



BioBLU® 3c - 50c Single-Use Bioreactors and Adaptor Kits

Operating Manual

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1 Operating instructions









1.1 Using this manual

- ▶ Read this operating manual completely before using the device for the first time. Also observe the instructions for use of the accessories.
- ▶ This operating manual is part of the product. Thus, it must always be easily accessible.
- ▶ Enclose this operating manual when transferring the device to third parties.
- ▶ Contact your Eppendorf bioprocess sales or service engineer to receive the current version of the operating manual.

1.2 Danger symbols and danger levels

1.2.1 Danger symbols

The safety instructions of this document indicate the following danger symbols and danger levels:

 <p>Hazard point</p>	 <p>Burns</p>
 <p>Explosion</p>	 <p>Biologically active substances</p>
 <p>Aggressive chemicals</p>	 <p>Oxidizing substances</p>
 <p>Magnetic field</p>	 <p>Material damage</p>


1.2.2 Danger levels

DANGER	<i>Will</i> lead to severe injuries or death.
WARNING	<i>May</i> lead to severe injuries or death.
CAUTION	May lead to light to moderate injuries.
NOTICE	May lead to material damage.

Operating instructions

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1.3 Symbols used

Example	Meaning
▶	You are requested to perform an action.
1. 2.	Perform these actions in the sequence described.
•	List.
	References useful information.

1.4 Abbreviations used**DO**

Dissolved oxygen

ID

Inner Diameter

LEL

Lower explosion limit

OD

Outer Diameter

RTD

Resistance temperature detector

UEL

Upper explosion limit

kGy

Kilogray – radiation dose unit; absorbed energy of ionizing radiation per unit mass

PA

Polyamide

PC

Polycarbonate

PG

Steel conduit thread

PS

Polystyrene

rpm

Revolutions per minute

USP

United States Pharmacopeia

2 Safety

2.1 Intended use

Eppendorf BioBLU Single-Use Bioreactor

The BioBLU Single-Use Bioreactor (part numbers listed see *BioBLU part numbers e-beam on p. 49* and *BioBLU part numbers X-ray on p. 49*) has been developed for the cultivation of cells and microorganisms for biotechnological research and process development applications. It may only be used for research and process development purposes, and only by trained personnel. The BioBLU Single-Use Bioreactors should only be used with accessories and control units recommended by Eppendorf.

Eppendorf BioBLU HNQ Single-Use Bioreactor

The BioBLU HNQ Single-Use Bioreactor (see *BioBLU part numbers HNQ on p. 50*) has been developed for the cultivation of cells and microorganisms and related cell-free applications. The BioBLU HNQ Single-Use Bioreactor is intended for use in biotechnological applications, supporting customers that, for example but not limited to follow Good Manufacturing Practice (GMP) guidelines for research and development and clinical and commercial manufacturing biotechnological products.



WARNING! Non-medical device statement

- ▶ The Eppendorf BioBLU Single-Use Bioreactor is not classified as a medical device under Regulation (EU) 2017/745 or, but no limited to, section 201(h) of the US Food, Drug, and Cosmetic Act. It is not intended for clinical or diagnostic use, nor for direct administration into humans or animals or any use which would classify the bioreactor as medical device.



CAUTION! Risk of damage to personnel and/or equipment

- ▶ The equipment must be operated as described in this manual.
 - ▶ The equipment must be operated by trained personnel only.
 - ▶ If operational guidelines are not followed, equipment damage and personal injury can occur.
 - ▶ Do not use this equipment in a hazardous atmosphere or with hazardous materials.
 - ▶ The manufacturer is not responsible for any damages that may result from installation or operation of this aftermarket adaptor kit.
-

2.2 Warnings for intended use

2.2.1 Personal injury



WARNING! Risk to health from infectious liquids and pathogenic germs

- ▶ When handling infectious liquids and pathogenic germs, observe the national regulations, the biological security level of your laboratory, the material safety data sheets, and the manufacturer's application notes.
- ▶ Wear personal protective equipment.
- ▶ Consult the "Laboratory Biosafety Manual" (source: World Health Organization, Laboratory Biosafety Manual, as amended) for comprehensive regulations on the handling of germs or biological materials of risk group II or higher.



WARNING! Risk to health from aggressive chemicals

- ▶ Observe the material safety data sheets for all substances used (e.g., pH adjusting agent).
- ▶ Wear personal protective equipment.



WARNING! Risk of injury and product damage

- ▶ Ensure the bioreactor is empty before attempting to move it.



WARNING! Pinch risk

When attaching the magnetically coupled motor to a BioBLU bioreactor, there is a strong force between the couplings for the bioreactor and the motor drive.

- ▶ Avoid pinching fingers between the bioreactor and the motor.
- ▶ Avoid pinching bioreactor tubing or personal protective equipment between the bioreactor and motor.



WARNING! Explosion hazard

- ▶ Do not operate the device in areas where work is completed with explosive substances.
- ▶ Do not use this device to process any explosive or highly reactive substances.
- ▶ Do not use this device to process any substances which could create an explosive atmosphere.



WARNING! Danger from oxidizing or explosive gases and gas mixtures

Gases and gas mixtures may have an oxidizing effect and be explosive in certain mixing ratios.

- ▶ Observe the material safety data sheets for the gases used.
- ▶ Check and observe the upper and lower explosion limits (UEL; LEL) of the gases used.
- ▶ Note the possibility of gas being produced during the cultivation process.
- ▶ Do not operate the bioreactor with gases within the explosion limits.
- ▶ Keep away from sources of ignition.
- ▶ Wear personal protective equipment when working with the bioreactor.



WARNING! Maximum pressure: 6 PSIG (0.4 bar). Exceeding the limit increases the risk of bursting.

The bioreactor is designed for a maximum operating pressure of 6 PSIG (0.4 bar) (relative over pressure).

- ▶ Do not operate the bioreactor at a higher pressure.
- ▶ Never block the outlet filter.
- ▶ Ensure outlet gas tubing is not kinked or blocked.
- ▶ Wear personal protective equipment during work, especially protective goggles to protect against flying splinters.



WARNING! Minimum pressure: 0 PSIG (0.0 bar). Negative pressure presents risk of implosion

- ▶ Do not expose the bioreactor to negative pressure.
- ▶ Ensure proper venting of the bioreactor during harvest procedures, to avoid negative pressure.
- ▶ Actively pumping out liquids or gasses out of the bioreactor can cause a negative pressure that could damage the vessel. To prevent a negative pressure, gas the headspace via the Gas (O)/Overlay port with a flow rate equivalent to the pump rate plus an additional 10 %. Ensure that pressure relief valves are installed properly.



WARNING! Risk of injury due to magnetic field

A small magnetic field may be present around the bearing assembly. Pacemakers or other similar equipment may be affected.

- ▶ Avoid contact if you wear a pacemaker or other similar equipment.



WARNING! Risk of personal injury

- ▶ Use protective gloves when handling hot components.



CAUTION! Risk of contamination during the disposal of used bioreactors

- ▶ Dispose of single-use bioreactors taking into consideration all substances with which they have come into contact.
- ▶ Autoclave single-use bioreactors in an autoclave bag.
- ▶ Ensure that during autoclaving, there is sufficient pressure equalization between the inside and outside of the bioreactor.
- ▶ BioBLU 5/14/50 bioreactors will deform and may lose integrity during autoclaving. Empty bioreactors before autoclaving.
- ▶ Observe the safety regulations for the disposal of biomaterial applicable in your laboratory.

Safety

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**CAUTION! Escaping liquids and gases**

Inadequately attached or incorrectly fitted luer connectors may lead to leaks.

The leakage of dispensing media may result in crust formation and the bioreactors sticking in the wells in the temperature control unit of Eppendorf systems.

The escape of combustible gases poses a risk of increased fire or explosion hazard.

- ▶ Before each use, check that all connections are mounted straight and are properly fitted.
- ▶ Before each use, check tubing for defects, such as kinks or punctures.
- ▶ During operation, also visually inspect the ports from time to time.
- ▶ Do not disconnect the connections during a process.

2.2.2 Damage to device

**NOTICE! Risk of product damage due to material brittleness**

The plastic material of the single-use bioreactor is very brittle. Handling the bioreactor can cause damage to the product.

- ▶ Avoid using excessive force when assembling accessories.
- ▶ Avoid strong impacts and other forces when handling the bioreactor.
- ▶ Do not use a screw wrench when screwing sensors into Pg 13.5 ports, only tighten the screw threads of the sensors by hand.

**NOTICE! Sterility and risk of contamination**

The single-use bioreactor is delivered in a sterile double-bag packing.

- ▶ Only open the sterile packing shortly before using the bioreactor.

**NOTICE! Product damage from sharp or pointed objects**

Using sharp or pointed objects when unpacking the single-use bioreactor can damage silicone tubing or the bioreactor itself.

- ▶ Do not use sharp or pointed tools to open the double-bag packing containing the bioreactor.
- ▶ Tear open the packing using the tear notch provided.

**NOTICE! Risk of damage to the silicone cap of the thermowell**

The silicone cap at the bottom of the thermowell may become damaged if force is applied when assembling the temperature sensor.

- ▶ Use care when inserting the Pt100 temperature sensor into the thermowell.



CAUTION! Risk of motor decoupling and/or damage to magnet

- ▶ The motor must be turned off when installing it on the headplate of the bioreactor.
- ▶ Ensure bioreactor and ambient temperatures are within specified limits.
- ▶ The maximum recommended viscosity of the culture is 30 mPas. Proper operation of the agitation system cannot be guaranteed at viscosities above the specified limit.
- ▶ BioBLU 3c, 5c, 5p, and 14c: Never increase agitation speed above 200 rpm.
- ▶ For BioBLU 50c: Never increase agitation speed above 150 rpm.
- ▶ Be sure to limit speed increases to increments of no more than 25 rpm at a time.



NOTICE! Increased risk of tipping due to top-heaviness of the bioreactor

The installation of the exhaust condenser and agitation drive greatly increases the top-heaviness of the bioreactor. There is a risk that the bioreactor may tip over.

- ▶ Make sure that the bioreactor is securely positioned by placing it in a vessel stand, when assembling accessories.

2.2.3 Application limits

BioBLU Single-Use Bioreactors are released for biosafety level 1 usage. All other usage lies with the responsibility of the user. BioBLU Single-Use Bioreactors are suitable for work with well-characterized agents which do not cause disease in healthy humans. In general, these agents should pose minimal potential hazard to laboratory personnel and the environment.



WARNING! Bioreactor failure after autoclave

- ▶ The bioreactor is not rated for use post autoclaving. The bioreactor may lose integrity when autoclaved.



NOTICE! Limited temperature resistance

The aging of plastics used is accelerated at elevated temperatures.

- ▶ Store at room temperature.
- ▶ Observe maximum operating temperatures (see Technical Data section).
- ▶ Do not fill the bioreactor with hot liquids.



NOTICE! Limited chemical resistance

Caution must be exercised when using concentrated acids and alkaline solutions.

- ▶ Before using questionable substances, inform yourself about the chemical resistance of the plastics used in the materials of construction for the bioreactor.

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**NOTICE! Risk of chemical incompatibility**

- ▶ Avoid BioBLU bioreactors coming into contact with: deionized water, concentrated bases (esp. ammonia), acetone, isopropyl alcohol, (aromatic) solvents, oils, hydrocarbons, strong oxidizing agents, polypropylene (glycol) and its derivatives, or polyethylene (glycol) and its derivatives.
- ▶ Avoid usage of the following antifoam agents: Antifoam 204, Pluronic L61, Pluronic 68, Pluriol P 2000, or Struktol J673. Based on chemical compatibility, we recommend the use of antifoam agents based on siloxanes in combination with BioBLU Single-Use Bioreactors.
- ▶ Before the first use, check the bioreactor for chemical compatibility with the substances to be used. Please note: Tests must be performed with the bioreactor variant of interest for your application.

**NOTICE! Low UV resistance**

Plastics, and the optical pH sensor spot, can be sensitive to UV light.

- ▶ Protect bioreactor from direct sunlight.
- ▶ Store in original packaging.

2.3 Notes on product liability

In following cases, safety may be impaired during the operation of the BioBLU Single-Use Bioreactor. Liability associated with property damage or personal injury claims of any sort then passes to the owner.

- Commissioning the use of the single-use bioreactor without observing the information provided in this instruction manual and other applicable documents.
- Use not as intended.
- Operation with accessories that are not recommended by Eppendorf.
- Use of the single-use bioreactor outside of the application limits described in this instruction manual.
- The manufacturer is not responsible for any damages that may result from installation or operation of an aftermarket adaptor kit.

3 BioBLU 3c - 50c Single-Use Bioreactors

3.1 BioBLU bioreactor

3.1.1 Unpacking the bioreactor



DANGER! Risk of explosion

- ▶ Do not use this equipment in a hazardous atmosphere or with hazardous materials for which the equipment was not designed.
 - ▶ Always use medical grade gases
 - ▶ Do not allow the gas pressure to rise above 6 PSIG (0.4 bar).
-



Internal configuration may differ depending on options selected.

1. Inspect the outer box for damage.
2. Check the label on the box to make sure that the product has not exceeded its expiration period.
3. Open the lid of the box, then remove the bioreactor carefully using both hands.
4. Carefully tear open the translucent outer bag at the top. Do not use a sharp blade of any sort.
5. Carefully slide the bioreactor out of the protective wrapper.



Removal of the clear outer wrapper can be used for transfer/storage in a clean room environment in which cardboard boxes are not permissible.



Do not open the inner wrapper yet. Inspect the wrapper for damage. The bioreactor should be stored in this protective wrapper until ready for use, to protect the optical pH sensor spot from being exposed to light.

6. When ready to use, carefully tear open the inner aluminium bag at the top. Do not use a sharp blade of any sort.



Do not use a sharp blade of any sort.

7. Carefully slide the bioreactor out of the protective wrapper.
8. Place the bioreactor next to the controller.



Internal configuration may differ depending on options selected.



Bioreactors are fragile, so handle them with care.



Always check the bioreactor for damage before usage.

For information on proper disposal of a BioBLU single-use bioreactor, (see *Personal injury on p. 8*) and also (see *Disposal on p. 51*).

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3.1.2 Bioreactors

The BioBLU cell culture bioreactor is a single-use stirred tank bioreactor designed for the growth of mammalian cells, insect cultures, and other cultures.

Each preassembled bioreactor consists of a bioreactor body, headplate, pitched blade impeller with shaft.

