Luminos Fusion

English

Operator Manual

XPD3-380G.620.07.04.02

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Operator Manual

SIEMENS

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CE 0123

This device bears a CE mark in accordance with the provisions of Council Directive 93/42/EEC of June 14, 1993 for medical device and the Council Directive 2011/65/EU of June 08, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment. The CE marking applies only to medical devices which have been put on the market according to the above-mentioned EC Directive. Unauthorized changes to this product invalidate this declaration.

Please observe the Safety register. This must be studied thoroughly before starting up the system.

Original language: English

EU Authorized Representative

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Do you have any notes on this operator manual?

Your opinion matters a lot to us!

We make every effort to continuously improve our product documentation. Therefore, we would like to offer you the opportunity of giving us your direct feedback concerning your requests, suggestions and criticism with respect to this operator manual.

- ❏ For feedback by fax, please use the following fax number:
  +49 9131/84-2378
- ❏ If you prefer to send your feedback by e-mail, please use this address:
  sp-ga.healthcare@siemens.com

  In this case, we request that you include the *complete print number in the footer of this page* in the subject line.

Thank you very much for supporting us in our efforts to improve our products.

My notes

Optional information	
Name	
Hospital	
City/country	
E-mail	
Telephone/fax	
Number of fax pages	

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General Information

To operate the Luminos Fusion system accurately and safely, the operating personnel must have the necessary expertise as well as knowledge of the entire Opertor Manual. It must be read carefully prior to starting up the Luminos Fusion system.

Operator Manual layout

To improve readability, your complete Operator Manual has been broken down into several individual Operator Manuals with thematically distinct content:

- ❏ Operator Manual - Luminos Fusion system
- ❏ Operator Manual - Fluorospot Compact imaging system

Information about this Operator Manual

Area of application

This Operator Manual is valid for the following products:

- ❏ Luminos Fusion[1]

Required documents

Reference is made in this Operator Manual to the following documents:

- ❏ Operator Manual - Fluorospot Compact imaging system

[1] with dynamic flat panel detector version

Structure

Register This Operator Manual includes various registers. The first header line shows the title of the register.

Chapter Every register can contain one or more chapters. The chapter title is in the second header line.

Page numbers The footer contains the page numbers and the number of pages in the register. Only the registers have consecutive page numbers.

Warnings and cautions

Warning Warning is used to indicate the presence of a hazard which can cause personal injury or death to patients, operating personnel or others.



Warning

First the source of danger is mentioned.

Then possible consequences are pointed out.

- Finally, information on how to avoid the danger is provided.

Caution Caution is used to indicate that minor injuries or damage to the system may occur if the system is not used properly.



Caution

First the source of danger is mentioned.

Then possible consequences are pointed out.

- Finally, information on how to avoid the danger is provided.

Text layout

A set of conventions has been observed in this Operator Manual that is intended to help you perceive the importance of a piece of text at a glance.

The following notations are used:

Instructions guides you in the proper use of your system.

◆ A diamond precedes text of this type.

Lists

❏ A square precedes text of this type.

Explanatory text subdivides an instructional text or a list into further subitems.

– A dash precedes text of this type.

Reference refers you to further explanations on another page of your Operator Manual or in a separate document.

→ An arrow indicates texts of this type.

Note is used in two different ways:

❏ emphasizes a safety-relevant piece of information without there being direct danger

❏ contains a summary of the most important information on a subject



This text is indicated by the icon for note and is printed in italics.

Information text that provides additional useful explanations about a subject.



This text is indicated by the icon for information and is printed in italics.

Menus and buttons Designations of software menus, buttons and dialog boxes are printed in **bold**.

Gender inclusivity

At Siemens Healthineers, we want to address all genders equally in our Instructions for Use. It is not our intention to exclude anyone. We continue to update our documentation with this in mind.

Names and parameters

All names and data on patients and equipment that are used as examples in this Operator Manual are entirely fictional.

Any resemblance to names of real persons and institutions is entirely coincidental.

All parameters and images shown in this Operator Manual are examples. Only the parameters displayed on your system are relevant.

The Luminos Fusion may be shown with expanded equipment or with optional accessories in some figures.

Pictograms

The following are pictograms and their meanings as they may apply to your system (IEC standard).

	Alternating current
	Equipotential bonding
	Caution: read Operator Manual
	Caution: Laser
	Off (disconnection from line power supply)
	On (connection to line voltage)
	Degree of protection type B

Illustrations

All illustrations of the equipment and of the user interface in this Operator Manual, are *examples* only.

Differences in detail may occur in your system due to the installed options, configuration and constant development of the system.

Reproduction of images can cause loss of detail. Pictures in this Operator Manual do not therefore provide any indication of image quality.

All names of patients in images or illustrations, are purely fictional. Any similarities with existing persons are entirely coincidental.

Value statements

All technical data are typical values unless specific tolerances are stated.

Values in pictures of the software user interface, have no clinical meaning.

- Only set the values preset in the exam sets provided or the values recommended by experienced application specialists.

Abbreviations

The following are abbreviations and their full description as they may apply to the manual.

Abbreviation	**Full Description**
AP	Anesthetics Test
BWS	Bucky Wall Stand
DMG	Dead Man's Grip
OGP	Organ Program
RHA	Rotation Horizontal Axis
RVA	Rotation Vertical Axis
SID	Source Image Distance
TUI	Touch User Interface
UPS	Uninterruptible Power Supply

Use of the product

Intended use

The intended use of the Luminos Fusion is universal digital X-ray imaging for radiography and fluoroscopy.

The applications of the system include the examination of the gastrointestinal tract, the genitourinary system, and thoracic, arthrographic, lymphographic, myelographic, bone, blood vessel, pediatric examinations, digital angiography, digital subtraction angiography (DSA), interventional operations, and fluoroscopic guidance during endoscopic examinations.

The projection images shall mainly be stored by means of a digital image system.

All patients up to a maximum weight of 150 kg (up to 200 kg with limitations) can be examined on the system.

Residual risks

Residual risks have been assessed and all relevant information is provided to the user via this Operator Manual.

Please note that risks inherently connected to the use of this device (e.g. radiation or moving parts) can not be avoided due to the nature of this device.

Physical functionality

Luminos Fusion is a device intended to visualize anatomical structures by converting an X-ray pattern into a visible image.

Usability



Caution

Failure to follow the instructions for use and safety recommendations provided in this manual, can cause injury to the patient, to the operator or to other persons

Unexpected radiation

- This product should be used only by employees adequately trained in the use of this equipment.
- Before using this product, the operator should be thoroughly acquainted with the instructions for use and safety recommendations provided in this manual.



Caution

Operation of the system by non-trained users.

Risk of incorrect diagnosis or treatment due to misinterpretation of image information.

- The system must only be used by persons with the necessary specialist knowledge, for example physicians, trained radiologists, or trained technologists, after an appropriate application training.

The systems must only be used by persons with the necessary specialist knowledge after training e.g. physicians, radiologists, cardiologists and medical specialists.

- ❏ Patient population: newborn to geriatric.
- ❏ Contraindications: Not found.
  Patients have to be informed about the hazards and safety measures during an examination. Prior to the examination, it must be confirmed by a physician that an examination is permissible, and checked whether increased precautions are necessary.
- ❏ Operator profile: The usage of the system described in this Operator Manual requires specific technical and medical knowledge and skills regarding, at a minimum, radiation protection, safety procedures and patient safety.
- ❏ People using, moving, working with the system must have acquired such knowledge and skills during their curriculum.
- ❏ Language understanding: Users must understand the language of the Operator Manual before touching the system.
- ❏ Equipment training: Application training is delivered with the equipment according to the handover contract. It is mandatory to follow such application training delivered by Siemens Representative before any use of the system.

- ❏ The follow-up training, which is necessary due to change of personnel, is in the responsibility of the operator of the system. Any additional training can be requested from Siemens.
- ❏ Operator Manual and precautions: Read and understand all the instructions in the Operator Manual before attempting to use the system and request additional training from Siemens, if needed.
- ❏ Keep the Operator Manual with the equipment at all times and periodically review the procedures and safety precautions.
- ❏ **Failure to follow the operating instructions and safety precautions could result in serious injury to the patient, others or yourself.**
- ❏ Patient safety: Provide assistance for getting the patient on and off the table. Be sure all patient health lines (IV, oxygen, etc.) are positioned so they will not be caught when moving the equipment. Never leave the patient unattended while in the system room.
- ❏ An unattended patient could fall from the table, activate a motion control, or encounter other problems which could be hazardous.
- ❏ Radiation safety: Always use proper technique factors for each procedure to minimize x-ray exposure and to produce the best diagnostic results.
- ❏ Establish emergency procedures: It is not always possible to determine when some components, such as x-ray tubes, are nearing the end of their operating lives. These components could stop operating during a patient examination.

Establish procedures for handling the patient in case of the loss of radiographic imaging or other system functions during an examination.

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General safety information

The organization responsible for the safety of the medical device according to IEC 60601 ff. is the user or the operator/operating company of the device.

Laws and regulations

If legally binding regulations govern the installation and/or the operation of the product, it is the responsibility of the installer or the operator to observe these regulations.

Modifying the medical product is not permitted.

Country-specific regulations

The legally established country-specific regulations must be followed in all countries. Deviating from this Operator Manual, values may be set according to country-specific regulations.

Regulations in the EU

Due to the Medical Device Directive 93/42/EEC, Luminos Fusion complies with the standards of the EN60601-1 series.

Additional national regulations

To ensure safety for operators, patients, and third parties, we recommend compliance with the regulations listed here to the extent that local national laws allow.

Germany **RöV** (X-Ray Ordinance) - Legally required tests according to §16:

Before start-up

- ❏ Acceptance test
- ❏ Expert inspection

During operation according to the time intervals specified

- ❏ Constancy test

MedBetreibV Ordinance for system owners of medical equipment

Safety check for technical construction at least every two years

CE marking

This device bears a CE mark in accordance with the provisions of Council Directive 93/42/EEC of June 14, 1993 for medical device and the Council Directive 2011/65/EU of June 08, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

Handling of non RoHS spare parts

In the interests of preserving natural resources, Siemens may reuse spare parts which in some circumstances are not compliant with RoHS 2011/65/EU.

However, in these cases Siemens uses the valid exceptions to these regulations which allow the use of these parts.

Data security

Personal data are subject to data protection.

- ◆ Please observe the relevant legal provisions.

Legally required tests

Legally required tests must be performed at the specified intervals. These tests include, for example,

- ❏ Constancy test according to the X-ray ordinance (§16 RöV) in the Federal Republic of Germany.
- ❏ Tests based on DHHS guidelines (Department of Health and Human Services) where applicable.

For more detailed information refer to Chapter **Functional checks/Cleaning**.

Explosion protection

Luminos Fusion is *not* designed for operation in explosion-endangered areas.



Warning

The system is not designed for operation in explosion-endangered areas. It does *not* fulfill the requirements for **AP**/**APG** classification.

Danger of explosion!

- Do *not* use the system where explosive atmospheres can arise.





Only products with the AP mark (AP = anesthetics test) may be used in explosion-endangered areas

Fire safety

In the event of a fire, shut down the entire system immediately, that is, disconnect the system from the main power supply.

- Press the emergency SHUTDOWN button or actuate the main or disconnecting switch.
- Use a CO_2 fire extinguisher.

Do *not* use water!



Caution

Fire inside or in the vicinity of the system

Risk of injury of patient and personnel and damage to the property.

Risk of gas poisoning caused by burning plastics.

- Switch off the system in the event of fire.
- Make sure that you and the patient know where the escape routes are.
- Make sure that you know where the fire extinguishers are located and familiarize yourself with the use of them.

- Contact SIEMENS Uptime Service before performing any refurbishing work and before starting the system up again.

UPS

UPS = Uninterruptible Power Supply

A UPS is a battery-backed system which provides emergency power in the event of a mains power supply failure.

UPS for the imaging system

To prevent data / image loss, your system may have a UPS which shuts down the *imaging system* in a controlled way in the event of a power failure.

UPS operation



Caution

Inappropriate device connected to UPS

Risk of electrical hazard or damage to the system

- Do *not* connect any additional device to the UPS power outlets.

In the event of power failure, all indicators and displays are dark. Only the imaging system as well as the monitors is still being powered by the UPS.

- Stop the examination.
- Do *not* press any keys.

After a configurable time (typically 2 minutes), the imaging system will shut down to prevent the backup battery to be exhausted.

Power recovers during this time

- Power on the system using the on-site room ON (or emergency SHUTDOWN) button, if necessary[1].

The system will be switched on again by the (still running) imaging system and it will be operable again after a short time.

Power does not recover

The imaging system will shut down when the recovery time has been elapsed. The shutdown needs a few minutes.

- Let the imaging system shut down.

After recovery of the power supply

- Power on the system using the on-site room ON (or emergency SHUTDOWN) button, if necessary[1].
- Switch the system on.
- Pay attention to any error messages.
- Check if all data/images are present.

[1] mandatory in Germany

Information about the software

Language



Caution

Incorrect image processing due to wrong configured system language

Incorrect basis for diagnosis

- Please configure the system only in one of the following languages: German ;English ;French ;Italian ;Spanish ;Russian ;Portuguese and Chinese

Copyright The system and user software used in this product is protected by copyright.

DICOM conformity The imaging system software is conforming to the DICOM standard. A DICOM conformance statement is available from Siemens.

Third-party software Only software authorized by Siemens for use with this product may be used.



Caution

Use of non-approved or manipulated software or hardware components

Risk of malfunctions posing a hazard to patients and equipment

- Use only software or hardware components approved by Siemens.
- Perform repairs only with our expressed written approval.



Caution

Impermissible or faulty manipulations/changes of the software or connection of the system to a network

Delayed or no diagnosis

- Make sure all necessary precautions with respect to the existing level of security are considered when adding a functionality or altering the shipped configuration.



Caution

Software Installation will disturb system functions

Interruption of patient treatment and loss of patient data

- Do not start installation during patient treatment

Caution

Installation of the Update package failed

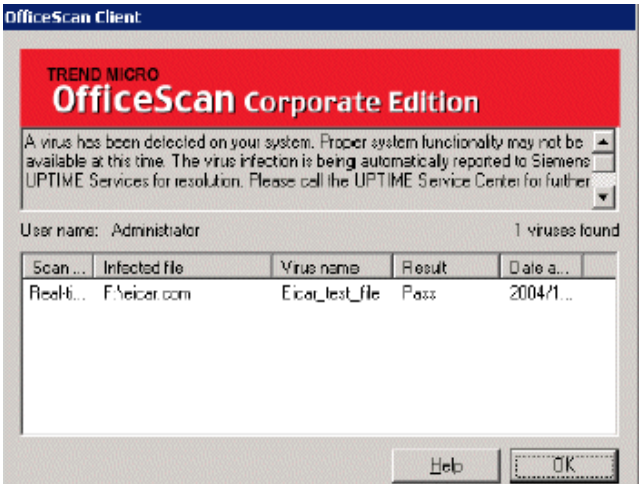
Failed Software installation will result in an undefined system state

- Do not use the system and call the UPTIME Service Center

Virus scanner

→ Refer to the **FLUOROSPOT Compact** Operator Manual for further information.

If the virus scanner detects a virus, the following message will be displayed:



The information on the detected virus will automatically be forwarded to SIEMENS Uptime Service.

The required checking of virus patterns and scan software is performed by remote updates during each start-up. It automatically checks whether new data is available and displays the dialog box **Software Distribution**.

- We recommend installing every new virus patterns and scan software by clicking the **Yes** button.

Caution

New viruses will not be recognized

System malfunction because of virus infection

- Confirm virus pattern file and scan engine updates at start-up time.

Checks, tests

Before the system is used for examinations, the user must ensure that all safety-relevant devices function correctly and that the system is ready for operation.

Important functional tests and checks must be made at certain time intervals.

Maintenance

To ensure the absolute safety of the patients, the operators and third parties, the equipment must be checked every 24 months to maintain its reliability and serviceability.

All parts of the unit which, if worn, may create a safety hazard, must be checked by skilled personnel at regular intervals and at least every 24 months, and replaced, if required. This should be done by the Siemens Customer Service department within the framework of maintenance.

If national laws or regulations specify more frequent checking and/or maintenance, this must be observed.

To ensure the safety of the patient, operating personnel and others, tests must be performed **regularly** to maintain the safety and proper functioning of the product.

The maintenance information is specified in the Maintenance Plan.



Caution

Wear or material fatigue in the system or accessories

Risk of injury or system damage.

- Follow the maintenance guidelines to maintain safety and proper function of the system.
- Check accessories for wear before use.

Service contract

Regular inspections should be part of the annual maintenance performed by SIEMENS Uptime Service under a service contract. We therefore recommend that you take out a service contract.

It is also possible to take out a service contract based on system usage.

- Please contact your authorized local sales representative in this matter.

Safety-related parts subject to wear

The safety-related parts subject to wear and the measures to be taken are listed in the Maintenance Plan.

Installation, repair

Modifications of or additions to the product must be made in accordance with the legal regulations and generally accepted engineering standards.

Siemens cannot accept responsibility for the safety features and for the reliability and performance of the equipment as the manufacturer, assembler, installer or importer, if:

- ❏ installation, equipment expansions, readjustments, modifications or repairs are not carried out by persons authorized by us to do so,
- ❏ components affecting safe operation of the product are not replaced by original spare parts in the event of a malfunction,
- ❏ the electrical installation of the room does not meet the requirements of the VDE regulation or the corresponding national regulations, or
- ❏ the product is not used in accordance with the Operator Manual.



The emissions characteristics of this product make it suitable for use in industrial areas and hospitals (CISPR 11 class A). If it is used in a residential environment (for which CISPR 11 class B is normally required) this equipment might not offer adequate protection to radio-frequency communication services.
The responsible organization might be required to take mitigation measures, such as relocating or reorienting the equipment.



Caution

Not-approved modifications or rebuilding of the system.

Safety measures become disabled. Risk of injury to patients, operators and technicians.

- ◆ Let only technicians qualified by Siemens do modifications and rebuilding of the System.

Technical documents

On request, we can provide you with technical documents for the product for a charge.

This does not imply authorization to undertake repairs.



We recommend that you obtain a report indicating the nature and the extent of the work performed from the persons carrying out such work. The report should include all changes in rated parameters or operating ranges as well as the date, the name of the company and a signature.



We accept no responsibility for repairs performed without our express written approval.

Error messages and status indicators

The system displays warnings and error messages as well as information about current system status on the screen. It gives information on how to proceed in each situation.

→ For further details refer to *Register* **System overview/System operation**, *„Ceiling-mounted tube support“*, or to the Operator Manual of the FLUOROSPOT Compact imaging system.

Search run

The system periodically initiates a search run.

If an error occurs, an error message is displayed.

Maintenance plan



This maintenance plan includes the required tests according to IEC 62353

Periodic maintenance

Periodic maintenance includes:

- ❏ Safety inspection
- ❏ Preventive maintenance
- ❏ Quality and function tests

Replacement of safety-relevant parts subject to wear

This work may be performed only by qualified and authorized service engineers. Qualified in this context means that the engineers have been trained accordingly or have acquired the necessary experience in practice. Authorized means that the engineers have been authorized by the operator of the system to perform maintenance work.

Prior to the first system startup, we recommend that you name a staff member who will be responsible for ensuring that routine checks and preventive inspection and maintenance work are performed. This employee has to archive all certificates in the folder for the "Technical Documentation".

In addition to our repair service, Siemens also offers you a complete range of services for preventive inspection and maintenance of your system. These services can be called on as required or agreed in a flexibly drafted service contract.

If you have not received a quotation from our **UPTIME Services** organization, please contact the Siemens representative responsible for your facility.

Safety inspection

The following checks are intended to ensure the safety of the system. Where appropriate, preventive measures must be adopted or repairs performed. For the most part, the points to be checked are prescribed by laws and standards.

Maintenance interval 24 months for the entire system

Listing of work steps to be performed

Object or function	Reason	What is checked
General checks		
Overall system	Safety of patients and personnel	Visual check of the system (cover panels) for damage and sharp edges
Cables and how cables are laid	Protection of patient and personnel against electric shocks	Visual check of cables and how cables are laid for safety deficiencies
Accessories	Safety of patients	Check for safety deficiencies
System radiation protection devices	Protection of patient and personnel against radiation injuries	Check unit radiation safety devices as well as any additional safety devices that are configured, e.g. lower body radiation shield, upper body radiation shield, ceiling-mounted radiation shield, for installation and for damage.
Operator documents	Protection against incorrect operation and thus protection of patients, personnel and unit	Check for the presence of operator documents
Warning notices	Protection against incorrect operation and thus protection of patients, personnel and unit	Check for presence of the required warning labels visible to the user for operation of the system.
Insertable fuses	Protection of patients, personnel and unit	Check all insertable fuses that are accessible without tools to determine whether manufacturer data (nominal value and switch-off characteristics) are met.
User interfaces	Protection against incorrect operation and thus protection of patients, personnel and unit	Check for legibility and operating symbols.
Electrical checks		
Electrical safety	Protection of patient and personnel against electric shocks	❏ Measurement of ground wire resistance ❏ Device leakage current measurement ❏ Patient leakage current measurement of the complete system per national regulations

Object or function	Reason	What is checked
Mechanical checks		
Wall and floor mounting	Protection of patients, personnel and unit	Mounting (visual check)
Pull and support cables	Protection of patients, personnel and unit	Check for wear and fraying
Chain drives	Ensure power transmission and safety functions	Check for wear, tension, ease of movement and function of the guide rollers
System movements (manual)	Safety of the system latching mechanisms	Check of brake holding and end stops
Movable components	Protection of patients, personnel and unit	Cable lead-in, movement behavior and, if applicable, brakes
Accessories	Safety of patients, personnel	Check for functionality and for good condition
User interfaces	Protection against incorrect operation and thus protection of patients, personnel and unit	Check for damage
Safety-relevant parts subject to wear	Protection of patients, personnel and unit	Check for damage
Function check		
Emergency stop devices	Preventing the first malfunction caused by application errors and collapsing patients	Switch-off of system functions after activating the emergency stop device
Control devices and warning indicators	Inform the operator about relevant system conditions and overload situations	The functions of the following displays: ❏ Radiation ❏ Fluoroscopy ❏ X-ray tube load ❏ Blocking ❏ Unit movements at the collision limit
System movements (motorized)	Protection of patients, personnel and unit	Safety shutdown of the movements
Collision protection	Prevent damage to unit components	Automatic shutdown of system movements in the collision zone (for example ceiling, wall, floor)
Function test	Prevent damage to unit components	Final function test of all components

Preventive maintenance

The purpose of preventive maintenance is to reduce unforeseen failures to a minimum. Thus the prerequisites for the system to meet the assured characteristics in the long term are created.

The effects of different operating conditions (full or partial load operation, temperature, size of dust particles, humidity, gases, vapors) are checked and the condition of parts subject to wear is determined by recording and analyzing characteristic values. Preventive measures must be adopted or repairs must be undertaken as appropriate.

The specified maintenance intervals correspond to the minimum requirements. Compliance with stricter national legislation may be necessary

Maintenance interval 24 months for the entire system

Listing of work steps to be performed

Object or function	Reason	What is checked
Overall system	Preventive measures to avoid: ❏ Safety risks ❏ Overheating ❏ Wear and tear ❏ Image artifacts	❏ Check of operating data ❏ Check of cables, cable routing and cable connections for damage ❏ Cleaning contrast medium, blood, disinfectants from areas not accessible to the customer ❏ Inspection and cleaning of coolant and air circulation passageways ❏ Inspection and cleaning of optical transmission paths ❏ Removal of foreign objects, for example positioning aids and injection needles ❏ Touch-up of paint to prevent corrosion and infection ❏ Check of measurement values with tolerance ranges ❏ Check of the movement forces ❏ Check of the drive characteristics, acceleration and deceleration movements ❏ Measures to ensure that all components move smoothly ❏ Check and analysis of points of friction ❏ Reading and analyzing the error log files ❏ Repairing minor damage

Quality and function tests

Quality and function tests are used to check whether the system meets the assured characteristics. Image quality tests determine differences from the original status (for example resolution, contrast range, minimum contrast, image signal and, if applicable, check of Digital Subtraction Angiography).

If there are differences, preventive measures must be taken or repairs performed, whenever is appropriate.

Maintenance interval 24 months for the entire system

Listing of work steps to be performed

Object or function	Reason	What is checked
Overall system	Optimum operation on the basis of the specifications listed in the data sheet	Interaction of all system components according to the assured characteristics
Power line connection	Unrestricted power input from the line power source for the purpose of maximum system load. (The power input can be limited by oxidation and corrosion, which can result in exposure fluctuations and system shutdowns).	Internal line impedance
Vacuum components: ❏ X-ray tube assembly	Assuring the system specifications (vacuum components are subject to aging)	Image quality
Beam geometry, centering, beam collimation	Observance of the specifications and legal regulations[1] to minimize radiation exposure of patient and personnel	Centering the central beam onto the center of the image receptor. Coincidence of radiation field size and image receptor size or light field size and radiation field size.
Radiation dose	Compliance with specifications and legal requirements[1] to minimize radiation exposure of patient and personnel	Check of dose rate/cutoff dose[2] during ❏ Fluoroscopy (DL) ❏ Acquisition in all operating modes
Detail recognition	Compliance with specifications and legal requirements[1] Ensuring image quality	Resolution[2] during ❏ Fluoroscopy (DL) ❏ Acquisition in all operating modes
Image contrast	Compliance with specifications and legal requirements[1] Ensuring image quality	Minimum contrast and dynamic range[2] during ❏ Fluoroscopy (DL) ❏ Acquisition in all operating modes

Object or function	Reason	What is checked
DSA device[2]	Compliance with specifications and legal requirements[1] Ensuring image quality	DSA scene: contrast sensitivity, dynamic range, taking the logarithm, subtraction, artifacts
Tomo device[2]	Compliance with specifications and legal requirements[1] Ensuring image quality	Accuracy of the tomographic height, resolution, shape and course of the tomographic pattern, blurring
Image display	Compliance with specifications and legal requirements[1] Ensuring image quality	Brightness, focus and the geometry of the configured monitors
Image artifacts	Compliance with specifications and legal requirements[1] Ensuring image quality	Image display for intolerable image artifacts in all existing application techniques
Dose measurement device[2]	Maintenance of specifications	Accuracy of the display
Image documentation systems	Compliance with specifications and legal requirements[1] Ensuring image quality	Gray scale reproduction, geometric imaging characteristics, resolution, optical density, artifacts

[1] DHHS and country-specific regulations must be observed
[2] Depending on the system configuration

Replacement of safety-relevant parts subject to wear

Safety-relevant parts which are subject to wear must be replaced in periodic intervals

3D ceiling stand

Object or function	Reason	What is replaced?	Interval
3D	Wear can cause springs to break and the support cable to split or fray.	Spring-loaded mechanism with steel cables	8 years

Personal safety measure

General information



Caution

Defect of system components

Any defect of a component in the system may lead to a reduced level of safety of the resulting system.

- Stop operation of the system.
- Call SIEMENS Uptime Service.

Information about unit movements

Because of the possible speed of movement of the Luminos Fusion, this system must be operated with particular care.



Caution

Manual or motorized movements

Risks of injury by crushing or collision for persons and objects in the vicinity of moving parts.

- Ensure that, during system movements, neither you nor any other person is in the path of the system.
- Ensure that everybody is outside the hazardous zone.



Caution

Surrounding persons or parts are not in the collision calculation.

Mechanical or personal damage

- Check that no persons or additional objects (accessories) are in the moving area of stands or table before starting any motorized movement.

Unit movements should be started only if neither a patient nor a third party may be endangered and if no object may hinder unit movements.

However, if an object (for example, during a down movement) was hindering a movement direction (for example seat) or the height of the detector unit or the X-ray tube was manually readjusted, the alignment control must be readjusted.

If this alignment is not performed, no acquisitions are possible!

Dead man's grip

All unit movements are controlled with a *dead man's grip* (DMG), that is, movements are performed only while the operating element is being actuated. In the event of danger, the movement can be stopped immediately by releasing the dead man's grip.

Danger of crushing

The patient and operating personnel must grip only the handles which are intended for the proper handling of the equipment or positioning of the patient. Where this is not possible, attention must be paid to possible risks of injury by crushing in the vicinity of moving parts.

- Pay special attention to the risks of crushing fingers/hands between moving parts and their guide openings.
- Before performing unit movements make certain that the patients do not grasp the frame of the tabletop.

Abnormal movements

If any part of the system moves although this movement was not released, there might be a fault.

Example: Monitor suspension system moves downward by itself.

- Shut down your system and call SIEMENS Uptime Service.



Attention: When organ programs are used in which the tube was programmed in the collision zone of the table, collisions of the tube and the table are possible.

Never leave the system unattended during system movements.

Special note for bed exposures and exposures at Bucky wall stand

Prerequisites

- ✓ System in vertical position > 85°
- ✓ X-ray tube assembly rotated to 180°

The longitudinal downward movement of detector and X-ray tube assembly stops when the central beam has reached a distance of about 130 cm above the floor.

Nevertheless, the movement can be continued by activating the joystick once again. Detector and X-ray tube assembly move with reduced speed and an acoustic warning signal.

Red emergency STOP buttons



Caution

Movement without intentional activation of control elements.

Risk of collision, risk of injury to patient or operator, risk of damage to the system.

- ◆ If movement does not stop press the nearest emergency STOP button.

Triggering STOP

If a malfunction of a unit movement causes an emergency situation, danger to the patient, to operating personnel, or to the unit:



- ◆ Press one of the red emergency STOP buttons immediately.
  - – All system drives are shut down and movements are stopped immediately. Movement can only be resumed when STOP is canceled.
  - – The Image Chain system, the generator and the imaging system still remain switched on and ready
  - – Radiation and fluoroscopy are interrupted, but can be released again if you press the fluoroscopy release pedal again (only with fluoroscopy, but not with exposure), even without canceling STOP.
  - – Injections are interrupted, but can be continued without canceling STOP.

Canceling STOP

Only when the cause of the danger has been unequivocally identified and remedied, can the emergency STOP button be disengaged.

- ◆ To do so, rotate and pull the red emergency STOP button



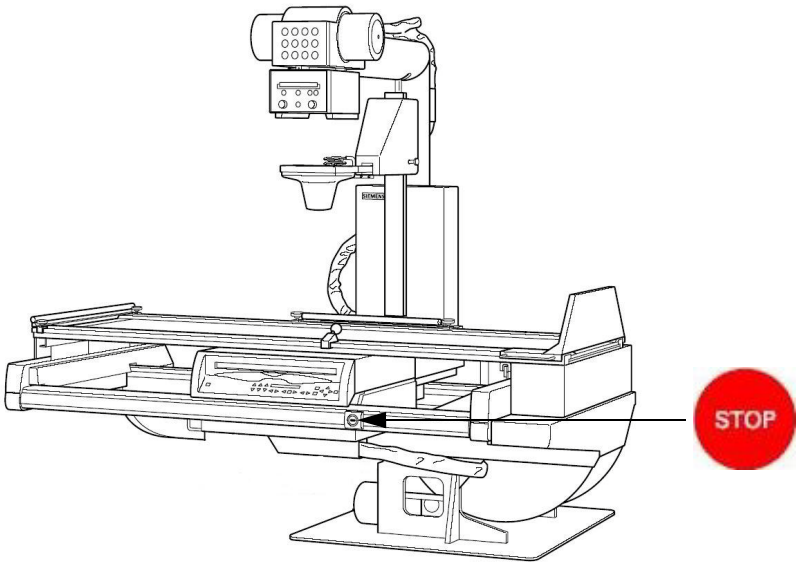
In the event of a system failure:

- ◆ Press the emergency STOP button and unlock it again.
  - – This will restart the system.

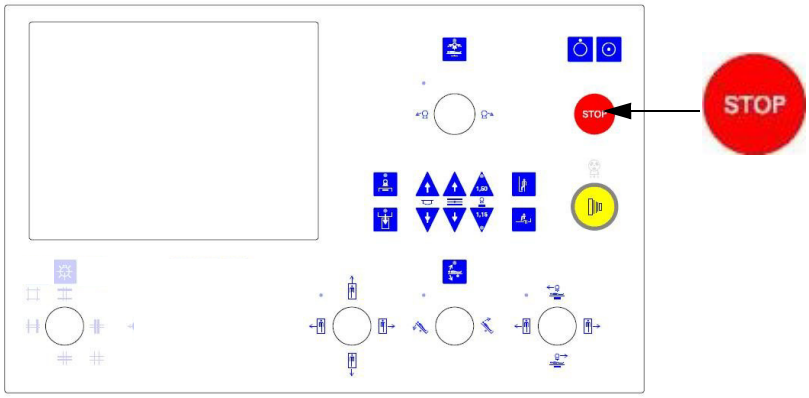
Locations of the emergency STOP buttons

You will find emergency STOP buttons in the following locations:

Luminos Fusion table



System control console



Emergency SHUTDOWN button (installed on-site)

Use this shutdown method *only in an extreme emergency* because it is an *uncontrolled* process!

Data could be lost, for example unsaved images, exporting and filming jobs, and so.

If a detector is used, it is also disconnected from the power supply. After the power has been switched on again, an additional waiting time is required to ensure optimum image quality.



Caution

The radiation indicator or a radiation warning light lights up without the radiation release switch being operated.

Unexpected radiation

- Switch off the X-ray system immediately with the emergency shutdown button.
- Notify your Service Center.



Caution

Shutdown system by using the emergency SHUTDOWN button.

Risk of data loss and/ or damage to tube due to lack of cooling

- Operate the emergency SHUTDOWN button (if provided by customer) only in case of emergency or if the system cannot be switched off normally.



An emergency power supply, if one is connected, will not be activated when emergency SHUTDOWN is pressed.

Switching off in an emergency

Only exclusively, if there is danger for patients, operators, third parties or the unit:

◆ Press the on-site emergency SHUTDOWN button.
– The entire system is disconnected from the power supply.

This means that:

❏ All unit movements are interrupted.

❏ Radiation is turned off.

❏ The current system program is interrupted.

❏ Current operating sequences are interrupted and cleared.

❏ All current acquisition data are cleared, unless they have been saved to non-volatile memory.

Switching on again

Only if the cause of the danger has been *unequivocally* identified and remedied, the emergency SHUTDOWN button can be released and the system operated again.

◆ In all other cases, for example system malfunction, contact SIEMENS Uptime Service.

◆ If the stop function does not respond normally, immediately activate an emergency shutdown to turn off the entire system. If this happens, you may not continue to use the system. Contact the Siemens Customer Service.

Danger zones / danger points ...



Caution

Patient holds on to moving parts during examination (for example tomographic rod)

Risk of crushing fingers and hands

- Attach all devices serving for safety, especially hand grip, hand grip strip, and footboard.
- Make sure that the patient uses only the grips provided.
- Make sure that system movements are started only when it is sure that neither the operator, the patient nor third parties can be endangered.

The positions marked in the following illustrations indicate danger zones in which patients or operating personnel could suffer injury by crushing or colliding:

❏ Avoid standing or sitting immediately adjacent to the system and especially do not sit next to the system with your legs or knees under the cross-beam at the head or foot end of the table.

❏ Take care that during system movements no one is in the area between the unit base and table.

❏ Take care that with the footrest attached there is a risk of collision with the extended cone (optional) when the tabletop and / or the longitudinal carriage are moving.

❏ Do not grasp in the loading shaft of the detector because of the risk of crushing.



Caution

Unintentional follow-up movements of the tilt axis.

Squeezing of patient who is sitting beside the table (for example wheelchair user)

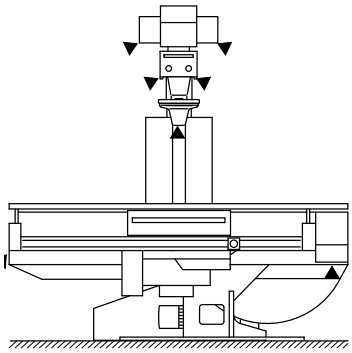
- Avoid movements as long as the patient is within a dangerous movement zone
- Be careful because most of the axes perform a short follow-up movement after letting go of the operating elements

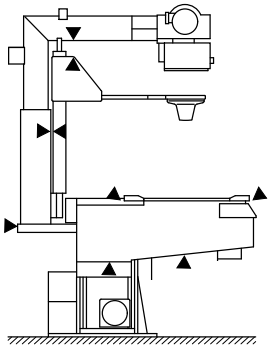
Danger zones with unit in horizontal position

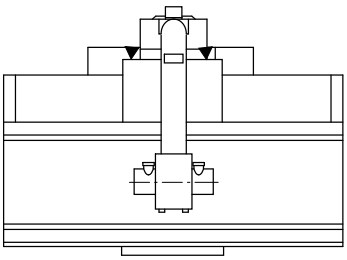
The places marked in the illustrations show possible danger zones at which the patient or operator can be injured.

▶ Risk of injury by crushing or collision

Luminos Fusion table



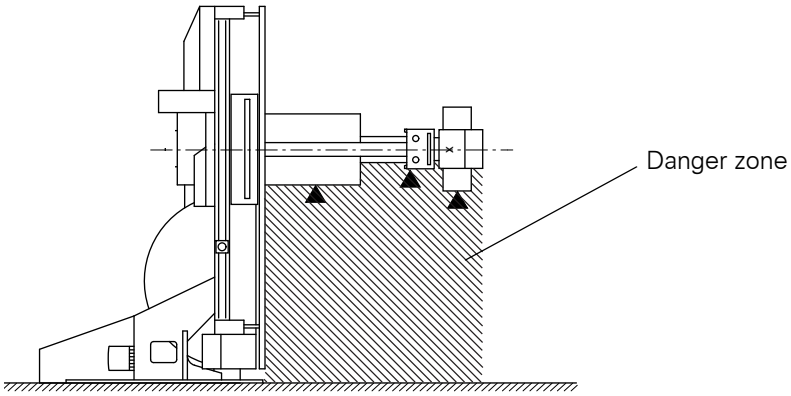




Danger of crushing
- ❏ Between the tabletop and the table frame
- ❏ Between the tabletop and the table base
- ❏ Between the handle and the frame (if the handles are operated from both sides)

Danger of collision
- ❏ On the outer edges of the table
- ❏ On the (sliding) accessory rails

Danger zones with unit in vertical position[1]



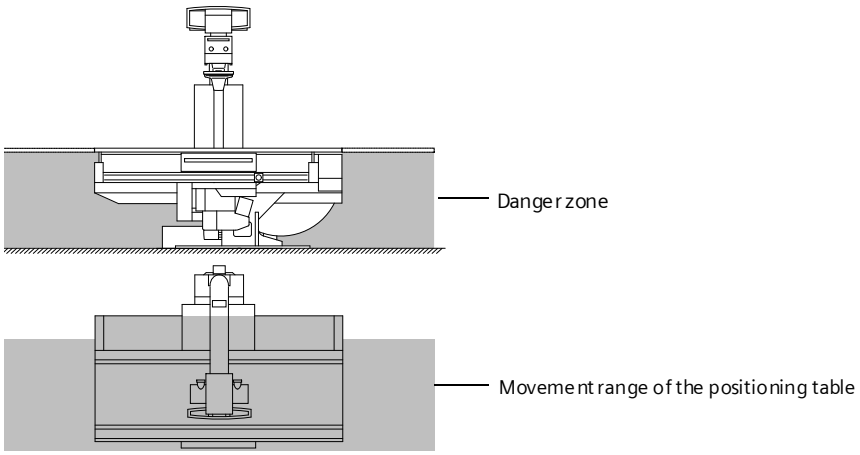
If the patient is located in the danger zone, it must always be ensured that the operating personnel are in the room and within reach of an emergency stop.

If the operating personnel leaves the room or moves out of reach of an emergency stop, then the patient has to be moved out of the danger zone.

[1] Between -17° and +90°

Danger zones during tilting

The dotted areas mark the danger zone, where no objects must be located during tilting.



- Prior to activating any movements of the unit, especially tilting of the unit, make sure that there are no objects such as stairs, steps, stands, waste containers, instrument tables, beds, gurneys, monitor support systems, operating consoles or the like in its movement range.

These objects are not detected by the collision monitoring of the unit. Avoiding collisions of the unit with these objects is subject to the operator's duty to take care.

- If a collision of the unit with a rigid obstacle (for example step) has occurred, press one of the red emergency stop buttons.
- Rescue the patient.

Under no circumstances must the unit be tilted down further or tilted up, b cause externally invisible, but safety-relevant damage to the tilting drive ma cur. Severe consequential damage including personal damage cannot be excluded in this case.

- Immediately notify the SIEMENS Uptime Service.

Danger zones at the ceiling-mounted X-ray tube support

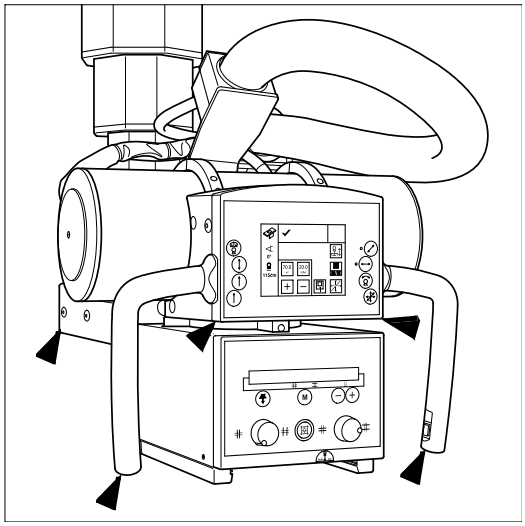


Caution

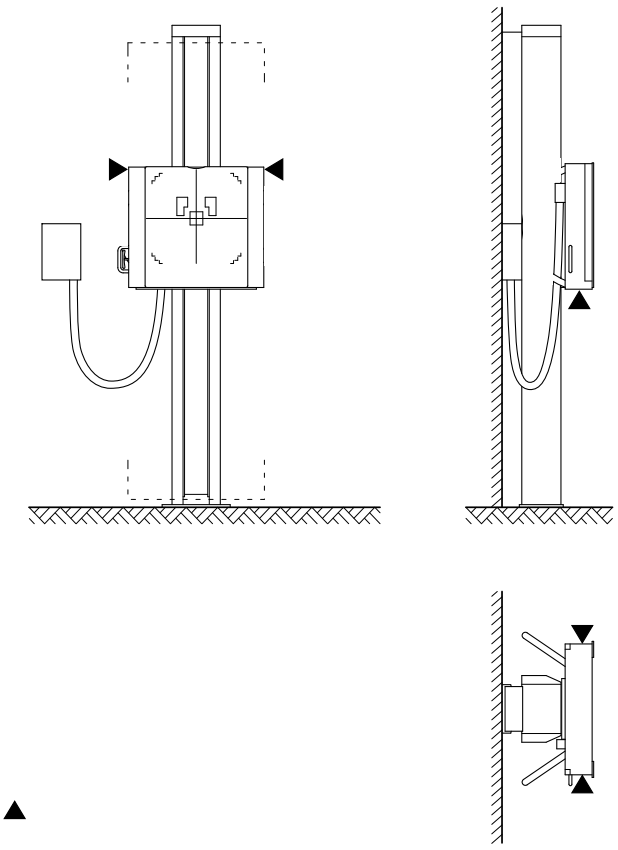
Manual or motorized movements

Risks of injury by crushing or collision for persons and objects in the vicinity of moving parts

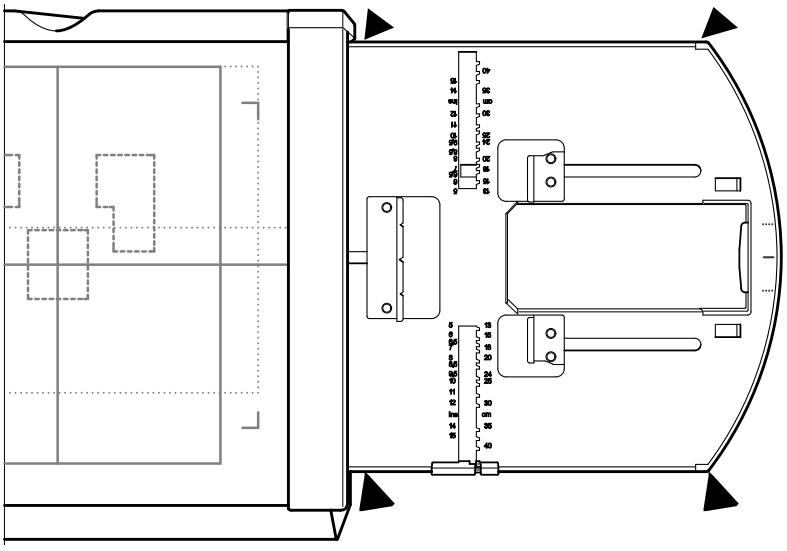
- Pay attention to the danger zones in which patients or operating personnel could suffer injury by crushing or colliding.



Danger zones at the wall stand



Danger zones at the wallstand with pulled-out Bucky tray



Saftey during patient examination

Correct image orientation - patient orientation

It is the responsibility of the operator to ensure correct image orientation on the monitor or film.



Caution

Incorrect patient position data or Image flipped.

Danger of incorrect diagnosis, for example confusion between up, down, left, and right.

- The examiner is responsible for using the functions and interpreting the images correctly and the consequences resulting from it.
- Check patient position data in the current image to exclude any errors.



Warning

Operation of the systemby non-trained users

Risk of incorrect diagnosis or treatment due to misinterpretation of image information.

- The system must only be used by persons with the necessary specialist knowledge, for example, physicians, trained radiologists, or trained technologists, after an appropriate application training.

Visual contact to patient

The operator of the X-ray system must ensure that there is visual and acoustic contact with the patient, thus making it possible to remain informed about the condition of the patient at all times.

Room lighting

According to DIN 68 68-57[1] the lighting in rooms in which diagnoses are made on image display devices (monitors) must fulfill the following requirements:

- ❏ The lighting must be adjustable and glare-free.
- ❏ The setting of the illuminance must be reproducible (for example, dimmer with scale).
- ❏ No mirroring or reflections of windows, lights, view boxes, and so on, must occur in the operating position of the monitors.

Prerequisites for diagnosis and treatment planning

The Fluorospot Compact Imaging System software has been designed and tested for use in diagnosis and treatment planning based on digital radiographic X-ray images and series. To ensure that the imaging system produces monitor images suitable for these purposes, the monitor must meet certain criteria for image quality.

Checks

Because image quality can deteriorate over time because of aging and normal wear and tear of the monitor and other components, the image quality must be checked at regular intervals (*once per month*) after installation to ensure that the system is still suitable for use in diagnosis and treatment planning.

These checks and the intervals required are described in the **Maintenance Plan**.



The operator must ensure that qualified personnel are chosen and that the criteria for image quality described in the installation and maintenance instructions are fulfilled.

Test images

Test images for the calibration of the monitor and to test the quality-output of the laser camera, are stored in the system.

For further information refer to the Operator Manual of **Fluorospot Compact**.

[1] valid in Germany

Anatomic measurements



Caution

Images from detector imaging system or cassettes are always projected images because of missing TOD and SID values.

Possibly false diagnosis

- ◆ Do not perform anatomic measurements with projected images.

Monitors

Please observe the following information:

- ❏ The operating indicator must light up.
- ❏ Please keep the ventilation slots of the monitors unobstructed at all times.



Caution

The standard flat panel display is used for diagnosis although it is not intended for this purpose.

Incorrect diagnosis

- ◆ For diagnosis, use a diagnostic display or transfer the image to a workstation.



Monitors are suitable for medical online diagnosis only if special measures to assure image quality are adopted (especially determining the brightness and contrast values).

In case of doubt, film images on a hardcopy camera if you want to make a diagnosis.

Siemens undertakes no liability for diagnoses which are performed on non-Siemens monitors or on monitors not calibrated by Siemens.

Use of hardcopy cameras

Only hardcopy cameras approved by Siemens may be used. Approvals by Siemens refer to DICOM image type XA. Siemens does not accept any liability for diagnoses made on the basis of images from non-approved hardcopy cameras.

Radiation protection

The X-ray equipment Luminos Fusion with radiation protection complies with IEC 60601-1-3 : 2008.

Mode of operation Continuous operation with Intermittent loading

Important information



Caution

Redundant accessories and auxiliary devices within the path of X-ray

Limited image quality

- Remove all accessories and auxiliary devices which are not used for the examination.
- Remove all radiopaque parts from the radiographic field, if possible.
- Make sure that all accessory parts are firmly attached.

The automatic format collimation system for acquisition and fluoroscopy modes, pulsed fluoroscopy, CAREPROFILE[1] - collimation without radiation - and CAREPOSITION[1] - positioning - as well as the automatic dose rate control including CAREFILTER - automatic copper filter system - help reduce the radiation dose to the patient and examiner considerably.

„Reducing radiation with C.A.R.E.“ on page 47.

Please observe the following:

Fluoroscopy

- Release fluoroscopy for as short a time as possible, use the LIH function!
- Make use of dose-saving fluoroscopy with CAREVISION!
- Collimate radiation-free in the LIH image; you can also set the filter diaphragms in the LIH image without radiation: CAREPROFILE[1]
- Position the patient radiation-free in the LIH image: CAREPOSITION[1]

[1] Optional

Radiation protection for the patient

- If possible, ensure the best possible protection of the patient during fluoroscopy band acquisitions in the vicinity of his or her reproductive organs (use gonadal shields, lead-lined rubber covers).
- Keep the radiation field as small as possible without reducing the active measuring field.
- Remove all radiopaque parts from the fluoroscopic or radiographic field, if possible.
- Set the X-ray tube voltage as high as possible (not forgetting the image quality; the optimum is 63 kV for iodine contrast).
- Set the X-ray tube to skin distance as large as is reasonable for each examination.

Radiation protection for the examiner

- If possible, release the acquisition series in the control room.
- The duration of your stay in the control area should be as short as possible.
- Wear protective clothing in the control area during examinations.
- Maintain the maximum possible distance from the source of radiation.
- Check your personal dose by wearing a radiation monitoring badge or a pen dosimeter.
- If possible, use mechanical protective shields (protection for upper and lower body). These contribute greatly to your personal radiation protection.

Switching off in an emergency

If a problem, for example a defect, occurs during the examination and radiation can no longer be interrupted by letting go of the radiation release button:

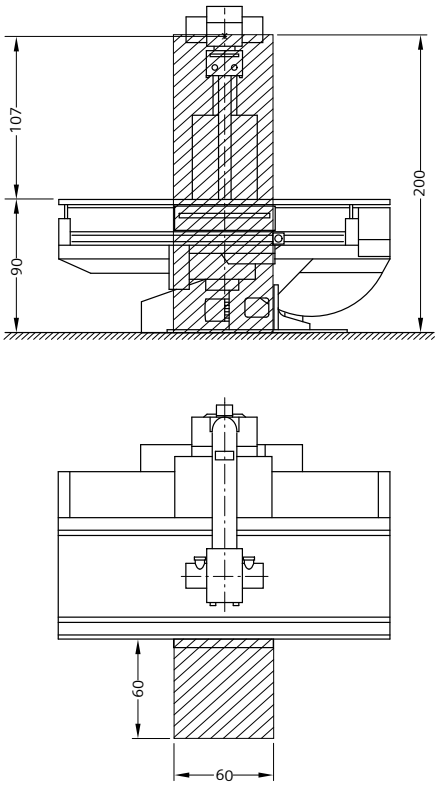


- Press the nearest emergency STOP button.

Radiation protection zones

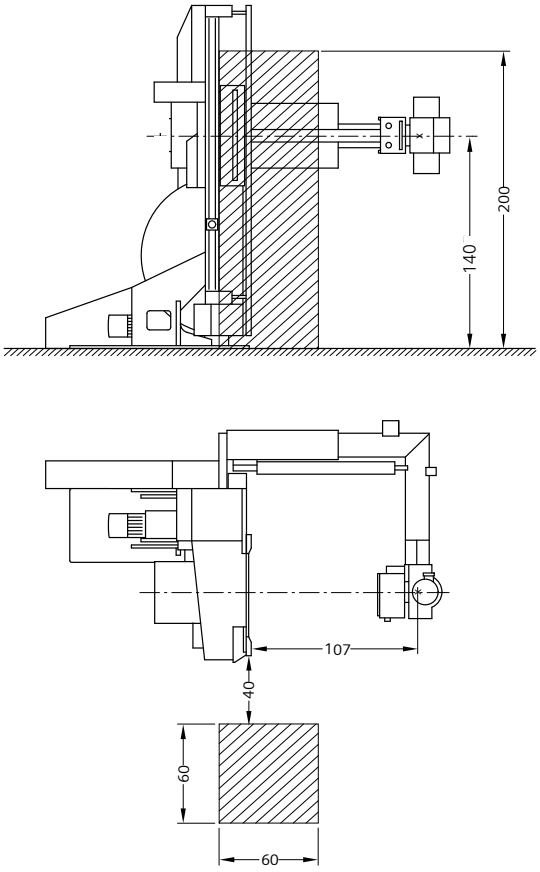
Position and size of the main operating area

Horizontal patient table



Main operating area
Dimensions in cm

Vertical patient table:

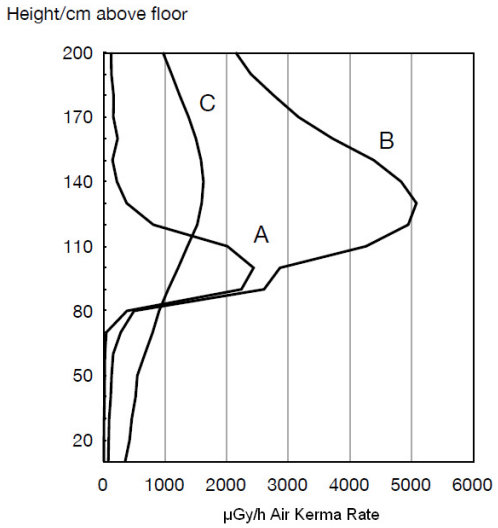


Main operating area
Dimensions in cm

Luminos Fusion table

Stray radiation in the main operating area according to DIN EN 60601-1-3

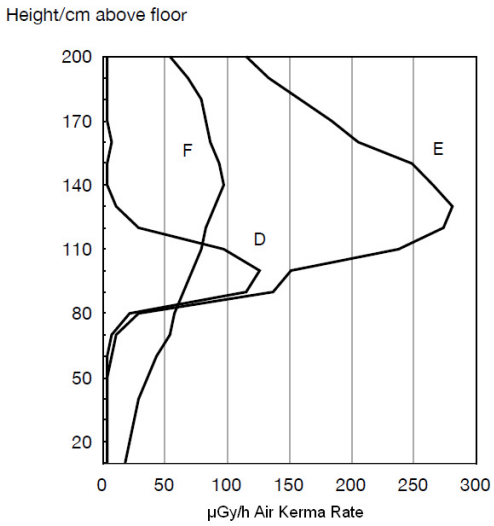
Tolerance of the air kerma measurements ± 5%



Characteristic A: Continuous fluoroscopy 110kV, 3mA, horizontal, with Radiation Protection, Removable

Characteristic B: Continuous fluoroscopy 110kV, 3mA, horizontal

Characteristic C: Continuous fluoroscopy 110kV, 3mA, vertical



Characteristic D:	Antiisowatt, horizontal, with Radiation Protection, Removable
Characteristic E:	Antiisowatt, 75 kV, 13.3 mA, 15 p/s, horizontal
Characteristic F:	Antiisowatt, 75 kV, 13.3 mA, 15 p/s, vertical

Reducing radiation with C.A.R.E.

The C.A.R.E. package (**C**ombined **A**pplications to **R**educe **E**xposure) comprises:

- ❏ CAREMATIC
- ❏ CAREFILTER
- ❏ CAREPROFILE[1]
- ❏ CAREPOSITION[1]
- ❏ CAREVISION
- ❏ CAREMAX[2]
- ❏ Please contact your Siemens sales engineer for information about C.A.R.E. radiation protection.

CAREMATIC Automatic X-ray control system for fully automatic calculation and optimization of the exposure data based on fluoroscopic values.

CAREFILTER The CAREFILTER function comprises various copper filters. These filters are used to filter out the low-energy components of the X-ray spectrum that are not needed to create the image. This causes hardening of the beam, reducing not only the skin dose for the patient but also the scattered radiation for the examiner.

Automatic dose rate control calculates the water equivalent of the patient from the current kV/mA values and the pulse width. The additional copper filter is automatically moved in or out of the beam path as a function of this value during acquisition if the image quality becomes unacceptable because of a very high patient density.

The CAREFILTER function is automated and cannot be operated manually.

CAREPROFILE[1] With CAREPROFILE, the positions of the multileaf collimator and the filter diaphragms are displayed graphically in the last fluoroscopic or acquisition image. In this way you can change the collimation without additional radiation release.

