NAVIEN
The Leader in Condensing Technology

Installation Manual

NFB-H Condensing Boilers

Model | NFB-175H
NFB-200H

Keep this manual near this boiler for future reference whenever maintenance or service is required.

WARNING

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

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

WHAT TO DO IF YOU SMELL GAS

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

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

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

Requirements for the State of Massachusetts

NOTICE BEFORE INSTALLATION

This appliance must be installed by a licensed plumber or gas fitter in accordance with the Massachusetts Plumbing and Fuel Gas Code 248 CMR Sections 4.00 and 5.00.

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

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

1. INSTALLATION OF CARBON MONOXIDE DETECTORS. No installation or replacement of a vented gas appliance shall be permitted unless a battery powered or electrically hard wired carbon monoxide detector is present on the same floor as the appliance or on the next adjacent floor when the appliance is located in a crawl space unless the appliance is located in a detached, uninhabitable garage. For all residential dwellings, a carbon monoxide detector must also be present on each habitable level of the dwelling. These requirements shall not be deemed to waive any additional requirements imposed by M.G.L. c. 148 §26F1/2.

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

3. SIGNAGE. Whenever any through-the-wall vent is installed less than seven feet above the finished grade, a metal or plastic identification plate shall be permanently mounted to the exterior of the building at a minimum height of eight feet above grade directly in line with the exhaust vent terminal. The sign shall read, in print size no less than 0.5 inches in size,**"GAS VENT DIRECTLY BELOW. KEEP CLEAR OF ALL OBSTRUCTIONS"**.

4. INSPECTION. The state or local gas inspector of the side wall horizontally vented gas fueled equipment shall not approve the installation unless, upon inspection, the inspector observes carbon monoxide detectors and signage installed in accordance with the provisions of 248 CMR 5.09 and 5.12.

Contents

Safety Information

The following safety symbols are used in this manual. Read and follow all safety instructions in this manual precisely to avoid unsafe operating conditions, fire, explosion, property damage, personal injury, or death.

DANGER

Indicates an imminently hazardous situation which, if not avoided, could result in severe injury or death.

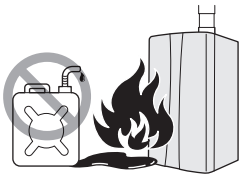
WARNING

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

CAUTION

Indicates a potentially hazardous situation that, if not avoided, could result in property damage.

DANGER



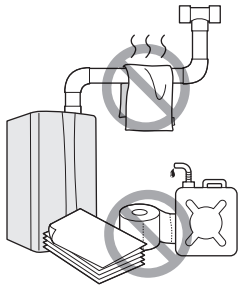
If you smell gas:

- Do not try to light any appliance.
- Do not touch any electrical switches or use landline phones.
- From a neighbor's phone, call your gas provider and follow their instructions.
- If you cannot reach your gas provider, call the fire department.
- Do not return to your home until authorized by your gas supplier or the fire department.

Do not use or store flammable products, such as gasoline, solvents, or adhesives in the same room or area as the boiler.

- The boiler has a main burner flame that can turn on at any time and can ignite flammable vapors. Vapors from flammable liquids can explode and catch fire, causing death or severe burns.
- Vapors cannot be seen and are heavier than air. They can travel long distances along the ground and can be carried from other rooms to the boiler's main burner flame by air current.
- Keep all flammable products far away from the boiler and store them in approved containers. Keep the containers closed tightly and out of the reach of children and pets.

WARNING



- **Do not store or use gasoline or other flammable liquids near this boiler.**
  Doing so may result in fire or explosion.
- **Do not place combustibles, such as newspapers or laundry, near the boiler or venting system.**
  Doing so may result in a fire.
- **Do not place or use hair sprays, spray paints, or any other compressed gases near the boiler or venting system, including the vent termination.**
  Doing so may result in fire or explosion.
- **Do not operate the boiler with the front cover opened.**
  Doing so may result in fire or carbon monoxide (CO) poisoning, which may result in property damage, personal injury, or death.
- **Do not operate this boiler without proper venting.**
  Doing so may result in fire or carbon monoxide (CO) poisoning, which may result in property damage, personal injury, or death.
- **Do not touch the power cord or internal components of the boiler with wet hands.**
  Doing so may result in electric shock.

California law requires the following Prop 65 warning to be provided:

WARNING

Cancer and Reproductive Harm - www.P65Warnings.ca.gov.

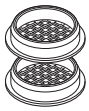
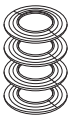
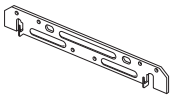
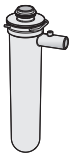
CAUTION

- **Do not turn on the boiler unless the water and gas supplies are fully opened.**
  Doing so may damage the boiler.
- **Do not use this boiler for anything other than its intended purpose, as described in this manual.**
- **Do not remove the front cover unless the power to the boiler is turned off or disconnected.**
  Failure to do so may result in electric shock.
- **When servicing the controls, label all wires prior to disconnecting them.**
  Failure to do so may result in wiring errors, which can lead to improper or dangerous operation. Verify proper operation after servicing.
- **Do not use unapproved replacement or accessory parts.**
  Doing so may result in improper or dangerous operation and will void the manufacturer's warranty.
- **Do not place anything in or around the vent terminals, such as a clothes line, that could obstruct the air flow in or out of the boiler.**
- **This boiler has been approved for use in the USA and Canada only.**
  Using the boiler in any other country will void the manufacturer's warranty.

1. About the Boiler

1.1 Included Items

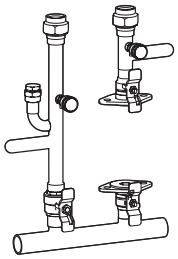
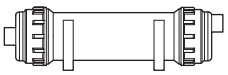
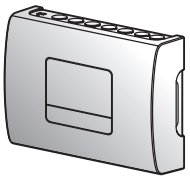
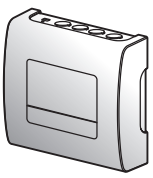
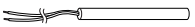
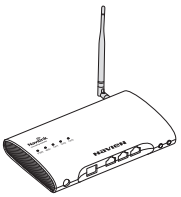
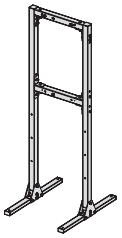
When you open the box, you will find the following items with the boiler. Check the box for each of the following items before installing the boiler.

	
Installation & Operation Manual, User's Information Manual	Quick Installation Manual
	
2 in Vent Termination Caps (x2)	2 in Wall Flanges (x4)
	
Air Vent	Wall Mounting Bracket
	
Tapping Screws & Anchors (x2)	Pressure Relief Valve, Heating
	
Propane Conversion Kit*	High Altitude Conversion Kit (Natural Gas Only)*
	
Outdoor Temperature Sensor and Cable	Air Vent Bushing (3/4in to 1/2in)
	
Condensate Trap	Universal Temperature Sensor
	
Spare Parts	

* High Altitude Conversion kit and Propane Conversion kit are attached to the inside of Product's cover.

1.2 Accessories

The following optional accessories are available for the boiler.

	
NFB-175/200H Manifold System (for single boilers)	Condensate Neutralizer Kit
	
Zone Controller (FMZ-40/60)	Zone Controller (FMZ-20/30)
	
Universal Temperature Sensor (with clip)	Navi-Link (Wi-Fi Control System)
	
Ready-Link Rack V2	NaviClean

Note The Universal Temperature Sensor can be used as a System Temperature Sensor or a DHW Tank Sensor.

1.3 Specifications

The following tables list the specifications for the boiler. Additional specifications for water, gas, electricity, and vent connections are provided in the Installation section.

Space Heating Specifications

Navien Condensing Boiler Space Heating Ratings						Other Specifications		
Model Number[1]	Heating Input (MBH)		Heating Capacity[2] (MBH)	Net AHRI Rating Water[3] (MBH)	AFUE[2] (%)	Water Pressure	Water Connection Size (Supply, Return)	Water Volume
	Min	Max						
NFB-175H	13.3	175	160	139	95	6–80 psi	1 ¼ in NPT	4.5 Gallon
NFB-200H		199	182	158	95			

Note

1. Ratings are the same for natural gas models converted to propane use.
2. Based on U.S. Department of Energy (DOE) test procedures.
3. The net AHRI water ratings shown are based on a piping and pickup allowance of 1.15. Consult Navien before selecting a boiler for installations having unusual piping and pickup requirements, such as intermittent system operation, extensive piping system, etc.

General Specifications

Item		NFB-175H	NFB-200H
Dimensions		17.3 in (W) x 17.3 in (D) x 27.6 in (H)	
Boiler weight		121 lb (55 kg)	
Boiler weight with water		148 lb (67 kg)	
Installation Type		Indoor Wall-Hung	
Venting Type		Forced Draft Direct Vent	
Ignition		Electronic Ignition	
Natural Gas Supply Pressure (from source)		3.5 in–10.5 in WC	
Propane Gas Supply Pressure (from source)		8.0 in–13.0 in WC	
Natural Gas Manifold Pressure		-0.03 to -0.70 in WC	-0.03 to -0.85 in WC
Propane Gas Manifold Pressure		-0.02 to -0.68 in WC	-0.02 to -0.75 in WC
Gas Connection Size		3/4 in NPT	
Power Supply	Main Supply	120V AC, 60Hz	
	Maximum Power Consumption	Less than 15 amperes	
Materials	Casing	Cold-rolled carbon steel	
	Heat Exchangers	Stainless Steel	
Venting	Exhaust	2 in or 3 in PVC, CPVC, approved polypropylene* 2 in or 3 in Special Gas Vent Type BH (Class III, A/B/C) 2 in or 3 in Stainless Steel	
	Intake	2 in or 3 in PVC, CPVC, polypropylene 2 in or 3 in Special Gas Vent Type BH (Class III, A/B/C) 2 in or 3 in Stainless Steel, ABS	
	Vent Clearance	0 in to combustibles	
Safety Devices		Flame Rod, APS, Ignition Operation Detector Water Temperature High Limit Switch, Exhaust Temperature High Limit Sensor, Water Pressure Sensor, Vent Installation Detector (VID)	

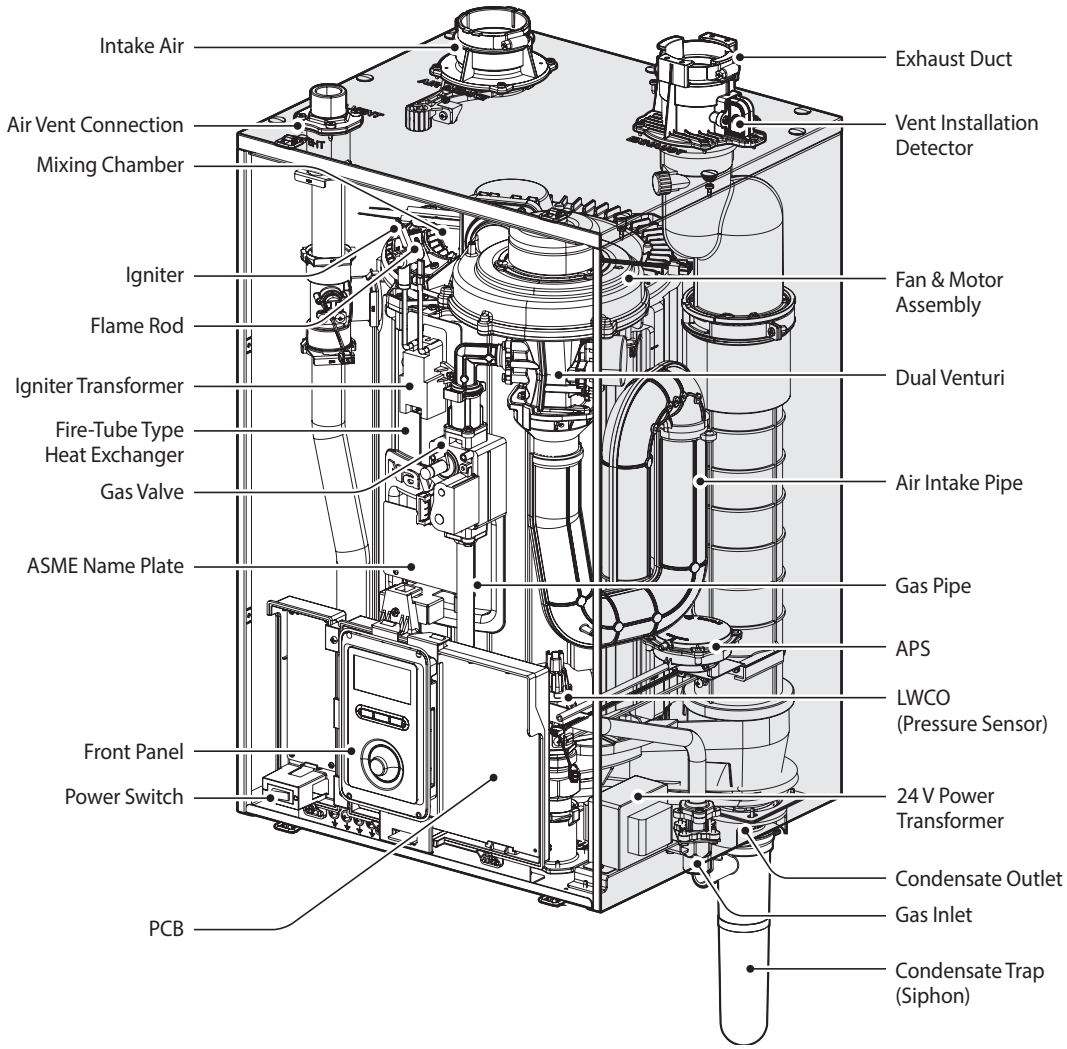
Temperature Setting Range

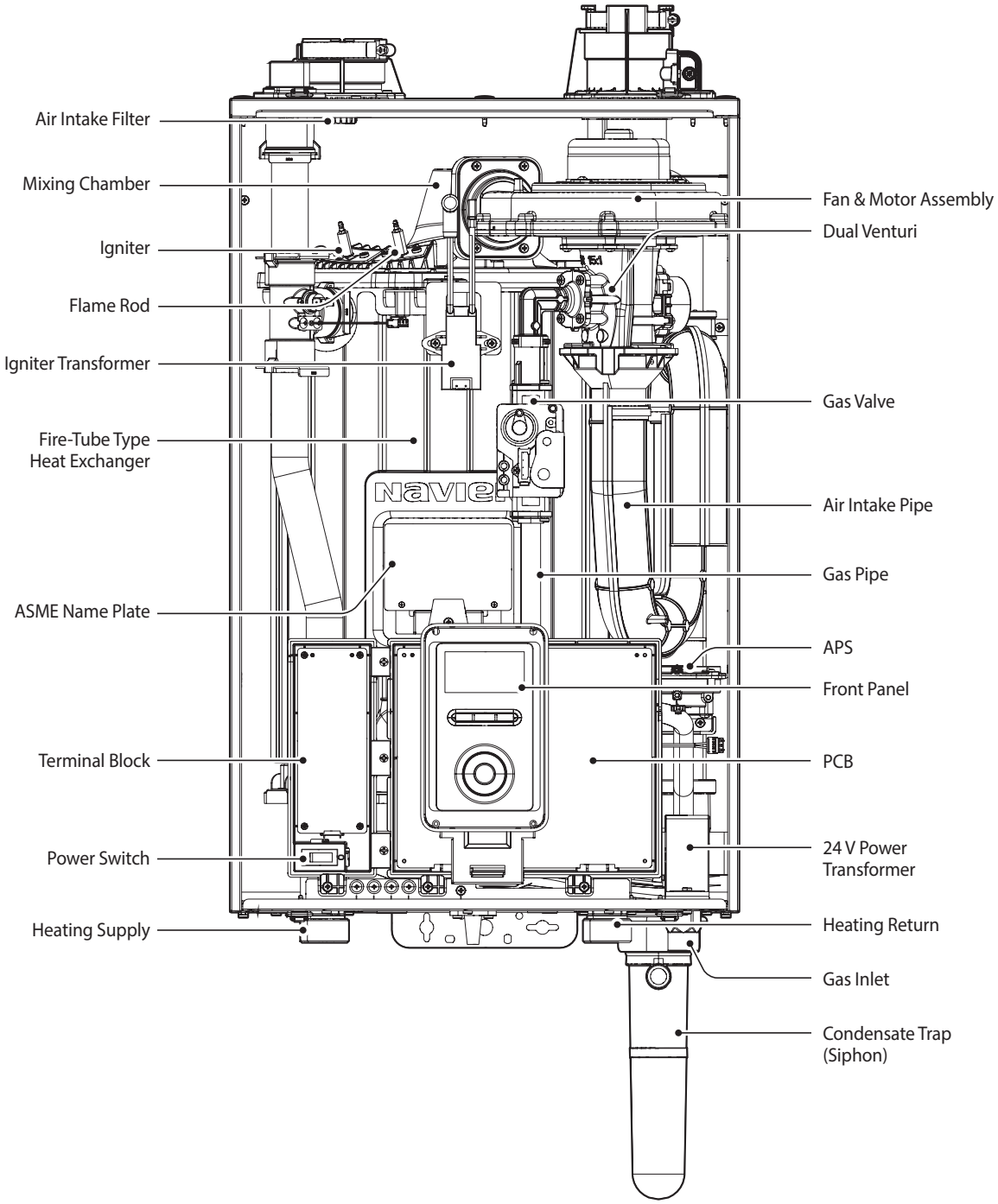
Item		Temperature Setting Range	Remarks
Space Heating	Supply	77-190°F (25-88°C)	Actual supply and return temperatures vary depending on the selected outdoor reset curve.
	Return	68–158°F (20-70°C)	

Note For more information about the space heating temperature setting range, refer to "11.5.2 Setting the Space Heating Operation" on page 101.

