COMBI BOILER EXPRESS SETUP & INSTALLATION GUIDE



THERMAFORCE®

COMBI BOILER EXPRESS INSTALLATION GUIDE

Tips for Professional Installation

BEFORE YOU BEGIN

This guide is designed to provide a high-level installation overview and address key installation questions.
It is not intended to replace the **Installation and Operating Instructions Manual** provided with the unit.
All instructions and installation requirements as well as any local or national codes must be followed.
Installation and service must be performed by a qualified licensed installer, service agency, or the gas supplier.
We are not liable for any damages or defects resulting from improper installation.

STEP 1: Unboxing the Unit

1. Remove unit and accessories from the box.

   WARNING: Do NOT use the condensate trap or vent connector to lift the unit out of the box, damage will occur.
2. Check unit for damage.
3. Ensure all accessories are present:

- ☐ Wall mounting bracket and lag bolts
- ☐ Condensate trap hose
- ☐ 30 PSI Relief valve
- ☐ Outdoor temperature sensor
- ☐ Cascade/indirect temp. sensor (160,000 & 199,000 only)
- ☐ Set of 2 flexible power cords
- ☐ Propane conversion kit
- ☐ Installation and Operating Instructions
- ☐ Controller Manual
- ☐ User's Information Manual

STEP 2: Find Installation Location | *Install Manual - Pre-Install Check*

1. Consider the following when selecting a location:
   - Sturdy wall (Step 3)
   - Vent termination location (Step 5)
   - Vicinity to gas, water, and power supply (Steps 10, 7, 8, 11)
   - Condensate drain (Step 6)
   - Minimum clearance requirements

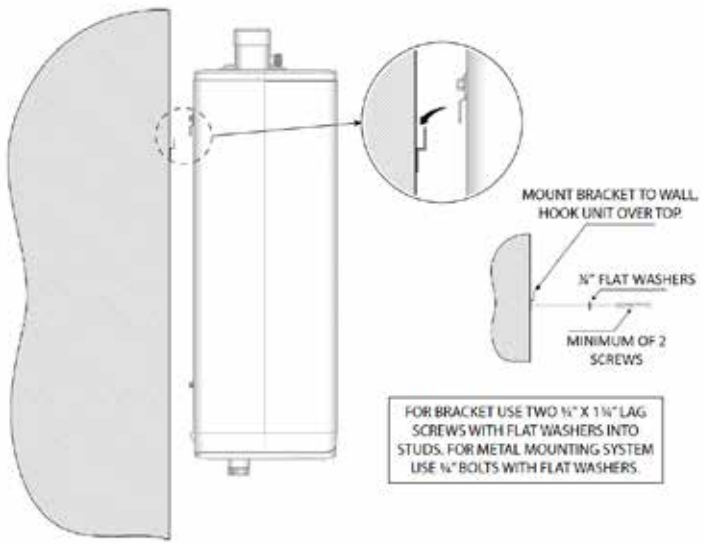
SURFACE	MIN. DISTANCE FROM COMBUSTIBLE SURFACES	RECOMMENDED DISTANCE FOR INSTALLATION AND SERVICE
Front	2"	24"
Rear	0"	0"
Left Side	1.5"	6" (labels may be difficult to read with reduced clearance)
Right Side	4"	6" (labels may be difficult to read with reduced clearance)
Top	2"	24"
Bottom	8"	24"

STEP 3: Mounting | *Install Manual - 1.3 Location*

1. Mount the bracket to the wall with two lag bolts when securing to wood studs. Vent connection is 8.5" above lag bolts.
2. Install the initial pipe fittings on the bottom connections while using caution to avoid getting Teflon tape, pipe dope, etc. into the fittings.
3. Hang the unit centered on the bracket.
4. If desired, secure the bottom of the unit to the wall with two field supplied ½" EMT clips.

Tankless Isolation Valves are recommended to allow easy servicing.

EZ Pipe Manifold is recommended to ensure proper boiler flow.



