medstrom solo® LTC

USER MANUAL

PRO00008
Revision 1.0

medstrom+
Improved Patient Outcomes

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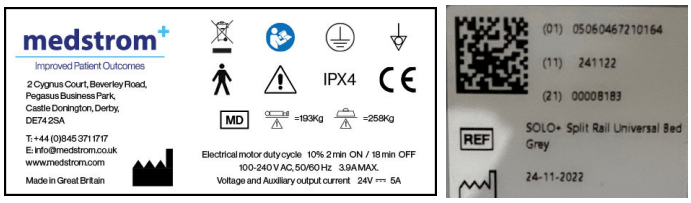
Contents

	This User Manual contains safety information and operating instructions. Please retain for future reference.

1. Notifications Used in the Manual

	**Warning:** There is a risk to safety. Please read this safety instruction and note any warning labels on the bed.
	**Caution:** There is a risk of damage to equipment. Please read this instruction.
Important:	Important information that provides further details for a procedure or condition..
Note:	A note that provides further explanation or advice.

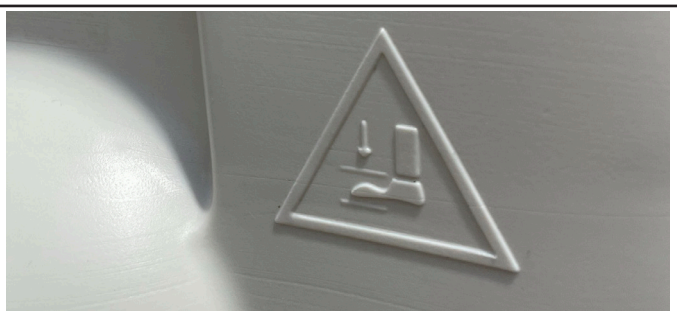
2. Identification of Labels Affixed to Bed



Reference label showing the manufacturer's type and serial number of the bed.
See following table for explanations of the symbols.

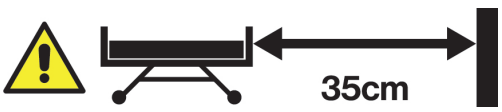
Label indicating the location of a possible trapping hazard:

Risk of trapping feet.

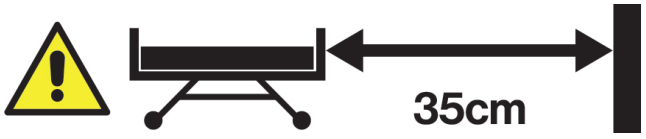


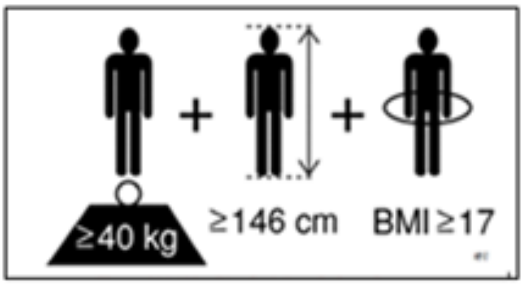
Label indicating the location of a possible trapping hazard:

Risk of trapping fingers/hands.



This label defines the required gap to be left between the head of the bed and the wall.





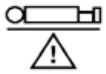
Recommended patient size for the bed.

MANUAL CPR

Manual CPR label.

Reference Label Symbols:

	Waste Electrical and Electronic Equipment (WEEE) Directive	Waste Electrical and Electronic Equipment must not be disposed of through general waste streams. Please contact an authorised disposal facility or Medstrom Ltd.
	Refer to User Manual	Refer to this manual before operating.
	Operating Instructions	Identifies the user manual that contains the safety information and operating instructions for the equipment.
	Protective Earth (Ground)	Terminal is intended for connection to an external conductor for protection against electrical shock in case of a fault, or is the terminal of a protective earth (ground) electrode.
	Equipotentiality (Equipotential Earth)	Identifies terminals which, when connected together, bring the various parts of the equipment to the same potential.
	Type B applied part	Identifies a type B applied part complying with *IEC 60601-1. Classification of protection against electrical shock.*
	Caution	There is a risk of damage to equipment.
IPX4	Ingress Protection (IP) Rating	IPX4: Water splashing against the equipment from any direction will have no harmful effect.
CE	CE Mark	Signifies that this product meets the General Safety and Performance Requirements (GSPR) of the European Medical Device Regulations.

	Medical Device	Identifies the equipment as a medical device.
	Maximum Patient Weight	The maximum weight of patient that the equipment is rated for (193 kg).
	Maximum Safe Working Load	The maximum safe working load (weight) (258 kg).
	Manufacturer	The manufacturer of the equipment (i.e. Medstrom) and their address.
	Reference	Manufacturer's reference catalogue number/identifier, i.e. Solo LTC.
	Date of Manufacture	The date that the equipment was manufactured.

3. Intended Use of the Bed

This bed is designed for use in hospitals, nursing homes, for long duration rehabilitation centres, elderly care facilities, and home settings . It is designed to aid comfortable sleep and smooth transfers into and out of bed. The bed ensures the highest level of care for patients, and staff with a safe working height.

The bed is designed for IEC 60601-2-52 Application Environments 2, 3 and 5, where medical care or medical supervision and control is provided, and where electro-medical devices are provided to help maintain and/or improve the condition of patients.

4. General Information

Important:

Read this user manual carefully before use and retain for future reference.

5. Precautions for Use

Important:

Read this user manual carefully before first use of the bed and any subsequent bed maintenance.

5.1. General Precautions

The following is a list of general precautions which should be followed when using the bed:

Warnings:

The bed is an electrical device with a risk of electric shock. Personnel using the bed must be informed and trained to potential risks related to electrical appliances.

It is essential to know how the product works to achieve the desired result during handling.

It is essential to comply with the use and recommendations described in this manual to ensure the security and integrity of the different users.

- The use and handling of a medical bed can cause injury if due precautions are not taken. It is essential that any person handling the bed is authorised, trained and made aware of the consequences of all actions and how not to cause involuntary movements.
- Incompatible mattresses can create hazards. See section "7.1. Dimensions" for dimensions and recommendations.
- If using the bed with other medical equipment not supplied by Medstrom e.g. mattresses, the compatibility of the equipment must be assessed for potential risks.
- Do not use the bed for patients not meeting the patient recommendations given in section "7.1. Dimensions".
- Do not allow sitting on the bed if the sleep deck and mattress are not completely flat.
- Do not load the bed beyond the recommended safe working load – 258 kg.
- Do not use the electrical functions of the bed in excess of their designed mode of operation (duty cycle), two minutes on/18 minutes off.

Important:

As a safety feature, when the actuators of the bed are used too intensively, the bed will go into 'safe mode' and shut down. The bed will return to its normal functions after returning to normal temperature. This return to normal temperature may take several hours.

- Ensure that the mains cable is not trailing beneath the bed when the bed is moved, as this could result in damage to the cable.
- Always unwind the mains cable fully when it is connected to the mains power outlet.
- Maintenance of the bed must be performed only by qualified personnel.
- When moving the bed, ensure that there is enough space to allow for the movement, in order to avoid damage to the bed, its environment, or causing injury to any person.
- Keep the space around the bed free from any obstructions so that it can be articulated into any of its full range of movements without causing damage to anything or any potential injury to anyone.
- When preparing to move the bed elsewhere, ensure that there is ample space to operate the bed without any obstructions that could create a hazard or cause damage to anything or any potential injury to anyone.
- The electrical and electronic fittings and components used on the bed are not explosion proof and therefore the bed is not suitable for use in hazardous areas, e.g. the bed must not be used in a full oxygen tent.
- Motorised bed mechanisms can cause serious injury.
- Before use of the bed, assess the needs of, and potential risks to, each individual patient.
- Side rails should be fully up and locked or fully down and locked to avoid risk of entrapment.
- Do adopt special safety measures when the bed is to be used by confused patients, e.g. put the bed in a lower position, use safety mats, use protective covers and barriers, enhanced surveillance.

