Steps *(continued)*

Start-up and Maintenance | **6. Relay tests**

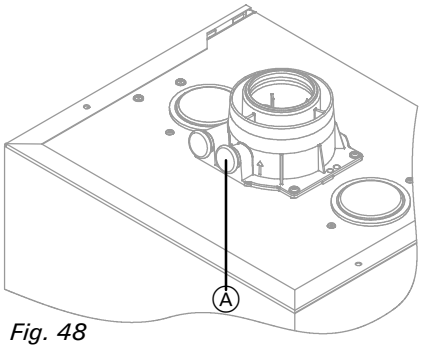


Fig. 48

Legend
Ⓐ Flue gas measuring port

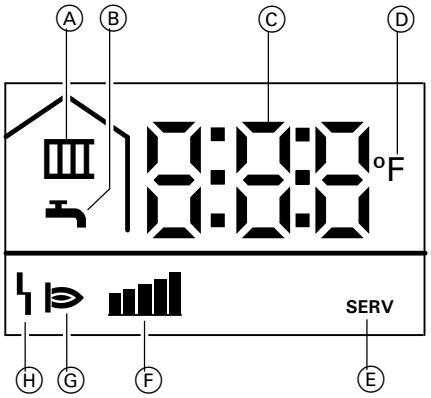
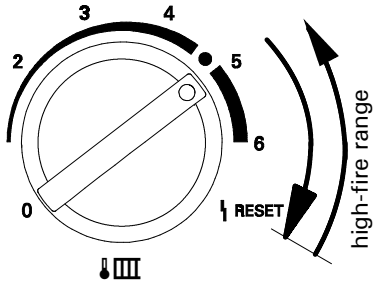


Fig. 49

Legend
Ⓐ Heating mode pump output on
Ⓑ Heating mode
Ⓒ Boiler water temperature in °F or fault code
Ⓓ Water temperature unit in °F
Ⓔ Service mode
Ⓕ Current burner firing rate
Ⓖ Burner in operation
Ⓗ Fault



Control range - high-fire

Fig. 50

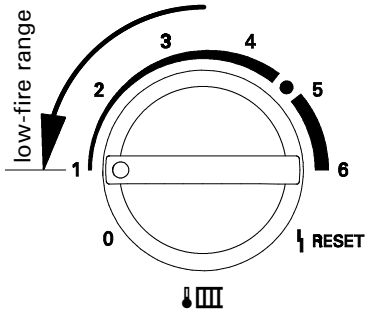
The Vitodens 100-W boiler is factory preset for operation with natural gas. It is recommended that a CO_2 check be performed at the boiler vent pipe adaptor as part of the initial start-up/maintenance procedure.
For high altitude operation (above 5,000 ft / 1,500 m), refer to page 52 first.
For conversion to propane, see the separate instructions.
The CO_2 value lies within the range of
- *7.5 to 10.5% for natural gas and 10 to 12% for propane gas.*

The CO_2 value measured must be compared with the above CO_2 value.

	CO_2	
	high-fire	low-fire
NG range	7.5-10.5%	7.5-10.5%
Target value	9.0%	8.7%
LP range	10.00-12.0%	10.00-12.0%
Target value	10.8%	10.5%

Note:
When the boiler is initially turned on, a self-diagnostic check is initiated. Wait until the temperature display is stabilized and the boiler's actual temperature is displayed.

Note:
If step 14 is not performed, the process will end automatically after 30 min.



Control range - low-fire

If the CO_2 value measured lies more than 1% outside the stated range, perform the following step:
- *Check the venting system for leaks (refer to the Vitodens Venting System Installation Instructions).*

1. Bring the boiler to a high-fire test position by turning the selector dial "🌡" clockwise all the way to **"⚡Reset"** and then back again into the high-fire control range (in less than 2 seconds) as shown in Fig. 51. The display shows "**SERV**", the boiler water temperature, five bars "▮▮▮▮▮" for high-fire test, burner in operation "🔥" and "▥" pump operation (Fig. 50).

2. Check the flue gas CO_2 content. Should the actual value deviate by more than 1% from the range shown in the table, check the seals in the balanced flue system. Adjust if necessary (see page 51).