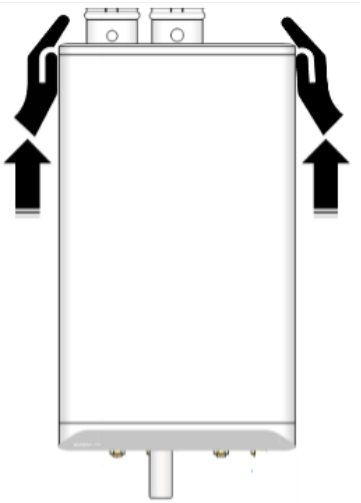
Wall Mounting Of Unit



Bottom of unit secured with two field supplied 1/2" EMT clips.

STEP 4: Removing the Cover | *Install Manual - 1.3 Location*

1. Loosen the two captive 5mm Allen screws at the bottom of the unit.
2. Place your palms at the top of the cover so your fingers are on top of the unit.
3. Apply inward pressure while using your fingers to lift the cover straight up and off the unit.





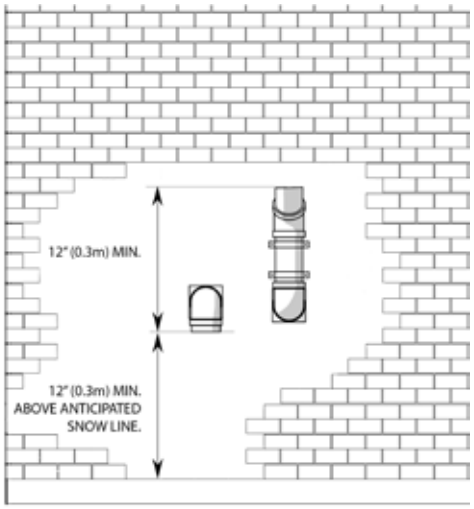
STEP 5: Venting | *Install Manual - 1.4 Exhaust Venting and Air Intake*

1. Direct vent the unit using only PVC, CPVC, or Polypropylene components approved by the authority having jurisdiction. Follow all venting manufacturer instructions.

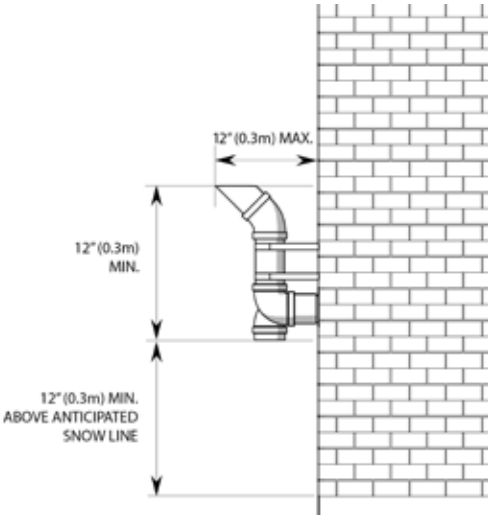
   WARNING: This unit must have the combustion air supply connected and terminated to the outdoors.
2. Calculate the equivalent vent length using the table.
3. Combustion air intake and exhaust piping must terminate in the same pressure zone (roof, sidewall) except for vertical vent and sidewall combustion air.
4. Vent termination must comply with all minimum clearances of the authority having jurisdiction and as shown in the figures below.
5. Begin the vent system installation at the unit and work towards the outdoor termination. Maintain at least 1/4" per foot pitch towards the unit or as required by the venting manufacturer.
6. Verify that all vent connections are liquid and pressure tight.

