

Operating Instructions
Original Operating Instructions

BioPAT® Pressure

0–4 bar
Single-use Pressure Sensor



85037-556-43



SARTORIUS

Contents

1	About these Instructions	5
1.1	Scope	5
1.2	Other Applicable Documents	5
1.3	Target Groups	5
1.4	Symbols Used	6
1.4.1	Warnings in Operation Descriptions	6
1.4.2	Other Symbols Used	6
2	Safety Instructions	7
2.1	Intended Use	7
2.1.1	Modifications to the Device	7
2.1.2	Repairs and Maintenance on the Device	7
2.2	Qualifications of Personnel	8
2.3	Significance of these Instructions	8
2.4	Device Functionality	8
2.5	Conduct in an Emergency	8
2.6	Accessories, Consumables, and Spare Parts	9
2.7	Personal Protective Equipment	9
2.8	Process Conditions	9
2.9	Pressure Sensor Holder	10
2.10	Components Under Pressure	10
2.11	Operating Medium	10
2.12	Single-use Pressure Pipes	10
3	Device Description	11
3.1	Device Overview	11
3.2	Multi-use Pressure Transmitter	12
3.3	Single-use Pressure Pipe	13
3.4	Measuring Principle	14
4	Installation	15
4.1	Scope of Delivery	15
4.2	Selecting an Installation Site	15
4.3	Unpacking	16
4.4	Acclimatizing	16
5	Getting Started	17
5.1	Inserting into the Pressure Sensor Holder	17
5.2	Connecting to the System	18
5.2.1	Sartorius Systems	18
5.2.2	Process Controller for a Different System	18
6	Process Preparation	19
6.1	Checking the Transmitter Membrane	19
6.2	Installing the Single-use Pressure Pipe	19
6.3	Performing Zero Point Calibration	20

7	Operation	21
7.1	Monitoring the Process	21
7.2	Finishing the Process	21
7.2.1	Preparing the Device	21
7.2.2	Removing the Single-use Pressure Pipe	21
8	Cleaning and Maintenance	22
8.1	Cleaning the Device	22
8.2	Maintenance Schedule	22
9	Faults	23
9.1	Signal Faults	23
9.2	Checking the Gaskets	25
9.3	Restarting	25
10	Decommissioning	26
11	Storage and Shipping	27
11.1	Storage	27
11.2	Returning the Device and Parts	27
12	Disposal	28
12.1	Decontaminating the Device	28
12.2	Disposing of Device and Parts	28
13	Technical Data	29
13.1	Multi-use Pressure Transmitter	29
13.1.1	Dimensions and Weight	29
13.1.2	Electrical Specifications and Connections	29
13.1.3	Materials	30
13.1.4	Approved Cleaning Agents	30
13.2	Single-use Pressure Pipes	30
13.2.1	Dimensions	30
13.2.2	Materials	31
13.2.3	Shelf Life	31
13.2.4	Chemical Resistance*	31
13.3	Ambient Conditions	32
13.4	Process Conditions	32
13.5	Operating Medium	32
14	Accessories, Consumables, and Spare Parts	33
14.1	Accessories	33
14.2	Consumables	33
14.2.1	Single-use Pressure Pipes	33
14.3	Spare Parts	33
15	Sartorius Service	34
16	Conformity Documents	34

1 About these Instructions

1.1 Scope

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

Device	Type
BioPAT® Pressure Sensor, consisting of the following components:	
BioPAT® Pressure Transmitter, 0-4 bar	BPD0005
Single-use components	
BioPAT® Pressure Pipe ¼" HB	BPD0010
BioPAT® Pressure Pipe ⅜" HB	BPD0011
BioPAT® Pressure Pipe ½" HB	BPD0012
BioPAT® Pressure Pipe ¾" HB	BPD0013
BioPAT® Pressure Pipe ¾" TC	BPD0014
BioPAT® Pressure Pipe 1" HB	BPD0015
BioPAT® Pressure Pipe 1" TC	BPD0016

1.2 Other Applicable Documents

- ▶ In addition to these instructions, observe the following documents:
 - Validation Guide
 - Instructions for the device or system to which the device is connected, e.g., FlexAct® COM
 - Instructions for accessories, e.g., benchtop pressure indicator, pressure sensor holder, tubing holder
 - Documentation on customer-specific modifications (if applicable)

1.3 Target Groups

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

Target Group	Knowledge and Qualifications
User	The user is familiar with the operation of the device and the associated work processes. The user understands the hazards which may arise when working with the device and knows how to prevent them. The user has been trained in the operation of the device.
Operating engineer laboratory manager	The operating engineer laboratory manager makes decisions about the use and configuration of the device. The operating engineer laboratory manager has been trained in the operation of the device.

Target Group	Knowledge and Qualifications
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 device is responsible for ensuring compliance with workplace health and safety regulations. The operator must ensure that all persons who work with the device have access to the relevant information and are trained in working with the device.

1.4 Symbols Used

1.4.1 Warnings in Operation Descriptions

WARNING

Denotes a hazard that may result in death or severe injury if it is **not** avoided.

CAUTION

Denotes a hazard that may result in moderate or minor injury if it is **not** avoided.

NOTICE

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

1.4.2 Other Symbols Used

- ▶ Required action: Describes activities that must be carried out. The actions in the sequence must be carried out in succession.
- ▷ Result: Describes the result of the activities carried out.

2 Safety Instructions

2.1 Intended Use

The BioPAT® Pressure sensor measures the pressure in liquid-flow tubes and converts it into an electrical signal. The device is intended for use in the following applications:

- Use as a safety system, e.g., for monitoring pressure of liquid-filled single-use vessels or for installing liquid-flow filter elements to enable immediate shut-off of the pumps in the event of any blockage.
- Applications in which pressure is a process parameter that is used for automated control loops, e.g., tangential flow filtration at constant pressure.
- Monitoring of the pressure in pressure-limiting single-use modules.

The BioPAT® Pressure sensor consists of a multi-use pressure transmitter and a single-use pressure pipe. The data can be read out by connecting the transmitter to a process control unit or to a desktop display.

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

If the device is used **improperly**: The device's protective systems may be impaired. This can lead to unforeseeable personal injury or property damage.

