

STEP 1 - Before Installing

Read both the Installation and User's Information Manuals before installing.

This product must be installed and serviced by a licensed plumber, a licensed gas fitter, or a professional service technician. NTI is not liable for any damages or defects resulting from improper installation.

When applicable, the installation must conform with Manufactured Home Construction and Safety Standards, Title 24 CFR, Part 3280 and/or CAN/CSA Z240 MH Series, Mobile Homes.

**WARNING**  
Follow all local codes and/or 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 (CAN/CGA B149.1).

Safety

DO NOT install in areas with excessively high humidity or poor air quality (dust, particulate matter, etc.)

STEP 2 - INSTALLING

1 Unpacking

Remove the accessories box before installing the boiler.

When you unpack the boiler you will find the following items. Check for each of the following items before installing the appliance.

Quantity	Description
1	Condensing Gas Boiler
1	Bracket
1	Assembly Screws (Fischer Type SX)
1	Installation Manual (This Document)
1	User's Information Manual
1	Template
1	LP Gas Conversion Kit
1	Condensate Drain Pipe
1	CH Pressure Relief Valve + Connection Tube + Gasket
1	2" CPVC Pipe, 5.5" Long
2	2" Vent Screen
2	3" Vent Screen
1	Outdoor Sensor Kit
1	Adapter Kit

Table 1 - Included with the Boiler

2 Location Requirements

Install the boiler in an area that allows for service and maintenance access to utility connections, piping, intake and exhaust piping, filters, and traps. Ensure the following clearances are maintained when choosing an installation location.

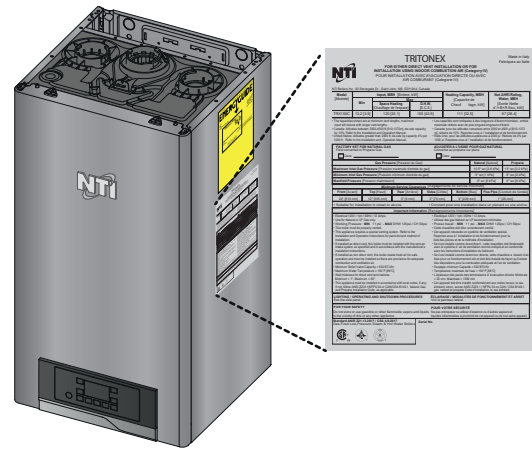
**NOTE:** The service clearances are recommendations. If you are unable to maintain those specific clearances, it might not be possible to service the boiler without removing it from the space.

**NOTE:** For closet installations, a combustible door or removable panel is acceptable front clearance. A 3" minimum clearance must be provided from the appliance front cover to the removable panel or combustible door.

When locating the boiler, it is essential that sufficient space be allotted for the installation and maintenance of components, such as: Flow Switch, Thermostatic Mixing Valve (TMV), Pressure Relief Valve (PRV), Shut-Off and Drain Valves, Expansion Tank, Condensate Drain and Assorted Equipment.

**Minimum Clearances from Combustible Materials**  
Hot Water and Exhaust Vent pipes - at least 1" from combustible materials

3 Checking the Rating Plate



The boiler is factory configured to operate on Natural Gas. If conversion to Propane Gas is required, the conversion kit supplied with the boiler must be used.

DANGER

- Before connecting the gas supply, determine the gas type and pressure for the boiler by referring to the rating plate. Use only the gas type indicated on the rating plate. Using a different gas type will result in abnormal combustion and malfunction of the boiler. Gas supplies should be connected by a licensed professional only.
- The boiler and its gas connection must be leak tested before placing the boiler in operation.
- The boiler cannot be converted from Natural Gas to Propane or vice versa without the supplied gas conversion kit. DO NOT attempt a field conversion of the boiler without a gas conversion kit. Doing so will result in property damage, serious personal injury, or death..

NTI is not liable for any damages (property damages, personal injuries, or deaths) resulting from improper conversions.

4 Wall Mounting

**MOUNTING TO A WOOD STUDDED WALL**  
To install the boiler on a standard wood studded wall a plywood board is required. The minimum dimensions of the plywood board are: 24" wide x 48" high x 1/2" thick. Use at least fourteen (14) #12 x 3" (3/16" x 3") round head tapping screws to secure the plywood board to the studded wall.

**WALL MOUNTING INSTRUCTIONS**  
After the plywood board has been installed to the studs, position the paper template on the plywood. Locate the positions of the hanging bracket and piping adapter bracket. Position the wall mounting and piping adapter brackets. Ensure the brackets are level. Then mark the bracket drilling holes. Mount the boiler bracket on the plywood board. Use the hardware delivered with the boiler m(fisher 5 10x50) and washers for wood mounting. Mount the piping bracket on the plywood board. Use suitable hardware.

