# Installation Manual

NORITZ AMERICA CORPORATION

# CONDENSING GAS COMBI BOILER

NRCB199DV (GHQ-C3201WX-FF US)
NRCB180DV (GHQ-C2801WX-FF US)

Potential dangers from accidents during installation and use are divided into the following three categories. Closely observe these warnings, they are critical to your safety.

| | |
|---|---|
| ⚠ **DANGER** | DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. |
| ⚠ **WARNING** | WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. |
| ⚠ **CAUTION** | CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. |

**WARNING:** If the information in this manual is not followed exactly, a fire or explosion may result causing property damage, personal injury or death.

Prohibited | Disconnect Power | Ground | Be sure to do

## ⚠ CAUTION

## Requests to Installers

- In order to use the Combi Boiler safely, read this installation manual carefully, and follow the installation instructions.
- Failures and damage caused by erroneous work or work not as instructed in this manual are not covered by the warranty.
- Check that the installation was done properly in accordance with this Installation Manual upon completion.
- After completing installation, please either place this Installation Manual in a plastic pouch and attach it to the side of the Combi Boiler (or the inside of the pipe cover or recess box if applicable), or hand it to the customer to retain for future reference. Also, be sure to fill in all of the required items on the warranty and to hand the warranty to the customer along with the Owner's Guide.

LOW-LEAD

Low NOx Approved by SCAQMD
14 ng/J or 20 ppm
(Natural Gas Only)

FOR USE IN RESIDENTIAL OR MANUFACTURED HOME APPLICATIONS.

Installation must conform with local codes, or in the absence of local codes, the National Fuel Gas Code, ANSI Z223.1/NFPA 54- latest edition and/or the Natural Gas and Propane Installation Code CSA B149.1 - latest edition.

Where required by the authority having jurisdiction, the installation must conform to the Standard for Controls and Safety Devices for Automatically Fired Boilers, ANSI/ASME CSD-1.

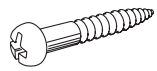
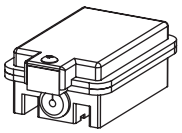
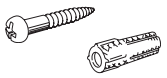
Noritz America reserves the right to discontinue, or change at any time, the designs and/or specifications of its products without notice.

SBB80UB-1
Rev. 07/17

*SBB80UB*

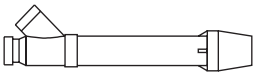
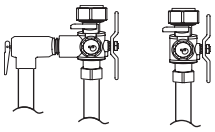
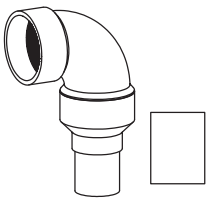
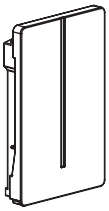
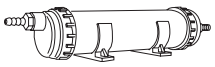
# 1. Included Accessories

The following accessories are included with the unit.
Check for any missing items before starting installation.

| Part | Shape | Q'ty | Part | Shape | Q'ty |
|---|---|---|---|---|---|
| Anchoring Screw |  | 7 | Owner's Guide, Warranty, Installation Manual (this document) |  | 1 each |
| Outdoor Temperature Sensor |  | 1 | Pressure Relief Valve for Heating (ASME Certified) (3/4",30psi) |  | 1 |
| Wall Mounting Bracket |  | 1 | Anchoring Screw & Anchor for Outdoor Temperature Sensor |  | 2 each |

# 2. Optional Accessories

The accessories listed below are not included with the units, but may be necessary for installation.

| Part | Shape | Q'ty | Part | Shape | Q'ty |
|---|---|---|---|---|---|
| Quick Connect Cord (QC-2) |  | 1 | Bird Screen for 3" (75mm) PVC VT3-PVCS |  | 2 |
| PVC Concentric Termination 2"(50mm) : PVC-2CT 3"(75mm) : PVC-3CT |  | 1 | Bird Screen for 2"(50mm) PVC VT2-PVCS |  | 2 |
| Isolation Valve Set for DHW* (includes pressure relief valve) |  | 1 each | 3" (75mm) Horizontal Hood Termination (PVT-HL) |  | 2 |
| 2" SV Conversion Kit (SV-CK-2) (• 90° Elbow - 2" Pipe (With Inlet Screen) • Installation Manual (Check List)) |  | 1 each | Noritz Connect Wireless Adapter NWC-ADAPTER (NAW-1 US) |  | 1 |
| Neutralizer (NC-1) (For 1 Combi Boiler) |  | 1 | Plastic Rain Cap** (PRC-1) |  | 1 |

Note: Additional vent pieces are available; consult the latest product catalogue for details.

* Isolation valves are necessary for flushing the Plate Heat Exchanger.
They allow for easy flushing of the system.

** Not approved for use in Canada.

# 3. Before Installation

## ⚠ DANGER

**Checkup**

- Check the mounting brackets and vent pipe yearly for damage or wear. Replace if necessary.

## ⚠ WARNING

**Precautions on Vent Pipe Replacement**

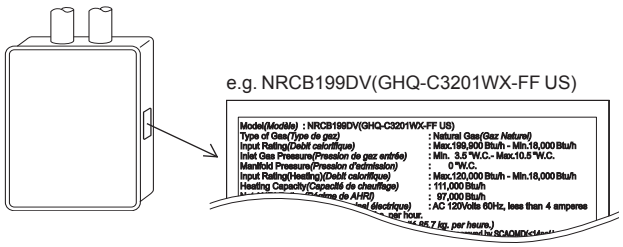
- The vent system will almost certainly need to be replaced when this appliance is being installed. Only use vent materials that are specified in this Installation Manual for use on this appliance. Refer to the "Vent Pipe Installation" section for details. If PVC, CPVC, or Category IV listed pipe is already installed, check for punctures, cracks, or blockages and consult with the vent pipe manufacturer before reusing.
  Improper venting may result in fires, property damage or exposure to Carbon Monoxide.

**Snow Precaution**

- If this product will be installed in an area where snow is known to accumulate, protect the vent termination from blockage by snow drifts or damage from snow falling off of roofs.

**Check the Gas**

- Check that the rating plate indicates the correct type of gas.
- Check that the gas supply line is sized for 199,900 Btu/h/ 120,000Btu/h (DHW / Heating mode) of NRCB199DV(GHQ-C3201WX-FF US). Check that the gas supply line is sized for 180,000 Btu/h/ 100,000Btu/h (DHW / Heating mode) of NRCB180DV(GHQ-C2801WX-FF US).




**Check the Power**

- The power supply required is 120VAC, at 60Hz.
  Using the incorrect voltage may result in fire or electric shock.

## ⚠ CAUTION

**Do Not Use Equipment for Purposes Other Than Those Specified**

- Do not use for other than increasing the temperature of the water supply, as unexpected accidents may occur as a result.

**Check Water Supply Quality**

- If the water supply is in excess of 12 grains per gallon (200 mg/L) of hardness, acidic or otherwise impure, treat the water with approved methods in order to ensure full warranty coverage.

# 4. Choosing Installation Site

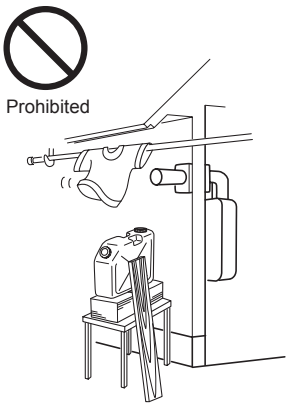
* Locate the appliance in an area where leakage from the unit or connections will not result in damage to the area adjacent to the appliance or to the lower floors of the structure. When such installation locations cannot be avoided, a suitable drain pan, adequately drained, must be installed under the appliance. The pan must not restrict combustion air flow.
* As with any water heating appliance, the potential for leakage at some time in the life of the product does exist. The manufacturer will not be responsible for any water damage that may occur.

## ⚠ DANGER

- Locate the vent terminal so that there are no obstacles around the termination and so that exhaust can't accumulate. Do not enclose the termination with corrugated metal or other materials.

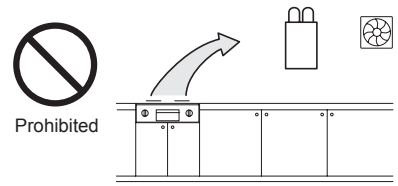
## ⚠ WARNING

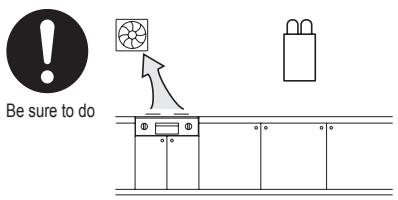
- Avoid places where fires are common, such as those where gasoline, benzene and adhesives are handled, or places in which corrosive gases (ammonia, chlorine, sulfur, ethylene compounds, acids) are present.
  Using the incorrect voltage may result in fire or cracking.
- Avoid installation in places where dust or debris will accumulate.
  Dust may accumulate and reduce the performance of the unit's fan. This can result in incomplete combustion.
- Avoid installation in places where special chemical agents (e.g., hair spray or spray detergent) are used.
  Ignition failures and malfunction may occur as a result.
- Carbon Monoxide Poisoning Hazard. Do not install this Combi Boiler in a recreational vehicle or on a boat.
- The manufacturer does not recommend installing the Combi Boiler in an attic due to safety issues.
  If you install the Combi Boiler in an attic:
  - Make sure the unit will have enough combustion air and proper ventilation.
  - Keep the area around the Combi Boiler clean. Dust may accumulate and reduce the performance of the unit's fan. This can result in incomplete combustion.
  - Place the unit for easy access for service and maintenance.
  - A drain pan, or other means of protection against water damage, is required to be installed under the Combi Boiler in case of leaks.



## ⚠ CAUTION

- The Combi Boiler is designed for indoor installation only.
  Never install it outdoors or in a bathroom, it may be damaged or a fire may be caused.
- Install the Combi Boiler in a location where it is free from obstacles and stagnant air.
- Consult with the customer concerning the location of installation.
- Do not install the Combi Boiler near staircases or emergency exits.
- Install the Combi Boiler in an area that allows for the proper clearances to combustible and non-combustible construction. Consult the rating plate on the appliance for proper clearances.
- Do not install the Combi Boiler in a place where it may be threatened by falling objects, such as under shelves.
- The Combi Boiler must be installed in a place where supply and exhaust pipes can be installed as directed.
- Do not install the Combi Boiler where the exhaust will blow on outer walls or material not resistant to heat. Also consider the surrounding trees and animals.
  The heat and moisture from the Combi Boiler may cause discoloration of walls and resinous materials, or corrosion of aluminum materials.
- Do not locate the vent termination directed towards a window or any other structure which has glass or wired glass facing the termination.
- Avoid installation above gas ranges or stoves.
- Avoid installation between the kitchen fan and stove. If oily fumes or a large amount of steam are present in the installation location, take measures to prevent the fumes and steam from entering in the equipment.
- Install in a location where the exhaust gas flow will not be affected by fans or range hoods.
- Take care that noise and exhaust gas will not affect neighbors. Avoid installation on common walls as the unit will make some operational noises while it is running.
- Before installing, make sure that the exhaust flue termination will have the proper clearances according to the National Fuel Gas Code (ANSI Z223.1-latest edition) or the Natural Gas and Propane Installation Code (CSA B149.1).





State of California: The Combi Boiler must be braced, anchored or strapped to avoid moving during an earthquake. Contact local utilities for code requirements in your area or call: 1-866-766-7489 and request instructions.

For Venting Manufacturers Requirements, see website listed below:

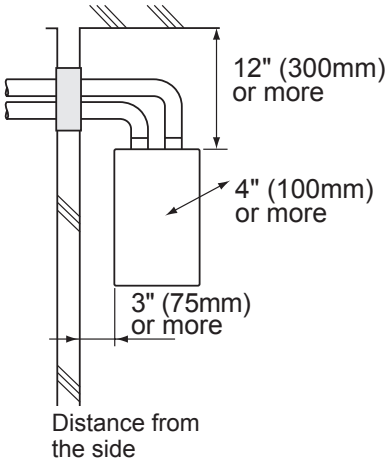
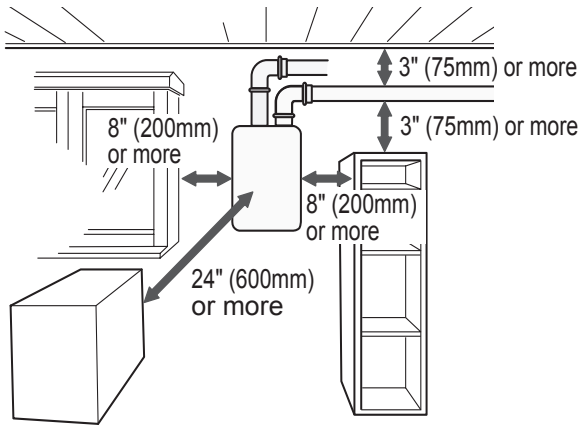
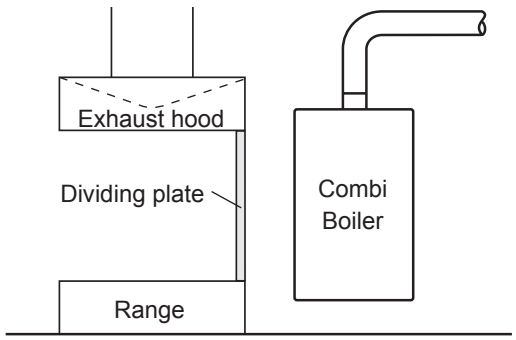
Noritz N-Vent www.noritz.com

# 5. Installation Clearances

## ⚠ WARNING

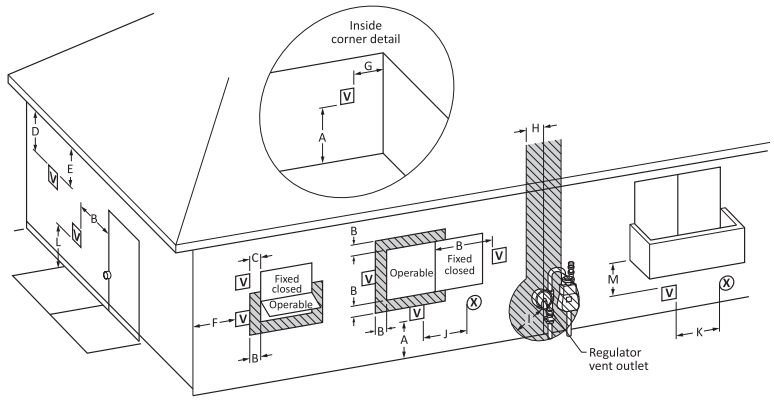
Before installing, check for the following:

Install in accordance with relevant building and mechanical codes, as well as any local, state or national regulations, or in the absence of local and state codes, to the National Fuel Gas Code ANSI Z223.1/NFPA 54 – latest edition. In Canada, see the Natural Gas and Propane Installation Code CSA B149.1 - latest edition for detailed requirements.

| Item | Check | Illustration |
|---|---|---|
| Distance from combustibles | • Maintain the following clearances from both combustible and non-combustible materials. |  |
| Securing of space for repair/inspection | In order to facilitate inspection and repair it is recommended to leave:<br>• 8" (200mm) or more on either side of the unit.<br>• 24" (600mm) or more in front of the unit.<br>• 3" (75mm) or more above and below the vent pipe. |  |
| Cooking Equipment | <When the indoor air supply><br>• If the unit will be installed in the vicinity of a permanent kitchen range or stove that has the possibility of generating steam that contains fats or oils, use a dividing plate or other measure to ensure that the unit is not exposed to air containing such impurities.<br>* The dividing plate should be of non-combustible material of a width greater than the Combi Boiler. |  |

# Clearance Requirements from Vent Terminations to Building Openings <When supplying combustion air from the outdoors (Direct Vent)>

* All clearance requirements are in accordance with ANSI Z21. 13 and the National Fuel Gas Code, ANSI Z223.1 and in Canada, in accordance with the Natural Gas and Propane Installation Code CSA B149.1.




V Vent Terminal

X Air Supply Inlet

Area Where Terminal is Not Permitted

| Ref | Description | Canadian Direct Vent Installations [1] | US Direct Vent Installations [2] |
|---|---|---|---|
| A= | Clearance above grade, veranda, porch, deck, or balcony | 12 in (30 cm) | 12 in (30 cm) |
| B= | Clearance to window or door that may be opened | 6 in (15 cm) for appliances ≤ 10,000 Btuh (3kW), 12 in (30 cm) for appliances > 10,000 Btuh (3kW) and ≤ 100,000 Btuh (30 kW), 36 in (91 cm) for appliances > 100,000 Btuh (30 kW) | 6 in (15 cm) for appliances ≤ 10,000 Btuh (3kW), 9 in (23 cm) for appliances > 10,000 Btuh (3kW) and ≤ 50,000 Btuh (15 kW), 12 in (30 cm) for appliances > 50,000 Btuh (15 kW) |
| C= | Clearance to permanently closed window | * | * |
| D= | Vertical clearance to ventilated soffit located above the terminal within a horizontal distance of 2 feet (61 cm) from the center line of the terminal | * | * |
| E= | Clearance to unventilated soffit | * | * |
| F= | Clearance to outside corner | * | * |
| G= | Clearance to inside corner | * | * |
| H= | Clearance to each side of center line extended above meter/regulator assembly | * | * |
| I= | Clearance to service regulator vent outlet | Above a regulator within 3 ft (91 cm) horizontally of the vertical center line of the regulator vent outlet to a maximum vertical distance of 15 ft (4.5 m) | * |
| J= | Clearance to nonmechanical air supply inlet to building or the combustion air inlet to any other appliance | 6 in (15 cm) for appliances ≤ 10,000 Btuh (3kW), 12 in (30 cm) for appliances > 10,000 Btuh (3kW) and ≤ 100,000 Btuh (30 kW), 36 in (91 cm) for appliances > 100,000 Btuh (30 kW) | 6 in (15 cm) for appliances ≤ 10,000 Btuh (3kW), 9 in (23 cm) for appliances > 10,000 Btuh (3kW) and ≤ 50,000 Btuh (15 kW), 12 in (30 cm) for appliances > 50,000 Btuh (15 kW) |
| K= | Clearance to a mechanical air supply inlet | 6 ft (1.83 m) | 3 ft (91 cm) above if within 10 ft (3 m) horizontally |
| L= | Clearance above paved sidewalk or paved driveway located on public property | 7 ft (2.13 m)† | * |
| M= | Clearance under veranda, porch, deck, or balcony | 12 in (30 cm)‡ | * |

[1] In accordance with the current CSA B149.1 Natural Gas and Propane Installation Code

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

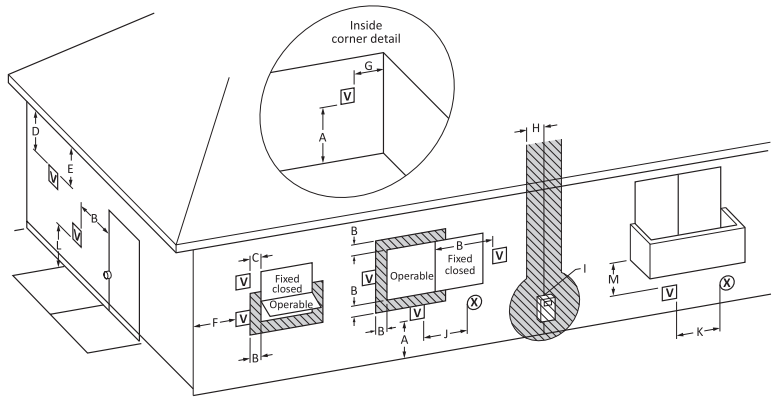
† A vent shall not terminate directly above a sidewalk or paved driveway that is located between two single family dwellings and serves both dwellings.

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

* Clearance in accordance with local installation codes and the requirements of the gas supplier. Clearance to opposite wall is 24 inches (60 cm).

# Clearance Requirements from Vent Terminations to Building Openings <Other than Direct Vent>

* All clearance requirements are in accordance with ANSI Z21. 13 and the National Fuel Gas Code, ANSI Z223.1 and in Canada, in accordance with the Natural Gas and Propane Installation Code CSA B149.1.




Vent Terminal

Air Supply Inlet

Area Where Terminal is Not Permitted

| Ref | Description | Canadian Non-Direct Vent Installation [1] | US Non-Direct Vent Installation [2] |
|---|---|---|---|
| A= | Clearance above grade, veranda, porch, deck, or balcony | 12 in (30 cm) | 12 in (30 cm) |
| B= | Clearance to window or door that may be opened | 6 in (15 cm) for appliances ≤ 10,000 Btuh (3kW), 12 in (30 cm) for appliances > 10,000 Btuh (3kW) and ≤ 100,000 Btuh (30 kW), 36 in (91 cm) for appliances > 100,000 Btuh (30 kW) | 4 ft (1.2 m) below or to side of opening; 1 ft (300 mm) above opening |
| C= | Clearance to permanently closed window | * | * |
| D= | Vertical clearance to ventilated soffit located above the terminal within a horizontal distance of 2 feet (61 cm) from the center line of the terminal | * | * |
| E= | Clearance to unventilated soffit | * | * |
| F= | Clearance to outside corner | * | * |
| G= | Clearance to inside corner | * | * |
| H= | Clearance to each side of center line extended above meter/regulator assembly | * | * |
| I= | Clearance to service regulator vent outlet | Above a regulator within 3 ft (91 cm) horizontally of the vertical center line of the regulator vent outlet to a maximum vertical distance of 15 ft (4.5 m) | * |
| J= | Clearance to nonmechanical air supply inlet to building or the combustion air inlet to any other appliance | 6 in (15 cm) for appliances ≤ 10,000 Btuh (3kW), 12 in (30 cm) for appliances > 10,000 Btuh (3kW) and ≤ 100,000 Btuh (30 kW), 36 in (91 cm) for appliances > 100,000 Btuh (30 kW) | 4 ft (1.2 m) below or to side of opening; 1 ft (300 mm) above opening |
| K= | Clearance to a mechanical air supply inlet | 6 ft (1.83 m) | 3 ft (91 cm) above if within 10 ft (3 m) horizontally |
| L= | Clearance above paved sidewalk or paved driveway located on public property | 7 ft (2.13 m)† | * |
| M= | Clearance under veranda, porch, deck, or balcony | 12 in (30 cm)‡ | * |

[1] In accordance with the current CSA B149.1 Natural Gas and Propane Installation Code

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

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

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

* Clearance in accordance with local installation codes and the requirements of the gas supplier. Clearance to opposite wall is 24 inches (60 cm).

# 6. Installation

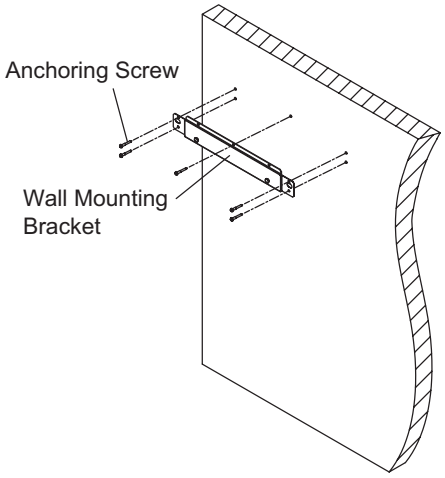
Be sure to do

- The weight of the device will be applied to the wall. If the strength of the wall is not sufficient, reinforcement must be done to prevent the transfer of vibration.
- Do not drop or apply unnecessary force to the device when installing. Internal parts may be damaged and may become highly dangerous.
- Install the unit on a vertical wall and ensure that it is level.

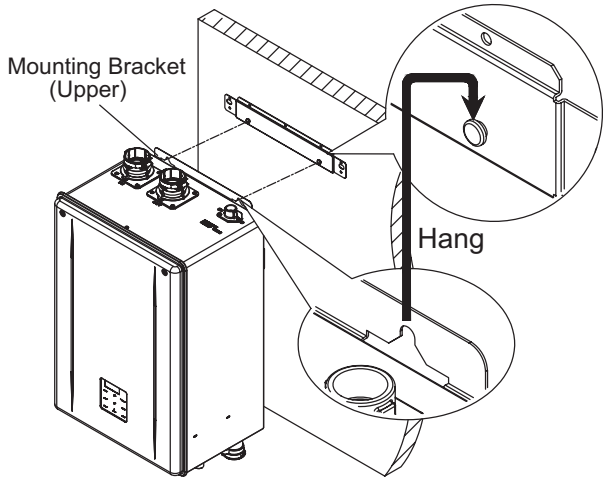
## Mounting the Combi Boiler to the wall

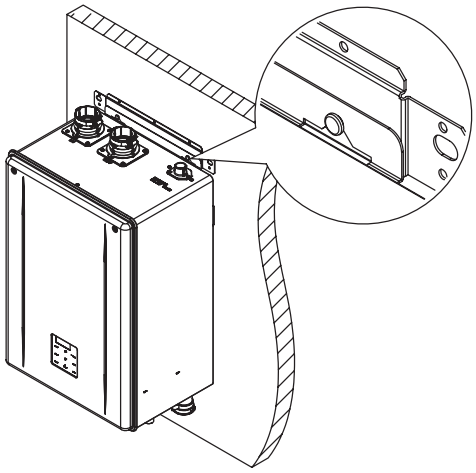
### ⚠ CAUTION

- When installing with bare hands, take caution to not inflict injury.
- Be careful not to hit electrical wiring, gas, or water piping while drilling holes.

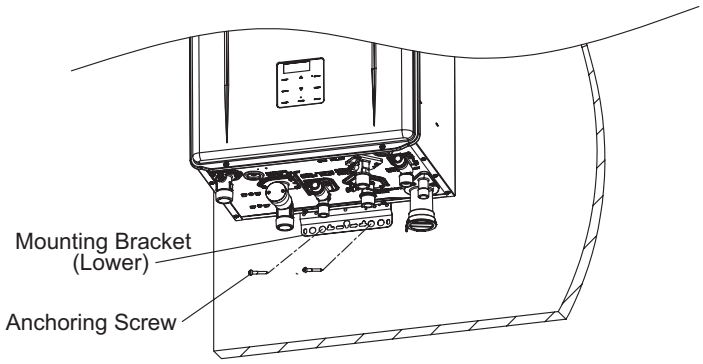



1. Drill holes for the Wall Mounting Bracket.
   Affix the Wall Mounting Bracket securely to the wall by 5 screws.
   Ensure that it is leveled, and it can support the weight of the Combi Boiler.