- Movement of the bed could cause damage to soft or improperly installed floor coverings.
- The plug end of the mains cable must always be accessible, so that the bed can be unplugged quickly in case of emergency.
- Only accessories supplied or authorised by Medstrom should be used in conjunction with an appropriate risk assessment for patient safety.
- Any serious incident that occurs in connection with the bed should be reported both to the manufacturer and the competent authority of the Country or Member State in which the facility is located.

Avoid Ignition Sources:

- Don't smoke in bed/on the mattress.
- Don't burn candles in the same room as the bed/mattress.
- Don't use matches or lighters in the vicinity of the bed/mattress.
- Don't have electrical equipment in the vicinity of the bed/mattress, e.g. a TV over the bed.
- Don't use electric blankets in combination with the bed/mattress.
- Don't have fires and heaters in the vicinity of the bed/mattress.
- Don't place hot items such as hair dryers or heated appliances on the bed or mattress.
- If you use a mobility aid keep it within reach of your bed or device.

5.2. Bed Frame Compatibility

⚠ Caution:
Where the mattress used on the bed is not supplied by Medstrom, the compatibility with the bed frame should be assessed independently.

5.3. Contraindications

This medical device is not intended to be used for:

- Patients weighing less than 40 Kg.
- Patients weighing more than the safe working load (SWL).
- Patients less than 146 cm in height.
- Patients with a Body Mass Index (BMI) of less than 17.

If any contraindication(s) exists for an individual patient, carry out and record a risk assessment before determining, as a minimum:

- Is this medical device a suitable and safe choice for the patient?
- Should the patient have access to the handset?
- Are any other safety actions required?

5.4. Potential Risk of Entrapment

The bed has been designed in accordance with IEC 60601 standards to reduce or eliminate the risk of entrapment and/or injury. However, please review the pictorial representations below, which highlight those parts of the bed where small risks remain.

The gap between side rail and sleep deck.

The gap between the back rest and side rail.

The gap between the underside of the side rail post and the floor.

The gap between the underside of the head/foot board and the floor.

The gap between the side rails.

5.5. Installation and Commissioning

Warnings:

Position the bed in such a way that there is always access to the mains power outlet. Do not pull on the mains cable to remove the plug from the mains power outlet.

Before using the bed, ensure that the power requirements of the bed are compatible with the available mains power outlet. The power requirements are provided on the bed reference label and in section “7.2. Technical Specifications”.

New beds are partly dismantled for ease of shipment and require some reassembly prior to use. If the installation is not carried out by Medstrom, proceed as follows:

1. Remove the protective wrapping, securing straps and cable ties.
2. Attach any accessories.
3. Check that all pin connectors are present and firmly connected to their connections and that the cables are not pinched. Unused connections are sealed to prevent damage from electrostatic discharge.

Warning:
If any electrical assembly or wiring is replaced or repaired, the appropriate electrical safety checks must be made before returning the bed to use.

4. Fit the headboard and footboards to the bed, in accordance with section "8.2. Removal and Replacement of Headboard/Footboard".
5. Thoroughly clean the bed, in accordance with the procedures in section "10. Operational Maintenance".
6. Position the bed in its use location, ensuring there is enough space to accommodate all bed movements while avoiding damage to the bed or the environment and/or injuring the patient, caregiver or any visitor.
7. Check that the mains cable will not be strained when connected to the mains power outlet.
8. Connect the mains cable, located at the head end of the bed, to the mains power outlet.

Note: An equipotential terminal, used to earth the bed, is situated under the sleep deck.

9. Using the handset, check that all functions are operating correctly.

Warning:
When routing cables from other equipment around the bed, check that those cables are not, and cannot be, squeezed, pinched or squashed by any part of the bed.

Caution:
Be aware that:

- You should not change the configuration of the bed without the written permission of the manufacturer.
- Users, patients and their families should be informed of the safety rules to be followed when using the bed.
- The bed comes with a quick user guide (QUG) and training video, these can be accessed via the QR code link on the frame of the bed.

Caution: Electromagnetic Compatibility
Precautions must be taken regarding electromagnetic compatibility (EMC).

- Interference with the bed's electrical/electronic system may be caused by the proximity of communications equipment, mobile phones or other medical equipment such as magnetic resonance imaging (MRI) or active high frequency surgical equipment.
- Caution should be exercised with regard to the use of other electronic equipment in close proximity to the bed. If such usage is unavoidable, the bed and the adjacent electronic equipment should be closely monitored to verify normal operation. If abnormal operation is observed, cease usage of the electronic equipment until an acceptable configuration has been determined and verified.
- The use of cables and accessories other than those specified by Medstrom may negatively affect EMC performance.

Caution: Battery Back-Up

The bed is equipped with a rechargeable battery back-up. The battery automatically supplies power to the bed if the bed is disconnected from the mains power outlet. The battery will enable operation of the bed electrical functions for short periods, e.g. when the bed is being moved, or in an emergency.

To ensure that the battery is kept fully charged, the bed must be connected to the mains power outlet at all times during normal use.

5.5.1. Battery Test

Check the condition of the batteries using the following procedure:

1. Ensure that the bed has been connected to the mains power outlet for a minimum of 24 hours.
2. Disconnect the bed from the mains power outlet.
3. Apply a load to the sleep deck.
4. Raise and lower the bed height, from minimum to maximum height, three times.
5. If the bed again fails to operate satisfactorily, the battery is not holding sufficient charge and should be replaced..

6. Transport and Storage

Warning:

This product is not designed for the general transportation of patients, it is designed for patient transportation within the application environments stated in section “3. Intended Use of the Bed”. For general patient transportation use equipment that is specifically designed for that purpose.

- The bed is designed for use in temperatures between 5°C and 40°C. These temperature limits also apply to transport and storage of beds.
- The sleep deck must be set flat, the bed height should be set to the low position, all bed movement functions should be locked-out, and the brake must be applied.
- The bed must be shut down as stated in section “6.1. Shutdown Procedure”.
- Use suitable padding materials to protect the bed from the effects of impact and friction.
- During transport in a vehicle the bed should be restrained to prevent movement.
- Do not use a forklift.
- Beds should not be stacked on top of each other.
- No load should be placed on top of a bed during storage.

6.1. Shutdown Procedure

1. Disconnect the mains cable from the mains power outlet and store the cable in a safe place.
2. Lock out all bed movement functions as described in section “8.1. Handset”.

