



Cios Select

Operator Manual

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Shaded content is already approved!

Cios Select

Operator Manual

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



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 to identify window titles, menu items, function names, buttons, and keys, for example, the Save button

Blue

Is used to emphasize **particularly** important sections of the text

UI text

Is used for on-screen output of the system including code-related elements or commands

User text

Is used to identify inputs you need to provide

Menu > Menu Item

Is used for the navigation to a certain submenu entry



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

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

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1 Introduction

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Information class: clinical

Use_of_the_product_FD__MDR_

1.1 Use of the product

TOPIC INFO

INDEX: [Use : of the product]
INDEX: [Product : use]

We welcome you as a user of the powerful Cios Select, the multifunctional C-arm system from Siemens Healthineers.

1.1.1 Intended purpose

TOPIC INFO

INDEX: [Indication of use]

Intended use

Cios Select is a mobile X-ray system designed to provide X-ray imaging of the anatomical structures of patient during following clinical applications: interventional fluoroscopic, gastro-intestinal, endoscopic, urologic, pain management, orthopedic, neurologic, vascular, cardiac, critical care and emergency room procedures.

Indications

In general, all clinical indications of angiography- and fluoroscopic-based procedures within the intended use are applicable for this device.

Contra-Indications

For this product there are currently no known contra-indications. However, contra indications for angiography- and fluoroscopy- based procedures apply. 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 cases involved.

Patient target group(s)

The system can be used on all patients, from newborn to geriatric.

Intended users

Operator profile: The usage of the system described in the 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.

Equipment training: Application training is delivered with the equipment according to the handover contract. It is mandatory to follow such application training delivered by Siemens 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.

1.1.2 Clinical benefit

The device is a general-purpose device for interventional imaging supporting diagnostic or therapeutic decisions by medical professionals. The device enables medical professionals to perform angiography- and fluoroscopy-based procedures within the intended use. Generic clinical benefits of angiography- and fluoroscopy- based procedures within the intended use are applicable for this device.

1.1.3 Undesirable side effects

Deterministic and stochastic effects of exposure to ionizing radiation (X-rays) are part of the physician's medical education. The necessity of an X-ray examination in relation to these risks must be considered by the physician when prescribing or performing such a type of examination.

For radiation emitting products, known deterministic effects of exposure to X-rays are erythema, cataracts, permanent epilation and delayed skin necrosis.

For radiation emitting products, known stochastic effects of exposure to X-rays are increased risks of developing cancer and hereditary diseases.

These stochastic dose effects have an increased probability of occurrence with increased dose. The related risk can be minimized by means of keeping the X-ray exposure to the necessary minimum and by means of careful and systematic application of protection measures for the operator and the clinical staff.

Examinations performed on patients especially sensitive to ionizing radiation (e.g. infants, pregnant women, individuals with certain genetic predispositions and/or diseases characterized by enhanced radiation sensitivity) or to contrast medium (e.g. chronic kidney diseases) need to be planned and performed with special care to minimize the exposure.

1.1.4 Residual risk

The **Cios Select** is a complex medical device, its functionality requires the seamless and synchronized operation of a high number of hardware and software components, as well as appropriate operating conditions.

A safe and effective operation of the **Cios Select** requires that it is operated by persons with the necessary specialist knowledge and appropriate knowledge about the system, its intended use, its functions, the conditions and limitations for its usage, periodic maintenance and routine checks which need to be performed, the potential error situations, as well as the corresponding recovery possibilities.

1 Introduction

System functions may be disturbed or completely lost at any time due to component errors, damages like ingress of liquids or collisions, or due to inappropriate operating conditions e.g. with regards to mains power supply, excessive use of the system at maximum load for a prolonged period of time or inappropriate maintenance or service. User or operator behavior like using the system without appropriate care, using the system in combination with devices, accessories, other equipment or pieces of software in a way which is not approved by the manufacturer or cleaning or disinfecting the system not according to the provisions given in the instructions for use may also lead to damages or functional disturbances. Certain materials in the X-ray beam like patient tables may impair the image quality and may lead to a higher radiation exposure.

The **Cios Select** is designed to comply with regulatory requirements regarding electromagnetic compatibility. It is protected against the electromagnetic influence of external devices and does not disturb the operation of these. However, individual external devices with emissions beyond the allowed levels or even the combined emission of multiple, individually compliant devices may lead to the influence levels considered in designing and testing the **Cios Select** being exceeded, and eventually, to functional disturbances. External devices, which are not sufficiently stable against electromagnetic influence may be disturbed by the emissions of the **Cios Select** as well.

When releasing system movements, the operator's care is required in order to prevent crushing, collisions with other equipment or collisions with and thus movement of body-penetrating objects like catheters or needles.

The **Cios Select** manages radiation exposure in order to minimize the radiation dose for the patient, user and staff, while providing the necessary level of imaging performance. The applied dose is measured, tracked and displayed. Warnings are given under defined conditions.

In combination with the appropriate care in the clinical workflow and informed decisions considering also the clinical benefit of radiation, the above mechanisms should prevent deterministic dose effects to the patient (erythema, cataracts, permanent epilation and delayed skin necrosis). Nevertheless, such injuries cannot be completely excluded. In rare cases, the dose management mechanisms may not be operating correctly. These issues are detectable for the user especially within a Quality Assurance framework. Some clinical applications using the **Cios Select** involve injecting contrast medium into the patient's cardiovascular system or other body orifices. Functional disturbances in the **Cios Select** may affect the imaging workflow resulting in the additional administration of contrast medium. This may lead to risks and side-effects in accordance with the information provided by the manufacturer.

1.1.5 Physical functionality

TOPIC INFO
INDEX: [Physical functionality]

The **Cios Select** X-ray systems are compact, powerful mobile X-ray systems with flat detector and digital image processing.

The systems are equipped with a footswitch and a hand switch for triggering exposure.

The following modes of operation are available in **Cios Select** for the broad scope of applications: Single image radiography (Single Image), fluoroscopy (Fluoro), subtraction (Sub) and roadmap (Road).

1.1.6 Conditions of use

TOPIC INFO

INDEX: [Conditions of use]

The digital **Cios Select** X-ray systems are mobile systems designed for use in the ER, OR, and in radiology and endoscopy departments of hospitals, clinics, and outpatient practices. The applicable country-specific requirements must be observed when using the system.

Minimum requirements concerning hardware

The image system of **Cios Select** is being delivered, installed, and connected to the IT environment as a complete and functioning system by our service organization.

Maintenance, cleaning and disinfection, service

(→ Page 241 *Maintenance*).

1.1.7 Essential performance characteristics

(→ Page 259 *Technical information*).

1.1.8 Frequently used operating functions

- System On/Off
- Patient registration
- Selecting the operating mode
- Acquiring X-ray images
- Processing X-ray images (Postprocessing/Adding comments)
- Saving/archiving studies locally or to a PACS

1.1.9 Operating functions regarding safety

- Emergency stop function (Emergency stop switch)
- Radiation protection (Collimator function)
- Moving the C-arm

1 Introduction

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Information class: clinical

Information_about_this_Operator_Manual

1.2 Information about this Operator Manual

1.2.1 Names and parameters

TOPIC INFO

INDEX: [Names]

INDEX: [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 by your system are definite.

1.2.2 Trademarks

Transliner® is a registered trademark of Siemens AG.

Microsoft and Adobe Acrobat are registered trademarks, and Windows is a trademark of Microsoft Corporation.

Oracle and Java are trademarks or registered trademarks of Oracle America, Inc.

All other product or company names mentioned in this document are trademarks or registered trademarks of their respective owners and are used only for purposes of identification or description.

1.2.3 Values

TOPIC INFO

INDEX: [Values]

All numbers specified are typical values unless specific tolerances are indicated.

1.2.4 Layout conventions

The Operator Manual has several registers. A detailed table of contents listing all chapters contained in the manual is provided at the beginning.

Certain sections of text are marked with symbols to help you quickly identify the information content of the text.

See (→ Page 4 *Legend*).

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Information class: clinical

General_safety_information

2.1 General safety information

TOPIC INFO

INDEX: [Safety information]

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Information class: clinical

Laws_and_regulations

2.1.1 Laws and regulations

TOPIC INFO

INDEX: [Laws]

INDEX: [Regulations]

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

OTHER: 3rd edition

Regulations required by law and the radiation protection regulations must be observed in all countries. Deviating from this Operator Manual, values may be set according to country-specific regulations.

The product bears a CE mark in accordance with the provisions of Directive93/42/EEC dated June 14, 1993 on medical devices as well as Directive 2011/65/EU dated June 8 2011 on the restricted use of certain hazardous substances in electrical and electronic devices.

Data related to individual persons are subject to data protection. Please comply with the applicable legal regulations.

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.

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Information class: clinical

Range_of_application

2.1.2 Range of application

This Operator Manual is valid for the following product:

- Cios Select

This Operator Manual is valid for the following system software versions:

- Software Full Version: VA21A and higher
- Software Release Version: VA21

2 Safety

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Information class: clinical

Using_the_system

2.1.3 Using the system

ee380204783419a7c0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_docUser_intended_use

hazard-key: hm_docUser_intended_use

⚠ CAUTION

Improper use of the system beyond its intended use.

Risk to the patient and user!

- ◆ The system may only be used as defined by its intended use for clinical applications.

4fe6538b78343487c0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_um_TrainedUsersOnly_s1

hazard-key: hm_um_TrainedUsersOnly_s1

⚠ CAUTION

System operation by untrained users.

Risk of improper operation due to misinterpretation of image information.

- ◆ Only persons with the required knowledge and expertise who have undergone the appropriate user training may work with the system.

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HZ_XP_hm_docUser_meaning_audio_signals

hazard-key: hm_docUser_meaning_audio_signals

⚠ CAUTION

Occurrence of audible signals.

Hazards possible, for example due to crushing risks, extended radiation release, and high dose rate.

- ◆ Please note that continued system operation may lead to one of these hazards.
- ◆ Use the system with extreme caution to avoid these hazards.

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Serious_incident_MDR_

Information class: clinical

2.1.4 Serious incident

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.

8ccb47e6f33071fac0a81e666dcf4dc5 / 3 / Draft
Information class: clinical

Software__MDR_

2.1.5 Software

TOPIC INFO

INDEX: [Software : safety]

The system and user software used in this product is protected by copyright.
The current software version is displayed on screen during system start-up.

0363a150f331ea08c0a81e660454aac5 / 2 / For approval for release

HZ_XP_hm_um_NonapprovedSwHw__MDR_

hazard-key: hm_um_NonapprovedSwHw

WARNING

Use of unreleased or altered software or hardware components.

Risk of malfunction that could endanger the patient or product.

- ◆ Only use Siemens Healthineers-authorized software and hardware components.
- ◆ Only perform repairs, or have them performed by an authorized third party, after having received our express written approval.

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HZ_XP_hm_um_ImpermissibleSW

hazard-key: hm_um_ImpermissibleSW

CAUTION

Unauthorized or incorrect alterations/changes of the software or connection of the system to a network.

Risk of unauthorized access.

- ◆ Make sure that all necessary precautions are taken with regard to the applicable security level if a functionality is added or the configuration of the condition on delivery is changed.

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HZ_XP_hm_docUser_modification_imaging_system

hazard-key: hm_docUser_modification_imaging_system

CAUTION

Unauthorized changes or interventions in the imaging system.

No or improper function of the imaging system.

- ◆ Do not perform any changes or interventions of any type on the imaging system without the written consent of Siemens Healthineers (supplier). This includes replacing hardware or installing and running additional software.

2 Safety

The pre-installed security package provides protection against cyberattacks, 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.

In order to receive software updates, the system must be switched on and connected to the network on a regular basis. If the system is equipped with WLAN, the WLAN option must be activated.



We recommend switching on the Cios Select at least once per week and connecting it to the LAN (or WLAN if available) network for 3 hours.

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Information class: clinical

IT_security_measures__MDR_

2.1.6 IT security measures

Operating system

Cios Select is based on Windows 10 Enterprise 2016.

Cryptography usage

Cios Select utilizes cyphers and protocols for encryption of InstantLink connections.

Handling of sensitive data

The Cios Select components maintaining sensitive data (other than removable media) are physically secure, i.e. cannot be removed without tools.

Additionally, secured equipment disassembly at the end of the product lifecycle ensures secured and definite destruction of all sensitive data.

User account information

The system supports HIPAA (Health Insurance Portability and Accountability Act) regulation with role based privilege assignment and access control. The security option must be procured to enable user management on application level.

Patching strategy

Siemens performs vulnerability monitoring of the included third party components (including the operating system). Vulnerabilities are assessed regarding their criticality and safety relevance. In case of critical vulnerabilities the associated hotfixes are distributed within a system service pack.

Service packs can be either installed remotely or on site by the trained Siemens service technician - depending on the availability of the remote service infrastructure at the customer's site and on the impact of the service pack.

Cybersecurity advisories and bulletins for Siemens Healthineers equipment are issued by the Siemens Product CERT (Computer Emergency Response Team).

Data recovery

It is assumed that Personal Health Information (PHI) is archived to a PACS after patient scan was completed or images/reports are ready after post processing.

The system supports backup and restore of system configuration to an external drive.

Boundary defense

Built in firewall is used to minimize the network attack surface. For optimized protection of sensitive data and operation of the system it must be deployed in a secure network environment, utilizing e.g. network segmentation, client access control and protection against access from public networks.

Boundary defenses in the hospital should be multilayered relying on firewalls, proxies, DMZ and network based IDS and IPS.

Malware protection

Microsoft Device Guard (Windows 10)

Controlled access based on the need to know

the system supports HIPAA standard with role based privilege assignment and access control. The security option must be procured to support this.

Authentication/authorization controls

The system security option provides the following controls:

- Role-based access control implemented via Windows Local Policy setting

Continuous vulnerability assessment and remediation

See (→ Page 18 *Patching strategy*)

Hardening

- Microsoft Device Guard protects against malware
- Microsoft Device Guard is also used to ensure installed software/update is manufacturer-authorized software or update
- Microsoft Firewall minimizes attack surface
- All accounts not required for the intended use of the **Cios Select** are disabled or deleted, for both users and applications
- All shared resources (e.g. file shares) not required for the intended use of the **Cios Select** are disabled
- All communication ports not required for the intended use of the **Cios Select** are closed/disabled (see Section Network Information)
- All services not required for the intended use for the **Cios Select** are deleted/ disabled (see Section Network Information)

2 Safety

- All 3rd party software as well as OS-included applications not required for the intended use of the **Cios Select** are deleted/disabled (see Section Software Bill of Materials)
- the system prohibits boot from removable media via password protected BIOS settings

Network controls

- Microsoft Firewall: Firewall rules are configured so that inbound connections from devices are restricted to minimize the attack surface
- Siemens recommends operating the system in a secured network environment, e.g. a separate network segmented or a VPN. Connection to the Internet is discouraged and may limit the liability of Siemens in case of incidents.
- In case of a denial of service (DoS) or malware attack, the system can be taken off the clinical network and operated offline. Exchange of clinical result would then require an active offline media (DICOM CDR or DVDR) function.

Physical protection

The **Cios Select** components maintaining sensitive data (other than removable media) are physically secure, i.e. cannot be removed without tools.

Data protection controls

- the system ensures integrity of stored data
- the system restricts health data transmission to configured DICOM nodes only
- PHI data is protected by role based access control. The security option must be procured to support this

Auditing/Logging

The system security option provides the auditing for the following events: login/logout

- Unsuccessful login attempt
- Creation/modification/deletion of patient and image data (including data received from the RIS)
- Start/end of image acquisition with timestamp
- Storage of images in a study
- Start/close of examination
- Sending of images (including destination, amount, mode, etc.)

With Siemens Remote Service

- Remote service activity

Remote connectivity

The following technical and organizational measures help minimize the risk of unauthorized access through remote services (SRS):

- Network separation, secured connection, and access control to protect customer network
- Multi-factor authentication procedure
- Country-specific authorization
- User on medical device controls access mode
- Optional: access log available to customers
- Optional: immediate email when access starts/stops

Incident response and management

See (→ Page 18 *Patching strategy*)

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Information class: clinical

Potential_equalization

2.1.7 Potential equalization

TOPIC INFO

INDEX: [Potential equalization]
INDEX: [Equalization]



Products for which equipotential bonding is required may only be operated in medical facilities where supplementary equipotential bonding has been installed and tested according to DIN VDE 0107/10.94 section 4 for Germany or the relevant country-specific regulations.

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Information class: clinical

Electromagnetic_compatibility__MDR_

2.1.8 Electromagnetic compatibility

TOPIC INFO

INDEX: [Electromagnetic interference]
INDEX: [Interference]

This medical device complies with the requirements of the applicable standard on electromagnetic compatibility (EMC).

See (→ Page 268 *Notes on electromagnetic compatibility (EMC)*)

[OptUnresolvedLink]Notes on electromagnetic compatibility (EMC) [CN][/OptUnresolvedLink]

Please be advised that other mobile electronic devices, e.g. cellular telephones, exceeding the established emissions limits in the EMC standard may disrupt the functions of your medical device.

2 Safety

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HZ_XP_hm_docUser_note_uncommon_system_behavior__MDR_

hazard-key: hm_docUser_note_uncommon_system_behavior

WARNING

Interference

Effect on electronic life-supporting device on patient

- ◆ When observing uncommon system behavior (performance characteristics) additional measures (adjustment, relocation) could be necessary.

426fa95e78338e88c0a81e664e3d56ba / 2 / Draft

Use_in_connection_with_high_frequency

Information class: clinical

2.1.9 Use in connection with high frequency

TOPIC INFO

INDEX: [High frequency]

The following regulations for use must be observed:

- IEC/TR 1289-1/07.94/
High frequency surgical equipment - Part 1: Operation
- IEC/TR 1289-2/08.94/
High frequency surgical equipment - Part 2: Maintenance

6abfcf31be75ac9ec0a81e6630416d16 / 1 / For approval for release

Maintenance_and_inspection_FD

Information class: clinical

2.1.10 Maintenance and inspection

TOPIC INFO

INDEX: [Maintenance]

INDEX: [Inspection]

Before using the equipment for examination, the user must ascertain that all safety-relevant devices function properly and that the system is ready for operation.

Wear and tear

The system is subject to mechanical and electrical wear and tear. In the interest of the safety of patients, operating personnel and third persons, maintenance and safety checks must be carried out every 24 months to maintain the operational safety and reliability of the product.

0833c65f78343217c0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_um_RegularMaintenance

hazard-key: hm_um_RegularMaintenance

CAUTION

Wear and tear.

**Risk of injury to the patient, operating personnel, and other persons.
Permanent damage to the system.**

- ◆ Follow the maintenance guidelines to maintain the safety and functionality of the system.

Please observe the relevant information in (→ Page 242 *Functional and safety checks*).

Image quality

Maintenance should include checking the image quality. Maintenance at regular intervals is recommended to always ensure best image quality.



To ensure optimal image quality, have the following functions checked in particular as part of regular maintenance:

Pixel shift, image rotation, noise reduction, edge enhancement, subtraction, roadmapping, noise filter.

Calibration

Maintenance should include checking the flat detector calibration.



Please contact Siemens Healthineers Customer Service for flat detector calibration.

8adf5688783424dec0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_docUser_note_run_regular_calibrations

hazard-key: hm_docUser_note_run_regular_calibrations

CAUTION

Geometric calibration adjusted incorrectly.

Risk of incorrect evaluation.

- ◆ Perform calibrations on a regular basis.

Performing maintenance

Maintenance work should be performed by trained technical personnel only. If you do not have a maintenance contract, please contact Siemens Healthineers Customer Service.

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

2 Safety

73dc8e8ebe75505cc0a81e6630416d16 / 1 / Draft
Information class: clinical

Acceptance_and_performance_testing__MDR_

Acceptance and performance testing, acceptance criteria

During system installation and after major modifications an acceptance test is carried out by qualified and authorized engineers. The corresponding acceptance criteria and test results are documented in a protocol on site.

30529a6778338777c0a81e664e3d56ba / 2 / For approval for release
Information class: clinical

Malfunctions

2.1.11 Malfunctions

TOPIC INFO

INDEX: [Malfunctions]

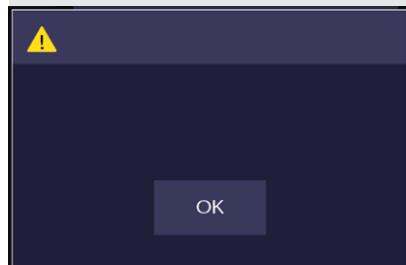
In the event of malfunctions of the Cios Select system, please call Siemens Healthineers Customer Service.

907aa09ae2a2fac2c0a81e660eca93e0 / 1 / For approval for release
Information class: clinical

Error_messages_at_the_C_arm_system_FD

Error messages at the C-arm system

When a malfunction is detected, the Cios Select system is disabled. The problem is shown as an error on all control units.



A message window with additional explanations is also displayed on the left monitor (→ Page 24 *System messages on the monitor*).

30408b8ada8963d3c0a81e6621198cd8 / 2 / For approval for release
Information class: clinical

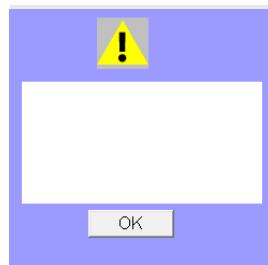
System_messages_on_the_monitor

System messages on the monitor

On the left monitor (upper left), three different types of system messages can appear. The type of message is identified by a corresponding symbol (top).

Error message:



Warning:**Information:**

3c6e27e2da89b588c0a81e6649a13d21 / 2 / For approval for release
Information class: clinical

Handling_error_messages

Handling error messages

- ✓ An error message window is displayed.

Acknowledging error messages

- 1 Please read the error messages carefully. Use the scroll bars to display error messages outside the area currently displayed.
- 2 Acknowledge the error message by clicking **OK** or pressing the footswitch or hand switch.



If you cannot continue with the normal examination mode, contact Siemens Healthineers Customer Service.

Repeatedly occurring errors

If errors occur repeatedly, switch off the Cios Select and notify Customer Service. Save the log file with the logged system activities beforehand:

- 1 Right-click this icon on the lower left of the left monitor.
- 2 In the dialog box, select the storage destination (USB and/or local storage for analysis via remote diagnostics) and confirm with **OK**.
- 3 Additionally, write down the following information:
 - Error number and time when error occurred.
 - Operating mode selected.
 - Was radiation activated when the error occurred?
 - Is the error related to an operating process?
- 4 In the case of a malfunction or failure of the radiation indicator, please notify Siemens Healthineers Customer Service.



2 Safety

7649f72478338719c0a81e664e3d56ba / 2 / For approval for release
Information class: clinical

Malfunction_of_electrical_systems

2.1.12 Malfunction of electrical systems

TOPIC INFO

INDEX: [Malfunction : of electrical systems]
INDEX: [Electrical systems : malfunction]

In case of risks for patients and operators (e.g. if there is no live image on the monitor and the radiation indicator is on despite this) or in case of risks for the device, you must disconnect the power plug immediately. Cios Select is completely shut down and disconnected from line power. This

- switches off radiation.
- aborts the current system program.
- aborts and cancels current operating sequences.
- deletes all image information not saved to a hard disk.

2bc07470783433ebc0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_um_SwitchOff

hazard-key: hm_um_SwitchOff



CAUTION

Technical error.

Unintentional radiation release.

- ◆ If the unintentional radiation release cannot be ended with the EMERGENCY STOP button, press the off switch to shut down the entire system.

Only after the cause of the hazard has been clearly identified and remedied may the system be reconnected to the power supply. In all other cases, e.g. system malfunction, contact Siemens Healthineers Customer Service immediately.

3a0450c878341a43c0a81e66032f7db4 / 2 / For approval for release

HZ_XP_hm_docUser_LED_fails

hazard-key: hm_docUser_LED_fails



CAUTION

Failure of LED indicators.

Treatment not possible.

- ◆ Perform the daily function check of the LED indicators before beginning treatment.
- ◆ If an LED indicator fails, contact Siemens Healthineers Customer Service.

ef6653a9b0555e9cc0a81e6639ad4aaf / 1 / Draft
Information class: clinical

System_failure__MDR_

System failure

TOPIC INFO

INDEX: [System failure]
INDEX: [Failure]

The user must have a replacement unit available if a system failure could predictably cause a critical situation resulting in patient injury during a medical examination.

64fdca51b0545da2c0a81e667ddb64a3 / 1 / Draft

HZ_XP_hm_docUser_backup_system__MDR_

hazard-key: hm_docUser_backup_system

WARNING

System component failure during cardiac/vascular procedure.

Risk of injury to the patient!

- ◆ Prepare a reserve system during cardiac/vascular applications.

bbde011978342e21c0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_um_EmergencyProcedure_s1

hazard-key: hm_um_EmergencyProcedure_s1

CAUTION

Due to the complexity of the system or if the line voltage is outside of the designated specification, the loss of X-ray imaging or other system functions during an examination cannot be entirely excluded.

Imaging is delayed or not possible at all, resulting in suboptimal treatment.

- ◆ For this reason, establishing emergency procedures for such cases should be considered.

9b1c878b78338cc4c0a81e664e3d56ba / 2 / Draft
Information class: clinical

Switching_to_emergency_power_supply

Switching to emergency power supply

TOPIC INFO

INDEX: [Emergency power supply : switching to]

In the event of a power interruption of longer than 10 ms, the Cios Select switches off. In this case the Cios Select must be switched on again after the system has switched over to the emergency power supply.

In case of a power failure, a signal sounds (up to 10 min.) when the system switches to the uninterruptible power supply (UPS).

2 Safety

dda75d0778337fe8c0a81e664e3d56ba / 1 / For approval for release
Information class: clinical

Disconnecting_the_power_plug

Disconnecting the power plug

TOPIC INFO

INDEX: [Disconnecting : the power plug]
INDEX: [Power plug : disconnecting]

After the power plug is disconnected, the uninterruptible power supply (UPS) supplies voltage to the imaging system and the left-hand monitor until the Cios Select switches off completely.

When the power plug is pulled out, switching to the uninterruptible power supply causes an acoustic signal to sound. The UPS switches off after maximum 10 min.

3dd5ba5778343571c0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_um_UPS

hazard-key: hm_um_UPS



CAUTION

Unsuitable devices connected to the UPS.

Risk of electrical shock or damage to the system.

- ◆ Do not attach additional devices to the UPS sockets.

86ff261678341a91c0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_docUser_lifetiem_UPS

hazard-key: hm_docUser_lifetiem_UPS



CAUTION

Charge capacity exhausted.

Diagnosis delayed or not possible.

- ◆ Please remember that the UPS battery life is limited.

826e4091783381adc0a81e664e3d56ba / 1 / For approval for release
Information class: clinical

EMERGENCY_STOP

2.1.13 EMERGENCY STOP

TOPIC INFO

INDEX: [EMERGENCY STOP]
INDEX: [STOP]

c1fbbee2bfd1c7cf0a53dbdb7cdb5cda / 1 / Draft
Information class: clinical

Press_the_Emergency_Stop_button_FD

Press the EMERGENCY STOP button

Immediately press the red EMERGENCY STOP button (arrow) on the C-arm system control unit at the first sign of a dangerous situation resulting from motorized movement.

- Motorized vertical lift and motorized orbital and angular movements are disabled immediately.
- The electromagnetic brakes are locked.
- Active radiation is terminated.
- All other system functions remain unaffected by this.

4dea7be078342befc0a81e66032f7db4 / 2 / For approval for release

HZ_XP_hm_um_CheckEmergencyStop_daily_s1

hazard-key: hm_um_CheckEmergencyStop_daily_s1

CAUTION

Manual or motorized movements.

Risk of crushing and collision for persons and objects in the vicinity of moving parts.

- ◆ Check the functionality of the EMERGENCY STOP button on a daily basis.

