Operating Manual

BCP-O2

BCP X-large
Aluminum IP65

BCP regular
with PA 6 housing

BlueSens

Rev.140310001

Contents

1 About this document

1.1 Function

This operating manual provides you with all of the necessary information for quick start-up and safe operation of the ***BCP-O2***. Please read the operating manual before starting operation.

1.2 Target group

This operating manual is intended for use by trained specialist personnel. The contents of this manual must be made available to personnel and followed by them.

1.3 Symbols used

Danger!

This symbol indicates a situation that is possibly dangerous. Failure to observe the safety instructions can result in personal injury.

Caution!

The symbol indicates the possibility of damage to property.

Note!

This symbol indicates helpful additional information.

1 Action sequence

Numbers indicate steps to be performed in sequence.

2 For your safety

2.1 General information

The ***BCP-O2*** was inspected in our plant and was ready for operation when it left.

Before installing and starting up the device, please read this operating manual carefully. The operating manual contains safety instructions that must be observed to ensure safe operation.

The device must never be operated in conditions that do not comply with the specifications on the type plate.

Maintenance and servicing may only be performed by specially trained personnel who are familiar with the hazards inherent to the work as well as the guarantee terms.

2.2 Authorized personnel

All of the actions described in this operating manual may only be performed by trained specialist personnel who have been authorized by the plant operator. Work on the device other than that described in this manual may only be performed by personnel of the BlueSens gas sensor GmbH Company for safety reasons and to ensure compliance with the terms of the guarantee.

2.3 Proper use

The ***BCP-O2*** is a gas sensor for measuring oxygen concentrations in the specified concentration area and under the conditions described in the technical data. It is used to monitor metabolism in biological processes such as fermentation. The BCP-O2 sensor may only be used in well ventilated rooms.

Danger!

The sensor does not have an ATEX certificate and may therefore only be used in well ventilated rooms.

2.4 Misuse warning

The ***BCP-O2*** may not be used as a safety component for monitoring gasses in systems or as a gas warning device. It may also not be used in areas subject to explosion hazards.

2.5 General safety information

If the device is mishandled or not used for its intended purpose, application-specific dangers may arise.

Danger!

If the device is incorrectly installed or set, there is a danger of explosions and poisoning.
After installation, check all connections for leaks.

2.6 CE conformity

The ***BCP-O2*** conforms to the EMC Directive (89/336/EEC, 92/31/EEC and 93/68/EEC) when applying the harmonized standards **EN50081–1, EN61000.**

The low-voltage directive (72/23/EEC und 93/68/EEC) is not applicable as no voltage greater than 24 V is used.

3 Product description

3.1 One-piece construction of the BCP-O2

The one-piece construction (fig. 1) means that the measuring adapter cannot be separated from the sensor head. It is the standard set-up for all BCP-sensors. The BCP-O2 is designed for a particular mechanical connection that can only be altered subsequently at the plant for a certain fee.

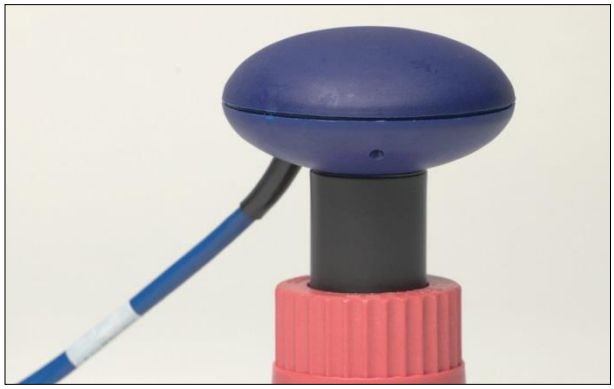


Fig. 1: One-piece construction of the BCP-O2 with PA-housing

Caution!

The BCP-O2 always requires a minimum of oxygen, so that the O_2 senor element is not damaged. The minimum usually corresponds to the smallest value in the measuring range (0.1% Vol. % O_2 for a maximum measuring range up to 25 Vol.% O_2 and 1% O_2 for a maximum measuring range up to 50 Vol. % O_2). This minimum value of O_2 must be ensured during the entire measurement. Do not use the BCP-O2 in processes without oxygen. For measurements without oxygen in the process, we recommend the BCP-O2ec.

Caution!

Don't use in flammable or explosive atmospheres!

Don't use in gases with polymers or silicon components!

Do not use the device in gas mixtures without oxygen (O2).

