

# Breathing system heater

## Supplement to Operator's Instruction Manuals

Fabius <sup>®</sup> GS SW 1.3n	(90 37 781)
Fabius <sup>®</sup> GS SW 2.n	(90 37 933)
Fabius <sup>®</sup> GS SW 3.n	(90 38 685)
Fabius <sup>®</sup> Tiro SW 2.n	(90 38 132)
Fabius <sup>®</sup> Tiro SW 3.n	(90 38 686)
Fabius <sup>®</sup> GS <i>premium</i> SW 3.n	(90 38 923)
Fabius <sup>®</sup> plus SW 3.n	(90 39 054)

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## **For Your Safety and that of Your Patients**

Strictly follow the Instructions for Use

Any use of the breathing system heater requires full understanding and strict observation of these instructions and the Fabius GS or Fabius Tiro Operator's Instruction Manual. The apparatus is only to be used for purposes specified here.

Safe connection with other electrical equipment

Electrical connections to equipment which is not listed in these Instructions for Use should only be made following consultations with the respective manufacturers or an expert.

Not for use in areas of explosion hazard

This apparatus is neither approved nor certified for use in areas where combustible or explosive gas mixtures are likely to occur.

Liability for proper function or damage

The liability for the proper function of the apparatus is irrevocably transferred to the owner or operator to the extent that the apparatus is serviced or repaired by personnel not employed or authorized by DrägerService or if the apparatus is used in a manner not conforming to its intended use.

Dräger cannot be held responsible for damage caused by non-compliance with the recommendations given above. The warranty and liability provisions of the terms of sale and delivery of are likewise not modified by the recommendations given above.

Dräger Medical GmbH

## **Purpose of This Document**

### **Purpose of This Document**

#### **Breathing System Heater (Optional)**

Breathing system heater for use in conjunction with the Fabius GS and Fabius Tiro anaesthetic machines in order to reduce the condensation of moisture in the breathing system during low-flow operation (fresh gas flow below 1 l/min).

This Instruction Manual supplement contains additions to the information contained in the Fabius GS or Fabius Tiro Operator's Instruction Manual.

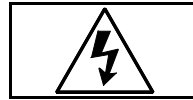
## Symbol Definition

The following symbols appear on the power supply of the (optional) breathing system heater.

**Caution:** Refer to accompanying documents before operating equipment.



**Caution:** Risk of electric shock, do not remove cover. Refer servicing to a DrägerService representative.



Degree of protection against electric shock:  
Class 1 Type B.



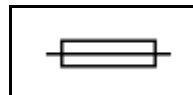
Registration Mark



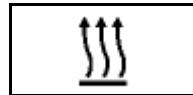
Mains Applied/Mains Power



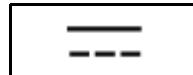
Fuse



Heater Power



DC Voltage



AC Voltage



## General Warnings and Cautions

### General Warnings and Cautions

The following list of warnings and cautions apply to general operation and maintenance of the Fabius GS and Fabius Tiro. Warnings and cautions about installing and operating specific parts appear with those topics.

- A Warning statement gives important information that, if ignored, could lead directly to personal injury.
- A Caution statement gives important information that, if ignored, could lead directly to equipment damage and indirectly to personal injury.

**Warning:** When the moisture content falls below a specified minimum level, the following undesirable reactions can occur, regardless of the type of CO<sub>2</sub> absorbent and the anaesthetic agent used, e.g. Halothane, Enflurane, Isoflurane, Sevoflurane or Desflurane:

- reduced CO<sub>2</sub> absorption,
- formation of CO,
- absorption and/or decomposition of the inhalation anaesthetic agent,
- increased heat generation in the absorber, leading to higher breathing gas temperatures.

Additionally, the breakdown products of anaesthetic agents exposed to dry absorbent are both flammable and toxic, and fires have been reported in association with the use of desiccated absorbent and volatile anaesthetics.

These reactions can result in danger to the patient in the form of CO intoxication, insufficient depth of anesthesia and airway burns.

## Installation of BSHPS (Fabius GS)

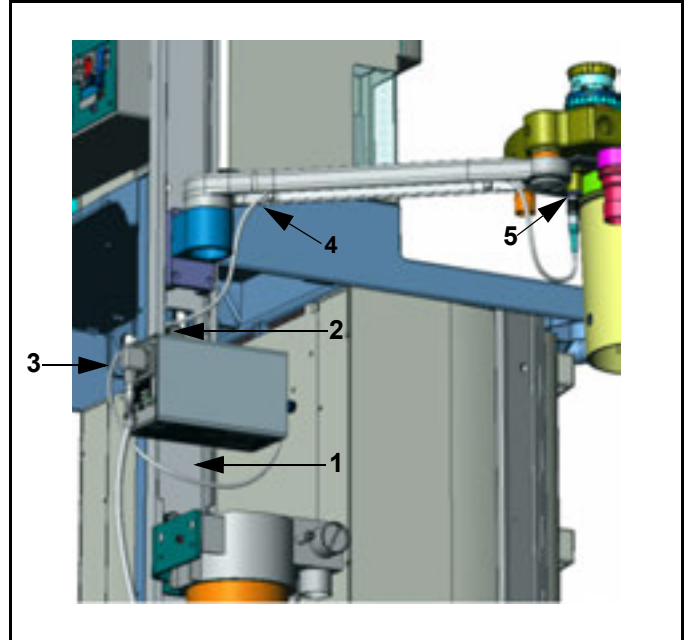
The following provides instruction on installation of the power supply for the breathing system heater (mains adapter).