Operating Conditions for the Device

Do **not** use the device in potentially explosive environments. Only use the device indoors.

The device 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 Device

If the device is modified, e.g., by attaching extra components: The safety of the device may be impaired or the device compliance may lose its validity.

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

2.1.2 Repairs and Maintenance on the Device

Device repairs and maintenance may only be carried out by persons with appropriate specialized knowledge of the device. If the device is **not** repaired or maintained by a specialist: The safety of the device may be impaired or the test marks may lose their validity.

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

Only the maintenance tasks described in these instructions should be carried out. For maintenance tasks that need to be carried out by Sartorius Service, contact Sartorius Service.

2.2 Qualifications of Personnel

If individuals who do **not** have sufficient knowledge on the safe handling of the device carry out work on the device: Those individuals may injure themselves or other people nearby.

- ▶ Ensure that all persons working on the device possess the necessary knowledge and qualifications (for description, see Chapter “1.3 Target Groups”, page 5).
- ▶ If a particular qualification is required for the actions described: Have these activities carried out by the required target group.
- ▶ If **no** particular qualification is required for the actions described: Have these activities carried out by the “user” 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. The required actions in the instructions build on each other.
- ▶ Ensure that the information contained in these instructions is available to all individuals working on the device.
- ▶ Retain the instructions.
- ▶ If these instructions are lost, request a replacement or download the latest version from the Sartorius website (www.sartorius.com).

2.4 Device Functionality

A damaged device or worn-out parts can cause malfunctions or lead to hard-to-detect hazards.

- ▶ Only operate the device when it is in safe and proper working order.
- ▶ Comply with the maintenance intervals (for intervals and maintenance work, see Chapter “8.2 Maintenance Schedule”, page 22).
- ▶ Organize the immediate repair of any malfunctions or damage by Sartorius Service.

2.5 Conduct in an Emergency

If an emergency occurs, e.g., due to the malfunctions of the device or dangerous situations: People may be injured. The device must be immediately taken out of operation:

- ▶ Disconnect the device from the supply systems.
- ▶ Secure the device to prevent it from restarting.

2.6 Accessories, Consumables, and Spare Parts

Unsuitable accessories, consumables, and spare parts can adversely affect functionality and safety and can have the following consequences:

- Risk of injury to persons
 - Damage to the device
 - Device malfunctions
 - Failure of the device
- ▶ You should only use approved accessories, consumables, and spare parts supplied by Sartorius.
 - ▶ Only use accessories, consumables, and spare parts that are in technically perfect condition.

2.7 Personal Protective Equipment

Personal protective equipment protects against hazards arising from the device. If personal protective equipment is not used or is unsuitable: People may be injured.

Protective Equipment Designation	Explanation/Examples
Safety gloves	Protect against chemicals, heat, and injuries.
Safety glasses	Protect against harmful influences, e.g., liquids, chemicals, splinters, or particles.
Safety boots	Protect against injuries to the feet caused by mechanical effects and against slipping on wet surfaces.

- ▶ Wear appropriate personal protective equipment.
- ▶ If the operating area, or the process in which the device is used, requires additional safety precautions: Wear the additional appropriate personal protective equipment.

2.8 Process Conditions

The device must be suitable for the measurement range, the type of measurement, and the specific measurement conditions in the process. If the device is **not** suitable for the process: There is a risk of injury to personnel working on the device and damage to the device.

- ▶ Check whether the device is suitable for the process conditions (see Chapter "13.4 Process Conditions", page 32).
- ▶ For more information on validation and quality assurance, please contact Sartorius.

2.9 Pressure Sensor Holder

The device must be attached to the system using a pressure sensor holder. The pressure sensor holder is used to fix the device securely to the system. If the device is secured without a pressure sensor holder or with an unsuitable pressure sensor holder: The device may become loose during the process.

- ▶ Mount the device on a pressure sensor holder.
- ▶ Only use suitable pressure sensor holders (see Chapter "14.1 Accessories", page 33).

2.10 Components Under Pressure

There is a risk of injury when working on pressurized components, e.g., the single-use pressure pipe. Leaking operating medium can cause chemical burns.

- ▶ When working on the device, entirely or partially depressurize the system (for depressurization, see instructions for the connected device or system).
- ▶ Only operate the device within the permissible operating parameters (see Chapter "13.4 Process Conditions", page 32).
- ▶ Wear personal protective equipment.

2.11 Operating Medium

The media used in the process (operating media) may be hazardous and cause personal injury or damage to the device. Using aggressive/corrosive operating media may carry the risk of chemical burns.

- ▶ Observe the applicable safety and occupational health and safety information concerning the operating media, e.g., handling, storage, and conduct in emergency situations.
- ▶ Wear personal protective equipment.
 - ▶ If required: Install additional protective measures, e.g., splash protection.
- ▶ Only use operating media that is suitable for the device (for suitability, see Chapter "13.5 Operating Medium", page 32).
- ▶ If there is media residue in the device: Clean the device (see Chapter "8 Cleaning and Maintenance", page 22).

2.12 Single-use Pressure Pipes

Only the single-use pressure pipes that are qualified for the multi-use pressure transmitter may be used with the multi-use pressure transmitter. If a pipe other than those specified is used: The accuracy of the pressure measurement **cannot** be guaranteed. Incorrect measurement results may lead to serious injuries.

- ▶ Use only approved single-use pressure pipes (see Chapter "13.1 Multi-use Pressure Transmitter", page 29).
- ▶ Observe the accuracy test report for the device.

3 Device Description

3.1 Device Overview

The BioPAT® Pressure sensor consists of a multi-use pressure transmitter and a single-use pressure pipe.



Fig. 1: BioPAT® Pressure sensor: multi-use transmitter with single-use pipe 1/2" HB (example)

Pos.	Designation
1	Single-use pressure pipe
2	Multi-use pressure transmitter

3.2 Multi-use Pressure Transmitter

The multi-use pressure transmitter converts the pressure of the operating medium in the single-use pressure pipe into an electrical signal, which can be transmitted to a process controller. The transmitter also carries out a temperature compensation and correction of the signal.

