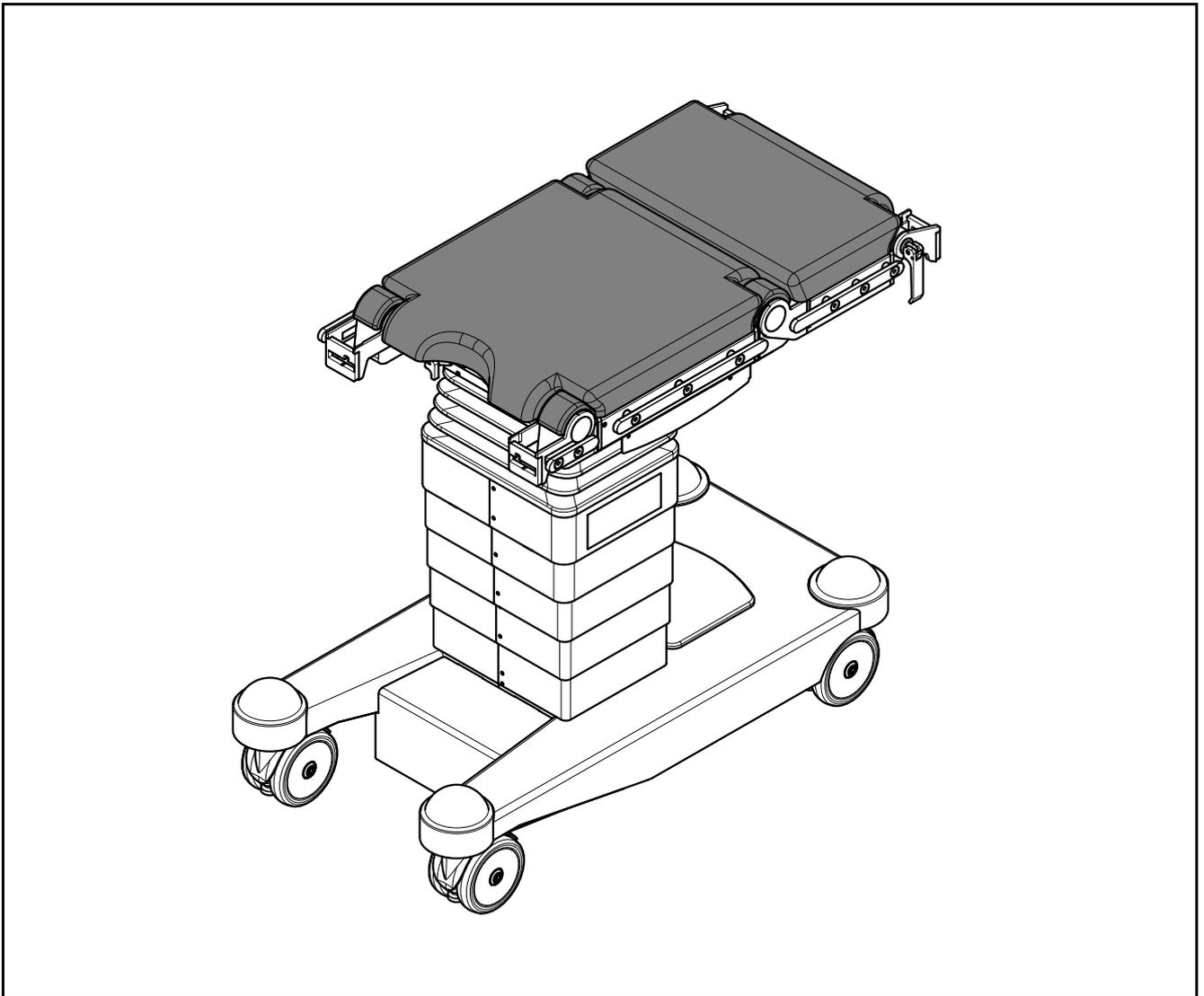


MARS 2 Operating Table

Instruction Manual



Translation of the original German instruction manual

CE mark: This is a Class I medical product according to the European Medical Device Directive (MDD 93/42/EEC) and is compliant with the Directive version currently in force at the time of product sale.



Conformity: The manufacturer declares conformity of this product with the essential requirements indicated in Appendix I, MDD, as well as the performance of a conformity evaluation procedure required for class I products according to Appendix VII, MDD and has documented such with the CE mark.

Manufacturer and distributor

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We are constantly developing our products.

We therefore reserve the right to make changes to the scope of the delivery with respect to the format, equipment and technology at any time.

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Within the bounds of the legal requirements, the manufacturer is only then responsible for the technical safety characteristics of this apparatus if the maintenance, repairs and modifications to this apparatus are performed by him or by someone appointed by him and in accordance with his instructions.

This instruction manual applies to the following sales units:

Product name	Mat. no.
MARS 2.01	0387610
MARS 2.01 S	0387611
MARS 2.01 V	0387612
MARS 2.02	0387620
MARS 2.02 S	0387621
MARS 2.02 V	0387622
MARS 2.03	0387630
MARS 2.03 S	0387631
MARS 2.03 V	0387632
MARS 2.04	0387640
MARS 2.04 S	0387641
MARS 2.04 V	0387642
MARS 2.05	0387650
MARS 2.05 S	0387651
MARS 2.05 V	0387652
MARS 2.06	0387660
MARS 2.06 S	0387661
MARS 2.06 V	0387662
Pad seat section MARS	4146053
Pad back section MARS	4146055
Pad seat section MARS T	1600131
Pad back section MARS T	1595445
Pad seat section MARS B	1851930
Pad back section MARS B	1851971

Product name	Mat. no.
Cable-based remote control, MARS 2 BM ^{*1}	1416569
Cable-based remote control, MARS 2 BE ^{*2}	1411554
Cable-based remote control, MARS 2 FA ^{*3}	1409407
IR remote control, MARS 2 BM ^{*1}	1416572
IR remote control, MARS 2 BE ^{*2}	1411553
IR remote control, MARS 2 FA ^{*3}	1409406
Mobile charger	4544122
U mobile charger	4500122
Charging unit mobile GB	1711505
Charging unit mobile BR	1711506
Wall-mounted charger	4544123
U wall-mounted charger	4500123
Charging unit for wall installation GB	1711507
Charging unit for wall installation BR	1711508
24 wall-mounted charger	4544139
Panelboard-installed charger	1220519
IR DVE charger	1314349
IR DVE U charger	1283947

*1 for the MARS 2.01/2.02 operating tables

*2 for the MARS 2.03/2.05 operating tables

*3 for the MARS 2.04/2.06 operating tables

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1 Important Information

Trumpf Medical products are manufactured to give a long and trouble-free service life. Development, design and production by TRUMPF Medizin Systeme GmbH + Co. KG have been certified in accordance with DIN EN ISO 13485.

This guarantees:

- highest quality and a long service life,
- easy operation,
- functional design and
- optimization for the intended purpose.

The products are manufactured in accordance with the requirements of the Medizinproduktegesetz MPG (Medical Products Act) and bear the CE mark. Prior to using the products, read this instruction manual carefully from the beginning to the end in order to familiarise yourself with the product and its diverse functions in a step-by-step manner. Store the instruction manual near the product, so you can refer to the information at a later time. The instruction manual is a fixed component of the product and must be transferred when changing location or personnel. Furthermore, the instruction manual must be accessible to all users of the product at any time.

This operating table can be used safely. Reference is made to any residual dangers at the appropriate points in the manual. Please observe the following instructions.

1.1 Proper use of the equipment

The devices described in this manual are for human medical use only.

The MARS 2 operating table is – in combination with the section segments and accessories offered and sold by Trumpf Medical – intended for the following application:

- Patient positioning during surgery, ranging from anaesthesia induction to actual surgery to recovery from the anaesthesia.
- Patient transport on the operating table top, from the patient transfer system to the operating theatre or from the operating theatre to the patient transfer system.

Positioning the patient on the operating table is carried out according to general practice and doctrine ¹⁾. Cover the operating table with sterile material before use.

¹⁾ For example, described in specialist literature

Transport of objects, devices, or materials on the operating table is prohibited. The operating table may be used and operated in a controlled and responsible manner by duly instructed medical specialists only. The training of operating and maintenance personnel will be carried out by the manufacturer or by other qualified persons by the manufacturer. Follow this instruction manual to comply with the intended use of this operating table. Any other use of the operating table is regarded as improper usage. The supplier/manufacturer is not liable for damage to property or injury to persons resulting from incorrect operation of the table or putting it to an improper use.

1.2 Explanation of symbols

Important information in this instruction manual is marked with symbols and keywords. Key words such as **DANGER**, **WARNING** or **CAUTION** indicate the level of danger involved. The symbols emphasise the message visually. Additional symbols can indicate injury hazards or danger to life and limb. The measures to prevent dangers arising must be implemented without fail.



DANGER
Danger to life and limb
(for example electric shock)!

Refers to a directly imminent danger that will result in death or serious injuries if the appropriate precautionary measures are not taken.



WARNING
Danger to life and limb!

Refers to a directly imminent danger that can result in death or serious injuries if the appropriate precautionary measures are not taken.



CAUTION
Danger of injury (such as crushing)!

Refers to a possible danger that can lead to slight or moderate injury or material damage if the appropriate precautionary measures are not taken.



CAUTION
Risk of material damage!

Refers to a possible danger that can lead to material damage if the appropriate precautionary measures are not taken.



NOTE

Additional useful information and tips.

1.3 Safety information

Safety information and measures to protect the user and patients from hazards that can result from use of the operating table.



WARNING Hazard to the patient!

A change to the medical device is prohibited. The manufacturer will not be held liable if changes are made to the operating table.

The medical device is subject to special precautionary measures regarding electromagnetic compatibility (EMC). The installation and commissioning must be carried out according to the EMC-related instructions specified in this instruction manual. See chapter 15.5 on page 87 and chapter 19 on page 92.

During an operation, changing the patient's position by moving the operating table (to the zero position, Trendelenburg) may be necessary to enable life-saving measures in critical situations.



WARNING Hazard to the patient!

Functional failure of the operating table cannot be completely excluded given state-of-the-art technology available on the market today. Should this rare event occur, motor-driven operating table functions will no longer be available during the operation.

If the electrical operating table functions fail, the patient can only be moved with suitable aids (e. g., by placing a pad underneath the patient) or by manually moving the patient from the operating table.

1.3.1 General information

- **Risk of material damage to electrical equipment through condensation!** Do not immediately turn on the operating table. When moving the operating table from a cold to a warm environment or vice versa, condensation can occur on the inside of the operating table top. Before turning on the operating table, store the table in a room with the prescribed ambient temperature and humidity (see page 83) (for at least 12 hours) and allow it to heat up/cool down. The batteries must be completely recharged after a significant change in temperature or humidity.

- Check that all electrical and mechanical functions/parts of the operating table, including accessories, are undamaged and in good working order before using them. Defective or damaged products may not be used.
- **Hazard to the patient due to improper attachment.** Check that the section segments and accessories are securely fastened to the operating table before each use. Spontaneous movement may occur, and released elements may slip out. Loosen controls for adjustment purposes only. Clamp them down immediately thereafter. Check that all fastening elements are seated properly and tightly.
- Risk of crushing by moving parts! Familiarise yourself with its operating functions before using the product.
- Risk of injury due to overhanging parts.
- Pay attention to the symbols on the product (see page 21)! All symbols (adhesive labels) on the device must be complete and legible. Replace damaged or loose adhesive labels.
- Follow the relevant instruction manuals for the proper and safe use of additional equipment.
- Turn the knobs counter-clockwise to loosen and clockwise to tighten, like a standard screw.

1.3.2 Electricity

- Set the operating table such that removable plugs and device connectors are easily accessible.
- The operating table may only be connected to the mains power supply with a protective earth conductor. This reduces the risk of electric shock.
- Get a qualified electrician to check the electrical safety of the operating table and the power supply every year. We recommend an annual general safety check by Technical Customer Service at Trumpf Medical.
- The anti-static properties of the operating table top comply with legal requirements if the pads supplied are used and properly secured.
- Always keep rechargeable batteries ready for service (i. e., charged) so they may be immediately used in the event of a power loss.
- **When charging the operating table during an operation, the power cable may not be extended**, as otherwise in emergency mode ¹⁾ the allowable limit of the patient leakage current for

¹⁾ Break in the protective conductor by a damaged power cable

operating on the heart (CF component according to IEC 60601-1) will be exceeded. Use only the power cable supplied!

- Do not crush or roll over power and equipotential bonding conductors. Do not use any damaged cables. Disconnect cables before moving equipment. If you have any concern about the safety of the power cables and equipotential bonding conductors, work with the internal (rechargeable) power supply only until you have replaced the cable in question.
- Only use the operating table when an equipotential bonding conductor is connected to an electrically conductive floor.
- Connection points for the equipotential bonding conductor on the operating table comply with IEC 60601-1 (DIN EN 60601-1/VDE 0750-1).

1.3.3 High-frequency (HF) surgical devices and defibrillators

The operating table is suitable for the use of HF surgical devices, defibrillators and defibrillator monitors. Please follow the manufacturer's instruction manual and safety information for these devices.

The operating tables are electrically conductive according to the currently valid IEC 60601-1 regulations. When high-frequency surgical devices, defibrillators and defibrillator monitors are used, the patient runs the risk of being burned if no safety precautions are taken:

- **Risk of burns to patient!** Position patients on the operating table to be isolated from metal parts (operating table, accessories) and conductive pads or tubes.
- Make sure patient does not come into contact with damp towels or pads. Only use dry materials!
- The electric motor-driven functions of the operating table can be interrupted by simultaneous use of HF surgical devices.

1.3.4 Pads

- The pads and cover retain the patient's body heat, thereby preventing the body temperature from falling due to heat diffusion.
- The pads are removable. Use appropriate pads only (manufactured by Trumpf Medical). Do not lay the patient on the operating table without a pad. The edges of the pad are flush with the operating table when operating table components are fitted properly.

- Lift the patient into the desired position on the operating table and do not pull the patient over the pads. After each repositioning, lift the patient's appropriate body parts. Any wrinkles or shearing forces that have developed will be eliminated.
- Do not place any sharp-edged objects on the pad or stick them into the pad. Do not attach any adhesive foil.
- Always use only **ONE** pad version for the patient positioning area (the table top plus the section segments). Note the different properties of the pad versions (see page 25).

1.3.5 Transport/Repositioning

- Occupational safety for personnel: Given their heavy weight, when lifting or carrying the section segments and accessories, or when manually moving the operating table with or without a patient, take extra care not to strain your back. Work with an additional person if necessary. Never couple or uncouple multiple section segments or heavy, unwieldy accessories at the same time. Hold the component securely and do not drop it.
- **Risk of personal injury!** Improper weight distribution can break the section segments off the operating table or cause the table to tip over. Do not climb onto or down from the operating table over the back section or attached section segments. Patients may only get on or off in the column area via the seat section. Do not sit on the back section or the attached section segments!
- Secure the patient on the operating table (with straps for example), and actively support the patient when moving the operating table.
- **Risk of collision when adjusting the operating table!** Perform all patient repositioning in a controlled and responsible manner. Monitor all electrically supported functions and movements on the operating-table until they reach their end positions to rule out any risks to the patient or material damage to the operating table, the equipment or furnishings. Potential collisions have to be prevented by interrupting the function.
Pay close attention that no surgical draping, tubing or other objects come in contact with moveable parts and get caught by them.
Pay particular attention to the operating table when lowering, since the table top may collide with operating accessories lying below it, or it may even contact the floor if it is set in an extreme position. In some circumstances, there is a possible risk of crushing people as well.

- When the zero position is approached on the operating table, inclined patient positions may become steeper than they were before the movement commenced.
Select the *ZERO POSITION* function only if there is no possibility of collisions. Closely watch the table as it moves from the zero position to the end position.
- **Risk of physical injury due to the operating table tipping over.** Moving the operating table plus a patient is permitted only when specific conditions are met (see page 70).
- **Risk of collision!** Use extra caution when transporting the operating table. Be careful to avoid collisions with nearby persons or furniture to prevent damage to the table.
- For accessories with removable pads, do not carry the accessories by the pad. The accessory will slip out of the pad and fall onto the floor.

