

Operating instruction

For the gas sensor for measuring carbon dioxide and oxygen gas concentrations



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1 About this document

1.1 Function

This operating manual provides you with all the information you need for quick commissioning and safe operation of *the BlueInOne*. Therefore, please read this operating manual before commissioning. Keep this operating manual in a safe place for future reference.

1.2 Target

Diese Betriebsanleitung richtet sich an ausgebildetes Fachpersonal. Der Inhalt dieser Anleitung muss dem Fachpersonal zugänglich gemacht und umgesetzt werden.

1.3 Symbole



This symbol indicates a potentially hazardous situation. It is used in combination with the following signal words:

Danger

High-risk hazard.

Failure to comply will result in death or serious injury.

Warning

Medium risk hazard.

Failure to comply may result in death or serious injury.

Caution

Low-risk hazard.

Failure to comply may result in minor or moderate injury.

Attention

This symbol indicates the possibility of property damage.



This symbol indicates the risk of hand injuries.



Dieses Symbol weist auf die Gefahr von ätzenden Stoffen hin.



This symbol indicates a requirement for action.



This symbol indicates that the operating instructions should be observed.



This symbol indicates that protective clothing should be worn.



This symbol indicates that eye protection should be worn.



This symbol indicates that hand protection should be used.



Note

This symbol indicates helpful additional information.



Reference

This symbol indicates additional information outside this document



List

The bullet point indicates a list in which the order of the items has no particular significance.

1. Sequence of steps

Numbers indicate steps that must be performed in a specific order

2 For your safety

2.1 General

The **BlueInOne** has left our factory in a tested and operational condition.

Please read these operating instructions carefully before installing and commissioning the device. The operating instructions contain safety instructions that must be observed to ensure safe operation.

Please keep this operating manual in a safe place for future reference. The device must never be operated under conditions that do not comply with the specified specifications and the information on the type placard.

Maintenance and repair may only be carried out by competent and trained personnel who are familiar with the associated hazards and warranty provisions.

2.2 Authorized personnel

All operations described in this operating manual may only be carried out by trained and authorized personnel. For safety and warranty reasons, any other interventions in the device may only be carried out by personnel from **BlueSens gas sensor GmbH**.

2.3 Intended use

The **BlueInOne** is a gas sensor for measuring carbon dioxide and oxygen gas concentrations in the specified concentration range and under the conditions described in the technical data. It is used to monitor metabolic processes in biological processes such as fermentation.



Danger

The BlueInOne is not ATEX certified.
There is a risk of serious or fatal injury.

→ **May therefore only be used in well-ventilated rooms.**

2.4 Warning against misuse

The **BlueInOne** must not be used as a safety monitor, nor must it be used in areas with a risk of explosion.

2.5 General safety instructions

If this device is used improperly or not in accordance with its intended purpose, application-specific hazards may arise.



Danger

Risk of poisoning/suffocation and/or explosion hazard, if applicable

Incorrect installation or adjustment may result in poisoning/suffocation or, in some cases, explosion hazards.

- Check all connections for leaks after assembly.

3 CE and FCC compliance

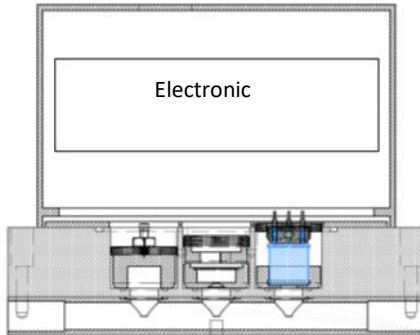
The **BlueInOne** complies with the EMC Directive (2014/30/EU) and the RoHS Directive (2011/65/EU).

The Low Voltage Directive (2014/35/EU) does not apply, as no voltage greater than 24V is used.

The CE and FCC certificates can be found in the chapters 9 and 10.

4 Product description

The **BlueInOne** is a combined CO₂ and O₂ sensor with automatic humidity and pressure compensation. The gas to be analyzed is passed through the three measuring chambers via the integrated flow adapter and analyzed for humidity, pressure, CO₂ and O₂ content. The flow adapters are available for all pipes with internal diameters from 4 mm to 1 1/4". Please note that the dimensions and weight of the analyzer may vary depending on the flow adapter used.



Pressure and humidity measurement	IR CO ₂ sensor	O ₂ sensor	For hoses/pipes from 4 mm to 1 1/4"
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Figure. 1. Schematic representation of the overall design

4.1 measurement principle

The analyzer contains 4 different measuring components:

- pressure measurement
- Humidity measurement
- CO₂ measurement
- O₂ measurement

4.1.1 Measurement principle for pressure measurement

A piezoresistive silicon pressure sensor is used as the pressure sensor.

4.1.2 Measuring principle for moisture measurement

Humidity is measured using a capacitive polymer sensor.

4.1.3 CO₂ measurement

The CO₂ sensor consists of an IR radiation source, a detector, and the reflection measuring cell (**Fehler! Verweisquelle konnte nicht gefunden werden.**).

The infrared light beam is reflected by the gas-filled measuring adapter, and the light weakened by the analyte gas is measured by the detector. The light-transmitting sapphire disc prevents the sample atmosphere from escaping to the outside and contaminating the optical components. The entire sensor is heated to prevent condensation of water vapor. Warming up takes approx. 1 hour both during initial commissioning and after each disconnection from the power supply. The sensor does not output any measured values during the warm-up period.

