

4.3 Calibration

The calibration procedure requires cal gases with known oxygen concentration to determine cal factors for the analyzer (slope and intercept)

 **Caution:** Calibration gases should be instrumentation grade and be supplied with a Certificate of Analysis (COA) indicating an accuracy of $\pm 0.03\%$.

 **Caution:** Recommended calibration gases are 21.00 and 99.99% oxygen with nitrogen as the balance gas. Pure nitrogen may not be used as a calibration gas, as the analyzer does not operate at 0% oxygen.

Note: Single point (high or low) calibration can be performed, but is less accurate.

4.3.1 Viewing the Calibration Set points

There are two adjustable calibration set points, one for a low cal gas and one for a high cal gas, for example, 21.00 and 99.99% oxygen with balance gas nitrogen.

To view the low cal set point, press the CAL key; to view the high cal set point, press CAL again or NEXT.

The set point is shown on the message display (e. g. "Cal 20.9").

4.3.2 Two point Calibration

Caution: Calibration should only be performed if the analyzer has been warmed up for at least 5 minutes. (Press the CAL key 6 times to display the cell temperature, which should be 45.0 ± 0.3 °C.)

- A. Connect the high cal gas to the inlet and flow the cal gas at 50 to 250 ml/min.
- B. Press the FLOW key to read flow. Adjust gas flow if needed.
- C. Press the CAL key twice to display CAL xxx where xxx is the high calibration set point. Ensure that the high cal set point matches the calibration gas oxygen concentration; adjust the set point if necessary (4.3.5).
- E. The upper oxygen display will show the oxygen measurement for the high cal gas.
- F. Allow the reading to stabilize then press the SET key. An automatic calibration will be initiated. The message display will briefly show HI CAL. As soon as the calibration is accepted by the monitor the message display will return to CAL xxx.



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- G. Disconnect the high cal gas and connect the low cal gas to the inlet and flow the gas at 50 to 250 ml/min.
- H. Press the FLOW key to read flow. Adjust gas flow if needed.
- I. Press the CAL key to display CAL xxx where xxx is the low calibration set point. Ensure that the low cal set point matches the calibration gas oxygen concentration; adjust the set point if necessary (4.3.4).
- J. The upper oxygen display will show the oxygen measurement for the low cal gas.
- K. Allow the reading to stabilize then press the SET key. An automatic calibration will be initiated. The message display will briefly show LOW CAL. As soon as the calibration is accepted by the monitor the message display will return to CAL xxx. Press the O2 key to restore the oxygen measurement display.

The analyzer is now calibrated.



Caution: A calibration error (CALERR) is generated if the cal set point does not match the cal gas concentration, or if the low and high cal set points are too close to each other.

4.3.3 Single Point Calibration

Connect the low cal or the high cal gas to the inlet. Proceed as in 4.3.1 above. Single point calibration may be performed, in a well ventilated room with "Room air" preferably dried with a desiccant. Select the low cal gas (i.e. 20.9% with dessicant, 20.7% to estimate humidity dilution) setting and proceed as in 4.3.1 above.

4.3.4 Span Calibration.

If calibration has been performed incorrectly by pressing the SET for High Cal with a low concentration gas in the sensor, the analyzer can be reset using the Span Cal feature. Apply true 99.99% oxygen to the inlet, check the flow, toggle to the Span Cal message and press Set. Follow with a Low Cal.

4.3.5 Changing the Low Cal Set Point:

Cal + Next Key: Press the Cal and Next keys simultaneously. Low Cal will appear in the lower display, and the low calibration set point will be appear in the upper display. To change the Low Cal set point, use the (+)arrow up or (-) arrow down key. Press set to store.

4.3.6 Changing the High Cal Set Point:

Cal + Next , Next: Press the Cal and Next keys simultaneously, and then press Next again. High Cal will appear in the lower display, and the high calibration set point will be appear in the upper display. To change the High Cal set point use the (+)arrow up or (-) arrow down key. Press set to store.