Ports are provided in the headplate for the following purposes:

- Liquid addition ports
- A thermowell for a resistance temperature detector (RTD)
- A sparge
- A harvest tube
- A sample tube
- An exhaust tube
- Dissolved oxygen and pH sensors

There is also a port for optional overlay use. All ports and tubing come pre-installed in the bioreactor.

Each bioreactor comes pre-sterilized with all tubing and filters already installed. The tubing used for addition, sampling and harvesting lines can be safely welded in a tube welder.

3.1.3 Aeration



DANGER! Risk of explosion

- ▶ Do not allow bioreactor gas pressure to rise above 6 PSIG (0.4 bar).
- ▶ Before you connect the sparge (and overlay, if present), be sure to install a pressure relief valve in the gas inlet line(s) before the filter. In the event that gas pressure should rise above 6 PSIG (0.4 bar), the pressure relief valve is designed to allow gas to exit, thereby preventing an explosion.



Eppendorf recommends microsparge only for controllers configured with low flow TMFCs or Rotameters (0 cc/min – 100 cc/min). For controllers with flow above this range, Eppendorf recommends macrosparge.

Gas is usually introduced via the porous microsparge or macrosparge. An overlay system is optional, using the headplate overlay port.

When using the microsparge element, ensure to have a constant gas flow active to prevent any liquid from entering the element which can result in clogging.

Once liquid has already entered the microsparge element, it can be displaced by applying a high gas flow rate (aim for >80 % of the maximum gas flow rate of the controller) rate for about 10 minutes.

Ensure that a pressure relief valve is installed. Slowly increase the gas flow rate step-wise and stop if excessive foaming occurs or the maximum pressure is reached.

Do not apply this high gas flow rate for extended periods of time because precipitates of medium components can built up inside the microsparge element.

3.1.4 Exhaust system



DANGER! Risk of explosion

- ▶ NEVER block the exhaust to pressurize the bioreactor. In addition to risk of explosion, if the exhaust is blocked the relief valve will bleed.
- ▶ While in use, the bioreactor exhaust filter must be vented.
- ▶ Ensure filter tubing is carefully positioned without kinks or closures of any kind.
- ▶ Any points of closure may cause venting issues and possible over-pressurization.

The exhaust gases pass into the exhaust tube where the gases are heated by the exhaust heater; any moisture present there is raised above the dewpoint and can easily pass through the filter. The remaining air passes through the exhaust filter.

3.1.5 Sampling system

This system consists of a needle-free connector attached to a sampling tube that extends to the lower portion of the bioreactor. Both the needle-free connector and the syringe use luer connections. Samples can be taken by aseptically attaching a needle-free syringe to the connector and drawing a sample.

3.1.6 Optional overlay system

The overlay system allows gas to be inserted directly into the headspace of the bioreactor through a port in the headplate.

3.2 Validation documentation

BioBLU bioreactor certificates can be found under the Service and Support tab on www.eppendorf.com.

3.3 Bioreactor assembly

The single-use bioreactor comes completely assembled and irradiated and is ready to use.



DANGER! Risk of explosion

- ▶ Do not use this equipment in a hazardous atmosphere or with hazardous materials for which the equipment was not designed.
- ▶ Always use medical grade gases.
- ▶ Do not allow gas pressure to rise above 6 PSIG (0.4 bar).



NOTICE! Risk of contamination

- ▶ Do not open your pre-sterilized bioreactor package until you are ready to use it.
- ▶ Do not open any port in the bioreactor headplate until ready for use.

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3.3.1 BioBLU 3c / 10c

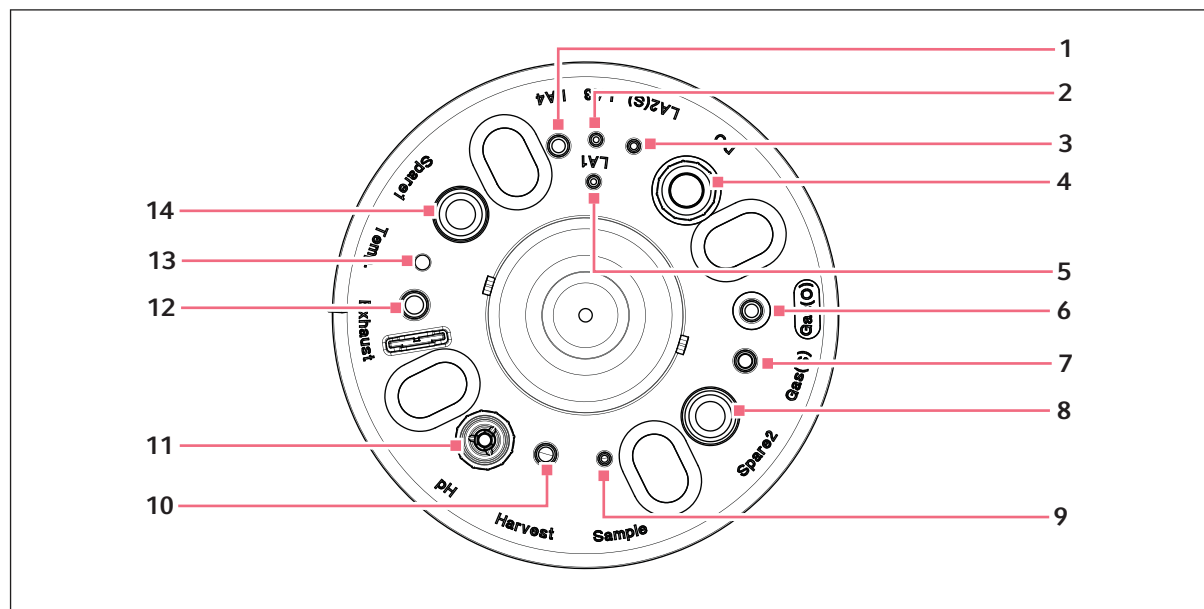


Fig. 3-1: Headplate without connections (BioBLU 3c shown as reference)

- | | |
|---|---|
| <p>1 LA4
Liquid addition 4</p> <p>2 LA3
Liquid addition 3</p> <p>3 LA2 (S)
Liquid addition 2 (submerged addition)</p> <p>4 DO
Pg 13.5 port for dissolved oxygen sensor (non-invasive sleeve)</p> <p>5 LA1
Liquid addition 1</p> <p>6 Gas (O)
Overlay</p> <p>7 Gas (S)
Sparge</p> | <p>8 Spare 2
BioFlo 3c: Pg 13.5 spare port
BioFlo 10c: 19 mm spare port</p> <p>9 Sample
Sample</p> <p>10 Harvest
Harvest</p> <p>11 pH
Pg 13.5 port for optical pH sensor (non-invasive sleeve)</p> <p>12 Exhaust
Exhaust gas</p> <p>13 Temp.
Temperature sensor</p> <p>14 Spare 1
Pg 13.5 spare port</p> |
|---|---|

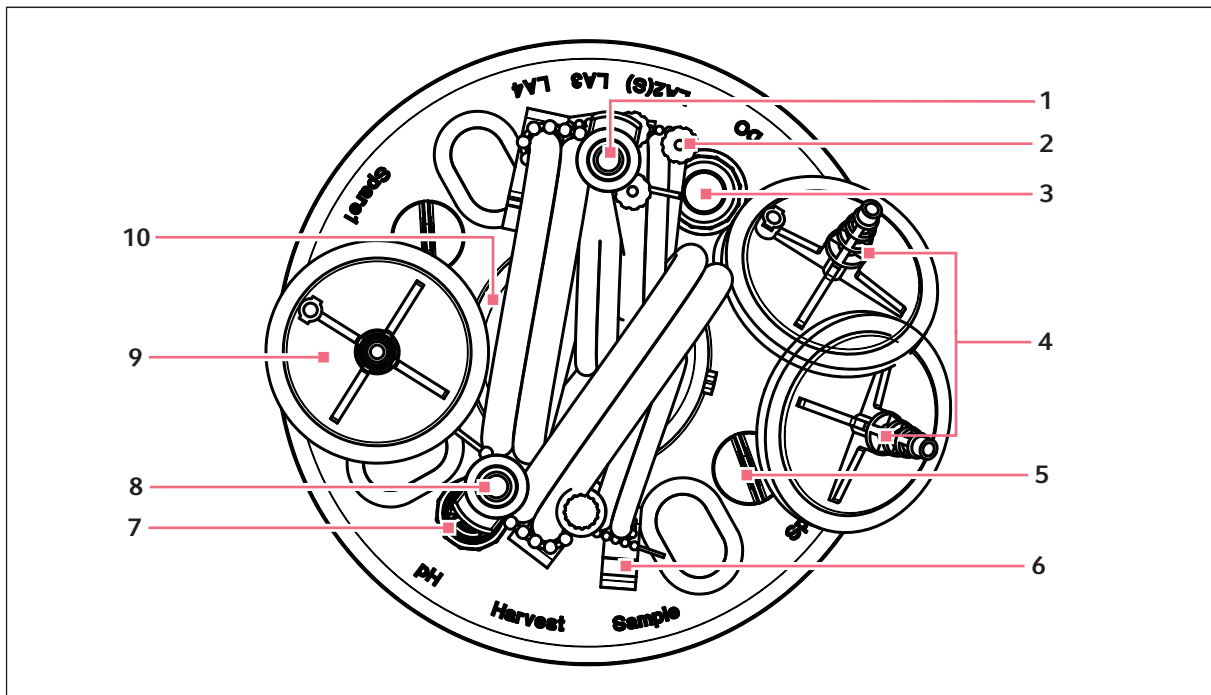


Fig. 3-2: Headplate with connections (BioBLU 3c shown as reference)

- | | |
|--|---|
| 1 ¼" CPC connection for liquid addition | 6 Sampling port with swabable valve |
| 2 ⅛" Luer connection for liquid addition (3 x) | 7 Optical pH sensor port with shipment support – non-invasive |
| 3 DO sensor port with permeable gas membrane – non-invasive | 8 ¼" CPC connection for harvest line |
| 4 2 x gas inlet filters (sparge /overlay) with 0.2 µm sterile filter | 9 Exhaust gas filter with 0.2 µm sterile filter |
| 5 Pg 13.5 port with plug (2 x) | 10 Magnetic coupling for agitation drive |

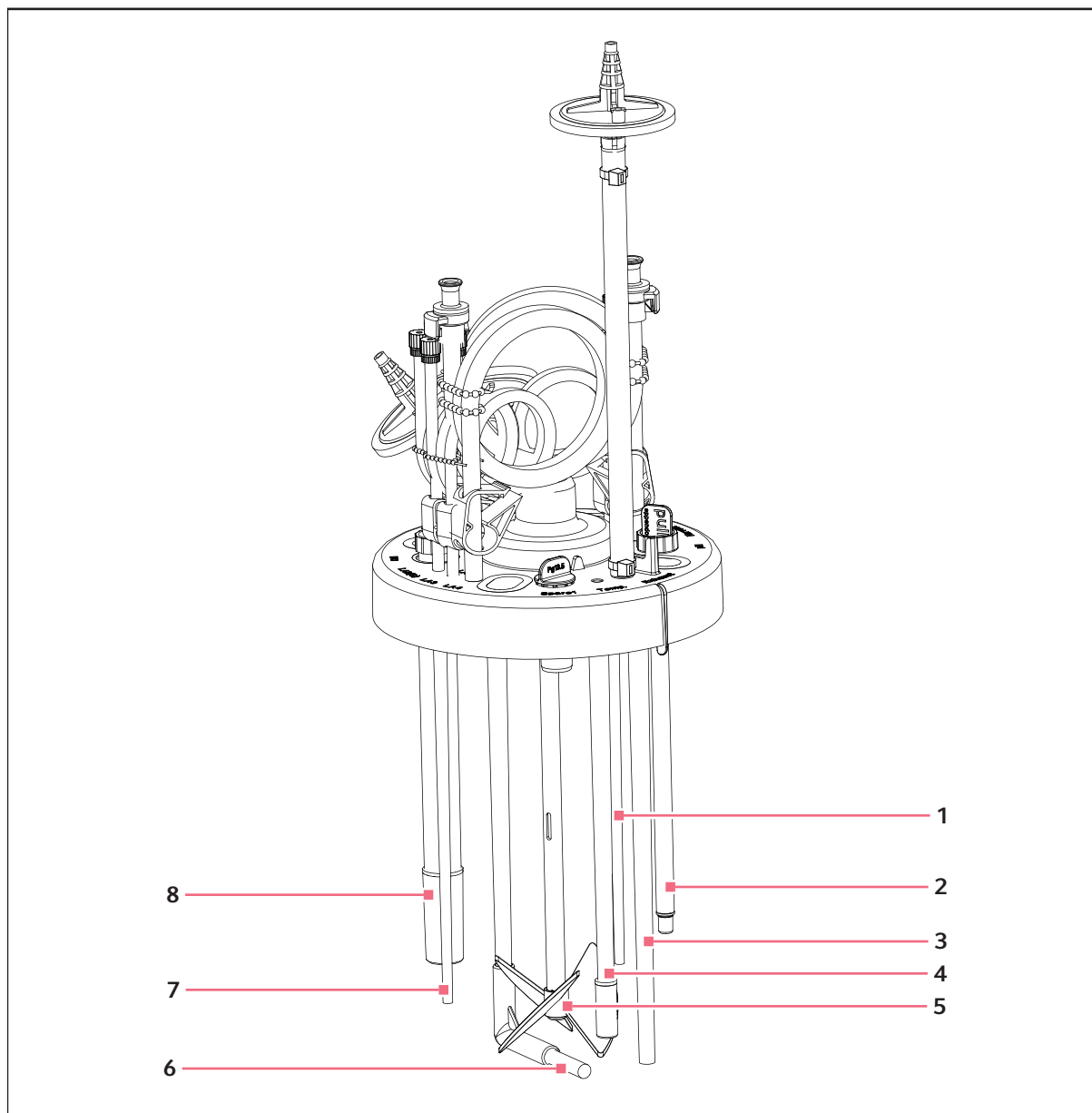


Fig. 3-3: Internal structure (BioBLU 3c shown as reference)

- | | |
|---------------------------------------|--|
| 1 Sample tube | 5 Pitched blade impeller |
| 2 Non-invasive optical pH tube | 6 Sparge element (macro- or micro-sparge) |
| 3 Harvest tube | 7 Submerged addition (LA2) |
| 4 Non-invasive RTD tube | 8 Non-invasive DO sensor tube |

