



BioBLU® 3f Single-Use Bioreactors and Adaptor Kits

Operating Manual

Copyright © 2025 Eppendorf SE, Germany. No part of this publication may be reproduced without the prior permission of the copyright owner.

The company reserves the right to change information in this document without notice. Updates to information in this document reflect our commitment to continuing product development and improvement.

Eppendorf® and the Eppendorf logo are registered trademarks of Eppendorf SE, Germany.

New Brunswick™ is a trademark of Eppendorf SE, Germany.

BioBLU® is a registered trademark of Eppendorf SE, Germany.

BioFlo® and CelliGen® are registered trademarks of Eppendorf, Inc., USA.

C-Flex® is a registered trademark of Saint-Gobain Performance Plastics Corporation, USA.

Antifoam 204 is a brand product of Sigma-Aldrich, Inc., USA.

Pluronic® is a registered trademark of BASF Corporation, USA.

Pluriol® is a registered trademark of BASF SE, Germany.

Struktol® is a registered trademark of Schill & Seilacher GmbH & Co., Germany.

Luer-Lock® is a trademark of Becton, Dickinson and Co., USA.

Trademarks are not marked in all cases with ™ or ® in this manual.

Table of contents

1	Operating instructions	5
1.1	Using this manual	5
1.2	Danger symbols and danger levels	5
1.2.1	Danger symbols	5
1.2.2	Danger levels	5
1.3	Symbols used	6
1.4	Abbreviations used	6
2	Safety	7
2.1	Intended use	7
2.2	Warnings for intended use	8
2.2.1	Personal injury	8
2.2.2	Damage to device	10
2.2.3	Application limits	11
2.3	Notes on product liability	12
3	BioBLU single-use fermentation bioreactor	13
3.1	Unpacking the bioreactor	13
3.2	Bioreactor assembly	14
3.3	Aeration	18
3.4	Exhaust system	18
3.5	Sampling system	18
4	Adaptor kits	19
4.1	Unpacking and inspection	19
4.2	BioFlo® 320 adaptor kit	19
4.3	BioFlo® 120 single-use bundle BioBLU 3f	19
4.4	BioFlo®/CelliGen® 310 adaptor kit	20
4.5	BioFlo®/CelliGen® 115	21
5	Installation	23
5.1	pH and DO sensor	23
5.2	Autoclaving the bioreactor	23
5.3	Exhaust condenser	24
5.3.1	Installing the exhaust condenser	25
5.4	Water manifold	25
5.4.1	Installing the water manifold	25
5.5	Bioreactor heat blanket	25
5.6	Temperature sensor	27
5.7	Gas pressure relief valves	28
5.8	Motor adaptor	29
5.8.1	BioFlo 320	29
5.8.2	BioFlo 310	31
5.8.3	BioFlo 115, 1/2 L vessel	32
5.8.4	BioFlo 115, 5/10 L vessel	34
6	Troubleshooting	37
6.1	Troubleshooting the bioreactor	37

Table of contents

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

7	Technical data	39
7.1	External headplate configuration BioBLU 3f	39
7.2	Functional specifications BioBLU 3f	41
7.3	Operating/storage conditions	41
7.4	Dimensions	41
7.5	Chemical incompatibility	42
7.6	Material of construction	42
8	Ordering information	43
8.1	Ordering information	43
9	Transport, storage and disposal	45
9.1	Disposal	45
9.2	Storage	45
	Index	46

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:

	Hazard point		Burns
	Explosion		Biologically active substances
	Aggressive chemicals		Oxidizing substances
	Magnetic field		Material damage


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

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

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

PA

Polyamide

PC

Polycarbonate

Pg

Steel conduit thread

PPE

Personal protective equipment

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 *1386000900 BioBLU 3f, Macro, non-Sterile, 1 pc* 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 *1386128000 BioBLU®3f,macro,3Imp,HNQ* 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. It must only be used by trained personnel for this purpose.
 - ▶ 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 for which the equipment was not designed.
 - ▶ 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 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 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! 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 pressure of 6 PSIG (0.4 bar) (relative over pressure).

- ▶ Do not expose the bioreactor to 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 bioreactor. 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 and product damage

- ▶ Use caution when moving the bioreactor when it contains media.



WARNING! Risk to health from damage to personal protective equipment

- ▶ Handle the bioreactor carefully as it has edges which can damage personal protective equipment, reducing safety.



WARNING! Risk of personal injury during installation or removal of motor from bioreactor

- ▶ Avoid holding the motor where your fingers might be pinched between the motor and the motor coupling on the top of the bioreactor. The strong magnets can cause the motor and motor coupling to be drawn together with enough force to injure fingers.



CAUTION! Lack of safety due to incorrect use of materials

- ▶ Do not use this device to process any flammable materials.



CAUTION! Avoid pinching bioreactor tubing or personal protective equipment when coupling the magnetic motor mount

- ▶ Keep tubing and PPE clear from the gap between the bioreactor and the magnetic motor when coupling them together.

**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.
- ▶ Observe the safety regulations for the disposal of biomaterial applicable in your laboratory.

**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.

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

- ▶ Before each use, check whether all connections are mounted straight and 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! Product damage from sharp or pointed objects**

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



NOTICE! 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.
- ▶ Never increase agitation speed above 1200 rpm.
- ▶ Be sure to limit speed increases to increments of no more than 25 rpm at a time.



NOTICE! Increased top-heaviness of the bioreactor due to the exhaust condenser and agitation drive

The top-heaviness of the single-use bioreactor is greatly increased after the exhaust condenser and agitation drive have been assembled. The bioreactor may tip over more easily.

- ▶ Make sure that the BioBLU bioreactor is securely positioned by placing it in a bioreactor stand.

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.



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! Risk of chemical incompatibility

Caution must be exercised when using concentrated acids, organic solvents, or alkaline solutions.

- ▶ 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.

Safety

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

**NOTICE! Low UV resistance**

Plastics can be sensitive to UV light.

- ▶ Protect bioreactors 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 operating 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 operating manual.
- The manufacturer is not responsible for any damages that may result from installation or operation of this aftermarket adaptor kit.

3 BioBLU single-use fermentation bioreactor

The BioBLU fermentation bioreactor is a single-use stirred tank bioreactor designed for the growth of, but not limited to, bacterial, fungal, and yeast cultures.

Each preassembled bioreactor consists of a vessel body, headplate, 3 Rushton-type impellers with shaft, and internal support structure.



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).
-

3.1 Unpacking the bioreactor

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 outer translucent bag at the top. **Do not use a sharp blade of any sort.**
5. Carefully slide the bioreactor out of the protective wrapper.
6. Carefully tear open the inner translucent bag at the top. Do not use a sharp blade of any sort.
7. Carefully slide the bioreactor out of the protective wrapper.
8. See section 5 for autoclaving instructions.
9. Place the bioreactor next to the controller.



Internal configuration may differ depending on options selected.



Always check the bioreactor for damage before use.

