



Navien Combination Boiler

Model

NCB-180/210/240

This boiler is configured for Natural Gas from the factory. If conversion to Propane Gas is required, the conversion kit supplied with the boiler must be used.

WARNING

This conversion kit shall be installed by a qualified service agency* in accordance with Navien America's instructions and all applicable codes and requirements of the authority having jurisdiction. The information in these instructions must be followed to minimize the risk of fire or explosion or to prevent property damage, personal injury or death. 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.

* A qualified service agency is any individual, firm, corporation or company which either in person or through a representative is engaged in and is responsible for the connection, utilization, repair or servicing of gas utilization equipment or accessories; who is experienced in such work, familiar with all precautions required, and has complied with all of the requirements of the authority having jurisdiction.

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 CAN-B149.1 and CAN1-B149.2 Installation Code.

Tools Required:

- Phillips Screwdriver
- Flathead Screwdriver
- 5/32 in or 4mm Allen Wrench
- Combustion Analyzer or Dual Port Manometer
- Gas Leak Detector

Included Items:

- Gas Orifice (refer to below table)

| Model | NG | | LP | |
|---------|--------|--------|--------|--------|
| | 1STAGE | 2STAGE | 1STAGE | 2STAGE |
| NCB-180 | Ø4.80 | Ø5.95 | Ø3.80 | Ø4.70 |
| NCB-210 | Ø6.10 | Ø6.30 | Ø4.50 | Ø4.80 |
| NCB-240 | Ø6.10 | Ø6.30 | Ø4.50 | Ø4.80 |

Table 1. Orifice Size

- Gas Pressure and Conversion Kit Number Labels

Procedure:

1. Turn off both gas and water supply to the boiler.
2. Using a Phillips screwdriver, remove 4 screws (2 from the top and 2 from the bottom) of the front cover assembly to gain access to the internal components. See Figure 1 for illustration of the front cover on the unit.



Figure 1.

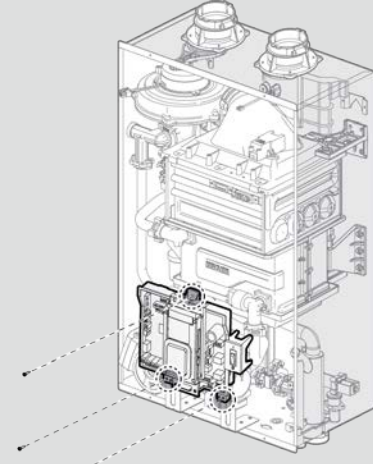


Figure 2.

3. Once the front cover is removed, place it in a safe location to prevent accidental damage.
4. Label all the wires on the PCB.
5. Disconnect all the wires.
6. Loosen the three screws indicated in the figure. (Refer to Figure 2.)

7. Remove the PCB assembly.
8. With the internal components exposed, locate the gas inlet pipe and the gas valve in the middle of the unit.
9. Use a Phillips screwdriver to remove the two screws at location A - the connection below the gas valve where it connects to the pipe. See Figure 3 for reference. Once the screws are removed, carefully separate the pipe from the gas valve.
10. Once the gas inlet pipe is detached from the gas valve, find location B - the connection above the gas valve where it is attached to the fan motor assembly. Carefully remove the four screws by hand using a Phillips screwdriver and pull the gas valve away from the fan assembly to access the gas orifice.

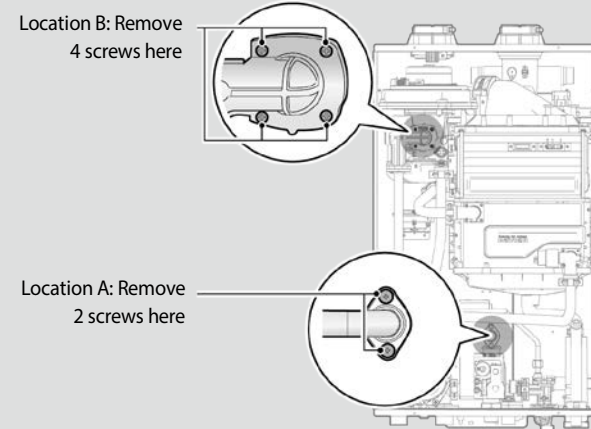


Figure 3. Detaching Gas Valve from Gas Inlet Pipe and Fan Motor Assembly

11. Once the Gas Orifice is exposed, remove the two screws that hold the part in place. Remove the Gas Orifice from its housing and prepare the new Gas Orifice for the LP conversion for installation.