3.3.2 BioBLU 5c / 14c / 50c

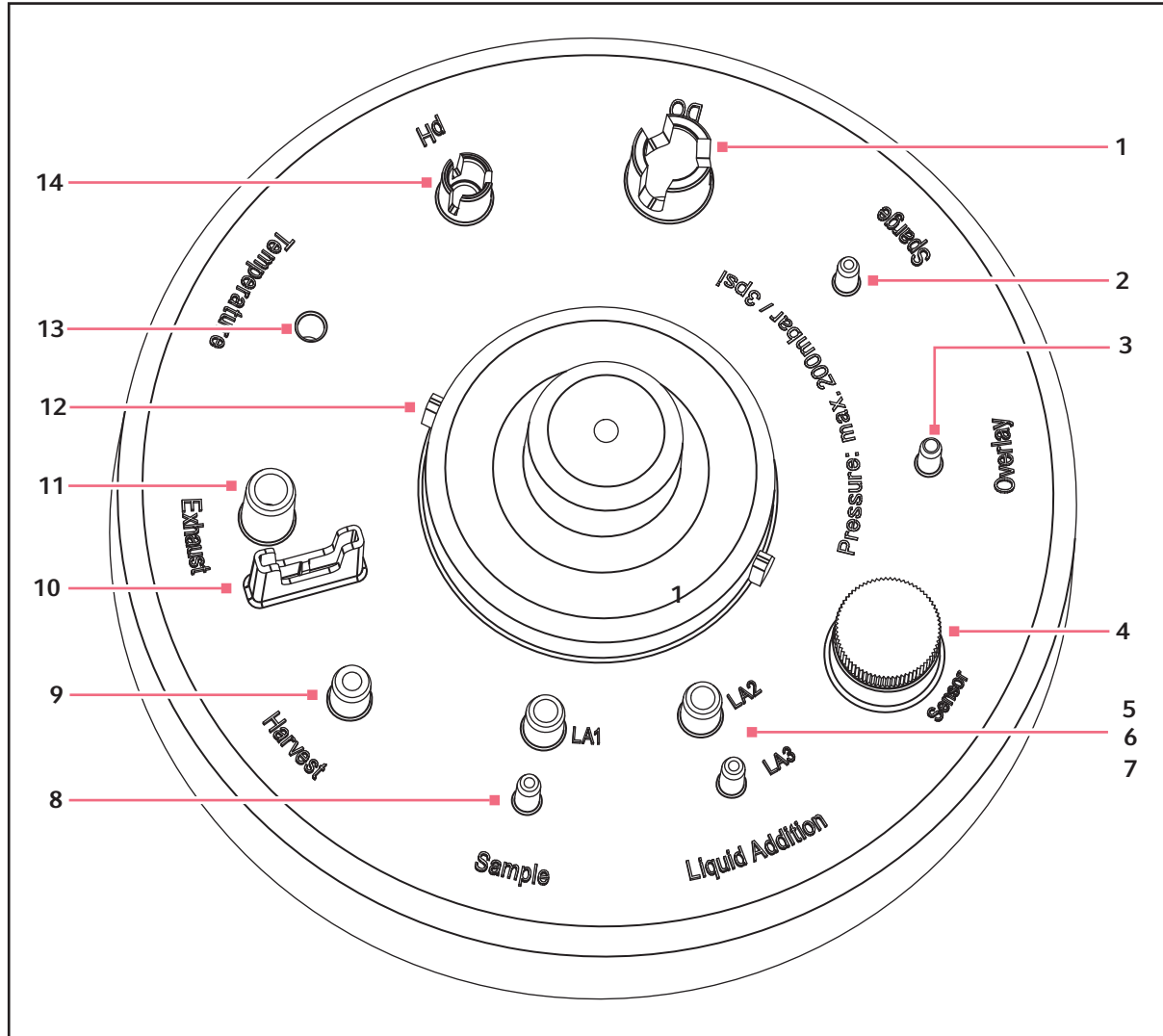


Fig. 3-4: Headplate Arrangement (shown without tubes and connectors)

- | | |
|---|--|
| 1 DO (dissolved oxygen) port | 9 Harvest port |
| 2 Sparge port | 10 Exhaust heater support |
| 3 Overlay port (use is optional) | 11 Exhaust port |
| 4 Threaded Pg 13.5 sensor port* | 12 Magnetic motor coupling** |
| 5, 6, and 7 Liquid Addition ports 1, 2, and 3 | 13 Temperature port for RTD and thermowell |
| 8 Sample port | 14 pH port |

* Plugged as standard

**Note ridges for proper alignment

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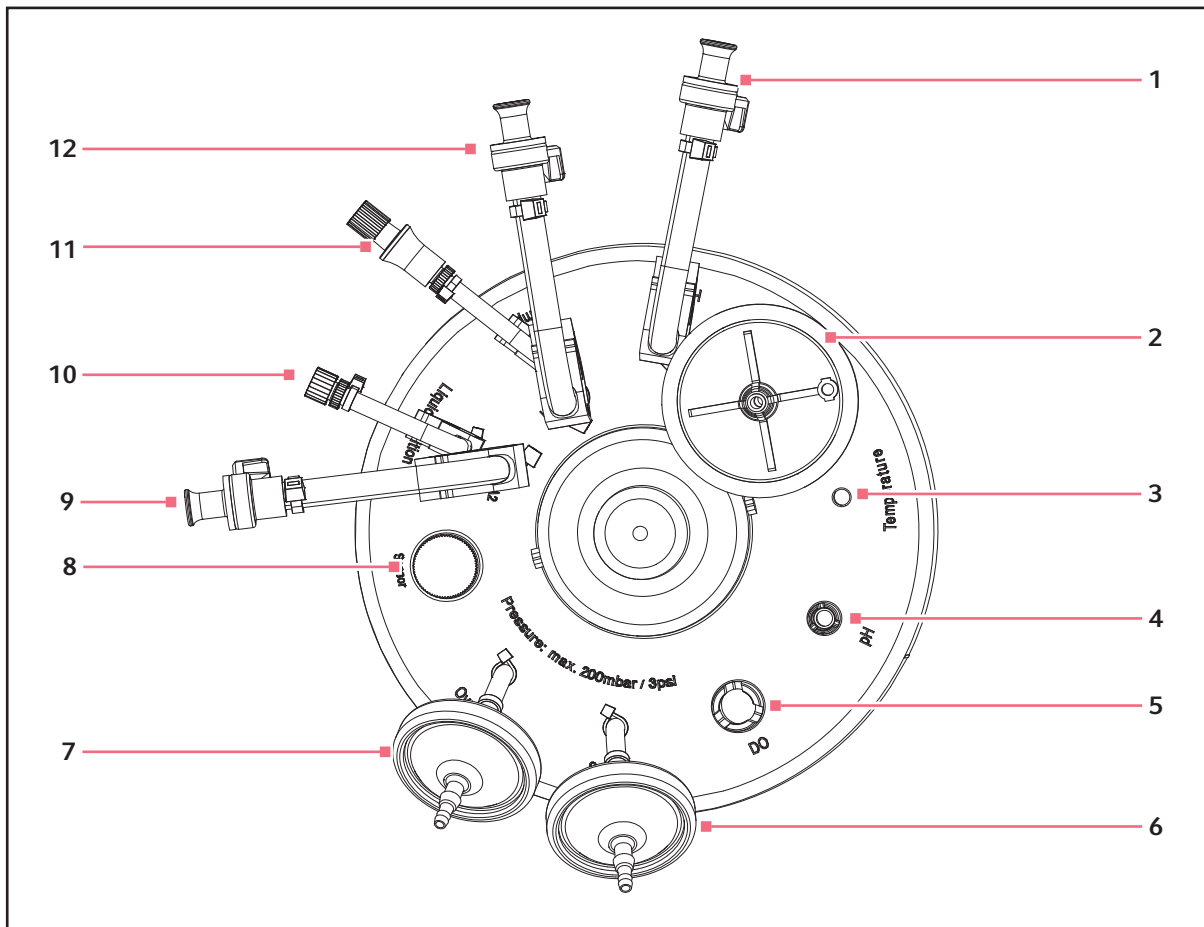


Fig. 3-5: Headplate arrangement (shown with tubes and connectors)

- | | |
|---|--|
| 1 CPC quick-connect for harvest | 7 0.2 μ m overlay filter (use is optional) |
| 2 0.2 μ m exhaust filter | 8 Pg 13.5 threaded port for gel-filled pH sensor |
| 3 Thermowell port for RTD | 9 CPC quick connect for Addition 2 |
| 4 Port for optical pH sensor (optional) | 10 CPC quick connect for Addition 3 |
| 5 Port for polarographic DO sensor | 11 Needle-free connector for sampling |
| 6 0.2 μ m sparge filter | 12 Luer connect for Addition 1 |

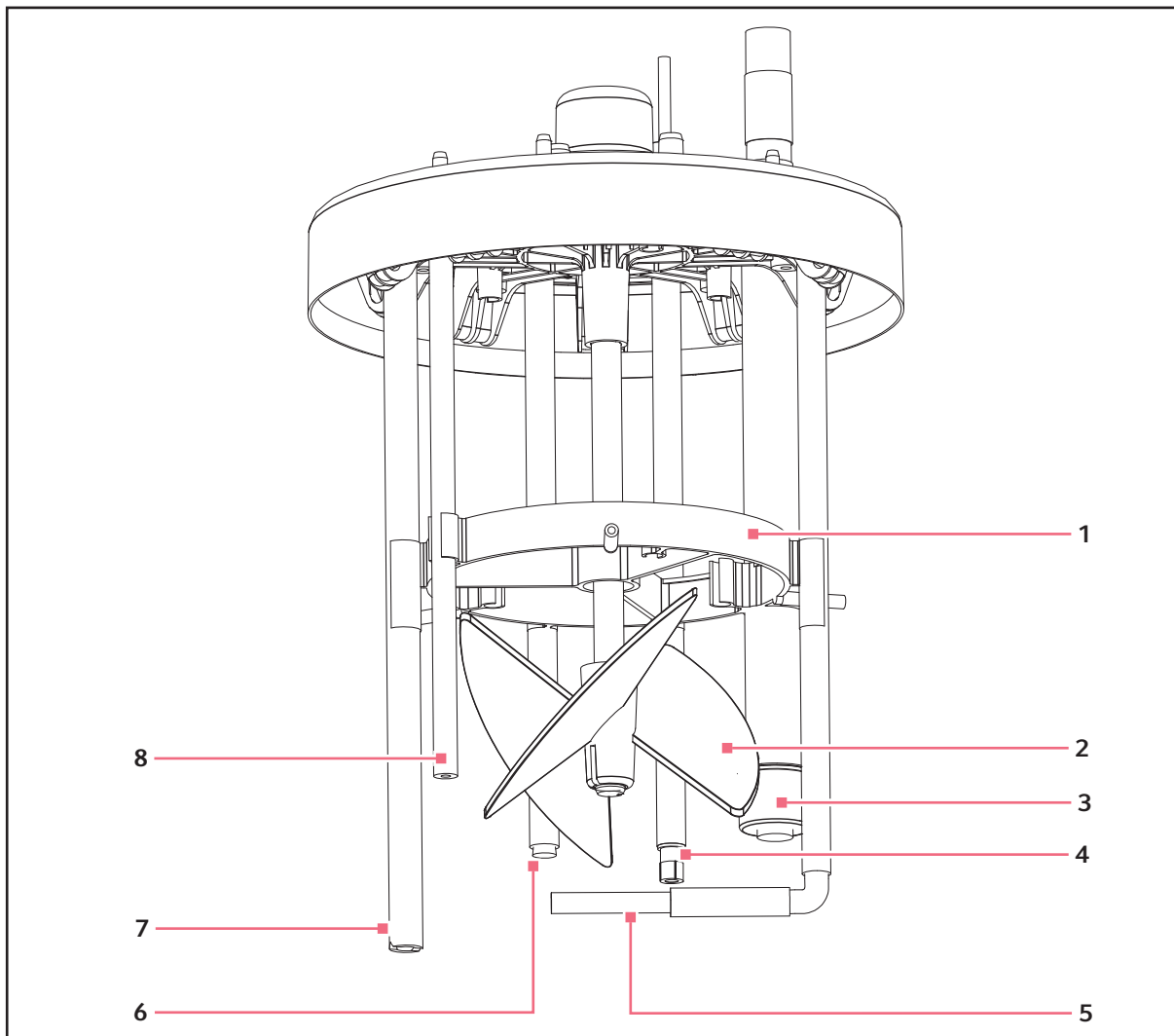


Fig. 3-6: Internal bioreactor components (BioBLU 5c shown)

- | | |
|--------------------------------|---|
| 1 Retaining ring (for support) | 5 Microsparge or macrosparge, depending on bioreactor configuration |
| 2 Pitched blade impeller | 6 RTD thermowell |
| 3 DO tube with silicone cap | 7 Harvest tube |
| 4 pH tube | 8 Sample tube |

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4 Adaptor kits

4.1 Unpacking and inspection

- Unpack your order and save the packing materials for possible future use.
- Save the operating manual for instruction and reference.
- Verify against your packing list that you have received the correct materials and that nothing is missing.
- Contact Eppendorf customer service for any missing parts.

A #2 Phillips-head screwdriver is required for assembly of some adaptor kit models (not provided).

4.2 BioFlo®/CelliGen® 115

In addition to a completely equipped and sterile single-use BioBLU bioreactor (sold separately) you should have the following components for converting an existing BioFlo/CelliGen 115 for use with BioBLU Single-Use Bioreactors:

- Exhaust tube heater with stainless steel support rod and 24 V, 30 Watt universal mains/power supply (100 VAC – 240 VAC, 50/60 Hz) complete with mains/power plug for wall outlet
- Bioreactor heat blanket
- Water Drawer Replacement (for Vessel Heat Blanket connection)
- Temperature sensor and cable (RTD)
- Tool kit
- Vessel stand
- Silicone pump tubing
- Polyurethane gas tubing
- Needle free sampling syringes
- Gas pressure relief valve assembly

4.3 BioFlo 120

In addition to a completely equipped and sterile single-use BioBLU bioreactor (sold separately) you should have the following components:

- Magnetic drive motor for use with BioBLU bioreactors
- Spare polyurethane gas tubing
- Exhaust tube heater with stainless steel support rod
- Bioreactor heat blanket (120/240 VAC)
- Heat blanket converter cable
- Temperature sensor and cable (RTD)
- DO sensor and cable
- Optical pH module and sensor
- Needle free sampling syringes

Report any missing parts to Eppendorf customer service.