### Left Mount COSY BSHPS Installation

The following numbers in boldface refer to [Figure 1](#).

1. Install the power supply onto the left rear GCX rail of the Fabius GS by sliding the mounting plate of the power supply through the opening of the rail (**1**) and then sliding it upward. Tighten the knob (**2**) against the rail when the power supply is in the desired position.
2. Route the power cable (**3**) for the heater below and behind the power supply and then up to the rear of the COSY arm. Push the cable into the cable management cavity (**4**) on the bottom of the COSY arm.
3. Plug the connector at the end of the cable into the mating connector (**5**) on the rear underside of the COSY. Orient the connector so that the red mark on the connector plug aligns with the red mark on the receptacle.

Figure 1. BSHPS Installation on Machine with Left Mount COSY



## Installation of BSHPS (Fabius GS)

### Right Mount COSY BSHPS Installation

1. Install the power supply onto the left rear GCX rail of the Fabius GS by sliding the mounting plate of the power supply through the opening of the rail (1 in Figure 1) and then sliding it upward. Tighten the knob (1 in Figure 2) against the rail when the power supply is in the desired position.
2. Route the power cable for the heater through the trough (2 in Figure 2) on the rear of the cabinet. At the right hand end of the trough, route the cable into the cable management cavity (1 in Figure 3) on the bottom of the COSY arm.
3. Plug the connector at the end of the cable into the mating connector (2 in Figure 3) on the rear underside of the COSY. Orient the connector so that the red mark on the connector plug aligns with the red mark on the receptacle.

Figure 2. BSHPS Installation on Machine with Right Mount COSY - Step 1

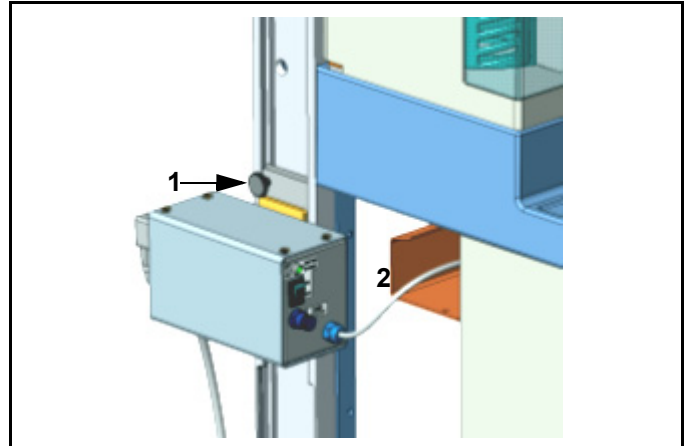
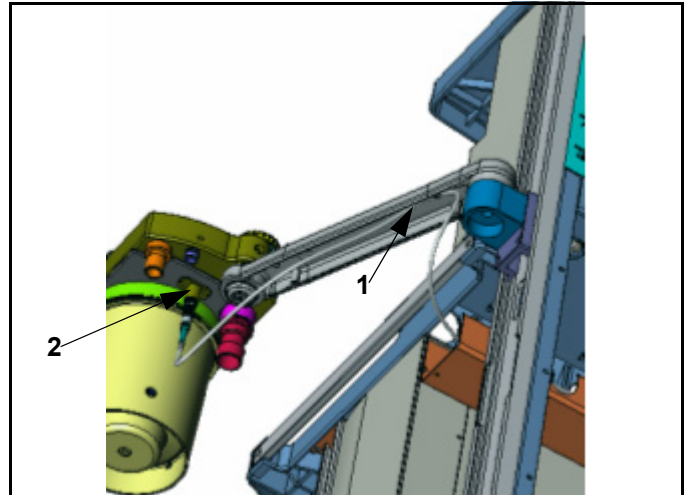