Don’t use in gases with halogens like F, Cl, Br etc., CFC or SO_x and H_2S!
Sensor could be destroyed if it is put in use with 100% relative humidity inside. Make sure every time that the sensor is warmer than its environment or that max. 75% humidity is inside the sensor.
Don’t expose sensor to water or humidity over 75% RH when the sensor is not in use. Sensor could be damaged.
Otherwise it could be dried at max. 80°C (176°F) for 3 hours on a hot plate or a drying chamber.
Measuring adapter will become hot. Don’t touch in use under power. Disconnect the power supply and wait 30 minutes for cooling.

A Teflon filter is placed at the bottom of the cap to protect the sensor element for a short time against water under normal pressure. In the case of over pressure this could not be guaranteed.
If foam or dust pollutes the Teflon filter it has to be changed (see chapter 5.3 Filter change – coarse filter). Behind the Teflon filter there is a second filter. If this filter is polluted, don’t change it! Call the service of BlueSens.
If the senor element gets in contact with water it could be destroyed. In this case the sensor needs a new element and a new factory calibration at the BlueSens site.

Fig. 2: Teflon filter

Caution!

The filter does not serve to protect the sensor against water under overpressure.
If the measuring cap is full of water the sensor element has to be dried at max. 80°C.
Don’t change the second filter of the sensor! Sensor could be destroyed.

3.2 Measuring principle

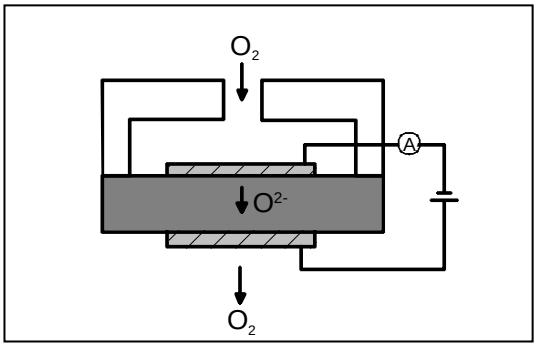


Fig. 3: Measuring principle

When voltage is applied to a zirconium electrolyte cell, oxygen is pumped through the zirconium disc from the cathode side to the anode side because the carriers of the current flowing through the zirconium electrolyte are oxygen ions (fig. 3).
By attaching a cap with a pinhole on the cathode side of the cell and by increasing the voltage over the cell the current shows saturation due to the rate limiting step in the transfer of oxygen to the cathode. This saturation current is called limiting current and is nearly proportional to the ambient oxygen concentration.

Caution!

The BCP-O2 always requires a minimum of oxygen, so that the O_2 senor element is not damaged. The minimum usually corresponds to the smallest value in the measuring range (0.1% Vol. % O_2 for a maximum measuring range up to 25 Vol.% O_2 and 1% O_2 for a maximum measuring range up to 50 Vol. % O_2). This minimum value of O_2 must be ensured during the entire measurement. Do not use the BCP-O2 in processes without oxygen. For measurements without oxygen in the process, we recommend the BCP-O2ec.

4 Installation

4.1 General instructions

The ***BCP-O2*** is protected by packaging on its way to its application location. This secures it against the usual transport strains. However, before installation, check whether the device has been damaged due to improper transport or improper storage. If the device is damaged in any way, operation without hazards is not possible and the device may not be installed and taken into operation.

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

The installation should only be performed under supervision by a specialist and in compliance with all applicable work safety rules.

Your instrument was protected by packing during transport to assure normal loads during transport.
The packing of standard instruments consists of environment-friendly, recyclable cardboard. For special versions PE foam or PE foil is also used. Dispose of the packaging material via specialised recycling companies.
To avoid high levels of humidity (max. 75%) and condensing humidity silica gel is added to the packing.
Storage conditions see data sheet.

Caution!

Sensor could be destroyed if it is put in use with 100% relative humidity inside. Make every time sure that it is warmer than its environment or that max. 75% humidity is inside the sensor. Otherwise it could be dried at max. 80°C (176°F) on a hot plate or a drying chamber.

4.2 Mechanical connection

Caution!

The sterile filter is not intended for repelling fluids. Never install the sensor such that fluid can run into the measuring adapter.

If water has penetrated the measuring adapter, allow it to dry out for at least 12 hours at max. 80°C in a drying cabinet or on a hot plate.

Protect the measuring adapter from penetration by liquids.

After installation, check that the pipe connection is gas-tight.

