Overview

The ASENSE Duct series with IP65 Rated Enclosure monitors the carbon dioxide (CO2) levels in industrial, commercial, school, and office type environments. The concentration of CO2 is a strong indication of the overall indoor air quality. The ASENSE Series is based on a single beam non-dispersive infrared technology and is a cost-optimized solution for the climate control of buildings and other processes. In addition, ABC software eliminates the need for manual calibration. The ASENSE Series measures the CO2 concentration in the ambient air up to 2,000 ppm and converts the data into an analog output. This data can be used in conjunction with a Building Automation or Demand Control Ventilation System to create a healthier indoor climate. This series features an analog temperature output (32 to 122°F) and come with combined output options of 0-10 VDC and 0 to 20 mA (4 to 20 mA and 2-10 VDC are field selectable via an onboard jumper) or 0-5 VDC for "-5" versions. A relay option is available for this series as well. The UIP5 software and programming cable offer a configuration/test utility and provide access to the main features of the ASENSE series.

Applications: Commercial Office Buildings, Hospitals & Schools

Part Numbers

NSA-ASENSE-D-LCD-REL **NSA-ASENSE-D-REL**

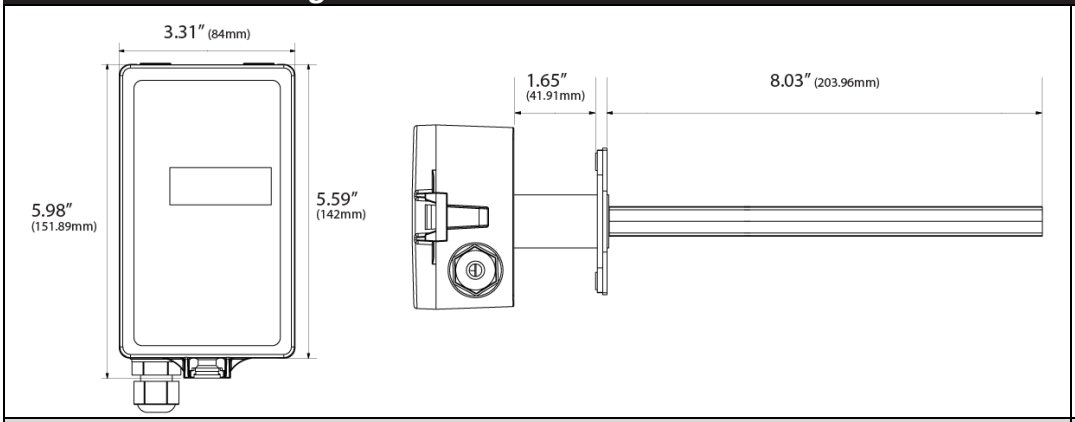
Specifications

Supply Voltage:	24 VAC/VDC ±20%; 50/60 Hz, 10.5 to 40 VDC maximum (Half-wave rectified)
Power Consumption:	<1W
Wiring Connections:	0.00232 in² (1.5 mm²) screw terminals
Operating Environment:	Residential, commercial, and industrial spaces
Operating Temperature:	32ºF to 122ºF (0ºC to 50ºC)
Operating RH:	0 to 85% RH Non-condensing
Warm-Up Time:	<5 minutes (@ full specs 15 minutes)
Accuracy:	**CO2**[1]: ±30 ppm ±3% of reading | **Temperature**: ±1.8ºF (1ºC)
Repeatability:	±20 ppm ±1% of measured value
Annual Zero Drift:	<± 0.3% of measurement range
Operating Pressure:	+1.6% per 0.145 psi (1 kPa) deviation from normal pressure | (1 Atmosphere = 14.7 psi (1.013 KPa))
Sensing Method:	Single beam Non-dispersive Infrared (NDIR)
Sensor Life[2]:	>15 years
Response Time (T1/e):	<10 seconds @ 30 cc / minimum flow rate, <3 minutes diffusion time
Sensing Range:	**CO2**: 0 to 2000 ppm | **Temperature**: -4 to 140ºF (-20 to 60ºC)
Extended CO2 Ranges:	2000 to 10,000 ppm (factory set or programming cable required)
Extended Range Accuracy:	+/- 30 ppm and +/- 5% of reading
Coverage Area:	7500 sq. ft. maximum
Self-Diagnostics:	Complete function check, yellow LED; LCD error indication (display model only)
Display (Optional):	4 digits, 7 segments LCD with ppm indicator
Calibration[3]:	Senseair ABC algorithm (Automatic Baseline Correction)
Outputs:	**Out 1 (CO2)**: 0/2 to 10V, 0/4 to 20 mA, 0 to 2000 ppm **Out 2 (Temperature)**: 0/2 to 10V, 0/4 to 20 mA, 32 to 122ºF (0 to 50ºC)
Relay (Optional):	**Out 3**: N.O. or N.C. rated 0.5A @ 125 VAC; 1A @ 24 VDC

