

Selecting a Vent Type

	Description	Canadian Direct Vent	US Direct Vent
A	Clearance above grade, veranda, porch, deck, or balcony.	12 in (30 cm)	12 in (30 cm)
B	Clearance to window or door that may be opened.	36 in (91 cm)	12 in (30 cm)
C	Clearance to permanently closed window.	*	*
D	Vertical clearance to ventilated soffit located above the terminal within a horizontal distance of 2 ft (61 cm) from the center line of the terminal.	*	*
E	Clearance to unventilated soffit.	*	*
F	Clearance to outside corner.	*	*
G	Clearance to inside corner.	*	*
H	Clearance to each side of center line extended above meter/regulator assembly.	3 ft (91 cm) within a height of 15 ft (4.6 m) above the meter/regulator assembly	*
I	Clearance to service regulator vent outlet.	36 in (91 cm)	*
J	Clearance to non-mechanical air supply inlet to building or the combustion air inlet to any other appliance.	36 in (91 cm)	12 in (30 cm)
K	Clearance to a mechanical air supply inlet.	6 ft (1.8 m)	36 in (91 cm) above if within 10 ft
L	Clearance above paved sidewalk or paved driveway located on public property.	7 ft (2.13 m)†	*
M	Clearance under veranda, porch, deck, or balcony.	12 in (30 cm)‡	*

1. In accordance with the current with the current CSA B149.1 Natural Gas & Propane Installation Code.

2. In accordance with the current ANSI Z223.1/NFPA 54 National Fuel Gas Code.

† A vent shall not terminate directly above a sidewalk or paved driveway that is located between two single-family dwellings and serves both of those dwellings.

‡ Permitted only if veranda, porch deck, or balcony is fully open on a minimum of two sides beneath the floor.

* Clearance in accordance with local installation codes and the requirements of the gas supplier.

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Selecting Vent Pipe Materials

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Venting requirements differ in the U.S. and Canada. Consult the following chart, or the most recent edition of ANSI Z223.1/NFPA 54 or CAN/CGA B149.1, as well as all applicable local codes and regulations when selecting vent pipe materials.

- ⚠ **DO NOT** use cellular core PVC (ASTM F891), cellular core CPVC, or Radel (polyphenolsulfone) for the exhaust vent.

WARNING

- ⚠ **DO NOT** mix components from different systems. The vent system could fail and harmful elements from the flue could leak into the living space. In the event this occurs, it could cause serious personal injury or death.
- Mixing of vent materials **WILL VOID THE WARRANTY** and certification of the appliance.

Location	Recommended Vent Materials
USA	<ul style="list-style-type: none">• PVC/CPVC Schedule 40 or 80 (Solid Core)• Approved Polypropylene (PP)
Canada*	<ul style="list-style-type: none">• Type BH Special Gas Vent Class IIA (PVC)• Type BH Special Gas Vent Class IIB (CPVC)• Type BH Special Gas Vent Class IIC (Polypropylene/Stainless Steel)

*For Installation in Canada, field-supplied plastic vent piping must comply with CAN/CGA B149.1 (latest edition) and be certified to the Standard for Type BH Gas Venting Systems, ULC-S636. Components of this listed system must not be interchanged with other vent systems or unlisted pipes or fittings. All plastic components and specified primers & glues of the certified vent system must be from a single system manufacturer and must not be intermixed with another system manufacturer's parts.

NOTE: The supplied vent connector and vent termination are certified as part of the water heater.

The maximum vent length when using 2 in. exhaust ducts is 60 ft (18 m). The intake duct length may be identical to the exhaust duct length. One foot straight pipe and an 90° elbow are not included in the vent length. The maximum vent length is reduced by the number of elbows used, as shown in the table below:

Vent Size	Max. Length	Equivalent Lengths
2 in	60 ft (18 m)	Reduce the maximum vent length accordingly for each elbow used: <ul style="list-style-type: none"> • Each 90° elbow equates to 5 linear ft. (1.5 m) of vent length. • Each 45° elbow equates to 2.5 linear ft. (0.8 m) of vent length. • The number of 90° elbows cannot exceed 7. • The number of 45° elbows cannot exceed 14.

NOTE: The use of a PVC or polypropylene concentric termination counts as 5 linear feet (1.5 m) of vent.

NOTE

When the exhaust pipe is too long, the gas load will be reduced due to the influence of air resistance.

- ⚠ **DO NOT** exceed the maximum length of the vent. Excessive length may result in heater shutdown and property loss.
- ⚠ **DO NOT** make the exhaust pipe shorter than the minimum length allowed. If the length of the pipe is too short, the exhaust gas generated by gas combustion could enter into the air inlet of the machine, which could lead to incomplete combustion, and result in heater failure, property loss, personal injury, or death.

Before installing the water heater, determine what type of vent termination is appropriate for the installation location and materials. The following sections describe some typical venting configurations, but do not include all possible options. The examples shown below and the following pages are possible indoor venting options.

The following PVC terminals listed in the table below have been approved to be adequate for the units mentioned in this manual.

Brand	Model	Type	Part #	Note
DiversTech	DiversTechH	Low profile	HVENT-2	2 in (51 mm)

NOTE

- Only the termination models listed in this manual are approved for use with this appliance
- Only terminations produced by the same manufacturer as the vent system must be used.
- Refer to the vent manufacturer's instructions for detailed installation procedures and guidelines.

(A) Two-Pipe Sidewall Venting



WARNING

The vent system must be installed by an authorized technician or licensed professional. Improper installation may cause appliance failure, property damage, severe personal injury, or death. Improper installation will also void the warranty of the water heater.

If the distance between the air inlet and exhaust vent terminations is less than 7 ft. (2.1 m), the water heater will draw in exhaust gases through the intake. This creates a risk of inadequate combustion air for the water heater, which can increase the amount of Carbon Monoxide (CO) emissions and noise due to vibration.

- Termination elbows must be oriented vertically, ensuring they point directly downward. Attempt to prevent exhaust air from entering the air inlet by angling termination elbows in directions other than directly downward will increase the risk of freezing.
- Reversing the air intake and exhaust pipes is not allowed. Carbon Monoxide (CO) emissions and noise due to vibration will increase.

In case of severe weather, such as an earthquake, tornado, or other natural disasters, have a trained professional check the vent pipe for any damage, that the exhaust flows normally, and the unit functions properly.

NOTE

- Install the bird screen at the end of the terminal elbow when a two-pipe sidewall venting method is applied.
- If glue and other solvent cement are used during the installation, please follow the manufacturer's instructions when using.
- Please refer to the illustrations on the following page for the dimension requirements when using this method of venting.

Terminating the Vent

Two-Pipe Sidewall Venting Example 1:

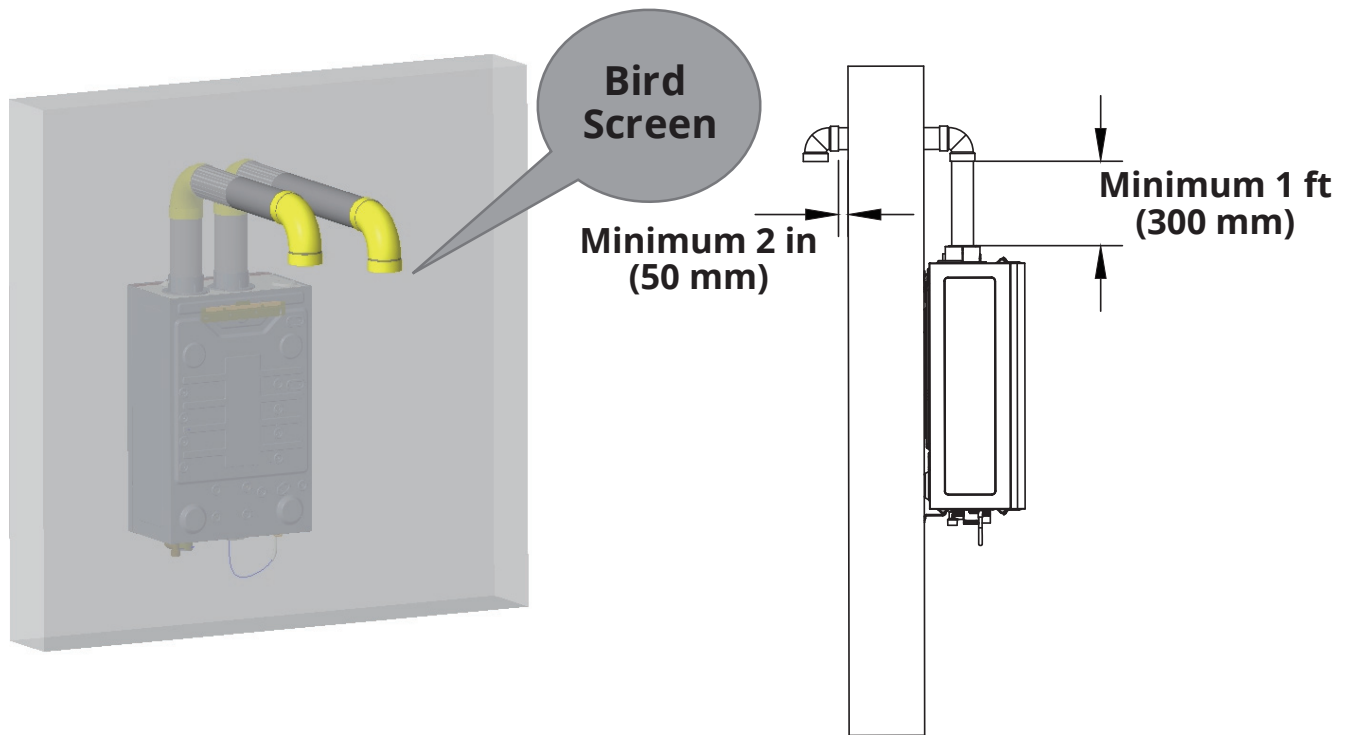


Fig. 17.1

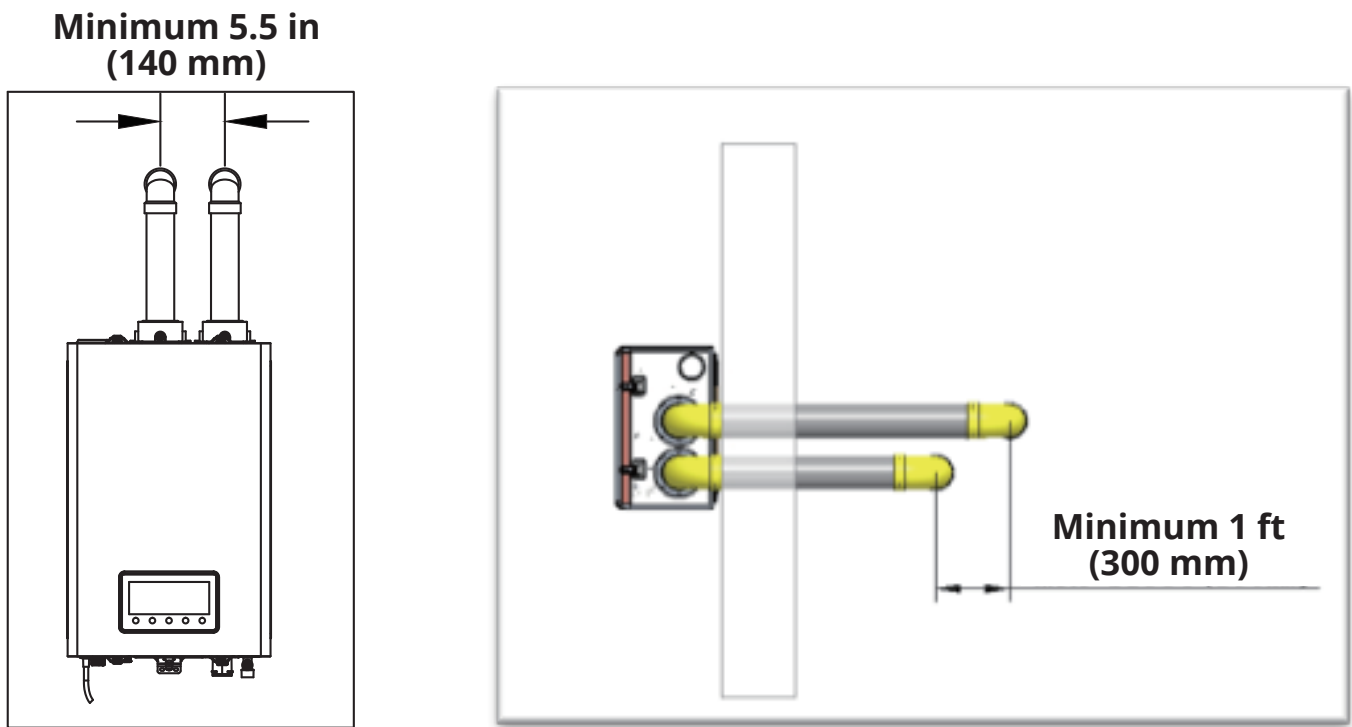


Fig. 17.2

Terminating the Vent

Two-Pipe Sidewall Venting Example 2:

