# How to zero calibrate your CozIR®-A or CozIR®-LP CO2 sensor using the Automatic Zero Point Calibration method.

Before using your CO2 sensor, we recommend that you perform a zero point calibration.

The automatic zero point calibration process described below is suitable for customers who are using either a CozIR®-A or CozIR®-LP sensor. These sensors have a built in autocalibration function.

## Requirements for autocalibration:

1. Exposure to fresh air
2. Continuously powered

## Exposure to fresh air

The sensor must be exposed to typical background CO2 levels (around 400-450ppm) at least once during the autocalibration period. The built in autocalibration function in CozIR®-A and CozIR®-LP sensors uses the information gathered at these periods to recalibrate the zero point.

A typical example would be in office buildings, which are often unoccupied overnight and at weekends. During these 'out of hours' times, background CO2 levels tend to drop very low. This is why an autocalibration cycle is typically at least 8 days, to include a weekend. The graph above shows a typical week's recording from an office building, with the low point circled.
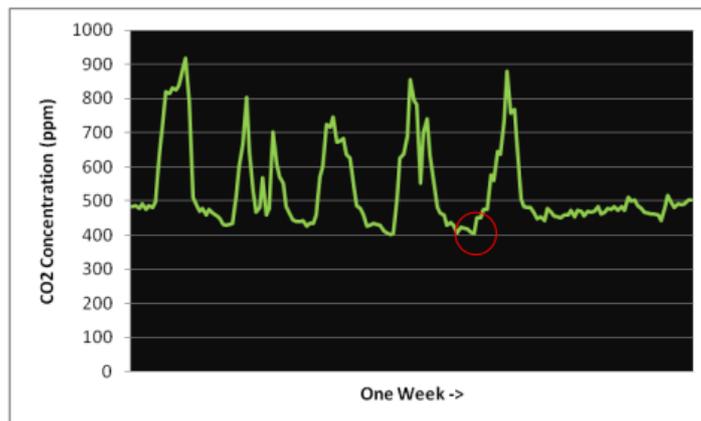
## Continuously powered

For autocalibration to function, the sensor must be continuously powered for the entire autocalibration period. This is because when the sensor is switched off, autocalibration information is deleted (to ensure that each installation is unaffected by previous data history).

## How to change the autocalibration settings

The sensor is already programmed to autocalibrate every 8 days. Therefore, if this is suitable for your application, you don't need to do anything further. If you want to change the autocalibration period, follow the steps below.

### Step 1

First, connect your sensor to a PC using a USB FTDI cable. Electrical connections vary by sensor type – further details can be found on the sensor datasheet on the website.
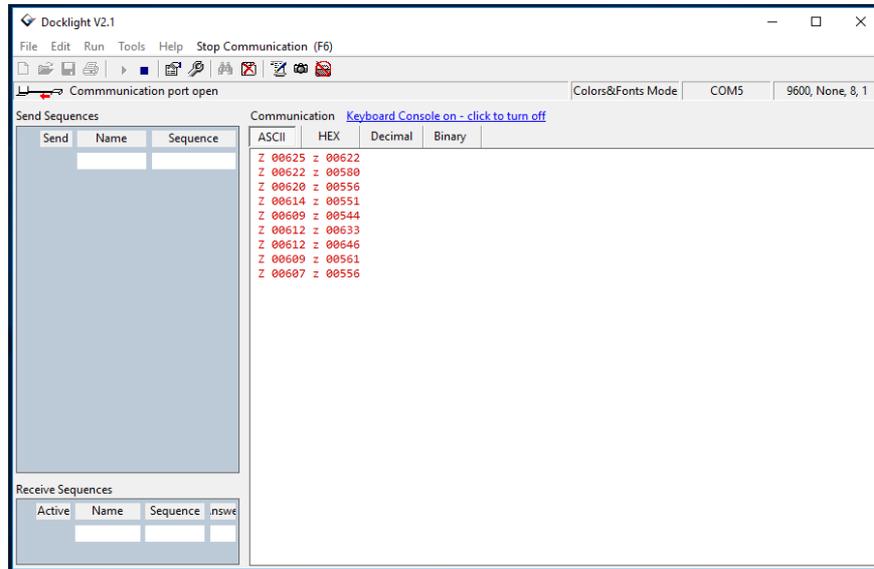


CozIR®-A connection                    CozIR®-LP connection

### Step 2

You can now issue autocalibration instructions, either using the GSS sensor evaluation kit, or via a terminal program such as the following Docklight example:

Gas Sensing Solutions Ltd
60-62 Grayshill Road
Westfield North Courtyard
Cumbernauld G68 9HQ

+44 (0) 1236 781900
info@gassensing.co.uk
www.gassensing.co.uk

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## Step 3

Next, determine the autocalibration settings. If autocalibration is enabled, the sensor will respond with the format below. This shows the initial and regular autocalibration intervals:

send: @ \r\n
response: @ 1.0 8.0\r\n

If autocalibration is disabled, the sensor will respond as follows:

send @ \r\n
response: @ 0\r\n

## Step 4

Now, set the autocalibration intervals to determine how often autocalibration takes place. Autocalibration periods can be set, interrogated or disabled using the '@' command.

To set autocalibration intervals, use this command structure:
**@ initialinterval regularinterval\r\n**

Please note, where both the initial interval and regular interval are given in days, both must be entered using a decimal point followed by 1 numerical figure.

For example, the following command will set the autocalibration interval to 8 days and the initial interval* to 1 day. Please note, you need to include a space between the @ and the first number, and a space between the two numbers.

> send: *@ 1.0 8.0\r\n*
> response: *@ 1.0 8.0\r\n*

## Step 5

Next, set the zero point. The background CO2 level varies slightly depending on the exact environment. Typically, a figure between 400ppm-450ppm is used. Choose your required zero point from the options below:

| Concentration | X | Y |
|:---:|:---:|:---:|
| 380 | 1 | 124 |
| 400 | 1 | 144 |
| 425 | 1 | 169 |
| 450 | 1 | 194 |

To set this, send the following command, where x and y depend on the concentration you want to set:

*P 8 x\r\n*
*P 9 y\r\n*

To calculate other values,
x= int(concentration/256)
y= the remainder after dividing concentration/256

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## How to disable autocalibration

If you want to disable autocalibration, follow the instructions below:

      send:            @ 0\r\n
      *response:*     *@ 0\r\n*

i.e. @ followed by a space followed by a zero ending with 0x0d 0x0a


## Notes

\* Initial autocalibration interval

It is possible for the initial autocalibration to happen quicker than regular autocalibration. This may help the sensor stabilize quickly after installation.

The autocalibration timers are reset when the power to the sensor is interrupted. When the sensor powers on, it always times an initial autocalibration interval first. It then settles into the regular autocalibration cycle.

The regular autocalibration timer is reset automatically if the user calibrates the sensor using the U, G, X, F or U commands.

If you require further information, please contact us and we can provide the relevant documentation and technical support.

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