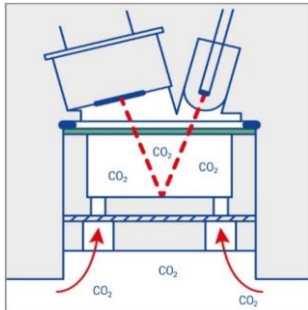


Figure 2: Measurement setup of the CO₂ sensor

4.2 Measuring principle O₂ BlueInOne Ferm

The oxygen sensor in **BlueInOne Ferm** is based on an oxygen pump cell and is independent of reference gases. When voltage is applied to the cell, oxygen ions are pumped from the cathode to the anode. If the cathode is additionally covered with a gas diffusion barrier, increasing the voltage causes a saturation current to set in, which is a measure of the oxygen concentration in the environment.

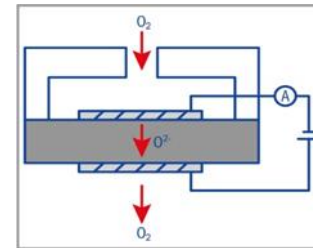


Figure 3: Measurement setup of the oxygen sensor in **BlueInOne Ferm**



Danger

- ➔ Do not use in flammable or explosive atmospheres!
- ➔ Do not use in gases containing polymers or silicone components.

- ➔ Do not use in gases containing halogens such as F, Cl, Br, etc., CFCs, or gases containing SO_x and H_2S
- ➔ Never expose the sensor to water or moisture ($\text{RH} < 75\%$) when it is switched off.
- ➔ Check all connections for leaks after installation.

4.3 Measuring principle O2 BlueInOne Cell

The oxygen sensor in *the BlueInOne Cell* is based on an oxygen battery that contains a lead-free anode, a gold oxygen cathode, and a weakly acidic electrolyte. Oxygen molecules enter the electrochemical cell through a non-porous fluorinated membrane, diffuse through the electrolyte, and are reduced at the gold electrode.



Note

- ➔ High concentrations of ammonia (NH_3) and ozone (O_3) can reduce the service life of the sensor element.
- ➔ The sensor must not be operated with dry gas ($< 5\%$ relative humidity), as this will cause the element to dry out.

- ➔ The sensor must not be operated outside the specified pressure range, as this may damage the sensor and electrolyte may leak out in the event of strong negative pressure.

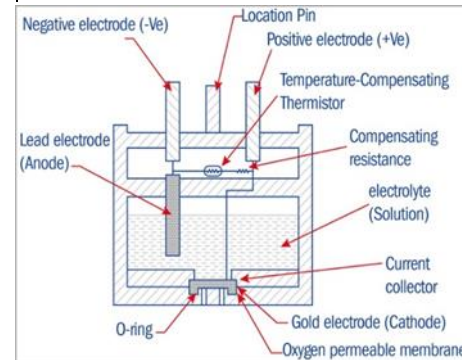


Figure 4: Schematic representation of the O_2 measurement principle in *the BlueInOne Cell*

5 Installation

5.1 General instructions

The **BluelnOne** was protected by packaging during transport to the place of use. This protects against normal transport stresses. Nevertheless, check before installation whether the device has been damaged by improper transport or storage. If there is any damage, safe operation is not possible. The device must not be installed or put into operation.

Check whether the enclosed materials, such as seals, are suitable for your process conditions (pressure, temperature, etc.).

Installation should only be carried out under expert guidance and in accordance with the relevant recognized rules for occupational safety.

5.1.1 Scope of delivery



Figure 5: Scope of delivery **BluelnOne**

	Item number	Description
A	Z-NT-00011	Netzteilset incl. internationale Anschlüsse 24V, 1A
B	Z-KA-00013	Adapter von M12 (8pol) auf USB (RS232)
C	Z-KA-00025	Verbindungskabel für BluelnOne, inkl. Spannungsanschluss, 0,2m

	Item number	Description
D		Flow adapter and hose nozzle/pipe connection according to customer requirements
E	Z-KA-00026	M12 connector (plug)
F	Z-KA-00027	M12 connector (socket)
G		Mounting plate (factory-installed)
	CC-BlueInOne ferm/cell*	BlueInOne calibration certificate

	Item number	Description
	BD-BlueInOne ferm/cell*	BlueInOne Ferm/Cell operating instructions

* not shown

5.2 Mechanical connection



Caution

The filters integrated into the sensor are not designed to repel liquids (see chapter 6.3). Never install the sensor in such a way that liquid can run into it.

The filters integrated into the sensor are not designed to repel liquids (see chapter 6.3). Never install the sensor in such a way that liquid can run into it.

If water has entered the flow adapter, flush it with plenty of dry air. After installation, check the gas tightness of the pipeline.

Do not use solvent-based sealants such as Loctide™ or similar products. Solvents could damage the sensor. If necessary, use Teflon or hemp tape for sealing.

5.2.1 Sensor installation on pipes

The sensor has a so-called flow adapter (Figure 7) through which the gas to be measured flows. This can vary in size from 1/8" to 1 1/4".