1.4 Components

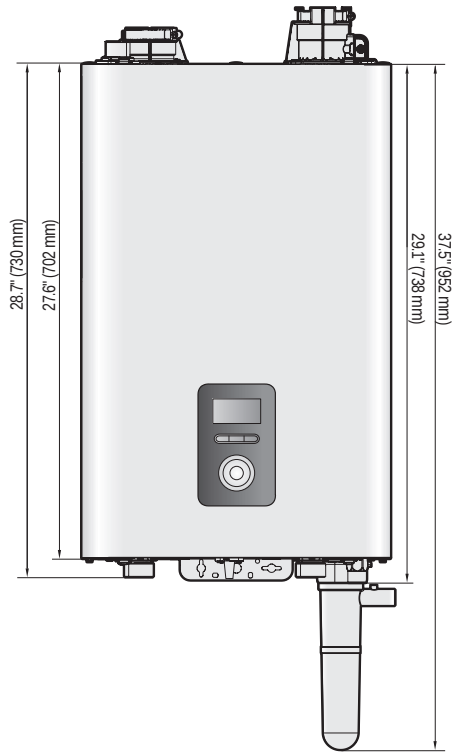
The following diagram shows the key components of the boiler. Component assembly diagrams and particular parts lists are included in the Appendixes.




Air Intake Filter
Mixing Chamber
Igniter
Flame Rod
Igniter Transformer
Fire-Tube Type
Heat Exchanger
ASME Name Plate
Terminal Block
Power Switch
Heating Supply
Fan & Motor Assembly
Dual Venturi
Gas Valve
Air Intake Pipe
Gas Pipe
APS
Front Panel
PCB
24 V Power
Transformer
Heating Return
Gas Inlet
Condensate Trap
(Siphon)

1.5 Dimensions

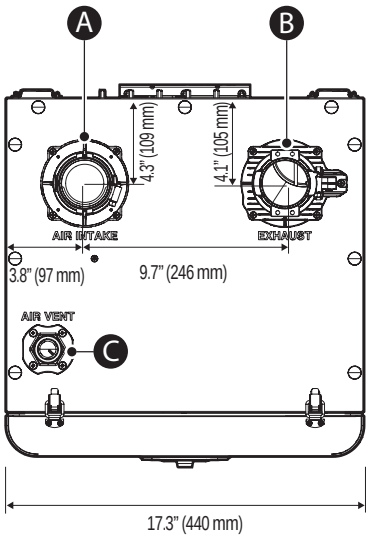
The following diagrams show the dimensions of the boiler and the table lists the supply connections.



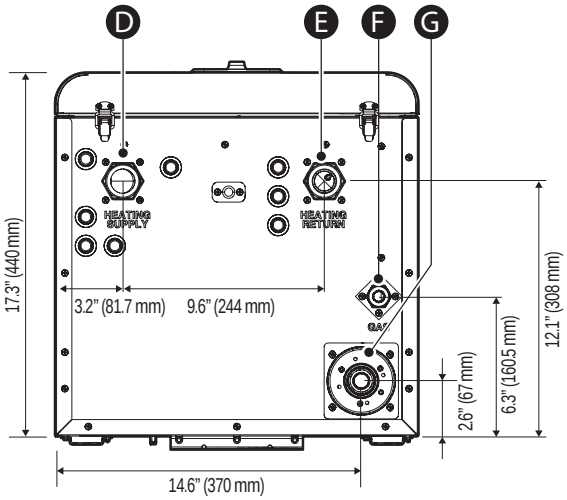
Supply Connections

	Description	Diameter
A	Air Intake	2 in
B	Exhaust Gas Vent	2 in
C	Air Vent Connection	3/4 in
D	Heating Supply	1 1/4 in
E	Heating Return	1 1/4 in
F	Gas Connection	3/4 in
G	Condensate Outlet	1/2 in

Overhead View

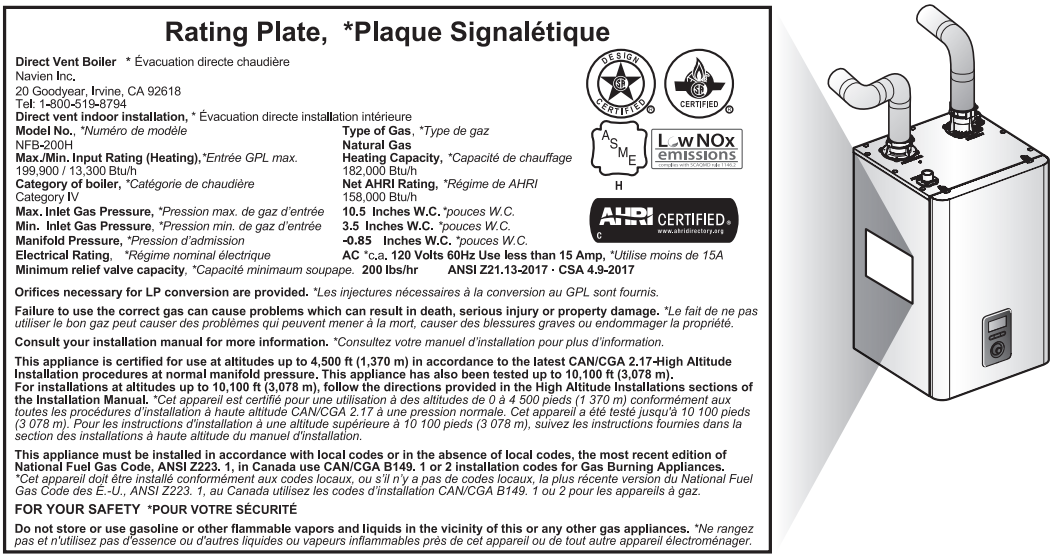


Supply Connections



1.6 Rating Plate

The Navien NFB-H boilers come from the factory configured for use with Natural Gas (NG). **Before starting the installation**, check the rating plate located on the side of the boiler to ensure that the boiler matches the gas type, gas pressure, water pressure, and electrical supply available in the installation location. **If the boiler does not match each of these ratings, do not install the boiler.** If conversion to Propane Gas is required, the included gas conversion kit must be used. Refer to "12.1 Gas & High Altitude Conversion" on page 117 for details.



Rating Plate, *Plaque Signalétique

Direct Vent Boiler * Évacuation directe chaudière
Navien Inc.
20 Goodyear, Irvine, CA 92618
Tel: 1-800-519-8794
Direct vent indoor installation, * Évacuation directe installation intérieure

Model No., *Numéro de modèle	**Type of Gas**, *Type de gaz
NFB-200H	**Natural Gas**
Max./Min. Input Rating (Heating), *Entrée GPL max.	**Heating Capacity,** *Capacité de chauffage
199,900 / 13,300 Btu/h	182,000 Btu/h
Category of boiler, *Catégorie de chaudière	**Net AHRI Rating,** *Régime de AHRI
Category IV	158,000 Btu/h
Max. Inlet Gas Pressure, *Pression max. de gaz d'entrée	**10.5 Inches W.C.** *pouces W.C.
Min. Inlet Gas Pressure, *Pression min. de gaz d'entrée	**3.5 Inches W.C.** *pouces W.C.
Manifold Pressure, *Pression d'admission	**-0.85 Inches W.C.** *pouces W.C.
Electrical Rating, *Régime nominal électrique	**AC *c.a. 120 Volts 60Hz Use less than 15 Amp,** *Utilise moins de 15A
Minimum relief valve capacity, *Capacité minimaum soupape.	**200 lbs/hr** **ANSI Z21.13-2017 · CSA 4.9-2017**

Orifices necessary for LP conversion are provided. *Les injectures nécessaires à la conversion au GPL sont fournis.

Failure to use the correct gas can cause problems which can result in death, serious injury or property damage. *Le fait de ne pas utiliser le bon gaz peut causer des problèmes qui peuvent mener à la mort, causer des blessures graves ou endommager la propriété.

Consult your installation manual for more information. *Consultez votre manuel d'installation pour plus d'information.

This appliance is certified for use at altitudes up to 4,500 ft (1,370 m) in accordance to the latest CAN/CGA 2.17-High Altitude Installation procedures at normal manifold pressure. This appliance has also been tested up to 10,100 ft (3,078 m).
For installations at altitudes up to 10,100 ft (3,078 m), follow the directions provided in the High Altitude Installations sections of the Installation Manual. *Cet appareil est certifié pour une utilisation à des altitudes de 0 à 4 500 pieds (1 370 m) conformément aux toutes les procédures d'installation à haute altitude CAN/CGA 2.17 à une pression normale. Cet appareil a été testé jusqu'à 10 100 pieds (3 078 m). Pour les instructions d'installation à une altitude supérieure à 10 100 pieds (3 078 m), suivez les instructions fournies dans la section des installations à haute altitude du manuel d'installation.

This appliance must be installed in accordance with local codes or in the absence of local codes, the most recent edition of National Fuel Gas Code, ANSI Z223. 1, in Canada use CAN/CGA B149. 1 or 2 installation codes for Gas Burning Appliances.
*Cet appareil doit être installé conformément aux codes locaux, ou s'il n'y a pas de codes locaux, la plus récente version du National Fuel Gas Code des É.-U., ANSI Z223. 1, au Canada utilisez les codes d'installation CAN/CGA B149. 1 ou 2 pour les appareils à gaz.

FOR YOUR SAFETY *POUR VOTRE SÉCURITÉ

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other gas appliances. *Ne rangez pas et n'utilisez pas d'essence ou d'autres liquides ou vapeurs inflammables près de cet appareil ou de tout autre appareil électroménager.

> **WARNING**
>
> Ensure that the gas type and power source specifications match what is listed on the rating plate. Using a different gas type will cause abnormal combustion and boiler malfunction. Using abnormally high or low AC voltage may cause abnormal operation, and may reduce the life expectancy of the product.

This appliance complies with the requirements of SCAQMD Rule 1146.2 for NOx emissions of 14 ng/J or 20 ppm at 3% O_2.

2. Installing the Boiler

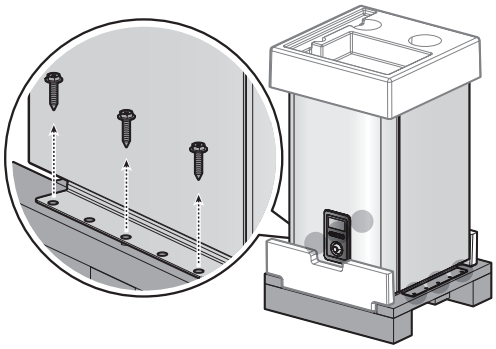
2.1 Removing the Wood Pallet from the boiler

After you open the box, remove the wood pallet and the pallet brackets and then install the boiler.

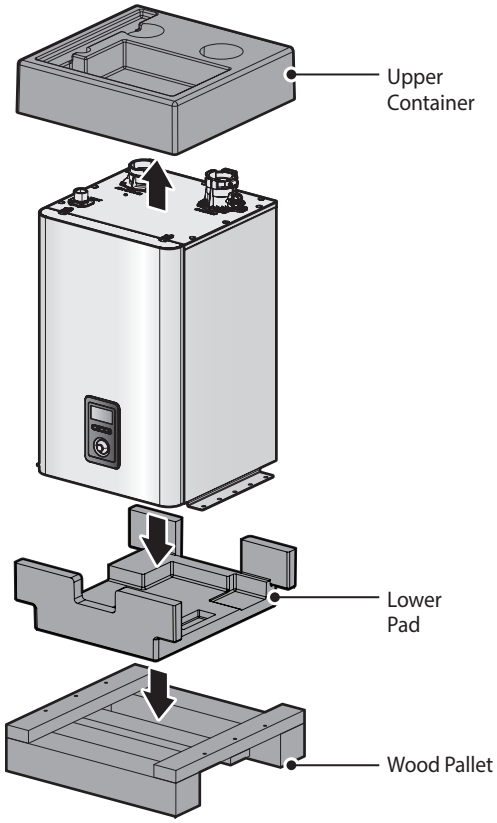
> **CAUTION**
>
> After opening the box, check the items of the upper container.

Removing the Wood Pallet and the Pallet Brackets

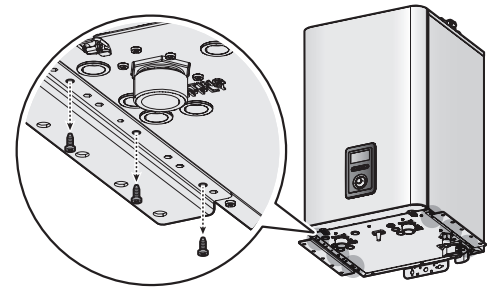
1. Loosen the six screws that secure the wood pallet on the bottom left and right sides of the boiler.



2. Remove the wood pallet, the upper container, and the lower pad.

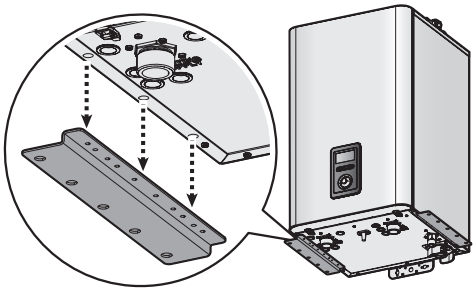


3. Loosen the six screws that secure the pallet brackets.

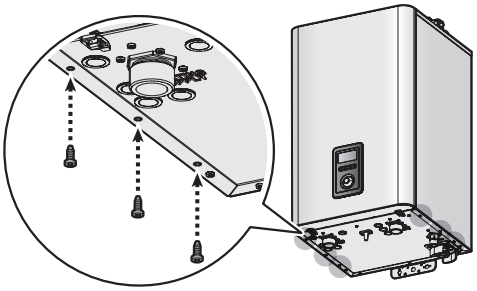


> **CAUTION**
>
> Keep the removed screws in a safe place. The screws will be used again in Step 5.

4. Remove the two pallet brackets.



5. Tighten the six screws into the original position.



CAUTION

Ensure that the screws have been retightened so that the boiler can maintain a proper airtight seal.

2.2 Choosing an Installation Location

When choosing an installation location, you must ensure that the location provides adequate clearance for the boiler, adequate venting and drainage options, and sufficient access to gas, water, and electrical supplies. Carefully consider the following factors when choosing an installation location:

Compliance Requirements

- Local, state, provincial, and national codes, laws, regulations, and ordinances.
- National Fuel Gas Code, ANSI Z223.1-latest edition.
- Standard for Controls and Safety Devices for Automatically Fired Boilers, ANSI/ASME CSD-1, when required.
- National Electrical Code.
- For Canada only: B149.1 Installation Code, CSA C22.1 Canadian Electrical Code Part 1, CSA-B214-12 Installation code for hydronic heating systems, and any local codes.

Access to Utilities

- Water – the installation location should be near where the domestic water supply enters the building.
- Gas – the installation location should be near where the gas supply enters the building.
- Electricity – the installation location should be near where the electrical supply enters the building.

Humidity and Contact with Water

When installing the boiler, avoid places with excessive humidity. The boiler has electric gas ignition components. Moisture can get inside the boiler and damage the ignition system. The boiler must be installed in a way to ensure that the gas ignition system components are protected from water (dripping, spraying, rain, etc.) during operation and service.

Adequate Drainage

The boiler produces a significant amount of condensate during operation. The boiler should be located near a suitable drain and where damage from a possible leak will be minimal. Installing the boiler in a location without a drain will void the warranty and Navien will not be responsible for water damages that occur as a result. For more information about condensate drainage, refer to "3.2 Connecting the Condensate Drain" on page 25.

The boiler must be located in an area where leakage of the unit or connections will not result in damage to the area adjacent to the appliance or to lower floors of the structure. When such locations cannot be found, installation of an adequately drained drain pan under the boiler is highly recommended. When installing the drain pan, ensure that the installation does not restrict combustion air flow.

Adequate Venting and Ventilation

Select a location that requires minimal venting. Consider venting restrictions caused by windows, doors, air intakes, gas meters, foliage, and other buildings. For more information about venting, refer to "5. Venting for Combustion Air" on page 54.

To ensure adequate venting and ventilation, follow these guidelines:

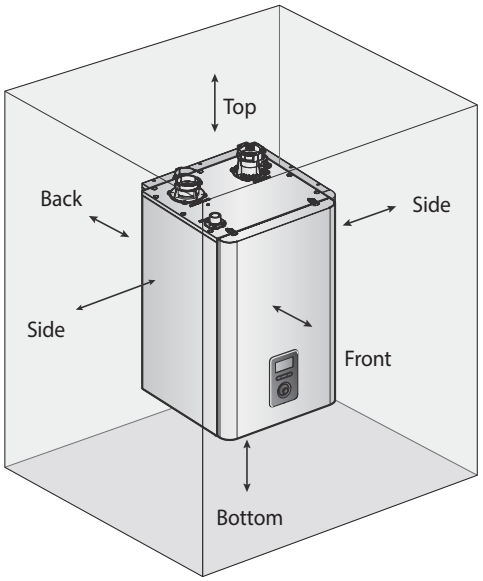
- Maintain proper clearances from any openings in the building.
- Ensure that the vent termination is at least 12 in (300 mm) above ground, 12 in (300 mm) above the highest anticipated snow level, or as required by local codes, whichever is greater.
- Do not enclose the vent termination.
- Install the exhaust vent in an area that is free from any obstructions, where the exhaust will not accumulate.
- Do not install the boiler where moisture from the exhaust may discolor or damage walls.
- Do not install the boiler in bathrooms, bedrooms, or any other occupied rooms that are normally kept closed or not adequately ventilated.

Adequate Installation Clearances

CAUTION

Do not install the boiler on carpeting.

Install the boiler in an area that allows for service and maintenance access to utility connections, piping, filters, and traps. Based on the installation location, ensure that the following clearances are maintained:



Clearance from:	Indoor Installation
Top	9 in (229 mm) minimum
Back	0.5 in (13 mm) minimum
Front	4 in (100 mm) minimum
Sides	3 in (76 mm) minimum
Bottom	12 in (300 mm) minimum

CAUTION

It is necessary to leave clearance for service access.

Clean, Debris and Chemical-free Combustion Air

- Do not install the boiler in areas where dust and debris may accumulate or where hair sprays, spray detergents, chlorine, or similar chemicals are used.
- Do not install the boiler in areas where gasoline or other flammables are used or stored.
- Ensure that combustible materials are stored away from the boiler and that hanging laundry or similar items do not obstruct access to the boiler or its venting.

High Elevation Installations

This unit may be installed at elevations up to 10,100 ft (3,078 m) for use with natural gas and propane. Refer to "6. Setting the DIP Switches" on page 69 for the appropriate altitude setting.

2.3 Mounting the Boiler to the Wall

Navien NFB-H boilers come with an upper mounting bracket that is pre-drilled at 16 in (400 mm) on center for easy installation on standard wall studs. If the strength of the wall is insufficient or if the framing is non-standard or uneven, reinforce the area before installing the boiler. Avoid installation on common walls as the unit will make some operational noises while it is running.

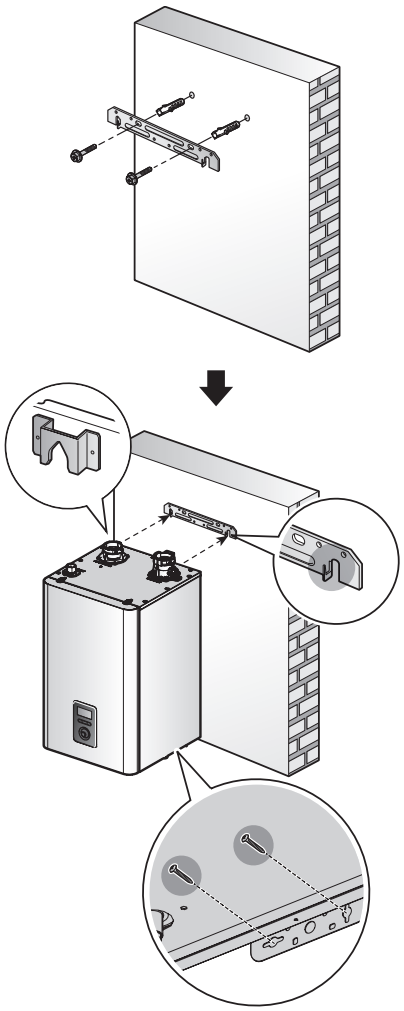
To mount the boiler to the wall:

1. Affix the bracket securely to the wall and ensure that it is level and that it can support the weight of the boiler.

2. Align the grooves on the back of the boiler with the tongues on the mounting bracket and hang the boiler on the bracket.

   When mounted with the mounting bracket, the boiler will have a $^{5}/_{8}$ in (16 mm) clearance from the back of the wall.

3. Install two set screws through the bracket at the bottom of the boiler to secure the boiler on the wall.



WARNING

- **The boiler is heavy.** Always lift the unit with assistance. Be careful not to drop the boiler while lifting or handling it to avoid bodily injury or damage to the unit.
- **Do not** rest the boiler on the bottom end after removing it from the shipping carton. Doing so may result in excessive pressure on protruding pipes and resulting in product damage. If you must put the boiler down, lay it on its back or put it inside the protective shipping base.
- Install the boiler in the upright, vertical position. Installation in any other orientation will result in improper boiler operation and property damage, and could result in serious personal injury or death.

CAUTION

- Ensure that the structure of the installation location is sturdy enough to support the full weight of the installed boiler, including the water contained in the heat exchanger and related piping.
- The wall must be vertical, and it must be capable of carrying the weight of the boiler.
- Do not mount the boiler to drywall that has not been reinforced.

3. Installing the System Piping

Prior to connecting piping to the boiler, flush the entire system to ensure it is free of sediment, flux, solder, scale, debris or other impurities that may be harmful to the system and boiler. During the assembly of the heating system, it is important to keep the inside of the piping free of any debris including construction dust, copper burr, sand and dirt.

For retrofits, all system piping including radiators, must be cleaned of all build-up including sludge and scale. All systems, old and new, must be cleaned to remove flux, grease and carbon residue. Navien recommends cleaning the boiler system with cleaning products specially formulated for boiler systems. For retrofit applications with heavy limescale and sludge deposits, a heavier duty cleaner may be required. For information on performing the cleaning, follow the instructions included with the boiler system cleaner products.

WARNING

Failure to rid the heating system of the contaminants listed above will void your warranty and may result in premature heat exchanger failure and property damage.

3.1 Installing a Space Heating System

The fire-tube type heat exchanger of the Navien NFB-H boiler is designed to attain the highest level of heat transfer in a compact design. To accomplish this, the heated gas flows through a series of small-diameter tubes, maximizing the heat transfer area. To maintain the efficient and reliable operation of the heat exchanger, and to avoid heat exchanger failure, it is critical to ensure the rules and guidelines in this section are followed.

CAUTION

Failure to follow the instructions provided in this section will void the warranty and may result in property damage, fire, serious injury or death.

3.1.1 Guidelines for a Space Heating Installation

Read and follow the guidelines listed below to ensure safe and proper installation of a boiler heating system.

Freeze Protection for a Space Heating System

- Freeze protection products may be used for the space 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. Navien recommends against exceeding a 50% concentration of glycol.
- When using the 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.
- The use of glycol results in a greater head loss due to its higher viscosity compared to water. See page 24 for additional information regarding the use of glycol.

WARNING

For systems requiring freeze protection, use only inhibited propylene glycol, specially formulated for hydronic heating systems; use of other types of antifreeze may be harmful to the system and will void the warranty.

System Pressure

- The Navien NFB-H boiler is intended solely for use in pressurized closed loop heating systems operating with 12-80 psi water pressure at the boiler outlet. To obtain the minimum system design pressure, follow the piping diagrams illustrated in this section.
- The Navien NFB-H boiler's space 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.

Oxygen Elimination

This boiler may only be installed in a pressurized closed-loop heating system, free of air (oxygen) and other impurities. All of the air should be removed from the system during commissioning via strategically placed and adequately sized air removal appliances, located throughout the heating system.

Note See the examples of system application at the end of this section detailing the installation location of the air removal device, in case an additional air removal device is required for a specific application.

WARNING

- Immediately repair any leaks in the system piping to avoid adding make-up water. Make-up water adds oxygen and minerals to the system that may lead to heat exchanger failure.
- Failure to follow these instructions may result in poor performance, unnecessary wear of system components and premature failure.

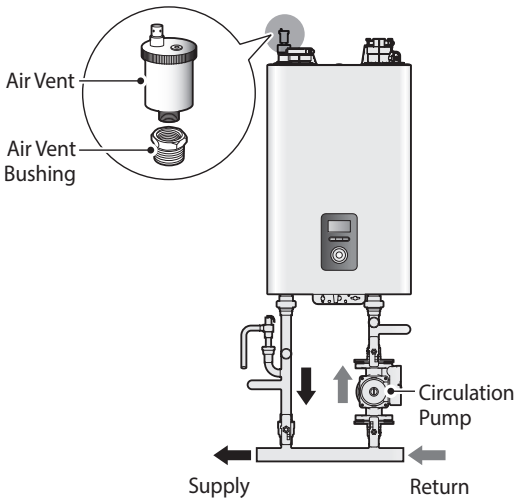
CAUTION

Do not solder piping directly onto the water connections, as the heat may cause damage to internal components. Use threaded water connections only.

3.1.2 Essential Elements in a Space Heating System

Air Vent

The Navien NFB-H boiler comes with an air vent and an adapter bushing that must be connected to the air vent connection. The vent efficiently removes the air from the boiler. The following figure illustrates an example of a typical air vent installation.



Also, an external LWCO and a pressure relief valve can be installed at the air vent connection. Refer to "Low Water Cut Off (LWCO) Device" on page 19 and "Pressure Relief Valve" on page 20.

Note Before installing the vent line and any vent fittings, you must be familiar with the LWCO and pressure relief valve installation guidelines.

Low Water Cut Off (LWCO) Device

Internal LWCO

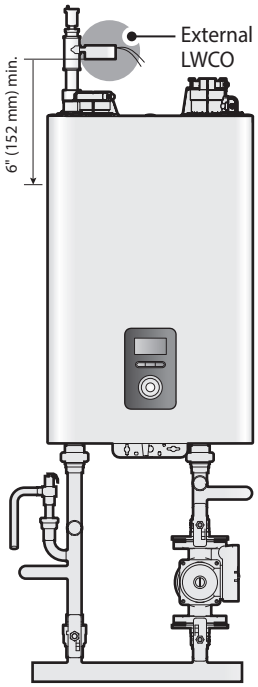
The Navien NFB-H boiler is equipped with a factory-installed, pressure-sensing type low water cutoff (LWCO) device. The minimum operation pressure for this device is 6 psi by default.

Note When the built-in water pressure sensor detects insufficient water level in the boiler, error code E302 is displayed on the front panel requiring a manual boiler reset.

Refer to local codes to determine if a LWCO device is required for your system and ensure that the built-in device meets the requirements.

External LWCO

If local codes require a separate LWCO device, install one separately. Combining the LWCO with the air vent simplifies the installation. The following illustration shows an example of a separately installed external LWCO.



The external LWCO must be installed at least 6 in (152 mm) above the top of the heat exchanger. Refer to "3.6.2 Wiring Diagram - External LWCO" on page 36 for typical wiring connections of the LWCO to the boiler PCB.

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 space heating piping to prevent excessive pressure 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 pump.
- Install the make-up water 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.

Isolation Valves and Unions

- Full port ball valves are required for the boiler system. Failure to use full port ball valves could result in a restricted flow rate through the boiler.
- Check valves are recommended for installation. Failure to install check valves could result in a reverse flow condition during pump(s) off cycle.
- Unions are recommended for unit serviceability.

Pressure Relief Valve

To complete the space heating system installation, you must install a 3/4 in, 30 to 80 psi (max.) pressure relief valve on the space heating hot water outlet. An ASME approved Watts 174A pressure relief valve (3/4 in, HV, Max 30 psi) is provided with the boiler.

WARNING

- Installing the pressure relief valve improperly may result in property damage, personal injury, or death. Follow all instructions and guidelines when installing the pressure relief valve. The valve should be installed only by a licensed professional.
- The pressure relief valve must be installed at the boiler outlet and in the vertical position, as shown in this section, with the drain pipe outlet exiting the side of the pressure relief valve horizontally and elbowing down.

CAUTION

Install the pressure relief valve as close to the boiler as possible. No other valve should be installed between the pressure relief valve and boiler.

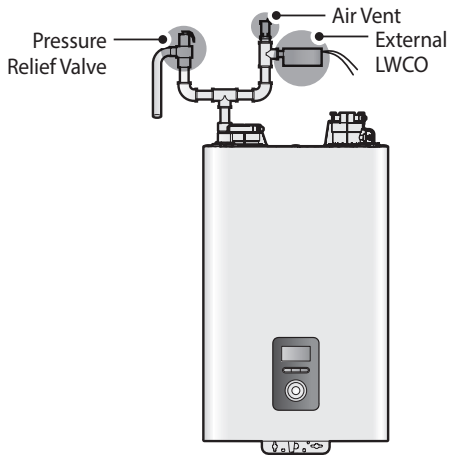
When installing the pressure relief valve, follow these guidelines:

- Ensure that the valve's discharge capacity is equal to or greater than the maximum pressure rating of the boiler's space heating system.
- Ensure that the maximum BTU/H rating on the pressure relief valve is equal to or greater than the maximum input BTU/H rating of the boiler.
- Direct the discharge piping of the pressure relief valve so that hot water does not splash on the operator or equipment.
- Attach the discharge line to the pressure relief valve and install the end of the line within 6-12 in (150-300 mm) above the floor.
- Ensure that the discharge line provides complete and unobstructed drainage. Do not install a reducing coupling or other restrictions on the discharge line.

If the relief valve discharges periodically, this may be caused by thermal expansion when the expansion tank is full or undersized. Do not plug the relief valve.

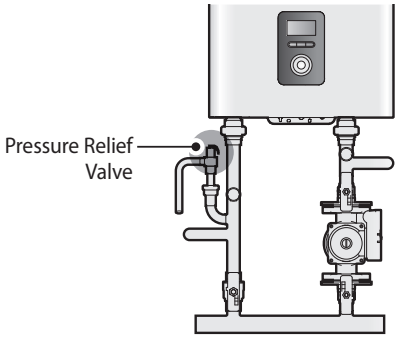
There are two pressure relief valve installation methods. In Method 1, the pressure relief valve is installed on top of the boiler and in Method 2 it is installed in a manifold system.

If the installed system does not have a Navien manifold system, install a pressure relief valve with the air vent. The illustration below shows an example of a pressure relief valve installed with the air vent.



Method 1.

Refer to the following illustration for a pressure relief valve installation in the space heating system. Watts 174A pressure relief valve (3/4 in, HV, Max 30 psi) is provided with the boiler.



Method 2.

Note Depending on the installation conditions, pressure relief valves (not included and for separate purchase) of up to 80 psi can be used.

Refer to "11.6.3 Setting the Operation Parameters - 17. High Sys Pressure" on page 107 to adjust the upper limit pressure lockout setting when using a higher rated valve.

CAUTION

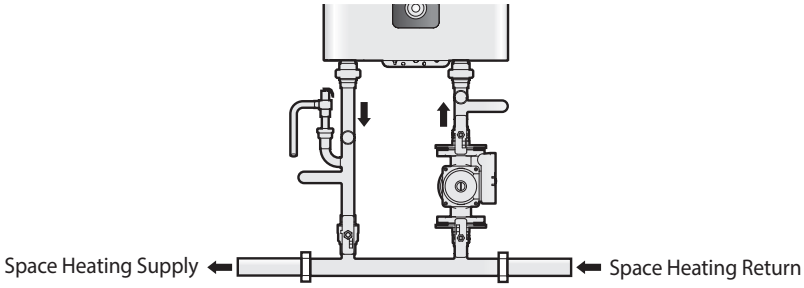
All separately purchased pressure relief valves must be ASME certified.

3.1.3 Space Heating System Piping

When connecting the space heating system, follow these guidelines:

- Carefully tighten all connections to avoid damage to fittings.
- After installing the boiler, check the space heating system's operation and inspect for leaks.

The optional Navien manifold system enables easy separation of the boiler (primary loop) from the system (secondary loop(s)). Refer to the illustration below for an example of the piping connections for a Navien manifold system (primary zone).



The following tables list the specifications for the available pumps and Navien's manifold system. If you are not using one of the pumps listed below, you must use a circulator with check valve installed at pump outlet or a pump with an integral check valve.

Model Number

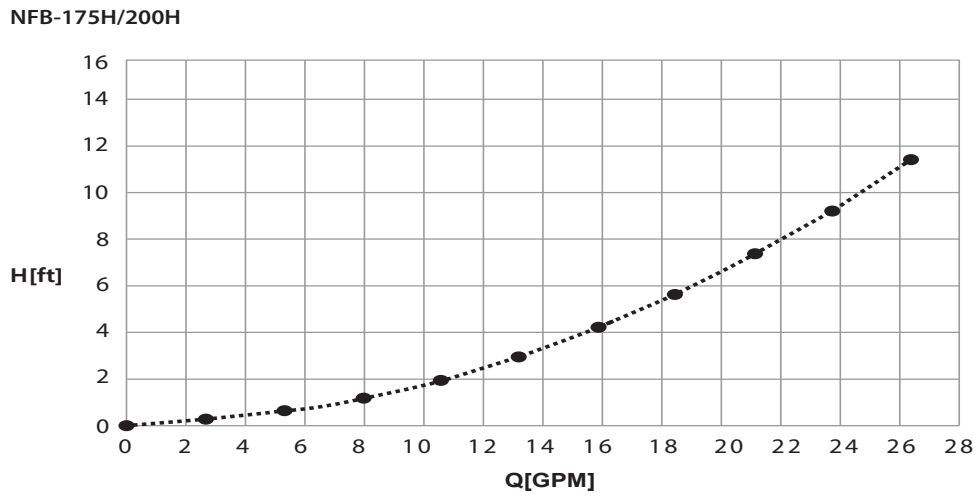
Item	NFB-175H	NFB-200H
NFB-175/200H Manifold System	PART CODE: GFFM-MSOZUS-002 UPC CODE: 884954907574	

Pump Specifications

Model	Temp. Rise	Pump Model			
		Grundfos	Taco	Bell & Gossett	Armstrong
NFB-175H	20°F	UPS26-99FC	0010-IFC 0013-MSF1-IFC	NRF-36	E7
	25°F	UPS26-99FC	0010-IFC 0015-MSF1-IFC	NRF-25	E7
	35°F	UPS15-58FC	005-IFC 0015-MSF1-IFC	NRF-22	Astro 30
NFB-200H	20°F	UPS26-99FC	0010-IFC 0013-MSF1-IFC	NRF-36	E7
	25°F	UPS26-99FC	007-IFC 0015-MSF1-IFC	NRF-36	E7
	35°F	UPS15-58FC	005-IFC 0015-MSF1-IFC	NRF-22	Astro 30

Note If you are not using one of the pumps listed in the above tables, use a pump with an integral check valve or install a check valve at the pump outlet. Refer to the performance curve on page 24 to select a pump that suits your application. The boiler can supply up to a maximum of 2.5 A current at the boiler pump connection terminal.

PQ Curve



Q [GPM]	0	2.6	5.3	7.9	10.6	13.2	15.9	18.5	21.1	23.8	26.4
H [ft]	0	0.3	0.7	1.1	2	3	4.3	5.6	7.4	9.2	11.5

Maximum and Minimum Flow Rates through the Boiler

Model	Minimum Pipe Diameter	Maximum Flow (GPM)	Minimum Flow (GPM)
NFB-175H	1 1/4"	23.1	7.0
NFB-200H	1 1/4"	26.4	8.0

Temperature Rise Conditions

Model	20°F ΔT @ 100% water		25°F ΔT @ 100% water		35°F ΔT @ 100% water	
	Flow Rate (GPM)	Head (Ft)	Flow Rate (GPM)	Head (Ft)	Flow Rate (GPM)	Head (Ft)
NFB-175H	16	4.2	13	2.9	9	1.4
NFB-200H	18	5.3	15	3.9	11	2.1

Pump Sizing for Use with Glycol

The use of glycol results in a greater head loss due to its higher viscosity compared to water. Heat transfer is also reduced as the glycol concentration increases. The corrected flow rate and head loss values below must be used when sizing the boiler pump in order to maintain similar performance as using 100% water for the heating system. Refer to the chart below.

Model	20°F ΔT @ 30% glycol		25°F ΔT @ 30% glycol		35°F ΔT @ 30% glycol	
	Flow Rate (GPM)	Head (Ft)	Flow Rate (GPM)	Head (Ft)	Flow Rate (GPM)	Head (Ft)
NFB-175H	17	6.0	14	4.0	10	2.2
NFB-200H	20	7.7	16	5.0	11	2.6

Model	20°F ΔT @ 50% glycol		25°F ΔT @ 50% glycol		35°F ΔT @ 50% glycol	
	Flow Rate (GPM)	Head (Ft)	Flow Rate (GPM)	Head (Ft)	Flow Rate (GPM)	Head (Ft)
NFB-175H	19	8.5	15	5.6	11	2.9
NFB-200H	22	11.1	17	7.0	12	3.8

Minimum Flow Rates through the Boiler for Use with Glycol

Model	Minimum Flow (GPM)	
	For Use With 30% glycol	For Use With 50% glycol
NFB-175H	7.5	8.3
NFB-200H	8.6	9.5

Note If the flow rate is below the required value for the specific boiler model as shown on the chart, it may result in noise and/or potential damage to the boiler.

3.2 Connecting the Condensate Drain

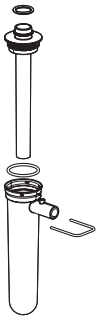
The Navien NFB-H boiler creates condensation when it operates. This condensation has an acidic pH of 3-5. Follow all local codes and regulations when disposing of condensate from the boiler. We recommend draining the condensate into a suitable external drain. However, other suitable waste drain locations may be used according to the local codes.

CAUTION

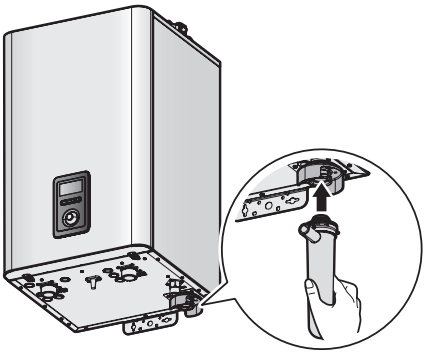
- Do not cap or plug the integrated condensate line. If prevented from draining, condensate can damage the boiler.
- The condensate line must have a negative slope to drain properly.

To attach the condensate trap to the boiler:

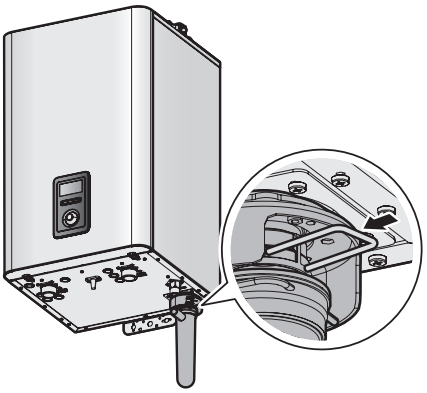
1. Check the components of the condensate trap.



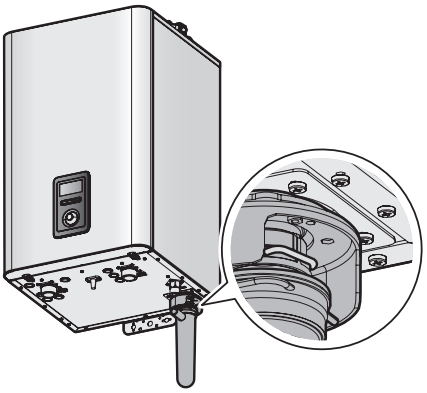
2. Insert the condensate trap to the drain adapter at the bottom of the boiler.



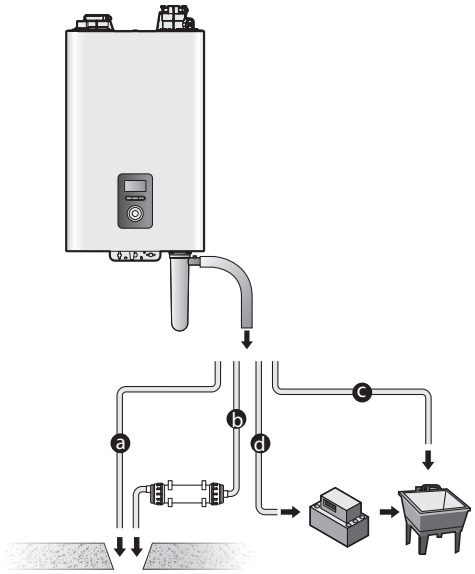
3. Attach the clip to the condensate trap.



4. Ensure that the condensate trap is firmly fixed to the bottom of the boiler.



Before connecting the condensate drain, choose one of the following disposal options:



a. From the boiler directly into an external drain.

Note Do not install a fixed connection for the drain.

b. From the boiler, through a neutralizing agent, and then into an external drain (refer to "3.2.1 Condensate Neutralizer Kit" on page 27).

Note If you choose this option, the neutralizing agent must be replaced periodically. Depletion of the neutralizing agent will vary, based on the usage rate of the boiler. During the first year of operation, the neutralizer should be checked every few months for depletion and replaced as needed.

c. From the boiler into a laundry tub.

Note The bottom of the boiler must be higher than the top of the laundry tub to use this option. The condensate line must have a negative slope to drain properly.

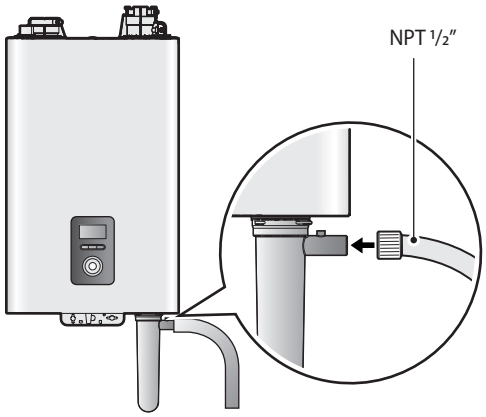
d. From the boiler into a condensate pump, and then into a laundry tub.

Note A pump can be used when there is a long distance between the boiler and the laundry tub or when the bottom of the boiler is lower than the top of the laundry tub.

To connect the condensate drain:

1. Connect a drain line to the 1/2 in fitting at the bottom of the boiler.

   Use only corrosion-resistant material for the drain line, such as PVC or CPVC. Do not reduce the size of this fitting or the drain line to less than 1/2 in.



2. Place the free end of the drain line into an appropriate drain.

3. If you are using a condensate pump, ensure that the pump allows for up to 3 GPH of drainage for each boiler in the system.

4. If you are not using a condensate pump, ensure that the drain line is pitched downward at a minimum slope of 1/4 in per foot.

3.2.1 Condensate Neutralizer Kit

WARNING

- To avoid damaging the appliance, the neutralizer inlet and discharge must be lower than the condensate drain.
- Do NOT allow exhaust flue gases to vent through the neutralizer. Leakage can cause injury or death from carbon monoxide.
- The connection between the appliance and the neutralizer must be installed to prevent the backflow of condensate into the appliance.
- Do not connect more than one appliance to the neutralizer.

If option 'b' (p. 25) is selected as the disposal option, the Navien condensate neutralizer kit is recommended. The condensate from the appliance flows through the neutralizing media and increases the pH of the condensate. An increased pH prevents corrosion of the installation's drainage system and the public sewer system.

Installation

- The inlet has a center connection port and the outlet has an offset connection.
- Install the neutralizer on the wall or the floor and secure it using the brackets supplied with the kit.
- If the neutralizer is installed horizontally, rotate the neutralizer to position the outlet at the highest point (Figure 1).
- If the neutralizer is mounted vertically, ensure that the outlet is higher than the inlet (Figure 2).
- Ensure that the condensate runs freely to the drain.
- Ensure all connections are made to prevent the backflow of condensate. Use corrosion resistant piping and secure all piping to prevent movement.

Note Do not install condensate piping in areas where the temperature drops below freezing point. Protect piping in high pedestrian areas from damage and vibration.

- If local codes permit, install a Y-fitting as a bypass drain for increased safety when the condensate drain is blocked. Connect the Y-fitting as shown in the installation diagram and ensure that the condensate runs freely to the drain.
- Ensure that the discharge connection is accessible. Access to the discharge connection is required for maintenance and pH testing.
- If there is insufficient gradient for drainage, install a drainage pump designed for boiler and water heater condensate removal.

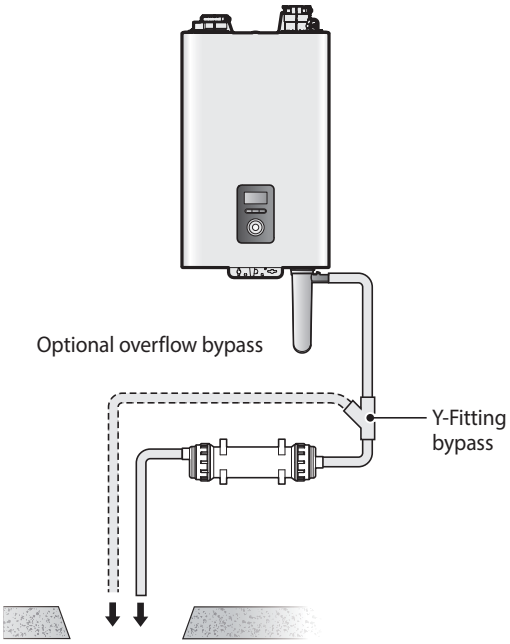


Figure 1. Horizontal installation

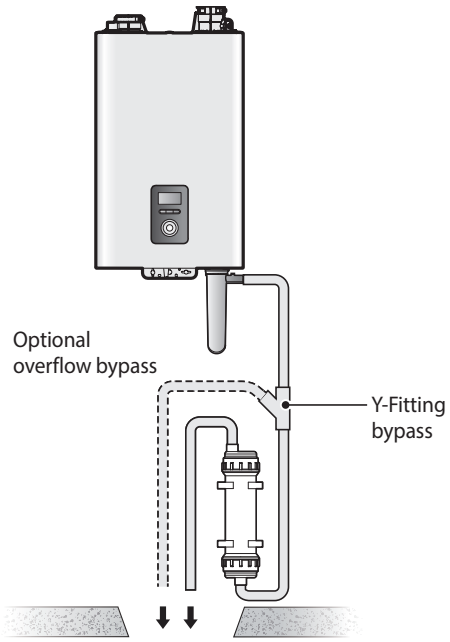


Figure 2. Vertical installation

Maintenance

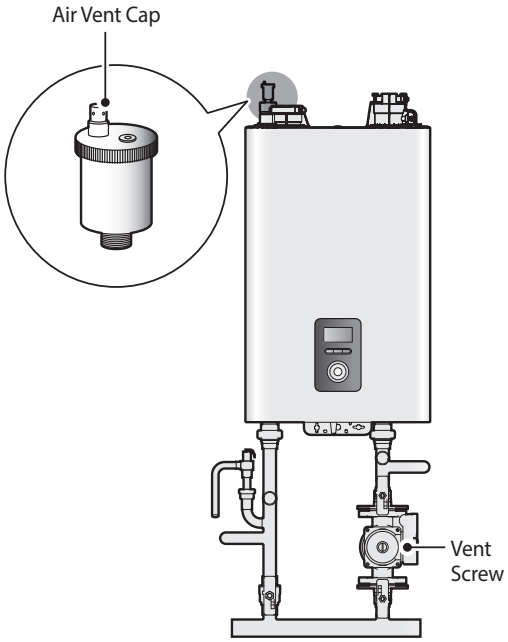
Periodically monitor the level of media in the neutralizer and test the pH level at the outlet. We recommend an annual pH test using recognized test strips or an electronic pH meter to obtain precise measurements. Replace the neutralizing media when the pH drops below the minimum level required by the local water authority. If the pH level is not specified, replace the neutralizing media when the pH is below 6.0. For replacement media, contact your local Navien distributor.

3.3 Filling the System

Before filling the boiler, completely unscrew and remove the air vent cap to enable the system to fill properly. Also, loosen the vent screws on the system and boiler pumps to prevent the air from being trapped inside the pumps.

Note If the air vent cap is only partially loosened, the air vent may not allow for the boiler to fully purge. The cap must be completely unscrewed and removed to complete the procedure.

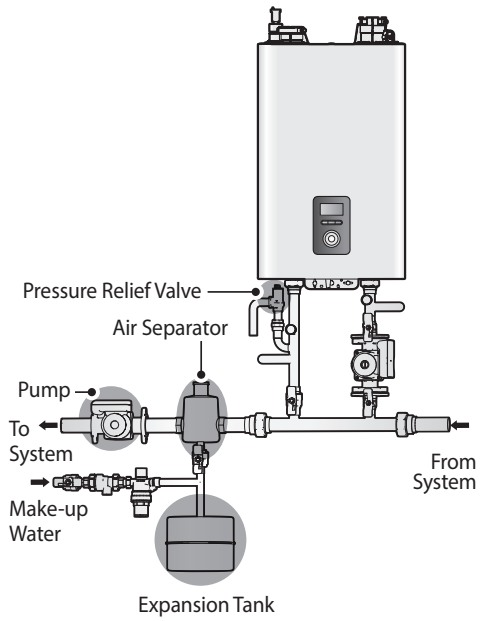
Replace the air vent cap and tighten the vent screws on the pumps when the system is full.



Note Ensure that the vent cap is re-installed and the vent screws on the system and boiler pumps are properly tightened before testing or operating the system.

3.3.1 Make-up Water Connection

An external make-up water connection is required. The illustration below shows an example of an external water supply connected to the system piping.



3.4 Testing the Water System

WARNING

Ensure that the boiler is full of water before firing the burner. Operating the unit without completely filling it will damage the boiler. Such damage is not covered by the warranty, and may result in property damage, severe personal injury, or death.

Perform a leak test after installing the boiler's water system to make sure that the system has been installed properly. Follow the instructions below to perform a fill test on the water system.

1. Fill the system only after ensuring that the water chemistry meets the requirements.

Contaminant	Maximum Allowable Level
Total Hardness	Up to 200 mg/l (12 grains/gallon)
Aluminum	0.05 to 0.2 mg/l
Chloride	Up to 250 mg/l
Copper	Up to 1.0 mg/l
Iron	Up to 0.3 mg/l
Manganese	Up to 0.05 mg/l
pH	6.5 to 8.5
Sulfate	Up to 205 mg/l
Total Dissolved Solids (TDS)	Up to 500 mg/l
Zinc	Up to 5 mg/l
Chlorine	Up to 4 mg/l

Note Proper maintenance of the boiler is required when water quality does not meet standards. Damage caused by poor water quality is not covered under warranty. The table above shows the maximum contaminant levels allowed. If you suspect that your water is contaminated in any way, discontinue the use of the boiler and contact an authorized technician or licensed professional.

2. Close the manual and automatic air vents and the boiler drain valve.

3. Fill the boiler to the correct system pressure. The correct pressure will vary with each application. The typical cold water fill pressure for a residential system is 12 psi. The pressure will rise when the boiler is turned on and the system water temperature increases. The operating pressure must never exceed the relief valve pressure setting.

4. At initial fill and during boiler start-up and testing, check the system thoroughly for leaks. Repair any leaks before proceeding further.

WARNING

Eliminate all system leaks. The continual introduction of fresh makeup water will reduce boiler life. Minerals can build up in the heat exchanger, reducing heat transfer, overheating the heat exchanger and causing heat exchanger failure.

The system may have residual substances that could affect water chemistry. After the system has been filled and leak tested, verify that water pH and chlorine concentrations are within the acceptable range by performing sample testing.

CAUTION

Before operating the boiler for the first time, ensure that the boiler system is filled with water. Purge the air inside the system to avoid damage to the boiler.

3.5 Considerations for System Applications

Read and follow the guidelines listed below when installing system piping for the Navien NFB-H boiler:

- System application drawings are intended to explain the system piping concept only.
- For the upstream side of all pumps, use straight pipes with a minimum inside diameter of 1/2 in (12 mm).
- Provide a system expansion tank following the guidelines on page 20.
- System installations must comply with all local codes.

Air Removal

The boiler and system piping layout must be configured to promote the removal of air from the water. Air vents and bleeders must be strategically placed throughout the system to aid in purging the air from the system during commissioning of the boiler. The system must also employ the use of a strategically located air removal device, such as an air eliminator designed to remove the air from the water as it flows through the system.

Follow the installation instructions included with the air removal device when placing it in the system; air removal devices generally work better when placed higher in the system. Always locate air removal devices in areas of the system that have a guaranteed positive pressure, e.g., in close proximity to the water fill and expansion tank.

Note Connecting an air vent on top of the boiler is recommended.

Expansion Tank

The expansion tank must be sized in accordance with the water volume of the system as well as the firing rate of the appliance. It is important to locate the expansion tank, and make-up water connection, on the inlet side of any pump in the system, as doing so will guarantee the lowest pressure in the system will be at least equal to the tank and make-up water pressure.

Ensure the expansion tank cannot become isolated from the boiler anytime the system is operating. Failure to follow these instructions may lead to discharge from the pressure relief valve, which may result in property damage or injury.

Note The installation of flow checks, motorized valves or other shutoff devices (other than for the purpose of servicing) are not permitted between the location of the "Closely Spaced Tees" and the expansion tank.

Air Handler Interface

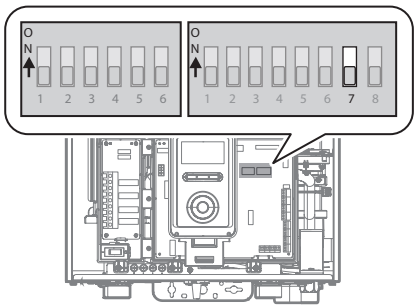
The Navien NFB-H boiler can control the operation of an air handler when a thermostat is used in combination with the air handling unit. The Air Handler Interface is designed to stop air handler operation when the boiler's space heating function is not operating due to DHW supply demands, boiler errors, or low water conditions.

The air handler contacts (A/H) turn off when the following conditions arise:

- The PCB DIP SW2 (Set of 8 Switches) #7 is set to ON.
- Thermostat is turned off.
- The boiler is supplying DHW, or it is in stand-by mode for DHW demand.
- Level 2 or higher errors occur.
- The boiler is turned off.

Thermostat Configuration for the Air Handler Interface

Set the PCB DIP SW2 (Set of 8 Switches) #7 to down position (OFF) to use a thermostat with the Air Handler.



Refer to the "3.6.9 Wiring Diagram - Air Handler" on page 45 for wiring connections.

WARNING

- The boiler, when used in conjunction with an air conditioning system, must be installed so that the chilled medium is piped in parallel with the heating boiler. Appropriate valves must be used to prevent the chilled medium from entering the boiler.
- If the boiler is connected to heating coils located in air handling units where they can be exposed to refrigerated air, use flow control valves or other automatic means to prevent gravity circulation of the boiler water during the cooling cycle.

Configuring a Zone System

The NFB-H boiler can control up to 3 zones utilizing zone valves or zone pumps. After installing the system, the boiler operation must be configured accordingly using the front panel.

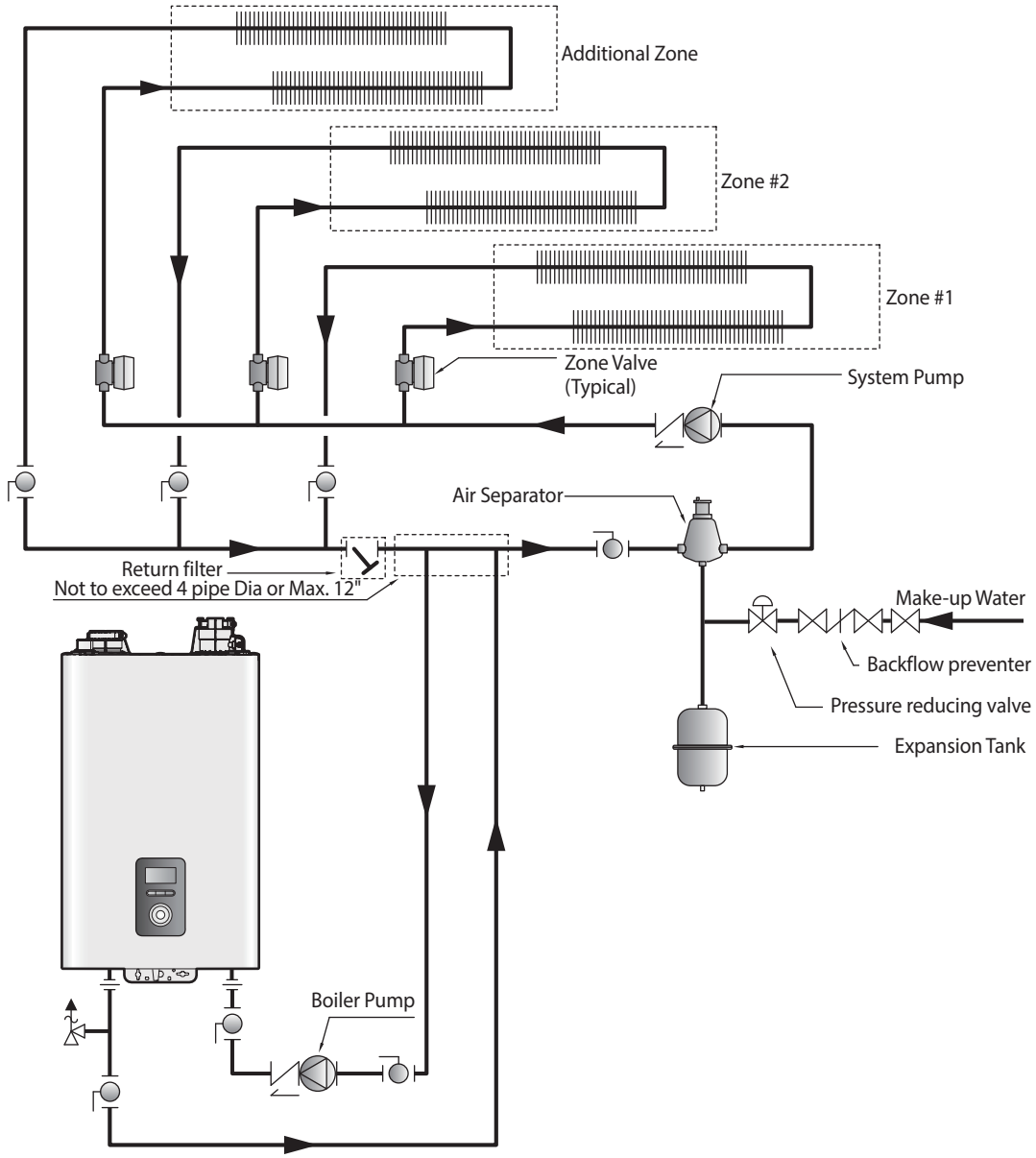
To configure a zone system:

On the front panel, press the Menu button (M) to enter the setting menu, and then select **2. Space Htg Operation > 2.Zone Settings**.

3.5.1 Examples of System Applications

Refer to the following examples to properly implement a system for space heating, DHW supply, or both. These examples are provided to suggest basic guidelines when you install the boiler system. However, the actual installation may vary depending on the circumstances, local building codes, or state regulations. Check the local building codes and state regulations thoroughly before installation, and comply with them fully.

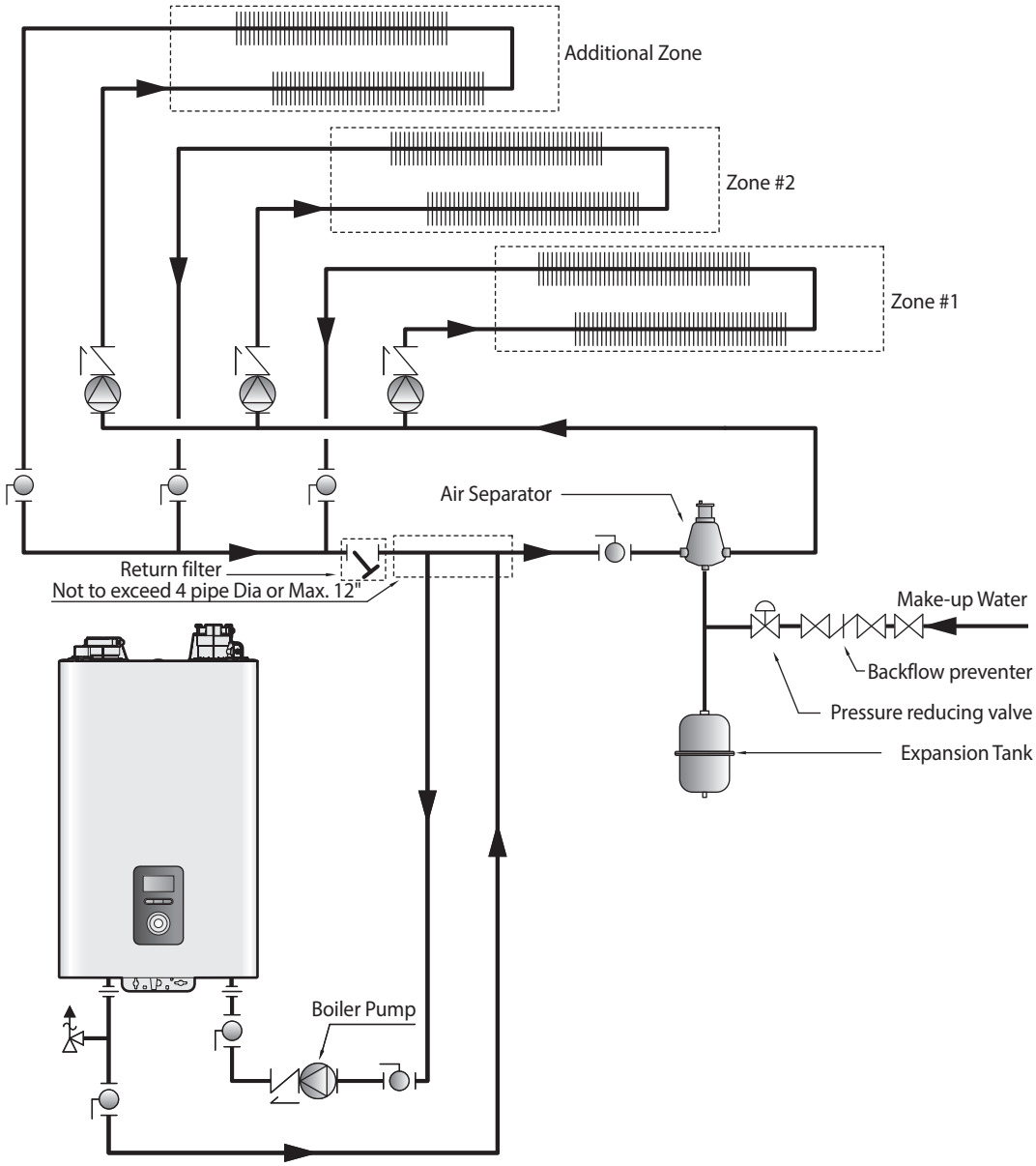
3.5.2 System Application - Zone System with Zone Valves (Primary/Secondary Piping)



Note

- System application drawings are intended to explain the system piping concept only.
- Install a filter in the system return to remove foreign objects from the system. Foreign objects inside the system may result in abnormal system operation.
- Refer to "3.3 Filling the System" on page 28 for make-up water connections and refer to the requirements of your local codes to ensure compliance.
- Use a pump with an integral check valve or install a check valve at the pump outlet.
- Refer to "3.6.5 Wiring Diagram - Zone Valve System" on page 41 for wiring connections.

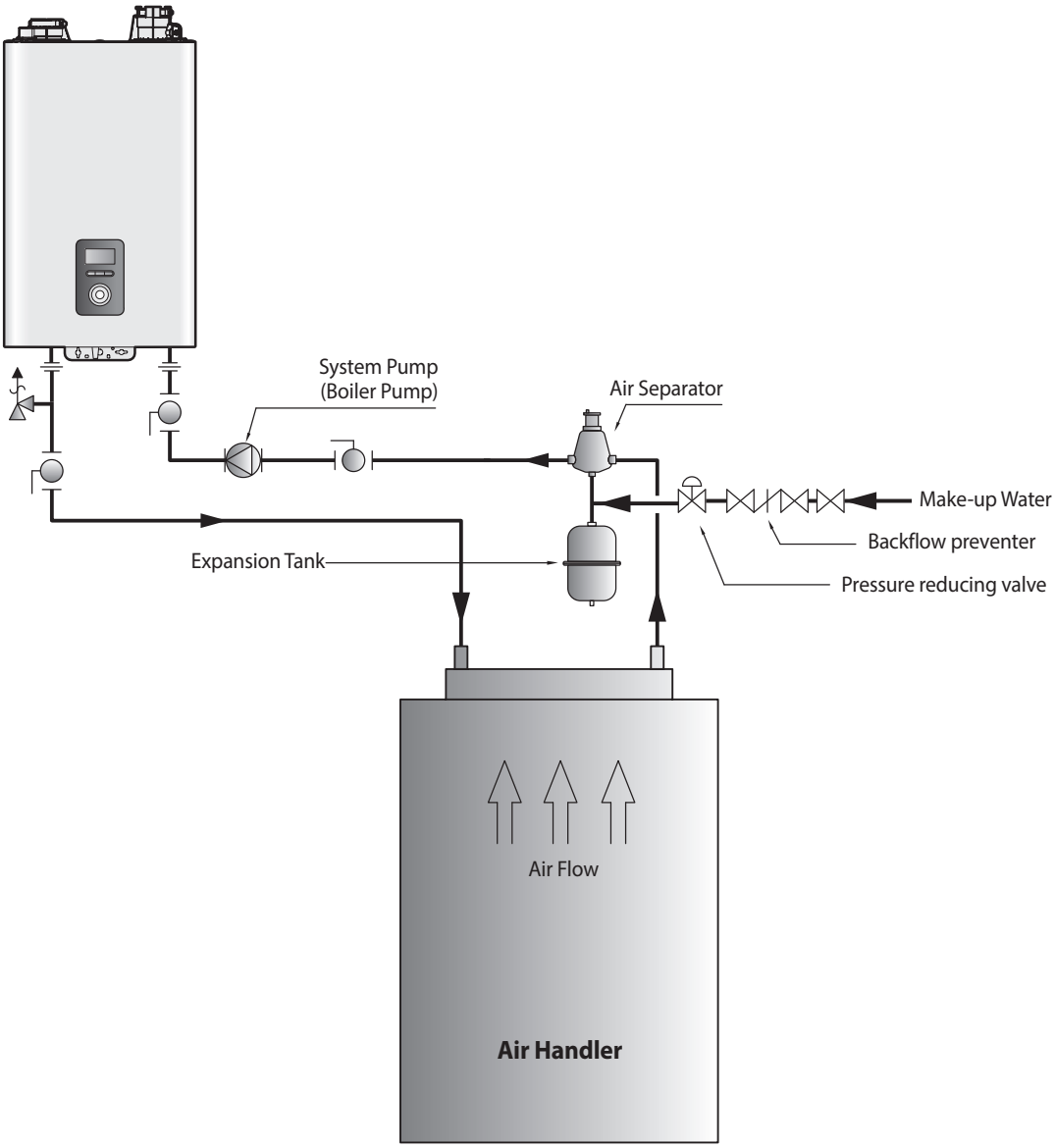
3.5.3 System Application - Zone System with Pumps (Primary/Secondary Piping)



Note

- System application drawings are intended to explain the system piping concept only.
- Install a filter in the system return to remove foreign objects from the system. Foreign objects inside the system may result in abnormal system operation.
- Refer to "3.3 Filling the System" on page 28 for make-up water connections and refer to the requirements of your local codes to ensure compliance.
- Use a pump with an integral check valve or install a check valve at the pump outlet.
- Refer to "3.6.3 Wiring Diagram - Zone Pump System" on page 37 for wiring connections.

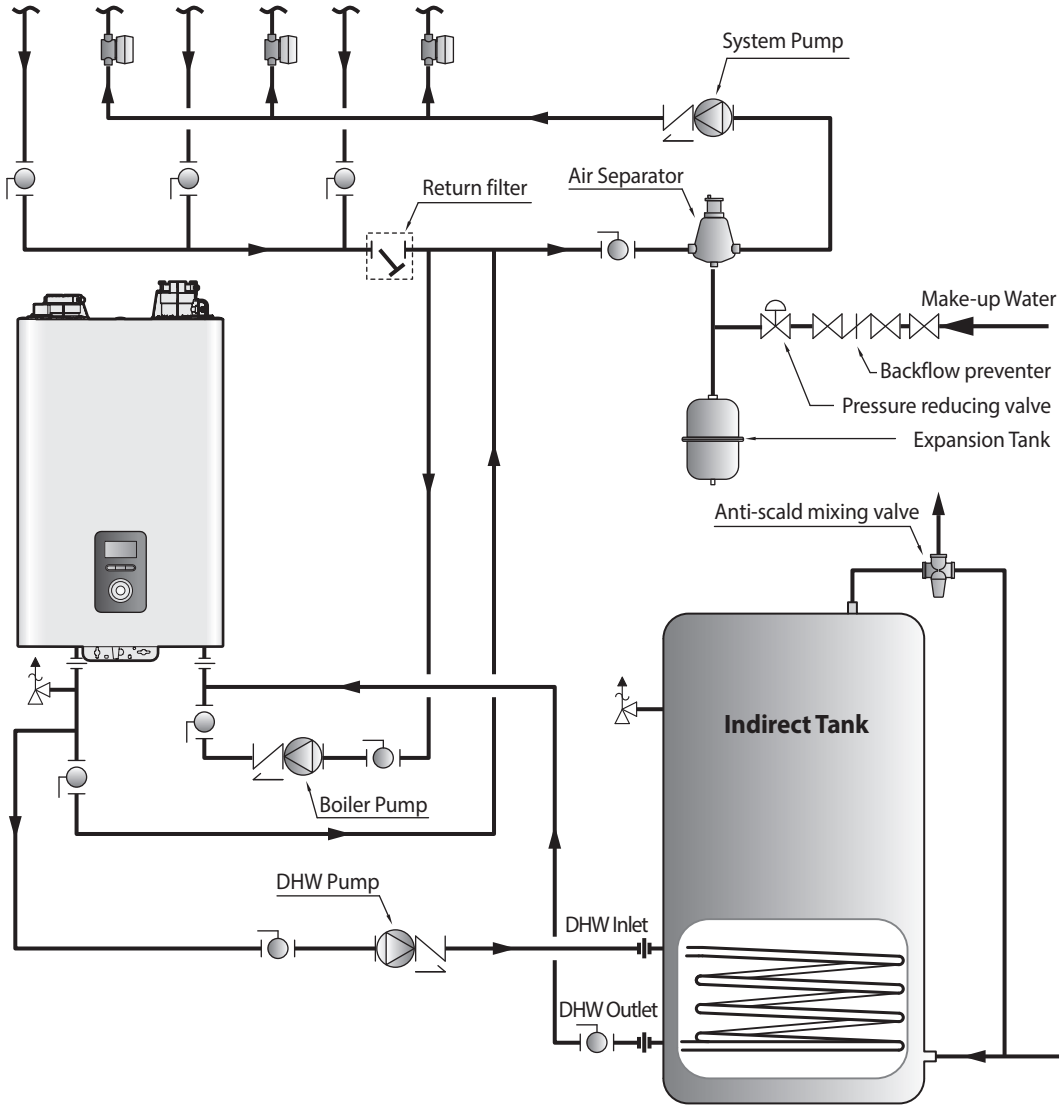
3.5.4 System Application - Air Handler System



Note

- System application drawings are intended to explain the system piping concept only.
- Install a filter in the system return to remove foreign objects from the system. Foreign objects inside the system may result in abnormal system operation.
- Refer to "3.3 Filling the System" on page 28 for make-up water connections and refer to the requirements of your local codes to ensure compliance.
- Air handlers with an internal pump shall be piped either with a crossover pipe at the AHU or in a primary/secondary configuration with the boiler.
- Refer to the "3.6.9 Wiring Diagram - Air Handler" on page 45 for wiring connections.
- You can use a secondary piping configuration for the air handler system to maintain optimal flow and heat capacity.

3.5.5 System Application - DHW System with Indirect Tank (Primary/Secondary Piping)



Note

- System application drawings are intended to explain the system piping concept only.
- Install a filter in the system return to remove foreign objects from the system. Foreign objects inside the system may result in abnormal system operation.
- Refer to "3.3 Filling the System" on page 28 for make-up water connections and refer to the requirements of your local codes to ensure compliance.
- Use a pump with an integral check valve or install a check valve at the pump outlet.
- Refer to the "3.6.10 Wiring Diagram - DHW System with Indirect Tank" on page 45 for wiring connections.

3.6 Examples of Electrical Connections

WARNING

Improperly connecting the electrical supplies can result in electrical shock and electrocution. Follow all applicable electrical codes of the local authority having jurisdiction. Connecting the electrical components should be performed only by a licensed professional.

CAUTION

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

Note The installation must comply with National Electrical Code and any other national, state, provincial or local codes or regulations. In Canada, CSA C22.1 Canadian Electrical Code Part 1, and any local codes.
Wiring must be N.E.C. Class 1. If original wiring as supplied with boiler must be replaced, use only type 105 °C wire or equivalent.
Boiler must be electrically grounded as required by National Electrical Code ANSI/NFPA 70 – latest edition.

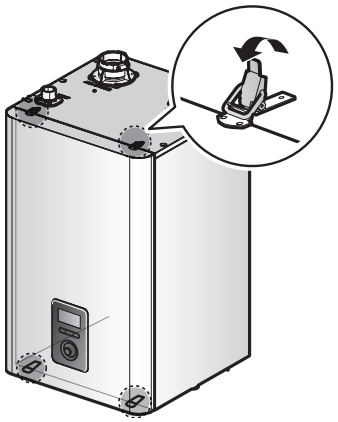
3.6.1 Accessing the Terminal Strips

DANGER

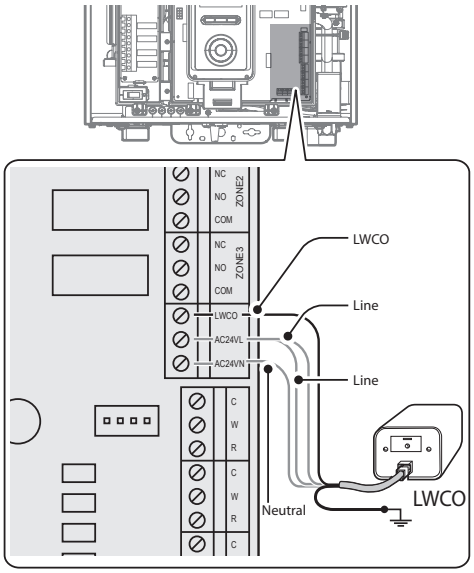
You must ensure that the boiler is disconnected from the electrical supply before carrying out any servicing inside the boiler and, particularly, on the electric terminal strips.

To access the PCB, carefully follow the steps below:

1. Turn off the power supply to the boiler.
2. Unfasten the 4 latches (2 at the top and 2 at the bottom) to remove the front cover and gain access to the internal components.

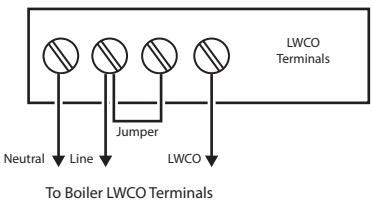


3.6.2 Wiring Diagram - External LWCO



Note The boiler supplies 24 VAC at the LWCO power terminals (CNC3).

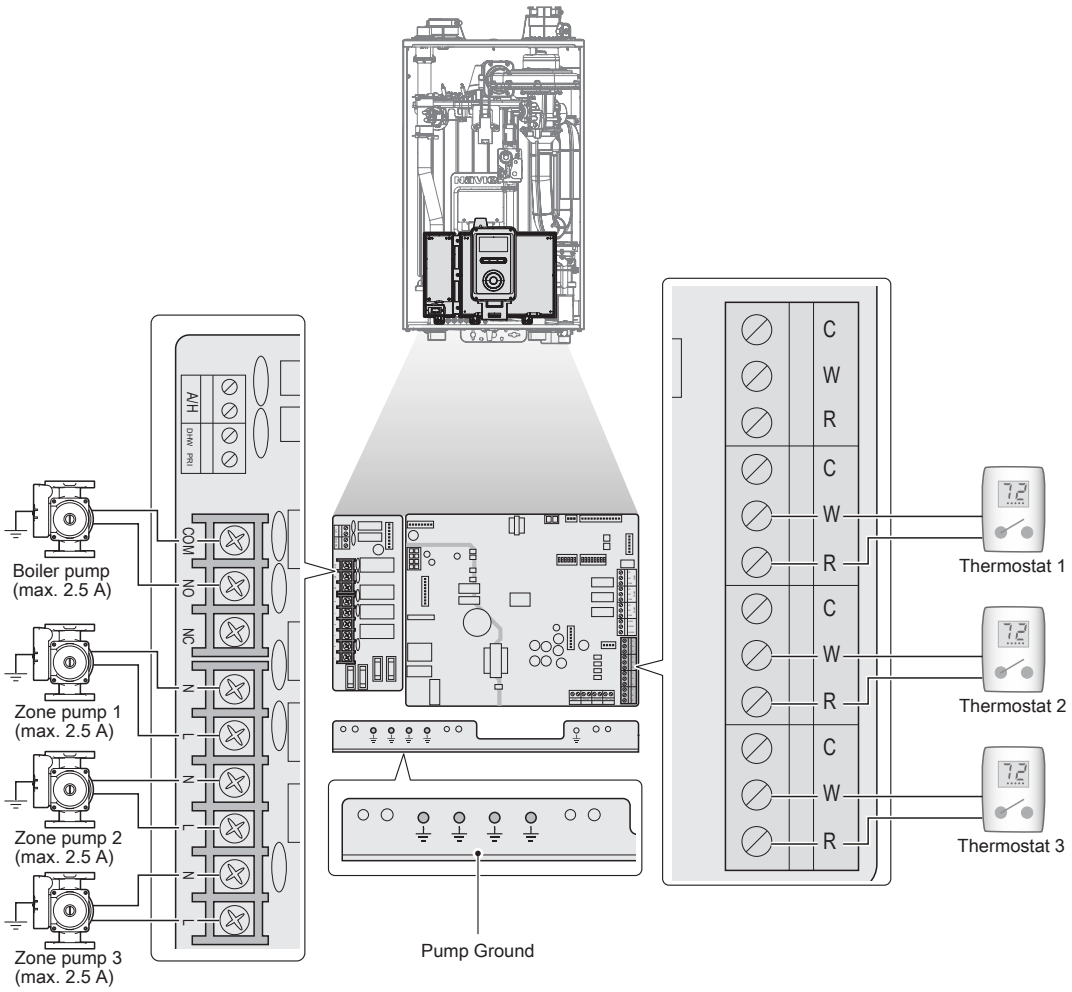
For terminal type LWCO devices, a typical wiring method is shown below (same voltage for control and burner circuit):



3.6.3 Wiring Diagram - Zone Pump System

The NFB-H Boilers can operate a heating system with up to 3 zones. The following is the wiring diagram for a zone pump system with 3 zones.

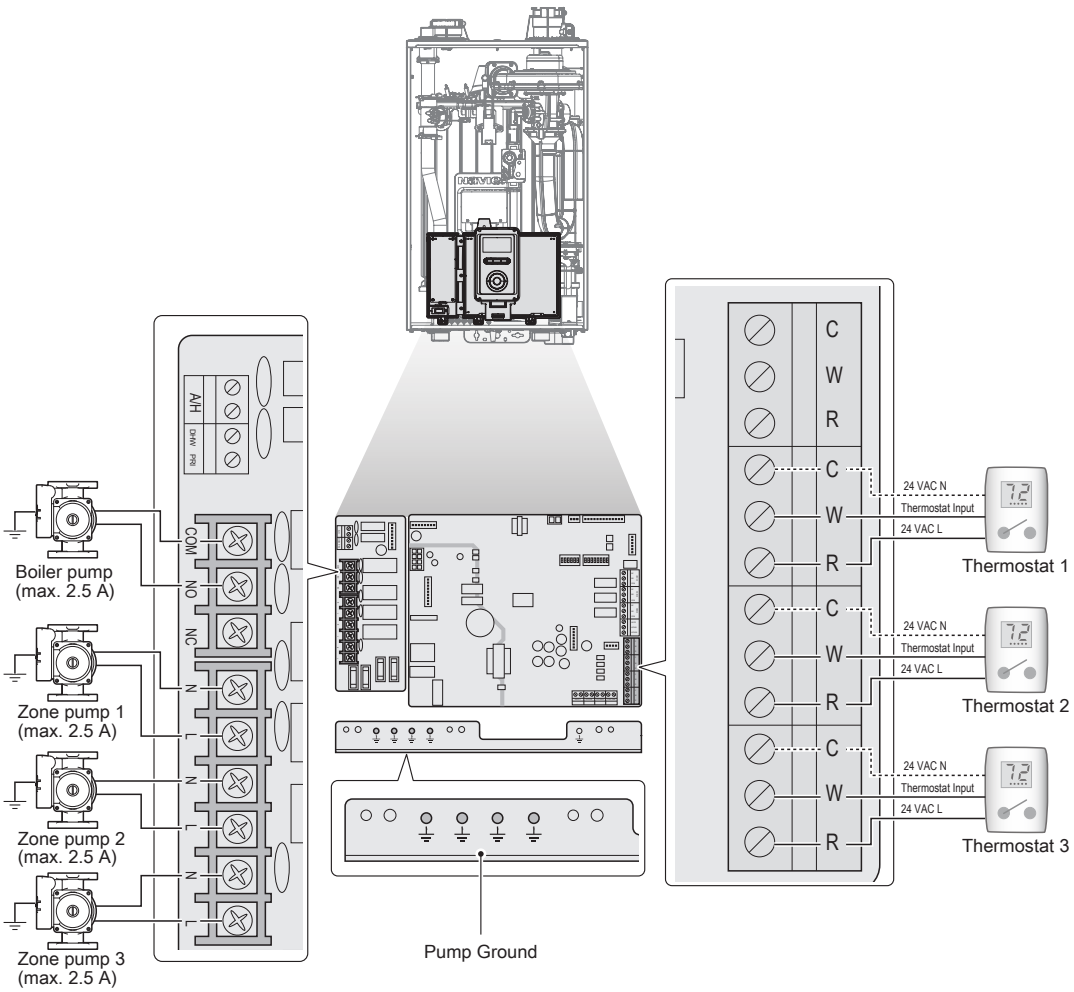
Without 24VAC connections



Note

- If you have a 24 V thermostat, connect it to the R & C terminals on the boiler's PCB.
- The C terminals are for optional connections with 24 V thermostat COMMON.

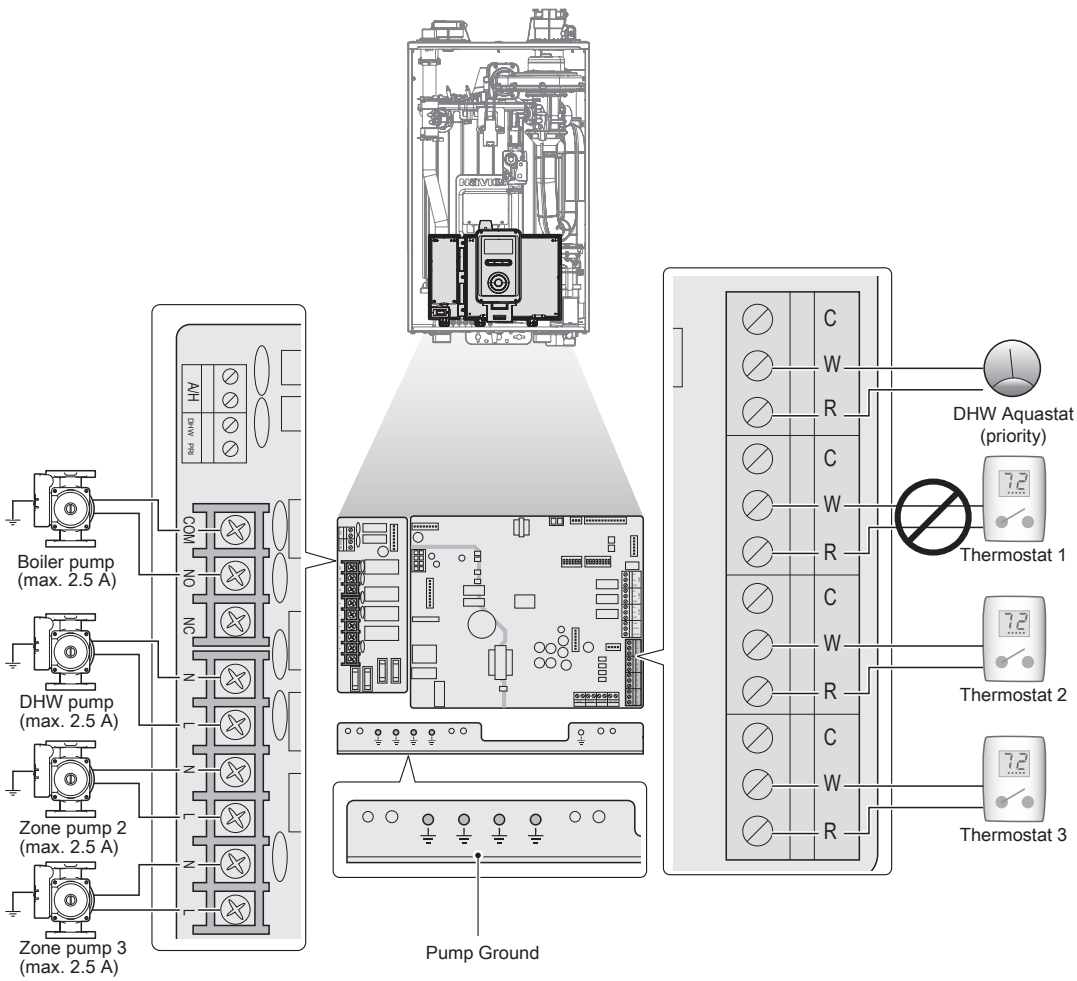
With 24VAC connections



3.6.4 Wiring Diagram - Zone Pump System with DHW Tank

The NFB-H Boilers can operate a heating system with up to 2 zones and 1 DHW Tank. The following is the wiring diagram for a zone pump system with 2 zones and 1 DHW Tank.

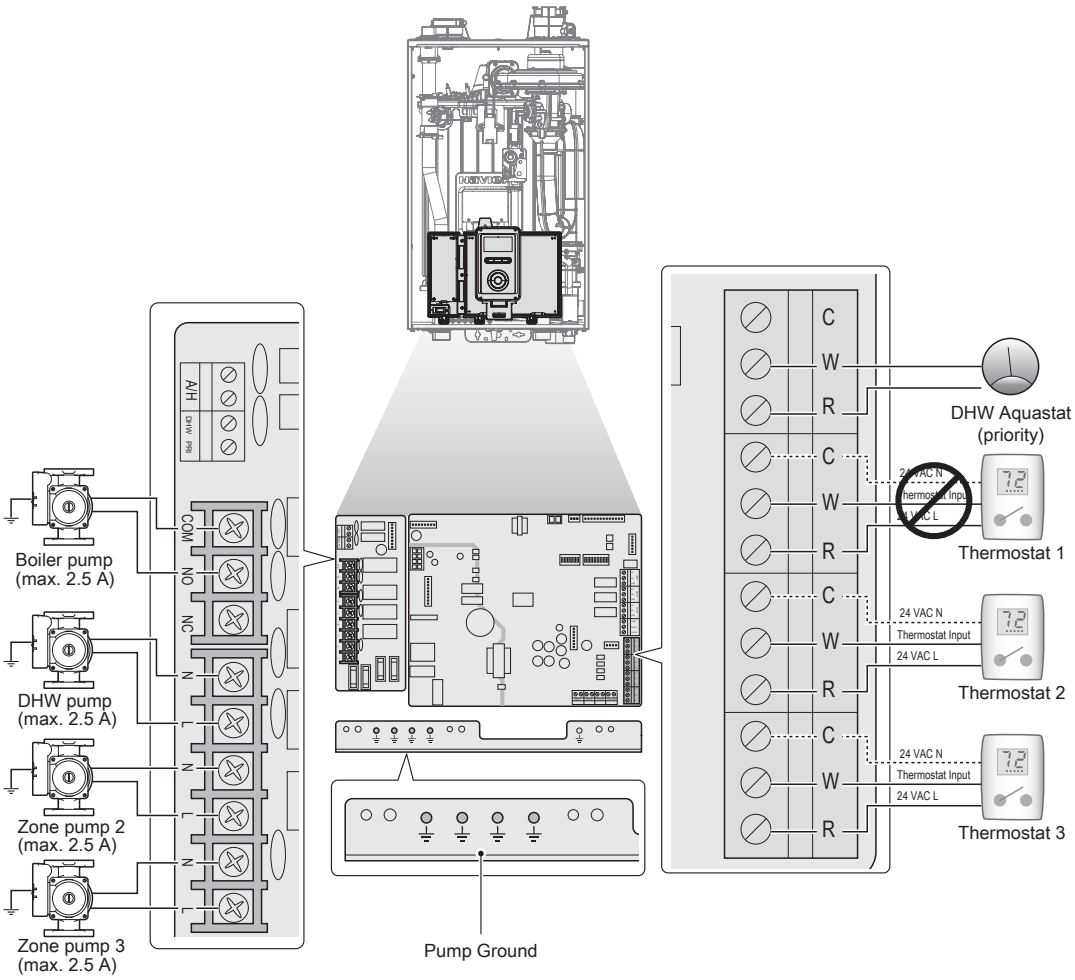
Without 24VAC connections



Note

- The C terminals are for optional connections with 24 V thermostat COMMON.
- If the DHW Tank is connected to the priority terminal, the T/S Zone 1 input is not available.

With 24VAC connections

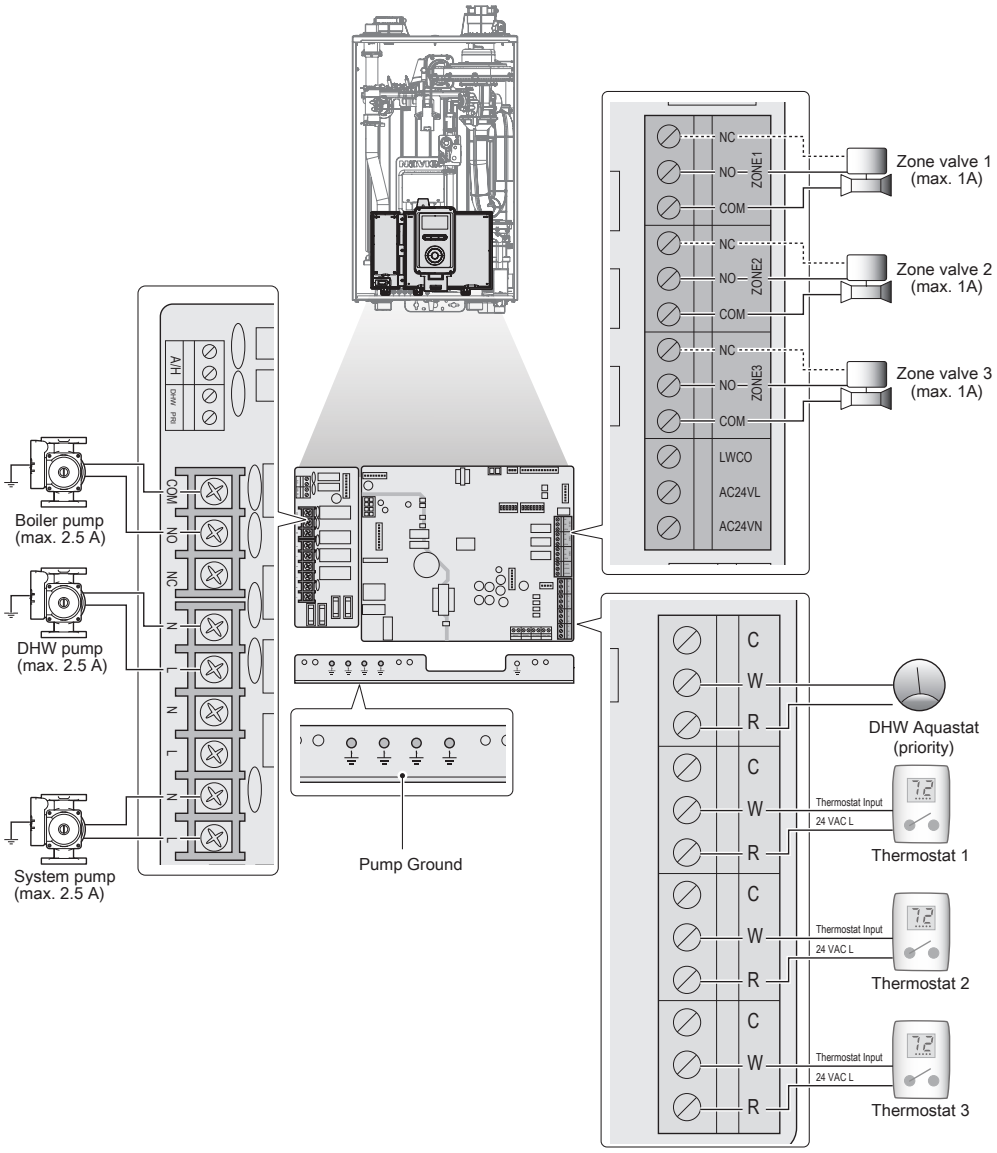


Note If the DHW Tank is connected to the priority terminal, the T/S Zone 1 input is not available.

3.6.5 Wiring Diagram - Zone Valve System

The NFB-H Boilers can operate a heating system with up to 3 zones. The following is the wiring diagram for a zone valve system with 3 zones.

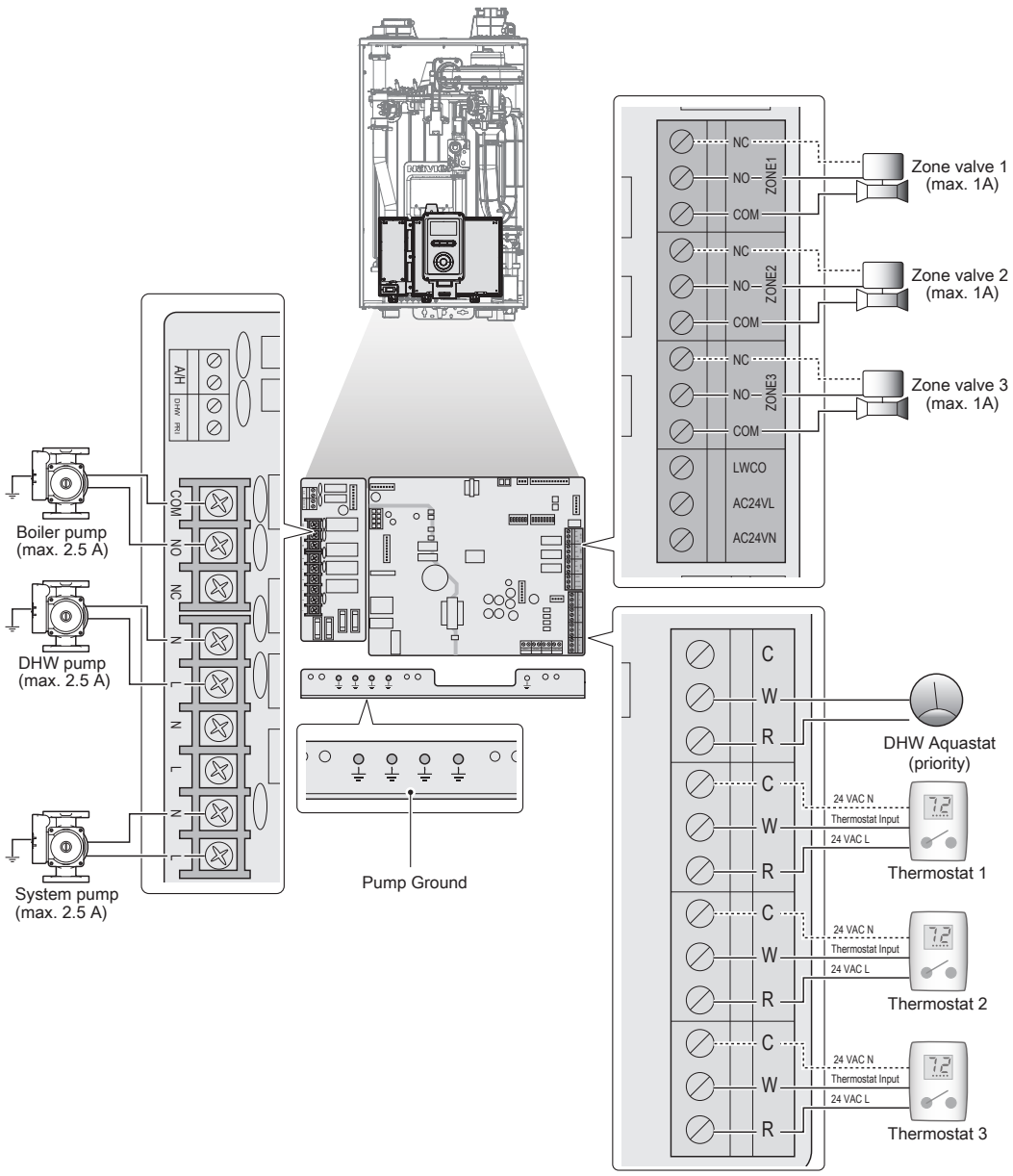
Without 24VAC connections



Note

- NO (Normal Open): Power is supplied when the zone valve is operating, and power turns off when the zone valve stops.
- NC (Normal Close): Power is supplied when the zone valve stops, and power turns off when the zone valve is operating.
- COM: 24 V AC COMMON
- The boiler has an internal 24V transformer that is rated for 75VA. This transformer provides power to the zone valve, low water cut-off (LWCO) and thermostat terminals.
- If the total power consumption of all 3 zone valves exceeds 70VA, an external zone valve controller must be used.

