



# Operation and Installation Manual

Model: iQ251

This product complies with ANSI Z21.10.3 (2011) / CSA 4.3 Gas Water Heater. For use as portable water heating.



## WARNING

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

- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

### WHAT TO DO IF YOU SMELL GAS

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

— Installation and service must be performed by a qualified installer, service agency, or the gas supplier.

## AVERTISSEMENT

Assurez-vous de bien suivre les instructions données dans cette notice pour réduire au minimum le risque d'incendie ou d'explosion ou pour éviter tout dommage matériel, toute blessure ou la mort.

- Ne pas entreposer ni utiliser d'essence ou ni d'autres vapeurs ou liquides inflammables à proximité de cet appareil ou de tout autre appareil.

### QUE FAIRE SI VOUS SENTEZ UNE ODEUR DE GAZ

- Ne pas tenter d'allumer d'appareil.
- Ne touchez à aucun interrupteur; ne pas vous servir des téléphones se trouvant dans le bâtiment.
- Appelez immédiatement votre fournisseur de gaz depuis un voisin. Suivez les instructions du fournisseur.
- Si vous ne pouvez rejoindre le fournisseur, appelez le service des incendies.
- L'installation et l'entretien doivent être assurés par un installateur ou un service d'entretien qualifié ou par le fournisseur de gaz.



**To avoid product damage, personal injury, or even possible death, carefully read, understand, and follow all the instructions in the Installation and Operation manuals before installing this product. Improper installation, adjustment, alteration, or maintenance can cause injury, loss of life, and/or property damage. This water heater should be installed and serviced by a qualified technician. The lack of proper service can result in a dangerous condition.**

This manual contains safety information, installation instructions, and maintenance procedures. It must be left with the homeowner or placed near the water heater in a noncombustible place. The customer should retain this manual for future reference.



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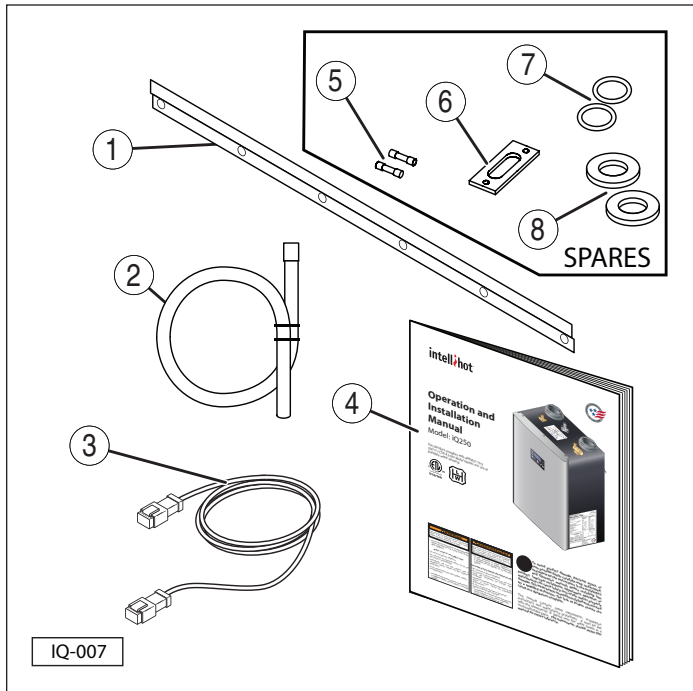
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# 1. General Information

## 1.1 Items Shipped With Water Heater

The following items are shipped with the water heater; upper mounting bracket (1), condensate drain (2), communication cable (3), and Operation and Installation manual (4).

**Note:** Items 5 through 8 are spare parts shipped with the unit. Two buss fuses, 10 Amp (5), electrode seal (6), O-rings #015 (7), and face seals (8).



## ⚠ WARNING

Condensate drain line (2) is shipped from the factory with a loop held together with plastic ties. Do not remove the ties and/or straighten the loop. This loop forms an air block (trap) which prevents carbon monoxide from exiting the water heater through the drain line. Improper installation of the drain line can result in excessive levels of carbon monoxide, which can lead to severe personal injury or death.

## 1.2 Contact Information

Call us first if you have any questions about this product. We can help you with questions about installation or operation, or if there are damaged or missing parts when you unpack this unit from the shipping box.



Dealer Contact Information

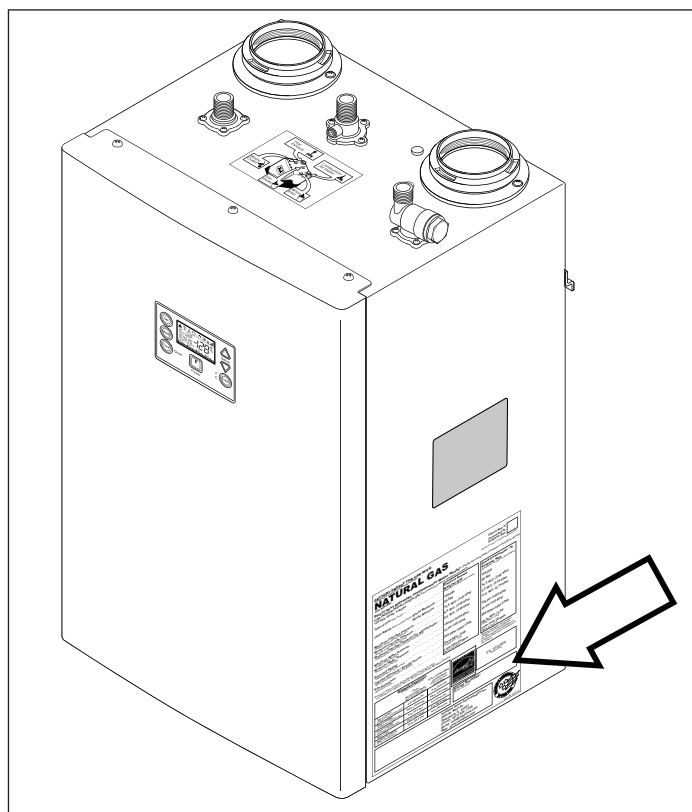
Due to our policy of continuous product improvement and technology, the design and/or technical specifications are subject to change without notice.

Serial Number: \_\_\_\_\_

Date of Installation: \_\_\_\_ / \_\_\_\_ / \_\_\_\_

## 1.3 Serial Number Plate Locations

Each unit's heat exchanger module has its own ASME certification plate (1). Rating plate (2) contains serial number for the unit. Please provide this serial number when calling for service or warranty.





## 2. Safety

### 2.1 Safety Signal Words

#### **DANGER**

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is limited to the most extreme situations.

#### **WARNING**

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

#### **CAUTION**

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

#### **NOTICE**

*Indicates that equipment or property damage can result if instructions are not followed.*

#### **SAFETY INSTRUCTIONS**

Safety instructions (or equivalent) signs indicate specific safety-related instructions or procedures.

**Note:** Contains additional information important to a procedure.

### 2.2 Installation Warnings

#### **WARNING**

**DO NOT use this water heater for any purpose other than water heating.**

Read, understand, and follow the Installation and Operation manuals, including all warnings and precautions, before operating this water heater. If you do not follow these instructions exactly, a fire or explosion may result, causing property damage, personal injury, or loss of life.

Follow all local codes and the most recent edition of the National Fuel Gas Code (ANSI Z223.1/NFPA 54) in the USA or the Natural Gas and Propane Installation Code in Canada (CSA B149.1).

This water heater must be installed by a licensed plumber, gas fitter, and/or professional service technician. Installation by unqualified person(s) voids the warranty.

#### **DANGER**

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

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

#### WHAT TO DO IF YOU SMELL GAS:

- Do not try to light any appliance.
  - Do not touch any electric switch; do not use any phone in your building.
  - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
  - If you cannot reach your gas supplier, call the fire or police department.
- C. Use only your hand to turn the manual gas shut-off valve. Never use tools. If manual gas shut-off valve will not turn by hand, don't try to repair it. Call a qualified service technician. Force or attempted repair may result in a fire or explosion.

#### **WARNING**

**DO NOT use or store flammable liquids around the water heater, including gasoline, oils, spray paints, etc.**

**DO NOT operate this water heater unless it is properly vented to the outside (the exhaust vent piping must be connected from the unit directly to the outside). Improper venting can cause a build-up of carbon monoxide, which can result in brain damage or death. Exhaust gases must be completely expelled out of the building.**

This water heater is factory preset for NATURAL GAS but may be field converted for use with propane. For propane conversion, refer to the Propane (LPG) Conversion section of this manual. Connecting the water heater to any other gas supply can result in property damage, serious injury, or even death.

This water heater is suitable for use in potable water heating applications. The cold and hot water fittings on the top of the water heater **MUST NOT** be connected to any heating system.

The water heater temperature is factory set to 120°F (49°C). Hot water temperatures above 125°F can cause severe burns instantly or death from scalds. If the proposed water heater outlet temperature is to be set above 125°F, installation of a thermostatically controlled (or temperature limiting) mixing valve is recommended for all hot water going to faucets to avoid the risk of scalding. Examples include commercial applications where 140°F (60°C) is often needed or if the space heating temperature required is higher than the domestic hot water. Always check the temperature of the hot water before bathing, showering, washing, etc.

**Protect against snow and debris accumulation around the vent terminations. Regularly inspect the exhaust vent pipe and the air intake pipe to ensure they remain clear from obstructions at all times.**

## **⚠ CAUTION**

Make sure you know the location of the gas shut-off valve and how to operate it. Immediately close the gas shut-off valve if the water heater is subjected to fire, overheating, flood, physical damage, or any other damaging condition that might affect the operation of the unit. Have the water heater checked by a qualified technician before resuming operation.

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If the water quality is known to have high acidity and/or high hardness, water treatment is recommended. Consult the local water authority.

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## **SAFETY INSTRUCTIONS**

**DO NOT** use this appliance if any part has been under water.

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**DO NOT** reverse the cold water and gas connections as this will damage the gas valve.

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**DO NOT** overtighten fittings as damage may occur, causing internal leakage.

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The appliance should be located in an area where leakage within the unit or at its connections will not result in damage to the surrounding area. The manufacturer will not be responsible for any damage resulting from leaking if adequate drainage is not provided.

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### 3. Technical Data

#### 3.1 Specifications Chart

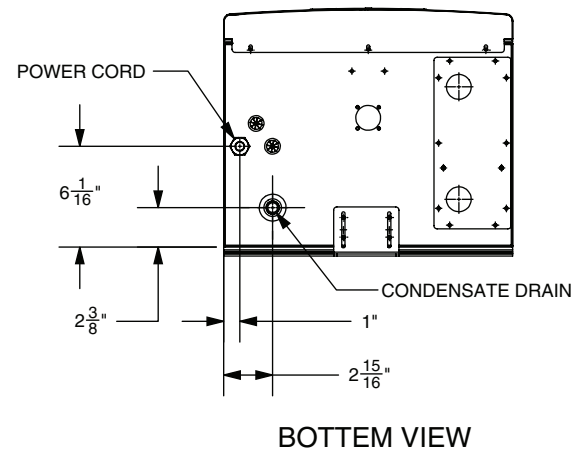
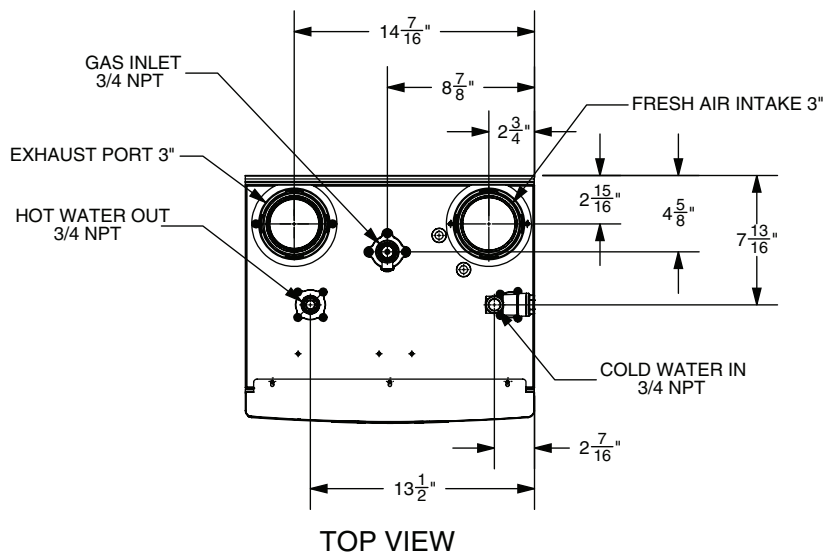
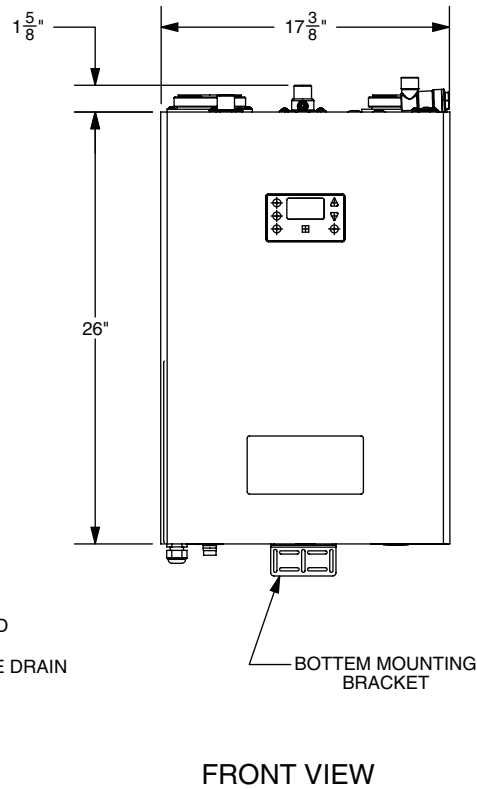
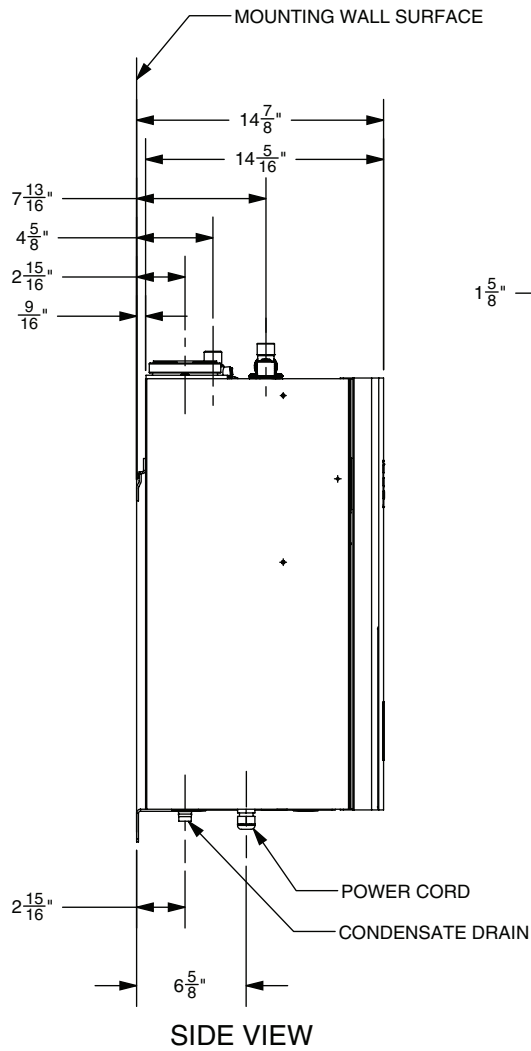
Technical Data	iQ251
Type	Indoor/Outdoor *, Wall Hung, Fully Condensing
Fuel	Preset for NG / LP Convertible
Minimum / Maximum Input (Btu/h)	30,000 / 251,000
Thermal Efficiency	96%
Dimensions H X W X D (inches)	26 X 17.4 X 14.9 (3.9 cu. ft)
Weight (lbs)	90 lbs.
Water Inlet / Outlet Connection	3/4" NPT
Gas Inlet Connection	3/4" NPT
Minimum Flow Rate for Activation	0.6 GPM
Ignition	Electronic Spark Ignition
Venting Type	Direct Vent (2 pipe - intake & exhaust), Power vent (1 pipe - exhaust only)
Venting Materials	Sch. 40 PVC, Sch. 40 CPVC, Polypropylene, Stainless Steel
Max 3" Vent Length - Single Pipe / Power Vent	130 ft, deduct 5 ft per 90° elbow and 2 ft per 45° elbow
Max 3" Vent Length - Two Pipe / Direct Vent	65 ft, deduct 5 ft per 90° elbow and 2 ft per 45° elbow
Common Venting	Yes
Safety	Flame Rod, Thermal Fuse, Overheat Prevention Device, Fan Speed Monitor, Flue Temperature Monitor, Blocked Vent Detector, Water Shut-Off Valve, 2X10A Fuse, Dual Flame Sensing, Flue Damper
Water Pressure Min / Max (PSI)	30 / 160
NG/LP- Minimum Static Gas Pressure 1/2" Black Iron	6"
NG/LP- Minimum Static Gas Pressure 3/4" Black Iron	2.5"
NG/LP - Maximum Static Gas Pressure	14"
Gas Pressure for Adjustments	8" for NG, 11" for LP
Electrical	120V AC, 60 Hz
Power Consumption	500W (Max 4.2 Amps), 8W (Standby)
Features	iQ251
Listing	ETL (Z21.10.3 / CSA 4.3), ASME HLW
Cascading	Masterless, Up to 10 Units (Similar Models)
Heat Exchanger	Expandable, Stainless 316L
Performance	iQ251
Hot Water Capacity (35°F Rise)	13.8 gallons
Hot Water Capacity (45°F Rise)	10.7 gallons
Hot Water Capacity (77°F Rise)	6.3 gallons
Domestic Mode Temp. Settings	100 – 140°F
Commercial Mode Temp. Settings	100 – 190°F
Commercial Warranty	Heat Exchanger Coil - 10 years, Parts – 2 year
Note: Due to continuous product improvements, the design and technical specifications are subject to change without notice	

\* With Intellihot Part #IGT-SPR0063

#### 3.2 High Elevation Installations

For operation at elevations above 2,000 feet, the hot water delivery capacity should be reduced by 4% for each 1,000 feet above sea level.

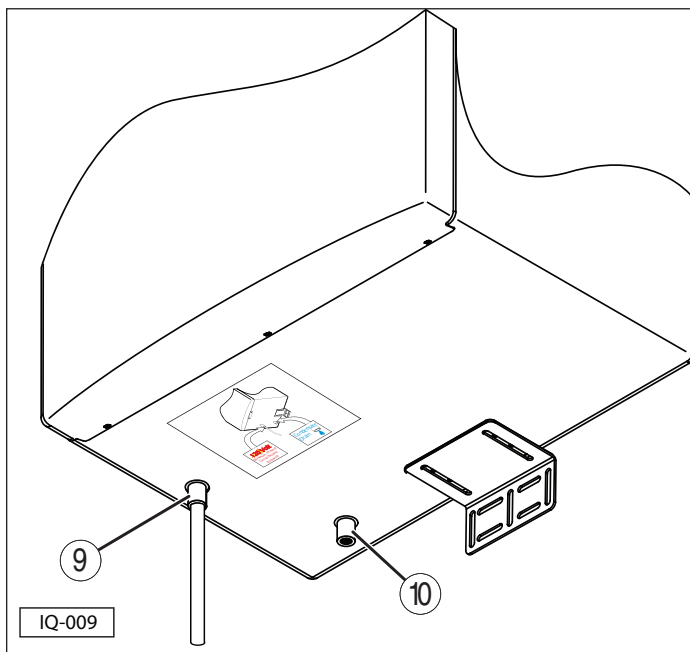
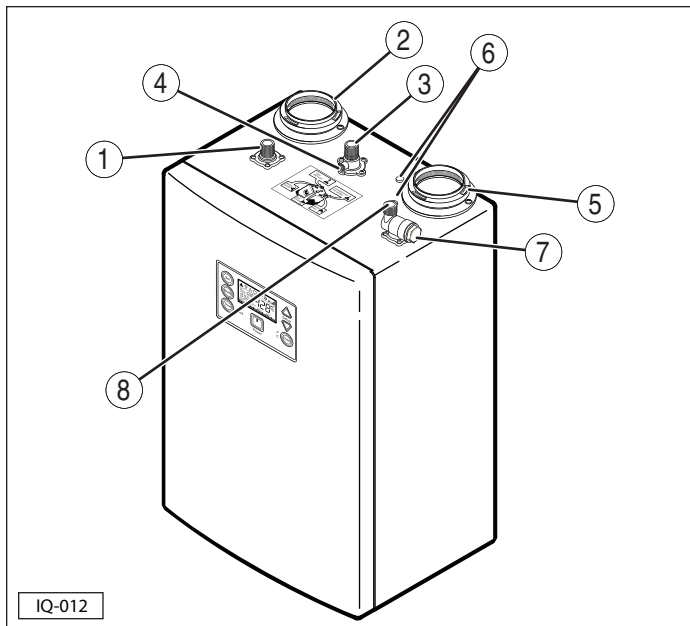
### 3.3 Dimensional Specifications



### 3.4 Connections

Item	Description	Specification <sup>1</sup>
1	Hot Water Outlet Connection	3/4" Male NPT
2	Exhaust Gas Vent	3" O.D.
3	Gas Supply Inlet Connection	3/4" Male NPT
4	Gas Pressure Analyzer Port	1/8" Female NPT
5	Fresh Air Intake	3" O.D.
6	Access Ports for Blower Mounting Screws	—
7	Water Inlet Strainer	—
8	Hot Water Supply Inlet Connection	3/4" Male NPT
9	Power Supply	—
10	Condensate Drain Connection	3/4" Nipple (3/4" flex hose)

<sup>1</sup> Using sizes other than specified can cause damage to the water heater and will void the warranty.



## 4. Preparation Before Installation

### 4.1 Selecting an Installation Site

**Note:** When installing the water heater, follow all local building codes and the current edition of the National Fuel Gas Code (ANSI Z223.1/NFPA 54) in the USA, or National Gas and Propane Installation Code (CAN/CGA B149.1) in Canada when installing this product.

**Note:** For water heater installations in Massachusetts, the unit must be installed by a plumber or gas-fitter licensed within the Commonwealth of Massachusetts. Refer to the Requirements for the State of Massachusetts section in this manual for additional information.

1. Select a location for the installation. Each installation is unique; therefore, take the time to find the best location for the water heater.
  - a. Install the water heater near locations that use hot water, such as bathroom, kitchen, or laundry room faucets.
  - b. Select a location that minimizes the length of the water pipe.
  - c. If the distances are long or if the faucet or appliance requires "instant" hot water, we recommend running a recirculation line back to the water heater from the farthest fixture.
  - d. Insulate the hot water supply and recirculation lines.
  - e. Select a location away from foot traffic and away from areas where dust, debris, chemical agents, or other combustible materials could accumulate.
  - f. Allow sufficient space for service and maintenance access to all gas, water, and drain connections.
  - g. Make sure the location meets all building code requirements.
  - h. Make sure the wall surface that the water heater is mounted on will support the weight of the unit (90 lbs. minimum).
2. Minimize the distance that the exhaust gas vent and fresh air intake must travel to an exterior wall.
  - a. The exhaust vent outlet must not be located next to a walkway, near soffit vents, crawl space vents, or other areas where condensate (water vapor) could cause damage or create a hazard. Refer to the Venting Clearance Specifications section for additional information.
  - b. The fresh air inlet vent must be located at least 12" from the exhaust vent.
  - c. Contaminated or dirty air drawn into the intake pipe can damage the water heater. The warranty does not cover damage caused by airborne contaminants.

3. Locate the unit close to a drain and near gas and water connections.

The water heater produces a significant amount of condensate during normal operation and should be located near a suitable drain where damage from a possible leak will be minimal. Installing the water heater in a location without a drain will void the warranty and the manufacturer will not be responsible for any resulting water damages that may occur. For additional information, refer to the Condensate Line Installation section.

4. Locate the water heater and all the water pipes in an area where the ambient temperature always remains above freezing.
  - a. When the water heater is connected to an electrical power supply, it will automatically prevent the water from freezing inside the unit.
  - b. The unit's freeze protection system will not prevent the water in surrounding pipes from freezing.

### NOTICE

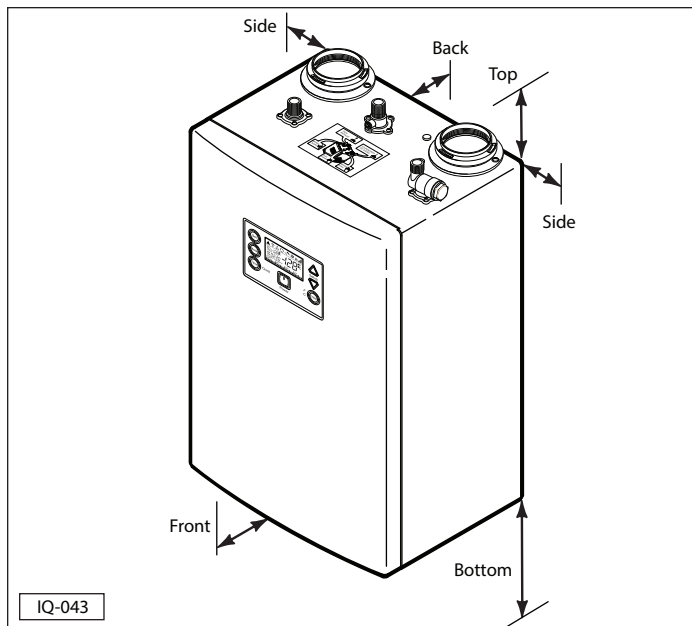
*In cold climates, if there is a power failure, the unit's freeze protection system will not operate and can result in water freezing inside the heat exchanger. To prevent damage to the water heater, turn OFF the gas supply and inlet water valve. Completely drain the unit. Damage caused by freezing water is not covered by the warranty.*

5. Select an appropriate location for the combustion air and exhaust pipes to exit the building, as shown in the Venting Clearance Specifications section in this manual.