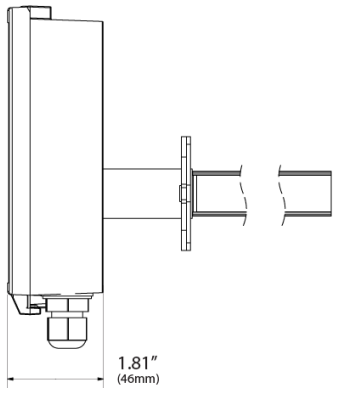
Relay Trip Point[4]:	1000 ppm (factory set)
Relay Deadband/Hysteresis:	100 ppm (factory set)
Relay Durability:	**Mechanical**: 5,000,000 operations minimum (at 36,000 operations/hr) **Electrical**: 100,000 operations minimum (under rated load, at 1,800 operations/hr)
Storage:	**NSA-ASENSE-D**: -40 to 158ºF (-40 to 70ºC) **NSA-ASENSE-D-LCD**: -4 to 122ºF (-20 to 50ºC) 0 to 85% RH Non-condensing
Enclosure:	**Duct Box**: PC & ABS blend, Flammability Rating UL94V-0 **Cover**: Makrolon® 6555 plastic, Flammability Rating UL94V-0 **Pipe**: PC & ABS blend, Flammability Rating UL94V-0
Product Dimensions:	(H) 5.95” (151.9 mm) x (W) 3.33” (84.6 mm) x (D) 1.85” (47 mm)
Product Weight:	0.812 lbs (0.368 kg)
Agency Approvals:	EMC Directive 2014/30/EC, RoHS Directive 2011/65/EU & RoHS 3 Directive 2015/863/EU

[1]Accuracy is defined after minimum three (3) ABC periods (1 period = 8 days) of continuous operations
[2]In normal Indoor Air Quality (IAQ) applications | Corrosive environments are excluded
[3]Building CO2 levels must drop to 400 ppm some time during the week for ABC to work properly | If the building is occupied 24 hrs/day, ABC must be turned off
[4]Changes can be made using TTL-232R-3V3 cable and UIP5 software