3.2 Bioreactor assembly

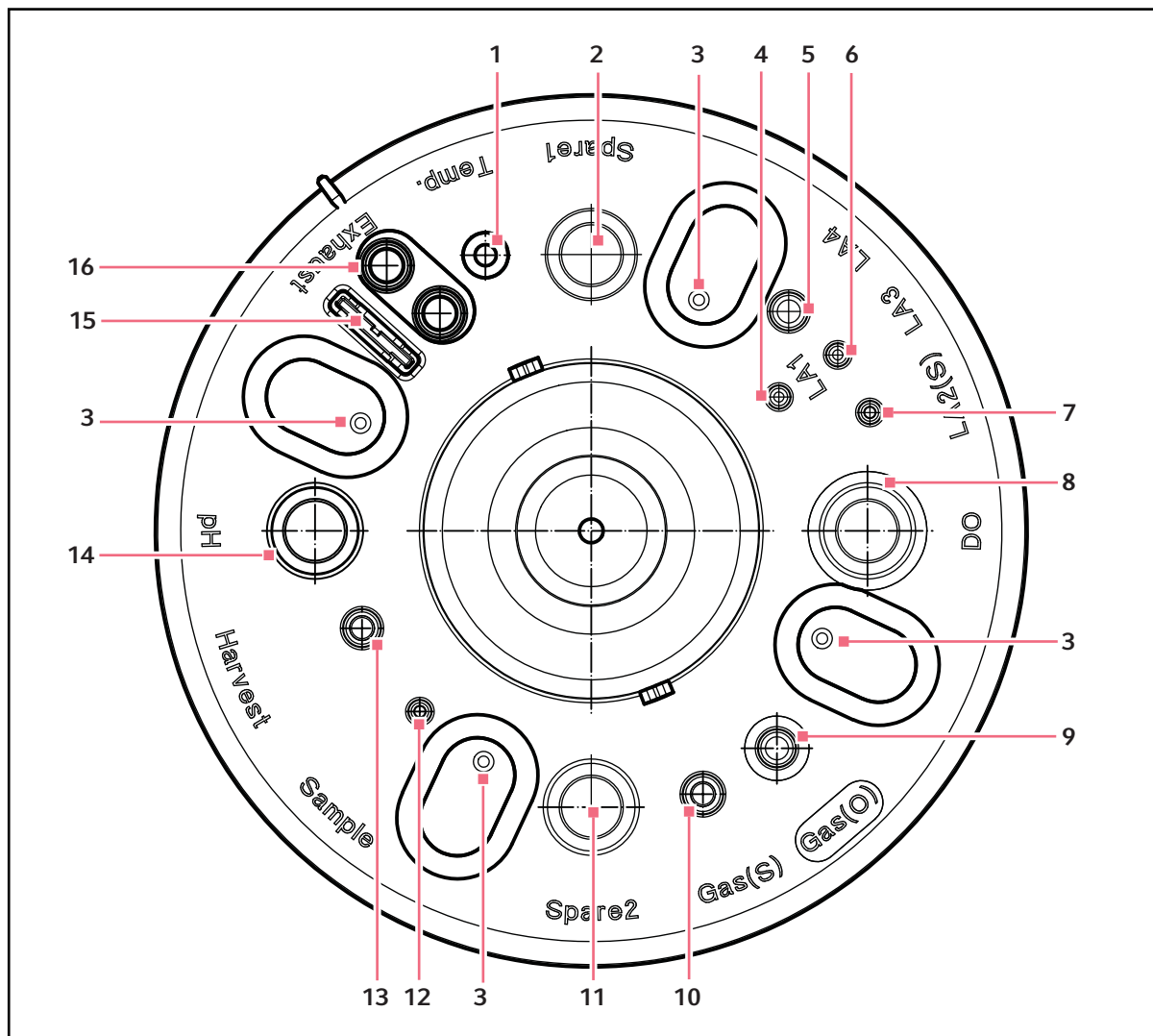


Fig. 3-1: BioBLU 3f headplate

- 1 Temp.**
Well for temperature sensor
- 2 Spare 1**
Pg 13.5 spare port
- 3 Baffle vent hole**
For venting during autoclave process
- 4 LA1**
Liquid addition 1
- 5 LA4**
Liquid addition 4
- 6 LA3**
Liquid addition 3
- 7 LA2(S)**
Liquid addition 2 (submerged addition with diptube)
- 8 DO**
Pg 13.5 port for dissolved oxygen sensor
- 9 Gas(O)**
Gas overlay port (used as vent during autoclave)
- 10 Gas(S)**
Submerged gassing
- 11 Spare 2**
Pg 13.5 spare port
- 12 Sample**
Sample port
- 13 Harvest**
Harvest port
- 14 pH**
Pg 13.5 port for pH sensor
- 15 Mount of exhaust condenser**
- 16 Exhaust**
Exhaust gas

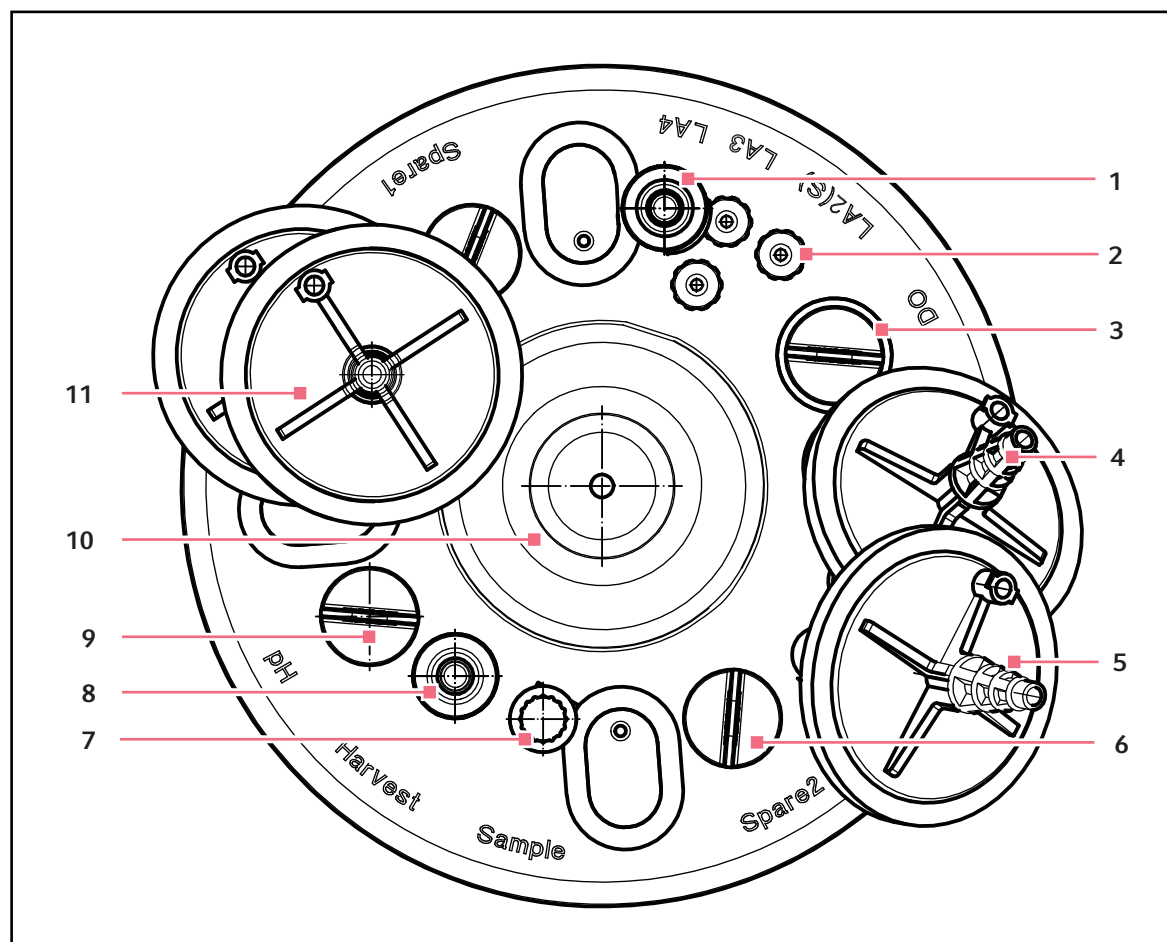


Fig. 3-2: BioBLU 3f with connections

- | | |
|---|--|
| 1 1/4" CPC connection for liquid addition | 7 Sampling port with swabable valve |
| 2 1/8" luer connection for liquid addition (3x) | 8 1/4" CPC connection for harvest line |
| 3 DO sensor port (Pg 13.5 port with plug) | 9 pH sensor port (Pg 13.5 port with plug) |
| 4 Gas inlet filter with 0.2 µm sterile filter | 10 Magnetic coupling for agitation drive |
| 5 Gas inlet filter with 0.2 µm sterile filter | 11 2x exhaust gas filters with 0.2 µm sterile filter |
| 6 Pg 13.5 port with plug (2x) | |