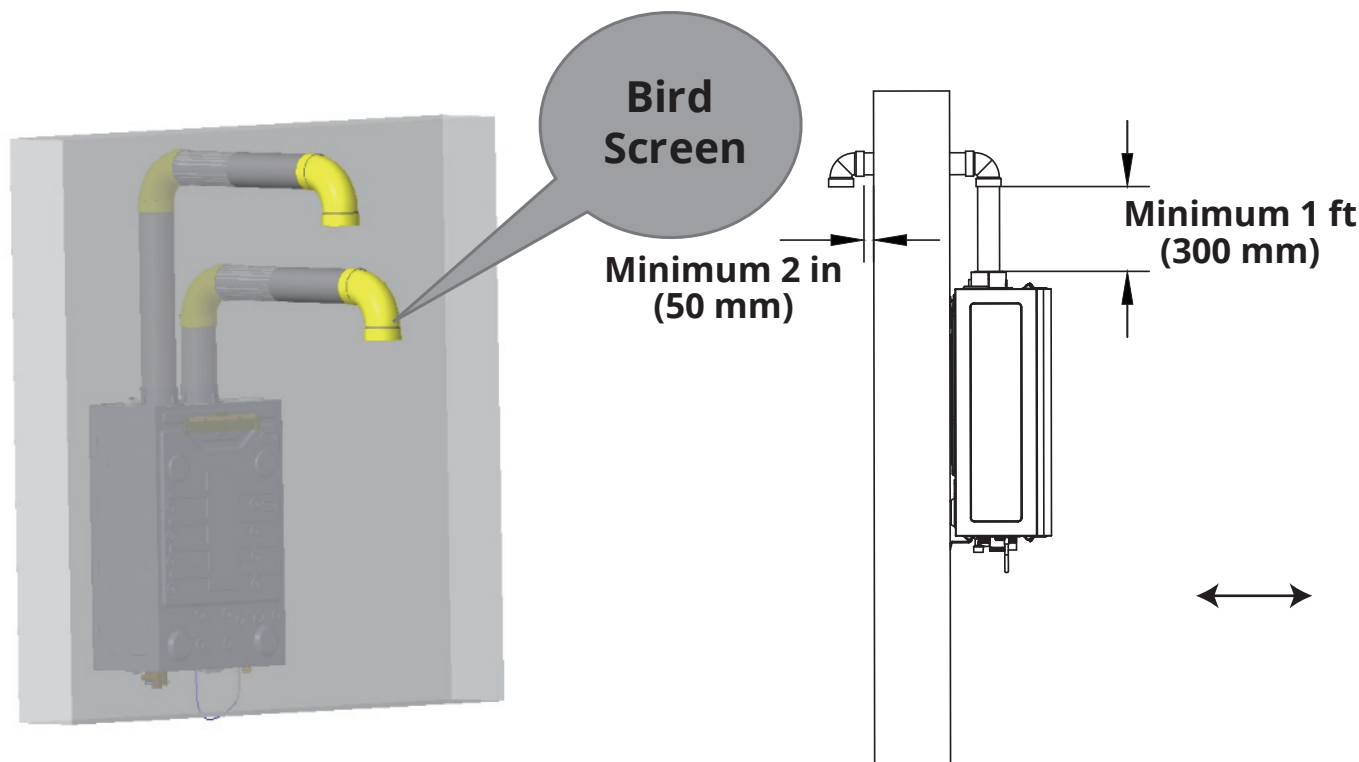


Fig. 17.3

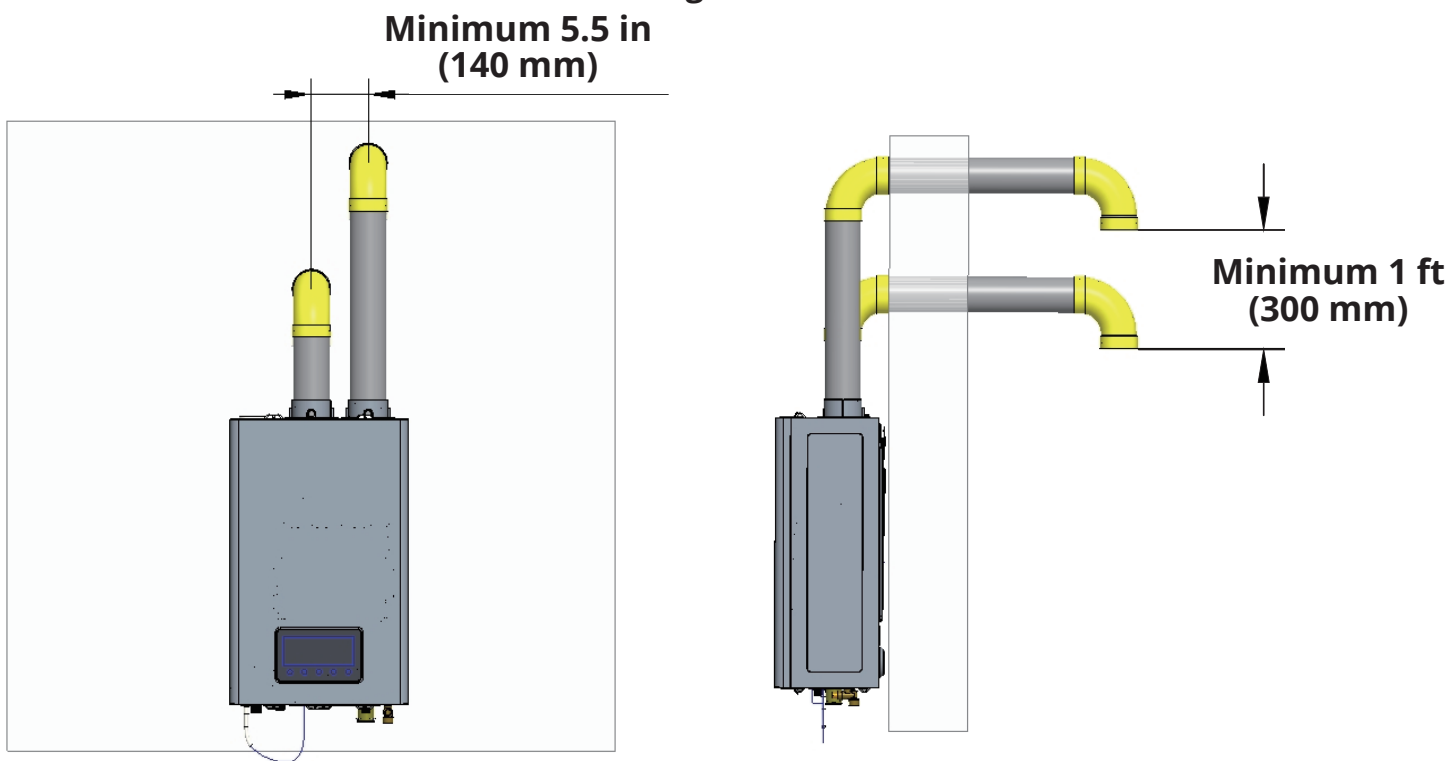


Fig. 17.4

Terminating the Vent

(B) Low Profile Two-Pipe Sidewall Venting*:

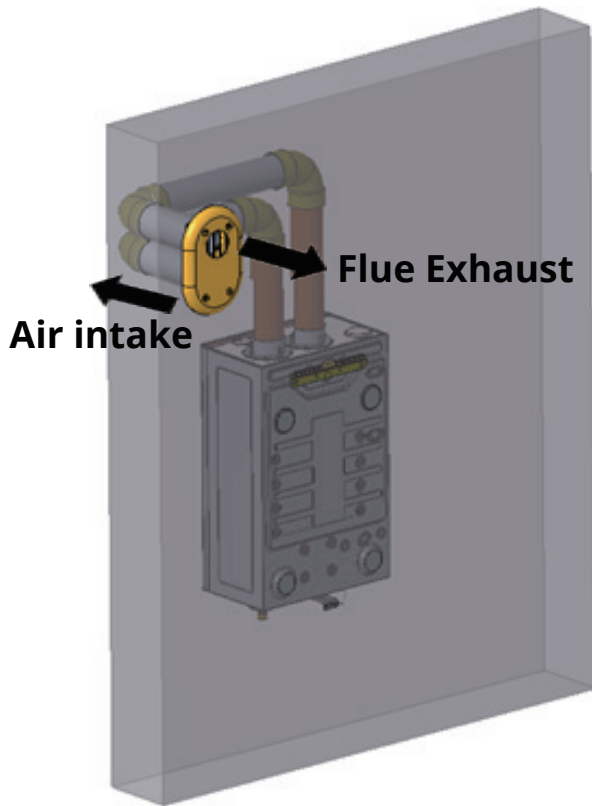
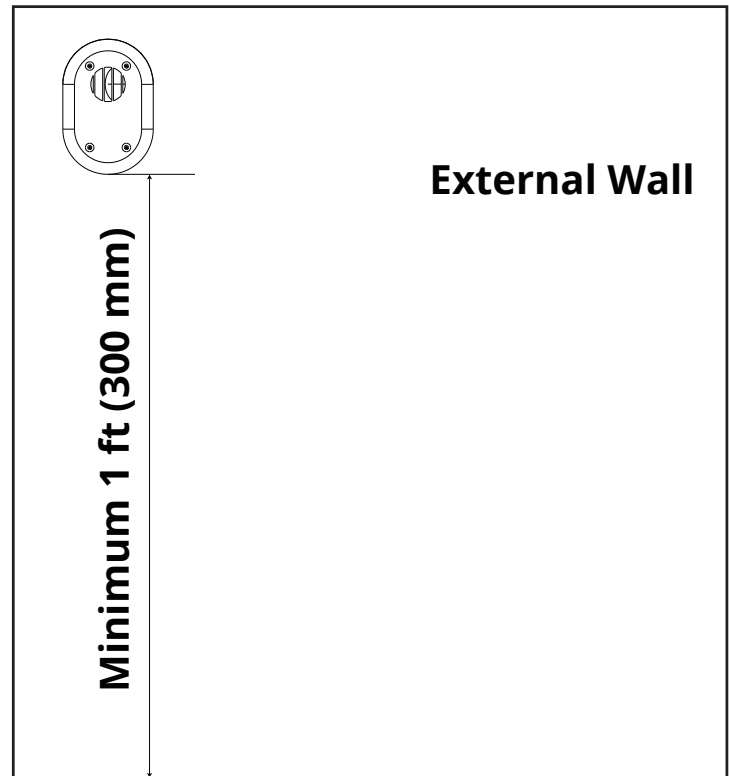


Fig. 17.5

***IPEX and Centrotherm Low Profile terminations ONLY.**
Clearance above the highest anticipated snow level or grade,
or as required by local codes, whichever is greater.

NOTE

Only the following orientations are allowed for twin pipe terminations.



Fig. 17.6



WARNING

The products referred to in this manual utilize an external electrical source. When installed, the unit must be electrically grounded in accordance with local codes or, in the absence of local codes, with the National Electrical Code, ANSI/NFPA 70, and/or the CSA C22.1, Canadian Electrical Code, Part 1.

Improperly connecting the power supply could result in personal injury, electrical shock, and/or death!

When connecting the power supply, follow these guidelines:

- ⊘ **DO NOT** connect the electrical supply until all plumbing and gas piping is complete and the water heater has been filled with water.
- ⊘ **DO NOT** connect the water heater to a 220-240V AC power supply. Doing this will damage the water heater and void the warranty.
- ⊘ **DO NOT** run a dedicated electrical line to the water heater. All water heaters come with a 3-pronged (grounded) plug. The water heater can be plugged into any grounded electrical outlet nearby to the installation location, as the unit only requires 2-4 Amps to operate.
- ⊘ **DO NOT** use a broken or modified power cord.
- ⊘ **DO NOT** bind, bend, or stretch power cords.
 - Keep power cord free of dust.
 - If local codes require the water heater to be wired directly, remove and discard the factory-installed plug. Install a power switch between the breaker and the water heater to facilitate any end-user maintenance and servicing. Connect the water heater to a 110-120V AC, 60 Hz rated electrical supply that has a maximum of 2 Amps (4 Amps if an external pump is connected).
 - The water heater must be electrically grounded. If using the power plug, ensure the electrical outlet that the water heater will be connected to is properly grounded. If wiring the water heater directly to a power supply, **DO NOT** attach the ground wire to the gas or water piping, as plastic piping or dielectric unions could prevent proper grounding.
 - It is recommended to use a surge protector to protect the water heater from power surges.
 - If there is a power failure in cold weather areas, the freeze protection system in the water heater will not operate and could result in freezing of the heat exchanger. In cold weather areas, where power failures are common, the water heater must be completely drained to prevent damage if the power will be off for an extended period of time. A battery back-up, which is available at most computer retailers, can be used to supply hot water during power outages. Damage caused by freezing temperatures due to a power loss is **NOT** covered by the warranty.

