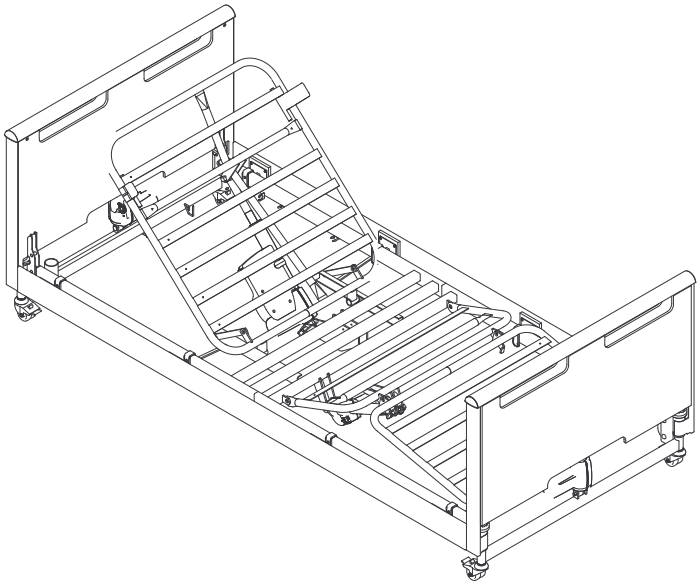
# Invacare® Etude Plus® HC





This manual MUST be given to the user of the product.
BEFORE using this product, read this manual and save for future reference.

Yes, you can.

# Contents

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# 1 General

## 1.1 Introduction

This user manual contains important information about the handling of the product. In order to ensure safety when using the product, read the user manual carefully and follow the safety instructions.

To ensure correct use, the bed must be tested and adjusted by qualified personnel.

All references to left and right are based on a person lying on his back in the bed, with his head in the head end.

If a problem should arise in connection with the delivered product, please contact your *Invacare®* dealer. An address list is shown on the back side at this manual.

### 1.1.1 Symbols in this manual

Symbols and signal words are used in this manual and apply to hazards or unsafe practices which could result in personal injury or property damage. See the information below for definitions of the signal words.

WARNING
Indicates a hazardous situation that could result in serious injury or death if it is not avoided.

CAUTION
Indicates a hazardous situation that could result in minor or slight injury if it is not avoided.

IMPORTANT
Indicates a hazardous situation that could result in damage to property if it is not avoided.

Tips and Recommendations
Gives useful tips, recommendations and information for efficient, trouble-free use.

This product complies with Directive 93/42/EEC concerning medical devices. The launch date of this product is stated in the CE declaration of conformity.

Manufacturer of the product.

## 1.2 Intended Use

The bed has been developed for domestic care and long term care:

- *Application environment 3*; Long-term care in a medical area where medical supervision is required and monitoring is provided if necessary and medical electrical equipment used in medical procedures may be provided to help maintain or improve the condition of the patient.
- *Application environment 4*; Care provided in a domestic area where medical electrical equipment is used to alleviate or compensate for an injury, disability or disease.
- The bed is intended for indoor use only.
- The bed is intended for adult users, having a physical size equal to or more than 146 cm, a weight equal to or more than 40 kg and a body mass index (BMI) equal to or more than 17.
- The bed is not intended for transportation of users. It is mobile within a room with a user in it. Castors are lockable.
- The bed is not intended for psychiatric patients.
- Maximum user weight and safe working load are listed on the product label and in the technical data section in this manual.

**WARNING!**
Any other or incorrect use could lead to hazardous situations.
*Invacare* accepts no liability for any use, change or assembly of the product, other than stated in this user manual.

## 1.3 Service life

The expected service life of this product is seven years when used daily and in accordance with the safety instructions, maintenance intervals and correct use, stated in this manual. The effective service life can vary according to frequency and intensity of use.

## 1.4 Compliance

Quality is fundamental to the company's operation, working within the disciplines of ISO 13485.

We are continuously working towards ensuring that the company's impact on the environment, locally and globally, is reduced to a minimum. We use only REACH and RoHS compliant materials and components.

The product is compliant with the European Directive 93/42/EEC concerning Class 1 medical devices.

The product has been tested and conforms to IEC 60601-2-52 – Medical Beds and all related standards. This includes tests regarding flammability and biocompatibility.

## 1.5 Warranty

The warranty covers all material and production defects for two years from the date of delivery, provided it can be demonstrated that such defects were present before delivery. All manufacturing faults or defects must be promptly reported.

*Invacare®* may repair the fault or replace the component. The warranty provided by *Invacare®* does not cover additional costs (transport, packaging, labour, sundry expenses, etc. are for the customer's account).

The warranty does not cover:

- Damage caused during transport that is not directly reported to the forwarder at the moment of delivery.
- Repairs performed by unauthorized centers and personnel.
- Parts subject to normal wear.
- Malicious damages or damaged caused by improper use of the bed.

## 1.6 Limitation of liability

Invacare accepts no liability for damage arising from:

- Non-compliance with the user manual
- Incorrect use
- Natural wear and tear

- Incorrect assembly or set-up by the purchaser or a third party
- Technical modifications
- Unauthorized modifications and/or use of unsuitable spare parts

# 2 Safety

## 2.1 General safety information

**WARNING!**
**Risk of entrapment / suffocation**
There's a risk of entrapment / suffocation between mattress support, side rail and bed end or between moving parts and objects placed nearby the bed.
– The bed must not be used by persons under 12 years of age, or by persons with a body size equivalent to an average 12 years old or smaller.
– The bed, in combination with side rails must not be used by persons having a physical size less than 146 cm, a weight less than 40 kg or a body mass index (BMI) less than 17.
– Due to mattress compression, an increased risk may occur over time. Periodically monitor gaps between the bed, mattress and/or side rail. Replace mattress if the gaps may lead to entrapment.

**WARNING!**
**Risk of slipping through the openings**
The bed fulfils all requirements regarding maximum distances. However, it is possible that persons with small body dimensions slip through the openings between the side rails or through the opening between the side rail and the mattress support.
– Pay special attention, if the bed is used for the care of persons with small body dimensions.

**WARNING!**
**Risk due to electromagnetic interference**
Electromagnetic interference between the bed and other electrical products can occur.
– To reduce or eliminate such electromagnetic interference, increase the distance between the bed and the products or switch them off.

This medical bed can be used together with medical electrical equipment connected to the heart (intracardially) or blood vessels (intravascularly) provided that following points are respected:
– The bed should be equipped with means for potential equalization connection marked out by a symbol shown in the back of this manual.
– Medical electrical equipment should not be fixed on the bed's metallic accessories such as side rails, lifting pole, drip rod, bed ends, etc.
– The medical electrical equipment power supply cord should be kept clear of the accessories or any other moving parts of the bed.