Dimensional Drawing



Front and Top Views

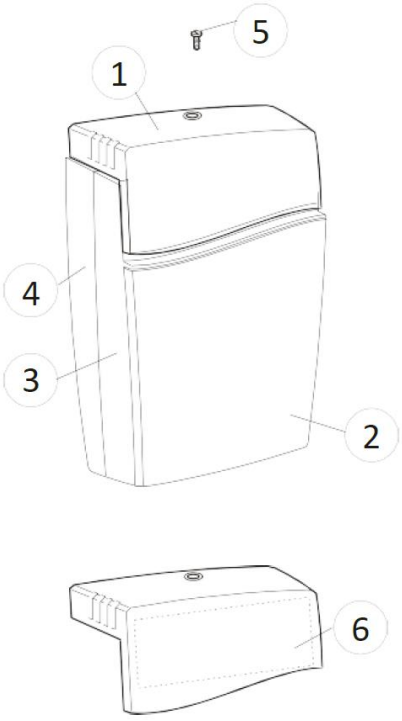


Right View

Accessories

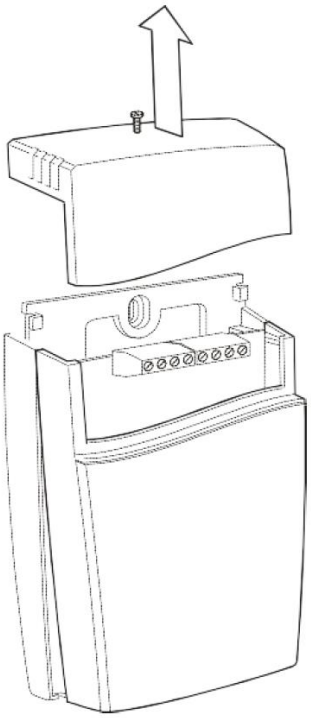
Part Number	Description
NSA-TTL-232R-3V3	USB programming cable

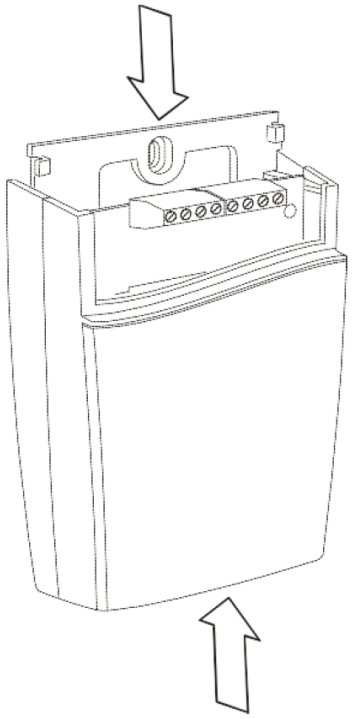
Installation



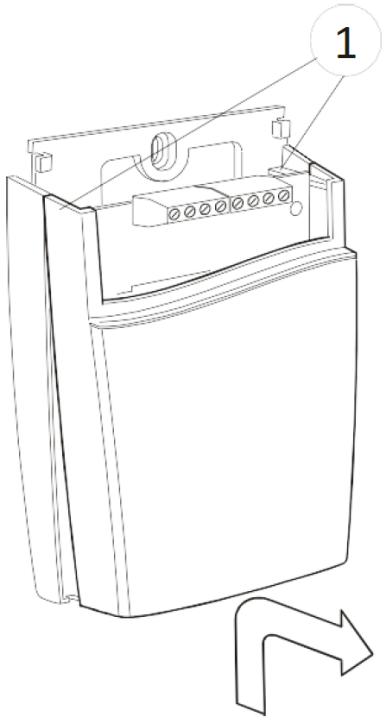
1. Top part
2. Lid
3. Front part
4. Wall plate
5. Screw
6. Label with settings inside the top part