1.3.6 Maintenance/Repair

- Keep a log book for this medical equipment. All services, inspections, and repairs are to be documented in this book.
- All repairs must be performed in accordance with the safety regulations as per IEC 60601-1 (DIN EN 60601-1/ VDE 0750-1).
- Within the bounds of the legal requirements, the manufacturer is only then responsible for the technical safety characteristics of this apparatus if the maintenance, repairs and modifications to this apparatus are performed by Trumpf Medical service technicians or by personnel authorised and trained by Trumpf Medical.
- Trumpf Medical shall not liable for damage of any kind arising from the failure to perform inspections or as a result of inadequate repairs or maintenance, or modifications to the product.

1.3.7 Protection against infection

- Comply with all the stipulations concerning cleaning/ disinfection (see page 81). Implement all cleaning and disinfection procedures and agents described in this instruction manual.
- Devices and fitments must be cleaned and disinfected before being handed over to service technicians for maintenance and repair work.
- Replace pads that no longer meet hygiene and infection requirements.

1.3.8 Environmental protection

- Dispose of any remaining cleaning and disinfection materials and any residues thereof in an environmentally safe manner.
- If possible, please recycle any rechargeable batteries you can no longer use.
- Observe the notes in this document for environmentally friendly disposal (see page 91).

1.4 Glossary

The following terms and abbreviations are used in this instruction manual:

Term	Explanation
<i>ITALICISED</i> text	Descriptions of keys, functions, displays and system components
Number in brackets [50]	Numbering used in illustrations (referencing text to illustrations)
[a 10]	Identification of displays on a control unit
[i 10]	Identification of functions (keys) on a control unit
[10]	Identification of parts
#	Material number
Trumpf Medical	TRUMPF Medizin Systeme GmbH + Co. KG
Closed section segment	One-piece section segment with two clamps, the width of the operating table top
Component/section segment	Attached part to further equip the operating table. It is connected to the operating table at the coupling points, and extends the patient resting surface.
Standard rail	Rails for attaching accessories
Operating table	Operating table plus running gear Section segments attached to the operating table top are considered part of the operating table.
Column keypad	Operating keypad on the column

Important Information

Term	Explanation
Accessories	Attached part to further equip the operating table. It is attached to the coupled section segment or on the standard rails of the operating table.
Two-key operation	Pressing two keys simultaneously to select a function on the column keypad: key ON + function key remote control: shift key + function key
Abbreviations in the product descriptions	
S	Attachment of the pad with mushroom fasteners
V	Pad attachment with Velcro

1.5 Overview of the various operating table types

Product name	Equipment/description
MARS 2.01	Operating table with standard table top height, manually adjustable movement and two-piece table top (seat and back plate) with two motor-driven joint pairs (leg and lower back section) and a manually adjustable joint pair (upper back section)
MARS 2.02	Operating table with standard table top height, manually adjustable movement and two-piece table top (seat and back section) with two motor-driven joint pairs (leg and lower back section), a manually adjustable joint pair (upper back section), support for the extension adapter and longitudinal displacement
MARS 2.03	Operating table with standard table top height, electrically adjustable movement and two-piece table top (seat and back section) with two motor-driven joint pairs (leg and lower back section), a manually adjustable joint pair (upper back section), support for the extension adapter and longitudinal displacement
MARS 2.04	Operating table with standard table top height, electrically adjustable movement and two-piece table top (seat and back section) with two motor-driven joint pairs (leg and lower back section), a manually adjustable joint pair (upper back section), support for the extension adapter and longitudinal displacement
MARS 2.05	Operating table with low table top height, electrically adjustable movement and two-piece table top (seat and back plate) with two motor-driven joint pairs (leg and lower back section), a manually adjustable joint pair (upper back section), support for the extension adapter and longitudinal displacement
MARS 2.06	Operating table with low table top height, electrically adjustable movement and electric drive, two-piece table top (seat and back section) with two motor-driven joint pairs (leg and lower back section), a manually adjustable joint pair (upper back section), support for the extension adapter and longitudinal displacement

1.6 Important performance characteristics

The medical device retains the position adjusted by the operator. Its position changes only when the operator chooses to do so.

2 Receiving Shipment, Unpacking, and Set up

The MARS 2 operating table comes delivered in cardboard packaging and on a pallet. Any section segments/accessories you have ordered are individually packaged and also on the pallet.

Package dimensions:	
Length	1940 mm
Width	800 mm
Height	1250 mm
Weight (depending on the scope of delivery):	
Operating table	approx. 300 kg

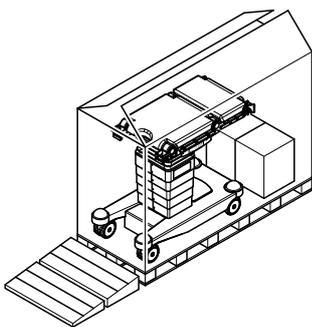
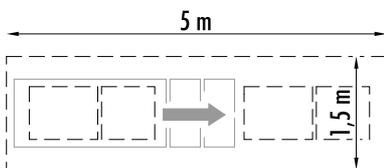


CAUTION
Risk of material damage!

The packaging is not weatherproof. Store in accordance with the "Technical Data".

Unpack the operating table in an area with a level floor and with sufficient free space for the apparatus to be rolled off the pallet.

Unpack in the following sequence:

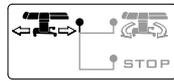
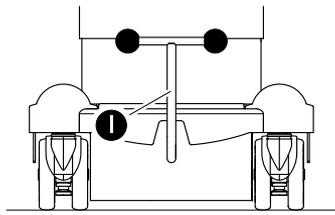


1. Place the pallet in a position where there is a free space of about 1.5 m x 5.0 m available.
2. Open the top of the cardboard packaging.
3. Pull the two-part ramp out in an upward direction and place it at the front end of the pallet.
4. Free the bottom of the cardboard from the pallet.
5. Remove cardboard in an upward direction.
6. Remove the delivered parts.
7. Take off the tension belts.
8. Remove the wooden chocks.
- 9.



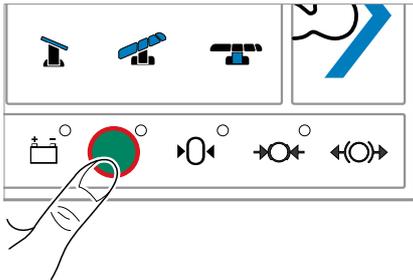
CAUTION
Risk of material damage to electrical equipment due to condensation!

Do not immediately turn on the operating table. When moving the operating table from a cold to a warm environment or vice versa, condensation may occur on the inside of the operating table. Before turning on the operating table, store it in a room (for at least 12 hours) at the prescribed ambient temperature and air humidity and allow it to warm up/cool down (see page 83).



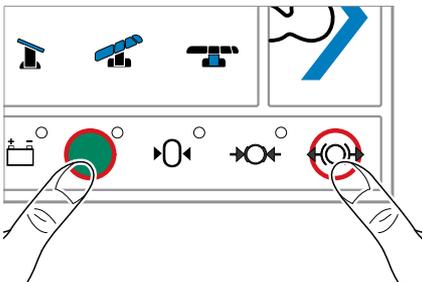
MARS 2.01/2.02 operating table

Move the *TRAVEL MODE* pedal located on the running gear upwards to the *DIRECTIONAL TRAVEL* position. Follow the pictogram.



MARS 2.03/2.04/2.05/2.06 operating table

- Turn the operating table via the column keypad (green ON key).



- On the column keypad, press the green ON key and UNLOCK key together for at least 1 second. The operating table is lowered.

10.



CAUTION

Risk of personal injury due to tipping over the operating table.

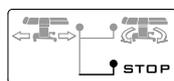
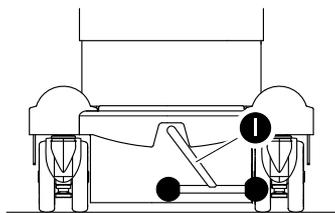
Do not go over the edge of the pallet!
Run the operating table down off the pallet under the control of at least two persons.

Carefully transport the operating table off the pallet, down the ramp and onto a level parking area.

11.

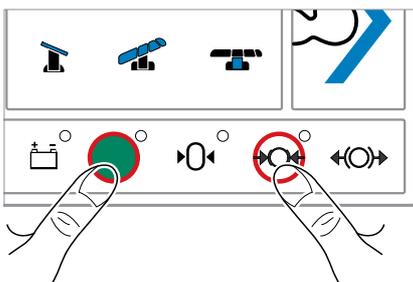
MARS 2.01/2.02 operating table

Move the *TRAVEL MODE* pedal located on the running gear downwards to the *BRAKE* position.



MARS 2.03/2.04/2.05/2.06 operating table

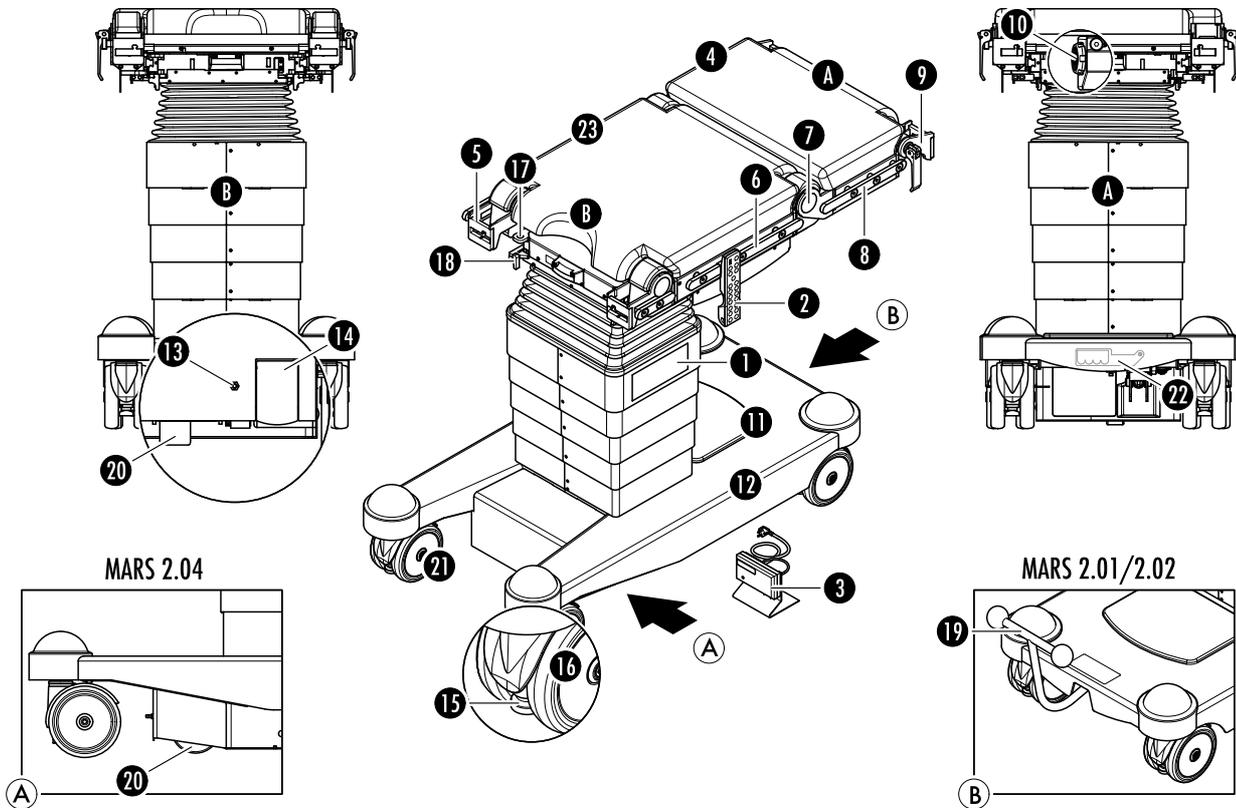
On the column keypad, press the green ON key and UNLOCK key together for at least 1 second. The operating table is jacked up.



12.

Dispose of the pallet, ramp and packing material in an environmentally friendly way.

3 Overview of Operating Table



Key:

- [1] Column keypad
- [2] Remote control
- [3] Remote control charger
- [4] Lower back section
- [5] Motorised leg section joint with standard rail
- [6] Standard rail for seat section
- [7] Motorised lower back section joint
- [8] Standard rail for lower back section
- [9] Manually upper back section joint
- [10] Connector socket for control unit
- [11] Cover for rechargeable battery area
- [12] Running gear
- [13] Connector pin for potential equalisation
- [14] Connector socket for power supply
- [15] Foot plate
- [16] Wheel
- [17] Insertion opening for extension adapter ^{*1}
- [18] Bayonet locking mechanism for extension adapter ^{*1}
- [19] Travel mode pedal ^{*2}
- [20] Wheel for directional travel and drive ^{*3}

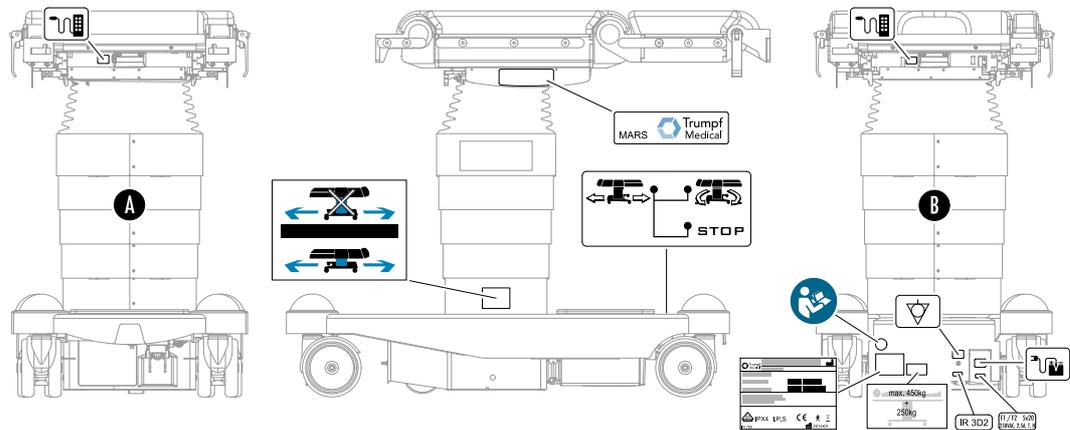
- [21] Wheel for directional travel ^{*4}
- [22] Emergency release lever for running gear ^{*5}
- [23] Seat section

- [A] Head end
- [B] Foot end

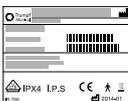
- *1 not MARS 2.01 operating table
- *2 MARS 2.01/2.02 operating table only
- *3 MARS 2.04/2.06 operating table only
- *4 not MARS 2.04/2.06 operating table
- *5 not MARS 2.01/2.02 operating table

3.1 Symbols found on product

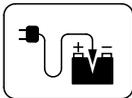
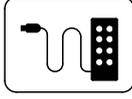
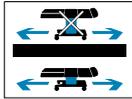
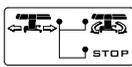
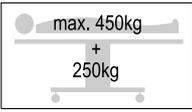
The following symbols are located on the operating table:



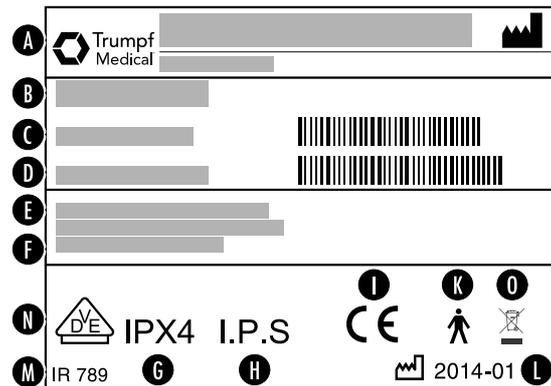
- [A] Head end
- [B] Foot end

Symbol	Meaning	Location
	Rating plate	Running gear on foot end
	Comply with the operating instructions	via the rating plate at the foot end of the chassis
	Operating table name	On the energy cover strip on both sides
	Connecting pin for equipotential bonding conductor	Running gear on foot end

Overview of Operating Table

Symbol	Meaning	Location
	Connector socket for power supply	On the connector socket cover, running gear on foot end
	Mains fuse 2x 2.5 AT (230 V) Mains fuse 2x 4 AT (115 V)	On the connector socket cover, running gear on foot end
	Connector socket for cable remote control	Beneath seat section, at top of column (on both sides)
	Before unlocking, lower the operating table until the pictogram is obscured.	On the column
	Position adjustment for the TRAVEL MODE pedal	At head end, on the running gear (MARS 2.01/2.02 operating table only)
	Follow the instruction manual The maximum possible patient weight on the operating table is 450 kg. The maximum operating table weight of 250 kg consists of the weight of the operating table and the weight of the attached components. When the operating table is loaded in the range of 225 kg to 450 kg, the functions on the operating table are restricted. See chapter 10 on page 47.	Next to the rating plate at the foot end of the running gear

Rating plate



Key

- [A] Manufacturer
- [B] Product name
- [C] Material number (with bar code)
- [D] Serial number (with bar code)
- [E] Voltage and frequency depending on the operating voltage:
 220 V-230 V, 50 Hz/60 Hz or
 240 V, 50 Hz or
 120 V-127 V, 50 Hz/60 Hz or
 110 V-115 V, 50 Hz/60 Hz
 Power: max. 450 VA
- [F] Mode of operation: Continuous operation with intermittent loading, 2 min ON, 8 min PAUSE
- [G] Level of protection against water penetration
- [H] Device has an internal power supply
- [I] Device conforms with directive 93/42/EEC
- [K] Level of protection against electrical shock: User part type B
- [L] Date of manufacture (year-month)
- [M] Infrared code for the IR remote control
- [N] Certification mark of the test centre
- [O] The product may not be disposed of in the regular trash.