**WARNING!**
**Risk of injury or damage to property**
– Do not roll the castors over the main power cord.
– Do not bring main power cord into moving parts.
– Disconnect the plug from the mains before moving the bed.
– Make sure that no wires (mains or from other equipment) are jammed or damaged, when the bed is used.
– Keep bed components and accessories at least 30 cm away from a heated surface and not in direct sunlight.

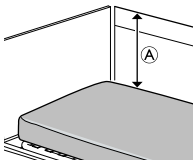
**CAUTION!**
There is a risk of entrapment of fingers in the bed moving parts.
– Pay attention to your fingers.

**CAUTION!**
– For a user entering or exiting the bed, always lower the bed to an appropriate height. The backrest can be used as a support. Make sure, the thigh- and leg section is horizontal to avoid overloading the mattress support.
– Always lower the bed to the lowest position before leaving the patient in the bed unattended.
– Make sure that there is nothing under, over, or near the bed that can obstruct the height adjustment, like for example furniture, lifts or window frames.

## 2.2 Mattresses

**WARNING!**
**Safety aspects regarding combination of side rails and mattresses:**
To get the highest possible safety level, when using side rails on the bed, the minimum and maximum measures for mattresses, must be respected.
– For correct mattress measures see mattress table in chapter *9 Technical data, page 20*.

**WARNING!**
**Risk of entrapment and/or suffocation**
– The user could get trapped and/or suffocate, if the horizontal space, between the mattress side and the inside of the side rail, is too big. Follow the minimum width (and length) of mattresses in combination with a side rail, as stated in the mattress table in chapter *9 Technical data, page 20* .
– Be aware that using very thick or soft mattresses (low density), or a combination of these, increases the risk.




**WARNING!**
**Risk of falling**
The user can fall over the edge and get seriously injured, if the vertical distance Ⓐ between the top of the mattress and the edge of the side rail/bed end, is too short. See image above.
– Always keep a minimum distance Ⓐ of 22 cm.
– Follow the maximum mattress height in combination with the side rail as stated in the mattress table in chapter *9 Technical data, page 20*.

## 2.3 Labels and symbols on the product

### 2.3.1 Product label


The product label is placed on the frame of the bed and contains the main product information, including technical data.

Symbols on the product label

| | |
|---|---|
| SN | Serial Number |
| REF | Reference Number |
| | Manufacturer Address |
| | Manufacturing Date |
| | Max. User Weight |
| | Max. Safe Working Load |
| | CLASS II equipment |
| | Type BF Applied Part |
| | WEEE conform |
| CE | This product complies with Directive 93/42/EEC concerning medical devices. |

Abbreviations for technical data:
- Iin = Incoming Current
- Uin = Incoming Voltage
- Int. = Intermittence
- AC = Alternating Current
- Max = maximum
- min = minutes

For more information about technical data, refer to 9 Technical data, page 20.

### 2.3.2 Other labels and symbols

| | |
|---|---|
| | Refer to User Manual |

**Label – user and mattress sizes**

| | |
|---|---|
| | Definition of min. weight, min. height and min. body mass index of an adult user<br>Refer to user documentation for the correct mattress measures. |

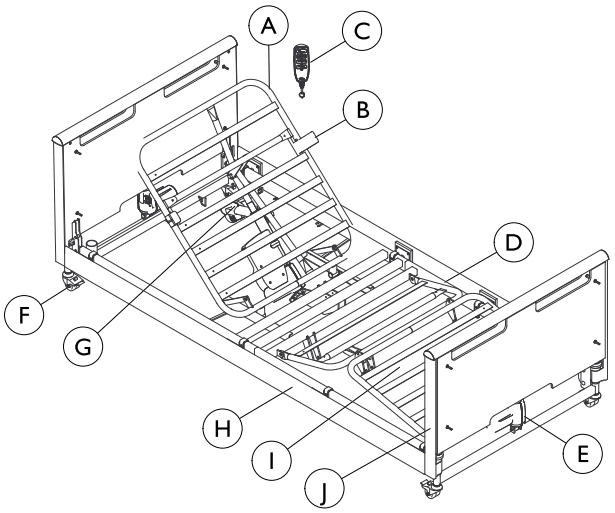
**Label on side rails**

| | |
|---|---|
| | Indicates the minimum space between side rail and the head end of the bed. (removable side rails only). |

# 3 Setup

## 3.1 Receiving the bed

When you receive the bed, check the packaging. If the bed shows any signs of damage upon delivery, please follow terms of delivery




**Scope of delivery:**

- Ⓐ Backrest (mattress support, upper half)
- Ⓑ Mattress retainers
- Ⓒ Hand control
- Ⓓ Thigh/Leg section (mattress support, lower half)
- Ⓔ Motor, bed end
- Ⓕ Castors
- Ⓖ Motor, backrest
- Ⓗ Wooden side panel
- Ⓘ Motor, thigh section
- Ⓙ Bed end

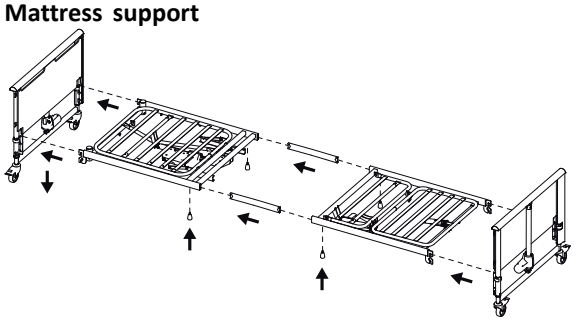
**Optional**

- Support handle
- Swivel support
- Side rail
- Lifting pole
- Mattress support extension
- Back-up battery

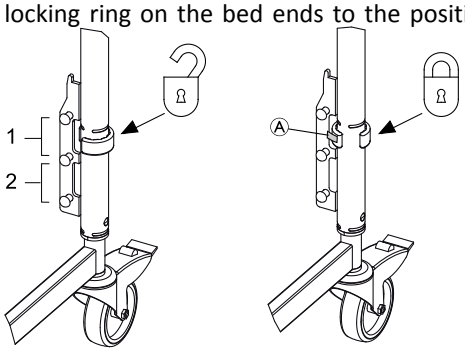
## 3.2 Assembly of the bed

**WARNING!**
– After each assembly, check that all fittings are tightened correctly and that the function of all parts is given.

**Mattress support**



1. Place the two inserts in the upper half of the mattress support. The inserts must be mounted in such a way that one extends further out of the side tube than the other.
2. Loosely screw in the two thumb screws.
3. Push the lower half of the mattress support onto the two inserts.
4. Tighten with two thumb screws.
5. Retighten the two thumb screws at the head end of the top frame.
6. Turn up the four mattress support brackets.
7. Turn the handle of the leg section up.
8. Press the bracket Ⓐ on the locking ring* and turn the locking ring on the bed ends to the position "open".