Dismounting the sensor



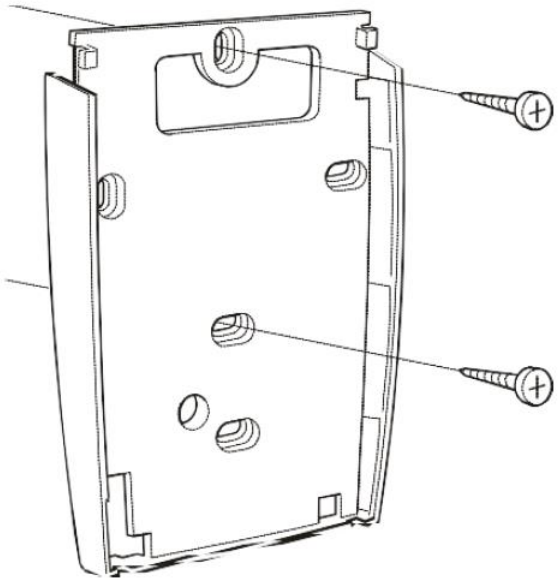


Push the front part of the lid upwards while keeping the wallplate steady

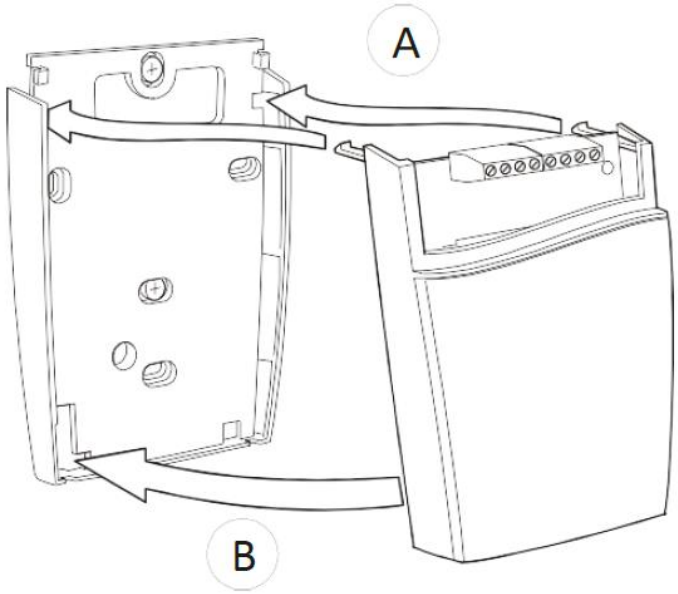


Fold the front part with the lid forwards and loose it from the hooks (#1)

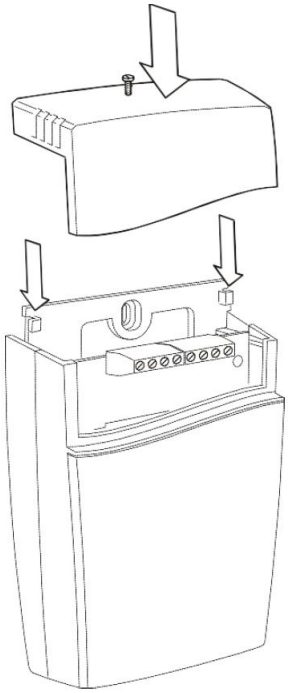
Mounting the sensor



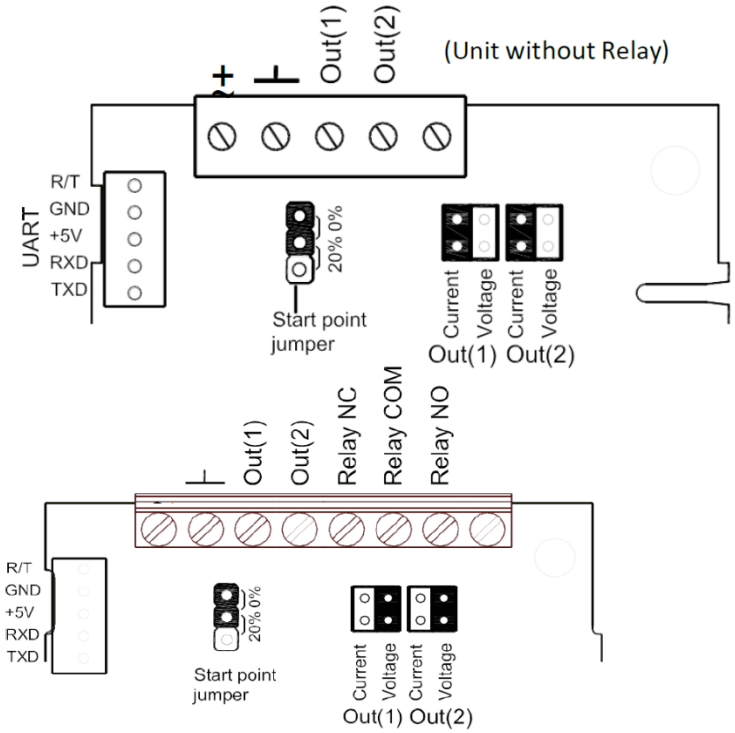
The wall plate is screwed onto the wall
The screw head diameter should be **max 7,5 mm**
The screw head height should be **max 2,5 mm**



(A) Put the top tabs of the front part into the top holes of the wall plate.
(B) Press the lower edge of the case onto the wall plate to latch



The top part is pushed under the locking hooks of the wall plate and secured with a screw.



