MULTIX Impact C

Operator Manual
VA20

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Legend

	Indicates a hint Is used to provide information on how to avoid operating errors or information emphasizing important details
	Indicates the solution of a problem Is used to provide troubleshooting information or answers to frequently asked questions
■	Indicates a list item
✓	Indicates a prerequisite Is used for a condition that has to be fulfilled before starting a particular operation
◆	Indicates a one-step operation
1 2 3	Indicates steps within operating sequences
Italic	Is used for references and for table or figure titles
➔	Is used to identify a link to related information as well as previous or next steps
Bold	Is used for screen outputs of the system
Menu > Menu Item	Is used for the navigation to a certain submenu entry
`Text`	Is used to identify inputs you need to provide
Orange	Is used to emphasize particularly important sections of the text
⚠ CAUTION	CAUTION Used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury or material damage. CAUTION consists of the following elements: • Information about the nature of a hazardous situation • Consequences of not avoiding a hazardous situation • Methods of avoiding a hazardous situation
⚠ WARNING	WARNING Indicates a hazardous situation which, if not avoided, could result in death or serious injury. WARNING consists of the following elements: • Information about the nature of a hazardous situation • Consequences of not avoiding a hazardous situation • Methods of avoiding a hazardous situation

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1 Introduction

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

1.1 Intended purpose

Intended Purpose Statement under the European Medical Device Regulation 2017/745:

Stationary X-ray system intended for various procedures that visualizes a variety of anatomical structures.

1.1.1 Indications for use / Intended use

MULTIX Impact C is a radiographic system used in hospitals, clinics, and medical practices. MULTIX Impact C enables radiographic exposures of the whole body including: skull, chest, abdomen, and extremities and may be used on pediatric, adult and bariatric patients. Exposures may be taken with the patient sitting, standing, or in the prone position. MULTIX Impact C is not intended for mammography.

MULTIX Impact C uses digital detectors for generating diagnostic images by converting X- rays into image signals. MULTIX Impact C is also designed to be used with conventional film/screen or Computed Radiography (CR) cassettes.

1.1.2 Contraindications

There are currently no known contraindications for MULTIX Impact C.

All residual risks are communicated to the user by warnings and cautions in the operator manual.

The final decision for use of the medical device in a certain application is made by the physician based on his/her medical knowledge and the risks of the case involved.

Clinically relevant hazards and risks were mitigated as summarized in the risk management report.

Clinically relevant side effects and risks that are generally observed with the diagnostic radiography and radiological technology and which are described in the literature, are the exposition of the patients to intended ionizing radiation.

1.1.3 Clinical benefits

The device is a digital X-ray system to generate X-ray images from the whole body including the skull, chest, abdomen and extremities. The acquired images support medical professionals to make diagnostic and/or therapeutic decisions. Generic clinical benefits of radiographic examinations within the intended use are applicable for this device.

1.1.4 Side effects

The side effects of the device are derived from the risk analysis. Based on the clinical evaluation, there are no known side effects associated with the use of MULTIX Impact C system.

1.1.5 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.

1.1.6 Patient group

The MULTIX Impact C system is designed for adult and pediatric (removable scattered radiation grid) patients.

1.1.7 Physical functionality

The MULTIX Impact C system may be used for projection of radiographic examinations of both adults and children (removable scattered radiation grid).

- On the patient table, X-rays can be taken on the recumbent or sitting patient from head to foot. Exposures in the region of the skull, of the spine, of thorax, lungs and abdomen as well as of the extremities are possible.
- On the wall stand, X-rays can be taken on the standing or sitting patient (chest, and so on).
- In addition, exposures onto the wireless detectors in the form of free exposures are possible.

1.1.8 Intended users

The MULTIX Impact C must be operated by qualified personnel with the necessary knowledge and expertise to operate X-ray equipment in accordance with the relevant country specific regulations.

(➔ Page 14 *User training*)

1.1.9 Conditions of use

The system is suitable for medical facilities such as hospitals, doctor’s offices, etc.

The climatic conditions specified in Technical data, Ambient conditions (operation) must be complied with.

1.1.10 Minimum requirements concerning hardware

The MULTIX Impact C system is being delivered, installed, and connected to the IT environment as a complete and functioning system by our service organization.

1.1.11 IT network characteristics

MULTIX Impact C may only be run in an environment approved or authorized by the manufacturer. The system may not be operated in public networks without firewalls or isolation.

Refer to the "MULTIX Impact C Security White Paper and MDS^2 Form".

1.1.12 Maintenance, cleaning, and disinfection

Refer to (➔ Page 14 *System Safety*) and (➔ Page 81 *System Operation*).

1.1.13 Service

The service must only be performed by qualified technical personnel.

1.1.14 Technical features

Refer to (➔ Page 245 *Technical data*).

1.1.15 Frequently used operating functions

Refer to (➔ Page 81 *System Operation*).

1.1.16 Operating functions regarding safety

Refer to (➔ Page 14 *System Safety*).

1.2 Usability

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

- Patient population: newborn to geriatric.
- 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 supplied with the equipment according to the hand-over contract. It is mandatory to follow such application training supplied by Siemens Healthineers 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 Healthineers.

- Operator Manual and precautions: Read and understand all the instructions in the Operator Manual before trying to use the system and request additional training from Siemens Healthineers if necessary.

  Keep the Operator Manual with the equipment at all times and periodically review the procedures and safety precautions.

  Failure to follow the Operator Manual and safety precautions could result in serious injury to the patient, others or yourself.

- Patient safety: Give assistance for getting the patient on and off the table. Be sure all patient health lines (IV, oxygen, and so on) 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, start a movement control, or encounter other problems which could be hazardous.

- Radiation safety: Always use correct 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. Have an emergency plan in case of non-availability of the system, for example, to use a different system.

CAUTION

Operation of the system by untrained 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.

1.3 Information about this Operator Manual

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

- Operator Manual - MULTIX Impact C system
- Operator Manual - MULTIX Impact C imaging system

1.3.1 Area of application

This Operator Manual is valid for the following product:

- MULTIX Impact C (VA20)

1.3.2 Required documents

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

- Operator Manual - MULTIX Impact C imaging system

1.3.3 Operator Manuals on the internet

The electronic Operator Manuals for the system are available on the internet: https://doclib.healthcare.siemens.com.

1.3.4 Pictograms

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

	Alternating current
	Caution: Read Operator Manual
	Caution: Laser
	Pushing prohibited
	Off (disconnection from line power supply)
	On (connection to line voltage)
	Attention: Hot surface (at the X-ray tube)
	Degree of protection type B

1.3.5 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 MULTIX Impact C may be shown with expanded equipment or with optional accessories in some figures.

1.3.6 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.

1.3.7 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.

1.3.8 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.

2 System Safety

2.1 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.

2.1.1 User training

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

Application training is supplied with the equipment according to the hand-over contract. It is mandatory to follow such application training supplied by Siemens Healthineers 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 Healthineers.

CAUTION

Operation of the system by untrained 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.

2.1.2 Laws and regulations

The statutory regulations of the respective country must be followed.

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 and EU regulation 2017/745 (MDR), MULTIX Impact C complies with the standards of the IEC 60601-1 series.

Incident reporting

According to EU regulation 2017/745 (MDR), any serious incident that has occurred in relation to the device should be reported to the manufacturer and the competent authority of the EU Member State in which the user and/or patient is established.

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

Regulations in the USA and Canada

Corresponding to the Medical Device Directive in the EU, MULTIX Impact C complies in the U.S.A. and Canada with the applicable standards.

Federal law stipulates that this system may only be sold to a physician or by order of a physician.

This system is intended for use in radiographic examinations and under the guidance of a trained health care professional.

Handling of non RoHS spare parts

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

However, in these cases Siemens Healthineers uses the valid exemption 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 (➔ Page 88 *Functional and safety check*).

2.1.3 Explosion protection

MULTIX Impact C is **not** designed for operation in explosion-endangered areas.

CAUTION

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.

AP

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

2.1.4 Fire safety

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

1 Press the emergency SHUTDOWN button or actuate the main or disconnecting switch.

2 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 property. Risk of inhalation of fumes from burning plastics.

- Switch off the system in the event of fire.
- Help the patient to escape from the system.
- Make sure that you 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.

3 Contact Siemens Healthineers Customer Service before performing any refurbishing work and before starting the system up again.

2.1.5 Information about the software

Network security

CAUTION

Unauthorized access to the system

Hazards up to and including loss of patient data and non-operational system

- The hospital is responsible for network security at the site.
- Set up user account password protections.
- Do not allow users to change configuration files.

Please note that the following are changes to the network that may introduce new risks:

- Network configuration change;
- Connection of additional systems or equipment to the network;
- Disconnection of systems or equipment from the network;
- Update or upgrade of equipment connected to the network.

Please note the following information relating to cybersecurity:

- Appropriate physical access controls shall be implemented;
- Cables shall be protected from interception, interference, and damage;
- Maintenance and inspection of devices shall only be carried out by authorized personnel;
- External personnel who perform maintenance or service work shall be accompanied at all times;
- Devices shall be secured with physical locking cables or securely locked away;
- The system shall lock down automatically or terminate the session after exceeding a reasonable defined idle time limit;

- Applications shall log off the user or terminate the session after exceeding a reasonable defined idle time limit;
- Malicious software shall not be created, downloaded, or distributed on purpose;
- User accounts shall only be assigned to and used by individual persons;
- For each account a different password shall be used;
- IP addresses assigned to systems shall be logged;
- Device log data shall be continuously analyzed;
- Device log data shall be stored for a reasonable time period;
- Devices shall be placed in network zones which fulfill and are appropriate for their information security requirements;
- The system must be used by persons with necessary specialist knowledge after training supplied by Siemens Healthineers Representative;
- The hospital is responsible for authorized access to the system;
- We recommend installing the system in a separate examination room with a door controller;
- The system can be connected to the internal network. The hospital is responsible for network security at the site;
- The Device Guard built into Windows 10 is used to prevent unauthenticated software from being executed in the system;
- The firewall built into Windows 10 is used to block network connections through illegal ports;
- The security service is used to encrypt/decrypt important files;
- The corespot service is used to enhance the security of the operating system;
- Normal users shall use a unique ID and password to log into the system;
- The system allows access in a special mode without authentication in order to enable examination in the event of an emergency. For this special mode no password is set;
- The system has basic requirements on the length/complexity/expiry time of the password;
- The system predefines several user roles, and users can only access the functions defined in their roles;
- The system has been tested before its launch, making sure that there are no software security vulnerabilities;
- The major 3rd party software used by the system has been registered to the Siemens Healthineers SVM service to monitor security vulnerabilities that may be found in future;
- Siemens Healthineers will analyze vulnerability notifications from SVM in a timely manner and take appropriate measures according to their severity;

- Siemens Healthineers will provide timely patches or mitigations for serious software security vulnerabilities;
- Siemens Healthineers releases a security patch for the system regularly (90 days) to repair general security vulnerabilities.

Third-party software

Only software authorized by Siemens Healthineers for use with this product may be used.

The pre-installed security package provides protection against cyber attacks, viruses, malware and other damaging software. It ensures that only trusted applications are run on the systems. It blocks unauthorized access, provides protection from network threats and infected USB sticks and thus offers control over when and who may make changes.

⚠ CAUTION

Use of unapproved or manipulated software or hardware components

Risk of malfunctions posing a hazard to patients and equipment

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

Original equipment manufacturer

Original Equipment Manufacturer (OEM), Open Source Software (OSS) from third-party providers in Siemens Healthineers products

Introduction

The product can contain OEM and OS software licensed and developed by third-party providers (depending on the system configuration and option).

These OEM and/or OS files are protected by copyright. Your right to use OEM and/or OS software beyond the mere execution of the Siemens Healthineers program is governed by the relevant terms of the OEM and/or OS software license.

Complying with these licensing conditions authorizes you to use the OEM and/or OS software as provided in the respective license. In case of conflicts between the licensing conditions of Siemens Healthineers and the OEM and/or OS software license conditions, the OEM and/or OS software conditions govern the OEM and/or OS portions of the software.

The OEM and/or OS software licenses (license conditions) are available on the CDs/DVDs (open source/legal concept) delivered together with the system.

For Open Source Software (OSS) only

Open source software is licensed free of charge (meaning that exercising the licensing rights is free of charge, while fees may be charged to recover the costs borne by Siemens Healthineers). If programs contained in this product are licensed under GNU General Public License (GPL), GNU Lesser General Public License (LGPL), or another open source license that requires source code, the corresponding code is delivered together with the device on CD/DVD.

Warranty regarding the further use of software from third-party providers:

Siemens Healthineers makes no warranty regarding the OEM and/or OS software programs in this device, when such programs are used in a manner other than the program execution intended by Siemens Healthineers. The license mentioned previously define the warranty, if any, from the authors or licensors of the OEM and/or OS software. Siemens Healthineers specifically disclaims any warranties for defects caused by altering any OEM and/or OS software program or the product's configuration. If the OEM and/or OS software violates the intellectual property of a third party, you have no warranty claim against Siemens Healthineers.

Technical support is available only for software that has not been modified.

Copyright

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

DICOM conformity

The digital imaging system is DICOM-conform. The “DICOM Conformance Statement” is available on request from Siemens Healthcare or via the Siemens Healthineers Internet homepage.

Remote software update

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 Siemens Healthineers Service.

2.1.6 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 documents.

2.1.7 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.

(➔ Page 88 *Daily checks*)

2.1.8 Maintenance plan

WARNING

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.

CAUTION

Image artifacts due to unperformed maintenance

Incorrect diagnosis basis

- Check that the image quality criteria described in the installation and maintenance manual are met before using the system.
- Maintenance work should be performed by trained technical personnel only.
- Purchasing a maintenance contract will keep the system in optimum condition.

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

Maintenance interval: 24 months for the entire system

The maintenance interval is estimated based on the workload of 40,000 patients within 24 months. If the examination workload is higher than the estimation, the maintenance interval may be shortened.

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 addition to our repair service, Siemens Healthineers 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 Customer Services organization, please contact the Siemens Healthineers 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, floor-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		
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 • 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

* DHHS and country-specific regulations must be observed

† Depending on the system configuration

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* 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* to minimize radiation exposure of patient and personnel	Check of dose rate/cutoff dose† during • Acquisition in all operating modes
Detail recognition	Compliance with specifications and legal requirements* Ensuring image quality	Resolution† during • Acquisition in all operating modes
Image contrast	Compliance with specifications and legal requirements* Ensuring image quality	Minimum contrast and dynamic range† during • Acquisition in all operating modes
Image display	Compliance with specifications and legal requirements* Ensuring image quality	Brightness, focus and the geometry of the configured displays
Image artifacts	Compliance with specifications and legal requirements* Ensuring image quality	Image display for intolerable image artifacts in all existing application techniques
Dose measurement device†	Maintenance of specifications	Accuracy of the display
Image documentation systems	Compliance with specifications and legal requirements* Ensuring image quality	Gray scale reproduction, geometric imaging characteristics, resolution, optical density, artifacts

* DHHS and country-specific regulations must be observed

† 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

2.1.9 Installation, repair or modifications

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

Siemens Healthineers does not accept responsibility for the safety features and for the reliability and performance of the equipment as the manufacturer, assembler, installer, or importer, in the following cases:

- Installation, equipment expansions, readjustments, modifications, or repairs are not carried out by persons authorized by us.
- 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.
- The product is not used in accordance with the Operator Manual.

Technical documents

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

These documents do not imply authorization to carry out repairs.

We recommend that you obtain a report showing 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.

Installation

All information and installation requirements contained in the service documentation require strict adherence.

If you require additional information, please contact the qualified people specified by the manufacturer.

Replacement

You can replace the following parts if necessary once the system has been switched off:

- Keyboard
- Mouse
- Barcode reader (optional)
- IR sensor
- Hand switch for radiation release (optional)

You can also replace the following parts as required before examinations:

- Grid
- Detector battery

2.1.10 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 (➔ Page 58 *Ceiling-mounted tube support*), or to the Imaging System Operator Manual.

2.2 Personal safety measures

2.2.1 Information about unit movements

Because of the possible speed of movement of the system, it must be operated very carefully.

WARNING

System movements cause collision

Risk of injury or system damage

- Perform system movements only when it is certain that neither the operator, the patient, third parties nor pieces of equipment can be endangered by these movements.
- Remove any objects or accessories, for example injector or infusion stand, from the collision area.
- Make sure you are standing outside the dangerous area.
- Always watch the patient when performing system movements.

CAUTION

Touching the column during movement

Risk of crushing

- Do not place your hands to moving or rotating parts.
- Use the provided hand grips to move ceiling-suspended parts.
- Whenever this is not possible, pay special attention to all crush zones on the column especially those involving the hands or fingers.

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!

Deadman function

All unit movements are controlled with a **deadman grip** (DMG), that is, movements are performed only while the operating element is being actuated. In the event of a danger, stop the movement immediately by releasing the operating element.

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 sure that the patients do not grasp the frame of the tabletop.

Abnormal movements

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

Example:

The monitor suspension system moves down by itself.

- Shut down your system and call Siemens Healthineers Service.

Collision protection

The MULTIX Impact C has a collision control device comprising all motor driven moving components like patient table and wall stand.

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.

Floating tabletop

Please pay attention to the behavior of the floating tabletop when the system is turned off.

WARNING

Brakes on tabletop have reduced force when the system is turned off.

Risk of injury

- Check that nobody is leaning on the tabletop when the system is turned off.
- Avoid positioning patients such that a sudden movement of the tabletop could cause them to fall.
- Execute patient transfer with special care.

Red emergency STOP buttons

WARNING

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, do the following:

- Press one of the red emergency STOP buttons immediately.

  All system motor drives are shut down and movements are stopped immediately. Motorized movement can only be continued when STOP is canceled.

  Radiation is not interrupted, and can be released again even 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.

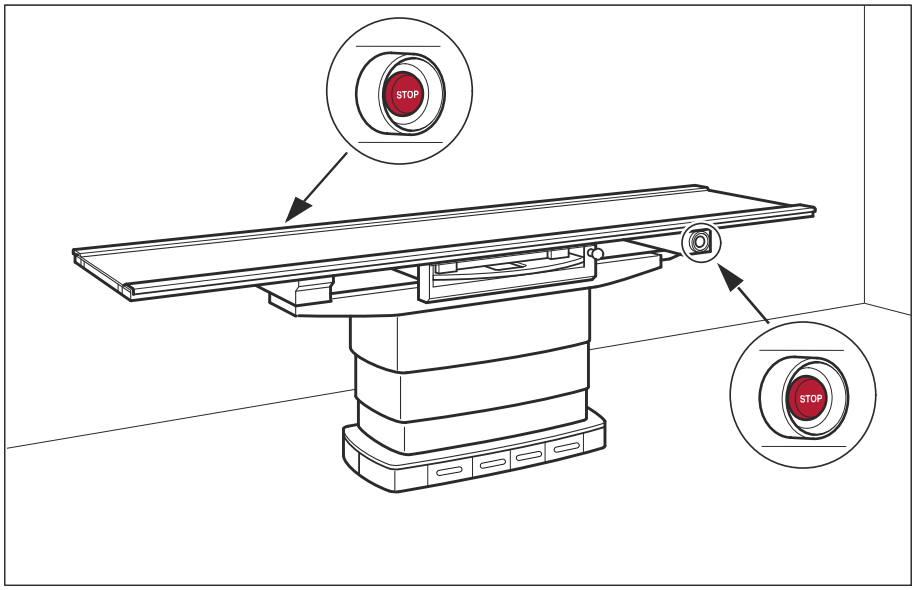
- To do so, turn clockwise and pull the red emergency STOP button.

In case of a system failure, press the emergency STOP button and unlock it again.

The system is reinitialized.

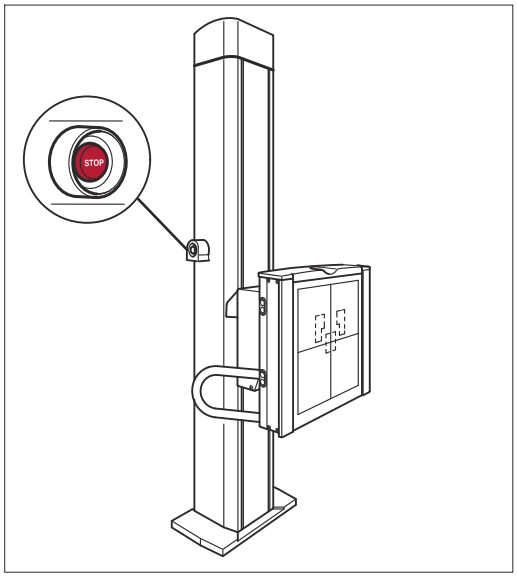
Where are the emergency STOP buttons?

You find the emergency STOP buttons in the following locations:



On the table

On the generator ON/OFF console



On the wall stand (The emergency STOP buttons are located at both sides of the wall stand.)

Emergency SHUTDOWN button (installed on-site)

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

Consequences:

- 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.

Data could be lost, for example unsaved images, exporting and filming jobs, and so on. The tube cooling system is also disconnected from the power supply, and the tube can overheat.

If a flat 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.

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

The UPS of the imaging system is also not activated.

Shutdown in an emergency

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

CAUTION

Shutdown using the emergency SHUTDOWN button

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

- Use the emergency SHUTDOWN button only in case of emergency or when the system cannot be switched off normally.

- Press the on-site emergency SHUTDOWN button.

  The entire system is disconnected from the power supply.

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.

1 In all other cases, for example system malfunction, contact Siemens Customer Service.

2 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.

Emergency procedures

CAUTION

Medical devices are not infallible and unexpected errors may occur

System is not available in an emergency or may stop working during an examination

- Have an emergency plan in case of non-availability of the system, for instance, to use a different system.
- Have an emergency plan for continuing or ending different types of examinations if the system stops working, for instance, during endoscopy, use the viewer of the endoscope to continue or end the examination.
- Consider whether an uninterruptible power supply is necessary at your site.

Power failure

If the power network at the site is very unstable, it may be advisable to install an uninterruptible power supply to prevent data loss. Contact Siemens for more information.

With UPS for imaging system (Uninterruptible Power Supply)

1 In case of a short power failure, please try to switch on the system after some seconds.

2 If it was possible to switch on the system, please wait until the system is ready.

3 Then continue working or rescue the patient.

4 If it was not possible to switch on the system or it the patient has collapsed, remove the patient immediately.

For more details on the UPS, refer to (➔ Page 83 *UPS (for the imaging system)*)

2.2.2 Danger zones / danger points

▶ Danger points

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

- Due to the mobility of the stands, there is a danger of injury in certain areas during unit movements.
  - Make sure that there are neither persons nor objects in the swivel or rotation range of the stands.
  - Make sure that there are neither persons nor objects in the lifting range of the patient table.
  - Make sure that the knees of sitting staff members are not in an area under a stand or the patient table.
  - Avoid standing or sitting immediately adjacent to the system.
  - If it is necessary to position the patient with legs or knees under the crossbeam at the head or foot end of the table, avoid system movements.
- Be aware of the danger zone between patient table and detector tray.

⚠ WARNING

Unintended overtravel when lowering the table

Crushing of patient or operator seated next to the table (for example, a wheelchair patient)

- ◆ Avoid movements when somebody is within the dangerous movement zone.
- ◆ Table movements do not stop immediately when the control elements are released.
- ◆ Most axes perform a short overtravel movement.

Patient table

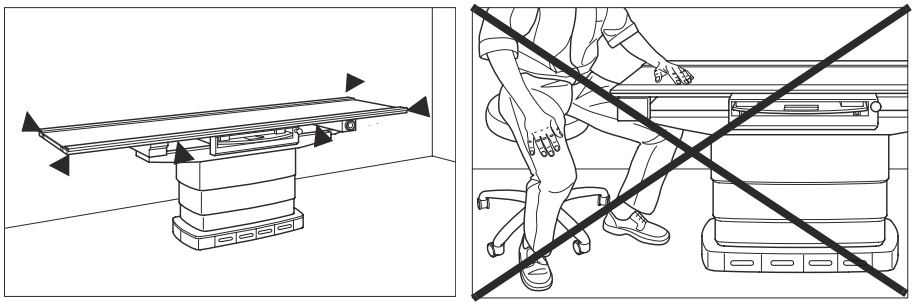


Fig. right side: Patient sitting with knee under the patient table (not allowed)

Above figure on the right shows a particular patient positioning that is not allowed because of the potential hazards when lowering the patient table.

Please pay more attention to this warning sign placed on the foot end and head end of the table.

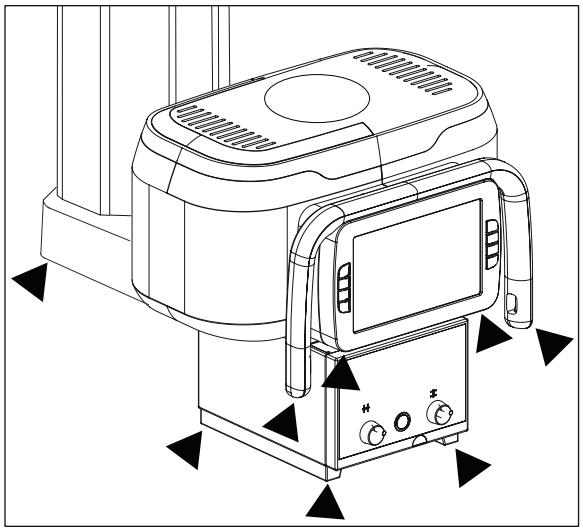
WARNING

Lowering the table onto a seated patient

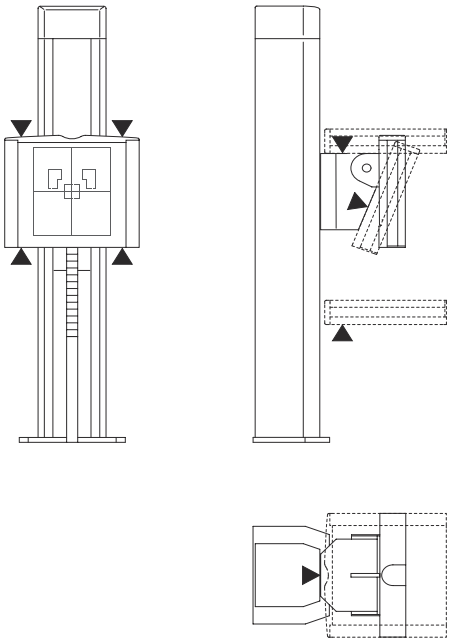
Crushing of patient or operator seated with legs under the table (for example, a wheelchair patient)

- Do not position a patient with legs under the table.
- Do not move the table while a patient is seated near the table. System will stop when collision is detected, but there is still a risk of injury for the patient!
- Move the patient away from the table first.

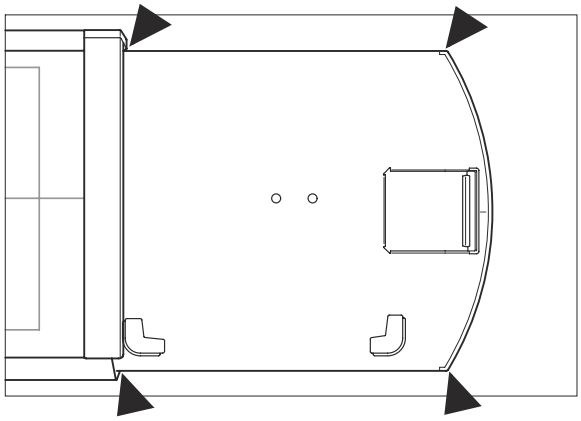
X-ray tube support



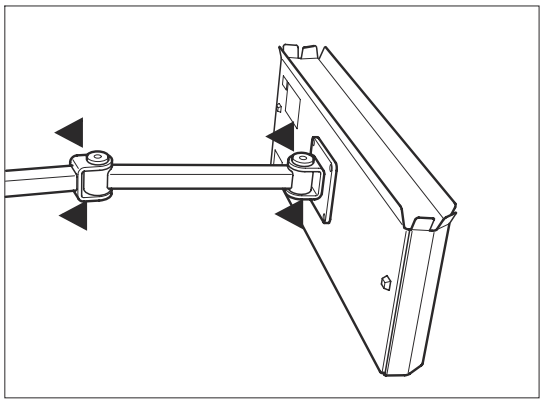
Wall stand



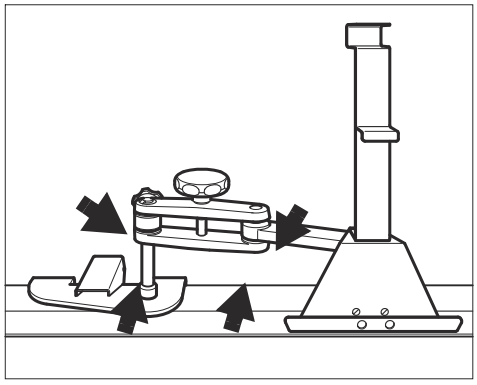
Wallstand with pulled out detector tray



Lateral detector holder



Lateral cassette holder



Grip locations

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

The following grip locations are provided:

- Two hand grips (front and back)

Grip attachment

◆ Make sure that the hand grips are always attached.

If these grip locations cannot be used:

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

Make sure during the examination that the patient does not hold on to the edges of the patient table under any circumstances.

2.2.3 Safety during patient examination

Patient positioning

- All safety-related equipment must be installed and functioning, in particular the hand grips and the compression belt.
- 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 during system movements.

WARNING

Patient cannot maintain position or becomes unconscious

Injuries to patient from falling

- Check that the patient is physically able to hold the examination position, especially when standing.
- Choose a different position or use positioning aids for immobilizing weak or very unstable patients.

WARNING

Hand grips loosen or are not used

Injuries to patient from falling

- Check that the patient hand grips on the table are in the right position.
- Ensure that hand grips are tightened prior to use.
- Make sure that the patient uses the hand grips during system movements or when turning over.
- Use other positioning aids for immobilizing weak or very unstable patients.

Correct image orientation - patient orientation

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

CAUTION

Image is incorrectly flipped due to incorrect patient position information or right/left labeling.

Risk of incorrect diagnosis or treatment because of left/right or up/down confusion

- The examiner is responsible for using the image orientation functions and interpreting the images correctly.
- Make sure that the **R**/**L** labels have been placed correctly.
- Compare the patient position data with the anatomic view when diagnosing images to exclude any errors.
- If necessary, use lead letters or similar devices during acquisition.

Visual contact to patient

Make sure that there is visual and acoustic contact with the patient . Thus, you stay informed about the condition of the patient at all times.

Room lighting

According to DIN 68 68-157 (valid in Germany), 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 MULTIX Impact C 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

Image quality can deteriorate over time because of aging and normal wear and damage of the monitor and other components.

- The image quality must be checked at regular intervals (**once per month**) after installation.
- Thus, you make sure that the system is still suitable for use in diagnosis and treatment planning.

For further information, refer to (➔ Page 21 *Maintenance plan*).

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

Test images Test images for 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 Imaging System Operator Manual.

Displays

Please observe the following information:

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

Do not touch the surface of the screen using sharp, pointed objects.

Do not open the display under any circumstances.

CAUTION

The standard 24" display and 19" display (optional) are not intended for diagnosis.

Incorrect diagnosis possible

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

Monitors are suitable for medical on-line diagnosis only if special measures to assuring 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 Healthineers undertakes no liability for diagnoses which are performed on non-Siemens Healthineers monitors or on monitors not calibrated by Siemens Healthineers.

Use of hardcopy cameras

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

Use of the full-field light localizer

CAUTION

Photobiological effect of ultraviolet radiation

Eye injury

◆ Do not look into the light beam for longer than 15 seconds.

◆ Always keep enough distance to the collimator.

2.2.4 Radiation protection

The X-ray equipment MULTIX Impact C with radiation protection complies with IEC 60601-1-3 :2013, IEC 60601-2-54:2018.

Mode of operation: Continuous operation with intermittent loading

Important information

The automatic format collimation system for acquisition helps reduce the radiation dose to the patient and examiner considerably.

For radiation dose indication during normal use of the equipment, the system is equipped with a measurement system based on an ionization chamber calibrated in dose area product.

Measures for reducing radiation exposure

Please observe the following:

Radiation may be released only by authorized operators or persons with proper authorization to apply ionized radiation.

Please pay attention to the fact that the air kerma is increased by the following settings:

- Higher kV
- Higher mAs
- Higher ms
- Smaller SID

Avoiding unwanted radiation

CAUTION

Tube is not directed toward the detector during acquisition.

Unwanted radiation exposure

- ◆ Use the free exposure mode with care.
- ◆ Check that the tube is active and use the light marker for positioning before releasing X-ray.

Radiation protection for the patient

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

   A larger focal spot distance leads to a lower air kerma.

Radiation protection for the examiner

1 If possible, release the acquisition series in the control room.

2 Stay in the examination area as short as possible.

3 If the exposure is to be released in the examination room, use an additional radiation shield (protection for upper and lower body) or radiation-proof window.

These measures contribute greatly to your personal radiation protection.

4 If the protective shields are not used, wear radiation protection clothing with a 0.25 mm lead layer or similar clothing.

5 Keep the maximum distance from the source of radiation.

6 Check your personal dose by wearing a radiation monitoring badge or a pen dosimeter.

CAUTION

Leakage, extrafocal, stray, scatter and residual radiation

Undesired radiation exposure

- When releasing the x-ray, stand as far away as safely possible from the radiation beam path.
- Use radiation protection as necessary.

CAUTION

Failure to observe radiation protection regulations

Unnecessary radiation exposure to personnel

This system produces x-rays.

- Wear protective clothing such as lead aprons.
- Monitor radiation exposure using personal dosimeters.

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.

2.3 Equipment safety measures

2.3.1 Protection against electric shock

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.

Covers

If socket covers (especially socket covers 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 the Siemens Healthineers 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:

- Foot switches: IPx8
- MAX wi-D: IP43 or higher
- Core XL: IPx3
- Rest of system: IPx0

Potential equalization

Systems for which potential equalization is recommended must only be operated in medical facilities where supplemental potential equalization 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.

2.3.2 Electromagnetic compatibility (EMC)

⚠ CAUTION

Radio interference from the system affects nearby equipment

Risk of malfunction of nearby equipment.

- ◆ Reorient or relocate the equipment or system or shield its location.
- ◆ Test the operation of the equipment in its new location.

Refer to (➔ Page 254 *Notice concerning electromagnetic compatibility (EMC)*)

2.3.3 Safety-relevant parts subject to wear

This system contains no safety-relevant parts subject to wear.

2.3.4 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 (ten) years. If the products are operated for longer than this time, additional checks and possibly repairs beyond the usual maintenance procedures may be necessary in order to ensure the functional integrity and safety of operation of these products. Please talk to us about these measures early enough!

2.3.5 Mechanical safety

Maximum weight

CAUTION

Too much weight on system components

Risk of damage or patient injury

- Observe the maximum allowable patient weight including the weight of the accessories.

The permitted patient weight on your tabletop is stated on the label on the tabletop and in the technical data.

It is important that the load is distributed uniformly over the tabletop. Otherwise there is a risk of material deformation and system malfunction. The patient weight includes any parts permanently or loosely connected with the patient, such as equipment, prostheses, implants, plaster casts.

Example of incorrect use

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

Maximum load

The component, for example tabletop or accessory, must not be loaded with more weight than indicated.

Equipment damage

Avoiding equipment damage

WARNING

System movements cause collision

Risk of injury or system damage

- Perform system movements only when it is certain that neither the operator, the patient, third parties nor pieces of equipment can be endangered by these movements.
- Remove any objects or accessories, for example injector or infusion stand, from the collision area.
- Make sure you are standing outside the dangerous area.
- Always watch the patient when performing system movements.

Check system and accessories daily for damaged or loose parts. If problems are found, have the parts repaired before resuming patient examinations.

1 Before starting system movements, especially lowering the table, make sure that the movement range is free of obstructions.

2 Remove chairs, steps, stands, waste containers, and similar objects from the movement area.

No collision monitoring!

3 Do **not** place any objects or consumable material on the cover of the table support, on the detector cover and on the longitudinal guides of the stand carriage.

Considerable forces which can damage these objects in the area of movement of the systems occur during movements of the tabletop.

4 Do **not** stand at any place on the covers of the table support.

The covers can be deformed.

Components located underneath them can be damaged and thus lead to operating disturbances.

WARNING

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.

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 Healthineers Uptime Service and let the tabletop be checked immediately if it is possible that it has been damaged (for example accidental collision with the bed of the patient)!

Damage to generator

CAUTION

Objects on top of the generator cabinet block ventilation

Generator becomes inoperable because it is too warm.

- Do not store objects on top of the generator cabinet.

Elevating table

When the tabletop meets any obstacle during downward movement of the table, the tabletop is lifted and movement stops. The system displays an error message.

In this case, only upward movement is possible.

Warning signs

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

Danger of crushing

These warning signs indicates possible danger of crushing for the patient and examiner.

Cardiopulmonary resuscitation

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

Risk of collision

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 the patient, such components are provided with the warning sign shown on the left.

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

General danger

Caution, always observe the Operator Manual!

These warning sign indicates that special instructions can be found in the Operator Manual.

Please read the Operator Manual.

Alert tones

Alert tones will be played on the TUI when the system is in one of below situations:

- All components are ready for use after reboot.
- An exposure is released.
- X-ray tube is too hot (tube heat unit ≥ 65% HU).
- A confirmation messages is displayed on the TUI.
- The tube unit is approaching a detent.
- Top or center alignment is reached.
- The detector unit in BWS is moved to a predefined position via WRCC (optional).
- Collision is detected between tube unit and patient table.
- Motorized movement limit is reached.
- Skin dose threshold is reached (SID ≤ 44 cm).

2.3.6 Combination with other products/components

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

The person connecting additional equipment to the medical device is considered to be the system configurer and is therefore responsible for ensuring that the current system configuration complies with the relevant standards (for example system standard IEC/EN 60601-ff and/or other applicable standards).

In case of doubt, please consult your local contact person.

Interfaces

Accessories connected to the analog or digital interfaces must be certified according to the respective IEC standards.

Example:

IEC 60950-1 for Information Technology 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. This person is thus responsible that the system complies with the requirements of the valid version of the system standard IEC 60601-1.

If in doubt, consult the Customer Services department or your local representative.

2.3.7 Disposal

CAUTION

Improper disposal of hazardous waste material can cause damage to people and the environment.

Risk of injury and environmental damage

- Dispose of waste material according to the national industry standards.
- Take account of local regulations governing the disposal of the product.

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
- Flat panel monitors
- Phantoms

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

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

For all countries of the EU:

In the member states of the European Union (EU) Siemens Healthineers 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. This directive determines the framework for the return and recycling of used equipment as applicable throughout the EU.

For details about return and disposal of the product or its components or accessories please contact your local Siemens Healthineers customer service or your Siemens Healthineers regional office.

2.3.8 Cleaning and disinfection

(➔ Page 48 *Important general information*)

(➔ Page 49 *Cleaning and disinfection process*)

(➔ Page 50 *Special cleaning information*)

(➔ Page 52 *Disinfection*)

(➔ Page 52 *Sterilization*)

Important general information

Safety hints

Switch off the system and disconnect it from the main power prior to cleaning or disinfecting.

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 cleaning and disinfection instructions.

CAUTION

Inadequate cleaning and disinfection

Risk of infection

- Clean and disinfect all contaminated surfaces and all parts which may come (or have come) into contact with patient after each examination.
- Use the recommended cleaning agents and disinfectants.
- Protect the portable detector with a single-use plastic bag.

Ventilation slots

- Keep the ventilation slots of all components unobstructed.

CAUTION

Objects on top of the generator cabinet block ventilation

Generator becomes inoperable because it is too warm.

- Do not store objects on top of the generator cabinet.

Generator cabinet

CAUTION

Cleaning liquids drip into the generator cabinet.

Electrical parts are damaged.

- Make sure that no liquids are used at the top of the generator cabinet.
- Clean the generator cabinet covers very carefully, making sure that no liquid seeps into the cabinet.

Detector protection

Avoid contact of detector with iodine-containing or other strongly dyeing substances.

We recommend to use a protective cover during examination.

Cleaning in general

Preparations

- Clean all contaminated parts and all parts that may come or have come into contact with the patient, directly or indirectly.

When cleaning and disinfecting, use suitable gloves for your own protection.

Equipment

1. Only use water or a lukewarm diluted household cleaning agent solution.

The use of other than the compatible cleaning agents can result in damage to the equipment.

2. Wipe system parts with a damp cloth (squeeze out wet cloth before using it) until all contaminations are removed.
3. Remove any watery residues immediately.

Disinfection in general

Disinfection by means of vaporization is not allowed!

Disinfection by means of UVC light is not allowed!

Cleaning and disinfection process

Preparation for decontamination: Protective equipment for cleaning personnel (gloves, water repellent protective apron, face protection mask or protective glasses and mask)

Always adhere to the disinfectant manufacturer's instructions for use regarding handling and exposure time of the disinfectant solution.

Always work from top to bottom (top down) and from clean to dirty areas.

Use wipes only as long as they leave a continuous liquid film on the surface.

If blood is to be wiped off, discard the wipe and use a new one to continue the cleaning and disinfection procedure.

A non-protein-fixing disinfectant with proven cleaning effect based on peroxide compounds, certified by corresponding national authorities (e.g. EPA or VAH), is recommended (Dismozon plus, Hartmann #981257, active ingredients: Magnesium monoperoxyphthalate hexahydrate 95.8g/100g was validated), tap water/flowing water (20+/- 2°C, minimum drinking water quality), lint free wipe (Braun Wipes Eco #19726 was validated).

1 Prepare cleaning and disinfection solution according to the manufacturer's instructions.

2 Wipe the surfaces of the product thoroughly with sufficiently saturated wipes for cleaning.

3 Make sure that all surfaces, existing grooves and protrusions of the product can be reached during the cleaning process and are completely moistened.

4 Soak a wipe with tap water and wipe all surfaces of the product thoroughly.

5 Check for cleanliness; if soiling is still visible, repeat the above steps.

6 Thoroughly wipe the surfaces of the product one more time with a sufficiently soaked wipe for disinfection.

7 Make sure that all surfaces, existing grooves and protrusions of the product can be reached during the disinfection process and are completely moistened.

8 Follow the manufacturer's instructions regarding the exposure time of the disinfectant solution.

9 Let the system dry.

Special cleaning information

Never use abrasive cleaners or cleaning agents with solvents (e.g. cleaning solutions, alcohol or spot removers), since they may damage housing surfaces.

DAP chamber (Option)

High voltage is present in the DAP ionization chamber. It is therefore very sensitive.

- Use a soft cloth to avoid scratching the chamber.

Mobile detector

WARNING

The battery of the portable detector is not resistant to fluids.

Electrical shock, damage to the detector

- Remove the battery from the portable detector before cleaning the detector.
- Check that the detector is waterproof before immersing it (symbol on detector).
- The battery can be wiped off but it is not waterproof.

The charge contact plate on the back of the detector must be completely dry before the detector is returned to the docking station, in the Bucky tray of the table or the Bucky wall stand. Otherwise, the detector will not charge sufficiently and the charge contact surfaces may corrode.

It is recommended to clean the back of the detector first so that it has more time to dry while the front is being cleaned.

The following agents can be used to clean the MAX wi-D and Core XL:

- Cleanisept
- Cavi Wipes XL
- Sani Cloth AF3 (Wipes)
- Neutral Disinfectant Cleaner
- Quaternary Disinfectant Cleaner
- Super Sani-Cloth
- Sani-Cloth Plus
- Apesin AP100
- Dismozon plus
- Clorox Healthcare Hydrogen Peroxide (Wipes)
- Oxivir Tb Wipes
- Optim 1 Wipes
- Cavi Wipes Bleach
- Peridox RTU
- Sani-Cloth Bleach
- Clorox Healthcare Fuzion Cleaner Disinfectant
- Clorox Healthcare Bleach Germicidal Wipes
- Ethanol 70 vol.-% (alcohol)

Touch User Interface (TUI)

You must clean the TUI regularly because it becomes dirty with fingerprints:

1 Do not spray the TUI directly.

2 Wipe the TUI only with a clean, damp cloth.

Monitors, touchscreen and keyboard

When cleaning the monitor screens or displays use only a moist cloth without any cleaning agents.

1 Wipe the screen.

2 Dry it with a soft cotton cloth.

3 Remove immediately any contamination, for example, contrast medium stains.

Liquid-crystal displays (LCD)

Liquid-crystal displays (LCD) are very sensitive to mechanical damage.

1 Avoid scratches and shocks.

2 Remove drops of water immediately, longer contact with water discolors the surface.

Camera window

Avoid using organic acids to clean the camera window.

Parts mounted above the patient

- Remove dust on parts mounted above the patient regularly.

Accessory parts

- Please note that for some accessory parts, there are special instructions on cleaning in the corresponding chapters.

  For more information, see the System Operator Manual - Chapter Accessories and Auxiliary Devices.

Unless special instructions are given there, the equipment cleaning instructions are valid.

Disinfection

Surfactant disinfectants

For surface disinfecting of the equipment, we recommend using liquid solutions of a commercially available surfactant disinfectant based on the following compatible ingredient classes:

- Peroxide compounds

As a general rule, disinfectant sprays must not be used since the spray mist may penetrate into the equipment which means the safety of the equipment can no longer be ensured (damage to electronic components, formation of flammable air solvent vapor mixtures).

Only use liquid disinfectants and wipe with a moist wipe.

Some substances contained in disinfectants (for example, aldehyde) are known to be hazardous to health. Their concentration in the air must not exceed the statutorily defined limits.

Follow the manufacturers' instructions for use of these products.

Sterilization

The system does not require sterilization.

3 System Overview

3.1 Product description

The MULTIX Impact C system is equipped with following components:

- Ceiling-mounted tube support with ACSS (Automatic Cassette Size Sensing) and Tracking function
- Bucky wall stand
- Image Station

Further components can be:

- Patient table
- A total of 3 different detectors are available:
  - MAX wi-D (wireless mobile detector with handle)
  - Core XL (wireless mobile detector with handle)
  - Core static (integrated detector)

The MAX wi-D as well as the Core XL can be used in the patient table, Bucky wall stand, and for free exposures.

The Core static can only be equipped with the Bucky wall stand.

Scatter radiation grid:

- The patient table and the wall stand are equipped with a stationary scatter radiation grid.
- For free exposures the MAX wi-D and Core XL can be equipped with a clip-on grid.

3.1.1 Application capabilities

A MULTIX Impact C system may be used for projection of radiographic examinations of both adults and children (removable scattered radiation grid).

- On the **patient table**, X-rays can be taken on the recumbent or sitting patient from head to foot. Exposures in the region of the skull, of the spine, of thorax, lungs and abdomen as well as of the extremities are possible.
- On the **wall stand**, X-rays can be taken on the standing or sitting patient (chest, and so on).
- In addition, exposures onto MAX wi-D and Core XL in the form of **free exposures** are possible.

3.1.2 System configurations

The following system configurations are available:

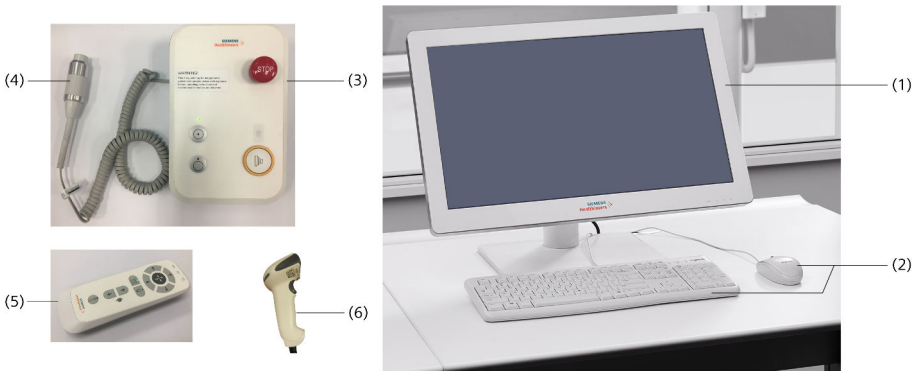
- MULTIX Impact C with ceiling-mounted tube support (ACSS & Tracking):
  - Bucky wall stand with Core static
  - Bucky wall stand with Core static, and optional Core XL
  - Bucky wall stand with Core static, and optional MAX wi-D
  - Bucky wall stand with Core XL
  - Bucky wall stand with MAX wi-D
  - Bucky wall stand with Core static and patient table with Core XL
  - Bucky wall stand with Core static and patient table with MAX wi-D
  - Bucky wall stand and patient table to be used with one Core XL
  - Bucky wall stand and patient table to be used with one MAX wi-D

3.2 Basic system

3.2.1 System overview in the examination room

(1) MULTIX Impact C ceiling support with control panel, tube assembly, TUI (Touch User Interface) and collimator
(2) Patient table (optional)
(3) Bucky wall stand

3.2.2 System overview in the control room



(1) Image Station
(Touch screen as an option is available.)
(2) Keyboard and mouse
(3) Generator ON/OFF console with radiation release button
(4) Hand switch for radiation release (optional)
(5) Wireless Remote Control Console (WRCC) (optional)
(6) Barcode scanner (optional)

3.2.3 Image Station

The Image Station is a digital imaging system with main purpose to manage patients (studies), acquire, display, postprocess, film, and archive X-ray images.