Adaptor kits

BioBLU® 3c - 50c Single-Use Bioreactors and Adaptor Kits
English (EN)

4.4 BioFlo/CelliGen 310

In addition to a completely equipped and sterile single-use BioBLU bioreactor (sold separately) you should have the following components for converting an existing BioFlo/CelliGen 310 for use with BioBLU Single-Use Bioreactors:

- Motor conversion kit
- Exhaust tube heater with stainless steel support rod and 24 V, 30 Watt universal mains/power supply (100 VAC – 240 VAC, 50/60 Hz) complete with mains/power plug for wall outlet
- Two gas pressure relief valve assemblies
- Bioreactor heat blanket
- Water drawer replacement (for bioreactor heat blanket connection)
- Temperature sensor and cable (RTD)
- Tool kit
- Vessel stand
- Silicone pump tubing
- Polyurethane gas tubing
- Needle free sampling syringes

4.5 BioFlo 320

The kit is designed to facilitate the use of a BioBLU disposable bioreactor with the BioFlo 320 control station.

In addition to a completely equipped and sterile single-use BioBLU bioreactor (sold separately) you should have the following components:

- Sales Bundle for new controllers: BioFlo 320 Magnetic drive motor for use with BioBLU bioreactors
- Adaptor kit for existing controllers: Motor adaptor for BioFlo 320 magnetic drive motor
- Two gas pressure relief valve assemblies
- Spare polyurethane gas tubing
- Exhaust tube heater with stainless steel support rod
- Bioreactor heat blanket (120/240 VAC)
- Temperature sensor and cable
- Needle free sampling syringes

Report any missing parts to Eppendorf customer service.

4.6 Non-Eppendorf equipment

Eppendorf does not offer standard equipment for conversion of non-Eppendorf controllers for use with BioBLU Single-Use Bioreactors.

Please contact your local sales/service team for consultations, part lists, and availability.

5 Installation

5.1 Bioreactor heat blanket



WARNING! Risk of personal injury

- ▶ If heat blanket or exhaust heater show any cracks, surface defects, or discoloration it is not permitted for use. It has to be replaced.
-



CAUTION! Risk of burns

- ▶ Do not touch the heat blanket or the exhaust heater until it is unplugged and has cooled down; they get very hot while in operation.
 - ▶ Do not set the temperature setpoint (which governs the heat blanket) above 40 °C.
-



NOTICE! Possible damage to heat blanket and bioreactor

- ▶ Ensure control station is powered down before heat blanket is connected.
 - ▶ Never plug in the bioreactor heat blanket without first plugging in the RTD and inserting it into the thermowell inside the bioreactor.
 - ▶ Only activate the bioreactor heat blanket after the bioreactor is filled to at least the minimum working volume.
 - ▶ Do not cover the heater blanket (e.g., with aluminum foil) during operation as the bioreactor material might overheat and melt as a result.
-



NOTICE! Damage to heat blanket

- ▶ Never fold the heat blanket, place any weight on it, or cut it.
 - ▶ Lay the heat blanket flat for storage.
 - ▶ Do not plug the heat blanket into the controller until you are ready to use it.
 - ▶ Only activate the bioreactor heat blanket after the medium is placed in the bioreactor.
-



NOTICE! Risk of damage to non-Eppendorf equipment

- ▶ Ensure non-Eppendorf equipment is rated for bioreactor heat blanket capacity (watts). Failure to do so can result in product failure and/or damage to equipment.
 - ▶ Eppendorf is not responsible for connections made to the non-Eppendorf equipment.
-

1. Wrap the bioreactor with the heat blanket, securing it using the straps. Ensure the blanket is oriented properly on the bioreactor, with the power cord connection located at the bottom of the blanket.
2. Connect the heat blanket to the dedicated port on the control station. For the newer heat blanket version, there may be an intermediary cable that is required to be installed between the heat blanket and control station.

Installation

BioBLU® 3c - 50c Single-Use Bioreactors and Adaptor Kits
English (EN)

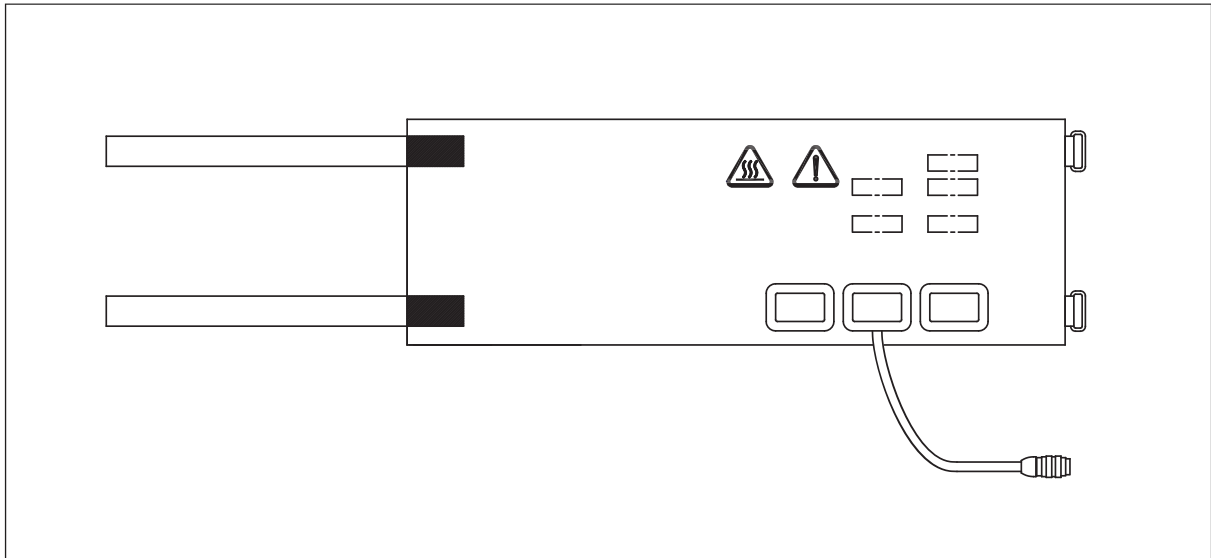


Fig. 5-1: Heat blanket for BioBLU Single-Use Bioreactor

5.2 Exhaust tube heater

**WARNING! Risk of personal injury**

- ▶ If heat blanket or exhaust heater show any cracks, surface defects, or discoloration it is not permitted for use. It has to be replaced.

**NOTICE! Risk of damage to equipment**

- ▶ The mains/power supply provided by Eppendorf for the exhaust heater has no protection against liquid.
- ▶ The exhaust heater should only be connected to the Eppendorf provided mains/power supply or Eppendorf bioprocess cabinet.

Do not use excessive force when installing the exhaust support rod into the bioreactor headplate.

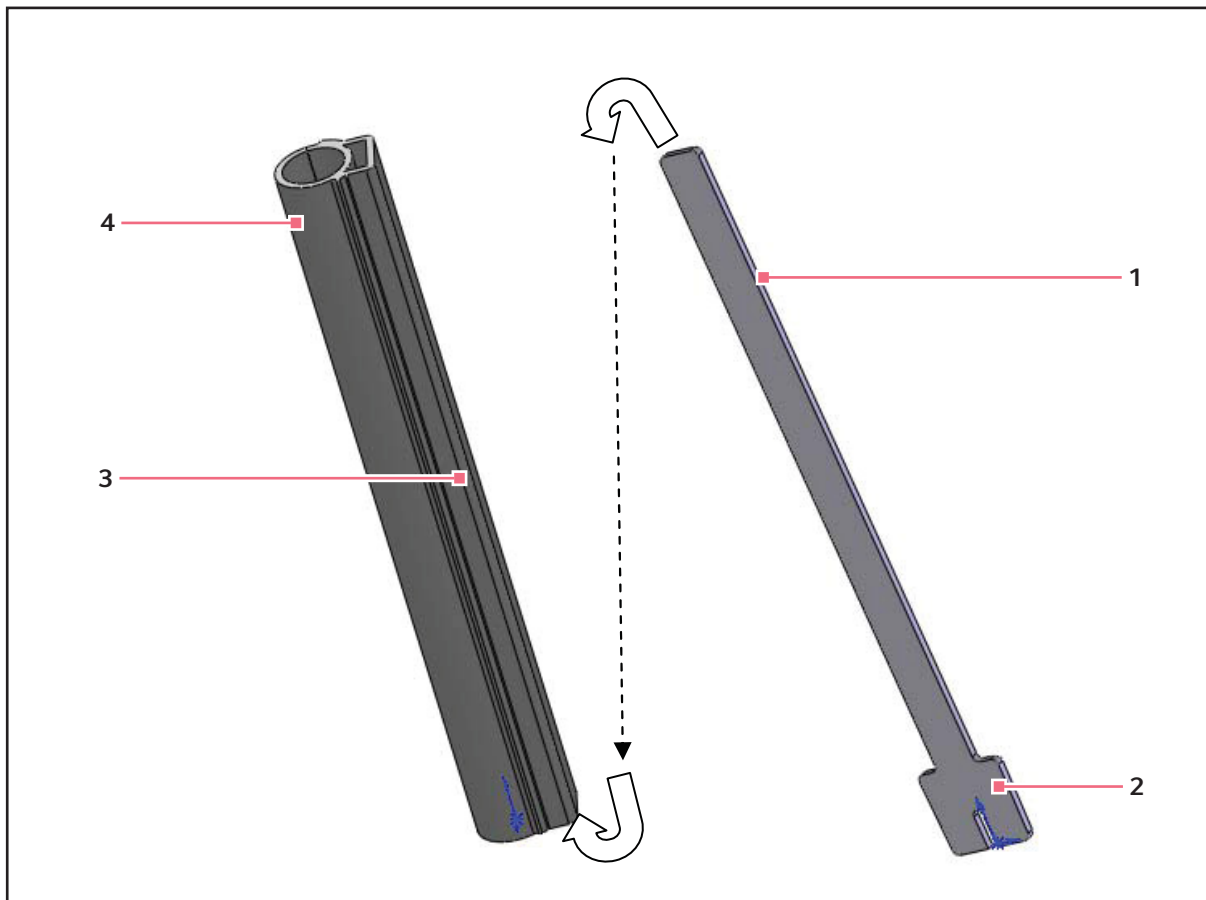


Fig. 5-2: Exhaust tube heater and support rod

- | | |
|---|--|
| 1 Exhaust tube heater | 3 Support rod |
| 2 Pocket channel for support rod | 4 Flange to seat in headplate bracket |

1. Slide the exhaust tube heater's pocket channel onto its support rod.
2. Firmly insert the support rod into its bracket on the head plate.

Installation

BioBLU® 3c - 50c Single-Use Bioreactors and Adaptor Kits
English (EN)

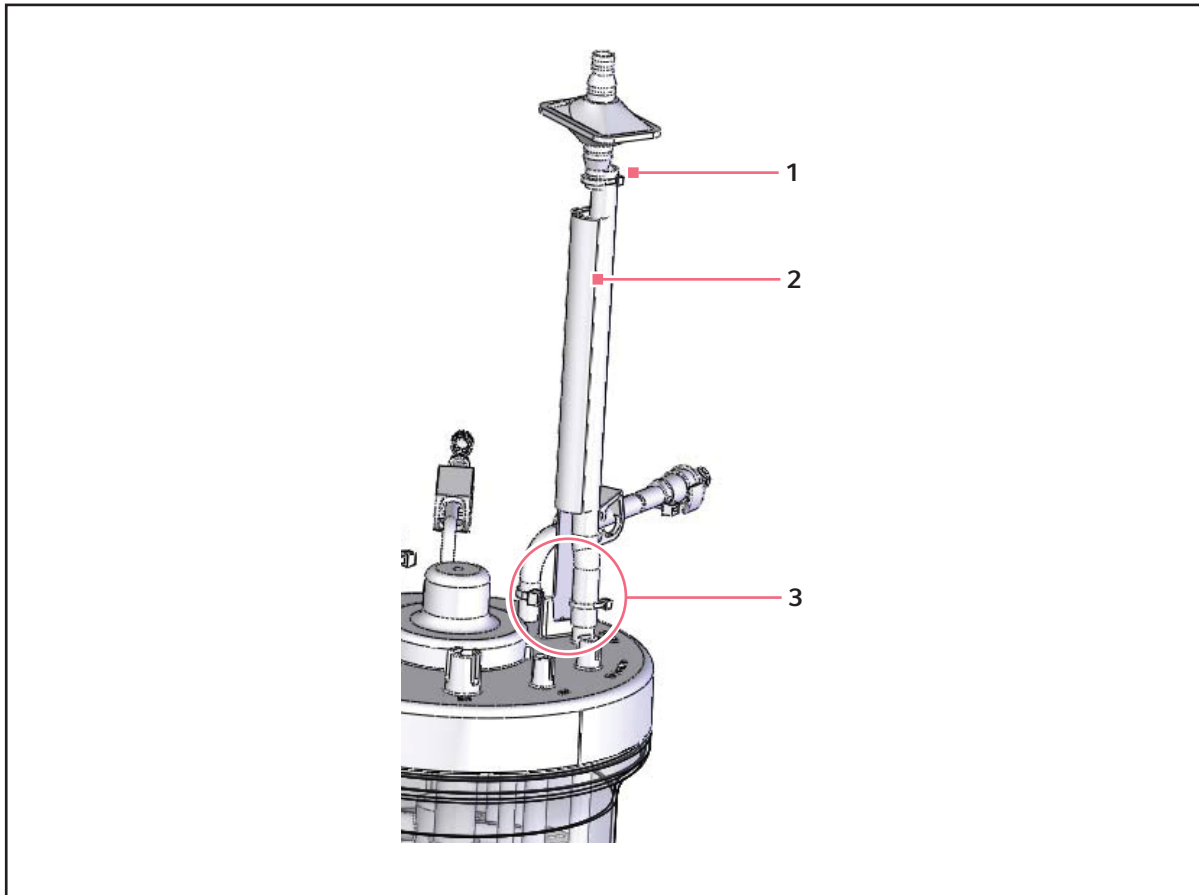


Fig. 5-3: Exhaust tube heater and support rod (installed)

1 Exhaust tube (and filter)

3 Support rod installed on headplate

2 Exhaust tube heater

3. Wrap the heater (it is split for this purpose) around the exhaust tube.
4. Select the heater mains/power cord appropriate to your needs, and attach to the universal mains/power supply (provided).

Do not connect the mains/power supply to your mains/power outlet until you are ready to use it.

The exhaust heater should always be on when gas is flowing into the bioreactor.