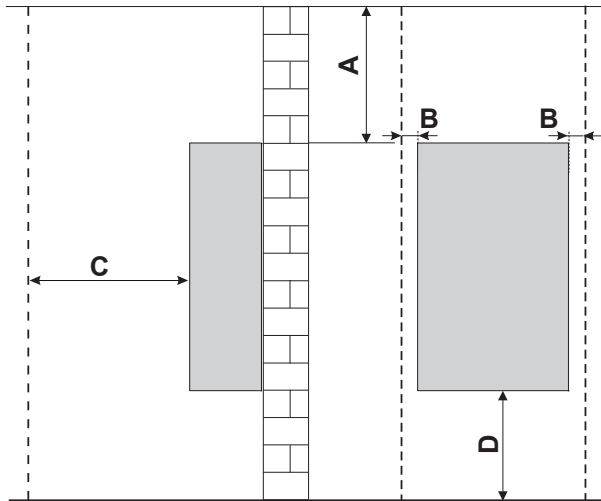
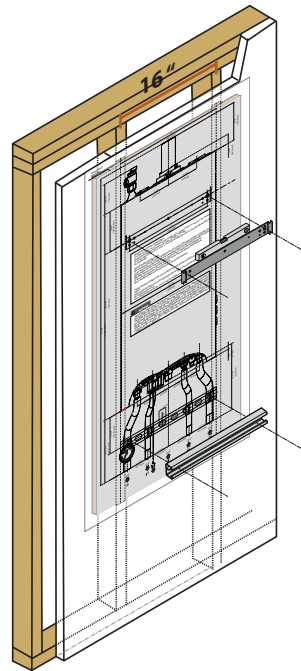


Figure 1 - Minimum Clearances

Dimension	Description	Clearance
A	Top	14" (355.6 mm)
B	Right or Left Side	2" (50.8 mm)
C	Front	18" (457.2 mm)
D	Bottom	12" (304.8 mm)
Not Displayed	Back	0" (0 mm)

Table 2 - Minimum Installation and Service Clearances

5 Preparing for Exhaust Vent and Intake Air Piping

EXHAUST VENT

Clean and dry the boiler connection. DO NOT use primer or cement on the boiler connection. When preparing pipe for installation: Ensure cuts are square. Bevel cut edges by 1/16" - 1/8". Deburr the pipe. Lubricate the gasket.

- Push the length of pipe into the connection until it touches the bottom of the fitting.
- Tighten the clamps using a screwdriver.
- Ensure the pipe is secure before continuing installation.
- For 3" installations, install the reducing coupling in a vertical section of pipe.

**When venting with PVC, first install the included 5.5" length of 2" CPVC into the boiler's exhaust connection, then adapt to PVC using approved CPVC to PVC transition cement. Installing PVC pipe into the boiler's exhaust connection is strictly prohibited - the strain of the gear clamp combined with heat can deform PVC over time and result in flue gas leakage causing property damage, severe personal injury, or death.**

INTAKE AIR PIPE

Follow the steps below to install the air intake pipe into the boiler air intake connection. See installation manual for additional details.

**NOTE:** Clean and dry the boiler connection. DO NOT use primer or cement on the boiler connection. Select an air intake connection (left or right of the exhaust vent collar). Using a utility knife, cut out the plastic covering the air intake connection from the side chosen.

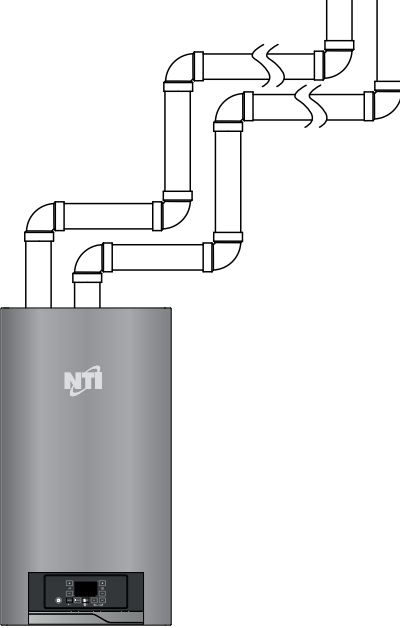
**NOTE: DO NOT CUT OUT BOTH SIDES!**

**You must cut out the plastic on the air intake connection being used before installing the air intake pipe. Failure to do so will result in improper boiler operation, property damage, severe personal injury, or death.**

See installation manual for details on completing vent installation.