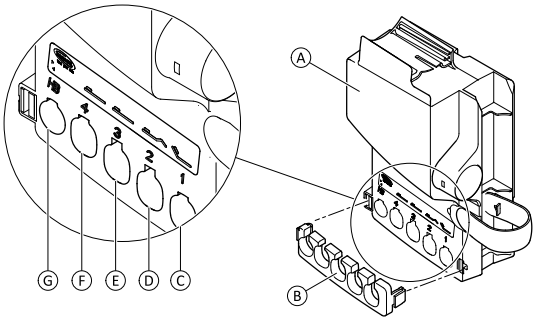



9. Latch the mattress support to the bed ends and press firmly into position.
10. Make sure that the bed ends are in the same level. It is possible to level the bed in high position (1) and low position (2).
11. Turn the locking ring to the position "lock".

* The locking rings ensure that the mattress support is not accidentally lift clear off the bed ends.

## 3.3 Control Box

The control box is latched to the backrest motor.




The control box Ⓐ is provided with a locking cam Ⓑ and a label with symbols showing where to connect the motor plugs:

- Backrest motor Ⓒ
- Thigh section's motor Ⓓ
- Bed end motor, foot end Ⓔ

- Bed end motor, head end Ⓕ
- Hand control Ⓖ

## 3.4 Wiring

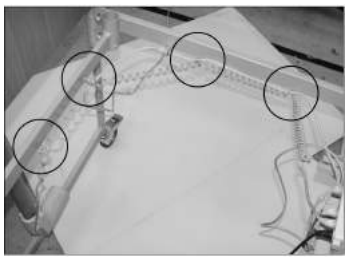
**IMPORTANT!**
– The cables must be mounted in such a way that they are kept clear off the floor and do not block the castors. Mount the mains cable on the hook for this purpose, see image.

In order to prevent the cables from being damaged when activating the motors, follow the instructions below.

1. Connect the cables of the bed end motors (head and foot end) directly to the control box.
2. The plug of the thigh motor must be directed through the opening of the supporter for the backrest motor and then connected to the control box.

3. Connect the main cable plug to the power socket.
4. Run the motors of the bed ends to their top position.
5. Place the motor cable of the foot end on the hook at the foot end.

6. Run the backrest to its top position.
7. Place the head end motor cables on the four hooks at the head end.



8. Attach the locking cam over the plugs in the control box.

## 3.5 Dismantle the bed

1. Dismantle side rails or wooden side panel and lifting pole.
2. Bring the bed to its lowest position and adjust all mattress support sections to horizontal position.
3. Disconnect main power supply. Roll the cable onto the hook of the head end of the bed.
4. Dismantle the locking cam from the control box with a tool, e.g. a flat headed screwdriver.
5. Disconnect all cables from the control box.
6. Separate the mattress support from the bed ends.
7. Divide the upper and lower halves of the mattress support.

# 4 Operating the bed

## 4.1 General Safety Information

**WARNING!**
**Risk of personal injury and damage to property.**
– The bed must be placed so that the height adjustment is not obstructed by, for example, lifts or furniture.
– Take care that no body parts are being squeezed between fixed parts (such as side rails, bed ends etc) and moving parts.
– The hand control must not be used by children.

**WARNING!**
**Risk of injury**
If the bed is used by confused or restless users or users with spasms:
– either, when the bed is equipped with a lockable hand control, lock the hand control functions,
– or make sure that the hand control is out of reach for the user.

### 4.1.1 Low working heights

**CAUTION!**
**Risk of injury**
Depending on the configuration, the minimum working height of the bed is very low.
Using an improper/incorrect posture while working at low working heights can lead to injuries for the carer.
– Be aware of your body posture when attending to the user.

## 4.2 Operating the hand control

The hand control can be equipped with three (HB83/HL83) or four (HB84/HL84) buttons to operate the electrical functions of the bed.

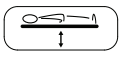
**Backrest section**

1. Up: press left side of the button (▲).
2. Down: press right side of the button (▼).

**Thigh section**

1. Up: press left side of the button (▲).
2. Down: press right side of the button (▼).

**Height adjustment**



1. Up: press left side of the button (▲).
2. Down: press right side of the button (▼).

**Tilt function (HB84/HL84)**

**CAUTION!**
**Risk of fatal injury**
Tilting with head end down can have fatal effect on users who are sensitive for increased blood pressure in the upper part of the body.
– Only medically trained persons must operate the tilt function.
– Always perform a medical evaluation, before tilting the bed with the user's lower extremities positioned higher than the heart.
– The tilt function is NOT a Trendelenburger function and must not be used for medical treatment.

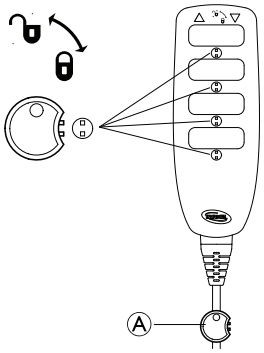
1. Head end up: press left side of the button (▲).
2. Foot end up: press right side of the button (▼).

If the bed is equipped with anti-tilt function only, tilting with the foot end up is not possible:

1. Head end up: press left side of the button (▲).
2. Horizontal position: bring the bed either all the way up or all the way down by using the height adjustment button.

### 4.2.1 Locking function

The locking function prevents usage of certain function buttons. Regardless of how many buttons your hand control has, they can all be locked individually.




1. Insert key Ⓐ in the key hole, below the wanted function.
2. To lock, turn the key clockwise.
3. To unlock, turn the key anti clockwise.

## 4.3 Castors and brakes

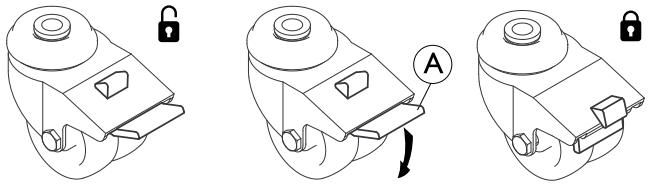
**CAUTION!**
**Risk of trapping/squeezing**
All brakes are foot-operated.
– Do not release the brake with the fingers.

**CAUTION!**
**Risk of injury**
User can fall, while entering or exiting the bed, if brakes are not locked.
– Always lock the brakes before the user is moving in or out of bed or when attending to the user.
– At least one castor at the head end and one castor in the foot end must be locked.

