



CANADA
TANKLESS PRODUCT GUIDE



A. O. Smith Tankless Advantage



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 tankless water heaters will continually provide a steady flow of hot water for as long as your application needs it.



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 tankless 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, a 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.

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

Condensing Tankless Advantages

METAL VENT COLLAR

Metal vent collar plus built-in gasket allows easy connection/removal of ULC S636 PVC, CPVC, or PP pipe without gluing or cutting. 3" venting up to 70' and 4" up to 100'. Easy connection to 4" Cat. III/IV stainless steel venting for backward compatibility.

DUAL FREEZE PROTECTION

Ceramic blocks and auto-fire functions protect the heat exchangers from temperatures as low as -22°F / -30°C. (540H models only)

DUAL EXHAUST TEMPERATURE MONITORS

These two sensors never allow the exhaust temperature, no matter what the hot water temperature is, to go above 149°F / 65°C. This makes our condensing tankless water heater the safest in the market.

COMBINATION STAINLESS + COPPER HEAT EXCHANGERS

High grade 316L stainless + copper makes an ideal, super compact, super light, minimum pressure drop heat exchanger. Copper transfers heat 25 times faster than stainless and requires no internal buffer tank and recirculation pump.

DOUBLE HI-LIMIT SENSORS

Both sensors disconnect voltage to the gas valve at high temperatures and protect heat exchangers from overheating making this product very safe.

DOUBLE COMBUSTION SENSORS

Dual flame sensor and air-fuel ratio sensor work to achieve perfect combustion.

BUILT-IN CONTROLLER

Info Mode: In/Out temperature, GPM

Diagnostic Mode: Various troubleshooting information for professionals.



Only 59lb (27kg)

Basic Sizing Guideline

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 specification of each model.

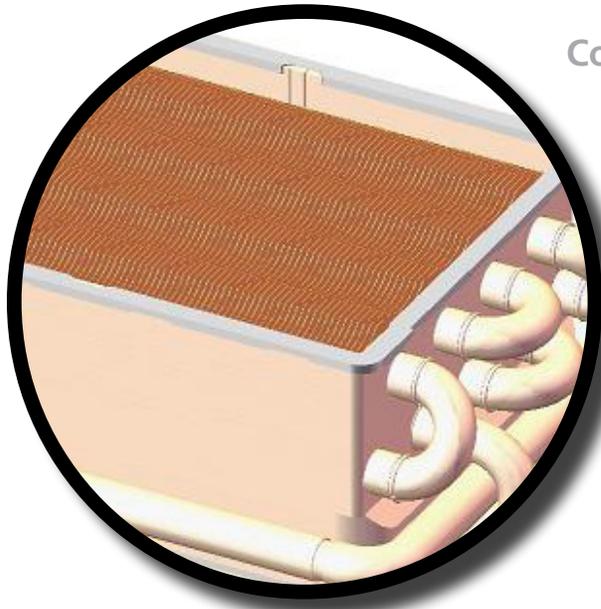
Temp Rise (°F)	240H	340H	540H
30°	6.6	8.0	10.0
35°	6.6	8.0	10.0
40°	6.6	8.0	9.5
45°	6.6	7.6	8.4
50°	6.1	6.8	7.6
55°	5.5	6.2	6.9
60°	5.1	5.7	6.3
65°	4.7	5.3	5.8
70°	4.3	4.9	5.4
75°	4.1	4.6	5.0
80°	3.8	4.3	4.7
85°	3.6	4.0	4.4
90°	3.4	3.8	4.2
95°	3.2	3.6	4.0
100°	3.0	3.4	3.8

240H	1 Shower	
340H	2 Showers	
540H	3 Showers	

Assuming the set point temperature is 120°F

Durability

Primary Heat Exchanger



Commercial Grade Copper Alloy

The commercial grade copper 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. Even at high temperatures, it maintains a fine grain and high strength. It provides resistance to the damaging effects of erosion and heat stress that can cause heat exchangers to leak.

Commercial grade copper tubing

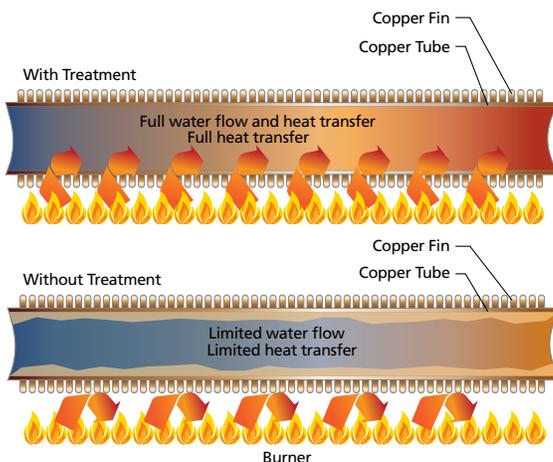


Drum Thickness

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 products utilize drums that are 25% thicker, ensuring the longevity of our products. A thicker drum creates less strain on the heat exchanger.

Hard Water and Tankless Heaters

When hard water scale forms a layer coating the inside wall of a tankless heat exchanger 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 the excess heat, eventually overheating and becoming damaged. Once the material has degraded enough, the heat exchanger piping eventually gives way and water leakage occurs.



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.
- Siliphos: Interferes with the ability of (calcium and magnesium) scale to crystallize. The suspended scale stays in the water and goes down the drain.

Picture shows a clean HX with treatment.