41dc623c78343091c0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_um_LocationEmergencyStop

hazard-key: hm_um_LocationEmergencyStop

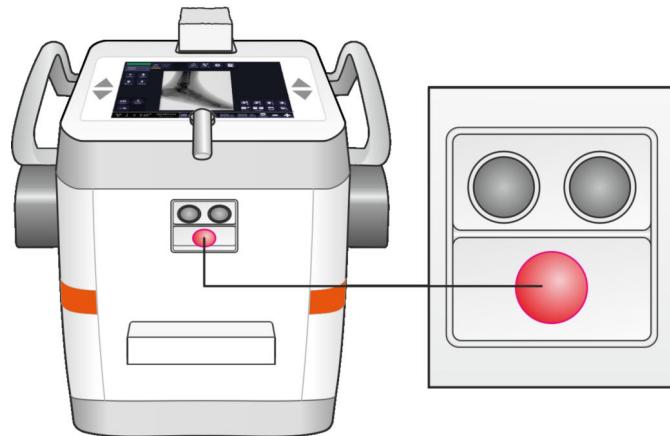
CAUTION

Position of EMERGENCY STOP buttons unknown.

Emergency STOP button will not be applied on time in case of an emergency!

- ◆ Familiarize yourself with the position of EMERGENCY STOP buttons.
- ◆ You will find EMERGENCY STOP buttons in the following locations (see the figure).

2 Safety



Emergency Stop button



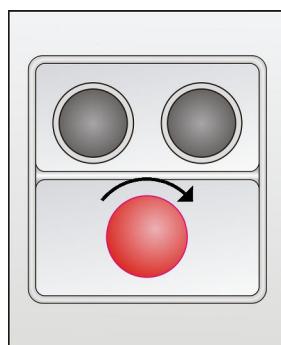
If during an examination an error occurs and radiation cannot be interrupted by releasing the trigger switch, press the EMERGENCY STOP button on the chassis of the C-arm system.

52974e5b78338e1bc0a81e6671622ad9 / 2 / Draft
Information class: clinical

Unlocking_the_EMERGENCY_STOP_switch

Unlocking the EMERGENCY STOP button

Unlock the button only after the danger has clearly been eliminated.



- ◆ To unlock the button, gently turn it clockwise so that it pops back out.

724ceda278338390c0a81e664e3d56ba / 1 / For approval for release
Information class: clinical

Fire_protection

2.1.14 Fire protection

TOPIC INFO
INDEX: [Fire protection]

a415e46278342fa7c0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_um_HintsForFire

hazard-key: hm_um_HintsForFire

CAUTION

Fire in or near the system.

Injury to patient and personnel, and damage to device. Risk of gas poisoning due to burning plastic.

- ◆ In case of fire switch off the system.
- ◆ Be aware of and inform patients of escape routes.
- ◆ Be aware of where fire extinguishers are located and know how to use them.

Please inform our Customer Service prior to starting up the Cios Select again if repair work has to be performed due to the fire.

fe65315178338333c0a81e664e3d56ba / 1 / For approval for release
Information class: clinical

Explosion_protection

2.1.15 Explosion protection

TOPIC INFO

INDEX: [Explosion protection]

7bb84af0783430efc0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_um_NoAPClassification

hazard-key: hm_um_NoAPClassification

CAUTION

The system is not designed for operation in areas where there is an explosion hazard. The system does not meet the requirements for AP/APG classification.

Explosion hazard!

- ◆ The system may not be used in locations where explosive atmospheres may occur.

9ff5b8467833893bc0a81e664e3d56ba / 2 / For approval for release
Information class: clinical

Overload_protection

2.1.16 Overload protection

TOPIC INFO

INDEX: [Overload protection]

Prolonged continuous radiation at maximum tube load is permissible in fluoroscopy mode. However, this can cause the X-ray tube assembly and C-arm to heat up. For this reason, the X-ray tube assembly and C-arm have a thermal monitor. If the X-ray tube assembly is too warm, there may be a reduction in pulse rate if necessary in all operating modes beginning with the next scene. A corresponding message will be displayed.

2 Safety

323bd2897834277cc0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_docUser_passed_contact_temperature

hazard-key: hm_docUser_passed_contact_temperature



CAUTION

Increased temperature due to extended use.

Risk of burns!

- ◆ Permitted short-term contact temperature is passed, when the switch of temperature of the monobloc activated.

80e0279b783434d5c0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_um_tube_hot

hazard-key: hm_um_tube_hot



CAUTION

Under extreme operating conditions (continuous operation), the X-ray tube can become very hot.

Risk of burns!

- ◆ Avoid touching the X-ray tube housing.



A constant X-ray tube load can lead to temperature-related cutoff of the radiation. Please make sure that the system has cooled down before performing critical interventional applications. It is also recommended to keep a second unit ready in case of continuous irradiation lasting longer than 30 min.

In the rare event image display is delayed due to high system utilization, radiation is automatically turned off. To continue treatment, radiation release has to be actuated again.



If the Radiography mode is misused on purpose by the operator for real-time imaging, the image display delay may be longer than in Radioscopy.

56a7cdba78338999c0a81e664e3d56ba / 1 / For approval for release
Information class: clinical

Personal_safety

2.2 Personal safety

TOPIC INFO

INDEX: [Personal safety]

INDEX: [Safety : personal]

83e439957833888fc0a81e664e3d56ba / 1 / For approval for release
Information class: clinical

Open_heart_and_skull_examinations

2.2.1 Open heart and skull examinations

TOPIC INFO

INDEX: [Open heart examinations]
INDEX: [Skull examinations]

If an approved system is used alone or with other equipment for open heart or open skull examinations, a conductive connection must be made between the system and a potential equalization point, e.g. the tabletop.

(→ Page 71 *Establishing the equipotential bonding connection*)

Only then can the patient be connected to the system.

6bd25e0df2e05e5cc0a81e664c1224cc / 1 / Draft
Information class: clinical

Crushing_hazards_on_the_C_arm_system_FD__MDR_

2.2.2 Crushing hazards on the C-arm system

TOPIC INFO

INDEX: [Crushing hazards : on the C-arm system]
INDEX: [C-arm system : crushing hazards]

Correct handling of the C-arm system requires that operating personnel and patients use only the grips provided for this purpose. Where this is not possible, monitor the points of potential crush injury between movable system parts and their guide openings.

7be9de8a7834168cc0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_docUser_clearance_of_system

hazard-key: hm_docUser_clearance_of_system

⚠ CAUTION

The distance between the patient or other persons and the system is too small.

Risk of crushing!

- ◆ Use the system only if the patient and other persons can be observed during movements.

c2d6b615f2deecd2c0a81e661dff9058 / 1 / Draft

HZ_XP_hm_um_danger_zones_s1_MDR_

hazard-key: hm_um_danger_zones_s1

⚠ WARNING

The points marked on the figure indicate hazardous locations around the system.

Risk of injury to the patient and personnel due to crushing or collision.

- ◆ Be careful around the hazardous locations indicated.

2 Safety

27ba7b1b78342329c0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_docUser_note_point_of_crushing

hazard-key: hm_docUser_note_point_of_crushing

⚠ CAUTION

The distance between the handles and other components is too small.

Risk of crushing!

- ◆ Be careful around the hazardous locations indicated.

e9407ab97834339dc0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_um_SqueezingZones

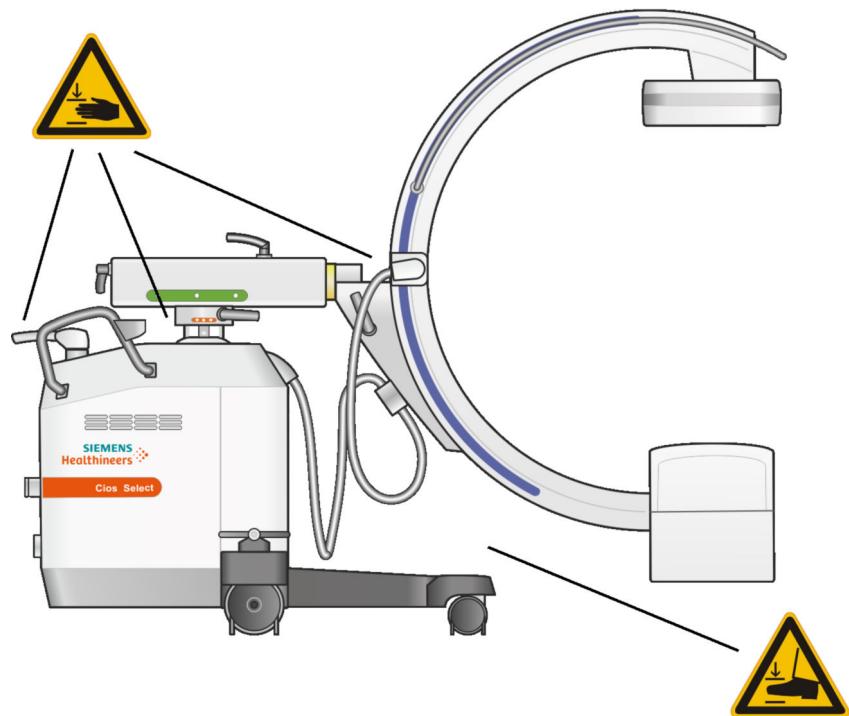
hazard-key: hm_um_SqueezingZones

⚠ CAUTION

Movements of the C-arm during patient positioning.

Crushing hazard for the patient!

- ◆ Be careful around the hazardous locations indicated.



Hazardous locations during C-arm movements

4361789478338832c0a81e664e3d56ba / 1 / For approval for release
Information class: clinical

Mechanical_damage

2.2.3 Mechanical damage

TOPIC INFO

INDEX: [Mechanical damage]

To avoid injury to the patient, operating personnel or third parties, mechanical damage to the system must be repaired by authorized service personnel.

50aae96e78338bab0a81e664e3d56ba / 2 / For approval for release
Information class: clinical

Radiation_protection

2.2.4 Radiation protection

TOPIC INFO

INDEX: [Radiation protection]

The unit is intended for procedures that may involve high skin doses when it is used as intended (mainly due to the long examination times), which presents a risk of radiation injury.

The unit is emitting X-ray with the effect of ionization radiation, and the intensity and distribution can refer to ([→ Page 264 Dosimetric information](#)).

Therefore observe the following important notes in order to keep the dose absorbed by the patient as low as possible.

For the patient

- Keep the radiation field as small as possible without reducing the active measuring field.
- If possible, ensure the best possible protection of the patient during fluoroscopy and acquisitions in the vicinity of his or her reproductive organs (use gonadal shields, ovarian shields and lead rubber covers).
- Remove all radiopaque parts from the fluoroscopy field or field of view, if possible.
- Set the voltage of the X-ray tube as high as necessary (note the image quality, however).

For the operating personnel

- Wear protective clothing in the control area during an examination: Depending on the application involved, the use of lead vests, lead jackets, X-ray protection goggles, sternum protection and protective gloves is recommended.

For patients and operating personnel

- Keep the fluoroscopic time as short as possible.
- Set the tube-skin distance as high as can be justified for the respective examination.

2 Safety

71889b3578342e7fc0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_um_EmergencyStopInterruptsXray

hazard-key: hm_um_EmergencyStopInterruptsXray



CAUTION

Because of a technical error the acquisition is not stopped or there is an unintended release of radiation.

Risk of unnecessary radiation exposure!

- ◆ In the event of unwanted radiation, press the nearest EMERGENCY STOP button.

5e0be9a178342403c0a81e66032f7db4 / 2 / For approval for release

HZ_XP_hm_docUser_note_radiation_indicator_failed

hazard-key: hm_docUser_note_radiation_indicator_failed



CAUTION

Failure of radiation indicator.

Danger of unintended radiation!

- ◆ If a radiation indicator fails contact Siemens Healthineers Customer Service.

abbd5ae4783415fffc0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_docUser_additional_objects_beam_path

hazard-key: hm_docUser_additional_objects_beam_path



CAUTION

Additional objects in the beam path.

Risk of injury!

- ◆ Note that additional objects in the beam path increase scatter radiation.

a7eb811d3d4f5d97c0a81e6679c412ed / 1 / For approval for release

HZ_XP_hm_docUser_release_x-ray_close_to_patient

hazard-key: hm_docUser_release_x-ray_close_to_patient



CAUTION

X-ray release may be possible from remote location.

Unnecessary dose!

- ◆ Do not release X-ray mistakenly if not in viewing distance to the patient.



Please be aware that certain materials in the X-ray beam (e.g. parts of an operating table) may impair the X-ray image due to imaging of contours and inclusions in these materials. In certain rare cases, this may lead to incorrect diagnosis. This material may also result in higher radiation exposure.



Cios Select contains no patient positioning aids. Therefore, undertable radiation protection options are not included in the scope of supply. For example, overhanging lead rubber mats can be used to protect against scattered radiation underneath the patient table.

f3240e5a78337f2dc0a81e664e3d56ba / 1 / For approval for release
Information class: clinical

Deterministic_radiation_effect

Deterministic radiation effect

TOPIC INFO

INDEX: [Deterministic radiation effect]
INDEX: [Radiation effect]

As per IEC 60601-1-3, 5.2.4.5 (A.2), deterministic radiation injury is possible if a radiation dose delivered to an organ or tissue exceeds a value of 1 to 3 grays.

With typical applications and proper use of the C-arm, there is no reason to expect such radiation injuries. It is assumed that the maximum fluoroscopic time will not exceed 20 minutes, depending on the application, and that the point of skin penetration will be 30 cm (50 cm maximum) away from the detector input.

Example: An accumulated fluoroscopic time of 20 minutes and a skin penetration dose of 20 mGy/min yields a dose of 400 mGy.

In the medical disciplines of vascular and cardiac surgery in particular, several applications require a significantly higher radiation time of up to 60 minutes.

Example: When treating an abdominal aortic aneurysm (AAA) with the Endovascular Aortic Repair (EVAR) procedure, the administered radiation dose can exceed 1 Gy. The average radiation dose when using this method is usually less than 500 mGy.

For procedures with a longer than expected radiation time, we recommend varying the beam direction (oblique beam through orbital and/or angular rotation) during the course of the procedure. In addition, the system reports the beam duration that has already been applied (regardless of applied dose).

The skin penetration dose for various operating modes and under standard operating conditions can be estimated using the "Dosimetric information" table ([→ Page 264 Dosimetric information](#)).



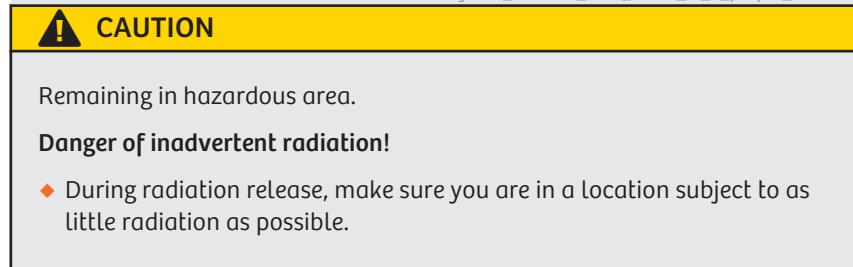
When changing the distance from the skin penetration point to the focus, please note that the skin dose decreases with the inverse square of the distance to the focus. This means that when the distance to the focus is halved, the skin penetration dose rate quadruples.

2 Safety

a1bc7bfb7834252cc0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_docUser_note_stand_in_a_proper_location

hazard-key: hm_docUser_note_stand_in_a_proper_location



42dc692ae2b4381ac0a81e660c7b937e / 2 / Draft
Information class: clinical

Location_and_size_of_the_relevant_operating_areas_FD

Location and size of the relevant operating areas

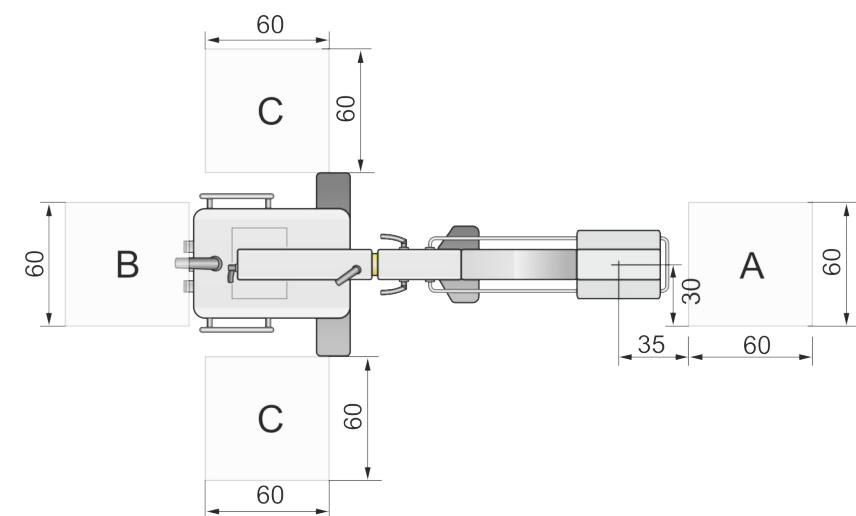
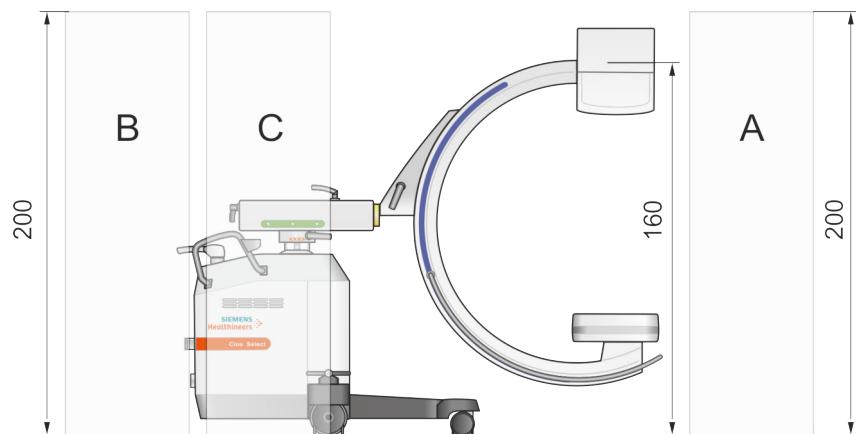
TOPIC INFO

INDEX: [Operating areas : location and size]

All examination types may be performed in the illustrated operating area of the X-ray system.

X-ray tube assembly at the top (dimensions in cm)

Vertical beam path: Focus 160 cm above ground



Maximum scatter radiation in operating area

TOPIC INFO

INDEX: [Scatter radiation : in operating area]

INDEX: [Operating areas : scatter radiation]

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

Height above the floor [cm]	Measurement A [mGy/h]	Measurement B [mGy/h]	Measurement C [mGy/h]
10	1.675	0.0988	0.6040
20	1.778	0.0805	0.6318
30	2.522	0.0587	0.6832
40	3.752	0.07	0.6757
50	5.102	0.0703	0.7612
60	6.633	0.0405	0.8137
70	8.44	0.0554	0.8447
80	9.839	0.1288	0.8337
90	9.875	0.1692	0.9508
100	9.801	0.2028	1.0120
110	12.78	0.2163	1.0320
120	13.40	0.2622	1.1520
130	11.03	0.2987	1.0790
140	8.952	0.3301	1.1060
150	8.313	0.3482	1.063
160	7.381	0.3682	0.9626
170	5.321	0.3776	0.9024
180	3.841	0.4321	0.8247
190	2.892	0.4351	0.8956
200	2.100	0.4493	0.9074

Tolerance of air kerma measurements \pm 5%

- Measurement A: Operating area A

Continuous fluoroscopy 110 kV, 5.3 mA, Continuous, 20.5 cm x 20.5 cm; C-arm vertical, X-ray tube assembly at the top, with scattered radiation grid

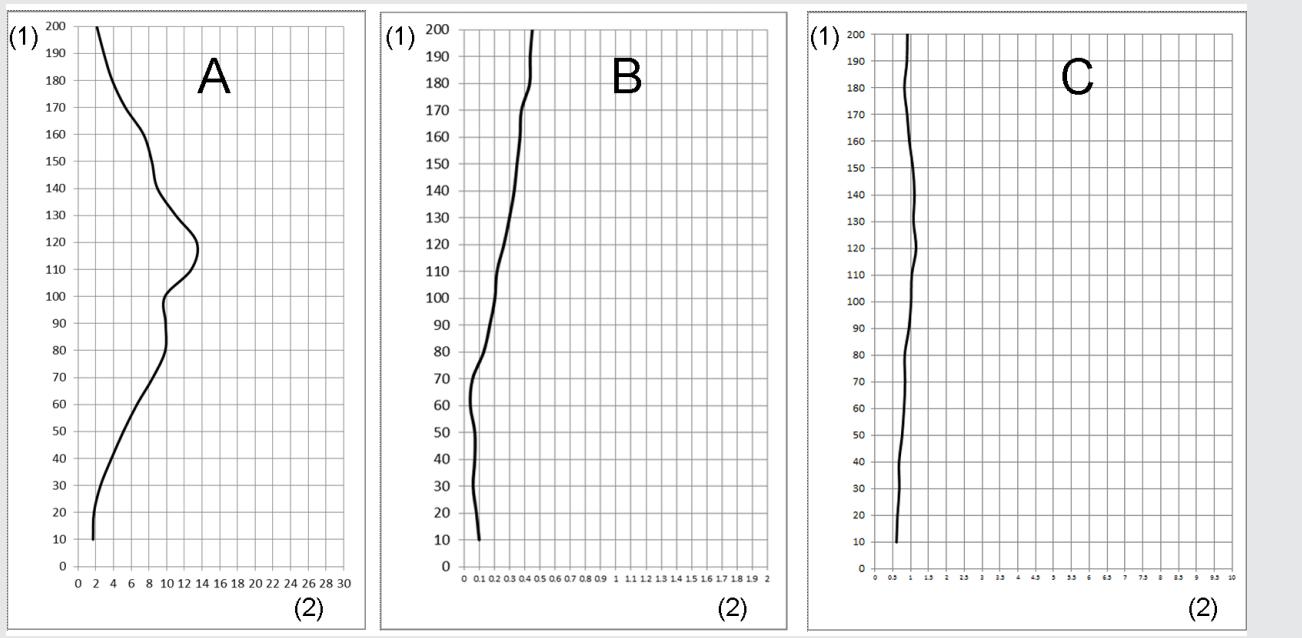
- Measurement B: Operating area B

Continuous fluoroscopy 110 kV, 5.3 mA, Continuous, 20.5 cm x 20.5 cm; C-arm vertical, X-ray tube assembly at the top, with scattered radiation grid

2 Safety

- Measurement C: Operating area C

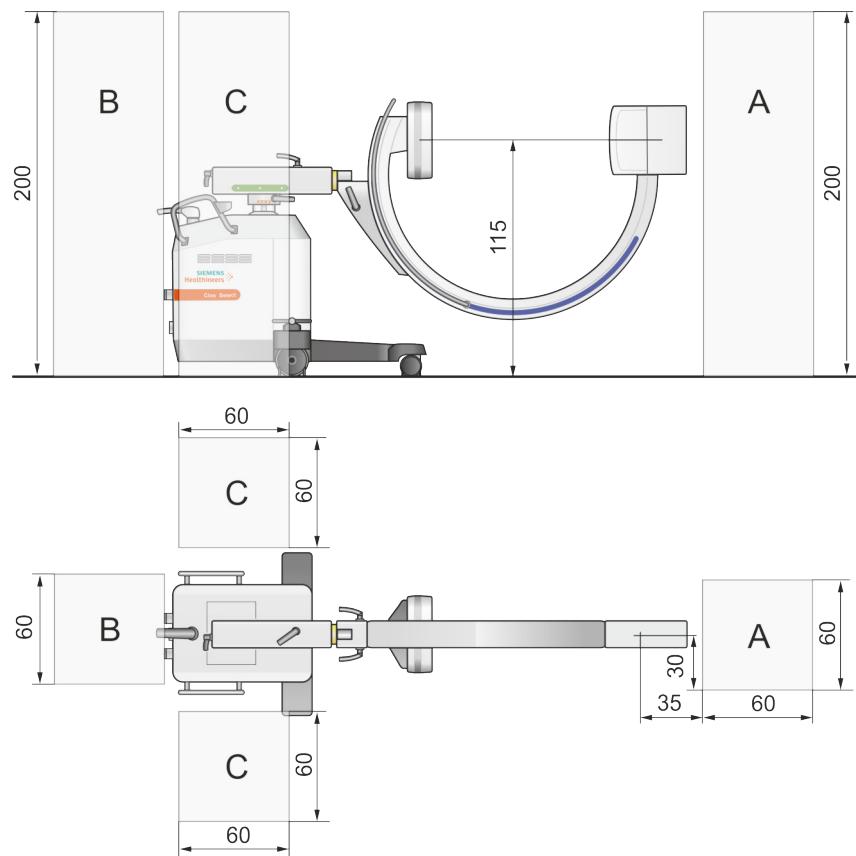
Continuous fluoroscopy 110 kV, 5.3 mA, Continuous, 20.5 cm x 20.5 cm; C-arm vertical, X-ray tube assembly at the top, with scattered radiation grid



Measurement A (left), measurement B (center), measurement C (right): Fluoroscopy 110 kV, 5.3 mA, Continuous, 20.5 cm x 20.5 cm

- (1) Height above the floor [cm]
- (2) Air kerma strength [mGy/h]

**X-ray tube assembly horizontal
(dimensions in cm)**



**Maximum scatter radiation in
operating area**

TOPIC INFO

INDEX: [Scatter radiation : in operating area]

INDEX: [Operating areas : scatter radiation]

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

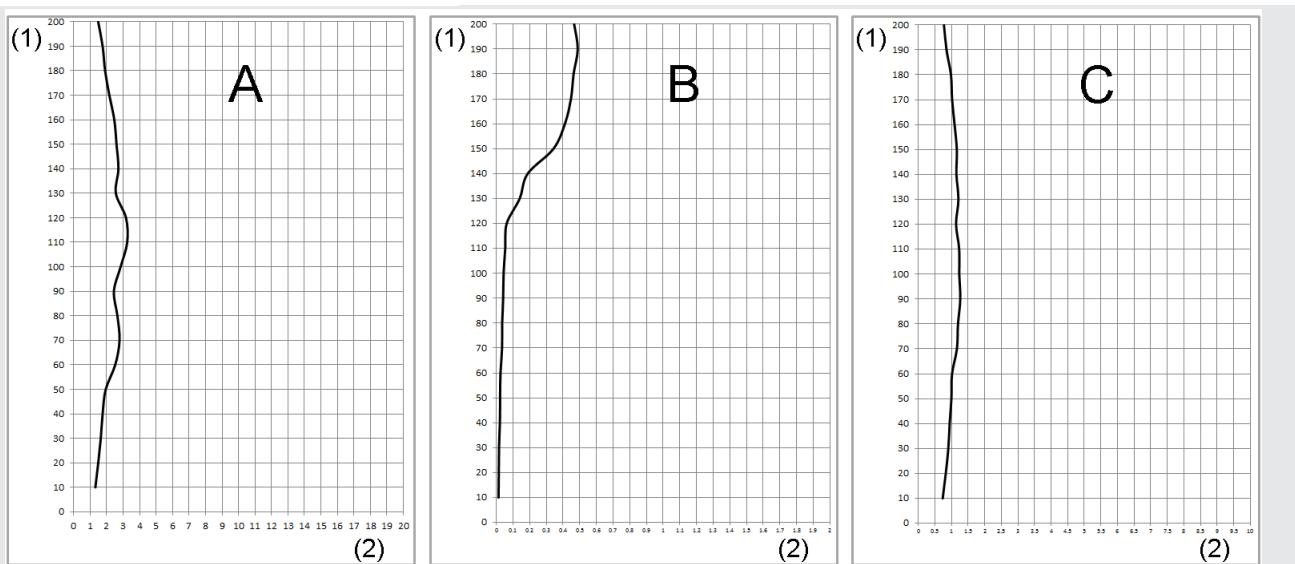
Height above the floor [cm]	Measurement A [mGy/h]	Measurement B [mGy/h]	Measurement C [mGy/h]
10	1.318	0.0130	0.7348
20	1.489	0.0145	0.8268
30	1.644	0.0158	0.9034
40	1.756	0.0211	0.9436
50	1.944	0.0224	0.9959
60	2.522	0.0246	1.016
70	2.782	0.0340	1.163
80	2.654	0.0350	1.195
90	2.439	0.0407	1.264
100	2.847	0.0432	1.234

2 Safety

Height above the floor [cm]	Measurement A [mGy/h]	Measurement B [mGy/h]	Measurement C [mGy/h]
110	3.248	0.0533	1.231
120	3.176	0.0619	1.137
130	2.560	0.1397	1.208
140	2.714	0.1876	1.148
150	2.598	0.3425	1.160
160	2.466	0.4108	1.092
170	2.163	0.4472	1.018
180	1.906	0.4627	0.9829
190	1.756	0.4876	0.8482
200	1.488	0.4662	0.7715

Tolerance of air kerma measurements $\pm 5\%$

- Measurement A: Operating area A
Continuous fluoroscopy 110 kV, 5.3 mA, Continuous, 20.5 cm x 20.5 cm; C-arm horizontal, detector at lateral 90° position, with scattered radiation grid
- Measurement B: Operating area B
Continuous fluoroscopy 110 kV, 5.3 mA, Continuous, 20.5 cm x 20.5 cm; C-arm horizontal, detector at lateral 90° position, with scattered radiation grid
- Measurement C: Operating area C
Continuous fluoroscopy 110 kV, 5.3 mA, Continuous, 20.5 cm x 20.5 cm; C-arm horizontal, detector at lateral 90° position, with scattered radiation grid



Measurement A (left), measurement B (center), measurement C (right): Fluoroscopy 110 kV, 5.3 mA, Continuous, 20.5 cm x 20.5 cm

- (1) Height above the floor [cm]
- (2) Air kerma strength [mGy/h]

b4575e2378338b0fc0a81e664e3d56ba / 1 / For approval for release
Information class: clinical

Radiation_interruption_for_all_operating_modes

Radiation interruption for all operating modes

TOPIC INFO

INDEX: [Radiation interruption]

The hand and footswitches are designed as pushbutton switches. Radiation is interrupted in fluoroscopy when releasing the corresponding operating element or, in other operating modes, after acquiring the stored image.

