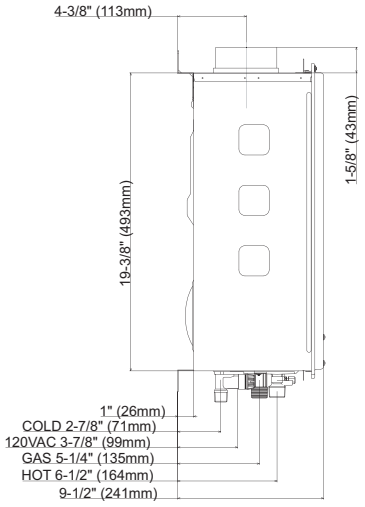
# 510 Series

The 510 series is well suited for residential/commercial applications such as small restaurants and beauty salons. Utilizing HRS35 copper alloy for the heat exchanger tubing, the 510 series is also suitable for heavier-residential usages such as space heating or domestic recirculation systems. Remote control included as a standard feature.



## Dimensions



# Specifications

Thicker heat exchanger drum and utilizes HRS (heat-resistant) copper for the heat exchanger tubing. Provides a variety of installation options: indoor, outdoor, and direct vent. Includes a pump control port, ensuring efficient operation of all circulation pumps. Easy-Link System capable up to 4 units.

**Warranty Information****

**Residential Use:**
15 yrs limited heat exchanger, 5 yrs limited parts

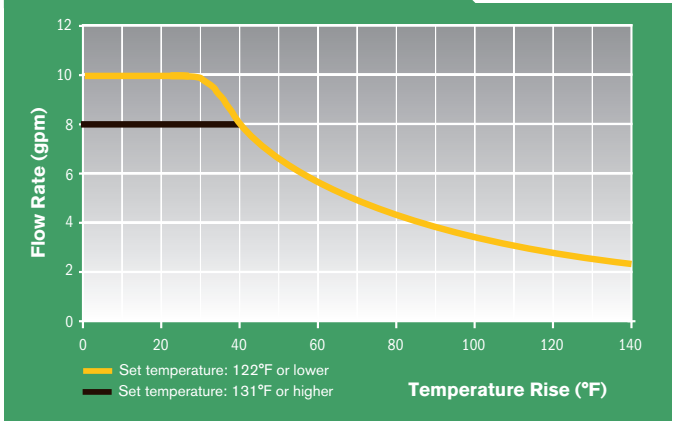
**Commercial Use:**
10 yrs limited heat exchanger, 5 yrs limited parts

**Refer to www.hotwater.com for further warranty details.

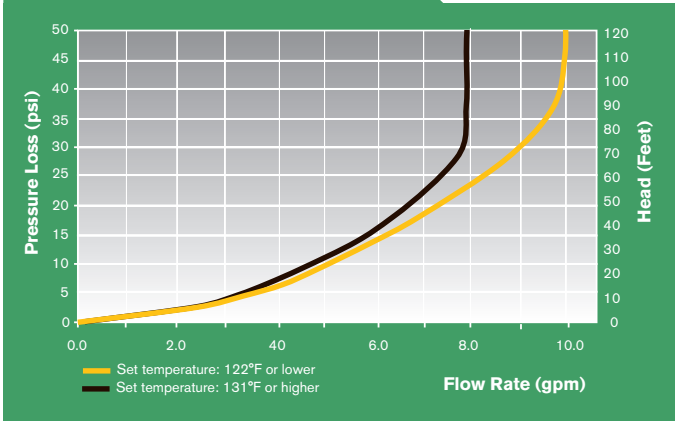
ATI-510 includes both a remote control and power cord as standard features

| | | | | |
|---|---|---|---|---|
| **Installation Type** | Indoor, Outdoor, Direct Vent | | | |
| **Dimension** | 20-1/4" (H) X 13-3/4" (W) X 9-1/2" (D) , Weight :39 lbs | | | |
| **Electric** | 120 V | 0.77 A (Operation) | 0.052 A (Standby) | **0.93 A (Freeze-Protection)** |
| **Ignition** | Electronic Ignition | | | |
| **Noise Level** | 55 dB at Max output | | | |
| **Fuel** | | NG | LP | |
| **Gas Consumption** | Min. Input | 11,000 BTU/h | 11,000 BTU/h | |
| | Max. Input | 199,000 BTU/h | 199,000 BTU/h | |
| **Energy Factor** | | 0.82 | 0.82 | |
| **Gas Pressure** | | Min 5.0" W.C. | Min 8.0" W.C. | |
| | | Max 10.5" W.C. | Max 14.0" W.C. | |
| **Flow Rate** | 10.0 GPM | Values based on factory testing. 0.4 GPM required for continuous fire after initial ignition | | |
| **Hot/Cold/Gas Connection** | 3/4" NPT | | | |
| **Coil Capacity** | ≈0.2 Gallons | | | |
| **Water Pressure** | 15-150 PSI | Pressure Only Relief Valve Requires (Min 200,000 BTUs. 150 PSI). 40 psi or above recommended for max. flow | | |
| **Multiple Unit Installation** | Easy-Link System | Up to 4 units | With no need for a system controller | |
| | Multi-Unit System | N/A | N/A | |
| **510 Temperature Settings** | Dipswitches | 104°F 113°F 122°F (default) 131°F 140°F 158°F 176°F 185°F | | |
| | With 9007603005 remote (max. distance 400' from heater, non-polarized 18 gauge wiring.) | | | |
| | 99°F to 185°F (19 options), 122°F Default Factory Setting | | | |

**510: Flow Rate vs. Temperature Rise**



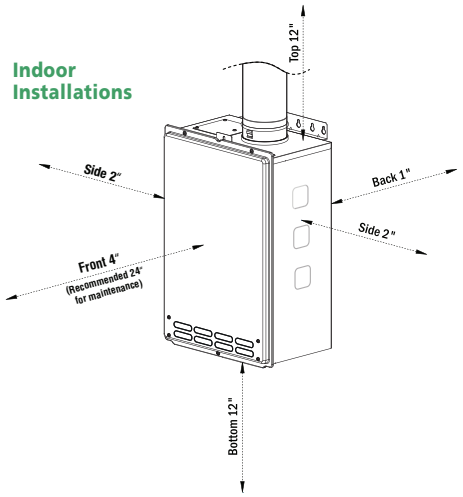

**510: Pressure Loss**



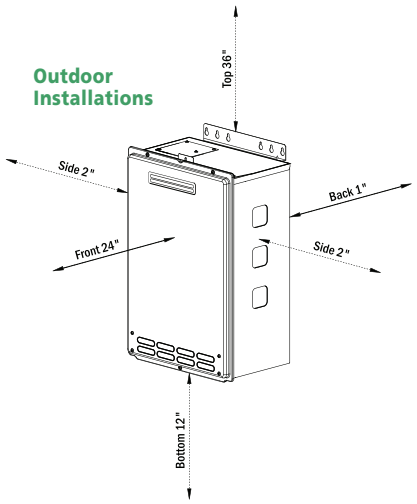

# Clearance

**Clearances to Combustible and Non-Combustible Surfaces**

**Indoor Installations**




**Outdoor Installations**



# 110U Series

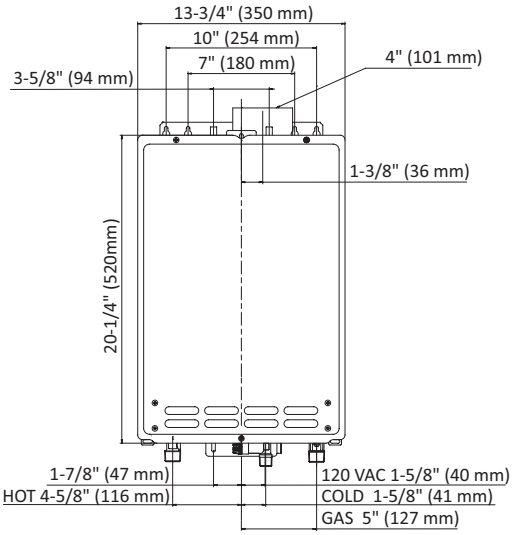
The 110U Series is great for apartments, one bath homes in cold climates, condos and summer cabins. Remote control included as a standard feature. Complies with Ultra-Low NOx regulations.


ATI-110U

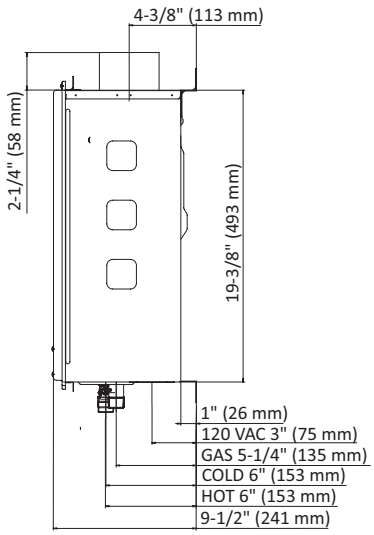
ATO-110U

## Dimensions

Front view




Side view



# Specifications

Provides a variety of installation options: indoor, outdoor, and direct vent. Complies with Ultra-Low NOx regulations. Meets the energy efficiency requirements of ASHRAE 90.1b-1992.

**Warranty Information****

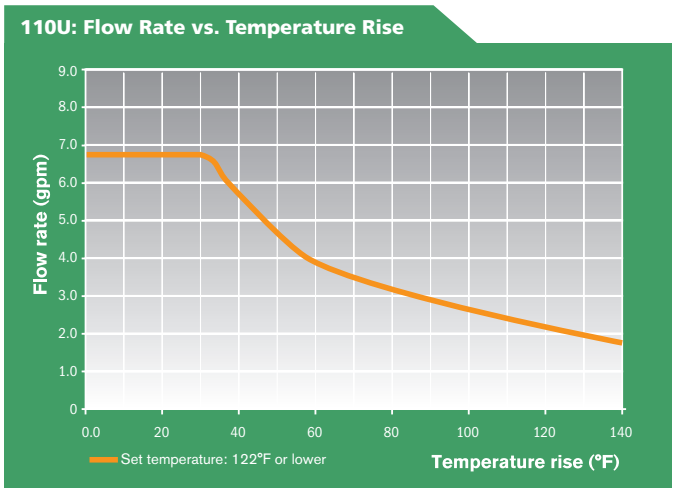
**Residential Use:**
15 yrs limited heat exchanger, 5 yrs limited parts

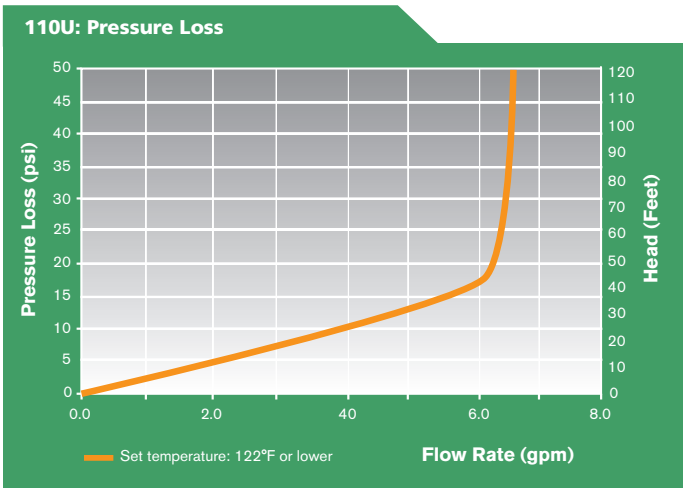
**Refer to www.hotwater.com for further warranty details.

Indoor models include both a remote control and power cord as standard features

Outdoor models include remote control as a standard feature

| | | | | |
|---|---|---|---|---|
| **Installation Type** | Indoor, Outdoor, Direct Vent | | | |
| **Dimension** | 20-1/4" (H) X 13-3/4" (W) X 9-1/2" (D) , Weight :33 lbs | | | |
| **Electric** | 120 V | 0.77 A (Operation) | 0.052 A (Standby) | **0.93 A (Freeze-Protection)** |
| **Ignition** | Electronic Ignition | | | |
| **Noise Level** | 55 dB at Max output | | | |
| **Fuel** | | NG | | |
| **Gas Consumption** | Min. Input | 15,000 BTU/h | | |
| | Max. Input | 140,000 BTU/h | | |
| **Energy Factor** | | 0.82 | | |
| **Gas Pressure** | | Min 5.0" W.C. | | |
| | | Max 10.5" W.C. | | |
| **Flow Rate** | 6.6 GPM | Values based on factory testing. 0.4 GPM required for continuous fire after initial ignition | | |
| **Hot/Cold/Gas Connection** | 3/4" NPT | | | |
| **Coil Capacity** | ≈0.2 Gallons | | | |
| **Water Pressure** | 15-150 PSI | Pressure Only Relief Valve Requires (Min 200,000 BTUs. 150 PSI). 40 psi or above recommended for max. flow | | |
| **Multiple Unit Installation** | Easy-Link System | N/A | N/A | |
| | Multi-Unit System | N/A | N/A | |
| **110U Temperature Settings** | Dipswitches | 120°F (default) 140°F | | |
| | With 9008172005 remote (max. distance 400' from heater, non-polarized 18 gauge wiring.) | | | |
| | 100°F to 140°F (9 options), 120°F Default Factory Setting | | | |

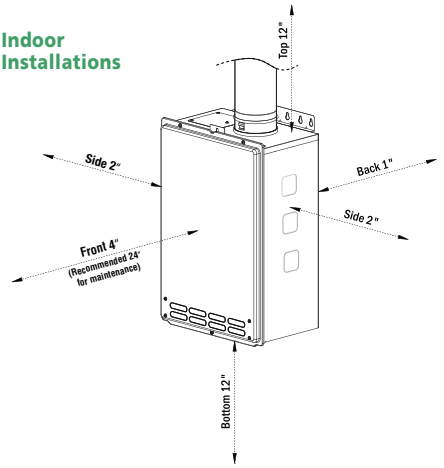


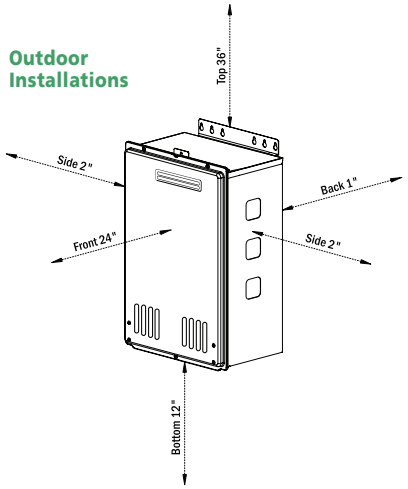

## Clearance

### Clearances to Combustible and Non-Combustible Surfaces

**Indoor Installations**




**Outdoor Installations**



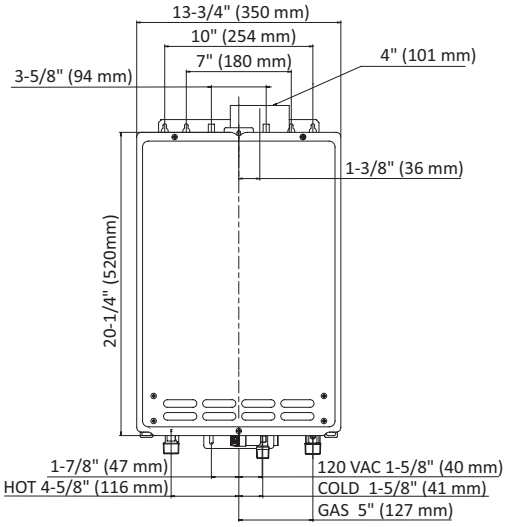
# 310U Series

The 310U features a max flow rate of 8.0 gpm providing enough hot water to run three showers at the same time. Remote control included as a standard feature. Complies with Ultra-Low NOx regulations.

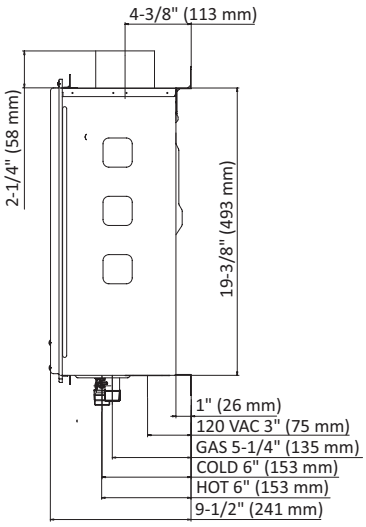



## Dimensions

Front view




Side view



# Specifications

Provides a variety of installation options: indoor, outdoor, and direct vent. Complies with Ultra-Low NOx regulations. Meets energy efficiency requirements of ASHRAE 90.1b-1992.

**Warranty Information****

**Residential Use:**
15 yrs limited heat exchanger, 5 yrs limited parts

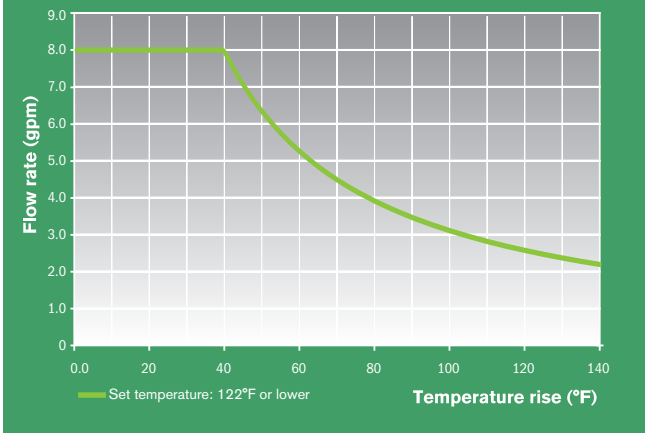
**Refer to www.hotwater.com for further warranty details.

