Instruction for use

Neonatal warming bed

THERMOCARE K

THERMOCARE K	□ **WY3001 /**	_____
	□ **WY3002 /**	_____
Under-pad heating device:	WY2010 /	_____
Year of construction:		_____
Software under-pad heating device:	LFSE	V 1.07

D2131_00

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* Depending on model and configuration

Intended use

The neonatal warming bed THERMOCARE K is used for warming care of infants up to 8 kg body weight and max. 70 cm body height for performing basic therapies such as oxygen therapy and phototherapy or similar. It is suitable for continuous operation.

General safety instructions

The user of the neonatal warming bed must be thoroughly acquainted with this instruction for use. The warming bed must be used under medical supervision by qualified persons only who are acquainted with the use and risks of under-pad heating devices.

The instructions for use must be kept available at all times for users to consult.

The under-pad heating device must be used with the original Weyer gel pad WY0620 only. Otherwise the safety features of the neonatal warming bed are impaired.

When the under-pad heating device is switched off, the gel pad may cause a reduction of the patient's temperature. When nevertheless the neonatal warming bed shall be used with switched off under-pad heating device, the PU pad WY0628 must be used instead of the gel pad or for isolation purposes a foam pad or woollen nappy, at least 2 cm thick, must be placed between patient and gel pad.

When connecting additional devices to the warming bed the latest version of the "General requirements for the safety of medical electrical systems EN 60601-1-1 + Supplement A1" in their latest version must be observed, in particular the permissible limit values for the total sum of leakage currents. The max. power input is specified at the take-off sockets and must be considered.

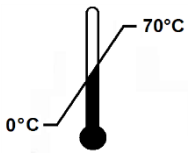
We can only be held responsible for the safety features of the neonatal warming bed when preventive maintenance and repairs are carried out by authorized qualified persons, by observing our instructions and by using original spare parts.

This device must not be modified without our explicit consent.

Transport and storage

For transport and storage the following conditions should be observed:

Temperature:



Relative air humidity: 15 to 95 %
Atmospheric pressure 210 to 1100 hPa

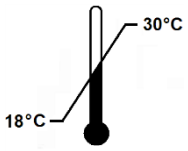
The neonatal warming bed must not be exposed to strong vibrations, such as e.g. transport over cobblestone pavement.

* Depending on model and configuration

Requirements of the location

The neonatal warming bed can be used under the following operation conditions:

Temperature:



Relative air humidity: 15 to 95 %
Atmospheric pressure 860 to 1100 hPa

The neonatal warming bed is not suitable for the use in explosion-hazardous areas.

Do not use the warming bed close to high-frequent radiation sources such as HF surgery devices, mobile phones or similar.

To avoid the risk of an electrical stroke this device must only be connected to an electrical mains with earth conductor.

Installation

For installation of the neonatal warming bed it has to be considered that heating or air conditioning devices may change the effect of the neonatal warming bed. Therefore a distance of 1 m should be kept clear. Locations in draughts, at cold walls or windows as well as in direct sunlight should be avoided.

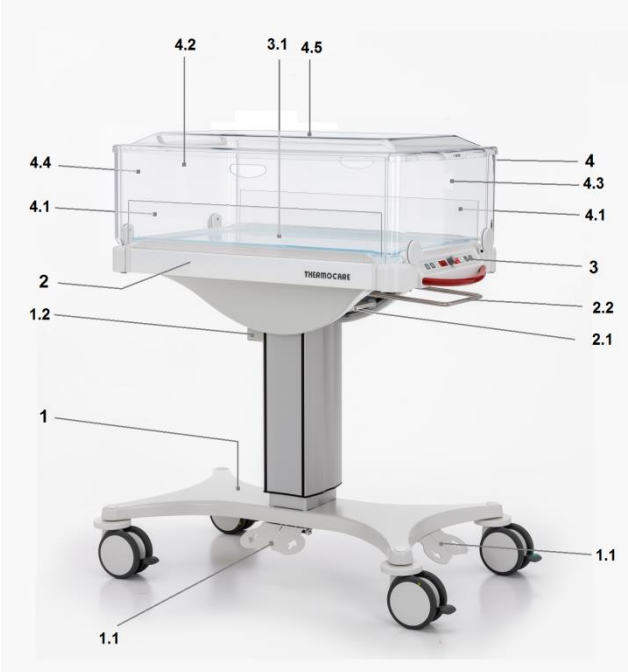
Take care that no items are placed within the height-adjustment* zone.

In order to completely separate the warming bed from the electrical mains, the connector plug must be disconnected. During installation respectively mounting take care that the connector plug is accessible at any time.

* Depending on model and configuration

Structure and operating principle

The neonatal warming bed **THERMOCARE K** consists of the following components assemblies:



1. **Trolley**
   - 1.1. Height adjustment *
   - 1.2. Electrical distribution
2. **Bed**
   - 2.1. Tilting facility
   - 2.2. Catch
3. **Under-pad heating device**
   - 3.1. Conductive gel pad
4. **Wall assembly 250 mm high or 170 mm high ***
   - 4.1. Safety side walls
   - 4.2. Side walls
   - 4.3. Front wall
   - 4.4. Rear wall
   - 4.5. Canopy *

5. **Upgrade items and accessories ***
   - 5.1. Shelf WY3035 (without drawer max. 4 pieces possible, with drawer max. 2 pieces possible).
   - 5.2. Drawer WY3036, fixed at the shelf WY3035, volume 400 x 150 x 160 mm, load 3 kg, arc-shaped sliding out to both sides (max. 2 pcs. possible).
   - 5.3. Support WY3051 for adapting 2 tubes Ø 27 mm.
   - 5.4. Tube assembly Ø 27 mm WY3055, length 650 mm , for adapting accessories.
   - 5.5. Shelf WY3060 or WY3061

* Depending on model and configuration

1. Trolley

The trolley supports the entire device. It has four smooth antistatic double castors, 3 with total lock, 1 with steering lock for easy movability. Four bumpers are provided to protect from damages during a transport.

1.1 Height adjustment *

The warming bed is gently and smoothly height-adjustable* by foot pedals ("soft-lift"). In this process the whole body of the device, including the accessories attached to the device, is raised vertically by an electric motor. The foot pedals can be arranged at the front or at either side of the trolley. A second pair of pedals can be provided as an option.

1.2 Electrical distribution

The power connection, the power source for the under-pad heating device and the height adjustment* as well as the 3 take-off sockets ~230 V are arranged below the rear side of the trolley.

2. Bed

The bed with tilting facility is arranged on the trolley. Raised sides prevent the patient from trundling out of the bed. The bed is actively heated (refer to 3. below) and provides a gel pad.

2.1 Tilting facility

The tilting facility below the bed allows a fine adjustment of the head up/feet down and feet up/head down position up to 12 °. A catch (2.2) is provided to fix the bed in the desired tilt position.

3. Under-pad heating device

An electrical heating device is integrated in the bottom of the bed. The temperature is precisely controlled to the selected value. A gel pad (3.1) accumulates the heat and conducts it to the patient (conductive heat transfer).

The under-pad heating device must be used with the original Weyer gel pad WY0620 only. Otherwise the safety of the neonatal warming bed is impaired.

The actual under-pad temperature and the selected temperature are permanently displayed. Deviations from the temperature selection, system faults as well as interruption of the power supply are alerted visually and audibly.

The temperature display does not give a reliable indication as to the patient's body temperature. Therefore the patient's temperature must be checked at regular intervals or monitored.

When the under-pad heating device is switched off, the gel pad (3.1) may cause a reduction of the patient's temperature. When nevertheless the neonatal warming bed shall be used with switched off under-pad heating device, the PU pad WY0628 must be used instead of the gel pad or for isolation purposes a foam pad or woollen nappy, at least 2 cm thick, must be placed between patient and gel pad.

