

CONVERSION TO NATURAL GAS MANUAL

M-Series Condensing Boiler

Wall-Mounted, Gas-Fired Boiler

For the Conversion from Liquid Propane Gas (LPG) to Natural Gas (NG)



MODELS	
M060C	M060S
M090C	M090S
M120C	M120S
M160C	M160S



Certified to ANSI Z21.13 and CSA 4.9

WARNING

This conversion kit shall be installed by a qualified service agency in accordance with the manufacturer's instructions and all applicable codes and requirements of the authority having jurisdiction. If the information in these instructions is not followed exactly, a fire, an explosion or production of carbon monoxide may result causing property damage, personal injury or loss of life. The qualified service agency is responsible for the proper installation of this kit. The installation is not proper and complete until the operation of the converted appliance is checked as specified in the manufacturer's instructions supplied with the kit.

1 Introduction

This manual provides instructions for converting the Rinnai M-Series Condensing Boiler from Liquid Propane Gas (LPG) to Natural Gas (NG).

For installations in Canada, the conversion shall be carried out in accordance with the requirements of the provincial authorities having jurisdiction and in accordance with the requirements of the CGA-B149.1, Natural Gas and Propane Installation Code.

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

If You Need Service

Contact your local dealer/distributor or call Rinnai Customer Care at 1-800-621-9419 Monday to Friday between 8 AM to 8 PM ET. Please have your full serial number or model number available for product- or service-related issues.

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2 Safety Symbols



This is the safety alert symbol. This symbol alerts you to potential hazards that can kill or hurt you and others.



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



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



Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It may also be used to alert against unsafe practices.

3 Specifications

COMBI

Models	M060C, M090C, M120C, M160C
Gas Supply Pressure	Natural Gas Minimum-Maximum supply gas pressure <ul style="list-style-type: none"> • Minimum: 3.0 in. (0.75 kPa) W.C. • Maximum: 10.5 in. (2.61 kPa) W.C.
Input Rate	The input rate can be verified by following the procedure in the National Fuel Gas Code (NFPA54 / ANSI Z223.1, 2006 or latest edition).

Gas Consumption (BTU/hr)

Gas Type: Natural Gas

Model	Minimum Gas Consumption	Maximum Gas Consumption
M060C	17,000	60,000 (CH) 103,000 (DHW)
M090C	23,500	90,000 (CH) 160,000 (DHW)
M120C		120,000 (CH) 160,000 (DHW)
M160C		160,000 (CH) 160,000 (DHW)

Kits

Model	Gas Type	Kit Number
M060C	NG	803000025
M090C	NG	803000029
M120C	NG	803000033
M160C	NG	803000037

SOLO

Models	M060S, M090S, M120S, M160S
Gas Supply Pressure	Natural Gas Minimum-Maximum supply gas pressure <ul style="list-style-type: none"> • Minimum: 3.0 in. (0.75 kPa) W.C. • Maximum: 10.5 in. (2.61 kPa) W.C.
Input Rate	The input rate can be verified by following the procedure in the National Fuel Gas Code (NFPA54 / ANSI Z223.1, 2006 or latest edition).

Gas Consumption (BTU/hr)

Gas Type: Natural Gas

Model	Minimum Gas Consumption	Maximum Gas Consumption
M060S	17,000	60,000
M090S		90,000
M120S	23,500	120,000
M160S		160,000

Kits

Model	Gas Type	Kit Number
M060S	NG	803000027
M090S	NG	803000031
M120S	NG	803000035
M160S	NG	803000039

4

Conversion Instructions



NOTICE

If subsequent conversions are made then a new conversion label must be placed on the water heater to accurately reflect the gas type.



WARNING

Failure to correctly assemble the components according to these instructions may result in a gas leak or explosion.



CAUTION

The gas supply shall be shut off prior to disconnecting the electrical power, before proceeding with the conversion.