CAREPOSITION[1] CAREPOSITION allows you to reposition the patient with the aid of the last fluoroscopic image (LIH) without additional fluoroscopy.

CAREVISION With CAREVISION, you have at your disposal a selection of fluoroscopy modes with different pulse rates that you can use to reduce the patient dose cons iderably.

CAREMAX[2] With a dose measuring chamber, which is mandatory in some countries, the area dose product and the patient dose (skin dose) are shown on the data display and on the system console and recorded in the examination data.

[1] Optional
[2] Mandatory in EU and other countries

The dose measuring chamber must be calibrated at regular intervals. This is done under the terms of a service contract. If you do not have a service contract, Siemens Service or the manufacturer can calibrate the dose measuring chamber.

During fluoroscopy/ acquisition

❏ The *current* values of the patient dose rate

Without radiation

❏ The *accumulated* values of the patient dose or[1] the relative patient dose in percent (%) related to a configurable limiting value (usually 2 Gy)

as well as:

Permanently

❏ The accumulated *area dose product*

If the dose area product exceeds a certain limit value, radiation injury (initially reddening of skin) may occur on the patient.
This information allows the examiner to avoid radiation injury, for example by changing the angulation.

The measuring device must be calibrated at regular intervals. This is done within the scope of a maintenance contract. If no maintenance contract has been concluded, the measuring device can be calibrated by the SIEMENS Uptime Service of the manufacturer.



Caution

Incorrect calibration

Inaccurate results possible

- The examiner is responsible for applying the correct calibration method.
- Perform calibration carefully.

[1] configurable. Contact your Siemens Service representative, if you prefer a different display.

Avoiding unwanted radiation

- Before starting system movements, make sure that the foot switch for fluoroscopy and radiography in the examination room is not in the travel range of the receptor system.



Caution

During free exposure & Bucky wall stand exposure with 3D top(second plane), the tube is not oriented to cassette.

Risk of unwanted radiation

- Be careful when using the free exposure mode & Bucky wall stand exposure with 3D top (second plane).

Interventional application

Caution

Due to the complexity of the system, the loss of radiographic imaging or other system functions during an exam can not be completely excluded.

Delayed or no diagnosis; possibly suboptimal treatment

- Please consider the need to establish emergency procedures.

- For interventional examinations, the system must be horizontal.

Cardiopulmonary resuscitation (CPR)

Pressure compression and maximum permissible patient weight



The Luminos Fusion system is designed for cardiopulmonary resuscitation (CPR) with a pressure compression of up to 500 N (50 kg).
This warning sign indicates that the patient table and the footrest can be loaded with a maximum weight.

This warning label indicates the position of the tabletop for cardiopulmonary resuscitation (CPR) with a pressure compression of up to 500N(50kg).

Only begin CPR when the tabletop is positioned over table support or table base or table column.

Free space

There should be sufficient free space for CPR.

- Remove any objects, such as chairs, trolley, from the examination area.

Cleaning and disinfecting (interventions)

Prevention
- Use sterile covers.

System parts
The following system parts can come into contact with body fluids, contrast medium and so on:

System part	Special cleaning measures
Control modules	◆ To prevent system movements, press an emergency STOP button.
Hand switch, Foot switch	◆ To prevent radiation release, activate **Block Radiation** in the **Exam** task card on the touchscreen control.
Injector	Refer to the **Injector Operator Manual**

Radiation protection (interventions)

High skin doses
The system is intended for procedures that, with proper use of the system, involve high skin doses (mainly due to the long examination times), which presents a risk of radiation injury.

Exam Sets
The dose is determined in the exam sets (fluoro/roadmap and acquisition programs).

The available exam sets depend on the system type and the profile set.
The system comes preinstalled with a number of exam sets.
For further information on the preinstalled examination sets ask your applications specialist.

- Select only suitable examination sets for the examination.
- If possible, select a dose-saving fluoro/acquisition program.
  – Fluoro programs with a lower dose are further to the left.

Door contacts

Recommended:
In case of interventional applications, a current procedure should neither be interruptible by door contacts nor by other measures.

Remedy:
Install door contacts (or have them installed) in such a way that an interruption can be made unavailable.

Programs for interventions
Contact your Siemens service engineer in this regard.

Protective measures

Avoiding equipment damage

- Before activating system movements, especially tilting the table, make sure that the movement range is free of obstructions.



No collision monitoring!

- Move especially monitor support systems, operating consoles, gurneys, beds and instrument tables out from the tilting range of the table.
- Remove chairs, steps, stands, waste containers, and similar objects from the movement area

- Move monitor support systems, operating consoles, gurneys, beds, and instrument tables out of the tilting range of the table.
- Remove chairs, steps, stands, waste containers, and similar objects from the movement area.
  – No collision monitoring!
- Do *not* stand at any place on the covers of the table support.
  – The covers can be deformed.
  – Components located underneath them are damaged and thus lead to operating disturbances.
- Do *not* place any objects or consumable material on the cover of the table support, on the detector and on the longitudinal guides of the stand carriage.
  – Considerable forces which can damage these objects in the area of movement of the systems arise during movements of the tabletop.
- Do *not* place any loose objects anywhere on the table.
  – These objects could fall down when the table is tilted, causing injury or damage.
- Do not place any objects on the operating areas of the control consoles and the tableside control.



Warning

Unintentional activation of control elements for movements

Collision with patient, operator or equipment

- Do *not* load the remote console with any objects, accessories, folders or documents.
- Use the following workflow for free exposure:

Unintentional activation of control elements for movements

Collision with patient, operator, or equipment

- Select Acq mode: free exposure.
- Rotate the tube assembly accordingly.
- Tilt the stand and move it to the correct SID.
- Position the patient.
- Control patient and stand.
- Do *not* let patient stay in system area during absence of operator.

Do not place folders next to the operating area of the control consoles and next to the table-side control.
Folders falling down might cause unwanted system movements.

- In vertical table positions do not use following system parts as a seat or support:
  - Stand column
  - Tube assembly support arm
  - Tube assembly cover
  - Primary collimator
  - Compression device.

This unallowed loading can lead to material breakage and damage to bearings.

- Never put contrast medium cups or open containers with liquid or pasty contents on the unit, on the remote console or on the control cabinets.
  - Contrast medium can spill, leak or overflow into system parts and lead to operational disturbances of the unit or to misinterpretation of exposures.
- When storing contrast medium in the cup holder on the compression carriage, use only cups with a maximum volume of 0.25 liter made of unbreakable materials, that is, under no circumstances glass or porcelain.
  - Remove contrast medium traces immediately!



Caution

Movement without intentional activation of control elements.

Risk of collision, risk of injury to patient or operator, risk of damage to unit parts.

- If movement does not stop, press the nearest emergency STOP button

Protection against electric shock

Attention:

To avoid the risk of electric shock, a protective conductor must be implemented when connecting this device to mains power.

Power supply

For all products that are operated within an X-ray system, the power supply must be made through a contactor or other multipole circuit breaker installed on-site.

The room installation must comply with DIN VDE 0100-710 or the corresponding national regulations.

Injector connector

When the injector is removed from the table, the adapter must also be removed from the connector on the table for safety reasons.

Power outlet

The multipurpose power outlet on the patient table is *not* switched off and on with the system.

Only devices which accord to IEC 60 601-1 must be connected.

Covers

If socket covers (especially of the operating modules) are damaged, they must be replaced.

In the event of defects, for example, if a covering cap has broken off:

◆ Call Siemens Service.

Protection class



The system belongs to protection class I with a type B applied part according to IEC 60601-1.

Protection against ingress of water:

❏ IPx8: footswitches

❏ IPx0: rest of the system

Equipotential bonding

Systems for which equipotential bonding is recommended must only be operated in medical facilities where supplemental equipotential bonding has been installed and tested according to the specifications in DIN 57107/VDE 0107/ 6.81 section 5 (Federal Republic of Germany) or the relevant local and federal regulations.

Opening the units

Only authorized service personnel are permitted to open the units.

Mechanical safety

Power failure

Without system UPS (Uninterruptible Power Supply)

- In case of a short power failure, please try to switch on the system after some seconds.
- If it was possible to switch on the system, please wait until the system is ready.
- Then continue working or rescue the patient.
- If it was not possible to switch on the system or if the patient has collapsed, remove the patient immediately.

With system UPS

- In case of a power failure, please switch on the system within 10 s.
- If the system is ready again, continue working or rescue the patient.
- If the patient has collapsed, remove the patient immediately.
  – For more details on the UPS refer to UPS (Uninterruptible Power Supply) „UPS“ on page 9

Maximum weight



Caution

Mechanical overload of system parts

Parts could be damaged or fall down.

Patient or user can be injured.

- Consider maximum patient weight including maximum additional accessories.



The permissible patient weight with which you can load your tabletop is stated on the label on the tabletop and in the technical data.

The patient weight includes any parts permanently or loosely connected with the patient, such as equipment, prostheses, implants, plaster casts.

In the interest of operating safety for the patient and unit, the permissible patient weight must not be exceeded.

Example of incorrect use

A patient with a maximum weight sitting at the end of a fully extended tabletop.

Maximum load



The component must not be loaded with more weight than indicated.

Damage to the tabletop

A damaged tabletop is a potential hazard to the patient!

When the patient tabletop collides with an obstacle such as a bed or instrument table, hairline cracks can result.

- Call Siemens Service and have the tabletop checked immediately if it is possible that it might have been damaged (for example, accidental collision with the patient's bed)!

Warning signs

Special danger points are marked on the unit with a warning sign:

Danger of crushing



This warning sign indicates possible danger of crushing for patient and/or examiner.

Risk of collision



However, under certain circumstances, additionally installed components, for example lead protective screens, lamps, auxiliary equipment and so on, can cause collision with the system.

To protect these components and also to protect the patient, such components are provided with the warning sign shown on the left.

We can provide you with these warning signs. Siemens Service will also attach them to additionally installed components on request.

Cardiopulmonary resuscitation



This warning sign shows the position of the patient table in cardiopulmonary resuscitation (CPR) with pressure compression up to 500N (50kg).

General danger

Caution, always observe the Operator Manual!



This warning notice indicates that special instructions can be found in the Operator Manual.

Please read the Operator Manual.

Grip locations

When handling the system correctly and when positioning the patient, operators and patients should use only the grip locations provided for this purpose.

The following grip locations are provided:

❏ 1 angled handgrip (front)

❏ 1 protection strip (head end)

❏ 1 handgrip rail (back)

◆ Ensure that the angled handgrip rail, the protection strip and the handgrip rail are always attached.

If these grip locations cannot be used:

◆ Pay special attention to the stated possibilities of crushing between moving parts and their guide openings.

◆ Ensure during the examination that the patient under no circumstances holds on to the edges of the patient table.

Not intended as gripping point:

The handle for turning the tube assembly must not be used as grip location or hold for the patient.

Patient positioning

❏ All safety-related equipment must be installed and operable. In particular the handgrip rail (head end), the protection strip (lateral), angled handgrip, footrest and shoulder supports.

❏ The hands, arms, legs, head and hair of the patient must not extend unsecured beyond the edge of the tabletop.

❏ Observe the patient while moving the tabletop and in system movements and take care that any catheter is correctly located.

❏ In examinations with the table tilted up vertically, the footrest serves as an adjustable step or seat.
– Ensure that the footrest is locked together with the tabletop on both sides.
– Check the firm location of the footrest.



Caution

Patient falls from side of table while turning over.

Cuts and other injuries

- Use the protection strip or the handgrip rail.



Caution

Hair, clothes and tubes or cables caught in table

Cuts and other injuries

- Be careful with hair, clothes and tubes or cables caught in the table.

Patient positioning with unit in vertical position

During examinations with the unit in the upright position there is a risk of crush injuries to the patient if the X-ray system (stand with tube unit) is moved in the longitudinal direction.

- Position the X-ray system approximately in the acquisition position.
- Move the patient into the acquisition position.
- Set the X-ray system to object height. Always watch the patient when starting this movement.

Remote compression

- The motor-driven compression device requires special care on the part of the examiner for the applied compression forces, especially in the case of frail (for example infants), sick and elderly patients.
- There is an increased risk of crushing and injury for the patient.
- Furthermore, there are considerable mechanical shearing forces with risk of damage between the compression cone and attached accessories by collision during the motor-driven tabletop movement.

Rescuing the patient in an emergency

For example, in case of power failure, motorized system movements are not available. However, you can move parts of the system manually.



Caution

Power failure during compression.

The patient is squeezed between compression cone and patient table.

Risk that the patient cannot be removed from the patient table.

- To rescue or release the patient from the system, proceed as described in the following.



During the following steps make sure that the patient is not crushed!

Personnel

- Use enough personnel for the rescue.

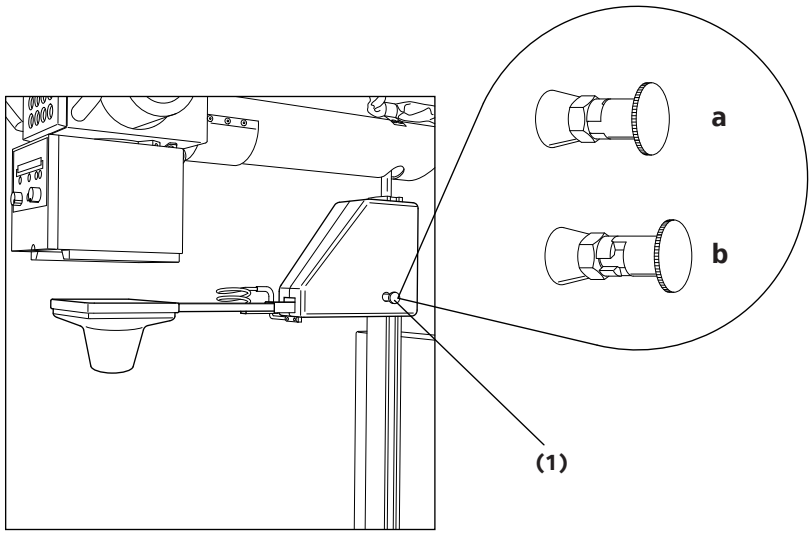
Accessories

- Bring accessories into a position which makes rescue possible.

If the patient is compressed with the cone

- Pull out the knob (1) from the engaged position b and turn it by 90° until it engages in the deep notch (notch position a).

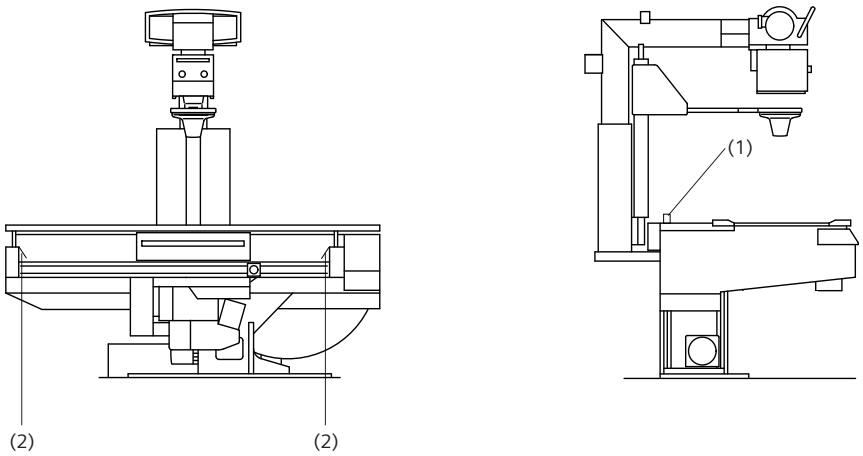
Lift the cone arm off from the patient until it locks in a position of about 10°.



Immobilization

- Loosen any fixtures.

Safety devices



(1) Switch rail between tabletop and stand

(2) Switch rails in each case at the end of the travel of the detector.

On activation of one of the safety devices all system movements stop and are blocked.

This means that the user cannot move out from the blockage by himself.

If it is not possible to remove the obstruction causing the problem, call in the Siemens Uptime Services.

Movements are possible again only after all safety devices have been deactivated.

Combination with other products or components

To ensure the necessary safety, only products or components expressly approved by Siemens AG, Healthcare Sector, may be used in combination with the system.

To find out about the current state of the equipment and the combinations and upgrades currently approved:

- Please contact your authorized local sales representative.

Interfaces

Accessory equipment connected to the analog or digital interfaces must be certified according to the respective IEC standards (for example IEC 60950 for data processing equipment and IEC 60601-1 for medical equipment).

Furthermore all configurations shall comply with the valid version of the system standard IEC 60601-1.

Everybody who connects additional equipment to the signal input part configures a medical system. He is therefore responsible that the system complies with the requirements of the valid version of the system standard IEC 60601-1.

If in doubt, consult the technical service department or your local representative.

Product service life

Our medical engineering products are designed for operation under average conditions in accordance with the Operator Manual for a useful life of 10 years. If the products are operated for longer than this time, additional checks and possibly repairs beyond the usual maintenance procedures may be necessary to ensure the functional integrity and operating safety of these products. Please talk to us about these measures early enough!

IT-security statement

The device can be connected to an IT- network. In this case, detailed information regarding the combination and the risk caused by the combination are described in the IT-security statement of Accompanying Document.

Disposal

Equipment disposal

On disposing of the complete system or parts thereof, currently valid environmental legislation must be observed.

Examples of environmentally relevant components are:

- ❏ Accumulators and batteries
- ❏ Transformers
- ❏ Capacitors
- ❏ Monitor picture tubes
- ❏ Phantoms

For details contact your local customer service representative or your Siemens regional office.

System components which are hazardous to persons or the environment must be disposed of with care and in compliance with legally binding

For all countries of the EU

In the member states of the European Union (EU) Siemens will take back and will dispose of the packing material of your system.



Products bearing this symbol are subject to EC directive 2002/96/EC on waste electrical and electronic equipment (WEEE), amended by 2003/108/EC. Thisdirective determines the framework for the return and recycling of used equipment as applicable throughout the EU.

For details about take-back and disposal of the product respectively its components or accessories please contact your local Siemens customer service or your Siemens regional office.

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System overview

Components

The basic system is equipped with a solid-state flat panel detector for universal use. It is suitable both as intensively used universal workstation and as a highly loaded special workstation.

Luminos Fusion is a universal X-ray diagnostic unit with:

- ❏ Gently starting and braking system movements
- ❏ Two-stage setting of the source-image distance
- ❏ Table tilt + 90° to - 17° with soft start and braking
- ❏ Motor-driven longitudinally and transversely moving tabletop
- ❏ Flat panel detector with a large axial travel range
- ❏ Fluoroscopy and imaging system with ergonomic remote control
- ❏ Integrated system movement control on the tableside control panel
- ❏ 3D ceiling-mounted X-ray tube assembly[1]
- ❏ Oblique projection and tomography in all table positions[1]

Application capabilities

The systems, depending on the configuration must be suitable for all examinations possible in an examination room today.

This includes:

- ❏ Fluoroscopy through flat panel detector
- ❏ Digital fluororadiography DFR
  - – Single acquisitions
  - – Series acquisitions
  - – Digital subtraction angiography
  - – Scan technique
- ❏ Digital radiography DR
  - – Single acquisitions
  - – Tomography
- ❏ Free exposure with Cassette
- ❏ Cassette exposures onto the Bucky wall stand

[1] Optional

System configuration

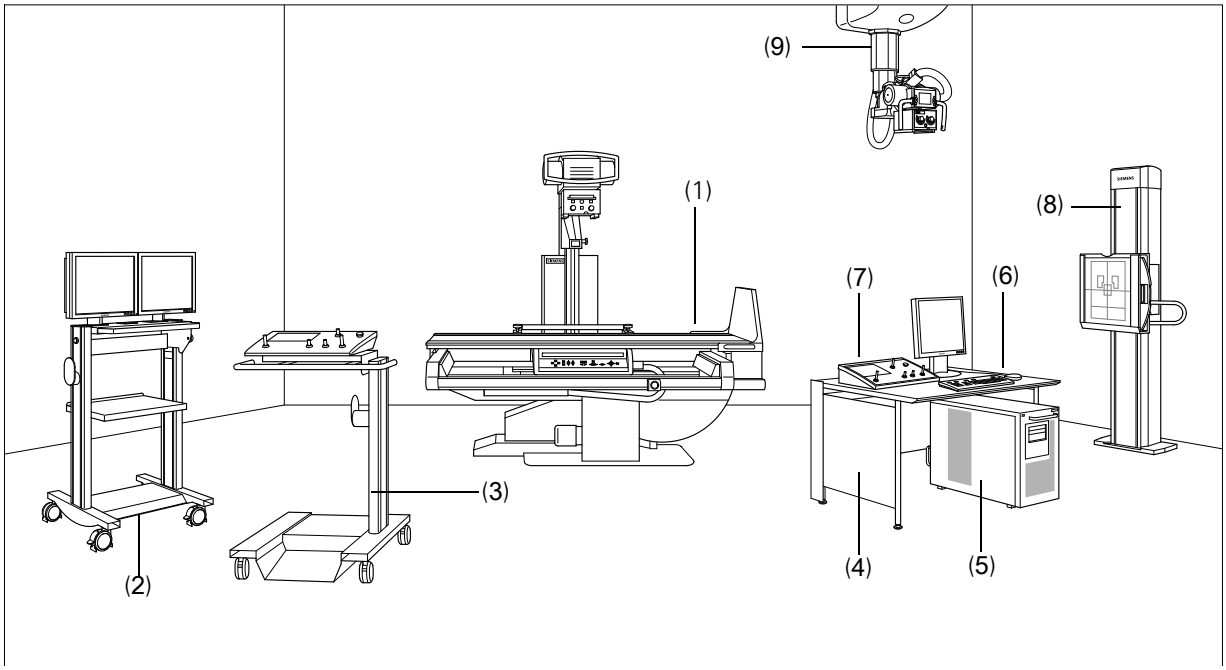
Standard version

- ❏ Luminos Fusion table
- ❏ System control console
- ❏ Flat panel detector
- ❏ OPTITOP X-ray tube assembly
- ❏ F65 / 80 X-ray generator
- ❏ Multileaf collimator
- ❏ 19" TFT flat display
- ❏ FLUOROSPOT Compact
- ❏ DICOM functions
  - – DICOM Image send
  - – DICOM Image print
- ❏ Accessories
  - – Footrest
  - – Handgrip rail
  - – Handgrip angled
  - – Protection stip
  - – Shoulder support

Additional components

- ❏ Ceiling-mounted tube support
- ❏ Bucky wall stand
- ❏ Reference image monitor
- ❏ Compression device
- ❏ Display trolley
- ❏ Measuring device for dose area product
- ❏ Movable control trolley with console
- ❏ Intercom
- ❏ Display ceiling suspension system
- ❏ DICOM functions:
  - – Get Worklist and MPPS
  - – Query/Retrieve

System overview



(1) Luminos Fusion examination unit

(2) Display trolley

(3) Movable control console on trolley

(4) Desk for operating consoles

(5) FLUOROSPOT Compact system PC

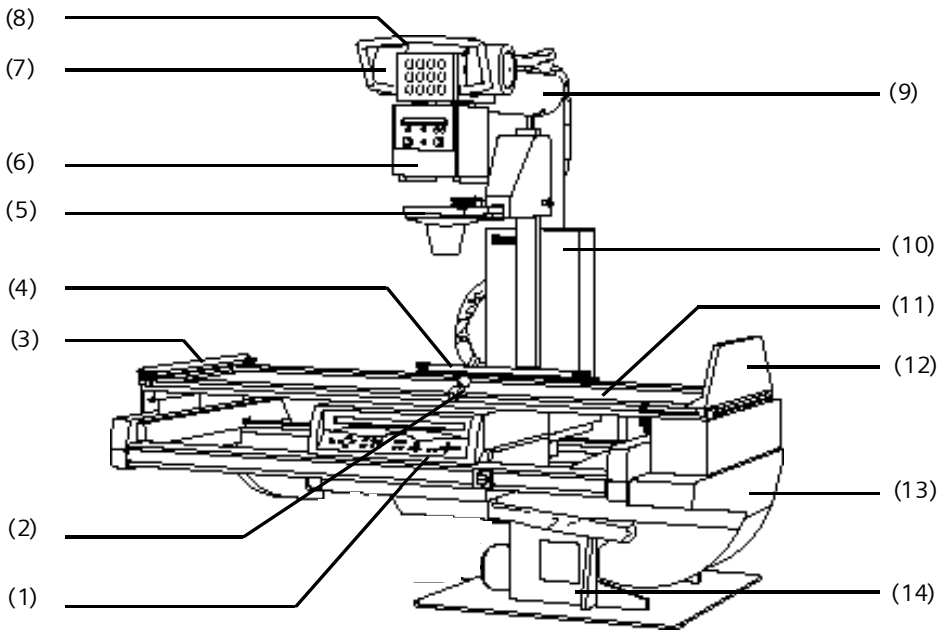
(6) FLUOROSPOT Compact keyboard

(7) System control console

(8) Bucky wall stand

(9) Ceiling-mounted tube support

System table unit overview



(1) Detector with tableside control panel

(2) Adjustable handgrip angled (at the front)

(3) Detachable protection strip (head end)

(4) Adjustable handgrip rail (located on back), secure in all patient positions

(5) Compression device for inserting a compression cone, continuously adjustable compression force

(6) Collimator with automatic format collimation and numeric format indication, with integrated motor-driven additional Cu filters, motor-driven adjustable semi-transparent filters

(7) Air-cooled X-ray tube assembly, partly enclosed, can be swiveled

(8) Handle for swivelling the tube assembly

(9) Tube assembly stand on the longitudinal carriage coupled with the detector and its tableside control panel by centering rod, axially swivelling, telescopic (SID 115 cm and 150 cm)

(10) Longitudinal carriage with attached tube assembly stand, motorized longitudinal travel, precisely controllable speed

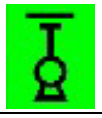
(11) Tabletop with flat accessory rails, motor-driven longitudinal and transverse travel

(12) Footrest, adjustable for use as seat, with attachment points for foot holder, can be changed over from foot end to head end.

(13) Table frame, can be tilted + 90°/-17°

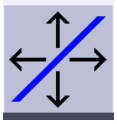
(14) Unit base with tilting drive on installation plate.

Information field

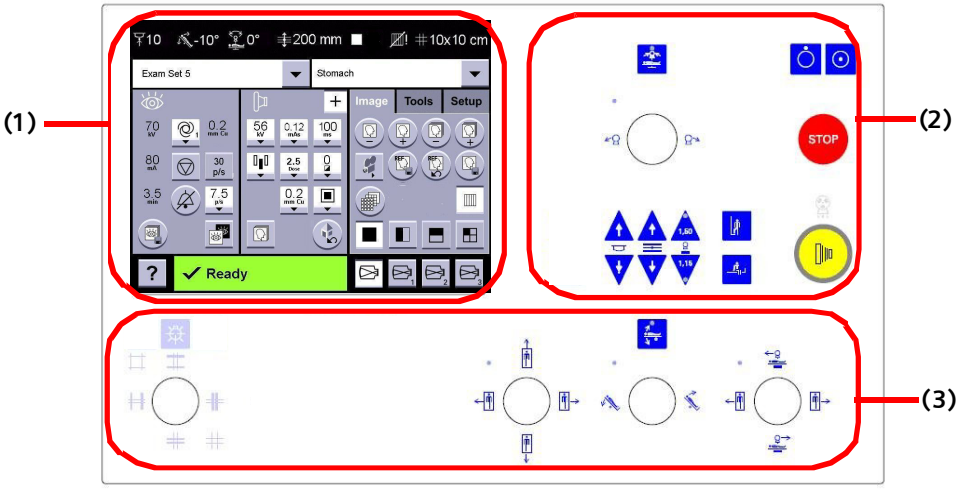
Icon	Description
n.a.	Depending on technique value for Speed, Density, correction, AEC Fields, Focal Spot, kV, mAs, ms on screen.
	**Tube rotation angle:** Values from -XX° to +XX° are displayed.
	**Selection of 2nd Plane:** 2nd Plane selected.
	**Portrait:** Display fields in portrait format.

Control field

General functions

Icon	Description
	Setting of control element disable function.
	If activated, all buttons of the tube stand and other components such as BWS and patient table are disabled!

System control console (SCC)



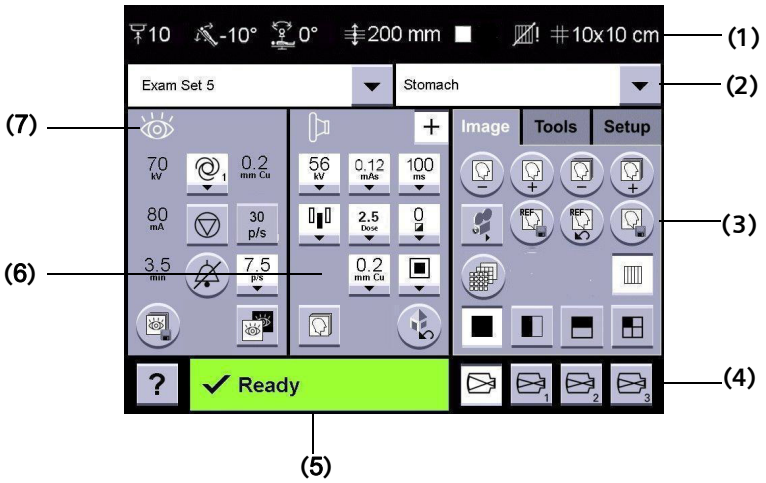
The SCC consists of three main parts:

(1) Touch user interface (TUI)

(2) Hardware buttons panel

(3) Joystick panel

Touch user interface (TUI)



(1) Status area

(2) Organ program selection

(3) Tab cards **Image**, **Tools** and **Setup**

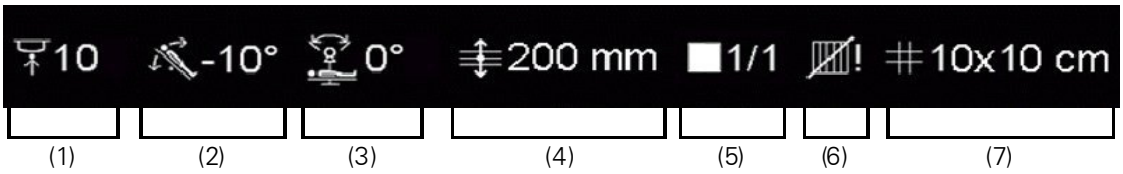
(4) Zoom format selection

(5) Message area

(6) Acquisition

(7) Fluoro

Status area



(1) Display of the set compression level, only in connection with the compression device

(2) Table tilt angle

(3) Oblique projection angle

(4) Fulcrum height (axial oblique projection = isocenter) or tomographic height

(5) Fill status or display for segmentation format

(6) Grid status

(7) Collimated field of view

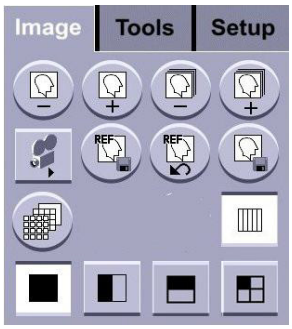
Organ program selection

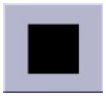
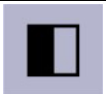
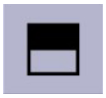
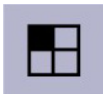


(1) Exam set popup menu

(2) OGP popup menu

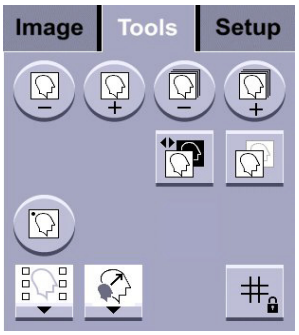
Image tab card



Icon	Short description
	Grid in or out by motorized control
	Image segmentation off
	Image segmentation for two segments left/right
	Image segmentation for two segments top/bottom
	Image segmentation for four segments

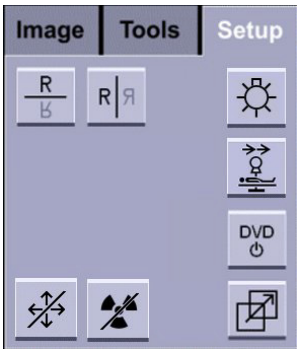
→ For other icons, please refer to the **Fluorospot Compact** operator manual.

Tools tab card



Icon	Short description
	Mark/unmark single image for filming/sending
	Preselect/set laterality label
	Magnification
	Lock collimation

Setup tab card

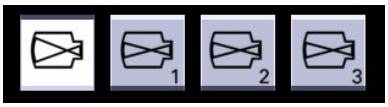


Icon	Short description
	Preselect horizontal flipping on/off
	Preselect vertical flipping on/off
	Room light on/off
	Periscanning
	DVD recording
	Disable movement
	Disable radiation
	Careposition*

* Optional

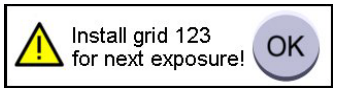
Zoom format selection

In this area, you can select the flat panel detector zoom formats from full format to zoom stages 1, 2 or 3.

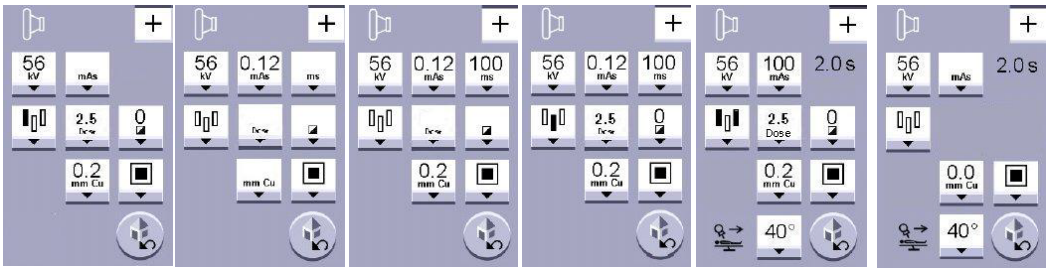


Message area

In the message area, errors and system messages are displayed as, for example:

Icon	Short description
	Status **Ready (no confirmation)**
	Message with confirmation

Acquisition area



(1) (2) (3) (4) (5) (6)

The acquisition area shows displays and icons relevant for acquisition with

(1) 1-point technique

(2) 2-point technique

(3) 3-point technique

(4) 3-point technique with IONTOMAT

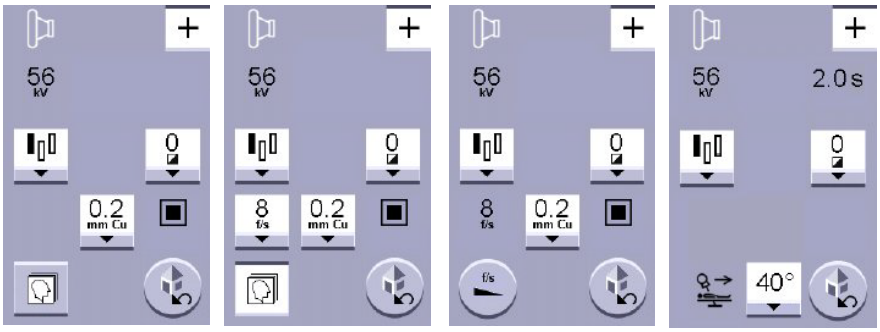
(5) mAs tomo technique

(6) Plani-Iontomat tomo technique

Icon	Short description
	Tube voltage in steps of 0.5 EP [kilo volts]
	Product of tube current and time in steps of 1 EP steps [milli ampere seconds]
	Pulse width in steps of 1 EP [milli seconds]
	Measuring fields (dominants)
	Exposure correction in exposure points [EP] in steps of 0.5 exposure points
	Cu filter selection in mm (0.0; 0.1; 0.2; 0.3)
	Focus: large/small
	Restore OGP parameters

Icon	Short description
	Select the tomo angle: 8°, 20°, and 40°

DR techniques



(1) (2) (3) (4)

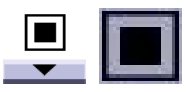
The acquisition area shows displays and icons relevant for acquisition with

(1) DR 0-point single technique

(2) DR 0-point series technique

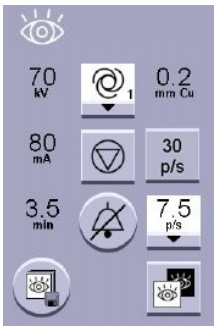
(3) DR 0-point technique with variable framerate

(4) DR tomo technique

Icon	Short description
	Tube voltage in steps of 0.5 EP [kilo volts]
	Measuring fields (dominants)
	Exposure correction in exposure points [EP] in steps of 0.5 exposure points
	Acquisition frame rate
	Cu filter selection in mm (0.0; 0.1; 0.2; 0.3)
	Focus: large/small

Icon	Short description
	Series
	Restore OGP parameters
	Select the tomo angle: 8°, 20°, and 40°

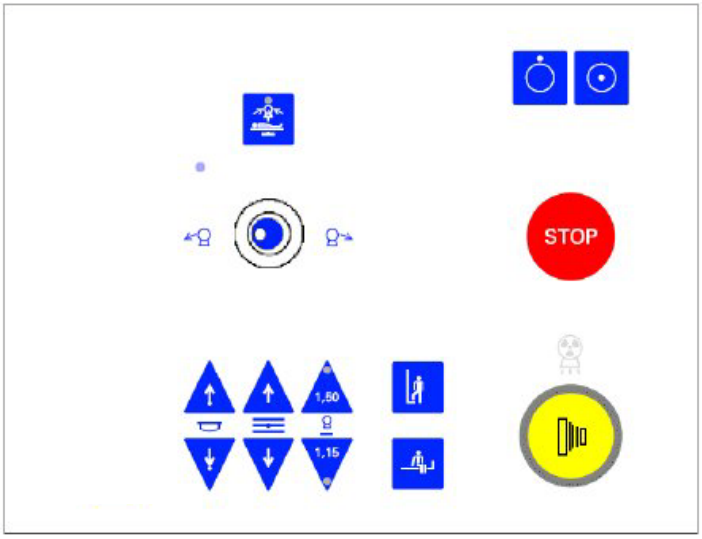
Fluoro area

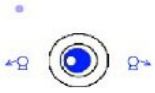


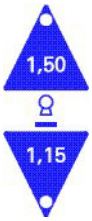
The fluoro area shows displays and icons relevant for fluoroscopy.

Icon	Short description
kV	Tube voltage [kilo volts]
mA	Tube current [milli amperes]
min	Elapsed fluoro time [minutes]
mm Cu	Filter display
	Fluoro curve 1, 2, or 3
	Regulation stop on/off
	Reset fluoroscopy signal
	High speed fluoroscopy
	Fluoro pulse rate
	Store fluoro loop
	Roadmap

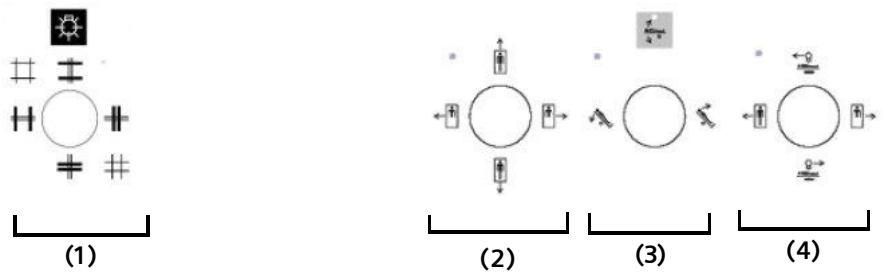
Hardware buttons panel



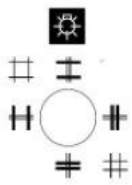
Icon	Short description
	ON button
	OFF button
	◆ Moving tube/detector into 0° position ◆ In Tomography mode, moving system to the tomographic position (in the middle of table frame)
	Joystick for the oblique beam angulation LED is on: Action is active
	Red emergency stop button
	❑ Moving compression cone up ❑ Moving compression cone down

Icon	Short description
	❏ Fulcrum height for oblique projection (= isocenter) ❏ Tomographic height setting above tabletop
	❏ Increasing SID up to 150 cm with indication when reached ❏ Decreasing SID up to 115 cm with indication when reached
	Automatic system positioning for upright patient transfer
	Automatic system positioning for horizontal patient transfer
	"Radiation ON" indicator – Symbol lights up orange **Note**: Immediately interrupt fluoro, when the "Radiation ON" indicator lights up and there is no image on the screen or the LIH does not disappear.
	Exposure release button with pre- and main contact

Joystick user interface



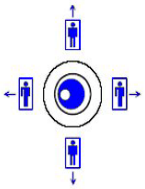
(1) Collimator functions



❏ Button for switching the laser light localizer on or off

The laser light localizer switches on automatically when the radiation field is changed.

❏ Joystick module:
- Horizontal deflection opens or closes width blades (left: opens; right: closes)
- Vertical deflection opens or closes height blades (up: opens; down: closes)
- Diagonal deflection up left opens width and height blades
- Diagonal deflection down right closes width and height blades.

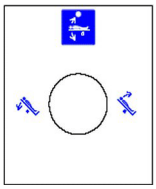


(2) Tabletop movement

❏ Horizontal deflection for transverse tabletop movement

❏ Vertical deflection for longitudinal tabletop movement

→ LED is on: Action is active

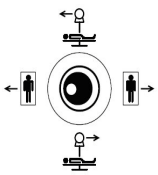


(3) Table tilt

❏ Configurable button with LED for enabling (LED off) or disabling (LED on) stop in 0° position

❏ Joystick module:
- Horizontal deflection to the right tilts table in positive (feet) direction
- Horizontal deflection to the left tilts table in negative (head) direction (Trendelenburg

→ LED is on: Action is active



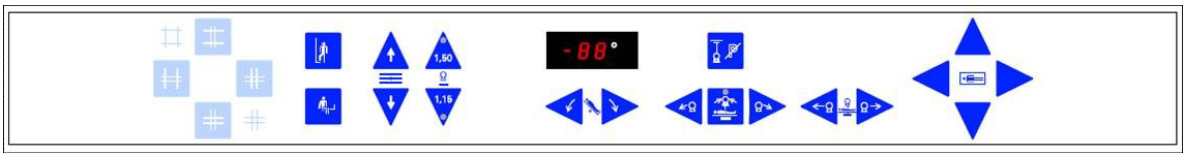
(4) System movement

❏ Horizontal deflection for transverse tabletop movement

❏ Vertical deflection for longitudinal movement of X-ray system.

→ LED is on: Action is active

Tableside control panel



System settings

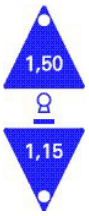


Automatic system positioning for upright patient transfer

Automatic system positioning for upright patient transfer



- ❏ Fulcrum height for oblique projection (= isocenter)
- ❏ Tomographic height setting above tabletop



- ❏ Increasing SID up to 150 cm with indication when reached
- ❏ Decreasing SID up to 115 cm with indication when reached



Table tilt control with display of tilt angle or display of a flashing “E” for an error message





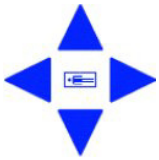
Bypass key for actuating system movements if the ceiling-mounted tube is not in park position.



Tube oblique movement control

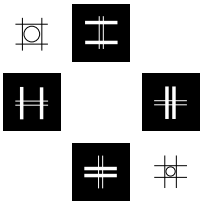


Move X-ray system longitudinally



Coordinate switch for moving tabletop longitudinally or transversely

Collimator settings

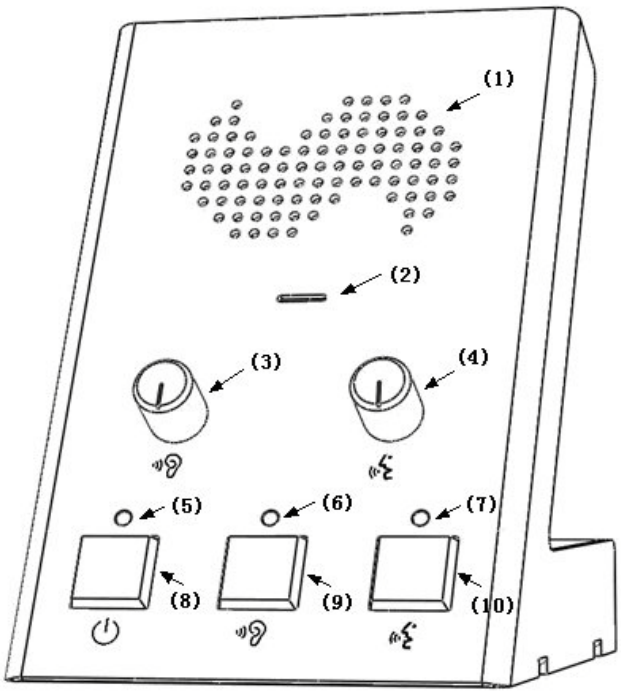


Coordinate switch for open or close

The laser light localizer switches on automatically when the radiation field is changed.

❏ Rectangular primary collimator

Intercom



(1) Loudspeaker

(2) Microphone

(3) Listening (loudspeaker) volume (in the control room)

(4) Speaking (microphone) volume (in the control room)

(5) LED: Power status indication
– LED lights up when power is ON

(6) LED: Listening (loudspeaker) status indication
– LED lights up when the loudspeaker is ON

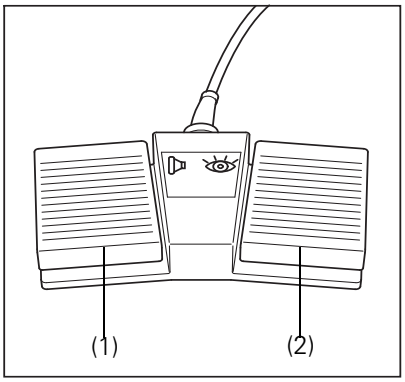
(7) LED: Speaker (microphone) status indication
– LED lights up when the microphone is ON

(8) Power ON or OFF button

(9) Listening (loudspeaker) ON or OFF button

(10) Speaking (microphone) ON or OFF button

Foot switch for fluoroscopy and radiography in the control room

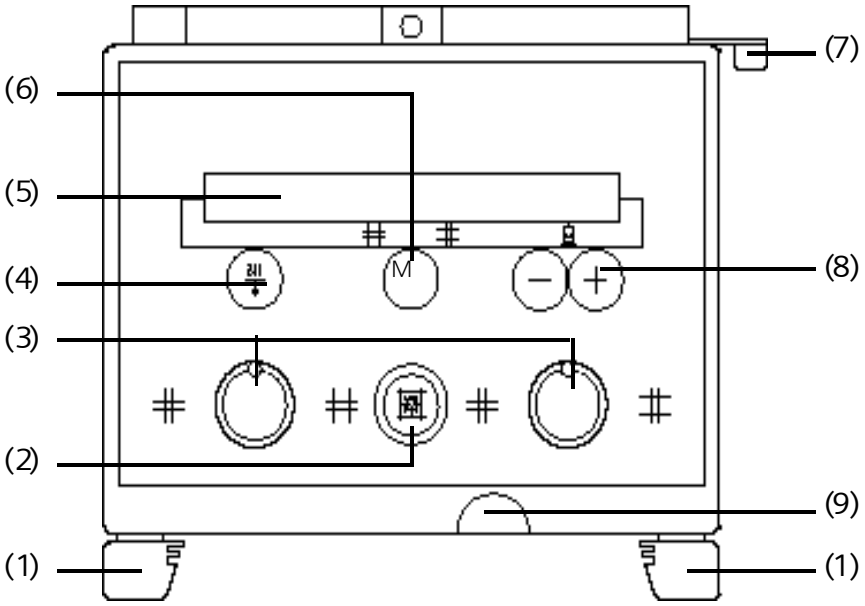


(1) Switch for exposure (without precontact)

(2) Switch for fluoroscopy

Control elements and displays

Multileaf collimator



(1) Accessory rails

(2) Button for full-field light localizer and laser light localizer, switches off automatically after 30 s, 60 s or 90 s (configurable)

(3) Manual setting of width and height of the radiation field
- Turning to the right opens the collimator.
- Turning to the left closes the collimator.

(4) Motorized prefilter selection button

(5) Display field

(6) Selection of the collimated radiation field of the last exposure

(7) Stop lever for ± 45° rotation of the collimator about the vertical axis[1], stop position 0°

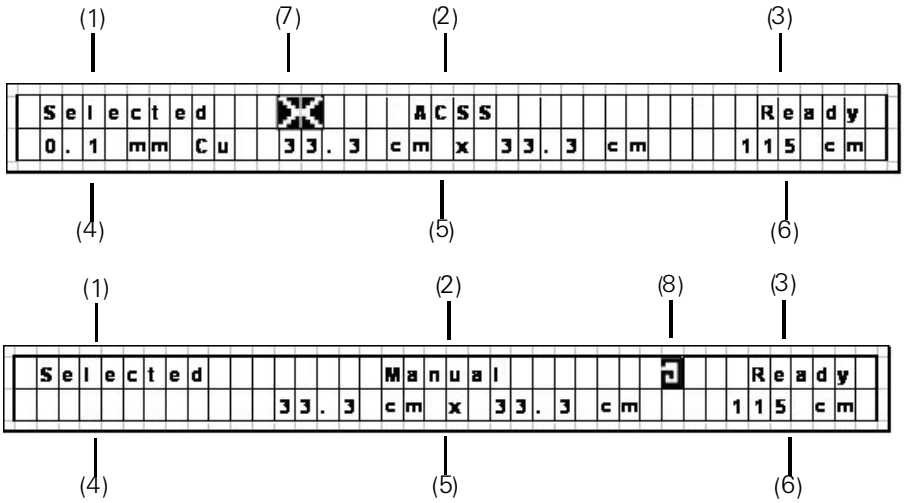
(8) Buttons for entering the SID for free setting

(9) Tape measure for SID setting (cm and inch)

Multileaf collimator in the tube assembly stand of the system table.

[1] configurable by SIEMENS Uptime Service

Display field



(1) Selected = tube assembly selected

(2) Operating mode:
– Manual = without automatic format collimation

(3) Ready = system ready for exposure

(4) Display of the selected prefilter in mmCu if prefilter is selected using a button or via remote control.
– Nothing is displayed in this field if the collimator is equipped with a manual filter unit.

(5) Format display (height x width in cm or inches)[1]

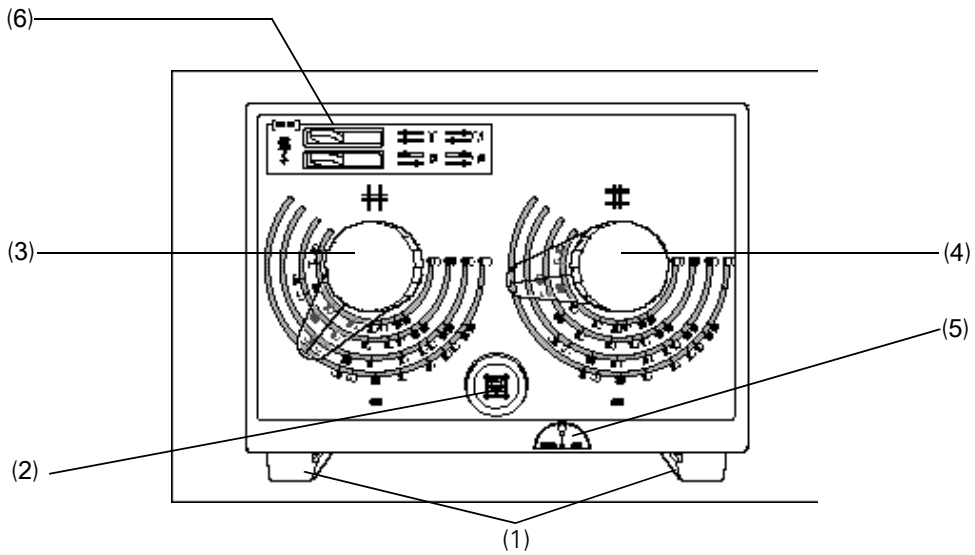
(6) Display of SID (in cm or inches)[1]

(7) Display: Collimator centered on image receptor[2]

(8) Display: Collimator rotated[2]
– Make sure this icon is *not* visible before using ACSS.

[1] Can be configured in cm or inch by SIEMENS Uptime Service
[2] Display function not available with all systems

Multileaf collimator (manual)



(1) Accessory rails

(2) Button for full-field light localizer and laser light localizer, switches off automatically after 10 - 90 s (configurable by SIEMENS Uptime Service)

(3) Adjusting knob for format height collimation.
– Turning to the left closes the collimator.
– Turning to the right opens the collimator.

(4) Adjusting knob for format width collimation.
– Turning to the left closes the collimator.

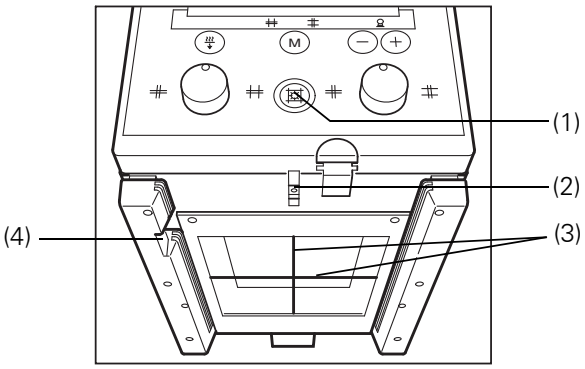
Turning to the right opens the collimator.

(5) Tape measure for SID setting (cm and inch)

(6) Switch lever for manual selection of the internal Cu prefiltration

Multileaf collimator (manual) is used with the tube assembly in the 3D ceiling-mounted tube support.

Control elements at the underside



(1) Button for full-field light localizer and laser line light localizer, switches off automatically after 10 - 120 s (configurable)

(2) Laser line light localizer with slider to cover the outlet opening

(3) Crosshairs in the light localizer window

(4) Locking spring for accessories

Laser line light localizer (2)

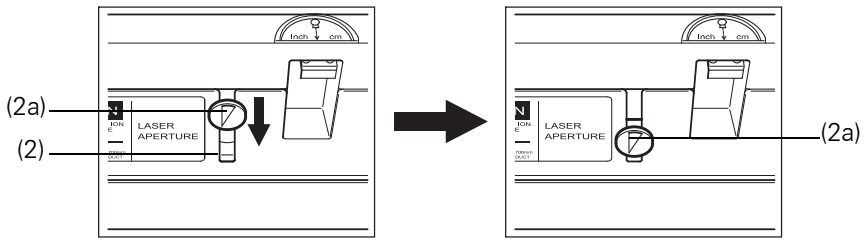
The laser line light localizer projects the axis mark for longitudinal centering, which is aligned with the centering mark on the receptor.

If necessary, the laser radiation exit of the laser line light localizer can be closed with the **slider (2a)**.

Laser light

Do not use optical lenses, mirrors and similar instruments if working with laser light. The optical instruments within the laser beam may amplify the laser intensity to dangerous values for eyes and skin.

◆ Switch off the laser light when optical instruments are used.





Caution

Laser Light

Eye injury!

- Do *not* look into the beam!
- Take care that neither you nor any other person look directly into the light beam.
- Close the laser radiation exit of the Laser light localizer with the sliding cover to protect the eyes of the patient or any other person.



Caution

If the halogen lamp of the light localizer burns for a long time, the lamp housing can heat up.

Danger of burns

- Avoid contact with the lamp housing.



- To switch the laser line light localizer on, press the button at the front of the collimator.
- To switch the laser line light localizer off, press the button again.
  – The laser line light localizer can also be switched off automatically by an internal time switch.

Crosshairs

- The crosshairs project the longitudinal and transverse axis of the radiation field onto the cassette or directly onto the patient.
- The full field light localizer for projecting the crosshairs is switched on with the button at the front of the collimator.
- To switch it off press the button again.
  – The full field light localizer can also be switched off automatically by an internal time switch.
- The laser line light localizer and the full field light localizer **cannot** be switched independently of one another.

Locking spring

The locking spring is located on the left guide rail at the underside of the collimator.

The locking spring locks the compensating filters, templates etc. inserted in the accessory rails of the collimator, thus securing them against falling out.

- To remove the accessories, press the locking spring to the left until the compensating filter, template etc. can be removed from the collimator.

Motorized prefilter selection



Caution

Incorrect filter selection

Risk of increased radiation dose for the patient

- Select the filter carefully.



Caution

In extreme operating mode, the temperature of the X-ray tube assembly can heat up.

Danger of burns

- Avoid contact with the tube housing.



Caution

Collimator not working correctly

Unnecessary radiation

- To protect the patient from unnecessary radiation, always check the collimator position with the light localizer.
- Use the tape measure to check the SID.



- To select a prefilter press the prefilter selection button.
  – The Cu prefilter changes to the next value each time the button is pressed
  – The currently selected prefilter is shown in the display.