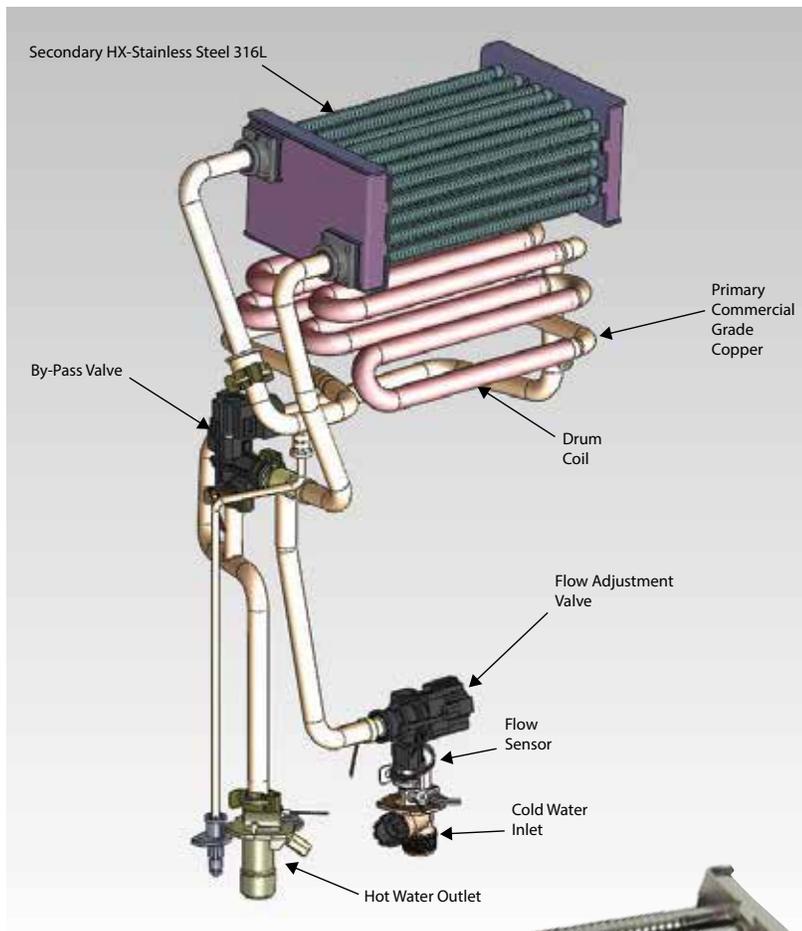
Scale build up from untreated water.



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.

240H

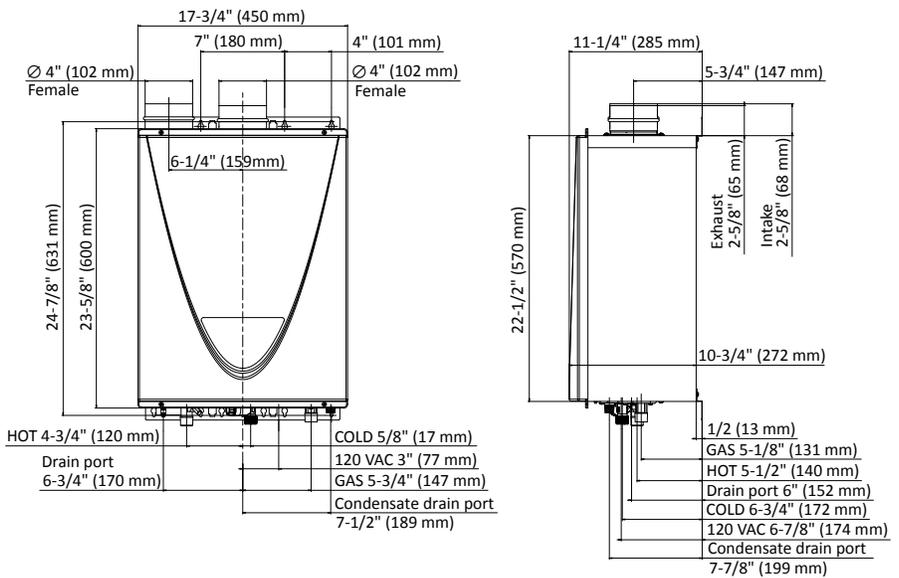
The 240H model offers high efficiency condensing technology allowing for the use of 3" or 4" ULC S636 PVC, CPVC and polypropylene venting and has 0" clearance to combustibles. These models utilize copper alloy for the heat exchanger tubing. Temperature control is built-in as a standard feature. Models are certified up to an altitude of 10,100 ft.



(Optional Temperature Remote Control)



Dimensions



Specifications

Power direct vent design. Meets the energy efficiency requirements of the current edition of ASHRAE 90.1b.

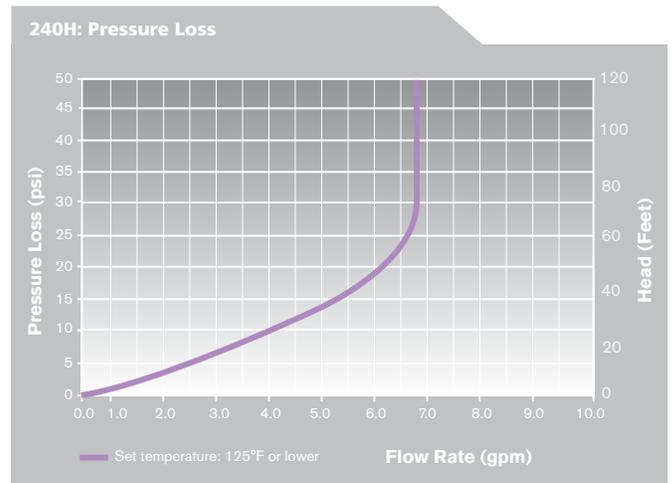
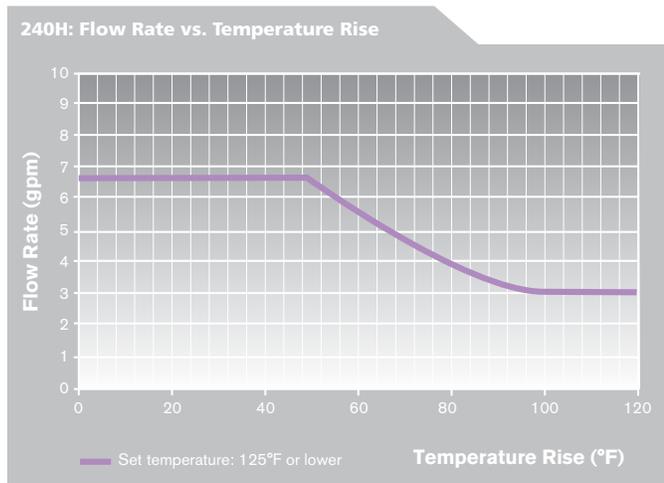
Warranty Information**