* Depending on model and configuration

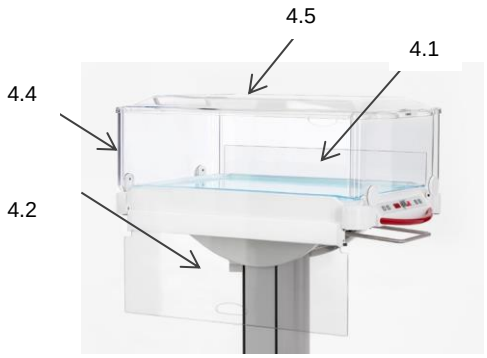
4. Wall assembly *

The warming bed is equipped with a wall assembly 250 mm high (WY3021) or 170 mm high (WY3022). A canopy is available as an option (one-piece WY3024 or two-piece WY3025).

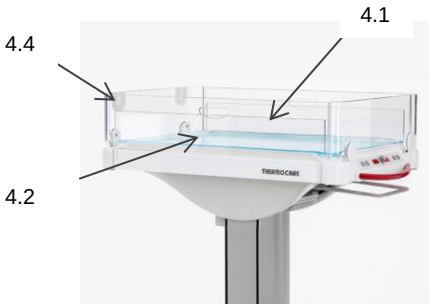
The four walls protect the patient from draught and falling from the bed. The warming bed can be closed with the canopy* (4.5). The open corners of the wall assembly allow a sufficient supply of air and prevent from an accumulation of CO_2 in the interior.

Cables and tubes connected to the patient are passed through the grommets in the rear wall (4.4).

For better accessibility during treatment the two side walls (4.2) can be folded down with one hand. When the canopy (4.5) is not attached, also the front wall (4.3) can be folded down. Two safety side walls (4.1) are additionally provided to protect the patient when the side walls are folded down. When the safety side walls are not in use they can be retracted into the bed.



Walls 250 mm high,
canopy one-piece or two-piece



Walls 170 mm high

5. Upgrade items and accessories

For storing necessary material, shelfs (5.1) and drawers (5.2), arc-shaped sliding out to both sides, are provided. For adapting further components the warming bed can be upgraded with a support (5.3) and a tube assembly Ø 27 mm (5.4). Refer to page 19.

* Depending on model and configuration

Use

Symbols and warnings for use

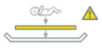
The following symbols used for the neonatal warming bed and its the accompanying documents:

General

Symbol	Meaning
	Attention, observe warnings
	Observe instruction for use
	Do not dispose in domestic waste
	Manufacturer

Symbol	Meaning
	Year of production
REF	Model- / article number
LOT	Batch / lot
SN	Serial number

Under-pad heating device*

Symbol	Meaning
	The underpad heating device must only be used with the gel pad.
	Heating On / Off
	Enter/Confirmation
	Exented temperature range
	Audio alarm pause

Symbol	Meaning
	Heating pulse
	Extended temperature range
	Deviation from selection
	Safety shutdown
	Power failure

General

- The neonatal warming bed is not suitable for the use in explosion-hazardous areas.
- Do not use the warming bed close to high-frequent radiation sources such as HF surgery devices, mobile phones or similar.
- Never use inflammable disinfectants!
- In no case the ambient conditions of the warming bed must be influenced by any warming or air condition devices which do not comply with the system.
- The display of the neonatal warming bed does not give a reliable indication as to the patient's body temperature.
- The patient's temperature must be checked at regular intervals or monitored.
- Sunlight, draught, cold walls and windows in direct ambience to the warming bed will influence the patient's temperature balance negatively. Furthermore alarms can be caused hereby.

* Depending on model and configuration

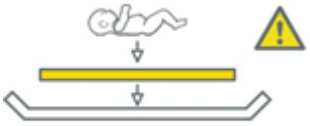
- When connecting additional devices to the warming bed the latest version of the "General requirements for the safety of medical electrical systems EN 60601-1-1 + Supplement A1" in their latest version must be observed, in particular the permissible limit values for the total sum of leakage currents. The max. power input is specified at the take-off sockets and must be considered.
- Take care that the patient is never unattended when one or more walls (4.2/4.3) of the bed are folded down.

Adjustment *

- During height-adjustment make sure that no device components or additional devices connected to the warming bed can touch furniture items or other devices in the ambience.
- It should also be considered that the distance to accessories, which are not fixed at the neonatal warming bed, will change and therefore connected lines and tubes might be pulled off.
- When moving the neonatal warming bed around, bring the height adjustment into the lowest position.

Under-pad heating device

The under-pad heating device carries the following warning symbol:



The device must only be used with gel pad.

- The under-pad heating device must be used with the original Weyer gel pad WY0620 only. Using other kinds of pads will influence the temperature characteristics negatively.
- The surface of the under-pad heating device must be checked for mechanical damages prior to each operating.
- The gel pad does not allow electrostatic discharge, is not autoclavable and not washing-machine proof.
- The gel pad can only be bent slightly and therefore must not be folded or laid over sharp edges. Sharp instruments like needles, knives or scissors will damage or even destroy the pad.
- Heating up the bed from ambient temperature to 37°C will take approx. 15 minutes. It may take up to 10 minutes more until the gel pad itself has reached the selected temperature. If necessary the heating up process can be accelerated by turning the gel pad upside down during heating up.
- When the under-pad heating device is switched off, the gel pad may cause a reduction of the patient's temperature. When nevertheless the neonatal warming bed shall be used with switched off under-pad heating device, the PU pad WY0628 must be used instead of the gel pad or for isolation purposes a foam pad or woollen nappy, at least 2 cm thick, must be placed between patient and gel pad.

Phototherapy *

- When the warming bed is used in connection with a phototherapy device, it must be observed that patient's temperature and humidity loss can increase.
- Observe the patient's body core temperature. Reduce the temperature selection of the under-pad heating device if necessary.
- Increase the hydration for the patient according to the increased water absorption by the phototherapy.

* Depending on model and configuration

Start-up

Qualified persons only should install and start-up the warming bed and instruct the user's personnel.

Before start-up all components and accessories of the warming bed must be checked for correct and secure position as well as for correct function.

The surface of the under-pad heating device must be checked for mechanical damages prior to each operating.

The under-pad heating device must be equipped with a 9V battery which is included in the delivery of the device. The battery compartment B is placed below the bed.

Prior to operation the warming bed must be prepared in cold condition according to chapter "Cleaning and disinfection" (page 25).

Function check of the moving mechanical components

Make sure that no items or devices are placed within the height-adjustment range. adjust the bed with the foot pedals (1.1) to the lowest and then to the highest position.

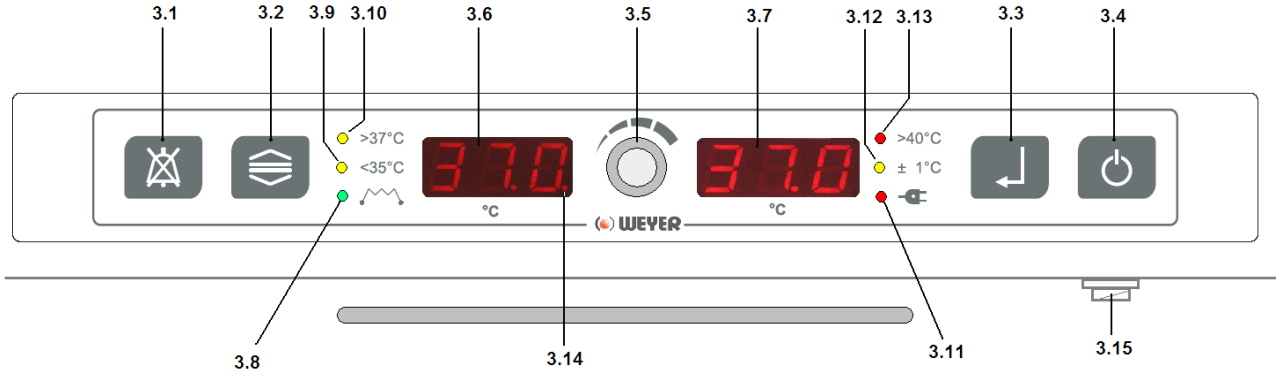
Unlock the catch (2.2) below the frontside of the bed by pulling and tilt the bed to feet up/head down and then in reverse position. Check in several positions whether the catch (2.2) locks automatically when being released and whether the bed is fixed in this position.