6 Venting

2" or 3" Venting

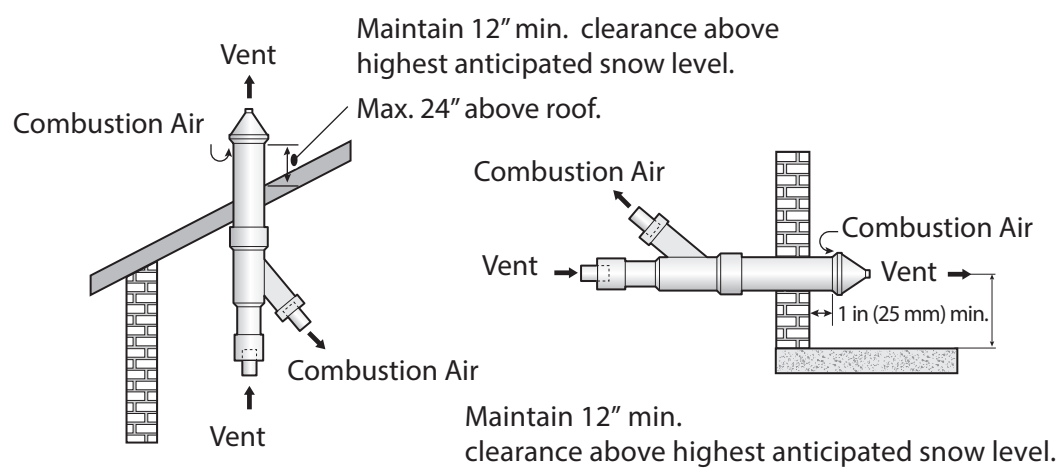


Minimum - Maximum Vent Run Lengths		
Diameter	2"	3"
Intake Air Pipe Run	0 - 100 feet	0 - 150 feet
Exhaust Vent Run	6 - 100 feet	6 - 150 feet

Friction Loss Equivalent in Piping and Fittings	
Fittings or Piping	Equivalent Feet
	2" or 3"
90 Degree Elbow*	5'
45 Degree Elbow	3'
Coupling	0'
Air Inlet Tee	0'
One Foot of Straight Pipe	1'
Concentric Kit	3'
V Series Vent Kit	1'
AL29-4C Vent Terminal	1'

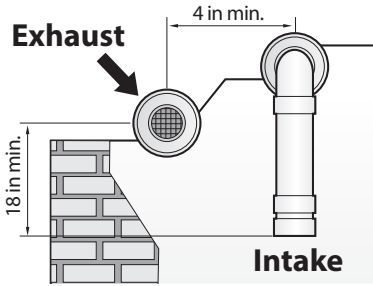
Table 4 - \*Friction loss for long radius elbow is 1 foot less. NOTE: Consult Polypropylene venting instructions for friction loss and pressure drop equivalents.

