Service Instructions

Blood and Infusion Warmer

BW 685 / BW 685 S

Print version BW 685 V 7
Software V 1.5

BIEGLER
medizinelektronik

Table of contents

1. Technical Data

Technical data for BW 685 / BW 685 S:

Device:	Blood and Infusion Warmer
Type designation:	BW 685 / BW 685 S
Voltage:	230 V / 50 Hz
Power consumption:	1.5 A
Protection class:	I
Degree of protection:	B
Humidity protection:	IPX4
Fuses:	primary 2 x 1.6 AT secondary 500 mAT
Control temperature:	37°C - 41°C adjustable in 0.5°C steps
Overtemperature shutdown:	42°C / 42.5°C / 45°C±3°C
Max. system pressure:	300 mm Hg
Classification:	IIb according to Rule 9
Operational mode:	Continuous operation
Dimensions BW 685:	WxHxD 228 x 228 x 132 mm
Weight BW 685:	1.9 kg
Dimensions BW 685 S:	WxHxD 228 x 278 x 132 mm
Weight BW 685 S:	2.0 kg
Tube warmer Tubeflow for BW 685 S:	Length 1340 mm

2. Symbols Used

Certifies compliance with the Directive 93/42/EEC

Observe the instructions for use

Do not dispose of this product as unsorted municipal waste

Control for increasing the temperature setting

Control for decreasing the temperature setting

IPX 4

Humidity Classes

Degree of protection B

Control for switching On / Standby

- for optional tube warmer Tubeflow

Operation

Malfunction

Do not cover

Do not wrap up

Do not expose to direct sunlight

Do not cut

3. Safety Instructions

The manufacturer, assembler, installer or importer is considered responsible for the device's effect on safety, reliability and performance only if:

- the device is used in compliance with the instructions for use
- the electrical installations in the affected rooms comply with the existing special technical regulations
- modifications, repairs or new adjustments have been or are only performed by Biegler or authorized personnel
- only original replacement parts from Biegler are used for repairs

  (applies also for the mains power cord).

After the buzzing tone sounds or the red alarm light lights up, the infusion or transfusion tube must be removed immediately from the warming cylinder!
The infusion or transfusion solution may no longer be used on the patient!

- In the event of any suspected malfunction while in operation, the device should be immediately removed from service and not used for infusions or transfusions until appropriate investigations have demonstrated that there has been no impairment.
- If the high temperature alarm is triggered the supply of liquid to the patient must be immediately stopped by disconnecting the connection tube to the patient. The medium being used in the device must no longer be administered to the patient.
- The device may only be fastened to infusion stands, tripods or equipment rails which are suitable due to their stability and load capacity.
- Only sterile consumables prescribed by BIEGLER may be used in conjunction with the BW 685 / BW 685 S.
- The device must only be used in areas in which the electrical installations are in accordance with the standards and regulations in force.
- Safe disconnection from the mains power supply can only be achieved by unplugging the mains plug.

- The device may not be used in rooms subject to explosion hazard.
- Repairs and modifications to the device may only be carried out by persons or service centres authorised by BIEGLER.

- The device must not be immersed in liquids or sterilised with steam or by thermochemical methods.
- All extraneous influences, such as electromagnetic waves or high temperatures are to be kept to a minimum.
- The system may malfunction due to the effect of strong electromagnetic fields (e.g. by HF therapy or surgical devices). The warmer works perfectly within the limit values of the Standard EN 60601-1-2. The system can be affected by limit values that do not comply with the Standard EN 60601-1-2.
- Avoid exerting force on the device or its accessories.
- If the device is dropped, damaged by force or if it shows a function deviating from the instructions for use, stop using the device immediately and return it to the service centre.
- The periodic technical safety inspections must be carried out (see the section "Periodic inspections")

Supplementary safety instructions for the accessory tube warmer Biegler Tubeflow BW 685 S:

- The Biegler Tubeflow may only be clamped to the Biegler blood warmer BW 685 S with the fixing clamp according to the diagram in the chapter of the instructions for use "Initial operation".
- Do not kink, cover, warm or cool the Biegler Tubeflow. Do not cover the Tubeflow with cloths or dressing material. Do not lead under blankets, warm air blankets, etc. Do not expose to direct sunlight or heat radiation. Lead the Tubeflow through the air unencumbered. Do not lead into or through incubators. Overwarming of the warmed liquid or burns to the patient cannot to be excluded in the case of non-compliance.

- Do not shorten or damage the Biegler Tubeflow.

The BW 685 / BW 685 S may not be used if:

- the housing is damaged or one of the front film layers becomes detached.

- the device has been exposed to a hard physical shock (e.g. dropped, hit or shaken)
- the device has been immersed in water
- the device has triggered a high temperature alarm that was not caused by external factors.
- the mains power cord or plug is damaged
- the device has given somebody an electric shock

the fixing clamps are damaged and no longer assure safe clamping to the infusion stand.

Should a malfunction be evident, suitable warning signs should be attached to the device to ensure that it cannot be used before necessary service and repair work has been carried out.

4. Warranty

Biegler Medizinelektronik provides a warranty for this device for a period of **two years** from the purchase date.
This warranty applies for defects in materials and workmanship and includes both replacement parts and labour.
The activated warranty requires that an invoice or proper receipt be presented and that the warranty claim be made within the warranty period.
The warranty expires if the device has been damaged, not used or maintained properly according to the instructions for use or unauthorized repairs or alterations have been made.

