High Efficiency Tankless Water Heater with Recirculation

TROUBLESHOOTING MANUAL

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⚠ WARNING

Before inspecting, diagnosing, repairing or operating any water heater, be sure to examine all of the safety and warning labels on the tank. Follow the instruction on these warning labels. Read and understand the Use and Care Manual that was shipped with the water heater. Failure to do so can result in unsafe operation of the water heater resulting in property damage, bodily injury, or death. Should you have any problems reading or following the instructions in the Use and Care Manual, seek the help of a licensed and qualified professional.

TECHNICAL SUPPORT LINE
PHONE: 800-432-8373
FAX: 334-260-1341

ORDER CENTER
1-800-621-5622

RHEEM WATER HEATERS
800 Interstate Park Dr.
Montgomery, AL 36109

Website: www.rheem.com
Email: Techserv@Rheem.com

This manual is specific for the following model numbers

HIGH EFFICIENCY WITH RECIRCULATION PUMP (Non-Condensing model)

ECOR200DVELN-3	ECOR200XELN-3
ECOR200DVELP-3	ECOR200XELP-3
RMTGR95DVELN-3	RMTGR95XELN-3
RMTGR95DVELP-3	RMTGR95XELP-3
RTG-R95DVELN-3	RTG-R95XELN-3
RTG-R95DVELP-3	RTG-R95XELP-3
RUTG-R95DVELN-3	RUTG-R95XELN-3
RUTG-R95DVELP-3	RUTG-R95XELP-3
ECOR160DVELN-3	ECOR160XELN-3
ECOR160DVELP-3	ECOR160XELP-3
RMTGR70DVELN-3	RMTGR70XELN-3
RMTGR70DVELP-3	RMTGR70XELP-3
RTG-R70DVELN-3	RTG-R70XELN-3
RTG-R70DVELP-3	RTG-R70XELP-3
RUTG-R70DVELN-3	RUTG-R70XELN-3
RUTG-R70DVELP-3	RUTG-R70XELP-3
FDTG-R95DVELN-3	FDTG-R95XELN-3
FDTG-R95DVELP-3	FDTG-R95XELP-3
FDTG-R70DVELN-3	FDTG-R70XELN-3
FDTG-R70DVELP-3	FDTG-R70XELP-3

Important Safety Information

SAFETY AND INTRODUCTION - The purpose of this manual is to provide technical and troubleshooting information to technicians and service professionals ONLY. Homeowners should consult the Use and Care Manual (AP21820 & AP22009) for general informational and installation inquiries or contact technical support prior to attempting to service this tankless water heater.

It is imperative that all persons who are expected to install, repair or adjust this water heater read this and the Use and Care manual. This manual is intended solely for professional technicians intending to assist in repairing or servicing this water heater. Any questions regarding the operation, maintenance, service, or warranty of this water heater should be directed to the seller from whom it was purchased.

READ THE SAFETY INFORMATION - Before inspecting, diagnosing, repairing, or operating any water heater, be sure to examine all of the safety and warning labels on the water heater. Follow the instruction on these warning labels. Read and understand the Use and Care Manual that was shipped with the water heater. Failure to do so can result in unsafe operation of the water heater resulting in property damage, bodily injury, or death. If you have any problems reading or following the instructions in the Use and Care Manual, seek the help of a licensed and qualified professional.

ELECTRICAL SHOCK - Troubleshooting and repairing this water heater can expose you to electrical shock. Some of the diagnostic procedures require the presence of AC and DC volt electricity. Use extreme caution when performing these procedures. When replacing an unserviceable component, turn off all power to the water heater and check for the presence of power with a multi-meter or test lamp. The ignition cable carries more than 10,000 volts of electrical energy. Use extreme caution when diagnosing the Tankless Gas Water Heater.

FLAMMABLE LIQUIDS AND VAPORS - Gasoline, as well as other flammable material and liquids (adhesives, solvents, etc.), and their vapors are extremely dangerous.

DO NOT handle, use, or store gasoline or other flammable or combustible materials anywhere near or in the vicinity of a water heater. The spark ignition and burner assembly in the water heater controls can ignite these vapors. Failure to do so can result in property damage, bodily injury, or death.

WATER TEMPERATURE ADJUSTMENT - Safety and energy conservation are factors to be considered when selecting the water temperature setting on the thermostat. Water temperatures above 126°F can cause severe burns or death from scalding. The chart shown here may be used as a guide in determining the proper water temperature for your application.

TIME / TEMPERATURE RELATIONSHIPS IN SCALDS	
Temperature	**Time to Produce Serious Burn**
120° F (49°C)	More than 5 minutes
125° F (52°C)	1½ to 2 minutes
130° F (54°C)	About 30 seconds
135° F (57°C)	About 10 seconds
140° F (60°C)	Less than 5 seconds
145° F (63°C)	Less than 3 seconds
150° F (66°C)	About 1½ seconds
155° F (68°C)	About 1 second

Table courtesy of Shriners Burn Institute

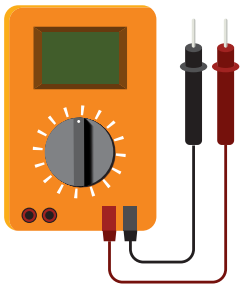
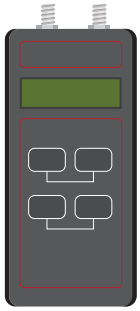
⚠ DANGER

Households with small children, disabled, or elderly persons may require a 120°F or lower thermostat setting to prevent contact with "HOT" water. The temperature of the water in the heater is regulated by the electronic control and surface mounted temperature sensors.

⚠ DANGER

Hotter water increases the potential for Hot Water SCALDS

Troubleshooting Tools

MULTI-METER Used to measure Resistance & Voltage	
MULTI-METER NEEDLE SET Used on meter test leads to access connectors while measuring Resistance & Voltage	
MANOMETER Used to measure gas pressure during standby and operation	

SAFETY FIRST

Your safety and safety of others is very important. This manual is only intended for qualified service technicians. ALWAYS USE CAUTION while testing voltages and/or gas supply.

Measuring Voltage & Resistance

⚠ WARNING

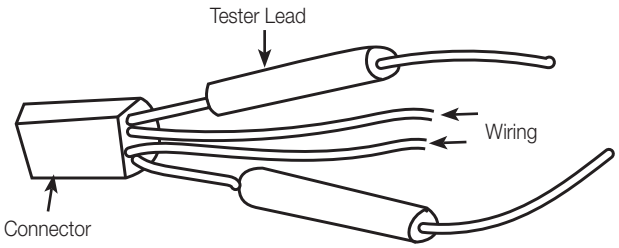
WHILE MEASURING VOLTAGE, DO NOT cross/touch multi-meter leads together. This will cause damage to electrical components.

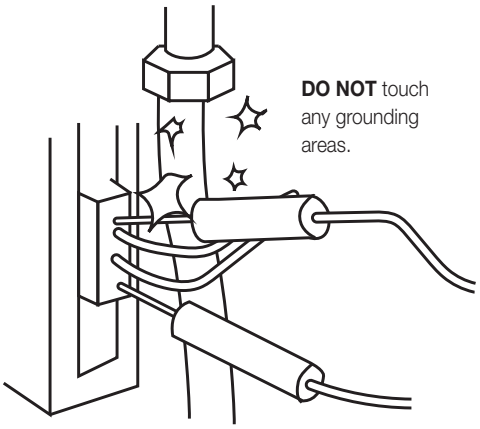
WHEN INSERTING LEADS INTO WIRING CONNECTOR, insert on the wiring side to prevent damage to connector.

BEFORE MEASURING RESISTANCE, TURN OFF all electrical power and make sure to REMOVE CONNECTOR from the circuit (control board). Check resistance on connector that was removed.

WHEN MEASURING VOLTAGE, DO NOT REMOVE CONNECTOR; insert multi-meter leads prior to operating unit.

WHEN MEASURING DC VOLTAGE, if the meter displays the dash (---) symbol, swap the position of your black and red leads on the connector.



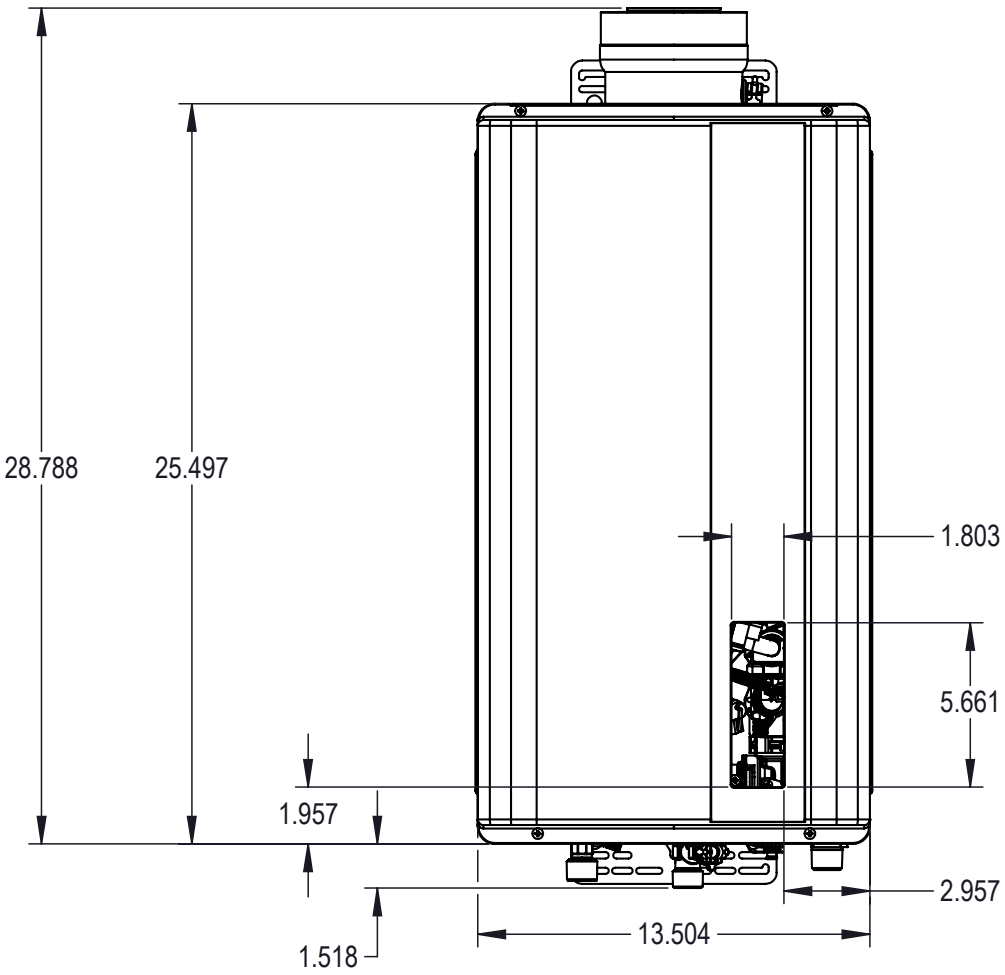


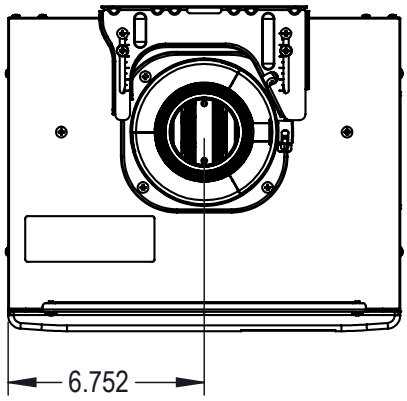
1. General Information

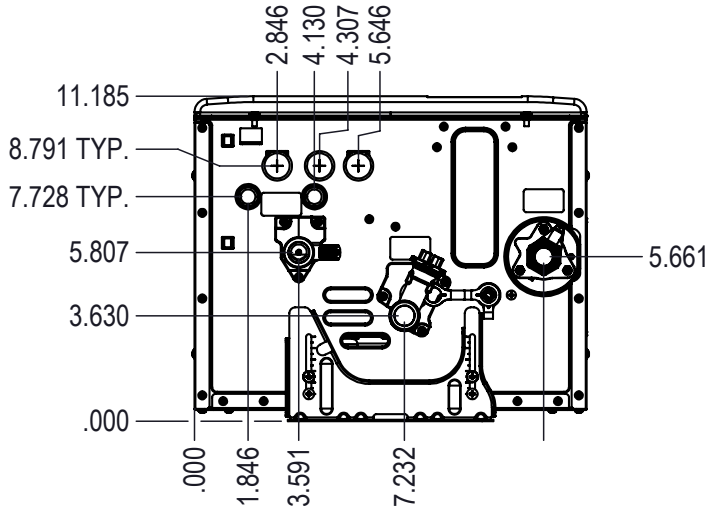
1.1 SPECIFICATIONS - NON CONDENSING INDOOR MODEL

Specification		199K	160K
Model Number		RTG-R199DV	RTG-R160DV
Dimensions	W	13.50 in. (343 mm)	
	H	28.79 in. (731 mm)	
	D	11.19 in. (284 mm)	
Approval Gas Type		Natural (NG) and Liquid Propane (LP)	
Maximum Gas Consumption		199,900 Btu/h	160,000 Btu/h
Minimum Gas Consumption		11,000 Btu/h	
Gas Supply Pressure	NG	4.0 in. w.c. – 10.5 in. w.c.	
	LP	8.0 in. w.c. – 13.0 in. w.c.	
Minimum Activation Flow Rate		0.4 GPM	
Extinction Flow Rate		0.26 GPM	
Vent Size		3 in. / 5 in concentric vent	
Service Connections	Gas Supply	¾ NPT	
	Cold Water Inlet	¾ NPT	
	Hot Water Outlet	¾ NPT	
Electrical Consumption	Normal	100 W	
	Standby	3.5 W	
	Antifreeze Protection	200 W	

1.1 SPECIFICATIONS - NON CONDENSING INDOOR MODEL (CONT.)





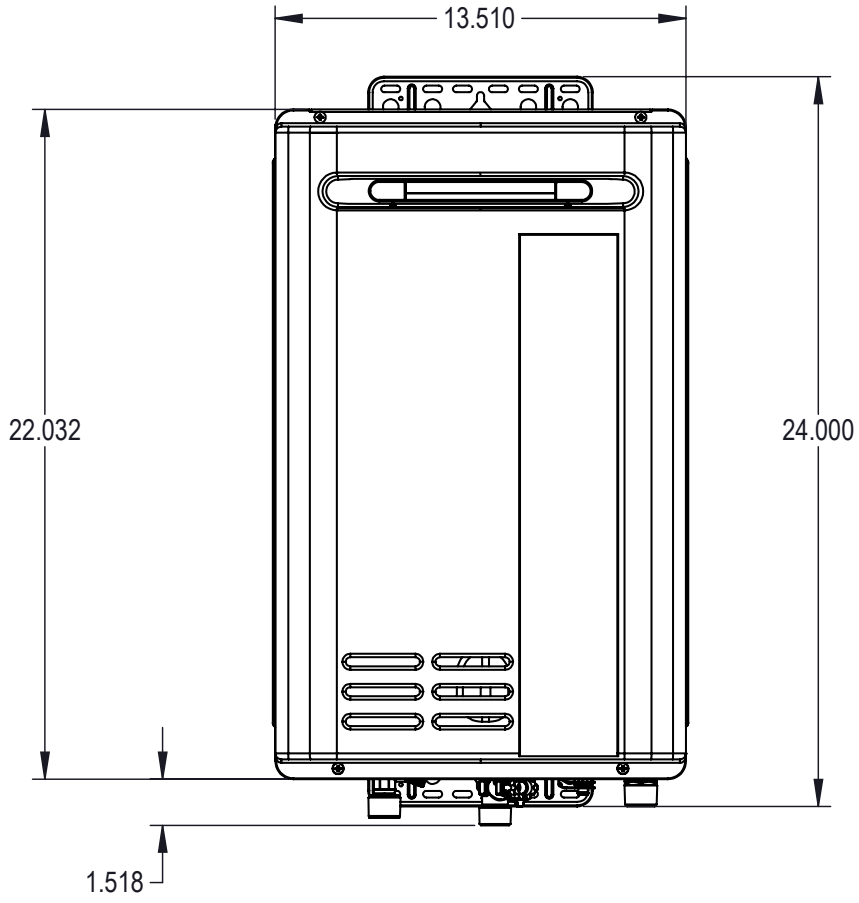


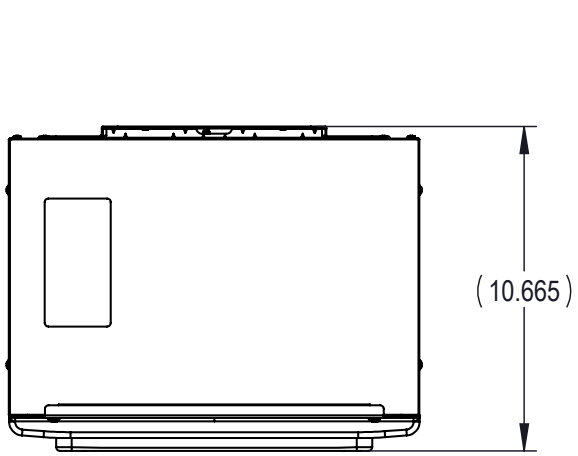
NOTE: Dimensions information are in inches.

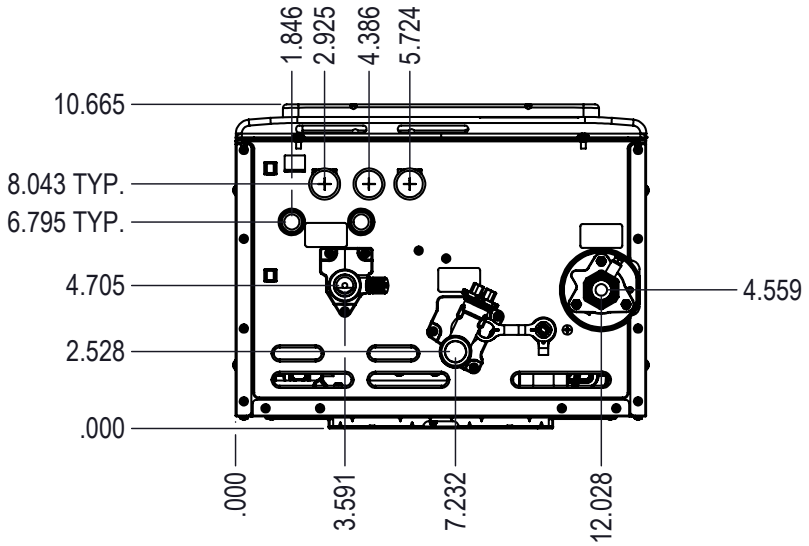
1.1.1 SPECIFICATIONS - NON CONDENSING OUTDOOR MODEL

Specification		199K	160K
Model Number		RTG-R199X	RTG-R160X
Dimensions	W	13.50 in. (343 mm)	
	H	22.0 in. (559 mm)	
	D	10.7 in. (272 mm)	
Approval Gas Type		Natural (NG) and Liquid Propane (LP)	
Maximum Gas Consumption		199,900 Btu/h	160,000 Btu/h
Minimum Gas Consumption		11,000 Btu/h	
Gas Supply Pressure	NG	4.0 in. w.c. – 10.5 in. w.c.	
	LP	8.0 in. w.c. – 13.0 in. w.c.	
Minimum Activation Flow Rate		0.4 GPM	
Extinction Flow Rate		0.26 GPM	
Service Connections	Gas Supply	¾ NPT	
	Cold Water Inlet	¾ NPT	
	Hot Water Outlet	¾ NPT	
Electrical Consumption	Normal	100 W	
	Standby	3.5 W	
	Antifreeze Protection	200 W	

1.1.1 SPECIFICATIONS - NON CONDENSING OUTDOOR MODEL (CONT.)







NOTE: Dimensions information are in inches.

1.1.2 VENTING FOR DIRECT-VENT WATER HEATER NON-CONDENSING MODEL ONLY

⚠ WARNING

Use 3-in. /5-in. UL-approved Category III Stainless Steel vent materials or water heater manufacturer approved vent material. No other vent material is permitted for use with this non-condensing model.

VENT REQUIREMENTS

The installation of the venting must comply with national codes, local codes and the vent manufacturer's instructions.

The water heater must be vented to the outdoors. DO NOT vent this water heater through a chimney. It must be vented separately from all other appliances.

All coaxial vent components (adapters, pipe, elbows, terminals, etc.) should be water heater manufacturer-approved Stainless Steel Venting Material (e.g., AL29-4C).

SINGLE UNIT: MAX. EQUIVALENT VENT LENGTHS - STRAIGHT PIPE	
Number of 90° Elbows	**Max. Length of 3" / 5" Straight Pipe**
0	43 ft (13.1 m)
1	41.5 ft (12.6 m)
2	40 ft (12.2 m)
3	38.5 ft (11.7 m)
4	37 ft (11.3 m)
5	35.5 ft (10.8 m)
6	34 ft (10.4 m)

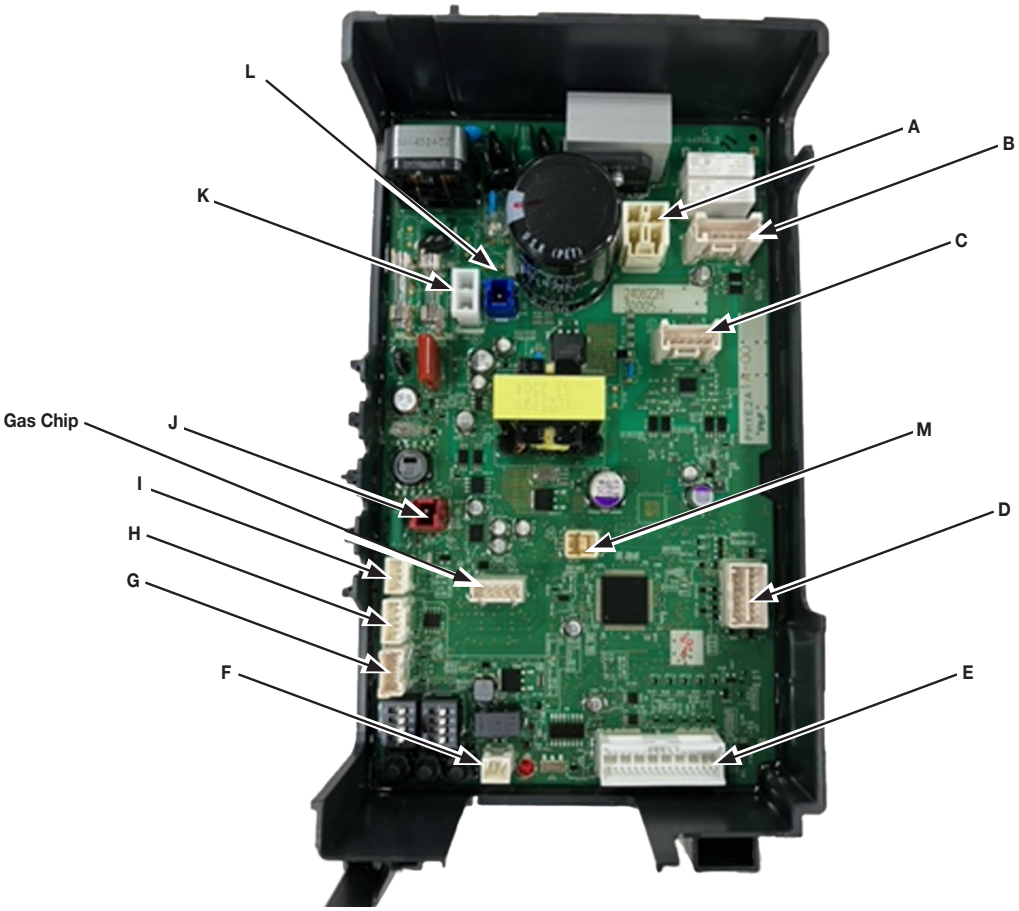
EQUIVALENT FT. OF ELBOWS	
	3" / 5"
90°	1.6 ft (0.49 m)
45°	0.9 in (0.23 m)

1.1.3 FLOW RATE

199K								
Temperature Rise (°F)								
35	45	50	60	67	70	80	90	100
9.5	7.4	6.6	5.5	5.0	4.7	4.1	3.7	3.3
Max Water Flow – GPM (gallons per minute)								

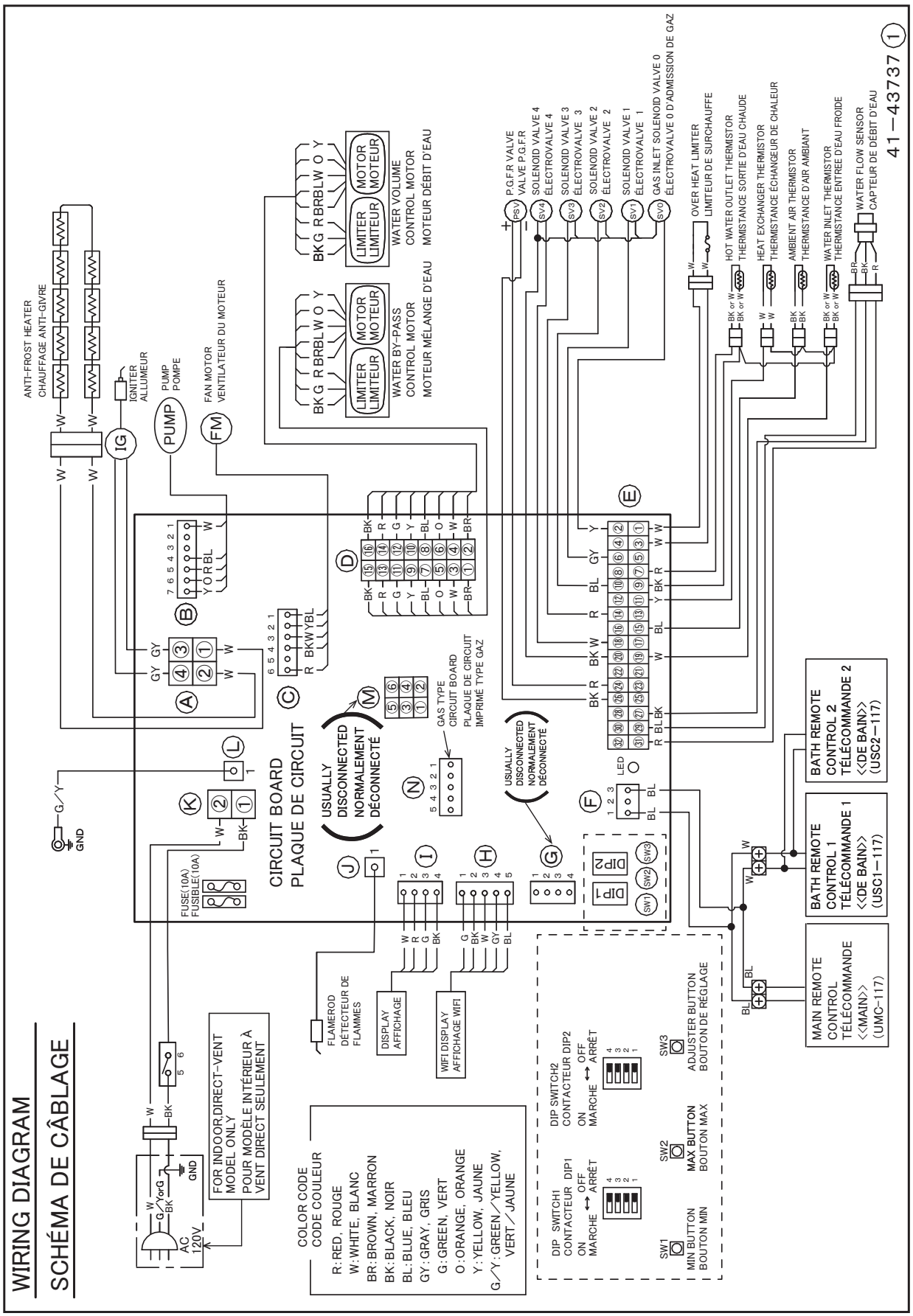
160K								
Temperature Rise (°F)								
35	45	50	60	67	70	80	90	100
7.0	6.0	5.4	4.5	4.5	3.9	3.4	3.0	2.7
Max Water Flow – GPM (gallons per minute)								

1.2 CONTROL BOARD CONNECTORS



Connector Wire Color		
Connector #	**Connector Color**	**Wire Color**
A	White	White, White, Gray and Gray
B	White	White, Blue, Red, Orange, and Yellow
C	White	Blue, Yellow, White, Black, N/A and Red
D	White	Brown, Brown, White, White, Orange, Orange, Blue, Blue, Yellow, Yellow, Green, Green, Red, Red, Black and Black
E	White	White, Yellow, White, Gray, Red, Black, Blue, Yellow, Red, Blue, White, White, Black, Red, Black, Black, Blue, and Red.
F	White	Blue and Blue
G	White	N/A
H	White	Blue, Grey, White, Black and Green
I	Blue	White, Red, Green and Black
J	Red	Red
K	White	Black and White
L	White	Green and Yellow
M	White	N/A

1.3 DIAGNOSTIC POINTS ON CONTROL BOARD

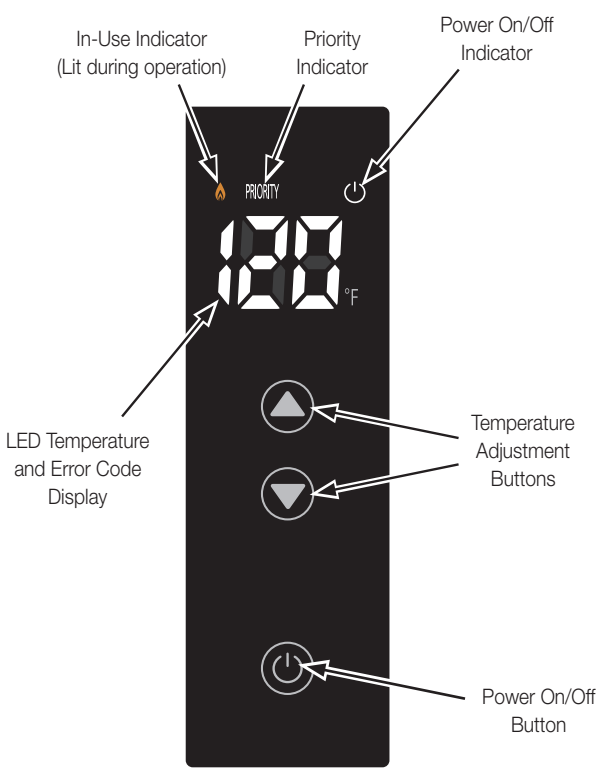


Connection #	Wire Color		Normal Value	What are you checking?
A	GY 3	GY 4	AC108 - 132V	Is the igniter working property?
B	W 1	BL 4	DC145 - 195V	Does the pump have the proper voltage?
	BL 4	R 5	DC12 - 18V	Does the pump have the proper voltage?
C	R 6	BK 4	DC145 - 195V	Does the fan motor have the proper voltage?
	BL 1	BK 4	DC4 - 10V (Pulse)	Is the fan motor producing regular pulse?
	W 3	BK 4	DC12 - 18V	Does the fan motor have the proper voltage?
E	W 1	W 3	50KΩ - 500KΩ	Is the Over Heat Limiter OK?
	BK 27	BL 29	DC 4 - 10V (Pulse) More than 1,310 pulse/minute	Does the water flow sensor send a pulse? (Only when water is flowing thru the unit)
	BK 27	R 31	DC 11 - 17V	Does the water flow sensor have voltage? (Power ON; no water flow)
	BK 9	R 7	68°F = 10.3 kΩ 104°F = 4.9 kΩ 140°F = 2.5 kΩ	Is the outlet water thermistor working?
	BK 9	Y 11	68°F = 10.3 kΩ 104°F = 4.9 kΩ 140°F = 2.5 kΩ	Is the heat exchanger thermistor working?
	BK 9	BL 15	68°F = 6.3 kΩ 104°F = 2.7 kΩ 140°F = 1.2 kΩ	Is the Ambient thermistor working?
	BK 9	W 19	68°F = 10.3 kΩ 104°F = 4.9 kΩ 140°F = 2.5 kΩ	Is the Inlet water thermistor working?
	Y 2	BK 20	DC 11-17V 10 Ω – 50 Ω	Is Solenoid valve OK?
	R 24	BK 26	DC4 – 10 V	Is Proportional Gas valve OK?
J	R 1	GND	AC108 - 132V	Flame rod detecting flame?
K	BK 1	W 2	AC108 – 132V	Does the control board have voltage?
I	W 1	BK 4	DC2 – 5V	Does the built-in Display have voltage? (Non-WiFi model only)

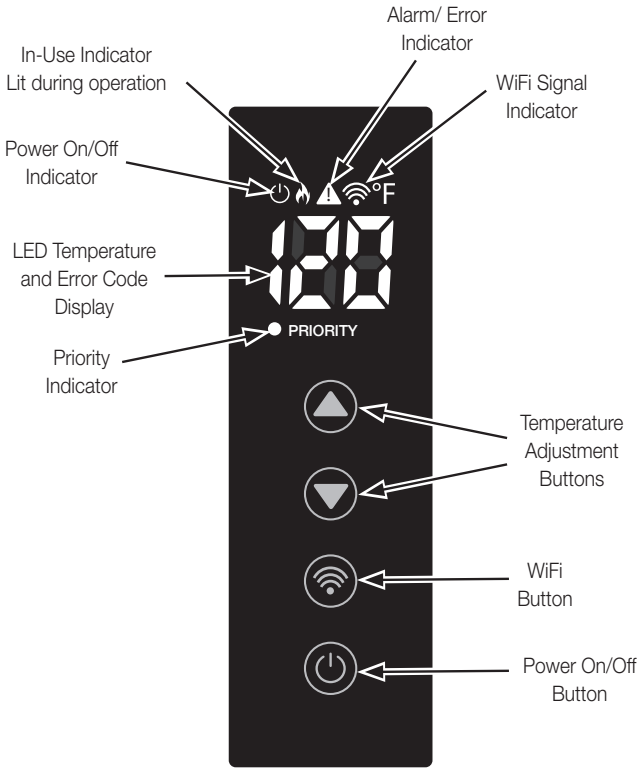
1.4 BUILT- IN CONTROLLER

The condensing model and Non-condensing indoor model have a built-in controller.