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

**Refer to the installation manual for further warranty details.

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

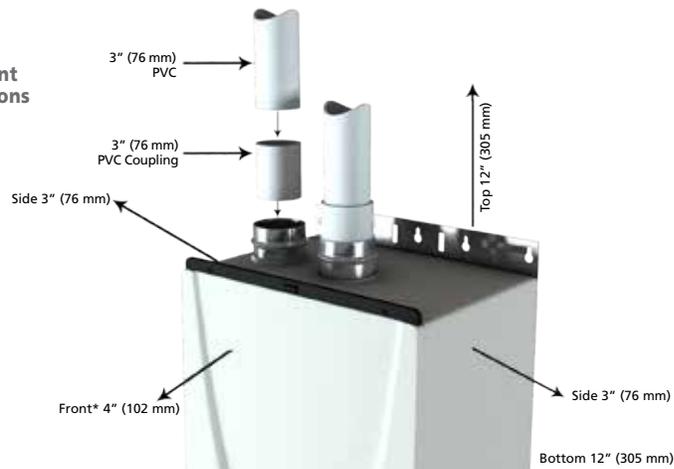
Installation Type	ULC S636, SCH 40 PVC, CPVC, Polypropylene or Cat. III/IV stainless steel Direct Vent			
Dimensions IN (MM)	22-1/2 (570) (H) X 17-3/4 (450) (W) X 10-3/4 (270) (D) , Weight: 58 lb (26 kg)			
Electric	120 V	1.27 A (Operation)	0.07 A (Standby)	1.73 A (Freeze-Protection)
Ignition	Electronic 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 Rates	Max @ 30°F temperature rise	6.6 GPM	Value based on factory testing. 0.4 GPM required for continuous fire after initial ignition.	
	@ 70°F temperature rise	4.3 GPM		
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 TM-RE42 remote	100°F 105°F 110°F 115°F 120°F (Default) 125°F 130°F 135°F 140°F (9 options)		



Clearance

Clearances to combustable and non-combustible surfaces

Direct Vent Installations



*Recommended 24" (610 mm) clearance from front of unit for maintenance)



340H

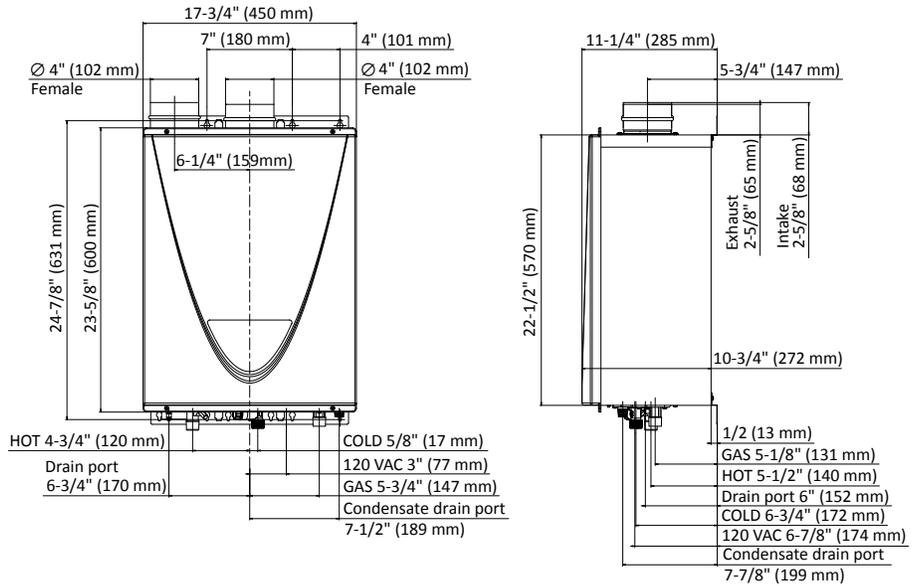
The 340H model offers high efficiency condensing technology allowing for the use of 3" or 4" ULC S636 PVC, CPVC and polypropylene venting and has 0" clearance to combustibles. These models utilize copper alloy for the heat exchanger tubing. Temperature control is built-in as a standard feature. Models are certified up to an altitude of 10,100 ft.



(Optional Temperature Remote Control)



Dimensions



Specifications

Power direct vent design. Meets the energy efficiency requirements of the current edition of ASHRAE 90.1b.

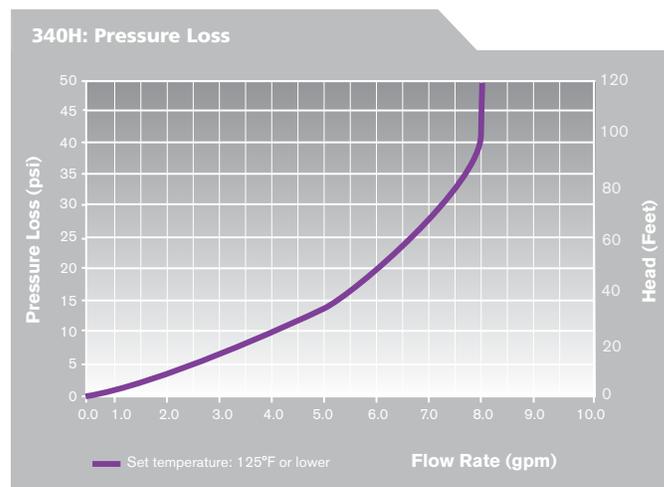
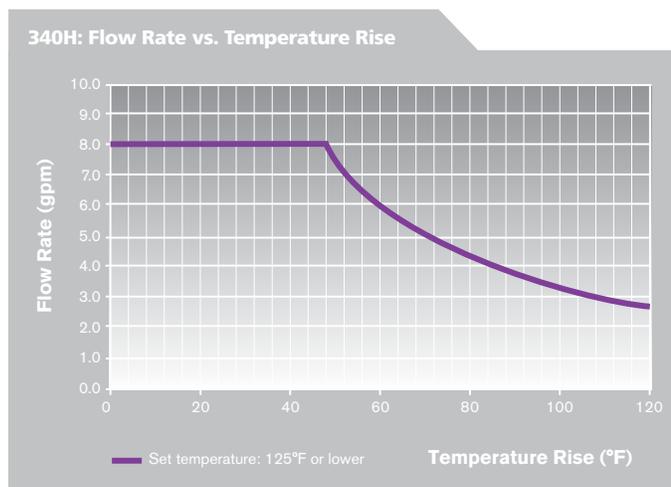
Warranty Information**

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

**Refer to the installation manual for further warranty details.

Includes a built-in temperature controller and advanced diagnostics to simplify troubleshooting.