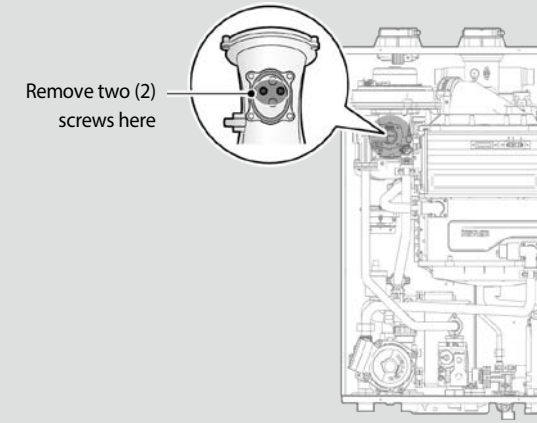


Figure 4. Access to Gas Orifice in Fan Assembly

WARNING

- DO NOT adjust or attempt to measure gas valve outlet pressure. The gas valve is factory-set for the correct outlet pressure. This setting is suitable for natural gas and propane, requiring no field adjustment.
- Attempting to alter or measure the gas valve outlet pressure could result in damage to the valve, causing potential severe personal injury, death or substantial property damage. Navien NCB boilers are shipped ready to fire natural gas ONLY.

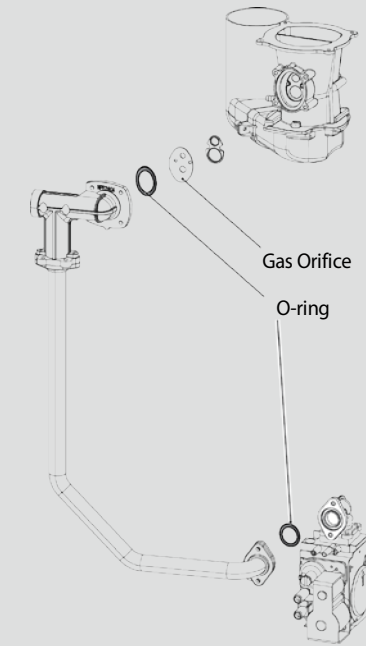


Figure 5. Exploded View of Gas Pipe Assembly

DANGER

See Figure 5. Inspect the O-ring between the gas valve and gas valve inlet adapter whenever they are disassembled. The O-ring must be in good condition and must be installed. Failure to comply will cause a gas leak, resulting in severe personal injury or death.

1 3
2 4

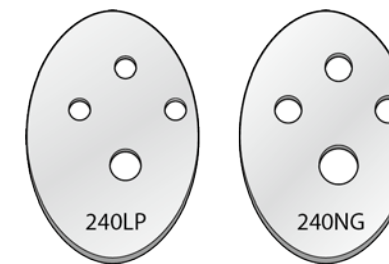


Figure 6. Orifice identification

12. Replace the old Orifice piece with the new part for use with LP gas. Ensure that the Orifice is properly seated inside the port before proceeding to the next step.
13. Replace the gas inlet pipe to its original position and use all screws to secure all connections.

Note Do not overtighten as this may damage or crack the components.

DANGER

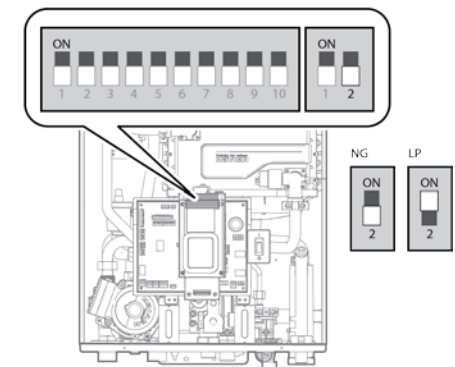
Inspect the O-ring between the gas valve and gas valve inlet adapter whenever they are disassembled. The O-ring must be in good condition and must be installed. Failure to comply will cause a gas leak, resulting in severe personal injury or death.