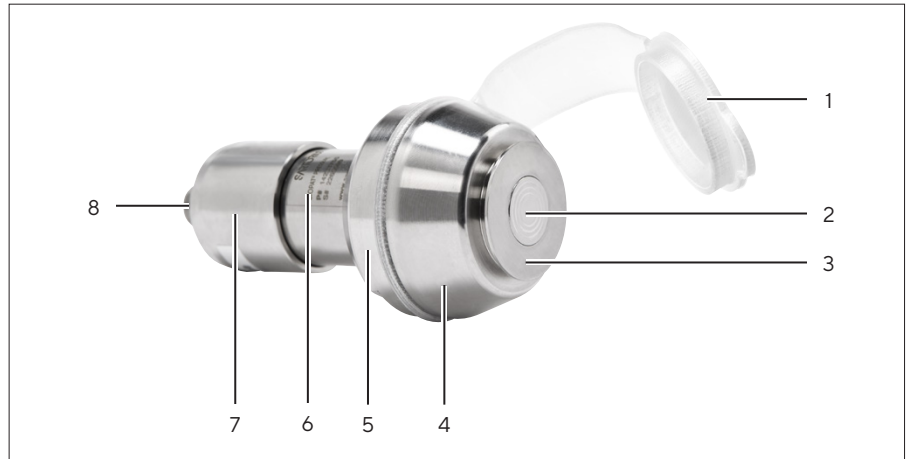


Fig.2: Multi-use pressure transmitter

Pos.	Designation	Description
1	Protective cap	Protects the metal membrane against mechanical damage or contamination.
2	Transmitter membrane	Transmits the pressure from the single-use pressure pipe.
3	Sensor connection	Holds the single-use pressure pipe.
4	Transmitter head	
5	Mounting nut	Is used to connect the multi-use pressure transmitter to a pressure sensor holder.
6	Manufacturer's ID label	
7	Sleeve	Surrounds part of the electronics of the multi-use pressure transmitter.
8	Signal connection	For insertion of the connection cable.

A set of gaskets (O-rings) are inserted in several positions in the mounting nut and the transmitter head in order to seal off the various parts of the transmitter.

3.3 Single-use Pressure Pipe

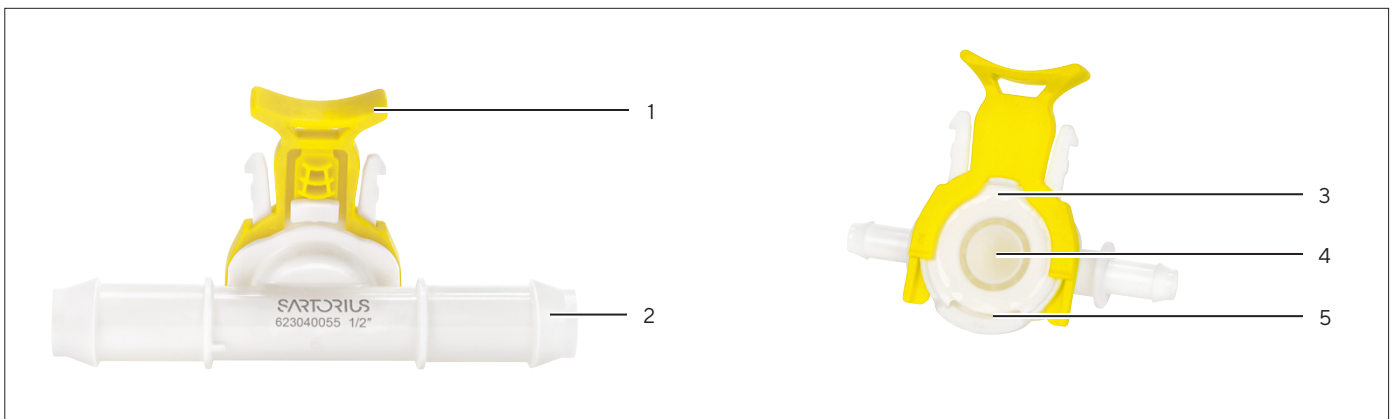


Fig.3: Single-use pressure pipe 1/2" HB, view from front and rear (example)

Pos.	Designation	Description
1	Mounting bracket	Secures the single-use pressure pipe to, or releases it from, the multi-use pressure transmitter.
2	Tubing connections	Is intended to connect a tube.
3	Upper fixing clip	Surrounds the sensor connection.
4	Membrane	Transfers the pressure of the operating medium to the transmitter membrane.
5	Lower fixing clip	Surrounds the sensor connection.

3.4 Measuring Principle

The BioPAT® Pressure sensor uses the piezoresistive effect for accurate and quick pressure determination. As soon as the single-use pressure pipe is installed on the transmitter, the silicone membrane of the single-use pressure pipe is in contact with the metal membrane of the multi-use transmitter. During measurement, in the event of pressure fluctuations force is applied to the membranes, which is detected by a piezoresistive pressure sensor in the multi-use transmitter. In addition, an integrated thermometer automatically corrects the influence of the temperature in the output signal.

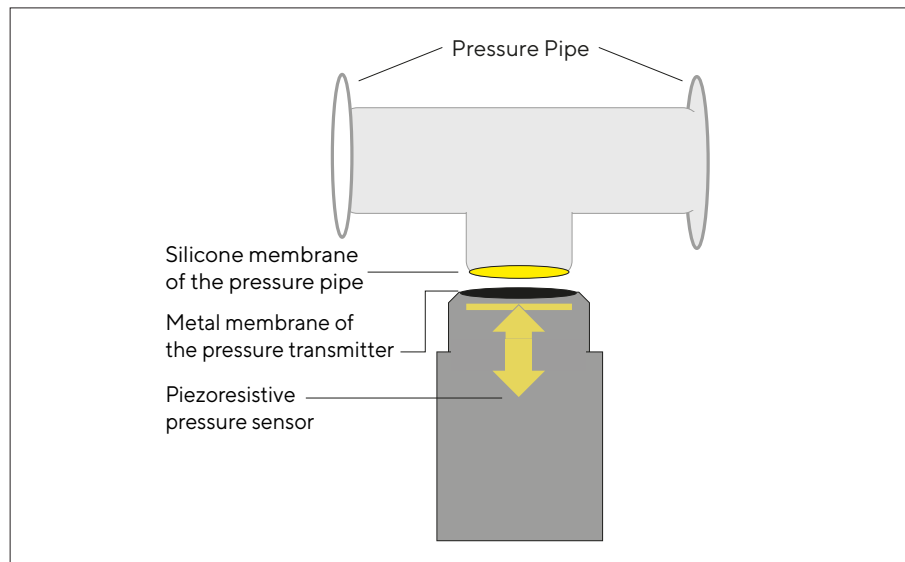


Fig. 4: Measuring principle of the sensor

4 Installation

4.1 Scope of Delivery

Item	Quantity
Multi-use Pressure Transmitter	1
Cable with open ends, 5 m	1
Test report	1
Operating Instructions	1