2. Hang the Combi Boiler on the Wall Mounting Bracket.



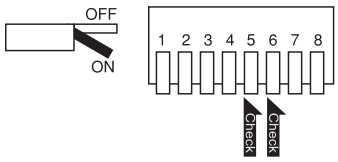

3. Affix the Mounting Bracket (Lower) to the wall by 2 screws.

## Elevation Adjustment above 2,000ft

- Adjust the dip switches as illustrated in the table below if this Combi Boiler is installed at an altitude of 2000 ft. (610m) or higher.
- Disconnect power to the Combi Boiler before changing the dip switches.
  Failure to perform this step will result in a "73" code displayed on the Operation Panel and a cease in operation. If this occurs, disconnect, then reconnect power to the Combi Boiler to reset the system.

Note: Please refer to page 19 for the location of the dip switch bank.

* Do not change any other dip switches.




| High Elevation Adjustment | Dip Switches #5 | Dip Switches #6 |
|---|---|---|
| 0 - 2,000 ft (0 - 610m) | ○ | ○ |
| 2,001 - 4,000 ft (611 - 1,220m) | ● | ○ |
| 4,001 - 7,000 ft (1,221 - 2,135m) | ○ | ● |
| 7,001 - 10,000 ft (2,136 - 3,050m) | ● | ● |

ON= ● OFF= ○

## Filling the Condensate Container with Water

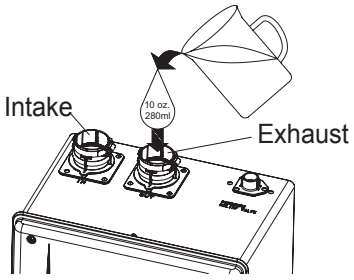
The condensate container can be filled before connecting the vent pipe.

**Filling the condensate container before vent pipe installation.**

**⚠ DANGER** Prior to initial start up, make sure that you fill the condensate container with water. This is to prevent dangerous exhaust gases from entering the building. Failure to fill the condensate container could result in severe personal injury or death.

Please follow one of the procedures described below to ensure that the condensate container is filled with water.

1) Fill the condensate container by pouring approx. 10 oz.(280ml) of water into the exhaust accessory on the top of the appliance as illustrated below.




Or, if the vent pipe has already been installed:

2) After installing the drain pipe, make sure that the area around the appliance is well ventilated; open a window or a door if necessary.
   Then, operate the unit and verify that condensate is coming out of the drain pipe.
   (During normal use of the Combi Boiler, condensate will begin to discharge from the drain pipe within 15 minutes of use. However, depending on the season and/or installation site conditions, it may take longer.

# 7. Venting the Combi Boiler (Indoor Installation Only)

## ⚠ WARNING

Be sure to do

CARBON MONOXIDE POISONING
Follow all vent system requirements in accordance with relevant local or state regulation, or, in the absence of local or state code, in the U.S. to the National Fuel Gas Code ANSI Z233.1/NFPA 54 – latest edition, and in Canada, in accordance with the Natural Gas and Propane Installation Code CSA B149.1 – latest edition.

## Indoor Installation

**General Requirements**

- This is a Category IV appliance. Only vent materials approved for use with Category IV appliances should be used.
- Under normal conditions, this appliance will not produce an exhaust flue temperature in excess of 149°F (65°C) and schedule 40 PVC pipe may be used as the vent material. **If the Combi Boiler set temperature is 160°F (70°C) or higher, use schedule 40/80 CPVC or PP.** Refer to page 13 for additional requirements.
- Make sure the vent system is gas tight and will not leak.
- Support the vent pipe with hangers at regular intervals as specified by these instructions or the instructions of the vent manufacturer.
- Do not common vent or connect more than one appliance to this venting system.
- The total vent length including horizontal & vertical vent runs should be no less than 3' (0.9m).
- Do not store hazardous or flammable substances near the vent termination and check that the termination is not blocked in any way.
- Steam or condensed water may come out from the vent termination. Select the location for the termination so as to prevent injury or property damage.
- If snow is expected to accumulate, take care the end of the pipe is not covered with snow or hit by falling lumps of snow.

**Maximum Vent Lengths**

- This appliance has been designed to be vented with either 2" (50mm) or 3" (75mm) PVC, CPVC or PP.
  Do not exceed the following maximum vent lengths:

| Pipe diameter | 2" (50mm) | 3" (75mm) |
|---|---|---|

| No. of Elbows | Max. Straight Vent Length* | |
|---|---|---|
| 8 | N/A | 60' (18.0m) |
| 7 | N/A | 63' (18.9m) |
| 6 | 12' ( 3.6m) | 69' (20.7m) |
| 5 | 18' ( 5.4m) | 75' (22.5m) |
| 4 | 27' ( 8.1m) | 78' (23.4m) |
| 3 | 36' (10.8m) | 84' (25.2m) |
| 2 | 42' (12.6m) | 90' (27.0m) |
| 1 | 51' (15.3m) | 96' (28.8m) |

* Not including the termination

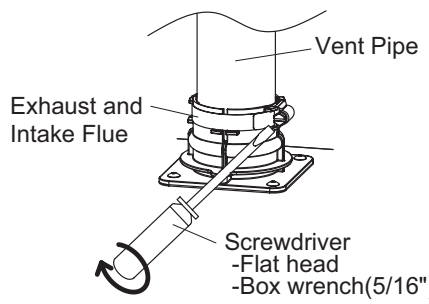
Refer to page 17 for max. vent lengths When using PVC Concentric Termination.

**Clearances**

PVC,CPVC or PP has been approved for use on this appliance with zero clearance to combustibles.

**How to tighten the vent pipe**

1. Continue to insert the Vent Pipe until it reaches to the base of the unit Exhaust and Intake Flue.
   (The Vent Pipe will be inserted approximately 2.3"(60mm).)
2. Secure the Vent Pipe by tightening the band using a screwdriver
   (The tightening torque shall be between 16 and 20 in lb.)



# Maximum Vent Length Adjustment Dip Switches

The unit can be adjusted to accommodate longer vent runs; refer to the below table to find the maximum vent length based on the number of elbows. Adjust the dip switches according to the vent condition noted in the tables below.

Note: By default, the unit has been set to the "①short length using 2" (50mm) pipe" condition. When adjusting the dip switches for longer vent runs, the BTUH input of the appliance will be reduced by up to 9%.

## <Maximum Vent Length Configurations>

●2" Pipe

| Vent length* | | | Elbows | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ft | m | Number of pieces** | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 3 | 0.9 | 1 | | | | | | | |
| 6 | 1.8 | 2 | | | | | | | |
| 9 | 2.7 | 3 | | | ① | | | | |
| 12 | 3.6 | 4 | | | | | | | |
| 15 | 4.5 | 5 | | | | | | | |
| 18 | 5.4 | 6 | | | | | | | |
| 21 | 6.3 | 7 | | | | | | | |
| 24 | 7.2 | 8 | | | | | | | |
| 27 | 8.1 | 9 | | | | ② | | | |
| 30 | 9.0 | 10 | | | | | | | |
| 33 | 9.9 | 11 | | | | | | | |
| 36 | 10.8 | 12 | | | | | | | |
| 39 | 11.7 | 13 | | | | | | | |
| 42 | 12.6 | 14 | | | | | | | |
| 45 | 13.5 | 15 | | | | | | | |
| 48 | 14.4 | 16 | | | | | | | |
| 51 | 15.3 | 17 | | | | | | | |
| 54 | 16.2 | 18 | | | | | | | |
| 57 | 17.1 | 19 | | | | | | | |
| 60 | 18.0 | 20 | | | | | | | |

* Not including the termination.

** Table assumes straight vent pieces are 3' (0.9m) each. Shorter or longer vent pieces may also be used up to the maximum allowed vent length.

●3" Pipe

| Vent length* | | | Elbows | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ft | m | Number of pieces** | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 3 | 0.9 | 1 | | | | | | | | | |
| 6 | 1.8 | 2 | | | | | | | | | |
| 9 | 2.7 | 3 | | | | | | | | | |
| 12 | 3.6 | 4 | | | | | | | | | |
| 15 | 4.5 | 5 | | | | | | | | | |
| 18 | 5.4 | 6 | | | | | ③ | | | | |
| 21 | 6.3 | 7 | | | | | | | | | |
| 24 | 7.2 | 8 | | | | | | | | | |
| 27 | 8.1 | 9 | | | | | | | | | |
| 30 | 9.0 | 10 | | | | | | | | | |
| 33 | 9.9 | 11 | | | | | | | | | |
| 36 | 10.8 | 12 | | | | | | | | | |
| 39 | 11.7 | 13 | | | | | | | | | |
| 42 | 12.6 | 14 | | | | | | | | | |
| 45 | 13.5 | 15 | | | | | | | | | |
| 48 | 14.4 | 16 | | | | | | | | | |
| 51 | 15.3 | 17 | | | | | | | | | |
| 54 | 16.2 | 18 | | | | | | | | | |
| 57 | 17.1 | 19 | | | | | | | | | |
| 60 | 18.0 | 20 | | | | | ④ | | | | |
| 63 | 18.9 | 21 | | | | | | | | | |
| 66 | 19.8 | 22 | | | | | | | | | |
| 69 | 20.7 | 23 | | | | | | | | | |
| 72 | 21.6 | 24 | | | | | | | | | |
| 75 | 22.5 | 25 | | | | | | | | | |
| 78 | 23.4 | 26 | | | | | | | | | |
| 81 | 24.3 | 27 | | | | | | | | | |
| 84 | 25.2 | 28 | | | | | | | | | |
| 87 | 26.1 | 29 | | | | | | | | | |
| 90 | 27.0 | 30 | | | | | | | | | |
| 93 | 27.9 | 31 | | | | | | | | | |
| 96 | 28.8 | 32 | | | | | | | | | |
| 99 | 29.7 | 33 | | | | | | | | | |
| 100 | 30.0 | 34 | | | | | | | | | |

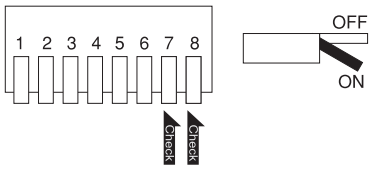
* Not including the termination.

** Table assumes straight vent pieces are 3' (0.9m) each. Shorter or longer vent pieces may also be used up to the maximum allowed vent length.

【Dip Switch Adjustment】

| Vent length condition | Dip Switches | |
|---|---|---|
| | #7 | #8 |
| ① Short length using 2" (50mm) pipe | ○ | ○ |
| ② Long length using 2" (50mm) pipe | ● | ○ |
| ③ Short length using 3" (75mm) pipe | ○ | ● |
| ④ Long length using 3" (75mm) pipe | ● | ● |

ON=● OFF=○




• Do not change any other dip switches.
• Please refer to page 19 for the location of the dip switch bank.

[Vent length example]
Using 2"(50mm) pipe, Vent length = 42 ft. (12.8m) and Two 90° elbows
→Set at "② long length using 2" (50mm) pipe" condition.

- Disconnect power to the Combi Boiler before changing the dip switches. Failure to perform this step will result in a "73" code displayed on the Operation Panel and a cease in operation. If this occurs, disconnect, then reconnect power to the Combi Boiler to reset the system.

The power must be unplugged when adjusting the dip switches to switch the airflow amount.

### Venting With PVC, CPVC or PP

This appliance can be vented with non cellular core plastic pipe materials as specified in the below table. Vent installations in Canada which utilize plastic vent systems must comply with ULC S636.

| Item | Material | United States | Canada |
|---|---|---|---|
| Exhaust Vent/Air Intake | Schedule 40 PVC | ANSI/ASTM D1785 | CSA B137.3 |
| | PVC-DWV | ANSI/ASTM D2665 | CSA B181.2 |
| | Schedule 40 CPVC | ANSI/ASTM F441 | CSA B137.3 |
| | Polypropylene* | Centrotherm-InnoFule® (certified ULC 636S) | |
| Pipe Cement/Primer | PVC | ANSI/ASTM D2564 | ULC S636 Certified Materials Only |
| | CPVC | ANSI/ASTM F493 | |
| Note: Use of cellular core PVC (ASTM F891), cellular core CPVC, or Radel® (polyphenylsulfone) in non-metallic venting system is prohibited. | | | |

* Polypropylene : Only listed manufacture specified vent parts may be used for this appliance. Refer to the manufacture's literature for detailed information.

| Approved Vent Manufacture | Parts# |
|---|---|
| Centrotherm - InnoFlue® PP | Single Wall Pipe (2”/3”) : ISVL02xx(UV) / 03xx(UV), ISEP02xx / 03xx, ISIA0203<br>Elbow : ISELL0287(UV) / 0387(UV), ISELL0245 / 0345<br>Termination** : ISELL0287UV / 0387UV, ISTT0220 / 0320<br>Bird Screen : IASPP02/03 |

** Applicable vent termination are "87 degree elbow" or "Tee type". Concentric vent termination of polypropylene are prohibited.

### PVC / CPVC / PP Installation Instructions

- Use only solid PVC / CPVC (schedule 40) or PP pipe. Cellular foam core piping is not allowed.
- Covering non-metallic vent pipe and fittings with thermal insulation is prohibited.
- 2" or 3" schedule 80 pipe may also be used on this appliance, however the BTUH input of the appliance will be reduced by up to 9%.
- In Canada, plastic vent systems must be certified to ULC S636. The components of the certified vent system must not be interchanged with other vent systems or unlisted pipe/fittings.
- In Canada, specified primers and glues of the ULC S636 certified vent system must be from a single system manufacturer and not intermixed with other system manufacturer’s vent system parts.
- Follow all general venting guidelines as outlined on this page.
- PVC, CPVC or PP pipe has been approved for use on this appliance with zero clearance to combustibles.
- The pipe shall be installed so that the first 3’ (0.9m) of pipe from the appliance flue outlet is readily accessible for visual inspection.
- When preparing and assembling the pipe, follow instructions as provided by the pipe manufacturer. In general, the following practices must be observed:
  - Squarely cut all pieces of pipe.
  - Remove all burs and debris from joints and fittings.
  - All joints must be properly cleaned, primed, and cemented. Use only cement and primer approved for use with the pipe material as outlined in the above table.

**⚠ WARNING**

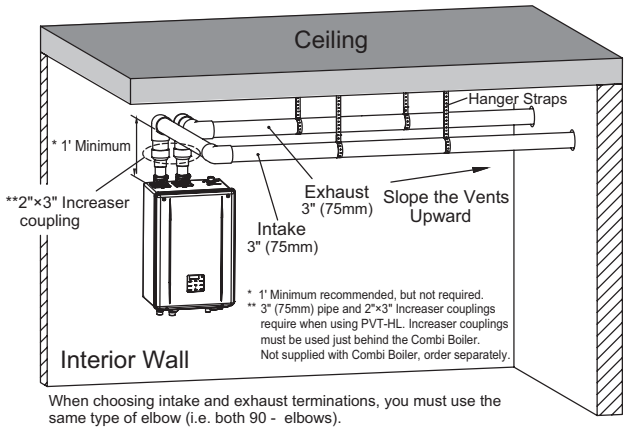
CARBON MONOXIDE POISONING
Failure to properly seal the vent system could cause flue products to enter the living space.

- All piping must be fully supported. Use pipe hangers at a minimum of 3’ (0.9m) intervals. Do not use the water heater to support the vent piping.
- When attaching the piping to the water heater, use the appropriate primer and cement to ensure a proper seal.
- A bird screen must be installed on the vent terminations to prevent debris or animals from entering the piping. These screens are not supplied with the water heater and must be purchased separately.

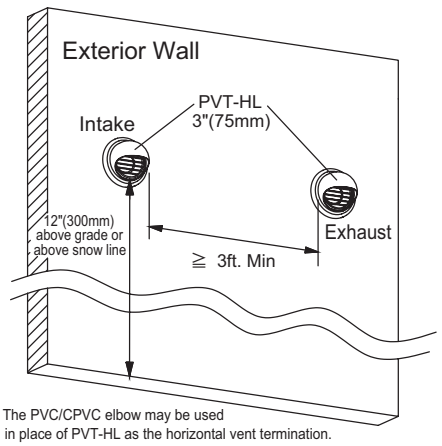
| Vent Material | Bird Screen Parts # |
|---|---|
| 2" (50mm)/3"(50mm) PVC or CPVC | VT2-PVCS / VT3-PVCS |
| Centrotherm - 2"(50mm)/3"(75mm) PP | IASPP02 / IASPP03 |

# Vent Pipe Installation

## Horizontal Vent Termination - PVC/CPVC Material Only (when using PVT-HL termination)



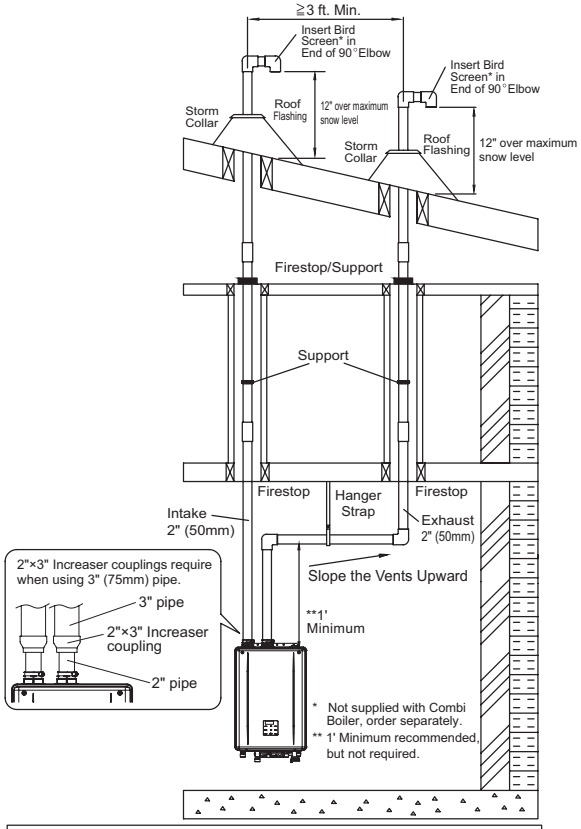

When choosing intake and exhaust terminations, you must use the same type of elbow (i.e. both 90 - elbows).
This will help with proper combustion by putting both terminations in the same pressure zone.




The PVC/CPVC elbow may be used in place of PVT-HL as the horizontal vent termination.

- Make sure to keep a distance of 3' (0.9m) or wider between the intake and exhaust when installing the vent piping. If 3' (0.9m) distance between Intake and Exhaust cannot be ensured, the installation can be carried out only in the installation method shown in page 15.
- Terminate at least 12" (300mm) above grade or above snow line.
- Slope the horizontal vent 1/4" upwards for every 12" (300mm) toward the termination.
- Use a condensation drain if necessary.
- In the Commonwealth of Massachusetts a carbon monoxide detector is required for all side wall horizontally vented gas fuel equipment. Please refer to Technical Bulletin TB 010606 for full installation instructions.

## Vertical Vent Termination - PVC/CPVC/PP Material



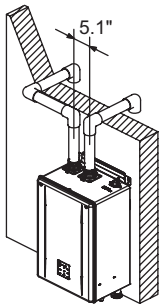

When choosing intake and exhaust terminations, you must use the same type of elbow (i.e. both 90° elbows).
This will help with proper combustion by putting both terminations in the same pressure zone.

- As illustrated on the left, make sure to keep a distance of 3' (0.9m) or wider between the intake and exhaust when installing the vent piping.
- Terminate at least 3' (0.9m) from the combustion air intake of any appliance and any other building opening.
- Enclose exterior vent systems below the roof line to limit condensation and protect against mechanical failure.
- When the vent penetrates a floor or ceiling and is not running in a fire rated shaft, a firestop and support is required.
- When the vent termination is located not less than 8' (2.4m) from a vertical wall or similar obstruction, terminate above the roof at least 2' (0.6m), but not more than 6' (1.87m), in accordance with the National Fuel Gas Code ANSI Z223.1/NFPA 54 or Natural Gas and Propane Installation Code CSA B149.1.
- Provide vertical support every 3' (0.9m) or as required by the vent pipe manufacturer's instructions.
- A short horizontal section is recommended to prevent debris from falling into the Combi Boiler.
- When using a horizontal section, slope the horizontal vent 1/4" upwards for every 12" (300mm) toward the termination to drain condensate.
- When using 3" (75mm) pipe, it will be necessary to use 2" (50mm) ×3" (75mm) increaser couplings and a short section 2" (50mm) pipe to connect the Exhaust and Intake Flue of the Combi Boiler. Use maximum 6" (150mm) section of pipe to make the connection between the increaser couplings and the Exhaust and Intake Flue of the Combi Boiler.

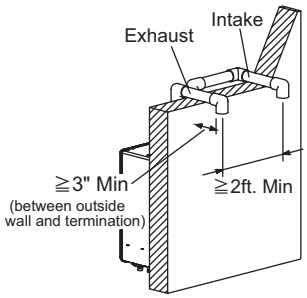
## Vent Pipe Installation

### Alternate Horizontal Vent Termination- PVC/CPVC/PP Material

* When 3' (0.9m) distance between Intake and Exhaust cannot be ensured.
* Can not use Hood termination (PVT-HL)
* Insert the bird screen. 90° elbow vertical setting (downward).
* Ensure at least 3ft (0.9m) or more distance between the near edge of the air intake pipe or exhaust pipe to the inside corner of a wall.
* Intake and exhaust should face the same direction. Intake and exhaust should keep the same pressure zone

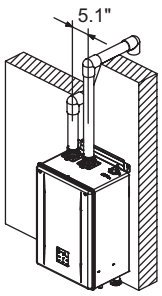



Interior View

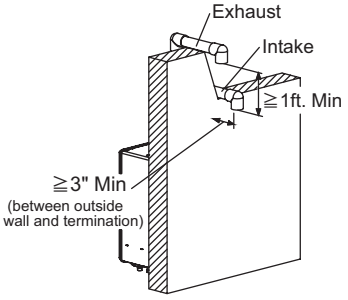



Exterior View

- Ensure at least 2ft (0.6m) or more distance between intake pipe and exhaust pipe. The distance is measured at inside of pipe to inner dimension.

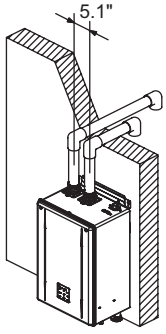



Interior View

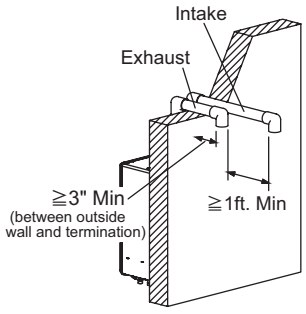



Exterior View

- Upper side is exhaust, lower side is intake. The reverse orientation is not allowed.
- Ensure at least 1ft (0.3m) or more distance between intake pipe and exhaust pipe. The distance is measured at the outlets of intake port (terminal) and exhaust port (terminal).




Interior View




Exterior View

- The side distant from wall is intake, the side near the wall is exhaust. The reverse orientation is not allowed.
- Ensure at least 1ft (0.3m) or more distance between intake pipe and exhaust pipe. The distance is measured at inside of pipe to inner dimension.

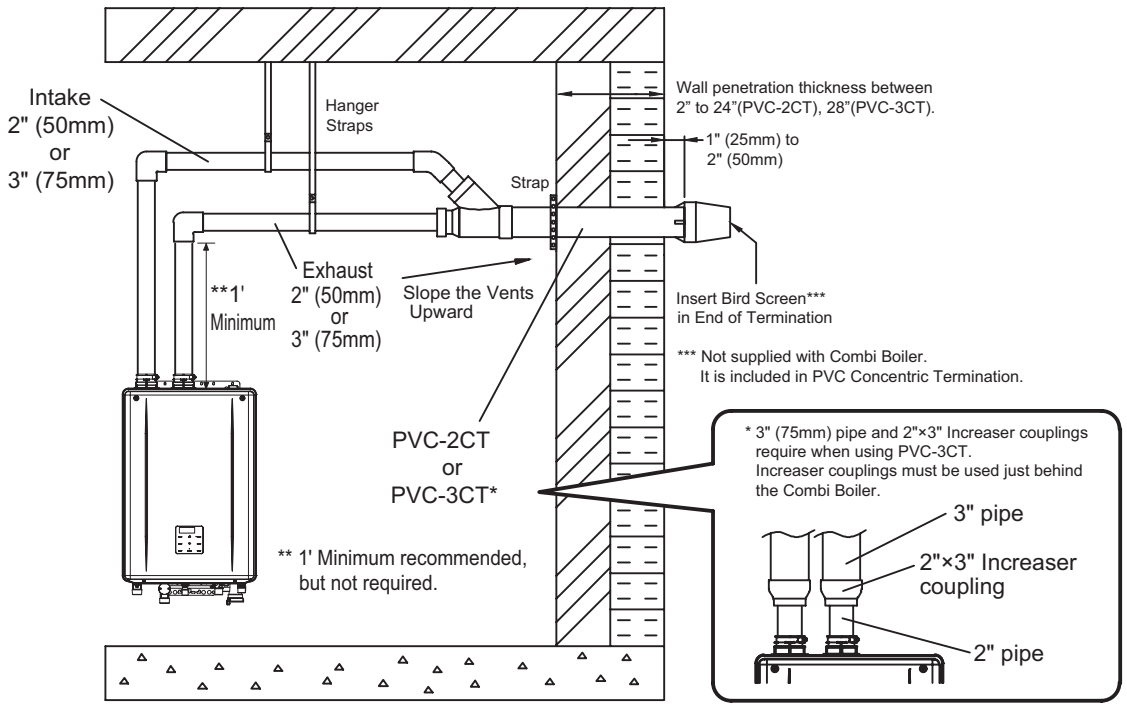
## ⚠ WARNING

- If the distance between the air inlet and exhaust vent terminations is too short, the Combi Boiler will draw in the exhaust gases through the intake. There is a risk of inadequate combustion air for the Combi Boiler, increasing Carbon Monoxide (CO) emissions and noise due to vibration.
- Termination elbows must be oriented vertically, pointing directly downward. Attempts to prevent exhaust air from entering the air inlet by angling termination elbows in directions other than directly downward will increase the risk of freezing.
- Reversing the air intake and exhaust pipes is not allowed. Carbon Monoxide (CO) emissions and noise due to vibration will increase.