5. Safety Shutdown

42 °C (software alarm):

- Switch device on
- Preheat the BW to 41°C and wait for the temperature to stabilise
- Disconnect the mains plug
- Hold down the control ↑ and reconnect the mains power cable.
- Press the control Operation/Standby (the device now slowly heats up to a target temperature of 42.5 °C)
- Observe the temperature display carefully. The high temperature alarm should be triggered at 42°C. (for reasons of safety, short beeping sounds are given at intervals of a second in this operational mode – the LEDs of the STANDBY indicator also flash, alternating with each other)

42.5 °C (hardware alarm):

Important: Testing of the hardware alarm can only be conducted with the service cable LZ10B0685!

- Connect the blood warmer to the computer and start a terminal programme
- Switch the blood warmer on and preselect 41°C on the device
- Allow the BW to warm up (about 1 minute)
- Press the "e" key on the computer
  The blood warmer is now in set-mode. This is signalled by the blinking of the STANDBY indicator and a beep.
- With the software alarm deactivated, the device now heats up to a temperature of 45°C. The hardware temperature shutdown must be active at 42.5°C +/- 0.5°C

45 °C (overtemperature cut-out):

- If, for any reason, the first and second electronic safety shutdowns do not activate, then the heat exchanger will be shut off by an automatic, resetable thermal cut-off at a temperature of 45°C.
- After the heat exchanger cools, the electronic shutdown must be tested. If this test is positive, the device can be put back into operation after cooling.
- This type of shutdown may also activate if the device is stored in the vicinity of strong heat sources or exposed to direct sunlight.

37 °C (low temperature alarm):

This alarm cannot active until 60 seconds after switching on the device. If the temperature of the heat exchanger is less than 36.5°C, the user will be notified by the low temperature alarm both optically and acoustically. The alarm is signalled by the blinking of the STANDBY display and an intermittent beep. This alarm resets automatically (if the temperature rises again to 37 °C, the alarm stops).

If a type of shutdown is activated, the device must be tested immediately and repaired, if necessary.

6. Setting the temperature

- Start the terminal software
- Connect the BW 685 with the computer or terminal (RS 232) using the connecting power cable LZ 10B0685 (Biegler ID)
- The monitor must now display data output as described in section 7, Service Interface
- Attach a suitable temperature probe (Ø 0.5 mm) in the middle of the heating ring on the upper side with a piece of infusion tubing in such a way that the temperature can be measured on the groove bed
- Send the command " * " to the BW685 to set the correction factors of both sensors to 0
- Start the warmer's heater and wait until the temperature has stabilised. This measurement must only be conducted in draft-free rooms to avoid false measurements.
- Conduct the temperature control.
  The measured temperature should be the same (+/- 0.1 °C) as the temperatures displayed on the monitor (actual-f and actual-r)
  Deviations up to +/- 0.5 °C can be compensated for with the commands " **!** ", " **„** ", " **?** " and " **=** ".

7. Service Interface

The BW 685 is equipped with a service interface. This serial interface provides different measured values that can be very useful during calibration and trouble-shooting. The BW 685 can be connected directly to a PC or terminal with an appropriate connecting power cable. The data can be displayed using an available terminal programme (hyperterminal).

Data format:
19 200, n, 8, 1

Control codes:		
code	**description**	**usage**
r	run	service/remote
s	stop	service/remote
0	set temp. 37°C	service/remote
1	set temp. 37.5°C	service/remote
2	set temp. 38°C	service/remote
3	set temp. 38.5°C	service/remote
4	set temp. 39°C	service/remote
5	set temp. 39.5°C	service/remote
6	set temp. 40°C	service/remote
7	set temp. 40.5°C	service/remote
8	set temp. 41°C	service/remote
9	set temp 41.5°C	debugging
!	heating correction front - 0.1	calibration
"	heating correction front + 0.1	calibration
?	heating correction rear + 0.1	calibration
=	heating correction rear - 0.1	calibration
*	all heating corrections 0	calibration
$	reset hour meter	service/info
b	display hour meter	service/info
:	set temp. 42°C	debugging
<	dec set temp (step 0.1°C)	debugging
>	inc set temp (step 0.1°C)	debugging
c	low temperature test	service
h	overtemperature test	service
l	LED-test	service
t	testmode 2 (no alarms)	service
e	testmode 1 (heater 42.5°C)	service
n	back to normal operation (after testmodes)	service
(	TubeFlow on	service/remote
)	TubeFlow off	service/remote
o	relais test	service

Output:		
headline	**description**	**usage**
target	setting temperature	service
ist_v	meas. temp front	service
ist_h	meas. temp rear	service
reg	temp. value used for regulation	debugging
mean	mean temperature used for display	service
S>I	diff setting/meas temp	debugging
I>S	diff meas/setting temp	debugging
P%	heat output	debugging
s	temp. slew rate	debugging
err	error counter	debugging
t	low temp. Inhibit alarm timer	debugging
kor_v	correction value front	service
kor_h	correction value rear	service