3. Enter actual values into the service report.

4. Bring the boiler to a low-fire test position by turning the selector dial "🌡" clockwise all the way to **"⚡Reset"** and then back again into the low-fire test control range (in less than 2 seconds), as shown in Fig. 51.
The display shows "**SERV**", the boiler water temperature, one bar "▮" for low-fire test, burner in operation "🔥" and "▥" pump operation, as shown in Figure 50.

Note:
Once in a low / high-fire test range, you can switch back and forth between the high and low by simply positioning the control range for the required test.

Note:
The heat generated by the boiler during the high-low-fire relay test must be removed. The heating load must be imposed on the boiler (DHW or heating) during the duration of the test. Boiler temperature is automatically adjusted to a maximum of 178°F / 81°C.

Steps *(continued)*

Start-up and Maintenance | **6. Relay tests** *(continued)*

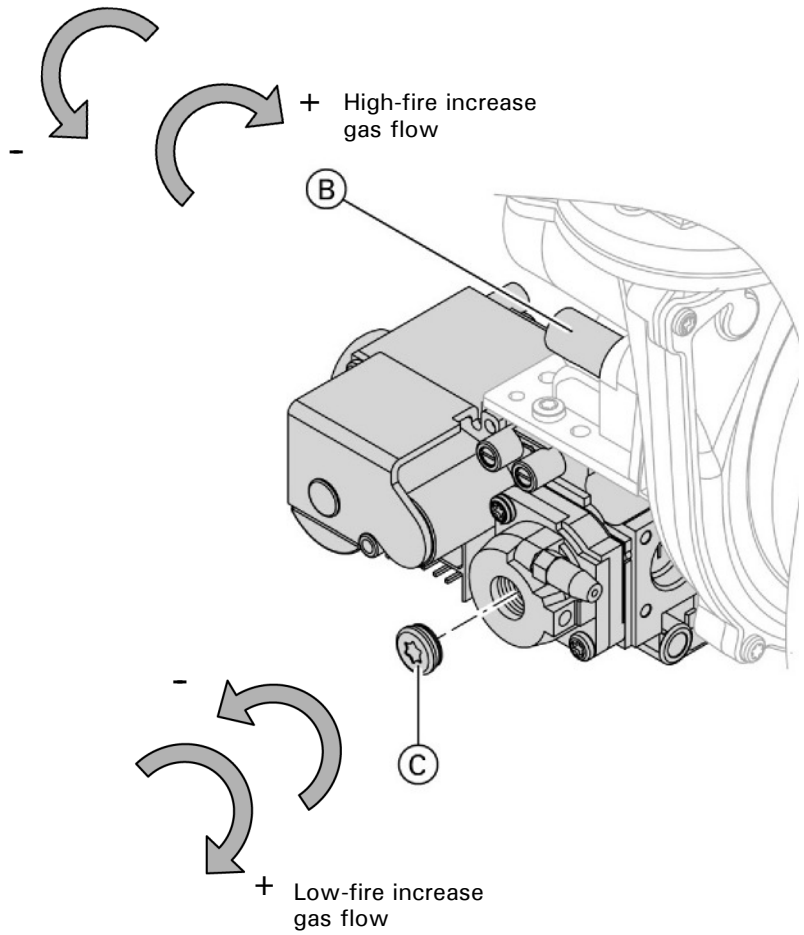


Fig. 51

5. Check the flue gas CO_2 content. Should the actual value deviate by more than 1% from the above range, check the seals in the balanced flue system.

6. Enter actual values into the service report.

7. Check the CO_2 content for high- and low-fire again. If the CO_2 content is **still not** within the given range (refer page 50), adjust the CO_2 content.

8. **Adjusting the CO_2 content.** Adjust the high-fire (natural gas).

9. With the adjusting screw Ⓑ, using a hex head wrench (4 mm), adjust the high-fire CO_2 content to 9%. Clockwise rotation decreases gas flow and counter-clockwise rotation increases gas flow.

10. Adjusting the CO_2 content (natural gas) during low-fire. Remove cover Ⓒ from the gas valve. With the adjusting screw under the cover and using a T40 size Torx head wrench, set the low-fire CO_2 content to 8.7% or refer to the table on page 50. Clockwise rotation increases gas flow and counter-clockwise rotation decreases gas flow.

11. Reinstall cover Ⓒ.

12. Shut the boiler down, remove flue gas analyzer and close flue gas measurement port Ⓐ.

13. Return selector dial "🔧" and "🌡" to their original positions.

14. To cancel the relay test, switch the boiler OFF then back ON. If not cancelled, the relay test is automatically deactivated after 30 minutes.