Indoor models include both a remote control and power cord as standard features

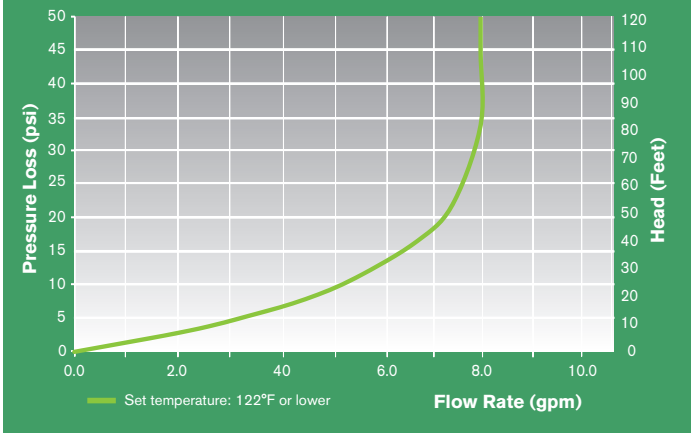
Outdoor models include remote control as a standard feature

| | | | | |
|---|---|---|---|---|
| **Installation Type** | Indoor, Outdoor, Direct Vent | | | |
| **Dimension** | 20-1/4" (H) X 13-3/4" (W) X 9-1/2" (D) , Weight :37 lbs | | | |
| **Electric** | 120 V | 0.73 A (Operation) | 0.052 A (Standby) | 0.93 A (Freeze-Protection) |
| **Ignition** | Electronic Ignition | | | |
| **Noise Level** | 55 dB at Max output | | | |
| **Fuel** | | NG | | |
| **Gas Consumption** | Min. Input | 15,000 BTU/h | | |
| | Max. Input | 190,000 BTU/h | | |
| **Energy Factor** | | 0.82 | | |
| **Gas Pressure** | | Min 5.0" W.C. | | |
| | | Max 10.5" W.C. | | |
| **Flow Rate** | 8.0 GPM | Values based on factory testing. 0.4 GPM required for continuous fire after initial ignition | | |
| **Hot/Cold/Gas Connection** | 3/4" NPT | | | |
| **Coil Capacity** | ≈0.2 Gallons | | | |
| **Water Pressure** | 15-150 PSI | Pressure Only Relief Valve Requires (Min 200,000 BTUs. 150 PSI). | | |
| | | 40 psi or above recommended for max. flow | | |
| **Multiple Unit Installation** | Easy-Link System | N/A | N/A | |
| | Multi-Unit System | N/A | N/A | |
| **310U Temperature Settings** | Dipswitches | 120°F (default) 140°F | | |
| | With 9008172005 remote (max. distance 400' from heater, non-polarized 18 gauge wiring.) | | | |
| | 120°F to 140°F (9 options), 120°F Default Factory Setting | | | |

**310U: Flow Rate vs. Temperature Rise**



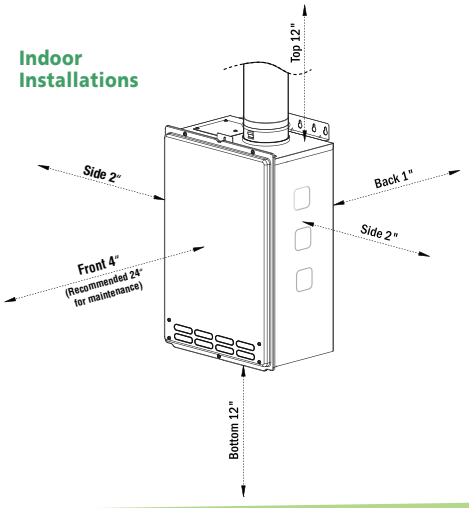

**310U: Pressure Loss**



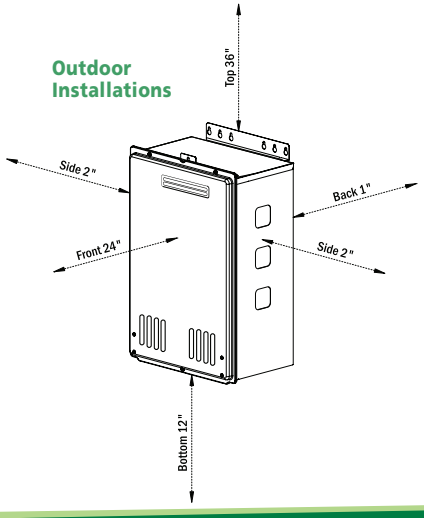

## Clearance

**Clearances to Combustible and Non-Combustible Surfaces**

**Indoor Installations**




**Outdoor Installations**

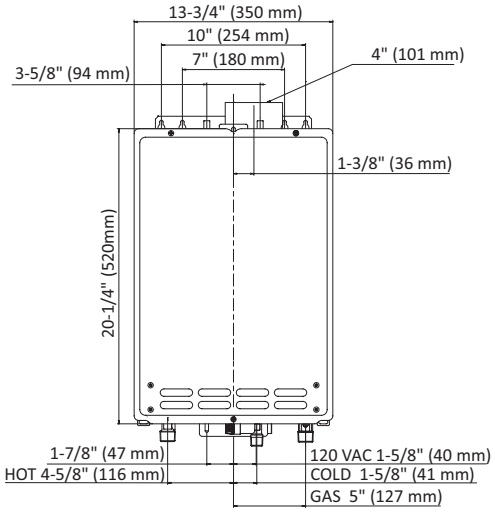


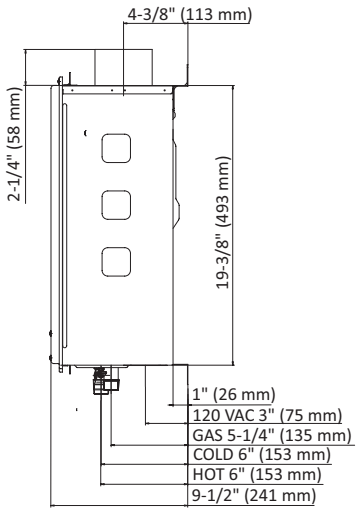
# 510U Series

The 510U series is well suited for residential/commercial applications such as small restaurants and beauty salons. Utilizing HRS35 copper alloy for the heat exchanger tubing, the 510U series is also suitable for heavier-residential usages such as space heating or domestic recirculation systems. Remote control included as a standard feature.




## Dimensions



# Specifications

Thicker heat exchanger drum and utilizes HRS (heat-resistant) copper for the heat exchanger tubing. Provides a variety of installation options: indoor, outdoor, and direct vent. Includes a pump control port, ensuring efficient operation of all circulation pumps. Complies with Ultra-Low NOx regulations. Meets the energy efficiency requirements of ASHRAE 90.1-b 1992. Easy-Link System capable up to 4 units. Multi-Link system capable up to 20 units.

**Warranty Information****

**Residential Use:**
15 yrs limited heat exchanger, 5 yrs limited parts

**Commercial Use:**
10 yrs limited heat exchanger, 5 yrs limited parts

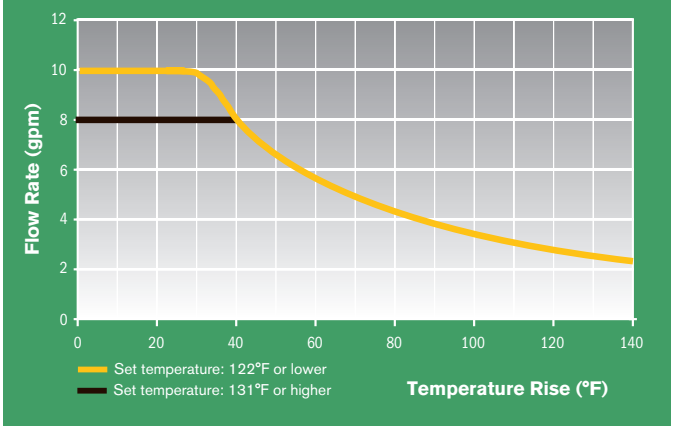
**Refer to www.hotwater.com for further warranty details.

Indoor models include both a remote control and power cord as standard features

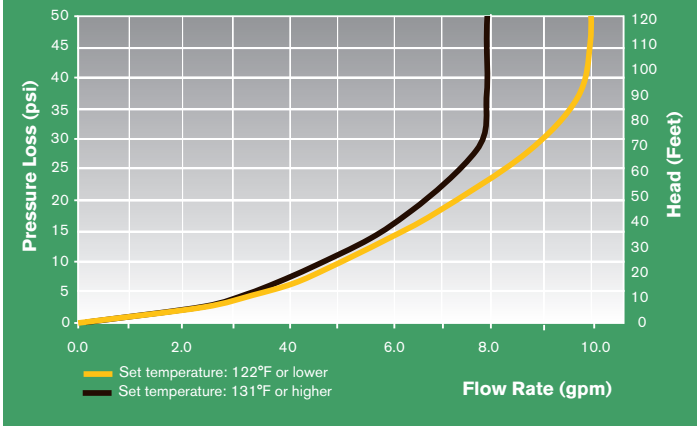
Outdoor models include remote control as a standard feature

| | | | | |
|---|---|---|---|---|
| **Installation Type** | Indoor, Outdoor, Direct Vent | | | |
| **Dimension** | 20-1/4" (H) X 13-3/4" (W) X 9-1/2" (D) , Weight :39 lbs | | | |
| **Electric** | 120 V | 0.77 A (Operation) | 0.052 A (Standby) | 0.93 A (Freeze-Protection) |
| **Ignition** | Electronic Ignition | | | |
| **Noise Level** | 55 dB at Max output | | | |
| **Fuel** | | NG | | |
| **Gas Consumption** | Min. Input | 15,000 BTU/h | | |
| | Max. Input | 199,000 BTU/h | | |
| **Energy Factor** | | 0.82 | | |
| **Gas Pressure** | | Min 5.0" W.C. | | |
| | | Max 10.5" W.C. | | |
| **Flow Rate** | 10.0 GPM | Values based on factory testing. 0.4 GPM required for continuous fire after initial ignition | | |
| **Hot/Cold/Gas Connection** | 3/4" NPT | | | |
| **Coil Capacity** | ≈0.2 Gallons | | | |
| **Water Pressure** | 15-150 PSI | Pressure Only Relief Valve Requires (Min 200,000 BTUs. 150 PSI). | | |
| | | 40 psi or above recommended for max. flow | | |
| **Multiple Unit Installation** | Easy-Link System | Up to 4 units | With no need for a system controller | |
| | Multi-Unit System | Up to 20 units | Multi-Controller (9008300005) | |
| **510U Temperature Settings** | Dipswitches | 120°F (default) 140°F | | |
| | With 9008172005 remote (max. distance 400' from heater, non-polarized 18 gauge wiring.) | | | |
| | 100°F to 185°F (16 options), 120°F Default Factory Setting | | | |

**510U: Flow Rate vs. Temperature Rise**



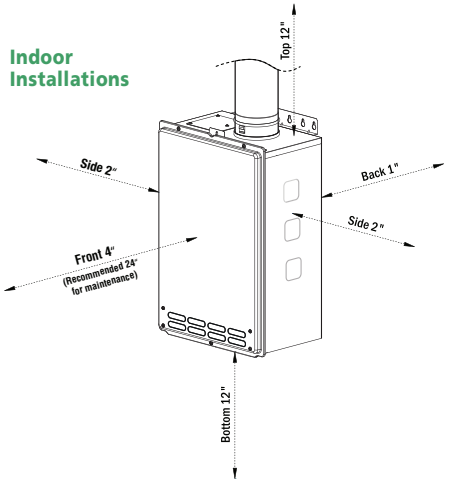

**510U: Pressure Loss**



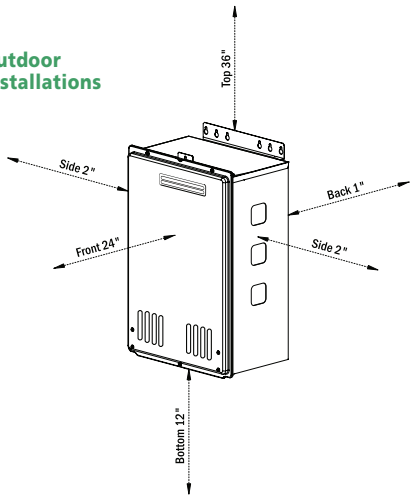

# Clearance

**Clearances to Combustible and Non-Combustible Surfaces**

**Indoor Installations**

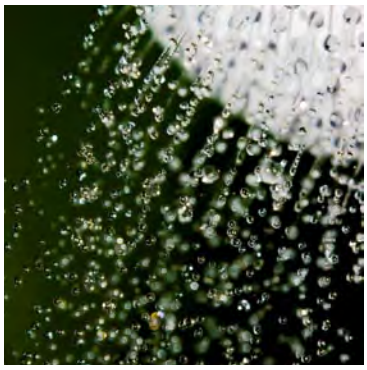



**Outdoor Installations**



# 240H Series

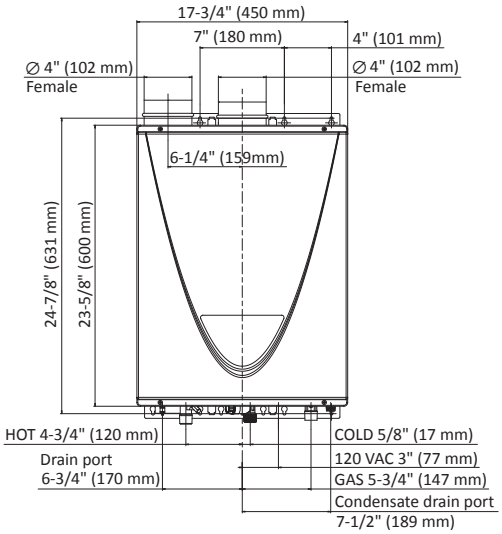
The 240H series offers high efficiency Ultra-Low NOx condensing technology allowing for the use of 3" PVC venting and has 0" clearance to combustibles. Utilizes HRS35 copper alloy for the heat exchanger tubing. Remote control included as a standard feature. Indoor models are certified up to 10,100 ft. altitude.

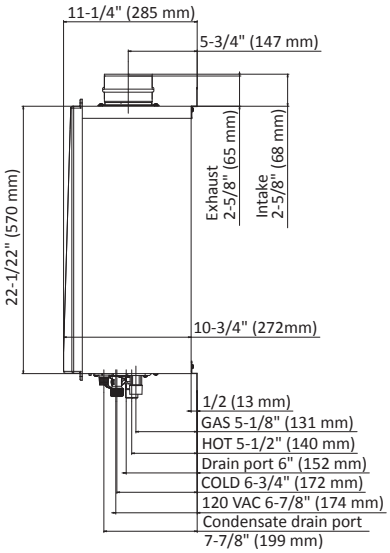



ATI-240H

ATO-240H

## Dimensions



# Specifications

Provides a variety of installation options: indoor, outdoor, and direct vent. Complies with Ultra-Low NOx regulations. Meets the energy efficiency requirements of ASHRAE 90.1b-1992.

**Warranty Information****

**Residential Use:**
15 years limited heat exchanger, 5 yrs limited parts

**Refer to www.hotwater.com for further warranty details.

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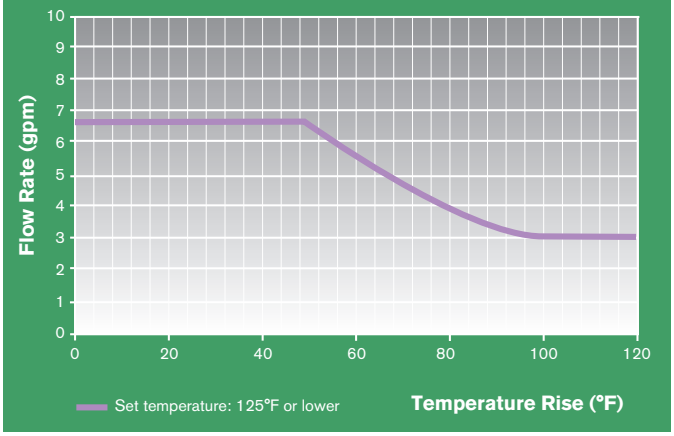
Indoor model includes a built-in temperature controller and advanced diagnostics to simplify troubleshooting.

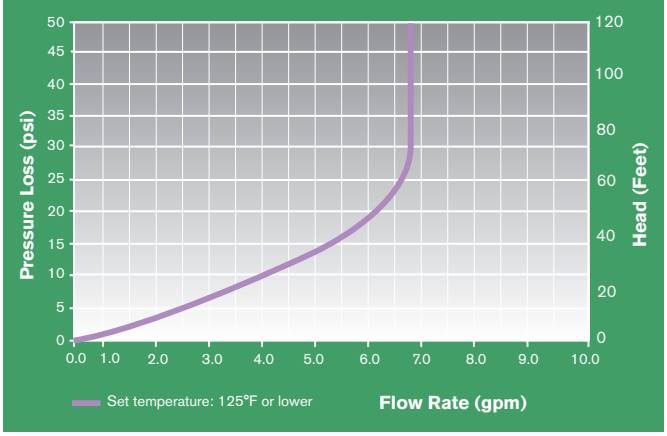
Outdoor model includes a wall mount temperature remote controller and advanced diagnostics to simplify troubleshooting.

| | | | | |
|---|---|---|---|---|
| Installation Type | Indoor, Outdoor, SCH 40 PVC Direct Vent | | | |
| Dimension | 23-5/8" (H) X 17-3/4" (W) X 11-1/4" (D) , Weight :DV: 58 lbs OS: 58 lbs | | | |
| Electric | 120 V | 1.27 A (Operation) | 0.07 A (Standby) | 1.73 A (Freeze-Protection) |
| Ignition | Electronic Ignition | | | |
| Noise Level | 55 dB at Max output | | | |
| Fuel | | NG | LP | |
| Gas Consumption | Min. Input | 15,000 BTU/h | 13,000 BTU/h | |
| | Max. Input | 160,000 BTU/h | 160,000 BTU/h | |
| Energy Factor | | 0.95 | 0.95 | |
| Gas Pressure | | Min 5.0" W.C. | Min 8.0" W.C. | |
| | | Max 10.5" W.C. | Max 14.0" W.C. | |
| Flow Rate | 6.6 GPM | Values based on factory testing. 0.4 GPM required for continuous fire after initial ignition | | |
| Hot/Cold/Gas Connection | 3/4" NPT | | | |
| Coil Capacity | ≈0.2 Gallons | | | |
| Water Pressure | 15-150 PSI | Pressure Only Relief Valve Requires (Min 200,000 BTUs. 150 PSI). | | |
| | | 40 psi or above recommended for max. flow | | |
| Multiple Unit Installation | Easy-Link System | N/A | N/A | |
| | Multi-Unit System | N/A | N/A | |
| 240H Temperature Settings | Built In / without remote | 100°F 105°F 110°F 115°F 120°F (Default) 125°F 130°F 135°F 140°F (9 options) | | |
| | With 9008172005 remote (max. distance 400' from heater, non-polarized 18 gauge wiring.) | | | |
| | 100°F to 140°F with 5°F intervals (9 options), 120°F Default Factory Setting | | | |

**240H: Flow Rate vs. Temperature Rise**



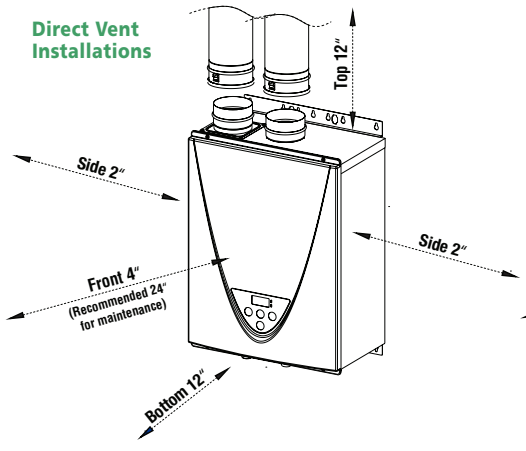

**240H: Pressure Loss**



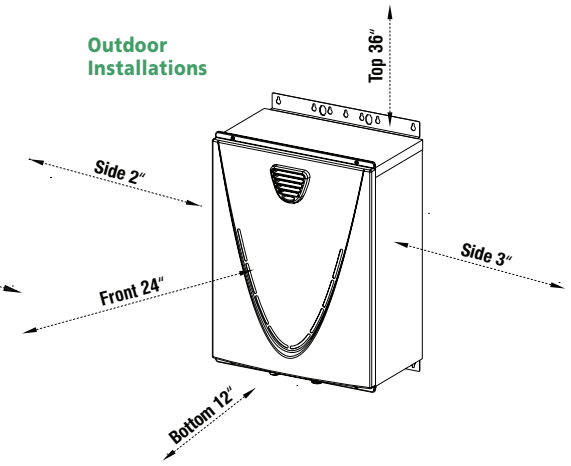

# Clearance

**Clearances to Combustible and Non-Combustible Surfaces**

**Direct Vent Installations**




**Outdoor Installations**

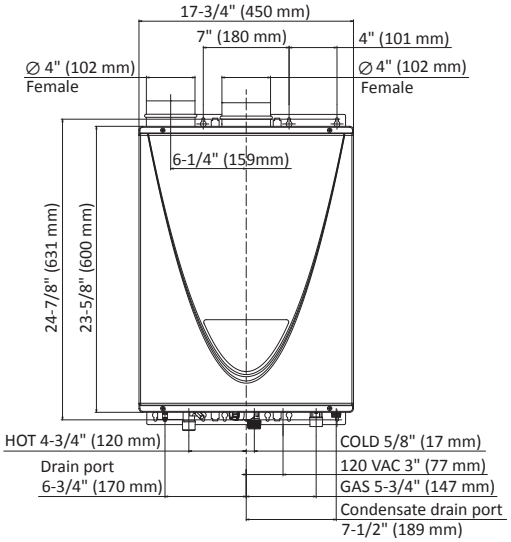


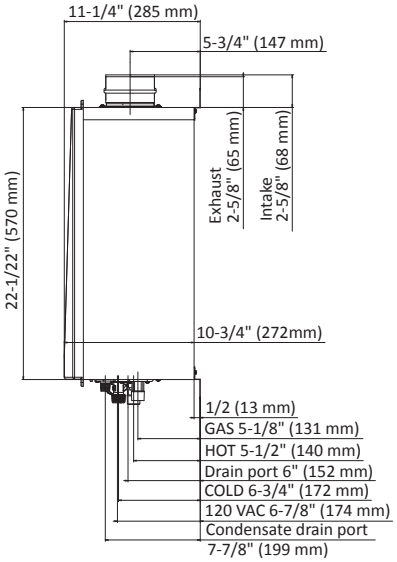
# 340H Series

The 340H series offers high efficiency Ultra-Low NOx condensing technology allowing for the use of 3" PVC venting and has 0" clearance to combustibles. Utilizes HRS35 copper alloy for the heat exchanger tubing. Remote control included as a standard feature. Indoor models are certified up to 10,100 ft. altitude.