The main component of the Image Station is an all-in-one computer with the Windows 10® operating system.

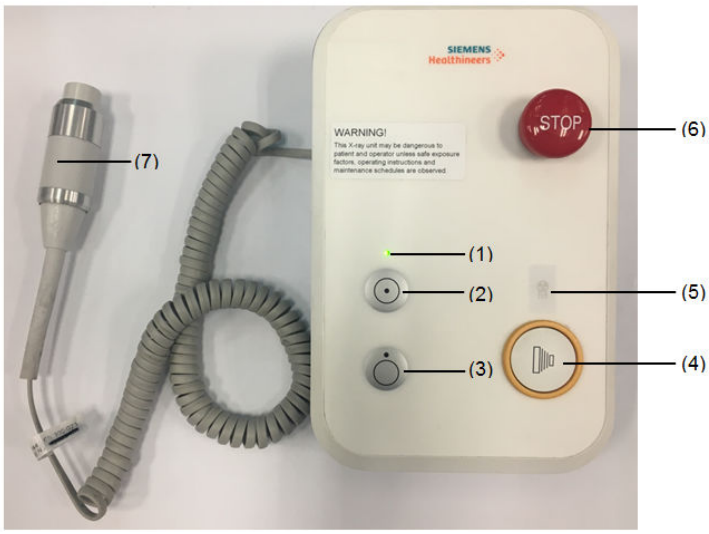
Do **not** touch the surface of the screen using sharp, pointed objects.

Do **not** open the display under any circumstances.

Operate the touch screen (optional) with one dry and clean finger.

For further information refer to the Imaging System Operator Manual.

3.2.4 Generator ON/OFF console



(8)

(1) LED indicator
Lights up when power is ON
Lights off when power is OFF
(2) Generator ON button
(3) Generator OFF button
(4) Radiation release button
(5) Radiation indicator
Lights up when radiation is ON
Lights off when radiation is OFF
(6) Emergency STOP button
(7) Hand switch (optional)
(8) Detector calibration switch (at the back side of the console)

The exposure is released either with the release button (4) integrated in the control console or with the hand switch (7) with spiral cable.

Before releasing a radiation, check the selected acquisition data on the imaging system.

The selected acquisition data should be checked during exposure parameter settings.

CAUTION

Wrong radiation parameters

Risk of undesired X-ray exposure due to wrong parameters

- Only suitably qualified personnel should use the system.
- Check the radiation parameters before releasing X-ray.
- Pay special attention to the exposure index (EXI).

Release exposure with hand switch

Preparations:

- Press the release button down to the 1st pressure point and hold it until the radiation release (approx. 1 s to 2 s).

  The rotating anode is accelerated to nominal speed.

  The required filament current is set.

After warming up the X-ray tube assembly and starting up the rotating anode, it is possible to release the exposure specifically.

Radiation release:

1 Press the release button down fully and keep it pressed until the exposure is ended.

  The radiation indicator on the control console lights up and an acoustic signal sounds during exposure release.

Letting the release button go ends the exposure immediately and the exposure can be underexposed.

2 Observe the following to increase the life of the X-ray tube assembly:

  If possible always select 80% tube utilization at the generator.

  In the programs with small focus and a tube voltage less than 70 kV, absolutely program 80% tube utilization.

  Under 70 kV work if possible with the large focus.

  Keep the preparation time short and press the exposure release button

Especially if you are working on workstations with a high patient throughput (emergency workstations), it is recommended to pay attention to the above notes to prevent premature wear and tear of the tube assemblies.

3.2.5 Unit overview

- Patient table

  (→ Page 72 *Patient table*)

- Ceiling-mounted tube support

  (→ Page 58 *Ceiling-mounted tube support*)

- Wall stand

  (→ Page 75 *Wall stand*)

3.3 Ceiling-mounted tube 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.

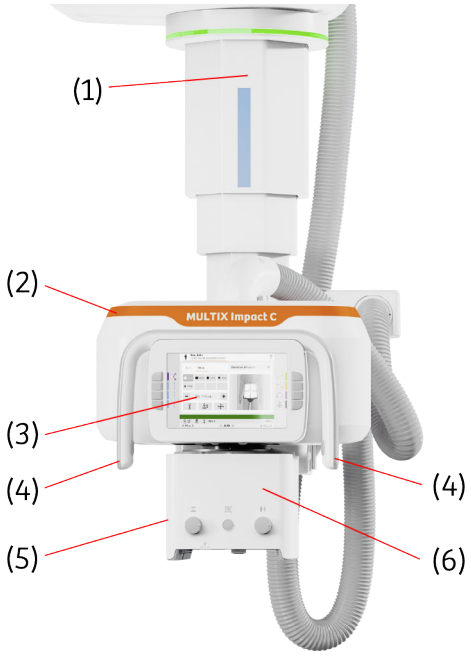
WARNING

Damaged cables inside the lifting column of the overhead tube or detector.

Overhead tube or detector can fall down. Risk of patient or user injury.

- If the overhead tube or detector cannot be moved vertically, do not force the movement.
- Call Siemens Healthineers Service.

The 3D overhead support consists of the following components:



(1) Lifting column with LED indicator (optional)
LED green: System is ready for exposure.
LED yellow: Exposures are being performed.
LED blue: System is not ready for exposure.
(2) X-ray tube unit
(3) Touch User Interface (TUI)
(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 (ACSS)
(6) Collimator control panel

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

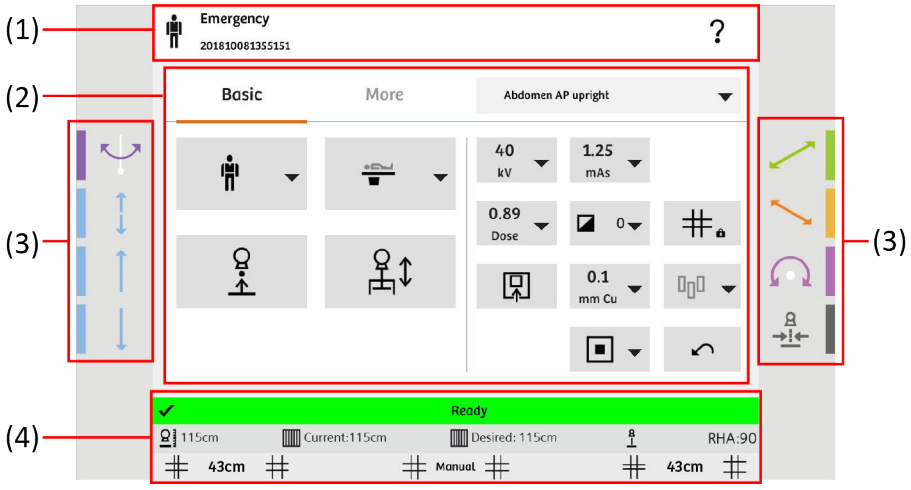
3.3.1 Touch User Interface (TUI)

The TUI is a color touch screen user interface for control of multiple functions. The touch screen corrects its display orientation from portrait to landscape, when the X-ray tube RHA angle is > 50°.

The display on the TUI informs you about the position of the support (SID, tube angle), the generator settings, patient name, organ programs, and so on.

Example of landscape orientation (left) and portrait orientation (right)

Layout



Example

(1) Patient information field
(2) Control field
(3) Movement button indicators
(4) System status and information field

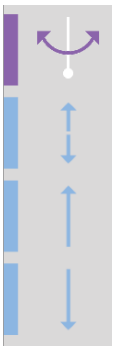
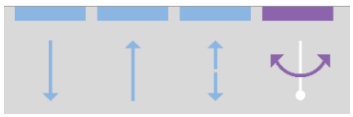
Press the TUI with one finger.

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

Buttons for movements and indications on the TUI

Next to the handles on the tube unit, there are four buttons on each side of the TUI.

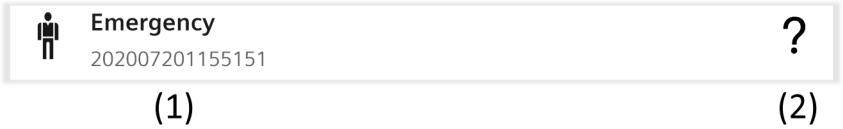
The functions of the buttons are indicated by symbols and colors on the TUI.

Vertical alignment of the tube unit	Horizontal alignment of the tube unit
 	 

Button symbol	Function of the button
	Tube rotation about the vertical axis
	Floating movement up and down
	Motorized movement up
	Motorized movement down
	Longitudinal movement
	Longitudinal movement is in lock position.
	Transverse movement
	Transverse movement is in lock position.

Button symbol	Function of the button
	Tube rotation about the horizontal axis
	Centering tube to the detector in bucky tray

Patient information field



(1) Patient information
(2) Help button

Before starting acquisition, make sure that the name of the patient on the TUI agrees with the name of the patient to be examined.

Displaying help

You can display context-sensitive help information on the TUI.

1 Tap the **?** icon.

The **?** icon is highlighted.

The user interface is in help mode and content sensitive help information is available.

2 Pressing an element and the help information is displayed.

3 To exit the help mode, tap the **?** again.

Control field

You can select the organ programs and check/change the acquisition parameters.

(1) **Basic** tab
(2) **More** tab
(3) Organ program selection

There are several basic types of buttons on the TUI.

Abbreviation	Type	Explanation
P	Push button	Starts an action The action terminates itself.

Abbreviation	Type	Explanation
T	Toggle button	Toggles between ON and OFF
S	Switch button	Switches among different states
Pop	Popup menu button	Opens a popup menu

Patient size and workplace selection

You can select the patient size and workplace by using the pop up menu.

Patient size The selected patient size is displayed with an icon.

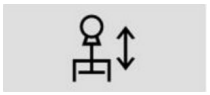
Icon	Short description
	Small/thin patient
	Medium patient
	Large/thick patient

Workplace selection The selected workplace is displayed with an icon.

Icon	Short description
	Patient table
	Wall stand
	Free exposure
	Cassette exposure

Direct accessible functions

SID tracking

Icon	Short description
	Disabled: Preconditions are not fully fulfilled. (➔ Page 98 *SID tracking*)
	Not pressed: inactive
	Pressed: active and tracking on target
 (red)	Active but tracking target lost - or - During tracking-movement Tracking function can be deactivated in "lost" state as well.

Tube/detector tracking

Icon	Short description
	Not pressed: inactive
	Pressed: active and tracking on target
 (red)	Active but tracking target lost Tracking function can be deactivated in "lost" state as well.

Top alignment

Icon	Short description
	Disabled: Preconditions are not fully fulfilled.
	Not pressed: center-aligned Press the centering button to activate the center alignment.

Icon	Short description
	Pressed: top-aligned Press the centering button to activate the top alignment. Preconditions: • Wall mode is selected. • Tube RHA angle is -90° ± 45° or 90° ± 45° depending on configured position of BWS.

Restore OGP parameter

Icon	Short description
	Restore the organ program parameters to default settings.

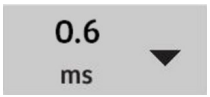
Control element disable function

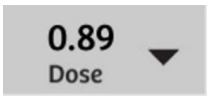
Icon	Short description
	Not pressed: inactive
	Pressed: active All buttons for motorized movement of the tube stand and other components such as BWS and patient table are disabled!

Software stops (only avaialble for systems with Ortho or SmartPositioning function)

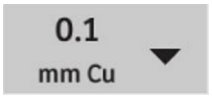
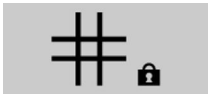
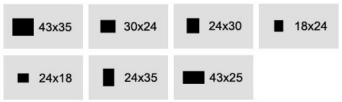
Icon	Short description
	Disabled
	Pressed: active Software stops at -90°; 0°; +90° are turned on for tube unit rotation around the horizontal axis.

Generator functions

Icon	Short description
	kV value selection
	ms value selection
	mAs value selection

Icon	Short description
	Dose value selection
	Density correction
	AEC fields selection
	Focus selection

Collimator functions

Icon	Short description
	Cu filter selection
	Restore collimator button (➔ Page 138 *Restoring the last collimation*)
	Collimator size selection
	SID adjustment for free exposures

System status and information field

System status

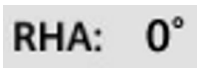
Icon	Short description
	Status: Ready
	Status: not Ready Error messages display with the warning symbol.

Grid status

Icon	Short description
 **Current: XXX**	A grid is inserted in the patient table or wall stand, and the grid type is indicated. Grid type: • **Universal**: universal grid, f_0= 140 cm • **115 cm**: grid, f_0= 115 cm • **180 cm**: grid, f_0= 180 cm
 **Current: none**	No grid is inserted.
 **Current: unknown**	For free exposures, a clip-on grid may be used. The status of the clip-on grid cannot be detected by the system.
 **Current: removed**	Grid removed during grid test Table or wall mode is active, grid runs out of its position during grid test.
 **Desired:XXX**	The grid defined in the organ program is indicated.
 **Desired: none**	No grid is defined in the organ program.
 **Desired: unknown**	An organ program for free exposure has been selected. The grid is not defined in the free exposure organ programs.

The grid information is highlighted in yellow when the actual grid status does not match the setting in the organ program.

Tube position

Icon	Short description
	SID in cm or inch
	Tube rotation angle RHA

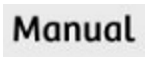
Centering display

Icon	Short description
	Beam in center- or top aligned mode
	Red: beam not in center- or top aligned mode

Collimation (for automatic collimator only)

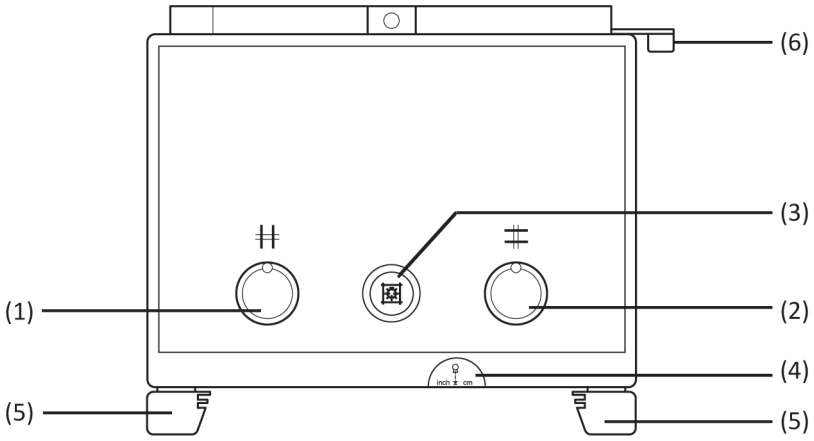
Icon	Short description
	Collimator height in cm or inch
	Collimator width in cm or inch
	Collimator rotation It displays when the collimator is rotated.

Collimator mode (for automatic collimator only)

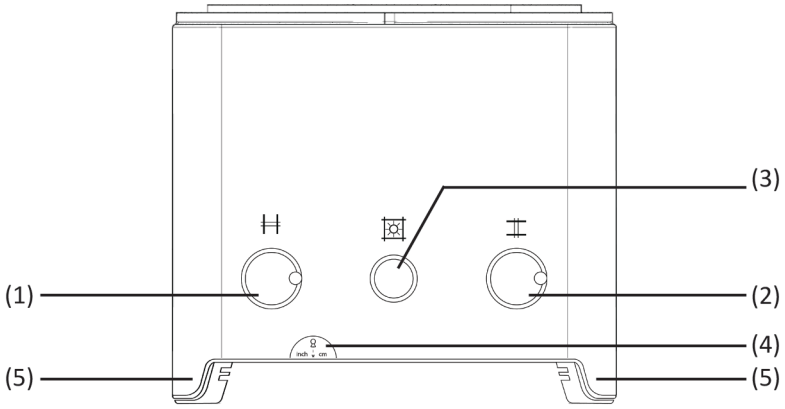
Icon	Short description
	ACSS mode
	Manual mode

3.3.2 Multileaf collimator

Control elements at the front



Collimator AL04 II-D



Collimator RFU

(1) Adjusting knob for format width collimation
Turning the knob to the left or right
(2) Adjusting knob for format height collimation
Turning the knob to the left or right
(3) Button for full-field light localizer and laser line light localizer
Switches off automatically after a preset time (configurable)
(4) Tape measure for SID setting (cm and inch)
(5) Accessory rails with locking spring
(6) Detent lever for ± 45° rotation of the collimator about the vertical axis. The collimator only stops in the 0° position.

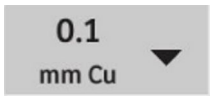
Additional Cu filter

There are **four** possibilities of selecting internal additional Cu filters for the automatic collimator:

- 0.0 mm (**no**) Cu
- 0.1 mm Cu
- 0.2 mm Cu
- 0.3 mm Cu

The selection of additional filters is specified in the organ program. However, you can change this setting at the imaging station or on the TUI.

Selecting additional filters



◆ Touch this button on the **Basic** tab on the TUI.

A popup menu appears where you can select the required filter

The additional filter which is selected is displayed at the imaging station.

When changing the additional filters with respect to the organ program selected, this is marked with a star * at the imaging station, denoting the change.

– or –

Select the filter at the imaging system.

Refer to the Imaging System Operator Manual for further information.

CAUTION

Incorrect filter selection

Risk of increased radiation dose for the patient

- Select the filter carefully.

Accessory rails

The accessory rails may be loaded with maximum 70N (7kp).

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.

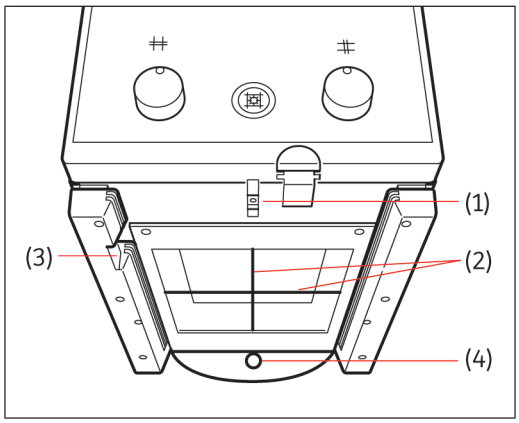
- Do not hang more than 7 kg on the collimator accessory rails.
- Do not exert any force on the multileaf collimator or its rails when inserting the accessory or auxiliary device.
- Check that the accessory is firmly anchored in the collimator rails.

Measuring tape for SID/SOD measurement

The measuring tape (6) has two scales:

Inches (left scale) and cm (right scale).

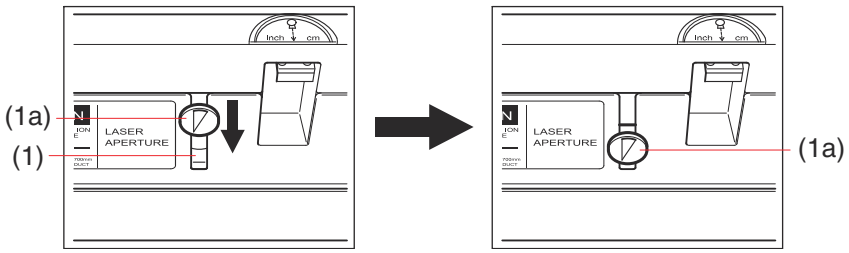
Control elements at the underside



(1) Laser line light localizer with slider to cover the outlet opening
(2) Crosshairs in the light localizer window
(3) Locking spring for accessories
(4) Camera (optional)

Laser line light localizer

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



The laser line light localizer is switched on and off jointly with the full field light localizer.

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.

To protect the eyes of the patient or any other person, the laser radiation outlet (1) of the laser line light localizer can be closed with the sliding cover (1a).

CAUTION

Looking into the laser light

Eye injury

- Take care that neither you nor anybody else looks directly into the laser beam.
- Close the sliding cover over the laser light to protect the eyes of the patient and other people.
- Note that the collimator can heat up when the light localizer is used for a longer period of time.

CAUTION

If the LED of the light localizer burns for a long time, parts of the light localizer can heat up.

Danger of burns

- Avoid contact with the light localizer to avoid burns.

Switching on/off the laser line light localizer

1 To switch on the laser line light localizer, press the button at the front of the collimator.

2 To switch off the laser line light localizer, press the button again.

The laser line light localizer can also be switched off automatically by an internal time switch. (The internal time switch can be set by Siemens Healthineers service. 5 s to 118 s)

Crosshairs

The crosshairs project the longitudinal and transverse axis of the radiation field onto the cassette or directly onto the patient.

1 The full field light localizer for projecting the crosshairs is switched on with the button at the front of the collimator.

2 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 internal time switch can be set by Siemens Healthineers service.)

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 and so on, inserted in the accessory rails of the collimator, thus securing them against falling out.

Removing the accessories

- Press the locking spring to the left until the compensating filter, template and so on, can be removed from the collimator.

3.4 Patient table

3.4.1 Application

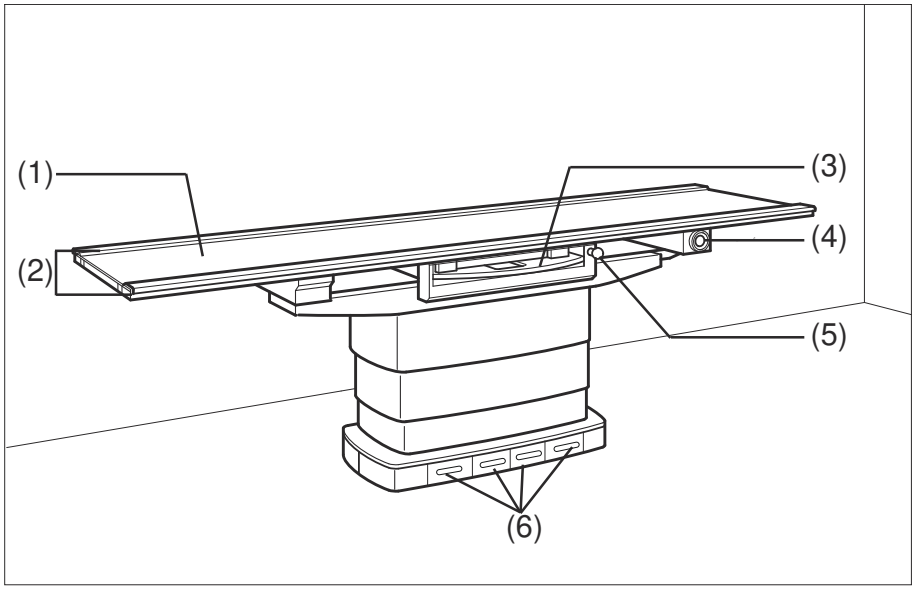
The patient table is designed for use in stationary radiographic systems. The patient table supports the sitting or recumbent patient during the radiographic exposure and contains the detector tray. The tabletop is movable in the direction of the X-, Y- and Z-axis.

The patient table may be used for projection of radiographic examinations of both adults and children.

- X-rays can be taken on the lying or sitting patient
- Exposures in the region of the chest, of the spine, of thorax, lungs and abdomen as well as of the extremities are possible.

3.4.2 Overview

The patient table can be used with a MAX wi-D or a Core XL.



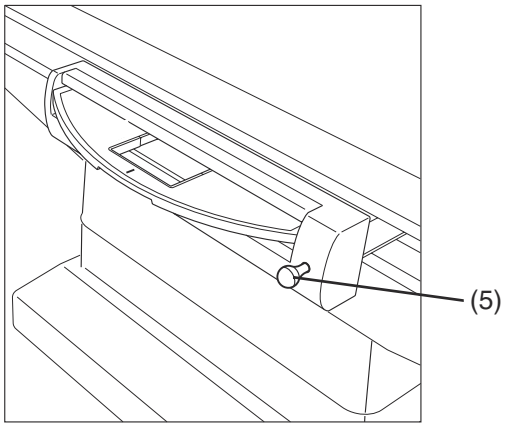
(1) Tabletop
(2) Accessory rails
(3) Detector tray, movable to the left or right manually
(4) Emergency STOP push button on both front and rear sides
(5) Brake knob to move the detector tray
(6) Foot kick switch for tabletop movements and table lift
As an option, a second set of foot kick switches on the rear side is available

3.4.3 Brake knob

The brake knob is mounted to the right side of the detector tray.

With the brake knob, the detector tray can be moved manually in longitudinal direction. The detector tray can be stopped and fixed at any position within its moving range.

Moving the detector tray



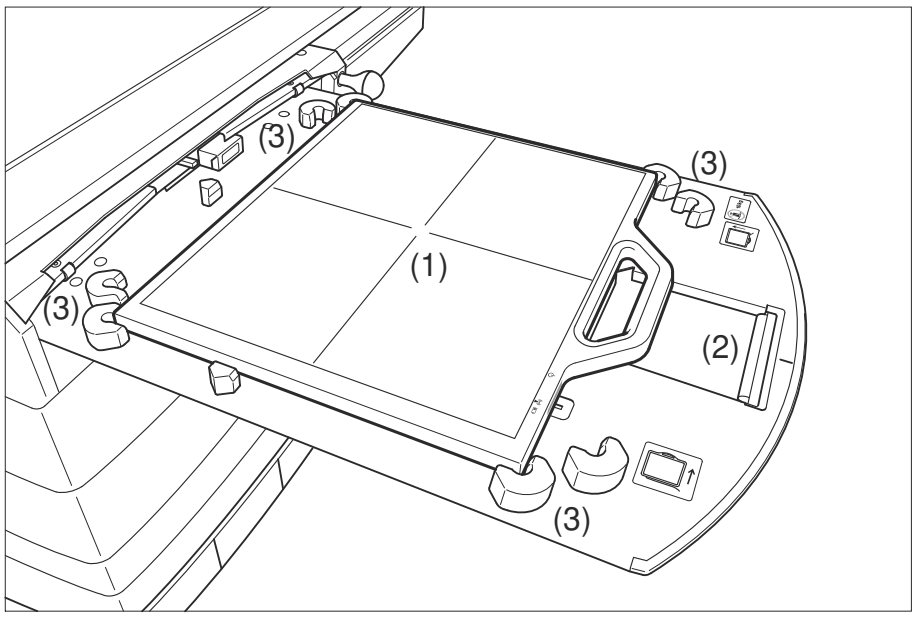
1 Pull the brake knob (5) to release the brake of the detector tray.

2 Let go of the brake knob in the desired position.

The brakes now hold the detector tray in position.

The brake knob is not functional during the coupling of the tube unit and the detector unit in the fixed table.

3.4.4 Detector tray with wireless detector



Example, detector tray with MAX wi-D

(1) Wireless detector
(➔ Page 77 *Wireless detectors (MAX wi-D or Core XL)*)
(2) Handle of the detector tray
(3) Stops

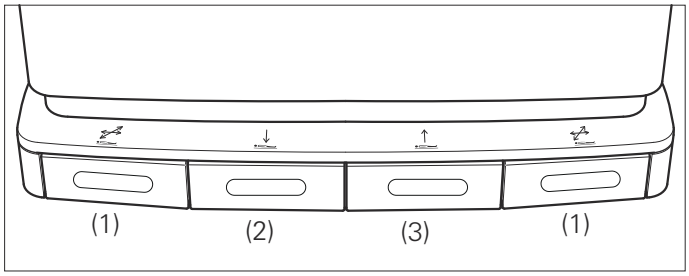
3.4.5 Emergency STOP push button

It interrupts **all motor driven** system movements.

For more details, please refer to (➔ Page 14 *System Safety*).

3.4.6 Foot kick switches in the table base

Standard functions



(1) Release the tabletop brakes (in longitudinal and transverse direction),

(2) Table downwards movement, “Push button mode”

(3) Table upwards movement, “Push button mode”

Alternative operation modes switch

The following modes of operation can be configured for both switches (1):

- Push button mode (dead man function)

  The foot kick switch operates like a push button.

  The corresponding function is enabled only as long as the foot kick switch is actuated.

- Sensor mode (toggle function)

  The foot kick switch operates like a switch.

  If the foot kick switch is actuated once, then the function is switched on (brakes released).

  The function is switched off again at the second actuation.

⚠ CAUTION

Floating tabletop in sensor mode (toggle function) is not locked.

Risk of falling or sliding

◆ In case the floating tabletop is working in sensor mode, always lock the tabletop after patient positioning is finished.

3.5 Wall stand

3.5.1 Description

- The wall stand contains a detector unit with grid.
- The detector unit is fully counterbalanced and features continuous vertical adjustment.
- The detector unit can be continuously tilted from the vertical into the horizontal position (+90°) and up to -20° with a detent at 0° and 90°.
- Automatic synchronization (detector height adjustment)

  X-ray tube follows synchronized and keeps centering on middle of detector or its upper edge
- The wall stand has a centering function

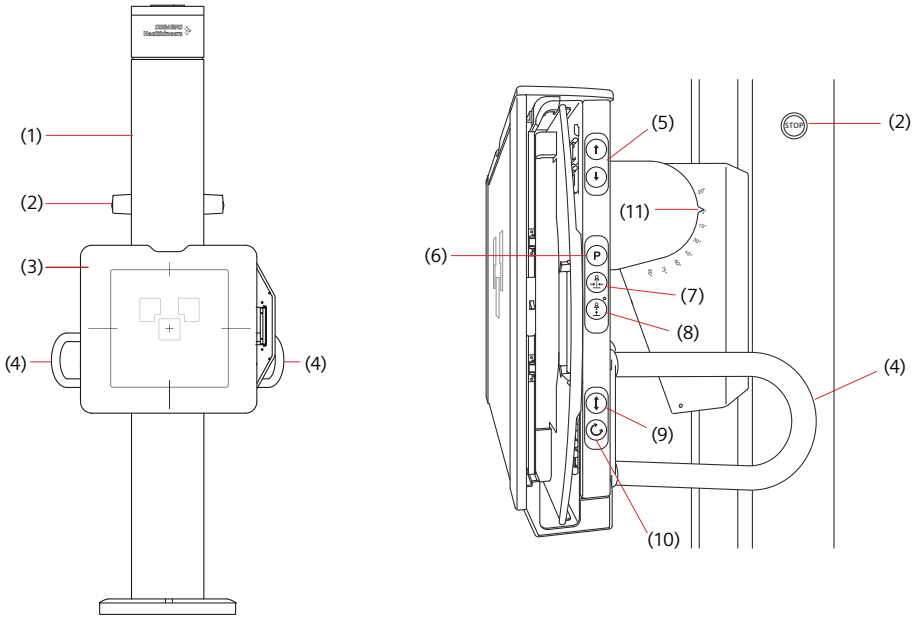
  Fully automatic centering of X-ray tube on middle of detector or its upper edge
- The wall stand can be mounted on the floor.

3.5.2 Application

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 thorax, abdominal, pelvic, skull and vertebral regions as well as radiography of the extremities.

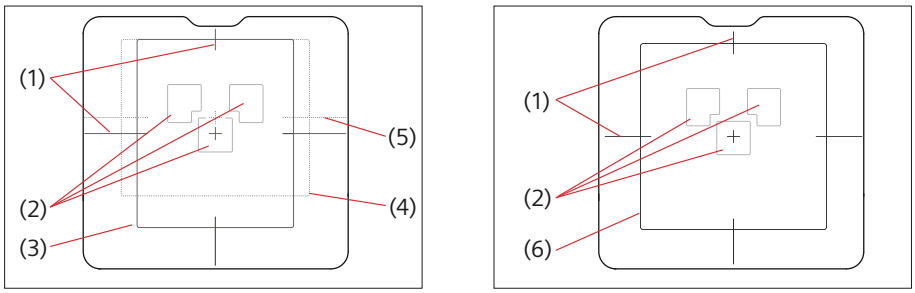
3.5.3 Operating elements

Operating elements can be found on both sides.



(1) Stand column with LED indicator (optional) on the top of the column
LED green: System is ready for exposure.
LED yellow: Exposures are being performed.
LED blue: System is not ready for exposure.
(2) Emergency STOP push button
(3) Front panel with imprint for detector position and measuring fields
(4) Patient hand grips
(5) Buttons for motorized vertical movement
(6) Button for parking position
(7) Button for centering tube to detector
(8) Button for tube/detector tracking function with LED indicator
(9) Button for manual vertical movement
(10) Button for unlocking the tilt mechanism
(11) Degree of tilting angle

3.5.4 Front panel markings

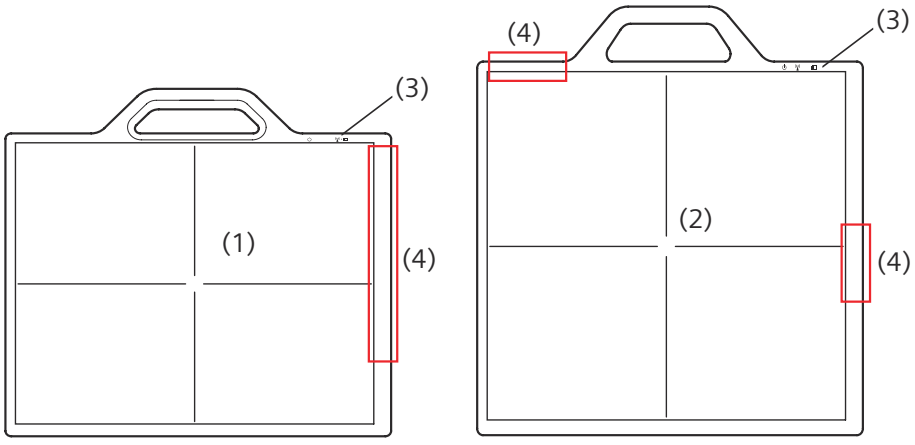


Example markings on wall stand with MAX wi-D (left) and Core XL / Core static (right)

(1) Center crosshairs
(2) Position of IONTOMAT ionization chambers
(3) Detector field for MAX wi-D in portrait format
(4) Detector field for MAX wi-D in landscape format
(5) Center marking for portrait format
(6) Detector field for Core XL / Core static

3.6 Wireless detectors (MAX wi-D or Core XL)

3.6.1 Description



(1) Detector MAX wi-D
(2) Detector Core XL
(3) Detector indicators
(4) Wireless antenna

General Description

The wireless detector is part of a digital image acquisition chain in an overall radiological system. It features a portable equipment designed for mobile applications.

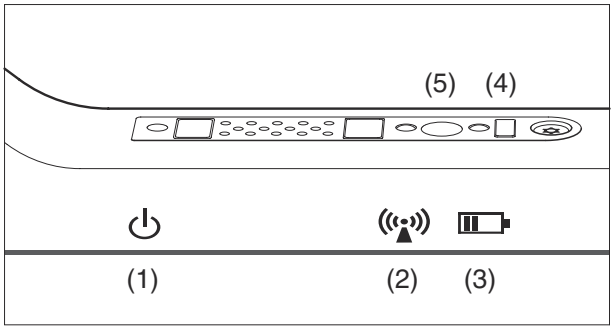
The communication is managed through a WiFi interface.

Do not cover the wireless antennae during exposures, as otherwise the detector will lose its wireless signal.

Detector description

The MAX wi-D and Core XL both have LED indicators for internal status and connector for service issues. The back sides (with respect to the active sensitive array) of the both detectors include electrical contacts to recharge the replaceable battery.

Detector indicators (MAX wi-D)



(1) Detector status LED
(2) Wi-Fi status LED
(3) Battery status LED
(4) Infrared sensor
needed for attachment of the detector
(5) Power button
Long push (switch off/on)

It may be possible that even when the Wi-Fi Status LED and the detector Status LED are green, release of radiation is blocked by the system.

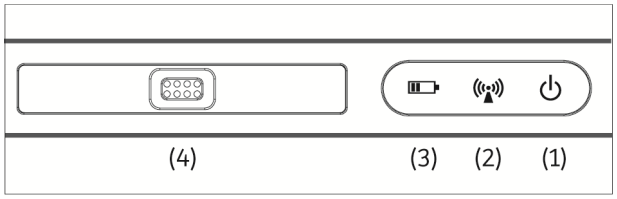
Please check information displayed on the user interface (TUI).

LEDs are provided on the detector (close to handling), to give basic information on the detector behavior.

LED color / status	Detector status LED (1)	Wi-Fi status LED (2)	Battery status LED (3)
LED off	OFF state	Wi-Fi disabled	No battery
LED green	Operating state and online Ready for acquisition	Wi-Fi available (detector connected to an Access Point)	Battery OK
LED orange	Offline or download state	Wi-Fi not ready (detector not connected to an Access Point)	Battery getting low
LED orange - blinking slow	Error state or switching ON	n.a.	n.a.
LED orange - **blinking fast**	n.a.	n.a.	Battery low

LED color / status	Detector status LED (1)	Wi-Fi status LED (2)	Battery status LED (3)
LED orange - **blinking fast, then red flashlight on the 3 LEDs, then OFF**	Switching OFF (going to OFF state) when requested by message or by time-out	n.a.	n.a.

Detector indicators (Core XL)



(1) Detector status LED
(2) Wi-Fi status LED
(3) Battery status LED
(4) Cable port
needed for attachment of the detector only

It may be possible that even when the Wi-Fi Status LED and the detector Status LED are green, release of radiation is blocked by the system.

Please check information displayed on the user interface (TUI).

LEDs are provided on the detector (close to handling), to give basic information on the detector behavior.

LED color / status	Detector status LED (1)	Wi-Fi status LED (2)	Battery status LED (3)
LED off	n.a.	n.a.	No battery
LED green	Detector connected to system	Wi-Fi available (detector connected to an Access Point)	Battery capacity: 11% - 100%
LED orange	Detector not connected to system	Wi-Fi not ready (detector not connected to an Access Point)	Battery capacity: 6% - 10%
LED orange - blinking	Detector in firmware update	n.a.	Battery capacity: ≤ 5%
LED green - blinking	Detector in startup	n.a.	Battery charging
LED green - blinking (once)	System in exposure	n.a.	n.a.

3.6.2 Status and system messages

In the following situations, the battery will probably be empty or the voltage will be too low:

- The wireless detector has been accidentally left outside one of the charging locations for too long, for example over night.
- The wireless detector is outside the room.

Proceed as indicated in the system messages to solve the problem.

4 System Operation

4.1 On-Off

The MULTIX Impact C system may be in one of the following operating status:

- Off

  All the components of the system and the imaging station are turned off except for the detectors which remain in standby mode.

- On

  All the components of the system 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 components including the detector power supply and the imaging system are disconnected from the mains using the on-site emergency SHUTDOWN switch.

4.1.1 Before using the system

If the power network at the site is very unstable, it may be advisable to install an uninterruptible power supply to prevent data loss. Contact Siemens Healthineers for more information.

1 Perform a visual inspection on the system.

2 Make sure that there is nothing to hinder stand movements.

4.1.2 Switching on a switched-off system

No indicators on the generator ON/OFF console are lit.

◆ Press the ON button.

The ON indicator is lit.

The system is powered up.

The system performs a self-test.

The imaging system is started.

If the battery of the detector is completely empty, charge it and wait at least 60 minutes. The detector needs a warm-up time between 60 and 120 minutes to achieve good image quality, depending on environmental temperature and switch-off time.

During warm-up time acquisitions are possible but reduced image quality may occur.

(This is the case if the system has been turned off completely via the mains switch and has not been in standby mode. If it has been turned off at the On/Off control console, no warm-up time is necessary.)

In case of a fault:

- Shut down the system and turn it on again.

  If the fault remains:
- Call Siemens Healthineers Customer Service.

4.1.3 Switching on after power failure or after an emergency SHUTDOWN switch is activated

When the on-site emergency SHUTDOWN switch is activated, the whole system is cut-off from the power supply.

Unstored images of the patient currently being examined may be lost. Images and data of terminated examinations of previous patients are stored to the hard disk of the image processor.

1 After a power failure or an emergency SHUTDOWN switch is activated, check the images of the last examined patient!

2 After removing the reason for activating the emergency SHUTDOWN switch, deactivate the emergency SHUTDOWN switch and then switch on the system.

3 If the imaging system does not start any more or if a serious error is indicated, call Siemens Healthineers Customer Service.

4.1.4 System switch-off

If no more acquisitions are required, you can switch the system off completely.

Do **not** press the keys **Ctrl**+**Alt**+**Del**.

Pressing this key combination is on your own risk.

If you do so, problems may occur.

1 Press the OFF button on the console.

The MULTIX Impact C system and the imaging system automatically shut down.

If the ON button is pressed again within 10 seconds (configurable by Siemens Healthineers Customer Service), only the MULTIX Impact C system shuts down, not the imaging system.

2 Switch off the main switch of the x-ray unit (or room), if necessary.

4.1.5 Emergency SHUTDOWN switch activation

- **Only** (exclusively) if patients, operators, third parties, or the unit are in danger, press (activate) the on-site emergency SHUTDOWN switch.

4.1.6 Rebooting the system

We recommend a daily reboot of the system or at least one reboot a week.

1 Press the OFF button an the console.

2 When the Image Station has shut down (dark monitor), press the ON button again.

4.1.7 UPS (for the imaging system)

UPS = Uninterruptible Power Supply

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

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.

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.

Functioning in the event of power failure

In the event of power failure, all indicators and displays are dark. Only the imaging system as well as the main monitor in the control room is still being powered by the UPS to end all active tasks, for example archiving of images.

1 Stop the examination.

2 Do not press any keys.

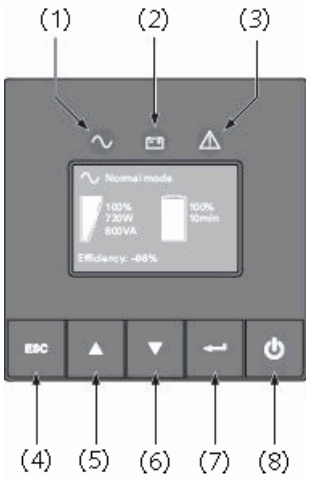
After a configurable time (typically 2 minutes), the imaging system shuts down to prevent the backup battery to be exhausted.

3 Wait for power to return or start emergency power.

4 Restart the system.

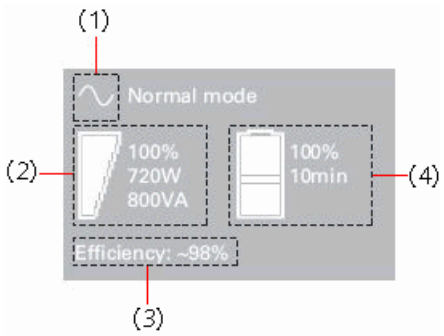
Description of UPS

The UPS has a five-button graphical LCD. It provides useful information about the UPS itself, load status, events, measurements and settings.



(1) Power ON indicator (green)
The UPS is operating normally
(2) Battery ON indicator (yellow)
The UPS is on battery mode
(3) Alarm indicator (red)
The UPS has an active alarm or fault
(4) Escape
(5) Up
(6) Down
(7) Enter
(8) ON/OFF button

LCD description



(1) Operation status
(2) Load/equipment status
(3) Efficiency and load group information
(4) Battery status

As default, or after 5 minutes of inactivity, the LCD displays the screen saver.

The backlight LCD automatically dims after 10 minutes of inactivity.

Press any button to restore the screen.

The following table describes the status information provided by the UPS:

Operation status	Possible cause	Action
Standby mode 	The UPS is OFF, waiting for start-up command from user	System is not powered until power button is pressed.
Normal mode 	The UPS is operating normally.	The UPS is powering and protecting the system.
In AVR mode  No beep	The UPS is operating normally, but the system voltage is outside normal mode thresholds.	The UPS is powering the system through an Automatic Voltage Regulation device. The system is still protected normally.
On battery  Battery LED is on 1 beep every 10 seconds	A utility failure has occurred and the UPS is in battery mode.	The UPS is powering the system with the battery power. Prepare your system for shutdown.
End of backup time  1 beep every 3 seconds	The UPS is in battery mode and the battery is running low.	This warning is approximate and the actual time to shutdown may vary significantly. Depending on the UPS load, the “Battery low” warning may occur before the battery reaches 20% capacity.

Operation

Start-up and normal operation

To start the UPS:

1. Verify that the UPS power cord is plugged in.

   The UPS front panel display illuminates and shows EATON logo.

2. Verify that the UPS status screen shows  .

3. Press the  button on the UPS front panel for at least 2 seconds.

   The UPS front panel display changes status to “UPS starting...”.

4. Check the UPS front panel display for active alarms or notices. Resolve any active alarms before continuing.

   (➔ Page 87 *Troubleshooting*)

If the ⚠ indicator is on, do not proceed until all alarms are clear.

Check the UPS status from the front panel to view the active alarms.

Correct the alarms and restart if necessary.

5 Verify that the ~ indicator illuminates solid, indicating that the UPS is operating normally and any loads are powered and protected.

The UPS should be in normal mode.

Starting the UPS on battery

Before using this feature, the UPS must have been powered by utility power with output enabled at least once.

To start the UPS on battery:

1 Press the ⏻ button on the UPS front panel until the UPS front panel display illuminates and shows the status “UPS starting...”.

The UPS cycles through Standby mode to Battery mode.

The 🔋 indicator illuminates solid.

The UPS supplies power to your system.

2 Check the UPS front panel display for active alarms or notices besides the “Battery mode” notice and notices that indicate missing utility power.

3 Resolve any active alarms before continuing.

See (➔ Page 87 *Troubleshooting*)

4 Check the UPS status from the front panel to view the active alarms.

5 Correct the alarms and restart if necessary.

UPS shutdown

To shut down the UPS:

◆ Press the ⏻ button on the UPS front panel for 3 seconds.

The UPS starts beeping and shows the status “UPS shutting OFF...”

The UPS then transfers to Standby mode and the ~ indicator turns off.

Operation on battery power

Transfer to battery power:

- The connected devices continue to be supplied by the UPS when AC input power is no longer available.

  The necessary energy is provided by the battery.

- The ~ and 🔋 indicators illuminate solid.
- The audio alarm beeps every 10 seconds.

The connected devices are supplied by the battery.

Low-battery warning:

- The and indicators illuminate solid.
- The audio alarm beeps every 3 seconds.

The remaining battery power is low.

Shut down all applications on the connected system because automatic UPS shutdown is imminent.

End of battery backup time:

- LCD displays “End of backup time”.
- All LEDs go OFF.
- The audio alarm stops.

Return of AC input power:

- Following an outage, the UPS restarts automatically when AC input power returns and the load is supplied again.

Troubleshooting

Operation status	Possible cause	Action
Batteries disconnected 	The UPS does not recognize the internal batteries	If the problem persists, contact Siemens Healthineers service.
	The batteries are disconnected	Verify that all batteries are properly connected. If the problem persists, contact Siemens Healthineers service
Overload 	Power requirements exceed the UPS capacity (greater then 105% of nominal)	Remove some of the devices from the UPS. • The UPS continues operation, but may shutdown if the load increases. • The alarm resets when the condition changes to normal.
End of battery life 	The end of the battery life is reached.	Contact Siemens Healthineers service for battery replacement.
Event 	A UPS event occurs.	
	Example: Remote power OFF, the RPO contact has been activated to shutdown the UPS and now prevents restart.	Set the contact back to its normal position and press button to restart.

Operation status	Possible cause	Action
UPS fault 	The UPS has an internal fault.	The UPS does not protect the system anymore. Note the alarm message and the UPS serial number, then contact Siemens Healthineers service.

4.2 Functional and safety check

4.2.1 Daily checks

After system switch-on

- Perform a visual inspection of all displays and signal lamps on the operating units.

  No errors must be indicated.

  If radiation is released, all radiation ON indicators which may be present must light up.

Damage check

1. Check system and accessories daily for damaged or loose parts.
2. If problems are found, have the parts repaired before resuming patient examinations.

Prior to examination

1. Remove unnecessary objects and equipment from the area of action of the system.
2. Remove unnecessary accessories from the accessory rails of the table and the primary collimator.
3. Attach the devices required for patient positioning and immobilization securely to the system.
4. Attach all safety-related accessory parts correctly (for example, footboard, grip protection strip, hand grip, hand grip strip) and make sure that they are properly secured.
5. Clean any contrast agent residues from the patient table, protective plate.