EXHAUST PIPE SIZE/ FITTINGS	MAXIMUM EQUIVALENT LENGTH
Schedule 40 PVC, CPVC, or PPs	
2"	65' *
3"	120'
2" or 3" 90° Long Sweep Vent Elbow	Allow 5 equivalent feet
2" or 3" 90° Short Sweep Vent Elbow	Allow 8 equivalent feet
2" or 3" 45° Vent Elbow	Allow 3 equivalent feet
PPs	
PPs 87-90° Elbow	Allow 8 equivalent feet
Flex PPs	
2" PPs Flex	Not Allowed
3" PPs Flex	35' Actual (Equivalent = Actual x 1.4)

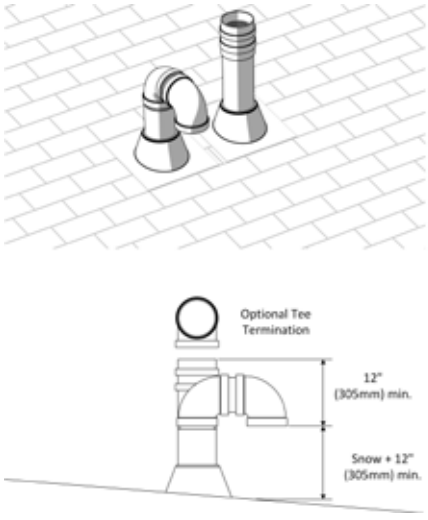
** Approximate input derate of 5-16% at 2" maximum vent length.*



Sidewall Detail



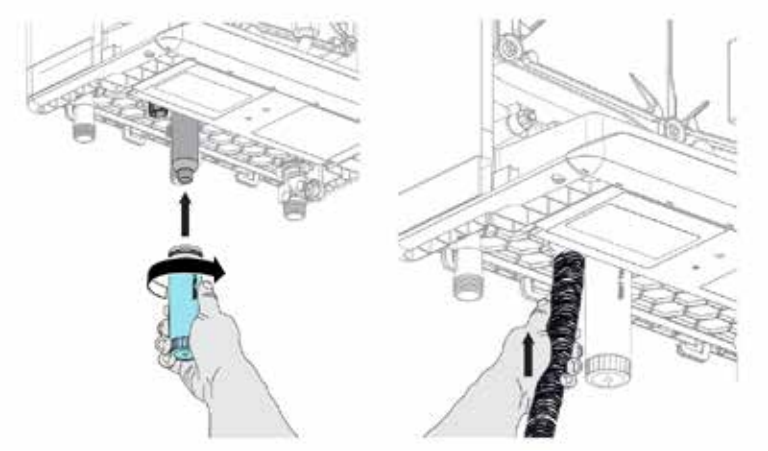
Sidewall Detail - Side View



Rooftop Vent Termination

STEP 6: Condensate Removal | *Install Manual - 1.5 Condensate Removal*

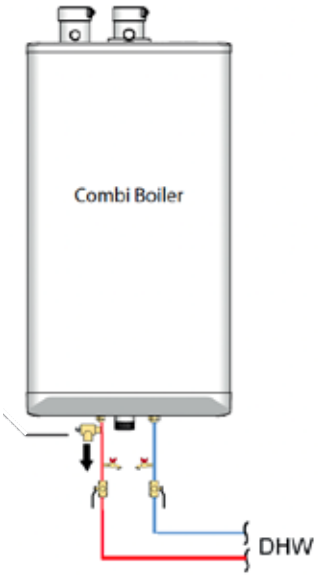
1. Fill the condensate trap cup with water.
2. Attach the drain hose to the condensate trap outlet and run to a suitable drain or condensate pump.
3. A condensate neutralizer must be installed when draining into any metallic drain to prevent corrosion and deterioration.



Condensate trap installation

STEP 7: DHW Piping | *Install Manual - 1.7 DHW System*

1. An installer supplied pressure relief valve meeting the following requirements must be installed on the DHW supply pipe before any isolation valves and piped to a suitable drain.
   - Maximum pressure rating of 150 PSI
   - Minimum capacity of 200,000 BTU/Hr
2. An installer supplied thermostatic mixing valve can be installed on the DHW supply to prevent excessively hot water from reaching a faucet if the unit is used in a high temperature heating system.
3. Connect the unit to the cold water supply and the DHW system piping.
4. Verify all internal fittings are leak free prior to pressurizing the DHW system as some loosening could occur during shipping. Do not overtighten.



