Quality People. Building Solutions.

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Date: 5/23/2023
Return Request: 6/2/2023
Project: Farm Credit Office
Supplier: Falk
Submittal: Plumbing Equipment
Submittal Number: 22 30 00-01
Drawing # and Installation: Plumbing Drawings

ARCHITECT
Hight Jackson
5201 W. Village Parkway, Suite 300
Rogers, AR 72758
479-464-4965

ENGINEER
HAS Engineering
7405 Ellis Rd.
Fort Smith, AR 72916
479-452-8922

GENERAL CONTRACTOR
Nabholz
612 Garland St.
Conway, AR 72032
501-505-5800

MECHANICAL SUBCONTRACTOR
Comfort Systems USA (Arkansas), Inc.
9924 Landers Rd.
N. Little Rock, AR 72117
501-834-3320

Notes:

CSUSA PROJECT NO.
23-1013
jon@comfortar.com

WATER HEATER

On-Demand Water Heater
Installation Manual and Owner's Guide

ANSI Z21.10.3 • CSA 4.3

540H only

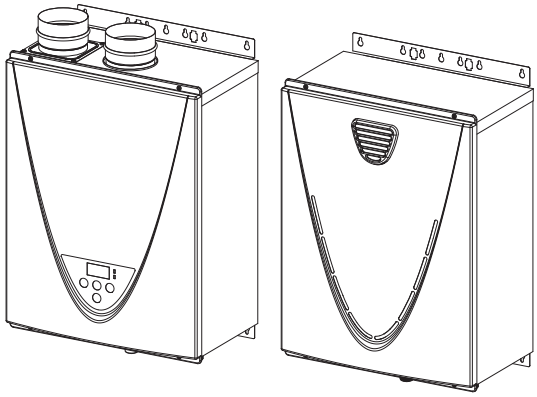
Models

140H

240H

340H

540H



Gas Tankless Water Heater™

Suitable for combination potable water heating and space heating. Please refer to local codes for space-heating compliance.

FEATURING

- ENDLESS HOT WATER
- ON-DEMAND USAGE
- COMPACT, SPACE SAVING
- ENERGY CONSERVATION
- COMPUTERIZED SAFETY
- NO PILOT LIGHT
- Complies with SCAQMD Rule 1146.2 for natural gas Low NOx Emissions of 14 ng/J or 20 ppm.
- EASY-LINK SYSTEM *(540H only)*
- MULTI-UNIT SYSTEM *(540H only)*

WARNING

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

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

If you have any questions, please call or write to:

In the United States
500 Tennessee Waltz Parkway
Ashland City, TN 37015
Toll Free: 1-877-737-2840

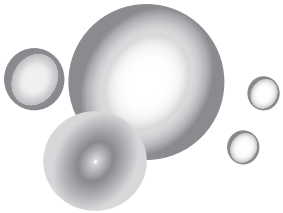
In Canada
599 Hill Street West
Fergus, ON N1M 2X1
1-888-479-8324

Keep this manual near the water heater for future reference whenever maintenance, adjustment, or service is required.

CONTENTS

Installation Manual

Owner's Guide



Owner's Guide

CONGRATULATIONS

Congratulations and thank you for choosing our tankless water heater. Before use, we recommend that you read through this owner's guide carefully. Keep this manual for future reference.

If you need an additional manual, contact the manufacturer or your local distributor. You may also download a manual from our website. When you call, please tell us the product name and the serial number of your unit written on the rating plate of the water heater.

OPERATING SAFETY

FOR YOUR SAFETY READ BEFORE OPERATING

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

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

B. BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

C. Use only your hand to turn the gas shutoff valve. Never use tools. If the valve will not turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

D. Do not use this appliance if any part has been under water. Immediately contact a qualified installer or service agency to replace a flooded water heater. Do not attempt to repair the unit! It must be replaced!

OPERATING INSTRUCTIONS

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

TO TURN OFF GAS TO APPLIANCE

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

⚠ DANGER

⚠ **Vapors from flammable liquids will explode and catch fire causing death or severe burns.**
Do not use or store flammable products such as gasoline, solvents or adhesives in the same room or area near the water heater.

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

FLAMMABLES

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

Keep flammable products:

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

Vapors:

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

⚠ DANGER

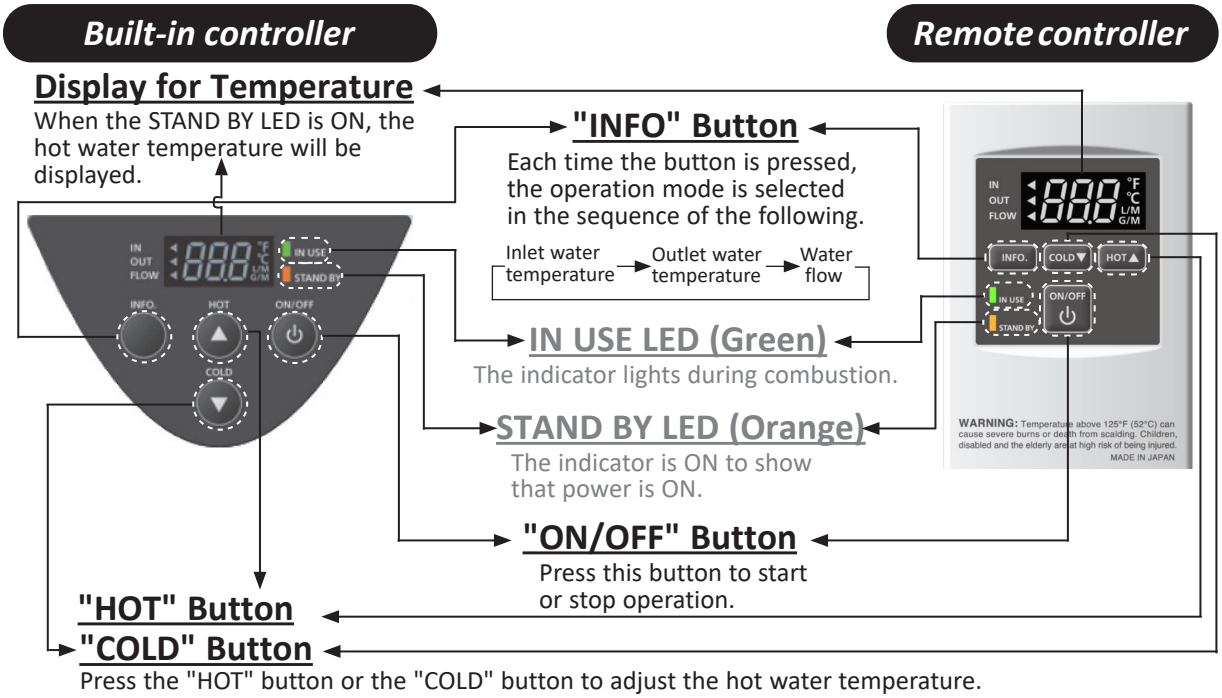
1. Water temperature over 125°F (52°C) can cause severe burns instantly or death from scalds.
2. Children, disabled and elderly are at highest risk of being scalded.
3. Feel water before bathing or showering.
4. Temperature limiting valves are available. See manual.
5. To reduce the risk of scalding,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

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

NORMAL OPERATION

BUILT-IN CONTROLLER AND REMOTE CONTROLLER

The illustration below shows an example of the controllers. The exact display may differ from examples. 140H built-in controller display is same orientation as remote controller image as shown below.



NOTICE

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

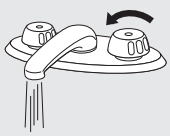
GENERAL

WARNING

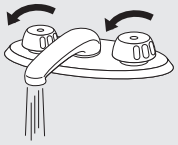
- **Temperatures above 125 °F (52 °C) can cause severe burns or death from scalding. Children, disabled and the elderly are at high risk of being injured.**
- **To reduce the risk of scalding, install Thermostatic Mixing Valves (temperature limiting valves) at each point of use.**

°F	120	125	130	135	140	145	150	155
°C	49	52	54	57	60	63	66	68
Time to produce serious burn	more than 5 min.	1½ to 2 min.	about 30 sec.	about 10 sec.	less than 5 sec.	less than 3 sec.	about 1½ sec.	about 1 sec.

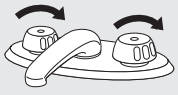
1. Open a cold water fixture.



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



3. When finished, close the water fixtures.

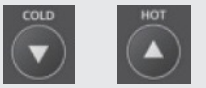
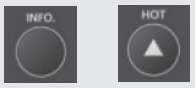


NOTICE

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

OUTLET WATER TEMPERATURE SETTING

-Set temperature

	Operation	Screen on the controller	
		Built-in controller	Remote controller
1.	Turn on the 120 VAC power supply to the unit (the water heater or the multi-unit controller).		
2.	Press the **"ON/OFF"** button on the controller in order to turn the controller on.		
3.	When ON, the STAND BY LED is lit.		
4.	It shows the set temperature on its display as shown in the picture on the right. (EX.: 120 °F)	 (EX.: 120 °F)	
5.	Press the **"HOT"** button or the **"COLD"** button to set the temperature setting of the unit.		
	⚠**WARNING! Higher temperatures increase the risk of scalding, but even at 120 °F (50 °C), hot water can scald (page 6).** **Increasing temperature from 120 °F (50 °C) to 125 °F (52 °C) :** 1. The water heater must be in Stand By to increase the temperature. 2. Press the "HOT" button to set 120 °F (50 °C). 3. Press and hold the "INFO" button and the "HOT" button for at least 3 seconds. The remote will emit a beep and change to 125 °F (52 °C). 4. Press the "HOT" button to set up to 140 °F (60 °C).		
	-540H model only-: **Increasing temperature above 140 °F (60 °C)** **To reduce the risk of scalding, install Thermostatic Mixing Valves (temperature limiting valves) at each point of use.** 1. The water heater must be in Stand By to increase the temperature. 2. Press the "HOT" button to set 140 °F (60 °C). 3. Press and hold the "INFO" button and the "HOT" button for at least 3 seconds. The remote will emit a beep and change to 145 °F (63 °C). 4. Press the "HOT" button to set up to 160 °F (70 °C).		

TEMPERATURE TABLE OF CONTROLLER

a) For 140H, 240H and 340H models

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

b) For 540H model

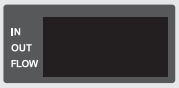
°F	100	105	110	115	120*	125	130	135	140	145	150	155	160
°C	38	40	43	45	50*	52	55	57	60	63	65	68	70

*Factory setting (Default): 120 °F

ADDITIONAL FEATURES

-Information mode-

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

INFO Button	Operation	Screen on the controller	
		Built-in controller	Remote controller
1st. press	Inlet water temperature will be displayed on the controller by pressing the **"INFO"** button.	 Inlet water temperature (EX.: 60 °F)	
2nd. press	Outlet water temperature will be displayed on the controller by pressing the **"INFO"** button.	 Outlet water temperature (EX.: 120 °F)	
3rd. press	And then, water flow will be displayed on the controller by pressing the **"INFO"** button.	 Water flow (EX.: 3.5 GPM)	
4th. press	Press the **"INFO"** button to finish information mode.		

-Unit conversion mode-

Units of measure can be changed from Imperial to Metric and vice versa. For example, temperature can be changed from °F to °C. Flow rate will also change from gallons per minute to liters per minute when this setting is changed. Follow this procedure to change this setting:

	Operation	Screen on the controller	
		Built-in controller	Remote controller
1.	Press the **"ON/OFF"** button on the controller in order to turn the controller on.		
2.	When ON, the orange LED is lit.		
3.	The previous set temperature will be displayed on the screen.	 (EX.: 100 °F)	
4.	Press the **"INFO"** buttons for at least 3 seconds.		
5.	The set temperature should now be displayed in the alternate unit of measurement.	 (EX.: 38 °C)	

NOTICE When the water heater is connected with the remote controller, the built-in controller will not operate temperature settings. It will only work for the information mode (Indoor models only).

TEMPERATURE SETTINGS ON THE PCB (WITHOUT REMOTE CONTROLLER)

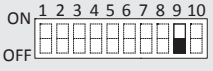
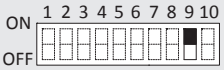
WARNING

- **Adjust the appropriate DIP switches according to model and temperature as shown below. DO NOT adjust the other DIP switches.**
- **Turn off the power supply to the water heater before changing the DIP switch settings.**
- **Failure to observe these warnings could lead to carbon monoxide poisoning, severe personal injury, or death.**

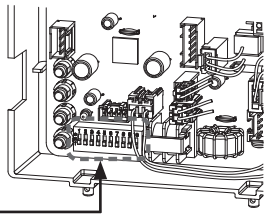
- There are 2 preset temperatures , 120 °F (50 °C) and 140 °F (60 °C), that you can select by changing the DIP switch settings on the computer board without the remote controller. See below.
- To reduce the risk of scalding, install Thermostatic Mixing Valves (temperature limiting valves) at each point of use.
- When the remote controller is in normal operation, the set temperature of the remote controller is given priority over the set temperature of the DIP switch settings.

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

140H/240H/340H

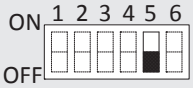
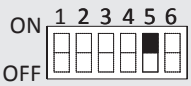
120 °F (50 °C) DEFAULT	140 °F (60 °C)
	
No. 9 : OFF	No. 9 : ON

Computer board

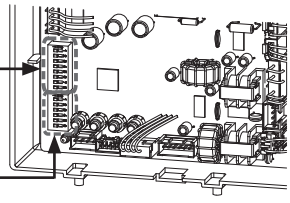


Bank of DIP switches

540H
(Lower bank of DIP switches)

120 °F (50 °C) DEFAULT	140 °F (60 °C)
	
No. 5 : OFF	No. 5 : ON

Computer board



Upper bank of DIP switches

Lower bank of DIP switches

NOTE: The dark squares indicate the correct DIP switch positions.

FLOW

- The flow rate through the water heater is limited to a maximum of 7.0 GPM (26.5 L/min) for the 140H model, a maximum of 6.6 GPM (25 L/min) for the 240H model, 8.0 GPM (30 L/min) for the 340H model, and 10.0 GPM (38 L/min) for the 540H model.
- The flow rate capacity of the water heater will vary based on temperature difference of the set temperature and supply water temperature. Flow Capacity tables are located on pages 74-75.
- The table to the right provides typical household plumbing fixture flow rates.

Household Flow Rates

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

Taken from UPC 2006

FREEZE PROTECTION SYSTEM

- This water heater comes equipped with heating blocks to protect it from damage associated with freezing. When the freeze protection thermostat senses air temperature below 36.5 °F (2.5 °C), the blocks will heat up to prevent freezing of the unit.
- The 540H Indoor model briefly fires on for about 3 seconds to provide freeze protection around the heat exchanger drum - Automatic firing system. Once 5 minutes have elapsed since the 540H Indoor previous firing operation, the computer will continually check the temperature of the exhaust thermistor. The freeze protection firing system will activate if: Tex < 32 °F (0 ˚C) (where Tex is the temperature of exhaust thermistor.)
- To operate these freeze protection systems, there has to be electrical power to the unit. Damage to the heat exchanger caused by freezing temperatures due to power loss is not covered under the warranty. In cases where power losses can occur, consider the use of a backup power supply. In the event of a power outage during freezing conditions, the manufacturer recommends draining water (page 55) from the water heater and disconnecting power.
- In any areas subject to freezing temperatures, the manufacturer highly recommends an indoor installation with an indoor model.
- The manufacturer also highly recommends the use of a backflow preventer (sold separately) to minimize the amount of cold air entering through the exhaust venting when the water heater is off.
- It is the installer's responsibility to be aware of freezing issues and take all preventative measures. The manufacturer will not be responsible for any damage to the heat exchanger as a result of freezing.
- If you will not be using your heater for a long period of time:
    1. Completely drain the water out of the unit. Refer to page 55.
    2. Disconnect power to your heater.

This will keep your unit from freezing and being damaged.

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

MAINTENANCE AND SERVICE

WARNING

- **Turn off the electrical power supply and close the manual gas shutoff valve and the manual water control valve before servicing.**
- **Failure to do so could result in severe personal injury, or death.**

The following maintenance is required for the proper operation of water heaters.

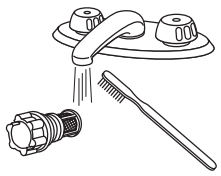
- Regularly ensure that the area around the water heater, vent termination, and air intake is free from dust, debris, and other contaminants.
- Be sure that all openings for combustion and ventilation air are not blocked.
- The venting system should be checked annually for any leaks, corrosion, blockages or damage.
- The screen of the termination (if it is installed) must be inspected regularly that it is no blocked by any object and debris including dust, dirt, and snow so on.
- Keep the area around the water heater clear. Remove any combustible materials, gasoline or any flammable vapors and liquids.
- Clean the cold-water inlet filter. (Refer to Inlet Water Filter Cleaning in the following.)
- If the relief valve discharges periodically, it may be due to thermal expansion in a closed water supply system. Contact a service technician to correct this issue.
- The pressure relief valve must be manually operated periodically to check for correct operation. Before operating the valve manually, check that it will discharge in a place for secure disposal.
- Condensate drain system must be inspected regularly to make sure it drains properly and accordance with local code or the part manufacturer's instructions. (Refer to pages 33 and 34.)
- The burner should be checked annually for dust, lint, grease or dirt by a licensed technician.
- Visually check the burner flames (see below) through the burner window in the burner assembly located at the middle of the water heater.-

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

INLET WATER FILTER CLEANING

If this filter is clogged, water will not be supplied to the water heater properly.

1. Close the manual gas shutoff valve.
2. Turn off power to the unit and wait a couple of seconds. Turn on again.
3. Wait 30 seconds, and then turn off power to the unit.
4. Close the **inlet** water valve. If the heater is part of an Easy-Link or Multi-Unit System, close the inlet and outlet water valves to isolate the heater. Then proceed to step 5.
5. Open all hot water taps in the house. When the residual water flow has ceased, close all hot water taps.
6. Have a bucket or pan to catch the water from the unit's large drain plug with filter. If Isolation valves are installed, open the drains to drain the water. If isolation valves are not installed, **unscrew** the large drain plug to drain all the water out of the unit. Do not lose the o-ring that will be on the large drain plug.
7. Wait a few minutes to ensure all water has completely drained from the unit.
8. **Clean the filter**: Check the water filter located within the cold inlet. With a tiny brush, clean the water filter of any debris which may have accumulated and reinsert the filter back into the cold water inlet.
9. Securely screw the drain plug back into place. **Hand- tighten only**.

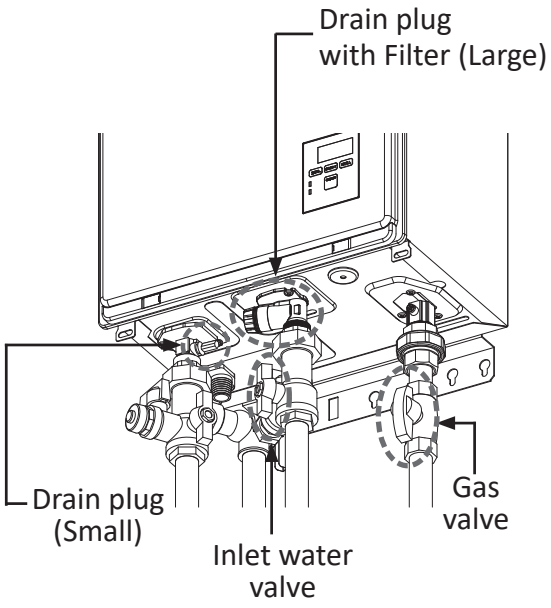


UNIT DRAINING & POWER OUTAGE (FREEZE PROTECTION)

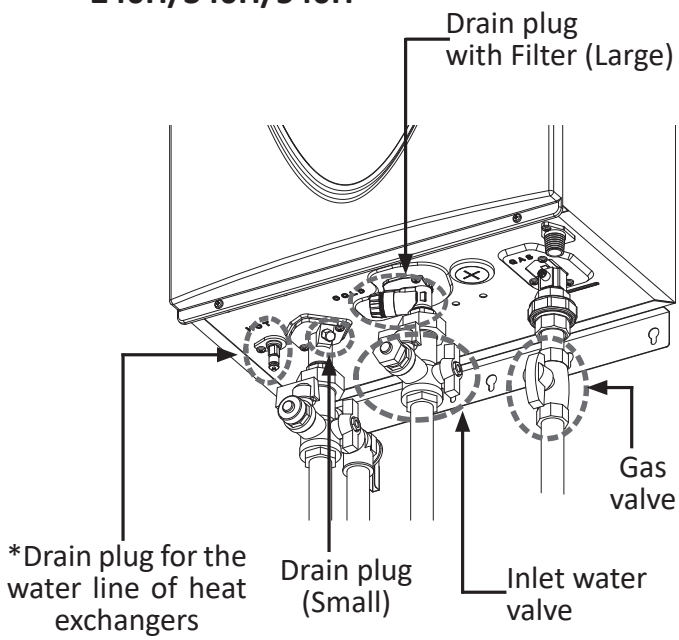
If you will not be using your heater for a long period of time, drain the water out of the unit completely and disconnect power to your heater to keep the water heater from freezing and being damaged.