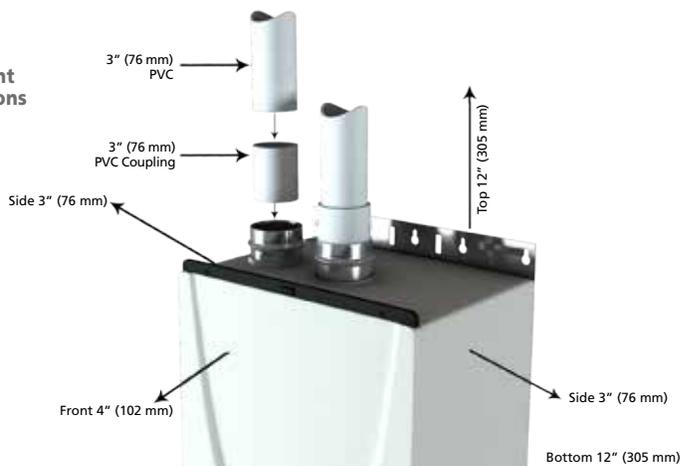
Installation Type	ULC S636 SCH 40 PVC, CPVC, Polypropylene or Cat. III/IV stainless steel Direct Vent			
Dimensions IN (MM)	22-1/2 (570) (H) X 17-3/4 (450) (W) X 10-3/4 (270) (D) , Weight : 58 lb (26 kg)			
Electric	120 V	1.27 A (Operation)	0.07 A (Standby)	1.73 A (Freeze-Protection)
Ignition	Electronic 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	Max @ 30°F temperature rise	8.0 GPM	Values based on factory testing. 0.4 GPM required for continuous fire after initial ignition.	
	@ 70°F temperature rise	4.9 GPM		
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 TM-RE42 remote	100°F 105°F 110°F 115°F 120°F (Default) 125°F 130°F 135°F 140°F (9 options)		



Clearance

Clearances to combustable and non-combustible surfaces

Direct Vent Installations



*Recommended 24" (610 mm) clearance from front of unit for maintenance)



540H

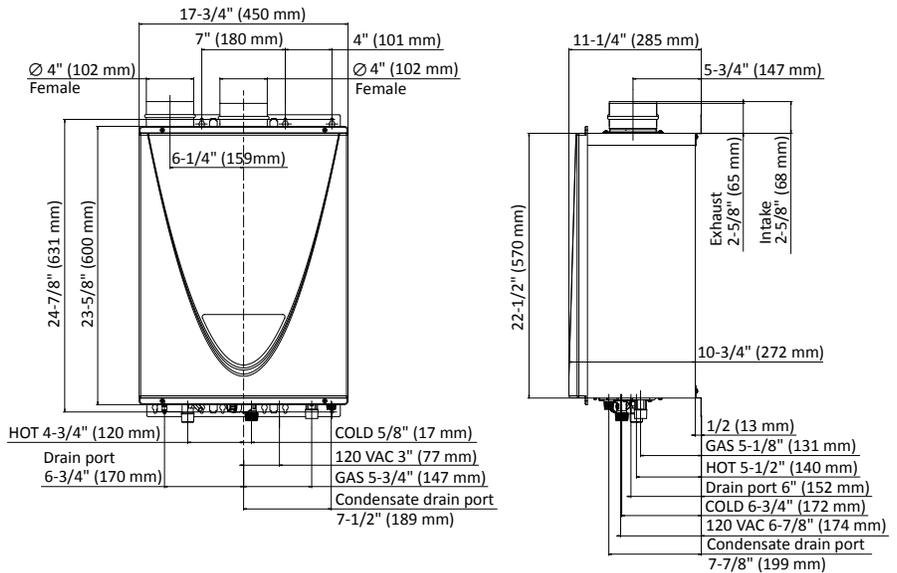
The 540H model is well suited for residential/commercial applications such as restaurants, beauty salons, hotels and motels. Utilizing copper alloy for the heat exchanger tubing, the 540H is also suitable for heavier-residential usages such as space heating or domestic recirculation systems. Temperature control is built-in as a standard feature. Models are certified up to an altitude of 10,100 ft.



(Optional Temperature Remote Control)



Dimensions



Specifications

Thicker heat exchanger drum and copper for the heat exchanger tubing. Power direct vent design. Models meet the energy efficiency requirements of the current edition of ASHRAE 90.1b. Built-in Easy-Link System capable up to 4 units or Multi-Link System capable up to 20 units.

Warranty Information**

Residential Use:

15 years limited heat exchanger,
5 years limited parts

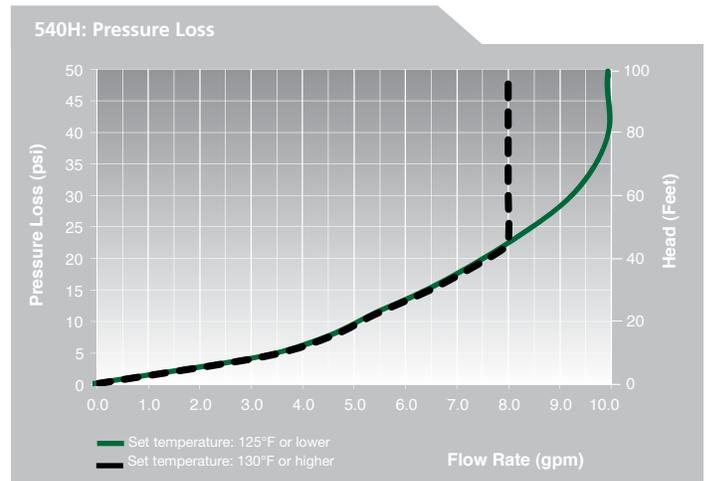
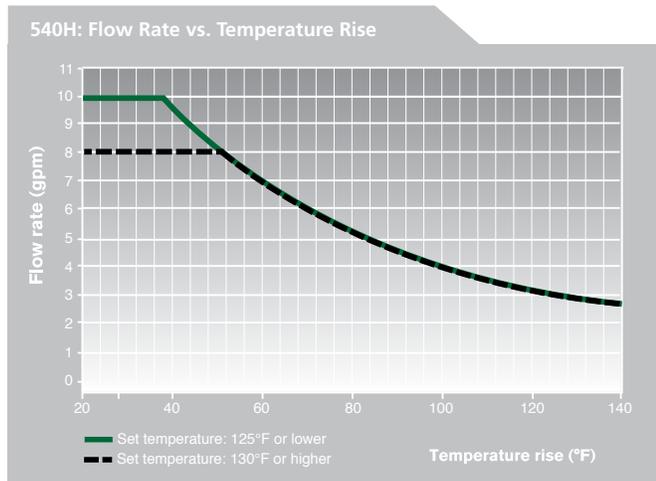
Commercial Use:

10 years limited heat exchanger,
5 years limited parts

**Refer to the installation manual for further warranty details.

Includes a built-in temperature controller and advanced diagnostics to simplify troubleshooting.