DHW on-demand application: DHW relief valve on outlet of water heater. Isolation valve ***not allowed*** between water heater and relief valve.

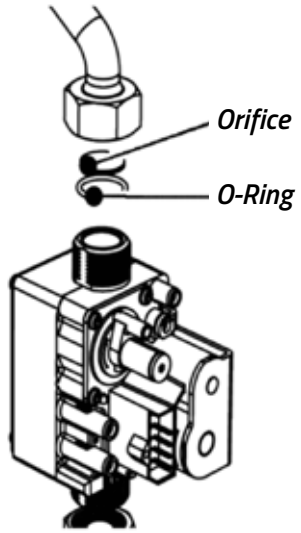
STEP 8: Boiler Piping | *Install Manual - 1.6 Water Piping - Space Heating*

1. The included pressure relief valve must be installed on the space heating supply pipe before any isolation valves and piped to a suitable drain.
2. Combi Boilers include a factory installed pump designed to ensure adequate flow through the unit and boiler piping in a primary/ secondary heating system.
3. Connect the unit to the system piping as illustrated in the Installation and Operating Instructions Manual.
4. Verify all internal fittings are leak free prior to filling the heating system as some loosening could occur during shipping. Do not overtighten.
5. Fill and purge the system of air.
   - The 99,000 & 125,000 models have a manual air vent at the top of the unit to purge out any trapped air.
   - The 160,000 &199,000 models must be purged through a drain.
   - The Combi Boiler must be free of air prior to commissioning.
   - A flashing pressure reading on the unit's display indicates that the system pressure is inadequate. Minimum recommended fill pressure is 15 PSI.

STEP 9: Propane Conversion | *Install Manual - 3.4 Fuel Conversion*

All models are factory fire tested with natural gas as shown on the rating plate. The unit must be converted for propane operation.

1. Disconnect the nut at the gas valve outlet (top of the valve) and remove the orifice and O-ring.
2. Insert the correct propane orifice into the O-ring, and re-install into the nut at the gas valve outlet (top of the gas valve) and then tighten the nut.
3. Affix propane conversion labels to the unit.
4. Perform combustion analysis as outline in Step 4 of the *Express Setup Guide*.