1. Close the manual gas shutoff valve.
2. Turn off power to the unit and wait a couple of seconds. Turn on again.
3. Wait 30 seconds, and then turn off power to the unit.
4. Close the **inlet** water valve. If the heater is part of an Easy-Link or Multi-Unit System, close the inlet and outlet water valves to isolate the heater. Then proceed to step 5.
5. Open all hot water taps in the house. When the residual water flow has ceased, close all hot water taps.
6. Have a bucket or pan to catch the water from the unit's drain plugs. If isolation valves are installed, open the drains to drain the water. If isolation valves are not installed, unscrew the filters and open the pressure relief valve to drain all the water out of the unit. Do not lose the o-rings that will be on the two filter caps.
7. In addition to the large and small drain plugs, the model has another drain plug that drains the small line that covers the water line between the primary and secondary heat exchangers*. Unscrew this drain plug to drain the water line as well.
8. Securely screw the drain plugs back into place. **Hand- tighten only**.

140H



240H/340H/540H

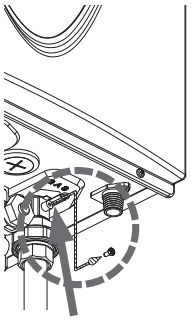


MEASURING INLET GAS PRESSURE

WARNING

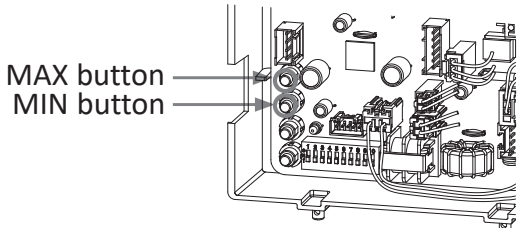
1. Turn off all electric power to the water heater if service is to be performed.
2. Turn the manual gas valve located on the outside of the unit to the off position.
3. Failure to follow these steps could lead to fire or explosion, resulting in personal injury or death.

The water heater cannot perform properly without sufficient inlet gas pressure. Below are instructions on how to check the inlet gas pressure. **ONLY A LICENSED PROFESSIONAL SHOULD PERFORM THE PROCEDURE BELOW.**

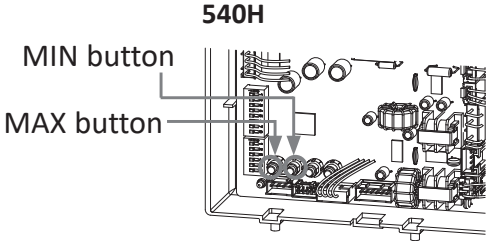

Pressure port

1. Shut off the manual gas valve on the gas supply line.
2. Remove the screw from the pressure port which is located on the gas inlet of the water heater shown in the diagram on the right.
3. Connect the manometer to the pressure port and zero the manometer.
4. Re-open the manual gas valve. Verify that there are no gas leaks.
5. With all gas burning equipment off, take a reading of the static gas pressure and make a note of it.
6. Measure gas supply pressure at maximum heater operation: Open hot water faucets to create maximum flow. Press the MAX button on the computer board. (Refer to the diagrams below.) Take a reading of the supply dynamic gas pressure with all gas burning equipment running at maximum rate.
7. The static and dynamic pressures should be within the ranges specified on the heater's rating plate and the table on page 30.
8. The difference of static to dynamic pressure should not exceed 1.5" W.C. Pressure drops that exceed 1.5" W.C. can indicate restricted gas flow, undersized gas lines, and/or undersized supply regulators. (NOTICE: In Canada, the pressure drops cannot exceed those specified in CSA B149.1.)
9. Measure gas supply pressure at minimum heater operation: Reduce water flow so the heater is running at minimal operation. Press the MIN button on the computer board. (Refer to the diagrams below.) Take a supply gas pressure reading and verify that it is within the specified inlet gas pressure range.

140H/240H/340H

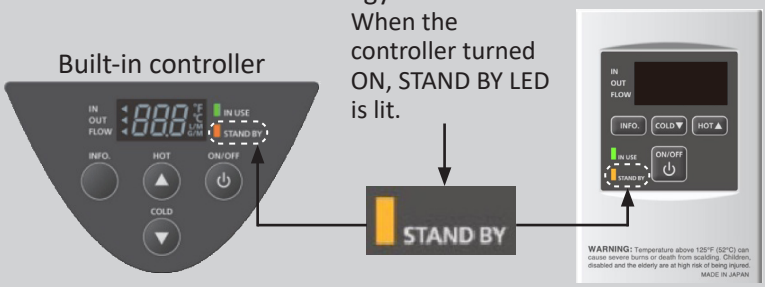
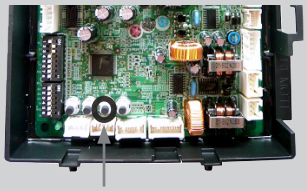


540H



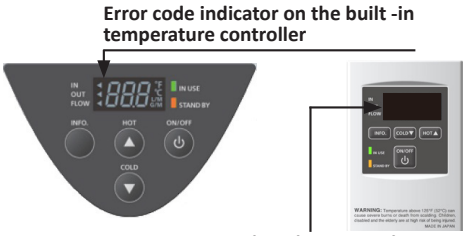
TROUBLESHOOTING

	PROBLEM	SOLUTIONS
TEMPERATURE and AMOUNT OF HOT WATER	It takes a long time to get hot water at the fixtures.	• The time it takes to deliver hot water from the water heater to your fixtures depends on the length of piping between the two. The longer the distance or the bigger the pipes, the longer it will take to get hot water. • If you would like to receive hot water to your fixtures more quickly you may want to consider a hot water recirculation system. (p. 41)
	The water is not hot enough.	• Compare the flow and temperature. See the charts on pp. 74 and 75. • Check cross plumbing between the cold water lines and hot water lines. • Is the gas supply valve open fully? (p. 45) • Is the gas line sized properly? (p. 31) • Is the gas supply pressure sufficient? (pp. 30 and 56) • Is the set temperature set too low? (pp. 50 and 52) • Check if the POU mixing valve are set correctly, if they are installed.
	The water is too hot.	• Is the set temperature set too high? (pp. 50 and 52)
	The hot water is not available when a fixture is opened.	• Make sure the unit has 120 VAC, 60 Hz power supply. • If you are using the remote controller and/or temperature controller, is the power button turned on? • Is the gas supply valve open fully? (p. 45) • Is the water supply valve open fully? (p. 45) • Is the filter on the cold water inlet clean? (p. 54) • Is the hot water fixture sufficiently open to draw at least 0.5 GPM (1.9 L/min) through the water heater? (p. 49) • Is the unit frozen? (p. 53) • Is there enough gas in the tank / cylinder? (For Propane models)
	The hot water turns cold and stays cold.	• Is the flow rate enough to keep the water heater running? (p. 49) • If there is a recirculation system installed, does the recirculation line have enough check valves? (p. 41) • Is the gas supply valve open fully? (p. 45) • Is the filter on the cold water inlet clean? (p. 54) • Are the fixtures clean of debris and obstructions? • Check if the flow rate is too low. (p. 49)
	Fluctuation in hot water temperature.	• Is the filter on the cold water inlet clean? (p. 54) • Is the gas line sized properly? (p. 31) • Is the supply gas pressure sufficient? (pp. 30 and 56) • Check for cross connection between the cold water lines and hot water lines.
WATER HEATER	Unit does not ignite when water goes through the unit.	• Is the flow rate over 0.5 GPM (1.9 L/min)? (p. 49) • Check for the filter on the cold water inlet. (p. 54) • Check for reverse connection and cross connection. • If you use the remote controller and/or built-in controller, is the power button turned on? • Check if the inlet temperature is too high. If it is too close to the set temperature, the water heater will not activate.
	The fan motor is still spinning after operation has stopped.	• This is normal. After operation has stopped, the fan motor keeps running from 15 to 70 seconds in order to re-ignite quickly, as well as purge all the exhaust gas out of the flue.
	Unit sounds abnormal while in operation	• Contact the manufacturer at 1-877-737-2840 (USA) 1-888-479-8324 (Canada).

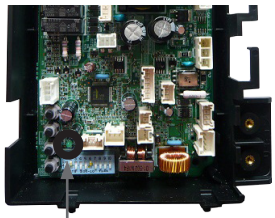
	PROBLEM	SOLUTIONS
BUILT-IN CONTROLLER AND REMOTE CONTROLLER	Controller does not display anything when the power button is turned on.	• Make sure the unit is supplied with power. • Make sure the connection to the unit is correct. (pp. 36 and 37) NOTICE: When the unit has not operated for five minutes or more, the display of the controllers turns off to conserve energy. Built-in controller When the controller turned ON, STAND BY LED is lit.  Although the controller of the parent unit will display the set temperature at the Easy-Link System, the controller of the child unit will not display the set temperature.
	An ERROR code is displayed.	• Please see pp. 58 to 61.
EASY-LINK SYSTEM 540H model only	How are the unit numbers assigned?	• For an Easy-Link System, the Parent unit is always labeled #1 and all other subsequent Child units are numbered randomly. • To check which numbers are assigned to which Child units, push the increase button on the computer board of any Child unit as shown below. The unit number will be displayed on the temperature controller of the Child unit and/or the remote controller of the Child unit, if installed. (Refer to pp. 38 and 39.)  Increase button to check unit number

ERROR CODES

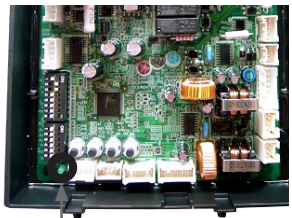
- The units have self-diagnostic functions for safety and convenience when troubleshooting.
- If there is a problem with the installation or the unit, the error code will be displayed on the built-in controller and remote controller. The green LED on the computer board will flash in a pattern shown on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



140H/240H/340H



540H



Error code on the computer board
Indicated by 1/2-second flashes on the Green LED.

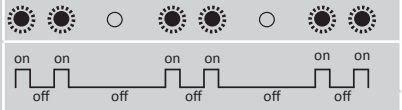
-Single unit Installation-

Example: If your unit has a "321" error code (which signifies an inlet thermistor failure)

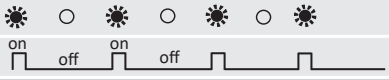
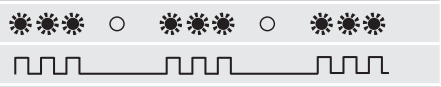
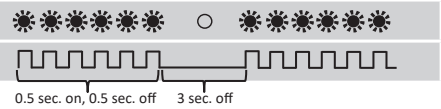
- **Indicator on the built-in controller or remote controller :** "321" will be displayed on the screen.

Error code

- **Green LED on the computer board:** The green LED on the computer board will indicate this code with two flashes with a 1/2 second pause in between. The pattern will repeat with a three second pause between patterns.

Error code	Green LED
321	

Error Indication

Error Code on the temperature controller	Green LED	
	The number of flashes	Flash pattern
031 701 711	One	
311 321 331 341 391 441	Two	
111 121	Three	
611 651 661	Four	
101 291 941 991	Five	
510 551 721	Six	

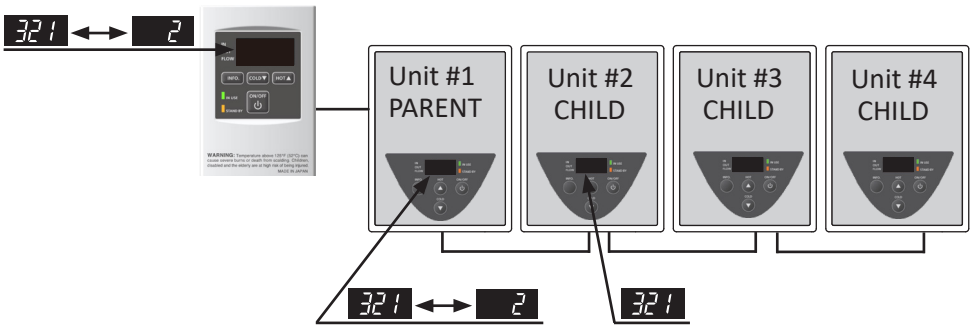
-Easy-Link System-
(540H model only)

Error codes will be displayed differently with units installed in an Easy-Link System. The built-in/remote controller installed in a PARENT unit will show both the error code and which unit has the error code. Below is an example of how an error code of "321" is displayed in an Easy-Link System.

Example: If Unit #2 has the "321" error code (inlet thermistor failure)

Indoor model installation

Indicator on the built-in and/or remote controller of Parent unit*: "321" and "2" will alternately flash on the display.

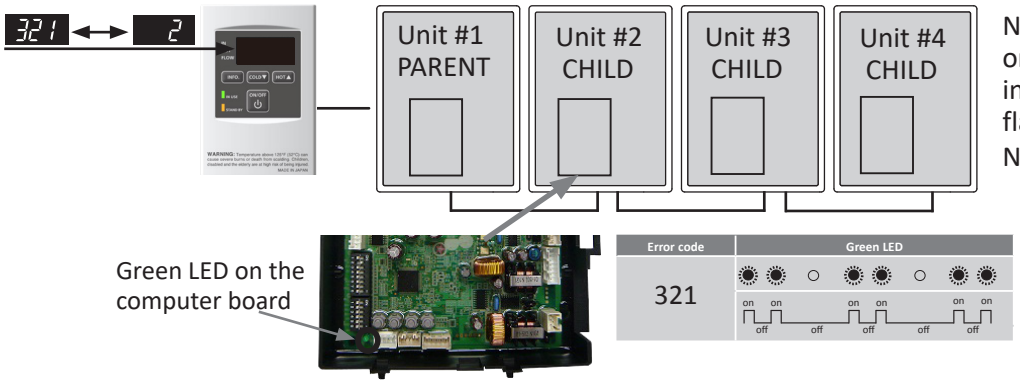


Unit #2: "321" will flash intermittently on the display. The green LED on the computer board will flash twice, just like in the single unit example.
Unit #3 and #4: These units will not display anything.

*If the remote controller is connected to the Parent unit, the remote controller has priority over the built-in controllers.

Outdoor model installation

Indicator on the remote controller of Parent unit (If it is installed): "321" and "2" will alternately flash on the display.



No. 2 Unit: The green LED on the computer board will indicate this code with two flashes every 1/2 second.
No. 3&4 Unit: No sign.

-Fault Analysis of Error Codes-

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

Controller	Green LED	Malfunction description	Diagnosis
031	One Flash	Incorrect DIP switch setting	• Check the DIP switch settings on the PCB (Part #701).
101	Five Flashes	Warning for the "991" error code	• Ensure the gas type of the water heater matches the gas supplied. • Inspect the environment around the water heater. Determine how long the unit has been installed. • Ensure the heater altitude DIP switches are properly set to match the installed altitude. • Check if there is any blockage in the intake air and/or exhaust. • If the water heater is installed as a direct-vent system, check whether there is enough distance between the intake air terminal and the exhaust terminal. • Check if there is grease and/or dirt in the burner (Part #101) and the fan motor (Part #103), especially if the water heater has been installed in a contaminated area.
111*	Three Flashes	Ignition failure	• Check if the Hi-limit switch (Part #412) is properly functioning. • Check for connection/breakage of wires (Part #413, 708, 709, 711) burn marks on the computer board (Part #701), and/or soot on the flame rod (Part #108). • Check if there is a buzzing spark ignition sound coming from the burner (Part #101) when the water heater prepares for combustion. • Listen for the double "clunk" sound coming from gas valve assembly (Part #102) when water heater goes into combustion. • Check if there is leaking from heat exchanger (Part #401).
121*	Three Flashes	Loss of flame	• Check if the Hi-limit switch (Part #412) is functioning properly. • Check for connection/breakage of wires (Part #413, 708, 709, 711) burn marks on the computer board (Part #701), and/or soot on the flame rod (Part #108). • Check if there is leaking from heat exchanger (Part #401).
291	Five Flashes	Blocked condensate drain system	• Check for and remove any blockage in the condensate drain line, neutralizer (if installed), condensate drain assembly inside the water heater (part #416, 421, 423). • Ensure that any horizontal drain line runs are sloped downward. Removal any sags in the drain line.
311*	Two Flashes	140H/240H/340H: Outlet Thermistor Failure 540H: Heat Exchanger Thermistor Failure	• Check for connection/breakage of wires and/or debris on thermistor (Part #407, 408, 411, 715).
321*	Two Flashes	Inlet thermistor failure	

*These error codes will be cleared when water flow stops.

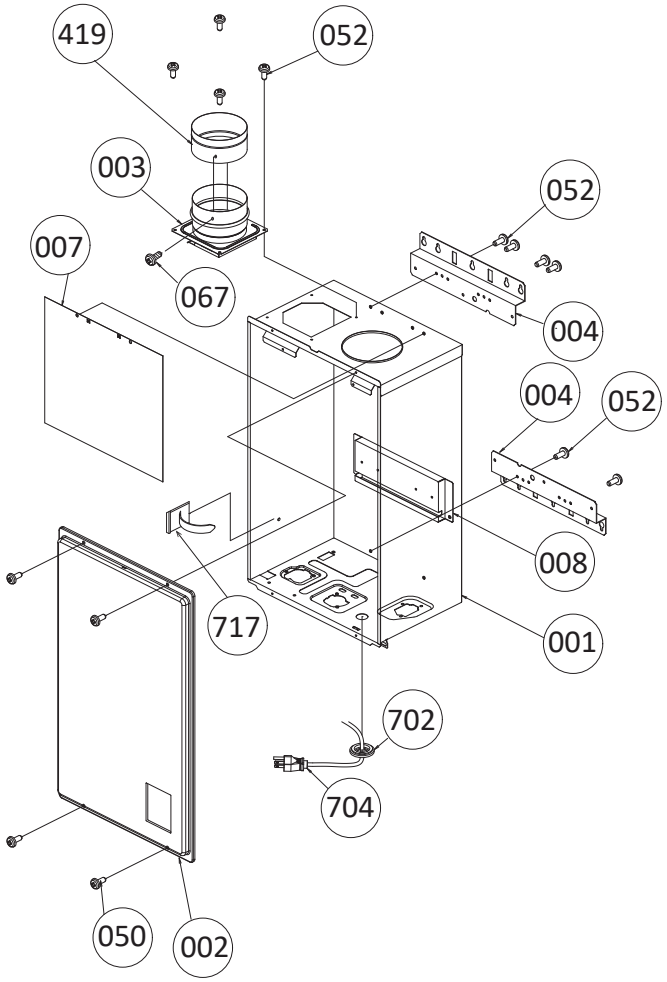
Controller	Green LED	Malfunction description	Diagnosis
331*	Two Flashes	Outlet thermistor failure (540H only)	• Check for connection/breakage of wires and/or debris on thermistor (Part #407, 408, 411, 715, 718 721).
341*	Two Flashes	Exhaust thermistor failure (Indoor models only)	
391*	Two Flashes	Air-fuel ratio rod failure	• Check for connection/breakage of wires (Part #709) and/or soot on the AFR rod (Part #108).
441	Two Flashes	Flow sensor failure (Easy-Link System only)	• Check for connection/breakage of wires and/or debris on the flow sensor impeller (Part #402). • Verify the shutoff valves on the hot and cold water line to the water heater are open. • Inspect the filter for blockage/debris. Refer to the procedure on p.51.
510	Six Flashes	Abnormal main gas solenoid valve	• Check for connection/breakage of wires (Part #708) and/or burn marks on the computer board (Part #701).
551	Six Flashes	Abnormal gas solenoid valve	• Check for connection/breakage of wires (Part #708) and/or burn marks on the computer board (Part #701).
611*	Four Flashes	Fan motor fault	• Check for connection/breakage of wires, dust buildup in the fan motor (Part #103) and/or burn marks on the computer board (Part #701). • Check for frozen/corrosion of connectors (Part #103).
651*	Four Flashes	Flow adjustment valve fault (Easy-Link System only)	• Inspect the flow adjustment valve (Part #402), for connection/breakage of wires, locked motor drive due to scale buildup, and/or water leakage.
661*	Four Flashes	Bypass valve fault (540H only)	• Inspect the bypass valve (Part #403), for connection/breakage of wires, locked motor drive due to scale buildup, and/or water leakage.
701*	One Flash	Computer board fault	• Check for connection/breakage of wires (Part #714).
711*	One Flash	Gas solenoid valve drive circuit failure	• Refer to the 111 and 121 error codes.
721*	Six Flashes	False flame detection	• For indoor models, check if condensate drain is installed on the vent collar of the water heater. • Check if there is leaking from heat exchanger (Part #401).
741	N/A	Miscommunication between water heater and remote controller	• Check the model type of the remote controller. • Inspect the connections between the water heater and remote controller. • Check the power supply of the water heater.
751	N/A	Miscommunication between water heater and built-in controller (Indoor models only)	• Inspect the connections between the water heater and built-in controller. • Check the power supply of the water heater.
761	N/A	Miscommunication in Easy-Link System	• Check if the connections between the parent unit and the child units are correct. Refer to pp. 38 to 39. • Check that power is on to all heaters.
941	Five Flashes	Abnormal exhaust temperature (Indoor models only)	• Check if the set temperature is higher than 140 °F (60 °C) and the system is Recirculation. • Check for connection/breakage of wires, dust buildup in the fan motor (Part #103). • Check for connection/breakage of wires of the hi-limit switch for exhaust (Part #472, 721).
991	Five Flashes	Imperfect combustion	• Check the gas type of the water heater. • Inspect the environment around the water heater. Determine how long the unit has been installed. • Check the altitude/elevation of the area where the water heater is installed. • Check if there is any blockage in the intake air and/or exhaust. • If the water heater is installed as a direct-vent system, check whether there is enough distance between the intake air terminal and the exhaust terminal. • Check if there is grease and/or dirt in the burner (Part #101) and the fan motor (Part #103), especially if the water heater has been installed in a contaminated area.