CAUTION



Do not touch any other areas on the PC board other than the described buttons while power is supplied to the appliance. Parts of the PC board are supplied with 120 volts AC.



CAUTION



Do not touch the areas at or near the heat exchanger or hot water lines. These areas become very hot and could cause burns.



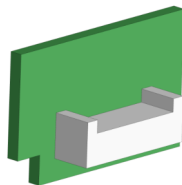
IMPORTANT

Before you get started, confirm that the inlet gas pressure is between the minimum and maximum pressures allowed for this boiler.

1. Items Required

The following items are supplied with the conversion kit:

EEPROM KEY



Model Specific

CONVERSION RATING PLATE



CONVERSION MANUAL



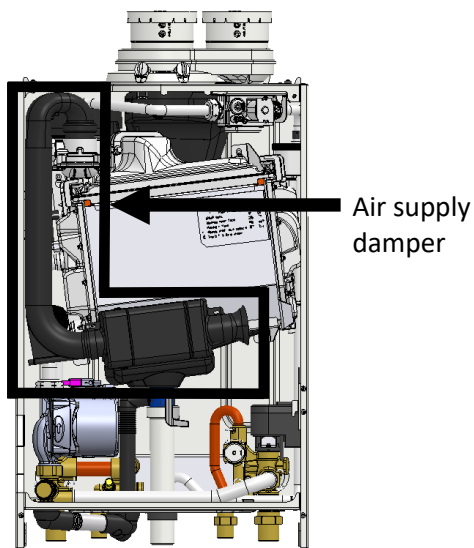
This Manual

Additional items needed:

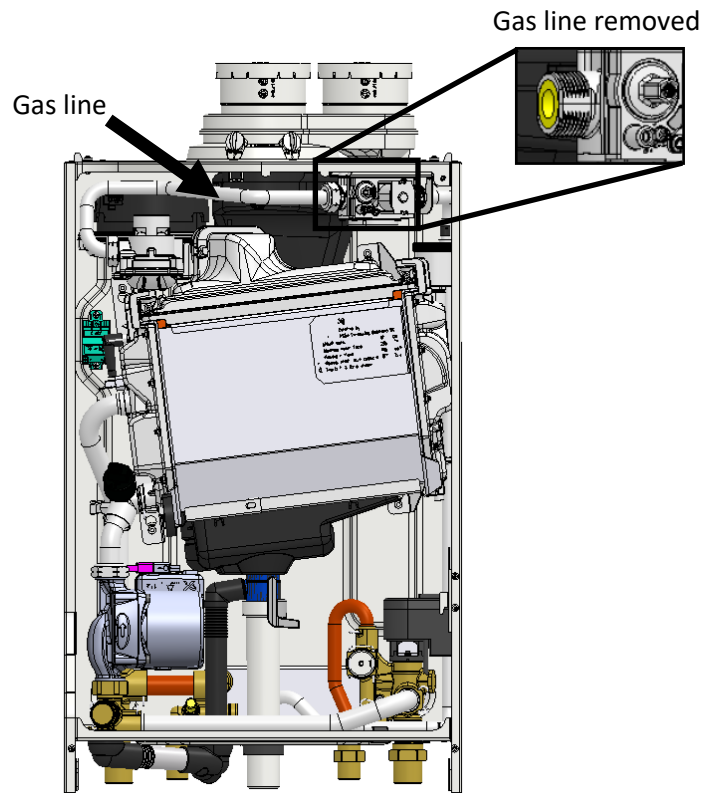
- Adjustable Wrench
- Combustion Analyzer