If the water heater will not be used for an extended period of time, follow these steps:

1. Completely drain the water out of the water heater.
2. Disconnect the power supply to the water heater. This will prevent the water heater from freezing and becoming damaged.



CAUTION

Label all wires before disconnecting them when you work on the controls. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing.



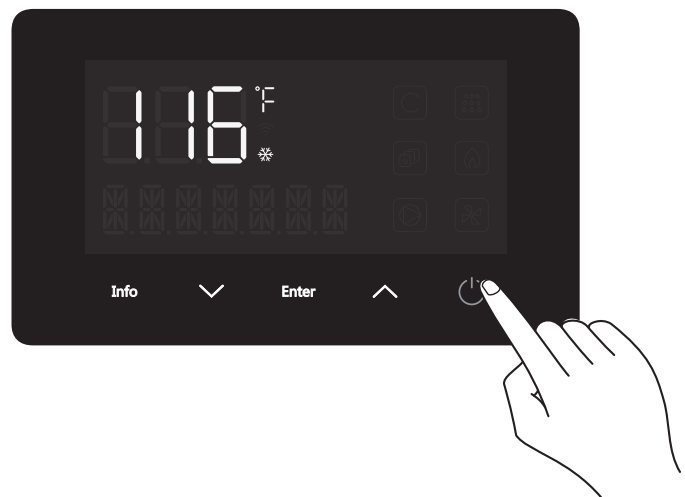
WARNING

Follow the instructions below to avoid unsafe operating conditions that could cause property damage or severe personal injury or death.

- Ensure the water heater is filled with water before using the water heater. If the water heater's gas valve cannot shut off the gas supply, shut off the gas supply to the water heater at the manual gas valve and call a qualified technician.
- If any part of the water heater has been submerged in water, do not use this appliance, immediately cut off the power supply, and call a qualified technician.

Power On/Off

Press the **POWER** button to turn on/off, the temperature setting will show on the display, and the buzzer will sound once when the power is turned on.



Temperature setting



WARNING

Before adjusting the temperature, pay attention to whether the water heater is functioning. Water temperatures above 122°F (50°C) can cause skin to scald instantly, severe burns, or death.

The default temperature setting is 116°F (47°C). To adjust the temperature while the power is on, press the $\vee$ or $\wedge$ buttons. Pressing the button quickly will change the temperature setting in small increments and the buzzer will sound with each press. Holding the button will down will rapidly adjust the temperature setting.

Decrease Temperature Setting



Increase Temperature Setting



Operation

Range of temperature setting	Accuracy
95°F ~ 140°F	1°F
35°C ~ 60°C	1°C

NOTE

- The temperature setting is from 95 to 140° (35-60°C) when burner is off. When burner is on, temperature setting is from 95 to 122° (35~50°C) if current set temperature is below 122°F;
- The temperature setting is from 95 to 140° (35-60°C) if current set temperature is above 122°F. If set temperature is adjusted to a value that is lower than 122°F (50°C), the range becomes 95-122°F (35~50°C).

Set or reset default setting temperature

To reset the default setting temperature, press the **ENTER** button for 3 seconds until the set temperature on the display flashes while the power is on. Then, press the $\vee$ or $\wedge$ keys to reset the default temperature setting.

To switch from current temperature to the default temperature, press the **ENTER** button while the burner is on. The buzzer will beep if successful.



NOTE

If you try to switch the default temperature by pressing ENTER while the burner is on, the system will not allow this and the buzzer will sound twice.

Operation

Information Query

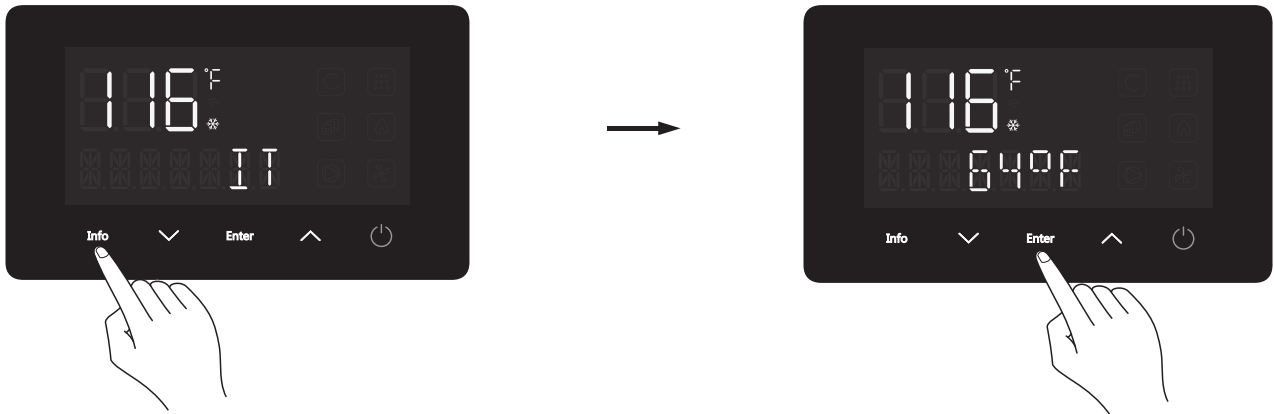
To view unit basic information

- 1. Press the info button to enter the information query interface while the power is on, **IT** displays as default.
- 2. Press the **▼** or **▲** buttons to select the information item.
- 3. Press **ENTER** to show details.

Contents	Description	Units
IT	Inlet Water Temperature	°Fahrenheit/°Celsius
WF	Water Flow Rate	Gallons Per Minute/Liters Per Minute

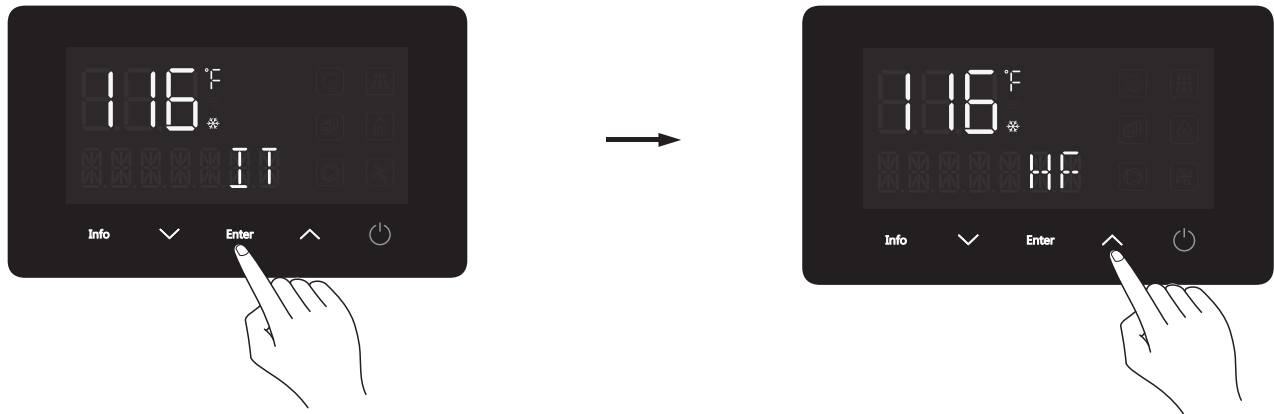
Step 1: Display effect after pressing **INFO** key

Step 2: Then, press **ENTER** to see the actual effect of IT:

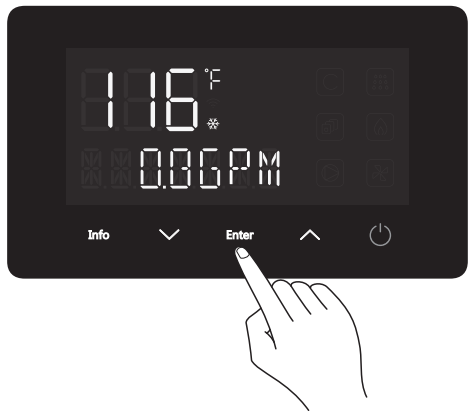


Step 3: Press **ENTER** again to return to the display effect screen.

Step 4: Press the **▲** key to display the effect.



Step 5: Press **ENTER** again to view the WF display effect screen.



Operation

Adjusting Parameters for a High Altitude Area

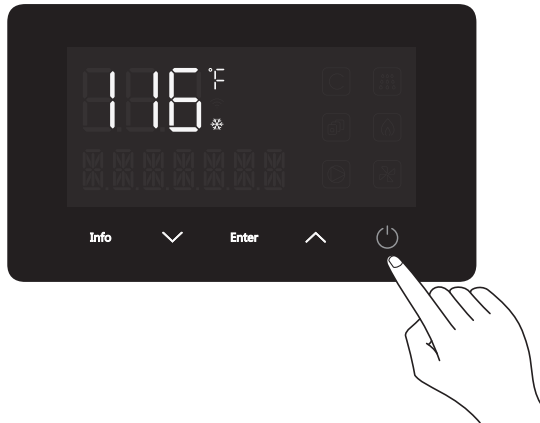
! CAUTION

This operation **MUST ONLY** be performed by licensed professionals.

To change program data:

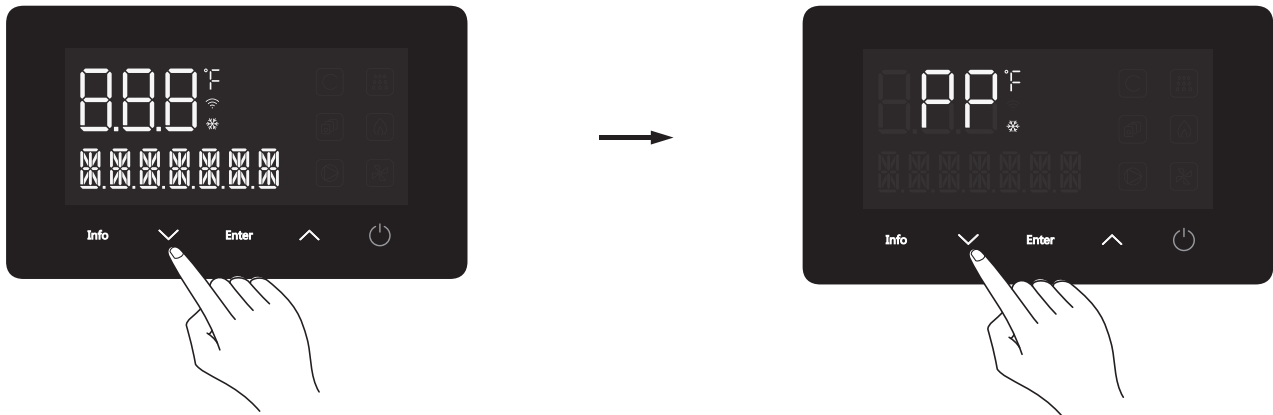
Step 1: Connect the power supply.

Step 2: Turn off the water heater by pressing the **POWER** button.

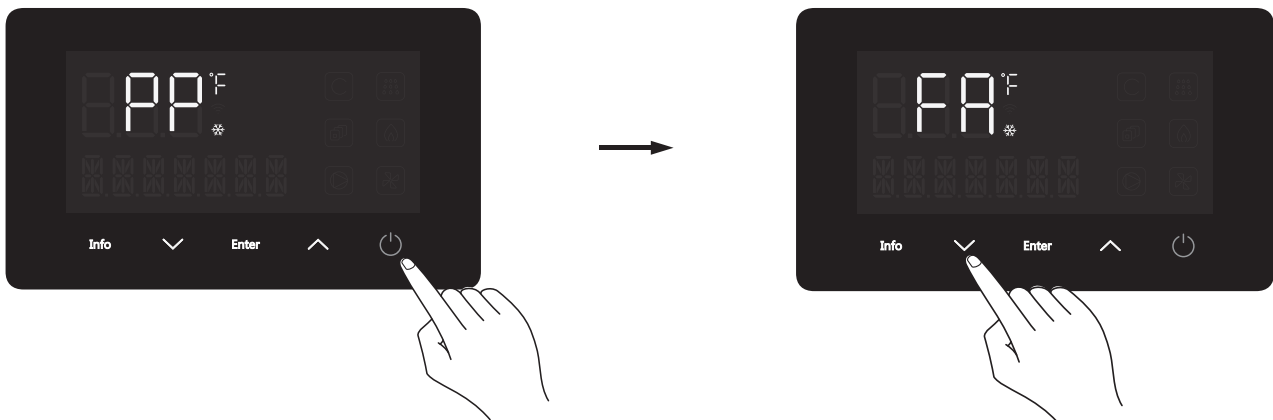


Step 3: Cut off the power supply.