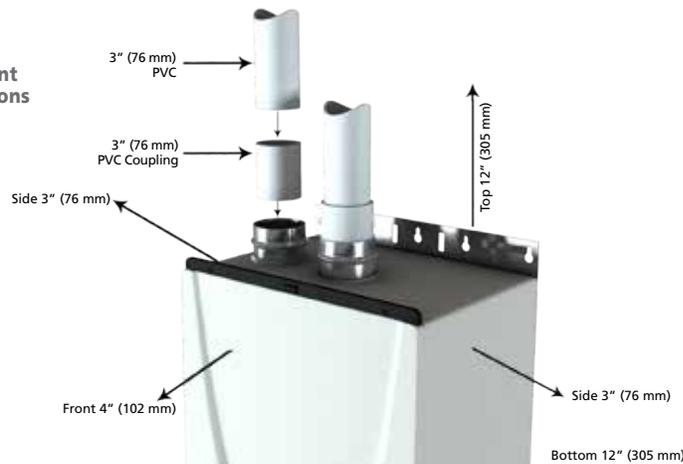
Installation Type	ULC S636 SCH 40 PVC , CPVC, Polypropylene or Cat. III/IV stainless steel Direct Vent		
Dimension IN (MM)	22-1/2 (570) (H) X 17-3/4 (450) (W) X 10-3/4(270) (D) , Weight: 59 lb (27 kg)		
Electric	120 V	1.27 A (Operation)	0.07 A (Standby) 1.73 A (Freeze-Protection)
Ignition	Electronic 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	Max @ 30°F temperature rise	10.0 GPM	Values based on factory testing. 0.4 GPM required for continuous fire after initial ignition.
	@ 70°F temperature rise	5.4 GPM	
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 (TM-MC02)
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 (9 options)	
	With TM-RE42 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 (13 options)	
	With TM-RE40 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 185°F (17 options)	



Clearance

Clearances to combustible and non-combustible surfaces

Direct Vent Installations



*Recommended 24" (610 mm) clearance from front of unit for maintenance)



Non-Condensing

		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	BTU/h (Max)	Dimension IN (MM)/ Weight
Residential/Light Commercial	110  110 is convertible to Direct Vent with TK-TV10 conversion kit.	3/4" Gas/ Water 120 VAC	Intake 3" (50' Max) Exhaust 4" (50' Max)	N/A	113 to 140 (99 to 167)	6.6	Energy Factor NG: 0.82 LP: 0.83	140,000	H= 20-1/4 (520) W= 13-3/4 (350) D= 7-3/4 (197) 33 lb, 15 kg
	310  310 is convertible to Direct Vent with TK-TV10 conversion kit.	3/4" Gas/ Water 120 VAC	Intake 3" (50' Max) Exhaust 4" (50' Max)	N/A	113 to 140 (99 to 167)	8.0	Energy Factor NG: 0.82 LP: 0.82	190,000	H= 20-1/4 (520) W= 13-3/4 (350) D= 9-1/2 (240) 38 lb, 17 kg
	510  510 model is convertible with TK-TV10 conversion kit.	3/4" Gas/ Water 120 VAC	Intake 3" (50' Max) Exhaust 4" (50' Max)	(EL) 4 units	104 to 140 (100 to 176)	10.0 (4 units generate 40 GPM Max)	Energy Factor NG: 0.82 LP: 0.82	199,000	H= 20-1/4 (520) W= 13-3/4 (350) D= 9-1/2 (240) 39 lb, 18 kg
Commercial	910 ASME model available   910 is convertible to Direct Vent with TM-DV50 conversion kit.	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%	380,000	H= 25-1/4 (642) W= 24-7/8 (632) D= 12-1/4 (311) 112 lb, 51 kg