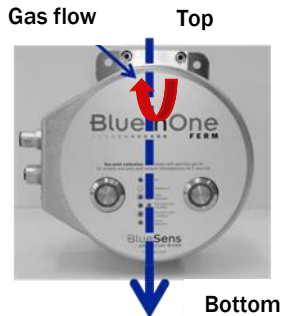


Figure 6 Gas flow BlueInOne

Various connectors for hoses or pipes are available with the 1/4" flow adapter. This allows the sensor to be connected directly to the exhaust pipe of fermenters.

There are filters between the flow adapter and the actual measuring cell to keep out particles. These filters are hydrophobic (water-repellent), but they don't permanently protect against liquids getting in!

The sensor should always be installed in such a way that no liquid can run into the measuring cells. Never install the sensor at the lowest point in the system and ideally install it so that the gas can flow vertically (from top to bottom) through the flow adapter (Figure 6).



Figure. 7 Various connection options for hoses

The bore in the flow adapter (A) has a $\frac{1}{4}$ " thread. The flow adapter can be replaced, allowing threads up to $1 \frac{1}{4}$ " to be used. Other designs can be produced on request.

5.3 Electrical connection

5.3.1 General

Caution

- Read the installation instructions carefully to avoid damage to the device.
- Proceed step by step.
- Only use the original plugs, cables, and power supplies.
- Never plug in or unplug connectors while the device is connected to the power supply.
- The device does not have an on/off switch; it is operational immediately after being connected to the power supply.
- Incorrect operation can cause damage to the device.

5.3.2 Electrical connection of the sensor

For the electrical connection of the sensor, refer to the following chapters: 5.3ff.

Chapters 4.3.3 to 4.3.6 explain the various installations with prefabricated plugs and adapters for the serial connection to USB.

Chapters 4.3.7 to 4.3.9 explain the installation with individual reception of serial and analog signals using custom connection solutions for experienced users.

Connector A is for serial data exchange and connector B is for analog signals (Figure 8).



Figure. 8 Connector **A** and connector socket **B** of *the BlueInOne*

5.3.3 Connection via RS232/USB

The following parts are required for connection via RS232 to USB (**Fehler! Verweisquelle konnte nicht gefunden werden.**):

A: Connection cable for *BlueInOne*, incl. power connection, 0.2 m (item no.: Z-KA-00025)

B: One *BlueInOne*

C: One power supply set incl. international connections 24V, 1A. Only use original accessories (item no.: Z-NT-00011).

D: Adapter from M12 (8-pin) to USB (RS232) (item no.: Z-KA-0013).



Figure 9 RS232 connection

To establish the connection via RS232 to USB:

1. Check the USB connector for the "RS232" sticker to ensure that it is the correct cable (Figure 10).
2. Connect the M12 (8-pin) to USB (RS232) adapter (item no.: Z-KA-0013) to the M12 socket of the BlueInOne connection cable (item no.: Z-KA-00025) (Figure 11) and tighten the metal ring.
3. Connect the free M12 socket on the connection cable (with power cable, **Fehler! Verweisquelle konnte nicht gefunden werden.** : A) to the M12 plug on **the BlueInOne** (Figure 11, port: A) and plug the power supply



Figure 10 RS232 sticker



Figure 11 Screw the cable in place



Figure 12 Connecting BlueInOne

into a power outlet (Figure 12)

4. Plug in the power connector and connect the USB connector to a free USB port on the computer (**Fehler! Verweisquelle konnte nicht gefunden werden.**). All drivers should already be available in Windows 11™.



Figure 13 Connecting the power plug and USB

Attention

- ➔ Please observe the safety instructions for your BlueInOne.

Observe the safety instructions for your **BlueInOne**. Never start the **BlueInOne** if it has been exposed to high concentrations of humidity. Observe the specifications on your data sheet. The **BlueInOne Fern** can be destroyed if it is operated with too much humidity or condensation in the measuring chamber. Never expose the sensor to water or liquid when it is switched off (RF < 75%). If the sensor has been stored in a cold environment, it must be warmed up for several

hours at normal room temperature in dry air before it can be switched on.

The **BlueInOne** does not have an on/off switch and begins the warm-up phase immediately. The **BlueInOne** will now warm up for approximately 60 minutes. During this time, the right push button will light up yellow continuously. After approx. 60 minutes, the left push button will light up green continuously and the right switch will continue to light up yellow (Figure 14). This indicates that the **BlueInOne** still needs to perform a one-point calibration (see chapter 6.1). Continue with the calibration.

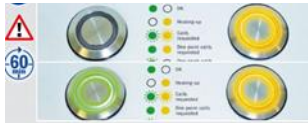


Abb. 14 oben: Aufwärm-phase, unten: 1-point request

5.3.4 RS485/USB connection: general information about the RS 485 connection

RS485 is a data bus used for transmitting measurement data. RS485 with a USB adapter is used as the standard for using the BlueVis software. To start a measurement with **BlueVis**, at least one **BlueInOne** gas analyzer must be connected to the PC or process control system. Up to 12 of these sensors can be connected to a single interface via an RS485 data bus. All data is transmitted to the computer via a single COM interface. Each BlueInOne requires its own MODBUS ID so that the processing program can assign the data correctly. This ID is a number between 1 and 247. The MODBUS ID is preconfigured at the factory and noted on a sticker on the device. However, the ID can also be adjusted later (see **BlueVis** instructions). The RS485 bus only works if a terminating resistor is attached to one end of the line (item no.: Z-KA-00012), Figure 15 .