7. Bed Features

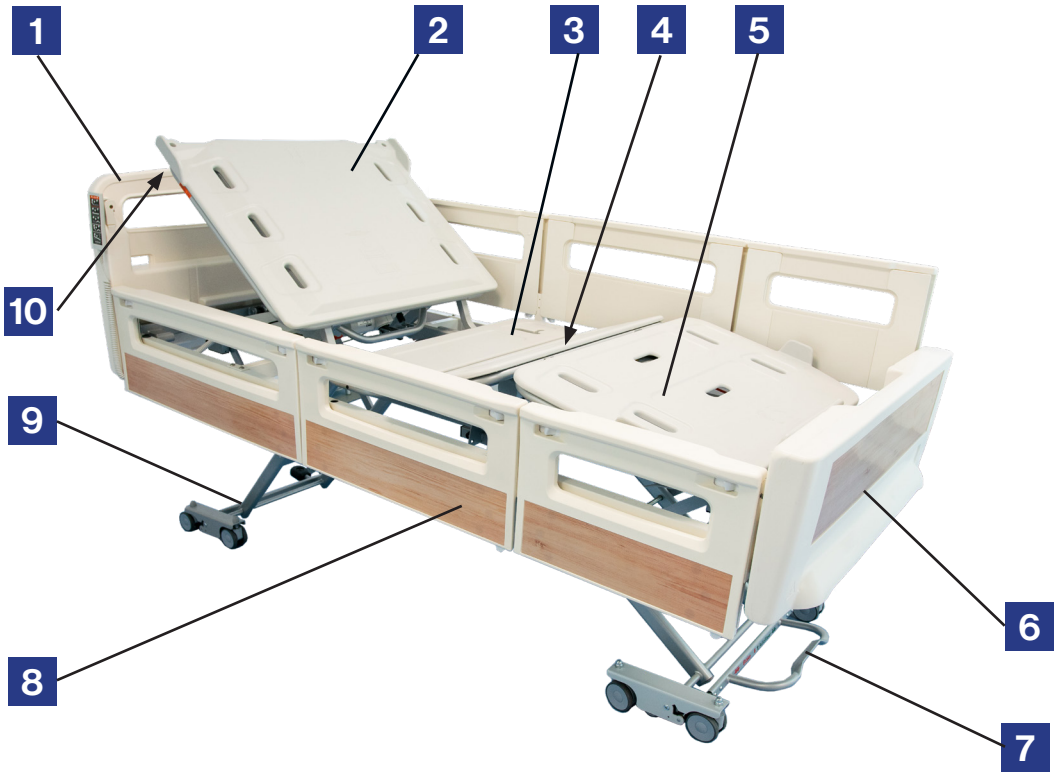
Certified characteristics are safety, electromagnetic compatibility, mechanical safety and fitness for use of the bed and its accessories.

Standard configuration:

- Full coverage side rails (3-segment) each side.
- Cabled handset with electric height, back rest, knee rest adjustment and mechanical lock-outs.
- One button cardiac chair position and back to flat.
- Electric Trendelenburg/reverse Trendelenburg.
- Electric CPR.
- Custom height setting.
- Bilateral manual CPR function.
- 2D movement of the back rest by 23 cm (eliminates patient migration and associated shear and friction on the patient's skin).
- Manual foot section adjustment.
- Six supports for IV poles.
- Two supports for patient helper.
- Extension of the sleep deck - 18 cm and 32 cm positions.
- Removable, easy to clean sleep deck panels
- Four multi-directional double castors x 75 mm (one anti-static) with front access brake and head end AutoSteer™ pedal.
- Battery back-up.

Options:

- Removable half-height board or full-height board for head and foot ends of bed.
- Four multi-directional double castors x 100 mm (one anti-static) with front access brake and head end AutoSteer™ pedal.
- Under-bed light.
- Catheter bag holders.



Number	Name
1	Full-height headboard
2	Back rest
3	Fixed part
4	Knee rest
5	Extendable leg section

Number	Name
6	Half-height footboard
7	Brake bar
8	3 segment side rails
9	AutoSteer™ pedal
10	CPR handle

Available Options
Removable full-height board (head or foot end of bed)
Removable half-height board (head or foot end of bed)
Four multi-directional double castors x 100 mm (one anti-static) with front access brake and head end AutoSteer™ pedal
Under-bed light
Catheter bag holders

7.1. Dimensions

Description	Dimensions
Height of sleep deck in high position	83 cm
Height of sleep deck in low position	21 cm
Total length	227 cm
Total width	106 cm
Dimension of sleep deck	198 cm x 88 cm
• Height of side rail from sleep deck	37 cm
Recommended mattress height with 3 segment side rails	14 cm Maximum: 25 cm when using a specialist mattress)
Recommended mattress size	198 cm x 90 cm +/- 2 cm
Full-board height from sleep deck	48 cm
Half-board height from sleep deck	14 cm
Weight of bed (no mattress or accessories)	149 kg
Back rest angle	70°
• Leg section angle	20°
Knee rest angle	30°
Trendelenburg angle	+14°
Reverse Trendelenburg angle	- 14°
Patient height	Minimum 146 cm/maximum 185 cm
Minimum patient weight	40 kg

Warning:

Incompatible mattresses can create hazards. Specialist mattresses require a local risk assessment.

Many specialty mattresses feature immersion therapy which allows the patient to sink into the surface of the mattress, thus reducing the risk of patient falls.

7.2. Technical Specifications

Description	Dimensions
Mechanical	
Safe working load	258 kg (193 kg patient, 65 kg for a mattress plus bedding and accessories)
Castors	Four multi-directional double castors x 75 mm (one anti-static)
Brake & steer	Brake at foot end, steer at head end
Electrical	
Power Input	Voltage 100-240 V ac 50/60 Hz
	Current 3.9 A Max
Mode of operation (duty cycle)	Non-continuous: 2 min. on/18 min. off
Output voltage of the transformer	24-26 VCC
Amperage	5 A max per channel, 5 A max total on secondary
Electric power	0.5 W idle, 200 W max full load

Description	Dimensions
Electronic protection	Individual in case of overload. Durability of non-resettable thermal circuit breaker relays.
Fuses	Electronic overcharge protection
Handset	Linak type HL75 (selective lock-out)
Power supply unit	Linak type CO61
Power supply wire	3x1.5 mm² PVC sleeve– interchangeable
Variable height motor	Linak type LA40 – 6000N
Back rest motor	Linak type LA27 – 3500N
Knee rest motor	Linak type LA27 – 3000N
Protective grounding class	Class I
Class of protection against dust and water	IPX4 for wireless handset HL75
	IPX6 for control box
Classification of the device	Type B according to IEC 60601
Battery back-up	Standard
Environmental Conditions of Use and Storage	
Use temperature	From 5°C to 40°C
Storage temperature	From -5°C to 50°C
Thermal cut-out reset time	Up to 5 hours
Humidity	From 20% to 90% - to 30° without condensation
Atmospheric pressure	700 to 1060 hPa
Maximum temperature of parts	59.8°C (for electrical boxes)
Sound level	41 dB

8. Instructions for Use

Warnings:

For your safety, before using the bed, it is essential to verify that:

- The mattress you intend using is compatible with the bed.
- The recommended mattress dimensions are 198 cm x 90 cm, +/- 2 cm.
- The recommended mattress depth is 14 cm. Maximum depth of 25 cm when using a specialist mattress.

The overall condition of the patient must be risk assessed to ensure compatibility with the use of side rails.

Ensure no obstacle or person hinders, or may hinder, the movement of the side rails during use to avoid injury or jamming.

Ensure the brake and steer pedals are applied properly in the locked position when the bed is stationary.