This built-in controller allows you to adjust water temperature and view the operating status or error code.



LED DISPLAY

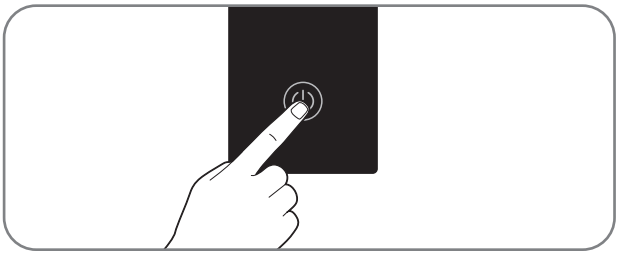


LED WIFI DISPLAY

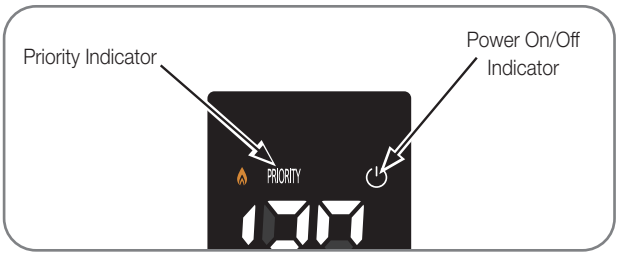
(WIFI MODEL ONLY)

1.4.1 ENABLING/DISABLING THE WATER HEATER

This water heater can be set to enable or disable mode by pressing “Power On/Off button”.



If the water heater is set to enable, the “Priority indicator” and “Power On/Off indicator” will turn on.



NOTE: The controller has a built-in safety that prevents the remote from powering on or allowing an increase of temperature while water is flowing through the water heater. Before enabling the controller, ensure all water supply and recirculation pumps are turned off.

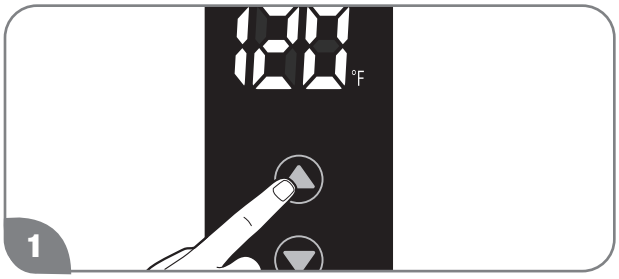
1.4.2 SETTING THE TEMPERATURE SET POINT

This water heater's set point temperature can be adjusted between 100°F (38°C) to 140°F (60°C).

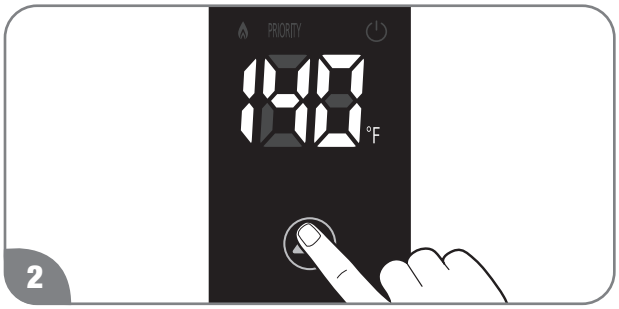
The set point temperature by default cannot be increased above 120°F (49°C).

To adjust the set point temperature above 120°F (49°C), please refer the following steps.

Turn off water supply and any recirculation pump before attempting to increase temperature.

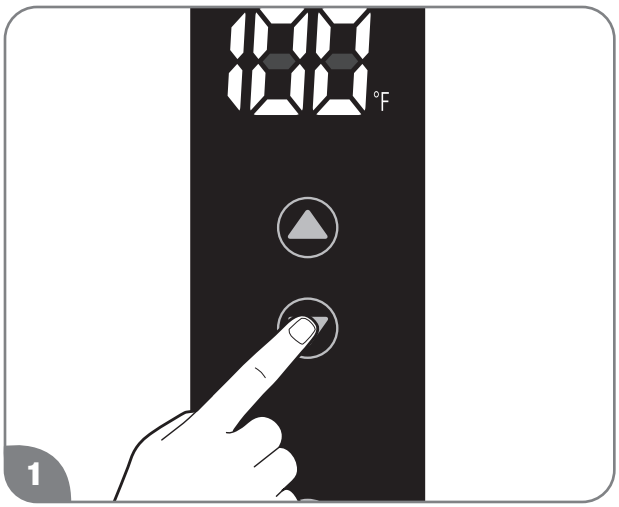


Press the UP adjustment button repeatedly until 120°F (49°C) shows in the LED display. Hold the UP button until the "120" on the display starts to blink.

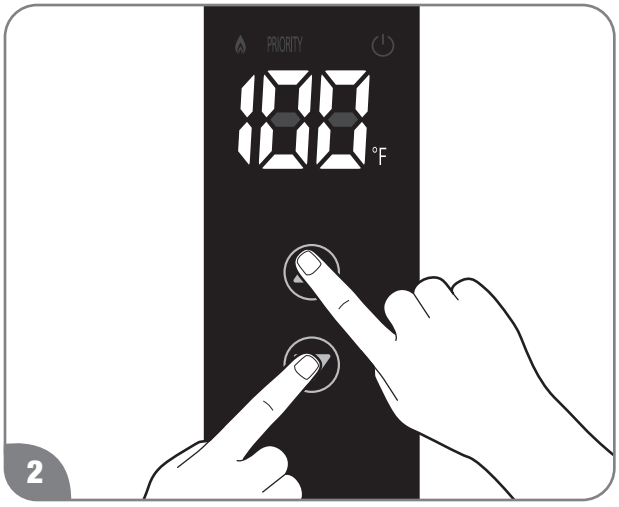


While "120" is blinking, press and hold the UP button for 5 seconds, to set the temperature above 120°F.

If the ability to set above 120°F (49°C) needs to be disabled, please refer to the following steps.



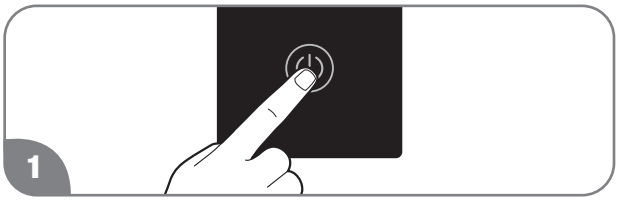
Press DOWN button until "100" is displayed.



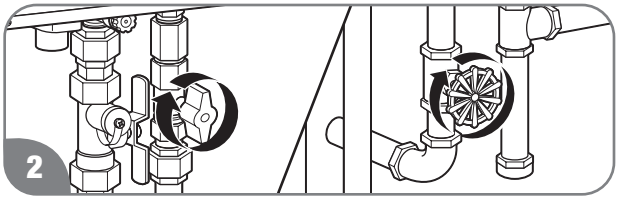
Press and hold the DOWN button for 2 seconds, and then press the UP button while continuing to hold the DOWN button.

1.4.3 SETTING MAINTENANCE

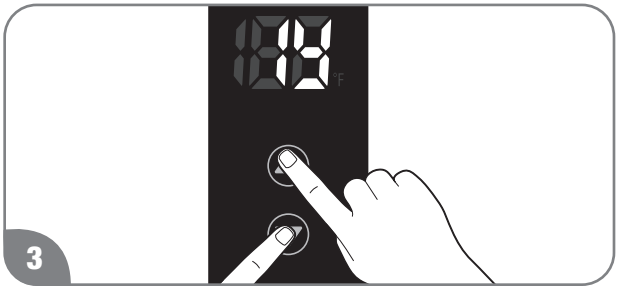
The maintenance notice is an optional control and is inactive as default. The maintenance notice reminds users of water heater maintenance activities such as flushing the heat exchanger or replacing the water treatment filter (if applicable) in order to maximize the life of your tankless water heater.



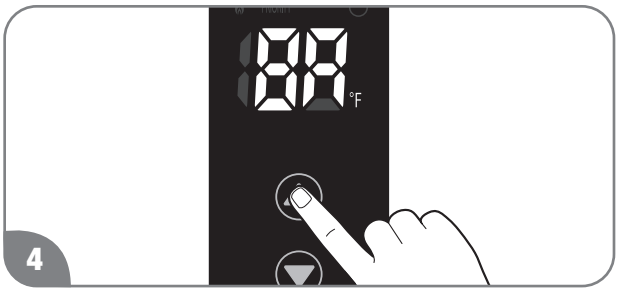
Turn off the remote control.



Turn off the gas and water to the water heater by closing the shut-off valves.



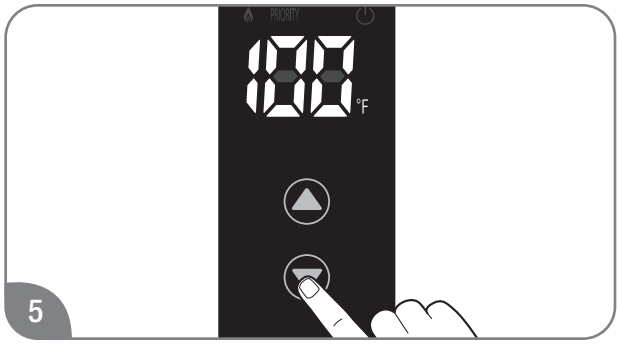
Press the "▲"and "▼"button until "1Y " is displayed on the LED display.



Press the "▲"or "▼"button until "8A " is displayed. And, press and hold the power button on the built-in display for 1 second.

The current setting time is displayed on the display.

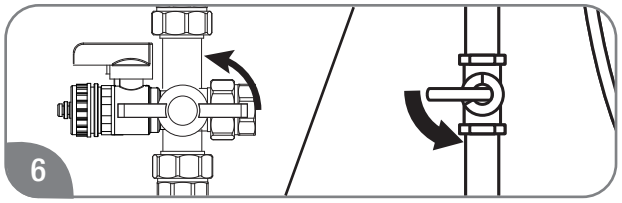
(Factory setting is "OFF")



Press the "▲"or "▼"button to choose "50", "75", "100" or "OF".

Displayed	Maintenance Notice Hour
50	500 hours
75	750 hours
100	1,000 hours
OF	OFF

Once the value is selected, power off the remote to exit maintenance mode.



First, press the power button to turn the remote control on. Then, turn on the gas and water to the water heater by opening the shut off valves.

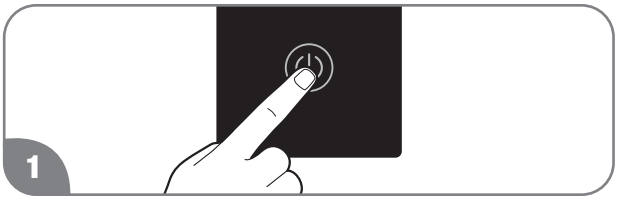
When the tankless water heater has a certain number of hours of combustion, error code "88" is shown on the display. It is highly recommended to perform water heater maintenance activities such as flushing the heat exchanger and/or replacing the water treatment filter (if applicable).

To clear error code "88", refer the section of "Error Code 88 Clearing" in this manual.

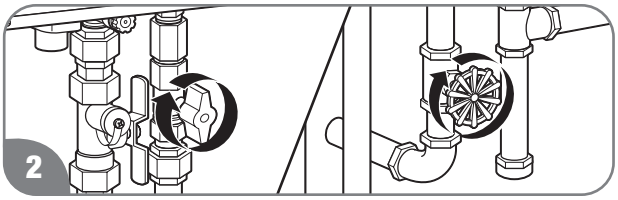
1.5 SETTING MENU ITEMS WITH DIP SWITCHES

1.5.1 MAINTENANCE MODE

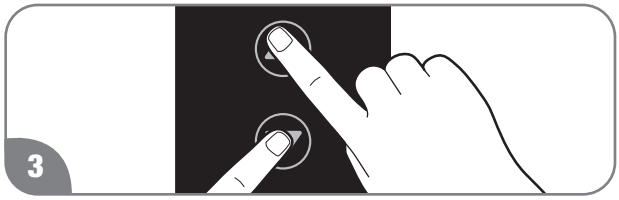
This water heater can display maintenance information with the built-in display or remote controller.



Turn off the remote control.



Turn off the gas and water to the water heater by closing the shut-off valves.



Press the "▲" and "▼" button until "1Y" is displayed on the built-in display.

And then, press "▲" or "▼" button to select the code with referring the following table.

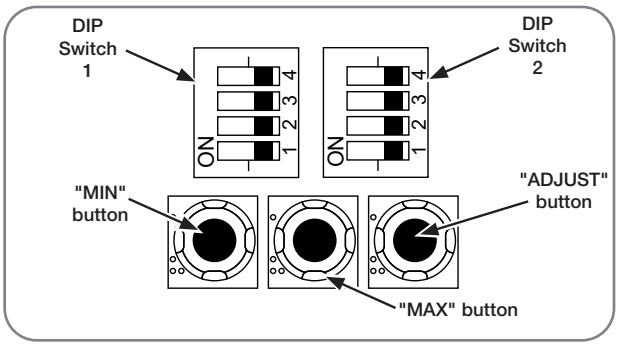
To operated the water heater heater while in maintenance mode press the power ON/OFF button once. The priority indicator should be on while the display reads the maintenance mode menu.

MAINTENANCE INFORMATION TABLE

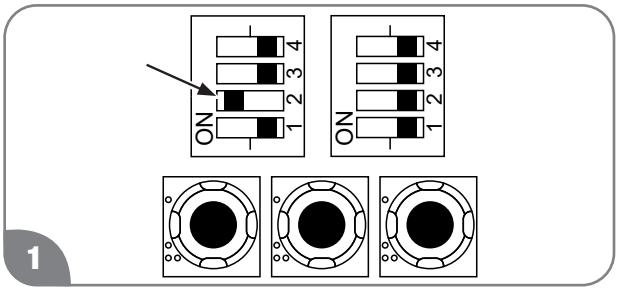
		***First DIGIT: Use DOWN (▼) button on controller**									
		***0**	***1**	***2**	***3**	***4**	***5**	***6**	***7**	***8**	***9**
***Second DIGIT: Use UP (▲) button on controller**	***E**	Null	Error Code for the most recent 8 faults								Null
	***F**	Null	Sequence number of the most recent 8 faults								Null
	***C**	Total combustion times (**x 10,000 times)	Total combustion times until the most recent 8 faults (** x 10,000 times)								Null
	***D**	Total combustion times (**x 100 times)	Total combustion times until the most recent 8 faults (** x 100 times)								Null
	***H**	Total combustion times (**x 1,000 hours)	Total combustion times until the most recent 8 faults (** x 1,000 hours)								Null
	***J**	Total combustion times (**x10 hours)	Total combustion times until the most recent 8 faults (** x 10 hours)								Vent Setting Status
	***Y**	Flame Rod Status	GPM Flow Rate (*.* GPM)	Ambient Air Temperature	Cold Water Inlet Temperature	Heat Exchanger Temperature	Hot Water Outlet Temperature	Fan Speed (**x100 RPM)	Power for gas valve	Maintenance Notice: Total Combustion Hours (**x10 Hours)	Null
	***A**	Remote control status (Main controller)	Remote control status (Shower controller)	Null	Null	Null	Null	Null	Null	Maintenance Notice: Setting status (**x10 Hours)	Null

1.5.2 SETTING OPERATION MODE

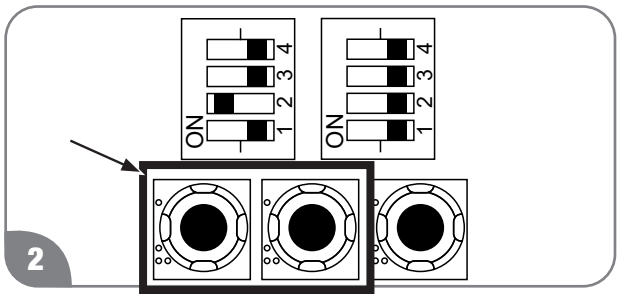
Using the DIP switches, this water heater can be set to the operation mode at the Max (6H) & Min (1L) input rates. This mode is for testing purposes ONLY.



If setting to the operation mode, please refer the following steps:



Change the second switch on “DIP 1” to the ON position (UP).



Press the “Max” button or “Min” button on the control board until “6H” or “1L” is displayed on the built-in display or the remote controller.

And then, operate the unit.

Once testing has been completed, return the DIP switch to the OFF position to exit the operation mode.

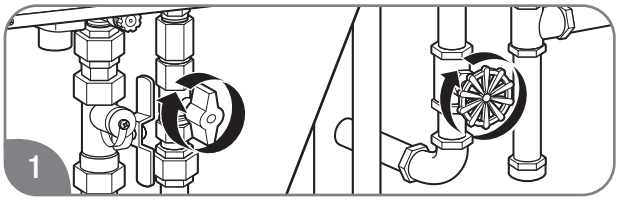
1.5.3 WATER SAVING CONTROL

Water saving control is optional and is inactive as default. To activate this control, appropriate procedures must be followed.

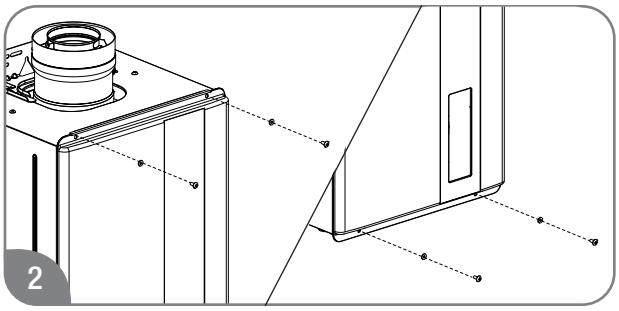
Water saving control can reduce waste water at initiation of hot water demand by reducing flow until outlet hot water reaches set temperature.

It is recommended to turn ON this control if the water heater is installed in a drought area or anywhere water conservation is needed.

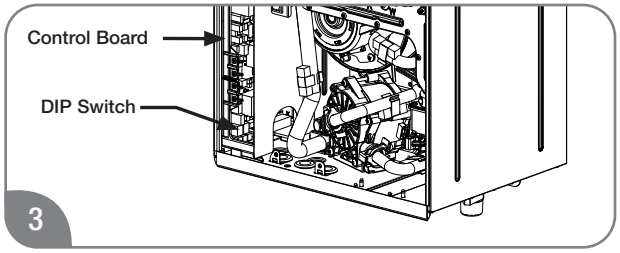
Follow the steps below to turn ON the water saving control.



Turn off the remote control and the gas/water to the water heater by closing the shut-off valves.

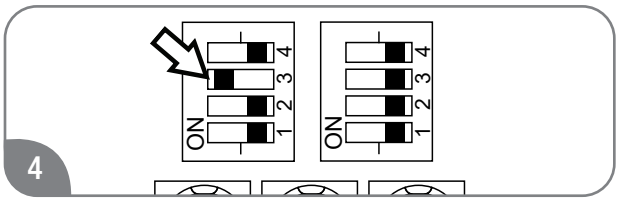


Remove the front cover panel on the water heater.

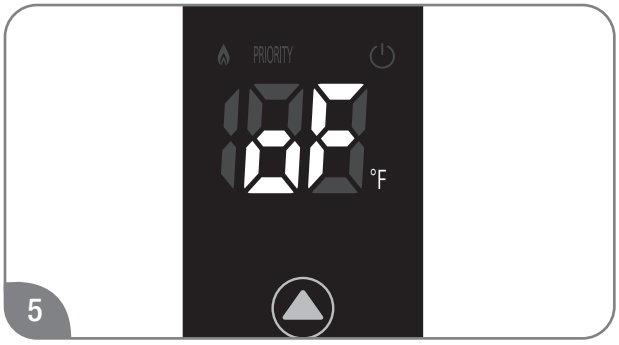


Find DIP Switch 1 located in the top-right portion at the control board.

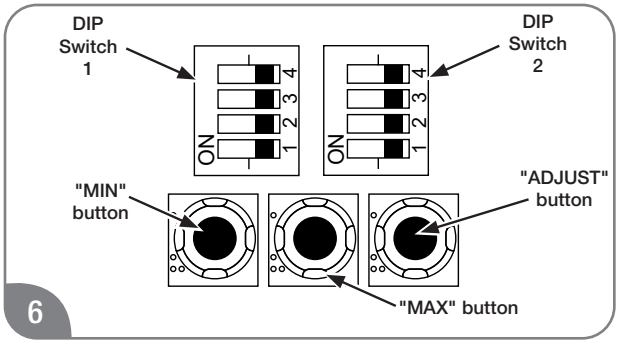
1.5.3 WATER SAVING CONTROL



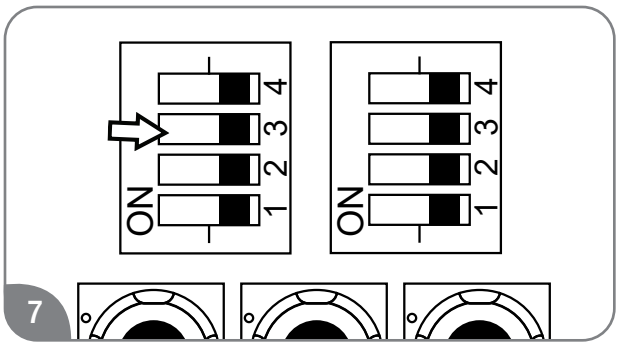
Change the third switch on “DIP switch 1” to the ON position (UP).



LED display on the built-in control shows “oF”.



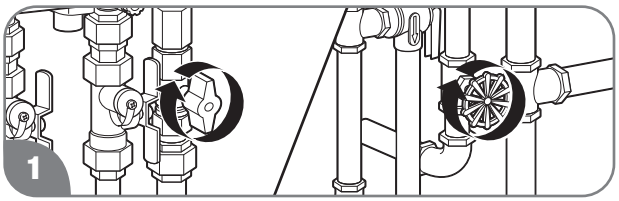
Press the “Max button” or “Min button” on the control board to set the activation of this control.



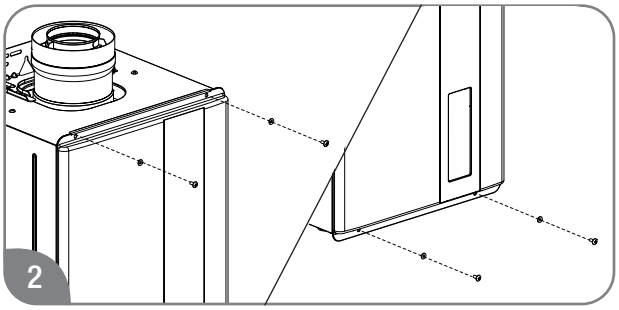
After setting the activation of this control, change the third switch on “DIP switch 1” to the OFF position (DOWN).

1.5.4 HIGH ALTITUDE ADJUSTMENT (NON - CONDENSING MODEL ONLY)

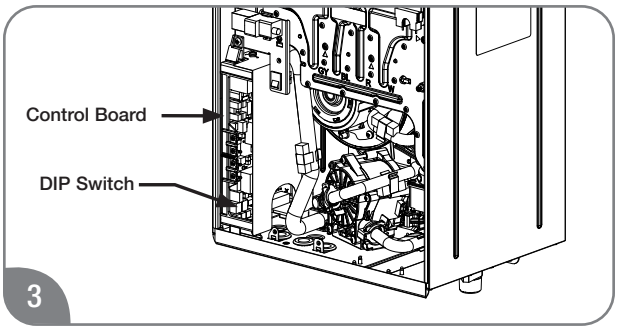
When the water heater is installed above 2000 ft. (610 m), the settings on the DIP switch located on the control board need to be changed per vent length and altitude. If these settings are not changed, the water heater may not function properly.



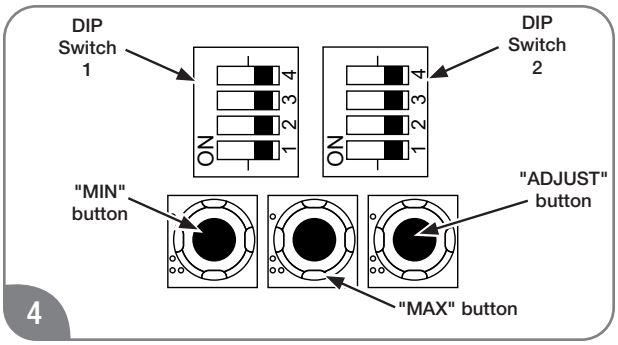
Verify the altitude that the water heater is installed. Turn off the gas and water to the water heater by closing the shut-off valves.



Remove the front cover panel on the water heater.

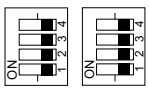
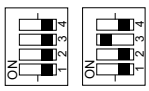
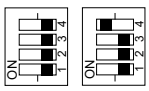
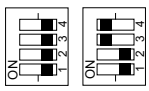


Find DIP Switch 2 located in the bottom-left portion of the control board. The switch labeled “DIP 2” is the right-most switch.



The factory settings for this switch should all be in the OFF position (DOWN).

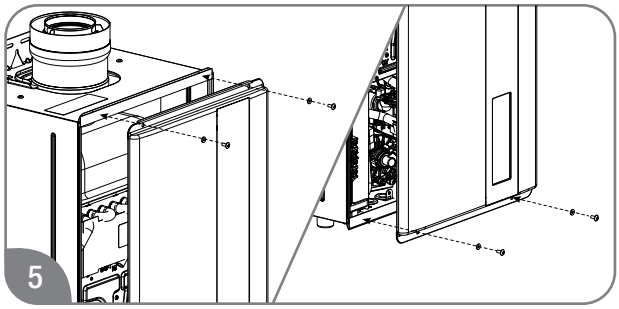
For altitudes above 2000 ft. (610 m), refer to the table below for the necessary DIP switch settings. These setting must be changed to ensure proper operation.

ALL VENT LENGTHS								
Identify Vent Length	IDENTIFY ALTITUDE							
	0 - 2,000 ft		2,001 - 5,400 ft		5,401 - 7,800 ft		7,801 - 10,200 FT	
	Setting	Dip	Setting	Dip	Setting	Dip	Setting	Dip
All Vent Lengths	A (Factory Setting)		B		C		D	

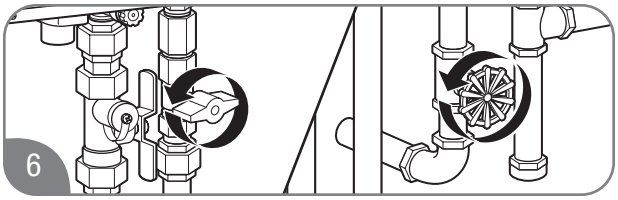
1.5.4 HIGH ALTITUDE ADJUSTMENT (NON - CONDENSING MODEL ONLY)

NOTICE:
DO NOT alter any other DIP switch settings. The manifold pressure will be reduced accordingly.

Please contact technical service if you have any questions of high altitude DIP switch adjustments.



Replace the front cover panel and turn the remote control ON.



Turn on the gas and water to the water heater by opening the shut-off valves.

1.6 RECIRCULATION PUMP CONTROL

Recirculation Operation

The water heater is turned ON when the recirculation pump starts operation. The water heater produces hot water at the setting temperature. When the return water temperature reaches approximately 18°F (10°C) below the setting temperature, the water heater and the pump will turn OFF. The cycle will restart at the approximate time interval in the table below based on the temperature thermistor readings.

Energy Saver Mode

The Energy Saver mode operates as follows:

- Less energy consumption due to fewer pump cycles
- Pump cycles ON every 30 to 60 minutes

Performance Mode

The Performance mode operates as follows:

- Higher energy consumption due to more pump cycles
- Pump cycles ON every 15 to 30 minutes

Actual pump ON intervals may vary based on the setting temperature, insulation, and heat loss in the system.

On-Demand Mode

The EcoNet application should be utilized for On-Demand Installations.

If the water heater is NOT a WiFi model, you cannot use the On-Demand mode.

To enter On Demand Mode

- Ensure Switch 1 on DIP 2 and switch 4 on DIP 1 are off.
- In less than one minute.
    - Turn Switch 1 on DIP 2 on-off-on-off.
    - Press the Adjust Button
    - The LED will flash one time

The unit is now in on-demand mode, which can be controlled through the EcoNet application.

NOTE: If the water heater does not have WiFi capability, the built-in display needs to be replaced to the display including wifi capability.

See the Parts and Accessories catalog for more information.

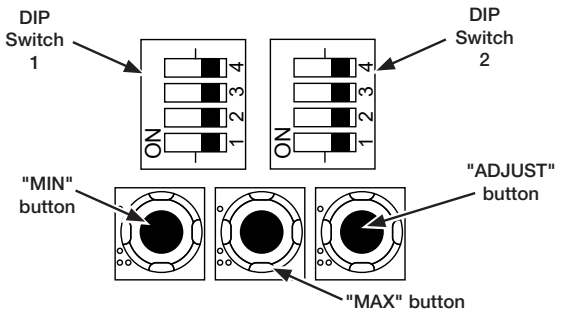
Schedule Mode

To use Schedule mode, the water heater should be set to Performance mode.

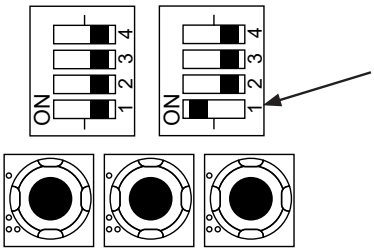
If the Schedule mode is used, the water heater needs wifi capability.

If the water heater is NOT a WiFi model, you cannot use the Schedule mode.

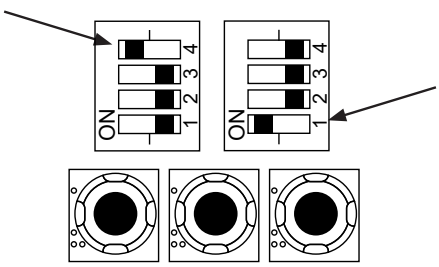
When set to Schedule mode, the recirculation pump is ON according the setting schedule on the application on smart phone.



Performance



Energy Saver



2. Error Code Diagnostics

2.1 NO ERROR CODE AND NO HOT WATER

EXPLANATION
No hot water is delivered when water is flowing through the heater with the controller or remote controller "On".

[For "NO POWER" complaint (Controller will not turn on) – Check wall outlet for 120V. If voltage is present, check two 10-amp fuses on the control board.]

POSSIBLE CAUSE
- Water flow (Minimum 0.4 GPM to active)
- Unit was not set to "Enable".
- Water flow sensor

CHECK METHOD
- **Water flow (0.4 GPM to active)**

1. Use cold water shutoff valve to turn OFF water supply to unit. Turn remote control OFF; unplug power cord at wall outlet. Wait 10 seconds; plug power cord back into outlet; wait 20 seconds; turn the remote control ON. Turn water supply ON; check the nearest hot water fixture for hot water.

2. Go to 1Y in maintenance mode (see 1.6.1), and check the flow rate with one or more hot water faucets running.
   If the unit shows above 0.4gpm, and the unit does not fire, replace the control board.
   If the unit shows 0.4gpm or less, check your fixture aerator screens(s) for debris. Clean if necessary.

3. Your water flow may be restricted by debris in the heat exchanger or water filter. To flush the water heater refer to section "1L error code," and remove the water filter and inspect. Clean if necessary.

4. Your water lines might be crossed. Make sure your hot and cold water supply lines are connected to the appropriate hot and cold water assembly connections on the unit.

- **Unit was not setting "Enable".**
  Please check the power ON/OFF indicator is shown on the built-in controller or remote controller. If this indicator is not shown, press the power ON/OFF button.

- **Water flow sensor**
  FINAL CHECK: Water flow sensor in water volume control valve.

1. Check the voltage between #27 wire (Black) and #31 wire (Red) at the connector "E" on control board.

2. With the unit turn ON and no water flow, you should read 11-17 DC volts.

3. If reading is not 11-17 DC volts, replace the control board.

4. If you have voltage, check the voltage between #27 wire (Black) and #29 wire (Blue) at the connector "E" with the water flowing. You should read a pulsing 4-10 DC volts.

5. If you have a reading and no main burner activity, replace the control board.

6. If you do not have a reading, remove any debris from water volume control valve.

2.2 ERROR CODE LIST

P1 Error Code – Not enough water flow for operation

EXPLANATION
If the water flow is too low to operate the water heater, the water heater displays the "P1" error code on the built-in controller or the remote controller.

This water heater needs a minimum water flow of 0.4 GPM to active the water heater.

To check the water flow rate through the unit, please refer to section "1.6.1 Maintenance mode".

DIAGNOSTIC CHECK ITEMS
- Not enough water flow
- Water supply line (Hot and Cold)
- Water filter
- Recirculation pump (If a pump is installed in recirculation line)

CHECK METHOD
- Your water flow may be restricted by debris in the heat exchanger or water filter. To flush the water heater refer to section "1L error code," and remove the water filter and inspect. Clean if necessary.

- Go to 1Y in maintenance mode (see 1.6.1), and check the flow rate with one or more hot water faucets running. If the unit shows above 0.4gpm, and the unit does not fire, replace the control board. If the unit shows 0.4gpm or less, check your fixture aerator screens(s) for debris. Clean if necessary.

- The water flow sensor may have a blockage. Remove the water control valve and clean if necessary.

- Possible plumbing cross-over in the home. Turn OFF hot water valve to the water heater. Go to each water fixture in the home and turn ON the hot water ONLY (test washing machine by setting it to hot ONLY). If water flows freely through the hot water side of the fixture, this is a plumbing crossover. HINT: During this test, to prevent scalding, pressure-balancing valves on single-handle fixtures will not allow any water to flow if there is a plumbing crossover.

1L Warning Code – Lime build-up detected in heat exchanger

EXPLANATION
The control board has detected lime build-up inside the heat exchanger. To prevent permanent damage to the unit, the unit must be drained and flushed

Flushing procedure may need to be repeated for excessive lime and scale build-up.

To reset 1L code, hold down the MIN and MAX buttons on the control board at the same time for 10 seconds.