Figure 3. BSHPS Installation on Machine with Right Mount COSY - Step 2





## Installation of BSHPS (Fabius Tiro)

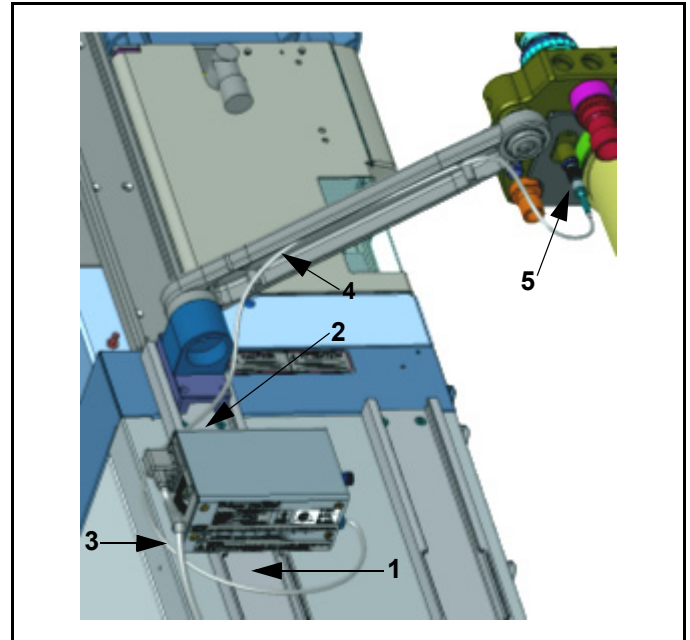
The following provides instruction on installation of the Breathing System Heater Power Supply (BSHPS).

### Left Mount COSY BSHPS Installation (Trolley)

The following numbers in boldface refer to [Figure 4](#).

1. Install the power supply onto the left rear GCX rail of the Fabius Tiro by sliding the mounting plate of the power supply through the opening of the rail (**1**) and then sliding it upward. Tighten the knob (**2**) against the rail when the power supply is in the desired position.
2. Route the power cable (**3**) for the heater below and behind the power supply and then up to the rear of the COSY arm. Push the cable into the cable management cavity (**4**) on the bottom of the COSY arm.
3. Plug the connector at the end of the cable into the mating connector (**5**) on the rear underside of the COSY. Orient the connector so that the red mark on the connector plug aligns with the red mark on the receptacle.

Figure 4. BSHPS Installation on Machine with Left Mount COSY (Trolley)



## Installation of BSHPS (Fabius Tiro)

### Right Mount COSY BSHPS Installation (Trolley)

1. Install the power supply onto the left rear GCX rail of the Fabius Tiro by sliding the mounting plate of the power supply through the opening of the rail (1 in Figure 4) and then sliding it upward. Tighten the knob (1 in Figure 5) against the rail when the power supply is in the desired position.
2. Route the power cable for the heater through the trough (2 in Figure 5) on the rear of the cabinet. At the right hand end of the trough, route the cable into the cable management cavity (1 in Figure 6) on the bottom of the COSY arm.
3. Plug the connector at the end of the cable into the mating connector (2 in Figure 6) on the rear underside of the COSY. Orient the connector so that the red mark on the connector plug aligns with the red mark on the receptacle.

Figure 5. BSHPS Installation on Machine with Right Mount COSY - Step 1 (Trolley)

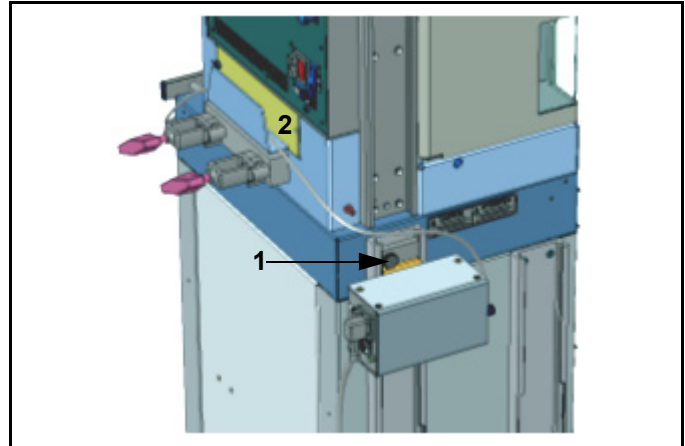
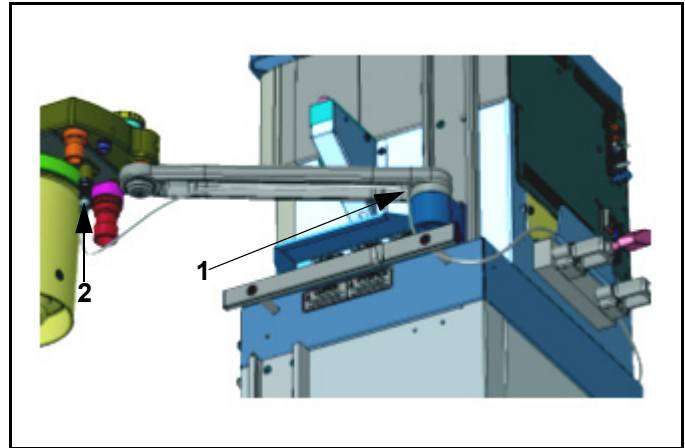


Figure 6. BSHPS Installation on Machine with Right Mount COSY - Step 2 (Trolley)



## Wall Mounted Machine BSHPS Installation

1. Remove the GCX slide plate (1 in [Figure 7](#)) from the side of the power supply by removing the two screws (2 in [Figure 7](#)).
2. Install the Dräger clamp onto the rear side of the power supply box using the two screws and lockwashers included with the clamp assembly ([Figure 8](#)).
3. Clamp the power supply onto the rear area of the left hand Dräger rail (1 in [Figure 9](#)).