Concentric Vent Terminations

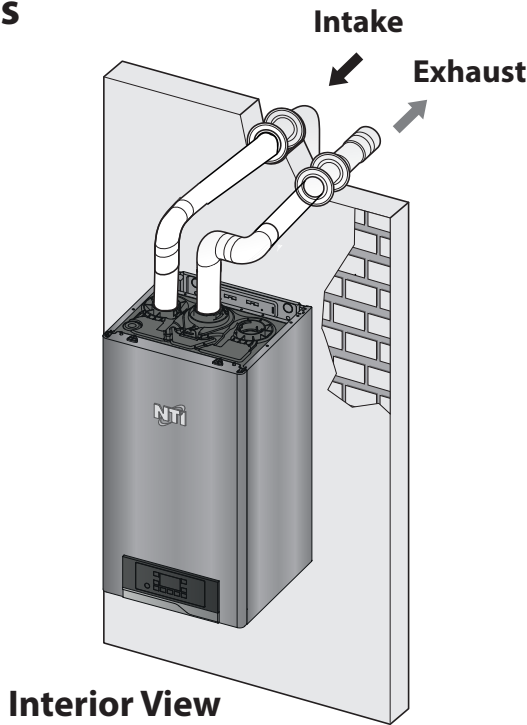


Vent Termination Options

Horizontal Vent Termination

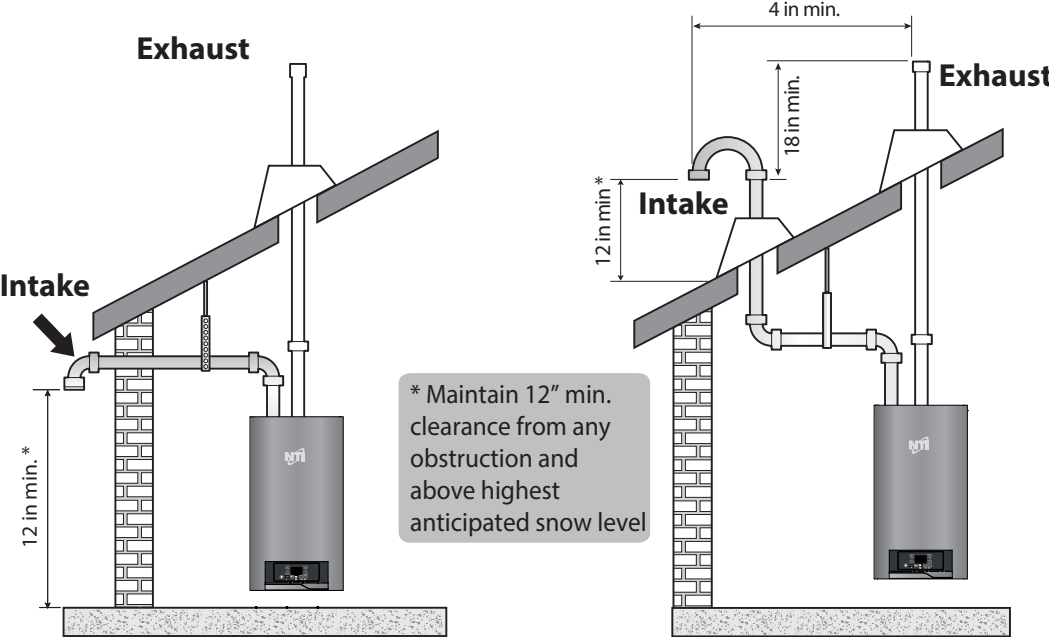


Exterior View



Interior View

Vertical Vent Termination



Intake Air and Exhaust Vent Materials

This boiler is certified as a "Category IV" appliance and requires a special venting system. The vent system will operate with a positive pressure in the pipe. Exhaust gases must be piped directly outdoors using the vent materials and rules outlined in the installation manual. Do not connect vent connectors serving appliances vented by natural draft into any portion of mechanical draft systems operating under positive pressure. Follow the venting instructions carefully. Failure to do so will result in substantial property damage, severe personal injury, or death.

- Installation should be made in accordance with the regulations of the Authority Having Jurisdiction, local code authorities, and utility companies which pertain to this type of water heating equipment.
- Install the venting system in accordance with these instructions and with the National Fuel Gas Code, ANSI Z223.1/NFPA 54, CAN/CGA B149, and / or applicable provisions of local building codes.
- This boiler must be vented with materials, components, and systems listed and approved for Category IV appliances. Consult the following chart and the most recent edition of ANSI Z223.1/NFPA 54, CAN/CGA B149, and / or applicable provisions of local building codes when selecting vent pipe materials. DO NOT use cellular core PVC (ASTM F891), cellular core CPVC, or Radel® (polyphenolsulfone) for the exhaust vent.

Item	Material	Standards for Installation In:	
		United States	Canada
Pipe Approved for Intake ONLY	ABS*	ANSI/ASTM D2661	Must be ULC-S636 Certified
Pipe Approved for Intake OR Exhaust Vent	PVC Schedule 40/80	ANSI/ASTM D1785	PVC, CPVC, and PP Venting Must be ULC-S636 Certified
	PVC-DWV Schedule 40/80	ANSI/ASTM D2665	
	CPVC Schedule 40/80	ANSI/ASTM F441	
	Polypropylene	UL-1738 or ULC-S636	
	Stainless Steel AL29-4C	Certified for Category IV and Direct Vent Appliance Venting	

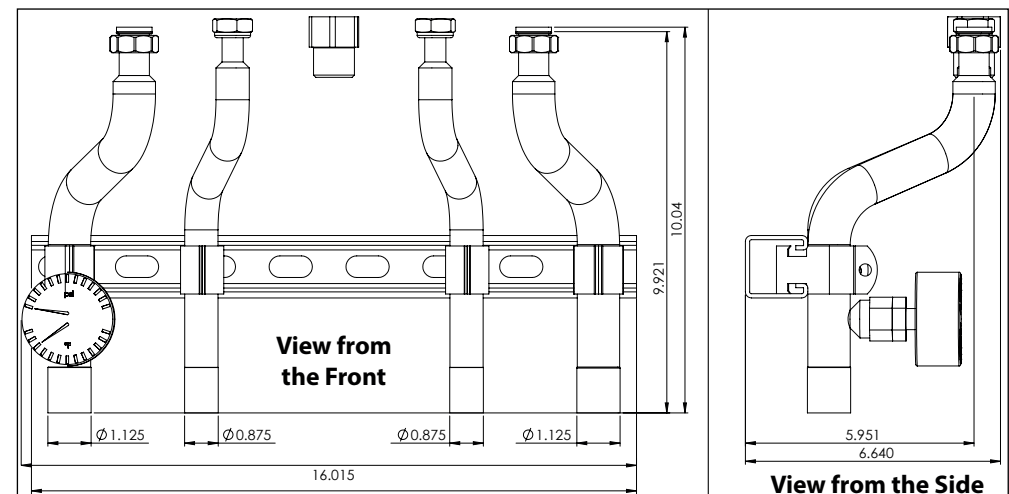
Table 5 - Approved Materials for Exhaust Vent and Intake Pipe



## 7 Plumbing

A box of accessories containing plumbing connections is shipped with the boiler.

- 1 Ensure the accessories box is removed before installation. Remove the plumbing adapter kit from the box.