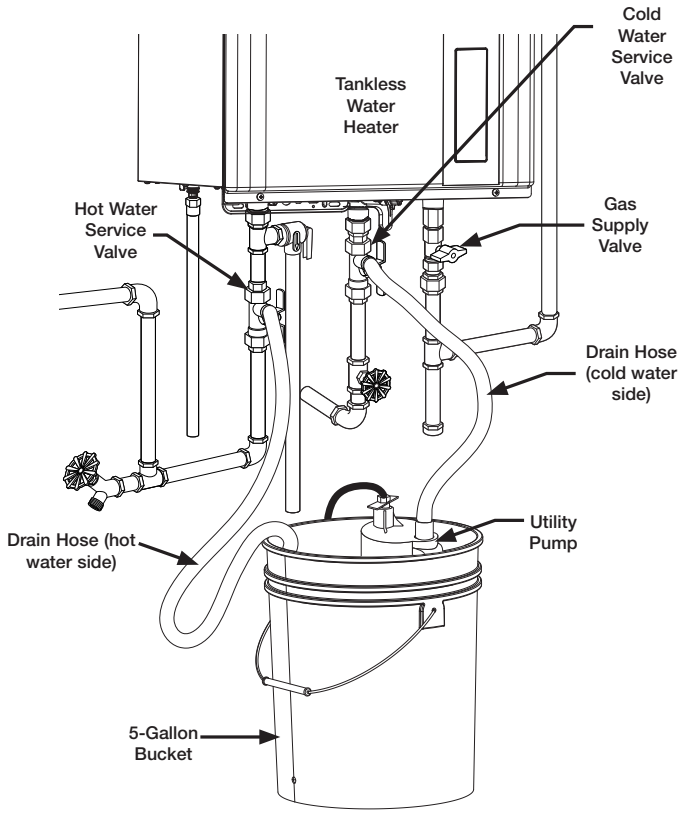
NOTE:
Flushing instructions utilize a submersible utility pump. (Provided with the Rheem/Ruud Tankless Flush kit – RTG20124)

1. Turn OFF gas and both the cold and hot water supply to the water heater. The gas must remain OFF during the flushing process.

2. At the remote control, turn OFF the power and wait 10 seconds. Turn ON the power and wait 10 seconds. Disconnect the water heater from the electrical source.

3. Connect a hose to the hose connections on the service valves under the water heater.

4. Place the loose end of the hoses into a 5 gallon bucket.



5. Open the service port valve on each side of the service valves, to allow the heater to drain. Connect the cold water side hose to the outlet side of the utility pump and set the pump into the bottom of the bucket.

6. Pour 2 gallons of virgin food grade white vinegar into the bucket and turn the pump ON.

7. Allow the pump to circulate the vinegar for 45 to 60 minutes. (time will vary depending upon mineral build-up and harness of the water).

8. Turn OFF the pump and remove the hose from the pump. Allow the vinegar to drain from water heater into the bucket.

9. Place the hot water side hose in another bucket or route it to a suitable drain.

10. Close the service port valve on the cold water side and disconnect the cold water hose from the service valve.

11. Follow instructions in the Use & Care manual, supplied with the water heater, to clean the water inlet filter.

12. Turn ON the cold water supply to the heater. DO NOT TURN ON THE HOT WATER SUPPLY TO THE HEATER. Water will begin to flow through the heater; this will rinse out any remaining vinegar from the water heater. Allow the water to run for approximately 5 minutes.

13. Close the hot water service port valve and disconnect the drain hose.

14. Open a hot water fixture in the home, such as a tub. Allow the water to flow for a minute to ensure there is no air remaining in the system. Turn OFF the hot water fixture.

15. Reconnect power to water heater, turn ON gas supply, and turn ON power at the remote control.

16. Turn ON a hot water fixture to ensure the water heater is operating.

03 Error Code – Manifold setting failure

EXPLANATION

Only for manifolded (multiple) unit installations: EZ-Link, MIC-6, or MIC-185 manifold systems.

If the water heaters are installed by manifolding, and some units in the manifolding cannot communicate to the manager unit and/or controller, the water heater displays the “03” error code on the display on the built-in controller or the remote controller of manger unit.

DIAGNOSTIC CHECK ITEMS

- Connection cable between water heaters and the manifold controller.
- The DIP switch setting on the control board.

CHECK METHOD

- Turn the gas and water supply off to all water heaters in the manifold.
- Disconnect main power supply to all water heaters on the manifold.
- If using a MIC-185, disconnect main power supply.
- Check the connection cable
- Please remove and reinsert the connecting cable between water heaters.
- Check the DIP switch setting
- The DIP switch is located on the control board of the water heater.
- To operate the units in the manifolding, DIP1, switch #4must be in the “ON” position for all units.
- Reconnect main power supply to all units in the manifold.
- If using a MIC-185, reconnect main power supply.
- Check the manifold
- For MIC-6 and MIC-185 watch the LED lights for all units plugged in until they are solid.
- Turn remote control on, then turn on gas and water supply to all units. Attempt operation.

If 03 error code is displayed after completing all checks:

Call Technical support (800)-432-8373

05 Warning Code & 28 Error Code Low heat exchanger temperature detected

EXPLANATION

If the heat exchanger thermistor detects low temperature while the water heater is running, the water heater displays the “05” warning code on the built-in controller or the remote controller.

And then, if the heat exchanger thermistor detects the low temperature continuously after “05” warning code is displayed, the water heater displays the “28” error code on the built-in controller or the remote controller.

DIAGNOSTIC CHECK ITEMS

- Inlet thermistor
- Heat exchanger thermistor
- Proportional gas valve
- Water valve

CHECK METHOD

- **Inlet thermistor**

Please refer the section of “31 Error Code: Inlet thermistor malfunction”

- **Heat exchanger thermistor**

Please refer the section of “32 Error Code: Heat exchanger thermistor malfunction”

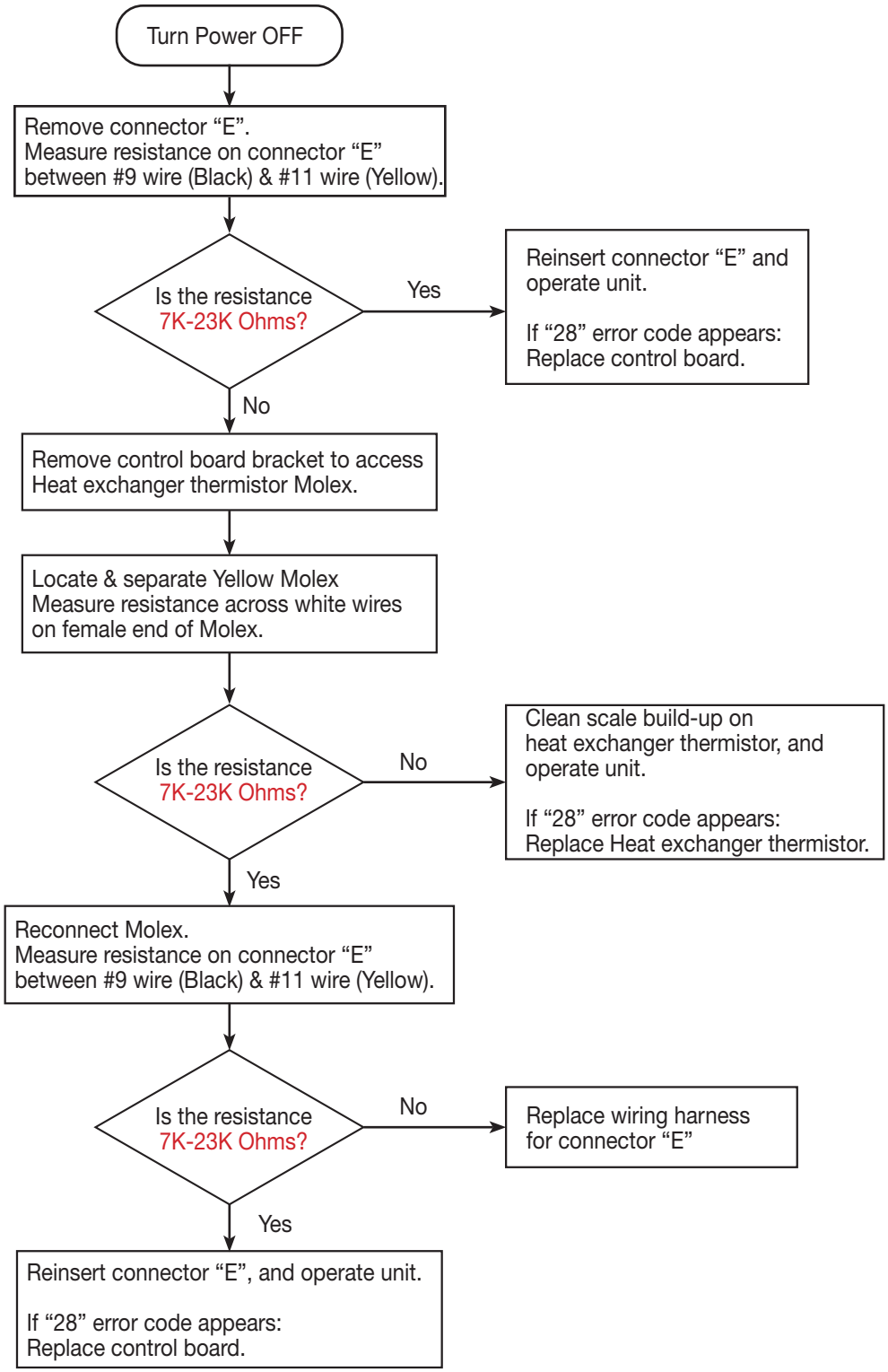
- **Proportional gas valve**

Please refer the section of “52 Error Code: Proportional gas valve malfunction”

- **Water valve**

Please refer the section of “65 Error Code: Water motor failed” and “66 Error Code: Bypass motor failed”

05 Warning Code & 28 Error Code (cont.)
Low heat exchanger temperature detected



10 Warning Code – Incorrect inlet air volume

EXPLANATION
If this water heater was operated prior to vent installation OR blower motor is not creating enough ventilation, the water heater displays the "10" warning code on the built-in controller or the remote controller.

DIAGNOSTIC CHECK ITEMS
- Venting
- Blower motor

CHECK METHOD
- **Venting**
  Check the condition of venting (For example, the vent connections and termination)
  If the venting is disconnected or the termination is blocked by something, reconnect the vents or clean the termination (Both inlet side and exhaust side)

  Refer to section "1.1.4 Venting for direct-vent water heater" in this manual and refer to U&C manual for installation instructions.

- **Blower motor**
  Refer to section "61 Error Code: Blower motor speed incorrect for combustion" in this manual.

11 Error Code – Flame Not Detected by Flame Rod

EXPLANATION
In the case of ignition failure, the water heater will attempt ignition 2 times.

If no flame is detected, the water heater displays the "11" error code on the built-in controller or the remote controller.

DIAGNOSTIC CHECK ITEMS
- Gas supply pressure
- Gas filter
- Venting
- Igniter rod
- Flame rod

CHECK METHOD
- **Gas supply pressure**
  1. Check the gas supply pressure at the gas connection of the water heater.
     The correct gas pressures are below;
     Natural Gas (NG); 4.0" – 10.5" W.C
     Liquid Propane (LP); 8.0" – 13.0" W.C
  2. While the static pressure is normal, the use of another gas appliance may cause a possible drop to the water heater. Therefore, it is required to check the dynamic pressure.
     Static pressure: Gas pressure during standby.
     Dynamic pressure: Gas pressure at max combustion.

- **Gas filter**
  Check the gas filter at the gas connection of the water heater, to ensure that filter is not blocked by some foreign substance.

  If the gas filter is blocked by something, clean the gas filter and remove the blockage.

- **Venting**
  Check the condition of venting (For example, the vent connections and termination).

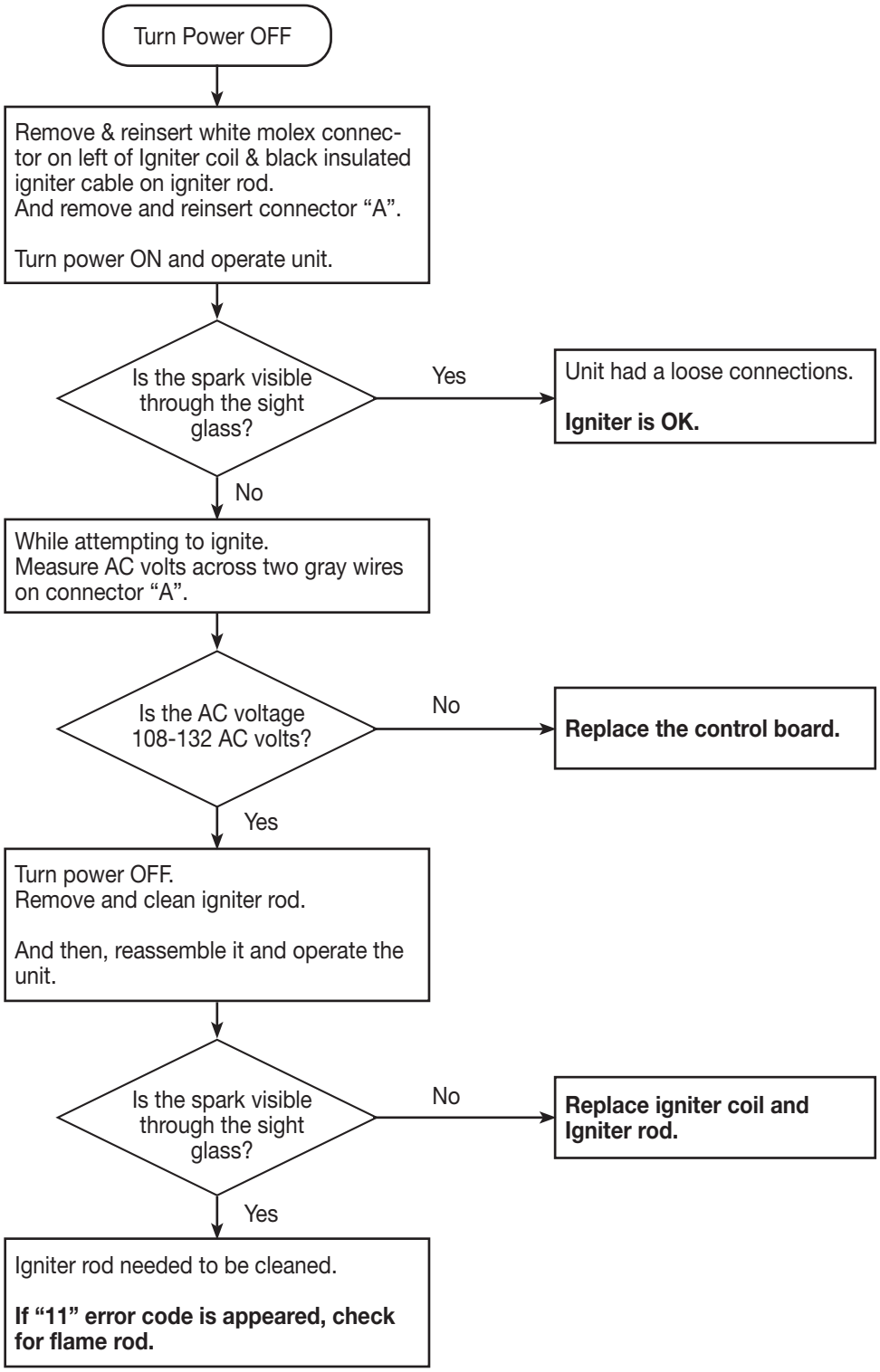
  If the venting is disconnected or the vent termination is blocked by something, reconnect the vents or clean the vent termination (Both inlet side and exhaust side).

  Refer to section "1.1.4 Venting for direct-vent water heater" in this manual and refer to U&C manual for installation instructions.

- **Dip Switches**
  Check that all dip switches are set according to their venting and altitude.

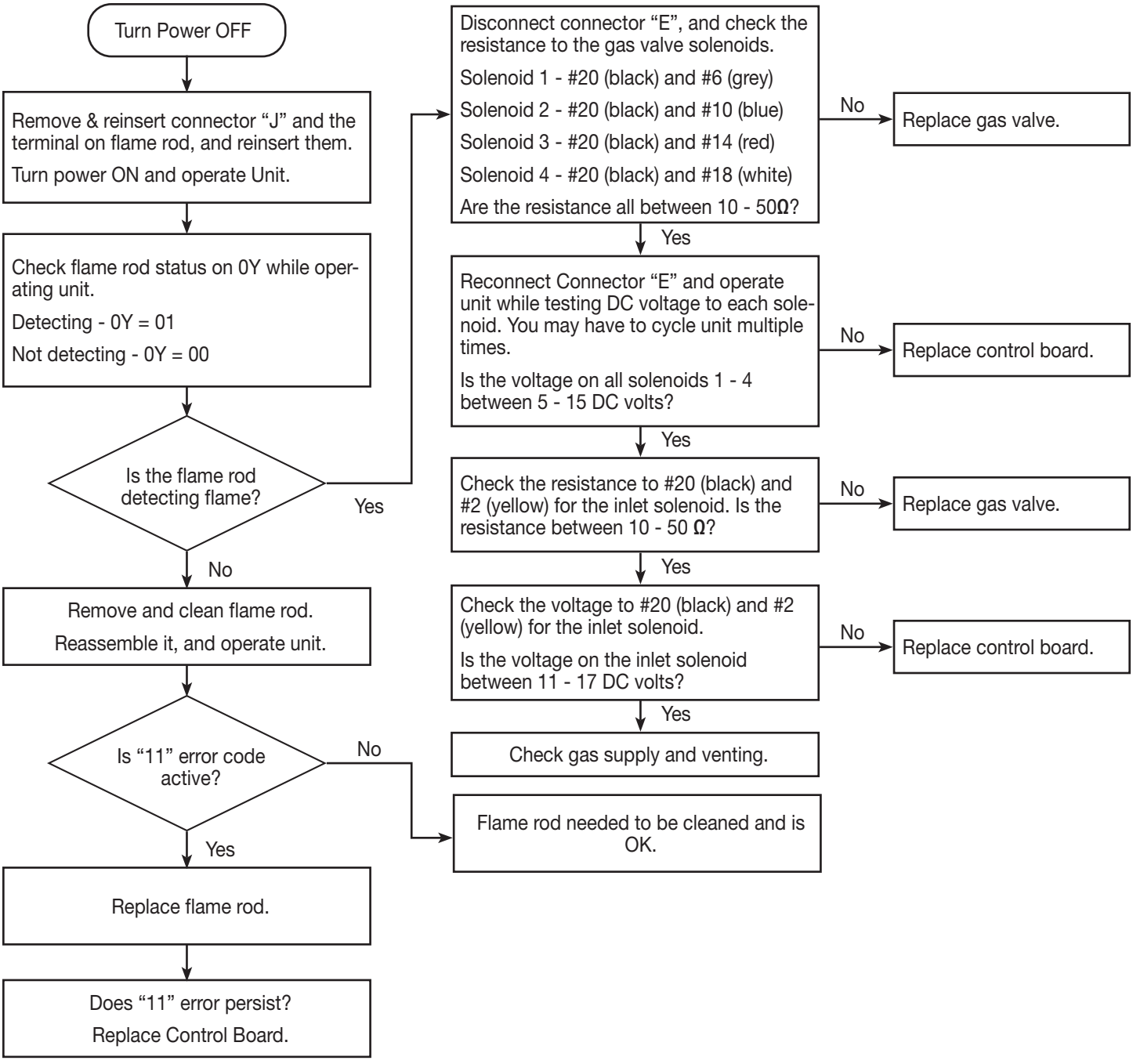
11 Error Code – Flame Not Detected by Flame Rod (cont.)

- **Igniter rod (Flame is not visible)**
  If the spark is NOT visible through the sight glass, refer to the following steps to check igniter rod and coil.



11 Error Code – Flame Not Detected by Flame Rod (cont.)

- **Flame rod (Flame is visible)**
  If the spark is visible through the sight glass, refer to the following steps to check flame rod. Flame rod status can be checked in maintenance mode on 0Y while operating the water heater. Refer to "1.6.1 Maintenance Mode."



12 Error Code – Detected Presence of Flame, Then Lost it

EXPLANATION

If the water heater detects loss of flame during combustion, the water heater stops supplying fuel, attempts to restart, counts the incidents of flame loss. If the incident occurs 3 times consecutively, the water heater displays the "12" error code on the built-in controller or the remote controller.

DIAGNOSTIC CHECK ITEMS

- Gas supply pressure
- Gas filter
- Venting
- Flame rod

CHECK METHOD

- **Gas supply pressure**
  1. Check the gas supply pressure at the gas connection of the water heater.
     The correct gas pressures are below;
     Natural Gas (NG); 4.0" – 10.5" W.C
     Liquid Propane (LP); 8.0" – 13.0" W.C
  2. While the static pressure is normal, the use of another gas appliance may cause a possible drop to the water heater. Therefore, it is required to check the dynamic pressure.
     Static pressure: Gas pressure during standby.
     Dynamic pressure: Gas pressure at max combustion.
     To set to max combustion, please refer to section "1.4.2 Setting operation mode" in this manual.

- **Gas filter**
  Check with the gas filter at the gas connection of the water heater, to ensure that filter is not blocked by some foreign substance.

  If the gas filter is blocked by something, clean the gas filter and remove the blockage.

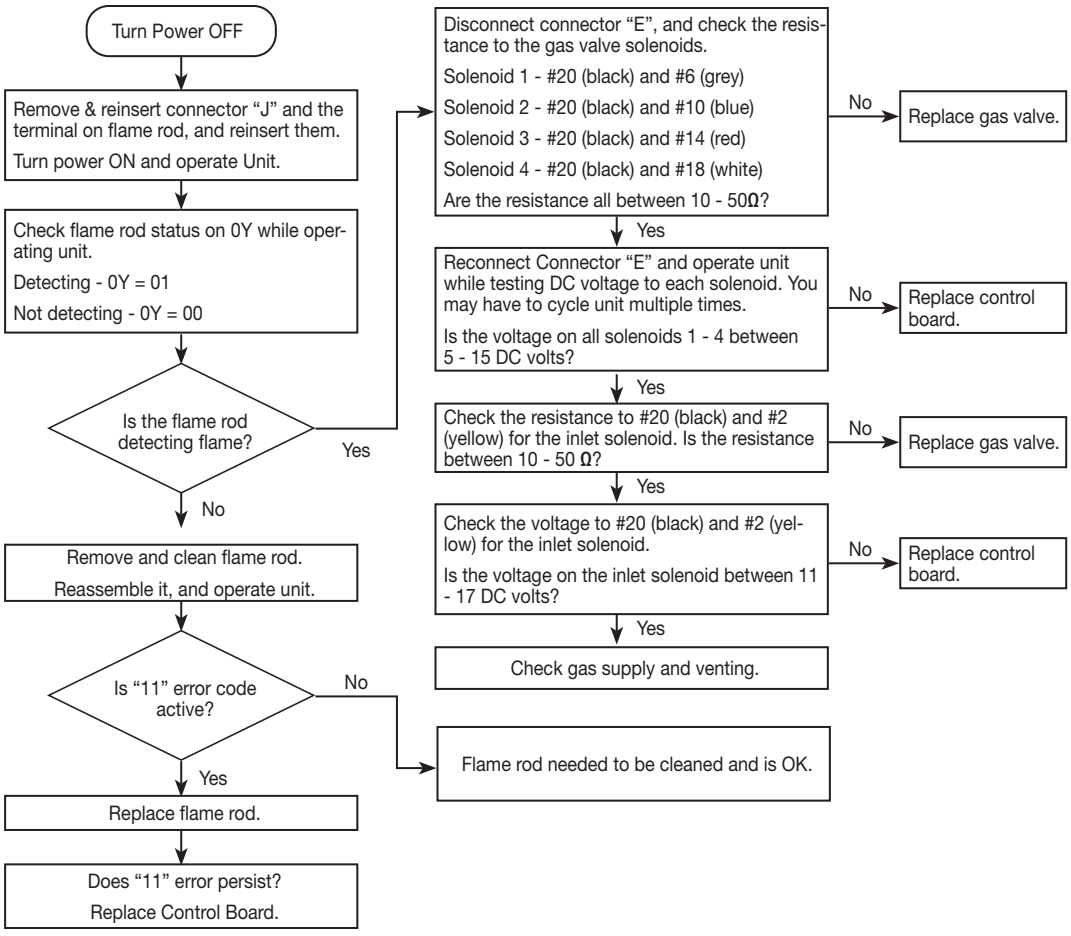
- **Venting**
  Check the condition of venting (For example, the vent connections and termination)

  If the venting is disconnected or the vent termination is blocked by something, reconnect the vents or clean the vent termination (Both inlet side and exhaust side)

  Refer to section "1.1.4 Venting for direct-vent water heat" in this manual and refer to U&C manual for installation instructions.

- **Flame rod (Flame is visible)**
  If the spark is visible through the sight glass, refer to the following steps to check flame rod.

- **Dip Switches**
  Check that all dip switches are set according to their venting and altitude.



14 Error Code – Over heat limiter is active

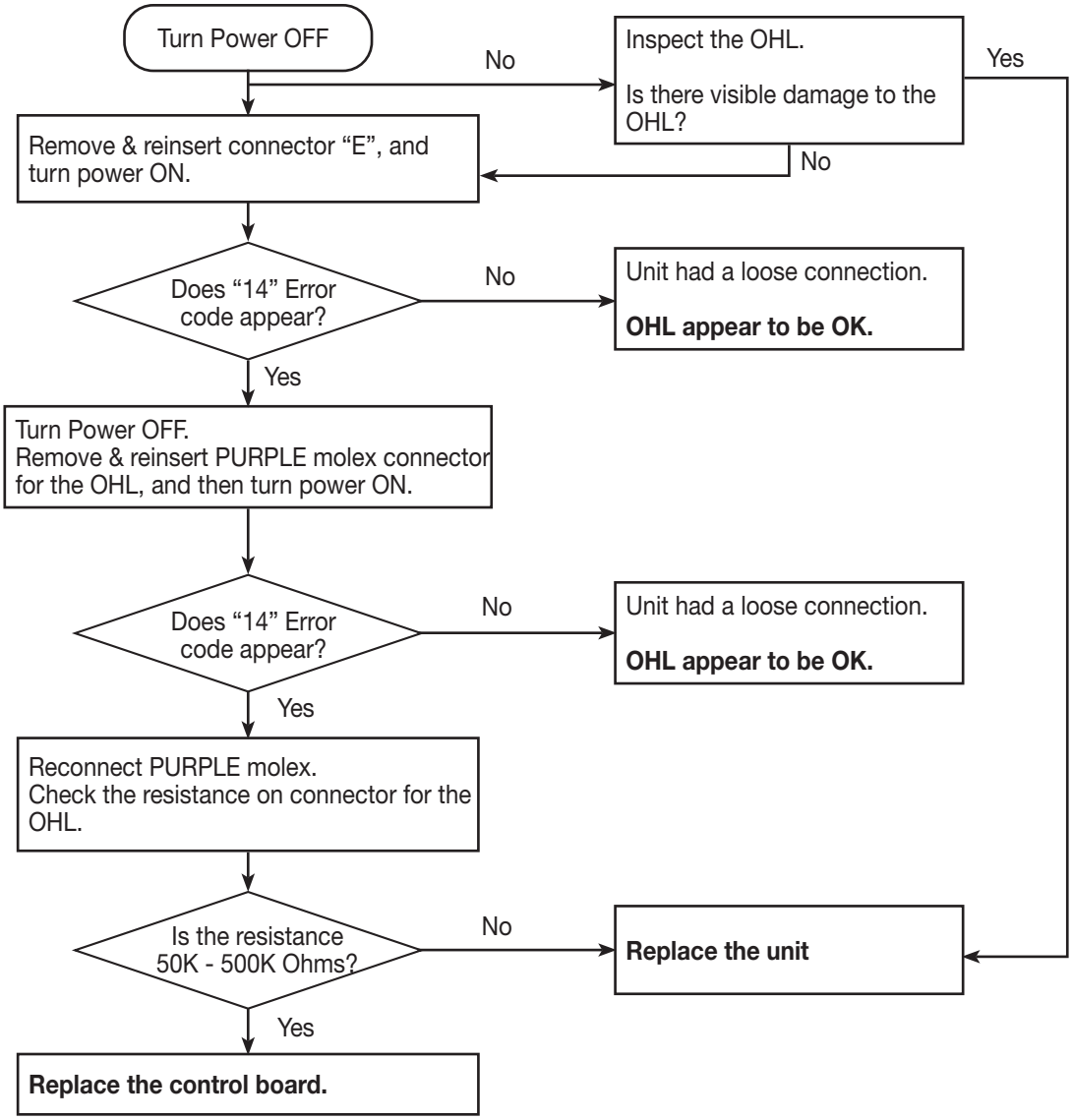
EXPLANATION
This water heater has an Over Heat Limiter (OHL).

If the OHL has been activated/broken, the water heater displays the "14" error code on the built-in controller or the remote controller.

This is normally cause by inadequate/wrong GAS SUPPLY and/or VENTING.

DIAGNOSTIC CHECK ITEMS
- Over Heat Limiter (OHL)

CHECK METHOD



15 Error Code – Excessively hot water detected

EXPLANATION
If the outlet and/or heat exchanger water temperature is more than 207°F (97°C) for more than 15 seconds, the water heater displays "15" error code on the built-in controller or the remote controller.

DIAGNOSTIC CHECK ITEMS
- Gas supply pressure
- Venting
- Heat exchanger thermistor
- Outlet thermistor
- Sediment build-up in heat exchanger

CHECK METHOD
- **Gas supply pressure**
  1. Check the gas supply pressure at the gas connection of the water heater.
     The correct gas pressures are below;
     Natural Gas (NG); 4.0" – 10.5" W.C
     Liquid Propane (LP); 8.0" – 13.0" W.C
  2. While the static pressure is normal, the use of another gas appliance may cause a possible drop to the water heater. Therefore, it is required to check the dynamic pressure.
     Static pressure: Gas pressure during standby.
     Dynamic pressure: Gas pressure at max combustion.

- **Venting**
  Check the condition of venting (For example, the vent connections and termination)

  If the venting is disconnected or the vent termination is blocked by something, reconnect the vents or clean the vent termination (Both inlet side and exhaust side)

  Refer to section "1.1.4 Venting for direct-vent water heater" in this manual or refer to U&C manual for installation instructions.

- **Heat exchanger thermistor**
  Go to "32 Error Code – Heat exchanger thermistor malfunction" diagnostic instructions.

- **Outlet thermistor**
  Go to "33 Error Code – Outlet thermistor malfunction" diagnostic instructions.

- **Sediment build-up in heat exchanger**
  Go to "1L Warning Code – Lime build-up detected in heat exchanger" diagnostic instructions for flushing instructions.

16 Error Code – Outlet thermistor failure

EXPLANATION
If the outlet water temperature is above the set point on the built-in controller or the remote controller, the water heater displays "16" error code on the built-in controller or the remote controller.

IMPORTANT
Check the outlet thermistor FIRST.

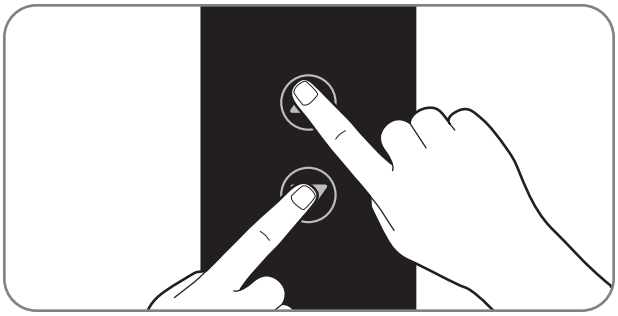
DIAGNOSTIC CHECK ITEMS
- Outlet thermistor
- Water bypass valve

CHECK METHOD
- **Outlet thermistor**
  Go to 33 Error Code -Outlet thermistor malfunction" diagnostic instructions.

- **Water bypass valve**
  Go to "66 Error Code – Bypass motor failure" diagnostic instructions.

24 Error Code – DIP switch malfunction

EXPLANATION
If the UP/DOWN buttons on the built-in controller or the remote controller are pressed for more than 20 seconds, the water heater displays “24” error code on the built-in controller or the remote controller.



DIAGNOSTIC CHECK ITEMS
- Built-in controller or remote controller.

CHECK METHOD
- Visually inspect wiring for the remote control for damaged or loose connections.

- Turn Power off and unplug the unit from its power source. Disconnect and reconnect the remote control wires.

- Plug unit in, turn power on, and attempt to operate unit.

If “24” error code occurs again, replace the built-in controller or remote controller.

31 Error Code – Inlet thermistor malfunction

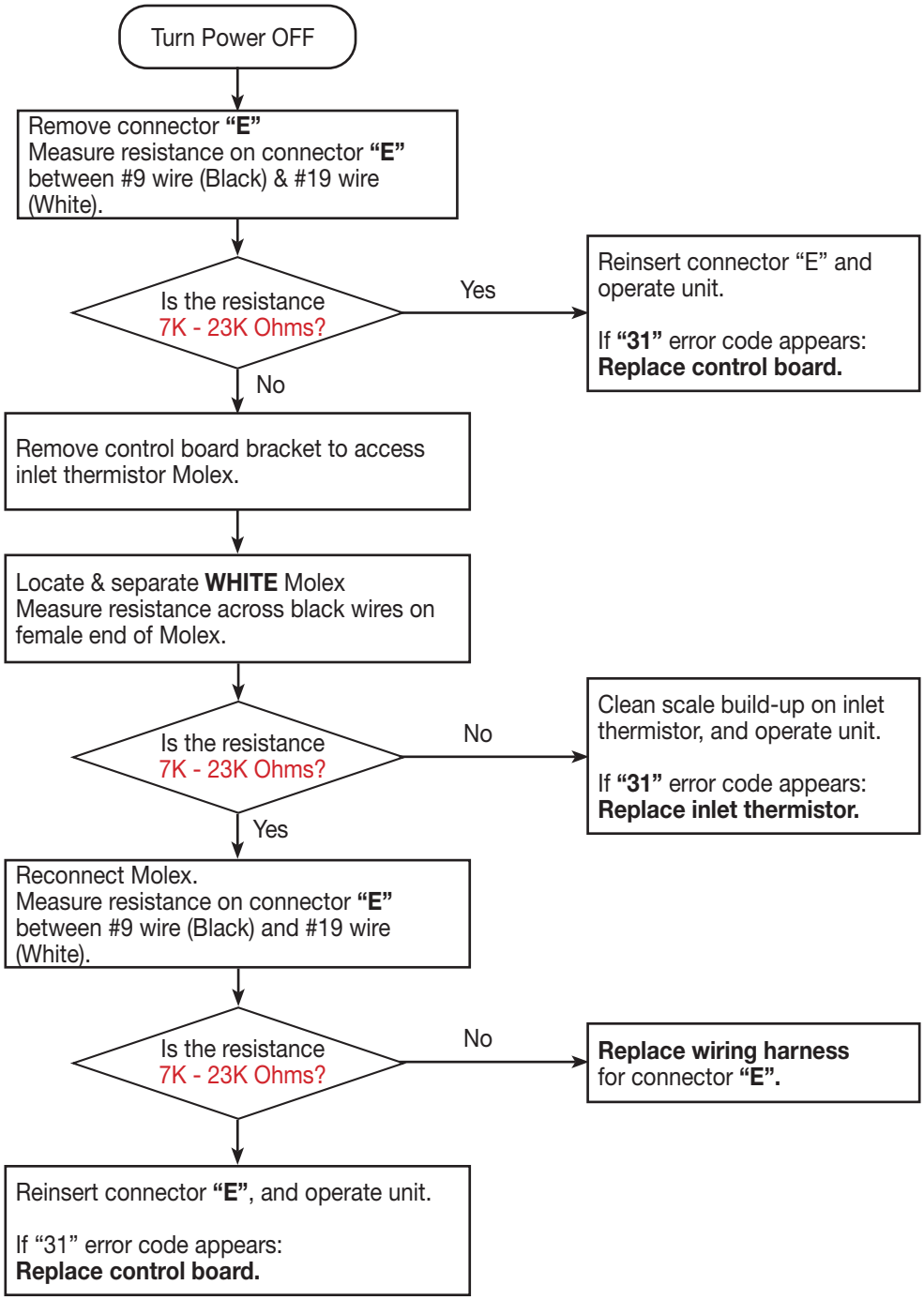
EXPLANATION

If an error in the inlet water thermistor is detected, the water heater displays the "31" error code on the built-in controller or the remote controller.