Terminals and jumpers on aSENSE RL.
The darker positions are default settings.
Terminals and jumpers are located under the top part.

CAUTION If the PCB must be removed, it must be handed carefully and protected from electrostatic discharge! Removing the PCB is not normally required.

Electrical connections

The power supply has to be connected to ⏦ and ⊥. ⊥ is considered as system ground. If the analogue output is connected to a controller, the same ground reference has to be used for the aSENSE RL unit and for the control system. Unless different transformers are used, special precautions must be taken.

IMPORTANT The same ground reference has to be used for the aSENSE RL unit and for the control system. If possible keep the sensor powered up after mounting. Connect the analogue output before measuring.

Connection Terminal	Function	Electrical Data	Notes
⏦ ⊥	Power (+) Power Ground (-)	24 VAC/DC+ (+-20%), 3W 24 VAC/DC-	2W without output load[1]
Out (1) Out (2)	Analogue Output 1 (+) Analogue Output 2 (+)	0-10 VDC or 0-20 mA, 2-10 VDC or 4-20 mA Same as Output 1	According to positions of OUT1 and start point jumpers.[2] According to positions of OUT2 and start point jumpers.[2, 3]
5 6 7	Normally closed relay Relay COM Normally open relay	Contact free relay minimum load 1mA/5V rated load 0,5A/125VAC; 1A/24VDC	Triggered by register Out (3).
8	Not Used		

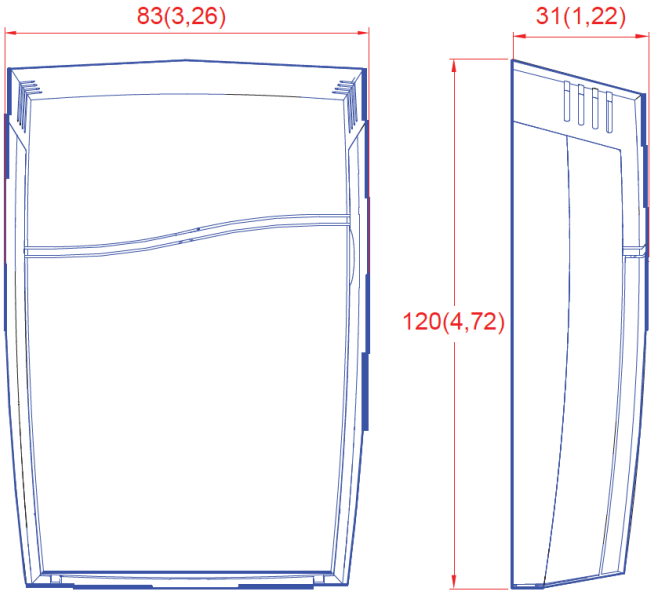
[1]The ground terminal is used as negative power supply DC input or AC phase ground (halfwave rectifier). A single transformer may be used for the entire system.

[2]aSENSE RL can deliver a voltage or a current loop for Out(1) / Out(2). To change between voltage and current output mode the hardware jumpers are used. There is one jumper for Out(1) and one for Out(2), so that one output can be a voltage output and the other a current output. Both, voltage output and current output can have start points 0 % (0-10 VDC or 0-20mA) or 20% (2-10 VDC or 4-20mA). The same start point is used for both outputs. See the function manual.

[3]Please use voltage outputs for temperature measurements. The accuracy of temperature measurements is valid only for units configured in voltage outputs mode.