5ce5469ef369cf4dc0a81e6666352ea8 / 1 / Draft
Information class: clinical

Equipment_safety_FD__MDR_

2.3 Equipment safety

TOPIC INFO

INDEX: [Equipment safety]

INDEX: [Safety : equipment]

2 Safety

2.3.1 Mechanical safety

f38e19b778343439c0a81e66032f7db4 / 2 / For approval for release

HZ_XP_hm_um_system_defect

hazard-key: hm_um_system_defect

CAUTION

System component error.

An error on one system component can reduce the safety of the entire system.

- ◆ Terminate system operation.
- ◆ Contact Siemens Healthineers Customer Service.

6fade6d3e2b95037c0a81e66290de85c / 1 / For approval for release

HZ_XP_hm_um_detector_toxic_material_s1_FD

hazard-key: hm_um_detector_toxic_material_s1

CAUTION

Detector cover damaged.

Toxic contamination!

- ◆ If the detector is damaged, do not continue using it.
- ◆ Contact Siemens Healthineers Customer Service.

ac5b5ce0f372fdddc0a81e66748c4cb7 / 2 / Draft

HZ_XP_hm_docUser_note_mechanical_safeguard_effected__MDR_

hazard-key: hm_docUser_note_mechanical_safeguard_effected

WARNING

Spindle nut broken or worn.

Risk of crushing!

- ◆ Vertical lift is blocked if the mechanical safeguard was triggered. Contact Siemens Healthineers Customer Service to replace the mechanical safeguard.

7e7d1e0c783389f6c0a81e664e3d56ba / 1 / For approval for release

Positioning_the_C_arm

Information class: clinical

2.3.2 Positioning the C-arm

TOPIC INFO

INDEX: [C-arm : positioning safety]

In case of improper handling of the Cios Select, the mobility of the C-arm may lead to collisions of the detector and the single tank with the patient and the patient table.

Brakes

Make sure the brakes are applied after adjusting the C-arm position.

Transport

When moving or transporting the C-arm system please take special care that the system parts do not collide with an obstacle. This could also result in accidental radiation release or an impairment of image quality under certain circumstances.

[6d6f466878342367c0a81e66032f7db4 / 1 / For approval for release](#)

[H2_XP_hm_docUser_note_professional_repair_remains](#)

hazard-key: hm_docUser_note_professional_repair_remains

CAUTION

Transport damage.

Risk of injury!

- ◆ If repairs are not done by a professional, injuries to the user, patient or third parties and consequential product damage cannot be ruled out.

[9dee06f3783384d8c0a81e664e3d56ba / 2 / For approval for release](#)

[Installation_repair](#)

Information class: clinical

2.3.3 Installation, repair

TOPIC INFO

INDEX: [Installation]

INDEX: [Repair]

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

As the manufacturer, Siemens Healthineers cannot accept responsibility for the safety features and for the reliability and performance of the equipment if:

- The product is used in a manner other than that specified in the Operator Manual
- Installation, upgrades, readjustments, modifications or repairs are performed by personnel not contracted and authorized by Siemens Healthineers
- Components affecting safe operation of the product are not replaced by original spare parts in the event of a malfunction
- The electrical wiring in the room containing the system does not meet the specifications of DIN VDE 0107 or the corresponding local regulations

If desired, we will provide the technical documentation for the product. However, this does not imply authorization to undertake repairs.

We cannot be held responsible for repairs made without our express written approval.

When any work is performed on the product, we recommend that you obtain a certificate indicating the nature and scope of the work performed. The certificate should include any changes in rated parameters or operating ranges as well as the date, the name of the company and a signature.

2 Safety

e3bfec90783388edc0a81e664e3d56ba / 2 / For approval for release
Information class: clinical

Original_accessories

2.3.4 Original accessories

TOPIC INFO

INDEX: [Original accessories]
INDEX: [Accessories : original]

For safety reasons, only approved original accessories or non-Siemens Healthineers accessories approved by Siemens Healthineers may be used for this product.

The operator is liable for any risks associated with the use of accessories not approved by Siemens Healthineers.

4a46175178342ac7c0a81e66032f7db4 / 2 / For approval for release

HZ_XP_hm_um_Appropriate_Accessory

hazard-key: hm_um_Appropriate_Accessory



CAUTION

Inappropriate accessories.

The use of accessories that do not comply with the safety requirements of this equipment can reduce the safety of the entire system.

- ◆ Use only original Siemens Healthineers accessories or accessories approved by Siemens Healthineers.

61f5279b78337e72c0a81e664e3d56ba / 2 / For approval for release
Information class: clinical

Combination_with_other_systems

2.3.5 Combination with other systems

TOPIC INFO

INDEX: [Combination : with other systems]

To ensure the required safety, only products/components expressly approved by Siemens Healthineers may be used in combination with this system.



Please note that changes to the system may be carried out only with the express authorization of Siemens Healthineers.



Additional components placed into the beam path (e.g. positioning aids) will attenuate radiation and can degrade image quality.

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Information class: clinical

Attachment_of_dedicated_options

2.3.6 Attachment of dedicated options

The attachment of certain (dedicated) options is permitted only if the following conditions are met:

18836daff39941eec0a81e6632ed4dd / 2 / Draft
Information class: clinical

General_safety_requirements__MDR_

General safety requirements

The use of accessories that do not comply with the relevant safety requirements of this system can result in a reduced safety level of the combined system.

When choosing accessories, the following aspects must be considered in particular:

- Use of accessories close to the patient.
- Proof that the accessories have been safety tested according to the applicable IEC 60601-1 guideline and/or the IEC 60601-1-1 harmonized national standard.

ffd43ea8f2e95194c0a81e661d3d06d9 / 2 / Draft

HZ_XP_hm_docUser_note_weight_put_on_MDR_

hazard-key: hm_docUser_note_weight_put_on

 **WARNING**

Changing the overall center of gravity.

Risk of crushing!

- ◆ Only products/components approved by Siemens Healthineers may be installed.

e98a023fe2c4f97ac0a81e6612a8aa7b / 1 / For approval for release
Information class: clinical

Attenuation_equivalent_FD

Attenuation equivalent

TOPIC INFO

INDEX: [Attenuation equivalent]

According to IEC 60601-1-3, inadequate attenuation of the X-ray beam by materials between the patient and image receptor must be avoided.

Documented proof by the manufacturer is recommended.

Remove any auxiliary devices located in the beam path for calibration or adjustment of the dedicated options before operating the Cios Select.



Image quality can be impaired by placing materials directly in front of the flat detector, or the applied dose is increased by the automatic adjustment. Additional objects in the beam path may result in increased scattered radiation.

ef4c75d878338f34c0a81e664e3d56ba / 1 / For approval for release
Information class: clinical

Weight_counterbalance

Weight counterbalance

TOPIC INFO

INDEX: [Weight counterbalance]

2 Safety

6fd1352e7834223fc0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_docUser_note_loss_of_weight_balance

hazard-key: hm_docUser_note_loss_of_weight_balance



CAUTION

Changing the weight distribution

Risk of crushing!

- ◆ Adding weight to the detector or single tank side means a loss in counterweight and can result in unintended movement of the C-arm.

Users must be alerted to the loss of counterbalance by a warning label. The responsibility for affixing the corresponding warning label lies with the company that attaches the dedicated option to the C-arm.

69faf02b7833848ac0a81e664e3d56ba / 2 / For approval for release

Image_quality_1

Information class: clinical

Image quality

TOPIC INFO

INDEX: [Image quality]

The attachment of a dedicated option must not affect image quality (impairment of the follow-up).

After maintenance or service work, the correct function of the non-Siemens Healthineers system on the detector must be tested.

eecc1f43783380a3c0a81e664e3d56ba / 2 / For approval for release

Electrical_safety

Information class: clinical

Electrical safety

TOPIC INFO

INDEX: [Electrical safety]

EN 60601-1, Section 3, "Protection against electric shock hazard" must be complied with.

f316c58778341f23c0a81e66032f7db4 / 2 / For approval for release

HZ_XP_hm_docUser_note_connect_iec_approve

hazard-key: hm_docUser_note_connect_iec_approve



WARNING

Connecting the LAN socket on the trolley in operation room

Risk of electric shock!

- ◆ Only IT equipments/products approved by IEC 60950-1 or IEC 60601-1 can be used in connection with this system.

24b85968bf5132bcc0a81e6602a8bd7f / 2 / Draft
Information class: clinical

Electromagnetic_interference_1__MDR_

Electromagnetic compatibility

TOPIC INFO

INDEX: [Electromagnetic interference]
INDEX: [Interference]

EN 60601-1-2 must be observed in order to comply with the limit values for electromagnetic compatibility.

43396e5e783422dbc0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_docUser_note_minimum_distance

hazard-key: hm_docUser_note_minimum_distance

CAUTION

Interference

Effect on persons with implants.

- ◆ Maintain a minimum distance in accordance with IEC 60601-1-2. If this not possible, the WLAN-client is to be turned off.

1eeae3d7b02334e9c0a81e660c8ad00f / 1 / For approval for release

HZ_XP_hm_docUser_note_uncommon_system_behavior__MDR_

hazard-key: hm_docUser_note_uncommon_system_behavior

WARNING

Interference

Effect on electronic life-supporting device on patient

- ◆ When observing uncommon system behavior (performance characteristics) additional measures (adjustment, relocation) could be necessary.

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Information class: clinical

Additional_safety_information_FD

Additional safety information

- To avoid thermal overloading of components and short circuits, EN 60601-1 Section 7 and, if appropriate, UL 60601-1 must be complied with.
- Connecting external loads to the power supply of the C-arm system is not permitted.
- We recommend that users in the EU have the relevant manufacturer of the accessory operated by you confirm the CE Declaration of Conformity according to Appendix II, MDD (Directive 93/42/EEC dated June 14, 1993), Directive 2011/65/EU dated June 8, 2011 on the restricted use of certain hazardous substances in electrical and electronic devices, and the Declaration of Compatibility according to Article 12, MDD. In countries outside the EU the relevant national regulations must be observed.



The product liability and warranty are restricted or expire if the above listed conditions and limit values are not complied with when attaching accessories.



For non-Siemens Healthineers options we generally accept no liability.

Languages

TOPIC INFO

INDEX: [Languages]

Your system can be configured by the Siemens Healthineers Customer Service in one of the following languages:

Imaging system user interface:

- English
- German
- French
- Spanish
- Russian
- Chinese
- Japanese

Control panel:

- English
- German
- French
- Spanish
- Chinese
- Japanese

78bb6c657834318bc0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_um_PostProcessConfigLanguage

hazard-key: hm_um_PostProcessConfigLanguage



CAUTION

Incorrect image processing due to wrong configured system language.

Incorrect basis for diagnosis.

- ◆ Configure the system only in one of these languages.

347eb7d378338046c0a81e664e3d56ba / 2 / For approval for release
Information class: clinical

Disposal

2.3.7 Disposal

TOPIC INFO

INDEX: [Disposal]

- If you want to remove the product from service, take into consideration that public legal directives may contain special regulations regarding disposal of this equipment. In order to ensure that these legal regulations are complied with and to avoid potential environmental hazards which may be caused by the disposal of your system, please consult Siemens Healthineers Customer Service.
- Batteries and packaging material must be disposed of in an environmentally safe manner according to national regulations.
- The sterile single-use covers (Detector, C-arm) must be disposed of in accordance with national regulations or the rules of the hospital.
- For further information about the disposal of the product, please refer to our service documents.

a537be2c41ae2c3ec0a81e660c7387c9 / 1 / For approval for release
Information class: clinical

Product_service_life

2.3.8 Product service life

TOPIC INFO

INDEX: [Product service life]

Cios Select is 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 operating safety of these products. Please talk to us about these measures early enough!

2 Safety

3 System Description

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3 System Description

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5da438e6b593fa8dc0a81e66757870b0 / 1 / For approval for release
Information class: clinical

Device_Description

3.1 Device Description

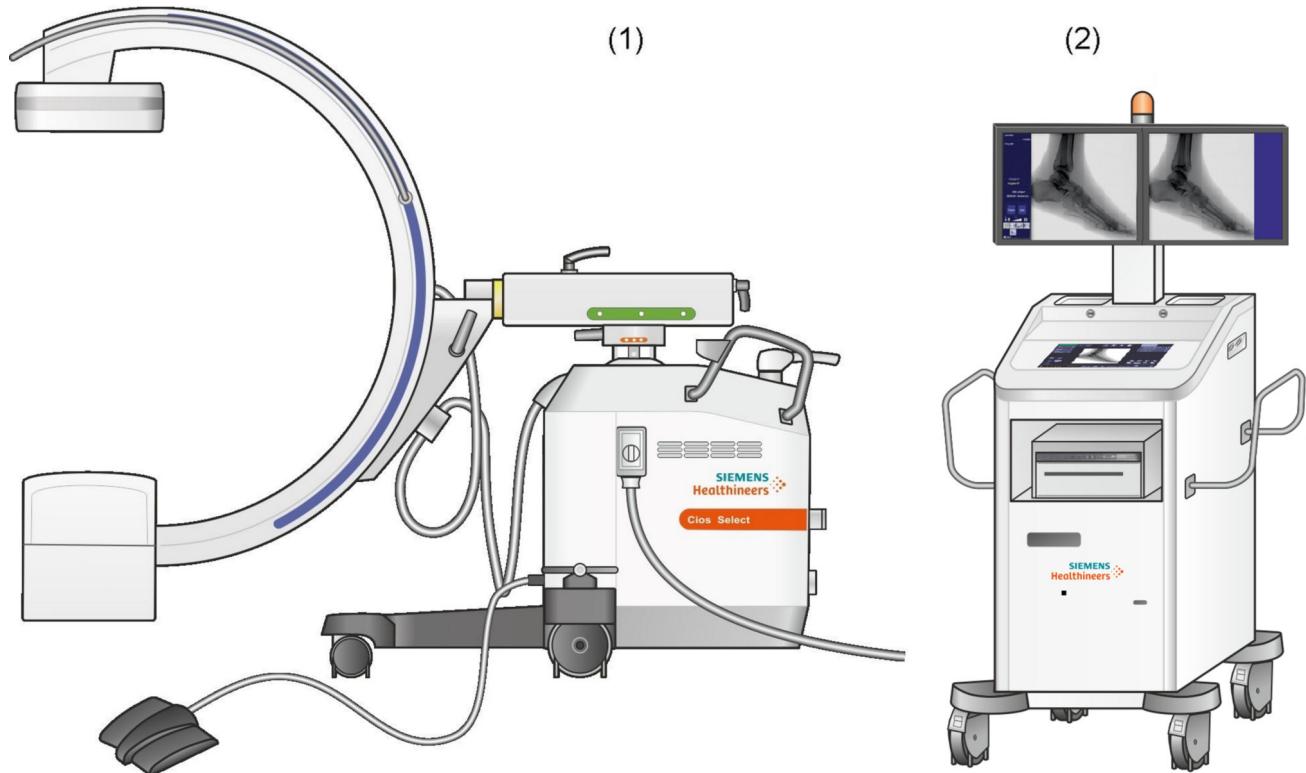
16fddc80e34e0c1bc0a81e6611724a68 / 2 / Draft
Information class: clinical

System_overview_FD

3.1.1 System overview

TOPIC INFO
INDEX: [System overview]

The Cios Select consists of a C-arm system and a monitor trolley.



- (1) C-arm system with flat detector and dual-focus stationary anode tube with generator
- (2) Monitor trolley with touch screen, mouse, USB port, two TFT displays, DVD drive and memory for 300,000 images

483b4edca4ccb99d0a53dbdb28d8728d / 1 / Draft
Information class: clinical

Standard_equipment_FD

Standard equipment

The following equipment is included in the basic configuration of the Cios Select:

3 System Description

- Monitor trolley**
- 2 TFT standard brightness displays
 - DVD recorder
 - Uninterruptible power supply (UPS)

- C-arm**
- 21x21 flat panel detector
 - Single tank with 2.3 kW

- Control elements**
- Control panel on the monitor trolley and C arm
 - Control unit on the C-arm system
 - Standard footswitch
 - Hand switch

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Information class: clinical

Options_FD

Options

TOPIC INFO
INDEX: [Options]

The following options are available for the **Cios Select**:

- Monitor trolley**
- 2 TFT high-brightness color displays (alternative to standard TFT color displays)
 - Wireless network connection (WLAN)
 - SONY thermal printer

Economical, light-weight, compact printer for singlecolor printing on thermal paper

- C-arm**
- Detector laser light localizer (Green)
 - Single-tank laser light localizer (Red)
 - Dose measurement chamber for dose area product/air kerma (valid for IEC 60601-1:2005 only)

- Control elements**
- Multifunctional footswitch, wireless (with extended functionality)

- Applications**
- Additional operating modes SUB/Road (Basic)
 - Radiation lock code
 - 2D measuring function (for measuring angles and distances)
 - Cios OpenApps*

* The Cios OpenApps is not commercially available in all countries. Their future availability cannot be guaranteed.

- Target Pointer
- Litho crosshair
- DICOM Worklist
- DICOM Send

- DICOM Print
- DICOM Query/Retrieve
- HIPAA (Health Insurance Portability and Accountability Act)

Interfaces • DVI video splitter (Monitors A and B)

- Accessories**
- Grounding cable
 - DHHS spacer
 - Sterile cover for the detector, single tank, and C-arm

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Information class: clinical

C_arm_system

3.1.2 C-arm system

TOPIC INFO

INDEX: [C-arm system]

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Information class: clinical

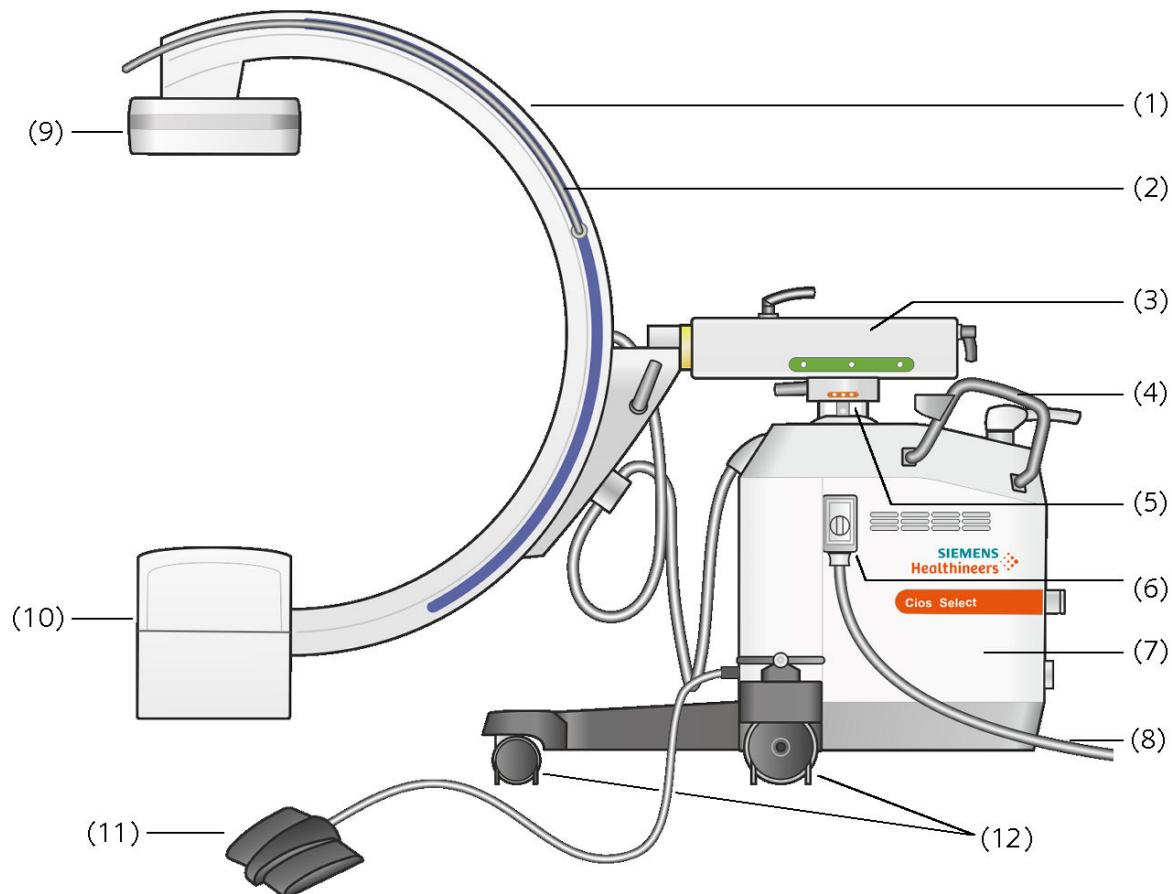
Overview_of_components_Carm_FD

Overview of components

TOPIC INFO

INDEX: [C-arm system]

3 System Description



- (1) C-arm
- (2) Handle for manual movement/positioning of the C-arm
- (3) Horizontal support arm
- (4) Handles on both sides with a hand switch holder, as well as a steering handle (center) for moving/transporting and braking the C-arm system
- (5) Lifting column
- (6) Central plug
- (7) Cios Select Electronics unit
- (8) Power cable
- (9) Single tank with X-ray tube unit and integrated collimator
- (10) Flat detector with anti-scatter grid
- (11) Wheels with cable deflectors
- (12) Footswitch (standard)

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Information class: clinical

Flat_detector_with_grid_FD

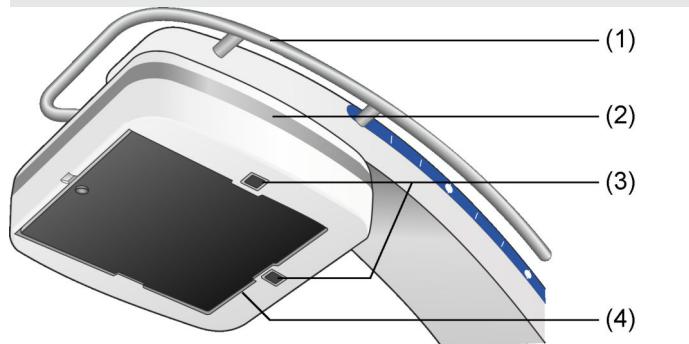
Flat detector with anti-scatter grid

TOPIC INFO

INDEX: [Flat detector]
INDEX: [FD]

Compared with the classic image intensifier, the flat detector has a much higher dynamic range. This enables an expansion of the application range, for example, to soft tissue imaging.

The anti-scatter grid attached to the flat detector further increases image quality.

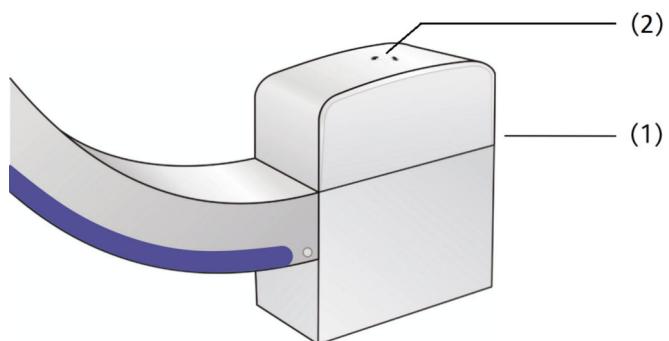


- (1) Handle for manual movement/positioning of the C-arm
- (2) Flat detector
- (3) Exit window for optional laser light localizer
- (4) Removable anti-scatter grid

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Information class: clinical

Single_tank_FD

Single tank



- (1) Integrated collimator system
- (2) Exit window for optional laser light localizer

3 System Description

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Information class: clinical

Monitor_trolley

3.1.3 Monitor trolley

TOPIC INFO

INDEX: [Monitor trolley]
INDEX: [Trolley]

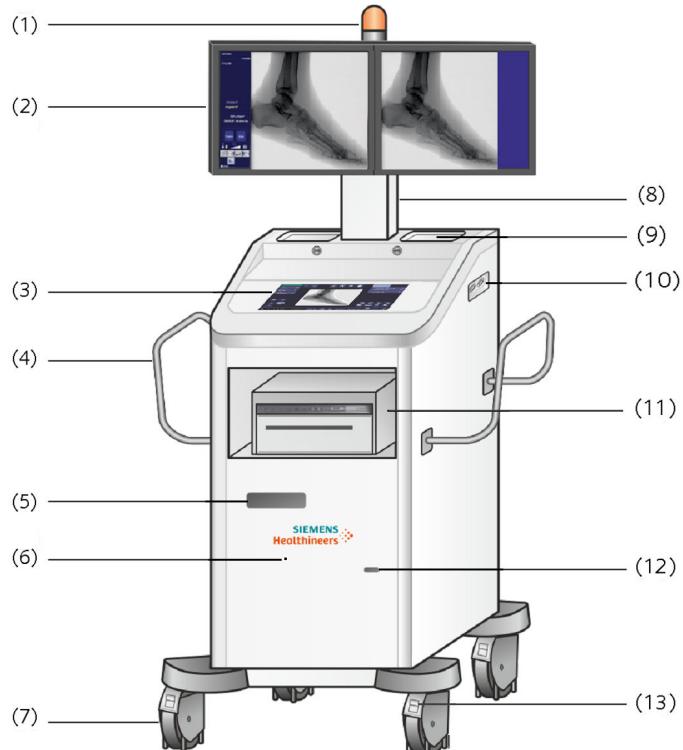
4c4ca134e352d605c0a81e664c5efa9d / 3 / Draft
Information class: clinical

Overview_of_components_Trolley_FD

Overview of components

TOPIC INFO

INDEX: [Monitor trolley]
INDEX: [Trolley]



- (1) Radiation Display
- (2) Monitors
- (3) Control panel
- (4) Handles: for neat cable storage
- (5) DVD R/W drive
- (6) Reset key
- (7) Wheels with cable deflectors

- (8) Monitor column
- (9) Storage for mouse; USB connections
- (10) Connection for LAN, WLAN, Cios OpenApps
- (11) Shelf for printer
- (12) UPS window (Charge state)
- (13) Locking brake

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Information class: clinical

UPS_display_field

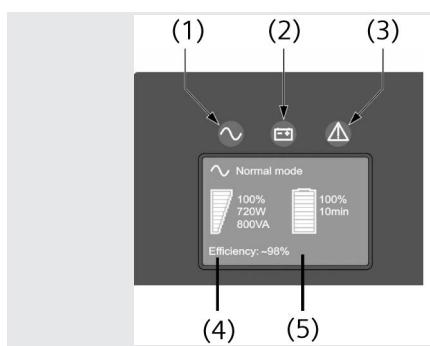
UPS display field

TOPIC INFO
INDEX: [UPS display field]



- (1) UPS window

The UPS display field on the front of the monitor trolley shows the charge state of the batteries and the operating status.