**PVC Concentric Termination- PVC/CPVC Material Only**

- The concentric termination may be shortened, but not lengthened from its original factory supplied length.
- 2"(50mm) or 3" (75mm) PVC or CPVC pipe may be used with the concentric termination. Maintain the same vent pipe diameter from the Combi Boiler flue to the termination.
- Do not exceed the maximum vent lengths as shown on page 17.
- When using 3" (75mm) pipe, it will be necessary to use 2"(50mm)×3" (75mm) increaser couplings and a short section 2" (50mm) pipe to connect the Exhaust and Intake Flue of the Combi Boiler. Use maximum 6" (150mm) section of pipe to make the connection between the increaser couplings and the Exhaust and Intake Flue of the Combi Boiler.
- There must be a 1" (25mm) to 2" (50mm) clearance between the outside wall and the air intake section of the termination as illustrated below.
- Install a securing strap to prevent movement of the termination.
- Terminate at least 12" (300mm) above grade or above snow line.
- For vertical installation, terminate at least 3' (0.9m) from the combustion air intake of any appliance and any other building opening.
- Slope the horizontal vent 1/4" upwards for every 12" (300mm) toward the termination.
- Use a condensation drain if necessary.
- In the Commonwealth of Massachusetts a carbon monoxide detector is required for all side wall horizontally vented gas fuel equipment. Please refer to Technical Bulletin TB 010606 for full installation instructions

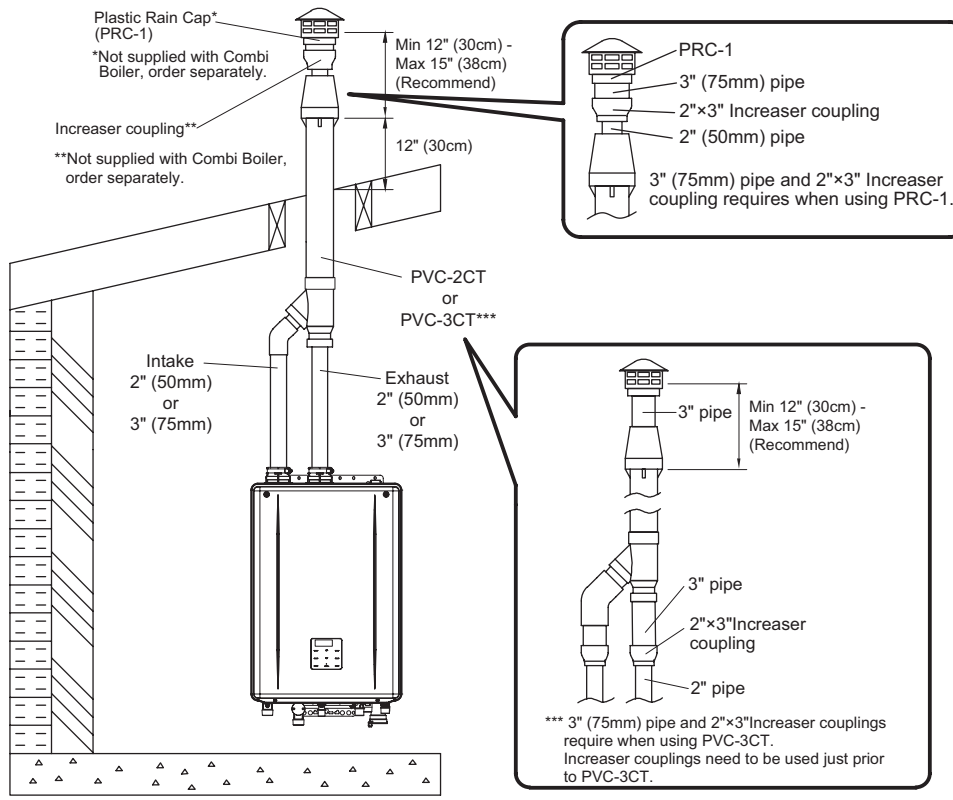
## Horizontal




e.g.) PVC-2CT installation

Continue to next page

## Vertical




e.g.) PVC-2CT installation

## ＜Maximum Vent length when using PVC-2CT or PVC-3CT＞

●2" Pipe

| Vent length* | | | Elbows | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ft | m | Number of pieces** | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 3 | 0.9 | 1 | | | | | | | |
| 6 | 1.8 | 2 | | | | | | | |
| 9 | 2.7 | 3 | | ① | | | | | |
| 12 | 3.6 | 4 | | | | | | | |
| 15 | 4.5 | 5 | | | | | | | |
| 18 | 5.4 | 6 | | | | | | | |
| 21 | 6.3 | 7 | | | | | | | |
| 24 | 7.2 | 8 | | | | ② | | | |
| 27 | 8.1 | 9 | | | | | | | |
| 30 | 9.0 | 10 | | | | | | | |
| 33 | 9.9 | 11 | | | | | | | |
| 36 | 10.8 | 12 | | | | | | | |
| 39 | 11.7 | 13 | | | | | | | |
| 42 | 12.6 | 14 | | | | | | | |
| 45 | 13.5 | 15 | | | | | | | |
| 48 | 14.4 | 16 | | | | | | | |
| 51 | 15.3 | 17 | | | | | | | |
| 54 | 16.2 | 18 | | | | | | | |
| 57 | 17.1 | 19 | | | | | | | |
| 60 | 18.0 | 20 | | | | | | | |

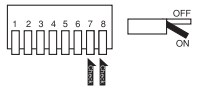
* Not including the termination.

** Table assumes straight vent pieces are 3' (0.9m) each. Shorter or longer vent pieces may also be used up to the maximum allowed vent length.

【Dip Switch Adjustment】

| Vent length condition | Dip Switches | |
|---|---|---|
| | #7 | #8 |
| ① Short length using 2" (50mm) pipe | ○ | ○ |
| ② Long length using 2" (50mm) pipe | ● | ○ |
| ③ Short length using 3" (75mm) pipe | ○ | ● |
| ④ Long length using 3" (75mm) pipe | ● | ● |

ON=● OFF=○




●3" Pipe

| Vent length* | | | Elbows | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ft | m | Number of pieces** | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 3 | 0.9 | 1 | | | | | | | | | |
| 6 | 1.8 | 2 | | | | | | | | | |
| 9 | 2.7 | 3 | | | | | | | | | |
| 12 | 3.6 | 4 | | | | | | | | | |
| 15 | 4.5 | 5 | | | | | | | | | |
| 18 | 5.4 | 6 | | | | ③ | | | | | |
| 21 | 6.3 | 7 | | | | | | | | | |
| 24 | 7.2 | 8 | | | | | | | | | |
| 27 | 8.1 | 9 | | | | | | | | | |
| 30 | 9.0 | 10 | | | | | | | | | |
| 33 | 9.9 | 11 | | | | | | | | | |
| 36 | 10.8 | 12 | | | | | | | | | |
| 39 | 11.7 | 13 | | | | | | | | | |
| 42 | 12.6 | 14 | | | | | | | | | |
| 45 | 13.5 | 15 | | | | | | | | | |
| 48 | 14.4 | 16 | | | | | | | | | |
| 51 | 15.3 | 17 | | | | | | | | | |
| 54 | 16.2 | 18 | | | | | | | | | |
| 57 | 17.1 | 19 | | | | | | | | | |
| 60 | 18.0 | 20 | | | | | ④ | | | | |
| 63 | 18.9 | 21 | | | | | | | | | |
| 66 | 19.8 | 22 | | | | | | | | | |
| 69 | 20.7 | 23 | | | | | | | | | |
| 72 | 21.6 | 24 | | | | | | | | | |
| 75 | 22.5 | 25 | | | | | | | | | |
| 78 | 23.4 | 26 | | | | | | | | | |
| 81 | 24.3 | 27 | | | | | | | | | |
| 84 | 25.2 | 28 | | | | | | | | | |
| 87 | 26.1 | 29 | | | | | | | | | |
| 90 | 27.0 | 30 | | | | | | | | | |
| 93 | 27.9 | 31 | | | | | | | | | |
| 96 | 28.8 | 32 | | | | | | | | | |
| 99 | 29.7 | 33 | | | | | | | | | |
| 100 | 30.0 | 34 | | | | | | | | | |

* Not including the termination.

** Table assumes straight vent pieces are 3' (0.9m) each. Shorter or longer vent pieces may also be used up to the maximum allowed vent length.

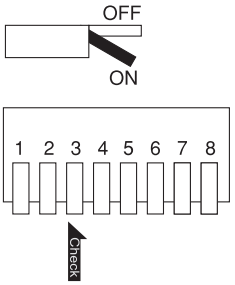
## Vent Pipe Installation (When supplying combustion air from the indoors (SV, non-direct vent))

### ⚠ DANGER

When installing this Combi Boiler in an area with a large amount of lint such as a commercial Laundromat, direct-vent ("-DV") system must be used. The "-SV" configuration (using an SV conversion kit) is prohibited.
When installing this Combi Boiler in a mobile home, all combustion must be drawn directly from the outdoors. The "-SV" configuration (using SV conversion kit) is prohibited.

- **Disconnect power and turn ON dip switch #3 if combustion air will be supplied from the indoors as illustrated to the right. Refer to page 19 for the location of the dip switch bank.**
- **SV Conversion kit SV-CK-2 is required for the air intake.**

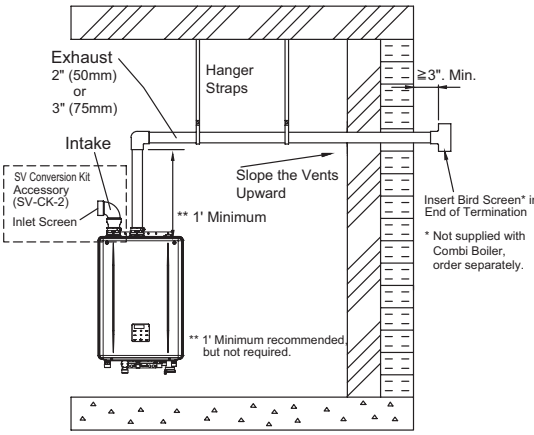
* Dip switch #3 is turned on.




### ⚠ WARNING

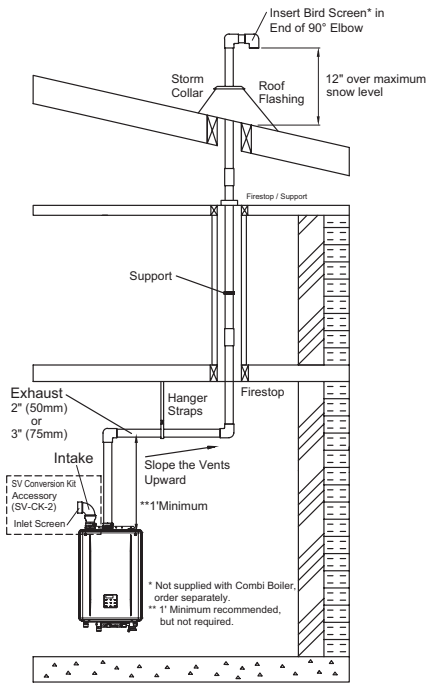
Failure to perform the above 2 steps could result in a fire or explosion causing property damage, personal injury or death.
Refer to the instructions provided with the conversion kit for additional details.
* Noritz recommends to install a Carbon Monoxide Alarm in installation site of the unit when supplying combustion air from the indoors.

### Horizontal Vent Termination




- A tee, the PVT-HL termination may be used for the vent termination. It is not necessary to use bird screens with the PVT-HL termination.
- Terminate at least 12" (300mm) above grade or above snow line.
- Slope the horizontal vent 1/4" upwards for every 12" (300mm) toward the termination.
- Use a condensation drain if necessary.
- In the Commonwealth of Massachusetts a carbon monoxide detector is required for all side wall horizontally vented gas fuel equipment.
  Please refer to Technical Bulletin TB 010606 for full installation instructions.

### Vertical Vent Termination




- Terminate at least 3' (0.9m) from the combustion air intake of any appliance and any other building opening.
- Enclose exterior vent systems below the roof line to limit condensation and protect against mechanical failure.
- When the vent penetrates a floor or ceiling and is not running in a fire rated shaft, a firestop and support is required.
- When the vent termination is located not less than 8' (2.4m) from a vertical wall or similar obstruction, terminate above the roof at least 2' (0.6m), but not more than 6' (1.87m), in accordance with the National Fuel Gas Code ANSI Z223.1/NFPA 54 or Natural Gas and Propane Installation Code CSA B149.1.
- Provide vertical support every 3' (0.9m) or as required by the vent pipe manufacturer's instructions.
- A short horizontal section is recommended to prevent debris from falling into the Combi Boiler.
- When using a horizontal section, slope the horizontal vent 1/4" upwards for every 12" (300mm) toward the termination to drain condensate.

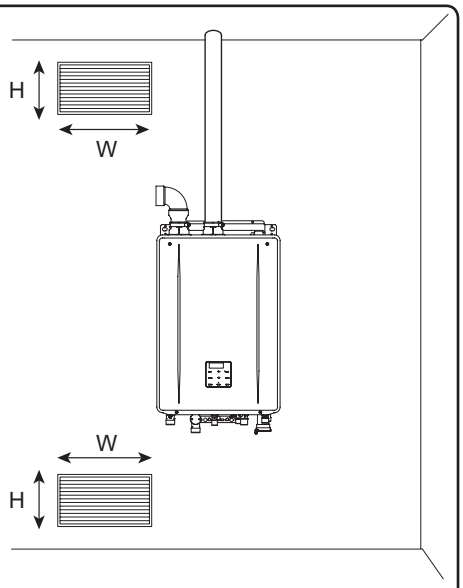
| **Combustion Air** | Supply combustion air to the units as per the National Fuel Gas Code, ANSI Z223.1-latest edition and in Canada, in accordance with the Natural Gas and Propane Installation Code CSA B149.1-latest edition. |
|---|---|

**Provide adequate combustion air so as to not create negative pressure within the building.**

- Provide two permanent openings to allow circulation of combustion air.
- A minimum free area of each openings

| Installation Unit | BTUH | Indoor make up air is provided | Outdoor make up air is provided | |
|---|---|---|---|---|
| | | | Direct or Vertical ducts | Horizontal ducts |
| NRCB199DV (GHQ-C3201WX-FF US) | 199.9 kbtuh | 200 $in^2$ 20" (W) x 10" (H) | 50 $in^2$ 10" (W) x 5" (H) | 100 $in^2$ 20" (W) x 5" (H) |
| NRCB180DV (GHQ-C2801WX-FF US) | 180 kbtuh | 180 $in^2$ 20" (W) x 9" (H) | 45 $in^2$ 10" (W) x 4 1/2" (H) | 90 $in^2$ 20" (W) x 4 1/2" (H) |

- If the unit is installed in a mechanical closet, a minimum of permanent clearance of 4" or more in front of the unit is required. A 24" or more clearance is recommended in order to facilitate maintenance and repair.
- If combustion air will be provided through a duct, size the duct to provide as below.
  NRCB199DV (GHQ-C3201WX-FF US) :
  70 cubic feet of fresh air per minute
  NRCB180DV (GHQ-C2801WX-FF US) :
  63 cubic feet of fresh air per minute
- If the unit is installed in a mobile home, outdoor air must be supplied. The usage of the "-SV" conversion kit is prohibited.




Openings supplying indoor air

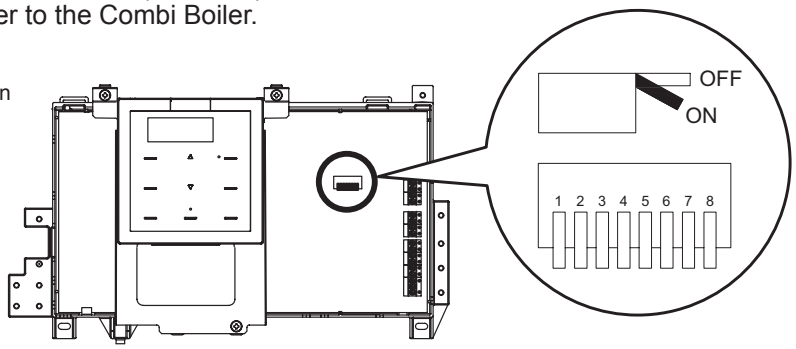
## The location of Dip Switch Bank

● How to change the dip switches*

*The dip switch bank is placed on the circuit board.

1. Disconnect electrical power to the Combi Boiler before changing the dip switches**.
2. Open the front cover of the Combi Boiler (4 screws).
3. Adjust the dip switches as illustrated below.
4. Close the front cover of the Combi Boiler (4 screws).
5. Reconnect the electrical power to the Combi Boiler.

**Failure to perform this step will result a "73" code displayed on the Operation Panel and a cease in operation. If this occurs, disconnect, then reconnect electrical power to the Combi Boiler to reset the system.



# 8. Gas Piping

Follow the instructions from the gas supplier.

## ⚠ CAUTION

The guidelines and examples we have provided in this manual section are for reference only. The sizing and installation of the gas system for this Combi Boiler, as with any gas appliance, is the sole responsibility of the installer. The installer must be professionally trained to do such work and must always follow all local and national codes and regulations. Gas line sizing calculations must be performed for every installation. Please contact Noritz America at 866-766-7489 if you have any questions or concerns.

**Gas Type**

The gas type indicated on the Combi Boiler rating plate (NG or LP) must match the type of gas being supplied to the Combi Boiler.

**Gas Conversions**

If the gas type supplied does not match the gas type on the rating plate, obtain a replacement unit with the proper gas type. If a gas type conversion must be made, there are conversion kits available for some models. [The conversion kit shall be installed by a qualified service agency in accordance with the manufacturer's instructions and all applicable codes and requirements of the authority having jurisdiction. The qualified service agency is responsible for the proper installation of this kit. Improper installation of this kit will void the warranty.]

**Meter**

The gas meter must be sized properly for the Combi Boiler and other gas appliances to operate properly. Select a gas meter capable of supplying the entire btuh demand of all gas appliances in the building.

## ⚠ CAUTION

**Regulators**

Ensure that all gas regulators used are operating properly and providing gas pressures within the specified range of the Combi Boiler being installed. Excess gas inlet pressure may cause serious accidents.

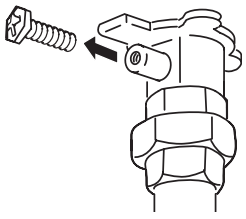
## ⚠ WARNING

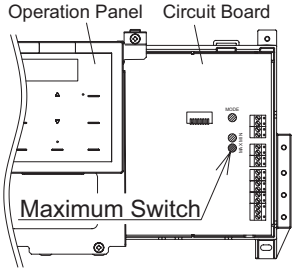
**Pressure**

Check the gas supply pressure immediately upstream at a location provided by the gas company. Supplied gas pressure must be within the limits shown in the specifications section with all gas appliances operating. The inlet gas pressure must be within the range specified. This is for the purposes of input adjustment. Low gas pressure may cause a loss of flame or ignition failure at other appliances in the home, which may result in unburned gas in the home. Serious accidents such as fire or explosion may result.

**Measuring Gas Pressure**

In order to check the gas supply pressure to the unit, a tap is provided on the gas inlet. Remove the **9/32" hex head/Philips screw** from the tap, and connect a manometer using a silicon tube. Open up at least 2 fixtures and hold in the "Maximum Switch" on the circuit board. Please call Noritz for details.





## ⚠ WARNING

**Pressure Test**

The appliance and its gas connections must be leak tested before placing the appliance in operation. The appliance must be isolated from the gas supply piping system by closing its individual manual shutoff valve during any pressure testing of the gas supply piping system at test pressures equal to or less than ½ psig (3.5 kPa). We do not recommend pressure testing in excess of ½ psig (3.5kPa). If it must be done, the appliance and its individual shutoff valve must be completely disconnected from the gas supply piping system during the test process.

**Pipe Sizing/Flexible Connectors**

A gas shutoff valve must be installed on the supply line. Gas flex lines are not recommended unless the minimum inside diameter is ¾" or greater and the rated capacity of the connector is equal to or greater than the BTU capacity of the Combi Boiler. Gas piping shall be in accordance with local utility company requirements and/or in the absence of local codes, use the latest edition of National Fuel Gas Code (NFPA54GC), ANSI Z223.1. In Canada, use the latest edition of CSA B149.1, National Gas and Propane installation code. Size the gas line according to total btuh demand of the building and length from the meter or regulator so that the following supply pressures are available even at maximum demand.

| Natural Gas Supply Pressure | LP Gas Supply Pressure |
|---|---|
| Min 3.5" WC | Min 8" WC |
| Max 10.5" WC | Max 14" WC |

## Reference Tools & Sample Calculations

## ⚠ CAUTION

The tables and samples below are for reference only. The professional sizing and installing the gas line should always run the appropriate calculations before all installations.

**Which Table to Use**

- For NG installations with the initial supply pressure at point of delivery (at the meter, for example) is less than 8" WC, use the 0.5" WC pressure drop table (Table 1).
- For NG installations with the initial supply pressure at point of delivery is greater than or equal to 8" WC, use the 3.0" pressure drop table (Table 2).
- For all LP installation use (Table 3)

The inlet pressure must be at least 5" WC for NG or 8" WC for LP for all appliances in the gas system. If the inlet gas pressure drops below 5" WC for NG or 8" WC for LP, the heater may continue to operate, but the other appliances in the house may experience flame loss or ignition failure, which can result in gas leakage into the home. Refer to the NFPA 54 for details.

Please contact Noritz for details. For corrugated stainless steel tubing (CSST) capacity tables, please consult with the manufacturer.

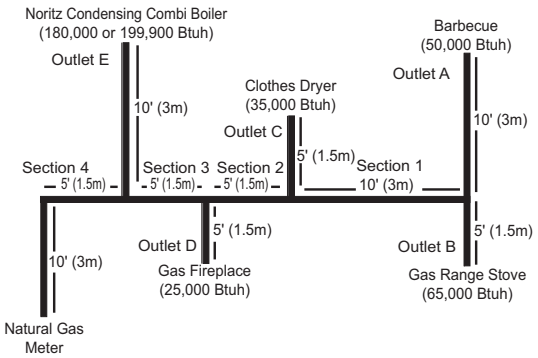
## Table 1. For Less than 8” WC initial supply pressure

Maximum Natural Gas Delivery Capacity (0.5” Pressure Drop) [Schedule 40 Metallic Pipe]

| Pipe Size | Length (including fittings) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10' (3m) | 20' (6m) | 30' (9m) | 40' (12m) | 50' (15m) | 60' (18m) | 70' (21m) | 80' (24m) | 90' (27m) | 100' (30m) | 125' (38m) |
| 3/4" | 360 | 247 | 199 | 170 | 151 | 137 | 126 | 117 | 110 | 104 | 92 |
| 1" | 678 | 466 | 374 | 320 | 284 | 257 | 237 | 220 | 207 | 195 | 173 |
| 1 1/4" | 1,390 | 957 | 768 | 657 | 583 | 528 | 486 | 452 | 424 | 400 | 355 |
| 1 1/2" | 2,090 | 1,430 | 1,150 | 985 | 873 | 791 | 728 | 677 | 635 | 600 | 532 |
| 2" | 4,020 | 2,760 | 2,220 | 1,900 | 1,680 | 1,520 | 1,400 | 1,300 | 1,220 | 1,160 | 1,020 |
| 2 1/2" | 6,400 | 4,400 | 3,530 | 3,020 | 2,680 | 2,430 | 2,230 | 2,080 | 1,950 | 1,840 | 1,630 |
| 3" | 11,300 | 7,780 | 6,250 | 5,350 | 4,740 | 4,290 | 3,950 | 3,670 | 3,450 | 3,260 | 2,890 |
| 4" | 23,100 | 15,900 | 12,700 | 10,900 | 9,660 | 8,760 | 8,050 | 7,490 | 7,030 | 6,640 | 5,890 |

Values in Table are in Cubic Feet of Gas per Hour (0.60 Specific Gravity, 0.5” Pressure Drop, inlet pressure less than 2psi). Contact your gas supplier for BTU/Cubic Foot ratings. For simplification of your calculations, 1 Cubic Foot of Gas is approximately equivalent to 1000 BTU.

**Sample Gas Line**




**Instructions**

1. Size each outlet branch starting from the furthest using the Btuh required and the length from the meter.
2. Size each section of the main line using the length to the furthest outlet and the Btuh required by everything after that section.