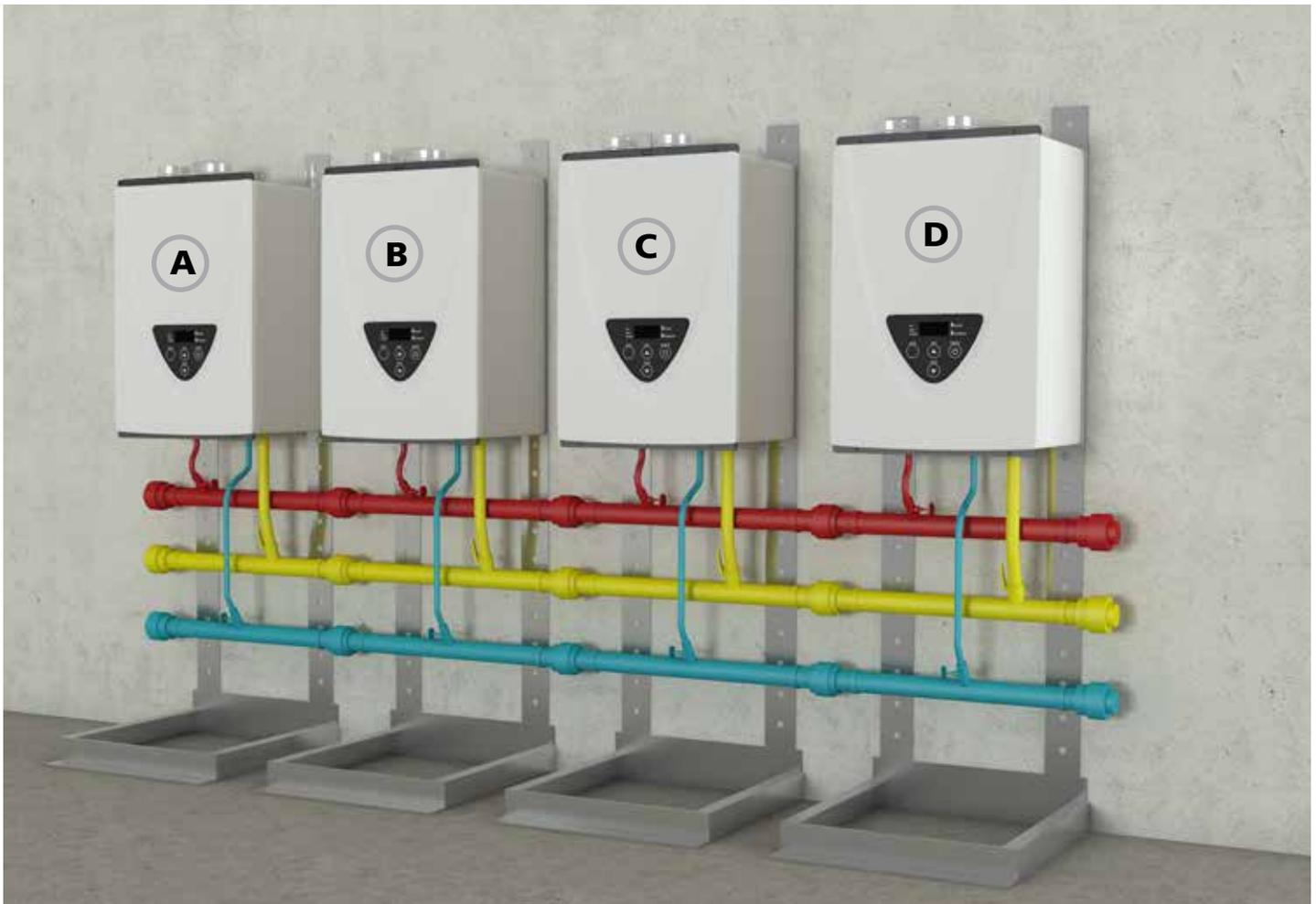


What Tankless Delivers

EASY-LINK(Up to 4 units)

For mid size commercial applications, the 540H, 510, and 910 models 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.

The configured Easy-Link System creates a lead/lag system allowing one or multiple units to fire depending on demand. This lead/lag system ensures rotation of the primary unit to minimize wear and tear on the entire system. Please refer to the image example below for more detail.



Unit A is the primary unit of this Easy-Link System. Unit A will fire first in the sequence followed by B, C and D in that order as demand requires. Once unit A reaches a certain run time, it will shut off and become the last unit to fire in the sequence and unit B will now become the primary unit. This pattern is followed continuously to distribute wear and tear evenly throughout the system. Image only. Not an actual installation.

MULTI-UNIT (Up to 10 or 20 units)

For even larger applications, the 540H and 910 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 540H units or ten 910 units.

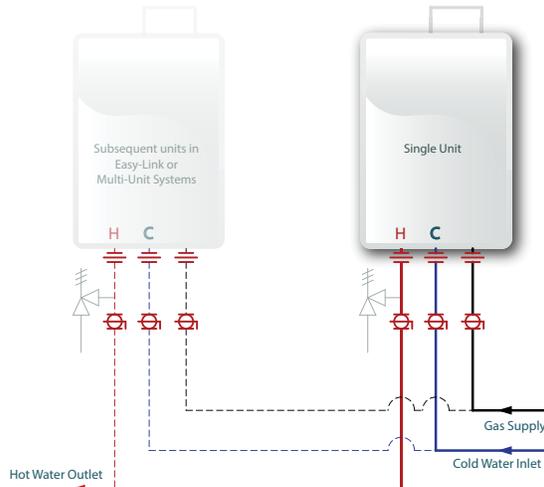


Image only. Not an actual installation.

Application Diagrams

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 products are built to provide endless, continuous hot water.*

Basic Installation

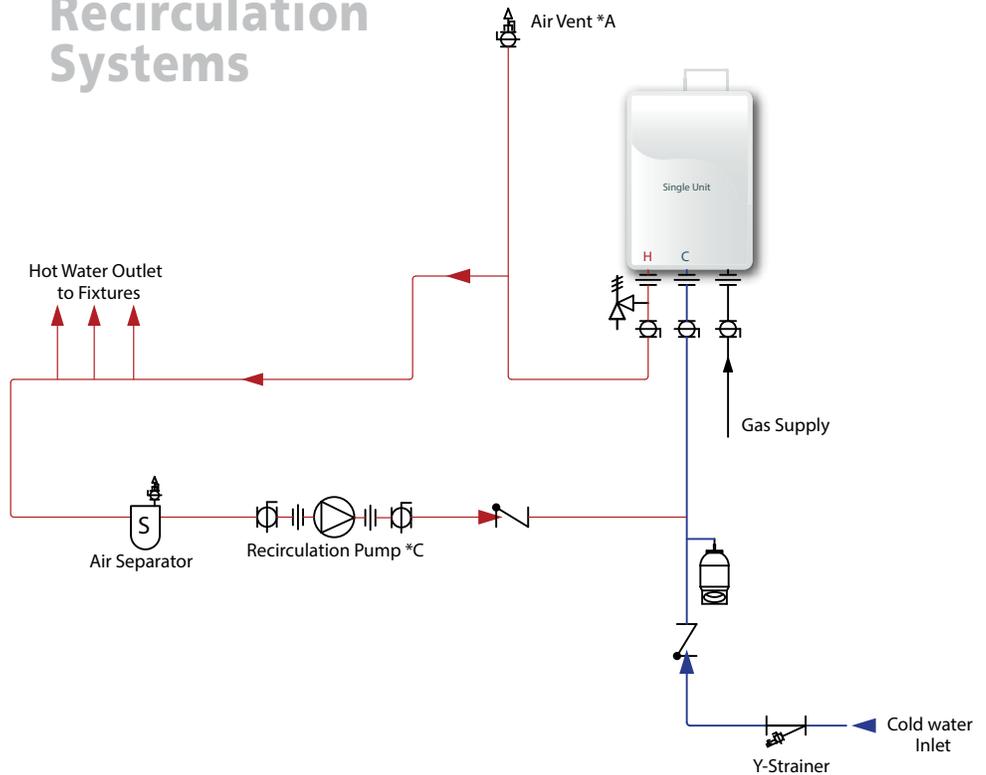


*When manifolding Takagi water heaters, whether in Easy-Link or Multi-Unit Systems, all water heaters are to be plumbed in parallel.