example of BW685 ASCII output

```
[38.5  38.5  38.6  38.6  38.5  00.0  00.1  008   000  000  085  +0.0  +0.0  ]
[38.5  38.6  38.7  38.7  38.5  00.0  00.2  006   001  000  084  +0.0  +0.0  ]
[38.5  38.6  38.8  38.8  38.5  00.0  00.3  004   001  000  083  +0.0  +0.0  ]
[38.5  38.6  38.8  38.8  38.6  00.0  00.3  004   000  000  082  +0.0  +0.0  ]
 soll ist_v ist_h  reg   mean  S>I   I>S    P%    s   err   t  kor_v kor_h
[38.5  38.6  38.8  38.8  38.6  00.0  00.3  004   000  000  081  +0.0  +0.0  ]
[38.5  38.6  38.8  38.8  38.6  00.0  00.3  004   000  000  080  +0.0  +0.0  ]
[38.5  38.6  38.8  38.8  38.6  00.0  00.3  004   000  000  079  +0.0  +0.0  ]
[38.5  38.6  38.8  38.8  38.7  00.0  00.3  004   000  000  078  +0.0  +0.0  ]
[38.5  38.6  38.8  38.8  38.7  00.0  00.3  004   000  000  077  +0.0  +0.0  ]
[38.5  38.6  38.8  38.8  38.7  00.0  00.3  004   000  000  076  +0.0  +0.0  ]
[38.5  38.6  38.8  38.8  38.7  00.0  00.3  004   000  000  075  +0.0  +0.0  ]

Standby
[38.5  38.6  38.7  38.7  38.7  00.0  00.3  000   000  000  074  +0.0  +0.0  ]
[38.5  38.6  38.8  38.8  38.7  00.0  00.3  000   001  000  073  +0.0  +0.0  ]
[38.5  38.6  38.7  38.7  38.7  00.0  00.3  000   000  000  072  +0.0  +0.0  ]
[38.5  38.6  38.7  38.7  38.7  00.0  00.3  000   000  000  071  +0.0  +0.0  ]
[38.5  38.6  38.7  38.7  38.7  00.0  00.3  000   000  000  070  +0.0  +0.0  ]
[38.5  38.5  38.6  38.6  38.7  00.0  00.3  000   000  000  069  +0.0  +0.0  ]
[38.5  38.5  38.6  38.6  38.7  00.0  00.3  000   000  000  068  +0.0  +0.0  ]
[38.5  38.5  38.6  38.6  38.7  00.0  00.3  000   000  000  067  +0.0  +0.0  ]

Operation   Heating starts with 010
 soll ist_v ist_h  reg   mean  S>I   I>S    P%    s   err   t  kor_v kor_h
[38.5  38.5  38.6  38.6  38.6  00.0  00.1  010   000  000  090  +0.0  +0.0  ]
[38.5  38.5  38.6  38.6  38.6  00.0  00.1  010   000  000  089  +0.0  +0.0  ]
[38.5  38.4  38.6  38.6  38.6  00.0  00.1  010   000  000  088  +0.0  +0.0  ]
[38.5  38.4  38.6  38.6  38.6  00.0  00.1  010   000  000  087  +0.0  +0.0  ]
[38.5  38.4  38.6  38.6  38.6  00.0  00.1  010   000  000  086  +0.0  +0.0  ]
[38.5  38.4  38.6  38.6  38.6  00.0  00.1  010   000  000  085  +0.0  +0.0  ]
[38.5  38.4  38.5  38.5  38.5  00.0  00.0  010*  000  000  084  +0.0  +0.0  ]
 soll ist_v ist_h  reg   mean  S>I   I>S    P%    s   err   t  kor_v kor_h
[38.5  38.4  38.5  38.5  38.5  00.0  00.0  010*  000  000  083  +0.0  +0.0  ]
[38.5  38.4  38.5  38.5  38.5  00.0  00.0  010*  000  000  082  +0.0  +0.0  ]
[38.5  38.4  38.6  38.6  38.5  00.0  00.1  008   001  000  081  +0.0  +0.0  ]
[38.5  38.4  38.6  38.6  38.5  00.0  00.1  008   000  000  080  +0.0  +0.0  ]
```

Description:

```
[                                          Data start
]                                          Data Stop
*                                          Heater on (used with P%)
“Betrieb”                                  Message: BW685 is in operation mode
“Standby”                                  Message: BW685 is in standby mode
                                           Message: Heater starts with 10% power
                          (for debugging)

“Heizung start mit 010”
```

8. Maintenance / Testing Instructions

These instructions serve as a reference.
Any changes that occur will be issued by BIEGLER in the form of supplementary sheets and must be added immediately.

A maintenance test must be conducted after a repair of the BW 685. This is identical to the PERIODIC INSPECTION.

PERIODIC INSPECTION

The periodic technical safety inspections (according to the local standards in force - e.g. in Austria ÖVE/ÖNORM E 8751-1) must be carried out on the BW 685 / BW 685 S at least every 12 months by persons able to carry out such technical safety inspections based on their training, knowledge and experience gained by practical activities.

The results of the periodic inspection are to be documented, together with the date and the inspecting agency, in the inspection protocol provided.

Important: Should a malfunction be evident during the periodic inspection, suitable warning signs should be attached to the device to ensure that it cannot be used before necessary service and repair work has been carried out.

CHECKING THE WARM-UP PERIOD

This is the time taken by the BW 685 / BW 685 S to heat up to 38.5°C from room temperature. The device is malfunctioning if it takes much longer than one minute.

CHECKING THE CONTROL TEMPERATURE

The control temperature is checked on the groove bed of the heat exchanger. The sensor of a suitable contact thermometer (tolerance +/- 0.15°C) is fixed to this position, e.g. by using a piece of infusion tubing. The examination is performed at a temperature setting of 38.5°C. The measured value is read after it has stabilized. The difference must not exceed +/- 0.5°C. There is a malfunction if a difference from the control temperature of greater than +/- 0.5°C is obtained.

LONG-TERM TEST:

- Start-up at 38.5 °C
- Measure the temperature on the heat exchanger after about 15 min.
- Measure the temperature again after 24 hours

The initial value (after 15 minutes) and the end value (after 24 hours) must not lie outside of tolerance range; the measurements must always be made under the same environmental conditions.