## Dimensions



# Specifications

Provides a variety of installation options: indoor, outdoor, and direct vent. Complies with Ultra-Low NOx regulations. Meets the energy efficiency requirements of ASHRAE 90.1b-1992.

**Warranty Information****

**Residential Use:**
15 years limited heat exchanger, 5 yrs limited parts

**Refer to www.hotwater.com for further warranty details.

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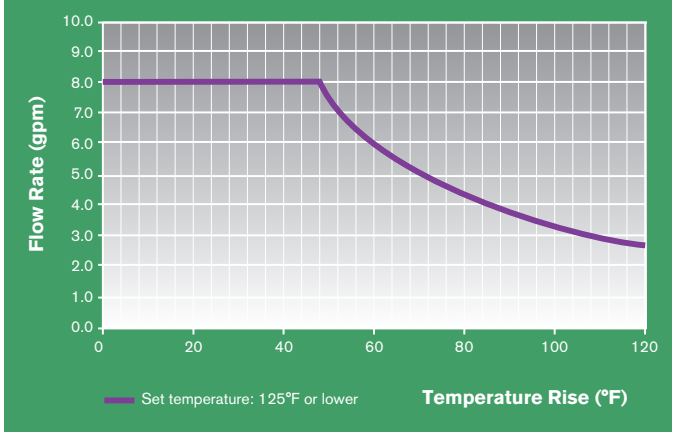
Indoor model includes a built-in temperature controller and advanced diagnostics to simplify troubleshooting.

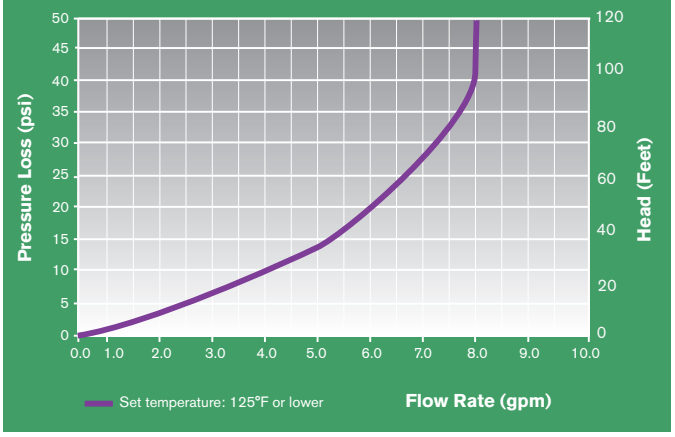
Outdoor model includes a wall mount temperature remote controller and advanced diagnostics to simplify troubleshooting.

| | | | | |
|---|---|---|---|---|
| Installation Type | Indoor, Outdoor, SCH 40 PVC Direct Vent | | | |
| Dimension | 23-5/8" (H) X 17-3/4" (W) X 11-1/4" (D) , Weight :DV: 58 lbs OS: 58 lbs | | | |
| Electric | 120 V | 1.27 A (Operation) | 0.07 A (Standby) | 1.73 A (Freeze-Protection) |
| Ignition | Electronic Ignition | | | |
| Noise Level | 55 dB at Max output | | | |
| Fuel | | NG | LP | |
| Gas Consumption | Min. Input | 15,000 BTU/h | 13,000 BTU/h | |
| | Max. Input | 180,000 BTU/h | 180,000 BTU/h | |
| Energy Factor | | 0.95 | 0.95 | |
| Gas Pressure | | Min 5.0" W.C. | Min 8.0" W.C. | |
| | | Max 10.5" W.C. | Max 14.0" W.C. | |
| Flow Rate | 8.0 GPM | Values based on factory testing. 0.4 GPM required for continuous fire after initial ignition | | |
| Hot/Cold/Gas Connection | 3/4" NPT | | | |
| Coil Capacity | ≈0.2 Gallons | | | |
| Water Pressure | 15-150 PSI | Pressure Only Relief Valve Requires (Min 200,000 BTUs. 150 PSI). 40 psi or above recommended for max. flow | | |
| Multiple Unit Installation | Easy-Link System | N/A | N/A | |
| | Multi-Unit System | N/A | N/A | |
| 340H Temperature Settings | Built In / without remote | 100°F 105°F 110°F 115°F 120°F (Default) 125°F 130°F 135°F 140°F (9 options) | | |
| | With 9008172005 remote (max. distance 400' from heater, non-polarized 18 gauge wiring.) | | | |
| | 100°F to 140°F with 5°F intervals (9 options), 120°F Default Factory Setting | | | |

**340H: Flow Rate vs. Temperature Rise**



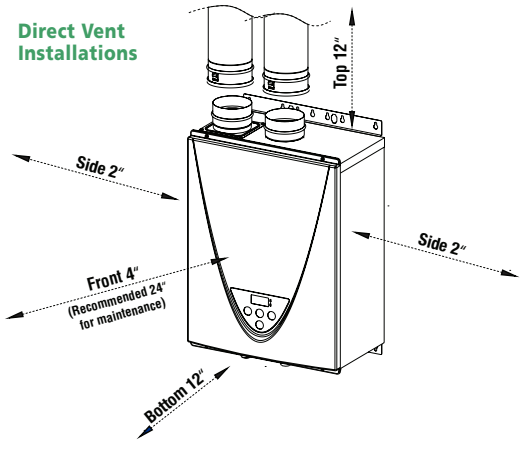

**340H: Pressure Loss**



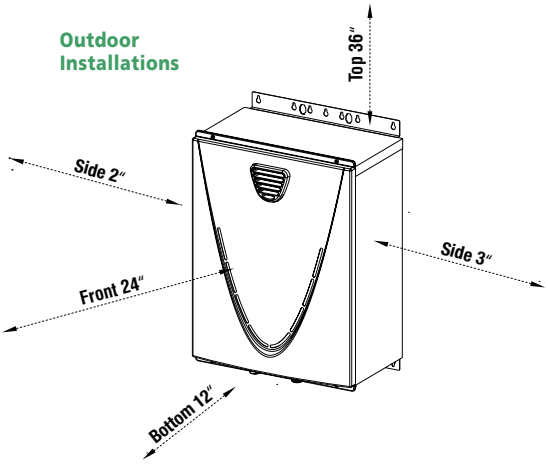

## Clearance

**Clearances to Combustible and Non-Combustible Surfaces**

**Direct Vent Installations**




**Outdoor Installations**

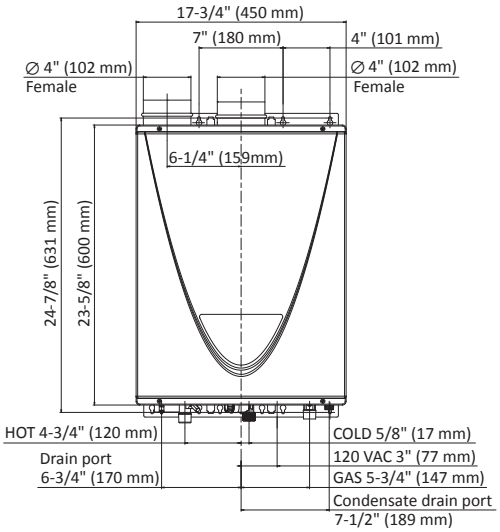


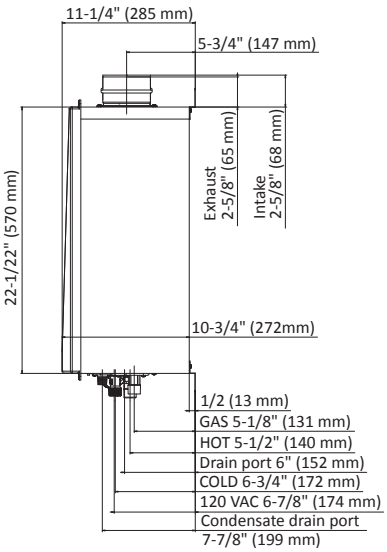
# 540H Series

The 540H is well suited for residential/ commercial applications such as small restaurants and beauty salons. Complies with Ultra-Low NOx regulations. Utilizing HRS35 copper alloy for the heat exchanger tubing, the 540H is also suitable for heavier-residential usages such as space heating or domestic recirculation systems. Remote control included as a standard feature. Indoor models are certified up to 10,100 ft. altitude.



## Dimensions



# Specifications

Thicker heat exchanger drum and utilizes HRS35 (heat-resistant) copper for the heat exchanger tubing. Provides a variety of installation options: outdoor, and direct vent. Includes a pump control port, ensuring efficient operation of all circulation pumps. Complies with Ultra-Low NOx regulations. Meets the energy efficiency requirements of ASHRAE 90.1b-1992. Easy-Link System capable up to 4 units. Multi-Link System capable up to 20 units.

**Warranty Information****

**Residential Use:**
15 yrs limited heat exchanger, 5 yrs limited parts

**Commercial Use:**
10 yrs limited heat exchanger, 5 yrs limited parts

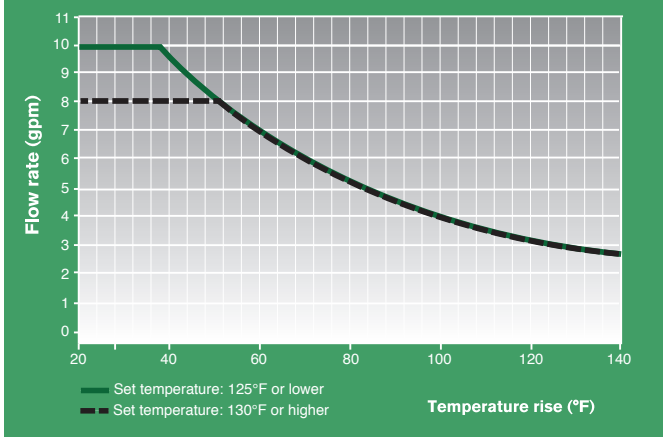
**Refer to www.hotwater.com for further warranty details.

Indoor model includes a built-in temperature controller and advanced diagnostics to simplify troubleshooting.

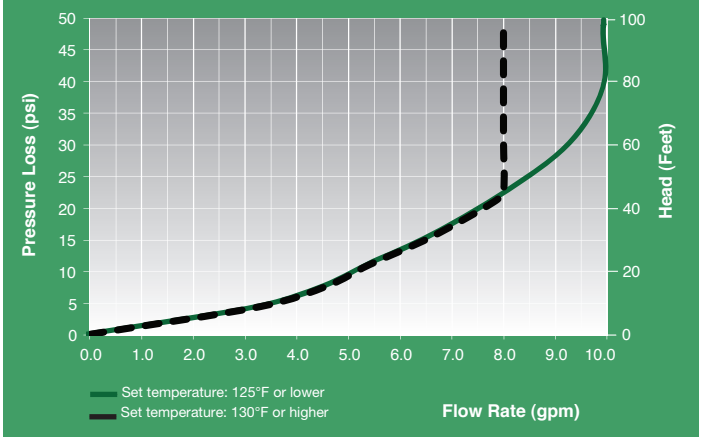
Outdoor models includes a wall mount temperature remote controller and advanced diagnostics to simplify troubleshooting.

| | | | | |
|---|---|---|---|---|
| Installation Type | Indoor, Outdoor, SCH 40 PVC Direct Vent | | | |
| Dimension | 23-5/8" (H) X 17-3/4" (W) X 11-1/4" (D) , Weight :DV: 59 lbs OS:59 lbs | | | |
| Electric | 120 V | 1.27 A (Operation) | 0.07 A (Standby) | 1.73 A (Freeze-Protection) |
| Ignition | Electronic Ignition | | | |
| Noise Level | 55 dB at Max output | | | |
| Fuel | | NG | LP | |
| Gas Consumption | Min. Input | 15,000 BTU/h | 13,000 BTU/h | |
| | Max. Input | 199,000 BTU/h | 199,000 BTU/h | |
| Energy Factor | | 0.95 | 0.95 | |
| Gas Pressure | | Min 5.0" W.C. | Min 8.0" W.C. | |
| | | Max 10.5" W.C. | Max 14.0" W.C. | |
| Flow Rate | 10.0 GPM | Values based on factory testing. 0.4 GPM required for continuous fire after initial ignition | | |
| Hot/Cold/Gas Connection | 3/4" NPT | | | |
| Coil Capacity | ≈0.2 Gallons | | | |
| Water Pressure | 15-150 PSI | Pressure Only Relief Valve Requires (Min 200,000 BTUs. 150 PSI). 40 psi or above recommended for max. flow | | |
| Multiple Unit Installation | Easy-Link System | Up to 4 units | With no additional parts or accessories needed | |
| | Multi-Unit System | Up to 20 units | Multiple-Unit Controller 9008300005 | |
| 540H Temperature Settings | Built In / without remote | 100°F 105°F 110°F 115°F 120°F (Default) 125°F 130°F 135°F 140°F 145°F 150°F 155°F 160°F 165°F 170°F 175°F and 185°F (17 options) | | |
| | With 9008172005 remote (max. distance 400' from heater, non-polarized 18 gauge wiring.) | | | |
| | 100°F to 185°F with 5°F intervals (16 options), 120°F Default Factory Setting | | | |

**540H: Flow Rate vs. Temperature Rise**

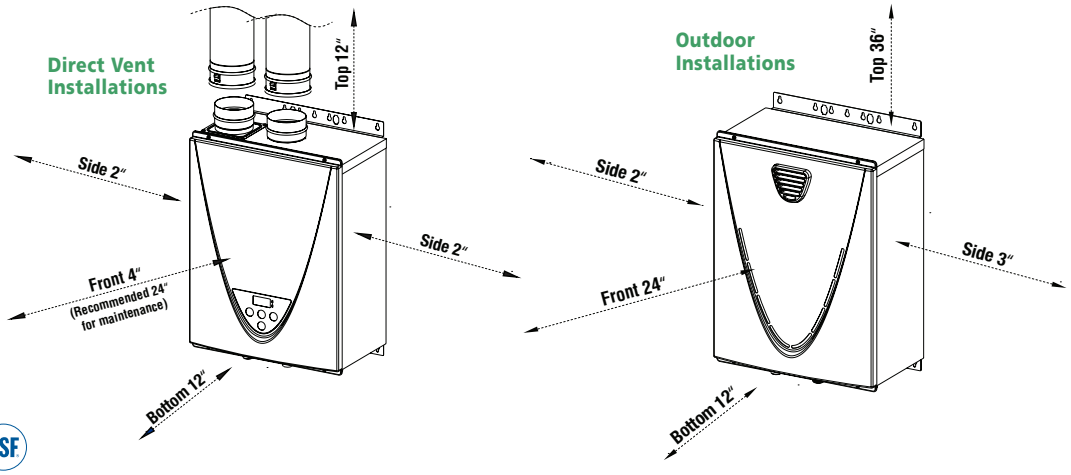



**540H: Pressure Loss**




# Clearance

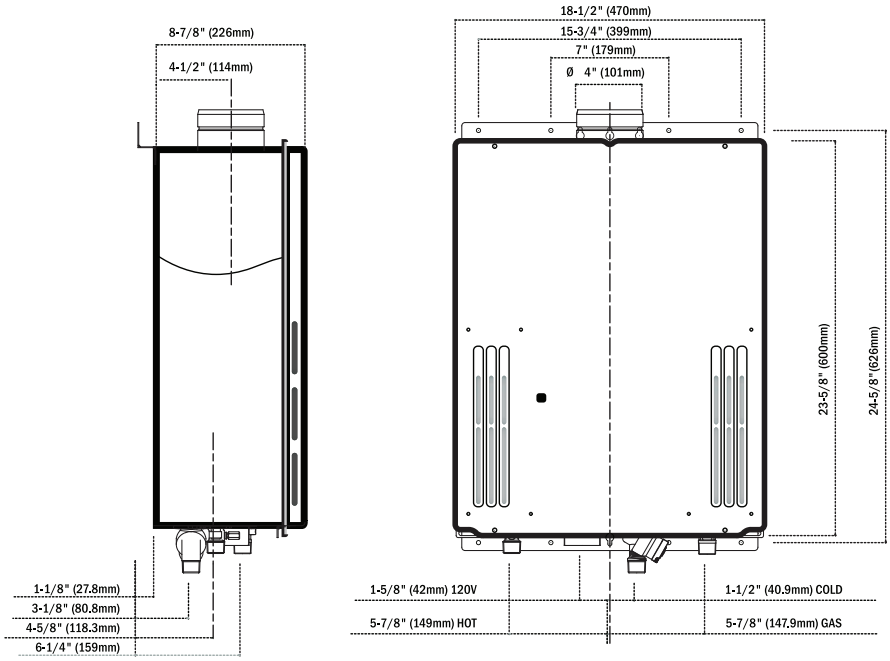
**Clearances to Combustible and Non-Combustible Surfaces**



# 710 Series

The 710 Series is specifically designed for commercial applications and shares many of the same commercial-grade attributes as the 910 Series. Though it was designed as a smaller, lighter, and less powerful unit than the 910 Series, it provides the versatility of being able to link up to 20 units in a Multi-Unit System.


## Dimensions



# Specifications

Thicker heat-exchanger drum and utilizes HRS35 copper alloy for the heat exchanger tubing. Provides a variety of installation options. Adjustments can be made for higher-altitude installations. Includes an internal pump control port. Easy-Link system capable up to 4 units. Multi-Unit System capable up to 20 units. An ASME version of the 710 Series is also available.*

**Warranty Information****

**Residential Use:**
15 yrs limited heat exchanger, 5 yrs limited parts

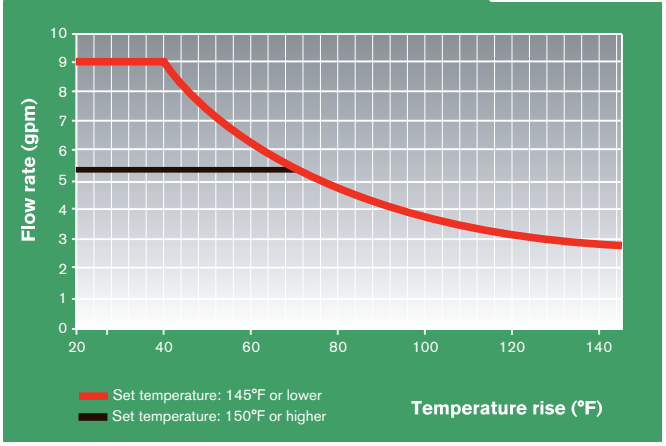
**Commercial Use:**
10 yrs limited heat exchanger, 5 yrs limited parts

*ASME models do not utilize HRS35 copper alloy.
**Refer to www.hotwater.com for further warranty details.