2. Replace the Orifice and Adjust Parameter Settings

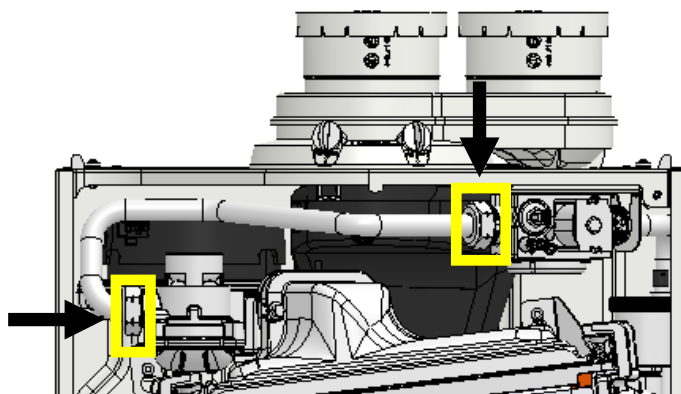
1. Disconnect electrical power to the boiler.
2. Turn off the boiler's gas supply by turning off the gas control valve.
3. Remove the boiler's front panel (refer to the boiler Installation and Operation Manual for instructions).
4. Remove the air supply damper:
 - Unclip the Velcro piece
 - Lift up the air supply damper to remove and gently place aside



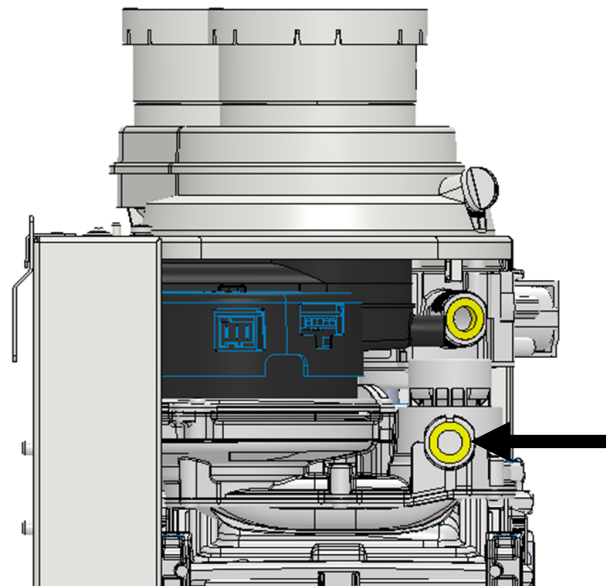
6. Remove the gas line and place aside.



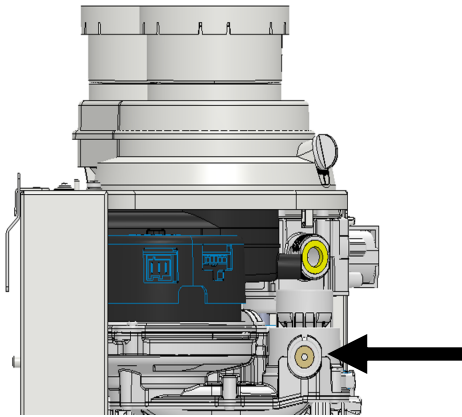
5. Unscrew the gas valve and gas venturi connections.



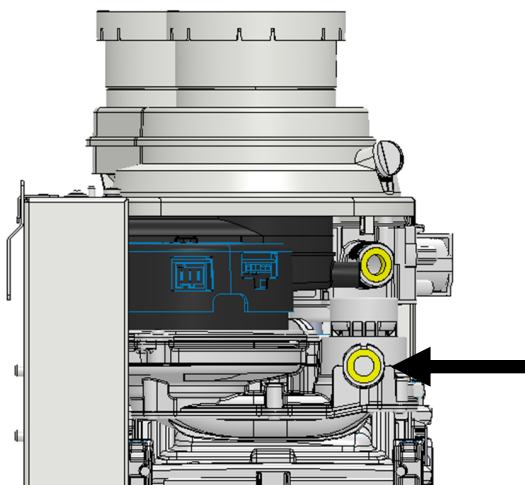
7. Pull out the yellow gasket from the gas venturi.



