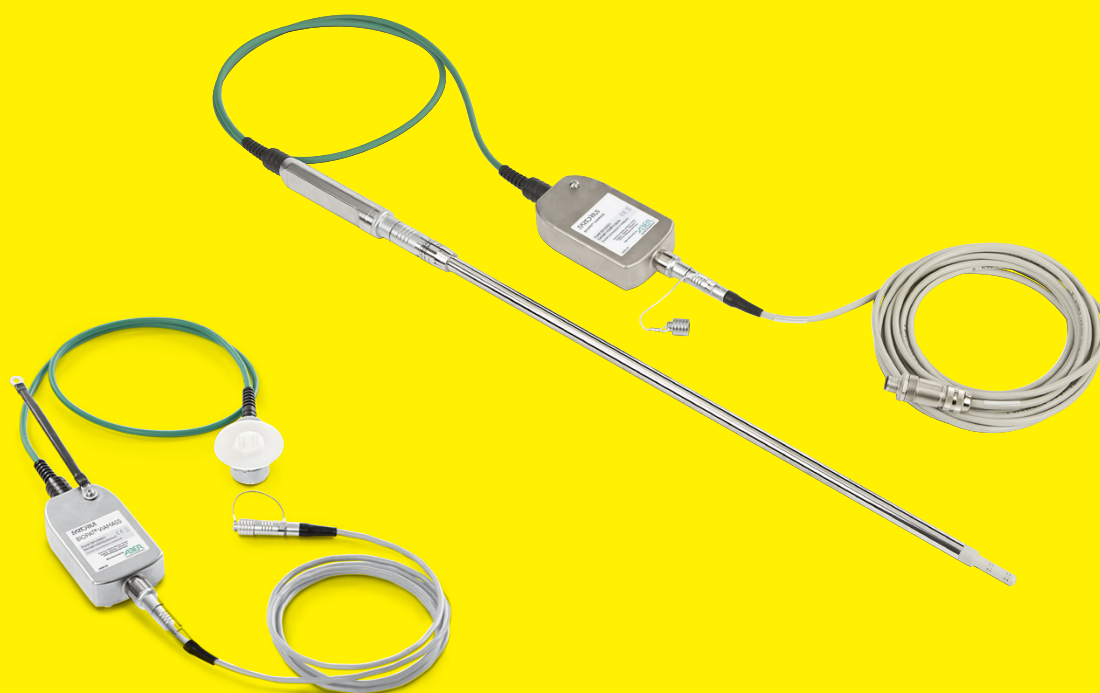


Operating Instructions  
Original Operating Instructions

# BioPAT® Viamass

Measuring System for Determining Cell Mass (Single-use | Multi-use)



85037-544-92



SARTORIUS



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# 1 About these Instructions

## 1.1 Scope

These instructions are part of the product. These instructions apply to the following versions of the product:

Product	Type
BioPAT® Viamass	SU (single-use)
BioPAT® Viamass	MU (multi-use)

## 1.2 Accompanying Documents

- In addition to these instructions, observe the following documentation:
- Operating Instructions of the bioreactor
  - Operating Instructions of the bioreactor software

## 1.3 Target Groups

These instructions are written for the following target groups. The target groups must possess the knowledge listed below.

Target Group	Knowledge and Qualifications
Operating engineer   laboratory manager	The operating engineer laboratory manager makes decisions about the use and configuration of the product. The operating engineer   laboratory manager has been trained in the operation of the product.
Administrator	The administrator is responsible for integrating the product into the production process. The administrator ensures the reliable functioning of the system and device software. The administrator has received training on how to operate the product.
Electrician	A qualified electrician who has the specialized training, knowledge and experience as well as familiarity with applicable standards and regulations to evaluate the work assigned to him or her and identify possible hazards.
Operator	The operator of the product is responsible for compliance with safety requirements and workplace safety regulations. The operator must ensure that anyone working with the product has access to the relevant information and is trained to work with the product.

## 1.4 Symbols Used

### 1.4.1 Warnings in Operating Descriptions

---

#### **CAUTION**

Denotes a danger with risk that moderate or minor injury may result if it is **not** avoided.

---

#### **NOTICE**

Denotes a hazard that may result in property damage if it is **not** avoided.

---

### 1.4.2 Other Symbols

► Required action: Describes actions that must be carried out.

▷ Result: Describes the result of the actions carried out.

[ ] Text inside brackets refers to control and display items.

[ ] Text inside brackets indicates status, warning, and error messages.

#### **Figures on the Operating Display**

The figures on the operating displays may deviate from those in these instructions.

## 2 Safety Instructions

### 2.1 Intended Use

The BioPAT® Viamass is an online measuring system for determining the living biomass in the culture medium of a Biostat STR®, Biostat® RM, Biostat® Univessel® or stainless steel reactor. The measuring system is intended to determine the cell mass of microorganisms and eukaryotic cells and can also be used to automate the bioprocess.

The product is intended exclusively for use in accordance with these instructions. Any further use beyond this is considered **improper**.

If the product is **not** used properly: The protective systems of the product may be impaired. This can lead to unforeseeable personal injury or property damage.

#### Operating Conditions for the Product

Do **not** use the product in potentially explosive environments. The product may only be used indoors.

The product may only be used with the equipment and under the operating conditions described in the Technical Data section of these instructions.

#### 2.1.1 Modifications to the Product

If the product is modified, for example, by attaching extra components: The safety of the product might be impaired, or the product conformity might lose its validity.

If you have any queries regarding modifications to the product, contact Sartorius.

#### 2.1.2 Product Repairs

Product repairs may only be carried out by persons with appropriate specialized knowledge of the product. If the product is **not** repaired by a specialist: The safety of the product might be impaired, or test marks might lose their validity.

We recommend that any repair work, even that not covered by the warranty, is carried out by Sartorius Service or after consulting with Sartorius Service.

### 2.1.3 Foreseeable Misuse

It is only safe to use the product when operated in accordance with its intended use. The following applications, for example, are **not** permitted:

- Modification or other technical changes to the product
- Use of the BioPAT® Viamass probes in corrosive media. Otherwise the reliability and service life of the probes are affected.
- Connection of the BioPAT® Viamass probes to third-party amplifiers.
- Connection of third-party probes to the BioPAT® Viamass electronics.

## 2.2 Personnel Qualification

If persons work with the product who **do not** possess sufficient knowledge about handling the product safely: Those individuals may injure themselves or other people nearby.

- ▶ Ensure that all persons working on the product possess the necessary skills and qualifications (for a description, see Chapter “1.3 Target Groups”, page 5).
- ▶ If a particular qualification is required for the activities described: Have these activities carried out by the required target group.
- ▶ If **no** qualification is required for the actions described: Have these actions carried out by the “Operating engineer | laboratory manager” target group.

## 2.3 Significance of these Instructions

Failure to follow the instructions in this manual might have serious consequences, e.g., danger to individuals.

- ▶ Read the instructions carefully and in full.
- ▶ Ensure that the information contained in these instructions is available to all individuals working with the product.
- ▶ Keep the instructions safe.
- ▶ If these instructions are lost, request a replacement or download the latest version from the Sartorius website ([www.sartorius.com](http://www.sartorius.com)).

## 2.4 Functionality of the Product

A damaged product or worn parts may lead to malfunctions or cause hazards which are difficult to recognize.

- ▶ Only operate the product when it is safe and in perfect working order.
- ▶ Organize the immediate repair of any malfunctions or damage by Sartorius Service personnel.



## 2.5 Electrical Equipment

Damage to the product's electrical equipment, e.g., damaged insulation, may result in unforeseeable hazards.

- ▶ If the electrical equipment of the product is defective, cut off the power supply and contact Sartorius Service.
- ▶ Keep live parts away from moisture. Moisture can cause short circuits.

## 2.6 Accessories, Consumables, and Spare Parts

The use of unsuitable accessories, consumables, and spare parts can affect the functionality and safety of the product and have the following consequences:

- Risk of injury to persons
  - Damage to the product
  - Malfunctioning of the product
  - Failure of the product
- 
- ▶ Only use approved accessories, consumables, and spare parts supplied by Sartorius.
  - ▶ Only use accessories, consumables, and spare parts that are in proper working order.

### 3 Product Description

#### 3.1 Single-use Applications in Flexsafe® RM and Flexsafe® STR

Components required for operation:

- Single-use probe disc, welded in a Flexsafe® RM or Flexsafe® STR bag
- Reusable electronics holder for the Biostat STR® or Biostat® RM
- Reusable electronics for single-use bags
- Signal simulator set for the BioPAT® Viamass SU probes containing two reusable simulators (0 pF/cm, 0 mS/cm and 100 pF/cm, 40 mS/cm)
- Connection cable for connecting the BioPAT® Viamass electronics to the bioreactor
- Grounding cable for the electronics (3 m, 5 m, twin system)

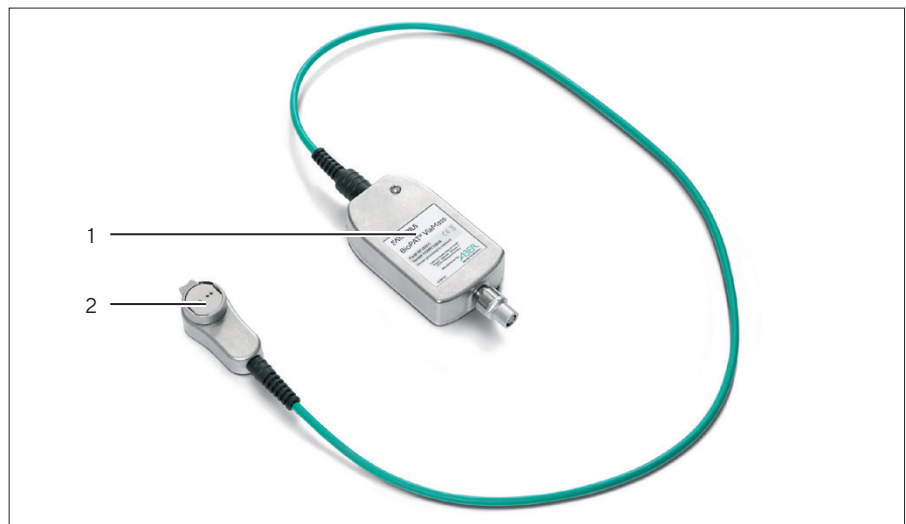


Fig.1: Electronics for single-use bags

Pos.	Name
1	Electronics
2	Pre-amplifier

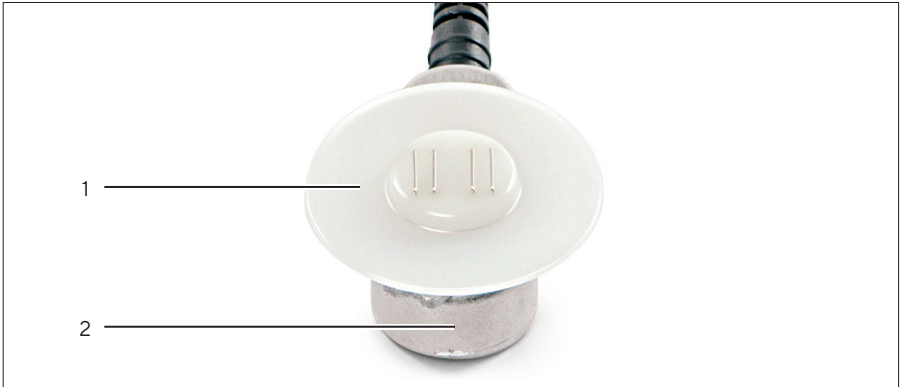


Fig.2: Single-use probe disc, connected to the electronic pre-amplifier

Pos.	Name
1	Probe disc (already integrated in the bag)
2	Pre-amplifier

### 3.2 Multi-use Applications with Biostat® Univessel® and Stainless Steel Reactors

Components required for operation:

- BioPAT® Viamass multi-use probe
- BioPAT® Viamass electronics for multi-use probes
- Signal simulator set for the BioPAT® Viamass multi-use probes containing three reusable simulators (0 pF/cm, 0 mS/cm and 100 pF/cm, 40 mS/cm and clean pulse)
- Connection cable for connecting the BioPAT® Viamass electronics to the bioreactor
- Grounding cable for the electronics



Fig.3: Electronics for multi-use culture vessels

Pos.	Name
1	Electronics
2	Pre-amplifier

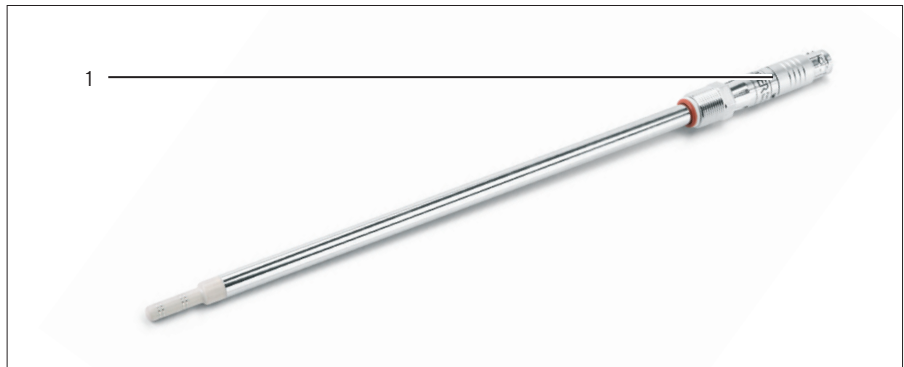


Fig. 4: 12 mm ring probe (multi-use benchtop)

Pos.	Name
1	Plug connector



Fig. 5: 25 mm flush probe (multi-use stainless steel tank)

Pos.	Name
1	Plug connector

## 4 Installation

### 4.1 Scope of Delivery

Item	Quantity
BioPAT® Viamass Electronics	
Multi-use	As ordered
Single-use	As ordered
Electronics holder	As ordered
BioPAT® Viamass probe, multi-use	
Ring probe	As ordered
Flush probe	As ordered
Signal simulator set	As ordered
Connection cable	As ordered
Grounding cable	As ordered
Operating Instructions	1

### 4.2 Unpacking

#### Procedure

- Unpack the product.
- We recommend you keep the original packaging for a safe and proper return of the product, e.g. for repairs.