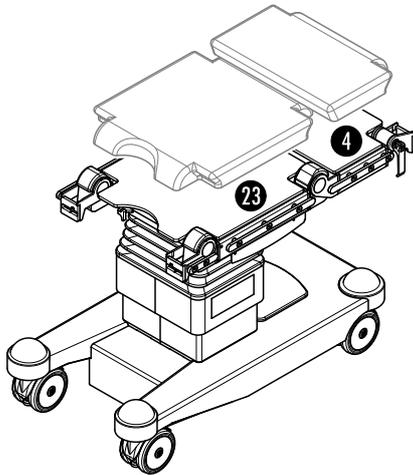
3.2 Audible signals

The operating table emits various audio signals during specific operating procedures or under certain conditions.

Action	Audio signal description
Error	1x 1 s (single tone) A continuous signal if operation is constantly incorrect
Indication (such as: end position has been reached)	1x 0.2 s (single tone)
Confirmation of an operation (such as: zero position has been reached)	2x 0.2 s (double tone)

4 Pads

The following pad versions are permitted for the MARS operating table:



	Seat section [23]	Lower back section [4]
Pad versions	Mat. no. ^{*1}	Mat. no.
Standard	4146053	4146055
FoamLine (T)	1600131	1595445
BasicLine (B)	1851930	1851971

^{*1} The material number is located on the underside of the pad.

Using the operating table with unapproved pads is prohibited, and will result in the loss of CE conformance.

4.1 Pad versions

All pad versions enable the patient to be positioned in such a way that impedes the development of pressure necroses. Medically trained personnel have to eliminate the residual risk by active decubitus prophylaxis while the patient is in position. The pads are anti-static and comply with the normative requirements when properly attached.

Standard pad

The standard pads consist of 50 mm thick, integral polyurethane foam with an electrically conductive outer layer and are secured on the operating table top with mushroom fasteners. The pads can be disinfected and machine washed (see chapter 14 page 81) and are radiolucent. Furthermore, the standard pads are latex-free.

Due to their shape-stable structure, the standard pads are particularly suitable for use in orthopaedics and traumatology, as well as for standard surgical interventions lasting up to 2 hours.

FoamLine (T) pad

FoamLine pads consist of 90 mm thick, viscoelastic foam with a 2-fold sandwich structure and a non-removable, electrically conductive covering fabric. Attachment to the operating table top is by means of Velcro. The pads can be disinfected and wiped (see chapter 14 page 81) and are radiolucent. Furthermore, FoamLine pads are latex-free and breathable.

Viscoelastic pads are suitable for all types of intervention, particularly for long-term intervention with a surgical duration longer than 2 hours and for use in patients predisposed to pressure ulcers.

BasicLine (B) pad

Basicline pads consist of 90 mm thick, viscoelastic foam with a 2-fold sandwich structure and a non-removable, electrically conductive covering fabric. Attachment to the operating table top is by means of Velcro. The pads can be disinfected and wiped (see chapter 14 page 81) and are radiolucent. Furthermore, BasicLine pads are latex-free and breathable.

Viscoelastic pads are suitable for all types of intervention, particularly for long-term intervention with a surgical duration longer than 2 hours and for use in patients predisposed to pressure ulcers.

4.2 Removing pad

Grip beneath the side edge of the pad you want to remove and pull the pad upward and place safely.

4.3 Installing pad



CAUTION

Hazard to the patient due to improper attachment!

Check that the pad is securely fastened to the operating table. The pad has to be attached precisely to the pad plate.

Standard pad

Align the holes on the underside of the pad with the pad nubs, and push down on the pad until it locks into place.

FoamLine (T) and BasicLine (B) pad

The pads are velcroed to the pad plate. When you attach the pad, be sure the pad's fleece straps are dry and lined up properly with the Velcro strap on the pad plate. Place the pad on the pad plate, press down across the length of the Velcro and check that it is securely attached.

5 Control Units

The following control units can be used to adjust the operating table:

- Column keypad
- MARS 2 cable remote control
- MARS 2 IR remote control
- Foot control

The *CONTROL UNIT* port on the operating table is for connecting the cable remote control, foot control and T-connector only.

Priorities

Entries keyed into the individual control units are accepted in the following order of priority:

1. Column keypad
2. Cable remote control
3. Foot control
4. IR remote control

Simultaneously pressing several keys leads to audible error signal or to functions being executed in order of priority.



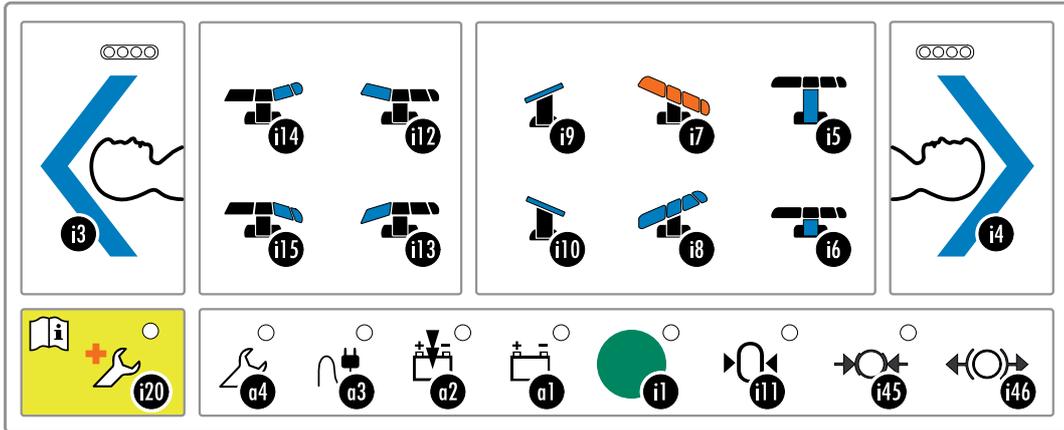
NOTE

Avoid the simultaneous operation of several IR remote controls of various manufacturers in the same room. This may result in short-term faults during function execution due to the system.

5.1 Column keypad

5.1.1 Overview

The column keypad user interface has keys and displays. The function of each key is identified by a corresponding pictogram.



Key:

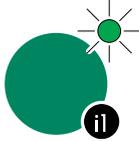
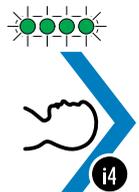
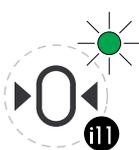
- [i 1] Turn on the operating table ^{*1}, display: Ready for use
- [i 3] Head position left ^{*1}, display: Head position left
- [i 4] Head position right ^{*1}, display: Head position right
- [i 5] Raise
- [i 6] Lower
- [i 7] Trendelenburg
- [i 8] Anti-Trendelenburg
- [i 9] Tilt left
- [i 10] Tilt right
- [i 1 1] Zero position, display: Zero position
- [i 1 2] Raise leg section joints
- [i 1 3] Lower leg section joints
- [i 1 4] Raise lower back section joints
- [i 1 5] Lower lower back section joints
- [i 20] Activate emergency mode ^{*1}, display: Emergency operation
- [i 45] Jacking up, display: Operating table is jacked up
- [i 46] Jacking down

- [a 1] Battery state of operating table
- [a 2] Battery charge of operating table
- [a 3] External power supply
- [a 4] Malfunction

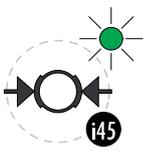
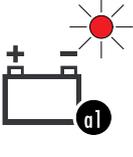
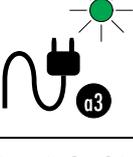
^{*1} Function not on remote control

Individual functions can only be executed with the two-key operation located on the column keypad. To do this, press the green ON key [i1] and the desired function key simultaneously. To adjust the operating table, press the function keys until the desired position is reached. The function stops when a key is released.

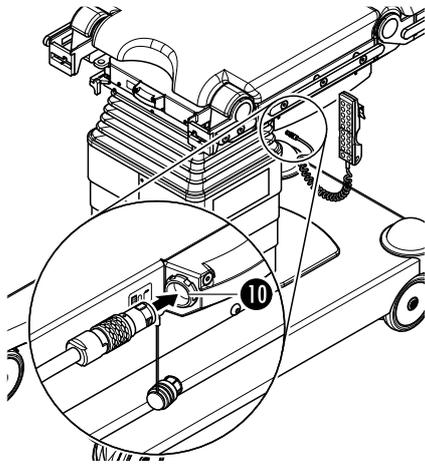
5.1.2 Visual displays

Display	State	Colour	Meaning	Steps to take
<i>READY FOR USE [i1]</i>				
	Illuminated	Green	The operating table is turned on and ready for use.	-
<i>HEAD POSITION LEFT [i3]</i>				
	Illuminated	Green	Display shows where the patient's head is located on the operating table.	-
<i>HEAD POSITION RIGHT [i4]</i>				
	Illuminated	Green	Display shows where the patient's head is located on the operating table.	-
<i>ZERO POSITION [i11]</i>				
	Illuminated	Green	The operating table is in the zero position.	-
<i>EMERGENCY OPERATION [i20]</i>				
	Flashing	Red	Emergency operation has been manually activated.	-
	Flashing	Red	Emergency operation has been automatically activated.	End current operation in emergency mode and then remove operating table from use! Contact Technical Customer Service!

Control Units

Display	State	Colour	Meaning	Steps to take
OPERATING TABLE JACKED [i45]				
	Illuminated	Green	Operating table is jacked up. The operating table cannot roll away.	-
BATTERY STATE [a1]				
	Illuminated	Red	Column batteries require recharging.	Connect the operating table to an external power supply (cable).
	Flashing	Red	Column batteries are out of charge. Electrical functions are blocked. The operating table will turn off after 30 seconds.	Connect the operating table to an external power supply (cable).
BATTERY CHARGING [a2]				
	Illuminated	Yellow	Column batteries are being charged. With power being supplied externally, the column batteries start charging 5 minutes after the last key was pressed.	-
	Flashing	Yellow	Charging is complete.	Disconnect the operating table from mains power if needed.
EXTERNAL POWER SUPPLY [a3]				
	Illuminated	Green	External (mains) power is being supplied. Power cable is connected to the operating table.	-
MALFUNCTION [a4]				
	Illuminated	Red	An electronics error Use of operating table is limited.	Contact Technical Customer Service! Activate the emergency mode if needed.
	Flashing	Red	Motor overload - the prescribed power-on time was not followed (selected function is blocked).	Wait at least one minute. After which, the function is available once again.

5.2 Remote control



Cable and IR remote controls have the same operating table functions available.

The IR remote control is powered by an internal rechargeable battery. The cable remote control is powered by the operating table. To connect the cable remote control, remove the port cover on the operating table and insert the plug into the *CONTROL UNIT* [10] port (at top of column, head end).

The IR remote control transmitter communicates with the receiver in the operating table by means of an infrared code. Each operating table has a specific remote control with the corresponding infrared code. The identifying IR numbers are located on the nameplate at the foot end on the running gear and on the back of the IR remote control. **Both IR numbers must match.**

The remote control is ready for service as soon as the operating table is turned on. When the remote control is not used for a short period of time, clip its rear retaining plate to a standard rail or to the holder (#1351241). After an extended period of use or after an operation, always return the IR remote control to its charger to make sure it will be ready for later use.

5.2.1 IR remote control charging



CAUTION
Risk of material damage!

Use only original Trumpf Medical rechargeable batteries to replace a defective battery. Please contact the Technical Customer Service of Trumpf Medical.

To charge the IR remote control, use only the charger designed to go with the MARS remote control made by Trumpf Medical.



WARNING
Risk of personal injury!

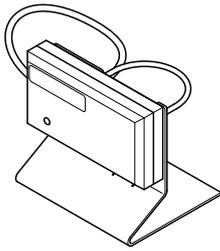
All charger versions must be used outside of explosive areas.



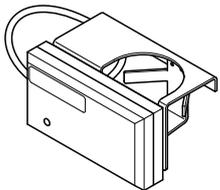
CAUTION
Risk of material damage! Note the mains voltage.

Connect the charger only to the voltage indicated on the rating plate (on the back side).

The charger comes in different designs with different supply voltages.



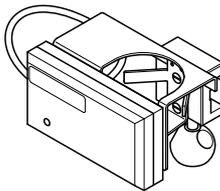
1. **Mobile charger** (desktop charger)
The charger is connected to power via the mains cable.



2. **Wall charger**
The charger is mounted to the wall and connected to the mains.

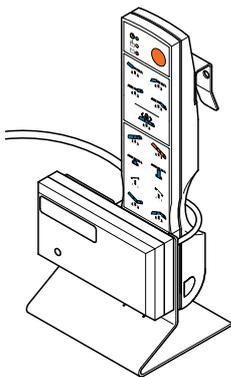


3. **Panel-installed charger**
The charger is mounted the central operating panel and has a plugless connection to a switchable 24 V (AC/DC) supply.



4. **IR DVE charger**
The charger is mounted on a standard rail of the ceiling supply unit and connected to mains power.

Chargers require no maintenance.

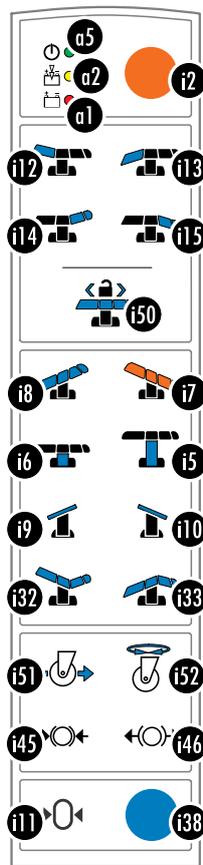


The charger is ready for use as soon as it is plugged into a mains socket. When using the charging device in the wall control panel, the wall control panel must first be switched on at the mains power switch. The charger's green LED shows the charge readiness. Charging begins as soon as the remote control is placed onto its dock on top of the charger. When batteries are completely empty, recharging takes up to 8 hours approximately. Charging takes place without contact (inductive). The chargers do not have any control elements.