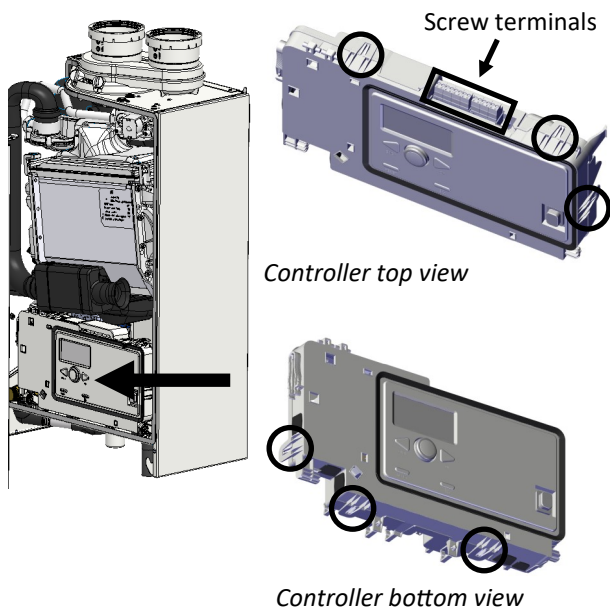
- Remove the Liquid Propane restrictor from the gas venturi.



- Place the yellow gasket into the gas venturi.



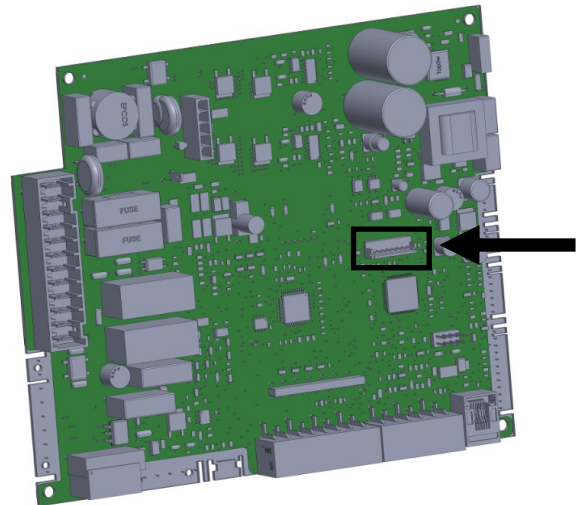
- Reconnect the gas valve, gas venturi connections and gas line.
- Reconnect the air supply damper.
- Locate the controller. Remove all screw terminals and unclip the 6 tabs from the front panel.



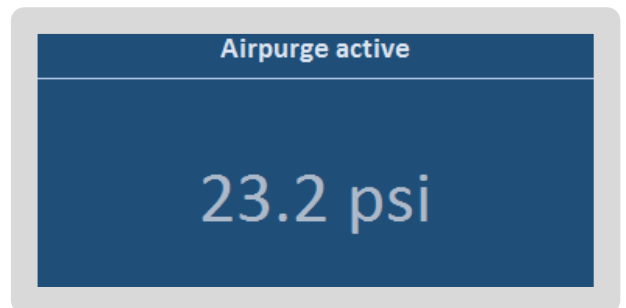
Controller top view

Controller bottom view

- Remove the front housing of the PCB.
- Insert the EEPROM key (included with conversion kit) into the connector on the PCB.

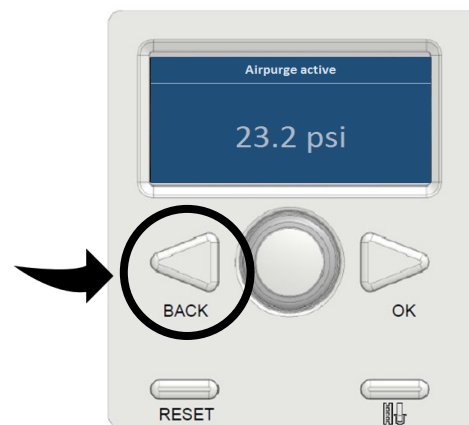


- Reattach the PCB front housing and screw terminals.
- Connect electrical power to the boiler.
- The **Airpurge active** screen appears on the boiler display.