## 5. Wall Mounting

### 5.1 Clearance Requirements

In order for the water heater to operate properly and efficiently, the clearances specified in the table are required.



Required Mounting Clearances			
Location	From Combustibles	From Non-Combustibles	Service Clearance <sup>1</sup>
Top	6" (15.2 cm)	2" (50.8 cm)	12" (30.4 cm)
Back <sup>2</sup>	5/8" (15.8 mm)	5/8" (15.8 mm)	5/8" (15.8 mm)
Sides	1" (25.4 mm)	1/2" (12.7 mm)	5/8" (15.8 mm)
Front	2" (5.1 cm)	2" (5.1 cm)	30" (76.2 cm)
Bottom	12" (30.4 cm)	12" (30.4 cm)	12" (30.4 cm)

<sup>1</sup> Service clearances are suggested to allow for normal service.

<sup>2</sup> Mounting bracket automatically sets this dimension.

### 5.2 Mounting the Unit to the Wall

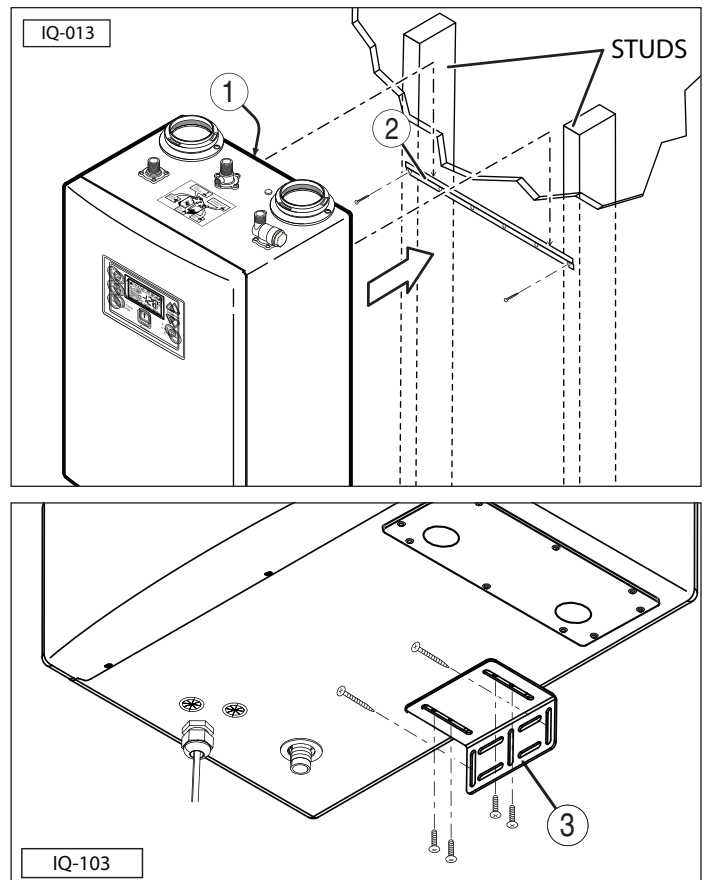
All water heaters come with an upper mounting bracket with predrilled holes spaced on 16 inch centers to facilitate easy installation on standard wall studs.

If the strength of the wall is insufficient or if the framing is non-standard or uneven, reinforce the area using a sheet of plywood before installing the water heater.

Avoid installation on inside walls that can transmit operational noises to occupants while the unit is operating.

To mount the water heater to the wall:

1. Place the upper mounting bracket on the wall and ensure that it is level. Use two appropriately sized wood screws to mount the bracket securely to the studs. Ensure that it is affixed securely and can support the weight of the 100 pound unit.



#### SAFETY INSTRUCTIONS

**Only the included brackets should be used to mount the unit. Water heaters weigh approximately 100 lbs., and must be securely attached to the wall.**

#### CAUTION

**According to the National Institute for Occupational Safety and Health, the recommended maximum safe lifting weight is 51 lbs., with all lifting conditions perfect; minimal forward reach, steady load close to the body, straight back, load between knees and shoulders, and good grips. To avoid personal injury, always use these proper lifting techniques and use two people to move the water heater which weighs 100 lbs.**

2. With assistance, hang the unit on the upper wall bracket, interlocking bracket (1) on the back of the unit, and wall bracket (2).
3. Install two appropriately sized wood screws in lower bracket (3) to secure the unit to the wall.
4. Make sure the unit is plumb and level, and tighten the four sheet metal screws on bottom bracket (3). When properly installed, there should be a 5/8" air space between the back of the water heater and the wall.



## 6. Gas Connections

### 6.1 Installation Guidelines

#### **WARNING**

To avoid serious injury or even death, the gas line installation and the gas line inlet pressure test must be done by a licensed professional.

The water heater is factory preset for natural gas.

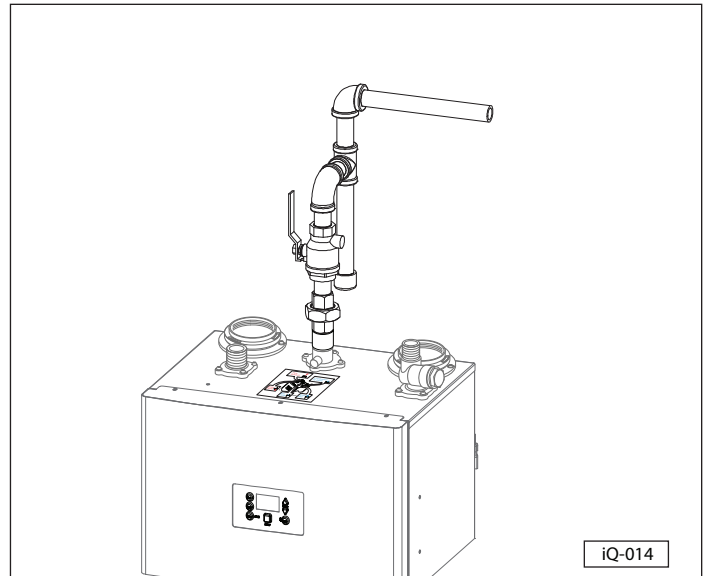
Make sure the gas line pressures are within normal limits. Pressures outside normal limits can result in poor performance and hazardous operating conditions.

1. Determine if the unit will use natural gas (factory preset) or LP (propane) gas. To convert the unit to propane, refer to the Propane (LPG) Conversion section in this manual.
2. Ensure the gas supply pressure meets the requirements for the unit, as shown below.

NG / LP Parameters	Inches of Water Column
Minimum Static Gas Pressure 1/2" (black iron pipe)	6"
Minimum Static Gas Pressure 3/4" (black iron pipe)	2.5"
Maximum Static Gas Pressure	14"
Gas Pressure for Adjustments	8" for NG, 11" for LP

3. Select the proper gas piping.
  - a. All gas piping and components must comply with NFPA local codes and utility requirements. Only gas approved fittings, valves, or pipes should be utilized.
  - b. Assembled piping should be clean of all scale, debris, metal particles, or foreign material.
  - c. The piping must be supported by the floor, ceiling, or walls.
4. Make sure the pipe diameter for the length being used is correctly sized to meet maximum output of the water heater(s) being installed.
  - a. The maximum gas flow rate required is the sum of the maximum inputs of each unit divided by the heat of combustion of the fuel supplied at the location (use 1,030 BTU per cubic foot for natural gas and 2,520 BTU per cubic foot for propane).
  - b. The fuel supplier or utility company should be consulted to confirm that sufficient volume and normal pressure is provided to the building at the discharge side of the gas meter or supply pipe.
  - c. Use the Gas Pipe Sizing tables in this manual or refer to the gas line manufacturer's sizing information to determine the correct diameter for the supply pipe.
5. Make sure a drip leg is installed on the gas piping.
  - a. Drip legs are required at the gas supply of each water heater to prevent any dirt, condensation, or debris from entering the gas inlet.

- b. When multiple heaters are installed, some utilities and local codes require a full size drip leg on the main gas supply line in addition to the drip leg for each unit.
- c. The bottom of the gas drip leg should be removable without disassembling any gas piping.
- d. The gas pipe should not be supported by the bottom of the drip leg.



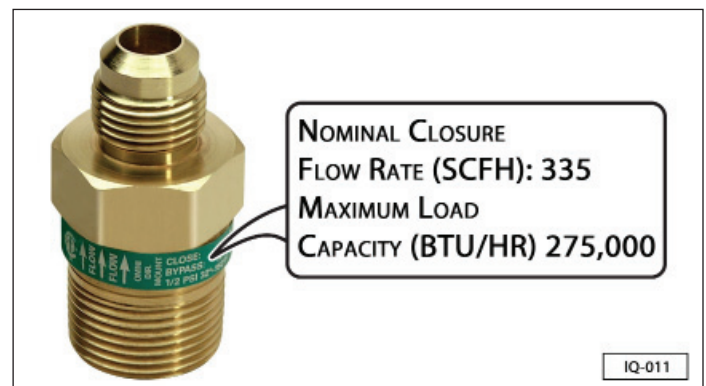
**Note:** Always clean the inside of the gas line of any dirt or debris before connecting the piping to the unit.

#### **NOTICE**

Do not start the water heater until all connections have been completed, leak-tested, and the heat exchanger is filled with water.

### 6.2 Excess Flow Valve (EFV)

If an excess flow valve (EFV) is installed in the gas line, check the manufacturer's minimum and maximum flow capacity rating. An improperly sized EFV will not allow for the full flow of gas to the water heater and will cause the unit to malfunction.





### 6.3 Gas Pipe Sizing Tables

This information is for reference only. Refer to gas pipe manufacturer specifications for actual delivery capacity. Contact the local gas supplier for actual BTU/ft<sup>3</sup> rating. This data copied from the National Fire Protection Association Article 54 (NFPA 54).

Pipe Sizes and BTU/h Capacity (Natural Gas). Use this table for static gas pressure less than 5"								
Length Including fittings	3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	4"
10	360,000	678,000	1,390,000	2,090,000	4,020,000	6,400,000	11,300,000	23,100,000
20	247,000	466,000	957,000	1,430,000	2,760,000	4,400,000	7,780,000	15,900,000
30	199,000	374,000	768,000	1,150,000	2,220,000	3,530,000	6,250,000	12,700,000
40	-	320,000	657,000	985,000	1,900,000	3,020,000	5,350,000	10,900,000
50	-	284,000	583,000	873,000	1,680,000	2,680,000	4,740,000	9,660,000
60	-	257,000	528,000	791,000	1,520,000	2,430,000	4,290,000	8,760,000
70	-	237,000	486,000	728,000	1,400,000	2,230,000	3,950,000	8,050,000
80	-	220,000	452,000	677,000	1,300,000	2,080,000	3,670,000	7,490,000
90	-	207,000	424,000	635,000	1,220,000	1,950,000	3,450,000	7,030,000
100	-	-	400,000	600,000	1,160,000	1,840,000	3,260,000	6,640,000
125	-	-	355,000	532,000	1,020,000	1,630,000	2,890,000	5,890,000
150	-	-	322,000	482,000	928,000	1,480,000	2,610,000	5,330,000
175	-	-	296,000	443,000	854,000	1,360,000	2,410,000	4,910,000
200	-	-	275,000	412,000	794,000	1,270,000	2,240,000	4,560,000
Note: BTU/h capacities are based on specific gravity of 0.6, pressure drop of 0.5" WC								

Pipe Sizes and BTU/h Capacity (Natural Gas). Use this table for static gas pressure greater than 5"									
Length Including fittings	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	4"
10	404,000	949,000	1,787,000	3,669,000	5,497,000	10,588,000	16,875,000	29,832,000	43,678,000
20	286,000	652,000	1,228,000	2,522,000	3,778,000	7,277,000	11,598,000	20,503,000	30,020,000
30	233,000	524,000	986,000	2,025,000	3,034,000	5,844,000	9,314,000	16,465,000	24,107,000
40	202,000	448,000	844,000	1,733,000	2,597,000	5,001,000	7,971,000	14,092,000	20,632,000
50	-	397,000	748,000	1,536,000	2,302,000	4,433,000	7,065,000	12,489,000	18,286,000
60	-	360,000	678,000	1,392,000	2,085,000	4,016,000	6,401,000	11,316,000	16,569,000
70	-	331,000	624,000	1,280,000	1,919,000	3,695,000	5,889,000	10,411,000	15,243,000
80	-	308,000	580,000	1,191,000	1,785,000	3,437,000	5,479,000	9,685,000	14,181,000
90	-	289,000	544,000	1,118,000	1,675,000	3,225,000	5,140,000	9,087,000	13,305,000
100	-	273,000	514,000	1,056,000	1,582,000	3,046,000	4,856,000	8,584,000	12,568,000
125	-	242,000	456,000	936,000	1,402,000	2,700,000	4,303,000	7,608,000	11,139,000
150	-	219,000	413,000	848,000	1,270,000	2,446,000	3,899,000	6,893,000	10,093,000
175	-	202,000	380,000	780,000	1,169,000	2,251,000	3,587,000	6,342,000	9,285,000
200	-	-	353,000	726,000	1,087,000	2,094,000	3,337,000	5,900,000	8,638,000
Note: For 1/2" line BTU/h capacities are based on specific gravity of 0.6, pressure drop of 4.6" WC and 5.0" WC. For all other line sizes, capacities are based on specific gravity of 0.6, pressure drop of 3.0" WC									

Pipe sizes and BTU/h capacity (Propane). Use this table for static gas pressure greater than 5"									
Length Including fittings	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	4"
10	409,000	608,000	1,150,000	2,350,000	3,520,000	6,790,000	10,800,000	19,100,000	39,000,000
20	289,000	418,000	787,000	1,620,000	2,420,000	4,660,000	7,430,000	13,100,000	26,800,000
30	236,000	336,000	632,000	1,300,000	1,940,000	3,750,000	5,970,000	10,600,000	21,500,000
40	204,000	287,000	541,000	1,110,000	1,660,000	3,210,000	5,110,000	9,030,000	18,400,000
50	-	255,000	480,000	985,000	1,480,000	2,840,000	4,530,000	8,000,000	16,300,000
60	-	231,000	434,000	892,000	1,340,000	2,570,000	4,100,000	7,250,000	14,800,000
80	-	212,000	400,000	821,000	1,230,000	2,370,000	3,770,000	6,670,000	13,600,000
100	-	-	372,000	763,000	1,140,000	2,200,000	3,510,000	6,210,000	12,700,000
125	-	-	349,000	716,000	1,070,000	2,070,000	3,290,000	5,820,000	11,900,000
150	-	-	330,000	677,000	1,010,000	1,950,000	3,110,000	5,500,000	11,200,000
175	-	-	292,000	600,000	899,000	1,730,000	2,760,000	4,880,000	9,950,000
200	-	-	265,000	543,000	814,000	1,570,000	2,500,000	4,420,000	9,010,000
Note: The line BTU/h capacities are based on specific gravity of 1.5, pressure drop of 0.5" WC.									

## 6.4 Gas Pressure Regulator

Depending on the gas inlet pressure at your location, it may be necessary to install a gas pressure regulator to lower gas pressures to an acceptable level. Please ensure that the gas pressure regulator has the same or higher minimum to maximum modulation range as the water heater model it is connected to. In the case of multiple units, it is recommended to use a dedicated gas pressure regulator for each unit.

Regulators should be mounted with a minimum of 12" of straight length pipe on either side.

## 6.5 Venting of Gas Supply Regulators

Below are the general guidelines for venting a gas regulator. The manufacturer recommends these guidelines be followed to ensure reliable and proper operation of the water heater. Local codes and the gas regulator manufacturer should also be consulted for additional installation information.

1. When venting the gas supply regulator, the vent pipe must be at least the same size as the regulator vent.
2. When multiple units are connected, each regulator must have a separate vent line.
3. Vent lines must not be connected together or connected with any other appliance requiring external venting.
4. When selecting the size, the pipe diameter must be increased by one size for every 20 feet of pipe.
5. Each 90° elbow is equivalent to approximately:  
4.5 feet for nominal pipe sizes of up to 1-1/2"  
10.5 feet for nominal pipe sizes of up to 4"
6. Each 45° elbow is equivalent to approximately:  
2 feet for nominal pipe sizes of up to 1-1/2"  
5 feet for nominal pipe sizes of up to 4"

## 7. Venting and Materials

### **WARNING**

**Improper venting of the water heater can result in excessive levels of carbon monoxide, which can lead to severe personal injury or death. This water heater must be vented in accordance with the “Venting of Equipment” section of the latest edition of the ANSI Z223.1 / NFPA 54 (Natural Fuel Gas Code) in the USA, or in Canada refer to the “Venting Systems and Air Supply for Appliances” section in the latest version of CAN/CGA B149.1 (Natural Gas and Propane Installation Code), and all applicable local building codes. Vent installation should be performed only by a licensed professional.**

### 7.1 Venting Guidelines

- This water heater must be properly vented to ensure there is a constant supply of clean intake air, and the exhaust is properly evacuated from the building. All seal connections should be airtight.
- The unit should be located as close to the vent termination, and the vents kept as short and straight as possible.
- Do not connect the water heater vent to a vent of any other non-water heater appliance.
- Combustion air may be drawn from the room where the unit is installed (single pipe/power vent) or directly from the outside (two pipe/direct vent).
- Ensure a sufficient supply of clean combustion air, free of any contaminants, such as dust, chemical fumes (i.e. aerosols, chlorine, paint), grass, or other airborne contaminants. If necessary, purchase and install the appropriate air screens, and follow a regular cleaning program to ensure an adequate supply of clean combustion air.
- Do not operate the unit in an area that is or will be under construction or renovation.
- The warranty does not cover damage caused by contaminants in the installation area. If you must install the water heater in an area with contaminated air, use direct venting to supply the air from the outside of the building.
- All horizontal runs should be sloped upwards towards the vent termination at a rate of 1/4" per foot.
- To avoid moisture and frost build-up to openings on adjacent homes, use 45° elbows, 90° elbows, or tees for the vent termination to direct the exhaust fumes away from the building.

### 7.2 Exhaust Vent Materials

The materials listed in the table below outline the acceptable exhaust vent materials:

United States Exhaust Vent Pipe Standards	
Material	Description*
Exhaust Vent Pipe	PVC Schedule 40
	CPVC Schedule 40, 80
	Approved Polypropylene
	AL294C Stainless Steel
Canadian Exhaust Vent Pipe Standards	
Material	Description (approved to ULC-S636)**
Exhaust Vent Pipe	Type BH Special Gas Vent Class IIA (PVC)
	Type BH Special Gas Vent Class IIB (CPVC)
	Type BH Special Gas Vent Class IIC (Polypropylene)
	Type BH Special Gas Vent Class I (AL294C Stainless Steel)

\*Note: Use of cellular core PVC (ASTM F891), cellular core CPVC, or Radel (polyphenylsulfone) in nonmetallic venting systems is prohibited. Covering non-metallic vent pipe and fittings with thermal insulation is prohibited.

\*\*Note: The components (pipe, fittings, primers, and glues) must be from a single manufacturer; do not interchange. Follow the vent manufacturer's certified instructions.

This water heater has a built-in exhaust vent temperature control that limits the exhaust temperature to a maximum of 149°F (65°C).

If the temperature approaches the upper limit, the burner will turn off automatically to protect the vent pipe. As a result, this water heater can be vented with PVC pipe. Once the exhaust temperature has dropped to a normal operating level, the unit will automatically restart.

If the inlet/return water temperature will exceed 150°F (66°C), do not use PVC venting. Refer to the Programming section for Flue Type Selection (PVC or CPVC) for additional information.

### 7.3 Air Intake Vent Materials

The air intake vent can be of any plastic or metal vent material available. ABS, PVC, Polypropylene, galvanized steel, and flexible corrugated ducting are all examples. If you are using a corrugated material, ensure there is no inadvertent crimping or blockage to the air intake pipe.

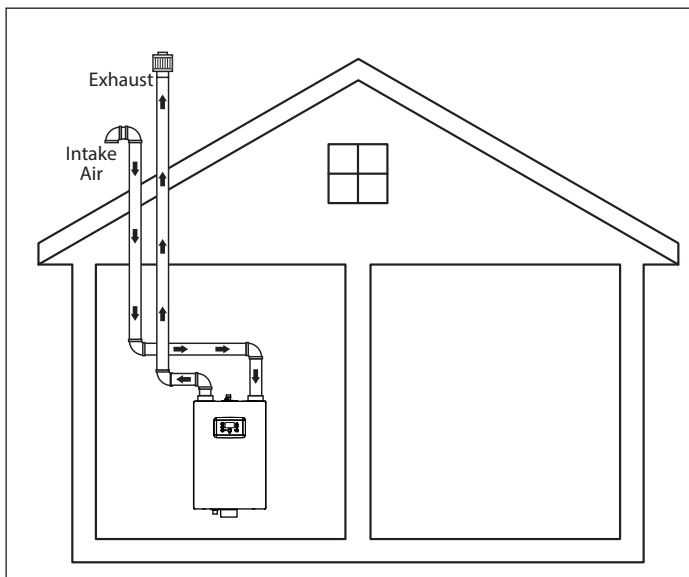
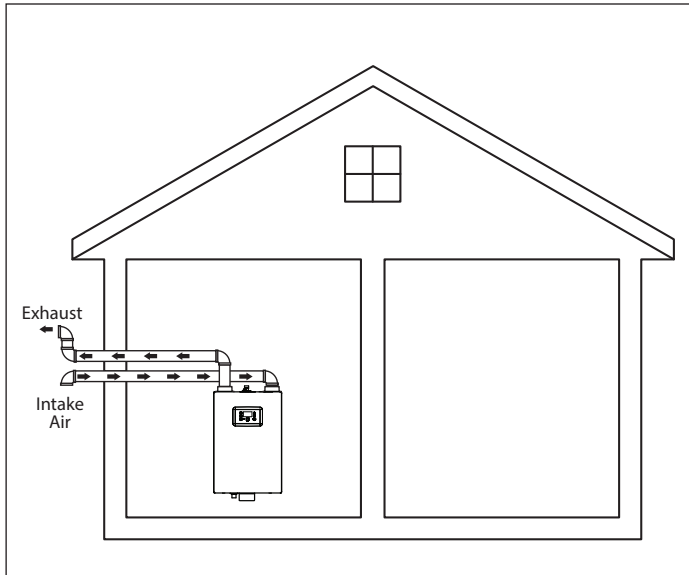
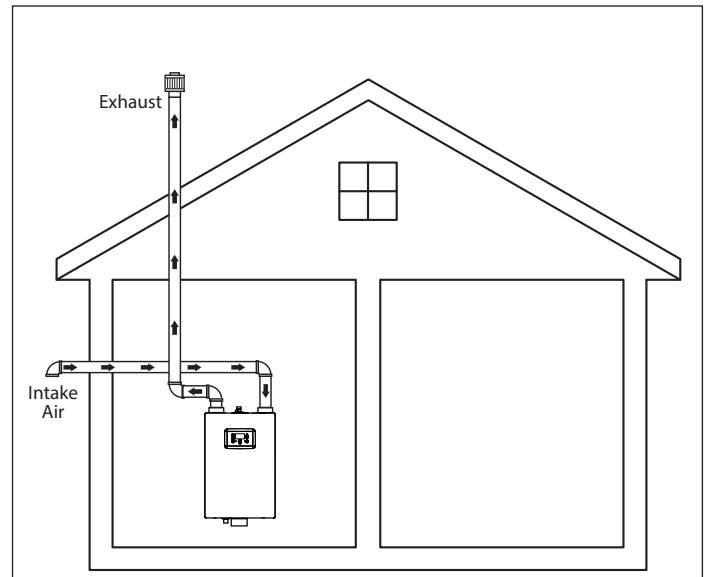
## 7.4 Venting Configurations

Water heaters may be installed with: two pipes (direct vent) configuration or with one pipe (power vent) configuration.

### 7.5 Two Pipe Vent System (Direct Vent)

The water heater can be direct vented without any modification using a 3 inch diameter pipe.

The following diagrams represent some typical direct venting configurations and are included to assist in designing the vent system. Possible configurations are not limited to the following diagrams.