Step 4: Connect the power supply and press the **v** button for at least 5 seconds until PP is displayed on the screen.

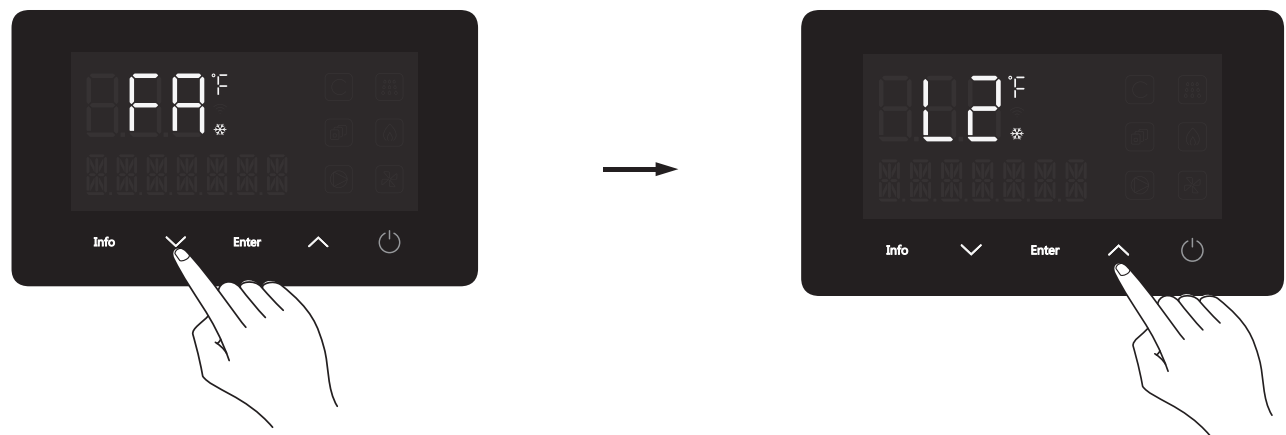


Step 5: Press the **POWER** button and FA will display on the screen.

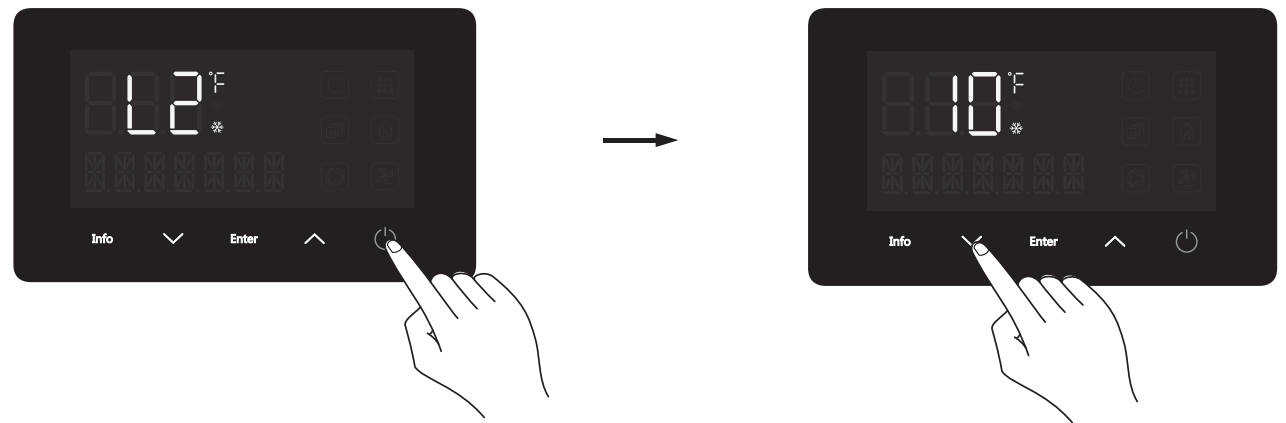


Operation

Step 6: Use the $\vee$ & $\wedge$ buttons to scroll through the parameter codes until L2 is displayed on the screen.



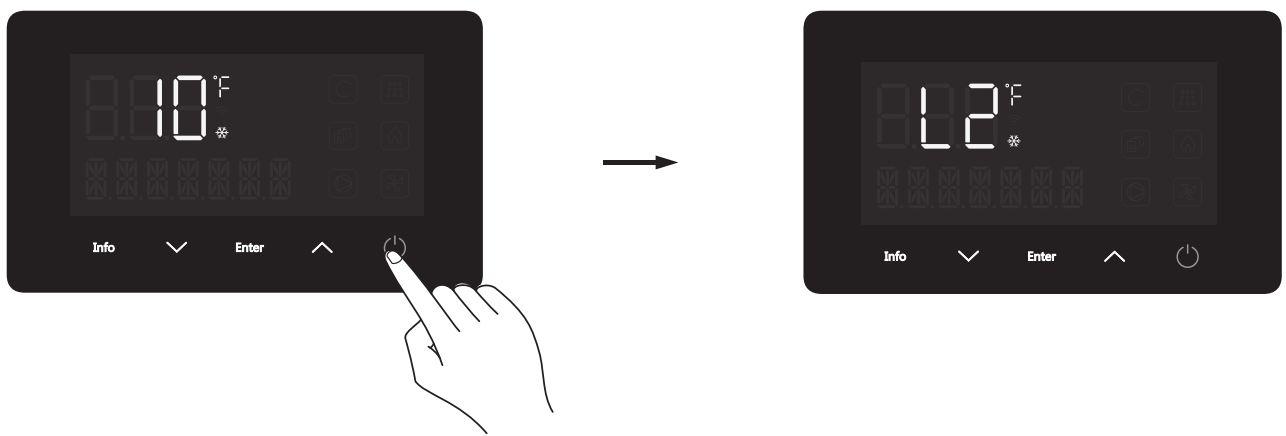
Step 7: Press the **POWER** button, and then press the $\vee$ & $\wedge$ buttons to adjust the L2 value according to the table below.



Units: feet (meters)

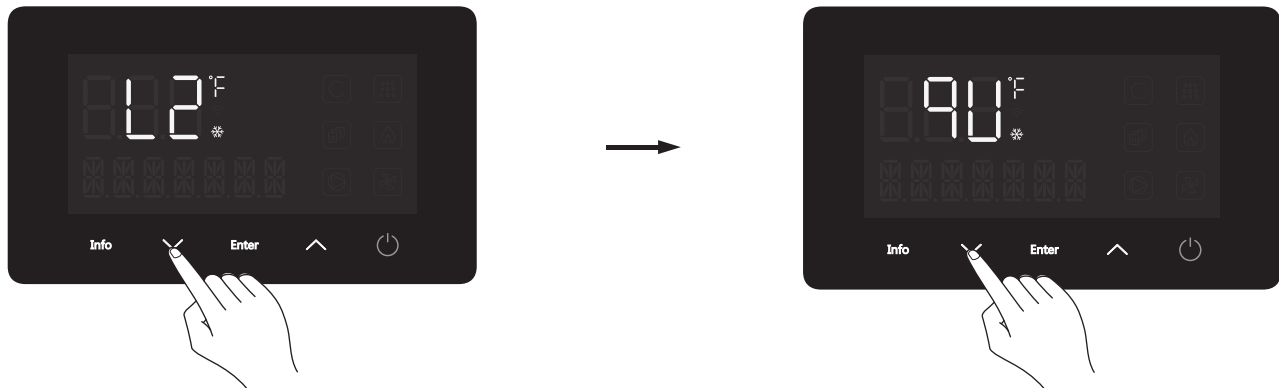
Program data	Altitude setting	
Altitude	2000 ft - 6500 ft (609.6 m - 1981.2 m)	6500 ft - 9800 ft (1981.2 m - 2987.0 m)
L2	05	06

Step 8: Press the **POWER** button again to exit the parameter code adjustment mode.

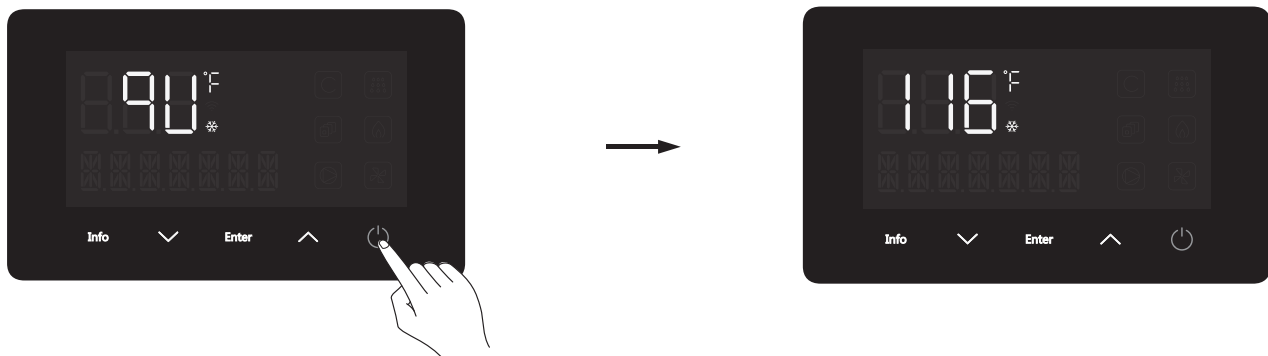


Operation

Step 9: Use the $\vee$ & $\wedge$ buttons until Qu is displayed on the screen.



Step 10: Press the **POWER** button to save the L2 code and exit the adjustment mode.

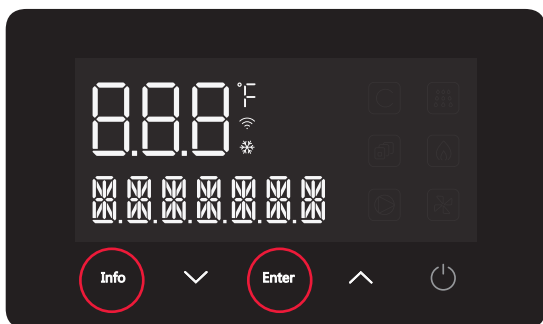


Information Interface for After-Sales

! CAUTION

This operation MUST be performed by licensed professionals.

Press and hold the **ENTER** & **INFO** buttons together for 3 seconds to enter the after-sales information interface (OT displays as default). Press the $\vee$ & $\wedge$ to scroll through the information fields listed below. Once the desired field is selected, press **ENTER** to show more details.



*HE: The most recent 10 error codes can be selected from the list.

**TUW: Total water consumption, displayed in Liter/Gallons (e.g., 1 HL/G means 100L/G-200L/G, 0 HL/G means less than 100 L/G.