### 4.3 Acclimatization

When a cold product is brought into a warm environment: The temperature difference can lead to condensation from humidity in the product (moisture formation). Moisture in the product may lead to malfunctions.

#### Procedure

- Allow the product to acclimatize for approx. 2 hours at the installation site. The product must be disconnected from the power supply during that time.

## 4.4 Instructions for Grounding the BioPAT® Viamass

Electromagnetic interference from neighboring electrical equipment may manifest itself as noisy readings on the BioPAT® Viamass. The capacitance reading is especially affected. To minimize measurement errors, the electronics housing must be securely connected to the appropriate system ground using the supplied grounding cable (see Chapter 4.6, page 16).

The BioPAT® Viamass electronics and probes should be positioned as far as possible from machinery that may cause electrical interference, such as large motors.

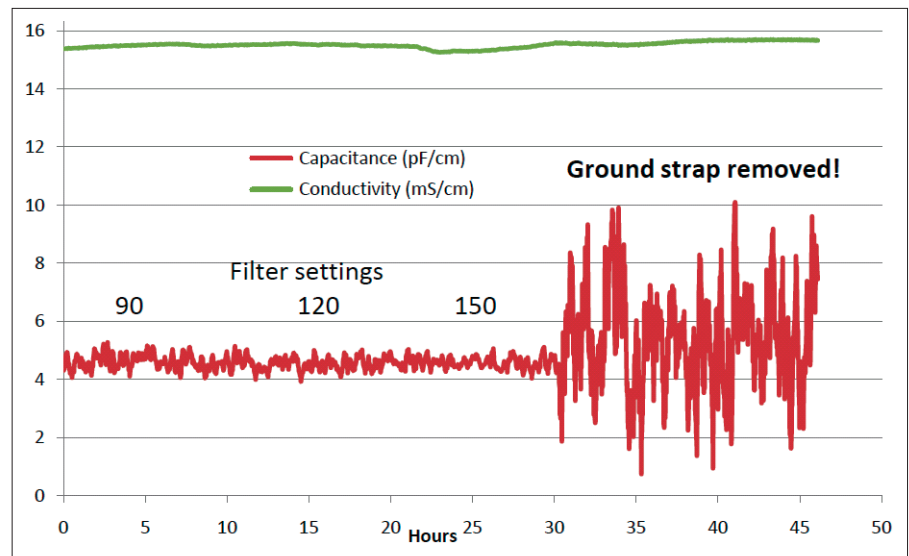
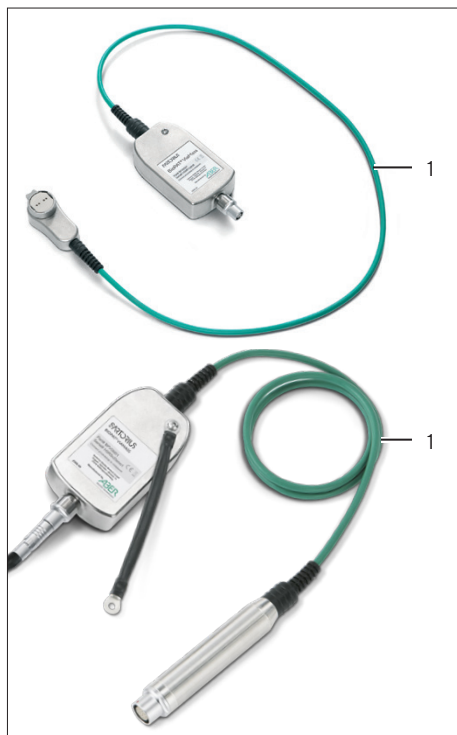


Fig. 6: Comparison between a well-grounded measuring system and a poorly grounded measuring system

As shown in the above graph, if the grounding cable is removed, the capacitance reading experiences fluctuations up to  $\pm 6$  pF/cm in environments with electrical interference, despite the high filter capacity of the system. The amount of fluctuations depends on the environment.

## 4.5 Instructions for Working with BioPAT® Viamass Cables



### NOTICE

Caution is recommended when handling BioPAT® Viamass units. The 1 m-long connection cable (1) between the two housings must **not** be kinked, rolled tightly, or twisted multiple times, because this could affect the function of the cable or cause cable failure. Observe the minimum bending radius (see Chapter 11.7, page 48). If the system is used in a vibrator, we recommend placing both housings on the platform in such a way that any repeated motions affect a replaceable connection cable.

- Adhere to the usual procedures when laying the connection cable.
- Observe the minimum bending radii, especially near the BioPAT® Viamass housing and connector (see Chapter 11.7, page 48).
- **Do not** detach the connector.
- Protect the connector cables from mechanical damage. Protect the connectors from excessive contact with water and corrosive substances.
- Avoid laying the connector cable parallel or too near to cables for variable speed motor controls or converters. While the BioPAT® Viamass is immune to permissible levels of electrical interference, some inverter systems exceed these levels of emission in some cases.

If the following problems are observed in normal operation when the probe is completely immersed in the measurement medium and the operation temperature is normal, immediately disconnect the BioPAT® Viamass electronics from the probe and check whether

- the conductivity deviates significantly from the expected value
- there are signs of galvanic corrosion on or near the probe body.

Due to the electronic properties of the dielectric measurement, the error may be caused by low direct current on an electrode. This phenomenon manifests itself as bubbles forming on the electrode when a clean pulse is not in progress. In the unlikely event that you see bubbles under these conditions, immediately disconnect the BioPAT® Viamass from your system to prevent damage. Contact Sartorius Service.

The reusable BioPAT® Viamass has an integrated clean pulse error detection function that automatically deactivates the corresponding internal circuits and generates error messages if triggered by a cable break or other faults. In the event that this type of error message is encountered, completely disconnect the electronics from your system and contact Sartorius Service.

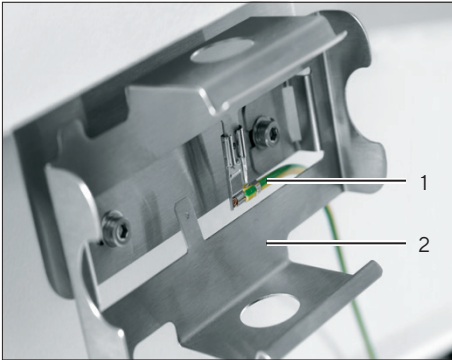
We recommend checking the integrity of the cables with the signal simulator for capacitance and conductivity measurements on a regular basis. If there are deviations from the normal values, completely disconnect the BioPAT® Viamass from your system and contact Sartorius Service.

## 4.6 Installing the Electronics with Electronics Holder on the Bioreactor

### 4.6.1 Installing the Electronics on the Bioreactor® RM

#### Procedure

- Connect the grounding cable (1) to the electronics holder (2).



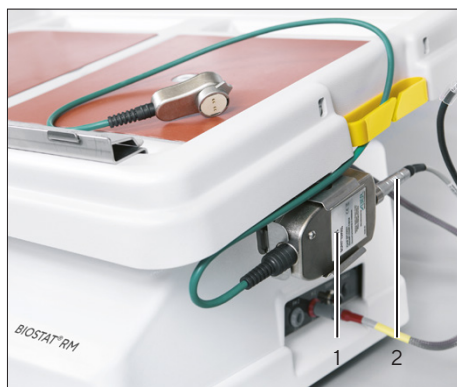
- Connect the grounding cable (1) to the equipotential bonding point [PA] on the control unit or to the potential equalization connection at the installation site.



- Connect the connection cable to the electronics. The two red points on the connectors must be facing one another.



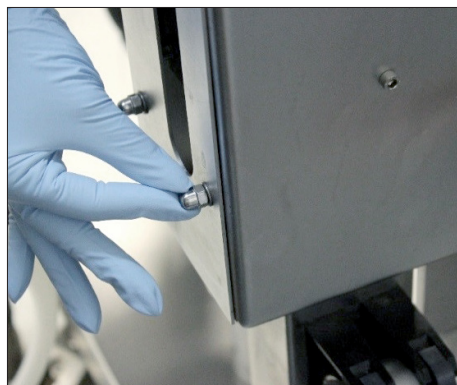




- Attach the electronics (1) to the electronics holder.

#### 4.6.2 Installing the Electronics on the Biostat STR® Gen 1 (50L - 1000L)

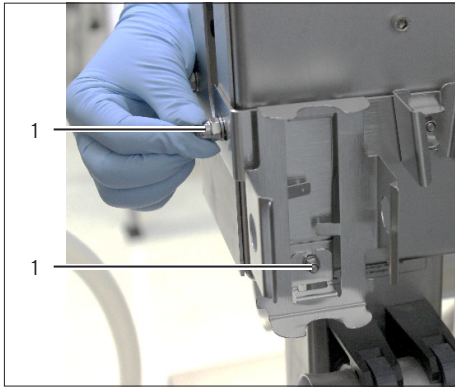
##### Procedure



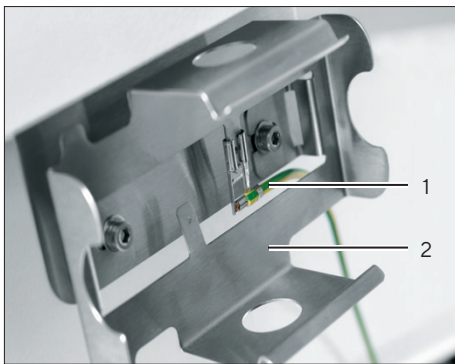
- Remove the lower nut along with the washer from the rear side of the motor arm.



- Place the electronics holder onto the screw thread.



- Fix the electronics holder in place using the washer and nut (1).



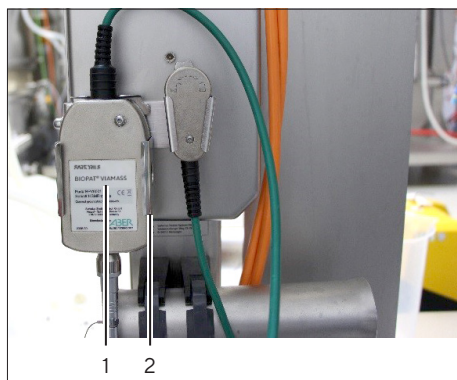
- Connect the grounding cable (1) to the electronics holder (2).



- Connect the grounding cable (1) to the equipotential bonding point [PA] on the control unit or to the potential equalization connection at the installation site.



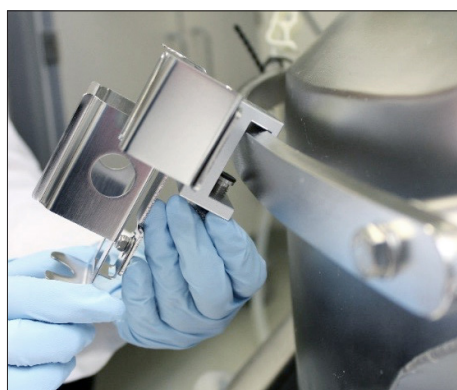
- Connect the connection cable to the electronics. The two red points on the connectors must be facing one another.



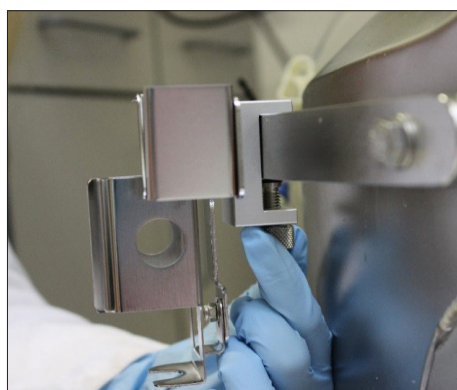
- Attach the electronics (1) to the electronics holder (2).

#### 4.6.3 Installing the Electronics on the Biostat STR® Gen 1 (2000L) and Gen 2 | Gen 3 (50L - 2000L)

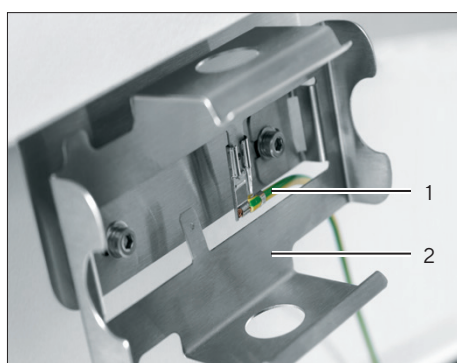
##### Procedure



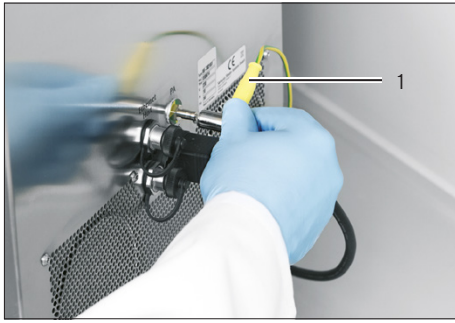
- Attach the electronics holder to the lower system rail of the probe window.



