



READ FIRST

This Quick Start Guide is provided for use by a professional installing contractor as reference instruction for the installation and start-up of this boiler. This is not a substitute for the Installation, Operation and Maintenance Manual (IOM), required professional training and conduct, and strict adherence to applicable jurisdictional codes and regulations. Failure to follow instructions, cautions and warnings in the IOM may result in property damage, personal injury, or loss of life. Fulton assumes no responsibility for damage(s) of any kind caused by inappropriate use of this Quick Start Guide and/or failure to read the full IOM provided.



DIGITAL MANUAL

Scan to download the Installation, Operation & Maintenance Manual



QUESTIONS?

Scan to find your local Fulton sales and service Representative

1. TRANSPORT

This boiler has a compact footprint, handle with care to avoid tipping, use caution during movement and take turns slowly.

Do not run ratchet straps or cargo tie downs over top of the shipping box.

Move the boiler using a pallet jack from any side or a hand truck from the right hand side only. The boiler may be laid down on the rear for transportation.

2. UNCRATING

Remove the cardboard shipping box, then remove the lag screws securing the boiler base to the wooden shipping skid. Carefully remove the boiler from the wooden shipping skid. Once the boiler is in position, the protective plastic may be peeled off the cabinet surfaces.

3. PLACEMENT

This boiler is required to be installed on a level, rigid, non-combustible base. It may be installed on a steel or concrete housekeeping pad or directly on the floor. Use metal shims if necessary to ensure the boiler is level. Do not install on springs.

Ensure boiler components are protected from water and debris, and choose a suitable location where room temperatures are above 32°F (0°C) and do not exceed 104°F (40°C). Models with rated capacity greater than 400,000 BTU/hr are not permitted for installation in a closet or alcove.

4. CLEARANCES

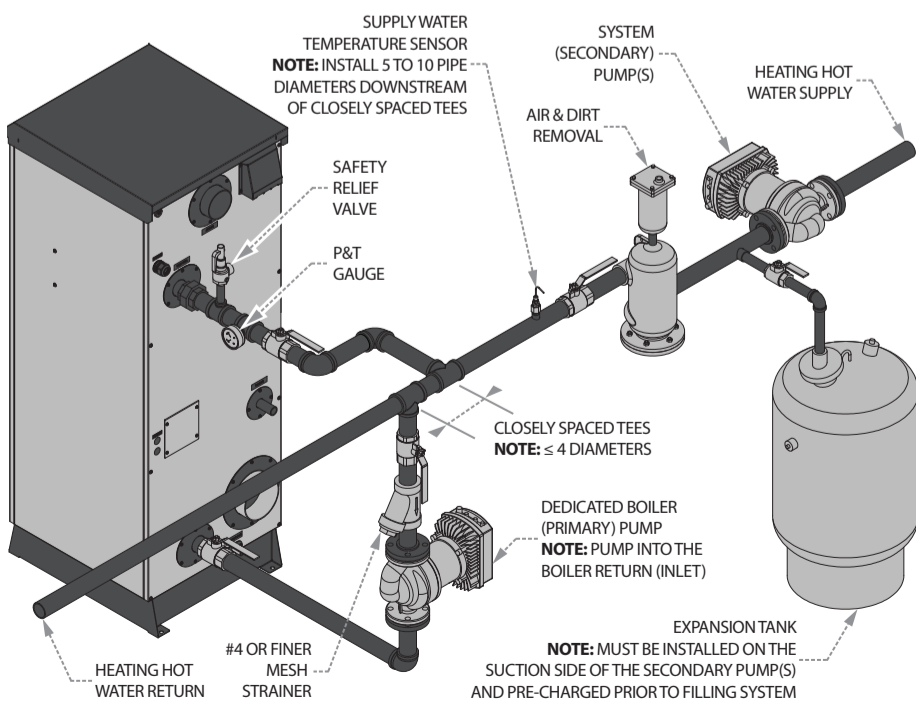
FRONT	REAR*	TOP	SIDES
24 inch (610 mm)	12 inch (305 mm)	16 inch (406 mm)	0 inch (0 mm)

* 12 inch rear clearance is to combustibles and for maintenance, allow for 24 inch rear clearance to accommodate installation of the flue gas exhaust vent.