- (1) LED "Green": Input voltage (line power operation)
- (2) LED "Yellow": Battery operation
- (3) LED "Red": Alarm, malfunction
- (4) Bar display of utilization ratio
- (5) Bar display of battery charge status



When the red LED is lit, the imaging system is no longer protected against power outages by the UPS. The power plug may not be pulled until the imaging system is shut down. If this is the case, notify Siemens Healthineers Customer Service.

3 System Description

3e17e8bd7833953cc0a81e664e3d56ba / 1 / For approval for release
Information class: clinical

Control_elements

3.1.4 Control elements

TOPIC INFO

INDEX: [Operating elements]

09be55a2e35429e1c0a81e667a06a85d / 2 / Draft
Information class: clinical

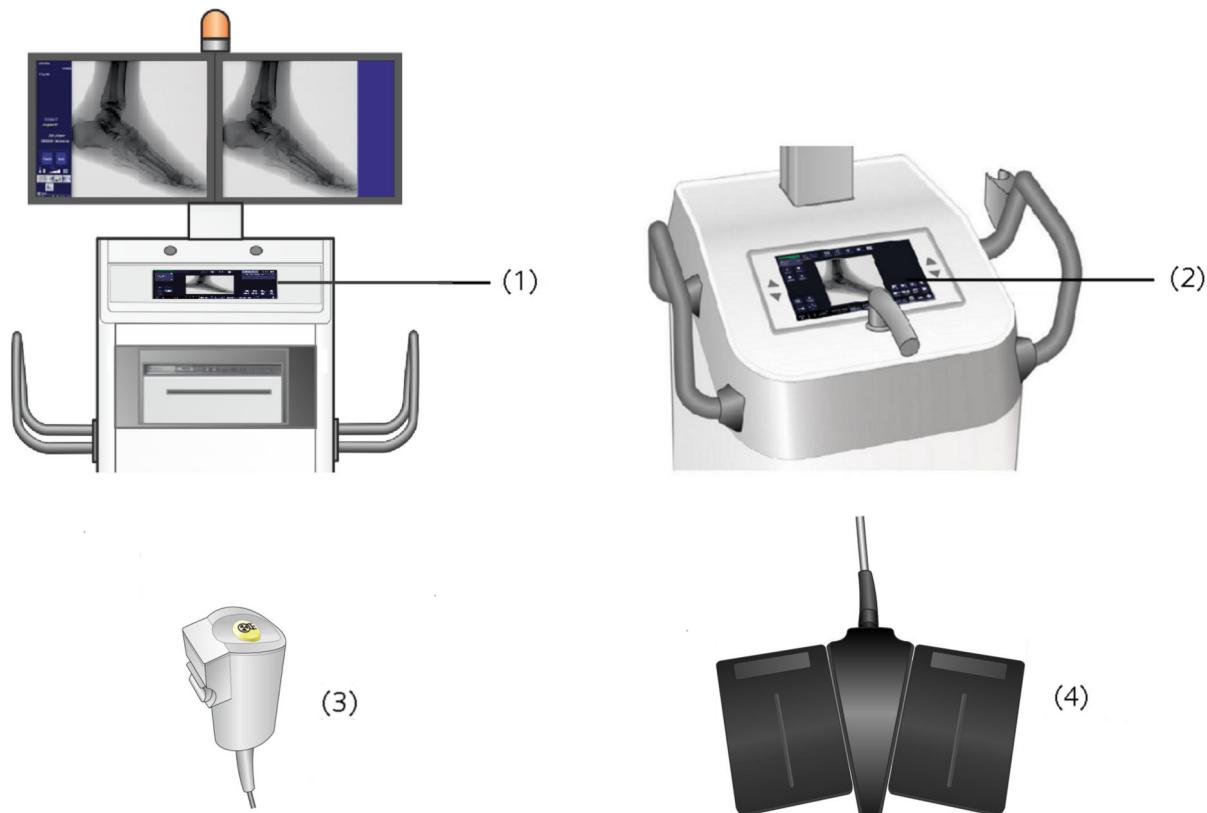
Overview_of_control_elements_FD

Overview of control elements

TOPIC INFO

INDEX: [Operating elements]

The following graphic is an overview of the Cios Select operating elements. Some of the control elements presented here are available as options.



(1) Control panel on monitor trolley, USB ports

(2) Control panel on the C-arm

(3) Hand switch

(4) Standard footswitch

(optional: wireless multifunctional footswitch)



Use only your fingers to operate the touch screens. Do not use hard or sharp objects.

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Information class: clinical

Control_unit_on_the_C_arm_system_FD

Control panel on the C-arm system

TOPIC INFO

INDEX: [C-arm control unit]
INDEX: [Control panel : on the C-arm]

The control unit for performing your examinations is located on the C-arm system.



(1) Vertical movement of the C-arm

(2) Control panel

The control panel on the C-arm control unit offers the same functions and shows the same user interface as the control panel on the monitor trolley.



The control panel is not an imaging device as prescribed in DIN 6868-157. Any images displayed are not suitable for diagnostic purposes.

ff53790ee356304ac0a81e6630cd4016 / 2 / Draft
Information class: clinical

Control_panel_on_the_monitor_trolley_FD

Control panel on the monitor trolley

TOPIC INFO

INDEX: [Control panel : on the monitor trolley]
INDEX: [Monitor trolley : control panel]

The monitor trolley control panel is used to operate applications for preparing (e.g. entering patient data) and evaluating examinations. The control panel is integrated flush into the cover plate of the monitor trolley.

3 System Description



- (1) USB ports
- (2) Storage for PC keyboard
- (3) Control panel on the monitor trolley



The control panel is not an imaging device as prescribed in DIN 6868-157. Any images displayed are not suitable for diagnostic purposes.

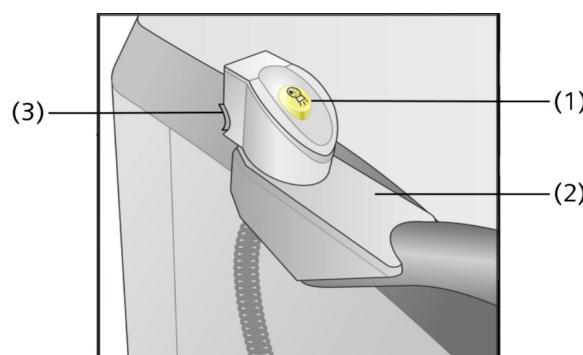
There is also a mouse, which is used as usual to execute functions on the left monitor.

2f8efca17833932ac0a81e664e3d56ba / 2 / Draft
Information class: clinical

Hand_switches

Hand switch

TOPIC INFO
INDEX: [Hand switches]



- (1) Yellow button for radiation release
- (2) Holder for hand switch
- (3) Key for saving images

298b6388783392dcc0a81e664e3d56ba / 2 / Draft
Information class: clinical

Footswitch

Footswitch**TOPIC INFO**

INDEX: [Footswitch]

The footswitch pedals assignment can be configured.

**Configuration for foot pedal assignment**

- (1) Radiation release in preselected operating mode (standard setting)

Exception: Single image when fluoroscopy operating mode is preselected

- (2) Radiation release for fluoroscopy (Standard setting)



In addition, the image saving function can be allocated to a pedal if desired.
(Standard footswitch only).

f59965577833959ac0a81e664e3d56ba / 1 / For approval for release
Information class: clinical

Operating_modes

3.1.5 Operating modes**TOPIC INFO**

INDEX: [Operating modes]

The following presents the operating modes of the system, their properties, and assigned system settings.

95dc72b8e35c671ec0a81e662fb2a83 / 1 / For approval for release
Information class: clinical

Fluoroscopy_FD

Fluoroscopy**TOPIC INFO**

INDEX: [Fluoroscopy : operating mode]

For **Fluoroscopy** operating mode, you can choose between several exam sets with different characteristic curve for fluoroscopy to determine the radiation parameters for fluoroscopy. Every application allows you to choose between different optimized programs.

3 System Description

The pulse duration is generally between 7 and 40 milliseconds. According to the level of noise reduction, many different fluoroscopic images can be integrated.

The standard setting of the system after startup is established in the configured standard application, and in general is **Fluoroscopy**.

System settings

Exposure factors and system control units including the way in which the automatic setting is controlled:

- 1 k² matrix
- Frame rate usually 0.5 to continuous; - 0.5; 1; 2; 3; 5; 7.5; 10; 15f/s and continuous fluoroscopy for configuration
- Image integration (as a function of the k factor set), i.e. a number of k exposures are integrated into one image by sliding averaging; the k factor can be set up to 32 and can be assigned to an exam set and stored.

CHARM: SP_00203084

Typical clinical procedure

Fracture reposition of the distal upper extremity (e.g. distal forearm fracture) in the plaster room of an emergency outpatient clinic where, under fluoroscopy, the fracture elements are reduced by extension, fixed temporarily in the best possible position and then fixed permanently by applying a plaster cast.

cfac50b1e35cf9ddc0a81e6607025340 / 1 / For approval for release
Information class: clinical

Single_image_FD

Single image

TOPIC INFO

INDEX: [Single image : operating mode]

The **Single image** operating mode provides an electronic instant image of the patient on the monitor. It is recommended for final exposures. The exposure time depends on the pulse width set.

System settings

Exposure factors and system control units including the way in which the automatic setting is controlled:

- 1 k² matrix
- X-ray pulse with a width of 7 ms up to a maximum of approx. 160 ms.

Typical clinical procedure

Final follow-up exposure of a fracture reposition of the distal upper extremity (see above).

a6357dbde35daebbc0a81e6655877a08 / 1 / For approval for release
Information class: clinical

Subtraction_Roadmap_option_FD

Subtraction/Roadmap (optional)

TOPIC INFO

INDEX: [Subtraction : operating mode]

INDEX: [Roadmap : operating mode]

The Subtraction/Roadmap option allows you to perform a digital subtraction angiography and simultaneously display the unsubtracted angiogram on the second monitor. Subtraction technique allows hemodynamic display as well as display of the maximum vascular filling and Roadmap. The Roadmapping features can also be used for other procedures.

System settings

Exposure factors and system control units including the way in which the automatic setting is controlled:

- 1 k^2 matrix
- Acquisition rate is freely selectable, up to 15 frames/s;
- Image integration (as a function of the k factor set), i.e. a number of k exposures are integrated into one image; the K factor can be set up to 32 by an authorized technician.
- Display of an arterial vessel for localizing vascular stenoses with injection of a contrast agent to enable the contrast-enhanced display of the vascular filling (subtraction of the native image (mask) from the contrast-enhanced image).
- Alternative to native display, subsequent inversion of the displayed image allows you to display a catheter introduced into the vessel path using the Roadmap function.

Typical clinical procedure

For information on performing an examination with Subtraction or Roadmap, refer to ([→ Page 152 Performing special examinations](#)).



729de2fa78339185c0a81e664e3d56ba / 2 / Draft
Information class: clinical

Description_of_image_processing

3.1.6 Description of image processing

The system's overall image processing is known as the "imaging chain". The imaging chain is divided into hardware and software modules. It includes image sources (e.g., image receptor), modules for preprocessing and postprocessing images, and image data display (e.g., monitor).

The imaging chain is also responsible for setting the correct parameters for the various components. Raw image data is transferred from the flat panel detector via various preprocessing steps to the imaging system PC. On the PC, the image data is then analyzed and processed in real time, and an initial adjustment of the brightness and contrast is performed. Finally, the image data is transferred to the imaging system software where it is stored.

At the same time, the image data is processed for optimum medical evaluation for the application in question (including local filtering, subtraction, brightness and contrast processing, geometric operations, peak opacification) and displayed on one or more monitors. Previewing on touch displays is carried out in the same way.

3 System Description

During a DICOM export the image data is not transferred as raw data but with all related processing steps (including any manual image adjustments such as windowing or annotations). From there it is sent to an archive (DICOM) along with the patient data. The original state cannot be restored. (Therefore do not use these images for the primary diagnosis!)

80ca701f78339387c0a81e664e3d56ba / 2 / Draft
Information class: clinical

Image_display

3.1.7 Image display

TOPIC INFO

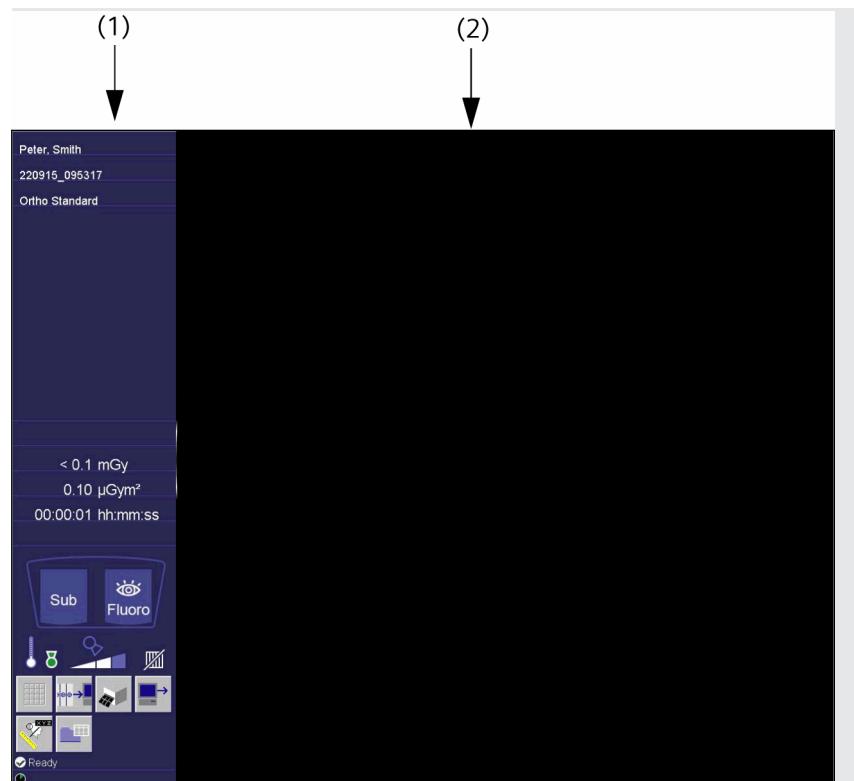
INDEX: [Image display]

The imaging system uses two monitors for image display.

- The left monitor is used to display live images as well as preoperative and postoperative images.
- The right monitor is used to display the reference images.

Reference images may be:

- preoperative images, incl. images of other modalities (e.g. CT, MR)
- images of current examinations
- images from previous examinations



9dcf13fd78339848c0a81e664e3d56ba / 1 / For approval for release
Information class: clinical

System_Operation

3.2 System Operation

b24c92197833a42ac0a81e664e3d56ba / 1 / For approval for release
Information class: clinical

Start_up

3.2.1 Start-up

TOPIC INFO
INDEX: [Start-up]

 Ensure that plugs and connectors are clean and dry.

Do not use damaged cables.

610be8db783399cec0a81e6671622ad9 / 2 / Draft
Information class: clinical

Connecting_the_C_arm_system_with_the_monitor_trolley

Connecting the C-arm system with the monitor trolley

The C-arm system is connected to the monitor trolley with a cable.

870b058e78342126c0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_docUser_note_Installing_cables

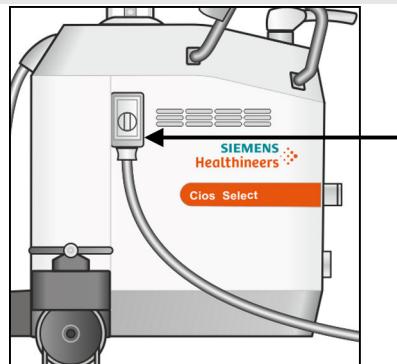
hazard-key: hm_docUser_note_Installing_cables

CAUTION

Tripping over cable.

Risk of falling.

- ◆ When routing cables, make sure they run on the floor properly and without loops.

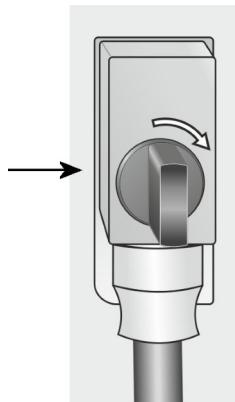


- 1 Plug the central plug into the socket on the left side of the C-arm system, when viewed from the C-arm. The switch must always be in the vertical position.

3 System Description



The monitor trolley may only be connected to the corresponding C-arm system. If the monitor trolley is connected to the wrong C-arm system, an error message is displayed indicating that the C-arm and monitor trolley are not a suitable pairing. Upon acknowledging the message, the text "Incorrect C-arm" indicating the status is displayed at the lower left of the imaging system monitor.



- 2 Turn the switch to the right until it audibly clicks into place.

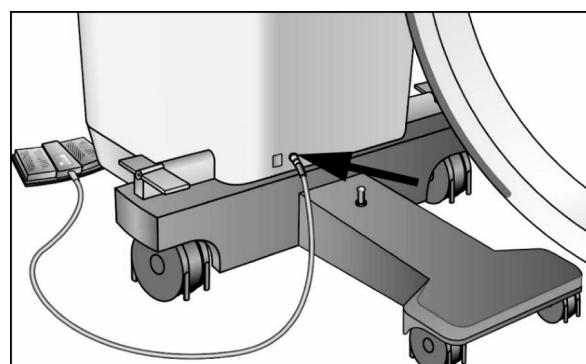
The monitor trolley is connected to the C-arm system.

6c7d5cd978339a2cc0a81e6671622ad9 / 3 / Draft
Information class: clinical

[Connecting_the_footswitch](#)

Connecting the footswitch

For the release of radiation with the footswitch, it must be connected to the C-arm system.



- ◆ Plug the footswitch cable into the socket labeled with the footswitch symbol on the front of the C-arm system.

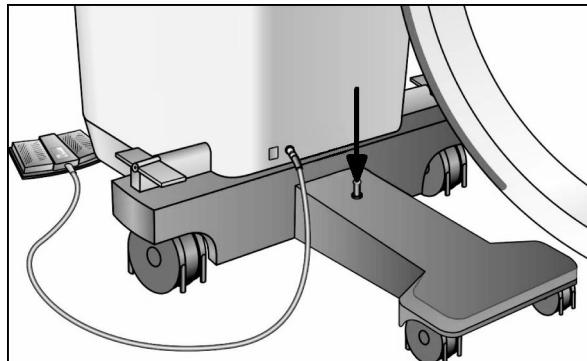


889b368a78339c7dc0a81e6671622ad9 / 3 / Draft
Information class: clinical

[Establishing_the_equipotential_bonding_connection](#)

Establishing the equipotential bonding connection

The Cios Select can be connected to a protective ground terminal via the equipotential bonding connector on the C-arm system. This will ensure that the Cios Select has the same electrical potential as other units connected to the same protective ground terminal.



- ◆ Clamp the equipotential bonding cable to the socket indicated by the symbol on the C-arm system front connection panel (arrow) and to an equipotential bonding point in the vicinity of the patient.

Equipotential bonding is established.

cdb4f7fa4075d2fc0a81e665070a4e2 / 1 / Draft
Information class: clinical

[Establish_the_power_line_connection__MDR_](#)

Establish the power line connection

The Cios Select operates using a line power connection cable from the main unit to a properly grounded socket.



To avoid the risk of electric shock, this equipment must only be connected to a supply mains with protective earth.

f1a9f05d10ceecb10a53dbdb26b88a00 / 1 / For approval for release

[HZ_XP_hm_docUser_contact_voltage_while_use](#)

hazard-key: hm_docUser_contact_voltage_while_use

WARNING
<p>Contact voltage while using the unit.</p> <p>Electric shock to operator and patient</p> <ul style="list-style-type: none"> ◆ Connect this device only to a power supply network that has been properly grounded.

3 System Description

91bb4qfbf420fc19c0a81e66673a608a / 1 / Draft

HZ_XP_hm_docUser_note_check_power_cable_MDR_

hazard-key: hm_docUser_note_check_power_cable

⚠ WARNING

Cable damage.

Risk of electrical shock!

- ◆ Check the power cable. Do not use the device if the power cable is damaged.
- ◆ Take more care of the power supply cable, do not stumble it.

1 Plug the power plug into the appropriate socket.

The line power connection is established.

2 Position the unit so that it is easy to disconnect from the line power.

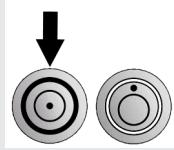
3dd895927833a5c0c0a81e6671622ad9 / 2 / Draft

Information class: clinical

Switching_on

Switching on

- ◆ Press the **ON** button on the unit.



c840dd24e4594fc8c0a81e660983e833 / 2 / Draft

Information class: clinical

Functions_during_system_start_up_FD

Functions during system start-up

TOPIC INFO

INDEX: [Start-up : functions]

- The **Cios Select** is switched on.
- The system automatically runs a self-test.
- On the control panel, all LEDs light for approx. 2 seconds as a function test and then switch off automatically.



Check whether all LEDs light correctly. If not, notify Siemens Healthineers Customer Service as there could be a malfunction.

An audible signal sounds while the system starts up.



If an audible signal does not sound, notify Siemens Healthineers Customer Service; there is a possibility that audible signals will not play back correctly.

An automatic self-test is performed for the C-arm control unit buttons.

Display of software version

During start-up, a start-up screen is displayed on the left monitor stating the current software version of your system.

Radiation stand-by

On the left monitor, radiation stand-by is indicated by a symbol in the status bar (lower left) after a patient has been registered. On the control panel, radiation stand-by is indicated by a green horizontal bar in the exposure parameters area (top left).



This icon appears on the monitor if radiation release is blocked. On the control panel, the horizontal bar is grey. You need to enter the password to unlock the radiation release (→ Page 112 *Unlocking/locking radiation release*)

Radiation cannot be released if the monitor trolley is operated separately.



Essentially, the system is not ready for radiation unless a patient is registered.

Flat detector calibration message

If a message is displayed on the monitor indicating that flat detector calibration is due:

- Contact Siemens Healthineers Customer Service.

Presettings

The following functions are set when the system is started:

- Operating mode: the preset operating mode in the application configured as **Standard**
- Image mirroring: switched off if it is not switched on in the application configured as **Standard**
- Number of images (fluoro): the default value in the application configured as **Standard**
- Automatic dose rate control (ADR): activated
- Zoom level: 0
- Collimators: Full format

b7cb1295e45b14d6c0a81e6661e7a864 / 1 / For approval for release
Information class: clinical

Move_C_arm_FD

3.2.2 Move C-arm

TOPIC INFO

INDEX: [C-arm : movements]

The horizontal movement, swivel movement, angulation and orbital movement of the C-arm are performed manually. Use the handles on the C-arm or the flat detector.

Additionally, the C-arm can be adjusted in height by motor control.

3 System Description

d41b46507834334fc0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_um_Risk_of_Crushing_s1

hazard-key: hm_um_Risk_of_Crushing_s1

WARNING

Manual or motorized movements.

Risk of crushing and collision for persons and objects in the vicinity of moving parts.

- ◆ During manual and motorized movements of the device, make sure you take into account any persons or objects in the way of movement, and control the movement to avoid collisions.
- ◆ Make sure that everyone is outside the hazardous zone.

d490dc1178342164c0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_docUser_note_intervisibility

hazard-key: hm_docUser_note_intervisibility

CAUTION

Activation of system movements without visual contact.

Risk of crushing!

- ◆ Use the system only if the patient and other persons can be observed during movements.

6b5fdeb78343533c0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_um_Tube_Rotation__hm_docUser_daily_inspection

hazard-key: hm_um_Tube_Rotation; hm_docUser_daily_inspection

CAUTION

C-arm rotation.

Risk of crushing!

- ◆ Pay particular attention to crushing risks between moving system parts and the corresponding guide openings.

7cee4c1e78342ecdc0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_um_EmergencyStopMovements

hazard-key: hm_um_EmergencyStopMovements

CAUTION

Movement due to unintended actuation of operating elements.

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

- ◆ Press the closest EMERGENCY STOP button if device movements do not stop.



Please note that the scale on the C-arm is intended for orientation only, not for measurement.

08de14ce7833a053c0a81e664e3d56ba / 2 / Draft
Information class: clinical

Operating_the_brakes

Operating the brakes

TOPIC INFO

INDEX: [Brakes : operating]

The Cios Select is equipped with mechanical brakes. The levers for releasing and locking the brakes for different directions of movement are marked with different colors. A graduated scale in the same colors for the corresponding directions of movement is located on the housing of the C-arm.

199cbbc178341ffec0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_docUser_note_crushing_chassis_on_a_ramp

hazard-key: hm_docUser_note_crushing_chassis_on_a_ramp

CAUTION

Brake failure.

Risk of crushing!

- ◆ Before beginning the examination, perform the daily function and safety checks.

3021fa8d783426f0c0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_docUser_parking_chassis_incline

hazard-key: hm_docUser_parking_chassis_incline

CAUTION

Braking power not sufficient.

Risk of crushing!

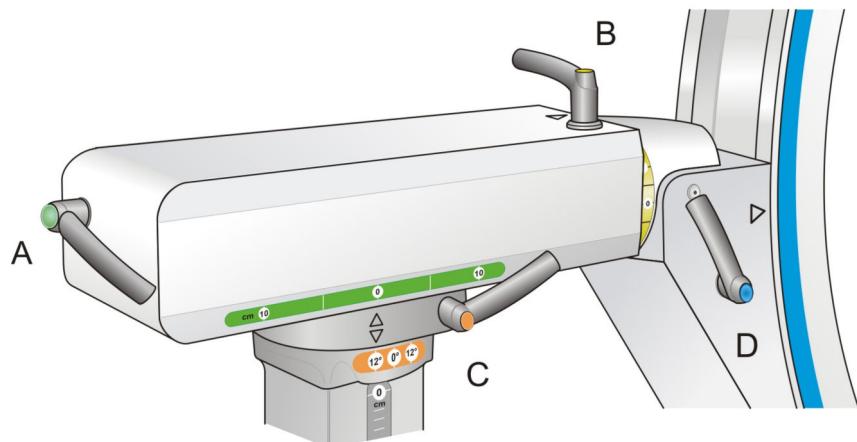
- ◆ While parking C-arm system on inclines activate brakes and turn castors/wheels into position which is perpendicular to down- or upward direction.

Overview of C-arm brakes

TOPIC INFO

INDEX: [C-arm : brakes]

3 System Description



- A: Horizontal brake
- B: Angular brake
- C: Swivel brake
- D: Orbital brake

Before moving the C-arm, the brake for the relevant direction of movement must be released.

Engage the corresponding brake lever after moving the C-arm.