The end value may deviate from the initial value by ± 0.5°C.

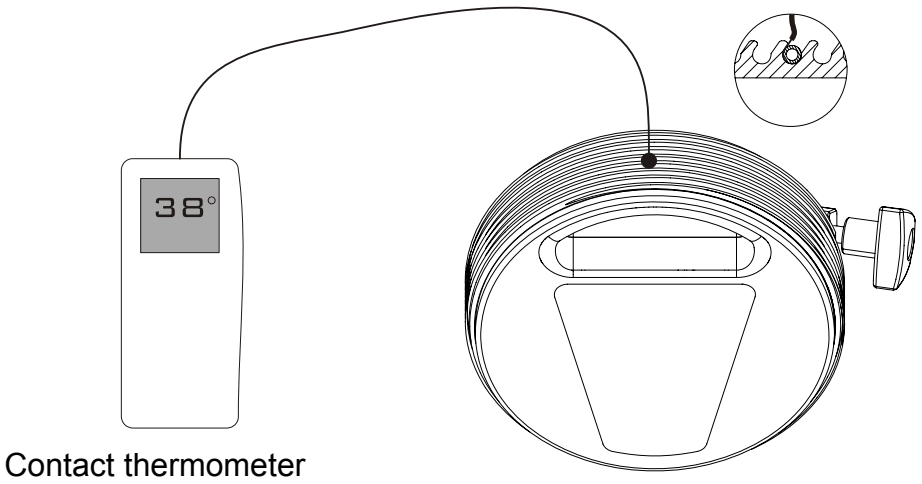

Fig.1 - Measurement Set-up

- Attach a suitable temperature probe (Ø 0.5 mm) in the middle of the heating ring on the upper side with a piece of infusion tubing in such a way that the temperature can be measured on the groove bed

Measuring device used:	TESTO Contact Thermometer 935		
	Precision: ± 1 digit		
	Type K	±0.7 °C	±0.5 % from the measured value

INSPECTION OF THE OVERTEMPERATURE ALARM (Software)

Preheat the device to 41°C and wait for the temperature to stabilise, then disconnect the mains plug. Hold down the control ▲ and reconnect the mains power plug. After the beep has ceased, release the control ▲. Press the switch ⏻. The device now slowly heats up to a target temperature of 42.5°C. Observe the temperature display carefully. The high temperature alarm should be triggered at a temperature of 42°C.
For reasons of safety, short beeping sounds are given at intervals of a second in this operational mode and the STANDBY indicator (Diag.1/4) flashes. There is a malfunction if the high temperature alarm is not triggered.

To reset the alarm, either disconnect the mains plug and allow the device to cool and then start up again, or reset the alarm using the service interface.

VISUAL CHECK OF GENERAL CONDITION

The device should be checked for mechanical damage (general mechanical condition) and for the completeness of the front film layer, sticker information, particularly the device label on the reverse. There is a malfunction if mechanical damage to the device is evident which could be harmful or impair the functional operation of the device. Also, the device must not have any dirt on it that might impair safety.

ELECTRICAL SAFETY

All relevant electrical safety data should be checked, particularly the earth conductor resistance (Target: < 0.3 Ohm) and leakage current (Target: < 0.75 mA). There is a malfunction if there is a measured value outside the tolerances.
These tests must be conducted at the operating temperature.

(IMPORTANT: Voltage !)

They are performed using the safety tester GERB - GM- 100 and the test programme BLUTW. 1. The protocol is stored in the PC.

INSPECTION OF THE FUSES IN PLACE

Necessary only after repair carried out.

The fuse inserts must be especially tested during maintenance work. For this device, either of the following may be used.

primary:	BW685	230V	1.6 AT
secondary all	BW 685:		500 m AT

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MAINTENANCE AND INSPECTION PROTOCOL FOR BW 685

Device no.: ..... Date: .....
230V □ Print number:.....

These tests require a precise knowledge of the associated maintenance / testing instructions!

TEST	TARGET / FUNCTION	EVALUATION	
		OK / Value	not OK
1. Long-term test	Initial value:.....°C End value:.....°C		
2. Operational readiness (at room temp.)	Warm-up period:.....s		
3. Overtemperature cut-off	Target: < 42.5 °C		
4. Low temperature Cut-off	Target: < 36.5 °C	Internal to BIEGLER only	
5. High voltage	Target: 1.5 kV / 1 minute	Internal to BIEGLER only	
6. Electrical fuse			
6.1. Earth conductor resistance	< 0.3 Ω		
6.2. Replacement device leakage current	< 0.75 mA		
6.3 Replacement device leakage current	first measured value		
7. Fuse insert	Only after repair carried out.		
8. Mechanical condition			
9. Dirt			
10. Verification of labels			

Signature of the inspecting personnel:	

The function controls indicated in the operating instructions must be conducted.

The replacement leakage current cannot be greater than 1.5 times the first measured value and, at the same time, not greater than the threshold indicated above.

If the devices are not functionally and/or operationally safe, they must be repaired or the operator must be informed of the hazard from the device.

The proper conducting of the tasks listed above and the correctness of the information must be confirmed.

Comments:

Technician Operator

_____ _____

(Date, Signature) (Date, Signature)

GERB Elektronik GmbH

Page 1 BLUTW1 Test Procedure Electrical Safety

Test point Description

GERB024 Power measurement
The effective power use of the device being tested is measured
The measurement is limited by time. Any time exceeded is indicated.
Maximum power use 3.5 kVA.
Care must be taken that the blood warmer is in the warming up phase when this measurement is taken.