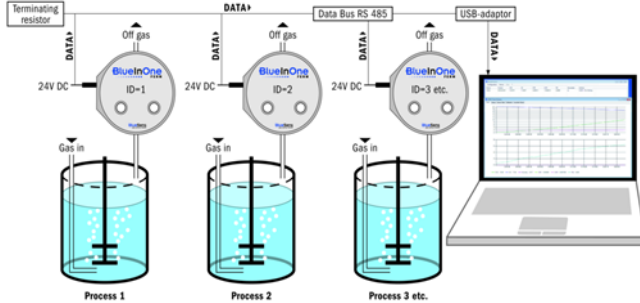


Figure 15 RS485 installation diagram

5.3.5 RS485/USB connection: connecting a BlueInOne

You can operate between one and twelve **BlueInOne devices** in a single MODBUS. The chapter 5.3.5 describes how to connect a **BlueInOne** via RS485/USB, and section 5.3.6 explains how to connect multiple **BlueInOne devices** via RS485/USB.

To operate a BlueInOne via RS485 to USB, the following items are required (**Fehler! Verweisquelle konnte nicht gefunden werden.**):

A: USB-RS485-M12 adapter (item no.: Z-KA-00015).

B: One **BlueInOne**

C: A power supply set including international connections 24V, 1A. Only use original accessories (item no.: Z-NT-00009)

D: **BlueInOne** connection cable (item no.: Z-KA-00025).

E: Terminating resistor (item no.: Z-KA-00012). Please note that the terminating resistor is the size of an M12 connector.

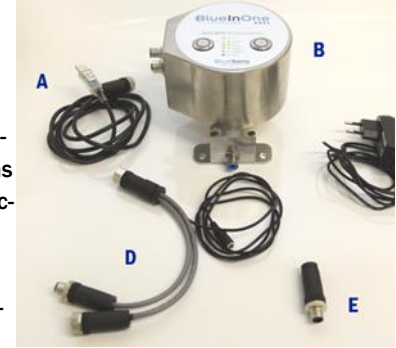


Figure 16 Accessories for installing a **BlueInOne** via RS485 to USB



Figure 17 Terminating resistor

1. The terminating resistor is plugged into the M12 socket of the connection cable that has no power connection, and the screw ring is then tightened (Figure 17).



Figure. 18 Connection KA-00015 to KA-00025

2. The USB-RS485-M12 adapter (item no.: Z-KA-00015) is connected to the M12 socket of the **BlueInOne** connection cable (item no.: Z-KA-00025, Figure 18).



Figure 19 USB plug RS485

Achten Sie darauf, den richtigen USB-Adapter zu verwenden. Der richtige Adapter kann an dem Aufkleber mit dem "RS485"-Aufdruck erkannt werden (Abbildung 19). Prüfen Sie bitte den Aufdruck auf dem Aufkleber!

3. Connect the free M12 socket of the connection cable to the M12 plug on **the BlueInOne** and plug the power supply into a power outlet (**Fehler! Verweisquelle konnte nicht gefunden werden.**).



Figure 20 Connecting **BlueInOne**

Attantion

→ Observe the safety instructions for your **BlueInOne..**

Observe the safety instructions for your **BlueInOne**. Never start the **BlueInOne** if it has been exposed to high concentrations of humidity. Observe the specifications on your data sheet. The **BlueInOne Ferm** can be destroyed if it is put into operation with too much humidity or condensation in the measuring chamber. Never expose the sensor to water or liquid when it is switched off (RF < 75%). If the sensor has been stored in a cold environment, it must be warmed up for several hours at normal room temperature in dry air before it can be switched on.

- Connect the USB connector to a USB port on your computer (Figure 21). All drivers should already be available in Windows 11™. Contact the administrator responsible for your computer if the drivers cannot be found.



Figure 21 Connection of USB adaptor and power adaptor.

- Plug the power connector from the power supply into the power socket on the connection cable (Figure 21). The **BlueInOne** does not have an on/off switch and will immediately begin the warm-up phase. The device will now warm up for approximately 60 minutes. During this time, the right push button will glow yellow continuously. After approx. 60 minutes, the

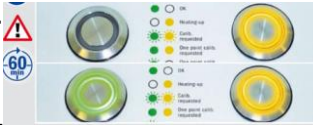


Figure 22 Top: Warm-up phase, bottom: 1-point request.

left push button will light up green continuously and the right switch will continue to light up yellow (Figure 22). This **Indicates** that the **BlueInOne** still needs to perform a one-point calibration (see 6.1). Now proceed with this calibration.

5.3.6 Connecting two or more BlueInOne devices via RS485/USB

Before installation, make sure that the **BlueInOne devices** in question have different MODBUS IDs or assign new IDs (see **BlueVis** manual). To connect two or more **BlueInOne devices** to a data bus, the following items are required (Figure 23):

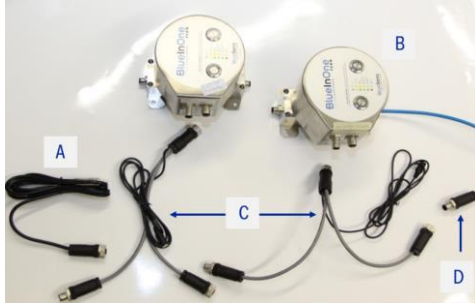


Figure 22 Installation of 2 or more BlueInOne devices.