Figure 7. BSHPS Installation on Wall Mounted Machine - Step 1

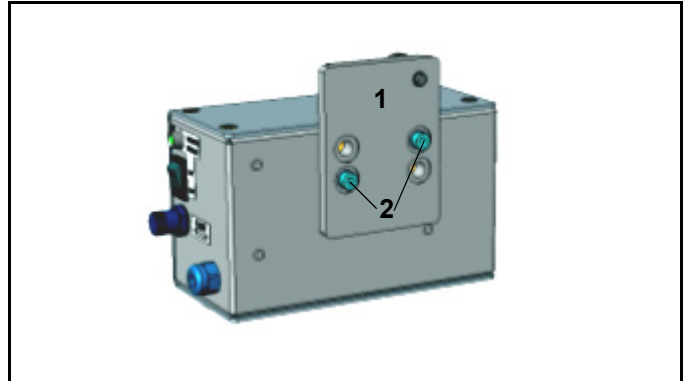


Figure 8. BSHPS Installation on Wall Mounted Machine - Step 2

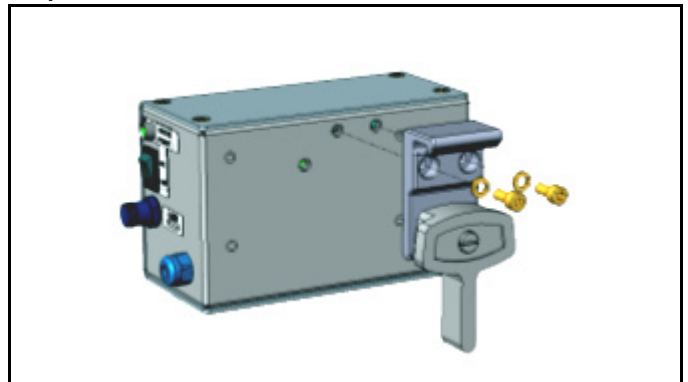
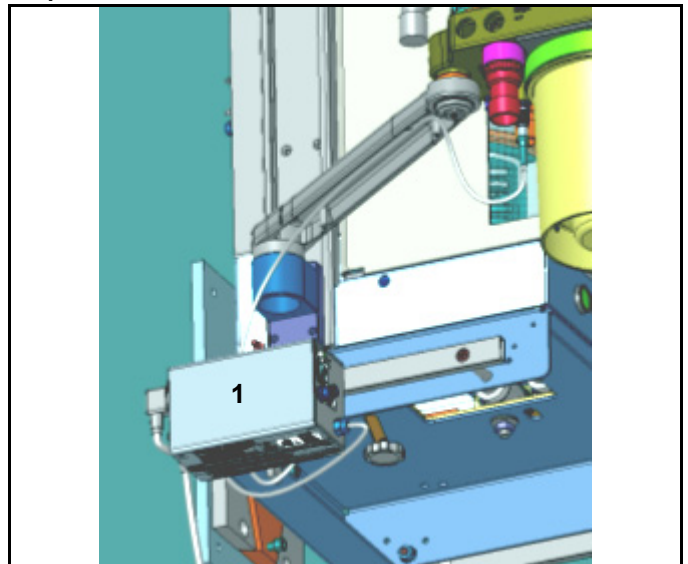


Figure 9. BSHPS Installation on Wall Mounted Machine - Step 3



## Installation of BSHPS (Fabius Tiro)

### Left Mounted COSY BSHPS Wall Mounted Installation

4. On a left mounted COSY, route the power cable for the heater below and behind the power supply and then up to the rear of the COSY arm (1 in Figure 10). Extra cable can be coiled around the clamp. Push the cable into the cable management cavity on the bottom of the COSY arm (1 in Figure 11).
5. Plug the connector at the end of the cable into the mating connector on the rear, underside of the COSY (2 in Figure 11). Orient the connector so that the red mark on the connector plug aligns with the red mark on the receptacle.