Measurement unit: Watt Target: 0.00 Threshold: 0.00 Interval tol.: 0.00 Rel. tol. 0.00
Measurement unit: Watt Target: 0.00 Threshold: 0.00 Interval tol.: 0.00 Rel. tol. 0.00

GERB003 Insulation resistance network protective earth conductor
Test voltage 500V= over 5 Mohm applied to both phases of the device to be tested.
The resistance between the phases and the earth conductor is measured.
Mains switch ON!

Measurement unit: MOhm Target: 0.00 Threshold: > 2.00 Interval tol. 0.00 Rel. tol. 0.00
Measurement unit: MOhm Target: 0.00 Threshold: > 2.00 Interval tol. 0.00 Rel. tol. 0.00

GERB005 Earth conductor resistance
Test voltage 6V max. 25A at the connection of the testing tip.
The testing tip must be held on the warming ring.
The test is limited by time.
If the time is exceeded, this will be displayed on the monitor.

Measurement unit: MOhm Target: 0.00 Threshold: < 0.30 Interval tol.: 0.00 Rel. tol. 0.00
Measurement unit: Ohm Target: 0.00 Threshold: < 0.30 Interval tol.: 0.00 Rel. tol. 0.00

GERB005 Earth conductor resistance
Test voltage 6V max. 25A at the connection test peak.
The testing tip must be held on the fastening clamp.
The test is limited by time.
If the time is exceeded, this will be displayed on the monitor.

Measurement unit: Ohm Target: 0.00 Threshold: < 0.30 Interval tol.: 0.00 Rel. tol. 0.00
Measurement unit: Ohm Target: 0.00 Threshold: < 0.30 Interval tol.: 0.00 Rel. tol. 0.00

GERB006 Earth leakage current N.C.
The earth leakage current is measured under operating conditions.
No additional grounding connection is allowed to be established between the safety testing device GM 100
and the device to be tested.
No testing tip is necessary.
Mains switch ON

Measurement unit: µA Target: 0.00 Threshold: < 500 Interval tol.: 0.00 Rel. tol. 0.00
Measurement unit: µA Target: 0.00 Threshold: < 500 Interval tol.: 0.00 Rel. tol. 0.00

GERB009 Housing leakage current S.F.C-PE open
The testing tip is held on conductive housing parts of the device to be tested.
Do not create any additional bond to the device to be tested
No testing tip is necessary.
Mains switch ON

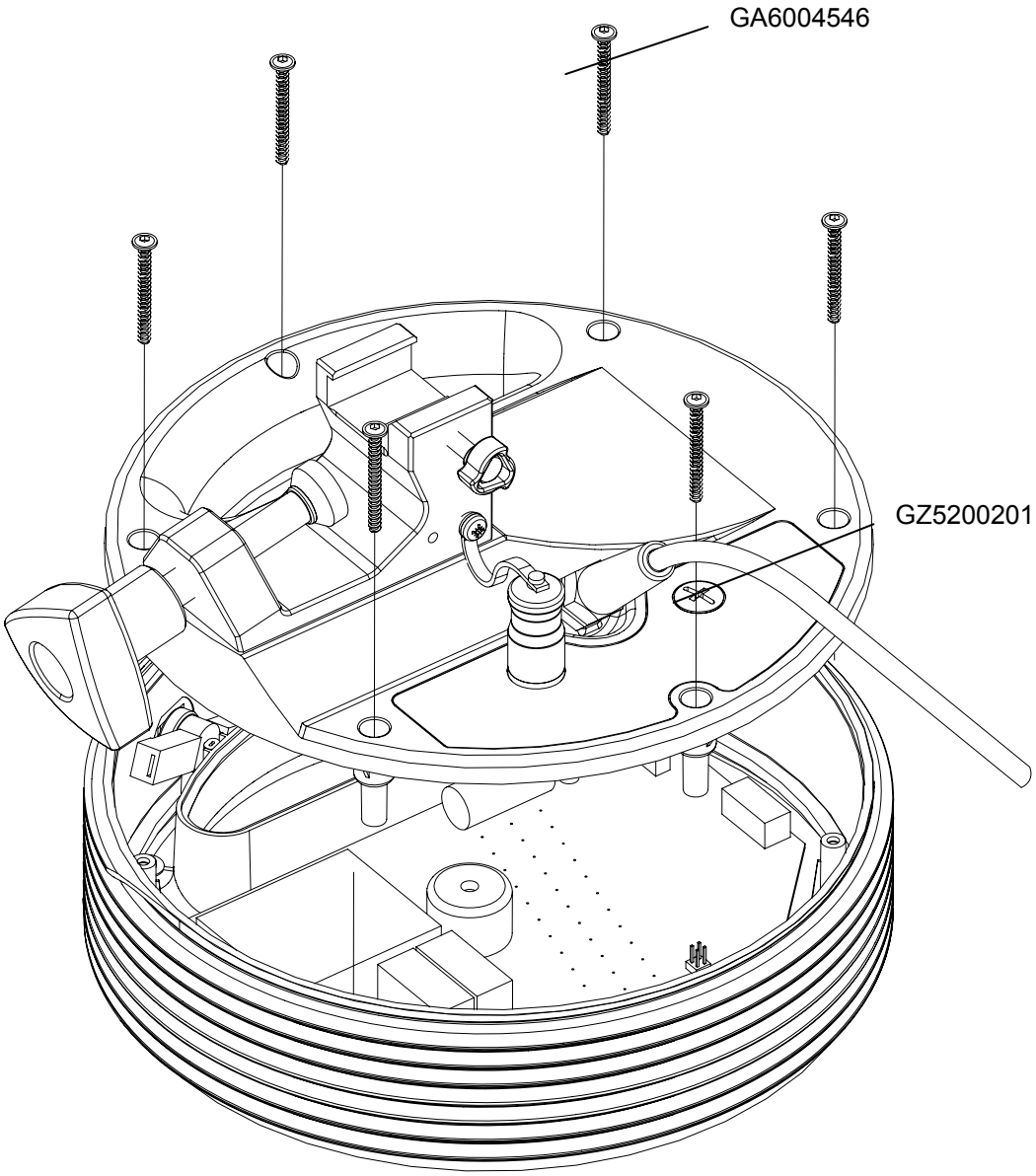
Measurement unit: µA Target: 0.00 Threshold: < 500 Interval tol.: 0.00 Rel. tol. 0.00
Measurement unit: µA Target: 0.00 Threshold: < 500 Interval tol.: 0.00 Rel. tol. 0.00