4.2.1 Installation on pipes

The connection to a pipe is made with a 1 ¼" nozzle with an external thread:

1. Place the sealing ring (O-ring 30 x 4 mm, viton, item no. Z-OR-00003) on the nozzle (fig. 4).
2. Place on the sensor (fig. 5).
3. Connect the nozzle and the sensor with the screw cap so that the connection is gas-tight (fig. 6).

Fig. 4

Fig. 5

Note!

Only use the supplied screw caps. Do not use metal screw caps as they result in thermal contact between the measuring adapter and the pipe and thus violate the technical specifications.

Fig. 6

4.2.2 Installation on a Tri-Clamp SMS38 connection

:

1. Place the sealing ring (item no. Z-OR-00013) on the nozzle (fig. 7).
2. Place on the sensor (fig. 8).
3. Fix the sensor with the Tri-Clamp on the nozzle (fig. 9).

Fig. 7

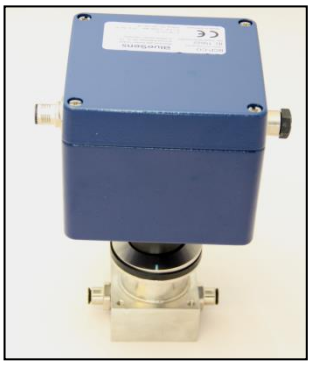


Fig. 8

Fig. 9

4.2.3 Installation on a POM flow adapter

To install the sensor on a POM flow adapter:

1. Place the sealing ring (item no. Z-OR-00004) on the nozzle of the flow adapter (fig. 10).
2. Place on the sensor (fig. 11).
3. Connect the flow adapter and the sensor with the screw cap so that the connection is gas-tight (fig. 12).

Fig. 10

Fig. 11

Fig. 12

4.2.4 Installation on a stainless steel flow adapter

To install the sensor on a stainless steel flow adapter:

4. Place the sealing ring (item no. Z-OR-00004) on the stainless steel connection piece (fig. 13).
5. Place on the sensor and put the screws in place (fig. 14).
6. Fasten the 4 screws (item no. Z-XX-00007) so that the connection is gas-tight (fig. 15).

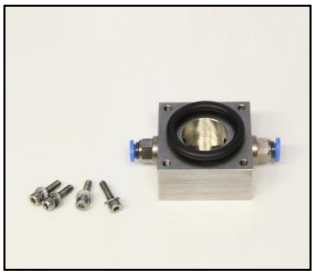


Fig. 13

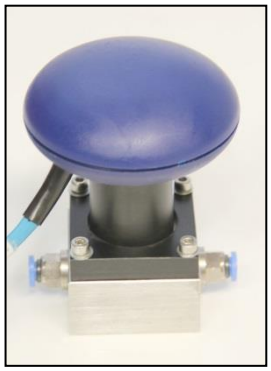


Fig. 14

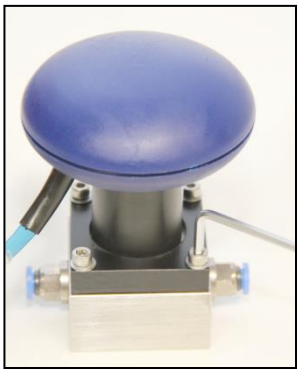


Fig. 15

4.2.5 Sterile installation at the shake flask

For sterile conditions with a shake flask autoclavable PES screwed connections with integrated filters are available. Before the measurement the shake flask must be prepared for the autoclaving (chap. 4.2.6.1 and 4.2.6.2). After the autoclaving the sensors can be installed (chap. 4.2.6.3).

4.2.5.1 Prepare the shake flask

In the first step the shake flask will be prepared with screw caps and accessories. For this installation you will need (fig. 16):

A: shake flask with GL 45 connections. Use specified shake flasks to ensure a reproducible calculation of the oxygen and carbon dioxide transfer rates.

B: A GL14 screw cap (art no. Z-MA-00001) and a correspondent silicone sealing (art. no.: Z-OR-00005).

C: (optional for open systems): A PTFE- filter (art. no.: Z-FL-00001) and a GL45 screw cap with bore (art. no.: Z-MA-00003) to cover the unused GL45 nozzles for air ventilation.

D: (optional for gas tight systems): A gasket GL45 (art. no.: Z-OR-00004) and a screw cap GL45 (art. no.: Z-MA-00030) to tighten unused GL45 nozzles.

Fig. 16

Fig. 17

To prepare the shake flask please proceed with the following steps:

1. Place the GL14 sealing (art. no.: Z-OR-00005) on the GL14 nuzzle and screw the GL 14 cap (art no. Z-MA-00001) on the nozzle (fig. 17).