5.3 pH and DO sensor



pH sensors must be cleaned, calibrated and then sterilized before being inserted into vessels under hood. pH sensors must have Pg 13.5 thread to properly connect.

5.3.1 Install the standard pH sensor

1. After calibration and after autoclaving the pH sensor in an autoclave pouch, bring the pouch to the vessel under a hood.
2. Remove the sensor from the pouch, and remove the plug from the threaded Pg 13.5 pH port.
3. Insert the sensor into the port, tightening its adaptor into the Pg 13.5 port.

5.3.2 Install the DO sensor

1. Remove pre-installed screw from DO port (BioBLU 3c/10c) to be able to screw in DO sensor of matching length.
2. Remove the protective cap (if present) from the DO sensor electrode end.
The membrane is delicate: never rest the sensor on its tip.
3. Remove the spacer and O-ring (if present) from the DO sensor.
4. In case you use a sensor of extra length use a compression fitting on the sensor to make sure the weight of the sensor does not rest on the membrane but on the headplate.



In order to allow proper oxygen transfer the DO membrane is very thin and must be handled with care.

Please do not add water into the sleeve before or when inserting the sensor.

5. Gently insert the sensor into the DO port. Sensors must be inserted carefully and slowly to allow the air in the sleeve to escape.



Gently turn the sensor as you press it into the port to avoid breakage, because the DO port is fluted and the fit is snug.

6. Make sure the compression fitting does not seal the headplate port while inserting the sensor.
7. Slightly overstretch the membrane (approx. 2 mm).
8. Pull back the DO sensor (approx. 1 mm).

5.3.3 Install optical fiber for optical pH spot



General instructions and recommendations:

- Please note for each bioreactor version there is a specific sensor length.
- The "pH" imprint on the top side of the bioreactor indicates where the optical fiber must be inserted.
- PreSens, official measurement range is pH 5.5 to 8.0. Recommended measurement range is pH 6.5 to 7.5. The difference from the measurements of conventional glass electrodes increases the more the pH value differs from pH 7.
- Avoid using bioprocess media whose pH is outside of the sensor specification (<5.5 or >8).
- Drift of the pH reading / calibration is normal, up to 0.1 pH units per day.
- Daily re-standardization is recommended.
- Avoid high concentrations of fluorescent substances as this might influence the measurement accuracy (e.g. phenol red in cell culture media).
- Avoid exposure of sensor to direct sun or light.
- Avoid exposure of sensor to deionized water.
- Avoid contact of sensor to cold media or buffer.
- Avoid contact of sensor to media or buffers with low osmolarity.
- Avoid contact of sensor with solvents.

Installation

BioBLU® 3c - 50c Single-Use Bioreactors and Adaptor Kits
English (EN)

Installation instructions

1. Make sure to use a compatible optical fiber.
2. Insert the optical fiber until it snaps into place.



The tip of the optical fiber must be in contact with the inner bottom of the pH cap.



Insert the optical fiber without the use of extensive force. The optical fiber must not push the pH cap out of the silicone hose.

3. Plug the optical fiber into your controller (for installation instructions refer to your controller operating manual).



The calibration data for the sensor can be found on the product label.

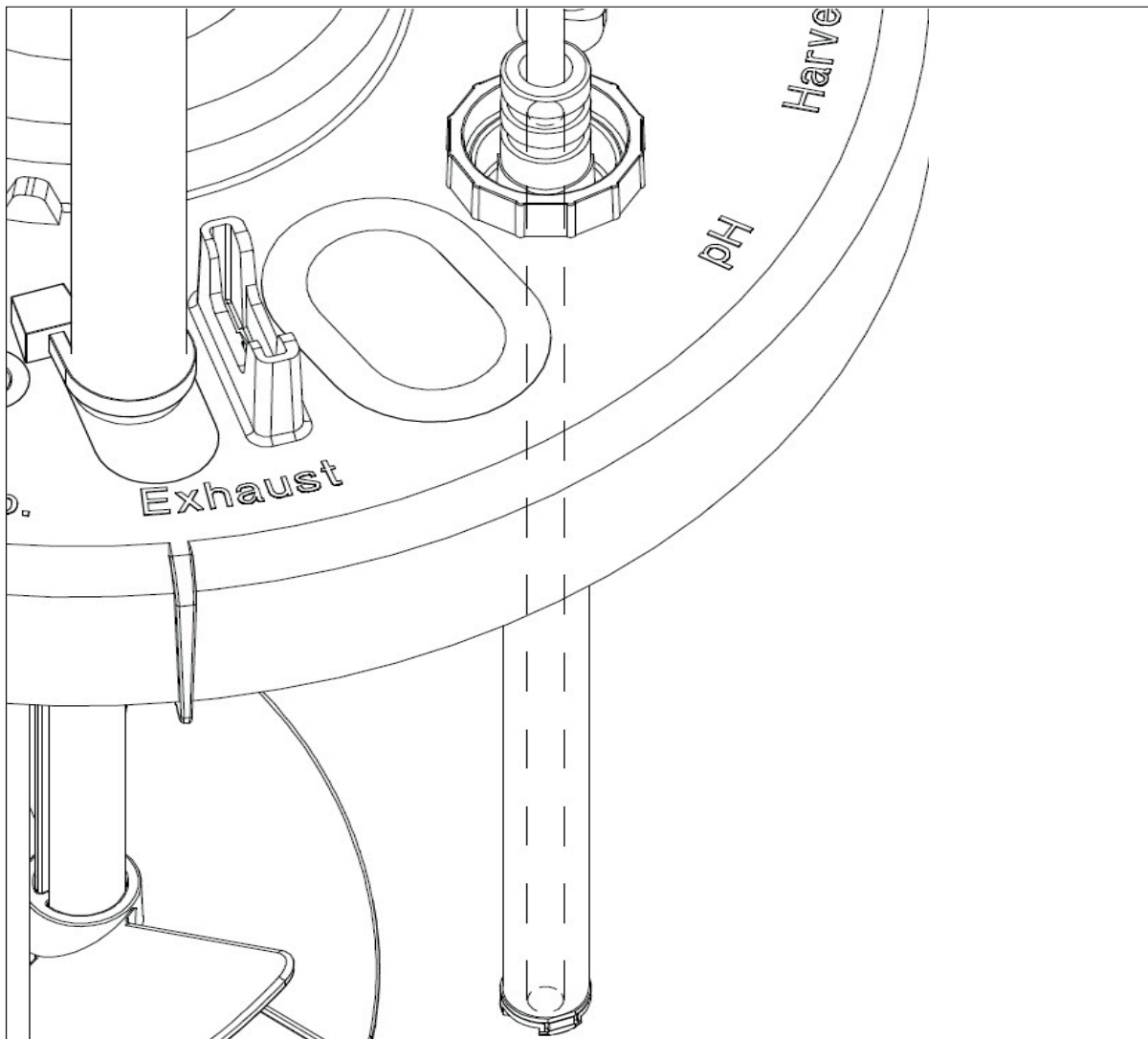


Fig. 5-4: Correctly installed optical fiber

5.4 Temperature sensor

1. Insert the RTD temperature sensor into its port, making sure the sensor extends all the way to the bottom.

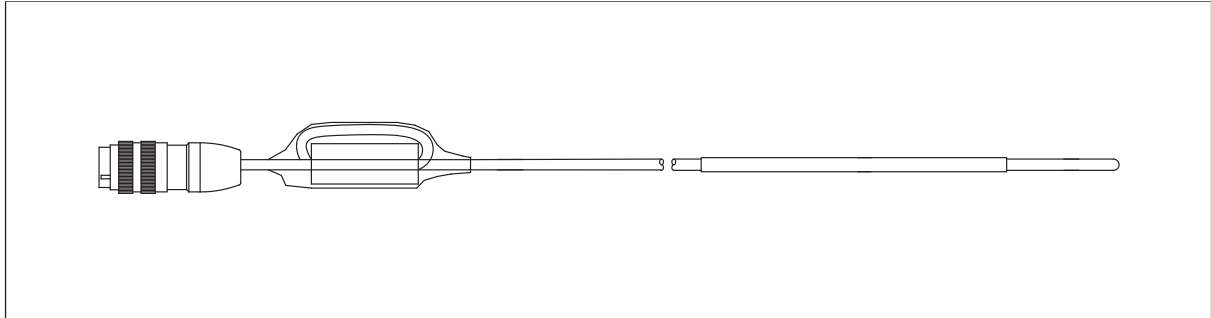


Fig. 5-5: RTD for BioBLU Single-Use Bioreactor

5.5 Gas pressure relief valves



DANGER! Risk of explosion

- ▶ Do not allow bioreactor gas pressure to rise above 6 PSIG (0.4 bar).
- ▶ Before you connect the sparge (and overlay, if present), be sure to install a pressure relief valve in the gas inlet line(s) before the filter. In the event that gas pressure should rise above 6 PSIG (0.4 bar), the pressure relief valve is designed to allow gas to exit, thereby preventing an explosion.

Install a gas pressure relief valve assembly (provided) in the gas inlet to the sparge and overlay (if applicable), before the filter.

Installation

BioBLU® 3c - 50c Single-Use Bioreactors and Adaptor Kits
English (EN)

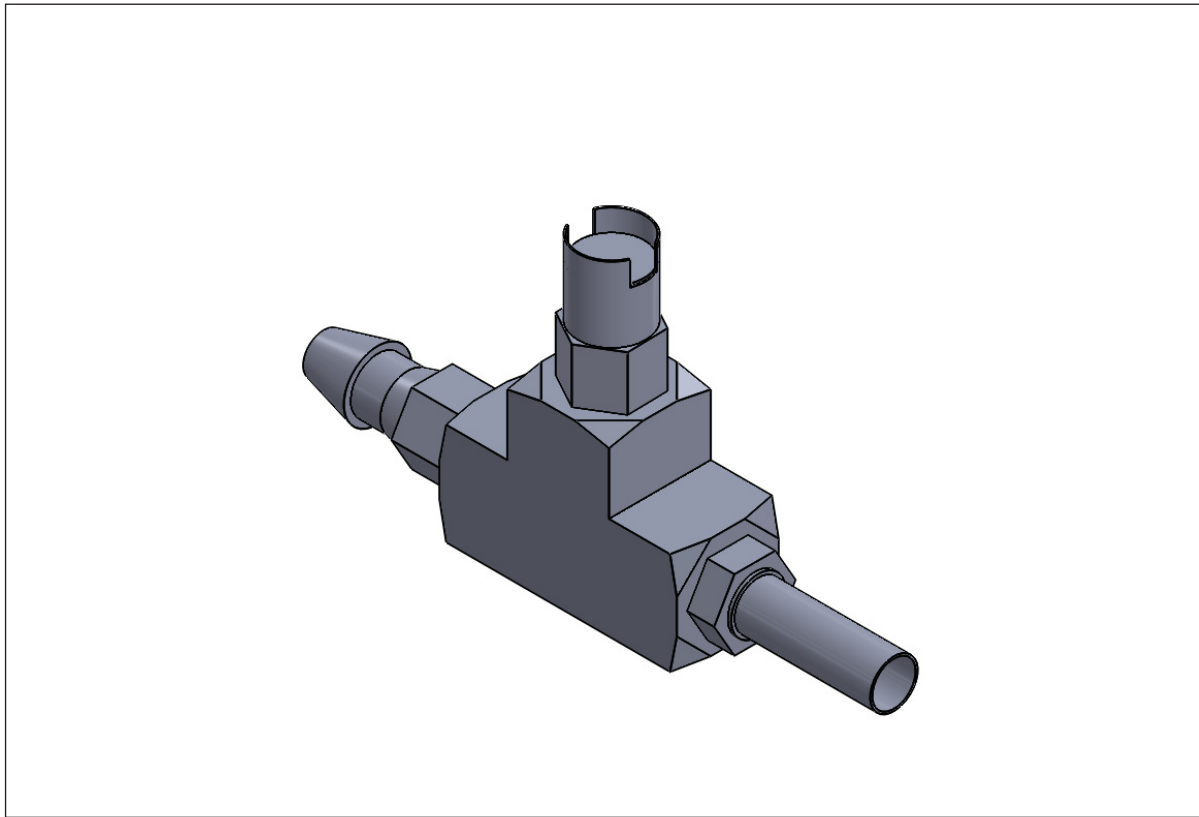


Fig. 5-6: Gas pressure relief valve assembly

Make all connections to your controller and utilities.

5.6 Motor adaptor



CAUTION! Risk of motor decoupling and/or damage to magnet

- ▶ The motor must be turned off when installing it on the headplate of the bioreactor.
- ▶ Ensure bioreactor and ambient temperatures are within specified limits.
- ▶ The maximum recommended viscosity of the culture is 30 mPas. Proper operation of the agitation system cannot be guaranteed at viscosities above the specified limit.
- ▶ BioBLU 3c, 5c, 5p, and 14c: Never increase agitation speed above 200 rpm.
- ▶ For BioBLU 50c: Never increase agitation speed above 150 rpm.
- ▶ Be sure to limit speed increases to increments of no more than 25 rpm at a time.



NOTICE! Risk of damage to motor

- ▶ Turn the motor off immediately if you hear scraping or grinding when you run it.
- ▶ Check your motor assembly.

5.6.1 BioFlo/CelliGen 115

Install the BioFlo/CelliGen 115 magnetic drive motor on the BioBLU bioreactor motor coupling, taking care to match the ridges on the coupling with the notches on the motor base.