Test point	Description
GERB019	Replacement leakage current according to Figure 9 according to VDE 0751 The network voltage is used as the test voltage on the network connection of the device to be tested. The current that flows from the housing to the earth is measured. The replacement leakage current cannot be greater than 1.5 times the first measured value and, at the same time, greater than the threshold value of 750 µA. Mains switch ON Measurement unit: µA Target: 0.00 Threshold: < 750 Interval tol.: 0.00 Rel. Tol.: 0.00 Measurement unit: µA Target: 0.00 Threshold: < 750 Interval tol.: 0.00 Rel. Tol.: 0.00
GERB020	Replacement device leakage current in the earth conductor according to VDE 751 An internally generated test voltage in the amount of the network voltage is applied to the connected network connections of the object to be tested. The current that flows from the connected female part of the object to be tested to the earth is measured, as well as the current that flows from the earth connector to the ground. The replacement leakage current cannot be greater than 1.5 times the first measured value and, at the same time, not greater than the threshold of 750 µA. Mains switch ON. Measurement unit: µA Target: 0.00 Threshold: < 750 Interval tol.: 0.00 Rel. tol. 0.00 Measurement unit: µA Target: 0.00 Threshold: < 750 Interval tol.: 0.00 Rel. tol. 0.00
GERB021	Replacement device leakage current according to VDE 751 An internally generated test voltage in the amount of the network voltage is applied to the connected network connections of the object to be tested. The current that flows from the connected female part of the object to be tested to the earth is measured, as well as the current that flows from the housing to the ground. The testing tip of the safety tester is held to the fastening clamp on the device to be tested. The replacement leakage current cannot be greater than 1.5 times the first measured value and, at the same time, not greater than the threshold of 750 µA. Mains switch ON. Measurement unit: µA Target: 0.00 Threshold: < 750 Interval tol.: 0.00 Rel. tol. 0.00 Measurement unit: µA Target: 0.00 Threshold: < 750 Interval tol.: 0.00 Rel. tol. 0.00
GERB001	Network voltage test The effective value of the network voltage is measured Measurement unit: VOLT Target: 230 Threshold: 0.00 Interval tol.: 0.00 Rel. tol. 0.00 Measurement unit: VOLT Target: 230 Threshold: 0.00 Interval tol.: 0.00 Rel. tol. 0.00

REPLACEMENT PARTS LIST

BW 685

Description	Biegler ID
Clamp, complete, BW 685	IA 1000685
Three-cornered grip M5 - complete	IB 9000003
Print assembly BW 685	IP 1000685
Ring, complete, BW 685	IR 1000685
Fuse T 500 mA	CE 1200500
Fuse T 1.6 A	CE 1201600
Cover for fuse	FA 3539561
Plunger for key	CZ 7014003
Front film BW 685	FV 1000685
Round cord, silicon 60 1.5	HB 2002002
Network connection power cable with mains lead cleat	KN 1003001
Cable for service interface (RS232)	LZ10B0685
Power pack for Tubeflow	CJ 4014006
Line filter	BN1012004
Network connection clamp	CC1000003
Connector for Tubeflow	CJ5592072
Connector cover for Tubeflow	CJ8256700
Locking screw for service interface	GZ5200201
Housing screws (set of 6 pieces)	GA6004546



Disconnect device from mains before opening!