Recommendation:

1. As a test, take a full-format exposure using the largest possible format.
2. Run a functional test of the emergency STOP buttons by performing an arbitrary system movement and pressing the emergency STOP button during the movement.

   The movement concerned must stop immediately.
3. Then unlock the button turning it clockwise.

   All system movements are possible again.

Check functionality of emergency stop daily.

Checking system movements

Overhead support

See also (➔ Page 94 *Positioning the 3D overhead support with tube unit*).

WARNING

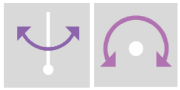
Abnormal sinking of the overhead column.

Injury of persons

- Perform maintenance at regular intervals (at least every 24 months) to maintain the safety and proper functioning of the product.

1 Check manual longitudinal, transverse and vertical movements of the overhead support.

2 Check 'floating' overhead support movement.



3 Check the unit rotation.

4 Check motor driven overhead support height adjustment.

5 Observe the indications in the display.

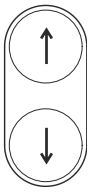
Patient table (optional)

1 Check manual longitudinal and transverse movement of the tabletop.

2 Check motor driven table height adjustment.

Wall stand

Verify up and down movement of the detector unit at the wall stand:



- Press the detector unit's up and down buttons.

Checking the light localizer and centering/collimation

Check the center position of radiation unit and wall stand with the light localizer and check the collimation.

Light on

- Press this button at the multileaf collimator.

  The light beam for collimation appears (time limited).

Centering

The accuracy of the stop positions of the tube unit can decrease to +/- 3 degrees due to hard wear. Lateral image information may be cut off.

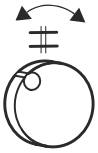
Always check the alignment of the tube unit to the detector with the light localizer.

- Check the alignment of the tube unit to the detector with the light localizer.

Collimation

Collimation close to the object reduces the scattered radiation and thus improves image quality. The radiation exposure to the patient is also reduced.

To protect the patient from unnecessary radiation, always check the collimator position with the light localizer.



- Open and close diaphragm.

  The light beam changes its height or width.

Checking the automatic collimation (ACSS): When ACSS is displayed on the TUI, the automatic collimation is active.

Light off

- Press the button again if light is on.

  The light beam is turned off.

During examination

1 Check the radiation ON indicator.

  It should light up or sound only if one of the radiation release switches has been pressed or for the duration of an X-ray exposure.

CAUTION

X-ray does not stop due to a technical defect or unintentional exposure. The radiation indicator or a radiation warning lamp lights up without a button/ switch being activated.

Risk of unnecessary radiation exposure

- Press the SHUTDOWN button to switch off the whole system.
- If no cause can be found, contact Siemens Healthineers Service and discontinue use of the system.

2 Check the patient positioning devices, for example the grip protection strip and hand grips.

3 Initiate system movements only under the following conditions:

There is no danger of injury to the patient or third parties.

There are no objects blocking the path of system movements.

4.2.2 Monthly checks

Make the following checks in addition to the daily checks:

SID

The three-digit digital SID display = source-image distance can be checked for agreement with the tape measure in the multileaf collimator.

We recommend you to make this check at regular intervals - approximately monthly.

Incorrect SID values can cause overframing.

In this case please call the Siemens Healthineers Service.

Constancy test

Perform the constancy test according to the applicable (country-specific) national statutory provisions.

CAUTION

Image incorrectly exposed because of malfunction of AEC

Unexpected radiation

- Perform a functional test of the automatic exposure control system as described below.

4.2.3 Functional check of the automatic systems

Automatic exposure control

If the values obtained in the following tests deviate from those specified, switch the system off and contact Siemens Healthineers Service immediately.

1 Select the an organ program.

2 Close the collimator on the tube assembly to a format of 10 cm x 10 cm.

3 Place a lead rubber apron, folded four times, in the beam path as a cover.

4 Release an exposure and keep the exposure switch pressed down.

The automatic exposure control automatically switches off when the limit is reached. A message appears: “Acquisition abort on limit excess”.

5 Release the exposure switch.

6 Open the collimator on the tube assembly and remove the lead rubber apron.

7 Press the exposure switch.

The automatic exposure control switches off automatically at < 1 mAs.

4.2.4 Checks concerning radiology

- IQAP check at delivery
- Maintenance every 24 months
- Daily image check by customer, for example, for artefacts.

4.2.5 DAP display test

The phantom for the test of the dose area product display consists of a 20 cm thick rectangular block of polymethylmethacrylate (PMMA) with side lengths greater than or equal to 25 cm.

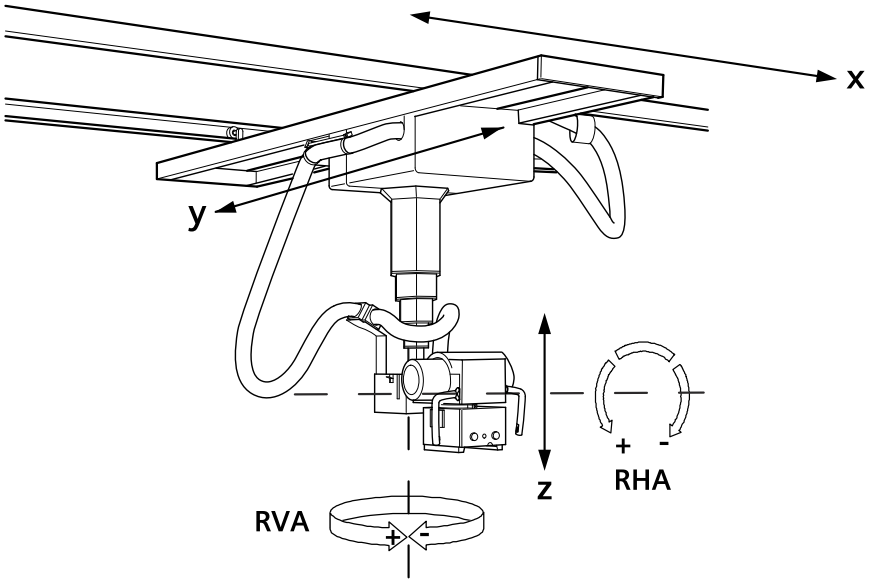
1 Measure the air kerma at a distance of 60 cm from the focal spot (approx. 55 cm above the tabletop for an SID of 115 cm) and multiply this dose value by the cross-sectional area of the useful beam in this plane.

2 Convert the result into units of [µGy x m^2] and compare it with the value displayed.

3 In case of inconsistent DAP values, call service.

4.3 Preparation and movements of the overhead support

4.3.1 Directions for moving and rotating the tube



Example

4.3.2 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

4.3.3 Directions for rotating

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

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

4.3.4 Rotating the collimator

For more detailed information refer to (➔ Page 99 *Rotating the multileaf collimator*)

4.3.5 Positioning the 3D overhead support with tube unit

WARNING

Defects on the carrying ropes or spring inside the lifting column broken

Injury of persons

- Do not exert strong force.
- Call the Siemens Healthineers service.

WARNING

Damaged cables inside the lifting column of the overhead tube or detector.

Overhead tube or detector can fall down. Risk of patient or user injury.

- If the overhead tube or detector cannot be moved vertically, do not force the movement.
- Call Siemens Healthineers Service.

CAUTION

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

Danger of burns

- Avoid contact with the tube housing to avoid burns.

Detents are provided in the longitudinal and transverse direction of the 3D overhead support, i.e. the support can be moved only by applying increased force or by releasing the button and pressing it again to go through certain positions (e.g. table center in longitudinal and transverse direction or defined SID values in longitudinal direction).

The buttons in the handles are configurable by the Siemens Healthineers 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

Adjusting height (z direction) manually

1 Grasp the handles of the tube unit with both hands

2 Press the button to release the brake for vertical movement.

Releasing the button will stop the movement.

3 Pull the tube unit into the required position.

Adjusting height (z direction) motor driven

- Press one of the buttons on the control panel for up or down movement.

Adjusting longitudinal position (x direction)

1. Grasp the handles of the tube unit with both hands
2. Press the button to release the brake for longitudinal movement.

   Releasing the button will stop the movement.
3. Pull the tube unit into the required position.

Detents are provided in the longitudinal and tranverse direction of the overhead support, i.e. the support can be moved only by applying increased force or by releasing the button and pressing it again to go through certain positions (e.g. table center in longitudinal and transverse direction or defined SID values in longitudinal direction: 115 cm, 150 cm, 180 cm and 300 cm for Ortho acquisition).

Adjusting transverse position (y direction)

1. Grasp the handles of the tube unit with both hands
2. Press the button to release the brake for transverse movement.

   Releasing the button will stop the movement.
3. Pull the tube unit into the required position.

Detents are provided in the longitudinal and tranverse direction of the overhead support, i.e. the support can be moved only by applying increased force or by releasing the button and pressing it again to go through certain positions (e.g. table center in longitudinal and transverse direction or defined SID values in longitudinal direction: 115 cm, 150 cm, 180 cm and 300 cm for Ortho acquisition).

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

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

Danger of burns

- Avoid contact with the tube housing to avoid burns.

The temperature of the tube surface during normal use reaches 50°C.

In case of high energy radiation the temperature may exceed the 50°C.

Rotation about horizontal axis (RHA)

1 Grasp the handles of the 3D overhead support with both hands.

2 Press the button to release the brake for rotating the tube unit about the horizontal (support arm) axis with your right thumb.

3 Turn the tube unit into the required position.

The angle of rotation is displayed in degrees on the TUI.

The tube unit can be rotated about the horizontal axis continuously, at a maximum by ±140°. There are stop positions at 0° and ±90°.

When the software stops function is active:

1 Rotate the tube unit to a position ±3° from the required detent (0° or ±90°).

2 Remove your finger from the button but hold the tube handles for 1 second.

The tube unit will be rotated automatically to the detent.

(➔ Page 64 *Software stops (only avaialble for systems with Ortho or SmartPositioning function)*)

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.

CAUTION

Rotation of tube

Risk of crushing

- Pay special attention to all crushing hazards between the system's moving parts and their guide openings.

Rotation about vertical axis (RVA)

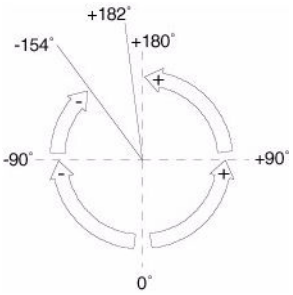
1 Grasp the handles of the 3D overhead support with both hands.

2 Press the button to release the brake for rotating the tube unit about the vertical (column stand) axis with your left thumb.

You can remove your thumb from the button once the brake has been released.

3 Turn the tube unit into the required position.

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



Rotation of the tube unit about the vertical axis (view from above: from the ceiling to the floor)

4.3.6 Tube tracking

Tube tracking in table acquisition mode

Prerequisite:

- Workplace "Patient table" is selected and a detector is inserted.

Press the button on the TUI to activate the tracking function.

Press the button for rotation about the horizontal axis on the tube and rotate the tube into the required position.

- or -

Press the button for longitudinal movement on the tube and pull the tube into the required position.

With RHA of the tube up to 45° in both directions, the detector inside the table follows the tube rotation or longitudinal movement; the central beam is locked on the detector.

The detector unit stops movement when it reaches the required position or the button for tube movement has been released.

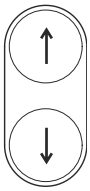
Tube tracking in wall acquisition mode

Prerequisite:

- Workplace "Wall stand" is selected and a detector is inserted.

Press the button on the wall stand or TUI to activate the tracking function.

The LED indicator on the wall stand is on.



Press one of the buttons for vertical movement on the wall stand to move the detector up and down to the required working height.

With RHA of the tube to 90°, the tube follows the detector inside the wall stand vertically; the central beam is locked on the detector.

The tube stops movement when it reaches the required height or the button for vertical movement on the wall stand has been released.

The tube movement stops immediately when it reaches the collision zone.

4.3.7 SID tracking

In addition to the tracking control perpendicular to the beam direction (in x direction), a further tracking control (in z direction) can be activated for keeping the SID (source-image distance) constant.

CAUTION

Parts of the system move unexpectedly during automatic positioning or tracking

Risk of injury to the patient or user

- Keep the patient within visual contact whenever performing any positioning functions.
- Use the emergency stop if motion needs to be stopped quickly.

Activating SID tracking in table acquisition mode

- ✓ Workplace table mode is active.
- ✓ A detector is inserted in the closed tray of the patient table.
- ✓ Tube unit is positioned above the table.
- ✓ Tube unit RHA angle is 0° ± 3°.
- ✓ Tube unit RVA angle is 0°.
- ✓ SID ≥ 90 cm

- Touch the SID tracking button at the TUI.

Activating SID tracking in wall acquisition mode

- ✓ Workplace wall mode is active.
- ✓ A detector is inserted in the closed tray of the wall stand.
- ✓ Detector unit is in +90°/horizontal position.
- ✓ Tube unit is positioned above the detector unit.

✓ Tube unit RHA angle is 0° ± 3°.

✓ Tube unit RVA angle is 0°.

✓ SID ≥ 90 cm

◆ Touch the SID tracking button at the TUI.

4.3.8 Deactivation of a tracking control

If the state of the system is changed so that one or several of the conditions for active tracking control are not fulfilled, then the tracking control is automatically switched off.

4.3.9 SID display

The SID (source-image distance) is displayed (in cm or inch according to configuration) at the TUI.

During oblique projections the angle in degrees is displayed on the TUI.

You must therefore absolutely measure the SID with the tape measure in the multileaf collimator.

4.3.10 Rotating the multileaf collimator

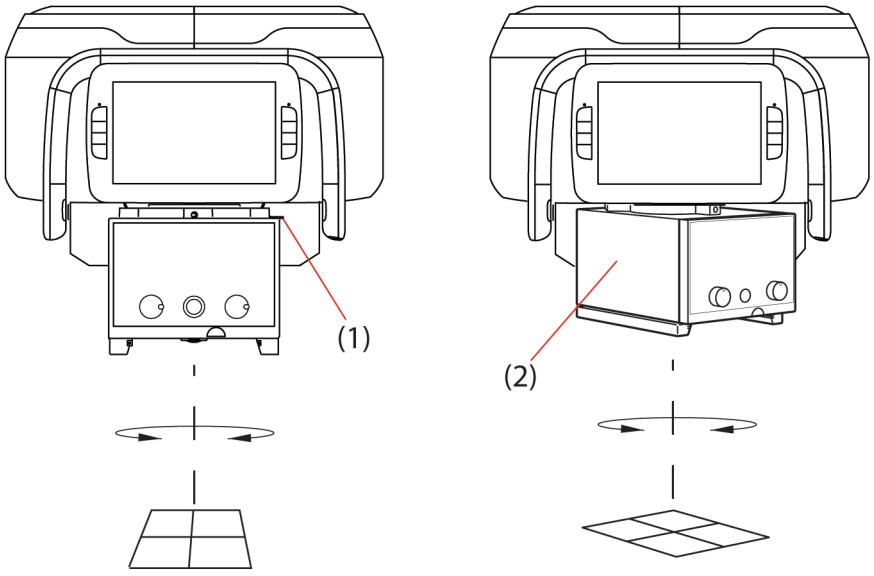
CAUTION

Hands between the handles and the overhead column

Risk of injury

◆ Grasp the collimator on the sides when turning it so that there is no risk of crushing your hands.

The collimator can be rotated out of the stop position 0°. The maximum rotation in both direction is ±45° by using the Siemens Healthineers tube flange. Assure that the rotation is not limited by the wiring harness.



Rotating the collimator

(1) Lock-in lever (not available on the Collimator RFU)
(2) Lamp housing

If the collimator is NOT in the 0° position, it will be indicated at the display of the TUI with this symbol.

Rotating the collimator ±45° around the Central Beam Axis

1 Press the lock-in lever on the multileaf collimator in the direction of the front panel.

The 0° lock of the multileaf collimator is released.

(There is no 0° lock in the Collimator RFU.)

2 Grasp the collimator and rotate it by the required angle to the required direction.

Rotating back into the 0° lock-in position

- Grasp the collimator and turn it into the centered 0° lock-in position.

4.4 Preparation and movements of the patient table

WARNING

System movements cause collision

Risk of injury or system damage

- Perform system movements only when it is certain that neither the operator, the patient, third parties nor pieces of equipment can be endangered by these movements.
- Remove any objects or accessories, for example injector or infusion stand, from the collision area.
- Make sure you are standing outside the dangerous area.
- Always watch the patient when performing system movements.

WARNING

Brakes on tabletop have reduced force when the system is turned off.

Risk of injury

- Check that nobody is leaning on the tabletop when the system is turned off.
- Avoid positioning patients such that a sudden movement of the tabletop could cause them to fall.
- Execute patient transfer with special care.

The table can be moved with the foot kick switches in the table base.

Optionally, there is also a foot switch for the elevating patient table.

4.4.1 Collision protection

The table has a collision detection that stops downward motorized movements in case the tabletop collides with an obstacle.

The tabletop can nevertheless be moved upwards.

4.4.2 Adjusting table height

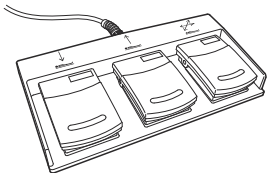
WARNING

Lowering the table onto a seated patient

Crushing of patient or operator seated with legs under the table (for example, a wheelchair patient)

- Do not position a patient with legs under the table.
- Do not move the table while a patient is seated near the table. System will stop when collision is detected, but there is still a risk of injury for the patient!
- Move the patient away from the table first.

Moving the table up

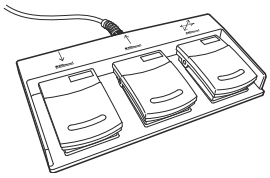


- Actuate the second foot kick switch from the right in the table base.

  – or –

  Actuate the middle foot switch (optional) for table up movement.

Moving the table down



- Actuate the second foot kick switch from the left in the table base.

  – or –

  Actuate the left foot switch (optional) for table down movement.

The table stops automatically at a certain height which can be programmed by Siemens Healthineers service.

4.4.3 Positioning the tabletop

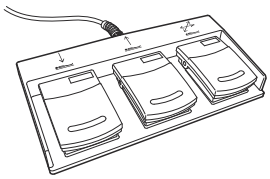
CAUTION

Patient does not use the hand grips and gets fingers caught in moving parts.

Risk of crushing

- Make sure that patient always uses the hand grips.
- If this is not possible, make sure that the patient's hands cannot get caught in the moving parts of the system.

1 Actuate one of the two outer foot kick switches in the table base.



– or –

Actuate the right foot switch to release the brakes for tabletop floating.

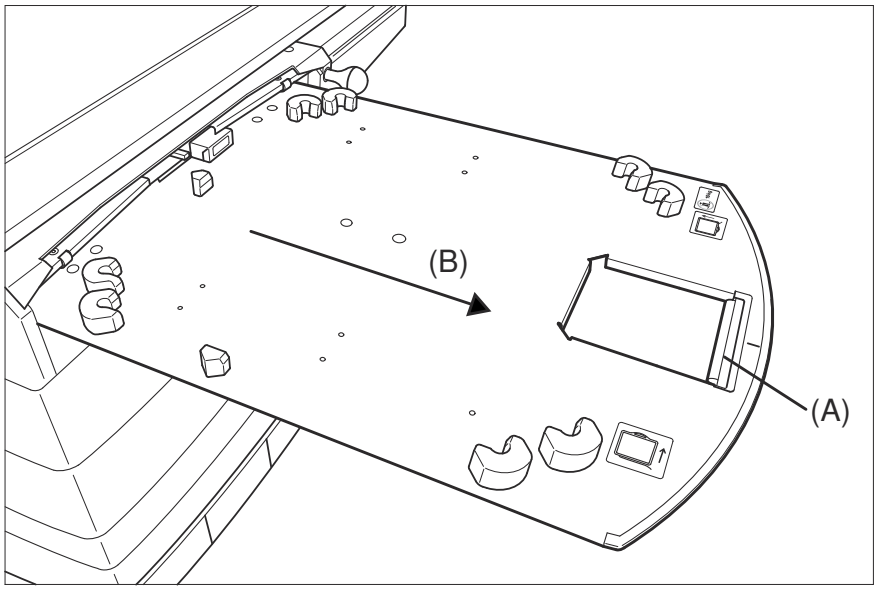
The tabletop brakes are released.

2 Push the tabletop manually into the required position.

Putting a strain on the extended tabletop may activate the collision control device.

4.4.4 Inserting wireless detector

1 Push the tabletop away from you as far as possible.



Example

2 Press the brake handle in the handgrip (A) to release the detector tray (B).

3 Pull out the detector tray (B) until it reaches the stop position.

CAUTION

Incorrect insertion of detector into the Bucky tray.

Risk of pinching or damage to detector.

- Be careful when inserting detector in the Bucky tray.

4 Carefully place the rear edge of the detector onto the detector tray, push the rear edge of the detector against the stops and lower the detector onto the tray between the lateral stops.

Only the MAX wi-D can be placed either in portrait or landscape format.

5 Carefully and slowly slide the detector tray into the patient table.

Push the detector tray back completely, or else the detector is not loaded in the detector tray.

Be careful not to damage the detector when sliding it into the tray as the tray does not have a mechanism to absorb the shock.

CAUTION

Detector cover broken

Toxic contamination

- Handle portable detector with care!
- If the detector is broken do **not** use it.
- Inspect if any particles are spilled.
- Leaked particles could be toxic - do **not** touch them!
- Use protective gloves to collect and keep them in a sealed container.
- Return spilled particles to Siemens Healthineers.

Do not load the withdrawn detector tray with more weight than the label on the detector tray states.

CAUTION

Detector tray overloaded

Risk of damage to the system and injury of the patient

- The maximum load of the opened detector tray must not exceed 10kg.
- Do not allow the patient to use the detector tray for support.

Do not pull the detector tray out of the patient table immediately after the exposure, wait at least 3 s after the exposure.

4.4.5 Positioning the detector tray

The detector tray can be moved manually to the left or right. The detector tray also follows the tube unit motor-driven within a certain range (pull-in range).

Longitudinally

- For normal exposures on the patient table, the detector tray can be moved longitudinally to the left or right using the break knob. To unlock the brakes you have to pull the knob.
- When the tracking function is active, the detector tray follows the longitudinal movement of the X-ray tube.

Centering

✓ If the software stop fucntion is configured, activate the function and rotate the tube unit to the software detent at 0°. (➔ Page 96 *Rotation about horizontal axis (RHA)*)

◆ To center the detector (tray) to the tube unit press the centering button on the tube unit.

The detector unit stops movement when it reaches the center position or the centering button has been released.

Free exposures

(applicable only for table with mobile detector)

For exposures without grid and without automatic exposure control, and for better accessibility, for example during exposures of the extremities, the detector tray can be pulled out like a drawer.

Pulling out the detector tray

◆ Pull the detector tray out to the front up to the stop.

The detector tray is locked in the end position.

Gently let slide the detector tray into the end positions, because strong vibrations may lead to impact on image quality.

CAUTION

Detector tray overloaded

Risk of damage to the system and injury of the patient

◆ The maximum load of the opened detector tray must not exceed 10kg.

◆ Do not allow the patient to use the detector tray for support.

Pushing the detector tray back in

◆ Push the detector tray back in until it locks into position.

Push the detector tray back completely, or else the detector is not loaded in the detector tray.

4.4.6 Scattered radiation grid

If necessary for pediatric exposures, the grid can be removed from or inserted into the beam path.

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 table grid using the following color scheme:

Colors for grid handle			Grid parameters	
SID (cm)	Grid		Ratio	Lines/cm
115		dark blue	13	92 & 40

Only the same type of grid can be shared from other system.

CAUTION

Grid is dropped or not handled properly

Risk of invisible damage and impaired image quality

- Handle the grid with special care.

CAUTION

Changing the grid

Crushing between the housings of the detector case.

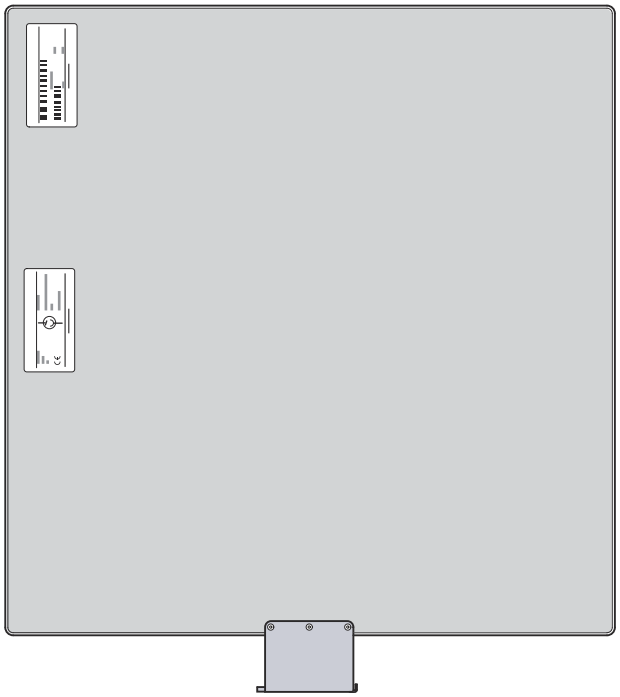
- Pay attention to danger zones / danger points of crushing between the housing of the detector case.

CAUTION

Image made with incorrect grid status

Poor image quality leading to repeated X-ray exposure

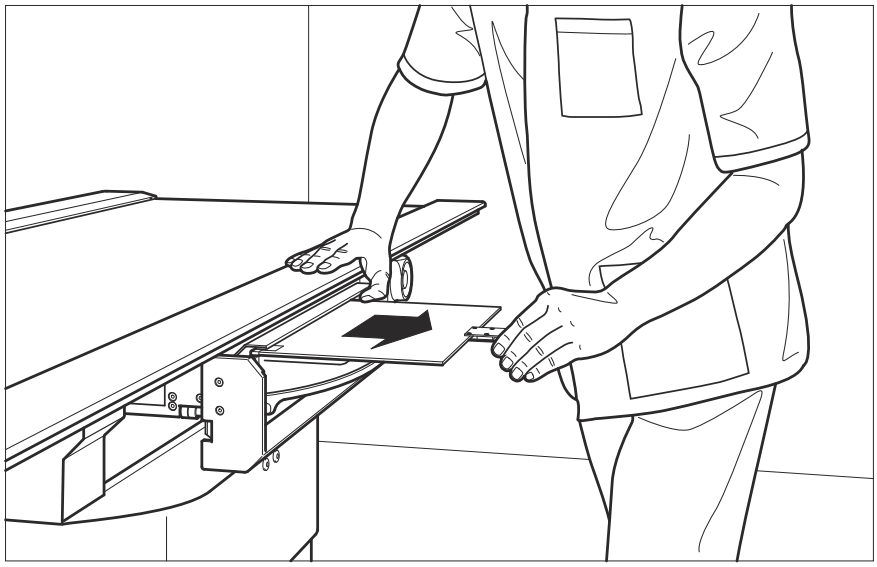
- The expected grid status (inserted, removed) is indicated on the imaging system.
- Manually remove or insert the grid from or into the detector tray as required before making the X-ray exposure.



Top of grid (facing the tube unit)

Removing the grid

1 Push the tabletop away from you.



2 Press the locking lever at the left side of the grip and, keeping it straight, pull the grid out towards the front.

3 Remove the grid.

Inserting the grid

Please pay attention to the label which indicates the correct focus side and attach the grid correctly.

1 Hold the grid horizontally, labels facing up.

Please take care that the SID range of the grid is compatible to the selected SID.

2 Insert the grid into the accessory rails.

3 Holding it horizontally and straight, push the grid all the way in.

When the grid has reached the end position, the locking lever engages.

4.5 Preparation and movements of the wall stand

4.5.1 Safety information

Information about holding facilities

CAUTION

Patient exerts too much weight on the patient hand grip on the wall stand.

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

- Do not let the patient hang on the patient hand grip.
- Do not exert more than 25kg weight on the patient hand grips.

CAUTION

Detector unit overloaded because patient is sitting on it or falling/leaning against it.

Risk of damage to the detector and injury of the patient

- Make sure that the detector is not mechanically overloaded as for example by patient sitting on it.

CAUTION

Loose patient hand grips on the wall stand

Mechanical or personal injury

- Check that patient hand grips are in right position when moving detector up or down.

WARNING

Parts of the system move unexpectedly during automatic positioning or tracking

Risk of injury to the patient or user

- Keep the patient within visual contact whenever performing any positioning functions.
- Use the emergency stop if motion needs to be stopped quickly.

CAUTION

In BWS, no grid or lighter grid is inserted, and button for manual vertical movement is pressed.

Risk of injury to the patient or user due to unintentional movement

- Hold the patient hand grip nearby when press the button for manual vertical movement.

Information about system movements

WARNING

Broken drive chain in wall stand

Risks of injury when moving front unit up or down

- Do not activate vertical movements when a broken drive chain is detected.

WARNING

Break of the chain

High movement forces in vertical direction

- Stop working with the component and call service.

4.5.2 Detector unit movements

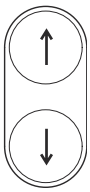
The detector unit can be moved vertically using the respective buttons at the detector housing.

Vertical movement (height adjustment) of the detector unit

- Press the button for the manual vertical movement and move the detector unit up or down to the required working height.

When moving down the detector unit, be careful not to hit the ground.

– or –



Press one of the buttons for the motorized vertical movement to move the detector up and down to the required working height.

Downward movement stops at 12 cm distance to floor.

You can continue movement manually.

Tilting the detector unit

The detector unit can be **continuously** tilted to the required position between 0°/vertical and +90°/horizontal or up to -20°.

- Press the button for unlocking the tilt mechanism and tilt the detector tray to the required position.

CAUTION

Detector unit overloaded because patient is sitting on it or falling/leaning against it.

Risk of damage to the detector and injury of the patient

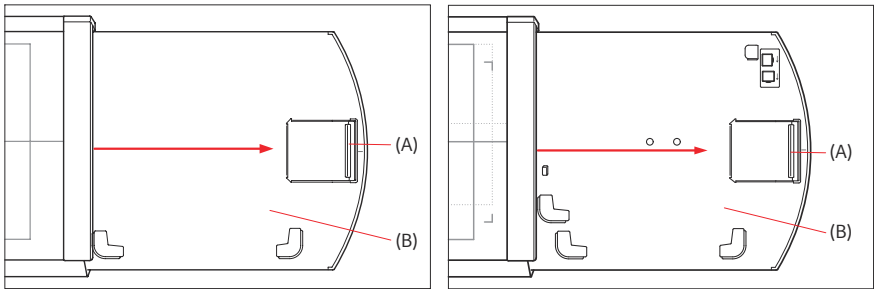
- Make sure that the detector is not mechanically overloaded as for example by patient sitting on it.

4.5.3 Inserting the detector into the wall stand

(with wireless mobile detector only)

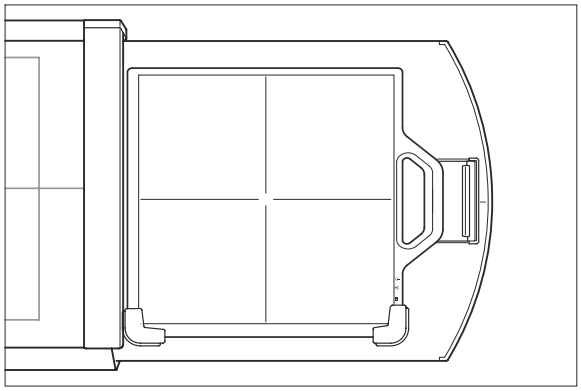
1 Move the detector unit to a convenient working height.

Vertical movement (height adjustment) of the detector unit



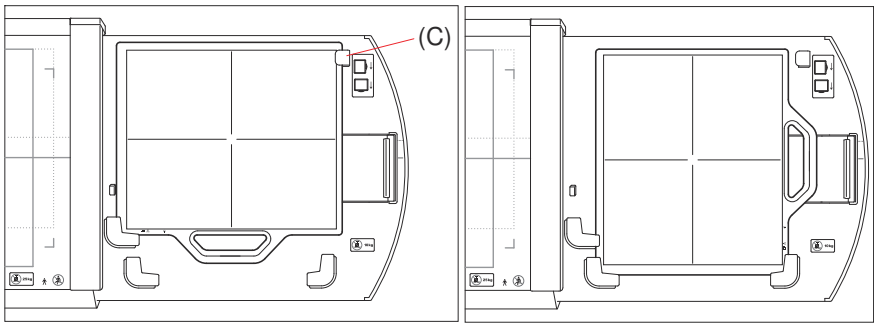
Example, detector tray for Core XL (left) and MAX wi-D (right)

2 Press the brake handle (A) and pull out the detector tray (B) until it reaches the stop position.



Example, detector tray with Core XL

3 Insert the detector from above into the holders as shown in above figure (with the centering cross facing toward the front).



Example, detector tray with MAX wi-D

Only the MAX wi-D can be inserted either in portrait or landscape format. When you insert the MAX wi-D in landscape format (see above figure on the left) you might have the feeling that the detector is not fixed properly. But be assured that the detector is fixed by the clamp (C) top right.

4 Press the brake handle.

5 Carefully and slowly slide in the detector tray with the detector.

Be careful not to damage the detector when sliding it into the tray as the tray does not have a mechanism to absorb the shock.

4.5.4 Removing the detector

(with wireless mobile detector only)

1 Move the detector unit to a convenient working height.

Vertical movement (height adjustment) of the detector unit

2 Use the brake handle (A) to pull out the detector tray with the detector.

3 Remove the detector pulling it upwards.

4 Carefully and slowly insert the detector tray again.

4.5.5 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 grid handle			Grid parameters	
SID (cm)	Grid		Ratio	Lines/cm
115		dark blue	13	92 & 40
140*		grey	13	92 & 40
180		dark orange	13	92 & 40
300		bright yellow	13	92

* Universal grid (140), working SID from f_0=115 cm to f_0= 180 cm

Only the same type of grid can be shared from other system.

CAUTION

Grid is dropped or not handled properly

Risk of invisible damage and impaired image quality

- Handle the grid with special care.

CAUTION

Changing the grid

Crushing between the housings of the detector case.

- Pay attention to danger zones / danger points of crushing between the housing of the detector case.

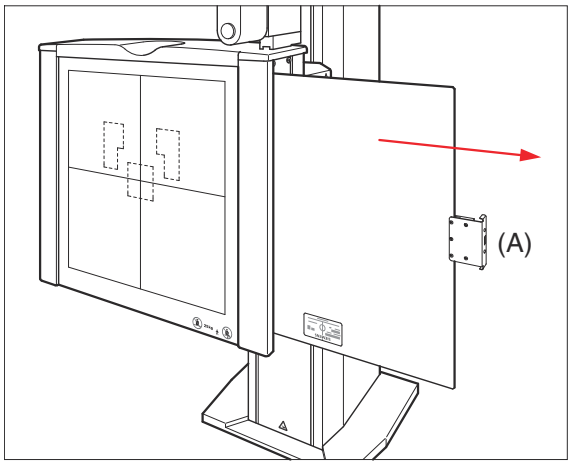
CAUTION

Image made with incorrect grid status

Poor image quality leading to repeated X-ray exposure

- The expected grid status (inserted, removed) is indicated on the imaging system.
- Manually remove or insert the grid from or into the detector tray as required before making the X-ray exposure.

Removing the grid



1 Press the locking lever (A) and, keeping it straight, pull the grid out towards the side.

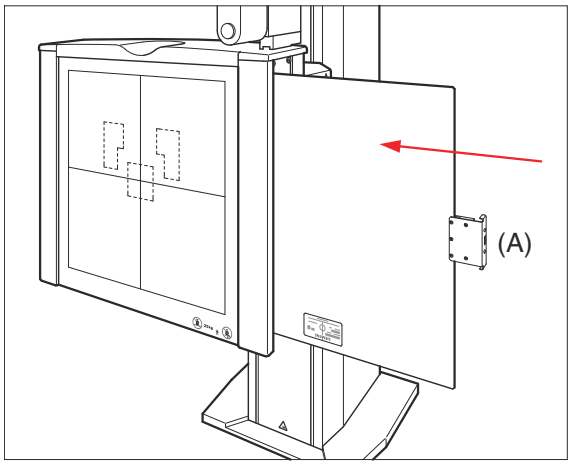
2 Remove the grid **with both hands**.

Inserting the grid

When inserting the scattered radiation grid, make sure that the **grid** being inserted is correctly assigned to the intended **source-image distance** (SID) on which the grid is focused.

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

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



2 Place the grid against the top and bottom guide rail.

3 Holding it vertically and straight, push the grid all the way in.

When the grid has reached the end position, the locking lever engages.

4.5.6 Positioning the tube unit automatically

✓ A suitable organ program for an exposure onto the wall stand is selected.

◆ Press the SmartPositioning button on the Wireless Remote Control Console.

(SmartPositioning is an optional function.)

The tube unit moves to the position provided in the selected organ program.

4.5.7 Positioning the tube unit manually

◆ Position the tube unit manually as required for the exposure using the movement buttons at the TUI or the buttons on the handles.

When the tube unit has reached the correct longitudinal and transverse centering detents, the centering displays (white ring) at the movement buttons light up.

– or –

Activate the tube tracking function by pressing the button on the wall stand.

The LED indicator is on.

(➔ Page 97 *Tube tracking*)

– or –

Move the tube unit to the vertical center position with the help of the light localizer.

4.5.8 Centering the tube unit in vertical direction

✓ If the software stop function is configured, activate the function and rotate the tube unit to the software detent at +90° or -90°. (➔ Page 96 *Rotation about horizontal axis (RHA)*)

◆ Press the centering button on the wall stand.

The tube unit stops movement when it reaches the center position or the centering button has been released.

Centering is not possible when the tube unit reaches the collision zone.

– or –

Move the tube unit manually to the vertical center position with the help of the light localizer.

4.5.9 Moving the tube unit to the parking position

A parking position has been set as default for the user to easily reach the tube unit.

The parking position can be configured by Siemens Healthineers service.

◆ Press the button on the wall stand.

– or –

Press the Parking position button on the Wireless Remote Control Console.

4.6 Preparation and handling of the wireless detectors

4.6.1 General safety information

Do not install the detector close to facilities where water is used.

Do not spill liquid or chemicals onto the detector or, in cases where the patient is injured, allow it to become wet with blood or other body fluids, as doing so may result in fire or electric shock.

In such situation, protect the detector with a single use plastic bag.

Do not spray the detector directly for cleaning and disinfection purposes.

Interference with other devices

The portable wireless detectors may be interfered with by other equipment, including portable and fixed RF communication equipment, even if such equipment meets the applicable emissions requirements.

Image transfer may be interrupted sporadically.

- The operator must ensure that other wireless devices in the 2.4 GHz or 5 GHz ISM band should not be operated in the vicinity of the system.
- Please observe and verify normal operation of the portable wireless detectors prior to using it.

4.6.2 Recommendations

Temperature

CAUTION

If the system has been completely without power by mistake or due to a power failure, the detector will not be at its operating point.

Poor detail resolution with all types of radiation!

- Note that image quality is unreliable under such circumstances. It is the physician's responsibility to decide whether to continue work on the basis of such image quality.

If a detector temperature warning message appears, please check if the warm-up time from a cold start (120 minutes) is respected. If yes, we recommend a recalibration.

CAUTION

Detector temperature out of range

X-ray without diagnostic value

- Check the temperature icon on the display regularly.

EMC compliance

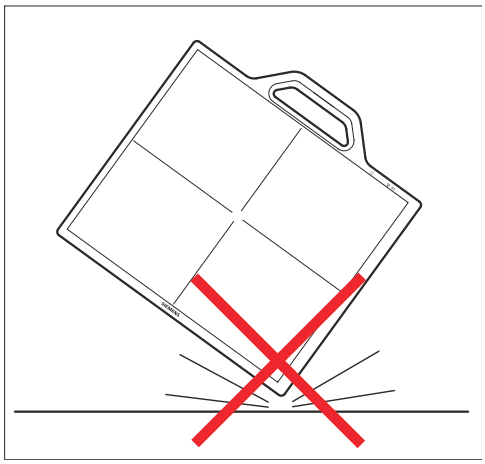
Portable and mobile RF communication equipment can affect the detector operation.

Warm-up time from a cold start

After a cold start (battery completely empty), it is possible to operate the detector, but with reduced image quality. Therefore, avoid the battery getting empty.

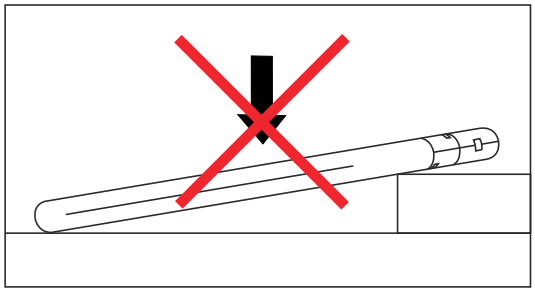
The detector reaches good image quality again after a maximum of 120 minutes (typically 60 minutes).

4.6.3 Notes on handling the detector

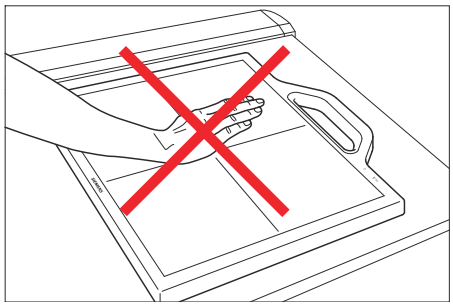


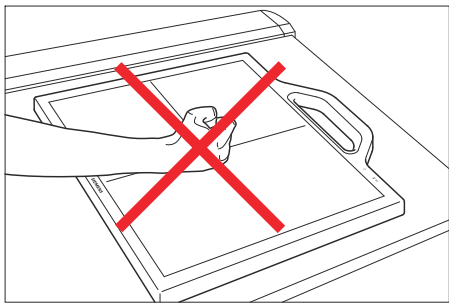
Handle the detector carefully, as it may be damaged if something is hit against it, if is dropped from high altitude, or if it receives a strong jolt.

The detector is monitored by integrated sensors, so that data can be read out by a technician.



Be sure to use the detector unit on a flat place so it will not bend. Otherwise, the detector may be damaged.





Do **not** hit the detector surface in any way.

CAUTION

Detector cover broken

Toxic contamination

- Handle portable detector with care!
- If the detector is broken do **not** use it.
- Inspect if any particles are spilled.
- Leaked particles could be toxic - do **not** touch them!
- Use protective gloves to collect and keep them in a sealed container.
- Return spilled particles to Siemens Healthineers.

CAUTION

Detector cover breaks because patient is too heavy

Possible injury of patient or personnel by carbon or glass splinters or electrical shock.

- Use the FD protector for patients heavier than 100 kg (maximum 227 kg).
- Handle the portable detector with care!
- When the detector is broken, do not use it.

CAUTION

Hot surface of detector The surface of the portable detector can reach 43°C (109°F), which may be too hot for high risk patients, such as infants.

Patient injury

- Protect such patients from exposure to the surface of the detector.

CAUTION

Portable detector is too hot.

Burns or heat injuries

- Pay attention to the warning messages pertaining to detector surface temperature.
- Remove the detector from contact with the patient if the surface temperature exceeds 41°C (106°F).

CAUTION

Improper or careless detector handling

Damage to the detector or detector surface

- Do not drop the detector.
- Only use the detector on a level surface to avoid sagging.
- Exercise absolute care in avoiding pressure or sudden impact on the detector surface.

CAUTION

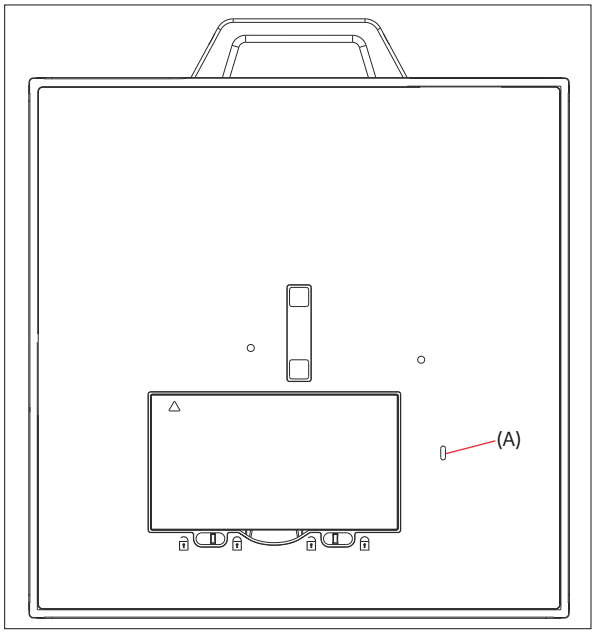
Exposure on a wireless detector that is connected to another system

Image data will be lost.

- Make sure that the detector and the system have the same colored labels.

Shock sensor

Both the MAX wi-D and Core XL have integrated shock sensors.



Core XL (back side)

The shock sensor (A) is located on the back side of the Core XL. Normally the shock sensor is white, and it turns red if the detector is dropped from high altitude (> 70 cm).

The shock sensor is not visible on the MAX wi-D. However, the shock details can be accessed in the **Detector Overview**.

(➔ Page 126 *FD management*)

4.6.4 Maintenance

No other maintenance action is required except the calibration needed for image quality, whose frequency is defined by the system program.

There are no parts that need to be replaced due to limited lifetime, except for the battery. In case of malfunction, the detector will be returned to the manufacturer for repair.

4.6.5 Operation and setting of WLAN

WARNING

The portable detector generates an electromagnetic field so high that it disturbs life-supporting device.

Interference with life supporting device resulting in possible malfunction

- Keep a safety separation distance of more than 90 cm between the portable detector and the life-supporting device.
- In case of interference with other equipment increase the distance between the interfering devices.

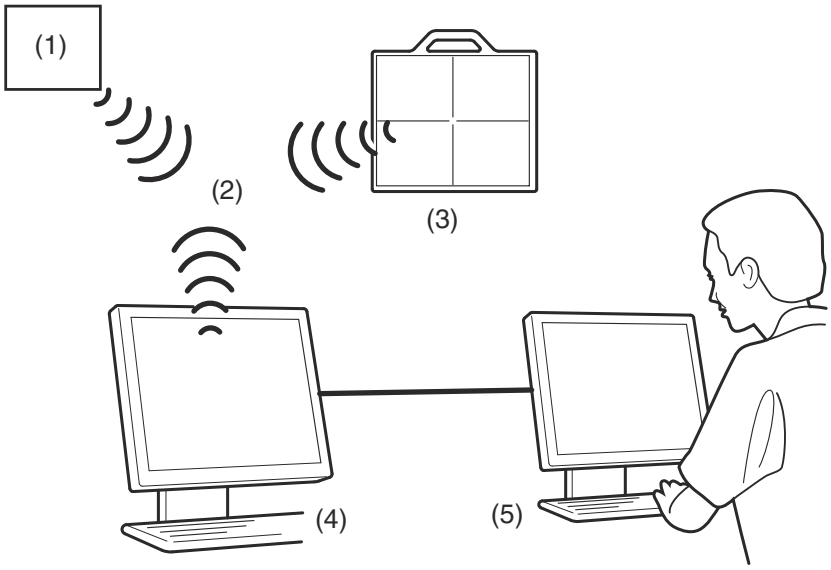
CAUTION

Image cannot be made because the battery in the portable detector is low

Portable detector not available for use

- Connect the portable detector to a loading port when it is not in use.
- Consider purchasing the battery loading station and additional batteries if portable detector availability is important.

Introduction



(1) Base station (WLAN access point)
(2) Wireless connection
(3) Wireless detector
(4) Imaging system
(5) PACS

The wireless connection of the mobile detector is established between the X-ray detector and the system.

Therefore, the phase of wireless connection and transfer does not utilize the existing wireless network that may be installed in the clinic. However, some precautions should be taken that both can coexist without interferences.

Properties of wireless connection

The system uses its own WLAN access point which is connected to the system and the X-ray detector as its sole client.

The communication is based on the WLAN standard 802.11. Within this standard, in most countries, there is the choice between the standards 11b, g, n (operating at 2.4 GHz) and the standards 11a, n (operation 5 GHz).

Within these standards (11a, b, g, n), several channels (frequencies) are available. A specific channel (frequency) can be selected by the site for use.

However, the available channels depend on legal regulations and requirements of the country with the installed system (wireless detector of MULTIX Impact C). The wireless connection is encrypted. For this the widely used and very secure WPA2 is applied.

