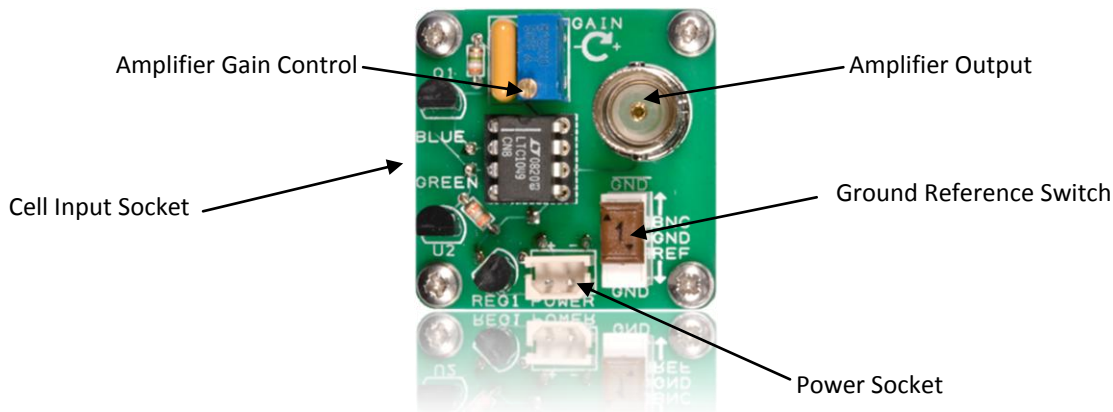


DART SENSORS

USER GUIDE

FEATURES



OPERATION

Before use, connect a sensor, power supply and some means of measuring output voltage. Set the ground reference switch to the up or down position, depending on the output signal required. In the down position, the output signal ground is measured from 0V; in the up position from the sensor reference voltage. The setting tailors the output signal to best suit the external measurement system. For example, if reading the output voltage manually using a voltmeter, it is usually most convenient to be viewing the absolute sensor output – in this case the switch should be in the up position. However if the board is attached to an external A/D convertor that cannot interpret signals below 0V, the switch should be in the down position.

When left disconnected, electrochemical sensors can build up offset voltages that can take up to several hours to settle when connected to the amplifier. Leaving the sensor connected to the amplifier when not in use will avoid this. It is not necessary to leave the power supply connected when not in use – the amplifier contains circuitry to prevent these offsets when disconnected from the power supply.

CALIBRATION

The amplifier/sensor system can be calibrated using the following procedure. Calibration requires a suitable reference standard to provide the sensor with a sample of known concentration.

1. Calculate the target output voltage:

$$\text{Target Voltage} = \left(\frac{\text{Max. Output Voltage} - \text{Sensor Reference Voltage}}{\text{Gas Concentration Range}} \right) \times \text{Concentration of Standard}$$

2. Introduce the sensor to the standard and compare the output voltage with the calculated voltage.
3. Adjust the amplifier's gain until the two values match. Turning the gain adjustment screw clockwise increases gain, anti-clockwise reduces gain.

EXAMPLE

To calibrate a HCHO sensor to give a maximum output range equivalent to 5ppm, using a liquid standard of concentration 1ppm HCHO:

The values for supply voltage and reference voltage here are the values used in the standard amplifier configuration. For custom configurations these values may differ.

- Power supply voltage = 5V
- Sensor reference voltage = 1.235V
- Gas concentration range (i.e. maximum possible reading) = 5ppm
- Concentration of standard = 1ppm

$$\begin{aligned} \text{Target Voltage} &= \frac{5V - 1.235V}{5\text{ppm}} \times 1\text{ppm} \\ &= 0.753V \end{aligned}$$

Once the amplifier output on the liquid standard has stabilised, adjust the gain control until the output reads 0.753V. If the ground reference switch has been set in the down position, adjust to a target voltage of (0.753V + Sensor Reference Voltage).

DATA INTERPRETATION

The concentration of gas in any given sample can be calculated from a calibrated amplifier/sensor system as follows.

1. Find the absolute sensor output. If the reference switch is in the up position the voltage output is the absolute value. If the reference switch is in the down position you must subtract the sensor reference voltage from the amplifier output voltage.
2. Calculate the gas concentration in the sample.

$$\text{Gas Concentration} = \text{Absolute Sensor Output} \times \left(\frac{\text{Gas Concentration Range}}{\text{Max. Output Voltage} - \text{Sensor Reference Voltage}} \right)$$

SPECIFICATIONS

Specifications given are for the standard configuration. Application-specific configurations are available on request.

Maximum Input Voltage	30V DC
Current Draw (typ.)	2.5mA
Maximum Output Voltage	5V
Sensor Reference Voltage	1.235V

SUPPORT

For further information, e-mail us on customer.service@dart-sensors.com, or visit www.dart-sensors.com to find contact details for our regional offices.