14. Place the PCB assembly back on to the boiler and tighten the three screws.
15. Check the labels carefully and then connect all the wires.

16. Set the front panel Dip Switch to change the gas type. For LP, set Dip Switch 2 #2 to On. For NG, set DIP SW2 #2 to Off.

WARNING

Ensure that you have turned off the power to the boiler before accessing the DIP switches.



DANGER

- When conversion is required, be sure to set the front panel DIP switches according to the supply gas type.
- Failure to properly set the DIP switches could cause carbon monoxide poisoning, resulting in severe personal injury or death.

17. Turn on the gas and water supply to the boiler.

18. Measure and adjust the gas/air ratio.
Option 1. Using Combustion Analyzer (recommended)

- a. Loosen the screw, rotate the plate and remove the gasket to access the emissions monitoring port as shown in Figure 7.
b. Insert the analyzer into the port (Figure 7).

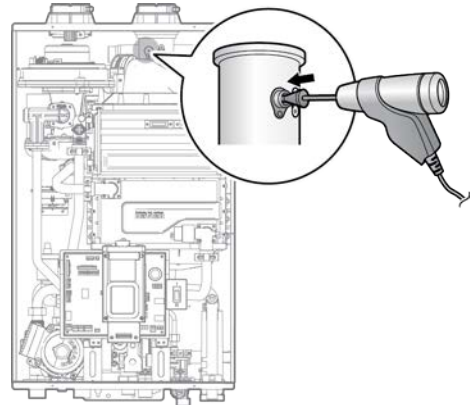


Figure 7. Insert the Analyzer

| Model | Fuel | High fire | Low fire |
|---------|------|------------------|------------------|
| | | %CO ₂ | %CO ₂ |
| NCB-180 | NG | 8.9 | 9.5 |
| | LP | 10.2 | 10.8 |
| NCB-210 | NG | 8.9 | 9.5 |
| | LP | 10.2 | 10.8 |
| NCB-240 | NG | 8.9 | 9.5 |
| | LP | 10.2 | 10.8 |

Table 2. CO₂ value

(CO₂ values must be within 0.5% of the values listed.)

- c. Fully open several hot water fixtures and set the boiler to operate at 1-stage MIN mode (refer to page 8). Measure the CO₂ value at low fire. If the CO₂ value is not within 0.5% of the value listed in Table 2, the gas valve set screw will need to be adjusted. If adjustment is necessary, locate the set screw as shown in Figure 8. Using a 5/32 in or 4 mm Allen wrench, turn the set screw no more than 1/4 turn clockwise to raise or counterclockwise to lower the CO₂ value.

- b. Connect a manometer to the offset pressure port. For dual port manometers, use the positive pressure side.

| Model | Kit Part No. | Gas Type | Offset |
|---------|--------------|----------|--------------|
| NCB-180 | NAC-01 | LP | -0.03"±0.01" |
| | NAC-100 | NG | -0.04"±0.01" |
| NCB-210 | NAC-02 | LP | -0.02"±0.01" |
| | NAC-200 | NG | -0.04"±0.01" |
| NCB-240 | NAC-03 | LP | -0.02"±0.01" |
| | NAC-300 | NG | -0.04"±0.01" |

Table 3. Offset value for low fire

- c. Fully open a hot water fixture and set the boiler to operate at 1-stage MIN mode (refer to table 2). Measure the offset value at low fire and compare it to the values in Table 3. If the offset value is out of range, the gas valve set screw will need to be adjusted. If adjustment is necessary, locate the set screw as shown in Figure 10. Using a 5/32" or 4mm Allen wrench, turn the set screw no more than 1/4 turn clockwise to raise or counterclockwise to lower the offset value.