Possible settings

- ❏ 0.0 mm Cu (no) prefilter
- ❏ 0.1 mm Cu prefilter
- ❏ 0.2 mm Cu prefilter
- ❏ 0.3 mm Cu prefilter

Manual prefilter selection

Caution

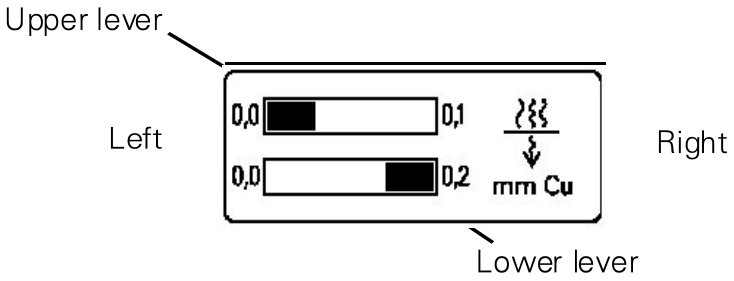
Incorrect filter selection

Risk of increased radiation dose for the patient

- Select the filter carefully

Manual prefilter selection is performed using the two levers on the left side of the collimator.

Cu prefilter	Lever position	
	Upper lever	Lower lever
0.0 mm	Left	Left
0.1 mm	Right	Left
0.2 mm	Left	Right
0.3 mm	Right	Right



An indicator is placed on the left side of the collimator for proper positioning of the levers.

Rotating the collimator

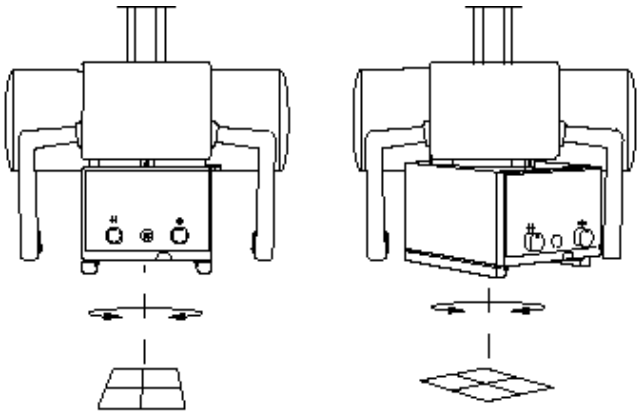
Caution

Rotation of collimator

Risk of crushing

- When rotating the collimator, make sure that your hands do not get caught or crushed between control handles, support arm, X-ray tube unit, collimator, etc.

The collimator can be rotated out of the stop position 0° by pulling the stop lever towards the front operating panel. The maximum rotation in both directions is ±45° by using the Siemens tube flange. Assure that the rotation is not limited by the wiring harness.



Rotating the Collimator ± 45° around the Central Beam Axis

- Move the detent lever on the collimator towards the front panel, i.e. towards the operator.
- Grasp the collimator with both hands and rotate it by the desired angle to the required direction.

Rotating the Collimator to the 0° Lock-in Position

Grasp collimator with both hands and turn it to the lock-in position at 0°.

Always pay attention to your hands so they may not be pinched or crushed between the collimator and other parts of the system.

Changing lamp of laser light localizer

As soon as the lamp brightness decreases, this symbol is shown in the collimator display. It recommends to change the lamp.

Although you can continue working with less brightness, we recommend to change the lamp as soon as possible. Please call the SIEMENS Uptime Service.

Accessories and auxiliary devices



Warning

Falling objects because too much weight is hung on the collimator.

The rails could be damaged by the use of excessive force.

A proper seating of the accessories or auxiliary devices can no longer be guaranteed and can lead to patient injury.

The position of the tube assembly can change.

- Do not hang more than 7 kg on the collimator accessory rails.
- Do not exert any force on the multileaf collimator or its rails when inserting the accessory or auxiliary device.
- Check that the accessory is firmly anchored in the collimator rails.

Wall stand (BWS)

Overview

Applications

The wall stand can be used as examination unit for universal medical applications performed on standing, sitting or recumbent patients and involving exposures of the abdominal, pelvic, skull and vertebral regions as well as radiography of the extremities.



Caution

Wall stand is overloaded because patient handgrip is mechanically overloaded.

Risk of damage to the wall stand and injury of the patient

- Brief patient that it is not allowed to hang on the patient handgrip with more than 25 kg.



Warning

Break of the load chain.

High movement forces in vertical direction

- Stop working with the component and call SIEMENS Uptime Service.

Control elements

Depending on the configuration, the operating elements are mounted laterally reversed either on the left-hand side or on the right-hand side.

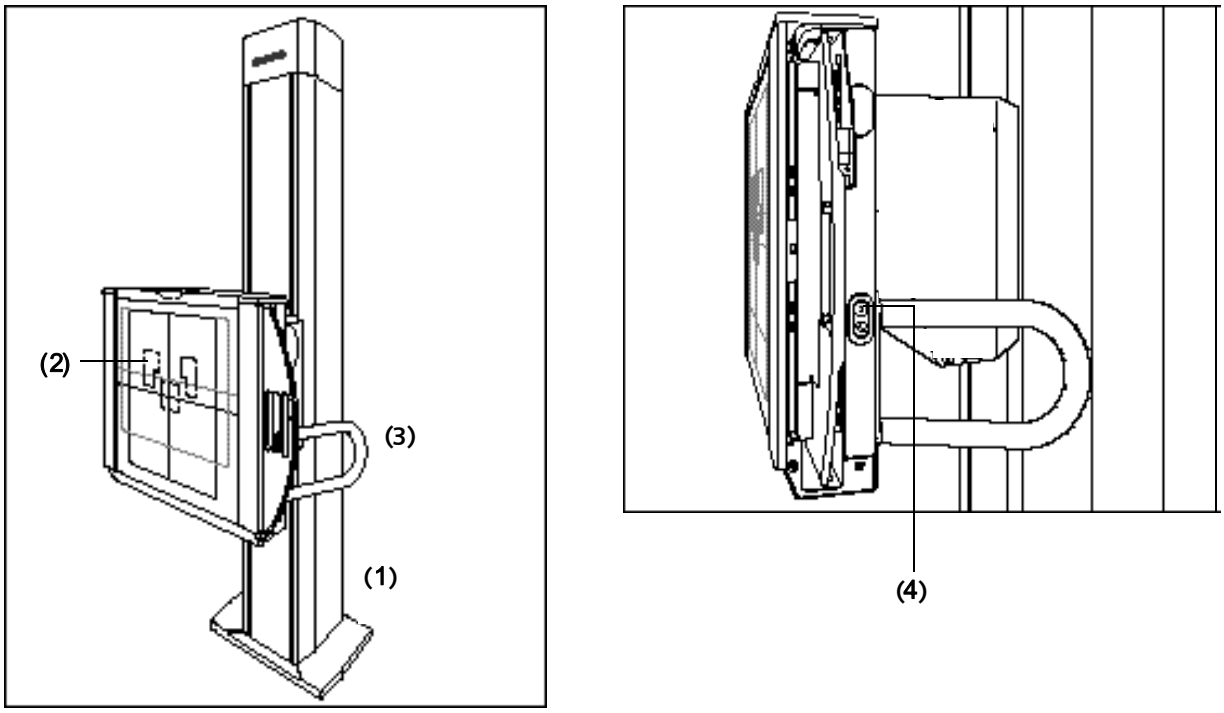


Fig. 1

(1) Stand column

(2) Front panel with imprint for cassette position and measuring fields

(3) Patient handgrips (on both sides)

(4) Button for manual vertical movement

Markings on front panel

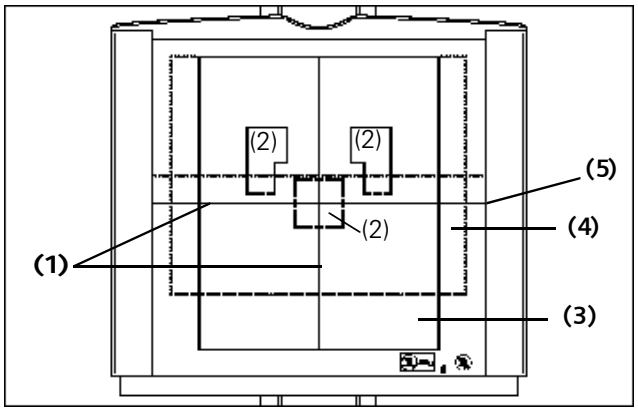


Fig. 2

(1) Center crosshair

(2) Position of IONTOMAT ionization chambers

(3) Cassette field for portrait format

(4) Cassette field for landscape format

(5) Center marking for portrait format

Positioning the Bucky tray

Vertical movement (height adjustment)



The Bucky unit can be moved vertically using the respective button (5).

→ „Control elements“ on page 38

Inserting and removing a cassette

The cassettes can be inserted into the Bucky tray in portrait or landscape format.

Inserting cassette

Caution

Incorrect insertion of cassette.

Injury by squeezing or falling down of parts, damage to cables.

- Be careful when inserting cassette in the Bucky tray.

- Move the Bucky tray to a convenient working height.

→ „Vertical movement (height adjustment)“ on page 39

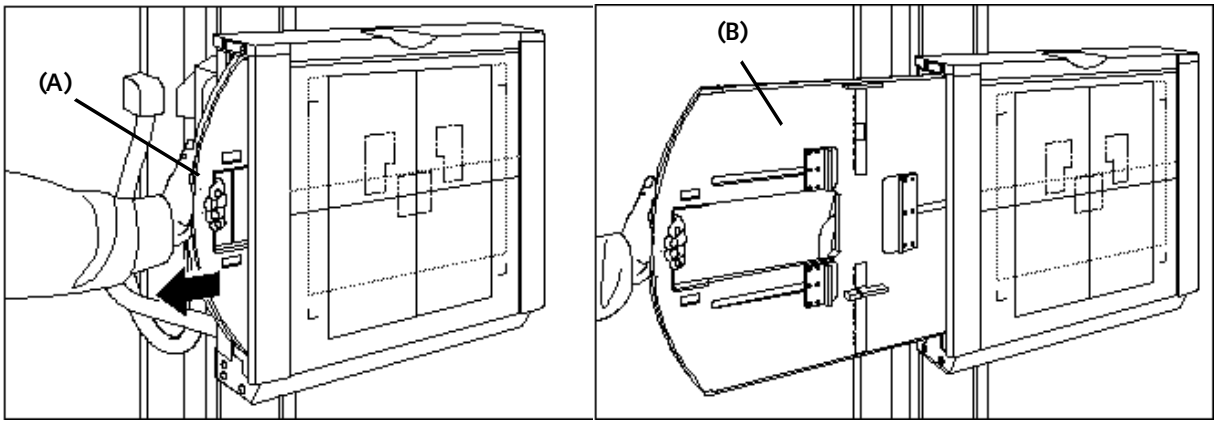


Fig. 3

- Press the brake handle in the handgrip (A) to release the Bucky tray (B).
- Pull out the Bucky tray (B) until it reaches the stop position (see Fig. 3)

Mechanical stops avoid any accidental falling out or removal of the Bucky tray.

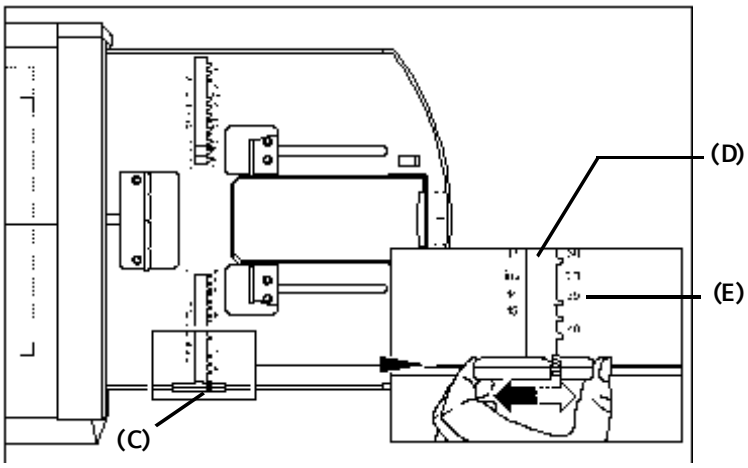


Fig. 4

- Before you insert a cassette, adjust the correct cassette size via the adjustable cassette stop (C).
- Compress the cassette stop (C) and move it on the guide rail (D) to the correct size as shown in Fig. 4.

To ease the setting of the cassette stops, the sizes (E) are written on the Bucky tray.

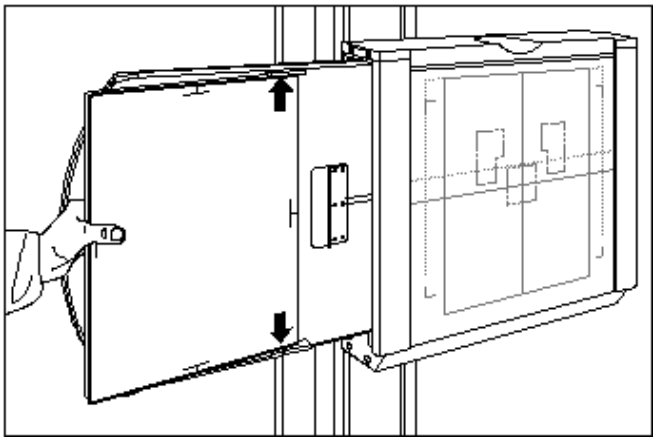


Fig. 5: Inserting a cassette (example)

Hold the cassette in the middle as shown in Fig. 5.

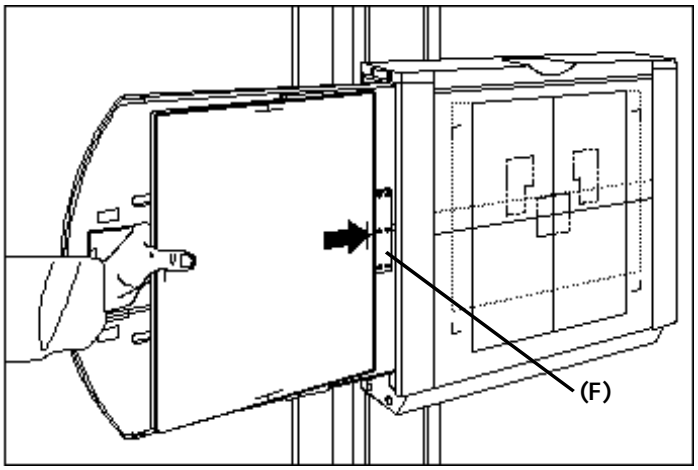


Fig. 6

- Insert the cassette centered against the rear spring jaw (F) of the Bucky tray.

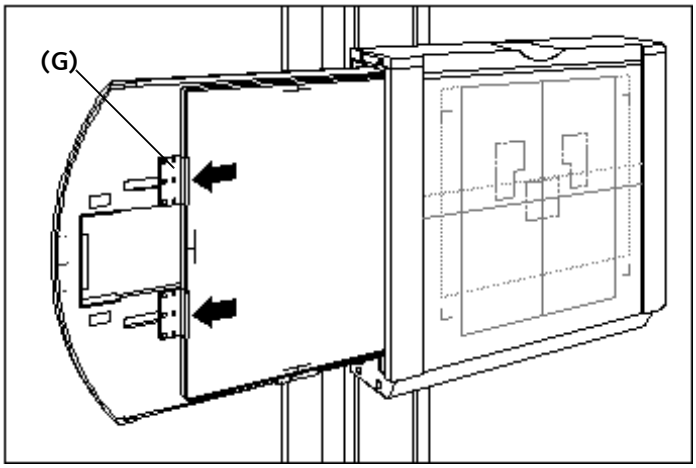


Fig. 7

- Push the cassette slightly against the rear spring jaw to move the front (G) and rear spring jaw (F) apart.
- Release the cassette gently.
  – The front and rear spring jaw will move back and fasten the cassette automatically.

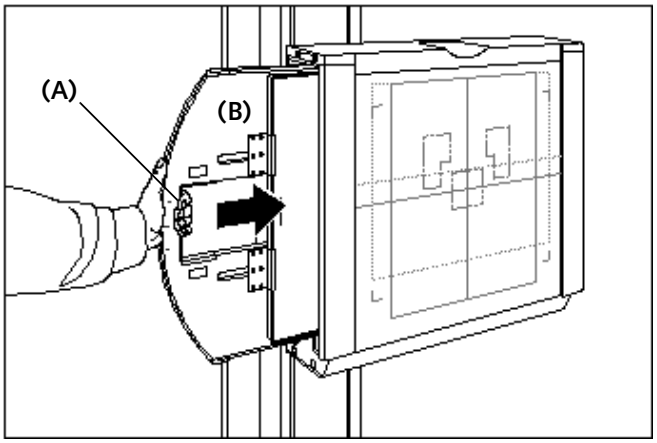


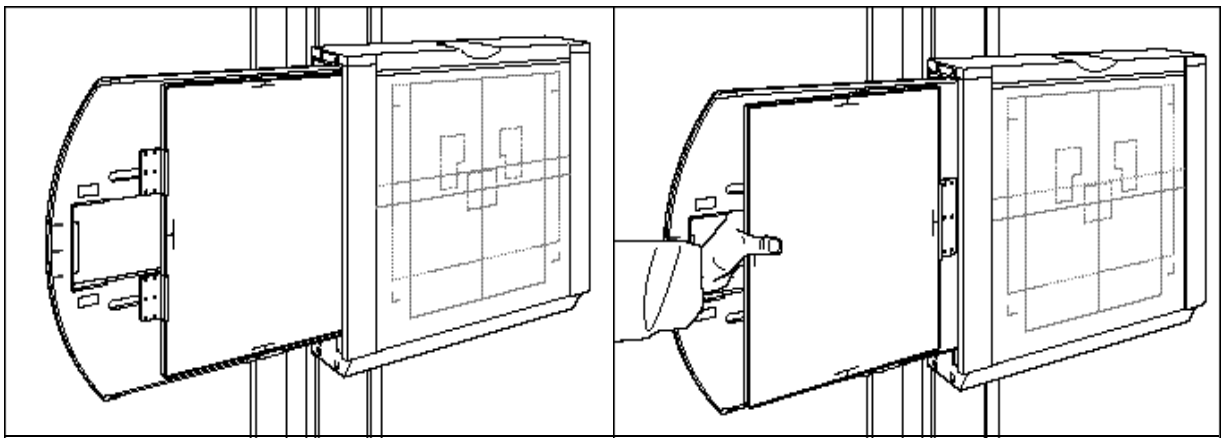
Fig. 8

- Press the brake handle in the handgrip (A) to release the Bucky tray (B).
- Slide in the Bucky tray (B) until it reaches the stop position (see Fig. 8)

Removing the cassette

- Pull out the Bucky tray as described on ∅ Page 40.

Mechanical stops avoid any accidental falling out or removal of the Bucky tray.



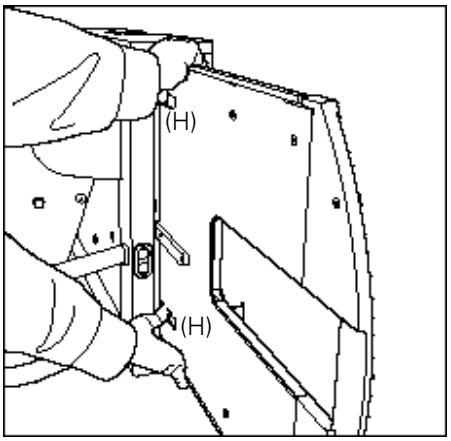
- Hold the cassette at the front in the middle.
- Push the cassette gentle to the back to move the front and rear spring jaw apart and thus release the cassette.
- Now lift the cassette and take the cassette out of the Bucky tray.

Removing and inserting the Bucky tray

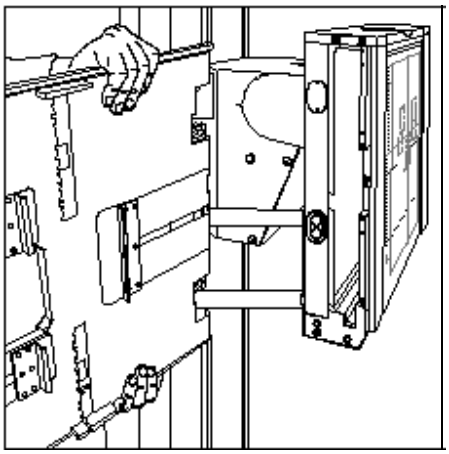
For normal use, there is no need to remove the Bucky tray. Yet it might be necessary to clean the Bucky tray from time to time. In such cases the removal of the Bucky tray might be necessary.

Removing the Bucky tray

- Pull out the Bucky tray as described on page 40.



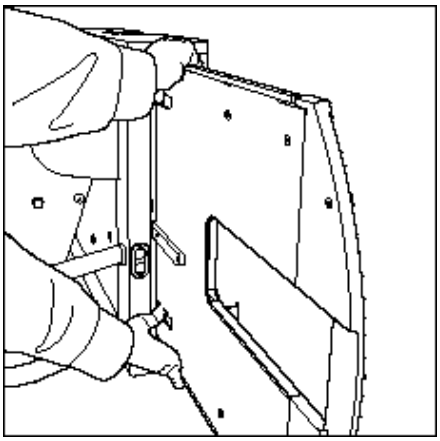
- Hold the Bucky tray from behind and push in both metal sheets (H) at the bottom of the Bucky tray to release the Bucky tray



- Hold the Bucky tray with both hands in a vertical position.
- Pull out the Bucky tray.

Inserting the Bucky tray

- Hold the Bucky tray with both hands and insert the Bucky tray slightly until it fits in the guide rail.



- Push in the Bucky tray until the metal sheets snap in.
- The Bucky tray is now secured again.
- Catch the Bucky tray hand grip to release the Bucky tray brakes.
- The Bucky tray can be inserted completely now.

Anti-scattered radiation grid

The responsibility for selecting and inserting the scattered radiation grid to be used for an exposure lies with the examiner.

The intended SID is color-coded on each wall stand grid using the following color scheme:

Colors for collimator and grid

SID (cm)	Manual collimator		Grid	
115		light blue		dark blue
150		light pink		dark pink
180		light orange		dark orange

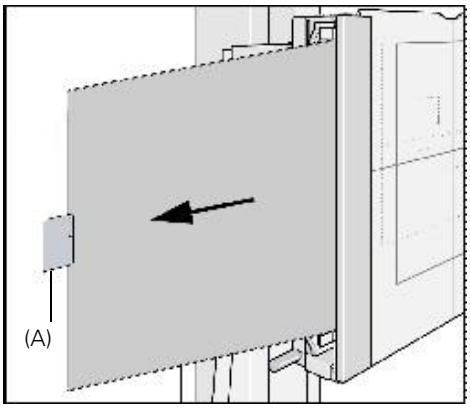
Caution

Incorrect grid status: inserted, removed, wrong type

Nonimaging radiation leads to unnecessary X-ray exposure.

- Please check at the grid handle that the correct grid is used for the selected SID.

Removing the grid

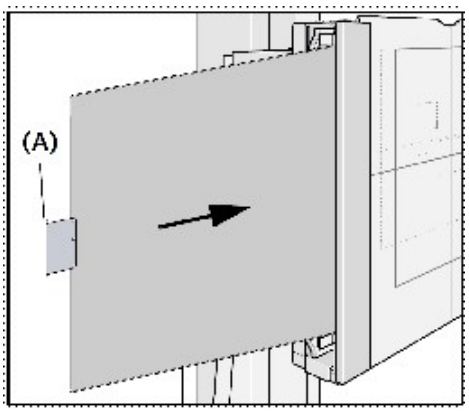


- Release the locking lever (A) and, keeping it straight, pull the grid out towards the front.
- Remove the grid *with both hands*.

Inserting the grid

- Hold the grid vertically, labels facing the tube unit.

The label with the tube symbol on the grid must point toward the tube unit.



- Place the grid against the top and bottom guide rail.
- Holding it vertically and straight, push the grid all the way in.
- When the grid has reached the end position, the locking lever engages.

Preparing exposures

Centered bucky exposure onto the bucky wall stand

Horizontal Projection

The Bucky tray is additionally equipped with an IONTOMAT measuring chamber for automatic exposure measurements.

IONTOMAT automatic exposure control

The catapult Bucky is equipped with an IONTOMAT ionization chamber for automatic exposure measurement. All exposures which are performed with a cassette *in* the Bucky tray are taken with the IONTOMAT automatic exposure control. Exposures thus triggered are automatically timed and switched off by the IONTOMAT automatic exposure control.

When selecting a IONTOMAT measuring field, make sure that the position of the patient, is anatomically correct in relation to the IONTOMAT measuring field. This procedure is necessary to avoid incorrect exposures.

❏ For this purpose, three-field templates are available.

◆ Insert them in the accessory rails of the multileaf collimator to project the IONTOMAT measuring fields onto the object.

→ See „Three-field template, set“ on page 56

◆ Select the IONTOMAT measuring field according to the object you want to expose.

◆ Locate the most important part of the object for the image *exactly* above the measuring field.

◆ Avoid the direct irradiation of the area near the measuring field, since this irradiation would cause premature cutoff resulting in an underexposure.

Solution: Good collimation or covering with lead

Exposure release

- Set all exposure data in the acquisition area at the TUI.
- Release an exposure at the system control.
- Ensure the necessary radiation protection.
- Change the cassette to prevent double exposures.



Caution

Double exposure of cassettes

Risk of unnecessary X-ray exposure

- Change cassette after every exposure.



Caution

Selection of wrong workplace

Risk of unnecessary X-ray exposure due to double exposure of X-ray cassette

- Before each exposure, verify that the correct workplace is selected.



Caution

Wrong acquisition data set, image incorrectly exposed.

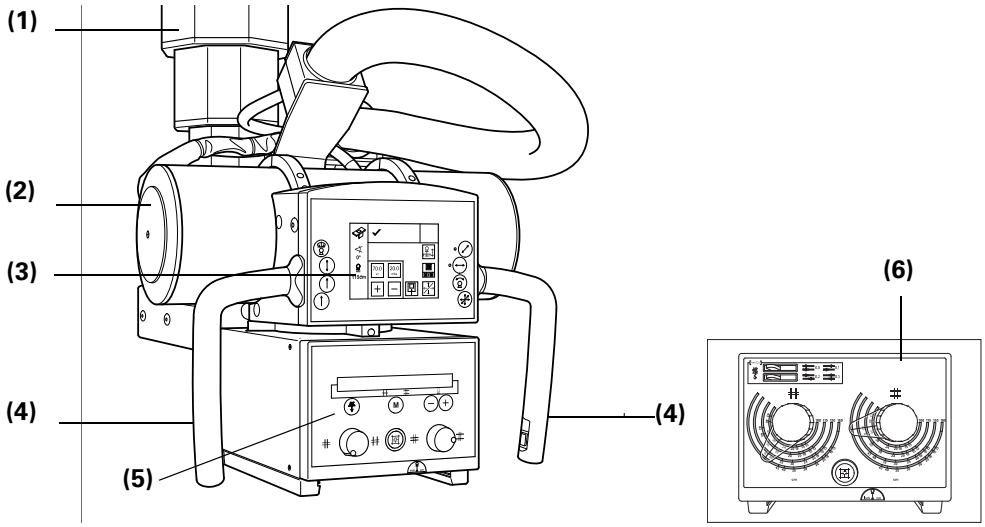
Unexpected radiation

- Check the selected acquisition data on the generator control console.

Preparing a cassette

You can insert all cassettes with a format of 18 cm x 24 cm to 35 cm x 43 cm in. either upright (portrait) or sideways (landscape).

Ceiling-mounted tube support



The 3D ceiling-mounted tube support consists of the following components:

(1) Lifting column

(2) X-ray tube unit

(3) Touch User Interface

(4) Handles with buttons
– Use the handles if you want to bring the tube unit manually into another position (vertical, longitudinal, transverse or rotation).

(5) Multileaf collimator

(6) Multileaf collimator (manual)

You control the movements of the 3D ceiling mounted tube support with the aid of the handles and the touchscreen.

The display on the touchscreen informs you about the position of the support.



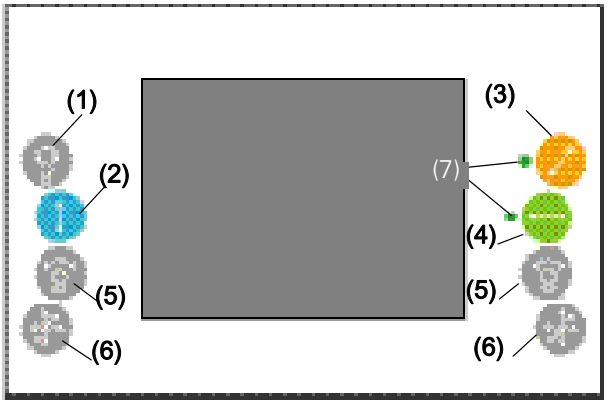
Caution

Heavy items (such as lead aprons) hung on ceiling-mounted devices.

Parts could be damaged or fall down

◆ Do not place any additional load on the ceiling mounted devices.

Movement Control Elements



Button No.	Icon	Description
(1)		Tube rotation about the vertical axis (RVA) → More details see„Directions for moving and rotating the tube“ on page 53
(2)		Vertical tube movement up and down (manual)
(3)		Transverse tube movement (manual)
(4)		Longitudinal tube movement (manual)
(5)		Tube rotation about the horizontal axis (RHA) → More details see„Directions for moving and rotating the tube“ on page 53
(6)		Floating tube movement (manual; transverse, longitudinal and vertical)
(7)	Green LED	Status LED for detents (transverse and longitudinal)

Movement of the 3D ceiling-mounted tube support

Caution

Vertical movement of the lifting column (tube support) is blocked downwards.

Injury of persons

- Do not exert strong force!
- Call the Siemens Service.

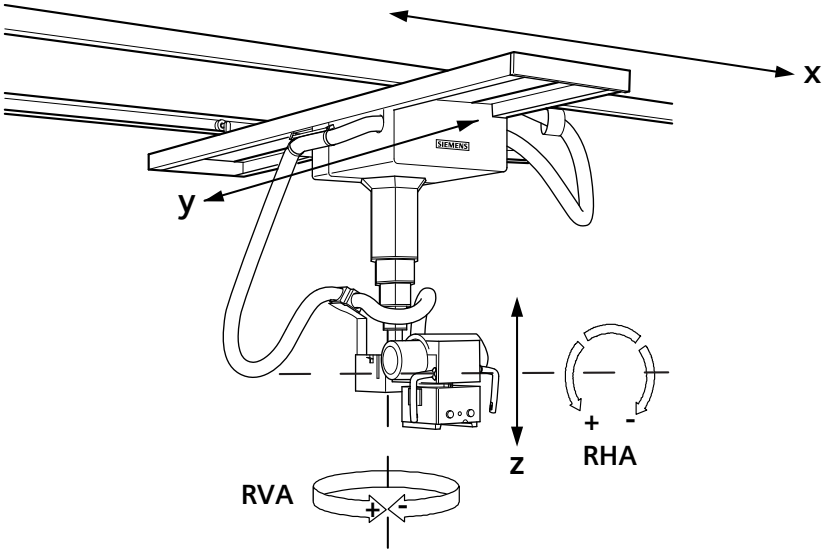
Warning

Collision monitoring not active due to selected override function.

Collision of patient and device with 3D support; Property damage or personal injury

- Execute unit movements always with direct visual contact and special care.

Directions for moving and rotating the tube



Directions for moving

The 3D ceiling-mounted tube support can be moved in the following directions:

- ❏ x direction: longitudinal movement
- ❏ y direction: transverse movement
- ❏ z direction: height movement



Caution

Abnormal sinking of the tube support.

Injury of persons

- ◆ Perform tests in regular intervals - at least every 24 month - to maintain the safety and proper functioning of the produc.

Directions for rotating

The X-ray tube unit can be rotated in the following directions:

- ❏ about the horizontal axis (RHA = rotation horizontal axis)
- ❏ about the vertical axis (RVA = rotation vertical axis)

Positioning the 3D ceiling-mounted tube support with tube unit

Detents are provided in the longitudinal and transverse direction and also for the center position of the 3D ceiling-mounted tube support (for example table center in center position of the support and defined SID values in longitudinal direction). If moving at low speed over a detent position the detent is engaged and the tube stand is arrested in the particular position. The support can only be moved out of the detent position by applying increased force.
The detents can be overrun at increased speed (the speed may be programmed by the service personnel).

Adjusting the height (Z direction)

Manually



- Grasp the handles of the 3D ceiling-mounted tube support with both hands
- Press the button to release the brake for vertical movement.
  – Releasing the button will stop the movement.
- Pull the 3D ceiling-mounted tube support into the required position.

Adjusting the longitudinal position (X direction)



- Grasp the handles of the 3D ceiling-mounted tube support with both hands.
- Press the button to release the brake for longitudinal movement.
  – Releasing the button will stop the movement.
- Pull the 3D ceiling-mounted tube support into the required position.

Adjusting the transverse position (Y direction)



- Grasp the handles of the 3D ceiling-mounted tube support with both hands.
- Press the button to release the brake for transverse movement.
  – Releasing the button will stop the movement.
- Pull the 3D ceiling-mounted tube support into the required position.

"Floating" support movement



If you want to move the support in longitudinal, transverse and vertical direction simultaneously, press one of the buttons on the handles or the button on the control panel for "floating" support movement.



Buttons in the handles

The buttons in the handles are configurable by the SIEMENS Uptime Service:

- ❏ Floating movement in X-, Y- and Z-direction
- ❏ Floating movement in X-, and Y-direction
- ❏ Floating movement in Z-direction
- ❏ With or without detent functioning in X- and Y-direction

Rotating the tube unit (RHA/RVA)

The tube unit (with multileaf collimator) can be rotated manually about two axes:

- ❏ about the horizontal axis (RHA)
- ❏ about the vertical axis (RVA)



Caution

Rotation of tube

Risk of crushing

- ◆ Pay attention to all crushing hazards between the moving parts of the system and their guide openings.



Caution

In extreme operating mode, the temperature of the X-ray tube assembly can heat up.

Danger of burns

- ◆ Avoid contact with the tube housing.

Rotation about horizontal axis

RHA



- Grasp the handles of the 3D ceiling-mounted tube support with both hands.
- Press the button for the brake for rotating the tube unit about the horizontal axis (support arm) with your right thumb.
- Turn the tube unit into the required position.
  – The angle of rotation is displayed in degrees on the **TUI (Touch User Interface)**.

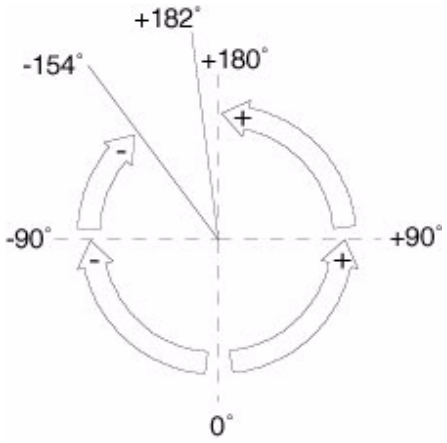
The tube unit can be rotated about the horizontal axis continuously, at a maximum by ±120°. There are stop positions at 0° and at ±90°.

The accuracy of the stop positions of the tube unit might decrease to ±3°, due to hard wear for example. Lateral image information might be "cut".

- Always check the alignment of the tube unit with the light localizer.

Rotation about vertical axis

RVA The tube unit can be rotated about the vertical axis from 182° to -154° with stop positions at +180°, +90°, 0° and -90°.



- Grasp the handles of the 3D ceiling-mounted tube support with both hands
- Press the brake button for rotating the tube unit about the vertical axis (ceiling-mounted tube support) with your left thumb
- Turn the tube unit into the required position.

The angle of rotation is displayed on the scale at the lower end of the lifting column.

Source Image Distance (SID)

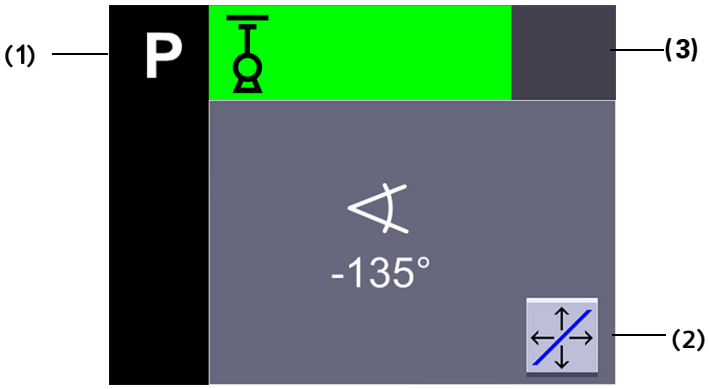
The SID is displayed (in cm or inch according to configuration) at the **TUI (Touch User Interface)**.

The SID display must be checked for agreement in case of angulated tube or detector with the tape measure in the multileaf collimator.

Touch User Interface (TUI)

The color touchscreen is a user interface for the control of multiple functions.

Layout



The Touch User Interface is divided into three fields with frames and different background colors:

(1) Information field with icons.

(2) Control field with buttons.

(3) Message field.

General information

The icons/buttons shown in this chapter only outline their performance and should not be taken as a detailed "pixel-by-pixel" design.

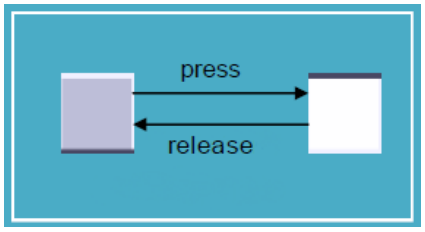
Button functions

There are several basic types of buttons on the TUI:

Abbreviation	Type	Explanation
P	**Push** button.	Starts an action. The action terminates itself.
T	**Toggle** button.	Toggles between ON and OFF.
S	**Switch** button.	Switches among different states.

The following diagrams show the state transitions of the buttons.

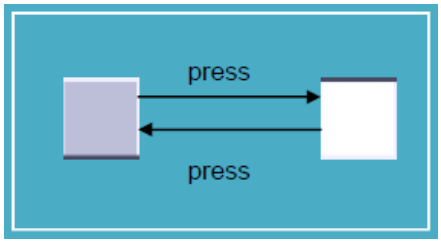
Button synopsis of push button (P):



❏ Button will be shown in pressed design while being pressed.

❏ Function will be transferred after being pressed but only ONCE in case of permanent pressing.

Button synopsis of toggle button (T):



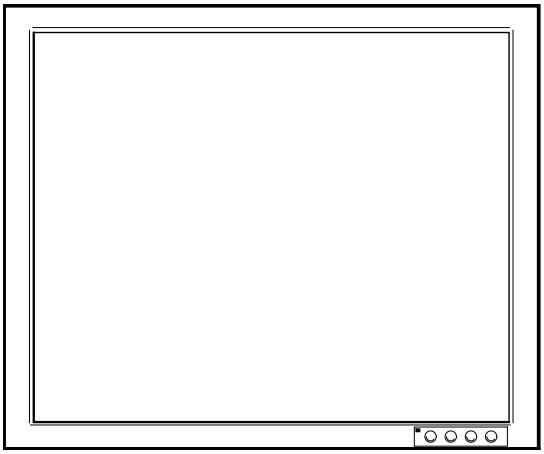
❏ Function will be transferred immediately when button is being pressed.

Monitor Supports and Displays

Support systems

Suitable for one or two 19" flatscreen displays.

Flatscreen display



Operation and indicators

Operating elements

The buttons for adjusting the flatscreen display are located on the front of the housing.

The necessary settings are made during startup; no operator actions are required during operation.

Do not remove any plug connections and housing parts.

Do *not* loosen any plug connections.

Power on or off

The flatscreen display has a power switch on the underside which you need to actuate *only* if the flatscreen display is not controlled via a system.

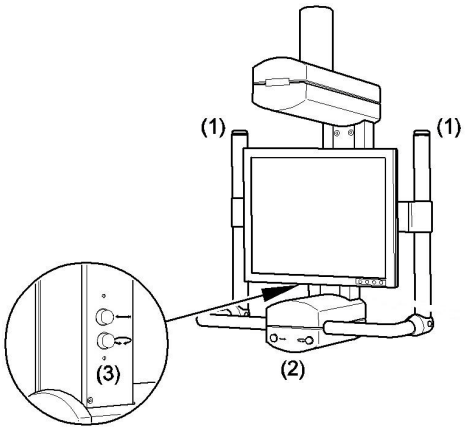
Operating indicator

The green LED operating indicator is located on the left next to the operating elements.

Errors

- ❏ If your display shows no image or a blurred image, vertical lines or other errors, please contact SIEMENS Uptime Service.
- ❏ If no input signal is applied, the green LED operating indicator flashes.

Display ceiling suspension system



Example of support system with one flatscreen display

(1) "Radiation On" lamp

(2) Front buttons

(3) Column side buttons



Caution

Heavy items (such as lead aprons) hung on ceiling-mounted devices.

Parts can be damaged or fall down

◆ Do not place any additional load on the ceiling mounted devices.

Operating elements

The support system can be moved, rotated and height adjusted with the handle.

Approach the end positions with reduced speed. Do not use the brakes for reducing the speed of the support system.

The brakes can be operated both from the front and laterally from the rear of the support.



Press this button for longitudinal travel.

– Longitudinal travel is released and rotation is disabled.

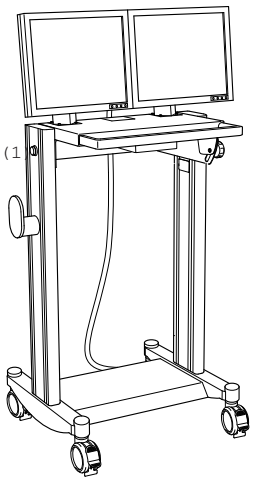


Press this button for rotation.

– Rotation is released and longitudinal travel is disabled.

Both movements are possible if no button is pressed.

Display trolley



Example of trolley with two flatscreen displays

(1) "Radiation On" lamp

Operating elements

The display trolley can be equipped with one or two 19'' flatscreen displays. You can move the trolley with the handle into any desired observation position. If you tilt the flatscreen display to the front or back, this position must then be locked again with the handle on the side.



Caution

Cables lying on the floor

Danger of damage to cables and the trolley falling over

- Do *not* run over cables lying on the floor.

Collision hazard

When moving the support system, make sure that the monitor does not collide with the examination unit.

Special care should be taken with the support system when starting motorized movements of the examination unit.



Caution

Ceiling-suspended support system stands at head height

Risk of injury due to collision

- Move support system out of the danger area.

System operation

Switching the system on/off

System operating status

A Luminos Fusion system may be in one of the following operating status:

Off
- ❏ All the system's components and the imaging station are turned off except for the detectors which remain in standby mode.

On
- ❏ All the system's components are turned on and may be supplied from the power line. When the start-up phase is completed, examinations and post-processings may be performed.

Emergency SHUTDOWN
- ❏ All the units *and* the display station are disconnected from the mains using the main breaker.



Caution

Faulty switch-on procedures during system starts

Delayed or faulty system start

- ◆ Switch on the system only as described in the Operator Manual

Switching the system on



◆ Press the ON button on the system control console[1].
– The entire system and all further connected devices are switched on.
– A safety test program runs automatically from this time.

The system is ready after initialization and the end of the safety test program under the following conditions:

On the TUI

❏ No error message appears in the message line of the data menu.

❏ None of the kV, mAs or ms displays flashes.

On the live monitor

❏ System logon window or the patient list appears.

On the system control console

❏ No displays flash.

On the tableside control console

❏ No displays flash.

Emergency stop

❏ No red emergency stop button is activated.

In the case of a fault of the safety test program, an error message will appear on the Touch User Interface.

Please notify the SIEMENS Uptime Service if the error cannot be solved.

Refer to the **FLUOROSPOT Compact** Operator Manual for further information.

Perform a functional and safety check according to the Functional and Safety Check chapter.



If the flat panel detector is ready and in normal working temperature range, it will take about 4 minutes (maximum) to restart image system and perform emergency operation.

[1] If a local hardcopy camera connection is present, the associated camera and network components should be switched on first.

Switching the system off



- Press the OFF button on the system control console.
  - The entire system and all further connected devices are immediately switched off.
  - All started operating sequences will be interrupted and the selected programs will be deselected.
  - If a background job is running (for example, transfer to CD), the imaging system will not shut down until the job is finished. If it is necessary to stop the imaging system immediately, the background job must be ended first.

Refer to the **FLUOROSPOT Compact** Operator Manual for further information.



Caution

Technical error

Unwanted radiation released

- If unwanted radiation cannot be stopped by Emergency Stop, press the switch-off button to switch off the whole system.

Standby power supply

❏ No radiation is possible in standby operation.

Standby power supply active appears on the system control console in the message line of the data menu and on the monitor.

Standby power supply inside the hospital

A standby power supply (inside the hospital) switches on if the line voltage fails. However, this is not as a rule without interruption and can take some time.

The system is switched off and must be switched on anew.

Power failure



Caution

Power failure

Interruption of medical procedure

- Connect the system to appropriate power source.
- System UPS can only provide fluoroscopy but not radiography.

General notes



Warning

In case of a failure it may incidentally happen that table movements are not stopped after release of the control elements.

Minor to severe injury

- In case of danger to patient or system, immediately press the nearest STOP button.
  – All system movements will be stopped.

Operating elements for system positions



Immediately press the nearest STOP button in the case of danger to the patient.
– All system movements are stopped.

After removing the cause of the danger, unlock the STOP button by turning it to the right.

Operating elements with deadman functions

All operating elements for the system settings are designed as deadman function, that is, system settings are active only as long as the operating element is actuated.

Operating elements with LEDs

❏ LED lights up.
– Function is selected.

❏ LED does not light up.
– Function is deselected

❏ LED flashes.
– Selected function is not yet concluded or message about a particular status (see relevant chapter for description).

General notes on error messages

The system is constantly monitored internally during operation.

When a fault is detected, the system is blocked and the fault is displayed as error in the message line of the system control console and stored.

At the Luminos Fusion with imaging system Fluorospot Compact, errors messages are displayed on the monitor and at the system control console.

Cancelling blocking

◆ Select the button on the error message on the imaging system or the TUI.
– Normally, the fault message is cancelled by this action.

Further operation of the system may be only under increased attention of the user.

However, if an error message is still displayed, there is an error.

◆ Call the SIEMENS Uptime Service.

Behavior of system settings in case of a fault

Fault occurs while actuating one of the following movements:

- ❏ Tilting the table up or down
- ❏ Moving the tabletop longitudinally
- ❏ Moving the X-ray system longitudinally

These movements are stopped and the fault is displayed as an error in the message line of the system control console and stored.

Cancelling the fault

- ◆ Briefly press the exposure release button on the system control console up to the first pressure point.
  – Normally, the fault is cancelled by this action.

Actuating the same movement again

If a fault occurs again when the same movement is actuated, then these movements are once again stopped and the fault is displayed as an error in the message line of the system control console and stored.

Collision monitoring is inoperable.

The operator is responsible for avoiding collisions of the system with objects and the floor.

- ◆ *Actuate system movements only with direct visual control.*

All other movements are possible only step by step. A warning signal (whistle) sounds on actuating and during the movement.

- ◆ Rescue the patient.
- ◆ Call the SIEMENS Uptime Service.

Table

Avoid a seated working position directly at the system with your legs or knees under the head end or foot end crossbeam.

The system monitors the safety distance only with regard to the floor. Collisions can occur with other room equipment and mobile objects such as foot switches, steps, refuse bins, and so on.

- *Make sure before you actuate movements that no obstructions are present.*
- *Then control the system with increased caution.*
  - *If you have set the footboard in an exceptional case on the head end of the tabletop, the safety distances which your system maintains automatically are impaired.*

Actuate movements then only with direct visual control.

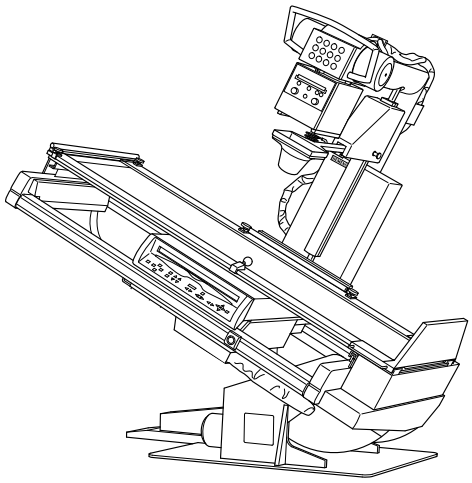
0° position of table



- Switch on or off the automatic stop position of the table in the 0° position with this key.
  - LED lights up: The table moves through the 0° position when tilting up or down.
  - LED does not light up: The table stops in the 0° position when tilting up or down

With the "Stop in 0° position" function switched off (LED light off), the movement stops even if the tilting down/tilting up operating elements are operated in the 0° position. You can continue the movement beyond the 0° position by letting go the operating element and activating it again.

Tilting the table up or down



System control console



- Deflect the joystick to the left or right.
  – The tabletop tilts down or up.

Tableside control console



- Press one of the keys.
  – The tabletop tilts down or up.

Limitations when tilting in Trendelenburg position:

To further tilt the table, release the joystick/button and press it once again.
– Detector and tabletop move footwards until table tilting is possible again.
– An acoustic signal sounds during tilting.



Caution

Patient falls from headend of table during negative table tilt.

Cuts and other injuries

- Secure the patient on the tabletop before tilting it.
- Use the shoulder support and/or foot holder to secure the patient.



The movement always stop automatically in the 0° position of the tabletop if the "Stop in 0° position" function is switched on.

When tilting the table down to a Trendelenburg position >15°, the shoulder supports or the foot holder must be used to secure the patient. The weight of the patient must not exceed 180 kg.

In the case of a Trendelenburg position >40°, the foot holder must be used in addition to the shoulder supports. The weight of the patient must not exceed 150 kg.

Reading the table tilt

Status area of the TUI



Tableside control console

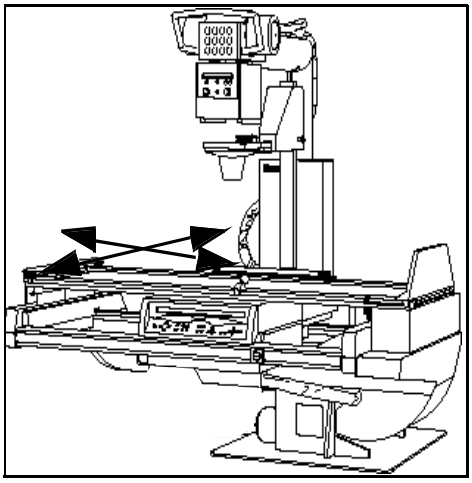


- Read the tilt in degrees (“°”) on the display.

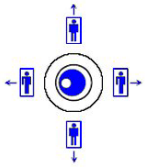
- Read the display in degrees (“°”).

Tabletop

- Longitudinal and transverse movement of tabletop

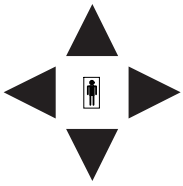


System control console



- Deflect the joystick to the left or right.
  – The tabletop moves transversely
- Deflect the joystick up or down.
  – The tabletop moves longitudinally

Tableside control console



- Actuate the key[1] on the left or right.
  – The tabletop moves longitudinally
- Actuate the key above or below.
  – The tabletop moves transversely

Travel range

❑ To avoid collisions with the floor, the system retracts the tabletop automati-cally as needed if you tilt the table up or down.
  – The X-ray system follows this movement synchronously if the available travel range is sufficient.
  – The object always remains centered in this case.

❑ If you tilt the table more than -30° down or more than +30° up, the system continuously calculates the maximum possible travel range of the tabletop, depending upon the room height and the system position.
  – You can move the tabletop only within this range.

[1] Display in horizontal table position

Complete lowering of tabletop with table in vertical position

If the tabletop is lowered to less than 120 mm above the floor with the table vertical, it is possible for feet to be crushed.

Make sure before remote operation that no one is in the direct vicinity of the system.

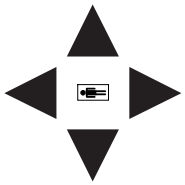
Avoid a location directly at the table end in the case of tableside operation.

You will hear a warning tone, if the tabletop is lowered to less than 120 mm above the floor.

Then control the movement with increased caution.

- Move the table into a vertical position (+ 90°).

Tableside control console



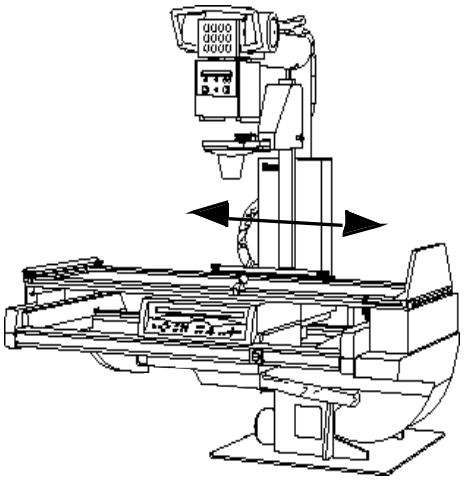
- Press the right[1] button until the tabletop stops automatically at 120 mm from the floor.
- Release the button and press it once again
  – The tabletop moves minimum to 40 mm from the floor
  – an acoustic signal sounds during the tabletop movement

[1] Display in horizontal table position

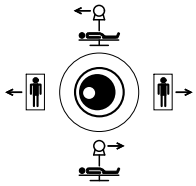
Longitudinal movement of X-ray system

The X-ray system consists of:

- ❏ Stand with tube assembly and primary collimator
- ❏ Flat panel detector and tableside control panel



System control console



◆ Deflect the joystick up or down.
– X-ray system moves headwards or footwards.

Use this operating element primarily during fluoroscopy.

The speed of the movement increases the further you deflect the joystick.

Tableside control panel



◆ Press a key.
– The X-ray system moves headwards or footwards

The movement takes place at constant speed.

Tube assembly stand

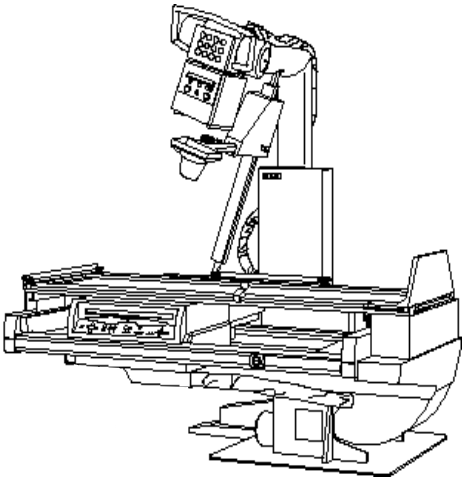
Setting the projection angle (oblique projection)

The setting range of the projection angle is maximally ± 40°.

To achieve the min. and max. angle for oblique projection ± 40° with compression device attached. The compression device shall be moved to the park position (topmost decompression position) first.

The center of rotation of the swivel can be adjusted in height by motor drive from 10 mm to 250 mm above the tabletop to adjust it to the position of the object. This allows isocentric viewing on the monitor.

The additional mechanical centering device ensures that the central beam is centered onto the detector for each projection angle.





- Press the right key for cranio-caudal projection.
- Press the left key for caudo-cranial projection.

If the tube assembly stand or the detector reach the end of their respective travel range, the movement stops.

To perform further oblique projections:

- Press the key for oblique projection again.
  - The tube assembly stand or detector moves to a position for additional projections
  - The object centering is lost.

Reposition the object by moving the tabletop longitudinally provided the range of travel allows this.

For fluoroscopy, position the isocenter for oblique projection at the object height. The object centering on the monitor will remain the same without shift if you select oblique projection.

Setting orthogonal projection (oblique ± 0°)



- Press this button[1].
  - If the central beam is orthogonal to the detector the LED lights up.
  - The display for oblique projection indicates "0°".

Reading off the projection angle

System control console



- Read off the angle in degrees ("°") on the display.

[1] In Tomography mode, pressing the button and moving system to the tomographic position (in the middle of table frame)

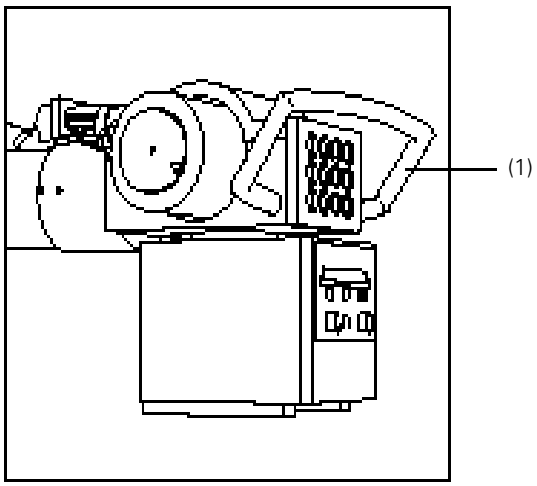
Manual tube assembly rotation

❏ During the rotational movement radiation release is not blocked.

❏ Outside the 0° rotation position, the automatic format collimation system switches from "ACSS" to the "Manual" mode (free radiation field setting).