2. For gastight systems: place the GL45 gasket (art. no.: Z-OR-00004) on the GL45 nozzle and tighten the screwed cap GL45 on the nozzle fig. 18). Check the complete system for tightness after the complete installation.

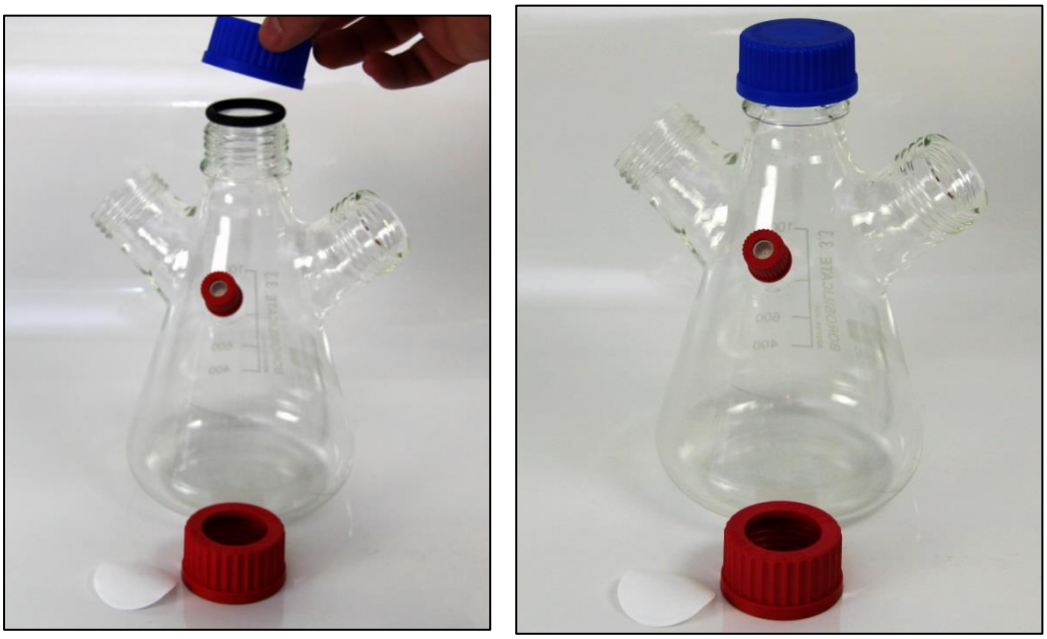


Fig. 18

3. Alternative Installation for air ventilated systems: To prevent the culture medium form pollutions place the aseptic PTFE filter on the GL45 nozzle (art. no.: Z-FL-00001) and screw the GL45 cap with bore (art. no.: Z-MA-00003) on the nozzle after that (fig. 19).

Fig. 19

4.2.5.2 Preparing the shake flask for autoclaving

Before starting a new measurement the shake flask with the aseptic filters, the screwed cap PES GL45 (see accessories, fig. 16: A) and the culture medium has to be sterilized. To prepare the shake flask for the autoclaving you will need (fig. 20).

A: The screw cap GL45 PES (art. no.: Z-MA-00009). This cap was pre-assembled in the factory and is already equipped with a filter. See chap.5.4 for information according the changing of the filter. The PES-cap can be autoclaved.

B: Two gaskets (art. no.: Z-OR-00004) for each sensor you want to install.

C: A sensor (at least) with screwed connector for PES-caps. Please note that the connector cannot be changed manually. It must be changed in the BlueSens´ site if you want another screwed connector type.

D: The already pre-assembled shake flask (see chap. 4.2.6.1).

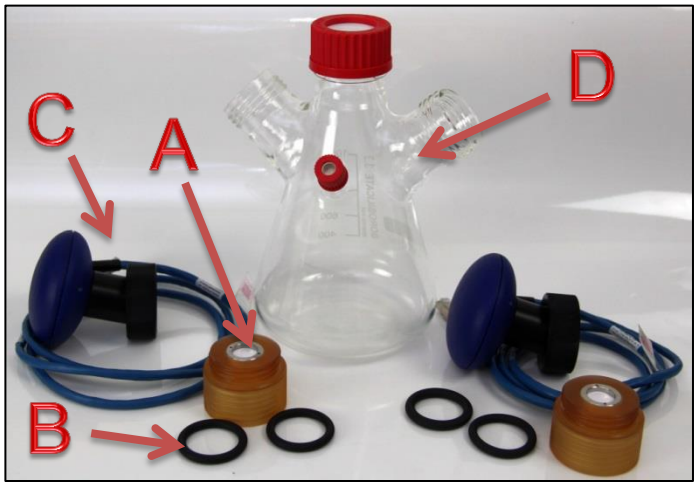


Fig. 20

Fig. 21

Before the autoclaving please proceed in the following steps:

1. Fill in the culture medium (not shown on images).
2. Place the gasket (art. no.: Z-OR-00004) on the GL 45 nozzle (fig. 21) Screw the screwed cap GL45 PES (art. no.: Z-MA-00009) on the nozzle (fig. 22). Continue accordingly if you want to install more than one sensor (fig. 23).