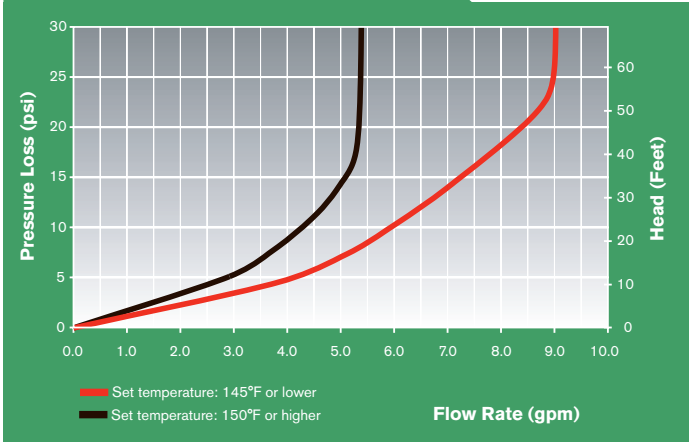
| | | | | |
|---|---|---|---|---|
| Installation Type | Indoor, Outdoor, Direct Vent | | | |
| Dimension | 23-5/8" (H) X 18-1/2" (W) X 10" (D), Weight : 59 lbs | | | |
| Electric | 120 V | 0.94 A (Operation) | 0.075 A (Standby) | 1.56 A (Freeze-Protection) |
| Ignition | Electronic Ignition | | | |
| Noise Level | 56 dB at Max output | | | |
| Fuel | | NG | LP | |
| Gas Consumption | Min. Input | 24,000 BTU/h | 24,000 BTU/h | |
| | Max. Output | 240,000 BTU/h | 240,000 BTU/h | |
| Thermal Efficiency | | 82.2% | 83.9% | |
| Gas Pressure | | Min 5.0" W.C. | Min 8.0" W.C. | |
| | | Max 10.5" W.C. | Max 14.0" W.C. | |
| Flow Rate | 9.0 GPM | Values based on factory testing. 0.4 GPM required for continuous fire after initial ignition. | | |
| Hot/Cold/Gas Connection | 3/4" NPT | | | |
| Coil Capacity | ≈0.32 Gallons | | | |
| Water Pressure | 15-150 PSI | Pressure-only relief valve required (min. 240,000 BTU/h, 150 psi) | | |
| | | 40 psi or above recommended for max. flow | | |
| Multiple Unit Installation | Easy-Link System | Up to 4 units | With no need for a system controller | |
| | Multi-Unit System | Up to 20 units | With 9007675005 (Multiple Unit System Controller) | |

| | | |
|---|---|---|
| ATIO-710 Temperature Settings | Dipswitches | 100°F 115°F 120°F (default) 135°F 145°F 155°F 165°F 185°F |
| | With 9007603005 remote (max. distance 400' from heater, non-polarized 18 gauge wiring) | |
| | Default Mode | 100°F 105°F 110°F 115°F 120°F (default) 125°F 130°F 135°F 140°F 145°F 150°F 155°F 160°F 165°F 170°F 175°F |
| | High Temp. Mode | 110°F 115°F 120°F (default) 125°F 130°F 135°F 140°F 145°F 150°F 155°F 160°F 165°F 170°F 175°F 180°F 185°F |

**ATIO-710: Flow Rate vs. Temperature Rise**



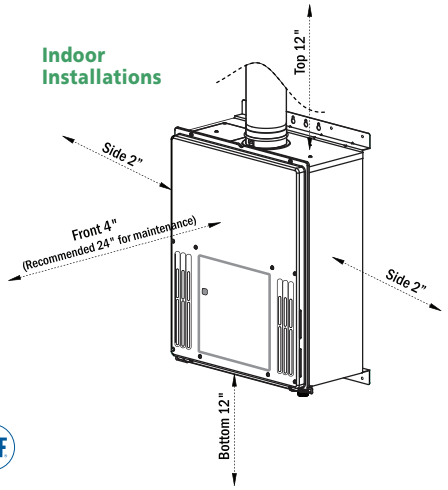

**ATIO-710: Pressure Loss**



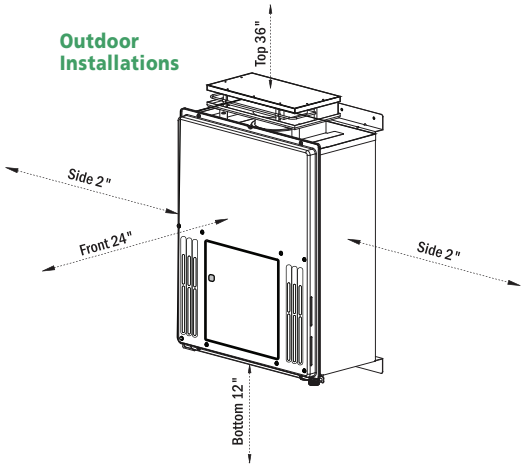

# Clearance

**Clearances to Combustible and Non-Combustible Surfaces**

**Indoor Installations**

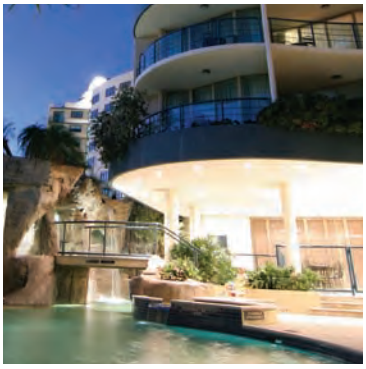



**Outdoor Installations**

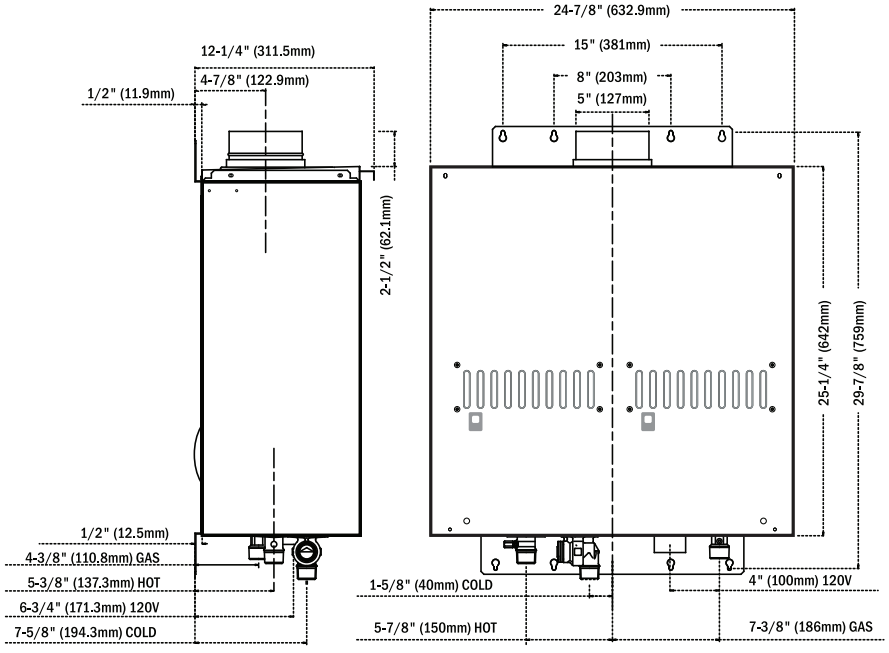


# 910 Series

The 910 Series, specifically designed for heavy-duty applications, is the largest A. O. Smith tankless heater yet, and the most powerful (14.5 GPM max) in the tankless industry! The 910 Series is suitable for commercial applications (hotels, restaurants, government, convalescent homes, etc.) that require high demand and the most durable of heaters. Along with HRS35 copper alloy, the 910 Series is the only commercial unit in the industry that offers a "dual-combustion system," providing redundancy for added reliability.




## Dimensions



# Specifications

Thicker heat exchanger drum and utilizes HRS35 (heat-resistant) copper for the heat exchanger tubing. Incorporates a dual system for redundancy, providing added assurance that the 910 Series will remain operational. Includes an internal pump control port. Easy-Link System capable up to 4 units. Multi-Unit System capable up to 10 units. An ASME version of the 910 Series is also available.*

**Warranty Information****

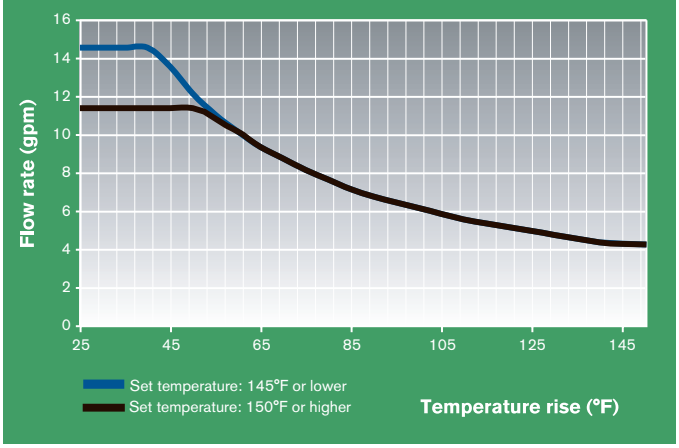
**Residential Use:**
15 yrs limited heat exchanger, 5 yrs limited parts

**Commercial Use:**
10 yrs limited heat exchanger, 5 yrs limited parts

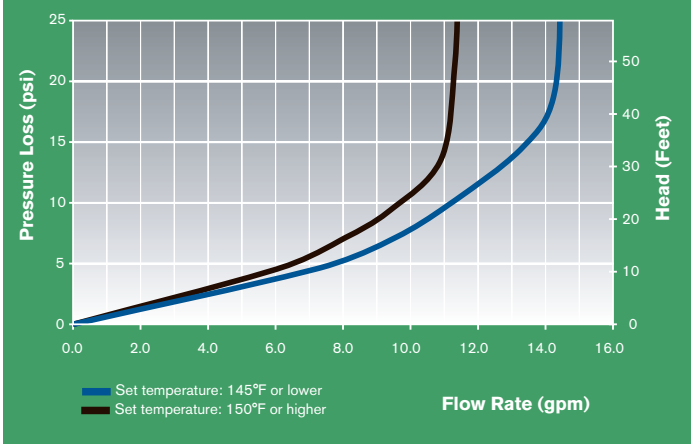
* ASME models do not utilize HRS35 copper alloy.
**Refer to www.hotwater.com for further warranty details.

| | | | | |
|---|---|---|---|---|
| Installation Type | Indoor, Outdoor, Direct Vent | | | |
| Dimension | 25-1/4" (W) X 24-7/8" (H) X 12-1/4" (D), Weight : 112 lbs | | | |
| Electric | 120 VAC | 1.49 A (Operation) | 0.14 A (Standby) | 2.26 A (Freeze-Protection) |
| Ignition | Electronic Ignition | | | |
| Noise Level | 56 dB at Max output | | | |
| Fuel | | NG | LP | |
| Gas Consumption | Min. Input | 15,000 BTU/h | 15,000 BTU/h | |
| | Max. Input | 380,000 BTU/h | 380,000 BTU/h | |
| Thermal Efficiency | | 80.2% | 82.4% | |
| Gas Pressure | | Min 5.0" W.C. | Min 8.0" W.C. | |
| | | Max 10.5" W.C. | Max 14.0" W.C. | |
| Flow Rate | 14.5 GPM | Values based on factory testing. 0.4 GPM required for continuous fire after initial ignition. | | |
| Hot/Cold/Gas Connection | 1" NPT | | | |
| Coil Capacity | ≈0.32 Gallons | | | |
| Water Pressure | 15-150 PSI | Pressure Only Relief Valve Requires (Min 380,000 BTUs. 150 PSI). | | |
| | | 40 psi or above recommended for max. flow | | |
| Multiple Unit Installation | Easy-Link System | Up to 4 units | With no need for a system controller | |
| | Multi-Unit System | Up to 10 units | With 9007675005 (Multiple Unit System Controller) | |
| ATIO-910 Temperature Settings | Dipswitches | 100°F 115°F 120°F (default) 135°F 145°F 155°F 165°F 185°F | | |
| | With 9007603005 remote (max. distance 400' from heater, non-polarized 18 gauge wiring) | | | |
| | Default Mode | 100°F 105°F 110°F 115°F 120°F (default) 125°F 130°F 135°F 140°F 145°F 150°F 155°F 160°F 165°F 170°F 175°F | | |
| | High Temp. Mode | 110°F 115°F 120°F (default) 125°F 130°F 135°F 140°F 145°F 150°F 155°F 160°F 165°F 170°F 175°F 180°F 185°F | | |

**ATIO-910: Flow Rate vs. Temperature Rise**



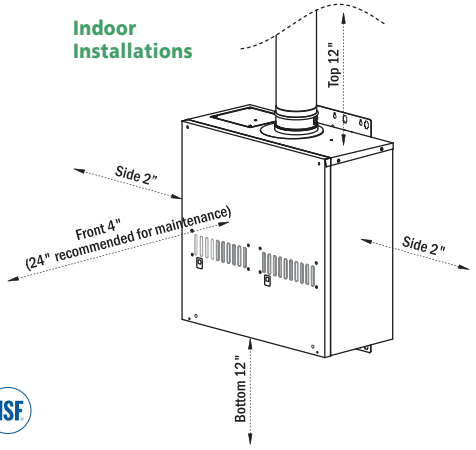

**ATIO-910: Pressure Loss**



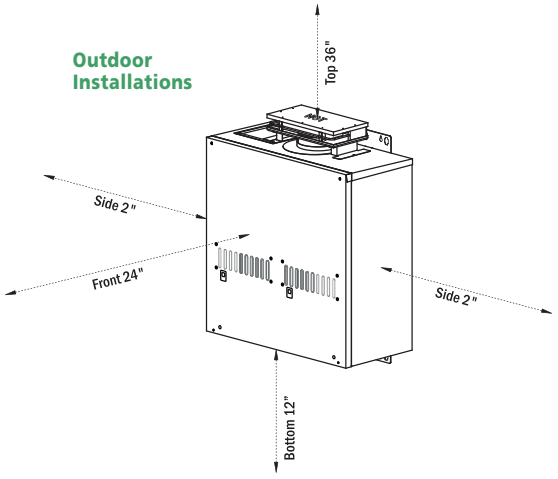

# Clearance

**Clearances to Combustible and Non-Combustible Surfaces**

**Indoor Installations**




**Outdoor Installations**



# What A. O. Smith Delivers

## EASY-LINK

For larger applications that require multiple water heaters to work in conjunction, all of A. O. Smith's commercial tankless heaters feature the Easy-Link system. This allows installers to easily manifold up to 4 units without the need for a system controller. The controls are already built into each model's internal computer. The Easy-Link system ensures proper modulation, using only the amount of energy required so that there is never any waste. Refer to each model's installation instructions for details.

# Multi-Unit System

## MULTI- UNIT

For even larger applications, the 510U, 540H, 710 Series and 910 Series models also feature the Multi-Unit system, allowing a greater number of units to manifold together. Use of the Multi-Unit System Controller is needed to enable the Multi-Unit system. The Multi-Unit System can control up to twenty 510U's, 540H's, 710's and ten 910's.

### UNIT COMPARISON

| | 510 Series | 510U* Series | 540H* Series | 710 Series | 910 Series |
|---|---|---|---|---|---|
| **EASY-LINK** (No Controller Necessary) | Up to 4 units | Up to 4 units | Up to 4 units | Up to 4 units | Up to 4 units |
| Maximum input (BTU/h) | 796,000 | 796,000 | 796,000 | 960,000 | 1,520,000 |
| **MULTI-UNIT** (with 9007675005 controller) | N/A | Up to 20 units | Up to 20 units | Up to 20 units | Up to 10 units |
| Maximum input (BTU/h) | N/A | 3,980,000 | 3,980,000 | 4,800,000 | 3,800,000 |

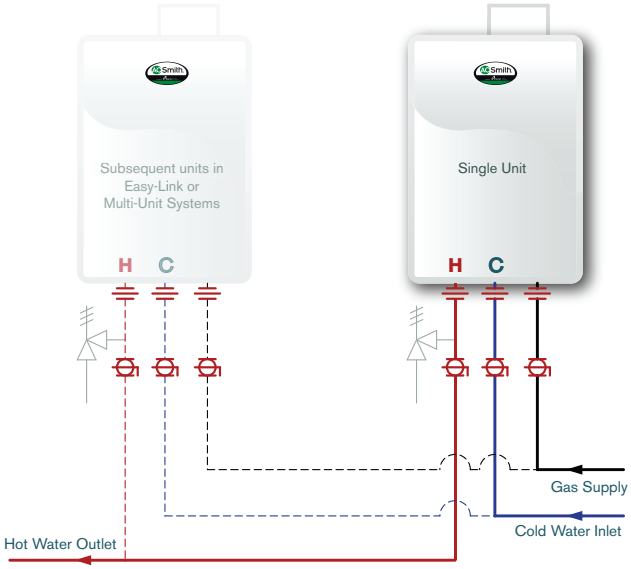
*510U and 540H models use 9008300005 controller for multi-link capabilities

# Application Diagrams

A. O. Smith tankless water heaters can be used in a wide variety of applications. Whether used in recirculation systems, in conjunction with storage tanks, or with heating applications, our commercial units are built to provide endless, continuous hot water.*

*Local codes dictate proper compliance

## Basic Installation

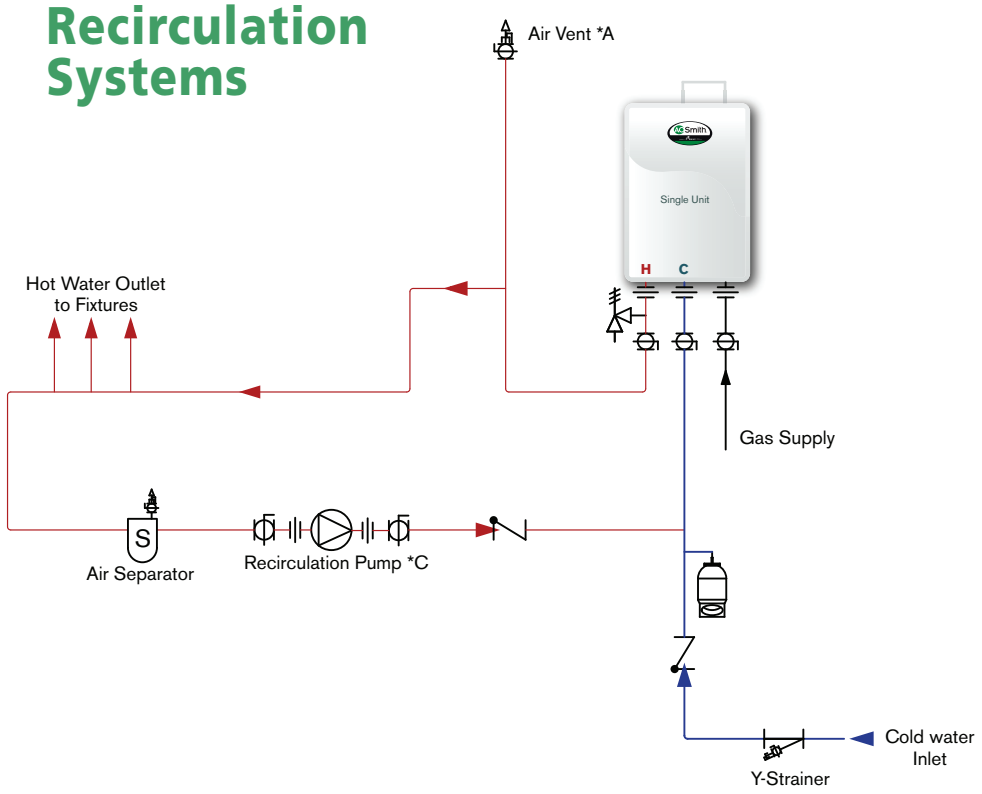



**Legend**

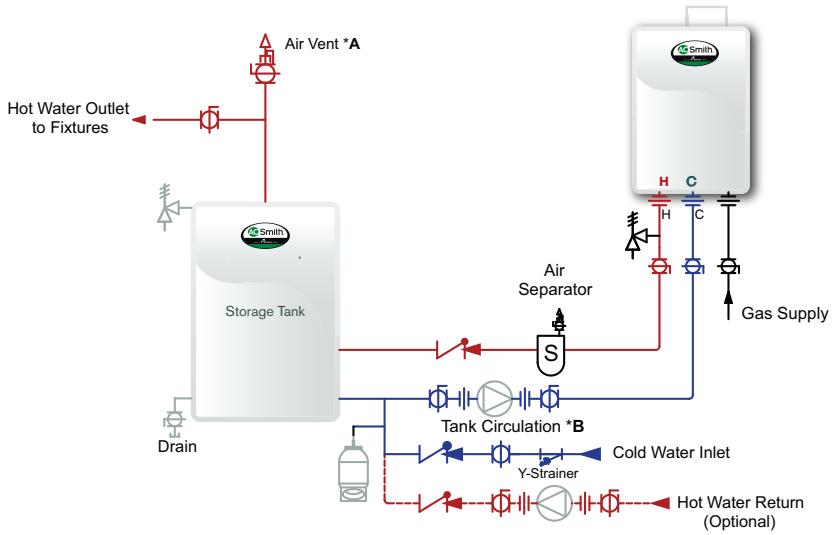
- Pump
- Expansion Tank
- Shut Off / Isolation Valves
- Check Valve
- Union
- Pressure Relief Valve
- Air Separator
- Air Vent
- Y-Strainer

*A. O. Smith tankless water heaters provide endless hot water when sized appropriately for your homes needs.

