

## SRC-C - Indoor CO2 Desktop Monitor

The SRC-C is an indoor CO2 monitoring desktop unit. Three LEDs in the colors green, orange and red indicate the CO2 concentration of the room air. This shows the user when to ventilate. A simple USB wall charger is used to power the unit. The CO2 background calibration of the SRC-C guarantees for accurate room air monitoring.

### Features

- Indoor CO2 measurement
- Indication with three separate color LEDs
- Includes a desktop stand
- A simple USB wall charger powers the unit
- Minimum and maximum CO2 value memory
- Levels of CO2 indication programmable
- Automatic CO2 background calibration
- Averaging signal adjustable
- Optional external display (OPU-S)
- Status LED



### Applications

- Indoor CO2 measurement (home, office, school, restaurant, greenhouse, ...)
- Recording of minimum and maximum CO2 limits for critical environments

### Scope of delivery

- Indoor CO2 measurement unit SRC-C and desktop stand
- USB wall charger and USB-C cable

### CO2 transmitter

The CO2 concentration is measured through non-dispersive infrared (NDIR) waveguide technology with ABC automatic background calibration algorithm. The applied measuring technology guarantees excellent reliability and long-term stability. The microprocessor samples the CO2 once per second. It calculates an averaging signal over a preset number of samples and generates the output signal.

### Automatic baseline calibration (ABC)

The ABC background calibration constantly supervises the measured CO2 concentrations. The calibration function expects the CO2 values sink to 400 ppm when the room is not occupied. Over a period of several days the controller tries to reach this value step by step through recalibration of 30ppm per day max. In order to reach the given accuracy, it is required that the sensor is for at least 3 weeks in continued operation with no power reset.

- i** NOTE: The ABC calibration works only in those applications where the CO2 concentration sinks regularly to fresh air levels of 400 ppm. For special applications such as green houses, animal farms, etc. the ABC calibration should be de-activated and the sensor should be manually calibrated. The automatic calibration can deactivate through the external operation terminal. The Sensor can be calibrated by the client and does not need to be sent in for calibration. For manual calibration see section "**Error! Reference source not found.**" on page **Error! Bookmark not defined.**

### Minimum and maximum values (CO2)

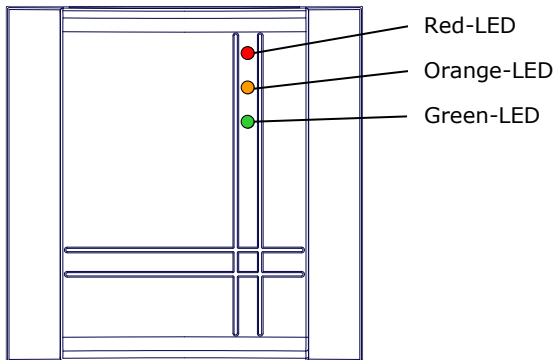
Using a display & programming module OPU-S, the user has the option to read out and reset the CO2 minimum and maximum values. The minimum and maximum values are automatically saved to the device and are available after a power interruption.



For OPU-S usage see section "Displaying Minimum and maximum values" on page 4.

### Indication of air quality

Three color LEDs are used to indicate air quality: Green for low CO2 concentration, orange for medium and red for high concentration. The levels for low-medium-high may be programmed.



Air quality LED	
No light	: No power or unit damaged
Green	: High air quality (low CO2 level)
Green + Orange	: Good air quality
Orange	: Moderate air quality (medium CO2 level)
Orange + Red	: Low air quality
Red	: Poor air quality (high CO2 level)
Red blinking	: 0 ppm calibration
Green blinking	: 400 ppm calibration

#### Default CO2 indication setting

Air quality LED	CO2 range in ppm
Green	0...699
Green + Orange	700...999
Orange	1000...1299
Orange + Red	1300...1599
Red	1600...2000

### Safety



#### **DANGER! Safety advice**

This device is for use as a CO2 concentration indicator for comfort applications. It is not a safety device. Where a device failure could endanger human life and property, it is the responsibility of the client, installer and system designer to add additional safety devices to prevent such a device failure. Ignoring specifications and local regulations may cause equipment damage and endangers life and property. Tampering with the device and misapplication will void warranty.