**Sample Calculation - (Using 0.5” WC Pressure Drop Table)**

Outlet A: 45' (13.5m) (Use 50' (15m)), 50,000 Btuh requires 1/2"
Outlet B: 40' (12m), 65,000 Btuh requires 1/2"
Section 1: 45' (13.5m) (Use 50' (15m)), 115,000 Btuh requires 3/4"
Outlet C: 30' (9m), 35,000 Btuh requires 1/2"
Section 2: 45' (13.5m) (Use 50' (15m)), 150,000 Btuh requires 3/4"
Outlet D: 25' (7.5m) (Use 30' (9m)), 25,000 Btuh requires 1/2"
Section 3: 45' (13.5m) (Use 50' (15m)), 175,000 Btuh requires 1"
Outlet E: 25' (7.5m) (Use 30' (9m)), 180,000 or 199,900 Btuh requires 3/4"
Section 4: 45' (13.5m) (Use 50' (15m)), 355,000 or 374,900 Btuh requires 1 1/4"

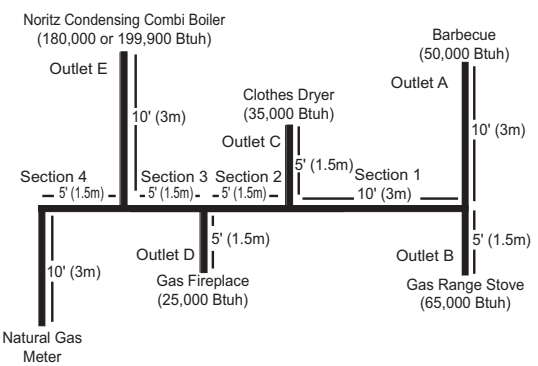
## Table 2. For 8” WC – 10.5” WC initial supply pressure

Maximum Natural Gas Delivery Capacity (3.0” Pressure Drop) [Schedule 40 Metallic Pipe]

| Pipe Size | Length (including fittings) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10' (3m) | 20' (6m) | 30' (9m) | 40' (12m) | 50' (15m) | 60' (18m) | 70' (21m) | 80' (24m) | 90' (27m) | 100' (30m) | 125' (38m) |
| 1/2" | 454 | 312 | 250 | 214 | 190 | 172 | 158 | 147 | 138 | 131 | 116 |
| 3/4" | 949 | 652 | 524 | 448 | 397 | 360 | 331 | 308 | 289 | 273 | 242 |
| 1" | 1,787 | 1,228 | 986 | 844 | 748 | 678 | 624 | 580 | 544 | 514 | 456 |
| 1 1/4" | 3,669 | 2,522 | 2,025 | 1,733 | 1,536 | 1,392 | 1,280 | 1,191 | 1,118 | 1,056 | 936 |
| 1 1/2" | 5,497 | 3,778 | 3,034 | 2,597 | 2,302 | 2,085 | 1,919 | 1,785 | 1,675 | 1,582 | 1,402 |
| 2" | 10,588 | 7,277 | 5,844 | 5,001 | 4,433 | 4,016 | 3,695 | 3,437 | 3,225 | 3,046 | 2,700 |
| 2 1/2" | 16,875 | 11,598 | 9,314 | 7,971 | 7,065 | 6,401 | 5,889 | 5,479 | 5,140 | 4,856 | 4,303 |
| 3" | 29,832 | 20,503 | 16,465 | 14,092 | 12,489 | 11,316 | 10,411 | 9,685 | 9,087 | 8,584 | 7,608 |
| 4" | 43,678 | 30,020 | 24,107 | 20,632 | 18,286 | 16,569 | 15,243 | 14,181 | 13,305 | 12,568 | 11,139 |

Values in Table are in Cubic Feet of Gas per Hour (0.60 Specific Gravity, 3.0” Pressure Drop, 8.0” WC or greater supply pressure, inlet pressure less than 2psi). Contact your gas supplier for BTU/Cubic Foot ratings. For simplification of your calculations, 1 Cubic Foot of Gas is approximately equivalent to 1000 BTU.

**Sample Gas Line**




**Instructions**

1. Size each outlet branch starting from the furthest using the Btuh required and the length from the meter.
2. Size each section of the main line using the length to the furthest outlet and the Btuh required by everything after that section.

**Sample Calculation (Using 3.0” WC Pressure Drop Table)**

Outlet A: 45' (13.5m) (Use 50' (15m)), 50,000 Btuh requires 1/2"
Outlet B: 40' (12m), 65,000 Btuh requires 1/2"
Section 1: 45' (13.5m) (Use 50' (15m)), 115,000 Btuh requires 1/2"
Outlet C: 30' (9m), 35,000 Btuh requires 1/2"
Section 2: 45' (13.5m) (Use 50' (15m)), 150,000 Btuh requires 1/2"
Outlet D: 25' (7.5m) (Use 30' (9m)), 25,000 Btuh requires 1/2"
Section 3: 45' (13.5m) (Use 50' (15m)), 175,000 Btuh requires 1/2"
Outlet E: 25' (7.5m) (Use 30' (9m)), 180,000 or 199,900 Btuh require 1/2"
Section 4: 45' (13.5m) (Use 50' (15m)), 355,000 or 374,900 Btuh requires 3/4"

**Table 3. Maximum Undiluted Propane (LP) Delivery Capacity in Thousands of BtuH (0.5" WC Pressure Drop) [Schedule 40 Metallic Pipe]**

| Pipe Size | Length (including fittings) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10' | 20' | 30' | 40' | 50' | 60' | 80' | 100' | 125' | 150' | 175' | 200' |
| | (3m) | (6m) | (9m) | (12m) | (15m) | (18m) | (24m) | (30m) | (38m) | (45m) | (53m) | (60m) |
| 1/2" | 291 | 200 | 160 | 137 | 122 | 110 | 101 | 94 | 89 | 84 | 74 | 67 |
| 3/4" | 608 | 418 | 336 | 287 | 255 | 231 | 212 | 197 | 185 | 175 | 155 | 140 |
| 1" | 1,150 | 787 | 632 | 541 | 480 | 434 | 400 | 372 | 349 | 330 | 292 | 265 |
| 1 1/4" | 2,350 | 1,620 | 1,300 | 1,110 | 985 | 892 | 821 | 763 | 716 | 677 | 600 | 543 |
| 1 1/2" | 3,520 | 2,420 | 1,940 | 1,660 | 1,480 | 1,340 | 1,230 | 1,140 | 1,070 | 1,010 | 899 | 814 |
| 2" | 6,790 | 4,660 | 3,750 | 3,210 | 2,840 | 2,570 | 2,370 | 2,200 | 2,070 | 1,950 | 1,730 | 1,570 |

For reference only. Please consult gas pipe manufacturer for actual pipe capacities.

## ⚠ CAUTION

**Final Check**

When the installation is complete, verify that inlet gas pressure for the entire gas system does not drop below 5" WC for NG or 8" WC for LP at all appliances. This can be tested by turning on all gas burning appliances including the Combi Boiler, then check the inlet pressure at each appliance to verify all appliances are receiving a minimum of 5" WC for NG or 8" WC for LP. If all appliances are not receiving the minimum inlet pressure the gas piping system may need to be changed.

# 9. Domestic Water Piping

Installation and service must be performed by a qualified plumber. In the Commonwealth of Massachusetts, this product 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. Observe all applicable codes.

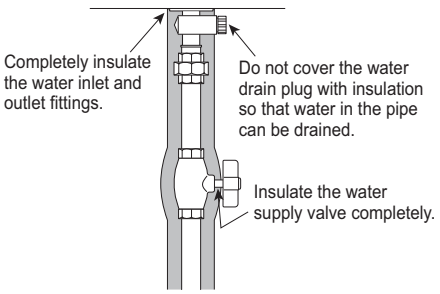
This appliance is suitable for combination potable water and heating applications. Do not use this appliance if any part has been underwater. Immediately call a qualified service technician to inspect the appliance and replace any part of the control system and gas control which has been under water.

If the Combi Boiler is installed with a return line that includes backflow preventer, such as one having a backflow preventer in the DHW cold water supply line, means shall be provided to control thermal expansion. Contact the water supplier or a local plumbing inspector on how to control this situation.

A pressure relief valve must be installed on the heating pressure relief connection and near DHW outlet that is rated in accordance with and complying with either The Standard for Relief Valves for Hot Water Supply Systems, ANSI Z21.22, or The ANSI/ASME Boiler and Pressure Vessel Code, Section IV (Heating Boilers). This pressure relief valve must be capable of an hourly Btu rated temperature steam discharge of 199,900 Btuh. Multiple valves may be used. The pressure relief capacity in DHW pipe must not exceed 150 psig. (The pressure relief capacity on the heating pressure relief valve connection must not exceed 30 psig.) No valve shall be placed between the relief valve and the Combi Boiler. The relief valve must be installed such that the discharge will be conducted to a suitable place for disposal when relief occurs. No reducing coupling or other restriction may be installed in the discharge line. The discharge line must be installed to allow complete drainage of both the valve and the line. If this unit is installed with a separate storage vessel, the separate vessel must have its own temperature and pressure relief valve. This valve must also comply with The Standard for Relief Valves for Hot Water Supply Systems, , ANSI Z21.22. (in the U.S. only). A temperature relief valve is not required, but if one is used, do not install the valve with the probe directly in the flow of water. This may cause unwarranted discharge of the valve.

DHW piping and components connected to the Combi Boiler shall be suitable for use with potable water.
Toxic chemicals, such as those used for boiler treatment, shall not be introduced into the potable water.
A Combi Boiler used to supply potable water may not be connected to any heating system or components previously used with a nonpotable water heating appliance.
When water is required in one part of the system at a higher temperature than in the rest of the system, means such as a mixing valve shall be installed to temper the water to reduce the scald hazard.

- Flush water through the pipe to clean out metal powder, sand and dirt before connecting it.
- Perform the following insulation measures for prevention of freezing.
  - Take appropriate heat insulation measures (e.g., wrapping with heat insulation materials, using electric heaters) according to the climate of the region to prevent the pipe from freezing.
  - Make sure that there are no water leaks from the cold and hot water supply pipes, then insulate the pipes completely.
  - Be sure to also completely insulate the water supply valve and the cold and hot water connections on the Combi Boiler (refer to the figure on the right).
  - Do not cover the water drain plug with insulation so that water in the pipe can be drained. (Refer to the figure in the right.)




- Use a union coupling or flexible pipe for connecting the pipes to reduce the force applied to the piping.
- Do not use piping with a diameter smaller than the coupling.
- When feed water pressure is too high, insert a depressurizing valve, or take water hammer prevention measure.
- Avoid using joints as much as possible to keep the piping simple.
- Avoid piping in which an air holdup can occur.
- If installing the unit on an attic:
- About lower-level DHW supply
  If the unit is installed on an attic to supply water to the levels below, make sure that the water pressure supplied to the unit does not drop below 29 psi. It may be necessary to install a pump system to ensure that the water pressure is maintained at this level.
  Check the pressure before putting the unit into operation.
  Failure to supply the proper pressure to the unit may result in noisy operation, shorter lifetime of the unit, and may cause the unit to shut down frequently.

**Supply water piping**

- Do not use PVC, iron, or any piping which has been treated with chromates, boiler seal or other chemicals.
- Mount a check valve and a shut off valve (near the inlet).
- In order for the client to use the Combi Boiler comfortably, 15 to 150 PSI* (103.4 to 1034 kPa) of pressure is needed from the water supply. Be sure to check the water pressure. If the water pressure is low, the Combi Boiler cannot perform to its full capability, and may become a source of trouble for the client.
  * Recommended 30 psi or more for maximum performance.

**Drain piping**

- Expansion water may drop from the pressure relief valve and wet the floor. If necessary, provide drain piping or use a drain hose to remove the water.

**DHW piping**

- Do not use lead, PVC, iron or any piping which has been treated with chromates, boiler seal or other chemicals.
- The longer the piping, the greater the heat loss. Try to make the piping as short as possible.
- Use mixing valves with low water resistance. Use shower heads with low pressure loss.

**Freeze Prevention**

- This Combi Boiler has functions to protect itself from freezing by operating the pump and turning on the burner when the thermistor detects lower than 39°F(4°C).
- Freezing is prevented within the device automatically unless the outside temperature without wind is below -30°F (-35°C).
  * When combustion air is supplied from the indoors, the room temperature must be greater than 32°F (0°C) to prevent freezing and the room inside must not have negative pressure.
- If this model is installed in an area where the outside temperature can reach freezing conditions of -30°F (-35°C) or below, then additional freeze protection measures must be used. For temporary freeze protection measures, refer to the Owner's Guide.
- The freeze prevention will not prevent freezing in the external plumbing of the unit. Protect this plumbing with insulation, heat tape or electric heaters, solenoids, or pipe covers.

* Freeze damage is not covered by the warranty.
* Refer to page 31 for Heating System Freeze Prevention.

Damage to the Combi Boiler as a result of the below is not covered by the Noritz America Limited Warranty.

- Water in excess of 12 gpg (200mg/L) of hardness
- Poor water quality (see table to the right)

| | |
|---|---|
| Total Hardness* | : 200 mg/L (12 gpg) or less |
| Aluminum | : 0.05 to 0.2 mg/L or less |
| Chloride | : 250 mg/L or less |
| Copper | : 1 mg/L or less |
| Iron | : 0.3 mg/L or less |
| Manganese | : 0.05 mg/L or less |
| pH | : 6.5 - 8.5 |
| Total Dissolved Solids | : 500 mg/L or less |
| Zinc | : 5 mg/L or less |
| Sulfate ion | : 250 mg/L or less |
| Residual chlorine | : 4 mg/L or less |

* Maximum limit suggested by Noritz.

# Water Treatment

If this Combi Boiler will be installed in an application where the supply water is hard, the water must be treated with either the Noritz ScaleShield or a water softener. Refer to the below tables for suggested treatment and maintenance measures to be taken based on the water hardness level.

Damage to the Combi Boiler as a result of the items below is not covered by the Noritz America Limited Warranty.
- Water in excess of 12 gpg (200mg/L) of hardness
- Poor water quality (See the Water Quality List on page 25.)

Note: Water softeners may be regulated by the local water jurisdiction, consult with the manufacturer for code, sizing, and installation guidelines; the below diagram is for reference only. For more information about ScaleShield, contact Noritz America at http://support.noritz.com/ or 866-766-7489.

Treatment Guidelines

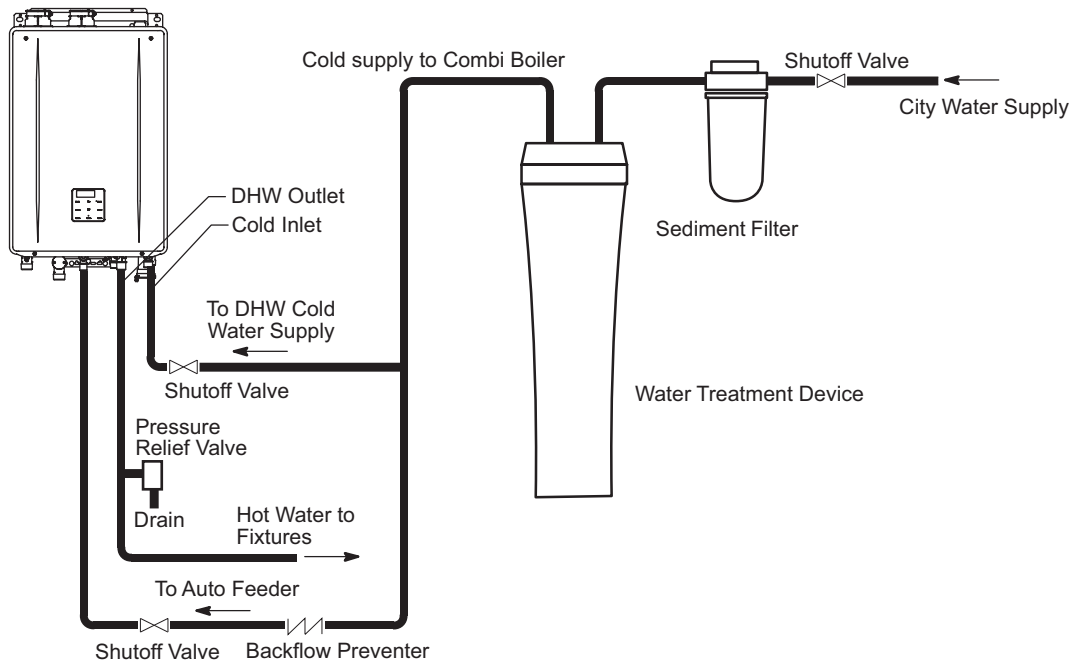
| Type of Water | Hardness Level | Treatment Device* | Flush Frequency** Residential Use |
|---|---|---|---|
| Soft | 0-1 gpg (0-17 mg/L) | None | None |
| Slightly Hard | 1-3 gpg (17-51 mg/L) | None | None |
| Moderately Hard | 3-7 gpg (51-120 mg/L) | ScaleShield or Water Softener | Once a Year*** |
| Hard | 7-10 gpg (120-171 mg/L) | ScaleShield or Water Softener | Once a Year*** |
| Very Hard | 10-12 gpg (171-200 mg/L) | ScaleShield or Water Softener | Once a Year*** |
| Extremely Hard | > 12 gpg (> 200 mg/L) | ScaleShield or Water Softener | Once a Year*** |

* When selecting a treatment device, you must consult with the device's spec sheet and installation manual for guidelines and limitations. Not all water supplies are compatible - a water test may be required.

** Install Noritz Isolation Valves to allow for flushing.

*** Flushing is required if a water treatment device is not installed.

## Water Treatment System




▲The illustration is an example. Please check with the actual Combi Boiler about the position of piping, and form.

# 10. Heating Piping

**System Pressure**

The Combi Boiler is intended solely for use in pressurized closed loop heating systems operating with 12-30 psi water pressure at the Combi Boiler outlet.
To obtain the minimum system design pressure, follow the piping diagrams illustrated in this section.
The Combi Boiler's Heating system is not approved for operation in an "open system", thus it cannot be used for direct potable water heating or to process heating of any kind.

**Backflow Preventer**

Install a backflow preventer valve in the make-up water supply to the unit as required by local codes.

**Expansion Tank**

An expansion tank must be installed in the heating piping to prevent excessive from building in the system.
See the examples of system application at the end of this section for the installation location.
Refer to the expansion tank manufacturer's instructions for additional details.
Follow the guidelines below when installing an expansion tank.

- Connect an air separator to the expansion tank only if the air separator is located on the suction side of the system circulator.
- The Combi Boiler is equipped with an auto-feeding water connection and motorized feeding valve. Therefore, installation of additional system water fill connection is not necessary in most cases.
- If an additional water fill connection is required for a specific use, install the water fill connection at the same location as the expansion tank's connection to the system.
- When replacing an expansion tank, consult the expansion tank manufacturer's literature for proper sizing.
- For diaphragm expansion tanks, always install an automatic air vent on the top side of the air separator to remove residual air from the system.

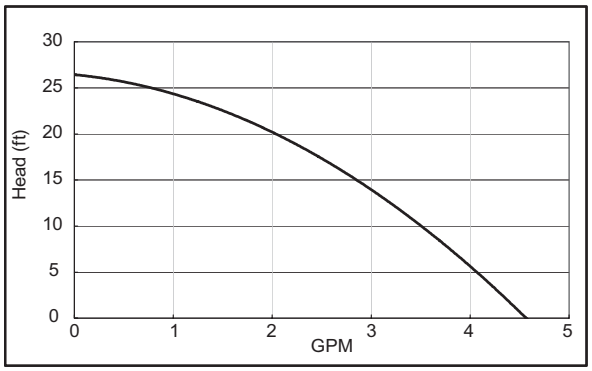
**Oxygen Elimination**

This Combi Boiler may only be installed in a pressurized closed-loop heating system, free of air (oxygen) and other impurities.
To avoid the presence of oxygen, ensure all of the air is removed from the system during commissioning via strategically placed and adequately sized air removal devices, located throughout the heating system.

**⚠ WARNING**

Immediately repair any leaks in the system plumbing to avoid the addition of make-up water, make-up water provides a source of oxygen and minerals that may lead to heat exchanger failure to follow these instructions will result in poor performance, unnecessary wear of system components and premature failure.

NRCB199DV(GHQ-C3201WX-FF US), NRCB180DV(GHQ-C2801WX-FF US) Pump Performance
(with internal pressure drop)



# Low Water Cutoff (LWCO)

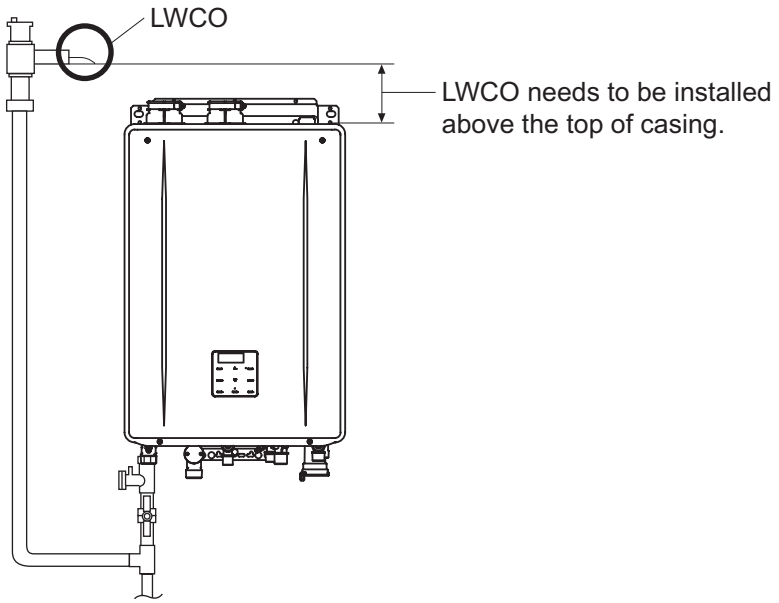
**Internal of the Combi Boiler**

The Noritz Combi Boiler is equipped with a factory installed, pressure sensor type low water cutoff device. The lowest operation pressure for this device is 8 psi. (operation pressure = (default valve 12 psi) - (4 psi))

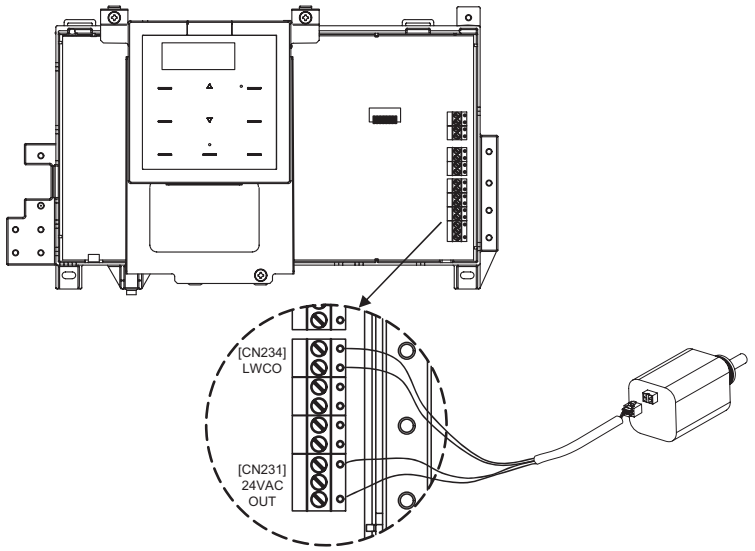
- The Combi Boiler performs water replenishment automatically when the built-in water pressure sensor detects insufficient water level in the Combi Boiler system.

**External of the Combi Boiler**

- Low water cutoffs shall comply with the Safety Standard for Limit Controls, ANSI/UL 353, or the Standard for Temperature Indicating and Regulating Equipment, CAN/CSA C22.2, No. 24, as applicable. The following illustrates example of typical LWCO installation.
- Install the probe above the minimum safe water level.
  NOTE: This may be in a tapping on the Combi Boiler or in the Combi Boiler supply or return piping.
- Install the probe to extend into the Combi Boiler cavity or piping to make contact with the water.
- Low water cutoffs shall be located so as to provide adequate access for cleaning, repairing, testing and inspection.

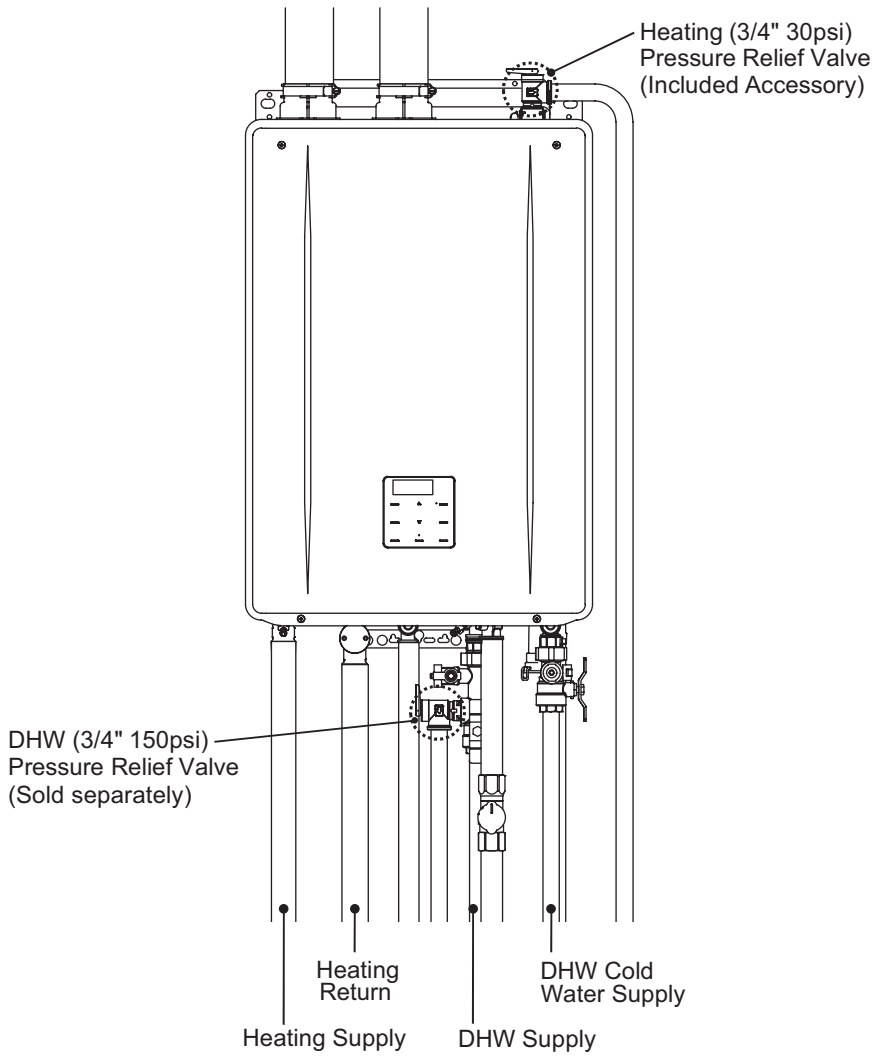



- Remove the factory installed jumper on the LWCO terminals (CN234) prior to connecting the LWCO.
- The Combi Boiler supplies 24 VAC from the terminal (CN231) (see below illustration).