Legend

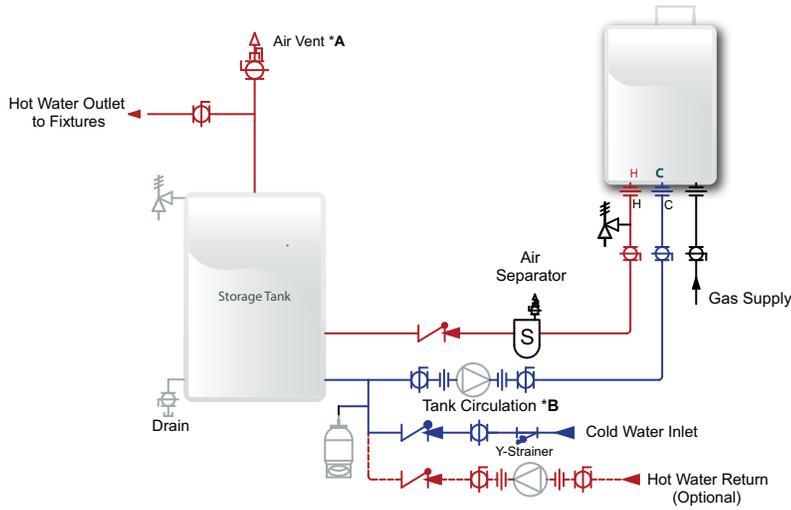
Pump	
Expansion Tank	
Shut Off / Isolation Valves	
Check Valve	
Union	
Pressure Relief Valve	
Air Separator	
Air Vent	
Y-Strainer	

Recirculation Systems



* Tankless water heaters provide endless hot water when sized appropriately for your application. Local codes dictate proper compliance.

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.

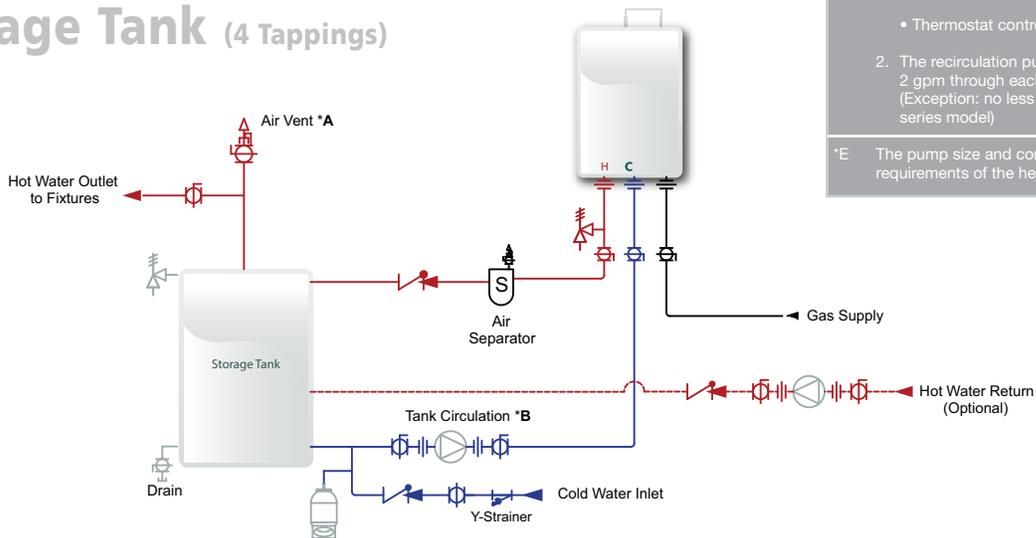
*B 1. The tank circulation pump is to be controlled by:
 • Dual-set aquastat (recommended w/ timer)
 OR
 • Pump Control set to "Storage Tank Mode" (if the model or controller has this function)
 2. The tank circulation pump is to provide no less than 2 gpm through each activated unit in the system. (Exception: no less than 4 gpm through each 910 series)

*C 1. The recirculation pump is to be controlled by:
 • Dual-set aquastat (recommended w/ timer)
 OR
 • Pump Control set to "Recirculation Mode" (if the 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 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
 • Pump Control set to "Recirculation Mode" (if the 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 unit in the system. (Exception: no less than 4 gpm through each 910 series model)

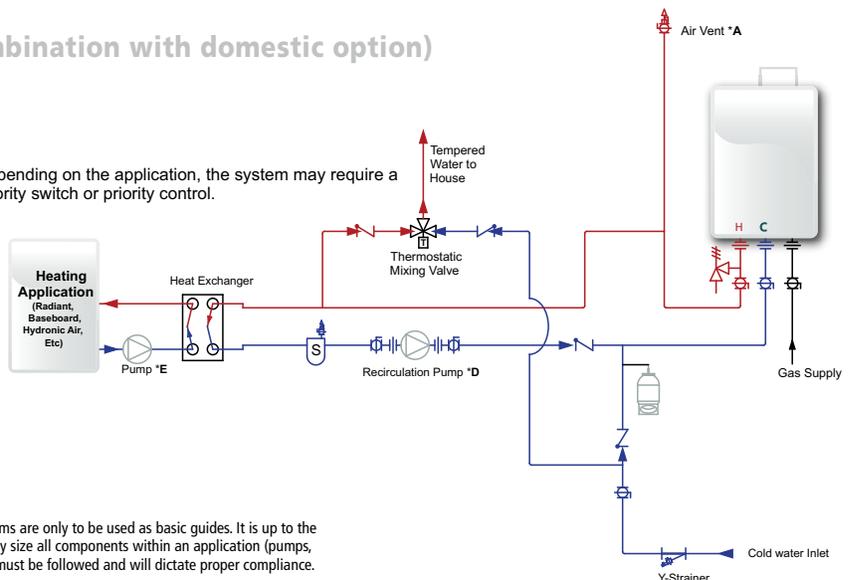
*E The pump size and control are dependant on the requirements of the heating application.