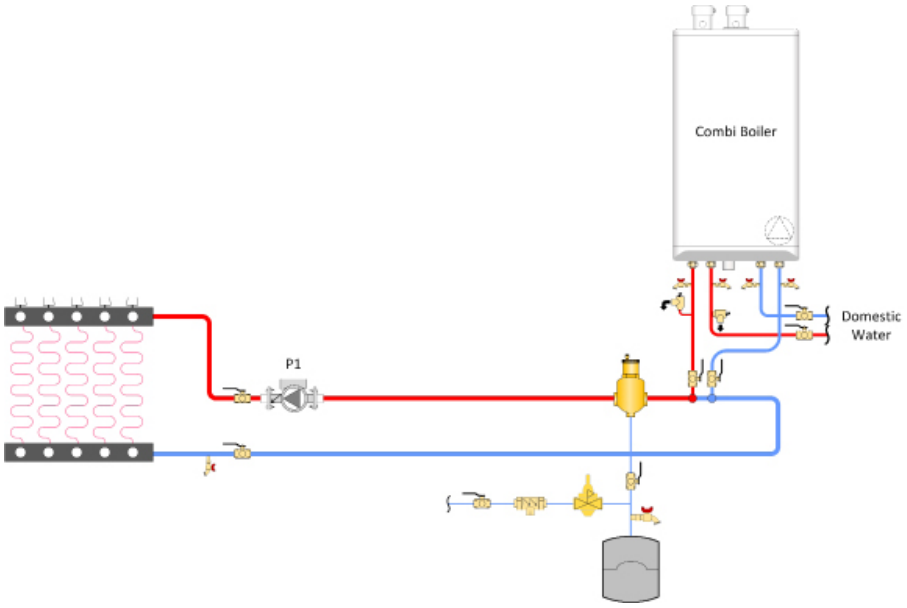


MODEL	PROPANE ORIFICE SIZE
99,000 BTU/hr	327
125,000 BTU/hr	392
160,000 BTU/hr	440
199,000 BTU/hr	535

All information contained in this quick start guide is subject to change wit







Typical one-zone heating system using closely-spaced tees

STEP 10: Gas Piping | *Install Manual - 1.8 Gas Piping*

1. Verify that the gas supply system including gas line, pressure regulator, and gas meter are sized properly for the BTU/Hr rating using the table below.
2. Gas supply piping must include manual shutoff valve and a sediment trap.
3. Connect the gas supply piping to the unit using natural gas/ propane rated pipe thread sealant.
4. Purge air from the gas line by opening the inlet gas pressure port using a Torx 15 screwdriver.
5. Perform a bubble test of all gas connections and fittings for leaks.

WARNING A properly sized and installed gas supply is critical to the proper operation of the unit. Please see National and Local Fuel Gas Code for details.

MODEL	1/2" IPS	3/4" IPS	1" IPS
99,000 BTU/hr (Nat. gas)	40'	175'	500'
125,000 BTU/hr (Nat. gas)	20'	100'	350'
99,000 BTU/hr (Propane)	100'	450'	1,400'
125,000 BTU/hr (Propane)	70'	300'	1,000'
160,000 BTU/hr (Nat. gas)	10'	70'	200'
199,000 BTU/hr (Nat. gas)	10'	40'	150'
160,000 BTU/hr (Propane)	50'	175'	600'
199,000 BTU/hr (Propane)	30'	125'	400'

Maximum pipe length

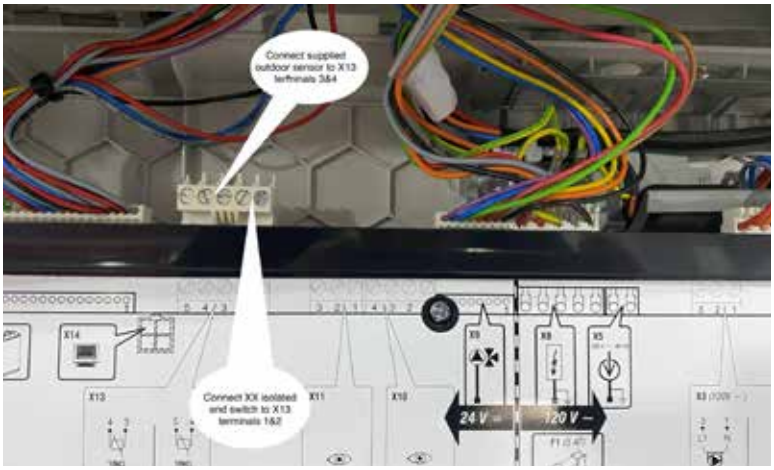
STEP 11: Electrical | *Install Manual - 1.9 Electrical Connections*

1. Connect the call for space heating from a dry contact thermostat or zone panel isolated end switch (XX) to terminals X13-1&2.

WARNING Do not supply 24VAC to the X13 terminal strip, control damage may occur.

2. Wire the included flexible power cords to terminals X3-1&3 & X4-1&3 only if the Combi Boiler will be operating a space heating and/or DHW pump.
3. Plug the unit's power plug into a non AFCI/GFCI outlet.

We recommend installing the included outdoor temperature sensor on a northern facing wall to enable the outdoor reset function for maximum efficiency.



hout notice due to clerical error, regulation change or product development

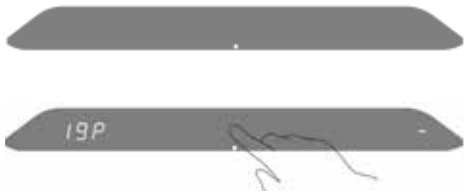
COMBI BOILER EXPRESS SETUP GUIDE

Tips for Professional Setup

STEP 1: Turn On The Unit

Install Manual - 2.3 Installer Interface

1. A dot will illuminate at the bottom center of the control when the unit is powered.
2. If the space heating water pressure is displayed on the left and "-" is displayed on the right, the unit is turned off. To turn on the unit, touch the area above the dot for 2 seconds until only the dot is illuminated.