The standard (11a, g, n) and the channel can be set by a Siemens Healthineers service technician via the service SW installed on the Image Station (imaging system). For a list of available channels in your country please contact your Siemens Healthineers project manager or sales representative.

The front end utilizes a power dependent on the standard and channel of the typical order of 32-79mW (always below 100mW). As the emission is not purely isotropic, more power is emitted in some directions and less in other directions. The maximum power emitted in a direction (max. EIRP) is 150 mW. This is defined based on the assumption that power would be emitted in all directions.

Coexistence with other wireless connection

Wireless devices (e.g. your wireless hospital network and the mobile detector of the MULTIX Impact C system) can influence each other if they are operated at the same frequency.

For the mobile detector, this can lead to a slowdown or disruption of the wireless connection.

To avoid such a situation, it is necessary to enquire about wireless devices that are used in or within the vicinity of the installed MULTIX Impact C system. The contact person for enquiries regarding wireless network and devices inside your hospital regarding is probably your network or IT expert.

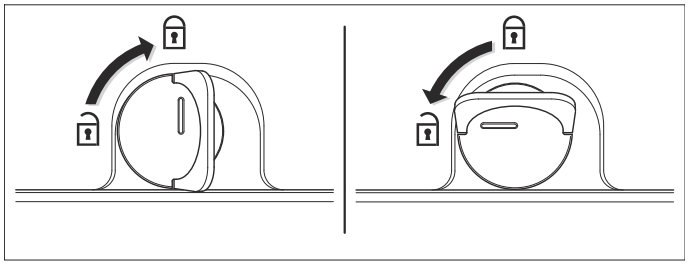
In case a WLAN-network is present in your work environment, the channels of the access points can be detected in the room where MULTIX Impact C will be installed. The frequencies in use (channels if you have WLAN) should be communicated to the Siemens Healthineers project manager.

Alternatively, select the channel to be utilized by the mobile detector of MULTIX Impact C and inform the service technician/project manager of the channel (frequency) accordingly.

It is important to ensure that this channel (frequency) will not be used at a later stage by other wireless devices.

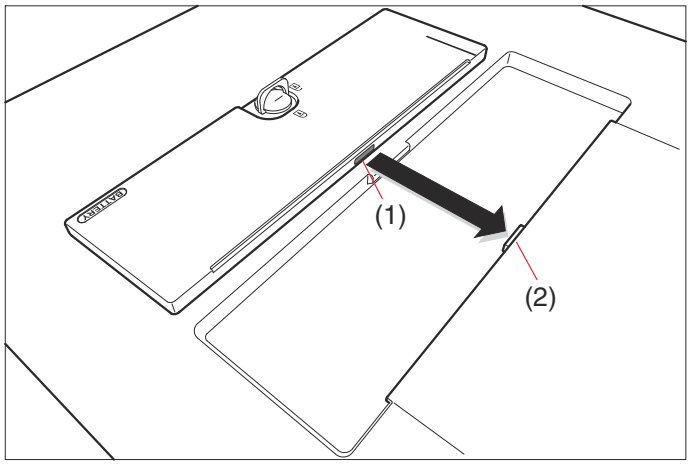
4.6.6 Battery change (MAX wi-D)

The procedure is as follows:

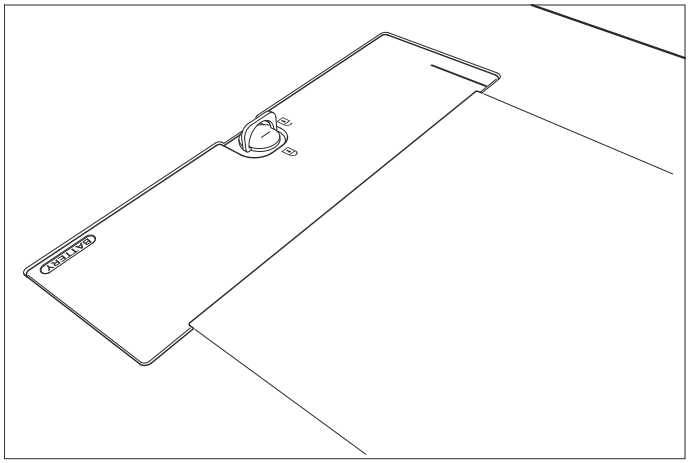


1 Open the locking system of the battery as shown in the figure.

2 Remove the discharged battery.

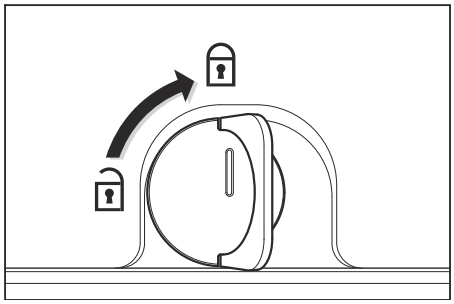


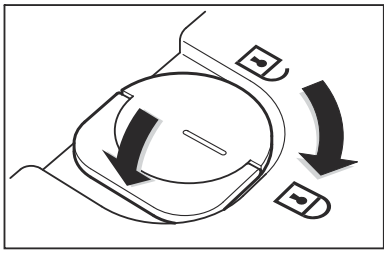
3 Orientate the charged battery in the correct position: battery connector (1) facing the device connector (2).



4 Slide battery in the recess area of the device.

5 Push down the battery in the recess area.





6 Close the locking system of the battery and push down the latch to ensure no protrusion of the locking system.

When the battery is inserted correctly, the detector starts automatically.

7 Before using the detector, wait until all LEDs are green.

CAUTION

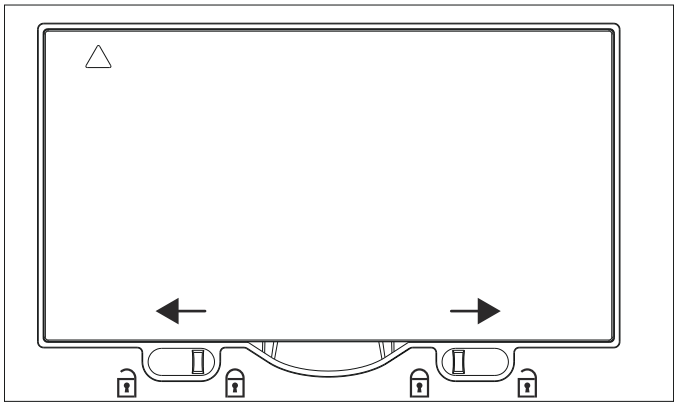
Incorrect handling of detector battery

Explosion or fire

- Handle the battery pack carefully.
- Do not drop, heat, open or mishandle it.

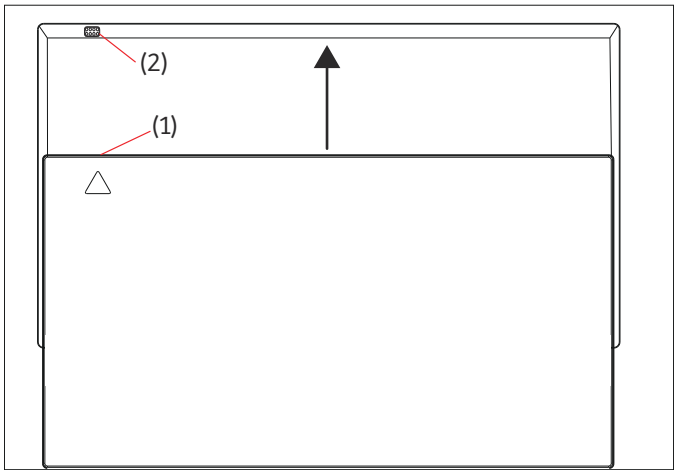
4.6.7 Battery change (Core XL)

The procedure is as follows:



1 Open the locking system of the battery as shown in the above figure.

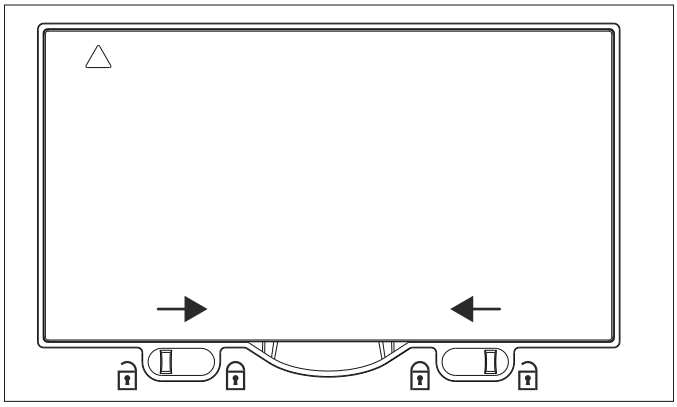
2 Remove the discharged battery.



3 Orientate the charged battery in the correct position: battery connector (1) facing the device connector (2).

4 Slide battery into the recess area of the device.

5 Push down the battery in the recess area.



6 Close the locking system of the battery.

When the battery is inserted correctly, the detector starts automatically.

7 Before using the detector, wait until all LEDs are green.

CAUTION

Incorrect handling of detector battery

Explosion or fire

- Handle the battery pack carefully.
- Do not drop, heat, open or mishandle it.

4.6.8 Charging the battery of the detector

The battery of the detector can be charged either

- with the detector in the closed detector tray of the table*, or
- with the detector in the closed detector tray of the Bucky wall stand*, or
- in the battery charger

*Automated detector battery charging as soon as the detector is located inside the table or Bucky wall stand tray, independent on the detector orientation.

Maximum operation time of a fully charged detector during regular utilization:

- MAX wi-D: 6.5 hours
- Core XL: 7.5 hours

Minimum charging time of a completely empty battery:

- MAX wi-D: 3 hours
- Core XL: 4 hours

Please put the detector in the closed detector tray for charging once acquisition has been finished.

When the system is switched off, make sure that the main power is on and put the detector in the closed detector tray, otherwise the battery will run down.

If the battery of the detector is completely empty, charge it and wait at least 60 minutes. The detector needs a warm-up time between 60 and 120 minutes to achieve good image quality, depending on environmental temperature and switch-off time.

4.6.9 FD management

The wireless detector overview window at the imaging system shows the detector configuration of the system.

The wireless detector overview is opened by clicking **Detector Overview** in the control area of the **Patient** mode.

Example

(1) It shows which type of detector is currently connected; the wireless detectors are shown with Wi-Fi, temperature and battery status
(2) The serial numbers of the detectors help to identify the right detector.
(3) It shows the date when the next calibration should be done.
(4) It shows the current position of a detector.
(5) It monitors the wireless detector and shows the shock history (only for the MAX wi-D).
(6) The wireless detectors can be detached from the system for usage with another system.
(7) Detector firmware version check
If a new firmware version is available, click **Update** to install the new firmware. After the successful upgrade, the word **up-to-date** is displayed.

CAUTION

Wrong detector size connected or wrong detector used

Radiation not usable

- Check that detector identification on the detector label matches the detector identification shown on the user interface.
- Check that the green ready light on the correct detector is lighted before releasing radiation.

4.6.10 Attaching the detector

✓ The detector has been registered before to this system by the Siemens Healthineers service.

✓ Detector battery level > 50%

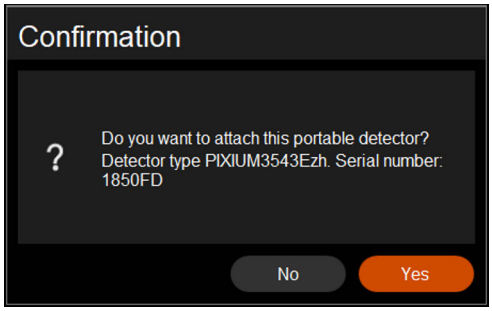
✓ **Detector Overview** dialog is displayed.

1 Connect the Core XL to the all-in-one PC with the cable.

– or –

Hold the MAX wi-D with the side of the LEDs to the IR sensor (1).

The detector can be taken away when the following message appears at the imaging system:



Example

2 Click **Yes** to attach the detector.

3 Wait a short time.

A message appears stating that the detector is attached successfully.

If the detector attachment was not successful, the detector has to be registered once to the system by the Siemens Healthineers Service.

Firmware upgrade during detector attachment

If a new detector firmware is available, the firmware upgrade will start automatically during detector attachment. Detector battery level < 50% will lead to firmware upgrade failure and the detector cannot be connected with the system.

- Charge the detector battery or replace it by a fully charged battery.
- It takes approximately 10 minutes to finish the firmware upgrade.
- Start the attachment again.

4.6.11 Detaching the detector

✓ The detector has been registered before to this system by the Siemens Healthineers Service.

✓ **Detector Overview** dialog is displayed.

1 Click **Disconnect** at the detector overview window.

A message appears asking if you want to detach the detector.

2 Click **OK** to start the detachment procedure.

A message appears stating that the detachment was successful.

The detached detector is removed from the detector overview window.

4.6.12 Detector sharing with MAX wi-D

With the detector sharing function, it is possible to share the MAX wi-D detector between different systems (Multitom Rax, Ysio Max, Multix Fusion Max, Luminos dRF Max, Luminos Agile Max, MOBILETT Elara Max).

You can detach a MAX wi-D detector at the system where it is not needed and attach it to another system.

A detector calibration must be performed after the MAX wi-D has been exchanged.

Only one wireless detector can be connected to the MULTIX Impact C at the same time.

CAUTION

Exposure on a wireless detector that is connected to another system

Image data will be lost.

◆ Make sure that the detector and the system have the same colored labels.

4.6.13 Detector calibration

For details, please refer to the corresponding chapter in the imaging system operator manual.

CAUTION

Calibration procedure is started although there is somebody in the exam room.

Unwanted radiation

- Check if there is somebody in the exam room before starting the calibration.
- Do not leave the system unattended during calibration.
- If necessary, the calibration procedure can be easily stopped via the user interface.

CAUTION

Incorrect calibration parameters - Reduced image quality

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

- Make sure that the detector is recalibrated every 12 months to maintain the image quality.

CAUTION

Detector temperature out of range; Incorrect calibration data

Risk of X-ray radiation without diagnostic value.

- Check the temperature icon on the display regularly.

4.7 Emergency operation

For emergency operation (e.g., if the detector not working) you can also use the cassette for free exposures.

CAUTION

Portable detector cannot be connected to system due to hardware or software problems

Portable detector not available for use

- Maintain procedures and equipment so that cassettes can be used in place of the portable detector for free exposures if necessary.

5 Examination

5.1 Safety information for examination

WARNING

Brakes on tabletop have reduced force when the system is turned off.

Risk of injury

- Check that nobody is leaning on the tabletop when the system is turned off.
- Avoid positioning patients such that a sudden movement of the tabletop could cause them to fall.
- Execute patient transfer with special care.

WARNING

Hand grips loosen or are not used

Injuries to patient from falling

- Check that the patient hand grips on the table are in the right position.
- Ensure that hand grips are tightened prior to use.
- Make sure that the patient uses the hand grips during system movements or when turning over.
- Use other positioning aids for immobilizing weak or very unstable patients.

1 Attach all necessary safety accessories.

2 Use only positioning aids expressly approved by Siemens Healthineers. Contact your local Siemens Healthineers representative if you have any questions.

Refer to (➔ Page 174 *Accessories and Auxiliary Devices*) for all accessories available for positioning. Attaching the accessories is also described there.

3 Ensure that these devices and positioning aids are secured correctly and are functioning properly.

4 Make sure that the body parts of the patient, especially arms and legs, do **not** extend over the edge of the tabletop.

5 Make sure that the patient uses the provided grip locations.

6 Let the patient get on or off the table only in the central area.

CAUTION

Incorrect positioning of the patient.

Risk of injury

- Ensure correct positioning of the patient. This applies in particular when using the different accessory parts.

5.2 Positioning the patient on the table

5.2.1 Hygiene

1 Check the unit for cleanliness.

2 If necessary, cover the tabletop with fresh paper.

5.2.2 Radiation protection

- Apply the necessary radiation protection to the patient.

5.2.3 Grid and SID

The grid focus (f0) and the source-image distance (SID) must always be identical.

- Check the correct grid focus (f0) on the grid label before making acquisitions.

5.2.4 Table position

Adjust the patient table approximately to the required working height:

1 Check the longitudinal and transverse position of the tabletop.

2 Adjust the table height.

(➔ Page 101 *Preparation and movements of the patient table*)

5.2.5 Positioning very heavy patients

CAUTION

Too much weight on the table

Risk of damage or patient injury

- When patients weighing more than 200kg are examined, both the patient and the floating tabletop must be centered over the table base.

CAUTION

Damage to the tabletop due to overloading, collision or sharp objects

Risk of injury if the table top splinters or breaks

- Do not exceed the maximum weight allowance for the table.
- Do not allow the patient to sit at the head end of the table.
- Call Siemens Healthineers Service and have the tabletop checked immediately if there is a possibility that it might have been damaged.

1 Center the tabletop.

2 Position the patient with a weight between 200 kg and 300 kg only in the center of the tabletop.

5.2.6 Tube unit position

1 Position the tube unit.

2 Observe messages on the display.

If the tube unit has been rotated about the vertical axis (RVA), the image cutout may not be performed correctly.

3 If necessary, correct the image collimation.

5.2.7 Manual SID

In cases when the system cannot determine the SID (for example, with oblique projections), the SID must be measured manually.

1 Measure the SID using the tape measure.

2 If necessary, correct the image collimation.

5.2.8 Detector pulled-out

An organ program with detector inside the patient table has been selected and acquisition parameters have been changed. Afterwards the detector has been pulled-out and pushed-in again by mistake. Then the parameters will be reset to their original values.

1 Adjust the detector position before selecting an organ program, if possible.

2 Check the acquisition parameters set, before releasing acquisitions.

5.3 Positioning the patient at the wall stand

5.3.1 Hygiene

1 Check the unit for cleanliness.

2 If necessary, cover the tabletop with fresh paper.

5.3.2 Radiation protection

◆ Apply the necessary radiation protection to the patient.

5.3.3 Wireless detector

◆ Insert the wireless mobile detector in the detector tray.

5.3.4 Grid

- If necessary, remove or insert the grid.

5.3.5 Overhead patient hand grip

- Swing the overhead patient hand grip to the required position or to the side if it is not needed.

  (➔ Page 185 *Overhead patient hand grip*)

5.3.6 Tube unit position

1. Press the SmartPositioning button.

   (➔ Page 223 *Wireless Remote Control Console*)

   – or –

   Using the handles bring the X-ray tube unit into position, if necessary into the pull-in range of the tracking control.
2. Observe messages on the display.

5.3.7 Operating Height

- Adjust the detector unit on the wall stand approximately to the required operating height by pressing the up/down buttons.

5.4 IONTOMAT automatic exposure control

The patient table and the wall stand are each equipped with an IONTOMAT measuring chamber for automatic exposure measurement.

All exposures which are taken **on the patient table with inserted detector or on the wall stand** can be exposed with the IONTOMAT automatic exposure control. The released exposure is then switched off automatically by the IONTOMAT automatic exposure control (**1-point technique**).

With pulled-out detector, the automatic exposure control cannot be used, exposure must be manually controlled (**2-point or 3-point technique**).

When selecting a measuring field, make sure the patient is positioned anatomically correctly and according to the measuring field in order to avoid faulty exposures.

For this purpose, three-field templates are available.

- Three-field templates, which can be introduced into the accessory rails of the multileaf collimator for projecting the IONTOMAT dominants onto the object are available for this purpose.

  (➔ Page 222 *Three-field template, set*)

5.4.1 Performing IONTOMAT automatic exposure control

1 Select the measuring field according to the object to be imaged.

When collimated narrowly in width, the system switches automatically to the center measuring chamber.

When collimated narrowly in height, no automatic switch-over of the measuring chamber is done. In this case, a smaller amount of imaging radiation will target the lateral measuring chambers.

2 If necessary, switch to the center measuring chamber.

No direct radiation may occur close to the measuring field, because the premature shut-off caused by this would lead to underexposure.

3 Pay attention to good collimation.

Take care that the correct dominant is selected before the exposure.

For selection of the measuring chamber refer to the Imaging System Operator Manual.

The most important part of the object must be located exactly above the measuring field.

Direct irradiation of the area near the measuring field must be avoided, since this would cause premature cutoff resulting in an underexposure.

If the measuring field is out side of the collimated field of view (FoV), it will automatically be deactivated by the system.

It is not possible to select the left and/or right chamber if one or both of them are not covered by the collimation. In such situation, only the middle chamber can be selected.

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 have been selected simultaneously, check the selection carefully.

5.5 Additional Cu filter

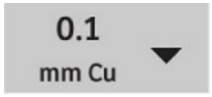
There are four possibilities of selecting internal additional Cu filters for the automatic collimator:

- 0.0 mm (no) Cu
- 0.1 mm Cu

- 0.2 mm Cu
- 0.3 mm Cu

The selection of additional filters is specified in the organ program. However, you can change this setting at the imaging station or on the TUI.

5.5.1 Selecting additional filters



◆ Touch this button on the **Basic** tab on the TUI.

A popup menu appears where you can select the required filter

The additional filter which is selected is displayed at the imaging station.

When changing the additional filters with respect to the organ program selected, this is marked with a star * at the imaging station, denoting the change.

– or –

Select the filter at the imaging system.

Refer to the Imaging System Operator Manual for further information.

CAUTION

Incorrect filter selection

Risk of increased radiation dose for the patient

◆ Select the filter carefully.

5.6 Light localizer and collimation

Ensure that the procedures described in this chapter are performed only by qualified operating personnel.

Collimation close to the object reduces the scattered radiation and thus improves image quality.

The radiation exposure to the patient is also reduced.

To protect the patient from unnecessary radiation, always check the collimation position with the light localizer.

5.6.1 Switching on and off of the light localizer

Automatic switching on

The light localizer / line light localizer is switched on automatically if

- the collimation size (in the image receptor plane) is changed in width or in height,
- the tabletop brake is released,
- the tube unit is moved in longitudinal direction or in height,
- the detector unit in the patient table is moved,
- the detector unit on the wall stand is moved in height,
- the top alignment function is activated/deactivated.

The service technician can configure when which function is activated individually or together.

CAUTION

Looking into the laser light

Eye injury

- Take care that neither you nor anybody else looks directly into the laser beam.
- Close the sliding cover over the laser light to protect the eyes of the patient and other people.
- Note that the collimator can heat up when the light localizer is used for a longer period of time.

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**.

(➔ Page 67 *Multileaf collimator*)

Automatic switching off

The light localizer is switched off, independently of how it was switched on, after a configurable time.

The internal time switch can be set by service: 5 s to 118 s

Switching on/off manually

You can switch the light localizer on or off at any time independent of automatic switching on and off.

- Press the button on the collimator.

5.7 Collimation

Collimation can be set in the following manners:

- Initial collimation is defined in the organ program.
- Via ACSS

  (→ Page 137 *Collimation / Automatic Collimation Size Sensing*)
- You can set the collimation on the imaging system virtually in the camera image (Virtual Collimation).

  See the Operating Manual of the imaging system.
- You can set the collimation with the light localizer via the knobs on the multileaf collimator.

5.7.1 Collimating manually

1 Rotate the diaphragm knob to adjust the format height and width.

2 Check illumination of the format and collimate as close as possible to the object.

Collimation close to the object reduces the scattered radiation and thus improves image quality. The radiation exposure to the patient is also reduced.

To protect the patient from unnecessary radiation, always check the collimator position with the light localizer.

5.7.2 Collimation / Automatic Collimation Size Sensing

MULTIX Impact C supports **ACSS** (Automatic Collimation Size Sensing).

ACSS limits the maximum opening of the collimator to the borders of the selected detector in the table and Bucky wall stand. ACSS is indicated by the letters **ACSS** in the collimator display. In case ACSS is not possible, **Manual** will be displayed. In this case you have to take care that the X-ray field will not go beyond the border of the FD detector.

The collimation format can be set in the OGP. If the selected OGP requires a new position of the tube and/or the detector, the collimation is set when the detector and the tube have reached the final position stored in the OGP.

Conditions for ACSS:

- All system components (collimator, generator, tube stand, imaging system, detector) are ready for use.
- A detector is inserted in the tray of the table or wall stand (ACSS is not supported for free mobile detectors or free cassette operation).
- The central beam is perpendicular to the solid state detector with a tolerance of not more than ± 3 degrees.

The SID is between 100 cm and 180 cm.

Make sure the X-ray beam does not extend the dimensions of the detector.

The collimator is not rotated.

The respective icon in the collimator status bar is not visible.

Manual collimation is always active if the above conditions are not fulfilled.

The type of collimation is displayed on the TUI.

- **ACSS** is displayed: Automatic Collimation Size Sensing (ACSS) is active.
- **Manual** is displayed: Manual collimation is active.

Make sure the X-ray beam does not extend the dimensions of the detector.

CAUTION

Precision of collimator control is not high enough to limit X-ray field inside detector active area when the system is not in **ACSS** mode.

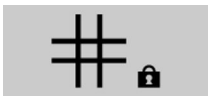
Patient receives more radiation than necessary.

- In **Manual** mode, check collimator size and make sure that the collimator does not open wider than the detector active area.

If Manual is active, the user is responsible for the adjustment of the multileaf collimator.

If Manual is active, but the image is very flat (low contrast), auto cropping may not work properly. In this case, disable auto cropping at the imaging system, and use the manual shutter after acquisition to crop the image manually.

5.7.3 Restoring the last collimation



This button on the TUI serves for memory recall of the last used format. If you press this button, then the collimation set for the last exposure is restored.

Please note that the memory recall can take place only if the preceding exposure was actually released.

5.8 Exposures onto the patient table

(→ Page 139 *Vertical projection onto the patient table*)

(→ Page 140 *Vertical projection onto the pulled-out detector*)

(→ Page 141 *Oblique projection onto the patient table*)

5.8.1 Vertical projection onto the patient table

Positioning the tube unit automatically

- Press the SmartPositioning button on the Wireless Remote Control Console.

  The tube unit moves to the position provided in the selected organ program.

Centering the tube unit manually

Manual movement of the tube unit to the required position:

1. Position the tube unit manually as required for the exposure using the movement buttons on the control panel or with the buttons on the handles.
2. Bring the tube unit into the centered mid-position.

3. Press the centering button on the tube unit to center the detector to the tube.

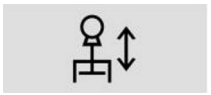
SID

Adjust SID by tube unit or vertical table movement (optional):

1. Press button on the tube unit control panel.

   – or –

   Actuate the table height adjustment via the foot kick switches at the table base or via the footswitch (option for the elevating patient table).



2. If required, switch on the tracking control for SID with the SID tracking button.

Light localizer

Switch the light localizer on the multileaf collimator on if required:

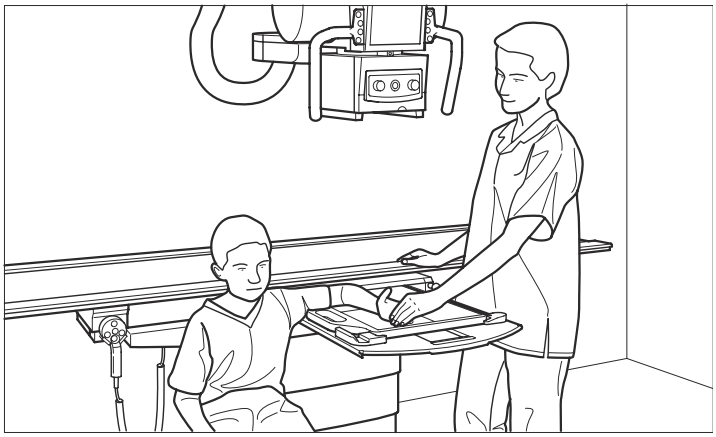
- Press the button, if necessary.

Positioning the patient

Push the patient with the floating tabletop into the required position:

- Actuate the foot kick switch or foot switch.

5.8.2 Vertical projection onto the pulled-out detector



Example

CAUTION

Tube is not directed toward the detector during acquisition.

Unwanted radiation exposure

- Use the free exposure mode with care.
- Check that the tube is active and use the light marker for positioning before releasing X-ray.

The automatic exposure control and the grid are **not available** for free exposures with the **detector tray pulled out**.

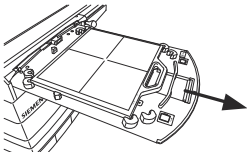
You must therefore expose in 2-point and 3-point technique.

Preparations

✓ An orgran program for an exposure on the pulled-out detector unit (table) is selected.

- Pull the detector tray out **up to the stop**.

  The acquisition type is switched over automatically.

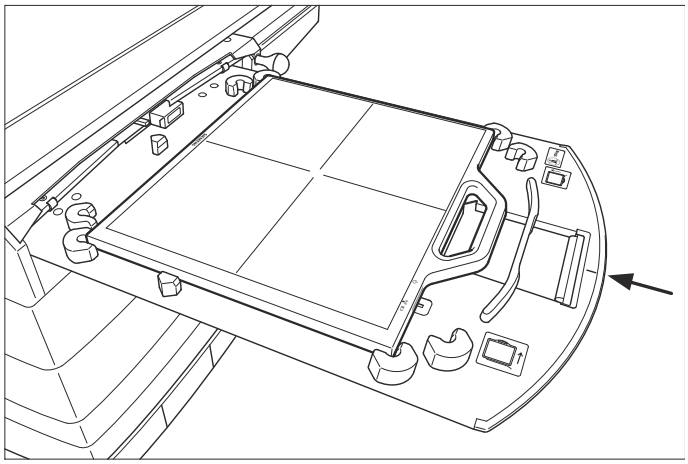


Example

Positioning the tube unit

- Using the handles, bring the X-ray tube unit to the corresponding stop position above the detector and into vertical beam path (0°):

  Loosen the brakes with the push buttons on the control panel or with the buttons on the handles and position the tube unit.



Example for axis marking on the handle

SID

Set the SID by tube unit or table vertical movement:

1 Press the button on the tube unit control panel.

– or –

Actuate the table height adjustment.

2 Measure the SID with the tape measure: Distance up to the detector.

3 Adjust the SID value on the TUI.

Positioning the patient

Push the patient with the floating tabletop into the required position:

- Actuate the foot kick switch or foot switch.

5.8.3 Oblique projection onto the patient table

1 Rotate tube unit about the horizontal axis (RHA) and/or about the vertical axis (RVA) into the required direction.

2 Release the brakes with the push buttons on the control panel or with the buttons on the handles and position the tube unit.

The angle of the rotation about the horizontal axis (RHA) is displayed in degrees in the display of the TUI.

Pay special attention in the diagnosis to distortions of the image geometry due to the oblique projection!

Automatic Collimation Size Sensing (ACSS) is not effective in the oblique projection.

You must collimate manually.

Make sure the collimated field is covered by the detector in the patient table.

3 Make the exposure.

Pay special attention in the diagnosis to distortions of the image geometry due to the oblique projection!

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.

5.9 Exposures onto the wall stand

(→ Page 142 *Horizontal projection onto the wall stand*)

(→ Page 143 *Vertical projection onto the wall stand*)

(→ Page 143 *Oblique projection onto the wall stand*)

5.9.1 Horizontal projection onto the wall stand

Positioning the tube unit automatically

- Press the SmartPositioning button on the Wireless Remote Control Console.

  The tube unit moves to the position provided in the selected organ program.

Centering the tube unit manually

Manual movement of the tube unit to the required position:

1 Position the tube unit manually as required for the exposure using the movement buttons on the control panel or with the buttons on the handles.

Please take care especially for exposures on the wall stand to exact fixation of the overhead support in one of the predetermined SID stop positions.

You avoid image quality defects due to grid shadows if the set SID agrees with the focusing of the grid.

2 Center the tube unit to the detector.

(➔ Page 115 *Centering the tube unit in vertical direction*)

The tube unit automatically follows the detector in height adjustment within a certain range (tracking control).

5.9.2 Vertical projection onto the wall stand

Positioning the tube unit automatically

- Press the SmartPositioning button on the Wireless Remote Control Console.

  The tube unit moves to the position provided in the selected organ program.

Centering the tube unit manually

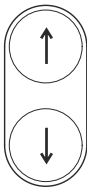
Manual movement of the tube unit to the required position:

1 Position the tube unit manually as required for the exposure using the movement buttons on the control panel or with the buttons on the handles.

2 Set the SID by using the buttons on the tube unit control panel.

– or –

Set the SID by using the buttons on the detector unit.



SID tracking is possible for this mode.

(➔ Page 98 *Activating SID tracking in wall acquisition mode*)

5.9.3 Oblique projection onto the wall stand

CAUTION

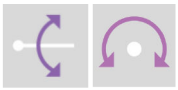
Tube is not directed toward the detector during acquisition.

Unwanted radiation exposure

- Use the free exposure mode with care.
- Check that the tube is active and use the light marker for positioning before releasing X-ray.

1 Tilt the detector unit into the horizontal position.

The mechanism locks automatically into place.



2 Rotate tube unit about the horizontal axis (RHA) and/or about the vertical axis (RVA) into the required direction.

3 Press the buttons for the longitudinal, transverse, and vertical brake or for the 'floating' movement and bring the tube unit into the required position.

4 Release the brakes with the push buttons on the control panel or with the buttons on the handles and position the tube unit.

The **angle** of the rotation about the horizontal axis (RHA) is displayed in degrees in the display of the TUI.

Pay special attention in the diagnosis to distortions of the image geometry due to the oblique projection!

Automatic Collimation Size Sensing (ACSS) is not effective in the oblique projection.

You must **collimate manually**.

5 Make the exposure.

Pay special attention in the diagnosis to distortions of the image geometry due to the oblique projection!

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.

5.10 Free exposure onto the wireless detector

CAUTION

Tube is not directed toward the detector during acquisition.

Unwanted radiation exposure

- Use the free exposure mode with care.
- Check that the tube is active and use the light marker for positioning before releasing X-ray.

CAUTION

Direct radiation on the detector

Ghost image appears on next image.

- Avoid direct radiation on the detector.
- Wait approximately 30 seconds after such an acquisition before making the next one.

For free exposures **onto detector**, Automatic Collimation Size Sensing (ACSS) and automatic exposure control are **not available**.

You must therefore collimate manually and expose in 2-point or 3-point technique. If necessary, the clip-on grid must be attached to the detector.

5.10.1 Preparations

1. Select an organ program on the imaging system for a free exposure onto wireless detector or for an exposure onto the bed.
2. Check which detector is selected on the imaging system. Make sure that the serial number of the wireless detector to be used is identical to the one displayed on the imaging system.
3. Make sure that the indication status light on detector is green and so ready for radiation.

5.10.2 Positioning the tube unit

Using the handles, bring the X-ray tube unit into position:

- Release the brakes with the push buttons on the control panel or with the buttons on the handles and position the tube unit.

  (➔ Page 146 *Positioning for vertical projection*)

  (➔ Page 146 *Positioning for oblique projection*)

  (➔ Page 146 *Horizontal projection onto the mobile detector*)

5.10.3 SID

Set the SID by tube unit or table vertical movement:

1. Press the button on the tube unit control panel.

   – or –

   Actuate the table height adjustment.
2. **Measure** the SID with the tape measure: Distance up to the detector.

3 Adjust the SID value on the TUI.

5.10.4 Positioning for vertical projection

1 If necessary set the tube unit vertical.

2 Release the brakes with the push buttons on the control panel or with the buttons on the handles and position the tube unit.

5.10.5 Positioning for oblique projection

Rotate the tube unit about the horizontal axis (RHA) and about the vertical axis (RVA) into the required direction:

- Release the brakes with the push buttons on the control panel or with the buttons on the handles and position the tube unit.

  The **angle** of the rotation about the horizontal axis (RHA) is displayed in degrees in the display of the TUI.

Pay special attention in the diagnosis to distortions of the image geometry due to the oblique projection!

We recommend using a protector for wireless detector when patient is directly standing on it.

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.

5.10.6 Horizontal projection onto the mobile detector

1 Attach the detector holder to the required position and insert the detector.

(➔ Page 213 *Detector holder, lateral*)

2 Rotate tube unit about the horizontal axis (RHA) and/or about the vertical axis (RVA) into the required direction.

3 Release the brakes with the push buttons on the control panel or with the buttons on the handles and position the tube unit.

4 Make the exposure.

5.11 Pediatric Use: Summary

5.11.1 Introduction

Special care should be exercised when imaging patients outside the typical adult size range, especially smaller pediatric patients whose size does not overlap the adult size range (e.g., patients less than 50 kg (110 lb) in weight and 150 cm (59 in) in height, measurements, which approximately correspond to that of an average 12 year old or a 5th percentile U.S. adult female.

Exposure to ionizing radiation is of particular concern in pediatric patients because:

- for certain organs and tumor types, younger patients are more radiosensitive than adults (i.e., the cancer risk per unit dose of ionizing radiation is higher for younger patients);
- use of equipment and exposure settings designed for adults of average size can result in excessive and unnecessary radiation exposure of smaller patients; and
- younger patients have a longer expected lifetime over which the effects of radiation exposure may manifest as cancer.

To help reduce the risk of excessive radiation exposure, you should follow the ALARA (As Low As Reasonably Achievable) principle and seek to reduce radiation dose to only the amount necessary to obtain images that are adequate clinically.

Pediatric Organ Programs

The exposure technique with the MULTIX Impact C is 1 point and 2 point technique. KV value and mAs are selected individually or preset in the organ program. The regular distance between focus and detector shall be 115cm for table and 180cm for bucky wall stand. The use of the copper filter (0.1mm or 0.2mm) further reduces the skin dose by reducing the low kV spectrum. Auto window center and window width is set as default settings. The organ programs listed here are for exposure techniques without a grid and with a grid.

OGP Name	AEC	Filter Type	Focus	KV	Contrast	Detail	Latitude	Noise	Grid	mAs	Tech	Exposure Correction	Dose	Stand Shutter1	Stand Shutter2
Abdomen Paed (0-3 yrs) 8-14 cm	n.a.	0	Small	70	2.3	2	3.8	1	n.a.	2.8	2pt	n.a.	n.a.	43	43
Abdomen Paed (4-11 yrs) 12-20 cm	L+R	0	Small	73	2.3	2	3.8	1	n.a.	n.a.	1pt	0	2.5	43	43
Abdomen Paed (12-14 yrs) 14-22 cm	L+R	0	Small	77	2.3	2	3.8	1	115	n.a.	1pt	0	2.5	43	43
Chest PA Paed (4-7 yrs) 14-20 cm	L+R	0	Small	85	1.3	2	4	1	n.a.	n.a.	1pt	0	2.5	31	31
Chest PA Paed (8-14 yrs) 15-22 cm	M	0	Small	109	1.3	2	4	1	180	n.a.	1pt	0	2.5	43	43

Chest AP Paed (0-3 yrs) 11-14 cm	n.a.	0	Small	73	1.3	2	4	1	n.a.	1.25	2pt	n.a.	n.a.	31	31
Chest AP Paed (4-7 yrs) 14-20 cm	n.a.	0	Small	75	1.3	2	4	1	n.a.	1.6	2pt	n.a.	n.a.	31	31
Chest AP Paed (8-14 yrs) 15-22 cm	L+R	0	Small	79	1.3	2	4	1	115	n.a.	1pt	0	2.5	43	43
Chest LAT Left Paed (4-7 yrs) 14-20 cm	n.a.	0	Small	75	1.3	2	4	1	115	1.6	2pt	n.a.	n.a.	35	43
Chest LAT Left Paed (8-14 yrs) 21-28 cm	M	0	Small	79	1.3	2	4	1	115	n.a.	1pt	0	2.5	35	43
Chest LAT Right Paed (4-7 yrs) 14-20 cm	n.a.	0	Small	75	1.3	2	4	1	115	1.6	2pt	n.a.	n.a.	35	43
Chest LAT Right Paed (8-14 yrs) 21-28 cm	M	0	Small	79	1.3	2	4	1	115	n.a.	1pt	0	2.5	35	43
Ribs AP Paed (0-3 yrs)	n.a.	0	Small	73	1.6	1.9	3.2	1	n.a.	1.25	2pt	n.a.	n.a.	32	32
Ribs AP Paed (4-7 yrs)	n.a.	0	Small	75	1.6	1.9	3.2	1	n.a.	1.6	2pt	n.a.	n.a.	32	32
Ribs AP Paed (8-14 yrs)	M	0	Small	75	1.6	1.9	3.2	1	115	n.a.	1pt	0	2.5	43	32
Ribs OBL Paed (0-3 yrs)	n.a.	0	Small	73	1.6	1.9	3.2	1	n.a.	1.25	2pt	n.a.	n.a.	32	32
Ribs OBL Paed (4-7 yrs)	n.a.	0	Small	75	1.6	1.9	3.2	1	n.a.	1.6	2pt	n.a.	n.a.	32	32
Ribs OBL Paed (8-14 yrs)	M	0	Small	75	1.6	1.9	3.2	1	115	n.a.	1pt	0	2.5	43	32
C-spine AP Paed (0-2 yrs) 4-8 cm	n.a.	0	Small	63	1.4	2.5	4	1	n.a.	4	2pt	n.a.	n.a.	31	25
C-spine AP Paed (3-5 yrs) 8-10 cm	n.a.	0	Small	64.5	1.4	2.5	4	1	n.a.	5	2pt	n.a.	n.a.	31	25
C-spine AP Paed (6-14 yrs) 10-12 cm	M	0	Small	66	1.4	2.5	4	1	n.a.	n.a.	1pt	0	2.5	31	25
C-spine LAT Paed (0-2 yrs) 4-8 cm	n.a.	0	Small	63	1.4	2.5	4	1	n.a.	4	2pt	n.a.	n.a.	31	25
C-spine LAT Paed (3-5 yrs) 8-10 cm	n.a.	0	Small	64.5	1.4	2.5	4	1	n.a.	5	2pt	n.a.	n.a.	31	25
C-spine LAT Paed (6-14 yrs) 10-12 cm	M	0	Small	66	1.4	2.5	4	1	n.a.	n.a.	1pt	0	2.5	31	25

T-spine AP Paed (0-2 yrs) 8-10 cm	n.a.	0	Large	70	1.4	2.3	2	1	n.a.	2.8	2pt	n.a.	n.a.	43	18
T-spine AP Paed (3-5 yrs) 10-14 cm	n.a.	0	Large	73	1.4	2.5	4	1	n.a.	3.6	2pt	n.a.	n.a.	43	18
T-spine AP Paed (6-14 yrs) 14-20 cm	M	0	Large	73	1.4	2.5	4	1	115	n.a.	1pt	0	2.5	43	18
T-spine LAT Paed (0-2 yrs) 8-10 cm	n.a.	0	Large	70	1.4	2.3	2	1	n.a.	2.8	2pt	n.a.	n.a.	43	18
T-spine LAT Paed (3-5 yrs) 10-14 cm	n.a.	0	Large	73	1.4	2.5	4	1	n.a.	3.6	2pt	n.a.	n.a.	43	18
T-spine LAT Paed (6-14 yrs) 14-20 cm	M	0	Large	73	1.4	2.5	4	1	115	n.a.	1pt	0	2.5	43	18
L-spine LAT Paed (0-2 yrs) 0-16 cm	n.a.	0	Large	68	1.4	1.8	4.8	1.3	n.a.	3.2	2pt	n.a.	n.a.	43	19
L-spine LAT Paed (3-5 yrs) 8-12 cm	n.a.	0	Large	70	1.4	1.8	4.8	1.3	n.a.	4	2pt	n.a.	n.a.	43	19
L-spine LAT Paed (6-14 yrs) 14-20 cm	M	0	Large	77	1.4	1.8	4.8	1.3	115	n.a.	1pt	0	2.5	43	19
L-spine AP Paed (0-2 yrs) 10-16 cm	n.a.	0	Large	68	1.4	1.8	4.8	1.3	n.a.	3.2	2pt	n.a.	n.a.	43	19
L-spine AP Paed (3-5 yrs) 8-12 cm	n.a.	0	Large	70	1.4	1.8	4.8	1.3	n.a.	4	2pt	n.a.	n.a.	43	19
L-spine AP Paed (6-14 yrs) 14-20 cm	M	0	Large	77	1.4	1.8	4.8	1.3	115	n.a.	1pt	0	2.5	43	19
Sacrum AP Paed (0-2 yrs)	n.a.	0	Large	68	1.1	1.8	4	1.3	n.a.	3.2	2pt	n.a.	n.a.	43	19
Sacrum AP Paed (3-5 yrs)	n.a.	0	Large	70	1.1	1.8	4	1.3	n.a.	4	2pt	n.a.	n.a.	43	19
Sacrum AP Paed (6-14 yrs)	M	0	Large	73	1.1	1.8	4	1.3	115	n.a.	1pt	0	2.5	43	19
Sacrum LAT Paed (0-2 yrs)	n.a.	0	Large	68	1.1	1.8	4	1.3	n.a.	3.2	2pt	n.a.	n.a.	43	19
Sacrum LAT Paed (3-5 yrs)	n.a.	0	Large	70	1.1	1.8	4	1.3	n.a.	4	2pt	n.a.	n.a.	43	19
Sacrum LAT Paed (6-14 yrs)	M	0	Large	73	1.1	1.8	4	1.3	115	n.a.	1pt	0	2.5	43	19
Pelvis Paed (0-3 yrs) 8-12 cm	n.a.	0	Small	63	1	2.1	3.8	1	n.a.	2.2	2pt	n.a.	n.a.	31	31

Pelvis Paed (4-11 yrs) 12-20 cm	L+R	0	Large	63	1	2.1	3.8	1	n.a.	n.a.	1pt	0	2.5	31	31
Pelvis Paed (12-14 yrs) 14-23 cm	L+R	0	Large	68	1	2.1	3.8	1	115	n.a.	1pt	0	2.5	43	43
Pelvis Lauenstein (frog) (0-3 yrs) 8-12 cm	n.a.	0	Small	63	1	2.1	3.8	1	n.a.	2.2	2pt	n.a.	n.a.	31	31
Pelvis Lauenstein (frog) (4-11 yrs) 12-20 cm	L+R	0	Small	63	1.3	2.2	4.2	1	n.a.	n.a.	1pt	0	2.5	31	31
Pelvis Lauenstein (frog) (12-14 yrs) 14-23 cm	L+R	0	Small	68	1	2.1	3.8	1	115	n.a.	1pt	0	2.5	43	43
Shoulder AP Paed (0-3 yrs)	n.a.	0	Small	60	1	2.4	4.6	1	n.a.	1.8	2pt	n.a.	n.a.	23	23
Shoulder AP Paed (4-11 yrs)	M	0	Small	63	1	2.4	4.6	1	n.a.	n.a.	1pt	0	2.5	25	25
Shoulder AP Paed (12-14 yrs)	M	0	Small	63	1	2.4	4.6	1	n.a.	n.a.	1pt	0	2.5	25	31
Shoulder Axial Paed (0-3 yrs)	n.a.	0	Small	60	1.4	2.2	5.2	1	n.a.	1.8	2pt	n.a.	n.a.	23	23
Shoulder Axial Paed (4-11 yrs)	n.a.	0	Small	63	1.4	2.2	5.2	1	n.a.	2.8.	2pt	0	n.a.	31	25
Shoulder Axial Paed (12-14 yrs)	n.a.	0	Small	63	1.4	2.2	5.2	1	n.a.	3.2	2pt	0	n.a.	25	31
Scapular Paed (0-3 yrs)	n.a.	0	Small	60	1	2.4	4.6	1	n.a.	1.8	2pt	n.a.	n.a.	23	23
Scapular Paed (4-11 yrs)	M	0	Small	63	1	2.4	4.6	1	n.a.	n.a.	1pt	0	2.5	25	25
Scapular Paed (12-14 yrs)	M	0	Small	63	1	2.4	4.6	1	n.a.	n.a.	1pt	0	2.5	31	25
Clavicle Paed (0-3 yrs)	n.a.	0	Small	60	1.4	2.1	4.8	1	n.a.	1.8	2pt	n.a.	n.a.	23	23
Clavicle Paed (4-11 yrs)	M	0	Small	63	1.4	2.1	4.8	1	n.a.	n.a.	1pt	0	2.5	25	25
Clavicle Paed (12-14 yrs)	M	0	Small	63	1.4	2.1	4.8	1	n.a.	n.a.	1pt	0	2.5	31	25
Acromio-clavicular Joint Paed (0-3 yrs)	n.a.	0	Small	60	1	2.4	4.6	1	n.a.	1.8	2pt	n.a.	n.a.	23	23
Acromio-clavicular Joint Paed (4-11 yrs)	M	0	Small	63	1	2.4	4.6	1	n.a.	n.a.	1pt	0	2.5	25	25
Acromio-clavicular Joint Paed (12- 14 yrs)	M	0	Small	63	1	2.4	4.6	1	n.a.	n.a.	1pt	0	2.5	31	25