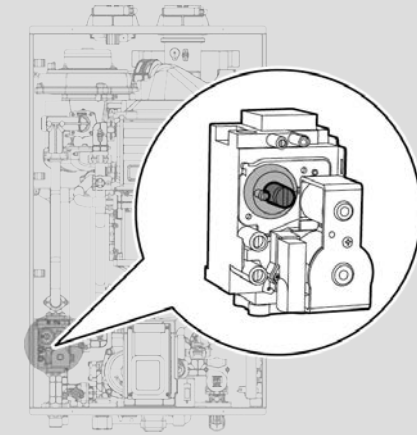


Figure 10

Note The set screw is located behind the screw-on cover. This must be removed first.

- d. At high fire, do not check the offset value and never adjust the gas valve.



DANGER

Improper gas valve settings can cause severe personal injury, death or substantial property damage.

5 7
6 8

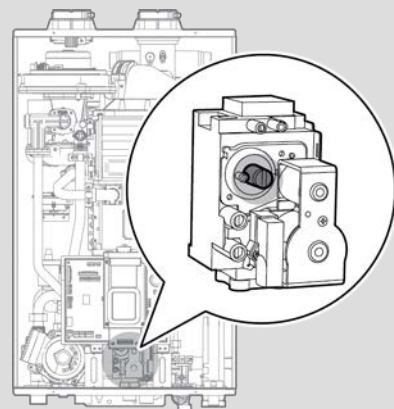


Figure 8. Set Screw Location

Note The set screw is located behind the screw-on cover. This must be removed first.

- d. Fully open several hot water fixtures and set the boiler to operate at 2-stage D. MAX mode (refer to page 8). Measure the CO₂ value at high fire.

If the CO₂ values do not match Table 2 at high fire, do not adjust the gas valve. Check for the proper Gas Orifice.



DANGER

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Option 2. Using Digital Manometer

- a. Open the offset pressure port by loosening the screw two turns as shown in Figure 9.

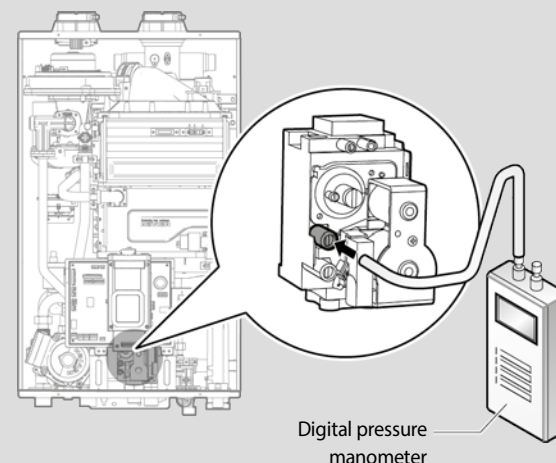


Figure 9. Connect Digital Pressure Monometer

12. Once the CO₂ or offset values have been confirmed, apply the included conversion stickers to show that the appliance has been converted to propane gas. Place these labels adjacent to the rating plate as shown in Figure 11.

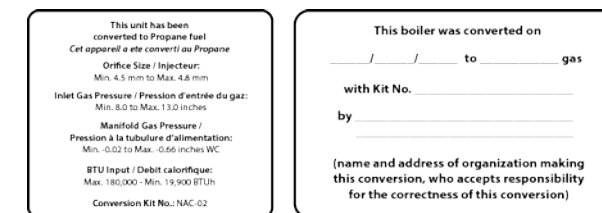


Figure 11. Proper Placement of Gas Conversion Labels

Note Manifold Gas Pressure ratings can change due to updated orifice sizes. Please confirm new manifold pressures approved by CSA before production of gas conversion labels.

Setting the Operation Mode

- Using the Front Panel, press and hold the Diagnostics Button or over 5 seconds until "1.PAR" is displayed.
- Press the + (Up) button two to change the display to "3.OPR".
- Press the Information Button once to access the Operation Mode menu.
- Press the + (Up) button once to set the boiler to operate at 1-stage MIN ("MIN.1").
- To set the boiler to operate at DHW 2-stage MAX, press the + (Up) button 4 times or until "D.MX.2" is displayed.
- To exit the Operation Mode and return the boiler to normal operation, press the Reset button twice.



Diagnostics
Mode
Reset



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