### Ordering information

Product Name	Product Nr.	Description/Option
<b>CO2 Sensor</b>		
SRC-C	40-300201	Indoor CO2 monitor with desktop stand and USB wall charger with USB-C cable
<b>Accessories</b>		
OPU-S	40-500030	External display and operation terminal. Note: For the correct display of values, V1.7 and later is required.

## Technical Specifications

<b>Power supply</b>	Operating voltage	5 VDC (4.5...5.25 VDC)
	Power consumption	Max. 5 VA
<b>Connection</b>	Female connector	USB-C
<b>CO2 measurement</b>	Sensing method	Non-dispersive infrared (NDIR) waveguide technology with ABC automatic background calibration algorithm
	Sampling method	Diffusion
	Response time (90%)	2 Minutes
	Measurement range	0 - 2000 ppm vol.
	Repeatability	± 20 ppm ± 1 % of measured value
	Accuracy	± 40 ppm ± 3 % of measured value
	Pressure dependence	+ 1.6 % reading per kPa deviation from normal pressure, 100 kPa
<b>Environment</b>	Operation	To IEC 721-3-3
	Climatic conditions	class 3 K5
	Temperature	0...50° C (32...122° F)
	Humidity	<95% RH non-condensing
	Transport & storage	To IEC 721-3-2 and IEC 721-3-1
	Climatic conditions	class 3 K3 and class 1 K3
Temperature	0...50° C (32...122° F)	
Humidity	<95% RH non-condensing	
Mechanical conditions	class 2M2	
<b>Standards</b>	Degree of protection	IP30 to EN 60 529
	Safety class	III (IEC 60536)
<b>Housing materials</b>	Cover	Fire proof PC+ABS plastic (UL94 class V-0)
	Mounting plate	Aluminium
	Desktop stand	Aluminium
<b>General</b>	Dimensions of transmitter (H x W x D)	21 x 88 x 88 mm (0.8 x 3.5 x 3.5 in)
	Dimensions of desktop stand	96 x 110 x 56 mm (3.8 x 4.3 x 2.2 in)
	Weight (including package)	298 g (10.5 oz) with desktop stand and wall charger