Humerus AP Paed (0-3 yrs)	n.a.	0	Small	55	1	2.4	4.6	1	n.a.	1.6	2pt	n.a.	n.a.	33	16
Humerus AP Paed (4-11 yrs)	n.a.	0	Small	55	1	2.4	4.6	1	n.a.	2.5	2pt	n.a.	n.a.	33	16
Humerus AP Paed (12-14 yrs)	n.a.	0	Small	55	1	2.4	4.6	1	n.a.	2.8	2pt	n.a.	n.a.	43	18
Humerus LAT Paed (0-3 yrs)	n.a.	0	Small	55	1	2.4	4.6	1	n.a.	1.6	2pt	n.a.	n.a.	33	16
Humerus LAT Paed (4-11 yrs)	n.a.	0	Small	55	1	2.4	4.6	1	n.a.	2.5	2pt	n.a.	n.a.	33	16
Humerus LAT Paed (12-14 yrs)	n.a.	0	Small	55	1	2.4	4.6	1	n.a.	2.8	2pt	n.a.	n.a.	43	18
Elbow AP Paed (0-3 yrs)	n.a.	0	Small	55	1.2	2.2	4.6	1	n.a.	1.4	2pt	n.a.	n.a.	26	16
Elbow AP Paed (4-11 yrs)	n.a.	0	Small	55	1.2	2.2	4.6	1	n.a.	2	2pt	n.a.	n.a.	33	16
Elbow AP Paed (12-14 yrs)	n.a.	0	Small	55	1.2	2.2	4.6	1	n.a.	2	2pt	n.a.	n.a.	43	16
Elbow LAT Paed (0-3 yrs)	n.a.	0	Small	55	1	2.2	4.6	1	n.a.	1.4	2pt	n.a.	n.a.	33	16
Elbow LAT Paed (4-11 yrs)	n.a.	0	Small	55	1	2.2	4.6	1	n.a.	2	2pt	n.a.	n.a.	16	16
Elbow LAT Paed (12-14 yrs)	n.a.	0	Small	55	1	2.2	4.6	1	n.a.	2.2	2pt	n.a.	n.a.	19	16
Forearm AP Paed (0-3 yrs)	n.a.	0	Small	55	1.2	2.2	4.6	1	n.a.	1.4	2pt	n.a.	n.a.	26	16
Forearm AP Paed (4-11 yrs)	n.a.	0	Small	55	1.2	2.2	4.6	1	n.a.	2	2pt	n.a.	n.a.	43	16
Forearm AP Paed (12-14 yrs)	n.a.	0	Small	55	1.2	2.2	4.6	1	n.a.	2.2	2pt	n.a.	n.a.	33	16
Forearm LAT Paed (0-3 yrs)	n.a.	0	Small	55	1.2	2.2	4.6	1	n.a.	1.4	2pt	n.a.	n.a.	26	16
Forearm LAT Paed (4-11 yrs)	n.a.	0	Small	55	1.2	2.2	4.6	1	n.a.	2	2pt	n.a.	n.a.	43	16
Forearm LAT Paed (12-14 yrs)	n.a.	0	Small	55	1.2	2.2	4.6	1	n.a.	2.2	2pt	n.a.	n.a.	33	16
Wrist PA Paed (0-3 yrs)	n.a.	0	Small	50	1	2.1	3.8	1	n.a.	1.25	2pt	n.a.	n.a.	16	16
Wrist PA Paed (4-11 yrs)	n.a.	0	Small	50	1	2.1	3.8	1	n.a.	1.8	2pt	n.a.	n.a.	23	23
Wrist PA Paed (12-14 yrs)	n.a.	0	Small	50	1	2.1	3.8	1	n.a.	2	2pt	n.a.	n.a.	23	23
Wrist LAT Paed (0-3 yrs)	n.a.	0	Small	50	1.2	2.4	4.6	1	n.a.	1.25	2pt	n.a.	n.a.	16	16
Wrist LAT Paed (4-11 yrs)	n.a.	0	Small	50	1.2	2.4	4.6	1	n.a.	1.8	2pt	n.a.	n.a.	23	23

Wrist LAT Paed (12-14 yrs)	n.a.	0	Small	50	1.2	2.4	4.6	1	n.a.	2	2pt	n.a.	n.a.	23	23
Scaphoid (Navicular) View Paed (0-3 yrs)	n.a.	0	Small	50	1	2.1	3.8	1	n.a.	1.25	2pt	n.a.	n.a.	16	16
Scaphoid (Navicular) View Paed (4-11 yrs)	n.a.	0	Small	50	1	2.1	3.8	1	n.a.	1.8	2pt	n.a.	n.a.	23	23
Scaphoid (Navicular) View Paed (12-14 yrs)	n.a.	0	Small	50	1	2.1	3.8	1	n.a.	2	2pt	n.a.	n.a.	23	23
Hand PA Paed (0-3 yrs)	n.a.	0	Small	50	1	2.2	3.6	1	n.a.	1.25	2pt	n.a.	n.a.	16	16
Hand PA Paed (4-11 yrs)	n.a.	0	Small	50	1	2.2	3.6	1	n.a.	1.8	2pt	n.a.	n.a.	23	23
Hand PA Paed (12-14 yrs)	n.a.	0	Small	50	1	2.2	3.6	1	n.a.	2	2pt	n.a.	n.a.	23	23
Hand OBL Paed (0-3 yrs)	n.a.	0	Small	50	1	2.2	3.6	1	n.a.	1.25	2pt	n.a.	n.a.	16	16
Hand OBL Paed (4-11 yrs)	n.a.	0	Small	50	1	2.2	3.6	1	n.a.	1.8	2pt	n.a.	n.a.	16	16
Hand OBL Paed (12-14 yrs)	n.a.	0	Small	50	1	2.2	3.6	1	n.a.	2	2pt	n.a.	n.a.	23	23
Finger PA Paed (0-3 yrs)	n.a.	0	Small	50	1	2.2	3.6	1	n.a.	1.25	2pt	n.a.	n.a.	13	6
Finger PA Paed (4-11 yrs)	n.a.	0	Small	50	1	2.2	3.6	1	n.a.	1.8	2pt	n.a.	n.a.	13	6
Finger PA Paed (12-14 yrs)	n.a.	0	Small	50	1	2.2	3.6	1	n.a.	2	2pt	n.a.	n.a.	13	6
Finger OBL Paed (0-3 yrs)	n.a.	0	Small	50	1	2.2	3.6	1	n.a.	1.25	2pt	n.a.	n.a.	13	6
Finger OBL Paed (4-11 yrs)	n.a.	0	Small	50	1	2.2	3.6	1	n.a.	1.8	2pt	n.a.	n.a.	13	6
Finger OBL Paed (12-14 yrs)	n.a.	0	Small	50	1	2.2	3.6	1	n.a.	2	2pt	n.a.	n.a.	13	6
Finger LAT Paed (0-3 yrs)	n.a.	0	Small	50	1	2.2	3.6	1	n.a.	1.25	2pt	n.a.	n.a.	13	6
Finger LAT Paed (4-11 yrs)	n.a.	0	Small	50	1	2.2	3.6	1	n.a.	1.8	2pt	n.a.	n.a.	13	6
Finger LAT Paed (12-14 yrs)	n.a.	0	Small	50	1	2.2	3.6	1	n.a.	2	2pt	n.a.	n.a.	13	6
Bone Age (0-3 yrs)	n.a.	0	Small	50	1	2.2	3.6	1	n.a.	1.25	2pt	n.a.	n.a.	16	16
Bone Age (4-11 yrs)	n.a.	0	Small	50	1	2.2	3.6	1	n.a.	1.8	2pt	n.a.	n.a.	23	23
Bone Age (12-14 yrs)	n.a.	0	Small	50	1	2.2	3.6	1	n.a.	2	2pt	n.a.	n.a.	23	23
Infant Upper Extremity	n.a.	0	Small	52	1.2	2.2	4.6	1	n.a.	2	2pt	n.a.	n.a.	43	16

Hip AP Paed (0-3 yrs) 8-12 cm	n.a.	0	Small	63	1.3	2.2	4.2	1	n.a.	2.2	2pt	n.a.	n.a.	31	21
Hip AP Paed (4-11 yrs) 10-18 cm	M	0	Large	66	1.3	2.2	4.2	1	n.a.	n.a.	1pt	0	2.5	31	21
Hip AP Paed (12-14 yrs) 14-22 cm	M	0	Large	70	1.3	2.2	4.2	1	115	n.a.	1pt	0	2.5	43	21
Femur AP Paed (0-3 yrs)	n.a.	0	Small	58.5	1.3	2.2	4.2	1	n.a.	2	2pt	n.a.	n.a.	31	20
Femur AP Paed (4-11 yrs)	n.a.	0	Small	61.5	1.3	2.2	4.2	1	n.a.	2.2	2pt	n.a.	n.a.	36	20
Femur AP Paed (12-14 yrs)	n.a.	0	Small	61.5	1.3	2.2	4.2	1	n.a.	2.5	2pt	n.a.	n.a.	43	20
Femur LAT Paed (0-3 yrs)	n.a.	0	Small	58.5	1.3	2.2	4.2	1	n.a.	2	2pt	n.a.	n.a.	31	20
Femur LAT Paed (4-11 yrs)	n.a.	0	Small	61.5	1.3	2.2	4.2	1	n.a.	2.2	2pt	n.a.	n.a.	36	20
Femur LAT Paed (12-14 yrs)	n.a.	0	Small	61.5	1.3	2.2	4.2	1	n.a.	2.5	2pt	n.a.	n.a.	43	20
Knee AP Paed (0-3 yrs)	n.a.	0	Small	55	1.5	2.4	3.4	1	n.a.	1.6	2pt	n.a.	n.a.	26	18
Knee AP Paed (4-11 yrs)	n.a.	0	Small	60	1.5	2.4	3.4	1	n.a.	2.8	2pt	n.a.	n.a.	28	21
Knee AP Paed (12-14 yrs)	n.a.	0	Small	60	1.5	2.4	3.4	1	n.a.	3.2	2pt	n.a.	n.a.	31	26
Knee LAT Paed (0-3 yrs)	n.a.	0	Small	55	1.2	2.2	3.6	1	n.a.	1.6	2pt	n.a.	n.a.	26	18
Knee LAT Paed (4-11 yrs)	n.a.	0	Small	60	1.2	2.2	3.6	1	n.a.	2.8	2pt	n.a.	n.a.	28	21
Knee LAT Paed (12-14 yrs)	n.a.	0	Small	60	1.2	2.2	3.6	1	n.a.	3.2	2pt	n.a.	n.a.	31	26
Patella Paed (0-3 yrs)	n.a.	0	Small	55	1.4	2.4	5.2	1.1	n.a.	1.6	2pt	n.a.	n.a.	18	18
Patella Paed (4-11 yrs)	n.a.	0	Small	60	1.4	2.4	5.2	1.1	n.a.	2.8	2pt	n.a.	n.a.	18	18
Patella Paed (12-14 yrs)	n.a.	0	Small	60	1.4	2.4	5.2	1.1	n.a.	3.2	2pt	n.a.	n.a.	18	18
Tibia/ Fibula AP Paed (0-3 yrs)	n.a.	0	Small	55	1.4	2.2	4.6	1	n.a.	1.6	2pt	n.a.	n.a.	36	16
Tibia/ Fibula AP Paed (4-11 yrs)	n.a.	0	Small	60	1.4	2.2	4.6	1	n.a.	2.8	2pt	n.a.	n.a.	39	16
Tibia/ Fibula AP Paed (12-14 yrs)	n.a.	0	Small	60	1.4	2.2	4.6	1	n.a.	3.2	2pt	n.a.	n.a.	43	16

Tibia/ Fibula LAT Paed (0-3 yrs)	n.a.	0	Small	55	1.4	2.2	4.6	1	n.a.	1.6	2pt	n.a.	n.a.	36	16
Tibia/ Fibula LAT Paed (4-11 yrs)	n.a.	0	Small	60	1.4	2.2	4.6	1	n.a.	2.8	2pt	n.a.	n.a.	39	16
Tibia/ Fibula LAT Paed (12-14 yrs)	n.a.	0	Small	60	1.4	2.2	4.6	1	115	3.2	2pt	n.a.	n.a.	43	16
Ankle AP Paed (0-3 yrs)	n.a.	0	Small	52	1.4	2.2	4.2	1	n.a.	1.6	2pt	n.a.	n.a.	16	12
Ankle AP Paed (4-11 yrs)	n.a.	0	Small	52	1.4	2.2	4.2	1	n.a.	2.2	2pt	n.a.	n.a.	19	13
Ankle AP Paed (12-14 yrs)	n.a.	0	Small	52	1.4	2.2	4.2	1	n.a.	2.5	2pt	n.a.	n.a.	21	16
Ankle LAT Paed (0-3 yrs)	n.a.	0	Small	52	1.1	2.2	4.2	1	n.a.	1.6	2pt	n.a.	n.a.	16	12
Ankle LAT Paed (4-11 yrs)	n.a.	0	Small	52	1.1	2.2	4.2	1	n.a.	2.2	2pt	n.a.	n.a.	19	13
Ankle LAT Paed (12-14 yrs)	n.a.	0	Small	52	1.1	2.2	4.2	1	n.a.	2.5	2pt	n.a.	n.a.	21	16
Foot AP Paed (0-3 yrs)	n.a.	0	Small	50	1.2	2.2	3.8	1	n.a.	1.25	2pt	n.a.	n.a.	31	19
Foot AP Paed (4-11 yrs)	n.a.	0	Small	52	1.2	2.2	3.8	1	n.a.	1.6	2pt	n.a.	n.a.	31	19
Foot AP Paed (12-14 yrs)	n.a.	0	Small	52	1.2	2.2	3.8	1	n.a.	1.8	2pt	n.a.	n.a.	31	19
Foot OBL Paed (0-3 yrs)	n.a.	0	Small	50	1.2	2.1	3.8	1	n.a.	1.25	2pt	n.a.	n.a.	31	19
Foot OBL Paed (4-11 yrs)	n.a.	0	Small	52	1.2	2.1	3.8	1	n.a.	1.6	2pt	n.a.	n.a.	31	19
Foot OBL Paed (12-14 yrs)	n.a.	0	Small	52	1.2	2.1	3.8	1	n.a.	1.8	2pt	n.a.	n.a.	31	19
Foot LAT Paed (0-3 yrs)	n.a.	0	Small	50	1.2	2.1	3.8	1	n.a.	1.25	2pt	n.a.	n.a.	31	19
Foot LAT Paed (4-11 yrs)	n.a.	0	Small	52	1.2	2.1	3.8	1	n.a.	1.6	2pt	n.a.	n.a.	31	19
Foot LAT Paed (12-14 yrs)	n.a.	0	Small	52	1.2	2.1	3.8	1	n.a.	1.8	2pt	n.a.	n.a.	31	19
Toe AP Paed (0-3 yrs)	n.a.	0	Small	50	1.2	2.2	3.8	1	n.a.	1.25	2pt	n.a.	n.a.	19	19
Toe AP Paed (4-11 yrs)	n.a.	0	Small	52	1.2	2.2	3.8	1	n.a.	1.6	2pt	n.a.	n.a.	19	19
Toe AP Paed (12-14 yrs)	n.a.	0	Small	52	1.2	2.2	3.8	1	n.a.	1.8	2pt	n.a.	n.a.	19	19
Toe OBL Paed (0-3 yrs)	n.a.	0	Small	50	1.2	2.2	3.8	1	n.a.	1.25	2pt	n.a.	n.a.	19	19

Toe OBL Paed (4-11 yrs)	n.a.	0	Small	52	1.2	2.2	3.8	1	n.a.	1.6	2pt	n.a.	n.a.	19	19
Toe OBL Paed (12-14 yrs)	n.a.	0	Small	52	1.2	2.2	3.8	1	n.a.	1.8	2pt	n.a.	n.a.	19	19
Infant Lower Extremity	n.a.	0	Large	58.5	1.4	2.2	4.6	1	n.a.	2.8	2pt	n.a.	n.a.	43	16
Skull AP Paed (0-6 mos) 8-10 cm	n.a.	0	Small	66	1.4	2	4.4	1	n.a.	1.25	2pt	n.a.	n.a.	31	26
Skull AP Paed (7-12 mos) 10-12 cm	n.a.	0	Small	66	1.4	2	4.4	1	n.a.	1.6	2pt	n.a.	n.a.	31	26
Skull AP Paed (1-4 yrs) 12-15 cm	n.a.	0	Small	70	1.4	2	4.4	1	115	2	2pt	n.a.	n.a.	31	26
Skull AP Paed (5-14 yrs) 16-20 cm	M	0	Small	73	1.4	2	4.4	1	n.a.	n.a.	1pt	0	2.5	31	26
Skull LAT Paed (0-6 mos) 8-10 cm	n.a.	0	Small	66	1.4	2	4.4	1	n.a.	1.25	2pt	n.a.	n.a.	31	26
Skull LAT Paed (7-12 mos) 10-12 cm	n.a.	0	Small	66	1.4	2	4.4	1	n.a.	1.6	2pt	n.a.	n.a.	31	26
Skull LAT Paed (1-4 yrs) 12-15 cm	n.a.	0	Small	70	1.4	2	4.4	1	n.a.	2	2pt	n.a.	n.a.	31	26
Skull LAT Paed (5-14 yrs) 16-20 cm	M	0	Small	73	1.4	2	4.4	1	n.a.	n.a.	1pt	0	2.5	31	26
Orbits PA Paed (0-6 mos)	n.a.	0	Small	66	1.4	2	4.4	1	n.a.	1.25	2pt	n.a.	n.a.	19	19
Orbits PA Paed (7-12 mos)	n.a.	0	Small	66	1.4	2	4.4	1	n.a.	1.6	2pt	n.a.	n.a.	19	19
Orbits PA Paed (1-4 yrs)	n.a.	0	Small	70	1.4	2	4.4	1	n.a.	2	2pt	n.a.	n.a.	19	19
Orbits PA Paed (5-14 yrs)	M	0	Small	73	1.4	2	4.4	1	n.a.	n.a.	1pt	0	2.5	19	19
Chest AP standing Paed (0-3 yrs) 11-14 cm	n.a.	0	Small	73	1.3	2	4	1	n.a.	1.25	2pt	n.a.	n.a.	31	31
Chest AP standing Paed (4-7 yrs) 14-20 cm	n.a.	0	Small	75	1.3	2	4	1	n.a.	1.6	2pt	n.a.	n.a.	31	31
Chest AP standing Paed (8-14 yrs) 15-22 cm	L+R	0	Small	79	1.3	2	4	1	115	n.a.	1pt	0	2.5	43	43

Chest LAT Left supine Paed (0-3 yrs) 11-14 cm	n.a.	0	Small	73	1.4	2	4.2	1	115	1.25	2pt	n.a.	n.a.	35	43
Chest LAT Left supine Paed (4-7 yrs) 14-20 cm	n.a.	0	Small	75	1.4	2	4.2	1	115	1.6	2pt	n.a.	n.a.	35	43
Chest LAT Left supine Paed (8-14 yrs) 21-28 cm	M	0	Small	79	1.4	2	4.2	1	115	n.a.	1pt	0	2.5	35	43
Chest LAT Right supine Paed (0-3 yrs) 11-14 cm	n.a.	0	Small	73	1.4	2	4.2	1	115	1.25	2pt	n.a.	n.a.	35	43
Chest LAT Right supine Paed (4-7 yrs) 14-20 cm	n.a.	0	Small	75	1.4	2	4.2	1	115	1.6	2pt	n.a.	n.a.	35	43
Chest LAT Right supine Paed (8- 14 yrs) 21-28 cm	M	0	Small	79	1.4	2	4.2	1	115	n.a.	1pt	0	2.5	35	43
Sternum LAT Paed (0-3 yrs)	n.a.	0	Small	73	1.6	1.9	3.2	1	n.a.	1.25	2pt	n.a.	n.a.	18	14
Sternum LAT Paed (4-7 yrs)	n.a.	0	Small	75	1.6	1.9	3.2	1	n.a.	1.6	2pt	n.a.	n.a.	20	16
Sternum LAT Paed (8-14 yrs)	M	0	Small	75	1.6	1.9	3.2	1	115	n.a.	1pt	0	2.5	24	18
Sternum OBL Paed (0-3 yrs)	n.a.	0	Small	73	1.6	1.9	3.2	1	n.a.	1.25	2pt	n.a.	n.a.	18	14
Sternum OBL Paed (4-7 yrs)	n.a.	0	Small	75	1.6	1.9	3.2	1	n.a.	1.6	2pt	n.a.	n.a.	20	16
Sternum OBL Paed (8-14 yrs)	M	0	Small	75	1.6	1.9	3.2	1	115	n.a.	1pt	0	2.5	24	18
OT150_W180_Long-Leg both (0-5 yrs)_1	L+R	0.1	Small	70	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W180_Long-Leg both (0-5 yrs)_2	L+R	0.1	Small	60	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W180_Long-Leg both (0-5 yrs)_3	L+R	0.1	Small	52	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W180_Long-Leg both (0-5 yrs)_4	L+R	0.1	Small	52	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	43

OT150_W180_Long-Leg both (6-10 yrs)_1	L+R	0.1	Small	73	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W180_Long-Leg both (6-10 yrs)_2	L+R	0.1	Small	64.5	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W180_Long-Leg both (6-10 yrs)_3	L+R	0.1	Small	60	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W180_Long-Leg both (6-10 yrs)_4	L+R	0.1	Small	60	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W180_Long-Leg both (11-15 yrs)_1	L+R	0.1	Small	77	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W180_Long-Leg both (11-15yrs)_2	L+R	0.1	Small	66	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W180_Long-Leg both (11-15yrs)_3	L+R	0.1	Small	63	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W180_Long-Leg both (11-15yrs)_4	L+R	0.1	Small	63	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W180_Long-Leg single (0-5 yrs)_1	M	0.1	Small	70	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	20
OT150_W180_Long-Leg single (0-5 yrs)_2	M	0.1	Small	60	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	20
OT150_W180_Long-Leg single (0-5 yrs)_3	M	0.1	Small	52	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	20
OT150_W180_Long-Leg single (0-5 yrs)_4	M	0.1	Small	52	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	20
OT150_W180_Long-Leg single (6-10 yrs)_1	M	0.1	Small	73	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	25
OT150_W180_Long-Leg single (6-10 yrs)_2	M	0.1	Small	64.5	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	25
OT150_W180_Long-Leg single (6-10 yrs)_3	M	0.1	Small	60	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	25

OT150_W180_Long-Leg single (6-10 yrs)_4	M	0.1	Small	60	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	25
OT150_W180_Long-Leg single (11-15 yrs)_1	M	0.1	Small	77	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	25
OT150_W180_Long-Leg single (11-15yrs)_2	M	0.1	Small	66	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	25
OT150_W180_Long-Leg single (11-15yrs)_3	M	0.1	Small	63	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	25
OT150_W180_Long-Leg single (11-15yrs)_4	M	0.1	Small	63	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	25
OT150_W180_Long-Spine a.p (0-5 yrs)_1	M	0.1	Small	68	1.3	2	4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W180_Long-Spine a.p (0-5 yrs)_2	L+R	0.2	Small	75	1.3	2	4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W180_Long-Spine a.p (0-5 yrs)_3	L+R	0.2	Small	87.5	1.3	2	4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W180_Long-Spine a.p (0-5 yrs)_4	L+R	0.2	Small	87.5	1.3	2	4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W180_Long-Spine a.p (6-10 yrs)_1	M	0.1	Small	70	1.3	2	4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W180_Long-Spine a.p (6-10 yrs)_2	L+R	0.2	Small	77	1.3	2	4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W180_Long-Spine a.p (6-10 yrs)_3	L+R	0.2	Small	87.5	1.3	2	4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W180_Long-Spine a.p (6-10 yrs)_4	L+R	0.2	Small	87.5	1.3	2	4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W180_Long-Spine a.p (11-15 yrs)_1	M	0.1	Small	71.5	1.3	2	4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W180_Long-Spine a.p (11-15yrs)_2	L+R	0.2	Small	79	1.3	2	4	1	n.a.	n.a.	1pt	0	2.5	43	43

OT150_W180_Long-Spine a.p (11-15yrs)_3	L+R	0.2	Small	87.5	1.3	2	4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W180_Long-Spine a.p (11-15yrs)_4	L+R	0.2	Small	87.5	1.3	2	4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W180_Long-Spine lat. (0-5 yrs)_1	M	0.1	Small	63	1.4	2.3	2	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W180_Long-Spine lat. (0-5 yrs)_2	L+R	0.2	Small	70	1.4	2.3	2	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W180_Long-Spine lat. (0-5 yrs)_3	L+R	0.2	Small	75	1.4	2.3	2	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W180_Long-Spine lat. (0-5 yrs)_4	L+R	0.2	Small	75	1.4	2.3	2	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W180_Long-Spine lat. (6-10 yrs)_1	M	0.1	Small	70	1.4	2.3	2	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W180_Long-Spine lat. (6-10 yrs)_2	L+R	0.2	Small	77	1.4	2.3	2	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W180_Long-Spine lat. (6-10 yrs)_3	L+R	0.2	Small	87.5	1.4	2.3	2	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W180_Long-Spine lat. (6-10 yrs)_4	L+R	0.2	Small	87.5	1.4	2.3	2	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W180_Long-Spine lat. (11-15 yrs)_1	M	0.1	Small	71.5	1.4	2.3	2	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W180_Long-Spine lat. (11-15yrs)_2	L+R	0.2	Small	79	1.4	2.3	2	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W180_Long-Spine lat. (11-15yrs)_3	L+R	0.2	Small	87.5	1.4	2.3	2	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W180_Long-Spine lat. (11-15yrs)_4	L+R	0.2	Small	87.5	1.4	2.3	2	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W300_Long-Leg both (0-5 yrs)_1	L+R	0.1	Small	70	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	43

OT150_W300_Long-Leg both (0-5 yrs)_2	L+R	0.1	Small	60	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W300_LongLeg both (0-5 yrs)_3	L+R	0.1	Small	52	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W300_LongLeg both (0-5 yrs)_4	L+R	0.1	Small	52	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W300_LongLeg both (6-10 yrs)_1	L+R	0.1	Small	73	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W300_LongLeg both (6-10 yrs)_2	L+R	0.1	Small	64.5	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W300_LongLeg both (6-10 yrs)_3	L+R	0.1	Small	60	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W300_LongLeg both (6-10 yrs)_4	L+R	0.1	Small	60	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W300_LongLeg both (11-15 yrs)_1	L+R	0.1	Small	77	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W300_LongLeg both (11-15yrs)_2	L+R	0.1	Small	66	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W300_LongLeg both (11-15yrs)_3	L+R	0.1	Small	63	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W300_LongLeg both (11-15yrs)_4	L+R	0.1	Small	63	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W300_LongLeg single (0-5 yrs)_1	M	0.1	Small	70	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	20
OT150_W300_LongLeg single (0-5 yrs)_2	M	0.1	Small	60	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	20
OT150_W300_LongLeg single (0-5 yrs)_3	M	0.1	Small	52	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	20
OT150_W300_LongLeg single (0-5 yrs)_4	M	0.1	Small	52	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	20

OT150_W300_LongLeg single (6-10 yrs)_1	M	0.1	Small	73	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	25
OT150_W300_LongLeg single (6-10 yrs)_2	M	0.1	Small	64.5	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	25
OT150_W300_LongLeg single (6-10 yrs)_3	M	0.1	Small	60	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	25
OT150_W300_LongLeg single (6-10 yrs)_4	M	0.1	Small	60	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	25
OT150_W300_LongLeg single (11-15 yrs)_1	M	0.1	Small	77	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	25
OT150_W300_LongLeg single (11-15yrs)_2	M	0.1	Small	66	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	25
OT150_W300_LongLeg single (11-15yrs)_3	M	0.1	Small	63	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	25
OT150_W300_LongLeg single (11-15yrs)_4	M	0.1	Small	63	1.5	2.4	3.4	1	n.a.	n.a.	1pt	0	2.5	43	25
OT150_W300_LongSpine a.p (0-5 yrs)_1	M	0.1	Small	68	1.3	2	4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W300_LongSpine a.p (0-5 yrs)_2	L+R	0.2	Small	75	1.3	2	4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W300_LongSpine a.p (0-5 yrs)_3	L+R	0.2	Small	87.5	1.3	2	4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W300_LongSpine a.p (0-5 yrs)_4	L+R	0.2	Small	87.5	1.3	2	4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W300_LongSpine a.p (6-10 yrs)_1	M	0.1	Small	70	1.3	2	4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W300_LongSpine a.p (6-10 yrs)_2	L+R	0.2	Small	77	1.3	2	4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W300_LongSpine a.p (6-10 yrs)_3	L+R	0.2	Small	87.5	1.3	2	4	1	n.a.	n.a.	1pt	0	2.5	43	43

OT150_W300_LongSpine a.p (6-10 yrs)_4	L+R	0.2	Small	87.5	1.3	2	4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W300_LongSpine a.p (11-15 yrs)_1	M	0.1	Small	71.5	1.3	2	4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W300_LongSpine a.p (11-15yrs)_2	L+R	0.2	Small	79	1.3	2	4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W300_LongSpine a.p (11-15yrs)_3	L+R	0.2	Small	87.5	1.3	2	4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W300_LongSpine a.p (11-15yrs)_4	L+R	0.2	Small	87.5	1.3	2	4	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W300_LongSpine lat. (0-5 yrs)_1	M	0.1	Small	63	1.4	2.3	2	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W300_LongSpine lat. (0-5 yrs)_2	L+R	0.2	Small	70	1.4	2.3	2	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W300_LongSpine lat. (0-5 yrs)_3	L+R	0.2	Small	75	1.4	2.3	2	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W300_LongSpine lat. (0-5 yrs)_4	L+R	0.2	Small	75	1.4	2.3	2	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W300_LongSpine lat. (6-10 yrs)_1	M	0.1	Small	70	1.4	2.3	2	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W300_LongSpine lat. (6-10 yrs)_2	L+R	0.2	Small	77	1.4	2.3	2	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W300_Long-Spine lat. (6-10 yrs)_3	L+R	0.2	Small	87.5	1.4	2.3	2	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W300_Long-Spine lat. (6-10 yrs)_4	L+R	0.2	Small	87.5	1.4	2.3	2	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W300_Long-Spine lat. (11-15 yrs)_1	M	0.1	Small	71.5	1.4	2.3	2	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W300_Long-Spine lat. (11-15yrs)_2	L+R	0.2	Small	79	1.4	2.3	2	1	n.a.	n.a.	1pt	0	2.5	43	43

OT150_W300_Long-Spine lat. (11-15yrs)_3	L+R	0.2	Small	87.5	1.4	2.3	2	1	n.a.	n.a.	1pt	0	2.5	43	43
OT150_W300_Long-Spine lat. (11-15yrs)_4	L+R	0.2	Small	87.5	1.4	2.3	2	1	n.a.	n.a.	1pt	0	2.5	43	43

Device specific features and instructions

The MULTIX Impact C provides the following specific design features and instructions that enable safer use of our device with pediatric patients:

Design feature important to pediatric imaging	**Page number reference in Instructions for use**
Removable grid	For table: (➔ Page 105 *Scattered radiation grid*) For wall stand: (➔ Page 112 *Scattered radiation grid*) For free exposures: (➔ Page 215 *Clip-on grids*)
Filter	For motorized collimator: (➔ Page 134 *Additional Cu filter*)
Variable focal spot size	(➔ Page 64 *Generator functions*)
Post-processing application	Refer to the imaging system Operator Manual, Chapter 4.7 Image postprocessing
Automatic Exposure Control	(➔ Page 64 *Generator functions*)
Testing information	**Page number reference in Instructions for use**
Quality Control instructions including tests to ensure proper operation across a broad patient size range	Refer to the Imaging System Operator Manual, Chapter 2.10 Quality control study

5.11.2 Use of anti-scatter grid

The grid can be removed from the side of the detector housing with an easy de-lock mechanism. The information which grid is inserted or if the grid is removed, is shown at the imaging system as well as at the touch user interface at the tube head. It is possible to program if a grid shall be available or not in the organ program, this means the user gets a message to remove the grid for pediatric examinations.

CAUTION

Image made with incorrect grid status during pediatric examination

Radiation not as desired

- The expected grid status (inserted, removed) is indicated at the imaging system.
- Manually remove the grid as required before making the X-ray exposure.

5.11.3 Use of filtration

The X-ray beam quality can be changed to reduce low-energy quanta and thus reduce the skin dose. The collimator is equipped with copper filters of 0.1, 0.2 or 0.3 mm Cu. The usage of the filters can be programmed in the organ program. Dedicated pediatric organ programs include this filtering, the filters will be inserted automatically to match the programmed value. The filters can be switched on and off any time at the imaging system as well as at the touch user interface at the tube head.

5.11.4 Automatic Exposure Control (AEC)

The system is equipped with a multi-field measuring chamber with sensitivity suitable for pediatric imaging in examinations with automatic exposure control. The different fields can be selected or programmed for the position or anatomy of the current task. The status of the selected chamber is displayed at the imaging system as well as at the touch user interface.

5.11.5 Specific organ programs for pediatric examinations

Our system provides a comprehensive set of dedicated pediatric organ programs. It is possible to add organ programs or change the organ program parameters according to the customers needs. If additional specific organ programs for a specific patient age or body region are needed, please contact the Siemens Healthineers application specialist in your country for support.

For further information, please see the following websites:

- Right Dose Information Center

  Find training materials and education across all modalities and clinical specialties.

  https://www.healthcare.siemens.com/medical-imaging/low-dose?stc=wwhim801487

- Understanding Medical Radiation

  A knowledge resource for patients and caregivers.

  http://www.medicalradiation.com/

  Additional educational material such as a checklists that includes special pediatric issues during pre-acquisition, acquisition, and post-acquisition may be obtained from the following example:

  "The Alliance for Radiation Safety in Pediatric Imaging, Implementation Manual Image Gently® Digital Radiography Safety Checklist, Safety Steps to Do and Verify for Your Pediatric Patient".

  http://www.imagegently.org/

5.11.6 Pediatric positioning aids

Positioning aids are available that support a safe examination with small patients. These aids are described in Register **Accessories and Auxiliary Devices.**

5.12 Ortho operation

If configured, you can acquire a series of images from different patient heights at the Bucky wall stand or on the patient table.

Both SmartOrtho and Smart Virtual Ortho can provide Ortho acquisition with automatic movement, whereby the system will automatically move in the correct position for each image of the Ortho sequence after the user has selected start and end position.

(➔ Page 165 *Ortho on patient table*)

(➔ Page 166 *Ortho on wall stand*)

(➔ Page 166 *Organ program for Ortho*)

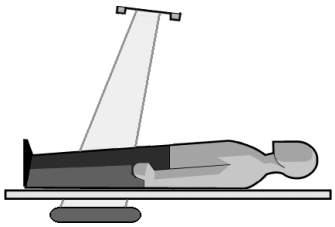
(➔ Page 167 *Preparing Ortho*)

(➔ Page 172 *Releasing the Ortho exposures*)

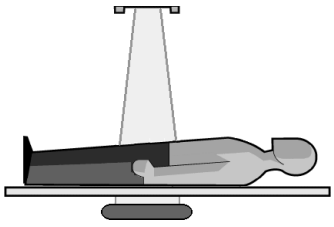
5.12.1 Ortho on patient table

The Ortho acquisition is done by tilting the X-ray tube unit and moving the detector unit. The X-ray tube unit is centered over the table. When an Ortho sequence is started, the detector moves automatically to the different positions (up to 3). The tube follows the detector, by tilting itself accordingly.

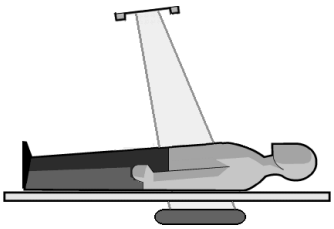
Example: Longitudinal Ortho a.p. lying (region with 3 positions)



Acquisition position 1



Acquisition position 2



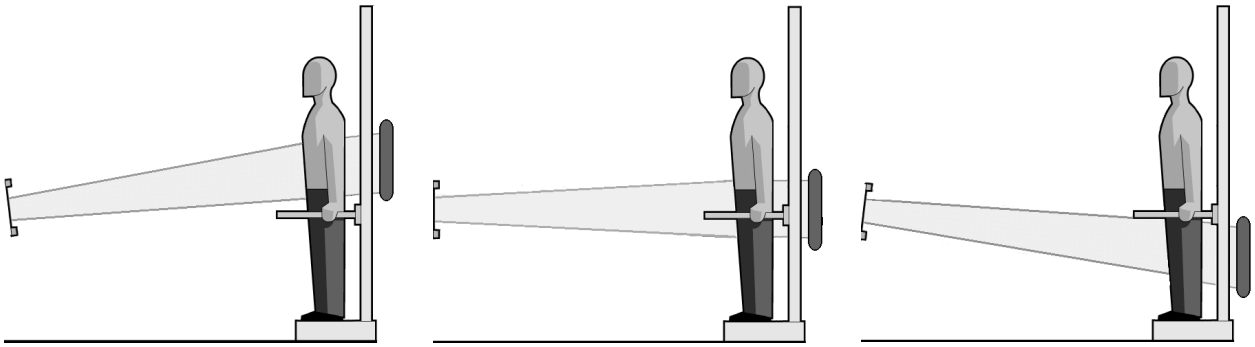
Acquisition position 3

Ortho acquisitions on the table can be performed with a SID of 1.5 m.

5.12.2 Ortho on wall stand

The Ortho acquisition is done by tilting the X-ray tube unit and moving the detector unit. The X-ray tube unit is positioned in the middle of the Ortho cover range. When an Ortho sequence is started, the detector moves automatically to the different positions (up to 4). The tube follows the detector, by tilting itself accordingly.

Example: Longitudinal Ortho a.p. standing (region with 3 positions)



Acquisition position 1 | Acquisition position 2 | Acquisition position 3

For automatic Ortho imaging onto the wall stand, the Ortho stand is needed.

(➔ Page 188 *Multipurpose / Ortho stand*)

Ortho acquisitions onto the wall stand can be performed with large SID (3 m) and short SID (1.8 m).

5.12.3 Organ program for Ortho

Organ programs for Ortho allow up to four acquisitions, belonging to one Ortho series. For each step individual settings for the generator are available.

The position of the units must be saved for the Ortho organ programs. It must be ensured that the unit axes are located orthogonally to each other.

CAUTION

Wrong organ program used in Ortho

Delayed diagnosis or repeated examination because results cannot be composed

- Use the correct organ program for Ortho.
- Make a test run.

5.12.4 Preparing Ortho

Pay attention to the messages displayed on the imaging system display and on the TUI.

If the series acquisition is interrupted, the whole sequence must be started again from the beginning!

(➔ Page 166 *Organ program for Ortho*)

✓ An Ortho organ program is selected.

✓ The collimator must be in the 0° lock-in-position.

✓ For Ortho acquisitions onto the wall stand, the detector unit must be in the 0° position.

1 Press the SmartPositioning button (if configured) to move the X-ray tube assembly and the detector to the start position.

CAUTION

The elevating table collides with patient during Ortho positioning.

Injury to patient.

- Ensure that nobody is in the danger zone of the elevating table when using the Wireless Remote Control Console for Ortho positioning.

– or –

If the SmartPositioning function is not configured, position the tube unit in detent and center to the detector.

2 Position the patient lying supine on the patient table or standing with their back directed to the Ortho stand.

(➔ Page 167 *Positioning the patient on the patient table*)

(➔ Page 168 *Positioning the patient on the Ortho stand*)

Positioning the patient on the patient table

CAUTION

Patient's hand is under the table during ortho

Risk of crushing between table and detector tray

- Check the position of the patient's hands.
- Make sure the patient is using the hand grips.

1 Position the patient lying on the table.

2 Position the calibration element (sphere, ruler) in the area relevant for diagnosis.

Positioning the patient on the Ortho stand

WARNING

Use of Ortho functionality without Ortho stand.

Risk of injury to patient

- Always use the Ortho stand if you are doing an Ortho study.

(➔ Page 188 *Multipurpose / Ortho stand*)

1 Carefully position the Ortho stand as close as possible to the detector tray.

Check that the detector tray does not grind on the semi-transparent stripes of the complete relevant area.

2 Position the patient standing on the Ortho stand in such a way that the longitudinal axis of the object runs parallel to the image receptor.

3 Position the calibration element (sphere, ruler) in the area relevant for diagnosis.

Changing/entering the TOD

For later measurements and calculation of acquisition positions, the correct TOD = "Table"-Object Distance must be entered, i.e. Ortho stand to object plane distance.

✓ After selecting an organ program for Ortho, the TOD defined in the organ program is displayed.

✓ The X-ray tube unit is positioned for Ortho.

1 Measure the TOD using a ruler.

– or –

Measure the SOD (source-object distance) using the tape measure.

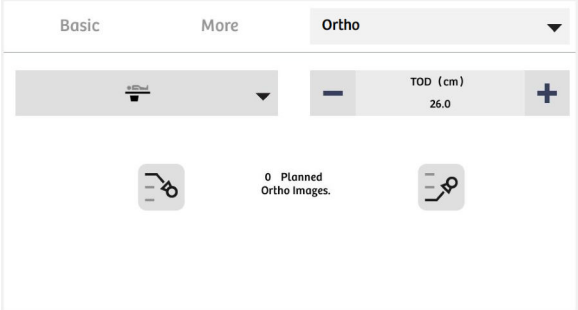
(TOD = SID - SOD)

2 Select the correct TOD on the TUI or imaging system (accuracy 0.5 cm).

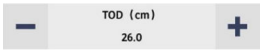
Adjusting the ROI with start and end position in the examination room

✓ SmartOrtho is configured.

✓ (➔ Page 167 *Preparing Ortho*)



Example of Ortho menu

Icon	Short description
	Select TOD (Table-Object Distance)
	Acquisition start or end position (based on the acquisition direction)
	Acquisition end or start position (based on the acquisition direction)

✓ The Ortho menu is displayed on the TUI.

Use the laser line light localizer to set the image area.

1 Ask the patient to close their eyes and turn on the light localizer.

2 Align the laser line on the upper or lower edge of the region of interest by tilting the X-ray tube unit.

3 Press one of these two icons on the TUI.

The position is stored and the icon is marked with a check mark.

4 Align the laser line on the lower or upper edge of the region of interest by tilting the X-ray tube unit again.

5 Press the other icon on the TUI.

The position is stored and the icon is marked with a check mark.

The acquisition order has been set in the Ortho organ program.

You can change the acquisition order in the **OGP Editor**.

If the upper or lower limit is out of the travel range of the detector, the icon is marked with a cross mark.

- Redefine the ROI.
- Use the additional removable platform on the Ortho stand when performing Ortho acquisition on the wall stand.

(→ Page 188 *Multipurpose / Ortho stand*)

The system automatically calculates any intermediate acquisition positions required for coverage of the acquisition range.

If more than four acquisition positions would be required to cover the acquisition range, a message is displayed. The target area has to be adjusted and the start and end positions have to be set again.

6 Turn off the laser light.

7 Collimate the region of interest in width.

(Collimation in height will be adjusted automatically.)

8 Check acquisition parameters, collimation, and measuring fields.

When collimated narrowly in width, the system switches automatically to the center measuring field.

Adjusting the ROI with camera in the control room

Using **Smart Virtual Ortho** with the integrated 2D camera, you can smoothen the preparation for orthopedic procedures, especially long leg and full spine, and thus enhance the conditions that patients experience.

✓ Smart Virtual Ortho is configured.

✓ (➔ Page 167 *Preparing Ortho*)

✓ The camera is configured for Ortho.

✓ The X-ray tube unit is positioned for Ortho.

✓ TOD has been set correctly.

1 Click the button on the imaging system.

The Ortho acquisition range (ROI) is shown with an orange frame on the imaging system.

2 Select the start and end position by adjusting the upper and lower line.

If the ROI is out of the travel range of the detector, the upper and lower lines are marked in red.

- Redefine the start or end position.
- Use the additional removable platform on the Ortho stand when performing Ortho acquisition on the wall stand.

  (➔ Page 188 *Multipurpose / Ortho stand*)

3 Collimate the region of interest (ROI) in width by adjusting the right and left line.

4 Check acquisition parameters and measuring fields on the imaging system.

ROI auto detection

✓ Smart Virtual Ortho is configured.

✓ Auto Long-Leg/Full-Spine Collimation is configured.

✓ (➔ Page 167 *Preparing Ortho*)

✓ The camera is configured for Ortho.

✓ Workplace wall stand is selected.

✓ The X-ray tube unit is positioned for Ortho.

✓ TOD has been set correctly.

◆ Click the button on the imaging system.

The ROI is automatically detected and shown with a blue frame on the imaging system.

If the ROI is out of the travel range of the detector, the upper and lower lines are marked in red.

- You can manually adjust the ROI.
- Use the additional removable platform on the Ortho stand when performing Ortho acquisition on the wall stand.

  (➔ Page 188 *Multipurpose / Ortho stand*)
- Adjust the upper or lower offset in the **Ortho Setting** function.

It is the responsibility of the operator to ensure correct acquisition range. Adjust the ROI manually if necessary.

To adjust the ROI manually:

- Select the start and end position by adjusting the upper and lower line.
- Collimate the region of interest (ROI) in width by adjusting the right and left line.

Once the ROI has been adjusted manually, the frame turns into orange.

5.12.5 Releasing the Ortho exposures

✓ The first Ortho step is selected.

✓ The units and the patient are correctly positioned.

✓ The Ortho acquisition range (ROI) has been defined.

✓ The TOD and the acquisition parameters are correctly set.

1 Confirm all the parameters by clicking **Confirm** on the imaging system.

While using the Ortho function, the X-ray exposure should be performed only after the suggested image field has been validated by the system operator.

To reselect the Ortho organ program, click **End of Exam**.

2 Press the acquisition push-button half way (pre-contact) and hold it in that position.

The system moves to the first acquisition position.

The acquisition order has been set in the Ortho organ program.

You can change the acquisition order in the **OGP Editor**.

3 Instruct the patient to keep still.

4 Press the acquisition push-button fully down and keep it pressed until all the acquisitions are finished.

The first position is acquired and displayed.

The system moves to the next acquisition position.

The next position is acquired and displayed.

and so on

After all exposures have been carried out, the acquired images are automatically stitched together.

Please pay attention to the system messages displayed on the monitor. These messages indicates the progress of the Ortho acquisitions.

If an Ortho series acquisition is interrupted, the whole sequence must be started again from the beginning!

The same Ortho organ program will be added in the Ortho examination mode automatically.

In this case, the acquisition range and modifications on the organ program parameters will be kept.

However, there is no frame on the imaging system to indicate the acquisition range anymore.

Start acquisitions when the system is ready.

Accepting or rejecting the acquired images

After acquisition, you can accept or reject the image:

- If the image is okay: Click **Accept**.

  – or –

  If the image is not okay: Click **Abort**.

  The same Ortho organ program will be added automatically.

In this case, the default organ program parameters will be used. Any modifications will be discarded.

6 Accessories and Auxiliary Devices

6.1 Preliminary remarks

6.1.1 Equipment with accessories

Depending on the system type and configuration, the accessories described in the following chapters either from 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 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.

6.1.2 Proper use of the product

Proper use of the accessories presupposes that the user has read and understood this part of the Operator Manual in detail.

In addition, the user must be thoroughly familiar with the rest of the Operator Manual.

Finally, detailed knowledge of the applicable safety regulations for the medical equipment being used is indispensable. These regulations are listed in (➔ Page 14 *System Safety*).

Explanation of “proper use” consists of illustrated descriptions of attaching, using and removing the accessory component.

CAUTION

Accessories not firmly attached or not used - Accessories overloaded

Patient injury

- Make sure that accessory parts are attached firmly by pulling and pushing them.
- Follow the instructions in the Operator Manual.
- Observe the information regarding storage and maximum weight when using the accessories.

6.1.3 Safety

WARNING

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.

CAUTION

Use of accessories not intended for the system

Risk of injury to patient or user - Risk of damage to the system

- Use only accessories approved by Siemens Healthineers with this system.
- All accessories are labeled and described in the Operator Manual.

For reasons of safety for patients, operators and the equipment, only original accessories manufactured and sold by Siemens Healthineers or Siemens Healthineers-approved accessories from another manufacturer may be used.

Siemens Healthineers cannot assume any responsibility for accessories not approved by us.