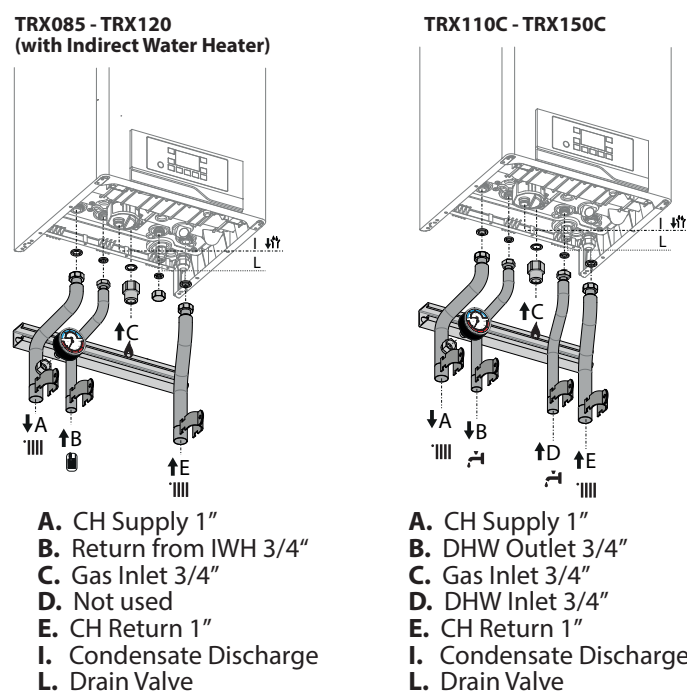
Quantity	Description
1	CH Supply Pipe (1")
1	CH Return Pipe (1")
2	DHW Pipe (3/4")
1	Gas Adapter (3/4")
3	2 Rubber CH Gasket + 1 Fiber Gas Gasket (3/4")
2	DHW Gasket (1/2")

Figure 4 - Adapter Kit Dimensions and Specifications - Included with Kit

**WARNING**  
Failure to follow the instructions in the installation manual WILL VOID the warranty and may result in property damage, severe personal injury, or death.

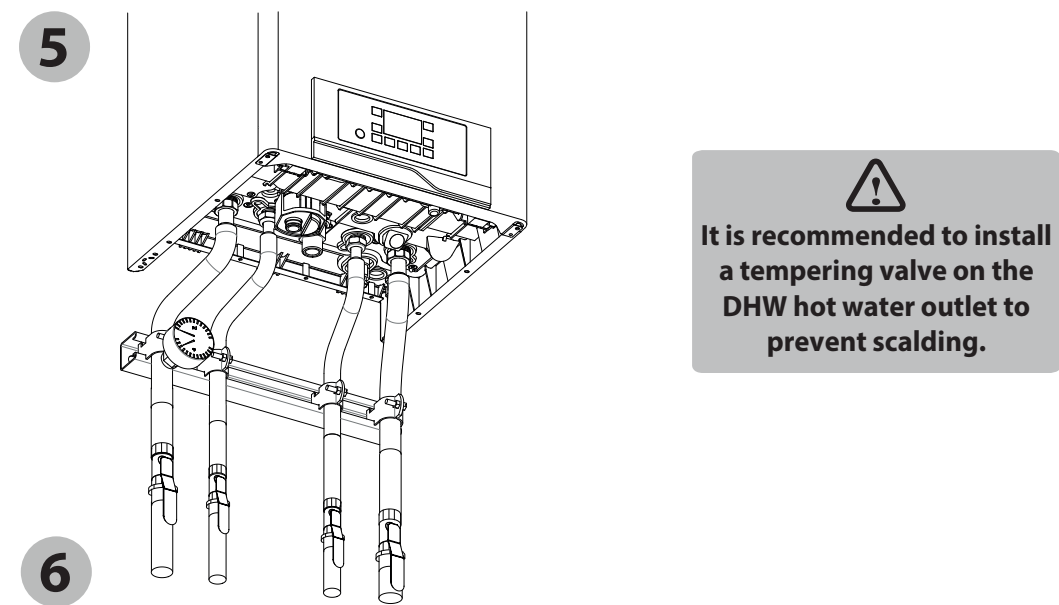
- 2 Plumbing of this product should only be done by a qualified, licensed plumber in accordance with all local plumbing codes. The boiler may be connected to an indirect water heater to supply domestic hot water. NTI offers indirect water heaters in a wide range of gallon sizes in either stainless steel or glass-lined construction.
- 3 The water connections must be installed in accordance with all local and national plumbing codes, or any applicable standard which prevails. Pipe material must be suitable to meet local codes and industry standards. The pipe must be cleaned and without blemish before any connections are made. The size of the DHW pipes should be 3/4" diameter, and the CH pipes should be 1" diameter. Isolation (shut-off valves) and unions should be used on both the CH and DHW loops to ease future servicing. All piping should be insulated. If there is a backflow preventer or any type of non-return valve in the DHW supply system, install a suitable expansion tank downstream. **NOTE:** The addition of a high temperature limiting device is important if the boiler is to be connected to a domestic hot water system.