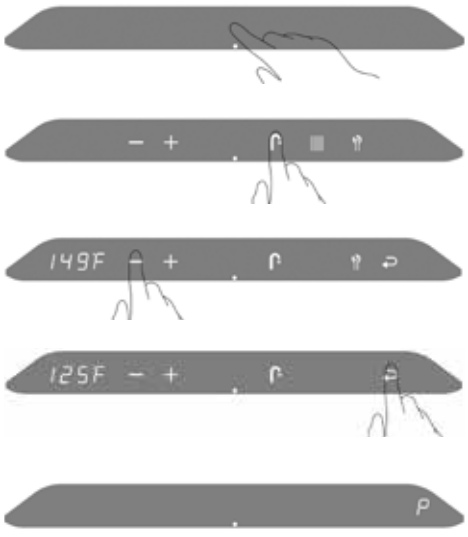


STEP 2: DHW Commissioning

Install Manual - 2.3 Installer Interface

To adjust the DHW target temperature:

1. Touch the area above the dot.
2. Touch the "Faucet" to display the current DHW target temperature.
3. To change the DHW target temperature, touch "-" or "+".
4. To save changes, touch the "Return" button.
5. "P" will be briefly displayed to indicate the target temperature has been stored.



STEP 3: Space Heat Commissioning

Controller Manual - Accessing the Installer Parameter Menu

1. Touch the area above the dot.



2. Touch the "Wrench" for two seconds until "Return" appears.



3. Touch the "Wrench" and "Return" together until "C000" appears.



4. Change "C000" to "C015" by touching "+".



5. Touch the "Wrench" to enter the installer parameter menu.



6. Touch "+" to reach "P050".



7. Touch the "Wrench" to see the current P050 design supply temperature setting.



8. Touch "-" and "+" to adjust the P050 setting.



9. Touch the "Wrench" to return to the parameter list.



10. **To adjust the smart outdoor reset* parameters when an outdoor sensor is not installed:**
    Adjust "P056" following the same procedure used for "P050".

    To adjust the outdoor reset^ parameters when an outdoor sensor is installed:
    Adjust "P051", "P052", and "P053" following the procedure used for "P050".

11. Touch "Return" to save changes.



12. "P" will be briefly displayed to indicate the target temperature has been stored.



** The smart outdoor reset function simulates weather dependent outdoor reset when an outdoor sensor is not connected to the unit.*

^ The outdoor reset function automatically adjusts the space heating water temperature based on the outdoor temperature when an outdoor sensor is connected to the unit.

	DESCRIPTION	DEFAULT	RANGE/OPTIONS	SUGGESTED
P050	Space Heating: Design supply temperature	176°F	50°F to 194°F	176°F for baseboard or design temp (from heat loss etc.). This parameter can also be adjusted by touching the radiator on the touch panel.
P05 1*	Space Heating: Minimum supply temperature	100°F	50°F to 194°F	120°F for most high temp applications
P052	Design outdoor temperature	16°F	-22°F to 50°F	20°F for most applications
P053	Maximum outdoor temperature	70°F	50°F to 85°F	77°F max. customer thermostat setting
P056	Space Heating: Smart outdoor reset minimum supply temperature	100°F	50°F to 140°F	Set to match parameter 51
P059	Space Heating: Maximum user adjustable temperature	194°F	50°F to 194°F	Default is fine unless radiant etc. set to maximum water temp needed.