281ffc81e45ce74dc0a81e6636396dee / 2 / Draft
Information class: clinical

Lifting_and_lowering_the_C_arm_FD

Lifting and lowering the C-arm

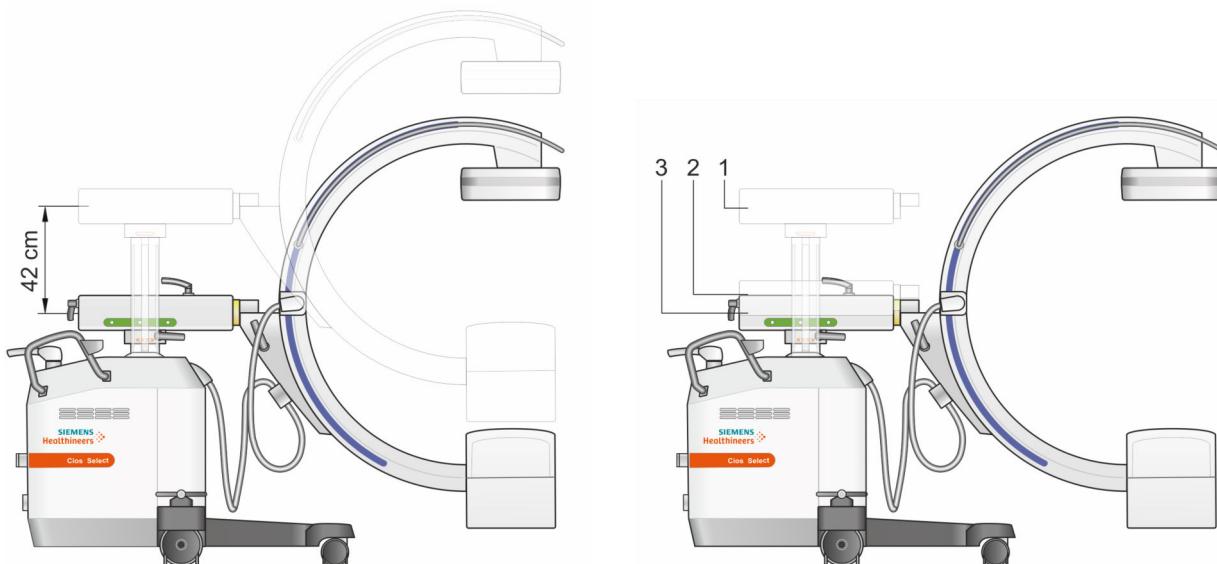
TOPIC INFO

INDEX: [C-arm : lifting and lowering]

You can lift and lower the C-arm by motor control using the arrow buttons on the C-arm control unit.



The lifting column can be lowered from position 1 (highest level) to intermediate position 2, down to position 3 (lowest level).



- (1) Position 1 = highest level
- (2) Position 2 = intermediate position
- (3) Position 3 = lowest level

Lifting the C-arm

- ◆ Press the **Up** key on the C-arm keyboard.

The lifting column moves upwards.

Lowering the C-arm

The lifting column can be lowered to position 3.

- 1 Press the **Down** key on the C-arm keyboard.

The lifting column then moves to the intermediate position (2) and automatically stops there.

- 2 Press the **Down** key on the C-arm keyboard again.

The lifting column is lowered further.

An audible signal sounds.

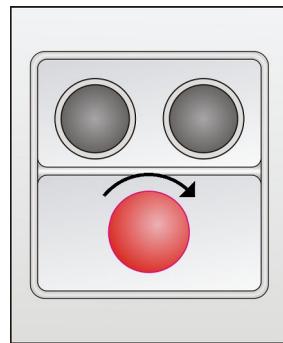


Make sure there is nothing in the hazard zone (under the C-arm or travel frame) when lowering the C-arm; crushing hazard!

Lifting movement failure

If the lifting column cannot be moved the EMERGENCY STOP button is pressed and must be unlocked.

3 System Description



- 1 Turn the knob clockwise until it pops back out.
- 2 If the lifting column can still no longer be moved in any direction, then please contact Siemens Healthineers Customer Service.

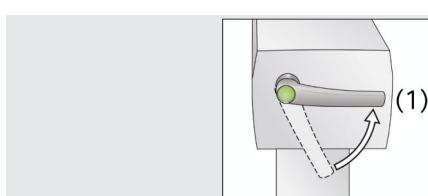
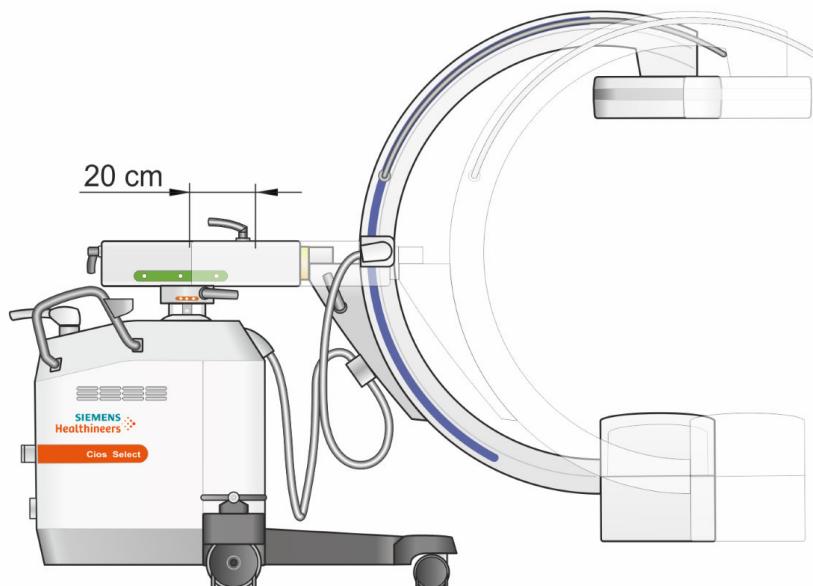
ac30204ae45d860bc0a81e66734aec18 / 2 / Draft
Information class: clinical

Moving_the_C_arm_horizontally_FD

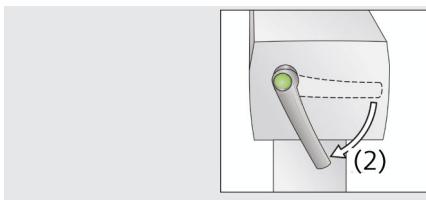
Moving the C-arm horizontally

TOPIC INFO
INDEX: [C-arm : moving horizontally]

You can move the support arm horizontally by up to 20 cm.



- 1 Open the brake lever marked in green for **horizontal movement** by turning it to position (1).
The brake is released.
- 2 Move the support arm to the desired position.



- 3 Lock the brake lever by turning it back to position (2).

The brake is locked.

ac34b0b5e45e8bc4c0a81e663bc0b64d / 2 / Draft
Information class: clinical

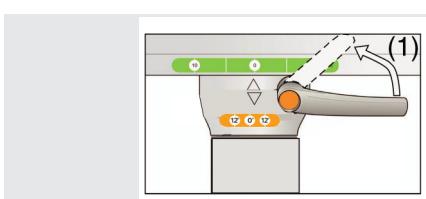
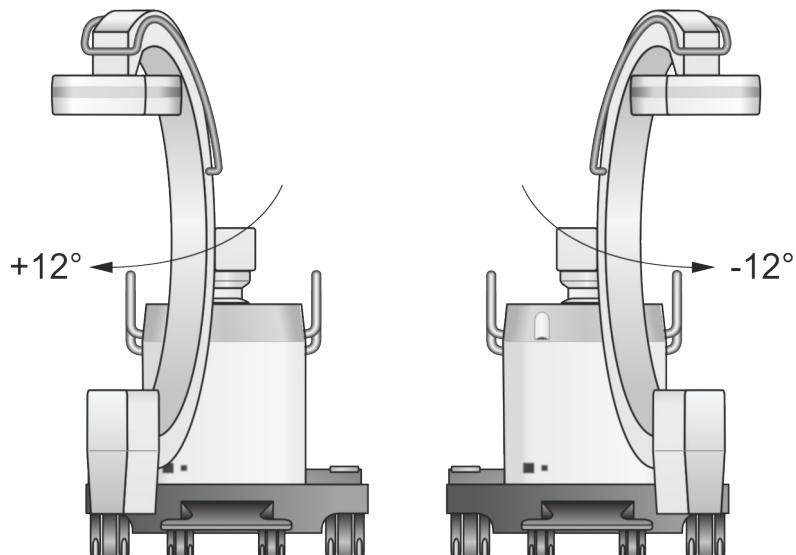
Swivelling_the_C_arm_FD

Swivelling the C-arm

TOPIC INFO

INDEX: [C-arm : swivelling]

You can move the C-arm in the horizontal plane $\pm 12^\circ$ about the lifting column.



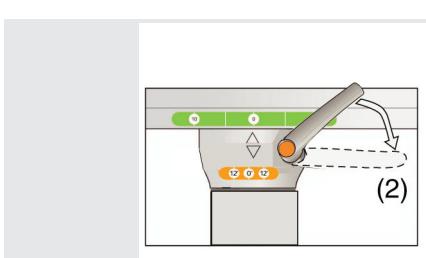
- 1 Open the brake lever marked in orange for **horizontal swivel** by turning it to position (1).

The brake is released.

- 2 Swivel the C-arm to the required position.

- 3 Lock the brake lever by turning it back to position (2).

The brake is locked.



3 System Description

d4623bf5e45df649c0a81e6607aa9310 / 2 / Draft
Information class: clinical

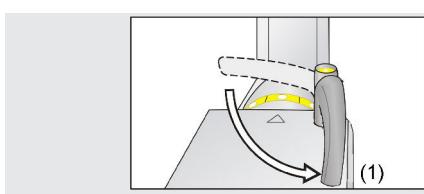
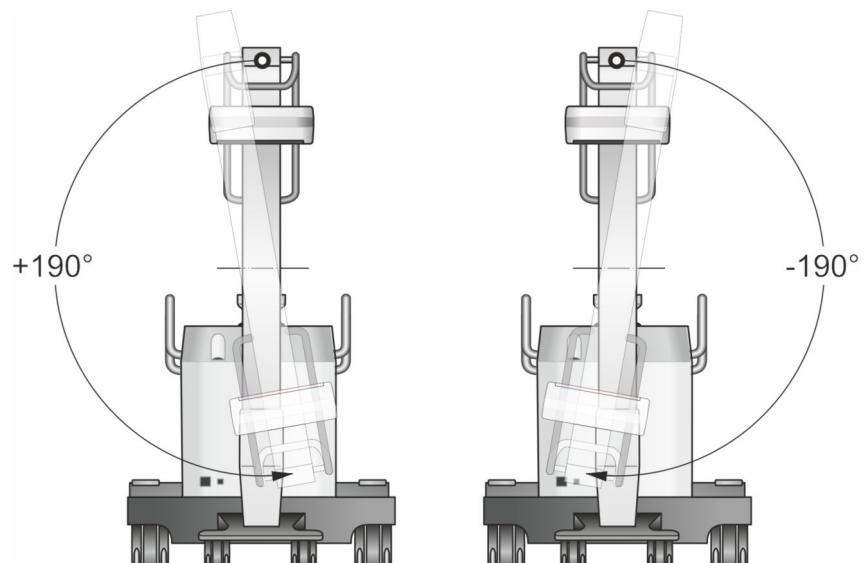
Angulating_the_C_arm_FD

Angulating the C-arm

TOPIC INFO

INDEX: [C-arm : angulating]

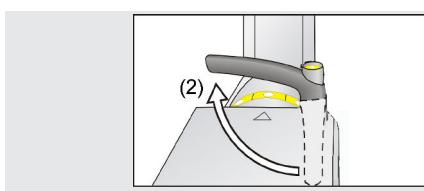
You can rotate the C-arm in the vertical plane $\pm 190^\circ$ about the horizontal support arm.



- 1 Open the brake lever marked in yellow for **angulation** by turning it to position (1).

The brake is released.

- 2 Rotate the C-arm to the required angulated position.



- 3 Lock the brake lever by turning it back to position (2).

The brake is locked.

76b3e8d4e45ef7a0c0a81e6662931048 / 2 / Draft
Information class: clinical

Orbital_movement_of_the_C_arm_FD

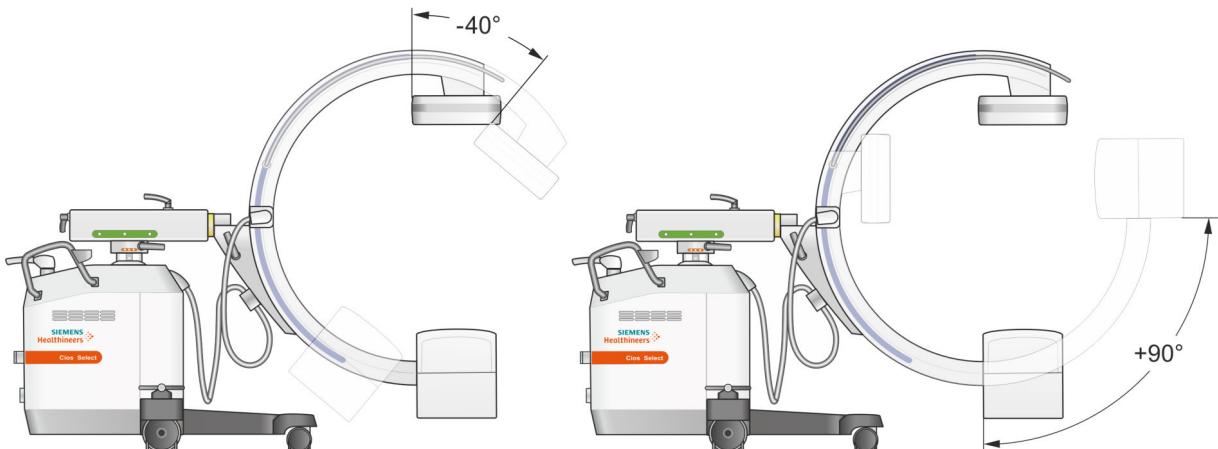
Orbital movement of the C-arm

TOPIC INFO

INDEX: [Orbital movement : of the C-arm]

INDEX: [C-arm : orbital movement]

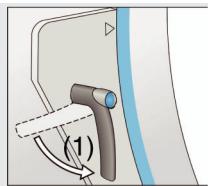
Starting from the basic position (0°), you can swivel the C-arm by up to $+90^\circ$ or up to -40° (130° in total).



- 1** Open the brake lever marked in blue for **orbital movement** by turning it to position (1).

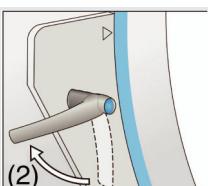
The brake is released.

- 2** Swivel the C-arm to the required orbital position.



- 3** Lock the brake lever by turning it back to position (2).

The brake is locked.



8d69f26e47ed62e2c0a81e663f919a1f / 2 / Draft
Information class: clinical

Control_panel_FD

3.2.3 Control panel

TOPIC INFO

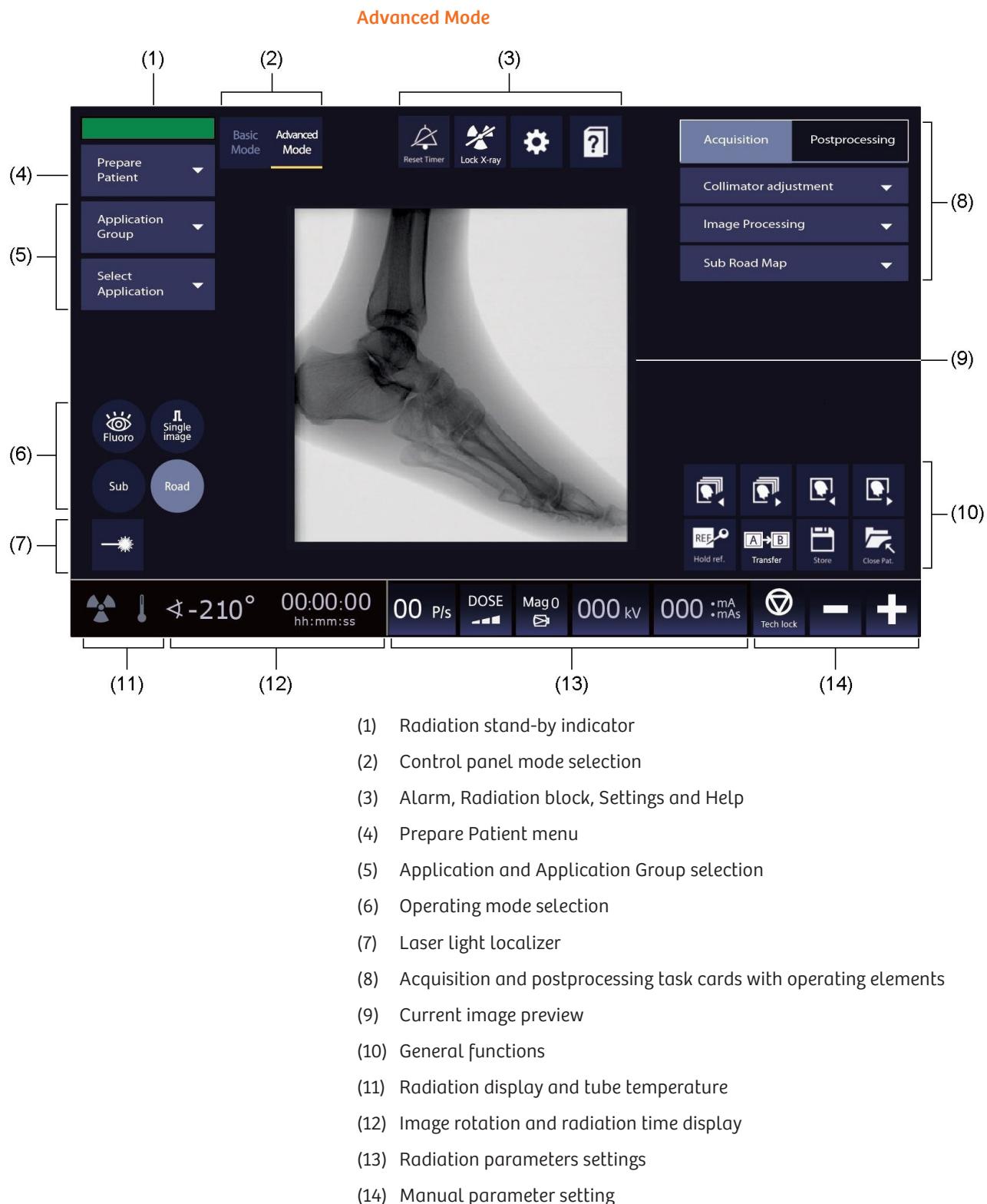
INDEX: [C-arm : Control panel]

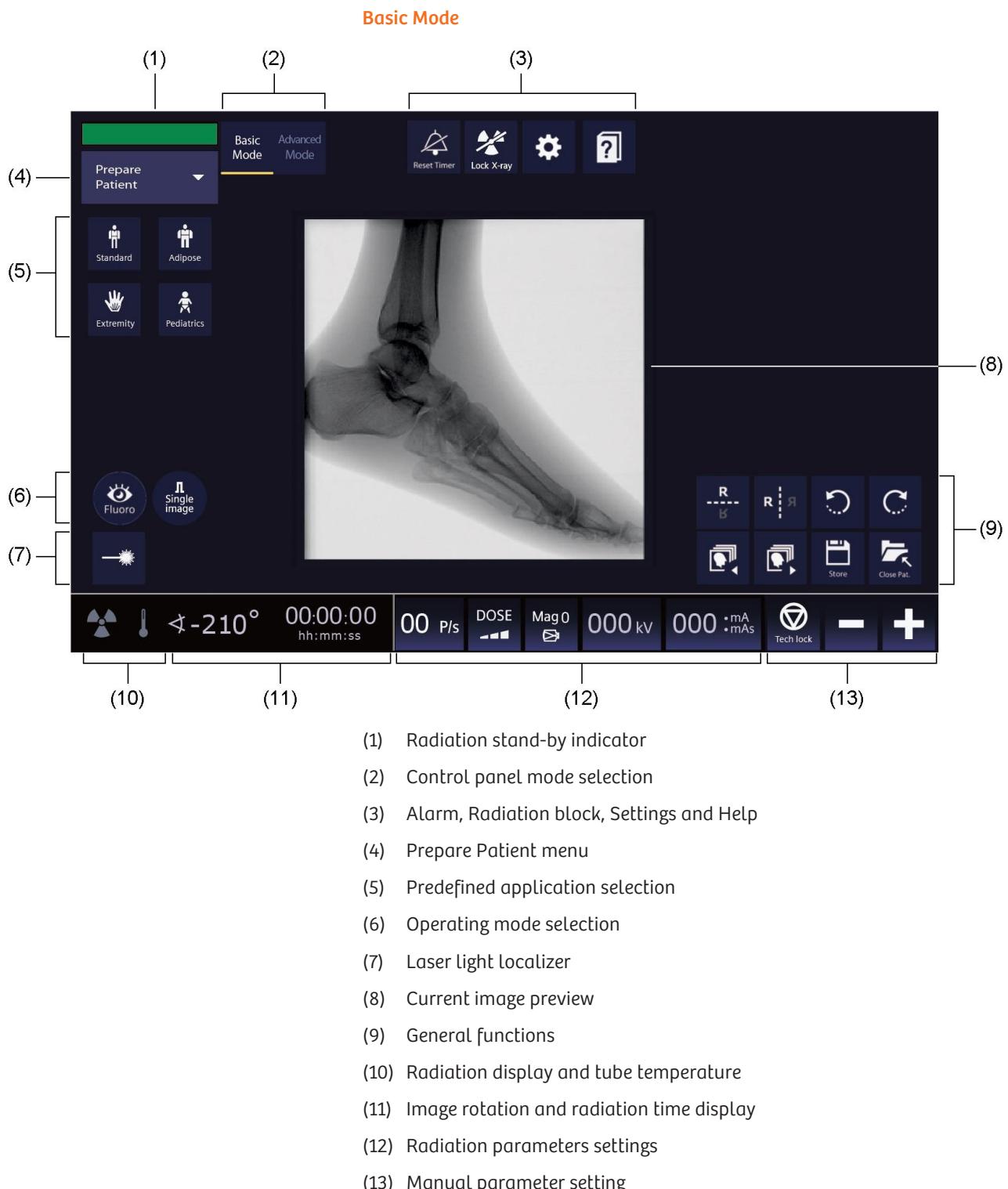
The control panels on the C-arm control unit and on the monitor trolley are identical in terms of function.

There are two modes available and buttons may differ in different modes.

Press the corresponding button to operate the function.

3 System Description





4c0fe65747f9aa2cc0a81e6645240bea / 2 / New
Information class: clinical

Radiation_stand_by_indicator_FD

Radiation stand-by indicator

Green: ready

3 System Description

White: not ready, e.g., C-arm system not connected or patient not registered

Gray: radiation release blocked (password entry required)

39414c6e47d65ac4c0a81e66058d9b90 / 1 / For approval for release
Information class: clinical

Task_cards_FD

Task cards

In **Advanced Mode**, the task card of **Acquisition** provide you access to required operating elements for image acquisition.

In the **Postprocessing** task card, you are provided with operating elements for image postprocessing.

Changing task cards

Acquisition

Postprocessing

- ◆ Press the tab of the required task card.

6c1d7dc247fd37e0c0a81e661394c2f3 / 2 / Draft
Information class: clinical

Control_elements_FD

Control elements

You perform individual function and set the required parameters using the task card operating elements.

00 P/s

Function value display: For some functions, the current set value is displayed in the operating element (example: Pulse rate....).



Function inactive: Many functions can only be executed when specific conditions are met (for example, **Hold reference** only when the image display is on the right monitor). Functions that currently cannot be executed appear as inactive.

Performing the function



- ◆ Press the button for the required function.



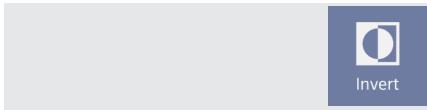
For some function the button can be pressed and held to continue performing the function (such as moving the collimator).

Activating/ deactivating functions

For functions that can be switched on or off, the button with the light background indicates the active state.



- 1 Press the button in deactivated state to switch on the function.



2 Press the button in activated state to switch off the function.

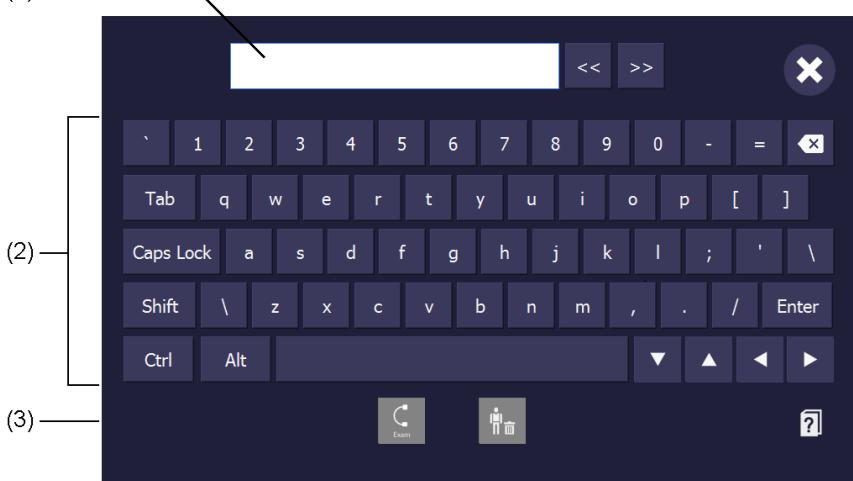
68a75c5f48011157c0a81e667f223918 / 1 / For approval for release
Information class: clinical

Keyboard_mode_FD

Keyboard mode

Keyboard mode is used to enter text and numbers.

(1)



(1) Text field

(2) Keyboard

(3) Symbol button bar for opening functions (visible only if appropriate for the current work step)

Opening keyboard mode

The system switches automatically to keyboard mode when functions requiring text input are opened (such as for patient registration). Keyboard mode can be opened manually when necessary (e.g., for service purposes).

- ◆ Press this button on the control panel (under the **Overview** menu in **Postprocessing** task card).

A virtual keyboard appears on the control panel instead of the task cards.

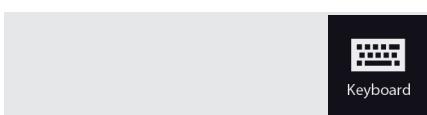
- ◆ Press the corresponding character buttons like a computer keyboard.

The entered characters are shown in the input screen on the monitor and in the white text field of the virtual keyboard.

For upper case letters and to enter special characters, press the Shift button and then the corresponding character.

Entering special characters

You have several options for entering special characters.



Entering text

The entered characters are shown in the input screen on the monitor and in the white text field of the virtual keyboard.

For upper case letters and to enter special characters, press the Shift button and then the corresponding character.

3 System Description

- ◆ Press one of the following key combinations:
 - The **Shift** button and the desired special characters
 - **Alt + Ctrl.**
 - **Alt + Ctrl + Shift**



When using a USB keyboard, ensure that the layout matches the keyboard layout of the user interface on the monitor trolley; otherwise incorrect entries can occur.

Ending keyboard mode



Keyboard mode ends automatically when the corresponding input screen on the monitor is closed. Depending on the function that is open, this can be done with the **Enter** button (such as comment text) or by opening the next work step (such as examination after patient registration).

- ◆ To terminate keyboard mode manually, press the **Close** button.
The task card previously shown is displayed again.

928101cae462d8edc0a81e6611d6245b / 2 / Draft
Information class: clinical

Operating_the_hand_switch_FD

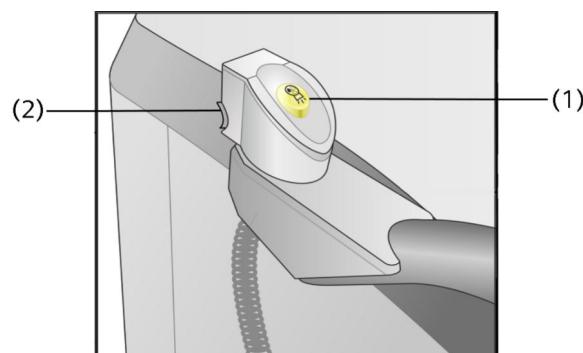
3.2.4 Operating the hand switch

TOPIC INFO

INDEX: [Hand switch : operating]

The hand switch is used to remotely control radiation release and image storage.

The hand switch can be inserted into the holder provided on the C-arm system.



- (1) Radiation release key
- (2) Image storage key

Radiation release

The hand switch is used to release radiation in the preselected operating mode.



- ◆ Press the yellow radiation release key on the hand switch and hold it down while radiation is released.

The current radiation parameters are shown on the keyboards.

The currently generated image is displayed on the left monitor unless the **Hold reference** function is active.

Image storage

During radiation



- ◆ Press this key on the hand switch.

The image currently generated and displayed is saved.

After radiation



- ◆ Press this key on the hand switch.

Holding the key for < 2 seconds: Saves the image last recorded (LIH).