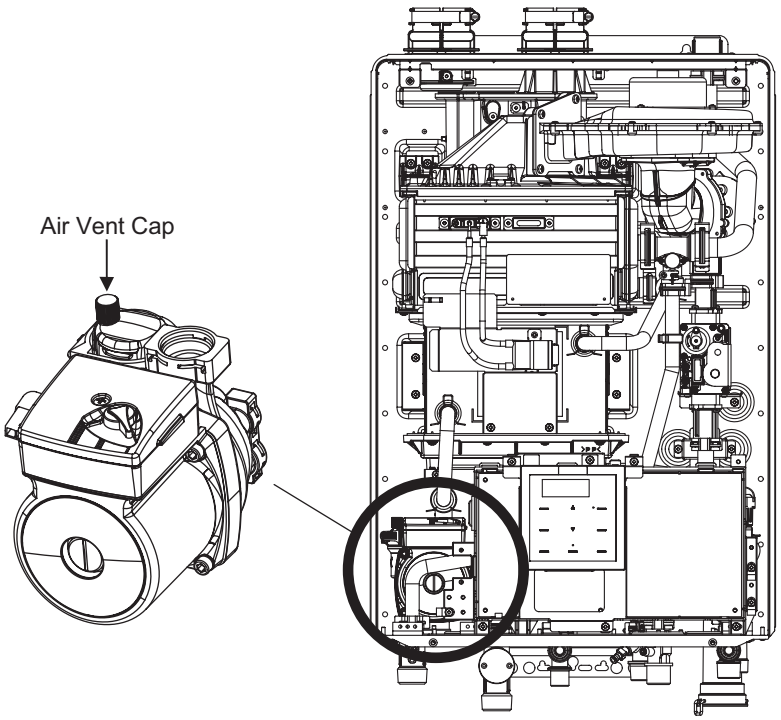
## Pressure Relief Valve

- External pressure relief valve must be installed. Observe the following. Failure to comply with the guidelines on installing the pressure relief valve and discharge piping can result in personal injury, death or substantial property damage.
- DO NOT install a relief valve (DHW pipe line) with pressure higher than 150 psi and relief valve (Heating pipe line) with pressure higher than 30 psi. This is the maximum allowable relief valve setting for the Combi Boiler.
- Approved "Pressure Relief Valve" must be used. An approved ASME HV Valve must be installed on the DHW supply line for hydronic domestic hot water loop as close to the unit as possible. (Valve size 3/4", maximum 150 psi) Refer to the figure below for more information on approved pressure relief valves. (Install "pressure relief valve", Field Supplied).
- No other valve should be installed between the pressure relief valve and Combi Boiler.
- Direct the discharge piping of the pressure relief valve so that hot water will not splash on anyone or any nearby equipment. Attach the discharge line to the pressure relief valve and run the end of the line to within 6 - 12" (150 - 300 mm) of the floor.
- Isolation valve set should be installed, sold separately.

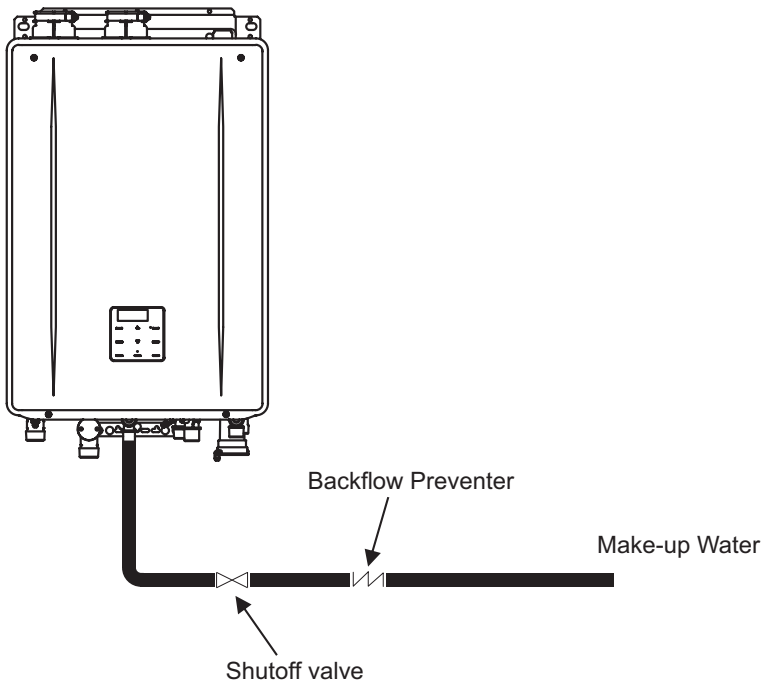


## Auto Feeder Connection

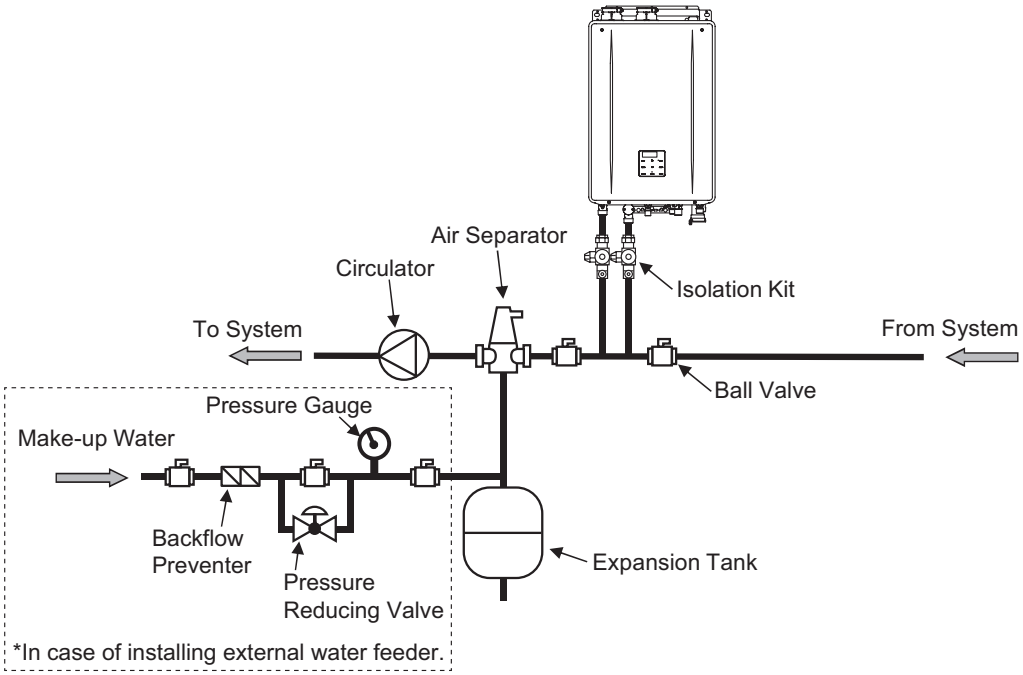
- Before filling the Combi Boiler, loosen the air vent cap to allow the system to fill properly. Tighten the cap when the system is full.




- The Combi Boiler is equipped with an auto feeder valve. Therefore, installation of additional system water fill connection is not necessary in most cases. See the following figure for an example of a water fill installation using the built-in connection.



- External water feeder may be installed on the system piping if it is required for specific applications. See the following figure for an example of external water feeder installation on the system piping.
- If the heating system does not require the Auto Feeder (the internal water feeder) operation, plug the Auto Feeder Water Inlet Connection.
  And set "Auto Feeder Activation" OFF.
  * Refer to page 58 for changing "Auto Feeder Activation" Setting.




**Freeze Prevention**

1. Unit
   - This Combi Boiler has functions to protect itself from freezing by operating the pump and turning on the burner when the thermistor detects lower than 39°F(4°C).
   - Freezing is prevented within the device automatically unless the outside temperature without wind is below -30°F (-35°C).
     * When combustion air is supplied from the indoors, the room temperature must be greater than 32°F (0°C) to prevent freezing and the room inside must not have negative pressure.
   - If this model is installed in an area where the outside temperature can reach freezing conditions of -30°F (-35°C) or below, then additional freeze protection measures must be used. For temporary freeze protection measures, refer to the Owner's Guide.
   - The freeze prevention will not prevent freezing in the external plumbing of the unit.
     Protect this plumbing with insulation, heat tape or electric heaters, solenoids, or pipe covers.

2. Heating System
   - Freeze protection products may be used for the heating system. Freeze protection for new or existing systems requires specially formulated glycol, which contains inhibitors to prevent the glycol from attacking the metallic system components.
   - Before using freeze protection products, ensure that system fluid contains proper glycol concentration and the inhibitor level is appropriate. Noritz recommends against exceeding a 50% concentration of glycol.
   - When using freeze protection products, the system must be tested at least once a year, and as recommended by the manufacturer of the glycol solution.
   - When using the freeze protection products, allowance should be made for expansion of the glycol solution.

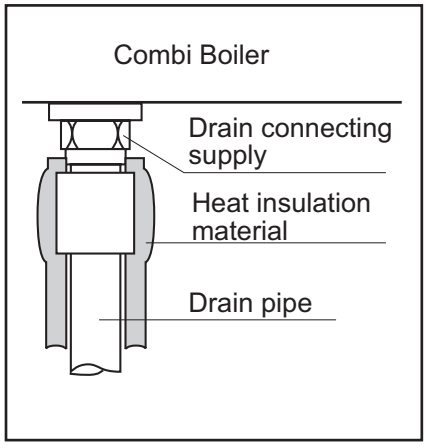
   * Freeze damage is not covered by the warranty.
   * When using freeze protection products, Noritz recommends to plug the Auto Feeder Water Inlet Connection and set "Auto Feeder Activation" OFF.
     * Refer to page 58 for changing "Auto Feeder Activation" Setting.

# 11. Condensate Piping

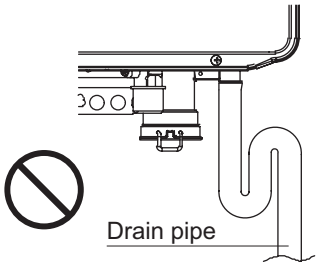
## ⚠ CAUTION

Due to the acidic nature of the condensate, be sure to properly drain and if necessary, treat the condensate prior to disposal. Damage caused by improperly handled condensate is not covered by the warranty.

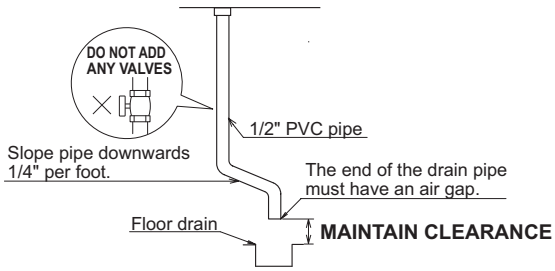
- This Combi Boiler is a high efficiency, fully condensing appliance which produces acidic condensate during operation. The Combi Boiler incorporates a collection and removal system which must be properly drained in order to ensure proper operation of this appliance.
- The pH level of the condensate is approximately 2-3. An external neutralizer must be installed on the drain piping prior to disposal when required by local code or when the condensate could cause damage.
- If an external neutralizer is installed, periodic replacement of the neutralizing agent will be required. Refer to the instructions supplied with the neutralizer for suggested replacement intervals.
- In order to drain the condensate, a 1/2" threaded fitting is provided at the base of the Combi Boiler. Do not reduce the size of this fitting or the drain piping to less than 1/2".
  In cold climates, do not drain the condensate to the outdoors. If the drain pipe freezes during cold weather, the pipe will not drain condensate and the unit will stop operating.
- Use plastic pipe, such as PVC, for the drain line. Do not use steel, black iron, or any other material which can corrode when placed into contact with acidic condensate.
- Keep the length of the drain pipe as short as possible. Long runs or applications where the nearest drain is above the Combi Boiler will require the use of a condensate pump. Size the pump to allow for a maximum condensate discharge of 2 GPH from the Combi Boiler.
- Horizontal runs must be sloped 1/4" per foot towards the drain or condensate pump. The condensate will be discharged by gravity force only. Make the drain pipe run as short as possible.
- The end of the drain pipe must not be submerged in water or blocked in any way. To ensure proper drainage, leave the end of the drain pipe open to the atmosphere. Do not have a trap. Also, make sure that there are no obstructions blocking the drain line from discharging condensate.
- Be sure to check that condensate is freely flowing from the drain piping after the system has been installed. Condensate will begin flowing out of the Combi Boiler within 15 minutes after operation has started.
- Take measures to prevent the condensate drain lines from freezing (insulation, heat tape, electric heaters, etc.).



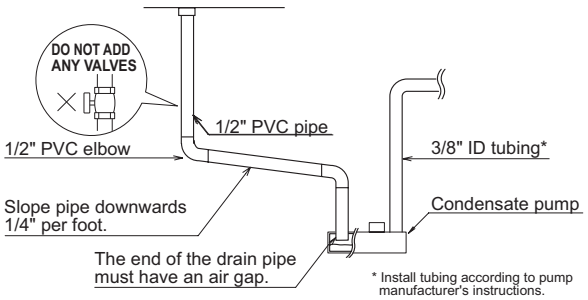

■ Do not pitch the drain line up once a horizontal section has been introduced. Always pitch the drain line down to ensure proper drainage.



**Condensate piping to floor drain**




**Condensate piping with pump**




Note:

If the drain line becomes clogged or frozen, condensate will back-up into the Combi Boiler and a "90" error code will flash on the Operation Panel, ceasing operation. If this occurs, clear the clog or freeze so that condensate can freely flow. Be sure to slope the drain pipe, use the appropriate size pipe, allow the proper clearances, and apply freeze prevention measures (when necessary) to prevent the drain line from clogging or freezing.

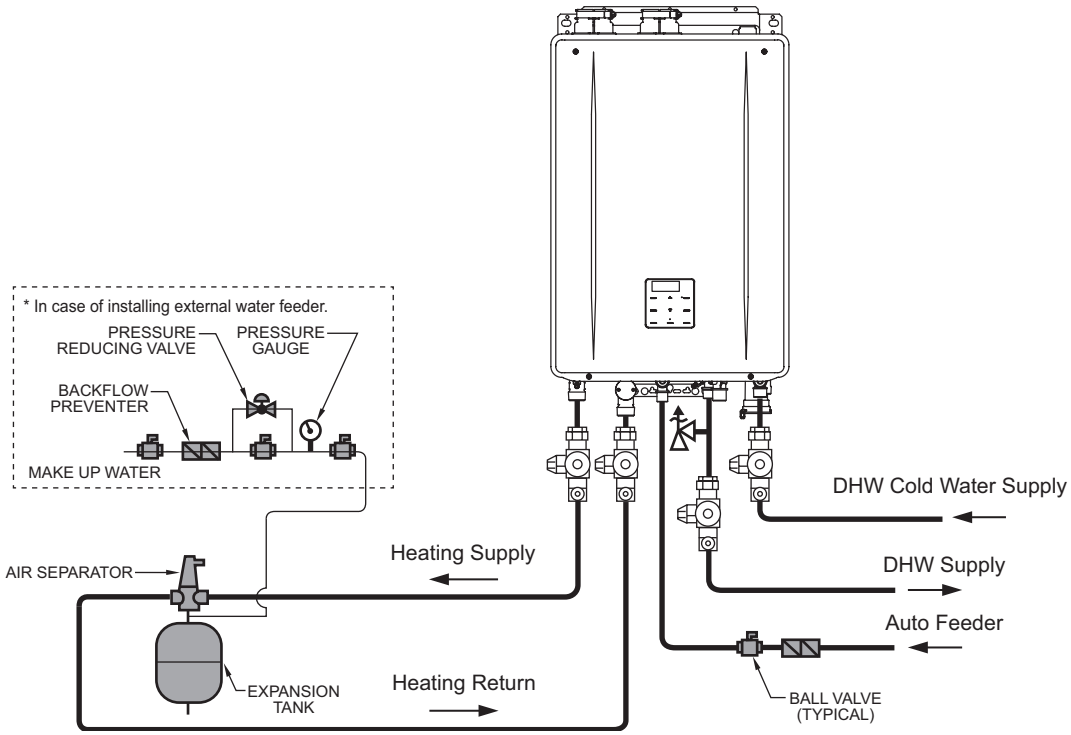
# 12. Plumbing Applications

1. This drawing is meant to show system piping concept only. Installer is responsible for all equipment and detailing required by local codes.
2. All closely spaced tees shall be within 4 pipe diameters or max 12" center to center spacing.
3. A minimum of 6 pipe diameters of straight pipe shall be installed upstream and downstream of all closely spaced tees.
4. The minimum pipe size of DHW piping should be 3/4” diameter and Heating piping should be 1” in diameter.
5. Piping shown is Primary/Secondary. System flow (secondary loop) must be greater than the appliance’s primary loop flow.
6. Install a minimum of 12 diameters of straight pipe upstream of all circulators.
7. In a valve-based system, each heating zone has a zone valve which opens when that zone calls for heat. Each zone thermostat is wired to its corresponding zone valve. Contacts in the zone valves provide a signal to the appliance to operate when there is a call for heat.
8. Unit is equipped with built-in primary pump for the heating loop. This pump is sized to ensure proper flow rate through the appliance heat exchanger and related piping. On long pipe runs, it is recommended to keep the pump at maximum speed (setting 3). DO NOT lower it from the factory default.
9. Install a backflow preventer valve in the make-up water supply to the unit as required by local codes.
10. Do not install an external pump upstream an expansion tank in heating supply pipe.

* Equip a cap (1/2") with the Auto Feeder Water Inlet Connection when piping has not been connected to the Auto Feeder Water Inlet Connection (refer to pages 31, 58 [I:15_AFA]).

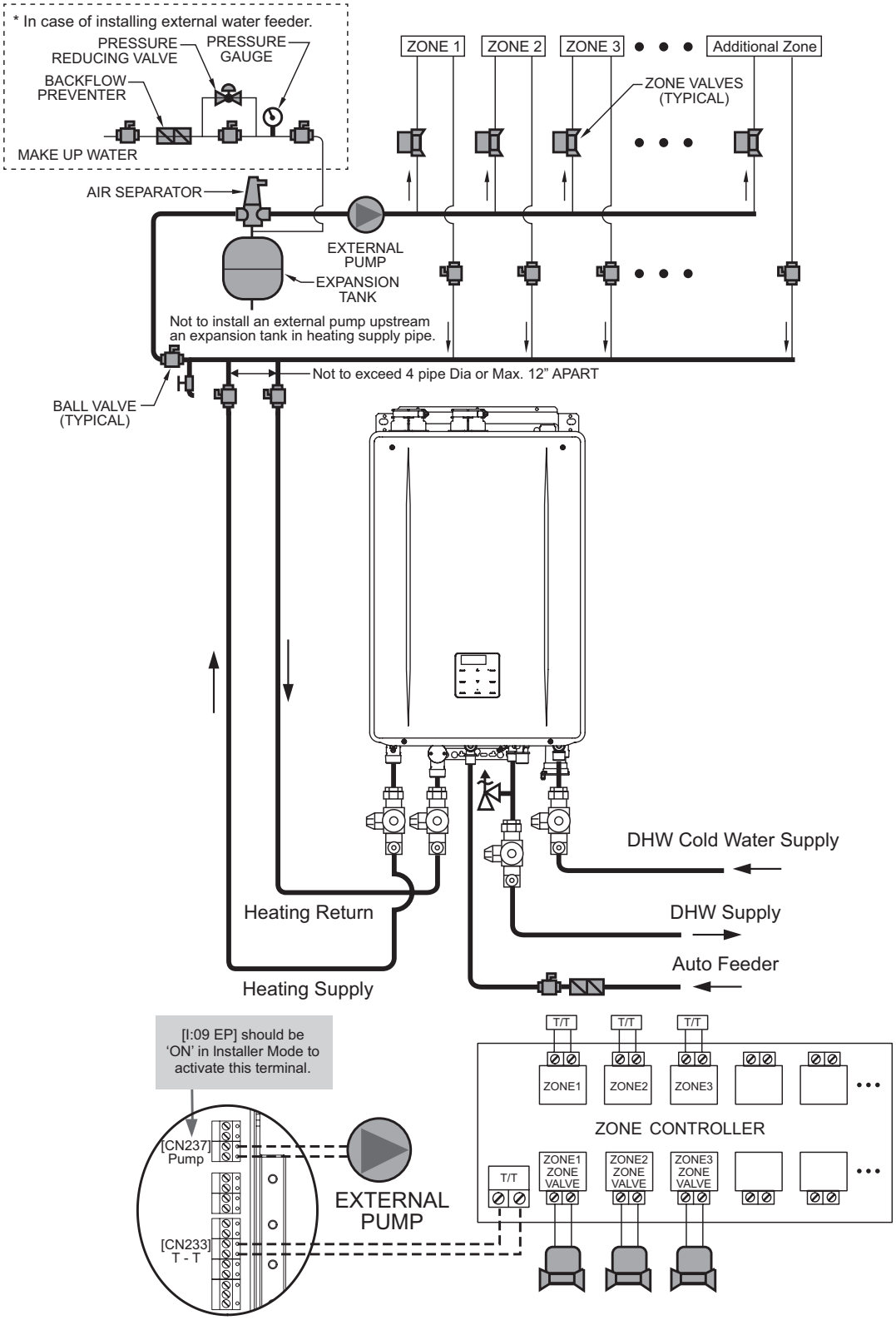
## 1. Only install Combi Boiler as a Water Heater (Install Heating in the future)

This drawing is meant to show system piping concept only. Installer is responsible for all equipment & detailing required by local codes.



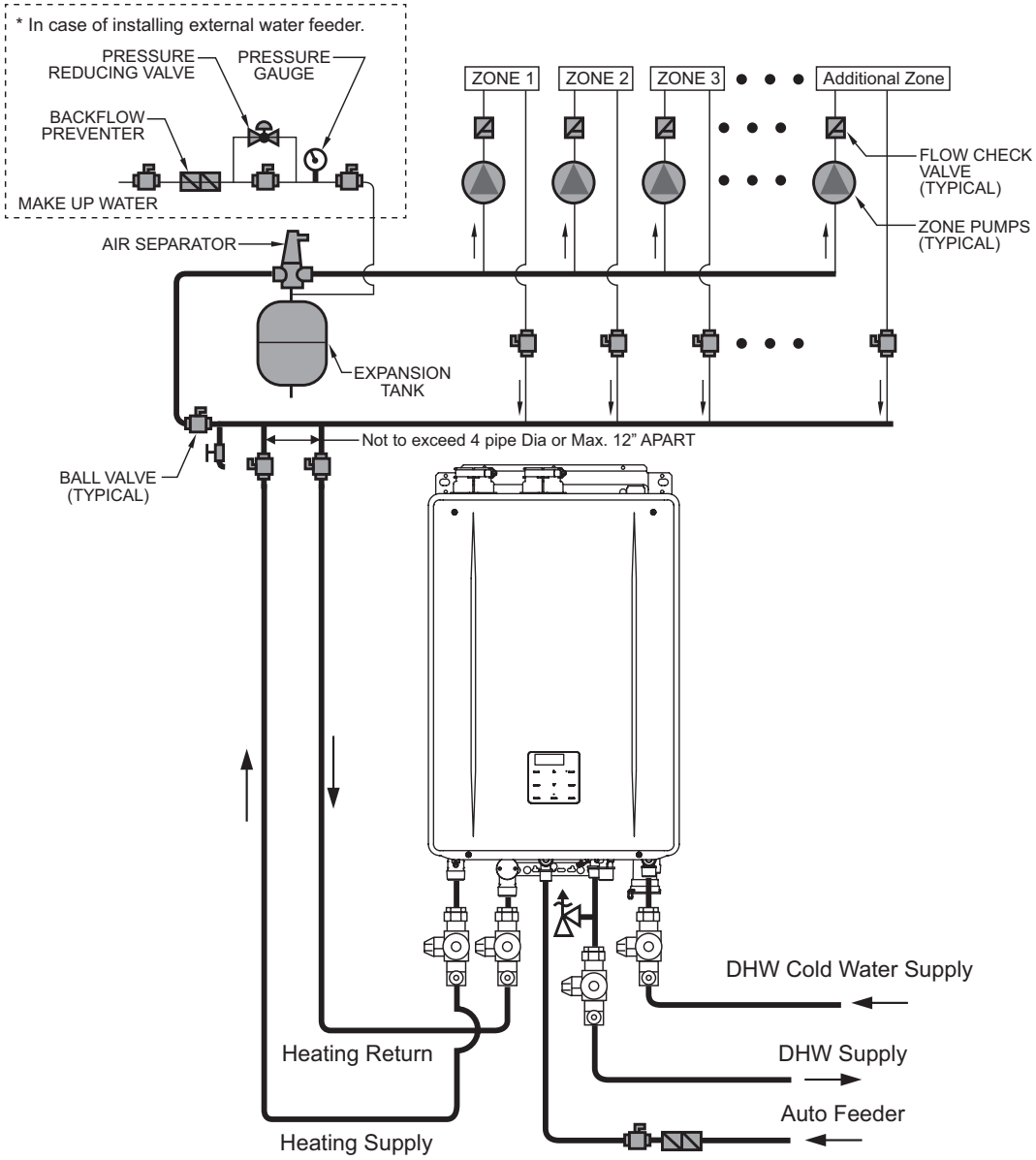
## 2. Zoned with Valves

This drawing is meant to show system piping concept only. Installer is responsible for all equipment & detailing required by local codes. Refer to page 43 for electrical wiring instructions.

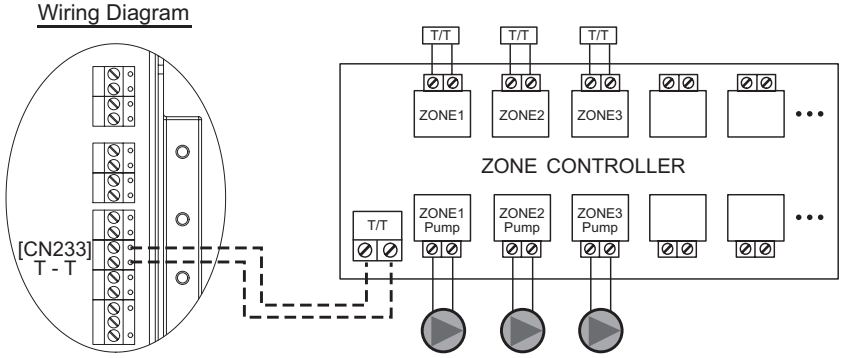


# 3. Zoned with Pumps

This drawing is meant to show system piping concept only.Installer is responsible for all equipment & detailing required by local codes. Refer to page 43 for electrical wiring instructions.