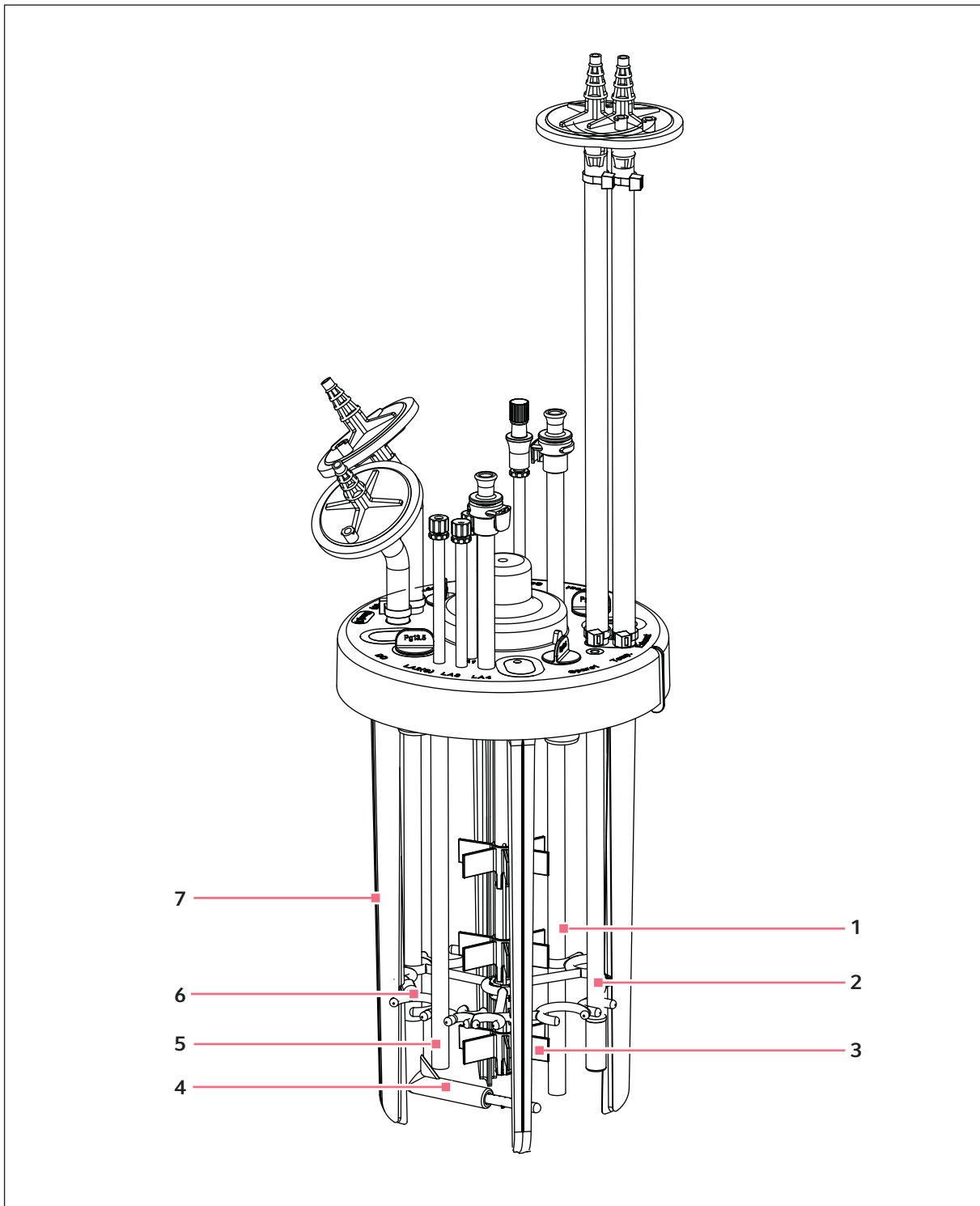


Fig. 3-3: BioBLU 3f internal structure

BioBLU single-use fermentation bioreactor

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

- | | |
|------------------------------|------------------------------|
| 1 Harvest tube | 5 Submerged addition (LA2) |
| 2 Non-invasive RTD tube | 6 Internal support structure |
| 3 Rushton-type impeller (3x) | 7 Baffle (4x) |
| 4 Macro-sparge element | |

3.3 Aeration

Gas is introduced via the macrosparge element.

**DANGER! Risk of explosion**

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

3.4 Exhaust system

The exhaust gases pass into the exhaust tube where the gases are cooled using a water-cooled exhaust condenser.

**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.
 - ▶ During an application, the bioreactor exhaust filter must be vented.
 - ▶ Ensure that filter tubing is carefully positioned without kinks or closures of any kind.
 - ▶ Avoid any points of closure that may cause venting issues or possible over-pressurization.
-

3.5 Sampling system

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

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® 320 adaptor kit

The adaptor kit is designed to facilitate the use of a BioBLU single-use fermentation bioreactor with a BioFlo 320 controller. It contains all of the components necessary for this application, except for pH/DO sensors and cables.



Sensors and cables for pH/DO are not provided as part of this kit. They are sold separately.

The kit provides the following components (BioBLU single-use bioreactor sold separately):

- Motor adaptor kit
 - Motor support and spacer
 - Magnet
 - Height adjustment spacer
- Fermentation cooling kit
 - 2x two-channel water manifolds with CPC connections (uses standard water supply hoses)
 - Water-cooled exhaust condenser with mounting bracket
 - Double walled silicone tubing for water connections
 - Exhaust condenser supply and return lines
- Relief valve for sparge gas
- Relief valve for overlay gas
- Tool kit
- Vessel stand
- Silicone pump tubing
- Polyurethane gas tubing
- 10 pack of needle free syringes
- Cooling finger
- Compression fitting for Pg 13.5 port

4.3 BioFlo® 120 single-use bundle BioBLU 3f

This bundle is designed to facilitate the use of a BioBLU single-use fermentation bioreactor with a BioFlo 120 controller. It contains all of the components necessary for this application, including sensors and cables.

The kit provides the following components (BioBLU single-use bioreactor sold separately):

Adaptor kits

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

- Magnetic drive motor
- Vessel heat blanket and adaptor
- Temperature sensor (RTD) and cable
- pH sensor and cable
- DO sensor and cable
- Fermentation cooling kit
 - 2x two-channel water manifolds with CPC connections (uses standard water supply hoses)
 - Water-cooled exhaust condenser with mounting bracket
 - Double-walled silicone tubing for water connections
 - Exhaust condenser supply and return lines
- Relief valve for sparge gas
- Relief valve for overlay gas
- Vessel stand
- Silicone pump tubing
- Polyurethane gas tubing
- 10 pack of needle free syringes
- Cooling finger
- Compression fitting for Pg 13.5 port

4.4 BioFlo®/CelliGen® 310 adaptor kit

The kit is designed to facilitate the use of a BioBLU single-use bioreactor with a BioFlo/CelliGen 310 controller. The adaptor kit contains all of the components necessary for this application.