❏ Tube assembly rotation is possible from +90° to -90° with stop positions every 15° and from -90° to -180° with stop positions every 30°.

◆ Remove the compression cone if present.



◆ Pull the handle (1) to the front and hold it firmly.

◆ Turn the X-ray tube assembly to the required position and hold it firmly at rest.

◆ Press the handle towards the rear and allow it to engage.

◆ Check for lock-in by turning the tube assembly slightly to the left and right.



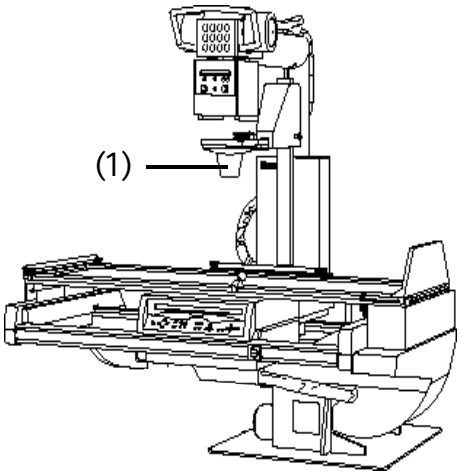
Caution

In extreme operating mode, the temperature of the X-ray tube assembly can heat up.

Danger of burns

◆ Avoid contact with the tube housing.

Compression device



(1) Compression device with cone

Using the compression device



- Insert the cone arm.

Refer to Part **Accessories and Auxiliary Devices**.

- Set an oblique projection angle of less than 30°.
- Press the top key for decompression.
- Press the below key for compression.

The motor-driven compression device is subject to the special duty of the examiner to take due care regarding the applied compression forces, especially in the case of frail, sick and elderly patients.

For further information refer to „Patient positioning“ on page 58.

For information about patient rescue in case of a power failure see .

❏ You can apply a maximum compression force of 155 N, adjustable in 15 steps.

❏ Relative movements are no longer possible at a compression force of 50 N and higher.

❏ The cone carriage moves manually into the park position (topmost decompression position)
– in tomography
– in Periscanning
– when setting a swivel angle greater than 30°.

Reading off the compression level

System control console



- Read off the indication on the TUI.

The force of the compression is 10 times of the step showing on the TUI, for example, the force for the status shown in the left icon is 100N.

Tomographic equipment

Setting the fulcrum height

The average fulcrum height (120 mm) is set automatically when the system is switched on. Fulcrum heights of 10 mm - about 250 mm above the tabletop can be set for digital tomography.

Position the fulcrum height at the object height when you release fluoroscopy. You will obtain unchanging object centering on the monitor without migration if you use an oblique projection.



- Press one of the keys:
  - Adjustment upwards
  - Adjustment downwards.

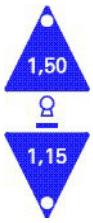
Press briefly and the fulcrum height changes by 1 mm.

Press longer, the fulcrum height changes continuously in steps of 1 mm.

Reading off the fulcrum height

The fulcrum height display in the status area of the TUI is decisive for all examinations.

Setting the source-image distance



If a SID is set between the two SID positions of 115 cm and 150 cm, then only free exposure technique is possible.

- Press a key.
  – Once the selected SID is reached, the LED in the key lights up.
  – If you release the key before the end position, the LEDs in both keys flash.

SID = 115 cm, 150 cm

Moving system to the tomographic position



- Moving tube/detector into 0° position
- In Tomography mode, moving system to the tomographic position (in the middle of table frame)

Setting the Image Geometry

Limiting the radiation field (collimation)

Rectangular

Fluoroscopy and Digital Radiography (DR)

You can view the collimation on the monitor under fluoroscopy.

The maximum possible collimator aperture is never greater than the selected detector format.

The collimator is opened or closed synchronously and symmetrically to the detector center.

- On selection of a lower ZOOM level (larger field) or full format, the rectangular collimation is etained, or the larger field is collimated (can be configured).
- On selection of a higher ZOOM level (smaller field), the collimator always switches to the smaller field.

Caution

Distortion due to exposure geometry

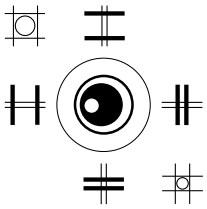
Incorrect basis for diagnosis

- Pay special attention in the diagnosis to distortions of the image geometry when using oblique projections!

Setting

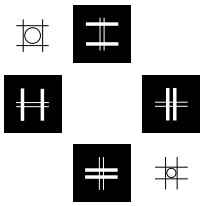
Rectangular collimation

System control console



- Push the joystick up or to the left.
  – The height or width collimator blade pair opens.
- Push the joystick down or to the right.
  – The height or width collimator blade pair closes.
- Push the joystick diagonally.
  – Both collimator blade pairs open or close simultaneously.

Tableside control panel



- Press the key above or on the left.
  – The width or height collimator blade pair opens.
- Press the key below or on the right.
  – The width or height collimator blade pair closes.

CAREPROFILE[1], collimation without radiation

The collimation of the rectangular collimators can be displayed on the LIH image without radiation.

The collimator position is displayed by a contour line as soon as the position of the collimator is changed.

Refer to the **FLUOROSPOT Compact** Operator Manual for further details.

CAREPOSITION[1]

The CAREPOSITION function enables you to position the patient anew without further fluoroscopy with the aid of the last fluoroscopic image (LIH).

When the column or tabletop is moved, the new position is displayed by a contour line.

Refer to the **FLUOROSPOT Compact** Operator Manual for further details.

Additional Cu filter

The organ programs determine which additional Cu filter is moved into the beam path on selection of the program.

A temporary change of the automatic additional Cu filter selection with organ program is possible by manual switchover. The manually selected additional Cu filter is maintained until renewed switchover or selection of an organ program with configured additional Cu filter.

The currently selected additional Cu filter is displayed on the control units and primary collimator.



Caution

Reduced image quality due to filtering

Risk that artifacts, for example metal implants, can appear to be loosening phenomena.
Filtering may cause loss of image quality.

- Choose the Gain value, LUT, the filter gain and filter kernel carefully.

[1] Optional

Image reversal

It is part of the user's duty to pay attention to the correct orientation of the display on the monitor.

Use suitable aids for this, for example Pb letters.

Electronically displayed right or left markings are not mirrored when the image is reversed.

A faulty diagnosis is possible due to incorrect position information, for example confusion between right and left, with legal consequences and under certain circumstances with severe consequences for the patient.

You can flip the images on the image monitor horizontally or vertically with these two icons on the TUI (setup tab card). If none of the icons is pressed, then the image is displayed in the normal position.

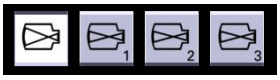


Image flipped horizontally or vertically

Switchover of zoom format

You can change the format even during a current examination.

- Press one of the icons on the TUI.
  – When the icon is shown pressed, the function is selected.



Flat panel detector full format and zoom stages 1, 2, and 3

Register 4 Examination

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Patient Positioning at the Table

General information

- Attach all safety accessories, especially the protection strip, handgrip rail, handgrip angled, footrest, and shoulder supports.
- Use only positioning aids expressly approved by Siemens. Contact your local Siemens representative if you have any questions.
- Refer to part Register **Accessories and Auxiliary Devices** for all accessories available for positioning. Attaching the accessories is also described there.
- Ensure that these devices and positioning aids are secured correctly and are functioning properly.
- Make sure that the body parts of the patient, especially arms and legs, do *not* extend over the edge of the tabletop.
- Make sure that the patient uses the provided grip locations.

Positioning the patient

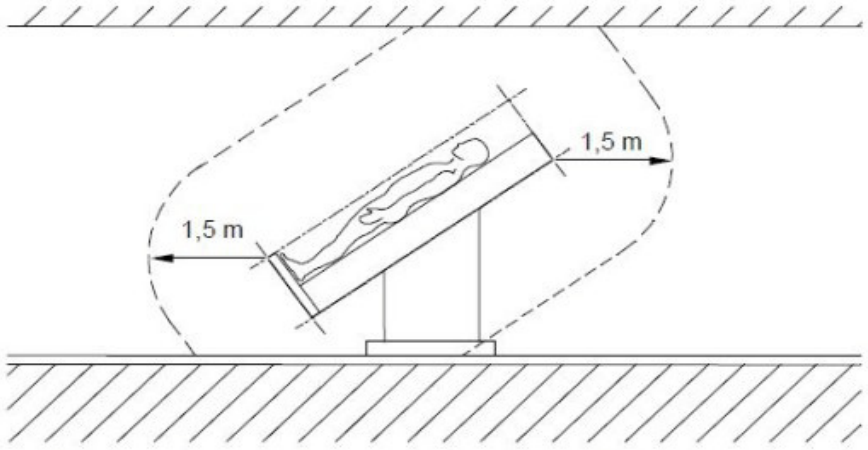


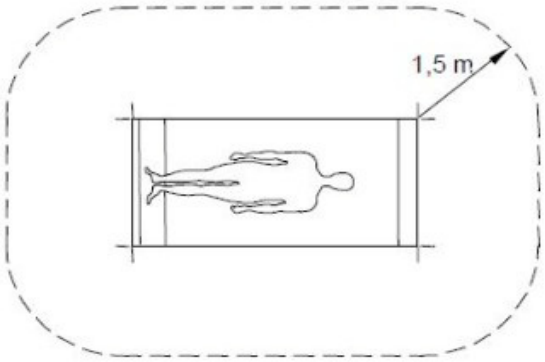
- Press one of these two buttons on the system control console or the tableside control console.
  – The system moves into a position (horizontal or vertical) favorable for patient transfer.
- Now transfer the patient.
- Immobilize the patient with the corresponding accessory parts.
- Move the radiographic system into the required position.

The collision protection system does not recognize accessory parts which project beyond the system contours. The system and the accessories can be damaged and possibly the patient can also be injured.

Patient Environment

Any volume in which intentional or unintentional contact can occur between a patient and parts of Medical Equipment or Medical Equipment System or between a patient and other persons touching parts of the Medical Equipment or Medical Equipment System.





The dimensions in the figure show minimum extent of the PATIENT ENVIRONMENT in a free surrounding.

The patient environment can contain following equipments:

- ❏ Luminos Fusion examination unit
- ❏ Display trolley
- ❏ Moveable tableside control trolley
- ❏ 3D ceiling-mounted tube support[1]
- ❏ Bucky wall stand[1]

[1] Optional

Fluoroscopy

operating modes

❏ High speed fluoroscopy (30p/s fluoroscopy)
– In high speed fluoroscopy 30 frames per second are generated.

❏ Primary pulsed fluoroscopy (CAREVISION)
– In pulsed fluoroscopy, the radiation is pulsed at 15 or 10 or 7.5 or 3 pulses per second. In this way a corresponding dose saving with a lower temporal resolution is possible.

❏ Roadmap (only with DSA)
– Roadmap is a special fluoroscopic mode with subtraction display.

Selection of operating mode

All parameters necessary for fluoroscopy are stored in organ programs.

◆ Select a corresponding organ program on the TUI.

Changing selection of operating mode

It is possible to change the selection of the operating modes in connection with the CAREVISION function.

The current operating mode is displayed in the operating menu of the live monitor.

Use the **FLUOROSPOT Compact** for operation.

CAREVISION



◆ Press this key briefly to select the following:
– Pulsed fluoroscopy with a pulse rate of 3 p/s, 7.5 p/s or 10 p/s, 15 p/s.

Or

– High speed fluoroscopy.

A pulse rate of 3 p/s is the lowest setting and high spped fluoroscopy is the highest setting.

You can also switch from one operating mode to another during a fluoroscopic examination.

Roadmap[1]

Roadmap can be combined with all fluoroscopic modes. There is a corresponding Roadmap Fluoro program for every combination.



◆ Press this icon on the TUI to select or deselect Roadmap.

You can select or deselect this function only when radiation is not being released. Roadmap is automatically deselected when you change to the "Pat. List" menu, on changing the exposure system (Peri, bed-side exposure) or the organ program selection.

Refer to the **FLUOROSPOT Compact** Operator Manual for information on the operating sequence.

[1] only with DSA

Releasing fluoroscopy

- Use the foot switch to release fluoroscopy.
  – Radiation is released as long as you continue to press the footswitch for fluoroscopy.
  – After you let go of the foot switch, the last image is retained and displayed on the monitor (LIH).
- With the red emergency STOP button actuated, fluoroscopy can be switched back on consciously after letting go of the fluoroscopy switch and pressing it again.
- A patient folder must be created and selected in the FLUOROSPOT Compact.
- No processing functions apart from storing the image are possible during fluoroscopy.
- The radiation ON indicators must light up.



If these radiation ON indicators light up although no switch has been actuated and the current fluoroscopic image cannot be seen on the monitor:

- *Switch off the system immediately!*
- *Notify the SIEMENS Uptime Service.*
- *Discontinue use of the system.*

Fluoroscopic data

The fluoroscopic data of kV, mA, time and dose-area product are displayed on the TUI.

Display of kV and mA values

During fluoroscopy Running display of the momentary kV and mA values

After the end of fluoroscopy kV and mA mean value of the examination

Display of fluoroscopic time

Continuous display of the time accumulating in the examination in minutes.

Display of dose-area product

Continuous display of the dose-area product accumulating in the examination.

Reset of fluoroscopic data

Once the examination is ended, note the displayed fluoroscopic data.

The displays for the fluoroscopic data and the dose area product are reset to zero when the patient list is displayed.

Automatic fluoroscopic control

Selecting automatic fluoroscopic control

The fluoroscopic curves and dose levels preset in the organ program can be changed with the automatic program keys on the system control console.

You can select different fluoroscopic curves with the automatic programs.



- Select automatic programs 1, 2 or 3 with one of the icons in the Fluoro area on the TUI.

Stop function

If the fluoroscopic values (kV, mA) set by the system should remain constant



- Press the stop icon on the TUI during fluoroscopy.
- To cancel the stop function, select one of the three automatic programs by a key or an organ program.

Fluoroscopic curves

Depending upon the system configuration, the following fluoroscopic curves are assigned to the automatic programs:

Automatic program	**Curve**	**Name**	**Description**
1	Antiisowatt	Linear fluoro curve	kV increases with the augmentation of mA. Use in general clinical applications.
2	73 kV plateau	Better image quality curve	Images are with high contrast and low noise level. Use for better image.
3	Dose reduced	Dose saving fluoro curve	Use in pediatric applications.

Fluoroscopy time limit

Fluoroscopy is switched off automatically and can no longer be switched on after a fluoroscopy time of 10 minutes[1].

◆ To continue working, let go of the fluoroscopy switch and press it once again.

Fluoroscopy warning signal

An acoustic signal sounds after a fluoroscopy time of maximum 5 minutes[2].



◆ Press this icon on the TUI.
– The signal disappears.

The time for the acoustic signal can be reset to zero at any time.

Automatic format collimation

Automatic format collimation is switched on automatically when fluoroscopy is released.

That is, the fluoroscopic field is never larger than the selected zone format.

You can limit the fluoroscopic field to the required size with the corresponding operating elements within this area.

Fluoroscopy programs

All parameters necessary for fluoroscopy are stored in programs.

The following programs can be stored:

❏ High Speed fluoroscopy

❏ Pulsed fluoroscopy (Carevision)

❏ Roadmap pulsed fluoroscopy

Refer to the **FLUOROSPOT Compact** Operator Manual.

[1] Can be changed on request by SIEMENS Uptime Service, under compliance with the national regulations.
[2] Can be configured from 1 to 5 minutes by the SIEMENS Uptime Service

Dose reduction[1]

In fluoroscopy with CAREVISION (pulsed fluoroscopy), the following dose reductions configured in the factory result related to standard fluoroscopy:

Automatic program	CAREVISION 15 P/s	CAREVISION 7,5 P/s	CAREVISION 3 P/s
1	- 50%	- 75%	- 90%
2	- 33%	- 55%	- 75%
3	- 30%	- 50%	- 65%

If the RADIOGRAPHY mode is misused on purpose by the operator for real-time imageing, the IMAGE DISPLAY DELAY may be longer than in RADIOSCOPY.

[1] for detector input dose rate

Digital Radiography

Important information

Power supply

If the mains power supply does not meet the standard, for example if the internal resistance is too high, it must be protected against overload by restricting the power.

In this case, the selection of the mA and mAs values may be limited.

Constrast medium

Some contrast media are very aggressive and can react with some materials of the system (for example tabletop).

To prevent this, please double-check the used contrast media with your Siemens representative.

Automatic format collimation in digital radiography

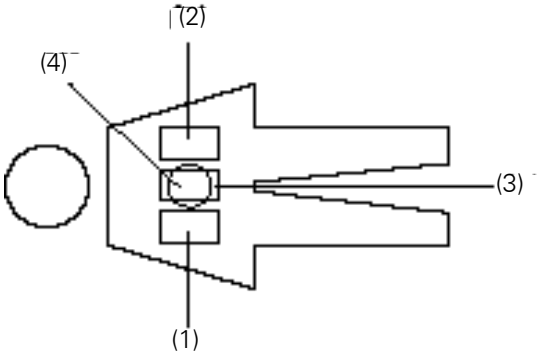
The exposure field is never larger than the selected flat panel detector format.

Within this area you can limit the exposure field to the required size with the corresponding operating elements.

Exposure measurement in digital radiography

Arrangement of dominants at the table

The following sketch shows the arrangement of the dominants in the monitor in relation to the a-p patient position (head end at the left, looking onto the patient with the table horizontal).



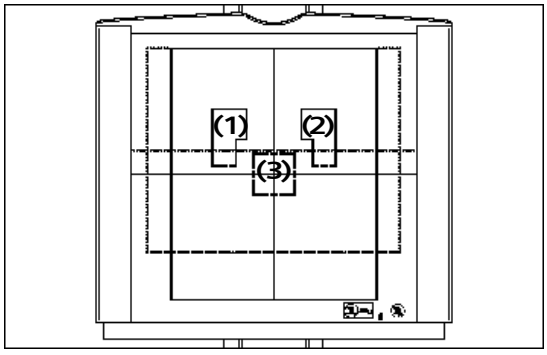
(1) Left dominant

(2) Right dominant

(3) Middle dominant

(4) Central circular dominant

Arrangement of dominants at the wallstand



(1) Left dominant

(2) Right dominant

(3) Middle dominant

Selecting dominants

The dominants are filed in the organ programs or can be set on the TUI.

Multiple selection of the dominants is possible.

Exception: Central circular dominant.



Caution

Error in automatic change-over to middle measuring field during collimation

Dose not as desired

The active measuring fields are displayed on the TUI.

- Pay attention to correct change-over.

- Press one of the following keys:



Left dominant



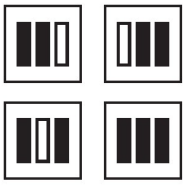
Middle dominant



Right dominant



Central circular dominant



The following dominant combinations are selectable, too.

*If a selected left or right dominant or both dominants becomes invalid tempo-rarily, for example due to collimation, then the central circular dominant is selected and displayed automatically.**

The originally selected dominant(s) will be active and displayed again when the collimator is opened again.

* only at the table

During collimation under fluoroscopy, take care that the selected left or right dominant lies completely in the radiation field. Otherwise there will be overexposure because of the inappropriate acquisition of the measured exposure values.

The position of the measuring field or the measuring field in relation to the object can be checked on the LIH image by means of brief fluoroscopy. A diagram with the position and size of the relevant measuring field is displayed briefly on the monitor.

Acquisition without tomography

Selection

- On the TUI of the system control console, select an organ program for:
  - Single image
  - Series or
  - DSA

Single image - series

Single image is not possible in DSA.

The display is in the operating area of the live image monitor.

The zoom format cannot be changed during an exposure series. Only the collimation is corrected on changing over to a larger zoom level.

Changing selection



- Press this key on the TUI to toggle between single image and series if a series organ program is active. Otherwise, the button is inactive.
  - The system switches over to single image in the "Series organ program"
  - Single image remains selected in the "Single image organ program"

A changed organ program remains retained only until you select another or the same organ program or switch off the system .

Frame rate

Operation is on the TUI of the system control console.

During a native series the programmed frame rate can be reduced.

Prerequisite The corresponding reductions are programmed in the relevant organ program (see FLUOROSPOT Compact).



- Press this button.

Releasing exposure

❏ Release the exposure with the exposure release button on the system control console or via the foot switch in the control room, or table-side.

❏ The radiation ON indicators must light up briefly during the exposure.

If these radiation ON indicators light up although no switch has been actuated and the current fluoroscopic image cannot be seen on the monitor:

- *Switch the generator off immediately!*
- *Notify the SIEMENS Uptime Service.*
- *Discontinue operation of the system.*

Radiation interruption

If you let go of the exposure release button during radiation, the exposure is interrupted immediately in single exposure. In serialography, the last exposure is still exposed correctly.

If a DSA series is interrupted before exposing the mask, the first image is used as mask. The series is then displayed native.

Exposure end

In single exposure, only one image is exposed, even if the exposure release button remains pressed.

Letting go of the exposure release button In serialography, a full image memory or reaching the programmed maximum scene time ends the exposure series.

The DSA series is ended and the DSA image from the middle of the series is displayed if you let go of the exposure release button.

You start a new DSA exposure series by pressing the exposure release button again.

In DSA exposures

The system switches automatically to subtraction after a predetermined number of images (for example two).

The point in time at which the contrast medium should be injected must be selected depending on the examination.

Organ programs

All parameters necessary for the exposure are stored in organ programs.

Programs

- ❏ Single image organ program
- ❏ Series organ program
- ❏ DSA organ program
- ❏ Radiography organ program.

Creation of programs

Refer to the **FLUOROSPOT Compact** Operator Manual.

Temporary changes of programs

For the following parameters stored in the organ program, it is possible to change them temporarily with the corresponding operating elements:

- ❏ Switching over from single image or series
- ❏ Dose value
- ❏ Dominants
- ❏ Cu prefilter
- ❏ Collimation
- ❏ X-ray parameters
- ❏ Focus size
- ❏ Automatic level 1, 2, 3

The changed parameters apply only until you select another or the same organ program or switch off the system.



Caution

Wrong exposure parameters

Risk of unnecessary X-ray exposure due to wrong exposure parameters.

- ◆ Take care of the correct exposure parameters.
- ◆ Non-imaging radiation leads to unnecessary X-ray exposure.
- ◆ As the exposure index (EXI) is an important indicator for the exposure of the acquisitions, please pay attention to the exposure index in all examinations.

Tomography prerequisites

- Select the required tomography organ program.
- The compression device is in its park position, if present.
- The tube assembly stand is in the 0° position.
- A source-image distance of 115 cm is set.
- Detector in tomographic position (in the middle of table frame).
- Table tilt in the permissible range, depending on room height.

→ When all the prerequisities are satisfied, the message changes to "Ready".



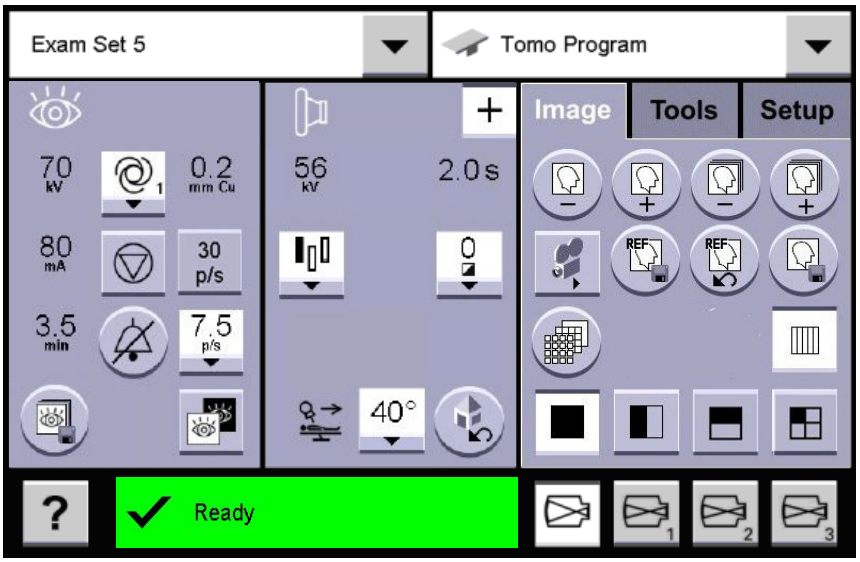
Permissible table tilt	**Room height**
- 17° to 4° ; 87° to 90°	≤ 285 cm
- 17° to + 90°	**>** 285 cm

When the prerequisites are fulfilled, the tomographic display stops flashing.

Tomographic sequence

With tomography and an appropriately equipped system, you can acquire a series of images in layers from different angles on the patient table.

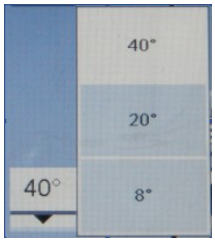
- Select the required tomography organ program.
- The tomography angle/time and the fulcrum height adjustment are displayed on the top of Touchscreen.



After selection of another organ program the system is preparing the detector for acquisition.

In case of a tomography program, this preparation needs a time of about 15 s.

If no acquisition is performed during 6 min, there will be another pause of 15 s.



- Select the required tomography angle or time at the TUI or the FLUOROSPOT Compact.
- The combination for tomographic angle/tomographic time appears in the display.



- If the X-ray system is not at start position, the message "Move to start position" appears and flashes in the message area of the TUI.

In Tomography mode, moving system to the tomographic position (in the middle of table frame)

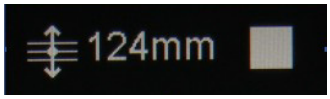
– Refer to „Tomography prerequisites“ on page 21

- Patient positioning.



- Adjust fulcrum height at the system control console.

The set height is indicated on the console monitor.



- Press the exposure release button up to the first pressure point.
  – The tube assembly stand moves to the head-end Tomography starting position (at the left with the unit horizontal).
- Give the breathing command to the patient.
- Press the exposure release button all the way down and hold pressed until the tube assembly stand stops.
  – During the exposure, the tube assembly stand moves towards the foot end and automatically remains in this position following the exposure.

With the exposure release button pressed, the tube assembly stand moves back into the starting position.

Prepare the next tomographic exposure:

- Set a new tomographic height.
- Press the exposure release button up to the first pressure point.
  – The tube assembly stand moves from the foot-end position towards the head-end Tomography starting position (at the left with the unit horizontal).

For further information, please refer to the Operator Manual of the **Fluorospot Compact**.

Releasing exposure

❏ To release the exposure, actuate the exposure release button at the system control console.

❏ The radiation ON indicators must light up during the exposure.

Radiation interruption If you let go of the exposure release button during radiation, the exposure is interrupted immediately and the tomographic movement is stopped.

Exposure end Letting go of the exposure release button or elapsing of the tomographic time ends the exposure.

Organ programs

All parameters necessary for the exposure are stored in organ programs.

Refer to the **FLUOROSPOT Compact** Operator Manual and Part **Generator** for further details on the organ programs and their programming.

Programs:

❏ Tomography organ programs

Creation of programs

Refer to the FLUOROSPOT Compact Operator Manual.

Temporary changes of programs

For the following parameters stored in the organ program, it is possible to change them temporarily with the corresponding operating elements:

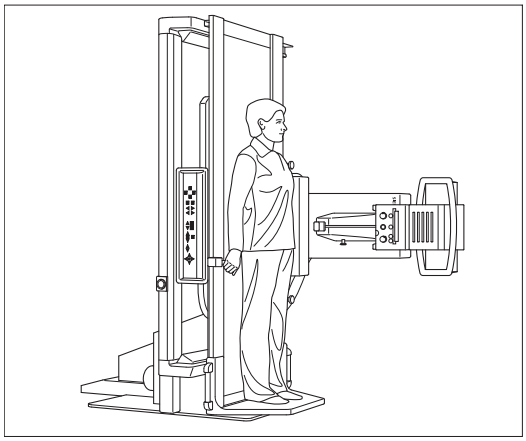
❏ Dose value

❏ Cu prefilter

The changed parameters apply only until you select another or the same organ program or switch off the system.

Scan Technique

Description



In Scan Technique, the stand is moved *continuously*, with constant linear speed. A series acquired in this way can be used for the reconstruction of survey images (**Composing**) on the syngo Workplace.

The stand speed and movement direction can be programmed in the organ program.

The frame rate is fixed to 2 f/s.

- To enable other functions, select a different organ program.



Caution

Wrong organ program used in scan technique.

Delayed diagnosis or repeat examination because results are unable to compiled.

- Use correct organ program for scan technique.
- Perform a test run.

Depending on the examination, there are two tpyes of acquisition:

- ❏ Scan Technique for images of the spine
- ❏ Scan Technique for orthopedic longleg images



Generate an organ programe for the Scan Technique in the series menu.

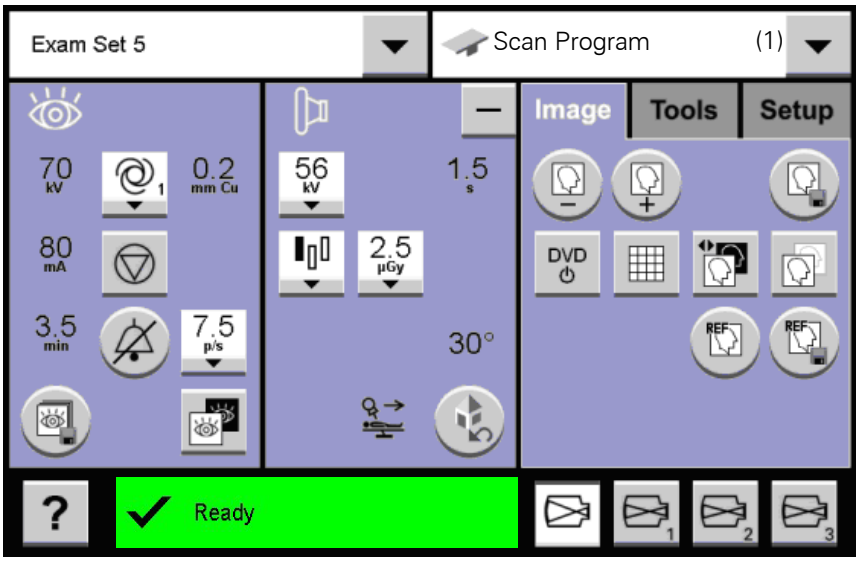


*It is recommended **not** to predefine image flip operations for the Scan Technique organ programs.*

Scan Technique can be performed like a regular series, with frame rate and a restricted active area on the detector.

→ For further information, please refer to the Operator Manual of the **Fluorospot Compact**.

Workflow



- Select the required scanning organ program (1).
- Adjust the SID to 150 cm.
- Adjust width of collimation manually
  – Height of collimation is adjusted to 10 cm, automatically.
- Release exposure
  – As long as the release button is pressed, the image receptor will move and acquire images.

→ Details see„Releasing an exposure“ on page 28

- Send the images from the imaging system to the *syngo* MultiModality Workplace using the "DICOM Send" function.
  – The images are composed on the *syngo* MultiModality Workplace.

Scanning can be performed in two different techniques:

❏ 0-point technique (kV and dose can be changed)

❏ 2-point technique (kV and mAs can be changed)

Releasing an exposure

A short fluoroscopy at the starting position is necessary before the acquisition in order to set the correct exposure parameters.[1]

- ❏ Release the exposure with the exposure release button in the system remote control console or via the foot switch in the control room, or table-side.
- ❏ Radiation is released as long as you continue to press the exposure release button.
- ❏ The signal lamps for radiation must light up.

Radiation interruption If you let go of the exposure release button during radiation, the exposure is interrupted immediately.

Exposure end Letting go of the exposure release button, a full image memory or reaching the maximum scene time ends the exposure series.

[1] necessary only for 0-point technique

Examination procedure for images of the spine and orthopedic longleg images

Preparation

For reasons relating to the exposure technology, the scanning direction is:

❏ Long leg: Head to foot direction

❏ Spine: Foot to head direction

◆ Prepare the digital imaging system

◆ Select a scan technique organ program

◆ Have the patient stand in front of the vertical table (with or without foot rest) and immobilize the patient with the compression belt.

◆ Make sure the organ of interest can be covered by the measurement field selected for exam.

◆ Set horizontal projection.

◆ Set the SID to 150 cm.

◆ Select the measuring fields (dominants):
  – Center dominant for spine ap (necessary only for 0-point technique)
  – Left plus center dominants for spine lat according to patient positioning
  – Center dominant for images of single leg
  – Left plus right dominants for images of both legs

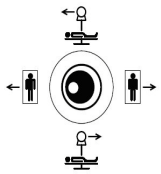
Moving system and tabletop into starting position (30 cm above the floor)

In system with +90° settings, in order to gain full othopedic longleg images, please move tabletop into starting position, 30 cm to 40 cm above the floor.

- Position the patient.
- Bring the X-ray system and tabletop into the intended starting position.

The exposure series is started in the pelvic region for better exposure control.

The entire examination area must be scanned without interruptions. If necessary, perform a test run without fluoroscopy and correct the starting position.



- Deflect the joystick for "X-ray system longitudinal movement" up or down until the entire examination area has been scanned.
- Return to the start position.
- Check the starting position during fluoroscopy.
  – The laser for positioning or the middle line of the fluoro image gives you orientation where the composed scanning image begins.

Scanning process

The X-ray system is in the starting position for the scanning process.

During the exposure series, the patient should take only shallow breaths or not breathe at all.

- Actuate the exposure release button until the entire examination area has been scanned.
  – The X-ray system moves automatically when the exposure is released.

End of scene

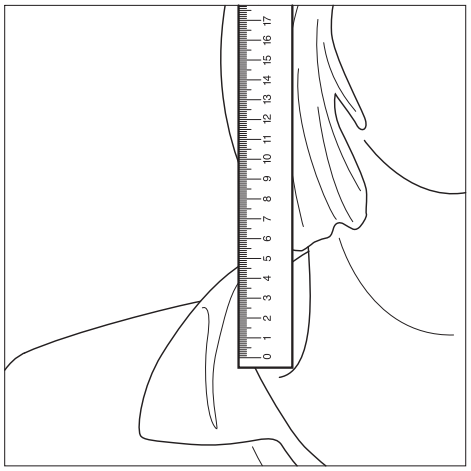
- Let go of the exposure release button.
  – The X-ray system movement stops automatically.

The scene is also ended if the image memory is full and the maximum scene time has been reached. This fact is independent of the position in which the system is located.

Application hints for spine composing

Spine

- Move the system in upright positon (+90°)
- Do *not* use a mattress to reduce the distance between object and detector.
- Use the maximum SID (150 cm).
- Use a table-detector distance as low as possible.
- Position the patient on the footboard of directly on the floor.
  – Patient standing physiologically: Feet, hip and ankle must be aligned (for ap: heels not against table); both legs must be loaded in the same way.



Placing ruler/sphere in longitudinal axis

- Set calibration element (sphere, ruler) and diagnostic relevant area in the same plane. Make sure that the longitudinal axis runs parallel to the image receptor (otherwise calibration on the syngo X-Workplace is not possible).

Scan Technique operation on FLUOROSPOT Compact (FLC)

For Scan Technique, the stand is moved continuously, with constant linear speed. A series acquired in this way can be used for the reconstruction of survey images (**Composing**).

The stand speed and movement direction can be programmed in the Scan Technique organ program.

→ „Additional parameters for Scan Technique“ on page 47

The frame rate is fixed to 2 f/s.

It can be configured in service mode.

Please ask Siemens Service.

The setup of the Scan Technique acquisition mode with all acquisition parameters is done by selecting an organ program.

For automatic composing of scanning acquisitions in Composing on the syngo X Workplace, the following conditions must be fulfilled:

- ❏ For every scan direction (head to feet or feet to head), a separate organ must be created.
- ❏ The exact organ program name must be entered on the syngo X Workplace via **Options > Assign OGP to Algorithm...**, e.g. "Scantechnique Feet-Head" and "Scantechnique Head-Feet".
- ❏ In the **Auto Composing Modes** configuration on the syngo X Workplace, **One Association** must be set.

Performing Scan Technique

Scan Technique can be performed like a regular series, with a fixed frame rate and a restricted active area on the detector.

1. Select the required scanning organ program.



This icon appears in acquisition modes: Scan Technique on patient table

2. Perform an acquisition.

Composing on the FLC

If **Automatic Composing** is set in the organ program, composition will start in **Postprocessing** mode automatically after the last image has been acquired.

If **Automatic Composing** is not set in the organ program, you can start composition in **Postprocessing** mode manually.

→ „Composing operation on FLUOROSPOT Compact (FLC)“ on page 34

Sending to Composing on syngo X Workplace

If automatic sending is configured, the images will be sent to the syngo X Workplace.

If automatic composing is configured on the syngo X Workplace, the images will be composed and displayed in the **Composing** task card on the syngo X Workplace.

See the syngo X Workplace - syngo X WorkplaceComposing Operator Manual.

Composing operation on FLUOROSPOT Compact (FLC)

Composing allows you to compose digital, overlapping single images that were acquired for this purpose.

The images are composed by system geometry.

Composing can be preformed automatically and manually:

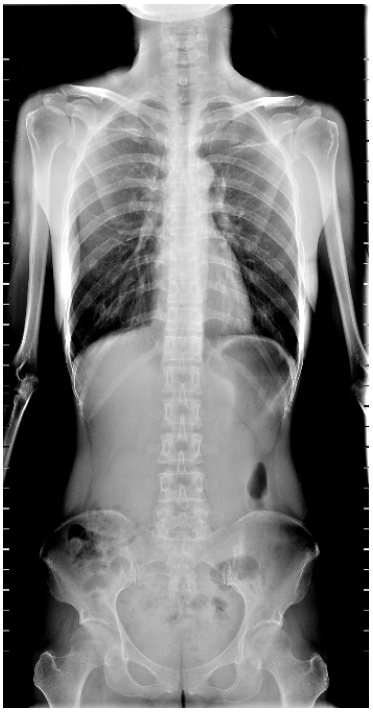
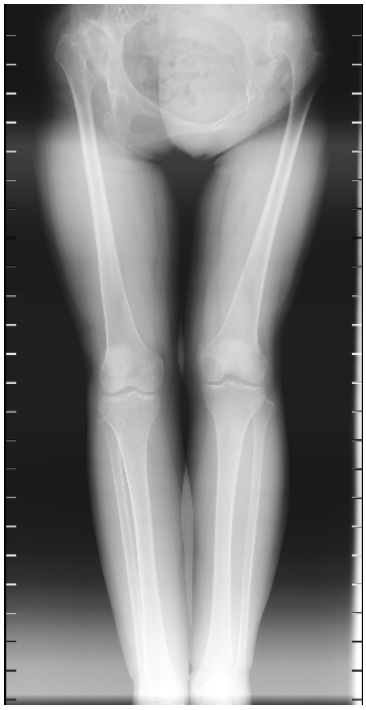
- ❏ Automatic Composing: If set in the organ program, images will be composed automatically. The algorithm for image composition (spine or leg) is automatically seleted.
- ❏ Manual Composing: You can also display an image from the series to compose in **Postprocessing** mode and then start composition manually.

The single images are aligned automatically and/or you can correct the alignment manually:

- ❏ Automatic alignment: The single images are shifted until the best alignment is achieved.
- ❏ Manual alignment: In the rare cases where transition areas have not been optimally reconstructed by the computer, you can adjust them manually. Proceed by shifting the image part below the transition edge relative to the image part above the transition edge until the best alignment is achieved in the overlapping area.

Reconstruction algorithms

	**Spine algorithm**
	**Leg algorithm** (orthopedic longleg for 1 leg)
	**Double leg algorithm** (orthopedic longleg for 2 legs)

Spine reconstruction	Orthopedic longleg
	
With the **Spine algorithm** you can reconstruct a complete image of the spinal column from images from fluoroscopic and radiographic systems.	One leg or both legs are displayed with the **Leg algorithm** or **Double leg algorithm** in one image generated from a series of images. This module enables you to generate, assess, and measure images of the total leg skeleton.

Performing reconstruction

Starting composition manually

1. Load an image of the series to compose in **Postprocessing** mode.



2. Click this icon.

Selecting the reconstruction algorithm

1. Click on the required icon.
2. Perform reconstruction

→ „Performing reconstruction“ on page 36

Improving reconstruction by entering the table-object distance

For the rescontruction of the spinal column it is improtant to know, for example, whether it was located directly above the table (for scans in the supine position) or at some distance from it (e.g. for scans in the lateral porition).

By entering a table-object distance (TOD) you can improve reconstruction of the object plane of interest for certain image types.

To achieve good reconstruction results for Spine a.p. and Spine lateral you should measure the TOD for every patient and enter TOD value manually!



◆ Enter the table-object distance **TOD** (cm).

→ „Performing reconstruction“ on page 36

Changing the order of the images

Normally, the images are acquired from head to feet. If the images are acquired vice-versa, you can reverse the order:



◆ Click **feet to head**.

Performing compositon

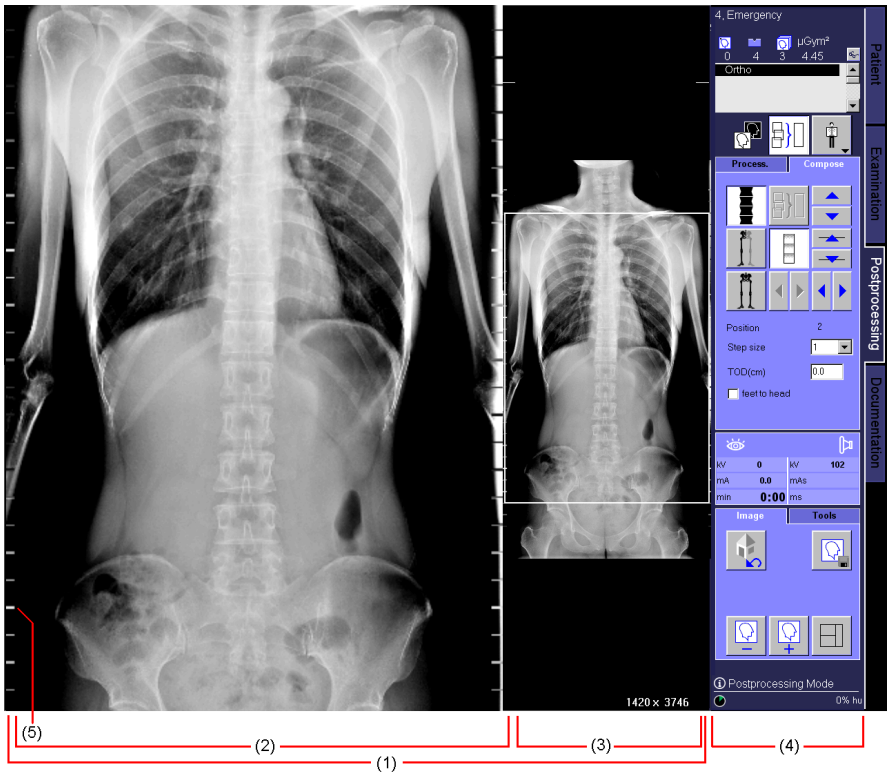


◆ Click this icon.



The images are composed to each other and then displayed.

Display of composed images



(1) Image area

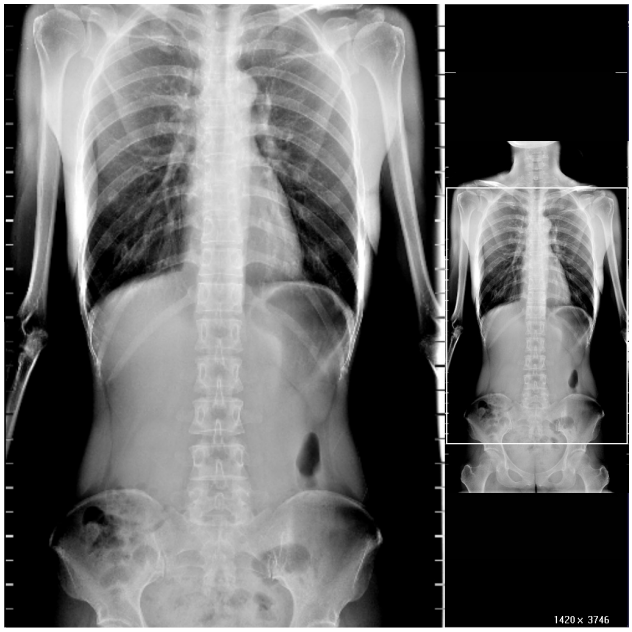
(2) Detailed image: Shows the composite image.

(3) Overview image: Show an overview of the entire composite image.

(4) Control area

(5) Section markings

Layout without or with original image

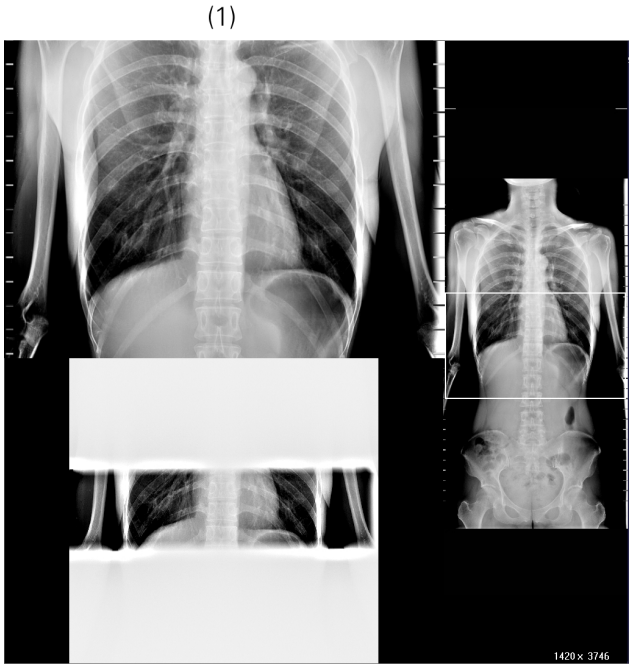


(1) (2)

Spine view (default setting): Only the composite image is displayed. In this display you will see a composite image, if necessary with an overview reduced in size.

(1) Detailed image

(2) Overview image



Single with original view: The composite image and the original image (if present) containing the original image information are displayed one below the other. This display mode can be used for checking the reconstruction and performing diagnoses.

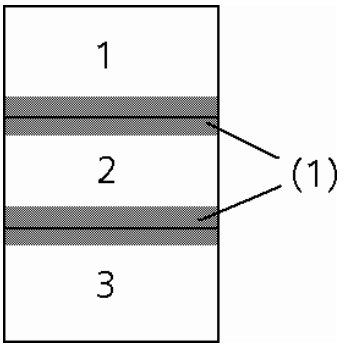
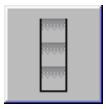
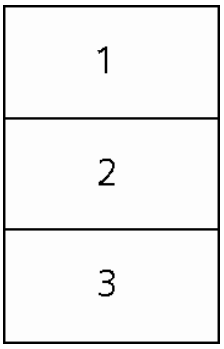
(1) Detailed image

(2) Overview image

(3) Original image

Blend mode and cut mode

Normally, composed images are displayed with "soft" transitions. For diagnosis, however, you can have the images displayed with "hard" cut edges and the original image information instead:

		**Blend mode** (default setting): The single images are blended at the transitions between each pair of images. (1) Interpolated areas
		**Cut mode:** The single images are placed side by side without blended transition.

Changing the display of a composed image

For assessment of composed image, you have to use **Single with original view** *and* **Cut mode***.*

With the latter, the images are joined at the cut lines without adjustment of the transition areas. This displays an overall image with the unchanged information of the single images.

Moving the image section

In the **overview** (right), the image section shown in the detailed image (left) is surrounded by a border.



◆ Click into the frame and drag it to the desired position.

- or -

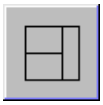


Move the mouse pointer into or over the border.

Drag the border to the desired position.

The image section of the overview image is moved accordingly.

Changing the layout without or with original image



◆ Click this icon on the **Image** subtask card, if necessary.

Switching between blend mode and cut mode



Normally, composed image are displayed with "soft" transitions. For diagnosis, however, you can have the images displayed with "hard" cut edges and the original image information instead:

- Click this icon on the **Compose** subtask card.

The icon appears selected: **Blend mode**

The icon appears as not selected: **Cut mode**

When **Blend mode** *is used, there are transition areas between the single images that were interpolated from two images.*

Although the **Blend mode** *image might appear more pleasing to the eye,* **only** *the original images must be used for the* **diagnosis** *of bones and vascular structures.*

Manual adjustment

Normally, all parameters required for image reconstruction are determined automatically.

In rare cases, you might find that the automatic algorithm does not provide optimum results. In this case, you may manually determine the position of the images relative to one another (shifting pixels).

*If any manual adjustment was performed, the text '***Manual adjustment performed***" is displayed in the image.*

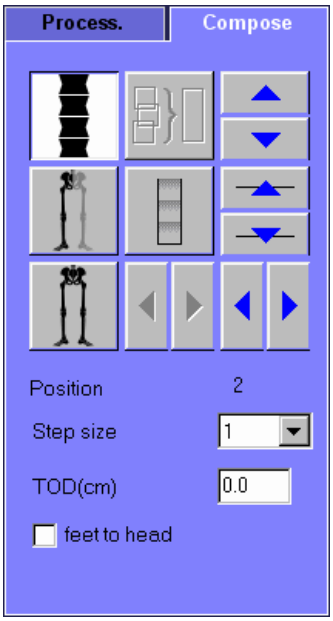
*A manually adjusted cutline is marked by an asterisk * in the saved resutl image.*

If you make manual changes and therefore modify the reference parameters, you may find that the calibration as well as any graphics drawn in the composed image are no longer valid. Calibration must be repeated and graphic must be redrawn.

In the case of a saved and reloaded composite image, the position of the single images may be changed only if the original images are still available.

As the user, you are responsible for correct manual adjustment of the reconstruction and the conclusions for diagnosis drawn from it.

Tools The tools for manual positioning can be found on the **Compose** subtask card of the **Postprocessing** task card.



Adjusting the reconstruction manually

Selecting the image position to be shifted

First, select the image in the series you want to shift:



- Move the border in the overview image so that the correct position is displayed in the detailed image.

The position of th image edge to be corrected is identified with the orientation mark in the **detail image** (on the left).

Setting the pixel number for the shift

For subsequent corrections you can set the number of pixels per mouse click. You can use one of the following values: 1, 2, 5, 10, 20, 50 pixels.

When you start the system, 1 pixel per mouse click is the default setting.



- Select the required number of pixel from the Step size drop down list.

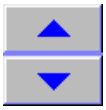
With each mouse click the image is shifted by the number of pixels set during correction.

Shifting images relative to each other

The topmost image cannot be shifted.

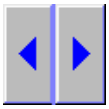
The shift should be performed in Cut mode because the pixel shift is easier to see in this mode.

→ „Changing the display of a composed image“ on page 41



1. Click the up or down arrow once or repeatedly.

The images below are moved up or down.



2. Click the left or right arrow once or repeatedly.

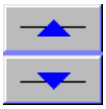
The images below are moved left or right.

The shift is performed after each click.

The lower part of the composed image is shifted relative to the upper part.

In reconstructions with two legs, you can adapt the two image halves separately with the left or right arrow.

Moving a cut line up/down



- Click an arrow with the line symbol up or down once or repeatedly.

The cut line (the image edge) is shifted up or down.

Saving the composed image



◆ Click this icon.

The image currently displayed is saved as a new image.

It will appear in the series/images catalog of a study directly after the original series.

The saved image is numbered by **COP_#**, when **#** is the original series number. If manual composition took place, an asterisk * is added to the image number.

Additionally, a second result image is stored with reduced matrix size.

The second image can be used for hardcopy to fit completely on the printout.

The second image will not be used for sending.

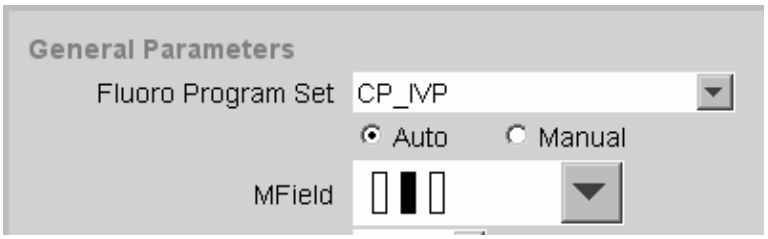
When leaving **Postprocessing** *mode, you are automatically asked for saving an unsaved composed image.*

Confirm with **Yes**, *if you want to save it.*

Postprocessing and documenting composed images

You can postprocess and document composed images in the normal manner. However, not all postprocessing functions are available.

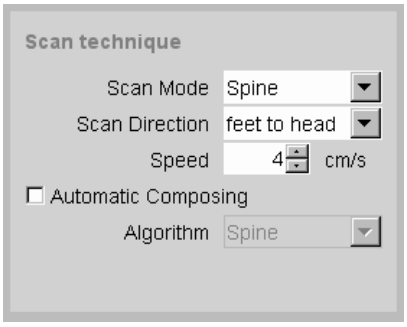
Additional parameters for Scan Technique



General Parameters

- **Auto**: 1 pt technique is used for scanning.
- **Manual**: 2 pt technique is used for scanning (**kV** and **mAs** values are set).

For the other parameters, refer to the **FLUOROSPOT Compact** Operator Manual.



Scan technique parameters

- **Scan Mode:** Scan mode/organ to be examined: **Spine**, **Leg** or **Colon**
- **Scan Direction**: Direction of scan: **head to feet** or **feet to head**
- **Speed**: Speed of scan: 4 cm/s or 6 cm/s
- **Automatic Composing**: Automatically compose the images after acquisition
- **Algorithm**: Algorithm for automatic composition

→ „Composing operation on FLUOROSPOT Compact (FLC)“ on page 34

Composing will not be possible when an image rotation is set in the organ program. **Rotation** *must not be set.*

Interventional Radiology

Prerequisites

- ❏ DSA
- ❏ Caremax[1]

Application

With "DSA for interventional applications", the Luminos Fusion X-ray system fulfills the "Particular Requirements for the Safety of X-ray Equipment for Interventional procedures" according to IEC 60601-2-43: 2010.

The system is designed for cardio-pulmonary resuscitation (CPR) with a pressure compression of up to 500 N (50 kg) for patients weighing up to 180 kg.

The system is intended for use in procedures such as:

- ❏ Transjugular intrahepatic portosystemic shunt (TIPS)
- ❏ Embolization treatment
- ❏ Non-cardiac vascular reconstruction

These procedures may involve high skin doses which can result in deterministic effects.

Important labels



This warning sign indicates that the patient table can be loaded with a maximum weight of 200 kg (180 kg for interventions).



This warning sign shows the position of the patient table for cardio-pulmonary resuscitation (CPR) with a pressure compression of up to 500 N (50 kg).

Please center the table top before performing CPR.

[1] Mandatory in EU and other countries

Information about contrast media

Some contrast media are very aggressive and can react with some materials of the system (for example tabletop).

To prevent this, please double-check the used contrast media with your Siemens representative.

Avoid contact between contrast media and tabletop.

– Certain contrast media can harm the surface of the tabletop.

For more information and details, refer to your Siemens contact person.

Disabling radiation

External buttons

To prevent the unintentional release of radiation, for example during cleaning or patient positioning, radiation can be disabled by an on-site switch in the examination room without impairing other system functions.

If the button is activated, the message line of the TUI on the system control console shows the message “Radiation disabled”.

Door contact switch

For interventional procedures, no door contact switch for interrupting radiation should be connected.

Contact your Siemens service engineer concerning this matter.

Preventing unnecessary interruptions of system movements

- Before initiating system movements, in particular tilting the unit, ensure that there are no obstacles in the movement area.
- Make sure that the patient does not actuate the switch rail between the tabletop and the stand.

For further information refer to „Protective measures“ on page 52.

System position for interventional examinations

For interventional examinations the system must be horizontal.

System position for "cardiopulmonary resuscitation" (CPR)

Cardiopulmonary resuscitation may be performed only with the following settings:

❏ Horizontal tabletop.

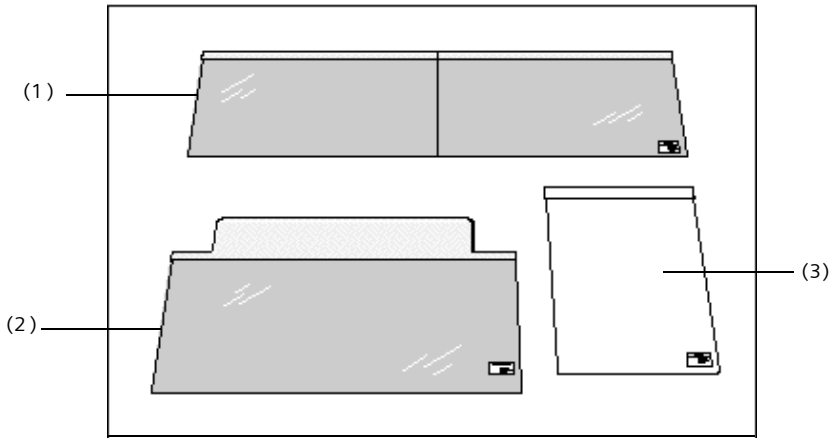
❏ Pressure point must be within the head-end and foot-end tabletop support.