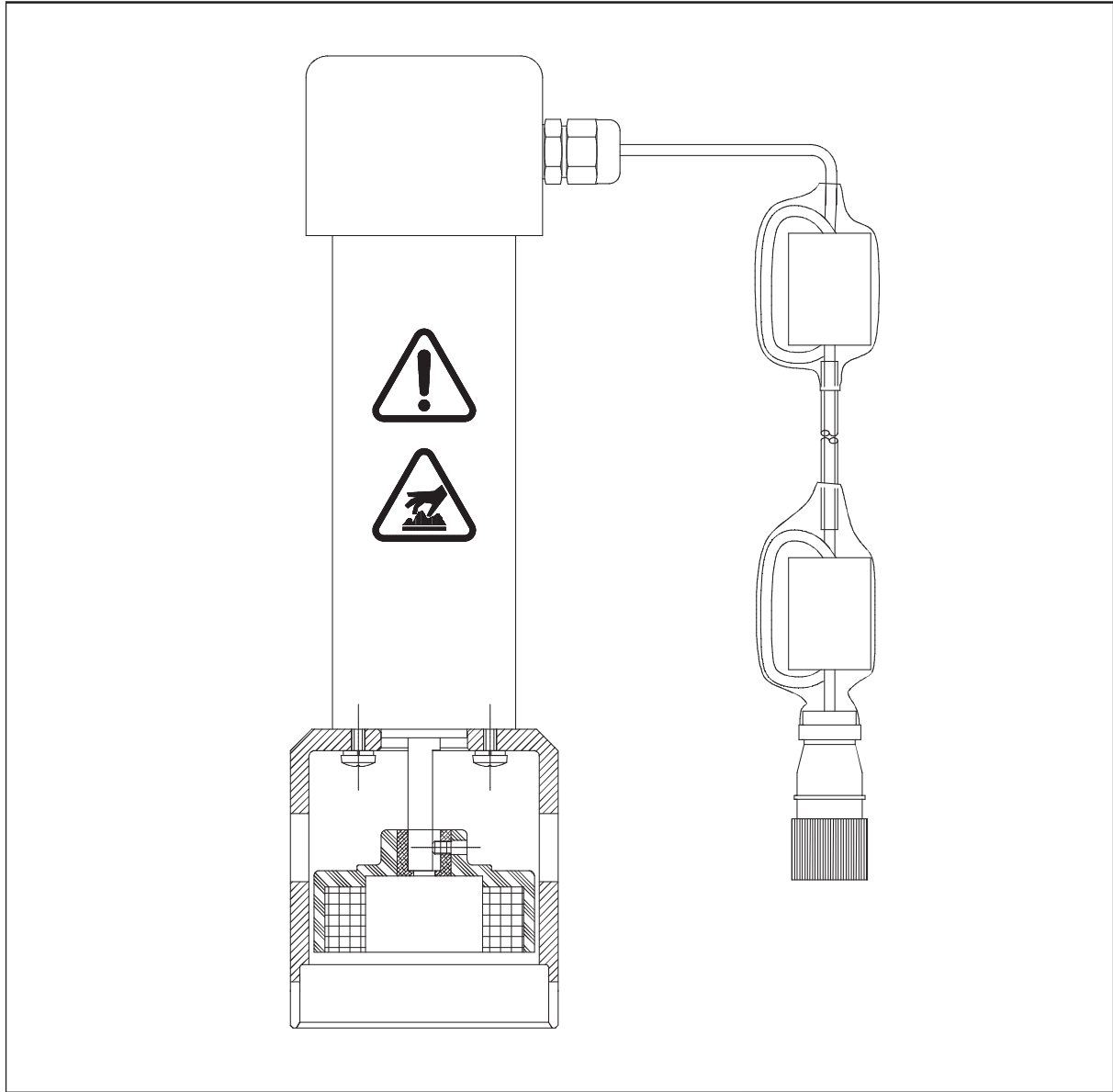


Fig. 5-7: Magnetic drive motor and support assembly

Installation

BioBLU® 3c - 50c Single-Use Bioreactors and Adaptor Kits
English (EN)

5.6.2 BioFlo/CelliGen 310**Remove the standard BioFlo/CelliGen 310 motor coupling from the motor**

1. Using the 3 mm Allen key (provided), loosen the magnet set screw through the slot on the motor adaptor.
2. Remove the magnet.
3. From underneath the motor/coupling assembly, use the #2 Phillips-head screw driver to remove the four screws to remove the coupling.
4. Store the standard coupling, the original coupling screws and the magnet.

Install the motor coupling adaptor

1. Using the #2 Phillips-head screw driver and four of the five motor coupling screws supplied with your adaptor kit, install the adaptor onto the bottom of the motor. Save the extra screw as a spare.
2. Place the white plastic spacer on a flat, level surface.
3. Position the magnet on top of the spacer, with the narrow end facing up.

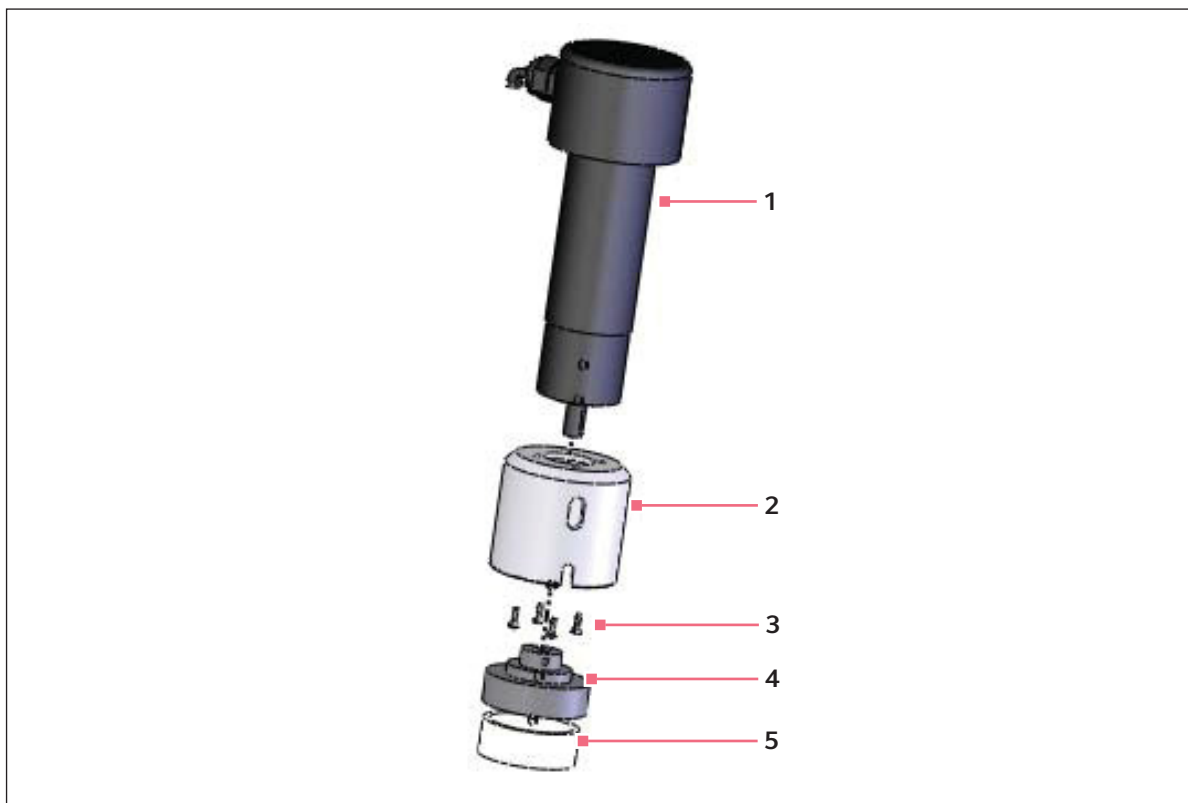


Fig. 5-8: Motor adaptor assembly (exploded view)

- | | |
|-----------------------------|------------------|
| 1 BioFlo/CelliGen 310 motor | 4 Adaptor magnet |
| 2 Motor adaptor | 5 Space |
| 3 Coupling screws | |

4. Place the adaptor over the magnet, rotating it until the magnet's set screw shows through one of the adaptor's slots.
5. Place the motor on top of the adaptor, inserting the drive shaft through the hole in the center.
6. Tighten the set screw with the Allen key. This tightens the magnet to the motor's drive shaft.

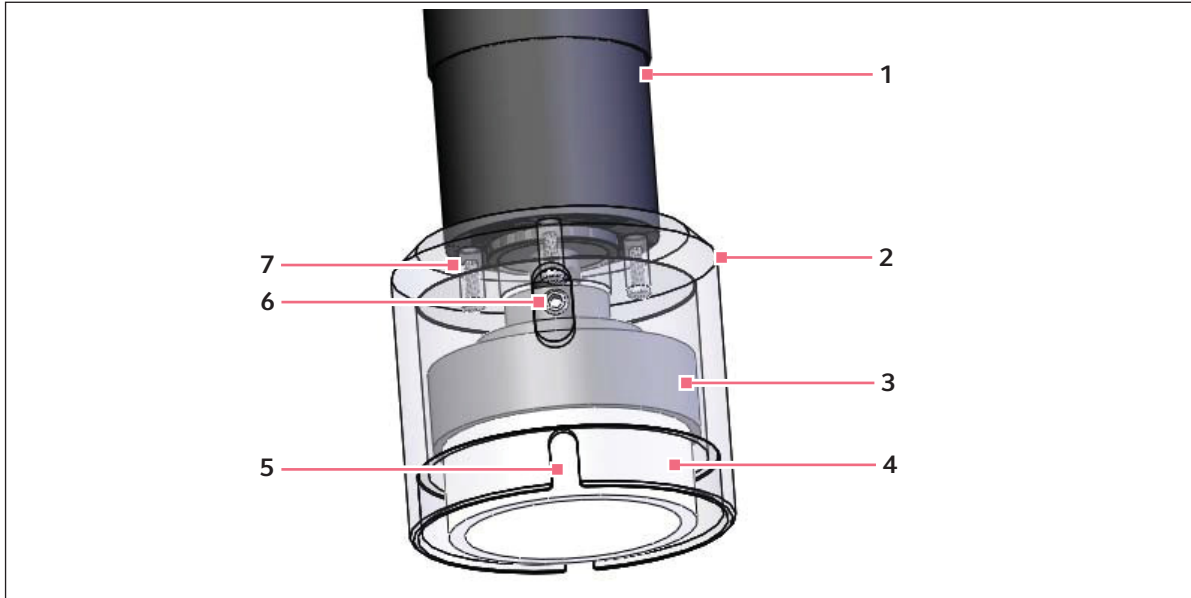


Fig. 5-9: Motor adaptor assembly (detail)

- | | |
|--|---|
| <ul style="list-style-type: none"> 1 BioFlo/CelliGen 310 motor 2 Motor adaptor 3 Adaptor magnet 4 Spacer | <ul style="list-style-type: none"> 5 Notches
For proper placement on headplate coupling 6 Set screw viewed through slot 7 Motor coupling screws (4) |
|--|---|

7. Set aside the spacer.
8. Install the motor on the bioreactor coupling, matching the adaptor notches to the matching ridges on the coupling.

Installation

BioBLU® 3c - 50c Single-Use Bioreactors and Adaptor Kits
English (EN)



Fig. 5-10: Motor adaptor (assembled)

5.6.3 BioFlo 320

Remove the standard BioFlo 320 motor coupling from the motor

1. Using the 3 mm Allen key (provided), loosen the magnet set screw through the slot on the motor adaptor.
2. Remove the magnet.
3. From underneath the motor/coupling assembly, use the #2 Phillips-head screwdriver to remove the four screws to remove the coupling.
4. Store the standard coupling, the original coupling screws and the magnet.

Install the motor coupling adaptor

1. Using the #2 Phillips-head screwdriver and four of the five motor coupling screws supplied with your adaptor kit, install the adaptor onto the bottom of the motor. Save the extra screw as a spare.
2. Place the white plastic spacer on a flat, level surface.
3. Position the magnet on top of the spacer, with the narrow end facing up.
4. Place the adaptor over the magnet, rotating it until the magnet's set screw shows through one of the adaptor's slots.
5. Place the motor on top of the adaptor, inserting the drive shaft through the hole in the center.
6. Tighten the set screw with the Allen key. This tightens the magnet to the motor's drive shaft.
7. Set aside the spacer.
8. Install the motor on the bioreactor coupling, matching the adaptor notches to the matching ridges on the coupling.

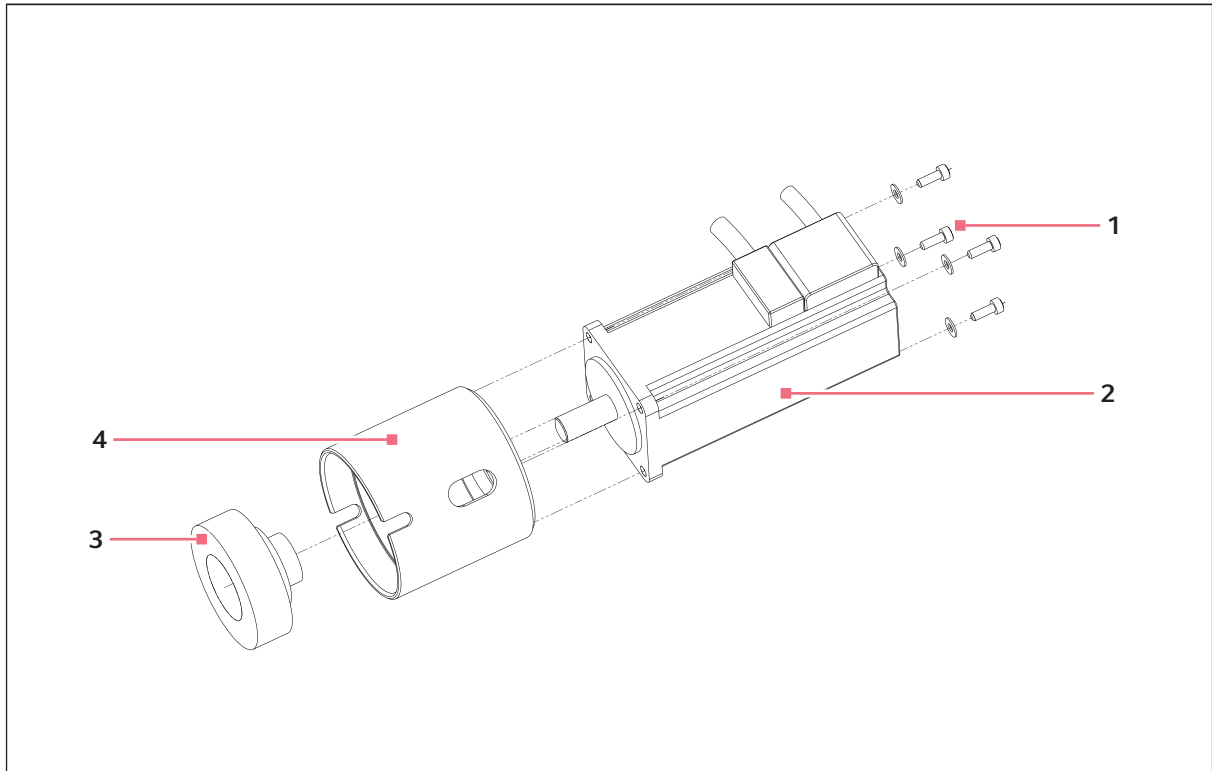


Fig. 5-11: Motor assembly (exploded view)

1 Screws/washers (4x)

3 Magnet

2 Motor

4 Motor coupling

Installation

BioBLU® 3c - 50c Single-Use Bioreactors and Adaptor Kits
English (EN)

5.7 Water drawer replacement

5.7.1 BioFlo/CelliGen 310

Connect drawer replacement

1. Turn off all electricity to the controller, and unplug the mains/power cord from the mains/power outlet.
2. With a Phillips-head screwdriver, remove the two bottom corner screws from the front panel of the water connections drawer on your BioFlo/CelliGen 310 controller. Set them aside for reuse.