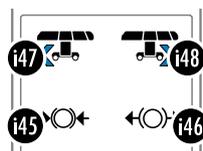
5.2.2 Overview

The remote control user interface consists of keys. The function of each key is identified by a corresponding pictogram. For keys with dual functions, the second function is not depicted on the pictogram. The second function can be selected by pressing the shift key along with the corresponding function key (two-key operation).

MARS 2 BE



MARS 2 FA



Key:

- [a 1] Battery state ^{*1}
- [a2] Battery charging of IR remote control
- [a5] Ready for service

- [i2] Turn off the operating table
- [i5] Raise
- [i6] Lower
- [i7] Trendelenburg
- [i8] Anti-Trendelenburg
- [i9] Tilt left
- [i10] Tilt right
- [i11] Zero position
- [i12] Raise leg section joints
- [i13] Lower leg section joints
- [i14] Raise lower back section joints
- [i15] Lower lower back section joints
- [i32] Reflex (lower back section joints)
- [i38]+[i32] Reflex (leg section joints)
- [i33] Flex (lower back section joints)
- [i38]+[i33] Flex (leg section joints)
- [i38] Shift key
- [i45] Jacking up operating table ^{*2}
- [i46] Jacking down operating table ^{*2}
- [i47] Drive, foot end ^{*3}
- [i48] Drive, head end ^{*3}
- [i50] Release longitudinal displacement ^{*4}
- [i51] Directional travel ^{*5}
- [i52] Freewheel ^{*5}

^{*1} IR remote control: Battery state of IR remote control

Cable remote control: Battery state of operating table column

^{*2} not MARS 2.01/2.02 operating table

^{*3} MARS 2.04/2.06 operating table only

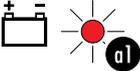
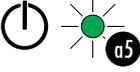
^{*4} not MARS 2.01 operating table

^{*5} MARS 2.03/2.05 operating table only

To adjust the operating table, press the function key until the desired position is reached. The function stops when the key is released. When the operating table is turned on, any function selected is executed immediately.

	CAUTION Hazard to patient if remote control is used improperly!
<p>Depending on the model, using the keypad improperly may damage a key. A mechanically defective key can spontaneously trigger the corresponding operating table function on a continual basis. If damage to a key is suspected, immediately discontinue use of the remote control! If damage to a key was not noticed and the table moves unintentionally, this incorrect movement can be stopped by doing the following:</p> <ul style="list-style-type: none"> • Press any two keys simultaneously on the remote control or • Press any one key on the column keypad <p>Hold down the selected key while simultaneously removing the defective remote control from the reception range of the operating table. Package up the defective remote control securely and send it back to TRUMPF Medizin Systeme GmbH + Co. KG in Saalfeld, Germany.</p>	

5.2.3 Visual displays

Display	State	Colour	Meaning on cable remote control	Meaning on IR remote control
<i>BATTERY STATE [a1]</i>				
	Illuminated when key is pressed	Red	-	IR remote control battery is already 70 % empty. IR remote control batteries require recharging. Place IR remote control in charger.
	Illuminated	Red	Column batteries require recharging. Connect the operating table to an external power supply (cable).	IR remote control battery is nearly empty. Use the cable remote control or the column keypad to use the operating table. Place IR remote control in charger.
<i>BATTERY CHARGING [a2]</i>				
	Illuminated	Yellow	-	The IR remote control batteries are being recharged.
<i>READY FOR USE [a5]</i>				
	Illuminated	Yellow	Key function displays	

5.3 Malfunction due to other devices

Portable and mobile HF communications equipment may affect the medical device.

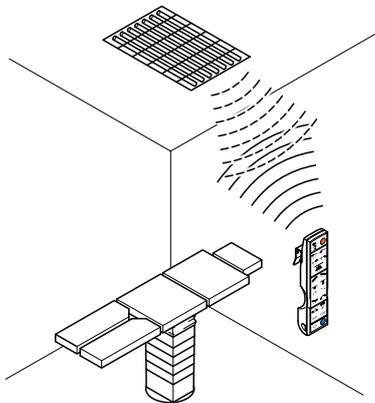
When operating the operating table with the IR remote control, the connection can be affected by other devices in the room.



WARNING

Hazard to the patient due to malfunctioning of the operating table!

It is possible that other medical or non-medical equipment in the room may use the same frequency range as the operating table or the IR remote control. This may enable the devices to cause a malfunction of the operating table. Note the operating frequencies of the various devices.



Examples of possible sources of interference:

- Lights with electronic ballast
- Electrosurgical devices
- Remote control for other devices (e.g., monitors)
- Very bright indoor lighting

6 Power Supply



DANGER
Danger to life due to electric shock!

Do not use any electrical cables indicating that they have been crushed or the insulation is damaged.

If you have any reservations about the power supply or potential equalisation cables, replace these cables immediately.

The electronics monitor the power supply and the charged state of the operating table batteries.

The following are monitored:

- Battery charge level (of the rechargeable batteries)
- Mains power supply
- The charging current for the batteries



CAUTION
Risk of material damage!

Before removing the operating table from service for a considerable amount of time, you must remove the batteries from the running gear. Only technical customer service or trained personnel may remove the batteries.

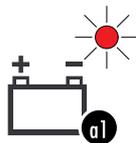
6.1 Internal power supply

Two maintenance-free sealed lead-acid batteries supply the table with internal power. Use of the electrical functions of the operating table is guaranteed for approx. one hour (cumulative total of all electrical function movements) when the battery set is fully charged.



CAUTION
Hazard to the patient!

Electrical motorised functions are blocked when batteries are empty or severely depleted. Connect the external power supply.



Pay attention to the *BATTERY STATE* [a 1] display on the column keypad (see page 29)! Column battery state is OK when the display is not illuminated. When red, the operating table batteries need to be recharged. A flashing red display means that batteries are empty and the operating table will soon shut down.

6.2 External (mains) power supply

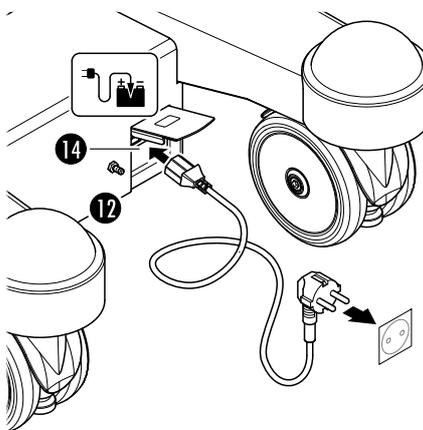
Mains power in the room provides external power for the operating table. With mains connection, use of the electrical operating table functions is unlimited.



WARNING

Risk of explosion in conjunction with combustible mixtures of anaesthetics with air.

Maintain the following steps for connecting and disconnecting the external power supply.



Connecting

1. Flip up the cover of the connector socket [14] on the running gear [12] and insert the power plug into the socket [14]. The connection point is marked with a symbol for mains connection.



CAUTION

Hazard to the patient!

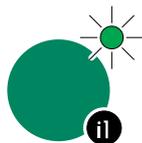
Note the mains voltage. Only connect the operating table to the voltage indicated on the rating plate.

Do not use extension cables. Extensions exceed the permissible values for the patient leakage current. Only use the mains power cables provided.

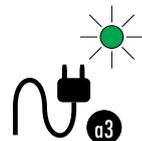
- 2.

Insert the power cable plug in an earthed wall socket outside the area where combustible mixtures of anaesthetics and air can occur.

3. If the operating table was switched off, it is automatically turned on and *READY FOR USE* [i1] is displayed on the column keypad. The operating table is ready for use.



4. Check whether there is a connection to the external power supply. The *EXTERNAL POWER SUPPLY* [a3] display must be illuminated on the column keypad.



Disconnecting



CAUTION

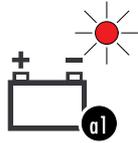
Risk of personal injury!

While disconnecting from the mains power supply, do not make any electrical motorised adjustments on the operating table.

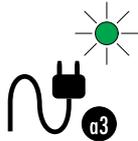
1. Remove the mains power plug from the earthed wall socket. The *EXTERNAL POWER SUPPLY* [a3] display on the column keypad will disappear.

2. Disconnect the mains cable from the connector socket [14] located on the running gear [12].

6.3 Charging the operating table



Pay attention to the *BATTERY STATE* [a1] display on the column keypad. When illuminated red (see page 29), the operating table batteries need to be recharged.



1. Connect the operating table to an external power supply (see page 37).

The *BATTERY STATE* [a1], *BATTERY CHARGING* [a2] and *EXTERNAL POWER SUPPLY* [a3] displays on the column keypad are illuminated.

2. The batteries in the operating table running gear are being recharged. Recharging batteries that are completely empty takes approximately 8 hours.

Pay attention to the *BATTERY CHARGING* [a2] display on the column keypad. Charging is complete when the display flashes. When charging is complete, the charging current is reduced to a level that is not harmful to the batteries. The *BATTERY STATE* [a1] display on the column keypad is off.

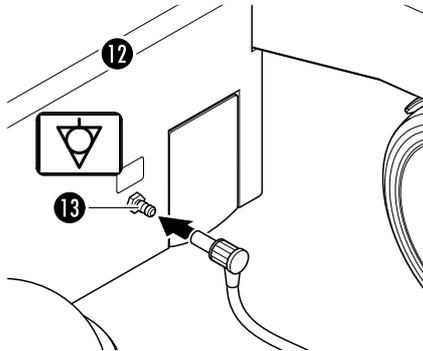


NOTE

Charge the batteries overnight so they are always ready for service.

3. Disconnect the operating table from the external power supply when needed (see page 37). The *BATTERY CHARGING* [a2] and *EXTERNAL POWER SUPPLY* [a3] will disappear on the column keypad.

6.4 Ready for use (power on)



1. Create potential equalisation:



DANGER
Risk of death due to electric shock!

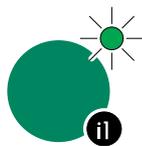
Use the operating table only with a connected equipotential bonding conductor. This applies to operation via the internal batteries as well.

Connect potential equalisation cable to the potential connection (pin) [13] on the running gear [12] and connect to the potential equalisation in the operating room. The connection point on the running gear is marked with a symbol for the equipotential bonding conductor connection.



CAUTION
Risk of personal injury!

Personnel may stumble over the mains connection cables and equipotential bonding conductors. Do not crush or roll over cables.



2. Turning on the operating table:

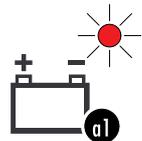
Press the green ON [i1] key on the column keypad. *READY FOR USE* [i1] appears on the display, and after a few seconds an audible signal is heard. The operating table is ready only after the signal is emitted. *READY FOR USE* [i1] remains illuminated while the operating table is on.

When connected to an external power supply, the operating table is already turned on



NOTE

Pay attention to the *BATTERY STATE* [a1] display on the column keypad. If illuminated or flashing red, battery charging is required.



6.5 Shutdown

When connected to an external power supply, the operating table is always turned on. The operating table can be turned off only with battery-powered use (internal power supply).



12 hours after the last key was pressed on a control unit, the operating table will shutdown to conserve battery power. If you wish to shut down the operating table immediately, hold down the orange *OFF* [i2] key on the remote control for **more than 2 seconds**.

7 Coupling Points

7.1 Definition

All operating table tops, section segments and accessory parts by Trumpf Medical have coupling points from the fastening system developed by Trumpf Medical. The coupling point is a separable connection site between the operating table top and additional equipment. The different coupling versions allow the operating table to be assembled individually and with mechanical safety.

The coupling points ensure

- Easy assembly/disassembly
- Reliable and play-free connections
- Different operating table configurations

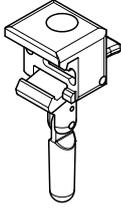
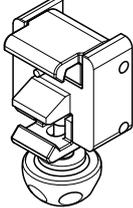
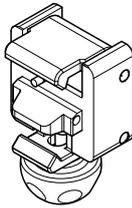
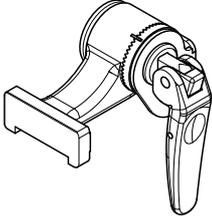
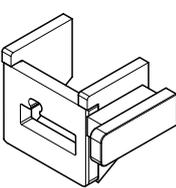
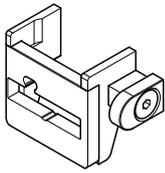


CAUTION

Risk of injury due to improper attachment!

Always ensure that the coupled parts are securely fastened to the operating table. Check the connection before each use. Never couple or uncouple more than one component at a time. The coupling and decoupling of accessory parts is described in the respective instruction manuals.

7.2 Basic types of Trumpf Medical coupling points

Clamp		
		
Single clamp	Narrow double clamp	Wide double clamp
Support		
		
Single rail	Double rail, narrow	Double rail, wide

7.3 Trumpf Medical coupling versions

Each product instruction manual states the type of coupling point used.

Clamp	Support					
	Single rail	Single rail ^{plus}	Double rail ^{minus} narrow	Double rail narrow	Double rail ^{plus} narrow	Double rail wide
Single clamp (e. g. head section)	x	x	x	x	x	x
Single clamp ^{plus} (e. g. table top segment 130)		x		x	x	x
Narrow double clamp ^{minus} (pair) (e. g. one-piece lightweight leg section)			x	x	x	x
Double clamp, narrow (single) (e. g. leg sections)			x	x	x	x
Narrow double clamp (pair) (e. g. upper back section)				x	x	x
Narrow double clamp ^{plus} (e. g. LegMaster)					x	x
Wide double clamp (e. g. seat section extension)						x

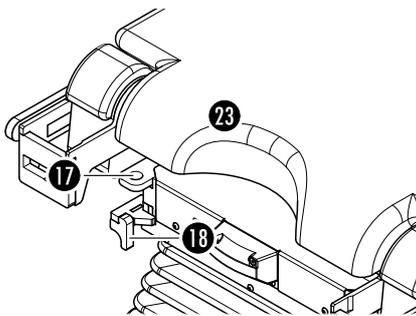
7.4 Coupling points on the operating table top

Operating table type	Head end	Foot end
MARS 2.01	Mechanical joint with a narrow double rail coupling point (Typically, the upper back section is attached to the back section.)	Motorised joint with a wide double rail coupling point (Typically, two-piece leg sections or a seat section extension are attached to the seat section.)
MARS 2.02/2.03/ 2.04/2.05/2.06	Mechanical joint with a narrow double rail coupling point (Typically, the upper back section is attached to the back section.)	<ul style="list-style-type: none"> - Motorised joint with a wide double rail coupling point (Typically, two-piece leg sections or a seat section extension are attached to the seat section.) - Support for the extension adapter (see page 43)

7.4.1 Standard rails

Standard rails for attaching accessories with single clamp are located on the side of the resting surface.

7.4.2 Support for the extension adapter (not MARS 2.01 operating table)



The operating table can be converted to an extension table with the aid of an extension adapter and accessories. Table top longitudinal displacement must be in the end position at the head end. The extension adapter is suspended in the insert openings [17] (foot end underneath the seat section [23]) and is fastened to the operating table via a bayonet lock [18].

When the extension adapter is installed, the longitudinal displacement function of the operating table is locked/blocked. Comply the relevant instruction manuals for using the extension unit properly and safely.

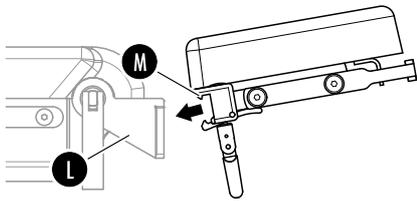
7.5 Attaching and removing components and accessories

Comply with the instruction manual the product used when attaching and removing components and accessories with clamps. The following descriptions assume one-piece components (closed section segments).

7.5.1 Single clamp

The head section (closed section segment) is a typical component with a single clamp. The upper claw of the single clamp is fixed.

Attaching



1. Loosen the right and left locking handle on the clamps. The clamps open.
2. Hook the component using the claws [M], diagonally from above into the coupling point [L] (wide/narrow double rail or single rail) of the operating table top.
3. Tighten the right and left locking handle on the clamps. The clamps close.