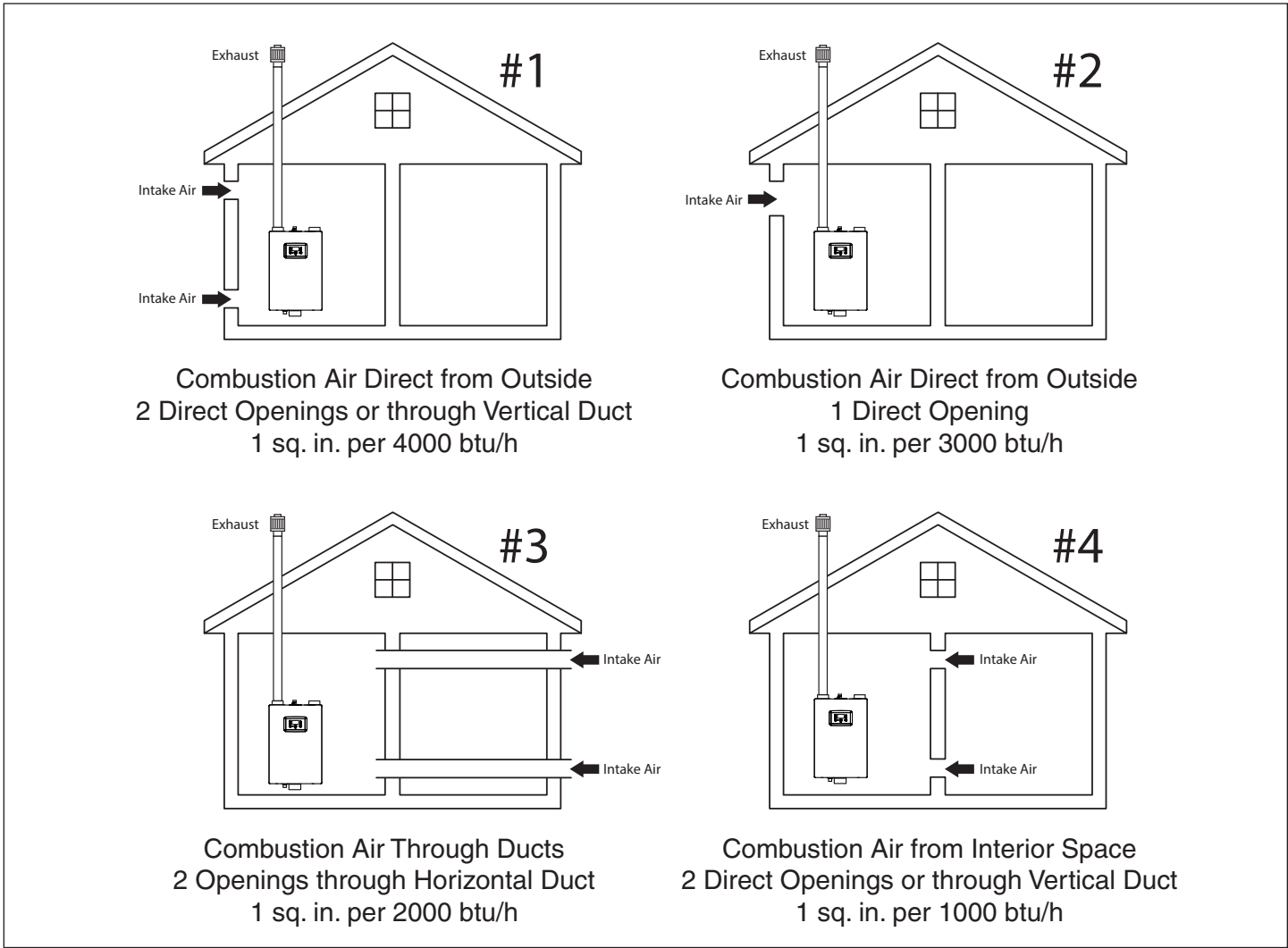


7.5.1 Single Pipe Venting System (Power Vent)

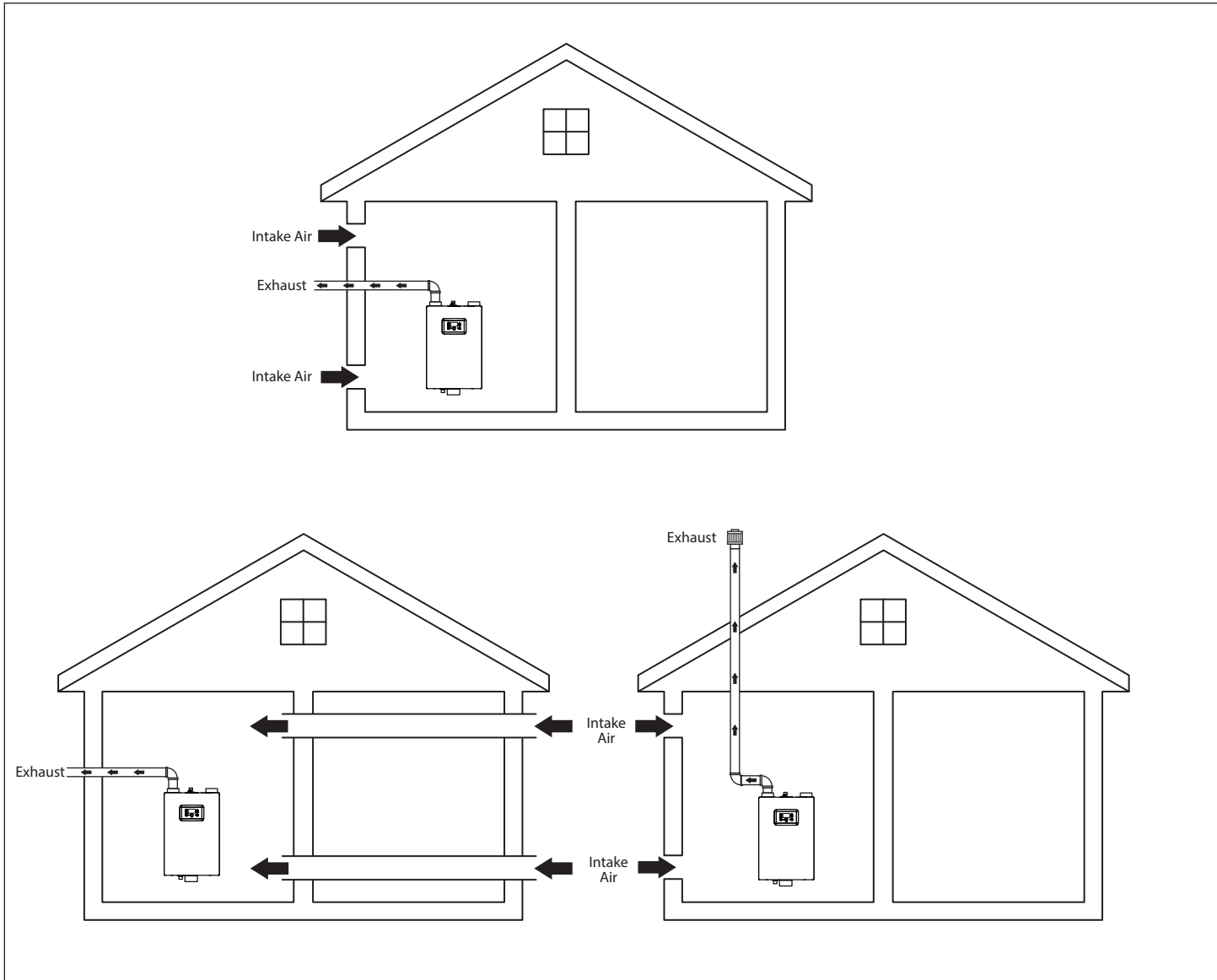
When using the single exhaust pipe/power vent method, the following table outlines the required opening sizes for the combustion and ventilation air coming into the room:

Required Combustion & Ventilation Air Opening Sizes (sq. in) Per Heater Per Room:					
Input BTU/hr	Air Type	Air is drawn directly from outside into the room			Example #4 Air is drawn from another interior space inside the building
		Example #1 through two openings*, direct or vertical	Example #2 through one opening**	Example #3 through two horizontal ducts***	
199,950	Combustion Air	50	67	100	67
	Ventilation Air	50		100	67
251,000	Combustion Air	63	84	125	84
	Ventilation Air	63		125	84

\*Where two openings are used, one must be within 12" of the floor and the other opening must be within 12" of the ceiling.  
\*\*Where one opening is required, it must be located within 12" of the ceiling. See illustration below.



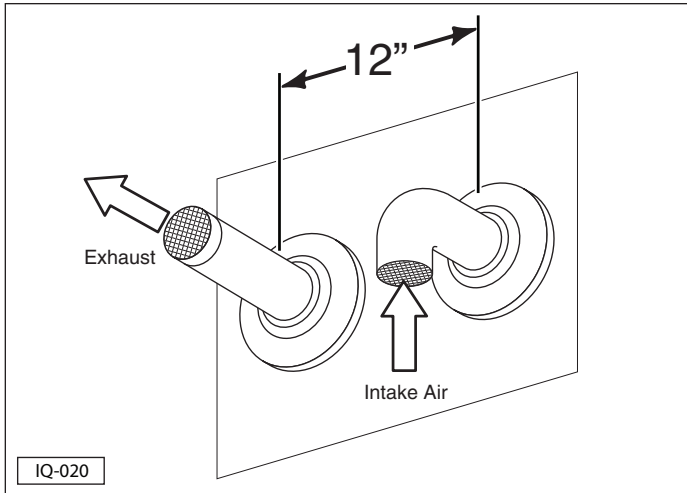
The following illustrations represent some typical power venting configurations and are included to assist in designing the vent system. Possible configurations are not limited to these designs.



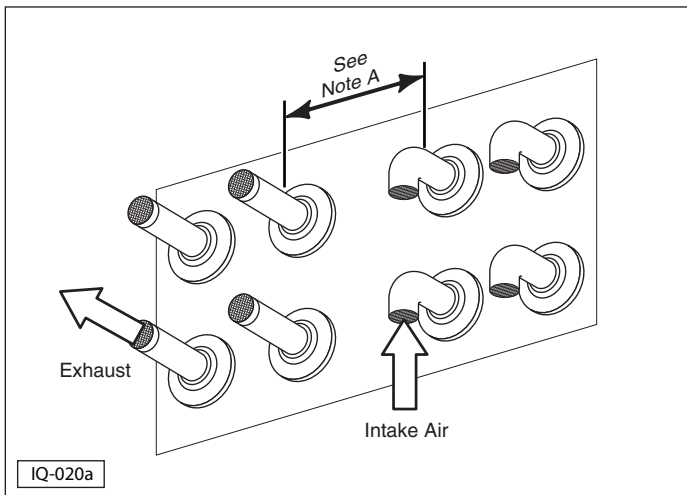
## 7.6 Venting Termination

### 7.6.1 Side Wall Termination

1. Terminate the air intake with a 90° elbow (angled down). Use a flange and PVC screen (not supplied).
2. Terminate the exhaust on the exterior wall at least 12" above ground and at least 12" away from the air intake, or as required by local building codes. In areas of high snow fall, protect the vent terminations from blockage. Use a flange and PVC guard.



Single unit.



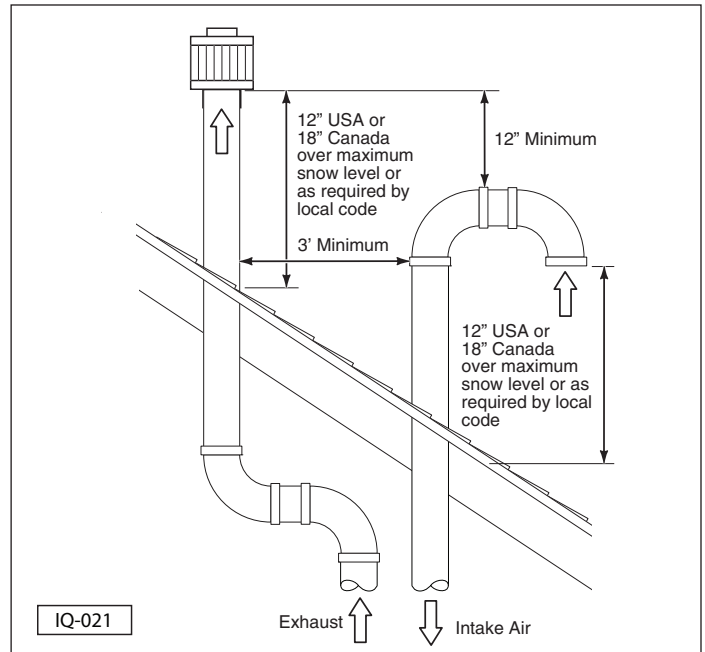
Multiple units.

**Note A:** The distance between any exhaust outlet and air intake should be between 18 and 36 inches or greater than 72 inches.

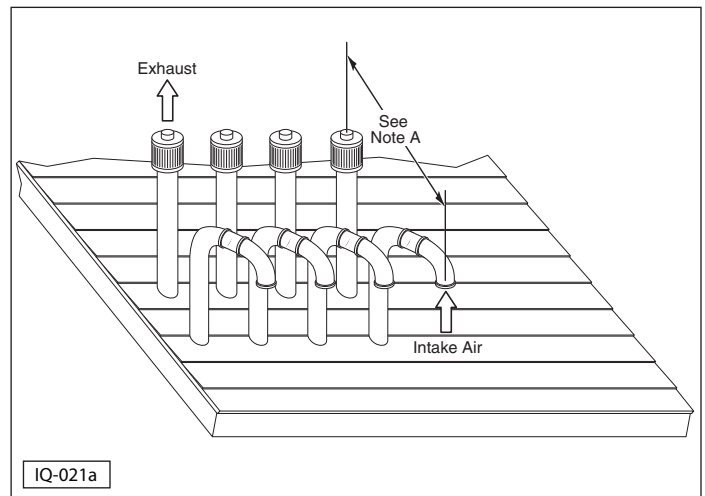
### 7.6.2 Roof Termination

Venting the unit through the roof is also an option. With this installation method, the terminations must extend at least 12" over maximum potential snow levels, or as required by local building codes. In areas of high snow fall, protect the vent terminations from blockage.

Terminate the air intake with a 90° elbow (angled down). A suitable roof flashing and vent cap (not supplied) should be installed.



Single unit.



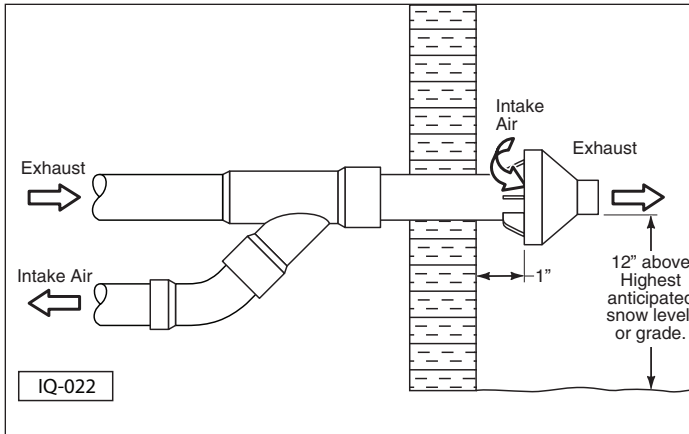
Multiple units.

**Note A:** The distance between any exhaust outlet and air intake should be between 18 and 36 inches or greater than 72 inches.

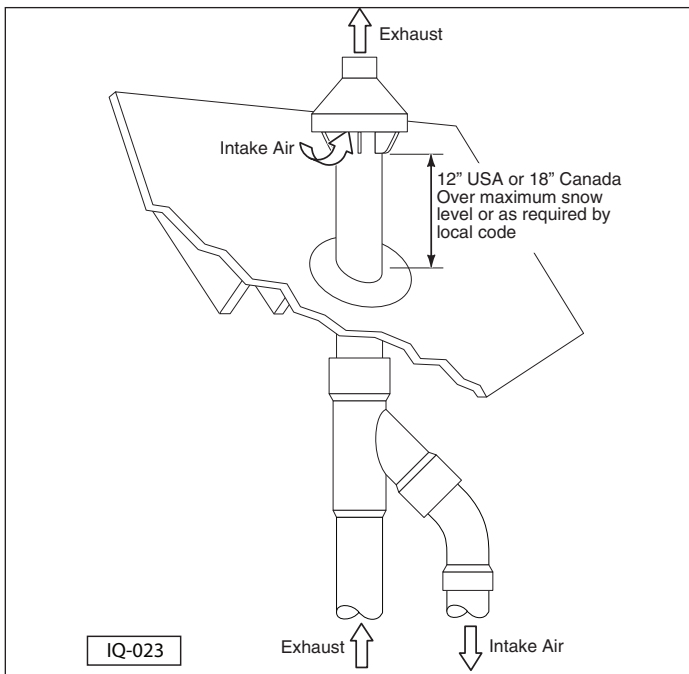
### 7.6.3 Concentric Venting Termination (Single Unit)

If desired, an optional concentric venting system, which uses one 5" opening through an exterior wall or roof, can be used, as opposed to cutting two 3" openings.

Follow all installation instructions included with the concentric vent kit when installing this type of vent system.



Concentric Venting System Through a Side Wall.

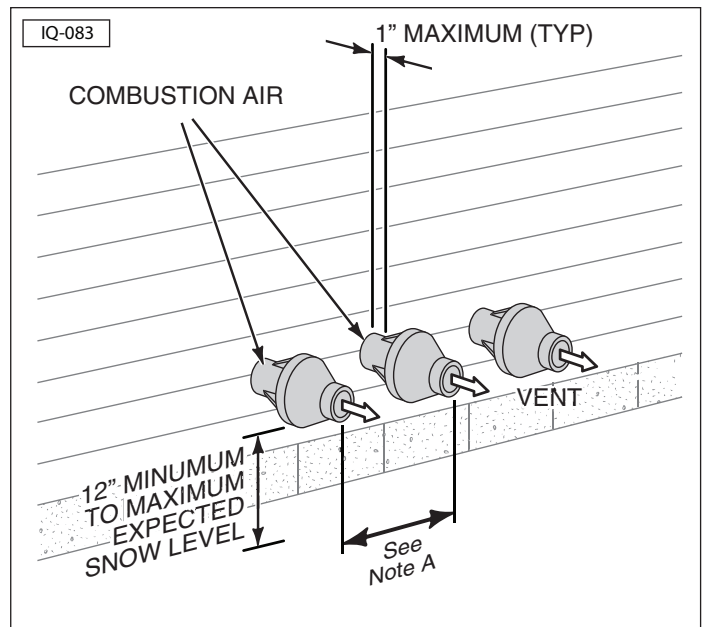


Concentric Venting System Through the Roof.

### 7.6.4 Concentric Venting Termination (Multiple Units)

In order to conform to some national codes, when two or more water heaters are installed they must be individually vented. When two or more units are vented near each other, each vent termination must be installed, as shown, to avoid recirculation of flue gases. A minimum distance of 18 inches must be maintained between each vent termination.

Follow all installation instructions included with the concentric vent kit when installing this type of vent system.

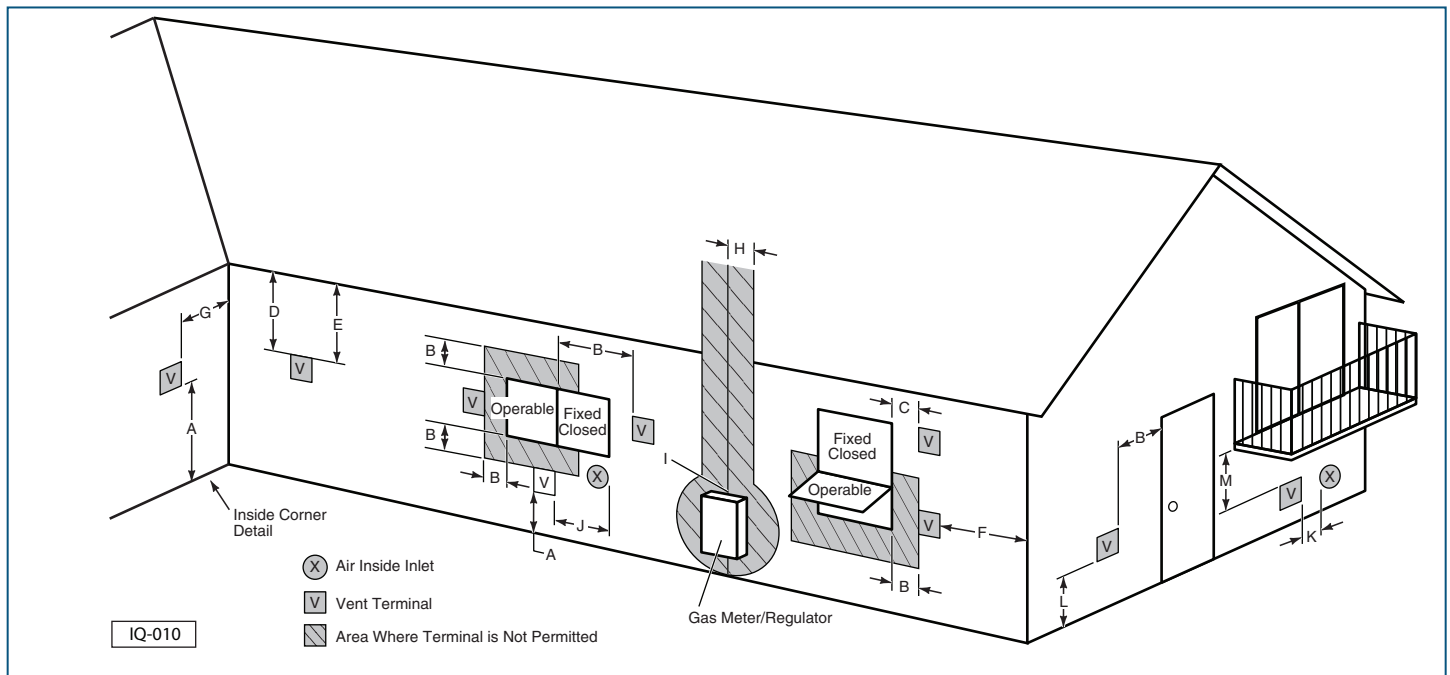


Multiple concentric units.

**Note A:** The distance between any exhaust outlet and air intake should be between 18 and 36 inches or greater than 72 inches.



## 7.7 Venting Clearance Specifications



Venting Clearance Specifications			
Item	Description	Clearance Distance	
		USA1	Canada2
A	Clearances above grade, veranda, porch, deck, or balcony	1 foot	1 foot
B	Clearances to window or door that may be opened	1 foot**	3 feet
C	Clearances to permanently closed window	*	*
D	Vertical clearance to a ventilated soffit, eaves, or overhang	*	*
E	Clearances to unventilated soffit, eaves, or overhang	*	*
F	Clearances to outside corner	*	*
G	Clearances to inside corner	*	*
H	Clearances to each side of centerline extended from meter/regulator	*	3 feet within a height 15 feet above meter/ regulator assembly
I	Clearances to gas meter regulator vent outlet	*	3 feet
J	Clearances to non-mechanical air supply inlet or combustion air inlet to any other appliance	1 foot**	3 feet
K	Clearances to mechanical air supply inlet	3 feet above if within 10 feet horizontally	6 feet
L	Clearances to above paved sidewalk or paved driveway on public property	*	7 feet
M	Clearances under veranda, porch, deck, or balcony	*	1 foot

\*Per local/gas supplier codes. Use clearances in accordance with local building codes and local gas supplier.  
 \*\* For single vent pipe/direct 4 feet (1.2 m) below or to the side of opening and 1 foot above opening.  
<sup>1</sup> In accordance with Z223.1  
<sup>2</sup> In accordance with CSA B149.1

## 7.8 Common Venting for Multiple Units

Connecting several units together requires proper sizing of the intake and exhaust pipes. Up to ten water heaters (similar model numbers) can be connected (cascaded) together.

### 7.8.1 Vent Diameter Sizing and Lengths

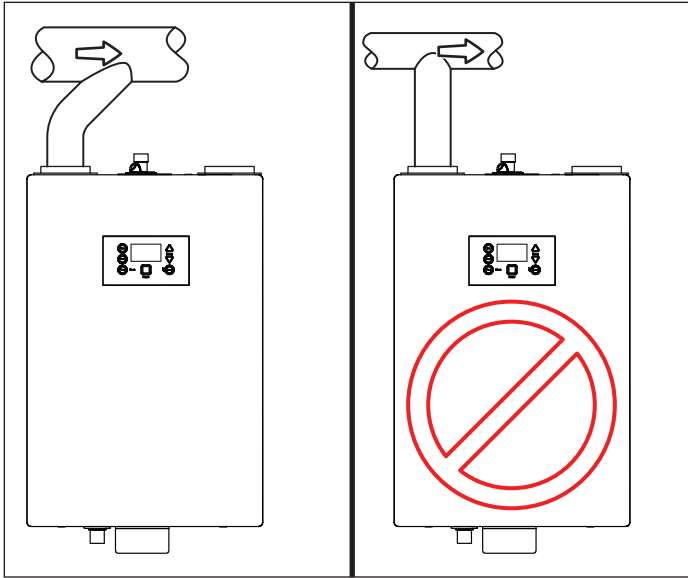
The water heaters are designed for 3 inch air intake and gas exhaust vents. The following chart outlines the maximum length of venting allowable for each model. A vent system's length is calculated by adding the length of all straight pieces used (both horizontal and vertical) and then adding the equivalent lengths of each fitting used in the system. A vent system's length must not exceed the maximum length outlined in the chart below:

Maximum Vent Length (in feet) for Power Vent (1 pipe)					
Number of Units common vented together	Duct Size				
	2"	3"	4"	6"	8"
1	26	130	130		
2			130		
3			30	130	
4				130	
5				130	
6				130	
7				45	
8				45	130
9					130
10					130
Note: Reduce the maximum equivalent length above by 5 feet per 90° elbow used and by 2 feet per 45° elbow used. Do not exceed the above set limits.					

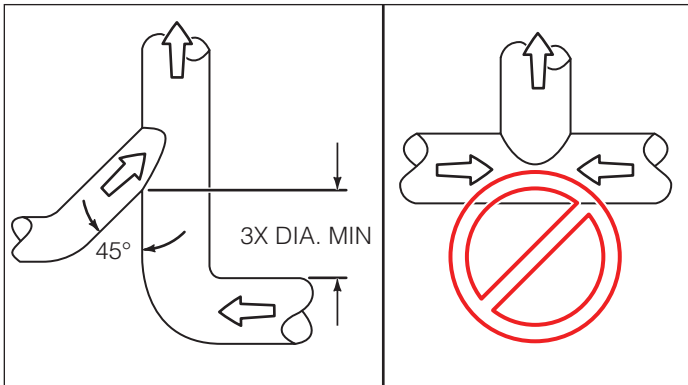
**NOTE: ONLY UNITS OF THE SAME MODEL NUMBER TO BE CASCADED TOGETHER**

Maximum Vent Length (in feet) for Direct Vent (2 pipe)					
Number of Units common vented together	Duct Size				
	2"	3"	4"	6"	8"
1	21	65	65		
2			65		
3			30	65	
4				65	
5				65	
6				65	
7				45	
8				30	65
9					65
10					65
Note: Reduce the maximum equivalent length above by 5 feet per 90° elbow used and by 2 feet per 45° elbow used. Do not exceed the above set limits.					