- Fix the electronics holder in place using a fixing screw.



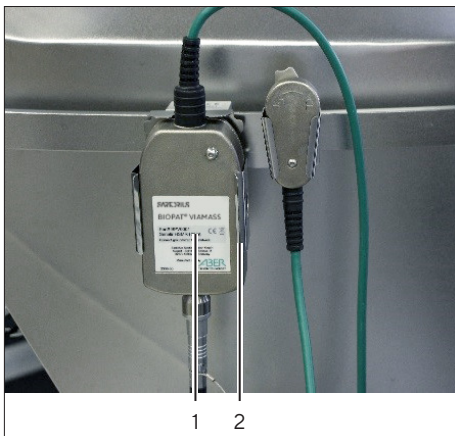
- Connect the grounding cable (1) to the electronics holder (2).



- Connect the grounding cable (1) to the equipotential bonding point [PA] on the control unit or to the potential equalization connection at the installation site.



- Connect the connection cable to the electronics. The two red points on the connectors must be facing one another.



- Attach the electronics (1) to the electronics holder (2).

## 4.7 Connecting the Electronics to the Control Unit

### Procedure

- Connect the electronics (1) to the control unit (see Operating Instructions of the bioreactor).

## 5 Getting Started

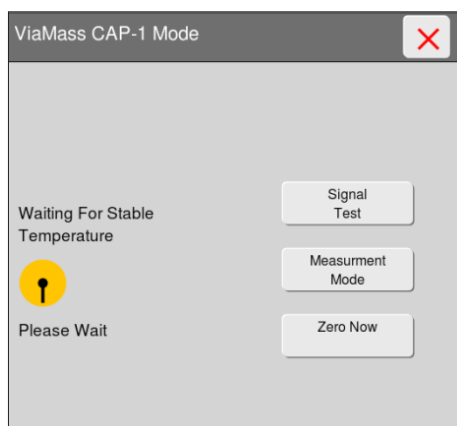
### 5.1 Checking the Warm-up Time

Once the electronics are connected to the control unit and the power is switched on, the system requires a warm-up time of approx. 30 minutes.

#### DCU

##### Procedure

- ▶ Open the “ViaMass CAP-#” calibration menu on the bioreactor operating display.
- ▷ The electronics are in the warm-up phase for as long as the message “Waiting for stable temperature” is displayed. The rotating clock indicates that the warm-up phase is in progress.



#### Biobrain

##### Procedure

- ▶ Open the process value dialog [BIOMASS-x].
- ▶ Press the [VIAMASS-1] key in the “Connected element” section in the process value dialog.
- ▷ This will open the [VIAMASS-#] dialog.
- ▷ The current probe temperature will be displayed in the “Probe” section under “Probe temperature”.

Immediately after connection, the display starts at 0.1 °C. The electronics are in the warm-up phase.

- ▶ Wait until the display shows between 24 °C and 30 °C.

BIOMASS-1	VIAMASS-1	
	General	Parameters
BIOMASS-1	Probe	
VIAMASS-1	Futura serial number	HARSc15612
	Probe serial number	SSZ16373
	Measuring frequency	1000 kHz
	High frequency	0 kHz
	Polarisation correction	No Pol C
	Filter level	7
	Probe temperature	0.1 °C
	Probe total hours use	86 h



## 5.2 Displaying Product System Information

The system parameters of the product can be checked before the system check.

### DCU

#### Procedure

- ▶ Press the “Info” key in the “ViaMass CAP-#” submenu.
- ▷ The “Info CAP-#” submenu is displayed.

Field	Description
Zero	-0.2pF/cm
Temp.	57.2°C
Probe	HSMR
SN	HSMR13011
FW	233007122zeta5
Bootl.	234207p10

Field	Description
Zero	Last configured   current valid zero value
Temp.	System temperature of the electronics
Probe	Name of the probe
SN	Serial number of the electronics
FW	Firmware number
Bootl.	Bootloader number

### Biobrain

#### Procedure

- ▶ Open the process value dialog [BIOMASS-x].
- ▶ Press the [VIAMASS-1] key in the “Connected element” section in the process value dialog.
- ▷ This will open the [VIAMASS-#] dialog.
- ▷ All the important system parameters are displayed in the “Probe” section.

VIAMASS-1		
General	Parameters	Module details
<b>Probe</b>		
Futura serial number	HARSc15612	
Probe serial number	SSZ16373	
Measuring frequency	1000	kHz
High frequency	0	kHz
Polarisation correction	No Pol C	
Filter level	7	
Probe temperature	0.1 °C	
Probe total hours use	86 h	
CIP & autoclaves total	196	
CIP & autoclaves threshold	0	
Increment autoclave count	<input type="text"/>	
Leakage detections	0	

## 6 Process Preparation

### 6.1 Carrying Out Electronics System Check with Signal Simulators

Before connecting the probes to the electronics, check that the entire measurement range of the system is working correctly.

Single-use signal simulator set



Single-use signal simulator set



Fig.7: Signal simulator sets

Signal simulator sets consist of one high-value signal simulator and one zero | low-value simulator.

Multi-use signal simulator sets also contain a clean-pulse simulator for testing the clean pulse function.

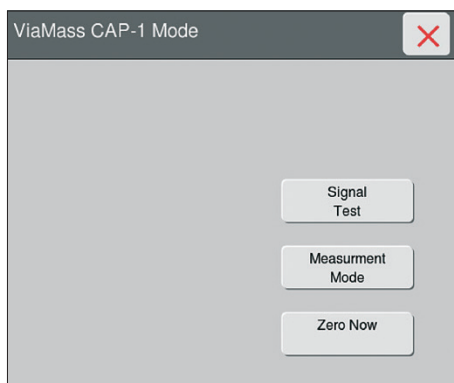
#### Carry out system check (DCU)

##### Requirements

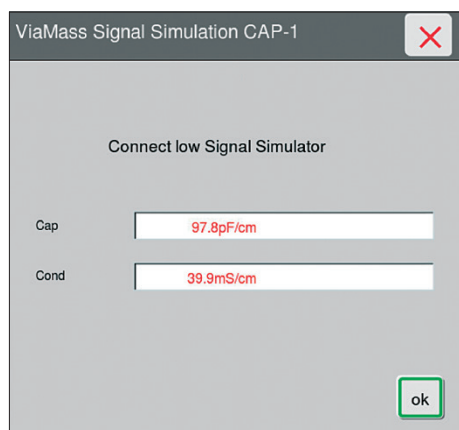
The electronics are connected to the bioreactor.

##### Procedure

- ▶ Press the [Signal Test] key in the “ViaMass CAP-# Mode” submenu.



- ▷ The “ViaMass Signal Simulation CAP-#” submenu for testing the BioPAT® Viamass electronics opens.



- ▶ Connect the signal simulator for the zero value (zero or low simulator) to the electronics (SU or MU).
- ▷ As soon as the low simulator is detected by the electronics, the capacitance reading [Cap] and the conductivity reading [Cond] will appear.

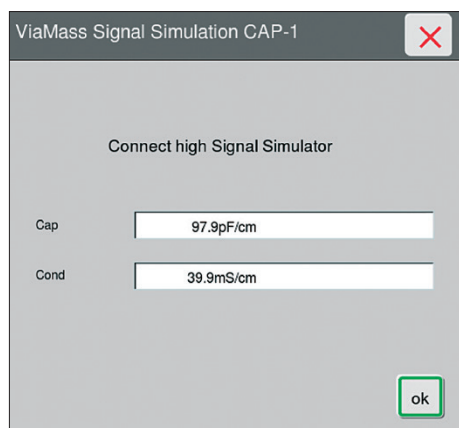
Low simulator		Acceptable range	
Capacity	Conductivity	Capacitance [pF/cm]	Conductivity [mS/cm]
0	0	$0 \pm 1$	$0 \pm 0.5$

If the readings are in the acceptable range, as expected:

- ▷ The values will be displayed in black.
- ▶ Confirm the check by pressing the [ok] key.

If the readings are not in the acceptable range:

- ▷ The values will be displayed in red.
- ▶ Check whether you have connected the right low simulator that matches your electronics unit.
- ▶ If the value is not in the acceptable range, despite the correct simulator being connected: Please contact Sartorius Service.



- ▶ Connect the simulator for the high measurement value (high simulator) to the electronics (SU or MU).
- ▷ As soon as the high simulator is detected by the electronics, the capacitance reading [Cap] and the conductivity reading [Cond] will appear.

High simulator		Acceptable range	
Capacity	Conductivity	Capacitance [pF/cm]	Conductivity [mS/cm]
100	40	$100 \pm 3$	$40 \pm 1$

If the readings are in the acceptable range, as expected:

- ▷ The values will be displayed in black.
- ▶ Confirm the check by pressing the [ok] key.

If the readings are not in the acceptable range:

- ▷ The values will be displayed in red.
- ▶ Check whether you have connected the right high simulator that matches your electronics unit.
- ▶ If the value is not in the acceptable range, despite the correct simulator being connected: Please contact Sartorius Service.

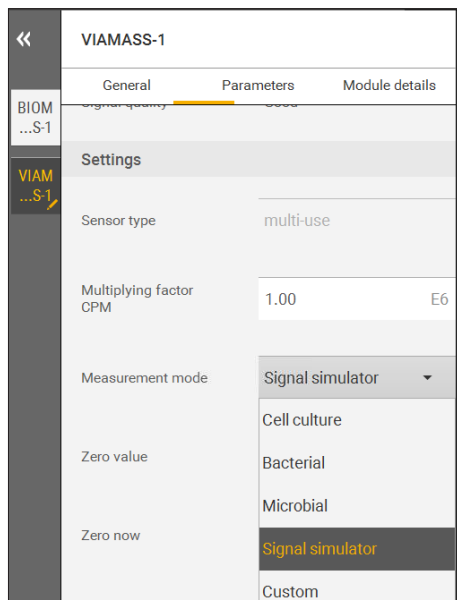


## Carry out system check (Biobrain)

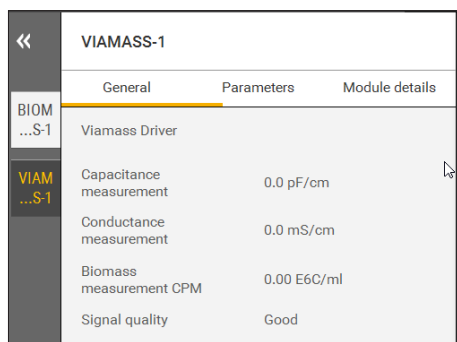
### Requirements

The electronics are connected to the bioreactor.

### Procedure



- ▶ Open the process value dialog [BIOMASS-x].
- ▶ Press the [VIAMASS-1] key in the “Connected element” section in the process value dialog.
- ▷ This will open the [VIAMASS-#] dialog.
- ▶ In the “Settings” section, select the “Signal Simulator” measurement mode from the [Measurement mode] selection list and activate it by pressing the [SAVE] key.



- ▶ Connect the signal simulator for the zero value (zero or low simulator) to the electronics (SU or MU).
- ▷ As soon as the low simulator is detected by the electronics, the capacitance and conductivity readings will appear.

Low simulator		Acceptable range	
Capacity	Conductivity	Capacitance [pF/cm]	Conductivity [mS/cm]
0	0	0 ±1	0 ±0.5

If the readings are not in the acceptable range:

- ▶ Check whether you have connected the right low simulator that matches your electronics unit.
- ▶ If the value is not in the acceptable range, despite the correct simulator being connected: Please contact Sartorius Service.

VIAMASS-1	
General	Parameters
BIOM ...S-1	Viamass Driver
VIAM ...S-1	Capacitance measurement
	100.4 pF/cm
	Conductance measurement
	40.0 mS/cm
	Biomass measurement CPM
	99.98 E6C/ml
	Signal quality
	Good

- ▶ Connect the simulator for the high measurement value (high simulator) to the electronics (SU or MU).
- ▶ As soon as the low simulator is detected by the electronics, the capacitance and conductivity readings will appear.

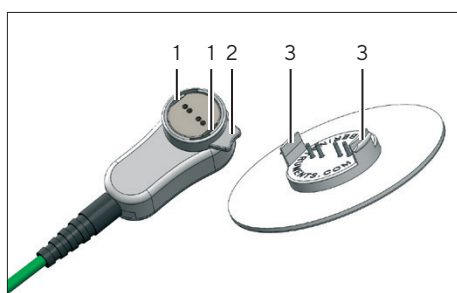
High simulator		Acceptable range	
Capacity	Conductivity	Capacitance [pF/cm]	Conductivity [mS/cm]
100	40	100 ±3	40 ±1

If the readings are not in the acceptable range:

- ▶ Check whether you have connected the right high simulator that matches your electronics unit.
- ▶ If the value is not in the acceptable range, despite the correct simulator being connected: Please contact Sartorius Service.