For checking the functions of the walls take off the canopy* (4.5). Unlock the side walls (4.2) and the front wall (4.3) by lifting and fold them down. They must latch securely again simply by folding up.

Before switching on the under-pad heating device acquaint yourself with the following control elements and displays.

* Depending on model and configuration

Functions of the under-pad heating device



3.1 Key audio alarm pause. By pressing the key in case of high or low temperature alarm, the audio alarm is paused for 15 minutes. The length of the alarm pause depends on the alarm priority.

3.2 a) Unlocking key for the extended temperature range (30°C to 35°C and 37°C to 38.5°C).
b) Activation of brightness adjustment of the displays (3.6) and (3.7) with rotary knob (3.5).

3.3 Enter key for confirming the desired under-pad temperature (selection).

3.4 Key heating On / Off.

3.5 a) Rotary knob for selection of the under-pad temperature.
b) Brightness adjustment of displays (3.6) and (3.7)

3.6 a) Temperature selection display.
b) Error display.

3.7 a) Actual temperature display.
b) Error display.

3.8 Pilot lamp (green) heating power. Lights when heating power is available.
When the lamp lights, the bed will heat-up, when it does not light, the bed will cool off.

3.9 Warning lamp (yellow). Lights in case of temperature selection below 35°C.

3.10 Warning lamp (yellow). Lights in case of temperature selection above 37°C.

3.11 Warning lamp (red). When it lights together with a permanent audio alarm the power supply of the under-pad heating device is interrupted. The alarm can be reset by switching off the heating (3.4). After reinstallation of the power supply the heating must be switched on again.

3.12 Warning lamp (yellow). Flashes in case of deviation between selected and actual temperature above 1°C.

3.13 Warning lamp (red). Flashes in case of bed temperature above 40°C.

3.14 Flashing point. Indicates that the internal processor is working.

3.15 Central switch-off button for under-pad heating.

* Depending on model and configuration

Switch on the under-pad heating device

Switch-on test:

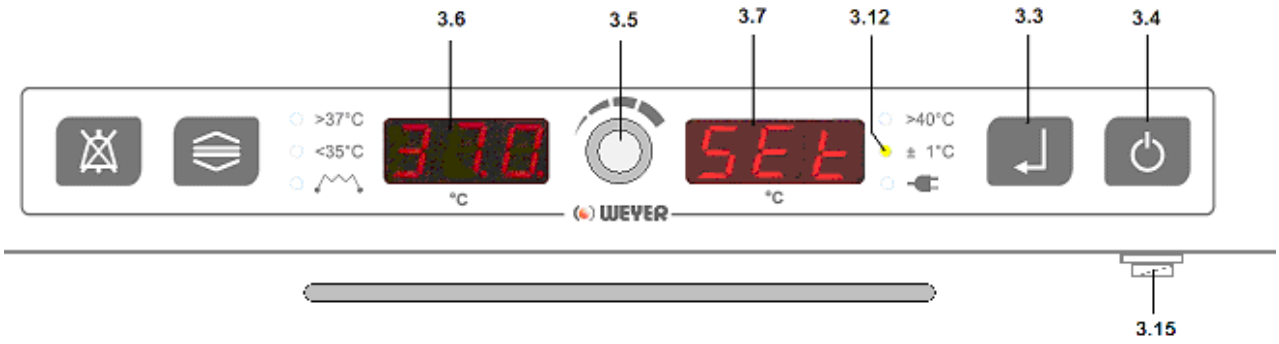
First of all make sure that the warming bed is connected to the power supply.

Press key (3.4) until the under-pad heating device is switched on. A tone sounds and all displays light up for 2 seconds. Both displays (3.6) and (3.7) indicate the value 88.8. Check during the 2 seconds whether all displays light up and the tone sounds. Simultaneously the internal processor automatically checks the vital functions of the electronical control. When the under-pad heating device is not switched on, push button (3.15) right hand below the bed.

When the internal automatic switch-on test was not successful, the reason will be displayed as an error code.

Start heating:

When the under-pad heating device is switched on after being switched off for more than 10 minutes, the value 37.0°C flashes in the temperature selection display (3.6) while the actual temperature display (3.7) indicates SET. Furthermore an indicative alarm tone sounds at intervals of 5 seconds.



Now the temperature value suggested in display (3.6) can either be entered by pressing key (3.3) or adjusted with the rotary knob (3.5). The adjusted value must be entered by pressing key (3.3). Then the under-pad heating device will heat according to the selection.

When the under-pad heating device is switched on after being switched off for less than 10 minutes, it will start heating with the last temperature selection.

* Depending on model and configuration

Temperature selection:

The temperature selection is devided in two ranges, i.e. the "standard" range (35°C to 37°C) and the "extended" range (30°C to 35°C and 37°C to 38.5°C).

In the standard range the temperature can be adjusted with the rotary knob (3.5) in increments of 0.1°C. Each increment is confirmed by a short tone. The temperature is increased by turning the rotary knob (3.5) clockwise and reduced by turning it anti-clockwise. During adjustment the currently selected temperature flashes. This temperature is entered by pressing key (3.3) and will then be permanently indicated in display (3.6). When key (3.3) is not pressed within 10 seconds after adjustment the under-pad heating device will continue to operate with last setting.

When a temperature value in the extended range (30°C to 35°C and 37°C to 38.5°C) shall be selected, turn the rotary knob (3.5) briefly, the display (3.6) flashes. Now the desired temperature can be adjusted while keeping key (3.2) pressed. This temperature is entered by pressing key (3.3) and will then be permanently indicated in display (3.6). When key (3.3) is not pressed within 10 seconds after adjustment the under-pad heating device will continue to operate with last setting.

When the selected temperature is lower than 35°C the yellow warning lamp (3.9) lights. When the selected temperature is higher than 37°C the yellow warning lamp (3.10) lights.

Remark for heating up:

Heating up the bed from ambient temperature to 37°C will take approx. 15 minutes. It may take up to 10 minutes more until the gel pad itself has reached the selected temperature. If necessary the heating up process can be accelerated by turning the gel pad upside down during heating up.

Brightness adjustment of the temperature display:

When key (3.2) is pressed during operation, the brightness of displays (3.6) and (3.7) can be adjusted with rotary knob (3.5).

Alarm system:

The under-pad heating device provides an alarm system with 4 priority levels:

High - Medium - Low - Indicative

The alarms are indicated visually and audibly (audio alarm).

The quicker the sequence of alarm tones and the shorter the pauses, the higher is the alarm priority.

Audio alarms can be paused with key (3.1) for a certain period. The pause period is according to the alarm priority.

Audio alarms are paused automatically for a certain period when they were caused by a logical action of the user, e.g. in case of temperature adjustment.