Steps *(continued)*

Start-up and Maintenance | **7. High altitude setting**

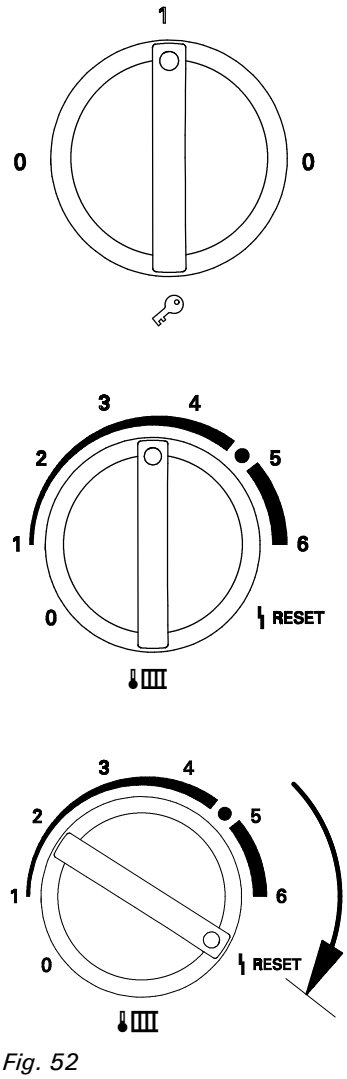


Fig. 52

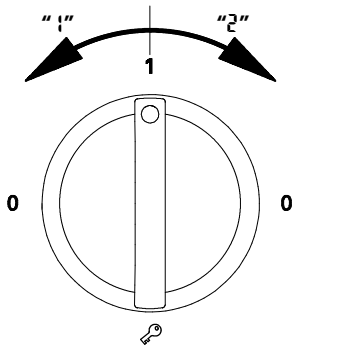


Fig. 53

1. Simultaneously turn selector dials "🔑" and "🌡" to their center position. **"SERV"** appears in the display. (To do the following step, **"SERV"** must still be shown in the display.)

2. Turn selector dial "🌡" clockwise all the way to the **"ϟReset"** position.

3. "🌡" appears on display along with flashing set value **"1"** or **"2"**.

4. With selector dial"🔑", set the value to **"2"** for operation above 5,000' / 1,500 m.

Turn the selector dial "🔑" from the center position to the right or left, as shown in Fig. 54.

Value	Operation
1	Altitude < 5,000' / 1,500 m
2	Altitude > 5,000' / 1,500 m

5. Do not adjust the selector dials for at least 15 seconds. The set value **"1"** or **"2"** is then saved and the control unit returns to standard mode.

6. Turn ON/ /OFF switch OFF and then ON. When completed, it will activate the designated setting

Note:
When the boiler is initially turned on, a self-diagnostic check is initiated. Wait until the temperature display is stabilized and the boiler's actual temperature is displayed.

Steps *(continued)*

Start-up and Maintenance

8. Clock natural gas meter

Clock natural gas meter to verify input

1. Ensure all other gas equipment served by the meter is turned off during timing of gas input to the Vitodens 100-W boiler.

2. Measure the time in seconds it takes for the boiler to use 10 cu. ft. of gas. Divide 3600 x 10 by the number of seconds and you get the number of cu. ft. of gas used per hour. Multiply this number by the heating value of the gas to obtain Btu per hour input.

For example:
A Vitodens 100-W boiler
(118 000 Btu/h input) requires 305 seconds to use 10 cu. ft. of natural gas. After contacting the local utility, you find the heating value is e.g. 1000 Btu per cu. ft.
Therefore,
((3600 x 10)/305) x 1000 ≅ 118 000 Btu/h input.
Therefore, the boiler input is correct.

Burner input formulas (up to 4500 ft.):
INPUT = (3600 ÷ t) x 1000 where
t = TIME (sec.) for 1 $ft.^3$
INPUT = (3600 x .01 x 1000 x 35.31) ÷ T where
T = TIME (sec.) for .01 m^3 natural gas

IMPORTANT

A boiler underfired by 5% is still acceptable. Do not overfire the boiler.

CAUTION

Always contact your gas utility to obtain the correct heating value before clocking the meter.

5368 828 v1.1