Holding the key for > 2 seconds: Saves the scene last recorded (LSH).



The images are stored in the local database. They are transferred from the left monitor to the right monitor unless the **Hold reference** function is active.

Storage

When not in use, the hand switch can be kept in one of the holders on either side of the C-arm system.

a7836dc97833a0c1c0a81e664e3d56ba / 2 / For approval for release
Information class: clinical

[Operating_the_footswitch](#)

3.2.5 Operating the footswitch

TOPIC INFO

INDEX: [Footswitch : operating]

The footswitch is used, for example, if both hands need to be free during the exposure.



The footswitch is also suitable for applications where fluids may land on the floor.



For operation of the wireless multifunctional footswitch (optional) see
(→ Page 301 *Wireless multifunctional footswitch*).

3 System Description

46b8e44fe4676fe7c0a81e666e147fd0 / 2 / Draft
Information class: clinical

Radiation_release_footswitch

Radiation release

TOPIC INFO

INDEX: [Radiation release]

In the default setting, the pedals are allocated as follows:

- The right pedal is always used to activate **Fluoroscopy** (Fluoro).
- The left pedal is used to activate the preselected operating mode.

Exception: If the **Fluoroscopy** (Fluoro) operating mode is preselected, the left pedal is allocated the **Single image** operating mode.



The left/right functionality of the two pedals can be reversed by Siemens Healthineers Customer Service upon request.

Pedal allocation:

The current pedal allocation is shown on the monitor trolley left screen.



If the footswitch is defective or not connected, the symbol for the hand switch is displayed instead.

Releasing radiation



- ◆ Keep the left or right foot pedal pressed during radiation release.

The current radiation parameters are shown on the control units.

422e52ab78339e03c0a81e6671622ad9 / 2 / For approval for release
Information class: clinical

Image_storage

Image storage

TOPIC INFO

INDEX: [Image storage]

One of the pedals can be configured with the "Save" function by Siemens Healthineers Customer Service.

In this case, in the default setting the pedals are allocated as follows:

- The right pedal is used to activate the preselected operating mode.
- The left pedal is used to activate image storage.

Saving during radiation



- ◆ Press the "Save" pedal on the footswitch.

The image currently generated and displayed is saved in the local database.

Saving after radiation



- ◆ Press the "Save" pedal on the footswitch.

Pressing the pedal for < 2 seconds: saves the image last recorded (LIH).

Pressing the pedal for > 2 seconds: saves the scene last recorded (LSH).



The images are stored in the local database. They are transferred from the left monitor to the right monitor unless the **Hold reference** function is active.

c1d3c7647833a4f5c0a81e6671622ad9 / 3 / Draft
Information class: clinical

Switching_off

3.2.6 Switching off

TOPIC INFO

INDEX: [Switching off]

Before disconnecting the Cios Select from line power, you must shut it down. During the shutdown procedure the imaging system is shut down before the system is switched off.

The shutdown procedure for the imaging system is complete when the stand-by indicator in the left monitor goes out.

0b3e791278342857c0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_docUser_shutdown_xray

hazard-key: hm_docUser_shutdown_xray

CAUTION

Loss of image data.

Risk of unnecessary radiation exposure!

- ◆ Do not shut down the system while radiation is being released.

If you still need the monitor trolley (for postprocessing), you can disconnect the C-arm system while switched on. In this case, only the C-arm system is shut down.

5de36756e468b3ebc0a81e66387125d4 / 2 / Draft
Information class: clinical

Switching_off_the_system_completely

TOPIC INFO

INDEX: [Switching off]

Ending active processes

- 1 Close the current patient with the corresponding button on the control panel.
- 2 If you have just started a print job, wait until the job is completed.
- 3 Make sure data were not written to CD/DVD.

If necessary, wait for CD/DVD write processes to be completed.

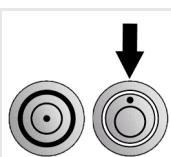
3 System Description

- 4 If there is a disk in the CD/DVD, take it out of the drive.



Open network export jobs are retained during shutdown and are continued when the system is switched back on. Storage jobs for removable devices as well as print jobs are stopped and deleted.

Switching off



- ◆ Press the **OFF** button on the unit.

The C-arm system is immediately switched off.

The imaging system switches off after the computer is shut down.

5b6869e782288c210a53dbdb55d696bb / 1 / Draft
Information class: clinical

Disconnecting_Cios_Select_from_line_power

Disconnecting Cios Select from line power

Please note that after finishing an examination, the **Cios Select** must be shut down properly before it is disconnected from the power supply.

- 1 Switch off the **Cios Select** and wait for it to shut down.
- 2 Disconnect the monitor trolley power plug from the power outlet.

When the power plug is pulled, the UPS switches to battery mode (yellow LED illuminates).



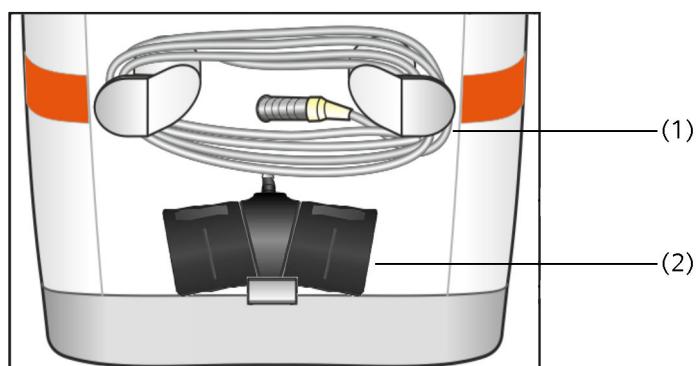
Pull on the plug, not on the cable!

Releasing the connection cable

- 1 Turn the central plug lever on the C-arm system to the left to unlock it.
Unplug the connector.
- 2 If attached, disconnect the equipotential bonding connection from the C-arm system.

Rolling up the footswitch cable

The footswitch is placed in the holder provided for storage and during transport.



- ◆ Roll up the footswitch cable (1) onto the cleat provided and place the footswitch into its holder (2).



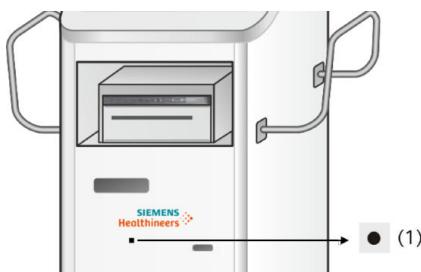
When attaching the footswitch, please be careful not to kink the cable.

f47061bb2aca7eb70a53dbdb56781898 / 1 / Draft
Information class: clinical

Reactivating_the_system

Reactivating the system

If the imaging system cannot be shut down properly after pressing the **OFF** button or if it no longer reacts to input, you must reactivate the **Cios Select** system as follows:



- 1 Use a pin or a pointed object to actuate the **RESET** button (1) on the monitor trolley:

All running processes are terminated and the **Cios Select** is shut down.

- 2 Switch the **Cios Select** on again and let it boot up completely.

Now you can either continue using the **Cios Select** or shut it down.



If the **Cios Select** is not fully operational despite the reset, please notify Siemens Healthineers Customer Service.

ffb6e82b7833a68bc0a81e664e3d56ba / 2 / For approval for release
Information class: clinical

Transport

3.2.7 Transporting the C-arm system

TOPIC INFO

INDEX: [Transport]

The C-arm system is equipped with 4 wheels for easy steering in any direction. The C-arm system can be locked in place with the steering/brake lever.

When transporting the C-arm system and the monitor trolley in the transport position, the floor inclination must not exceed 10°.

3 System Description

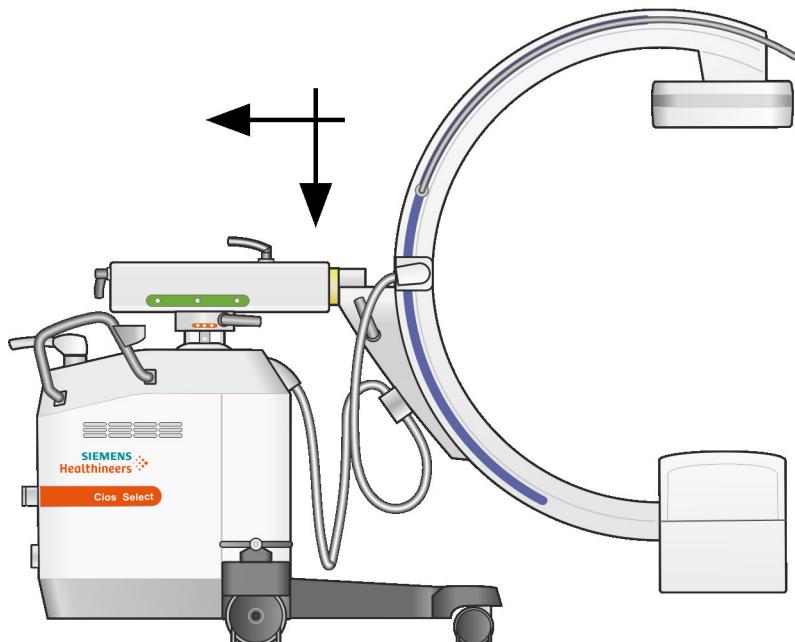
96cb3ddce46c2edcc0a81e6604eeae02 / 2 / Draft
Information class: clinical

Preparing_the_C_arm_FD

Preparing the C-arm

Prior to transport, the C-arm system must be set to the transport position.

- 1 Release all brakes of the C-arm.
- 2 Set the C-arm to the transport position shown in the drawing.
 - Angulation 0°
 - Orbital position 0°
- 3 Move the lifting column to its lowest position.
- 4 Move the horizontal support arm all the way back.



Avoid transporting the C-arm system on inclined surfaces > 5° or it may slip or tip over.

5e6792f87833a6d90a81e6671622ad9 / 4 / Draft
Information class: clinical

Transporting

Drive operation and steering of the C-arm system

With the steering lever, you operate the breaks of the C-arm wheels and steer the C-arm in the required direction.

The steering lever can be locked into 3 different positions. One is for movement straight ahead, the others for transverse travel to the right or left.

a6a12282f2dd090bc0a81e664f75534f / 1 / Approved for release

HZ_XP_hm_docUser_note_fast_braking_more_difficult

hazard-key: hm_docUser_note_fast_braking_more_difficult

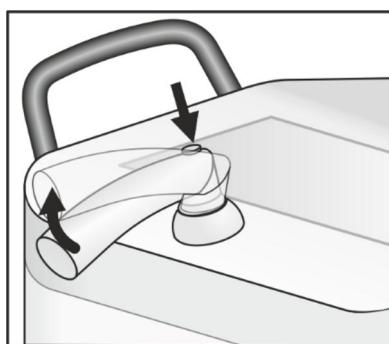
CAUTION

Weight of the device.

Risk of crushing!

- ◆ Fast braking can be impacted by the weight of the device. Pay attention to your speed as well as the floor covering, slope, and uneven areas.

- 1 Pull the lever up.



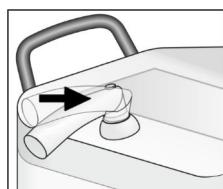
Drive operation for the C-arm system is now possible.

- 2 Turn the steering lever in the required direction.

- 3 Move the C-arm system by hand.

You have the following options for steering the C-arm system:

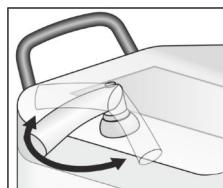
- **Motion straight ahead / pivoting in place**



The brake is released, the steering lever is pointing straight up.

The C-arm system can now be driven straight ahead or pivoted in place.

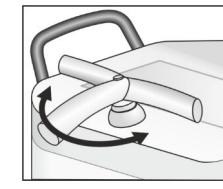
- **Diagonal motion**



The brake is released, the steering lever is angled to the left or to the right.

The C-arm system can now be driven diagonally.

- **Straight left or straight right motion**



The brake is released, the steering lever is pointing straight to the left or the right.

The C-arm system can now be driven straight to the left or straight to the right.

3 System Description



Avoid transporting the C-arm system on inclined surfaces > 5° or it may slip or tip over.

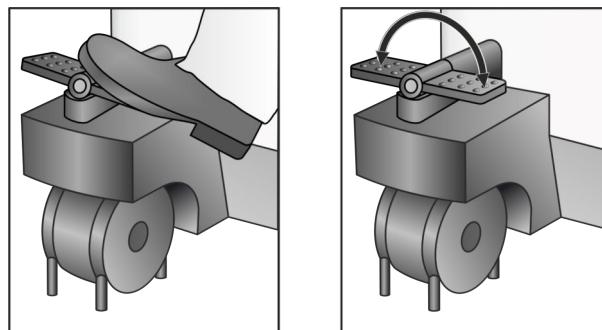
ab6337fd78339f89c0a81e6671622ad9 / 3 / Draft
Information class: clinical

Moving_the_C_arm_system

Braking the C-arm system

To securely brake the C-arm system, particularly on tilted or uneven planes and surfaces, proceed as follows:

- ◆ Keep the foot pedal pressed on both sides of the system.



The foot pedal can be pressed in both directions.

The C-arm system brakes are now locked. However, even with the brake applied, C-arm movements are still possible.

4082bbbe78339971c0a81e664e3d56ba / 3 / Draft
Information class: clinical

Cable_deflectors

Cable deflectors

TOPIC INFO
INDEX: [Cable deflectors]

Any cables on the ground that might inhibit the maneuverability of the unit are pushed aside by cable deflectors. Unit movement is not obstructed.



When transporting the C-arm system make sure there are no obstructions on the floor.

5ac0738348e43377c0a81e6656427e71 / 1 / For approval for release
Information class: clinical

Transporting_the_monitor_trolley

3.2.8 Transporting the monitor trolley

TOPIC INFO
INDEX: [Monitor trolley : transporting]
INDEX: [Trolley : transporting]

5d4fe241f428ec42c0a81e6621a73c26 / 2 / Draft
Information class: clinical

Preparing_the_monitor_trolley_FD__MDR_

Preparing the monitor trolley

Prior to transport, the connection cable for the monitor trolley should be placed on the handles of the monitor trolley.

161a1f33f425de09c0a81e66236d6b79 / 2 / Draft

HZ_XP_hm_docUser_note_increase_of_tilt_moment__MDR_

hazard-key: hm_docUser_note_increase_of_tilt_moment



- ◆ Hang the rolled-up cables on the handles of the monitor trolley.

i Avoid transporting the monitor trolley on inclined surfaces > 5° or it may slip or tip over.

da4139f778339fe6c0a81e6671622ad9 / 3 / Draft
Information class: clinical

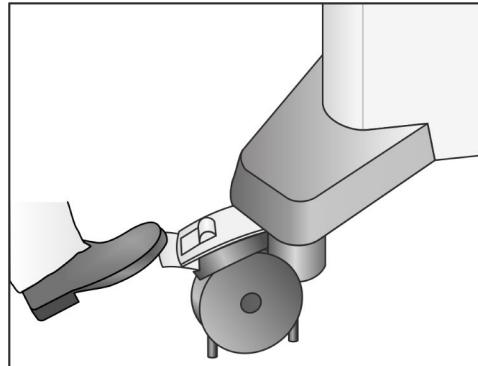
Moving_the_monitor_trolley

Moving the monitor trolley

TOPIC INFO

INDEX: [Monitor trolley : moving]
INDEX: [Trolley : moving]

3 System Description



- ◆ Release the central brake on the front of the monitor trolley to start moving it.



When the monitor trolley is moved, care must be taken that it does not collide with, for example, catheters or anesthesia tubes.

7a46b80f9ba773270a53dbdb239480c5 / 1 / Draft
Information class: clinical

Locking_the_monitor_trolley

Locking the monitor trolley

- ◆ To lock the monitor trolley, push the center brake down with your foot until it stops/engages.

630980f878341cc3c0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_docUser_note_autonomous_movements_break_failure

hazard-key: hm_docUser_note_autonomous_movements_break_failure

⚠ CAUTION

Brake failure.

Risk of crushing!

- ◆ Before beginning the examination, perform the daily function and safety checks.

a4bd38dc9ba8d8b80a53dbdb43324eb5 / 1 / Draft
Information class: clinical

Monitor_trolley_park_position

014f54307834273ec0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_docUser_parking_trolley_incline

hazard-key: hm_docUser_parking_trolley_incline

CAUTION

Insufficient braking force.

Risk of crushing!

- ◆ On inclines turn Trolley with footbrake downwards and activate brakes while parking.

On inclined surfaces with an angle of > 5°:

1 Make sure that the brakes are locked.



2 Make sure that the front of the monitor trolley faces forward in the direction of the incline.

15c2db5578339af7c0a81e664e3d56ba / 3 / Draft
Information class: clinical

Emergency_situations

3.3 Emergency situations



Keep a replacement unit ready for critical applications in an emergency.

Refer to [\[OptUnresolvedLink\]System failure\[/OptUnresolvedLink\]](#)
(→ Page 27 *System failure*)

2f0740afb9ef2a40a53dbdb527921f2 / 1 / Draft
Information class: clinical

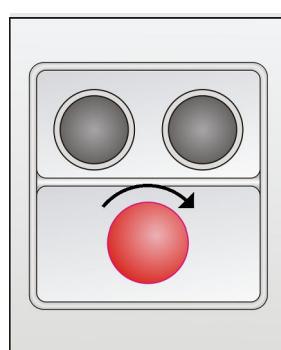
Function_of_the_Emergency_Stop_switch

3.3.1 Function of the Emergency Stop switch

TOPIC INFO

INDEX: [EMERGENCY STOP : function]

A red EMERGENCY STOP button is located in front of the unit.



3 System Description

The EMERGENCY STOP button stops the following processes immediately in a hazardous situation:

- motorized C-arm movements
- active radiation



When the EMERGENCY STOP button is activated (pressed), a red lock symbol flashes on the active emergency stop button.



If the EMERGENCY STOP button has been activated (pressed), radiation can still be released manually and the brakes can be actuated manually.

- ◆ Unlock the EMERGENCY STOP button by turning it to the right only when the hazardous situation has been eliminated.

15133b1c9bb290490a53dbdb7ca95e01 / 1 / Draft
Information class: clinical

Overriding_the_brakes

Overriding the brakes

In case of emergency (patient recovery during power failure), the C-arm can be moved in the direction desired without releasing the brakes when enough strength is applied.

53581a0a78339913c0a81e6671622ad9 / 2 / Draft
Information class: clinical

Behavior_in_case_of_power_failure

3.3.2 Behavior in case of power failure

TOPIC INFO

INDEX: [Power failure]

In the case of a power failure, the unit is switched off. In order to prevent data/image loss, an uninterruptible power supply (UPS) which carries out a controlled shutdown of the imaging system is installed in the monitor trolley. The images from the last examination are saved if the auto save function is switched on (**Auto save** must be on for interventional applications).

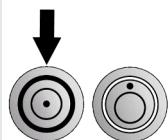
The following are not saved:

- Current, not completed examination in the event of an unexpected shutdown or power outage
- Collimator position
- Set dose values
- Image orientation
- Position memory
- Zoom

If there is one, a hospital emergency power supply cuts in if the mains power supply fails. However, this usually occurs with interruption and can take some time.

The system can be restarted as soon as the mains power supply is available or the emergency power unit is functioning.

Restarting



- 1 Press the **ON** button on the C-arm system to restart the system.
- 2 Wait until the unit has fully rebooted.
- 3 Pay attention to error messages.

When the power-up process has been completed (after approx. 4 minutes), the Cios Select is fully operational again.

- 4 Reselect the last patient in order to continue his or her treatment.
- 5 Perform the procedure, dose and collimator settings required in order to continue the application.

The positioning of the C-arm remains intact when the system is switched off. Nevertheless, please check the current position and correct it if necessary.

6c924ea97833a3bdc0a81e6671622ad9 / 3 / Draft
Information class: clinical

[Restarting_the_Cios_Select](#)

3.3.3 Restarting the Cios Select

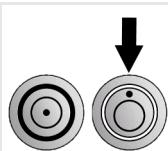
TOPIC INFO

INDEX: [Rebooting]

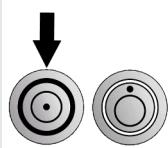
The Cios Select must be restarted following certain error messages.

The following settings are reset to their default values by a restart:

- Collimator position
- Set dose
- Image orientation
- Position memory
- Zoom



- 1 Switch the system off by pressing the **OFF** button on the unit.
- 2 Wait until the computer has shut down.



- 3 Press the **ON** button to restart the unit.
- 4 Pay attention to the error messages displayed.
- 5 Reselect the last patient in order to continue his or her treatment.
- 6 Perform the procedure, dose and collimator settings required in order to continue the application.

The positioning of the C-arm remains intact when the system is switched off. Nevertheless, please check the current position and correct it if necessary.

3 System Description

6128f30e35127397c0a81e664310ce76 / 1 / For approval for release

HZ_XP_hm_docUser_Reset_procedure

hazard-key: hm_docUser_Reset_procedure

⚠ CAUTION

Restarting the imaging system is not possible.

Treating patients no longer possible!

- ◆ Restart the system as presented in the following reset procedure.

96a159df2af616c30a53dbdb05a11853 / 1 / Draft

Restart_via_reset

Information class: clinical

3.3.4 Restart via reset

TOPIC INFO

INDEX: [RESET]

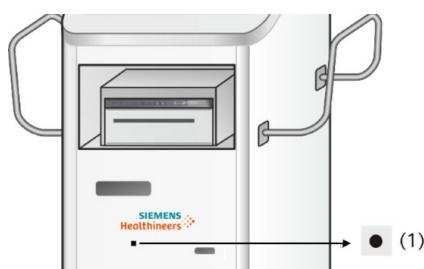
If the computer fails to shut down or no longer reacts to inputs, a system reset may be necessary.

The following information will be lost following a reset:

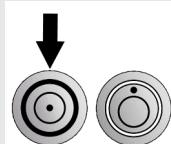
- Collimator position
- Set dose
- Image orientation
- Position memory
- Zoom

Resetting

- 1 Use a pin or a pointed object to actuate the reset button on the monitor trolley (the system will not automatically boot up afterwards).



- 2 After the system switches off, press the **ON** button (1) to switch the unit on. Wait until the system has rebooted.
- 3 Reselect the last patient in order to continue his or her treatment.
- 4 Perform the procedure, dose and collimator settings required in order to continue the application.



The positioning of the C-arm remains intact when the system is switched off. Nevertheless, please check the current position and correct it if necessary.

3.3.5 Procedure for cardiopulmonary resuscitation (CPR)

TOPIC INFO

INDEX: [Cardiopulmonary resuscitation (CPR)]
INDEX: [CPR]

If cardiopulmonary resuscitation (CPR) becomes necessary, the Cios Select must be removed from the treatment table to ensure free access to the patient. The treatment table used for cardiopulmonary resuscitation must comply with IEC 60601-2-43:2010.

- 1 Move the C-arm to a position where it can be removed from the table without causing a collision.
- 2 Release the brakes and move the C-arm to the required position either via motor drive or manually. Reapply the brake to prevent unwanted movements of the C-arm.
- 3 Then release the brake lever and move the Cios Select out of the treatment area.
- 4 At the same time, watch out for the cables leading to the monitor trolley and the footswitch.
- 5 Release the brake of the monitor trolley, if necessary, and remove it from the treatment area.

3 System Description

4 Examination

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240c025b7833b8f2c0a81e664e3d56ba / 2 / Draft
Information class: clinical

Safety_information_relating_to_the_examination_procedure

4.1 Safety information

TOPIC INFO

INDEX: [Examination : safety information]

6628285b7833b50cc0a81e664e3d56ba / 1 / For approval for release
Information class: clinical

Prior_to_the_examination

4.1.1 Prior to the examination

TOPIC INFO

INDEX: [Prior to the examination : safety information]

Examination settings

Before starting surgery, please make sure that all the set parameters as well as examination settings in all operation modes are correct.

Audible warnings

Audible warnings over the loudspeakers indicate possible hazards, such as crushing hazards, longer radiation release or high dose rate.

df06ed5678341d20c0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_docUser_note_befor_sataring_treatment

hazard-key: hm_docUser_note_befor_sataring_treatment

CAUTION

Falling short of the safety distance.

Risk of crushing!

- ◆ Check the loudspeakers for proper functioning. An audible signal must sound while the system starts up.

Software failure

d7dbcddc783428b4c0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_docUser_software_lockup

hazard-key: hm_docUser_software_lockup

CAUTION

Software crash.

Working with the imaging system is no longer possible.

- ◆ Restart the system.

Storage capacity

The hard disc fill level is displayed in the status bar of the left monitor. A warning signal is displayed before the final capacity of the hard disk is reached.

4 Examination

Icon	Short description
	Available disk space: ≤ 100%
	Available disk space: ≤ 75%
	Available disk space: ≤ 50%
	Available disk space: ≤ 25%
	Available disk space: < 12.5% This icon indicates the available disk space has reached a critical level.
	Available disk space: = 0 This icon indicates there is no available disk space.



Please make sure that there is sufficient storage capacity before you start the examination. In addition, please observe the relevant system messages.

Reference images from previous examinations

b02d6e5878341c36c0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_docUser_network_failure

hazard-key: hm_docUser_network_failure



CAUTION

Risk that the network connection may not be available continuously.

Reference images not available during intervention.

- Before beginning the intervention, the user should load the required images from the network archive.

ab6578d02b1b2fb80a53dbdb7530ecca / 1 / For approval for release

During_the_examination_FD

Information class: clinical

4.1.2 During the examination

TOPIC INFO

INDEX: [During the examination : safety information]

6a3e0cb978341e87c0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_docUser_note_collisions_with_other_OR_instruments

hazard-key: hm_docUser_note_collisions_with_other_OR_instruments

⚠ CAUTION

C-arm movement during surgery.

Risk of injury!

- ◆ Due to the maneuverability of the C-arm, collisions with other surgical devices are possible if the device is not used as intended and in accordance with the instructions in this manual.

f70a3bbc4c4fcf67c0a81e665768f1e8 / 1 / For approval for release

HZ_XP_hm_docUser_xCP_intrusion_instruments

hazard-key: hm_docUser_xCP_intrusion_instruments

⚠ WARNING

Instruments falling into the gap between the control unit and its housing.

Risk of short circuit, electric shock, and/or fire!

- ◆ Make sure no instruments, conductive material, or fluids penetrate into the openings/joints between the control unit and its housing.

Patient position

Prior to the release of radiation, it is necessary to check whether the patient is positioned correctly.

Image orientation

Ensure correct image orientation (accurate to side) on the monitor/on the hardcopy.

Data conformity

Correct orientation of image and patient data must be checked before storage.

Before terminating an examination and beginning work on the next patient, the patient data should be verified.

The registered patient should be deselected at the end of the examination.

(→ Page 150 *Closing the patient*)

4 Examination

Detector temperature

7af2888e4c5e1021c0a81e6653ffea49 / 1 / For approval for release

HZ_XP_hm_docUser_to_high_detector_temp

hazard-key: hm_docUser_to_high_detector_temp



CAUTION

Detector temperature is not within recommended range.

Risk of Limited image quality in the resulting X-ray images. Risk of X-ray radiation exposure without any diagnostic value!

- ◆ Regularly check the temperature icon on the display.

Exceeding the critical temperature threshold of 58°C is indicated by a system message. In this case it is recommended to shut down the system immediately to allow it to cool.

44581bdd7833b450c0a81e664e3d56ba / 1 / For approval for release

Preparing_the_system

Information class: clinical

4.2 Preparing the system

45ca173678341d5fc0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_docUser_note_befor_starting_daily_inspection

hazard-key: hm_docUser_note_befor_starting_daily_inspection



CAUTION

Brake failure.

Crushing hazard from automatic movements!

- ◆ Before beginning the examination, perform the daily function and safety checks.

af401f0a4c6f1630c0a81e66280ebea9 / 2 / Draft

Removing_inserting_the_FD_grid_FD

Information class: clinical

4.2.1 Removing/inserting the anti-scatter grid

TOPIC INFO

INDEX: [Scattered radiation grid : removing/inserting]

INDEX: [Grid : removing/inserting]

Removing the anti-scatter grid reduces the radiation dose (as well as image quality), e.g., for a pediatric examination.

c8f35db978342ba1c0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_um_ChangingGridWithCare

hazard-key: hm_um_ChangingGridWithCare

⚠ CAUTION

Changing the grid.