* Depending on model and configuration

The most common alarms which are released during operation are mentioned in the following list. A complete list of alarms can be found on pages 21 to 24**.**

Hazard/ Error condition	**Alarm priority**			**Warning lamp**	**Temperature display**		**Action needed**	**Consequence when neglected**
					Selection	**Actual**		
Battery capacity not sufficient for power failure alarm.	Indic-ative	Mute	- , -	None	E.g.  every 15 Sec. 	E.g.  every 15 Sec. 	Replace battery.	Power failure alarm not sufficiently secured.
Temperature more than 1°C <u>below</u> selection.	Medium	Inter-mittent	Yes 1.)	● ±1°C Yellow	E.g. 	E.g. 	Pause audio alarm. 2.) Watch the patient's temperature. If necessary relocate the patient or place an isolating blanket between patient and pad.	Patient cools down and becomes hypothermic.
Temperature more than 1°C <u>above</u> selection. (Possibly sun-light, external warming devices?)	Medium	Inter-mittent	Yes 1.) 2.) 3.)	● ± 1°C Yellow	E.g.	E.g.	Pause audio alarm. 2.) Watch the patient's temperature. If necessary relocate the patient or place an isolating blanket between patient and pad.	Patient becomes hyperthermic for a short while. After automatic safety switch-off he can become hypo-thermic again.
Interruption of power supply.	Medium	Perm-anent	No	●  Red	Dark 	Dark 	Switch off under-pad heating, re-install power supply. If necessary relocate the patient or place an isolating blanket between patient and pad.	Patient cools down and becomes hypothermic.
Selection > 37°C.	Indic-ative	Mute	- , -	● > 37°C Yellow	> 37°C 	E.g. 	Increased attention, check patient's temperature	Patient's core temperature increases.
Selection < 37°C.	Indic-ative	Mute	-,-	● < 37°C Yellow	< 37°C 	E.g. 	Increased attention, check patient's temperature	Patient's core temperature can fall.

1.) Automatic alarm pause caused by a logical action of the user (e.g. temperature adjustment).

2.) When alarms are paused repeatedly there is a permanent fault which must be removed. In such cases the heating is cut off automatically and the audio alarm can no longer be paused. Switch off the under-pad heating with key (3.4) and switch it on again when the fault has been removed.

3.) At an ambient temperature above 30°C and a temperature selection of 30°C a high temperature alarm may be released. In that case increase the temperature selection to 32°C or switch off the under-pad heating device. When the under-pad heating device is switched off, place a foam pad at least 2 cm thick or a woollen blanket between patient and gel pad in order to avoid that heat is withdrawn from the patient by the cooling gel pad.

* Depending on model and configuration

Hazard/ Error condition	Alarm priority			Warning lamp	Temperature display		Action needed	Consequence when neglected
					Selection	Actual		
Bed is warmer than 40°C.	High	Inter-mittent	Yes	● > 40°C Also ● ± 1°C yellow	E.g. 	E.g. 	Check whether high temperature was caused by sunlight or external warming devices. Switch off under-pad heating device temporarily. Watch temperature (residual heat). When the bed will not cool off, disconnect the under-pad heating device from the power supply with the central switch-off button (3.15) . Place an isolating blanket between patient and pad. Depending on the situation relocate the patient. Remove the alarm cause.	Patient can become dangerously hyperthermic. Attention: Above 42°C danger of burns.
Bed is warmer than 40,5°C.	High	Perm-anent	No					
Error in the control system.	High	Perm-anent	No	Depending on situation		Code up to 	Switch off the under-pad heating device immediately with central button (3.15) and have it repaired. Relocate patient.	Relay de-energized. Patient may cool off and become hypothermic.

End of operation

Switch off the under-pad heating device with key (3.4). All displays extinguish, with the exception of the actual temperature display (3.7). When the under-pad heating device is connected to the power supply, the under-pad temperature is displayed until it has fallen below 30°C.

Remark:
When the under-pad heating device is switched on again within 10 minutes after switch-off, it will start immediately with the last temperature selection.

When the under-pad heating device must be disconnected from the power supply for reasons of device failure or external influence, it must be switched off by the central on-off switch button (3.15), right hand below the bed.

* Depending on model and configuration

Bed with wall assembly

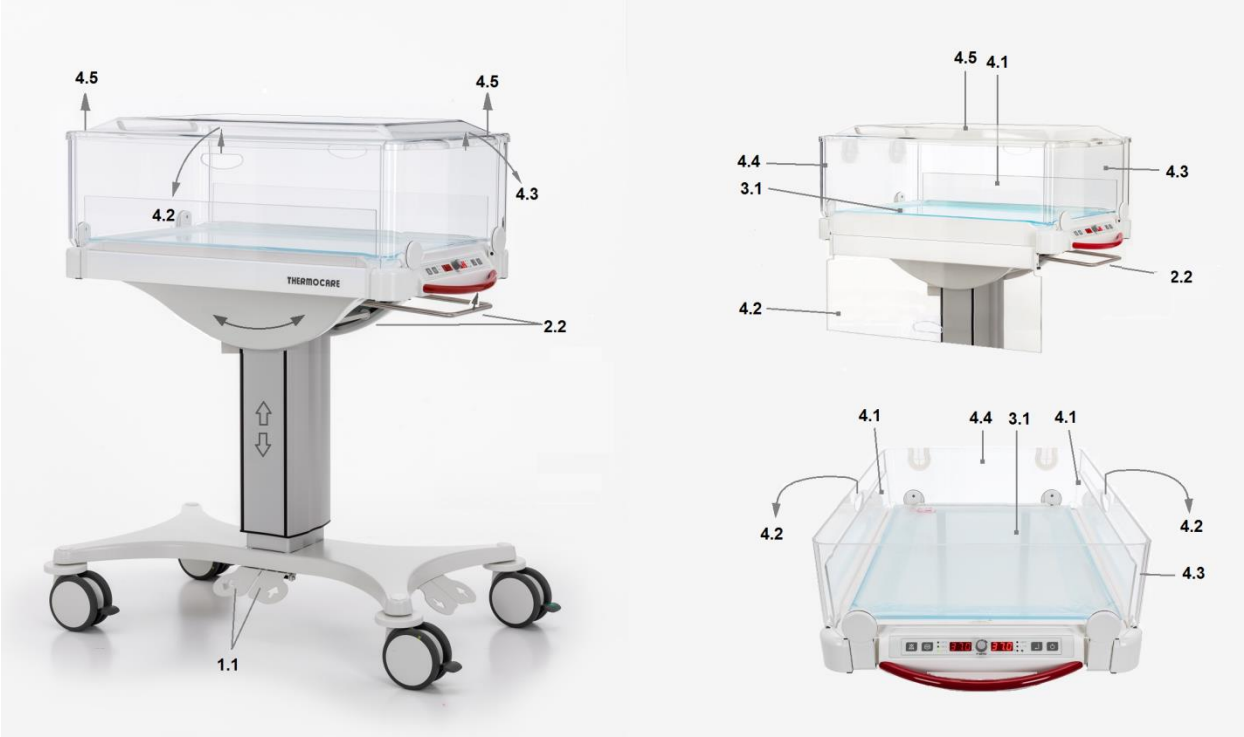
Move the bed to the desired working level* with the foot pedals (1.1). Take off the canopy * (4.5). Cover the gel pad (3.1) with a **cloth as thin as possible**. Take care that the cloth does not block the walls and their locking system. The walls (4.2/4.3) must always close smoothly and latch securely.

The safety side walls (4.1) should be inserted in a way that the patient cannot fall from the bed. For better accessibility they can be taken out of their support and inserted again set off by 180°. So the walls are retracted into the bed, allowing full access to the patient.

Cables and tubes connected to the patient must exclusively be passed through the grommets in the rear wall (4.4).

Heating up the bed from ambient temperature to 37°C will take approx. 15 minutes. It may take up to 10 minutes more until the gel pad itself has reached the selected temperature. If necessary the heating up process can be accelerated by turning the gel pad upside down during heating up.