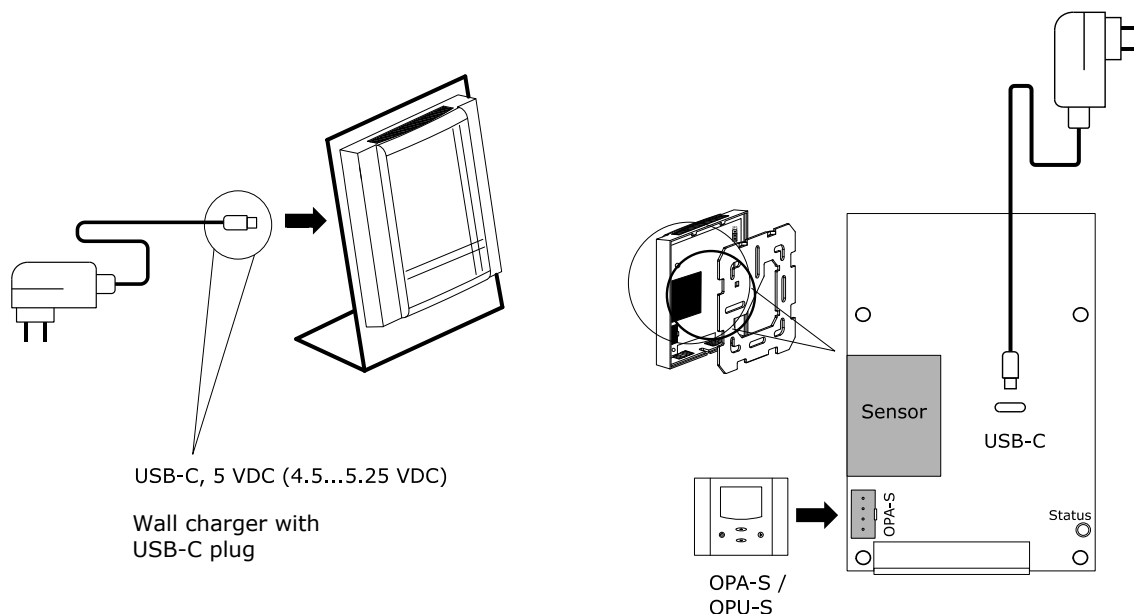
## Product testing and certification



Declaration of  
Conformity

Information on the conformity of our products can be found on our website  
[www.vectorcontrols.com](http://www.vectorcontrols.com) on the corresponding product page under "Downloads".

## Connection



### Placement position

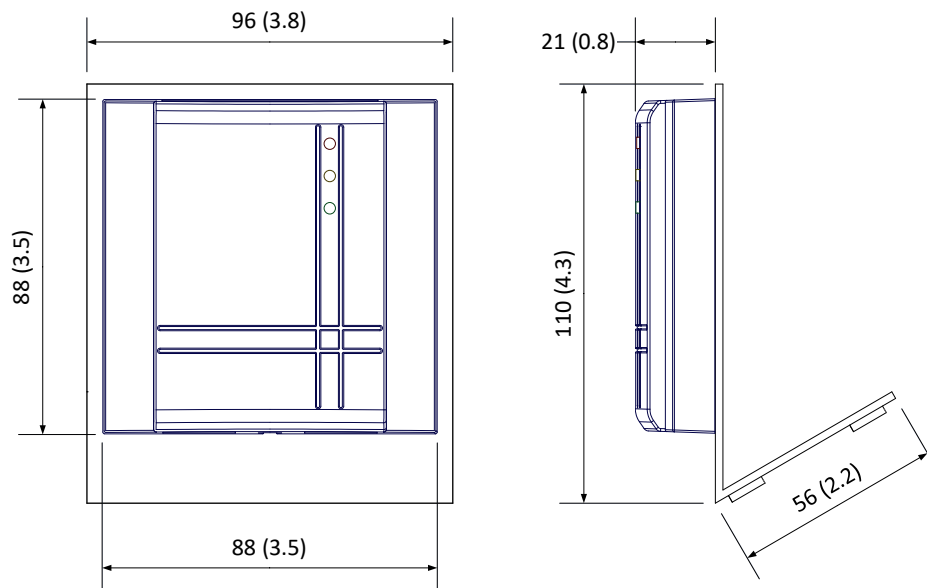
- On a flat surface
- The following installation position should be avoided:
  - Protect from direct exposure to sunlight
  - Do not install near heat sources, e.g., radiators or other heat-generating devices
  - Areas with poor air circulation and niches, e.g., behind doors or shelves
  - In the direct influence area of ventilation openings and fans

### Placement instruction



See SRC-C installation sheet no. 70-000859 ([www.vectorcontrols.com](http://www.vectorcontrols.com)).

### Dimension mm (inch)



## Operation

### Displaying Minimum and maximum values

Use the optional display & operation terminal OPU-S to read out or reset the stored CO2 minimum and maximum values.

1. Remove SRC housing from the back plate (see SRC-C installation sheet no. 70-000859 [www.vectorcontrols.com](http://www.vectorcontrols.com)).
2. Connect the operation terminal OPU-S to the OPA-S connector on the SRC (see section "Connection" on page 3). The measured CO2 value is displayed.
3. Press the "UP" key to see the maximum values or the "DOWN" key to see the minimum values.
4. To reset the minimum value, press the "DOWN" key for at least 5 seconds and wait until the value changes.
5. To reset the maximum value, press the "UP" key for at least 5 seconds and wait until the value changes.

## Configuration

### Parameter configuration

The transmitter can be adapted to fit perfectly into any application by adjusting the software parameters. The parameters are set with the operation terminals OPU-S. The OPU-S may also be used as remote indicator.

NOTE: For the correct display of data, version 1.7 or greater of OPU-S is required.