Moving to the CPR position automatically



- Press the key until all movements have been completed.
  – The system moves to the patient transfer position with horizontal tabletop.
  – The system moves into the orthogonal beam path.

Protective covers



(1) Front cover

(2) Foot end cover

(3) Rear cover

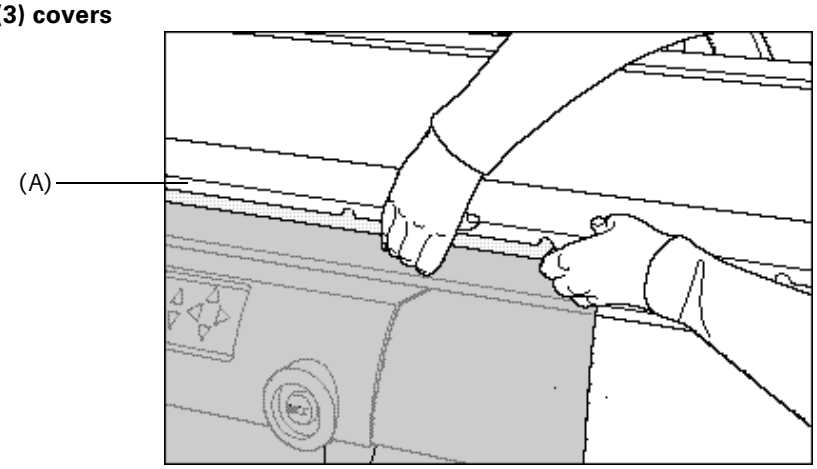
The protective cover consists of plastic sheets for the front, rear, and foot ends of the table. The protective covers are positioned between the tabletop and the table frame to prevent the penetration of liquids.

The front and rear can be fixed to the accessory rails of the table top. The cover for the foot end can be slid between the table top and the table frame. Be careful during longitudinal table movement that the cover does not become dislodged.

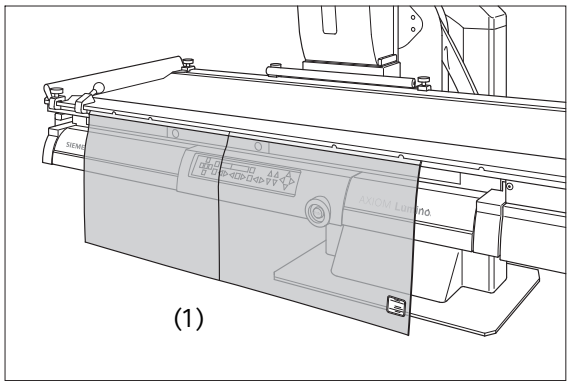
The covers can be cleaned with normal cleaning agents (see Part Register **Cleaning and disinfection**, chapter "Register ").

Attaching the front (1) and rear (3) covers

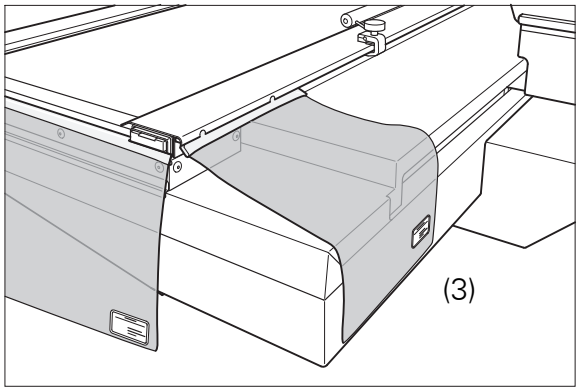
The tabletop is in the horizontal position



◆ Push the gray strip (A) of the covers from underneath into the accessory rails.



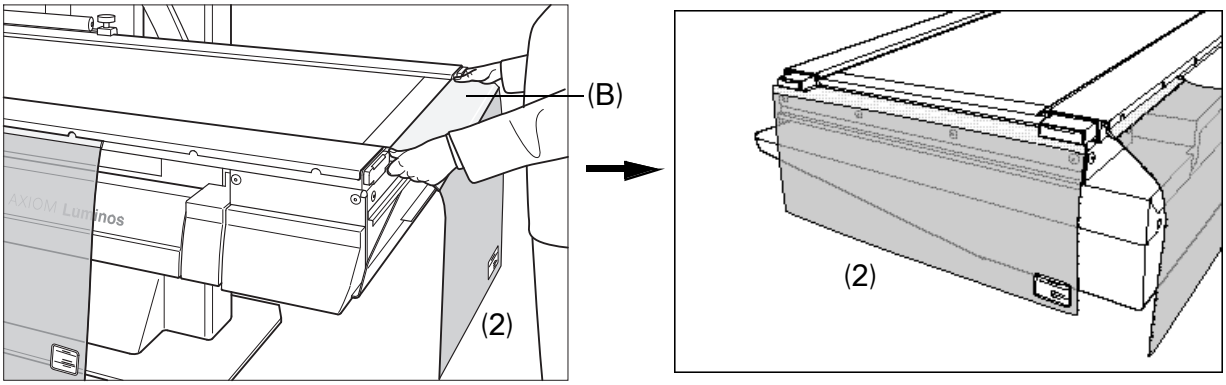
Front cover attached (1)



Rear cover attached (3)

Attaching the cover at the foot end (2)

❏ The table is in the horizontal position.



◆ Slide the flat gray end (B) of the cover (2) underneath the tabletop.

Do *not* move tabletop with covers attached!

Removing the covers

❏ The tabletop is in the horizontal position.

◆ Pull the covers out of the accessory rails and from under the tabletop with a smooth motion.

Storing the covers

◆ Store the covers in an appropriate place.

Fluoroscopy

Changing the fluoroscopy mode

Using the pulse rate button on the touchscreen of the system control console you can select the low dose values with pulsed fluoroscopy (Carevision).

For further information refer to „Fluoroscopy“ on page 7 and to the **FLUOROSPOT Compact** Operator Manual.

Releasing fluoroscopy

Use the system foot switch for fluoroscopy and acquisition in the examination room.

DSA exposures

For DSA exposures select the organ programs for DSA.

For DSA acquisitions select a DSA organ program at the Fluorospot Compact or at the TUI on the system control console.

Tube load computer

General

The tube load computer protects the connected X-ray tube assembly from overloading in radiographic mode.

From the selected exposure factors and from the physical and geometrical properties of the tube assembly it computes the length of the cooldown time that may be necessary.

- The current load (%hu) is constantly displayed.

Pause time indication

If the tube load reaches 65%, a pause time will be displayed on the User Interface.

- The indicated pause time in the message line must be observed to prevent overloading the tube assembly.



Caution

User ignores pause time instruction on FLC that appears after tube load has reached or exceeded 65%

X-ray is blocked because tube is getting too hot

- Follow the pause time instruction on FLC.
  – The indicated pause time must be followed to prevent overloading of the tube.
- Do not release the next exposure before this time has elapsed.
  – Otherwise, the tube could be too hot to generate X-ray.

Patient skin entrance dose

Reference air kerma strength (= measured value) according to IEC 60601-2-43:2010 (203.6.101).

Characteristic curve Size of X-ray field 30 cm above patient support		20cm PMMA phantom, with anti-scatter grid, zoom 1, collimator size 30.3 cm x 30.3 cm	20cm PMMA phantom, with anti-scatter grid, zoom 2, collimator size 22.7 cm x 22.7 cm	20cm PMMA phantom, with anti-scatter grid, zoom 3, collimator size 15.2 cm x 15.2 cm
Antiisowatt Automatic 1 (7.5p/s) 29nGy/p Low Mode	Values of automatic exposure control Measurement: Dose in 30 cm distance above patient support	0.2 mmCu 84.8 kV, 18.0 mA 43.6 µGy/s	0.2 mmCu 89.1 kV, 19.3 mA 55.1 µGy/s	0.2 mmCu 96.0 kV, 21.7 mA 77.8 µGy/s
Antiisowatt Automatic 2 (15 p/s) 32 nGy/p Normal Mode	Values of automatic exposure control Measurement: Dose in 30 cm distance above patient support	0.2 mmCu 87.5 kV, 17.2 mA 93.2 µGy/s	0.2 mmCu 91.5 kV, 18.3 mA 118.3 µGy/s	0.2 mmCu 98.6 kV, 20.2 mA 158.9 µGy/s
Maximum skin dose (covered with Pb until maximum kV and mA)				
Antiisowatt Automatic 2 (15 p/s) 32 nGy/p Normal Mode	Values of automatic exposure control Measurement: Dose / image	0.2 mmCu 111 kV, 23.7 mA 283 µGy/s 15 P/s=18.9 µGy/ P (Image)		
DSA				
Characteristic curve: DSA Sub (Antiisowatt Automatic 2)				
DSA program 4 p/s Scene 10 s Dose/p 1.74,	Values of automatic exposure control Measurement: Dose/image	0.1 mmCu 2652µGy/s / 4p/s = 663 µGy/p (image)	0.1 mmCu 3592µGy/s / 4p/s = 898 µGy/p (image)	0.1 mmCu 5000µGy/s / 4p/s = 1250µGy/p (image)

Measuring conditions: Interventional reference point is at 30 cm distance above tabletop, radiation field size in plane of patient support see table above, 25 cm x 25 cm x PMMA-Phantom centered in beam on patient support, small focus, SID 115 cm.

The operator manual has to specify two modes for the normal use, which are stated as “normal” and “low”. The value of the low mode must not exceed 50% of the value of the “normal mode” (see IEC 60601-2-43: 2010, 203.6.101).

Reduction of patient skin entrance dose by Cu prefiltration

Reduction of the air kerma strength as a function of the Cu prefiltration with 20cm PMMA object thickness.

Tube voltage (kV)	Cu prefiltration (mm)	Relative reduction to
60	0	1.00
	0.1	0.51
	0.2	0.33
	0.3	0.22
70	0	1.00
	0.1	0.62
	0.2	0.45
	0.3	0.39
80	0	1.00
	0.1	0.67
	0.2	0.52
	0.3	0.42
100	0	1.00
	0.1	0.71
	0.2	0.55
	0.3	0.51

Concept of interventional reference point

The interventional reference point for the measurement of the air kerma strength was defined in the central ray 30 cm above the tabletop as the location of the patient skin entrance dose for a medium patient thickness.

Isodose curves

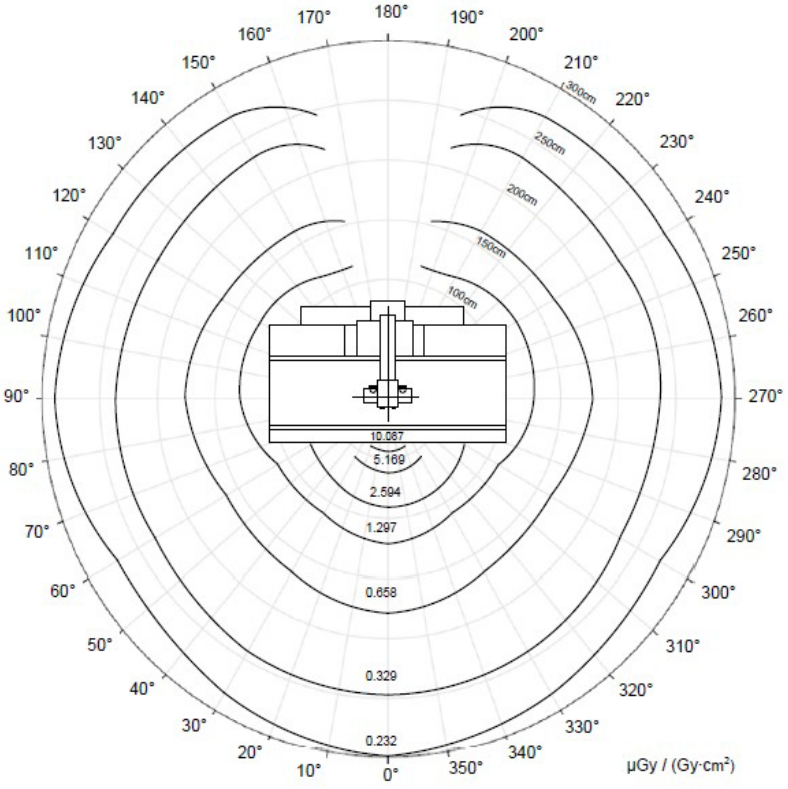
According to IEC 60601-2-43:2010.

The measurements were performed at the Luminos Fusion with a fixed table height of 89 cm and 4343F flat panel detector.

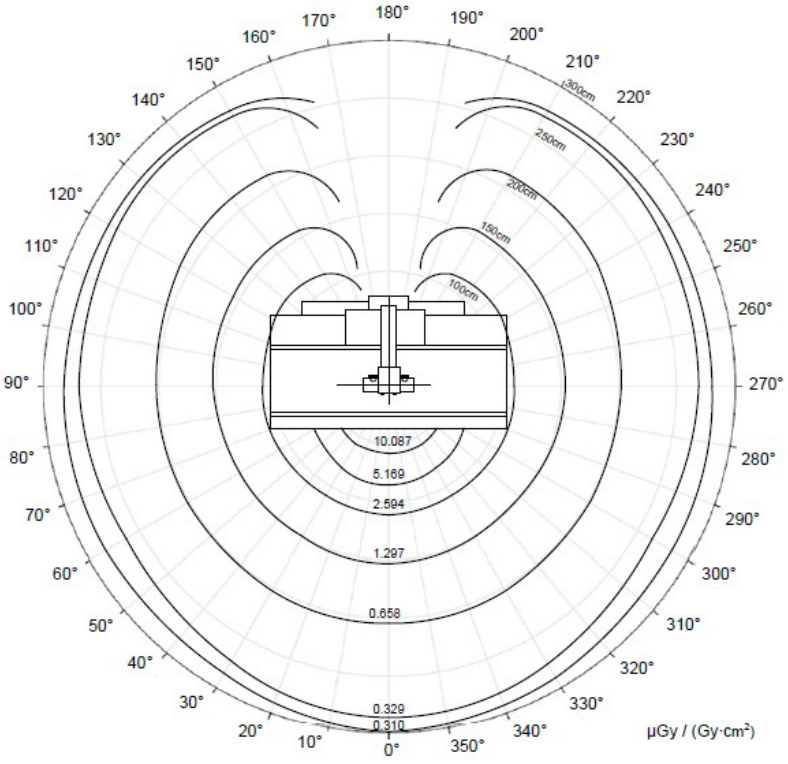
Measuring conditions:

- ❏ PMMA cube phantom with a side length of 25 cm
- ❏ X-ray field 10 cm x 10 cm
- ❏ CPR setting, tabletop in center position
- ❏ Source - phantom surface 83cm
- ❏ Small focus, SID 115 cm, 0 mm Cu, anti-scatter grid
- ❏ Vertical, downward projection
- ❏ 110 kV, 2.7 mA

Isodose 100 cm above the floor



Isodose 150 cm above the floor



Exposures on cassette in wall stand

Important information

Exposures on the cassette in the wall stand are possible with the following system configurations:

Configuration (1)

Basic configuration plus wall stand.

– Exposures with the tube assembly of the Luminos Fusion basic unit onto the cassette in the wall stand.

Configuration (2)

Basic configuration plus manual ceiling-mounted tube support and wall stand.

In this configuration, exposures onto the cassette in the wall stand are only possible with the mannual ceiling-mounted tube.

Workflow

Preparations

◆ Insert the cassette in the detector tray.



◆ Adjust the bucky unit on the wall stand approximately to the required operating height, manually with the brake handle by pressing the button.

Refer to the Register **Wall stand (BWS)** , „Vertical movement (height adjustment)“ on page 39

Overhead patient handgrip

◆ Swing the overhead patient handgrip to the required position or to the side if it is not needed.

→ See Register **Accessories and Auxiliary Devices**; „Overhead patient handgrip“ on page 14

Grid

◆ If necessary, remove or insert the grid.

Hygiene

◆ Check the unit for cleanliness.

◆ If necessary, cover the bucky unit with fresh paper from the roll.

Radiation Protection

◆ Lay the required radiation protection on the patient.

Positioning the tube assembly

At the system table unit

- Move the system table unit at the vertical position.
- Rotate the tube assembly at the system table unit of 180 degrees and make it faces the Bucky wall stand.

At the ceiling-mounted tube support

- Tilt the tube assembly to 90°

Refer to Register **Ceiling-mounted tube support** , see „Positioning the 3D ceiling-mounted tube support with tube unit“ on page 55

The ACSS function is not available to the ceiling-mounted tube support.

Bucky wall stand is floating even if brakes are not released

Patient can slip or fall down

- Brief patient that it is not allowed to lean against bucky tray cover.

Patient positioning and acquisition

- Position the patient at the wall stand.

Radiation protection

- Lay the required radiation protection on the patient.

Light localizer



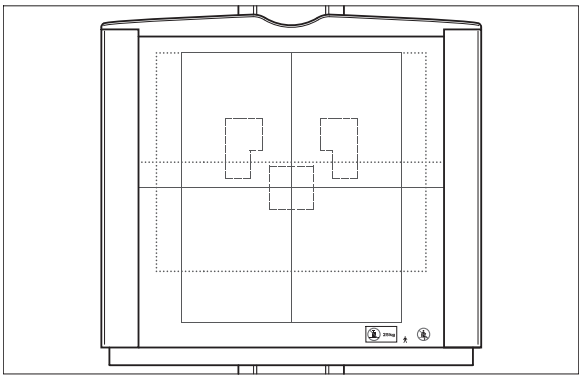
- If necessary, switch on the light localizer / line light localizer on the multileaf collimator pressing this button.

To protect the eyes of the patient or any other person, the LASER radiation exit of the LASER line light localizer can be closed with the sliding cover.

Register **Control elements and displays**, *see „Multileaf collimator“ on page 28*

Auto exposure chamber

- Pay attention to the positioning with respect to the Iontomat measuring chambers.



Position of the Iontomat measuring chambers

When the left and/or right chamber is/are selected and one or both of them is covered during collimation, the system automatically switches to the middle chamber.

An incorrect selection of measuring chambers by the user or by communication network disturbances leads to unnecessary X-ray exposure.

- Always select the measurement chambers carefully.
- Always check the selection of the measurement chambers before starting the measurement.

If several measuring chambers were selected simultaneously, check the selection carefully.

Collimation Collimate the desired acquisition field:

Automatic

ACSS

❏ The automatic format preselection controls the collimation by the multileaf collimator for *constant* collimation onto the format determined in the organ program with variable SID within the SID range.

Manually

Manual

❏ You can collimate additionally further close to the object if required with the control knobs for format collimation on the multileaf collimator:



◆ Rotate the diaphragm knob to adjust the format height.



◆ Rotate the diaphragm knob to adjust the format width.

Prerequisites for exposure The automatic format preselection ACSS is active when the central beam is vertical to the bucky tray.

Acquisition Refer to the **Fluorospot Compact** operator manual

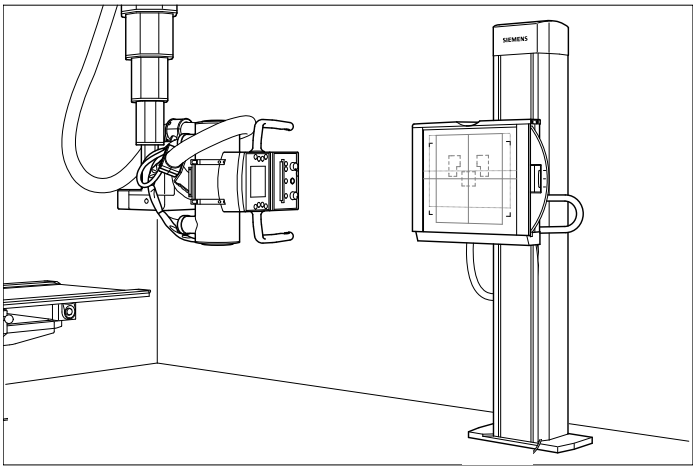
Horizontal projection[1]

- Select a suitable organ program at the **Fluorospot Compact** imaging system or at the Touch user interface for an exposure onto the wall stand.
- Position the tube unit manually as required for the exposure.

Refer to Register **Ceiling-mounted tube support** , see „Positioning the 3D ceiling-mounted tube support with tube unit“ on page 55

Please take care especially for Bucky exposures on the wall stand to exact fixation of the Ceiling mounted tube support in one of the predetermined SID stop positions.2

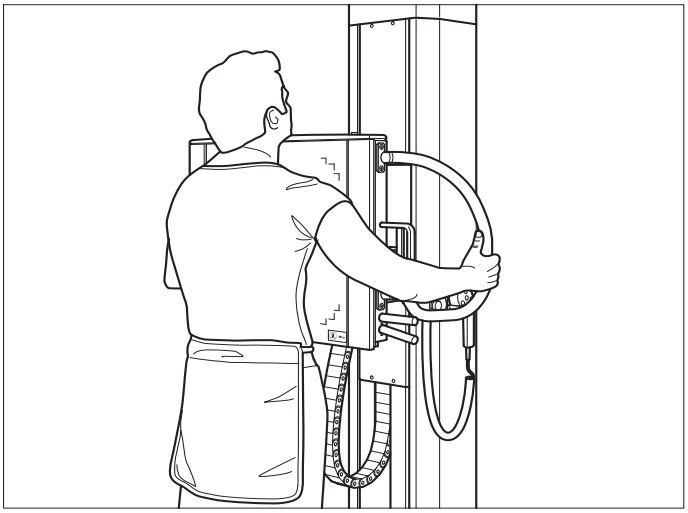
You avoid image quality defects due to grid shadows if the set SID agrees with the focusing of the grid.



Example: Tube unit position for exposures on the wall stand with horizontal projection with the Ceiling mounted tube support

- Center the tube unit to the bucky tray[2]
- Make an exposure

[1] Configurations (1) and (2)
[2] Configuration (2) only



Example for a thorax acquisition

Wallstand is overloaded because patient handgrip is mechanically overloaded.

Risk of damage to the wallstand and injury of the patient

- Brief patient that it is not allowed to hang on the patient handgrip with more than 25 kg.

Free exposures

The following free exposures are possible:

❏ Exposures on a cassette placed on a patient trolley (for example, Prognost tables)

❏ Exposures on a cassette placed on the floor (for example, exposures of the feet).

These first two kinds of free exposures can be done with the fully manual 3D ceiling-mounted tube support or the tube assembly at the system table unit with tilted table.

❏ Exposures on a cassette placed on the system table unit.

These free exposures can be done with the tube assembly at the system table unit or with the manual ceiling-mounted tube support.



Caution

Unit movements

Risk of collision

- Make sure that unit movements are released only if it is certain that neither the operator, the patient, third parties nor pieces of equipment can be endangered.
- Make sure that you are standing outside the dangerous area.
- Remove any objects or accessories, for example injector or infusion stand, from collision area.



Warning

Unintentional activation of control elements for movements

Collision with patient, operator, or equipment

- Do *not* load the remote console with any objects, accessories, folders, or documents.
- Use the following workflow for free exposure.

Workflow

- Place the cassette according to the kind of free exposure you want to do.
- If necessary, turn the tube assembly 90° and set the table to a vertical position (Refer toRegister **Ceiling-mounted tube support**„Movement Control Elements“ on page 52).
  – For exposure with the tube assembly at the system table unit on a patient trolley or on the floor.
- Select an organ program for free exposure.
- Position the patient.
- Lay the required radiation protection on the patient.
- Adjust the tube assembly to the object using the full-field light localizer and positioning laser.



„Tube assembly stand“ on page 77 or „Movement of the 3D ceiling-mounted tube support“ on page 53

- Collimate in relation to the object.
- Release an exposure.

Collimation on exposure

The automatic format collimation of the system is not effective if you have selected ”free mode”, or if you have turned the tube
assembly into a position outside 0°.

❏ You can set the exposure format freely.

❏ The limits of the maximum radiation field are determined by the mechanism of the primary collimator.

❏ The collimator does not react to a change of the SID.

❏ The digital display field of the primary collimator shows ”Manual”.

Releasing exposure



Caution

Exposure does not stop due to a technical defect or unintentional exposure.

Risk of unnecessary radiation exposure

- In case of unwanted radiation, please press the nearest emergency STOP button.

To release an exposure, actuate the exposure release button on the System control console.

Before every exposure release

- Check the format limitation with the aid of the light localizer on the collimator.
- Check the set SID with the tape measure on the collimator.
- Check the central ray on cassette center with the aid of the laser line light localizer on the collimator.
  – The radiation ON indicators must light up.



Caution

Defect in video chain

Radiation without image

- If radiation is indicated without a monitor image, switch the system off and call customer service.

Basic exposure table

Standard values for setting by the user

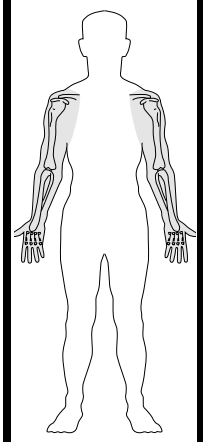
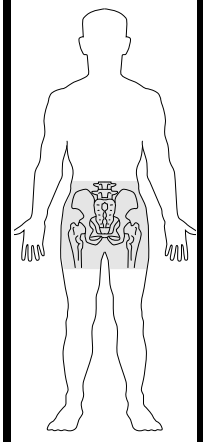
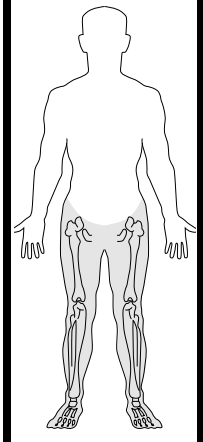
The stated exposure data apply for optimum processing conditions as well as for the proposed film-screen sensitivity classes when using multipulse or 12-pulse generators. If there is a deviation from the stated exposure parameters, the required change of the exposure data must be determined in accordance with the correction and conversion table.

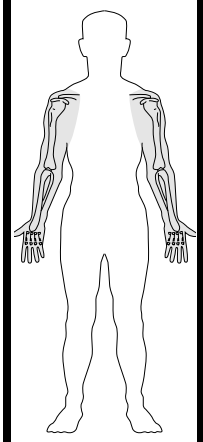
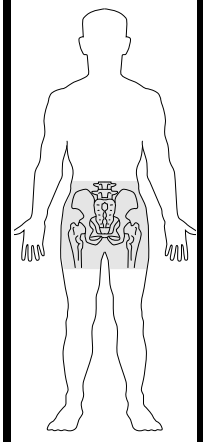
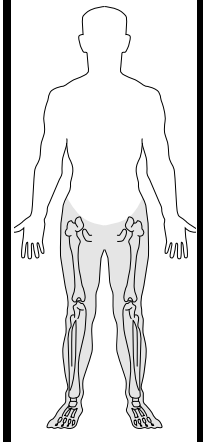
*In units with undertable tube: 70 cm
In units with overtable tube: 115 cm
**Cassette on the tabletop

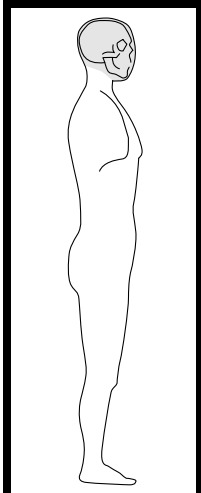
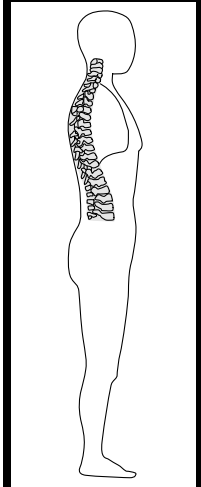
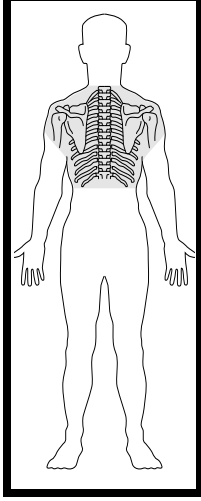
Object		Thickness (cm)	SID (cm)	Sensitivity class	Grid (Pb 12/40)	Points	kV	mAs
Skull								
Skullp.a./a.p.		19	115	400	with	27	77	16
Skull survey	lat.							
Skull	axial	16						
		22	115	400	with	26	73	16
			115	400	with	32	85	32
Petrous bone	sag.	17	115	200	with	30	73	40
Petrous bone, Stenvers		17	115	200	with	30	73	40
Nasal sinuses	p.a.	22	115	400	with	29	77	25
Orifice of optic nerve, Rhese		17	115	200	with	29	77	25
Mandible	lat.	11	105**	200	without	17	57	6,3
Chest								
Ribs 1 - 7	p.a./a.p.	20	115	400	with	25	70	16
Ribs 8- 12	p.a./a.p.							
Sternum	p.a.	22	115	400	with	26	73	16
		21	115	400	with	24	70	12.5
Sternum	lat.	30	115	400	with	25	73	12,5
Clavicle	p.a./a.p.	14	115	400	with	21	66	8
Scapula	lat.							
		17	115	400	with	23	66	12.5
Lung	p.a./a.p.	21	180	400	with	26	125	2
Lung (in bed)	a.p.							
Lung, heart	lat.	21	115	400	without	13	60	2
		30	180	400	with	29	125	4
Lung, heart (in bed)	lat.	30	115	400	without	16	60	4
Esophagus	obl	28	70/115*	400	with	24/28	90	4/10
Abdomen								
Kidney, gallbladder	lat.	27	115	400	with	30	81	25
Kidney, gallbladder	a.p.	19	115	400	with	27	73	20
Urinary bladder	a.p.	19	115	400	with	25	77	10

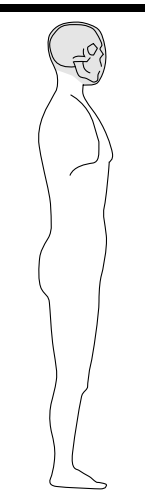
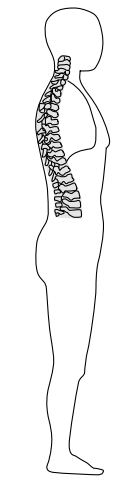
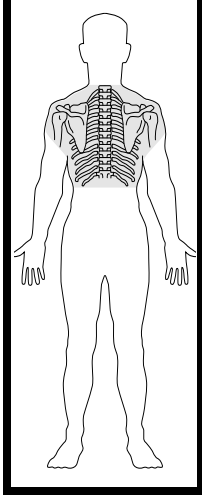
Object		Thickness (cm)	SID (cm)	Sensitivity class	Grid (Pb 12/40)	Points	kV	mAs
Urinary bladder	axial	21	115	400	with	27	81	12.5
Content study of stomach	p.a.	22	70/115*	400	with	27/31	109	4/10
Bulbus	p.a.	22	70/115*	400	with	27/31	109	4/10
Gastrointestinal tract, survey	sup.	22	70/115*	400	with	27/31	109	4/10
Stomach, relief		22	70/115	400	with	27/31	109	4/10
Spinal column								
Cervical vertebrae, 1-3	oral	13	115	200	with	26	70	20
Cervical vertebrae, 4-7	a.p.	13	115	200	with	28	73	25
Cervical vertebrae, 1-7	lat.	12	115	200	with	25	70	16
Cervical vertebrae, 1-7	obl.	13	115	200	with	26	70	20
Thoracic vetebrae	a.p.	21	115	400	with	31	77	40
Thoracic vertebrae	lat.	30	115	400	with	33	81	50
Lumbar vertebrae, 1-4	a.p.	19	115	400	with	32	81	40
Lumbar vertebrae, 1-4	lat.	27	115	400	with	38	90	100
Lumbar vertebrae, 1-4	obl.	22	115	400	with	33	85	40
Lumbar vertebra 5	a.p.	22	115	400	with	32	90	25
Lumbar vertebra 5	lat.	33	115	400	with	36	90	63
Pelvis								
Pelvis, hip	a.p.	20	115	400	with	24	77	8
Sacrum, coccyx	a.p.	19	115	400	with	32	90	25
Sacrum, coccyx	lat.	33	115	400	with	36	90	63
Upper extremities								
Shoulder joint	a.p.	11	115	200	with	23	66	12,5
Shoulder joint	axial	11	105**	200	without	20	66	6,3
Upper arm	a.p./lat.	8	105**	200	without	18	60	6,3
Elbow	a.p.	6	105**	200	without	15	57	4
Elbow	lat.	8	105**	200	without	15	57	4
Forearm	a.p.	6	105**	200	without	14	55	4
Forearm	lat.	7	105**	200	without	15	55	5
Wrist	p.a.	4	105**	200	without	12	46	6,3
Wrist	lat.	6	105**	200	without	15	52	6,3
Hand	p.a.	3	105**	200	without	9	46	3,2
Hand	lat./obl.	6	105**	200	without	10	46	4
Finger		2	105**	200	without	7	46	2
Lower extremities								
Neck of femur	axial	22	105*	400	without	22	77	5
Femur	sup.	13	115	400	with	23	73	8
Femur	inf.	12	115	400	with	21	66	10
Knee joint	a.p.	12	115	200	with	22	63	12,5
Knee joint	lat.	10	115	200	with	21	63	10
Knie joint fissure		12	105**	200	without	15	60	3,2

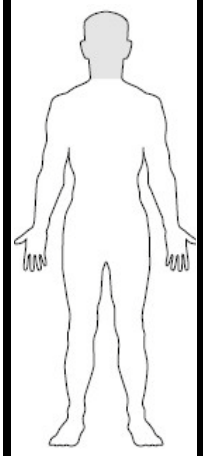
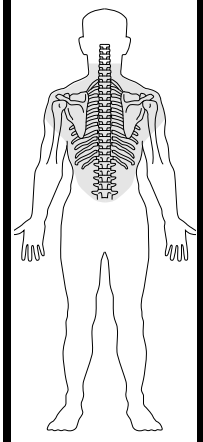
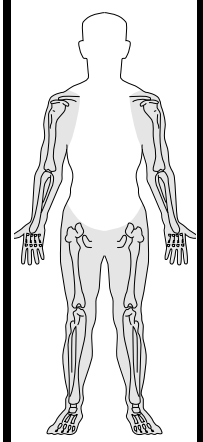
Object		Thickness (cm)	SID (cm)	Sensitivity class	Grid (Pb 12/40)	Points	kV	mAs
Patella	axial	7	105**	200	without	15	60	3,2
Tibia	a.p.	11	105**	200	without	14	60	2,5
Tibia	lat.	9	105**	200	without	13	60	2
Ankle	a.p.	9	105**	200	without	14	57	2,5
Ankle	lat.	7	105**	200	without	13	57	2,5
Oscaleis	lat.	7	105**	200	without	12	55	2,5
Oscaleis	axial	10	105**	200	without	12	55	2,5
Metatarsus	d.pl.	5	105**	200	without	11	52	2,5
Metatarsus	obl.	6	105**	200	without	11	52	2,5
Foot	lat.	7	105**	200	without	12	52	3,2
Toes		3	105**	200	without	9	48	2,5

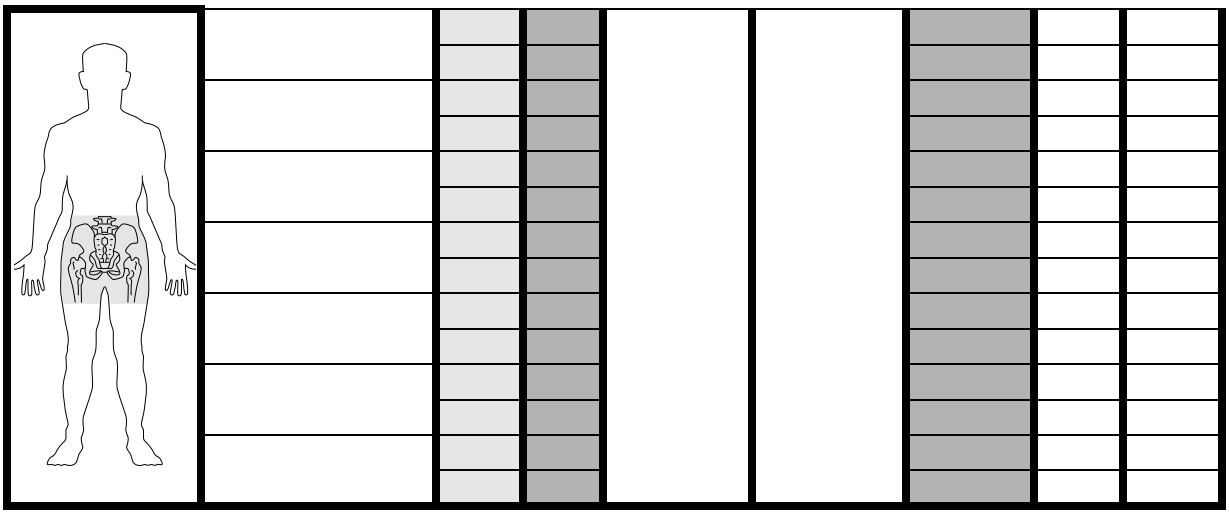
	Object Object Objeto					Focus Foyer Foco		Screen Folie Pantalla	SID DFF DFP	Grid Grille Rejilla
	Object	kV	mAS	kV	mAs	■	■	Folie	FFA	
										
										
										

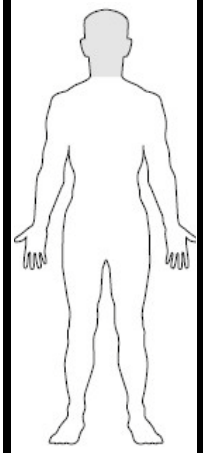
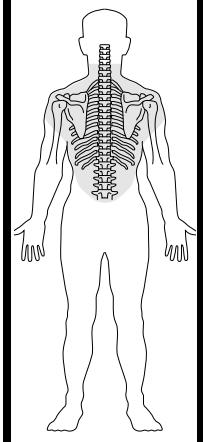
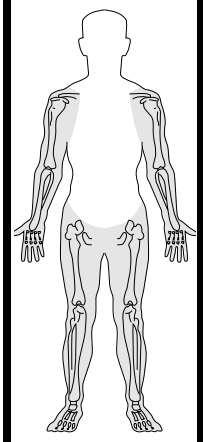
	Object Object Objeto					Focus Foyer Foco		Screen Folie Pantalla	SID DFF DFP	Grid Grille Rejilla
	Object	kV	mAS	kV	mAs	■	■	Folie	FFA	
										
										
										

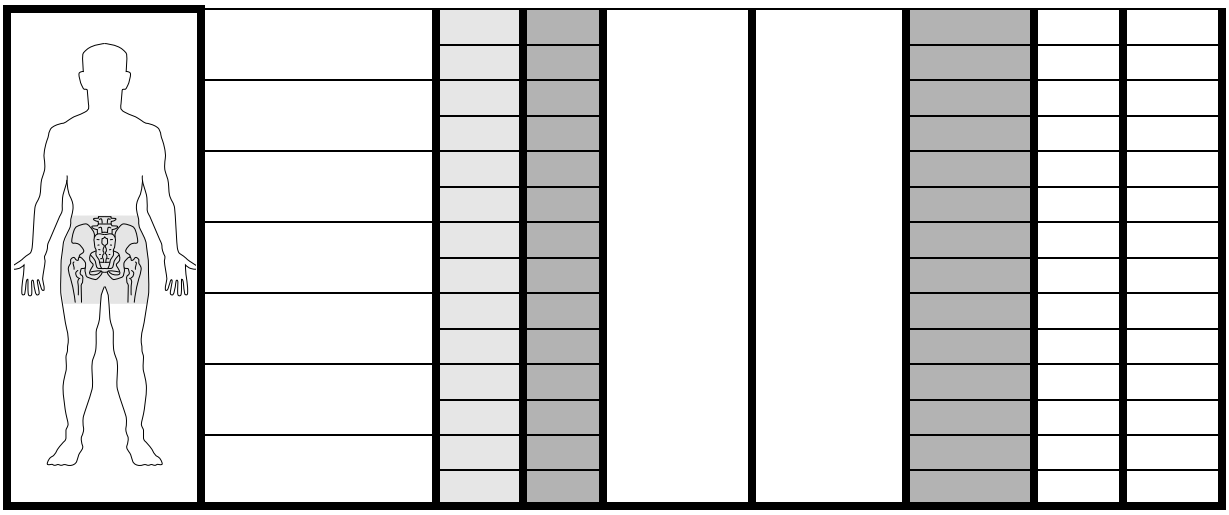
	Object Object Objeto					Focus Foyer Foco		Screen Folie Pantalla	SID DFF DFP	Grid Grille Rejilla
	Object	kV	mAS	kV	mAs	■	■	Folie	FFA	
										
										
										

	Object Object Objeto					Focus Foyer Foco		Screen Folie Pantalla	SID DFF DFP	Grid Grille Rejilla
	Object	kV	mAS	kV	mAs	■	■	Folie	FFA	
										
										
										

	Object Object Objeto			Pattern Trajectoire Figura		Screen Folie Pantalla	Focus Foyer Foco	
	Object	kV	mAS	**Figur**		Folie	■	■
								
								
								



	Object Object Objeto			Pattern Trajectoire Figura		Screen Folie Pantalla	Focus Foyer Foco	
	Object	kV	mAS	**Figur**		Folie	■	■
								
								
								



Correction values

in exposure points * for deviations from the starting conditions

SID	cm	65	75	85	95	105	115	130	145	160	185	210	235	260	290	325	360	400
	Points	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10	+11

Screens			Generator		Grid		Object		Tomography			
Sensi-tivity	Points (50-90 kV)	(90-150 kV)	Type	Points in kV	Type	Points	Condition	Points	Figure	Points	Figure	Points
800	-7	-8	DC voltage	0	without	-6	thin	-3...-1		+2		+1
400	-3	-4	Multipulse	0	Pb 8/40	-2	thick	+1...+3		+3		+1
200	0	-1	12-pulse	0	Pb 10/40	-1	Close collimation	+2		+3		
100	+3	+3	6-pulse	+1	Pb 12/40	0	Plaster half-shell	...+3	16°	+3		
50					Pb 17/70	0	Dry plaster	...+5		+4		
25							Wet plaster	...+7				

*A difference of three exposure points doubles or halves the dose in the film plane.
A difference of one exposure point changes the optical density on the X-ray film by D_s a 0,25.

Conversion table

from exposure points into mAs values or kV values

kV											40	41	42	44	46
Points	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4
mAS	0.1	0.125	0.16	0.2	0.25	0.32	0.4	0.5	0.63	0.8	1	1.25	1.6	2	2.5

kV	48	50	52	55	57	60	63	66	70	73	77	81	85	90	96
Points	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
mAS	3.2	4	5	6.3	8	10	12.5	16	20	25	32	40	50	60	80

kV	102	109	117	125	133	141	150	66	70	73	77
Points	20	21	22	23	24	25	26	27	28	29	30
mAS	100	125	160	200	250	320	400	500	630	800	1000

Troubleshooting aids

❏ When the image quality is not optimum.

❏ If the image quality of the radiographs is not adequate or changes spontaneously, you should read through the following checklist.

Film

What error symptoms appear?

Error symptom:	**Possible cause:**	: **with Iontomat** @ **free operation**
Film too bright	Film or screen less sensitive than usually;	: / @
	Film sensitization not suitable for the screen;	: / @
	Grid absorbs more strongly than usual;	@
	Wrong measuring field set;	:
	Larger SID than usual;	@
	Voltage response of the screen not taken into account;	: / @
	Screen glued in wrongly;	: / @
	Developer temperature too low;	: / @
	Film density correction switch wrongly set;	:
Film too dark	Film or screen more sensitive than usually;	: / @
	Less absorbing or no grid;	@
	Wrong measuring field set;	:
	Smaller SID than usual;	@
	Film density correction switch wrongly set;	:
	Developer temperature too low;	: / @
Film insufficiently defined	Too low voltage selected	: / @
Film dull	Too high voltage selected	: / @
Film almost black	Grid not in beam path, wrong grid;	@
Film low in contrast with brown smear	Developer exhausted? Regeneration pump failed?	: / @
Film shows gray fog in total	Film superposed/previously exposed. Developer temp. too high. In simult. changer operation not cleanly collimated.	: / @ @
Film of differing density from edge to edge	Tube assembly decentered or grid defocussed	: / @
Film partially unsharp	Unequal cassette pressing pressure; lock not closed	: / @
Film spotty	Dirty screen; film touched by moist fingers	: / @
Film shows partially black margins	Cassette not lightproof; film partially previously exposed; cassette lock not closed.	: / @ : / @
Spotfilms uniformly unsharp	Patient movement? Wrong focus selected	: / @
Film not fully fixed	Water tap not turned open; pump failed	: / @
Film shows milky emulsion parts	Film type requires longer processing time	: / @
Film shows isolated/splash-like bright spots	Contrast medium on tabletop or covering cloth	: / @
Film shows surface contamination	Film processor rollers dirty	: / @
		: / @

Darkroom

What has to be checked?

- ❏ When was the last machine maintenance or change of chemicals for manual processing?
- ❏ Were there any long public holidays or department closures during this period?
- ❏ Were chemicals other than those customarily used?
- ❏ Does the developer temperature agree with the setting on the measuring instrument? Thermostat defective?
- ❏ Is the regenration pump running?
- ❏ Is the DUKA filter intact, or was a new, stronger lamp inserted in the meantime?

Call our technical service, ...if you can not find any of the stated error symptoms.

Register 5 Technical description

Chapter: Technical Specification

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- Display Trolley 15

Chapter: Labels

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Technical Specification

All technical data represent typical values unless specific tolerances are stated.

System

Power connection	The entire system is connected to the power supply via the generator
Nominal voltage:	3/N/PE, 380 V/400 V/440 V/480 V[1] ± 10%
Nominal frequency:	50/60 Hz ± 1 Hz
Nominal rating:	Moment: 126 kVA; Long Time: 1.5kVA (Standby)
Ambient conditions	
Operation:	+10°C to +35°C 20% to 75%, relative humidity, non-condensing 700 hPa to 1060 hPa
Storage and transport:	-20°C to + 60°C 10% to 95%, relative humidity, non-condensing 500 hPa to 1060 hPa
Radio interference suppression/EMC	EN 60 601-1-2
Protection type	Protection class I, according to IEC 60601 - 1
Degree of protection	 Type B
Rated operating altitude	≤ 3000 m
Floor space required	5.15 m (Length) x 4.10 m (min. width) x 3.20 m (Height) without restrictions to movement, traffic area and safety distances.
Operation mode	Continuous operation with intermittent loading

[1] Pretransformer required for 440/480 V

Weight	
Unit	About 1300 kg
System control console	About 5 kg
Generator cabinet	About 339 kg
FLUOROSPOT Compact	About 60 kg
Mobile tableside control console	About 40 kg with trolley
Room height	❏ 3.20 m without limitations; ❏ With ceiling-mounted support: – From 2.50 m to 3.20 m with automatic movement restrictions by collision computer

Unit

Table and tabletop

Table tilt

- ❏ Motorized, + 90° to - 17°;
- ❏ Tilting speed about 4°/s;
- ❏ Minimum tilting time 90° to 0°: 23 s (incl. soft start and braking);
- ❏ Automatic stop in horizontal position (0°) can be switched on or off

Table height In horizontal position 89 cm with flat panel detector

Tabletop dimensions:

Dimensions: Outside 210 cm x 80 cm, radiotransparent 193 cm x 54 cm

Attenuation equivalent: ≤ 0.6 mm Al at 100kV 2.7mm Al HVL (acc. to FDA)

≤ 0.65 mm Al at 100kV 3.7mm Al HVL (acc. to DIN EN 60601-1-3)

Patient weight: Maximum of 200 kg with the following restrictions:

- ❏ 181 kg to 200 kg: no table longitudinal and transverse movements permitted;
- ❏ 151 kg to 180 kg: restriction of the movement speeds max. 20% and of the table longitudinal movement ± 40 cm and transverse movement to the front 7.5 cm; Trendelenburg position maximum -17° with patient secured with shoulder supports and foot holder.
- ❏ 0 kg to 150 kg: no restrictions of the table longitudinal and transverse movement. In addition 50 kg for cardiac massage (CPR) in the table mid-position.

The permitted nominal patient weights were defined with 4 times the test load.

Longitudinal travel: 160 cm motor-driven, 80 cm each to the head and foot end; speed 6 cm/s

Transverse travel: 35 cm motor-driven, 17.5 cm each forward and reverse; speed 4.5 cm/s

Tube assembly stand

SID: 115 cm, 150 cm, can be set by motor drive; adjustment at approximately 5 cm/s

Oblique projection:
- ❏ Maximum ± 40° (SID 115 cm) or ± 35° (SID 150 cm), at 5°±1°/s;
- ❏ Fulcrum height adjustable by motor drive 10 to 250 mm above tabletop (= parallax correction of the object);

Tube assembly swivel: Manually in the range of + 90° to - 90° with stops every 15° and - 90° to -180° with stops every 30°

3D ceiling-mounted support for X-ray tube

Horizontal travel range	
Longitudinal	352 cm
Transverse	❏ With 3 m rail: 215 cm ❏ With 4.35 m rail: 350 cm
Vertical travel range	180 cm, manual adjustment
Minimum focus-ceiling distance	83 cm
Tube rotation	
Around vertical axis	❏ +182° to -154° manual
Around horizontal axis	❏ ±120° manual

Image receptor

Scattered radiation grid:
- ❏ Stationary 13:1, 80 lines/cm, f_0= 130 cm;
- ❏ Motorized grid movement in or out of beam path in 4 s

Movement:
- ❏ Maximum 105 cm (remote-controlled), fine-adjustable up to a maximum of 6 cm/s(routine) or 15 cm/s (Periscanning);

Central ray height above the floor:
- ❏ 115 cm to 150 cm;

Distance from central beam to end of table: Minimum 42 cm (head end)

Attenuation of the useful radiation
- ❏ With grid attenuation m = 1,8
- ❏ Attenuation factor with cone m = 2,50

Compression device

Can be remotely controlled, cone radiotransparent, detachable and replaceable

Compression force: 0 to maximum 155 N, movement blockage starting from 50 N compression force

Speed: Compression/decompression 6cm to 9 cm/s

Force indication: Digital (LCD) in increments from 0 to 15 at the TUI

Cone/tabletop distance: 5 cm to 50 cm (standard cone)

Park position: Cone in maximum decompression position

Projection angle: + 30° to - 30°

Tomographic device

Linear tomography in all table positions; automatic positioning of object and image receptor in the working area.

Tomographic angle/ tomographic time combinations:

- ❏ 8° with 0.4 s;
- ❏ 20° with 1.2 s;
- ❏ 40° with 2 s (working area 11.0 cm)

Tomographic angle at 200 mm fulcrum height

SID: 115 cm

Fulcrum height:

- ❏ 10 to 250 mm above tabletop, 0.2 cm increments;
- ❏ Laser line light localizer for fulcrum height on the patient;
- ❏ Operation on the system control console and table-side

Components

Flat panel detector

Pixium FE 4343F

Dimensions	
Detector area	About 43 cm x 43 cm
Active detector size	42.0 cm x 42.6 cm
Active detector matrix	Up to 2840 x 2874 pixels
Pixel size	148 µm
Semiconductor material	Amorphous silicon, a-Si
Scintillator	Cesium iodide (CsI)
Ambient conditions (Operation)	
Temperature:	+10°C to +35°C
Relative humidity:	20% to 75%, non-condensing
Barometric pressure:	700 hPa to 1060 hPa
Ambient conditions (Transport and storage):	
Temperature:	-20°C to +60°C
Relative humidity:	20% to 75%
Barometric pressure:	500 hPa to 1060 hPa
Image Field Size:	❏ 42 cm x 42.6 cm ❏ 30 cm x 30 cm ❏ 22 cm x 22 cm ❏ 15 cm x 15 cm

Monitor

LCD monitor 19" (48 cm screen diagonal)

Tube assembly

OPTITOP 150/40/80HC-100, cover with fan.