Sensors and cables for pH/DO are not provided as part of this kit. They are sold separately.

The kit provides the following components (BioBLU single-use bioreactor sold separately):

- Motor adaptor kit
 - Motor support and spacer
 - Magnet
 - Height adjustment spacer
 - 4 coupling screws, lock/flat washers
- Fermentation cooling kit
 - 2x two-channel water manifolds with CPC connections (uses standard water supply hoses)
 - Water-cooled exhaust condenser with mounting bracket
 - Double walled silicone tubing for water connections
 - Exhaust condenser supply and return lines
- Relief valve for sparge gas
- Relief valve for overlay gas
- Temperature sensor and cable (RTD)
- Tool kit
- Vessel stand
- Silicone pump tubing
- Polyurethane gas tubing
- 10 pack of needle free syringes
- Cooling finger
- Compression fitting for Pg 13.5 port

4.5 BioFlo®/CelliGen® 115



This kit does not include pH/DO sensors or cables. They are sold separately.

The kit provides the following components (BioBLU single-use bioreactor sold separately):

- Motor adaptor kit
 - Motor support and spacer
 - Magnet
 - Height adjustment spacer
 - 4 coupling screws, lock/flat washers (not included with motor adaptor kit for 1/2 L BioFlo 115 fermentation vessels)
- Fermentation cooling kit
 - 2x two-channel water manifolds with CPC connections (uses standard water supply hoses)
 - Water-cooled exhaust condenser with mounting bracket
 - Double walled silicone tubing for water connections
 - Exhaust condenser supply and return lines
- Relief valve for sparge gas
- Relief valve for overlay gas
- Temperature sensor and cable (RTD)
- Tool kit
- Vessel stand
- Silicone pump tubing
- Polyurethane gas tubing
- 10 pack of needle free syringes
- Cooling finger
- Compression fitting for Pg 13.5 port

Adaptor kits

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

5 Installation

5.1 pH and DO sensor



NOTICE! Risk of equipment damage due to improper use

- ▶ Carefully read the operating manual (provided with each sensor) for proper installation information.

1. If installing a sensor that requires a compression fitting, install the sensor into the compression fitting and tighten.
2. If installing a sensor directly into the headplate, gently thread the sensor into the port.

We recommend installing sensors directly into the headplate. Please see Tab. 7-3 on p. 41, for recommended sensor lengths.



The fit may be snug; gently turn the sensor as you press it into the port to avoid potential damage.



The sensor should be calibrated prior to use.

5.2 Autoclaving the bioreactor



WARNING! Risk of explosion

Excess pressure can build behind the exhaust filter.

- ▶ During autoclaving the bioreactor exhaust filter and the Gas(O) port 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.
- ▶ Do not clamp the Gas(O) port/tube during the autoclave process.



WARNING! Risk of personal injury

- ▶ Use protective gloves when handling hot components.



NOTICE! Risk of damage to the equipment

- ▶ Autoclave parameters must not exceed 121.1 °C for more than 20 min.

Installation

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



NOTICE! Risk of damage to the equipment from excess pressure

During autoclaving the bioreactor must be vented at all times.

- ▶ Release the autoclave pressure only when the temperature has dropped below 90 °C.
 - ▶ Use slow exhaust (30 min – 60 min).
 - ▶ If available, the autoclave should be on liquid cycle pressure release.
-

The bioreactor may only be autoclaved once before use. It can then be autoclaved only once again for disposal using an autoclave bag.



Sensor tips should be submerged into media or buffer during sterilization.

- If you will be doing batch fermentation, be sure the bioreactor is filled with media so the media will also be sterilized.
- If you will be using heat-labile media, fill the bioreactor with a balanced salt solution (such as phosphate-balanced saline solution). Sterilize the media separately, and then add it after autoclaving the bioreactor.
- Do not use de-ionized water when wetting sensors.

1. Clamp off the harvest tube, the sample tube, the Gas(S) sparge, and all other submerged line tubing.



Do not clamp C-Flex® tubing, as it may weld to itself in the autoclave.

2. If using pH and DO sensors, install each sensor's shorting cap (provided with sensor) if it is rated for autoclaving.
3. Loosely wrap all filters with aluminum foil (or preferred barrier) to protect them from steam. Ensure that the foil does not prevent the bioreactor from venting.
4. Loosen luer caps for the overlay liquid addition ports.
5. Remove all lines from the pump heads.
6. Insert the entire bioreactor assembly into an autoclave and sterilize.
7. When you remove the bioreactor from the autoclave, tighten all luer connectors and remove the aluminium foil from filters.
8. Position the bioreactor next to the control station.
9. Follow the steps included in the operating manual provided with the control station.

5.3 Exhaust condenser



The bend in the exhaust gas condenser bracket is intentional.



The exhaust condenser supply should be mated with the lower CPC connection on the exhaust condenser. The exhaust condenser return line should be mated with the upper CPC connection on the exhaust condenser.

5.3.1 Installing the exhaust condenser

1. Remove the front cover of the exhaust condenser. Set the cover and screw(s) aside.
2. Insert the bottom bracket of the exhaust condenser in the space provided on the bioreactor headplate (the front cover should be left off at this point).
3. Insert the exhaust tubing into the channels provided in the exhaust condenser.
4. Install the front cover of the exhaust condenser over the installed tubing, ensuring not to pinch the tubing.
5. For water-based exhaust cooling, connect the water lines from the control station.

5.4 Water manifold

5.4.1 Installing the water manifold

1. Install the provided cooling finger into the bioreactor, using a Pg 13.5 compression fitting.
2. Mark one water manifold for use as WATER IN and one as WATER OUT.
3. For WATER IN:
 1. Insert the male CPC connection from the manifold marked WATER IN to the VESSEL WATER SUPPLY location on the control station.
 2. Insert one of the 1/4 inch (6.4 mm) straight to hose barb fittings into the first available output on the water manifold.
 3. Cut a piece of silicone tubing to the desired length and connect barbed end of fitting installed in water manifold to one of the open, barbed ends of the cooling finger.
 4. Insert the 1/4 inch plugs provided into the remaining open ports on the manifold marked WATER IN.
4. For WATER OUT:
 1. Insert the male CPC connection from the manifold marked WATER OUT to the VESSEL WATER RETURN location on the control station.
 2. Insert one of the 1/4 inch straight to hose barb fittings into the first available output on the water manifold.
 3. Cut a piece of silicone tubing to the desired length and connect barbed end of fitting installed in water manifold to the other open barbed end of the cooling finger.
 4. Insert the 1/4 inch plugs provided into remaining open ports on the manifold marked WATER OUT.

5.5 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.

Installation

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

**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 the control station is powered down before the 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.
- ▶ Do not cover the heat blanket (e.g., with aluminum foil) during operation as the bioreactor material might overheat and melt as a result.
- ▶ Only activate the bioreactor heat blanket after the bioreactor is filled to at least the minimum working volume.