Figure 10. BSHPS Installation on Wall Mounted Machine (Left Mount COSY) 1

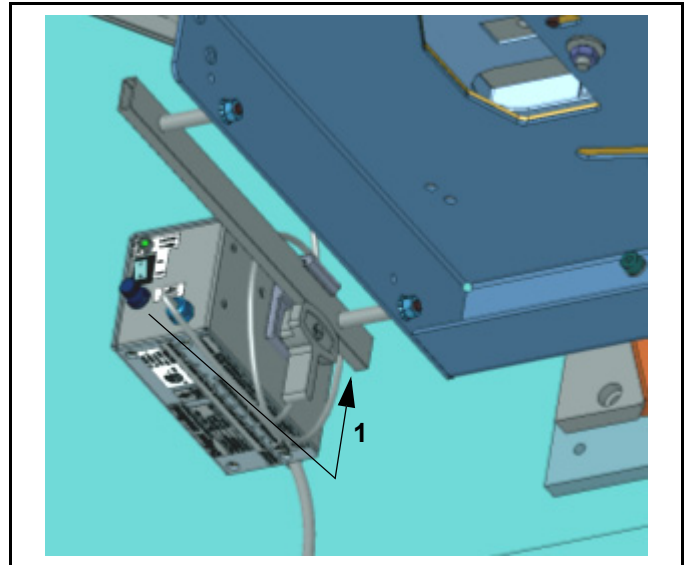
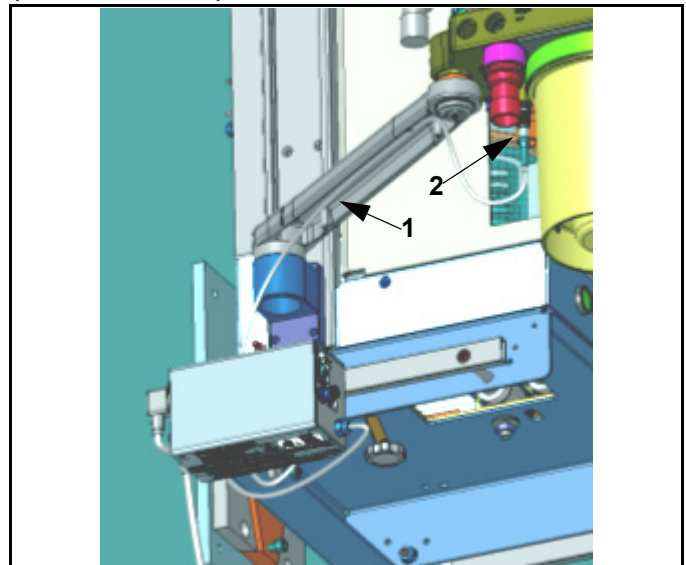


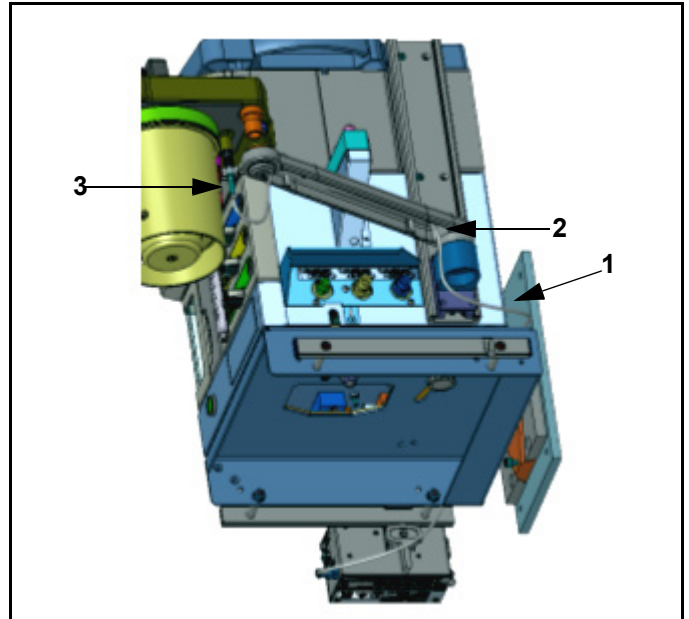
Figure 11. BSHPS Installation on Wall Mounted Machine (Left Mount COSY) 2



### Right Mounted COSY BSHPS Wall Mounted Installation

4. On a right mounted COSY machine, route the power cable for the heater through the trough on the rear of the cabinet (1 in Figure 12). At the right hand end of the trough, route the cable into the cable management cavity on the bottom of the COSY arm (2 in Figure 12).
5. Plug the connector at the end of the cable into the mating connector on the rear underside of the COSY (3 in Figure 12). Orient the connector so that the red mark on the connector plug aligns with the red mark on the receptacle.

Figure 12. BSHPS Installation on Wall Mounted Machine (Right Mount COSY)



## Operation of BSHPS

### Operation of BSHPS

1. Plug the power cord (1 in Figure 13) into a mains power outlet on the wall. The green LED for MAINS POWER (2 in Figure 13) will illuminate when the plug is connected to power.
2. Switch the HEATER POWER switch (1 in Figure 14) to the ON position (top of the rocker depressed). The HEATER POWER LED will illuminate (2 in Figure 14).
3. After 15 to 30 minutes, the underside of the COSY will feel slightly warm.