*These error codes will be cleared when water flow stops.

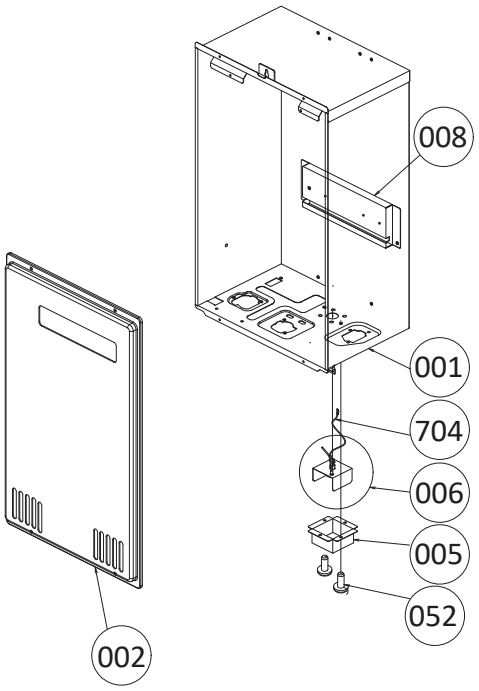
COMPONENTS DIAGRAM

Case assembly

140H Indoor

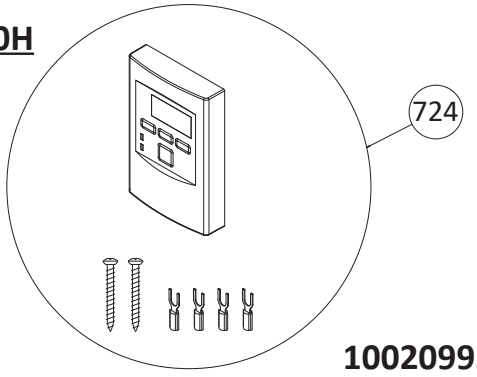


140H Outdoor



Temperature remote controller

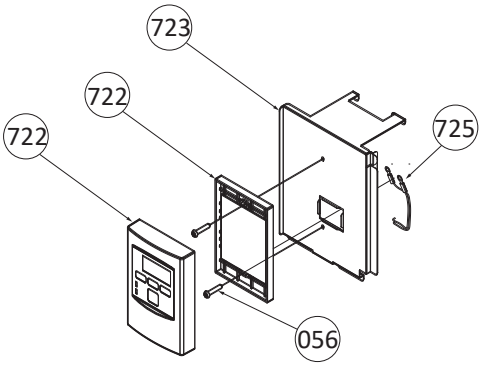
140H



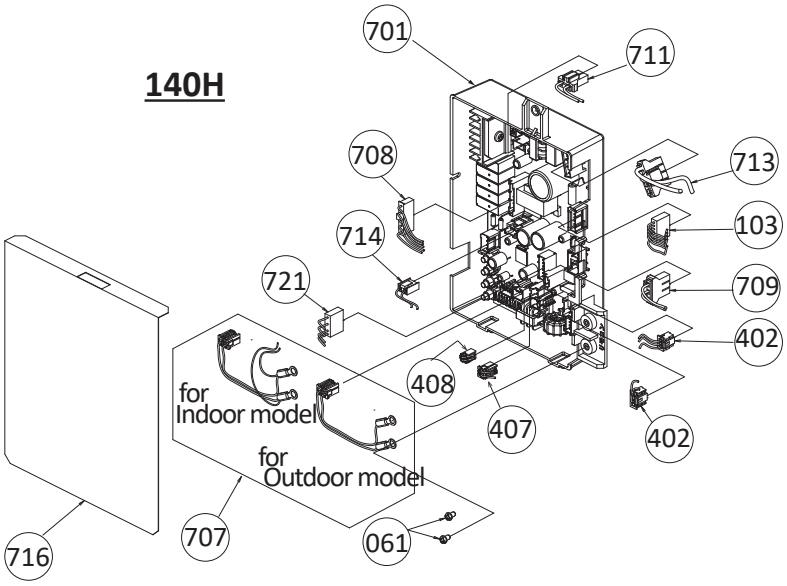
100209924

Built-in controller

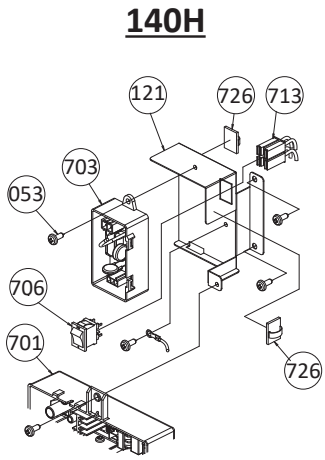
140H Indoor



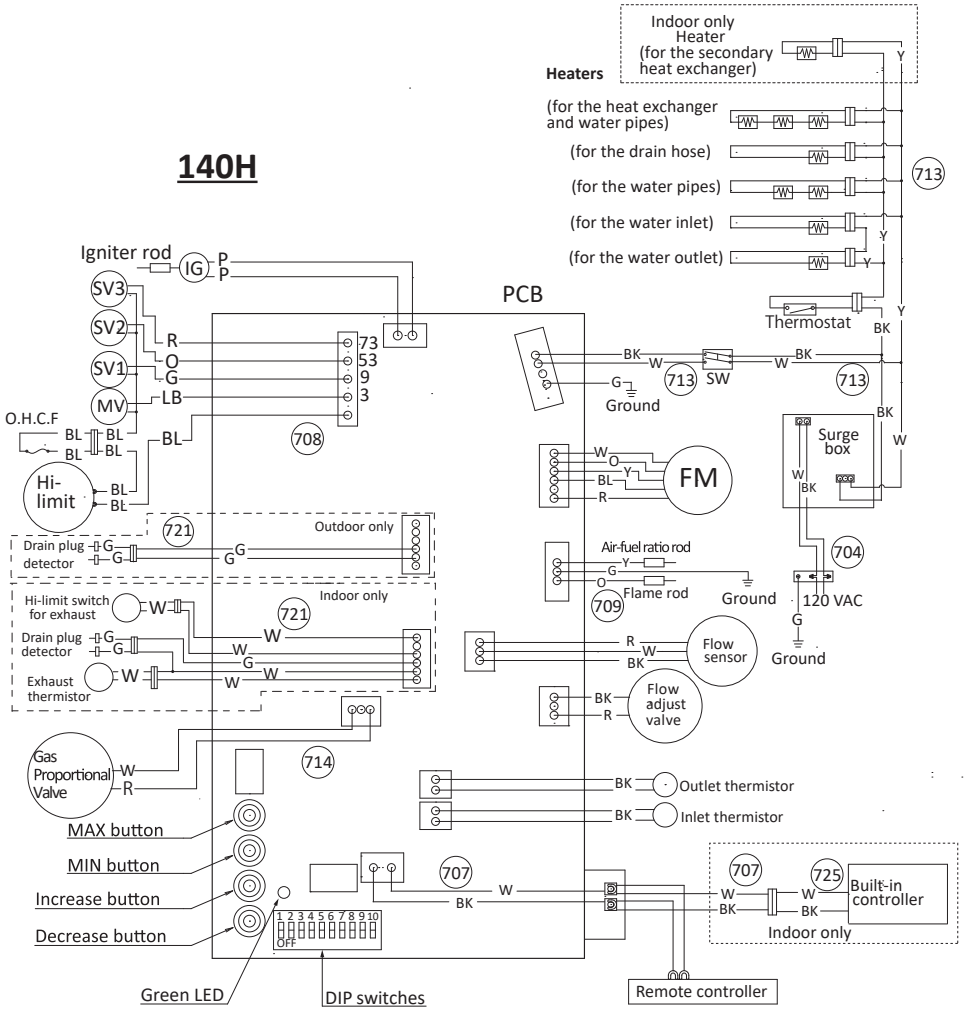
Computer board assembly



Surge box assembly

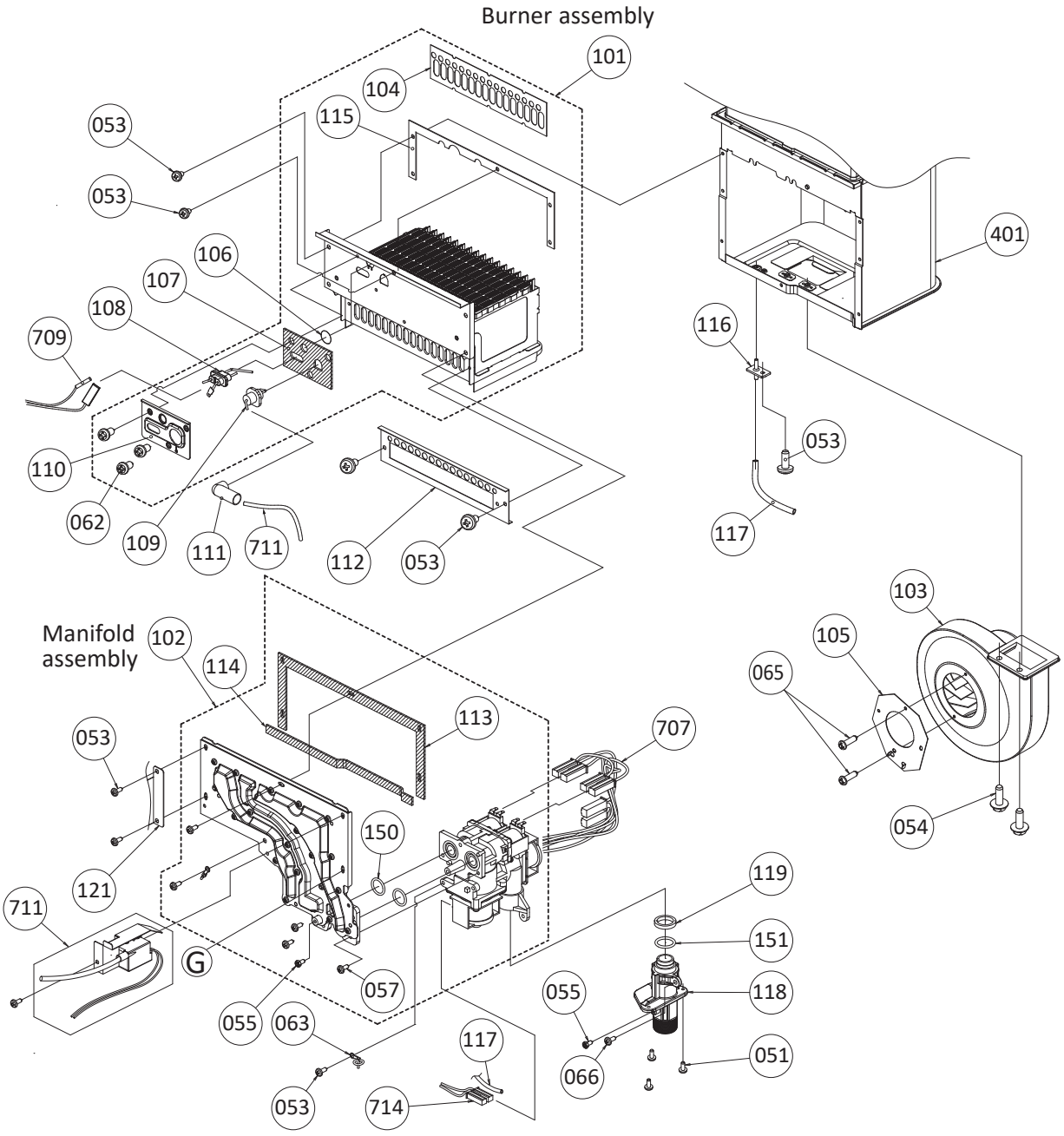


Wiring diagram



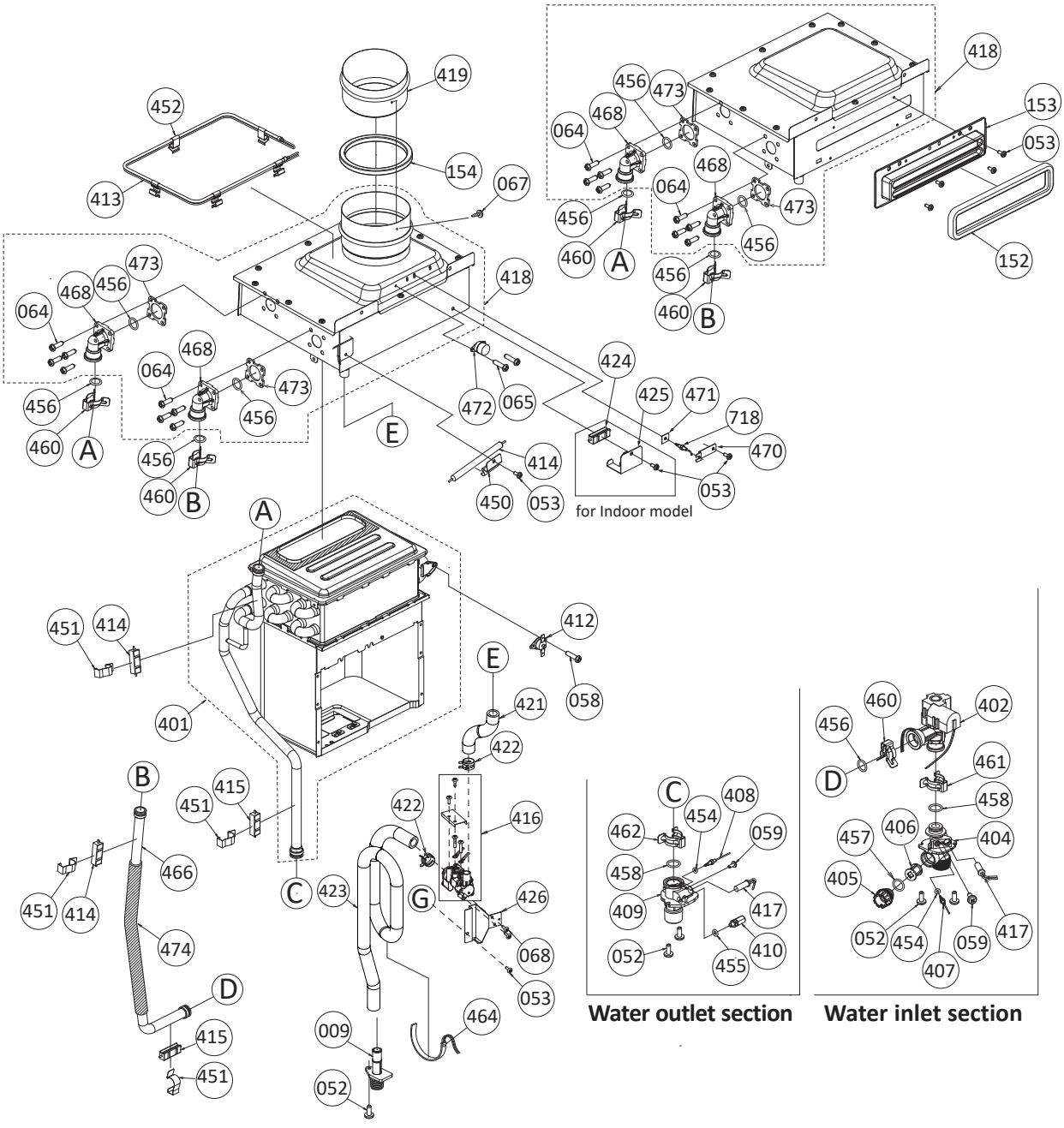
Burner assembly

140H



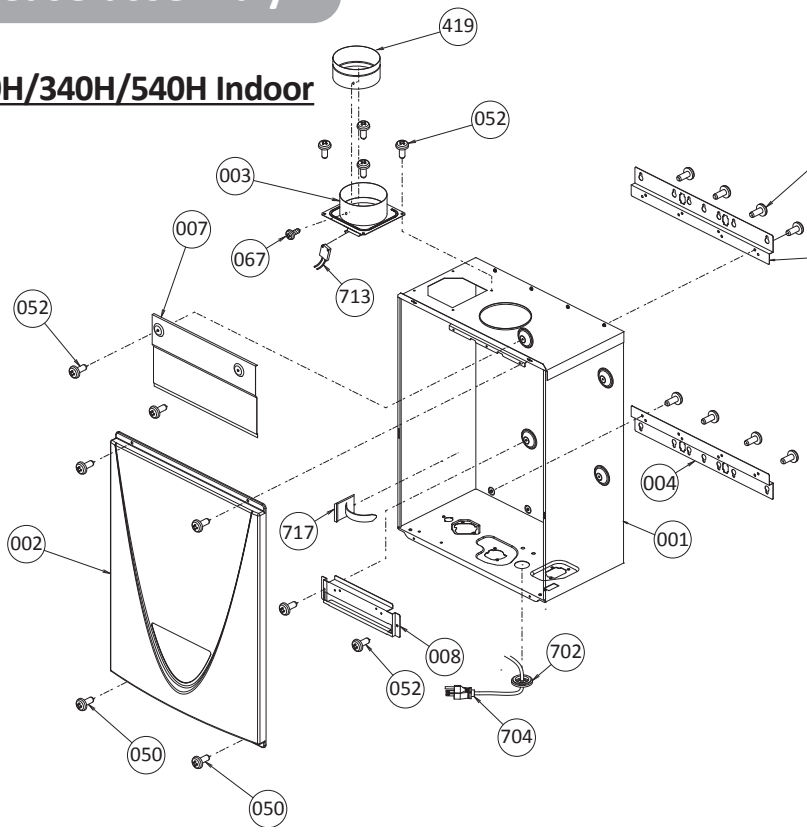
Water Way assembly

140H Indoor **140H Outdoor**

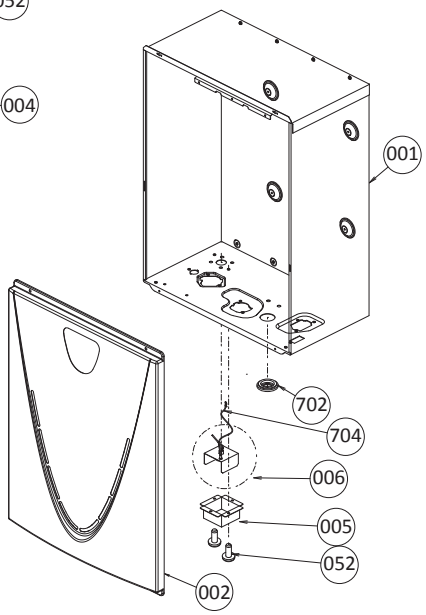


Case assembly

240H/340H/540H Indoor

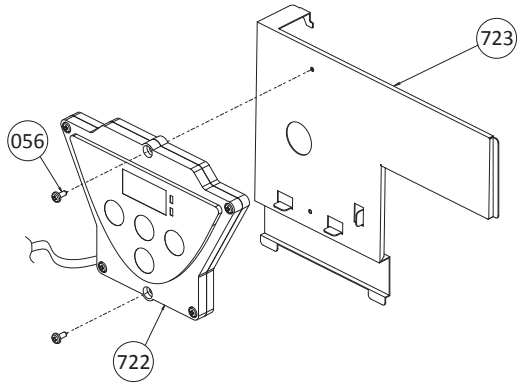


240H/340H/540H Outdoor



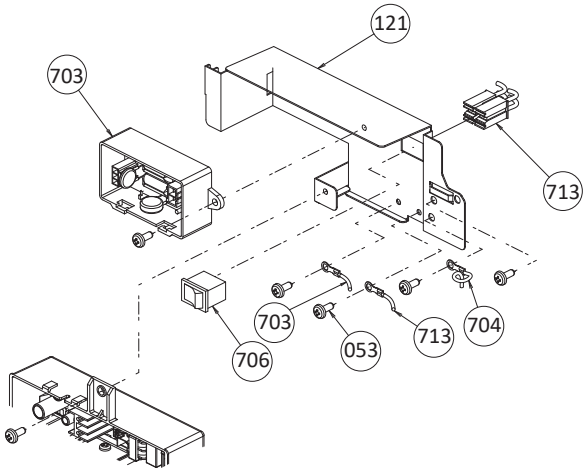
Built-in controller

240H/340H/540H Indoor



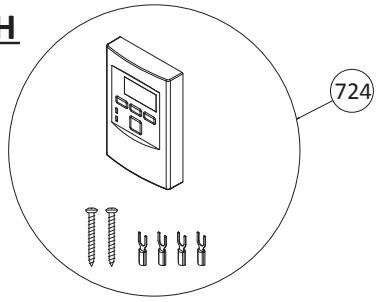
Surge box assembly

240H/340H/540H



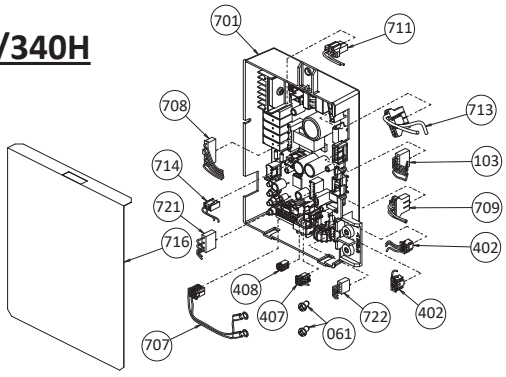
Temperature remote controller

240H/340H/540H

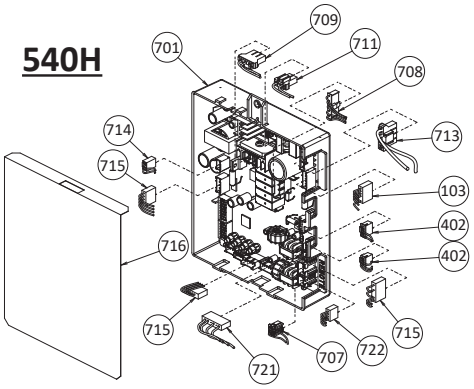


Computer board assembly

240H/340H

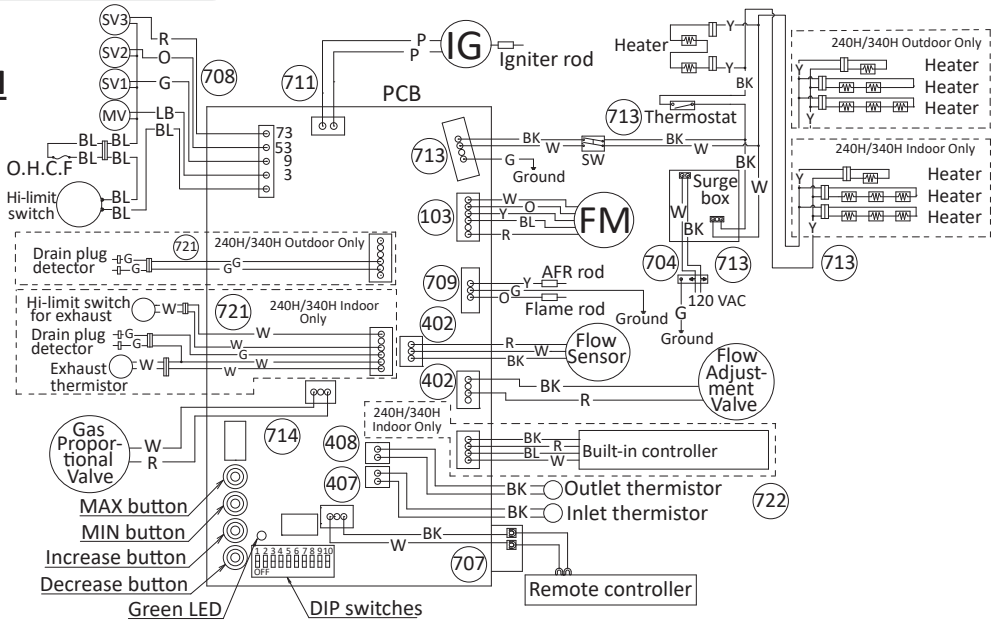


540H

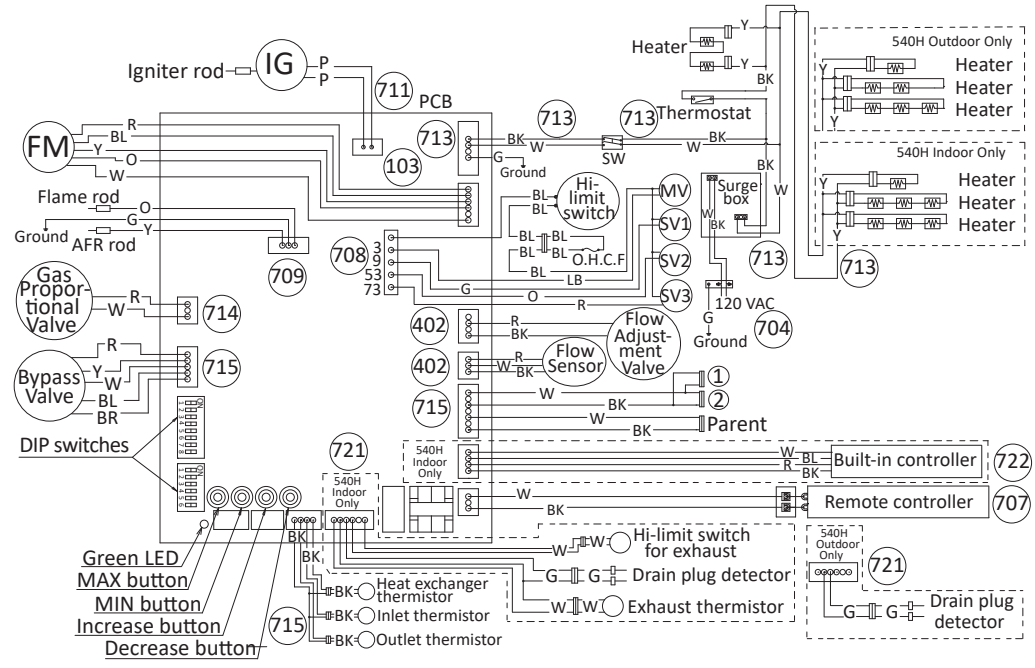


Wiring diagram

240H/340H

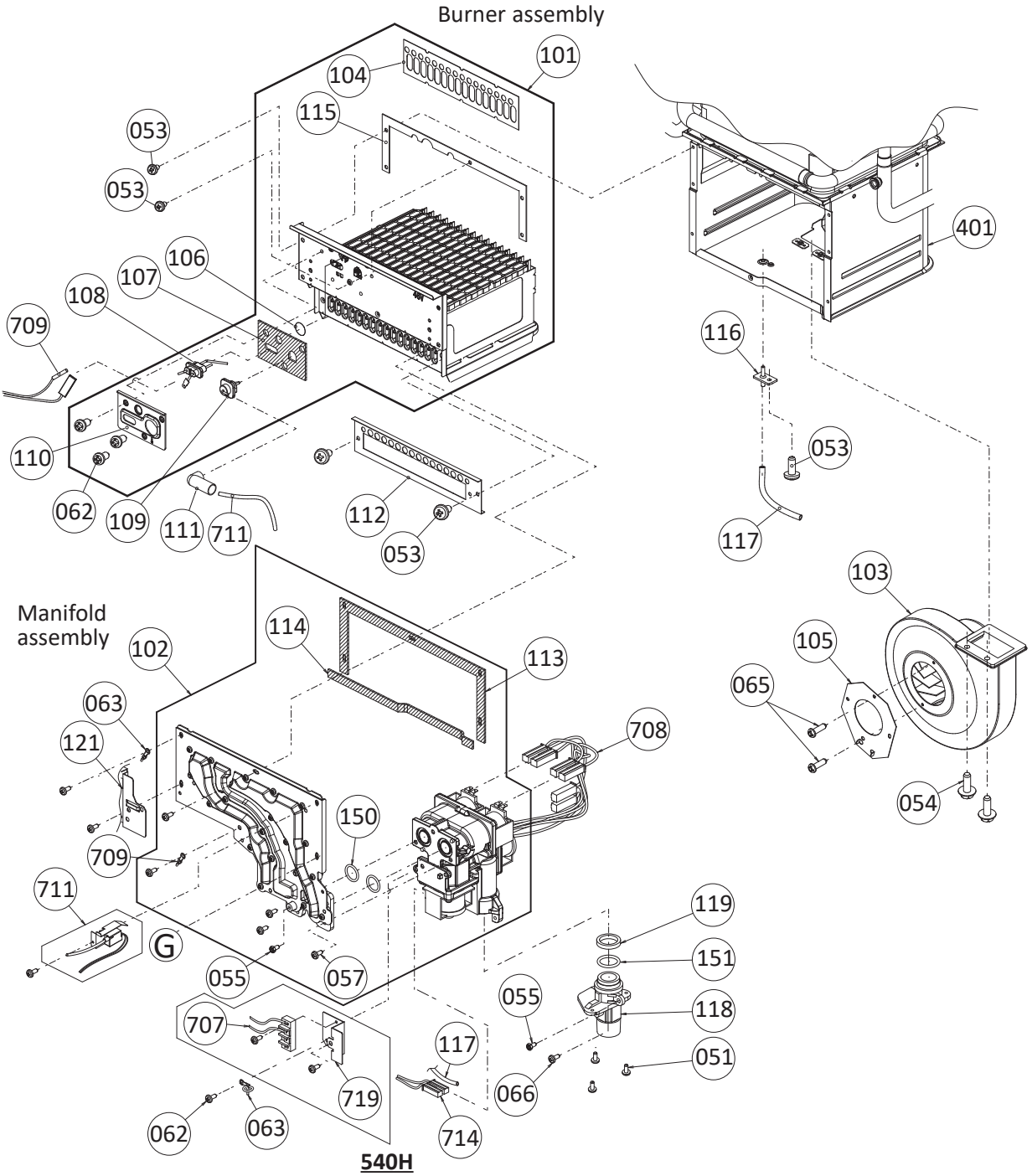


540H



Burner assembly

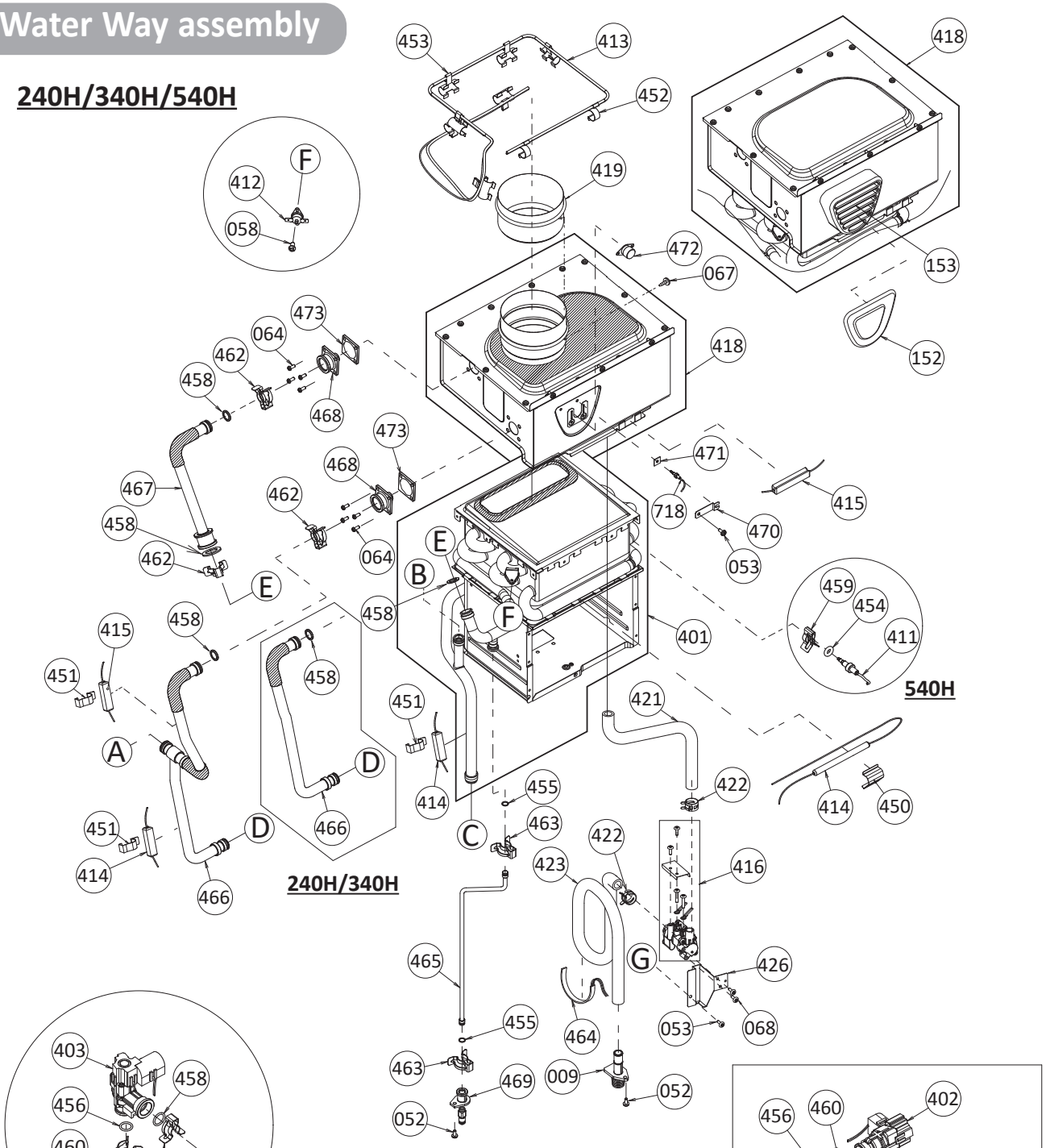
240H/340H/540H



540H

Water Way assembly

240H/340H/540H



PARTS LIST

Item #	Description	Model			
		140H	240H	340H	540H
001	Case assembly Indoor	N/A			
	Case assembly Outdoor	N/A			
002	Front cover Indoor	N/A	100074663		100074665
	Front cover Outdoor	N/A	100074664		100074666
003	Intake air port assembly	100076311	100074667		
004	Bracket	N/A			
005	Junction box	100074668	100074668		
006	Power supply cord assembly	100076313	100074669		
007	Back guard panel	N/A			
008	Chamber fixing plate	N/A			
009	Condensate drain port	100074203			
050	Truss screw M4X2 (W/Washer) SUS410	100074210			
051	Truss screw M4×10 (W/Washer)	100074509			
052	Truss screw M4×10 (Coated) SUS3	100074211			
053	Truss screw M4×10 SUS	100074245			
054	Hex head screw M4×12 (W/Washer) SUS3	100074510			
055	Hex head screw M4x8 FEZN	100074248			
056	Pan screw M4x20	N/A			
057	Tap tight screw M4x12 FEZN	100074385			
058	Pan head screw M3x6 SUS3	100074272			
059	Truss head screw M4x6 SUS3	100074512			
061	Screw M3x6 Plus bind FEZN	N/A			
062	Pan screw M4x8 MFZN	100074244			
063	Wire clamp 60	100074233			
064	Truss tapping screw M4x10 (S coated)	N/A			
065	Screw M3x6 SUS3 Binding head	100074514			
066	Pan screw M4x10	100074247			
067	Pan screw M4x10 for 3” adapter	N/A			
068	Plus truss P tight M3.5x12	N/A			

Item #	Description	Model			
		140H	240H	340H	540H
101	Burner assembly	100076314	100074670		
102	Manifold with gas valve assembly LP	100337320	100074671		
	Manifold with gas valve assembly NA	100337321	100074672		
103	Fan motor for Indoor model	100074606			
	Fan motor for Outdoor model	100074228			
104	Burner gasket	100074216			
105	Fan damper for Indoor model (140H: Outdoor)	100074466			
	Fan damper for Indoor model (140H)	100076511	N/A		
106	Burner window	100074218			
107	Rod holder gasket	100074219			
108	Flame rod	100074673			
109	Igniter rod	100076318	100074222		
110	Rod holder	100074221			
111	Rod cap	100076319	100074223		
112	Burner damper LP (240H/340H/540H)	N/A	100074674		
	Burner damper NA (240H/340H/540H)	N/A	100074675		
	Burner damper Indoor (140H)	100076320	N/A		
	Burner damper Outdoor (140H)	100076321	N/A		
113	Manifold gasket A	100074229			
114	Manifold gasket B	100074230			
115	Burner holder gasket	100074217			
116	Pressure port	100074227			
117	Combustion chamber tube	100074528			
118	Gas inlet	100076323	100074616		
119	Gas inlet ring	100074234	100074526		
121	Surge box plate	N/A	N/A		
150	O-ring P18 NBR (Black)	100074533			
151	O-ring P20 NBR (Black)	100074242			