Fig. 2 – Opening of the BW 685 / BW 685 S

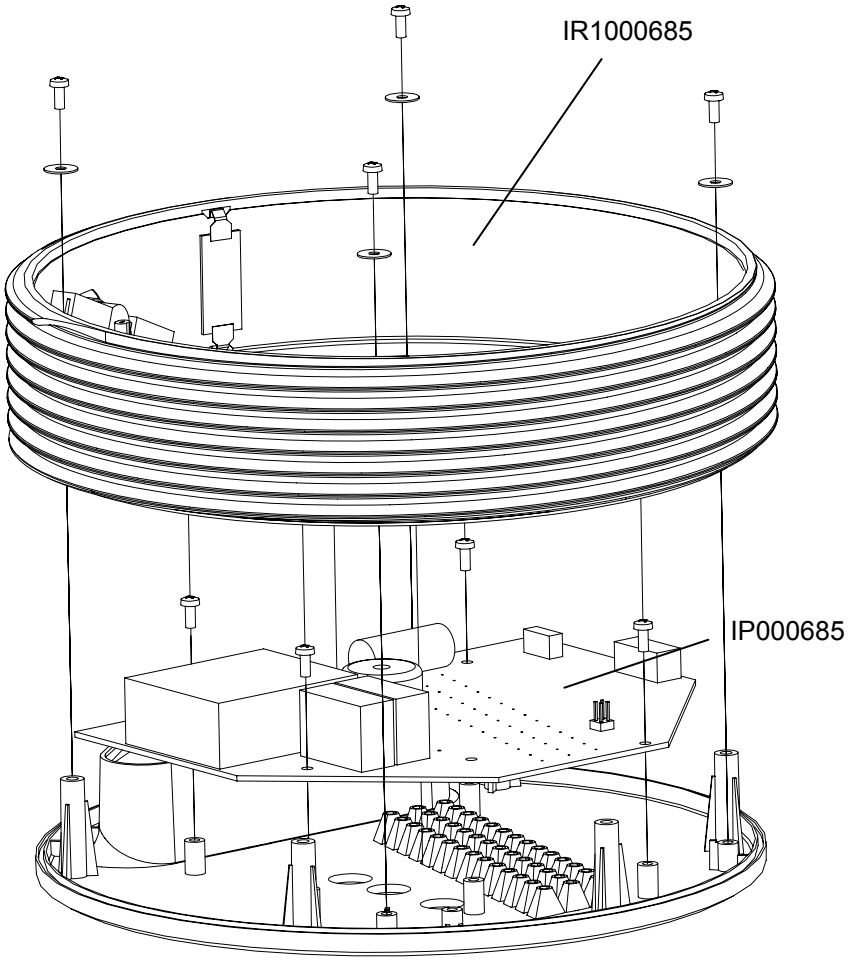


Fig. 3 – Disassembly of the BW ring

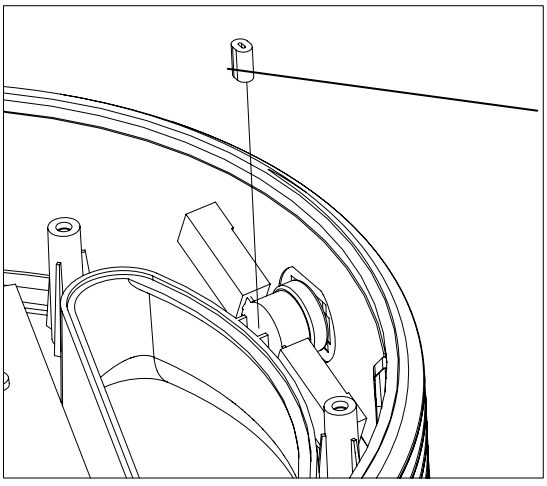


Fig. 4 – Bimetal safety temperature limiter 45 ± 3˚C
Self-resetting (at room temperature)