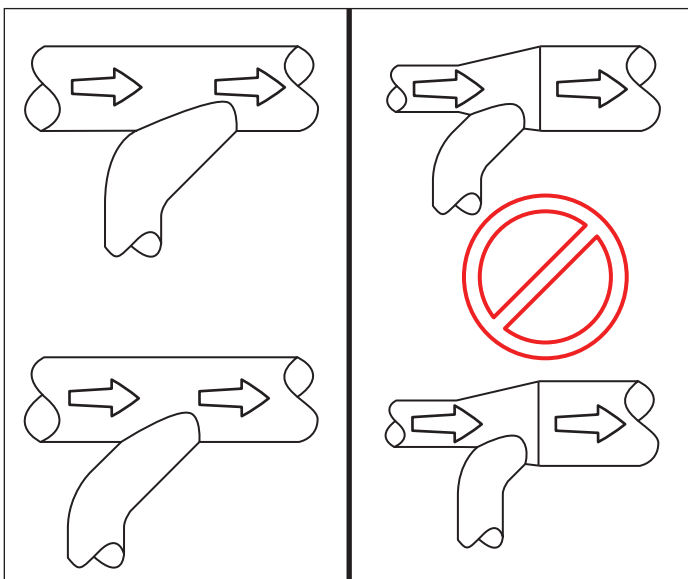
## 7.8.2 Recommended Exhaust Pipe Transitions



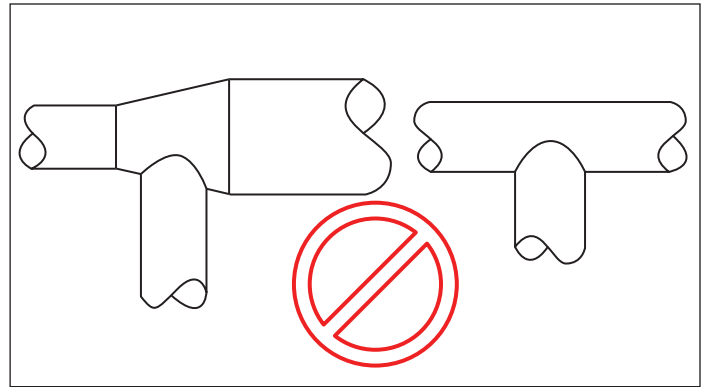
Do not use a 90 degree t-fitting for the gas exhaust.



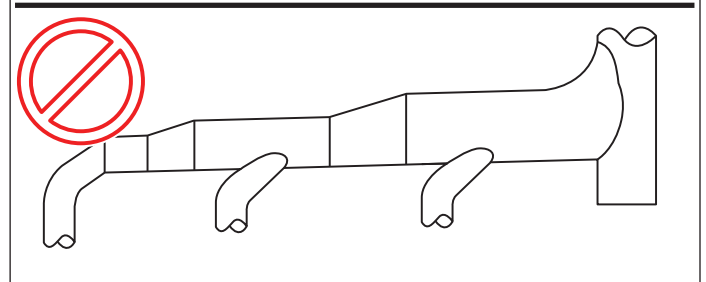
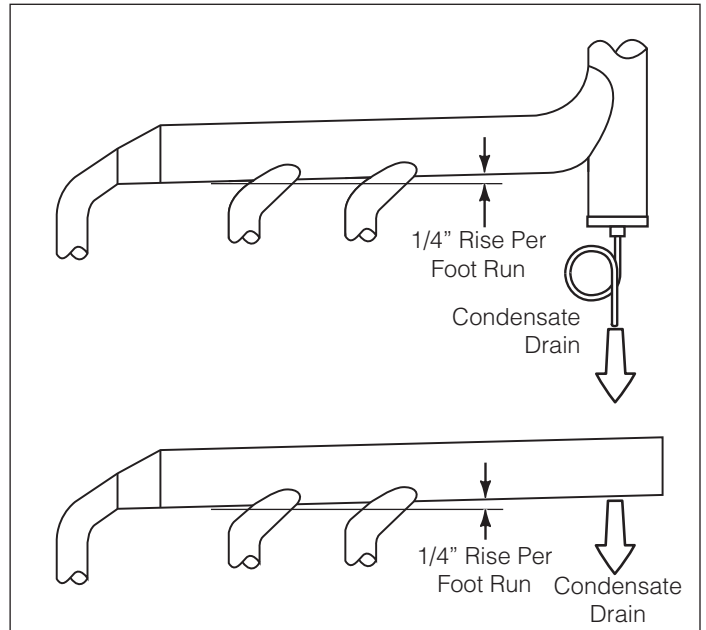
Do not direct gas exhaust from opposite directions. Use a 45 degree transition, as shown.



Do not transition into a reducer or use a t-fitting. Transitions should always be directed into a straight run of pipe.



Do not use 90 degree transition into a reducer or a straight pipe.

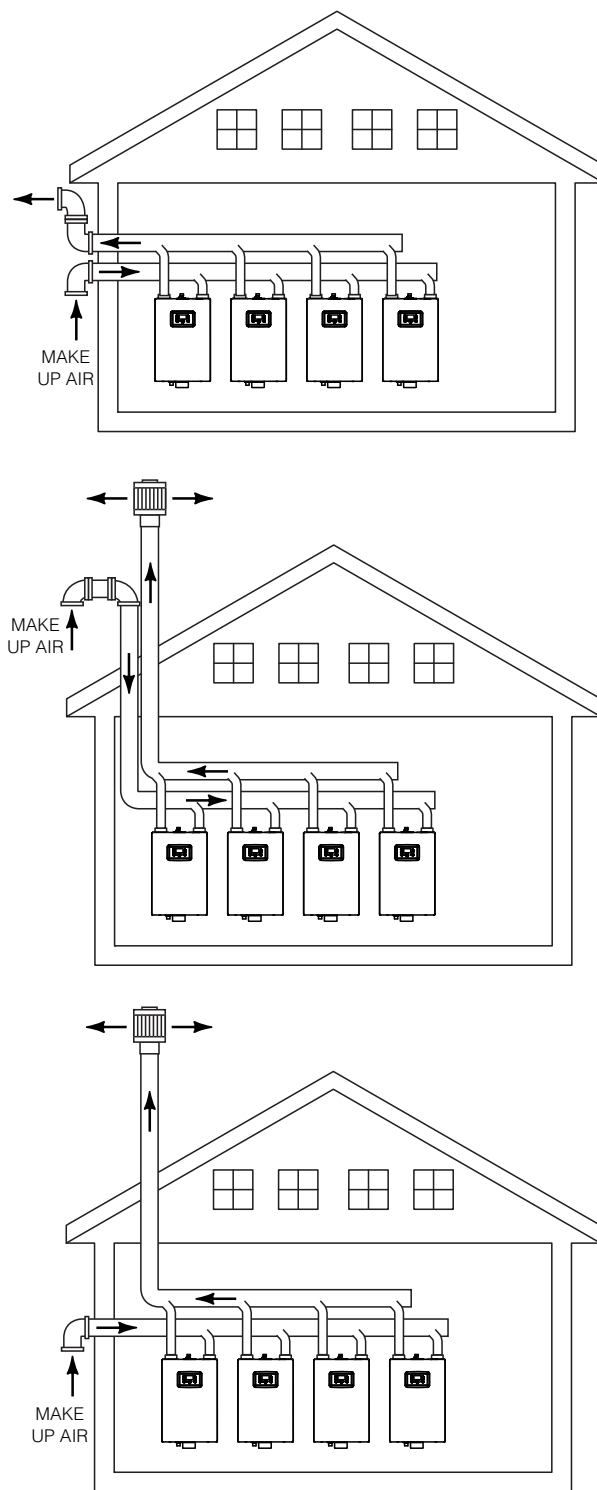


Do not use reducers in a straight run of pipe.

### 7.8.3 Two Pipe Vent System (Direct Vent)

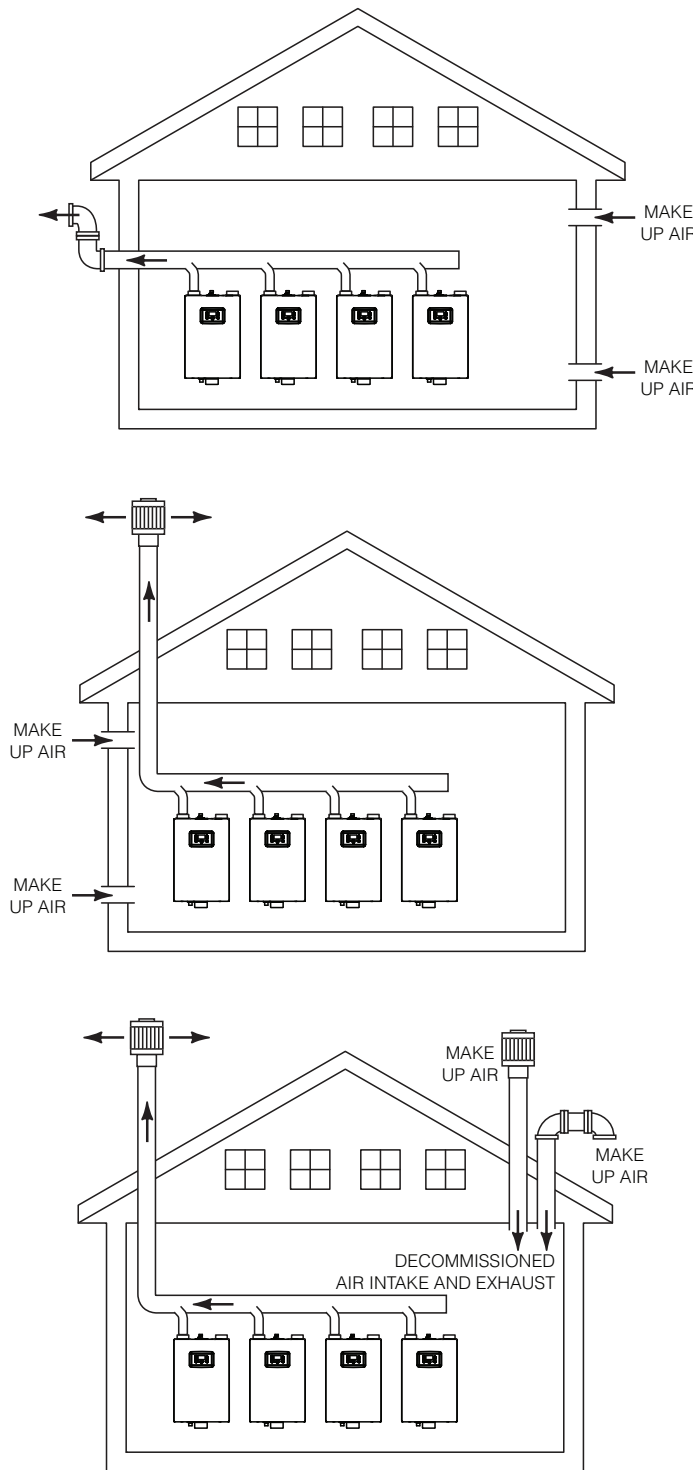
The water heater can be direct vented without any modification using a 3 inch diameter pipe.

The following diagrams represent some typical direct venting configurations and are included to assist in designing the vent system. Possible configurations are not limited to the following diagrams.



7.8.4 Single Pipe Venting System (Power Vent)

When using the single exhaust pipe/power vent method, the following table outlines the required opening sizes for the combustion and ventilation air coming into the room:



## 8. Water Connections

### 8.1 Water Line Connection Guidelines

**Note:** For flow rate changes faster than 10 gpm in one second, a water hammer arrester must be installed to prevent damage to the water heater.

When making the water-side connections, please follow these guidelines:

- Since each installation is different, it is up to the installer to route the water lines in the most efficient manner.
- Keep the hot water pipes as short as possible to deliver hot water to the fixtures quickly.
- Only materials (pipes, fittings, valves, solder, etc.) that are approved for use in potable water systems should be used.
- When tightening any fittings to the connections on the water heater, care should be exercised not to overtighten these joints and damage the unit.
- Unions and manual shut-off valves on the cold water inlet and hot water outlet are recommended.
- Isolation valve kits can be used if incoming water treatment is anticipated (such as a water softener) due to hardness levels or heavy usage of the unit.
- To conserve energy, insulate all hot water piping, except the condensate drain or pressure relief valve.
- When the water heater is installed in a closed loop recirculation system, and if the cold water supply line has a back flow preventer, then an expansion tank should be installed to allow for water expansion.
- After installation, test the water heater for proper flow and inspect for leaks.
- Run the hot water for a few minutes and then clean the inlet water strainer located on the cold water inlet fitting. This strainer must be cleaned periodically to maintain proper water flow.

### 8.2 Water Quality

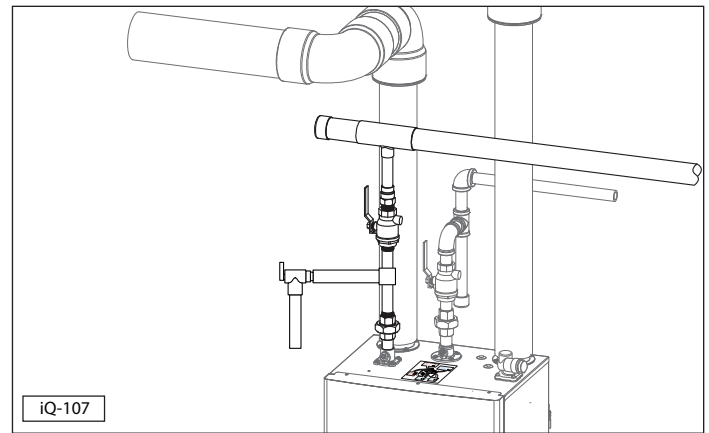
Proper maintenance of the water heater is required to ensure that your water meets EPA quality standards. The following table shows the maximum contaminant levels allowed, based on the EPA National Secondary Drinking Water Regulations (40 CFR Part 143.3). If you suspect that your water is contaminated in any way, discontinue use of the water heater and contact an authorized technician or licensed professional.

Contaminant	Maximum Allowable Level
Aluminum	0.05 to 0.2 mg/l
Chloride	250 mg/l
Copper	1.0 mg/l
Iron	0.3 mg/l
Manganese	0.05 mg/l
pH	6.5-8.5 mg/l
Sulfate	205 mg/l
Total Dissolved Solids (TDS)	500 mg/l
Zinc	205 mg/l

If the incoming water is known to have a high mineral content or “hardness” (see warranty section), treatment is recommended upstream from the water heater.

### 8.3 Hot Water Side Connection

#### 8.3.1 Installation Instructions



1. Connect a 3/4" NPT coupler to the water heater's hot water connection.
2. Install a 3/4" union connection.
3. Following local building codes, install a 3/4" manual shut-off valve with 3/4" NPT fittings.

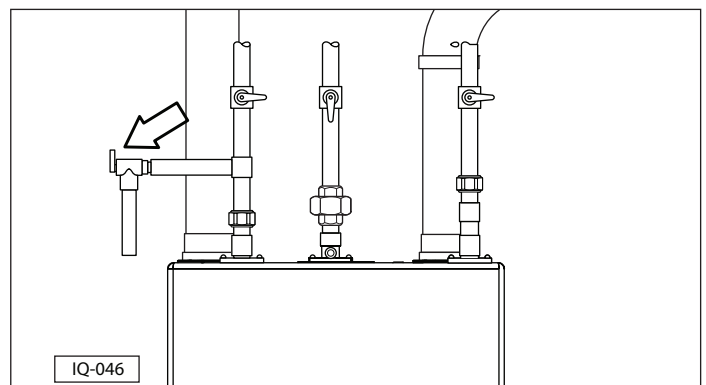
#### 8.3.2 Pressure Relief Valve Installation

### ⚠ WARNING

**To prevent serious personal injury, do not install any shut-off device between the water heater and the pressure relief valve. This valve is designed to release abnormally high pressure within the water heater in the event of a system problem.**

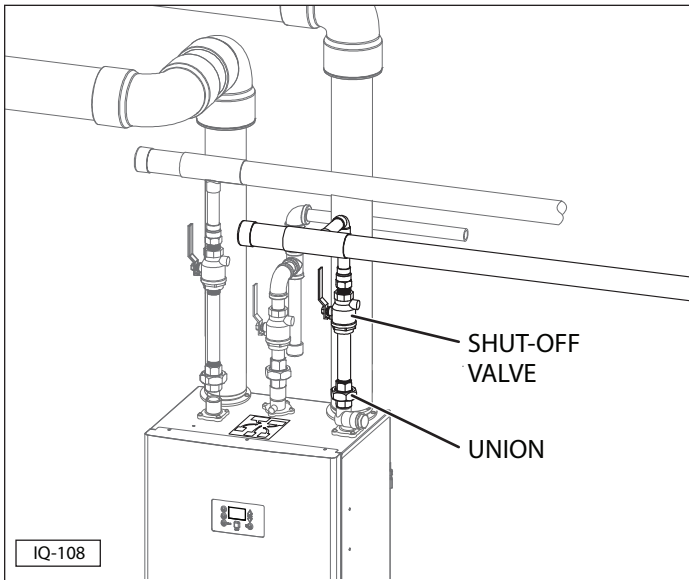
Install the manufacturer-supplied 3/4" 150 psi maximum pressure relief valve with the appropriate BTU/HR rating into outlet piping of the unit. In the case of multiple (cascaded) units, each water heater should have its own individual pressure relief valve.

**Note:** The water heater is designed with an internal high temperature shut-off switch and, therefore, only a pressure relief valve is required for these units.



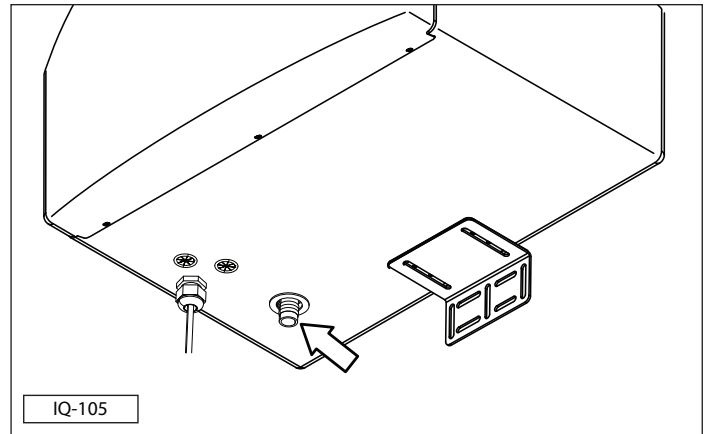
## 8.4 Cold Water Side Connection

Install and connect the cold water line.



1. Connect a 3/4" NPT coupler to the water heater's cold water connection.
2. Install a 3/4" union connection.
3. Following local building codes, install a 3/4" manual shut-off valve with 3/4" NPT fittings.
4. Connect the unit to the existing cold water lines. If the existing plumbing is 1/2" pipe, adapters may be used to transition from the 3/4" pipe.
5. Leak test the water piping before placing the unit in operation.

1. Attach and tighten the flex hose with the loop to the barb fitting located on the bottom of the unit.



2. Follow applicable local codes and if required, install in-line neutralizer (3) to treat the acidic condensate. Follow all the installation instructions included with the neutralizer.

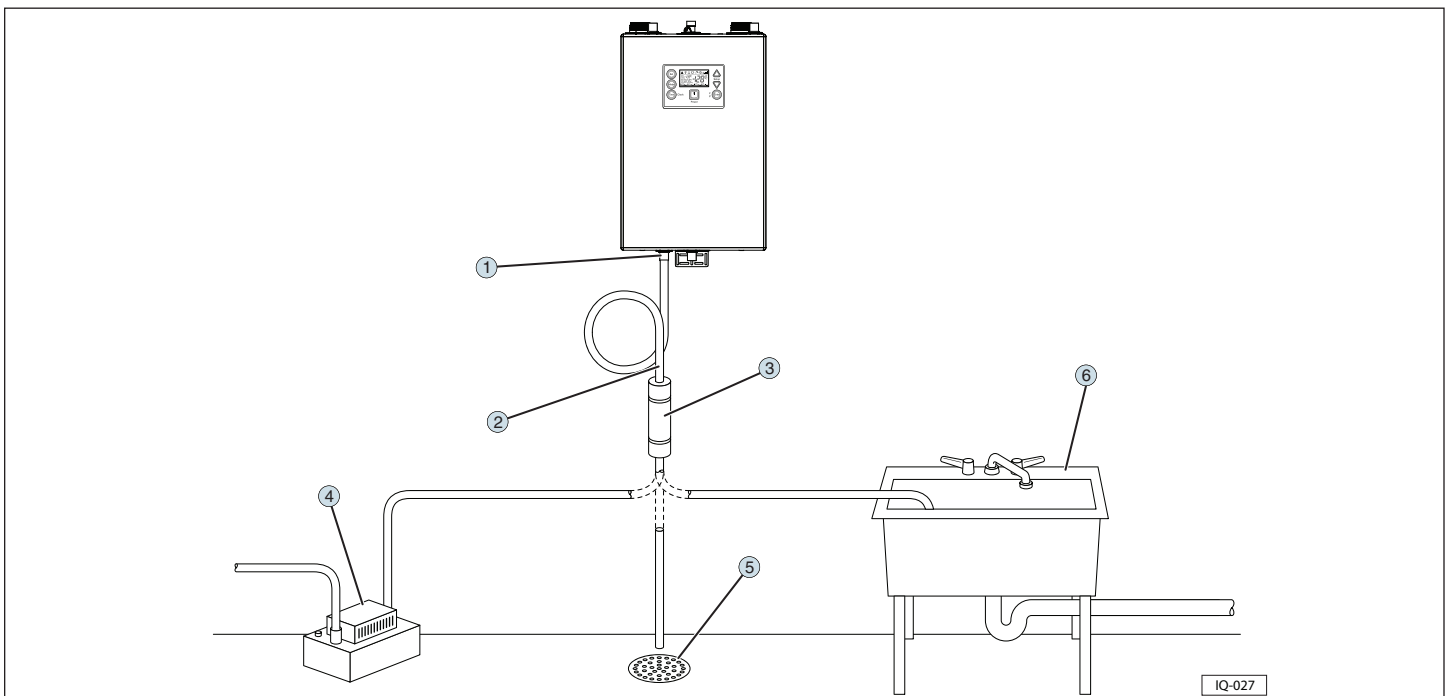
**Note:** Ensure that the flex tube is not pinched or kinked. The tube should freely drain. The tube termination should not be immersed in water.