4.2 Selecting an Installation Site

Procedure

► Make sure that the following conditions are met at the installation site:

Condition	Requirements
Mounting surface	Sufficient installation space is available for the device and the mounted components e.g., tubes, pressure sensor holder (for space required for the device, see Chapter 13, page 29; for space required for the components, see the instructions for the components)
Ambient conditions	Suitability tested (see Chapter 13.3, page 32)
Process conditions	Suitability tested (see Chapter 13.4, page 32)
Operating medium	Suitability tested (see Chapter 13.5, page 32)

4.3 Unpacking

Procedure

- ▶ Unpack the device.
- ▶ Install the device at the intended installation site.
- ▶ We recommend keeping the original packaging including the protective cap to return the device securely and appropriately, e.g., for repairs.

4.4 Acclimatizing

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

Procedure

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

5 Getting Started

5.1 Inserting into the Pressure Sensor Holder

NOTICE

Damage to the connection lines!

If the signal connection loosens from the device: The exposed connection cables may be damaged, e.g., by being clamped.

- ▶ Carefully position the signal connection on the device and hold in place.

NOTICE

Tools can damage the device!

If a tool is used in the wrong place: The device may be damaged.

- ▶ Only apply the open-ended wrench to the mounting nut.

Qualification required: Electrician | Sartorius Service

Tool: Open-ended wrench, 42 mm

Requirements

- The pressure sensor holder is mounted on the system.
- The device is **not** connected to a system.

Procedure



- ▶ Unscrew the sleeve (2) in the direction of the signal connection (1).
- ▶ **NOTICE** Traction may damage the device! Do **not** pull on the connection cable of the looser signal connection.
- ▶ Loosen the mounting nut (3) using the open-ended wrench.
- ▶ Unscrew the mounting nut (3) from the device.
- ▶ Check whether the gaskets have been inserted in the grooves of the mounting nut and transmitter head.
 - ▶ If required: Push the gaskets into the groove.
- ▶ Insert the device into the pressure sensor holder.
- ▶ Check whether the protective cap is lying in front of the pressure sensor holder.
 - ▶ If required: Pull the protective cap in front of the pressure sensor holder.
- ▶ Apply the mounting nut (3) to the device.
- ▶ Screw the sleeve (2) onto the device and tighten by hand.
- ▶ Tighten the mounting nut using the open-ended wrench.

5.2 Connecting to the System

5.2.1 Sartorius Systems

If the multi-use pressure transmitter is being connected to a Sartorius system controller, e.g., FlexAct® COM: The supplied open-ended connection cable is **not** required. The device must be connected to the controller of the Sartorius system by Sartorius Service.

- ▶ Please contact Sartorius Service.

5.2.2 Process Controller for a Different System

Qualification required: Electrician

Requirements

- The multi-use pressure transmitter is sufficiently secured, e.g., using a sensor holder.
- The system to which the multi-use pressure transmitter is being connected is switched off.

Procedure



- ▶ **NOTICE** The device can be damaged by incorrect connections! Observe the correct assignment of the connections on the device and on the connection cable (connections see Chapter “13.1.2 Electrical Specifications and Connections”, page 29).
- ▶ Screw the round plug of the connection cable (1) to the signal connection (2).
- ▶ Connect the contacts of the connection cable to the system controller (see instructions for the connected system).
- ▶ If the device is **not** grounded by the system: Ground the device.

Configuring Process Control on the Device

⚠ WARNING

Danger of injury due to incorrect system settings!

Incorrect system settings can impact the accuracy of the pressure measurement and cause serious injuries.

- ▶ Ensure the correct system settings are used.
- ▶ Please contact Sartorius Service.

- ▶ See instructions for the connected system and Chapter “13.1.2 Electrical Specifications and Connections”, page 29.

6 Process Preparation

6.1 Checking the Transmitter Membrane

Procedure

- ▶ **⚠ WARNING** Risk of injury due to damaged transmitter membrane! If the device is used with a damaged transmitter membrane: The accuracy of the pressure measurement **cannot** be guaranteed.
- ▶ Open the protective cap.
- ▶ Check the transmitter membrane for damage, e.g., cracks or dents.
 - ▶ If required: Replace the device.

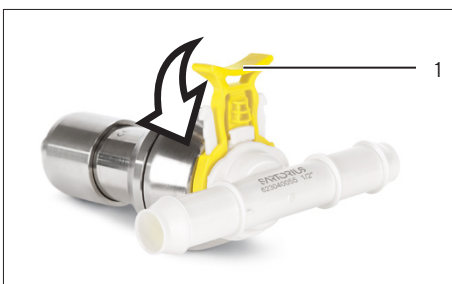
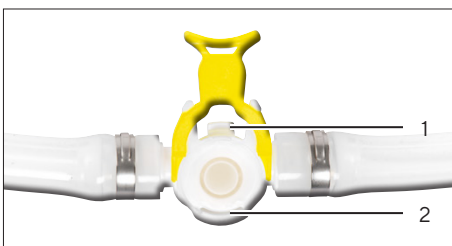
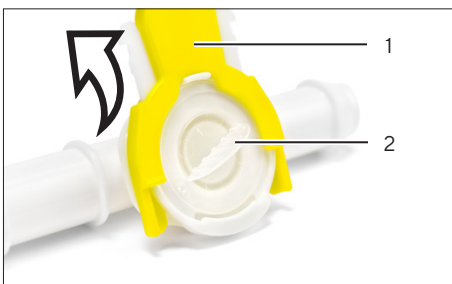
6.2 Installing the Single-use Pressure Pipe

Requirements

The system has been entirely or partially depressurized.