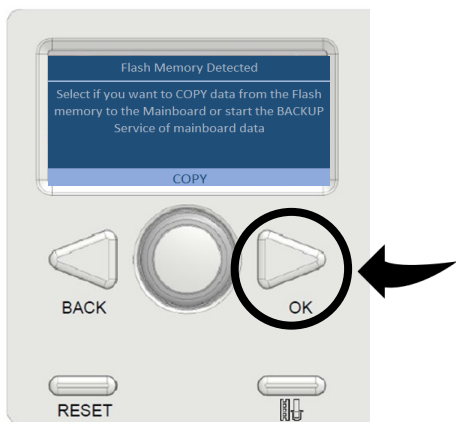


Your psi values may differ than the values shown in image.

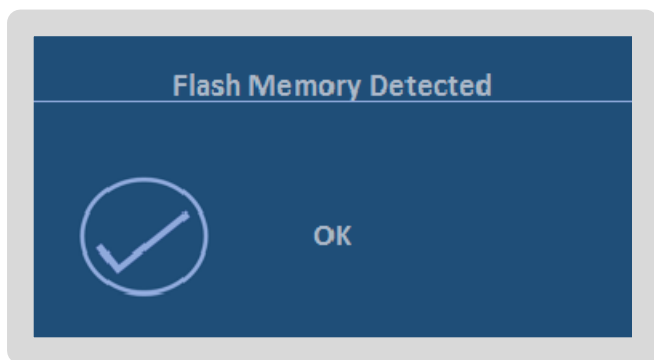
- Press the **Back** button for approximately 7 seconds.



19. The **Flash Memory Detected** screen appears. Press **OK**.



20. The following screen appears indicating data parameters have been copied to the Mainboard.



21. The Home screen briefly appears on the display and then the boiler turns off.



22. After a few seconds, the boiler automatically turns on and goes into **Airpurge active** mode.



Your psi values may differ than the values shown in image.

23. Remove the EEPROM key from the PCB:

- a. Disconnect power to the boiler
- b. Remove the front housing of the PCB.
- c. Remove the EEPROM key from the connector.

24. Reattach the PCB front housing and screw terminals. Clip the 6 tabs back into place.

25. Connect electrical power to the boiler. The boiler will be back in normal operating mode with the proper gas type parameters.

26. See the next section for further instructions.

3. Set the O2 at Maximum Input

THIS SECTION IS INTENDED FOR THE INSTALLER



NOTICE

The O2 percentage setting is required to be checked at commissioning, maintenance and faults and adjusted if needed.



WARNING

The O2 percentage is required to be checked and adjusted after a conversion from Natural Gas to Liquid Propane, or from Liquid Propane to Natural Gas. Setting the O2 at maximum input must be performed with a calibrated combustion analyzer that is set to the correct gas type.

1. Put the boiler into operation with a maximum DHW or heat demand.
2. From the controller home screen, press and hold the **Chimney Active (Service Mode)** button for approximately 7 seconds.
3. Remove the plug covering the **flue gas** test port and place the calibrated combustion analyzer probe into the port (see right image).
4. Scroll to **ON** and press **OK**.
5. Scroll to **100%** and press **OK**.
6. The boiler is now at maximum input.
7. After the boiler has run for approximately one minute, the O2 percentages displayed on the combustion analyzer should match the ranges shown in the table below.

If the ranges do not match, adjust the parameters by following the steps in section: **5. Adjust O2 Percentages**.