A: One USB-RS485-M12 adapter cable (item no.: Z-KA-00015).

B: Two or more **BlueInOne** devices.

C: One **BlueInOne** connection cable (item no.: Z-KA-00025) for each **BlueInOne**.

D: One terminating resistor (item no.: Z-KA-00012). Please note that the terminating resistor is the size of an M12 connector.

E: One power supply for each **BlueInOne** (not shown in Figure 23).

F: An optional M12 extension cable (not shown in Figure 23, item no.: Z-KA-00009) can be used to bridge a greater distance if the **BlueInOne** devices are not installed directly next to each other (available in lengths up to 5 meters).



Figure 23 Data bus.

To establish the connection:

1. Connect all parts as shown in **Fehler! Verweisquelle konnte nicht gefunden werden.** For this type of connection, only port A on the **BlueInOne** is used. If more than two **BlueInOne** devices are to be connected, another connection cable is connected instead of the terminating resistor. The terminating resistor must always be connected at the end of this data bus and the USB-RS485-M12 adapter cable at the beginning.
2. Continue with the installation as described for a single **BlueInOne** (see 5.3.5).

5.3.7 Pin assignment for a direct serial connection Connector A: RS232/RS485

The following instructions are for users who want to receive signals from the BlueInOne serially and do not want to or cannot use ready-made connectors. The instructions are intended for trained specialists.





Note

The PIN numbering shown and their assignment refer to the rear view of the socket Figure 25.

Only strip your cables to the extent that no short circuits can occur in the connector housing.

Table1: Assignment of the enclosed socket A (Z-KA-00027) for plug A

PIN 1	Suppla voltage = 24V	 <p>Figure 24 Rear side of socket for connector A</p>
PIN 2	GND	
PIN 3	RS232_TXD	
PIN 4	RS232_RXD	
PIN 5	RS485_A	

PIN 6	RS485_B	 <p>Figure 25 Socket for connector A complete</p>
PIN 7	RS485_GND	
PIN 8	GND	

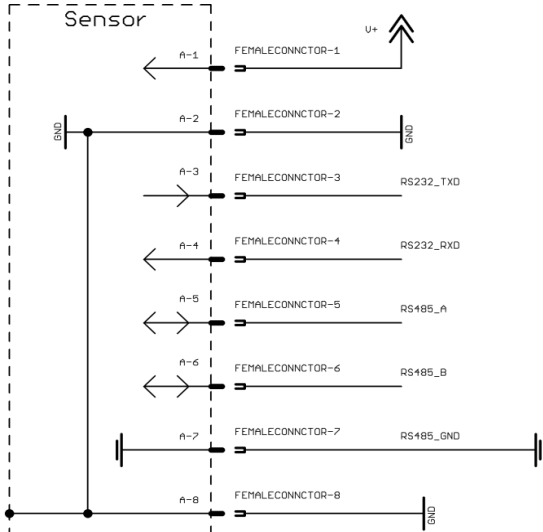


Figure 26 Circuit diagram for connector A

5.3.8 Pin assignment for socket B for a direct analog connection

The following information is intended for users who wish to receive signals from BlueInOne analog and do not wish to use ready-made connectors. This information is intended for trained specialists.


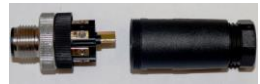


Note

The PIN numbering and assignment shown refer to the rear view of the connector (Figure 28).

Only strip your cables to the extent that no short circuits can occur in the connector housing.

Table2: Pin assignment of socket B (Z-KA-00026) of the sensor

PIN 1	4-20mA output, RL < 500 Ohm for CO ₂	 <p>Figure 27 Rear side of the connector for socket B</p>
PIN 2	GND	
PIN 3	4-20mA output, RL < 500 Ohm for O ₂	 <p>Figure 28 Plug for socket B complete</p>
PIN 4	GND	
PIN 5	For internal use only!	
PIN 6	GND	
PIN 7	1-point calibration (5 seconds)	
PIN 8	GND	

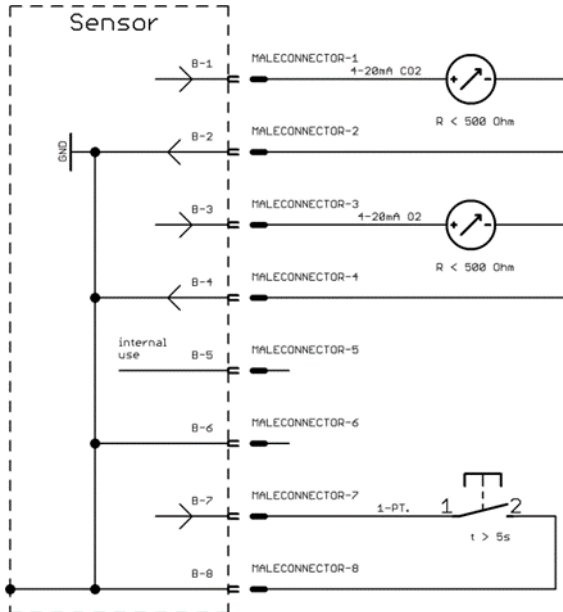


Figure 29: Circuit diagram for connector B

5.3.9 Commissioning after direct analog and serial connection

This type of commissioning applies to users who have connected the **BlueInOne** individually via the pin assignment in section



Note

Connect all cables carefully. Please note that the device requires 1 hour of warm-up time before it reaches its specifications.