Procedure

- ▶ **⚠ WARNING** Components under pressure can cause injury! Entirely or partially depressurize the system (see instructions for the connected device or system).
- ▶ Pull the mounting bracket (1) off the pipe (until it clicks twice).
- ▶ **NOTICE** The transmitter may be damaged if the protective cap is not removed! Remove the protective cap (2).



- ▶ Apply the upper fixing clip (1) to the sensor connection at a slight angle.
 - ▷ The upper fixing clip (1) reaches fully under the sensor connection.
- ▶ Push on the lower fixing clip (2).
 - ▷ The lower fixing clip (2) surrounds the sensor connection.
- ▶ Push the mounting bracket (1) in the direction of the sensor connection and make sure it fully engages into place.
 - ▷ The membrane of the single-use pressure pipe and the transmitter membrane are connected (contact close).

6.3 Performing Zero Point Calibration

The contact between the transmitter membrane and the membrane of the single-use pressure pipe generates a certain offset pressure, which is specific for each single-use pressure pipe.

In order to guarantee an accurate measurement of the actual relative pressure in the process: The zero point calibration can be performed in the controller of the connected system or via accessories.

If the hydrostatic pressure also needs to be recorded: Perform the zero point calibration when the system is full of air.

Procedure

- ▶ Fill the tubes with air/liquid. To do this, refer to the instructions for the connected device or system.
- ▶ Perform a zero point calibration on the process controller of the connected device or system (for zero point calibration, see instructions for the connected system or accessory).
- ▷ The device is ready for use.

7 Operation

7.1 Monitoring the Process

Depending on the operating conditions and hazard potential of the operating media, hazards may arise during the process, e.g., in the event of malfunctions of the device.

Procedure

- ▶ In order to avoid hazards for the user and damage to the device: Monitor the pressure sensor during the process (visual check).
- ▶ **⚠ WARNING** Danger of injury from escaping operating medium! Leaking operating medium can cause injuries, e.g., chemical burns.
 - ▶ Check that the tubing is correctly connected and that the seal is tight.
 - ▶ Wear personal protective equipment.
- ▶ If operating medium is leaking:
 - ▶ Switch off the system.
 - ▶ Remedy the fault (for troubleshooting, see Chapter 9, page 23).

7.2 Finishing the Process

7.2.1 Preparing the Device

Requirements

The process has been finished.

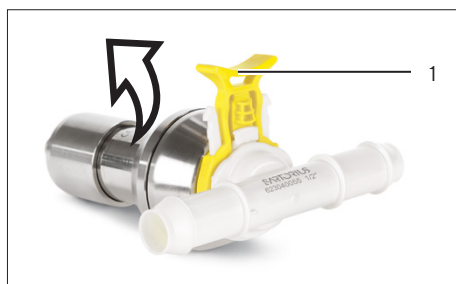
Procedure

- ▶ **⚠ WARNING** Components under pressure can cause injury! Entirely or partially depressurize the system (see instructions for the connected device or system).
- ▶ To end the process: See the instructions for the connected device or system.

7.2.2 Removing the Single-use Pressure Pipe

Procedure

- ▶ Pull the mounting bracket (1) into the second engaged position.
- ▶ Remove the single-use pressure pipe from the multi-use pressure transmitter and dispose of it.
- ▶ If there is media residue in the device: Clean the device (see Chapter "8.1 Cleaning the Device", page 22).



8 Cleaning and Maintenance

WARNING

Aggressive or caustic operating media may cause injuries!

The media used in the process (operating media) may be hazardous and cause personal injury or damage to the device.

- ▶ Wear personal protective equipment.

8.1 Cleaning the Device

Requirements

- The process is complete (see Chapter “10 Decommissioning”, page 26).
- The system has been entirely or partially depressurized.
- The system has cooled down.

Procedure

- ▶ In order to disconnect the device from the power supply: Switch off the system (see the instructions for the connected device or system).
- ▶ **NOTICE** Corrosion or damage to the device due to unsuitable cleaning agents! Only use suitable cleaning agents and observe the product information for the cleaning agent used (see Chapter “13.1.4 Approved Cleaning Agents”, page 30).
- ▶ Wipe the device with a damp cloth.

8.2 Maintenance Schedule

Interval	Component	Activity	Chapter, Page	Target Group
Before each process	Transmitter membrane	Check the transmitter membrane for damage, e.g., tears, deep indentations.	6.1, 19	User
Annually	Multi-use pressure transmitter	Calibrate the multi-use pressure transmitter. Please contact Sartorius Service.		
Annually	Electrical components	Check all electrical components for damage. Please contact Sartorius Service.		
Annually	Gaskets	Check gaskets in the transmitter head and in the mounting nut. If required: Replace the gaskets. Please contact Sartorius Service.	9.2, 25	

9 Faults

9.1 Signal Faults

Fault	Cause	Correction	Chapter, Page	Target Group
No output signal can be detected on the process controller	The device is not connected correctly.	If the device is connected to a Sartorius system: Please contact Sartorius Service.		
		If the device is connected to the controller of another system: <ul style="list-style-type: none"> – Check the cables for damage. – Check the pin assignment. 	5.2, 18	Electrician
Consistent output signal when pressure changes	Mechanical overload on the device due to excessive pressure	If the device is connected to a Sartorius system: Please contact Sartorius Service.		
		If the device is connected to the controller of another system: <ul style="list-style-type: none"> – Decommission the device. – Replace the device. 	10, 26 5, 17	User User
Signal range too small or decreasing	Mechanical overload on the device due to excessive pressure	If the device is connected to a Sartorius system: Please contact Sartorius Service.		
		If the device is connected to the controller of another system: <ul style="list-style-type: none"> – Decommission the device. – Replace the device. 	10, 26 5, 17	User User
	The transmitter membrane is damaged.	If the device is connected to a Sartorius system: Please contact Sartorius Service.		
		If the device is connected to the controller of another system: <ul style="list-style-type: none"> – Decommission the device. – Replace the device. 	10, 26 5, 17	User User
The gaskets of the transmitter head or mounting nut are damaged or dirty.		Check the gaskets. Clean if necessary.	9.2, 25	User