3. Route the drain line to nearby laundry tub (6), floor drain (5), or condensate pump (4).

## WARNING

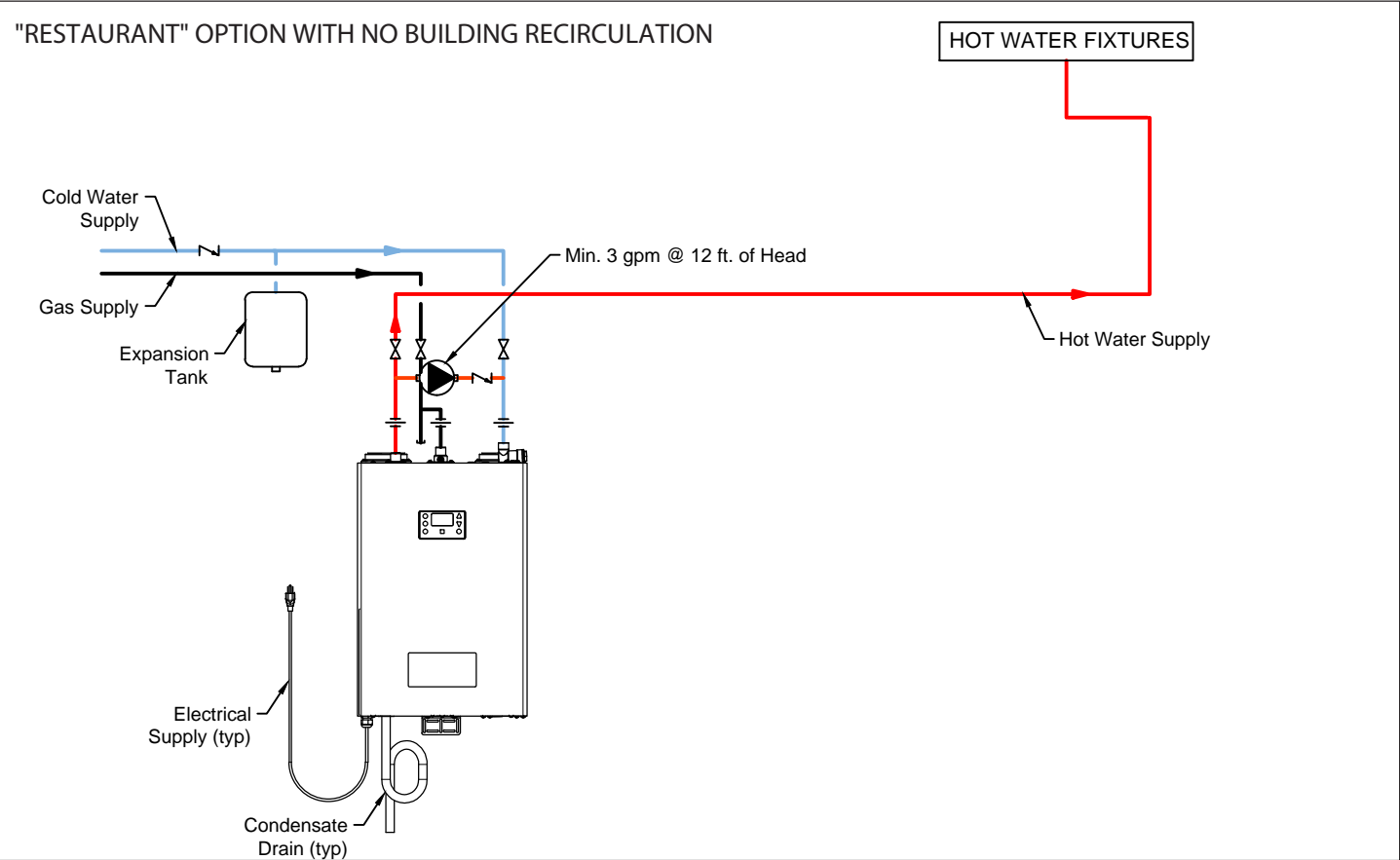
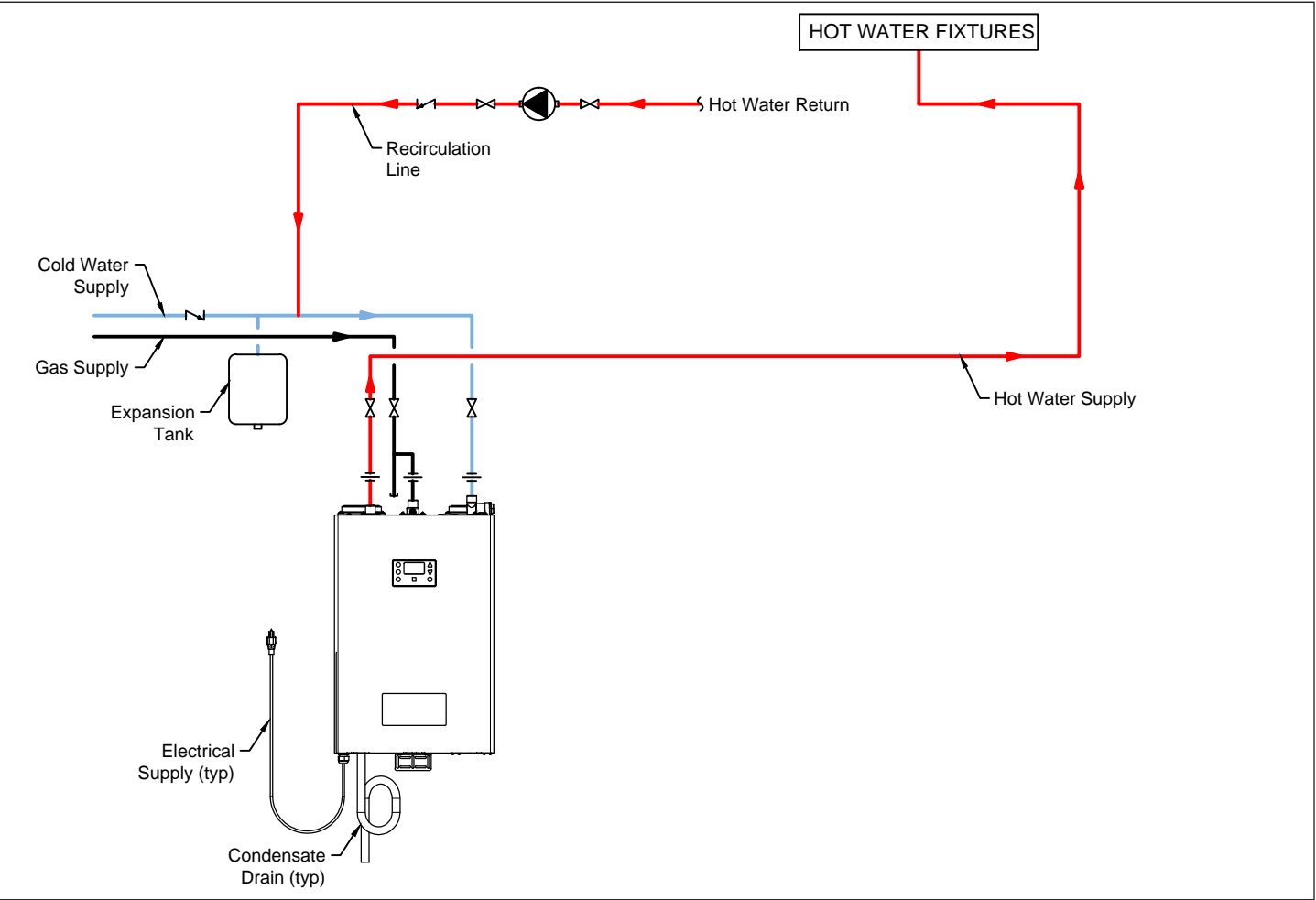
The drain line is shipped from the factory with a loop held together with plastic ties. Do not remove the ties and/or straighten the loop. This loop forms an air block (trap) which prevents carbon monoxide from exiting the water heater through the drain line. Improper installation of the drain line can result in carbon monoxide build, which can lead to severe personal injury or death.

## 8.5 Condensate Line Installation



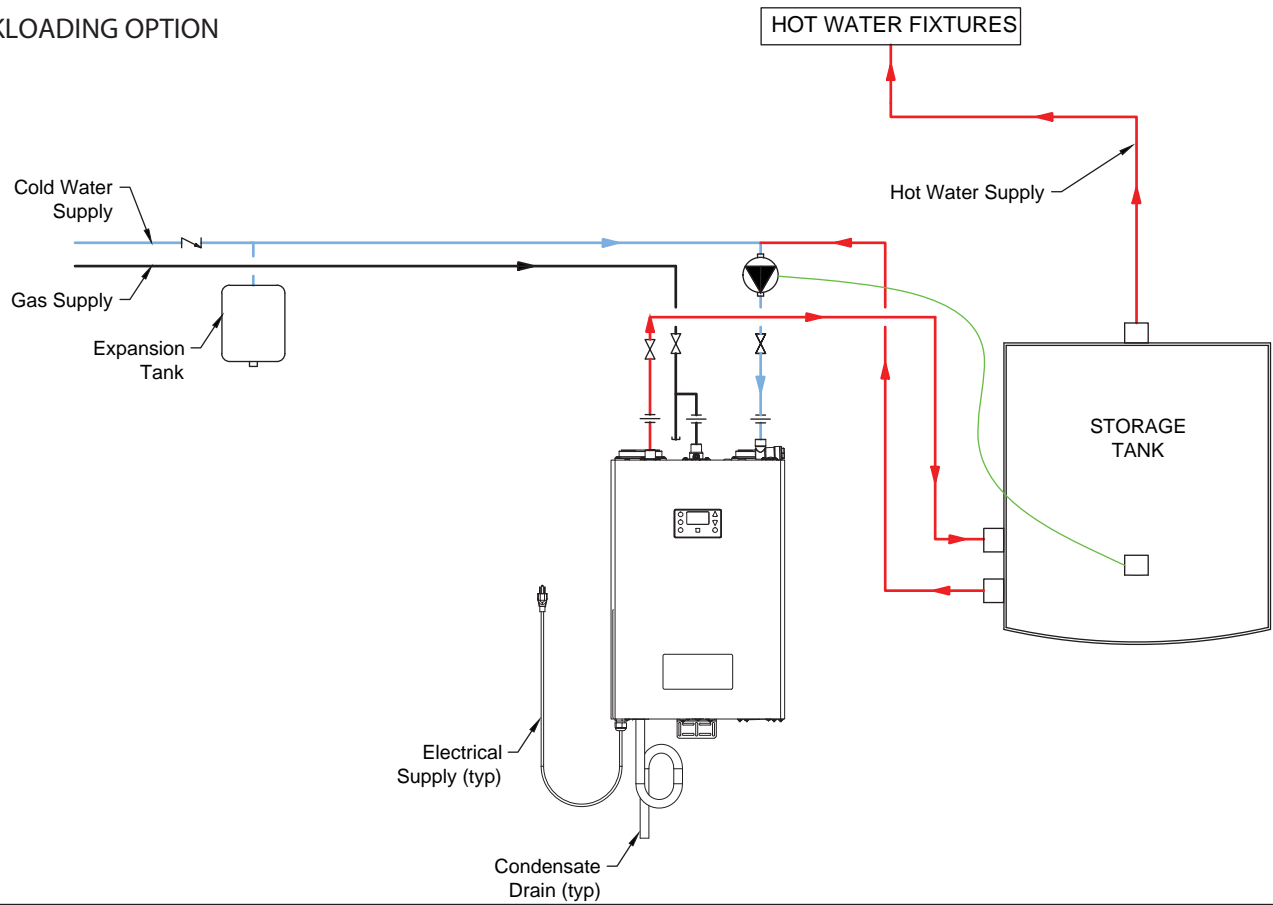
8.6 External Recirculation Options

The following illustrations provide possible external recirculation options.

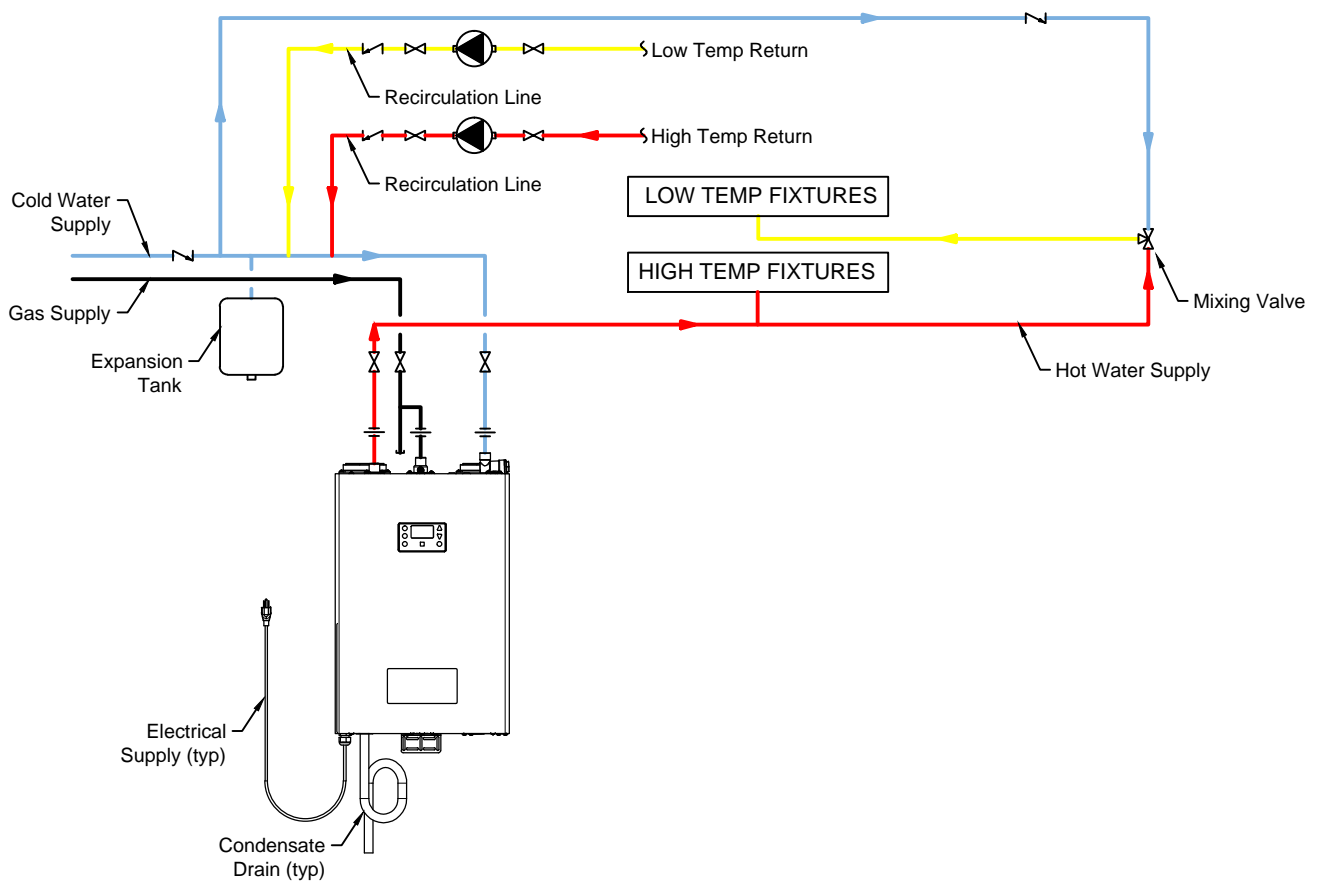




## TANKLOADING OPTION



## MIXING VALVE OPTION



## 9. Electrical

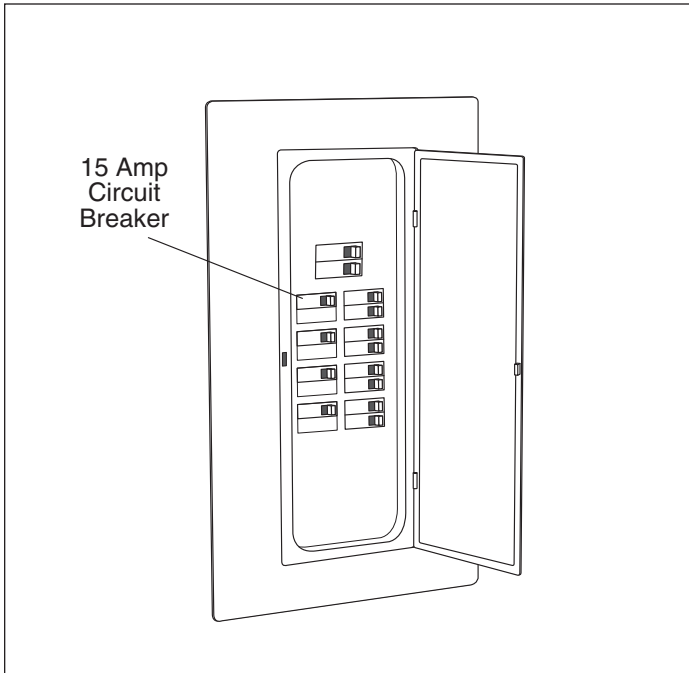
### **⚠ WARNING**

To avoid serious injury or even death, follow all applicable local, state, and national regulations, mandates, and building codes for guidelines to install the electrical power supply.

### 9.1 Electrical Code Requirements

Electrical code requirements are different in the USA and Canada. Refer to and follow the local building codes, the latest edition of the National Electrical Code (NFPA 70) in the USA, or the CGA C22.1 Canadian Electrical Code - Part 1.

The circuit breaker should be at least 15 amps.



Use 15 Amp Breakers For Single Units.

**Note:** For an electrical wiring schematic, refer to the Wiring Diagram section in this manual for additional information.

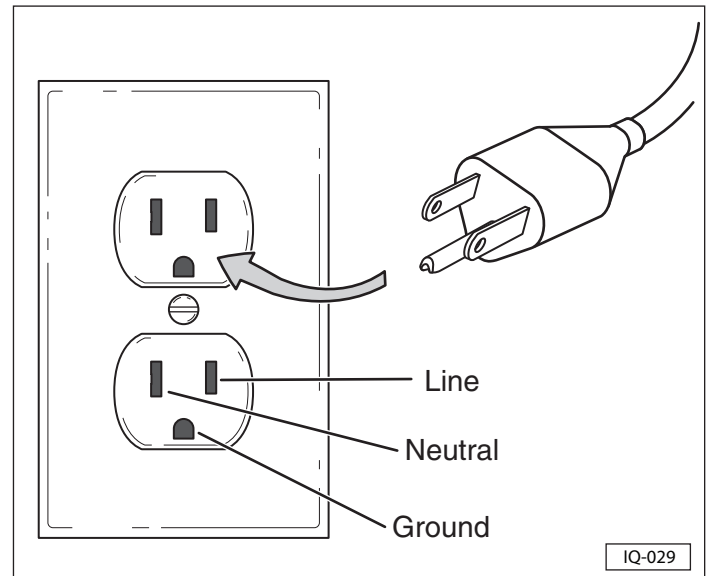
### 9.2 Electrical Connection and Polarity

### **NOTICE**

#### **POLARITY**

**The plug provided with the unit is polarity sensitive. Ensure that the line and neutral are at the correct locations in the wall socket. If the polarity is reversed, it will cause the unit to malfunction and turn off every 15 seconds.**

Make sure the electrical outlet being used is wired with at least 12 gauge wire and grounded. Only one water heater should be plugged into an outlet with the 12 gauge wire. It should also be connected to at least a 15 Amp circuit breaker. The electrical power required for the water heater is 120V AC at 60 Hz.



### **SAFETY INSTRUCTIONS**

**If desired, the water heater can be wired into the electrical system by removing the power cord and replacing it with electrical cable. If this method is used, a separate ON/OFF switch must be installed to remove power from the unit.**

## 10. Propane (LPG) Conversion

### SAFETY INSTRUCTIONS

A qualified service technician **MUST** make the required changes to convert the water heater from Natural Gas to LP Gas.

### 10.1 General Information

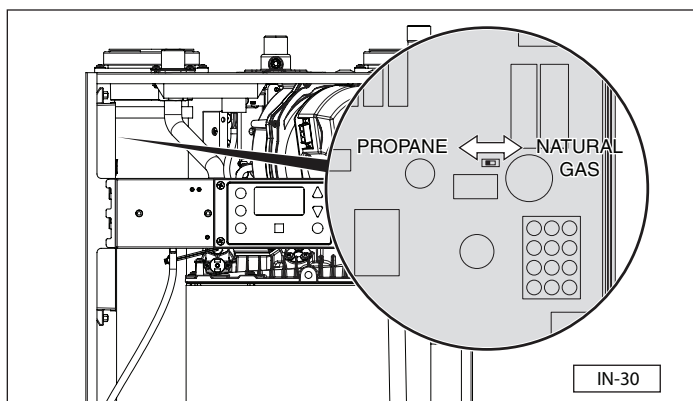
Before beginning the conversion, make sure the LP gas inlet pressure is between 8.0" and 13.0" W.C. Record the gas pressure here.

STATIC LP GAS PRESSURE \_\_\_\_\_ W.C.

DATE \_\_\_\_\_

### 10.2 Procedure

1. Make sure all hot water faucets are OFF. If required, press the control panel Power button to turn the water heater OFF. Disconnect the power.
2. Shut OFF the gas supply inlet valve closest to the unit, if connected.
3. Remove the front cover and locate the main circuit board.
4. Locate DIP Switch 1 and change it to the PROPANE position.



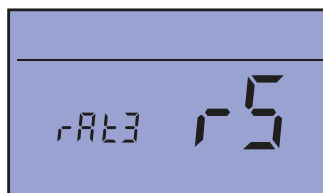
#### DIP Switch Settings (Réglages des commutateurs DIP)

SW1	ON  Propane	ON  Natural Gas (Gaz naturel)
-----	-------------	----------------------------------

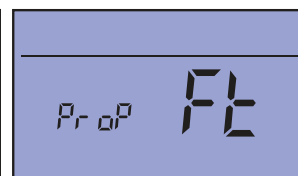
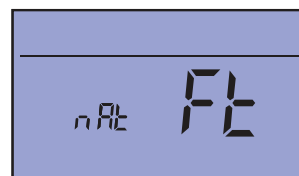
5. Reconnect the power and wait for main screen to appear.



6. Press and hold the Mode button until the rS screen appears on the display.



Press the Mode button multiple times until the Ft screen appears on the display. The current Fuel Type setting will appear. Either nAt or Prop will be displayed to indicate the position of the DIP switch.



7. Press and hold the Enter button to return to the main display.



8. Refer to Adjusting the CO<sub>2</sub> Level section in this manual for instructions on connecting a calibrated CO<sub>2</sub> analyzer to the gas valve.

## 11. Adjusting CO<sub>2</sub> Level

### 11.1 General Information

This procedure is required only during installation in a high altitude location or when changing the unit from natural gas to propane, or when experiencing combustion problems. This procedure should only be done by a qualified technician.

#### **DANGER**

A concentration of carbon monoxide as small as 0.04% (400 parts per million) in the air can be fatal. When making high fire and/or low fire adjustments, CO levels must be monitored using a flue gas analyzer so that the level of no more than 400 ppm of CO is exceeded at any time during the operation.

Adjusting the “low fire screw “ or the “high fire screw” in small increments can result in a significant increase in CO concentration. To avoid serious injury or death, **DO NOT** make any adjustments to the gas valve without monitoring the exhaust gases with a fully functional and calibrated flue gas analyzer.

CO <sub>2</sub> and CO Standards		
Description	CO <sub>2</sub> Range (%)	Max. CO Level (ppm)
Natural Gas		
High Fire	9.1% to 9.3%	< 200 ppm
Low Fire	9.1% to 9.3%	< 60 ppm
LP Gas		
High Fire	10.1% to 10.5%	< 200 ppm
Low Fire	10.1% to 10.5%	< 60 ppm

#### **NOTICE**

The values listed in the table are for nominal conditions. Variables such as gas pressure, heating value of the gas, and the humidity and temperature of combustion air can all impact CO and CO<sub>2</sub> values. Changes in these variables can result in different CO and CO<sub>2</sub> values on the same water heater.

A qualified service technician must use a calibrated CO<sub>2</sub> analyzer to adjust the gas valve to achieve the desired CO<sub>2</sub> and CO values.

It is recommended that before any adjustments are made, the gas pressure to the unit be as follows:

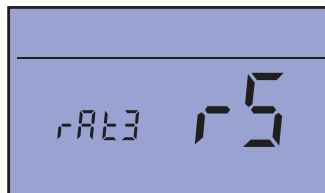
NG - 8" W.C.

LP - 11" W.C.

The service technician must confirm Static gas pressures before setting High Fire and Low Fire CO<sub>2</sub> and CO values.

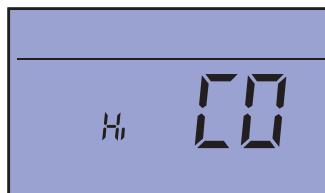
### 11.2 Procedure

1. Locate the gas valve.
2. Use a CO<sub>2</sub> analyzer to measure the exhaust vent gas at the bottom of the condensate trap.
3. Press and hold the Mode button for five seconds to access the r5 screen on the display.

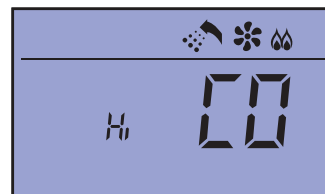


4. Press and release the Mode button multiple times until the CO screen appears on the display.

Hi will be displayed indicating the unit will fire at its highest firing rate when a hot water faucet is opened.



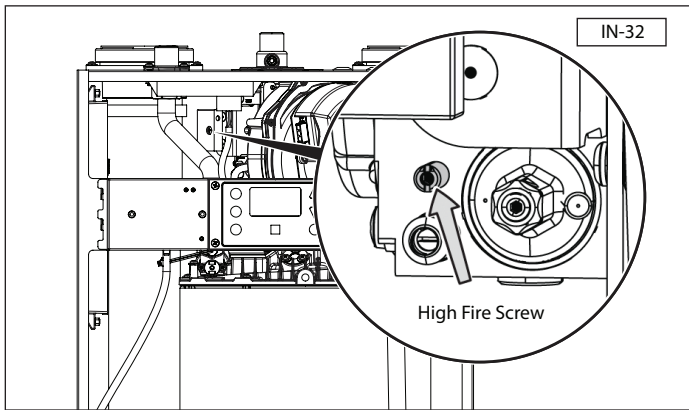
5. Open several hot water faucets to allow at least 5 gpm of water flow.
6. When the unit is operating at high firing – the shower, blower, and flame icons will be displayed.



7. Record values in table column 1, 'Hi'. If the CO<sub>2</sub> values are within the appropriate range, proceed to step 9, otherwise continue with Step 8.

- Use a flat blade screwdriver to adjust the gas valve high fire screw to achieve the desired CO<sub>2</sub> values.

**Note:** Turn clockwise to decrease CO<sub>2</sub> and counterclockwise to increase CO<sub>2</sub>. Make adjustments by making 1/4 turn increments. Wait three minutes for reading to stabilize and then record the combustion analyzer values for CO<sub>2</sub> and CO.



- Once the desired values are achieved, record the new HIGH FIRE CO<sub>2</sub> values in table column 2, 'Adjusted Hi'.

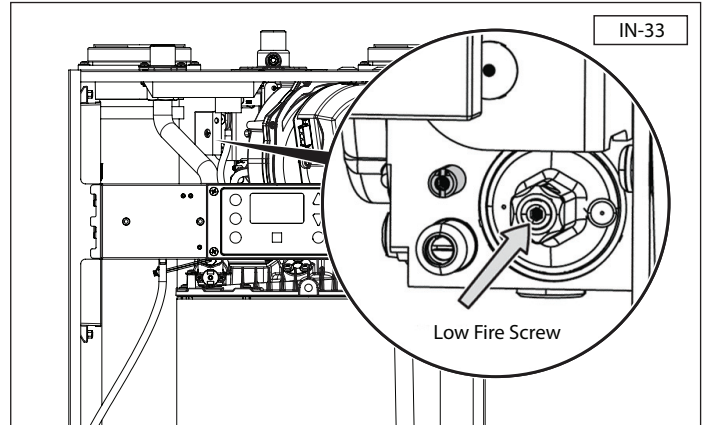
CO <sub>2</sub> and CO Recorded Values				
	Hi	Adjusted Hi	Lo	Adjusted Lo
CO <sub>2</sub> Value %				
Max CO ppm				
Date				

- Press the Down arrow key to let the unit fire at low fire.



- Record values in table column 3, 'Lo'. If the CO<sub>2</sub> values are within the appropriate range, proceed to Step 14, otherwise continue with Step 12.

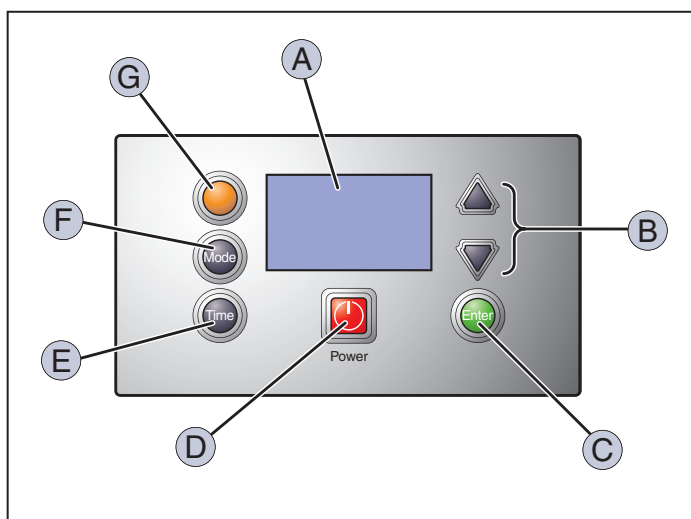
- Adjust the Low Fire screw while the burner operates at low fire using a 2 mm hex wrench. Turn clockwise to increase CO<sub>2</sub> and counterclockwise to decrease CO<sub>2</sub>.