Castors might make marks on different types of absorbing floor surfaces - such as untreated or badly treated floors. To prevent marks, *Invacare®* recommends to place a suitable kind of protection between the castors and the floor.

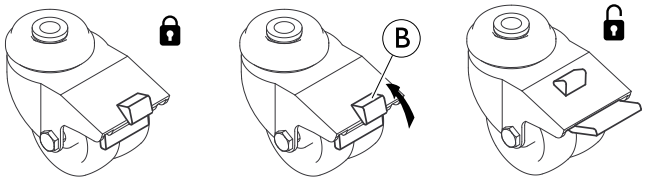
### 4.3.1 Castor brake

**Locking the brake**



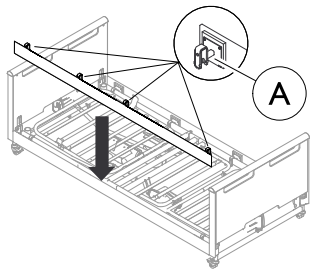
Step on the outer pedal Ⓐ.

**Unlocking the brake**



Push up the release button Ⓑ.

## 4.4 Wooden side panel

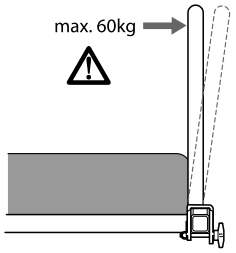


Press the brackets Ⓐ down, onto the top frame.

## 4.5 Support handles / Swivel handles

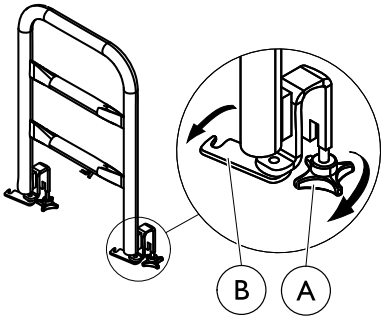
One or more support handles can be mounted on the top frame to support the user when getting in or out of bed.

**WARNING!**
**Risk of serious injury**
The support handles are not to be used as side rails; to keep the user from falling out of the bed
– Only use the support handles as a support when getting in and out of bed.



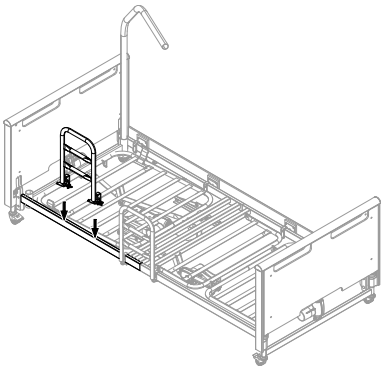

**Mounting the Support handles / Swivel handles**

1.

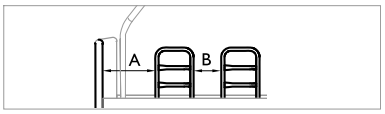



a) Loosen the finger screws Ⓐ.
b) Rotate the metal plates Ⓑ out to the side.

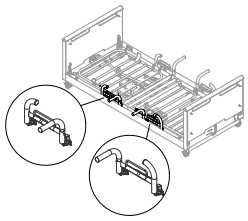
2.



Press the brackets onto the top frame.

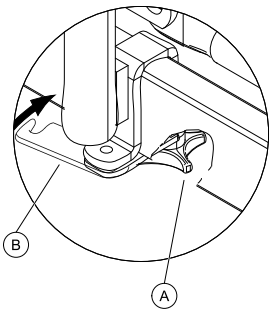



**WARNING!**
**Risk of squeezing, getting trapped or suffocated**
Pay attention to the distance between support/swivel handle and bed end.
Pay attention to the distance between two support handles.
– The safety distance Ⓐ must be bigger than 390 mm.
– The safety distance Ⓑ must be either 0–60 mm or 318 mm or bigger.
– Never use the support handles in combination with side rails.



The Swivel handle has to be mounted with the movable part towards the center of the bed.

3.

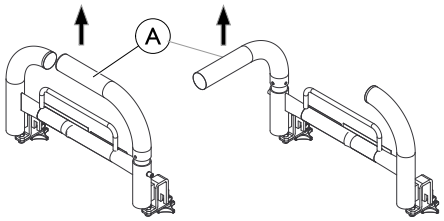



a) Rotate the metal plates Ⓑ back to close the brackets around the frame.
b) Re-tighten the finger screws Ⓐ.

**Operating the Swivel handles**

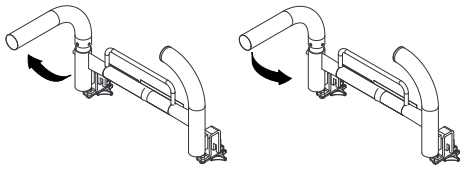
**Open and close the handle**

1.



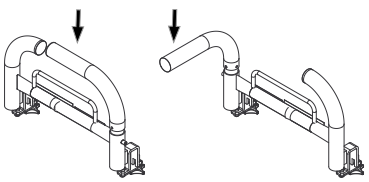

Pull the swivelling handle Ⓐ up to disengage it.

2.



Rotate the handle inwards or outwards to/from the bed.

3.



Push the handle down to secure it. Make sure it is properly locked before using it as support.

## 4.6 Operating side rails

**WARNING!**
**Risk of entrapment or suffocation**
There's a risk of entrapment or suffocation between mattress support, side rail and bed end.
– Always ensure correct fitting of the side rails.

**WARNING!**
**Risk of entrapment**
There's a risk of entrapment or suffocation between mattress support, side rail and bed end.
– When using removable side rails, always make sure that the distance between the bed end and the side rail's handle upper edge is less than 6 cm in the head end and more than 32 cm in the foot end of the bed.

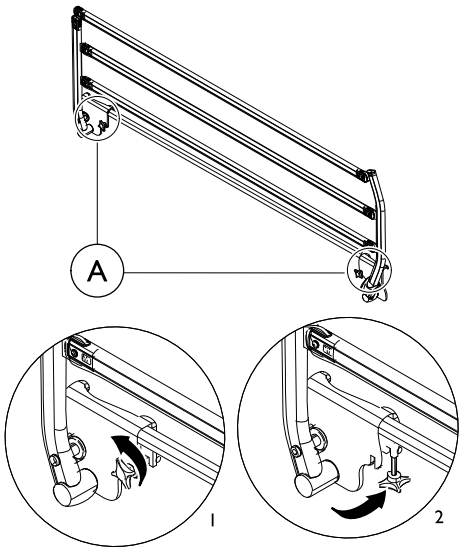
**CAUTION!**
If the side rail is not locked properly it can fall down.
– Pull/push the top bar of the side rail to ensure that the locking system is properly engaged.