Fault	Cause	Correction	Chapter, Page	Target Group
Signal range fluctuating and imprecise	Source of EMC interference in the environment, e.g., frequency converter	<ul style="list-style-type: none"> – Shield the device and the lines. – If the fault continues to occur: Remove the source of EMC interference. 		Electrician
	Temperatures too high or too low	Maintain the permissible temperatures for operation.	13.3, 32	User
	The device is not grounded.	Ground the device.	9, 23	Electrician
	The pressure of the operating medium is fluctuating drastically.	<ul style="list-style-type: none"> – Install a device for damping the pressure fluctuations. – If required: Please contact Sartorius Service. 		User
Deviating zero point signal	Temperatures too high or too low	Maintain the permissible temperatures for operation.	13.3, 32	User
	Deviating installation position	Correct the system installation position.		User
	The permissible overload pressure limit has been exceeded.	Observe the permissible overload pressure limit.	13.4, 32	User

9.2 Checking the Gaskets

NOTICE

Damage to the connection lines!

If the signal connection loosens from the device: The exposed connection cables may be damaged, e.g., by being clamped.

- ▶ Carefully position the signal connection on the device and hold in place.

NOTICE

Tools can damage the device!

If a tool is used in the wrong place: The device may be damaged.

- ▶ Only apply the open-ended wrench to the mounting nut.

Qualification required: Electrician

Tool: Open-ended wrench, 42 mm

Procedure



- ▶ Unscrew the sleeve (2) in the direction of the signal connection (1).
- ▶ **NOTICE** Traction may damage the device! Do **not** pull on the connection cable of the looser signal connection.
- ▶ Loosen the mounting nut (3) using the open-ended wrench.
- ▶ Unscrew the mounting nut (3) from the device.
- ▶ Check whether the gaskets have been inserted in the grooves of the mounting nut and transmitter head.
 - ▶ If required: Push the gaskets into the groove.
- ▶ Check the gaskets in the mounting nut and in the transmitter head for damage, e.g., cracks or pressure sites.
 - ▶ If required: Please contact Sartorius Service.
- ▶ Check the gaskets and the protective cap for dirt.
 - ▶ If required: Wipe the gaskets and protective cap with a damp cloth.
- ▶ Apply the mounting nut (3) to the device.
- ▶ Screw the sleeve (2) onto the device and tighten by hand.
- ▶ Tighten the mounting nut using the open-ended wrench.

9.3 Restarting

Procedure

- ▶ Commission the device (see Chapter 5, page 17).

10 Decommissioning

NOTICE

Damage to the connection lines!

If the signal connection loosens from the device: The exposed connection cables may be damaged, e.g., by being clamped.

- ▶ Carefully position the signal connection on the device and hold in place.

NOTICE

Tools can damage the device!

If a tool is used in the wrong place: The device may be damaged.

- ▶ Only apply the open-ended wrench to the mounting nut.

Qualification required: Electrician

Tool: Open-ended wrench, 42 mm

Requirements

- The process is complete (see Chapter 10, page 26).
- The system has been entirely or partially depressurized.

Procedure

- ▶ Remove the connection cable from the device and from the system.
- ▶ Unscrew the sleeve (2) in the direction of the signal connection (1).
- ▶ Loosen the mounting nut (3) using the open-ended wrench.



- ▶ Pull the device out of the pressure sensor holder.
- ▶ Check whether the gasket has been inserted into the groove of the mounting nut.
 - ▶ If required: Push the gasket into the groove.
- ▶ Apply the mounting nut to the device.
- ▶ The retaining ring of the protective cap lies between the gaskets of the mounting nut and the transmitter head.
- ▶ Screw the sleeve onto the device and tighten by hand.
- ▶ Check whether the gasket has been inserted into the groove in the transmitter head.
 - ▶ If required: Push the gasket into the groove.
- ▶ Tighten the mounting nut by hand.
- ▶ Pull the protective cap over the sensor connection and press in place.
- ▶ Clean the device.

11 Storage and Shipping

11.1 Storage

Requirements

The device has been decommissioned.

Procedure

- ▶ Clean the device.
- ▶ Store the device according to the ambient conditions (see Chapter 13.3, page 32).

11.2 Returning the Device and Parts

Defective devices or parts can be sent back to Sartorius. Returned devices must be clean, decontaminated, and properly packed.

Transport damage as well as measures for subsequent cleaning and disinfection of the device or parts by Sartorius shall be charged to sender.

Devices contaminated with hazardous materials, e.g., harmful biological or chemical substances, will **not** be accepted for repair or disposal. The devices must be decontaminated before being shipped.

Procedure

- ▶ Decommission the device.
- ▶ Contact Sartorius Service for instructions on how to return devices or parts (please refer to www.sartorius.com).
- ▶ Pack the device and its parts properly for return.

12 Disposal

12.1 Decontaminating the Device

The device does **not** contain any hazardous materials that would necessitate special disposal.

The cultures and media (e.g., acids, bases) used during the processes are potentially hazardous materials that could cause biological or chemical hazards.

If the device has come into contact with hazardous substances: Steps must be taken to ensure proper decontamination and declarations.

Procedure

- ▶ Remove the operating media from the device.
- ▶ Decontaminate the device. The operator of the device is responsible for adhering to local government regulations on the proper decontamination and declaration for transport and disposal.

12.2 Disposing of Device and Parts

The device and the device accessories must be disposed of properly by disposal facilities.

The packaging consists of environmentally friendly materials that are intended to be used as secondary raw materials.

The consumables are designed and intended for single-use.

Requirements

The device has been decontaminated.

Procedure

- ▶ Dispose of the device. Follow the disposal instructions on our website (www.sartorius.com).
- ▶ Dispose of the consumables in accordance with local government regulations.