- Once the desired values are achieved, record the LOW FIRE CO<sub>2</sub> values in table column 4, 'Adjusted Lo'.
- Remove the combustion analyzer.
- Turn off water flow
- Press and hold the **Enter** button to return to home screen to resume operation.

## 12. Operation

### 12.1 Control Panel



#### A) LCD screen

The LCD display screen shows all information about the operating functions of the water heater.

#### B) Arrow keys

Press the UP or DOWN arrows to adjust the value of the selected feature, such as time or water temperature.

#### C) Enter button

To return to the Main or Home screen.

#### D) Power button

When the water heater is initially connected to an electrical power supply, the unit will automatically turn ON and the display panel should light up. To turn the unit OFF, press and hold the Power button and the water heater will go through a shutdown process. The unit can then be turned ON again, once the blower finishes its purge cycle (10 seconds) by pressing the Power button.

#### E) Time button

Press this button to set the hours and minutes on the clock.

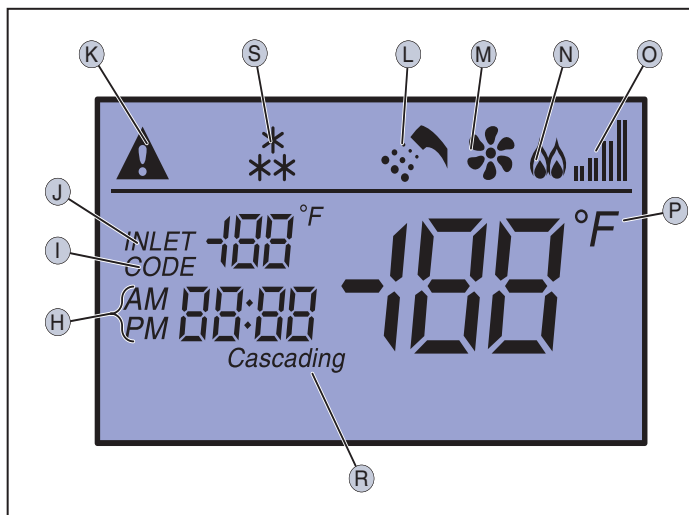
#### F) Mode button

Press this button to access various Modes of Operation.

#### G) Set button

Used to view real time flow and temperature readings.

### 12.2 Display Icons



H) Displays the current time in AM or PM.

#### I) CODE Display

Displays the CODE icon and the most recent digital error code.

#### J) INLET Display

Displays the INLET icon and the actual inlet water temperature in degrees Fahrenheit.

#### K) Error Icon

Indicates an error has been detected and a trouble code may be shown next to the CODE icon.

L) Indicates water flow (open faucet).

M) Indicates blower is ON.

N) Indicates burner is ON.

#### O) Gas Consumption Icon

Indicates the level of energy usage. There are four "bar" indicators and each represent 25% of gas usage.

P) Indicates outlet water temperature.

#### R) Cascading

The CASCADING icon will appear when multiple units are daisy chained and programmed.

#### S) Freeze Indicator Icon

Warns of freezing conditions within the water heater. The water heater is designed to turn ON to prevent freezing of the internal water pipes.

### 12.3 Turning Water Heater ON and OFF

1. To turn the water heater ON press the Power button. The home screen will automatically display when the unit is ready to use.
2. To turn the water heater OFF, press and hold the Power button for three seconds and the display screen will go blank.

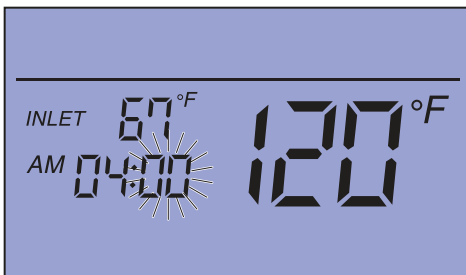
### 12.4 Resetting (Clear) Error Codes

1. To reset the water heater and clear all error codes, press and release Power button.

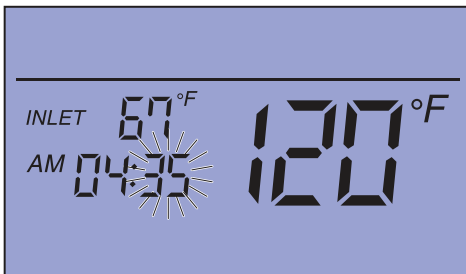
### 12.5 Setting the Time

1. Press and release the Time button.

The minute section of the time display will flash.

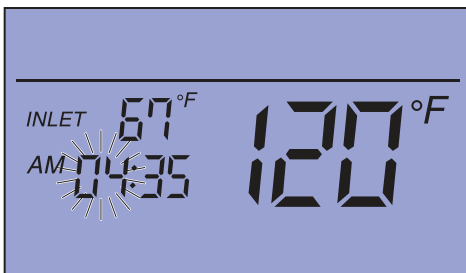


2. Press the Up/Down arrows to set the correct minute.

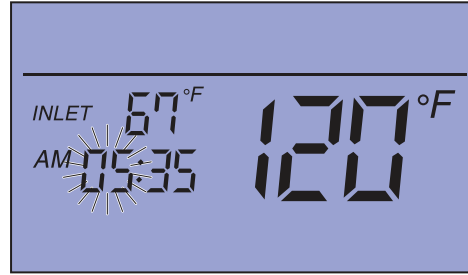


3. Press and release the Time button again.

The hour section of the time display will flash.

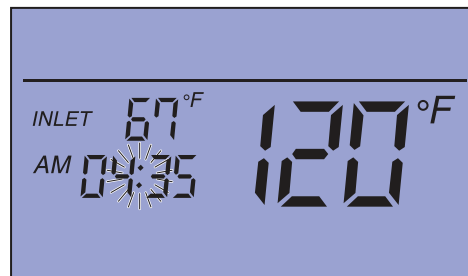


4. Press the Up/Down arrows to set the correct hour. When setting the hour, make sure you have correctly advanced the time to either the AM or PM hour setting.



5. Press and release the Time button again.

The colon (:) between the hours and minutes should now be flashing, indicating the time has been properly set.



### 12.6 Adjusting the Water Temperature

#### 12.6.1 General Information

These commercial water heaters are capable of heating water to 190°F.

**Note:** The outlet water temperature is factory preset to 120°F.

### ⚠ WARNING



Hot water temperature over 125°F (52°C) can cause severe burns instantly or death from scalding. Children, the disabled, and the elderly are at the highest risk of being scalded. Do not leave children or the infirm unsupervised. Check temperature of hot water before taking a shower or bath. To

control water temperature to a particular faucet, temperature limiting valves can be installed by your service professional.

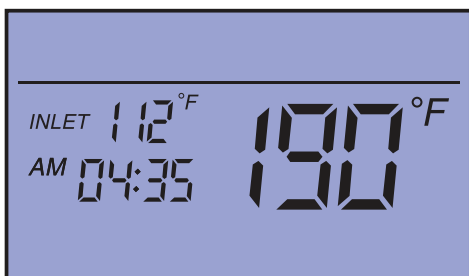
All water faucets must be closed before changing the temperature setting. The unit must not be operating (burner icon not on).

## 12.6.2 Adjustment Procedure

Press the Up/Down arrows to set the desired temperature range from 100 to 140°F in one degree increments.



For setting the temperature above 140°F, press and continue to hold the Set button while pressing the Up arrow. Continue pressing the Up button until the desired temperature range is reached.



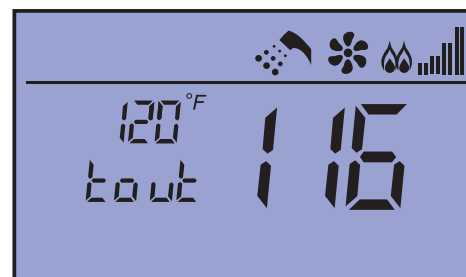
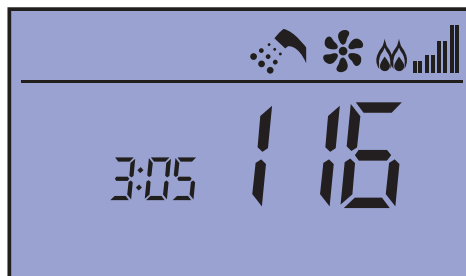
Once the desired temperature is selected, the unit will heat water up to that temperature.

When the Set button is released, the Home screen will appear.

## 12.7 Real Time Temperature and Flow of the System

Press and hold the Set button. On the left hand side the screen will toggle between Flow, then show the flow rate in gallons per minute, after which the words “Flue” along with the flue temperature will appear, followed by the word Tout (water outlet temperature). These three screens will continue to cycle as long as the set key is held down.

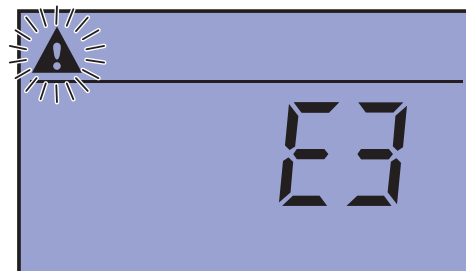
The flow screen Flow indicates gallons per minute (gpm). This screen alternates between Flow and the actual gallons per minute. The first two digits are gallons and the second two digits are a portion of one gallon. For example 3:05 is 3.05 gallons per minute.



Release the Set button to return to the home screen.

## 12.8 Error Screen

If an error occurs, the display will indicate an error code; E1, E3, E7, etc. The flashing triangle will also appear in the upper left corner of the display to indicate a potential problem with the unit.



Refer to the Troubleshooting section for additional information on the resolution of error codes.



## 13. Programming

### 13.1 Modes of Operation

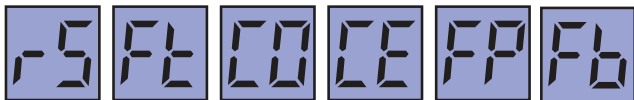
The Modes of Operation screens provide set up screens and additional information on the water heater. There are five Mode of Operation screens which are used by the technician during installation or maintenance of the water heater.

#### 13.1.1 Standard Modes



1. Press and release the Mode button until the desired screen shows on the display.  
dC - Daisy Chain  
FC - Flow Control  
PH - Performance History  
dE - Diagnostic Error
2. Follow the instructions in the specific section to enter the desired settings.

#### 13.1.2 Advanced Modes



1. Press and hold the Mode button for five seconds until the rS screen appears. Now press and release the Mode button multiple times until the desired screen shows on the display.  
rS - Burner Rate Ramp Setting  
Ft - Fuel Type  
CO - Adjust CO<sub>2</sub> Level  
CE - Common Exhaust  
FP - Flue Pipe Type  
Fb - Flow Boost
2. Follow the instructions in the specific section to enter the desired settings.

### 13.2 Viewing and Setting Modes of Operation

#### 13.2.1 Daisy Chain



##### Set DIP Switches

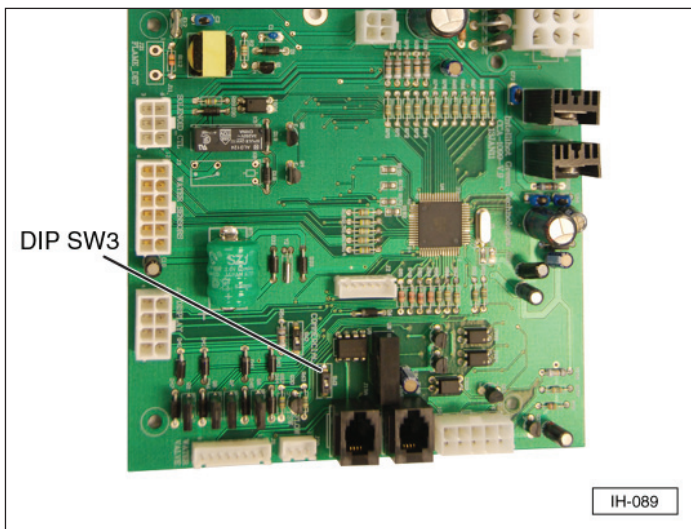
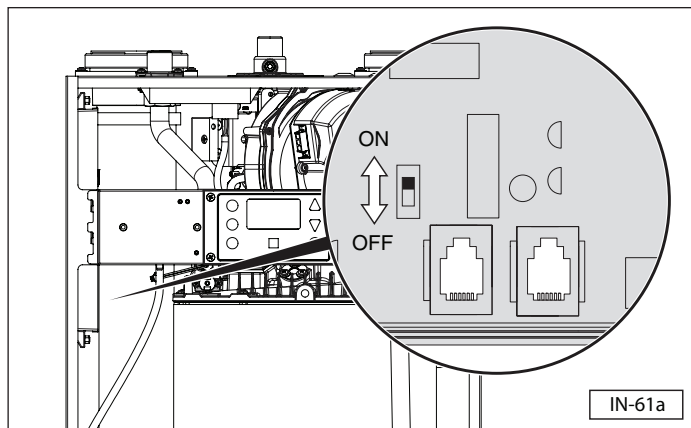
1. Disconnect the power from all the units in the system.

### ⚠ WARNING

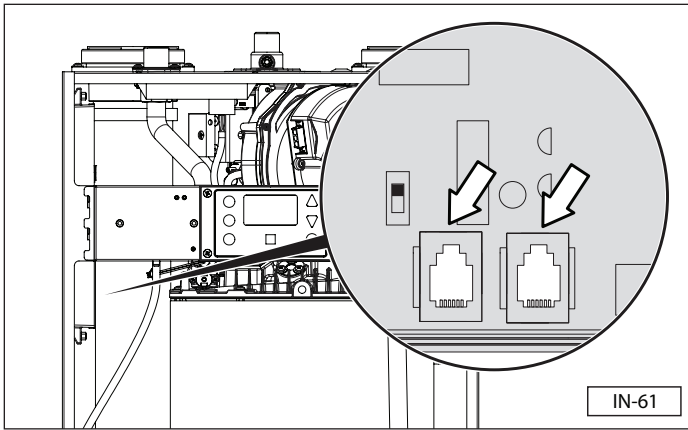
#### SHOCK HAZARD

**Before making any adjustments or connections inside the water heater cabinet, make sure the power is disconnected. Unplug the water and/or turn the circuit breaker OFF.**

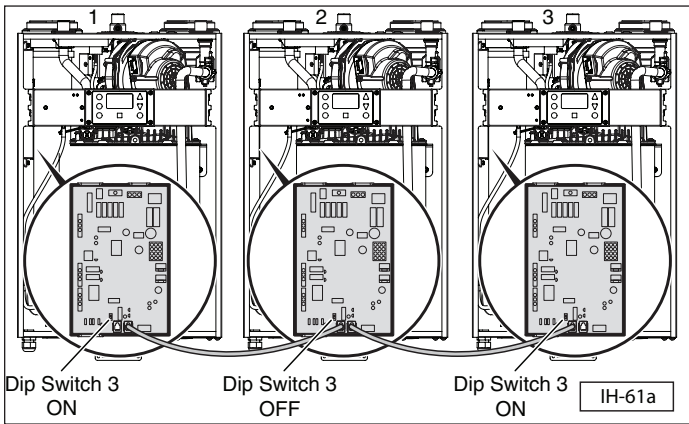
2. Remove the front covers and locate the main circuit boards on the first and last units.
3. Locate DIP Switch 3 on the first and last units and position the switch in the ON position. On all the middle units, position the switch in the OFF position.



- Using the supplied cables, connect one end of a cable into either of two jack receptacles (arrows) located on the circuit board and the other end to the jack in the next unit.



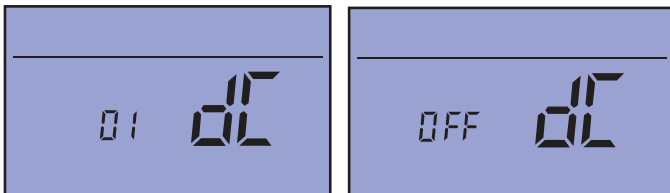
- Pass the cable through the grommet located at the bottom of the cabinet.
- Secure the cable using a zip tie.



- Replace the front covers.

### Set Up Unit Number

- Reconnect the power and wait for the home screen to appear.
- Press and release the Mode button until the dC screen appears. The designated number for the unit will be displayed. The default is 01.



- Now, press the Up/Down arrows to select the desired number for the particular water heater. Change the selection from 01 to one of the ten possible selections (01, 02, 03, though 10). The up/down arrows scroll from 1 through 10.
- Once the desired number is selected, press and hold the Enter button for three seconds to save this setting and return to the main display screen.
- Repeat the above steps and set each unit to a different number. For example, the next unit would be 02, the third unit would be 03, and so on.

### 13.2.2 Flow Control Selection



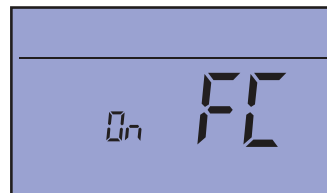
Press the Mode button multiple times until the FC screen appears on the display.

The current setting will be shown on the display.



The water control valve is set to ON for temperature priority and OFF for maximum flow.

Press the Up/Down arrows to select either ON or OFF.



Press and hold the Enter button for three seconds to save the settings and return to the home screen.

**Note:** If the Enter button is not pressed within 30 seconds of inactivity, the display will return to the home screen.

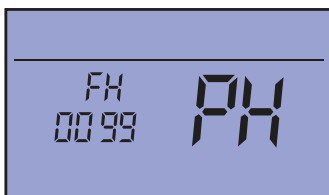
### 13.2.3 Performance History



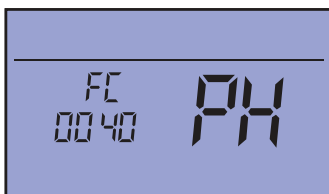
The Performance History mode allows the technician to view ignition cycles, number of ON times, and cumulative water flow. The displayed results are for all the water heater modules combined within the unit.

Press the Mode button multiple times until the PH screen appears.

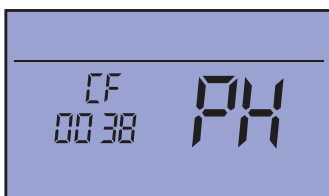
The Flow-On Hours FH, Firing Counts FC, and Cumulative Flow CF, will now begin to display for 1.5 seconds each. The display will continue to cycle for 30 seconds and then return to the home screen. Some examples are shown below.



Diagnostic Code FH (Flow-on hours) shows one hour of flame. (To obtain the total hours, multiply the number by 10).



Diagnostic Code FC (Firing Count) shows a flame count of 40,000. (To obtain the total number, multiply the number by 1,000).



Diagnostic Code CF (Cumulative Flow) shows 38,000 gallons of water. (To obtain the usage in gallons, multiply the number by 1,000).

Press and hold the Enter button for three seconds to return to the home screen.

**Note:** If the Enter button is not pressed within 30 seconds of inactivity, the display will return to the home screen.

### 13.2.4 Diagnostic Code and Error Log Selection



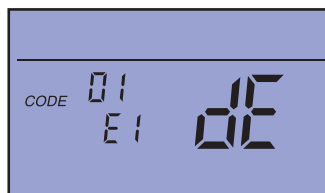
This screen provides the technician with Diagnostic Codes and Errors recorded as the water heater operates. These codes are used in conjunction with the Performance History Codes.

Error Code	Description of Error Code
E1	Blower Speed Fault
E3	Blocked Flue Fault
E7	Ignition Failure
E9	Temperature Sensor Shorted
EA	Temperature Sensor Open Circuit
EC	Flue Temperature Exceeded Set Limit
Ed	Heat Exchanger Outlet Temperature Exceeded Set Limit
Flashing Warning Icon	Error Code and Unit Locked Out
Flashing Cascading Icon	Loss of Communication Between Units

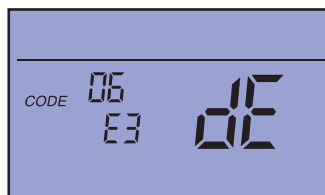
\* If Eb is displayed, please call the factory for service instructions.

Press and release the Mode button multiple times until the dE screen appears.

The 01:E1 screen is the most recent code, while the 10:E3 is the last viewable screen. Refer the examples below for further clarification.



Example of latest diagnostic code Fan Speed Error Code E1.



Example of the last viewable code Blocked Flue Fault Code E3.

Press and hold the Enter button for three seconds to return to the home screen.

**Note:** If the Enter button is not pressed within 30 seconds of inactivity, the display will return to the home screen.

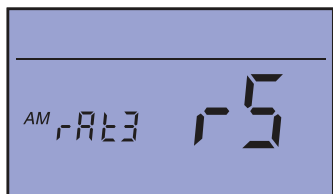
### 13.2.5 Blower Ramp Selection



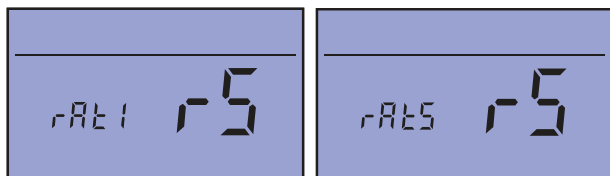
When exhaust harmonics are observed, i.e. resonance at low fire, adjust the water heater using the blower ramp setting (default is **rat3**). Increase the rate number until the resonance is no longer observed.

The Blower Ramp Selection has five different settings (**rat1** - **rat5**):

Press and hold the Mode button for five seconds to access the **r5** screen on the display. The current setting will be displayed.



Press the Up/Down arrows to select the Blower Ramp Selection from five different settings (**rat1** - **rat5**). Select a ramp rate at which the harmonics disappears during operation.



Press and hold the Enter button for three seconds to save the settings and return to the home screen.

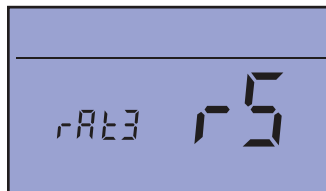
**Note:** If the Enter button is not pressed within 30 seconds of inactivity, the display will return to the home screen.

### 13.2.6 Fuel Type Verification

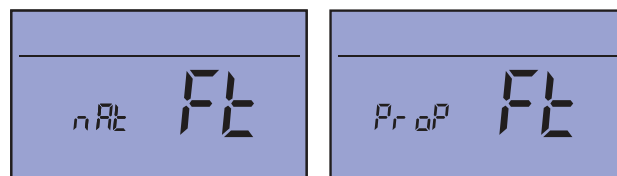


The Fuel Type mode screen shows the selected fuel type; natural gas (factory preset) or Propane. Operation with natural gas is factory preset. Refer to the Propane (LPG) Conversion section in this manual for additional set up information.

Press and hold the Mode button for five seconds to access the **r5** screen on the display.



Press and release the Mode button until the **Ft** screen appears on the display. The current Fuel Type setting will appear (**nAt** or **PrOP**) to indicate the position of DIP switch 3 on the circuit boards. Fuel type cannot be changed from the screen.



To change fuel type from factory set natural gas to propane, follow the Propane Conversion procedure in this manual.

Press and hold the Enter button for three seconds to return to the home screen.

**Note:** If the Enter button is not pressed within 30 seconds of inactivity, the display will return to the home screen.


### 13.2.7 Adjusting CO<sub>2</sub> Levels Selection



Refer to the Adjusting the CO<sub>2</sub> Level section in this manual.

### 13.2.8 Common Exhaust Venting



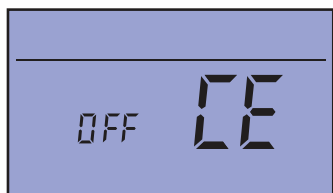
Changing this setting can only be done when the Flame ON  icon is not displayed.

This mode is applicable when multiple units are connected together. Turning the CE mode ON allows multiple units to be vented into a common vent. Refer to the Venting for Commercial Application section for information on common venting guidelines.

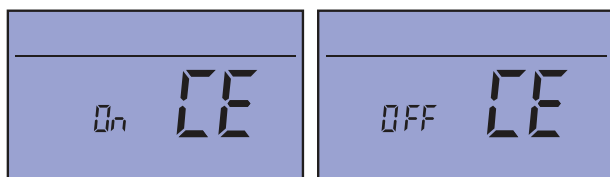
Press and hold the Mode button until the rS screen appears.

Press and release the Mode button multiple times until the CE screen appears. The current setting will be displayed.

The default setting for this mode in ON.



Press the Up/Down arrows to select either ON or OFF.



Press the Enter button to save the changes and return to the main display.

**Note:** If the Enter button is not pressed within 30 seconds of inactivity, the display will return to the home screen.

### 13.2.9 Flow Boost Mode



This mode may be used to increase the overall system recirculation flow by enabling all the water valves in a multiple units (or multiple heat exchangers) installation to be open.

Press and hold the Mode button until the rS screen appears.

Press and release the Mode button multiple times until the Fb screen appears.


The current setting will be display. The default setting for this mode is OFF.

Press the up/down arrows to select either ON or OFF.

Press and hold the Enter button for three seconds to save the setting and return to the home screen.

### 13.2.10 Flue Pipe Selection (PVC or CPVC)



Changing this setting can only be done when the Flame ON  icon is not displayed.

#### **WARNING**

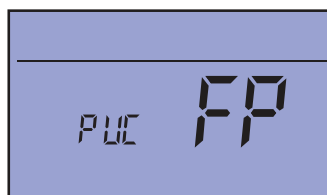


**When the unit is set for CPVC or polypropylene pipe, flue temperatures can reach 190°F. PVC pipe will lose integrity at temperatures above 149°F. Make sure FP setting and the type of material being used for the flue are compatible.**

Press and hold the Mode button until the rS screen appears.