DIAGNOSTIC CHECK ITEMS

- Inlet thermistor

CHECK METHOD



32 Error Code – Heat exchanger thermistor malfunction

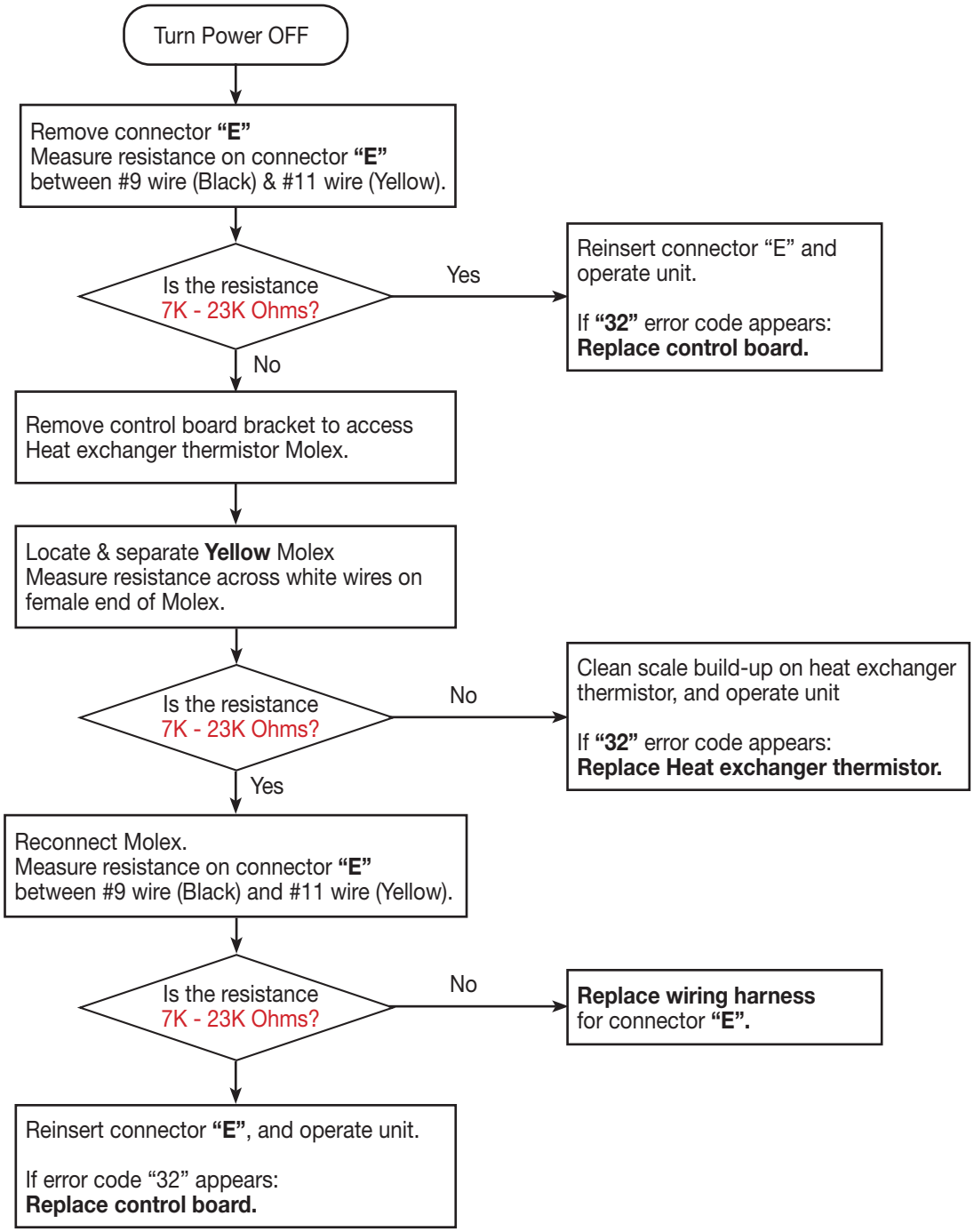
EXPLANATION

If an error in the heat exchanger thermistor is detected, the water heater displays the "32" error code on the built-in controller or the remote controller.

DIAGNOSTIC CHECK ITEMS

- Heat exchanger thermistor

CHECK METHOD

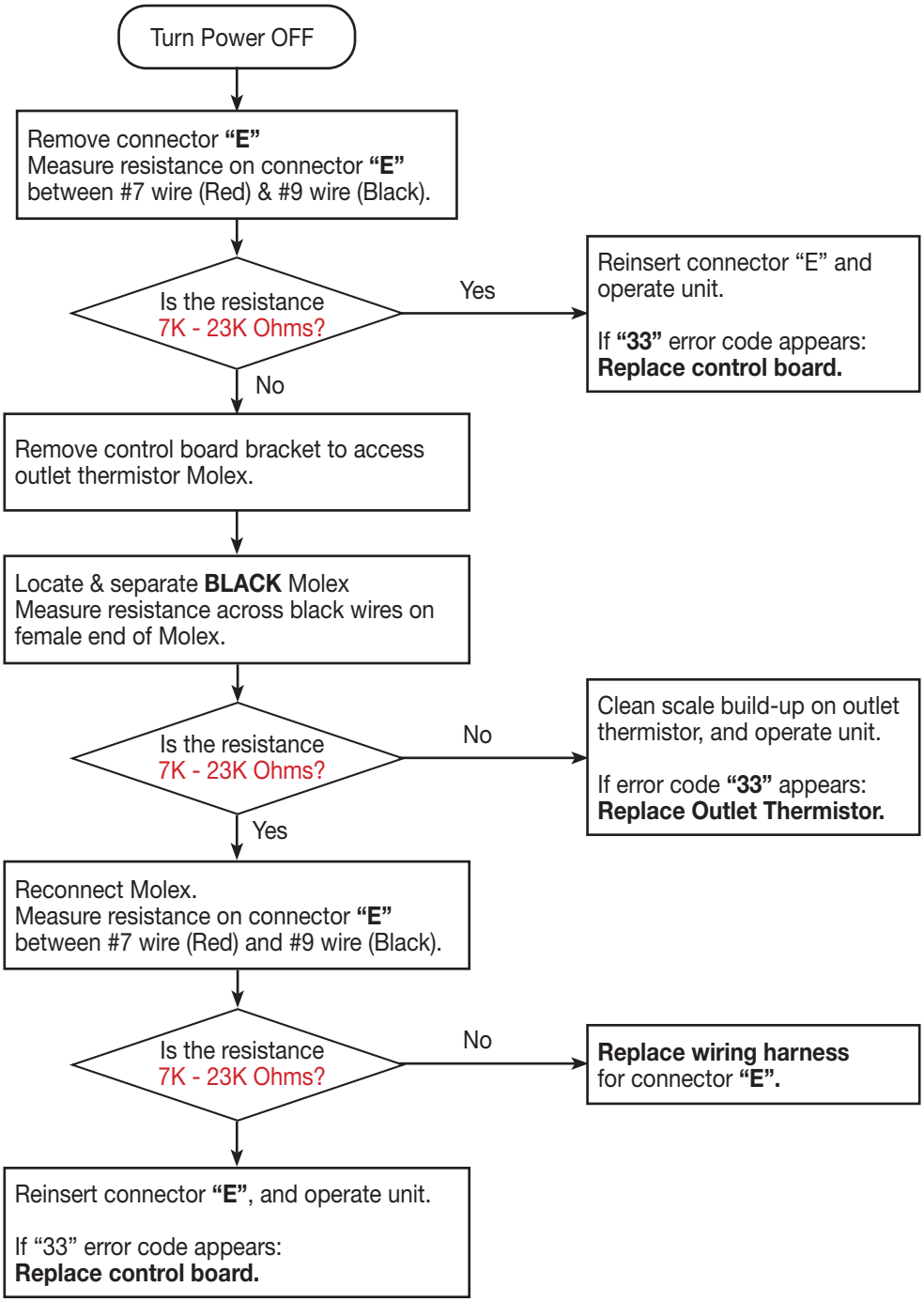


33 Error Code – Outlet thermistor malfunction

EXPLANATION
If an error in the outlet water thermistor is detected, the water heater displays the “33” error code on the built-in controller or the remote controller.

DIAGNOSTIC CHECK ITEMS
- Outlet thermistor

CHECK METHOD

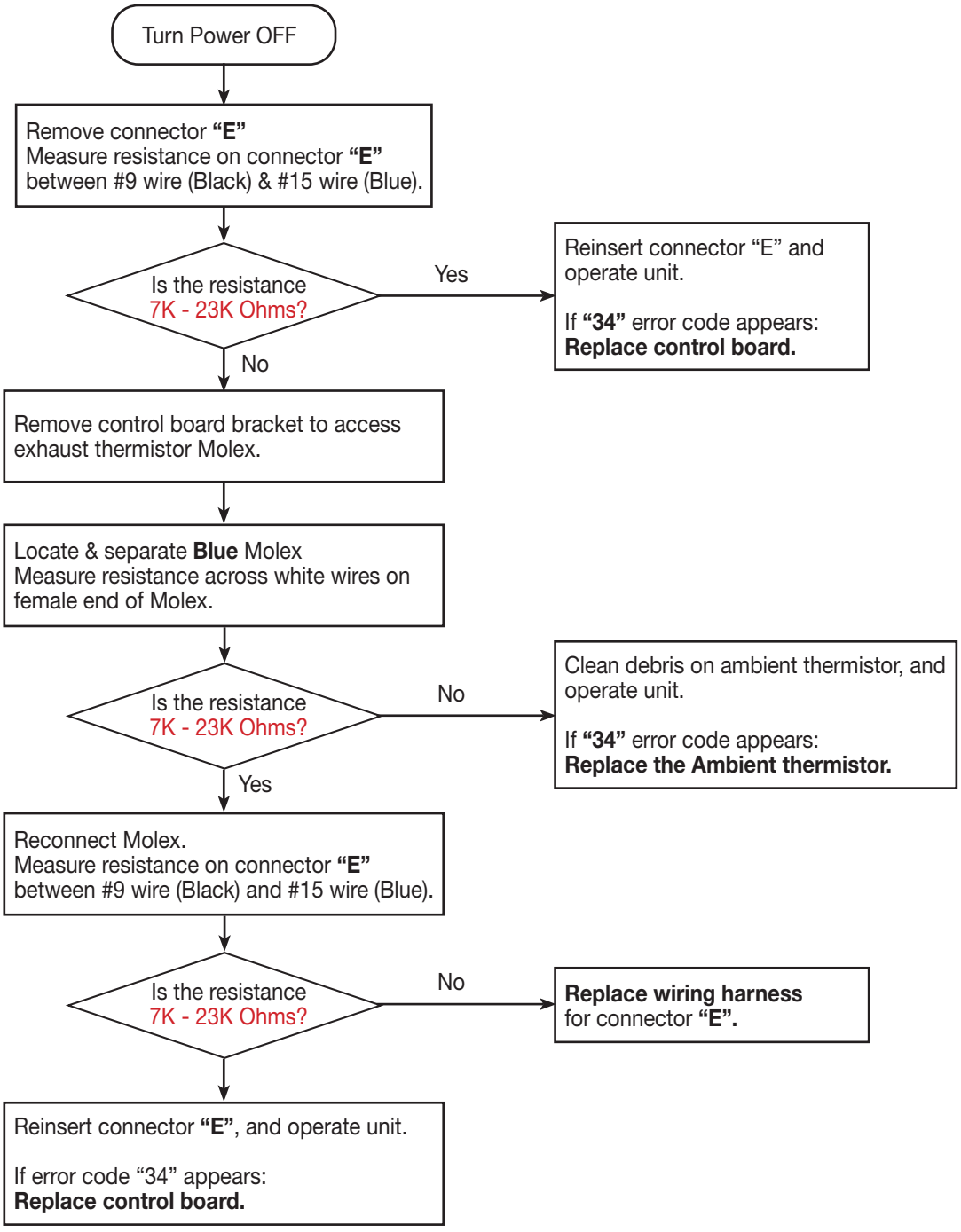


34 Error Code – Ambient/air supply thermistor malfunction

EXPLANATION
If an error in the inlet air thermistor is detected, the water heater displays the **"34"** error code on the built-in controller or the remote controller.

DIAGNOSTIC CHECK ITEMS
- Inlet air thermistor

CHECK METHOD



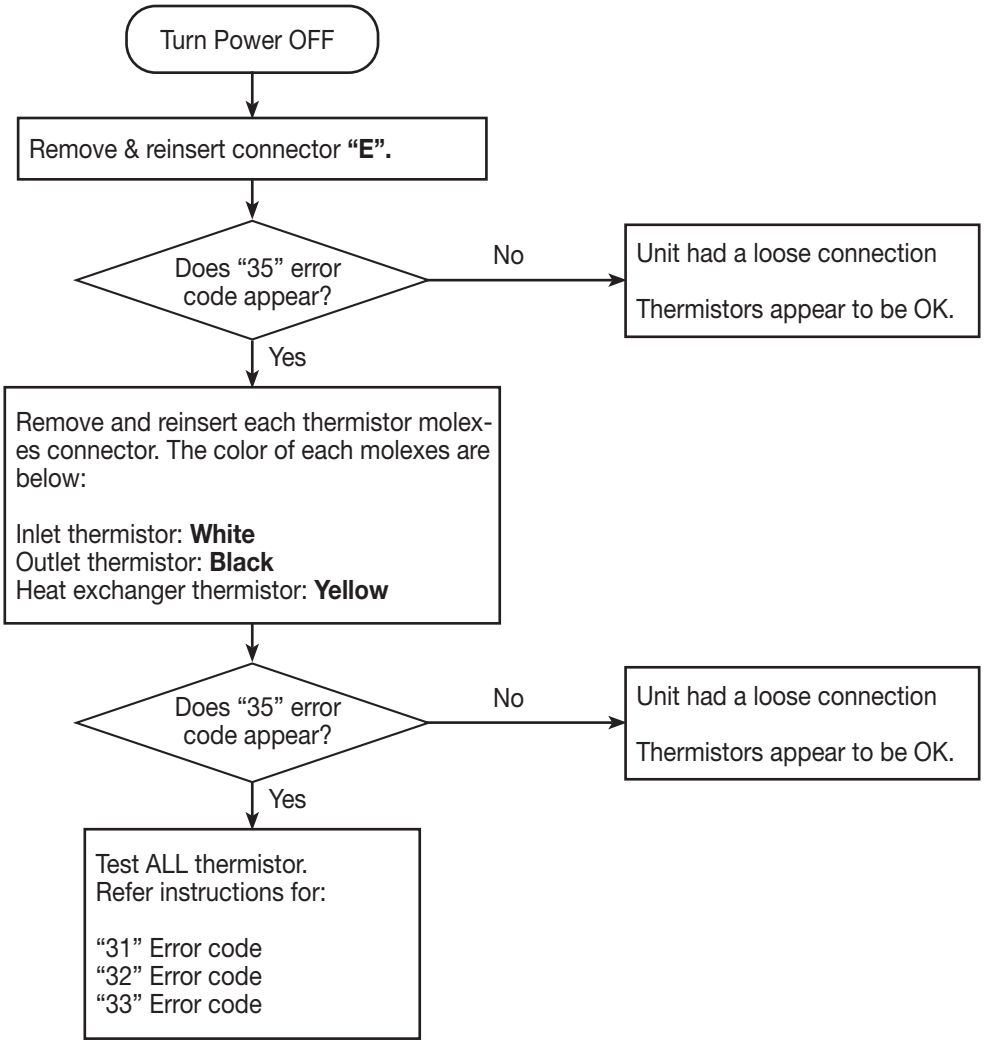
35 Error Code – Improper thermistor connection

EXPLANATION
This tankless water heater has three thermistors (Inlet, Outlet and Heat exchanger thermistor)

If one or more possibly has a poor connection or not connected in proper location, the water heater displays the “35” error code on the built-in controller or the remote controller.

DIAGNOSTIC CHECK ITEMS
- Inlet thermistor
- Outlet thermistor
- Heat exchanger thermistor

CHECK METHOD

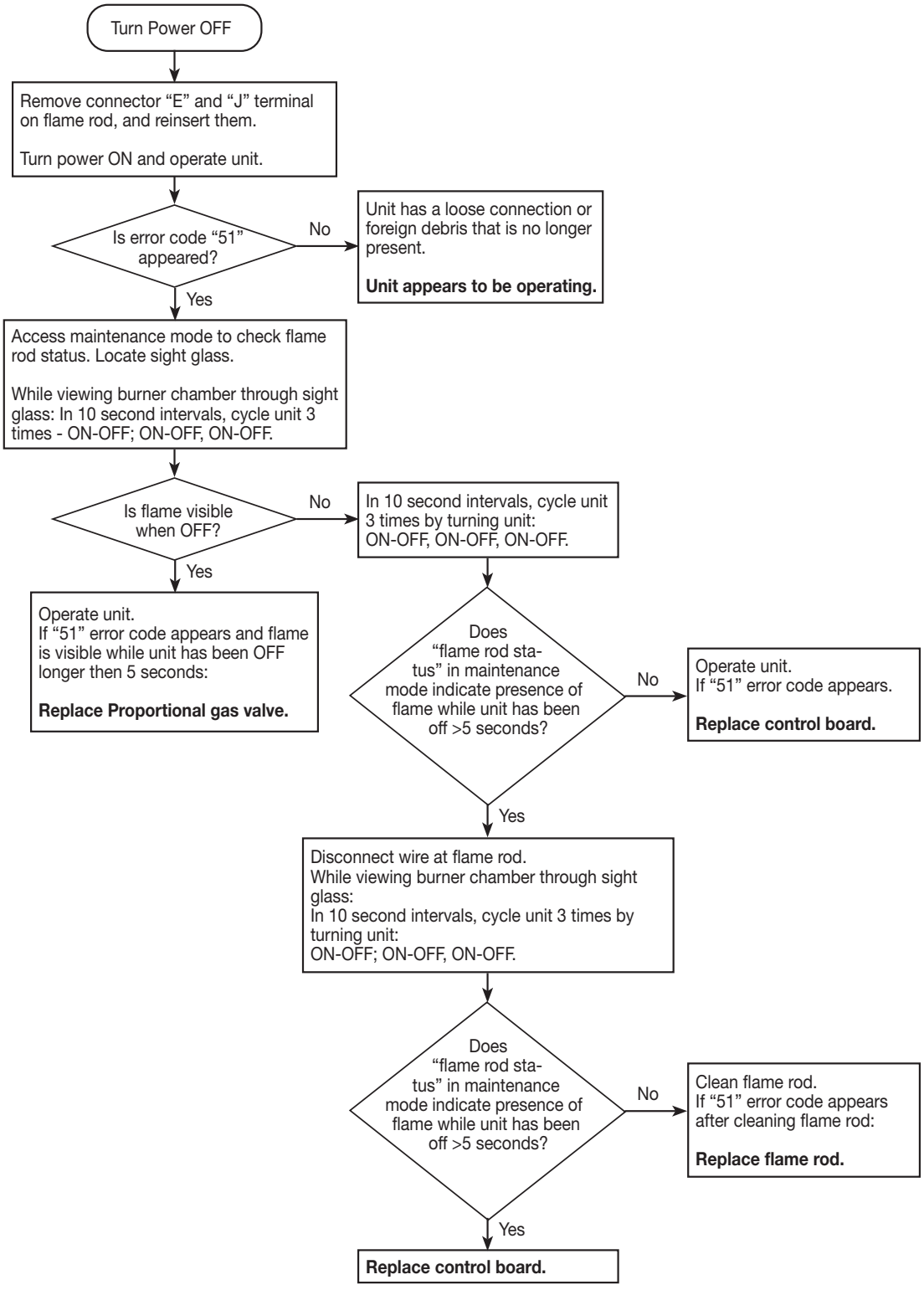


51 Error Code – Main gas solenoid valve (SV) malfunction

EXPLANATION
If the flame rod is detecting flame a few seconds after turning the water heater off, the water heater displays the “51” error code on the built-in controller or the remote controller.

DIAGNOSTIC CHECK ITEMS
- Flame rod
- Proportional gas valve

CHECK METHOD



52 Error Code – Proportional gas valve malfunction

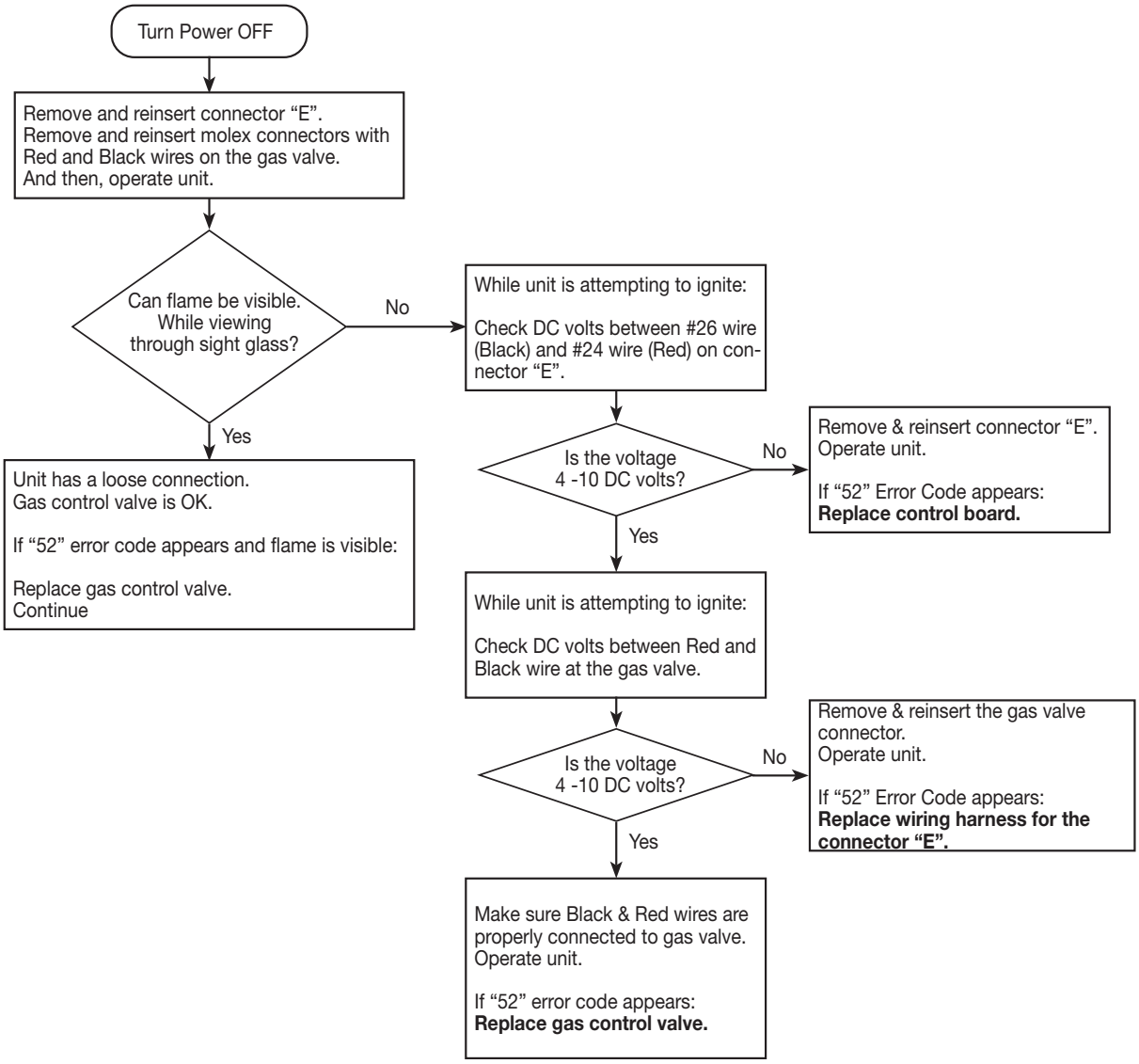
EXPLANATION

If the flame rod is detecting flame a few seconds after turning the water heater off, the water heater displays the “52” error code on the built-in controller or the remote controller.

DIAGNOSTIC CHECK ITEMS

- Flame rod – Please refer the section of “12 error code- Detected presence of flame, Then lost it”
- Proportional gas valve.

CHECK METHOD



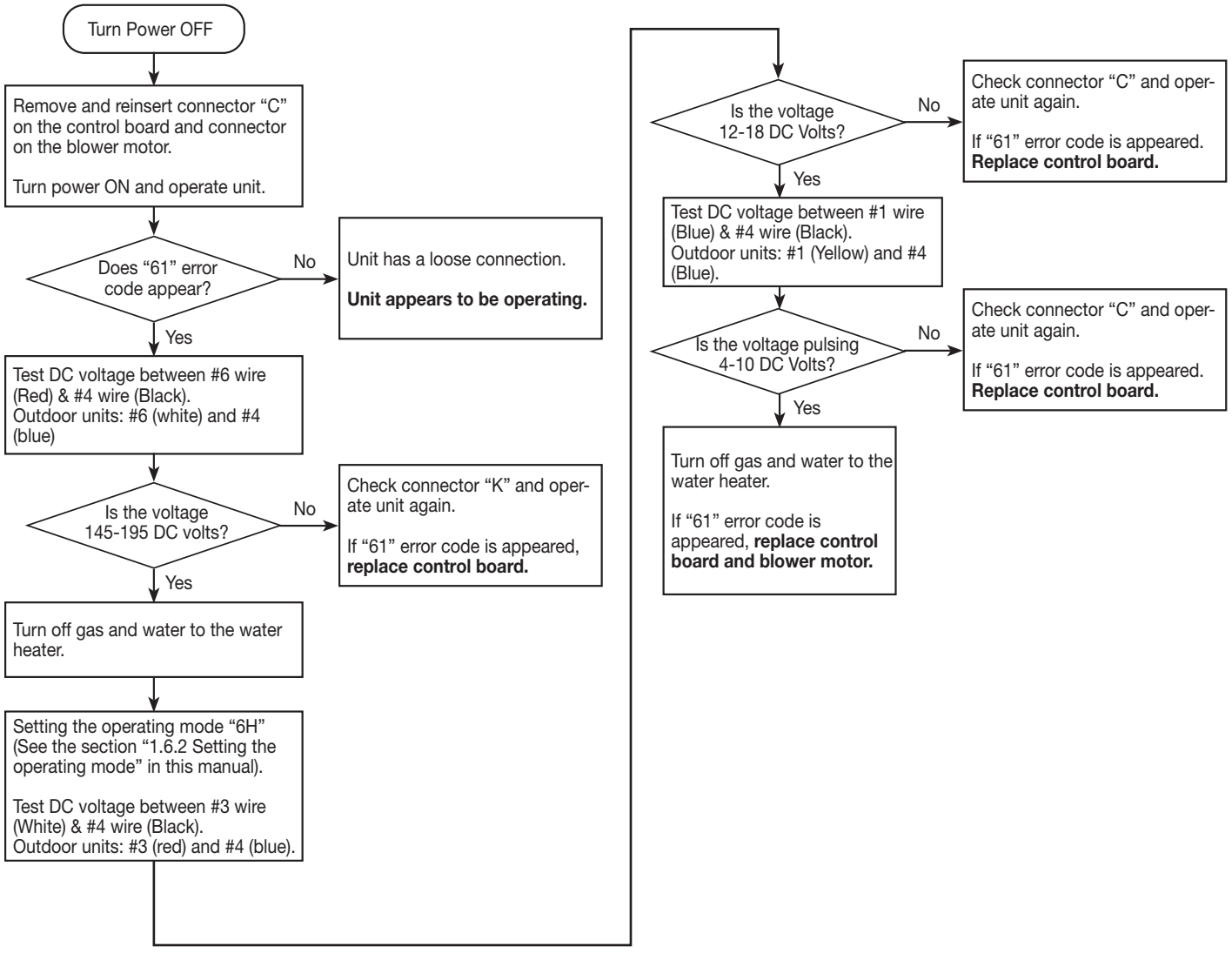
61 Error Code – Blower motor speed incorrect for combustion

EXPLANATION
This water heater checks the RPM signal after the fan starts to run.

If the RPM signal is incorrect after the fan runs, the water heater displays the "61" error code on the built-in controller or the remote controller.

DIAGNOSTIC CHECK ITEMS
- Blower motor

CHECK METHOD



IMPORTANT
While performing voltage checks, DO NOT touch multi-meter leads between #1 (Yellow) and #3 (Red) wires. Damage may occur to blower motor & control board.

63 Error Code – Recirculation pump speed incorrect

EXPLANATION

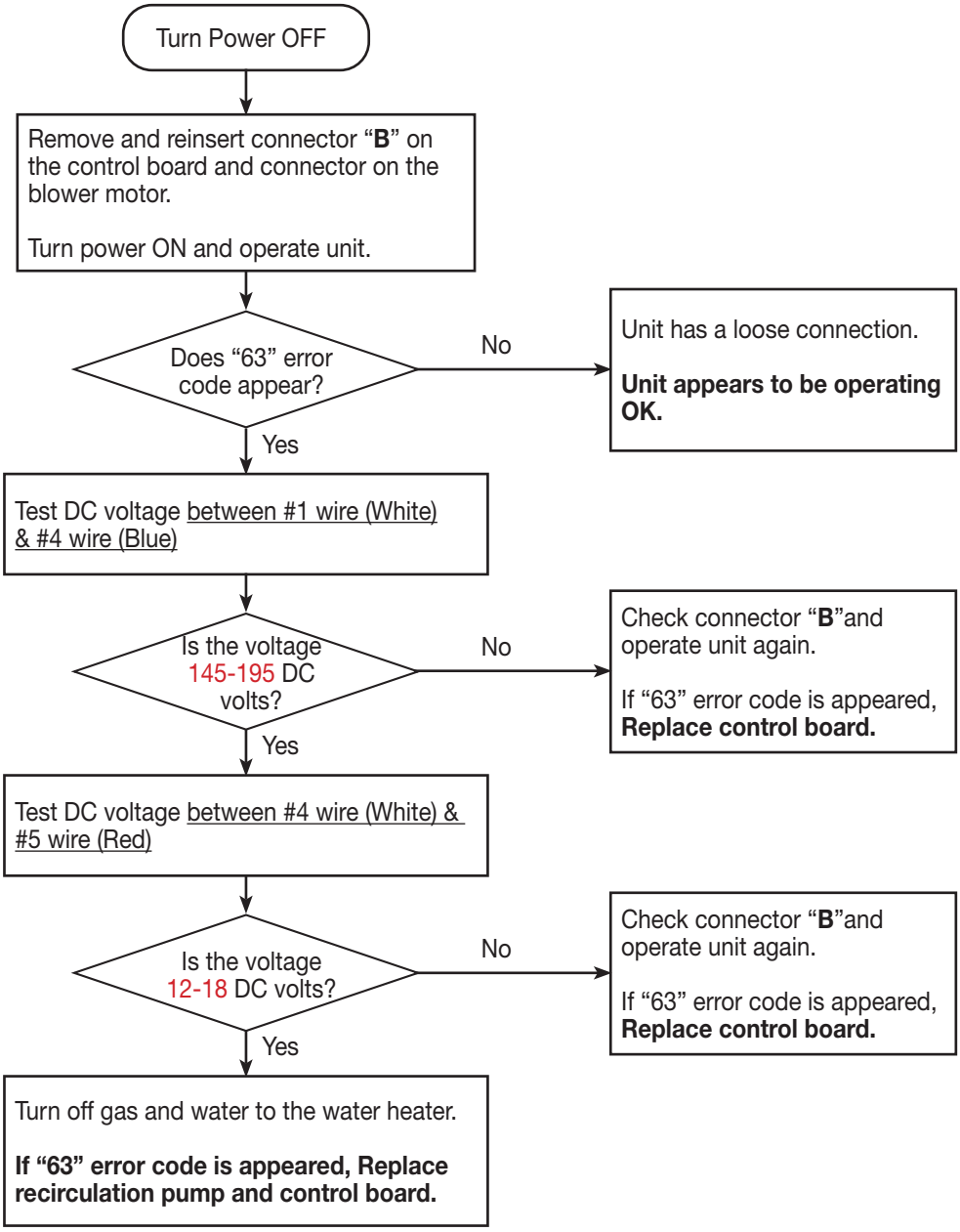
This water heater checks the RPM signal of recirculation pump.

If the RPM signal is incorrect when pump is started to work, the water heater displays the “63” error code on the built-in controller or the remote controller.