### OPU-S operation

1. Remove SRC housing from the back plate (see SRC-C installation sheet no. 70-000859 [www.vectorcontrols.com](http://www.vectorcontrols.com)).
2. Connect the OPU-S operating device to the OPA-S connector on the SRC (see section "Connection" on page 3). The measured CO2 value is displayed.
3. Press the "Up" and "Down" keys simultaneously for more than 3 seconds. "Code 0000" is displayed.
4. Use the "UP" and "DOWN" keys to set the password "0009" and confirm with the "RIGHT" key.
5. Select "IP SEL (Input Parameter) or "OP SEL" (Output Parameter) with "UP" and "DOWN" and confirm with the "RIGHT" key. The first parameter is displayed.
6. Use the "UP" and "DOWN" key to switch to the desired parameter. After pressing the "RIGHT" key adjust the parameter value with the "UP" and "DOWN" keys. Confirm the setting with the "RIGHT" key.
7. Complete parameter setting by pressing the left "ON/OFF" key twice. The measured CO2 value is displayed.



#### Important

In order for the SRC-C to apply the new settings correctly, the parameter setting must be completed with the left "ON/OFF" key!



Detailed information on the OPU-S can be found on the website [www.vectorcontrols.com](http://www.vectorcontrols.com) on the corresponding product page under "Downloads".

### Input configuration

Parameter	Description	Range	Default
<b>IP 00</b>	CI1: Light intensity of air quality LED on front	0...10	8
<b>IP 01</b>	CI1: Samples taken for averaging control signal <sup>1)</sup>	1...255	10
<b>IP 02</b>	CI1: Calibration	-10...10%	0
<b>IP 03</b>	CI1: Minimum CO2 range ppm <sup>2)</sup>	0...5000 ppm	0 ppm
<b>IP 04</b>	CI1: Maximum CO2 range ppm <sup>2)</sup>	0...5000 ppm	2000 ppm
<b>IP 05</b>	CI1: CO2 level for medium CO2 indication <sup>2)</sup>	0...5000 ppm	1000 ppm
<b>IP 06</b>	CI1: CO2 level for high CO2 indication <sup>2)</sup>	0...5000 ppm	1600 ppm
<b>IP 07</b>	CI1: Enable ABC automatic background CO2 calibration	ON, OFF	ON
<b>IP 08</b>	CI1: Calibrate CO2 sensor Note: For normal operation, calibration is not required. Only experts should calibrate the sensor. 0 = No calibration (default) 1 = Calibrate to gas (0 ppm) 2 = Calibrate to fresh air (400 ppm) 4 = Calibration error (status)	0...4	0

<sup>1)</sup> Sample interval: 1 sec.

<sup>2)</sup> Changing this parameter affects the control of the air quality LEDs as follows:

Air quality LED	Effective Parameters	Default settings
Green	<b>IP 03</b> value ... ( <b>IP 05</b> value + 400) / 2	< 700
Green + Orange	( <b>IP 05</b> value + 400) / 2 ... <b>IP 05</b> value	700...1000
Orange	<b>IP 05</b> value ... ( <b>IP 05</b> value + <b>IP 06</b> value) / 2	1000...1300
Orange + Red	( <b>IP 05</b> value + <b>IP 06</b> value) / 2... <b>IP 06</b> value	1300...1600
Red	<b>IP 06</b> value ... <b>IP 04</b> value	> 1600

### Output configuration

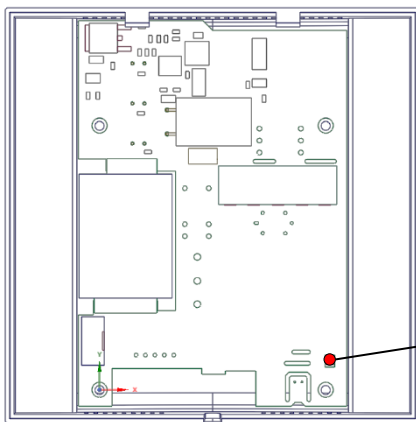
Parameter	Description	Range	Default
<b>OP 00</b>	AO1 (CO2): Configuration of output signal: 0 = CO2 value 1 = Recorded minimum CO2 value 2 = Recorded maximum CO2 value	0..2	0
<b>OP 01</b>	Not used	-	-
<b>OP 02</b>	Not used	-	-