***IS: Number of times of Ignition success (e.g., 1H means 100-200 times, 0H means less than 100 times.

Contents	Description	Units
OT	Outlet Temperature	°F/°C
EGT	Exhaust Gas Temperature	°F/°C
HET	Heat Exchanger Temperature	°F/°C
FS	Fan Speed	RPM
BWF	Bypass Water Flow Rate	LPM/GPM
AP	Air Pressure	PA
HE*	Historical Error	N/A
TUW**	Total Water Consumption	HL/G
IS***	Ignition Success Times	H
UA	Version Number of Main Board	N/A
UB	Version Number of Display Board	N/A

Content of the Error code

	ERROR	CODE	DISPLAY	DISPLAY CONTENT
a.)	Hot water outlet Temperature Sensor Failure	E0	E0 Flash	OT SENSOR ERROR
b.)	Accidental Flame Lost	E1	E1 Flash	FLAME LOST ERROR
c.)	Fake Flame	E2	E2 Flash	FAKE FLAME ERROR
d.)	Thermistor Failure	E3	E3 Flash	THERMOSTAT ERROR
e.)	Outlet Temperature Too High	E4	E4 Flash	OT OVERHEAT ERROR
f.)	Fan Failure	E5	E5 Flash	FAN ERROR
g.)	Gas Valve Failure	E6	E6 Flash	GAS VALVE ERROR
h.)	Main Water Valve Failure*	E9	N/A	MAIN WATER VALVE ERROR
i.)	Overtime Failure	EE	EE Flash	HEATING OVERTIME ERROR
j.)	Inlet Temperature Failure	F2	F2 Flash	IT SENSOR ERROR
k.)	Ignition Fail	C0	C0 Flash	IGNITION FAILURE ERROR
l.)	Residual Flame	C1	C1 Flash	FLAME LEFT ERROR
m.)	Vent Blockage	C4	C4 Flash	VENT BLOCK ERROR
n.)	Exhaust gas Temperature Sensor Failure	C9	C9 Flash	EGT SENSOR ERROR
o.)	Exhaust Gas Temperature Too High	CA	CA Flash	EXHAUST GAS OVERHEAT ERROR
p.)	Bypass Water Valve Failure*	CB	N/A	BYPASS WATER VALVE ERROR
q.)	Heat Exchanger Outlet Temperature Sensor Failure	CF	CF Flash	HET SENSOR ERROR
r.)	Watch Dog Circuit Failure	A0	A0 Flash	WATCH DOG ERROR
s.)	MCU PC Command Failure	A1	A1 Flash	MCU CMD ERROR
t.)	Instruction Compilation & Execution Failure	A2	A2 Flash	CMD RUN ERROR
u.)	MCU RAM DC Failure	A3	A3 Flash	MCU RAM DC ERROR
v.)	MCU ROM Failure	A4	A4 Flash	MCU ROM ERROR
w.)	MCU Register DC	A5	A5 Flash	MCU REGISTER ERROR

* These error codes will not display on the screen, however, they can be accessed in the after-sales mode. Please refer to the previous page for more information.

General Maintenance

- Check frequently to see whether the gas supply pipelines (rubber hose) are in good condition without aging or cracks. Pay attention to periodic replacement of rubber hoses. In order to prevent gas leakage, check the joints of pipelines frequently by using suds to see if there are bubbles that form. If bubbles form, there is a leak.
- A water heater must be examined and cleaned after it has been used for a period of time (generally about half a year) to guarantee normal operation of the heater.
- Clean the casing of the unit with water and any neutral cleaner other than harsh chemical cleaner or volatile solvent, otherwise the casing will fade and lose luster.
- Clean the inlet water filter regularly.

! CAUTION

Before performing any maintenance, please follow these steps:

- 1.) Disconnect the power supply and close the gas valve.**
- 2.) After the power is turned off, drain the hot water from the faucet until it runs cold. Then, close the water supply valve of the water heater.**

Flush the heat exchanger

Scale may build up inside the heat exchanger and block the passage due to the hardness of the water. Periodic flushing is necessary in order to ensure smooth water flow. **It is recommended the heat exchanger be flushed once a year. Damage to the water heater which results from water scale deposited WILL NOT be covered under warranty.**

Please follow these steps when you wish to flush and descale the heat exchanger. It is recommended that you contact a licensed professional to carry out this procedure. (See Fig. 20.1)

1. Connect the empty connection of the isolation valve on the cold water side to the outlet of the circulation pump.
2. Connect the empty connection of the isolation valve on the hot water side to the solution tank.
3. Connect the inlet of the circulation pump to the solution tank.
4. Make sure there's no leakage in any of the connectors.
5. Fill the solution tank with descaling solution. (It's recommended to use white vinegar as a descaling solution. However, if using commercial descaler, please properly follow the instruction of the descaler manufacturer.)
6. Turn the isolation valves and make sure the water loop is switched to the circulation loop.
7. Run the circulation pump until the solution that comes out from the hot water side is clean.
8. Drain the solution from the unit.
9. Disconnect the pipes/tubes for flushing and close the empty connectors of the isolation valves.
10. Turn the isolation valve and switch to the normal water flow.
11. Restore the power supply, gas supply and the water supply.
12. Run the water heater for several minutes to make sure there's no solution remaining in the unit.

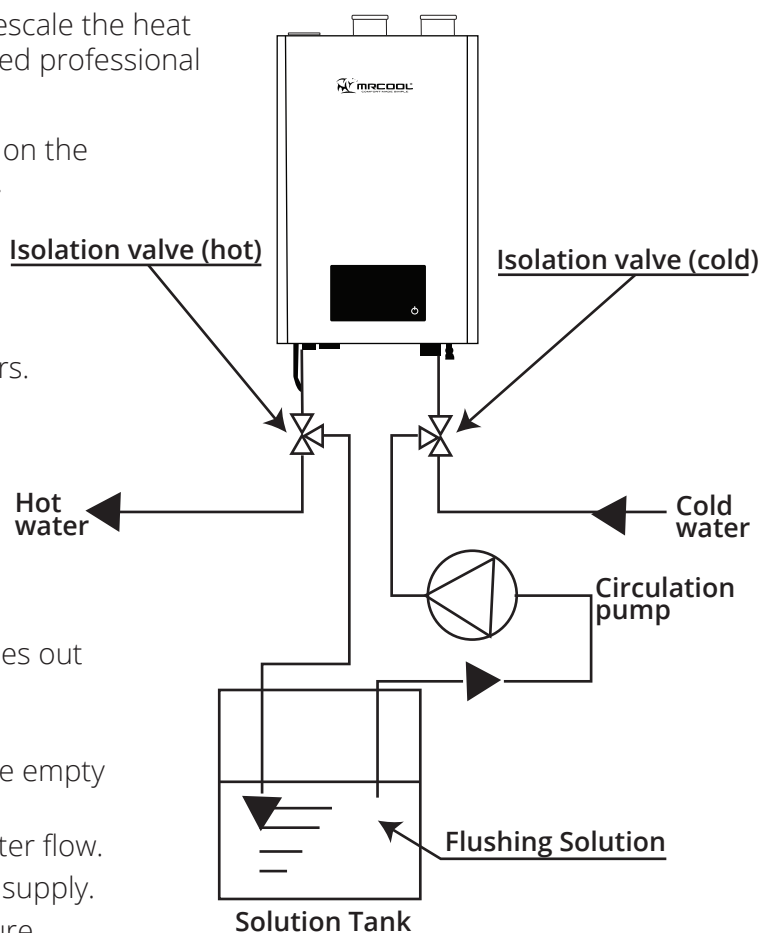


Fig 20.1

General Maintenance

Clean the Inlet Water Filter:

1. Drain the water heater
2. Take out the filter by turning it counterclockwise. **(See Fig. 20.2)**
3. Rinse the filter with clean water, brush or wipe it when necessary.
4. Insert the cleaned filter and tighten it by turning clockwise.

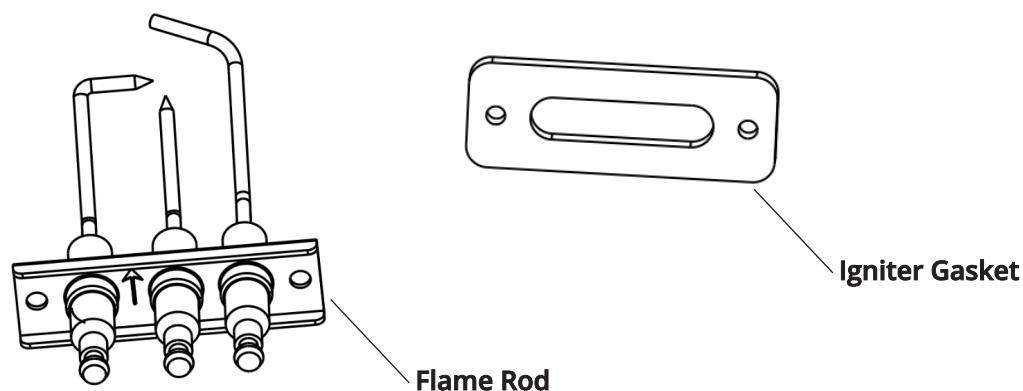


Fig 20.2

Periodic Cleaning of Igniter / Flame Rod:

Ignition failure can occur when there is buildup of dirt or dust.
If ignition failure continuously occurs, the flame rod should be serviced as detailed below.

1. Turn off the power to the unit.
2. Remove the igniter.
3. Clean the flame rod with sandpaper. Be sure to clean any residue on the sensor left by the sandpaper before moving to the next step.
4. Reinstall the igniter with a new igniter gasket. ***CAUTION* Using the old gasket can cause gas leakage which can result in injury or death.**
5. Turn on the power to the unit and check the ignition during operation.



Error Codes and Solutions

If you should experience a problem with the water heater, please refer to the following chart for possible remedies. Error codes that appear on the front panel display are explained in the following section. For minor problems or issues, resetting the water heater may resolve the issue. To reset the water heater, press the **POWER** button on the front panel, or turn off the faucet and then back on.

Error Code	Description	Cause	Solution
E0	E0 Displayed	Outlet water temperature sensor open or has short-circuited.	Ensure temperature sensor is properly connected. If connection is good, change the sensor.
			If error still occurs change the MAIN CONTROL BOARD.
E1	Accidental Flame Lost	Gas has run out during combustion or no pressure in the pipeline.	Increase the gas supply pressure to the required value.
		Gas valve operation is unstable.	Replace the gas valve.
E2	Flame Signal Detected Before Ignition	Open circuit formed between flame sensor and the burner or the heat exchanger before ignition.	Unplug the flame sensor from the MAIN CONTROL BOARD, with the power on, but burner off. <ul style="list-style-type: none"> • If E2 persists, change the MAIN CONTROL BOARD. • If E2 does not exist, change the flame sensor.
E3	Thermistor Open Circuit*	Heat exchanger outlet water overheated.	1. Check if there's debris or dirt on the filter of the water inlet. If so, clean the filter (refer to the Clean the inlet water filter section). 2. Check the BWF value (refer to the section regarding the Information interface for after-sales), if it exceeds 0.4 GPM, check the HE, if the CB error can be searched from HE, change the bypass water valve.
		Thermistor failure.	Turn off the unit, use a multi-meter to check if the thermistor is conducting. If E3 exists while the thermistor is conducting, change the MAIN CONTROL BOARD.
E4	Outlet Water Temperature Exceeds 185°F (85°C) For Over 3 Seconds	Outlet hot water overheated.	1. Check if there's debris or dirt on the filter of the water inlet. If so, clean the filter (refer to the Clean the inlet water filter section). 2. Check the BWF value (refer to the section regarding the Information interface for after-sales), if it exceeds 0.4 GPM, check the HE, if the CB error can be searched from HE, change the bypass water valve.
		Temperature sensor failure.	Replace the sensor.

* The unit will not automatically restore while this error code is displayed. Press power off and then on to manually restore the unit.

Troubleshooting

E5	Fan Failure	Cables not connected.	<ul style="list-style-type: none"> Connect the cables If E5 persists, replace the fan.
		Fan Controller Failure.	
E6	Gas Valve Failure	Cables not connected.	<ul style="list-style-type: none"> Connect the cables If E6 persists, replace the gas valve.
		Solenoid failure.	
E9**	Fan Failure	Main water valve jam	Clean the main water valve.
		Malfunction from fan driving part to main-control communication	Replace the main water valve.
EE	Overtime	Operation time exceeds 40 minutes.	Close & open the faucet to restart combustion operation.
F2	Inlet Water Temperature Sensor Failure	Inlet water temperature sensor open or has short-circuited.	<ul style="list-style-type: none"> Ensure the sensor is connected. If the sensor is connected and F2 persists, change the sensor. If F2 persists with a new sensor, change the MAIN CONTROL BOARD.
C0	Ignition Failure	Gas valve not open.	Replace the gas valve.
		Air in the gas supply line.	Attempt to ignite several time to discharge the air.
		Gas supply pressure too low.	Ensure gas supply pressure is within range.
		Nozzle blockage.	Clean the nozzle.
		No signal from flame sensor.	Change the flame sensor. If C0 persists, change the MAIN CONTROL BOARD.
C1	Residual Flame	Gas valve leakage.	Replace the gas valve.
C3	Air Pressure Sensor Failure	Failure of air pressure sensor.	<ul style="list-style-type: none"> Replace the air pressure sensor. Replace the control board.
C4	Vent Blockage	Vent Pipe Blockage	<ul style="list-style-type: none"> Clean and remove debris from the vent pipe. Condense water drain blockage. Check condensing water drain.
		Ambient wind pressure too high.	Change the terminal to resist higher wind pressure.
		Air pressure sensor failure.	Replace air pressure sensor module.
		Fan Failure.	Replace the fan.
C9	Exhaust Gas Temperature Sensor Failure	Exhaust gas temperature sensor is open or has short-circuited.	<ul style="list-style-type: none"> Ensure the sensor is connected. If the sensor is connected and C9 persists, change the sensor. If C9 persists with a new sensor, change the MAIN CONTROL BOARD.
CA	Exhaust Gas Temperature Too High	Heat exchanger failure.	Change the heat exchanger.
		Exhaust gas temperature failure	Refer to C9 above.
CB	Bypass Water Valve Failure	Bypass water valve jam.	Clean the bypass water valve.
		Bypass water valve failure.	Replace the bypass water valve.
CF	Heat Exchanger Outlet Temperature Sensor Failure	Heat exchanger outlet temperature sensor is open or has short circuited.	<ul style="list-style-type: none"> Ensure the sensor is connected. If the sensor is connected and CF persists, change the sensor. If CF persists with a new sensor, change the MAIN CONTROL BOARD.