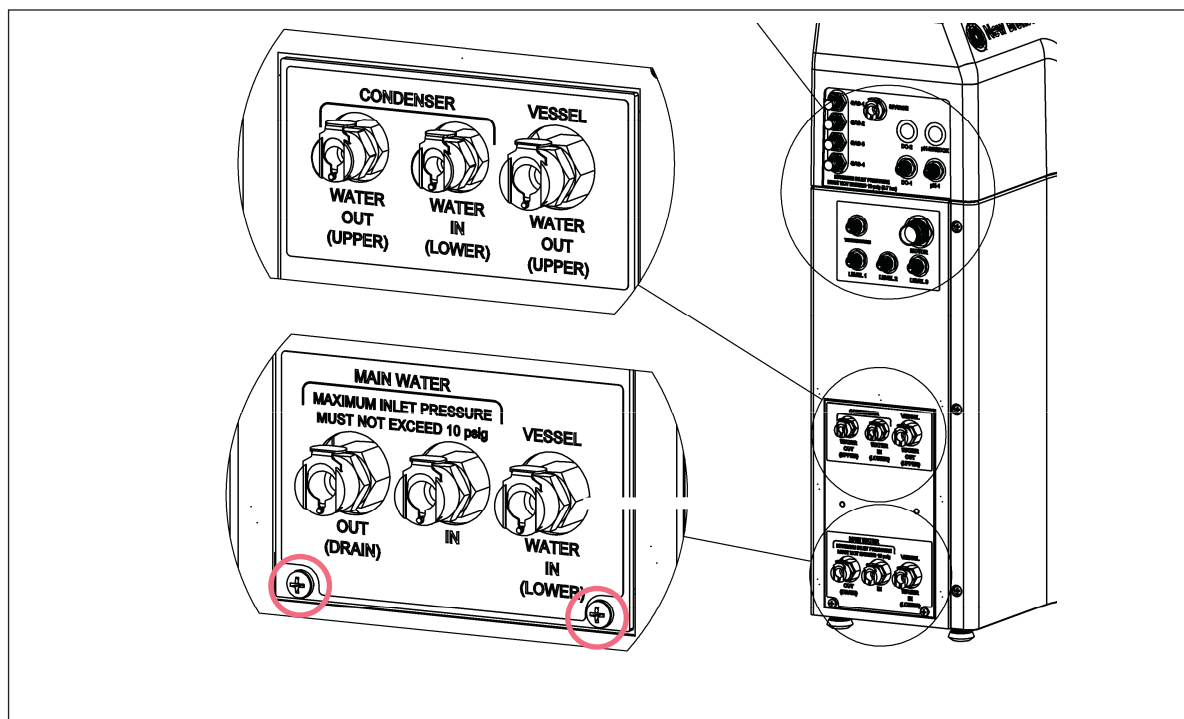


Fig. 5-12: BioFlo/CelliGen controller water connections drawer

3. Firmly grasping any two of the water connectors, pull the drawer out until you see two white plastic wiring harness connectors inside.
4. Pull apart the smaller white plastic connector.
5. Press and hold the locking tab on the larger white plastic connector, then pull the connector apart.
6. Remove the drawer entirely from the controller. Set it aside for safe storage.
7. Insert the replacement drawer provided. Slide it in until the large white connector is close enough to connect to its mate.

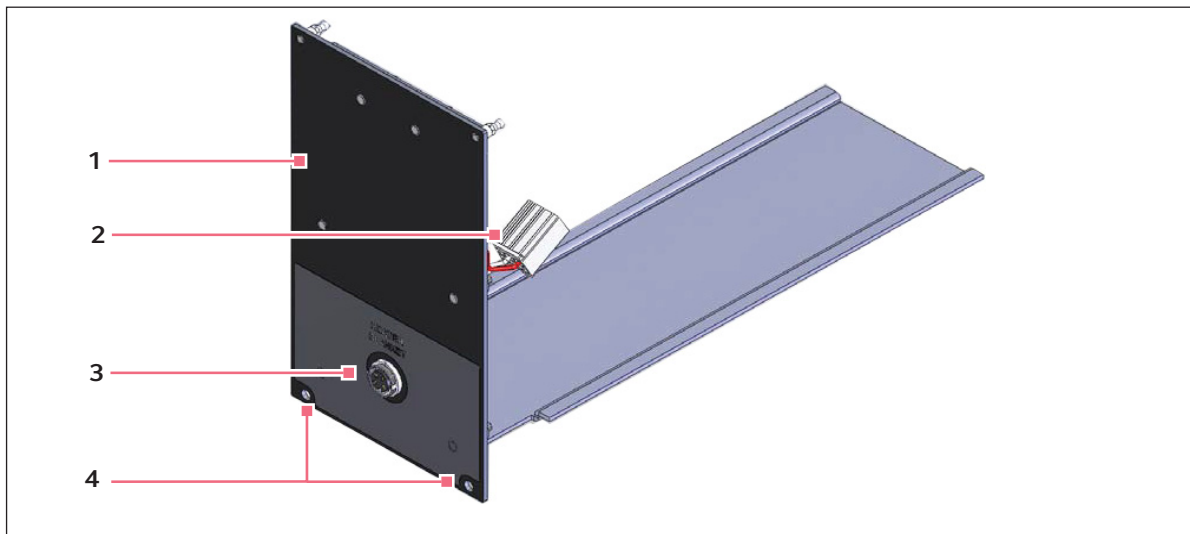


Fig. 5-13: Replacement controller connector drawer (front)

- | | |
|---------------------------------|----------------------------------|
| 1 Front panel | 3 Heat blanket connector |
| 2 Large white plastic connector | 4 Holes for Phillips-head screws |

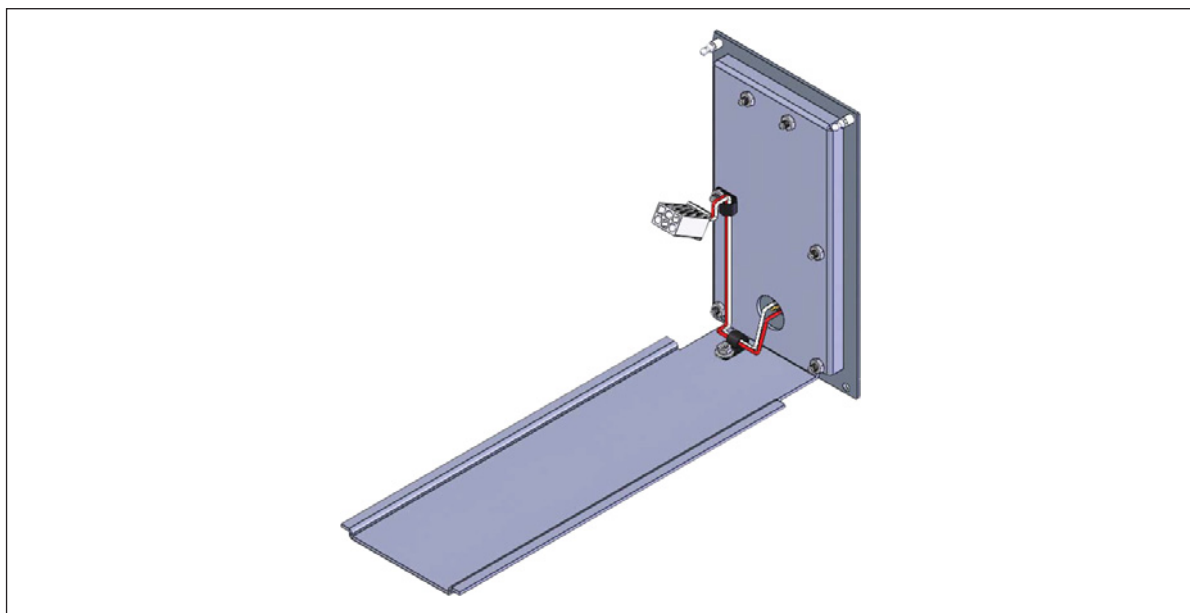


Fig. 5-14: Replacement controller connector drawer (rear)

8. Connect the large connector, snapping it in place.
9. Carefully slide the drawer all the way into the controller.
10. Reinstall the two Phillips-head screws to lock the front panel in place.



This change affects the wiring schematic of your BioFlo/CelliGen 310 controller.

Installation

BioBLU® 3c - 50c Single-Use Bioreactors and Adaptor Kits
English (EN)

5.8 Reset temperature gauge**5.8.1 BioFlo/CelliGen 115**

1. Start the BioFlo/CelliGen115 controller, and go to the Temperature gauge screen.
2. Reset the temperature Proportional gain to 150.0 and Incremental gain to 3.50.
3. Make sure the operating mode is set to Cell Culture in the Controller Setup screen.
4. If appropriate, reset the vessel size at the same time.

5.8.2 BioFlo/CelliGen 310

1. Start the BioFlo/CelliGen 310 controller, and go to the Temperature gauge screen.
2. Reset the temperature Proportional gain to 150.0 and Incremental gain to 3.50.
3. Make sure the operating mode is set to Cell Culture in the Controller Setup screen.
4. If appropriate, reset the vessel size at the same time.

6 Troubleshooting

6.1 Troubleshooting the bioreactor

Problem	Cause	Solution
Bioreactor does not maintain desired temperature.	Improper cooling fluid temperature and/or temperature setpoint selection. Uncontrolled constant flow of coolant that prevents reaching the temperature setpoint.	Ensure temperature setpoint, cooling fluid, and cooling fluid flow control all match specifications for temperature loop from technical data section.
	Cooling fluid delivery is inadequate.	Add another stainless steel cooling finger to an open Pg 13.5 port, using one of the four available fluid delivery lines.
Bioreactor does not maintain desired gas flow rate.	Blocked or clogged exhaust filters.	Replace filters under laminar flow hood using proper aseptic technique.
	Inadequate exhaust gas heating.	Ensure exhaust gas heater is connected and heating.
	Improper gas supply pressure.	Ensure gas supply pressure meets specification from technical data section.
Bioreactor does not maintain desired agitation rate.	Bioreactor may require active gas supply to achieve high rpm rate in viscous or dense cultures.	Turn on gas supply to desired value.
	Decoupled magnet (audible clicking will be present).	Turn off motor and allow for full stop. Turn back on to desired setpoint.
	Desired setpoint is entered where $SP \geq PV + 25$.	Ensure setpoint is achieved in increments of no greater than 25 rpm.

Troubleshooting

BioBLU® 3c - 50c Single-Use Bioreactors and Adaptor Kits
English (EN)

7 Technical data
7.1 Headplate specifications
7.1.1 BioBLU 5c

Headplate port	External				
	Material	Length	ID	OD	Termination
LA3	C-Flex	700 mm (28 in)	3.2 mm (1/8 in)	6.4 mm (1/4 in)	Luer (female)
LA2	C-Flex	700 mm (28 in)	6.4 mm (1/4 in)	9.6 mm (3/8 in)	CPC (female)
LA1	C-Flex	700 mm (28 in)	6.4 mm (1/4 in)	9.6 mm (3/8 in)	CPC (female)
Pg 13.5	N/A	N/A	N/A	N/A	Pg 13.5 plug
Harvest	C-Flex	700 mm (28 in)	6.4 mm (1/4 in)	9.6 mm (3/8 in)	CPC (female)
Sample	C-Flex	500 mm (20 in)	3.2 mm (1/8 in)	6.4 mm (1/4 in)	Needle-free sampling
Exhaust	Silicone (PTC)	200 mm (8 in)	9.6 mm (3/8 in)	12.7 mm (1/2 in)	Vent filter (0.2 µm)
Sparge	Silicone (PTC)	50 mm (2 in)	6.4 mm (1/4 in)	9.6 mm (3/8 in)	Vent filter (0.2 µm)
Overlay	Silicone (PTC)	50 mm (2 in)	6.4 mm (1/4 in)	9.6 mm (3/8 in)	Vent filter (0.2 µm)

7.1.2 BioBLU 14c

Headplate port	External				
	Material	Length	ID	OD	Termination
LA3	C-Flex	700 mm (28 in)	3.2 mm (1/8 in)	6.4 mm (1/4 in)	Luer (female)
LA2	C-Flex	700 mm (28 in)	6.4 mm (1/4 in)	9.6 mm (3/8 in)	CPC (female)
LA1	C-Flex	700 mm (28 in)	6.4 mm (1/4 in)	9.6 mm (3/8 in)	CPC (female)
Pg 13.5	N/A	N/A	N/A	N/A	Pg 13.5 plug
Harvest	C-Flex	700 mm (28 in)	6.4 mm (1/4 in)	9.6 mm (3/8 in)	CPC (female)
Sample	C-Flex	500 mm (20 in)	3.2 mm (1/8 in)	6.4 mm (1/4 in)	Needle-free sampling
Exhaust	Silicone (PTC)	200 mm (8 in)	9.6 mm (3/8 in)	12.7 mm (1/2 in)	Vent filter (0.2 µm)
Sparge	Silicone (PTC)	50 mm (2 in)	6.4 mm (1/4 in)	9.6 mm (3/8 in)	Vent filter (0.2 µm)
Overlay	Silicone (PTC)	50 mm (2 in)	6.4 mm (1/4 in)	9.6 mm (3/8 in)	Vent filter (0.2 µm)

Technical data

BioBLU® 3c - 50c Single-Use Bioreactors and Adaptor Kits
English (EN)