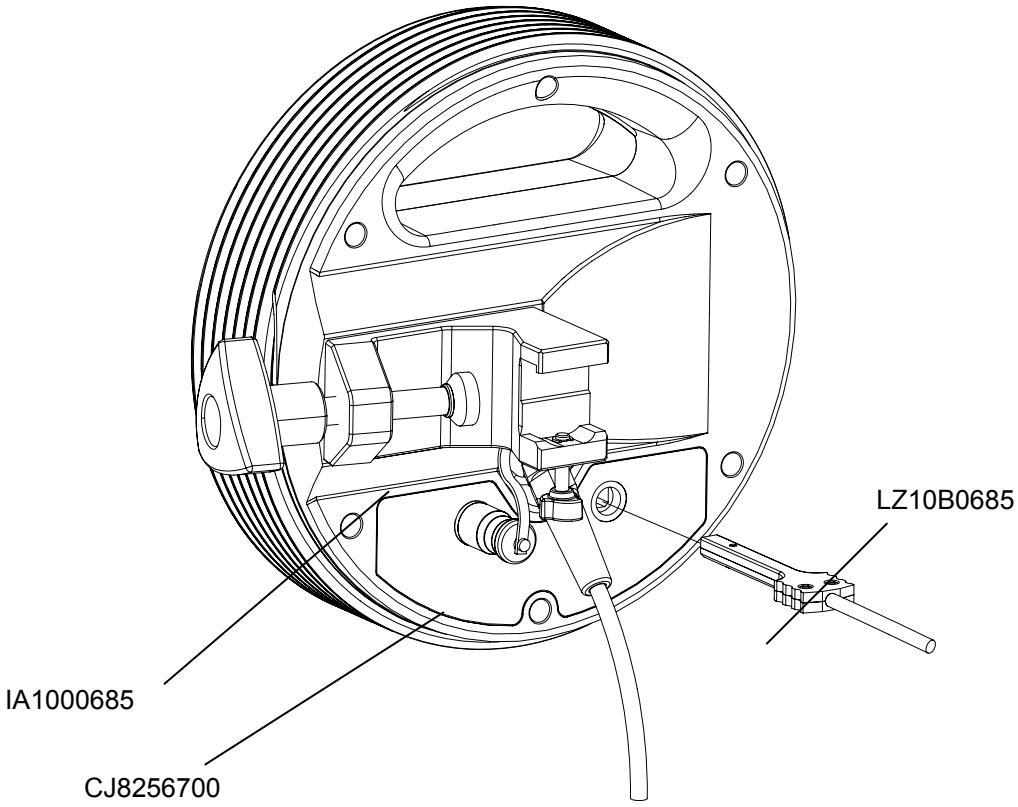


Fig. 5 – Connection of the service interface with cable *LZ10B0685*

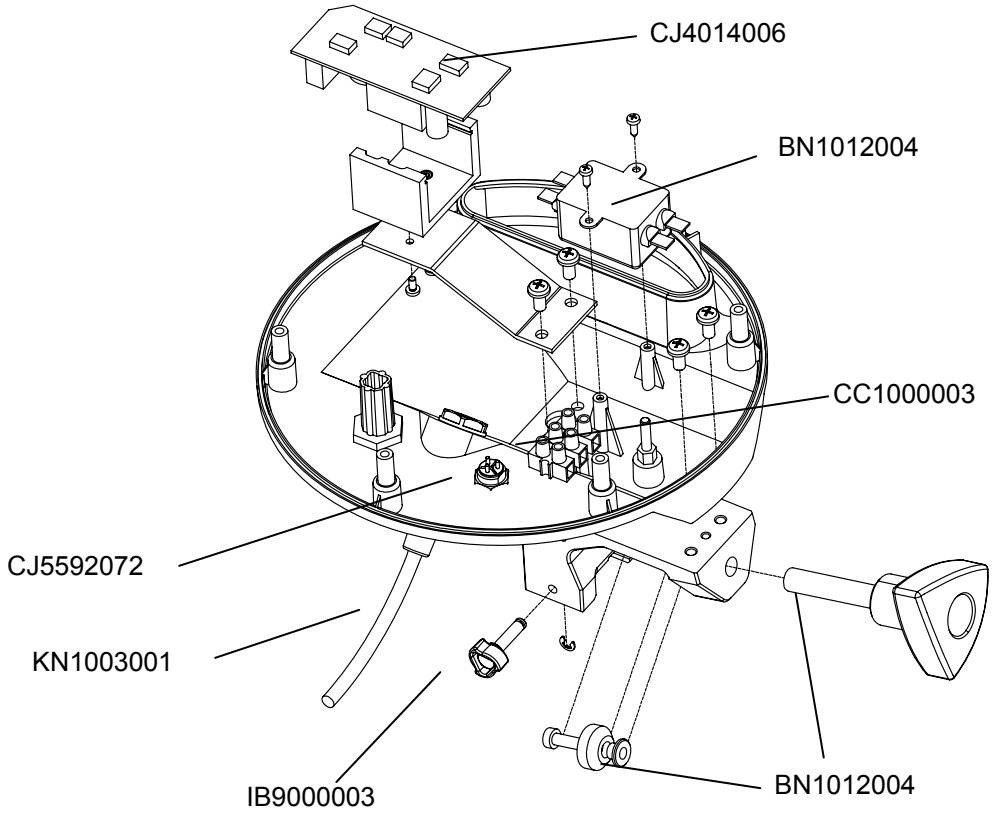


Fig. 6 – BW 685 S

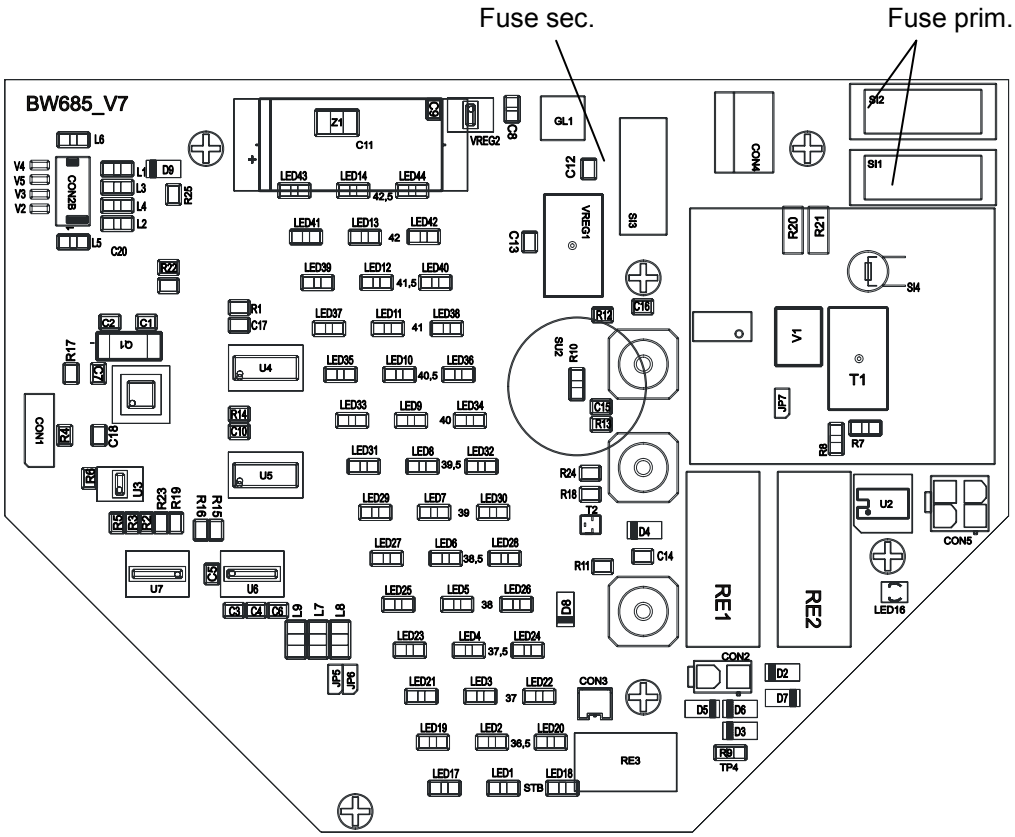


Fig. 7 – Assembly diagram for conductor board

MANUFACTURER'S DECLARATION

The blood and infusion warmer BW 685 / BW 685 S is a medical product as defined by Directive 93/42/EEC.

This is documented by attaching the CE mark.
Notified Body: TÜV Product-Service, Approval Number CE0123

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