8. See the next section for further instructions.

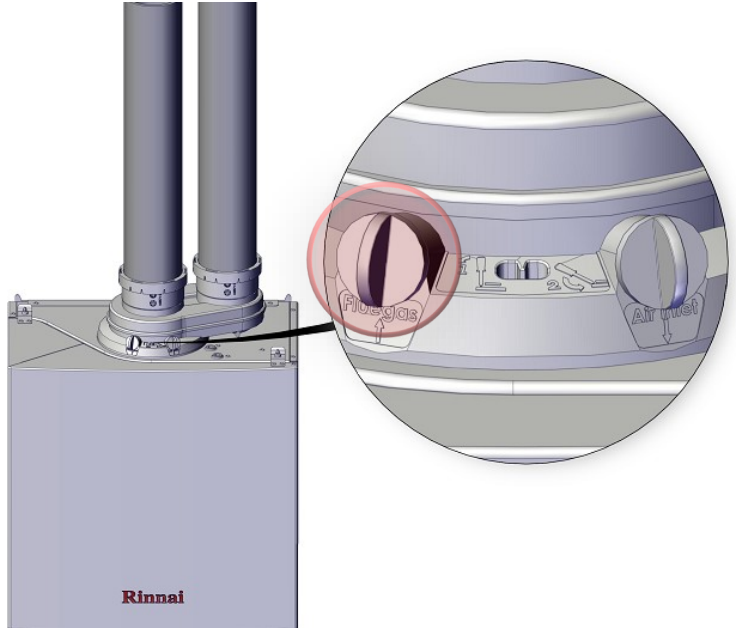


Table: Nominal O2 Percentages

COMBI MODELS

	MAXIMUM INPUT	MINIMUM INPUT
Model	Natural Gas	Natural Gas
M060C	4.7 - 4.9	6.3 - 6.5
M090C	4.2 - 4.4	5.8 - 6.0
M120C	4.2 - 4.4	5.8 - 6.0
M160C	4.2 - 4.4	5.8 - 6.0

SOLO MODELS

	MAXIMUM INPUT	MINIMUM INPUT
Model	Natural Gas	Natural Gas
M060S	4.7 - 4.9	6.3 - 6.5
M090S	4.7 - 4.9	6.3 - 6.5
M120S	4.2 - 4.4	5.8 - 6.0
M160S	4.2 - 4.4	5.8 - 6.0