5. WATER CONNECTIONS

The upper water connection is the boiler supply (outlet). The lower water connection is the boiler return (inlet). Field piping, fittings and ancillaries are not supplied with the boiler. Install pipe hangers or supports so that the boiler is not supporting any external piping load.

This boiler is for closed loop hot water heating (hydronic) service. It is not suitable for use as a domestic water heater. Do not heat open loop water, such as used for showers, sinks, pools, or washdown process directly through the boiler.



Primary-Secondary Arrangements: A dedicated boiler (primary) pump must be installed on the boiler return, pumping into the boiler. Install closely spaced tees a maximum of 4 pipe diameters apart, or use a hydraulic separator.

Refer to the IOM for variable primary and modular (multiple boiler) arrangements.

A Safety Relief Valve (SRV), tee for SRV, and Pressure & Temperature (P&T) gauge are provided in the boiler trim kit. Install the tee and SRV in the upright vertical position on the boiler supply (outlet) piping. Do not isolate the boiler pressure vessel from the SRV with any valves. Use a tee (not supplied) to install the P&T.

Installation of a properly selected expansion tank, strainer, air separator and air vent is required. These ancillaries must be installed on the suction side of the system (secondary) pump(s).

Water Systems: Install an automatic fill valve in the water fill line to the system and set the valve to meet or exceed a minimum fill pressure of 12 psi at the boiler.

Water/Glycol Systems: Install a glycol feed system and set the fill pressure switch to meet or exceed a minimum fill pressure of 30 psi at the boiler.

6. FILLING THE BOILER

Pre-charge the expansion tank per the manufacturer's instructions and begin filling the hydronic system.

Open the boiler SRV to bleed air from the boiler vessel, leave SRV open until a steady flow of water is observed. Eliminate air in system piping.

Using the P&T gauge on the boiler outlet, verify the system meets the minimum fill pressure of 12 psi for water, and 30 psi for water/glycol.

7. FUEL GAS CONNECTION

To ensure adequate gas supply, size the field gas piping such that the inlet gas pressure drop from static (boiler idle) to dynamic (boiler at high fire) does not exceed 15%. It is typical for gas delivery piping to be up-sized one or more diameters larger than boiler gas inlet size.

The gas pipe and the fittings must be new and free of dirt or other deposits. Install a test port, manual gas shutoff valve and union (not supplied) prior to the boiler. Install pipe hangers or supports so that the boiler is not supporting any piping load. Refer to the IOM for installation of gas vents to the outdoors.

Refer to the nameplate at the rear of the boiler for gas pressure requirements. Where gas pressure exceeds the maximum listed on the nameplate, install an appropriately selected line pressure regulator (not supplied) listed and labeled to ANSI Z21.80/CSA 6.22 a minimum of 10 feet (3 m) of pipe away from the boiler. Appliance regulators are not a substitution for line gas pressure regulators and must not be used.