Focal spot nominal value (ICE 60336):	0.6/1.0
Nominal power (IEC 60613):	40 kW/80 kW
Cold power:	52 kW/103 kW
Nominal voltage (IEC 60613):	150 kV
Anode angle:	12°
Anode heat storage capacity:	580 000 J (820 000 HU)
Anode rotation frequency:	❏ Radiography: 150 Hz/ 180 Hz ❏ Fluoroscopy: 20 to 30 Hz
Mean continuous power:	Maximum 450 W
Total filtration (IEC 60601-1-3):	2.5 mm Al
Inherent filtration:	1.5 mm Al at 75 kV
Additional filter:	1.0 mm Al
Leakage radiation (IEC 60601-1-3):	<0.8 mSv/h at 150 kV/450 W in 1 m distance
Load curves:	Refer to the X-ray tube assembly operating instructions

Multileaf collimator

Maximum field size	42.6 cm x 42.6 cm at SID=115cm or 150cm
Minimum field size	< 3.0 cm x 3.0 cm at 1.15 m SID
Angle of rotation	± 45° about the central beam axis
Inherent filtration	1.0 mm Al at 70 kV
Additional filters	0.1 mm / 0.2 mm / 0.3 mm Cu
Radiation protection	Depending on regulations, up to max. tube voltage of 150 kV
Brightness of full-field light localizer	≥ 160 lux (measured at a distance of 1 m) (if original Siemens three-field templates and dose measurement chambers are used)
Dimensions (height x width x depth)	❑ 182 mm x 228 mm x 365.5 mm (without DSA module)
Maximum weight (without accessories)	10.5 kg ± 1kg
Maximum weight of the accessories	≤ 7kg
Connected load	30 - 40 V AC ; 50/60 Hz; 8A
Aperture angle	28° / 28°

Generators

F65 / 80

Line connection

Nominal voltage/ line frequency	❏ 400 V ± 10%, 50/60 Hz three-phase ❏ 380 V ± 10%, 50/60 Hz three-phase ❏ (440/480 V ± 10%,50/60 three-phase via internal line-matching transformer, expansion)
F65 Internal line resistance	0.16 ohms (380 V) 0.17 ohms (400 V) 0.20 ohms (440 V) 0.24 ohms (480 V)
F80 Internal line resistance	0.10 ohms (380 V) 0.11 ohms (400 V) 0.14 ohms (440 V) 0.16 ohms (480 V)
Nominal load	❏ At 400 V: 34.6 kVA ❏ At 440 V: 38.0 kVA ❏ At 480 V: 41.5 kVA
Nominal power	80 kW (100 kV, 800 mA, 0.1 s)
Radio interference suppression/EMC:	IEC 60601-1-2
Type of protection:	Protective class I, according to IEC 60601 - 1
Degree of protection:	IPX0 according to IEC 60529
Ambient conditions (operation)	
Temperature range	+ 10°C to + 35°C
Relative humidity	20% to 75%, not condensing
Atmospheric pressure	70 kPa to 106 kPa
High-voltage waveform	Multipulse

Output	65 kW	80 kW
	150 kV, 430 mA	150 kV, 530 mA
	100 kV, 650 mA	100 kV, 800 mA
	79 kV, 800 mA	79 kV, 1000 mA

Fluoroscopy

Working range:

- ❏ 450 W from 40 kV/0.2 mA up to 110 kV/23 mA, pulsed fluoroscopy

Tube voltage

- ❏ 53 values from 40 to 150 kV
- ❏ In steps of half Siemens exposure points (EP) or 1 EP (configurable)

Automatic system

- ❏ 0-,1-, 2-point technique with continuously / falling load

mAs integrator

- ❏ 65 values from 0.5 mAs to 800 mAs
- ❏ In steps of half Siemens exposure points (EP) or 1 EP (configurable)

Switching time

- ❏ 1- point technique: 1 ms to 5 s with mAs and time postindication
- ❏ 2- point technique: 2 ms to 5 s depending upon kW, mAs and kV
- ❏ 3- point technique: 20 ms to 5 s depending upon kW, mAs and kV in 49 steps
- ❏ In steps of half Siemens exposure points

Tube assembly connection

- ❏ 2 Siemens double-focus tube assemblies
- ❏ 1 Siemens double-focus tube assembly

Workstations

Maximum five

Automatic exposure control

- ❏ CAREMATIC

Tolerances

- ❏ kV accuracy ± 5%
- ❏ mAs accuracy ± (10% + 0.2 mAs)(minimum ± 0.2 mAs)
- ❏ mA accuracy ± 20% (minimum ± 0.1 mA)
- ❏ ms accuracy ± (10% + 1ms)

Wall stand (BWS)

Weight	185 kg for wall stand without tiltable Bucky tray
Minimum travel range (central beam-floor)	image receptor in 0° position, portrait format Distance from floor - the top of the image receptor: < 540 mm
Scatter radiation grid	Transparent grid, Pb 10/50; 50 lines, ratio 10:1, f_0 = 180 cm, f_0 = 150 cm, f_0 = 115 cm
Object-detector distance	
Cassette	Distance front panel - film ≤ 42 mm
Maximum radiation field	Maximum symmetrical radiation field at a distance of 1150 mm from the focus:
Cassette	430 mm x 341 mm

Support systems and flatscreen displays

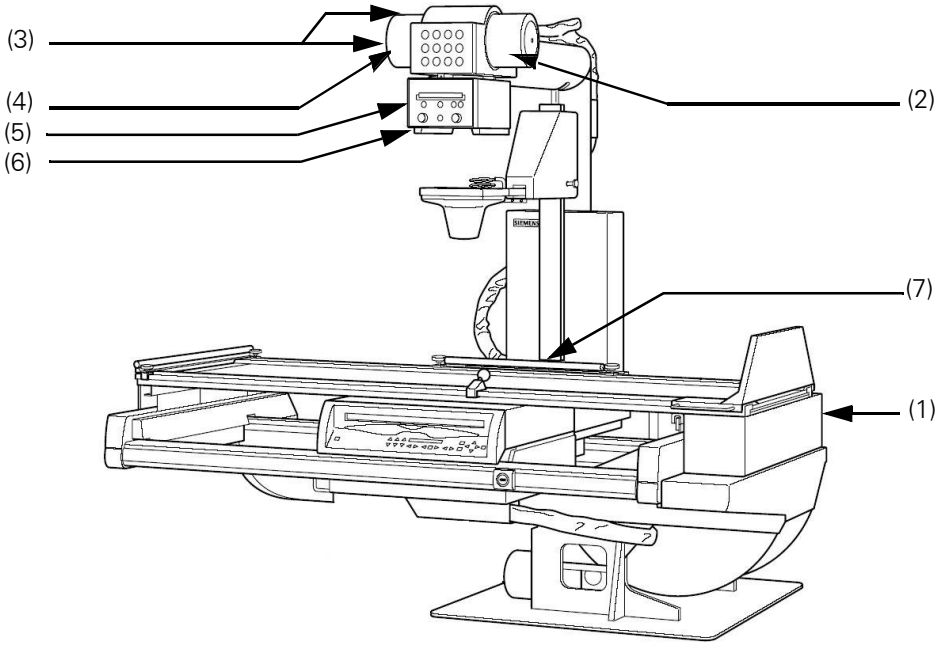
Display suspension system

Length of the longitudinal rails	4250 mm
Travel range of the ceiling carriage	3250 mm
Vertical movement (height adjustment)	965 mm
Rotation range of ceiling support to rail axis	300°, adjustable every 30°
Rotation of flatscreen displays	330°, adjustable every 30°
Weight including rails	❏ With one 19" flatscreen display: approximately 180 kg ❏ With two 19" flatscreen displays: approximately 190 kg

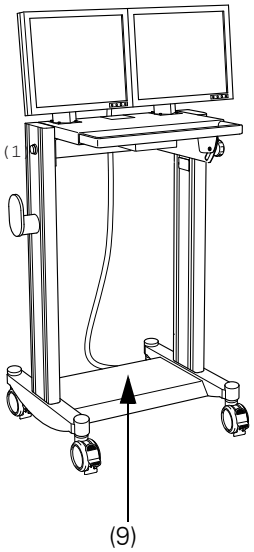
Display Trolley

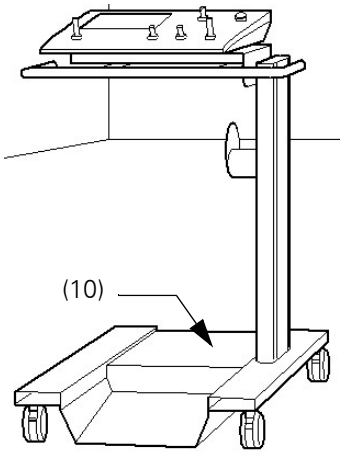
Distance of the flatscreen display support plate to the floor	1150 mm
Tilting range of the flatscreen display	+15°/-10°
Weight	❏ With one 19" flatscreen display: approx. 74 kg ❏ With two 19" flatscreen displays: approx. 84 kg

Labels





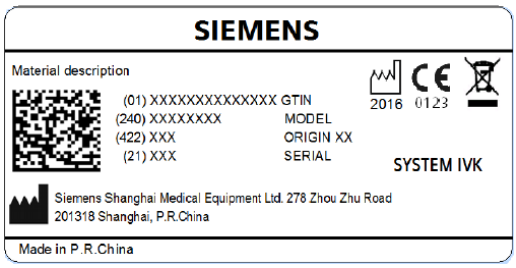




This Document shows the location of the system labels. The numbers and parameters on the labels are examples only. They do not necessarily correspond to the system components.

(1) System labels

System ID label



Unit Revision label

Rev. 00	01	02	03	04	05	06	07	08	09	10	11	
12	13	14	15	16	17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32	33	34	35	36	37

Brazil label (Only for Brazil)



EAC label (This label is for Eurasian Economic Union (EEU) with EAC declaration done.)



Ukraine label

Система рентгенографічна діагностична Luminos Fusion	
UA.TR.101	Уповноважений представник на території України **ТОВ «СІМЕНС МЕДИЦИНА»** вул. М. Грінченка, 4-В, м. Київ, 03680, Україна Тел./факс: +380(44) 390-7000
Виробник:	**Сіменс Шанхай Медікал еквіпмент**, 278 Жоу Жу Роад, 201318, Шанхай, Китай
Країна походження Китай	

Swiss representative label (Indicates the authorized representative in Switzerland)

CH REP

Siemens Healthineers International AG
Hinterbergstr. 14
6312 Steinhausen
Switzerland

MoH label

وزارة الصحة
Ministry of Health

System input rating label

SIEMENS

Input voltage:
3N~, 380V/400V/440V/480V
Input frequency: 50Hz/60Hz
Max power: 126kVA
Standby power: 1.5kVA
Continuous operation with intermittent loading

AR label

EC REP

Siemens
Healthcare GmbH
Henkestr. 127
91052 Erlangen
Germany

(2) Radiation warning label



(3) High voltage label



(4) Danger of burns label



Laser radiation warning label



(5) Laser radiation label



(6) Labels for patient table

Max. weight-bearing label 200kg; 180kg; 150kg



Refer to manual label



CPR-Position label



(7) Labels for generator cover

Caution label



Refer to manual label



(8) Labels on the display trolley



(9) Moveable tableside control trolley



Register 6 Functional checks / Cleaning

Chapter: Functional and safety checks

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Chapter: Cleaning, disinfection, sterilization

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Functional and safety checks

Daily checks

You should perform the following checks before carrying out the examination:

General checks

- Visually inspect all the unit components.
- Perform a visual inspection of the indicators and control lights on the control console.
  – No error indication may appear.
  – The radiation indicator on the control console or the radiation warning lights in the room must not light up.
- Clean the unit components to eliminate any sign of contamination.
- Check patient hand grips for secure attachment.
- Remove objects that could hinder movements (for example, chair beneath patient table or 3D ceiling-mounted tube support).
- Check out radiation protection accessories.

If the radiation ON indicator or a radiation warning lamp lights up, or a live fluoroscopic image (not LIH) appears on the monitor without actuating a switch

- immediately switch the X-ray system off and
- notify the SIEMENS Uptime Service.

Use exclusively foot switches from SIEMENS (original parts with approval) for radiation release.

Checking the emergency STOP function

Functional control of the red emergency STOP pushbutton:

- Actuate a button for motor driven movement, for example, table lift.



- Press the emergency STOP pushbutton.

The movement must stop immediately.

Checking system movements

3D ceiling-mounted tube support

See also Register **System overview**, Ceiling-mounted tube support on page 51

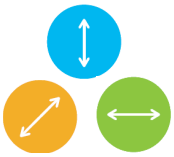


Warning

Abnormal sinking of the tube support

Injury of persons

- Perform tests in regular intervals - at least every 24 month - to maintain the safety and proper functioning of the product.



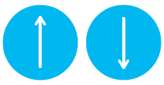
- Check manual vertical movement
- Check manual transverse and longitudinal movements



- Check 'floating' 3D ceiling-mounted tube support movement.



- Check tube unit rotation about the horizontal and vertical axis.



- Check motorized vertical movements (height adjustment).
- Observe the indications in the display.

Patient table

- Check manual longitudinal and transverse movement of the tabletop.
- Check motor driven table height adjustment.

Checking the light localizer and centering/collimation

- Check the center position of radiation unit and detector unit with the light localizer and check the collimation.

Light on

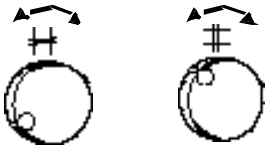


- Press the multileaf collimator's button.
  – The light beam for collimation appears (time limited).

Centering

- Check the centering of the light cone at the markers at the detector unit.

Collimation



- Open and close diaphragm.
  – The light beam changes its height or width.

At least one edge of the collimator leaves has to be visible in the fluoro image.

Light off

- Press the button again if light is on.
  – The light beam is turned off.

Prior to examination

- Remove unnecessary objects and equipment from the area of action of the system.
- Remove unnecessary accessories from the system accessory rails and the primary collimator.
- Attach the devices required for patient positioning and immobilization securely to the system.
- Attach all safety-related accessory parts correctly (for example footrest, protection strip, handgrip angled, handgrip rail and make sure they are properly secured.
- Clean any contrast agent residues from the patient table, protective plate and detector cover.

Recommendation: As a test, take a full-format exposure using the largest possible format.

Run a functional test of the proximity switches (collision protection)

- Perform an arbitrary system movement and press a proximity switch during the movement.
  – The movement concerned must stop immediately.
- Release the proximity switch
  – All system movements are possible again.

During the examination

Check the radiation ON indicator. It should light up only

- ❏ if one of the fluoroscopy switches has been pressed or
- ❏ for the duration of an X-ray exposure.



Caution

Exposure does not stop due to a technical defect or unintentional exposure.

Risk of unnecessary radiation exposure

- ◆ In case of unwanted radiation, press the nearest emergency STOP button.



If the radiation ON indicator or a radiation warning lamp lights up, or a live fluoroscopic image (not LIH) appears on the monitor without actuating a switch

immediately switch the X-ray system off and

notify the SIEMENS Uptime Service

Check the patient positioning devices, for example use of the grip protection strip and handgrip.

Switch system movements on only if:

- ❏ There is no danger of injury to the patient or third parties.
- ❏ There are no objects blocking the path of system movements.

Monthly tests

Functional test of the automatic format collimation

See Part **Safety**.

Automatic dose rate control

- Close the tube-side collimator.
- Place a lead apron folded at least 4 times in the beam path as a cover.
- Turn on fluoroscopy.
  – The maximum kV value (approximately 110 kV) must be displayed.
- Turn off fluoroscopy.
- Remove the lead apron from the beam path.
- Open the tube-side collimator.
- Turn on fluoroscopy.
  – The minimum kV value (approximately 40 kV) must be displayed.
- Turn off fluoroscopy.

In Germany, automatic dose rate control is tested during the constancy test.

Legally required tests

Inform yourself in Part **Safety**.

Cleaning, disinfection, sterilization

Cleaning and disinfection



Caution

Inadequate cleaning and/or disinfection.

Risk of infection

- Clean and disinfect all contaminated surfaces/parts and all parts which may come (or have come) into contact with patient after each examination.
- For cleaning, use water or a lukewarm diluted household cleaning agent solution.
- For disinfection, use recommended common surface disinfectants (quaternary compounds and/or guanidine derivates).



Caution

Use of harsh cleaning agents, liquids or sprays.

Risk of electrical hazard or damage to the system

- Use *only* substances for cleaning and disinfection, which are recommended.
- Do *not* let cleaning liquids seep into the openings of the system (for example air openings, gaps between covers).
- Observe the following cleaning and disinfection instructions.



Caution

When cleaning the generator cover, liquids can seep into the generator and cause electric shock, short circuits, or corrosion of electrical parts.

Risk of serious injury or damage to electronic components!

- Before cleaning the generator, shut down the system properly.
- Do not spray the generator cover.

Cleaning

- Before cleaning the system, shut the system down properly.

When cleaning and disinfecting, use suitable gloves for your own protection.

- Clean all contaminated parts and all parts that may or have come into contact with the patient directly or indirectly.

Equipment

- Only use water or a lukewarm diluted household cleaning agent solution.

The use of other than the recommended cleaning agents can result in damage to the equipment.

- Wipe system parts with a damp cloth (squeeze out wet cloth before using it) until all contaminations are removed.
- Remove any watery residues immediately.

Ventilation slots

- Keep the ventilation slots of all components unobstructed.

Monitors, touch-screens and keyboard

When cleaning the monitor screens or displays use only a water damp cloth without any cleaning agents.

- Wipe the screen.
- Dry it with a soft cotton cloth.
- Remove any contamination (such as contrast medium stains) immediately.

Liquid-crystal displays (LCD) are very sensitive to mechanical damage.

- Avoid scratches and shocks.
- Remove drops of water immediately, longer contact with water discolors the surface.

Accessory parts

Please note that for some accessory parts there are special instructions on cleaning in the corresponding chapters.

See part **Accessories and Auxiliary Devices**.

Unless there are special instructions, the equipment cleaning instructions are valid.

Disinfection

- Disinfect all parts that may or have come into contact with the patient directly or indirectly.
- In addition, observe the hygiene plan of your hospital.
- Disinfect the system by wiping only.

For the disinfection of surfaces we recommend the following active ingredients:

❏ Quaternary compounds

❏ Guanidine derivatives

Follow the manufacturer's instructions for use for these disinfectants.

The use of disinfectants other than those recommended can cause health impairments to the user and damage to the system.

Sterilization

The system does not require sterilization.

Register 7 Accessories and Auxiliary Devices

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Important information

Equipment with accessories

Depending on the system type and configuration, the accessories described in the following chapters either form part of the standard equipment supplied or can be purchased optionally.

For more information, please contact your local sales representative.

Please note that not all accessories described in this Operator Manual are deliverable in all countries. For detailed information, please contact to your local sales representative.

Other products/ components

For operation, technical description, models, and technical data, please refer to the documentation supplied by the respective manufacturer.



Caution

Inappropriate accessary

The use of Accessory equipment not complying with the equivalent safety requirements of this equipment may lead to a reduced level of safety of the resulting system

- Use only original Siemens accessories or accessories approved by Siemens.



Caution

Redundant accessories and auxiliary devices within the path of X-ray

Limited image quality

- Remove all accessories and auxiliary devices which are not used for the examination.
- Remove all radiopaque parts from the radiographic field, if possible.
- Make sure that all accessory parts are firmly attached.



Caution

Accessories not firmly attached

Patient sliding off table! Risk of personal injury by falling accessory parts.

- Make sure that all accessories attached to the table are firmly attached and used according to the instructions.

Patient positioning mattress

Application

The mattress is used for comfortable patient positioning and is attached to the protection strip of the tabletop.

Attachment

- Attach the protection strip at the head end of the tabletop.
- Place the mattress on the tabletop and pull the loops over the hand screws of the protection strip.

Radiation protection value

The attenuation equivalent is ≤ 0.5-mm Al.

Handgrips, angled

Application

The handgrip can be mounted in the front or back accessory rail for stabile and secure patient positioning.

They are provided for the safety of the patient.

To avoid injuries to the patient's hands when moving the tabletop, please ensure that

❏ the patient uses the grips and

❏ does *not* grasp the ends or sides of the tabletop.



Caution

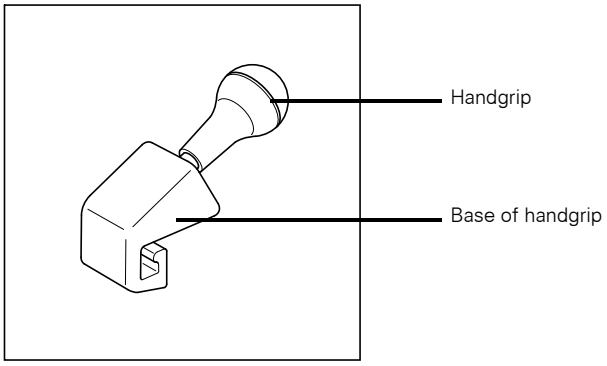
The handgrips may loosen because they cannot support the patient’s full weight.

Injuries by squeezing

- Use other positioning aids for immobilizing weak or very unstable patients.
- Ensure that handgrips are tightened prior to use.

Attaching the handgrip

The handgrip is attached to either of the two lateral accessory rails of the patient table.



✓ Patient table in horizontal position.

◆ Holding the base of the handgrip, loosen the handgrip.

◆ Slide the handgrip onto the edge of the accessory rail and move it into position.

◆ Tighten the handgrip.

◆ Check that the handgrip is secure by pulling on it.

Please make sure that the handgrips are securely fastened.

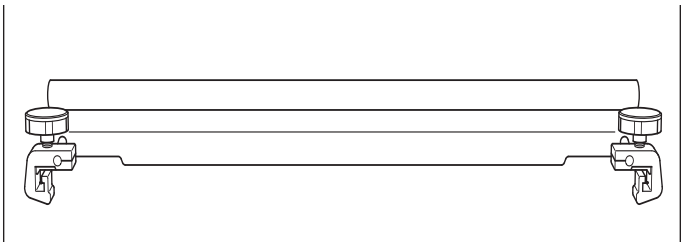
Removing the handgrip

✓ Patient table in horizontal position.

◆ Loosen the handgrip.

◆ Pull the handgrip out of the accessory rail.

Protection strip



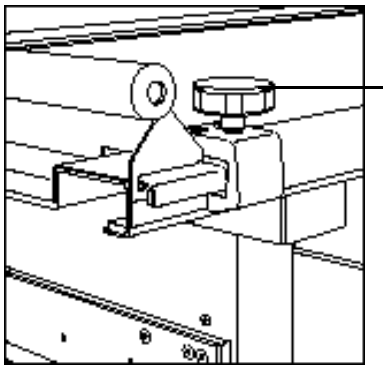
Application

Handgrip and finger protection for patients during examinations in the lateral or prone position.

Attachment

✓ Patient table in horizontal position.

◆ Loosen the cap screws (1) on the protection strip.



◆ Insert the protection strip on the head or footend in the accessory rails up to the end stop.

◆ Tighten (1) the cap screws.

◆ Check that the protection strip is securely attached by pulling and pressing on it.

The protection strip provides added safety for the patient. To prevent injury to the hands when moving the tabletop, make sure that the patient uses the protection strip and not the headend or the side edge of the tabletop.

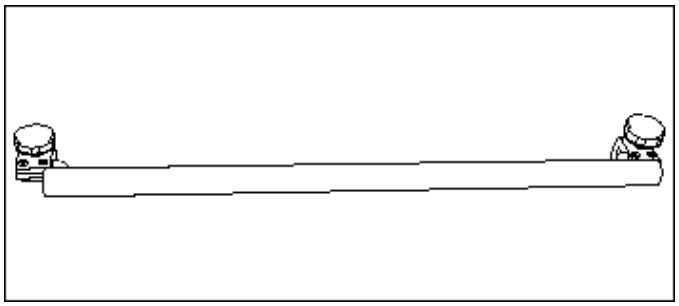
Removal

✓ Patient table in horizontal position.

◆ Loosen the cap screws.

◆ Remove the protection strip from the accessory rail.

Handgrip rail

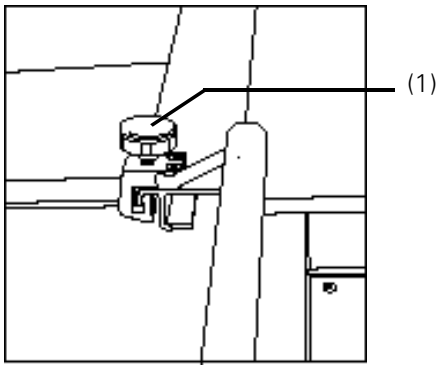


Application

Handgrip rail for mounting on the front or back accessory rail to assist in positioning the patient

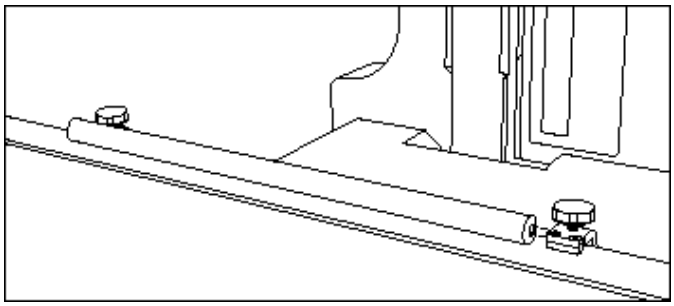
Attachment

Patient table in horizontal position.



- Loosen the right and left cap screws (1) on the handgrip rail.
- Insert the handgrip rail in the accessory rail and push it into position.

We recommend placing the handgrip rail on the far side of the user.



- ◆ Tighten both cap screws.
- ◆ Make sure that the handgrip rail is secure by pulling and pressing on it.

The handgrip rail provides additional safety for the patient. To prevent injury to the hands of the patient when moving the tabletop, make sure that the patient uses the handgrip rail (not the cap screw) and does not hold onto the headend or the side edge of the patient table.

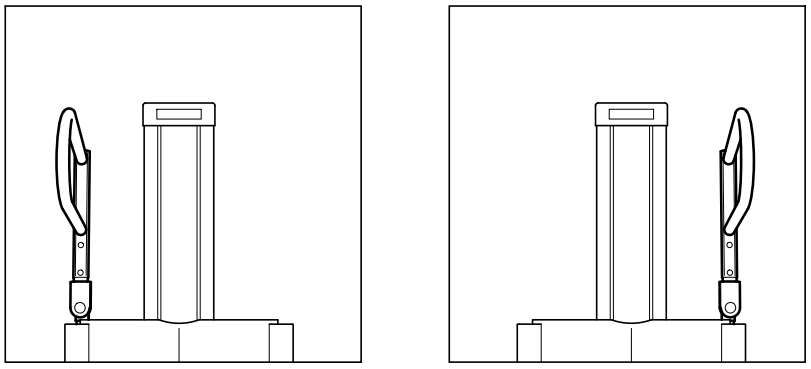
Removal

✓ Patient table in horizontal position.

- ◆ Loosen both cap screws on the handgrip rail.
- ◆ Pull the handgrip rail out of the accessory rail.

If required, an additional handgrip rail for the front accessory rail can be ordered via the SIEMENS Uptime Service (against payment).

Overhead patient handgrip



Application

The overhead patient handgrip serves to stretch the patient during chest examinations.

The overhead patient handgrip can be inserted on the left or right side of the Bucky unit. Once in position, it can be swiveled by 90° (vertically or parallel to the bucky. The overhead patient handgrip engages in the 90° end positions.

For easy storage of the overhead patient handgrip, a wall holder is provided.

The overhead patient handgrip has no locking mechanism to prevent it from being pulled out from the top.

Please pay special attention when patients use the grip!

The maximum load on the overhead patient handgrip must not exceed the stated value (see label).

Inserting

- Move the bucky tray until its upper edge is approx. at eye level.
- Push it straight down into the holder on the left or right at the top of the bucky tray until the bolt is completely inside the duct.
  – In this position, you cannot swivel it about its vertical axis.

Moving and removing

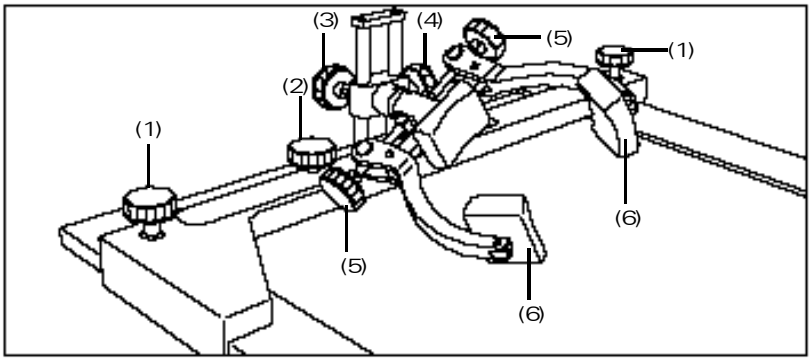
- When moving or removing the overhead patient handgrip, pull it vertically upwards out of its holder.

Adjustment

You can swivel the overhead patient handgrip about its lower center of rotation through 360°. The exception is the position parallel in front of the bucky. In this position, you can swivel the handgrip only by 100°.

- Pull the overhead patient handgrip axially approx. 1 cm against the spring force to the front.
- Swivel it by the required angle.
- Then let it snap back again into its axial rest position.

Head Support



Application

Holder for cranial examinations which can be adjusted in height, width, and lateral tilt.

Attachment

✓ Patient table in horizontal position.

◆ Loosen both cap screws (1) for attaching the head support to the accessory rails.

◆ Insert the head support into the accessory rails at the head end or foot end of the table and move it to the appropriate position.

◆ Tighten the cap screws (1).

◆ Pull the head support to ensure that it is secured properly.

◆ Turn the following cap screws as indicated to adjust the head support:
– (2) position from side to side.
– (3) height.
– (4) lateral tilt from 0° to ± 90° (depending on the height setting).
– (5) pads (6) to the width of the patient's head; turn to the left.

◆ Set the position from side to side.

◆ Tighten the cap screw (2).

◆ Push and pull the head support to ensure it is seated properly.

◆ Assist the patient in positioning his/her head in the head support.
– The head of the patient should make contact with the top pad.

◆ Raise the stabilizing arms to the height required.

◆ Tighten the cap screw (3).

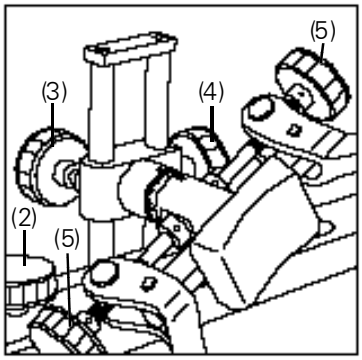
◆ Push and pull on the stabilizing arms to ensure they are seated properly.

◆ Turn the cap screws (5) carefully to the right.
– Both padded stabilizing arms will move toward the head of the patient.

◆ Ensure the head of the patient is safely stabilized.

To avoid injury to the head of the patient, ensure that the stabilizing arms are opened sufficiently and that the cap screws (5) are not tightened too much prior to positioning the head of the patient in the support.

◆ Turn the head of the patient to the right or left as required for the examination.
– The scale indicates the angle in degrees "°".



◆ Tighten the cap screw (4).

◆ Ensure that the patient is comfortable and stabilized properly.

Removal

✓ Patient table in horizontal position.

◆ Loosen the cap screw (4).

◆ Turn the head of the patient to the 0 ° position.

◆ Open the stabilizing arms using the cap screws (5).

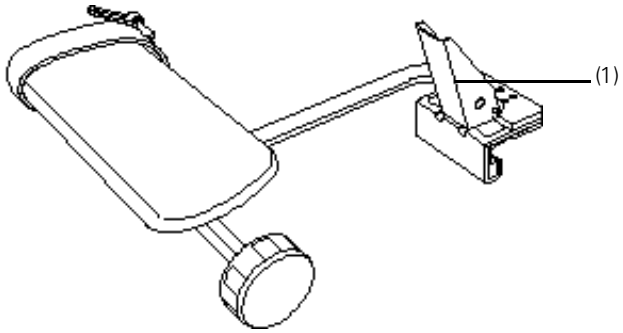
◆ Assist the patient in removing his/her head from the support.

◆ Assist the patient in stepping down from the patient table.

◆ Loosen the cap screws (1).

◆ Remove the head support from the accessory rails.

Arm support



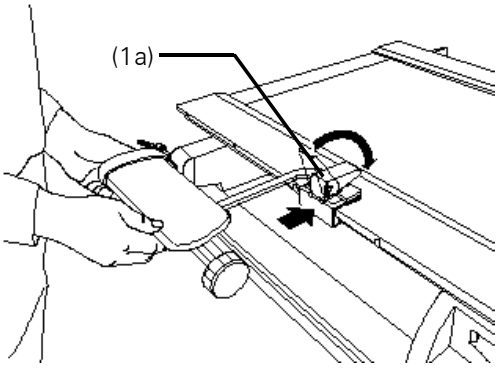
Application

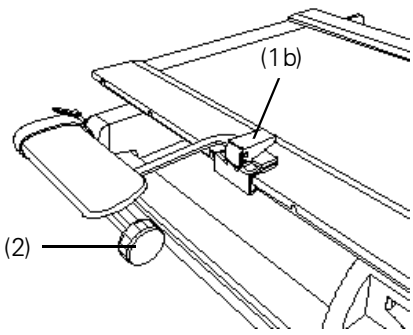
For securing the arm of the patient for injections, IVs, or insertion of a catheter.

Attachment

✓ Patient table in horizontal position.

◆ Position the patient.





◆ Open the clamping lever (1a).

◆ Place the arm support onto the front or rear accessory rail and slide it into position.

◆ Close the clamping lever (1b).

◆ Push and pull on the arm support to ensure it is seated properly.

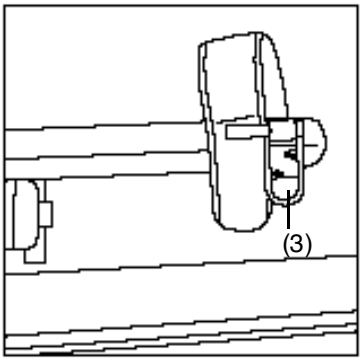
◆ Loosen the cap screw (2).

◆ Move the padded arm support to a comfortable position.

◆ Tighten the cap screw (2).

◆ Ensure that the arm support is seated properly.

◆ Place the arm of the patient on the arm support.

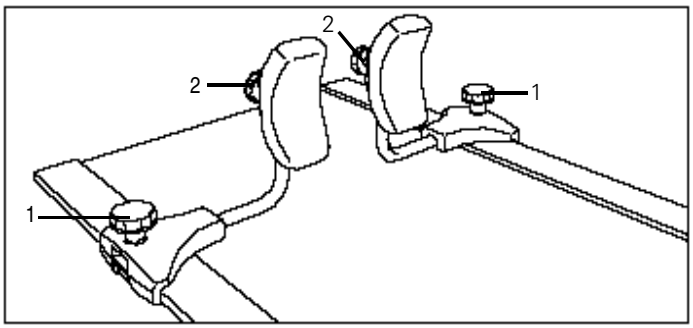


- ◆ Place the strap over the arm of the patient and under the pin.
- ◆ Press down on the clamp (3).
- ◆ Ensure that the arm of the patient is stabilized and comfortable.

Removal

- ✓ Patient table in horizontal position.
- ◆ Pull the clamp upward and loosen the strap.
- ◆ Raise the arm of the patient from the arm support.
- ◆ Open the clamping lever (1a).
- ◆ Remove the arm support from the accessory rail.

Shoulder supports



Application

To support the patient during examinations in Trendelenburg position, for example Myelography

For >15° Trendelenburg position, the shoulder supports must be used.

Up to 45°, the patient weight must not exceed 180 kg.

In Trendelenburg position >45°, the maximum patient weight of 150 kg must not be exceeded.

Attachment

✓ Patient table in horizontal position.

◆ Position the patient.

◆ Loosen the cap screws (1) on both supports.

◆ Move the supports into position on both accessory rails.

◆ Pull the shoulder pads out until they are aligned with the center of the shoulders of the patient.

◆ Tighten (1) the cap screws.

◆ Check the shoulder supports.

◆ Loosen the cap screws (2) for the shoulder pads.

◆ Adjust the height of the shoulder pads for secure and comfortable positioning.

◆ Tighten both (2) cap screws.

When in Trendelenburg position, the patient is protected against slipping only by the shoulder supports. Pull on the shoulder supports to be sure that they are securely attached before moving the patient into the Trendelenburg position.

Removal

✓ Patient table in horizontal position.

◆ Loosen the cap screws (1) on both sides.

◆ Pull the shoulder supports out of the accessory rails.

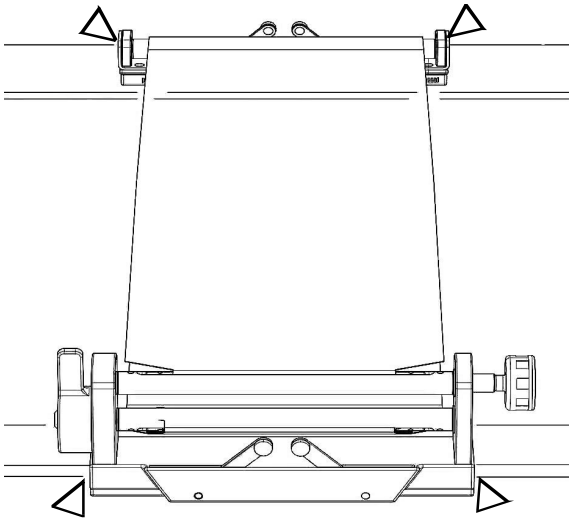
Compression belt

Safety

Risk of crushing

It is the responsibility of the operator to attach and remove the equipment only if it is ensured that neither the patient nor third parties can be endangered.

The parts of the unit marked in the drawing, show possible danger zones where fingers can be crushed.



Risk of injury for the personnel when attaching compression belt.

Functional and safety check

Daily checks

- Check tension lever.
- Check cap screw.

When the cap screw and tension levers are in locked status, check if the compression belt is locked.



Caution

Attachment of the compression belt not correctly done.

Compression belt falls down.

Injury of persons.

- Make sure that the clamping part is attached firmly by pulling and pushing it.



Remove all traces of contrast agent from the compression belt. Otherwise, the X-ray image shows artifacts.

The compression belt is made of transparent plastic. You can clean it with a damp cloth.

Cleaning and disinfection

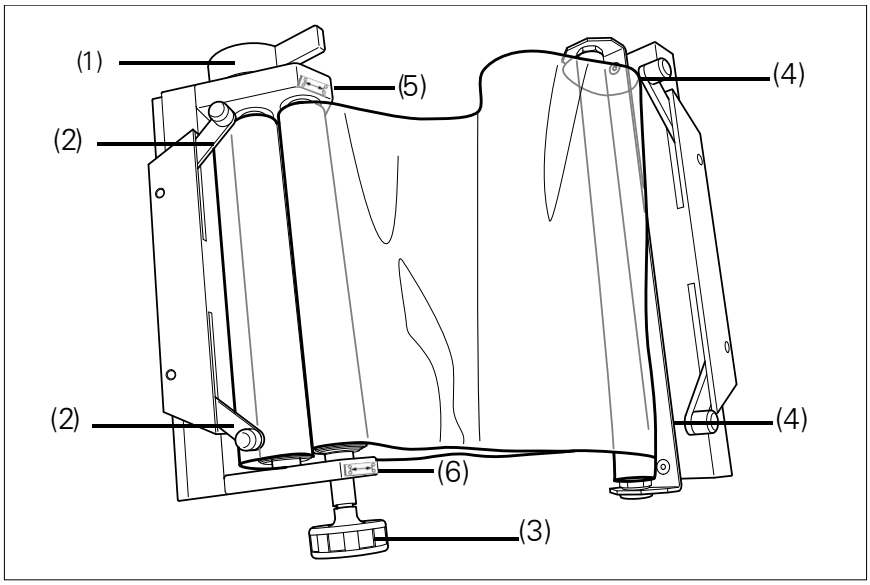
Cleaning

- The compression belt is made of transparent plastic and can be cleaned with a damp cloth.
- Do not use corrosive, soluble or abrasive cleaning materials for cleaning.
- For sprayed paint, plastic and chromium alloy surface, make sure to use clean and dry soft cloth to wipe clean.

Disinfection

- Disinfect all components of the compression belt, only with a soft cloth soaked in disinfectant.
- Do not use spray disinfectant.

Product description



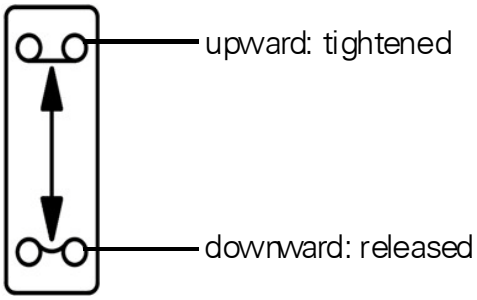
(1) Ratchet handle

(2) Tension lever

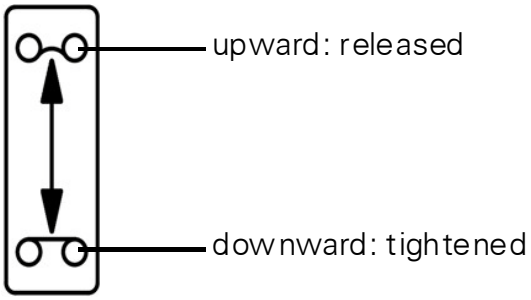
(3) Cap screw

(4) Tension lever

(5) Tag for ratchet handle



(6) Tag for cap screw



Intended use

The compression belt is a mechanical component for X-ray exposures.

It is used to quickly fix the patient on the table or BWS.

In addition, it can reduce the thickness of the patient which leads to better image quality for some examinations, especially abdominal.

Product features

- ❏ High reliability
- ❏ Easy attachment
- ❏ Fasten frail patient
- ❏ Increase image quality

Operation

Requirements

The X-ray imaging system must be operated by trained and qualified personnel. In addition, make sure to follow the requirements of relevant laws and regulations during the operating process.

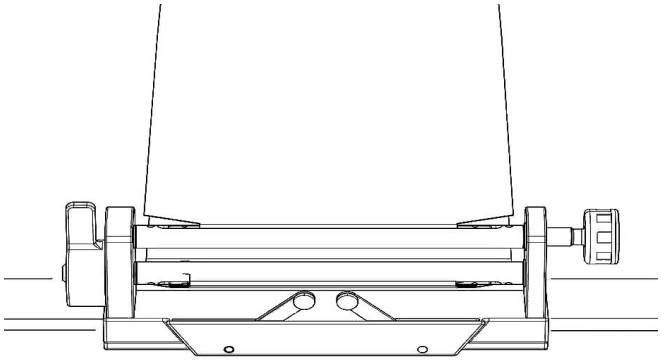
How to operate the compression belt

For use on the table

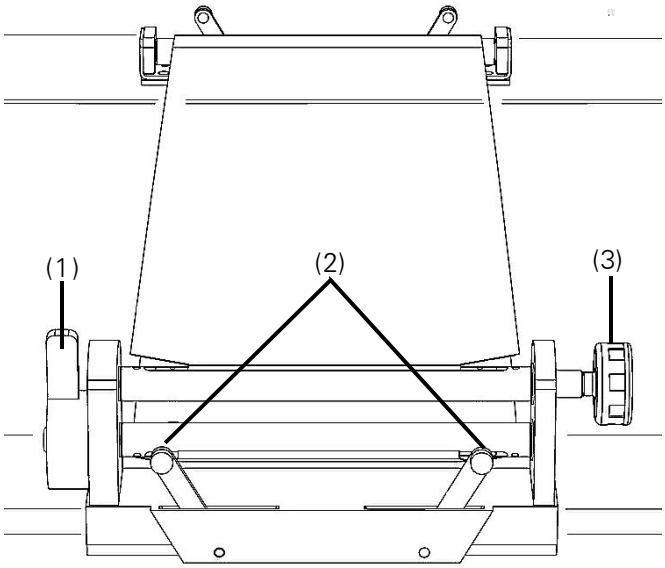
Attachment

◆ Move the patient table to the horizontal position.

❑ Position the patient on the table.



◆ Push the tensioning part of the compression belt into the required position over the front accessory rail.



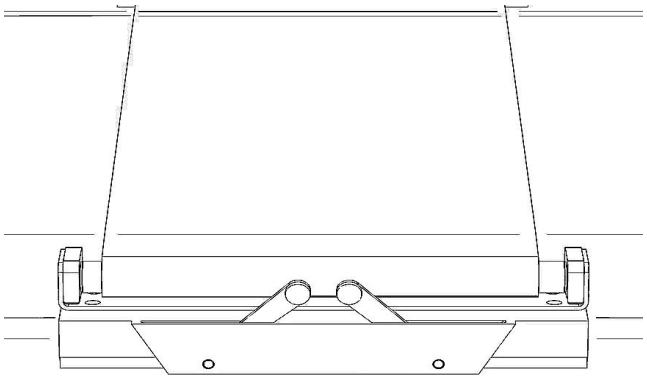
◆ Press both tension levers (2) outward.

◆ Check that the tensioning roller is firmly seated by pulling on it.

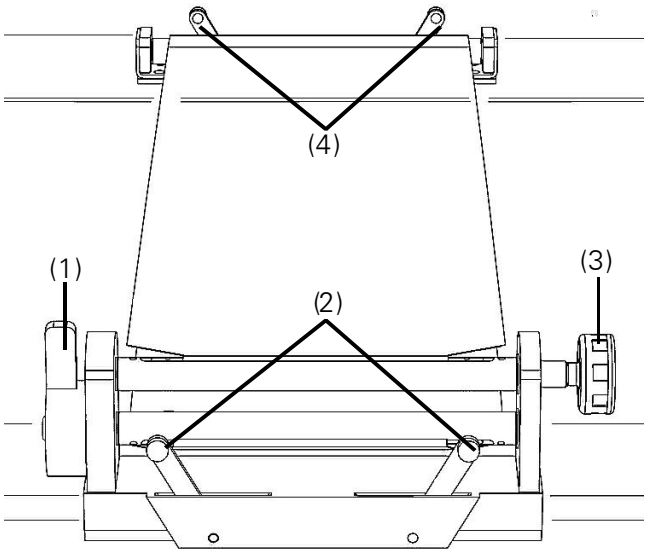
◆ Press the ratchet handle (1) downward.
– The belt is released.

For obese patients, the belt holder is easier to secure if you are standing at the back of the patient table. In this case, and for restless or frail patients, we recommend that someone assist you in attaching the compression belt

- Lift the holder with the belt across the patient.



- Push the holder over the back accessory rail. Make sure that the compression belt attaches straight across the tabletop and not at an angle.



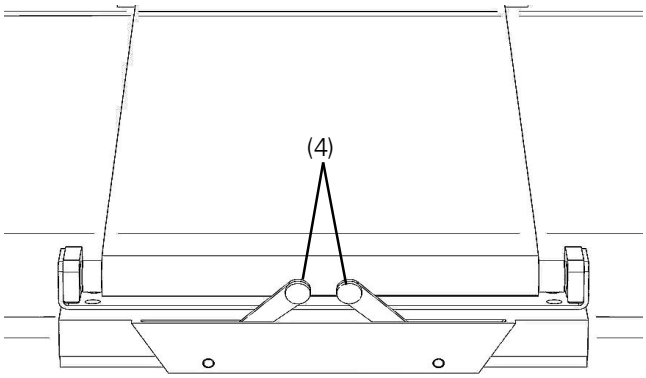
- Press the tension levers (4) outward.
- Check that the holder is seated firmly by pulling on it.
- Turn the cap screws (3) on the tensioning roller toward the left to tighten the belt.
- Push and pull back on the ratchet handle (1), until the belt tension is optimal.
- Check the belt tension on the patient once again.

Loosening the compression belt

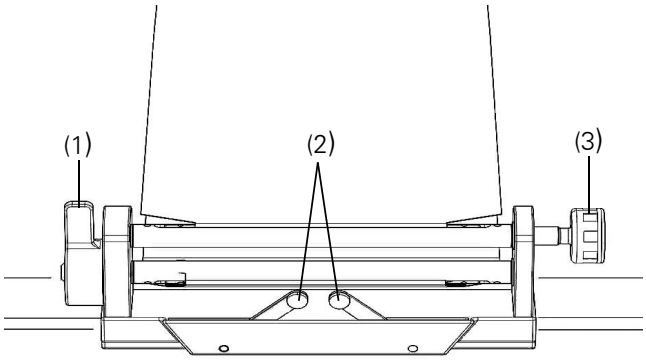
- Move the patient table to the horizontal position.
- Press the ratchet handle (1) back.
- Turn the cap screw (3) on the tensioning roller toward the right.
  – The compression belt unclenches.
- Use the ratchet handle to set a lower belt tension.

Removal

- Move the patient table to the horizontal position.
- Press the ratchet handle (1) back.
- Turn the cap screw (3) on the tensioning roller toward the right.
- The compression belt unclenches.



- Press both tension levers (4) on the belt holder inward.
- Pull the belt holder backward off the accessory rail.
- Lift the belt holder over the patient.
- Roll up the compression belt halfway using the cap screw.
- Place the belt holder next to the tensioning roller.

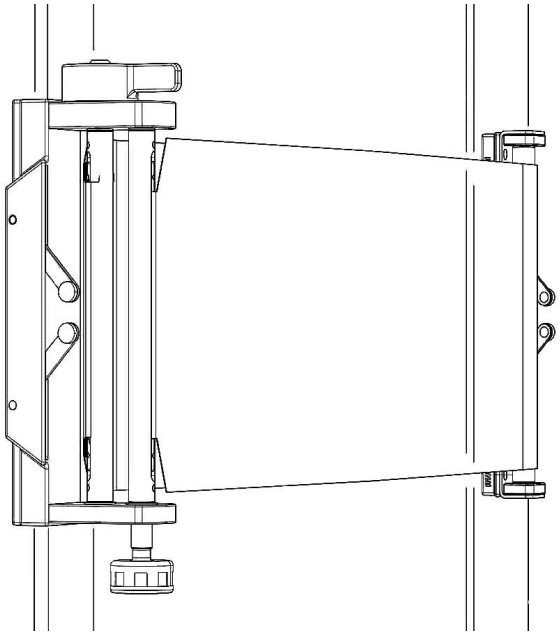


- Press both levers (2) inward on the tensioning roller.
- Pull the tensioning roller from the front accessory rail.
- Help the patient to get off the patient table.
- Use the cap screw (3) to roll up the belt on the tensioning roller.

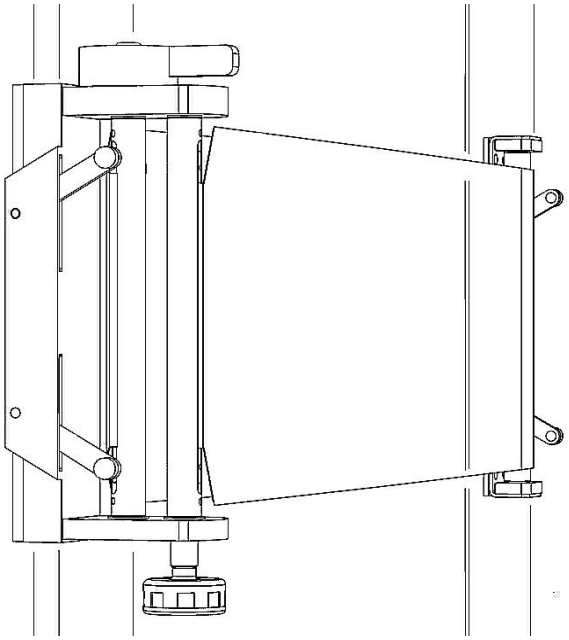
For use at wallstand

Attachment

- Position the patient.



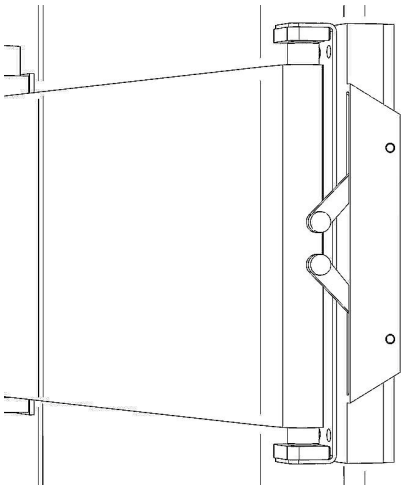
- Attach the clamping part of the compression belt to the left accessory rail at the required position.



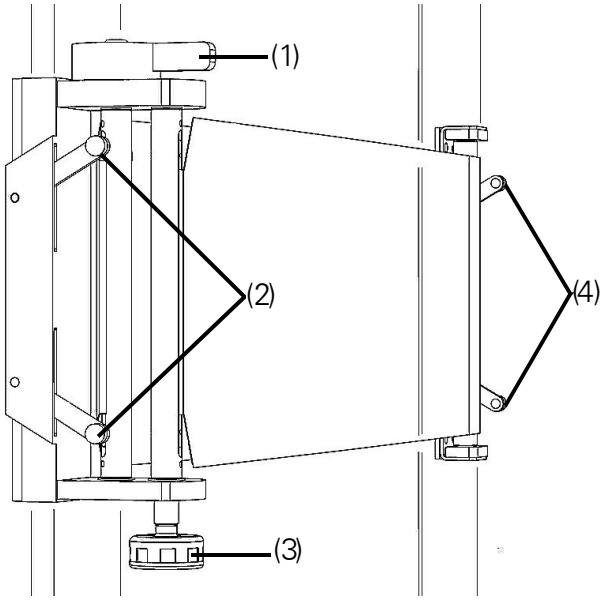
- Push both tension levers (2) outwards.
- Make sure that the clamping part is attached firmly by pulling and pushing it.
- Push the ratchet handle (1) to the back.
  – The belt unclenches.

For the attachment at the wall stand, we recommend that two persons fasten the compressor belt.

- Lift the holding part with belt over the patient.



- Push the holding part over the right accessory rail. Take care that the belt runs at right angles to the tabletop and is not applied obliquely.



- Push both tension levers (4) outwards.
- Make sure that the holding part is attached firmly by pulling and pushing it.
- Turn the cap screw (3) on the clamping part to the left.
  – The belt is tensioned.
- Push the ratchet handle(1) backwards and forwards until the belt is tensioned optimally.

- Check the belt tension once again on the patient.

Loosening the compression belt

- Push the ratchet lever (1) to the back.
- Turn the cap screw (3) on the clamping part to the right.
  – The belt unclenches.
- Set a reduced belt tension once again with the ratchet lever.

Removal

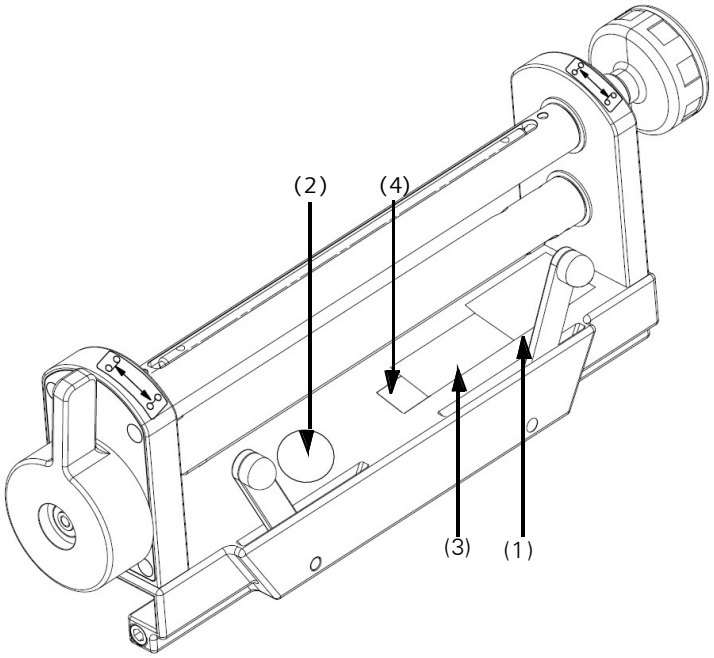
- Push the ratchet lever (1) to the back.
- Turn the cap screw (3) on the clamping part to the right.
- The belt unclenches.Turn the cap screw (3) on the tensioning roller towards the right.
  – The compression belt unclenches.

Technical description

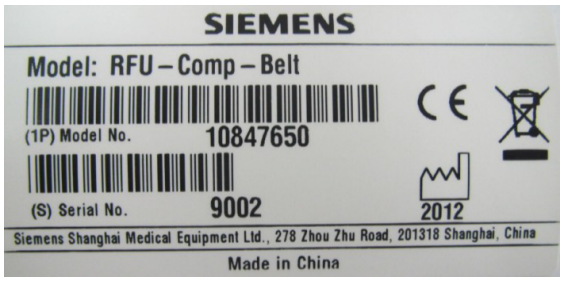
Technical data

Dimensions	
Width	≤ 100 mm
Length	≤ 400 mm
Height	≤ 150 mm
Ambient conditions (Operation)	
Temperature:	+10°C to +35°C
Relative humidity:	20% to 75% rel. air humidity without condensation
Barometric pressure:	700 hPa to 1060 hPa
Ambient conditions (Transport and storage):	
Temperature:	-20°C to +70°C
Relative humidity:	10% to 95% rel. air humidity without condensation
Barometric pressure:	500 hPa to 1060 hPa
Aluminum equivalent	≤ 0.8 mm Al

Location of labels



(1) Identification label for compression belt



(2) Warning label



(3) UR label/ UR



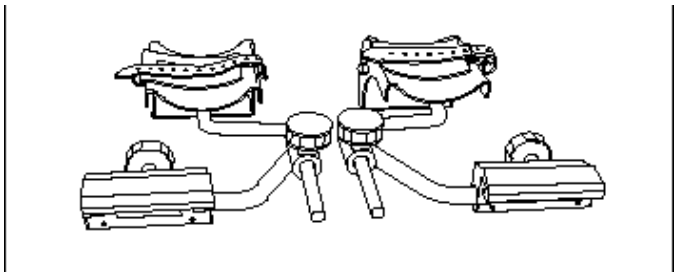
(4) Type B equipment Label



Complying standards

- ❏ UL 60601-1, 1st Edition, 2006-04-26 (Medical Electrical Equipment,Part 1: General Requirements for Safety)
- ❏ CAN/CSA-C22.2 No. 601.1-M90, 2005 (Medical Electrical Equipment,Part 1: General Requirements for Safety)
- ❏ CAN/CSA-C22.2 No. 60601-1, Medical Electrical Equipment - Part 1: General Requirements for Basic Safety and Essential Performance
- ❏ ANSI/AAMI ES60601-1 (2005 + C1:09 + A2:10), Medical Electrical Equipment,Part 1: General Requirements for Basic Safety and Essential Performance
- ❏ IEC 60601-1:1988 + A1:1991 + A2:1995
- ❏ IEC 60601-1: 2005

Leg support

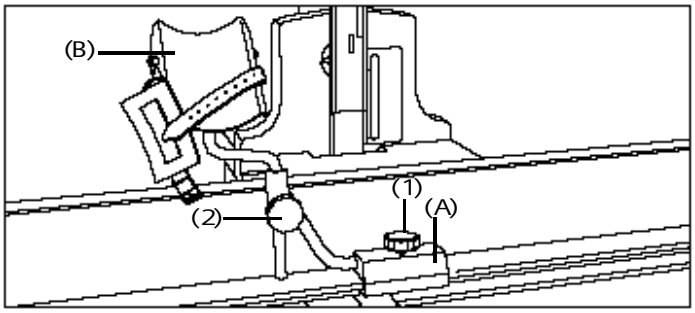


Application

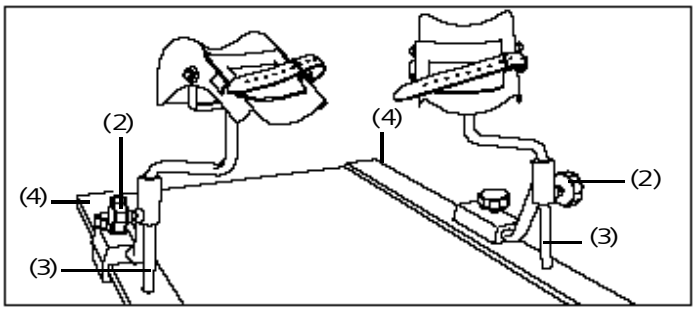
For facilitating positioning for gynecological and urological examinations

Attachment

✓ Patient table in horizontal position.



- Loosen both cap screws (1).
- Slide flanges (A) onto the accessory rails.
- Insert both molded leg supports (B) into the holders at the cap screws (2).
- Position the patient on the patient table.
- Slide the leg supports along the accessory rails to the examination position.
- Tighten the cap screws (1).
- Open the securing straps on the molded leg supports.
- Position the lower legs of the patient on the molded leg supports.



- Raise the leg supports to the examination position and adjust the position of the legs inward or outward as needed.

When adjusting the height of the leg supports ensure that the distance between the accessory rail (4) and the holder for the leg supports (3) is at least 1 cm.

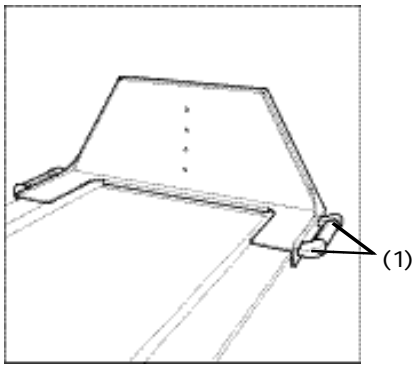
- Tighten the cap screws (2).
- Pull and push on the leg supports and the flanges to ensure they are seated properly.
- Place the leather pads over the center of the lower legs of the patient.
- Position the straps around the lower legs of the patient.
- Tighten the straps appropriately.