152	Silicon ring for Outdoor models	100074553	100074678		
153	Exhaust port for Outdoor models	100074306	100074679		
154	Silicon ring (140H)	100074250	N/A		
401	Primary heat exchanger assembly	100076510	100074698		100074699
402	Flow adjustment valve / Flow sensor	100074624			
403	Bypass valve (540H)	N/A			100074625
404	Water inlet	100074377			
405	Inlet drain plug	100074381			
406	Inlet water filter	100074382			
407	Inlet thermistor	100074398			100074626
408	Outlet thermistor	100074680			100074374
409	Water outlet	100074627	100074681		
410	Outlet drain plug	100074383			
411	Heat exchanger thermistor (540H)	N/A			100074281

Item #	Description	Model			
		140H	240H	340H	540H
412	Hi-Limit switch	100074412			100074280
413	Overheat-cut-off fuse	100074252	100074334		
414	Pipe heater	100076325	100074682		
415	Inlet heater for Indoor model	100076326	100074683		
	Inlet heater for Outdoor model (240H/340H/540H)	N/A	100074684		
416	Drain plug detector assembly	100342423			
417	Inlet heater	100074629			
418	Secondary heat exchanger for Indoor model	100076507	100074700		
418	Secondary heat exchanger for Outdoor model	100076508	100074701		
419	3” PVC adapter	100310706			
421	Upper drain tube	N/A			
422	Band A	N/A			
423	Lower drain tube	N/A			
424	Secondary heat exchanger heater (140H)	100076328	N/A		
425	Heater fixing plate (140H)	N/A	N/A		
426	Drain detector fixing plate	N/A			
450	Pipe heater fixing plate	N/A	100074273		
451	Heater fixing plate 16	100074310			
452	Fuse fixing plate 18 (240H/340H/540H)	N/A	100074251		
	Fuse fixing plate (140H)	N/A	N/A		
453	Fuse fixing plate 14 (240H/340H/540H)	N/A	100074331		
454	O-ring P4 FKM	100076303			
455	O-ring P6 FKM	100076305			
456	O-ring P14 FKM	100076306			
457	O-ring P15 FKM	100076307			
458	O-ring P16 FKM	100076308			
459	Fastener “4-11” (240H/340H/540H)	N/A	100074282		
460	Fastener “14-22”	100074290			
461	Fastener “16A”	100074410			
462	Fastener “16-25A”	100074389			
463	Fastener “6-15” (240H/340H/540H)	N/A	100074297		
464	Flat heater	100074686			
465	Drain tube (240H/340H/540H)	N/A	100074687		
466	Cold pipe	100076509	100074688		100074689
467	Stainless heat exchanger out pipe (240H/340H/540H)	N/A	100074690		
468	Header connection	100076329	100074691		

Item #	Description	Model			
		140H	240H	340H	540H
469	Drain port (240H/340H/540H)	N/A	100074692		
470	Thermistor fixing plate	100074291			
471	Exhaust thermistor gasket	100074296			
472	Hi-limit switch for exhaust	100074289			
473	Gasket	100074693			
474	Inlet pipe packing (140H)	N/A	N/A		
701	Computer board	100342808	100342802	100342801	100342430
702	Rubber grommet	N/A	100076470		
703	Surge box	100076100			
704	120 VAC wire for Indoor model	100074601			
704	120 VAC wire for Outdoor model	100074697			
706	120 VAC Power ON-OFF switch	100074326			
707	Remote controller wire (240H/340H/540H)	N/A	100074649		100074650
	Remote controller wire for Indoor model (140H)	100076337	N/A		
	Remote controller wire for Outdoor model (140H)	100074634	N/A		
708	Gas valve wire	100076340	100074651		
709	Flame rod wire	100076341	100074652		
711	Igniter assembly	100076342	100074640		
713	Switch wire with thermostat for Indoor model	100342431			
	Switch wire with thermostat for Outdoor model	100342432			
714	Proportional gas valve wire	100074642	100074657		
715	24V cables for 540H model	N/A			100074658
716	Computer board cover	100074375			
717	Cable clamp for Indoor model	N/A			
718	Exhaust thermistor for Indoor model	100074316			
719	Remote fixing plate (540H)	N/A			100074644
721	Exhaust Hi-limit switch wire for Indoor	100342433			
	Drain plug wire	100342434			
722	Built-in controller for Indoor model	100076567	100074660		
723	Fixing plate	N/A	100074661		
724	Temperature remote controller	100209924			
725	Built-in controller connection wire (140H)	100076471	N/A		
726	Nylon clamp FC6 (140H)	N/A	N/A		
	Communication cable for Easy-Link (540H)*	N/A			100076516

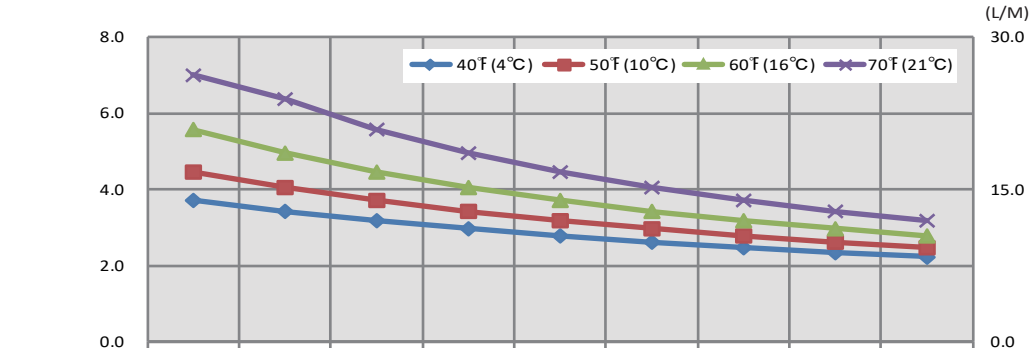
*Refer to page 9.