**CAUTION!**
**Risk of pinching fingers**
– Pay attention to your fingers when assembling or operating the side rail.

### 4.6.1 Verso HC side rail

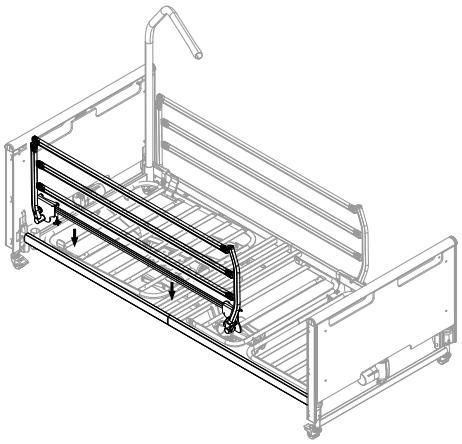
**Mounting the side rail**

1. Unfold the side rail.
2.



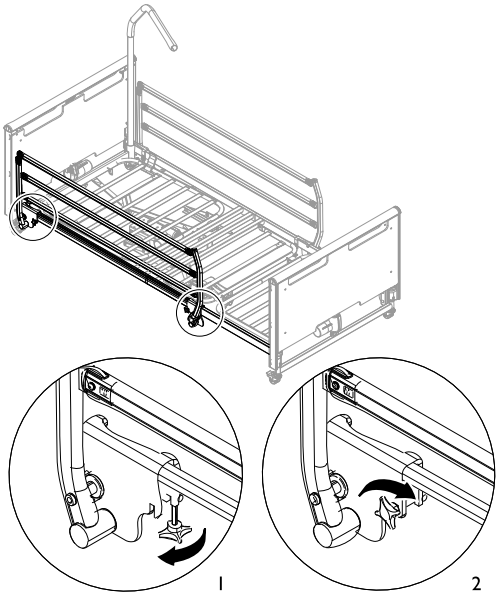

Open the brackets by turning the finger screws Ⓐ anti clockwise (1). Press the fingers screws down and fold them backwards completely out of the notches (2).

3.



Press the U-formed side rail brackets onto the top frame.

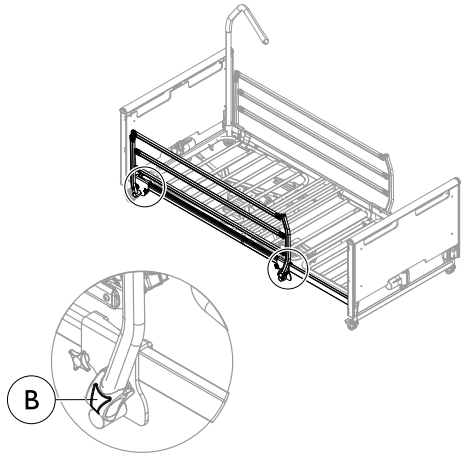
4.




Fold the finger screws forwards (under the top frame) and up into the notches (1). Close the brackets by turning the finger screws clockwise (2).

5. Make sure the finger screws are tightened and the side rail properly attached (not loose).

**Operating the side rail**




**Folding down the side rail**

1. Hold the top bar of the side rail with one hand and push the release button Ⓐ with the other hand.
2. Fold down the side rail sidewards to its lowest position.

**Folding up the side rail**

1. Hold the top bar of the side rail and pull up until it locks with a clicking sound.

## 4.7 Lifting pole

**WARNING!**
**Risk of injury**
The bed can tip if the handle is used, while the lifting pole is turned away from the bed.
– The lifting pole always has to be positioned with the handle hanging over the bed area.
– Do not exceed the maximum load of the lifting pole; 80 kg.

### 4.7.1 Place the lifting pole

The lifting pole can be placed either on the left or the right side of the head end of the bed.

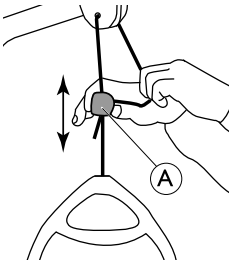
1. Insert the lifting pole into the lifting pole tube and fix it with the finger screw.

It's not required to tighten the finger screw, in case you want the lifting pole to swing away to the side of the bed.

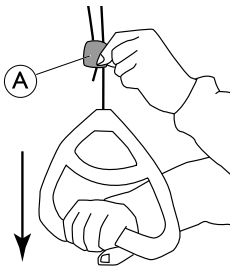
### 4.7.2 Adjusting the handle height

The handle height should always be adjusted to the user's need.

1.




2.

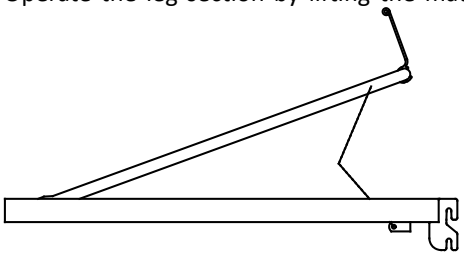



1. Hold the cord out while sliding the plastic cord lock Ⓐ upwards or downwards until the handle reaches the preferred height.
2. Lock the handle by pressing back the cord in the lock Ⓐ and pull the handle downwards.

**IMPORTANT!**
After adjusting the handle height:
– Check that the two cords above the cord lock are parallel and inside the cord lock.
– Make sure the cord is properly locked by pulling the handle hard.

## 4.8 Adjusting the leg section

Operate the leg section by lifting the mattress handle:



1. **Up:** Lift the mattress handle on the leg section.
2. **Down:** Lift the mattress handle on the leg section right up and then lower the leg section.

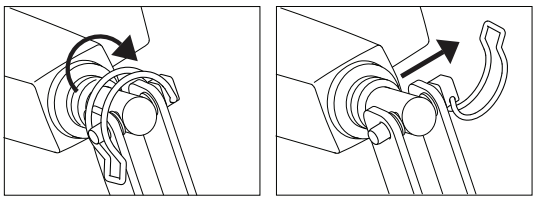
## 4.9 Emergency release of a mattress support section

In case of a power- or motor failure, an emergency release of the back, thigh or leg section could be necessary . An emergency release of the height adjustment is NOT possible.

**CAUTION!**
**Risk of injury**
– A minimum of two persons is required for an emergency release of a mattress support section.
– When releasing a mattress support section, it might lower fast. Do not reach under the mattress support while lowering it.