## 6.2 Connecting the Pre-amplifier to the Probe on the Bag

### 6.2.1 Connecting the Pre-amplifier to the RM Bag



Each probe disc has four platinum electrodes and two plastic tabs (3) on the back for attaching it to the pre-amplifier. There is a locking ring (2) with clamping levers (1) on the pre-amplifier housing. The plastic tabs on the probe disc are locked into the clamping levers in order to secure the probe disc safely and reliably to the BioPAT® Viamass plug connector.

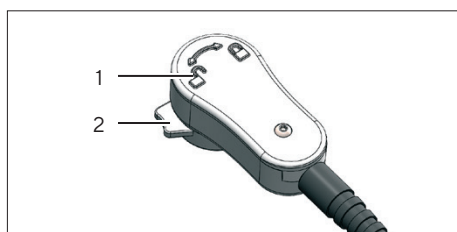
When filling the bag or when the bag is full, the pre-amplifier must **not** be disconnected from the probe disc. Re-opening and re-connecting the pre-amplifier to the probe disc is **not** permitted. It is therefore essential to ensure that the pre-amplifier is correctly positioned on the probe disc before closing the locking ring.

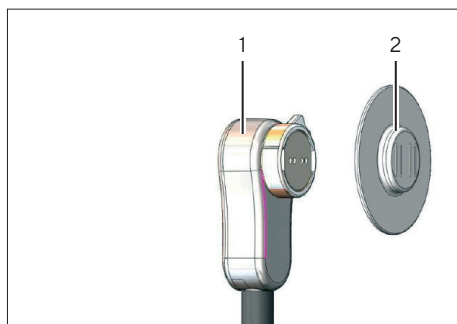
#### Requirements

The bag is empty.

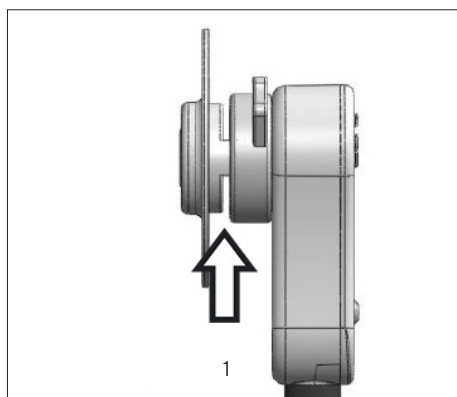
#### Procedure

- ▶ Remove the plug protector from the probe disc.
- ▶ Twist the locking ring (2) on the pre-amplifier into the unlocked position (1).

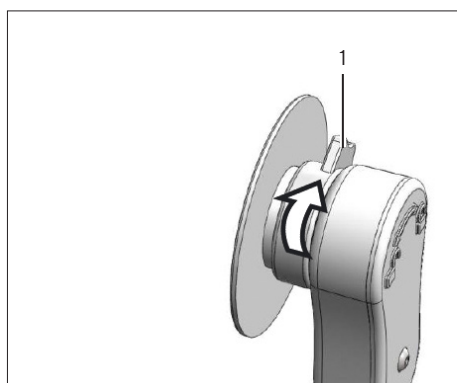




- Align the pre-amplifier (1) with the probe disc (2). The tabs on the probe must line up with the slots in the locking ring.



- Place the pre-amplifier onto the probe disc at a right angle. Apply a little pressure so that you can see a gap of approx. 3 mm between the pre-amplifier and the probe disc (1).

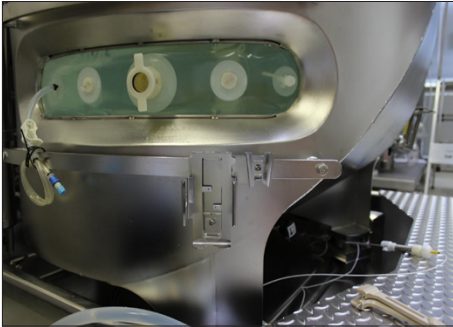


- If the position of the pre-amplifier is aligned and both parts are positioned on top of one another at a right angle: Twist the locking ring completely into the locked position (1). This will fix the probe securely to the pre-amplifier.

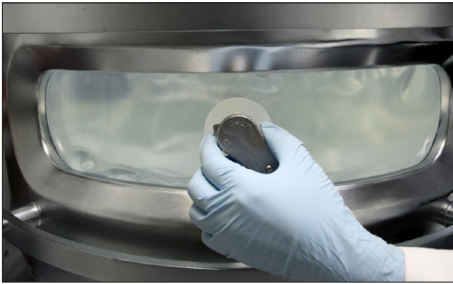
### 6.2.2 Installing the Pre-amplifier on the 50L – 200L STR Bag

When filling the bag or when the bag is full, the pre-amplifier must **not** be disconnected from the probe disc. Re-opening and re-connecting the pre-amplifier to the probe disc is **not** permitted. It is therefore essential to ensure that the pre-amplifier is correctly positioned on the probe disc before closing the locking ring.

#### Procedure



- Fill the STR bag with cell medium until it reaches the minimum volume (25 % of the max. working volume).

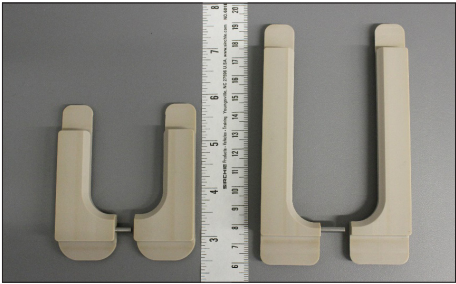


- Attach the pre-amplifier to the probe disc (see Chapter "6.2.1 Connecting the Pre-amplifier to the RM Bag", page 26).

- Fill the bag to the desired working volume.
- Ensure that the pre-amplifier stays attached until the end of the cultivation.

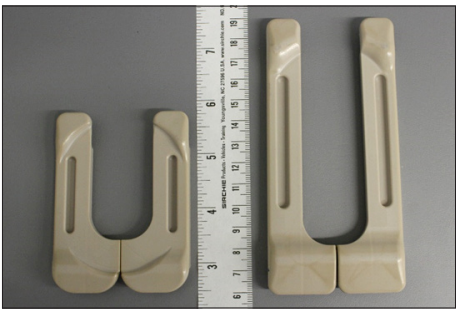
6.2.3 Installing the Pre-amplifier and Viamass Support on the 500L – 2000L STR Bag

An STR Viamass support is required to use the Viamass on the 500L | 1000L | 2000L STR bag. The STR Viamass support is available in two sizes:



Front view of the STR Viamass support

	for Biostat®	Height of probe window [mm]
Left-hand side:	Gen 1, 500L   1000L	60
Right-hand side:	Gen 2   Gen 3, 500L   1000L   2000L	100

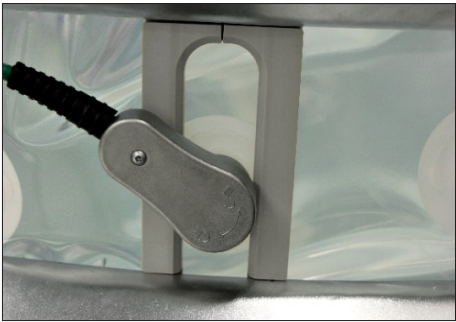


Rear view of the STR Viamass support

	for Biostat®	Height of probe window [mm]
Left-hand side:	Gen 1, 500L   1000L	60
Right-hand side:	Gen 2   Gen 3, 500L   1000L   2000L	100

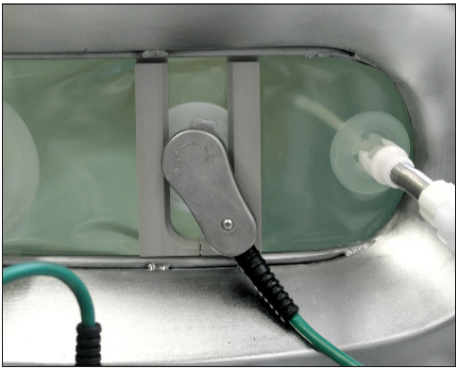
Depending on how the bag is installed, the probe disc may not be positioned, height-wise, in the center of the probe window.

If the probe disc is positioned too far down:  
The STR Viamass support can be installed with the connecting element and connection cable pointing upwards.



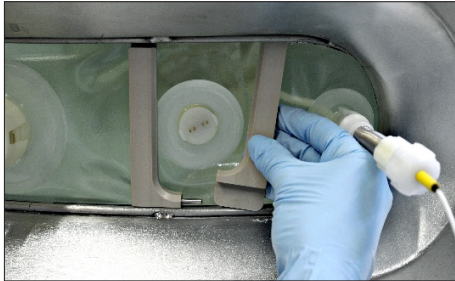
If the probe disc is positioned too far up:  
The STR Viamass support can be installed with the connecting element and connection cable pointing downwards.

This is the standard installation position. This will be explained later on in the process.



When filling the bag or when the bag is full, the pre-amplifier must **not** be disconnected from the probe disc. Re-opening and re-connecting the pre-amplifier to the probe disc is **not** permitted. It is therefore essential to ensure that the pre-amplifier is correctly positioned on the probe disc before closing the locking ring.

#### Procedure



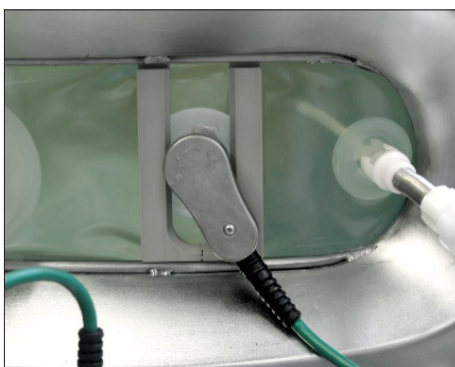
- ▶ Fill the STR bag with cell medium until it reaches the minimum volume (25% of the max. working volume).
- ▶ To avoid damaging the bag, only press the flat side of the support against the bag.
- ▶ Clamp both parts of support between the STR bag and bag holder one after the other.



- ▶ When going on to assemble the pre-amplifier, make sure that
  - the connection cable is pointing towards the curved side of each part of the support.
  - there is a gap of at least 1 cm between the two parts of the support.
- ▶ Attach the pre-amplifier to the probe disc (see Chapter "6.2.3 Installing the Pre-amplifier and Viamass Support on the 500L – 2000L STR Bag", page 29).



- ▶ Carefully push the right and left parts of the support together until the pin is no longer visible.



- ▶ The pre-amplifier is attached securely to the probe disc using the STR Viamass support.
- ▶ Fill the bag to the desired working volume.
- ▶ Ensure that the pre-amplifier stays attached until the end of the cultivation.

## 6.3 Dismounting the Pre-amplifier

### 6.3.1 Dismounting the Pre-amplifier from the RM Bag

#### NOTICE

Always disconnect the pre-amplifier from the bag (probe disc) before removing the bag from the bag holder. Failing to do this may damage the cable or bag.

#### Procedure

- ▶ Twist the locking ring on the pre-amplifier completely into the unlocked position.
- ▷ The single-use probe is released.
- ▶ Remove the single-use probe.

### 6.3.2 Dismounting the Pre-amplifier from the STR Bag

#### NOTICE

Always disconnect the pre-amplifier from the bag (probe disc) before removing the bag from the bag holder. Failing to do this may damage the cable or bag.

#### Procedure

- ▶ Empty the bag up to the upper edge of the probe window on the bag holder.
- ▶ Carefully pull apart the right and left parts of the STR Viamass support.
- ▶ Twist the locking ring on the pre-amplifier completely into the unlocked position.
- ▷ The single-use probe is released.
- ▶ Remove the single-use probe.





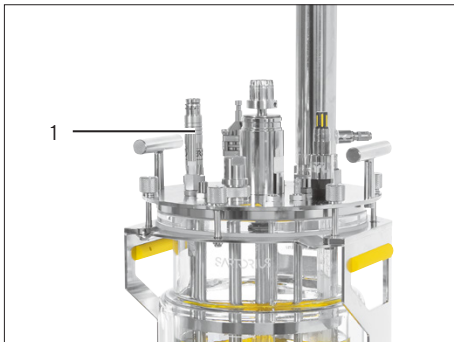
## 6.4 Attaching the Multi-use Probes

### 6.4.1 Attaching the Multi-use Probes

All multi-use probes generate the same strength of capacitance signal for the same amount of biomass, provided they have an unobstructed field of vision. If the visual field of a probe is restricted (e.g., by the wall of the Univessel®, a deflector, or other probes), this causes a change in the capacitance signal. For optimum performance, the tip of the probe should be suspended at a distance of at least 30 mm from all surfaces and metal objects.

#### Procedure

- ▶ Attach the multi-use probe (1) (see Operating Instructions for the Univessel®).



### 6.4.2 Connecting the Multi-use Probes to the Electronics

#### Procedure

- ▶ Connect the connection cable to the electronics. The two red points on the connectors must be lined up with one another.
- ▶ The connecting elements are secured automatically.



### 6.4.3 Disconnecting the Multi-use Probes from the Electronics

#### Procedure

- ▶ Pull out the locking ring on the probe connector so that it is slightly separated from the probe.
- ▶ Disconnect the probe from the electronics.