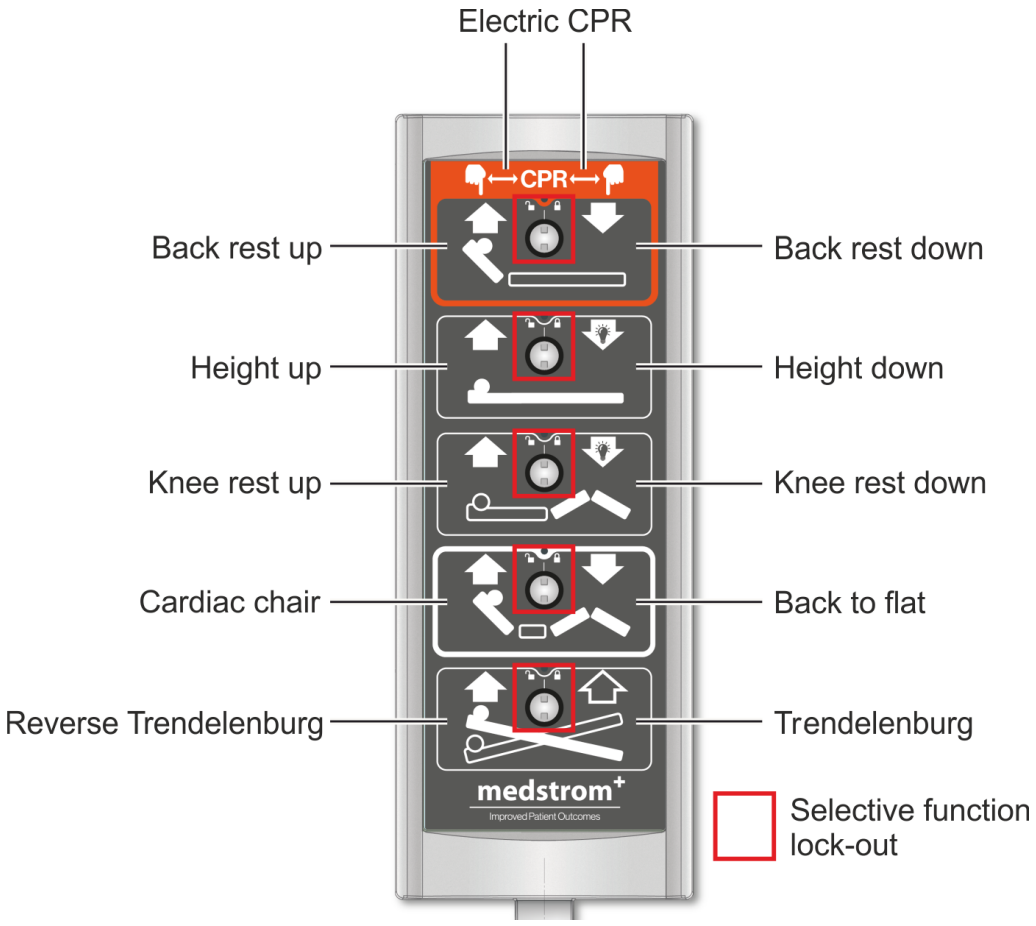
Mattress and side rail combinations that are incompatible with the dimensions that are provided in this document can cause an entrapment hazard.

Warning:

Keep clear of the bed when it is being operated. Severe injury can result from crushing by moving parts.

Be aware that bed sections can be operated under battery power even when the mains cable is disconnected from a mains power outlet.

8.1. Handset



Control	Action
Electric CPR buttons	Press and hold the back rest up and down buttons simultaneously. Drives the sleep deck flat and horizontal, then lowers the sleep deck to the low height setting.

Control	Action
Back rest buttons	Press and hold the up/down button to raise or lower the back rest to the desired angle.
Bed height buttons	Press and hold the up/down button to raise or lower the sleep deck.
Knee rest buttons	Press and hold the up/down button to raise or lower the knee rest to the desired angle.
Cardiac chair/back to flat buttons	Cardiac chair: • Press and hold the up cardiac chair button. The back rest will raise to 45° and the knee rest will raise to 30°. The bed will then go into the Reverse Trendelenburg position. Back to flat: • To return the bed to the flat position, press and hold the down cardiac chair (back to flat) button.
Custom bed exit height setting	Press and hold the cardiac chair button and back to flat button simultaneously for 10 seconds to set the correct bed exit height for an individual patient. See section "8.5.6. Storing a Custom Bed Exit Height in the Memory".
Trendelenburg / reverse Trendelenburg buttons	Press and hold the Trendelenburg button. Drives the sleep deck flat, pauses for two seconds, then tilts the sleep deck head downwards utilising the height actuators. Press and hold the reverse Trendelenburg button. Drives the sleep deck flat, pauses for two seconds, then tilts the sleep deck head upwards utilising the height actuators.
Function lock-out	The handset has a selective lock-out function allowing any electric function of the bed to be locked. To lock a function, insert the key provided on the cable into the pins next to the function to be locked-out and turn to the 1 o'clock position. To enable the function again, return to the 12 o'clock position.

Note: It is necessary to keep pressing the function button for the entire duration of the desired movement. An exception to this is when lowering the bed height to its minimum, the bed goes down and reaches a height of 24 cm from the floor. At this point the bed pauses to indicate a risk of entrapment if an object or bodily part is located between the bed and the floor. To continue lowering to the lowest position, release the button, then press it again. This will lower the bed to the ultra-low position. An audible signal will sound to alert the user of the reduction of the space between the floor and the bed.

8.2. Removal and Replacement of Headboard/Footboard

To remove:

1. Hold the headboard/footboard firmly with one hand on each handle area.
2. Pull upwards until the pins at the bottom of the board are clear of the sockets on the bed frame.

To replace:

1. Engage the pins at the bottom of the board with the sockets on the bed frame.
2. With one hand on each handle area, press vertically downwards until fully engaged.

8.3. Side Rail Operation

The bed is fitted with 3 segment side rails on each side of the bed. These are positioned on the bed in compliance with safety clearances required by the safety regulations and to aid patients with mobilising safely and comfortably. Each side rail (head, middle, foot) is lowered using a trigger mechanism built into the outside of each rail. 3 segment side rails cannot be removed by the end user.

The rails are designed to prevent patient falls whilst in the bed and to avoid the risk of entrapment. The use of side rails should be risk assessed for individual patients.

Beds are supplied with six side rails installed:

- Left-hand side rail (head end)
- Left-hand side rail (middle)
- Left-hand side rail (foot end)
- Right-hand side rail (head end)
- Right-hand side rail (middle)
- Right-hand side rail (foot end)

8.3.1. 3 Segment Side Rail Operation

- To raise a side rail into position, lift from the centre of the top rail and lock into place (there will be an audible click to indicate when in place correctly).

Warning:
Do not lift from the underside of side rail.

- To lower a side rail, click and release both trigger handles of the side rail. Keep hold of side rail and lower gently into position.

8.3.2. Automatic Side Rail Locking

When the bed is lowered to the ultra-low position, the side rails are automatically locked in place creating a “box-bed” configuration. The brake is also automatically engaged when the bed is lowered to the ultra-low position.

To set this function, lower each side rail first using the release triggers on each rail.

Lower the bed and it will automatically stop at 24 cm, sounding an alarm to remind caregivers to ensure no feet or items can be trapped. Continue to lower the bed to the ultra-low position (21 cm). Check that the side rails are locked into place by gentling pulling them upwards to ensure they cannot move.

Warning:
Side rails are designed for easy operation. There is an extremely small risk of pinching fingers when articulating the sleep deck and lowering the side rail when holding on to the handle area.

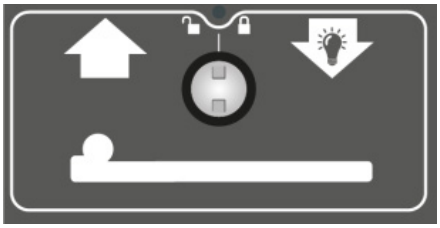
8.4. Variable Bed Height Function

When the down bed height button is pressed and held, the bed will lower and stop at a pre-set height of 24 cm, before it reaches its lowest position. The bed will sound an alarm after it reaches the 24 cm position.

If a custom height has been programmed, the bed will stop at that custom height and at 24 cm.

In its lowest position, the sleep deck is 21 cm from the floor. The bed can be positioned at any height between the highest and lowest positions.

Maximum care height for the bed is 83 cm.



The brake will engage automatically when the bed reaches its lowest position. The bed must be raised by 5 cm from the lowest height (21 cm + 5 cm) in order to access the brake and allow the bed to be moved. The lowest height position of the bed should be risk-assessed for patients at high risk of falling.

It is recommended that periodically the bed is placed into either the highest or lowest position to maintain the precision of the height adjustment software.

Operation:

The height of the bed is adjusted using the handset. Press the up button to go up or the down button to go down to the desired height.

Warnings:

For patients who may be at risk of injury from falls, carry out a risk assessment to determine if leaving the bed at the low height may reduce the risk of injury.