Fig. 22

Fig. 23

The shake flask can be sterilized now.

During the sterilization of the flask, the sensors could be adjusted with ambient air on an additional shake flask. The BCP-O2 sensor must be running before that and must continue to be supplied with power all the time during the calibration. Place the sensors in a vessel with sterilized water and fresh ambient air or 100% nitrogen (other conditions possible, see the attached date sheet) for at least 30 minutes. Always note the data sheet for other specifications. Wait until 100% rel. humidity has been reached in the vessel (e.g., the first drops of humidity condensate on the glass) and the signals are constant. Carry out the 1-point calibration subsequently by clicking in the menu in ***Options/1-point calibration*** of FermVis.

Caution!

Read the manual of FermVis very carefully to avoid mistakes.

4.2.5.3 Connect the sensor

After the autoclaving the culture medium can be inoculated and the sensors can be connected to the shake flask.

1. Put the second gasket (art. no.: Z-OR-00004) on the screwed cap GL45 PES (art. no.: Z-MA-00009, fig. 24).
2. Put the sensor with the GL45 PES connector on the GL45 PES cap and tighten the connection until a gas tight connection has been established (fig. 25). Continue accordingly if you want to install more than one sensor (fig. 26).

The shake flask is now ready for operation.

Fig. 24

Fig. 25

Fig. 26

In the case of shaking the flask they must be fixed on the shaking panel.
After that the measurement could be started with FermVis.

Fig. 27: Assembly on sticky plate

Caution!
Use only specified filters (Z-FI-00001) and specified shake flasks to ensure a reproducible calculation of the oxygen and carbon dioxide transfer rates.

Caution!
Fix the BACCom and the cables onto the shaking plate (fig. 27) to avoid a cable break.

4.3 Electrical connection

4.3.1 General information

Caution!

Read the installation instructions carefully to prevent damage to the device.

Proceed step-by-step.

Only use the original plugs, cables and power adapters.

Never connect or disconnect plugs when the device is connected to the power supply.

The device does not have an on/off switch; it starts operation as soon as it is connected to the power supply.

Improper operation can result in damage to the device.

4.3.2 Version 4 – 20 mA in PA6 housing

To connect the measuring device to the connection cable of the sensor head in the PA6 housing (fig. 28), use the supplied socket and strain relief (fig. 29).

Fig. 28

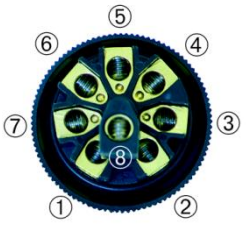
.Fig. 29

☞ **Note!**

The numbering of the pins and their assignment refer to the socket when seen from behind (fig. 30).

Remove the insulation of the cables a little as possible to avoid short circuits in the plug housing.

PIN 1	V+ = 12 V
PIN 2	GND
PIN 3	RS232_TXD
PIN 4	RS232_RXD
PIN 5	1-point calibration
PIN 6	4–20mA, RL < 250 Ohm
PIN 7	For internal use only
PIN 8	GND



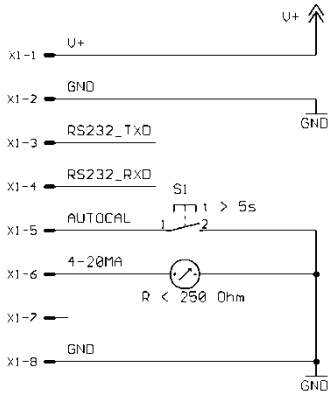


Fig. 30: Plug assignment

1. Connect the 12 V DC power supply to pin 1 of the socket.
2. Connect GND (ground) to pin 2.
3. Connect the measuring device to pin 6 (R_L < 250 Ohm) and pin 8 GND (ground).
4. Plug the sensor cable into the socket.

After around 1 hour of heating-up time, the sensor still requires adjusting. During the heating-up time, the sensor displays 2.3 mA. To make the adjustment, expose the sensor for approx. 30 minutes (depending on specification – see datasheet) to ambient air (20.97 Vol. % O2) or process gas without any biological activity in the reactor.