When the under-pad heating device is at operation temperature, place the patient on the pad (3.1). Take care that the walls are folded up so that the patient cannot fall from the bed. Make sure that no body parts of the patient, cables of additional devices and tubes are squeezed. Attach the canopy (4.5)*, if necessary. After unlocking the catch (2.2) tilt the bed to the desired position. After releasing the catch check whether it has locked and the bed is fixed.



* Depending on model and configuration

Temperature selection of the under-pad heating device

The temperature selection of the under-pad heating depends on several factors, e.g.:

- Age and maturity of the patient.
- Weight.
- Does the patient suffer from Hypothermia / Hyperthermia?
- Are vital functions impaired?
- Which accompanying therapies are applied?
- Is the patient clothed or unclothed?

For a mature unclothed infant a temperature of approx. 36.5°C should be selected.

For a pre-term neonate a temperature of approx. 37° to 37.5°C is recommendable.

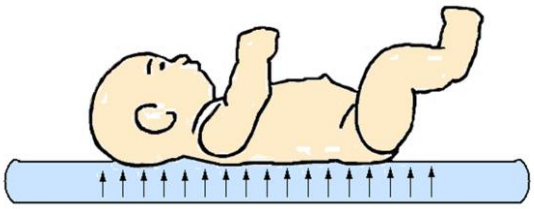
For clothed infants the temperature can be selected 0.5 to 1°C lower.

For temperature selection it must be considered that the temperature of the gel pad has a direct influence on the patient (thermal conduction).

When the pad temperature is higher than the patient's temperature, heat is supplied to the patient.

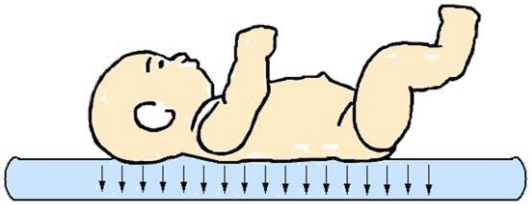
When on the other hand the pad temperature is lower than the patient's temperature, heat may be withdrawn from the patient!

Heat is conducted to the patient



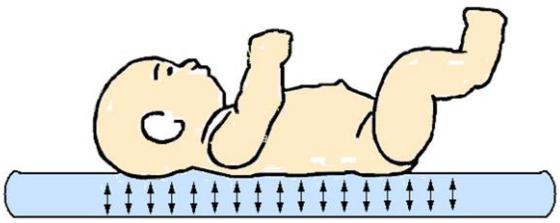
> 37,5 °C

Heat is withdrawn from the patient



< 36,5 °C

Temperature balance



36,5 °C - 37,5 °C

The patient's temperature must be checked at regular intervals or monitored.

When the under-pad heating device is switched off, the gel pad may cause a reduction of the patient's temperature. When nevertheless the warming bed shall be used with switched off under-pad heating device, for isolation purposes a foam pad or woollen nappy, at least 2 cm thick, must be placed between patient and pad!

In case of ambient temperature above 30°C and a temperature selection of 30°C a high temperature alarm may be released. In that case increase the temperature selection to 32°C or switch off the under-pad heating device.

* Depending on model and configuration

Device models and mandatory accessories

Order No.	Description
	Base devices
WY3001	Warming bed THERMOCARE K, fixed-height trolley, under-pad heating.
WY3002	Warming bed THERMOCARE K, height-adjustable trolley, under-pad heating.
	Wall assemblies (mandatory)
WY3021	Wall assembly with hinges, consisting of: • 4 walls 250 mm high can be folded down with one hand. • Rear wall with 3 silicon grommets for plane passing of cables and tubes. • 2 safety side walls, retractable into the bed.
WY3022	Wall assembly, consisting of: • 4 walls 170 mm high can be folded down with one hand. • Rear wall with 2 silicon grommets for plane passing of cables and tubes. 2 safety side walls, retractable into the bed.

Optional upgrade items / accessories

Order No.	Description
WY3024	PMMA canopy (one-piece), for wall assembly 250 mm high, with recessed grips and temperature indicator.
WY3025	PMMA canopy (two-piece), for wall assembly 250 mm high, with recessed grips and temperature indicator.
WY3035	Shelf fixed at the pillar of the warming bed, (without drawer max. 4 pcs. possible. with drawer max. 2 pcs. possible).
WY3036	Drawer, fixed at the shelf WY3035, volume 400 x 150 x 160 mm, load 3 kg, arc-shaped sliding out to both sides (max. 2 pcs. possible).
WY3032	Additional pair of foot pedals for height adjustment.
WY3051	Support for adapting 2 tubes Ø 27 mm, necessary for mounting accessories to the warming bed.
WY3055	Tube assembly Ø 27 mm, length 650 m, fixed at the support WY3051. Necessary for mounting accessories to the warming bed.
WY3060	Instrument and monitor shelf 420 x 280 mm, fixed at the tube assembly Ø 27 mm. Provision for suspending the canopy*.
WY3061	Instrument and monitor shelf 240 x 320 mm, fixed at the tube assembly Ø 27 mm, with lateral instrument rail 25 x 10 mm.
WY3064	Instrument rail 25 x 10 mm, 460 mm length, fixed at the tube assembly Ø 27 mm.
WY3067	Infusion holder, height-adjustable, fixed at the tube assembly Ø 27 mm.
WY3070	Four-poster for bed, plugged in tube assembly Ø 27 mm WY3055.

* Depending on model and configuration

	Phototherapy	
WY1816	**BILICOMPACT®** Phototherapy device for treatment of the neonatal hyperbilirubinemia, 10 energy saving lamps blue BAM/PL9/52, wave length spectrum 420 to 460 nm, integrated hour counter, handles. To be placed on warming bed THERMOCARE K, canopy WY3024 required	
	When placing on canopy not desired:	
WY2003	**Height-adjustable mobile stand** for phototherapy device BILICOMPACT®, with 4 antistatic castors, 2 of them with kickstop, bottom side of the phototherapy device height-adjustable 1315 to 1675 mm, rotatable 360°, vertical adjustment ± 90°.	

Additional devices

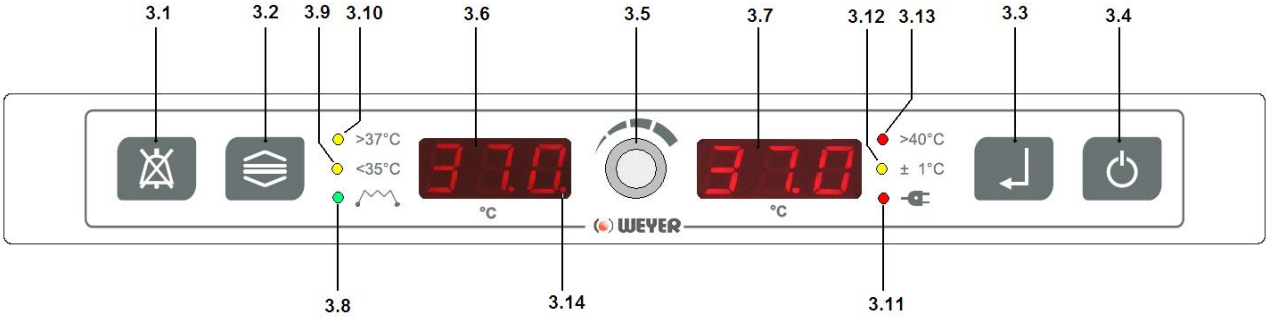
The "General requirements for the safety of medical electrical systems EN 60601-1-1 + Supplement A1" must be observed. Furthermore the maximum permissible power consumption for additional devices is specified at the take-off sockets and must be considered. The limit values of the total leakage currents must be maintained.