**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.

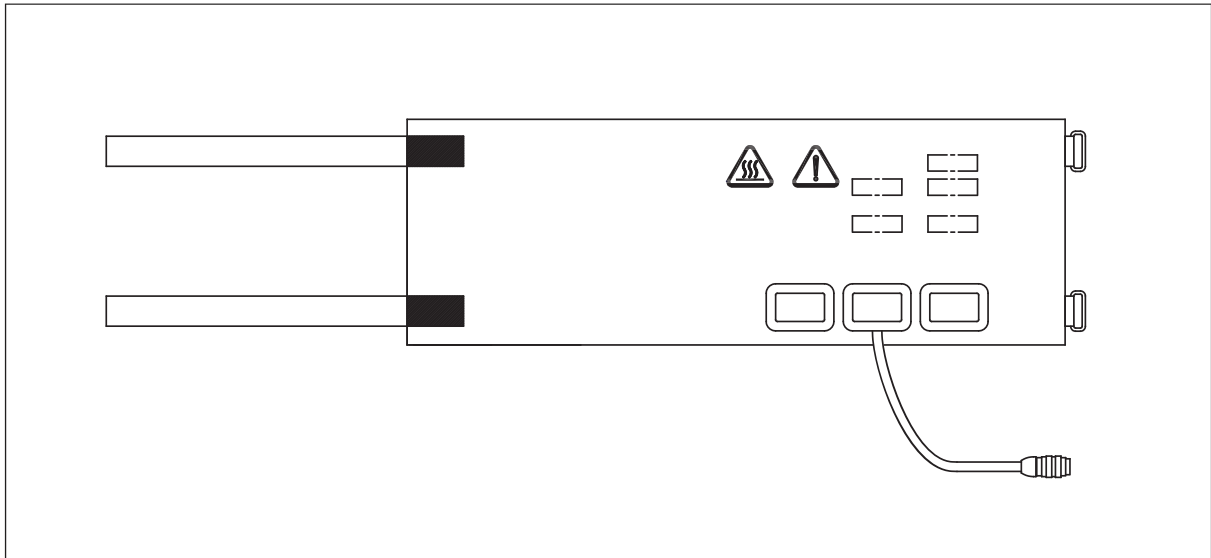


Fig. 5-1: Heat blanket for BioBLU single-use bioreactor

5.6 Temperature sensor



CAUTION! Corrosion damage

The RTD can experience corrosion damage if it is immersed in water.

- ▶ Do not place water in the well for the temperature sensor.

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

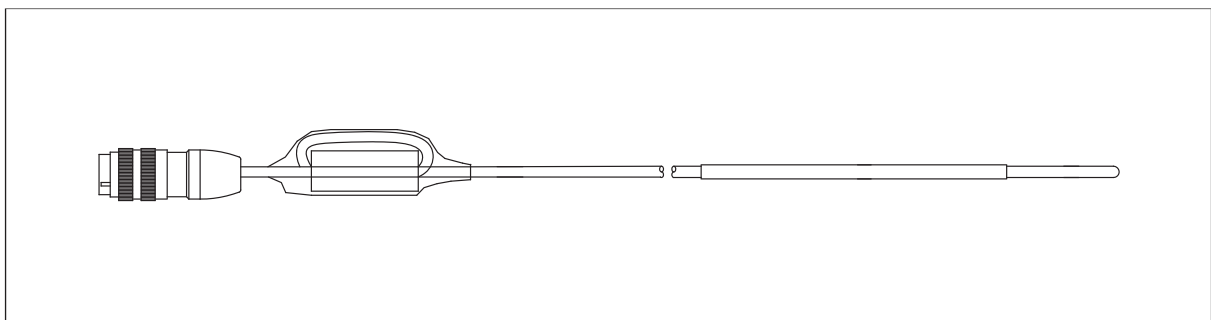


Fig. 5-2: RTD for BioBLU single-use bioreactor

Installation

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

5.7 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.

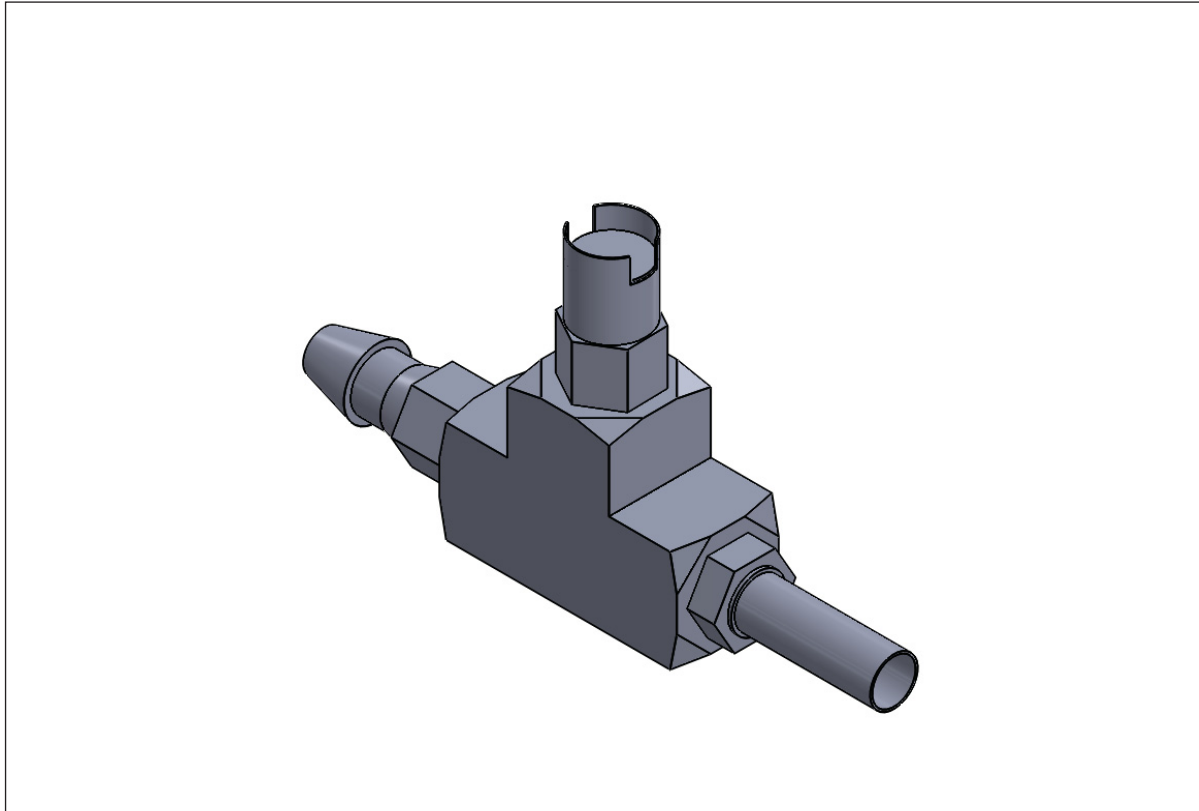


Fig. 5-3: Gas pressure relief valve assembly

Make all connections to your controller and utilities.

5.8 Motor adaptor



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.



NOTICE! 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.
- ▶ Never increase agitation speed above 1200 rpm.
- ▶ Be sure to limit speed increases to increments of no more than 25 rpm at a time.