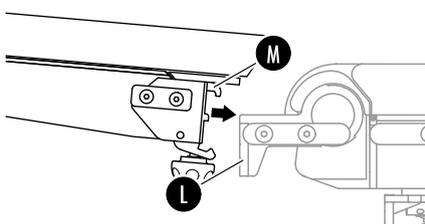
Removing

1. Loosen the right and left locking handle on the clamps. The clamps open.
2. Tip the component slightly upward and pull it diagonally out of the coupling point (wide/narrow double rail or single rail) of the operating table top.

7.5.2 Double clamp with fixed upper claw

The one-piece carbon table top segment (closed section segment) is a typical component with wide/narrow double clamps and fixed upper claw.

Attaching



1. Loosen the right and left locking knob on the clamps. The clamps open.
2. Hook the component using the claws [M], diagonally from above into the coupling point [L] (wide/narrow double rail) of the operating table top.
3. Tighten the right and left locking knob on the clamps. The clamps close.

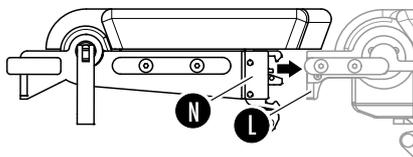
Removing

1. Loosen the right and left locking knob on the clamps. The clamps open.
2. Tip the component slightly upward and pull it diagonally out of the coupling point (wide/narrow double rail) of the operating table top.

7.5.3 Double clamp with movable upper claw

The seat section extension (closed section segment) is a typical component with wide/narrow double clamps and movable upper claw.

Attaching



1. Loosen the right and left locking knob on the clamps. The clamps open.
2. Hold the component straight and use the double clamps [N] to press the coupling points [L] (wide/narrow double rail) of the operating table top until both coupling points lock in each other.
3. Tighten the right and left locking knob on the clamps. The clamps close.

Removing

1. Loosen the right and left locking knob on the clamps. The clamps open.
2. Push both locking knobs upward, at the same time tilt the component upward slightly and remove it from the coupling point (wide/narrow double rail) of the operating table top.

8 Radiolucence

The table top is fully radiolucent between the arms. The column area is radiopaque. Avoid any pad creasing for a minimally artifactual X-ray.

9 Patient Positioning

 **CAUTION**
Hazard to the patient!

Extremities must not overhang the ends.

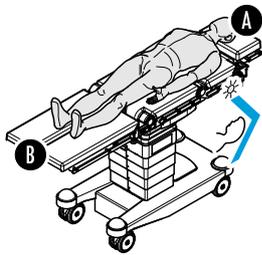
Improper weight distribution can break the section segments off the operating table or cause the operating table to tip over. Do not climb onto or down from the operating table over the section segments. Patients may only get on or off in the column area via the seat section. Do not sit on the section segments!

Cover the operating table with sterile material before use.

The head position of the patient must match the display on the column keypad. See chapter 11.1 on page 60.

NORMAL position:

The patient's head lies at the head end of the table top.

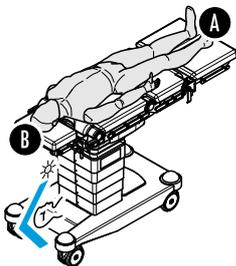


[A] Head end

[B] Foot end

INVERS position:

For certain positions, it is possible to design the operating theatre table inversely. This means that the patient lies the other way round on the operating theatre table top (with the head on the foot end).



[A] Head end

[B] Foot end

10 Load Capacity



WARNING

Personal injury and material damage are possible when permissible loads are exceeded.

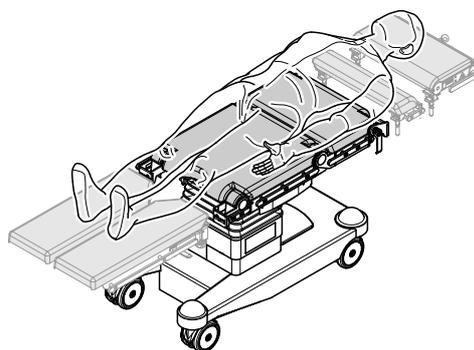
The operating table may tip over when overloaded. In general, overloading the operating table can lead to a failure in electrical functions and cause material damage to mechanical parts. Do not exceed the limits stated.

The maximum operating table load (operating table column with operating table top plus connected section segments) may be achieved only when complying with the conditions presented. The load consists of the weight of the patient and the net weight of the accessories attached to the operating table. Refer to the corresponding instruction manual for the tare weight of the accessory used. Irrespective of the maximum operating table load, do not exceed the loading capacity of the individual section segments and accessories. The limits can be found in the relevant instruction manuals.

The values stated are valid for an evenly loaded operating table top (surface), including accessories.

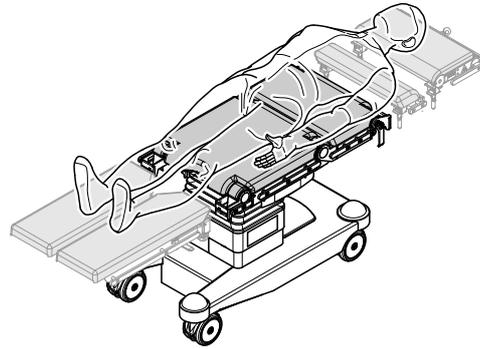
Before transporting the operating table, fold up or remove the accessories.

10.1 Conditions for using the operating table at loads of up to 450 kg



1. Operating table equipment, at head end:
At maximum, 130 table top segment with 530 head section, double-jointed
2. Operating table equipment, at foot end:
Leg sections
(except for the lightweight leg section (all types), two-piece long leg section and LegMaster)
3. Place the patient in the *NORMAL* position on the table top
The patient's head is at the head end
4. The operating table functions of longitudinal travel, Anti-/Trendelenburg and tilt must be in the zero position. The lift position can be selected as desired and adjusted.

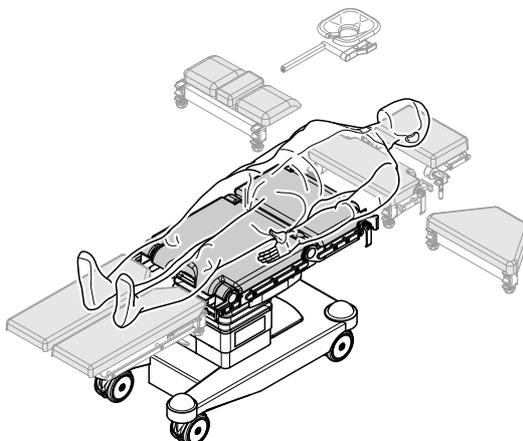
10.2 Conditions for using the operating table at loads of up to 360 kg



1. Operating table equipment, at head end:
At maximum, 130 table top segment with 530 head section, double-jointed
2. Operating table equipment, at foot end:
Leg sections
(except for the lightweight leg section (all types), two-piece long leg section and LegMaster)
3. Place the patient in the *NORMAL* position on the table top
The patient's head is at the head end
4. Table top longitudinal displacement permitted only in the foot-end longitudinal displacement range

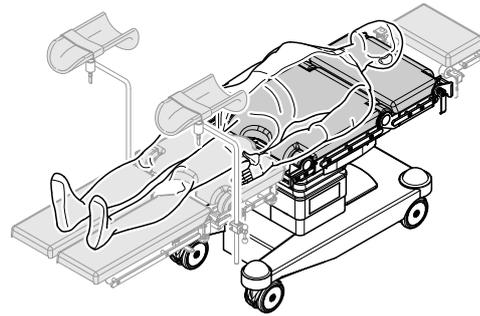
10.3 Conditions for using the operating table at loads of up to 225 kg

Variant 1



1. Operating table equipment, at head end:
 - a) At maximum, the upper back section with head section
 - b) At maximum, the upper back section with shoulder adapter and the respective head positioning accessory
 - c) At maximum, the upper back section with ophthalmology adapter and the respective head positioning accessory
2. Operating table equipment, at foot end:
leg sections
(except for the lightweight leg section (all types), two-piece long leg section and LegMaster)
3. Place the patient in the *NORMAL* position on the table top
The patient's head is at the head end
4. Any table top longitudinal displacement allowed

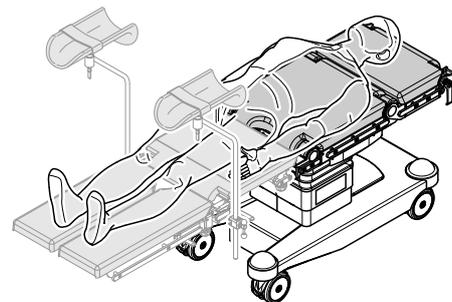
Variant 2



1. Operating table equipment, at head end:
With head section, if needed
2. Operating table equipment, at foot end:
 - a) At maximum, seat section extension, long with leg sections (except for the lightweight leg section (all types), two-piece long leg section and LegMaster)
 - b) At maximum, seat section extension, long with Goepel leg supports
3. Place the patient in the *NORMAL* position on the table top
The patient's head is at the head end
4. Any table top longitudinal displacement allowed

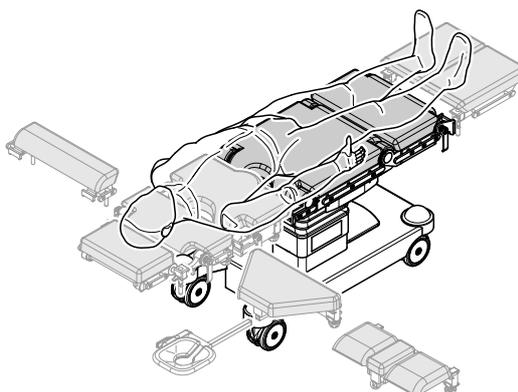
10.4 Conditions for using the operating table at loads of up to 160 kg

Variant 1

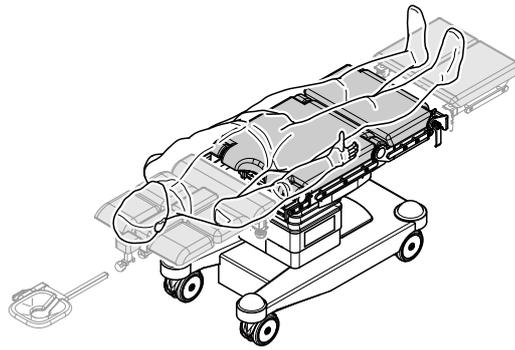


1. Operating table equipment, at head end:
No coupling required
2. Operating table equipment, at foot end:
 - a) Carbon 450 table top segment with leg section (except for the lightweight leg section (all types), two-piece long leg section and LegMaster)
 - b) Carbon 450 table top segment with Goepel leg supports
3. Place the patient in the *NORMAL* position on the table top
The patient's head is at the head end
4. Any table top longitudinal displacement allowed

Variant 2



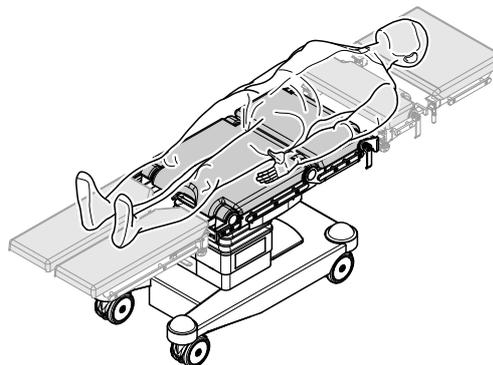
1. Operating table equipment, at head end:
Leg sections
(except for the lightweight leg section (all types), two-piece long leg section and LegMaster)
2. Operating table equipment, at foot end:
 - a) At maximum, seat section extension with upper back section and head section
 - b) At maximum, seat section extension with 130 table top segment and head section
 - c) At maximum, seat section extension with shoulder adapter and the respective head positioning accessory
 - d) At maximum, seat section extension with ophthalmology adapter and the respective head positioning accessory
3. Place the patient in the *INVERS* position on the table top
The patient's head is at the foot end
4. Any table top longitudinal displacement allowed

Variant 3

1. Operating table equipment, at head end:
Leg sections
(except for the lightweight leg section (all types), two-piece long leg section and LegMaster)
2. Operating table equipment, at foot end:
Shoulder segment with the respective head positioning accessory
3. Place the patient in the *INVERS* position on the table top
The patient's head is at the foot end
4. Any table top longitudinal displacement allowed

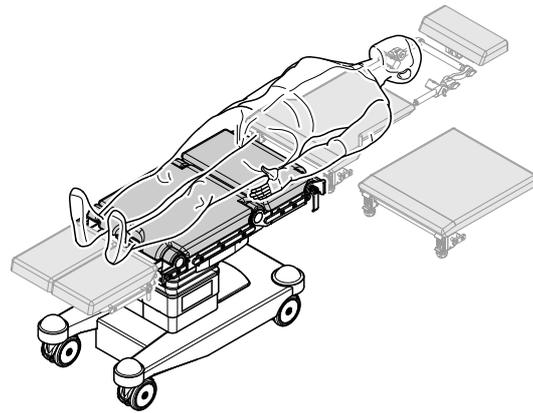
10.5 Conditions for using the operating table at loads of up to 135 kg

Variant 1



1. Operating table equipment, at head end:
At maximum, upper back section with one-piece short leg section
2. Operating table equipment, at foot end:
Leg sections
(except for the lightweight leg section (all types), two-piece long leg section and LegMaster)
3. Place the patient in the *NORMAL* position on the table top
The patient's head is at the head end
4. Any table top longitudinal displacement allowed

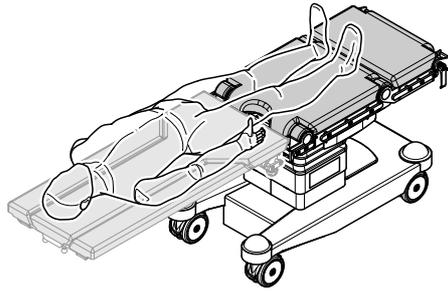
Variant 2



1. Operating table equipment, at head end:
 - a) Carbon 600 table top segment with X-RAY adapter and X-RAY head positioning accessory ^{*1}
 - b) Carbon narrow table top segment with X-RAY adapter and X-RAY head positioning accessory X-RAY ^{*1}
2. Operating table equipment, at foot end:
 Leg sections
 (except for the lightweight leg section (all types), two-piece long leg section and LegMaster)
3. Place the patient in the *NORMAL* position on the table top
 The patient's head is at the head end
4. Any table top longitudinal displacement allowed

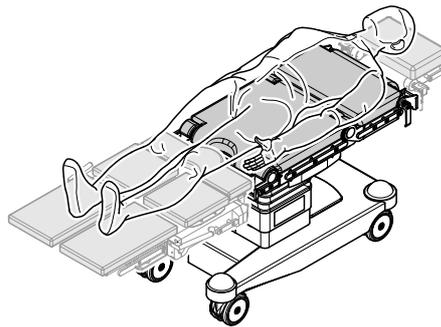
^{*1} **WARNING! Take care when adjusting head positioning accessory. Risk of tipping over!** Do not pull the adapter too far out of the couplings. The maximum distance between the butterfly screw (lengthwise pullout) to the centre of gravity of the patient's head is 200 mm (see the pictogram on the crossbrace of the carbon resting surface between the coupling points). There is no additional protective function.

Variant 3



1. Operating table equipment, at head end:
No coupling required
2. Operating table equipment, at foot end:
Carbon table top segment, three-piece
3. Place the patient in the *INVERS* or *NORMAL* position on the table top
The patient's head is at the foot or head end
4. Any table top longitudinal displacement allowed

Variant 4



1. Operating table equipment, at head end:
With head section, if needed
2. Operating table equipment, at foot end:
LegMaster
3. Place the patient in the *NORMAL* position on the table top
The patient's head is at the head end
4. Any table top longitudinal displacement allowed

10.6 Standard rails



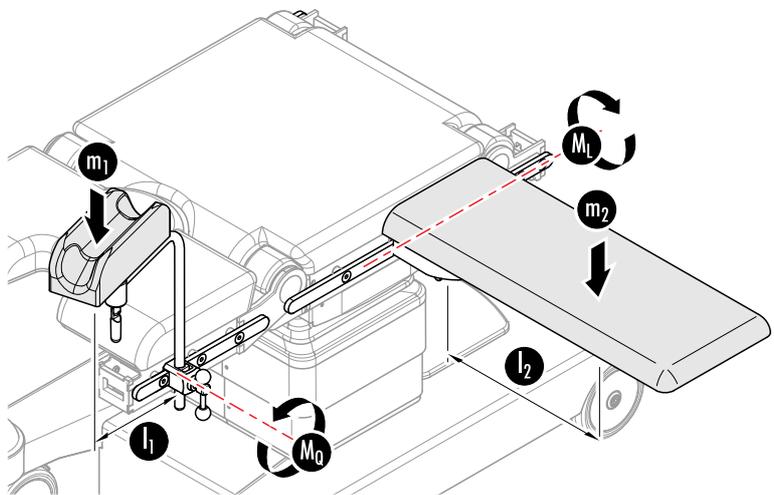
WARNING

Risk of physical injury due to the operating table tipping over.