It should also be considered that the distance to accessories, which are not fixed at the neonatal warming bed, will change and therefore connected lines and tubes might be pulled off.

* Depending on model and configuration

Safety and alarm functions

Under-pad heating device



Hazard/ Error condition	Alarm priority			Warning lamp	Temperature display		Action needed	Consequence when neglected
					Selection	Actual		
Automatic switch-on test failed.	Medium	Yes	No	None	Error-Code according to the detected failure.		Do not put the under-pad heating device into operation.	None, as it is not possible to switch on the under-pad heating
Temperature more than 1°C <u>below</u> selection.	Medium	Inter-mittent	Yes 1.)	● ±1°C Yellow	E.g. 36.0.	E.g. 34.8.	Pause audio alarm. 2.) Watch the patient's temperature. If necessary relocate the patient or place an isolating blanket between patient and pad.	Patient cools down and becomes hypothermic.
Temperature more than 1°C <u>above</u> selection. (Possibly sun-light, external warming devices?)	Medium	Inter-mittent	Yes 1.) 2.) 3.)	● ± 1°C Yellow	E.g. 36.0.	E.g. 37.5.	Pause audio alarm. 2.) Watch the patient's temperature. If necessary relocate the patient or place an isolating blanket between patient and pad.	Patient becomes hyperthermic for a short while. After automatic safety switch-off he can become hypo-thermic again.
Temperature adjustment more than 1 °C <u>above</u> actual temperature ≡ HT-alarm.	Medium	Automatic alarm pause max. 10 minutes		● ±1°C Yellow	E.g. 37.0.	E.g. 35.5	Wait until bed temperature reaches the selection ± 1°C. Watch the patient's temperature.	None
Temperature adjustment more than 1 °C <u>below</u> actual temperature ≡ LT-alarm.					E.g. 35.5	E.g. 37.0.		

1.) Automatic alarm pause caused by a logical action of the user (e. g. temperature adjustment).

2.) When alarms are paused repeatedly there is a permanent fault which must be removed. In such cases the heating is cut off automatically and the audio alarm can no longer be paused. Switch off the under-pad heating with key (3.4) and switch it on again when the fault has been removed.

3.) At an ambient temperature above 30°C and a temperature selection of 30°C a high temperature alarm may be released. In that case increase the temperature selection to 32°C or switch off the under-pad heating device. When the under-pad heating device is switched off, place a foam pad at least 2 cm thick or a woollen blanket between patient and gel pad in order to avoid that heat is withdrawn from the patient by the cooling gel pad.

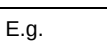
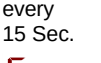
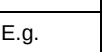
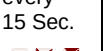
* Depending on model and configuration

Hazard/ Error condition	**Alarm priority**			**Warning lamp**	**Temperature display**		**Action needed**	**Consequence when neglected**
					Selection	**Actual**		
Selection > 37°C.	Indic-ative	Mute	- , -	● > 37°C Yellow	> 37°C 	E.g. 	Increased attention, check patient's temperature	Patient's core temperature increases.
Selection < 37°C.	Indic-ative	Mute	-,-	● < 37°C Yellow	< 37°C 	E.g. 	Increased attention, check patient's temperature	Patient's core temperature can fall.
Bed is warmer than 40°C.	High	Inter-mittent	Yes	● > 40°C Also ● ± 1°C yellow	E.g. 	E.g. 	Check whether high temperature was caused by sunlight or external warming devices. Switch off the under-pad heating device temporarily. Watch temperature (residual heat). When the bed will not cool off, disconnect the under-pad heating device from the power supply with the central switch-off button (3.15). Place an isolating blanket between patient and pad. Depending on the situation relocate the patient. Remove the alarm cause.	Patient can become dangerously hyperthermic. Attention: Above 42°C danger of burns.
Bed is warmer than 40,5°C.	High	Perm-anent	No					
Battery capacity not sufficient for power failure alarm.	Indic-ative	Mute	- , -	None	E.g.  every 15 Sec. 	E.g.  every 15 Sec. 	Replace battery.	Power failure alarm not sufficiently secured.
Interruption of power supply.	Medium	Perm-anent	No	 Red	Dark 	Dark 	Switch off the under-pad heating device, re-install power supply. If necessary relocate the patient or place an isolating blanket between patient and pad.	Patient will cool off and become hypothermic.
Re-installation of the power supply within 10 minutes.	Indic-ative	1 x short	- , -	Mostly ● ± 1°C yellow	Last selection	Actual temper-ature	Increased attention, if necessary pause audio alarm	None
Power supply below 190 V or defective fuse in heating circuit.	Indic-ative	No	- , -	Mostly ● ± 1°C yellow	E.g.  every 15 Sec.	E.g.  every 15 Sec.	Inform facility management on this situation. Take action to increase the voltage.	Longer heating-up period and reaction after selecting a higher temperature.

* Depending on model and configuration

Hazard/ Error condition	Alarm priority			Warning lamp	Temperaturdisplay		Action needed	Consequence when neglected
					Selection	Actual		
Defective control elements: 	Low	Perma-nent	No	None	Err.	38.1 38.2 38.3 38.4	Switch off the under-pad heating device, switch it on again and check whether the error still exists. In case of continuous error condition relocate the patient. Put the under-pad heating out of operation and have it repaired.	Relay de-energized. Patient may cool off and become hypothermic.
Triac for heating voltage is permanently switched on.	Medium	Yes	Yes	● ± 1°C Yellow	E.g. 37.0.	E.g. 38.5	Pause audio alarm. Watch temperature.	Safety cut-off at 40.5°C. Patient's temperature may increase considerably.
	High	Yes	No	Possibly ● > 40°C	37.0. Every 15 Sec. Err.	40.8 Every 15 Sec. 41.1	Alarm is released when being paused for the 4th time. Switch off the under-pad heating device.	
Triac for heating voltage is not switched on.	Medium	Yes	Yes	Mostly ● ± 1°C yellow	E.g. 37.0.	E.g. 35.5	Pause audio alarm. Watch temperature. If it still falls, place an isolating blanket between patient and pad. Depending on the situation relocate the patient.	Patient cools down and becomes hypothermic
Failure audio signal generator.	Medium	Not possible	Yes	None	Selection	Actual temper-ature	Put the under-pad heating device out of operation and have it repaired.	Fault may not necessarily become obvious, therefore an alarm condition may remain unrecognized.
Error A/D converter defective.	High	Yes	No	None	Err.	20	Put the under-pad heating device out of operation immediately and disconnect it from the power supply with the central switch-off button (3.15) . Place an isolating blanket between patient and pad. Depending on the situation relocate the patient.	Relay de-energized. Patient may cool off and become hypothermic.
Error A/D converter time out.					Err.	21		
Sensor difference > 0,5K.					Err.	22		
Sensor broken.					Err.	23		
Sensor short circuit.					Err.	24		
Smart sensor defective or not available.					Err.	25		
Temperature correction value false/illogical.					Err.	26		
EEPROM error.					Err.	27		
Watchdog error.					Err.	28		

* Depending on model and configuration

Hazard/ Error condition	Alarm priority			Warning lamp	Temperature display		Action needed	Consequence when neglected
					Selection	Actual		
Relay is energized, one or both contacts do not close.	Medium	Yes	Yes	After a short while: ● ± 1°C yellow	E.g.  every 15 Sec. 	E.g.  every 15 Sec. 	Switch off the under-pad heating device. Place an isolating blanket between patient and pad. Depending on the situation relocate the patient.	Relay does not close the heating circuit. Temperature falls. Patient may cool off and become hypothermic.
After pausing the high temper-ature alarm 3 times due to defective heating circuit or external heat source.	High	Yes	No	● ± 1°C Yellow depending on situation: ●> 40°C red	E.g.  every 15 Sec. 	E.g.  every 15 Sec. 	Switch off the under-pad heating device. Place an isolating blanket between patient and pad. Watch temperature. In case of external influence remove the external heat source. If necessary, relocate the patient and put the under-pad heating device out of operation	Safe operation may no longer be guaranteed. Patient is overheated.
Bed temperature higher than 40.5 C.	High	Yes	No	● ± 1°C yellow ●> 40°C red	E.g.  every 15 Sec. 	E.g.  every 15 Sec. 		
Failure of the safety relay.	High	Yes	No	Depending on situation	E.g.  every 15 Sec. 	E.g.  every 15 Sec. 	Immediately disconnect the under-pad heating device from the power supply with the central switch-off button (3.15) . Place an isolating blanket between patient and pad. Watch the temperature. If necessary relocate the patient.	Safe operation no longer guaranteed. Danger of overheating!