** These error codes will not display on the screen, but can be accessed in the after-sales mode.



WARNING

This water heater is equipped with a blocked vent shut-off system. Should error codes E5 or C4 occur, turn off the gas valve at the manual shut-off point. Then, check the vent terminations for obstructions. If none are found, press the power button to reset the water heater. If the error code persists, call a qualified service technician or the gas supplier to check the water heater. Failure to follow these instructions could result in property damage, personal injury or death.

Troubleshooting

A0	Watch Dog Circuit Failure	MCU internal failure.	Change the controller.
A1	MCU PC Command Failure	MCU internal failure.	Change the controller.
A2	Instruction Compilation & Execution Failure	MCU internal failure.	Change the controller.
A3	MCU RAM Failure	MCU internal failure.	Change the controller.
A4	MCU ROM Failure	MCU internal failure.	Change the controller.
A5	MCU Register DC	MCU internal failure.	Change the controller.

Corrective Action Recommendations

Issue	Possible Causes	Possible Remedies
No electrical power to the water heater.	Is the plug on the power supply cord unplugged from the electrical outlet?	Reset the plug.
	Has the electrical panel's 10 Amp circuit breaker been tripped?	Reset the circuit breaker.
	Is the fuse on the circuit board good?	If the display panel is blank, unplug the unit & contact a qualified installer or service technician.
	Is there a power outage?	Contact the power company.
No water is available when the faucet is turned on or opened.	Is the water supply valve shut off at the meter (are the cold water faucets still working)?	Open the closed supply valve.
	Is the water supply valve near the unit opened?	Open the water valve.
	Is the water pipe frozen?	Turn OFF the unit, close all water valves and the gas valve. Then, contact a qualified installer or service technician.
	Is the main water valve jammed?	Check to see if an E9 code has been triggered in the error code history of the after-sales mode. If the water supply is OK, and there is no water flow at the hot water outlet, change the main water valve.
Hot water is not available when the faucet is turned on or opened.	Does the water heater have power (is it plugged in)?	Restore electrical power to the unit.
	Is the water heater turned on?	Press & hold the power button to turn the unit on.
	Is an error code flashing on the display panel?	Refer to the error codes & solutions section on the previous pages.
	Is the gas supply valve shut off at the meter (are other gas devices operating)?	Open the gas supply valve.

Troubleshooting

Issue	Possible Causes	Possible Remedies
The water temperature is not hot enough or turns cold during operation.	Is the faucet open enough to draw at least 0.66 gallons (2.5 liters) per minute through the water heater?	Open the faucet to allow more water flow.
	Is an error code flashing on the display panel?	Refer to the error codes & solutions section on the previous pages.
	Is the outlet water temperature set too low?	Adjust the outlet water temperature.
The water is not hot enough.	Is the water temperature set too low?	Adjust the temperature setting.
The water at the faucet is too hot.	Is the water temperature set too high?	Adjust the temperature setting.
A fan can be heard even when the unit is not operating.	The fan continues to operate after the burner shuts off to clear the exhaust vent of combustion gases.	This is a normal pre-purge or post-purge operation, no action is required.
White smoke can be seen coming out of the exterior exhaust gas vent.	Depending on the outside temperature, water vapor can be produced as the exhaust is vented.	This is a normal operation, no action is required.

Diagnostics and Suggested Corrective Actions

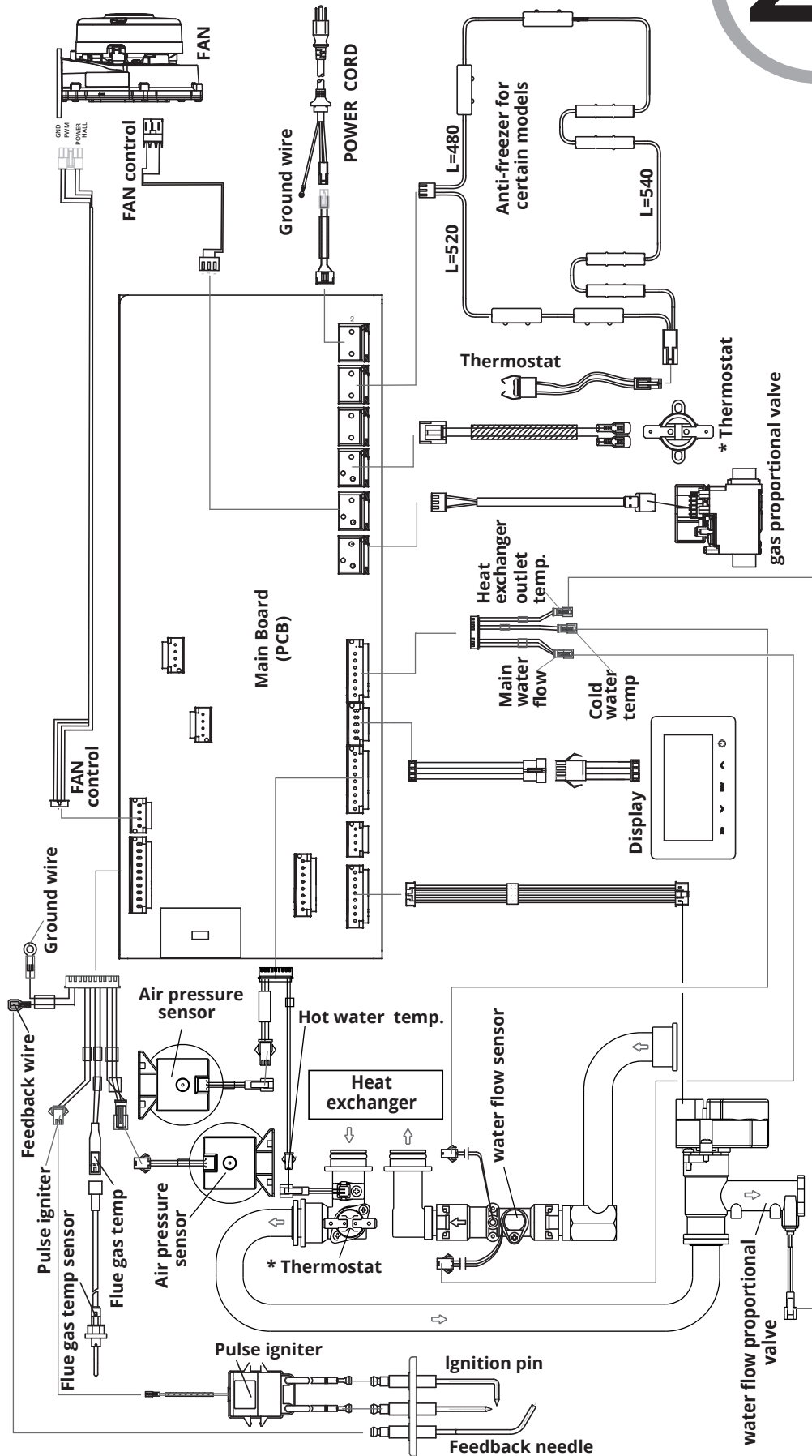
The water heater control panel is able to record information about the water heater's operating condition at the time of the ten most recent faults or errors. This information is available to view in the error code history when accessed in the After-Sales Mode. The following screens will be displayed when reviewing the water heater history. The table below also includes diagnostic information and possible corrective actions.

Display	Condition	Diagnostic	Possible Corrective Actions
Nothing appears on the display panel but the unit beeps.	Main control board is not receiving commands.	Check the wiring to ensure it is correct and there are no short-circuits.	Correct wiring per wiring diagram, including the connection of the transformer to the control.
Nothing appears on the display panel and no other components are operating.	No 120V power supply is being received.	Ensure the power button on the display panel is turned ON.	Turn on the power button on the display panel.
		Is there 120V at the distribution box?	Troubleshoot and correct the power supply to the distribution box.
		Is the power connector on the MAIN CONTROL BOARD disconnected?	Properly connect the power cable to the MAIN CONTROL BOARD.
		Inspect the fuse.	Replace the MAIN CONTROL BOARD.
Display repeatedly goes through initialization sequence.	Occurs when power supply is abnormal.	Power supply voltage too low.	Turn on the power button on the display panel.
		Switching power is malfunctioning.	Replace the MAIN CONTROL BOARD.

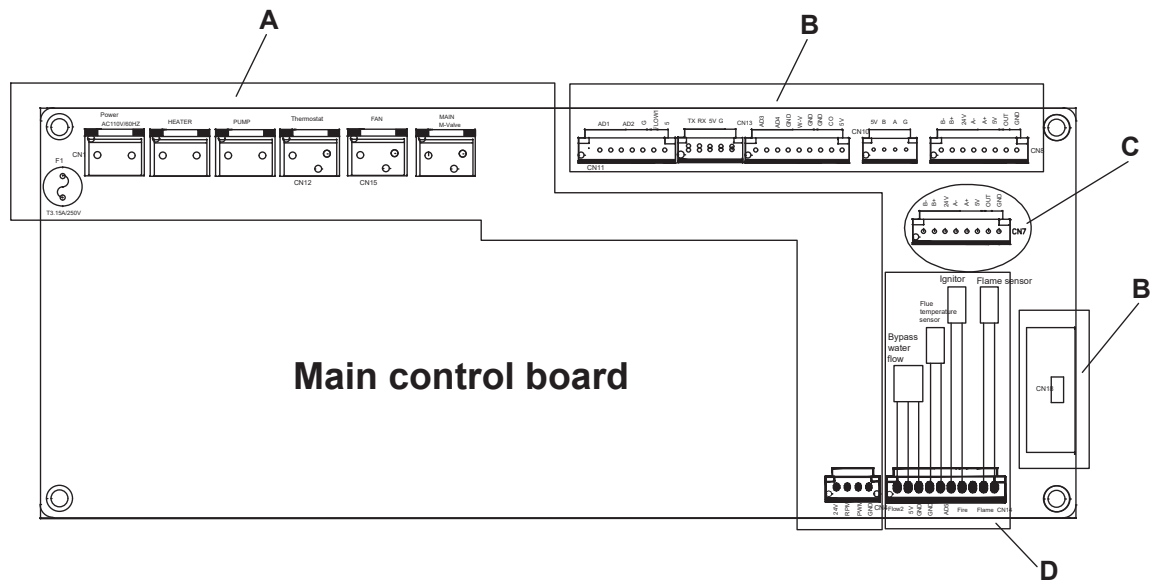
Troubleshooting

Display	Condition	Diagnostic	Possible Corrective Actions
Nothing appears on the display control panel, but the water heater is operating.	This occurs when communications are lost from the control to the display.	Check for loose connections and proper pin alignment/engagement on the control's connector.	Correct wiring per wiring diagram, including the connection of the transformer to the control.
		Power the water heater off and on using the power button on the display board and check for operation.	Replace the display module.