OUTPUT TEMPERATURE CHART

These charts are based on properly sized gas lines and installation at 0-2,000 ft (0-610m). The water heater will de-rate approximately 4% per 1,000 ft (305 m) of elevation increase above 2,000 ft (914 m).
To reduce the risk of scalding, install Thermostatic Mixing Valves (temperature limiting valves) at each point of use.

140H model

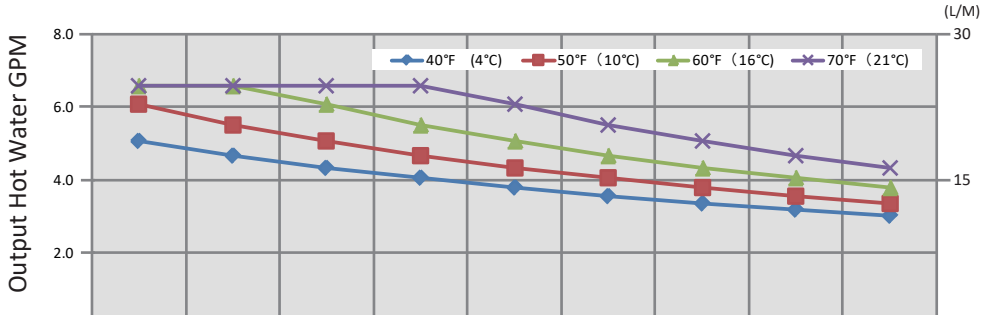
Output Temperature vs. GPM (Max. 7.0 GPM) with Various Inlet Water temperature



	100 (38)	105 (40)	110 (43)	115 (45)	120 (50)	125 (52)	130 (55)	135 (57)	140 (60)
40℉ (4℃)	3.7 (14.1)	3.4 (13.0)	3.2 (12.1)	3.0 (11.3)	2.8 (10.6)	2.6 (9.9)	2.5 (9.4)	2.3 (8.9)	2.2 (8.4)
50℉ (10℃)	4.5 (16.9)	4.1 (15.4)	3.7 (14.1)	3.4 (13.0)	3.2 (12.1)	3.0 (11.3)	2.8 (10.6)	2.6 (9.9)	2.5 (9.4)
60℉ (16℃)	5.6 (21.1)	5.0 (18.8)	4.5 (16.9)	4.1 (15.4)	3.7 (14.1)	3.4 (13.0)	3.2 (12.1)	3.0 (11.3)	2.8 (10.6)
70℉ (21℃)	7.0 (26.5)	6.4 (24.1)	5.6 (21.1)	5.0 (18.8)	4.5 (16.9)	4.1 (15.4)	3.7 (14.1)	3.4 (13.0)	3.2 (12.0)

240H model

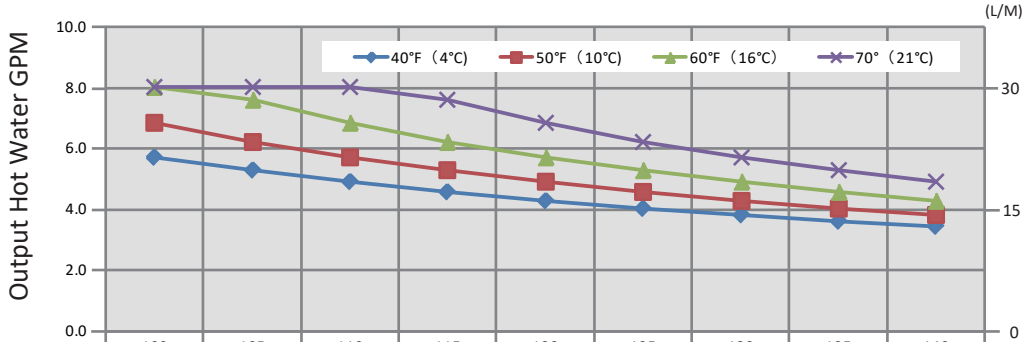
Output Temperature vs. GPM (Max. 6.6 GPM) with Various Inlet Water temperature



Incoming temp. \ Set temp.°F(°C)	100 (38)	105 (40)	110 (43)	115 (45)	120 (50)	125 (52)	130 (55)	135 (57)	140 (60)
40°F (4°C)	5.1 (19.2)	4.7 (17.7)	4.3 (16.4)	4.1 (15.3)	3.8 (14.4)	3.6 (13.5)	3.4 (12.8)	3.2 (12.1)	3.0 (11.5)
50°F (10°C)	6.1 (23.0)	5.5 (20.9)	5.1 (19.2)	4.7 (17.7)	4.3 (16.4)	4.1 (15.3)	3.8 (14.4)	3.6 (13.5)	3.4 (12.8)
60°F (16°C)	6.6 (25.0)	6.6 (25.0)	6.1 (23.0)	5.5 (20.9)	5.1 (19.2)	4.7 (17.7)	4.3 (16.4)	4.1 (15.3)	3.8 (14.4)
70°F (21°C)	6.6 (25.0)	6.6 (25.0)	6.6 (25.0)	6.6 (25.0)	6.1 (23.0)	5.5 (20.9)	5.1 (19.2)	4.7 (17.7)	4.3 (16.4)

340H model

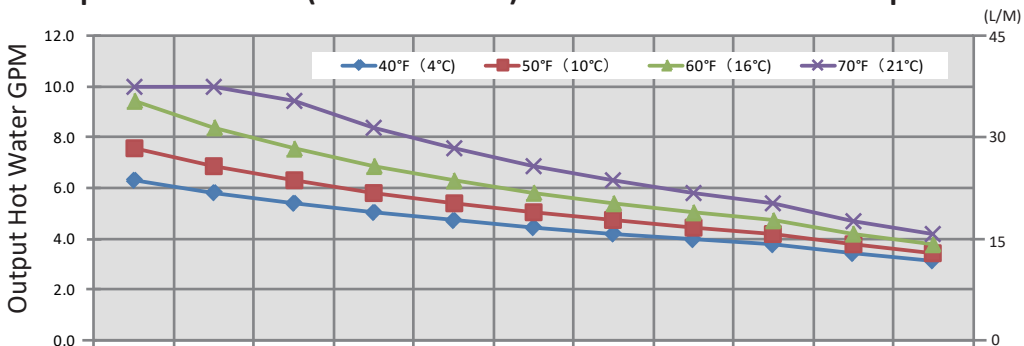
Output Temperature vs. GPM (Max. 8.0 GPM) with Various Inlet Water temperature



Incoming temp. \ Set temp.°F(°C)	100 (38)	105 (40)	110 (43)	115 (45)	120 (50)	125 (52)	130 (55)	135 (57)	140 (60)
40°F（4°C）	5.7 (21.6)	5.3 (19.9)	4.9 (18.5)	4.6 (17.3)	4.3 (16.2)	4.0 (15.2)	3.8 (14.4)	3.6 (13.6)	3.4 (12.9)
50°F（10°C）	6.8 (25.9)	6.2 (23.5)	5.7 (21.6)	5.3 (19.9)	4.9 (18.5)	4.6 (17.3)	4.3 (16.2)	4.0 (15.2)	3.8 (14.4)
60°F（16°C）	8.0 (30.3)	7.6 (28.8)	6.8 (25.9)	6.2 (23.5)	5.7 (21.6)	5.3 (19.9)	4.9 (18.5)	4.6 (17.3)	4.3 (16.2)
70°（21°C）	8.0 (30.3)	8.0 (30.3)	8.0 (30.3)	7.6 (28.8)	6.8 (25.9)	6.2 (23.5)	5.7 (21.6)	5.3 (19.9)	4.9 (18.5)

540H model

Output Temperature vs. GPM (Max. 10.0 GPM) with Various Inlet Water temperature



Incoming temp. \ Set temp.°F(°C)	100 (38)	105 (40)	110 (43)	115 (45)	120 (50)	125 (52)	130 (55)	135 (57)	140 (60)	150 (65)	160 (70)
40°F（4°C）	6.3 (23.9)	5.8 (22.0)	5.4 (20.4)	5.0 (19.1)	4.7 (17.9)	4.4 (16.8)	4.2 (15.9)	4.0 (15.1)	3.8 (14.3)	3.4 (13.0)	3.2 (11.9)
50°F（10°C）	7.6 (28.6)	6.9 (26.0)	6.3 (23.9)	5.8 (22.0)	5.4 (20.4)	5.0 (19.1)	4.7 (17.9)	4.4 (16.8)	4.2 (15.9)	3.8 (14.3)	3.4 (13.0)
60°F（16°C）	9.5 (35.8)	8.4 (31.8)	7.6 (28.6)	6.9 (26.0)	6.3 (23.9)	5.8 (22.0)	5.4 (20.4)	5.0 (19.1)	4.7 (17.9)	4.2 (15.9)	3.8 (14.3)
70°F（21°C）	10.0 (37.9)	10.0 (37.9)	9.5 (35.8)	8.4 (31.8)	7.6 (28.6)	6.9 (26.0)	6.3 (23.9)	5.8 (22.0)	5.4 (22.4)	4.7 (17.9)	4.2 (15.9)

TO: Hight Jackson Associates
jandrade@hjarch.com

ATTN: Jorge Andrade
RE: Farm Credit - Russellville, AR
Plumbing
DATE: 07/05/2023 JOB NO. 22-166

ELECTRONIC SUBMITTAL WAS REVIEWED AS FOLLOWS:

☒ CUT SHEETS	☐ NO EXCEPTIONS TAKEN	☒ APPROVED
☐ DRAWINGS	☒ NOTE MARKINGS	☐ REJECTED
☐ OTHER	☐ COMMENTS ATTACHED	☐ RESUBMIT
		☐ RESUBMIT only items marked

REMARKS:

Submittal - 22 30 00-01 Plumbing Equipment 1

☐ APPROVED
☐ APPROVED AS CORRECTED
☑ REVIEWED BY CONSULTANT
☐ REVISE AND RESUBMIT
☐ NOT APPROVED
☐ SUPPLEMENTAL HJ COMMENTS

Checking is only for conformance with the design concept of the Project and compliance with the information given in the Contract Documents. Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to the fabrication process or to the techniques of construction; and for coordination of the work of all trades.

BY: Jorge Andrade
DATE: 7/6/2023

Hight Jackson ASSOCIATES

ENGINEER'S REVIEW IS FOR GENERAL CONFORMANCE WITH THE DESIGN CONCEPT AND CONTRACT DOCUMENT. MARKINGS OR COMMENTS SHALL NOT BE CONSTRUED AS RELIEVING THE CONTRACTOR FROM COMPLIANCE WITH THE PROJECT PLANS AND SPECIFICATIONS, NOR DEPARTURE THEREFROM. THE CONTRACTOR REMAINS RESPONSIBLE FOR DETAILS AND ACCURACY, FOR CONFIRMING AND CORRELATING ALL QUANTITIES AND DIMENSIONS, FOR SELECTING FABRICATION PROCESSES, FOR TECHNIQUES OF ASSEMBLY AND PERFORMING HIS WORK IN A SAFE MANNER.

SUBMITTAL

Copies To:
X File
Owner
X Architect
Other BY: Nathan Wilson, PE

HSA Engineering Consulting Services, Inc.
7405 Ellis Street
Fort Smith, AR 72916
479.452.8922
www.hsaconsultants.com

Project Name: Farm Credit, Russellville, AR
Project Number: 02-23-2720
Transmitted To: Hight Jackson Associates
Specification: 22 30 00-01 Plumbing Equipment

Construction Manager:

NABHOLZ CONSTRUCTION SERVICES

- [ ] Revise & Resubmit
- [ ] Reviewed & Amend As Noted
- [X] Reviewed

By: Ann Miller **Date:** 06.22.2023

Design Review Comments:

P-8

COMMERCIAL-GRADE

RESIDENTIAL / COMMERCIAL GAS WATER HEATERS

TANKLESS CONDENSING HIGH EFFICIENCY

Ultra-Low NOx gas tankless water heaters with condensing technology featuring up to 0.95 Uniform Energy Factor (UEF) which lowers operating costs and is environmentally friendly.

FEATURES:

ULTRA-LOW NOX CONDENSING TECHNOLOGY PROVIDES UP TO 0.95 UNIFORM ENERGY FACTOR

DURABLE HEAT EXCHANGER

- Primary Heat Exchanger is constructed of Commercial-Grade Copper that is more resilient to erosion and is 25x better at heat transfer than stainless steel thus stabilizing outgoing water temperatures quicker
- Secondary Heat Exchanger is made of Type 316L Stainless Steel to protect against corrosion

CONTINUOUS MAXIMUM FLOW RATES UP TO 10.0 GPM

ENERGY STAR® QUALIFIED+

AVAILABLE IN NATURAL GAS OR PROPANE (LP)

INDOOR MODEL - INCLUDES INTEGRATED TEMPERATURE CONTROLLER AND ADVANCED DIAGNOSTICS TO SIMPLIFY TROUBLESHOOTING

OUTDOOR MODEL - INCLUDES A WALL MOUNT TEMPERATURE REMOTE CONTROLLER AND ADVANCED DIAGNOSTICS TO SIMPLIFY TROUBLESHOOTING

FACTORY-INSTALLED POWER CORD INCLUDED FOR INDOOR MODELS

GTS-540 MODELS

- Can be used in residential and commercial applications
- Easy-link up to 4 heaters
- Multi-link up to 20 heaters

COMMON VENT UP TO 8 UNITS

COMPLIES WITH LEAD FREE STANDARDS

SAFETY FEATURES:

- Air-Fuel Ratio (AFR) Sensor
- Exhaust & Water Temperature Safety Control
- Overheat Cut-Off Fuse

INTERNAL FREEZE PROTECTION SYSTEM

POWER DIRECT VENT DESIGN

- Exhaust, 3" PVC Venting up to 70 feet or 4" PVC Venting up to 100 feet
- Provides flexible venting with PVC, CPVC, or ABS Pipe for Intake and Exhaust (solid core only). Canadian Installations Require ULCS636 Listed PVC or CPVC Pipe for Venting.
- Category III or IV venting can be used

ACCESSORIES

- Pipe Cover
- Neutralizer Kit
- Isolation Valve Kits
- Concentric Termination

WARRANTY

- 15-year limited warranty on heat exchanger in residential applications
- 5-year limited warranty on heat exchanger in commercial applications
- 5-year limited warranty on all parts

+Select models

INDOOR MODELS
GTS-240, GTS-340, GTS-540

OUTDOOR MODELS
GTS-240, GTS-340, GTS-540

Meets: SCAQMD Rule 1146.2 California and Texas

DESIGN CERTIFIED

ENERGY STAR

NSF 540 models only

LOW-LEAD IAPMO R&T

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ANSI Z21.10.3 CSA 4.3

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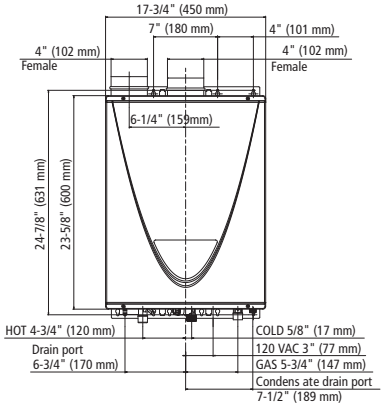
COMMERCIAL-GRADE

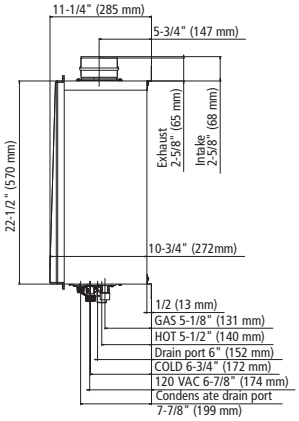
RESIDENTIAL / COMMERCIAL GAS WATER HEATERS

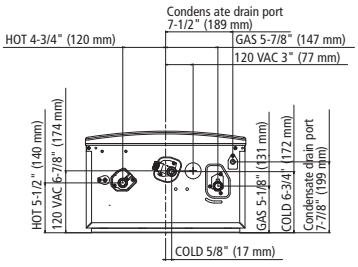
Model Number	Type	Gas Consumption Input		Inlet Gas Pressure		UEF	Maximum GPM*	Hot/Cold Connections	Gas Connection	Dimensions in Inches			Approx Shipping Weight (lbs)
		Minimum BTU/H	Maximum BTU/H	Minimum in. W.C.	Maximum in. W.C.					Height	Width	Depth	
Indoor Models													
GTS-240-NIH	Natural	15,000	160,000	4.0	10.5	0.94	6.6	3/4" NPT	3/4" NPT	23-5/8	17-3/4	11-1/4	71
GTS-240-PIH	Propane	13,000	160,000	8.0	14.0	0.94	6.6	3/4" NPT	3/4" NPT	23-5/8	17-3/4	11-1/4	71
GTS-340-NIH+	Natural	15,000	180,000	4.0	10.5	0.95	8	3/4" NPT	3/4" NPT	23-5/8	17-3/4	11-1/4	71
GTS-340-PIH+	Propane	13,000	180,000	8.0	14.0	0.95	8	3/4" NPT	3/4" NPT	23-5/8	17-3/4	11-1/4	71
X **GTS-540-NIH**	Natural	15,000	199,000	4.0	10.5	0.93	10	3/4" NPT	3/4" NPT	23-5/8	17-3/4	11-1/4	71
GTS-540-PIH	Propane	13,000	199,000	8.0	14.0	0.93	10	3/4" NPT	3/4" NPT	23-5/8	17-3/4	11-1/4	71
Outdoor Models													
GTS-240-NEH+	Natural	15,000	160,000	4.0	10.5	0.95	6.6	3/4" NPT	3/4" NPT	23-5/8	17-3/4	11-1/4	69
GTS-240-PEH+	Propane	13,000	160,000	8.0	14.0	0.95	6.6	3/4" NPT	3/4" NPT	23-5/8	17-3/4	11-1/4	69
GTS-340-NEH	Natural	15,000	180,000	4.0	10.5	0.94	8	3/4" NPT	3/4" NPT	23-5/8	17-3/4	11-1/4	69
GTS-340-PEH	Propane	13,000	180,000	8.0	14.0	0.94	8	3/4" NPT	3/4" NPT	23-5/8	17-3/4	11-1/4	69
GTS-540-NEH+	Natural	15,000	199,000	4.0	10.5	0.95	10	3/4" NPT	3/4" NPT	23-5/8	17-3/4	11-1/4	69
GTS-540-PEH+	Propane	13,000	199,000	8.0	14.0	0.95	10	3/4" NPT	3/4" NPT	23-5/8	17-3/4	11-1/4	69