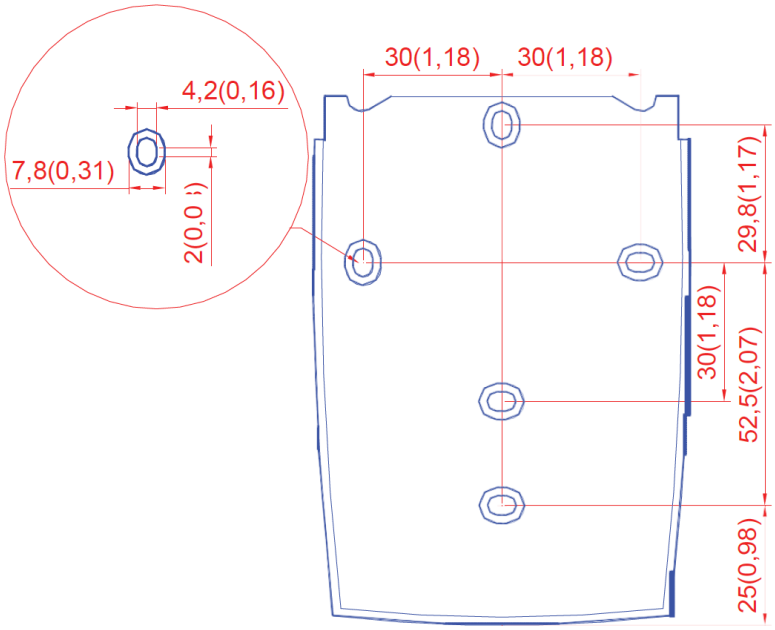
Dimensions and Holes

Dimensions of sensor in mm and (inches)



Mounting the sensor to the wall

Use screws with head diameter less than 7,5 mm (0,295 inches) and head height less than 2,5 mm (0,1 inches)



Connecting ASense to UIP5 software

NSA-TTL-232R-3V3 programming cable is required.

1. Download the UIP5 software from the SenseAir website. http://www.senseair.com/products/software/uip-5/
2. Plug the programming cable into a USB port, and go into Device Manager on the computer to determine which port is being used.
3. Open the UIP5 software.
4. Power the sensor on and plug the programming cable into the sensor. The programming cable must have the black wire with the arrow connected towards the top of the connector on PCB as shown in Figure 1.

Figure 1

5. Click the **Meter** tab at the top of page. In the **Connection Configuration** window:
    a. Select **Com Port**.
    b. Set **Baud rate** to 9600.
    c. Set **Parity** to NONE.
    d. Click **Save**.

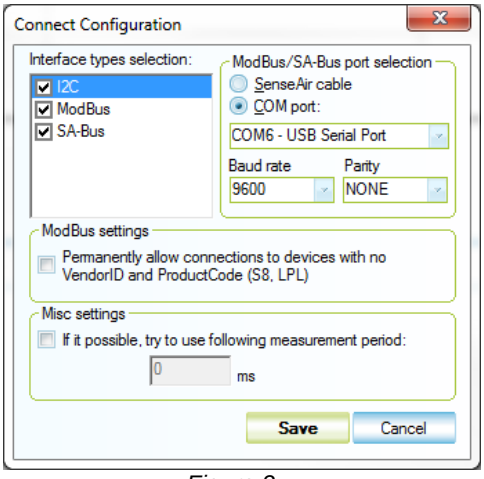


Figure 2

6. Go to **Meter**, and click **Connect**.

7. Select **Any Address** and all interface types.
8. Click **Connect**. The unit takes approximately 30 seconds to connect.

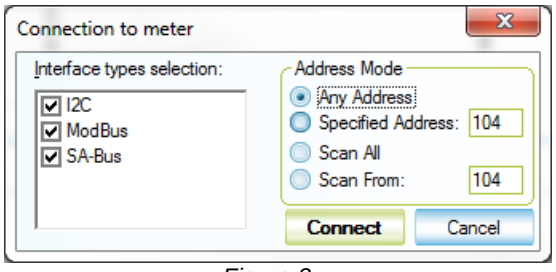


Figure 3

9. You can now adjust your settings: ABC can be turned off, change ppm, change output scale, etc.
10. After the settings are changed, power cycled the sensor.