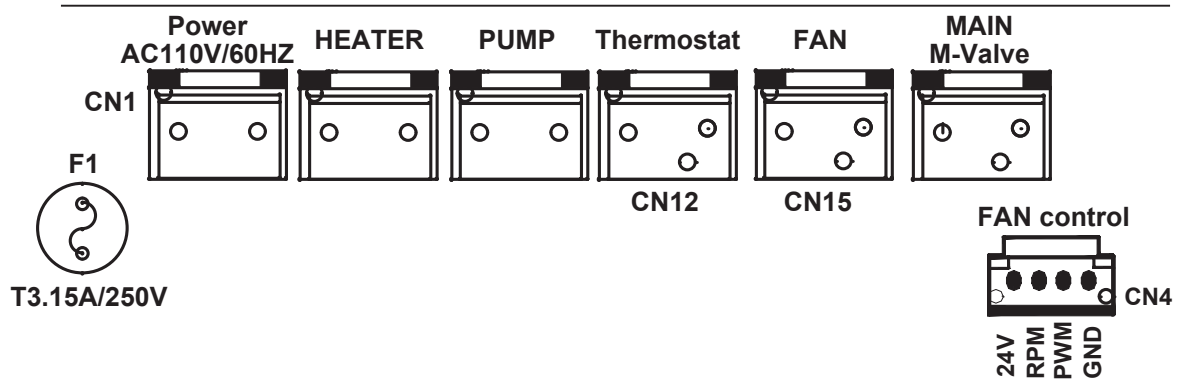
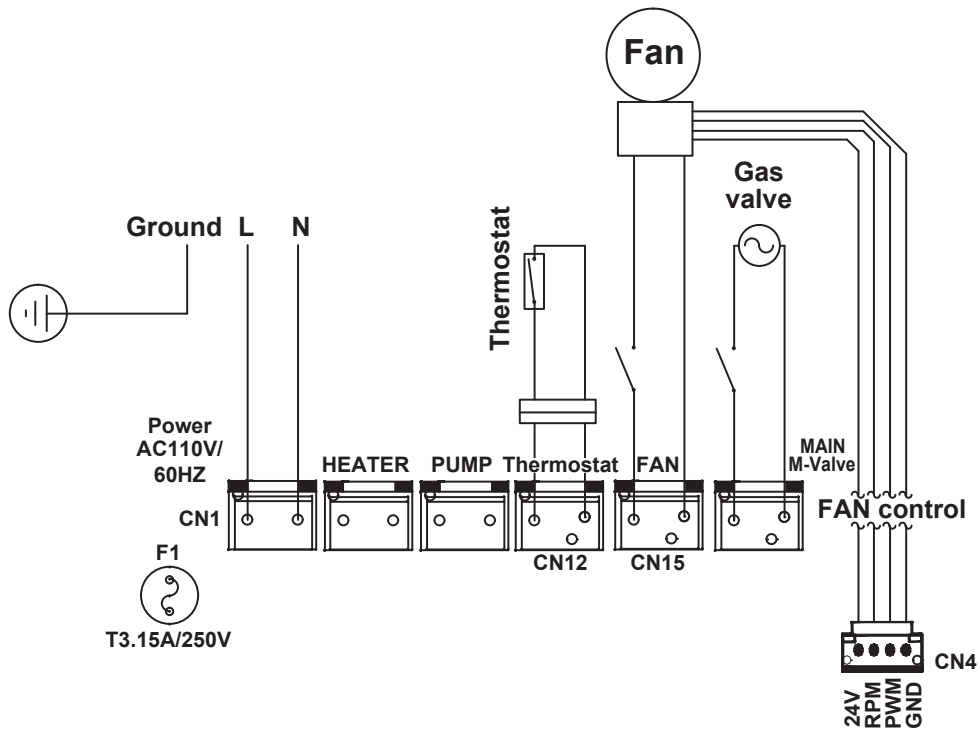
Wiring Diagram