13 Technical Data

13.1 Multi-use Pressure Transmitter

13.1.1 Dimensions and Weight

	Unit	Value
Dimensions, \varnothing x L	mm	48 x 100
Weight	kg	0.4

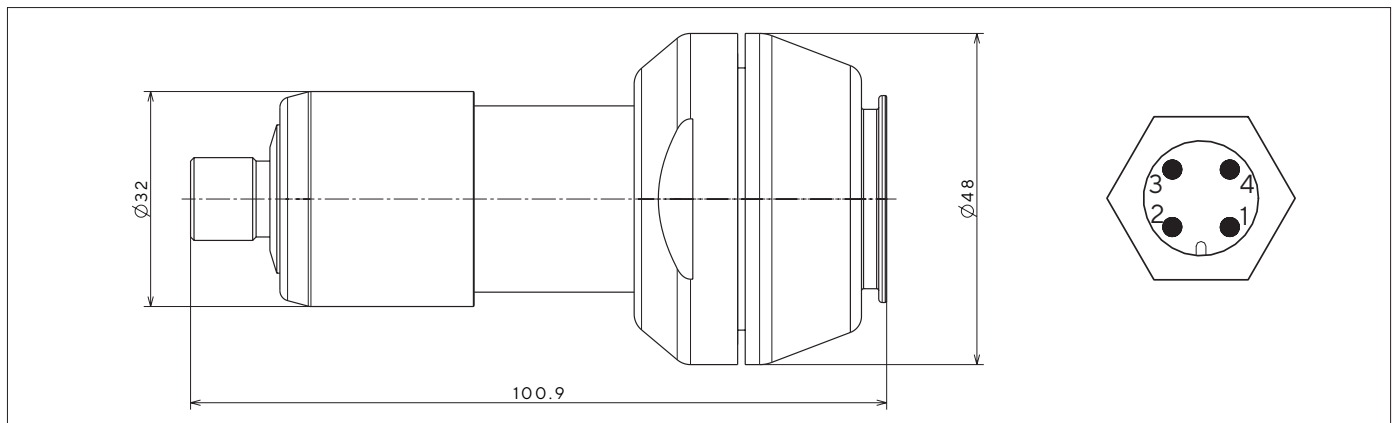


Fig. 5: Dimensions of multi-use pressure transmitter and electronic connections

13.1.2 Electrical Specifications and Connections

	Unit	Value
Output signal	mA	4-20
Power supply	V_{DC}	24
Permissible range	V_{DC}	9-30
Conductor cross-section	mm ²	0.5
Protection class		IP67
Round plug, type M12 x 1, 4-pin		
Pin assignment		
1 = U+ (brown)		
2 = (not assigned)		
3 = U- (blue)		
4 = (not assigned)		
Parametrization, 0 bar	mA	~ 4
Parametrization, 5 bar	mA	~ 20

13.1.3 Materials

Device: CrNi steel (stainless steel)

13.1.4 Approved Cleaning Agents

Alcohol-based surface cleaner

13.2 Single-use Pressure Pipes

13.2.1 Dimensions

	Unit	Value
BioPAT® Pressure Pipe 1" TC, Ø x L	mm	50.5 x 100
BioPAT® Pressure Pipe ¾" TC, Ø x L	mm	50.5 x 100
BioPAT® Pressure Pipe 1" HB, Ø x L	mm	30.8 x 119.2
BioPAT® Pressure Pipe ¾" HB, Ø x L	mm	25 x 115
BioPAT® Pressure Pipe ½" HB, Ø x L	mm	18.8 x 106.5
BioPAT® Pressure Pipe ⅜" HB, Ø x L	mm	13.8 x 90.5
BioPAT® Pressure Pipe ¼" HB, Ø x L	mm	9 x 75.1

