

CX series, VX series, & SL 85/ 115/ 160/ 199 G3 Models



Warning

This replacement kit shall be installed by a qualified service agent in accordance with these 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 is checked as specified in these instructions.

Note

Installation of these gas valves requires the use of a flue gas analyzer.

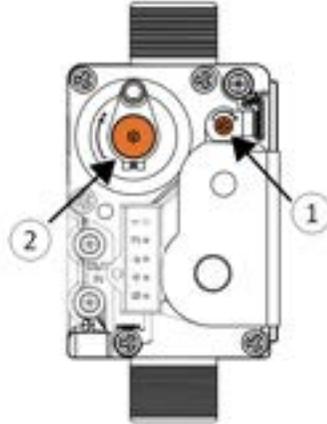
Replacement gas valves are **not shipped pre-calibrated**. Gas valves require pre-calibration to produce a flammable gas-air mixture. Pre-calibration setup of the gas valve will vary according to boiler model and the fuel used. See [Table 1](#) .

If the replacement gas valve has a factory calibration sticker present proceed to [Installation of Pre-Calibrated Gas Valve on page 3](#). It can be installed without having to pre-calibrate it as described in this document.

When you purchase this kit from a wholesaler, you'll receive:

Gas Valve - SL 85/115/160/199 G3, VX , CX series			
	Part #	Description	Quantity
	180-165	Gas Valve	1
	150-175	O-Ring,IG Boiler,2mm X 19ID (used for SL 85/115/160 G3 and VX models)	1
	150-245	O-Ring, 2mm X 15 ID(used for CX series)	1
	150-459	O-Ring, Square, NBR70, ID16 (used for SL 199 G3 model as well as for the inlet side of the gas valve)	2

High-Fire/Low-Fire Adjustment for Gas Valve



Item Number	Description
1	High-Fire Adjustment Screw
2	Low-Fire Adjustment Screw (under cap, pictured)



Note

A ladder or step may be required to have a clear vertical view of the work area.

Do not attempt to remove the assemblies without a clear view, as damage to the connectors, screws or refractory may occur.

Pre-Calibration of Gas Valves

Adjustment of High-Fire Gas / Air Ratio

1. Use a Torx 15 bit and turn the high-fire gas/air ratio screw clockwise to the *fully open position*, in the direction of the (+) sign (see [Figure 1](#)).
2. Refer to [Table 1](#), and based on the model and fuel source, turn the high-fire gas/air ratio screw counter-clockwise in the direction of the (-) sign the appropriate number of turns.

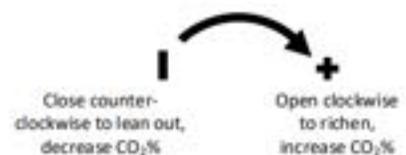


Figure 1 High-fire gas/air ratio adjustment

Boiler Model	Pre-calibration Counter-clockwise Turns Closed	
	Natural Gas	Propane
SL 10-85 G3	15 ¼	15 ¾
SL 14-115 G3	14	15
SL 20-160 G3	10	10 ¼
SL 30-199 G3	10 ¾	13 ½
VX 110	11 ¾	13 ½
VX 150	9¼	11
VX 199	8	10 ½
CX 150	10	12 ½
CX 199	9 ¼	10 ¾

Table 1 Pre-calibration turns for replacement gas valve based on fuel type

- Remove the cap from the zero offset (low-fire) adjustment screw.
- Use a Torx screwdriver to close the zero offset screw approximately a sixth ($\frac{1}{6}$) of a turn in the direction of the (-) sign (i.e. counter clockwise, from 'noon' to 10 o'clock), regardless of the model or fuel type.



Caution
Never attempt to 'bottom out' the low-fire screw.

- Replace the cap.

Installation of Pre-Calibrated Gas Valve

Preparing the Boiler for Service

- Remove call(s) for heat.
- Remove power to the boiler at a wall switch or a breaker.
- Shut off gas supply to the boiler.

Do not drain the boiler unless freezing conditions are expected during this procedure.

- Allow the boiler to cool down.
- Remove the front cover.