Wiring Connections

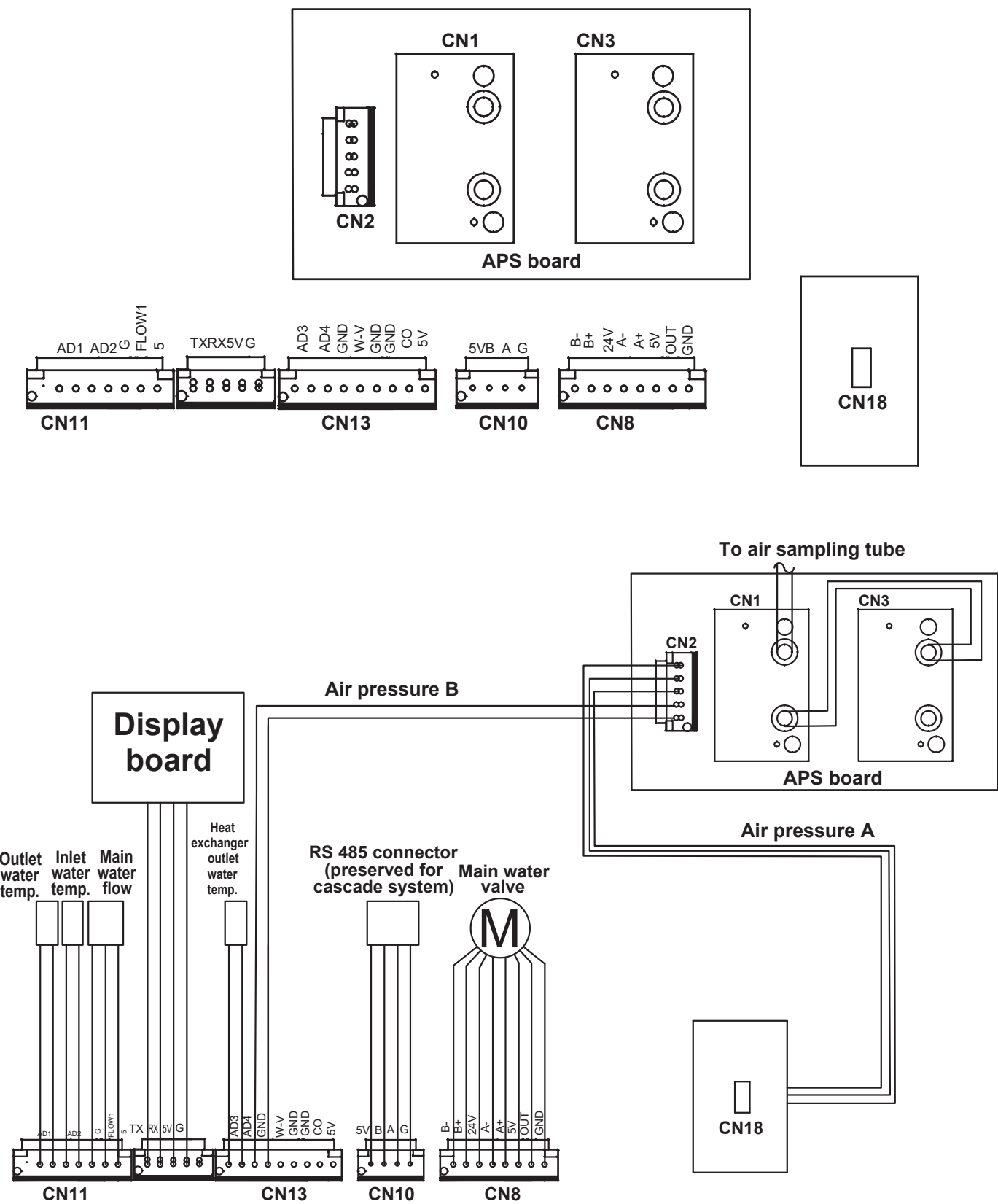


① Area A



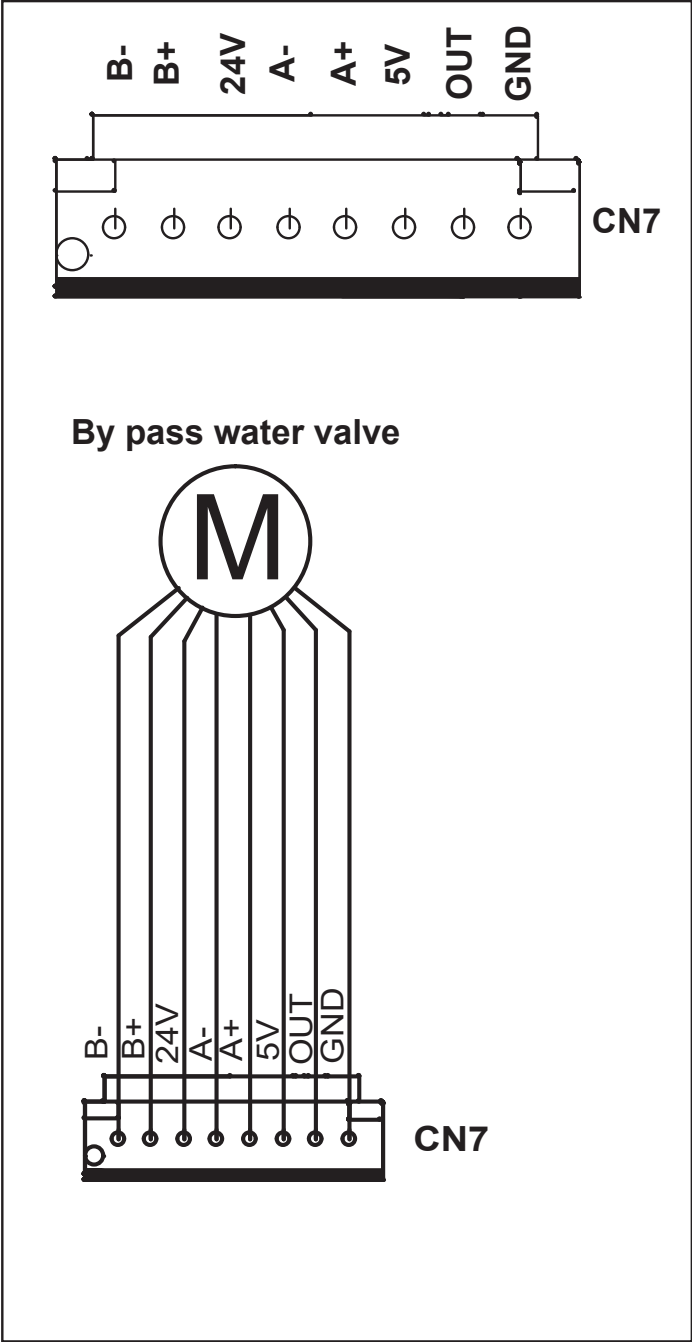
Wiring Connections

② Area B

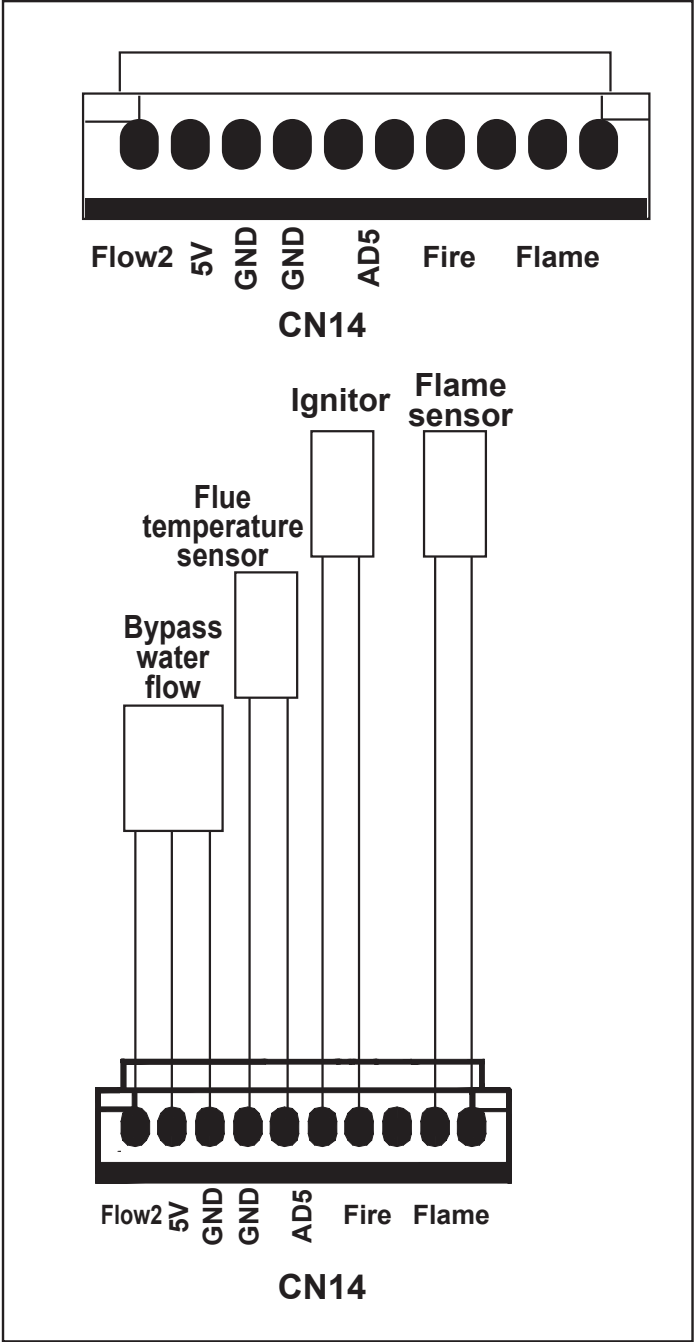


Wiring Connections

③ Area C



④ Area D

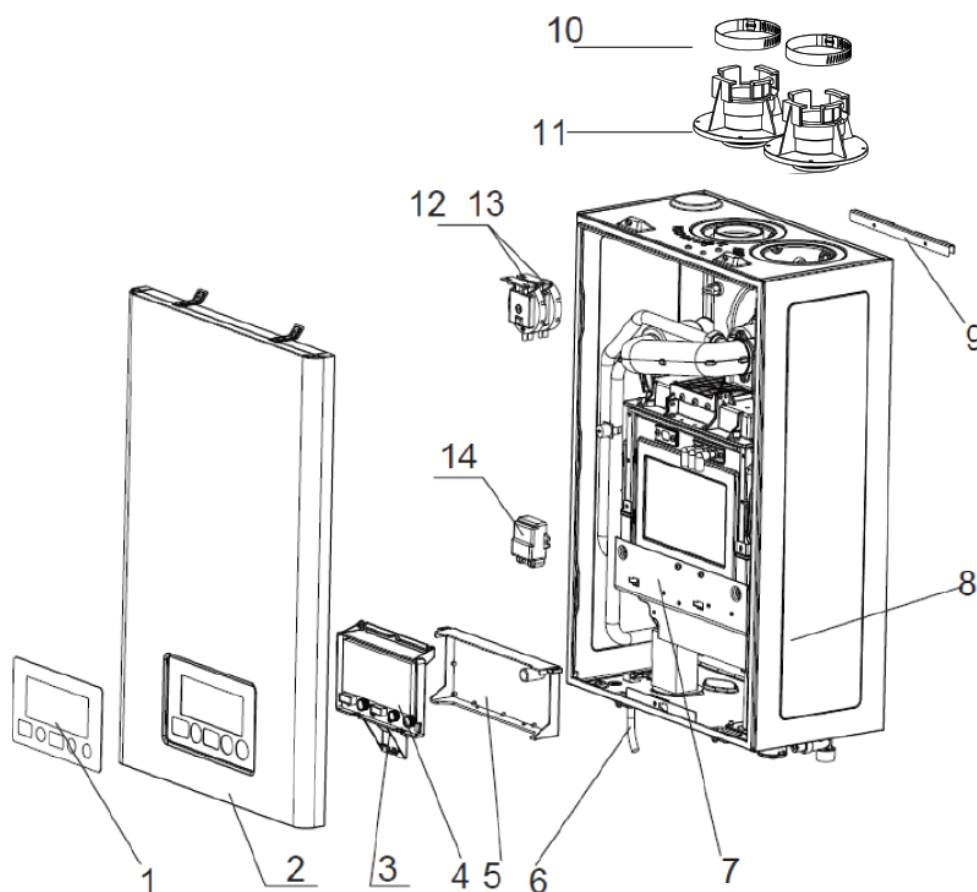


No.	Items	Check box
Water Heater Installation		
1.	Have you maintained the required clearances from building openings and intake air vents?	
2.	Have you minimized the distance between the water heater and the vent termination?	
3.	Have you minimized the distance between the water heater and major fixtures?	
4.	Have you maintained the proper service and maintenance clearances?	
5.	Is the water heater and vent piping clear of combustible materials, including clothing, cleaning materials, and rags?	
Gas Supply Connection		
6.	Does the gas supply match what is specified on the water heater rating plate?	
7.	Is the gas line at least 1/2 or 3/4 in inner diameter?	
8.	Is the gas supply line sufficient in length and diameter to deliver the required BTUs?	
9.	Have you measured the pressure of the gas supply line?	
10.	Is the gas supply pressure within the recommended ranges specified in this manual?	
11.	Is the gas supply line equipped with a manual full port valve?	
12.	Have you tested the gas line pressure and all fittings for leaks?	
13.	Has the gas company inspected the installation, if required?	
Water Supply Connection		
14.	Is the water supply pressure sufficient (greater than 40 PSI)?	
15.	Have you installed shut off valves on the inlet and outlet to facilitate cleaning of the inlet water filter?	
16.	Have you bled the air out at each fixture?	
17.	Have you checked each fixture to ensure hot water is being supplied?	
18.	Have you cleaned the inlet water filter?	
Pressure Relief Valve Connection		
19.	Have you installed an approved pressure relief valve on the water heater?	
20.	Does the rating of the pressure relief valve match or exceed the maximum BTU rating of the water heater?	
21.	Is the pressure relief valve at least 3/4 in. inner diameter?	
22.	Have you installed the pressure relief valve on the hot water outlet pipe near the water heater?	
23.	Have you installed a discharge drain tube from the pressure relief valve to within 6-12 in. (150-300 mm) of the floor?	
Condensate Drain Connection		
24.	Have you installed a condensate drain line from the water heater to a drain or laundry tub?	

Installation Checklist

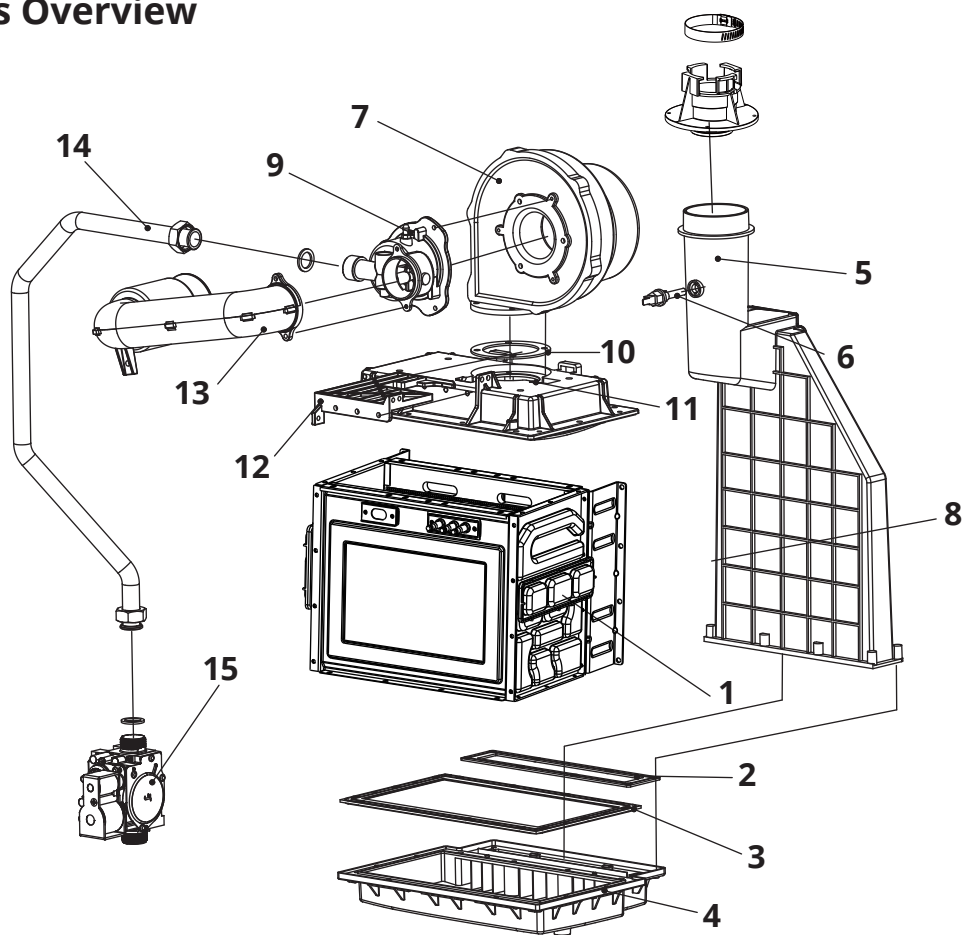
Venting the Water Heater (continued)		
25.	Have you vented the water heater with 2 in or 3 in PVC, CPVC, Polypropylene, Type BH Special Gas Vent (ULC-S636) for this water heater, or in accordance with all local codes and the guidelines in this manual?	
26.	Have you ensured that PVC solid core pipe has not been used as venting for the water heater?	
27.	Is the vent sloped upward toward the vent termination at a rate of 1/4 inch per foot (2% grade)?	
28.	Are all vent runs properly supported?	
29.	Have you properly supported the vent termination?	
30.	Have you properly sealed all air intake and exhaust joints, from the flue collar to the to the vent termination?	
31.	Have you installed bird screens on the exhaust and intake Terminations?	
32.	Have you checked the venting for leaks?	
33.	Is the vent termination at least 12 in (300 mm) above the exterior grade?	
34.	Is the total vent length within the maximum vent length restriction?	
Power Supply		
35.	Is the supplied voltage 110-120 V AC?	
36.	Is the water heater plugged into a properly grounded outlet?	
37.	Have you checked the polarity of the electrical connection?	
Water Heater in Operation		
38.	Have you shown the owner how to clean the inlet water filter?	
39.	Have you given the Manuals to the owner for future reference?	
40.	Have you shown the owner how to shut off the gas in case of an emergency?	

Casing Parts Overview



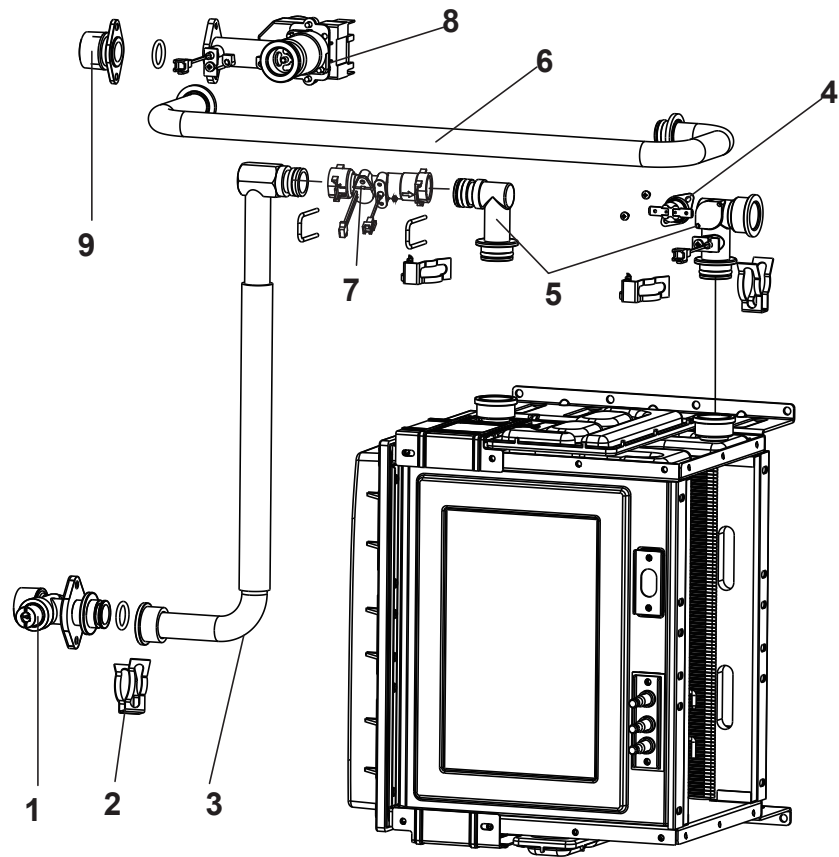
No.	Description	Notes
1.	Export Paster	
2.	Front Cover	
3.	Control Box	
4.	Display Panel	
5.	Control Board Assembly	PCB box included
6.	Power Line	
7.	Controller Support	
8.	Button Plate Assembly	
9.	Hook	
10.	Vent Seal	2 inch/3 inch adapted
11.	Vent Collar	
12.	Pressure Sensor (APS)	
13.	Pressure Sensor (APS)	
14.	Ignition Transformer	

Gas Loop Parts Overview



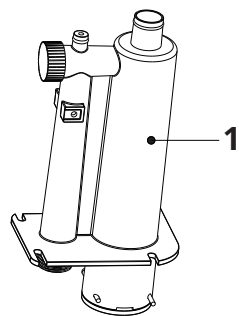
No.	Description	Notes
1.	Heat exchanger assembly	
2.	Vent gasket	
3.	Condensate collector gasket	
4.	Condensate collector	
5.	Flue Vent	
6.	Flue temperature sensor	
7.	Blower	
8.	Igniter assembly	
9.	Mixer assembly	
10.	Blower gasket	
11.	Burner assembly	
12.	Blower bracket	
13.	Muffler	
14.	Gas pipe	
15.	Gas valve	

Water Loop Parts Overview



No.	Description	Notes
1.	Cold water inlet connector	
2.	Clip	
3.	Cold water pipe	
4.	Thermistor	
5.	Connector of water inlet	
6.	Connecting pipe component	
7.	Water flow sensor	
8.	Water Ratio Valve	
9.	Water outlet connection	

Accessories



No.	Description	Notes
1.	Condensate trap assembly	



MRCOOL®
COMFORT MADE SIMPLE

Electrician and/or HVAC Technician:

License #:

Installation Date:

Installation location:

Serial number: