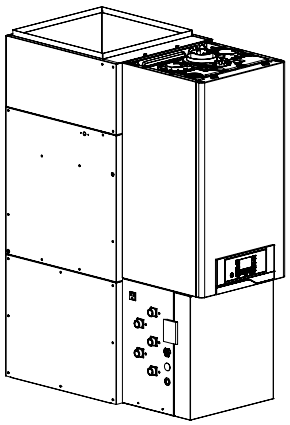
GF150 Installation Manual

Combination gas-fired, condensing combi boiler and space heating fan coil

C US
NSF/ANSI 372

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



WARNING

This appliance (GF150) is a combination gas-fired, condensing, combi boiler and space heating fan coil. The boiler is a CSA-certified product in its own right and, as such, must be installed according to its installation and operation manuals (supplied).
This manual provides installation instructions for the GF150, but defers to the boiler's manual(s) where appropriate. Throughout, in any conflict between instructions from this manual and those from the boiler's, the latter are assumed to be correct (unless otherwise noted). When reading the boiler manuals, only sections pertaining to the TRX150C model may apply.

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, ANSIZ223.1/NFPA 54 and/or CSA B149.1, Natural Gas and Propane Installation Code. When applicable, the installation must conform with the Manufactured Home Construction and Safety Standard, Title 24 CFR, Part 3280 and/or CAN/CSA Z240 MH Series, Mobile Homes.

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1. Important Information

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This manual provides installation instructions for the GF150, but defers to the boiler manuals where appropriate. Throughout, in any conflict between instructions from this manual and those from the boiler's, the latter are assumed to be correct.
When reading the boiler manuals, only those sections pertaining to the TRX150C model may apply.

As part of the GF150's manufacturing process, certain portions of the boiler's installation have been completed. As such, some sections of this manual differ significantly from the corresponding instructions in the boiler manuals.
In these sections, it is intended that the installer follow the specific instructions as described for the GF150, while following the general instructions in the boiler manuals.

Installation and service must be performed by a qualified installer, service agency, or the gas supplier. Failure to follow these and other included instructions exactly could result in a fire or explosion, causing property damage, personal injury, or death.

1.1 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.

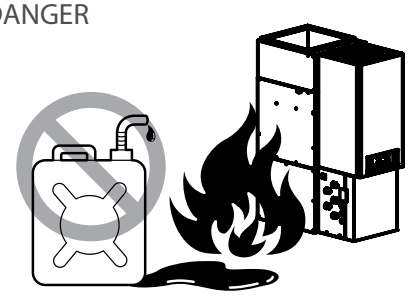
WARNING

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

CAUTION

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

DANGER



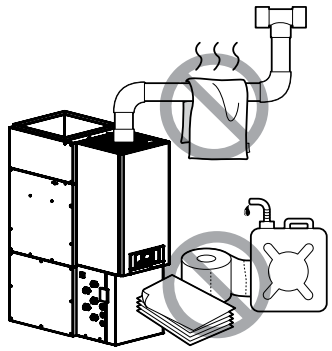
If you smell gas:

- 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 use or store flammable products, such as gasoline, solvents, or adhesives in the same room or area as the appliance.

- The appliance 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 may be heavier than air. They can travel long distances along the ground and can be carried from other rooms to the appliance's main burner flame by air current.
- Keep all flammable products far away from the appliance 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 appliance.
  Doing so may result in fire or explosion.
- Do not place combustibles, such as newspapers or laundry, near the appliance 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 appliance or venting system, including the vent termination.
  Doing so may result in fire or explosion.
- Do not remove the front cover unless the power to the appliance is turned off or disconnected.
  Failure to do so may result in electric shock.
- Do not operate the appliance 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 appliance 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 internal components of the appliance with wet hands.
  Doing so may result in electric shock.

CAUTION

- Do not turn on the appliance unless the water and gas supplies are fully opened.
  Doing so may damage the appliance.
- Do not turn on the water if the cold water supply shut-off valve is closed.
  Doing so may damage the appliance.
- Do not use this appliance for anything other than its intended purpose, as described in this manual.
- 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 appliance.
- This appliance has been approved for use in the USA and Canada only. Using the appliance in any other country will void the manufacturer's warranty.

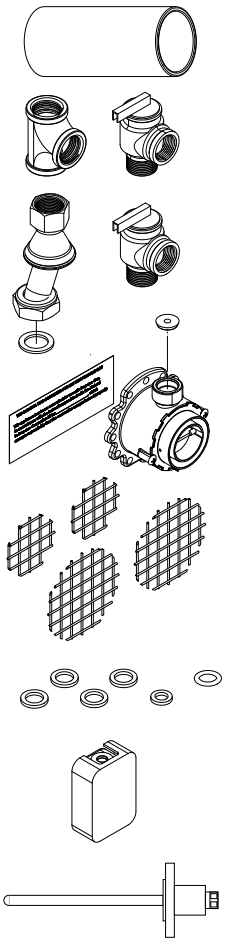
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2. About the Appliance

2.1 Items Included

When you open the packaging, you will find the following items with the appliance. Check for each of the following items before installing the appliance. The manual packet and kit box can be found inside the front cover.

GF150 Installation Manual	TRX150C Manuals and other Documentation
	

Kit Box, including:	Item	Part No.	Qty
	2" CPVC Pipe, 5.5" Long	86586	1
	DHW Pressure Relief Valve (150 psi) + Brass Tee	480020061500 87438	1 + 1
	CH Pressure Relief Valve (30 psi) + Connection Tube (w/ gasket)	13701 + 87360 (87769)	1 + 1 (1)
	LP Gas Conversion Kit	87380	1
	2" Vent Screen + 3" Vent Screen	86231 86232	2 + 2
	Seals: GAS: 2 x 3/4" (yellow) CH: 2 x 3/4" (black) DHW: 1 x 1/2" (black) 3WV: 1 x P22 (black)	87599 65115193 65116896 85374	6
	Outdoor Sensor Kit	560030034300	1
	Plenum Sensor	87423	1
	Decal, "GAS VENT DIRECTLY BELOW"	83008	1

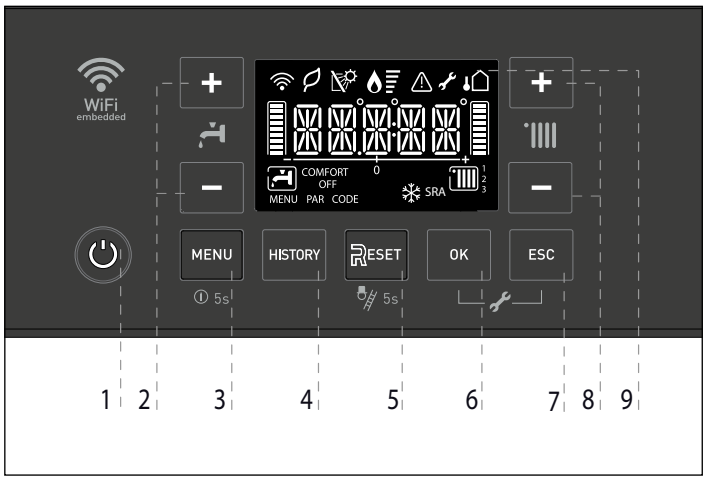
2.2 Specifications

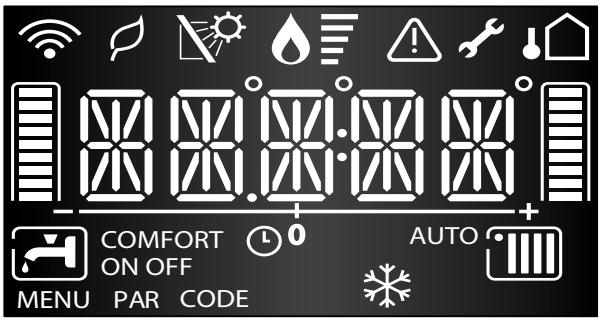
The following table lists the specifications for the appliance. Additional specifications about water, gas, electric, and air supplies (venting) appear in the Installation section.

GF150					
Forced Air Heating Capacity				13,200 – 80,000 BTU/h	
Cooling Capacity				Up to 3 tons (@ 400 CFM/ton)	
Flow Rate (Forced Air)	Heating / Ventilation			300 –1200 CFM	
	Cooling			360 –1200 CFM	
Connection Sizes	DHW Inlet / Outlet			¾ in NPT-M	
	CH Supply / Return				
	Gas Inlet				
Dimensions (W x H x D)				17⅞ in x 48 in x 35¾ in	
Weight				220 lbs	
Power Supply				120 V AC, 60 Hz, 15 A	
TRX150C*	Energy Efficiency (AFUE)			95%	
	Space Heating Capacity (Hydronic + Forced Air)			13,200 – 120,000 BTU/h	
	DHW Capacity			13,200 – 150,000 BTU/h	
	Flow Rate (DHW)	77°F (43°C) Temp Rise		3.6 GPM	
		Minimum		0.5 GPM	
	Water Pressure	DHW Max. Pressure		150 PSI	
		Heat Exchanger MAWP		55 PSI	
	Venting	Length (intake)		2" (0 – 100 ft) | 3" (0 – 150 ft)	
		Length (exhaust)		2" (6 – 100 ft) | 3" (6 – 150 ft)	
		Materials		PVC, CPVC, PP, SS	
	Installation Type			Indoor, Fully Condensing	
	Flue System			Category IV, Sealed Combustion Direct Vent, Power Vent	
	Burner System			Premixed Fuel Modulation / Stainless Steel Burner	
	Ignition System			Direct Electronic Spark Ignition / Flame Rectification	
	Gas Valve System			Air Ratio Valve	
	Gas Supply Pressure (from source)	NG	3.5 – 10.5 in w.c.	See TRX150C Boiler Installation Manual (Supplied)	
		LP	8 – 13 in w.c.		
	Gas Manifold Pressure (min-max)		0 in w.c.		
Materials	Casing			Cold Rolled Carbon Steel	
	Heating Coil			Copper (tubes); Aluminum (fins)	
	Interconnecting piping			Stainless steel, Copper, Brass (low-lead), Polymers (Viton™, EPDM, etc.)	
Safety Devices				Flame Rectifier Probe, Temperature Limit Control (190°F), Water Pressure Switch (min. 8 PSI), Freeze Protection, Blocked Condensate Pressure Switch, Condensate Trap, Flue Temperature High Limit Sensor (210°F), Blocked Vent Pressure Switch, Coil Freeze Protection (Plenum Sensor; Fan RPM Sensor)	

*The TRX150C is the boiler component of the GF150.

2.3 Display (HMI)





1. ON / OFF Button (see NOTICE below)
2. Domestic Hot Water Adjustment Button +/-
3. MENU: (short press = User Menu); (long press = Info Menu)
4. HISTORY Button - view last 10 errors
5. RESET Button (see NOTICE below)
6. OK – confirms menu selection
7. ESC – exits menu selection
8. Heating Temperature Adjustment Button +/-
9. Display

NOTICE

ON/OFF Button
The button lights up (white) when the boiler is electrically powered.

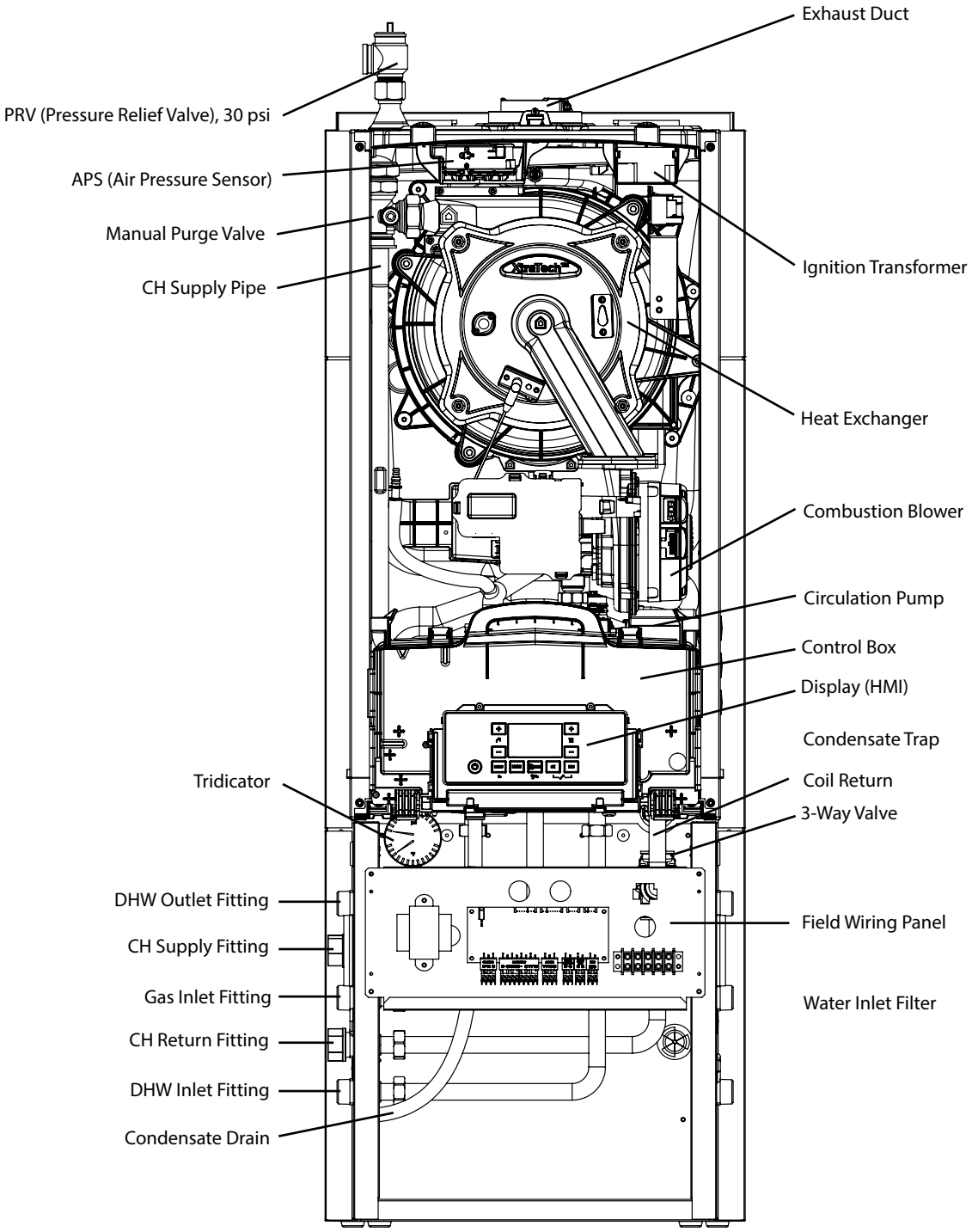
ON/OFF Button
The button is not lit in the event of an error or power failure.

RESET BUTTON
The button lights up (red) in the event of a lockout error. After pressing the Reset button to clear the error condition, the button will flash for five (5) seconds.

	Digits Indicating: • Boiler Status • Temperature (°F) with bar level • Error Codes (ERROR) • Press] RESET] button request (boiler lockout) • Menu Settings
	Technical assistance request
	Flame detected with indication of power level
	CH Heating Operation Set
	CH Heating Operation Active
	DHW Operation Set
	DHW Operation Active
COMFORT	Hot Water Comfort Activated (Combi Only)
OFF	Boiler off with Antifreeze Function active
	Antifreeze Function Active
AUTO	Automatic Temperature Control activated
	High Efficiency Operation (Low CH flow temperature)
	Error signal - Display will also show a code and description
	Outdoor Sensor Connected - Optional
	WiFi Active

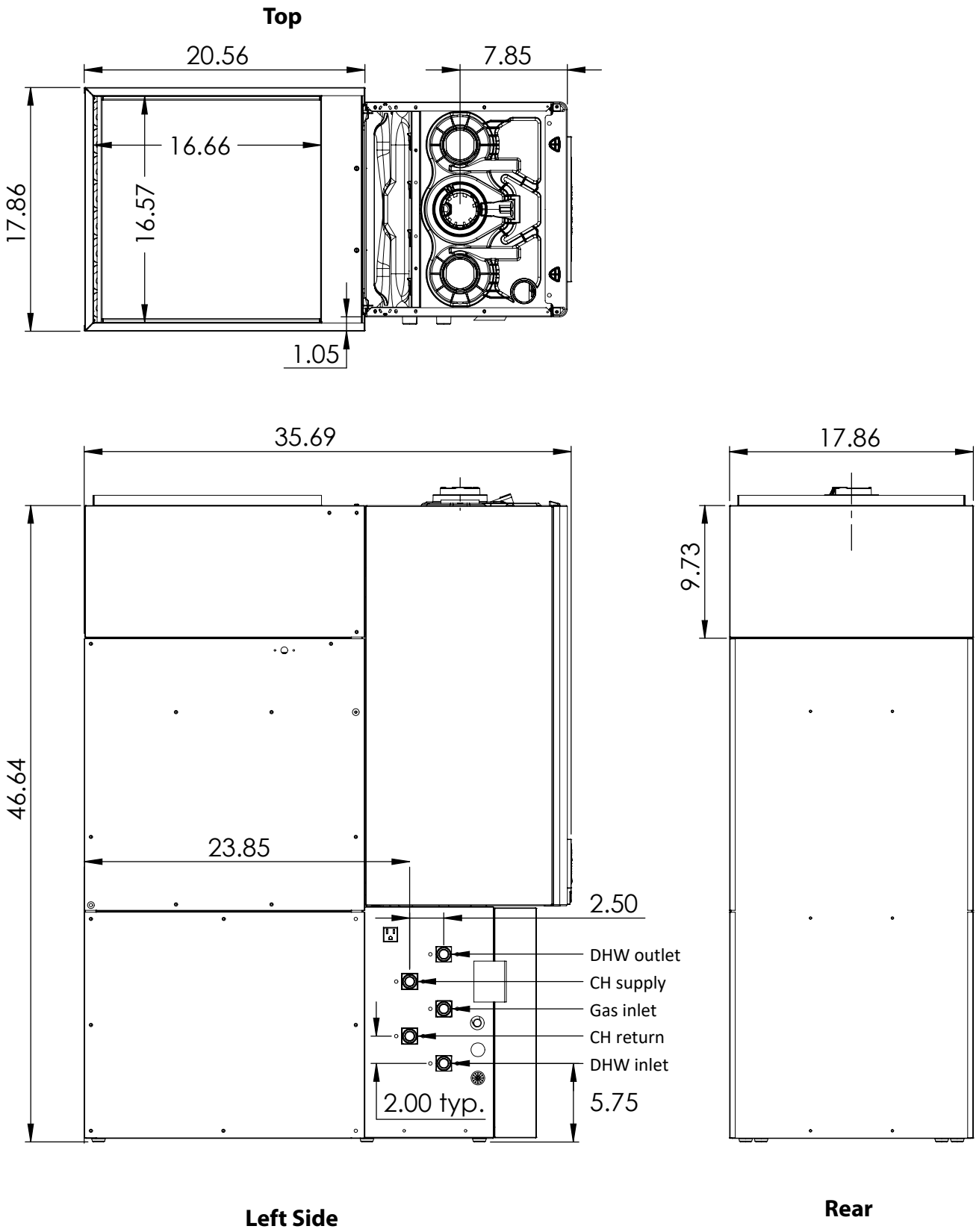
2.4 Components

The following diagram shows the key components of the appliance. A more detailed drawing of the boiler itself is included in its manual. Component assembly diagrams and particular parts lists are included in the Appendixes.



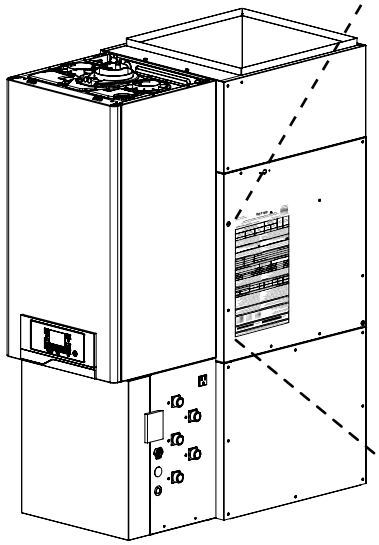
2.5 Dimensions

The following diagrams show the dimensions of the appliance and the connections.



2.6 Rating Plate

This appliance comes from the factory configured for use with Natural Gas (NG). Before starting the installation, check the rating plate located on the side of the appliance to ensure that it matches the gas type, gas pressure, water pressure, and electrical supply available in the installation location. If the appliance does not match each of these ratings, do not install the appliance. If conversion to Propane Gas is required, the included LP Gas Conversion Kit must be used.



Certified by
Certifie par

GF150

Made in Canada
Fabriqués au Canada

COMBINATION GAS COMBI BOILER / CENTRAL AIR HEATING
COMBINAISON CHAUDIÈRE COMBI / CHAUFFAGE DE L'ESPACE

NTI Boilers Inc. 30 Stonegate Drive
Saint John, NB E2H 0A4

Serial No. 2105262138174672

Model [Modèle]	Fuel [Gaz]	Input, MBH [Entrée, kW]		Heating Capacity, MBH [Capacité de chauffage, kW]		
		Min	Max	DHW [ECS]	Hydronic [Hydronique]	Forced Air [Air pulsé]
GF150	Nat./LP	13.2 [3.9]	150 [43.9]	150 [43.9]	120 [35.1]	80 [23.4]

- The capacities shown are at minimum vent lengths; maximum input capacity will reduce with longer vent lengths.
- Canada: for altitudes between 2000 – 4500 ft [610 – 1372 m], de-rate capacity by 10%. See Installation & Operation Manual (IOM).
- United States: for altitudes greater than 2000 ft, de-rate capacity by 4% per 1000 ft above sea level. Refer to the IOM.

- Les capacités sont indiquées à des longueurs d'évent minimales; l'entrée maximale sera réduit avec de plus longues longueurs d'évent.
- Canada: pour altitudes de 2000 – 4500 pi [610 – 1372 m], réduire la puissance de 10%. Reportez-vous au manuel.
- États-Unis: pour les altitudes au dela de 2000 pi [610 m], réduire la puissance de 4% par 1000 pi [305 m] au dessus du niveau de la mer. Reportez-vous au manuel.

FACTORY SET FOR NATURAL GAS
Field converted to Propane Gas :
☐ Date: _____

ADJUSTÉ À L'USINE POUR GAZ NATUREL
Convertie au propane sur place :
☐ Date: _____

- Mixer necessary for LP conversion is provided.
- Failure to use correct gas can cause problems which can result in death, serious injury or property damage.

- Le mélangeur nécessaire à la conversion au GPL est fourni.
- 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.

Gas Pressure [Pression de gaz]	Natural [Naturel]	Propane
Maximum Inlet Gas Pressure [Pression maximale d'entrée du gaz]	10.5" w.c. [2.6 kPa]	13" w.c. [3.2 kPa]
Minimum Inlet Gas Pressure [Pression minimum d'entrée du gaz]	3.5" w.c. [2.6 kPa]	8" w.c. [2.0 kPa]
Manifold Pressure [Pression d'admission]	0" w.c. [0 kPa]	0" w.c. [0 kPa]

Minimum Clearances [Dégagements minimum]

	To Combustibles [Au combustibles]	Service & Maintenance (Recommended) [Service & entretien (recommandés)]
Top [dessus]	9 in [po]	as required [comme nécessaire]
Back [arrière]	0	0
Front [avant]	0	0 or 24 in [po]*
Side [côté]	0	0 or 24 in [po]**

* No clearance required to front of unit if obstruction is removable (such as a door or access panel), 24 inch clearance if obstruction is permanent.
** Service access (to blower) must be maintained by clearance or other means (door/access panel, removable duct work, or front service clearance).

* Aucun dégagement nécessaire à l'avant de l'unité si l'obstruction est amovible (comme une porte ou un panneau d'accès), 24 po. si l'obstruction est permanente.
** L'accès de service (au ventilateur) doit être conservé, soit par dégagement ou autres moyens (porte/panneau d'accès, un conduit d'air amovible, ou acces à l'avant de la chaudière).

Electrical Rating / Caractéristique Électrique

VOLTS	FREQ.	PHASE	RATED AMPS	MCA	MAX. CKT. BRK.	INDOOR BLOWER MOTOR	
						RATED AMPS	HP
120	60 Hz	1	<12 A	15 A	20 A	7.7 A	1/2

Important Information [Rensignesments Importants]

- Use for Natural or LP Gas only.
- Maximum DHW Water Pressure = 125 psi
- Maximum CH Water Pressure = 30 psi
- Maximum Static Pressure = 0.8 in. w.c.
- Maximum Inlet Water Temperature = 180°F
- This appliance must be installed in accordance with local codes, if any; if not, follow ANSI Z223.1/NFPA 54 or CAN/CSA B149.1, Natural Gas and Propane Installation Code, as applicable.

- Utilisez le gaz naturel ou LP seulement.
- Pression d'eau max. (ECS) = 862 kPa
- Pression d'eau max. (Chauffage) = 207 kPa
- Pression statique max. = 0.2 kPa
- Temp. maximale d'eau d'entrée = 82°C
- Cet appareil doit être installé conformément aux codes locaux, le cas échéant ; sinon, suivez ANSI Z223.1 / NFPA 54 ou CAN / CSA B149.1, Code d'installation du gaz naturel et propane, le cas échéant.

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

POUR VOTRE SÉCURITÉ
Ne pas entreposer ou utiliser de l'essence ou d'autres vapeurs et liquides inflammables à proximité de cet appareil ou de tout autre appareil.

Standard ANSI Z21.13-2017 • CSA 4.9
Gas-fired low pressure steam and hot water boilers

CSA C22.2 No. 236 / UL 1995
Heating and Cooling Equipment

Model: *628233733481*

Serial No. *2105262138174672*

BOILER RATING PLATE LOCATED ON SIDE OF BOILER CABINET
[PLAQUE SIGNALÉTIQUE DE LA CHAUDIÈRE SITUÉE SUR LE CÔTÉ DE LA CHAUDIÈRE]

WARNING

- Be sure the gas type and electricity voltage match the rating plate. Using a different gas type will cause abnormal combustion and appliance malfunction.
- Using abnormally high or low AC voltage may cause abnormal operation, and may reduce the life expectancy of this product.

3. Installing the appliance

NTI recommends that the connections be made in the following order to ensure ease of installation, given the limited space in the piping cabinet:

- Ductwork (could also be last)
- Condensate drain
- Domestic water (Inlet, then Outlet)
- Gas supply
- Electrical

3.1 Choosing an installation location

This appliance must be installed indoors, in a dry location free of dust and debris.

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

Water quality

The following table shows the maximum contaminant levels allowed, based on the EPA National Secondary Drinking Water Regulations (40 CFR Part 143.3). If you suspect that your water is contaminated in any way, discontinue use of the appliance and contact an authorized technician or licensed professional.
Failure to do so could void the warranty.

Contaminant	Maximum Allowable Level
Total Hardness	**Up to 200 mg/l (12 grains/gal.)**
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

Adequate drainage

- Maintain proper clearances from any openings in the building.
- Install the appliance with a minimum clearance of 12 in (300 mm) above an exterior grade, or as required by local codes.
- Maintain a minimum clearance of 4 ft (1.2 m) from heating and cooling vents.
- Do not enclose the vent termination.
- Install the exhaust vent in an area that is free from obstructions and does not allow the exhaust to accumulate.
- Do not install the appliance where moisture from the exhaust may discolor or damage exterior walls.
- Do not install the appliance in bathrooms, bedrooms, or any other occupied rooms that are normally kept closed or that are not adequately ventilated.

Proximity to fixtures and other appliances

Install the appliance near fixtures that deliver or use hot water, such as bathroom, kitchen, and laundry room faucets. Select a location that minimizes the water piping required between major fixtures. If the distances are long or the user requires "instant" hot water, we recommend running a recirculation line back to the appliance from the furthest fixture. Insulate as much of the hot water supply and recirculation lines as possible.

Additionally, take care to locate the appliance such that the supply and return ductwork can be installed efficiently, to limit noise and power consumption.

Combustion air quality

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

3.2 Installation clearances

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

Minimum clearance:	from combustibles	for service
Top	9 in	as required
Back	0	0
Front	0*	0 | 24 in*
Side (w/o connections)	0	0 | as required
Side (w/ connections)	0	as required
Side (Blower access)	0	24 in
Bottom	0	0

* No clearance required to front of unit if obstruction is removable (such as a door or access panel). 24 inch clearance if obstruction is permanent.

Note The service clearances are recommendations.

If you are unable to maintain those specific clearances, be sure you have an alternative plan as to how you are going to service the unit.

When locating the appliance prior to completing the ductwork and plumbing, it is essential that sufficient space be allotted for the installation and maintenance of components such as:

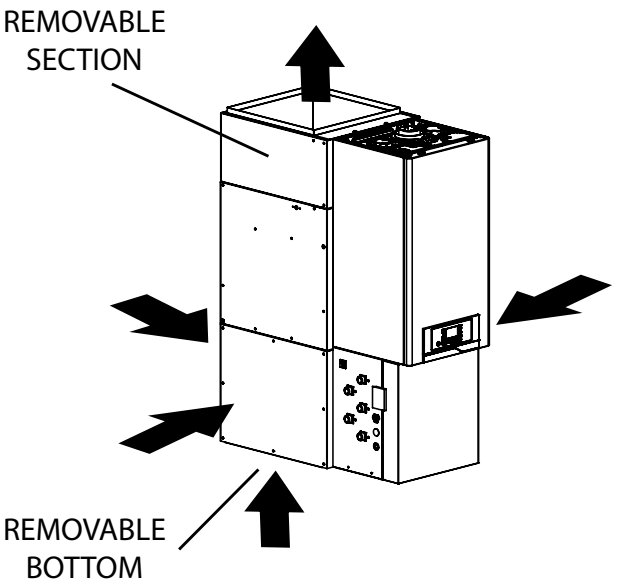
- Pressure Relief Valves (PRV)
- Shut off and drain valves
- Thermostatic Mixing Valve (TMV)
- Expansion tank (optional)
- Condensate drain (and optional pump)
- Return air filter
- Circulating blower

3.3 Ducting the appliance

3.3.1 Supply ducting

The GF150 provides a standard-size flanged supply air outlet for easy installation of an evaporator coil or supply plenum. Take care not to damage the heating coil when installing ductwork to the supply air outlet by using screws no longer than ¾" (0.75 in.).

As a space-saving measure, the top 10" of cabinet may be removed (6 screws on the inside flanges) to reduce the overall height of the GF150 + A/C unit.



3.3.2 Return ducting

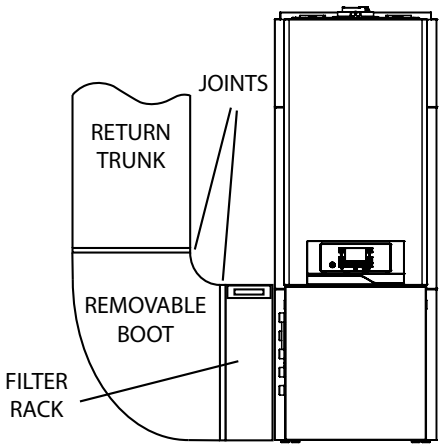
The return air may be delivered to the appliance via:

a) either side;

b) the back;

c) the bottom; or

d) any combination thereof, provided, in all cases, that blower access is maintained.



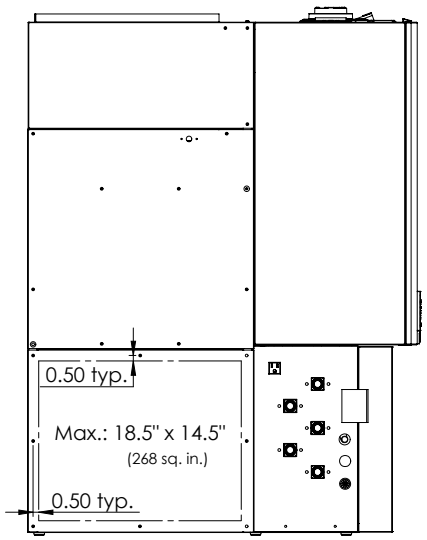
Should spatial restrictions preclude sufficient clearance in a side-return installation, it is recommended that a joint (or joints) be made in the return ducting such that the portion immediately adjacent to the cabinet be removable to allow for blower access.

a) Side return:

When routing return air into the side of the unit, one may remove the (lower) side panel entirely and install a filter rack directly to the opening. Alternatively, an opening may be cut into the central area of the lower side panel (see indicated boundary below).

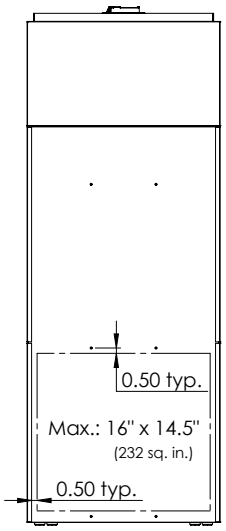
If installing a cabinet-mounted filter rack, it may be fastened (with self-tapping screws no longer than ¾" (0.75 in.)) to both the remaining side panel material *and/or* the cabinet, such that it overlaps the opening.

However, DO NOT drill holes or cut away any material from the cabinet frame itself.



b) Rear return:

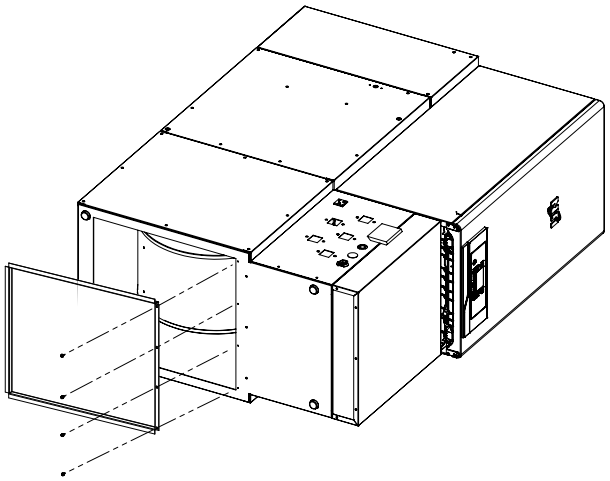
When routing return air into the back of the unit, an opening may be cut within the confines of the indicated boundary, taking care not to damage the blower housing within when using longer tools.



c) Bottom return:

A removable panel is included as part of the floor of the GF150. To remove it, simply remove the 4 screws from the panel's front flange, and rotate the panel about its rear flange to release it.

The resulting opening is 15.5" x 16.8" (260 sq. in.).



3.3.3 Air filtration system

In all installations, an appropriate air filtration system is recommended and must meet test requirements in UL 900. Failure to install a filter could lead to damage to and/or premature failure of the space heating components.

In all cases, care must be taken to ensure that return ducting is sealed against the inlet, such that the entire airstream is directed through the air filter. Failure to do so could cause damage to the air moving equipment and clogging of the heating and/or cooling coils.

NTI does not provide a specific filter recommendation. However, filters in the MERV 7-10 range are generally suggested for residential use. Ensure the static pressure in the ductwork (including the filter) does not exceed the 0.8" w.c. maximum limit.

3.4 Connecting the Condensate Drain

CAUTION

This condensing high efficiency appliance has a condensate removal system. Condensate is water vapor derived from combustion products, similar to that produced by an automobile when it is initially started. It is very important that the condensate line is sloped down away from the appliance and to a suitable drain.

The condensate line must remain unobstructed. If allowed to freeze in the line or obstructed in any other manner, condensate can exit from the appliance tee, resulting in potential water damage to property.

When installing a condensate pump, select one approved for use with condensing appliances and furnaces. The condensate pump should have an overflow switch to prevent property damage from spillage.

Condensate from the appliance will be slightly acidic (pH from 2 to 4.5). Check with your local gas company to determine if combustion condensate disposal is permitted in your area. Install a neutralizing filter if required by local codes.

NOTES:

1. Condensate line must be pitched at least ¼" per foot to properly drain. If this cannot be done, or a very long length of condensate hose is used, increase the condensate line to a minimum of 1" ID and place a tee in the line after the condensate neutralizer to properly reduce vacuum lock in the drain line.
2. Use corrosion-resistant materials to drain condensate. Use the included flexible plastic hose and flexible tube, PVC, or CPVC pipe. PVC or CPVC pipe must comply with ASTM D1785, F441, or D2665. Cement must comply with ASTM D2564 for PVC pipe or F493 for CPVC pipe.
   For Canadian applications, use CSA or ULC certified flexible tube, PVC or CPVC pipe, fittings, and cement.
3. If using flexible tube, place an overflow tee in the tube line to prevent condensate backing up into the appliance if the tube should kink.
   Ensure the overflow tee is positioned near a drain or in a location that will not damage the surrounding area.
4. Do not reduce the size of the condensate line. The line must at minimum equal the diameter of the line included with the appliance.
5. A frozen condensate line could result in a blocked vent condition. It is very important to protect the condensate line from freezing temperatures or any type of blockage. In installations that may encounter sustained freezing conditions, the use of heat tape is recommended to avoid freezing of the condensate line. It is also recommended to bush up the condensate line size to 1" and terminate condensate discharge as close to the unit as possible.
   Longer condensate runs are more prone to freezing.
   Damages due to frozen or blocked condensate lines ARE NOT covered by warranty.
6. Support of the condensate line may be necessary to avoid blockage of the condensate flow.
7. Local building codes may require an in-line neutralizer to be installed (not included) to treat the condensate. See facing figure.
   If required by local authorities, a condensate filter of lime crystals, marble, or phosphate chips will neutralize slightly acidic condensate. Follow all the installation instructions included with the neutralizer.
   If a neutralizer is installed, periodic replacement of the limestone (or neutralizing agent) will be required. The rate of depletion of the limestone varies with usage of the appliance.
   During the first year of operation, check the neutralizer every few months for depletion.
8. Route the drain line to a nearby floor drain, laundry tub, or condensate pump.
   If the appliance condensate outlet is lower than the drain, you must use a condensate removal pump.
9. An error will appear on the appliance display if the condensate line is blocked. The boiler will not operate with a blocked condensate line.
   It is extremely important to have this condition repaired by a qualified service technician.
10. Damages due to frozen or blocked condensate lines or leaks ARE NOT covered by warranty.
11. To clean out condensate trap, see Maintenance section.

WARNING

THE CONDENSATE TRAP MUST BE FILLED WITH WATER BEFORE THE BOILER IS USED.

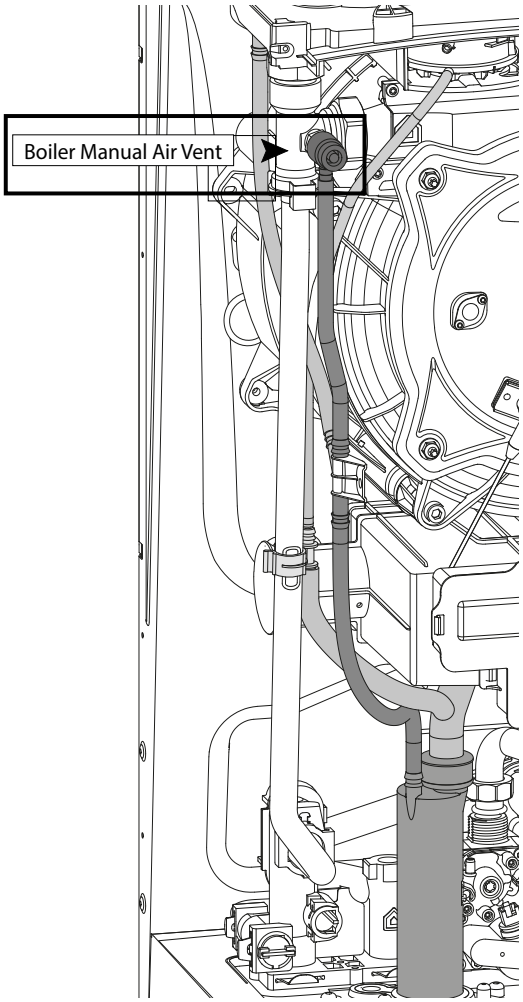
The siphon is filled with water during the air purging procedure. See Filling Procedure in this manual for further instructions.

Ensure the siphon contains water. If the siphon does not contain water it must be filled. Open the manual air vent on the main heat exchanger until filling is complete. See diagram below.

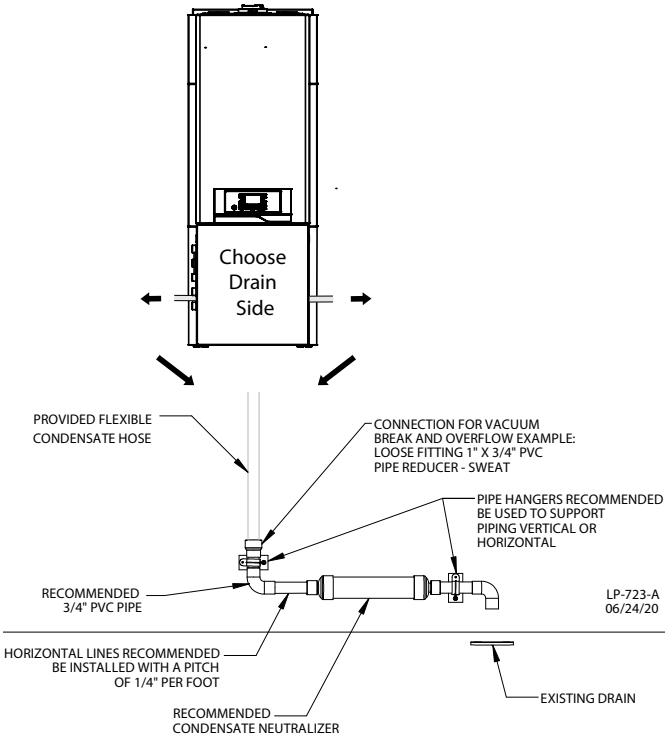
Check the system pressure with the indicator gauge.

INSUFFICIENT WATER IN THE TRAP CAN CAUSE FLUE GAS TO BE EXPELLED.

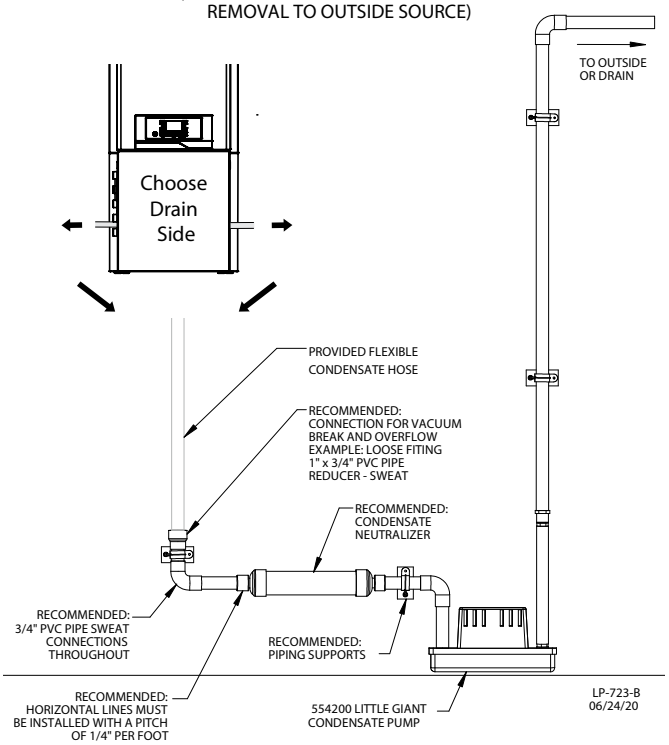
Failing to ensure the condensate trap is full of water could result in property damage, severe personal injury, or death.



CONDENSATE PIPING
(SUGGESTED SETUP FOR CONDENSATE REMOVAL TO FLOOR DRAIN)



CONDENSATE PIPING WITH PUMP
(SUGGESTED SETUP FOR CONDENSATE REMOVAL TO OUTSIDE SOURCE)



3.5 Connecting the Water Piping

WARNING

- Failure to follow the instructions in this section WILL VOID the warranty and may result in property damage, severe personal injury, or death.
- The National Standard Plumbing Code, the National Plumbing Code of Canada, and the Uniform Plumbing Code limit heat transfer fluid pressure to less than the minimum working pressure of the potable water system up to 30 PSI maximum. In addition, the heat transfer fluid must be water or another non-toxic fluid having a toxicity of Class 1, as listed in Clinical Toxicology of Commercial Products, 5th Edition. Failure to follow this warning could result in property damage, severe personal injury, or death.

CAUTION

- Do not apply a torch within 12" of the appliance. If sweat connections are used, sweat tubing to the adapter before fitting adapter to the water connections on the appliance. Damages due to improper installation practices ARE NOT covered by warranty.
- Where appropriate, use two wrenches when tightening connections. Failure to prevent piping connections from turning could cause damage to components.
- Dielectric unions or galvanized steel fittings must not be used in a system with this appliance. Doing so WILL VOID the warranty. Use only copper, brass, black iron, or stainless steel fittings.
- The building piping system must meet or exceed the piping requirements in this manual.
- The control module uses temperature sensors to provide both high limit protection and modulating temperature control. The control module may also provide low water protection by sensing the water level in the heat exchanger. Some codes/jurisdictions may require additional external controls.

3.5.1 General Plumbing Information

The water connections must be installed in accordance with all local and national plumbing codes, or any applicable standard which prevails.

- Pipe material must be suitable to meet local codes and industry standards.
- The pipe must be cleaned and without blemish before any connections are made.
- The size of the DHW pipes should be 3/4" diameter, and the CH pipes should be 1" diameter.
- Isolation (shut-off valves) should be used on both the CH and DHW loops to ease future servicing.
- All piping should be insulated.
- If the appliance is installed with 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.

It is recommended to install a sweat shut-off valve and a union in the return and supply piping to ease future servicing. If there is a backflow preventer or any type of a no return valve in the system, install an additional tee here suitable for an expansion tank.

NOTE: The addition of a high temperature limiting device is important if the appliance is to be connected to a domestic hot water system.

3.5.2 Backflow Preventer

Use a backflow preventer specifically designed for hydronic boiler installations. This valve should be installed on the cold water fill supply line per local codes.

3.5.3 Expansion Tank

An expansion tank is provided with the GF150 for standalone installations (without external hydronic loads). For applications involving significant external CH piping, consult the relevant section (Part 4 – C) of the TRX150C IOM for further details on specifying and installing an expansion vessel.

3.5.4 CH and DHW Pressure Relief Valves

WARNING

To avoid water damage or scalding due to relief valve operation:

- Discharge line must be connected to relief valve outlet and run to a safe place of disposal. Terminate the discharge line in a manner that will prevent possibility of severe burns or property damage should the relief valve discharge.
- Discharge line must be as short as possible and the same size as the valve discharge connection throughout its entire length.
- Discharge line must pitch downward from the valve and terminate at least 6" above the floor drain, making discharge clearly visible.
- The discharge line shall terminate plain, not threaded, with a material serviceable for temperatures above 375°F.
- Do not pipe discharge to any location where freezing could occur.
- No valve may be installed between the relief valve and appliance or in the discharge line. Do not plug or place any obstruction in the discharge line.
- Test the operation of the relief valve after filling and pressurizing the system by lifting the lever. Make sure the valve discharges freely. If the valve fails to operate correctly, immediately replace with a new properly rated relief valve.
- Test relief valve at least once annually to ensure the waterway is clear. If valve does not operate, turn the appliance "OFF" and call a plumber immediately.
- Take care whenever operating relief valve to avoid scalding injury or property damage.

FAILURE TO COMPLY WITH THE ABOVE GUIDELINES COULD RESULT IN FAILURE OF RELIEF VALVE OPERATION, RESULTING IN POSSIBILITY OF SUBSTANTIAL PROPERTY DAMAGE, SEVERE PERSONAL INJURY, OR DEATH.

This appliance has a high-temperature shut-off switch built in as a standard safety feature. Therefore, a "pressure only" relief valve is required.

DO NOT operate this appliance before the supplied pressure relief valve (PRV) is installed with sufficient relieving capacity in accordance with the ASME rating plate on the appliance.

WARNING

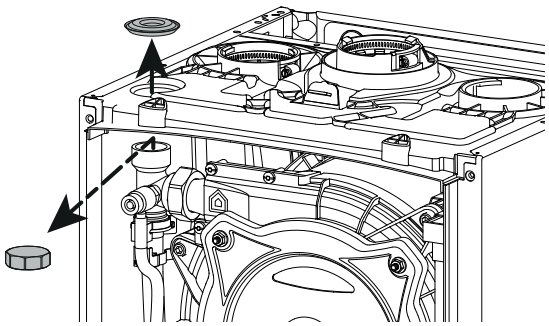
- The pressure relief valve must be installed with the provided adaptor pipe in the top of the appliance as detailed below.
- No other valves should be placed between the pressure relief valve and the appliance. Failure to comply with these guidelines can result in sub-stantial property damage, personal injury, or death.

CH Loop

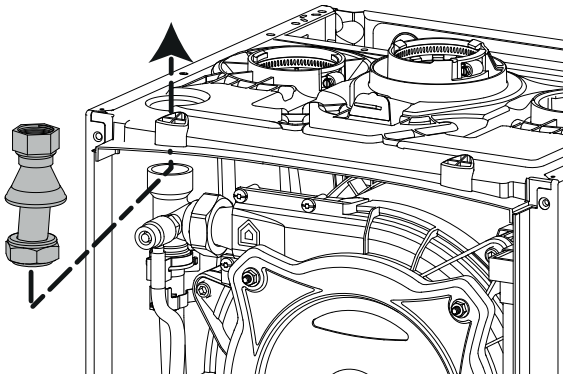
This appliance is provided with a CH PRV that complies with the ANSI/ASME Boiler and Pressure Vessel Code, Section IV (Heating Boilers). The included 30 psi CH PRV must be installed at the top of the boiler, using the included pipe adapter and grommet, as illustrated below.

DO NOT install a relief valve with a pressure rating in excess of 50 psi – the maximum allowable operating pressure of the boiler. The relief valve capacity must exceed the BTU/H input capacity of the boiler. To install the pressure relief valve proceed as follows:

1. **Remove the plastic cover on the top of the boiler.**
2. **Remove the hex cap on the flow pipe.**

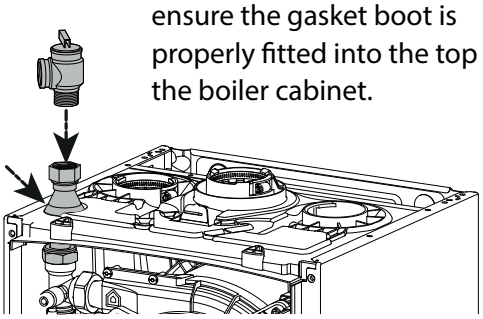


3. **Insert the pipe and gasket.**



4. **Connect the pressure relief valve and gasket.**

NOTE: To maintain an airtight seal, ensure the gasket boot is properly fitted into the top of the boiler cabinet.



DHW Loop

The DHW piping must be provided with a DHW pressure relief valve that complies with local codes, but not less than valves certified as meeting the requirements of Relief Valves for Hot Water Supply Systems, ANSI Z21.22 / CSA4.4 by a nationally recognized lab that maintains periodic inspection of production listed equipment.

A DHW pressure relief valve included in the Kit Box is to be installed in the DHW piping. DO NOT install a DHW relief valve with a pressure rating greater than 150 psi - the maximum allowable operating pressure of the boiler's DHW circuit. After installing the relief valves and filling and pressurizing the system, test the operation of the valves by lifting the levers. Make sure the valves discharge freely. If a valve fails to operate correctly, replace it with a new relief valve. The relief valve capacity must exceed the BTU/H input capacity of the boiler.

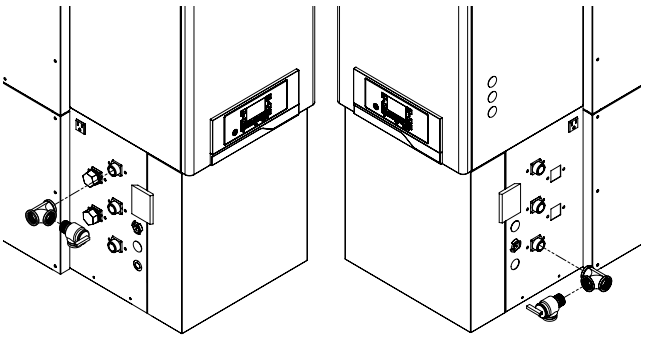
Installing the DHW PRV

1. The GF150 is factory-configured with all water, gas, and condensate connections on the left.

The CH connections are fixed to the left side, but the DHW and GAS pipes may be flipped (see connection diagram below).

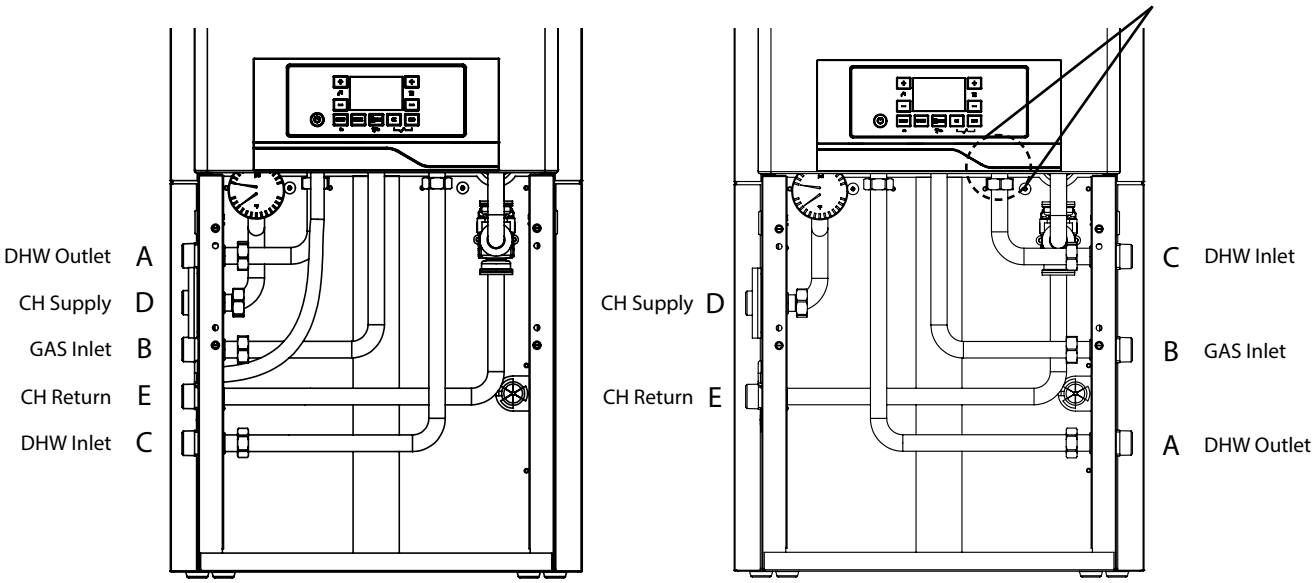
2. Install the 150 psi Pressure Relief Valve and tee (supplied in Kit Box) onto the DHW Outlet pipe, as shown below (note difference between Left and Right configurations).

Note The 150 psi PRV may be installed in an alternate location, farther downstream on the DHW Hot Supply line, so long as it remains on the appliance side of the Shut Off valve.



Left configuration Right configuration

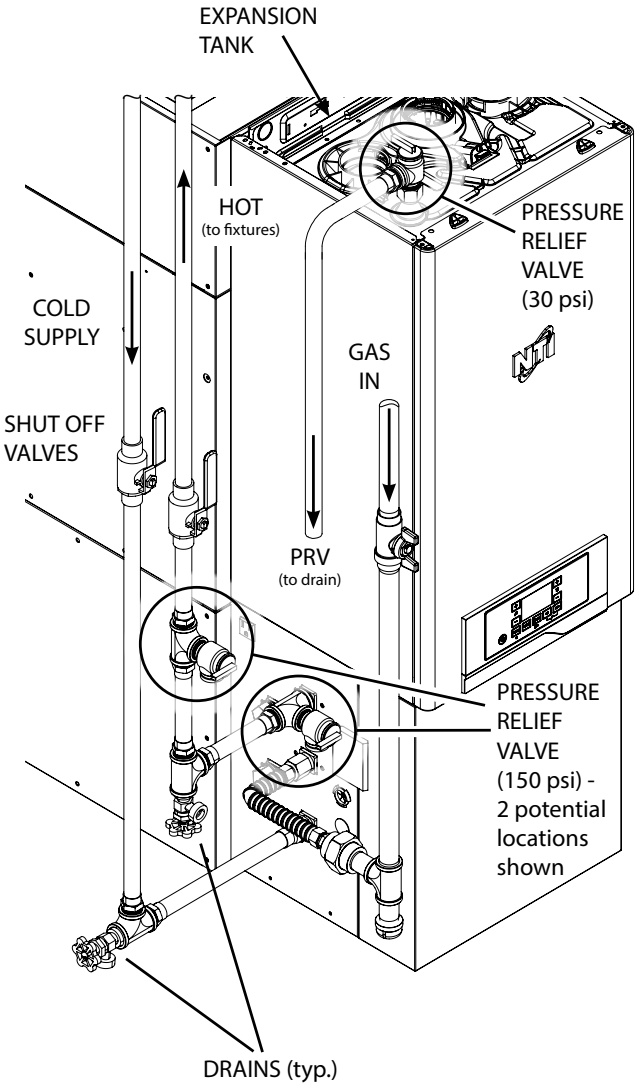
Note When swapping DHW Inlet and Outlet pipes, DO NOT swap the adapters between the pipes and the boiler. Only one contains a flow restrictor, and it must remain on the boiler's DHW Inlet port.



Left configuration Right configuration

3.5.5 Example plumbing layout

All field DHW, CH, and Gas fittings are 3/4" NPT-M. Example shown here without external CH loop (fittings capped off at factory).



3.5.6 Maintaining Appliance pressure in Forced Air-only applications

ATTENTION

- NTI recommends the installation of an auto-filling device to prevent low-pressure conditions.
- Failure to comply with this recommendation may result in FILL errors (E.108), requiring periodic manual re-filling of the appliance.

As with any hydronic system, no matter how thoroughly bled, some air may escape from the appliance in the first few weeks (or months) of use.

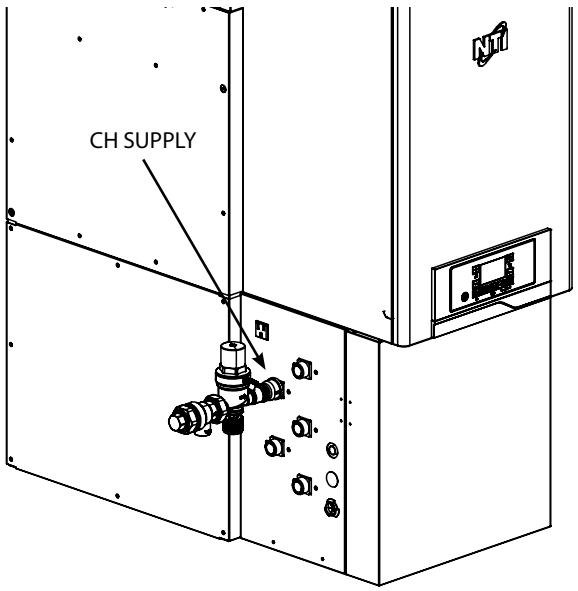
The built-in expansion vessel will mitigate most fluid loss (up to 1/3 cup | 78 mL).

The operating pressure in the boiler circuit should be maintained at 20 psi (E.108 occurs at ~8 psi).

Re-filling the system can be accomplished using the same Filling Valve (blue knob) used in the initial filling procedure (see **3.5.7 Filling the Appliance**).

Re-filling may also be automated by the installation of an auto-filling device set to 20 psi.

In installations *without* an external hydronic loop, the auto-filling device (and requisite backflow preventer) must be connected to 'CH Supply', as shown below.

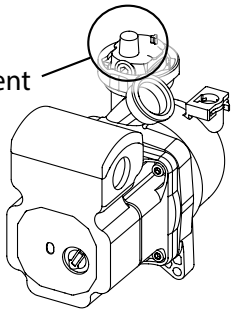


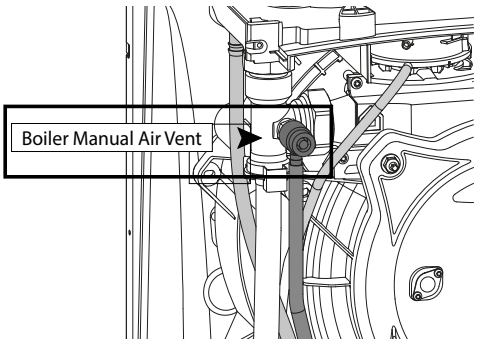
Note If an external Central Heating (CH) zone is connected to the GF150, disregard the requirement to install the device on 'CH Supply'.

3.5.7 Filling the Appliance

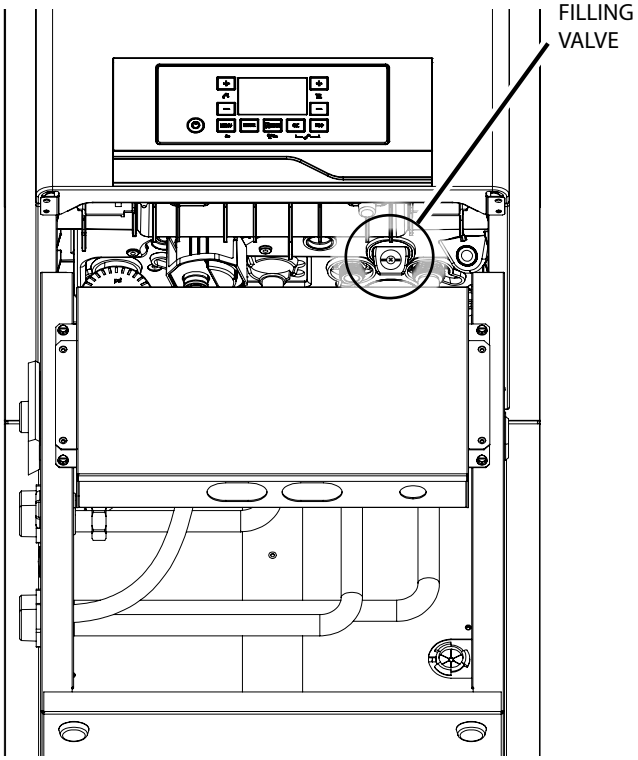
The GF150 is factory-configured with a manual filling valve to allow the appliance to be filled from the domestic water supply without the need for any additional fittings.

1. Fill the DHW circuit.
2. Check that the Auto Air Vent on the pump is open.
3. Open the Boiler Manual Air Vent (Purge Valve) ~ 3 turns.

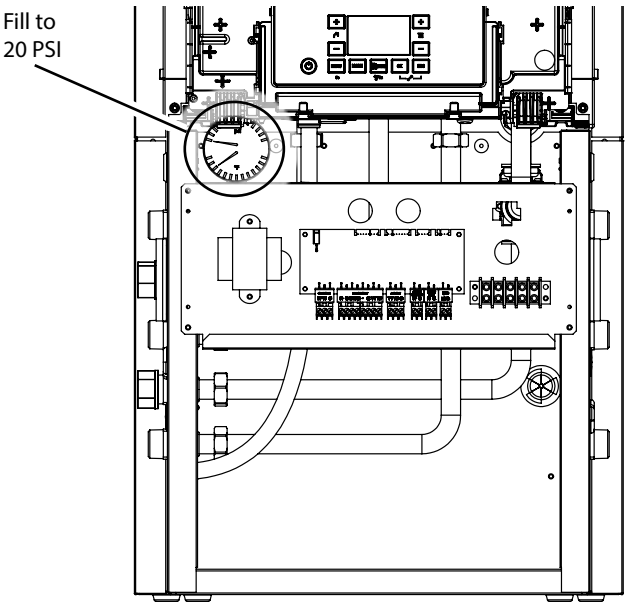




4. Open the Filling Valve (blue knob) ~ 5 turns. Water will be heard filling the boiler circuit, and air will begin to escape the vents.



5. Power on the boiler.
6. The water entering the boiler circuit should activate PURGE mode, which will engage the pump to clear the air from the heating coil.
   - Force PURGE manually: hold ESC for 5 s
   - Stop PURGE manually: press ESC once
7. Monitor the pressure indicator and the discharge from the Manual AIr Vent. Continue filling until the discharge runs clear (no air bubbles) while taking care to keep the pressure at or below 20 psi. Once the Manual Air Vent runs clear with water (no air bubbles or pockets), close it to begin pressurizing the system.



8. Continue to fill while monitoring the system pressure – NTI recommends filling the system to 20 psi.
9. Once system pressure is stable, close the blue filling valve by turning it clockwise.

   Make sure to continue turning the valve past the point where the flow audibly stops to fully seat the valve.

10. System pressure may fluctuate during the first heat demand(s). If required, briefly reopen the manual filling valve (and/or purge valve) to adjust the pressure back to 20 psi (see **3.5.6 Maintaining Appliance pressure in Forced Air-only applications**).

3.6 Connecting a CH system (optional)

When connecting a hydronic heating loop, refer to the **TRX manual (Part 4)** for specific instructions, while bearing in mind that some aspects will differ for the GF150, specifically:

C. Expansion Tank

- A small tank is provided inside the TRX supplied with the GF150. However, for larger hydronic installations, a supplementary tank will likely be required.

D. Piping the Boiler

- Given that the TRX is pre-installed onto the GF150 chassis, the diagram shown in this sub-section (D.) may be disregarded, insofar as pipes are concerned.

G. CH and DHW Pressure Relief Valves (PRVs)

- While the general information regarding CH PRVs remains accurate, the maximum DHW pressure rating for the GF150 is 150 PSI. Do NOT install a PRV with a higher pressure rating.

J. Applications

While the general information on hydronic applications remains accurate, the diagrams no longer reflect the plumbing layout within the GF150.

- The following plumbing diagrams are examples of typical GF150 installations with hydronic loops.

CAUTION

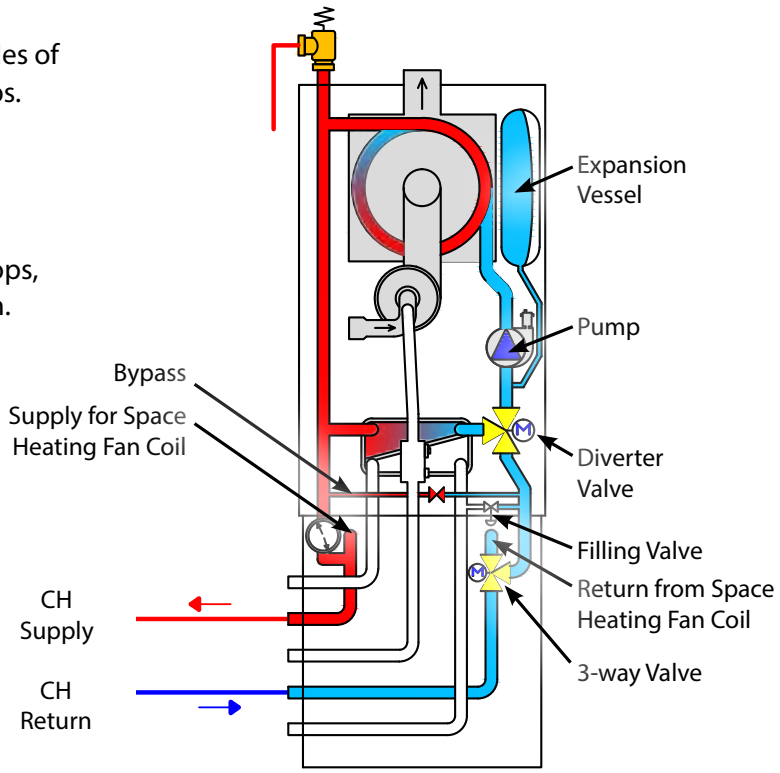
- When including *low-temperature* hydronic loops, a mixing valve is **required** for their protection.

K. Load balancing

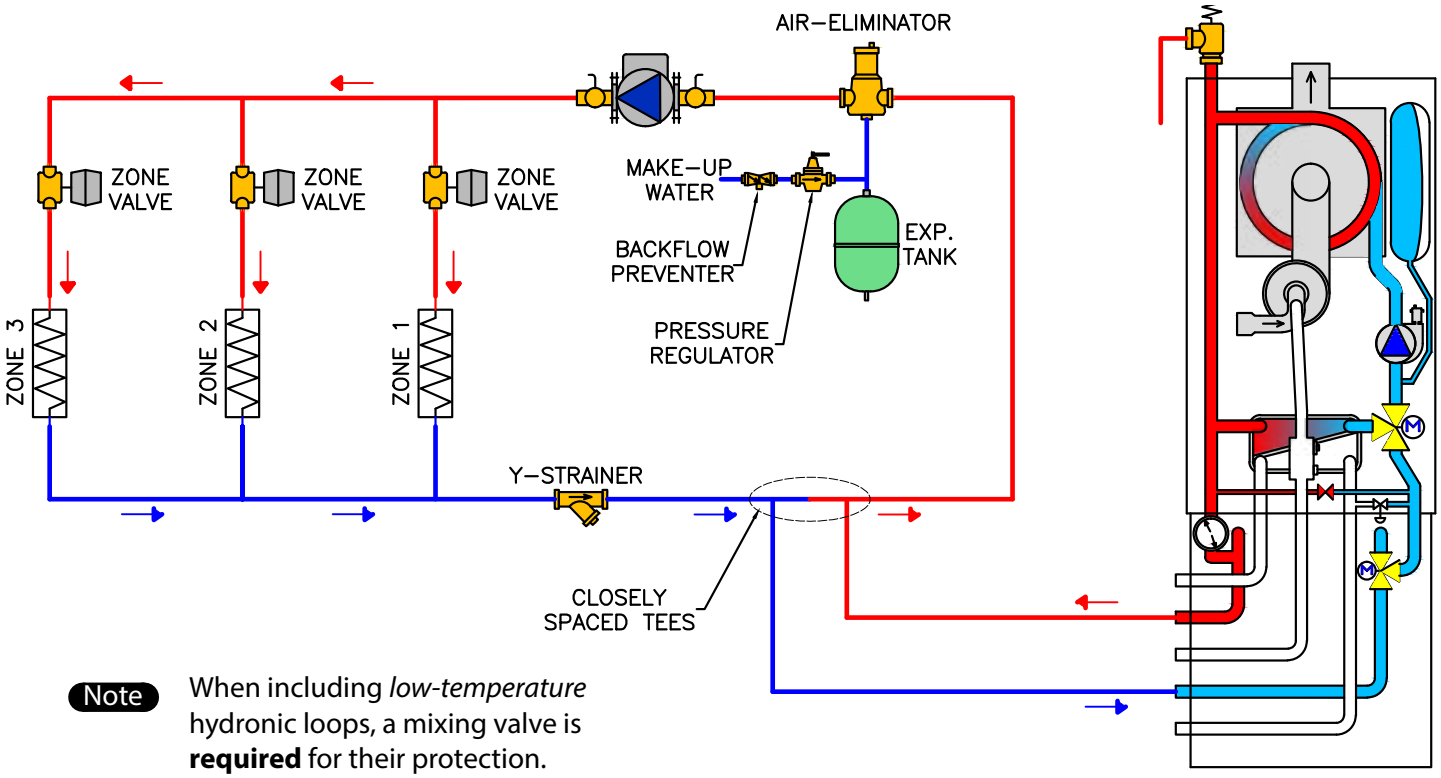
While the GF150 is able to supply both its internal forced-air coil and an external hydronic load simultaneously, the internal piping (and pump) are still subject to proportional flow.

It is recommended that some means of load balancing (e.g. load valve) be incorporated into the external hydronic loop, to be adjusted by the installer during commissioning.

In the absence of such means, a heavily imbalanced load pairing (e.g. a low-loss header / primary loop) could significantly limit the pumped flow through the coil during simultaneous hydronic and forced air demands, resulting in dimished heat output from the fan coil.

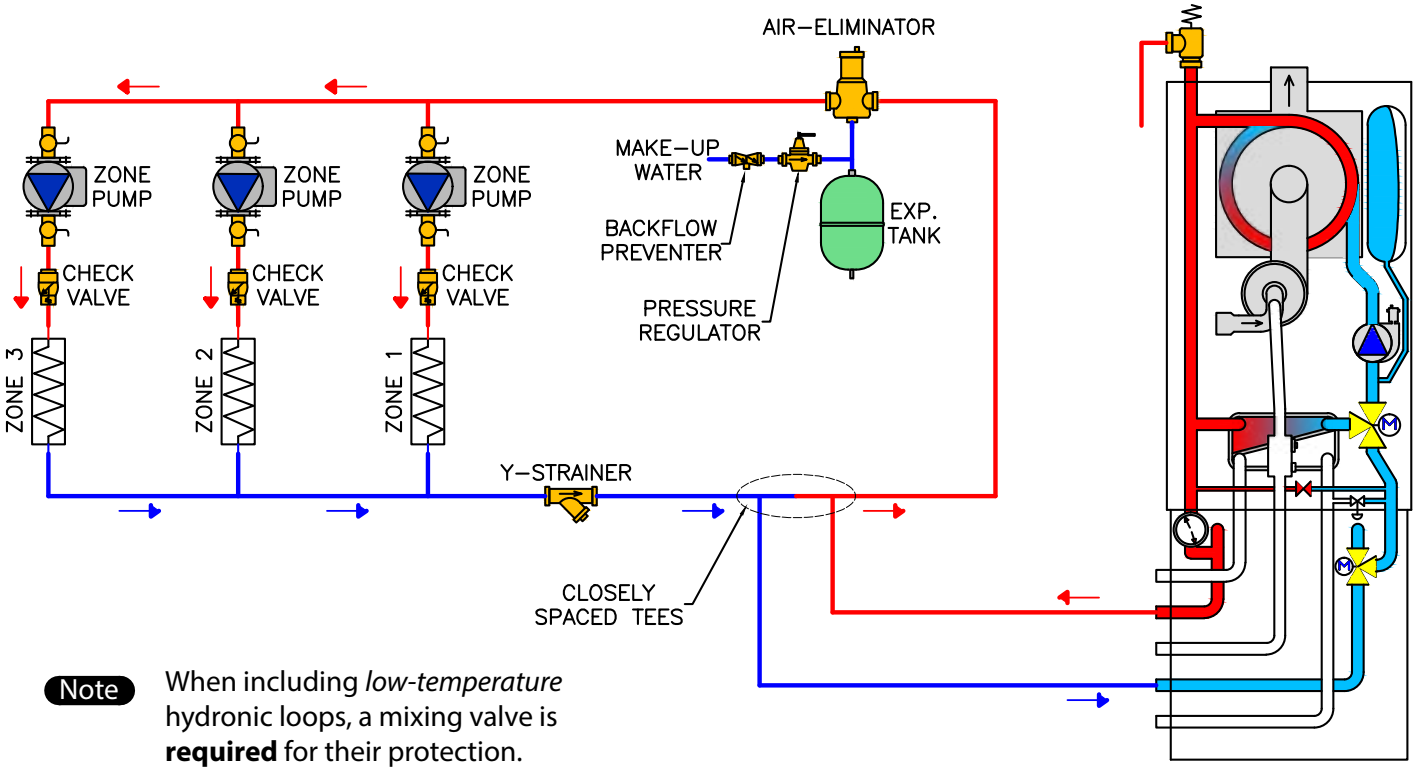


GF150 with Single Central Heating Circulator:



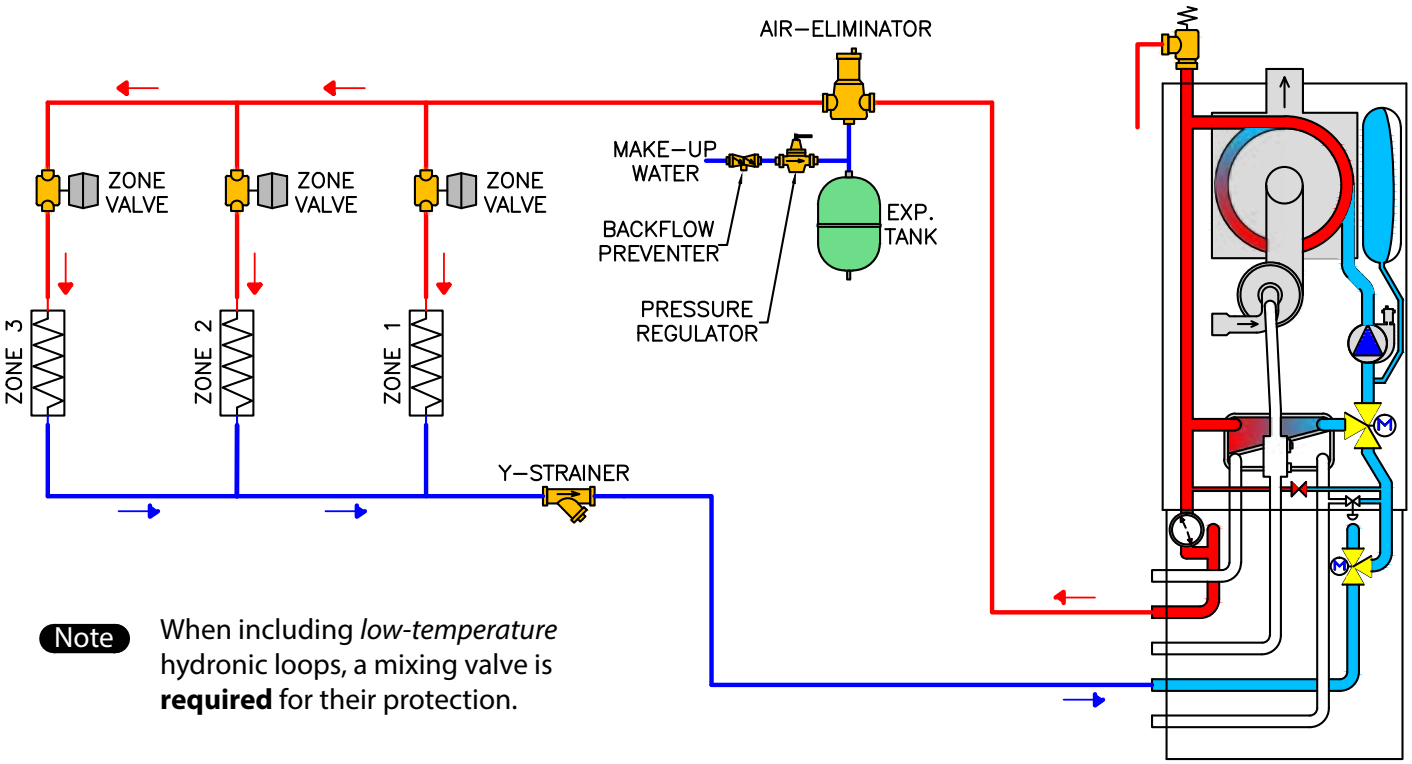
Note When including *low-temperature* hydronic loops, a mixing valve is **required** for their protection.

GF150 with Multiple Central Heating Circulators:



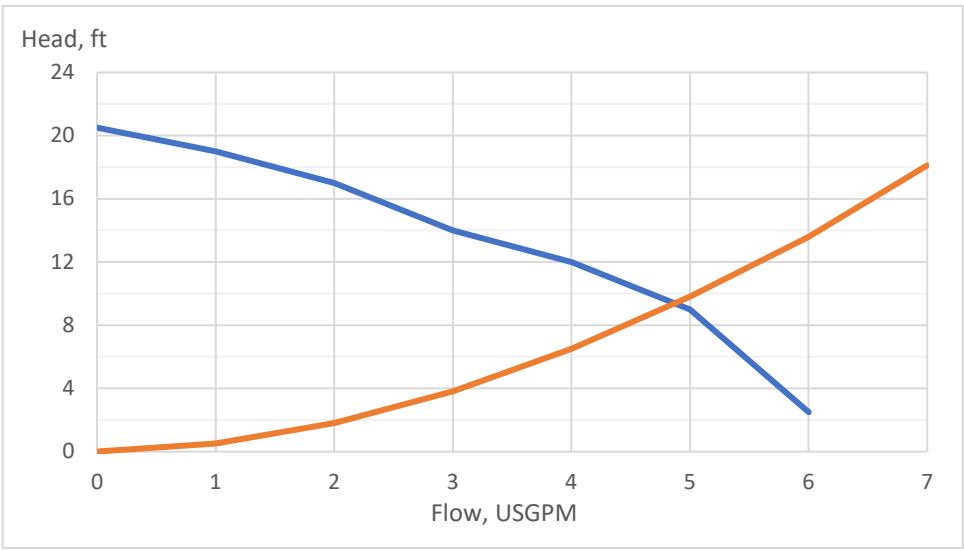
Note When including *low-temperature* hydronic loops, a mixing valve is **required** for their protection.

GF150 without Central Heating Circulator:



Note When including *low-temperature* hydronic loops, a mixing valve is **required** for their protection.

Graph representing available built-in pump head and forced-air heating coil pressure drop:



3.7 Venting the Appliance

For detailed instructions on venting the appliance, see the relevant section in the boiler installation manual (supplied).

The GF150 is heated by a TRX150C combi boiler, itself a CSA-certified heating appliance.

As such, any GF150 installation must abide by any applicable directions in the TRX150C boiler installation manual (supplied).

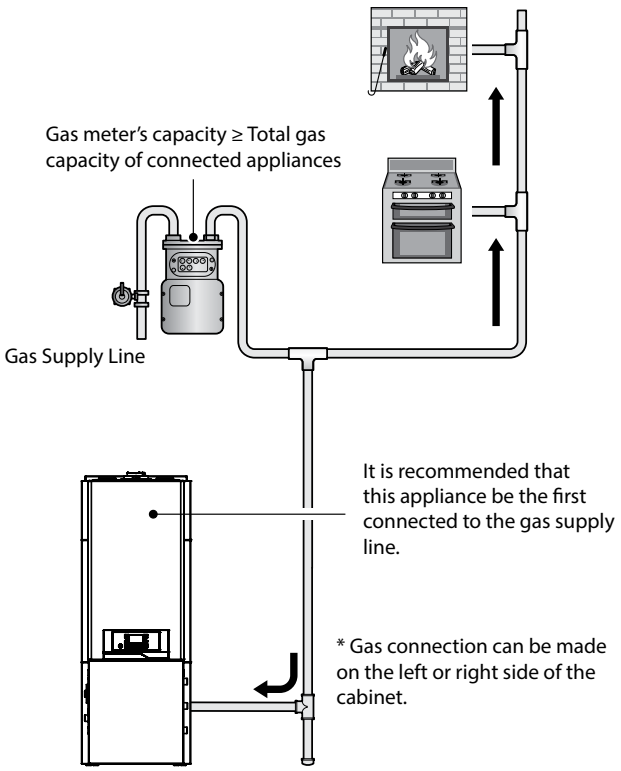
In particular, the instructions pertaining to venting the appliance (Part 5) are applicable in their entirety.

Please review this section before proceeding with the installation.

3.8 Connecting the Gas Supply

WARNING

- Before connecting the gas supply, determine the gas type and pressure for the appliance by referring to the rating plate. Use only the same gas type indicated on the rating plate. Using a different gas type will result in abnormal combustion and malfunction of the appliance. Gas supplies should be connected by a licensed professional only.
- The appliance and its gas connection must be leak tested before placing it in operation.
- This appliance cannot be converted from natural gas to propane or vice versa without a gas conversion kit. Do not attempt a field conversion of this appliance without a gas conversion kit. Doing so will result in dangerous operating conditions and will void the warranty.
- For gas conversion instructions, refer to relevant sections of the boiler installation manual (supplied).



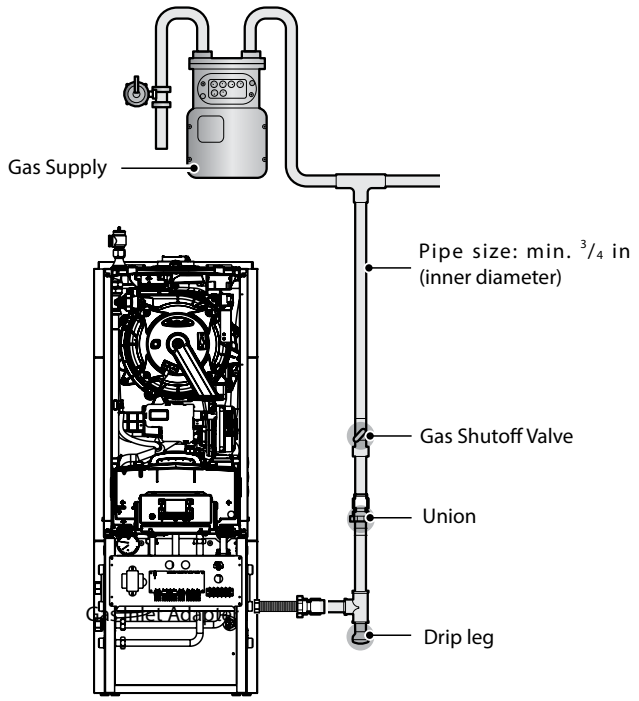
For detailed instructions on conecting the gas supply to the appliance, see the relevant section in the boiler installation manual (supplied).

The GF150 is heated by a TRX150C combi boiler, itself a CSA-certified heating appliance.
As such, any GF150 installation must abide by any applicable directions in the TRX150C boiler installation manual (supplied).
In particular, the instructions pertaining to the Gas Connections (Part 8) are applicable in their entirety, save for specific details regarding the 'gas adapter' (B.1.)

Please review this section before proceeding with the installation.

To connect the gas supply:

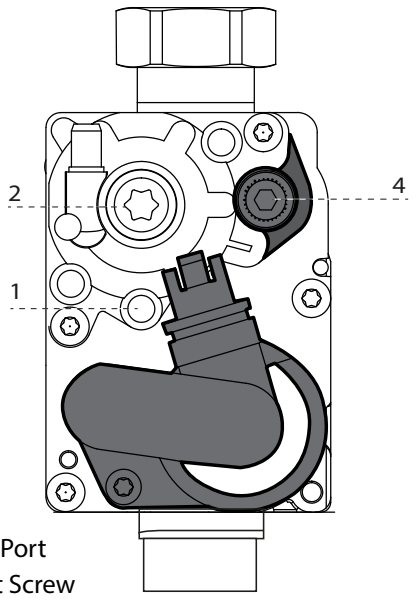
1. Determine the gas type and pressure for the appliance by referring to the rating plate.
2. Perform a pressure test on the main gas supply line. For detailed instrustions to measure the inlet gas pressure, see the relevant section in the boiler installation manual (supplied).
3. Purge the gas line of any debris.
4. Determine the proper size and type for the gas line (use Local or National Gas Codes).
5. Install full port valves on the gas supply line and appliance.
6. Connect the gas supply line.
7. Test the supply line, all connection points, and the appliance for gas leaks.
8. Use a manometer to test the gas pressure to make sure it meets the minimum standards and does not exceed the maximum standards of the boiler.
9. Do not operate the boiler until all connections have been completed and the heat exchanger is filled with water.
10. Check the inlet gas pressure reading on the manometer as shown below.
11. If readings are out of range: adjust the inlet gas pressure regulator.



Note

- Tighten the appliance connection fittings with care to avoid damage.
- It is recommended that a union be installed on the gas supply line close to the appliance, to facilitate any future maintenance or service.

Gas Valve Detail:



1. Line Pressure Test Port
2. Offset Adjustment Screw
4. Throttle Adjustment Screw

Recommended Gas Pressure Settings:

NG: 3.5" – 10.5" w.c.
LP: 8.0" – 13.0" w.c.

3.9 Connecting the Electrical

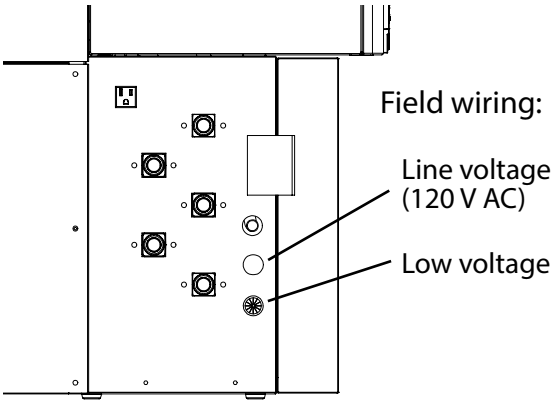
WARNING

Improperly connecting the power supply can result in electrical shock and electrocution. Follow all applicable electrical codes of the local authority having jurisdiction. In the absence of such requirements, follow the latest edition of the National Electrical Code (NFPA 70) in the USA or the latest edition of CSA C22.1 Canadian Electrical Code Part 1 in Canada. Connecting the power supply should be performed only by a licensed professional.

When connecting the power supply, follow these guidelines:

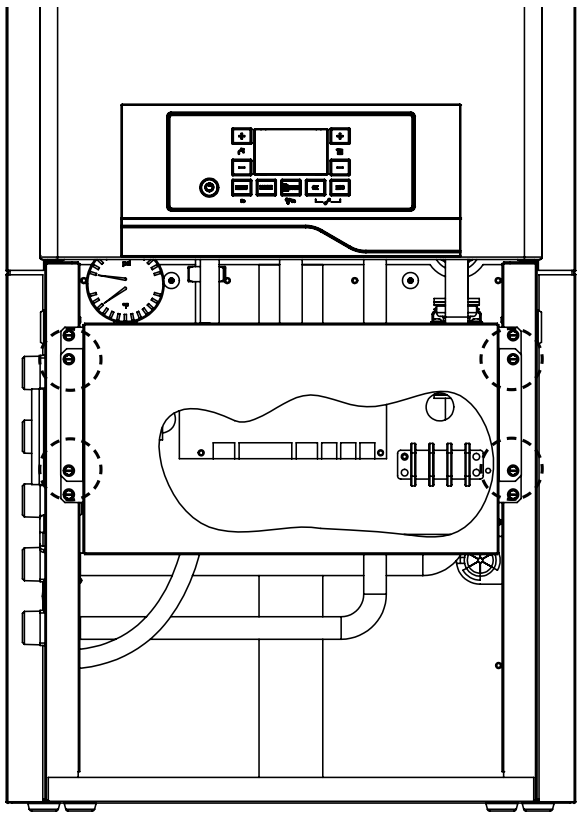
- Do not connect the electric supply until all plumbing and gas piping is complete and the appliance has been filled with water.
- Do not connect the appliance to a 220-240 V AC power supply. Doing so will damage the appliance and void the warranty.
- This appliance must be wired directly. It is recommended that a power switch be installed between the breaker and the appliance to facilitate end-user maintenance and servicing.
- Connect the appliance to a 110-120 V AC circuit at 60 Hz, with a minimum circuit ampacity (MCA) of 15 A, and a maximum circuit breaker size of 15 A, as per the rating plate.
- Ensure that the appliance is electrically grounded via the GND circuit on the barrier strip. Do not attach the ground wire to either the gas or the water piping as plastic pipe or dielectric unions may prevent proper grounding.
- If there is a power failure in cold weather areas, the freeze prevention system in the appliance will not operate and may result in freezing of the heat exchanger and or coil. In cold weather areas where power failures are common, you must completely drain the appliance to prevent damage if the power will be off for any extended period of time. A battery back-up (available at most computer retailers) may be used to supply hot water during periods of power outages. Damage caused by freezing is not covered under warranty.

A 7/8" (0.875 in.) panel hole is provided on each side of the cabinet for mechanical strain relief of the power supply wiring (see "Line Voltage" in the following diagram):



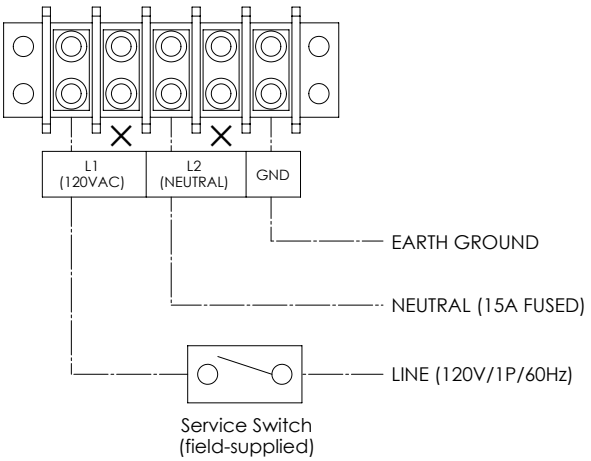
All low-voltage wiring is intended to pass through the grommet below the line voltage panel hole on either side of the cabinet.

The Field Wiring Panel is located behind a steel safety cover (shown in cutaway below), held in place by four (4) screws (circled below). Grommet-lined holes are provided at the base of this panel for routing field wiring.



3.9.1 Connecting the line voltage wiring

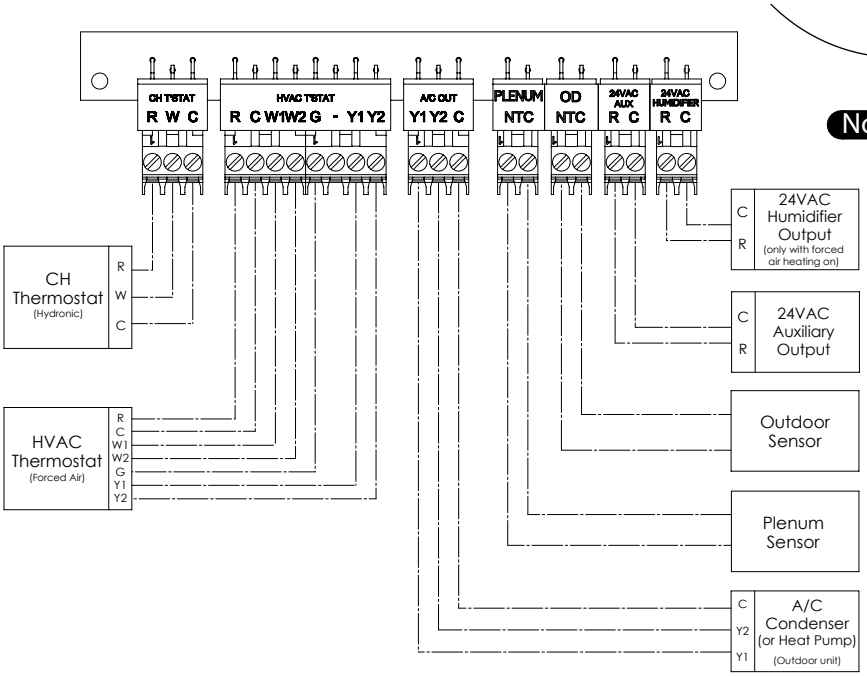
When connecting the power supply wires to the Field Wiring Panel, use positions 1, 3, and 5 for Line, Neutral, and Ground, respectively, leaving a gap between each wire:



3.9.2 Connecting the low-voltage wiring

Thermostat:

The GF150 is capable of simultaneous hydronic (in-floor, baseboard, etc.) *and* forced air heating. Connect the thermostat(s) to the terminal blocks on the PCB as shown in the diagram below:



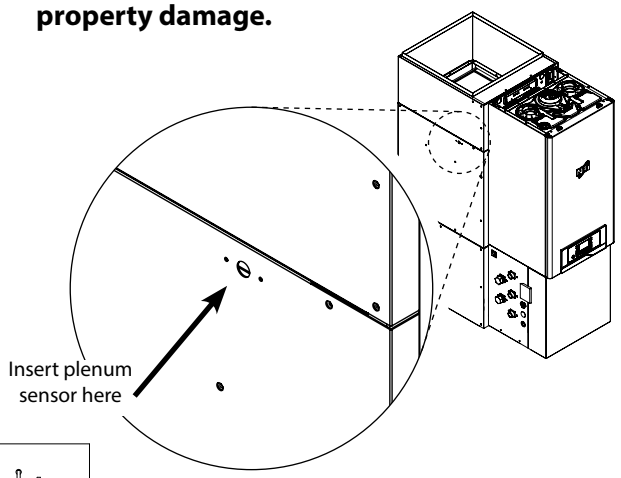
Freeze protection:

The GF150 protects its heating coil from freezing by only allowing the A/C (or HP) system's condenser (outdoor unit) to run when the plenum temperature is safely above freezing.

As such, when wiring the cooling system, it is **imperative** that:

1. The outdoor unit be wired to the 'A/C OUT' (**Y1 Y2 C)** terminal block
2. The plenum sensor (supplied in Kit Box) be installed correctly:
   - Affix plenum sensor to either side of cabinet (remove grommet and re-use screws)
   - Wire to Plenum Sensor input (labeled 'PLENUM NTC' on field wiring side of PCB)

Failure to do so correctly may void the warranty and could cause significant property damage.



Note

When connecting a Heat Pump, the ourdoor unit is to be wired as one would an A/C Condenser.

The " - " terminal on the HVAC T'STAT block provides a non-connected landing point for the O/B wire.

3.10 Configuring the Appliance

For detailed instructions on the boiler control interface (HMI), see the relevant section (Part 9) in the boiler installation manual (supplied).

Please review this section before proceeding with the installation.

These last few steps will finalize the installation, and set-up the GF150 to provide heating, cooling, and DHW.

3.10.1 Selecting a Forced Air Heating Mode

With the AUTO Function Enabled (2.2.4 = 1), one may choose from three modes of Automatic Temperature Control:

- Basic [4.2.1 = 1]:
  Adjusts set point as duration of demand increases
- Outdoor Reset [4.2.1 = 3]:
  Adjusts set point based on outdoor temperature along defined reset curve.
- Fixed Outlet Temperature [4.2.1 = 0]:
  Simply operates at a fixed temperature.

3.10.2 Setting the Set Point Temp. range

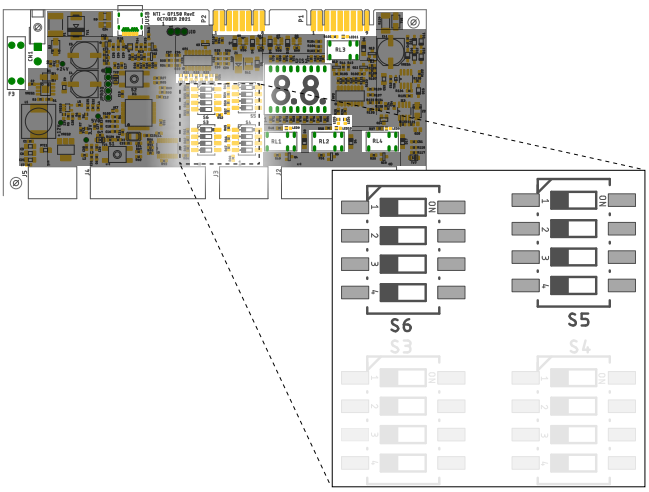
The various modes above affect how the target set point is *calculated*, but the GF150 allows the installer to dictate the Maximum [4.2.5] and Minimum [4.2.6] set points the boiler will supply to the space heating coil (Zone 1).

Par.	Range	Default	Description
4.2.5	86 – 179°F	160°F	MAXIMUM Temp. Setting
4.2.6	86 – 179°F	115°F	MINIMUM Temp. Setting

This, along with setting the Blower Rate limits, allows the installer to effectively control the range of heat output from the forced air heating system.

3.10.3 Setting the Blower Parameters – Forced Air Heating Mode

The installer dictates the Max. and Min. blower flow rates during Forced Air Heating Mode using the DIP switches on the GF150 PCB (see next pages).



DIP Switch	Range (CFM)	Default	Description
S6-2, -3, -4	*300* – 800	500	MINIMUM Blower Rate
S6-1 S5-3, -4	*500* – 1200	1000	MAXIMUM Blower Rate

With these ranges set, the blower will run proportionally to the current supply temperature, relative to their respective ranges.

For example, using the factory default values:

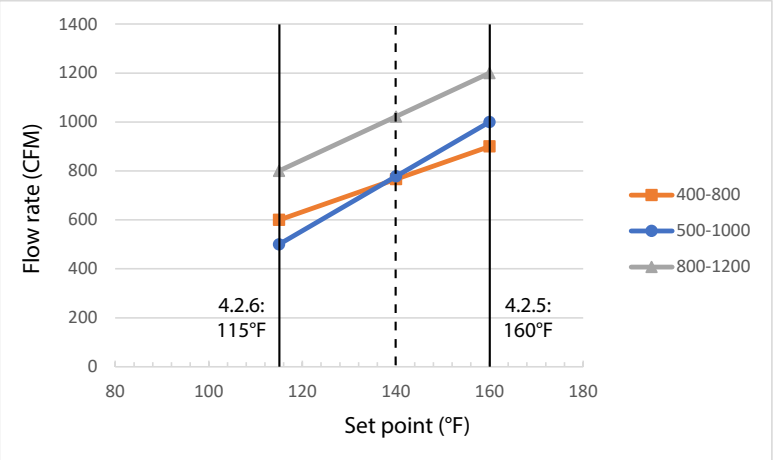
(4.2.5 = 160°F; 4.2.6 = 115°F)
(Max. = 1000 CFM; Min. = 500 CFM)

If the boiler set point were set/calculated to be 140°F, the blower would be set to ~778 CFM, which would appear as 52 on the red LED display:

Set point: 115 -----> 140 ----> 160°F
% of range: 0 -----> 56 ----> 100%
Flow Rate: 500 -----> 778 ----> 1000 CFM
PWM: 0 -----> 52 ----> 100

As the boiler modulates its set point through the permitted range (per the chosen mode of Automatic Temperature Control), the blower will adjust the deliverd CFM accordingly.

This chart shows how adjusting the Max. and Mix. blower rate values can affect the resulting flow rate for a given set point (and set point range).



This table shows approximate heat output and supply air temperatures for a given combination of water temperatures and air flow rates.

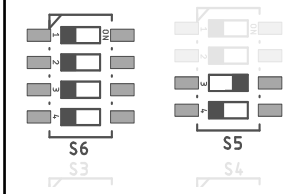
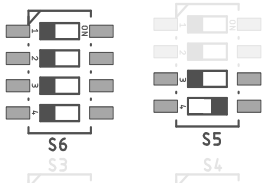
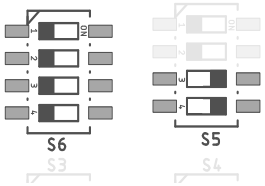
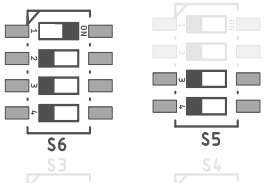
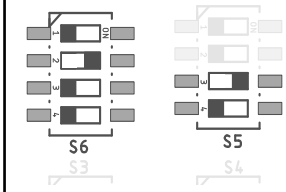
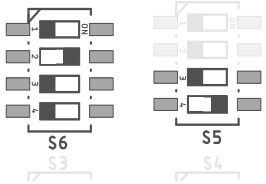
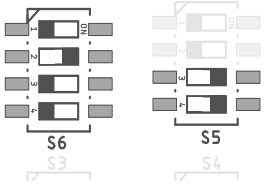
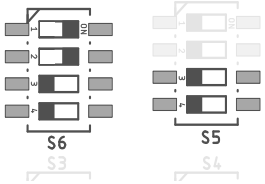
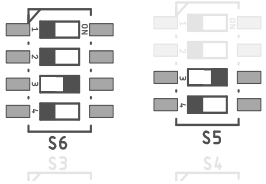
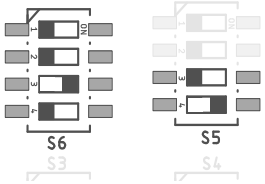
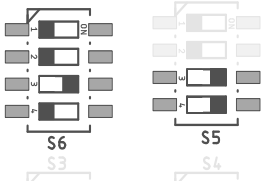
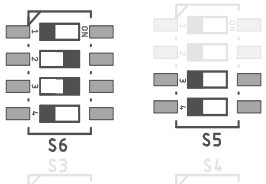
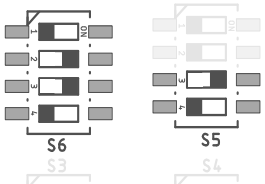
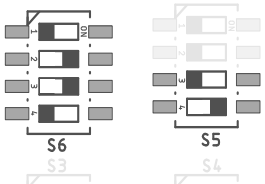
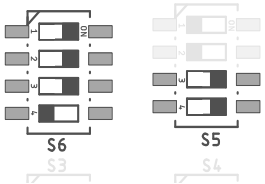
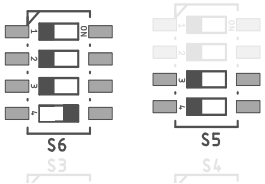
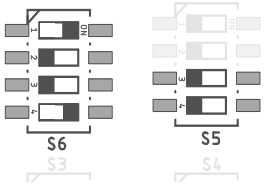
Those combinations whose figures are ~~struck through~~ are not recommened due to the likelihood of over-heating or short-cycling the burner.

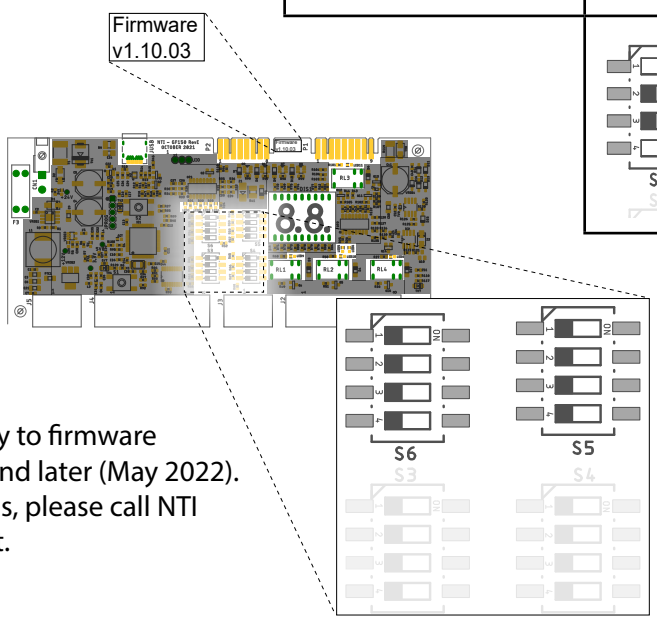
Those combinations in *italics* are discouraged for reasons of comfort.

Approximate heat output (BTU/hr) and Supply air temp. (°F)											
		Blower flow rate (CFM)									
		300	**400**	**500**	**600**	**700**	**800**	**900**	**1000**	**1100**	**1200**
Supply water temp. (°F)	**180**	~~30,800 166~~	~~39,200 161~~	~~46,900 158~~	54,000 154	60,600 151	66,800 148	72,500 145	77,900 142	82,900 140	87,600 138
	170	~~28,000 157~~	35,600 153	42,600 149	49,100 146	55,100 143	60,600 140	65,800 138	70,700 136	75,200 134	79,500 132
	160	25,100 148	32,000 145	38,300 141	44,100 138	49,500 136	54,500 133	59,100 131	63,500 129	67,600 127	71,500 125
	150	22,300 139	28,400 136	34,000 133	39,200 131	43,900 128	48,400 126	52,500 124	56,400 122	60,000 121	63,400 119
	140	19,500 131	24,900 128	29,700 125	34,200 123	38,400 121	42,200 119	45,800 117	49,200 116	52,400 114	55,400 113
	130	16,700 122	21,300 119	25,400 117	29,300 115	32,800 114	36,100 112	39,200 110	42,100 109	44,800 108	47,300 107
	120	13,900 113	17,700 111	21,200 109	24,400 108	27,300 106	30,000 105	*32,600 103*	*35,000 102*	*37,200 101*	*39,400 100*
	110	~~*11,100 104*~~	*14,100 103*	*16,900 101*	*19,400 100*	*21,800 99*	*24,000 98*	*26,000 97*	*27,900 96*	*29,700 95*	*31,400 94*
	100	~~*8,300 96*~~	~~*10,600 94*~~	~~*12,600 93*~~	*14,500 92*	*16,300 91*	*17,900 91*	*19,500 90*	*20,900 89*	*22,200 88*	*23,500 88*

Maximum Blower Rate (CFM)

Minimum Blower Rate (CFM)

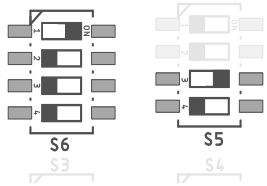
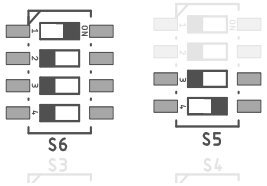
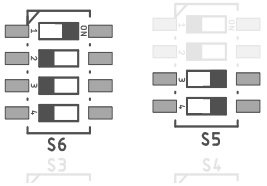
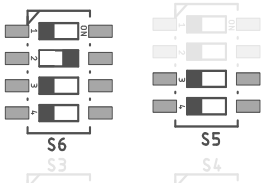
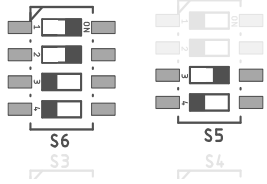
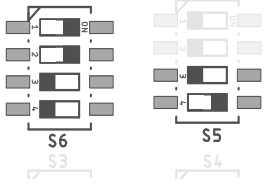
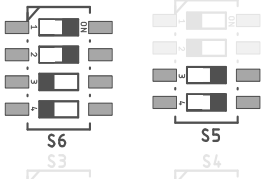
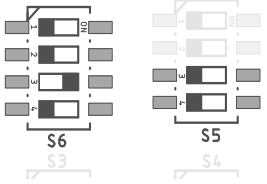
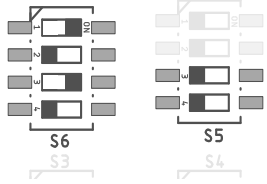
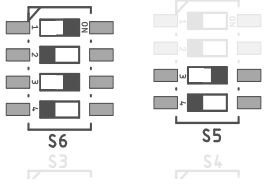
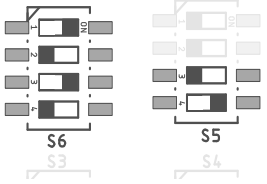
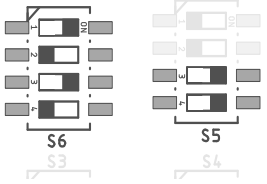
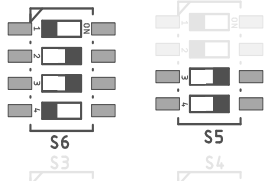
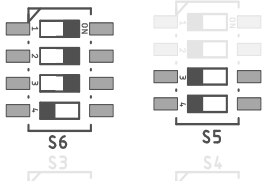
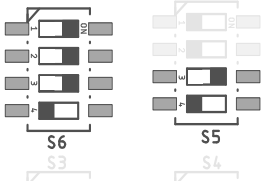
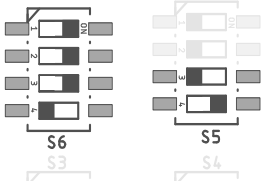
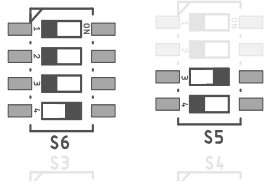
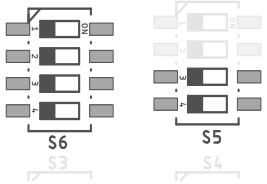
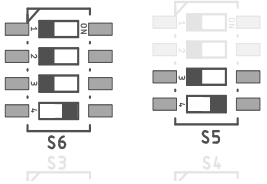
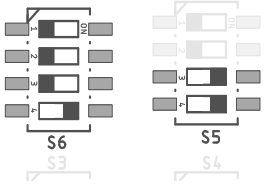
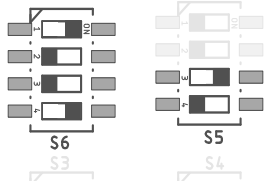
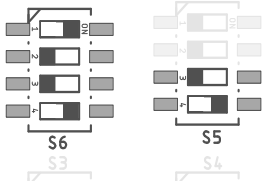
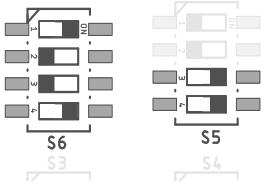
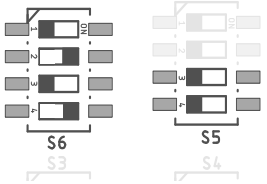
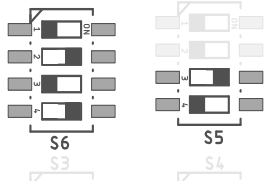
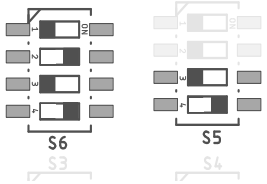
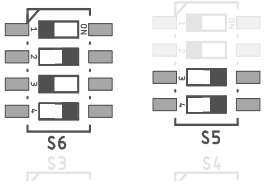
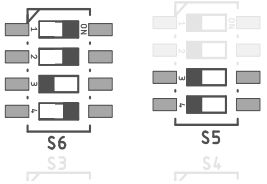
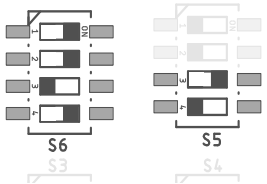
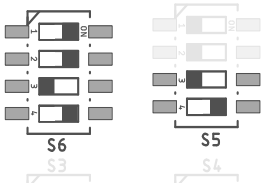
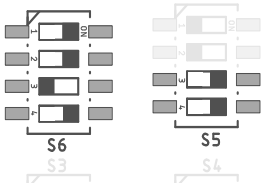
Minimum Blower Rate (CFM)	500	600	700	800	
300					300
350					350
400					400
450					450
					500
					600



Note These tables apply to firmware versions 1.10.03 and later (May 2022). For earlier versions, please call NTI Technical Support.

Maximum Blower Rate (CFM)

Minimum Blower Rate (CFM)

	900	*1000*	1100	1200	
300					300
350					350
400					400
450					450
500					*500*
600					600
700					700
800					800

At the end of a heat demand cycle, the blower will continue to operate for a brief period to extract residual heat from the coil. Two DIP switches (S5-1, S5-2) control the duration of this period (0 – 90 s).

3.10.4 Setting the Blower Parameters – Cooling and Ventilation Mode

The GF150 is compatible with up to 3 tons of cooling (or heat pump) capacity.

In order to set the DIP swicthes (see facing page) to match the application:

1. Select the nominal/nameplate tonnage for the system.
   - Note: if a 1-ton, single-stage system is installed, simply select the '**1.5 ton**' option, but use only the '**Y1**' terminal.
2. Select the desired adjustment for local climactic conditions (e.g. +7.5% for dry/arid conditions; -7.5 or 15% for humid conditions).
3. Select the desired ventialtion flow rate (as a % of the nominal Y2 rate)

For example, using the factory default values:
(1.5 tons = 600 @ Y2; Normal (0%) adjustment;
Ventilation (G) = 28% of Y2 CFM)

If the HVAC thermostat were to initiate a cooling demand (beginning with Y1, assuming a 2-stage system), the blower would be set to 420 CFM, which would appear as 28 on the red LED display:

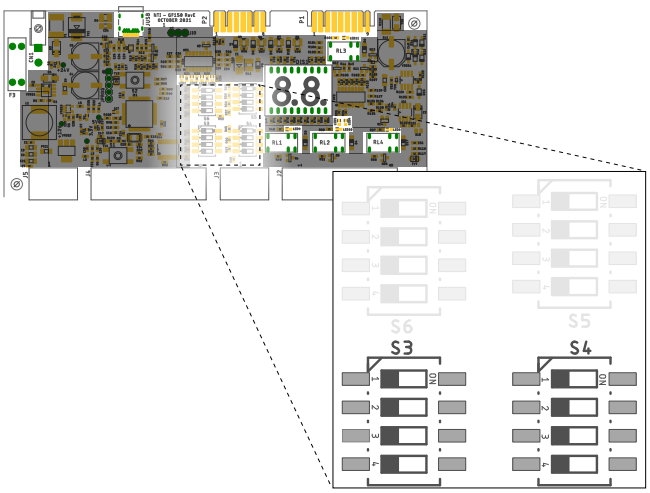
Flow Rate: 420 CFM
PWM: 0 ---> 28 ------> 100

If the thermostat were to initiate a Y2 demand, the blower would be set to 420 CFM, which would appear as 40 on the red LED display:

Flow Rate: 600 CFM
PWM: 0 ----> 40 -----> 100

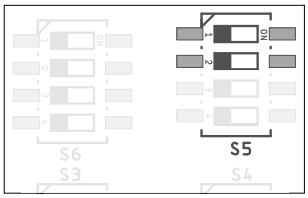
If the thermostat were to initiate a ventilation (G) demand, the blower would be set to 168 CFM, which would appear as 11 on the red LED display:

G = Y2 CFM × 28%
600 × 0.28
Flow Rate: 168 CFM
PWM: 0 -> 11 --------> 100

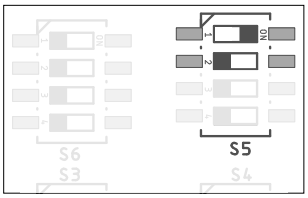


Blower-off Delay

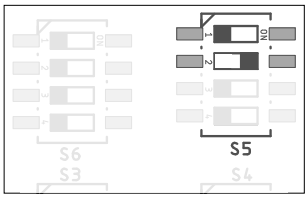
0 s



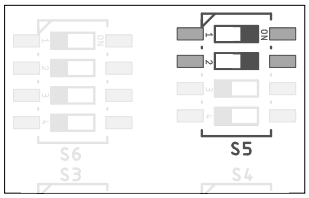
30 s



60 s



90 s



3.10.4 Blower Parameters – Cooling and Ventilation Modes

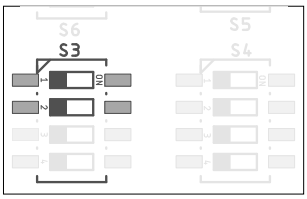
Cooling (Y1/Y2)

	1.5 ton	2 ton	2.5 ton	3 ton
CFM (@ Y2)	*600*	800	1000	1200
CFM (@ Y1)	*420*	560	700	840
S3-1	*OFF*	ON	OFF	ON
S3-2	*OFF*	OFF	ON	ON

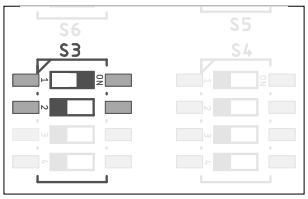
Cooling Adjustment

		Adjustment (%)			
		+ 7.5%	***Normal***	**- 7.5%**	**- 15%**
CFM (@ Y2)	**1.5 ton**	645	*600*	555	510
	2 ton	860	*800*	740	680
	2.5 ton	1075	*1000*	925	850
	3 ton	1290	*1200*	1110	1020
S4-3		ON	*OFF*	ON	OFF
S4-4		ON	*OFF*	OFF	ON

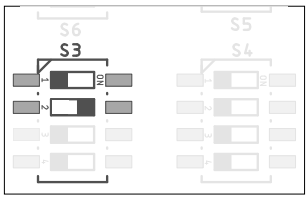
1.5 ton



2 ton



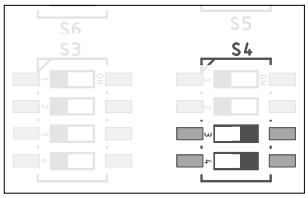
2.5 ton



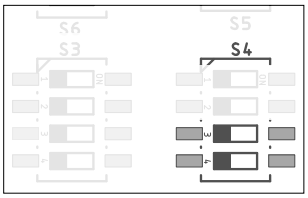
3 ton



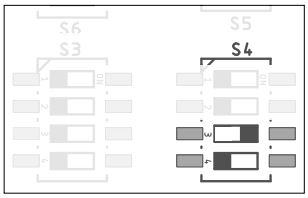
+ 7.5%



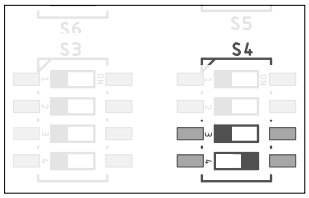
Normal



- 7.5%

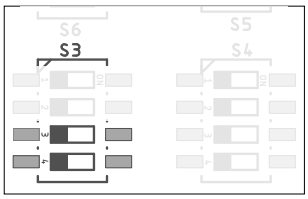


- 15%

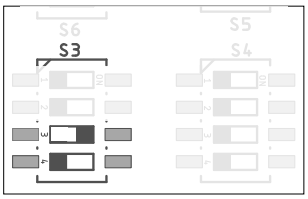


Ventilation (G)
(% of CFM @ Y2)