CAUTION

Trolley or wheeled accessory tips over or suddenly stops while being rolled

Injury of persons

- Please be careful when pushing trolleys or wheeled accessories. They are not designed to be pushed over a step, cable or other hindrance because they can tip over or suddenly stop.
- Take special care when wheeling the Babix cradle trolley with a baby in the Babix cradle.

CAUTION

Lead radiation protection can drop on the patient

Risk of patient injury

- Avoid any collisions with the radiation protection when moving the system.
- Make sure that the radiation protection is securely fastened.

6.1.4 Orientation

When using the accessories and to simplify the description, the following directional indications shall apply in this Operator Manual with regard to the working position of the user.

- **In front** means in front of the patient table looking in the direction of the X-ray tube
- **Left** is the head end of the patient table
- **Right** is the foot end of the patient table
- **Frontal** means the longitudinal side of the patient table close to the operating panel
- **In back** means the longitudinal side of the patient table away from the operating panel
- **Turn toward the right** means tighten accessory with knurled screws or levers (clockwise)
- **Turn toward the left** means remove accessory with knurled screws or levers or other fastening devices (counterclockwise)

Example

1 Turn both knurled screws toward the left.

2 Push the grip protection bar on the head end into both accessory rails.

3 Turn both knurled screws toward the right.

4 Check that the grip protection bar is seated securely.

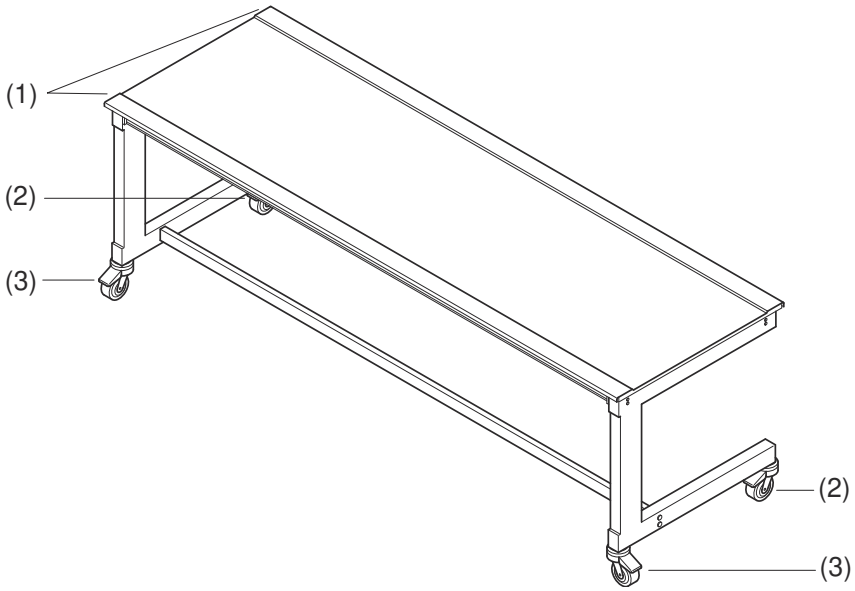
6.2 Description

6.2.1 Trolley UM mobile patient table

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 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.

Product features

- Wide application scope
- High reliability
- Easy mobility of the patient table
- Tabletop has high level of X-ray permeability and stiffness
- Large tabletop facilitates emplacement of patients
- The thin tabletop 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.

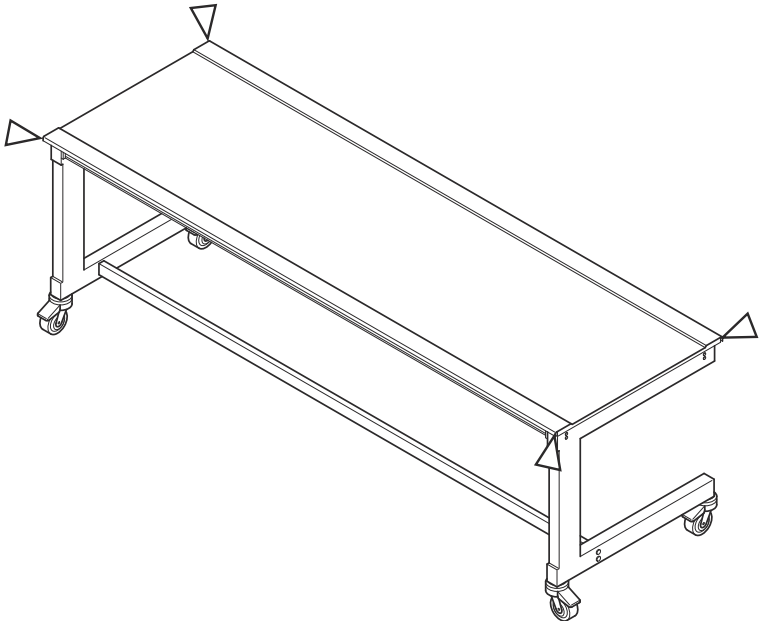
When the patient is moving onto or leaving the patient table, the brake pedal must stay locked. Besides, give assistance to the patient, otherwise the table might slide to create hazard.

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 below 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 tabletop in position.

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

Before using the table, make sure to remove all nearby objects such as chairs which might collide with the table.

When moving the mobile patient positioning table:

- Make sure to avoid collision with X-ray the detector or other devices.
- Make sure to notice and avoid squeezing of hands and similar incidents.
- Make sure that both the patient and the operating personnel stay inside controllable safety zone.
- Make sure to take care and avoid bringing any unnecessary harm to patients, operators or other personnel, and also tube and detector.

1 Before exposure, place the detector and the tube at the required exposure position.

2 Adjust the height of the detector moving it at pre-set height matching the patient table height.

3 Move the table to a position above the detector, make sure the table cannot collide with the detector and the post.

4 Move the table to an appropriate position.

5 Lock both castors and ensure the table is fixed.

6 Help the patient onto the bed and adjust the position as required.

7 Release the brakes of both castors, move the table to obtain the required exposure position, and then lock the brakes again.

8 Switch on the light localizer at the collimator, and prepare the final exposure position.

9 Adjust the light field of the collimator and release an exposure.

10 Release the brakes on both castors and move the table to a position convenient for the patient to leave the table.

11 Lock both castors and help the patient from the table.

WARNING

Grid line artifacts

Normal grid in used in free exposure mode

◆ Do not use normal grid in the mobile patient table. Use the clip-on grid instead.

Cleaning and disinfection

Before cleaning and disinfecting the equipment, make sure no liquid can seep into the interior of the equipment.

Cleaning

1. Do not use water to clean the table, otherwise it might bring rust to the mechanical structure.
2. Do not use corrosive, soluble or abrasive cleaning materials for cleaning.
3. For sprayed paint, plastic and chromium alloy surface, make sure to use clean and dry soft cloth to wipe clean.

Disinfection

1. Disinfect all components of mobile patient table, including accessories, only with a soft cloth soaked in disinfectant.
2. Do not use spray disinfectant.

Functional and safety check

Daily checks

1. Check the unit movement
2. Check the brakes
3. Check the mobility of the castors
4. Check that the necessary devices for patient holding and immobilisation are attached properly to the unit.
5. When the castor brake pedal is in locked status, check if the patient table position is locked.

Technical description

Technical data

Dimensions	Tabletop	2000 mm (± 5 mm) X 660 mm (± 5 mm)
	Distance from tabletop to the ground	700 mm (± 10mm)
	Usable width of tabletop between standing posts	1900 mm
Maximum load of the tabletop	135 kg	
Aluminum equivalent of tabletop	< 0.8 mm Al (according to measurement results based on GB 9706.12 (IEC 60601-1-3:2013) (100 kV/3.7 mm Al)	
Environmental conditions	Temperature	+10 °C to +35°C
	Relative humidity	30% to 70%
	Atmospheric pressure	700 hPa to 1060 hPa

6.2.2 Patient positioning mattress

Application

The mattress is used for comfortable patient positioning and is attached to the protection strip of the tabletop.

Radiation protection value

The attenuation equivalent is < 0.5 mm Al.

Attaching the mattress

1 Attach the protection strip at the head end.

2 Place the mattress on the tabletop and pull the loops over the hand screws of the protection strip.

6.2.3 Paper roll holder

Application

The paper roll holder used to hold paper rolls of different diameters and lengths. It can be attached to the foot end or head end of the tabletop.

Attachment

1 Push the paper roll holder from the foot end or head end onto the tabletop.

2 Tighten/loosen it by turning the screws which can be find underneath the paper roll holder.

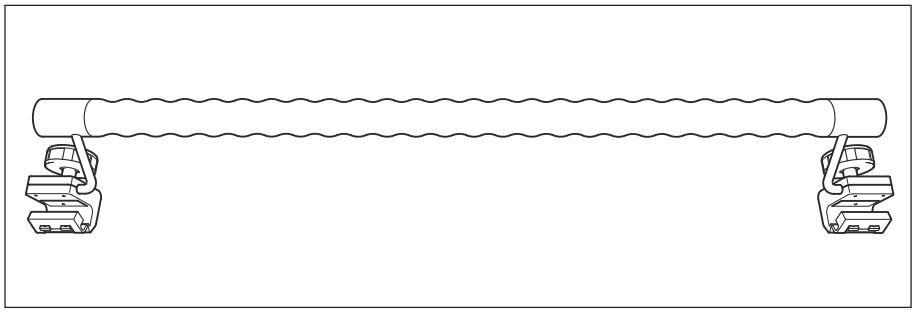
6.2.4 Hand grip strip

WARNING

Hand grips loosen or are not used

Injuries to patient from falling

- Check that the patient hand grips on the table are in the right position.
- Ensure that hand grips are tightened prior to use.
- Make sure that the patient uses the hand grips during system movements or when turning over.
- Use other positioning aids for immobilizing weak or very unstable patients.

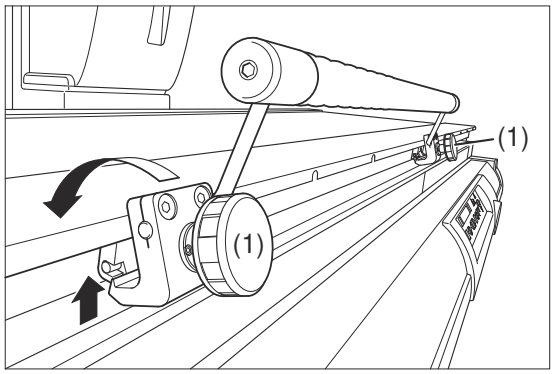


Application

Hand grip strip which can be attached to front or back accessory rail to assist in positioning the patient.

The maximum permissible load of the hand grip strip is 20 kg.

Attaching the hand grip strip



Example

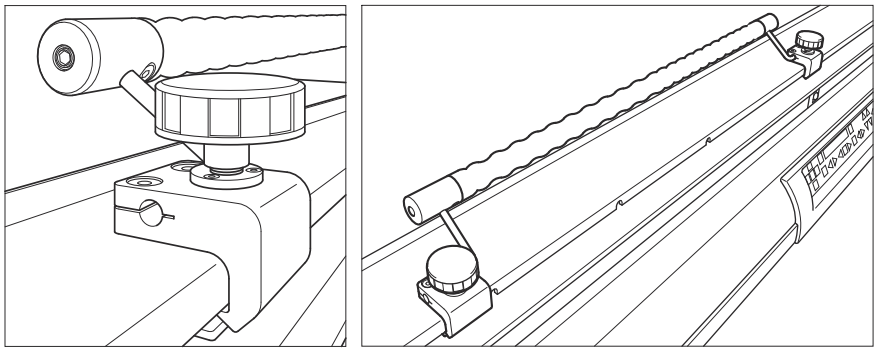
✓ Patient table in horizontal position

1 Loosen the right and left cap screws (1) on the hand grip strip.

2 Position the hand grip strip from below at the accessory rail as shown in above figure.

3 Lift it up and turn it down (see following figure)

We recommend placing the hand grip strip on the far side of the user.



4 Tighten both cap screws.

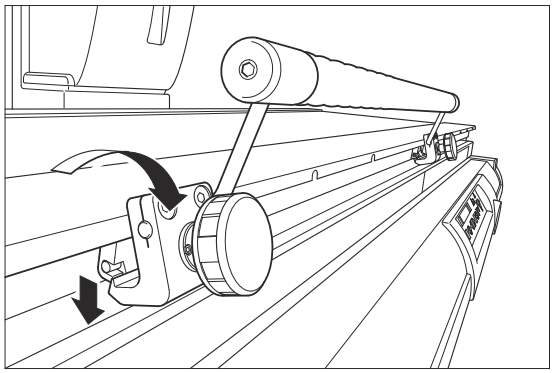
5 Make sure that the hand grip strip is secure by pulling and pressing on it.

The hand grip strip provides additional safety for the patient. To prevent injury to the patient's hands when moving the tabletop, make sure that the patient uses the hand grip strip (not the cap screw) and does not hold onto the head or the side edge of the patient table.

Removal

✓ Patient table in horizontal position

1 Loosen both cap screws on the hand grip strip.



2 Turn up the hand grip strip and remove it carefully from the accessory rail.

6.2.5 Hand grip, lateral

WARNING

Hand grips loosen or are not used

Injuries to patient from falling

- Check that the patient hand grips on the table are in the right position.
- Ensure that hand grips are tightened prior to use.
- Make sure that the patient uses the hand grips during system movements or when turning over.
- Use other positioning aids for immobilizing weak or very unstable patients.

Application

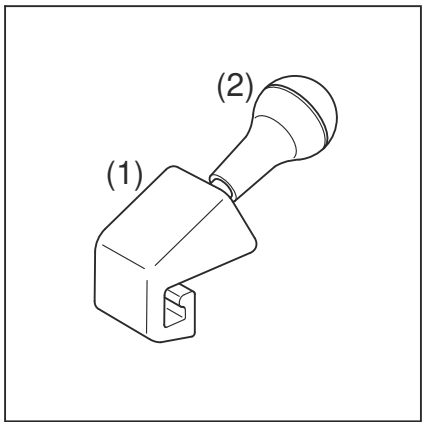
The hand grips serve for stable and safe patient positioning.

The hand grips 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.

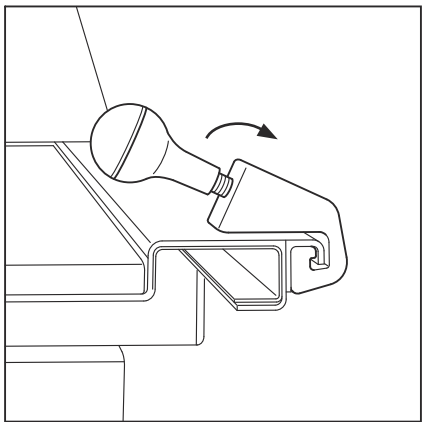
Attaching the hand grip

The hand grip can be attached to either of the two lateral accessory rails of the patient table.



1 Hold the base (1) of the hand grip and loosen it by turning the hand grip (2) counterclockwise.

2 Insert the hand grip into the groove of the accessory rail and slide it into the desired position.



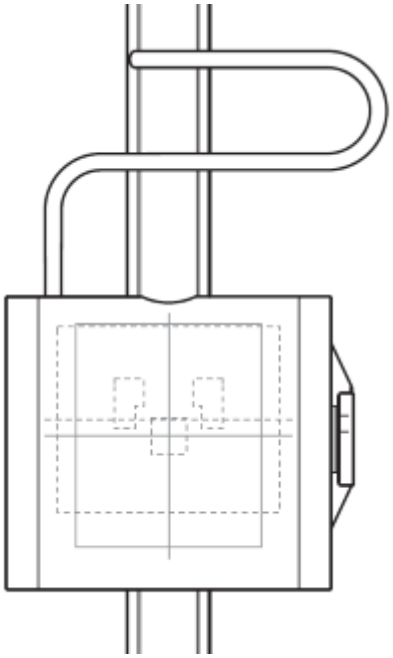
3 Tighten the hand grip by turning it clockwise.

Please make sure that the hang grips are securely fastened.

Removing the hand grip

- Proceed in reverse order.

6.2.6 Overhead patient hand grip



Application

The overhead patient handgrip serves to stretch the patient during chest examinations.

Insert the overhead patient handgrip on the left or right side of the Bucky unit/ detector tray. You can insert it 0° parallel to the detector tray or 90° vertically in front of the detector tray. The overhead patient handgrip engages in the 0° and 90° positions.

CAUTION

Overhead patient handgrip overloaded because patient hanging on it.

Risk of damage to wall stand and injury of the patient

- The overhead patient handgrip has no locking mechanism to prevent it from being pulled out from the fixture.
- 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).

CAUTION

Patient exerts too much weight on the overhead patient hand grip on the wall stand.

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

- Do not let the patient hang on the overhead patient hand grip.
- Do not exert more than 25kg weight on the overhead patient hand grips.

Inserting

1 Move the detector tray until its upper edge is approx. at eye level.

2 Push the shaft of the overhead hand grip straight down into the holder on the left or right at the top of the detector tray until the shaft is completely inside the duct.

In this position, you cannot swivel it about its vertical axis.

Moving and removing

CAUTION

Overhead hand grip on the wall stand swivels unexpectedly

Injury of patient

- Check that the overhead hand grip is correctly locked and that no red mark is visible.

CAUTION

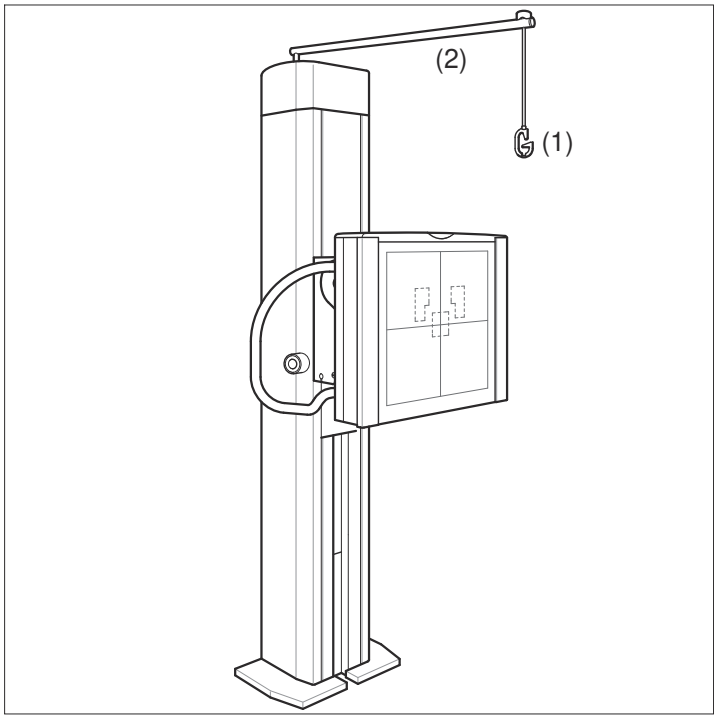
Overhead patient hand grip swivels unexpectedly

Injury of the patient or user

- Check that the overhead hand grip (stretch grip) is firmly attached and that no red mark is visible.
- Check that it cannot swivel before allowing the patient to use it.
- The maximum load on the overhead patient handgrip is 25 kg.

- When moving or removing the overhead patient hand grip, pull it vertically upwards out of its holder.

6.2.7 BABIX holder



(1) BABIX holder
(2) Support arm

The BABIX holder is mounted with the support arm on the wall stand column and can be parked either on the left or on the right.

Application

The BABIX holder is used to fasten the BABIX during pediatric examinations of small children. To park the holder, it can be swivelled 180° around its fastening point. The fastening hook slides lengthwise in the support arm. This makes it possible to position the BABIX at different locations up to right in front of the front panel of the wall stand.

WARNING

Assembly of babix holder not correctly done.

Injury of persons

- Follow the instructions in the Operator Manual.

Using the BABIX holder

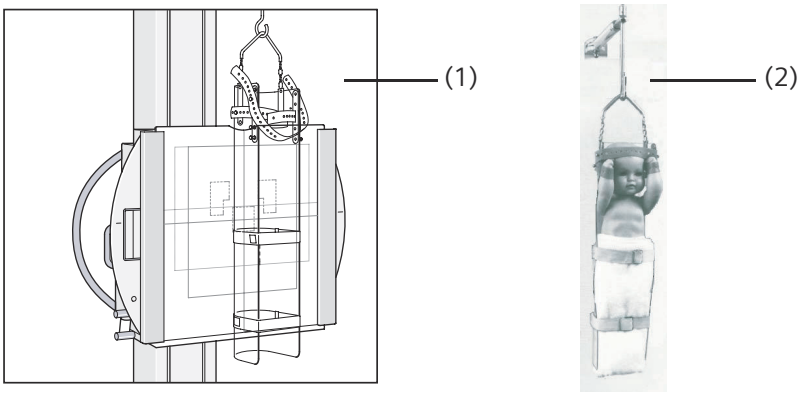
1 Swing the support arm (2) of the BABIX holder (1) in front of the center of the detector tray.

The BABIX holder is now ready to hook up the BABIX.

2 Check the BABIX holder (1) for firm attachment at the support arm (2) by pulling or pushing it.

3 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.

4 Hook the bow of the BABIX in the hook of the BABIX holder.



(1) Attach the BABIX holder on the BWS
(2) They way for fixing child
Compression belt can be used to assist fixing child.

WARNING

BABIX holder loaded with more than 10 kg

Injury of persons

- Do **not** load the BABIX holder with more than 10 kg.

6.2.8 Multipurpose / Ortho stand

The Ortho stand is necessary to position the patient correctly for Ortho imaging at the wall stand.

WARNING

Use of Ortho functionality without Ortho stand.

Risk of injury to patient

- Always use the Ortho stand if you are doing an Ortho study.

CAUTION

Riding on wheeled accessories

Accessory overbalances and tips over causing damage to system or injury of persons.

- Do not ride or allow anyone else to stand, sit or ride on wheeled accessories while they are being rolled.

CAUTION

Positioning the Ortho stand

Injury of the user

- Follow the instructions in the Operator Manual.
- Be careful not to pinch your fingers, hand or legs during positioning.

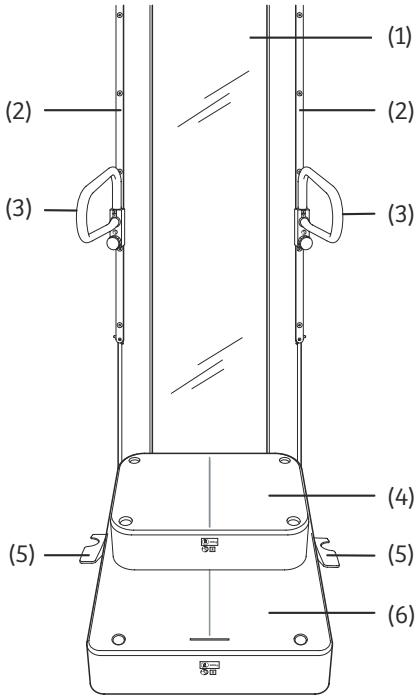
CAUTION

Collision of the detector with the Ortho stand

Risk of damage to the detector and injury of the patient.

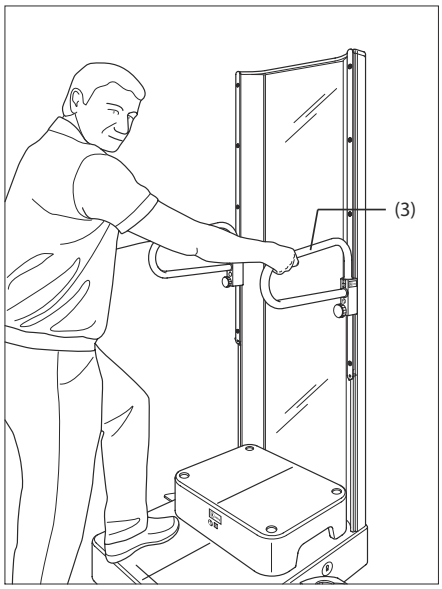
- Re-position the detector only when no patient is on the Ortho stand.

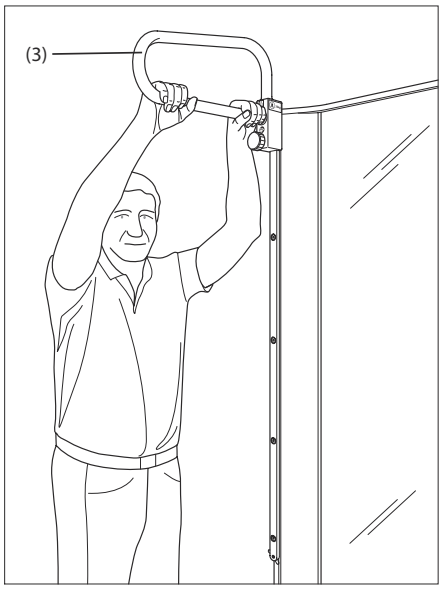
Description of the Ortho stand



(1) Radiotransparent rear plate
(2) Accessory rails (on both sides)
for attachment and height adjustment of accessories
(3) Hand grips (on both sides) with scales in cm and inch
(4) Additional removable platform for smaller patients (for example children) and for examinations of the lower extremities
(5) Brake pedals (on both sides)
(6) Patient platform (with positioning indentations for additional platform and swivel stool)

Handgrips on the Ortho stand





- The hand grips (3) are intended to support the patient while standing during the examination.
- The hand grips (3) can also be used as patient stretch grip on top.
- The hand grips can be moved along the guide rails to the required height.
- The hand grips can be used to measure the TOD in cm or inch.
- The maximum load of the hand grips is 30 kg.

WARNING

Hand grips loosen or are not used

Injury of patient due to falling

- Check that the patient hand grips are in the right position.
- Ensure that hand grips are tightened prior to use.
- Make sure that the patient uses the hand grips during system movements or when turning over.
- Use other positioning aids for immobilizing weak or very unstable patients.

Attaching the handgrips

The hand grips can be attached to the guide rails from below for use as patient support or from above for use as patient stretch grip.

CAUTION

Mounting the Ortho stand

Patient can slip or fall down

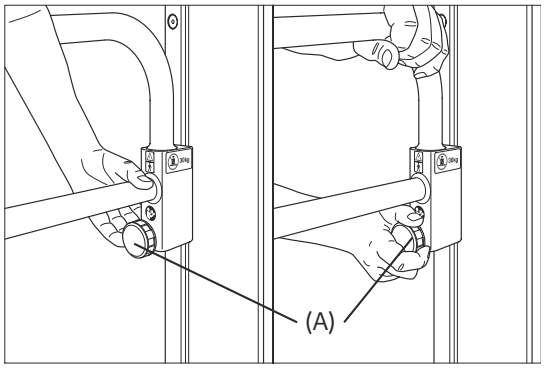
- Position the patient hand grips at the lowest possible position when the patient is mounting or dismounting.

CAUTION

Patient uses handgrips for support when mounting the Ortho stand.

Injury of patient

- The handgrips can only support 30 kg. If necessary, have the patient grasp the vertical plate when mounting the stand.
- Then position the handgrips to the correct height for the examination.
- Make sure that the patient's hands are not on the vertical plate during the examination.



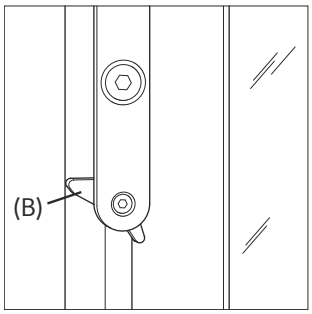
1 Turn the locking screws (A) on the handgrips counterclockwise.

2 Slide the handgrips from below or from above on the guide rail to the required height.

3 Fix the handgrips (A) by turning the locking screws clockwise.

Check that the locking screws on both handgrips are properly fixed. Thus, you prevent the handgrips from disengaging while the patient is leaning on them.

Disengaging handgrips might cause injuries to the patient and/or damage to the support!

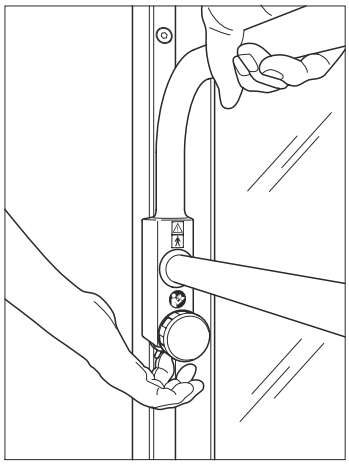


In addition to the locking screws, there is a security lever (B) at the bottom of each guide rail to prevent the hand grips from falling to the ground if the locking screws are not properly fixed.

Removing the handgrips

1 To remove the hand rips when used as stretch grip, just turn the locking screws counterclockwise and remove the handgrips upwards from the guide rails.

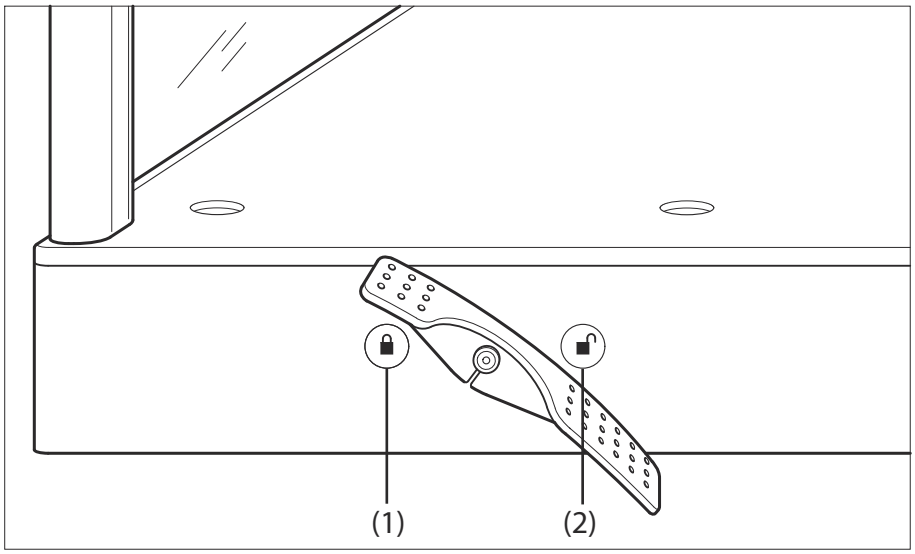
2 To remove the handgrips when used as support for the patient, turn the locking screws counterclockwise and slide the handgrips downward to the lower end of the guide rails where they are stopped by the security lever.



3 Press the security lever to the side as shown in above figure and remove the hand grips downwards from the guide rails.

Brake pedals

The Ortho stand is equipped with brakes to enable the secure stand of the Ortho stand. For transport of the Ortho stand you have to release the brakes. The brakes are operated with the brake pedals on both sides of the patient platform.



To lock the brakes push the pedal down towards the symbol of the closed padlock (1).

To release the brakes push the pedal down towards the symbol of the open padlock (2).

CAUTION

Pedal locking the Ortho stand springs down.

Risk of foot injury

- Make sure that there is nothing under the pedals on the Ortho stand when locking the wheels.
- Note that there is a pedal on both sides of the stand, and both pedals move when the wheels are locked or unlocked.

Swivel stool

CAUTION

The swivel stool detaches from the Ortho stand

Risk of patient injury

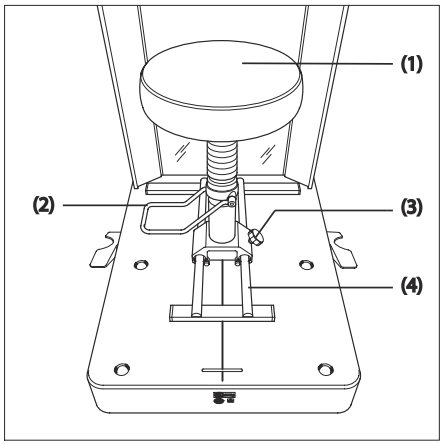
- Make sure that the swivel stool is attached correctly to the Ortho stand.
- Push and pull the stool to make sure that it is secure before positioning the patient.

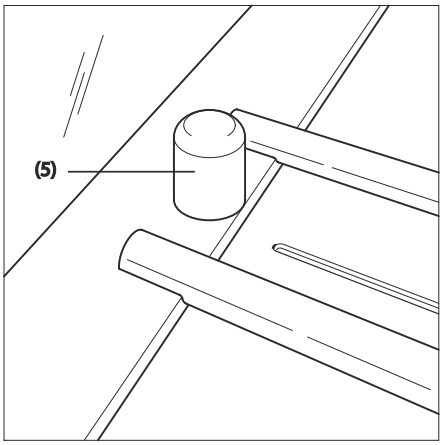
CAUTION

Patient falls from the swivel stool

Risk of patient injury

- Make sure that the patient is seated securely on the swivel stool.
- Position a handgrip so that the patient can hold on.

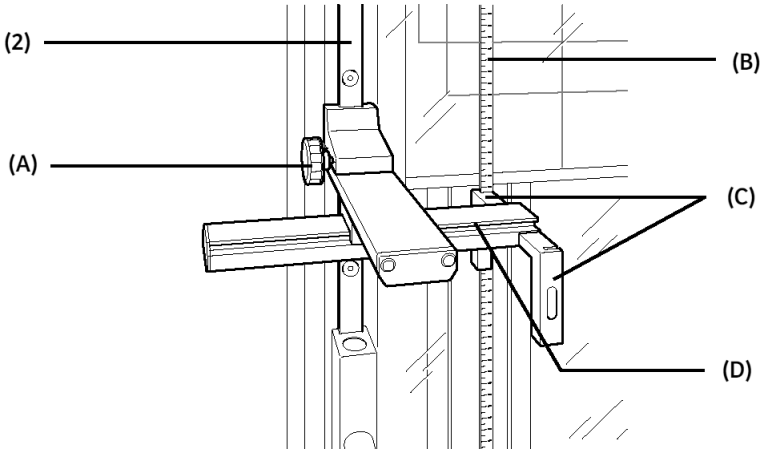




(1) Swiveling seating
(2) Lever for height adjustment / fixing the swivel movement
(3) Screw to fix swivel stool in a certain position on the rails
(4) Rails for longitudinal movement
(5) Fixing bolt for the attachment of the stool on the patient platform

Ruler with holding device

The holding device is used to position the ruler on the image.



(A) Locking screw

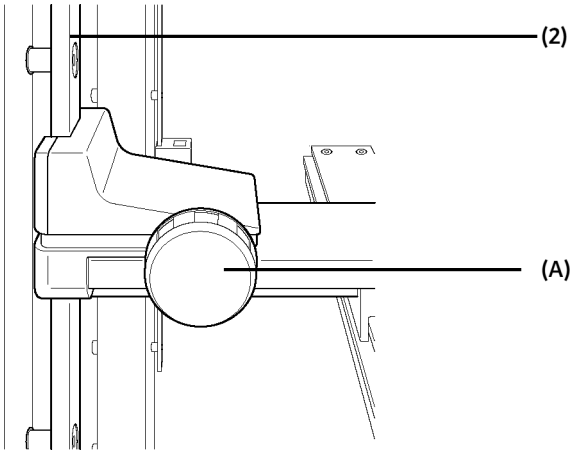
(B) Ruler

(C) Positioning slots

(D) Movable holding arm

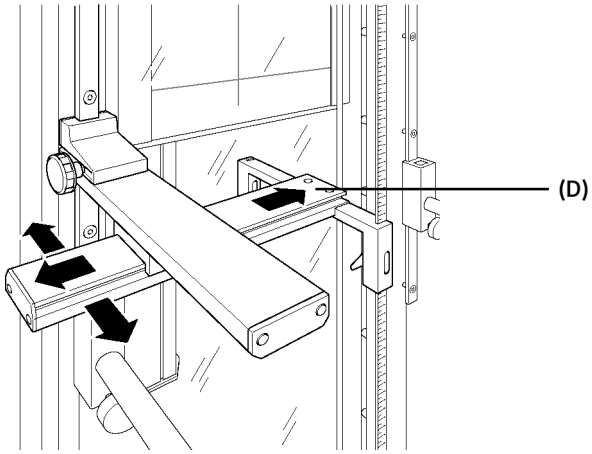
(2) Guide rail

How to use the holder for the ruler

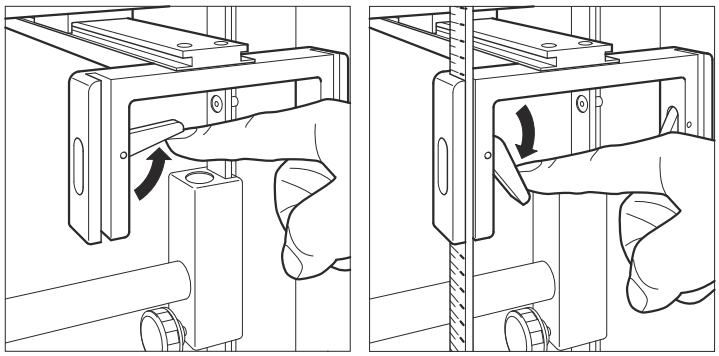


1 Attach the holding device to one of the guide rails (2) and fix it by turning the locking screw (A) clockwise.

2 To move the holder vertically, release the locking screw (A).



3 The holding arm (D) can be moved horizontally as shown above.

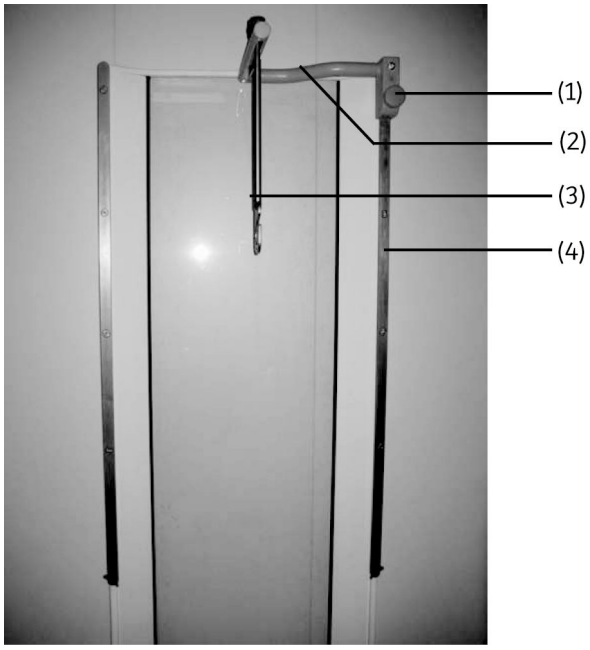


4 To position the ruler in one of the two holding slots first of all open the fixing clamp as shown above left.

5 Position the ruler in the slot and fix it with the fixing clamp as shown above right.

BABIX holder

The BABIX holder is used to fasten the BABIX during pediatric examinations of small children.



(1) Cap screw
(2) Support arm
(3) BABIX holder
(4) Guide rail

Attachement

WARNING

Assembly of babix holder not correctly done.

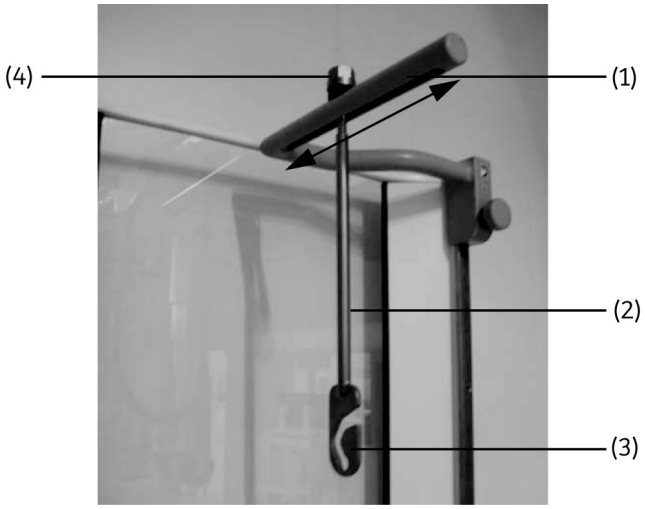
Injury of persons

- Follow the instructions in the Operator Manual.

The BABIX holder can only be mounted on the right guide rail at the top.

- Slide the support arm (2) with the BABIX holder (3) from above on the guide rail (4) and fix it with the cap screw (1).

Positioning the BABIX holder



(1) Guide rail
(2) BABIX holder
(3) Hook for attaching the BABIX
(4) Holding knob

Horizontal positioning

The BABIX holder can be positioned moving it back and forth in the guide rail (2).

Turning the hook

- The hook of the BABIX holder can be turned in steps of 90° around the vertical axis by lifting the BABIX holder with the holding knob and turning it.

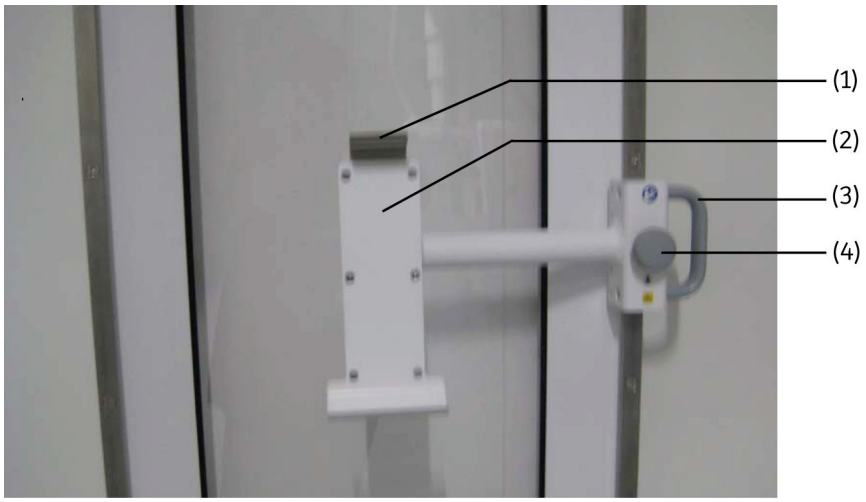
CAUTION

Babix holder overload

Risk of damage to of the babix holder and injury of the patient

- Do not load the BABIX holder at the point of suspension with more than 10kg.

Detector holder



(1) Fixing device for detector
(2) Detector holder
(3) Handle
(4) Locking screw

Attaching the detector holder

CAUTION

The detector holder is not securely fastened.

Injury of persons or damage to the detector holder

- Make sure the detector holder is securely fastened.

The detector holder can be attached only to the right guide rail from below (recommended) or from above.

1 Turn the locking screw (4) counterclockwise.

2 Slide the detector holder from below or from above on the guide rail to the required height using the handle (3).

3 Fix the detector holder by turning the locking screw clockwise.

Check that the locking screw is properly fixed.

In addition to the locking screws, there is a security lever at the bottom of each guide rail to prevent the detector holder from falling to the ground if the locking screw is not properly fixed. (For more deteails to the security lever, refer to (➔ Page 190 *Attaching the handgrips*).

Placing the detector

1 Lift the fixing device (1).

2 Place the detector on the lower holder.

3 Slide the fixing device downward.

4 Ensure the detector is seated properly in the holder.

Removing the detector holder

- Refer to (➔ Page 190 *Attaching the handgrips*).

Cleaning of the Ortho stand

CAUTION

Patient hand grips slip because the guide rails are contaminated.

Patient injury

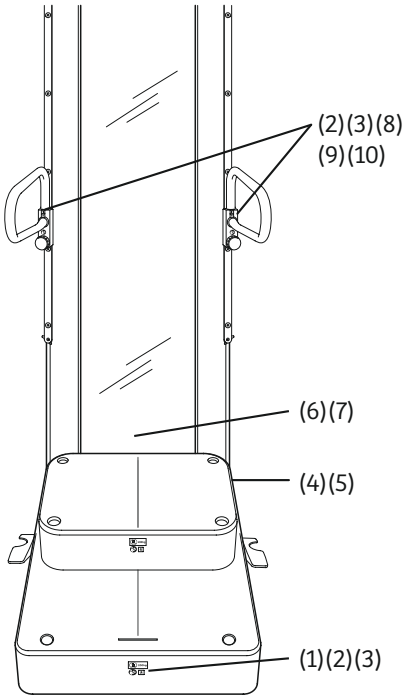
- Clean the Ortho stand with a suitable agent.
- Check that there is no oily residue on the guide rails.

Technical data of the Ortho stand

Height	197 cm
Depth	86 cm
Width	82 cm (incl. brake pedals)
Weight	112 kg (incl. additional platform and two handgrips)
Max. patient weight	200 kg
Max. patient size	190 cm
Attenuation equivalent of the transparent protection plate acc. to DIN EN 60601-1-3	< 1 mm Al - 100 kV 3.6 HVL

Location of labels

All labels displayed in the operator manuals are examples only and may differ from the labels attached to the system and components.

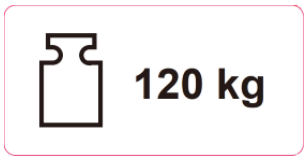


(1) Weight label (200 kg)

(2) Type B equipment label

(3) Refer to manual label

(4) Ortho stand ID label



(5) Weight label (120 kg)

(6) DHHS label

(7) Al equivalent label

(8) Handgrip ID label

(9) Weight label (30 kg)

(10) Caution label

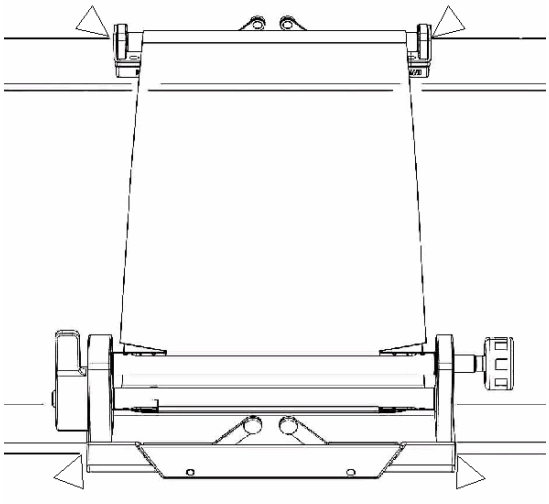
6.2.9 Compression Belt

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

1. Check tension lever.
2. Check cap screw.
3. When the cap screw and tension levers are in locked status, check if the compression belt is locked.

Remove all traces of contrast agent from the compression belt. Otherwise, the X-ray image shows artifacts.

Cleaning and disinfection

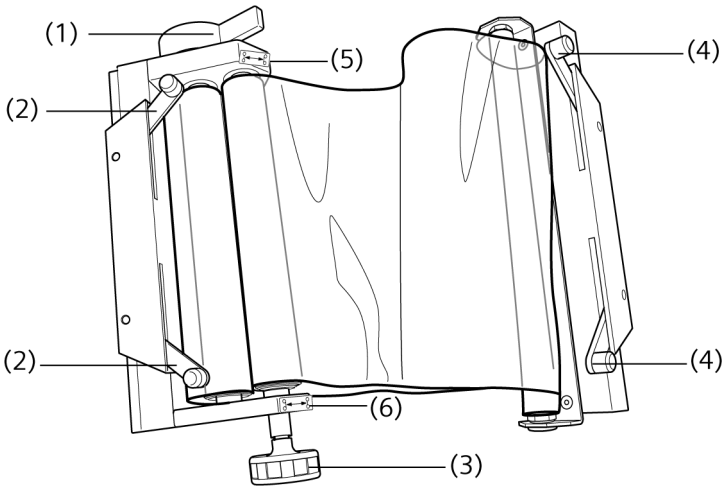
Cleaning

1. The compression belt is made of transparent plastic and can be cleaned with a damp cloth.
2. Do not use corrosive, soluble or abrasive cleaning materials for cleaning.
3. For sprayed paint, plastic and chromium alloy surface, make sure to use clean and dry soft cloth to wipe clean.

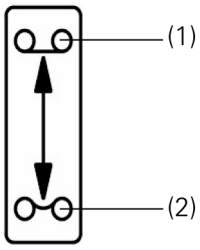
Disinfection

1. Disinfect all components of the compression belt only with a soft cloth soaked in disinfectant.
2. Do not use spray disinfectant.

Product description

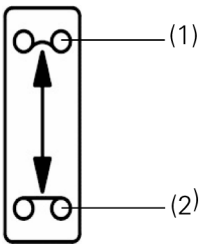


(1) Ratchet handle
(2) Tension lever
(3) Cap screw
(4) Tension lever
(5) Tag for ratchet handle
(6) Tag for cap screw



Tag for ratchet handle

(1) upward: tightened
(2) downward: released



Tag for cap screw

(1) upward: released
(2) downward: tightened

Intended use

The compression belt is a mechanical component for X-ray exposures.

It is used to quickly fix the patient on the table.