Irrespective of the permissible loads of the individual standard rails, the total moment on one side around the longitudinal axis of the operating table must not exceed **100 Nm** during proper use.

The maximum torque allowed on the standard rail of the operating table top is **100 Nm** around the longitudinal and cross-axes.

A torque works as soon as an accessory is coupled to the standard rail.



[l_1]	Distance from the coupling position until the impact of power (in meters)	[l_2]	Distance from the coupling position until the impact of power (in meters)
[M_Q]	Torque around the cross-axis (in Newton meters)	[M_L]	Torque around the longitudinal-axis (in Newton meters)
[m_1]	Dead weight of the accessory + weight placed (in kilograms)	[m_2]	Dead weight of the accessory + weight placed (in kilograms)

Refer to the corresponding instruction manual for the tare weight of the accessory used.

That torque working on the standard rail can be calculated approximately with the following rule of thumb:

$$M = m \times l \times 10$$

In the following table the torque is calculated depending on the weight and distance for some standard situations.

General calculation matrix:

Weight [m]	Distance [l]				
	10 cm	20 cm	30 cm	40 cm	50 cm
10 kg	10 Nm	20 Nm	30 Nm	40 Nm	50 Nm
20 kg	20 Nm	40 Nm	60 Nm	80 Nm	100 Nm
30 kg	30 Nm	60 Nm	90 Nm	120 Nm	150 Nm
40 kg	40 Nm	80 Nm	120 Nm	160 Nm	200 Nm
50 kg	50 Nm	100 Nm	150 Nm	200 Nm	250 Nm

11 Function Description



DANGER
Danger to life due to electric shock!

Check the potential connection for the mobile operating table column. Use the operating table only with a connected potential equalisation cable. The potential connection on the operating table column must be connected to the equipotential conductor in the operating theatre.



WARNING
Risk of explosion in conjunction with combustible mixtures of anaesthetics with air.

Prevent electrostatic charges!

Use only anti-static pads on the operating table on anti-static flooring.



CAUTION
Hazard to the patient! Risk of jamming and collision!

Watch all motorised movements of the operating table carefully right up until the end position. If the operating table is fully equipped, not all of the coupled parts are detected by the electronics. Collisions cannot be ruled out entirely and must be prevented by aborting the function. Closely monitor all accessories attached in the column area when adjusting the table position.

The seat and back section form a single unit and can be adjusted by the control units. They have coupling points for additional components.

Before use, turn the operating table on and brake/jack up.

Secure the patient before adjusting the operating table and provide active support during adjustments. The head position of the patient must match the display on the column keypad. Set the head position at the column keypad.

To adjust the operating table, the corresponding function key(s) on the control unit has to be pressed until the desired position is reached. The function stops when the key(s) is released, or the zero position or the final position is reached. For further adjustment beyond the zero position, briefly release the function key(s) and press it again.

11.1 Selecting the head position



NOTE

The head position of the patient must match the display on the column keypad.



The operating table top can be set up in the "inverse" direction for certain patient positions where the patient needs to be lying at the other end of the operating table top (with head at the foot end). The column keypad displays no longer match the patient's head position. Some operating table functions (e. g., Trendelenburg, tilting) are then reversed. In such cases, you must manually switch the head position using the *HEAD POSITION LEFT* [i3] key to reflect the actual head position. The appropriate display will then be illuminated. After you have changed the head position, table movements will be executed correctly. Switching the operating table off and back on again always restores the *NORMAL* position setting, and the *HEAD POSITION RIGHT* [i4] display is illuminated.

11.2 Zero position

Approaching the zero position means that the electrically adjusted joints on the operating table automatically return to their defined starting positions (a neutral position), one after the other.

- Any adjusted motorised table top joints are returned to the horizontal position.
- A Trendelenburg or anti-Trendelenburg position is returned to the horizontal.
- A tilted position is returned to the horizontal.

Adjustment



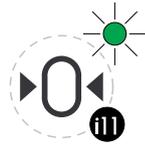
CAUTION Hazard to the patient!

Monitor the patient's position. When approaching the zero position, inclined patient positions may become steeper than they were before the movement commenced!

1. Adjust the spreadable leg sections so that they are not on top of one another. Position accessories to prevent collisions when approaching the zero position.
2. Approach the zero position by pressing the following keys:

Column keypad ^{*1}	Remote control
Zero position	
	

^{*1} Two-key operation



- When the final zero position is reached, an audible signal is emitted and the *ZERO POSITION* [i 1 1] display is illuminated on the column keypad.
- Manually place the section segments of the mechanically adjustable joints in the zero position (horizontal position, line markings on gearing line up).

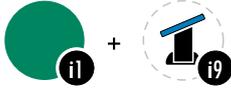
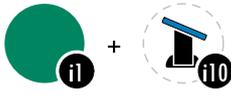
11.3 Tilt

When tilted, the table top is inclined to the left or right along its longitudinal axis. The range of adjustment is $\pm 25^\circ$.

In cases of more extreme Anti-/Trendelenburg positions, the tilting range will be limited. To enlarge the degree of tilting, reduce the Anti-/Trendelenburg position of the table top.

For the lower lifting range (the last 10 cm), tilting is even more limited with regard to the Anti-/Trendelenburg position.

Pressing the following keys assumes the tilt position:

Column keypad ^{*1}	Remote control
Tilt left	
	
Tilt right	
	

^{*1} Two-key operation

 NOTE
The tilt functions are only active with the operating table jacked up.

11.4 Anti-Trendelenburg/Trendelenburg

With the Anti-/Trendelenburg function, the table top is tilted in the head or foot direction along its transverse axis. The range of adjustment is 30° ¹⁾/25° ²⁾ for Trendelenburg and 35° Anti-Trendelenburg. When using the *INVERS* position (meaning the head has been oriented in the *HEAD POSITION LEFT*), the two ranges of adjustment are reversed accordingly.

For more extreme tilting, the Anti-/Trendelenburg range is limited. To enlarge the degree of the Anti-/Trendelenburg position, reduce the table top tilting.

When in the lower lifting range (the last 10 cm), the Anti-/Trendelenburg position limitations are even more dependent on the degree of tilting.

	<p>CAUTION Hazard to the patient! Risk of collision!</p>
<p>When tilting the table top, collisions may occur with the column, the floor, furnishings or devices beneath the table top and possibly covered by draping. Carefully monitor its movement and stop the function before lowering the table top. Clear the area beneath the table top, move table top to a higher lift position, or raise the corresponding section segments (leg/back section joints). Try moving it into the desired Trendelenburg position again.</p>	

Pressing the following keys assumes the Anti-/Trendelenburg position:

Column keypad ^{*1}	Remote control
Trendelenburg	
	
Anti-Trendelenburg	
	

^{*1} Two-key operation

¹⁾ MARS 2.01/2.02/2.03/2.04 operating table
²⁾ MARS 2.05/2.06 operating table

11.5 Lifting mechanism

The lift function allows you to raise or lower the entire table top. The range of adjustment is 420 mm ¹⁾/350 mm ²⁾.

When combining more extreme Trendelenburg/anti-Trendelenburg and tilt positions, the table cannot be lowered entirely. Reduce the degree of the Anti-/Trendelenburg or tilting position as you reach the lower range for table lifting (the last 10 cm).



CAUTION

Hazard to the patient! Risk of collision!

Clear the area beneath the table top before lowering the table top. Especially with the LOWER function, collisions may occur with furnishings or devices beneath the table top and possibly covered by draping.

When leg sections are positioned downward, collision with the floor or running gear is possible when lowering the table top. Carefully watch the movement and stop the function before a collision occurs. If necessary, move the leg sections upwards and then continue to lower the table top.

Pressing the following keys assumes the lifted position:

Column keypad ^{*1}	Remote control
Raise	
Lower	

^{*1} Two-key operation

1) MARS 2.01/2.02/2.03/2.04 operating table
2) MARS 2.05/2.06 operating table

11.6 Longitudinal displacement (not MARS 2.01 operating table)

	CAUTION Hazard to the patient due to uncontrolled motion.
<p>Spontaneous movement of the table top after using the <i>RELEASE LONGITUDINAL DISPLACEMENT</i> button is possible. Prior to any adjustment, securely hold the table top by the standard side rails and actively support the patient. Do not use the longitudinal displacement when the operating table top is at an angle in the Trendelenburg/Anti-Trendelenburg direction.</p> <p>All repositioning must be performed in a controlled and responsible manner.</p>	

	CAUTION Risk to the patient due to collisions.
<p>Sliding the table top can cause accessories mounted to the standard rails to collide with the column, presenting a risk to the patient. Advance the table top only as far as it will go without any collisions. Remove accessories if needed.</p>	

With longitudinal displacement, the table top is manually moved toward the foot or head end. The range of adjustment is 270 mm. The increments are limited by the gearing. With the table top at an incline of more than 1° in an Trendelenburg/anti-Trendelenburg position, longitudinal displacement is blocked. Reduce the table top incline to make further adjustments.

When the *RELEASE LONGITUDINAL DISPLACEMENT* button is depressed for more than 5 seconds and there is no displacement, the longitudinal displacement feature is automatically locked.

1. Hold the table top securely and hold the following buttons depressed to release the longitudinal displacement:

Column keypad	Remote control
Release longitudinal displacement	
Function is not available	

2. The locking mechanism is released and you can slide the table top to the position you want.
3. Release the *RELEASE LONGITUDINAL DISPLACEMENT* button [i50]. The table tops locked into place.



CAUTION
Risk of material damage if gearing is jammed.

You must hear that the teeth have locked into place (and are not tooth on tooth). If needed, move the table top back and forth a little bit until it securely locks into place.

4. Check that the table top is securely attached.

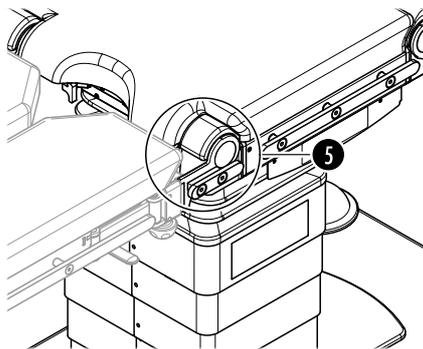
11.7 Leg section joints



CAUTION
Hazard to the patient! Risk of jamming and collision!

Pay close attention to any motorised movements. When lowering the leg section(s), especially with the lift lowered and also in the Anti-Trendelenburg position, there is a risk of collision with the column and the running gear.

Before you adjust the leg section joints, make sure that the spreadable leg sections coupled to the leg section joints are not above one another.



The two leg section joints [5] are motorised and can only be adjusted together. Use the back section functions to tilt any coupled section segments at the foot end up or down. The range of adjustment is $\pm 90^\circ$.

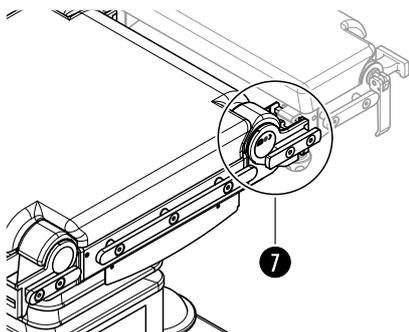
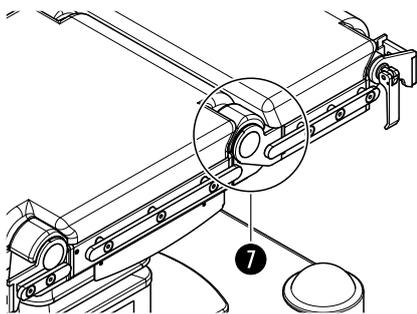
With head-end positioning of the table top, the *LEG SECTION JOINTS DOWN* function is limited to a downwards range of 35° .

Pressing the following keys assumes the leg sections position:

Column keypad ^{*1}	Remote control
Raise leg section joints	
Lower leg section joints	

^{*1} Two-key operation

11.8 Lower back section joints



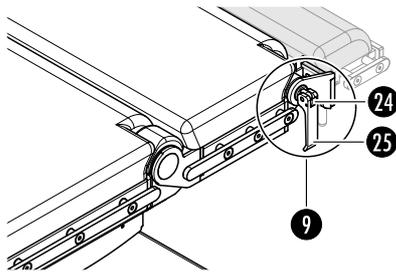
The two back section joints [7] are motorised and can only be adjusted jointly. The back section functions are used to raise or lower any coupled section segments at the head end. The range of adjustment is + 80° /- 40°.

Pressing the following keys assumes the lower back section position:

Column keypad ^{*1}	Remote control
Raise lower back section joints	
Lower lower back section joints	

^{*1} Two-key operation

11.9 Upper back section joints



You can manually tilt the upper back section joints [9] separately 90° upward or 55° downward. The angle increments are limited by the gearing. The upper back section is usually connected to the upper back section joints.



CAUTION
Risk of material damage!

If (one-piece) section segments are closed, adjust both joints on the table top to the same angle. If set at different angles, the section segment on the operating table will be crooked.

1. Press the safety lever [24] and hold.

- 2.



CAUTION
Hazard to the patient due to uncontrolled motion.

When opening the eccentric handle, the connected section segment drops down due to the patient's weight. Support the connected section segment before releasing the locking mechanism.

Securely hold the section segment and pull the eccentric handle [25] outward. If the section segments are closed, release the eccentric handle on both joints of the operating table. This opens the gearing of the joints, allowing the section segment to be tilted to the desired position. The section segment is at the same level as the table top when the gearing line markings from both parts match up.

- 3.



CAUTION
Risk of material damage if gearing is jammed.

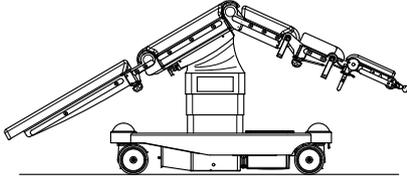
Position the joint so that when the eccentric handle is pushed inwards, the gears will lock into place (and not be tooth on tooth). If necessary, raise or lower the section segment slightly until the teeth engage and the joint safely locks into place.

Push the eccentric handle(s) [25] inward.

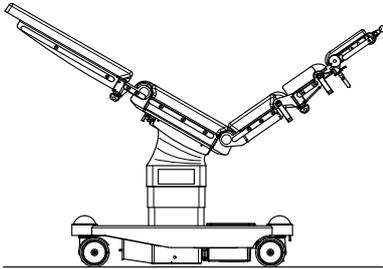
4. Check whether the safety lever [24] is engaged. If necessary, push the eccentric handle(s) inward again.
5. Check that the seat section extension is securely attached.

11.10 Flex/Reflex

The *FLEX* and *REFLEX* functions are attained by executing two functions at the same time, creating a bend between the operating table top seat and leg sections. Regardless of the longitudinal displacement, the maximum angle for the flex position is 220°, and for the reflex position 140°.