8. FUEL GAS LEAK TESTING

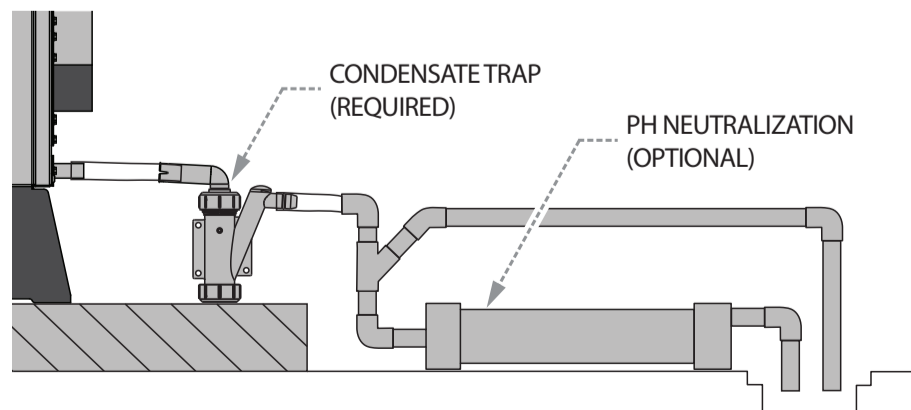
All gas piping connections must be checked for leaks before being placed into service. Test with compressed air or inert gas if possible.

After completing pressure testing and obtaining any necessary approvals from the Authority Having Jurisdiction (AHJ), introduce gas service and purge gas piping in accordance with local codes. Do not purge into a confined space or where fuel gas can accumulate.

The boiler gas train has been factory leak tested, however, fittings may loosen during shipping or installation. After field gas piping is completed and before wiring installation is started, all piping connections (factory and field) must be carefully checked for gas leaks. Use a soap and water solution or combustible gas detector. Detection must not exceed Level 1 (500 ppm).

9. FLUE GAS CONDENSATE DRAIN

A condensate drain trap is provided with the boiler and must be installed as shown. A condensate pH Neutralizer is optional, but may be required by the AHJ. Condensate drain lines and fittings (not supplied) must be PVC, CPVC, stainless steel or silicone tube. Do not use copper or steel/iron pipe, these materials are not suitable. Maintain a minimum downward pitch toward the floor drain of 1 inch (25 mm) for every 12 feet (3.7 m).



10a. COMBUSTION AIR FROM THE ROOM

Room must be maintained at a neutral pressure relative to the outdoors, a negative pressure is not permitted. Do not install exhaust fans in the boiler room. Verify combustion air is not taken from occupied spaces within the building.

Avoid operation if the combustion air is contaminated by sources such as laundry, pools, active construction sites, refrigerants or chemical storage. Damage to or failure of boiler components due to contaminated air is not covered under warranty.

The minimum net free area requirement for each louver is 1 inch² (645 mm²) per 4,000 BTU/hr of the combined capacity of all boilers. The net free area must account for the blocking effects of screens and louvers. Ensure the high opening is within 12 inches (305 mm) of the ceiling, and the low opening is within 12 inches (305 mm) of the floor. Refer to the IOM for single louver installation requirements or mechanical combustion air supply systems.

10b. COMBUSTION AIR FROM OUTDOORS

Adhere to minimum combustion air duct diameters, an adapter may be required:

EXE-399	EXE-500	EXE-650	EXE-750
4 inch (102 mm)	4 inch (102 mm)	6 inch (152 mm)	6 inch (152 mm)

The ducting must have a minimum slope of 1/4 inch per foot (21 mm per meter) downward from the boiler to ensure moisture drains away from the boiler. The typical maximum equivalent length is 100 feet (30 m). Ensure ducting is supported.

The air termination must be a downward facing 90° elbow installed a minimum of 10 feet (3 m) upwind and 4 feet (1.2 m) below any sidewall exhaust. For mesh openings use a 1/2 inch (13 mm) screen size. A 45° elbow termination is not permitted. Refer to the IOM for alternate combustion air configurations.

11a. SIDEWALL FLUE GAS VENTING

Adhere to minimum flue gas exhaust vent diameters, an adapter may be required:

EXE-399	EXE-500	EXE-650	EXE-750
4 inch (102 mm)	4 inch (102 mm)	6 inch (152 mm)	6 inch (152 mm)

The vent must have a minimum slope of 1/4 inch per foot (21 mm per meter) upward from the boiler to ensure flue gas condensate drains back to the boiler. The typical maximum equivalent length is 100 feet (30 m). Material must be stainless steel or polypropylene listed and labeled to UL-1738, or Sch 40 PVC/CPVC (ULC-S636 required for Canada). Stainless steel or polypropylene is recommended for applications with water temperatures above 140°F (60°C).