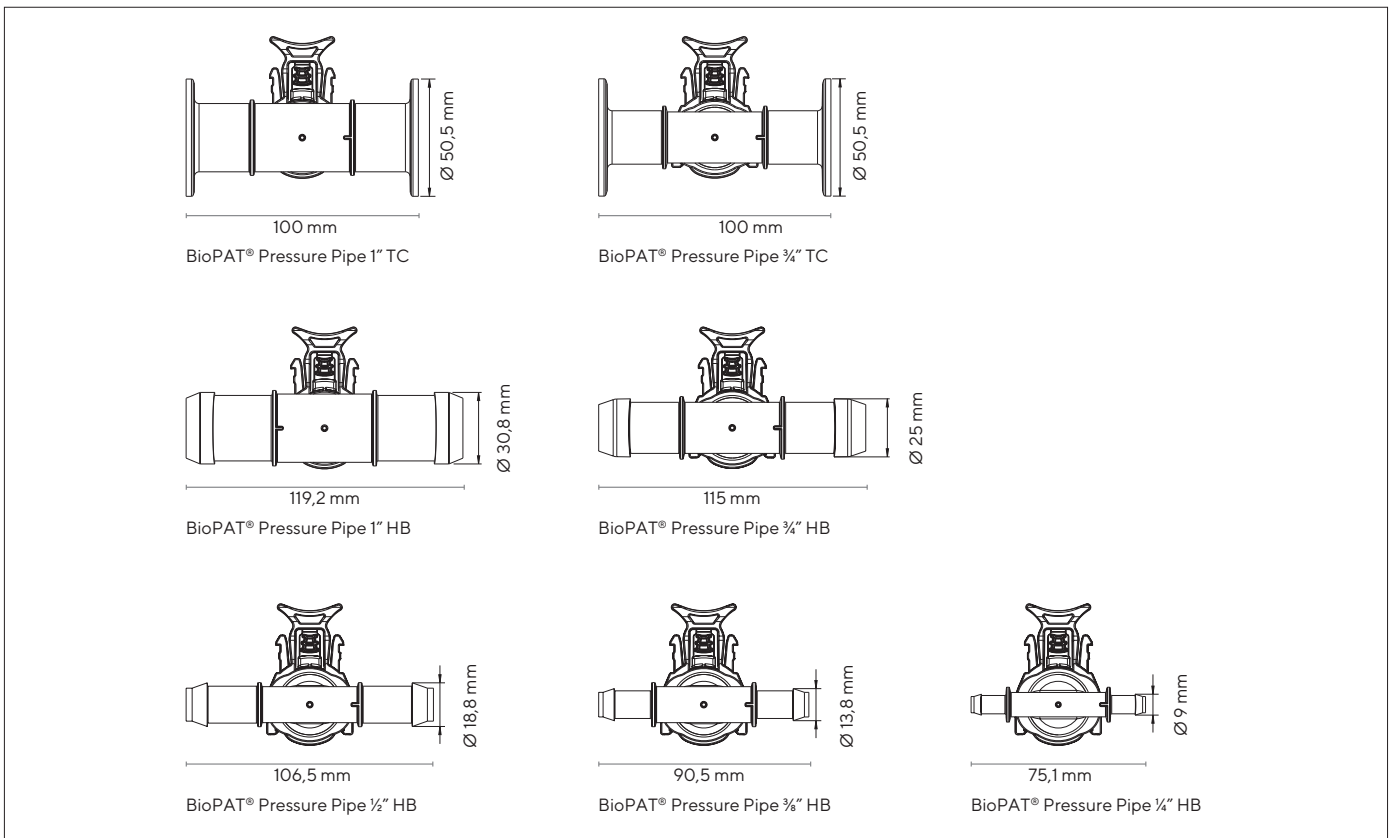


Fig. 6: Overview of the single-use pressure pipes

13.2.2 Materials

In contact with the product

Polybutylene terephthalate (PBT)

Liquid silicone rubber, conditioned

Otherwise

Polypropylene (PP)

Acrylonitrile butadiene styrene (ABS)

13.2.3 Shelf Life

Shelf life

before gamma radiation: 3 years

after gamma radiation: 3 years

13.2.4 Chemical Resistance*

1 M NaOH at 40°C for 2 h

20% solutions at 25°C for 1 h at 7.5 bar of: N,N-dimethylacetamide (DMAc); dimethyl sulfoxide (DMSO), N,N-dimethylformamide (DMF), propylene glycol (PG), acetonitrile (ACN), N-methylpyrrolidone (NMP)

*tested with gamma-radiated single-use pressure pipes, which were stored for the equivalent of 1 year under accelerated aging conditions.

13.3 Ambient Conditions

	Unit	Value
Temperature		
In operation	°C	4-40
Storage	°C	4-40
Relative humidity	%	10-96

13.4 Process Conditions

	Unit	Value
Temperature of operating medium	°C	0-40
Overload pressure limit	bar(g)	7.5
Measurement range		0-4
System accuracy* at 0-2 bar(g)	mbar	80
System accuracy* at 2-4 bar(g)	% c.v.	4

* The system accuracy is calculated as 1-sigma accuracy (mean deviation from the reference measurement + 1 standard deviation) and is valid for the use of each transmitter with each BioPAT® Single-use Pressure Pipe. For further information see: Validation Guide.

13.5 Operating Medium

Suitability of operating medium
Aqueous solutions, e.g., buffer and cell cultures
Acids and alkalis with a concentration of max. 1 M
Alcoholic solutions, e.g., ethanol or isopropanol, with a concentration of max. 70%

14 Accessories, Consumables, and Spare Parts

14.1 Accessories

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

Item	Quantity	Order Number
Pressure Sensor Holder	1	BB-34164015
½" tubing holder	1	4ZF-0059
¾" tubing holder	1	4ZF-0060
Digital display for multi-use pressure transmitter		BPD0101

14.2 Consumables

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

14.2.1 Single-use Pressure Pipes

Item Number	Connection	Size	Minimum Order Quantity
BPD0010	Hose barb	¼" (6.35 mm)	10
BPD0011	Hose barb	⅜" (9.53 mm)	10
BPD0012	Hose barb	½" (12.7 mm)	10
BPD0013	Hose barb	¾" (19.05 mm)	10
BPD0014	Tri-clamp connection	¾" (19.05 mm)	10
BPD0015	Hose barb	1" (25.4 mm)	10
BPD0016	Tri-clamp connection	1" (25.4 mm)	10

14.3 Spare Parts

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

Item	Quantity	Order Number
Multi-use pressure transmitter, 0-4 bar	1	BPD0005

15 Sartorius Service

Sartorius Service is at your disposal for queries about the device. Please visit the Sartorius website (www.sartorius.com) for information about the service addresses, services provided, or to contact a local representative.

16 Conformity Documents

The attached documents declare the conformity of the device with the designated directives or standards.

SARTORIUS



Original

EU-Konformitätserklärung EU Declaration of Conformity

Hersteller Sartorius Stedim Systems GmbH
 Manufacturer Robert-Bosch-Str. 5-7, 34302 Guxhagen, Germany

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

Geräteart Drucktransmitter
 Device type Pressure Transmitter

Baureihe **BioPAT[®] Pressure**
 Type series

Modell **BPD0005, BPD00L5, BPD00U5**
 Model


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

	EMV EMC	RoHS
Richtlinie Directive	2014/30/EU	2011/65/EU
Norm(en) Standard(s)	EN 61326-1:2013	EN IEC 63000:2018

Die Person, die bevollmächtigt ist, die technischen Unterlagen zusammenzustellen:
The person authorised to compile the technical file:

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 Product Compliance
 Robert-Bosch-Str. 5-7
 34302 Guxhagen, Germany

Sartorius Stedim Systems GmbH
 Guxhagen, 2022-10-04

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Doc: 2062054-03

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PCF: 2062053

GP-124F-00_2021-12-20



Original

UK Declaration of Conformity

Manufacturer Sartorius Stedim Systems GmbH
 Robert-Bosch-Str. 5-7
 34302 Guxhagen, Germany
 declares under sole responsibility that the equipment

Device type Pressure Transmitter

Type series **BioPAT® Pressure**

Model **BPD0005, BPD00L5, BPD00U5**


in the form as delivered fulfils all the relevant provisions of the following British Regulations and meets the applicable requirements of the British Designated Standards including any amendments valid at the time this declaration was signed listed below:

	EMC	RoHS
Regulation	The Electromagnetic Compatibility Regulations 2016	The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012
	UK Statutory Instruments 2016 No. 1091	UK Statutory Instruments 2012 No. 3032
Standard(s)	BS EN 61326-1:2013	BS EN IEC 63000:2018

The person authorised to compile the technical file:

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Doc: 2819354-01 SSS22UKCA012-00.en 1 / 1 PCF: 2062053 GP-124F-00_2021-12-20

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