## Recirculation Systems



# Storage Tank (3 Tappings)




***A** The air vent is to be installed at the highest location of the system. The diameter of the pipe leading up the air vent is to be no smaller than the piping throughout the system.

***B**
1. The tank circulation pump is to be controlled by:
   - Dual-set aquastat (recommended w/ timer)

   OR
   - A. O. Smith Pump Control set to "Storage Tank Mode" (if the A. O. Smith model or controller has this function)
2. The tank circulation pump is to provide no less than 2 gpm through each activated A. O. Smith unit in the system. (Exception: no less than 4 gpm through each 910 series)

***C**
1. The recirculation pump is to be controlled by:
   - Dual-set aquastat (recommended w/ timer)

   OR
   - A. O. Smith Pump Control set to "Recirculation Mode" (if the A. O. Smith model or controller has this function)
2. The recirculation pump is to provide no less than 2 gpm and no more than 4 gpm through each activated A. O. Smith unit in the system. (Exception: between 4 gpm and 8 gpm through each 910 series)

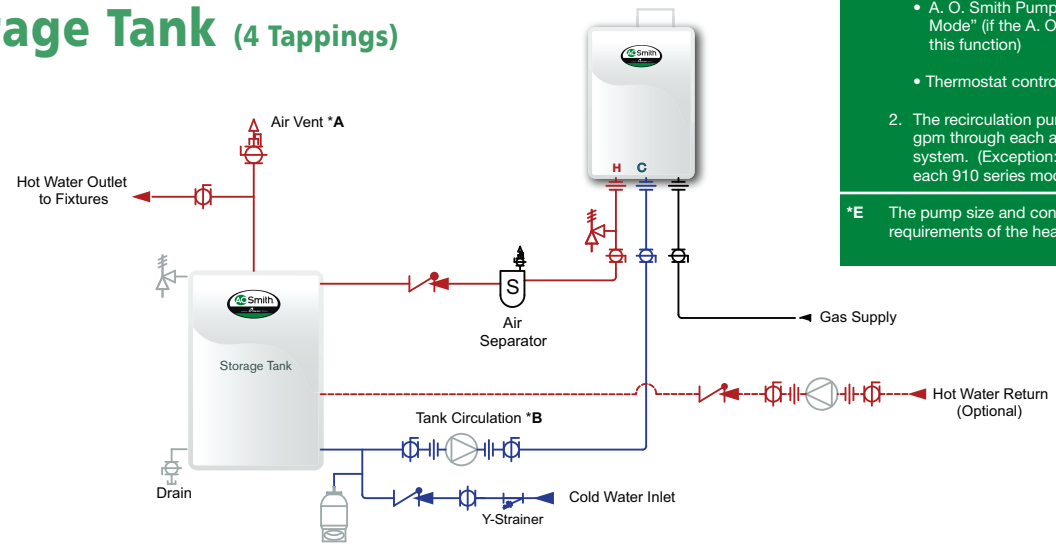
***D**
1. The recirculation pump is to be controlled by:
   - Dual-set aquastat (recommended w/ timer)

   OR
   - A. O. Smith Pump Control set to "Recirculation Mode" (if the A. O. Smith model or controller has this function)

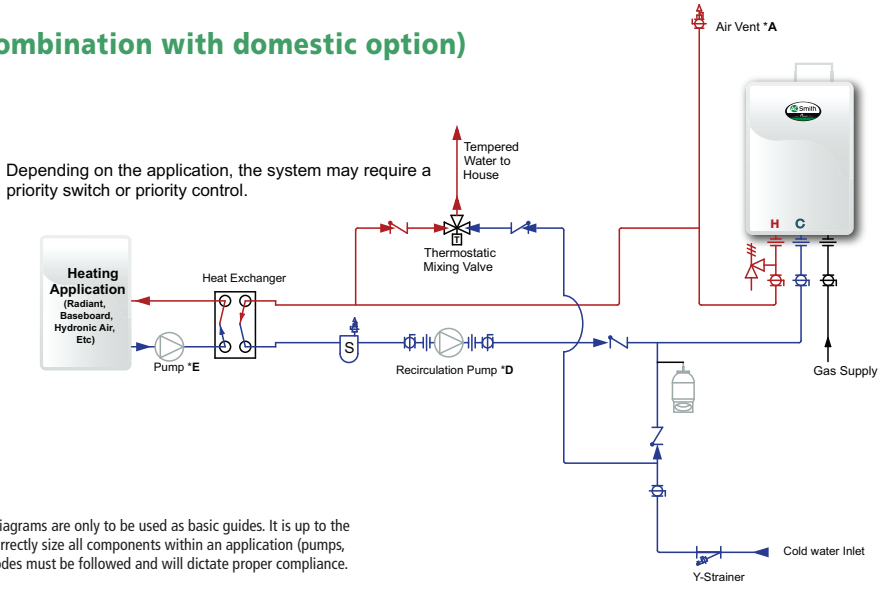
   OR
   - Thermostat controlling the heating application
2. The recirculation pump is to provide no less than 2 gpm through each activated A. O. Smith unit in the system. (Exception: no less than 4 gpm through each 910 series model)

***E** The pump size and control are dependant on the requirements of the heating application.

# Storage Tank (4 Tappings)

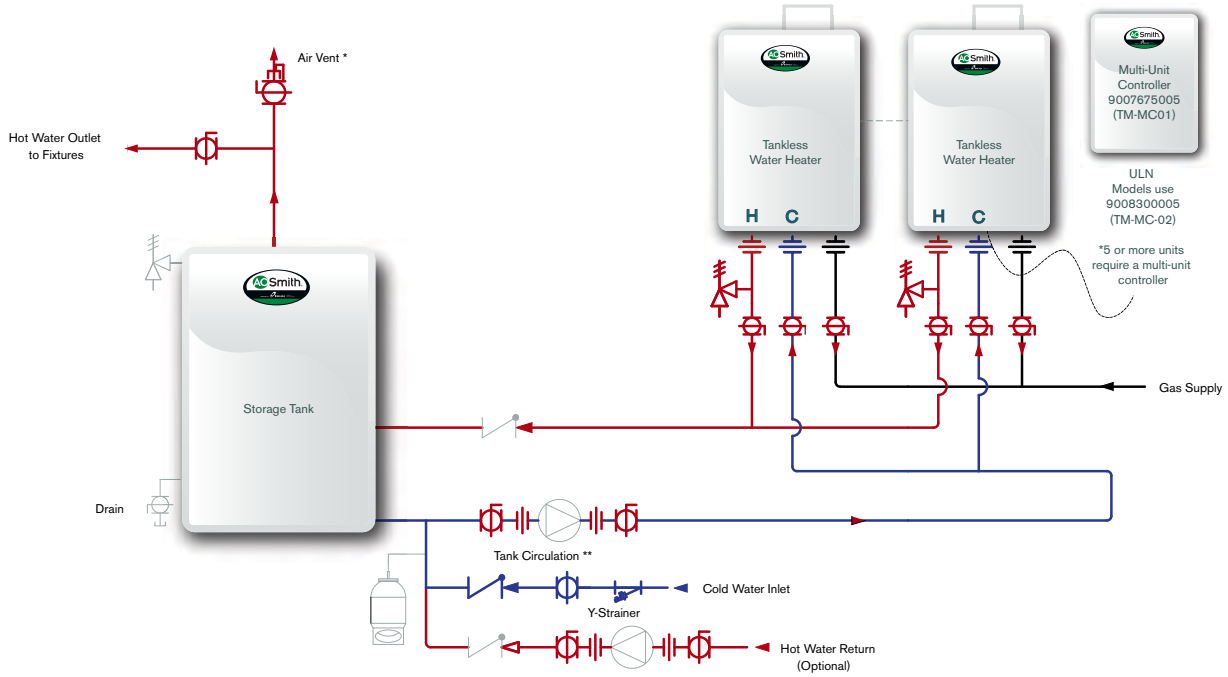



# Heating (Combination with domestic option)

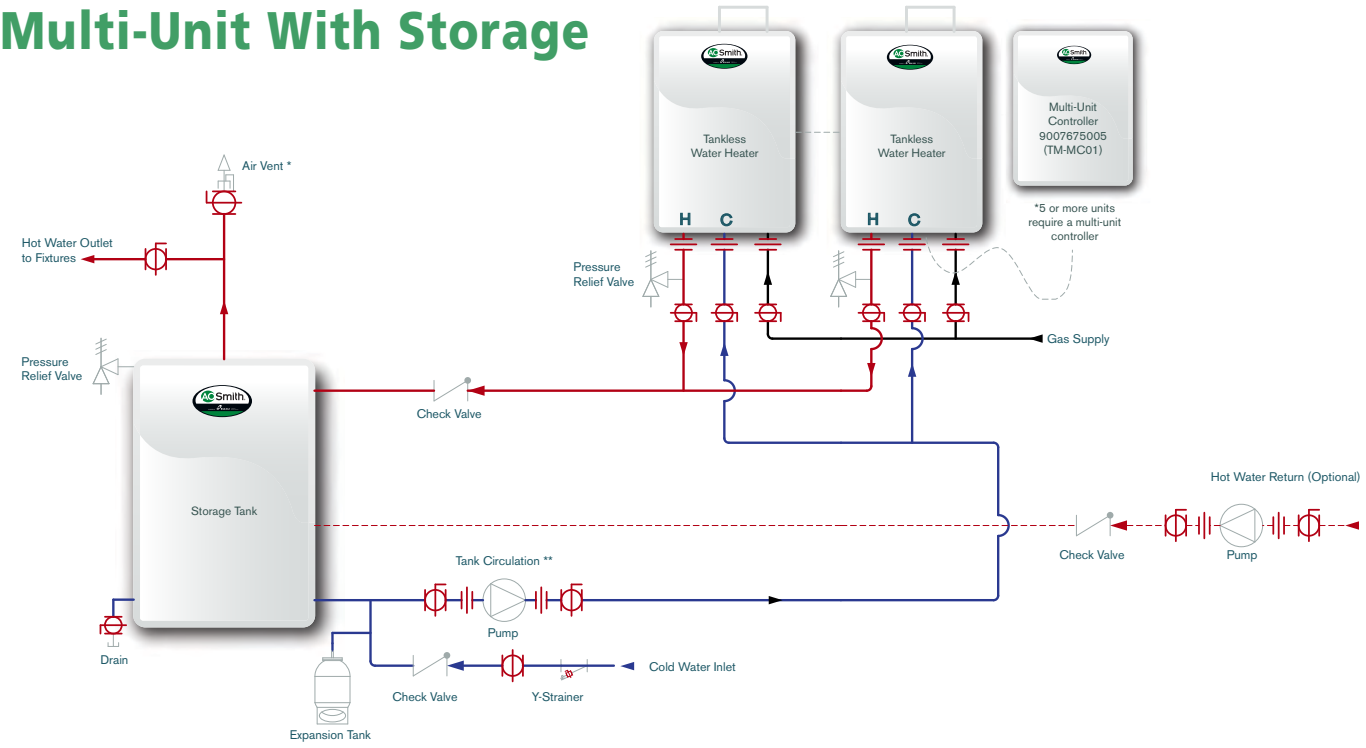



All application diagrams shown are concept drawings only. These diagrams are only to be used as basic guides. It is up to the application designer to properly design the plumbing layout and correctly size all components within an application (pumps, piping, storage tanks, water heaters, etc.). All National and Local codes must be followed and will dictate proper compliance.

# Multi-Unit




# Multi-Unit With Storage

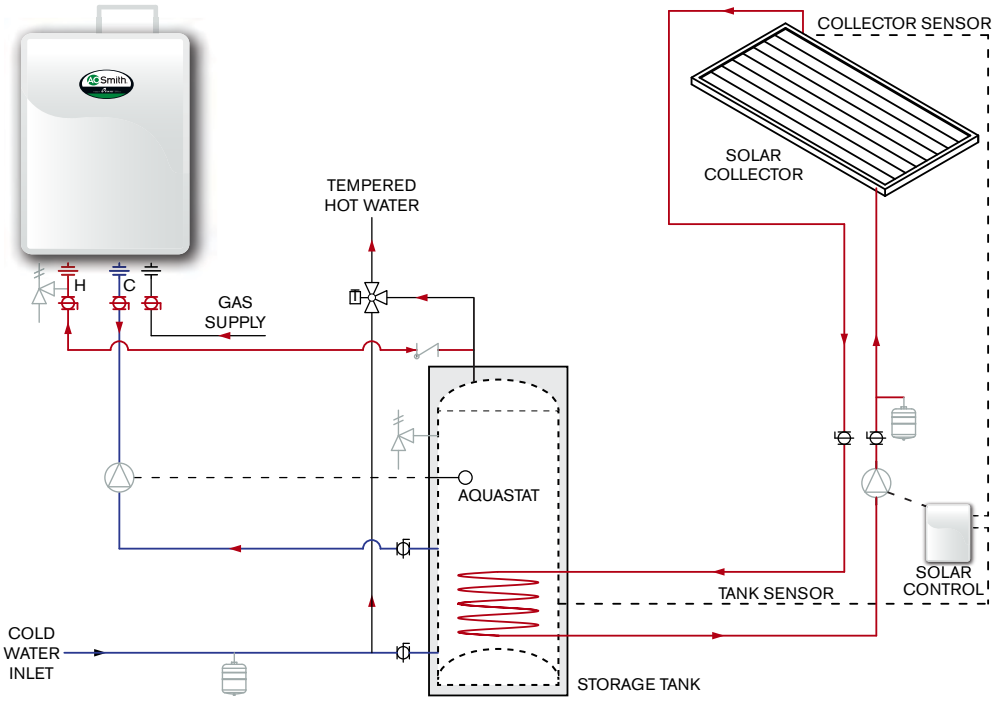



* The air vent is to be installed at the highest location of the system. The diameter of the pipe leading up the air vent is to be no smaller than the piping throughout the system.

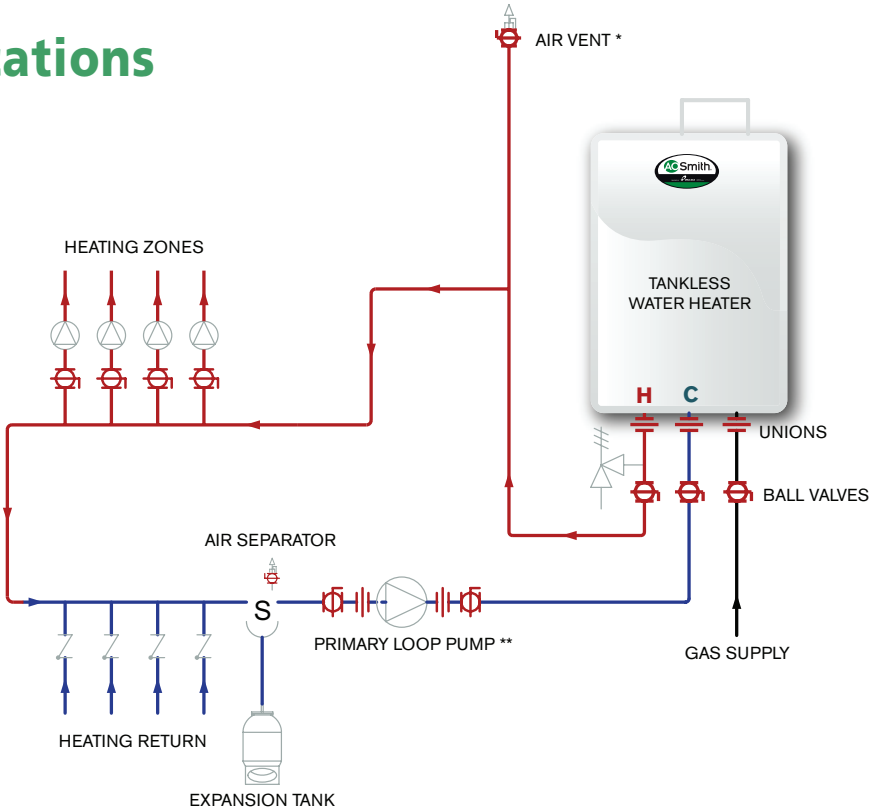
** 1. The tank circulation pump is to be controlled by: Dual-set aquastat (recommended w/ timer) OR Unit Pump Control set to "Storage Tank Mode" (if the unit model or controller has this function)

** 2. The tank circulation pump is to provide no less than 2 gpm through each activated unit in the system. (Exception: no less than 4 gpm through each 910 series)

# Solar Tankless Back Up




# Heating Applications




* The air vent is to be installed at the highest location of the system. The diameter of the pipe leading up the air vent is to be no smaller than the piping throughout the system.