Removal

- The patient table is in the horizontal position.
- Release the straps.
- Lift the legs of the patient from the leg supports.
- Wrap the straps around the leg supports.
- If necessary, remove the leg supports by loosening the cap screws (2).
- Loosen the cap screws (1).
- Remove the flanges from the accessory rails.

Please place towels between the legs of the patient and the leg supports to avoid direct skin contact with the leg supports.

Footrest *(P/N:07094613)*



Application

Positioning aid for examinations of patients when standing or sitting and for additional use with the foot restraints for recumbent patients in Trendelenburg position.

The maximum permissible patient weight on the footrest is 180 kg.

Caution

Footrest not firmly attached

Danger of slipping off!

- Make sure that the footrest is attached firmly by pulling and pushing it.
- Attach and remove *only* when table is horizontal.

The footrest can also be attached to the head end of the patient table, if the patient has to be turned for positioning (right head end).

Three lock-in positions each at the head end and foot end at a distance of 20 cm each are available.

The room height calculator does not consider the footrest attached at the head end.

Be extremely careful when raising the unit with the footrest attached at the head end and extended tabletop.

Attachment

✓ The patient table is in the horizontal position.

◆ Hold footrest laterally on the handgrips and press the spring-loaded handgrip rails in the handgrips.
– The two red buttons (1) must be visible.
– The two green markings on the spring-loaded handgrip rails disappear.

◆ Insert the footrest anywhere in the accessory rail at any place of the tabletop in the head or foot range, first on one side and then on the other.

◆ Move the footrest to the desired position (lock-in position).

◆ Release the handgrip rails and shift the footrest slightly back and forth until it locks in.
– The two red buttons must be flush with the handgrip.
– The two green markings on the spring-loaded handgrip rails must be visible again.

◆ Check that the footrest is locked by pulling on it.

◆ Position the patient.



Be sure to check that the footrest has locked into position before allowing patients to sit or stand on it.

If you want to tilt the patient table from the horizontal position to the Trendelenburg position, you must secure the patient with the shoulder supports or the foot restraints at 15°.

In case of a Trendelenburg position >40°, the foot restraints must be used in addition to the shoulder supports.

Make sure that patients standing on the footrest hold onto the handgrip and the handgrip rail.

For additional safety, use the compression belt for frail or very unsteady patients

Adjustment

- Press the spring-loaded handgrip rails in the handgrips.
  – The two red buttons must be visible.
  – The two green markings on the spring-loaded handgrip rails disappear.
- Move the footrest to the desired position (lock-in position).
- Release the handgrip rails and shift the footrest slightly back and forth until it locks in.
  – The two red buttons must be flush with the handgrip.
  – The two green markings on the spring-loaded handgrip rails must be visible again.

The footrest may only be unlocked, adjusted or removed when the table is in the horizontal position. In all other system positions, the footrest could fall off and present a high risk of accidents.

Removal

✓ The patient table is in the horizontal position.

- Press the spring-loaded handgrip rails in the handgrips.
  – The two red buttons must be visible.
  – The two green markings on the spring-loaded handgrip rails disappear.
- Lift the footrest first on one side and remove from the accessory rail.
- Remove other side of the footrest from the accessory rail.

Maintenance Note To prevent contrast medium from penetrating into the sockets, cover the footrest surface with an absorbant fleece pad.

Footrest (P/N:10393617)



Caution

Footrest not firmly attached

Danger of slipping off!

- Make sure that the footrest is attached firmly by pulling and pushing it.
- Attach and remove *only* when table is horizontal.



The footrest can also be attached to the head end of the patient table, if the patient has to be turned for positioning (right head end).

Three lock-in positions each at the head end and foot end at a distance of 20 cm each are available.

The room height calculator does not consider the footrest attached at the head end.

Be extremely careful when raising the unit with the footrest attached at the head end and extended tabletop.



Be sure to check that the footrest has locked into position before allowing patients to sit or stand on it.

If you want to tilt the patient table from the horizontal position to the Trendelenburg position, you must secure the patient with the shoulder supports or the foot restraints at 15°.

In case of a Trendelenburg position >40°, the foot restraints must be used in addition to the shoulder supports.

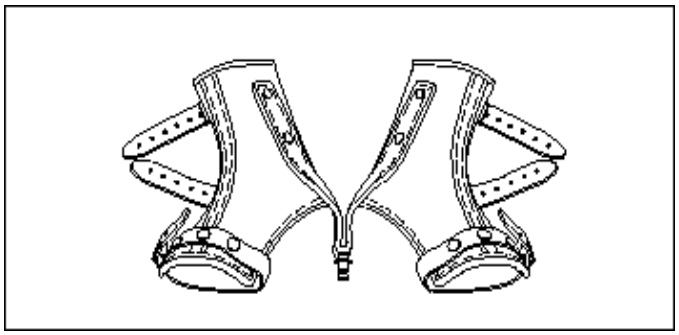
Make sure that patients standing on the footrest hold onto the handgrip and the handgrip rail.

For additional safety, use the compression belt for frail or very unsteady patients



The footrest may only be unlocked, adjusted or removed when the table is in the horizontal position. In all other system positions, the footrest could fall off and present a high risk of accidents.

Foot holder



Application

For securing the patient during examinations in the Trendelenburg position with a relaxed spinal column.

At a Trendelenburg position >40°, the foot holder must be used in addition to the shoulder supports.

Up to 45° the maximum patient weight must not exceed 180 kg.

The maximum patient weight must not exceed 150 kg at a Trendelenburg position >45°.

Inspection/ maintenance note

Check that the foot holder is in a proper condition at regular intervals of about two months.

Check especially that the fastening rivets, the supporting straps and closing straps are firmly attached. Check that their seams are complete and that the leather is free of cracks and porous areas.

If the foot holder shows any signs of defects, take it out of service and obtain a replacement through SIEMENS Uptime Service.

We recommend using a commercially available transparent impregnating pump spray for leather for cleaning and care

Attachment

✓ The patient table is in the horizontal position.

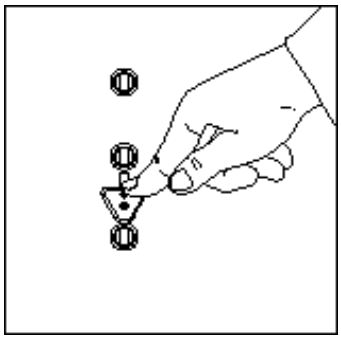
◆ Attach the footrest.

◆ Make sure that the footrest is attached firmly by pulling and pushing it.

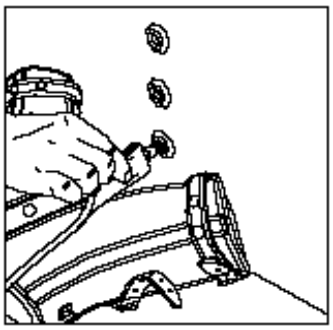
◆ Position the patient in the prone or supine position with the feet resting against the footrest.

◆ Place the foot holder closely around the ankles of the patient.

◆ Tighten the straps.



- Push the triangular locking tab on the back of the footrest down and hold it firmly.



- Insert the metal spigot of the foot holder in the hole of the appropriate footrest that will enable the patient to lie quietly and relaxed.
  – The heels or toes of the patient should lie lightly on the tabletop.
- Release the locking tab.
- Check the locking of the foot holder by pulling on it.

Ensure without fail that the metal spigot of the foot holder is locked in the footrest.

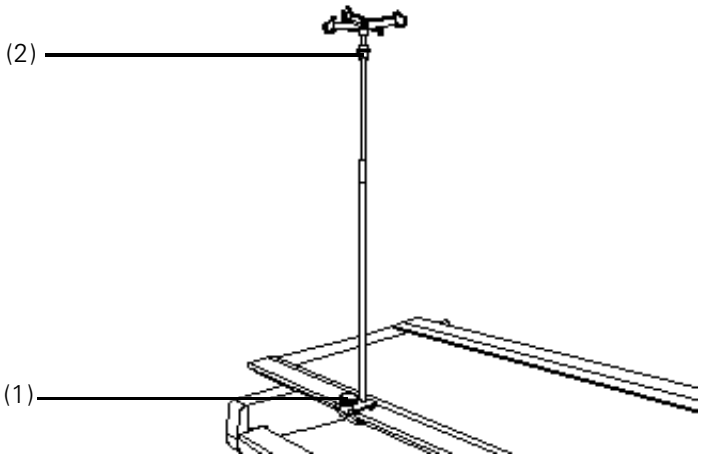
Instruct the patient to hold the handgrips firmly during this examination!

Removal

✓ The patient table is in the horizontal position.

- Push the triangular locking tab on the back of the footrest down and hold it firmly.
- Pull the metal spigot of the foot holder out of the hole of the footrest.
- Loosen the straps.
- Lift the feet of the patient out of the foot holder.

Infusion bottle holder

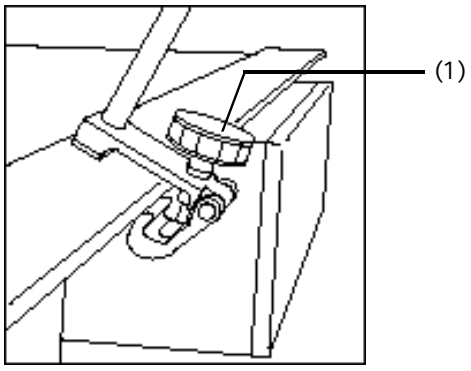


Application

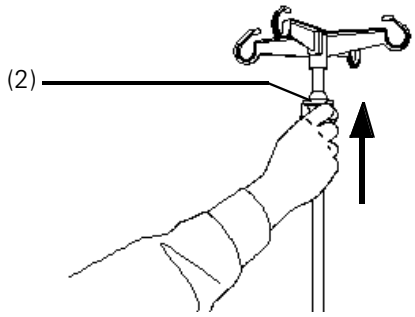
For intravenous therapy or administration of a contrast agent during the radiological examinations.

Attachment

Patient table in horizontal position.



- Loosen the cap screw (1).
- Position the infusion bottle holder (IV holder) at the treatment position and clip it onto the accessory rail or slide it onto the accessory rail.
- Tighten the cap screw.
- Push and pull on the IV holder to ensure it is seated properly.
- Hang one or more IVs on the loops.



- To set the height of the IV holder push the fixing ring (2) at the removable upper section of the IV holder upward (as shown above) and move the upper section to the desired height.
- To fix the height just release the fixing ring (2).
- Ensure that the height-adjustable rod is seated properly and secure.

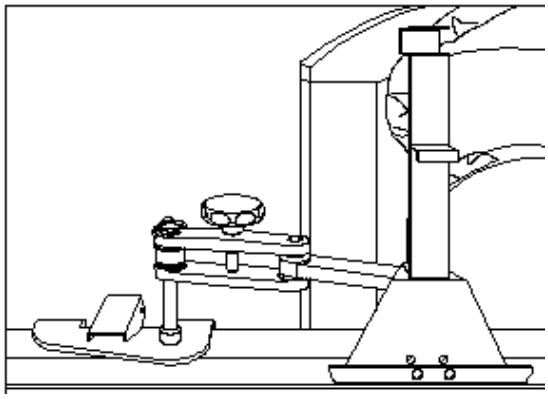
The IV holder can be used in system positions up to ± 20°.

Removal

✓ Patient table in horizontal position.

- Remove the IVs.
- Push the fixing ring (2) at the removable upper section of the IV holder upward and move the upper section downward.
- Release the fixing ring (2).
- Ensure that the upper section and extension rod are secured.
- Loosen the cap screw (1).
- Lift the base of the IV holder from the accessory rail or slide it off the accessory rail.

Cassette holder, with retainer



Application

❏ For lateral exposures with a second X-ray tube;

❏ To hold the cassette upright in all table positions, including Trendelenburg.

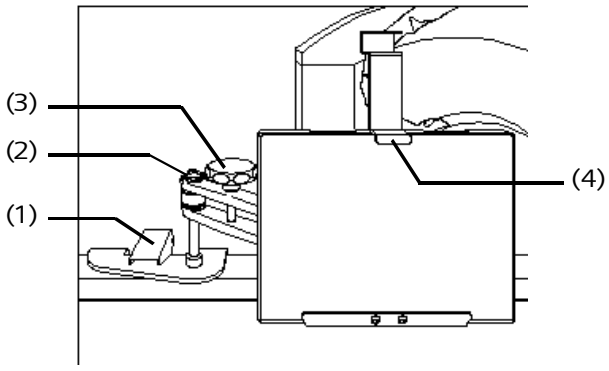
Maximum cassette format 35 cm in height, width is unrestricted, for example 35 cm x 43 cm horizontal is possible.

Minimum cassette formats 13 x 18 cm vertical or 18 cm x 24 cm horizontal.

Attachment

✓ Patient table in horizontal position.

◆ Position the patient.



◆ Open the clamping lever (1).

◆ Place the cassette holder on the accessory rail and move it to the exposure position.

◆ Close the clamping lever (1).

◆ Push and pull the cassette holder to ensure that it is seated properly.

- ◆ Lift the tensioning device (4).
- ◆ Place the cassette on the lower holder.
- ◆ Slide the tensioning device downward.
- ◆ Ensure the cassette is seated properly in the holder.
- ◆ Loosen the cap screw (2) to permit adjustment of the height and the cap screw (3) to permit lateral adjustment.
- ◆ With the patient positioned for the examination, adjust the height and lateral tilt of the cassette.
- ◆ Tighten the cap screws (2) and (3).
- ◆ Ensure that the patient is stabilized and comfortable.

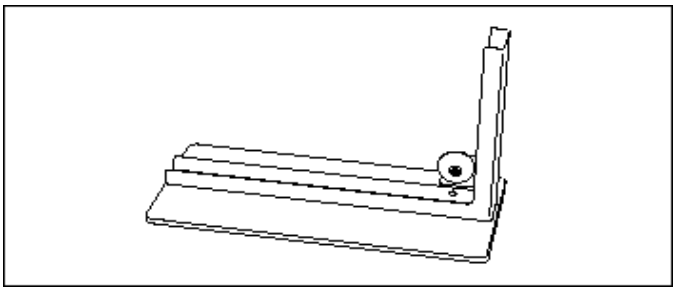
Have the patient place the hands on the protection strip, the handgrip rail, or the handgrip, depending on the type of examination. This will increase the feeling of security of the patient during the examination.

Removal

✓ Patient table in horizontal position.

- ◆ Hold the rail for height adjustment.
- ◆ Loosen the cap screw (2).
- ◆ Lift the rail for height adjustment.
- ◆ Tighten the cap screw (2).
- ◆ Open the clamping lever (1).
- ◆ Remove the cassette holder from the accessory rail.
- ◆ Assist the patient in stepping down from the patient table.

Cassette holder without retainer



Application

- For lateral exposures with a second X-ray tube;
- To hold the cassette upright with the tabletop in the horizontal position
- For all cassette formats, horizontal and vertical.

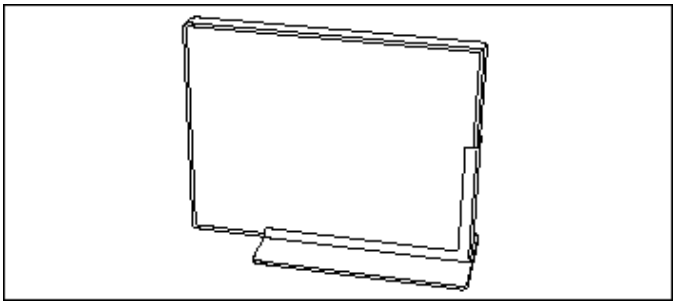
Attachment

✓ Patient table in horizontal position.

Use this cassette holder only if the patient table will remain in the horizontal position throughout the entire examination. The cassette holder will fall if the patient table is tilted.

Observance of this recommendation will prevent potential injury to the patient or personnel as well as equipment damage.

- Position the patient.
- Ensure the patient is comfortable and stabilized.



- Slide the cassette into the bracket of the cassette holder.
- Ensure that the cassette is seated properly in the holder.
- Position the cassette holder on the tabletop at the patient in the location appropriate for the examination.
- Ensure that the cassette holder is stable

Have the patient place the hands on the protection strip, the handgrip rail, or the handgrip, depending on the type of examination. This will increase the feeling of security or the patient during the examination.

Removal

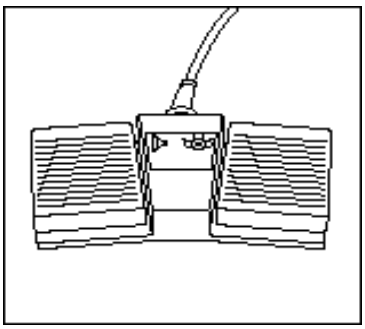
- Remove the cassette from the bracket of the cassette holder.
- Remove the cassette holder from the tabletop.
- Assist the patient in stepping down from the tabletop.

Footswitch for fluoroscopy and exposure

The load on accessory rails should not exceed 70 N (7 kg).

Rails could be damaged by too strong a pressure and proper seating of the accessory or auxiliary device can no longer be guaranteed.

Do *not* exert any torque on the multileaf collimator or its rails when inserting the accessory or auxiliary device.



Application

For releasing radiographic or fluoroscopic exposures during tableside examinations.

Caution

Persons stepping accidentally on the footswitch

Unwanted radiation

- Avoid stepping accidentally on footswitch, especially during interventional procedure.

Attachment

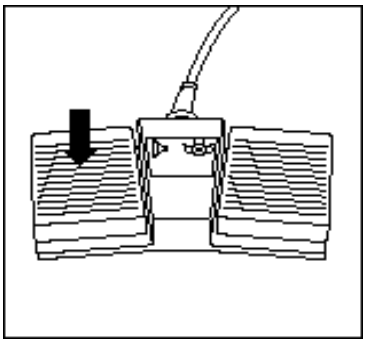
The footswitch is connected to the system at installation of the system by the Siemens Service technician.

Route the cable carefully to avoid safety hazards (for example tripping).

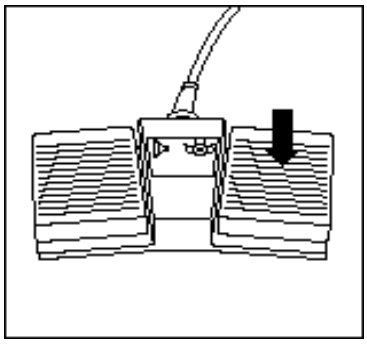
Do not permit the wheels of transport devices such as carts and wheelchairs to run over the pedals of the footswitch assembly.

– Such an action can cause inadvertent radiation release.

Ensure proper radiation protection.



Releasing radiography



Releasing fluoroscopy

Releasing radiography

- Step on the left pedal (footswitch for radiography).
- Continue pressing down on the pedal until the exposure has ended.
  – The exposure has ended when the radiation ON indicator on the system control console goes out.
- Stop pressing down on the pedal.

Releasing fluoroscopy

- Step on the right pedal (footswitch for fluoroscopy).
- Continue pressing down on the pedal as long as fluoroscopy should be released.
- Stop pressing down on the pedal.
  – Fluoroscopy release ends.

Removal

Depending on the frequency of use, you can leave the footswitch attached, or disconnect it after the examination.

- Turn the locking ring on the cable plug to the left.
- Remove the plug from the receptacle.
- Roll up the footswitch cable.
- Store the footswitch and cable in an appropriate location.

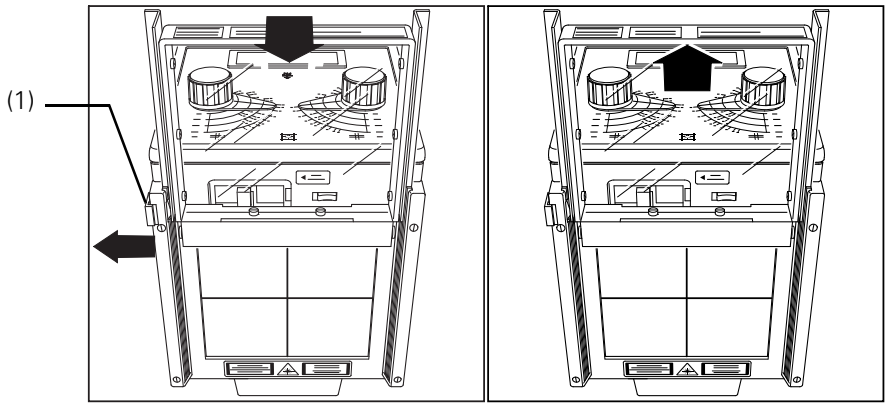
Dose measuring chamber

Caution

Incorrectly mounted dose measuring chamber

Risk of injury by measuring chamber falling down

- Ensure that the dose measuring chamber is firmly attached.



Inserting

- Push the safety lever (1) outwards.
- Insert the filter into the two collimator accessory rails and slide it up to the stop (left above).
  – The safety lever in the left rail springs to the right.
- Check that the filter is held firmly in place by pushing and pulling it.

Removal

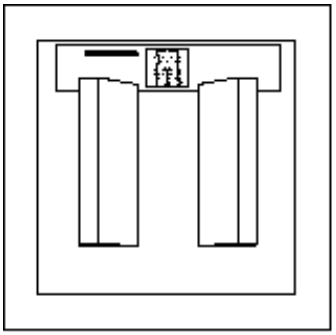
- Push the safety lever on the left accessory rail outwards.
- Pull the filter out of the collimator accessory rails (left above).
  – The safety lever in the left rail springs to the right.

Compensation filters

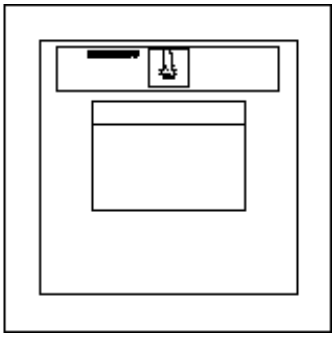
Application

Absorption compensation for acquisitions of:

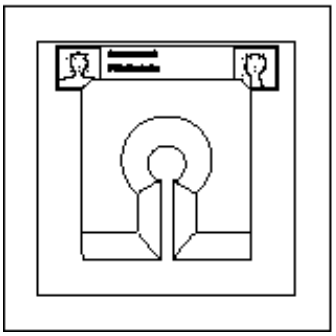
- ❏ Pelvis
- ❏ Foot
- ❏ Infant skull
- ❏ Adult skull
- ❏ T-spine, L-spine
- ❏ Shoulder



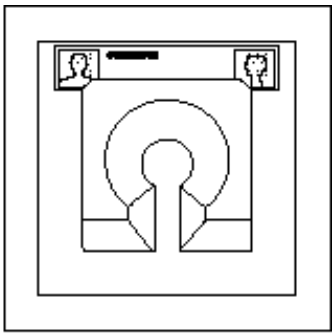
Compensation filter for pelvis



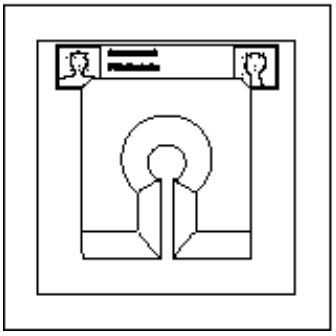
Compensation filter for foot



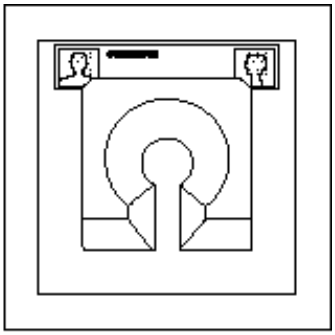
Compensation filter for infant skull



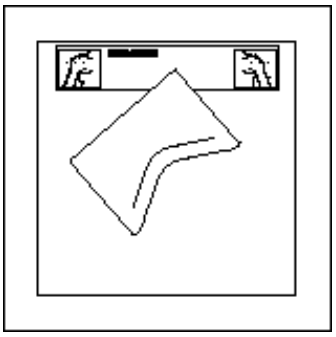
Compensation filter for adult skull



Compensation filter for thoracic spine, lat.



Compensation filter for thoracic or lumbar spine, lat.

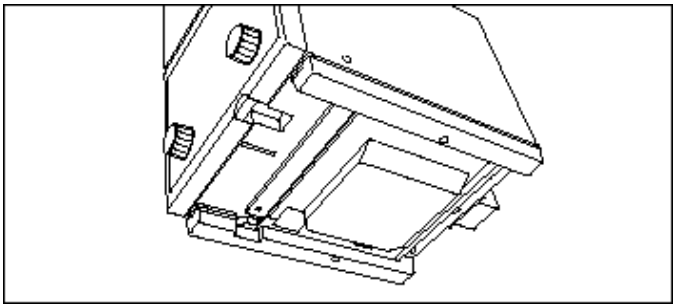


Compensation filter for shoulder

Attachment

The operating personnel has to take care that the filters are attached appropriately.

- Push the filter with the aluminum part *downwards* into the two accessory rails of the multileaf collimator.
  – The safety spring in the left rail is pushed beside in this case.
- Push the filter up to the stop.



The load on accessory rails should not exceed 70 N (7 kg).

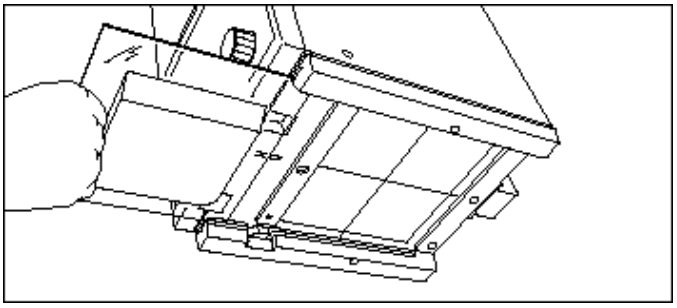
Rails could be damaged by too strong a pressure and proper seating of the accessory or auxiliary device can no longer be guaranteed.

Do *not* exert any torque on the multileaf collimator or its rails when inserting the accessory or auxiliary device.

If you exert too strong a pressure on the accessory rails, you might have to change the settings of the RHA because of a change in the position of the tube assembly.

Removal

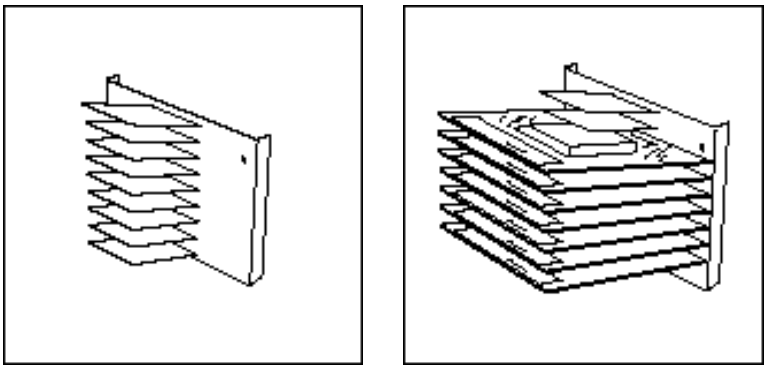
- Pull filter out of the accessory rails of the multileaf collimator
  – The safety spring in the left rail has to be pushed beside in this case.



- Keep filter secured in the holder.

Please be careful when handling the compensation filters. They are thin, scratch-sensitive, and may become unusable due to rough handling.

Filter holder for eight filters



Application

For storing a maximum of eight compensation filters.

Fastening the wall holder

- Have the holder fastened to the wall at working height at a suitable place with the enclosed wall plugs and screws.

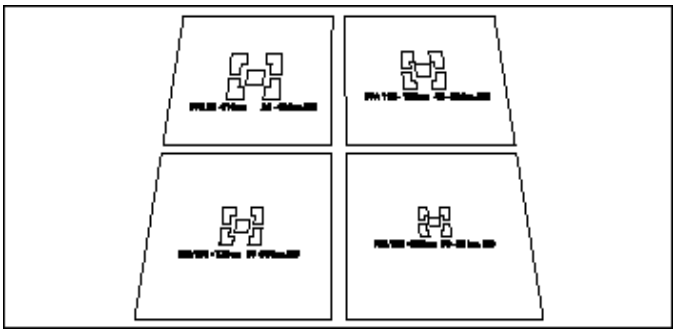
Equipping the wall holder

- Remove compensation filters from the packaging.
- Turn the filter so that you can read the designation on the filters reading normally from above.
- Place the filters in the upwards angled compartments.

Storing the compensation filter

- Place the filter in a free compartment of the wall holder, turn the filter so that you can read the designation on the filter reading normally from above.

Three-field template, set



Application

For showing the IONTOMAT ionization chambers on the object to be exposed.

The three-field templates are available as a complete set or individually for the following SIDs:

- ❏ 90 cm - 110 cm
- ❏ 110cm - 130cm
- ❏ 130cm - 175cm
- ❏ 175cm - 220cm



Caution

Incorrect patient orientation

Image without diagnostic value

- ◆ Make sure you use the correct three-field template for the SID used.
- ◆ Ensure that the three-field template is correctly attached.

Attachment

- ◆ Push the locking lever on the left accessory rail to the left.
- ◆ Slide the template into the collimator accessory rail in the correct direction for exposing the ionization chamber.
  – The locking lever on the accessory rail springs to the right.
- ◆ Check that the template sits firmly in the collimator.
- ◆ Expose the ionization chambers. To do so, switch on the light of the collimator.

Removal

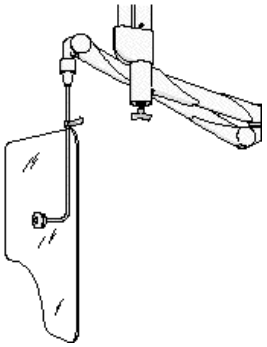
- Push the locking lever on the left accessory rail to the left.
- Pull the template out of the accessory rails.
  – The locking lever on the accessory rail springs to the right.

Store the three-field templates in a suitable location.



Please be very careful with the three-field templates. They are thin, sensitive to scratching and can become useless if handled carelessly.

Radiation protection for the upper body



Application

The radiation protection window is used to reduce exposure of the upper body of the examiner to scattered radiation. It is especially designed to decrease the exposure of the eyes and thyroid of the examiner to radiation.

The radiation protection window can be moved in any direction.

The upper body radiation protection is not suitable for supporting loads! This means, it is not suitable for carrying any additional weight.
This could pull down the upper body radiation protection.

Do not hang any objects on it.

During unit movements, especially swiveling movements, there is a risk of collisions and damage (could break off and fall down).

Watch out for possible collisions while performing unit movements.

Lead equivalent The lead equivalent value is 0.5 mm (according to EN61331-3:1999).

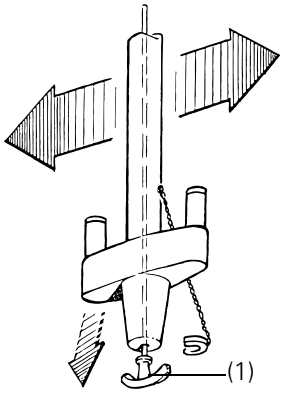
Cleaning and disinfection

- Clean a slightly soiled lead glass pane with a lukewarm detergent solution and a soft cloth.
- Wipe off heavy dirt and grime with a linen cloth moistened with alcohol and then rinse with clear water.
- Remove blood spots best of all with cold water.
- Remove contrast medium spots best of all with warm water.
- Use a disinfectant commercially available for medical use to disinfect the radiation protection device. Then wipe it off with clear water.

Sterile cover Both window designs can be provided with sterile covers; contact your Siemens sales representative.

Positioning

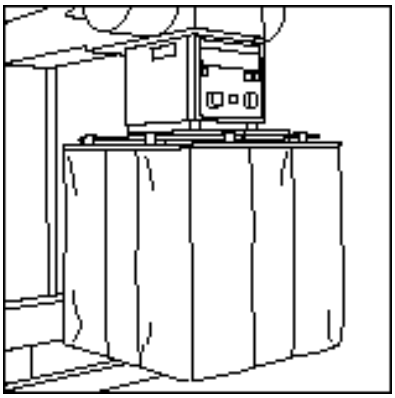
The radiation protection device can be moved along the ceiling rail:



- Pull down and turn the brake handle (1).
  – You can move the carriage freely in the ceiling rail.
- Move it to the required position.
- Release the brake handle.
- Position the radiation protection window so that it protects the eyes and thyroid of the examiner.

For patient positioning and when not in use, the upper body radiation protection should be positioned outside the swivel range of the system.

Radiation protection, removable



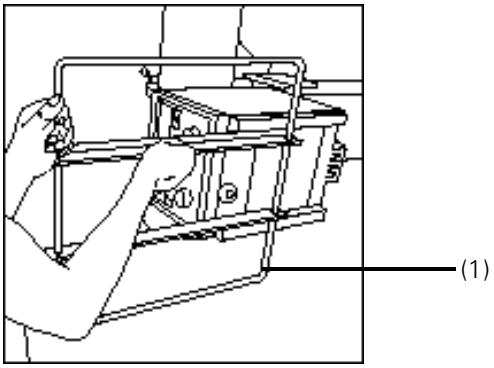
Application

Additional radiation protection in tableside examinations, for example interventional radiography.

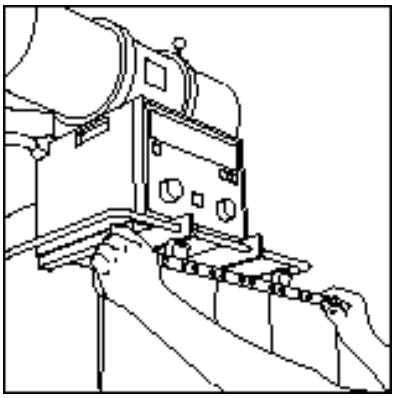
Use this radiation protection only with the tabletop practically horizontal up to max. ±10°. At a greater tilt there is a danger that the lead-rubber aprons will slip off and drop on the sterile covered patient.

Attachment

Recommendation Set the examination unit horizontal and lower the table to minimum height.



- Push the bar (1) into the upper groove of the accessory rails up to the stop.
  – When in position in the stop, a spring lever in the left profile rail engages in a notch of the bar.
- Check for the firm seating of the bar on the collimator.



- Be sure to set the examination unit horizontal (± 10°)!
- As required hook a lead-rubber apron on the front bar of the holder.
- Hook the second lead-rubber apron according to the position of the examiner on the left or right bar.

Do *not* exceed the maximum permissible additional weight of 70N or 7kg. This means that at the most two lead-rubber aprons may be hooked onto the bar.

Removal

- Unhook the lead-rubber aprons from the bars after one another and carefully place them on the side (do not kink them).
- Pull the bars out from the accessory rails of the collimator.
- Store the accessory in a suitable place.

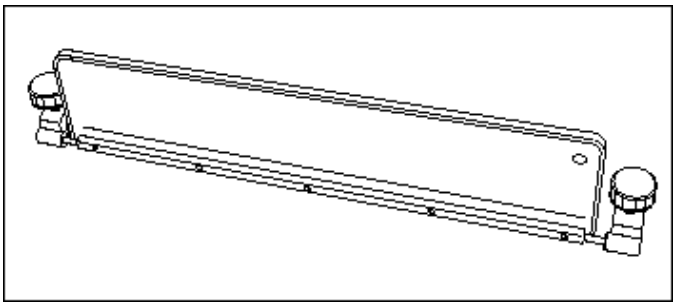
The lead-rubber elements of this accessory are inserted in welded plastic pockets. These pockets are riveted with the rails.

The plastic pockets can be cleaned easily with mild dish-washing liquid solutions.

Radiation protection value

The lead equivalent of the double-layer lead-rubber apron is 0.5 mm Pb at 80 kV.

Radiation protection, lateral

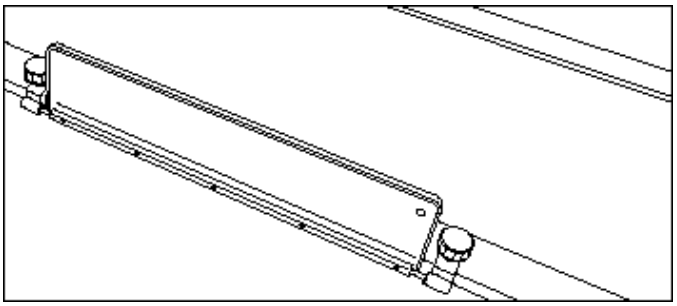


Application

For additional radiation protection during tableside operation of exposures

Attachment

- Move the patient table to the horizontal position.
- Position the patient.
- Loosen the right and left cap screws on the lateral radiation protection.

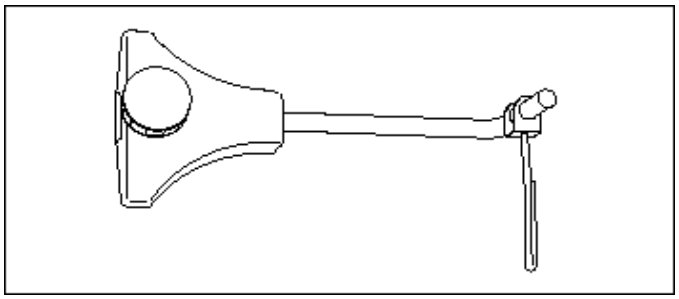


- Insert the radiation shield in the front accessory rail and slide it to the appropriate work position.
- Tighten both cap screws.
- Push and pull on the radiation protection to ensure it is seated properly.
- Tilt the radiation protection into a protective position.
  – The radiation shield can be tilted inward on the accessory rail as well as outward and completely down.

Removal

- Move the patient table to the horizontal position.
- Tilt the radiation protection to the vertical position.
- Loosen both cap screws.
- Remove the lateral radiation protection from the front accessory rail.

BABIX Holder



Application

For pediatric examinations using BABIX with the patient table tilted or in the vertical position

Attachment

- Move the patient table to the horizontal position.
- Slide the BABIX holder with the hook along the front or rear accessory rail to the center of the patient table and move it to the exposure position.
- If the table is not in the horizontal position, insert the BABIX holder into the accessory rail, position it, and secure it.
- Tighten the cap screw.
- Pull and push the holder to ensure that it is seated properly.

Tighten the cap screw and ensure it is secure.

Remember that the BABIX holder is the sole means of support for the hanging BABIX. Securing the cap screw properly ensures that the BABIX holder will not slide down the accessory rail, thereby avoiding injury to the patient and equipment damage.

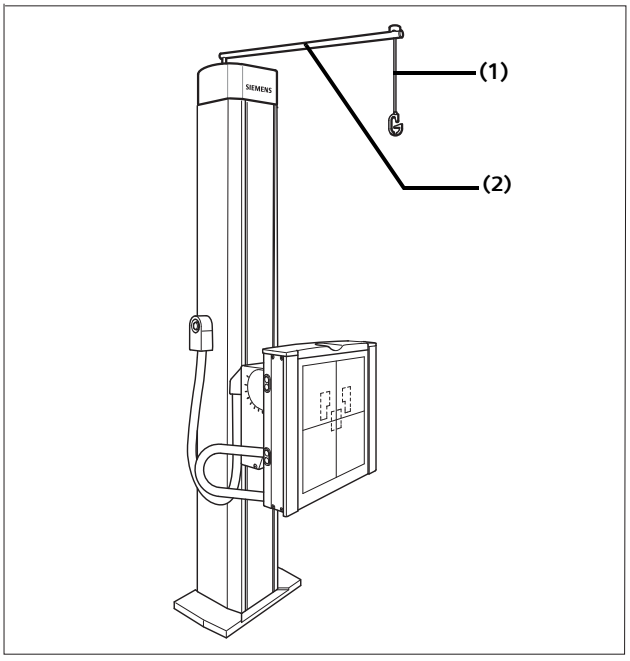
- Bring the BABIX with the secured infant into the examination room.
- Hang the BABIX U-shaped cradle on the hook of the holder and position it for the examination.
- Place the flat BABIX on the horizontal patient table in the examination position.

Maximum load 15 kg

Removal

- Remove the BABIX from the BABIX holder.
- Take the BABIX with the infant out of the examination room and attend to the infant.
- Loosen the cap screw.
- Remove the BABIX holder from the accessory rail.

BABIX holder



(1) BABIX holder

(2) Support arm

The BABIX holder is mounted with the support arm on the wall stand column. You can be park it either on the left or on the right.

Application

The BABIX holder is used to fasten the BABIX cradle during pediatric examinations of small children. To park the holder, swivel it 180° around its fastening point. The fastening hook slides lengthwise in the support arm. This action makes it possible to position the BABIX cradle at different locations up to right in front of the front panel of the wall stand.



Caution

BABIX holder overload

Risk of damage to the BABIX holder and injury of the patient

- Do not load the BABIX holder at the point of suspension with more than 10 kg.

Caution

Assembly of BABIX holder not correctly done

Injury of persons

- Follow the instructions in the Operator Manual.

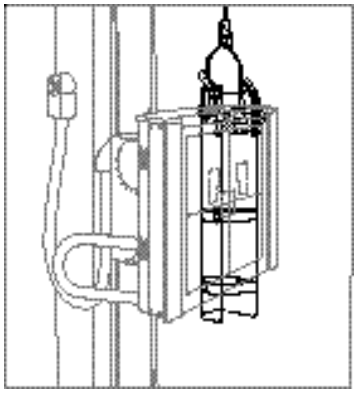
Caution

Insufficient fastening of the BABIX to the wall stand

Risk of injury of the infant due to falling down

- Pay attention that the BABIX cradle is correctly and safely fastened to the wall stand.

- Swing the support arm (2) of the BABIX holder (1) in front of the center of the cassette/detector tray.
  – The BABIX holder is now ready to hook up the BABIX cradle.
- Check the BABIX holder (1) for firm attachment at the support arm (2) by pulling or pushing it.
- Check the tractive force as well as screws and other fixing devices of the BABIX holder (1) at the support arm (2) for their stability and loading capacity.

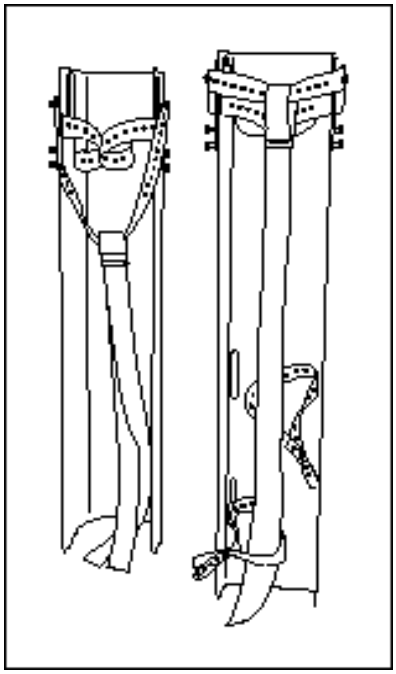


- Hook the bow of the BABIX cradle in the hook of the BABIX holder.

BABIX

The BABIX are made of transparent, radiolucent plastic.

They are available in two shapes:



- Secure the infant above and below the knees through the slit in the back of the cradle.
- Secure the infant in the abdominal region through side slits.
- Use the rubber or Velcro tapes provided for immobilizing the infants.

Restriction The BABIX are not suitable for use in magnetic resonance tomography.

Application

BABIX, U-shaped, 700mm Pediatric examinations with the patient table positioned upright or horizontal in which the body of the child must be firmly enveloped in a straight posture.

There is a danger of rolling away when placed down on the horizontal table.

BABIX, flat, 700 mm This shape is suitable for pelvic and spinal examinations. The flat cradle can be placed safely on the table in the horizontal position.

Attachment

- Position the BABIX holder.
- Check that the BABIX holder is securely attached.
- Hook the BABIX on the hook of the holder and align it for the exposure.



Caution

Insufficient attachment of BABIX straps

Injury to the infant by falling out

- Make sure the infant is secured properly with the straps of the BABIX.



Caution

Insufficient fastening of the Babix harness belts

Risk of injury of the infant due to falling or dropping down

- Pay attention to the correct and secure fastening of the belts.

Removal

- Remove the BABIX from the holder.
- Take the BABIX with the infant out of the examination room and attend to the infant.
- Hang the BABIX on the corresponding BABIX retainer and store appropriately.

Radiation protection value The attenuation equivalent of the BABIX is $\leq$ 1.6 mm Al.

Permissible load 10 kg

Information on the possibility of wear

In addition to Part **Safety**, please note the following information concerning the possibility of wear on **BABIX** and their **immobilizing straps**.

- ❏ After prolonged use, cracks may form in the PVC plastic material.
- ❏ The immobilizing straps may show wear.
- ❏ Following a visual check, replace the defective parts, if necessary, or dispose of the entire BABIX.
- ❏ The tensile/shear strength of the welded chains, brackets and fittings has been designed so as to ensure a safety factor of 20.
- ❏ If any external damage can be seen on these parts, replace them.

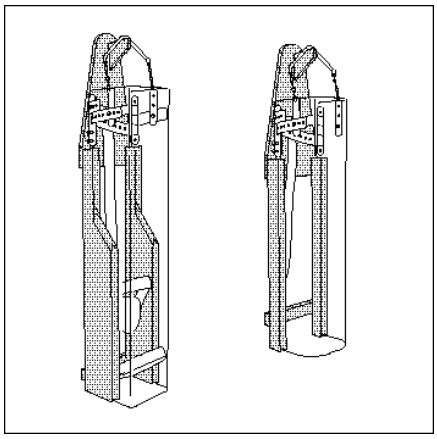
Cleaning

The BABIX can be cleaned using commercially available detergents and disinfectants.



Do *not* use chemical-based solvents!

BABIX retainer, for U-shaped or flat BABIX



Caution

Unintentional activation of the compression device during attachment of the pediatric cradle.

Risk of collision between compression device and the infant in the cradle

Risk of personal injury and property damage

- Do not use the compression device while using the pediatric cradle.

Application

Pediatric exposures in sitting cradles

Attachment

- Set the tabletop horizontal and if possible move it into its working position.
- If a mattress is on the tabletop, remove it.

Because of its weight, we recommend that two persons carry the cradle holder to the tabletop and set it down there. It is also mounted more easily by two persons.

- Position the cradle holder on the table.
  – The two stop pins (1) on the front and back of the mounting rail must project parallel to the edges of the front and back accessory rail.

Removal

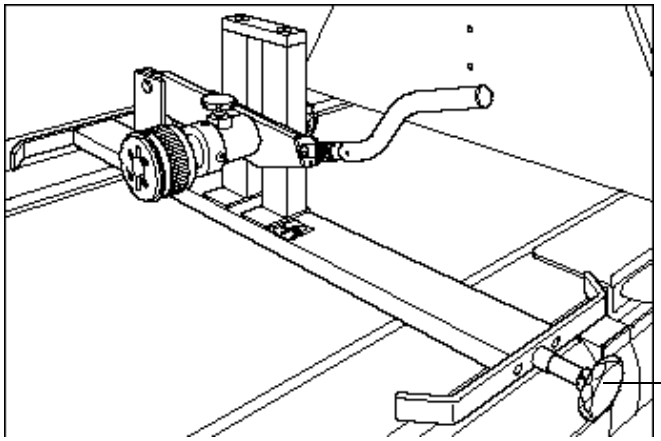
- Carefully pull the BABIX out of the groove of the BABIX retainer.
- Hold the BABIX securely.
- Lift the BABIX off the wooden hook of the retainer.
- Place the BABIX on a safe supporting surface.
- Carefully place the child in the BABIX in a comfortable position.
- Secure the child in the BABIX.
- Check to make sure the child is correctly and safely positioned in the BABIX.
  – Take the child into the prepared X-ray room.

Storing

- Remove the child from the BABIX and attend to its needs.
- Hang the BABIX on the wooden hook with the opening in the BABIX facing the retainer.
- Press the two longitudinal sides of the BABIX into the grooves of the retainer.
  – Check to make sure that the BABIX is securely seated in the retainer.

Manual holder for pediatric cradle

Ensure without fail that the two stop pins are located directly next to the outer edges of the front and back accessory rail. Under no circumstances, may they stand on the accessory rails. The cradle holder does not stand securely in this case and cannot be mounted. It could tilt over or drop down. In this way, you avoid possible injury of persons and material damage.



◆ Tighten the cap screw (2).

Please tighten the cap screws firmly.

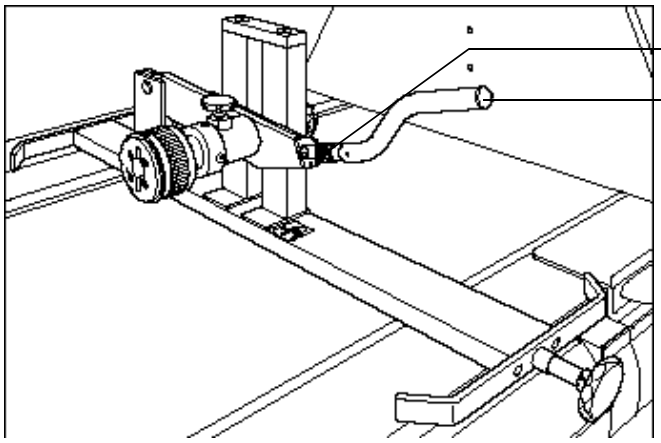
– Apart from the clamp, there is no further fastening or securing for the cradle holder.

For certain examinations, the tabletop together with the cradle holder is tilted up into the +90 ° position.

With the correct attachment of the cradle holder and the cradle, you avoid the cradle holder dropping down. Thus you avoid possible injury of persons and material damage.

◆ Check the firm location of the cradle holder by pulling and pushing.

Setting the handle



It is possible to set the handle (3) of the cradle holder at three working heights.

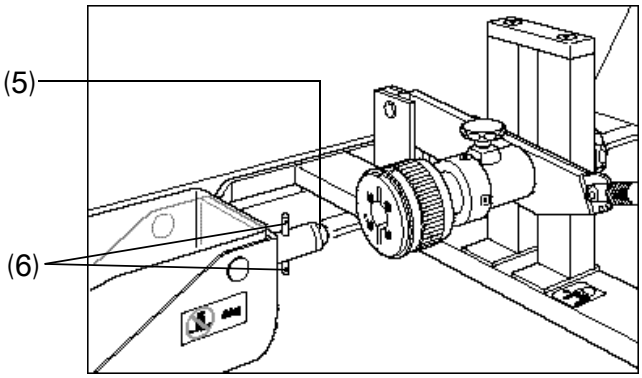
- Set the handle to the working height which is suitable for you before fastening the sitting cradle.
  – That simplifies raising and lowering the cradle.
- Pull the knurled ring (4) to the front against the spring tension and hold it tight.
- Raise or lower the handle to its working height.
- Let the knurled ring snap into one of the three grooves.
- Check that the handle is locked by pulling and pushing.

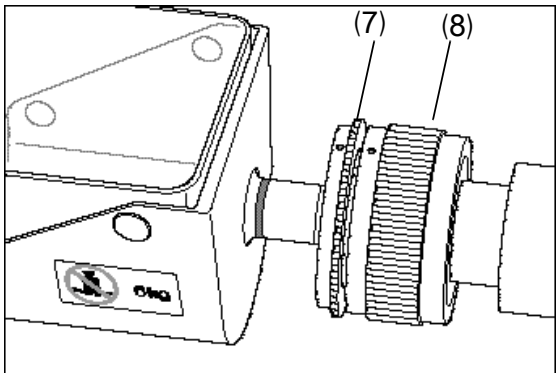
Attachment of the cradle

- Move the tabletop if possible into its working position upwards or downwards.
- Prepare the sitting cradle with the infant outside the examination room. Fasten the infant securely in the cradle.

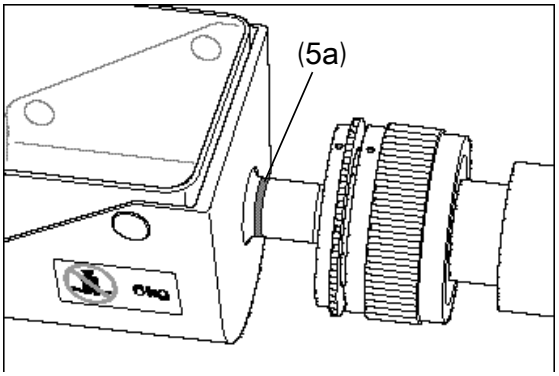
To make your work easier, we recommend that two persons fasten the cradle in the cradle holder and remove it again.

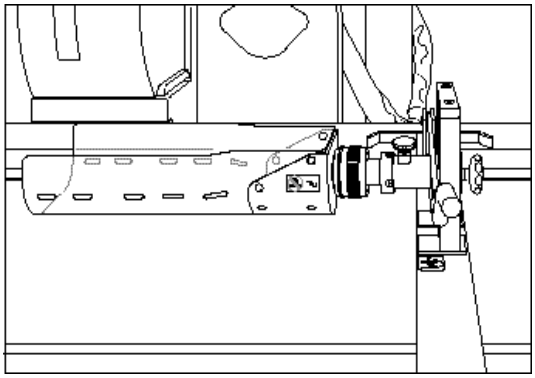
Reason: The sitting cradle together with the infant can weigh up to 18 kg.





- Push the shaft (5) of the cradle horizontally in the round opening of the bayonet closure.
- Fit the two pins (6) in the corresponding openings of the bayonet closure.
  – The red dot on the narrow ring (7) must be located opposite the red dot on the wide knurled ring (8) of the cradle holder.





- Push the sitting cradle up to the stop into the bayonet closure.
  – The red ring (5a) on the shaft of the cradle must be completely vanished.
  – The wide knurled ring turns to the left in this case and springs back into its basic position.
  – The red dot on the narrow ring (7) must be located opposite the red dot on the wide knurled ring (8) of the cradle holder.



Caution

Pediatric cradle is not inserted correctly in the cradle holder.

Cradle dropping down onto tabletop

Injury of infant

- Make sure that the pediatric cradle engages correctly in the bayonet closure.
- Check that the cradle is locked in the holder by pulling and pushing on it.

- Move the sitting cradle with the tabletop into the exposure position.

Raising, lowering, and turning the cradle

Caution

Turning, raising, and lowering the cradle.

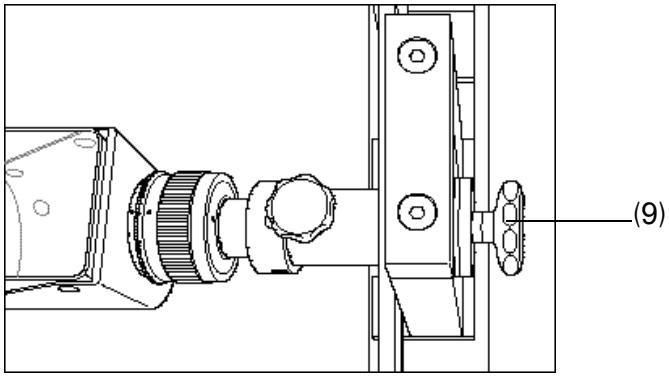
Risk of cradle dropping down onto tabletop or touching the tabletop

Risk of personal injury (for example, squeezing of hands)

- Be careful when raising, lowering and turning the cradle.
- Follow the instructions in the Operator Manual.

Raising and lowering the cradle

You can adjust the distance of the sitting cradle from the tabletop continuously.



- Hold the handle firmly.
- Loosen the knurled ring (9) on the back of the cradle holder.
- Raise or lower the sitting cradle with the handle into the examination height.
- Tighten the knurled ring firmly.

Please tighten this knurled ring firmly. Except for this clamp, there is no further fastening or securing for the cradle.

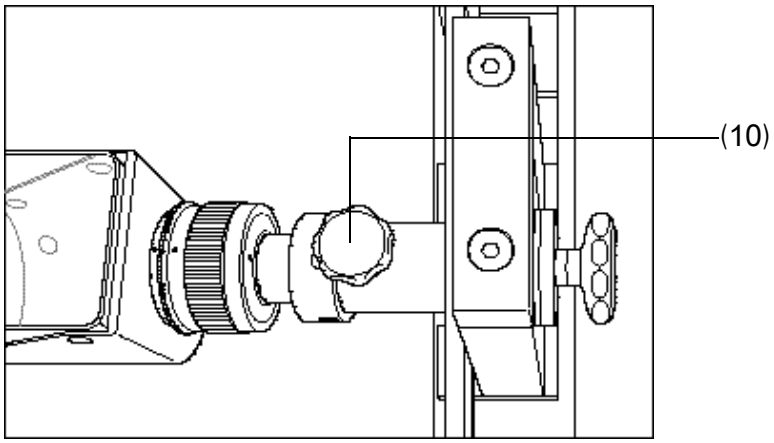
By correctly tightening the knurled ring you avoid the cradle dropping down onto the tabletop and thus possible injuries of persons and material damage.