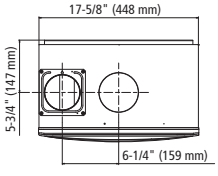
All dimensions are in inches.
15-150 psi Water Pressure. 40 psi or above is recommended for maximum flow.
*Current numbers based on factory testing; 0.4 GPM required for continuous fire after initial ignition.
Indoor models are certified from sea level to 10,100 ft. elevations.
Outdoor models are certified from sea level to 6,000 ft. elevation.
The manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligation.
+ENERGY STAR® Qualified

INDOOR MODELS

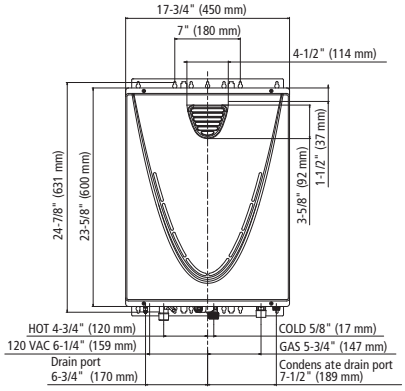


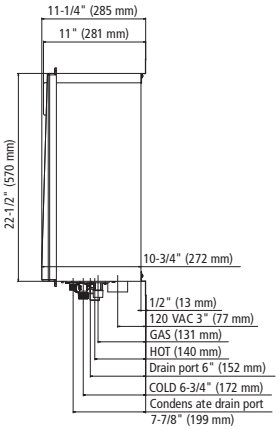


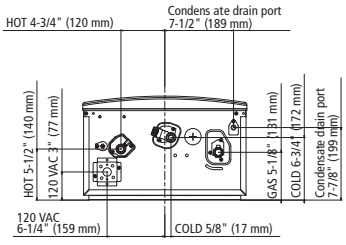


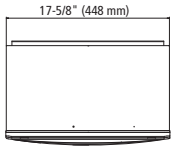


OUTDOOR MODELS

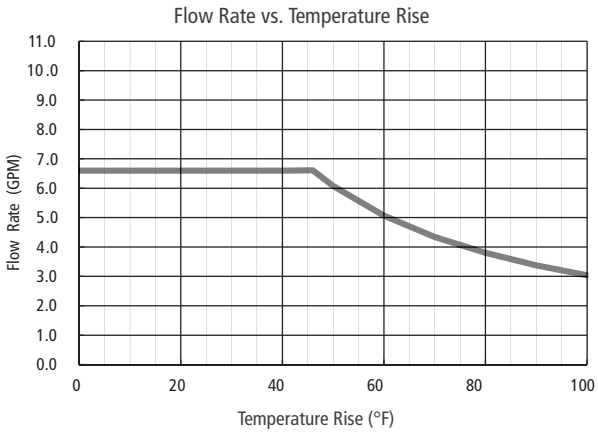


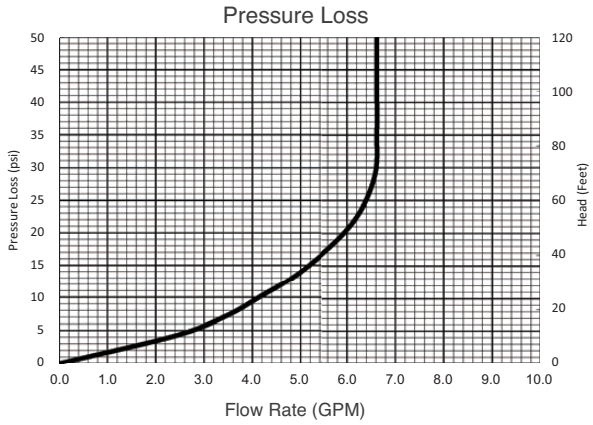




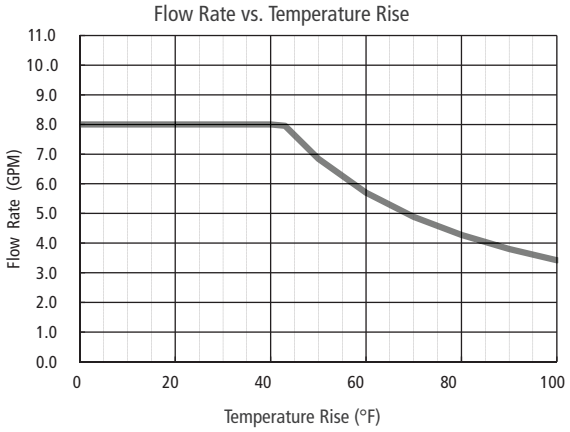


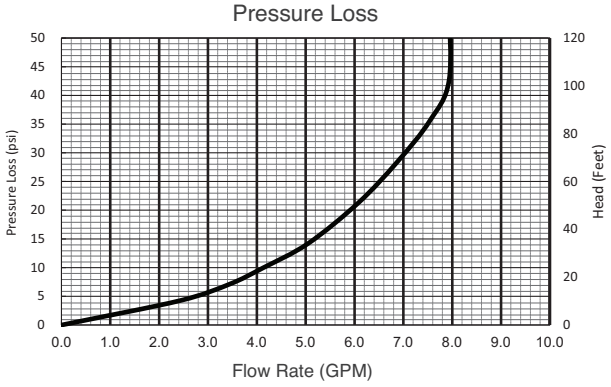
240 MODEL



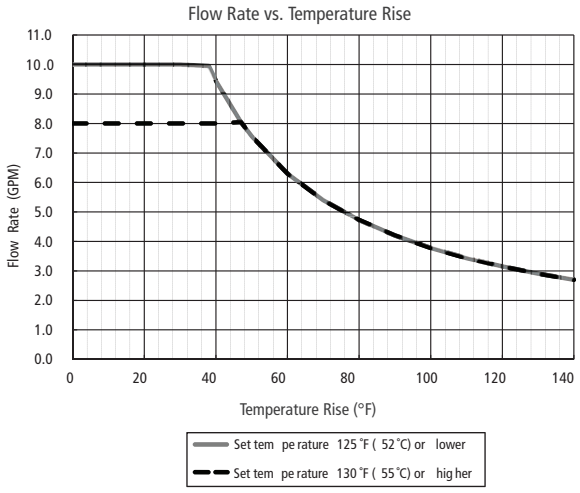


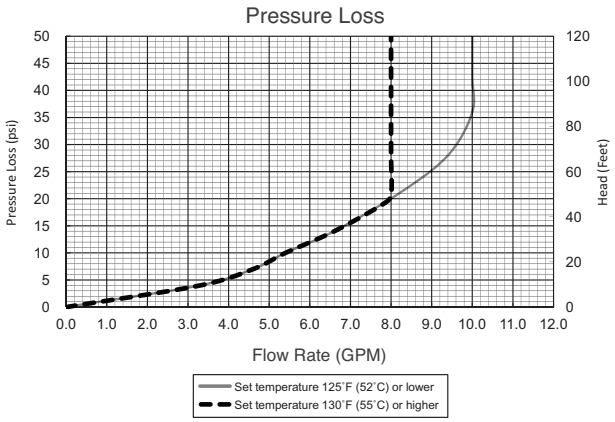
340 MODEL





540 MODEL





TANKLESS CONDENSING HIGH EFFICIENCY SPECIFICATIONS

The fully modulating, on-demand, condensing gas fired tankless water heater(s) shall be State model GTS540, having a maximum input rating of 199,000 Btu/h and available in NG or LP. The heater shall have ¾ in. male NPT water and gas connections. The inlet gas supply pressures shall be 4.0 in. WC (min.) up to 10.5 in. WC (max) for NG and 8.0 in. WC (min.) up to 14 in. WC (max.) for LP. The indoor heater(s) shall incorporate an integrated temperature controller that will provide diagnostic information, fault history, and heater set temperature. The outdoor heater(s) shall be factory supplied with a temperature remote, 100209924, that can be installed up to 400 ft. from the heater using 18 gauge (minimum) control wire. The temperature remote shall provide diagnostic information, fault history, and heater set temperature. The heater(s) shall operate using 120 V / 60 Hz power source. The indoor heater(s) will incorporate a factory installed power cord.

The indoor heater(s) shall be vented with 3" or 4" diameter schedule 40 PVC, CPVC, ABS, or Category IV vent pipe with a length not to exceed 70 ft. (equivalent) for 3" vent or 100 ft. (equivalent) for 4" vent, terminating horizontally or vertically. The intake pipe may use material such as PVC, ABS, aluminum, or Category IV pipe and cannot exceed 70 ft. (equivalent) for 3" vent or 100 ft. (equivalent) for 4" vent. The outdoor heater(s) shall be constructed with an integral exhaust vent on the front of the heater.

The water heater(s) shall use a commercial-grade copper, fin tube primary heat exchanger with quick release brass or bronze waterways. The secondary heat exchanger shall be constructed from stainless steel 316L. The heater(s) shall be controlled by an on-board solid-state printed circuit board which uses the following factory installed components: thermistors to monitor water temperature and exhaust temperature; a flow sensor to measure flow rate; a flame sensor to monitor combustion; an Air-Fuel Ratio Rod to measure and adjust air input in order to maintain optimal combustion efficiency. The heater also consists of in-line fusing and surge absorbers for electrical surge protection, an electronic spark igniter, aluminized stainless steel burners, hi-limit temperature switches to monitor water and exhaust temperatures, modulating gas valve, dual freeze protection that will automatically fire the heater (indoor model only) and use heating blocks to protect the heat exchanger, and an overheat cutoff fuse.

The heater(s) can manifold to Easy-Link up to 4 heaters to provide additional capacity. The Easy-Link controls shall be built onto the on-board solid-state printed circuit board and does not require external controls. The linking control wire shall be supplied with the heater. The heater(s) can use a Multi-Unit controller, 100112691, to manifold 5-20 heaters. The Easy-Link and Multi-Unit Controller shall modulate the system for the most efficient performance. The Easy-Link and Multi-Unit Controller shall rotate the priority heater every 12 hours of operation time or 100 starts for balanced duty/cycle operation.

The heater(s) shall be CSA approved for sale in the United States and Canada, has a minimum uniform energy factor of 0.93, meets the energy efficiency requirements of the U. S. Department of Energy and ASHRAE 90.1-2007, complies with Ultra-Low NOx emissions of 14 ng/J or 20 ppm, and shall be certified to NSF 5 Standards.

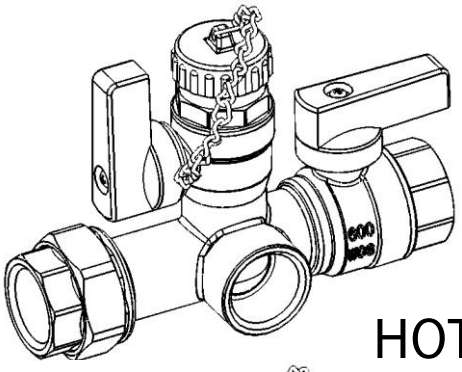
Product Submittal Form

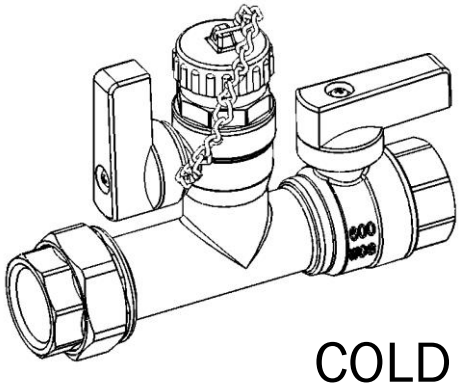
For Residential and Commercial Applications

Job Name		Engineer / Architect	
Job Location		Wholesaler	
Submittal Date		Contractor	

TWV30 /TWV3S Tankless Water Heater Hot/Cold Service Valves

Use: For use in potable water distribution systems for water flow control. Valves connect directly to cold water inlet and hot water outlet of the tankless water heater. Use for appliance maintenance and emergency shut-off.





Design Features:

- **Compact design** ideal for recessed and cover box installations
- **Captive coupling nut & washer** reduces opportunity for component loss making installation easier
- **Captive washer** won't kink or tear during installation
- **Forged, one-piece construction** reduces the potential for pinhole leaks
- **Integrated drain valve** with independent, ¼ turn operation allows quick system diagnostic testing and maintenance
- **Built-in side port** for the pressure relief valve reduces the number of connections & simplifies the installation
- **Right-sized handles, color-coded** for immediate system identification. Perfect for tight installations
- **100%** Compliant

Operating Specifications:

Temperature: 40°- 180° F

Pressure: 125 PSI maximum

Standard

MATERIAL SPECIFICATIONS	
Valve Body	*Forged brass*
Stem	*Brass*
Handle	*Aluminum, coated*
Handle Screw	*Steel, zinc plated*
Flat Seal	*Rubber*
Coupling Nut	*Forged brass*
Drain Cap	*Forged brass*
Cap Gasket	*Rubber*
Seat	*PTFE*
Ball	*Brass, chrome plated*

Compliant

MATERIAL SPECIFICATIONS	
Valve Body	*Compliant forged brass*
Stem	*Compliant brass*
Handle	*Aluminum, coated*
Handle Screw	*Steel, zinc plated*
Flat Seal	*Rubber*
Coupling Nut	*Forged brass*
Drain Cap	*Forged brass*
Cap Gasket	*Rubber*
Seat	*PTFE*
Ball	*Compliant brass, chrome plated*

BrassCraft®

Product Submittal Form

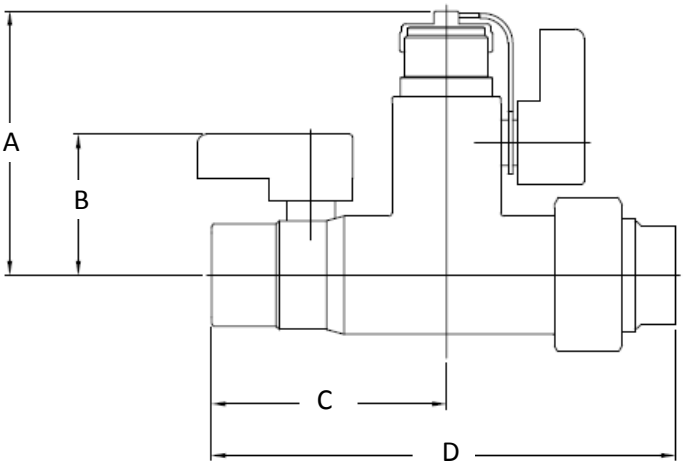
TWV30 /TWV3S Tankless Water Heater Hot/Cold Service Valves

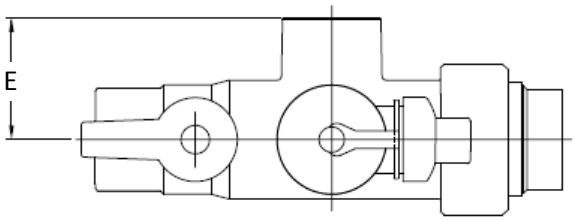
Standard Part Listing:

☐	TWV30	3/4” IPS x 3/4” IPS Hot/Cold Service Valves Only
☐	TWV30R	3/4” IPS x 3/4” IPS Hot/Cold Service Valve Kit w/ 200K Pressure Relief Valve
☐	TWV3S	3/4” Sweat x 3/4” IPS Hot/Cold Service Valves Only
☐	TWV3SR	3/4” Sweat x 3/4” IPS Hot/Cold Service Valve Kit w/ 200K Pressure Relief Valve

Compliant Part Listing:

☐	TWV30X	3/4” IPS x 3/4” IPS Hot/Cold Service Valves Only
☒	TWV30RX	3/4” IPS x 3/4” IPS Hot/Cold Service Valve Kit w/ 200K Pressure Relief Valve
☐	TWV3SX	3/4” Sweat x 3/4” IPS Hot/Cold Service Valves Only
☐	TWV3SRX	3/4” Sweat x 3/4” IPS Hot/Cold Service Valve Kit w/ 200K Pressure Relief Valve





PART SPECIFICATIONS *(Inches)*					
Model	***DIM. A***	***DIM. B***	***DIM. C***	***DIM. D***	***DIM. E****
TWV30 / TWV30R	3.03	1.76	2.60	5.61	1.09
TWV3S / TWV3SR	3.03	1.76	2.60	5.61	1.09

*Dimension for hot valve with pressure relief valve port

Listings and Certifications:

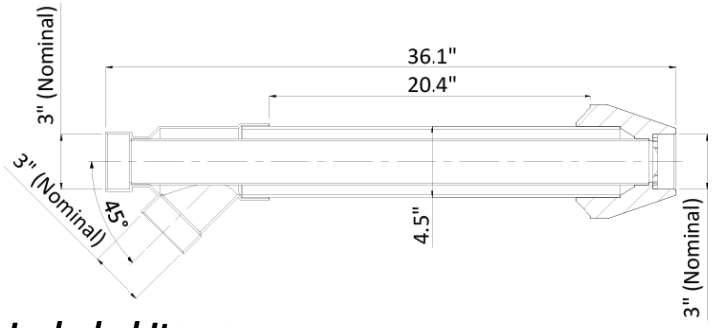
- CSA verified to WOG 600 rating
- IAPMO listed to NSF/ANSI 61-2010 (File # N-5427) and IGC 157-2010 (File # 5427)
- Compliant product manufactured in compliance with section 116875 of the California Health & Safety Code. IAPMO File # 6242

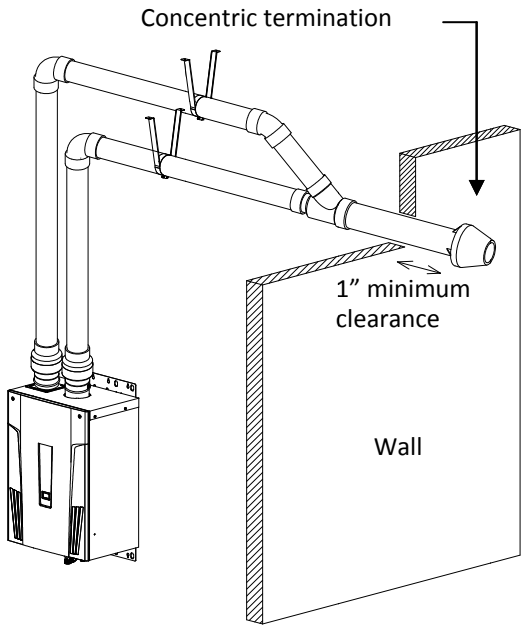
provide vertical concentric vent kits.

NSTRUCTIONS

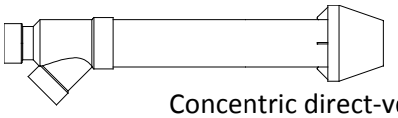
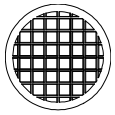
TH-CVPVC33

3” Sidewall Direct-Vent Concentric Termination Kit





Included Items

 Concentric direct-vent termination (Qty.1)
 Bird screen (Qty.1)
 Installation Instructions (Qty.1)
Stainless steel screw & nut set (Qty.1)

GENERAL

WARNING

Improper installation can cause nausea or asphyxiation, severe injury or death from carbon monoxide and flue gas poisoning. Improper installation will void product warranty.

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

The TH-CVPVC33 termination kit is only to be used with the Takagi T-H2-DV model and is only to be used as a sidewall termination (horizontal). The TH-CVPVC33 is not to be used as a roof termination (vertical). Doing so will void the warranty of the Takagi water heater. **Please follow all instructions in the T-H2-DV Installation Manual for proper venting.**

The T-H2-DV must be vented in accordance with the section “Venting of Equipment" of the latest edition of the Natural Fuel Gas Code: ANSI Z223.1/NFPA 54 and/or Section 7 of the CAN/CSA B149.1 Natural Gas and Propane Installation Code in Canada, as well as all applicable local building codes.