Flex: Function *ANTI-TRENDELEBURG* and *LOWER BACK SECTION JOINTS DOWN*

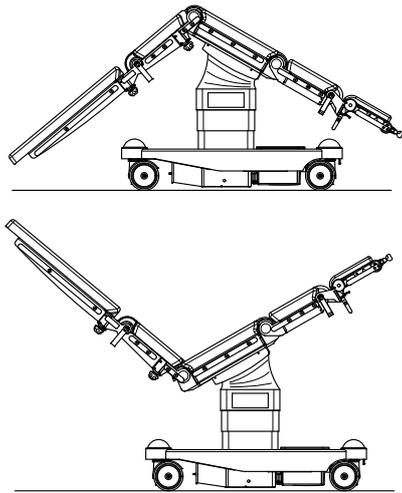


Reflex: Function *TRENDELEBURG* and *LOWER BACK SECTION JOINTS UP*

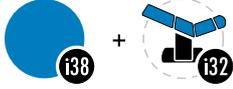
Adjustment is complete when the first final position has been reached.

The flex/reflex position can be adjusted only via the remote control. Hold down the respective function key on the remote control until the operating table is in the position you require.

Column keypad	Remote control
Flex (Lower back section joints)	
Function is not available	
Reflex (Lower back section joints)	
Function is not available	



Pushing the *SHIFT* and *FLEX/REFLEX* keys can also cause a fold between the seat and leg sections. Regardless of the longitudinal displacement, the maximum angle for the flex position is 220°, and for the reflex position 140°.

Column keypad	Remote control ^{*1}
Flex (Leg section joints)	
Function is not available	
Reflex (Leg section joints)	
Function is not available	

^{*1} Two-key operation

12 Travel Modes



WARNING

Risk of injury! Very high sliding force necessary.

Always undertake the transport of a patient weighing over 225 kg (patient weight) with at least 2 persons.

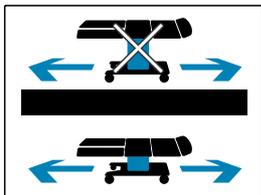
12.1 Conditions for jacking down/moving of operating table



WARNING

Risk of physical injury due to the operating table tipping over.

Jacking down and moving the operating table with the patient is permitted only when the following conditions are met.



1. The table top is to be lowered until the pictogram on the column cover is obscured.

Column keypad ^{*1}	Remote control
Lower	

^{*1} Two-key operation

2. Return any tilted position of the table top to a horizontal position.

Column keypad ^{*1}	Remote control
Tilt left	
Tilt right	

^{*1} Two-key operation



NOTE for lowering the jack and for the traction drive

When table top tilting is greater than 5°, the operating table software blocks any unlocking commands for the operating table for safety reasons.

3. Align spreadable leg sections parallel to the longitudinal direction of the operating table.
4. Fold accessories onto the operating table or remove them from the operating table.



**CAUTION
Risk of shearing off the connecting cables!**

Before moving the operating table, disconnect the power supply and equipotential bonding conductor from the operating table!

When moving the operating table, do not roll over or crush the power supply cables and equipotential bonding conductors.

12.2 MARS 2.01/2.02 operating table

The mode of travel and the brakes are set via the *TRAVEL MODE* pedal.

Use two people to move the operating table longer distances.

The pedal can assume 3 positions:



- Directional travel



- Freewheel

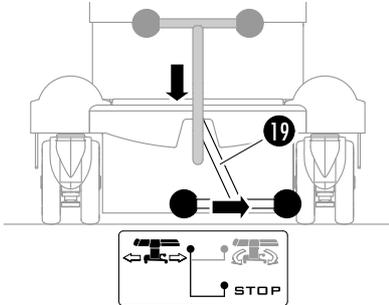
STOP

- Brake

Pay attention to the *TRAVEL MODE* pictogram located between the wheels at the foot end of the table. It shows the mode of travel.

12.2.1 Brake

The brake function prevents the operating table from rolling away. Foot plates emerge for all four wheels, which secure the operating table in place.

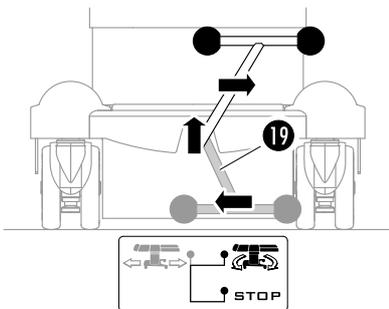


CAUTION
Risk of the brake foot crushing cables on the floor!

Do not position the operating table across or on any cabling.

Push the *TRAVEL MODE* pedal [19] downwards and let it lock into place to the right.

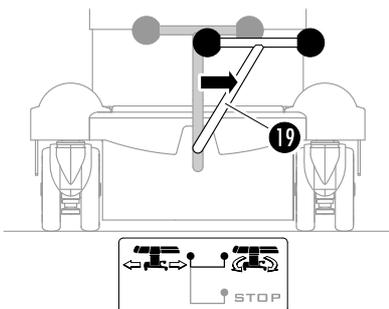
12.2.2 Freewheel



In the freewheel mode, all wheels on the operating table can swivel freely. The operating table can be pushed in any direction.

adjust from the *BRAKE* position:

1. Prepare the operating table according to the requirements on page 70.
2. Push the *TRAVEL MODE* pedal [19] lightly downwards, move to the left and release. All foot plates are retracted and the operating table will automatically switch to the *FREEWHEEL* setting.



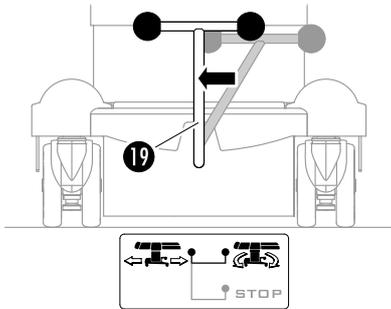
adjust from the *DIRECTIONAL TRAVEL* position:

Push the *TRAVEL MODE* pedal [19] downwards and let it lock into place upwards to the right.

12.2.3 Directional travel

With directional travel, the front right wheel is locked in the longitudinal direction. Axis rotation is not possible, nor can the operating table be moved in the transverse direction. Uni-directional steering is supported.

Steering mode can only be engaged from the *FREEWHEEL* setting.



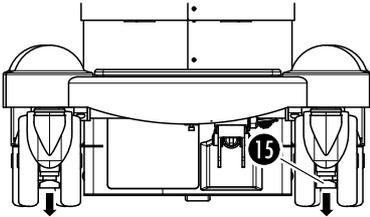
Push the *TRAVEL MODE* pedal [19] downwards slightly and let it lock into place upwards to the left.

12.3 MARS 2.03/2.04/2.05/2.06 operating table

Use the control units to set the mode of travel (freewheel, directional travel and directional travel plus drive) and the brakes.

Use two people to move the operating table longer distances.

12.3.1 Locking the operating table (brake)



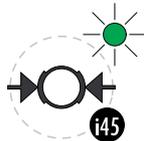
The *LOCK BRAKE* function prevents the operating table from rolling away. Foot plates [15] emerge for all four wheels, which secure the operating table in place.

	CAUTION Risk of the brake foot crushing cables on the floor!
Do not position the operating table across or on any cabling.	

To lock the operating table, push the following keys for at least 1 second:

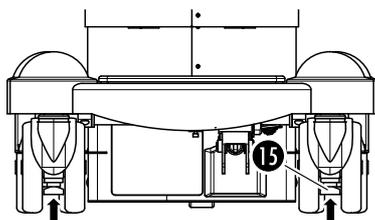
Column keypad ^{*1}	Remote control
Lock	

^{*1} Two-key operation



When locked, you will hear an audible signal and the *OPERATING TABLE LOCKED* display on the column keypad next to the *LOCK* [i45] key is illuminated.

12.3.2 Unlocking the operating table (release the brake)



Selecting the *UNLOCK* function retracts the foot plate [15] of all four operating table wheels. The operating table is once again mobile.

1. Prepare the operating table according to the requirements on page 70.
2. To unlock the operating table, push the following keys for at least 1 second:

Column keypad ^{*1}	Remote control
Unlock	

^{*1} Two-key operation

You will hear an audible signal after the table is unlocked. The operating table is in the freewheel mode (all wheels swivel).

3. The operating table can be moved manually or using the drive mode ¹⁾.

The operating table can also be unlocked with the directional travel functions (hold down for at least 1 second) and is then in directional travel mode.

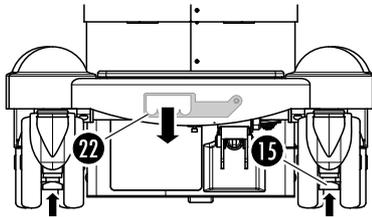
MARS 2.03/2.05 operating table	
Column keypad	Remote control
Directional travel	
Function is not available	

MARS 2.04/2.06 operating table	
Column keypad	Remote control
Drive foot end	
Function is not available	
Drive head end	
Function is not available	

¹⁾ MARS 2.04/2.06 operating table only

12.3.3 Operating table chassis emergency release (unlock)

If, after lowering the table top and setting the tilt to horizontal, a defect prevents the operating table from being jacked down by the control units, it is possible to lower the jack manually.



1. Lower the emergency release lever [22] at the head end of the chassis. All foot plates [15] are immediately retracted.
2. You can now move the operating table.
3. Contact Technical Customer Service at TRUMPF Medizin Systeme GmbH + Co. KG in Saalfeld, Germany.

If the emergency release was accidentally used, the release can be reversed.

To return to the original condition (emergency release re-engaged) press the following key(s) on a control unit until the lever audibly engages in the chassis:

Column keypad ^{*1}	Remote control
Unlock	

^{*1} Two-key operation

12.3.4 Freewheel

In the freewheel mode, all wheels on the operating table can swivel freely. The operating table can be pushed in any direction.

adjust from the OPERATING TABLE LOCKED position:

1. Prepare the operating table according to the requirements on page 70.
2. To activate the freewheel push the following keys for at least 1 second:

Column keypad ^{*1}	Remote control
Unlock	

^{*1} Two-key operation

The brake feet on all four wheels of the chassis are retracted. After completing the process an audible signal sounds.

adjust from the *DIRECTIONAL TRAVEL* position:

To activate the freewheel push the following keys for at least 1 second:

MARS 2.03/2.05 operating table

Column keypad	Remote control
Freewheel	
Function is not available	

The lock on the front right wheel of the trolley is released.

MARS 2.04/2.06 operating table

Column keypad ^{*1}	Remote control
Unlock	
	

^{*1} Two-key operation

The additional wheel in the middle under the chassis is retracted. After completing the process an audible signal sounds.

12.3.5 Directional travel

In steering mode, motion in one direction is supported. Axis rotation is not possible, nor can the operating table be moved in the transverse direction.

1. Prepare the operating table according to the requirements on page 70 if it is in the jacked-up position.
2. To activate the steering mode push the following key for at least 1 second:

MARS 2.03/2.05 operating table

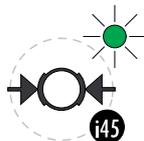
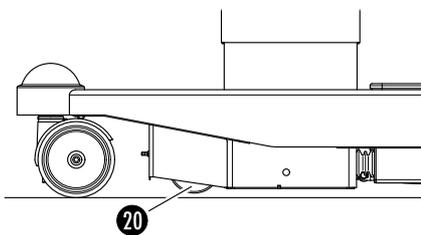
Column keypad	Remote control
Directional travel	
Function is not available	

The right front wheel of the operating table chassis is locked in the longitudinal direction.

MARS 2.04/2.06 operating table

Column keypad	Remote control
Drive foot end	
Function is not available	
Drive head end	
Function is not available	

The additional wheel in the middle under the chassis [20] is extended.



When the wheel is extended, you will hear an audible signal and the OPERATING TABLE LOCKED display on the column keypad next to the LOCK [i45] key is blinking.

12.3.6 Drive mode (MARS 2.04/2.06 operating table only)

To support the user when moving the operating table, especially for heavy patients, the operating table has a drive mode on the additional wheel. For safety purposes, the mode is controlled via the cable remote control only.

	WARNING Risk of physical injury due to the operating table tipping over.
The operating table may only be moved over a flat floor.	

After selecting directional travel (see page 78), press the key indicating the direction of travel. Hold the key depressed until the operating table is at its destination.

Column keypad/ IR remote control	Cable remote control
Drive foot end	
Function is not available	
Drive head end	
Function is not available	

The operating table slowly begins to travel in the direction indicated. After approx. 2 seconds, the table has reached its maximum travel speed.

	CAUTION Risk of collision!
Drive mode supports only travel. The user must manually steer the operating table.	

13 Emergency Operation of the Operating Table



Various electronics for operating table control (such as the processors, etc.) have a redundant design to increase operational reliability. When one processor fails, the system control detects such. The table automatically switches to the emergency mode. The *EMERGENCY OPERATION* [i20] display blinks red and the red *MALFUNCTION* [a4] display remains illuminated.



	NOTE
Use the emergency mode only to complete a procedure that is already underway. After which, remove the operating table from service and contact technical customer service.	

In the emergency mode, all adjustments are executed at half-speed. An acoustic signal is emitted while moving the operating table.

	CAUTION Hazard to the patient! Risk of collision!
The limits switches are not monitored. Do not put the operating table in any extreme positions.	

If the operating table is reacting atypically, e. g., due to a sensor failure, certain adjustments cannot be executed or are limited to such an extent that the emergency mode can also be manually activated in an emergency.



To activate the emergency mode press the green *ON* [i 1] and the *EMERGENCY OPERATION* [i20] keys on the column keypad simultaneously for approx. 10 seconds. You will hear various acoustic signals. When you hear one long beep, the operating table is now in the emergency mode. The red *EMERGENCY OPERATION* [i20] display will continually blink.

	NOTE
Activate the operating table emergency mode only when an error is present. The emergency mode is intended only for retrieving a patient. Complete the current operation and then inform the customer service technician. Bar the faulty operating table from further operations!	
If the emergency mode has previously been manually activated, switching the operating table off and on again will reset it to normal operation.	

14 Care, Cleaning and Disinfection



CAUTION
Risk of personal injury!

Prior to performing any maintenance work or cleaning, disconnect the operating table from the external power supply. Ensure that no motorised movements can take place.



CAUTION
Risk of material damage due to incorrect product maintenance.

- The operating table is **not machine-washable**.
- Do not use a high-pressure cleaner. With high-pressure water jets, fluids can penetrate the interior through gaps or openings and damage the product (e. g. corrosion).
- **Inappropriate cleaning agents damage surfaces.** Do not use any cleaners or disinfectants that are abrasive or contain halogens or peracetic acid in caring for the product in general. In addition, do **not use any cleaners or disinfectants containing alcohol or (flammable) solvents** on plastic parts and pads.



Cleaning agents and disinfectants have to meet all nationally applicable regulations for the medical field and/or be in the list of the DGHM ¹⁾/VAH ²⁾. Observe the hospital's hygiene regulations.

Clean soiled products immediately. Cleaning/disinfection is limited to regularly wiping down (not submersing) equipment with suitable substances.



CAUTION
Risk of personal injury!

Use of inappropriate cleaning agents will remove the anti-static properties of the pads in accordance with IEC 60601 - 1 (DIN EN 60601 - 1). Use the specified cleaning agents and disinfectants only.

¹⁾ Deutsche Gesellschaft für Hygiene und Mikrobiologie (German Society for Hygiene and Microbiology)
²⁾ Verbund für Angewandte Hygiene e. V. (Association for Applied Hygiene)

To clean stainless steel and plastic components, use a pH-neutral or mildly alkaline all-purpose cleaner containing tensides as the active cleaning ingredient. If heavily soiled, use a concentrated cleaner and then rinse with clear water. Position the operating table in the uppermost lift position for cleaning and wipe with a moist cloth. In this position, the metal panels and the bellows of the operating table column can be pulled apart and are easy to clean. Remove the pad to clean the pad plate and the underside of the pad.

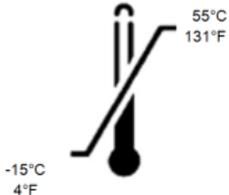
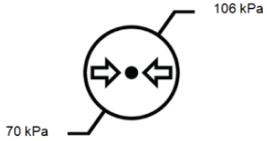
Alcohol- or aldehyde-based surface disinfectants may be used to disinfect stainless steel components. Use only aldehyde-based surface disinfectants for plastic parts and pads. Alcohol-based solutions can damage these surfaces. Follow the manufacturer's instructions when using a disinfectant.