Crushing hazard between the detector housing parts.

- ◆ Note the hazardous zones/locations between the detector housing parts.

a5cdc9c378343301c0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_um_Removable_Grid

hazard-key: hm_um_Removable_Grid

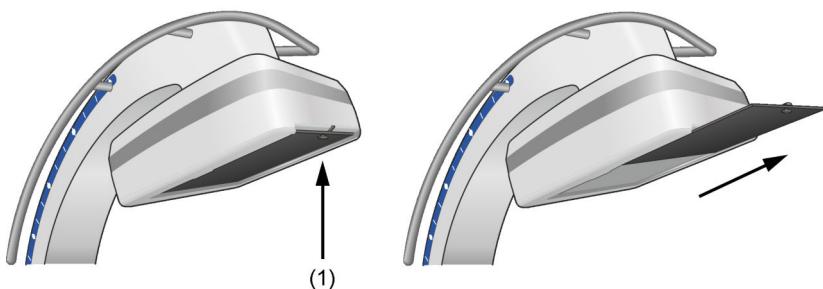
⚠ CAUTION

Incorrect grid status: inserted, removed.

Radiation unsuitable for imaging results in unnecessary radiation exposure!

- ◆ Select the application according to your clinical procedure.
- ◆ Make sure that the current grid status meets your image requirements. The imaging system indicates whether a grid has been inserted or removed.
- ◆ If necessary, insert the grid manually or remove it from the tray.

Removing the anti-scatter grid



- 1 Turn the screw clockwise to open (counterclockwise to lock) the anti-scatter grid.
- 2 Carefully pull out the anti-scatter grid.
- 3 Put the anti-scatter grid in a safe place.
- 4 Check that the icon for "anti-scatter grid inserted" has a line through it.

This indicator appears on the left monitor and the control panels in the exposure parameter area.



4 Examination

Inserting the anti-scatter grid

Once the pediatric examination is completed, you must reinstall the anti-scatter grid in order to ensure optimum image quality during standard examinations.

- 1 Install the anti-scatter grid in the reverse order of its removal: Push in the anti-scatter grid and tighten the knurled screw.
- 2 Check that the icon for "anti-scatter grid inserted" does not have a line through it.



This indicator appears on the left monitor and the control panels in the exposure parameter area.

3a9409a52b20f6690a53dbdb408a8c0b / 1 / For approval for release
Protection_against_contamination_and_the_penetration_of_fluids_FD
Information class: clinical

4.2.2 Protection against contamination and the penetration of fluids

If a significant amount of fluid is expected during an examination, there is a risk of fluids penetrating into the system. It is recommended to cover the relevant areas appropriately.

The C-arm can be covered completely or partially with a sterile disposable sheet to protect it against contamination.

(→ Page 306 *Sterile cover on the detector, single tank and C-arm*)

096eba2c4c86699dc0a81e6648ff48cc / 1 / For approval for release

HZ_XP_hm_docUser_use_FD_drapes

hazard-key: hm_docUser_use_FD_drapes

WARNING

Fluid penetration and contamination.

Damage to the flat detector

- ◆ Make sure that the detector is always covered by a disposable cover during the examination.

d6af6c2accfa6ecc0a81e66647eb467 / 1 / For approval for release
Information class: clinical

Positioning_the_C_arm

4.2.3 Positioning the C-arm

4ef193cd2b2357f00a53dbdb3b604d85 / 2 / Draft
Information class: clinical

Using_the_Laser_Light_Localizer_FD

Using the Laser Light Localizer

TOPIC INFO

INDEX: [Laser light localizer]

Depending on the configuration of your Cios Select, you can use the laser light localizer as a positioning aid.

Switching on



- ◆ Press this button on the control panel.

Depending on the system configuration, all laser light localizers on the Carm system switch on.

The target crosshairs are displayed on the left monitor as long as the laser light localizer is switched on (depending on the configuration settings).

Switching off



- ◆ Press the activated button on the control panel.

The activated laser light localizer is switched off automatically after 5 minutes.

a4836e917833a801c0a81e6671622ad9 / 2 / For approval for release
Information class: clinical

Aligning_the_C_arm

Aligning the C-arm

TOPIC INFO

INDEX: [C-arm : aligning]

3f27411878341ed5c0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_docUser_note_collisions_with_other_systems

hazard-key: hm_docUser_note_collisions_with_other_systems

CAUTION

Collision with other systems.

Risk of injury!

- ◆ Due to the maneuverability of the C-arm, collisions with other systems are possible if the device is not used as intended and in accordance with the instructions in this manual.

- 1 Align the C-arm system to the table and patient.
- 2 Release the relevant brake and move the C-arm to the required exposure position.

[OptUnresolvedLink]Move C-arm (Move C-arm)[/OptUnresolvedLink]
(→ Page 73 Move C-arm)

- 3 Lock all brakes again.

a661605d7833bf68c0a81e664e3d56ba / 2 / For approval for release
Information class: clinical

System_position_for_interventional_examinations

4.2.4 System position for interventional examinations

TOPIC INFO

INDEX: [Interventional examinations]

For interventional examinations the system must be in vertical position.

4.2.5 Unlocking/locking radiation release

TOPIC INFO

INDEX: [Radiation release : unlocking/locking]

Your system has a lock-out option for radiation release to prevent unintentional release of radiation, e.g., by accidentally pressing the footswitch.

The radiation lock can be optionally secured with a password so only authorized persons can set the exposure parameters and release radiation.



You can set and change the password for locking radiation release in the configuration.

(→ Page 239 *Password for radiation release*)

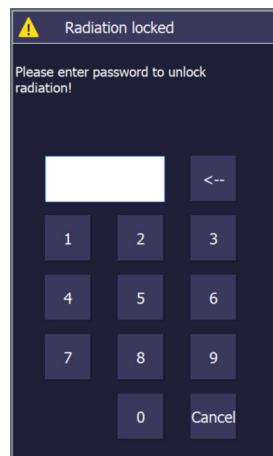
Unlocking radiation release



1 Press this button on the control panel.

Without password protection on the radiation lock, exposure parameters can be set and radiation released.

With radiation lock password protection, the password entry dialog is displayed.



2 Enter the correct password (default setting: **0000**).

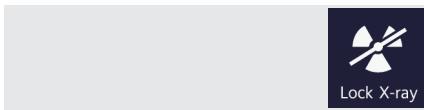
Exposure parameters can now be set.

Radiation can be released with the hand switch and the footswitch.



If you mistype your password, you can delete your entry by pressing the backspace button.

Locking radiation release



- 1 Press this button on the control panel.

Without password protection on the radiation lock, exposure parameters setting and radiation release are locked.

With password protection, the password entry dialog is displayed.



- 2 Enter the correct password.

Exposure parameters setting and radiation release are locked.

92dd01cf2b2d62260a53dbdb1adf3986 / 2 / Draft
Information class: clinical

Selecting_the_application_FD

4.2.6 Selecting the application

TOPIC INFO

INDEX: [Application : selecting]

The applications contain individual sets of examination settings tailored to various medical application areas (such as General, Breast, Ortho).

The available applications are divided into application groups, for example, according to hospital-specific requirements.

193401cd350dc344c0a81e666c607529 / 1 / For approval for release

HZ_XP_hm_docUser_image_orientation_reset

hazard-key: hm_docUser_image_orientation_reset

CAUTION

The image orientation is reset.

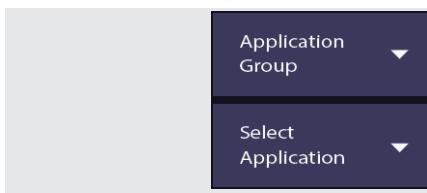
Risk of an incorrect decision during surgery!

- ◆ Be aware that the image orientation is reset when changing the application group or application. All previous settings are lost.

Setting the application and application group

The applications and application groups are available in the **Advanced Mode** on the control panel.

4 Examination



1 Press the button to open the **Application Group** or **Application** selection lists.

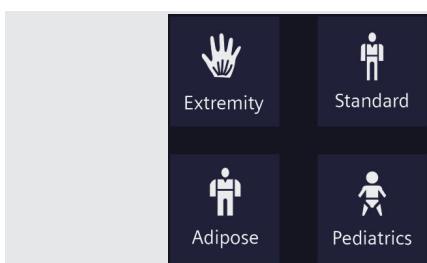
2 Use the scroll bar to scroll up and down in the selection lists.

3 Click the desired entry.

The exposure parameters including the operating mode are preset according to the selected application.

Predefined application selection

You can choose from four default standard applications in the **Basic Mode** on the control panel.



◆ Press the button for the required application.

The button pressed is highlighted white.

The selected application is displayed on the left monitor.



8bdff77a7833b25dc0a81e664e3d56ba / 2 / For approval for release
Information class: clinical

Patient_registration

4.3 Patient registration

Before you can examine a patient with your system, you must register the patient.

Registration means that you give your system all the information about a patient that it requires for an examination.

588feb7f2dd5788c0a81e664f75534f / 1 / Approved for release

HZ_XP_hm_docUser_wrong_patient_assignment

hazard-key: hm_docUser_wrong_patient_assignment



CAUTION

Risk of mistaking patients.

The wrong patient is being treated.

◆ The user must ensure the correct patient is being treated before he or she is registered on the system.

adce0b85f2dd40fcc0a81e664f75534f / 1 / Approved for release

HZ_XP_hm_docUser_selectPatient

hazard-key: hm_docUser_selectPatient

CAUTION

Patient ID already exists.

Misinterpretation of data of the examined patient if the selection is based solely on the patient ID.

- ◆ Always use four-way identification [patient name, sex, date of birth, patient ID].
- ◆ Avoid mixing up patient data by using four-way identification. Selecting patient data based on the patient ID alone is insufficient. Ensure the proper display of parameters in the **Worklist** and in the **Patient list**.

Depending on how registrations are organized in your hospital and how much time you have for registration, you can choose between different patient registration procedures.

- **Emergency registration**

If a patient is admitted who is in an extremely critical condition and must therefore be examined and treated immediately, select emergency registration. The patient is registered with provisional data as an emergency patient. This reduces the time before you can begin the examination to a minimum.

- **Registration for the examination**

However, if you want to register a patient for an examination, you first enter the patient's data or select it from the database and then examine the patient.

- **Preregistration**

If you want to prepare the system to examine a patient at a later point in time, then you can preregister the patient.

For example, in the morning you can enter the data of all the patients to be examined during the day. When you want to begin an examination, simply select the relevant data and edit them, if necessary. This saves time during the examination.

- **HIS/RIS query**

If your system is connected to a HIS/RIS system (hospital and radiology information system), the patient can be registered for the examination through one of these systems.

4 Examination

9f6d5613f2dce269c0a81e664f75534f / 1 / Approved for release

HZ_XP_hm_docUser_HISRIS_configuration

hazard-key: hm_docUser_HISRIS_configuration



CAUTION

HIS/RIS configuration not harmonized.

Communication not possible.

- ◆ Within the HIS/RIS do not use the "Only Patient ID" configuration because the patient is identified in the imaging system based on four pieces of data (patient name, ID, sex, date of birth).



Patient registration is also possible on the monitor trolley when the C-arm system is disconnected.

4e8c55a92b3570580a53dbdb6cf8d9ad / 2 / Draft
Information class: clinical

Emergency_registration_FD

4.3.1 Emergency registration

TOPIC INFO

INDEX: [Emergency registration]

An emergency registration is performed if a patient must be examined and treated immediately, without any time to waste entering the patient's data.

Emergency registration on the monitor trolley

Emergency registration can be performed on the control panel at any time, regardless of the processing step you find yourself in.

Start Exam menu

Prepare Patient

- 1 Press the **Prepare Patient** menu button.

Emergency

- 2 Press the **Emergency** button from the drop-down button list.

You can now start with the examination.

Another patient registered

If you perform emergency registration while another patient is registered, a corresponding dialog box is displayed.

- 1 Select the desired options to conclude the examination.
(→ Page 150 *Closing the patient*)
- 2 Click **OK** to close the currently registered patient.

Emergency registration on the monitor

When you are editing patient data the **Data Entry Dialog** window is displayed on the monitor. You can start emergency registration in that window with a click of the mouse.

Emergency

- ◆ Click this button in the **Data Entry Dialog** window.

The patient is registered as an emergency patient.

The dialog window on the monitor closes.

Emergency registration with the hand switch or footswitch

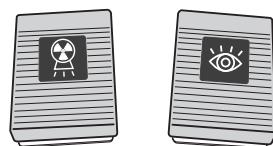
Outside a running examination, you can perform emergency registration by activating the hand switch or footswitch.

- 1 Make sure that there is not a patient registered for an examination.



- 2 On the hand switch, press the radiation release button **once**.

– or –



- On the footswitch, press the radiation release pedal **once**.

The patient is registered as an emergency patient.

Provisional patient data

During emergency registration, missing patient data are supplemented automatically. An emergency patient is registered with the following data:

Data type	Entry
Last name	Emergency
First name	Emergency if the patient ID has already been entered sequential number if the patient ID has not already been entered
Date of Birth	Today's date
Sex	Unknown
Patient ID	E_ sequential number



Make sure to correct the provisional patient data when the opportunity becomes available (→ Page 167 *Correcting data*).

99f765217833b634c0a81e664e3d56ba / 2 / New
Information class: clinical

Registering_a_new_patient

4.3.2 Registering a new patient

TOPIC INFO

INDEX: [Registration : new patient]
INDEX: [New patient : registration]

4 Examination

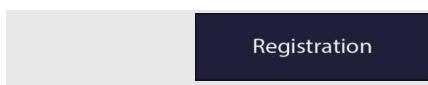
If a patient has never been examined in your hospital or practice before, no data about this patient will be stored on your system. Therefore all the required data for this patient must be entered before an examination.

8966156f2b36b73c0a53dbdb3a92a594 / 2 / Draft
Information class: clinical

Opening_patient_registration_FD

Opening patient registration

Open patient registration on the control panel.



1 Press this button.

2 Press the **Registration** button from the drop-down button list.

The control panel switches to keyboard mode.

The **Data Entry Dialog** window opens on the left monitor.

bbe729e37833ad10c0a81e664e3d56ba / 3 / Draft
Information class: clinical

Data_Entry_Dialog_Window

Data Entry Dialog window

The mandatory fields for registration and preregistration are highlighted in bold. Which fields are displayed and which are mandatory can be configured (→ Page 228 *Patient registration*).

The screenshot shows the "Data Entry Dialog" window divided into several sections:

- PATIENT:** Contains fields for Last Name, First Name, Middle Name, Title, Suffix, Military Rank, Patient ID, Social Security No., Date of Birth (with day, month, year dropdowns), Age, Sex (Male, Female, Other radio buttons), Height, and Weight.
- INSTITUTION:** Contains fields for Institute Name, Operator 1, Operator 2, Referring Physician, and Physician 1, each with a dropdown menu.
- STUDY:** Contains fields for Accession No., Request ID, Study Description, Study ID, and Study Comment.
- Application:** Contains fields for Application group (Standard dropdown) and Application (Standard (d)fei dropdown).
- GROUPS:** Contains a Group dropdown set to Administrators.

At the bottom of the window are buttons for Emergency, Examination, Preregister, and Cancel.

PATIENT area

Name, Patient ID, Age, and Sex of the patient are always mandatory entry fields. This information uniquely identifies the patient in your databases.

Special notes:

- **Patient ID**

You can have a unique patient ID generated as long as no internal rules have been set for the format.

- **Date of Birth**

Four digits must be entered for the year of birth. If the date of birth is unknown, the patient's age is used to calculate a date of birth from today's date.

- **Age**

If the date of birth has been entered, the patient's age is calculated from today's date and entered.

STUDY area

In this area, data from the HIS/RIS system (option), if connected, are entered automatically. The data are used especially to uniquely identify the study created for the examination.

INSTITUTION area

This area contains information regarding the examining facility and personnel. The information can be helpful if the examination images are passed on to a different organization for reporting.

Special notes:

- **Institution Name**

The institution name entered during configuration is entered here as the default.

Application area

This area shows the applications available for selection, divided into different application groups (→ Page 113 *Selecting the application*).

GROUPS area

This area is only available if HIPPA is licensed. If your user account belongs to several groups, you can select the group the patient shall belong to.

Only groups your user account belongs to are displayed.



1bb132702b3853130a53dbdb369420af / 2 / Draft
Information class: clinical

Entering_data_FD

Entering data

The cursor is in the input field for the patient's name.

Making entries

- 1 Enter text and numbers using the keyboard in the control panel.

The characters entered are shown on the monitor and in the text field on the control panel.

	<<	>>
--	----	----

4 Examination



- 2 Use the mouse to select entries from the selection list.



You can manage the content of certain selection lists (drop-down combo boxes) in the following way:

- To add an entry to the list, mark the text entered in the text field and press **Shift** or **Ctrl + ↑** (arrow up) on the keyboard.
- To remove an entry from the list, select it from the list (text is marked in the text field) and press **Shift** or **Ctrl + ↓** (arrow down) on the keyboard.

Changing fields



- ◆ Use the **Tab** button or click the mouse to switch to the required field.

Generate a patient ID



- ◆ Click the icon in the **Data Entry Dialog** window.

A new patient ID is generated based on the current date and time.

Correcting the entry



- 1 Press the arrow buttons to move the cursor one character at a time.



- 2 Press this button to delete the character ahead of the cursor.

– or –



Mark the incorrect characters with the arrow buttons while holding the **Shift** button, and overwrite with the keyboard.

Deleting an entry

- 1 Select all the characters in an entry to be deleted with the mouse.



- 2 Press this button.

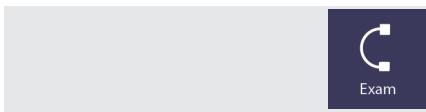
15fe89b72b39a1b40a53dbdb345bfbb4 / 2 / Draft
Information class: clinical

Completing_registration_FD

Completing registration

Once you have at a minimum completed the mandatory fields in the **Data Entry Dialog** window, you can register the patient for the ensuing examination or preregister him or her for examination later on.

Examining the patient



- ◆ Press this button on the control panel.
- or -

Click this button in the **Data Entry Dialog** window.

The **Data Entry Dialog** window closes.

You can start examining the patient.

Preregistering patients



During preregistration the patient and entered data are stored locally. You can then access the patient data again when you start the examination.

(→ Page 124 *Registering patients from the worklist*)

- ◆ Click this button in the **Data Entry Dialog** window.

The patient is included in the **Worklist**.

The **Data Entry Dialog** window closes.



You can abort the current registration and close the **Data Entry Dialog** window by clicking the **Cancel** button in the dialog window or pressing the **Close** button on the control panel.



de20e6a07833b6e0c0a81e664e3d56ba / 2 / For approval for release
Information class: clinical

Registering_previous_patients

4.3.3 Registering previous patients

TOPIC INFO

INDEX: [Registration : previous patient]
INDEX: [Previous patient : registration]

A patient who has already been examined in your hospital or practice is known to your system.

For the current patient registration you apply the saved information in the **Data Entry Dialog** window.

0ea656382b3bf2b40a53dbdb1b25116a / 1 / For approval for release
Information class: clinical

Opening_the_Patient_list_FD

Opening the Patient List

You open the **Patient List** on the control panel.

- 1 Press the **Prepare Patient** menu button.



4 Examination

Previous, Pat

- 2 Press this button from the drop-down button list.

The control panel switches to keyboard mode.

The **Patient List** opens on the left monitor.

Patient Name	Patient ID	Date of Birth	Sex	Study Description	Physician	Flag
Emergency, 61	E_61	16-01-2013 (0)	O	Standard		-----
Emergency, 66	E_66	16-01-2013 (0)	O	Standard		----C--
Kunz, Andrea	160113_104...	01-04-1945 (67)	F	Standard		----C--
Meier, Hans	160113_103...	23-12-1976 (36)	M	Standard		----C--
Muster, Bernhard	160113_104...	12-05-2011 (1)	M	Standard		----C--
Schmidt, Manuel	160113_104...	12-12-1955 (57)	M	Standard		----C--
Zander, Stefanie	160113_104...	09-05-2000 (12)	F	Standard		----C--

Patient not found

If the patient you want is not displayed, a database filter may be on or the patient has been deleted.

- 1 Set the filter criteria accordingly or switch off the filter. See
(→ Page 165 *Filtering data*)

- 2 If necessary, import the patient data from the archive. See
(→ Page 170 *Importing data*)

b11e24b42b3ca4e20a53dbdb1bde6240 / 2 / Draft

Information class: clinical

Checking_correcting_patient_data_FD

Checking/correcting patient data

Patient and exam data are corrected in the **Data Entry Dialog** window.

Opening data



- 1 Use the arrow buttons or mouse to select the required patient.



- 2 Press this button.

The data of the selected patient are transferred to the **Data Entry Dialog** window.

Editing data



- 1 Check that the information in the **Data Entry Dialog** window is correct and add any missing data.

(→ Page 119 *Entering data*)

- 2 Press this button on the control panel.

– or –

Click this button in the **Data Entry Dialog** window.

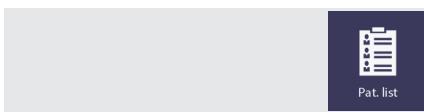
The **Data Entry Dialog** window closes.

The **Patient List** is updated based on the changes.

Wrong patient

Correct pat. data

If you have selected the wrong patient:



◆ Press this button on the control panel.

– or –

Back to pat. list

Click this button in the **Data Entry Dialog** window.

All changes in the **Data Entry Dialog** window are discarded.

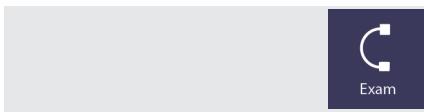
The **Patient List** is displayed again.

846ebbd62b3da15a0a53dbdb7db4f103 / 2 / Draft
Information class: clinical

Completing_registration_1_FD

Completing registration

Examining the patient



◆ Press this button on the control panel.

– or –

Examination

Click this button in the **Data Entry Dialog** window.

The **Data Entry Dialog** window closes.

You can start examining the patient.

Preregistering the patient



◆ Click this button in the **Data Entry Dialog** window.

The patient is included in the **Worklist**.

The **Data Entry Dialog** window closes.

d4eef53a2b3e7f200a53dbdb0bc1eb44 / 2 / Draft
Information class: clinical

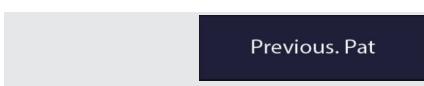
Resuming_a_commenced_study_FD

Resuming a commenced study

If you cancelled a study with **Close**, you can continue this study later. Just select the study, load the data into the **Data Entry Dialog** window, and then start the examination. All newly generated images are saved in the existing study as a new series. Please note that this is only possible if you have already acquired images in the commenced study. An empty study cannot be used for registration.



1 Press this button.



2 Open the **Patient List** by pressing this button from the drop-down button list.

3 Select the corresponding study.

4 Examination



Examination

- 4 Register the patient for examination.

You may resume your study.

dcfe88a07833b692c0a81e664e3d56ba / 1 / For approval for release
Information class: clinical

Registering_patients_from_the_worklist

4.3.4 Registering patients from the worklist

TOPIC INFO

INDEX: [Registration : worklist patient]
INDEX: [Worklist patient : registration]

The **Worklist** contains patients that were preregistered manually in your system and automatically via the HIS/RIS connection.

7fc55f852b3f8b1c0a53dbdb20112d6e / 2 / Draft
Information class: clinical

Updating_the_worklist_FD

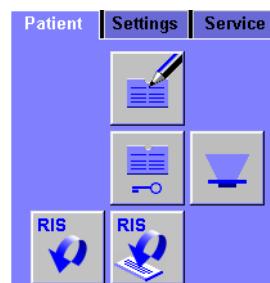
Updating the worklist

The **Worklist** is updated via the HIS/RIS system at regular intervals, and when the **Worklist** is opened. You can also initiate the update manually, for example, when you want to continue working without HIS/RIS connection.



- ◆ Press this button on the control panel.

The **Manage Tool** opens on the left monitor.



Worklist complete



- ◆ Click this icon in the **Patient** subtask card.

The **Manage Tool** closes.

The **Worklist** opens on the left monitor and is updated with the examinations planned for your system.

Filtering the worklist

If you are looking for a specific patient you can enter his name or you can query the HIS/RIS for specific entries only.



- 1 Click this icon in the **Patient** subtask card.

The **Get Worklist Dialog** window opens.



- 2 Enter the data you know as search criteria.

Possible placeholders: * stands for one or more random characters, ? stands for one random character.

Modality: The modality planned for the patient

Not only today's worklist: Query for all scheduled appointments.

- 3 Click this button.

The **Manage Tool** closes.

The **Worklist** opens on the left monitor and updates. In addition to the patients preregistered manually, only those HIS/RIS entries that meet the search criteria are displayed.

045b38232b40335b0a53dbdb03c934a2 / 2 / Draft
Information class: clinical

Opening_the_worklist_FD

Opening the worklist

You open the **Worklist** on the control panel, unless it is already displayed due to a manual update.

Prepare Patient ▾

Worklist

- 1 Press this menu button.

- 2 Press this button from the drop-down button list.

The control panel switches to keyboard mode.

The **Worklist** opens on the left monitor.

Patient Name	Patient ID	Date of Birth	Sex	Study Description	Procedure
Emergency, 65	E_65	16-01-2013 (0)	O		
Emergency 450	E_450	21-05-2013 (1D)	O		
Meier, Hans	160113_103359	11-11-1986 (26)	M		
Emergency, 64	E_64	16-01-2013 (0)	O		

4 Examination

b9d9c6b62b40e8cd0a53dbdb10d8a13a / 2 / Draft
Information class: clinical

Checking_correcting_patient_data_worklist_FD

Checking/correcting patient data

Opening data



- 1 Use the arrow buttons or mouse to select the required patient.



- 2 Press this button.

The data of the selected patient are transferred to the **Data Entry Dialog** window.

Editing data



- 1 Check that the information in the **Data Entry Dialog** window is correct and add any missing data.

(→ Page 119 *Entering data*)

- 2 Press this button on the control panel.

– or –

Correct pat. data

Click this button in the **Data Entry Dialog** window to confirm changes.

The **Data Entry Dialog** window closes.

The **Worklist** is displayed again.



For reasons of data consistency, some information in HIS/RIS entries cannot be changed, such as the personal data of the patient.

Wrong patient



If you have selected the wrong patient:

- ◆ Press this button on the control panel.

– or –

Back to pat. list

Click this button in the **Data Entry Dialog** window.

All changes in the **Data Entry Dialog** window are discarded.

The **Worklist** is displayed again.

8abadf0f2b41ae4a0a53dbdb73cdbc78 / 2 / Draft
Information class: clinical

Completing_registration_2_FD

Completing registration



- ◆ Use the arrow buttons or mouse to select the required patient in the **Worklist**, if necessary.

Examining the patient



◆ Press this button to examine the patient.

The **Worklist** closes.

You can start examining the patient.

– or –

Double-click the patient with the mouse.

[ffb43c32b422fa60a53dbdb19de12b5 / 2 / Draft]
Information class: clinical

Deleting_a_patient_entry_FD

Deleting a patient entry

As soon as the examination of a patient in the **Worklist** ends, the data saved in the study is moved automatically to the **Patient List**.

If an examination for a patient is cancelled, you can manually delete the entry so that the **Worklist** remains clear.



1 Use the arrow buttons or mouse to select the required patient in the **Worklist**, if necessary.

2 Press this button to remove the patient in question from the **Worklist**.



[f38109197833afcec0a81e664e3d56ba / 3 / Draft]
Information class: clinical

Defining_the_examination_settings

4.4 Defining the examination settings

TOPIC INFO

INDEX: [Examination : settings]

The standard exposure parameters are already set by default for the examination, depending on the **Application** you have selected

[OptUnresolvedLink]Selecting the application (Selecting the application)[/OptUnresolvedLink] (→ Page 113 *Selecting the application*).