### 4 ADAPTER INSTALLATION

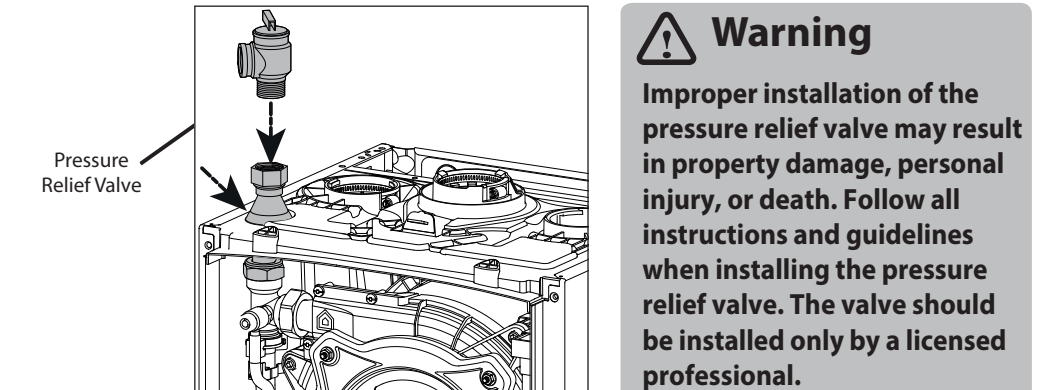


- A. CH Supply 1"  
B. Return from IWH 3/4"  
C. Gas Inlet 3/4"  
D. Not used  
E. CH Return 1"  
I. Condensate Discharge  
L. Drain Valve
- A. CH Supply 1"  
B. DHW Outlet 3/4"  
C. Gas Inlet 3/4"  
D. DHW Inlet 3/4"  
E. CH Return 1"  
I. Condensate Discharge  
L. Drain Valve

## Typical near-appliance plumbing layout



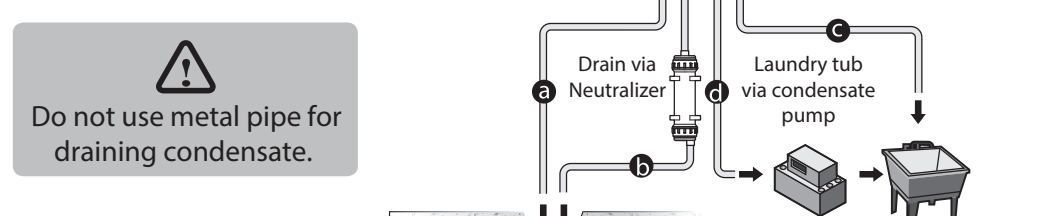
**CH Pressure Relief Valve**  
This boiler is provided with a CH pressure relief valve that complies with the ANSI/ASME Boiler and Pressure Vessel Code, Section IV (Heating Boilers). The included 30 psi CH Pressure Relief Valve must be installed at the top of the boiler, using the included pipe adapter and grommet, as illustrated below. DO NOT install a relief valve with a pressure rating in excess of 50 psi - the maximum allowable operating pressure of the boiler. The relief valve capacity must exceed the BTU/H input capacity of the boiler. To install the pressure relief valve follow the instructions in the installation manual.



**DHW Pressure Relief Valve (Combi Models)**  
The DHW piping must be provided with a DHW pressure relief valve that complies with local codes, but not less than valves certified as meeting the requirements of Relief Valves for Hot Water Supply Systems, ANSI Z21.22 / CSA4.4 by a nationally recognized lab that maintains periodic inspection of production listed equipment. A DHW pressure relief valve is not included with the boiler, and is to be field supplied and installed in the DHW piping. DO NOT install a DHW relief valve with a pressure rating greater than 125 psi - the maximum allowable operating pressure of the boiler's DHW circuit. After installing the relief valves and filling and pressurizing the system, test the operation of the valves by lifting the levers. Make sure the valves discharge freely. If a valve fails to operate correctly, replace it with a new relief valve. The relief valve capacity must exceed the BTU/H input capacity of the boiler.