Adjusting the trip point on the relay

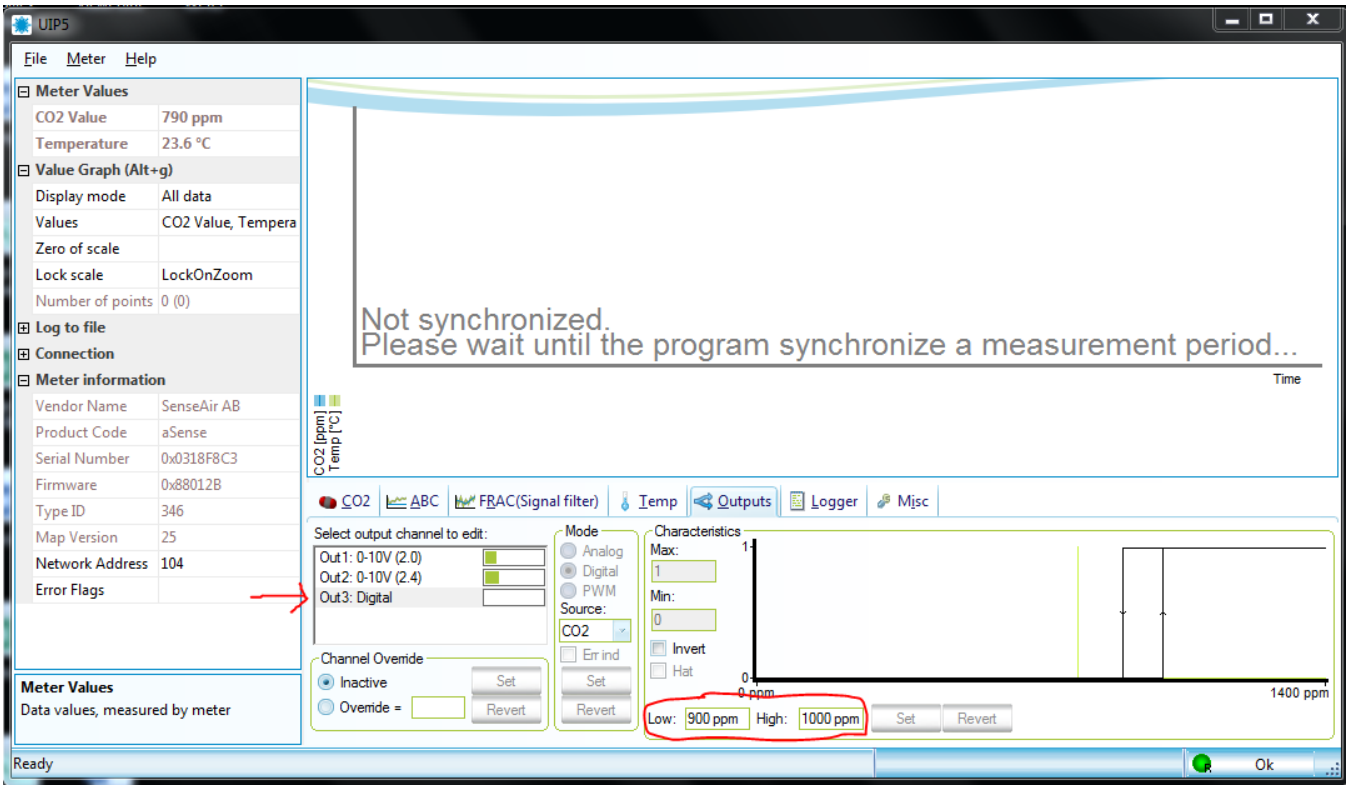


Figure 4

Click “SET” after adjustment is made.

Calibration:

- -100% nitrogen for zero calibration - http://www.mesagas.com/disposable-calibration-gas/nitrogen-n2/
- -0.25lpm regulator - http://www.mesagas.com/disposable-calibration-gas/series-400-17l/34l-preset-flow-regulator-for-disposables/
- -1K PPM Span Gas for Bump Test - https://www.mesagas.com/disposable-calibration-gas/carbon-dioxide-co2/

1. Click the **CO2** tab at the bottom of the page.
2. Ensure the target box under Calibration is set to “0”.
3. Apply the Nitrogen gas to above the CO2 sensor filter. On the Asense, Carrier recommens removing the PCB from the enclosure for best results.

Figure 5

4. Wait until the CO2 reading on the UIP5 stabilizes at 0 ppm and press **Calibrate** on the UIP5 screen.
5. After the calibration process, check CO2 readings using a known ppm test gas for verification.