**IMPORTANT!**
– Before an emergency release of the mattress support, remove the plug from the mains socket.

1. Both persons hold the mattress section.
2. One of them locates the motor in question and pulls out the safety pin.

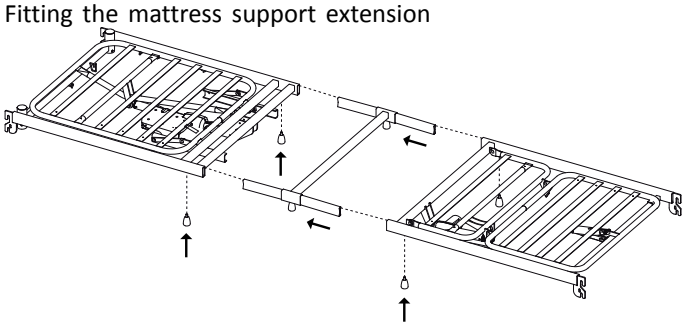


3. Both persons slowly lower the mattress section until it is completely down.

## 4.10 Mattress support extension

For users, taller than two meters it is recommended to use a mattress support extension.

Fitting the mattress support extension



1. Disassemble the bed and remove the inserts.
2. Mount the mattress support extension between both parts of the mattress support and reassemble the bed.

# 5 Accessories

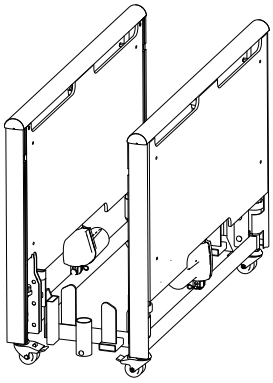
## 5.1 Accessories / Components

For accessories, please see more information in the instructions delivered with the accessory.

> **Important**
> – Use only original accessories and spare parts. Spare parts lists and extra user manuals can be ordered from *Invacare*.

## 5.2 Transport brackets

1.



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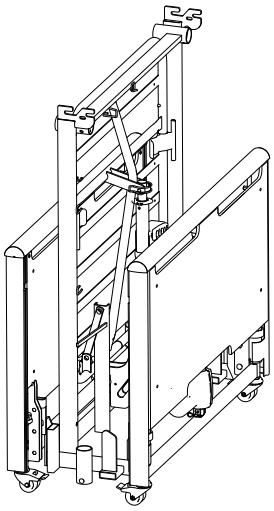
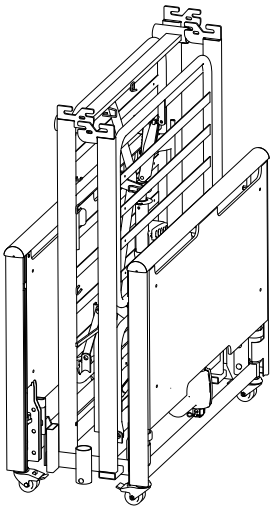
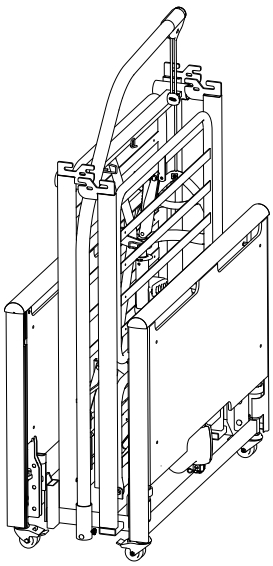


3.



4.



1. Attach both bed ends on the brackets.
2. Attach the mattress support head section.
3. Attach the mattress support leg section.
4. Place the lifting pole on the bracket.

# 6 Maintenance

## 6.1 Maintenance

A service contract can be made in the countries, where *Invacare®* has its own sales company. In certain countries Invacare®offers courses in service and maintenance of the bed. Spare parts lists and additional user manuals are available from *Invacare®*.

With normal daily use, service must be carried out according to the check list after two years use and thereafter every second year.

**IMPORTANT!**
– The mattress support must be supported during service inspections, to prevent accidental lowering.
– Only personnel who have received the necessary instructions or training may perform service and maintenance of the bed.
– After reconditioning the bed, or if bed functions change, service must be carried out according to the check list.

**Before Use**

- Ensure that all manual and electrical parts functions correctly and are in a secure state.

**After three months**

- Ensure that all manual and electrical parts are functioning, and tighten bolts, screws, nuts, etc.

**Every year**

- We recommend a safety test comprising the motors' performance and mechanical state.

**Every second year**

- Service should be performed according to the check list.

**Motors, hand control and control units** are serviced by exchanging the faulty part.

### 6.1.1 Checklist maintenance

**Checkpoints**

- ❑ Visual inspection of all parts of the bed (no deformations)
- ❑ Circlips, cotter pins and plastic fixing ring - properly locked and intact.
- ❑ Screws - tightened.
- ❑ Weldings - intact (no wear and tear)
- ❑ Castors (rolling smoothly)
- ❑ Castor fittings - tightened.
- ❑ Castor brakes - locking properly.
- ❑ All motors - running properly (with regular speed and at low noise).
- ❑ Wires - correctly wired and undamaged.
- ❑ Electric plugs - undamaged.
- ❑ Side rail locking and moving system - properly locking and running smoothly.
- ❑ Accessories - correctly assembled and correct function.
- ❑ Damaged coating - repaired.
- ❑ Leakage of grease - check for grease.

**CAUTION!**
**Risk of injury or damage to property**
Grease leaks can lead to accidental falls or fire.
– Contact service provider if leaks of grease or other residue is detected.

## 6.2 Inspection after relocation - Prepare for new user

**IMPORTANT!**
When the bed has been relocated; before given to a new user it has to be thoroughly inspected.
– Inspection must be done by a trained professional.
– For regular maintenance see maintenance chart.

### 6.2.1 Checklist - After relocation

**Checkpoints**

- ❑ Check that the inserts connecting the two mattress support halves are fully inserted and locked.
- ❑ Check that the mattress support is correctly mounted to the bed ends and that the locking ring is engaged.
- ❑ Check the locking of the motors (pipe pins correctly mounted).
- ❑ Check the electronic wiring for the motors (wires not squeezed).
- ❑ Check that the enclosing of the motors are intact (no cracks that enables fluids to pierce).
- ❑ Check that the locking cam is properly mounted over the contacts in the control box.
- ❑ Check the sections of the mattress support by using the hand control to activate all functions of the moving parts.
- ❑ Check the function of the brakes.
- ❑ Check the locking function(s) of the side rails.
- ❑ Check that all bed slats are intact and not loose.

## 6.3 Cleaning and disinfection

**IMPORTANT!**
Wrong fluids or methods can harm or damage your product.
– Follow instructions carefully for either Non-washable or Washable components.
– Never use corrosive fluids (alkalines, acid, cellulose thinner, acetone etc)
– Never use a solvent that changes the structure of the plastic or dissolves the attached labels.
– Always make sure that the bed is carefully dried before taking it into use again.

### 6.3.1 Cleaning methods

**Electrical components**

**IMPORTANT!**
Non-washable electronics can not withstand high temperatures.
– Do not wash or dry in higher temperatures than 40 °C.