Vent termination must be a vertically oriented tee installed a minimum of 10 feet (3 m) downwind and 4 feet (1.2 m) above any air intake. A 45° elbow termination is not permitted. Refer to the IOM for common venting configurations.

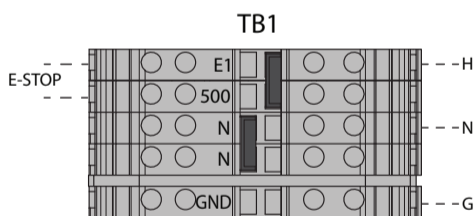
11b. ROOFTOP FLUE GAS VENTING

Adhere to the diameter, slope, length and material requirements in step 11a.

Use a straight type or velocity cone termination installed a minimum of 4 feet (1.2 m) downwind and 4 feet (1.2 m) above any air intake, greater separation is preferred. Do not install a rain cap. Ensure the vent terminates in an open area above nearby structures, architectural walls or parapets to prevent stagnant flue gas vapor clouds. Refer to the IOM for common venting configurations.

12. ELECTRICAL CONNECTIONS

Using the strain relief connection at the rear of the boiler, route line voltage wiring to terminal blocks TB1-E1, N and GND in the control panel. For use with an emergency stop, wire the e-stop device to E1-500 and remove the jumper.



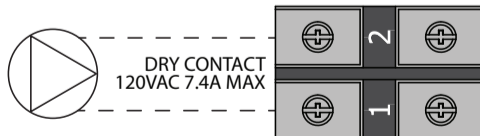
All other field electrical and communication wiring, including steps 13-17 must use the lower knockouts connections provided at the rear of the boiler.

Do not drill new knockouts through side, front or top cabinet panels as this may cause operational issues and impede maintenance.

	PURE CONTROL Scan to download the Endura XE PURE Control User Manual		BACNET SETUP Scan to download the FPC-N54 Protonode Start-Up Guide
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13. PUMP CONTROL CONNECTION

Wire the boiler (primary) pump or boiler motorized isolation valve to Terminals 1 and 2 on Barrier Strip 1. This is a dry contact with a maximum rating of 120VAC 7.4A.



Do not power the pump or isolation valve through the boiler controls panel.

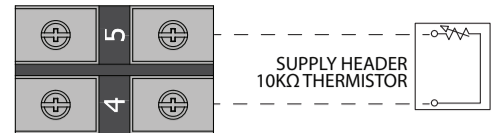
Pump Motors Exceeding 7.4A Rating: A motor starter is required (not supplied).

Power-Open Power-Close Type Valves: A SPDT relay is required (not supplied).

Refer to the User Manual for configuration. Refer to the IOM for variable speed boiler pump, system (secondary) pump or domestic hot water pump installation.

14. SUPPLY HEADER TEMPERATURE SENSOR

The supply header temperature sensor option is required for all primary/secondary and/or modular systems. Wire the sensor to Terminals 4 and 5 on Barrier Strip 2 using 18 awg twisted pair insulated wiring. Join to sensor leads with soldered and heat shrink tubing connections, do not use wire nuts. The maximum wiring distance is 50 feet (15.3 meters).

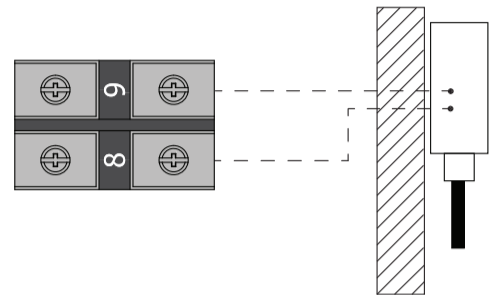


Install the sensor 5 to 10 pipe diameters downstream of the last boiler in the common supply header piping. Ensure location and the depth will effectively read a blended temperature. Refer to the figure in step 5 of this guide.