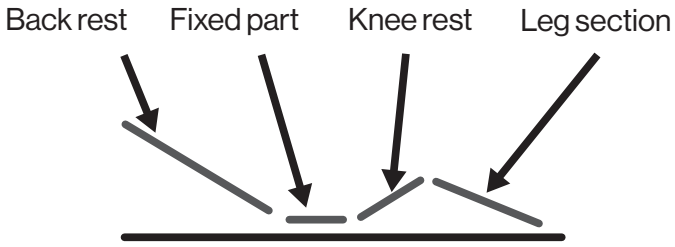
Under certain circumstances it may be necessary to prevent patient operation of the bed functions, this can be done using the selective lock out function on the handset.

Hoists and under-bed tables cannot fit under the bed when it is in its ultra-low position.

8.5. Sleep Deck Articulation Functions

The sleep deck can be articulated using the following functions:

- Back rest function.
- Manual CPR function.
- Electric CPR function.
- Knee rest and leg sections function.
- Cardiac chair function.
- Storing a custom bed exit height in the memory.
- Trendelenburg/Reverse Trendelenburg function.



Articulated sections of the sleep deck

8.5.1. Back Rest Function

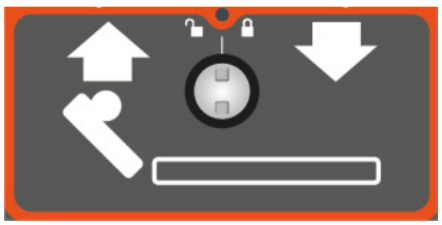
This allows angle adjustment of the back rest.

The back rest will pause at the 30° and 45° angles when it is raised or lowered. This eliminates the need for angle indicators.

The 2D back rest design eliminates patient migration, particularly when the cardiac chair button is used. This gives better comfort to the patient and reduces the risk of shear.

The back rest angle is adjustable from 0 to 70°.

Electric adjustment of the back rest only occurs with the use of the handset.



Operation:

- Press the back rest up button to raise the back rest, or the back rest down button to lower the back rest.

⚠ Caution:
This bed is equipped with both manual and electric CPR functions. The manual CPR function uses a damper to assist with controlling the back rest movement. The electric CPR function is operated by simultaneously pressing the two (up/down) back rest buttons.

8.5.2. Manual CPR Function

The manual CPR function is a quick way of setting the back rest horizontal in readiness to perform CPR.

Bilateral CPR handles

Operation:

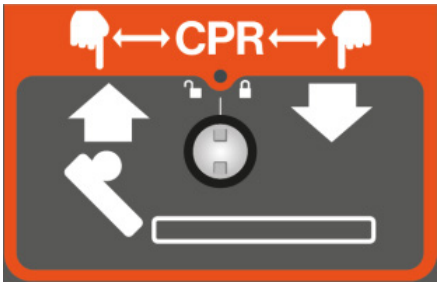
The following operation should only be performed if the bed is occupied. The electric back rest function will operate normally.

- Lower the side rails if they are raised.
- Remove the headboard from the head end of the bed frame.
- Pull and hold either of the orange CPR handles and lower the back rest until flat.
- Release the CPR handles.

⚠ Caution:
This function should not be used as a simple back rest tilt adjustment. Improper use of the manual CPR release handles may degrade and damage the mechanism.

8.5.3. Electric CPR Function

The electric CPR function flattens the sleep deck within seconds and sets the bed to a height suitable to perform CPR.

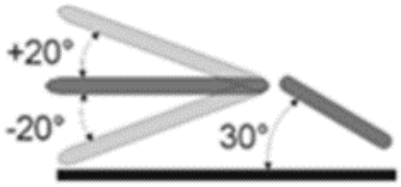


Operation:

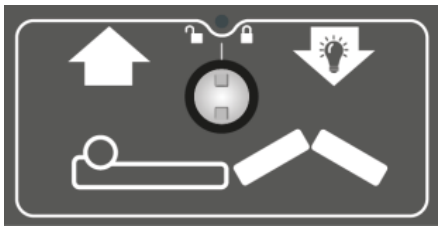
- To operate the electric CPR function using the wireless handset, press and hold the up and down back rest buttons simultaneously.
- This will set the sleep deck to the flat position and to a height appropriate for CPR.

8.5.4. Knee Rest and Leg Sections Function

This function allows adjustment of the knee rest and leg sections.



Range of movement of the knee rest and leg sections

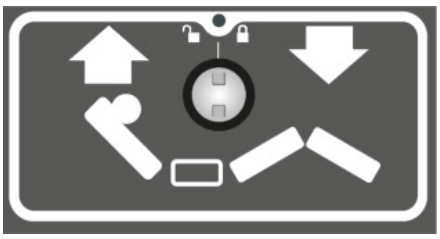


Operation:

- Press the knee rest up button to raise the knee rest, or the knee rest down button to lower the knee rest.

8.5.5. Cardiac Chair Function

The cardiac chair function allows the patient to be placed in a full chair position. It combines movement of the back rest and the knee rest with the reverse Trendelenburg position in a continuous motion, using only one button.



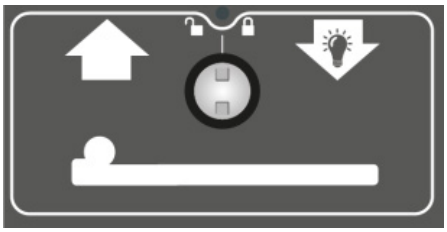
Operation:

- Press and hold the up cardiac chair button using the wireless handset. The back rest will raise to 45° and the knee rest will raise to 30°. The bed will then go into the reverse Trendelenburg position.
- To revert the bed to flat, press and hold the down cardiac chair (back to flat) button.

8.5.6. Storing a Custom Bed Exit Height in the Memory

This function allows the 'bed exit position' to be set for each patient. This promotes safe patient mobilisation. The exit position ensures that the bed is at the correct height for the patient to get their feet flat on the floor prior to raising themselves to exit the bed. This greatly reduces the risk of falls during mobilisation.

It is recommended that a custom exit position is set for every patient when they are first placed on the bed.

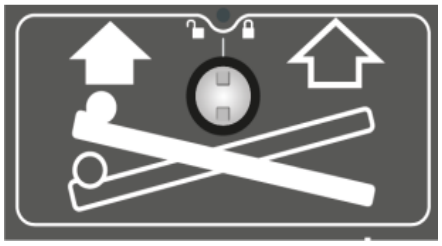


Operation:

- Using the handset, put the bed at the height where the patient's feet are flat on the floor and their hips and knees are at an approximately 90° angle.
- Then, simultaneously press the up cardiac chair button and the down cardiac chair (back to flat) button for 10 seconds.
- A beep will sound when the bed height position is registered and stored in the memory. The bed will now stop at this position when raising or lowering the bed until the process is repeated for the next patient.

8.5.7. Trendelenburg/Reverse Trendelenburg Function

This function should be used with the sleep deck in the flat position. Tilting the sleep deck without first setting it back to flat will provoke a downward sliding of the patient.



Operation:

The Trendelenburg (feet up) function allows you to tilt the whole bed backward and down.

- Using the handset press and hold the down cardiac chair (back to flat) button to set the sleep deck to the flat position.
- Then press and hold the right-hand up Trendelenburg/reverse Trendelenburg button until the bed reaches the desired feet up angle.
- To return the sleep deck to the flat position, press and hold the left-hand up Trendelenburg/reverse Trendelenburg button. The function will pause to indicate when the sleep deck is back to horizontal. Release the button.
- Continuing to hold the left-hand up Trendelenburg/reverse Trendelenburg button would allow the reverse Trendelenburg (feet down) movement to begin.

The reverse Trendelenburg (feet down) function allows you to tilt the whole bed forward and down.

- Using the handset, press and hold the down cardiac chair (back to flat) button to set the sleep deck to the flat position.
- Then press and hold the left-hand up Trendelenburg/reverse Trendelenburg button until the bed reaches the desired feet down angle.
- To return the sleep deck to the flat position, press and hold the right-hand up Trendelenburg/reverse Trendelenburg button. The function will pause to indicate when the sleep deck is back to horizontal. Release the button.
- Continuing to hold the right-hand up Trendelenburg/reverse Trendelenburg button would allow the Trendelenburg (feet up) movement to begin.