Vent installations in Canada which utilize plastic venting must use vent systems that comply with ULC S636. The TH-CVPVC33 concentric vent termination kit is certified to ULC S636 for use with IPEX PVC vent system. Please follow the procedures outlined in the IPEX System 636 Installation Guide on the use of solvents and cements, available at www.ipexinc.com.

Takagi Industrial Co.USA, Inc
5 Whatney, Irvine, CA 92618 Tel: 949.770-7171 Fax: 949.770.3171
www.takagi.com

Concentric vent kit assembly

1. Once the proper location has been determined, cut a hole in the wall large enough to accommodate the outer pipe.
2. Solvent cement the inner pipe to the concentric Y-fitting.
3. Solvent cement the outer pipe to the concentric Y-fitting.
4. Slide the assembly through the wall penetration.
5. To permanently affix the termination cap, it should be solvent cemented to the inner pipe. For installations where removal of the cap may be required for service or cleaning, it can be fastened mechanically with the supplied screw & nut set. For either installation method, the outer pipe is only a friction fit with the cap.
6. Once the cap is installed, and the kit is secured as outlined below, the kit can be connected to the venting system.

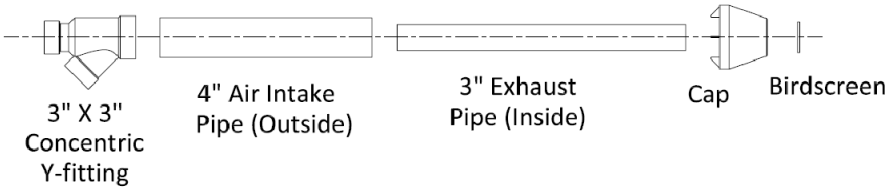
Installation / support procedures

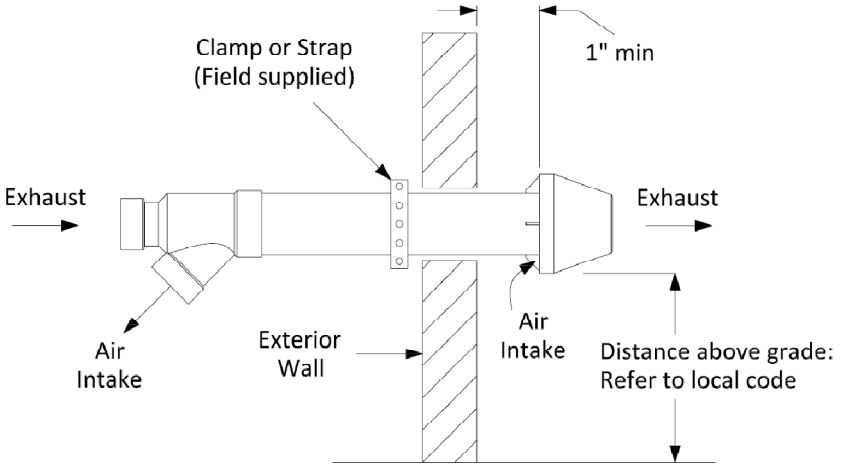
1. Kits must be securely fastened to structure, to ensure dimensions shown below are maintained.
2. Straps are field supplied. Use straps, clamps, or equivalent that will not score or damage the pipe. Expansion and contraction should be addressed between appliance and termination point.
3. All penetrations must be sealed according to local codes. Caulking for sidewall terminations is typical. Use only PVC/CPVC compatible sealing material.
4. The weight of the concentric kits must be supported by the clamps/straps and not by the vent system it connects to.

Mechanically fastened termination cap

If the cap is to be mechanically fastened, please follow the instructions below:

1. Locate the drill location dimple on the outside of the cap.
2. At this location, drill a 3/16” hole through the cap and the inner pipe wall. Ensure that the path of the hole is perpendicular to the inner pipe, NOT the outside of the cap.
3. Insert the screw and tighten the bolt. Do not over tighten.





P-25,26

COMMERCIAL-GRADE

RESIDENTIAL / COMMERCIAL GAS WATER HEATERS

TANKLESS CONDENSING HIGH EFFICIENCY

Ultra-Low NOx gas tankless water heaters with condensing technology featuring up to 0.95 Uniform Energy Factor (UEF) which lowers operating costs and is environmentally friendly.

FEATURES:

ULTRA-LOW NOX CONDENSING TECHNOLOGY PROVIDES UP TO 0.95 UNIFORM ENERGY FACTOR

DURABLE HEAT EXCHANGER

- Primary Heat Exchanger is constructed of Commercial-Grade Copper that is more resilient to erosion and is 25x better at heat transfer than stainless steel thus stabilizing outgoing water temperatures quicker
- Secondary Heat Exchanger is made of Type 316L Stainless Steel to protect against corrosion

CONTINUOUS MAXIMUM FLOW RATES UP TO 10.0 GPM

ENERGY STAR® QUALIFIED+

AVAILABLE IN NATURAL GAS OR PROPANE (LP)

INDOOR MODEL - INCLUDES INTEGRATED TEMPERATURE CONTROLLER AND ADVANCED DIAGNOSTICS TO SIMPLIFY TROUBLESHOOTING

OUTDOOR MODEL - INCLUDES A WALL MOUNT TEMPERATURE REMOTE CONTROLLER AND ADVANCED DIAGNOSTICS TO SIMPLIFY TROUBLESHOOTING

FACTORY-INSTALLED POWER CORD INCLUDED FOR INDOOR MODELS

GTS-540 MODELS

- Can be used in residential and commercial applications
- Easy-link up to 4 heaters
- Multi-link up to 20 heaters

COMMON VENT UP TO 8 UNITS

COMPLIES WITH LEAD FREE STANDARDS

SAFETY FEATURES:

- Air-Fuel Ratio (AFR) Sensor
- Exhaust & Water Temperature Safety Control
- Overheat Cut-Off Fuse

INTERNAL FREEZE PROTECTION SYSTEM

POWER DIRECT VENT DESIGN

- Exhaust, 3" PVC Venting up to 70 feet or 4" PVC Venting up to 100 feet
- Provides flexible venting with PVC, CPVC, or ABS Pipe for Intake and Exhaust (solid core only). Canadian Installations Require ULCS636 Listed PVC or CPVC Pipe for Venting.
- Category III or IV venting can be used

ACCESSORIES

- Pipe Cover
- Neutralizer Kit
- Isolation Valve Kits
- Concentric Termination

WARRANTY

- 15-year limited warranty on heat exchanger in residential applications
- 5-year limited warranty on heat exchanger in commercial applications
- 5-year limited warranty on all parts

+Select models

INDOOR MODELS
GTS-240, GTS-340, GTS-540

OUTDOOR MODELS
GTS-240, GTS-340, GTS-540

Meets: SCAQMD Rule 1146.2 California and Texas

DESIGN CERTIFIED

ENERGY STAR

NSF 540 models only

LOW-LEAD IAPMO R&T

AHRI CERTIFIED® www.ahridirectory.org

ANSI Z21.10.3 CSA 4.3

SOLID. STATE.

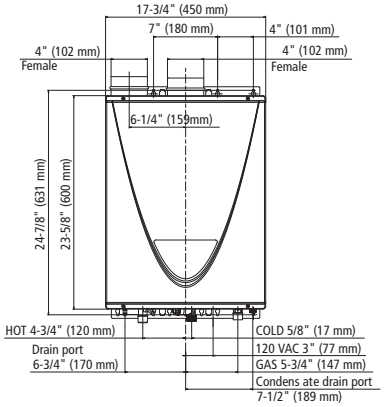
COMMERCIAL-GRADE

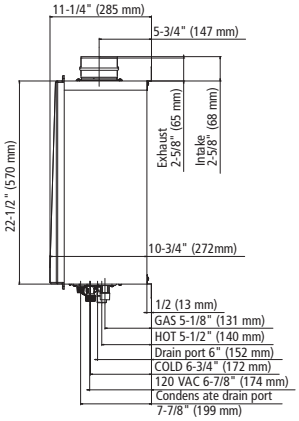
RESIDENTIAL / COMMERCIAL GAS WATER HEATERS

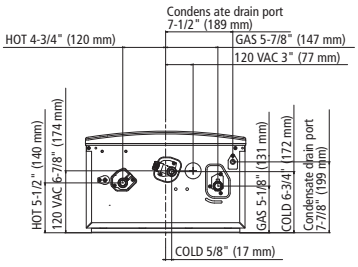
Model Number	Type	Gas Consumption Input		Inlet Gas Pressure		UEF	Maximum GPM*	Hot/Cold Connections	Gas Connection	Dimensions in Inches			Approx Shipping Weight (lbs)
		Minimum BTU/H	Maximum BTU/H	Minimum in. W.C.	Maximum in. W.C.					Height	Width	Depth	
Indoor Models													
GTS-240-NIH	Natural	15,000	160,000	4.0	10.5	0.94	6.6	3/4" NPT	3/4" NPT	23-5/8	17-3/4	11-1/4	71
GTS-240-PIH	Propane	13,000	160,000	8.0	14.0	0.94	6.6	3/4" NPT	3/4" NPT	23-5/8	17-3/4	11-1/4	71
GTS-340-NIH+	Natural	15,000	180,000	4.0	10.5	0.95	8	3/4" NPT	3/4" NPT	23-5/8	17-3/4	11-1/4	71
GTS-340-PIH+	Propane	13,000	180,000	8.0	14.0	0.95	8	3/4" NPT	3/4" NPT	23-5/8	17-3/4	11-1/4	71
X **GTS-540-NIH**	Natural	15,000	199,000	4.0	10.5	0.93	10	3/4" NPT	3/4" NPT	23-5/8	17-3/4	11-1/4	71
GTS-540-PIH	Propane	13,000	199,000	8.0	14.0	0.93	10	3/4" NPT	3/4" NPT	23-5/8	17-3/4	11-1/4	71
Outdoor Models													
GTS-240-NEH+	Natural	15,000	160,000	4.0	10.5	0.95	6.6	3/4" NPT	3/4" NPT	23-5/8	17-3/4	11-1/4	69
GTS-240-PEH+	Propane	13,000	160,000	8.0	14.0	0.95	6.6	3/4" NPT	3/4" NPT	23-5/8	17-3/4	11-1/4	69
GTS-340-NEH	Natural	15,000	180,000	4.0	10.5	0.94	8	3/4" NPT	3/4" NPT	23-5/8	17-3/4	11-1/4	69
GTS-340-PEH	Propane	13,000	180,000	8.0	14.0	0.94	8	3/4" NPT	3/4" NPT	23-5/8	17-3/4	11-1/4	69
GTS-540-NEH+	Natural	15,000	199,000	4.0	10.5	0.95	10	3/4" NPT	3/4" NPT	23-5/8	17-3/4	11-1/4	69
GTS-540-PEH+	Propane	13,000	199,000	8.0	14.0	0.95	10	3/4" NPT	3/4" NPT	23-5/8	17-3/4	11-1/4	69

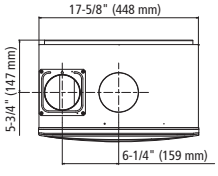
All dimensions are in inches.
15-150 psi Water Pressure. 40 psi or above is recommended for maximum flow.
*Current numbers based on factory testing; 0.4 GPM required for continuous fire after initial ignition.
Indoor models are certified from sea level to 10,100 ft. elevations.
Outdoor models are certified from sea level to 6,000 ft. elevation.
The manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligation.
+ENERGY STAR® Qualified

INDOOR MODELS

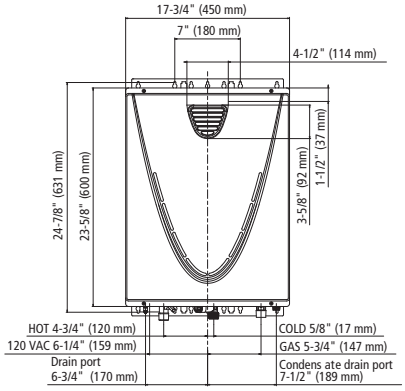


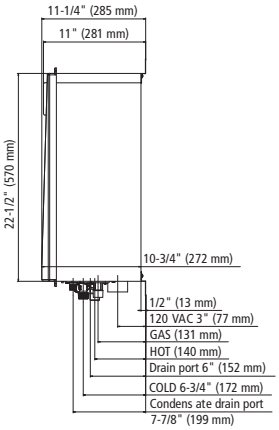


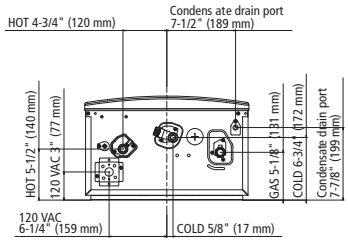


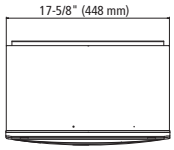


OUTDOOR MODELS

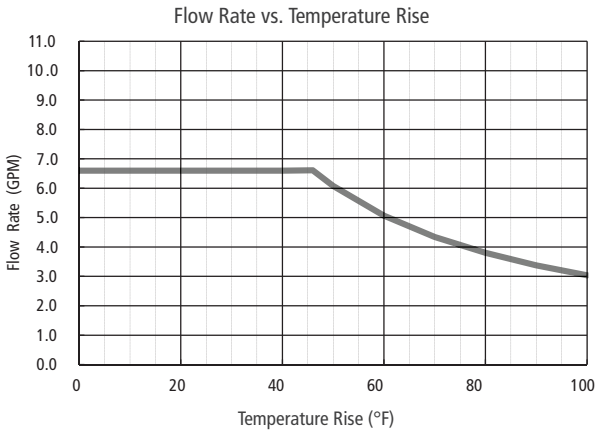


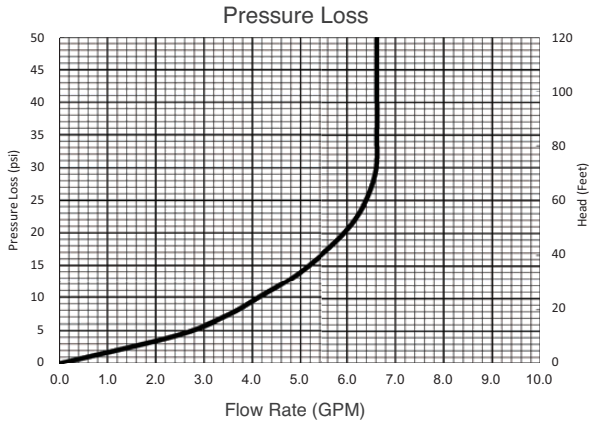




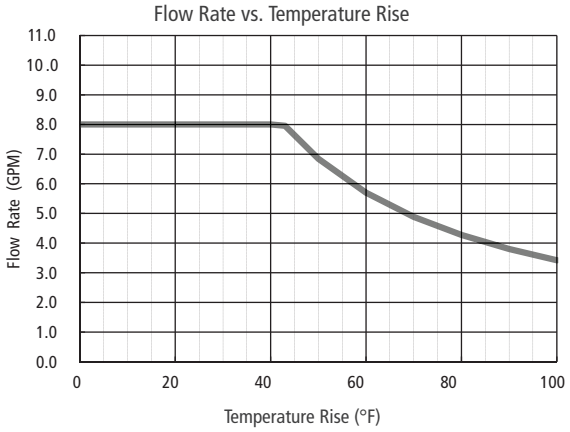


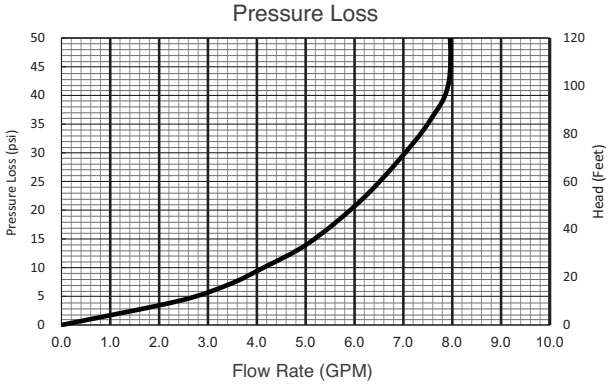
240 MODEL



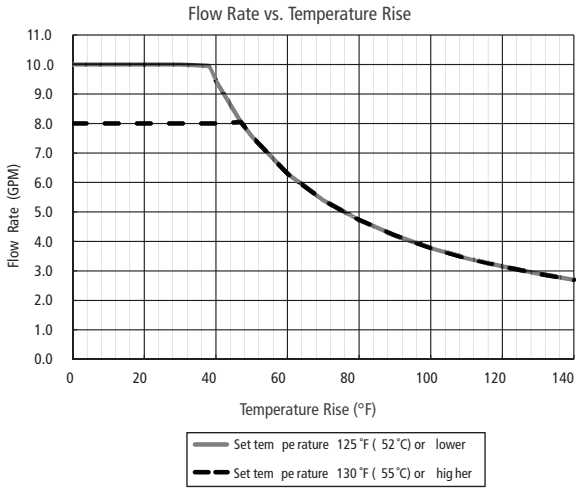


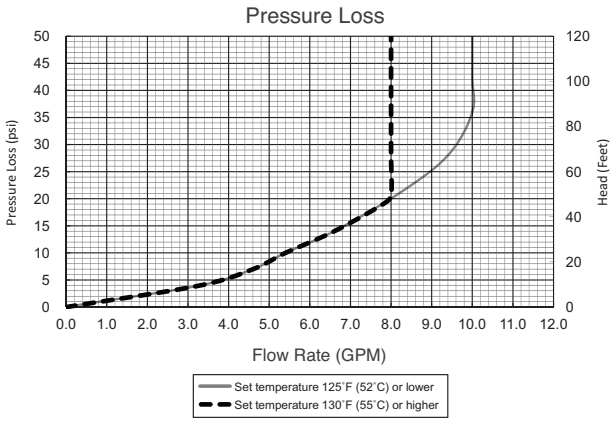
340 MODEL





540 MODEL





TANKLESS CONDENSING HIGH EFFICIENCY SPECIFICATIONS

The fully modulating, on-demand, condensing gas fired tankless water heater(s) shall be State model GTS540, having a maximum input rating of 199,000 Btu/h and available in NG or LP. The heater shall have ¾ in. male NPT water and gas connections. The inlet gas supply pressures shall be 4.0 in. WC (min.) up to 10.5 in. WC (max) for NG and 8.0 in. WC (min.) up to 14 in. WC (max.) for LP. The indoor heater(s) shall incorporate an integrated temperature controller that will provide diagnostic information, fault history, and heater set temperature. The outdoor heater(s) shall be factory supplied with a temperature remote, 100209924, that can be installed up to 400 ft. from the heater using 18 gauge (minimum) control wire. The temperature remote shall provide diagnostic information, fault history, and heater set temperature. The heater(s) shall operate using 120 V / 60 Hz power source. The indoor heater(s) will incorporate a factory installed power cord.

The indoor heater(s) shall be vented with 3" or 4" diameter schedule 40 PVC, CPVC, ABS, or Category IV vent pipe with a length not to exceed 70 ft. (equivalent) for 3" vent or 100 ft. (equivalent) for 4" vent, terminating horizontally or vertically. The intake pipe may use material such as PVC, ABS, aluminum, or Category IV pipe and cannot exceed 70 ft. (equivalent) for 3" vent or 100 ft. (equivalent) for 4" vent. The outdoor heater(s) shall be constructed with an integral exhaust vent on the front of the heater.

The water heater(s) shall use a commercial-grade copper, fin tube primary heat exchanger with quick release brass or bronze waterways. The secondary heat exchanger shall be constructed from stainless steel 316L. The heater(s) shall be controlled by an on-board solid-state printed circuit board which uses the following factory installed components: thermistors to monitor water temperature and exhaust temperature; a flow sensor to measure flow rate; a flame sensor to monitor combustion; an Air-Fuel Ratio Rod to measure and adjust air input in order to maintain optimal combustion efficiency. The heater also consists of in-line fusing and surge absorbers for electrical surge protection, an electronic spark igniter, aluminized stainless steel burners, hi-limit temperature switches to monitor water and exhaust temperatures, modulating gas valve, dual freeze protection that will automatically fire the heater (indoor model only) and use heating blocks to protect the heat exchanger, and an overheat cutoff fuse.

The heater(s) can manifold to Easy-Link up to 4 heaters to provide additional capacity. The Easy-Link controls shall be built onto the on-board solid-state printed circuit board and does not require external controls. The linking control wire shall be supplied with the heater. The heater(s) can use a Multi-Unit controller, 100112691, to manifold 5-20 heaters. The Easy-Link and Multi-Unit Controller shall modulate the system for the most efficient performance. The Easy-Link and Multi-Unit Controller shall rotate the priority heater every 12 hours of operation time or 100 starts for balanced duty/cycle operation.