# 7 Operation

## 7.1 Selecting the Measurement Mode

### 7.1.1 Available Measurement Modes

The BioPAT® Viamass can be used with a range of different cell suspensions. Cells come in all shapes and sizes and respond differently when exposed to different electrical fields. However, they always fit the beta dispersion model.

The electronics can be configured to use multiple frequency options to suit the respective cell suspension. Some options suit highly aerated vessels, while others suit very dense cell suspensions, for example.

The system has the following preset measurement modes for common applications:

- Cell Culture Mode
- Bacterial Mode
- Microbial Mode

In addition, there is a custom mode which allows the user to choose their own settings. Here are the descriptions of the measurement modes.

#### Cell Culture Mode

Cell Culture Mode is designed for larger cells such as animal or plant cells, for example CHO cultures with a diameter of approx. 10 to 20 micrometers.

All probes exposed to a metal-liquid boundary during measurement, such as BioPAT® Viamass probes, are subject to an unwanted electrochemical effect when exposed to low frequencies and high conductivity. This is called 'polarization'. For this reason, this mode uses a technology called 'polarization correction' (see Chapter "7.7 Polarization Correction", page 41).

In this mode, the biomass is measured at ~0.6 MHz with polarization correction.

Noise filtering is set to a medium filter level of 30 in this mode by default. Although in some cases this level can be increased or decreased as required.

Typically a 0.1 pF/cm resolution corresponds to  $10^5$  cells/ml.

### Bacterial Mode

Bacterial Mode is optimized for bacteria cells (e.g., E. coli which is around 3 micrometers in length).

In this mode, the biomass is measured in dual frequency at ~1.12 MHz and then ~15 MHz. Most cells are not polarized at 15 MHz, so the 15 MHz reading is used as a form of automatic zeroing and subtracted from the 1.12 MHz value. With this approach, the capacitance of background matter is automatically subtracted from the signal.

Noise filtering is set to a high filter level of 90 in this mode by default. Although in some cases this level can be increased or decreased as required. Typically a 0.1 pF/cm resolution corresponds to  $10^9$  cells/ml or 2 g per liter.

### Microbial Mode

Microbial Mode is optimized for microbial cells, such as yeasts and fungi, with a typical cell diameter of around 6 micrometers.

In this mode, the biomass is measured at ~0.6 MHz and then ~15 MHz. Most of these cells do not produce usable readings at 15 MHz, so the 15 MHz reading is used as a form of automatic zeroing and subtracted from the 0.6 MHz value. With this approach, the capacitance of background matter is automatically subtracted from the signal.

Noise filtering is set to a high filter level of 90 in this mode by default. Although in some cases this level can be increased or decreased as required.

Typically a 0.1 pF/cm resolution on the device corresponds to  $10^6$  cells/ml or 0.5 g per liter.

### Custom Mode

---

#### NOTICE

Custom Mode is only to be used by individuals who have received training from Sartorius or are being supervised by a Sartorius expert. Wrong configuration of Custom Mode parameters can lead to erroneous or imprecise measurements.

---

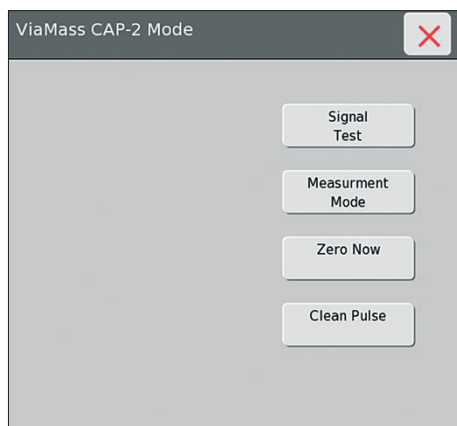
All settings in this mode can be adjusted. This mode is primarily used for experimental purposes.

The default settings for Custom Mode are: single frequency measurement at 1 MHz, no polarization correction, no dual frequency, and low filter level.

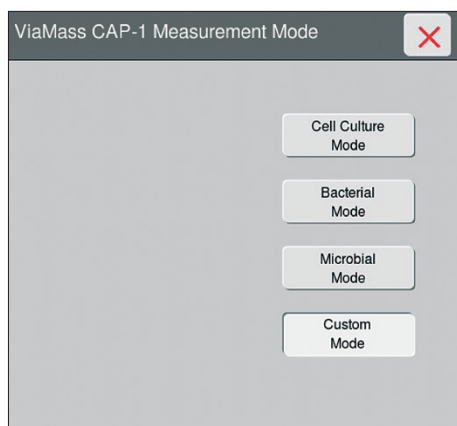
## 7.1.2 Selecting the Measurement Mode (DCU4)

### Procedure

- ▶ Press the [Measure] key in the “ViaMass CAP-#” submenu.
- ▶ Press the [Measurement Mode] key in the “ViaMass CAP-# Mode” submenu.



- ▶ The “ViaMass CAP-# Measurement Mode” submenu for selecting the measurement mode appears.

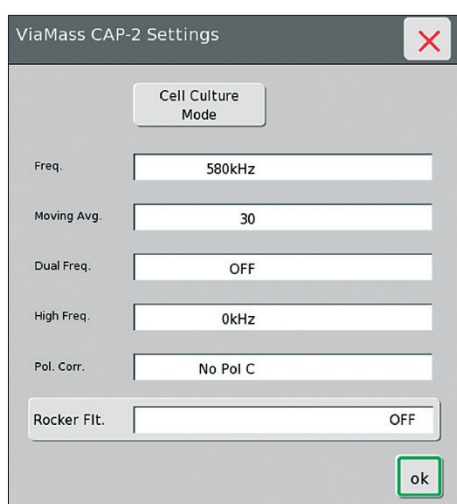


- ▶ Select the measurement mode that suits your application.

### NOTICE

Only use the [Custom Mode] if you have received training from Sartorius or under the supervision of a Sartorius expert. Wrong configuration of Custom Mode parameters can lead to erroneous or imprecise measurements. Under normal circumstances, one of the three modes is used for cultivation or fermentation.

If activated by mistake, the Custom Mode may be switched off by switching back to one of the preset modes.



- ▶ The corresponding “ViaMass CAP-# Settings” submenu opens.
- ▶ The presets for the measurement mode in question are displayed.

- ▶ To configure the rocker filter, see Chapter “7.2 Activating | Deactivating the Rocker Filter”, page 36.

## 7.1.3 Selecting the Measurement Mode (Biobrain)

### Procedure

- ▶ Open the process value dialog [BIOMASS-x].
- ▶ Press the [VIAMASS-1] key in the “Connected element” section in the process value dialog.
- ▶ This will open the [VIAMASS-#] dialog.
- ▶ In the “Settings” section, select [Measurement Mode] from the selection list.
- ▶ Select the measurement mode that suits your application.

### NOTICE

Only use the [Custom Mode] if you have received training from Sartorius or under the supervision of a Sartorius expert. Wrong configuration of Custom Mode parameters can lead to erroneous or imprecise measurements. Under normal circumstances, one of the three modes is used for cultivation or fermentation.

If activated by mistake, the Custom Mode may be switched off by switching back to one of the preset modes.

- ▶ Activate the selected measurement mode by pressing the [SAVE] key.
- ▶ The default settings for the measurement modes are displayed in the “Probe” section.

VIAMASS-1	
General	Parameters
Viamass Driver	
Capacitance measurement	0.0 pF/cm
Conductance measurement	0.0 mS/cm
Biomass measurement CPM	0.00 E6C/ml
Signal quality	Good
Settings	
Sensor type	multi-use
Multiplying factor CPM	1.00 E6
Measurement mode	Cell culture
Zero value	Bacterial
Zero now	Microbial
Un-zero now	Signal simulator
	Custom
<div> <span>X</span> <span>SAVE</span> </div>	

## 7.2 Activating | Deactivating the Rocker Filter

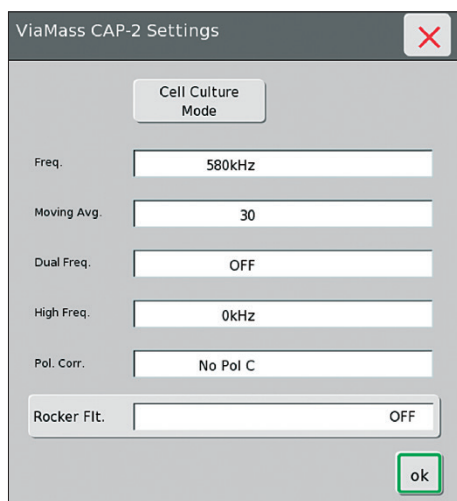
The rocking motion of the Biostat® RM causes the measurement signal to fluctuate due to the variation of the liquid level over the probe in the RM bag.

Optimization filters with various rocking motion parameters are integrated into the electronics. Using these filters enables the continuous monitoring of biomass development in cell cultivations that are subject to rocking motions.

Only use this filter when taking measurements under conditions where the liquid level above the electrodes varies and is 3 cm or less.

The setting for the rocker filter [Rocker Flt.] can only be viewed for single-use (SU) systems (Biostat® RM | STR). The rocker filter must be manually activated | deactivated according to the system:

- Biostat® RM: ON
- Biostat STR®: OFF



### Procedure

- ▶ If using a Biostat® RM:
  - ▶ Press the [Rocker Flt.] key.
  - ▷ The field now displays the [ON] value.
  - ▶ Confirm the change by pressing the [ok] key.
  - ▷ The rocker filter is activated.
- ▶ If using a Biostat STR® gen 1 or gen 2:
  - ▶ Press the [Rocker Flt.] key.
  - ▷ The field now displays the [OFF] value.
  - ▶ Confirm the change by pressing the [ok] key.
  - ▷ The rocker filter is deactivated.

## 7.3 Zeroing

The zeroing function can be used to tare the capacitance signal of the measuring system. For example, if a signal produces a reading of 7 pF/cm that increases to 12 pF/cm during the experiment, the total change is 5 pF/cm. This change of 5 pF/cm corresponds to the viable biomass reading. The starting value of 7 pF/cm corresponds to the medium.

The zeroing function can be used to eliminate the offset of 7 pF/cm.

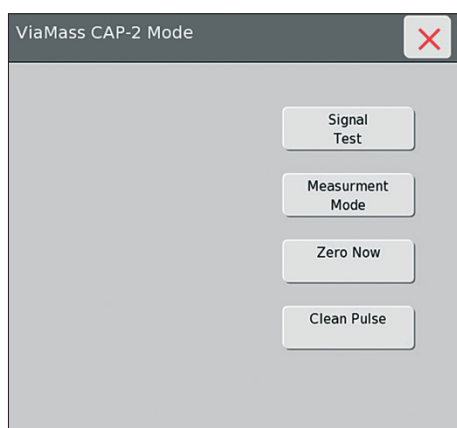
This means that the output signal increases from 0 pF/cm to 5 pF/cm over the course of the experiment when the measuring system is zeroed in the 7 pF/cm solution.

The BioPAT® Viamass has a built-in zeroing function.

### Zeroing (DCU)

#### Procedure

- ▶ Press the [Measure] key in the “ViaMass CAP-#” submenu.
- ▶ Press the [Zero Now] key in the “ViaMass CAP-# Mode” submenu.
- ▷ The “ViaMass CAP-#” submenu for zeroing the BioPAT® Viamass electronics appears.



- ▶ Press the [Set Zero] key.
- ▶ The [Cap] field for the capacitance value is then set to zero. The [Zero] field displays the current offset, also called the deduction value. This offset is the value that is deducted from the ongoing measurement.
- ▶ Pressing the [Clear Zero] key deletes the offset value, and the current offset value of the system is displayed in the [Cap] field.

## Zeroing (Biobrain)

### Procedure

- ▶ Open the process value dialog [BIOMASS-x].
- ▶ Press the [VIAMASS-1] key in the “Connected element” section in the process value dialog.
- ▶ This will open the [VIAMASS-#] dialog.
- ▶ Select the “Zero now” function in the “Settings” section
- ▶ Activate the function by pressing the [SAVE] key.
- ▶ After a short time the values displayed in the “ViaMass Driver” section will go to zero. The offset value is set to zero.
- ▶ Selecting and activating the [Un-zero now] function deletes the offset value and the actual offset value will be displayed in the “ViaMass Driver” section.

VIAMASS-1			
	General	Parameters	Module details
BIOMASS-1	Viamass Driver		
VIAMASS-1	Capacitance measurement	0.0 pF/cm	
	Conductance measurement	0.0 mS/cm	
	Biomass measurement CPM	0.00 E6C/ml	
	Signal quality	Good	
<b>Settings</b>			
	Sensor type	multi-use	
	Multiplying factor CPM	1.00	E6
	Measurement mode	Signal simulator	
	Zero value	0.0	pF/cm
	Zero now	<input checked="" type="checkbox"/>	
	Un-zero now	<input type="checkbox"/>	
		X	SAVE

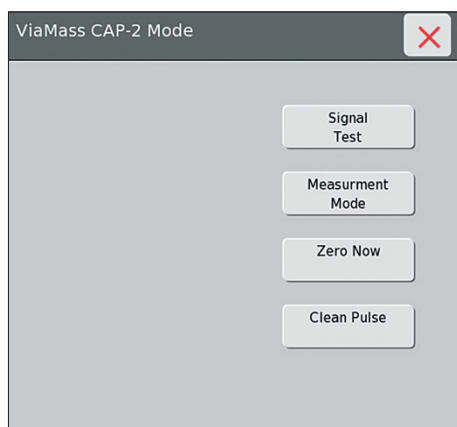
## 7.4 Starting the Clean Pulse Cleaning Function (Only with Multi-use)

The [Clean Pulse] cleaning function is only available for multi-use probes.