To avoid the possibility of drying out absorbent, it is recommended that the heater be turned off when not in use.

**Warning:** When the moisture content falls below a specified minimum level, the following undesirable reactions can occur, regardless of the type of CO<sub>2</sub> absorbent and the anaesthetic agent used, e.g. Halothane, Enflurane, Isoflurane, Sevoflurane or Desflurane:

- reduced CO<sub>2</sub> absorption,
- formation of CO,
- absorption and/or decomposition of the inhalation anaesthetic agent,
- increased heat generation in the absorber, leading to higher breathing gas temperatures.

Additionally, the breakdown products of anaesthetic agents exposed to dry absorbent are both flammable and toxic, and fires have been reported in association with the use of desiccated absorbent and volatile anaesthetics.

These reactions can result in danger to the patient in the form of CO intoxication, insufficient depth of anesthesia and airway burns.

Figure 13. BSHPS Back

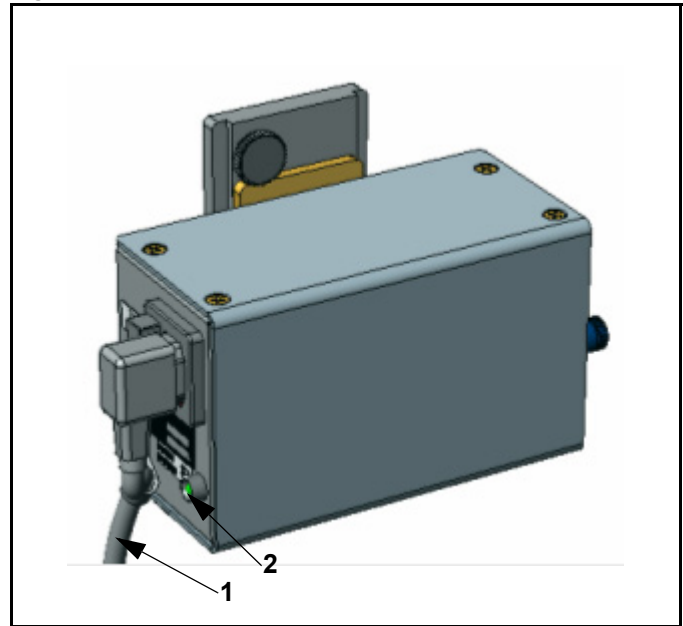
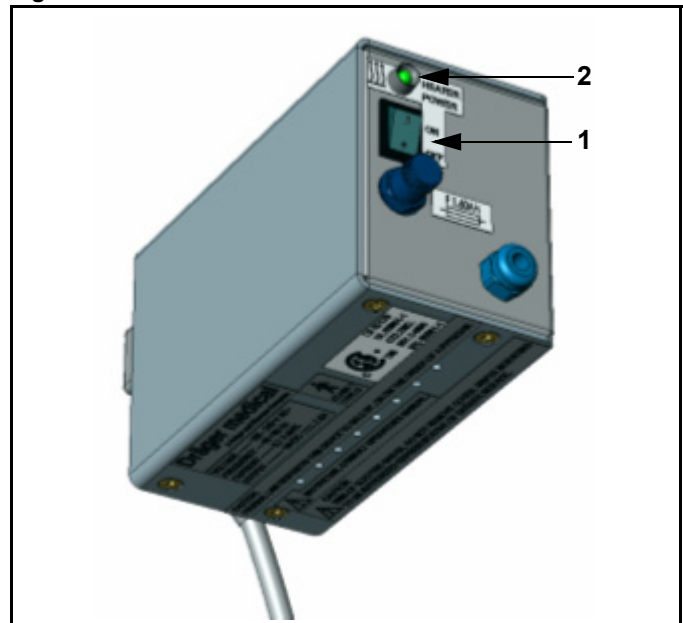


Figure 14. BSHPS Front



## BSHPS Problem Resolution

**Note:** Call your local Authorised Service Organisation or DrägerService if the following steps do not resolve BSHPS problems.

### Bottom of COSY Not Warm After 30 Minutes

1. Ensure that the HEATER POWER switch (1 in Figure 15) is in the ON position.
2. Ensure that the “HEATER POWER ON” LED is illuminated (2 in Figure 15).
3. Check that the connector (1 in Figure 1) on the cable running to the COSY is plugged in properly.
4. Check that the MAINS POWER LED (1 in Figure 17) is illuminated and that the Mains Power cord (2 in Figure 17) is plugged into a functioning wall outlet.

### “HEATER POWER ON LED” Is Not Illuminated

If the “HEATER POWER ON” LED (2 in Figure 15) is not illuminated when the HEATER POWER switch (1 in Figure 15) is in the ON position and the MAINS POWER LED (1 in Figure 17) is illuminated, check the fuse (3 in Figure 15). If it is blown, replace it with the properly rated fuse.