Primary-Secondary Arrangements: Install the sensor in the system (secondary) supply piping 5 to 10 pipe diameters downstream of the closely spaced tees. Do not install the sensor in the boiler (primary) loop piping.

15. OUTDOOR AIR TEMPERATURE SENSOR

The Outdoor Air Temperature (OAT) sensor option is used for heating setpoint reset and boiler plant enable. Wire the sensor to Terminals 8 and 9 on Barrier Strip 2 using 18 awg twisted pair insulated wiring. Join to sensor leads with soldered and heat shrink tubing connections, do not use wire nuts.



Mount the sensor vertically on a north facing wall away from mechanical equipment or other potential heat sources. Refer to the User Manual for configuration.

16. LEAD-LAG NETWORKING

Communication between boilers uses an Ethernet/IP network field wired with Cat5e or Cat6. An 8P8C female connector port is provided at the rear of the boiler cabinet. Two boilers may be directly connected. For installations of 3 to 10 boilers a 10/100 Ethernet switch is required. Refer to the User Manual for configuration.

17. BUILDING AUTOMATION INTEGRATION

Modbus communication requires shielded three-wire twisted Belden 3106A. Refer to the electrical diagram provided with the boiler for connections. Ground the shield at one end only directly to Earth ground. An FPC-N54 Protonode is required for BACnet. Refer to the User Manual and Protonode Start-Up Guide for configuration.

18. VERIFY BOILER SOFTWARE IS UP TO DATE

Using the PURE Control touchscreen, navigate to Configuration and verify the software version is up to date. If a newer version of the software is available on Fulton.com, update before continuing. Refer to the User Manual for instruction.

19. ADJUSTING AND VERIFYING COMBUSTION

Warranty coverage is valid only if the following steps are performed by a technician who has completed the Factory Authorized Commissioning Technician (FACT) service training course. A calibrated combustion analyzer, Slack Tube manometer, and the Installation & Operation "Start-Up" Report (I&O) form will be required. Refer to the IOM for the full tool list, safety device testing procedure, table of combustion parameters, and detailed instruction on adjusting and verifying combustion.

Open the top and front cabinet panels and remove the cap on the main gas train regulator. Insert the combustion analyzer a maximum of 2 inches (50 mm) into the flue gas test port. Using the touchscreen, navigate to Tech Tools, Commissioning.

Start the burner and step towards P10. Adjustments to Air Position or Blower Position are only necessary to maintain flame stability or to satisfy the manifold air switch. **Do not tune combustion parameters prior to reaching P10.**

Upon reaching P10, first adjust Blower Position to set Discharge pressure at P10 in accordance with the IOM. Next, adjust Air Position to set Intake Manifold pressure at P10 in accordance with the IOM. Then, adjust the Main Gas Train Regulator to set MV Downstream pressure at P10 in accordance with the IOM. Finally, adjust Gas Position to set flue gas O2% at P10 in accordance with the IOM.

Reinstall the main gas train regulator cap. **MV Downstream is only set at P10.**

Step down the curve from P9 to P0 adjusting positions at each point setting Intake Manifold pressure and O2% values in accordance with the IOM. Blower Position must have a minimum 100 RPM separation between points. Never decrease Gas Position at P1. Cycle the burner a minimum of 10 times to verify reliable ignition.

Record all information on the I&O form. Do not leave fields blank. Leave a copy of the I&O form with the boiler or site contact and retain a copy for your records in a safe location. Warranty coverage is valid only if the I&O form is successfully completed and returned to Fulton within twelve weeks of start-up.

Replace all plugs using the appropriate thread sealant. Reinstall the cabinet.

20. ENABLING AUTOMATIC OPERATION

Place the boiler into automatic operation using the Boiler Control screen. Adjust local set point to verify the boiler is responding accordingly with quiet, repeatable, and reliable combustion.