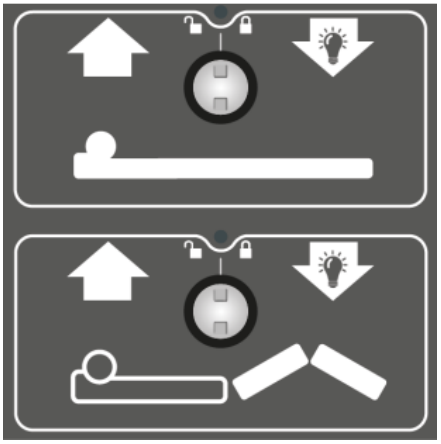
⚠ Caution:

The Trendelenburg/reverse Trendelenburg positions are related to clinical indications and should be used only upon prescription and by a competent person.

Only use the Trendelenburg/reverse Trendelenburg function when the brake is locked. Ensure there is sufficient head space around the bed to accommodate the manoeuvre.

8.5.8. Under-Bed Light

The optional under-bed Light comprises an LED light unit, fitted under the bed platform, to assist the patient with getting in and out of the bed at night.



Operation:

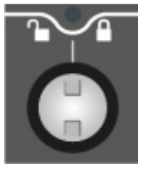
- To turn on the under-bed light, simultaneously press the down bed height button and the down knee rest button on the handset and hold both for four seconds.
- To turn off the under-bed light, simultaneously press the down bed height button and the down knee rest button on the handset.

8.5.9. Function Lock-Out

Used in conjunction with the function buttons to lock out the electric functions and restrict unwanted access.

Operation:

- Insert the key provided on the mains cable into the pins next to the function to be locked-out and turn to the 1 o'clock position.
- To enable the function again, return to the 12 o'clock position.



8.6. Braking System

The brake is located at the foot end of the bed.

The brake should be applied (locked/pedal in the down position) at all times that the bed is stationary.

The bed has been designed such that the brake is applied automatically when the bed height is set to its lowest position of 21 cm. Whilst in this position it is not possible to release the brake. In order to access the brake, the bed must be raised by at least 5 cm above the lowest height setting (21 cm + 5 cm).

Brake engaged – brake bar in down position

Operation:

- To apply the brake, using one foot, press down the brake bar at the foot end of the bed.
- To release the brake, using one foot, insert the toes under the brake bar and lift up (AutoSteer™ mode).

Warning:
Maintenance of the brake should only be carried out by an authorised Medstrom technician.

Caution:
The brake function of the bed satisfies the requirements of the basic safety and essential performance standard IEC 60601-2-52. This requires the brake system to be certified to hold the bed stationary when it is at an angle of 6° relative to the horizontal plane on a concrete floor covered with a vinyl coating of 2 mm to 4 mm thick, in normal use.

Caution:
Be mindful of possible trapping of a foot when setting the bed height to its lowest position as the brake bar is automatically applied in the lowest position.

Caution:
If the bed does not have to be moved, it is strongly advised to apply the brake to avoid potential falls when a patient is accessing or exiting the bed.

Before stopping the bed in its final position, ensure that nothing will prevent normal movement of the bed; up, down or sideways.

8.7. Steering System - AutoSteer™

The Medstrom Solo® LTC bed is equipped with four multi-directional castors, in two castor assemblies at the foot and head-end of the bed.

The steering lock acts on the front set of castors on the castor assemblies. The steering lock is applied or released

using the AutoSteer™ pedal at the head end of the bed.

- When the steering lock is applied, AutoSteer™ pedal down, the front castors are locked in the straight-ahead position. This allows for easier control of bed movement and prevents lateral (sideways) movement of the bed (AutoSteer™ mode).
- When the steering lock is released, AutoSteer™ pedal up, the front castors are released. This allows the bed to be moved in any direction, including lateral (sideways) movement (FreeMove™ mode).

The brake and steering should be applied (locked/pedals in the down position) at all times that the bed is stationary.

Operation:

- To apply the steering lock, using one foot, press down the AutoSteer™ pedal at the head end of the bed.
- To release the steering lock, using one foot, insert the toes under the AutoSteer™ pedal and lift up.

Steering lock applied – AutoSteer™ pedal in down position

8.8. Moving the Bed

It is recommended that when moving the bed it should be pushed and steered from the foot end of the bed.

When travelling in a straight line along corridors or when leaving the bed unattended, the steering lock should be applied, by putting the AutoSteer™ pedal in the down (locked) position. This will allow controlled movement of the bed with reduced effort, significantly reducing the force required to move the bed, and helps steer the bed around tight corners, with or without the patient being in the bed (AutoSteer™ mode).

When lateral (sideways) movement of the bed is required, the steering lock should be released, by putting the AutoSteer™ pedal in the up (released) position. This will allow movement of the bed in any direction (FreeMove™ mode).

To locate the bed into a bed space, make sure steering lock is applied, AutoSteer™ pedal in the down (locked) position, and push the bed into place in a straight line. When the bed is in position apply the brake, brake bar in the down (locked) position.

The brake and steering should be applied (locked/pedal in the down position) at all times that the bed is stationary.

Operation:

- For small movements with the mains cable still connected to the mains power outlet, check that the mains cable is not being pulled tight and being stressed.
- For larger movements, disconnect the mains cable from the mains power outlet, and stow it safely to avoid it trailing on the floor.
- Check that no device or accessory is connected to the technical wall panel and can be damaged during movement.
- Check that any installed IV pole and side accessories are contained within the area of the bed.
- Check that the handset is properly hooked onto the bed and that its cable is not trailing on the floor.
- Release the brake, with brake bar in the up (released) position, and leave the steering lock applied, AutoSteer™ pedal in the down (locked) position.
- Manoeuvre the bed using the handle areas on either the headboard or footboard, ideally the footboard.
- When locating the bed in a bed space or patient room, check that no obstacle will prevent normal movement of the bed; up, down or sideways.

Caution:
It is advised to position the bed at least 35 cm from the wall during installation. This will ensure that if the Trendelenburg/Reverse Trendelenburg function is used the bed will not touch the wall.

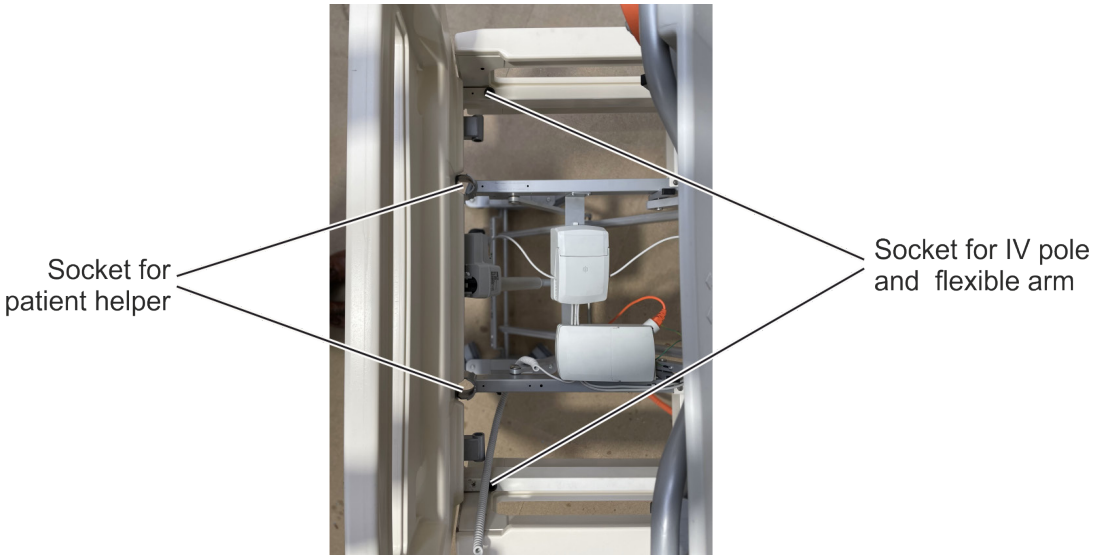
9. Accessories

The Medstrom Solo® LTC bed is designed to fit the following Medstrom accessories:

- Patient helper with adjustable handle.
- IV poles.
- Flexible arm extension for handset.