Wiring Diagram

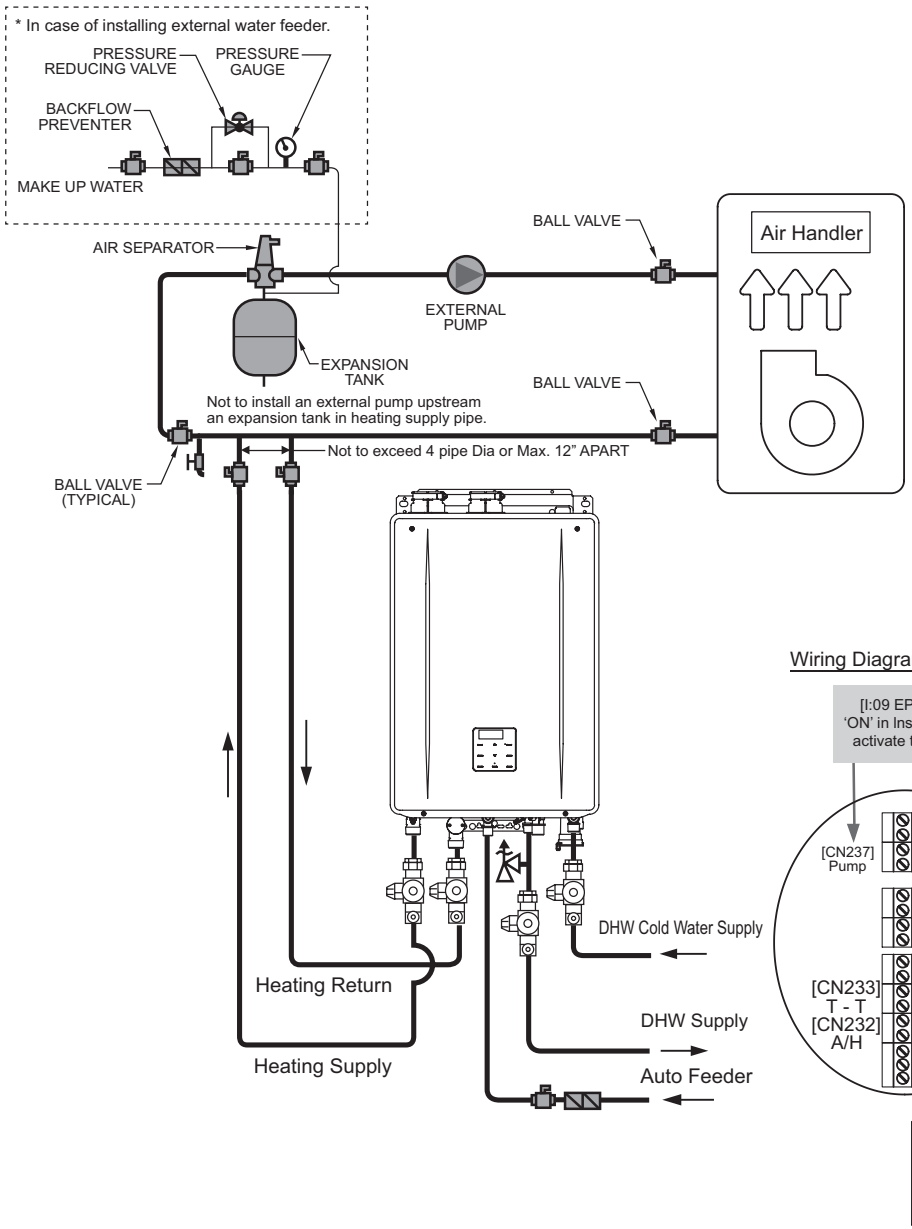


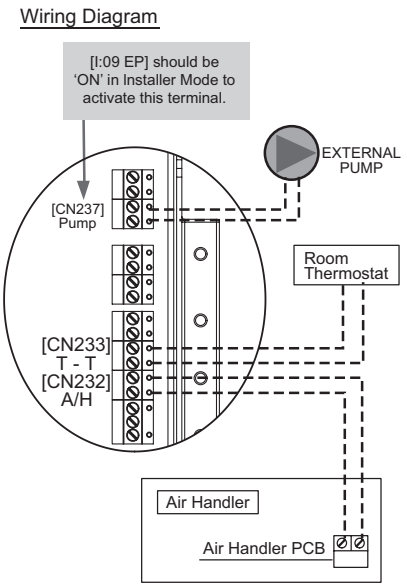
# 4. Air Handler

■ The Noritz Combi Boiler can control the operation of an Air Handler when thermostat is used in combination with the Air Handler.
The Air Handler function is designed to stop the Air Handler's pump and fan operation when the Combi Boiler's operation is not suitable for the Air Handler.

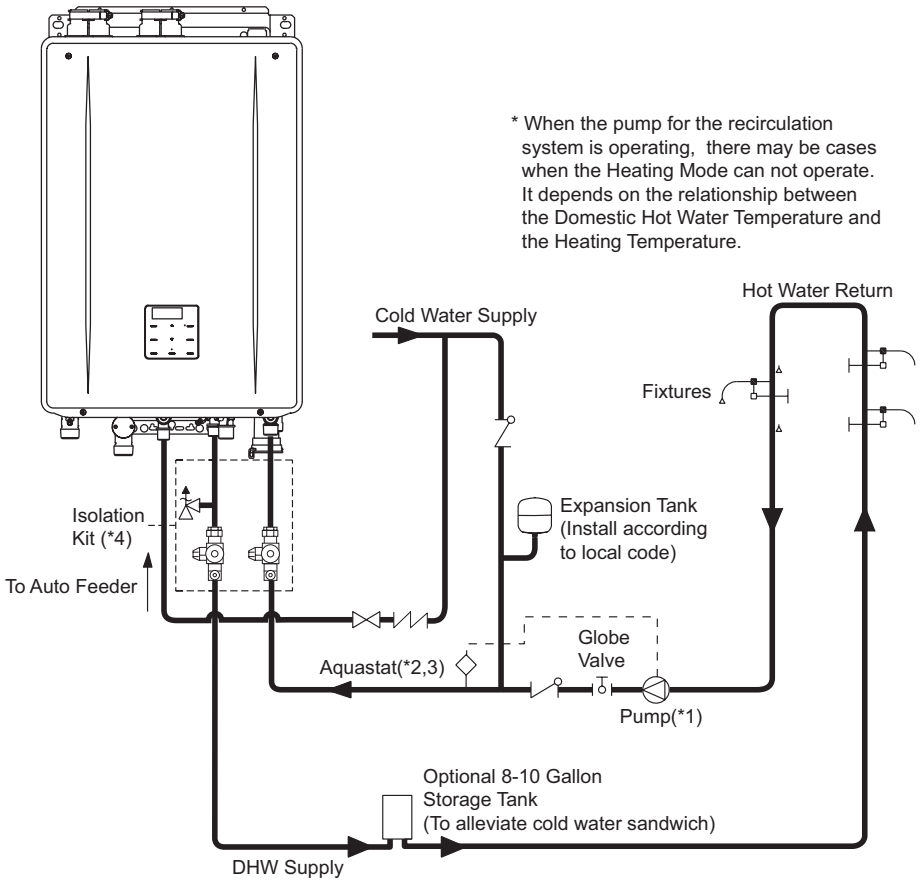
* In order to set up the Air Handler, from Installer Mode [I:08_Air] should be activated.
(Refer to page 56)

This drawing is meant to show system piping concept only.
Installer is responsible for all equipment & detailing required by local codes.
Refer to page 43 for electrical wiring instructions.



# 5. Recirculation System



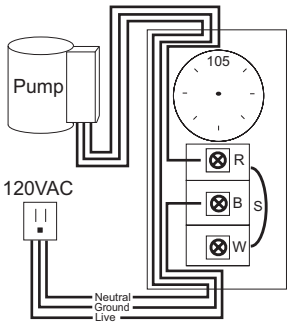

Notes:

*1. Size the pump to provide a maximum of 2 GPM (7.5 L/min.) through the system at 10 ft (3m) of head plus piping losses. Adjust the flow using a globe valve and verify the flow rate with the maintenance monitors.

*2. An Aquastat must be used to control the pump.

*3. Set the Aquastat to 10˚F below the DHW Temperature Setting. An aquastat is the minimum pump control requirement in order to maintain the full recirculation warranty.

*4. Noritz recommends the use of an Isolation Kit with the installation. These kits include an integrated shut-off and service valve with unions and a pressure relief valve.




Aquastat Wiring
Use Honeywell Aquastat
(Model L6006A or L6006C)

* The heating might not operate in some conditions during recirculation.
Be sure to make sure the following requirement when install the recirculation system.

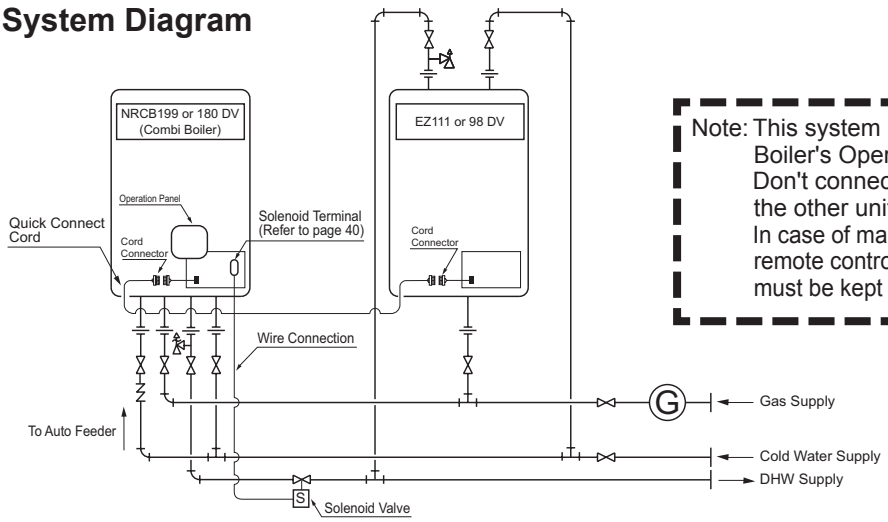
- Insulate the DHW Supply and Return pipe completely to prevent the recirculation operation continuously.

# 6. Quick Connect Multi System Installation

- The Quick Connect Multi System allows the installation of two units together utilizing only the Quick Connect Cord. Unit's MAX Btuh must be same in order to quick connect. e,g. When installing NRCB199DV(GHQ-3201WX-FF US), you must install EZ111DV(GQ-C3259WX-FF US), not EZ98DV(GQ-C2859WX-FF US).

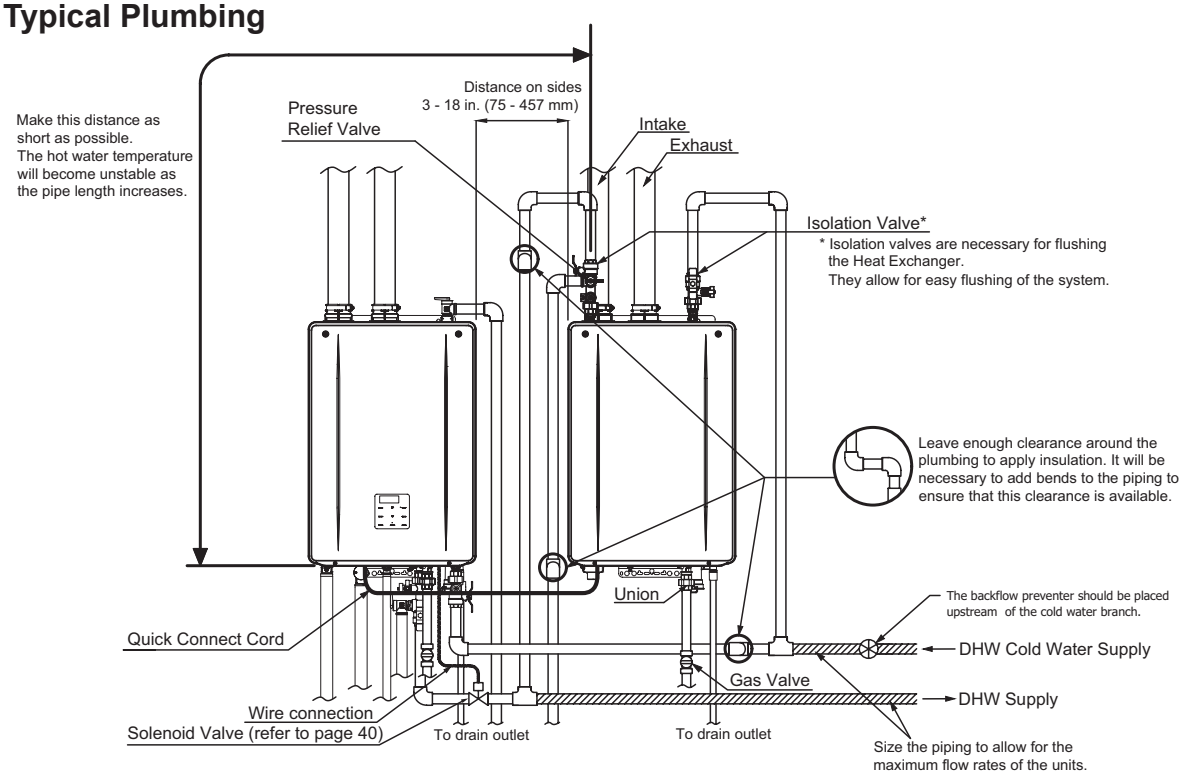
The Quick Connect Cord is 6 ft.(2m) long. Install the units 3-18" (75-457mm) apart from each other to ensure the cord will be able to reach between the units. (See Typical Plumbing diagram). (If the distance between the two units is too great, not only will the cord not be able to reach, but the water temperature may also become unstable because of the difference in pipe length between the two units).

## System Diagram




Note: This system is operated by the Combi Boiler's Operation Panel.
Don't connect the remote controller to the other unit.
In case of maintenance, EZ111 or 98 DV's remote controller (Included Accessory) must be kept by the customer.

## Typical Plumbing




- Insulate the hot water piping to prevent heat loss. Insulate and apply heating materials to the cold water supply piping to prevent heat loss and freezing of pipes when exposed to excessively cold temperatures.

## Connecting Quick Connect Cord-2

For Quick Connect Multi System Installation use part #QC-2 only. (sold separately).


Do not connect electrical power to the unit until all electrical wiring has been completed.

## ⚠ WARNING

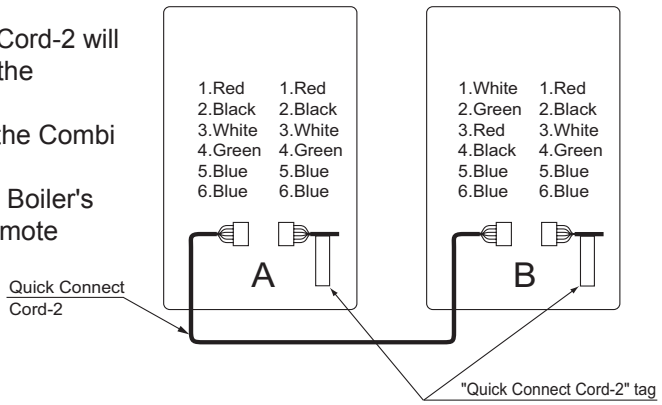
Electrical Shock Hazard

Do not turn power on until electrical wiring is finished. Disconnect power before servicing.
Failure to do so may result in death or serious injury from electrical shock.

## Caution

The wire coloring on the Quick Connect Cord-2 will not be the same as the wire coloring of the connection plug inside the unit.

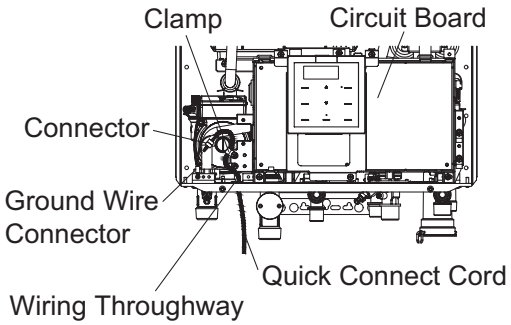
* When connecting two units, use only the Combi Boiler's Operation Panel.
* This system is operated by the Combi Boiler's Operation Panel. Don't connect the remote controller to the other unit.




**Connecting the Quick Connect Cord.**

1. Turn off the power.
2. Remove the front cover of the unit (4 screws).
3. Pass the Quick Connect Cord through the wiring throughway and into the unit.
4. Plug the connector on the Quick Connect Cord to the receptacle inside the unit.
5. Attach the ground wire of the Quick Connect Cord to the terminal block fixing plate.
   (If the ground wire is not attached, electrical noise may cause problems).
6. Secure the Quick Connect Cord with a clamp.
7. Replace the front cover.

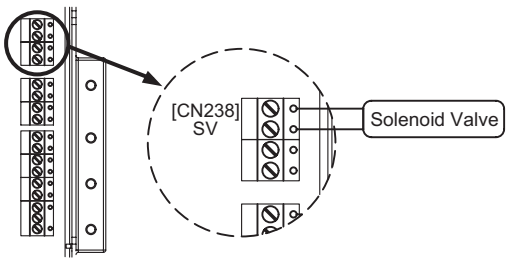
Connecting the cord to the Combi Boiler




* Connecting the cord to the other unit, refer to the unit's Installation Manual.

* Specifications for a solenoid valve.
- Pipe size : 3/4"
- Voltage : 120VAC
- Current : Max 1.5A
- Normally closed (Closed when de-energized)

* A slow-closing solenoid is recommended to prevent water hammer from occurring.



# Check the Quick Connect Multi System Installation

After install the Quick Connect System, do the following step to check proper installation:

| Operation | Screen Display |
|---|---|

**1** Press the ON/OFF button ON.

**2** Press the MAINTENANCE button.

Screen Display: td (td:technical data)

**3** Press the ENTER button to view the "Technical Data".

Screen Display: 03 (Data No. 03) ▼ After 2 sec. 100 (e.g.: 100)

**4** Press the △ ▽ buttons to navigate through the "Technical Data".

* Pressing and holding the button to change it in increments of 10.

**5** Check the Quick Connect Cord-2 connection

Select 74, then check 002 appears.

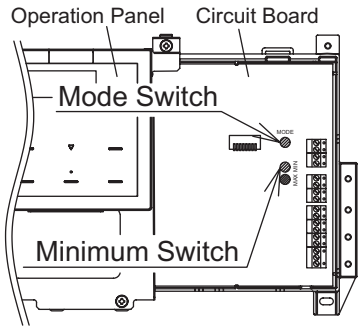
If 001 appears, check the Quick Connect Cord-2 connection.

Screen Display: 74 (Data No. 74) ▼ After 2 sec. 002

**6** Open the front cover and a hot water fixture.

Press and hold the "Mode" and "Minimum" Switches on the Circuit Board simultaneously for more than 3 seconds.

Check step 7 within 30 minutes.




**7** Check the Combi Boiler operation

Select 75, then check 002 appears.

If 001 appears, check the plumbling and the Solenoid Valve.

When you are done, press the "Mode" Switch for more than 3 seconds, then close the hot water fixture and the front cover.

Screen Display: 75 (Data No. 75) ▼ After 2 sec. 002

**8** Press the BACK button twice or let it sit for approximately 10 minutes to return to the home screen.

Note

The water heater can be set as the master unit in the quick connect multi system. The master unit controls the DHW ON/OFF status of the Combi Boiler in the system. Once turned on by the master unit, the Combi Boiler will operate in stages to satisfy the DHW demands.

* Please contact Noritz America at 866-766-7489 if you have any questions or concerns.

# 13. Electrical Wiring

Consult a qualified electrician for the electrical work.


Do not connect electrical power to the unit until all electrical wiring has been completed.

This appliance must be electrically grounded in accordance with local codes, or in the absence of local codes, with the National Electrical Code, ANSI/NFPA 70. In Canada, the latest CSA C22.1 Electrical Code.

**Caution:** Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.

Verify proper operation after servicing.

Field wiring to be performed at time of appliance installation.

## ⚠ WARNING

Electrical Shock Hazard

Do not turn power on until electrical wiring is finished. Disconnect power before servicing.

Failure to do so may result in death or serious injury from electrical shock.

- The electrical supply required by the Combi Boiler is 120VAC at 60 Hz.
  The power consumption may be up to 210W or higher if using optional accessories.
  Use an appropriate circuit.
- Do not disconnect the power supply when not in use. When the power is off, the freeze prevention in the Combi Boiler will not activate, resulting in possible freezing damage.
- Do not let the power cord contact the gas piping.

Tie the redundant power cord outside the Combi Boiler. Putting the redundant length of cord inside the Combi Boiler may cause electrical interference and faulty operation.

**Ground**

- To prevent electrical shock, provide a ground with resistance less than 100Ω.
  An electrician should do this work.

Do not connect the ground to the city water or gas piping. Do not tie the ground to a telephone line.

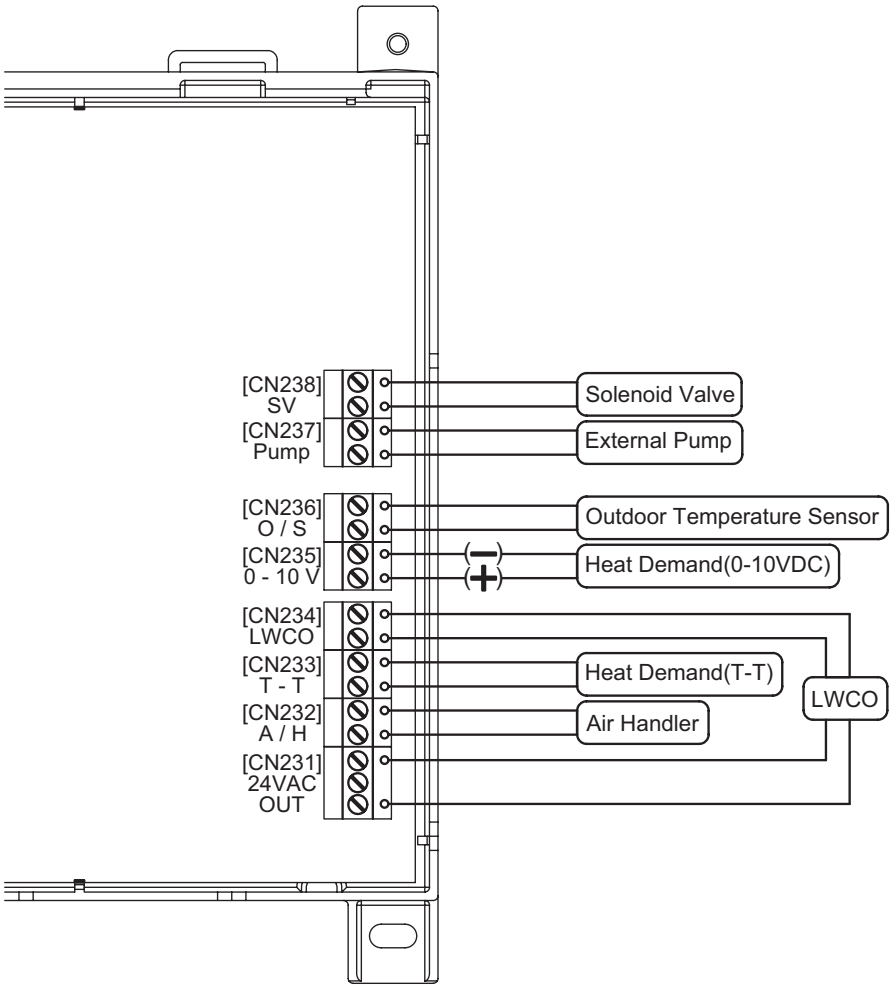
**Breaker Installation**

- Mount a device which shuts off the electrical path automatically (leakage breaker) when electrical leakage is detected.

## ⚠ CAUTION

- Electrostatic discharge can affect electronic components. Take precautions to prevent electrostatic discharges from personnel or hand tools during the Combi Boiler installation and servicing to protect product's electronic control.

## Wiring Diagram for External Options



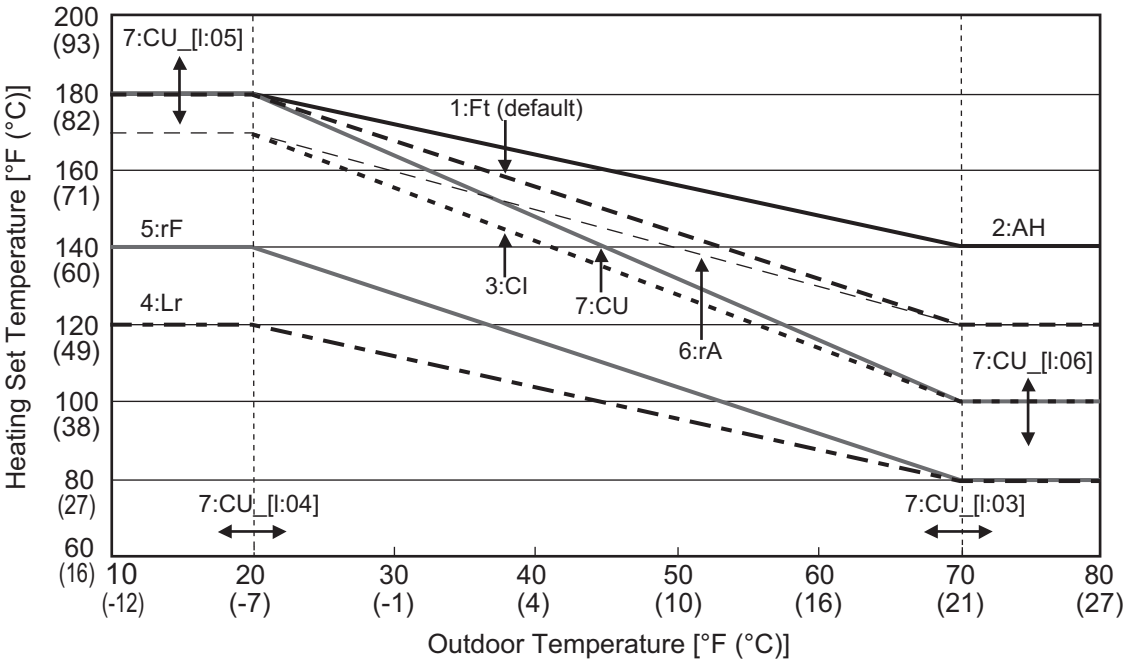

| | Connection Item | page(s) | note |
|---|---|---|---|
| [CN231] 24VACOUT | 24VAC for LWCO | 28 | |
| [CN232] A/H * | Air Handler | 37, 56 | |
| [CN233] T-T | Heat Demand Input (T-T) | 35-37 | |
| [CN234] LWCO | LWCO | 28 | The factory installed a jumper on the terminals. |
| [CN235] 0-10V | Heat Demand Input (0-10VDC) | 50-52 | This terminal has electrical polarity. |
| [CN236] O/S | Outdoor Temperature Sensor | 44-49 | |
| [CN237] Pump ** | External Pump | 35, 37, 56 | 120VAC / Max 2.0A |
| [CN238] SV | Solenoid Valve for Quick Connect Multi System | 39, 40 | 120VAC / Max 1.5A |

Note:
* Air Handler Terminal : [I:08_Air] should be “on” in Installer Mode to activate this terminal.
** External Pump Terminal : [I:09_EP] should be “on” in Installer Mode to activate this terminal.