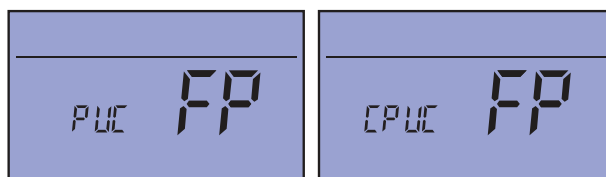
Press the Mode button multiple times until the FP screen appears. The current setting will be displayed.

The default setting for this mode is PVC.



Press the Up/Down arrows to select the desired setting of either PVC or CPVC.

**Note:** The flue temperature for PVC material must not exceed 149°F. The flue temperature for CPVC or Polypropylene material must not exceed 190°F.



Press the Enter button to save the changes and return to the main screen.

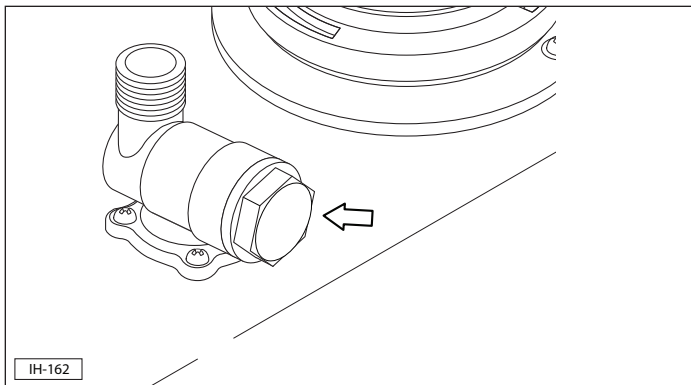
**Note:** If the Enter button is not pressed within 30 seconds of inactivity, the display will return to the home screen.

## 14. Maintenance

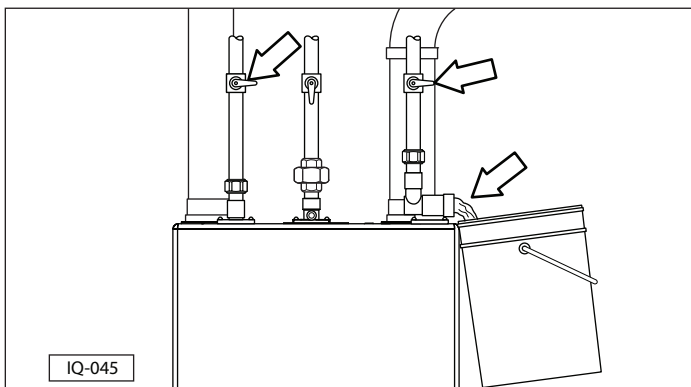
### 14.1 Cleaning the Inlet Water Strainer

All the water heaters are equipped with a sediment strainer on the inlet water connection.

Initially, this strainer should be inspected and cleaned every three months to establish a cleaning schedule.

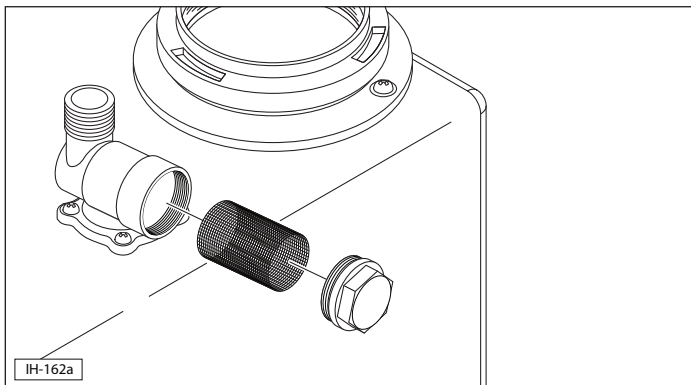


1. Turn off power and gas.
2. Position a container under the strainer on the water inlet piping.
3. Close the water inlet and outlet valve (arrow) and remove the cover plug. Allow the water to drain from the pipe.



**Note:** If a water shut-off valve was not installed, shut off the main water supply valve at the water heater.

4. Remove the strainer screen, clean it, and reinstall it in the housing.



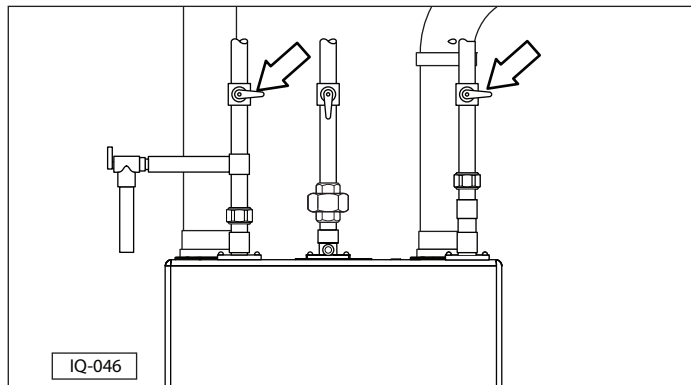
5. Replace the strainer cover plug.

### 14.2 Draining the Water Heater

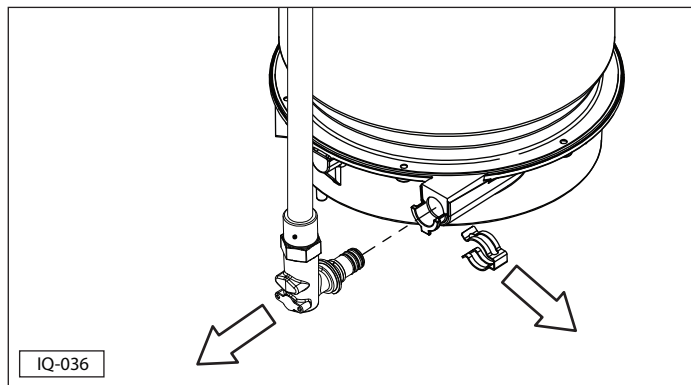
#### **CAUTION**

**Hot water can cause burns to the skin. The water temperature is factory set to 120°F (49°C). To avoid burns, make sure the water heater is OFF and the power supply is disconnected. The water heater will remain hot for some time. Wait until the unit has completely cooled before draining the water heater or performing any other maintenance.**

1. Press the Power button to turn OFF the water heater. Disconnect the power.
2. Close the water supply inlet and outlet valves. The valve is closed typically when the handle is perpendicular to the pipe, as shown in the illustration.



3. Remove the front panel. Position a bucket or other container under the heat exchanger inlet.
4. Remove the clip holding the line into the heat exchanger. Allow the water to drain from the heat exchanger.








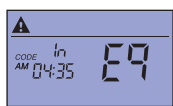


5. When all the water has drained from the water heater, replace the line and the clip.

### **14.3 Filling the Water Heater**


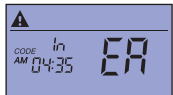

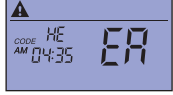



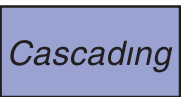
1. Open the water outlet supply valve. Slowly open the water inlet supply valve.
2. Open the hot water faucet that is located farthest away from the water heater. Once a steady stream of water flows and all the air is purged from the system, close the hot water faucet.
3. Connect the unit to the power supply.
4. Open a hot water faucet. The water heater should operate normally.

## 15. Troubleshooting

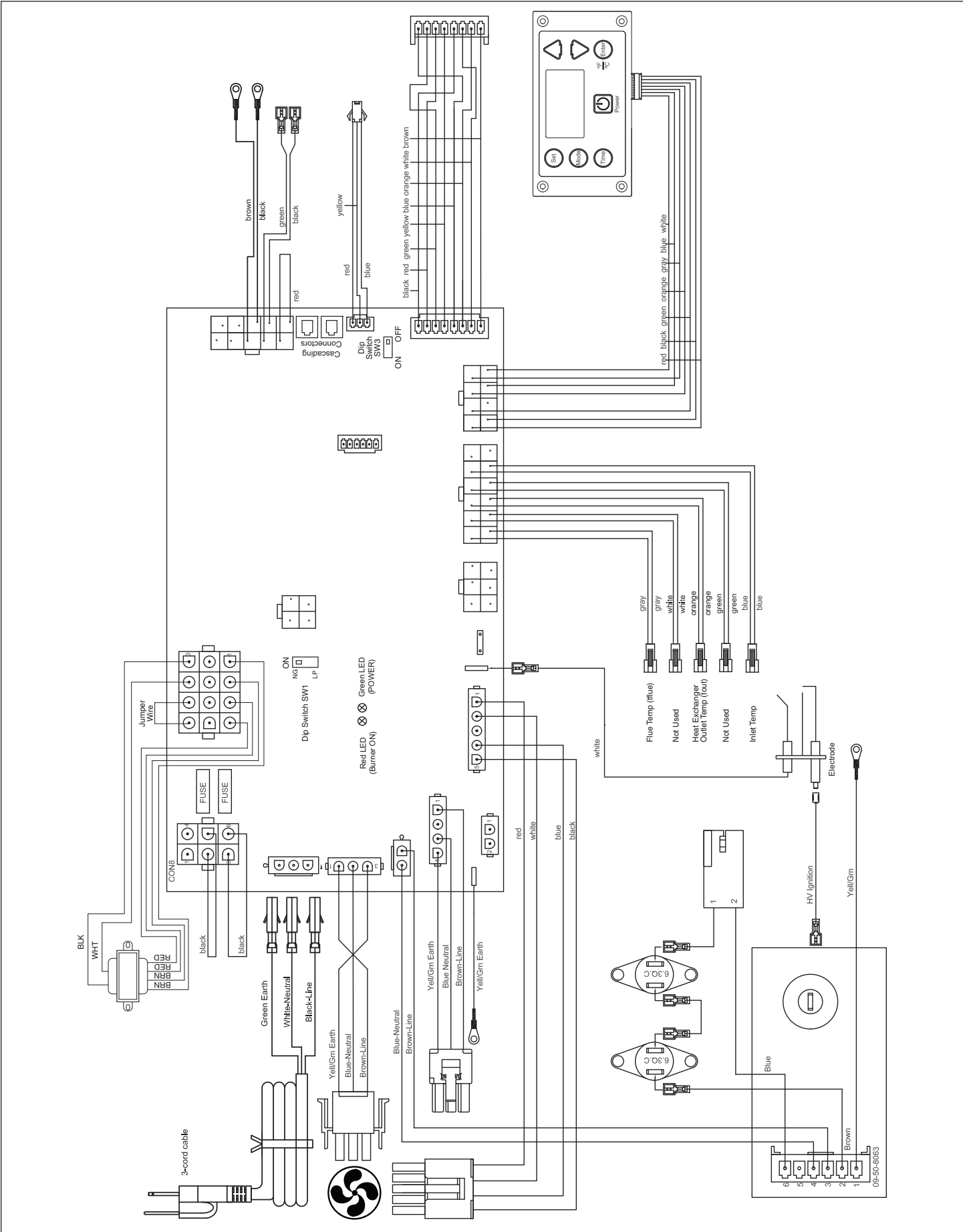
### 15.1 Error Code Chart

ERROR CODE	DESCRIPTION	POSSIBLE CAUSE	REMEDY
	Blower Speed Fault	<ul style="list-style-type: none"> <li>• Blower noisy / impeller jammed.</li> <li>• Disconnected signal wire.</li> <li>• Wiring faulty.</li> </ul>	<ul style="list-style-type: none"> <li>• Inspect blower / impeller. Clean and remove any obstructions.</li> <li>• Check PWN signal. Check for loose wires / pins, and repair.</li> <li>• Check PWN signal. Check for loose wires / pins, and repair.</li> </ul> <p>If the problem persists, turn control panel OFF, shut gas valve, unplug unit, and contact an authorized service technician.</p>
	Blocked Flue Fault	<ul style="list-style-type: none"> <li>• Exhaust blocked (bird, etc).</li> <li>• Backed up condensate.</li> <li>• Wiring loose (switch open).</li> </ul>	<ul style="list-style-type: none"> <li>• Check exhaust termination. Check exhaust connection at water heater. Install screens.</li> <li>• Check slope of drain. Check for double loops, air locks, or debris in loop.</li> <li>• Check wiring.</li> </ul>
	Ignition Failure	<ul style="list-style-type: none"> <li>• Water over-heat switch tripped.</li> <li>• Faulty DSI, faulty igniter wire, faulty ignition connection, faulty PCB, bad igniter.</li> <li>• Low gas pressure.</li> </ul>	<ul style="list-style-type: none"> <li>• Check pump, check cross over solenoid. Electrical noise (dsi).</li> <li>• Replace part.</li> <li>• Adjust gas pressure at regulator, check / upsize gas line, check for gas line blockage.</li> <li>• If the problem persists, turn control panel OFF, shut gas valve, unplug unit, and contact an authorized service technician.</li> </ul>
	Water Valve Fault	<ul style="list-style-type: none"> <li>• Faulty Water Valve Wiring</li> <li>• Water valve clogged or damaged</li> </ul>	<ul style="list-style-type: none"> <li>• Check for nicked or broken wiring or connectors. Also check for corroded or wet connectors.</li> <li>• Check and clean the water valve</li> <li>• Check and clean the external Wye strainer</li> <li>• Replace the Water valve</li> </ul>
	Temperature Sensor Shorted   	<ul style="list-style-type: none"> <li>• Faulty sensor wiring</li> <li>• Faulty sensor</li> <li>• HE - heat exchanger water outlet temperature sensor.</li> <li>• FL - Flue temperature sensor.</li> <li>• IN - inlet water temperature sensor.</li> <li>• Faulty controller</li> </ul>	<ul style="list-style-type: none"> <li>• Check for nicked or broken sensor wiring or connectors. Also check for corroded or wet connectors.</li> <li>• Measure resistance of sensor at connector (18 Kohm at 50°F, 10 Kohm at 77°F, 3 Kohm at 140°F)</li> <li>• Replace controller</li> </ul>

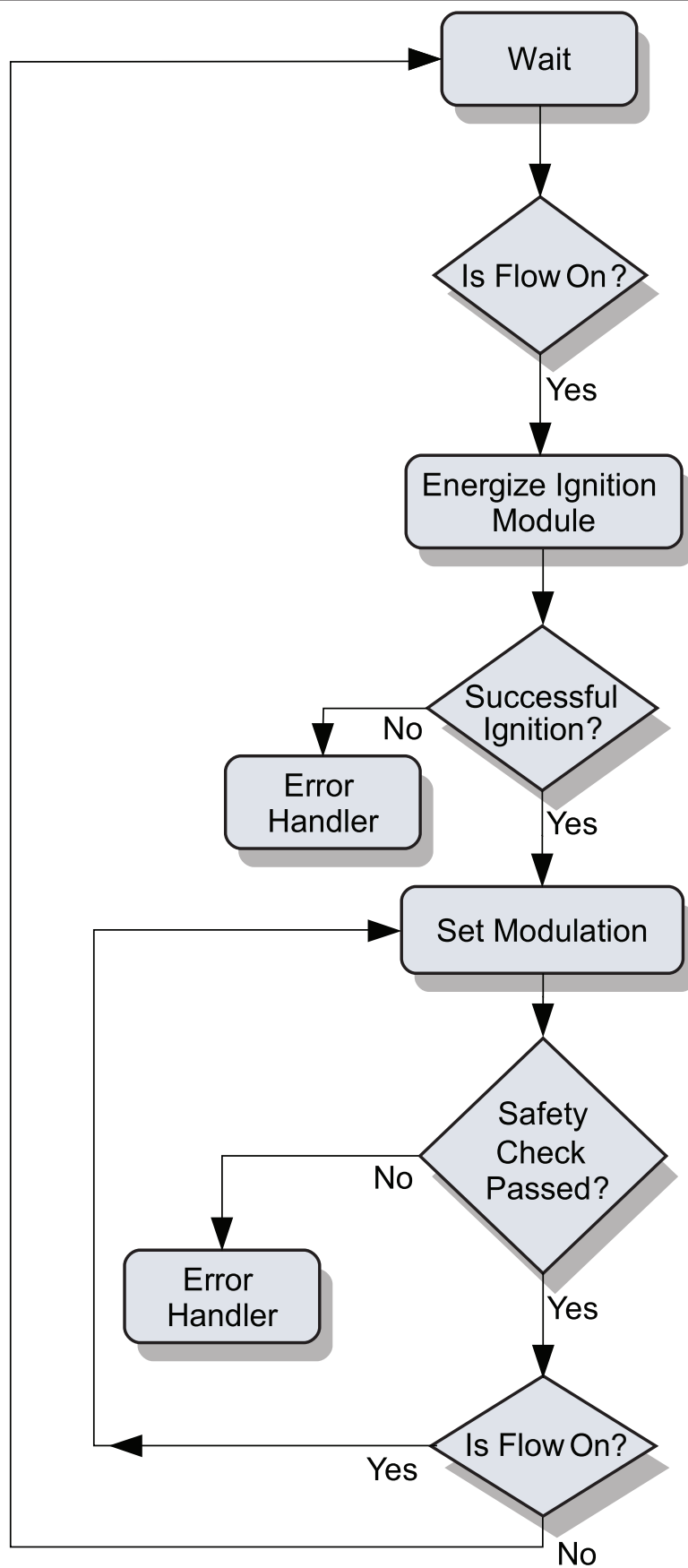


ERROR CODE	DESCRIPTION	POSSIBLE CAUSE	REMEDY
	Temperature Sensor Open Circuit   	<ul style="list-style-type: none"> <li>• Unplugged connectors</li> <li>• Faulty sensor wiring</li> <li>• Faulty sensor</li> <li>• HE - heat exchanger water outlet temperature sensor.</li> <li>• FL - Flue temperature sensor.</li> <li>• IN - inlet water temperature sensor.</li> <li>• Faulty Controller</li> </ul>	<ul style="list-style-type: none"> <li>• Check connectors and ensure they are securely connected</li> <li>• Check for nicked or broken sensor wiring or connectors. Also check for corroded or wet connectors</li> <li>• Measure resistance of sensor at connector (18 Kohm at 50°F, 10 Kohm at 77°F, 3 Kohm at 140°F)</li> <li>• Replace controller</li> </ul>
	Flue Temperature Exceeded Set Limit	<ul style="list-style-type: none"> <li>• Incorrect vent set up</li> <li>• High inlet temperature</li> <li>• Faulty sensor wiring</li> <li>• Faulty sensor</li> <li>• Faulty Controller</li> </ul>	<ul style="list-style-type: none"> <li>• If vent pipe material is CPVC or Polypropylene, ensure that CPVC is selected in the FP (Flue Pipe) mode.</li> <li>• Ensure inlet temperature is lower than 150°F if vent pipe material is PVC or lower than 190°F if vent pipe material is CPVC or Polypropylene.</li> <li>• Check for nicked or broken sensor wiring &amp; connectors. Also check for corroded or wet connectors</li> <li>• Measure resistance of sensor at connector (18 Kohm at 50°F, 10 Kohm at 77°F, 3 Kohm at 140°F)</li> <li>• Replace controller</li> </ul>
	Heat Exchanger Outlet Temperature Exceeded Set Limit	<ul style="list-style-type: none"> <li>• Flow rate changes excessive</li> <li>• Faulty sensor wiring</li> <li>• Faulty sensor</li> <li>• Faulty Controller</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure the water flow rate does not change faster than 2 GPM every 5 seconds</li> <li>• Check for nicked or broken sensor wiring or connectors. Also check for corroded or wet connectors</li> <li>• Measure resistance of sensor at connector (18 Kohm at 50°F, 10 Kohm at 77°F, 3 Kohm at 140°F)</li> <li>• Replace controller</li> </ul>
	Flashing Icon	<ul style="list-style-type: none"> <li>• Indicates an error code and unit locked out</li> </ul>	<ul style="list-style-type: none"> <li>• Refer to the indicated error code (E1, E2, etc) for resolution</li> </ul>
	Flashing Cascade Icon	<ul style="list-style-type: none"> <li>• Loss of communication between units</li> </ul>	<ul style="list-style-type: none"> <li>• Check for broken or nicked communication cable or loose connector</li> <li>• Ensure that the communication cable is not bundled or tied to any high voltage lines</li> <li>• Ensure dip switch (SW3) is ON in first and last units and OFF in all other units</li> <li>• Ensure each unit numbering is unique under the dC mode</li> </ul>