5. Afterwards, connect pin 5 to pin 8 (GND) for 5 seconds.

6. Screw on the strain relief. The sensor has been adjusted.

4.3.3 RS232 serial version in PA6 housing

1. Connect the sensor to the power supply with the cable supplied.
2. Connect the sensor to a computer using the serial cable.

Fig. 31

After around 1 hour of heating-up time, the sensor still requires adjusting. To do this, expose the sensor for approx. 30 minutes (depending on specification – see datasheet) to ambient air (20.97 Vol. % O2) or process gas without any biological activity in the reactor. The adjustment itself is performed with the ***BACVisSingle*** software (see ***BACVisSingle*** operating manual).

Start the ***BACVisSingle*** software. You will find further relevant information in the corresponding operating manual.

4.3.4 Version 4 – 20 mA in aluminum housing

To connect the measuring device to the connection cable of the sensor head in the aluminum housing (fig. 32), use the supplied socket and strain relief (fig. 33).

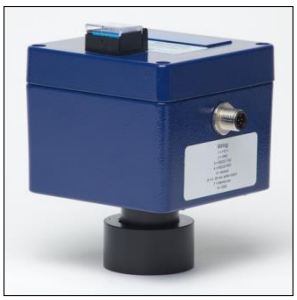


Fig. 32

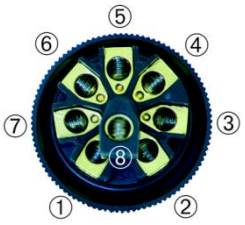
Fig. 33

☞ **Note!**

The numbering of the pins and their assignment refer to the socket when seen from behind (fig. 34).

Remove the insulation of the cables a little as possible to avoid short circuits in the plug housing.

PIN 1	V+ = 12 V – 24 V
PIN 2	GND
PIN 3	RS232_TXD
PIN 4	RS232_RXD
PIN 5	1-point calibration
PIN 6	4–20 mA, RL < 250 Ohm
PIN 7	For internal use only
PIN 8	GND



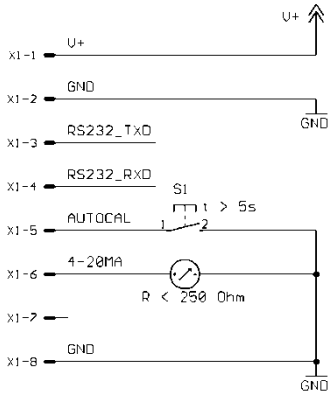


Fig. 34: Plug assignment

1. Connect the 12 – 24 V DC power supply to pin 1 of the socket.
2. Connect GND (ground) to pin 2.
3. Connect the measuring device to pin 6 (R_L < 250 Ohm) and pin 8 GND (ground).
4. Plug the sensor cable into the socket.

After around 1 hour of heating-up time, the sensor still requires adjusting. During the heating-up time, the sensor displays 2.3 mA. To make the adjustment, expose the sensor for approx. 30 minutes (depending on specification – see datasheet) to ambient air (20.97 Vol. % O2) or process gas without any biological activity in the reactor.

5. Afterwards, connect pin 5 to pin 8 (GND) for 5 seconds.

6. Screw on the strain relief. The sensor has been adjusted.

4.3.5 RS232 serial version in aluminum housing

1. Connect the sensor to the power supply with the cable supplied.
2. Connect the sensor to a computer using the serial cable.

After around 1 hour of heating-up time, the sensor still requires adjusting. To do this, expose the sensor for approx. 30 minutes (depending on specification – see datasheet) to ambient air (20.97 Vol. % O2) or process gas without any biological activity in the reactor.

The adjustment itself is performed with the ***BACVisSingle*** software (see ***BACVisSingle*** operating manual).

Start the ***BACVisSingle*** software. You will find all of the further relevant information in the corresponding operating manual.

Fig. 35

1 = +12 …+ 24 V
2 = 0 V
3 = RS232_RxD
4 = RS232_TxD
5 = RS232_GND = PE
PE = ground

Fig. 36: Plug assignment

4.3.6 Connection via BACCom12

The ***BACCom12*** connection box is an electronic multiplexer with an integrated pressure sensor. It facilitates the connection of up to 12 sensor heads.

Communication with a PC can be switched between RS232 or Ethernet.