5.8.1 BioFlo 320

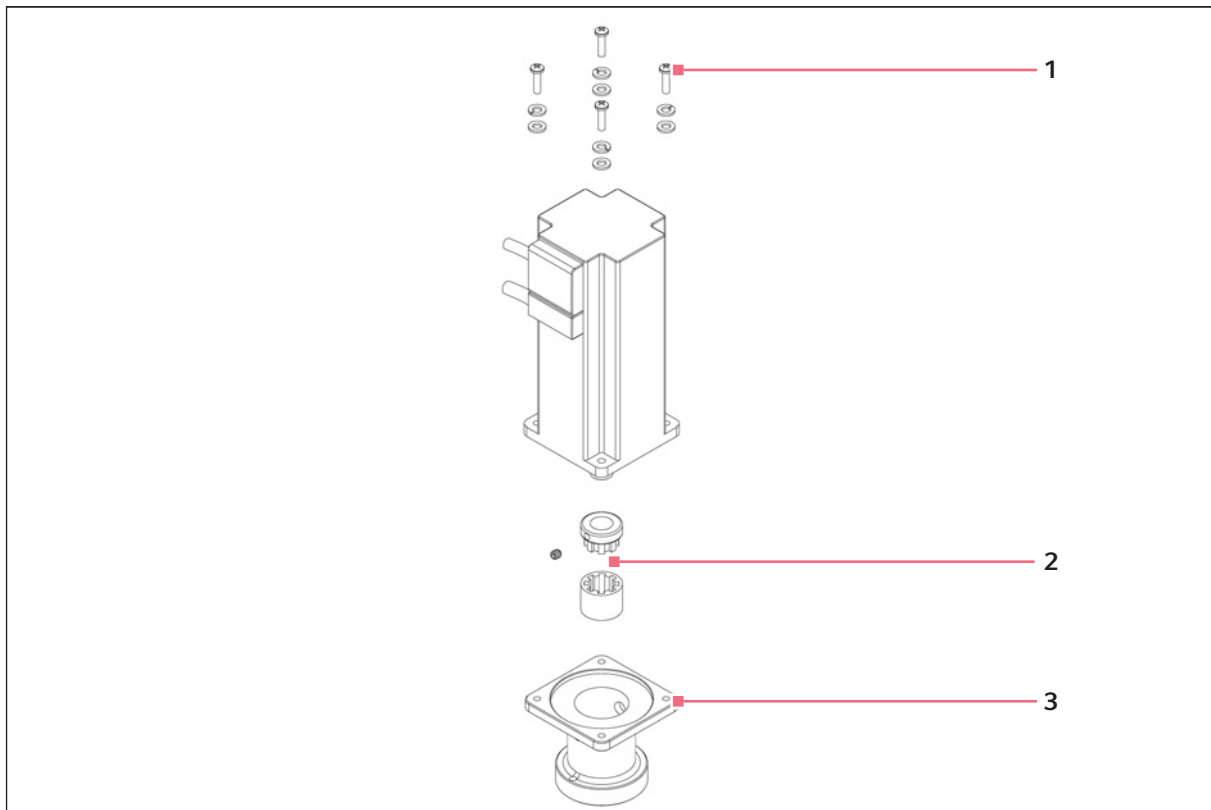


Fig. 5-4: BioFlo 320 motor assembly (exploded view)

1 Coupling screws (4x)
10-32 x 5/8 inch pan head

2 Motor coupling

3 Adaptor

Installation

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

Remove the motor coupling from the motor

1. Remove the 4 direct drive coupling screws from motor, and save for later use.
2. Remove the direct drive coupling and set aside.

Install the motor adaptor

1. Using the 4 direct drive coupling screws that were set aside, install the adaptor onto the bottom of the motor.
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.

5.8.2 BioFlo 310

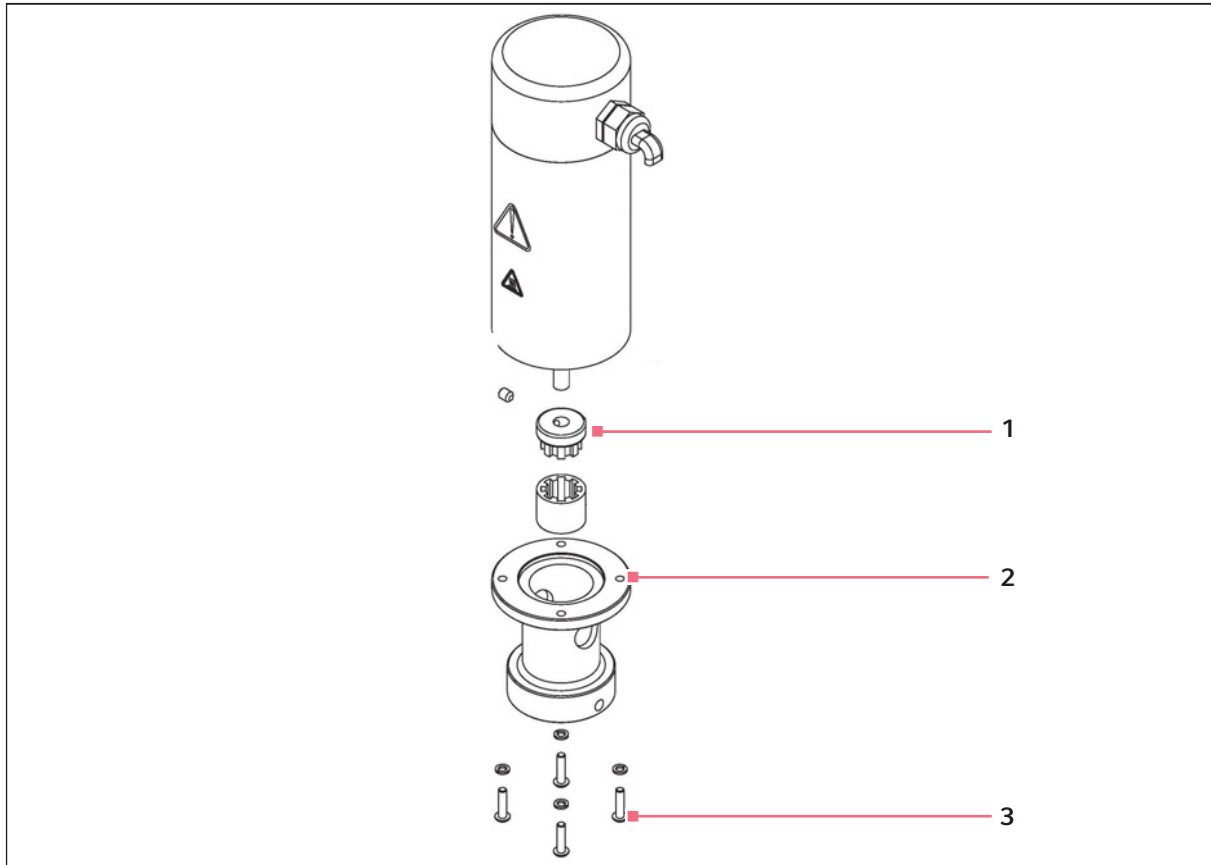


Fig. 5-5: BioFlo 310 motor assembly (exploded view)

1 Motor coupling

3 Coupling screws (4x)

2 Adaptor

Remove the motor coupling from the motor

1. Remove the 4 direct drive coupling screws from BioFlo 310 motor, and save for later use.
2. Remove the direct drive coupling, and set aside.

Install the motor spacer (not shown in figure above)

1. Align the top side of the motor spacer with the BioFlo 310 motor.



The bottom side of the motor spacer has countersunk holes to ensure proper orientation.

2. Using the 4 direct drive coupling screws set aside previously, attach the motor spacer to the BioFlo 310 motor.

Installation

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

Install the motor adaptor

1. Using the motor coupling pan head screws, lock, and flat washers supplied with the adaptor kit, install the adaptor onto the bottom of the motor.
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.