** 1. Control of the primary loop pump is dependent on the requirement of the heating application.

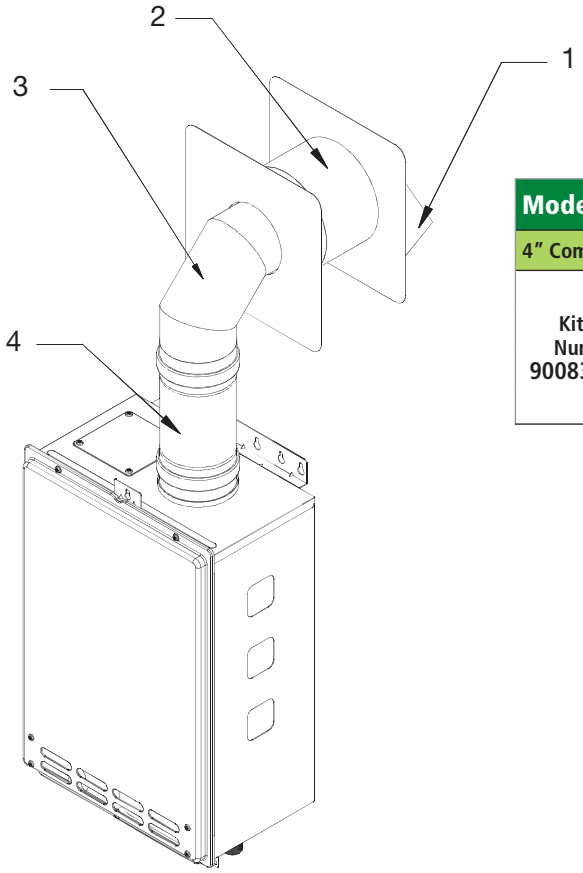
** 2. The primary loop pump is to provide no less than 2 gpm through each activated State unit in the system. (Exception: no less than 4 gpm through each 910 series)

*** Size of zone pumps and method of control are dependent on the requirements of the heating application.

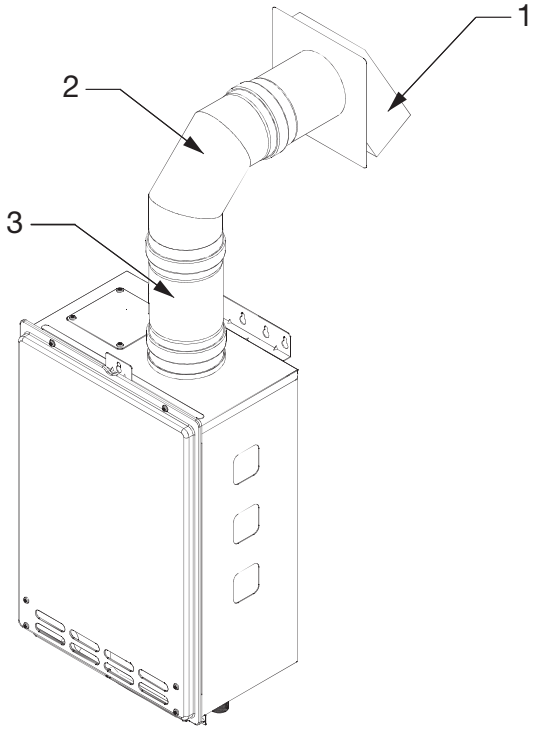
# Venting Diagrams (Examples)

## 4” Sidewall Termination

(Please check the wall thickness for proper installation)



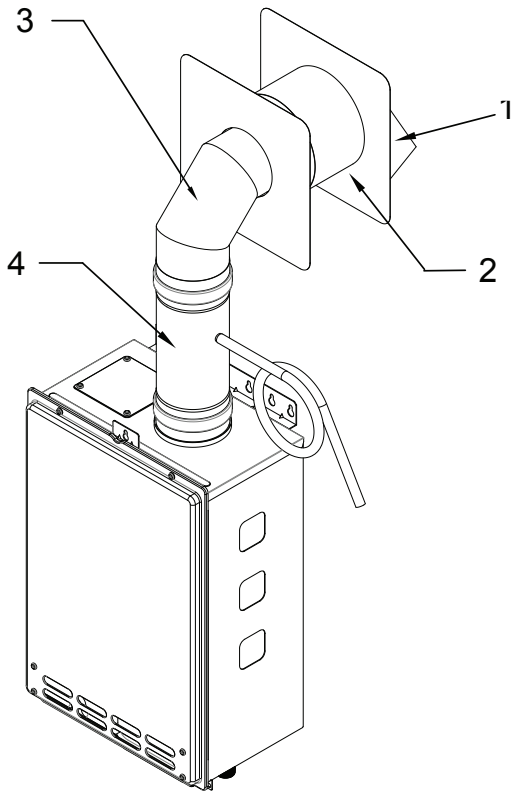

| Models 110/U, 310/U, 510/U, 710 | | | | |
|---|---|---|---|---|
| 4” Combustible Sidewall Termination | | | | Qty. |
| Kit Part Number: 9008339005 | 1 | 9007999005 | 4" Sidewall Hood Terminator | 1 |
| | 2 | 9008345005 | 4" Wall Thimble (4.0"-7.0") | 1 |
| | 3 | 9007980005 | 4" 90 degree Elbow | 1 |
| | 4 | 9007979005 | 4" Female-Female Adaptor | 1 |



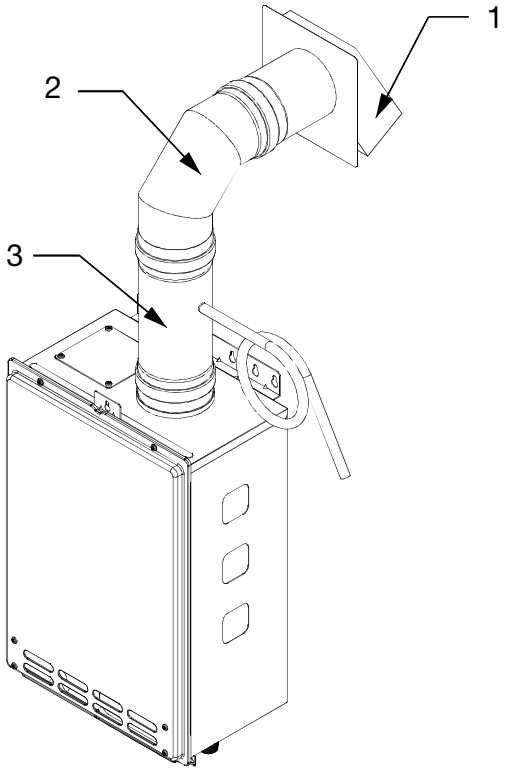

| Models 110/U, 310/U, 510/U, 710 | | | | |
|---|---|---|---|---|
| 4" Non-Combustible Sidewall Termination | | | | Qty. |
| Kit Part Number: 9008481005 | 1 | 9007999005 | 4" Sidewall Hood Terminator | 1 |
| | 2 | 9007980005 | 4" 90 degree Elbow | 1 |
| | 3 | 9007979005 | 4" Female-Female Adaptor | 1 |

# 4” Sidewall Termination
## (With Condensate Trap)

(Please check the wall thickness for proper installation)



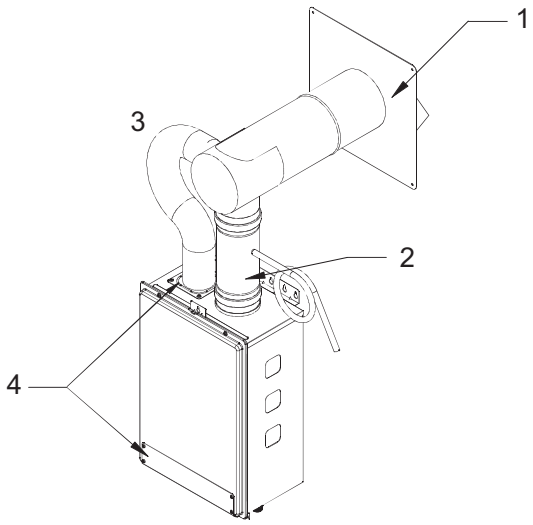

| Models 110/U, 310/U, 510/U, 710 | | | | |
|---|---|---|---|---|
| 4" Combustible Sidewall Termination (With Condensate Trap) | | | | Qty. |
| Kit Part Number: 9008489005 | 1 | 9007999005 | 4" Sidewall Hood Terminator | 1 |
| | 2 | 9008345005 | 4" Wall Thimble (4.0"-7.0") | 1 |
| | 3 | 9007980005 | 4" 90 degree Elbow | 1 |
| | 4 | 9008146005 | 4" Universal Appliance Adaptor | 1 |




| Models 110/U, 310/U, 510/U, 710 | | | | |
|---|---|---|---|---|
| 4" Non-Combustible Sidewall Termination (With Condensate Trap) | | | | Qty. |
| Kit 4 Part Number: 9008490005 | 1 | 9007999005 | 4" Sidewall Hood Terminator | 1 |
| | 2 | 9007980005 | 4" 90 degree Elbow | 1 |
| | 3 | 9008146005 | 4" Universal Appliance Adaptor | 1 |

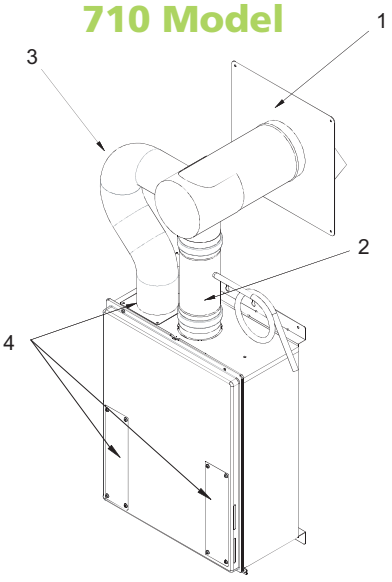
# Direct Vent, Concentric Sidewall Termination

## 110/U, 310/U, 510/U Models



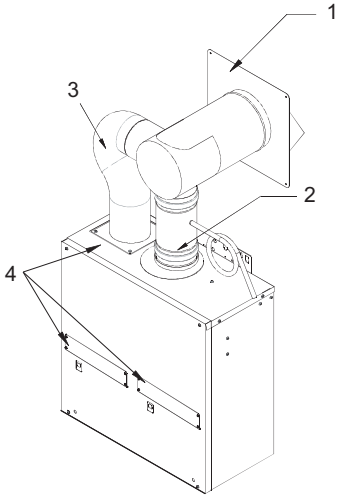

| Models 110/U, 310/U, 510/U | | | | |
|---|---|---|---|---|
| 5-10" Sidewall Thickness Direct Vent, Concentric Termination | | | | Qty. |
| Kit Part Number: 9008001005 | 1 | 9008147005 | Concentric Intake/Exhaust Kit | 1 |
| | 2 | 9008146005 | Universal Appliance Adaptor | 1 |
| | 3 | N/A | 3" Aluminum Flex | 1 |
| | 4 | 9007667005 | Direct Vent Conversion Kit | 1 |
| 12-18" Sidewall Thickness Direct Vent, Concentric Termination | | | | Qty. |
| Kit Part Number: 9008000005 | 1 | 9008147005 | Concentric Intake/Exhaust Kit | 1 |
| | 2 | 9008146005 | Universal Appliance Adaptor | 1 |
| | 3 | N/A | 3" Aluminum Flex | 1 |
| | 4 | 9007667005 | Direct Vent Conversion Kit | 1 |

## 710 Model



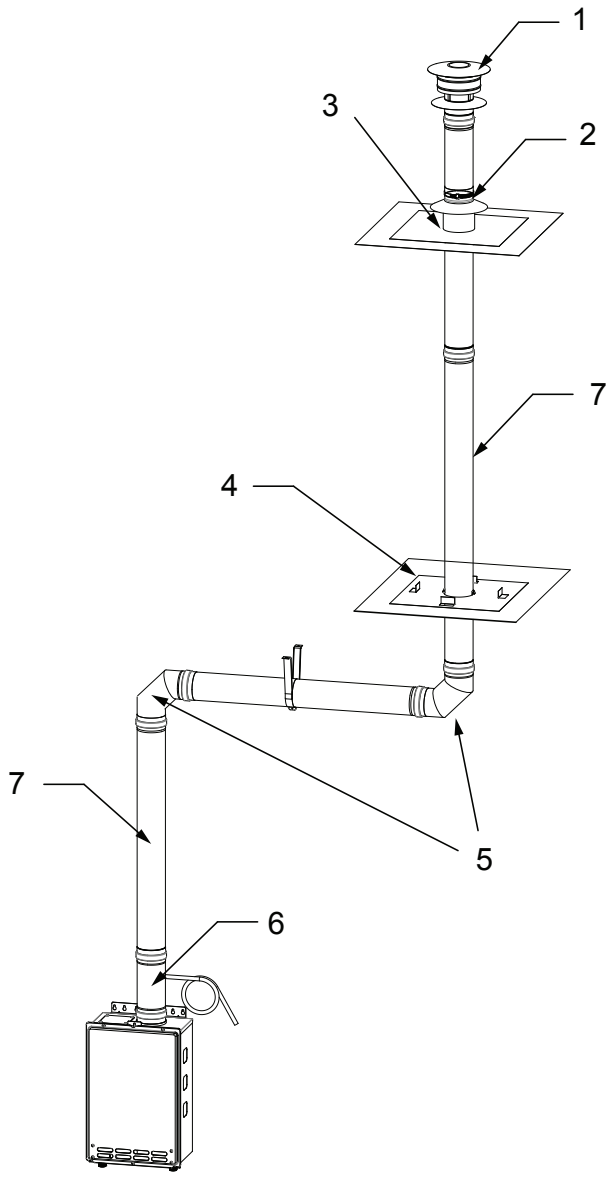

| Models 710 | | | | |
|---|---|---|---|---|
| 5-10" Sidewall Thickness Direct Vent, Concentric Termination | | | | Qty. |
| Kit Part Number: 9008206005 | 1 | 9008149005 | Concentric Intake/Exhaust Kit | 1 |
| | 2 | 9008146005 | Universal Appliance Adaptor | 1 |
| | 3 | N/A | 4" Aluminum Flex | 1 |
| | 4 | 9007668005 | Direct Vent Conversion Kit | 1 |
| 12-18" Sidewall Thickness Direct Vent, Concentric Termination | | | | Qty. |
| Kit Part Number: 9008207005 | 1 | 9008150005 | Concentric Intake/Exhaust Kit | 1 |
| | 2 | 9008146005 | Universal Appliance Adaptor | 1 |
| | 3 | N/A | 4" Aluminum Flex | 1 |
| | 4 | 9007668005 | Direct Vent Conversion Kit | 1 |

## 910 Model

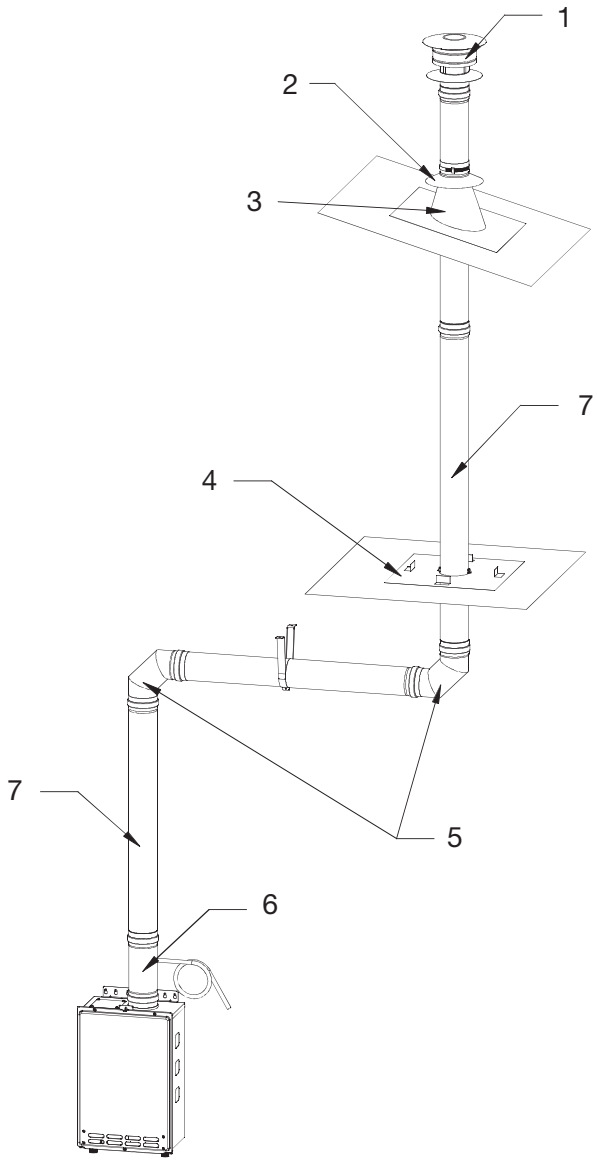



| Models 910 | | | | |
|---|---|---|---|---|
| 5-10" Sidewall Thickness Direct Vent, Concentric Termination | | | | Qty. |
| Kit Part Number: 9008210005 5"-10" | 1 | 9008208005 | Concentric Intake/Exhaust Kit | 1 |
| | 2 | 9008201005 | Universal Appliance Adaptor | 1 |
| | 3 | N/A | 5" Aluminum Flex | 1 |
| | 4 | 9007669005 | Direct Vent Conversion Kit | 1 |
| 12-18" Sidewall Thickness Direct Vent, Concentric Termination | | | | Qty. |
| Kit Part Number: 9008205005 12"-18" | 1 | 9008209005 | Concentric Intake/Exhaust Kit | 1 |
| | 2 | 9008201005 | Universal Appliance Adaptor | 1 |
| | 3 | N/A | 5" Aluminum Flex | 1 |
| | 4 | 9007669005 | Direct Vent Conversion Kit | 1 |

# 4” Rooftop Termination

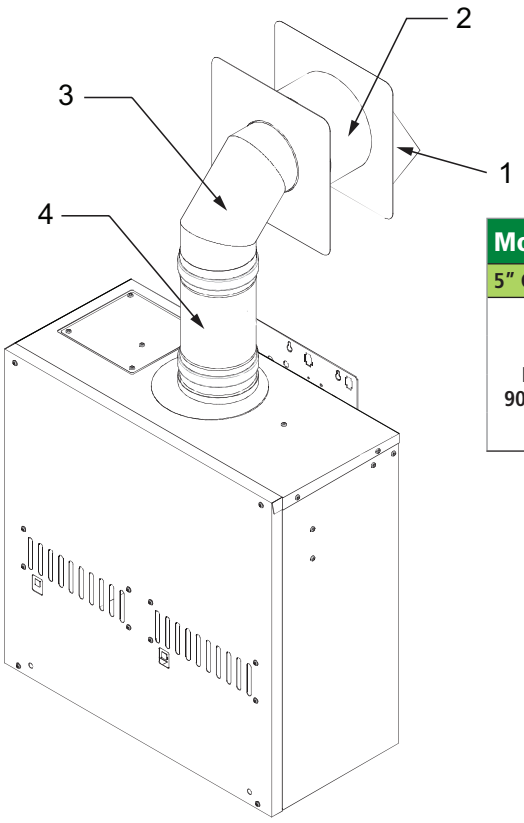



| Models 110/U, 310/U, 510/U & 710 | | | | |
|---|---|---|---|---|
| 4” Flat Roof Termination | | | | Qty. |
| Kit Part Number: 9008340005 | 1 | 9008145005 | 4” Extreme Weather Rain Cap | 1 |
| | 2 | 9007990005 | 4” Storm Collar | 1 |
| | 3 | 9007992005 | 4” Flat Roof Flashing | 1 |
| | 4 | 9007988005 | 4” Vertical Firestop | 1 |
| | 5 | 9007980005 | 4” 90 degree Elbow | 2 |
| | 6 | 9008146005 | 4” Universal Appliance Adaptor | 1 |
| | 7 | Refer to page 47 | Straight Pipe | TBD |

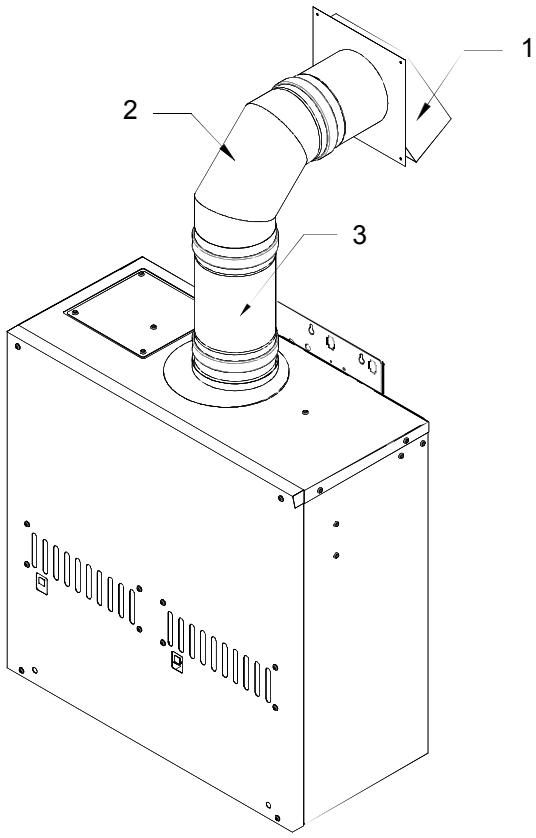



| Models 110/U, 310/U, 510/U & 710 | | | | |
|---|---|---|---|---|
| 4” Angled Roof Termination | | | | Qty. |
| Kit Part Number: 9008341005 | 1 | 9008145005 | 4” Extreme Weather Rain Cap | 1 |
| | 2 | 9007990005 | 4” Storm Collar | 1 |
| | 3 | 9007991005 | 4” Angeled Roof Flashing | 1 |
| | 4 | 9007988005 | 4” Vertical Firestop | 1 |
| | 5 | 9007980005 | 4” 90 degree Elbow | 2 |
| | 6 | 9008146005 | 4” Universal Appliance Adaptor | 1 |
| | 7 | Refer to page 47 | Straight Pipe | TBD |