## Outdoor Reset Control

- The Outdoor Reset Control feature may be used to enhance energy efficiency while maintaining optimal heating performance.
  With the Outdoor Reset Control, the heating temperature setting automatically changes according to the outdoor temperature and the current heating system application.
- There are various pre-defined temperature range options available to assist matching the system heat load with the applicable outdoor temperature range.
- The built in outdoor reset control provides simple heating curve selection based upon pre-defined Combi Boiler set temperature ranges determined by the type of heating application. This can be adjusted either by selecting the appropriate menu option, or by utilizing the fully customizable mode.

### Outdoor Reset Control




Note:
The optimal set up should be determined for each job location.
[7:CU] default setting: Max Temperature: 180°F, Min Temperature: 100°F

# Setting the Outdoor Reset Control Mode - [I:01_HCt]

| Operation | Screen Display |
|---|---|

**1** Connect Outdoor Temperature Sensor to terminal.
(Refer to pages 48, 49 for details.)

**2** Press the ON/OFF button to OFF. The Operation Panel must be off.

**3** Press the SETTINGS button.

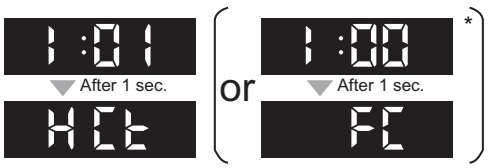
Select 2:1 n using the △ ▽ buttons, and

then press the ENTER button.

The "Installer Mode" screen appears.


**4** When entering the "Installer Mode", display will change to 1:01 / HCt (After 1 sec.) or 1:00 / FC (After 1 sec.) *.

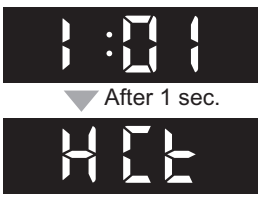
*This function will appear within the first 10 minutes of connecting electrical power and before pressing the ON/OFF button.




**5** When display shows 1:00 / FC (After 1 sec.),

press the △ ▽ buttons to navigate 1:01 / HCt (After 1 sec.)

in the "Installer Mode".




**6** Select 1:01 / HCt (After 1 sec.), then press the ENTER button to enter the function.


**7** Press the △ ▽ buttons to change the parameter value 2:or,

and then press the ENTER button to save the settings and to exit the function.

And additional menu items will become available to adjust.


The icon will flash if the outdoor sensor is not detected.

# Adjusting Outdoor Reset Control Options

Note: The Operation Panel must be off.

| Operation | Screen Display |
|---|---|

**1** Press the △ ▽ buttons to navigate 

in the "Installer Mode".


**2** Select 

, and then press the ENTER button to enter the function.

**3** Press the △ ▽ buttons to navigate into desired system.

Types of Heating System

| Type of Heating System | Screen Display | Temperature(°F) | | Temperature(°C) | | Note |
|---|---|---|---|---|---|---|
| | | LOW | HIGH | LOW | HIGH | |
| [1:Ft] Fin Tube Baseboard | 1:Ft | 120 | 180 | 49 | 82 | Default |
| [2:AH] Air Handler | 2:AH | 140 | 180 | 60 | 82 | |
| [3:CI] Cast Iron Baseboard | 3:CI | 100 | 170 | 38 | 76 | |
| [4:Lr] Low Mass Radiant Floor | 4:Lr | 80 | 140 | 27 | 60 | |
| [5:rF] Mass Radiant Floor | 5:rF | 80 | 120 | 27 | 49 | |
| [6:rA] Radiator | 6:rA | 120 | 170 | 49 | 76 | |
| [7:CU] Custom | 7:CU | 100* | 180* | 38* | 82* | |

* Factory Default.

**4** When you are done, press the ENTER button to save the settings and to exit the function.

If you select 7:CU, refer to pages 47, 54-57.

**5** To exit the "Installer Mode" or another function, press the BACK button.

## Customized Settings

Note: The Operation Panel must be off.

 allows for adjustment of the outdoor temperature range and heating temperature range.

e.g. To set Highest Outdoor Temperature

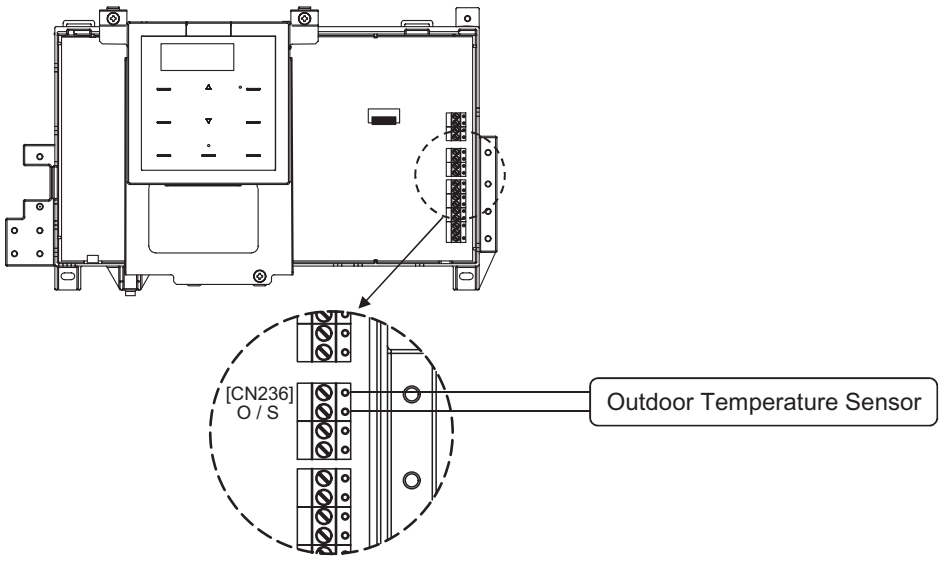
| Operation | Screen Display |
|---|---|
| **1** Press the △ ▽ buttons to navigate  in the "Installer Mode". |  |
| **2** Select  , and then press the ENTER button to enter the function. |  |
| **3** Press the △ ▽ buttons to the desired temperature. | |
| **4** Press the ENTER button to save the settings and to exit the function. | |

* The others are similar to the above mentioned method.

NOTE:
Installer Mode [I:03_Hot] :Highest Outdoor Temperature
Installer Mode [I:04_Lot] :Lowest Outdoor Temperature
Installer Mode [I:05_HHt] :Heating High Temp Range
Installer Mode [I:06_HLt] :Heating Low Temp Range

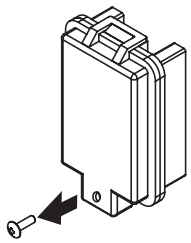
## Outdoor Temperature Sensor Installation Guidelines

- Avoid areas with direct sunlight and where temperatures may not be representative of true outdoor temperature.
- Avoid placing sensor in close proximity of heat sources that may affect correct temperature sensing. (fans, exhausts, vents, lights)
- Avoid installing the sensor in areas where the sensor is subjected to excessive moisture.
- Make sure wiring connections are secure before closing the cap.
- The sensor is a water resistant device.
- Any damage to the device may require the replacement of the entire component.
- If the system requires a fixed operating temperature, the outdoor sensor is not required and should not be installed.
  There is no connection required if an outdoor sensor is not used in the installation.
- Use a minimum 22 AWG wire for runs of 100 feet or less and minimum 18 AWG wire for runs of up to 150 feet.
- Mount the outdoor sensor on an exterior surface of the building, preferably on the North or Northeast side, in an area that will not be affected by direct sunlight or will be exposed to varying weather conditions.
- For correct mounting procedures, follow instructions provided with the sensor.
- If sensor wires are located in an area with sources of potential electromagnetic interference (EMI), the sensor wires should be shielded, or the wires routed in a grounded metal conduit.
  If using shielded cable, the shielding should be connected to the common ground of the appliance.

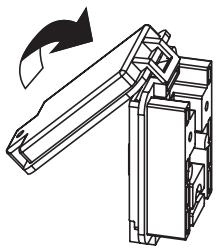


## Outdoor Temperature Sensor Installation

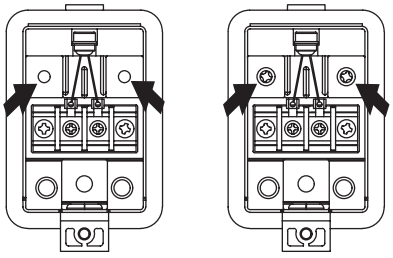
1. Loosen the screw by hand using a Phillips screwdriver indicated in the figure.



2. Remove the cover by lifting it and pulling it outward.

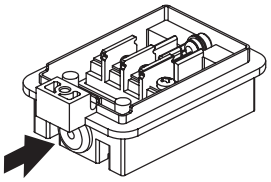


3. Mount the outdoor sensor onto an exterior surface of the building with the supplied screws (2 pcs) by hand using a Phillips screwdriver.

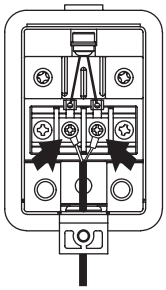


* if neccesarry, use anchors(Included Accessory).

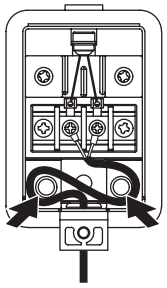
4. There is a through hole to pass wire into the case.



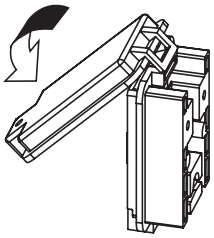
5. After leading wire into the case, connect wire to the terminal by hand using a Phillips screwdriver.



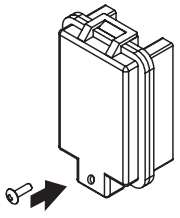
6. You can use two knobs to relieve stress of wire.



7. Replace the cover.
   The hook should be attached to the stopper.



8. Tighten the screw by hand using a Phillips screwdriver indicated in the figure.



# Outdoor Reset Control [0 – 10 Volt Input Control]

- The Outdoor Reset Control feature may be used to enhance energy efficiency while maintaining optimal heating performance.

  With the Outdoor Reset Control, the heating temperature setting automatically changes according to the voltage input from external controller that is decided by outdoor temperature.
- Blinking ( ) on the Operation Panel is not an Error Code.
- ( ) is lit on the Operation Panel, when the Combi Boiler receive 1.5 VDC or more and the Outdoor Reset (Energy Saving) is enabled.

- A signal from external (i.e. building management system) may be connected to the Combi Boiler to enable remote control.

  This signal should be a 0 -10 volt positive DC signal. When this input is enabled (1.5 VDC or more), an external control system can be used to control the set point temperature of the Combi Boiler.
- The control interprets the 0 -10 volt signal as follows; when the signal is between 0 and 1.5 volts, the Combi Boiler will be in standby mode, not firing [Blinking ( ) on the Operation Panel. This is not an Error Code.]

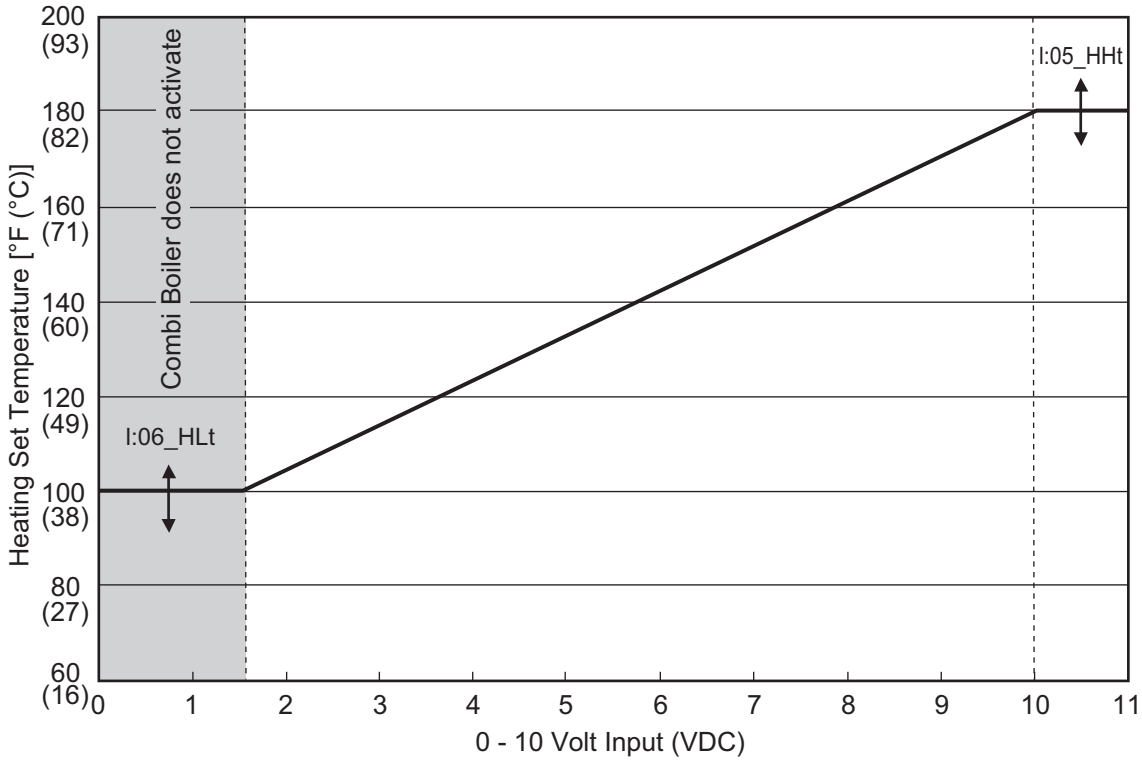
  When the signal rises above 1.5 volts, the Combi Boiler will ignite. As the signal continues to rise towards its maximum of 10 volts, the Combi Boiler will increase the set point temperature.
- Connect an external control system to the terminals marked for this purpose on the Combi Boiler terminal block (refer to page 52). Caution should be used to ensure that the 0 – 10 volt connection does not become connected to ground.

Note: Ensure that the polarity of the connections from the external modulating controller to the Combi Boiler is correct.

Reversed polarity could lead to erratic and/or no response from the Combi Boiler controller.

Note: ( ) will flash if an external control system does not supply 1.5 VDC or more.

## Outdoor Reset Control [0 – 10 Volt Input Control]



# Setting the Outdoor Reset Control [0 – 10 Volt Input control] - [I:01_HCt]

| Operation | Screen Display |
|---|---|

**1** Connect Heat Demand(0-10VDC) to terminal.
(Refer to page 52 for details.)

**2** Press the ON/OFF button to OFF. The Operation Panel must be off.

**3** Press the SETTINGS button.

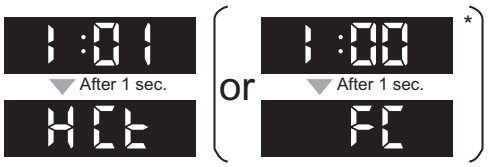
Select 2:1 n using the △ ▽ buttons, and

then press the ENTER button.

The "Installer Mode" screen appears.


**4** When entering the "Installer Mode", display will change to 1:01 / HCt (After 1 sec.) or 1:00 / FC (After 1 sec.) *.

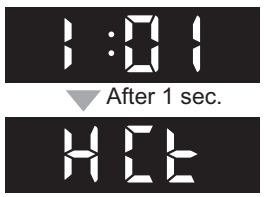
*This function will appear within the first 10 minutes of connecting electrical power and before pressing the ON/OFF button.




**5** When display shows 1:00 / FC (After 1 sec.),

press the △ ▽ buttons to navigate 1:01 / HCt (After 1 sec.)

in the "Installer Mode".




**6** Select 1:01 / HCt (After 1 sec.), then press the ENTER button to enter the function.

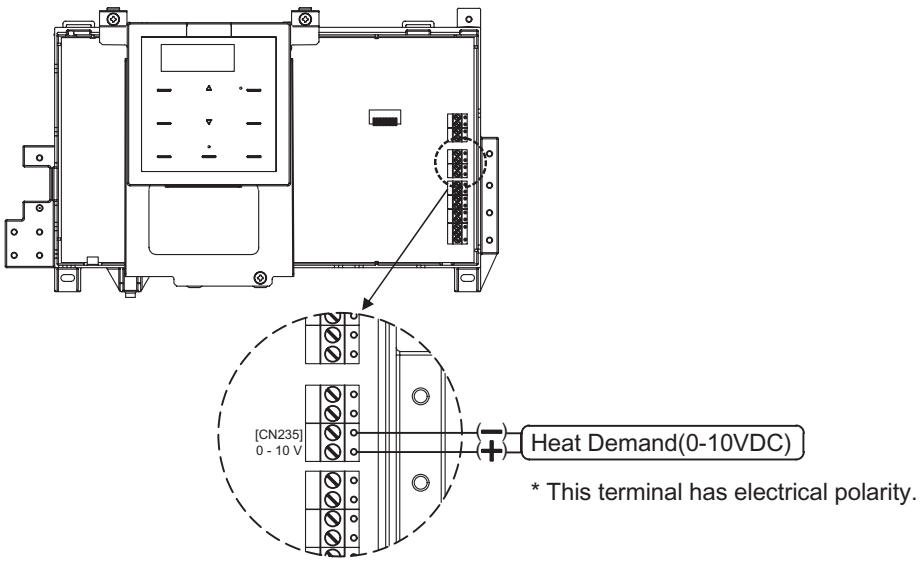

**7** Press the △ ▽ buttons to change the parameter value 3:EC,

and then press the ENTER button to save the settings and to exit the function.


The icon will flash if the Heat Demand Input (0-10VDC) is not detected.

• Do NOT connect room thermostat to heat demand (T-T) when an external control system is connected.
  * The Combi Boiler is activated only by receiving voltage.

Note: DO NOT mix [Room Thermostat Control], [External Voltage Control System (without Room Thermostat)] and [Outdoor Temperature Control with Outdoor Temperature Sensor and Room Thermostat]



# 14. Installer Mode (Parameter Settings)

**How to enter "Installer Mode".**

| Operation | Screen Display |
|---|---|

**1** Press the ON/OFF button to OFF. The Operation Panel must be off.

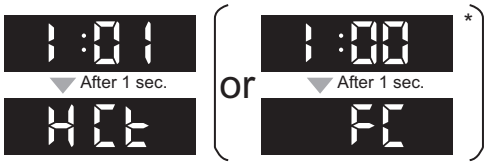
**2** Press the SETTINGS button.

Select 2:1 n using the △ ▽ buttons, and


then press the ENTER button.

The "Installer Mode" screen appears.

**3** When entering the "Installer Mode", display will change to 1:01 / HCt After 1 sec. or 1:00 / FC After 1 sec. *.




*This function will appear within the first 10 minutes of connecting electrical power and before pressing the ON/OFF button.

**4** Press the △ ▽ buttons to navigate into the desired function in the "Installer Mode".

**5** Select the desired function, then press the ENTER button to enter the function.

**6** Press the △ ▽ buttons to change the parameter value.

**7** When you are done, press the ENTER button to save the settings and to exit the function.

**8** To exit the "Installer Mode" or another function, press the BACK button.

<table>
<tr><th>Function</th><th>Function Name & Description</th></tr>
<tr><td rowspan="2">I:00_FC<br>(Skipped*)</td><td>Fahrenheit / Celsius  </td></tr>
<tr><td>This mode is for changing temperature and flow rate units on the Operation Panel.<br>* This function will appear within the first 10 minutes of connecting electrical power and before pressing the ON/OFF button.</td></tr>
<tr><td rowspan="2">I:01_HCt</td><td>Heating Control Type  </td></tr>
<tr><td>This mode is for changing heating control type.</td></tr>
<tr><td rowspan="2">I:02_tHS<br>(Skipped**)</td><td>Type of Heating System  </td></tr>
<tr><td>This mode is for choosing Type of Heating System, when [I:01_HCt] setting is "2:or".<br><br>There are 6 typical Heating Systems that are available.<br>For these 6 heating types the low and high temperature points are pre-programmed.<br>(See ranges to the below)<br><br>If "2:AH" is selected, additional steps are needed to be programmed, see [I:08_Air].<br><br>To use custom low and high temperature points, select "7:CU" and follow [I:03_Hot], [I:04_Lot], [I:05_HHt] and [I:06_HLt] to set custom low and high temperature points.
<table>
<tr><th rowspan="2">TYPE</th><th colspan="2">Fahrenheit [°F]</th><th colspan="2">Celsius [°C]</th></tr>
<tr><th>LOW</th><th>HIGH</th><th>LOW</th><th>HIGH</th></tr>
<tr><td>1:Ft</td><td>120</td><td>180</td><td>49</td><td>82</td></tr>
<tr><td>2:AH</td><td>140</td><td>180</td><td>60</td><td>82</td></tr>
<tr><td>3:CI</td><td>100</td><td>170</td><td>38</td><td>76</td></tr>
<tr><td>4:Lr</td><td>80</td><td>140</td><td>27</td><td>60</td></tr>
<tr><td>5:rF</td><td>80</td><td>120</td><td>27</td><td>49</td></tr>
<tr><td>6:rA</td><td>120</td><td>170</td><td>49</td><td>76</td></tr>
<tr><td>7:CU</td><td>80 ~ [Max Set-point - 30]</td><td>[Min Set-point +30] ~ 180</td><td>27 ~ [Max Set-point - 17]</td><td>[Min Set-point +17] ~ 82</td></tr>
</table>
**When [I:01_HCt] setting is "1:St" or "3:EC", this function will not appear.</td></tr>
<tr><td>I:03_Hot<br>(Skipped***)</td><td>Highest Outdoor Temperature  </td></tr>
<tr><td>I:04_Lot<br>(Skipped***)</td><td>Lowest Outdoor Temperature  </td></tr>
<tr><td></td><td>These settings are for changing the highest and the lowest outdoor temperature range.<br>You can set the Highest Outdoor Temperature [I:03_Hot] and the Lowest Outdoor Temperature [I:04_Lot], when [I:02_tHS]_"7:CU" is selected.<br>***When [I:02_tHS] setting is "7:CU", [I:03_Hot] and [I:04_Lot] functions will appear.</td></tr>
</table>

| Settings | | Default | Pages |
|---|---|---|---|
| 1: F  | F: Fahrenheit & Gallon<br>All of the units shown on the display screen are °F & GPM. | Default | |
| 2: C  | C: Celsius & Liter<br>All of the units shown on the display screen are °C & LPM. | | |
| To change the setting: Press and hold the △ or ▽ button for approximately 5 seconds. (°F→°C : △ button, °C→°F : ▽ button) | | | |
| 1: St  | St: Standard<br>You can change the Heating Set Temperature by Operation Panel. | Default | pages 44, 50 |
| 2: or  | or: Outdoor Reset Control<br>Outdoor Reset Control is activated. | | |
| 3: EC  | EC: External Control (0-10V)<br>External Control(0-10V) is activated. | | |
| 1: Ft  | Ft: Fin Tube Baseboard | Default | pages 44 - 49 |
| 2: AH  | AH: Air Handler | | |
| 3: CI  | CI: Cast Iron Baseboard | | |
| 4: Lr  | Lr: Low Mass Radiant Floor | | |
| 5: rF  | rF: Mass Radiant Floor | | |
| 6: rA  | rA: Radiator | | |
| 7: CU  | CU: Custom | | |
| [Min Set-point+10] ~ 110 (°F)<br>[Min Set-point+5] ~ 43 (°C) | This should be set to the highest average outdoor temperature during the winter season.<br>(not the highest possible outdoor temperature.) | 70 °F<br>(21 °C) | page 44 |
| -4 ~ [Max Set-point-10] (°F)<br>-20 ~ [Max Set-point-5] (°C) | This should be set to the lowest average outdoor temperature during the winter season.<br>(not the lowest possible outdoor temperature.) | 20 °F<br>(-7 °C) | |
| | | | |

| Function | Function Name & Description |
|---|---|
| I:05_HHt | Heating High Temp Range   |
| I:06_HLt | Heating Low Temp Range   |
| | These settings are for changing the heating high temperature range and low temperature range.<br>You can change the Highest Set Temperature [I:05_HHt] and the Lowest Set Temperature [I:06_HLt] by adjusting the numbers on the display.<br>If [I:01_HCt]_"2:or" is selected then the settings for [I:05_HHt] and [I:06_HLt] will be overridden by [I:02_tHS] settings. (except below)<br>If [I:02_tHS]_"7:CU" is selected then the settings for [I:05_HHt] will be the heating high temperature range and [I:06_HLt] will be heating low temperature range. |
| I:07_bSt<br>(Skipped*) | Boost Timing   |
| | This setting is to increase the set temperature during unit cold start up if the actual room temperature doesn't reach the thermostat set temperature quick enough, the Boost time function will increase the set temperature of the Combi Boiler by 10°F (5°C) after the selected Boost time setting has passed.<br>Example :<br>Room thermostat set at 72°F, Combi Boiler set temp at 140°F, and Boost time function set to 30 min.<br>If the room temperature does not reach 72°F within 30 min then the Combi Boiler will increase its set temp from 140°F to 150°F.<br>*When [I:01_HCt] setting is "2:or" or "3:EC", this function will appear. |
| I:08_Air | Air Handler   |
| | This function needs to be turned 'on' if an Air Handler is being used as a heating type.<br>The Air Handler function is designed to stop the Air Handler's pump and fan operation when the Combi Boiler's operation is not suitable for the Air Handler. |
| I:09_EPP | External Pump   |
| | This setting can activate or deactivate the terminals in the Combi Boiler for an External Pump (secondary pump) on the circuit board. |
| I:10_rFt | Re Fire Time   |
| | This function is to set up the interval time in Heating Mode to prevent inconsistent heating.<br>If the selected time passes and the Combi Boiler's inside temperature drops, this function will automatically reignite the burner in the Combi Boiler. |

| Settings | | Default | Pages |
|---|---|---|---|
| [Min Set-point+30] ~ 180 (°F)<br>[Min Set-point+17] ~ 82 (°C) | | 180 °F<br>(82 °C) | pages<br>44, 50 |
| 80 ~ [Max Set-point-30] (°F)<br>27 ~ [Max Set-point-17] (°C) | | 100 °F<br>(38 °C) | |
| | | | |
| OFF, 1 - 120min | OFF: Boost Timing is deactivated.<br>1 - 120min: Time before starting the boost operation. | OFF | |
| | | | |
| OFF, ON | OFF: When an air handler is not used.<br>ON: When an air handler is used. | OFF | page<br>43 |
| | | | |
| OFF, ON | OFF:When an external pump is not used.<br>ON:When an external pump is used. | OFF | page<br>43 |
| | | | |
| 0 - 20min | | 3min | |
| | | | |

| Function | Function Name & Description |
|---|---|
| I:11_Pot | Pump Overrun Time   |
| | This mode is to control how long the pump will run after the heating demand is satisfied.<br>This setting is to prevent unnecessary running of the pump and extend the life of the pump. |
| I:12_bFt | Differential Burner OFF Temperature   |
| I:13_bot | Differential Burner ON Temperature   |
| | When the internal temperature of the Combi Boiler is too high or low the unit will stop burning or start burning. |
| I:14_HPS | Heating Water Pressure Setting   |
| | This function is to control the water pressure on the heating side of the Combi Boiler.<br>This will insure there is enough water inside the Combi Boiler to operate correctly.<br>When using the external water feeder, set to the proper pressure for the external water feeder. If not, the Combi Boiler may shut down frequently. |
| I:15_AFA | Auto Feeder Activation   |
| | This setting can activate or deactivate the Auto Feeder.<br>If the heating system does not require the Auto Feeder operation, set [I:15_AFA] OFF and plug the Auto Feeder Water Inlet Connection. |
| I:16_dHP | DHW/Space Heating Priority   |
| | This mode is for choosing the Combi Boiler operation "Simultaneous use of DHW & Heating" or "DHW Priority".<br>This Combi Boiler can operate DHW/Heating at the same time.*<br>But if a heating system is not suitable for simultaneous use of DHW & Heating, set [I:16_dHP] "2:dH".<br>*Depend on the conditions (refer to pages 60-61). |
| I:17_dHt | DHW Wait Time   |
| | This setting is when the duration of the Combi Boiler maintains the DHW supply mode after a DHW demand.<br>(The circulation pump will keep running and if necessary, burner will ignite.)<br>With the DHW Wait Time is enabled, a faster DHW supply may be available when there is a subsequent DHW demand. |