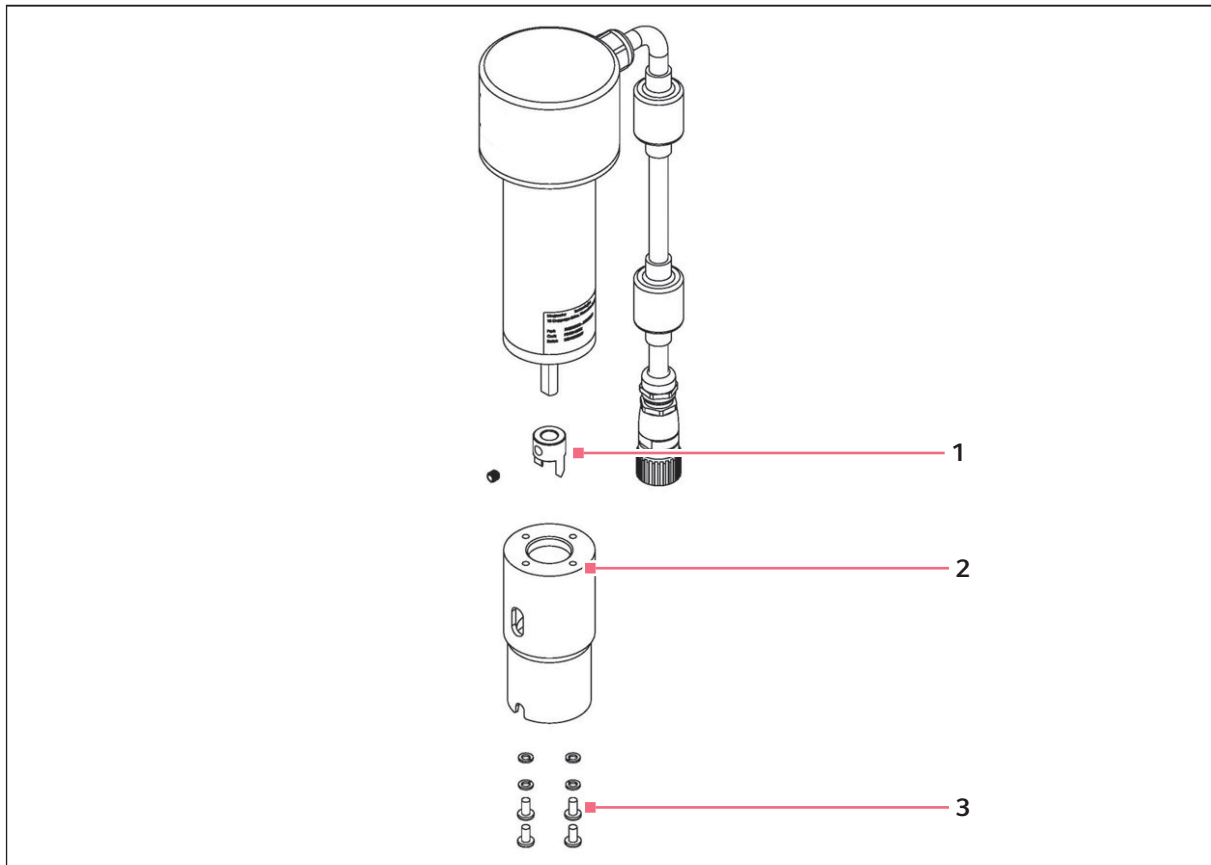
5.8.3 BioFlo 115, 1/2 L vessel

Fig. 5-6: BioFlo 115 1/2 L motor assembly (exploded view)

1 Motor coupling

3 Coupling screws (4x)

2 Adaptor

Remove the motor coupling from the motor

1. Remove the 4 direct drive coupling screws from motor, and save for later use.
2. Remove the direct drive coupling and set aside.

Install the motor adaptor

1. Using the 4 direct drive coupling screws that were set aside, install the adaptor onto the bottom of the motor.
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.

Installation

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

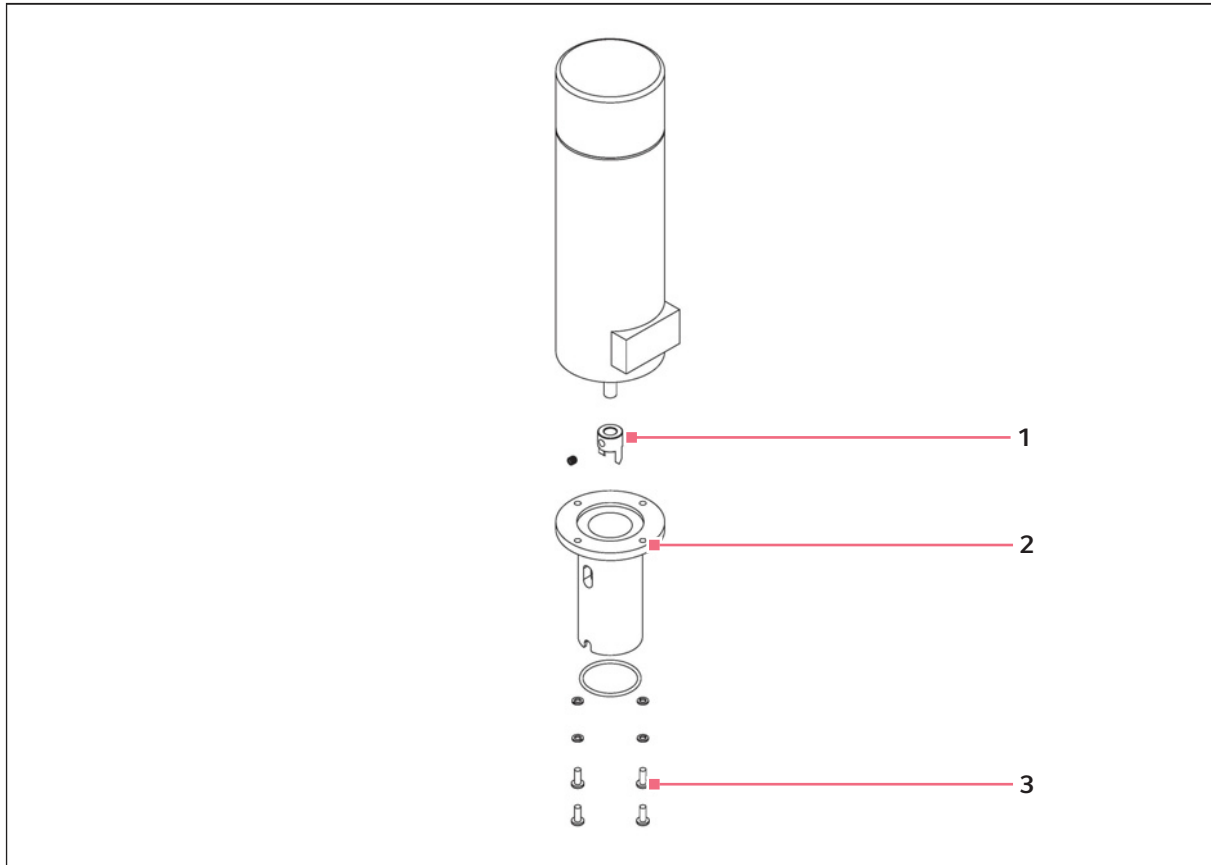
5.8.4 BioFlo 115, 5/10 L vessel

Fig. 5-7: BioFlo 115 5/10 L vessel motor assembly (exploded view)

1 Motor coupling

3 Coupling screws (4x)

2 Adaptor

Remove the standard BioFlo 115 motor coupling from the motor

1. Remove the 4 direct drive coupling screws from the BioFlo 115 motor, and save for later use.
2. Remove the direct drive coupling, and set aside.