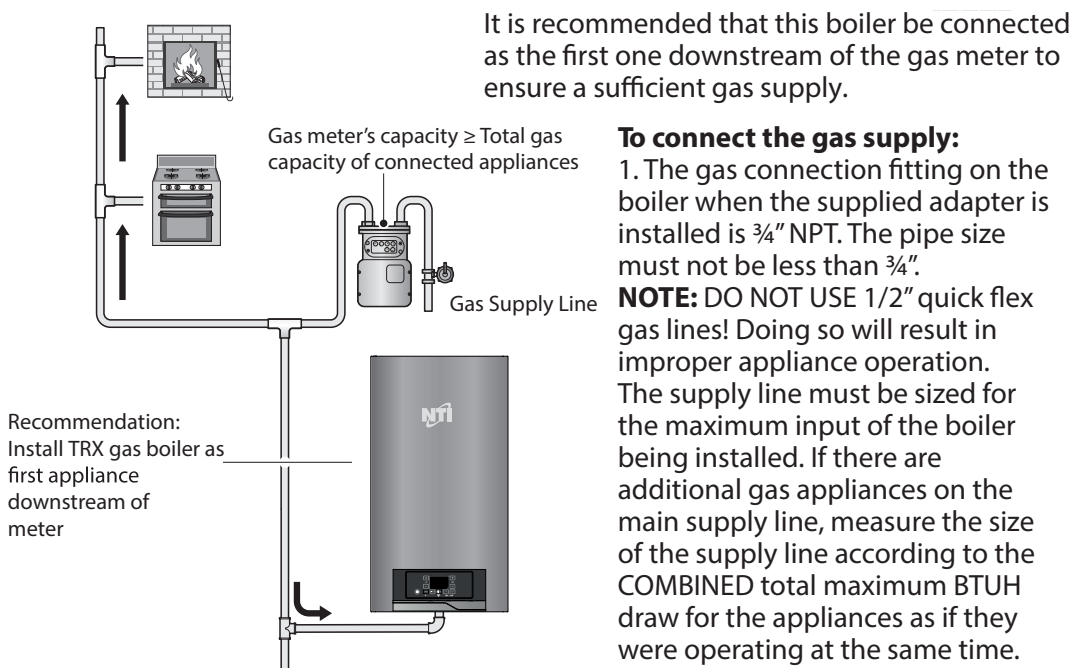
## 8 Connecting the Condensate Drain

This boiler is shipped from the factory with a pre-installed condensate trap and a separate drain hose. The supplied drain hose must be connected before routing the condensate to one of the following disposal options:  
a. Direct to drain  
b. Drain via neutralizer  
c. Direct to laundry tub  
d. To drain via condensate pump  
Follow boiler installation manual when installing the condensate drain.



**To connect the condensate drain:**  
1. Condensation is slightly acidic (typically with a pH of 3 to 5) and must be piped with the correct materials. Never pipe the condensate using metal pipe subject to corrosion. Plastic PVC or CPVC pipe are the only approved materials. A condensate neutralizer, if required by local authorities, can be made up of lime, marble, or phosphate chips that will neutralize the condensate. This may be done by the installer or purchased from NTI (7450P-212).  
2. The boiler is equipped with a barbed outlet fitting. Connect the supplied hose to the fitting and route it with a downward slope away from the boiler to a local drain. If the boiler condensate outlet is lower than the drain, use a condensate removal pump, available from NTI (554200). This pump has two leads to connect an alarm or other warning device to alert the user of an overflow, which could cause property damage.  
3. If a long horizontal run is used, create a vent in the horizontal run to prevent a vacuum lock in the condensate line.  
4. Do not expose the condensate to freezing temperatures.  
5. It is very important you support the condensation line to assure proper drainage.

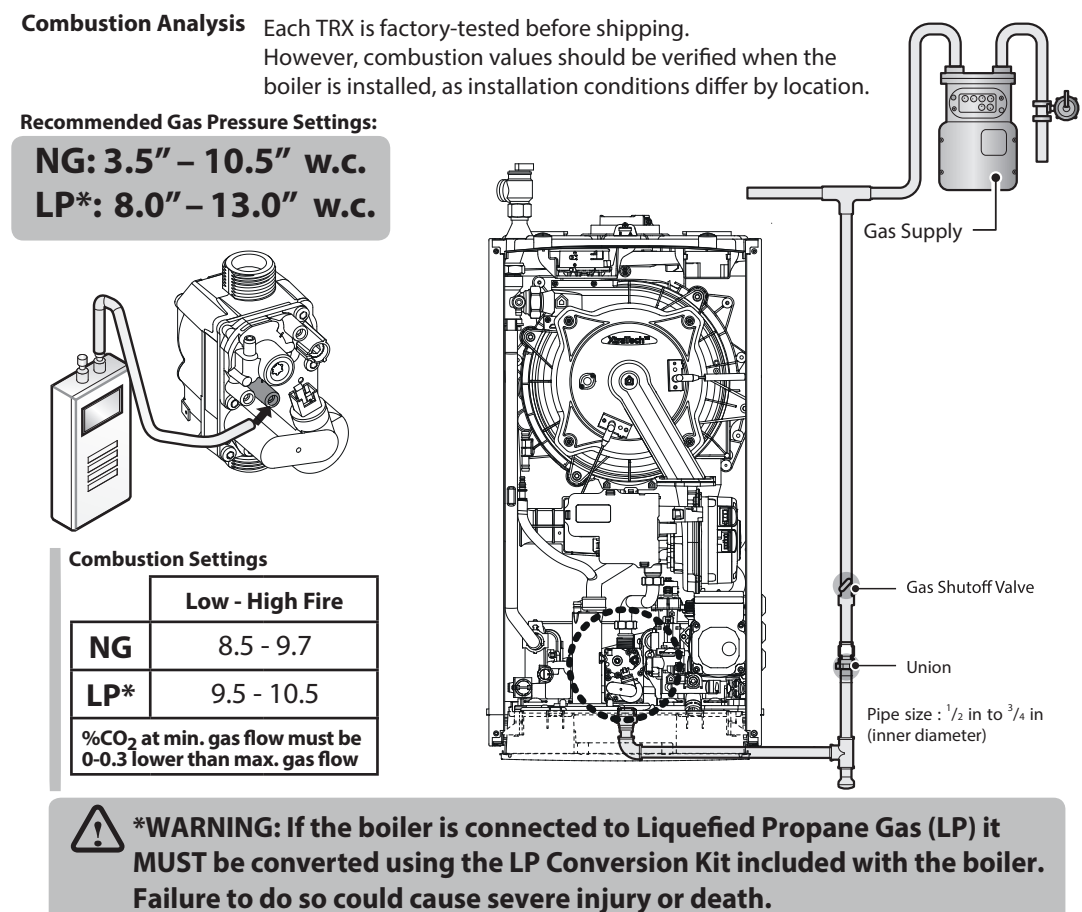
## 9 Gas Connection



It is recommended that this boiler be connected as the first one downstream of the gas meter to ensure a sufficient gas supply.