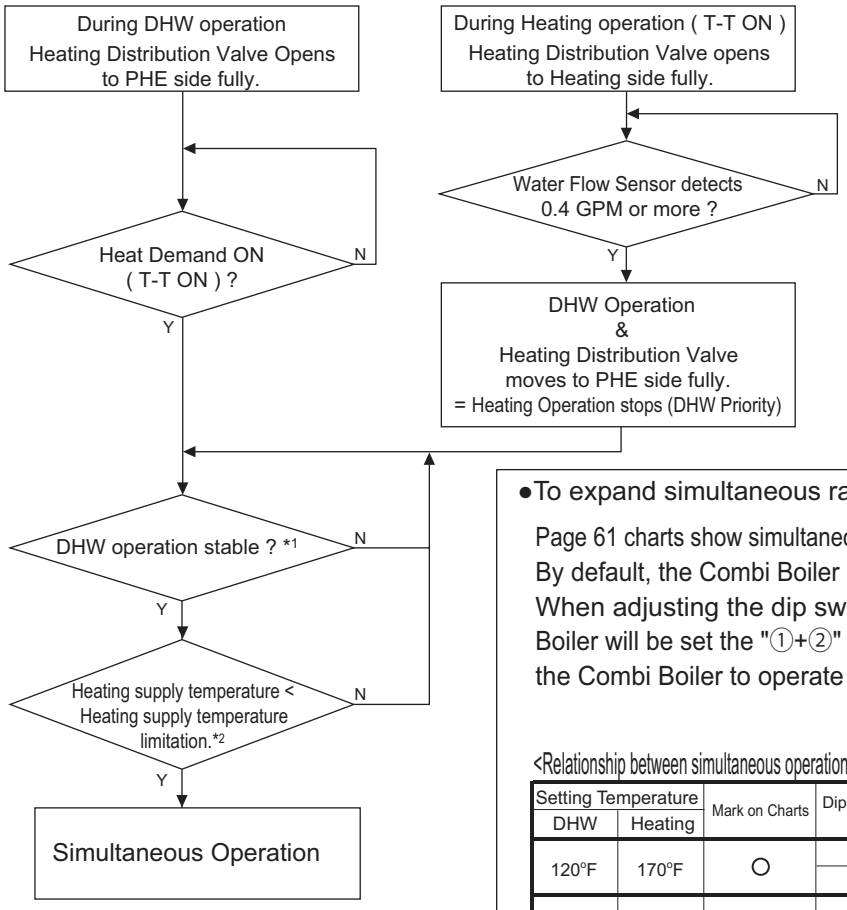
| Settings | | Default | Pages |
|---|---|---|---|
| OFF, 1 - 40min | | OFF | |
| | | | |
| 0 - 27 (°F)<br>0 - 15 (°C) | | 13 °F<br>(7 °C) | |
| 5 - 27 (°F)<br>3 - 15 (°C) | | 18 °F<br>(10 °C) | |
| Burner OFF Temperature = Heating Set Temperature + [I:12_bFt]<br>Burner ON Temperature = Heating Set Temperature - [I:13_bot] | | | |
| 12 - 26 PSI | | 12 PSI | |
| Water Refilling Pressure = Setting Pressure - 4 PSI<br>Water Refilling Stop Pressure = Setting Pressure + 2 PSI | | | |
| OFF, ON | ON: The Auto Feeder is activated.<br>OFF: The Auto Feeder is deactivated. | ON | |
| To change the setting: Press and hold the △ or ▽ button for approximately 2 seconds. (ON→OFF : △ button, OFF→ON : ▽ button) | | | |
| 1:St | St:Standard Mode<br>Simultaneous use of DHW & Heating. | Default | pages<br>60 - 61 |
| 2:dH | dH:dHW<br>DHW Priority. | | |
| To change the setting: Press and hold the △ or ▽ button for approximately 2 seconds. (1:St→2:dH : △ button, 2:dH→1:St : ▽ button) | | | |
| OFF, 1 - 30min | | OFF | |
| | | | |

| Function | Function Name & Description |
|---|---|
| I:18_CLr | Setting CLear   |
| | This setting may be used to reset all the parameters in installer mode to their factory default settings.<br>* Except [I:00_FC] setting. |

## Using DHW and Heating at the same time

This Combi Boiler is designed for using DHW and Heating at the same time. Simultaneous operations are not always available and suitable. It depends on DHW and Heating setting temperatures.

### ■ Simultaneous Operation Flow




*1: DHW supply temperature does not fluctuate.

*2: It depends on heating setting temperature or Type of Heating System[I:02_tHS].

●To expand simultaneous range

Page 61 charts show simultaneous operation is available or not. By default, the Combi Boiler has been set to the "①" area. When adjusting the dip switch #2 to ON, the Combi Boiler will be set the "①+②" area. This adjustment allows the Combi Boiler to operate simultaneous more flexible.

<Relationship between simultaneous operation and setting temperatures on page 61 Charts>

| Setting Temperature | | Mark on Charts | Dip Switch #2 Setting | simultaneous operation Available or Unavailable |
|---|---|---|---|---|
| DHW | Heating | | | |
| 120°F | 170°F | ○ | OFF | Available |
| | | | ON | Available |
| 130°F | 90°F | □ | OFF | Unavailable |
| | | | ON | Unavailable |
| 110°F | 130°F | ● | OFF | Unavailable |
| | | | ON | Available |

* If [I:01_HCt] is set to [2:or] or [3:EC], the Combi Boiler operates simultaneously DHW and Heating automatically by increasing the heating supply temperature.

NOTE
When the dip switch #2 is ON, Heating temperature setting is increased up to approximately 30°F during simultaneous operation. Damage caused by increasing Heating temperature is not covered by the Noritz America Limited Warranty. Check whether for the hydronic heating appliance and plumbing are acceptable it.

| Settings | | Default | Pages |
|---|---|---|---|
| OFF, ON | | OFF | |
| Press and hold the △ button for approximately 5 seconds to reset all parameters. (The ▽ button cannot accept.) | | | |

<Relationship between simultaneous operation and temperature settings>

Chart1

Faucet Flow Rate 2.0GPM (7.6L/min)
Faucet Water Outlet Temp 107°F (42°C)
DHW Water Inlet Temp 40°F (4.4°C)

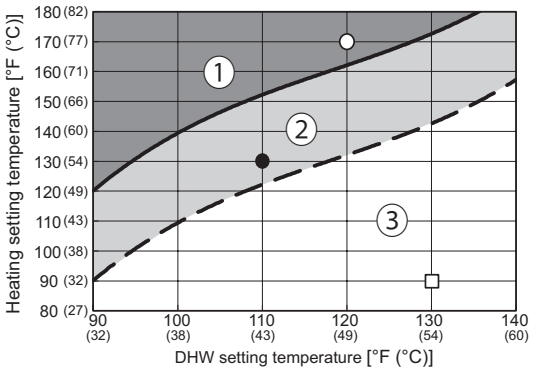



Chart2

Faucet Flow Rate 2.5GPM (9.5L/min)
Faucet Water Outlet Temp 107°F (42°C)
DHW Water Inlet Temp 40°F (4.4°C)

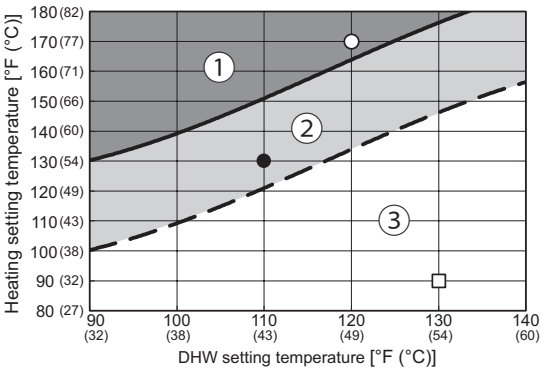



Chart3

Faucet Flow Rate 2.0GPM (7.6L/min)
Faucet Water Outlet Temp 107°F (42°C)
DHW Water Inlet Temp 50°F (10°C)

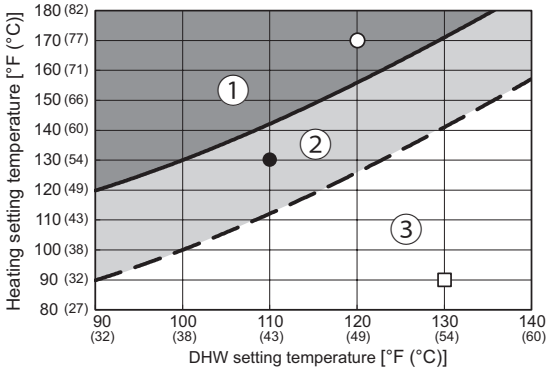
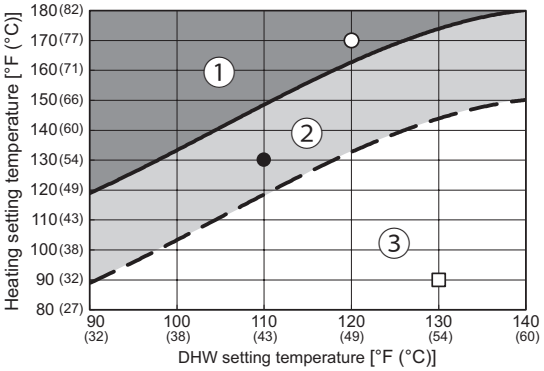



Chart4

Faucet Flow Rate 2.5GPM (9.5L/min)
Faucet Water Outlet Temp 107°F (42°C)
DHW Water Inlet Temp 50°F (10°C)

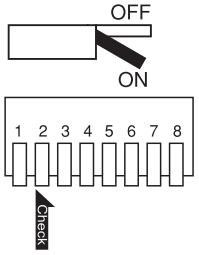



* The "③" area is unavailable for simultaneous operation.
* When DHW setting temperature is under 107°F(42°C), Faucet Water Outlet Temp equals DHW setting temperature.

【Dip Switch Adjustment】

- Disconnect power and turn ON dip switch #2 if the Combi Boiler operates using area①+② in simultaneous operation.

* Dip switch #2 turned on.




Contact Noritz America for more information about simultaneous use for DHW and Heating.
(Phone # : 866–766–7489)

# 15. Temperature Setting

## How to Set Heating Temperature

Note: The following Heating Temperature Setting can be changed when the “Outdoor Reset Control” is disabled (Refer to page 44-49).

| Operation | Screen Display |
|---|---|
| **1** Press the ON/OFF button ON. |  (e.g.: 10:15AM) |
| **2** Press the TEMP button once.<br>The current "Heating Temperature Setting" and "Heating Icon" will be blinking.<br>* Initial factory setting is 180°F (82°C in °C mode). |  (e.g.: 180°F) |
| **3** Set the temperature using the △ ▽ buttons. | * To return to the home screen, press the BACK button or let panel sit for approximately 20 seconds. |

## How to Set DHW Temperature

| Operation | Screen Display |
|---|---|
| **1** Press the ON/OFF button ON. |  (e.g.: 10:15AM) |
| **2** Press the TEMP button twice.<br>The current "DHW Temperature Setting" and "DHW Icon" will be blinking.<br>* Initial factory setting is 110°F (40°C in °C mode). |  (e.g.: 110°F) |
| **3** Set the temperature using the △ ▽ buttons. | * To return to the home screen, press the BACK button or let panel sit for approximately 20 seconds. |

**Temperature Setting Range**

| | | | |
|---|---|---|---|
| Temperature Settings | DHW* | °F Mode | 90-140°F(In 5°F intervals) (11 Options) |
| | | °C Mode | 32°C,35°C,37°C-48°C (In 1°C intervals),50°C,55°C,60°C (17 Options) |
| | Heating | °F Mode | 100-180°F (In 1°F intervals) (81 Options)** |
| | | °C Mode | 40-82°C (In 1°C intervals)(43 Options)** |

* When you use Quick Connect Multi System, temperature setting range is changed to below.
°F Mode : 100-140°F (In 5°F intervals)
°C Mode : 37 - 48°C (In 1°C intervals), 50°C,55°C,60°C

** Heating Temperature range depends on Installer Mode Setting (I:05_HHt,I:06_HLt).

# 16. Service Reminder

The Combi Boiler is equipped with a Service Reminder to announce for maintenance.
The factory default of this Service Reminder is "OFF".
The customer or installer needs to set the Service Reminder to ON or OFF.

## How to select the Service Reminder

| Operation | Screen Display |
|---|---|
| **1** Press the ON/OFF button to OFF. The Operation Panel must be off. | |
| **2** Press the MAINTENANCE button.<br>Select 2:dl using the △ ▽ buttons, and then press the ENTER button.<br>The "Diagnostic Mode" screen appears. |  |
| **3** When entering the "Diagnostic Mode", display will change to d:01 ▼ After 1 sec. ECC. |  |
| **4** When display shows d:01 ▼ After 1 sec. ECC., press the △ ▽ buttons to navigate d:03 ▼ After 1 sec. SEr in the "Diagnostic Mode". |  |
| **5** Select d:03 ▼ After 1 sec. SEr, then press the ENTER button to enter the function. | |
| **6** Press the △ ▽ buttons to change the parameter value.<br>* OFF(default), 6, 12, 18, 24, 30, 36, 42, 48, 54, 60 months. |  (e.g.: OFF) |
| **7** Press the ENTER button to save the settings and to exit the function. | |
| **8** To exit the "Diagnostic Mode" press the BACK button. | |

When the set time period has been reached, the Error Code 88* will flash on the Operation Panel.

* How to reset the code 88:
When the code 88 appears, press the ON/OFF button 5 times in 5 seconds.
The Service Reminder will be reset.

# 17. Maintenance

Periodically check the following to ensure proper operation of the Combi Boiler.

- The venting system must be examined periodically by a qualified service technician to check for any leaks or corrosion.
- The burner flame must be checked periodically for a proper blue color and consistency.
- If the flame does not appear normal, the burner may need to be cleaned.
- If the burner needs to be cleaned, it must be performed by a qualified service technician.
- Do not obstruct the flow of combustion and ventilation air.
- The pressure relief valve must be operated once a year to ensure that it is functioning properly and there is no obstruction. Power off to the unit before opening the relief valve, and make sure that water draining out of the valve will not cause any damage.
- If the relief valve discharges periodically, it may be due to thermal expansion in a closed water system. Contact the water supplier or a local plumbing inspector on how to correct this situation. Do not plug the relief valve.
- See the Owner's Guide for further maintenance.

**Warning:** There is a scald potential if the output temperature is set too high.
Should overheating occur, or the gas supply fail to shut off, turn off the manual gas control valve to the appliance.
Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.
Periodically check and clean the filter inside the DHW cold water inlet of the unit.

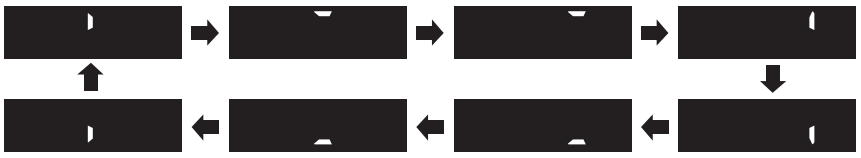
# 18. Trial Operation

The installer should test operate the unit, explain to the customer how to use the unit, and give the owner this manual before leaving the installation.

## Auto Feeder Process

1. Turn on the power to the Operation Panel.
2. The unit starts auto feeder process for heating when the heating water pressure is less than [I:14_HPS(default: 12psi) - 4psi].
3. Once heating water pressure reaches to a certain pressure, the pump will operate to bleed the air from the heating loop.
4. The unit will repeat auto feeder process for heating and the unit will stop the trial run when the heating water pressure reaches to [I:14_HPS(default: 12psi)].

* The Operation Panel will display the following rotational patterns during the auto feeder process.



* If error code 57 appears on the Operation Panel after finishing auto feeder process, the Combi Boiler is not filled with water enough to operate. When error code 57 appears,

press the 

button twice and start auto feeder again.

- Preparation ..... (1) Open a hot water fixture to confirm that water is available, and then close the fixture.
  (2) Open the gas supply valve.
  (3) Turn on the power supply. Using the Operation Panel, turn on the Power On/Off button (the Operation lamp will turn on).

(1) Open a hot water fixture and confirm that the Burner On lamp comes on, and that hot water is being produced. (If necessary, repeat until the air in the gas piping is bled out).
   * White smoke may be noticed from the exhaust vent during cold weather. This is not a malfunction of the unit.
   * If an “11” error code appears on the Operation Panel, turn the unit off and then back on again, and then open a hot water fixture again.

(2) Change the temperature setting on the Operation Panel and check that the water temperature changes. Refer to page 62.

- If the Combi Boiler does not operate normally, refer to “Troubleshooting” in the Owner's Guide.
* After the trial operation, clean the filter in the DHW cold water inlet.

<If installed with a quick connect multi-system>
- Turn the system power ON with the Operation Panel.
- Slowly open a hot water fixture and check that the units ignite sequentially. Check to see that the hot water temperature is the same as the temperature displayed on the Operation Panel. (*1)

* If an 11 or F11 error code flashes on the Operation Panel, press the Power ON/OFF Button on the Operation Panel off and on 2 -3 times.
* If (*1) cannot be done, the Quick Connect Cord may not be properly connected. Check that the cord is properly connected.

**⚠ CAUTION**

**Handling after trial operation**

- If the unit will not be used immediately, close off all gas and water shutoff valves, drain all of the water out of the unit and the plumbing system to prevent the unit and system from freezing, and bleed the gas out of the gas line.
  Freezing is not covered by the warranty.

**⚠ WARNING**

A fire or explosion may result if these instructions are not followed, which may cause lose of life, personal injury or property damage.

## Lighting Instructions

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

1. Read the safety information in the installation manual or on the front of the Combi Boiler.
2. Turn off all electrical power to the unit.
3. Do not attempt to light the burner by hand.
4. Turn the gas control manual valve (external to the unit) clockwise to the off position.
5. Wait five minutes to clear out any gas. If the smell of gas remains, stop, and follow the instructions on page 3 of Owner's Guide.
6. Turn the gas control manual valve counterclockwise to the on position.
7. Turn on electric power to the unit.
8. The unit will now operate whenever hot water is called for. If the unit will not operate, follow the shutdown instructions and call a service technician.

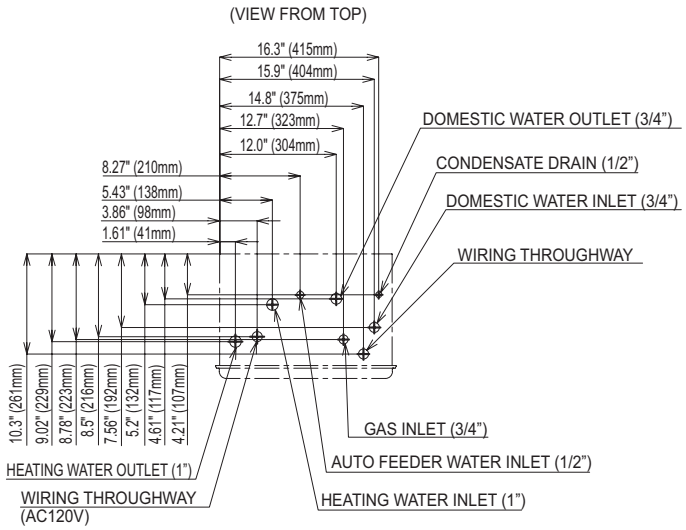
## Shutdown Instructions

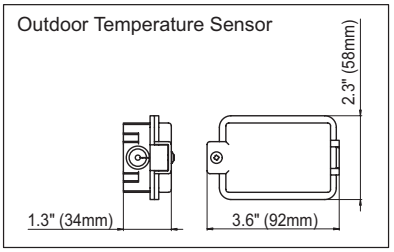
1. Stop any water demand.
2. Turn off electric power.
3. Turn the gas control manual valve clockwise to the off position.

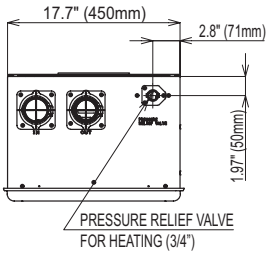
Should overheating occur, or the gas supply fail to shut off, turn off the manual control valve to the appliance.

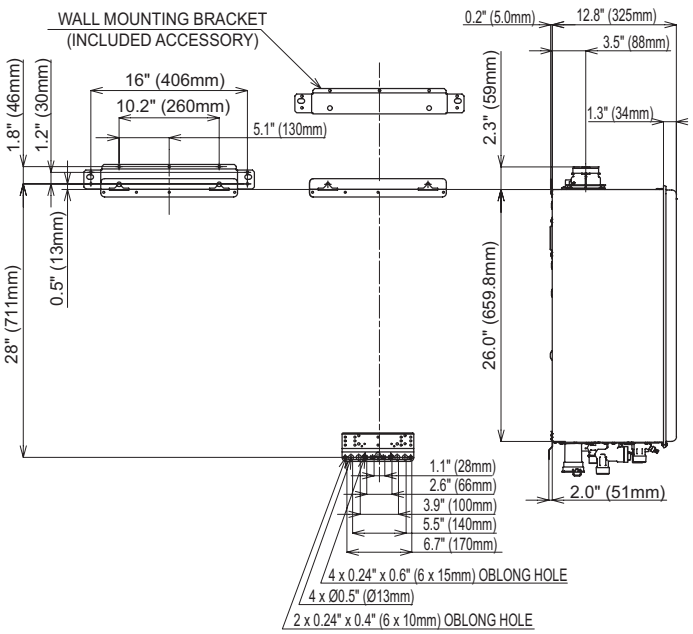
# 19. Dimensions

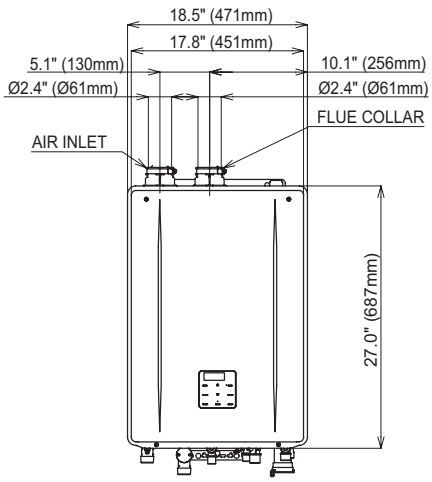
< inch (mm) >




HEIGHT OF EACH FITTING
FROM CASE

| PRESSURE RELIEF VALVE FOR HEATING | TOP | 1.0" (26mm) |
|---|---|---|
| DOMESTIC WATER OUTLET | BOTTOM | 2.0" (51mm) |
| DOMESTIC WATER INLET | BOTTOM | 1.9" (49mm) |
| HEATING WATER OUTLET | BOTTOM | 2.2" (55mm) |
| HEATING WATER INLET | BOTTOM | 3.4" (86mm) |
| AUTO FEEDER WATER INLET | BOTTOM | 2.3" (58mm) |
| CONDENSATE DRAIN | BOTTOM | 1.7" (42mm) |
| GAS INLET | BOTTOM | 2.2" (55mm) |