Storage Tank (4 Tappings)



Heating (Combination with domestic option)

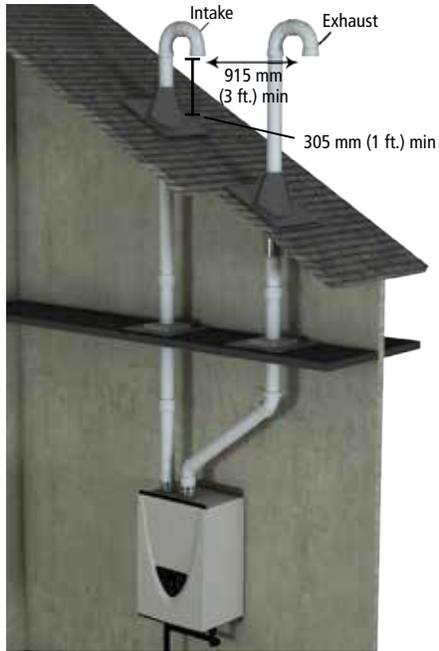
Depending on the application, the system may require a priority switch or priority control.



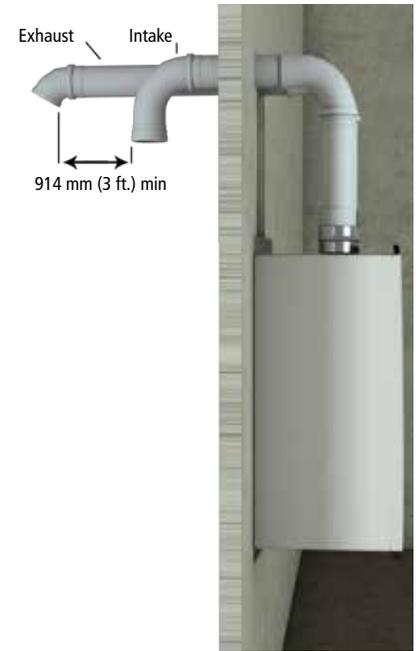
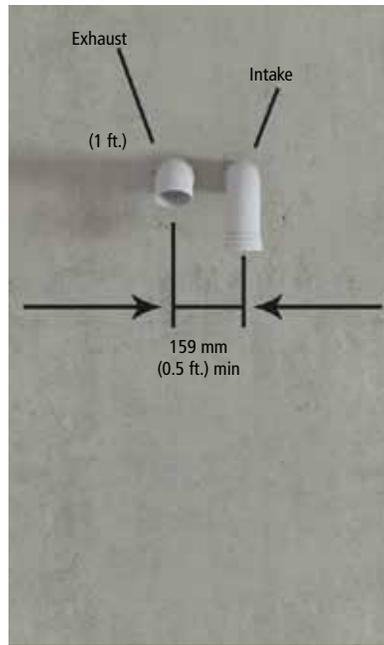
All application diagrams shown are concept drawings only. These diagrams are only to be used as basic guides. It is up to the application designer to properly design the plumbing layout and correctly size all components within an application (pumps, piping, storage tanks, water heaters, etc.). All National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

Venting Diagrams (Examples)

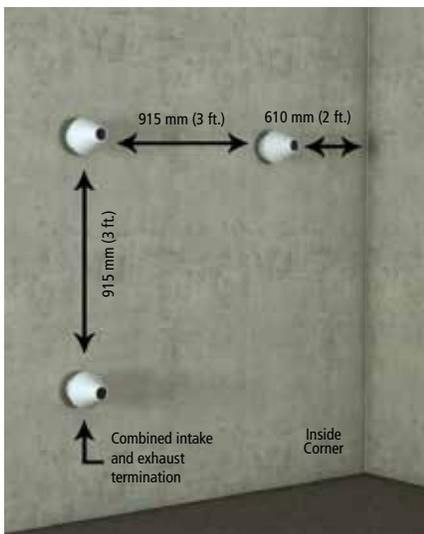
Vertical Rooftop Termination



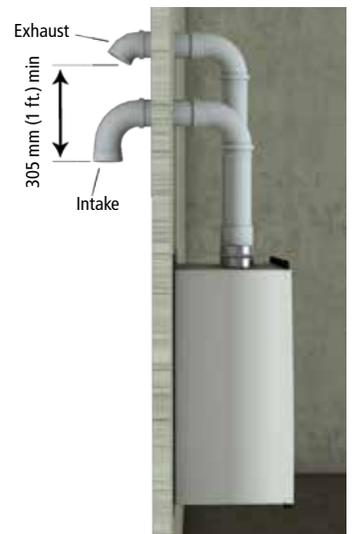
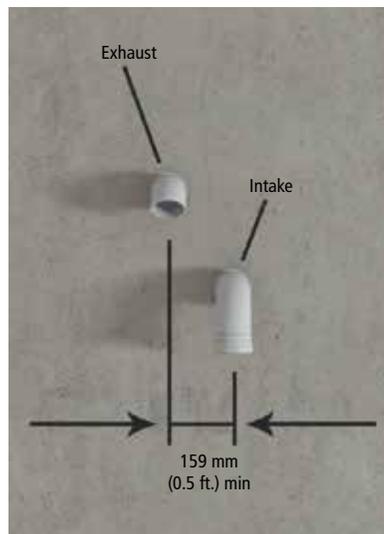
Horizontal Sidewall Termination



Multiple Unit Sidewall Termination



Horizontal Sidewall Termination (offset)



Please refer to the installation manual for detail on venting requirements.

Accessories

PART #	DESCRIPTION							
		110	310	510	240H	340H	540H	910
TK-RE02	 Remote Temperature Controller	X	X					
TM-RE30				X				X
TM-RE40		 Remote Temperature Controller				X	X	X
TM-RE42						X	X	X
TK-PC01	 Pipe Cover		X	X			X	
TK-PC1r2		X						
TM-PC50								X
TH-PC03					X	X	X	
TM-MC02	 Multiple Unit Controller						X	X
TK-IV01-AB	 Lead Free Isolation Valves & a Pressure Relief Valve	X	X	X	X	X	X	
TM-IV50-AB								X
TH-NT01	 Neutralizer				X	X	X	
TH-CVPVC33	 3" Concentric PVC Termination ULC S636 Approved				X	X	X	
TK-TV10	 Direct Vent Conversion Kit	X	X	X				
TM-DV50								X
2SVSHTCKIT43	 Stainless Steel Concentric Vent Kit	X	X	X				
2ZVCK55								X



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