Method: Wipe off with a wet cloth or soft brush.

Max. temperature: 40 °C

Solvent/chemicals: Water

**Metal components**

Method: Wipe off with a wet cloth or soft brush. Water may be pressurized, but not high pressure or steam.

Max. temperature: 40 °C

Solvent/chemicals: Household detergent or soap and water, 6-8 pH

**Wood (including textile straps on side rails, if existing)**

Method: Wipe off with a wet cloth or soft brush.

Max. temperature: 40 °C

Solvent/chemicals: Household detergent or soap and water, 6-8 pH

**Textiles (including upholstery and mattresses)**

See attached label on each product.

## 6.4 Lubrication

**Lubrication plan**

We recommend lubricating the bed according to the following instructions:

- Points of rotation in mattress support and base frame - lubricate with medically clean oil.
- Motor attachment points to mattress platform - lubricate with medically clean oil.
- All of the motors' tension rod - lubricate with medically clean oil.
- All motor bearings - lubricate with medically clean oil.

The wooden side rails gliding system must not be lubricated with oil - otherwise the wooden bars will move sluggishly.

# 7 After Use

## 7.1 Waste disposal

Waste disposal/recycle must comply with the laws and regulations for waste handling in each country.

Invacare® is continuously working towards ensuring that the company's impact on environment, locally and globally, is reduced to a minimum.

We comply with the current environment legislation (e.g. WEEE and RoHS directive).

We only use REACH compliant materials and components.

- All wooden parts must be dismantled and sent for incineration.
- All electric parts must be dismantled and be disposed of as electric components.
- Plastic parts must be sent for incineration or recycling.
- Steel parts and castors must be disposed of as waste metals.

**IMPORTANT!**
Accumulator back-up
– Old accumulators must be returned to *Invacare®* or recycled as car batteries

# 8 Troubleshooting

## 8.1 Troubleshooting electrical system

| Symptom | Possible cause | Remedy |
|---|---|---|
| Mains indicator does not light up | Mains are not connected | Connect mains |
| | Fuse in the control unit is blown | * Replace the control unit |
| | Control unit is defective | * Replace the control unit |
| Mains indicator lights up, but the motor is not running. The relay in the control unit makes a clicking noise. | Motor plug is not fully inserted into the control unit. | Insert the motor plug properly into the control unit |
| | The motor is defective. | * Replace the motor |
| | Motor cable is damaged. | * Replace the cable |
| | Control unit is defective | * Replace the control unit |
| Mains indicator lights up, but the motor is not running. No relay sound is heard from the control unit. | Control unit is defective | * Replace the control unit |
| | Hand control is defective | * Replace the hand control |
| Control unit is in order except for one direction on one channel. | Control unit is defective | * Replace the control unit |
| | Hand control is defective | * Replace the hand control |
| Motor is running, but the piston rod does not move. | Motor is damaged | * Replace the motor |
| The motor cannot lift full load. | | |
| Motor noise, but no movement of piston rod. | | |
| Piston rod operates inwards and not outwards. | | |

* Service and maintenance of the bed must only be performed by personnel who have received the necessary instruction or training.

**Risk of personal injury and damage to the product.**
– The bed must be unplugged from the main power source before opening or repairing electrical parts.

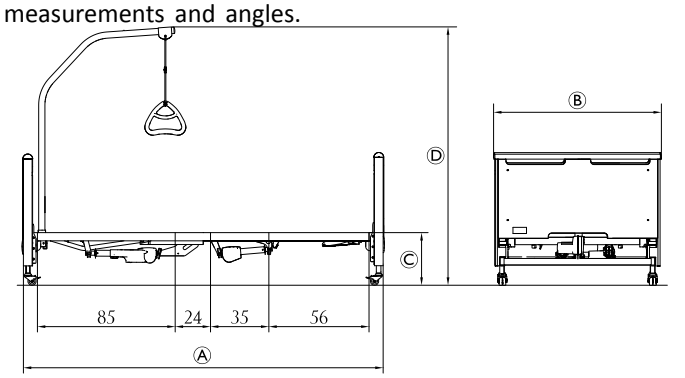
**WARNING!**
**Risk of personal injury and damage to the product.**
– The bed must be unplugged from the main power source before opening or repairing electrical parts.

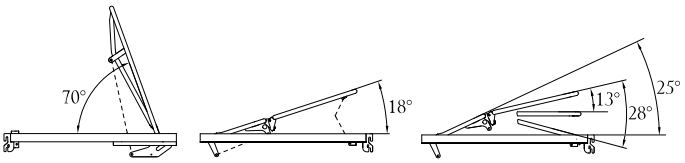
# 9 Technical data

## 9.1 Dimensions

All measurements are stated in cm. All angles are stated in degrees. All measurements and angles are stated without tolerances.

*Invacare®*reserves the right to change the stated measurements and angles.

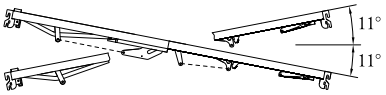



| | Etude Plus HC | |
|---|---|---|
| | **Low** | **High** |
| Ⓐ | 219 | 219 |
| Ⓑ | 102 | 102 |
| Ⓒ | 20–60 | 27–67 |
| Ⓓ | 138–178 | 145–185 |

The angle between the lower leg section and horizontal is adjustable from 0º to 15º.

**Bed with tilt function**




## 9.2 Mattress dimensions

| | Mattress measures (in cm): | | | |
|---|---|---|---|---|
| **Side rail:** | **Min. height** | **Max. height** | **Min. width** | **Min. length** |
| Verso HC | 14 | 16 | 90 | 190 |

Min. density: 38kg/m³

## 9.3 Weights

| | | |
|---|---|---|
| | Max. patient weight (provided that the weight of the mattress and the accessories do not exceed 35 kg) | 165 kg |
| | Max. safe working load (patient + accessories) | 200 kg |
| | Etude Plus standard bed, complete, excluding accessories | 77.3 kg |
| | Etude Plus auto-regression, complete, excluding accessories | 82.7 kg |
| | Etude Plus bed end – 1 piece | 17.9 kg |
| | Mattress support, standard head end | 24.1 kg |
| | Mattress support with auto-regression, head end | 27.9 kg |
| | Mattress support with auto-regression, head end, without actuator and control box | 24.1 kg |
| | Mattress support, foot end | 17.4 kg |
| | Verso HC side rail – 1 piece | 7.4 kg |
| | Lifting pole | 4.2 kg |
| | Mattress support extension (10 cm) | 3.2 kg |
| | Mattress support extension (20 cm) | 5.5 kg |
| | Support handle 40 x 30 cm | 1,6 kg |
| | Support handle 40 x 40 cm | 2,0 kg |
| | Swivel handle | 1,8 kg |

## 9.4 Environmental conditions

| | Storage and transportation | Operation |
|---|---|---|
| Temperature | -10°C to +50°C | +5°C to +40°C |
| Relative humidity | 20% to 75% | |
| Atmospheric pressure | 800 hPa to 1060 hPa | |

Be aware that when a bed has been stored under low temperatures, it must be adjusted to operating conditions before use.