IP = Input Parameter  
 OP = Output Parameter  
 CI = CO2 Input  
 AO = Analog Output

### Error messages shown on OPU-S

Error	Description
<b>Err 1:</b>	Communication error: Verify cable connections, cable type and maximum distance.
<b>Err 2:</b>	CO2 sensor error: Make sure the sensor is not miss-calibrated. If possible, execute 400 ppm calibration. (see section " <b>Error! Reference source not found.</b> " on page <b>Error! Bookmark not defined.</b> ). If error cannot be removed by calibrating the sensor, replace product.

### Status-LED



#### Status LED

- No light	: No power or unit damaged
- 5 sec flashing	: Normal
- 2 second blinking	: Calibration
- 10 second pulse	: Calibration successful
- Constant red > 10 sec	: Calibration or sensor error

Red Status-LED

## Calibration

The CO2 sensor unit is maintenance free in normal environments thanks to the built-in self-correcting ABC algorithm (Automatic Baseline Correction). This algorithm constantly keeps track of the sensor's lowest reading over a 7 days interval and slowly corrects for any long-term drift detected as compared to the expected fresh air value of 400 ppm CO2. Rough handling and transportation might, however, result in a reduction of sensor reading accuracy. With time, the ABC function will tune the readings back to the correct numbers. The default "tuning speed" is however limited to about 30 ppm/week. For post calibration convenience, in the event that one cannot wait for the ABC algorithm to cure any calibration offset, manual calibration may be activated using following procedure. There are two calibration possibilities: 0 ppm and 400 ppm. Only one of the two manual calibration needs to be performed.

### Calibration to 400 ppm (Fresh air)

1. Connect an OPA-S and expose the sensor for at least 5 minutes to the fresh outside air. It is important to expose the sensor to only fresh air. An open window close to the sensor with a higher level of CO2 could prevent a stable signal. Observe the CO2 value on the OPA-S.
2. Once the CO2 value has stabilized, login with the OPA-S and set **IP 08 = 2**, then exit configuration mode. The air quality LED will blink green color 4 times alternating with the status LED in 2 second intervals.
3. The sensor will now wait for a stable CO2 concentration. Once the calibration has been executed, the status LED will show constantly red for 20 seconds and the green air quality LED will light up for 20s if successful. If the calibration is not successful (no stable concentration for 5 min or no communication with sensor) the red air quality LED will blink instead and the status LED will stay constantly red in error mode. Recalibrate or restart the device to stop the error mode.
4. You may additionally verify the calibration using the OPA-S. If successful, **IP 08** will change to 0. If unsuccessful, the value of **IP 08** changes to 4.
5. If unsuccessful, wait at least 1 minute before repeating the procedure again. Make sure that the sensor environment is steady and calm!

### Calibration to 0 ppm with CO2 free gas

1. Connect an OPA-S and place the sensor in a container filled with a gas mixture which is free from CO2 (i.e., Nitrogen or Soda Lime CO2 scrubbed air). Observe the CO2 value on the OPA-S.
2. Once the CO2 value has stabilized, login with the OPA-S and set **IP 08 = 1**, then exit configuration mode. The air quality LED will blink in red color 4 times alternating with the status LED in 2 second intervals.
3. The sensor will now wait for a stable concentration. Once the calibration has been executed, the status LED will show constant red and the green air quality LED will light up for 20s if successful. If the calibration is not successful (no stable concentration for 5 min or no communication with sensor) the red air quality LED will blink instead and the status LED will stay constantly red in error mode. Recalibrate or restart the device to stop error the mode.
4. You may additionally verify the calibration using the OPA-S. If successful **IP 08** will change to 0. If unsuccessful the value of **IP 08** changes to 4.
5. If unsuccessful, wait at least 1 minute before repeating the procedure again. Make sure that the sensor environment is steady and calm!

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