### MAINS POWER LED Is Not Illuminated

If the MAINS POWER LED (1 in Figure 17) is not illuminated when the mains power cord (2 in Figure 17) is plugged into a wall outlet:

1. Check that the wall outlet is functioning and the plug is plugged into it properly.
2. Check that the power supply-end cord plug (4 in Figure 17) is plugged into the power supply properly.
3. Check the two fuses in the power inlet assembly (3 in Figure 17). Replace them if they are blown.

Figure 15. BSHPS Front

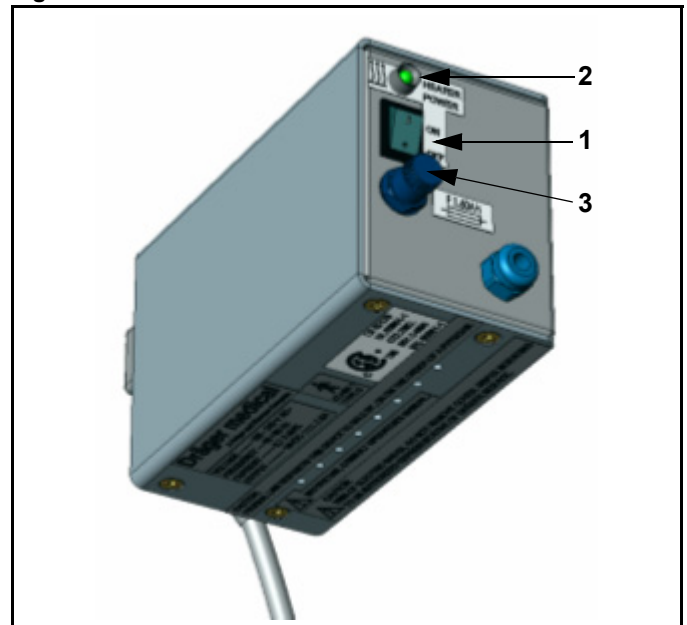


Figure 16. BSHPS Connector

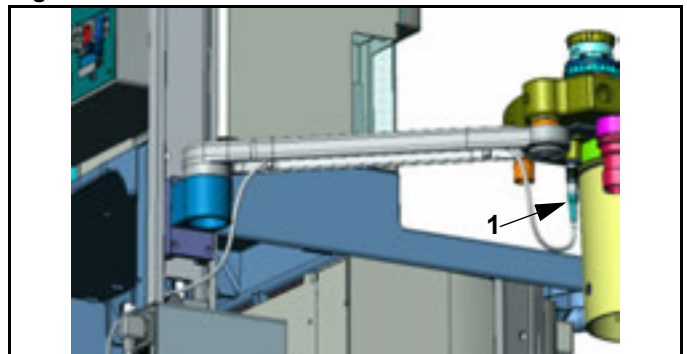
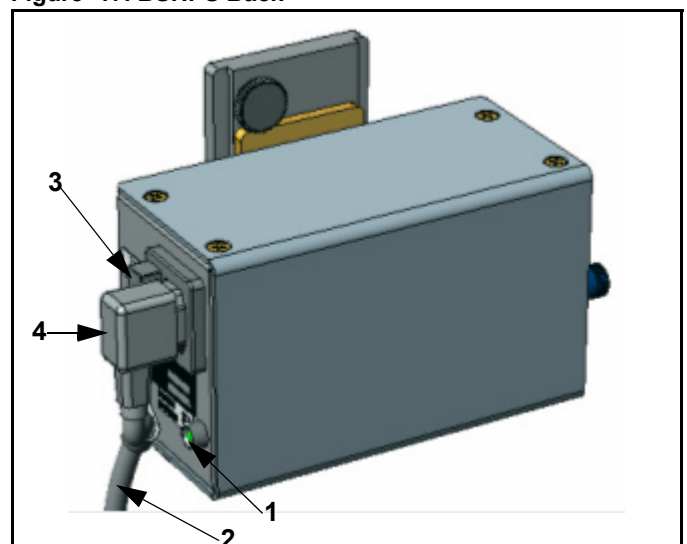