After cleaning and disinfecting equipment, use a dry cloth to wipe up any excess liquid that has collected, such as drops on the lower edge of the operating table top standard rail. Attach the cleaned and disinfected pad to the product using dry fleece straps only.

15 Technical Data

15.1 Conditions for operation, storage and transport

The storage and transport conditions are represented by pictograms on the operating table packaging.

Symbol	Meaning	
	Temperature range for storage and transport	- 15 °C to +55 °C 4 °F to 131 °F
	Humidity for storage and transport	5 % to 95 %
	Air pressure for storage and transport	540 mbar to 1060 mbar 54 kPa to 106 kPa
	Protect against moisture	
	Cannot be stacked	
	Fragile packaged good	
	Top	

The conditions for using the operating table are as follows:

Temperature	+10 °C to +40 °C
Air humidity	20 % to 80 %
Air pressure	min. 540 mbar to 1060 mbar



NOTE

Before removing the operating table from service for a considerable amount of time, you must remove the batteries from the running gear and the IR remote control. Only technical customer service or trained personnel may remove the batteries.

15.2 Operating table

Average service life	about 10 years when used as intended	
Date of manufacture	see the rating plate on the product	
Dimensions (table top)	Length (with seat and back section)	1007 mm
	Width (with standard rails)	582 mm
Height (without pads)	MARS 2.01/2.02/2.03/2.04	700 mm to 1120 mm
	MARS 2.05/2.06	600 mm to 950 mm
Weight	Depending on the model, 200 kg to 215 kg	
Maximum operating table load	450 kg under the conditions set forth in chapter „Load Capacity“ from page 48	
Standard rail load	100 Nm each	
Internal power supply	I. P. S., 2 batteries, 12 V/10 Ah	
External power supply	Follow the information on the rating plate.	depending on the country of delivery: 220 V-230 V, 50 Hz/60 Hz or 240 V, 50 Hz or 120 V-127 V, 50 Hz/60 Hz or 110 V-115 V, 50 Hz/60 Hz
Power consumption	max. 450 VA	
Mains power plug	Earthed plug with dual earthing system	
Length of power cable	maximum 3 m	

Adjustable ranges		
Lifting mechanism	MARS 2.01/2.02/2.03/2.04	420 mm
	MARS 2.05/2.06	350 mm
Longitudinal displacement	MARS 2.02/2.03/2.04/ 2.05/2.06	270 mm
Trendelenburg	MARS 2.01/2.02/2.03/2.04	30°
	MARS 2.05/2.06	25°
Anti-Trendelenburg	35°	
Tilt	± 25°	
Leg section joint	± 90°	
Lower back section joint	+ 80°/-40°	
Upper back section joint	+ 90°/-55°	
Flex	220°	
Reflex	140°	

Classification	
Safety class of the operating table	I Device with internal power supply, I. P. S
Level of protection against electrical shock for the entire operating table	User part type B Patient leakage current according to CF pursuant to IEC 60601-1
Level of protection against water penetration	IP X4
Mode of operation	Continuous running with intermittent loading (DBAB) 2 min ON, 8 min OFF

15.3 MARS 2 remote control

Average service life	about 10 years when used as intended
Date of manufacture	see the rating plate on the product
Dimensions (L x W x H)	approx. (230 x 70 x 55) mm
Weight	approx. 300 g
Power supply	internal NiMH battery 8.4 V, 150 mAh (rechargeable using charger provided)
IR channel	36 kHz modulation frequency

Technical Data

Classification	
Level of protection against water penetration	IP X4

15.4 Chargers

Average service life	about 10 years when used as intended	
Date of manufacture	see the rating plate on the product	
Dimensions (L x W x H)	Mobile charger	(125 x 100 x 120) mm
	Wall-mounted charger	(125 x 85 x 67) mm
	Panelboard-installed charger	- (integrated in panel)
	IR DVE charger	(125 x 115 x 105) mm
Weight	Mobile charger and wall mount	approx. 550 g
	Panelboard-installed charger	-
	IR DVE charger	approx. 800 g
Operating voltage	Mobile charger, wall mount, and IR DVE	depending on the country of delivery: 230 V~ or 115 V~
Supply voltage	Charger wall mount 24 and panel installation	24 V AC/DC
Power consumption	Mobile charger, wall mount, and IR DVE	depending on the operating voltage: max. 4 VA or max. 3 VA
	Charger wall mount 24 and panel installation	max. 3.5 VA
Oscillator frequency	29...31 kHz	
Battery charging current	15...22 mA	
Frequency	Charger wall mount 24 and panel installation	50/60 Hz
	Charger wall mount 24 and panel installation	0/50/60 Hz

Classification	
Safety class	II
Level of protection against water penetration	IP X4
Mode of operation	Continuous operation

15.5 Cables

Only the following cables are allowed to be connected to the medical device:

- Mains supply cable, length 3 m
- Cable to the remote control, block length 0.7 m and 3 m long when drawn out
The cable is firmly connected to the remote control and cannot be removed.
- Cable to the foot control, length 3 m
The cable is firmly connected to the foot control and cannot be removed.
- Cables sold by the manufacturer of the operating table as spare parts

Other accessories and other cables may have higher electrical and electromagnetic emissions or lead to reduced noise immunity of the operating table.

Service work on remote control units and foot controls, especially on their cables, should be done only by the Technical Customer Service of TRUMPF Medizin Systeme GmbH + Co. KG or by personnel authorised, trained, and certified by them.

16 Troubleshooting

Error	Possible cause	Fix
No response when pushing button	Operating table is not switched on	Press the green <i>ON</i> button on the column keypad
Operating table cannot be turned on	Column batteries are out of power	Use mains power to operate the table and recharge column batteries
No response when using the column keypad	The green <i>ON</i> button on the column keypad was not pressed at the same time (a two-button operation)	Press the green <i>ON</i> button and the required additional function key on the column keypad at the same time
No movement when button is pressed, instead an audible error signal	Function is either not possible or not permitted at that moment	-
No response when pushing button, the <i>BATTERY STATE</i> display on the column keypad flashes	Column batteries are out of power	Use mains power to operate the table and recharge column batteries
Operating table cannot be charged, the <i>BATTERY CHARGING</i> display is not illuminated	Either the controlling electronics, power line or input fuse (2x 2.5 AT) is defective	Contact Technical Customer Service
No function with IR remote control	Wrong IR remote control	Compare the IR code on the operating table with that of the IR remote control
Operating table cannot be used with mains power, the <i>EXTERNAL POWER SUPPLY</i> display is not illuminated	The mains power cable is defective	Contact Technical Customer Service
Operating table cannot be charged, the <i>EXTERNAL POWER SUPPLY</i> display is not illuminated	Mains input on MARS 2 is defective	Contact Technical Customer Service
Operating table cannot be charged, the <i>BATTERY CHARGING</i> display is not illuminated	Column or batteries are defective	Contact Technical Customer Service
Anti-/Trendelenburg position cannot be fully attained	The tilt angle setting is too high	Reduce the tilt
Tilting position cannot be fully attained	The Anti-/Trendelenburg angle setting is too high	Reduce the Anti-/Trendelenburg setting
Operating table cannot be unlocked	Tilt is not horizontal tilt is not horizontal (< 5°)	Return any tilted position to a horizontal position

Error	Possible cause	Fix
The operating table cannot be tilted more than 5° when unlocked (not braked)	OK - For safety reasons, tilting is not permitted during transport	Lock the operating table
The cable remote control does not work for operating table drive mode	Operating table is connected to mains power	Unplug the operating table from mains power
The IR remote control does not work for operating table drive mode	OK - For safety reasons, drive mode is permitted with the cable remote control only	Use the cable remote control

17 Maintenance and Repair

Repairs may only be performed by the Technical Customer Service at TRUMPF Medizin Systeme GmbH + Co. KG or by personnel authorised, trained, and certified by Trumpf Medical.

Trumpf Medical shall not be liable for damage of any kind arising from the failure to perform inspections or as a result of inadequate repairs or maintenance, or modifications to the product.

Please contact Technical Customer Service at Trumpf Medical if you require service.

Telephone	+49 3671 586-41911
Fax	+49 3671 586-41175
E-mail	Service.wvo@trumpfmedical.com

The maintenance intervals for the operating table are as follows:

- First maintenance in the 2nd year
- Second maintenance in the 4th year
- Annual maintenance from the 5th year onwards

We recommend that you take out a maintenance contract with Trumpf Medical. Having your service work performed by the Technical Customer Service at Trumpf Medical will ensure that you get many years of reliable service from the operating table.

18 Disposal

Operating table, accessories, and packaging must be recycled in an environmentally friendly fashion. Disposal, including that of individual parts, must be environmentally friendly, i. e., in accordance with the legal regulations currently in force. For information on properly disposing of old equipment, please contact either Trumpf Medical Technical Customer Service, your local sales representative or the appropriate national bureau. Trumpf Medical will take back your old equipment or products that are defective or no longer used. Please contact Technical Customer Service in Saalfeld for more information. Return rechargeable batteries that are no longer useable to Trumpf Medical or your local sales representative for environmentally friendly disposal.

19 EMC Data

Table 1 according to IEC 60601-1-2:2007		
Guidelines and manufacturer's declaration - electromagnetic emissions		
The MARS 2 operating table is suitable for use in one of the environments stated below. The customer or the user of the aforementioned device should ensure that it is being used in such an environment.		
Recorded interfering emissions	In compliance with	Electromagnetic environment - guidelines
RF emissions as per CISPR 11	Group 1	The MARS 2 operating table uses RF energy for internal FUNCTIONING only. Therefore, its RF-emissions levels are very low. It is improbable that neighbouring devices would be affected adversely.
RF emissions as per CISPR 11	Class A	The MARS 2 operating table is suitable for use in settings other than residential areas and is suitable in settings where a direct connection to the PUBLIC POWER SUPPLY NETWORK is provided that also provides power to buildings used for residential purposes.
Harmonic oscillation emissions as per IEC 61000-3-2	Class A	
Voltage fluctuation/flicker emissions as per IEC 61000-3-3	in compliance	

**NOTE**

The device must not be used in direct proximity to any other devices. If such is required, the device must be continually monitored to ensure its appropriate use under these applied conditions.

Table 2 according to IEC 60601-1-2:2007			
Guidelines and manufacturer's declaration - electromagnetic resistance			
The MARS 2 operating table is suitable for use in one of the environments stated below. The customer or the user of the aforementioned device should ensure that it is being used in such an environment.			
Resistance testing	IEC 60601 test levels	Compliance levels	Electromagnetic environment - guidelines
Electro-static discharge (ESD) as per IEC 61000-4-2	±6 kV contact discharge ±8 kV air discharge	±6 kV contact discharge ±8 kV air discharge	Flooring should be made of wood or concrete or have ceramic tiles. If the floor is covered with a synthetic material, the relative humidity must be at least 30 %.
Rapid transient electrical interference variables/ bursts as per IEC 61000-4-4	±2 kV for mains power ±1 kV for input and output lines	±2 kV for mains power ±1 kV for input and output lines	The power supply quality should correspond to that of a typical commercial or hospital environment.
Surges as per IEC 61000-4-5	±1 kV voltage outer conductor - outer conductor ±2 kV voltage outer conductor - earth	±1 kV voltage outer conductor - outer conductor ±2 kV voltage outer conductor - earth	The power supply quality should correspond to that of a typical commercial or hospital environment.
Interrupted voltage, brief interruptions and fluctuations in supply voltage as per IEC 61000-4-11	<5 % U_T (>95 % interruption of U_T) for ½ cycle 40 % U_T (60 % interruption of U_T) for 5 cycles 70 % U_T (30 % interruption of U_T) for 25 cycles <5 % U_T (>95 % interruption of U_T) for 5 s	<5 % U_T (>95 % interruption of U_T) for ½ cycle 40 % U_T (60 % interruption of U_T) for 5 cycles 70 % U_T (30 % interruption of U_T) for 25 cycles <5 % U_T (>95 % interruption of U_T) for 5 s	The power supply quality should correspond to that of a typical commercial or hospital environment. If the user of the MARS 2 operating table requires continuous use of the equipment in the event of an interrupted power supply, using an uninterruptible power supply or a battery to power the MARS 2 operating table is recommended.
Magnetic field with a supply frequency (50/60 Hz) as per IEC 61000-4-8	3 A/m	3 A/m	Magnetic fields for the network frequency should comply with values commonly found in commercial and hospital environments.
Comment	U_T denotes the mains alternating voltage prior to applying test levels.		

Table 4 according to IEC 60601-1-2:2007			
Guidelines and manufacturer's declaration - electromagnetic resistance			
The MARS 2 operating table is suitable for use in one of the environments stated below. The customer or the user of the aforementioned device should ensure that it is being used in such an environment.			
Resistance testing	IEC 60601 test levels	Compliance levels	Electromagnetic environment - guidelines
			Portable and mobile transmission devices, and their cables, should not be used in a proximity to the MARS 2 operating table that is greater than the safe distance recommended and used in calculating the transmission frequency. Recommended safe distance:
Conducted RF interference variables as per IEC 61000-4-6	3 V _{eff} 150 kHz to 80 MHz	3 V _{eff}	d=1.17√P
Emitted RF interference variables as per IEC 61000-4-3	3 V/m 80 MHz to 2.5 GHz	3 V/m	d=1.17√P 80 MHz to 800 MHz
			d=2.33√P 800 MHz to 2.5 GHz
			P is the nominal rating of the transmitter in watts (W) as per transmitter manufacturer data and d is the recommended safe distance in metres (m). As based on an on-site inspection ^a , field strength of stationary communications transmitters should always be less than the compliance levels at all frequencies. ^b When in the proximity of equipment bearing the following  symbol, interference is possible.
Comment 1	At 80 MHz and 800 MHz, the higher value applies.		
Comment 2	These guidelines may not be applicable in all cases. The dispersion of electromagnetic values is affected by the absorption and reflection of buildings, objects and people.		
a	Theoretically, the field strengths of stationary transmitters cannot be predicted precisely, e. g. base stations of wireless phones and mobile land-based wireless devices, amateur radio stations, AM and FM and television broadcasting stations. To ascertain the electromagnetic environment with respect to stationary transmitters, on-site study is required. If the field strengths of the site where the device is to be used exceed the aforementioned compliance levels, the MARS 2 operating table should be closely monitored. Additional measures may be necessary, e. g., changing the setup or relocating the MARS 2 operating table.		
b	For values exceeding the 150 kHz to 80 MHz frequency range, the field strengths should be less than 3 V/m.		

Table 6 according to IEC 60601-1-2:2007			
Recommended safe distances between portable and mobile RF telecommunications devices and the MARS 2 operating table			
The MARS 2 operating table is suitable for use in an electromagnetic environment where interfering RF-variables are controlled. The customer or user of the aforementioned device can assist in avoiding electromagnetic interference by maintaining the minimum distance between portable and mobile RF telecommunications devices (transmitters) and the aforementioned device - as stated below, depending on the output power of the communications device.			
Nominal transmitter power W	Safe distance as per the transmission frequency		
	150 kHz to 80 MHz $d=1.17\sqrt{P}$	80 MHz to 800 MHz $d=1.17\sqrt{P}$	800 MHz to 2.5 GHz $d=2.33\sqrt{P}$
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 with a maximum nominal power not found in the table above, the recommended safe distance (d) can be calculated in metres (m) with the equation for the respective column. P is the maximum nominal power of the transmitter in watts (W) as according to the transmitter manufacturer's data.			
Comment 1	At 80 MHz and 800 MHz, the higher frequency range applies.		
Comment 2	These guidelines may not be applicable in all cases. The dispersion of electromagnetic values is affected by the absorption and reflection of buildings, objects and people.		

20 Information on Purchasing Additional Equipment for the Operating Table

Trumpf Medical offers a variety of section segments and accessories to equip the operating table. Detailed information is available from Trumpf Medical representatives (see the back of the document). For products used together with the operating table (such as leg sections, radial setting clamps), the instruction manual of the respective product applies.

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