4. Set the O2 at Minimum Input

THIS SECTION IS INTENDED FOR THE INSTALLER

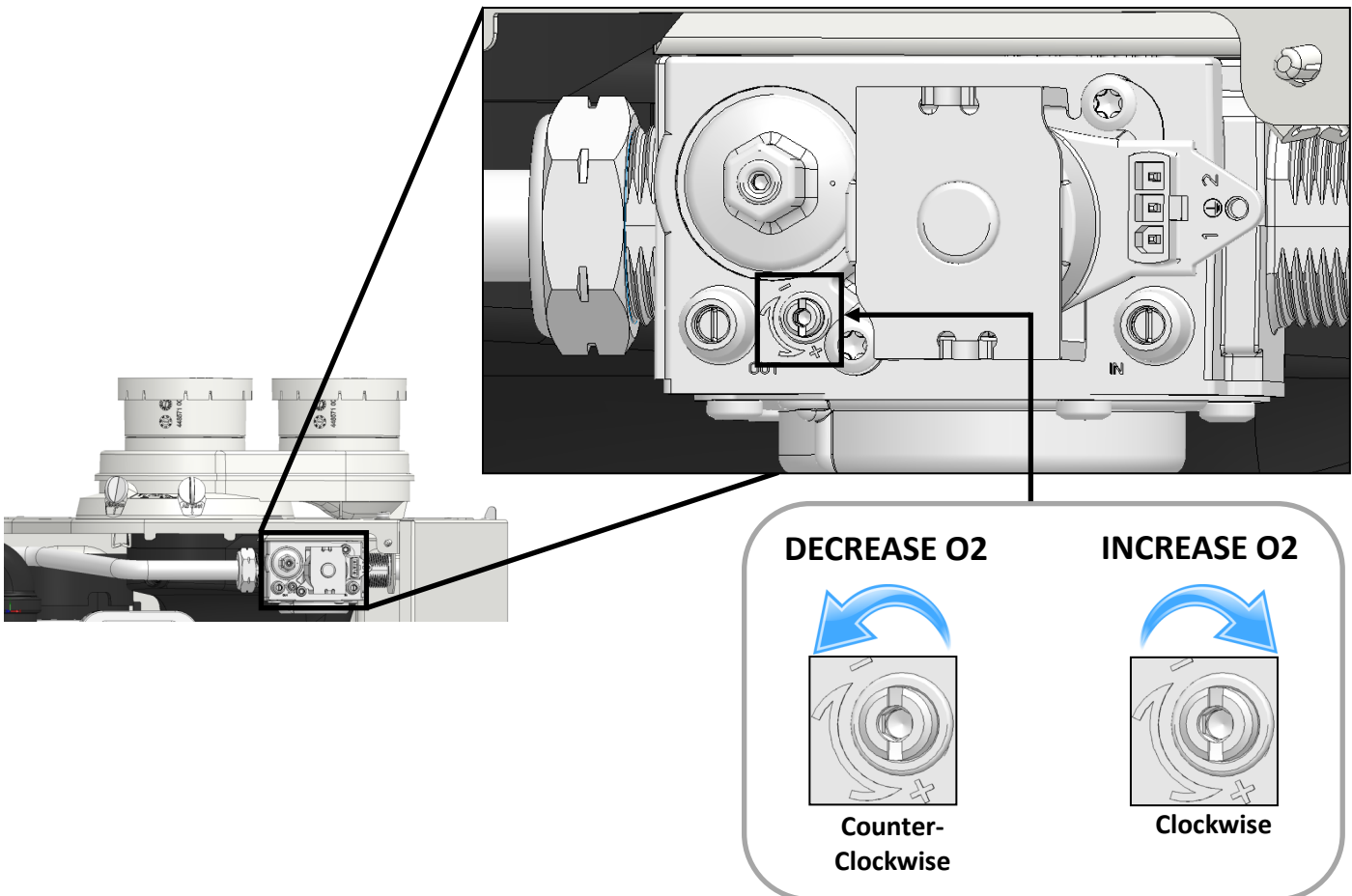
1. While still in service mode (as described in the previous step), use the scroll wheel to adjust to **0%**.
2. Press **OK**.
3. The boiler is now at minimum input.
4. After the boiler has run for approximately one minute, the O2 value displayed on the combustion analyzer should be 1.6% higher than the maximum input value.
Example: If maximum input value is 4.8%, then minimum input value should be 6.4%. If the values do not match, adjust the parameters by following the steps in section: **5. Adjust O2 Percentages**.
5. When adjustments are complete, place the plug back into the flue gas test port.
6. On the controller, press and hold the **Back** button until the Home screen appears in the window.
7. See the next section for further instructions.

5. Adjust O2 Percentages

This section is required only if it is necessary to adjust O2 percentages.

Rotate the screw on the gas valve assembly until you reach the levels shown in the **Nominal O2 Percentages** table (see section **Step 3: Set the O2 at Maximum Input**).

- Rotate counter-clockwise to decrease the O2 percentage
- Rotate clockwise to increase the O2 percentage