* Depending on model and configuration

Cleaning and Disinfection

Cleaning and disinfection must be carried out after every change of patient, but at least once a week.

Cleansing agents and disinfectants

Do not use scouring cleaning agents.

For disinfection only agents from the class of surface disinfectants should be used. Disinfectant sprays must only be used for the castors, not for the remaining device.

Because of the good material compatibility disinfectants based on aldehydes and quaternary ammonium merges are suitable in particular.

Tincture of iodine 5 %, carbolic acid, spirit, ether, acetone and other alcoholic agents as well as disinfectants basing on halogen-splitting merges, strong organic acids and oxygen-splitting merges are not suitable.

When choosing a substance the manufacturer's recommendations must be observed. The manufacturer of the substance is held liable for the application field and possible material damages.

The main materials of which warming bed is made are as follows:

Walls, canopy*	PMMA, polycarbonate
Bed, housing parts	Polyurethane
Gel pad	Polyurethane gel

We recommend the use of disinfectants according the current list of the German Society for Hygiene and Microbiology (DGHM) or a comparable national institution.

The following surface disinfectants can be recommended:

Incidur®	*Ecolab Deutschland GmbH, Monheim am Rhein*
Antifect® extra	*Schülke & Mayr GmbH, Norderstedt*
Kohrsolin® extra	*Paul Hartman AG, Heidenheim*

When using washing and disinfection machines only cleansing agents should be used. If alkaline or chlorine-liberating disinfectants are used, there is a danger of corrosion.

⚠ *Never use inflammable disinfectants!*

When using disinfectant concentrates please observe the correct mixing ratio.

* Depending on model and configuration

Dismantling, cleaning and disinfection

After use switch off the under-pad heating device and wait until the actual temperature display has extinguished. Disconnect the power plug.

- Remove nappies and tissues.
- Disconnect suction assemblies and patient circuits (if any).
- Empty liquid containers (if any).

Gel pad:

- Remove the pad from the bed.
- Clean and wipe disinfect the surface.
- Do not bend or fold the pad!

Wall assembly*:

- Remove all tube grommets* and treat them in the disinfection machine or soak them in disinfectant solution.
- Remove the canopy* the safety side walls from the bed and place them on a soft, non-scratching under-lay.
- Fold down the walls and remove visible contamination with a soft cloth or disposable cloth soaked in cleansing agent, in particular around the hinges.

  Remark: Do not use cellulose cloths for cleaning the walls as these will scratch the surface of the walls.
- Wipe disinfect surface and allow the disinfectant to take effect in accordance with the disinfectant manufacturer's instructions. Then wipe the walls with a soft, slightly damp cloth and finally wipe them dry.

Castors:

The castors must be cleaned very carefully and sprayed with a disinfecting solution.

Remaining device:

Clean the remaining surfaces of the warming bed with a cloth soaked in cleansing agent. Then wipe them dry.

After disinfection let the warming bed dry for at least 1 hour.

A disinfection by ultraviolet light is not recommendable as acrylic and plastic components may be damaged.

After cleaning and disinfection reassemble all components of the warming bed, check them for completeness and correct function. The surface of the under-pad heating device must be checked for mechanical damages prior to each operation.

Waste disposal

Batteries: Batteries included in the scope of the device can be returned to us for disposal free of charge. They can also be given to the official waste collection.


Do not dispose batteries in domestic waste!


Do not dispose batteries in fire! Danger of explosion!


Never open batteries by force! Danger of acid burns!

Gel pad: Domestic waste.

* Depending on model and configuration

Maintenance

Nomenclature

Qualified person	= Skilled worker, engineer, bio-medical engineer, with corresponding qualification.
Authorized qualified person	= Qualified person, who has acquainted special knowledge of a certain product.
Inspection	= Ascertainment of the actual state in terms of operational and functional safety of the medical device..
Preventive maintenance	= Measures to maintain the nominal state.
Repair	= Measures to restore the nominal state.
Maintenance	= Inspection, preventive maintenance, repair.

In order to ascertain the safe operation of the neonatal warming bed we recommend inspections by qualified persons at regular intervals which include the following checks.

- *Verification that the actual use is in conformance with the intended use.*
- *General condition of the device.*
- *Function and secure latching of the wall assembly.*
- *Function and secure locking of height-adjustment* and tilting facility.*
- *Possible damages at the device, mains cord and gel pad.*
- *Functions of the device and of the safety provisions.*
- *Measurement of the electrical safety according to the national standards and limit values actually in force.*

The battery securing the power failure alarm should be changed by qualified persons once per year, however, at the latest when the displays (3.6) and (3.7) indicate Lo + bAt. The battery compartment B is placed below the bed.

In order to maintain the nominal state of the warming bed we recommend an annual preventive maintenance to be performed by authorized qualified persons. The preventive maintenance includes the following checks in addition to the inspection:

- *Check of: interior wiring and connections.*
- *Check of all functions and safety-relevant parameters, in particular according to EN 60601-2-35:2010.*
- *Check of the safety cut-off at > 40.5°C.*
- *Calibration of the under-pad heating device according to EN 60601-2-35:2010.*

We can only be held responsible for the safety features of the neonatal warming bed when preventive maintenance and repairs are carried out by authorized qualified persons, by observing our instructions and by using original spare parts.

Devices respectively device components have to be cleaned and disinfected prior to each maintenance measure or when they are sent out to our factory for repair.

The microprocessor control system recognizes failures and cuts off the under-pad heating device in case of unsafe conditions. The safety and alarm functions are listed on pages 21 to 24.

* Depending on model and configuration

Spare and wear parts

Order No.	Description
M1221	Front wall 250 mm high
M1223	Side wall 250 mm high
	Order separately:
F0052	Logo THERMOCARE
M1228	Rear wall 250 mm high
	Order separately:
WY0412	Silicon grommet ***(3 x necessary)***
M1220	Front wall 170 mm high
M1222	Side wall 170 mm high
	Order separately:
F0052	Logo THERMOCARE
M1224	Rear wall 170 mm hoch
	Order separately:
WY0412	Silicon grommet ***(2 x necessary)***
M1231	Safety side wall
WY3024	PMMA canopy (one-piece), for wall assembly 250 mm high, with recessed grips and temperature indicator
WY3025	PMMA canopy (two-piece), for wall assembly 250 mm high, with recessed grips and temperature indicator
WY0620	Gel pad 74.5 x 49 x 1.3 cm
WY0628	PU pad 66 x 41 x 2 cm (when the warming bed is used with under-pad heating switched-off
EG0002	Battery 9 V energy block for power failure alarm

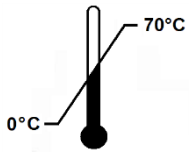
* Depending on model and configuration

Technical Data

Transport and storage

For transport and storage the following conditions should be observed:

Temperature:



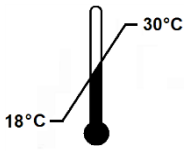
Relative air humidity: 15 to 95 %
Atmospheric pressure 210 to 1100 hPa

The neonatal warming bed must not be exposed to strong vibrations, such as e.g. transport over cobblestone pavement.