There are:

- Two sockets for a patient helper between the headboard and backrest.
- Six sockets for IV poles and Flexible arm extension for handset. These are located in all four corners of the side rails support bar, plus one either side of the middle of the bed.



Warning:
Only accessories supplied by the manufacturer must be used.

9.1. Patient Helper with Adjustable Handle

Maximum load for the patient helper is 75 kg.

Patient helper with adjustable handle
Part No. 9999AC00122GRY

9.2. IV Poles

Warning:

ONLY use approved accessories.

When clamping additional equipment to a bed mounted IV pole, check and re-check the following:

- NEVER clamp equipment over the manufacturer label on the IV pole. It is important that the label and the QR code remain visible at all times.
- ALWAYS read the instructions for use supplied with the IV pole.
- Scan the QR code on the IV pole to read the latest version of the instructions for use.
- Scan the QR code on the bed to access and read the current instructions for use.
- ALWAYS clamp equipment to the lower fixed height section of the IV pole. Do not attach equipment to the upper adjustable section of the pole.

The bed and the head and foot sections of the bed are all height adjustable. The side rails move with the head and foot sections of the bed. The IV pole moves up and down with the bed frame.

After clamping equipment to a bed mounted IV pole, raise the side rail adjacent to the pole and equipment then:

- Verify that, when the relevant section of the bed is raised or lowered, equipment atached to the pole does not collide with any moving part of the bed.
- Verify that equipment attached to the pole cannot rotate from the original mounting position (spin around the IV pole) into a position where there will be a collision with any moving part of the bed or any adjacent object or equipment, such as a bedside table.

Failure to check for the possibility of a collision between fixed and moving parts of the bed may result in a safety hazard.

ALWAYS check the surrounding area for obstructions BEFORE adjusting the height of the bed or the backrest. Failure to check for the possibility of a collision between fixed height objects and moving parts of the bed may result in a safety hazard.

In the event of a collision, the pole and equipment may be damaged or lifted from the mounting point on the bed then fall onto the floor, bed, patient, other person or other equipment.

CONSIDER using a free standing IV pole, or other support, for your additional equipment and reduce the risk of collision with moving parts of the bed.

If in doubt, STOP, then contact your local Medstrom representative or local safety team for advice and support.

Two options are available:

- Straight IV pole, one hand height adjustment, stainless steel hooks.
- Angled IV pole, one hand height adjustment, stainless steel hooks.

The maximum load of an IV pole is two kg per hook.

To adjust the height, lift up the adjuster, adjust the height to the required level and release the adjuster.

Straight IV Pole: Part No. 9999AC00006CRM

Angled IV Pole: Part No. 9999AC00002CRM

Height adjuster

9.3. Flexible Arm Extension for Handset

The Flexible arm has a 16 mm pin to fit in the middle socket in the side rail frame bar, either right or left side of the patient to provide convenient access for the patient to articulate the bed, where appropriate.

9.4. Full-height / Half-height Board Design

Design features of the full and half-height head and footboards provide convenient areas for tidy management of control units when required for specialist mattresses.

Routing of mains cable

Routing of air hoses

Hanging of control unit brackets

10. Operational Maintenance

Warning:
The bed is not designed for automatic cleaning - only manual cleaning should be undertaken.

Caution:
Using detergent/disinfectant products does involve some risk. Always wear personal protective equipment (PPE), follow the instructions and avoid mixing different products.

10.1. Cleaning Guidelines

The bed should be cleaned and disinfected weekly and between patients, following these guidelines:

- Unplug the bed and lock out all of its electric functions using the handset.
- Ensure that the mains cable plug does not come into contact with any liquid.
- Check that electrical connections are secure.
- Check that electrical components do not show any signs of wear likely to allow the penetration of liquid.
- Do not wash the bed in a wash tunnel, using a water jet or with any sort of pressure equipment.
- Avoid saturating areas containing electrical connections or electrical components. Be sure to dry cleaned areas carefully to avoid any risk of moisture remaining, in particular in the area of electrical connections.

Warning:
If there is any doubt or concern about the penetration of liquid into electrical connections or electrical components, it is strongly recommended that the bed should not be reconnected to the mains power outlet and the maintenance department advised.

- Clean surfaces with a soft cloth, warm water and a mild detergent/disinfectant solution. Ideally use the cleaning/disinfection solution recommended by the care facility, following the dilution instructions carefully.
- The use of abrasive products or materials is forbidden.
- Products such as petrol, ketonic solvents, concentrated alkali or acid products, chlorine-based solvents or dissolvent risk causing permanent damage to the surfaces and should not be used.
- Non-ionic detergents diluted to 5%, bleach diluted to 10%, and ammonia-based products diluted to 5% may be used.
- Stains left by coloured substances such as eosin, betadine, etc., as well as food products, should be cleaned as quickly as possible to avoid the risk of impregnation.
- For stubborn stains, the use of pure disinfection products is possible locally, as long as the necessary precautions are taken.
- Areas showing traces of cuts or deep scratches should be repaired to avoid the risk of infiltration and deterioration of the protective surface.

10.2. Sources of Dirt and Contamination

Sources of dirt and contamination of a medical bed in use are:

- Fabric dust coming from the bedding.
- Food residues.
- Ink.
- Antiseptic liquids.
- Vomit, urine, excrement, blood, etc.

It is necessary to take three types of cleaning/disinfection or bio-cleaning of the bed into consideration:

1. Daily bio-cleaning of the areas of high risk.
2. Bio-cleaning at the start and on the transfer of the patient, and, as a minimum, every month for high and moderate risk areas.
3. Full bio-cleaning of the bed after the departure of a patient presenting risk of infection, and, as a minimum, every two months.

10.3. Recommended Cleaning Procedures

Healthcare establishments are divided into sectors in terms of the risk of infection.

Frequency and methods of cleaning and disinfection are adapted according to the evaluated risk.

The level of infection risk in one room with a patient being cared for is moderate. It is much higher if the patient presents an identifiable infection risk.

Cleaning or disinfection of a medical bed, although not in direct contact with the patient and in particular damaged areas, should be performed regularly. Certain areas of the bed are more subject to contamination given the frequency of contact with caregivers' and patients' hands. The bed can be broken down into three areas:

High Contamination Level Areas

- Handle areas of the headboard and footboard.
- Side rails and handset.
- Accessories - (patient helper, IV poles, etc.).

Moderate Contamination Level Areas

- Bed headboard and footboard.
- Upper surfaces of the bed.
- Brake bar and AutoSteer™ pedal.

Low Contamination Level Areas

- Metal structure of the bed.
- Underside surfaces of the bed.
- Electric actuators.
- Wheels.

10.3.1. Daily Bio-Cleaning Procedure

This procedure can be carried out with the patient still in the bed. The objective being to ensure good hygiene of the parts regularly in contact with caregivers' and/or patients' hands.

- Carefully clean the handle areas of the headboard and footboard, the side rails, the handset and cable, and any accessories that are fitted.
- Eliminate all traces of dirt apparent on the other parts of the bed.

Important:

Clean the side rail in the upright position.