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

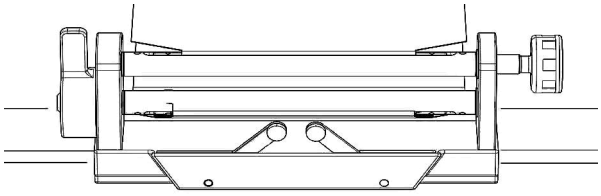
The X-ray imaging system must be operated by trained and qualified personnel. In addition, make sure to follow the requirements of relevant laws and regulations during the operating process.

For use on the table

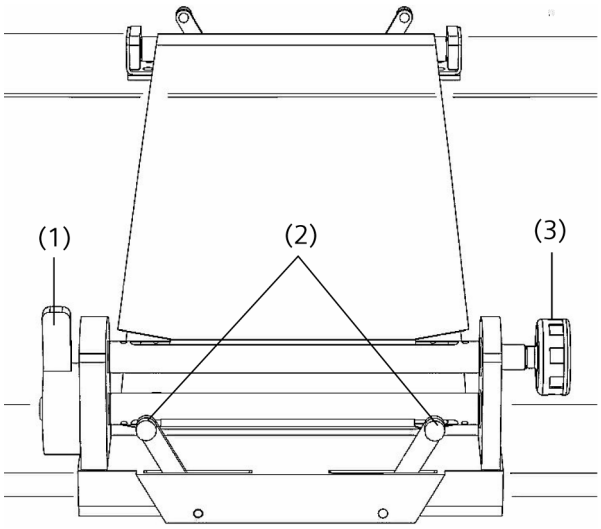
Attachment

1 Move the patient table to the horizontal position.

2 Position the patient on the table.



3 Push the tensioning part of the compression belt into the required position over the front accessory rail.



4 Press both tension levers (2) outward.

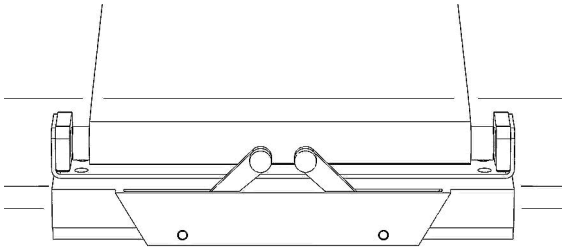
5 Check that the tensioning roller is firmly seated by pulling on it.

6 Press the ratchet handle (1) downward.

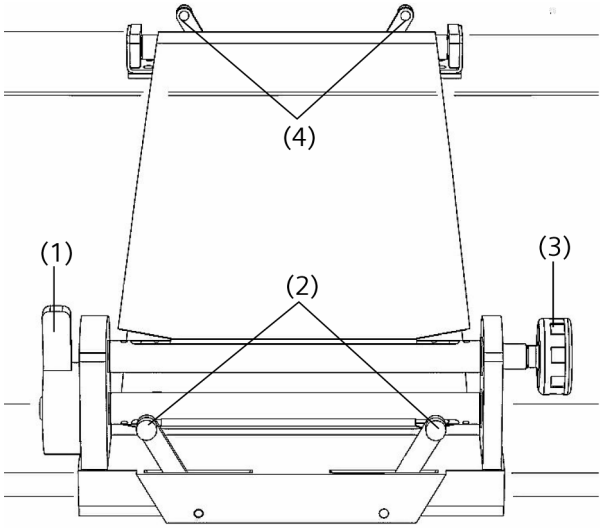
The belt is released.

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

7 Lift the holder with the belt across the patient.



8 Push the holder over the back accessory rail. Make sure that the compression belt attaches straight across the tabletop and not at an angle.



9 Press the tension levers (4) outward.

10 Check that the holder is seated firmly by pulling on it.

11 Turn the cap screws (3) on the tensioning roller toward the left to tighten the belt.

12 Push and pull back on the ratchet handle (1), until the belt tension is optimal.

13 Check the belt tension on the patient once again.

Loosening the compression belt

1 Move the patient table to the horizontal position.

2 Press the ratchet handle (1) back.

3 Turn the cap screw (3) on the tensioning roller toward the right.

The compression belt unclenches.

4 Use the ratchet handle to set a lower belt tension.

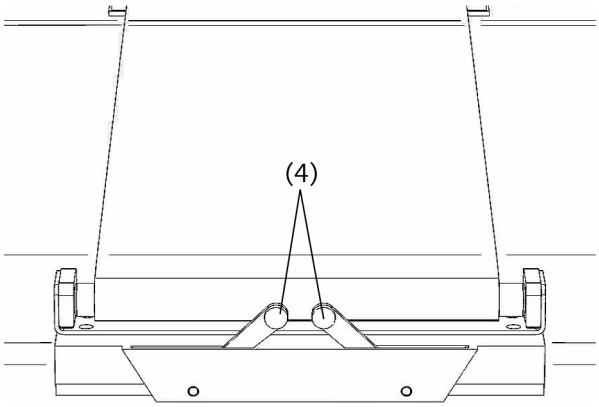
Removal

1 Move the patient table to the horizontal position.

2 Press the ratchet handle (1) back.

3 Turn the cap screw (3) on the tensioning roller toward the right.

The compression belt unclenches.



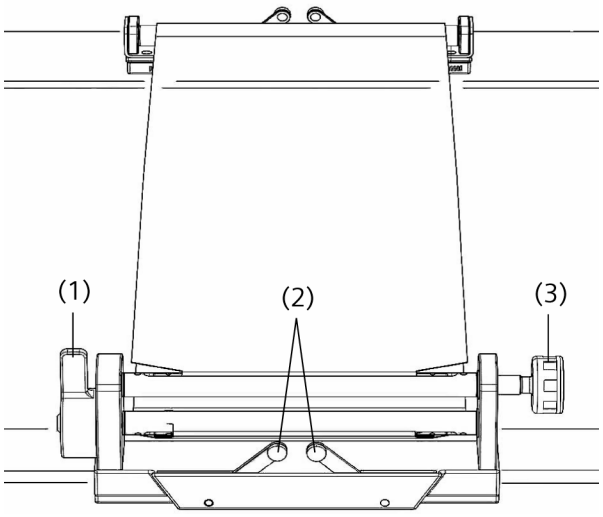
4 Press both tension levers (4) on the belt holder inward.

5 Pull the belt holder backward off the accessory rail.

6 Lift the belt holder over the patient.

7 Roll up the compression belt halfway using the cap screw.

8 Place the belt holder next to the tensioning roller.



9 Press both levers (2) inward on the tensioning roller.

10 Pull the tensioning roller from the front accessory rail.

11 Help the patient to get off the patient table.

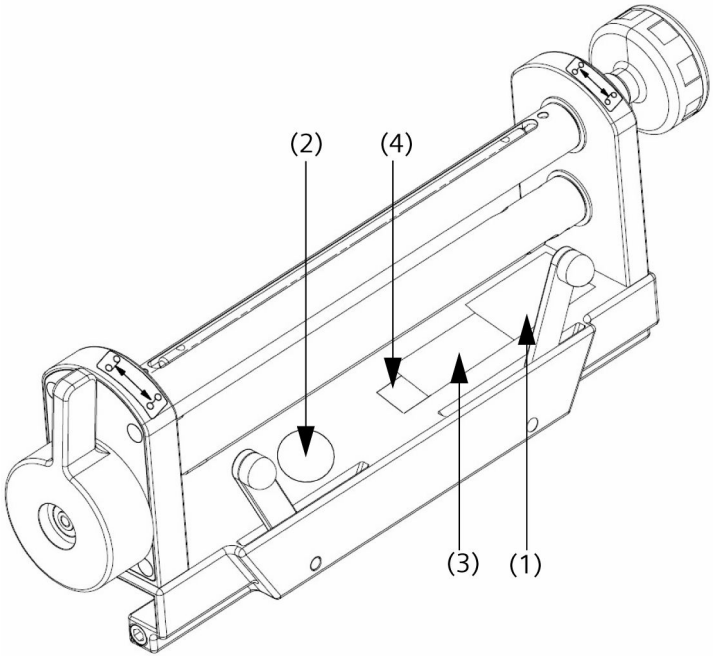
12 Use the cap screw (3) to roll up the belt on the tensioning roller.

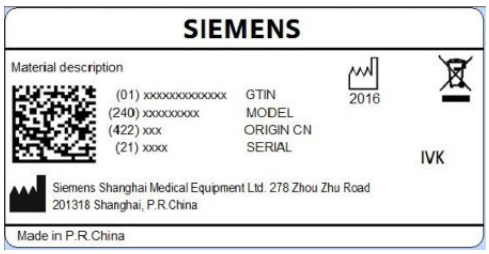
Technical data

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

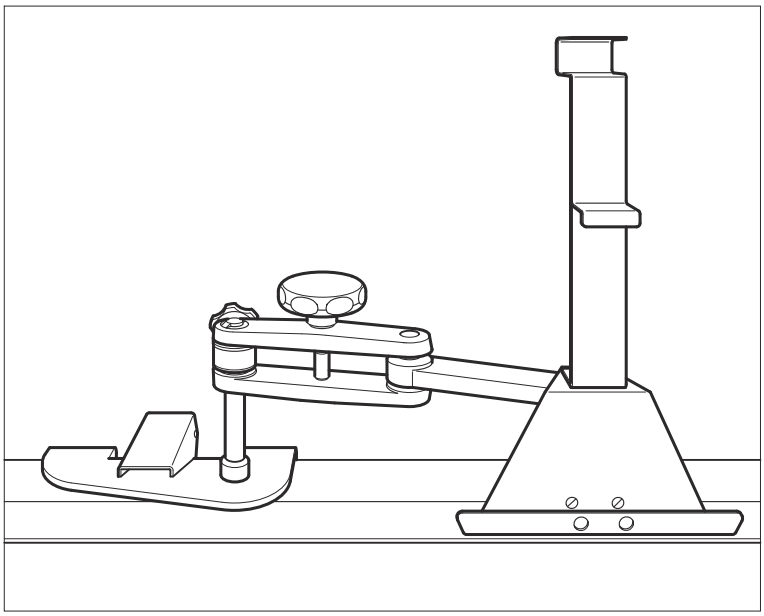
(3) UR label/ UR

(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 + A1:2012

6.2.10 Cassette holder, lateral



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.

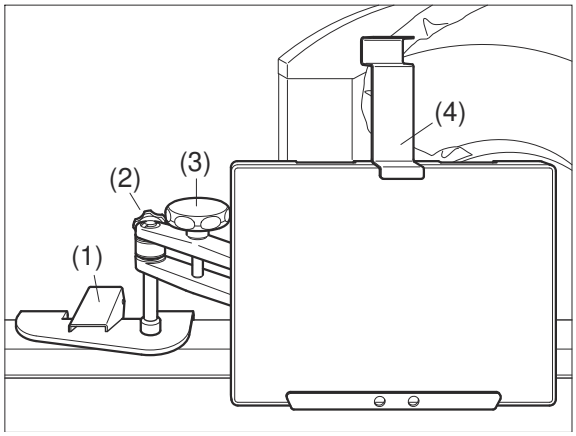
Maximum load capacity

3 kg

Attachment

✓ Patient table in horizontal position.

1 Position the patient.



2 Open the clamping lever (1).

3 Place the cassette holder on the accessory rail and move it to the exposure position.

4 Close the clamping lever (1).

5 Push and pull the cassette holder to ensure that it is seated properly.

6 Lift the tensioning device (4).

7 Place the cassette on the lower holder.

8 Slide the tensioning device downward.

9 Ensure the cassette is seated properly in the holder.

10 Loosen the cap screw (2) to permit adjustment of the height and the cap screw (3) to permit lateral adjustment.

11 With the patient positioned for the examination, adjust the height and lateral tilt of the cassette.

12 Tighten the cap screws (2) and (3).

13 Ensure that the patient is stabilized and comfortable.

Have the patient place the hands on the protection strip, the handgrip strip, 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.

1 Hold the rail for height adjustment.

2 Loosen the cap screw (2).

3 Lift the rail for height adjustment.

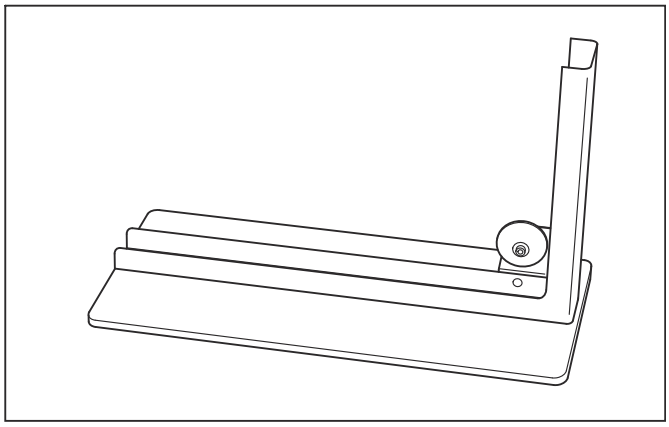
4 Tighten the cap screw (2).

5 Open the clamping lever (1).

6 Remove the cassette holder from the accessory rail.

7 Assist the patient in stepping down from the patient table.

6.2.11 Cassette holder without retainer



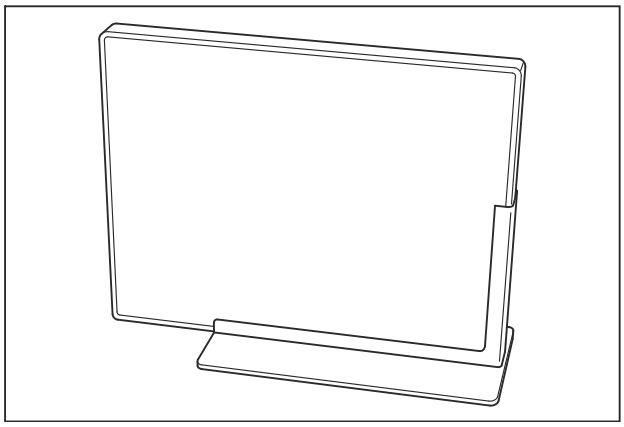
Application

- For lateral exposures;
- To hold the cassette upright;
- For all cassette formats, horizontal and vertical

Attaching the cassette holder without retainer

1 Position the patient.

2 Ensure the patient is comfortable and stabilized.



3 Slide the cassette into the bracket of the cassette holder.

4 Ensure that the cassette is seated properly in the holder.

5 Position the cassette holder on the tabletop at the patient in the location appropriate for the examination.

6 Ensure that the cassette holder is stable.

Have the patient place the hands on the protection strip, the hand grip strip, or the hand grip, depending on the type of examination. This will increase the feeling of security of the patient during the examination.

Removal

1 Remove the cassette from the bracket of the cassette holder.

2 Remove the cassette holder from the tabletop.

3 Assist the patient in stepping down from the tabletop.

6.2.12 Mobile detector holder CR

Refer to the **original Operator Manual of the manufacturer**.

CAUTION

Lifting the table when the mobile detector holder is positioned above the tabletop.

Risk of crushing

- Be careful lifting the tabletop when the mobile detector holder is positioned near the table.

CAUTION

Removing the detector from the mobile detector holder - Due to the spring loading, the holder will move upwards when the detector is removed or the brake is released.

Risk of injury

- Be careful when removing the detector from the detector holder.
- Turn the knob to lock the vertical position before removing the detector.
- Hold the horizontal arm while slowly removing the detector to make sure that the holder remains at that position.

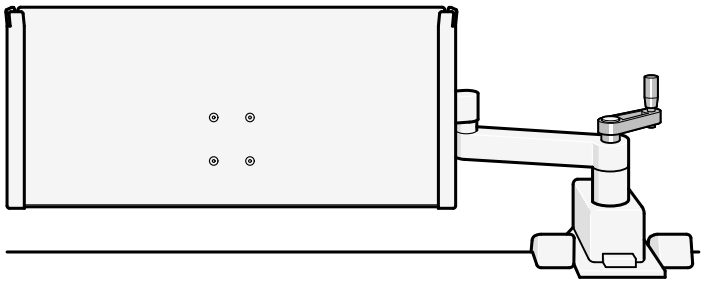
CAUTION

The detector holder is not securely fastened.

Injury of persons or damage to the detector or holder

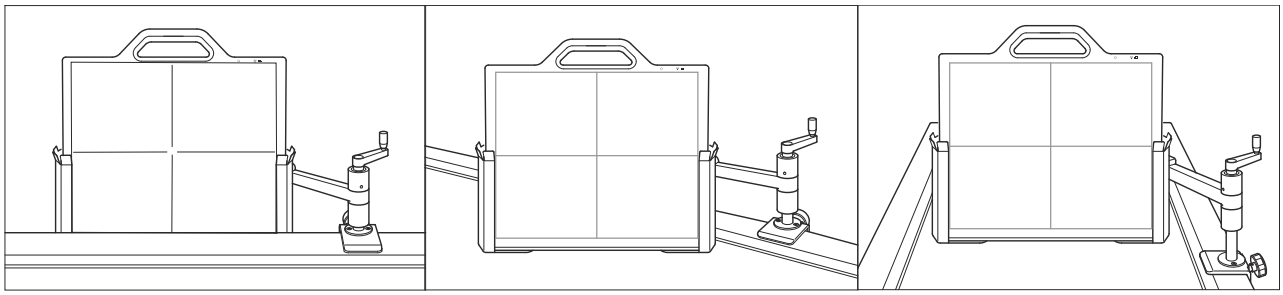
- Make sure the detector holder is securely fastened.

6.2.13 Detector holder, lateral



Application

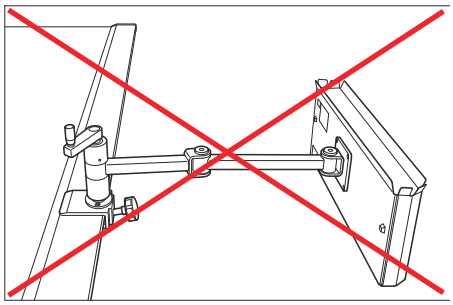
Lateral exposures with the X-ray tube onto the upright detector.



Examples of application

The detector holder is to be used only on or above the tabletop or directly at the side of the tabletop (see examples above).

Misuse



- Do **not** use the detector holder as shown above.
- Do **not** lean on it, you might damage the tabletop.

Attaching detector holder

The detector holder can be attached to either of the two lateral accessory rails of the patient table.

1 Take the detector holder with both hands (high weight!) and insert it into the groove of the accessory rail.

2 Slide it into the desired position.

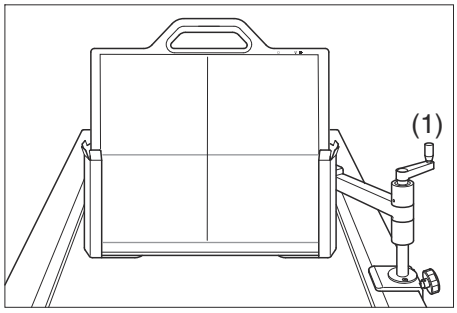
3 Tighten the detector holder.

CAUTION

The detector holder is not securely fastened.

Injury of persons or damage to the detector or holder

◆ Make sure the detector holder is securely fastened.

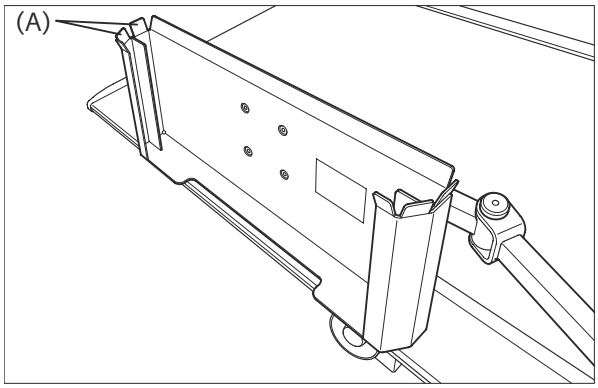


4 To move the detector holder vertically use the crank (1).

Inserting the detector

There are two grooves (A) that can be used to insert the detector:

- In the front groove only the detector can be inserted.
- In the back groove the detector with the optional grid attached can be inserted.



◆ Insert the detector into the detector holder from above.

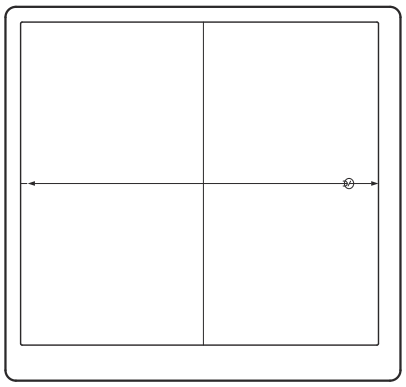
Removing detector and detector holder

1 Take the detector out of the detector holder from above.

2 Place the detector in a safe location.

3 Dismantle the detector holder with both hands from the lateral accessory rail of the patient table.

6.2.14 Clip-on grids



The following clip-on grids are available:

- 5/85 F115
- 15/80 F115 (only for MAX wi-D)

Application

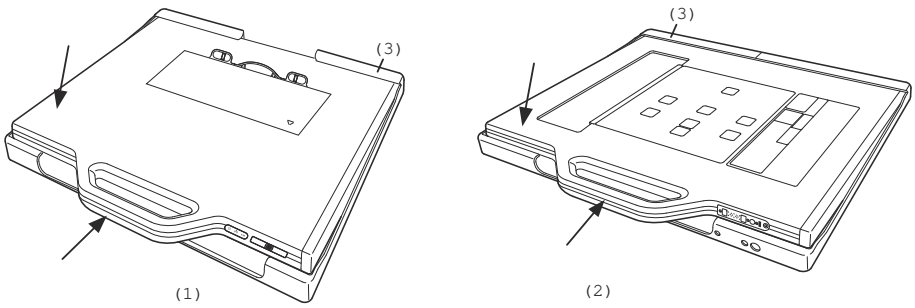
The clip-on grids are used for free exposures on the mobile detectors.

For exposures on the patient table or on the wallstand, use the corresponding internal grid.

When the clip-on grid is not in use, remove it from the detector and store it in a safe place where it cannot fall, for example in the grid holder.

Even if it is not extremely damaged, maybe its characteristics are changed, which may cause a problem in image quality.

Attaching the clip-on grids

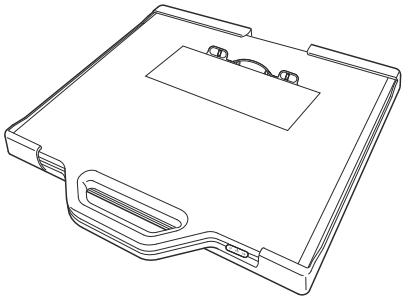


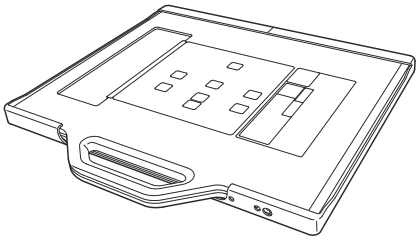
(1) Core XL
(2) MAX wi-D
(3) Clip-on grid

✓ Detector front must face the backside of the clip-on grid.

1 Put the detector with the bottom in the clip-on grid as show in above figure.

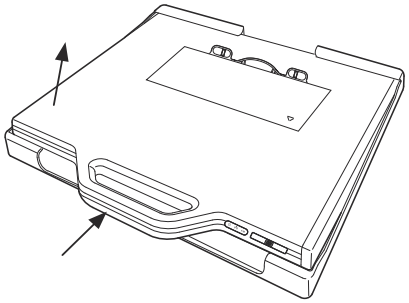
2 Push the detector gently down against the loading spring of the clip-on grid and let it slide smoothly into the clip-on grid and let go.

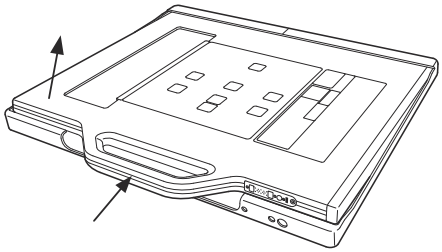




Ensure that the grid unit is locked before lifting the detector unit. Otherwise, the grid unit can fall and be damaged.

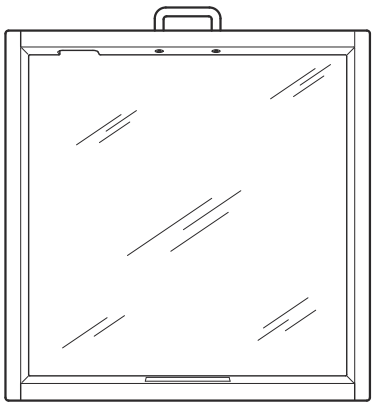
Removing the clip-on grid

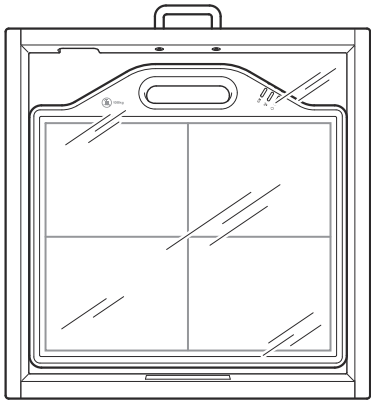




- Push the detector gently down against the loading spring of the clip-on grid and then pull the detector out of the clip-on grid and let go.

6.2.15 FD protector (patient support)





Application

The FD protector is a protective cover for the detector. It is used for examinations where the patient has to stand on the detector if the patient body weight exceeds 100 kg.

The FD protector may only be used without clip-on grids.

The FD protector is made of acrylic glass.

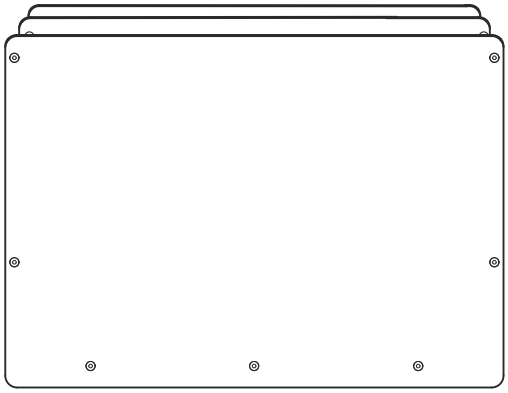
The maximum load on the FD Protector must not exceed the specified value on the label.

Al equivalent

The Al equivalent value is 1.39 (for 3.7 mm Al).

6.2.16 Wall holder for grids

This holder is used for storage of exchangeable grids or cassette trays. You can mount it to the wall.

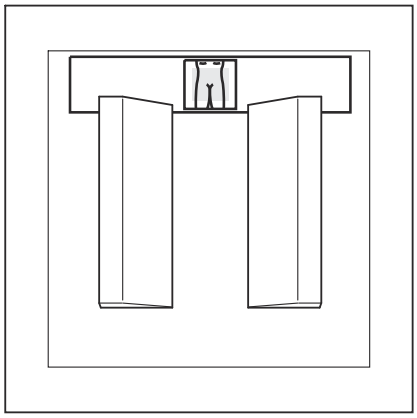


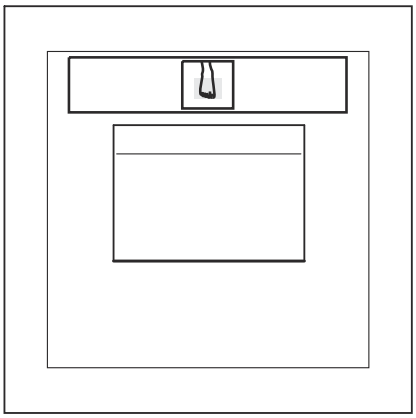
6.2.17 Compensation filters

Application

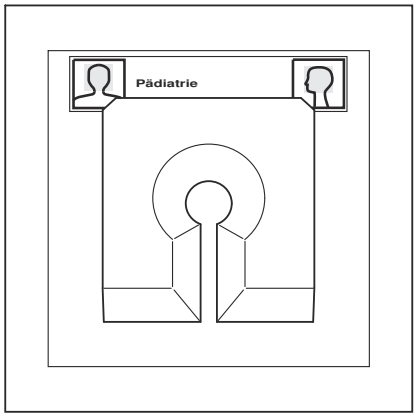
Absorption compensation for acquisitions of:

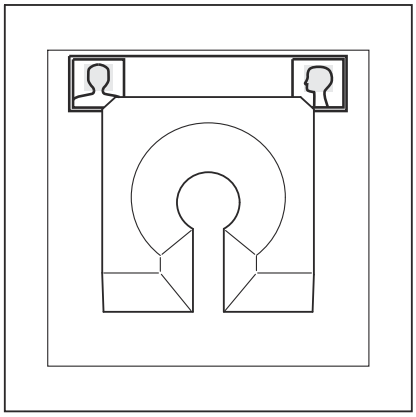
- Pelvis
- Foot
- Infant skull
- Adult skull
- T-spine, L-spine
- Shoulder



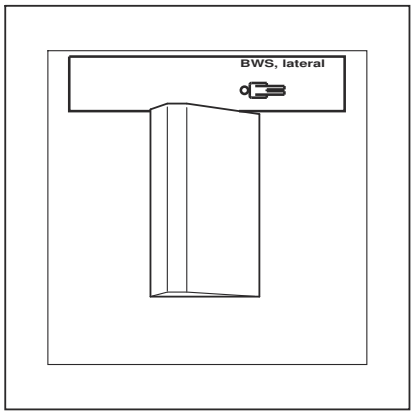


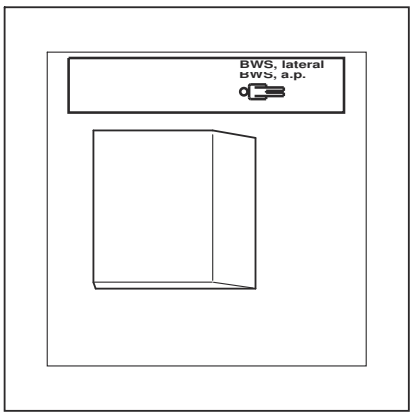
Compensation filter for pelvis and compensation filter for foot



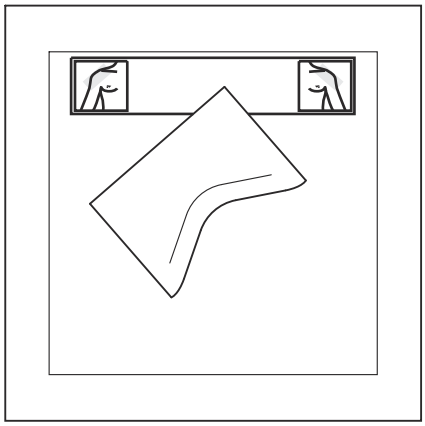


Compensation filter for infant skull and compensation filter for adult skull





Compensation filter for thoracic spine, lat. and compensation filter for thoracic or lumbar spine, lat.



Compensation filter for shoulder

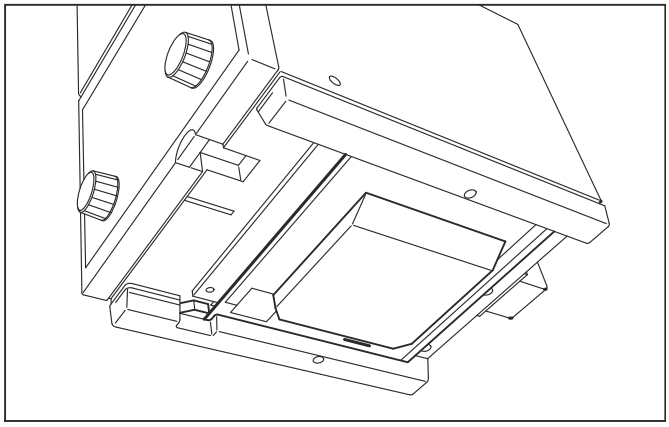
Attaching compensation filters

The operating personnel has to take care that the filters are appropriately attached.

1 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.

2 Push the filter up to the stop.



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.

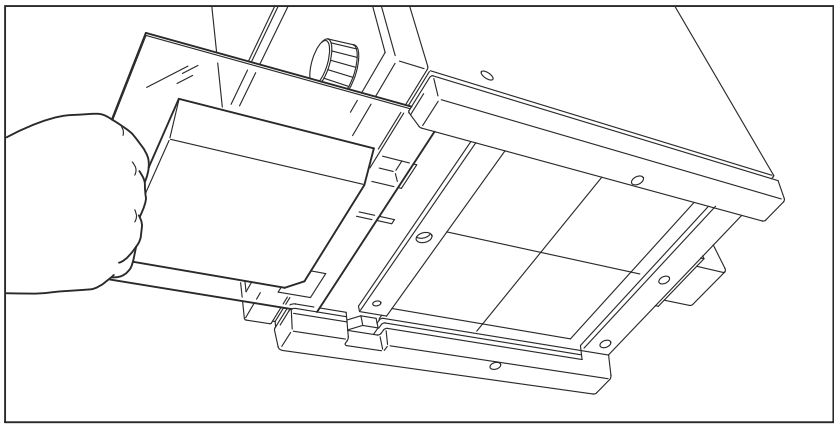
- Do not hang more than 7 kg on the collimator accessory rails.
- Do not exert any force on the multileaf collimator or its rails when inserting the accessory or auxiliary device.
- Check that the accessory is firmly anchored in the collimator rails.

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

1 Pull filter out of the accessory rails of the multileaf collimator

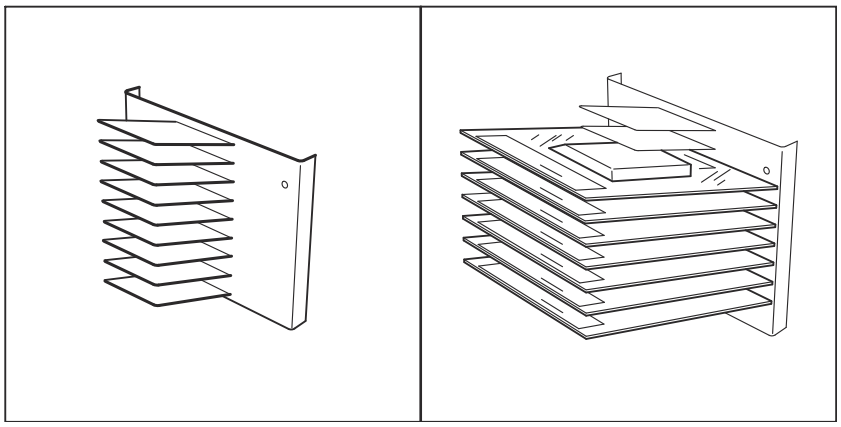
The safety spring in the left rail has to be pushed beside in this case.



2 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.

6.2.18 Filter holder for eight filters



Application

For storing a maximum of eight compensation filters.

Filter holder operation

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.

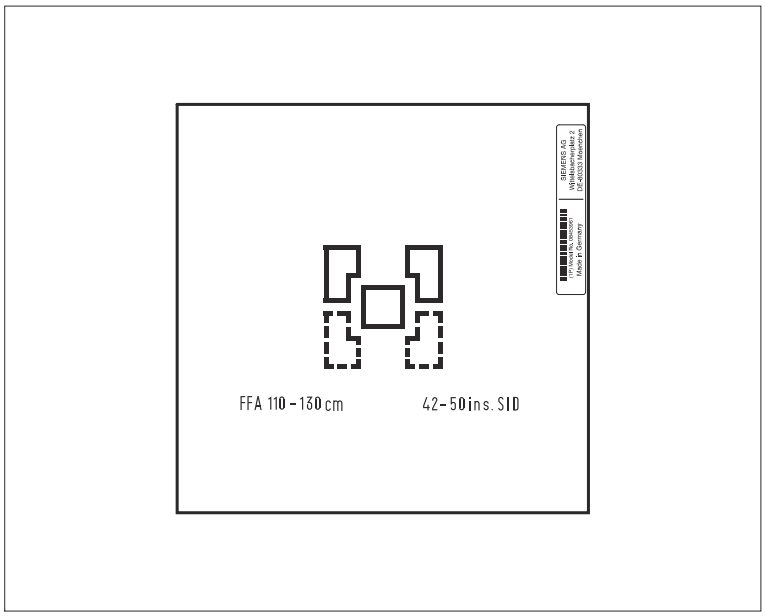
Equipping the wall holder

1. Remove compensation filters from the packaging.
2. Turn the filter so that you can read the designation on the filters reading normally from above.
3. 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.

6.2.19 Three-field template, set



Application

For exposing 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
- 110 cm - 130 cm
- 130 cm - 175 cm
- 175 cm - 220 cm

Using the three-field template set

1 Push the locking lever on the left accessory rail to the left.

2 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.

3 Check that the template sits firmly in the collimator.

4 Expose the ionization chambers. To do so, switch on the light of the collimator.

Storing the three-field template set

1 Push the locking lever on the left accessory rail to the left.

2 Pull the template out of the accessory rails.

The locking lever on the accessory rail springs to the right.

3 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.

6.2.20 Wireless Remote Control Console

Important information

The functions of the Wireless Remote Control Console are activated via an RF transmitter.

The Wireless Remote Control Console may be interfered by other equipment, including portable and fixed RF communication equipment, even if such equipment meets the applicable emission requirements.

The operator must assure that other wireless devices in the 2.4-GHz ISM band are not operated in the vicinity of appr. 5 m around the MULTIX Impact C system. System movements can interrupt sporadically.

Please observe and verify normal operation of the Wireless Remote Control Console prior to using it.

During operation, the Wireless Remote Control Console emits electromagnetic energy.

Maybe, nearby electronic equipment is affected.

- Operate the Wireless Remote Control Console only inside the examination room in close vicinity to the tube stand and with full visibility to the patient on the table or at the wall stand.
- Take care that the batteries are always sufficiently charged.

WARNING

The Wireless Remote Control Console generates an electromagnetic field so high that it disturbs a life-supporting device.

Interference with a life-supporting device resulting in possible malfunction

- Make sure to keep a safety separation distance of larger than 90 cm between the wireless remote control and the life-supporting device.
- In case of interference with other equipment increase the distance between the interfering devices.

CAUTION

Collision with operator or patient

Mechanical or personal damage

- Take care that the used remote control and the system have the same colored label.
- Use remote control only when there is visual and acoustic contact with the patient.
- In case of unintended movement press the nearest emergency STOP button.

WARNING

Movement without intentional activation of control elements

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

- Do not load the remote console with any objects, accessories, folders or documents.
- If movements does not stop, press the nearest emergency STOP button.

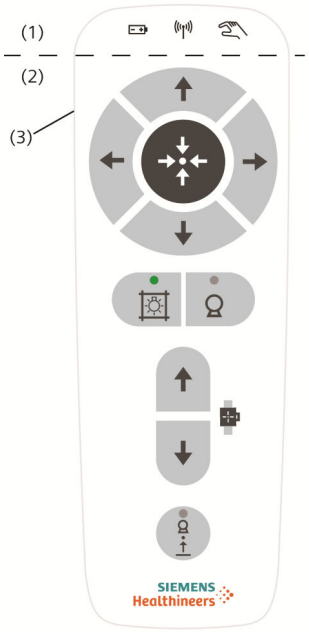
Changes or modifications not expressly approved by the party responsible for compliance could void the user´s authority to operate the equipment.

The Wireless Remote Control Console may be interfered with by other equipment, including portable and mobile RF communication equipment, even if this equipment meets the applicable emissions requirements.

In order to perform its intended function, the Wireless Remote Control Console must emit electromagnetic energy. Maybe, nearby electronic equipment is affected.

Operation

The remote control is active in a range of approx. 7 m around the tube stand, where the receiver is mounted. If the remote control is in a wider range of the table, it may lose contact with the receiver. It then turns into an inactive mode.



Wireless Remote Control Console

(1) Display area
(2) Operation area
(3) Warning label

Example of the warning label

Please ensure that the distance to the next emergency stop button is less than 2 m when pressing a button on the remote control.

Display area

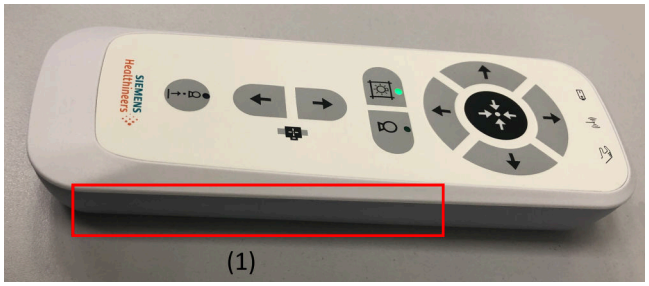
There are 3 LEDs showing the status of the remote control console.

- LED off: battery sufficiently charged, remote control not connected to the USB charging cable
- LED on red : battery needs charging, remaining capacity < 2.0V
- LED flashing yellow: remote control connected to the USB charging cable and batteries are being charged
- LED on yellow: remote control connected to the USB charging cable and batteries are fully charged

- LED off: The bluetooth signal strength is good.
- LED on: no bluetooth signal

- LED off: No operation button is being pressed or the dead-man sensor is not activated.
- LED on: An operation button is being pressed and meanwhile the dead-man sensor is activated.

Operation area



(1) Dead-man sensor

On both sides of the remote control, there is a dead-man sensor. To carry out an operation using a button in the operation area, you must activate the dead-man sensor with your hand at the same time.

As soon as you remove your hand from the dead-man sensor, the current operation is stopped.

Collimator adjustment / tube unit movement

You can select which part of the system you want to operate.

The green LED on the selected button is on.

Selection of collimator adjustment

Selection of tube unit movement

Collimator adjustment is selected by default setting.

Mode-switch can be set by the Siemens Healthineers service to shift the selection from tube unit movement to collimator adjustment after a timeout.

- Opening the collimator in vertical direction

- or -

- Moving the tube unit up in vertical direction

- Closing the collimator in vertical direction

- or -

- Moving the tube unit down in vertical direction

- Closing the collimator in horizontal direction

- Opening the collimator in horizontal direction

Position of organ program or parking position

SmartPositioning (optional):

Moving the system to the position which is stored in an organ program

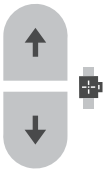
or

Parking position:

Moving the system to the parking position

(The parking position can be configured by Siemens Healthineers service.)

Detector unit up/down movement



Moving the detector unit of the wall stand up and down

Tracking control

Disable/enable tube tracking in wall mode

- LED off: Tracking function is inactive.
- LED on: Tracking function is active.

To enable the tracking function, the preconditions must be fully fulfilled.

(➔ Page 97 *Tube tracking*)

Charging

We recommend charging the batteries every day after deployment using the USB charging cable.

USB charging cable

Changing batteries

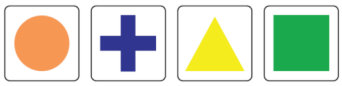
The batteries of the Wireless Remote Control Console should be changed every 24 months by authorized and trained staff. Please call Siemens Healthineers Service. Unauthorized exchange may cause severe damage.

Technical data

Active range	Approximately 7 m around the receiver mounted to the stand.
Charging time	Approx. 8 h
Operating time with full batteries	Approx. 20 h
Frequency range	2402 MHz - 2480 MHz
Modulation	GFSK
RF Power	4 dBm
RF emissions	CISPR 11 Compliance: Group 2 FCC 47 CFR 15, RED, SRRC The deployment of Wireless Remote Control in combination with MULTIX Impact C wi-D changes the classification of MULTIX Impact C wi-D from compliance group 1 to compliance group 2.

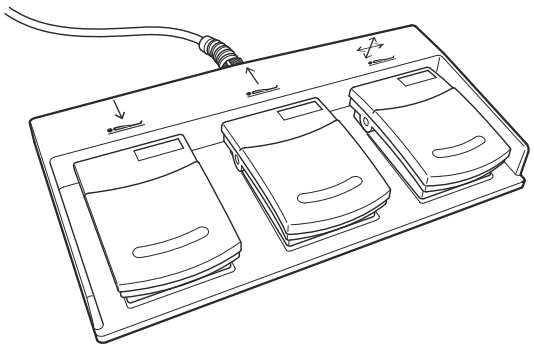
Marking signs

The Wireless Remote Control is marked with a colored sign of different shape. So you can avoid a mix up for installations with a multitude of Wireless Remote Controls. The same mark is attached to the system during installation.



These signs are examples of colored signs of different shape to mark the remote control to the system.

6.2.21 Foot switch



The foot switch can only be used with the elevating patient table.

- Left foot switch for table down movement.
- Middle foot switch for table up movement.
- Right foot switch to release the brakes for tabletop floating.

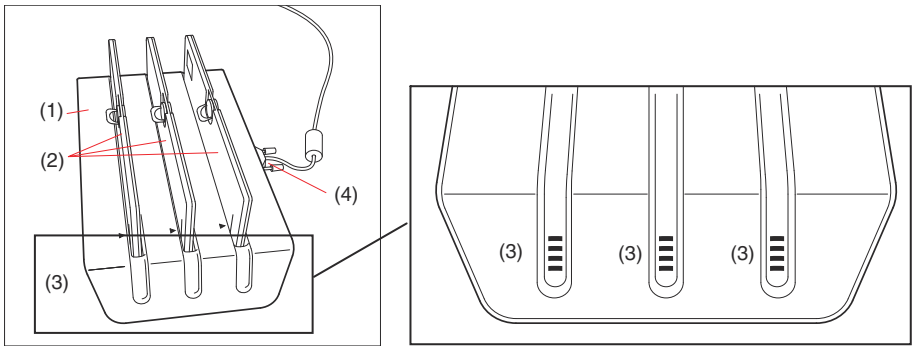
CAUTION

Operator or patient trips over the foot switch cable or the foot switch itself.

Risk of injury

◆ Position the foot switch and the associated cable on the floor so that nobody trips.

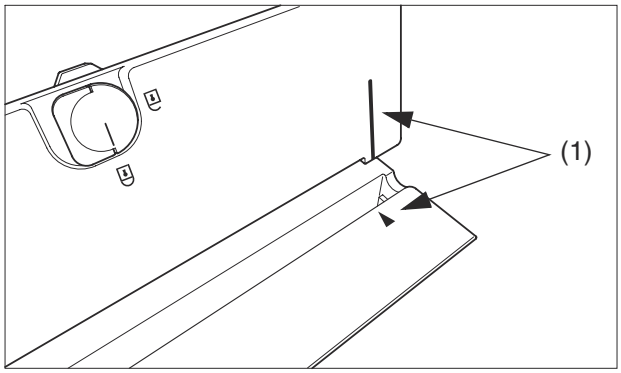
6.2.22 Battery charger (MAX wi-D)



(1) Charger
(2) Batteries
(3) 4 charging LEDs for each battery
(4) Power input with green power indicator
Green LED is illuminated when power is on.

Inserting battery into charger

The battery charger is designed to insert a battery in only one direction.



1 Insert the battery into the charger as shown above.

2 Pay attention to the alignment identification (1) on the battery and the charging slot (see above).

3 Gently push the battery onto the connector.

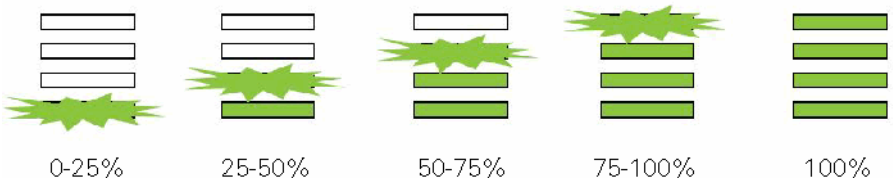
Once the battery is in place correctly, the bottom green LED starts blinking.

Charging a fully discharged battery will take a maximum of 3 hours. Up to three batteries can be charged at a time in the charger.

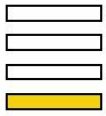
Status LEDs

For each charging slot, there are 4 LEDs. When there is no battery to be charged, all LEDs should be off.

There is 1 bottom LED (orange or green) and 3 green LEDs.



Charging levels



Fault signal

Charging trouble shooting

ORANGE Fault LED on

The battery is not inserted correctly / battery temperature too high.

- Remove battery and insert it again correctly.

  If the problem remains, the battery may be damaged.

  – or –

  Remove battery and insert it again with a normal temperature.

  The charger slot will remain in a fault condition until the battery is removed and inserted again with a normal temperature.

No green power LED active

- Check that the power supply is working.