Figure 17. BSHPS Back

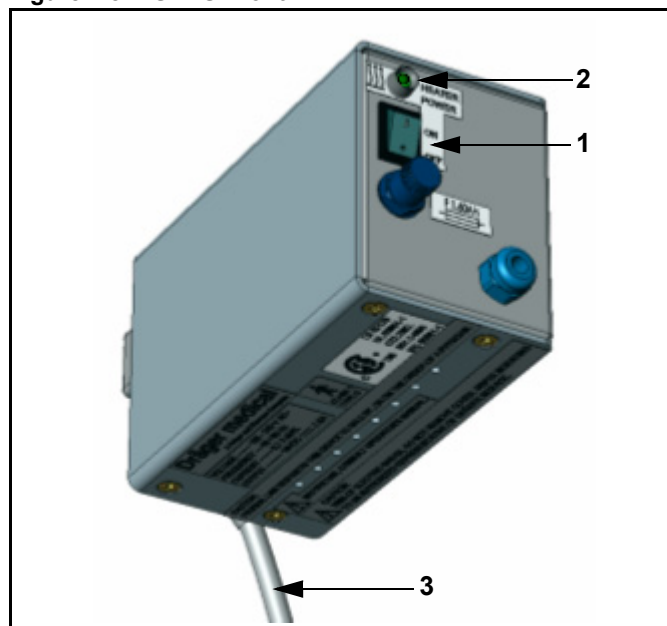


## Switching Off BSHPS

### Switching Off BSHPS

1. Switch the HEATER POWER switch (1 in Figure 18) to the OFF position (bottom of the rocker depressed). The HEATER POWER LED will darken (2 in Figure 18).
2. Unplug the power cord (3 in Figure 18) from the mains power outlet on the wall.

Figure 18. BSHPS Front



### Preparing the Compact Breathing System for Disinfection and Cleaning

1. Leave the Dräger Vapour(s) on the machine.
2. Remove all breathing hoses.
3. Remove the breathing bag.
4. Remove the ventilation hose.
5. Remove the fresh gas hose from the breathing system.
6. Remove the anaesthetic scavenging hose.
7. Detach the APL-bypass and the Peep/Pmax lines from the breathing system and from the side of the machine.
8. Remove the flow sensor cable.
9. Remove the O<sub>2</sub> sensor cable.
10. Turn off optional Breathing System Heater Power Supply (BSHPS) power and disconnect BSHPS power cable from the breathing system.
11. Remove the compact breathing system.



# Preparing the Compact Breathing System for Disinfection and Cleaning

## Disinfection / Cleaning / Autoclaving

The same information applies to the breathing system with heater as that for the breathing system contained in the Fabius GS or Fabius Tiro Operator's Instruction Manual.

Cleaning/disinfection of the mains adapter should be performed as described in the Fabius GS or Fabius Tiro Operator's Instruction Manual under "Machine (exterior)".

## Servicing / Maintenance

Please refer to the following Instruction Manuals

Fabius GS SW 1.3n	(90 37 781)
Fabius GS SW 2.n	(90 37 933)
Fabius GS SW 3.n	(90 38 685)
Fabius Tiro SW 2.n	(90 38 132)
Fabius Tiro SW 3.n	(90 38 686)
Fabius GS <i>premium</i> SW 3.n	(90 38 923)
Fabius plus SW 3.n	(90 39 054)

## **BSHPS Technical Data**

### **BSHPS Technical Data**

The Fabius GS and Fabius Tiro can be configured with a breathing system heater to reduce condensation of moisture in the system.

#### **Electrical**

##### AC Input Voltage and Current

100-240 VAC, 50-60 Hz nominal, single phase, 0.6 Amps max.

##### DC Output

15Vdc  $\pm$  5%, 1.3 Amps

##### Fuses

- 2x T2.5AH 250V IEC 60127-2/V
- 1x F1.60AH 250V IEC 60127-2/V

##### Electromagnetic Compatibility (EMC)

Conforming to EN 60601-1-2, IEC 60601-1-2, and ANSI/AAMI/IEC 60601-1-2

##### Electrical Safety Conformance

- IEC 60601-1
- CAN/CSA C22.2 No. 601.1-M90
- UL 60601-1

#### **Environmental**

##### Temperature

Operating +10 °C to +35 °C

Storage -10 °C to +70 °C

##### Humidity

Operating 20% to 80% non-condensing

Storage 10% to 90% non-condensing

##### Barometric Pressure

Operating 700 to 1060 mbar

Storage 500 to 1060 mbar

#### **Classification**

Classification Class II a  
in accordance with  
Directive 93/42/EWG  
Annex IX

UMDNS Code 15-105  
Universal Medical Device  
Nomenclature System

Protection class I, in accordance with IEC 60601-1

## Daily Checkout

### Breathing System Heater (when present)

- Check cable connections.
- Check power cord connections.
- Ensure that the MAINS POWER LED is illuminated.
- Ensure that the HEATER POWER switch is in the "ON" position.
- Ensure that the "HEATER POWER ON" LED is illuminated.
- Ensure that the underside of the COSY is warm (approximately 35-40°C) after 30 minutes have elapsed since the "HEATER POWER ON" LED was illuminated.





These Instructions for Use apply only to  
**Fabius GS, Fabius Tiro,**  
**Fabius GS *premium* and Fabius plus**  
with Serial No.:

If no Serial No. has been filled in by  
Dräger these Instructions for Use are  
provided for general information only and  
are not intended for use with any specific  
machine or device.



Directive 93/42/EEC  
Concerning Medical Devices

**Dräger Medical GmbH**  
Germany

 Moislinger Allee 53 – 55  
D-23542 Lübeck  
 +49 451 8 82- 0  
FAX  +49 451 8 82- 20 80  
 <http://www.draeger.com>

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