During this time, the analog outputs only emit 2.3 mA.

The LED rings around the switches also light up and indicate the respective status of the sensor.

1. Check that the air at the sensor elements, i.e., in the flow adapter, is dry. If necessary, flush with dry air for 60 minutes. Otherwise, the O₂ sensor may be destroyed!
2. Connect the 24 V DC power supply to PIN 1 of the socket for connector A.
3. Connect the 24 V DC power supply to PIN 1 of the socket for connector A.
4. Serial interrogation can be performed by connecting the appropriate cables to the socket for connector A as shown in Figure. 24.

5. To display the CO₂ channel, connect the analog measuring device to PIN 1 (RL < 500 ohms) and PIN 2 (return conductor) of the plug for socket B.
6. To display the O₂ channel, connect the analog measuring device to PIN 3 (RL < 500 ohms) and PIN 4 (return conductor) of the plug for socket B.
7. Unscrew the strain relief and reattach the plug or socket housing properly.
8. Insert the plug for socket B into socket B.

Connect the socket for plug A to plug A. After approx. 1 hour of warm-up time, the sensor must still be adjusted. During the warm-up time, the sensor displays approx. 2.3 mA. During this time, the analog output of the **BlueInOne** can be switched between 2.3 mA, 4.0 mA, and 20.0 mA by pressing the 1-pt buttons. This can be used to calibrate the analog inputs of the downstream measuring device (or the PLC). The sensor must then be flushed for at least 30 minutes with the gas specified in the data sheet. The gas flow must not fall below a minimum of 200 ml/min. If the sensor has been exposed to a higher CO₂ concentration, it must be flushed for several hours. In order to save calibration gas, the flushing can initially be carried out with fresh air (except for the last 30 minutes). Any change in the gas mixture for the one-point calibration will result in a measurement error. Please note that not all **BlueInOne** are suitable

for single-point calibration with fresh air. The standard gas concentrations for the respective **BlueInOne** are listed in the following table. The sensor is now calibrated.

9. **It is essential that you also observe the calibration instructions on the data sheet for your individual sensor! The information on the data sheet takes absolute precedence over the standard information..**
10. Then connect PIN 7 to PIN 8 (GND) of connector B for 5 seconds or press both integrated buttons on the BlueInOne simultaneously for 5 seconds.

The sensor is now calibrated.

Table 3: 1-point calibration for BlueInOne Ferm

Standard concentrations for 1-point calibration. Please always refer to the data sheet to find out which gas your sensor has been calibrated for.

	Fresh air (0,04 Vol.% CO2, 20,97 Vol.% O2, remainder N2*)	20,97Vol.% O2, remainder N2*)
BlueInOne 1025 (10% CO2, 25%O2)	X	
BlueInOne 2525	X	
BlueInOne 1050	X	
BlueInOne 10100	X	
BlueInOne 2550	X	
BlueInOne 25100	X	
BlueInOne 5025		X
BlueInOne 5050		X
BlueInOne 50100		X

Standard concentrations for 1-point calibration. Please always refer to the data sheet to find out which gas your sensor has been calibrated for.

	Fresh air (0,04 Vol.% CO2, 20,97 Vol.% O2, remainder N2*)	20,97Vol.% O2, remainder N2*)

*Abweichungen führen zu Messfehlern



Note

Observe the safety instructions for your **BlueInOne**. Never start the **BlueInOne Ferm** if it has been exposed to high concentrations of humidity. Observe the specifications on your data sheet. The **BlueInOne Ferm** can be destroyed if it is put into operation with too much humidity or condensation in the measuring chamber. Never expose the sensor to water or liquid when it is switched off (RF < 75%)..

Observe the safety instructions for your **BlueInOne**. Never start the **BlueInOne Ferm** if it has been exposed to high concentrations of hu-

midity. Observe the specifications on your data sheet. The **Blue-InOne Ferm** can be destroyed if it is put into operation with too much humidity or condensation in the measuring chamber. Never expose the sensor to water or liquid when it is switched off (RF < 75%). If the sensor has been stored in a cold environment, it must be warmed up for several hours at normal room temperature in dry air before it can be switched on.

5.4 Sensor status display via LEDs



Figure 30: Switch with LEDs

LED status	Description	Possible cause
Green	Everything OK, sensor ready for operation	
Yellow	Heating phase, which can take up	Sensors are being tempered and must first reach

LED status	Description	Possible cause
	to 60 minutes depending on the circumstances	the correct temperature, otherwise the measured values may be incorrect
Green/yellow	1-point adjustment required	1. Commissioning, monthly reminder (operating time)
Green flashing	1-point adjustment in progress	Adjustment started
Green/yellow flashing	Factory calibration required	After one year of operation
red	Sensor not working	Sensor is just starting up, signal too weak, sensor defective

6 Maintenance

In addition to regular 1-point calibration, as described in 6.1, we recommend annual factory calibration.