- Check the secure location of the cradle in the holder by pulling on it.

Turning the cradle

You can turn the cradle manually by 360° to the right (back) or to the left (front).

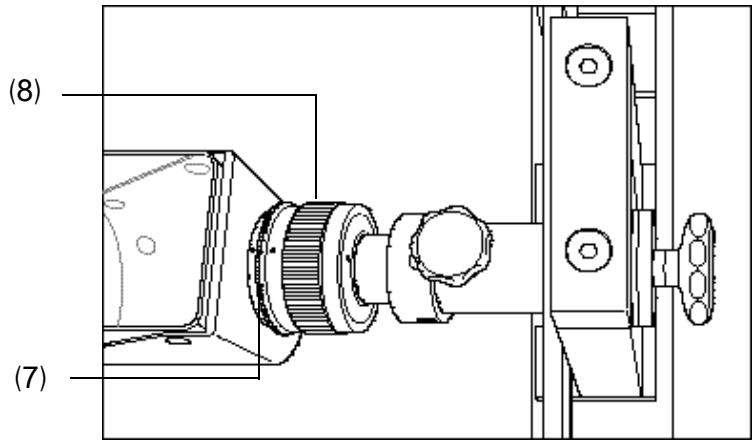
Please take care that the cradle in the holder is in a height above the tabletop which enables the cradle to be turned without touching the tabletop. You thus avoid possible injury of persons and material damage.



- Loosen the knurled screw (10).
- Turn the cradle to the right (back) or to the left (front) into the examination position.

Please take care that the infant is strapped safely in the cradle.

Removal of the cradle



We recommend that two persons both fasten and also remove the sitting cradles.

- Hold the cradle firmly.
- Turn the wide knurled ring (8) together with the narrow knurled ring (7) on the bayonet closure to the left (front) and hold it.
- Pull the cradle about 4 cm to the left up to the stop and release the wide knurled ring.
  – The wide knurled ring then turns to the left.
  – The red dot on it springs back into the basic position.
  – The red dot on the wide knurled ring (8) now stands again opposite the red dot on the narrow ring (7) on the cradle.
- Turn the narrow knurled ring (7) on the bayonet closure to the right (back) and hold it.

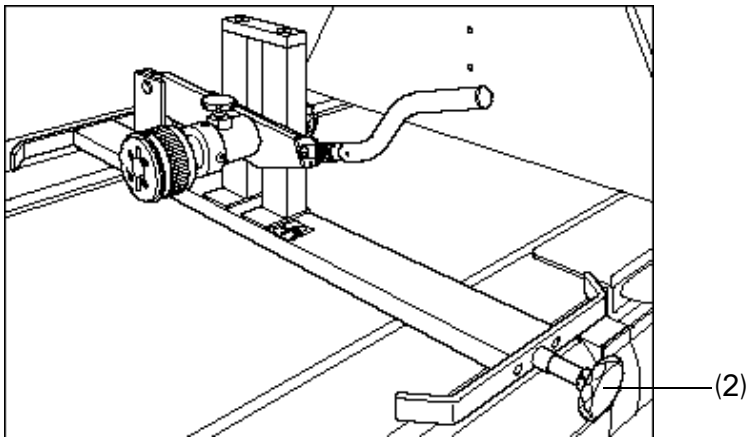
The cradle is now inserted unsecured in the bayonet closure. Hold the cradle firmly with both hands before you withdraw it completely from the cradle holder. In this way, you prevent the cradle tilting down or dropping onto the tabletop and thus possible injury of persons and material damage.

- Withdraw the sitting cradle completely from the cradle holder.
- Remove the sitting cradle with the infant from the X-ray room.
- Loosen the retaining straps, lift the infant out from the cradle and care for it.

For safety reasons, may you under no circumstances dismantle the complete holder with infant and cradle!

Removal of cradle holder

- Set the tabletop horizontal.
- If possible move the tabletop into a height suitable for lifting the cradle holder down.



- Loosen the knurled screw (2) completely.
  – The mounting rail is released from the accessory rails.
- If possible, two persons should lift the cradle holder down off from the accessory rails.



Caution

Incorrect removal of cradle

Cradle tilting or dropping down onto tabletop. Injury of infant.

- To remove the cradle follow the instructions in the operator manual.

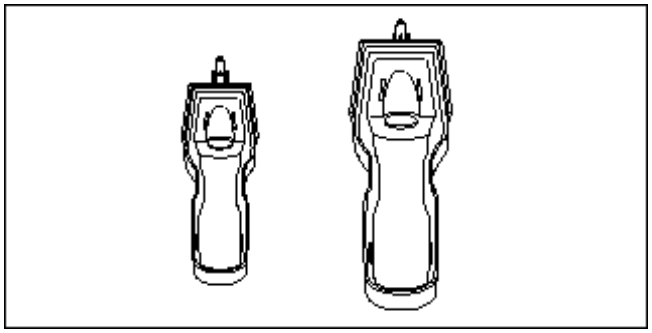
Cradle assortment with Velcro tapes

Application

Positioning aids for pediatric exposures

Sitting cradle, 640 mm

Made of radiolucent, not transparent material



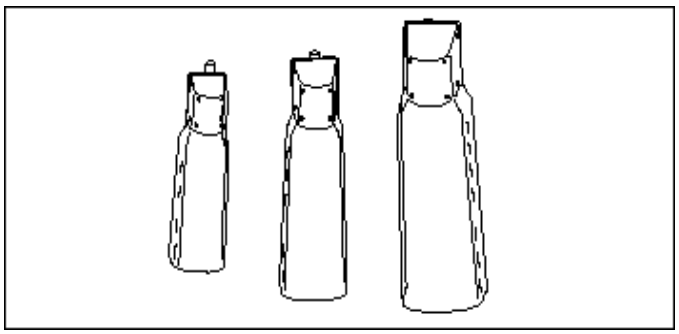
Length	640 mm
Maximum carrying capacity	Up to 13 kg

Radiation protection value

The attenuation equivalent is $\leq$ 0.8-mm Al.

Cradle set

Made of radiolucent, transparent material



Cradle 500 mm

Length	500 mm
Maximum carrying capacity	Up to 6 kg

Cradle 650 mm

Length	650 mm
Maximum carrying capacity	Up to 10 kg

Cradle 800 mm

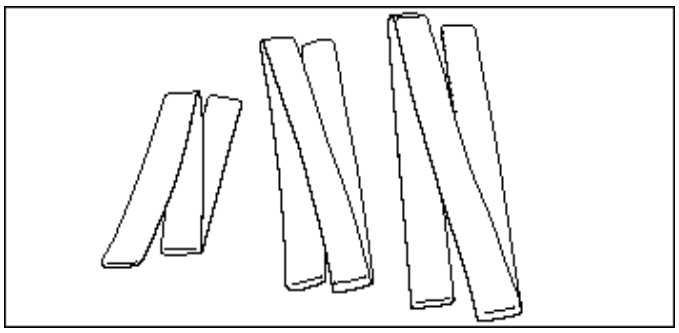
Length	800 mm
Maximum carrying capacity	Up to 15 kg

Radiation protection value

The attenuation equivalent is $\leq$ 0.8-mm Al.

Set of Velcro tapes

Used for secure fastening of infants in the cradles.



Attaching Velcro tapes

- Pull off Velcro tapes of suitable length from the mounting rail.
- Lift a cradle of the correct size from the holder and place it securely on a suitable base.
- Position the infant in the cradle.
- Pull the Velcro tapes through the slots in the cradle.
- Press the Velcro tapes firmly onto one another.
- Check the comfortable position and secure fastening of the infant in the cradle.
- Bring the cradle into the X-ray room ready for the examination.

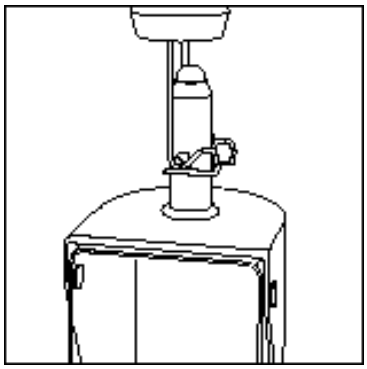
Removing Velcro tapes

- Bring the cradle out from the X-ray room.
- Pull the Velcro tapes apart.
- Lift the infant out from the cradle and care for it.
- Pull the Velcro tapes out from the slots in the cradle.
- Hook the cradle into the holder.
- Check the firm location of the cradle in the holder.
- Fasten the Velcro tapes to the rail.

Storing the BABIX cradle

- Install the holder or the holders for the BABIX cradle at a good working height with the wire hook downwards, for example, on a shelf.
  – The wire hook must be open to the front.
- Take care that the distance between the holders is large enough so that the cradles can hang without touching and can be easily removed or suspended.

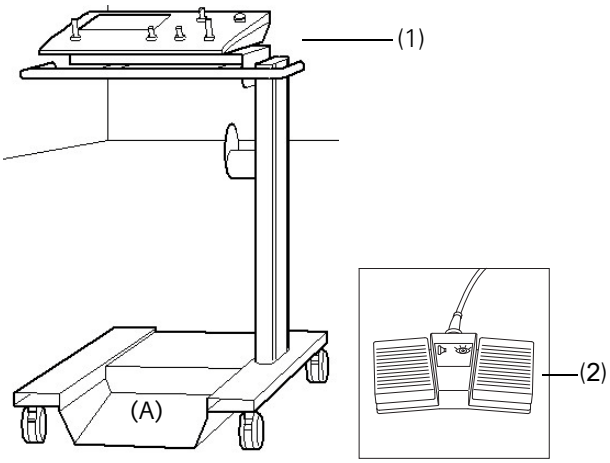
Refer to the suggestion on the following Figure.



Storing the Velcro tapes

Install the fastening rail for the Velcro tapes on the wall at a good working height next to the sitting cradles.

Moveable tableside control trolley



(1) Extended tableside control on mobile stand in the examination room.

(2) The footswitch (2) is placed on the position (A) of moveable tableside control trolley.

→ „Footswitch for fluoroscopy and exposure“ on page 49

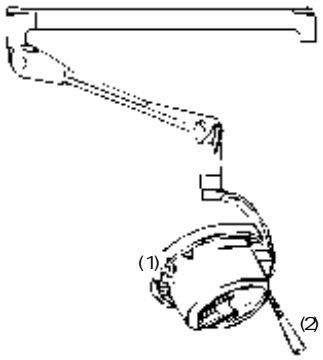
❏ For interventional examinations

❏ Complete unit and system control with joysticks

❏ User interface identical to system control console for Fluorospot Compact
– The footswitch (2) is placed on the position (A) of moveable tableside control trolley.

Do not lean onto the tableside control trolley!

Examination lamps



(1) On/off switch

(2) Turn to adjust beam focus

Application

The examiner light is used to illuminate the puncture point. It is attached to the carriage with a support arm, which can be moved freely in the ceiling rail.

The examiner light may also be mounted on the adapter of the radiation protection for the upper body with a separate support arm.

The light can be dimmed, and the light beam can be focused.

Depending on the system configuration, the light is either turned off by "X-radiation on" or it can be turned on or off using the footswitch.

During unit movements, especially swiveling movements, there is a risk of collisions and damage. Watch out for possible collisions while performing unit movements.

Switching on or off

The examiner light is *not* automatically switched on when the system is switched on. Generally the light is switched on or off directly at the lamp:

Depending on the configuration or installation, the light can be turned on or off during the examination with the footswitch or by radiation on or off.

- Press the on or off switch (1)

Dimming

- Turn the black knob (1).

Focusing the light beam

- Turn the handle (2).

The handle is also available in a sterilizable version.

Injector

Installation

The injector is mounted in different ways depending on the system combination.

- ❏ Can be moved on floor stand, with connection at examination table
- ❏ On the wall with a special wall bracket
- ❏ Injector head ceiling-mounted and mobile on the rails of the radiation protection or permanently attached to a column on an articulated arm similar to the radiation protection holder. The control console is installed in the control room or the examination room.
- ❏ Injector head with holder on the accessory rails of the patient table

Although a system might offer several different possibilities for connecting injectors, only one injector may be connected!

Only use injectors approved by Siemens.

See also the user manual for the *contrast medium injector* for details on installation and injector accessories.

Attachment

The injector is connected to the system by a Siemens Service technician

Trolley UM mobile patient table

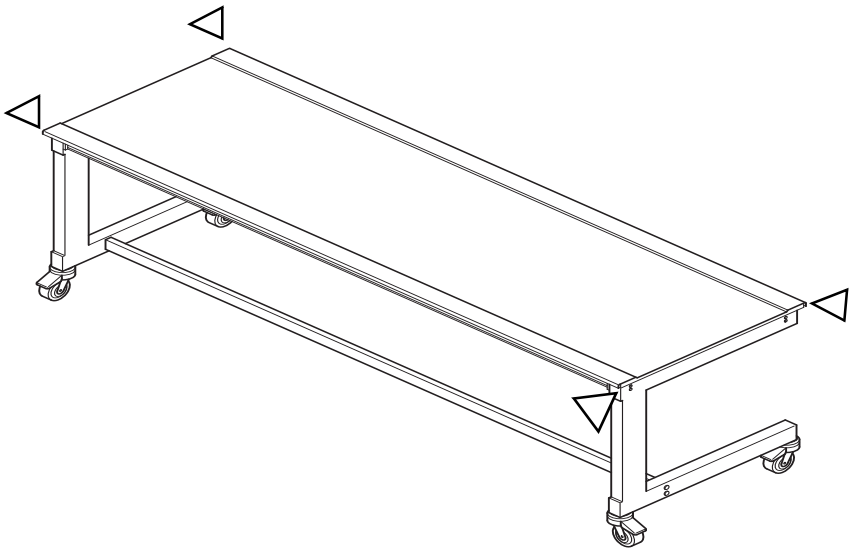
Safety

Risk of crushing

When the equipment is handled properly and when patients are positioned, the staff may only grasp the handles provided with their hands.

It is the responsibility of the operator to initiate movements of the equipment only if it is ensured that neither the patient nor third parties can be endangered by these movements.

The parts of the unit marked in the drawing indicate possible danger zones where the patient or staff coned crush their fingers or be struck.



▽ Risk of injury for the operating staff when placing the table top in position.

Functional and safety check

Daily checks

- Check the unit movement
- Check the brakes
- Check the mobility of the castors
- Check that the necessary devices for patient holding and immobilisation are attached properly to the unit.
- When the castor brake pedal is in locked status, check if the patient table position is locked.

Cleaning and disinfection

Before cleaning and disinfecting the equipment, make sure no liquid can seep into the interior of the equipment.

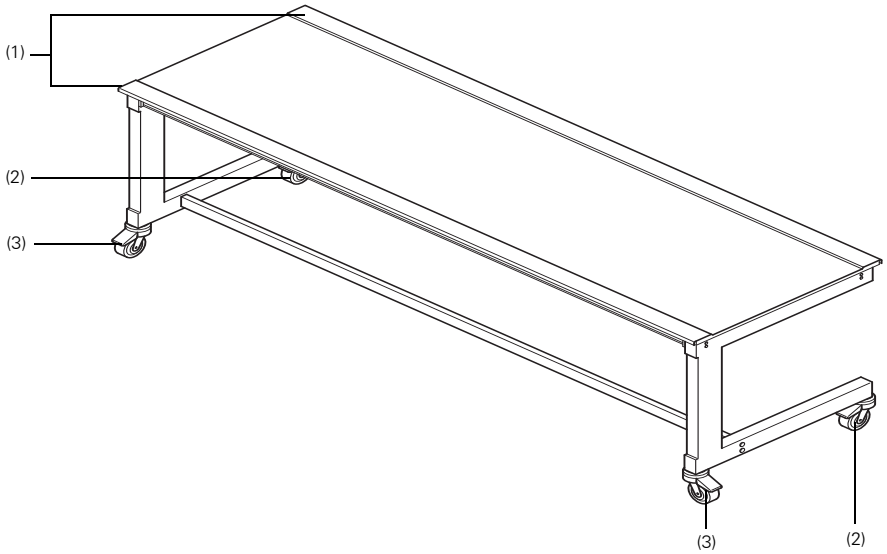
Cleaning

- Do not use water to clean the table, otherwise it might bring rust to the mechanical structure.
- Do not use corrosive, soluble or abrasive cleaning materials for cleaning.
- For sprayed paint, plastic and chromium alloy surface, make sure to use clean and dry soft cloth to wipe clean.

Disinfection

- Disinfect all components of mobile patient table, including accessories, only with a soft cloth soaked in disinfectant.
- Do not use spray disinfectant.

Product description



(1) Accessory rails

(2) Castors without brakes

(3) Castors with brake pedal

Castor brake pedal

To enable the patient table to be fixed at any location, the two castors at the front of the table are equipped with brake pedals (as shown in the picture).

When the patient is moving onto or leaving the patient table, this device can be locked to fix the table position.

Intended use

As a patient supporting device of the X-ray imaging system, Trolley UM mobile patient table can facilitate X ray imaging of the recumbent patient, for instance the examination of stomach and lower limbs.

Product features

- ❏ Wide application scope
- ❏ High reliability
- ❏ Easy mobility of the patient table
- ❏ Table top has high level of X ray permeability and stiffness
- ❏ Large table top facilitates emplacement of patients
- ❏ The thin table top surface can narrow the distance between the cassette and the object to be exposed;
- ❏ By using the brake control device, it is easy to position the patient table.



Trolley UM patient table must not be used to carry patients, it is only to be used as auxiliary supporting device when taking exposures.

When the patient is moving onto or leaving the patient table, the brake pedal must stay locked. Besides, give assistance to the patient, otherwise the table might slide to create hazard.

Operation

Requirements

As a part of the X ray imaging system, the mobile patient table is used for the examination of body parts such as abdomen and lower limbs.

The X ray imaging system must be operated by trained and qualified personnel. In addition, make sure to follow the requirements of relevant laws and regulations during the operating process.

How to operate the patient table

When using the patient table, please follow the steps below. In addition, make sure to avoid collision with X ray cassettes or other devices:

- Before exposure, place the cassette and the tube at the required exposure position.
- Adjust the height of the cassette moving it at pre-set height matching the patient table height.
- Move the table to a position above the cassette, make sure the table cannot collide with the cassette and the post.
- Move the table to an appropriate position.
- Lock both castors and ensure the table is fixed.
- Help the patient onto the bed and adjust the position as required.
- Release the brakes of both castors, move the table to obtain the required exposure position, and then lock the brakes again.
- Switch on the light localizer at the collimator, and prepare the final exposure position.
- Adjust the light field of the collimator and release an exposure.
- Release the brakes on both castors and move the table to a position convenient for the patient to leave the table;
- Lock both castors and help the patient from the table.



When moving the table, make sure to notice and avoid squeezing of hands and similar incidents.

When moving the table, make sure that both the patient and the operating personnel stay inside controllable safety zone.

Before using the table, make sure to remove all nearby objects such as chairs which might collide with the table.

When moving the table, make sure to take care, and avoid bringing any unnecessary harm to patients, operators or other personnel, and also tube and cassette.

Technical description

Technical data

Dimensions	
Table top	2000 mm (± 5 mm) X 660 mm (± 5 mm)
Distance from table top to the ground	700 mm (±10mm)
Usable width of table top between standing posts	1900 mm
Maximum load of the table top	135 kg
Aluminum equivalent of table top	< 0.8 mm Al (according to measurement results based on GB 9706.12(IEC60601-1-3:1994) (100 kV/3.7 mm Al)
Environmental conditions	
Temperature	+10 °C to +40°C
Relative humidity	30% to 70%
Atmospheric pressure	700hPa to 1060hPa

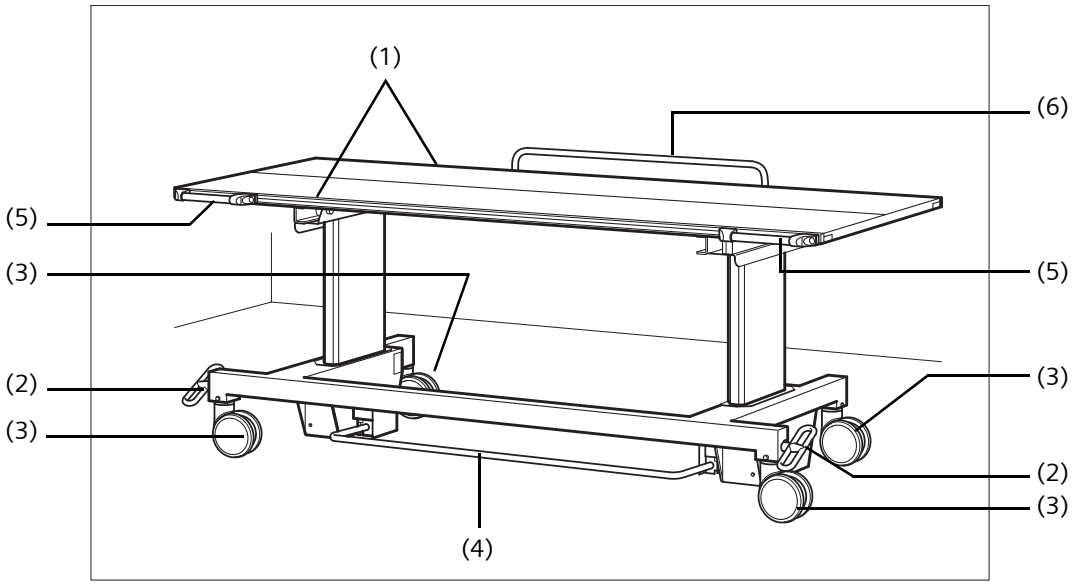
Complying Standards

- ❏ GB 9969.1-1998 General principles for preparation of instructions for use of industrial products;
- ❏ GB/T 191-2000 Packaging-Pictorial markings for handling of goods;
- ❏ YY 0076-1992 Coating classification and technical conditions for metal fabrication;
- ❏ YY 91099-1999 Medical X-ray equipment – Designation, packaging, transportation and storage;
- ❏ YY/T 0291-1997 Environmental requirements and test methods for medical X-ray equipment;
- ❏ YY/T 91055-1999 Paint coating for medical devices-Classification and specification;
- ❏ UL 60601-1, 1st Edition, 2006-04-26 (Medical Electrical Equipment, Part 1: General Requirements for Safety);
- ❏ CAN/CSA-C22.2 No. 601.1-M90, 2005 (Medical Electrical Equipment - Part 1: General Requirements for Safety);
- ❏ IEC 60601-1:1988 + A1:1991 + A2:1995;
- ❏ IEC 60601-1-3 MEDICAL ELECTRICAL EQUIPMENT. Part 1: GENERAL REQUIREMENTS FOR SAFETY ;COLLATERAL STANDARD: General Requirements for Radiation Protection in Diagnostic X-Ray Equipment-Edition 1-Issue date1994/07/01;
- ❏ IEC 60601-2-32 Medical electrical equipment Part 2: Particular requirements for the safety of associated equipment of X-ray equipment-Edition 1-Issue Date 1994/03/01;
- ❏ IEC 60601-1-3 MEDICAL ELECTRICAL EQUIPMENT. PT. 1-3, GENERAL REQUIREMENTS FOR SAFETY – COLLATERAL STANDARD: RADIATION PROTECTION IN DIAGNOSIS X-RAY EQUIPMENT - Edition 2 - Issue Date 2008/01/01;
- ❏ IEC 60601-2-54 Medical electrical equipment –Part 2-54: Particular requirements for the basic safety and essential performance of X-ray equipment for radiography and radioscopy-Edition 1-Revision Date 2010/03/01;
- ❏ AAMI ES60601-1 MEDICAL ELECTRICAL EQUIPMENT, PART 1: GENERAL REQUIREMENTS FOR BASIC SAFETY AND ESSENTIAL PERFORMANCE - Edition 1 - Revision Date 2010/04/01;
- ❏ CSA C22.2 NO. 60601-1 MEDICAL ELECTRICAL EQUIPMENT. PT. 1, GENERAL REQUIREMENTS FOR BASIC SAFETY AND ESSENTIAL PERFORMANCE - Edition 2 - Revision Date 2011/06/01;
- ❏ IEC 60601-1 MEDICAL ELECTRICAL EQUIPMENT PART 1: GENERAL REQUIREMENTS FOR BASIC SAFETY AND ESSENTIAL PERFORMANCE - Edition 3 - Revision Date 2009/01/01

Patient table Prognost XP

This patient table is a mobile easy to move patient table with floating table top for digital or conventional exposures with U/L-arm units.

The open table frame allows fast positioning of the table with the patient on top directly above the corresponding image receptor.



(1) Accessory rails

(2) Parking brakes

(3) Castors

(4) Foot pedal for release of mechanical table brake

(5) Handgrips, short (at user side, two pieces recommended)

(6) Handgrip, long (at receptor side)

Handling

Prepositioning of the table is performed through castors (3).

Parking brakes (2) are operating on two castors and their vertical axis for a sturdy position of the table.

- For exact centering of the patient to the exposure field, release the mechanical brake of the floating table top by foot pedal (4).
- Then, move the table top with patient to the desired position.

Technical data

Table top	Carbon fiber with low attenuation (typical 0.7 mm Al)
Thickness	2.5 cm
Length	200 cm
Width	75.5 cm 65.5 cm
Table height	73.8 cm
Usable width between the columns	112 cm
Table top movement	
longitudinal	± 33 cm
transverse	± 10 cm
Table weight	92 kg
Max. permissible patient weight	150 kg

Mobile Patient Tables Prognost XPE and XPE-Akku

Intended use

The Prognost XPE/XPE-Akku is a patient table for examinations with X-ray units for general radiography in diagnostic human medicine use. It must only be used in medically rooms.



The Prognost XPE/XPE-Akku is not suitable for patient transportation.

Features

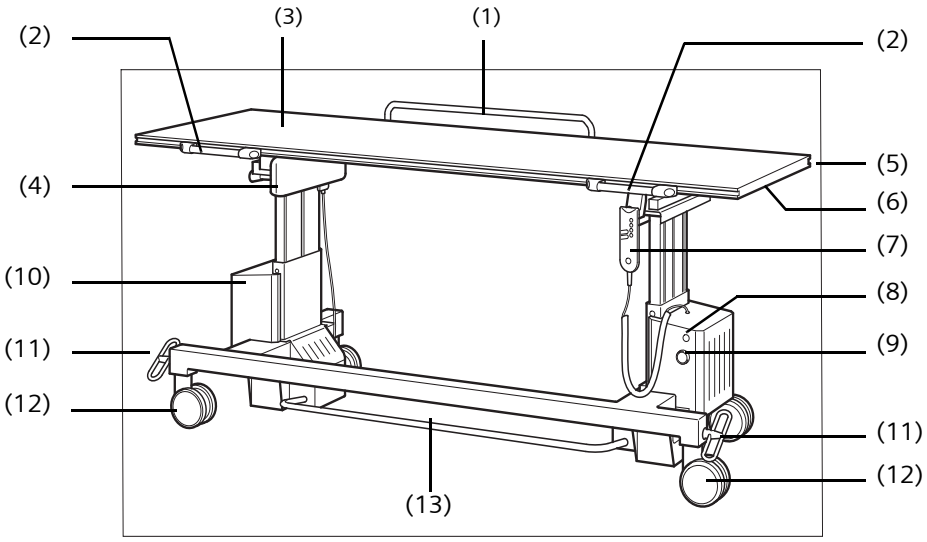
- ❏ Wide range of application
- ❏ Motor driven elevation table for heights from 575 up to 840 mm with smooth start and stop and convenient patient access
- ❏ Automatic stop at pre programmed working heights
- ❏ High reliability
- ❏ Easy movement
- ❏ Floating flat table top, carbon fiber type, high transparency with high rigidity
- ❏ Hand grip, long (at rear side)
- ❏ Hand grips, short (at user side)
- ❏ Large range of table top displacement for convenient patient positioning
- ❏ Minimized table top thickness for short image receptor to object distance
- ❏ Control elements are arranged for easy access
- ❏ Power line independently battery powered usage with two exchangeable accumulator-boxes[1].
- ❏ Separate accumulator-box charging station[1].

[1] For XPE Akku only

Components

- ❏ **Hand grip, long,** mounted on the long side of the table top in order to ease the patients getting on and off
- ❏ **Hand grips, short,** mounted on the long side of the table top in order to ease shifting of the table or of the table top
- ❏ **Fixing mechanism,** left or right mountable, for moving the table around the corresponding elevating column axis
- ❏ **Side edge guard,** for protection of the cassette
- ❏ **Bumper profile,** for rear accessory rail of table top
- ❏ **Protection foil ,** for internal covers
- ❏ **Center stop,** for transverse table top movement

Control elements and indicators



(1) Handgrip, long (at rear side)

(2) Handgrips, short (at user side, two pieces recommended)

(3) Table top

(4) Protection foil

(5) Bumper profile

(6) Side edge guard

(7) Hand-held control including holding device

(8) Indicator lamp (Ready for use)

(9) Emergency stop button

(10) Power supply[1]

(11) Parking brakes for front castors

(12) Front castors (fixable)

(13) Foot pedal for release of mechanical table brake

[1] For XPE-Akku only

Handgrips (1)(2)

The following handgrips are available:

❏ Handgrip, long, for attachment at the rear side of the table top
– Used for the patient to get On and OFF the table top easier.

❏ Handgrips, short, for attachment at user side
– For easier movement of table and table top

Protection foil (3)

The protection foil on internal covers increases the slippage at contact with the cassette.

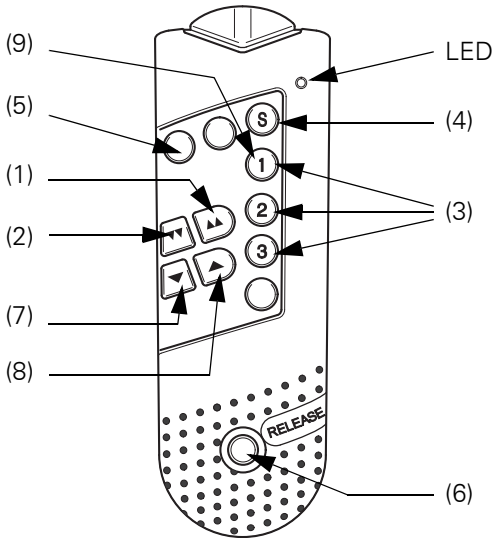
Bumper profile (5)

The bumper profile avoids a direct contact of the rear accessory rail of the table with the stand or the cassette support.

Side edge guard (6)

The side edge guards avoid direct contact of the cassette with the z-angle.

Hand-held control (7)



(1) Table top upwards movement, fast, together with pushbutton (6)

(2) Table top downwards movement, fast, together with pushbutton (6)

(3) Memory 1, 2 and 3, for stored heights

(4) Store, intermediate height

(5) Pushbutton to drive the table down, used in combination with pushbutton (4) for column synchronization

(6) Up/down motion-release

(7) Table top downwards movement, slow, together with pushbutton (6)

(8) Table top upwards movement, slow, together with pushbutton (6)

(9) Special function: error and error log reset (for service only)

LED flashes if a button is pressed.

To move the table top up/down, it is necessary to press the motion-release pushbutton (6) before any other motion pushbutton.

To stop movement it is necessary to release the motion pushbutton before the motion-release pushbutton (6).

Place the hand-held control in the holding device when you do not use it.

Emergency stop button (9) and Power On indicator lamp (8)

Attention: If the emergency stop button is activated and the Power On indicator is off, the table input power line connector can still be under line voltage. The table is disconnected from the power line only by disconnecting the power cord from power line receptacle connector.

Emergency stop button

Press the emergency stop button to switch off the controller and the motor for the height adjustment of the table top.

Release the emergency stop button by turning it clockwise.

Power On indicator lamp

The 3-color indicator lamp is placed near the emergency stop button.

It indicates

❏ that the table elevation controller is ready for use.

❏ the actual status of the table.

Visual status of indicator lamp

Status low green: Energy-saving mode[1]

◆ Press the motion-release pushbutton to activate full power mode.

Status bright green: Ready for operation

Status orange: Accumulator discharged to first level, normal operation possible[1].

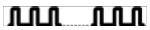
Status red: Accumulator discharged, only slow movements possible[1].

– After **low-power** mode is reached, it is not possible to switch to full power mode.

◆ Replace discharged accumulator with a charged one.

[1] For XPE-Akku only

Further status messages are displayed with red blinking cycles

Status	Red blinking cycle	Description	Action
1	1x 	Overtemperature of power amplifier caused by to frequent up and down moving or too heavy patient load.	◆ Cool down unit in standby until the red blinking cycle is finished and indicator lamp is bright green again. ◆ Reduce the patient load
2	2x 	Drive blocked	◆ Remove the blockage reason. ◆ Reset status message by pressing the motion-release pushbutton (6) ◆ Call service if the failure status is indicated again during next movement.
3	3x 	Drive blocked[1] Drive overload[2]	◆ Cool down unit in standby. ◆ Reduce the patient load. ◆ Reset the status message by pressing the motion-release pushbutton (6).
4	4x 	Unintentional moving down	◆ Reduce the patient load. ◆ Reset status message by pressing the motion-release pushbutton (6) ◆ Call service if the failure status is indicated again during next movement.
5	5x 	Internal voltage breakdown	◆ Call service if the failure status is indicated again during next movement.
6	6x 	Discharged accumulator	◆ Change accumulator.
7	7x 	Internal limit switch error	◆ Call service

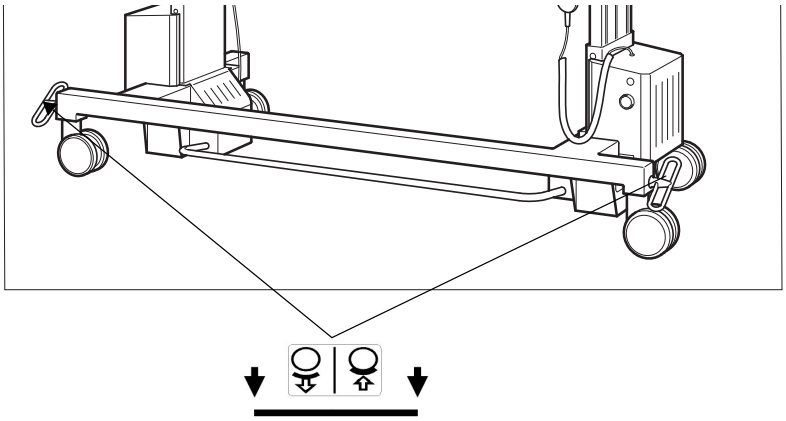
[1] For XPE only
[2] For XPE-Akku only

Acoustic status message

With all visual indicator lamp messages, an acoustic beeper message is generated.

Beep cycle	Description
2x	General warning
3x	Accumulator nearly discharged
6x	Accumulator discharged

Parking brakes for castors



Foot pedal for release of mechanical table top brakes

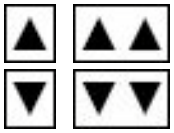
◆ Press the foot pedal to release the mechanical table top brakes.

Now, you can move the floating table top manually.

Table top Up and Down movement

You can adjust the table top to the preferred height.

However, move the cassette *carefully about 4 cm under the table top.*



To move the table top up or down, press the corresponding pushbuttons in combination with the motion-release pushbutton.

Column synchronization

Synchronize the controller, if

- ❏ the table is used for the first time or
- ❏ the table is used after a long time without operation or
- ❏ heights differences between the columns are visible.

Otherwise, the two columns can have different heights. As a consequence, if the table top brakes are released, the table top can move automatically to the lower side.

Never synchronize the controller with a patient on the table!

To synchronize the controller, use the hand-held control:

- ◆ Press pushbutton „S“ (4) thrice.
- ◆ Then press pushbutton (5) in combination with the motion-release pushbutton (6) to move the table down until both columns stop.
  – The columns elevation controllers are now synchronized.

Adjustment and storage of preferred table heights

It is possible to store and memorize three different intermediate table heights to pushbuttons 1, 2 and 3 on the hand-held control.

- ◆ Move table height to desired position.
- ◆ Press pushbutton "S" (4) thrice.
- ◆ Then press the memory pushbuttons 1, 2, or 3.
  – The current height is now memorized to the selected pushbutton.
  – A beep confirms the Storage.

We recommend to memorize the table heights sequentially as for example

- ❏ for pushbutton 1 the lower height
- ❏ for pushbutton 2 the medium height and
- ❏ for pushbutton 3 the highest table position.

- ◆ To select a memorized position, press memory pushbuttons 1, 2 or 3 in combination with the motion-release pushbutton (6) until the table top stops.

Energy-saving mode[1]

To reduce discharging of accumulator in standby, the Prognost XPE-Akku switches into energy-saving mode 20 seconds after last table top height adjustment.
  – The indicator lamp switches from bright green to low green.

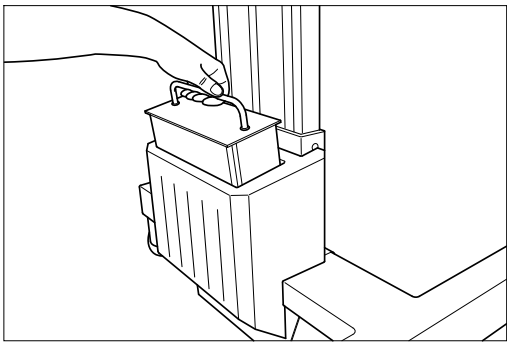
The Prognost XPE-Akku switches from energy-saving mode back to normal operating mode by pressing the motion-release pushbutton again.
  – The indicator lamp switches back to bright green or to the status before energy-saving mode.

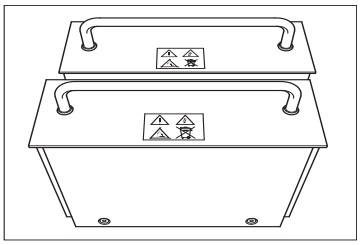
If the Prognost XPE-Akku is not in operation over a longer period (for example on weekends), we recommend switching it OFF via emergency stop button.

[1] For XPE-Akku only

Accumulator box[1]

Two accumulator boxes are delivered with the XPE-Akku.





For the operation of the Prognost XPE-Akku, insert a charged accumulator box into the power supply box of the table.

Before replacement of accumulator box, switch OFF Prognost XPE-Akku with emergency stop button.

After insertion of new charged accumulator box, switch ON again.

[1] For XPE-Akku only

Charger

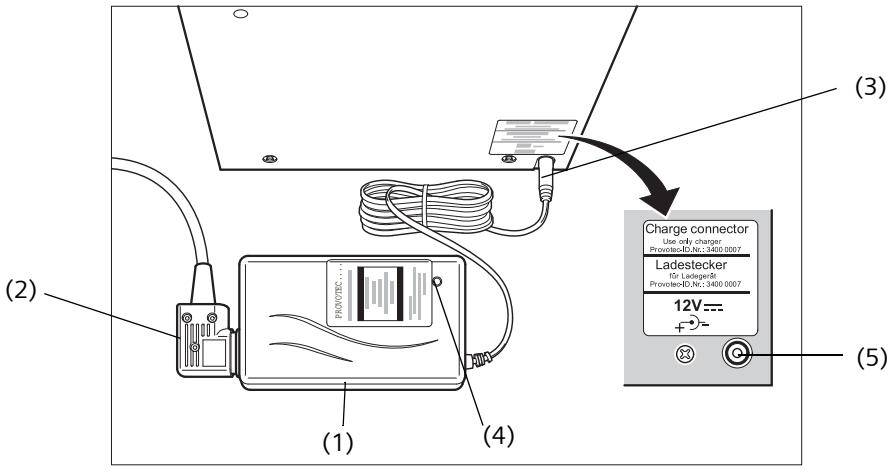
Do not place the charger in the patient area!

When you charge lead-acid storage batteries, explosive gases may develop.

- Ensure sufficient ventilation and avoid open fire or the formation of sparks.

The charger is for indoor use only.

- In order to avoid the risk of fire and/or electric shock, protect the charger against high humidity and water.
- To clean the charger, disconnect it from the mains supply.
- Use only a dry cloth.
- Do not plug in the charger if there are signs of damage to the housing or power cable.
- Call the service in such cases.
- Always disconnect charger from mains supply before you connect or remove the accumulator box.



(1) Charger

(2) Power cord with connector

(3) Charger connector

(4) Charging status LED

(5) Socket for charger connector at the accumulator box

Charging the accumulator

Charging of accumulator boxes is only allowed with chargers that are released by Provotec.

At the bottom, the accumulator box has 2 contacts for connection to the 12-Vdc voltage of the inside mounted accumulator.

Never short-circuit these contacts!

To prevent the accumulator from short-circuiting, never place an accumulator box on metal plates, metal parts or conductive parts!

- Place accumulator box on a *non conductive* stable underground.
- Make sure that charger is disconnected from mains supply, before you connect the charger with the accumulator box.
- Insert the charge connector into the corresponding socket at the accumulator box.

Refer to „Charger“ on page 107

- Connect the charger with the mains supply.
- When the accumulator is charged, first of all, disconnect charger from mains supply.
- Wait until control LED is off.
- Then disconnect charge connector from the corresponding socket at the accumulator box.

Charging state at the charger

Even if you ignore the acoustic and visual discharge limit tone, the XPE controller allows up and down movement of the table.

You can continue table movements until the discharge safety limit of the accumulator box is reached.

If the discharge safety limit is reached, all movements are disabled to prevent the accumulator from complete discharging.

- Insert a new charged accumulator into the power supply box, to set the Prognost XPE Akku into correct operation again.

When the Prognost XPE-Akku is not used over a longer period, the accumulator box can discharge. To prevent discharging, we recommend switching the table OFF with the emergency stop button.

As known as characteristic of accumulators, the maximum charging capacity is reached after several cycles of discharging and charging.

The accumulator boxes are charged when delivered with the table.

In any case we recommend charging the accumulator boxes with the charger before the first use of Prognost XPE-Akku.

LED orange

Mode **boost charging**:
- Maximum and constant charging current until the load voltage is reached.
- The status LED changes from orange to yellow. The charge timer is switched on.

LED yellow

Mode **charge timer**:
- The charger is for 2 hours in time-controlled mode.
- Charge voltage is constant and charge current decreases. At this time, battery capacity is between 80-95% of maximum.
- The charger remains in this mode until the time interval is completed.

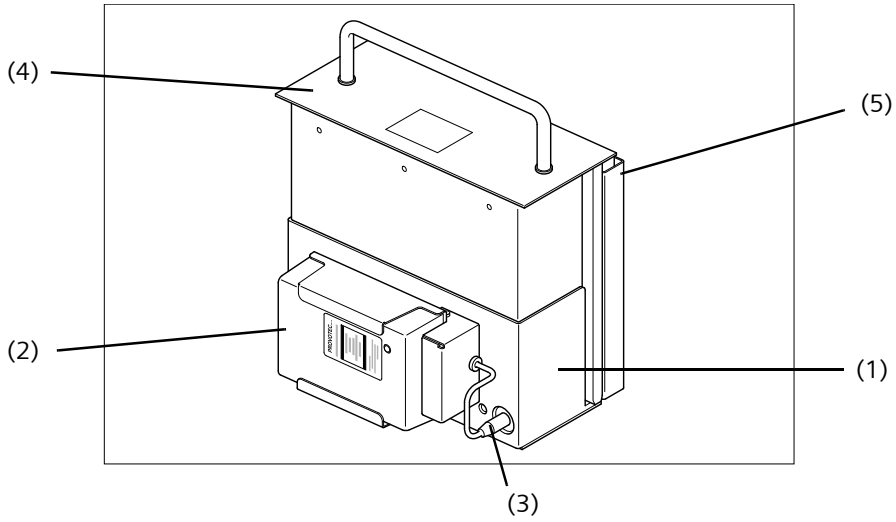
LED green

Mode **trickle charge** (standby):
- The battery is fully charged.

If the accumulator box is not removed after fully charged, the charger switches over to trickle charge.

Remove the charge connector from accumulator box, after charger is disconnected from mains supply, to prevent discharging of accumulator to low energy level.

Accumulator box charging station



(1) Charging station

(2) Charger

(3) Charge connector

(4) Accumulator box

(5) Wall holder

The charging station is used for positioning of a discharged accumulator box.

You can mount the charging station at the wall using the wall holder.

Do not place the charger in the patient area!

- Place the accumulator box inside the charging station.
- At first, connect the charge connector.
- Then connect charger to mains supply.

For further steps refer to „Charging the accumulator“ on page 108.

- Disconnect charger from mains supply.
- Then remove the charge connector from the corresponding socket at the accumulator box.
- Then remove the accumulator box.

Exposures with Prognost XPE/XPE-Akku

- Insert the power plug into the corresponding wall socket[1].
- Lay the power cord in such a way that you cannot damage it by the wheels running over it during table movement.[1]
- Insert a charged accumulator box into the power supply box.[2]
- Switch power supply ON with emergency stop button.[2]
  – A short acoustic signal sounds from the controller box.
  – The green (Ready for use) indicator lamp must light up.



If the green (Ready for use) indicator lamp is not lit:

- Check the correct insertion of accumulator box into the power supply box.
- Make sure that the emergency stop button is switched on.
- Make sure that the accumulator box is charged.
- If it is not possible to solve the problem, call service.

If the green (Ready for use) indicator lamp flashes only for approx. 5 seconds after the power supply is switched ON with emergency stop button:

- Switch OFF the power supply with the emergency stop button.
- Remove the accumulator box from the power supply box
- Call service to check function of electronic inside controller .box



Before you remove a discharged accumulator box, switch OFF power supply with emergency stop button.
  – A short acoustic signal sounds from the controller box.
  – The green (Ready for use) indicator lamp does not light up.

To avoid collision with the system or the image receptor, the following sequence is necessary.

- Move the X-ray system to the necessary position.
- Adjust the height of the image receptor according to table top height or adjust height of mobile table according to height of image receptor.

[1] For XPE only
[2] For XPE-Akku only

Attention: The table elevating system is designed for short time rating, only.

- Move table carefully to desired exposure position.
- Check that there is no collision between table top, table, and image receptor.
- Move table to the best position for the patient to get ON the table top.
- Lock the parking brakes of the front castors and check that brakes are fixed.
- Assist patient to get ON the table top.
- Unlock the parking brakes.
- Move table to previous desired exposure position.
- Lock the parking brakes.
- Switch ON the collimator light.
- Move floating table top with patient to final exposure position.
- Collimate the organ and take an exposure.
- Unlock parking brakes.
- Move table to the best position for the patient to get OFF the table top easily.
- Lock parking brakes and check that brakes are fixed.
- Assist patient to get OFF the table top.

Attention: The Prognost XPE is not suitable for patient transport. Only use it as a support for the patient during examination.

Let patients get ON or OFF the table top only

❏ if the brakes are fixed;

❏ under supervision and assistance from the examining personnel.

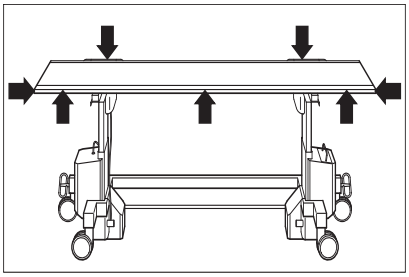
Otherwise, the whole table may tilt.

Danger points

The positions marked in the following illustration indicate danger zones in which patients or operating personnel could suffer injury by crushing or colliding.

Be sure that during movement of the table and the table top patients or personnel are *not* within the uncontrolled movement area.





Take care that nobody is within the movement areas of the table and the X-ray system.

Remove objects, as for example, chairs, out of the collision area, before using the table.

Be aware that careless movements of the Prognost XPE table and table top may injure patients, users, or other persons.

It may also cause damages to the X-ray tube assembly or the X-ray image receptor.

Cleaning

Do not use water for cleaning.
– Water causes short circuits in the electrical system, and corrosion in the mechanical components.

Do not use corrosives, solvents, or abrasive cleaning materials.

Clean painted and plastic surfaces only with a cloth and common household cleaners.

Wipe surfaces with a clean, dry, lint-free cloth.

Wipe chrome-plated parts with a clean, dry, lint-free cloth.

Disinfection

Disinfect all components, including accessories and connecting cables only by wiping with a disinfectant solution.

Cover the equipment with plastic sheets during room disinfection.

For safety reasons, do *not* spray.

Daily checks

- Check that the front castors are locked, when the parking brakes are turned into locking position.
- Check fixing and easy movement of table top by using the brake foot pedal.
- Check if there are visible height differences of elevation columns for table top. If yes, perform synchronization according to „Column synchronization“ on page 104
- Check that the power cord shows no damages.
  If there are visible damages, do not insert the power plug into the wall socket and inform the service.

Checking the motion-release pushbutton

- Press the motion-release pushbutton without pressing any other motion pushbutton or the other way round.
  – Height adjustment must not start.

If table height adjustment starts during this check, put the table out of operation and call service.

Disposal remarks

The Prognost XPE does not contain any toxic materials.

Dispose of all mechanical, electrical, and plastic components according to local or national regulations.

Technical data

The table top consists of carbon fiber with low attenuation (typical 0.7 mm Al)

Dimensions and weights	
Table top thickness	2.5 cm
Length	200 cm - 226 cm
Width	65.5 cm - 75.5 cm
Height	59.5 cm - 86.5 cm
Usable width between the columns	112 cm
Table weight	120 kg (without patient)
Max. permissible patient weight	150 kg - 230 kg
Table top movement	
longitudinal	± 33 cm to ± 46 cm
transverse	± 10 cm
Electrical characteristics	
Line voltage[1]	230 V / 50 Hz or 115 V / 60 Hz
Power supply[2]	12-Vdc accumulator box
Classification	Class I, type B (according to EN 60601-1)[1] Internally powered equipment, type B (according to EN 60601-1)[2]

[1] For XPE only
[2] For XPE-Akku only

Environmental conditions (operation)	
Temperature range	+10° C to +40° C
Relative humidity	30 % to 70%, non-condensing
Air pressure	700 hPa to 1060 hPa
Environmental conditions (transport and storage)	
Temperature Range	-10°C to +70°C
Relative Humidity	10% to 95%, non-condensing
Air Pressure	500 hPa to 1060 hPa

Symbols


Parking brake unlocked


Parking brake locked


Attention, read accompanying documents!


Attention, High Voltage!


CE-marking


Earth conductor[1]


Classification according to EN 60601-1, Class 1 Equipment, Type B


EMC interference


Danger of violent pressure to hands and fingers etc.


Do *not* exceed maximum weight, risk of breakage


Do not exceed maximum weight, danger of tilting


Examination position


Longitudinal positioning


Transverse positioning


Special disposal, separate collection[2]


No smoking[2]


Warning against battery risk[2]

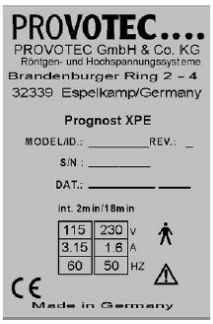

Do *not* touch electric contacts![2]

[1] For XPE only
[2] For XPE-Akku only

Labeling

Prognost XPE

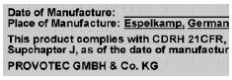
Nameplate



UL Label



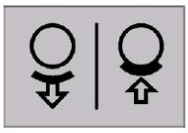
FDA Label



near power inlet
(background yellow)



Labels brake
release/activate



Identification of
actual line
voltage setting



Warning label at controller box
(background yellow)



Near line fuse



On table top





Prognost XPE 150kg version



Prognost XPE 230kg version

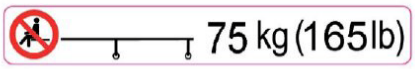
At lower front frame of
table (background yellow)



Labels on head and foot end of table top:



200cm table top length



226cm table top length

EMERGENCY-STOP



Prognost XPE-Akku

8.2 Labels

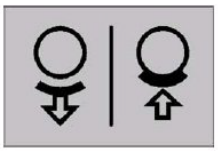
Nameplate table



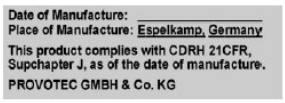
UL Label



Labels brake release/activate



FDA Label



Labels inside power supply box and near contacts of accumulator-box



Plus pole c 12dc

Labels inside power supply box

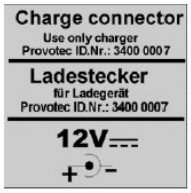




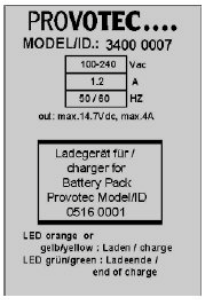
Minus pole o 12dc

Labels Akku-Box
nameplate





Label on charger



Warning (background yellow)





At lower front frame of table (background yellow)



EMERGENCY-STOP



On table top



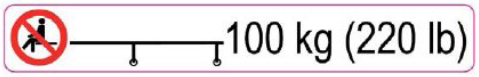


Prognost XPE-Akku 150kg version

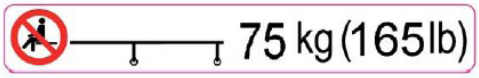


Prognost XPE-Akku 230kg version

Labels on head and foot end of table top:

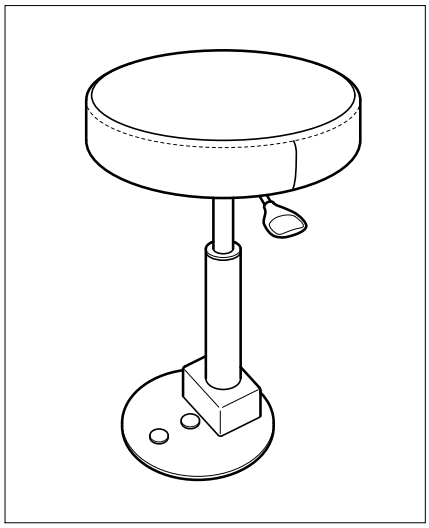


200cm table top length



226cm table top length

Rotating chair



Application

The rotating chair is attached to the foot rest and is used for examinations in sitting position.

The rotation range of 360° allows front and side views without standing.



Caution

Movement of the tube and the table with a patient sitting on the swivel stool.

Danger of crushing the patient (Knee, hand) with the compression unit.

- Pay special attention to the danger zone between the compression unit and the sitting patient.
- Move the table as little as possible when the patient is positioned on the swivel stool.



Caution

Patient falls from the swivel stool

Risk of patient injury

- Make sure that the patient is seated securely on the swivel stool. Position a hand grip so that the patient can hold on.
- Do not move the table remotely when a patient is positioned on the swivel stool; perform all movements from the table-side control.

Inspection/maintenance note

Check that the foot holder is in a proper condition at regular intervals of about two months.

Check especially that the fastening rivets are firmly attached.

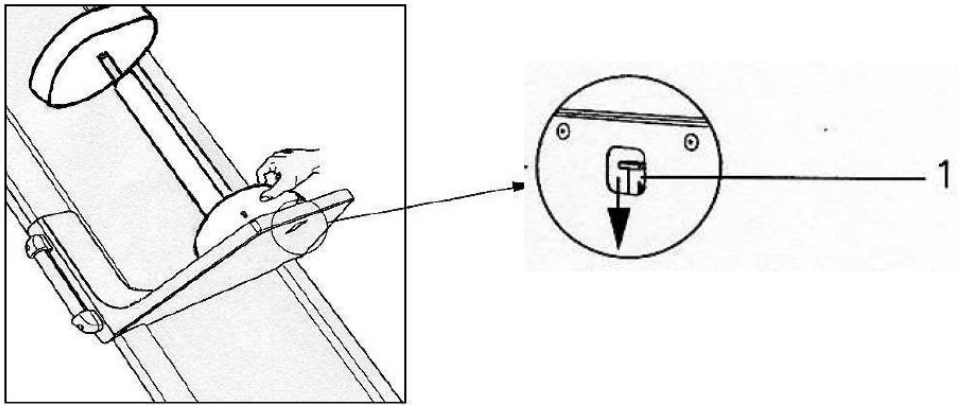
The rotating chair is not in the collision calculation of the system. Therefore, execute tabletop movements with attached footrest and rotating chair very carefully.

- Remove the rotating chair before tilting the table back into the horizontal position.

Attachment

✓ Footrest attached.

✓ Table tilted to nearly 80°.



- Place the chair at the front edge of the footrest as shown above.
- Push the locking tab (1) on the back of the footrest down and hold it firmly.
- Insert the metal spigots at the base of the rotating chaire in the corresponding holes of the footrest.
- Release the locking tab.
- Check the locking of the rotating chaire by pulling on it.
- Tilt the table to 90°.



Caution

The swivel stool detaches from the foot rest

Risk of patient injury

- Make sure that the swivel stool is attached correctly to the foot rest.
- Push and pull the stool and lift it up to make sure that it is secure before positioning the patient.



Ensure without fail that the metal spigot of the rotating chaire is locked in the footrest.

Removal

✓ Table tilted to nearly 80°.

- Push the locking tab on the back of the footrest down and hold it firmly.

Pull the metal spigots of the rotating chair out of the holes of the footrest.

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