DIAGNOSTIC CHECK ITEMS

- Recirculation Pump

CHECK METHOD



65 Error Code – Water motor failed

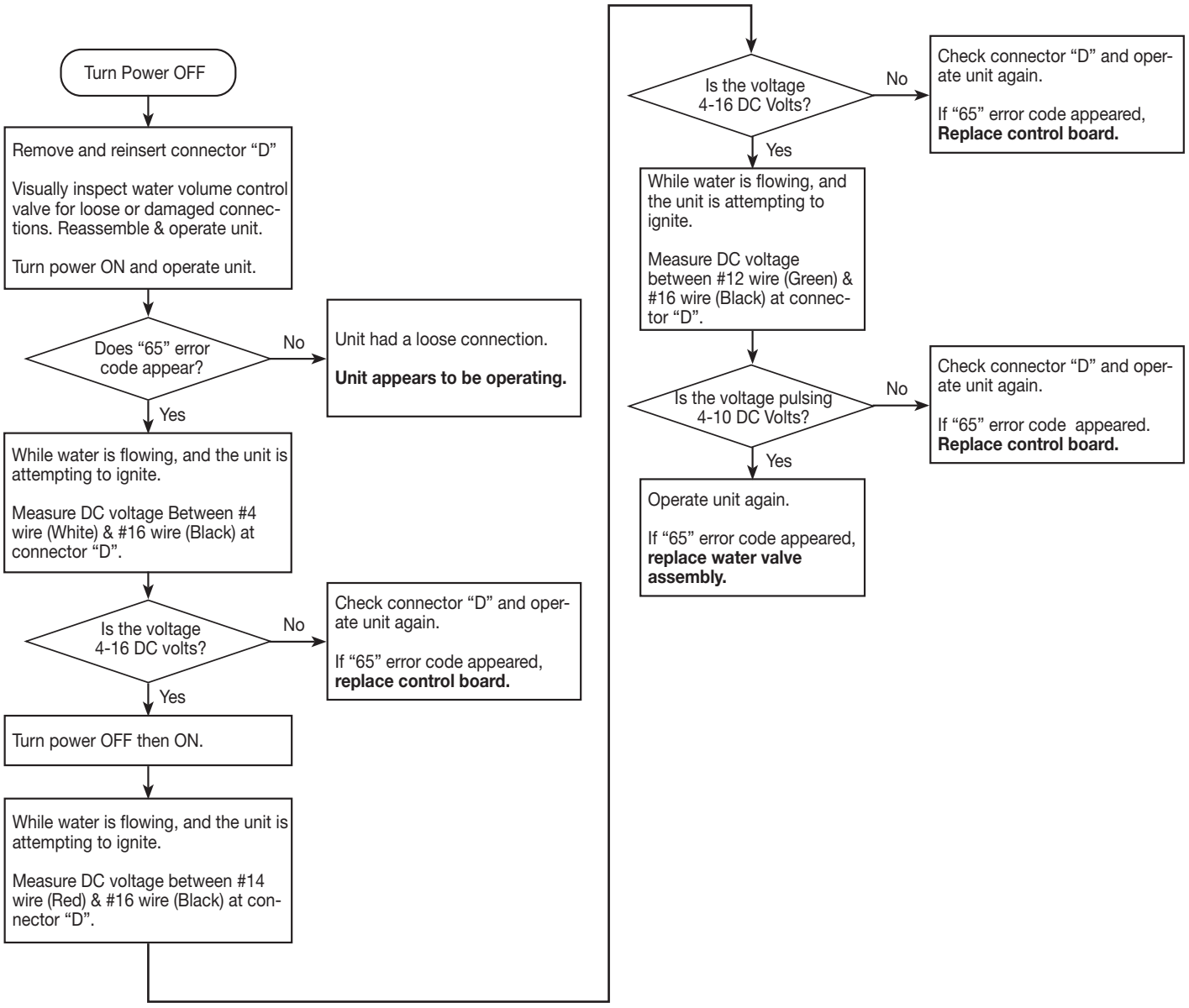
EXPLANATION

If the water valve motor does not work properly, the water heater displays the “65” error code on the built-in controller or the remote controller.

DIAGNOSTIC CHECK ITEMS

- Water volume control valve

CHECK METHOD



66 Error Code – Bypass motor failed

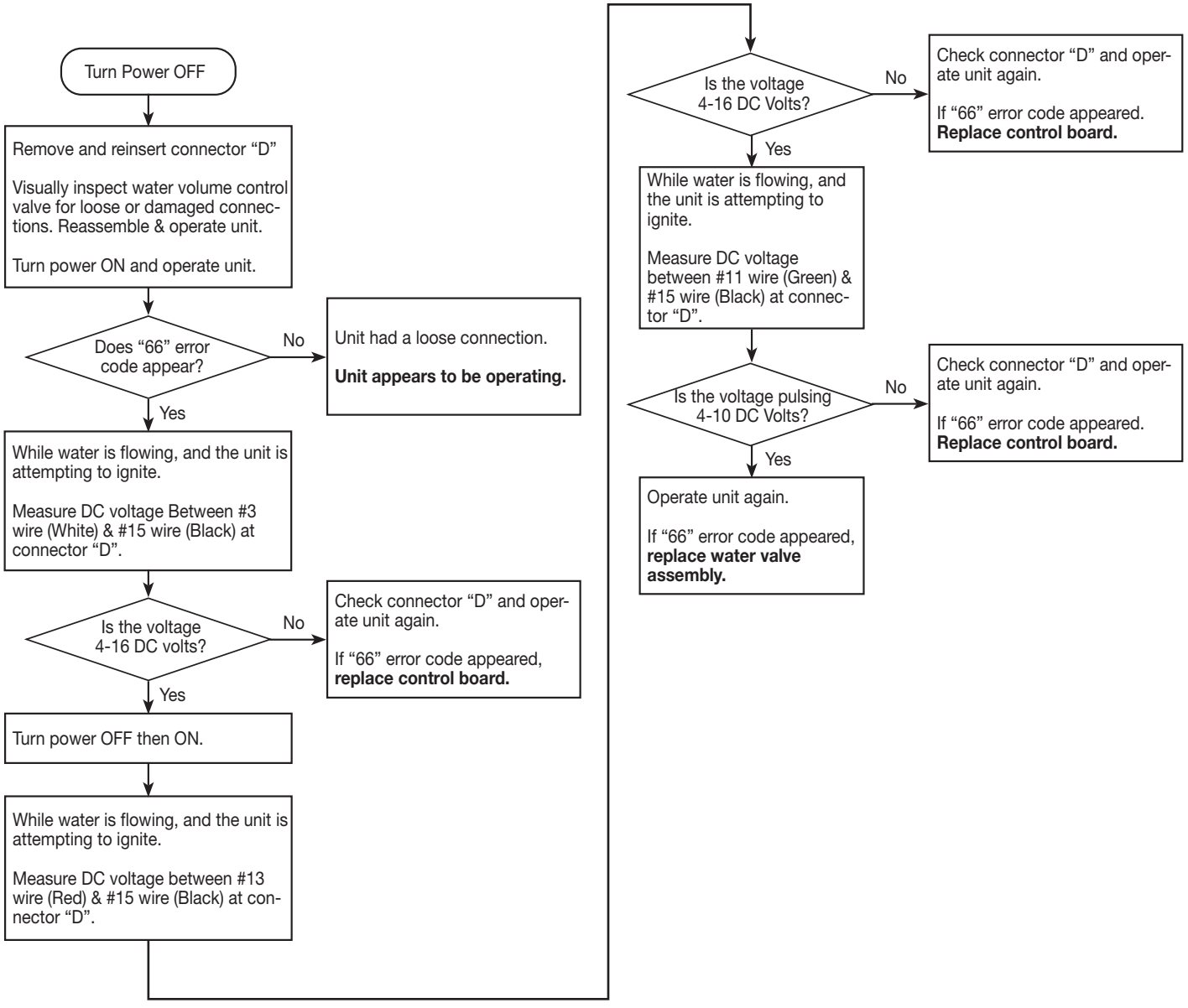
EXPLANATION

If the bypass valve motor does not work properly, the water heater displays the "66" error code on the built-in controller or the remote controller.

DIAGNOSTIC CHECK ITEMS

- Bypass motor

CHECK METHOD

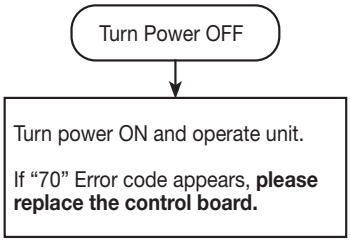


70 Error Code – Microcomputer abnormality

EXPLANATION
If the microcomputer on the control board is not working properly, the water heater displays the “70” error code on the built-in controller or the remote controller.

DIAGNOSTIC CHECK ITEMS
- Control board

CHECK METHOD

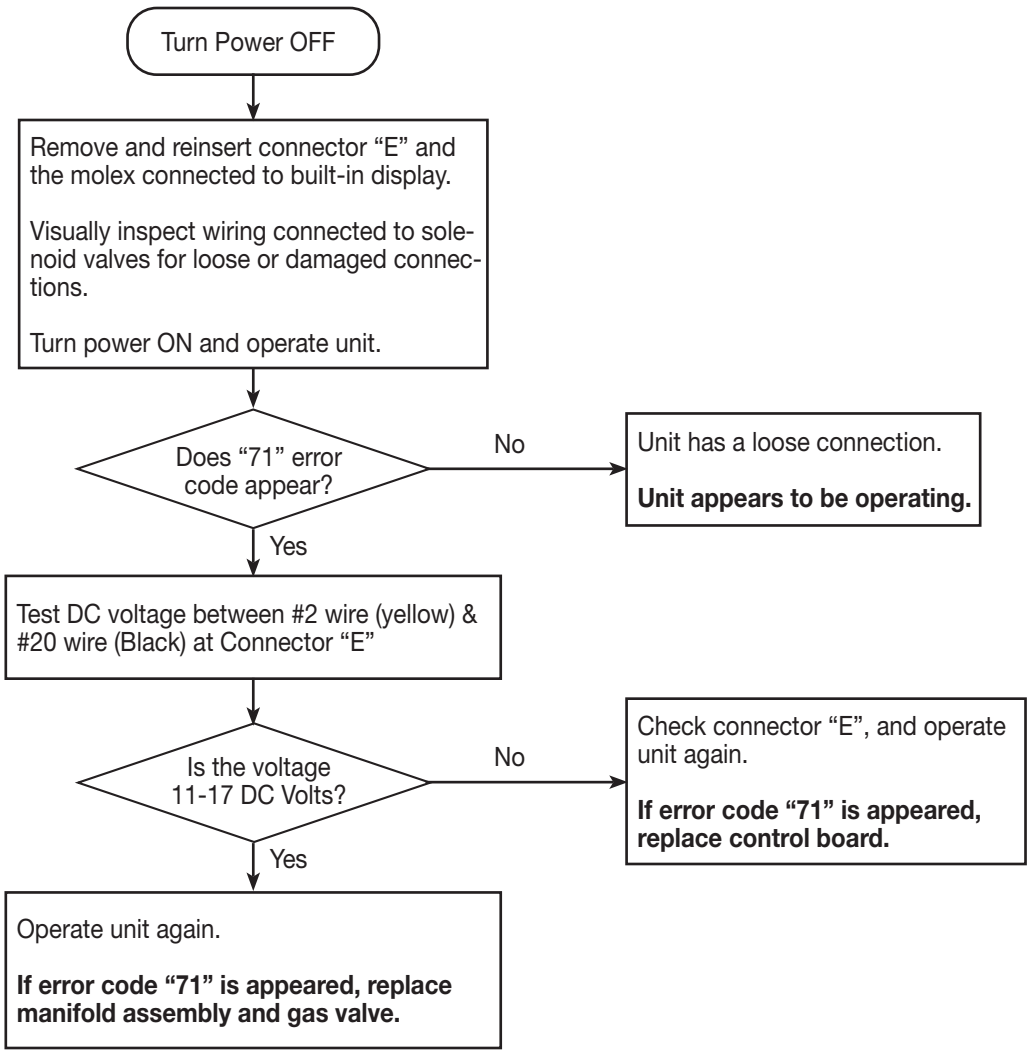


71 Error Code – Solenoid valve (SV) circuit failure

EXPLANATION
If the solenoid valve (SV) is not working properly, the water heater displays the "71" error code on the built-in controller or the remote controller.

DIAGNOSTIC CHECK ITEMS
- Control board

CHECK METHOD



72 Error Code – Flame rod detected flame before ignition

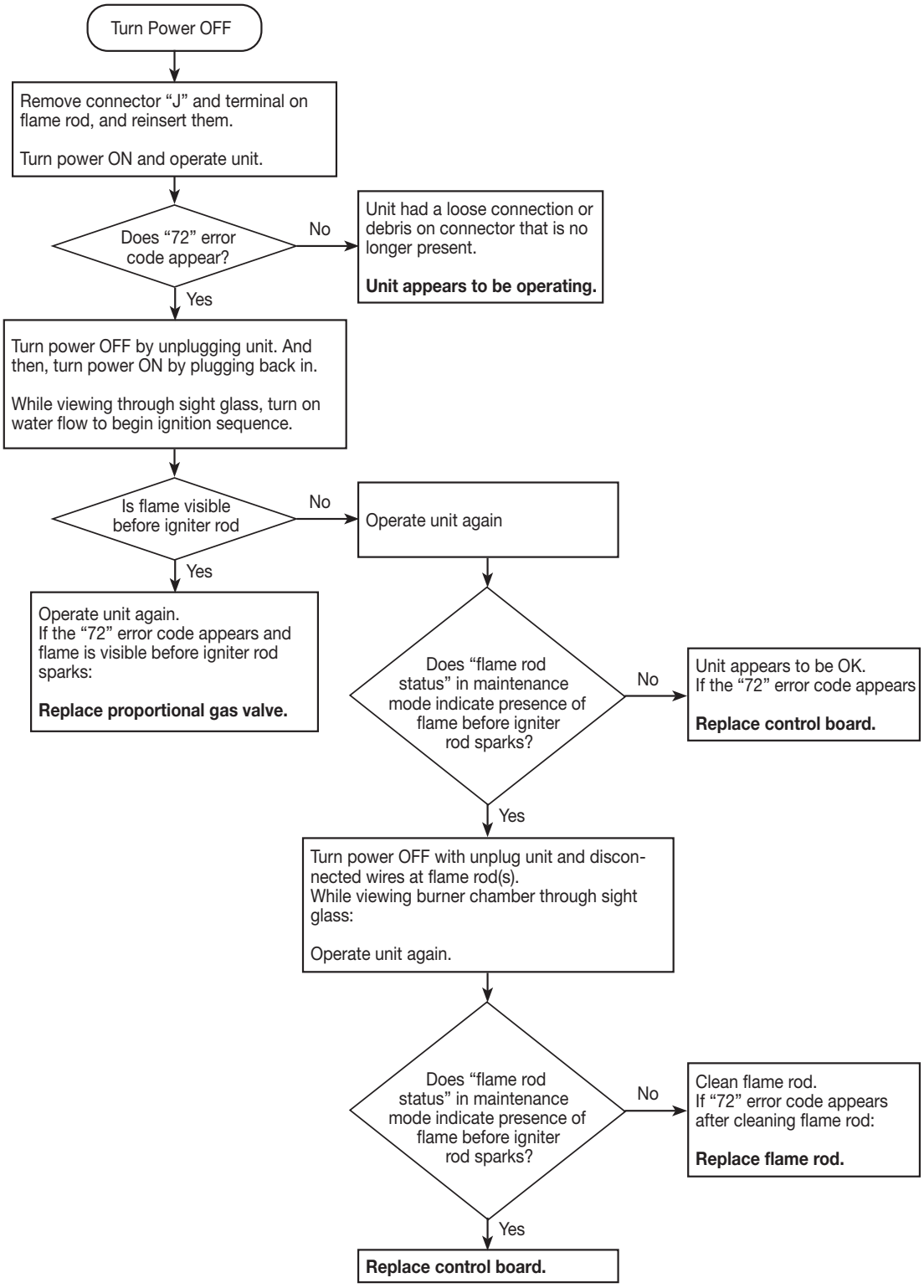
EXPLANATION

If the flame rod detects presence of flame before ignitor is activated, the water heater displays the “72” error code on the built-in controller or the remote controller.

DIAGNOSTIC CHECK ITEMS

- Flame rod
- Proportional gas valve

CHECK METHOD

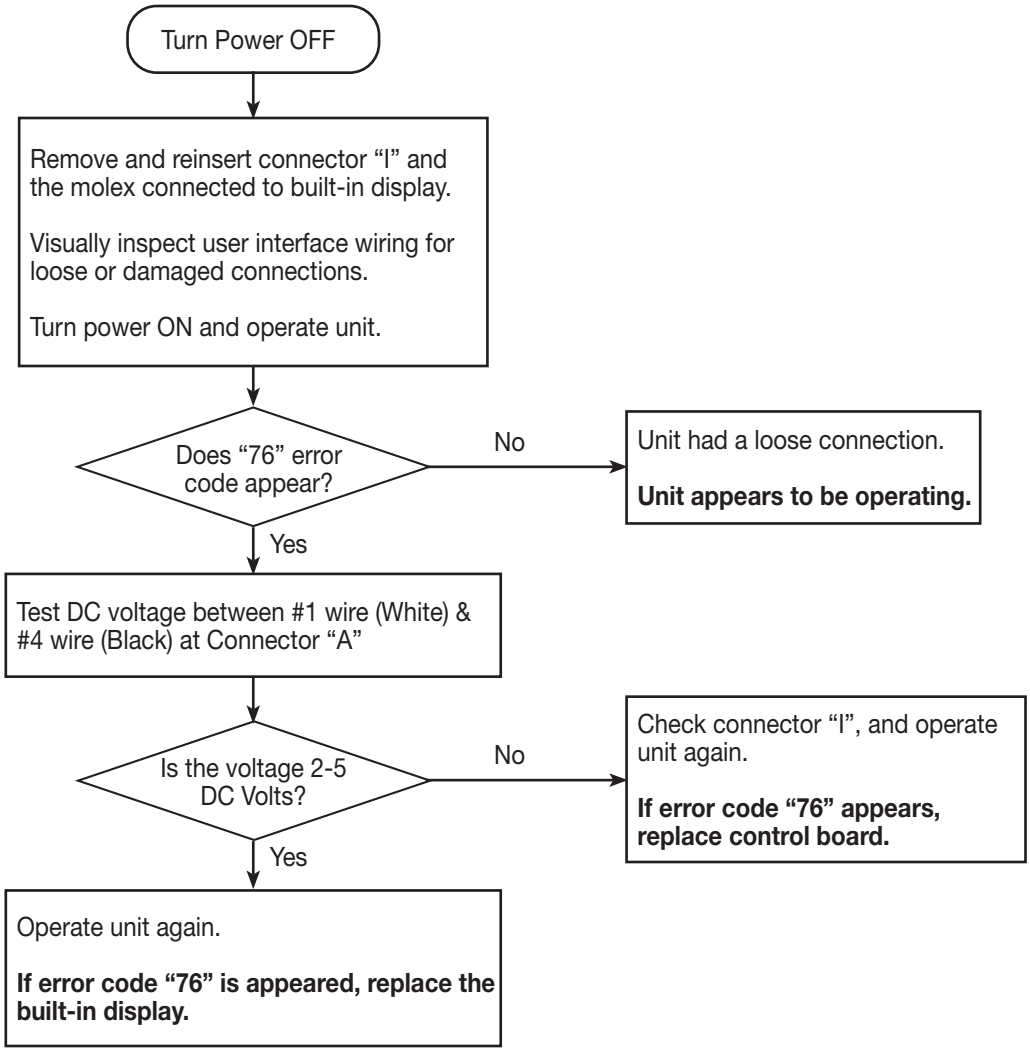


76 Error Code – Built-in display (or remote controller) to water heater comm. failure

EXPLANATION
If the built-in controller or the remote controller is not communicating with control board, the water heater displays the "76" error code on the built-in controller or the remote controller.

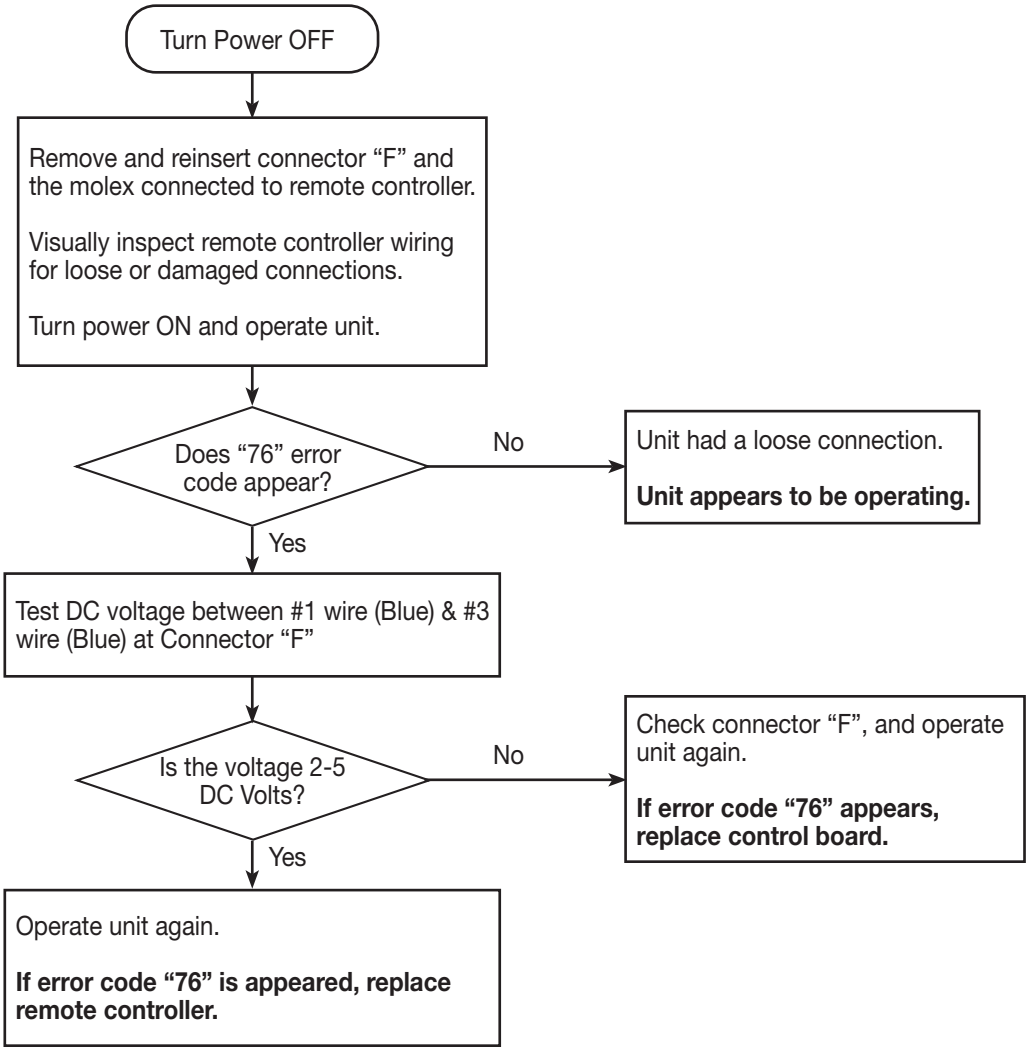
DIAGNOSTIC CHECK ITEMS
- Built-in controller or remote controller

CHECK METHOD



76 Error Code – Built-in display (or remote controller) to water heater comm. failure (cont.)

REMOTE CONTROLLER



79 Error Code – Blower motor current failure

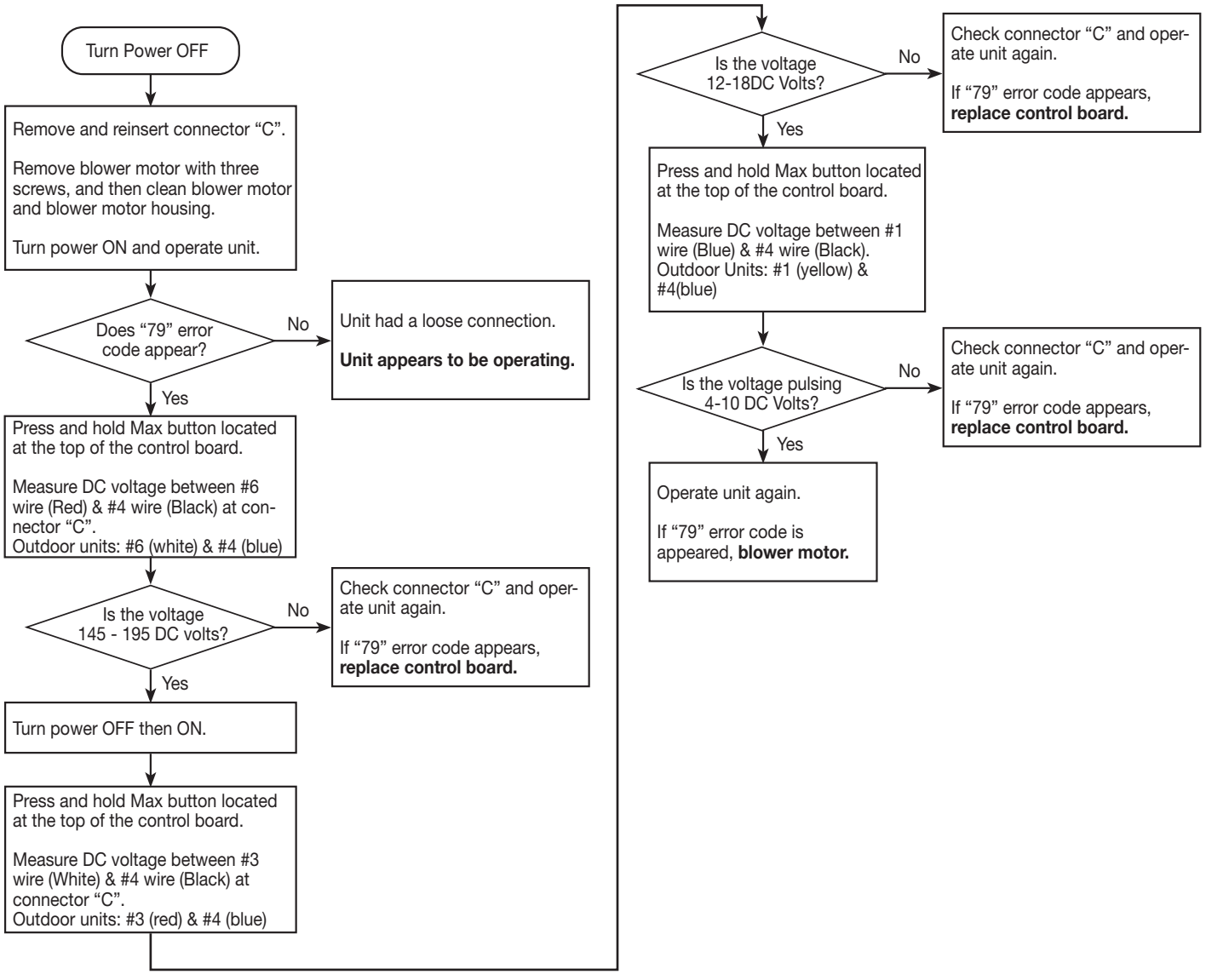
EXPLANATION

If the blower motor current is not a certain value when the blower is operated, the water heater displays the “79” error code on the built-in controller or the remote controller.

DIAGNOSTIC CHECK ITEMS

- Blower motor

CHECK METHOD



80 Error Code - Detected flame presence after closing solenoid valves

EXPLANATION
If the flame rod is detecting flame a few seconds after the solenoid valves close, the water heater displays the “80” error code on the built-in controller or the remote controller.

DIAGNOSTIC CHECK ITEMS
- Flame rod
- Solenoid valves

CHECK METHOD
- **Flame rod**
  Please refer the section of “12 Error Code: Detected presence of flame, Then lost it”.

- **Solenoid valves**
  Please refer the section of “51 Error Code: Main gas solenoid valve (SV) malfunction”.

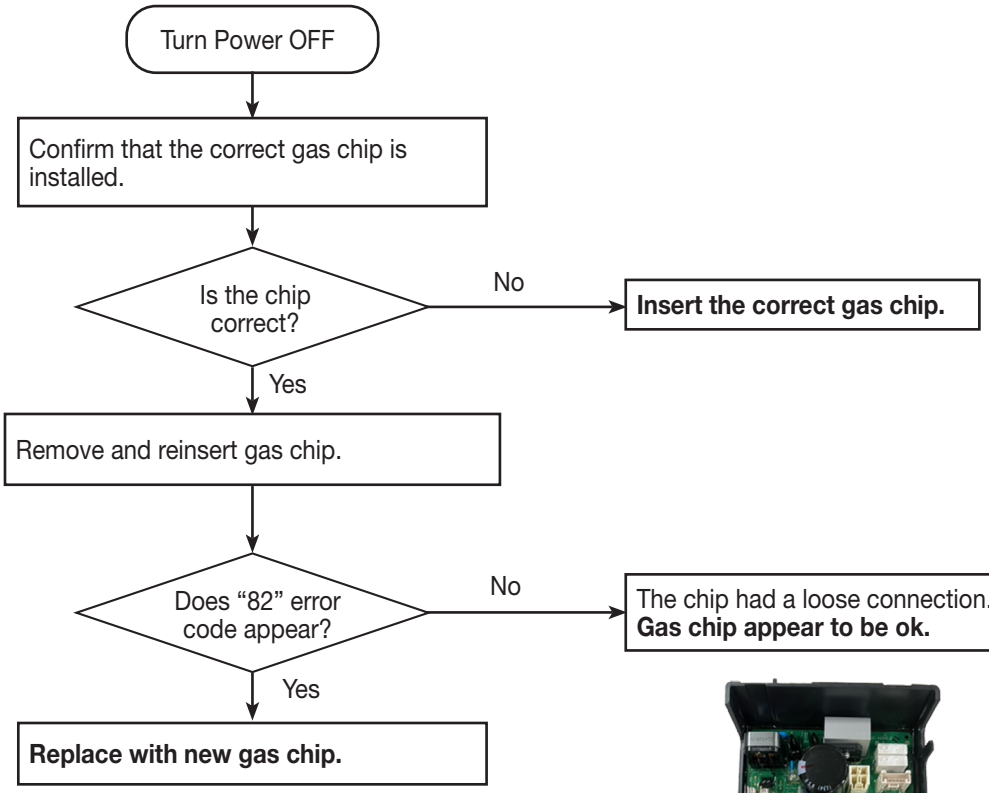
82 Error Code – Installed chip error

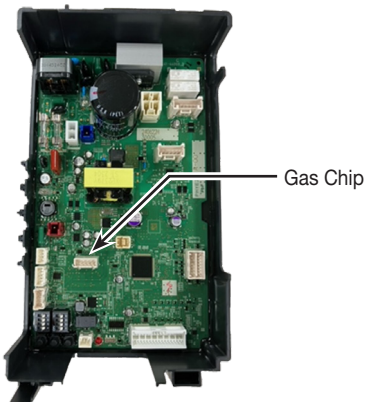
EXPLANATION
This tankless water heater has gas chip on the control board.

If the gas chip has a poor connection or the data that gas chip has is inadequate/wrong, the water heater displays the “82” error code on the built-in controller or the remote controller.

DIAGNOSTIC CHECK ITEMS
- Gas chip

CHECK METHOD





88 Error Code – Maintenance notice

EXPLANATION
If this water heater has the maintenance notice enabled and the life cycle of water heater has reached the set time, the water heater displays the “88” error code on the built-in controller or the remote controller.

This is a warning code and the unit will eventually shut down to protect itself.

To set this service alert, refer to section “1.4.3 or 1.5.3 Setting maintenance notice options”.

DIAGNOSTIC CHECK ITEMS
- Built-in controller or remote controller.

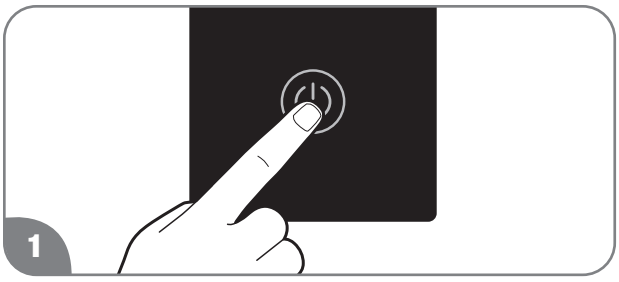
CHECK METHOD
If the “88” error code is displayed, the unit must be drained and flushed.

To flush the unit, refer to “1L Warning Code – Lime build-up detected in heat exchanger” diagnostic instructions for flushing instructions.

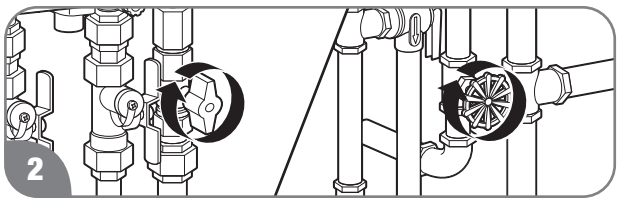
ERROR CODE 88 CLEARING

IMPORTANT:
It is highly recommended to perform water heater maintenance activities such as flushing the heat exchanger and/or replacing the water treatment filter (if applicable) before clearing this error code.

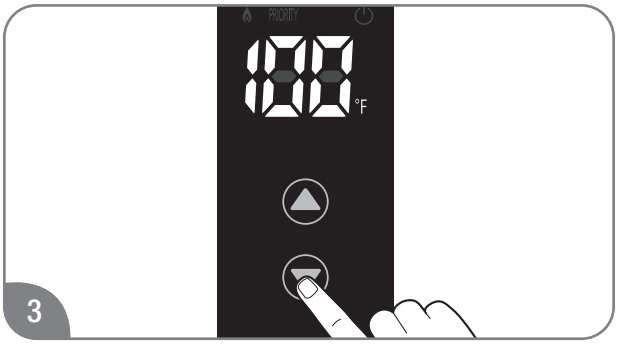
After these maintenance activities are completed, follow the steps below in order to clear error code “88”.



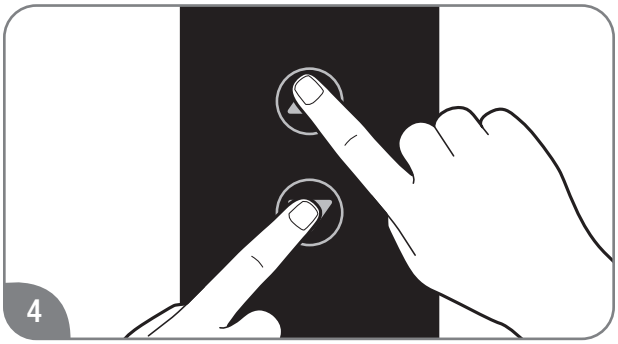
Turn on the remote control.