6.1 1-point calibration

Once a month and during initial commissioning, the **BlueInOne** must be calibrated using the one-point method to ensure accurate measurement results. To do this, the sensor must be flushed for at least 30 minutes with the gas specified in the data sheet (Figure 32)



Figure. 30 Flush with certified gas

The gas flow must not fall below a minimum of 200 ml/min. If the sensor has been exposed to a higher CO₂ concentration, it must be flushed for several hours. In order to save calibration gas, the flushing can initially be carried out with fresh air (except for the last 30 minutes). Any change in the gas mixture for single-point calibration will result in a measurement error. Please note that not all **BlueInOne** devices are suitable for single-point calibration with fresh air. The standard gas concentrations for the respective **BlueInOneFerm** are listed in the The sensor is now calibrated.

. It is essential that you also observe the calibration instructions on your individual data sheet! The information on the data sheet takes absolute precedence over the standard information.

Then connect PIN 5 to PIN 8 (GND) on the connection cable for 5 seconds or press both buttons simultaneously for 5 seconds (Figure 33)



Figure 31 1-point calibration is started

Once the sensor has completed calibration, the left push button will light up green continuously. The **BlueInOne** can now be used again.

The 1-point calibration can also be started via the **BlueVis** software. Please note the instructions in the relevant operating manual.

6.2 Recalibration

For annual recalibration, the sensor should be returned to the manufacturer or an authorized dealer.

6.3 Filter replacement

6.3.1 Sensor von Durchflussadapter entfernen



Figure 32 Remove the sensor from the flow adapter

Loosen the four screws visible from above (see **Fehler! Verweisquelle konnte nicht gefunden werden.**) and remove the sensor from the flow adapter.

6.3.2 Replace the filter

1. Remove the filter from the recess (Figure 35).

2. Insert the new filters (a BIO replacement part set with filters and seals can be ordered under item no.: Z-XX-00053). First insert the coarse filter and then the fine filter.
3. Check the seals for damage and replace them if necessary.
4. Reattach the sensor to the flow adapter using the 4 screws.

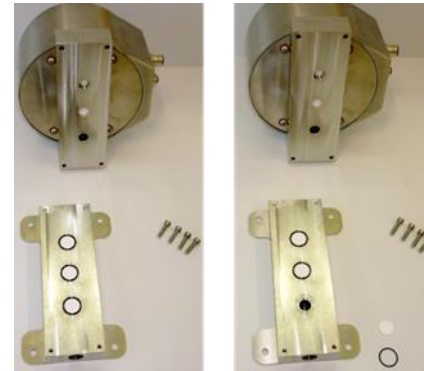


Figure 33 Filter replacement

6.4 Wall mounting

The **BlueInOne** can be mounted almost anywhere using the mounting plate. Please also note the information in chapter 5.

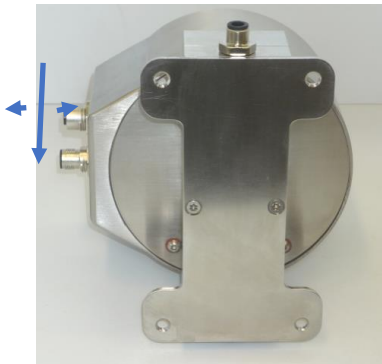


Figure. 34 Sensor with mounting plate

7 Troubleshooting

Problem	Possible cause	Solution
LED flashes red..	Insufficient power supply.	Check whether the power supply unit outputs 24V DC 1A. Always use original accessories from BlueSens gas sensor GmbH (item no. Z-NT-00011).
LEDs flash green and yellow.	The BlueInOne requires a 1-point calibration.	Perform a 1-point calibration according to the operating instructions (see section 5.1 1-point calibration).
LED lights up yellow and no measured values are output.	Sensor heating up.	After power connection, the BlueInOne requires about 60 minutes to reach a stable operating temperature. No measured values are output during this time.

Problem	Possible cause	Solution
	Unstable power supply.	Install a sufficiently dimensioned UPS (uninterruptible power supply) between the power outlet and the power supply unit.
	Insufficient power supply.	Check whether the power supply unit outputs 24V DC 1A. Always use original accessories from BlueSens gas sensor GmbH (item no. Z-NT-00011).
Measured values deviate from the expected values.	The expected values are outside the measuring range.	The BlueInOne has a predefined measuring range, which is specified on the type plate and in the accompanying data sheet. Measured values outside this range are displayed, but are outside the specified accuracy range. If

Problem	Possible cause	Solution
		your process regularly falls outside the measuring range, you can order a new, modified factory calibration. To do so, simply contact the sales department at BlueSens gas sensor GmbH .
	Missing or incorrect 1-point calibration.	Transport stress or a 1-point calibration that has not been carried out carefully can cause a strong signal drift. Please perform a new 1-point calibration (see section 5.1 point calibration).
No digital communication	Incorrect cable.	Please check that the cable harness is complete and correctly connected (see also section 5.3 Electrical connection) and use

Problem	Possible cause	Solution
		the cable that matches your protocol:
		Serial BlueSens protocol (RS232): You need the USB cable labeled RS232 (label on M12 and USB connector, item no. Z-KA-00013).
	Incorrect parameters selected.	Compare your settings with those in BlueInOne : The default settings for RS232 are: 19200 baud 8 bits 1 stop bit No parity No handshake The default settings for RS485 (Modbus) are: 38400 baud 8 bits