The individual connections are explained in the following table:

	Designation	Description
A	RJ45	RJ45 socket for connecting the sensors
B	LED	Operating display when a voltage is present
C	Sub D 9 pin	Data transmission to the PC
D	Switch	Switches between RS232 and Ethernet
F	RJ45	Ethernet connection
G	Power socket	12 V 3.75 A, only use the supplied power adapter
H	Box reset	Resets the box; does not effect the sensors
K	M8 4 pin socket	4-pin connection sockets A–D for additional boxes

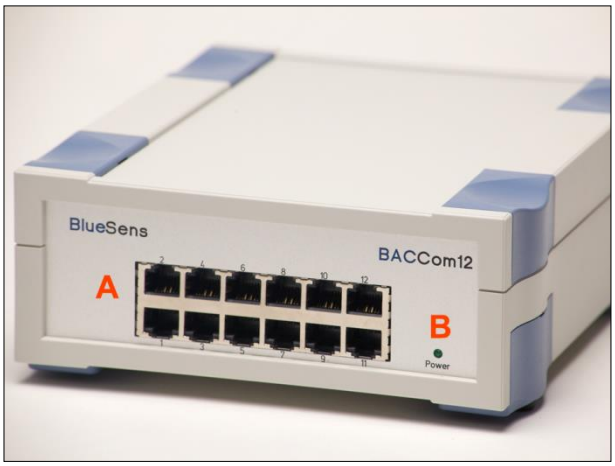


*Fig. 37: Front of the **BACCom12***

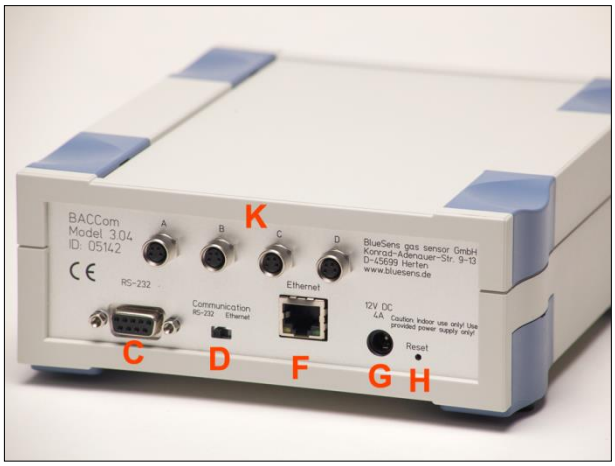


*Fig. 38: Connections on the **BACCom12***

Caution!

To prevent damage to the device, only use the supplied power adapter and the supplied cable.

Never disconnect or connect the connection plugs on the sensor heads when the *BACCom12* is switched on.

1. Connect all sensor heads with the ***BACCom12***.
2. Connect the supplied power adapter to the power socket **G**.
3. Plug the power plug of the power adapter into the socket.

After a heating-up time of approx. 1 hour, the measuring system is ready for operation.

4. Connect the ***BACCom12*** to the PC or network via the Ethernet port **E**,
   or connect the
   BACCom12 via the RS232 output **C** with the **supplied** cable to the serial interface of the computer.
5. Select the corresponding interface with the switch **D**.

After around 1 hour of heating-up time, the sensor still requires adjusting. To do this, expose the sensor for approx. 30 minutes (depending on specification – see datasheet) to ambient air (20.97 Vol. % O2) or humid process gas without any biological activity in the reactor.

Adjustment of the sensors is performed with the ***BACVis*** software. Start the corresponding software. You will find all further information in the software instructions.

After initial commissioning, the measuring device can remain switched on constantly, meaning that the heating-up time is not required before every measuring.

4.4 Minimization of dilution effects through humidity

To minimize the effect of dilution through accumulating water molecules in the dry process gas, the oxygen sensors could be adjusted with humid process gas (20.97 Vol. % O_2) (at working temperature) instead of ambient air.

5 Maintenance

We recommend sending the device to BlueSens for annual maintenance, checking and calibration of the sensors. If the sensor is not used under power no aging occurs. In this case it has to be stored under conditions of ambient air (humidity smaller than 75%).

5.1 1-point calibration

Once monthly, or after each connection and disconnection of the sensor head and measuring adapter, the sensor head must be exposed for approx. 30 minutes (depending on specifications, see datasheet) to ambient air (20.97 Vol.% O2) or humid process gas without any biological activity in the reactor.

Afterwards, connect pin 5 to pin 8 on the connection cable for 5 seconds, or, if present on the sensor, press the blue button for 5 seconds (fig. 39).

Fig. 39

For the serial version, the adjustment can be made using the ***BACVis/BACVisSingle*** *or* ***the FermVis*** software.