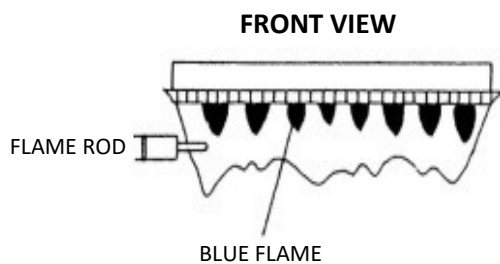


6. Check Operation

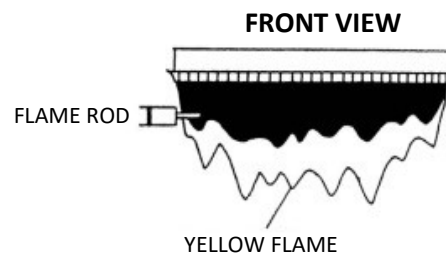
1. Check the normal operating sequence:
 - a. When you press the ON/OFF button, the LED display will illuminate, the combustion fan will begin to run if there is a domestic or central heating demand, and the spark will ignite the main burner.
 - b. This boiler has an automatic ignition system. When the burner has lit, the boiler will show either DHW Active or CH Active, and the spark will stop.
2. Visual inspection of flame:
 - a. Check that the burner flames are operating normally. The flame can be seen through the circular window above the burner. When operating normally, the burner flame should burn evenly over the entire surface. The flame should be clear, blue, and stable. A yellow flame is abnormal and maintenance is required.



SATISFACTORY



UNSATISFACTORY



7. Conversion Rating Plate

1. Reinstall the boiler front panel.
2. Enter the required information on the conversion rating plate label.
3. Affix conversion rating plate label as close as possible to the existing rating plate on the appliance.

8. Canadian High Altitude Installation Setting Procedure



NOTICE

For Canada Only: 610-1,372 m (2,000-4,500 ft). The O₂ percentage setting is required to be checked at commissioning, maintenance, and faults, and adjusted if needed.

The O₂ percentage is required to be checked and adjusted after a conversion from NG to LP or from LP to NG. This process must be done with a calibrated combustion analyzer that has been set to the correct gas type. See section 5. **Adjust O₂ Percentages** for instructions.

All settings/adjustments must be performed by a qualified Service Technician. The conversion shall be carried out by a manufacturer's authorized representative, in accordance with the requirements of the manufacturer, provincial or territorial authorities having jurisdiction and in accordance with the requirements of the CAN/CGA-B149.1 or CAN/CGA-B149.2 Installation Codes.

For high-altitude installations, elevations between 2,000 ft and 4,500 ft (600 m and 1,350 m), in Canadian area it is required to fill out the High Altitude Label. Place the filled out High Altitude Label on the controller supporting frame, on the left side of the rating plate.

5 Operating Instructions

FOR YOUR SAFETY READ BEFORE OPERATING




WARNING


If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

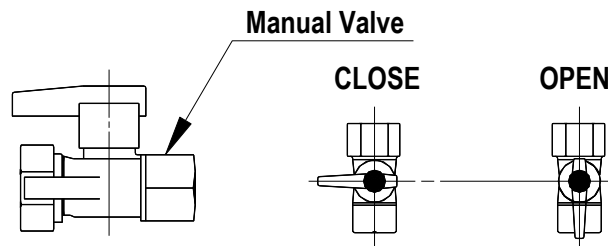
- A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
- B. BEFORE OPERATING, smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

WHAT TO DO IF YOU SMELL GAS
 - Do not try to light any appliance.
 - Do not touch any electric 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.
- C. Use only your hand to push in or turn the gas control valve. Never use tools. If the gas control valve will not turn by hand, do not try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.
- D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.


OPERATING INSTRUCTIONS

1. **STOP!** Read the safety information above.
2. Set the temperature controller to lowest setting.
3. Turn off all electric power to the appliance.
4. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
5. Turn the manual gas control valve located at gas inlet of appliance clockwise  to the OFF position.
6. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas,

STOP! Follow "B" in the safety information above. If you don't smell gas, go to the next step.
7. Turn the manual gas valve located at gas inlet of appliance counterclockwise  to the full ON position.
8. Turn on all electric power to the appliance.
9. Set the temperature controller to desired setting.
10. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier.



TO TURN OFF GAS TO APPLIANCE

1. Set the temperature controller to lowest setting.
2. Turn off all electric power to the appliance if service is to be performed.
3. Turn the manual gas control valve located at gas inlet of appliance clockwise  to the OFF position.



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Local, state, provincial, federal and national fuel gas codes must be adhered to prior to and upon installation.

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