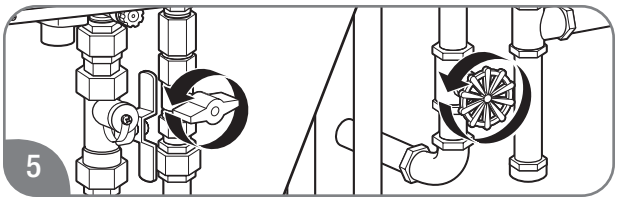
Turn off the gas and water to the water heater by closing the shut-off valves.



Press the DOWN adjustment button repeatedly until the lowest setting temperature shows in the LED display.



Press and hold the DOWN and UP adjustment button for 5 to 10 seconds.



Turn on the gas and water to the water heater by opening the shut off valves.

If error code “88” is still shown, repeat steps 1 through 5 above.

89 Error Code – High exhaust temperature detected

EXPLANATION
This water heater has over temperature limit switch on the secondary heat exchanger.

If the exhaust temperature is too high, this limit switch is activated and the water heater displays the “89” error code on the built-in controller or the remote controller.

This is normally cause by inadequate/wrong GAS SUPPLY and/or VENTING.

DIAGNOSTIC CHECK ITEMS
- Over temperature limit switch

90 and 99 Error Code - Blockage in venting detected

90 - Error Code will occur BEFORE unit goes into ignition.
99 - Error Code will occur AFTER unit shuts down.

EXPLANATION
If this water heater was operated prior to vent installation OR unit detected blockage in the venting during the pre-purge OR post-purge cycles, the water heater displays the “90” or “99” error codes on the built-in controller or the remote controller.

DIAGNOSTIC CHECK ITEMS
- Venting

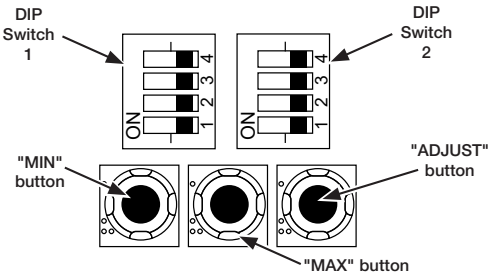
Reset Procedure

ONLY FOR ‘HARD LOCKOUTS’ - ERROR CODES: 10, 13 & 99

1. Turn remote control OFF; leave unit plugged in. Remove front cover. Locate the DIP Switches (Upper Right on the control board).
2. Make sure all the DIP Switches are OFF (down position).
3. Locate DIP1 - Switch #2 and turn it ON (up position) then immediately turn it OFF.
4. Within 5 seconds, press and hold the MIN and MAX buttons for at least 2 seconds.
5. The remote control will flash “UL” then it will go solid. This indicates the heater has been reset.
6. Release the buttons.
7. Turn remote control ON. You may operate unit.

Clearing Fault History

1. Turn remote control OFF; leave unit plugged in. Remove front cover. Locate the DIP Switches (Upper Right on the control board).
2. Make sure all the DIP Switches are OFF (down position).
3. Locate DIP1 - Switch #1 and turn it ON (up position) then immediately turn it OFF.
4. Within 5 seconds, press and hold the MIN and MAX buttons for at least 2 seconds.
5. The remote control will flash “CL” then it will go solid. This indicates the heater has been reset.
6. Release the buttons.
7. You can verify clearing history by entering maintenance mode and check the code at location 1E. Should read NULL (--two dashes).
8. Turn remote control ON. You may operate unit.



17 Error Code – Water leak detected

EXPLANATION
This error code is displayed ONLY when wifi controller is used on this water heater.

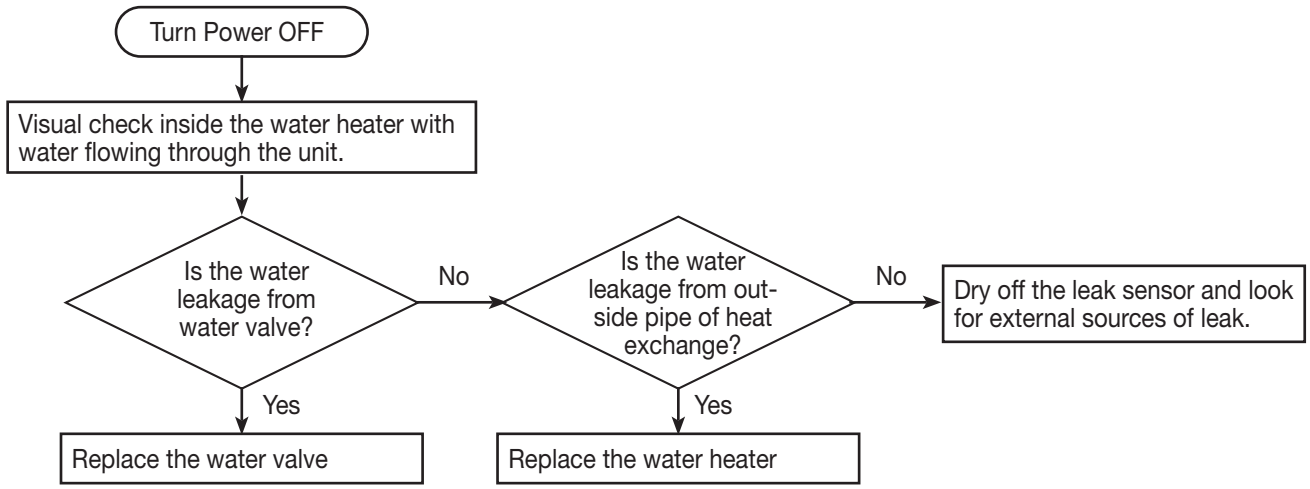
If the water leak sensor detects a water leak inside the water heater, “17” error code is displayed on the built-in controller or the remote controller.

If this error code is displayed, the water heater may have water leakage from somewhere.

DIAGNOSTIC CHECK ITEMS
- Heat exchanger
- Water valve

NOTE: There can be additional causes for the water leak sensor triggering that aren’t internal component related. Confirm if condensation buildup is present in the cabinet or if condensation is entering from intake venting.

CHECK METHOD



48 Warning Code – Water leak detection disabled

EXPLANATION
This error code is displayed ONLY when wifi controller is used on this water heater.

When the water heater displays “17” error code, this water heater can be set to disable the error code through the WiFi application for 24 hours.

After 24 hours, the water hear displays “48” warning code on the built-in controller or the remote controller.

49 Warning Code – Water leak sensor not installed

EXPLANATION
This error code is displayed ONLY when wifi controller is used on this water heater.

If the water leak sensor is not installed when the wifi controller is used on this unit, the water hear displays “49” warning code on the built-in controller or the remote controller.

DIAGNOSTIC CHECK ITEMS
- Water leak sensor

2.3 ERROR CODE LIST (WIFI MODEL ONLY)

07 Warning Code – Limited hot water condition

EXPLANATION
This error code is displayed ONLY when wifi controller is used on this water heater.

If the water heater controls water flow rate when the water heater is set water saving mode, the water heater displays the “07” warning code on the built-in controller or the remote controller.

77 Warning Code – WiFi chip communication failure

EXPLANATION
This error code is displayed ONLY when wifi controller is used on this water heater.

If the communication between WiFi chip and the display’s microcontroller is lost, the water heater displays “77” warning code on the built-in controller or the remote controller.

DIAGNOSTIC CHECK ITEMS
- WiFi display

83 Warning Code – Configuration data restore failure

EXPLANATION
This error code is displayed ONLY when wifi controller is used on this water heater.

If the WiFi display’s microcontroller is unable to read the data, the water heater displays “83” warning code on the built-in controller or the remote controller.

DIAGNOSTIC CHECK ITEMS
- WiFi display

84 Warning Code – Configuration write limit exceeded

EXPLANATION
This error code is displayed ONLY when wifi controller is used on this water heater.

If the number of commands to the display’s EEPROM has been exceeded, the water heater displays “84” warning code on the built-in controller or the remote controller.

DIAGNOSTIC CHECK ITEMS
- WiFi display

85 Warning Code – DIP switch not set for intended recirculation mode

EXPLANATION
This error code is displayed ONLY when WiFi controller is used on this water heater and the water heater is installed with a recirculation line.

If there is a mismatch between the setting of the DIP switch on the control board and WiFi application, the water heater displays “85” warning code on the built-in controller or the remote controller.

DIAGNOSTIC CHECK ITEMS
- Recirculation setting on WiFi application.
- DIP switch setting on the control board.

102 Error Code – Manifolding comm. error between unit 2 and manager unit

103 Error Code – Manifolding comm. error between unit 3 and manager unit

104 Error Code – Manifolding comm. error between unit 4 and manager unit

105 Error Code – Manifolding comm. error between unit 5 and manager unit

106 Error Code – Manifolding comm. error between unit 6 and manager unit

EXPLANATION
This error code is displayed ONLY for incorrect manifolded set-ups.

The display may flash any number from 102 through 106. This indicates that one of the units is not visible on the network. Confirm that all RJ11 cables are connected as described and in good condition.

If the alarm persists, it is recommended to redo the set-up process. Please confirm that the Manager unit and the Unit Instance values are set to the proper values.

DIAGNOSTIC CHECK ITEMS
- WiFi display
- Cable connection
- Manifolding instructions

149 Error Code – Water leak sensor not installed

EXPLANATION
This error code is displayed ONLY when the wifi controller is used on this water heater.

If the leak sensor is missing or the connection between the leak sensor and the display wire harness is lost, the water heater displays “149” warning code on the built-in controller or the remote controller.

DIAGNOSTIC CHECK ITEMS
- Leak sensor
- WiFi display wire harness

176 Error Code – WiFi display to water heater comm. error

EXPLANATION
This error code is displayed ONLY when the wifi controller is used on this water heater.

If the communication between WiFi controller and the water heater's PCB is lost, the water heater displays "176" warning code on the built-in controller or the remote controller.

DIAGNOSTIC CHECK ITEMS
- WiFi display
- PCB

195 Error Code – The manager unit detects a failure in one of the manifolded units

EXPLANATION
This error code is displayed ONLY for incorrect manifolded set-ups.

If the Manager units detects a communication issue with on of the other manifolded heaters, the water heater displays "195" warning code on the built-in controller or the remote controller.

DIAGNOSTIC CHECK ITEMS
- Manifolding instructions

196 Error Code – The manifolded unit detects incorrect local dip switch setting

EXPLANATION
This error code is displayed ONLY for incorrect manifolded set-ups.

For installations with multiple RTG-R-3 (with pump) models, ensure that the pump has been enabled via the DIP switches on both heaters. The settings should match on both heater's PCBs.

For installations that combine one RTG-R-3 (with pump) and an RTG-3 (no-pump) model(s), ensure that recirculation is only enabled via the DIP switches on the RTG-R-3 (with pump) model. The RTG-3 (no-pump) heaters should be left on the "No Operation" settings.

DIAGNOSTIC CHECK ITEMS
- PCB dip switches

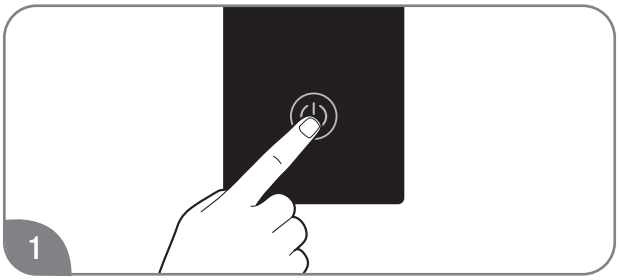
3. Components Removal Instructions

3.1 DRAINING THE WATER HEATER

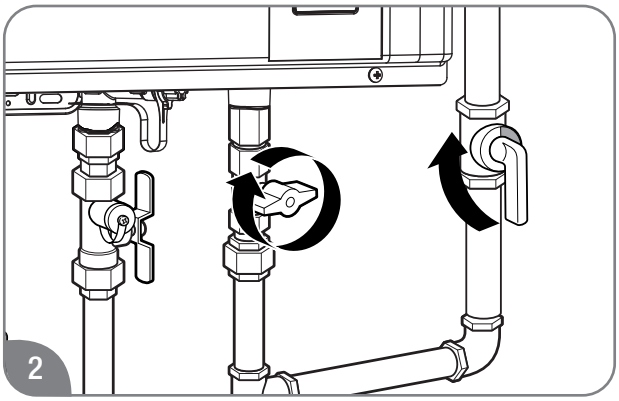
If need to remove or replace the part that is through water, please drain water from the water heater. To drain water from the water heater, refer the following process.

⚠ WARNING

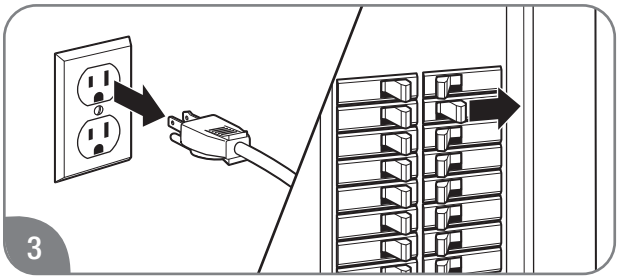
Failure to follow these draining instructions can cause serious personal injury from scalding and/or product damage.



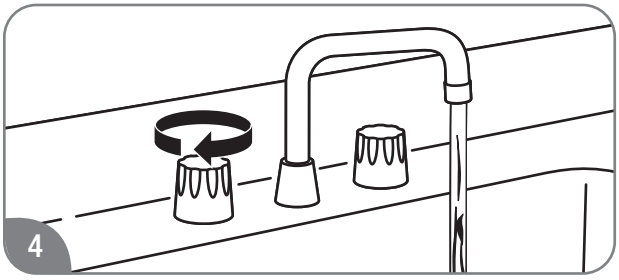
Turn off the water heater by pressing the POWER ON/OFF button on the LED display.



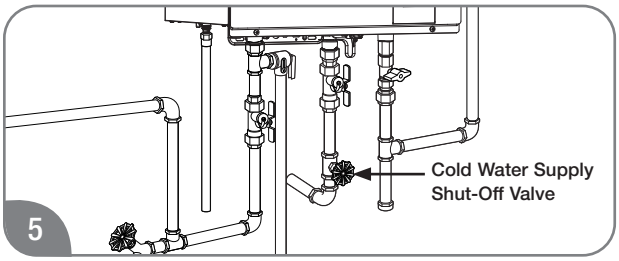
Close the gas shut-off valve(s).



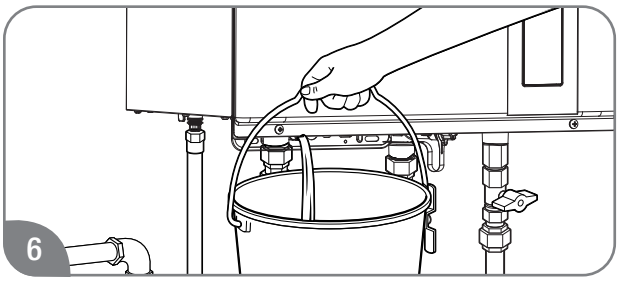
At least 10 seconds after Step 1, unplug the water heater or disconnect the power supply at the circuit breaker box.



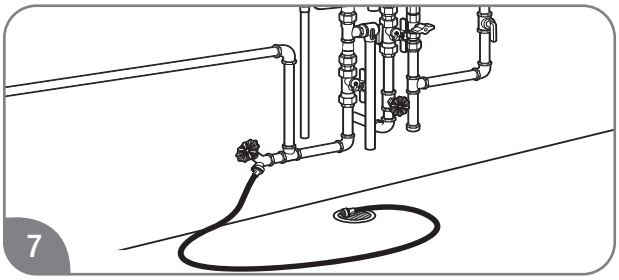
Open all hot water faucets. Run the water until it is COLD; then shut off the faucet.



Close the water shut-off valve.



Using a suitable container to catch the water, remove the water filter from the base of the cold water inlet line.

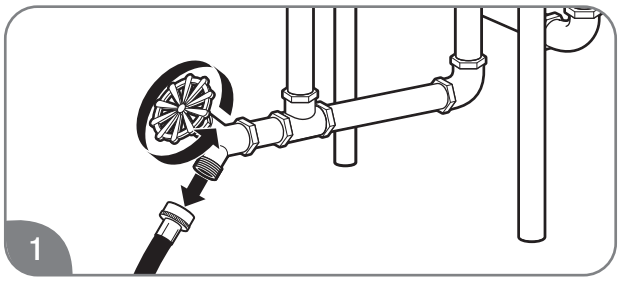


Connect a garden hose to the drain valve in the hot water outlet line and place the other end in a suitable drain. Open the drain valve until all the water has drained from the water heater. Leave water heater as is until placed back in service.

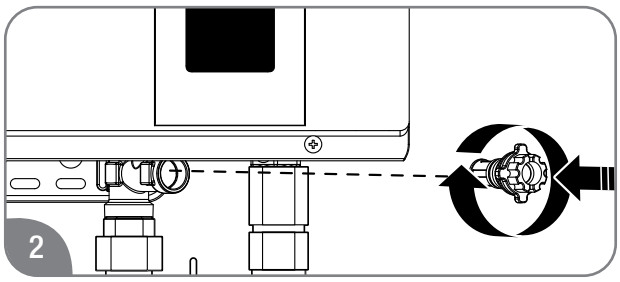
⚠ CAUTION

Even when drained properly, a small amount of water will remain in the water heater. In cold weather conditions, this water can freeze. If this happens, allow the defrost protection on the water heater at least 60 minutes to melt the frozen water. The water heater will not work properly until this water is thawed.

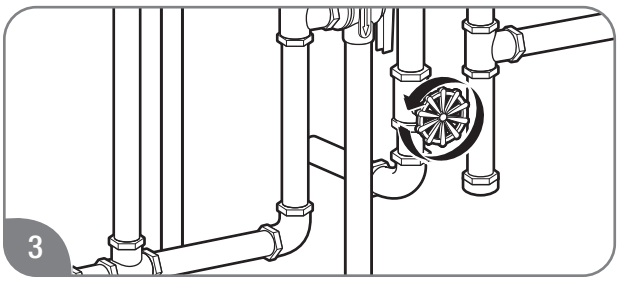
To put the water heater back in service:



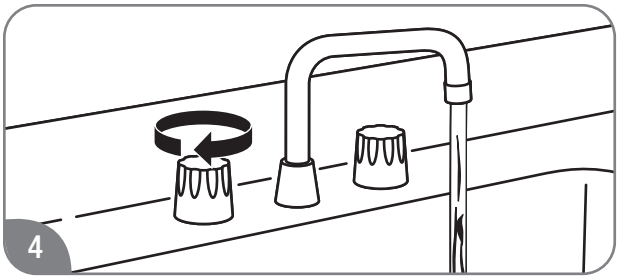
Disconnect drain hose. Make sure the drain valve is closed.



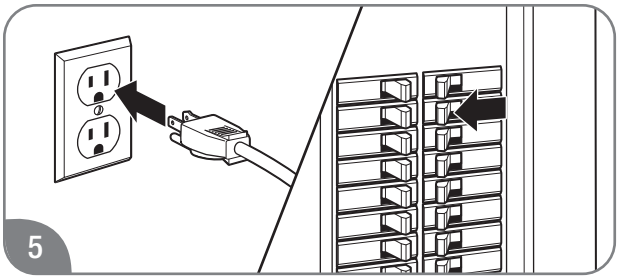
Reinstall the water filter in the base of the cold water inlet line.



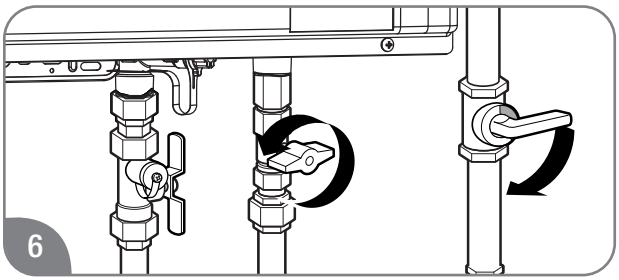
Open the water shut-off valve.



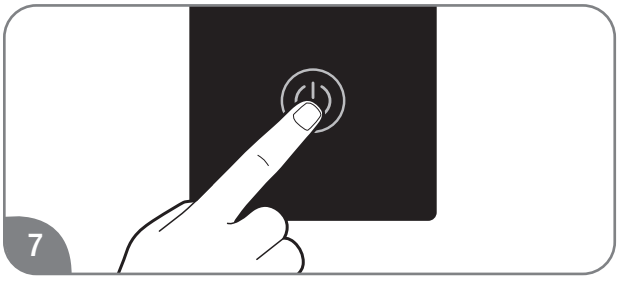
Open all hot water faucets and let run until all air has been purged from the lines.



Plug in the power cord or reconnect the power supply at the circuit breaker box.



Open the gas shut-off valve(s).

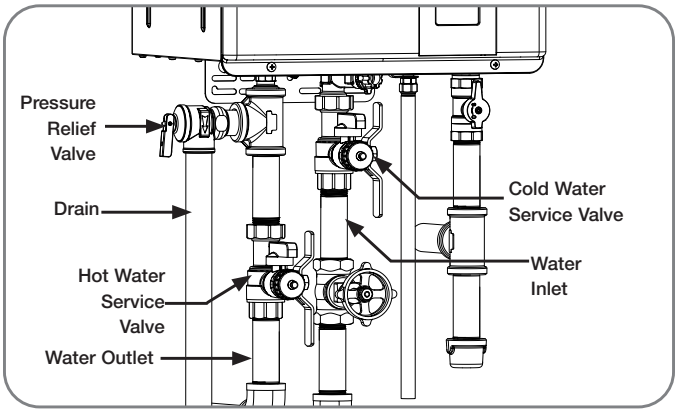


Press the POWER ON/OFF button on the remote control to restart the unit.

3.1 DRAINING THE WATER HEATER (CONT.)

STANDARD DRAIN METHOD

Isolator valve kits may be purchased from the manufacturer, distributor, or place of purchase. The kits include two full port isolation valves to be used in the inlet and outlet water lines. It is highly recommended to install isolator valve kits because these kits provide a means for full diagnostic testing and ease of system flushing.

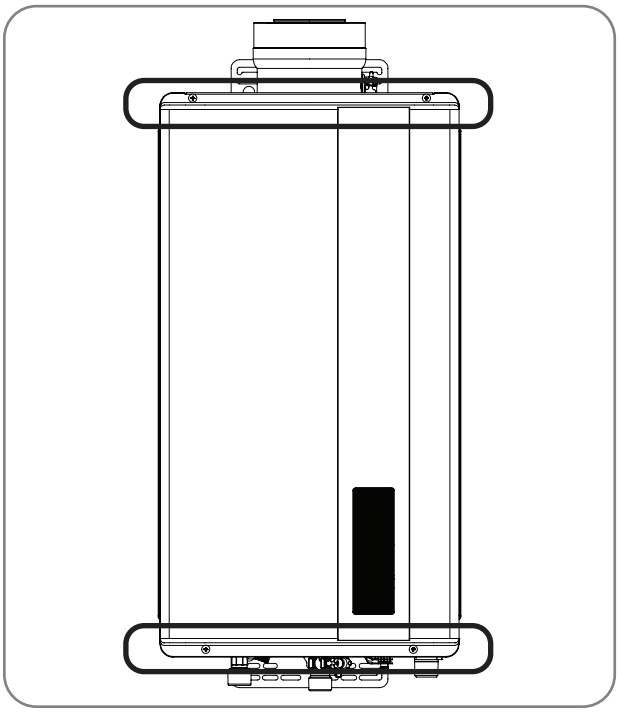


3.2 CONDENSING AND NON-CONDENSING MODELS

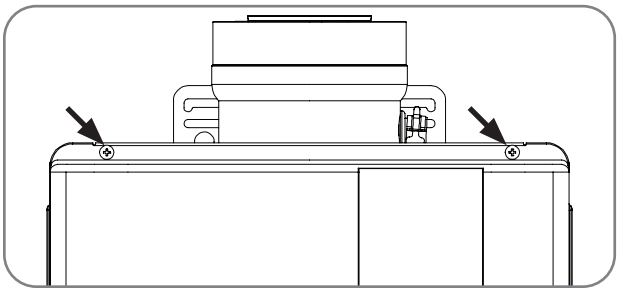
3.2.1 FRONT COVER

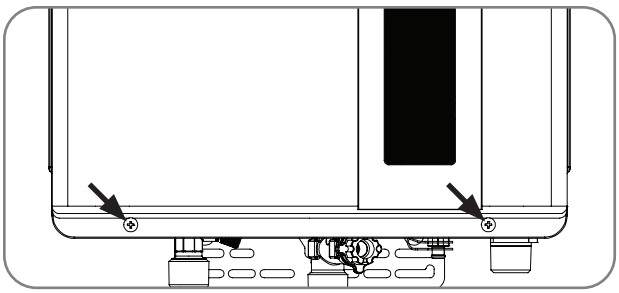
If need to remove or replace the front cover, refer the following steps.

The front cover is fixed with 4 screws that are located at the top and bottom of this water heater.

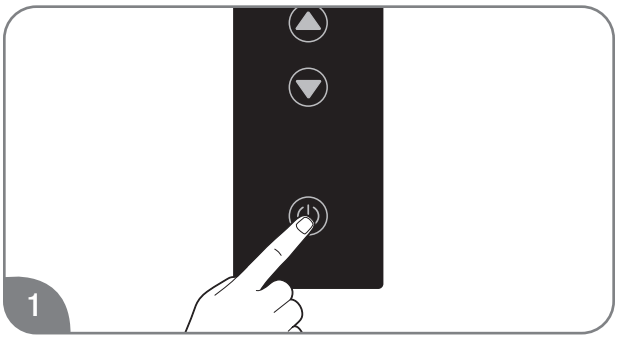


Remove 4 screws to remove this front cover.

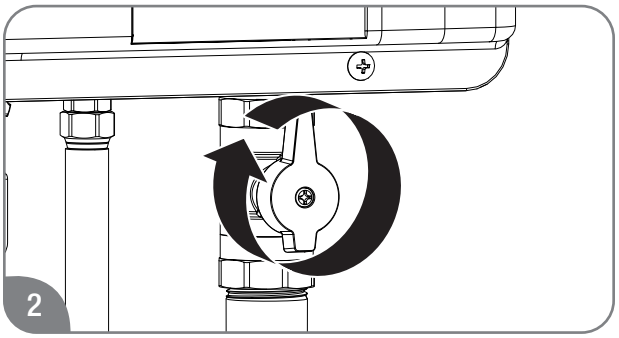




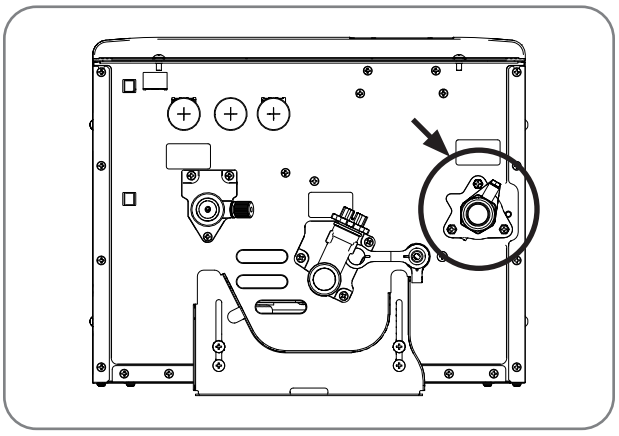
3.2.2 GAS CONNECTION FINAL ASSEMBLY



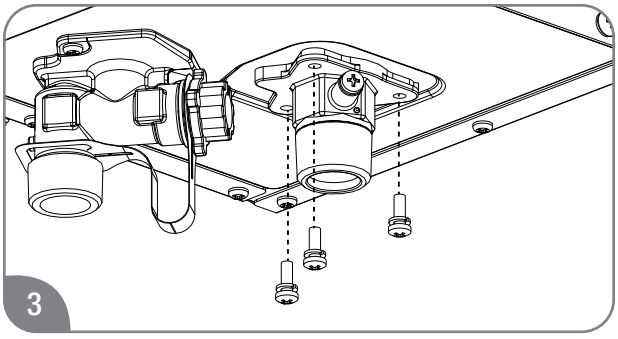
Turn OFF power on built-in display



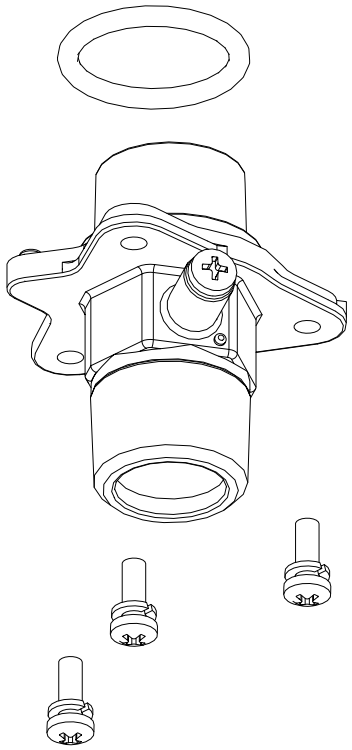
And then, Turn OFF the gas shut-off valve.



The gas connection final assembly is located bottom of this water heater with 3 screws.



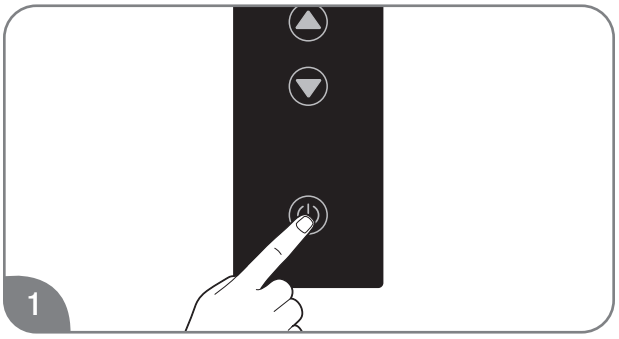
Remove 3 screws to remove this gas connection. Be sure not to lose the o-ring.



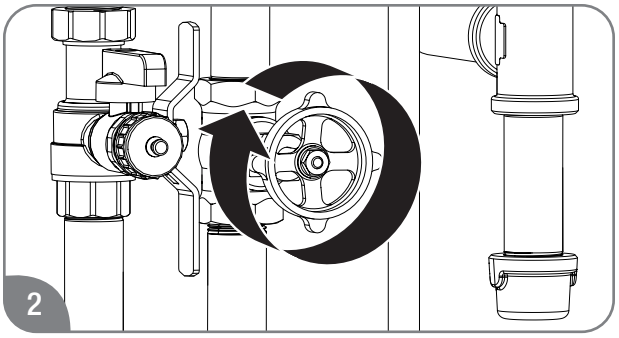
3.2.3 WATER INLET CONNECTION ASSEMBLY

If need to remove or replace the front cover, refer the following steps.

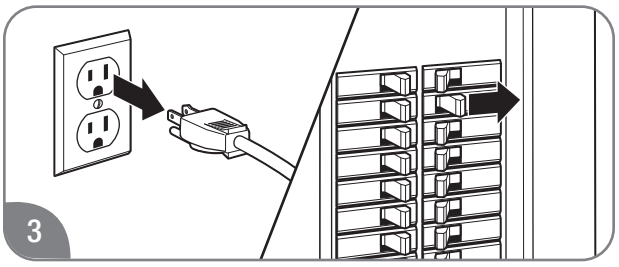
NOTICE
Before removing the water inlet connection, close the water valve and drain water from the water heater.
To drain water from this water heater, refer the section 3.1.



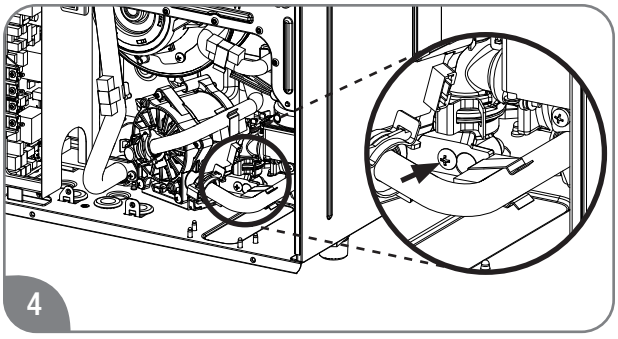
Turn OFF power on built-in display.



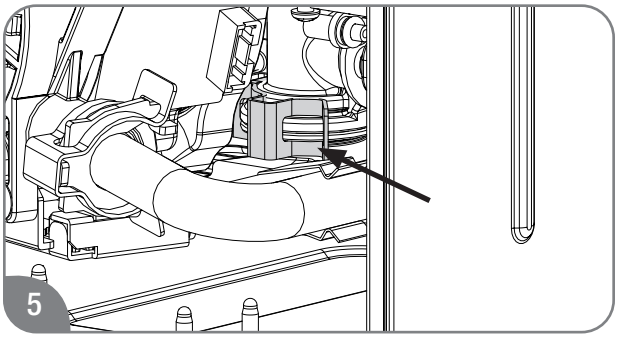
And then, close the water valve.



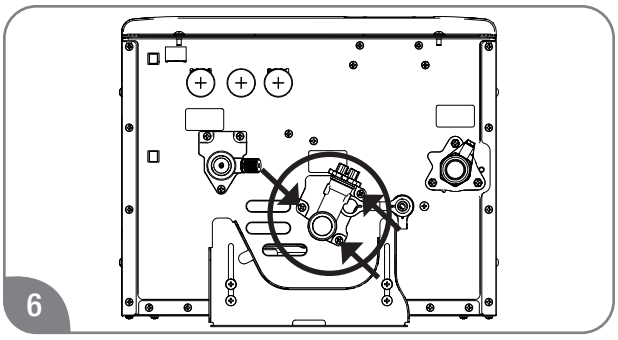
Disconnect electrical power from water heater.



Remove screw folding freeze protection heater from water inlet connection.



Remove quick fastener connected to water control valve.