The heater(s) shall be CSA approved for sale in the United States and Canada, has a minimum uniform energy factor of 0.93, meets the energy efficiency requirements of the U. S. Department of Energy and ASHRAE 90.1-2007, complies with Ultra-Low NOx emissions of 14 ng/J or 20 ppm, and shall be certified to NSF 5 Standards.

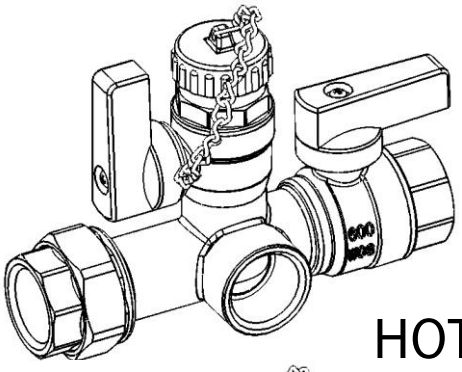
Product Submittal Form

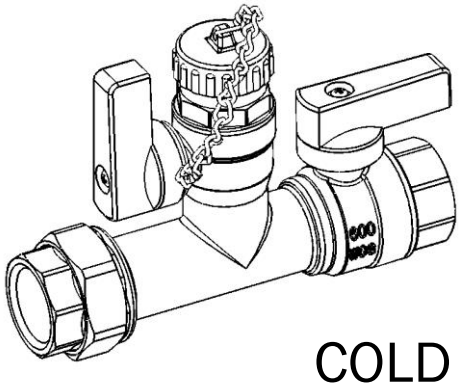
For Residential and Commercial Applications

Job Name		Engineer / Architect	
Job Location		Wholesaler	
Submittal Date		Contractor	

TWV30 /TWV3S Tankless Water Heater Hot/Cold Service Valves

Use: For use in potable water distribution systems for water flow control. Valves connect directly to cold water inlet and hot water outlet of the tankless water heater. Use for appliance maintenance and emergency shut-off.





Design Features:

- **Compact design** ideal for recessed and cover box installations
- **Captive coupling nut & washer** reduces opportunity for component loss making installation easier
- **Captive washer** won't kink or tear during installation
- **Forged, one-piece construction** reduces the potential for pinhole leaks
- **Integrated drain valve** with independent, ¼ turn operation allows quick system diagnostic testing and maintenance
- **Built-in side port** for the pressure relief valve reduces the number of connections & simplifies the installation
- **Right-sized handles, color-coded** for immediate system identification. Perfect for tight installations
- **100%** Compliant

Operating Specifications:

Temperature: 40°- 180° F

Pressure: 125 PSI maximum

Standard

MATERIAL SPECIFICATIONS	
Valve Body	*Forged brass*
Stem	*Brass*
Handle	*Aluminum, coated*
Handle Screw	*Steel, zinc plated*
Flat Seal	*Rubber*
Coupling Nut	*Forged brass*
Drain Cap	*Forged brass*
Cap Gasket	*Rubber*
Seat	*PTFE*
Ball	*Brass, chrome plated*

Compliant

MATERIAL SPECIFICATIONS	
Valve Body	*Compliant forged brass*
Stem	*Compliant brass*
Handle	*Aluminum, coated*
Handle Screw	*Steel, zinc plated*
Flat Seal	*Rubber*
Coupling Nut	*Forged brass*
Drain Cap	*Forged brass*
Cap Gasket	*Rubber*
Seat	*PTFE*
Ball	*Compliant brass, chrome plated*

BrassCraft®

Product Submittal Form

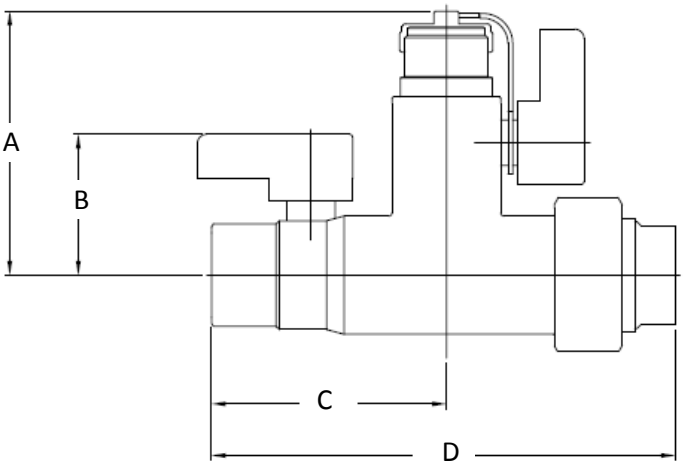
TWV30 /TWV3S Tankless Water Heater Hot/Cold Service Valves

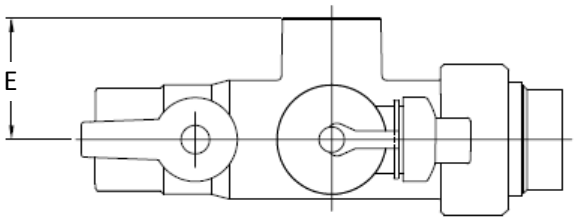
Standard Part Listing:

☐	TWV30	3/4” IPS x 3/4” IPS Hot/Cold Service Valves Only
☐	TWV30R	3/4” IPS x 3/4” IPS Hot/Cold Service Valve Kit w/ 200K Pressure Relief Valve
☐	TWV3S	3/4” Sweat x 3/4” IPS Hot/Cold Service Valves Only
☐	TWV3SR	3/4” Sweat x 3/4” IPS Hot/Cold Service Valve Kit w/ 200K Pressure Relief Valve

Compliant Part Listing:

☐	TWV30X	3/4” IPS x 3/4” IPS Hot/Cold Service Valves Only
☒	TWV30RX	3/4” IPS x 3/4” IPS Hot/Cold Service Valve Kit w/ 200K Pressure Relief Valve
☐	TWV3SX	3/4” Sweat x 3/4” IPS Hot/Cold Service Valves Only
☐	TWV3SRX	3/4” Sweat x 3/4” IPS Hot/Cold Service Valve Kit w/ 200K Pressure Relief Valve





PART SPECIFICATIONS *(Inches)*					
Model	***DIM. A***	***DIM. B***	***DIM. C***	***DIM. D***	***DIM. E****
TWV30 / TWV30R	3.03	1.76	2.60	5.61	1.09
TWV3S / TWV3SR	3.03	1.76	2.60	5.61	1.09

*Dimension for hot valve with pressure relief valve port

Listings and Certifications:

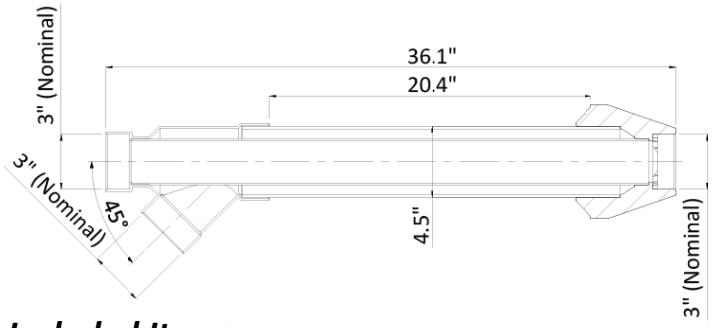
- CSA verified to WOG 600 rating
- IAPMO listed to NSF/ANSI 61-2010 (File # N-5427) and IGC 157-2010 (File # 5427)
- Compliant product manufactured in compliance with section 116875 of the California Health & Safety Code. IAPMO File # 6242

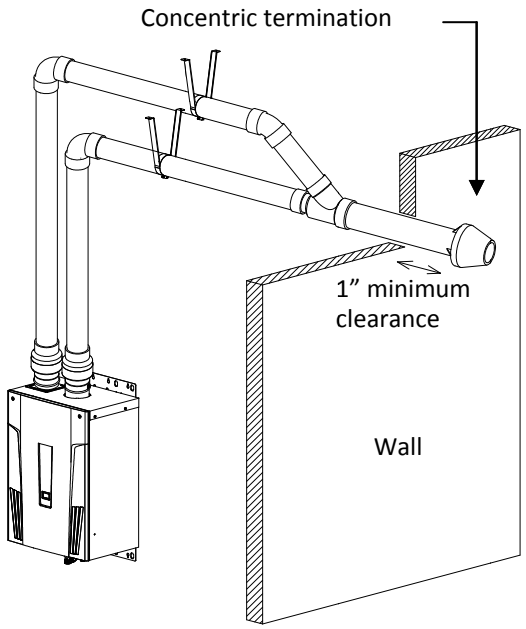
provide vertical concentric vent kits.

INSTALLATION INSTRUCTIONS

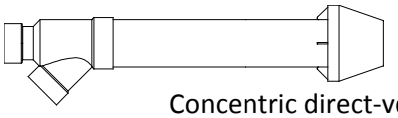
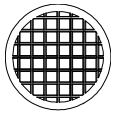
TH-CVPVC33

3” Sidewall Direct-Vent Concentric Termination Kit





Included Items

 Concentric direct-vent termination (Qty.1)
 Bird screen (Qty.1)
 Installation Instructions (Qty.1)
Stainless steel screw & nut set (Qty.1)

GENERAL

WARNING

Improper installation can cause nausea or asphyxiation, severe injury or death from carbon monoxide and flue gas poisoning. Improper installation will void product warranty.

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

The TH-CVPVC33 termination kit is only to be used with the Takagi T-H2-DV model and is only to be used as a sidewall termination (horizontal). The TH-CVPVC33 is not to be used as a roof termination (vertical). Doing so will void the warranty of the Takagi water heater. **Please follow all instructions in the T-H2-DV Installation Manual for proper venting.**

The T-H2-DV must be vented in accordance with the section “Venting of Equipment" of the latest edition of the Natural Fuel Gas Code: ANSI Z223.1/NFPA 54 and/or Section 7 of the CAN/CSA B149.1 Natural Gas and Propane Installation Code in Canada, as well as all applicable local building codes.

Vent installations in Canada which utilize plastic venting must use vent systems that comply with ULC S636. The TH-CVPVC33 concentric vent termination kit is certified to ULC S636 for use with IPEX PVC vent system. Please follow the procedures outlined in the IPEX System 636 Installation Guide on the use of solvents and cements, available at www.ipexinc.com.

Takagi Industrial Co.USA, Inc
5 Whatney, Irvine, CA 92618 Tel: 949.770-7171 Fax: 949.770.3171
www.takagi.com

Concentric vent kit assembly

1. Once the proper location has been determined, cut a hole in the wall large enough to accommodate the outer pipe.
2. Solvent cement the inner pipe to the concentric Y-fitting.
3. Solvent cement the outer pipe to the concentric Y-fitting.
4. Slide the assembly through the wall penetration.
5. To permanently affix the termination cap, it should be solvent cemented to the inner pipe. For installations where removal of the cap may be required for service or cleaning, it can be fastened mechanically with the supplied screw & nut set. For either installation method, the outer pipe is only a friction fit with the cap.
6. Once the cap is installed, and the kit is secured as outlined below, the kit can be connected to the venting system.

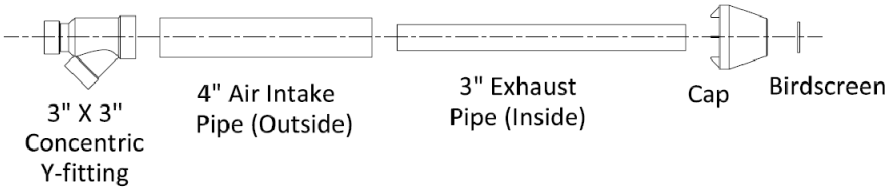
Installation / support procedures

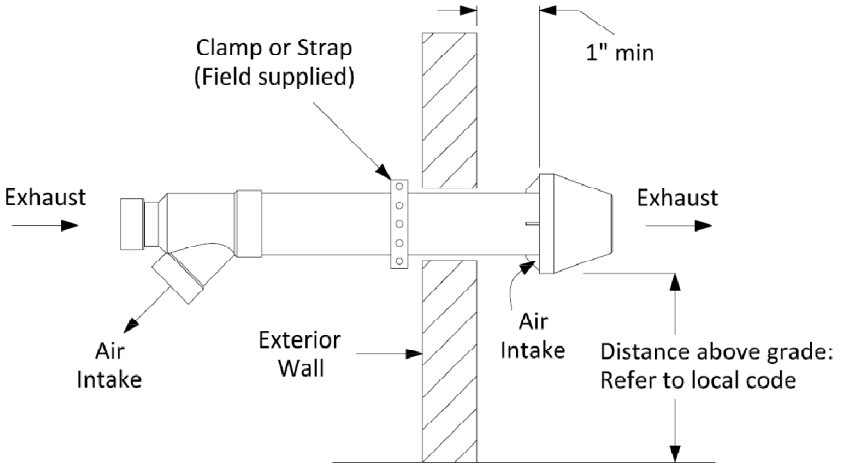
1. Kits must be securely fastened to structure, to ensure dimensions shown below are maintained.
2. Straps are field supplied. Use straps, clamps, or equivalent that will not score or damage the pipe. Expansion and contraction should be addressed between appliance and termination point.
3. All penetrations must be sealed according to local codes. Caulking for sidewall terminations is typical. Use only PVC/CPVC compatible sealing material.
4. The weight of the concentric kits must be supported by the clamps/straps and not by the vent system it connects to.

Mechanically fastened termination cap

If the cap is to be mechanically fastened, please follow the instructions below:

1. Locate the drill location dimple on the outside of the cap.
2. At this location, drill a 3/16” hole through the cap and the inner pipe wall. Ensure that the path of the hole is perpendicular to the inner pipe, NOT the outside of the cap.
3. Insert the screw and tighten the bolt. Do not over tighten.





ET

Engineering Specification

Job Name _____ Contractor _____

Job Location _____ Approval _____

Engineer _____ Contractor's P.O. No. _____

Approval _____ Representative _____

LEAD FREE*

Series PLT

Potable Water Expansion Tanks

Series PLT Potable Water Expansion Tanks are designed to absorb the increased volume of water created by thermal expansion and to maintain balanced pressure throughout the potable water supply system.

Heated water expands, and in a domestic hot water system, the system may be closed when the potable water system is isolated from the public water supply by a one-way valve such as pressure reducing valve, backflow preventer or check valve. Provisions must be made for this expansion.

Series PLT expansion tanks absorb the increased volume of water created when the hot water storage tank is heated and keeps the system pressure below the relief setting of the T&P relief valve.

It is a pre-pressurized steel tank with an expansion membrane that prevents contact of the water with the air in the tank. This prevents loss of air to the water and insures long and trouble-free life for the system. These tanks may be used with all types of Direct Fired Hot Water Heaters (gas, oil or electric) and hot water storage tanks.

Features

- Rugged flexible butyl diaphragm
- Field adjustable pre-charge
- In-line and free standing models
- Can be used with most standard hot water heaters and storage tanks

Models

PLT-5-M1	¾" male connection, tank volume 2.1 gal.
PLT-12-M1	¾" male connection, tank volume 4.5 gal.
PLT-20-M1	¾" male connection, tank volume 8.5 gal.
PLT-35-M1	1" female connection, tank volume 14.00 gal.

Specifications

The potable water expansion tank shall be of drawn steel construction. It shall have a Butyl diaphragm separating the air chamber from the water containing chamber. Inlet connector shall be Stainless Steel. Materials of manufacture for the diaphragm shall be FDA approved.

The potable water expansion tank shall be a Watts Model PLT.

Standards

Models PLT-5, PLT-12 and PLT-20 are Listed by IAPMO.
Certified to ANSI/NSF 61
Model PLT-35
Certified to ANSI/NSF 61

(73˚F/23˚C)

Note: The potable water expansion tank shall be installed in the cold water service pipe line on the supply side of the water heater (or water storage tank). A pressure relief valve sized and installed in accordance with local codes must be incorporated in the system.
In those systems requiring a combined temperature and pressure safety relief valve, the temperature and pressure relief valve should be sized and installed in accordance with local codes. Adequate drainage provisions should be provided where water flow will cause damage.

See chart on back

NOTICE

The information contained herein is not intended to replace the full product installation and safety information available or the experience of a trained product installer. You are required to thoroughly read all installation instructions and product safety information before beginning the installation of this product.

NOTICE

Inquire with governing authorities for local installation requirements

***The wetted surface of this product contacted by consumable water contains less than 0.25% of lead by weight.**

Selection

This Quick Reference Selection Guide may be used as an alternative to using a formula to determine the correct expansion tank for the system. This table is based upon a relief valve setting of 150psi (10.3 bar), and a maximum of 50°F temperature rise.

To select the correct model PLT series tank, simply go the supply pressure equal to the system supply pressure (for pressures between those shown use next highest supply pressure shown), read across the chart to the correct tank as indicated by the water heater capacity (for capacities between those shown, use next highest capacity).

To accommodate the thermal expansion required for higher temperature and/or higher pressure systems, multiple tanks may be used. Please contact the factory for sizing information.

Materials

Diaphragm: Butyl rubber

Inlet Connection: Stainless Steel

Technical Information

DESCRIPTION	PLT-5	PLT-12	PLT-20	PLT-35
Max. Pressure - PSI	150	150	150	150
Max. Temp. - °F	200	200	200	200
Tank Volume - Gal.	2.1	4.5	8.5	14.00
Air Pre-charge - PSI	20	20	20	20
Connections Size - Inches	¾ Male	¾ Male	¾ Male	1 Female
Diameter - Inches	8	10.5	12.5	16.0
Length - Inches	11	13.5	19.2	21.7
Weight - Lbs.	5.5	10	15	32

Acceptance Volume

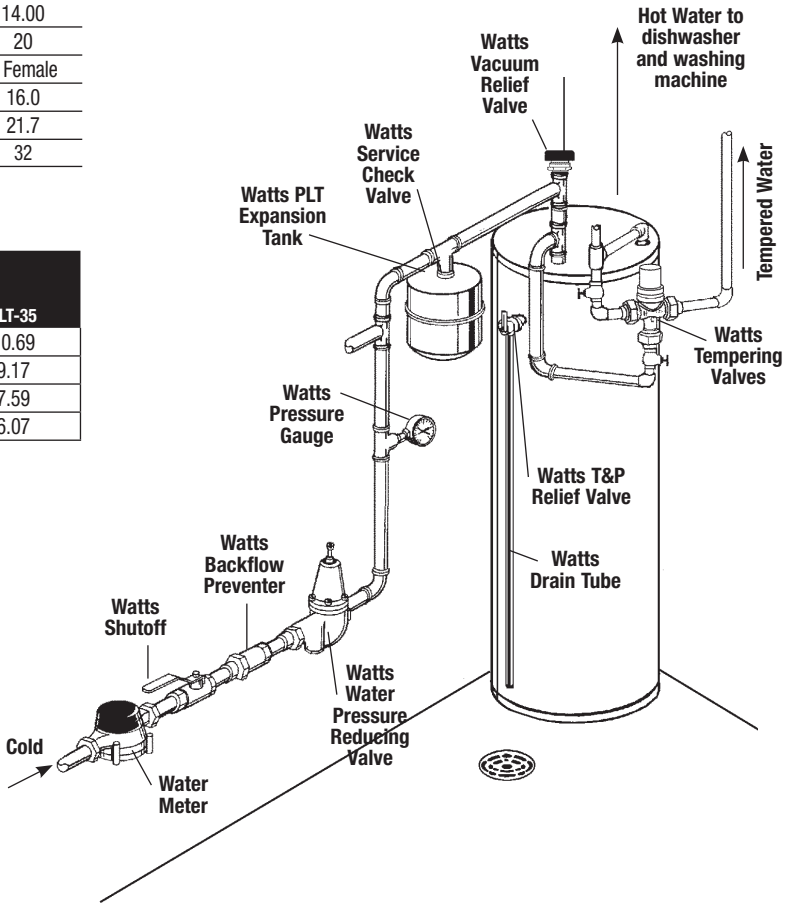
AIR SIDE PRE-PRESSURE (PSI)	WATER SIDE VOLUME AT 150PSI (GALLONS) PLT-5	PLT-12	PLT-20	PLT-35
20	1.48	3.42	7.102	10.69
40	1.26	2.88	5.882	9.17
60	1.0	2.49	4.705	7.59
80	.8	1.85	4.009	6.07

SUPPLY PRESSURE (PSIG)	WATER HEATER (GALLONS) 20	30	40	50	80	100	120
40							
50							
55							
60							
70							
80							
90							
100							
110							
120							

PLT-5 PLT-20

PLT-12 PLT-35

Multiple tanks required - consult factory



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