With 24VAC connections



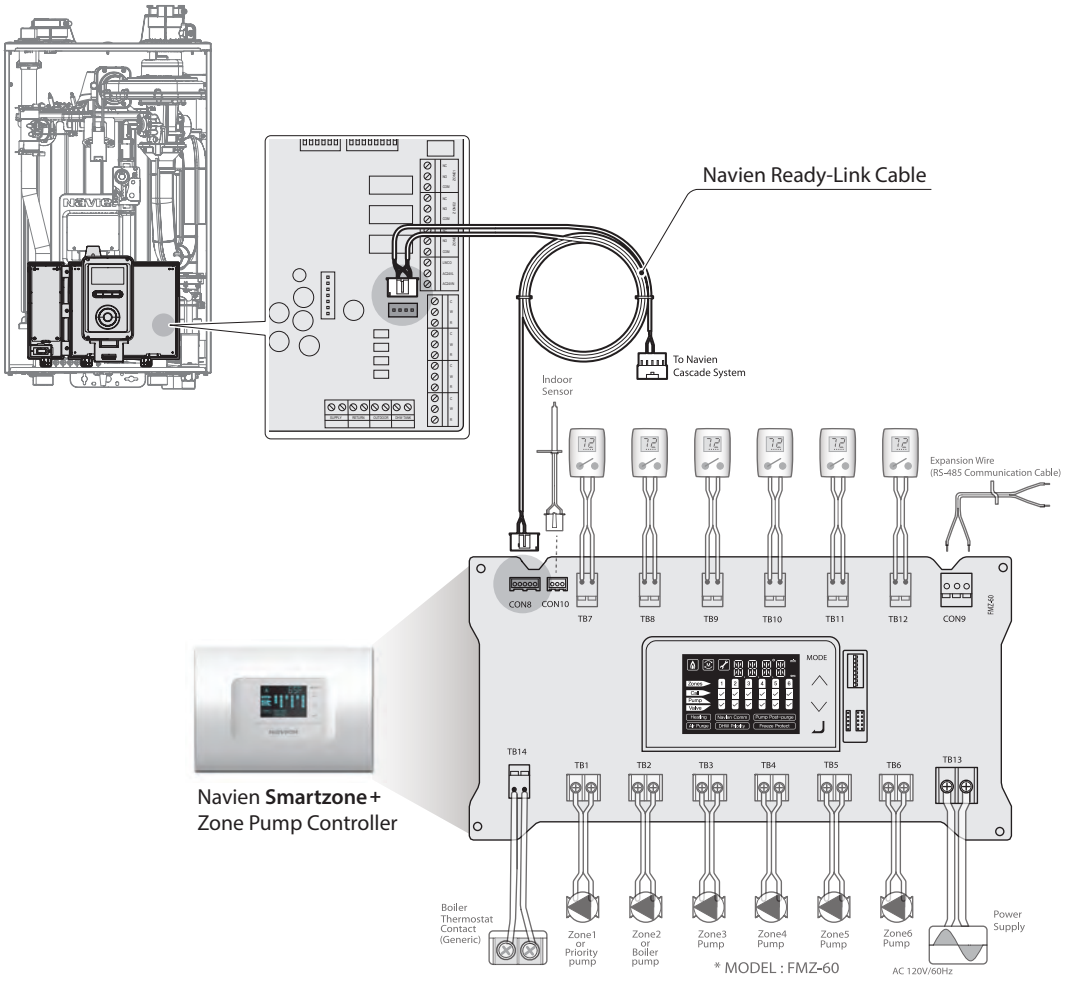
Note

- NO (Normal Open): Power is supplied when the zone valve is operating, and power turns off when the zone valve stops.
- NC (Normal Close): Power is supplied when the zone valve stops, and power turns off when the zone valve is operating.
- COM: 24 V AC COMMON
- The boiler has an internal 24V transformer that is rated for 75VA. This transformer provides power to the zone valve, low water cut-off (LWCO) and thermostat terminals.
- If the total power consumption of all 3 zone valves exceeds 70VA, an external zone valve controller must be used.

3.6.6 Wiring Diagram - the Navien SmartZone +

The Navien Smart Zone + controller may be used with the NFB-H Boilers to operate a heating system with more than 3 zones.

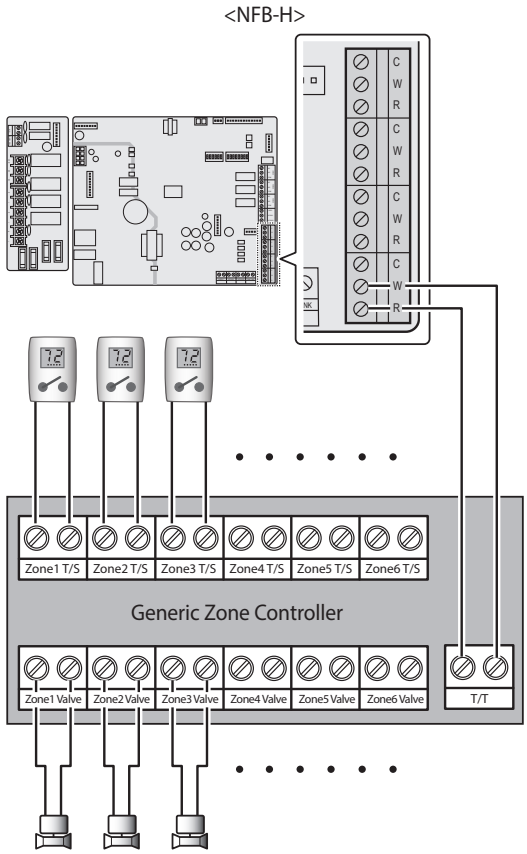
When Navien boilers are used with a Navien Smartzone+ zone pump controller, an RS-485 data communication link is established through the Ready-link connection. This allows the controller and the boiler to share operational information and to control the zones more efficiently by minimizing unnecessary pump operation. The communication link also provides an optimal control environment for freeze protection.

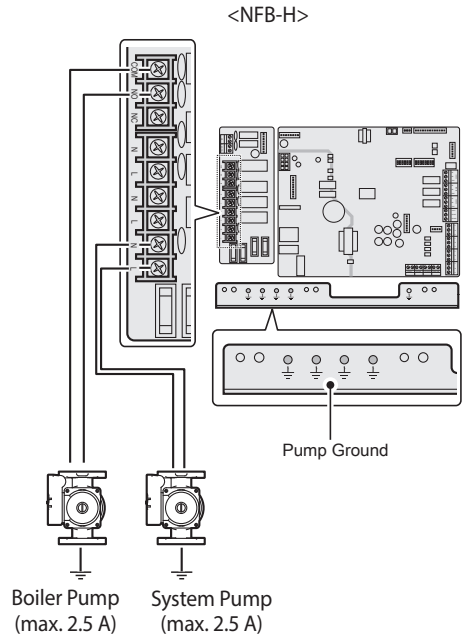


Refer to the user manual that is supplied with the Navien Smartzone+ zone pump controller for details.

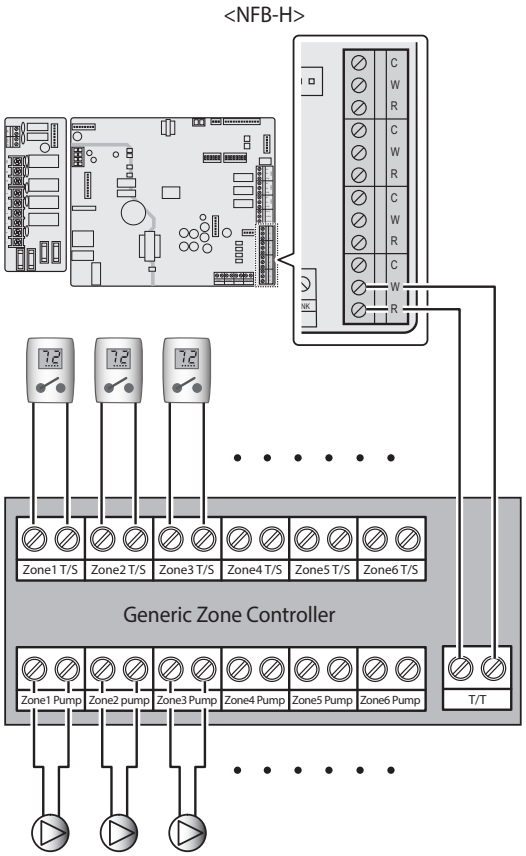
Note The Navien Zone Controller setting must be enabled when using the Ready-Link cable for communication. Refer to "11.5.2 Setting the Space Heating Operation" on page 101 for details.

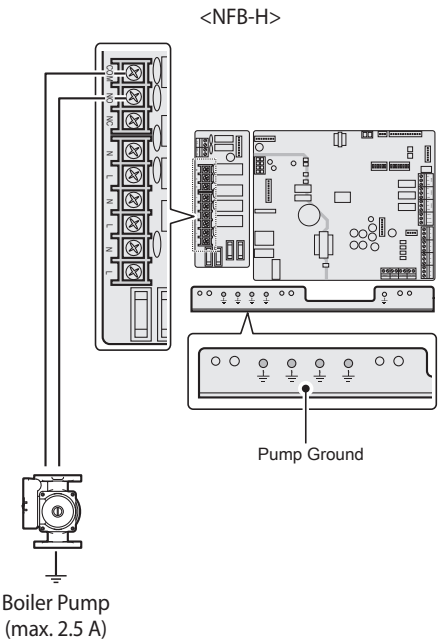
3.6.7 Wiring Diagram - Generic Zone System with Zone Valves



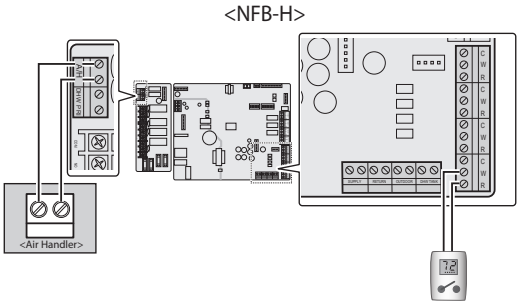


3.6.8 Wiring Diagram - Generic Zone System with Circulators

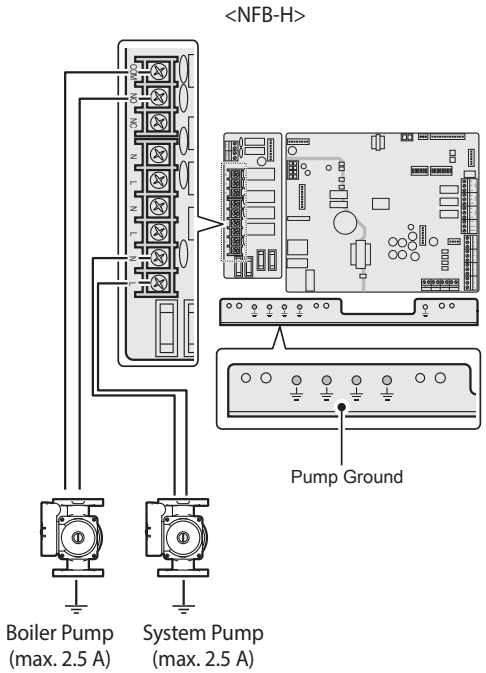




3.6.9 Wiring Diagram - Air Handler

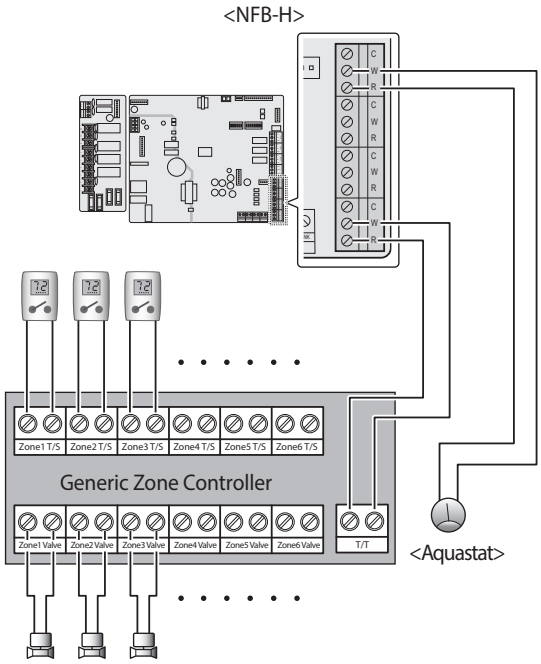


If you are using the Navien manifold system, connect the pump wires to the system pump. If you are not using the Navien manifold system, connect the pump wires to either the system pump or the boiler pump.



3.6.10 Wiring Diagram - DHW System with Indirect Tank

When connecting the Aquastat



When connecting the DHW Tank Sensor

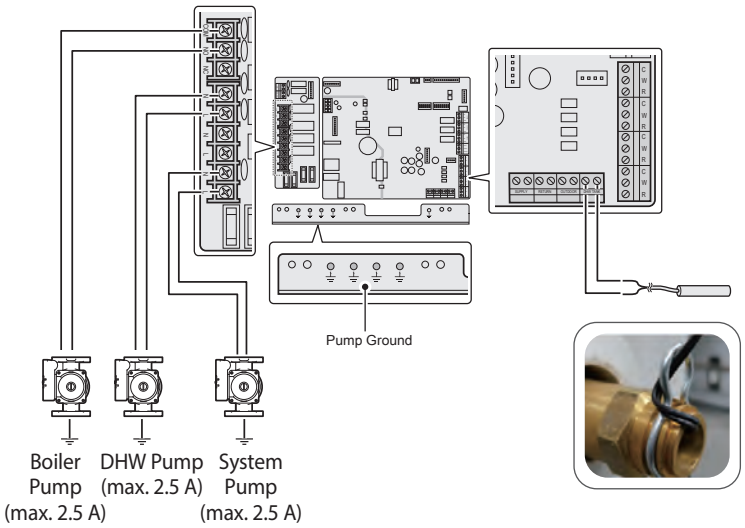
The Navien Universal Temperature sensor can be used as a DHW Tank Sensor. When installing the Universal Temperature sensor to the boiler, follow these guidelines:

- This sensor is compatible for use with aquastat immersion wells. Attach an aquastat immersion well to the DHW tank before installing the sensor.
- When installing the sensor to the tank, verify that the sensor is completely inserted into the immersion well.
- Install the included clip on the groove on the immersion well as shown in the illustration.
- Insert the wire through the available eyelet on the clip then wrap it around the clip once to fix the sensor to the well.
- Complete the installation by connecting the wires to the DHW Tank terminals located on the PCB.

Note When inserting the sensor into the immersion well, heat conductive paste can be used to improve thermal transfer between the two components.

Installing the DHW Tank Sensor

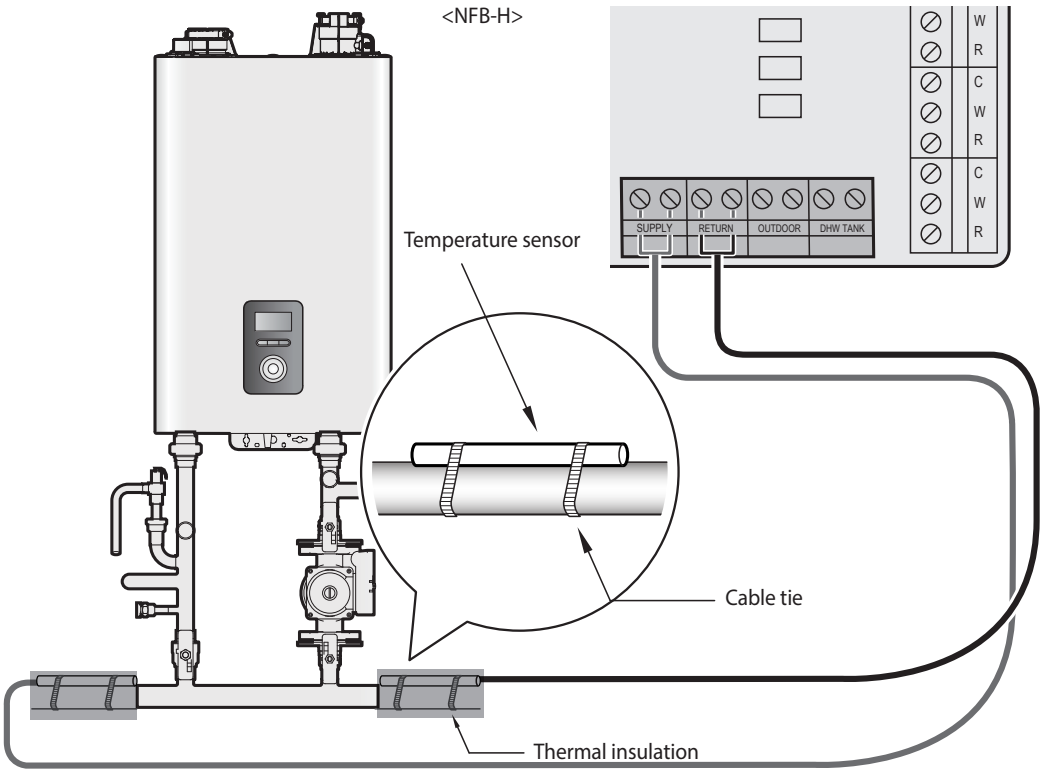
<NFB-H>



WARNING

Use only the Navien Universal Temperature sensor (#GXXX001769). The use of other sensors may result in higher water temperatures than expected.

3.6.11 Wiring Diagram - Optional Supply/Return Temperature Sensors



Note To control the boiler supply or return water temperature using the external temperature sensors, configure the system accordingly.
On the front panel, press the Menu button (M) to enter the setting menu, and then select 2. Space Htg Operation > 6. SH Control Method to select one of the control modes.

Installation Manual

NFB-H Condensing Boilers

Getting Service

If your boiler requires service, you have several options for getting service:

- Contact Technical Support at 1-800-519-8794 or on the website: www.navieninc.com.
- For warranty service, always contact Technical Support first.
- Contact the technician or professional who installed your boiler.
- Contact a licensed professional for the affected system (for example, a plumber or electrician).

When you contact Technical Support, please have the following information at hand:

- Model number
- Serial number
- Date purchased
- Installation location and type
- Error code, if any appears on the front panel display.

Version: 1.0 (March, 2021)

800.519.8794 | www.navieninc.com
20 Goodyear Irvine, CA 92618