## 9.5 Electrical system

| |
|---|
| Voltage supply: Uin = 120 Volt, AC, 50/60 Hz (AC = Alternating current) |
| Maximum current input: Iin max. = 1.6 A |
| Intermittent (periodic motor operation): Int = max. 10%, 2 min ON / 18 min OFF |
| Degree of protection: IPx6* or IPx4** (depending on configuration)<br>The control unit, external power supply and motors are protected according to IPx6. When the bed is equipped with a HL80 hand control, it is protected according to IPx4 |
| Insulation class: Class II |
| Type BF Applied Part<br>Applied Part complying with the specified requirements for protection against electrical shock according to IEC60601-1.<br>(An applied parts is a part of the medical equipment which is designed to come into physical contact with the user or parts that are likely to be brought into contact with the user.) |
| Sound level: 45 – 50 dB (A) |

* IPX6 classification means that the electrical system is protected against water projected in powerful jets from any direction.

** IPX4 classification means that the electrical system is protected against water splashed against the component from any direction.

The bed has no isolator (main switch). If the bed needs to be electrically disconnected, it has to be unplugged from the mains socket.

## 9.6 Electromagnetic compliance (EMC)

**Guidance and manufacturer´s declaration – electromagnetic emission**

The medical bed is intended for use in the electromagnetic environment specified below. The customer or the user of the bed should assure that it is used in such an environment.

| Emissions test | Compliance | Electromagnetic environment - guidance |
|---|---|---|
| RF emissions<br>CISPR 11(partly) | Group I | The medical bed uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment. |
| RF emissions<br>CISPR 11(partly) | Class B | The medical bed is suitable for use in all establishments including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes. |
| Harmonic emissions<br>IEC 61000-3-2 | Class A | |
| Voltage fluctuations / flicker emissions<br>IEC 61000-3-3 | Complies | |

**Guidance and manufacturer´s declaration – electromagnetic immunity**

The medical bed is intended for use in the electromagnetic environment specified below. The customer or the user of the bed should assure that it is used in such an environment.

| Immunity test | IEC 60601–1–2 test level | Compliance level | Electromagnetic environment – guidance |
|---|---|---|---|
| Electrostatic discharge (ESD)<br>IEC 61000-4-2 | ± 6 kV contact<br>± 8 kV air | ± 6 kV contact<br>± 8 kV air | Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %. |
| Electrostatic transient / burst<br>IEC 61000-4-4 | ± 2 kV for power supply lines<br>± 1 kV for input/output lines | ± 2 kV for power supply lines<br>± 1 kV for input/output lines | Mains power quality should be that of a typical commercial or hospital environment. |
| Surge<br>IEC 61000-4-5 | ± 1 kV differential mode<br>± 2 kV common mode | ± 1 kV differential mode<br>± 2 kV common mode | Mains power quality should be that of a typical commercial or hospital environment. |
| Voltage dips, short interruptions and voltage variations on power supply input lines<br>IEC 61000-4-11 | < 5% $U_T$ (>95% dip in $U_T$) for 0,5 cycle<br>40% $U_T$ (60% dip in $U_T$ ) for 5 cycles<br>70% $U_T$ (30% dip in $U_T$) for 25 cycles<br>< 5% $U_T$ (>95% dip in $U_T$) for 5 sec | < 5% $U_T$ (>95% dip in $U_T$) for 0,5 cycle<br>40% $U_T$ (60% dip in $U_T$ )for 5 cycles<br>70% $U_T$ (30% dip in $U_T$) for 25 cycles<br>< 5% $U_T$ (>95% dip in $U_T$) for 5 sec | Mains power quality should be that of a typical commercial or hospital environment. If the user of the medical bed requires continued operation during power mains interruptions, it is recommended that the medical bed be powered from an un-interruptible power supply or a battery.<br>$U_T$ is the a. c. mains voltage prior to application of the test level. |
| Power frequency (50/60 Hz) magnetic field<br>IEC 61000-4-8 | 3 A/m | 3 A/m | Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment. |
| Conducted RF<br>IEC 61000-4-6 | 3 V | 3 V | Portable and mobile RF communications equipment should be used no closer to any part of the medical bed including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.<br>Recommended separation distance:<br>$d = [\frac{3,5}{V_1}]\sqrt{P}$ |

| Immunity test | IEC 60601–1–2 test level | Compliance level | Electromagnetic environment – guidance |
|---|---|---|---|
| Radiated RF<br>IEC 61000-4-3 | 3 V/m | 3 V/m | $d = [\frac{3,5}{E_1}]\sqrt{P}$ 80 MHz to 800 MHz<br>$d = [\frac{7}{E_1}]\sqrt{P}$ 800 MHz to 2,5 GHz<br>where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and *d* is the recommended separation distance in metres (m).[b]<br>Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,[a] should be less than the compliance level in each frequency range.[b]<br>Interference may occur in the vicinity of equipment marked with the following symbol:<br>  |

[a] 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 medical bed is used exceeds the applicable RF compliance level above, the medical bed should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the medical bed.

[b] Over the frequency range 150 kHz to 80 MHz, field strengths should be less than [V1] V/m.

At 80 MHz and 800 MHz, the higher frequency range applies.

**Recommended separation distances between portable and mobile RF communications equipment and the medical bed**

The medical bed is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the medical bed can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the medical bed as recommended below, according to the maximum output power of the communications equipment

| Rated maximum output of transmitter [W] | Separation distance according to frequency of transmitter [m] | | |
|---|---|---|---|
| | 150 kHz to 80 MHz $d = [\frac{3,5}{V_1}]\sqrt{P}$ | 80 MHz to 800 MHz $d = [\frac{3,5}{E_1}]\sqrt{P}$ | 800 MHz to 2,5 GHz $d = [\frac{7}{E_1}]\sqrt{P}$ |
| 0.01 | 0.12 | 0.12 | 0.23 |
| 0.1 | 0.37 | 0.37 | 0.74 |
| 1 | 1.17 | 1.17 | 2.33 |
| 10 | 3.69 | 3.69 | 7.38 |
| 100 | 11.67 | 11.67 | 23.33 |

For transmitters rated at a maximum output power not listed above the recommended separation, distance d in metres (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.

At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

ℹ These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.