PREMIER SENSOR MANUAL CALIBRATION

The **"Manual Calibration"** feature is supported on sensors with **Regular** and **Low Power** firmware versions. However, it is **not available** on **Low Power 2** sensors.

To calibrate the **Premier sensor**, use the **Zero** and **Span** buttons on the PCB to short the **Rx** or **Tx** pin to the **0V** pin according to the instructions below for the Zero and Span calibration.

Note 1: The manual calibration will only work when the Premier Sensor has been powered for a minimum of 10 minutes. For the first 10 minutes, the Rx/Tx pins are still being used for UART communications. The sensor operates normally during the first ten minutes, after which the communication pins switch to serve as calibration inputs.

Note 2: The "Comms" options of the Premier sensor must be set to "Manual Calibration" mode, prior to using the feature. Therefore, the "Manual Calibration" option must be specified when the sensors are ordered.

Note 3: Note that when performing the "Manual Calibration", the span gas concentration must match the value specified on the calibration certificate for each sensor.

Sensor Zero

Ensure the sensor is in zero-gas environment. Press the **Zero** button on the PCB; this will connect the Rx pin to the sensor 0V supply for a minimum of 5 seconds to zero the sensor.
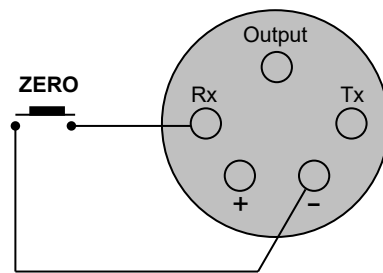
Figure 1

Note 1. Sensors must be zeroed using 100% nitrogen.
Note 2. Where a purging gas has to be applied, use a flow rate of between 200 and 600cc/min. Allow sufficient time for the sensor to respond and for the reading to stabilize.

Sensor Span

Always zero the sensor prior to performing a span operation.

The default gas concentration for a **Span** operation is listed below:

Gas range	Ideal Calibration Gas Level
0-5% vol. CH4	2.5% vol. CH4
0-100% vol. CH4	100% vol. CH4
0-2% vol. C3H8	1.1% vol. C3H8
0-100% vol. C3H8	100% vol. C3H8

This approach ensures optimal linearity across the entire operating range. However, if maximum accuracy is needed at a specific gas concentration—such as 25% of the full-scale value—a Span calibration can be performed using that specific value instead of the default half-scale value.

Apply a known concentration of gas (applicable to sensor type) at a flow rate of between 200 and 600cc/min.

Allow time for the sensor to respond and for the reading to stabilize. The response time of the sensor is the time takes for the sensor to reach a certain value. T100, the time taken to reach 100% of the reading may never be reached. Thus, typical times are set for T50, the time taken to reach 50% of the applied gas and T90, the time taken to reach 90% of the applied gas:

The following table illustrates some typical values:

Gas range	Gas level %v/v	T50 (typical) Seconds	T90 (typical) Seconds	T90 (max) Seconds
0-5% CH4 (methane)	2.5	10	20	30
0-100% CH4 (methane)	100	12	25	30
0-2% C3H8 (propane)	1.1	12	25	30

Press the **Span** button on the PCB; this will connect the Rx pin to the sensor 0V supply for a minimum of 5 seconds to zero the sensor.
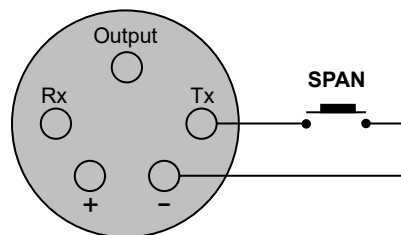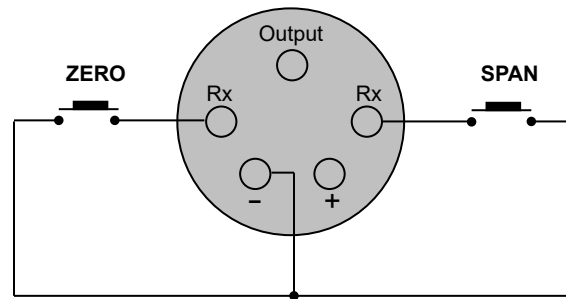

Figure 2

The Span command can be used repeatedly until there is no further change in the observed gas value.

Turn off and disconnect the calibration gas.

Note that Figure 1 and Figure 2 show the connections for a "POSITIVE" sensor. The connections for "NEGATIVE" sensors are shown below in Figure 3.

Figure 3

Flow & Pressure Considerations

The sensor operates in diffusion mode and as such care must be taken not to pressurize the sensor during gas sampling. Applying pressure to the sensor will result in inaccurate readings.
The flow rate should be between 200 and 600 cc/min. Avoid rapid changes in flow rate. Excessive flow rates will temporarily 'freeze' the gas reading updates.

A calibration flow adaptor is available for separate purchase to use with the sensor housing and to facilitate easy calibration of the sensor.