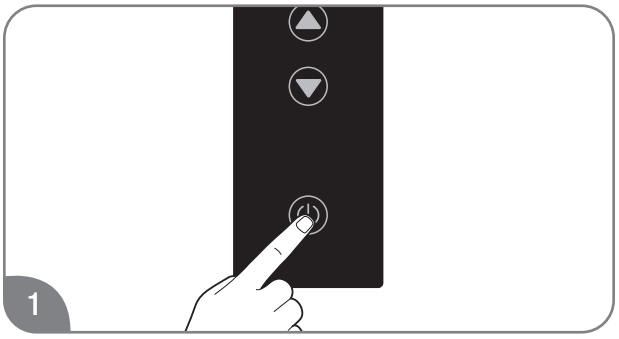
The water inlet connection is located at the bottom of this water heater with 3 screws.

Remove the 3 screws to remove this water connection.

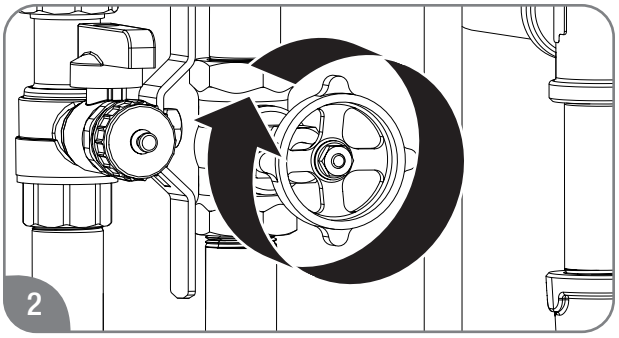
3.2.4 HOT WATER CONNECTION KIT WITH O-RING

If need to remove or replace the hot water connection on this water heater, refer the following steps.

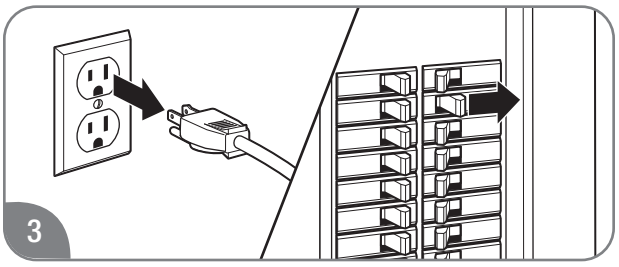
NOTICE
Before removing the hot water connection, close the water valve and drain water from the water heater.
To drain water from this water heater, refer the section 3.1.



Turn OFF power on built-in display.



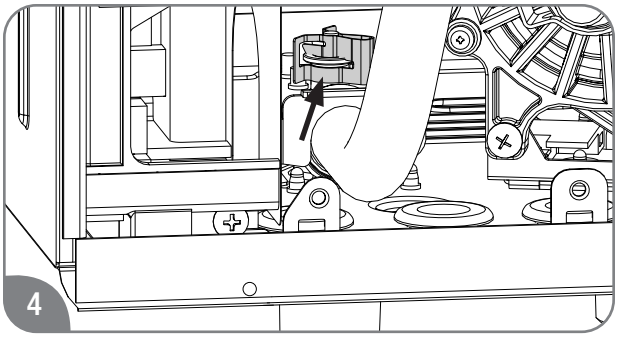
And then, close the water valve.



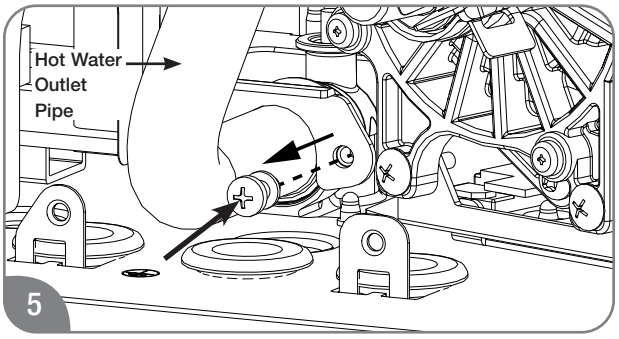
Disconnect electrical power from water heater.

Remove PCB from the water heater.

To remove PCB, refer to section "3.2.15 PCB kit".



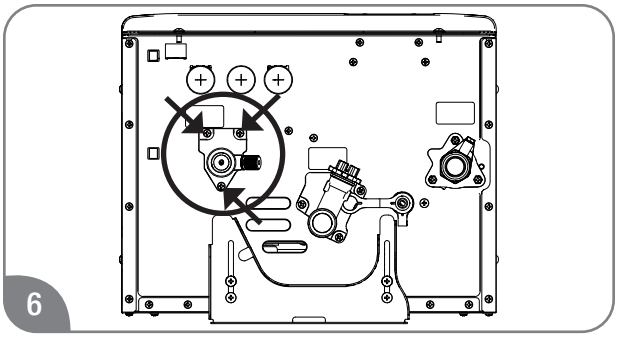
Remove quick fastener connected to hot water thermistor.



Remove screw and flange bracket. And then, remove hot water outlet pipe.

If the O-ring on the hot water pipe is damaged, replace the O-ring on the pipe.

This kit includes O-ring for hot water pipe.



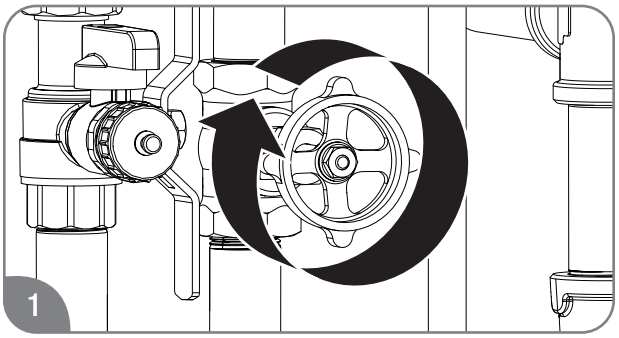
Hot water connection kit with O-ring is located at the bottom of this water heater with 3 screws.

Remove 3 screws to remove this hot water connection.

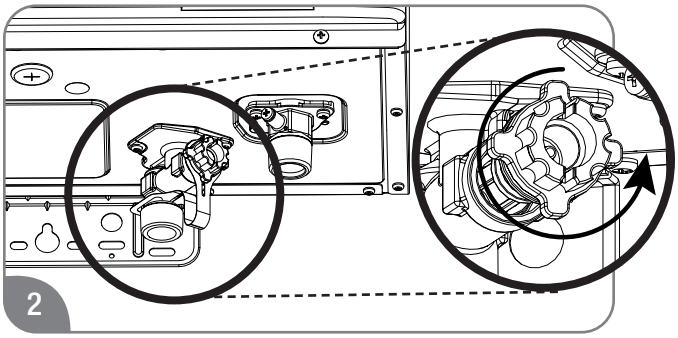
3.2.5 WATER FILTER

If need to remove or replace the water filter, refer the following section.

NOTICE
Before removing the water filter, close the water valve and drain water from the water heater.
To drain water from this water heater, refer the section 3.1.



Turn off the water to the water heater by closing the shut-off valve.



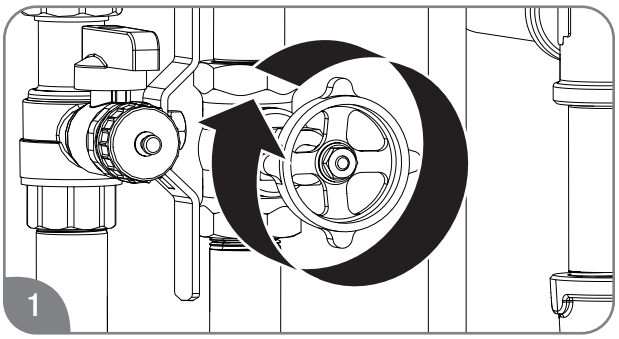
Water filter is located at the bottom of the water heater.

Turn the water filter counterclockwise to remove.

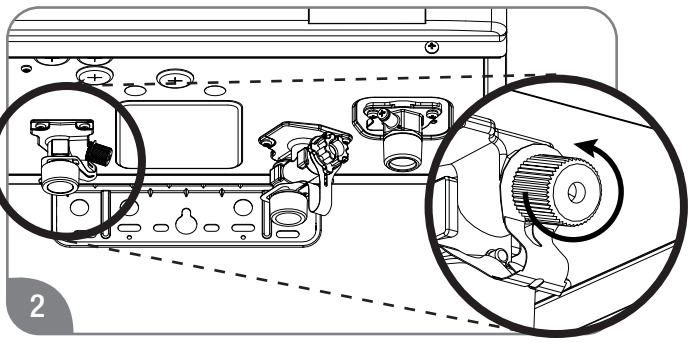
3.2.6 DRAIN VALVE

If need to remove or replace the drain valve on this water heater, refer the following steps.

NOTICE
Before removing the drain valve, close the water valve and drain water from the water heater.
To drain water from this water heater, refer the section 3.1



Turn off the water to the water heater by closing the shut-off valve.



Drain valve is located on the hot water connection that is bottom of the water heater.

Put a bucket under the drain valve to catch any water.

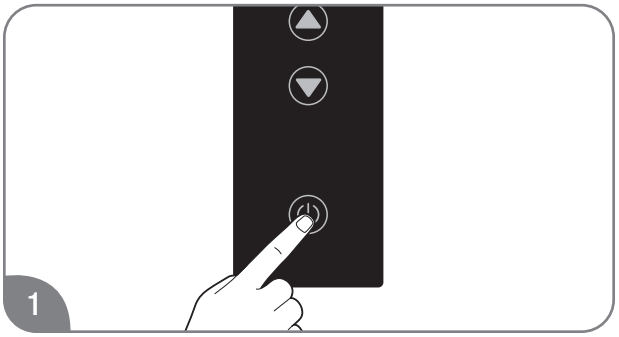
Turn the drain valve counterclockwise to remove.

3.2.7 WATER CONTROL VALVE KIT WITH O-RING

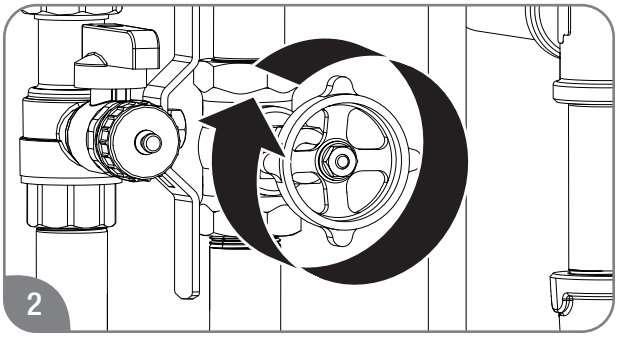
If need to remove or replace the water control valve on this water heater, refer the following steps

NOTICE
Before removing the water control valve, close the water valve and drain water from the water heater.

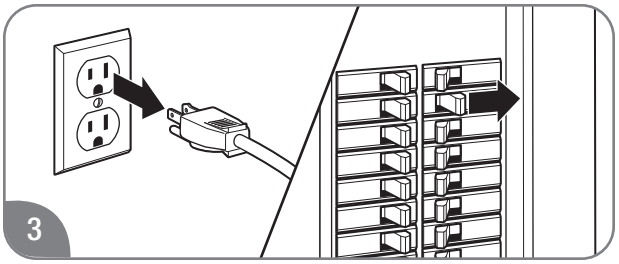
To drain water from this water heater, refer the section 3.1



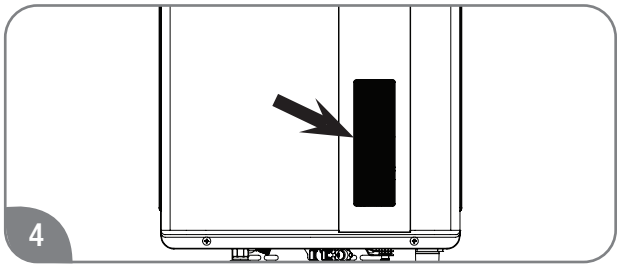
Turn OFF power on built-in display.



And then, close the water valve.

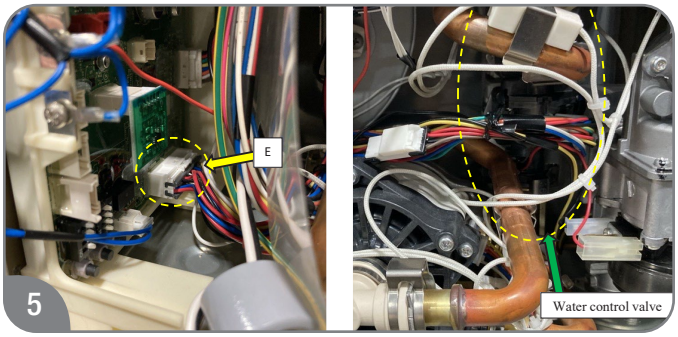


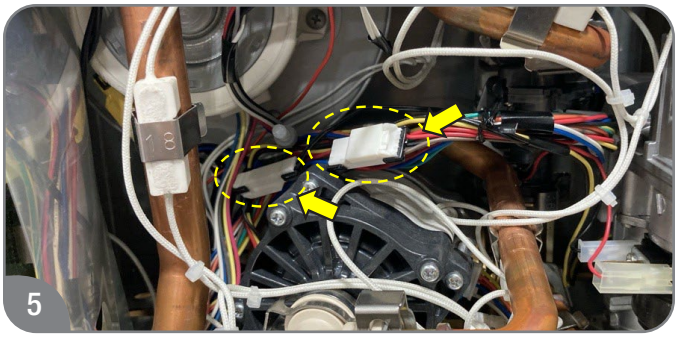
Disconnect electrical power from water heater.



Remove the display and recirc. pump from the water heater.

To remove the display, refer to sections “3.2.16 Built-in Display” and “3.2.17 Recirc. Pump”.

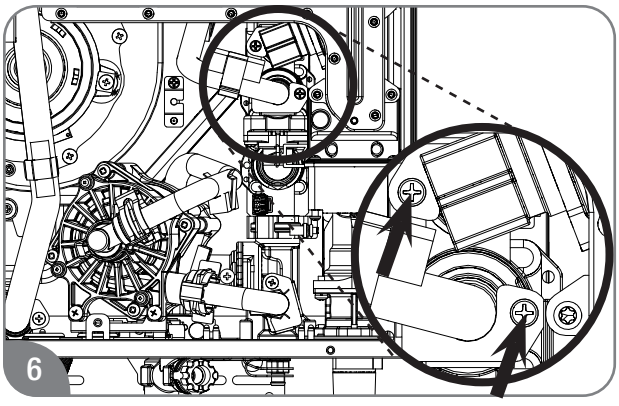




The water control valve kit with O-ring is located on the right side inside the water heater.

Remove water control wiring harness from the control board (connector “E”)

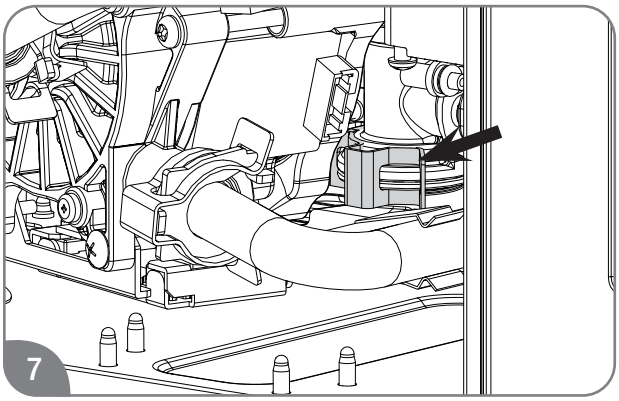
And remove 2 white connectors.



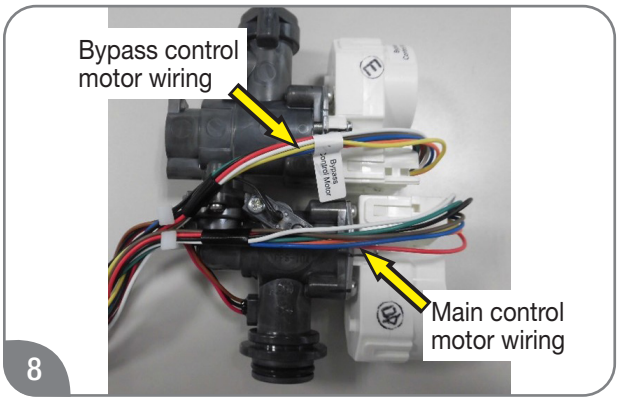
Remove 2 screws and 2 flange brackets. And then, remove water inlet pipe and bypass pipe.

Continue on the next page...

3.2.7 WATER CONTROL VALVE KIT WITH O-RING (CONT.)



Remove quick fastener connected to check valve.

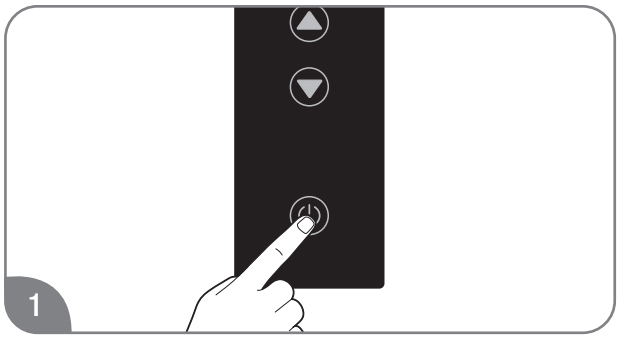


Remove water control valve kit with O-ring.

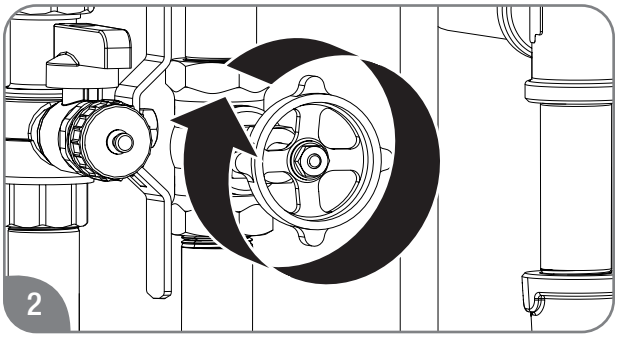
3.2.8 IGNITER AND FLAME ROD KIT

If need to remove or replace the igniter and flame rod on this water heater, refer the following steps.

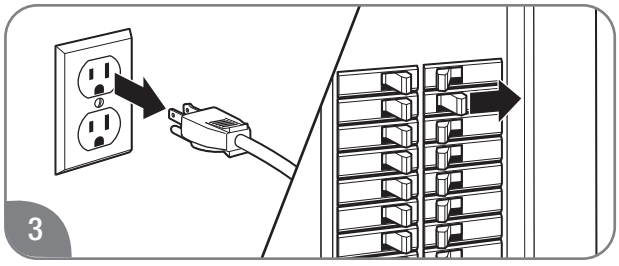
NOTICE
Before removing the igniter and flame rod, close the water valve and turn of power to the water heater.



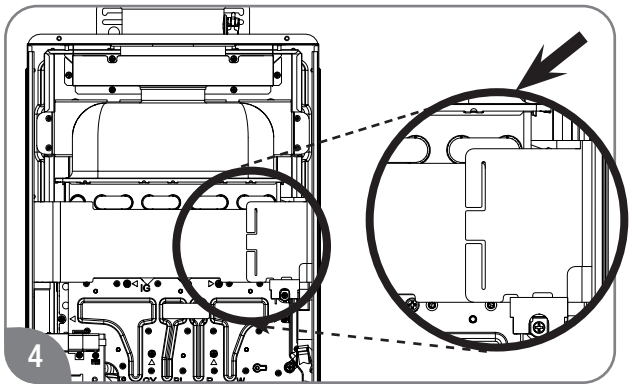
Turn OFF power on built-in display.



And then, close the water valve.



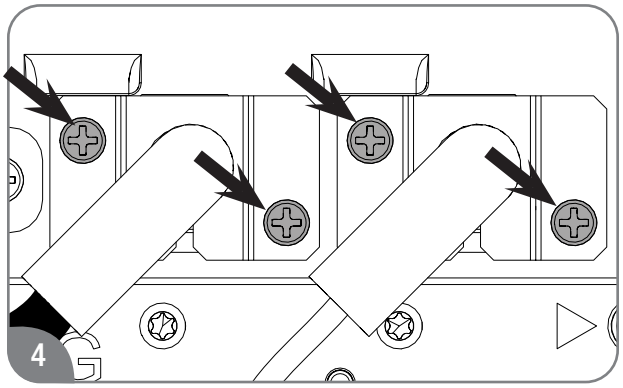
Disconnect electrical power from water heater.



Remove the hook film part of the Over Heat Limiter (OHL).

DO NOT cut the film.

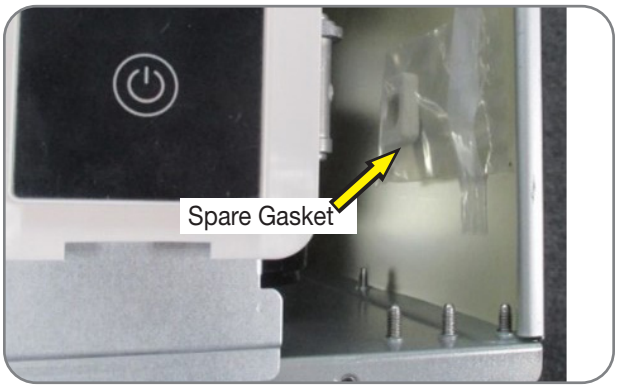
3.2.8 IGNITER AND FLAME ROD KIT (CONT.)



Remove igniter and flame rod wiring connecting the rod.

And remove 4 screws from the igniter and flame rod, bracket and pull these rods.

NOTICE
When reassembling igniter and flame rod, please use a spare gasket if the condition of the gasket is not good.

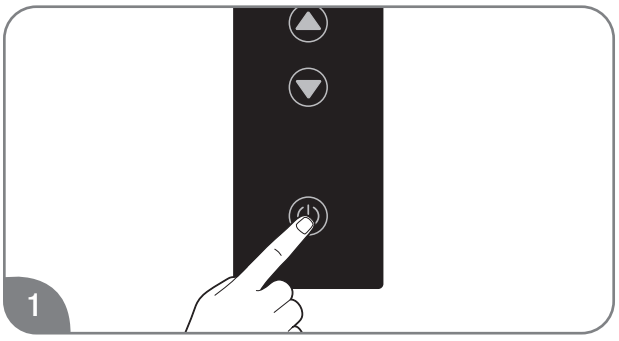


The spare gasket is located at the lower right in the unit.

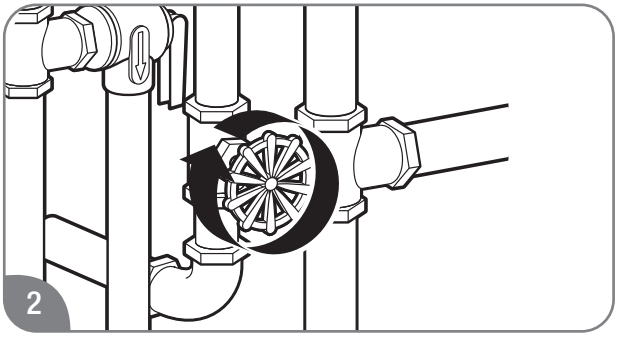
3.2.9 HEX THERMISTOR WITH O-RING

If need to remove or replace the Heat Exchanger (HEX) thermistor on this water heater, refer the following steps.

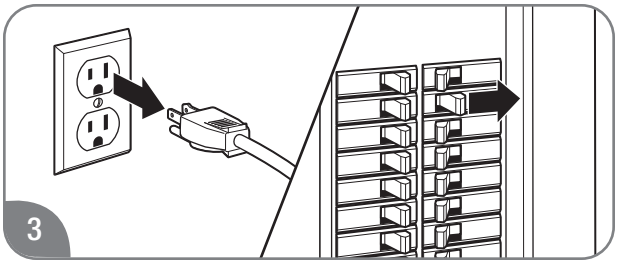
NOTICE
Before removing the HEX thermistor, close the water valve and drain water from the water heater.
To drain water from this water heater, refer the section 3.1.



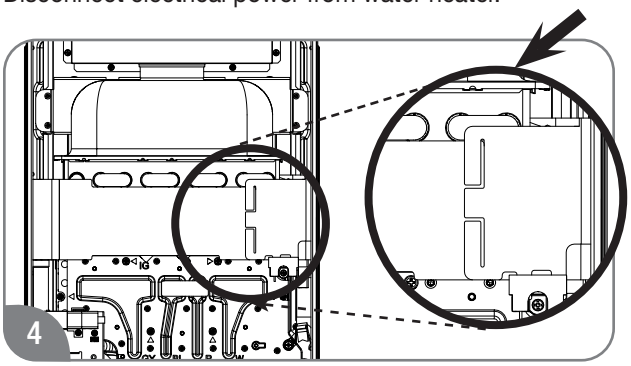
Turn OFF power on built-in display.



And then, close the water valve.



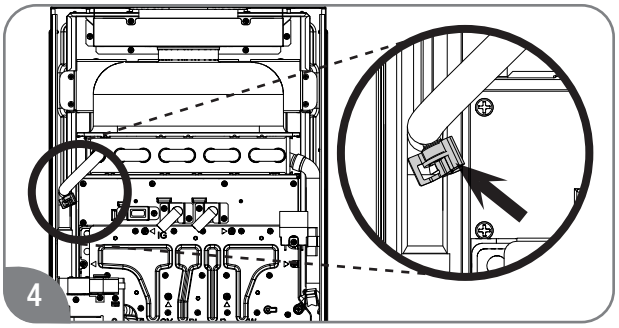
Disconnect electrical power from water heater.



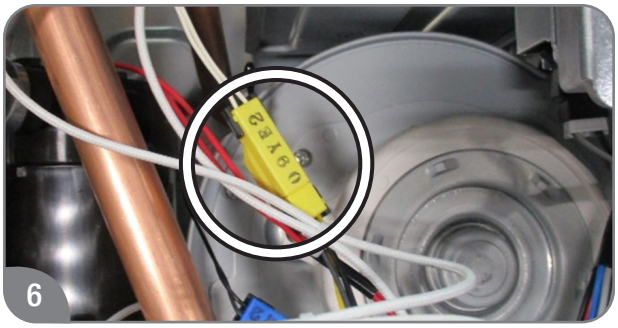
HEX thermistor with O-ring is located on the left side inside the water heater and gently fold it back. Unhook the film part of the Over Heat Limiter (OHL).

DO NOT cut the film.

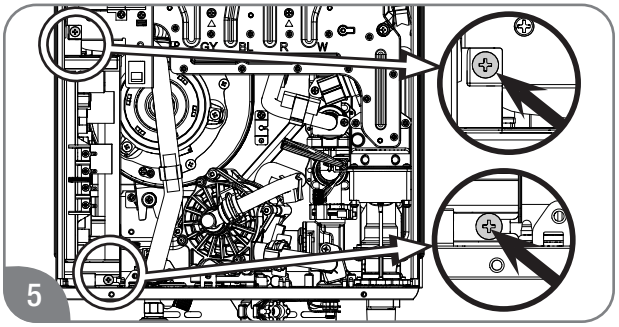
3.2.9 HEX THERMISTOR WITH O-RING (CONT.)



Remove quick fastener connected to HEX outlet pipe.



Remove yellow connector located behind the PCB.

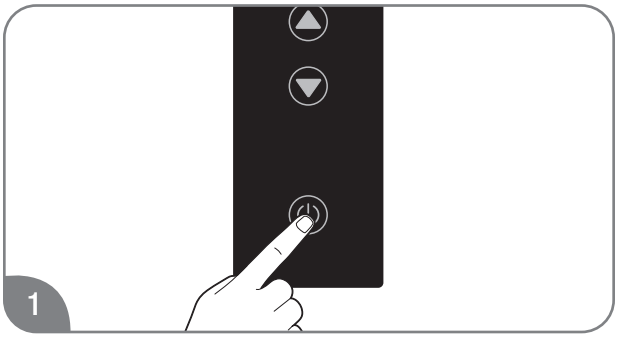


Remove 2 screws and tilt the PCB toward you.

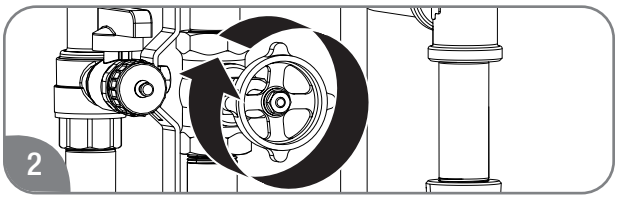
3.2.10 HOT WATER THERMISTOR WITH O-RING

If need to remove or replace the hot water thermistor on this water heater, refer the following steps.

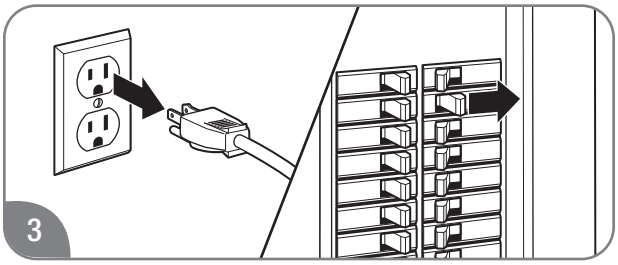
NOTICE
Before removing the hot water thermistor, close the water valve and drain water from the water heater.
To drain water from this water heater, refer the section 3.1.



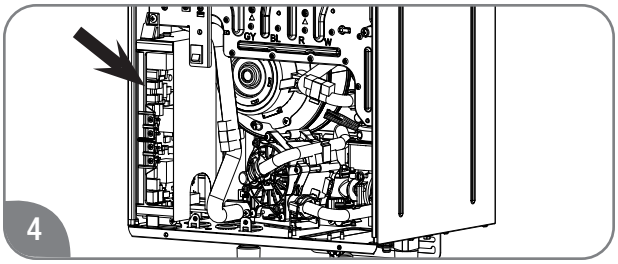
Turn OFF power on built-in display.



And then, close the water valve.

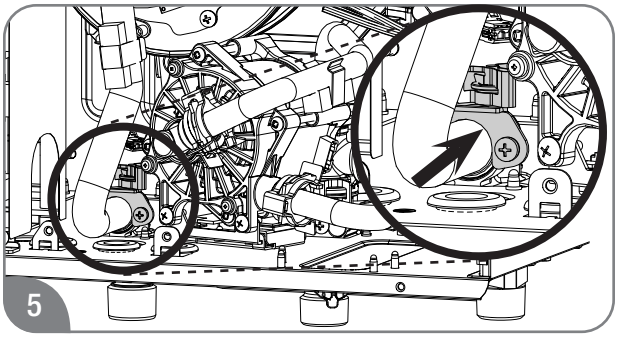


Disconnect electrical power from water heater.

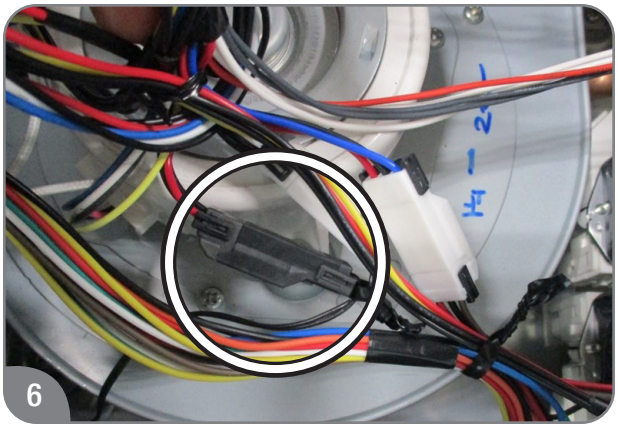


Remove PCB from the water heater. To remove PCB, refer to section “3.2.14 PCB kit”.

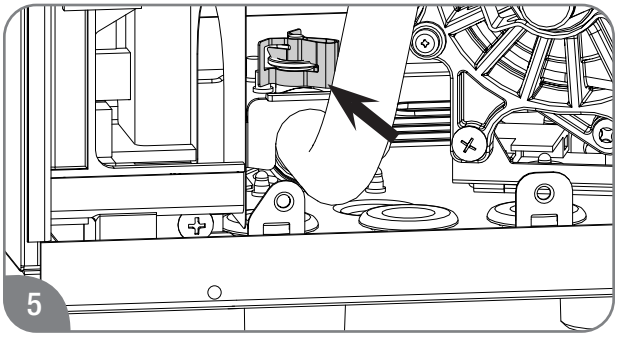
3.2.10 HOT WATER THERMISTOR WITH O-RING (CONT.)



Hot water thermistor with O-ring is located on the left side inside the water heater.

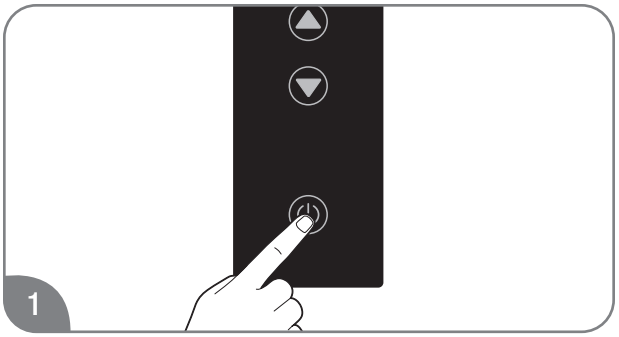


Remove black connector.

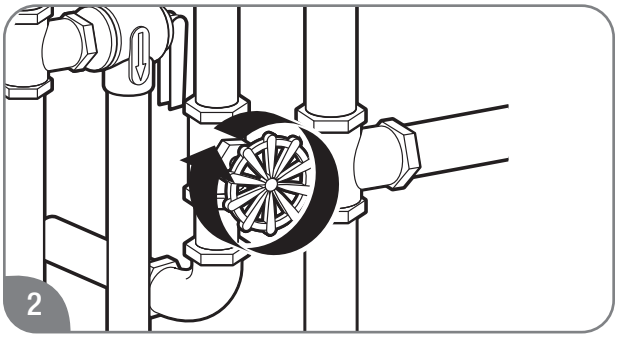


Remove quick fastener connected to hot water connection kit with O-ring.