Installing the Pre-Calibrated Gas Valve

1. Remove the old gas valve:
 - a. Disconnect the gas valve electrical cable by removing the screw (retain),
 - b. Unscrew the nut on the outlet of the gas valve,
 - c. Separate the gas valve from the outlet gas line and remove the orifice and o-ring (or gasket).
 - d. Unscrew the nut on the inlet of the gas valve, and remove the gas valve bracket. Ensure that the gasket remains inside the nut.
2. Position the inlet of the new pre-calibrated gas valve so that it is supported by the gas valve bracket. Ensure that the gasket (part 150-459) is in place and secure the valve in place by tightening the nut on the inlet.
3. Make certain that the o-ring is in place, and tighten the upper gas valve nut.
 - » Ensure that the gas valve orifice is in place, and use o-ring part number 150-175 for SL 85/115/160 G3 models and VX series. Measure and ensure that the inner diameter (ID) of the o-ring is 19mm ($\frac{3}{4}$ ").
 - » Use o-ring part number 150-245 for CX series. Ensure that the inner diameter (ID) is 15mm ($\frac{9}{16}$ ").
 - » Use o-ring part number 150-459 for SL 199 G3 model. Ensure that the inner diameter (ID) is 16mm ($\frac{5}{8}$ ").
4. Reconnect the gas valve electrical cable with the screw.

Start-up Procedure

1. Turn on gas to the boiler.
2. Check connections for leaks during operation.
3. Turn on power to the boiler.
4. Perform a combustion analysis, and test for proper operation.

Combustion Testing and Adjustment

1. Give the boiler a call for heat.
2. Prepare analyzer but do not insert it into flue test port until a stable flame has been established.

Note

If fuel supply is undiluted and a good spark is observed, but the trial for ignition is unsuccessful, enrich the gas / air screw one half turn (clockwise).

3. Follow the steps below based on the controller touchscreen color to set the heat-out value for the **maximum** and **minimum** MBH:

a. Run the boiler at high fire by setting the heat-out value in Test Operation mode to the boiler's **maximum MBH**:

Black Touchscreen UI	Blue Touchscreen UI
» Select ●●●(More) > Test Operation	» Main Menu > Diagnostics > Test Operation
» Select Fan Test: Heat Output box and enter the maximum MBH (or kW) using the number pad.	

b. Set the heat-out value in Test Operation mode to the **minimum MBH** for the boiler:

Black Touchscreen UI	Blue Touchscreen UI
» Select ●●● (More) > Test Operation.	» Main Menu > Diagnostics > Test Operation
» Select Fan Test: Heat Output box and enter the minimum MBH (or kW) using the number pad.	

4. Adjust according to [Table 2](#) below, or refer to the Installation Manual for combustion targets.

- a. Use a screwdriver and turn clockwise to raise the CO₂% (to richen).
- b. Turn counter-clockwise to lower CO₂%.

 **Caution**

The low fire screw is particularly sensitive.

To avoid major fuel changes that may dramatically impact the system, start adjusting by one eighth (1/8) of a turn until the analyzer measures a change, then adjust by increments of 1/16 of a turn.

If changing direction on this adjustment you may notice a significant backlash.

5. Check the results and confirm the correct settings when you return the boiler to high fire, and then to low fire.

 **Note for Conversion to Natural Gas**

Lock the gas meter to confirm full maximum rating plate input.

6. Set the heat to zero (0) and return to the home screen.
7. Remove the call for heat.
8. If a manometer is connected to the gas valve inlet gas pressure port:
 - a. Turn off the gas supply at the external gas shut-off valve.
 - b. Disconnect the manometer.
 - c. Tighten the inlet pressure port screw with a screwdriver.

9. Remove the analyzer probe, and install the test port plug.
10. Turn on the gas supply, and return the boiler to normal operation.
11. Reinstall front panel.

Fuel	CO ₂ at High fire		CO ₂ at Low fire		CO max PPM
	Range	Target	Range	Target	
Natural Gas	8.9% - 10.0%	9.5%	8.2% - 9.2%	8.7%	<150
Propane	10.3% - 11.3%	10.8%	9.3% -10.3%	9.8%	< 250

Table 2 Table for Combustion Test Target Ranges

Note
 Low fire CO₂ should be at least 0.5% lower than High fire CO₂