STEP 4: Perform Combustion Analysis

Install Manual - 3.3 Commissioning

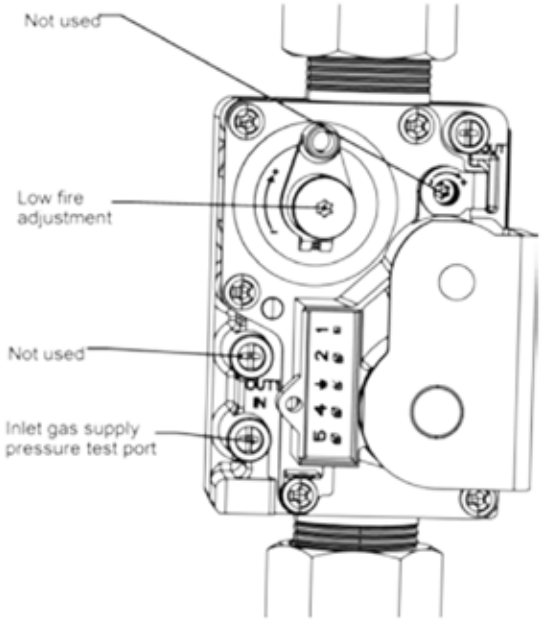
1. Loosen the inlet gas pressure test port screw with a Torx 15 screwdriver until gas is heard escaping then push a manometer hose over the test port to monitor inlet gas pressure.
2. Start your combustion analyzer and confirm it is set to the correct fuel and the O2 reading is 20.9% in fresh air before proceeding.
3. Create a large DHW demand to dissipate the heat produced during the combustion test.
4. Remove the test cap from the flue connection and insert the combustion analyzer probe.
5. To test high fire combustion, touch the "Flame", then touch and hold the "Wrench" for 2 seconds. Then while holding the "Wrench", touch the "+" twice. "H" will show in the service display as the unit enters high fire.
6. If the gas pressure is not in the range of 4" – 14", verify the gas line, pressure regulator, and meter are properly sized. Bring gas pressure within range before proceeding.
7. Wait for the combustion analyzer readings to stabilize then record the combustion readings and inlet gas pressure.
8. High fire combustion is set by the orifice installed and is not field adjustable. Contact technical support if high fire combustion readings are outside of the permitted range.
9. To test low fire combustion, touch the "Wrench" and "-" together. "L" will show in the service display as the unit enters low fire.
10. If the gas pressure is not in the range of 4" – 14" or is not within 2" of the high fire gas pressure, bring gas pressure within range before proceeding.
11. Wait for the combustion analyzer readings to stabilize then record the combustion readings and inlet gas pressure.
12. If the low fire combustion readings are outside of the permitted range, remove the low fire adjustment cap to reveal a Torx 15 screw. Make small adjustments, typically less than 1/8th of a turn at a time until low fire combustion readings are within range. Contact technical support if low fire combustion readings are still outside of the permitted range after adjusting ½ of a turn.
13. Touch the "-" and "+" together to return to normal operation.

	NATURAL GAS	PROPANE
CO_2 VALUE (%) AT HIGH FIRE WITH THE FRONT COVER OPEN[1]		
Max. CO_2 value	10.3%	11%
Min. CO_2 value	8.7%	9.8%
CO LIMIT (PPM) AT HIGH FIRE WITH THE FRONT COVER OPEN[2]		
Max. CO limit	< 150ppm	<250ppm
CO_2 VALUE (%) AT LOW FIRE WITH THE FRONT COVER OPEN		
Max. CO_2 value	= Actual value at High fire	= Actual value at High fire – 0.3%
Min. CO_2 value	8.7%	9.5%

Acceptable high and low fire combustion values

[1] High Fire CO_2 is set by the orifice installed and is not field adjustable.

[2] If the CO reading exceeds the limit in this table, the unit must be shut down until the cause of excessive CO readings is corrected.



Gas Valve Adjust

REFERENCE: Information Menu

Install Manual - 2.7 Accessing The Information Menu

The Information Menu provides real time operating information to assist with troubleshooting. To access the Information Menu:

1. Touch the area above the dot.



2. Touch the "Wrench" for two seconds until "Return" appears.



3. Touch the "Wrench" again for two seconds to enter the Information Menu.



4. Touch the "-" and "+" to scroll through the codes.



Using the chart, navigate and observe values. We recommend running all DHW fixtures and recording values.