No charging LEDs active

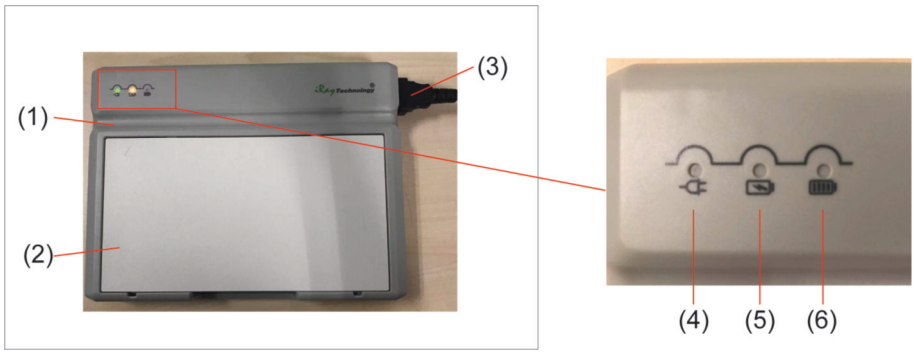
No battery inserted

Battery not inserted correctly.

1 Remove battery and insert it again correctly.

2 If problem remains, check that connectors are not damaged or battery is not faulty.

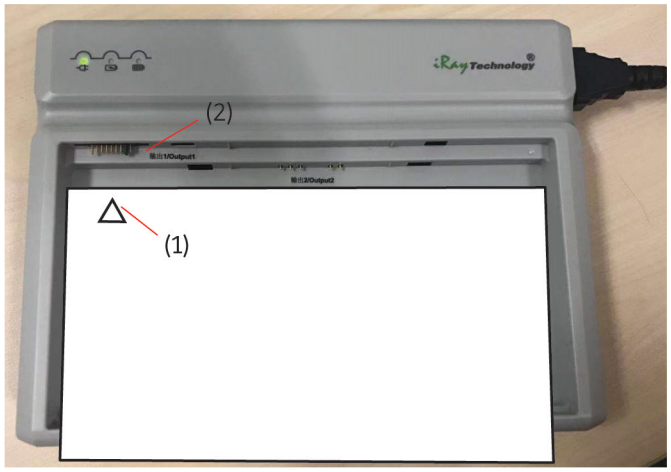
6.2.23 Battery charger (Core XL)



(1) Charger
(2) Battery
(3) Power input
(4) Power input LED
Green LED is illuminated when power is on.
(5) Charging LED
Yellow LED is illuminated when the battery is in charge.
(6) Battery full LED
Green LED is illuminated when the battery is full.

Inserting battery into charger

The battery charger is designed so that a battery can be inserted in only one direction.



1 Insert the battery into the charger as shown above.

2 Pay attention to the alignment identification (1) on the battery and the charging slot (Output1) (2) .

3 Slide battery into the recess area of the device.

Once the battery is in place correctly, the bottom green LED starts blinking.

Charging a fully discharged battery will take a maximum of 4 hours.

6.2.24 Wall charger

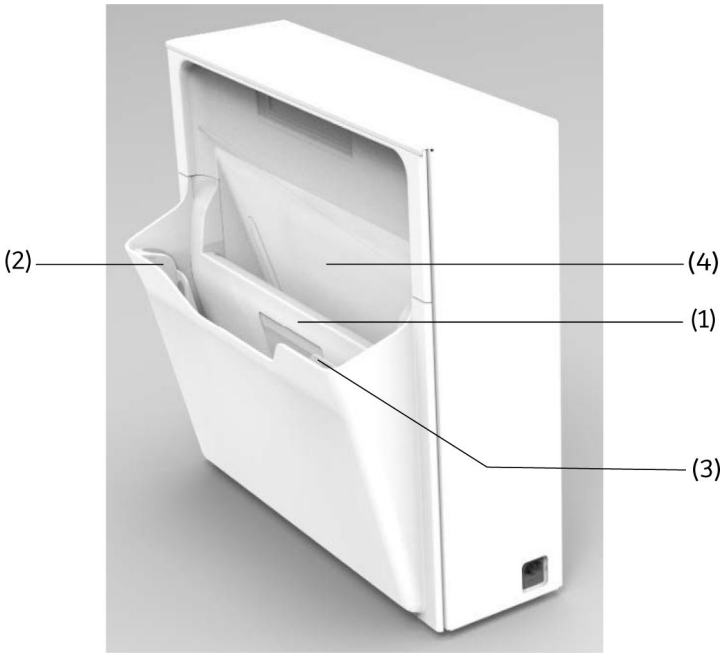
The wall charger has two functions:

- It can store one MAX wi-D portable detector, one MAX mini, one portable grid for the MAX wi-D and a spare detector battery.
- It is also used to charge the battery of the stored MAX wi-D automatically, when the detector is properly inserted in the wall charger. This is indicated by a blinking battery LED on the detector.

  The MAX mini and the spare battery cannot be charged.

Do not place the charger in the patient area!

The wall charger can be mounted to the wall.



(1) Compartment for one MAX wi-D
(2) Compartment for one MAX mini (without charging)
(3) Compartment for one spare detector battery (without charging)
(4) Compartment for one portable grid for the MAX wi-D

Inserting the MAX wi-D detector correctly for charging:

1 Insert the MAX wi-D detector into the corresponding compartment (charging station) of the wall charger.

2 Make sure that the handle of the detector points up and the charging contacts of the detector face the wall to permit the charging procedure to start.

Removing the MAX wi-D detector:

- Grab the MAX wi-D detector by its handle and pull it out of the wall charger carefully.

6.2.25 Barcode scanner

The barcode scanner is used for scanning patient data.

The barcode scanner beam must cross the entire label. (The scanner cannot correctly read a barcode if the entire label is not scanned.)

When connecting the scanner to the imaging system or disconnecting it from the imaging system, make sure the system has been switched off.

Usage

✓ **Pre-registered Patients** list is displayed on the screen.

1 Point the barcode scanner at the corresponding label and press the trigger button.

The patient ID is displayed in the searching field in the **Pre-registered Patients** list.

2 Click **Search** .

The patient is shown in the **Result List**.

Troubleshooting If the scanner is not operating properly, the following checks should be performed:

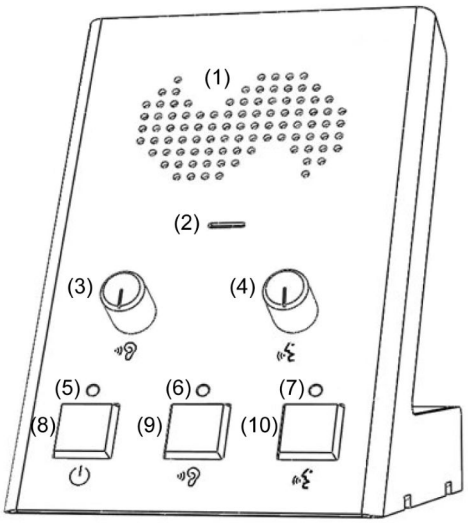
1 Check that the interface cable is securely attached to the scanner handle and the terminal.

2 Check that the labels are of sufficient quality to be recognized by the scanner. Wrinkled, smudged or torn labels can cause the scanner to not read at all. If you suspect that label quality is a problem, scan a known good label to check the scanner's read operation.

3 If the scanner still does not function properly, contact your Siemens Healthineers Customer Service.

6.2.26 Intercom system in control room

Overview



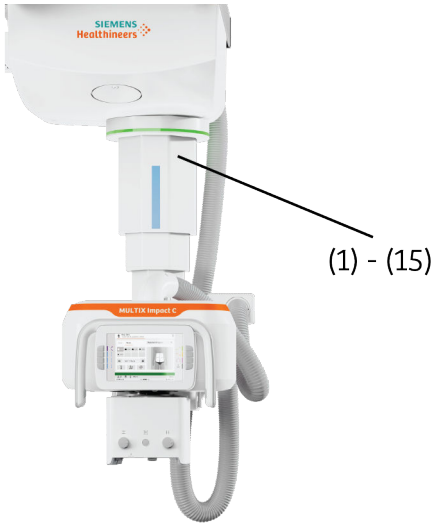
(1) Loudspeaker
(2) Microphone
(3) Listening (loudspeaker) volume (in the control room)
(4) Speaking (microphone) volume (in the control room)
(5) LED: Power status indication
LED lights up when power is ON
(6) LED: Listening (loudspeaker) status indication
LED lights up when the loudspeaker is ON
(7) 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

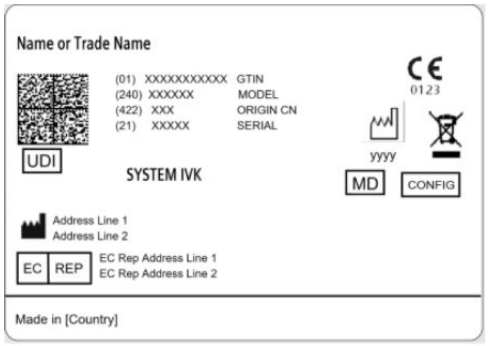
7 Technical Description

7.1 Location of labels

All labels displayed in the operator manuals are examples only and may differ from the labels attached to the system and components.

7.1.1 Labels on the ceiling-mounted tube support





(1) System ID label

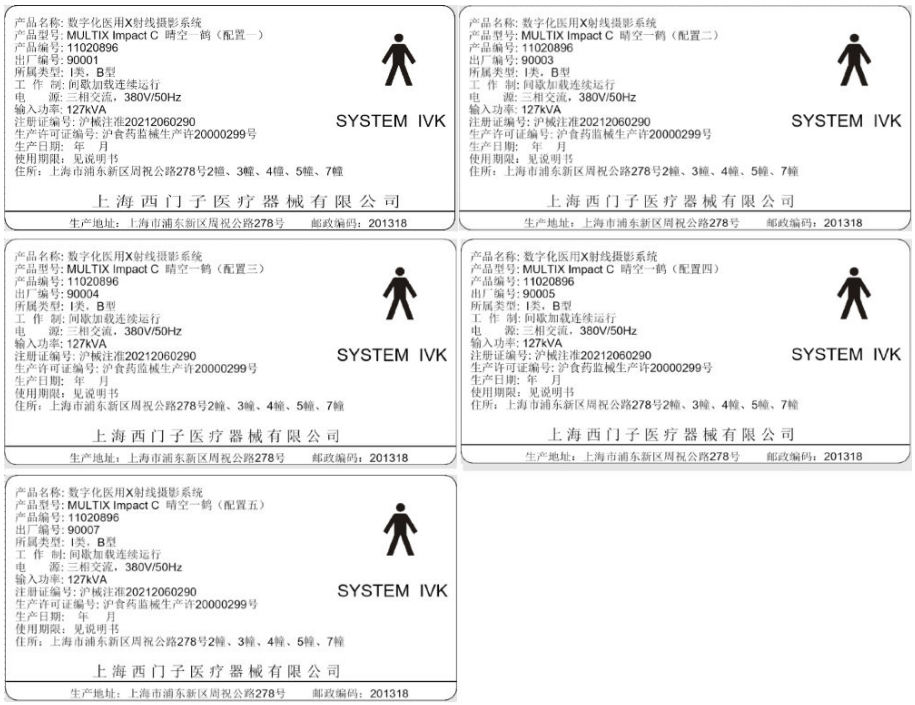
The following symbols are contained in the labels, if applicable:

MD

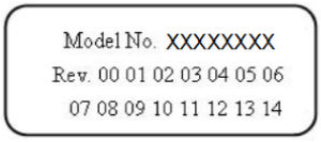
Medical device

CONFIG

Configurable device. A configurable device is a device that consists of several components which can be assembled by the manufacturer in multiple configurations. Those individual components may be devices in themselves.

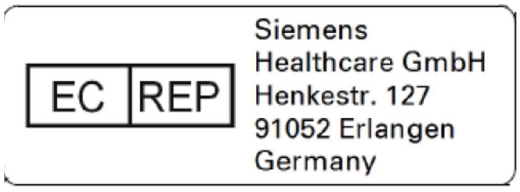


(2) China nameplate label

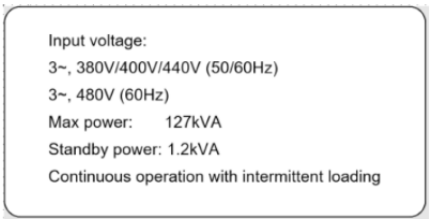


(3) Unit revision label

(4) Refer to manual label



(5) AR label



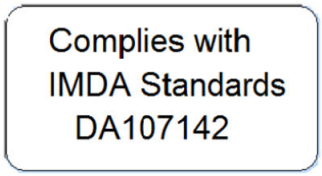
(6) Power label

(7) China RoHS label

当心电离辐射

(8) Warning label for ionizing radiation for deliveries to China

(9) SGS label



(10) Label for deliveries to Singapore

(11) Brazil label

(12) MoH label for deliveries to Ministry of health in Saudi Arab

EAC

(13) EAC label (This label is for Eurasian Economic Union (EEU) with EAC declaration done.)

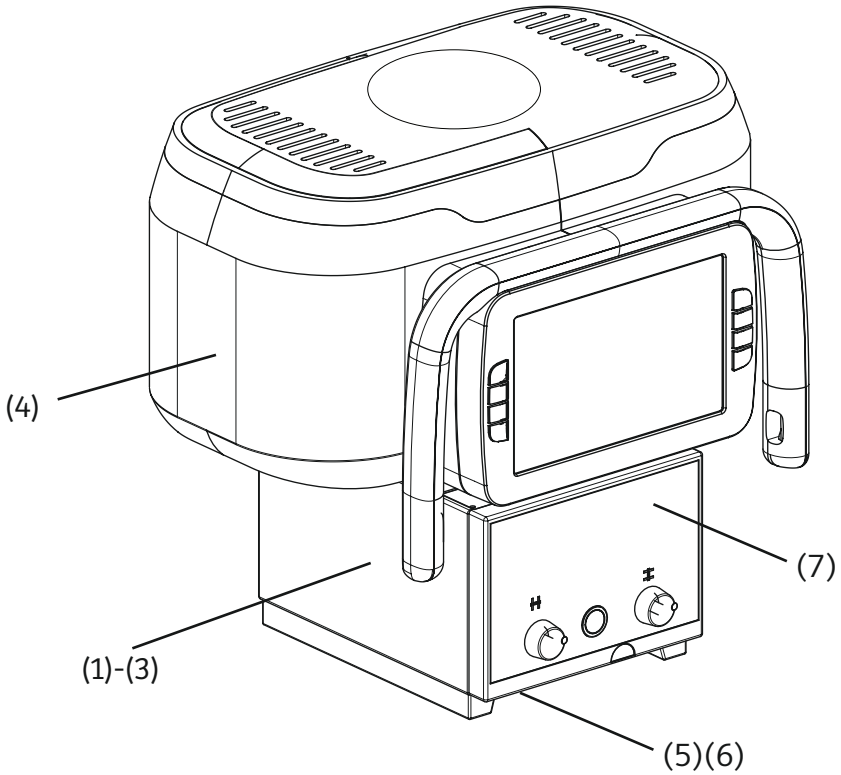
This product complies with DHHS regulations
21 CFR Subchapter J, applicable at date of manufacture.
Manufactured: August 2018
Siemens Shanghai Medical Equipment Ltd.,
278 Zhou Zhu Road,201318 Shanghai
China

(14) DHHS label for deliveries to USA

MULTIX Impact C

(15) Malaysia label

7.1.2 Labels on the tube unit with multileaf collimator

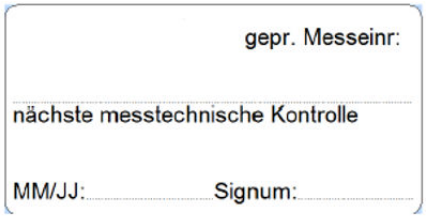


(1) Refer to manual label

Only for deliveries to China

or

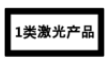
(2) Laser radiation label for collimator AL04 II-D



(3) DAP label for deliveries to Germany and Austria

(4) Tube 2nd set of labels

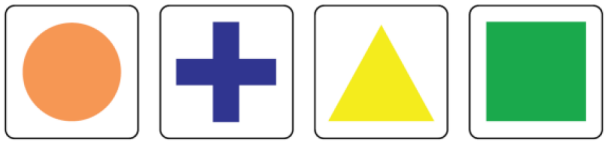
(5) Laser radiation label for collimator AL04 II-D



Only for deliveries to China

or

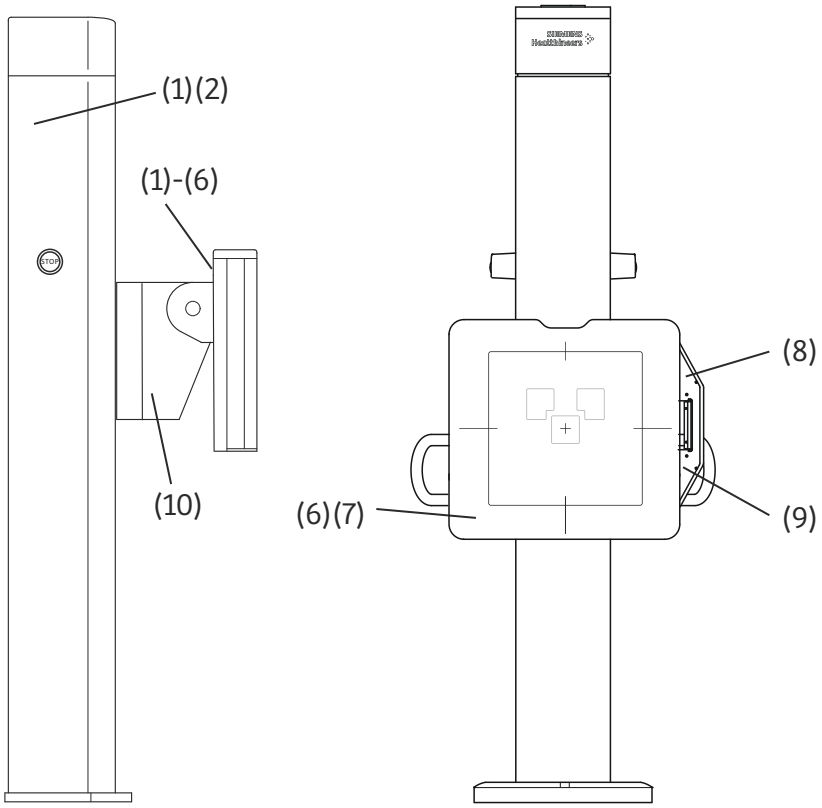
(6) Laser radiation label for collimator RFU



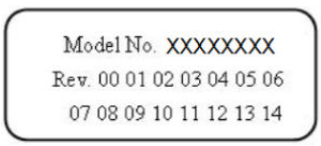
(7) Color coding label

(only when WRCC or Remote Interface is configured)

7.1.3 Labels on the wall stand



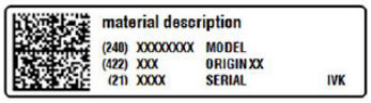
(1) Wall stand ID label



(2) Unit revision label

(3) DHHS label

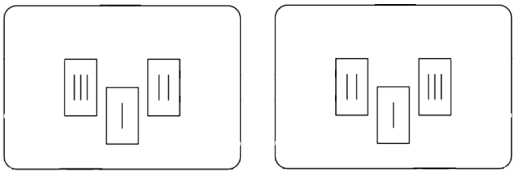
(4) Detector 2nd set of label



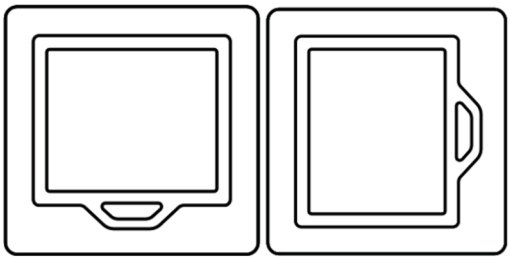
(5) Core static ID label

(6) 25 kg label

(7) Type B label



(8) Iontomat label (only the right label)

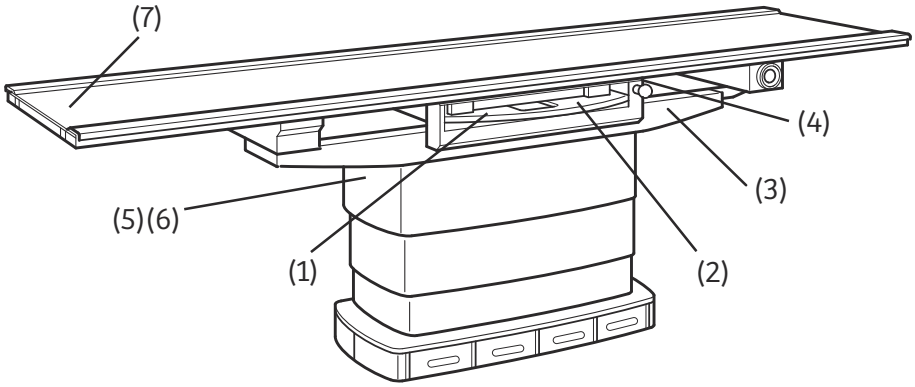


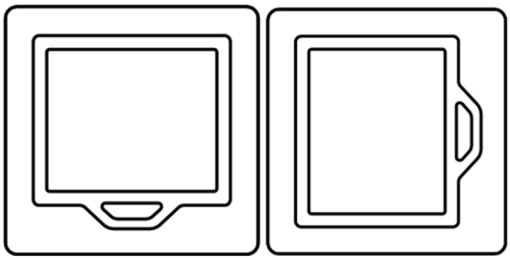
(9) Wireless detector position labels

For Core XL, only one label is pasted on the table (left) and wall stand (right).

(10) Anti-grip label

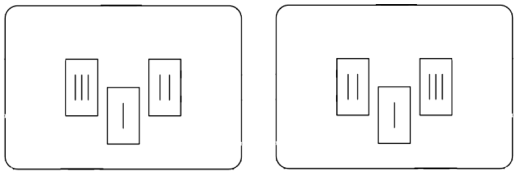
7.1.4 Labels on the patient table





(1) Wireless detector position labels

For Core XL, only one label is pasted on the table (left) and wall stand (right).

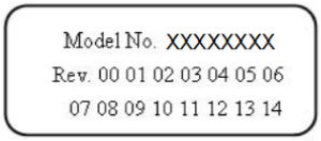


(2) Iontomat label for table with wireless detector

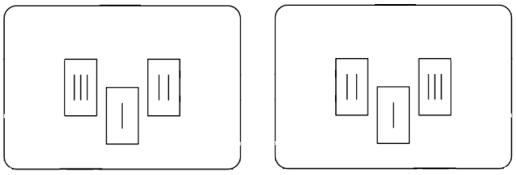
(3) Warning label of crush leg

(4) Anti-grip label

(5) Patient table ID label

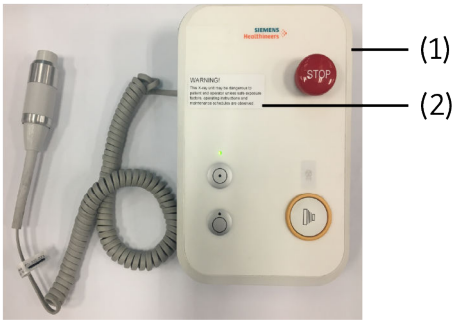


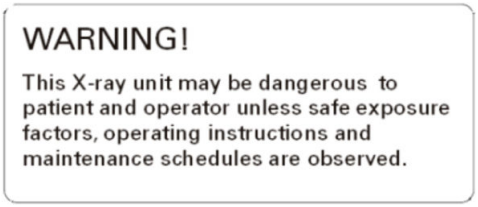
(6) Unit revision label



(7) Iontomat label for table with fixed detector

7.1.5 Labels on the generator ON/OFF console

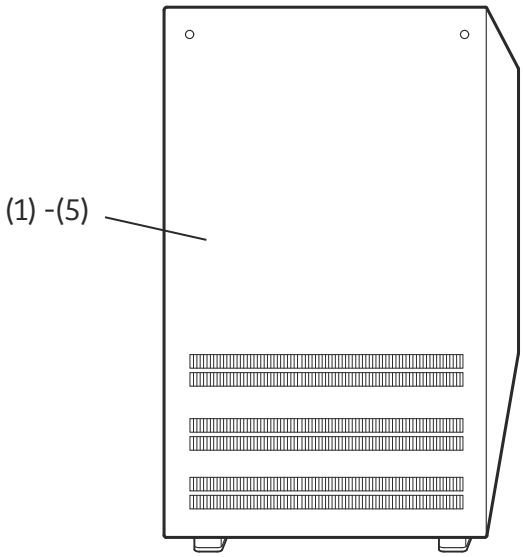




(1) Radiation emission warning label for deliveries to USA

(2) DHHS label for deliveries to USA

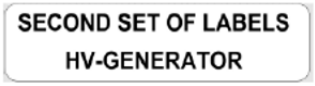
7.1.6 Labels on the generator cover



(1) Caution label

(2) Refer to manual label

(3) High voltage label



(4) Generator 2nd set of label

(5) PSU 2nd set of label

7.2 Technical data

All technical data represent typical values unless specific tolerances are given.

Siemens Healthineers reserves the right to change the design and specifications without notice.

7.2.1 System

Installation data	The entire system is powered via a three phase voltage connection.
Power connection	3-phase, 380 V/400 V/440 V (50/60 Hz), 480 V (60 Hz) (± 10%)
Power consumption	Max. 127 kVA (80 kW)
Standby	1.2 kVA

Internal line resistance	Max. R_{Line}		
U_{Line}	55 kW	65 kW	80 kW
380 V	0.15 Ω	0.15 Ω	0.10 Ω
400 V	0.17 Ω	0.17 Ω	0.11 Ω
440 V	0.20 Ω	0.20 Ω	0.14 Ω
480 V	0.24 Ω	0.24 Ω	0.16 Ω

Ambient conditions (operation): Examination room	Temperature range	+10°C to +35°C
	Relative humidity	20% to 75%, non-condensing
	Barometric pressure	700 hPa to 1060 hPa
	Height	≤ 3000 m above sea level
Ambient conditions (operation): Imaging system	Temperature range	0°C to +35°C
	Relative humidity	20% to 75%, non-condensing
Ambient conditions (Transport and storage)	Temperature range	-20°C to +70°C
	Relative humidity	10% to 95%, non-condensing
	Barometric pressure	700 hPa to 1060 hPa
Radio interference suppression/EMC	IEC 60601-1-2	
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:	• Foot switches: IPx8 • MAX wi-D: IP43 or higher • Core XL: IPx3 • Rest of system: IPx0

	Attention: To avoid the risk of electrical shock, a protective conductor must be implemented.	
Explosion protection (AP, APG after IEC 60601-1-3:2013; IEC 60601-1:2012)	The system is not intended for operation in explosion-endangered areas (for example highly flammable mixtures of anaesthesia gases with air or oxygen or nitrous oxide).	
Operating mode	Continuous operating with intermittent loading	
Weight	Bucky wall stand	Approx. 240 kg
	X-ray tube support	With 3 m rail: approx. 300 kg
		With 4 m rail: approx. 320 kg
	Imaging station	With normal screen: approx. 14.5 kg
		With touch screen (optional): approx. 15.4 kg
	Generator cabinet	Approx. 190 kg
	Patient table	Approx. 320 kg
Degree of contamination	Class 2, according to IEC 60601-1-3:2013; IEC 60601-1:2012	
Total inherent filtration	2.5 mm Al at 70 kV/2.5 mm Al HVL (DIN EN 61267, RQR5) (combined with collimator Al equivalent 1.0 mm Al and tube Al equivalent 1.5 mm Al) + DAP Al equivalent < 0.5 mm Al	
DAP chamber	Dose area product is measured by DAP meter at the collimator	
	Tolerance of DAP values	± 35%
AEC chambers	AEC chambers attenuation equivalent	0.7 mm Al
	Tolerance of AEC values	± 3%
Applied parts	• Table • Compression device • Wall stand • Portable detector	

7.2.2 Components

Patient table

Table height	51.5 cm to 90.0 cm; total lift 38.5 cm (tabletop)
Tabletop dimensions	• Standard tabletop: 233 cm x 80 cm • Short tabletop (optional): 213 cm x 80 cm
Tabletop Al equivalent	≤ 0.7 mm Al (with 100 kV / 3.6 mm Al HVL; IEC 60601-2-54)
Patient weight	Max. load 300 kg

Longitudinal travel	• Standard tabletop: ± 44 cm • Short tabletop (optional): ± 34 cm
Transverse travel	± 14 cm (± 5 mm tolerance)
Detector cover range	≥ 100 cm
Max. patient coverage	About 190 cm with standard tabletop
Grid	Stationary, Pb 13/92, f_0 = 115 cm
	Stationary, Pb 13/40; f_0 = 115 cm
Tabletop - detector distance	≤ 73 mm
Maximum radiation field	• Maximum symmetrical radiation field at a distance of 1150 mm from the focus, • With table tray for MAX wi-D: 426 mm x 355 mm • With table tray for Core XL: 426 mm x 426 mm • With table tray for Core static: 426 mm x 426 mm

Bucky wall stand

Travel range (central beam to floor)	From 31.5 cm to 175 cm
Detector unit	Tiltable from -20° to +90° withdetent at 0° and +90°
Detector cover - detector distance	• With MAX wi-D: ≤ 4.2 cm • With Core XL: ≤ 4.2 cm • With Core static: ≤ 4.5 cm • With a cassette: ≤ 4.6 cm
X-ray absorption	≤ 0.6 mm Al (at 100 kV/3.6 mm Al HVL; IEC 60601-2-54)
Anti scatter grid	• Stationary grid, Pb 13/92, f_0 = 140 cm • Stationary grid, Pb 13/40, f_0 = 140 cm Optional stationary grids: • Pb 13/92, f_0 = 115 cm; f_0 =180 cm; f_0 =300 cm • Pb 13/40, f_0 = 115 cm; f_0 =180 cm

X-ray tube support

Horizontal travel range	Longitudinal	352 cm
	Transverse with 3 m trolley:	215 cm
	Transverse with 4 m trolley:	350 cm
Vertical travel range	180 cm ± 2 cm, manual or motorized	

Minimum focus-ceiling distance	83 cm
Rotation range around the vertical axis	-154° to + 182°, manual Detents at -90°; 0°; +90°; +180°
Rotation range around the horizontal axis	± 137° ± 2°, motorized tiltling; ± 120° ± 2°, manual tiltling; Detents at -90°; 0°; +90°

X-ray tube

Maximum exposure voltage (IEC 60613)	150 kV
Focal spot nominal value (IEC 60336)	• 0.6 • 1.2
Radiographic anode input power (IEC 60613)	34 kW/80 kW
Nominal anode input power (IEC 60613) (thermal anode reference output = 300 W)	22 kW/54 kW (50/60Hz) 33 kW/78 kW (150/180Hz)
Nominal anode input power (thermal anode reference output = 0 W)	29 kW/73 kW (50/60Hz) 45 kW/107 kW (150/180Hz)
Anode angle	12°
Maximum heat storage capacity of tube housing	1,000 kJ (1,350 kHU)
Total filtration (IEC 60601-1-3)	≥ 2.5 mm Al/75 kV
Leakage radiation (IEC 60601-1-3)	(at 150kV at 1 m distance) ≤ 0.8 mGy/h (450 W)

Collimator

Inherent filtration	• Collimator AL04 II-D: 1mm Al at 70 kV • Collimator RFU: 1mm Al at 75 kV
Full field light localizer	Very efficient high power LED technology, high energy efficiency enabling low-noise design without external cooling system; long lifetime approx. 100,000 h; timer functionality; laser line light localizer (can be covered)
Copper prefilter	Without filter; 0.1 mm; 0.2 mm; 0.3 mm; motorized
Rotation	±45°
Collimator control	Manual or motorized

Detectors

MAX wi-D	pixium 3543 EZh
Detector technology	Cesium iodide scintillator coupled to TFT matrix with amorphous silicon technology
Dimensions (active area)	34.8 cm x 42.4 cm
Dimensions with detector housing	44 cm x 46.1 cm x 1.9 cm
Active detector matrix	2350 x 2866
Pixel size	148 µm
Semiconductor material	Amorphous silicon (a-Si)
Scintillator	Cesium iodide (CsI)
Acquisition depth	16-bit
Data transmission	< 2 s preview; < 4 s full image
DQE in %; 2µGy (RQA5) (IEC 62220)	70% at 0.05 lp/mm 51% at 1 lp/mm 42% at 2 lp/mm 29% at 3 lp/mm 19% at Nyquist
MTF in % (RQA5) (IEC 62220)	63% at 1 lp/mm 35% at 2 lp/mm 19% at 3 lp/mm 12% at Nyquist
Thickness	19 mm
Weight	3.3 kg
Max. load capacity	• 300 kg with patient recumbent on it (300 kg is only for functional availability rather than full performance) • 100 kg with patient standing
Battery	Lithium-ion, rechargeable, exchangeable
Charging time	3 h
Battery operation time	• Up to 1,050 images • 6.5 hours in usual operation
Charging location	Table detector tray, wall stand detector tray, battery charger (optional)
Clip-on grid	• Pb 5/85, f_0 = 115 cm • Pb 15/80, f_0 = 115 cm

MAX wi-D	pixium 3543 EZh
WLAN Standard	IEEE 802.11 b/g/n, 2 x 2 mimo, WPA2/AES Encryption, EAP/TLS support

Core XL	Mars1717VS
Detector technology	Cesium iodide scintillator coupled to TFT matrix with amorphous silicon technology
Dimensions (active area)	42.6 cm x 42.6 cm
Dimensions with detector housing	46.1 cm x 46.1 cm x 1.57 cm
Active detector matrix	3070 x 3070
Pixel size	139 µm
Semiconductor material	Amorphous silicon (a-Si)
Scintillator	Cesium iodide (CsI)
Acquisition depth	16-bit
Data transmission	< 3 s preview; < 7 s full image
DQE in %; 2µGy (RQA5), (IEC 62220)	80% at 0.05 lp/mm 65% at 1 lp/mm 53% at 2 lp/mm 34% at 3 lp/mm 21% at Nyquist
MTF in % (RQA5), (IEC 62220)	64% at 1 lp/mm 34% at 2 lp/mm 18% at 3 lp/mm 13% at Nyquist
Thickness	15.7 mm
Weight	4.2 kg
Max. load capacity	• 150 kg with patient recumbent on it • 100 kg with patient standing
Battery	Lithium-ion, rechargeable, exchangeable
Charging time	4 h
Battery operation time	• Up to 950 images • 7.5 hours in usual operation
Charging location	Table detector tray, wall stand detector tray, battery charger (optional)
Clip-on grid	Pb 5/85, f_0 = 115 cm

Core XL	Mars1717VS
WLAN Standard	IEEE 802.11 b/g/n, 2 x 2 mimo, WPA2/AES Encryption, EAP/TLS support

Core static	Venu1717X
Detector technology	Cesium iodide scintillator coupled to TFT matrix with amorphous silicon technology
Dimensions (active area)	42.6 cm x 42.6 cm
Dimensions with detector housing	46.0 cm x 46.0 cm x 1.55 cm
Active detector matrix	3070 x 3070
Pixel size	139 µm
Semiconductor material	Amorphous silicon (a-Si)
Scintillator	Cesium iodide (CsI)
Acquisition depth	16-bit
Data transmission	< 3 s preview; < 5 s full image
DQE in %; 2µGy (RQA5), (IEC 62220)	80% at 0.05 lp/mm 65% at 1 lp/mm 53% at 2 lp/mm 34% at 3 lp/mm 21% at Nyquist
MTF in % (RQA5), (IEC 62220)	64% at 1 lp/mm 34% at 2 lp/mm 18% at 3 lp/mm 13% at Nyquist

Generator

All technical data prove typical values, if specific tolerances are not indicated.

Polydoros RFX	
According to IEC 60601-2-7 and GB 9706.3	
High voltage form	Multipulse
Generator frequency	≥ 100 kHz
Exposure voltage	40 kV - 150 kV
Maximum current	50 A
Maximum kWs value in AEC mode	56 kWs ± 5 %

Polydoros RFX

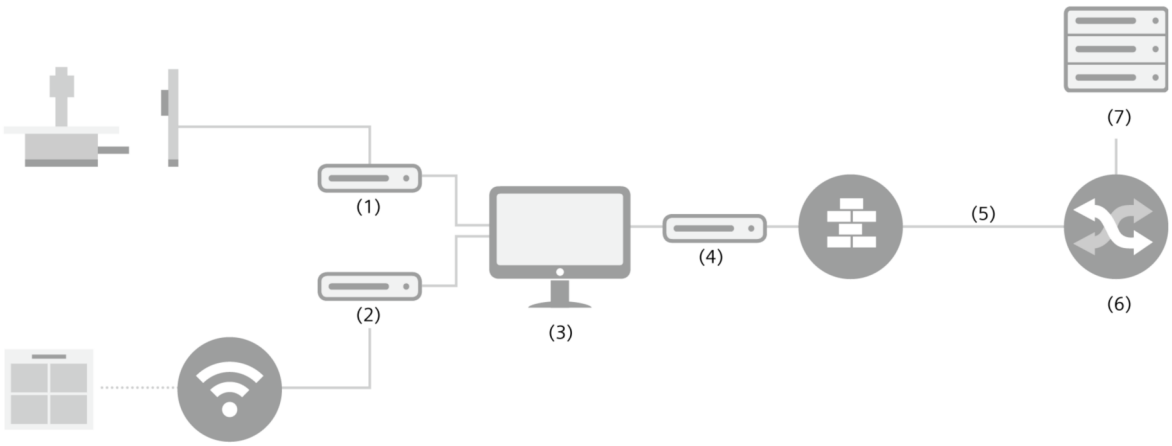
mAs range	• 0.5 mAs to 800 mAs for 55 kW/65 kW • 0.5 mAs to 1000 mAs for 80 kW
Minimum exposure time	• 1-point technique: 1 ms at 100 kV • 2-point technique: 2 ms at 100 kV • 3-point technique: 20 ms at 100 kV
Tolerance	• kV tolerance ± 5 % • mAs tolerance not greater than ± (10 % + 0.2 mAs) • ms tolerance not greater than ± (10 % + 1 ms)
Nominal electric power	• 55 kW : 100 kV, 55 mAs, 100 ms (550 mA) • 65 kW : 100 kV, 65 mAs, 100 ms (650 mA) • 80 kW : 100 kV, 80 mAs, 100 ms (800 mA)
Max. electric power	• 55 kW : 100 kV, 55 mAs, (550 mA) • 65 kW : 100 kV, 65 mAs, (650 mA) • 80 kW : 100 kV, 80 mAs, (800 mA)
Max. tube current and voltage	• 55 kW: 68 kV at 800 mA • 65 kW: 81 kV at 800 mA • 80 kW: 80 kV at 1,000 mA
mA value at nominal 150 kV	• 55 kW: 350 mA • 65 kW: 400 mA • 80 kW: 509 mA

Image Station

Computer system	Computer	Intel® Core™ i5-6500TE Processor, 6 M Cache, up to 3.30 GHz, 1 x DDR4 8 GB memory, 2 x 500 G SATA HDD, 4 x USB 2.0, 2 x USB 3.0
	Operating system	Windows® 10 LTSB 64 bit or above
Archiving and documentation	System storage capacity	10,000 images
	Background functions	Preprocessing and data transfer is done in the background.
	Archiving	USB, DVD or CD-R read/write in DICOM 3.0 format (or packed format)

	CD-R storage:	• DICOM 3.0 format • Packed format • DICOM send • DICOM query/retrieve
	Export	In JPG, BMP, or TIFF format via USB/DVD/CD-R
	Documentation	• DICOM Print • Virtual Film Sheet
	DICOM Worklist, MPPS	Data exchange via HIS/RIS
	Paper printing	Printing of lists and images to a network paper printer

7.2.3 Network information



(1) #3 NIC
(2) #2 NIC
(3) Imaging system (Windows 10 LTSB 2016)
(4) #1 NIC
(5) DICOM TCP Port 104
(6) Switch on customer site
(7) Any RIS or HIS or PACS

MULTIX Impact C uses the Windows firewall to restrict access.

The following ports need to be opened in the hospital network firewall:

Application	Functionality	Network - MULTIX Impact C (In-going)	Network - MULTIX Impact C (Out-going)
Windows operating system	DNS	None	53 (UDP, TCP)
	DHCP	None	67 (UDP)
	NTP	None	123 (UDP)

Application	Functionality	Network - MULTIX Impact C (In-going)	Network - MULTIX Impact C (Out-going)
DICOM	DICOM	104 (TCP)	Configurable by customer* (TCP)
Remote Services	MNP	8226, 13001 (TCP)	8227, 8228, 12061 (TCP)
	Teamviewer	10080,10081 (TCP)	None
	Transfermanager	49152-65534(TCP)	20-21(TCP)
	Remote Web Service	443 (TCP)	None

*Ports for DICOM communication are opened for configured peer nodes, e.g. PACS or RIS or HIS.

7.3 Notice concerning electromagnetic compatibility (EMC)

Medical electrical equipment needs special precautions regarding EMC. EMC information provided in the accompanying documents must be followed where appropriate.

WARNING

The portable detector generates an electromagnetic field so high that it disturbs life-supporting device.

Interference with life supporting device resulting in possible malfunction

- Keep a safety separation distance of more than 30 cm between the portable detector and the life-supporting device.
- In case of interference with other equipment increase the distance between the interfering devices.

CAUTION

Radio interference from the system affects nearby equipment

Risk of malfunction of nearby equipment.

- Reorient or relocate the equipment or system or shield its location.
- Test the operation of the equipment in its new location.

The system is suitable for professional healthcare facility environment according to standard IEC 60601-1-2:2014.

Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to any part of the system , including cables specified by the manufacturer. Otherwise, degradation of the performance of this equipment could result.

Fixed product cabling, which can not be removed by the users, is not listed. This cabling is part of the product and was present at all EMC-measurements. Without this cabling there is no complete functionality of the product.

Deviations or additions to this document are added to the product specific documents.

The use of accessories, transducers and cables other than those specified, with the exception of transducers and cables sold by the manufacturer of the product as replacement parts for internal components, may result in increased emission or decreased immunity of the product.

The emissions characteristics of this equipment 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 user might need to take mitigation measures, such as relocating or reorienting the equipment.

The system should not be used adjacent to or stacked with other equipment and that if adjacent or stacked use is necessary, the equipment or product should be observed to verify normal operation in the configuration in which it will be used.

Precautions to take if the use location is near (e.g. less than 1.5 km from) AM, FM or TV broadcast antennas.

The essential performance of this equipment is defined in particular medical electrical equipment standard, such as IEC 60601-2-43, IEC 60601-2-54.

Medical electrical equipment is subject to special precautions regarding EMC. These systems must be installed and put into service according to the EMC information provided in the accompanying documents.

7.3.1 Guidance and manufacturer's declaration - electromagnetic emissions

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

Emission test	Compliance	Electromagnetic environment - guidance
RF emissions CISPR 11	Group 1	The system uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class A	The system is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Not applicable	
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Not applicable	

7.3.2 Guidelines and manufacturer's declaration - electromagnetic immunity

The system is intended for use in an electromagnetic environment as specified below. The customer or the user of the system should ensure that it is operated in such an environment.

Immunity test	IEC 60601 Test level	Compliance level	Electromagnetic environment - Guidelines
Electrostatic discharge (ESD) IEC 61000-4-2	± 8 kV contact ± 2 kV, ± 4 kV, ± 8 kV, ± 15 kV air	± 8 kV contact ± 2 kV, ± 4 kV, ± 8 kV, ± 15 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/ burst IEC 61000-4-4	± 2 kV for power port ± 1 kV for input/ output port 100 kHz repetition frequency	The same as IEC 60601 test level	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	± 0.5 kV, ± 1 kV line to line ± 0.5 kV, ± 1, ± 2 kV line to ground	The same as IEC 60601 test level	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	0% U_T; 0.5 cycle (0°, 45°, 90°, 135°, 180°, 225°, 270° and 315°) 0% U_T; 1 cycle 70% U_T; 25/30 cycles	Not applicable	The mains power quality should be that of a typical commercial or hospital environment. If the user of the system requires continued operation during power mains interruptions, it is recommended that the system be powered from an uninterruptible power supply.
	0% U_T; 250/300 cycles	< 5% U_T for 0.5 sec (> 95% dip in U_T)	
Power frequency magnetic field IEC 61000-4-8	30 A/m 50 Hz or 60 Hz	30 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
NOTE: U_T is the a.c. mains voltage prior to application of the test level.			

Immunity test	IEC 60601 Test level	Compliance level	Electromagnetic environment - Guidelines
			Portable and mobile RF communications equipment should be used no closer to any part of the product than the recommended separation distance calculated from the equation applicable to the frequency of the transmitters. Recommended separation distance:

Immunity test	IEC 60601 Test level	Compliance level	Electromagnetic environment - Guidelines
Conducted RF IEC 61000-4-6	3 V 150 kHz-80 MHz 6 V; in ISM bands between 150 kHz and 80 MHz 80% AM at 1 kHz	3 V 6 V; in ISM bands	d=1.2 √P
Radiated RF IEC 61000-4-3 Proximity fields from RF wireless communications equipment	3 V/m 80 MHz to 2.7 GHz 80% AM at 1 kHz See 8.10 of IEC 60601-1-2-2014	3 V/m See 8.10 of IEC 60601-1-2-2014	d=1.2 √P for 80 MHz to 800 MHz d=2.3 √P for 800 MHz to 2.7 GHz Where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey[1], should be less than the compliance level in each frequency range[2]. Interference may occur in the vicinity of equipment marked with the following symbol: 

Remark 1: At 80 MHz and 800 MHz, the higher frequency range applies.

Remark 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

[1] Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To be able to assess the electromagnetic environment with regard to the stationary transmitters, an electromagnetic site study should be considered. If the measured field strength at the location where the system is used exceeds the applicable RF compliance level specified above, the system should be observed to verify normal operation. Should unusual performance features be observed, additional measures (such as change in orientation or change of site of the system) may be necessary.

[2] Above the frequency range of 150 kHz to 80 MHz the field strength should be less than 3 V/m.

7.3.3 Recommended separation distance between portable and mobile RF communications equipment and the system

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

Nominal power of the transmitter [W]	Separation distance according to frequency of transmitter [m]		
	150 kHz to 80 MHz d=1.2 √P	80 MHz to 800 MHz d=1.2 √P	800 MHz to 2.7 GHz d=2.3 √P
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

Remark 1: At 80 MHz and 800 MHz, the higher frequency range applies.

Remark 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

7.3.4 RF transmitters

Name	Frequency range	Bandwidth	Modulation type	Effective radiated power
Wireless Remote Control Console (WRCC)	2402 - 2480 MHz/2 MHz step	2402 - 2480 MHz/2 MHz step	GFSK	27 dB 31.6 mA (Max)
Wireless detector MAX wi-D	2400 - 2483.5 MHz, 5150 - 5350 MHz, 5725- 5850 MHz	2400 - 2483.5 MHz, 5150 - 5350 MHz, 5725- 5850 MHz	BPSK/QPSK/16QAM/ 64QAM/256QAM/ DBPSK/DQPSK/CCK	33 dBm (Max) 20 dBm (EIRP) (Max)
Wireless detector Core XL	2400 - 2483.5 MHz, 5150 - 5250 MHz, 5725- 5850 MHz	2.4GHz: 20MHz, 40MHz 5.1GHz: 20MHz, 40MHz, 80MHz 5.8GHz: 20MHz, 40MHz, 80MHz	11b: CCK, DQPSK, DBPSK, DSSS 11n: QPSK, BPSK, 16QAM, 64QAM, OFDM 11ac: QPSK, BPSK, 16QAM, 64QAM, OFDM, 256QAM	802.11b: 16dBm 802.11a: 13dBm 802.11g: 14dBm 802.11n: 13dBm 802.11ac: 8dBm
iPad mini A2133	2400-2483.5 MHz, 5150-5350 MHz, 5725-5850 MHz	80 MHz, 20 MHz, 8 MHz, 3 MHz	BPSK/QPSK/16QAM/ 256QAM/DBPSK/ DQPSK/CCK GFSK π/4-DQPSK 8DPSK	33 dBm (Max) 23 dBm (EIRP) (Max) 20 dBm (EIRP) (Max)

8 Glossary

ACSS	Automatic Collimation Size Sensing
AEC	Automatic Exposure Control
BWS	Bucky Wall stand
DICOM	Digital Imaging and Communications in Medicine
DMG	Dead Man's Grip
EMC	Electromagnetic compatibility
MPPS	Modality Performed Procedure Step
OGP	Organ Program
RHA	Rotation about the horizontal axis
ROI	Region of Interest
RVA	Rotation about the vertical axis
SID	Source Image Distance
TOD	Table-Object Distance
TUI	Touch User Interface
UPS	Uninterruptible Power Supply
WRCC	Wireless Remote Control Console

1, 2, 3 ...

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0123

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