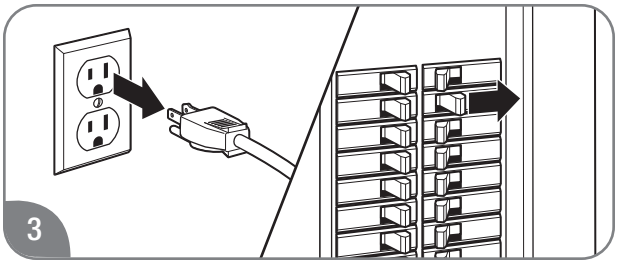
3.2.11 BLOWER MOTOR ASSEMBLY



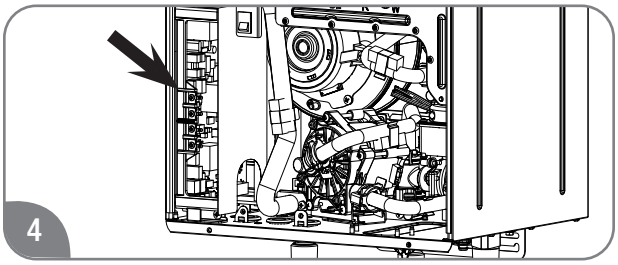
Turn OFF power on built-in display.



And then, close the water valve.



Disconnect electrical power from water heater.

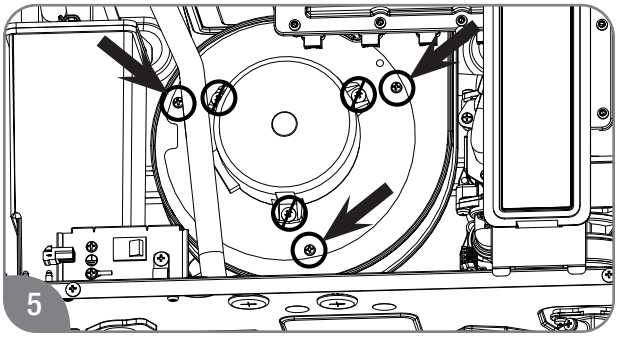


Remove PCB and recirc. pump from the water heater.

To remove PCB recirc. pump, refer to sections “3.2.14 PCB kit” and “3.2.17 Recirc. Pump”.

Continue on the next page...

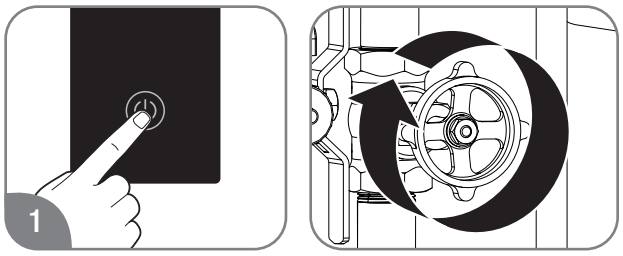
3.2.11 BLOWER MOTOR ASSEMBLY (CONT.)



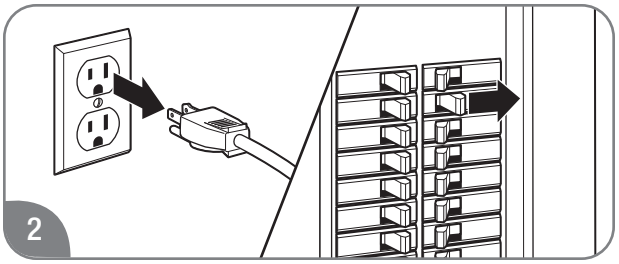
Remove 3 screws from blower motor assembly .

⊘DO NOT remove these screws.

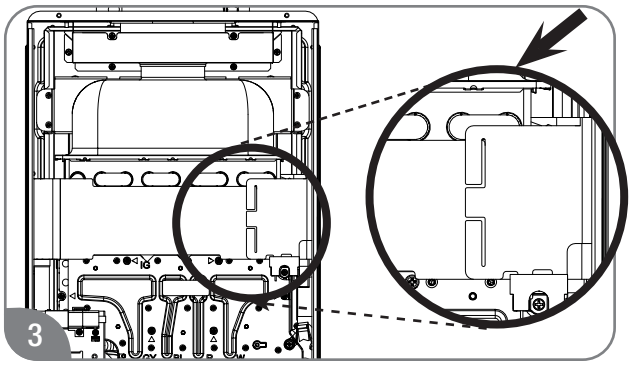
3.2.12 IGNITOR MODULE



Turn OFF power at display and the water to the water heater by closing the shut-off valve.

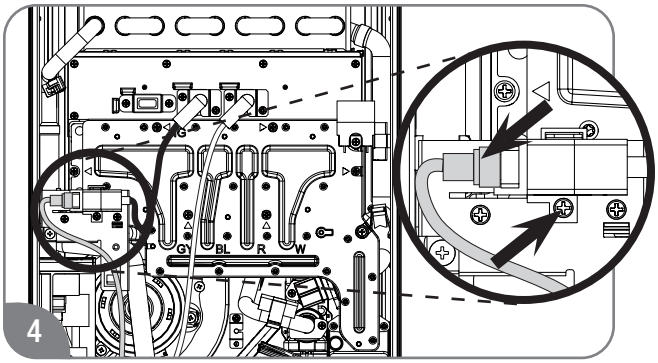


Disconnect electrical power from water heater.

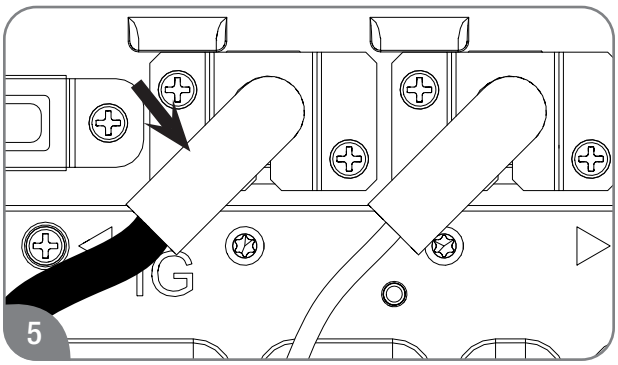


Ignitor module is located on the manifold assembly kit with screw. Unhood film part of the Over Heat Limiter (OHL) and gently fold it back.

Please DO NOT cut the film.

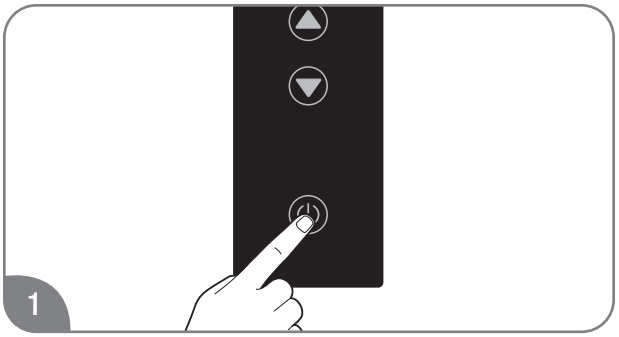


Remove connector and screw from the ignitor module.

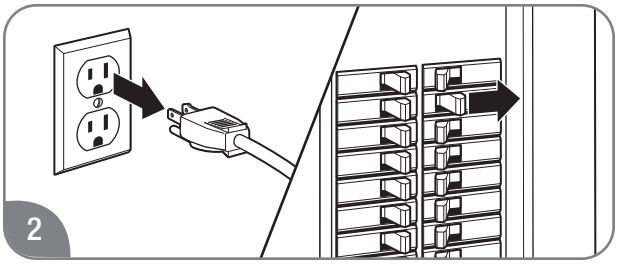


Remove wiring from the Igniter rod.

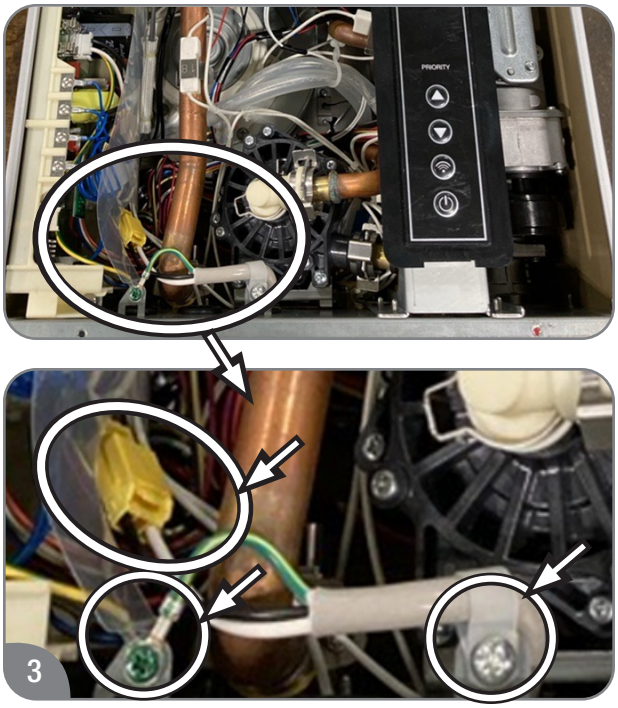
3.2.13 POWER CORD



Turn OFF power on built-in display.



Disconnect electrical power from water heater.



The power cord is located at bottom of the water heater (near the on/off switch) with 2 screws.

Remove 2 screws and disconnect the yellow connector to remove power code.

3.2.14 PCB KIT

These instructions are intended for qualified service technicians to assist in repairing and servicing the water heater.

⚠ WARNING

You will need to perform this procedure when you replace the PCB. Without this adjustment, the water heater may not function properly.

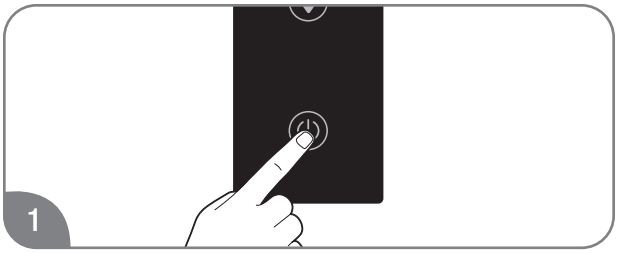
If you are not replacing the PCB, but removing it to access components, you do not need to perform the Burner Manifold Adjustment.

NOTE: During the adjustment procedure if [EE] is displayed on the display of remote control, adjust again with caution. This means there was an error in the adjustment sequence.

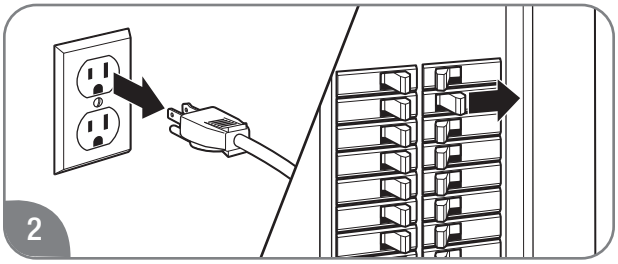
NOTE: Read these entire instructions before starting this procedure.

NOTE: This procedure requires a manometer to measure manifold pressure. Please prepare manometer before starting this procedure.

When replacing the printed circuit board (PCB), perform the following sequence of steps.



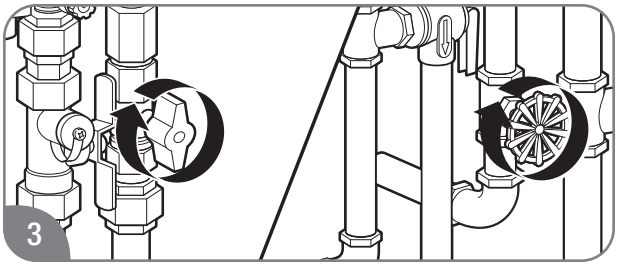
Turn OFF power at display.



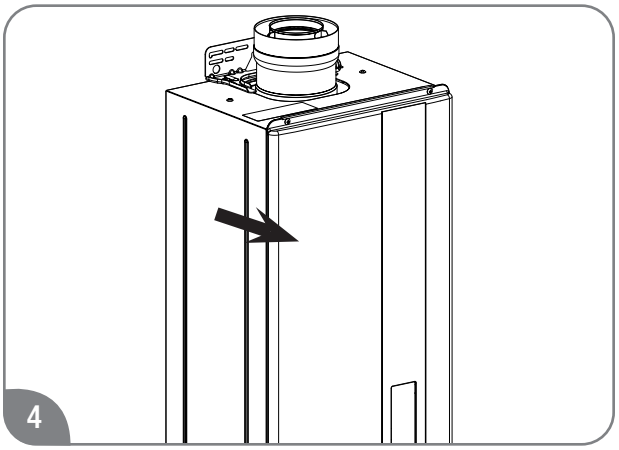
Disconnect electrical power from water heater.

Continue on the next page...

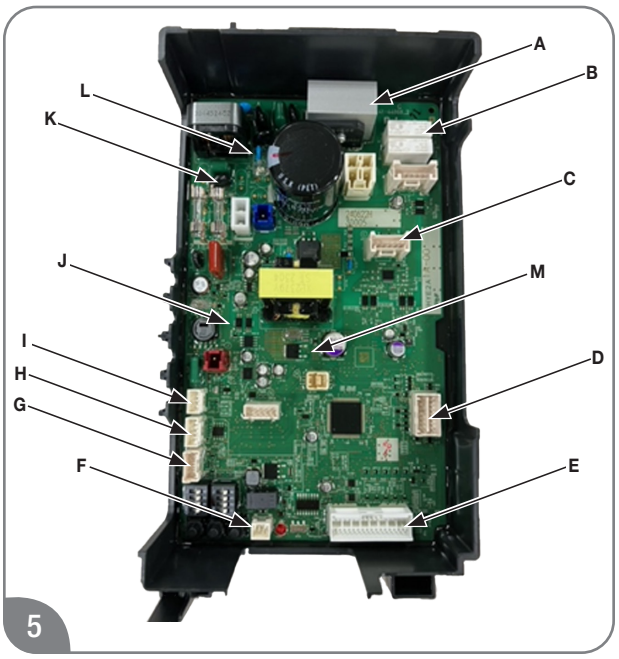
3.2.14 PCB KIT (CONT.)



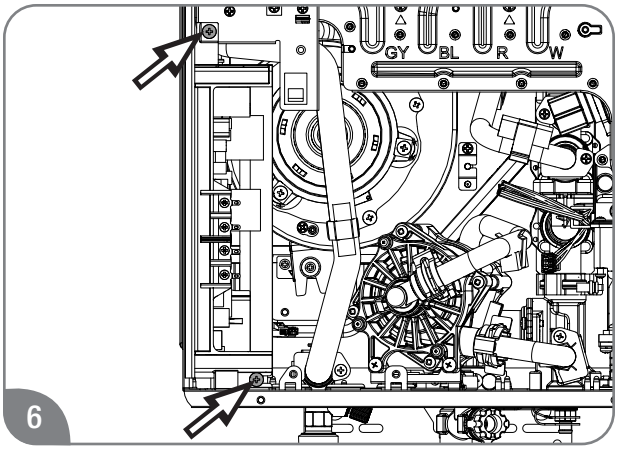
Turn off the gas and water to the water heater by closing the shut-off valves.



Remove front cover from the water heater. To remove the part, refer to section “3.2.1 Front cover”.

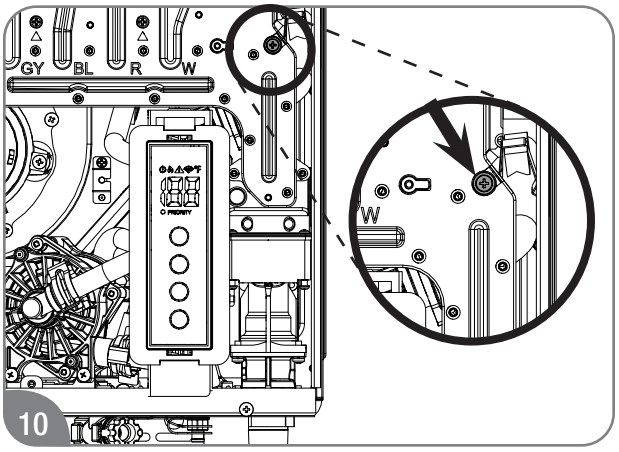


Remove 11 connectors (A, B, C, D, E, F, H, J, K, L, and M) from the substrate.



Remove 2 screws from bottom plate and manifold assembly kit.

7. **Remove old PCB.**
8. **Remove program chip from old PCB and install in new PCB.**
9. **Install new PCB in water heater.**



Remove screw located on manifold assembly kit, and connect manometer to measure manifold pressure.

11. **Reconnect electrical power to water heater.**

    NOTE: DO NOT turn on power at remote controller.

12. **Turn on gas supply to the water heater**
13. **Turn on water supply to the water heater. (Note: ensure there are no water leaks)**

3.2.14 PCB KIT (CONT.)

ADJUSTMENT OF THE BURNER MANIFOLD

NOTE: To adjust the manifold pressure at Minimum and Maximum on the water heater, please refer the tables in Anex 1.

NOTE: Always start with the "Minimum" set point when adjusting the burner manifold pressure setting. The set point numbers will display on the remote control. There must be a remote control connected to the heater in order to perform this procedure.

14. Adjustment of minimum manifold pressure.

- Turn ON power at remote control
- Turn ON a hot water faucet to at least the minimum activation flow rate.
- While holding the adjust button (ADJ), momentarily press (tap) the minimum button (MIN). The current number [01 - 39] is displayed on the display of remote control. If the manifold pressure displayed on manometer does not agree with the pressure on the table proceed to next step. If the value does agree then release the adjust button (ADJ).
- Continue to momentarily press (tap) the minimum button (MIN) until you get to the minimum pressure recorded on the table.

NOTE: Every time you press the MINIMUM (MIN) button, the display will cycle up to the number 39. Once it reaches 39, it will automatically reverse and cycle back down to 01.

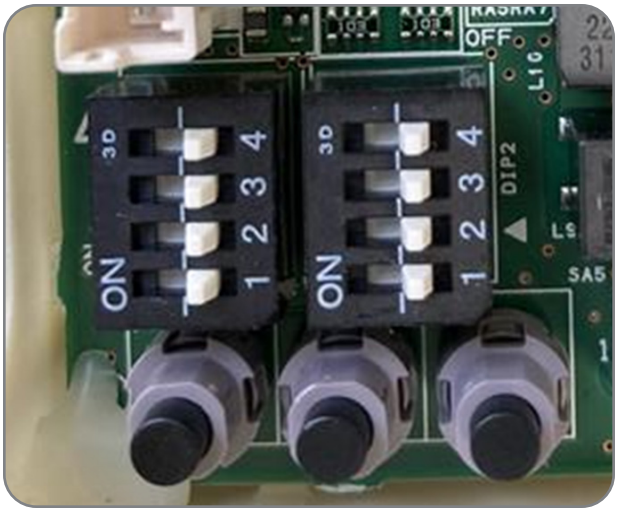
- Release the adjust button (ADJ).

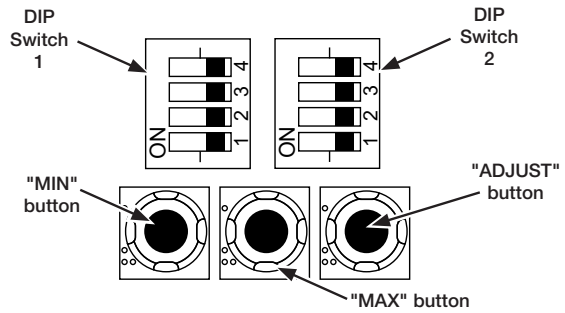
15. Adjustment of maximum manifold pressure.

- Turn ON power at remote control
- Turn ON multiple hot water faucets to achieve maximum flow rate.
- While holding the adjusting button (ADJ), momentarily press (tap) the maximum button (MAX).
- The current number [01 - 39] is displayed on the display of remote control. If the manifold pressure displayed on manometer does not agree with the pressure on the table proceed to next step. If the value does agree then release the adjusting button (ADJ).
- Continue to momentarily press (tap) the maximum button (MAX) until you get to the minimum pressure recorded on the table.

NOTE: Every time you press the MAXIMUM (MAX) button, the display will cycle up to the number 39. Once it reaches 39, it will automatically reverse and cycle back down to 01.

- Release the adjusting button (ADJ).



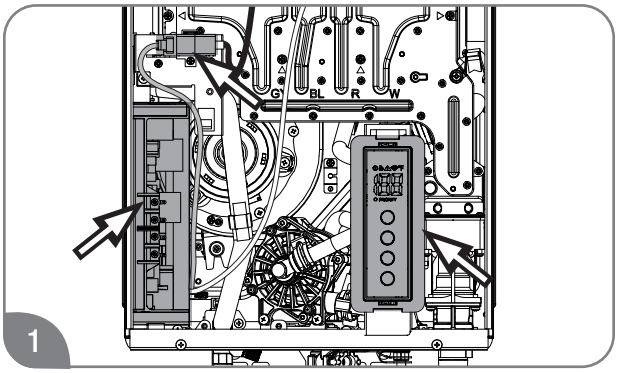


3.2.14 PCB KIT (CONT.)

	PCB PART NUMBER	RHEEM MODEL	MANIFOLD [in w.c.]			199K	180K
NON CONDENSING WITH PUMP	41-43931-00	RTG-R199DVL	INDOOR	NATURAL	MIN	0.85	0.85
					MAX	3.11	2.05
				LP	MIN	1.2	1.2
					MAX	4.43	2.96
	41-43931-00	RTG-R199XL	OUTDOOR	NATURAL	MIN	0.85	0.85
					MAX	3.55	2.31
				LP	MIN	1.2	1.2
					MAX	4.71	3.11

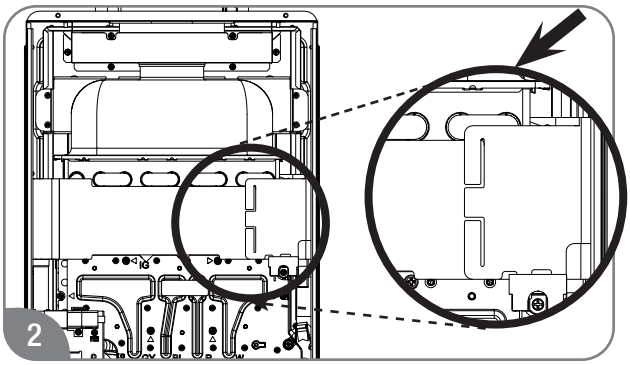
3.2.15 MANIFOLD ASSEMBLY KIT WITH GAS PROPORTIONAL VALVE

FOR PHILLIPS HEAD SCREWS



Remove display, PCB, and Ignitor module from the water heater.

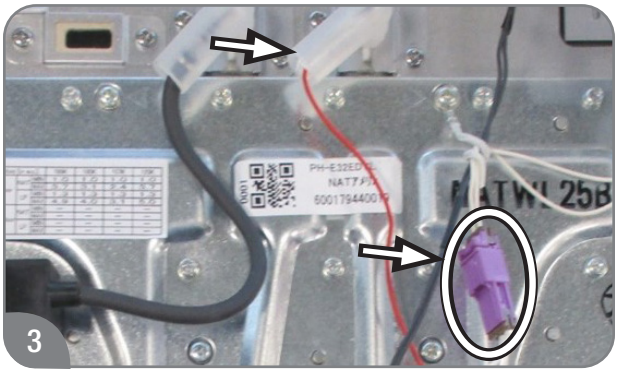
To remove these parts, refer to section “3.2.16 Built-in Display” and “3.2.14 PCB Kit”.



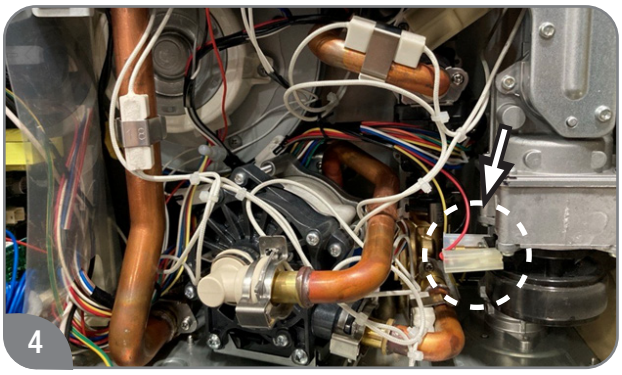
Remove the hook film part of the Over Heat Limiter (OHL) and gently fold it back.

Please DO NOT cut the film.

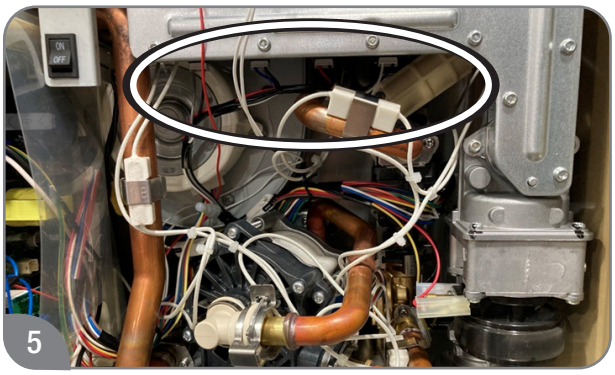
Remove 2 white connectors and screw from Manifold assembly kit.

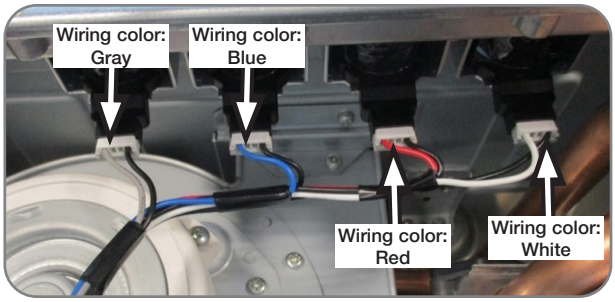


Remove purple connector and flame rod wiring from the rod.

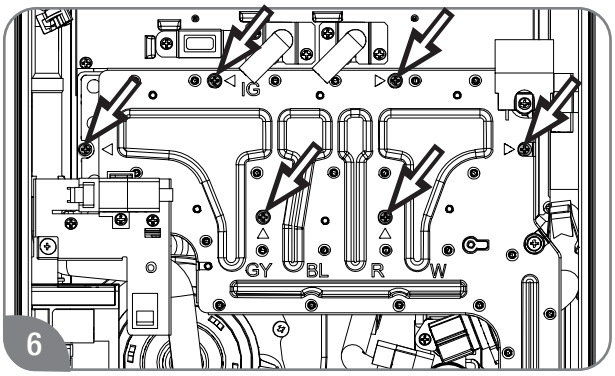


Remove 2 connectors from proportional gas valve.



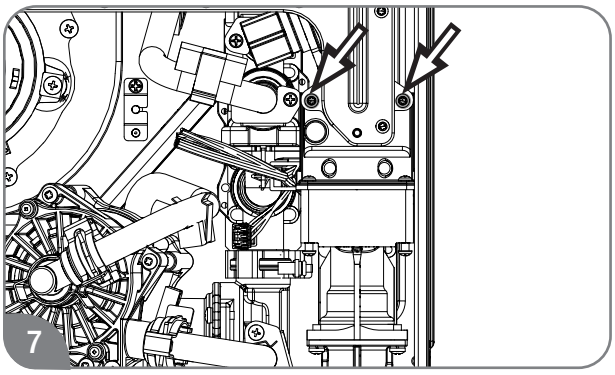


Remove 4 connectors from manifold assembly kit. The clips holding the harnesses into the plug are to the rear of the unit. Do not apply force to these connectors or they will break.



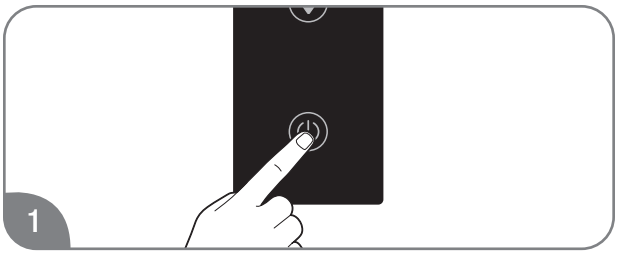
Remove 6 screws from manifold assembly kit. Arrows pointing to these screws are stamped in the metal plate. (Continue on the next page).

3.2.15 MANIFOLD ASSEMBLY KIT WITH GAS PROPORTIONAL VALVE (CONT.)

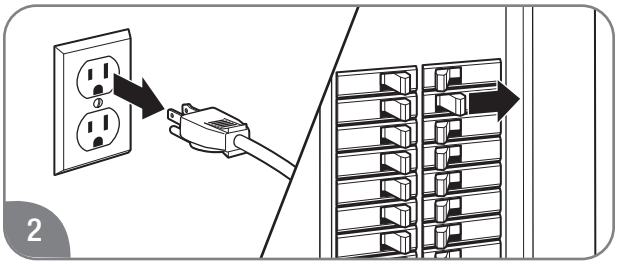


Remove 2 screws from the gas valve assembly and remove the manifold assembly plate. Ensure the gasket between each part is not lost.

3.2.16 BUILT-IN DISPLAY



Turn OFF power on built-in display.

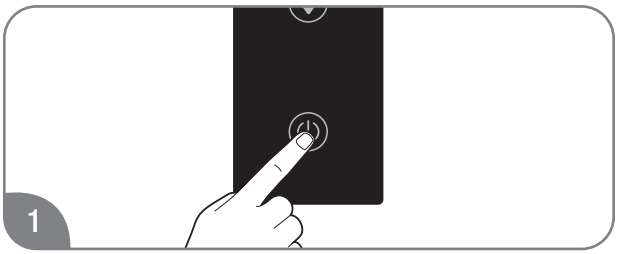


Then disconnect electrical power from water heater.

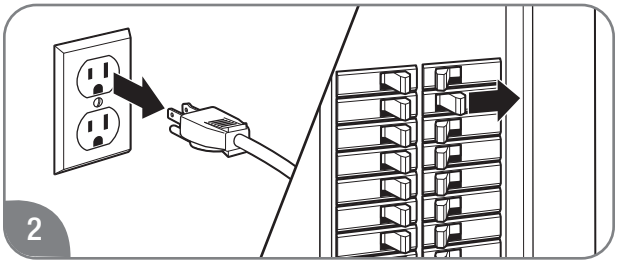
Remove the following connector from the PCB to remove built-in display.

Wifi model: connector H

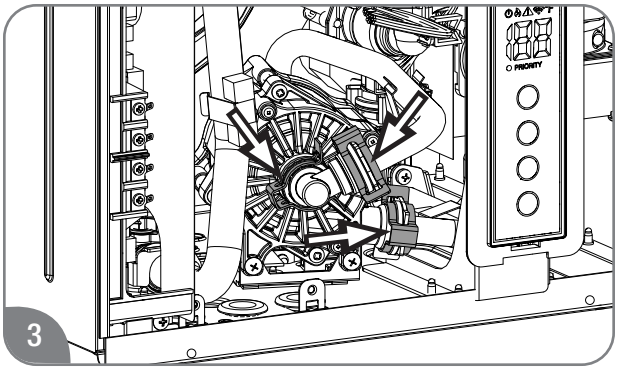
3.2.17 RECIRCULATION PUMP



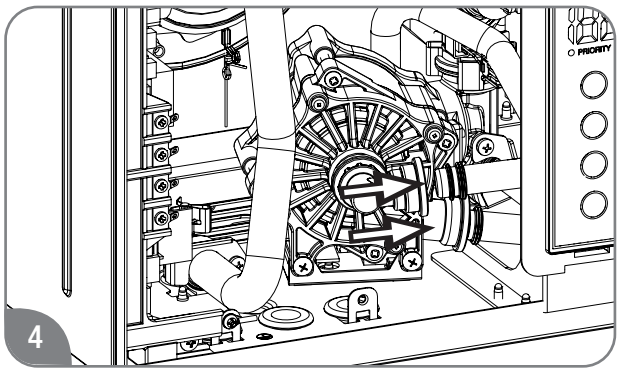
Turn OFF power on built-in display.



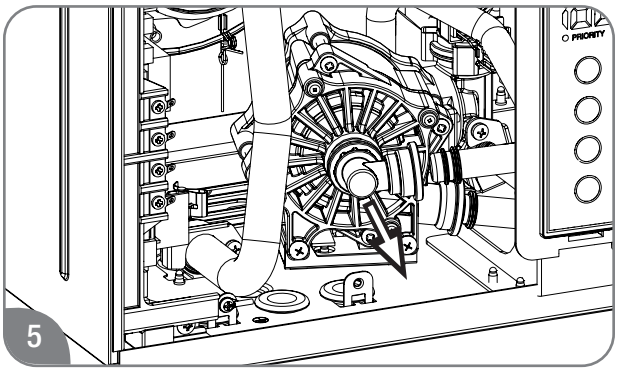
Then disconnect electrical power from water heater.



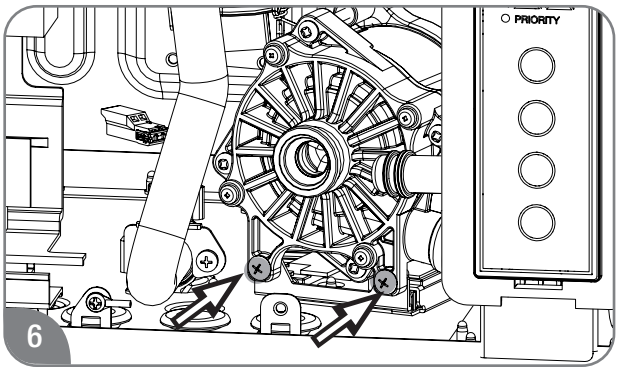
Remove the metal clips connecting the water pipes to the pump.



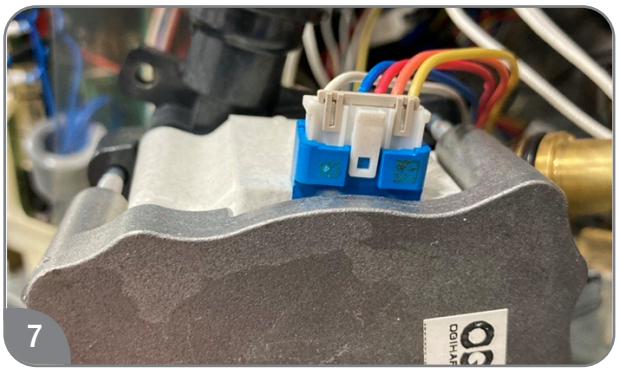
Disconnect the metal pipes from the pump connections.



Pull out the elbow.



Remove the two screws from the pump bracket and move the pump out of the cabinet.



Disconnect the wire harness from the pump. The pump can now be removed from the water heater.

NOTES

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NOTES

TECHNICAL SUPPORT LINE
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