### Starting the Cleaning Function (DCU)

#### Procedure

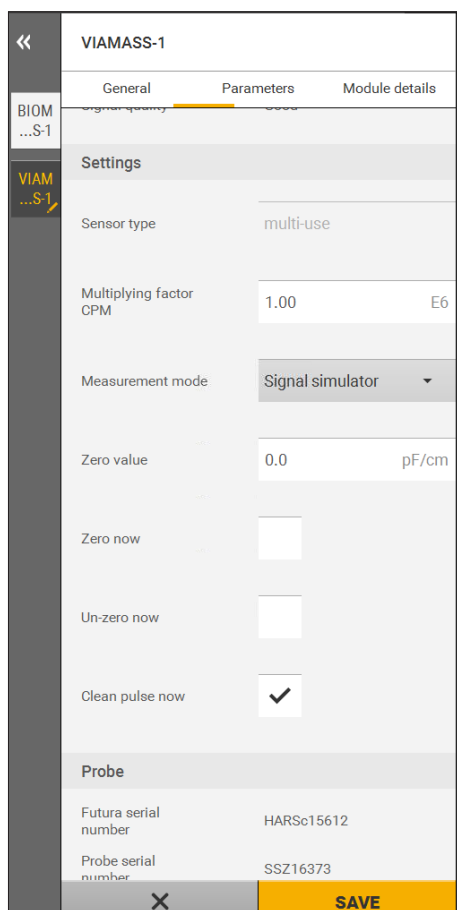
- ▶ Press the [Measure] key in the “ViaMass CAP-#” submenu.
- ▶ Press the [Clean Pulse] key in the “ViaMass CAP-# Mode” submenu.
- ▷ The multi-use probe cleaning function is performed.



### Starting the Cleaning Function (Biobrain)

#### Procedure

- ▶ Open the process value dialog [BIOMASS-x].
- ▶ Press the [VIAMASS-1] key in the “Connected element” section in the process value dialog.
- ▷ This will open the [VIAMASS-#] dialog.
- ▶ Select the “Clean pulse now” function in the “Settings” section
- ▶ Activate the function by pressing the [SAVE] key.
- ▷ The multi-use probe cleaning function is performed.



## 7.5 Converting the Capacitance Value in Cells per Milliliter (C/ml)

The [BMass] biomass value calculated using the CPM factor only correlates to the reference value for the density of living cells during the exponential phase of a cell culture. In the stationary phase, the capacitance value continues to rise because the volume of living cells keeps growing, although the cell density no longer does. As a result of this, the reference value for cell density no longer agrees with the biomass value. The BioPAT® Viamass determines the living cell volume which only correlates to cell density in the exponential phase.

### Procedure

- ▶ To determine the conversion factor, remove one sample in the exponential phase of the process to be monitored.
- ▶ Make a note of the corresponding capacitance value.
- ▶ You can determine the conversion factor using the value determined by the laboratory in cells per milliliter and the recorded capacitance values. The [CPM Factor] conversion factor is calculated using the following equation:

$$CPM\ Factor = \frac{C_{Cell\ density}}{Cap-1} = \frac{\left[\frac{Cells}{ml}\right]}{\left[\frac{pF}{cm}\right]}$$

$C_{Cell\ density}$  reference value for cell density

$Cap-1$  capacitance reading on the BioPAT® Viamass

### DCU

- ▶ Press the [CPM Factor] key in the "ViaMass CAP-#" submenu.
- ▶ The submenu for entering the conversion factor opens.
- ▶ Enter the conversion factor in the [CPM Factor] input field.

The screenshot shows the 'ViaMass CAP-1' window with a red close button in the top right. The 'Mode' is set to 'Measure'. Below this, there is a dropdown menu currently showing 'CAP-1'. The main display area contains four rows of data: 'CAP-1' with a value of '94.1pF/cm', 'Cond' with '39.9mS/cm', 'BMass' with '39.53E6c/ml', and 'CPM Factor' with '0.42E6'. At the bottom left, there is an 'Info' button.



VIAMASS-1			
	General	Parameters	Module details
BIOMASS-1	Conductance measurement	40.0 mS/cm	
VIAMASS-1	Biomass measurement CPM	201.09 E6C/ml	
	Signal quality	Good	
<b>Settings</b>			
	Sensor type	multi-use	
	Multiplying factor CPM	2.00 E6	
	Measurement mode	Signal simulator	
	Zero value	0.0 pF/cm	
	Zero now	<input type="checkbox"/>	
	Un-zero now	<input type="checkbox"/>	
	Clean pulse now	<input type="checkbox"/>	
Probe			
		X	SAVE

## Biobrain

- ▶ Open the process value dialog [BIOMASS-x].
- ▶ Press the [VIAMASS-1] key in the “Connected element” section in the process value dialog.
- ▷ This will open the [VIAMASS-#] dialog.
- ▶ Enter the conversion factor into the [Multiplying factor CPM] entry field in the “Settings” section.
- ▶ Activate the conversion factor by pressing the [SAVE] key.

## 7.6 Configuring Alarm Limits

### Procedure

- ▶ Refer to the Operating Instructions for the control | supply unit (DCU), or see the software manual (Biobrain).

## 7.7 Polarization Correction

This correction is used to compensate for an electrochemical effect that occurs with all metal probes that are immersed in liquid. This effect influences low-frequency capacitance readings at high conductivity. The capacitance–frequency curve looks similar to a  $1/x^2$  curve, which is virtually asymptotic at low frequency and settles to a horizontal straight line at high frequencies.

In order to compensate for this, two additional biomass measurements are taken at low frequencies and this information is used to calculate the shape of the curve. The offset generated by this effect is then subtracted from the actual biomass measurement.

This eliminates the effect of changing polarization of the biomass signal.

## 7.8 Filtering | Calculating the Mean Average of Readings

The BioPAT® Viamass has a function for outputting measurements based on the mean average of the readings.

A filter value of 0 or 1 equates to no filtering, while a value of 180 (maximum) takes the mean average of 180 measurements.

Once the specified number of measurements has been taken, the upper 5% and lower 5% readings are removed before the mean average is calculated. This approach automatically suppresses interfering signals.

### Procedure

- The filter function is preset for “Cell Culture Mode”, “Bacterial Mode”, and “Microbial Mode”. “Custom Mode” is the only measurement mode in which the user can define the filter settings (see Chapter 7.1.2, page 35).

## 8 Cleaning

### 8.1 Cleaning the BioPAT® Viamass Single-use Probe

#### Requirements

The process has been completed.

#### Procedure

- ▶ Disconnect the product from the power supply.
- ▶ **NOTICE** Corrosion or damage to the product due to unsuitable cleaning agents!
  - ▶ Do **not** use corrosive, chloride-containing or aggressive cleaning agents.
  - ▶ Do **not** use cleaning agents that contain abrasive ingredients, e.g. scouring agents, steel wool.
  - ▶ Do **not** use solvent-based cleaning agents.
  - ▶ Only use suitable cleaning agents. Read the product information provided for all cleaning agents used.
- ▶ Wipe the housing with a slightly damp cloth. Use a mild soapy solution or a suitable cleaning agent for more severe contaminations.

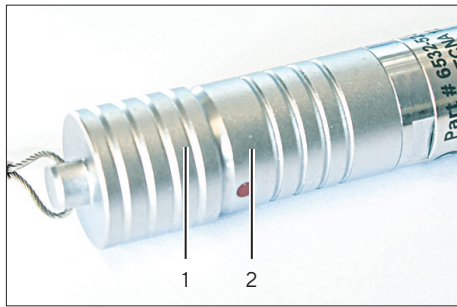
### 8.2 Cleaning the BioPAT® Viamass Multi-use Probe

#### Requirements

The process has been completed.

#### Procedure

- ▶ Disconnect the product from the power supply.
- ▶ **NOTICE** Corrosion or damage to the product due to unsuitable cleaning agents! Unsuitable cleaning agents may shorten the service life of the probe.
  - ▶ Do **not** use corrosive, chloride-containing or aggressive cleaning agents.
  - ▶ Only use alcohol and ethanol-based cleaning solutions.
  - ▶ Only use laboratory-quality degreasers.
  - ▶ Do not use any strong acids or lyes.



- ▶ **NOTICE** Incorrect assembly of the protective cap may result in damage to the probes during autoclaving!
  - ▶ Push the protective cap (1) fully onto the probe plug connector (2).
  - ▶ Make sure there is not a visible gap between the probe (1) and the protective cap (2). This is achieved by clicking the cap into place and twisting it. Lightly pull on the cap to ensure it is locked in place. This protects the product from moisture during autoclaving.
  
- ▶ Clean the probe using autoclaving and CIP processes. For the cleaning requirements, see Chapter “11.7 Cable Bending Radii”, page 48.

## 9 Malfunctions

### 9.1 Warning Messages

Warning message	Fault	Cause	Solution
Error E02	BioPAT® Viamass electronics busy	The electronics are still busy evaluating the measurement results. This error may occur under normal conditions.	– If the error does not clear within a few seconds: Please contact Sartorius Service.
Error E10	Lid lock warning message   Lid not locked	Anti-tamper feature warns when the lid of the electronics unit is opened.	– If this error occurs under normal operating conditions: Please contact Sartorius Service.

### 9.2 Erroneous Measurements

Fault	Cause	Solution	Chapter, page	Target group
Noisy or unexpected readings	Readings are affected by obstructions in the probe's visual field.	– Make sure that the system check with the signal simulators has been successfully carried out.	6.1, 23	Operating engineer   laboratory manager
		– Check the probe placement.	6.4.1, 32	Operating engineer   laboratory manager
	One of several measurement modes may be selected, depending on the application and cell type being measured.	– Make sure that the right measurement mode is selected, or that the settings are correct if using Custom Mode.	7.1, 33	Operating engineer   laboratory manager
		– Check the measurement options.		
	Grounding connection of the BioPAT® Viamass is defective.	– Check that the electronics housing is grounded correctly via the electronics holder.	4.4, 14	Operating engineer   laboratory manager
		– Check that there is as large a distance as possible between the electronics and the probe and larger electrical devices.		
		– Make sure that the system check with the signal simulators has been successfully carried out.	6.1, 23	Operating engineer   laboratory manager

Fault	Cause	Solution	Chapter, page	Target group
Noisy capacitance readings	Inadequate grounding of the BioPAT® Viamass measuring system.	<ul style="list-style-type: none"> <li>– Check that the electronics housing is grounded correctly via the electronics holder.</li> <li>– Check that there is as large a distance as possible between the electronics and the probe and larger electrical devices.</li> </ul>	4.4, 14	Operating engineer laboratory manager

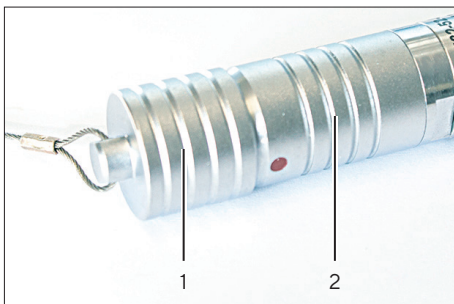
## 10 Storage

### Procedure

- ▶ Decommission the product.
- ▶ Clean the product.
- ▶ Store the product according to the specified ambient conditions (for specifications on the ambient conditions, see Chapter “11.2 Ambient Conditions”, page 47).
  - No UV radiation or direct sunlight.
  - No areas where solvents, chemicals, acids, and fuels are stored.

The BioPAT® Viamass probe must **not** come into contact with grease.

- ▶ Place the protective cap (1) onto the plug connector (2) of the probe. This protects the contacts from dirt and moisture.



- ▶ Ensure that the connection cables are not stretched or kinked while in storage.

# 11 Technical Data

## 11.1 Power Supply

	Unit	Value
Power supply	V <sub>DC</sub>	+ 24

## 11.2 Ambient Conditions

	Unit	Value
Operating temperature range	°C	+ 5 to + 40
Protection class		IP65

## 11.3 Pressure Threshold

	Unit	Value
Pressure threshold	bar	6
	psi	87

## 11.4 Measurement Specifications

	Unit	Value
Frequency range	50 kHz to 20 MHz	
Measurement range		
Capacity	pF/cm	0 to 400
Conductivity	mS/cm	1-40 +/-0.1
Minimum conductivity	mS/cm	0.5
Sensitivity   resolution	pF/cm	0.1
	mS/cm	0.02
	– Bacteria typically 0.1 g/L dry weight or $2 \times 10^9$ cells/ml for E. coli.	
	– Yeast or animal cells 0.05 g/L or $1 \times 10^5$ cells/ml	
	– The relationship between these capacitance values and the biomass depends on cell type and cell line.	
Accuracy	Accuracy is typically better than $\pm 3\%$ of the measurement range or $\pm 2\%$ of the displayed reading	
Repeatability	Typically $\leq \pm 0.5$ pF/cm, no filter active.	