VALUE	DESCRIPTION	CODE	ACTUAL
00uA	Flame current (µA) – Above 4.0µ is acceptable	A	
00	DHW flow rate (LPM/GPM)	b	
15 P	Boiler water pressure (Bar/PSI) – Above 15 PSI is acceptable	C	
0	Estimated firing rate (kW/MBH)	F	
110°F	Space heating target temperature	n	
0	Boiler pump speed (%)	P	
F004	Last fault code	t	
r 193	CPU software version	=	
r 121	Display software version	≡	
70°F	Heat exchanger temperature	0	
70°F	Space heating supply temperature	1	
--	Not applicable	2	
70°F	DHW outlet temperature	3	
70°F	DHW inlet temperature	4	
70°F	Flue gas temperature	5	
70°F	Outdoor temperature sensor wired to X13-3&4	6	
70°F	Indirect water heater temperature sensor wired to X13-4&5	7	
C F	Cascade communication	r	

REFERENCE: Replacement Kits

Install Manual - 6.0 Replacement Kits

PART NO.	DESCRIPTION	MODELS			
		99,000	125,000	160,000	199,000
P-081014	Conversion to Propane - Venturi 375				x
P-081024	Conversion to Natural Gas - Venturi 375				x
P-081034	Conversion to Propane - Venturi 528	x			
P-081044	Conversion to Natural Gas - Venturi 528	x			
P-081054	Conversion to Propane - Venturi 500		x		
P-081064	Conversion to Natural Gas - Venturi 500		x		
P-081364	Conversion to Low Calorific Gas - Venturi 528	x			
P-081374	Conversion to Low Calorific Gas - Venturi 500		x		
P-081414	Conversion to Low Calorific Gas - Venturi 375				x
P-081744	Conversion to Propane - Venturi 456			x	
P-081754	Conversion to Natural Gas - Venturi 456			x	
P-081764	Conversion to Low Calorific Gas - Venturi 456			x	
P-081134	Replacement Kit: Flue Temperature Sensor	x	x	x	x
P-081144	Replacement Kit: Ignitor	x	x	x	x
P-081154	Replacement Kit: Burner (99-125)	x	x		
P-081174	Replacement Kit: EBM Fan	x	x	x	x
P-081224	Replacement Kit: Boiler Pump	x	x	x	x
P-081234	Replacement Kit: Gas Valve	x	x	x	x
P-081264	Replacement Kit: Flow Sensor Complete (99-125)	x	x		
P-081294	Replacement Kit: Temperature Sensor Heat Exchanger	x	x	x	x
P-081314	Replacement Kit: Pressure Sensor	x	x	x	x
P-081334	Replacement Kit: Controller Box - White	x	x	x	x
P-081384	Replacement Kit: Burner (160-199)			x	x
P-081444	Replacement Kit: Flow Sensor (Clip Only)	x	x	x	x
P-081454	Replacement Kit: Maintenance Set Heat Exchanger			x	x
P-081494	Replacement Kit: Bypass Wiring			x	x
P-081504	Replacement Kit: Ignition Wiring	x	x	x	x
P-081534	Replacement Kit: Sensor Wiring Tankless			x	x
P-081574	Replacement Kit: Ignition Line Complete	x	x	x	x
P-081654	Replacement Kit: Condensate Trap Boiler	x	x	x	x
P-081694	Replacement Kit: Temperature Sensor Clip - 22mm	x	x	x	x
P-082424	Replacement Kit: Bypass Valve			x	x
P-081784	Replacement Kit: Temperature Sensor DHW Clip - 15mm	x	x	x	x
P-081794	Replacement Kit: Controller Box - Black	x	x	x	x
P-081814	Replacement Kit: Strainer	x	x	x	x

All information contained in this quick start guide is subject to change without notice.
Due to clerical error, regulation change or product development please confirm all information .
900-851 (R1) 07.01.2026