5.2 Recalibration

The sensor should be sent back to the manufacturer or an authorized dealer for annual recalibration.

You can get further information for our annual maintenance service Blue4Care incl. extension of the warranty up to 6 years on:

http://www.bluesens.de/fileadmin/dl/Blue4Care.pdf

or just go to:

www.bluesens.com → Service/Downloads

to find the latest information about Blue4Care.

5.3 Filter change – coarse filter

5.3.1 Removing the filter cover

1. Hold the sensor head and screw off the lower cover counterclockwise using the clamping ring tongs (fig. 40).

Fig. 40

5.3.2 Changing the filter

Remove the filter from the recess (fig. 41).

1. Insert a new filter (item no. F-PTFE-13-050).
2. Check the seals (item no. S-S1425) for damage and replace as required.
3. Screw on the lower cover using the clamping ring tongs.

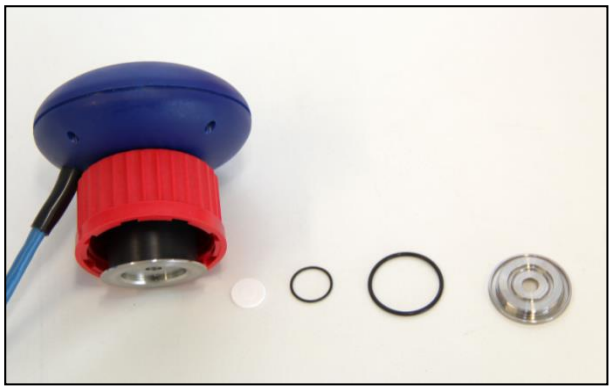


Fig. 41

5.4 Filter change PES cap

If the filter was contaminated by liquids or dirt you have to change the filter.

1. Hold the cap in one head and screw off the cover ring counterclockwise using the clamping ring tongs (fig. 42).
2. Remove the filter from the recess (fig. 43).
3. Insert a new filter (art. no. Z-Fl-00005).
4. Screw on the cover ring with the clamping ring tongs. Take care that you do not cant the ring so that the PES-winding will not be damaged.

Fig. 42: Changing the filter

Fig. 43

6 Appendix

6.1 Calibration table

Complete calibration can only be conducted by BlueSens. Monthly 1-point calibration can be performed as described in chapter 5.1. The adjustment must also be made each time the sensor head and the measuring adapter are disconnected from each other.

Fill out the table below when this is performed.

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

6.2 Technical data

See enclosed datasheet.

Blue4Care - The maintenance service by BlueSens

BlueSens' gas sensors are high quality measuring devices. To ensure accurate operation and to extend the guarantee for one year we recommend annual maintenance in our factory.

Blue4Care is a full service package for your BlueSens gas sensors. It´s not necessary to order and pay for the service directly with your sensor order. Within one year after the sale of the sensor we will inform you and offer the service to you.

If you decide for **Blue4Care**, we will book a date for the maintenance and calibration of your sensors. The typical timeframe to complete the service will be one week exclusive shipping time.

If you service your sensor annually using **Blue4Care**, the devices will remain in our extended guarantee scheme. This means that, excluding user damage, your sensor will keep its original guarantee for years with significantly reduced maintenance costs.

You may also request at any time "**maintenance on demand**". BlueSens will repair or replace broken parts and calibrate the sensor as required by the user. Maintenance on demand does not extend the guarantee

Advantages:

- Maintenance administration by BlueSens
- Payment and Order one year after purchase
- Reduce Rate compare to "Maintenance on demand"
- Fixed cost per year
- Annual extension of guarantee for one year after maintenance (up to 6 years)

Cost: Please visit the service-area on our homepage for prices:

www.bluesens.com → Service/Downloads

EG-Konformitätserklärung
EC Declaration of conformity

Hiermit erklären wir, dass unser Produkt, Typ:
We hereby declare that our product, type;

BCP-O2

folgenden einschlägigen Bestimmungen entspricht:
complies with the following relevant provisions:

Niederspannungsrichtlinie (72/23/EWG und 93/68/EWG) findet keine Anwendung, da keine Spannung größer 24 V genutzt wird.
Low voltage guideline (72/23/EEC and 93/68/EEC) is not applicable as no voltage higher than 24 V is used.

EMV-Richtlinie (89/336/EWG, 92/31/EWG und 93/68/EWG)
EMC guideline (89/336/EEC, 92/31/EEC and 93/68/EEC)

Angewendete harmonisierte Normen, insbesondere:
Applied harmonized standards, in particular:

EN50081–1
EN61000

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