	Unit	Value
Stability		Better than $\pm 0.2$ pF/cm at constant temperature with standard conductivity solution of $\sim 12$ mS/cm
Linearity		Better than $\pm 1\%$ above 100 pF/cm

## 11.5 Cell Concentration Range

	Unit	Value
Yeast (6 $\mu$ m)	Cells/ml	$10^6 - 10^{10}$
Bacteria (1 $\mu$ m)	Cells/ml	$10^9 - 10^{13}$
Animal cells (12 $\mu$ m)	Cells/ml	$10^5 - 10^9$
Plant cells (50 $\mu$ m)	Cells/ml	$10^3 - 10^7$

## 11.6 Materials

Product Contact Material (BioPAT® Viamass MU)

Stainless steel 316L DIN 1.4404

Fortron 1

Platinum 99.99%

Seals silicone USP class VI and FDA CFR21

## 11.7 Cable Bending Radii

	Unit	Value
Bending radius for flexible installation, minimum	mm	30
Bending radius for fixed installation, e.g. in a cable duct, minimum	mm	18



## 11.8 Cleaning Requirements During Autoclaving (Only for BioPAT® Viamass MU)

	Unit	Value
<b>Not</b> suitable for vacuum autoclaves		
Permissible temperature for autoclave		
Device, consumables, accessories	°C	121
Autoclaving times		
Device, consumables, accessories, min.	min.	20
Single-use sampler, max.	min.	20

## 11.9 Weights

	Unit	Value
BioPAT® Viamass electronics (multi-use and single-use)	g	211
BioPAT® Viamass pre-amplifier (single-use)	g	203

## 11.10 Dimensions

### 11.10.1 Dimensions of Electronics and Pre-amplifier (Single-use)

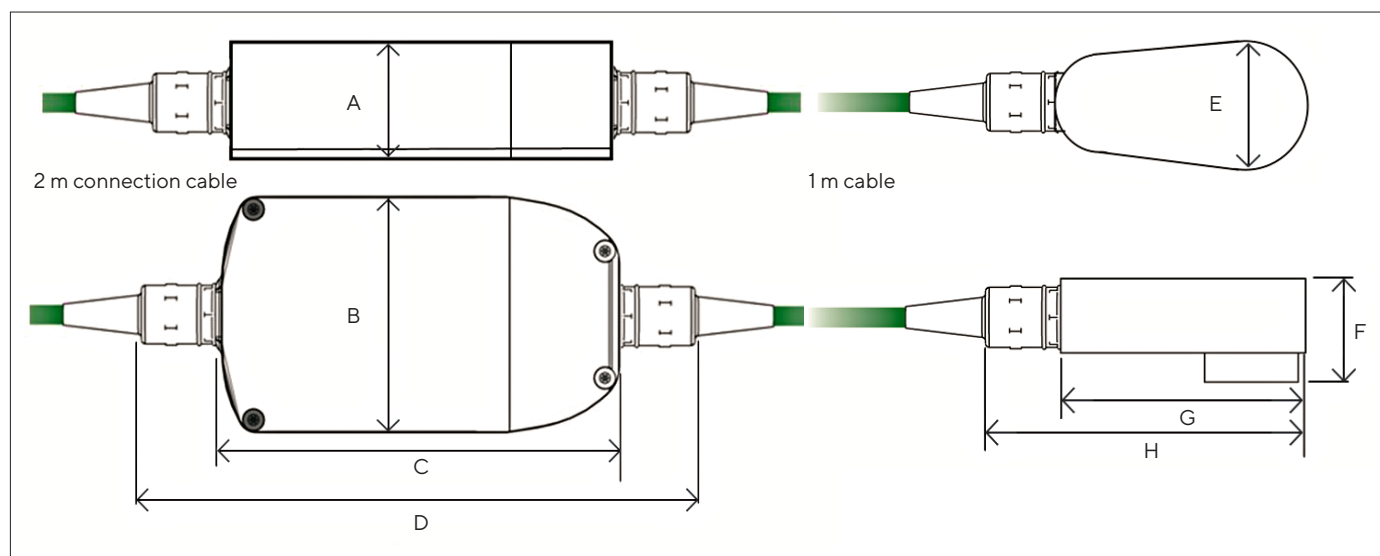


Fig.8: Dimensions of BioPAT® Viamass Electronics and Pre-amplifier for Single-use Probe Disc

Electronics			Pre-amplifier		
Pos.	Unit	Value	Pos.	Unit	Value
A	mm	27	E	mm	32
B	mm	62.5	F	mm	27
C	mm	110	G	mm	66
D	mm	158	H	mm	90

### 11.10.2 Dimensions of Probe Disc (Single-use)

The probe discs are integrated into the Flexsafe® RM bag and the Flexsafe® STR bag. For detailed information, see the data sheets for the Flexsafe® RM bag and the Flexsafe® STR bag.