7.1.3 BioBLU 50c

Headplate port	External				
	Material	Length	ID	OD	Termination
LA3	C-Flex	700 mm (28 in)	3.2 mm (1/8 in)	6.4 mm (1/4 in)	Luer (female)
LA2	C-Flex	700 mm (28 in)	6.4 mm (1/4 in)	9.6 mm (3/8 in)	CPC (female)
LA1	C-Flex	700 mm (28 in)	6.4 mm (1/4 in)	9.6 mm (3/8 in)	CPC (female)
Pg 13.5	N/A	N/A	N/A	N/A	Pg 13.5 plug
Harvest	C-Flex	700 mm (28 in)	6.4 mm (1/4 in)	9.6 mm (3/8 in)	CPC (female)
Sample	C-Flex	500 mm (20 in)	3.2 mm (1/8 in)	6.4 mm (1/4 in)	Needle-free sampling
Exhaust	Silicone (PTC)	200 mm (8 in)	9.6 mm (3/8 in)	12.7 mm (1/2 in)	Vent filter (0.2 µm)
Sparge	Silicone (PTC)	50 mm (2 in)	6.4 mm (1/4 in)	9.6 mm (3/8 in)	Vent filter (0.2 µm)
Overlay	Silicone (PTC)	50 mm (2 in)	6.4 mm (1/4 in)	9.6 mm (3/8 in)	Vent filter (0.2 µm)

7.1.4 BioBLU 3c

Headplate port	External				
	Material	Length	ID	OD	Termination
LA1	C-Flex	700 mm (28 in)	3.2 mm (1/8 in)	6.4 mm (1/4 in)	Luer (female)
LA2	C-Flex	700 mm (28 in)	3.2 mm (1/8 in)	6.4 mm (1/4 in)	Luer (female)
LA3	C-Flex	700 mm (28 in)	3.2 mm (1/8 in)	6.4 mm (1/4 in)	Luer (female)
LA4	C-Flex	700 mm (28 in)	6.4 mm (1/4 in)	9.6 mm (3/8 in)	CPC (female)
Pg 13.5 (1)	N/A	N/A	N/A	N/A	Pg 13.5 to optical pH
Pg 13.5 (2)	N/A	N/A	N/A	N/A	Pg 13.5 to 12 mm
Pg 13.5 (3)	N/A	N/A	N/A	N/A	Pg 13.5 plug
Pg 13.5 (4)	N/A	N/A	N/A	N/A	Pg 13.5 plug
Harvest	C-Flex	700 mm (28 in)	6.4 mm (1/4 in)	9.6 mm (3/8 in)	CPC (female)
Sample	C-Flex	500 mm (20 in)	3.2 mm (1/8 in)	6.4 mm (1/4 in)	Needle-free sampling
Exhaust	Silicone (PTC)	200 mm (8 in)	9.6 mm (3/8 in)	12.7 mm (1/2 in)	Vent filter (0.2 µm)
Sparge	Silicone (PTC)	50 mm (2 in)	6.4 mm (1/4 in)	9.6 mm (3/8 in)	Vent filter (0.2 µm)
Overlay	Silicone (PTC)	50 mm (2 in)	6.4 mm (1/4 in)	9.6 mm (3/8 in)	Vent filter (0.2 µm)

7.1.5 BioBLU 10c

Headplate port	External				
	Material	Length	ID	OD	Termination
LA1	C-Flex	700 mm (28 in)	3.2 mm (1/8 in)	6.4 mm (1/4 in)	Luer (female)
LA2	C-Flex	700 mm (28 in)	3.2 mm (1/8 in)	6.4 mm (1/4 in)	Luer (female)
LA3	C-Flex	700 mm (28 in)	3.2 mm (1/8 in)	6.4 mm (1/4 in)	Luer (female)
LA4	C-Flex	700 mm (28 in)	6.4 mm (1/4 in)	9.6 mm (3/8 in)	CPC (female)
Pg 13.5 (1)	N/A	N/A	N/A	N/A	Pg 13.5 to optical pH
Pg 13.5 (2)	N/A	N/A	N/A	N/A	Pg 13.5 to 12 mm
Pg 13.5 (3)	N/A	N/A	N/A	N/A	Pg 13.5 plug
19 mm	N/A	N/A	N/A	N/A	Pg 13.5 plug
Harvest	C-Flex	700 mm (28 in)	6.4 mm (1/4 in)	9.6 mm (3/8 in)	CPC (female)
Sample	C-Flex	500 mm (20 in)	3.2 mm (1/8 in)	6.4 mm (1/4 in)	Needle-free sampling
Exhaust	Silicone (PTC)	200 mm (8 in)	9.6 mm (3/8 in)	12.7 mm (1/2 in)	Vent filter (0.2 µm)
Sparge	Silicone (PTC)	50 mm (2 in)	6.4 mm (1/4 in)	9.6 mm (3/8 in)	Vent filter (0.2 µm)
Overlay	Silicone (PTC)	50 mm (2 in)	6.4 mm (1/4 in)	9.6 mm (3/8 in)	Vent filter (0.2 µm)

7.2 Technical data



Do not operate the bioreactor outside the technical specifications.

Tab. 7-1: Bioreactor geometrical data

Bioreactor geometrical data						
	Unit	BioBLU 3c	BioBLU 5c	BioBLU 10c	BioBLU 14c	BioBLU 50c
Total volume (V_T)	L	5.0	5.0	13.35	14.0	50.0
Max. working volume (V_{wmax})	L	3.8	3.8	10.01	10.5	40.0
Min. working volume (V_{wmin})	L	1.3	1.3	3.34	3.5	18.0
Headspace	%	25.0	24.0	25.00	25.0	20.0
Total liquid height (H_l)	mm	294.2	250.0	408.0	418.0	674.0
Max. liquid height (h_{Vwmax})	mm	220.7	188.0	306.0	315.0	428.0
Vessel inner diameter (D_i)	mm	147.1	166.0	204.1	210.0	337.0
Ratio H_l/D_i	–	2.0	1.5	2.0	2.0	2.0
Ratio h_{Vwmax}/D_i	–	1.5	1.1	1.5	1.5	1.3

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Bioreactor geometrical data						
No. of impeller	–	1	1	1	1	1
Impeller diameter (d)	mm	66.2	100.0	91.8	100.0	160.0
Impeller height (h _i)	mm	49.7	75.0	68.9	75.0	120.0
Impeller bottom clearance (C)	mm	44.8	75.0	55.0	83.0	105.0
Ratio d/D _i	–	0.5	0.6	0.45	0.5	0.5

Tab. 7-2: Functional specifications

Functional specifications						
	Unit	BioBlu 3c	BioBLU 5c	BioBLU 10c	BioBLU 14c	BioBLU 50c
Agitation	rpm	200 (max)				150 (max)
Pressure	psig / barg	6 / 0.4 (max)				6 / 0.4 (max)
Temperature (continuous operation)	°C	up to 40				up to 40
Recommended max. operation time	days	14				14



For information on the maximum recommended viscosity for a culture, (see *Damage to device on p. 10*).



For information on the maximum recommended pressure for the bioreactor, (see *Aeration on p. 14*).

Tab. 7-3: Operating / storage conditions

Operating / storage conditions
<ul style="list-style-type: none"> • Store in the original packaging. • Store and transport in an upright position. • Never lay the bioreactor on the side or the top as this will cause damage to the BioBLU bioreactor. • Protect bioreactors from sun light and UV light. • Store at room temperature (10–30 °C). • Avoid strong temperature fluctuations. • Keep dry. • Humidity up to 80 % RH, non-condensing • Altitude limit is 2,000 meters.

Tab. 7-4: Recommended sensor length in mm (inches)

Sensor	BioBLU 3c / 5c	BioBLU 5p	BioBLU 10c	BioBLU 14c	BioBLU 50c
pH Analog	200 mm (7.9 inch) (max. 225 mm (8.8 inch))	120 mm* (4.7 inch)	325 mm (12.8 inch) (max. 395 mm (15.6 inch))	325 mm (12.8 inch) (max. 395 mm (15.6 inch))	625 mm* (24.6 inch)
pH Digital (ISM)	225 mm (8.8 inch)	120 mm* (4.7 inch)	425 mm* (16.7 inch)	425 mm* (16.7 inch)	N / A
DO Analog	225 mm (8.8 inch)	120 mm (4.7 inch)	325 mm (12.8 inch)	355 mm (14.0 inch)	526 mm (20.7 inch)
DO Digital (ISM)	220 mm (8.7 inch)	120 mm (4.7 inch)	420 mm (16.5 inch)	420 mm (16.5 inch)	N / A

* Requires compression fitting adaptor.



For information on application limits regarding chemical compatibility, (see *Application limits* on p. 11).

Tab. 7-5: Main material

Main material	BioBLU 3	BioBLU 5	BioBLU 5p	BioBLU 10	BioBLU 14	BioBLU 50
Vessel body	PC	PS	PS	PC	PS	PS
Headplate	PC	PC	PC	PC	PC	PC
Impeller shaft	PC	PC	PC	PC	PC	PC
Impeller	PC	PC	PC	PC	PC	PC
Cage	-	-	PC	-	-	-

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8 Ordering information

Tab. 8-1: BioBLU part numbers adaptor kits and bundles

Part No.	Description
M1386-9943	Adaptor, BioBLU® 3c/5c to BioFlo® 320
M1386-9963	Adaptor, BioBLU® 10c/14c to BioFlo® 320
M1386-9983	Adaptor, BioBLU® 50c to BioFlo® 320
B120SUV004	Bundle, BioBLU® 3c/5c to BioFlo® 120
B120SUV005	Bundle, BioBLU® 5p to BioFlo® 120
B120SUV006	Bundle, BioBLU® 10c/14c to BioFlo® 120
B120SUV007	Bundle, BioBLU® 50c to BioFlo® 120
M1379-0322	Bundle, BioBLU® 3c/5c to BioFlo® 320
M1379-0323	Bundle, BioBLU® 5p to BioFlo® 320
M1379-0324	Bundle, BioBLU® 10c/14c to BioFlo® 320
M1379-0325	Bundle, BioBLU® 50c to BioFlo® 320

Tab. 8-2: BioBLU part numbers e-beam

Part No.	Description
1386000100	BioBLU 3c, Microsparge, Sterile, 1-pack
1386000300	BioBLU 3c, Macrosparge, Sterile, 1-pack
1386000900	BioBLU 3f, Macro, non-Sterile, 1 pc
1386120000	BioBLU 3c, Micro, Sterile, 2 Imp, 1-pack
1386121000	BioBLU 3c, Macro, Sterile, 2 Imp, 1-pack
M1363-0119	BioBLU 5p, Microsparge, Sterile, 1-pack
M1363-0121	BioBLU 5c, Macrosparge, Sterile, 1-pack
M1363-0125	BioBLU 5c, Microsparge, Sterile, 1-pack
M1363-0133	BioBLU 5p, Macrosparge, Sterile, 1-pack
1386140000	BioBLU 10c, micro, 1 Imp, pH, S, 1 pc
1386141000	BioBLU 10c, macro, 1 Imp, pH, S, 1 pc
M1363-0122	BioBLU 14c, Macrosparge, Sterile, 1-pack
M1363-0126	BioBLU 14c, Microsparge, Sterile, 1-pack
M1363-0129	BioBLU 50c, Macrosparge, Sterile, 1-pack
M1363-0131	BioBLU 50c, Microsparge, Sterile, 1-pack

Tab. 8-3: BioBLU part numbers X-ray

Part No.	Description
1386124000	BioBLU 3c micro, 1Imp, pH, X-Ray
1386125000	BioBLU 3c macro, 1Imp, pH, X-Ray

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Part No.	Description
1386126000	BioBLU3c,micro,2Imp,pH,X-Ray
1386127000	BioBLU3c,macro,2Imp,pH,X-Ray
1386130500	BioBLU5p,micro,1Imp,pH,X-Ray
1386131000	BioBLU 5c macro, 1Imp, pH, X-Ray
1386130000	BioBLU 5c micro, 1Imp, pH, X-Ray
1386131500	BioBLU5p,macro,1Imp,pH,X-Ray
1386140300	BioBLU 10c micro, 1Imp, pH, X-Ray
1386141300	BioBLU 10c macro, 1Imp, pH, X-Ray
1386151000	BioBLU 14c macro, 1Imp, pH, X-Ray
1386150000	BioBLU 14c micro, 1Imp, pH, X-Ray
1386163000	BioBLU 50c, macro, 1Imp, pH, X-Ray, 1Stk
1386162000	BioBLU 50c, micro, 1Imp, pH, X-Ray, 1pc.

Tab. 8-4: BioBLU part numbers HNQ

Part No.	Description
1386124500	BioBLU®3c,micro,1Imp,pH,HNQ
1386125500	BioBLU®3c,macro,1Imp,pH,HNQ
1386128000	BioBLU®3f,macro,3Imp,HNQ
1386126500	BioBLU®3c,micro,2Imp,pH,HNQ
1386127500	BioBLU®3c,macro,2Imp,pH,HNQ
1386132500	BioBLU®5p,micro,1Imp,pH,HNQ
1386133000	BioBLU®5c,macro,1Imp,pH,HNQ
1386132000	BioBLU®5c,micro,1Imp,pH,HNQ
1386133500	BioBLU®5p,macro,1Imp,pH,HNQ
1386140500	BioBLU®10c,micro,1Imp,pH,HNQ
1386141500	BioBLU®10c,macro,1Imp,pH,HNQ
1386153000	BioBLU®14c,macro,1Imp,pH,HNQ
1386152000	BioBLU®14c,micro,1Imp,pH,HNQ
1386165000	BioBLU®50c,macro,1Imp,pH,HNQ
1386164000	BioBLU®50c,micro,1Imp,pH,HNQ
1386145500	BioBLU®10c,micro,2Imp,pH,HNQ
1386144500	BioBLU®10c,macro,2Imp,pH,HNQ

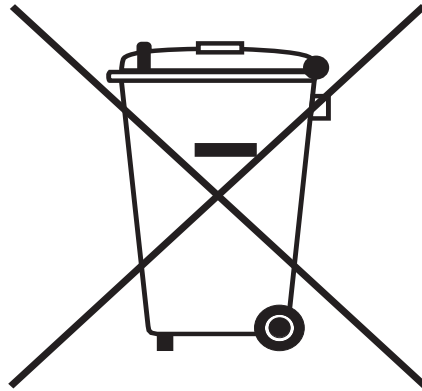
9 Disposal

Observe the relevant legal regulations when disposing of the product.

Information on the disposal of electrical and electronic devices in the European Community:

Within the European Community, the disposal of electrical devices is regulated by national regulations based on EU Directive 2012/19/EU pertaining to waste electrical and electronic equipment (WEEE).

According to these regulations, any devices supplied after August 13, 2005, in the business-to-business sphere, to which this product is assigned, may no longer be disposed of in municipal or domestic waste. They are marked with the following symbol to indicate this:



As the disposal regulations may differ from one country to another within the EU, please contact your supplier for more information.

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