15.2 Wiring Diagram Chart



### 15.3 Operational Diagram

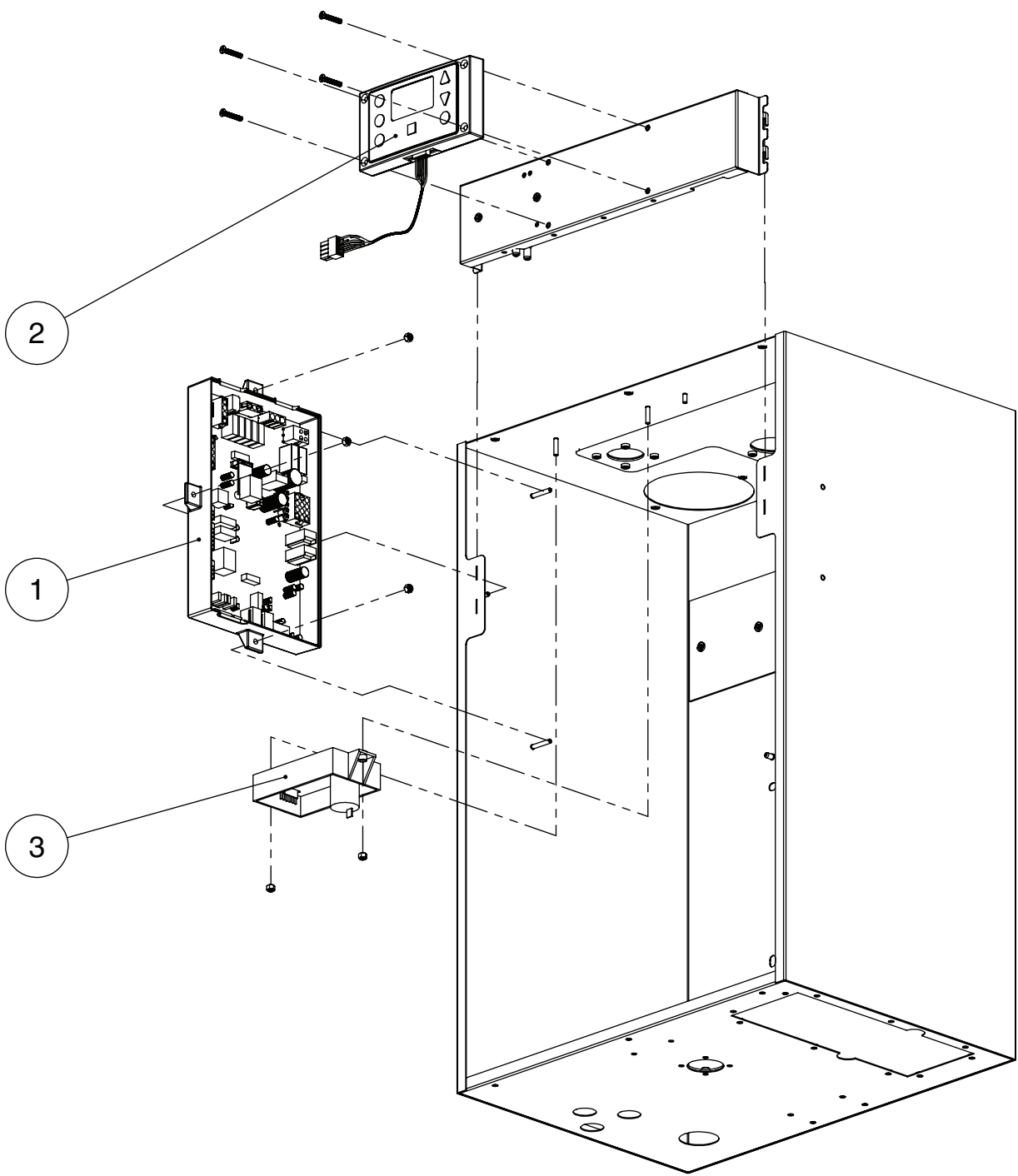


IQ-35

# 16. Serviceable Parts

## 16.1 Electrical Components

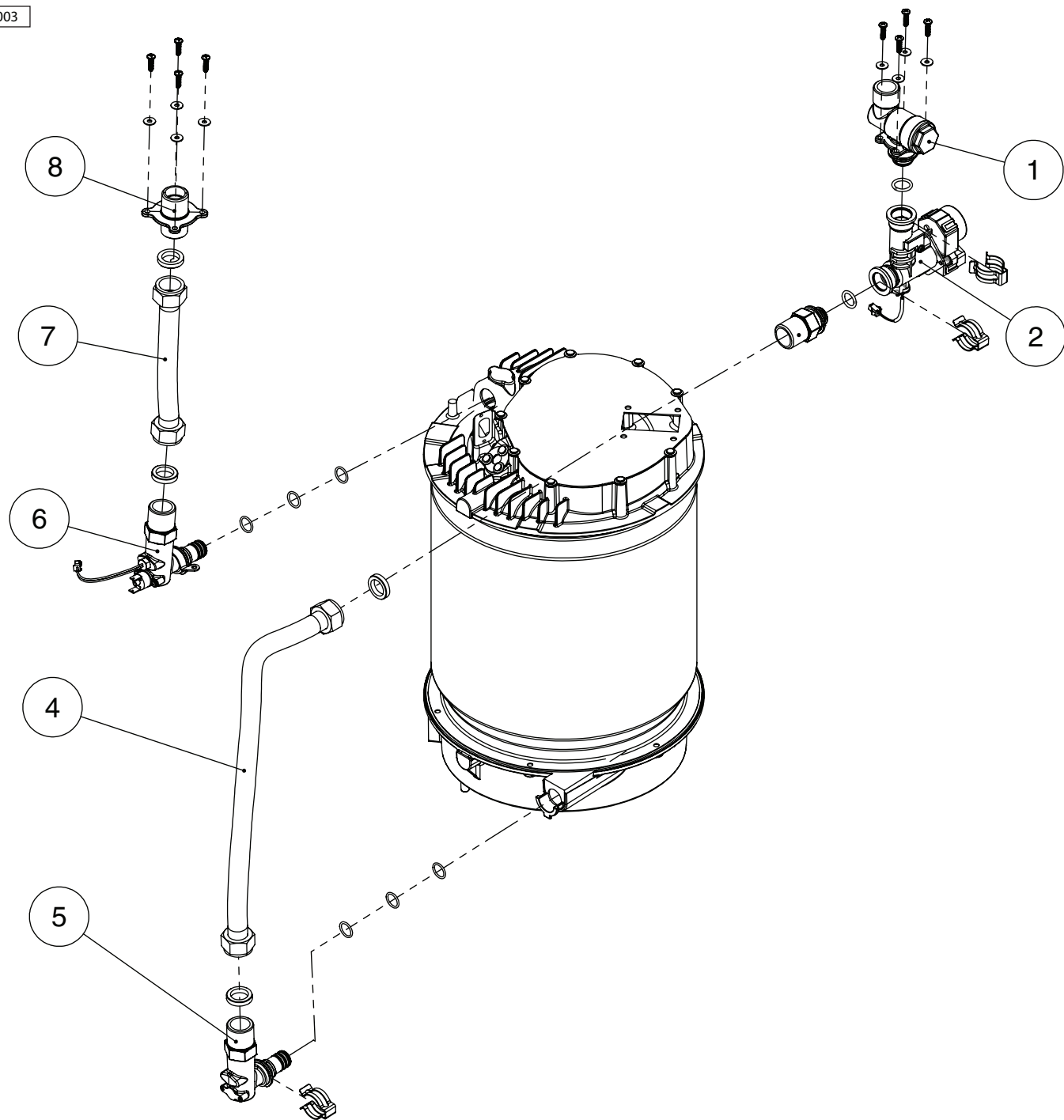
IQ-002



ITEM NO.	PART NUMBER	DESCRIPTION
1	IGT-SPR0002	CONTROLLER
2	IGT-SPR0004	DISPLAY
3	IGT-SPR0005	IGNITER MODULE

16.2 Water Lines and Fittings

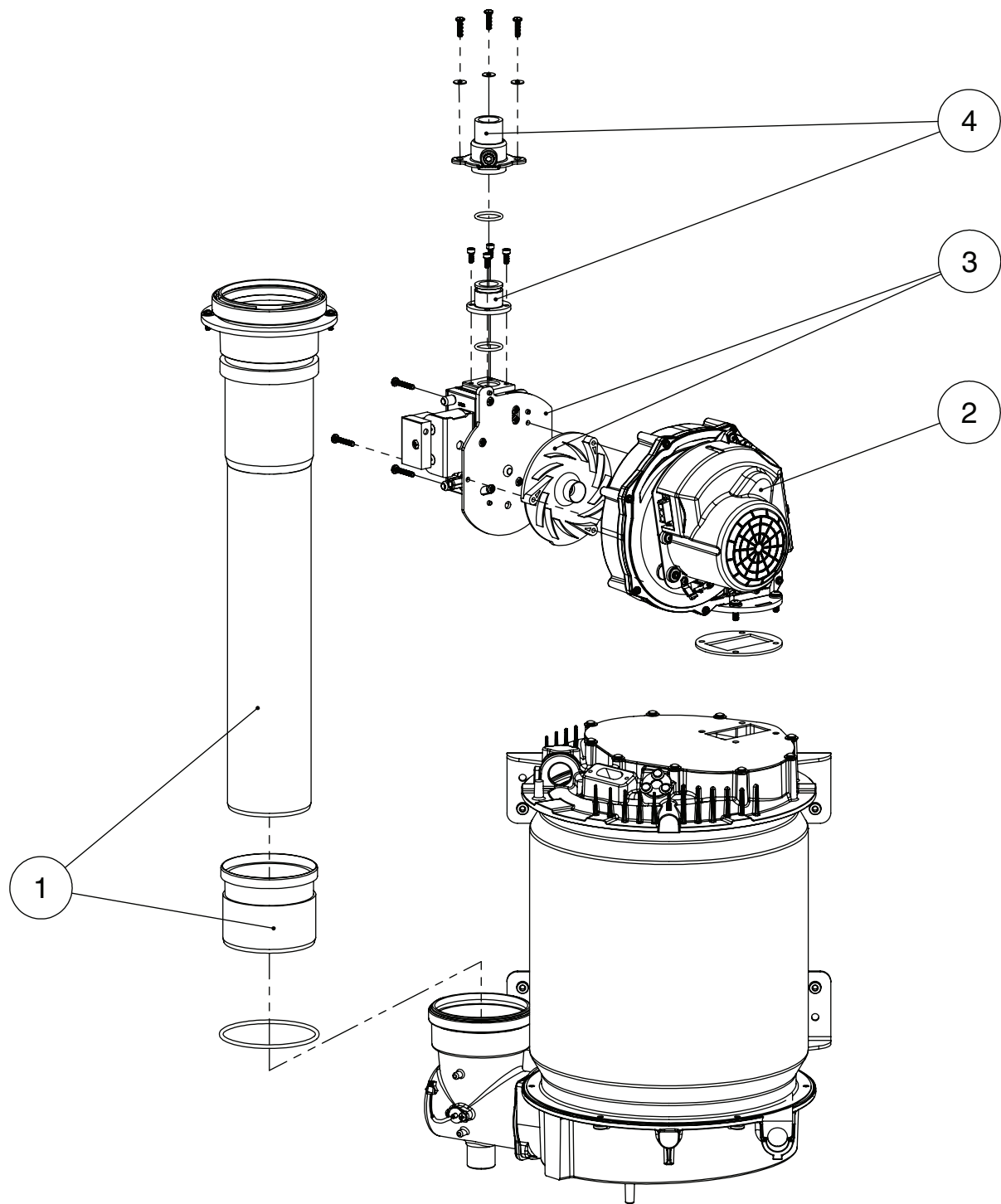
IQ-003



ITEM NO.	PART NUMBER	DESCRIPTION
1	IGT-SPR0018	WATER INLET FITTING (3/4" NPT)
2	IGT-SPR0003	FLOW SENSOR ASSEMBLY
3	NOT USED	NOT USED
4	IGT-SPR0009	HEAT EXCHANGER INLET LINE (SS)
5	IGT-SPR0010	HEAT EXCHANGER INLET FITTING
6	IGT-SPR0012	HEAT EXCHANGER OUTLET FITTING
7	IGT-SPR0013	HEAT EXCHANGER OUTLET LINE (SS)
8	IGT-SPR0014	WATER OUTLET FITTING (3/4" NPT)

16.3 Blower, Gas Valve, and Exhaust

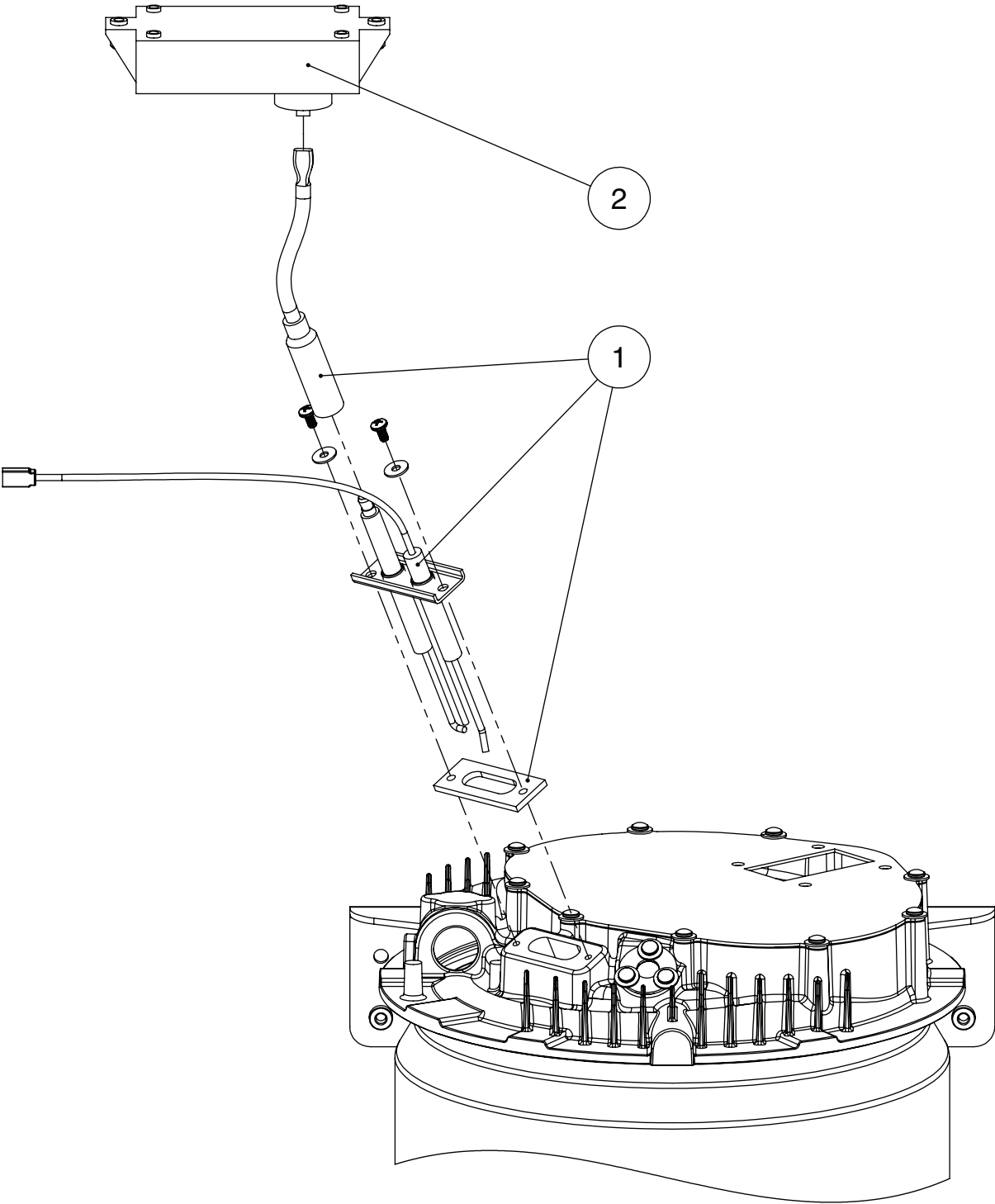
IQ-004



ITEM NO.	PART NUMBER	DESCRIPTION
1	IGT-SPR0017	FLUE PIPE ASSEMBLY (PP)
2	IGT-SPR0008	BLOWER ASSEMBLY
3	IGT-SPR0011	GAS VALVE ASSEMBLY
4	IGT-SPR0016	GAS INLET ASSEMBLY

16.4 Ignition Components

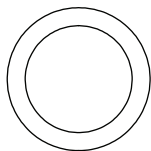
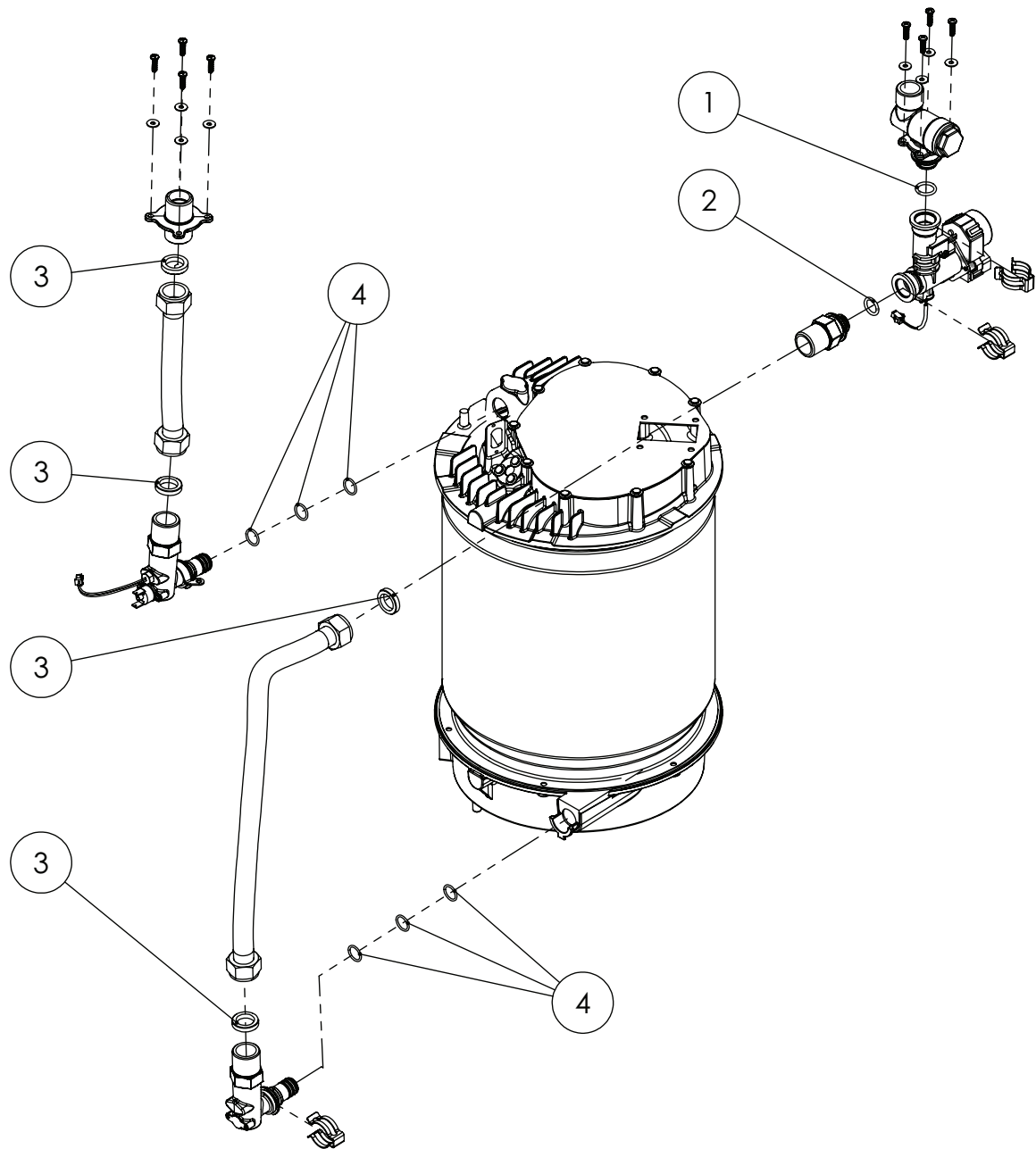
IQ-005



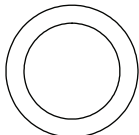
ITEM NO.	PART NUMBER	DESCRIPTION
1	IGT-SPR0006	ELECTRODE KIT
2	IGT-SPR0005	IGNITER MODULE

16.5 Water Side Seals

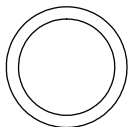
IQ-005



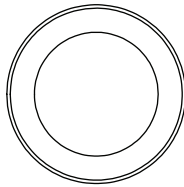
O-RING #114



O-RING #113



O-RING #015



FACE SEAL

O-RING LAYOUT  
SCALE 1:1

O-RING KIT  
IGT-SPR0015

ITEM NO.	DESCRIPTION	QTY.
1	O-RING #114	1
2	O-RING #113	1
3	FACE SEAL	4
4	O-RING #015	6



## 13. Requirements for State of Massachusetts

### Notice Before Installation

This appliance must be installed by a licensed plumber or gas fitter in accordance with the Massachusetts Plumbing and Fuel Gas Code 248 CMR Sections 2.00 and 5.00.

**IMPORTANT:** In the State of Massachusetts (248 CMR 4.00 & 5.00)

For all side wall horizontally vented gas fueled equipment installed in every dwelling, building or structure used in whole or in part for residential purposes, including those owned or operated by the Commonwealth and where the side wall exhaust vent termination is less than seven (7) feet above finished grade in the area of the venting, including but not limited to decks and porches, the following requirements shall be satisfied:

#### 1. INSTALLATION OF CARBON MONOXIDE DETECTORS.

At the time of installation of the side wall horizontal vented gas fueled equipment, the installing plumber or gasfitter shall observe that a hard wired carbon monoxide detector with an alarm and battery backup is installed on the floor level where the gas equipment is to be installed. In addition, the installing plumber or gasfitter shall observe that a battery operated or hard wired carbon monoxide detector with an alarm is installed on each additional level of the dwelling, building, or structure served by the side wall horizontal vented gas fueled equipment. It shall be the responsibility of the property owner to secure the services of qualified licensed professionals for the installation of hard wired carbon monoxide detectors.

- a. In the event that the side wall horizontally vented gas fueled equipment is installed in a crawl space or an attic, the hard wired carbon monoxide detector with alarm and battery back-up may be installed on the next adjacent floor level.
- b. In the event that the requirements of this subdivision cannot be met at the time of completion of installation, the owner shall have a period of thirty (30) days to comply with the above requirements; provided, however, that during said thirty (30) day period, a battery operated carbon monoxide detector with an alarm shall be installed.

#### 2. APPROVED CARBON MONOXIDE DETECTORS.

Each carbon monoxide detector, as required in accordance with the above provisions, shall comply with NFPA 720 and be ANSI/UL 2034 listed and IAS certified.

#### 3. SIGNAGE.

A metal or plastic identification plate shall be permanently mounted to the exterior of the building at a minimum height of eight (8) feet above grade directly in line with the exhaust vent terminal for the horizontally vented gas fueled heating appliance or equipment. The sign shall read, in print size no less than one-half (1/2) inch in size, "GAS VENT DIRECTLY BELOW. KEEP CLEAR OF ALL OBSTRUCTIONS".

#### 4. INSPECTION.

The state or local gas inspector of the side wall horizontally vented gas fueled equipment shall not approve the installation unless, upon inspection, the inspector observes carbon monoxide detectors and signage installed in accordance with the provisions of 248 CMR 5.08(2)(a)1 through 4.

## 18. Warranty

### General

This water heater is warranted by IntellihotInc. (Intellihot), and covers defects in materials and workmanship, subject to the applicable time periods and terms below. This warranty begins on the date of commissioning. This warranty is extended to the original purchaser and any subsequent owner at the original install location, and applies only when properly installed by a licensed contractor and operated in accordance with the instruction manuals. This warranty is limited to repairs or replacement of parts, at Intellihot's option, that are proven to be defective under normal use and connected only to potable water systems.

### Effective Start Date

Intellihot requires proof of purchase (dated sales receipt) and warranty registration in order to obtain warranty service. Register the warranty within 30 days of purchasing the product by mailing a completed warranty card in this manual.

Commercial Warranty  
Heat Exchanger Coil - 10 years  
Other Parts - 2 years

### Heat Exchanger Coil

The warranty period for a heat exchanger coil, when installed in a commercial application (including recirculation), is ten (10) years from the effective start date.

### All other Parts and Components

The warranty period for any original parts (excluding the heat exchanger coil) against failure, when installed in a commercial application (including recirculation), is two (2) years from the effective start date. A replacement part will be warranted for the unexpired term of the original warranty. Defective parts submitted may not be returned. No returns will be accepted without prior authorization from Intellihot.

### Shipping Costs

If a replacement part is supplied under the terms of this warranty, Intellihot will provide ground service delivery for the part free of charge. Any expedited shipping expense will be paid by the customer.

### Definition of Potable Water

Potable water is defined as drinkable water supplied from utility or well water in compliance with EPA secondary maximum contaminant levels (40 CFR part 143.3), as shown in the table.

Contaminant	Level
Aluminum	0.05 to 0.2 mg/l
Chloride	250 mg/l
Color	15 color units
Copper	1.0 mg/l
Corrosivity	Non-corrosive
Fluoride	2.0 mg/l
Foaming Agents	0.5 mg/l
Iron	0.3 mg/l
Manganese	0.05 mg/l
Odor	3 threshold odor number
pH	6.5-8.5 mg/l
Silver	0.1 mg/l
Sulfate	250 mg/l
Total dissolved solids (TDS)	500 mg/l
Zinc	5 mg/l

### Water Hardness Criteria

This warranty applies only when the water quality and supply meets the parameters outlined in the table below.

To use the table, locate the desired unit setpoint temperature on the left side of the table. Then locate the incoming water pressure across the top. The corresponding value in the table is the maximum allowable hardness in grains per gallon (gpg).

Maximum Allowable Hardness (grains per gallon, gpg)						
Unit Setpoint (°F)	Incoming Water Pressure (psi)					
	30	40	50	60	80	100
100-120	8	15	20	25	30	30
120-140	5	11	15	20	27	30
140-160	4	5	11	13	18	20
160-190	3	4	10	12	15	17

## **Not Covered by this Warranty**

This warranty does not cover failures or problems due to:

- Failure to install in accordance applicable building codes, ordinances, normal plumbing and electrical trade practices.
- Improper installation, improper use, improper maintenance, improperly made replacements or repairs, accidents, or abuse.
- Sediment deposits, fire, flood, lightning, freezing, and acts of God, or any causes other than defects in materials and workmanship.

This warranty will be void and have no effect if:

- The water heater is modified or altered in any way.
- Appliance(s) or equipment attached to the water heater that have not been approved by Intellihot.
- If the unit is used exclusively as a booster heater for a commercial dishwasher, or if the water from a reverse osmosis or deionized process is run directly through the unit.
- The serial number is altered, defaced, or discarded.

## **Warranty Limitations**

This warranty applies only when the water heater is used in the United States or Canada. Except for the limited warranties provided above, Intellihot disclaims any and all other warranties, including but not limited to warranties or merchantability and fitness for a particular purpose; provided however, that implied warranties or merchantability and fitness for a particular purpose are not disclaimed during the one year period from the effective date. Intellihot shall not be liable for indirect, special, incidental, consequential, or other similar damages, including lost profits, arising from or relating to the water heater. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

## **How to Make a Claim**

Please call (877) 835-1705. Proof of purchase in the form of a dated sales receipt and warranty registration is required in order to obtain warranty service, and should be included with your claim. The product owner should submit the warranty claim directly to Intellihot at the following address:

Intellihot Inc.  
Attn: Warranty Claims  
2900 W. Main Street  
Galesburg, IL 61401

All parts claimed to be defective may be requested to be returned to Intellihot for examination prior to full claim settlement. Please include the following information on your warranty claim:

- Model number and serial number of the water heater.
- Date of original purchase.
- Owner's name and address.
- A description of the problem with the part and water heater.

## NOTES

[illegible]

## 9. Product Warranty Card

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To activate your warranty, please fill out the information in the form below and mail to the following address:

Warranty Registration  
Intellihot Inc.  
2900 W. Main Street  
Galesburg, IL 61401

Model: \_\_\_\_\_

Serial Numbers (up to 4):

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Owner Information:

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City, State, Postal Code \_\_\_\_\_

Phone Number \_\_\_\_\_

Dealer Information:

Sold By: \_\_\_\_\_

Address: \_\_\_\_\_

City, State, Postal Code \_\_\_\_\_

Phone Number \_\_\_\_\_

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## 20. Preparation Before Outdoor Installation

### 20.1 Selecting an Outdoor Installation Site

**Note:** When installing the water heater, follow all local building codes and the current edition of the National Fuel Gas Code (ANSI Z223.1/NFPA 54) in the USA, or National Gas and Propane Installation Code (CAN/CGA B149.1) in Canada when installing this product.

**Note:** For water heater installations in Massachusetts, the unit must be installed by a plumber or gas-fitter licensed within the Commonwealth of Massachusetts. Refer to the Requirements for the State of Massachusetts section in this manual for additional information.

1. Select a location for the installation. Each installation is unique; therefore, take the time to find the best location for the water heater.
  - a. Select a location that minimizes the length of the water pipe.
  - b. If the distances are long or if the faucet or appliance requires “instant” hot water, we recommend running a recirculation line back to the water heater from the farthest fixture.
  - c. Insulate the hot and cold water supply and recirculation lines.
  - d. Select a location away from foot traffic and away from areas where dust, debris, chemical agents, or other combustible materials could accumulate.
  - e. Allow sufficient space for service and maintenance access to all gas, water, and drain connections.
  - f. Make sure the location meets all building code requirements.
  - g. Contaminated or dirty air drawn into the intake pipe can damage the water heater. The warranty does not cover damage caused by airborne contaminants.
  - h. Ensure that the air intake is free (and remains free) from grass clippings, wood, landscaping and other debris. It must be higher than the code defined snow line.
  - i. Install Intellihot outdoor kit IGT-SPR0063. For installation instructions & details, see manual IGT-MNL0019.

2. Locate the unit close to a drain and near gas and water connections.

The water heater produces a significant amount of condensate during normal operation and should be located near a suitable drain where damage from a possible leak will be minimal. If installing on a roof, installing the water heater in a location without a drain will void the warranty and the manufacturer will not be responsible for any resulting water damages that may occur. For additional information, refer to the Condensate Line Installation section.

3. Locate the water heater and all the water pipes in an area where they can be properly insulated.
  - a. When the water heater is connected to an electrical power supply, it will automatically prevent the water from freezing inside the unit.
  - b. The unit’s freeze protection system will not prevent the water in surrounding pipes from freezing.

### NOTICE

*If there is a power failure, the unit’s freeze protection system will not operate and can result in water freezing inside the heat exchanger. To prevent damage to the water heater, turn OFF the gas supply and inlet water valve. Completely drain the unit. Damage caused by freezing water is not covered by the warranty.*



**Dealer / Installer Contact Information:**