10.3.2. Monthly Bio-Cleaning Procedure or Bio-Cleaning Procedure on the Departure of a Patient

This procedure is carried out without a patient in the bed. The objective being to disinfect all parts of the bed that regularly come into contact with hands, plus areas dirtied by liquid deposits, secretions, dust and food residues, etc.

- Use locally approved cleaning materials and detergent/disinfectant solutions.
- Release the brake and move the bed away from the wall to give access all round the bed. Re-apply the brake.
- Put the bed in the flat position and set to a suitable working height.

- Unplug the bed and lock out all electrical functions using the handset.

Cleaning the Foot End of the Bed

- Clean the footboard and the bed frame cross-member that holds the footboard.
- Lift the foot end of the mattress and fold over towards the head end of the bed. Clean the upper surfaces of the bed, the inner side of the side rails and then the underside of the mattress.
- Fold the mattress back into place. Clean the outer side of the side rails.

Cleaning the Head End of the Bed

- Clean the headboard and the bed frame cross-member that holds the headboard , the IV pole and patient helper if in use.
- Clean the handset and cable, side rails and both orange CPR release handles.
- Lift the head end of the mattress and fold over towards the foot end of the bed. Clean the upper surfaces of the bed, the inner side of the side rails and then the underside of the mattress.
- Fold the mattress back into place. Clean the outer side of the side rails.
- Clean the AutoSteer™ pedal.
- Release the brake and re-position the bed against the wall. Re-apply the brake.
- Clean the brake bar.
- Reconnect the bed to the mains power outlet and unlock the function lock outs on the handset using the key as shown in section “8.5.9. Function Lock-Out”.

10.3.3. Full Bio-Cleaning Procedure for the Bed

This procedure is carried out without the patient in the bed. The objective is to disinfect the whole bed after it has been occupied by a contaminated patient or periodically every two months.

This operation should also be carried out before first using the bed.

- Use locally approved cleaning materials and detergent/disinfectant solution.
- Release the brake and move the bed away from the wall to give access all round the bed. Re-apply the brake.
- Remove the mattress, the sleep deck parts, the headboard and footboard.

Warning:
The central part protects the power supply unit, its connections and two sensors.

- Adjust the bed base to a suitable working height and raise all the hinged sections using the handset.
- Unplug the bed and lock out all electrical functions using the handset as shown in section “8.5.9. Function Lock-Out”.

Cleaning the Upper Part of the Bed

- Lower all three side rails first on both sides of the bed.
- Clean the handset and cable, the bed frame cross member that holds the footboard and headboard, the bed extension, the IV pole and the patient helper, if in use.
- Clean the frame parts that hold the sleep deck, the main frame and the bed legs.

Cleaning the Lower Part of the Bed

- Raise all three side rails first on both sides of the bed.
- Clean the inside and outside of all six side rails.
- Clean the bed chassis, the main frame and both orange CPR handles.

- Working down the bed, clean the bed legs, the elevation arms and the castors.
- Clean the AutoSteer™ pedal.
- Clean both surfaces of the various plastic parts of the sleep deck and put them back in place (be careful to make sure they are positioned correctly on the curved tubing).
- Clean the headboard and footboard and reposition them on the bed.
- Release the brake and re-position the bed against the wall. Re-apply the brake.
- Clean the brake bar.
- Reconnect the bed to the mains power outlet and unlock the function lock outs on the handset using the key as shown in section “8.5.9. Function Lock-Out”.
- Set the bed to the flat position using the handset.
- Clean the mattress and replace it on the bed.

11. Warranty, Servicing and Maintenance

Medstrom reserves the right to make changes to the design, characteristics and models without prior notice.

The only warranty Medstrom makes is the express written warranty extended on the sale or rental of its products.

Warranty may lose its validity in the following cases:

- Disassembly of mechanical or electrical parts of the bed without consultation and approval of the manufacturer.
- Replacement parts are not supplied by the manufacturer.
- Work on the electrical parts or gas cylinders by un-approved personnel.
- Degradation of coatings or materials from shock, friction and scratches.
- Abnormal use of bed not following the precautions and recommendations, including SWL and maximum/minimum patient weights, resulting in degradation of the bed or its environment.
- Medstrom do not approve disinfectants. Disinfectants are locally approved by each establishment.
- Use of cleaning products without respecting appropriate dilution proportions.
- Washing with a water pressure jet.
- Crushing or cutting the mains cable or the control cables.
- Intensive use of electric bed functions beyond the recommended service factor.
- Use of a bed that indicates a mechanical or electrical malfunction.
- Stacking of beds during storage.
- The manufacturer, assembler or installer cannot be held responsible for the safety, reliability or the characteristics of the device if it is not used in a safe electrical environment.
- Accommodating the bed complies with the relevant recommendations, and the device is used in accordance with the instructions for use.

Warnings:

- It is prohibited to modify the bed.
- Use only spare parts approved by the manufacturer.
- Any item damaged must be replaced before using the bed.
- Disposal of the product is necessary if the essential requirements are no longer met, especially when the product no longer has its original features.
- On disposal, product must be rendered unusable.
- Please observe the environmental regulations of the country in which the product is being disposed of.
- The manufacturer specifies that the mattress is not an element of the bed and is not part of this manual.

11.1. Service Checklist Form

	Pass	Fail	Comment
General Condition			
Castors: Rotate through 360°, check fixings are secure.			
Brake mechanism: Lock in position, condition of brake castors.			
Steer mechanism: Lock in position.			
Side rails: Free from damage and scratches. Slide up and down smoothly and lock into place correctly. Remain in locked position when in ultra-low position.			
Frame: Free from distortion, cracks in welds, fastening points secure, spacers.			
Sleep deck: Securing points in place, free from damage, check retaining clips.			
Handset: All functions working, free from damage.			
Headboard/footboard: Locate in position, free from damage.			
Labels: All labels applied, i.e. serial number, SWL, model, asset label, brake/steer.			
Electrics: Check cables for wear and tear, damage and secure connections (bed must not be connected to mains power during these checks)			
Functionality			
Raise and lower: Operate to set positions.			
Back rest section: Operate to set positions, pause at 30° and 45° angles.			
Knee rest: Operate to set positions.			
Reverse Trendelenburg/Trendelenburg: Operate to set positions.			
Bed extension: Operates and locks in set positions.			
Lateral bed movement: Bed can be moved with ease in lateral direction (FreeMove™).			
Side rails: Lock in upright position, release mechanism operational and locked when in ultra-low position (21 cm).			
Castors: Braking - remains in position when applied.			
Castors: Steer - travels in straight line when steering lock is applied (AutoSteer™).			
Features			
Ultra-low position: Operational beyond standard low position.			
CPR: Operational via the handsets, puts bed at height and in a flat position.			
Manual CPR: Releases back rest section to flat position once handle is pulled.			
Under-bed light: Illuminated once selected from the handsets.			
Patient exit (side): Sets to designated position from the handsets.			
Bed reset (calibration): Recalibrates control box with actuators operated from handsets (raise bed up to highest, then lowest position. Same process with back rest and knee rests).			

	Pass	Fail	Comment
Egress: Bed will initially raise if in low position.			
Date:			
Signed:			

12. Manufacturer's Details

UK:

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Pegasus Business Park, Castle Donington,
DE74 2SA
United Kingdom
Tel : +44 (845) 3711717
info@medstrom.co.uk

EC Representative:

EC REP

BEING s.r.l.s.,
Saonara (PD) Via Vittorio Emanuele II,
53 CAP 35020
Italy

CH Representative:

CH REP CHRN-IM-20000224

Medstrom Healthcare Sàrl
Chemin des Quatre-Vents 7F, 1166 PERROY
Switzerland

For further information relating to technical characteristics, maintenance or after sales service, please consult the bed's technical manual available on request.

CE

GTIN Numbers:

- Solo LTC UK 5060467210225
- Solo LTC EU 5060467210379
- Solo LTC CH 5060467210386

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Improved Patient Outcomes

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