Requirements of the location

The neonatal warming bed can be used under the following operation conditions:

Temperature:



Relative air humidity: 15 to 95 %
Atmospheric pressure 860 to 1100 hPa

The neonatal warming bed is not suitable for the use in explosion-hazardous areas.

Do not use the warming bed close to high-frequent radiation sources such as HF surgery devices, mobile phones or similar.

To avoid the risk of an electrical stroke this device must only be connected to an electrical mains with earth conductor.

* Depending on model and configuration

General Data

Overall dimensions

Castors	4 smooth double castors Ø 125 mm, antistatic (3 x with total lock, 1 x with steering lock). 4 bumpers Ø 70 mm.	
Bed	Concave shape **D** = 760 mm, **W** = 480 mm	
Head up/feet down - Feet up/head down	To 12°	
Pad	PU-Gel, conductive effect	
Walls	4 walls 250 mm or 170 mm high, can be folded down with one hand.	
	WY3001	WY3002
Weight	66 kg	72 kg
Height adjustment (Softlift Column)	No	Yes
Under-pad heating device	Yes	Yes
Take-off sockets for accessories	3	3

* Depending on model and configuration

Operating / Performance data

General

Operating voltage / power supply	~ 230 V / 50 Hz	
Power input	WY3001	WY3002
	180 W / 0,8 A	300 W / 1,3 A
Max. power consumption	2300 W / 10 A	
Max. possible CO_2 concentration when canopy * is attached	< 0,3 %	

Under-pad heating device

Temperature selection:	
- Standard range	35 to 37°C
- Extended range	30 to 35°C and 37 to 38.5°C
Increments of temperature selection	0.1°C
Resolution of the displays	0.1°C
Temperature selection display	30 to 38.5°C
Actual temperature display	0 to 50°C
Residual heat display	Down to 30°C, then automatic switch-off
Safety cut-off	At 40.5°C
Heating-up time from ambient temperature 24°C to 37°C	Approx. 15 minutes

Classification

Protection class	1
Type complete device	B
Type under-pad heating	BF
MDD class	IIa

Standards

The device complies with	EN 60601-1:2006
	EN 60601-2-35:2010

Certification

CE 0197

* Depending on model and configuration

Guidelines and manufacturer's declaration electromagnetic emissions and immunity

Guidelines and manufacturer's declaration electromagnetic emissions		
The warming bed THERMOCARE K is suitable for use in the specified electromagnetic environment. The customer and/or the user of the device should assure that it is used in an electromagnetic environment as described below:		
Emissions Test	**Compliance**	**Electromagnetic Environment – Guidance**
RF emissions CISPR 11	Group 1	The warming bed system uses RF energy only for its internal function. Therefore, its HF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class A	The warming bed is suitable for the use in all locations including those in the living area, which are connected directly to the public power supply and which also supplies buildings used for living.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations/flicker emissions IEC 61000-3-3	N.A.	

Guidelines and manufacturer's declaration electromagnetic immunity			
The warming bed THERMOCARE K is suitable for use in the specified electromagnetic environment. The customer and/or the user of the device should assure that it is used in an electromagnetic environment as described below:			
Immunity Test	**IEC 60601 Test Level**	**Compliance Level**	**Electromagnetic Environment – Guidelines**
Electrostatic discharge (ESD) IEC 61000-4-2	±6 kV Contact discharge ±8 kV Air discharge	±6 kV Contact discharge ±8 kV Air discharge	Floors should be wood, concrete, or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %.
Electrical fast transient/burst IEC 61000-4-4	± 2 kV for power supply lines ± 1 kV for input/output lines	± 2 kV for power supply lines ± 1 kV for input/ output lines	Mains power quality should be that of a typical commercial and/or hospital environment.
Surge IEC 61000-4-5	± 1 kV differential mode ± 2 kV common mode	± 1 kV differential mode ± 2 kV common mode	
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	< 5 % U_T (> 95 % dip in U_T)for 0,5 cycle 40 % U_T (60 % dip in U_T) for 5 cycles 70 % U_T (30 % dip in U_T) for 25 cycles < 5 % U_T (> 95 % dip in U_T) for 5 sec	< 5 % U_T (> 95 % dip in U_T)for 0,5 cycle 40 % U_T (60 % dip in U_T) for 5 cycles 70 % U_T (30 % dip in U_T) for 25 cycles < 5 % U_T (> 95 % dip in U_T) for 5 sec	Mains power quality should be that of a typical commercial and/or hospital environment. If the user of the warming bed requires continued operation during power mains interruptions, it is recommended that the warming bed is powered from an uninterruptible power supply or a battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	30 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial and/or hospital environment.
Note:	U_T is the a.c. mains voltage prior to application of the test level.		

* Depending on model and configuration

Guidelines and manufacturer's declaration electromagnetic immunity			
The warming bed THERMOCARE K is suitable for use in the specified electromagnetic environment. The customer and/or the user of the device should assure that it is used in an electromagnetic environment as described below:			
Immunity Test	**IEC 60601 Test Level**	**Compliance Level**	**Electromagnetic Environment – Guidance**
Conducted RF IEC 61000-4-6	3 V_{RMS} 150 kHz – 80MHz	3-V_{RMS}	Portable and mobile RF communications equipment should be used no closer to any part of the warming bed, including cables, than the recommended separation distance calculated from the equation appropriate for the frequency of the transmitter. Recommended separation distance : $d = 1{,}17 \times \sqrt{P}$
Radiated RF IEC 61000-4-3	3 V/m 80 MHz – 2,5 GHz	3 V/m	$d = 1{,}17 \times \sqrt{P}$ for 80 MHz – 800 MHz $d = 2{,}33 \times \sqrt{P}$ for 800 MHz – 2,5 GHz Where P is the maximum output power rating of the transmitter in watts according to the transmitter manufacturer and d is the recommended separation distance in metres. Field strength from fixed RF transmitters, as determined by an electromagnetic site survey*, should be less than the compliance level in each frequency range**. Interference may occur in the vicinity of equipment marked with the following symbol. 
Note 1: At 80 MHz and 800 MHz the higher frequency range applies			
Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			
* Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast, and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the warming bed is used exceeds the applicable RF compliance level above, the warming bed should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the warming bed.			
** Over the frequency range 150 kHz to 80 MHz, field strength should be less than 3 V/m.			

* Depending on model and configuration

Guidelines and manufacturer's declaration electromagnetic immunity			
The warming bed THERMOCARE K is suitable for use in the specified electromagnetic environment in which in which radiated RF disturbances are controlled. The customer or the user of the device can help to prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and warming bed as recommended below, according to the maximum output power of the communications equipment.			
Rated maximum output power of transmitter [W]	**Separation distance according to frequency of transmitter [m]**		
	150 kHz – 80 MHz $d = 1{,}17 \times \sqrt{P}$	**80 MHz – 800 MHz** $d = 1{,}17 \times \sqrt{P}$	**800 MHz – 2,5 GHz** $d = 2{,}3 \times \sqrt{P}$
0,01	0,12	0,12	0,23
0,10	0,37	0,37	0,73
1,00	1,17	1,17	2,30
10,00	3,70	3,70	7,30
100,00	11,70	11,70	23,00
For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.			
Note 1: At 80 MHz and 800 MHz the higher frequency range applies			
Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			

* Depending on model and configuration