Problem	Possible cause	Solution
		<p>2 stop bits no parity</p> <p>The default Modbus ID is 1. If it needs to be changed, enter the new ID on the sticker to the left of the connections.</p>
	Missing drivers.	<p>For RS232 or RS485, check whether the current FTDI driver has been installed (https://ftdichip.com/drivers/).</p>
	Fehlender Abgleich mit dem Empfänger (Analogkalibration).	<p>Bei der ersten Einrichtung sollte dringend der Analogausgang des BlueInOne mit dem Eingang Ihrer Steuerung abgeglichen werden. Dazu können die Ausgänge des BlueInOne während der</p>

Problem	Possible cause	Solution
		<p>Aufheizphase fix auf 4 oder 20mA gesetzt werden (Siehe Punkt 5.3.9. Inbetriebnahme nach einem individuellem Anschluss analog und seriell).</p>
Incorrect or no 4-20 mA output.	Incorrect pin assignment.	<p>Please compare the pin assignment with Table 2 under point 5.3.8 Pin assignment socket B for a direct analog connection.</p>
	Missing calibration with the receiver (analog calibration).	<p>During initial setup, it is essential to calibrate the analog output of the BlueInOne with the input of your control system. To do this, the outputs of the BlueInOne can be set to a fixed 4 or 20 mA during the warm-up phase (see</p>

Problem	Possible cause	Solution
		section 5.3.9. Commissioning after direct analog and serial connection).

8 Appendix

8.1 Calibration table

Date	Procedure	Condi- tions	Name	Signature
	Complete calibration	25° C, 1 bar	BlueSens	
	1-point calibration			

8.2 Technical data

See enclosed data sheet

8.3 Warranty

The warranty period is specified in the General Terms and Conditions.



Note

The warranty may be voided if these operating instructions are not followed, if the device is handled improperly (e.g., opening the **BlueInOne**), or if a power supply other than the original power supply supplied with the device is used.

8.4 Service and support

Our qualified customer service team is happy to assist you as your partner.


If necessary, please contact your dealer or us directly:

Tel.: +49 (0)2366 / 4995-567 or by email to service@bluesens.de

USA: 847 201 3124 or by email at service@bluesens.com

8.5 Recycling and disposal

The **BlueInOne** that you have purchased from us, the accessories, and the packaging are recyclable.

- The **BlueInOne** is packaged to protect it from damage during transport. Please recycle any packaging that you no longer need.
- Recycle and dispose of the **BlueInOne**, including accessories and packaging, in accordance with your local regulations.
- The symbol  on the **BlueInOne** means that you must not dispose of the **BlueInOne** with normal waste within the EU, but must recycle it separately.
- We recommend returning BlueInOne devices/accessories for disposal to **BlueSens gas sensor GmbH** or **BlueSens Corporation** (USA). To do this, you will need a **return number**, which you can obtain from our service team at service@bluesens.de or service@bluesens.com (USA), along with the return address applicable to you. We guarantee professional dismantling and environmentally friendly recycling of all components! This service is, of course, free of charge for you.
- If there is any personal data on the **BlueInOne**, it must be deleted before returning it.

8.6 Imprint

BlueInOne operating instructions – English, translated from German
Index Z-BA-BIO-ENG

Edition Rev. 260211_001

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The accuracy of the information in this manual has been carefully checked. Nevertheless, **BlueSens gas sensor GmbH** accepts no liability for consequences resulting from any errors in the description and illustrations. The General Terms and Conditions of **BlueSens gas sensor GmbH** apply.

BlueSens gas sensor GmbH

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Fax: +049 (0)2366/4995599

E-Mail: service@bluesens.de

Website: www.bluesens.de

- Information status: February 2026

9 CE CERTIFICATE

Declaration of conformity for machines (EC Machinery Directive 2006/42/EC)

The company

BlueSens gas sensor GmbH
Spirigelskamp 25
D-45699 Herten
Germany

that the BlueInOne (term and cell configuration) from serial number:
39096

In combination with our accessories:

- power supply, cable
- complies with the relevant provisions of the EC Machinery Directive (2006/42/EC), including any amendments applicable at the time of the declaration.
- complies with the relevant provisions of the following additional EC directives and their amendments applicable at the time of the declaration:

- 2006/42/EG
- 2014/35/EU
- 2003/10/EG
- 2014/30/EU
- 2011/65/EU

that the following harmonized standards (or parts thereof) have been applied:

- DIN EN ISO 12100-2011-03
- DIN EN ISO 20607-2019-10
- DIN EN ISO 12100 Berichtigung 1:2013-08
- DIN EN 60204-1:2019-06

that the following harmonized standards (or parts thereof) were applied without presumption of conformity

- DIN EN 82079-1:2021-09
- DIN EN 61000-2-2:2020-05
- DIN EN 55011:2022-05
- DIN EN IEC 61326-1:2022-11

that the following national standards and technical regulations (or parts thereof) have been applied:

Herten, 10.06.2024

Place and Date

Ulf Schmalz,
Managing Director / CE Representative



10 FCC CERTIFICATE

FCC Declaration of conformity

Herewith, the company

BlueSens gas sensor GmbH
Snhrgelskamp 25
D-45699 Herten
Germany

Declare under our sole responsibility, that the BlueInOne (firm and cell) when used together with our accessories power supply and cable since SN:

39096

- meets all legal requirements based, conforms to the following specifications
- FCC 47 CFR, 15B, §15.107
- FCC 47 CFR, 15B, §15.109

The declaration applies to all manufactured according to the tested prototype



Herten, 07.11.2019
Place, Date

LDO Schmale,
Managing Director/representative