# 5” Sidewall Termination

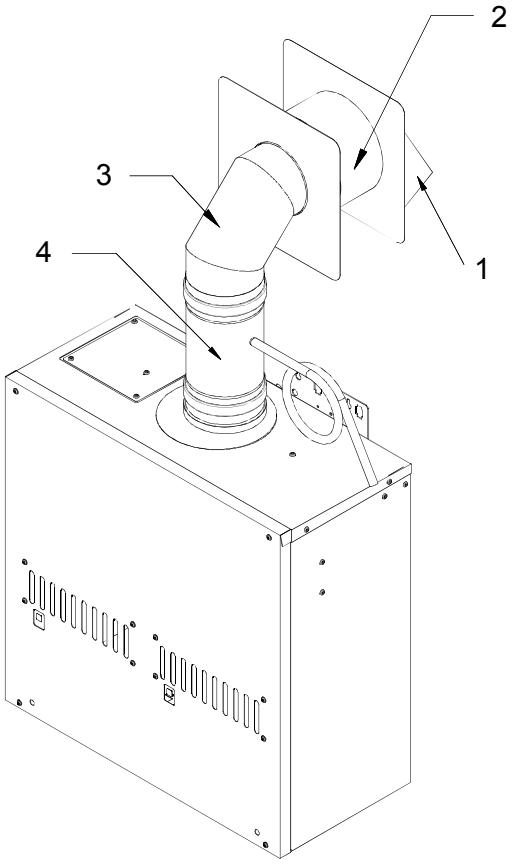



| Models 910 | | | | |
|---|---|---|---|---|
| 5” Combustible Sidewall Termination | | | | Qty. |
| Kit Part Number: 9008342005 | 1 | 9008197005 | 5" Sidewall Hood Terminator | 1 |
| | 2 | 9008347005 | 5" Wall Thimble (4.0"-7.0") | 1 |
| | 3 | 9008188005 | 5" 90 degree Elbow | 1 |
| | 4 | 9008203005 | 5" Female-Female Adaptor | 1 |

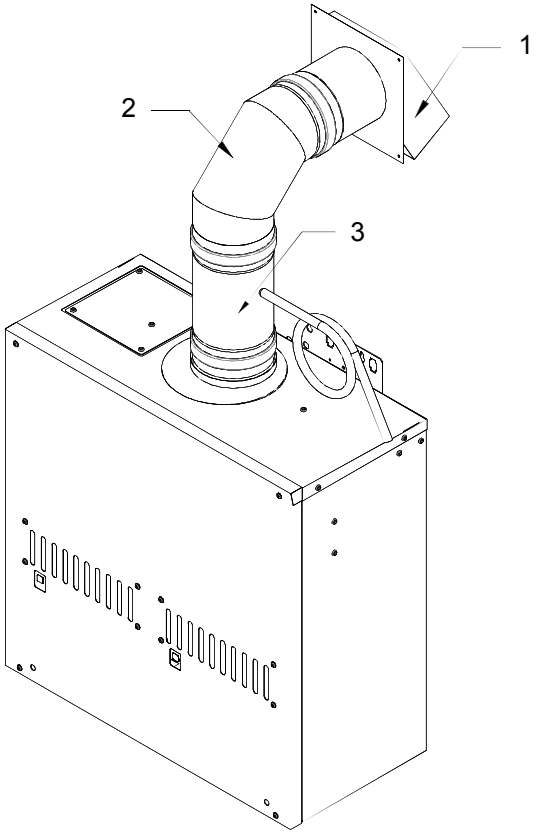



| Models 910 | | | | |
|---|---|---|---|---|
| 5" Non-Combustible Sidewall Termination | | | | Qty. |
| Kit 8 Part Number: 9008482005 | 1 | 9008197005 | 5" Sidewall Hood Terminator | 1 |
| | 2 | 9008188005 | 5" 90 degree Elbow | 1 |
| | 3 | 9008203005 | 5" Female-Female Adaptor | 1 |

# 5” Sidewall Termination
## (With Condensate Traps)

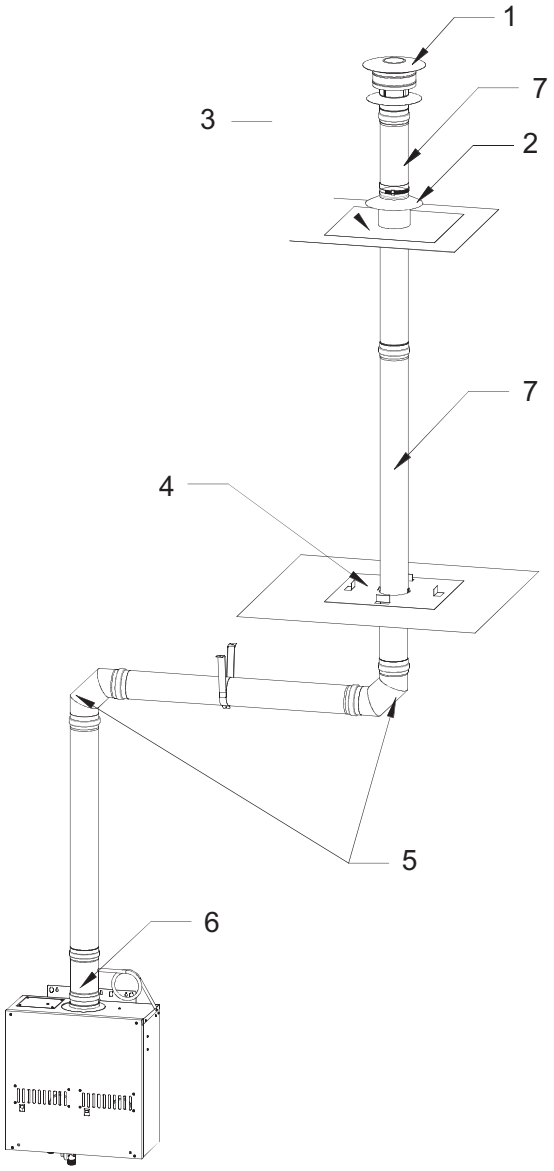



| Models 910 | | | | |
|---|---|---|---|---|
| 5” Combustible Sidewall Termination (With Condensate Trap) | | | | Qty. |
| Kit 9 Part Number: 9008491005 | 1 | 9008197005 | 5" Sidewall Hood Terminator | 1 |
| | 2 | 9008347005 | 5" Wall Thimble (4.0"-7.0") | 1 |
| | 3 | 9008188005 | 5" 90 degree Elbow | 1 |
| | 4 | 9008201005 | 5" Universal Appliance Adaptor | 1 |

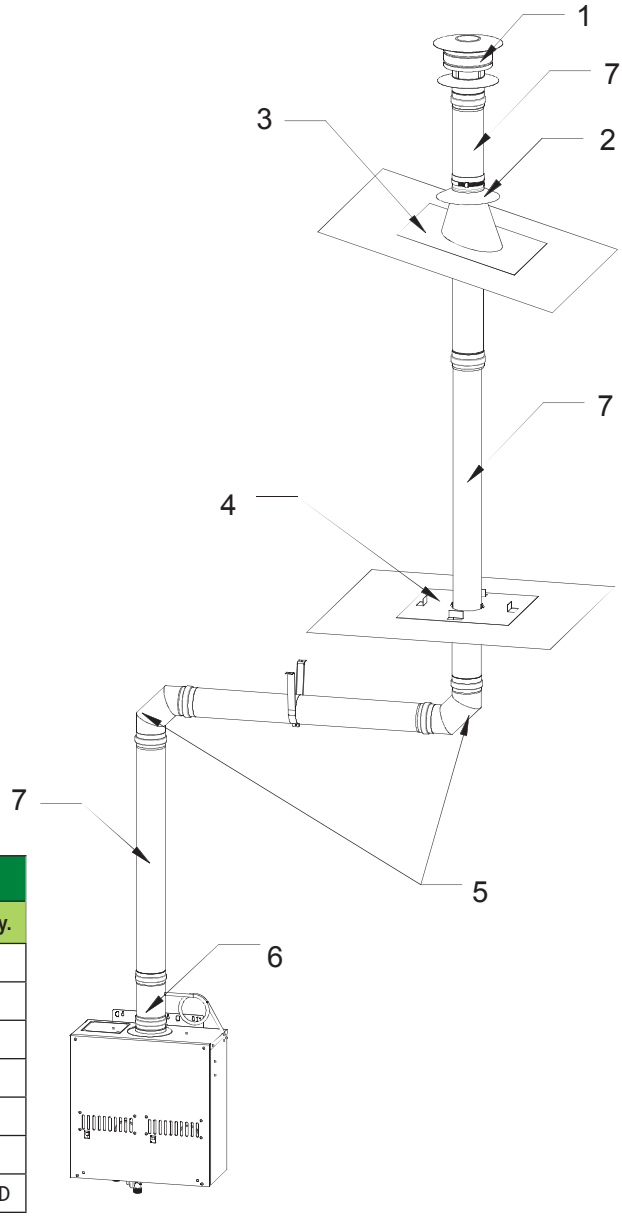



| Models 910 | | | | |
|---|---|---|---|---|
| 5” Non-Combustible Sidewall Termination (With Condensate Trap) | | | | Qty. |
| Kit 10 Part Number: 9008492005 | 1 | 9008197005 | 5" Sidewall Hood Terminator | 1 |
| | 2 | 9008188005 | 5" 90 degree Elbow | 1 |
| | 3 | 9008201005 | 5" Universal Appliance Adaptor | 1 |

# 5” Rooftop Termination




| Model 910 | | | | |
|---|---|---|---|---|
| 5” Flat Roof Termination | | | | Qty. |
| Kit Part Number: 9008343005 | 1 | 9008200005 | 5” Extreme Weather Rain Cap | 1 |
| | 2 | 9008193005 | 5” Storm Collar | 1 |
| | 3 | 9008195005 | 5” Flat Roof Flashing | 1 |
| | 4 | 9008194005 | 5” Vertical Firestop | 1 |
| | 5 | 9008188005 | 5” 90 degree Elbow | 2 |
| | 6 | 9008201005 | 5” Universal Appliance Adaptor | 1 |
| | 7 | Refer to page 47 | Straight Pipe | TBD |

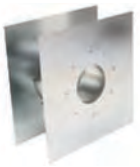


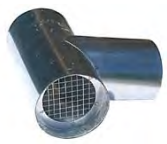
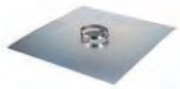
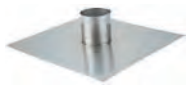

| Model 910 | | | | |
|---|---|---|---|---|
| 5” Angled Roof Termination | | | | Qty. |
| Kit Part Number: 9008344005 | 1 | 9008200005 | 5” Extreme Weather Rain Cap | 1 |
| | 2 | 9008193005 | 5” Storm Collar | 1 |
| | 3 | 9008196005 | 5” Angled Roof Flashing | 1 |
| | 4 | 9008194005 | 5” Vertical Firestop | 1 |
| | 5 | 9008188005 | 5” 90 degree Elbow | 2 |
| | 6 | 9008201005 | 5” Universal Appliance Adaptor | 1 |
| | 7 | Refer to page 47 | Straight Pipe | TBD |

# Venting Components

**Simple Leak-Proof Gasketed Connections** – No Sealant Required. **High Quality** – Category III / IV Stainless Steel.
**Versatile** – Vertical and Horizontal Terminations. **Convenient** – Vent Kits Available.
**UL Listed**. **All Connections have Heat Resistant Rubber Gaskets**

| Nova Vent Part # | DESCRIPTION | |
|---|---|---|
| **STRAIGHT VENT PIPE** | | |
| 9007987005 | 4" Straight pipe - 6" Length |  |
| 9007986005 | 4" Straight pipe - 12" Length | |
| 9007984005 | 4" Straight pipe - 24" Length | |
| 9007983005 | 4" Straight pipe - 36" Length | |
| 9007982005 | 4" Straight pipe - 48" Length | |
| 9008181005 | 5" Straight pipe - 6" Length | |
| 9008182005 | 5" Straight pipe - 12" Length | |
| 9008183005 | 5" Straight pipe - 24" length | |
| 9008184005 | 5" Straight pipe - 36" Length | |
| 9008185005 | 5" Straight pipe - 48" Length | |
| **ADJUSTABLE VENT PIPE** | | |
| 9007985005 | 4" Adjustable Pipe (7"- 9.9") |  |
| 9008186005 | 5" Adjustable Pipe (7"- 9.9") | |
| **ELBOW** | | |
| 9007981005 | 4" 45 Degree Elbow |  |
| 9008187005 | 5" 45 Degree elbow | |
| 9007980005 | 4" 90 Degree Elbow |  |
| 9008188005 | 5" 90 Degree Elbow | |
| **ADAPTOR** | | |
| 9007979005 | 4" Female-Female Adaptor |  |
| 9008203005 | 5" Female-Female Adaptor | |
| 9008146005 | 4" Universal Appliance Adaptor 3-in-1 (F-F adaptor, condensate drain, & back-flow preventer) |  |
| 9008201005 | 5" Universal Appliance Adaptor 3-in-1 (F-F adaptor, condensate drain, & back-flow preventer) | |

| Nova Vent Part # | DESCRIPTION | |
|---|---|---|
| **BACKFLOW PREVENTER** | | |
| 9007996005 | 4" Backflow Preventer & F-F Adaptor |  |
| 9008202005 | 5" Back-flow Preventer & F-F Adaptor | |
| **CONDENSATION DRAIN** | | |
| 9007994005 | 4" Horizontal Drain Tee |  |
| 9008191005 | 5" Horizontal Drain Tee | |
| 9007993005 (M-F) | 4" Vertical Drain Tee |  |
| 9008192005 | 5" Vertical Drain Tee | |
| **SUPPORT** | | |
| 9007989005 | 4" Support Strap (1") |  |
| 9008204005 | 5" Support Strap (1") | |
| **WALL THIMBLE** | | |
| 9008345005 (4"-7") | 4" Wall Thimble |  |
| 9008346005 (5"-10") | 4" Wall Thimble | |
| 9008347005 (4"-7") | 5" Wall thimble | |
| 9008348005 (5"-10") | 5" Wall thimble | |
| **4" SIDEWALL TERMINATION & THIMBLE KIT** | | |
| 9008004005 (4"-7") | Sidewall Vent Terminator (Hood) and Wall Thimble |  |
| 9008005005 (5"-10") | Sidewall Vent Terminator (Hood) and Wall Thimble | |

| Nova Vent Part # | DESCRIPTION | |
|---|---|---|
| **TERMINATION** | | |
| 9008144005 | 4" Termination Tee |  |
| 9008198005 | 5" Termination Tee | |
| 9007999005 | 4" Exhaust Sidewall Vent Terminator (Hood) |  |
| 9008197005 | 5" Exhaust Sidewall Vent Terminator (Hood) | |
| 9007995005 | 4" Rain Cap |  |
| 9008145005 | 4" Extreme Weather Rain Cap | |
| 9008200005 | 5" Extreme Weather Rain Cap | |
| 9007611005 | 3" Concentric PVC Termination |  |
| **FIRESTOP** | | |
| 9007988005 | Vertical Firestop |  |
| 9008194005 | 5" Firestop | |
| **ROOF FLASHING** | | |
| 9007992005 | 4" Flat Roof Flashing |  |
| 9008195005 | 5" Flat Roof Flashing | |
| 9007991005 | 4" Angled Roof Flashing |  |
| 9008196005 | 5" Angled Roof Flashing | |
| **STORM COLLAR** | | |
| 9007990005 | 4" Storm Collar |  |
| 9008193005 | 5" Storm Collar | |
| **DIRECT VENT CONVERSION KIT** | | |
| 9007667005 | Direct Vent Conversion Kit for NIE models 110/310/510 |  |
| 9007668005 | Direct Vent Conversion Kit for NIEA Model 710 | |
| 9007669005 | Direct Vent Conversion Kit for NIEA Model 910 | |

| Nova Vent Part # | DESCRIPTION | |
|---|---|---|
| **DIRECT VENT, CONCENTRIC SIDEWALL TERMINATION** | | |
| 9008147005 | 5.0" to 10.0" 3" Intake, 4" Exhaust |  |
| 9008148005 | 12.0" to 18.0" 3" Intake, 4" Exhaust | |
| 9008149005 | 5.0" to 10.0" 4" Intake, 4" Exhaust | |
| 9008150005 | 12.0" to 18.0" 4" Intake, 4" Exhaust | |
| 9008208005 | 5.0" to 10.0" 5" Intake, 5" Exhaust | |
| 9008209005 | 12.0" to 18.0" 5" Intake, 5" Exhaust | |
| **INTAKE HOOD (GALVANIZED)** | | |
| 9008142005 | 3" | |
| 9008143005 | 4" | |
| 9008180005 | 5" | |
| **DIRECT VENT, CONCENTRIC SIDEWALL TERMINATION KIT** Includes : DV Conversion Kit, Concentric Termination, Universal Adaptor 3-in-1, Aluminum Flex and Gear Clamp | | |
| 9008001005 | 5.0" to 10.0" 3" Intake, 4" Exhaust |  |
| 9008000005 | 12.0" to 18.0" 3" Intake, 4" Exhaust | |
| 9008206055 | 5.0" to 10.0" 4" Intake, 4" Exhaust | |
| 9008207005 | 12.0" to 18.0" 4" Intake, 4" Exhaust | |
| 9008210005 | 5.0" to 10.0" 5" Intake, 5" Exhaust | |
| 9008205005 | 12.0" to 18.0" 5" Intake, 5" Exhaust | |

# Accessories

| PART # | | DESCRIPTION | 110/110U INDOOR | 110/110U OUTDOOR | 310/310U INDOOR | 310/310U OUTDOOR | 510/510U INDOOR | 510/510U OUTDOOR | 240 INDOOR | 240 OUTDOOR | 340 INDOOR | 340 OUTDOOR | 540 INDOOR | 540 OUTDOOR | 710 INDOOR / OUTDOOR | 910 INDOOR / OUTDOOR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9007666005 |  | Remote Temperature Controller | X | X | X | X | | | | | | | | | | |
| 9007603005 | | | | | | | X | X | | | | | | | X | X |
| 9008172005 |  | | ● | ● | ● | ● | ● | ● | X | X | X | X | X | X | | |
| 9007670005 |  | Pipe Cover | ● | ● | X | X | X | X | | | | | | | | |
| 9007671005 | | | X | X | | | | | | | | | | | | |
| 9007672005 | | | | | | | | | | | | | | | X | |
| 9007673005 | | | | | | | | | | | | | | | | X |
| 9008331005 | | | | | | | | | X | X | X | X | X | X | | |
| 9007674005 |  | Recess Box | | X | | X | | X | | | | | | | | |
| 9007675005 |  | Multiple Unit Controller | | | | | | | | | | | | | X | X |
| 9008300005 | | | | | | | ● | ● | | | | | X | X | | |
| 9007605005 |  | Isolation Valves & a Pressure Relief Valve (Lead free models available) | X | X | X | X | X | X | X | X | X | X | X | X | | |
| 9007779005 | | | | | | | | | | | | | | | X | |
| 9007781005 | | | | | | | | | | | | | | | | X |
| 9007607005 |  | Neutralizer | | | | | | | X | X | X | X | X | X | | |
| 9007676005 |  | Outdoor Vent Cap | | | | | | | | | | | | | X | |
| 9007677005 | | | | | | | | | | | | | | | | X |
| 323631-000 |  | Product Preservers® LG1.5L Anti-Scale System | | | | | W | W | | | W | W | W | W | C | C |
| 323631-001 | | LG1.5L Replacement Cartridge | | | | | | | | | | | | | | |
| 323631-002 | | Product Preservers® SM1.0L Anti-Scale System | CW | CW | CW | CW | C | C | CW | CW | C | C | C | C | | |
| 323631-003 | | SM1.0L Replacement Cartridge | | | | | | | | | | | | | | |

**X** = Standard ● = Ultra-Low NOx Models **C** = Cooler Climate **W** = Warmer Climate

# Hard Water and Tankless Heaters

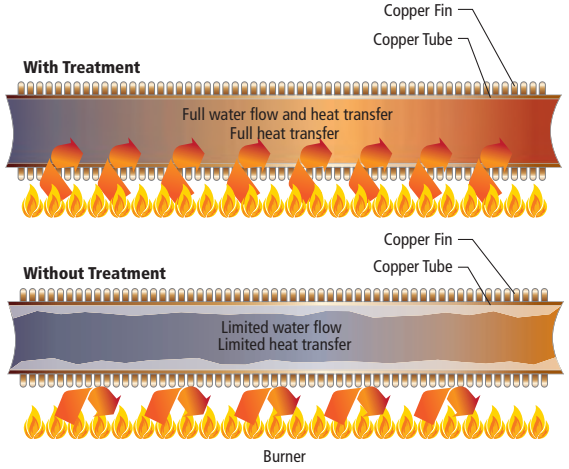
Hard water can adversely affect plumbing systems, from water piping to water fixtures, and even down to the water heating system. For piping and fixtures, hard water can create more pressure loss and reduce water flow. For water heaters, it can even reduce energy efficiency and damage the heater. This is especially true for tankless water heaters and it is important to understand what hard water is, what hard water does, and how to protect your tankless water heater from possible damage caused by hard water.