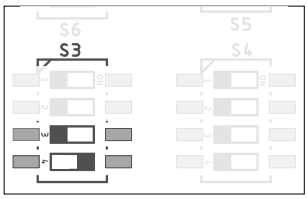
28%



38%



70%

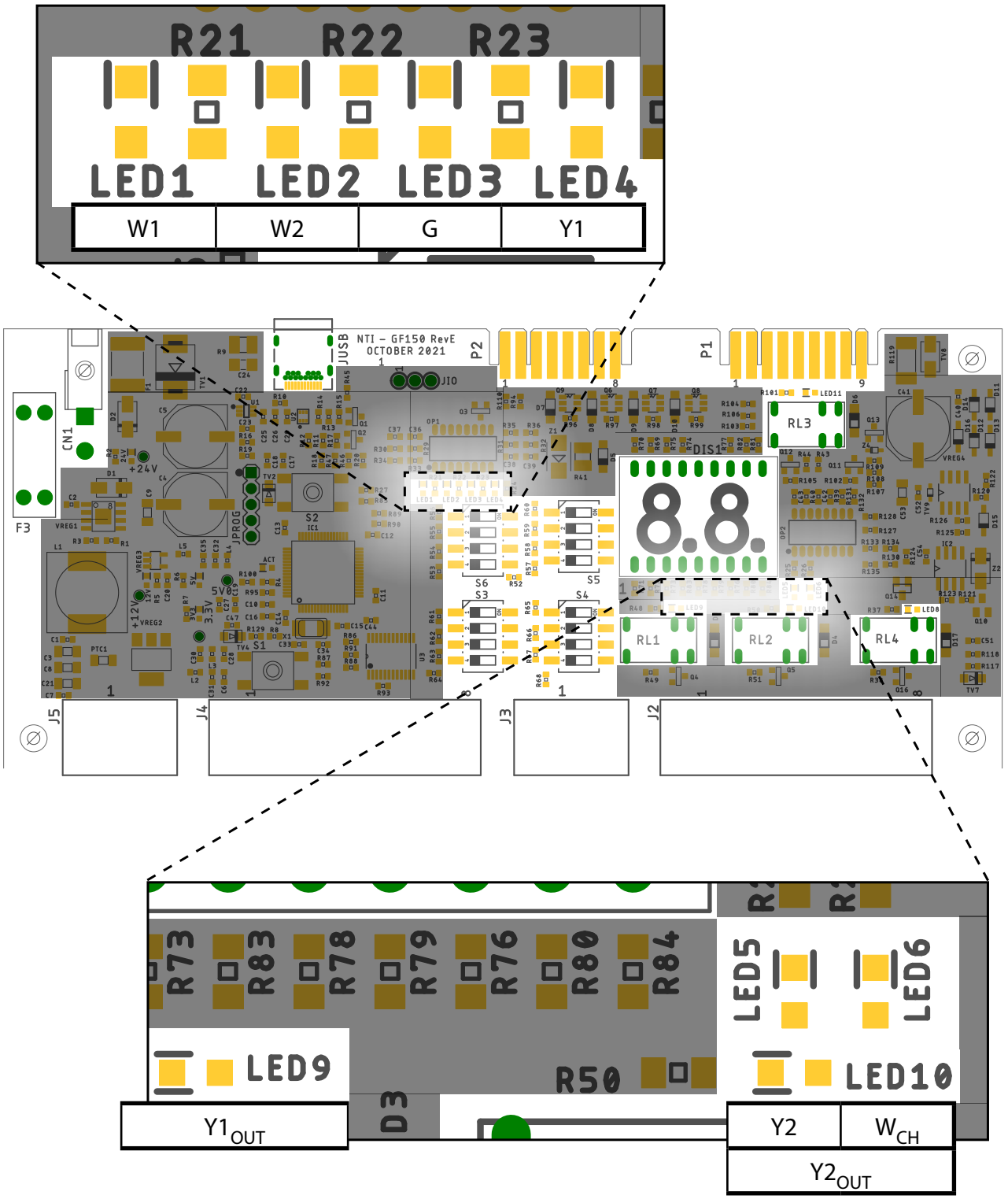


100%

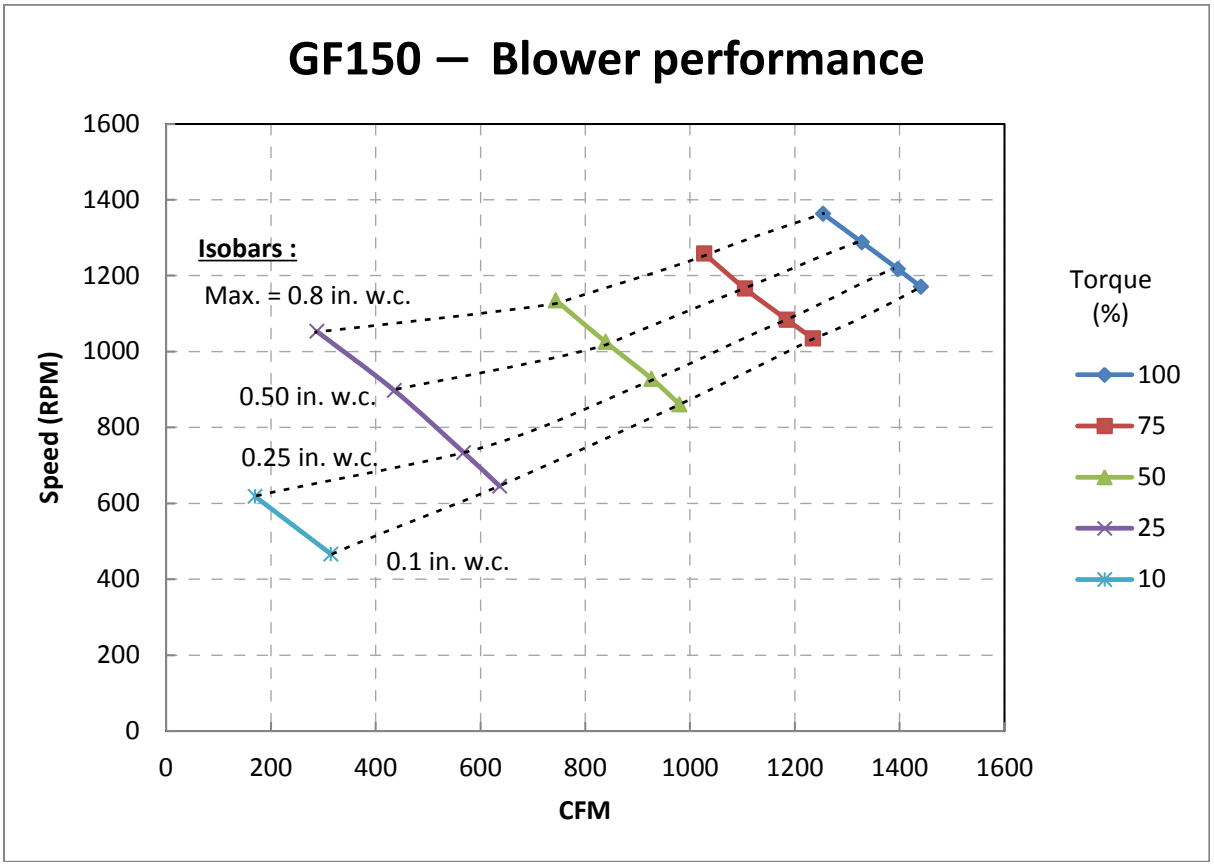


4. Appendices

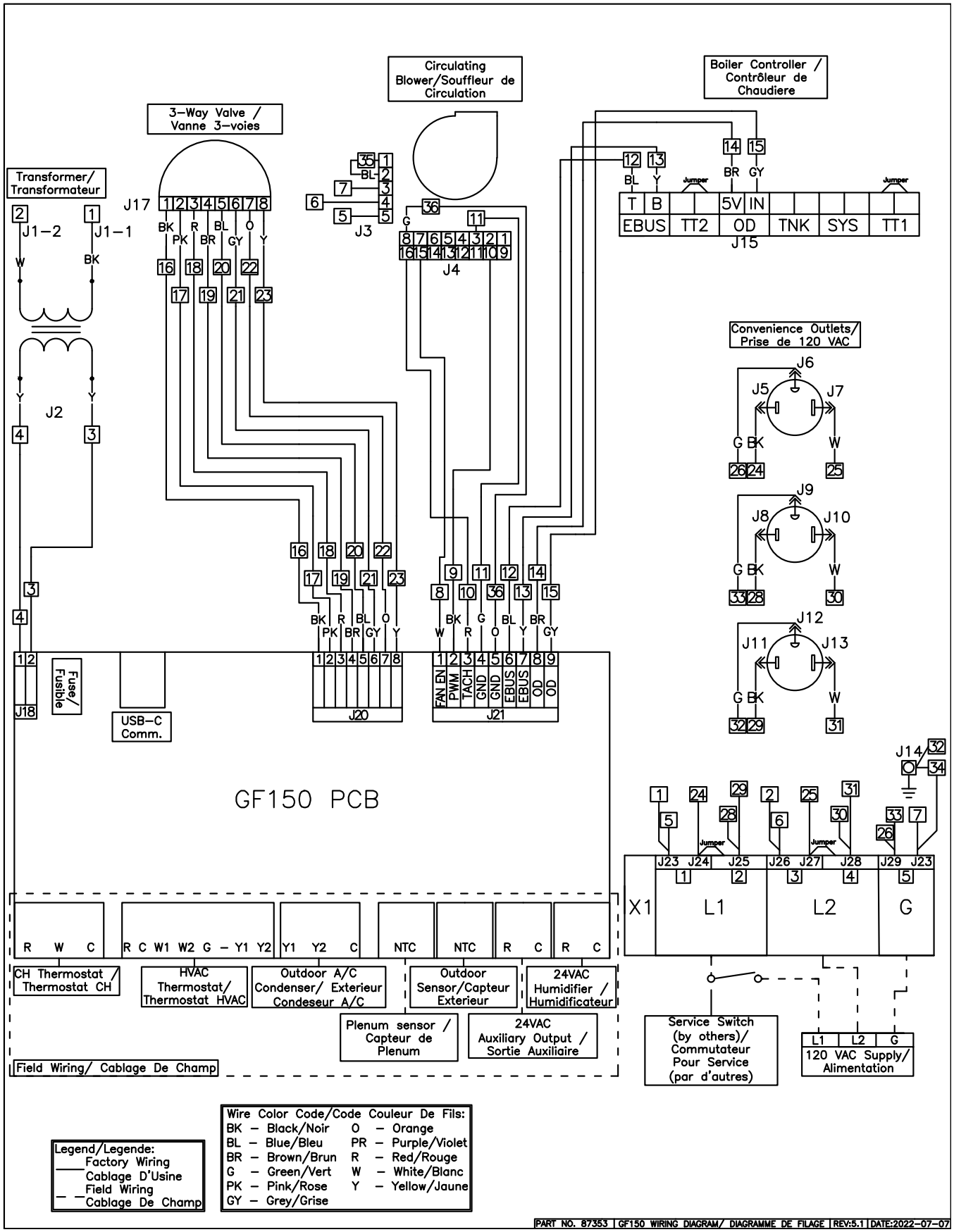
4.1 PCB I/O LEDs

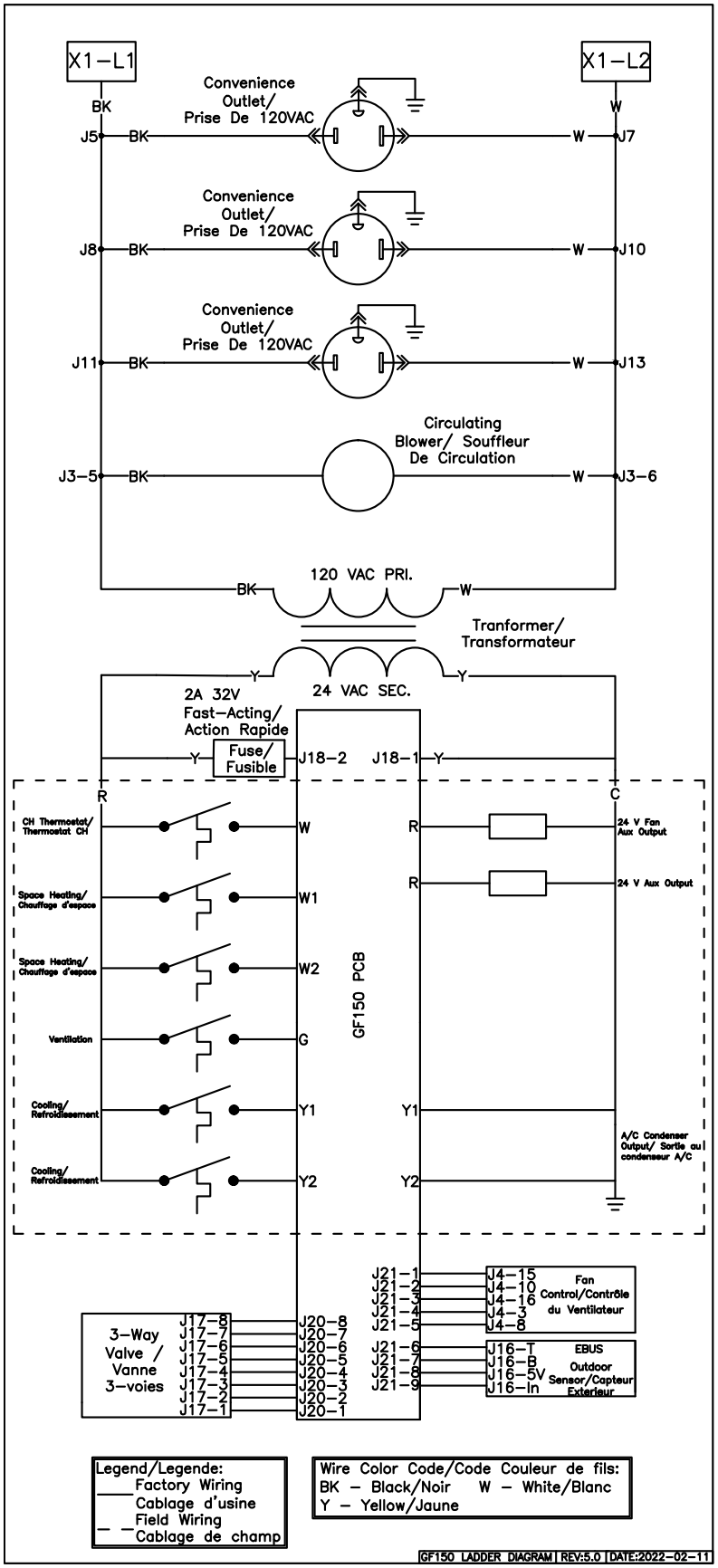


4.2 Blower Performance

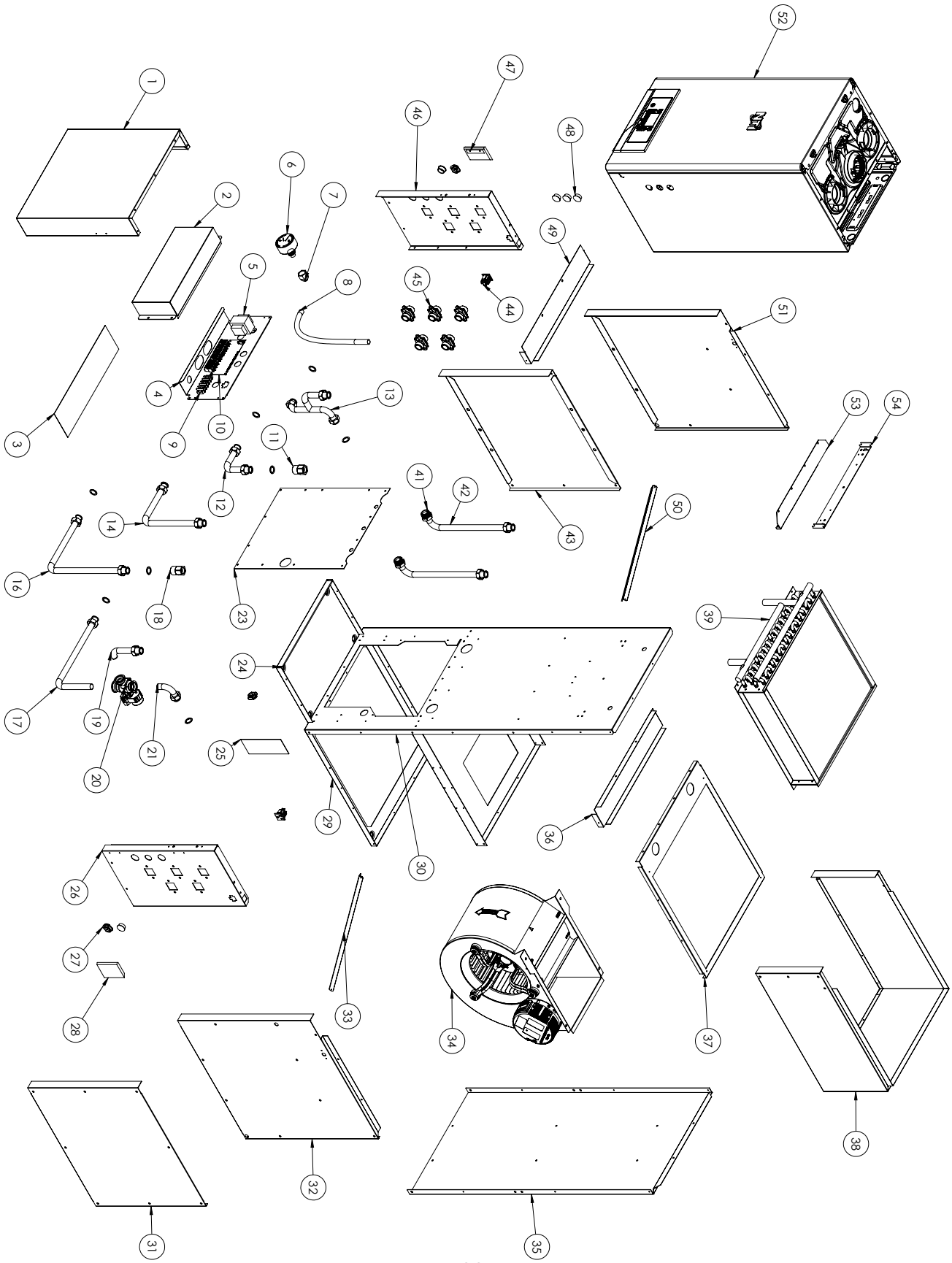


4.3 Electrical Diagrams




X1–L1
X1–L2
BK
W
Convenience Outlet/ Prise De 120VAC
J5
J7
J8
J10
J11
J13
Circulating Blower/ Souffleur De Circulation
J3–5
J3–6
120 VAC PRI.
Tranformer/ Transformateur
24 VAC SEC.
2A 32V Fast–Acting/ Action Rapide
Fuse/ Fusible
J18–2
J18–1
R
C
CH Thermostat/ Thermostat CH
Space Heating/ Chauffage d'espace
Space Heating/ Chauffage d'espace
Ventilation
Cooling/ Refroidissement
Cooling/ Refroidissement
W
W1
W2
G
Y1
Y2
24 V Fan Aux Output
24 V Aux Output
A/C Condenser Output/ Sortie au condenseur A/C
GF150 PCB
3–Way Valve / Vanne 3–voies
J17–8
J17–7
J17–6
J17–5
J17–4
J17–3
J17–2
J17–1
J20–8
J20–7
J20–6
J20–5
J20–4
J20–3
J20–2
J20–1
J21–1
J21–2
J21–3
J21–4
J21–5
J21–6
J21–7
J21–8
J21–9
J4–15
J4–10
J4–16
J4–3
J4–8
Fan Control/Contrôle du Ventilateur
J16–T
J16–B
J16–5V
J16–in
EBUS Outdoor Sensor/Capteur Exterieur
Legend/Legende:
Factory Wiring
Cablage d'usine
Field Wiring
Cablage de champ
Wire Color Code/Code Couleur de fils:
BK – Black/Noir W – White/Blanc
Y – Yellow/Jaune
GF150 LADDER DIAGRAM | REV:5.0 | DATE:2022–02–11

4.4 Component Diagrams and Parts Lists



#	Description	Part #	#	Description	Part #	#	Description	Part #
1	Plumbing Cover	N/A	24	Bottom panel (16 ga galv.)	N/A	47	Door Latch	99987500
2	Control Panel Cover	N/A	25	Blanking Plate	N/A	48	Caps (3), 0.75", plastic	99984948
3	Plumbing Cover Top	N/A	26	Pipe Wall panel	N/A		Caps (2), 0.75", brass	99987105
4	Control Panel	N/A	27	Low-voltage wire bushing	99986246	49	Plenum Front, upper	N/A
5	Transformer	99987635	28	Door Latch	99987500	50	Brace (16 ga galv.)	N/A
6	Tridicator	99986804	29	Bottom panel (16 ga galv.)	N/A	51	Upper panel (20 ga painted)	N/A
7	Tridicator Adapter		30	Spine panel (16 ga galv.)	N/A	52	TRX150C	3314120
8	Condensate Tube	99987364	31	Lower panel (20 ga painted)	N/A	53	Support bracket	N/A
9	Barrier Strip	99987612	32	Upper panel (20 ga painted)	N/A	54	Mounting hook bracket	N/A
10	GF150 PCB	99987329	33	Brace (16 ga galv.)	N/A			
11	DHW Outlet Adapter	99987359	34	Blower, 9x7 DEC Star	99987361			
12	DHW Pipe (short)	99987351	35	Rear panel (20 ga painted)	N/A			
13	CH Supply Pipe	99987356	36	Plenum Front, lower	N/A			
14	Gas pipe	99987352	37	Coil Plate (16 ga galv.)	N/A			
14-1	Gasket, gas (not shown)	760010145000	38	Plenum (removable)	N/A			
15			39	Fan Coil	99987209			
16	DHW Pipe (long)	99987350	40					
17	CH Return Pipe	99987347	41	3/4" NPT-M sweat adapter	99987348			
18	DHW Inlet Adapter	99987358	42	Coil Supply Pipe				
19	3-way Outlet Pipe	99987345	43	Lower panel (20 ga painted)	N/A			
20	3-way Valve	99985376	44	Receptacle (1 Amp)	99984423			
21	Coil Return Pipe	99987349	45	Adapter, ¾" NPT-M - ¾" G-M	580070111400			
23	Access Panel (2-pc)	N/A	46	Pipe Wall panel	N/A			

Note Sheet metal components are listed as 'N/A', but may be ordered as needed by quoting the bubble # (1-54) above.

4.5 Installation Checklist

After installing the appliance, review the following checklist. You should be able to answer "Yes" to all of the items in the checklist. If not, review the appropriate sections to complete the installation. If you have additional questions or need assistance with installation, contact Technical Support at 1-800-688-2575.

Boiler Checklist	**Yes**	**No**
Have you completed the Installation Checklist in the Boiler Installation Manual?		

The following check list is intended to supplement those found in the boiler manual, and focuses on installation details specific to the overall appliance (GF150).

Connecting the Power Supply	**Yes**	**No**
Is the supplied voltage 110-120 V AC?		
Have you installed a power switch to facilitate end-user maintenance?		
Have you checked the polarity of the electrical connection?		

Relief Valve	**Yes**	**No**
Have you ensured that a 150 psi DHW Pressure Relief valve was installed correctly?		
Ducting the Appliance	**Yes**	**No**
Have you set the appropriate air flow rate for the installation (trunk/return size)?		
Have you installed a return air filtration system?		
Have you verified that the system ductwork does not exceed the maximum allowable external static pressure (0.8 in. w.c.) when operating at maxmum air flow (typically during a Y2 demand)?		

Configuring the Appliance	**Yes**	**No**
Have you selected a Forced Air Heating Mode (4.2.1 = 0; 1; 3)?		
Have you adjusted the Set Point Temperature range (4.2.5 & 4.2.6)?		
Have you set the Heating CFM range DIP Switches?		
Have you set the Heating Blower Off Delay DIP Switches?		
Have you set the Ventilation CFM, Cooling CFM, and Cooling CFM adjustment DIP Switches?		

Operating the Appliance	**Yes**	**No**
Have you given both this Installation Manuals and the Boiler Manuals to the owner for future reference?		
Have you shown the owner how to clean/replace the return air filter?		

4.6 Troubleshooting

Code	Description	Possible Causes	Remedies
AF	Anti-Freeze Mode: 1. If T_{plenum} drops below 46°F (8°C) at any time : • The Y1/Y2 OUT relays open (to disable the condenser) • The blower runs at Y1 speed (i.e. 70% of Y2) for 5 minutes 2. If T_{plenum} does not surpass 50°F (10°C) inside those 5 minutes - *OR* - T_{plenum} drops below 40°F (4.4°C) at any time: • A heat demand (W1) shall be initiated to prevent the coil from freezing • This demand shall continue until T_{plenum} > 50°F (10°C), and shall remain active for 5 additional minutes.	Plenum temperature too low (below 46°F (8°C))	• Increase plenum temperature above 50°F
		Plenum sensor not connected	• Check that the plenum sensor wiring is connected properly (at both ends) • Check that PLENUM and OUTDOOR NTC connectors are not reversed
		Plenum sensor malfunction / defective	• Check resistance of sensor (~10kΩ @ room temperature - refer to table ___)
		Sensor wiring damaged / defective	• Inspect plenum sensor wiring
		A/C coil freeze-up due to incorrect wiring to condenser (compressor / outdoor unit)	• Wires leading to outdoor unit should be connected to A/C OUT terminal block on GF150 PCB
		A/C coil freeze-up due to lack of air flow	• Check for sufficient discharge airflow • Check and clean filter
		GF150 PCB malfunction / defective	• Sensor and wiring tests OK • Plenum temperature above 50°F • If problem persists, replace GF150 PCB
E.3	3-Way Valve (3WV) Error – valve not in correct position after start-up/'home' position call	Power anomaly	• Cycle power to GF150 PCB. • If Error persists, proceed to next Possible Causes.
		3WV harness damaged / disconnected	• Check harness connection at PCB • Check harness wires for continuity from valve to PCB
		3WV malfunction / obstruction	• Remove 3WV - inspect for debris. • Cycle power to GF150 PCB. • If Error persists, replace 3WV.
		GF150 PCB malfunction / defective	• Harness and wiring tests OK • No obstructions in valve • New valve installed • If problem persists, replace GF150 PCB
E.F	'E.F' flashes briefly during blower spin-up / wind-down *or* during Ventilation (G) ONLY demand	Normal operation	During low-speed demands, blower RPM may dip below 300 RPM – this is normal operation and can safely be disregarded.
	'E.F' flashes briefly every 5 seconds: Fan Speed Error – RPM too low (<300) during Heating / Cooling	Blower not running	See 'Blower Will Not Operate' section
		Air flow rate too low during Heating / Cooling operation	Increase Heating / Cooling air flow rates as needed.
		Blower wire harness damaged	Check Blower-PCB harness (J4-J21) wires for damage / continuity.
		PCB malfunction	Enable Heating or Cooling demand. Check DC voltage across J21-2 (Black) and J21-5 (GND) If voltage is less than 1.0 V DC, replace PCB
		RPM feedback issue	If Error persists despite new PCB, replace blower / blower control module.

4.6 Troubleshooting

Symptom	Description	Possible Causes	Remedies
8.8.	Appears for 2 seconds on PCB power-up	Power turned off/on	• Normal operation on power-up
		Communication interruption between GF150 PBC and TRX Boiler Controller	• Check harness connection at PCB • Check harness wires for continuity: J21 6-7 to J15 Orange EBUS connector
No Heat – Forced Air (no code)	No error codes displayed – insufficient heat	Thermostat incorrectly wired / not enabling call for heat	• Check that thermostat wires are connected to the R/C/W/Y terminals on the "HVAC T'STAT" strip of the PCB. • Call for heat will be recognized by the PCB when 24 V AC is present on the 'W1' or 'W2' input. LED1 will light up [ref. Fig. 4.6-1].
		Missing jumper(s) on TRX Boiler Controller	• Check J15 for jumpers on TT1 and TT2
		eBus wiring between GF150 PCB [J21] and TRX Boiler Controller [J15] disconnected / damaged	• See '8.8.' error code
		Insufficient set point temperature	• Check Parameter 4.2.6 and 4.2.5, which dictate the set point range. • If using an Outdoor Sensor, check Parameter 8.3.5 (Outdoor Temperature Reading) for accuracy.
		Insufficient air flow	• Check air filter(s) and ducts for blockages. • Check Blower Rate DIP Switch settings
No A/C – insufficient cooling (no code)		Insufficient air flow	• Check air filter(s) and ducts for blockages. • Check Blower Parameters – 3.10.4
		Thermostat incorrectly wired / not enabling call for cooling	• Check that thermostat wires are connected to the R/C/W/Y terminals on the "HVAC T'STAT" strip of the PCB. • Call for cooling will be recognized by the PCB when 24 V AC is present on the 'Y1' or 'Y2' input. LED4 and LED5 will light up, respectively [ref. Fig. 4.6-1].
		Condenser (Outdoor A/C unit) not operating	• Check wiring on A/C OUT (Y1 Y2 C)
		Frozen Evaporator (Indoor A/C Coil)	• Insufficient air flow • Refrigeration system malfunction
		3-way valve incorrectly positioned	• If valve has been replaced, check orientation -- harness should be on the bottom. • Power cycle GF150 at the main supply switch. Check for 'E.3' code after start-up.

NOTES

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GF150

Getting Service

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

- Contact Technical Support at 1-800-688-2575 or on the website: www.NTIBoilers.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 display

NTI Boilers
www.NTIBoilers.com
1-800-688-2575
30 Stonegate Drive
Saint John, NB E2H 0A4

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