Install the motor spacer (not shown in figure above)

1. Align the top side of the motor spacer with the BioFlo 115 motor.



The bottom side of the motor spacer has countersunk holes to ensure proper orientation.

2. Using the 4 direct drive coupling screws set aside previously, attach the motor spacer to the BioFlo 115 motor.

Install the motor adaptor

1. Using the motor coupling pan head screws, lock, and flat washers supplied with the adaptor kit, install the adaptor onto the bottom of the motor.
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.

Installation

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

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 condensation.	Reduce temperature of cooling fluid (minimum 4 °C).
	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® 3f Single-Use Bioreactors and Adaptor Kits
English (EN)

7 Technical data

7.1 External headplate configuration BioBLU 3f

Tab. 7-1: Headplate specifications for the BioBLU 3f

Headplate	External				
	Material	Length	ID	OD	Connector
LA1	Silicone	75 mm (2.95 in)	3.2 mm (1/8 in)	6.4 mm (1/4 in)	Luer-style (female)
LA2	Silicone	75 mm (2.95 in)	3.2 mm (1/8 in)	6.4 mm (1/4 in)	Luer-style (female)
LA3	Silicone	75 mm (2.95 in)	3.2 mm (1/8 in)	6.4 mm (1/4 in)	Luer-style (female)
LA4	Silicone	80 mm (3 1/16 in)	6.4 mm (1/4 in)	9.6 mm (3/8 in)	MPC (female)
Pg 13.5 (1)	PP	N/A	N/A	N/A	Pg 13.5 plug
Pg 13.5 (2)	PP	N/A	N/A	N/A	Pg 13.5 plug
Pg 13.5 (3)	PP	N/A	N/A	N/A	Pg 13.5 plug
Pg 13.5 (4)	PP	N/A	N/A	N/A	Pg 13.5 plug
Harvest	Silicone	80 mm (3 1/16 in)	6.4 mm (1/4 in)	9.6 mm (3/8 in)	MPC (female)
Sample	Silicone	75 mm (2.95 in)	3.2 mm (1/8 in)	6.4 mm (1/4 in)	Needle-free sampling (swabable valve)
Exhaust	Silicone	300 mm (11.8 in)	9.6 mm (3/8 in)	12.7 mm (1/2 in)	0.2 µm / 20 cm ² Hydrophobic vent filter (2x)
Gas (O)	Silicone	50 mm (2 in)	6.4 mm (1/4 in)	9.6 mm (3/8 in)	0.2 µm / 20 cm ² Hydrophobic vent filter
Gas (S)	Silicone	80 mm (3 1/16 in)	6.4 mm (1/4 in)	9.6 mm (3/8 in)	0.2 µm / 20 cm ² Hydrophobic vent filter

Technical data

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

7.2 Functional specifications BioBLU 3f

Tab. 7-2: Functional specifications for the BioBLU 3f

Agitation	max. 1200 rpm	May require up to 1 vvm gas supply depending on process. See "Damage to device" on page 10 for warnings on agitation.
Gas flow	max. 1.5 vvm	
Pressure	max. 6 PSIG (0.4 bar)	
Temperature (continuous operation)	14 – 45 °C	Minimum specification requires 4 °C cooling fluid.
Recommended max. operation time	7 days	

Tab. 7-3: Recommended sensor lengths in mm (inches)

Sensor	BioBLU 3f
pH Analog	200 mm (7.9 in) (max. 225 mm (8.9 in))
pH Digital (ISM)	225 mm (8.9 in)
DO Analog	225 mm (8.9 in)
DO Digital (ISM)	220 mm (8.7 in)

7.3 Operating/storage conditions

Tab. 7-4: Environmental conditions for operation and storage of the BioBLU 3f

Ambient temperature	10 – 30 °C, up to 80 % RH, non-condensing
Altitude limit	2000 m
Light exposure	Protect from strong sun light and UV light
Instructions for storage	<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. • Avoid strong temperature fluctuations. • Keep dry.

7.4 Dimensions

	Unit	BioBLU 3f
Total volume (V_T)	L	5.0
Max. working volume (V_{wmax})	L	3.75
Min. working volume (V_{wmin})	L	1.25
Headspace	%	25

Technical data

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

	Unit	BioBLU 3f
Total liquid height (H_i)	mm	294
Max. liquid height (h_{Vwmax})	mm	220
Vessel inner diameter (D_i)	mm	147
Ratio H_i/D_i	--	2.0
Ratio h_{Vwmin}/D_i	--	0.5
Ratio h_{Vwmax}/D_i	--	1.5
No. of impeller(s)	--	3
Impeller diameter (d)	mm	56
Impeller height (h_i)	mm	14
Ratio d/D_i	--	0.4
Autoclave dimensions		
Height (with exhaust condenser)	mm	660
Outer diameter	mm	200



Do not operate the bioreactor outside the technical specifications.

7.5 Chemical incompatibility

BioBLU single-use bioreactors are made of plastic material. Please note that chemicals can affect the properties (e.g., strength, flexibility, or surface appearance) of plastic components. Before extensive usage, always test the equipment with the chemicals you use and under the specific conditions of your application. BioBLU 3f bioreactor body, head plate, impeller and shaft consist of polycarbonate. Inform yourself about the chemical resistance of polycarbonate towards any chemicals will get in contact with it.



NOTICE! Risk of chemical incompatibility

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

7.6 Material of construction

Main Material	Vessel body	Headplate	Impeller shaft	Impeller
BioBLU 3f	PC	PC	PC	PC

8 Ordering information

8.1 Ordering information

Part No.	Description
M1386-9923	Adaptor kit, BioBLU® 3f to BioFlo® 320
M1379-0326	Bundle, BioBLU 3f to BioFlo® 320
B120SUV001	BioFlo 120 SU Ferm Bundle, BioBLU 3f
1386000900	BioBLU 3f, Macro, non-Sterile, 1 pc
1386128000	BioBLU®3f,macro,3Imp,HNQ

Ordering information

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

9 Transport, storage and disposal

9.1 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.

9.2 Storage

Tab. 9-1: Environmental conditions for operation and storage of the BioBLU 3f

Ambient temperature	10 – 30 °C, up to 80 % RH, non-condensing
Altitude limit	2000 m
Light exposure	Protect from strong sun light and UV light
Instructions for storage	<ul style="list-style-type: none"> • Store in 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 bioreactor. • Avoid strong temperature fluctuations. • Keep dry.

Index

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

Index**A**

Aeration 18
Autoclaving 23

B

BioFlo 120 SU bundle 19
BioFlo 320 adaptor kit 19
BioFlo/CelliGen 115 adaptor kit 21
BioFlo/CelliGen 310 adaptor kit 20

C

Caution, explanation of 5

D

Danger, explanation of 5
Disposal 45
DO sensor 23

E

Exhaust condenser 24, 25
Exhaust system 18

G

Gas pressure relief valves 28

H

Heat blanket 25

M

Manual conventions 6
Motor adaptor
 BioFlo 115, 1/2 vessel 32
 BioFlo 115, 5/10 L vessel 34
 BioFlo 310 31
 BioFlo 320 29

N

Notice, explanation of 5

P

pH sensor 23

S

Sampling system 18
Symbols used 6

T

Technical data 39
Temperature sensor 27
Troubleshooting 37

U

Unpacking 19
 BioBLU 3f 13
Using this manual 5

W

Warning, explanation of 5
Water manifold 25

Evaluate Your Manual

Give us your feedback.
www.eppendorf.com/manualfeedback