## What is hard water and hard water scale?

Very simply, hard water is defined as water that has a high mineral content, specifically in magnesium and calcium ($Ca^{2+}$ and $Mg^{2+}$ ions). Hard water is not considered a health risk and these minerals generally remain dissolved in the water. However, the problems arise when the minerals precipitate out of the water and leave behind a solid mineral buildup. This buildup is called hard water scale, and it is this scale that reduces water flow through pipes and fixtures, reduces the energy efficiency of water heating equipment, and at worst, causes irreversible damage to the heat exchangers within tankless water heaters. It is important to note that the likelihood of scale formation is only based on the hardness levels of the water and the temperature of the water, not on the material the scale is adhering to. For example, hard water scale would form equally on a copper surface as it would on a stainless steel surface, given the same hardness level and temperature of water.

## What does hard water scale do to my water heater?

When hard water scale forms a layer coating the inside wall of a tankless heat exchanger fin pipe, it acts as a thermal insulator. This insulation effectively prevents a significant amount of heat, coming from the burners, from properly transferring into the water within the piping. Because the heat is not transferring into the water, the heat exchanger material is forced to retain this excess heat, eventually overheating and becoming damaged. Once the material has degraded enough, the heat exchanger piping eventually gives way and water leakage occurs.




Picture shows a clean HX with treatment.

Scale Build up from untreated water.

Product Preservers® protects your tankless heat exchanger from scale formation. Refer to the chart to properly size for your application.

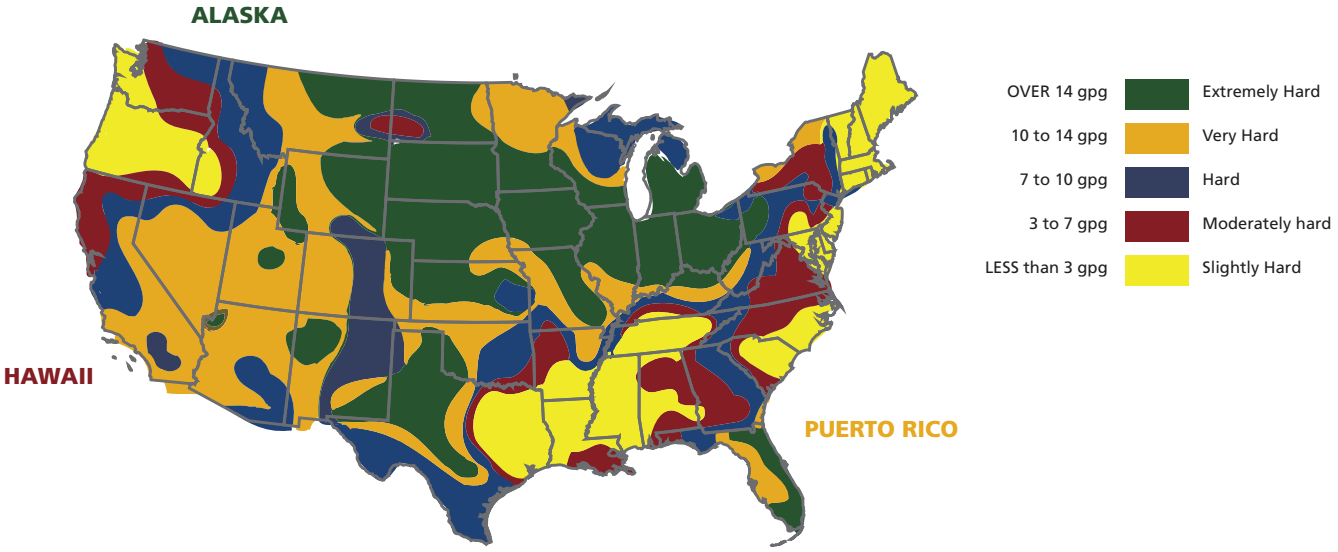
**Flow Rate Based Ground Water Temperature (assume 120°F Setpoint)**

| | | Tankless Model | 110/U | 240H | 310/U | 510/U | 340H | 540H | 710 | 910 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Output (BTU/h) | 114800 | 152000 | 155800 | 163180 | 171000 | 189050 | 196800 | 304000 |
| Ground Water Temperature (°F) | Warmer Climate | 85 | 6.56 | 6.60 | 8.00 | 9.32 | 8.00 | 10.00 | 9.00 | 14.50 |
| | | 80 | 5.74 | 6.60 | 7.79 | 8.16 | 8.00 | 9.45 | 9.00 | 14.50 |
| | | 75 | 5.10 | 6.60 | 6.92 | 7.25 | 7.60 | 8.40 | 8.75 | 13.51 |
| | | 70 | 4.59 | 6.08 | 6.23 | 6.53 | 6.84 | 7.56 | 7.87 | 12.16 |
| | | 65 | 4.17 | 5.53 | 5.67 | 5.93 | 6.22 | 6.87 | 7.16 | 11.05 |
| | | 60 | 3.83 | 5.07 | 5.19 | 5.44 | 5.70 | 6.30 | 6.56 | 10.13 |
| | | 55 | 3.53 | 4.68 | 4.79 | 5.02 | 5.26 | 5.82 | 6.06 | 9.35 |
| | Colder Climate | 50 | 3.28 | 4.34 | 4.45 | 4.66 | 4.89 | 5.40 | 5.62 | 8.69 |
| | | 45 | 3.06 | 4.05 | 4.15 | 4.35 | 4.56 | 5.04 | 5.25 | 8.11 |
| | | 40 | 2.87 | 3.80 | 3.90 | 4.08 | 4.28 | 4.73 | 4.92 | 7.60 |
| | | 35 | 2.70 | 3.58 | 3.67 | 3.84 | 4.02 | 4.45 | 4.63 | 7.15 |

| | |
|---|---|
| | 323631-002 Product Preservers® SM1.0L Anti-Scale System |
| | 323631-000 Product Preservers® LG1.5L Anti-Scale System |
| | Requires multiple units |

# Where is hard water found?

Hard water is everywhere. In fact, more than 85% of American homes have hard water.




## How is the hardness of water measured?

Water hardness is measured in either parts per million (ppm) or grains per gallon (gpg). Anything that measures above 3 gpg is generally considered hard (Unites States Geological Survey) and it is advised at this point to look into water treatment. The U.S. Department of Interior and the Water Quality Association have classified water hardness under several levels:

| CLASSIFICATION | MG/L OR PPM (PARTS PER MILLION) | GPG (GRAINS PER GALLON) |
|---|---|---|
| Soft | 0 - 17 | 0 - 1 |
| Slightly Hard | 17 - 60 | 1 - 3.5 |
| Moderately Hard | 61 - 120 | 3.5 - 7.0 |
| Hard | 121 - 180 | 7.0 - 10.5 |
| Very Hard | 180 and above | 10.5 and above |

## How do I prevent hard water scale?

Fortunately, there are quite a few great options to choose from when looking to protect water heating equipment from scale buildup. These solutions range in cost, maintenance, and application, so it is always best to consult with water treatment professionals before making the final decision on a water treatment solution.

- Ion exchanger water softeners: Water softeners are probably the most common solution used today for eliminating hard water. Calcium and magnesium ions are removed from the water and replaced with sodium ions. Without the calcium and magnesium, hard water scale cannot form.
- Product Preserver®: prevents scale by transforming dissolved hardness minerals into harmless, inactive microscopic crystal particles. These crystals stay suspended in the water and are passed to drain
- Siliphos: Interferes with the ability of (calcium and magnesium) Scale to crystallize. The suspended scale stays in the water and goes down the drain.

# Models

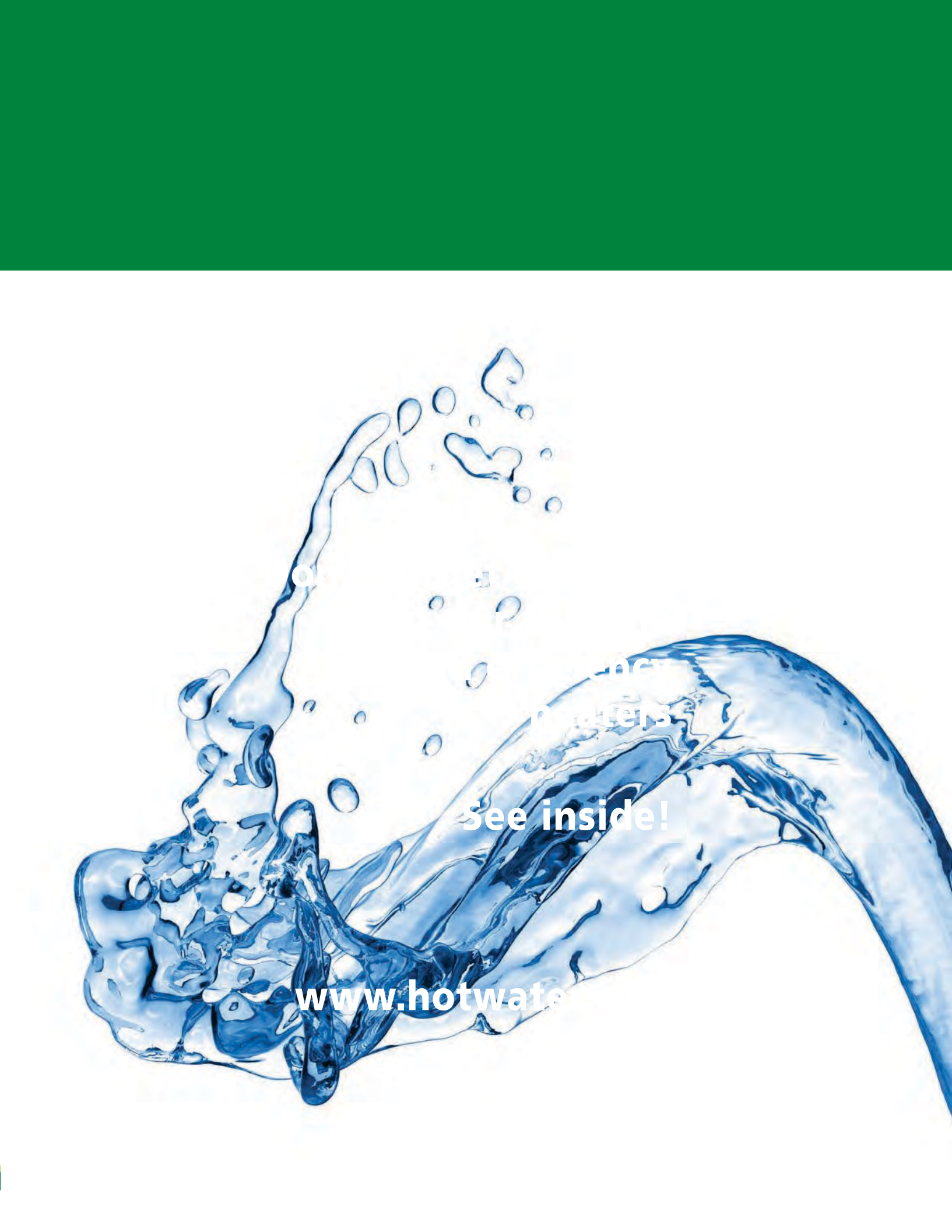
ATI Inside ATO Outside

| | | | Connection: Gas/Water Power | Venting Intake Exhaust (Cat. III Stainless) | Easy-Link (EL) Multi-Unit (MU) | Temperature (with remote) | GPM (Max) Per Unit | Energy Factor NG, LP | NG Max (BTU/h), LP Max (BTU/h) | Dimension/ Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| Condensing | **240H Series**  ATO-240H ATI-240H | High efficiency ultra-low NOx condensing tankless. 3" PVC venting. 0" clearance to combustible. | 3/4" Gas/ Water 120 VAC | Intake & Exhaust 3", 70' Max, 5 elbow Max OR 4", 100' Max, 5 elbow Max (PVC venting capable) OS= no venting required | N/A | 100 to 140 (100 to 140) | 6.6 | Energy Factor NG: 0.95 LP: 0.95 | NG: 160,000 LP: 160,000 | H = 22-1/2" W = 17-3/4" D = 10-3/4" DV = 58 lbs OS = 58 lbs |
| | **340H Series**  ATO-340H ATI-340H | High efficiency ultra-low NOx condensing tankless. 3" PVC venting. 0" clearance to combustible. | 3/4" Gas/ Water 120 VAC | Intake & Exhaust 3", 70' Max, 5 elbow Max OR 4", 100' Max, 5 elbow Max (PVC venting capable) OS = no venting required | N/A | 100 to 140 (100 to 140) | 8.0 | Energy Factor NG: 0.95 LP: 0.95 | NG: 180,000 LP: 180,000 | H = 22-1/2" W = 17-3/4" D = 10-3/4" DV = 58 lbs OS = 58 lbs |
| | **540H Series**  ATO-540H ATI-540H | High efficiency ultra-low NOx condensing tankless. 3" PVC venting. 0" clearance to combustible. | 3/4" Gas/ Water 120 VAC | Intake & Exhaust 3", 70' Max, 5 elbow Max OR 4", 100' Max, 5 elbow Max (PVC venting capable) OS = no venting required | (EL) 4 units (MU) 20 units | 100 to 185 (100 to 185) | 10.0 (4 units generate 40 GPM Max; 20 units generate 200 GPM Max) | Energy Factor NG: 0.95 LP: 0.95 | NG: 199,000 LP: 199,000 | H = 22-1/2" W = 17-3/4" D = 10-3/4" DV = 59 lbs OS = 59 lbs |
| Non-Condensing Ultra-Low NOx | **110 Series**  ATO-110 ATI-110 ATI-110-N is convertible to Direct Vent with 9007667005 conversion kit. | Great for apartments, condos and summer cabins. | 3/4" Gas/ Water 120 VAC | ATI Model: Intake 3" (50' Max) Exhaust 4" (50' Max) OS Model N/A | N/A | 113 to 140 (99 to 167) | 6.6 | Energy Factor NG: 0.82 LP: 0.83 | NG: 140,000 LP: 140,000 | H= 20-1/2" W= 13-3/4" D= 6-3/4" 33 lbs |
| | **310 Series**  ATO-310 ATI-310 ATI-310-N is convertible to Direct Vent with 9007667005 conversion kit. | Adds 1 more shower over the 110 at minimal increase in cost. | 3/4" Gas/ Water 120 VAC | ATI Model: Intake 3" (50' Max) Exhaust 4" (50' Max) OS Model N/A | N/A | 113 to 140 (99 to 167) | 8.0 | Energy Factor NG: 0.82 LP: 0.82 | NG: 190,000 LP: 190,000 | H= 20-1/2" W= 13-3/4" D= 8-1/2" 38 lbs |
| | **510 Series**  ATO-510 ATI-510 ATI-510-N model is convertible with 9007667005 conversion kit. | Well suited for light commercial applications. HRS Copper. | 3/4" Gas/ Water 120 VAC | ATI Model: Intake 3" (50' Max) Exhaust 4" (50' Max) OS Model N/A | (EL) 4 units (MU) 20 units (510U only) | 104 to 185 (99 to 185) | 10.0 (4 units generate 40 GPM Max; 510U generates up to 200 GPM Max) | Energy Factor NG: 0.82 LP: 0.82 | NG: 199,000 LP: 199,000 | H= 20-1/2" W= 13-3/4" D= 8-1/2" 39 lbs |
| Non-Condensing | **710 Series** ASME model available  ATIO-710 ATIO-710-N is convertible to Direct Vent with 9007668005 conversion kit. | Generates 180 Gpm (Max) when manifolding 20 units. HRS Copper. LED display | 3/4" Gas/ Water 120 VAC | Intake 4" (50' Max) Exhaust 4" (50' Max) | (EL) 4 units (MU) 20 units | 100 to 185 (100 to 185) | 9.0 (4 units generate 36 GPM Max; 20 units generate 180 GPM Max) | Thermal Efficiency NG: 82.2% LP: 83.9% | NG: 240,000 LP: 240,000 | H= 23-5/8" W= 18-1/2" D= 8-7/8" 59 lbs |
| | **910 Series** ASME model available  ATIO-910 ATIO-910-N is convertible to Direct Vent with 9007669005 conversion kit. | Generates Most GPM in tankless industry. 14.5 GPM (Max). HRS Copper. LED display | 1" Gas/ Water 120 VAC | Intake 5" (50' Max) Exhaust 5" (50' Max) | (EL) 4 units (MU) 10 units | 100 to 185 (100 to 185) | 14.5 (4 units generate 58 GPM Max; 10 units generate 145 GPM Max) | Thermal Efficiency NG: 80.2% LP: 82.4% | NG: 380,000 LP: 380,000 | H= 25-1/4" W= 24-3/4" D= 11-3/4" 102 lbs |

ATI/O-110, ATI/O-310 & ATI/O-510 are available in standard non-condensing models, see pages 12-17.

# Notes

# Notes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## Offices


**Headquarters**
500 Tennessee Waltz Pkwy
Ashland City, TN 37015
Toll Free: 800.527.1953

**North East**
Pennsauken, NJ
Tel: 856.488.5777

**Southern California**
500 Wald
Irvine, CA 92618
Tel: 949.770.7171
Fax: 949.770.3171

**Canada**
599 Hill Street West
Fergus, ON N1M 2X1
Tel: 519.843.1610
Fax: 519.787.5500
Toll Free: 877.877.4953