**To connect the gas supply:**  
1. The gas connection fitting on the boiler when the supplied adapter is installed is 3/4" NPT. The pipe size must not be less than 3/4".  
**NOTE:** DO NOT USE 1/2" quick flex gas lines! Doing so will result in improper appliance operation. The supply line must be sized for the maximum input of the boiler being installed. If there are additional gas appliances on the main supply line, measure the size of the supply line according to the COMBINED total maximum BTUH draw for the appliances as if they were operating at the same time.

3. Measure the length of the gas supply line from the gas meter to the boiler. The boiler must be installed downstream of the gas meter to ensure adequate gas supply. Use the tables in the installation manual or refer to the gas line manufacturer's sizing information to determine the correct supply pipe size.  
4. The National Fuel Gas Code (NFPA 54) requires that a sediment trap (drip leg) be installed in the gas line on boilers not so equipped. The drip leg must be accessible, a minimum of 3" in length, and not subject to freezing conditions.  
5. A manual gas shut-off valve should be installed in the gas supply line close to the boiler. See Figure below.<  
6. To facilitate any future maintenance, it is also recommended that an approved gas union fitting be installed in the supply line between the shut-off valve and the 3/4" NPT connection on the boiler.  
7. Use a manometer to test the gas pressure to make sure it meets the minimum standards and does not exceed the maximum standards of the boiler.  
8. Leak test the gas line pipe before placing the boiler in operation. Only use approved leak detector liquid solutions to check for leaks.  
9. Do not operate the boiler until all connections have been completed and the heat exchanger is filled with water.



## 10 Wiring

**\*WARNING:** Install wiring and electrically ground boiler in accordance with the authority having jurisdiction or, in the absence of such an authority, follow the National Electrical Code, NFPA 70, and/or CSA C22.1 Electrical Code-Part 1 in Canada. Failure to follow all applicable local, state, and national regulations, mandates, and building supply codes for guidelines to install the electrical power supply could result in property damage, serious personal injury, or death.

The boiler is equipped with a three prong power cord. The boiler is limited to a maximum of 15 amps at 120 volts in use.  
1. This boiler must be properly grounded. Ensure the electrical receptacle is properly grounded. Do not remove the grounding prong from the boiler plug.  
2. Do not attach the ground wire to either the gas or water piping.  
3. The wiring diagrams in this manual are to be used for reference purposes only.  
4. Refer to these diagrams and the wiring diagrams of any external controls used with the installation when wiring the boiler. Read, understand, and follow all wiring instructions supplied with the controls.  
5. Do not disconnect the power supply when the boiler is in normal operation.  
**NOTE:** For additional electrical protection, the use of a whole house surge protector is recommended. Damage caused by power surges IS NOT covered by the warranty.

Low Voltage Wiring Connections	
BUS	Optional System Interface, Room Sensor, or Multifunctional Kit Connection
TT2	Room Thermostat 2
OD	Outdoor Sensor
TNK	Tank Temperature Sensor (Probe / Aquastat)
SYS	Cascade Manager
TT1	Room Thermostat 2

Table 6 - Low Voltage Wiring Connections

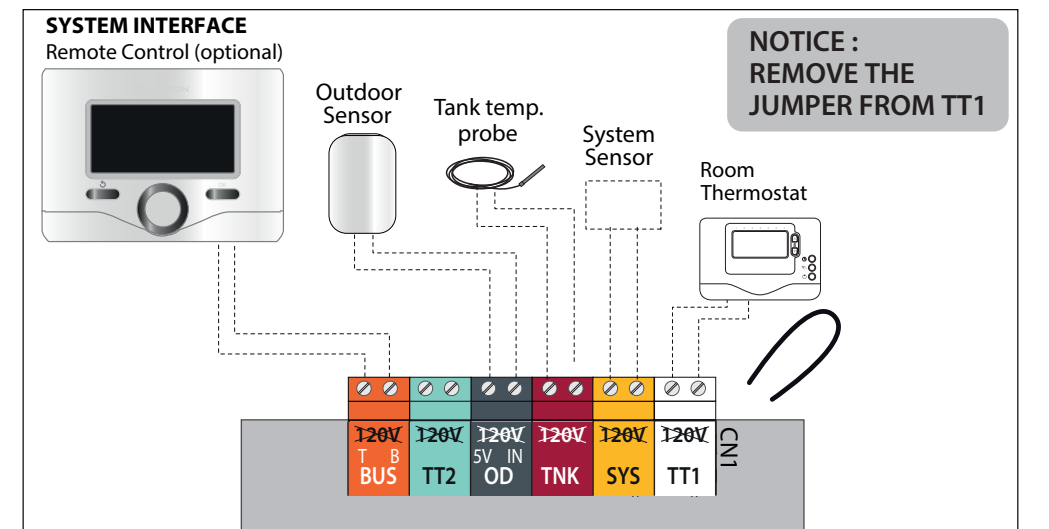


Figure 7 - Low Voltage Wiring Connections

## 11 Front Panel