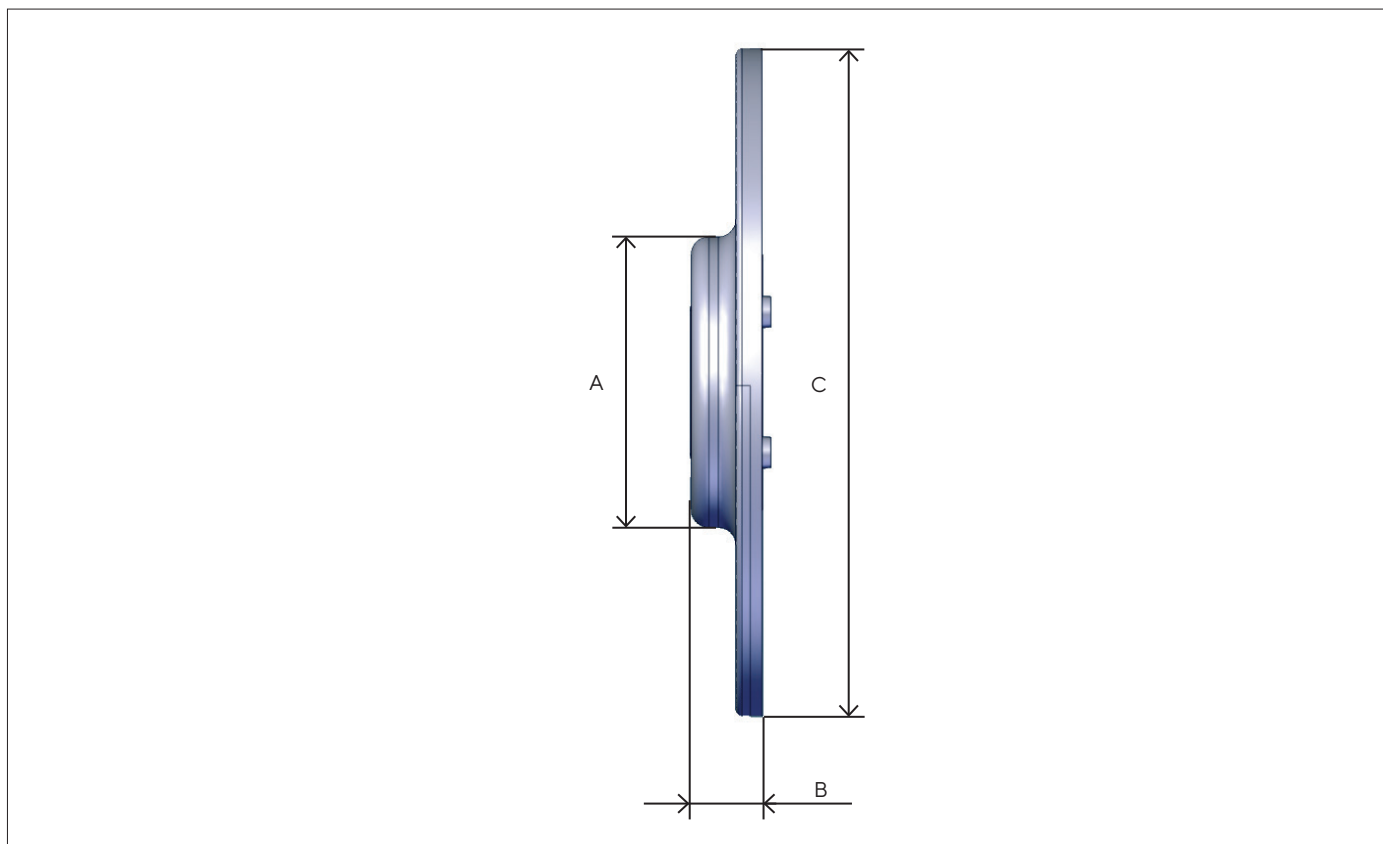


Fig. 9: Dimensions of Single-use Probe Disc

Pos.	Unit	Value
A	mm	25
B	mm	6
C	mm	56.5

### 11.10.3 Dimensions of Electronics (Multi-use)

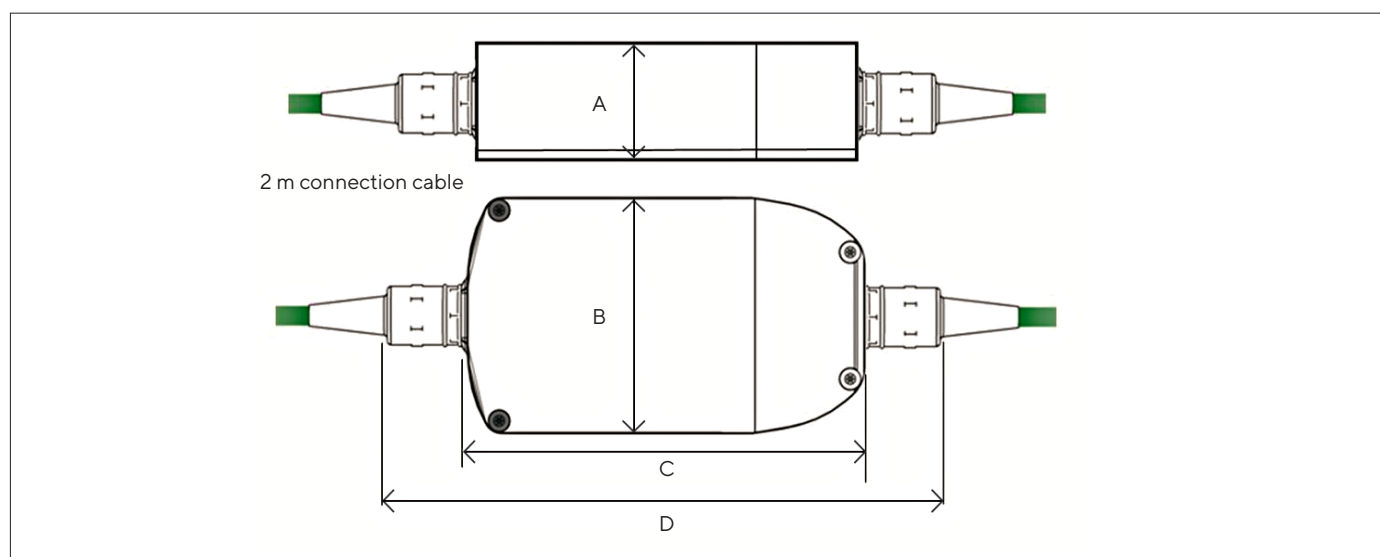


Fig. 10: Dimensions of BioPAT® Viamass Electronics for Multi-use

Pos.	Unit	Value
A	mm	27
B	mm	62.5
C	mm	110
D	mm	158

#### 11.10.4 Dimensions of Flush Probe 25 mm (Multi-use Stainless Steel Vessel)

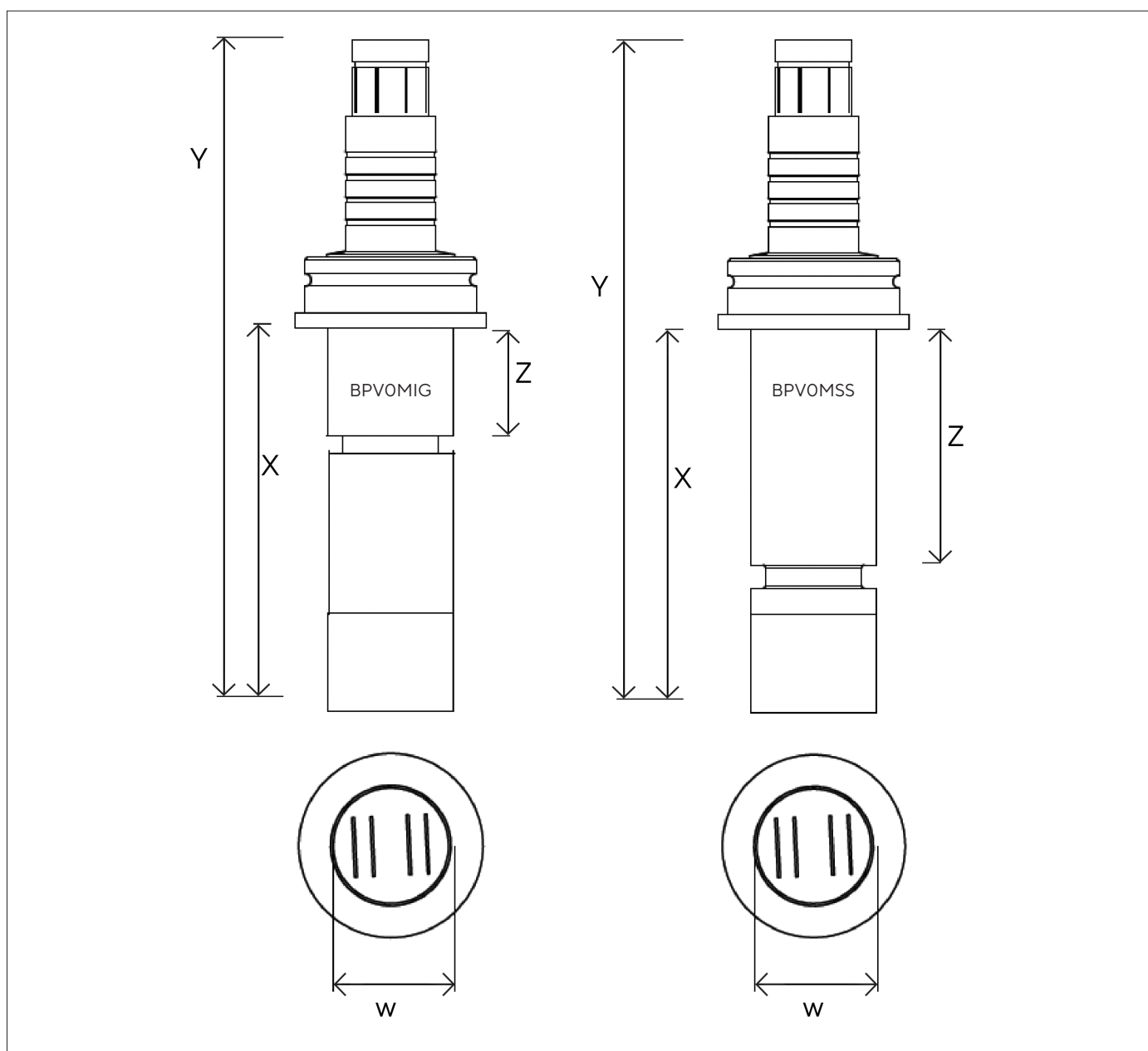


Fig.11: Dimensions of BioPAT® Viamass Flush Probe, 25 mm

Description	Unit	W	X	Y	Z
BioPAT® Viamass 25 mm flush probe for Ingold port	mm	25	75	132	22
BioPAT® Viamass 25 mm flush probe for Sartorius port	mm	25	75	132	46

### 11.10.5 Dimensions of 12 mm Ring Probe (Multi-use Benchtop Univessel® Glass)

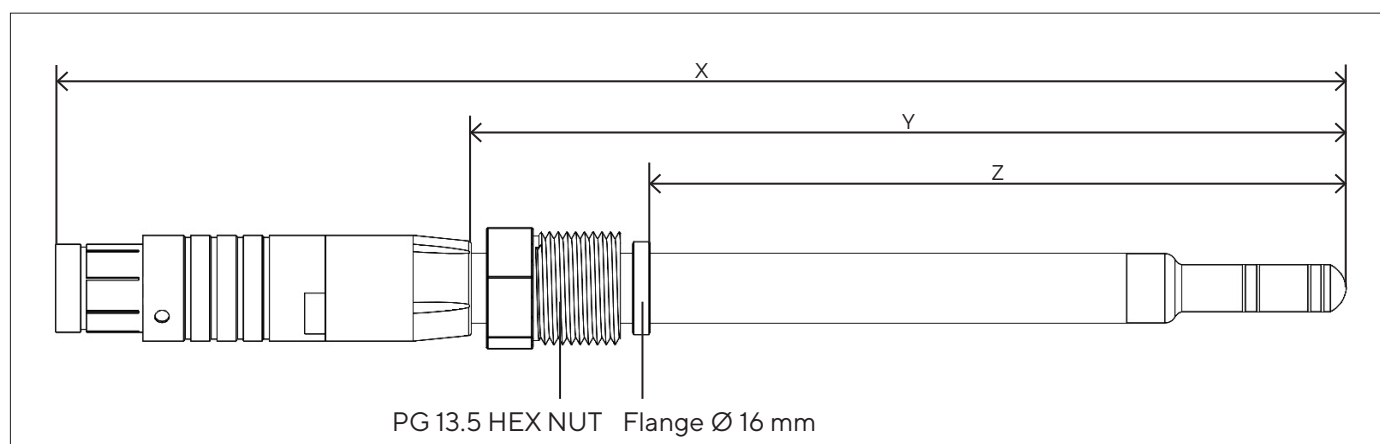


Fig. 12: Dimensions of BioPAT® Viamass Ring Probe, 12 mm

Description	Unit	X	Y	Z
BioPAT® Viamass ring probe, 12 mm, for Univessel® 1L	mm	223	152	120
BioPAT® Viamass ring probe, 12 mm, for Univessel® 2L	mm	323	252	220
BioPAT® Viamass ring probe, 12 mm, for Univessel® 5L	mm	423	352	320
BioPAT® Viamass ring probe, 12 mm, for Univessel® 10L	mm	555	480	440

## Univessel® Glass

The distances from the cover plate of the vessel and a motor (fixed to the head plate) should measure such that the motor is located 118 mm above the plate and at a distance of more than 7.4 mm from the center line of the connection for the Futura probe.

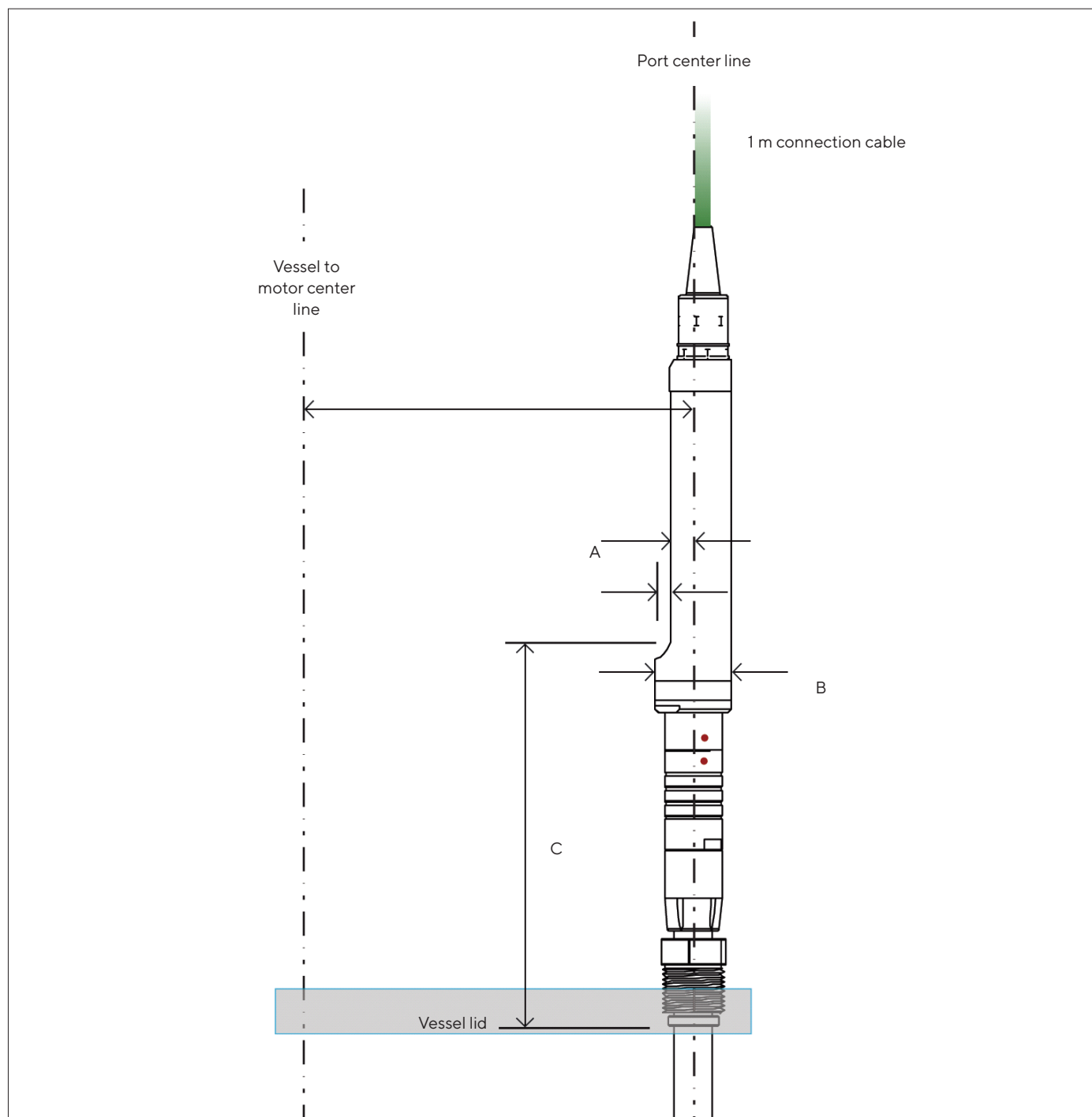


Fig. 13: Dimensions of BioPAT® Viamass for Univessel® Glass

Pos.	Unit	Value
A	mm	7.4
B	mm	Ø 24
C	mm	118

## 12 Accessories

This table contains an excerpt of the accessories that can be ordered. For information on other products, please contact Sartorius.

Item	Order number
BioPAT® Viamass electronics and pre-amplifier (single-use)	BPV0001
BioPAT® Viamass electronics (multi-use)	BPV0M02
BioPAT® Viamass signal simulators – MU calibration, 3 reusable simulators	BPV0MCK
BioPAT® Viamass signal simulators – SU set, 2 reusable simulators	BPV0011
MU adapter M12, 8 pin to ODU connector 1 m	1000012258
Connection cable M12, 8 pin to ODU connector 3 m	SSS000038
Connection cable M12, 8 pin to ODU connector 5 m	SSS000039
SU extension cable ODO connector to ODU connector 2 m	SSS000040
Grounding cable 1.5 m, twin system	SSS000037
Grounding cable 3.0 m	SSS000035
Grounding cable 5.0 m	SSS000036
Electronics holder for Biostat® RM	SSS000034
Electronics holder for Biostat STR® gen 2 and gen 3	SSS000033
Electronics holder for Biostat STR® gen 1	SSS000032
BioPAT® Viamass 25 mm flush probe for Sartorius port	BPV0MSS
BioPAT® Viamass 25 mm flush probe for Ingold port	BPV0MIG
BioPAT® Viamass ring probe, 12 mm, for Univessel® 1L	BPV0M1L
BioPAT® Viamass ring probe, 12 mm, for Univessel® 2L	BPV0M2L
BioPAT® Viamass ring probe, 12 mm, for Univessel® 5L	BPV0M5L
BioPAT® Viamass ring probe, 12 mm, for Univessel® 10L	BPV0MXL



## 13 Sartorius Service

Sartorius Service is available for queries regarding the product. Please visit the Sartorius website ([www.sartorius.com](http://www.sartorius.com)) for information about the service addresses, services provided, or to contact a local representative.

When contacting Sartorius Service with questions about the system or in the event of malfunctions, be sure to have the product information, e.g. serial number, close at hand. This information can be found on the manufacturer's ID label.

## 14 Conformity Documents

The attached documents confirm compliance of the product with the directives or standards cited.



## EU-Konformitätserklärung EU Declaration of Conformity

Hersteller  
*Manufacturer* **Sartorius Stedim Biotech GmbH**  
**August-Spindler-Str. 11, D-37079 Goettingen, Germany**

erklärt in alleiniger Verantwortung, dass das Betriebsmittel  
*declares under sole responsibility that the equipment*

Geräteart  
*Device type* **Biomassensensor BioPAT®ViaMass (Elektronik)**  
**Bio mass sensor BioPAT®ViaMass (Electronic)**

Baureihe  
*Type series* **BPV0001, BPV0M01, BPV0M02, BPV0M03**


in der von uns in Verkehr gebrachten Ausführung allen einschlägigen Bestimmungen der folgenden Europäischen Richtlinien – einschließlich deren zum Zeitpunkt der Erklärung geltenden Änderungen – entspricht und die anwendbaren Anforderungen folgender harmonisierter Europäischer Normen erfüllt:  
*in the form as delivered fulfils all the relevant provisions of the following European Directives – including any amendments valid at the time this declaration was signed – and meets the applicable requirements of the harmonized European Standards listed below:*

2014/30/EU Elektromagnetische Verträglichkeit / *Electromagnetic compatibility*  
 EN 61326-1:2013, EN 61326-2-1:2013, EN 61000-3-2:2014, EN 61000-3-3:2013

2011/65/EU Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten (RoHS)  
*Restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)*  
 EN 50581:2012

Jahreszahl der CE-Kennzeichenvergabe / *Year of the CE mark assignment:* **17**

Sartorius Stedim Biotech GmbH  
 Goettingen, 2017-09-09

  
 Dr. Susanne Gerighausen  
 Director of Quality Engineered Systems & Instruments

  
 Dr. Dieter Klausgrete  
 Head of International Certification Management

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*This declaration certifies conformity with the above mentioned EU Directives, but does not guarantee product attributes. Unauthorised product modifications make this declaration invalid. The safety information in the associated product documentation must be observed.*

Doc: 2025148-01 SSB14CE003-01.de,en 1 / 1 PMF: 2025147 OP-113\_fo1\_2015.10.12

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Last updated:

04 | 2021