If these settings are appropriate for your examination, you can start the image acquisition immediately on the **Cios Select** (→ Page 137 *Acquiring images*).

The **Application** currently selected together with the patient data are displayed in the left monitor on the upper left.

Meier, Hans
23-12-1976
Standard

i Make sure that the patient's name on the monitor matches the patient to be examined.

4 Examination

b451e1302b5767f70a53dbdb3b01b1bc / 2 / Draft
Information class: clinical

Changing_the_fluoroscopy_parameters_FD

4.4.1 Changing the fluoroscopy parameters

TOPIC INFO

INDEX: [Fluoroscopy parameters]

On the control units, you set the exposure parameters on the control panel. Settings may be changed prior to each radiation release.

ed108e2078342f1bc0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_um_Exposure_Parameters

hazard-key: hm_um_Exposure_Parameters



CAUTION

Incorrect exposure parameters.

Risk of unnecessary radiation exposure due to incorrect exposure parameters.

- ◆ Ensure the exposure parameters are correct. Pay attention to the exposure index (EXI).



The operating modes can also be selected via the corresponding button on the multifunctional footswitch (optional), if used. You can then release radiation again right away.

(→ Page 301 *Wireless multifunctional footswitch*)

a786fe502b5845d90a53dbdb48ace6b0 / 1 / For approval for release
Information class: clinical

Selecting_the_operating_mode_FD

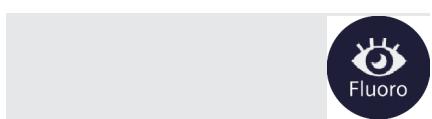
Selecting the operating mode

TOPIC INFO

INDEX: [Operating mode : selecting]

The operating mode currently set is indicated by the button highlighted white. The current operating mode is deselected when switching to another mode.

Fluoroscopy



Fluoroscopy operating mode enables real-time imaging which, for example, allows viewing of moving objects.

- ◆ Press this button.

Fluoroscopy mode is selected.

The button is highlighted white.



Upon switching on the Cios Select, the operating mode configured as the standard application, usually **Fluoroscopy**, is selected automatically by default.

Single image

Single image operating mode enables an electronic instant image with the best image quality. It is recommended for final exposures.

On activation of single image a short radiation pulse is released.



Please note that a Fluoro exposure with > 2fps has to be made before a single exposure in order to set the exposure parameters (kV/mA) and thereby achieve good image quality.



When acquiring single images, remember to keep the radiation release button pressed (on the hand switch or footswitch) until the radiation indicator goes out.



- ◆ Press this button.

Single image operating mode is selected.

The button is highlighted white.



After complete image acquisition, radiation is automatically switched off, even if the radiation release button remains pressed.

Subtraction (Sub)



The subtraction technique enables an isolated display of the vascular system after injection of the contrast agent by means of background subtraction.

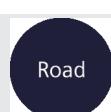
(→ Page 152 *Subtraction angiography (Sub)*)

- ◆ Press this button.

Subtraction operating mode is selected.

The button is highlighted white.

Roadmap



The Roadmap technique enables the user to position a catheter precisely in a blood vessel under fluoroscopy.

(→ Page 154 *Roadmap (Road)*)

- ◆ Press this button.

The **Roadmap** mode is selected.

The button is highlighted white.



Please note that a Fluoro exposure with > 2fps has to be made before exposures using subtraction or roadmap technique in order to set the exposure parameters (kV/mA) and thereby achieve good image quality.

Setting collimators

TOPIC INFO

INDEX: [Collimator : setting]

The Cios Select uses the following collimators to collimate the X-ray beam:

- Iris collimator

The iris collimator provides radiation protection for the patient and all persons participating in the exam.

- Slot collimator

The semi-transparent slot collimator is used primarily for collimation of the extremities.



When you open/close the iris collimator or move the slot collimator without radiation, you can see the position of the collimators on the LIH image displayed with lines superimposed.

When you release radiation, the collimators are in the position shown in the image.

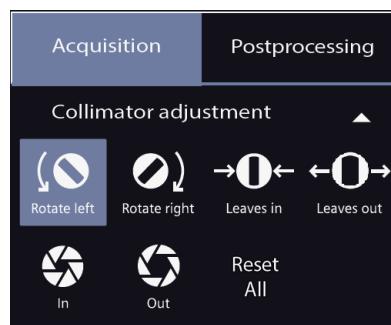
Digital collimator function

The areas outside the collimated areas are automatically blackened if so configured by Siemens Healthineers Customer Service for the selected application.

Close/open iris diaphragm

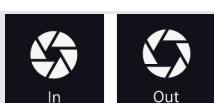
When switching on the Cios Select, the iris collimator automatically opens to full format. Smaller collimation produces less scatter radiation and therefore better image contrast.

- 1 Change to **Advanced Mode** if necessary
- 2 Open the **Collimator adjustment** menu in the **Acquisition** task card.



- 3 Press one of these buttons.

The iris collimator opens/closes.



c40661bf78342ce9c0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_um_CollimatorCheck

hazard-key: hm_um_CollimatorCheck

CAUTION

Wrong collimator setting.

Dose not as required!

- ◆ The iris collimator needs to be set so that at least one edge of the leaves is visible in the fluoroscopy image. This must be checked daily.

Opening/closing the slot collimator

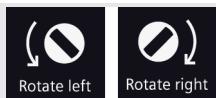


Collimation enhances image contrast and reduces scatter radiation. Direct radiation that passes the soft tissue laterally is reduced to such an extent, that differences in brightness do not disturb when images are viewed on the monitor. The position of the left and right slot collimator blades can be changed jointly (symmetric).

- ◆ Press one of these buttons.

The slot collimator opens/closes symmetrically.

Rotating the slot collimator



By rotating the slot collimator, the collimated field can be quickly oriented to the direction of the anatomy under examination (e.g. the extremities).

- ◆ Press one of these buttons.

The slot collimator rotates to the left/right.

Resetting the collimator



- ◆ Press this button.

The collimators are reset to full format.

07736d6b2b5a74750a53dbdb5a6398f3 / 2 / Draft
Information class: clinical

Selecting_the_dose_rate_level_FD

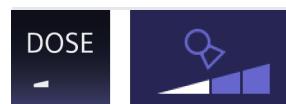
Selecting the dose level

TOPIC INFO

INDEX: [Dose level : selecting]

You can choose between three dose levels (deviating from the current user program).

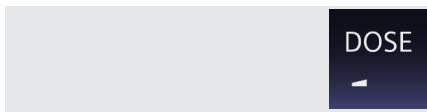
The dose level currently set is shown on the display of the control panel and on the left monitor.



Dose level display

4 Examination

Setting the dose level



- ◆ Press this button several times, if necessary.

Each time you press the button, you switch between dose levels of low, medium, and high.



(1) Low dose

(2) Medium dose

(3) High dose



CHARM: SP_00169047

When selecting different dose levels, please note that additional specific parameter settings, such as k factor and pulse rate, change automatically.



If the maximum skin dose is exceeded at the highest dose level, the corresponding button is called "High level". The maximum duration of a fluoro scene is limited to 30 s. The button and the display on the monitor are marked with a warning symbol.



9575bdee613735ddc0a81e6634917889 / 2 / Draft
Information class: clinical

Switching_on_metal_correction_FD

Switching on metal correction

TOPIC INFO

INDEX: [Metal correction : switching on]

Metal correction is designed for examinations with metal parts in the measurement range (e.g., larger, non-standard implants). When activated, the contrast and brightness settings are adjusted accordingly and the automatic dose rate control is improved.

- 1 Change to **Advanced Mode** if necessary.
- 2 Open the **Image Quality Setting** menu in the **Acquisition** task card.



3 Press this button.

The button is highlighted white.



69f5007d2b5bd2bc0a53dbdb4c3bacb1 / 2 / Draft
Information class: clinical

Selecting_the_noise_filter_FD

Selecting the noise filter

TOPIC INFO

INDEX: [Noise filter : selecting]

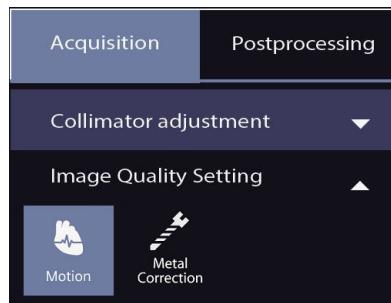
By using noise filters, you take into account the influence of movements when filtering noise. Image integration depends on the preset k factor (depending on the operating mode up to max. $k = 32$), which is adapted according to the selected noise filter.



k factor: a number of k exposures are integrated into one image; the k factor can be set up to 32 and can be assigned to an exam set and stored (IEC 60601-2-7:1998 29.1.103 d).

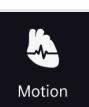
1 Change to **Advanced Mode** if necessary.

2 Open the **Image Quality Setting** menu in the **Acquisition** task card.



3 Press this button.

The button is highlighted white.



4 Examination

a84c266f614ee353c0a81e660f61473c / 2 / Draft
Information class: clinical

Selecting_the_input_format_FD

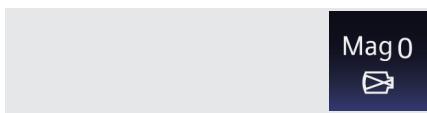
Selecting the input format (Detector zoom/magnification)

TOPIC INFO

INDEX: [Input format : selecting]
INDEX: [Detector zoom : selecting]
INDEX: [Zoom : selecting]
INDEX: [Magnification : selecting]

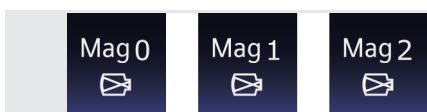
Three different zoom levels are available. This sets the input format for the subsequent image acquisition. The input format is the size of the detector area that is exposed and then fills the screen when displayed on the monitor.

Zoom level	Mag 0	Mag 1	Mag 2
Input fields (active field)	20.58 cm x 20.58 cm (8.1" x 8.1")	15 cm x 15 cm (5.9" x 5.9")	10 cm x 10 cm (3.9" x 3.9")



- ◆ Press this button.

Each time you press the button, you switch between zoom levels 0 (full format), 1 and 2.



The input format display is updated accordingly.

b437aacb2b5dcf9f0a53dbdb6f3e8c2e / 2 / Draft
Information class: clinical

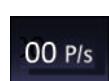
Setting_the_pulse_rate_FD

Setting the pulse rate

TOPIC INFO

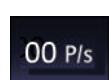
INDEX: [Pulse rate : setting]

Depending on the configuration level you can select different pulse rates from 0.5 to 15 fps or continuous fluoroscopy. The respective set value is displayed on the control panel using the **Pulse rate** button.



- ◆ Press this button several times, if necessary.

The pulse rate changes accordingly.



The k value currently set is shown on the display of the C-arm control panel above the **Pulse rate** key. If **continuous** is set, "co" (**continuous**) appears.

972446442b5f65fc0a53dbdb75d934ba / 2 / Draft
Information class: clinical

Setting_the_X_ray_parameters_manually_FD

Setting the X-ray parameters manually

TOPIC INFO

INDEX: [X-ray parameters : setting manually]

You can change the default X-ray parameters manually with the +/- buttons for kV/mA or kV/mAs (for single image operating mode).

Automatic dose rate control: Using automatic dose rate control (ADR), the kV/mA values or kV/mAs values are regulated so that the mean value of the image gray values is kept constant largely independently of the object thickness and position. This ensures optimal image quality for on-screen evaluation.

The current automatic dose rate control status can be read on the control panel using the **Tech lock** button.



The system possess an automatic metal correction which is designed for examinations with metal parts in the measurement range. The metal correction parameters are included in the **Application** settings. For example, the contrast and brightness settings are adjusted accordingly and the automatic dose rate control is improved.

If the image quality is not sufficient, please use the additional **Metal correction** or **Tech lock** functionality.

Activating kV/mA stop

When metallic objects (e.g. intramedullary nails) are introduced into the beam path or when examining objects of varying density (e.g. hip prosthesis) under fluoroscopy, it is recommended that you set the kV just established with the **Tech lock** button at the start of fluoroscopy.



The automatic dose rate control (ADR) must remain activated during interventional procedures.



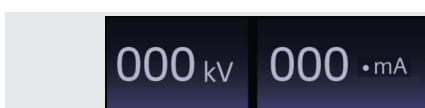
- ◆ Press this button.
- The button is highlighted white.
- Automatic dose control is disabled.
- The +/- buttons for kV/mA are enabled.



Do not switch between Fluoroscopy and Single Image operating modes while **Tech Lock** is active, because with **Tech Lock** the image brightness cannot be adjusted to the different dose levels in the two operating modes.

Changing the X-ray parameters manually

Activating **Tech lock** enables you to manually set kV/mA.



The set values are shown on the control panel.



- ◆ Press the +/- buttons.

The values for kV/mA increase or decrease.

Pressing the button for an extended period continually increases or decreases the corresponding X-ray parameter.

Once the upper or lower limit of the setting range is reached, an audible tone is emitted. Pressing the key again has the same effect.



The mA values assigned to the kV values result from the fluoroscopy curves.

(→ Page 261 *Curves and diagrams*)

2daed8092b603c2c0a53dbdb1537b73b / 2 / Draft
Information class: clinical

Setting_the_image_parameters_FD

4.4.2 Setting the image parameters

TOPIC INFO

INDEX: [Image orientation : selecting]

INDEX: [Image parameters : setting]

On the control units, you set the image parameters in the **Postprocessing** task card in the right area of the control panel. Changing the settings impacts the image currently displayed (if applicable) and any images acquired thereafter.

Selecting the image orientation

It may be necessary to rotate and/or flip the image so that it appears in the required orientation on the monitor.



Object display on the monitor depends upon the C-arm system position relative to the patient.

216cfdf7783421b2c0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_docUser_note_label_each_side

hazard-key: hm_docUser_note_label_each_side

⚠ CAUTION

Inverted image orientation.

Risk of an incorrect decision during surgery.

- ◆ The operator must apply due diligence; identifying each side is recommended.

168abe9578342200c0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_docUser_note_lead_letters

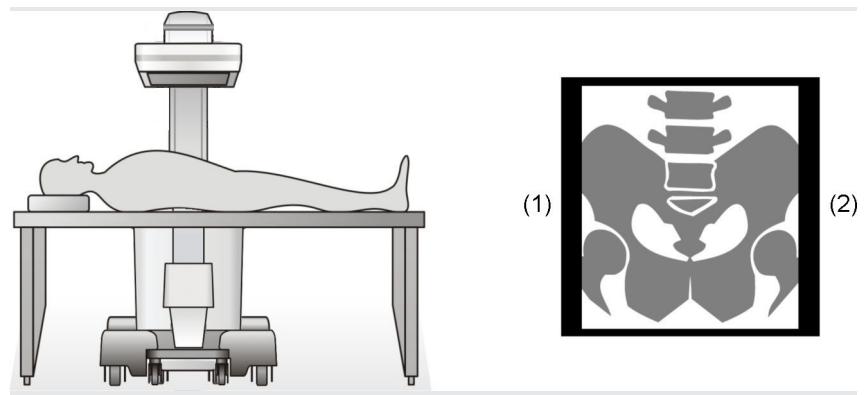
hazard-key: hm_docUser_note_lead_letters

⚠ CAUTION

Inverted image orientation.

Incorrect intervention decision!

- ◆ It is recommended to mark the patient position using lead letters.

Standard image orientation

- (1) Right side of patient
 (2) Left side of patient

Selecting image rotation

- 1** Press one of these buttons.

With each short press of the button, image rotation increases 1° in the corresponding direction.

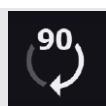
Pressing the button for an extended period continually increases or decreases the angle of rotation.

Rotation stops at 90° . If the image must be rotated further, the button must be pressed again.

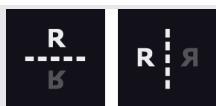
The current rotation angle is shown on the display of the control panel (display range 0° - 359°).

- or -

Use these buttons to set the angle of rotation in 90° increments.



- 2** Press this button to reset the angle of rotation to 0° .

**Selecting image flip**

- ◆ Press one of these buttons.

Vertical/horizontal image flip is activated.

4.5 Acquiring images

TOPIC INFO

INDEX: [Examination : acquisition]

INDEX: [Acquisition]

4 Examination

All further steps of the examination are performed at the C-arm system. For detailed information on operating the C-arm, hand switch, and footswitch ([→ Page 53 System Description](#)).

Meier, Hans

23-12-1976

Standard

The registered patient's last name, first name and patient ID appear in the upper control area of the left monitor.

Prior to releasing radiation, make sure that the registered patient and actual patient are the same.

d4fe9c5478341fb0c0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_docUser_note_correct_position_of_the_patient

hazard-key: hm_docUser_note_correct_position_of_the_patient

⚠ CAUTION

Inverted image orientation.

Risk of an incorrect decision during surgery.

- ◆ Prior to releasing radiation, the user must ensure the correct patient position with respect to the X-ray beam.

31b737437833b73dc0a81e6671622ad9 / 3 / New
Information class: clinical

Release_radiation

4.5.1 Releasing radiation



- ◆ Release radiation with the hand switch or footswitch.

The current fluoro image is displayed on the left (live) monitor.



Please keep the radiation release switch pressed until radiation has been released and a usable image is displayed.

Complete image integration as a function of the set k factor (up to max. k = 32, depending on the operating mode) is ensured even for very short exposures ("toe tapping").



k factor: a number of k exposures are integrated into one image; the k factor can be set up to 32 and can be assigned to an exam set and stored (IEC 60601-2-7:1998 29.1.103 d).

8d07ec3a783416dac0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_docUser_defective_FLC_HW

hazard-key: hm_docUser_defective_FLC_HW

CAUTION

Defective imaging system hardware.

Risk of X-ray radiation exposure without a saved image!

- ◆ If no image appears, immediately stop the radiation and switch off the tube assembly.

cbe4cfef2b7e7e270a53dbdb2b6e7fd8 / 2 / Draft
Information class: clinical

Displaying_fluoroscopy_images_FD

Displaying fluoroscopy images**TOPIC INFO**

INDEX: [Fluoroscopy : display images]

In the image area the fluoroscopic images are displayed during and after exposure. Additional information may be shown as image text, depending on the configuration.

(→ Page 234 *Image display and print properties*)



(1) Information on kV and mA

(2) Window value and LUT information

Live images

As soon as the exposure (i.e. radiation) starts, the current fluoroscopic images (live images) are displayed in the image area of the left monitor.

4 Examination

Last Image Hold (LIH)

The left monitor displays the last fluoro image (Last Image Hold) as soon as the exposure ends.

098f6a402b7f9be00a53dbdb0ba4d426 / 2 / Draft
Information class: clinical

Confirming_a_warning_signal_FD

Confirming a warning signal

TOPIC INFO

INDEX: [Fluoroscopy : warning signal]
INDEX: [Warning signal : for fluoroscopy]
INDEX: [Fluoro timer]

After 5 minutes of fluoroscopy time, a warning signal sounds. However, this can be reset on the control panels. After 10 minutes of uninterrupted fluoroscopy time, radiation is terminated. However, it can be released again.



These settings are country-specific and can be changed by Siemens Healthineers Customer Service in accordance with the applicable regulations.



- ◆ Press the reset button (alarm icon flashes).

The audible warning signal is deactivated.

The fluoro timer is reset.

ea09f70f2b8072860a53dbdb2a09f3d4 / 1 / For approval for release
Information class: clinical

Temperature_monitoring_FD

Temperature monitoring

TOPIC INFO

INDEX: [Temperature monitoring]

If the system is used intensively over an extended period, the X-ray tube and single tank can become very hot.

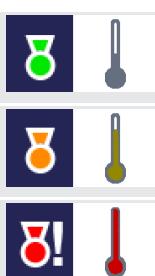
Single-tank temperature



The current thermal capacity of the single tank is shown by an 11-segment bar display on the left monitor:

The length of the bar indicates the relative temperature load of the X-ray system.

X-ray tube temperature



The temperature status of the X-ray tube is shown as follows on the monitor and the control panel:

if the temperature is normal, a green tube symbol appears on the left monitor and a grey symbol appears on the control panel.

if the tube is heated, an orange tube symbol appears on the left monitor and a yellow symbol appears on the control panel.

if the tube temperature is critical, a red tube symbol with an exclamation point appears on the left monitor and a red symbol appears on the control panel.

To prevent overheating, the pulse rate for a very hot tube is limited to 10 images per second. Working with the reduced frame rate is nevertheless possible without any further restrictions.

14b29db12b811bc80a53dbdb44745a6a / 2 / Draft
Information class: clinical

Radiation_information_FD

Radiation information

TOPIC INFO

INDEX: [Radiation information]

The radiation data appear on the left monitor. The fluoroscopy time is also shown on the control panel. The information is updated with every release of radiation.

00:00:11
hh:mm:ss

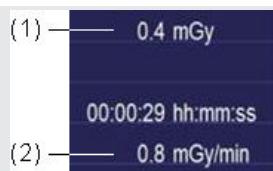
55
 μGym^2

Here, the entire fluoroscopic time since the start of the examination of a patient is displayed.

The cumulative dose area product for the current patient is displayed if the dose measurement chamber is installed.

CHARM: 320354

Description of display of air kerma rate



As an alternative: Display of the air kerma value (2) and cumulative air kerma value (1). These data appear on the left monitor.



The reference location for determining the air kerma strength with the optional dose measurement chamber is 30 cm in front of the flat detector input. The reason for this convention is that in typical applications the object to be examined is located approximately 30 cm in front of the flat detector.

Depending on country-specific regulations, you can have Siemens Healthineers Customer Service change the display so that it indicates the air kerma and cumulative air kerma value instead of the dose area product.

83c4013a2b81f82c0a53dbdb7fb91111 / 2 / Draft
Information class: clinical

Saving_and_displaying_images_FD

4.5.2 Saving and displaying images

TOPIC INFO

INDEX: [Images : saving and displaying]

In Fluoroscopy, Subtraction and Roadmap operating modes, images can be saved manually during the examination. Images that you want to print out later have to be saved during the examination.

Images printed directly during the examination are saved automatically.



If the application used is configured such that all images are saved automatically, manual saving is not necessary and therefore not possible.

Saving images/scenes with the footswitch is also possible when the pedal allocation is configured accordingly.



Images/scenes can always be saved via the corresponding button on the wireless multifunctional footswitch ([→ Page 301 Wireless multifunctional footswitch](#)).

Storing images (during radiation)



- ◆ Press this button on the control panel.

– or –

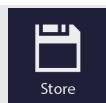


Press this button on the hand switch.

The current image (or the subtraction image in Sub/Roadmap mode) is stored in the local database.

The saved fluoro image is displayed on the right (reference) monitor.

Storing images (after radiation)



- ◆ Press this button on the control panel.

– or –



Press this button on the hand switch (press and hold < 2 seconds).

The displayed image (LIH) is stored in the local database.

The LIH is displayed on the right (reference) monitor.



Holding the key for > 2 seconds: saves the scene last recorded (LSH).

4a67c78c2b82ab6b0a53dbdb17cf83f0 / 2 / Draft
Information class: clinical

[Saving_and_reviewing_a_scene_FD](#)

Saving and reviewing a scene

TOPIC INFO

INDEX: [Scene : saving and reviewing]

In the fluoroscopy, subtraction and Roadmap operating modes, scenes can be saved and reviewed (Last Scene Hold) during the examination.

Saving the scene

- ◆ Press this button on the control panel (hold down > 2 seconds).
- or -



Press this button on the hand switch (press and hold > 2 seconds).

The current scene (LSH) will be stored in the local database. In case of a restricted review range, images are saved from the starting point to the end point.

The LSH is displayed on the right (reference) monitor.

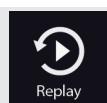
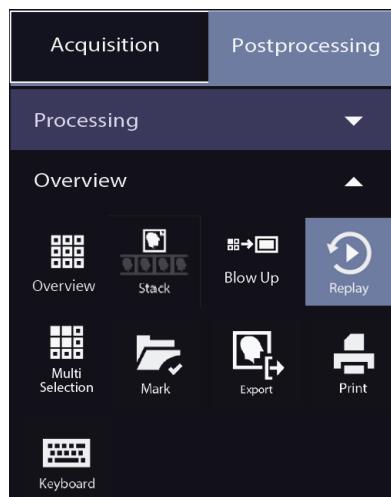


Holding the key for < 2 seconds: saves the image last recorded (LIH).

Reviewing a scene

1 Change to **Advanced Mode** if necessary

2 Open the **Overview** menu in the **Postprocessing** task card.



3 Press this button.

The scene is replayed (replay speed matches the storage rate).

The button is highlighted white.



If **Autoreplay** is configured in the application used, cine replay is started automatically at the end of the exposure.



4 Press this button again.

Scene review is paused.

The button is highlighted dark.

4 Examination



5 Press the button to go back/forward by a single image in the scene.



6 Press the button to play the previous/next available scene.

a86132d62b8377140a53dbdb7efcf705 / 2 / Draft
Information class: clinical

Changing_the_image_display_FD

Changing the image display

There are tools available on the control panel for subsequent optimization of the image display.

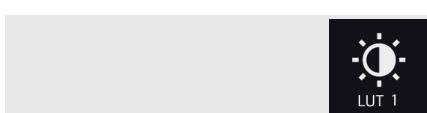
For detailed information see (→ Page 175 2D image processing).



1 Brightness



2 Contrast



3 LUT selection (3 levels)

ed681c84783431c9c0a81e66032f7db4 / 1 / For approval for release HZ_XP_hm_um_Processing_Parameters

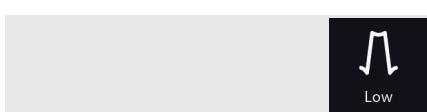
hazard-key: hm_um_Processing_Parameters

⚠ CAUTION

Reduced image quality due to filtering.

Risk of artifacts, e.g., metal implants can appear to be loosening phenomenon. Filters can cause loss of image quality.

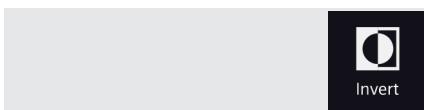
◆ Carefully select the intensification factor, LUT and low-pass filter.



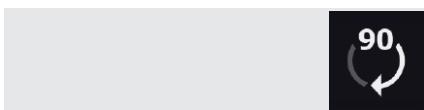
4 Edge enhancement (4 levels)



5 Zoom an image



6 Invert an image



7 Rotate an image



8 Flip an image

b108c4ec7833c1b8c0a81e664e3d56ba / 1 / For approval for release
Information class: clinical

Using reference images

4.5.3 Using reference images

TOPIC INFO

INDEX: [Reference images]

In addition to the live images on the left monitor, selected images, e.g. images used for comparisons, can be displayed on the right monitor.

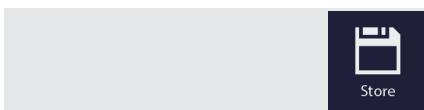
d380c7c22b84692a0a53dbdb13d24a57 / 2 / Draft
Information class: clinical

Transferring_Images_FD

Transferring images

Automatic

During saving, an image or scene is transferred automatically to the right monitor:



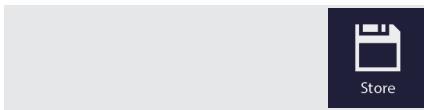
1 Save the image manually with the **Store** button (during/after radiation).

The displayed image/LIH is saved and transferred.

– or –

Save the image automatically (**Automatic save** is active).

The LIH is saved and transferred after radiation ends.



2 Save the scene manually using the **Save** button (hold down > 2 seconds).

The LSH is saved and transferred.

– or –

Save the scene automatically (**Automatic save** is active).

The LSH is saved and transferred after radiation ends.

Manual

Using the **Transfer A to B** function you can transfer an image to the right monitor during or after radiation, without saving it simultaneously.

1 Change to **Advanced Mode**.

4 Examination



2 Press this button.

The displayed image is transferred.



Please remember that the transferred image has not been saved, and will be lost permanently if overwritten by another image.

f850e5012b85b75f0a53dbdb21fa834e / 2 / Draft
Information class: clinical

Scrolling_through_images_FD

Scrolling through images

If the **Automatic save** function is active or you have saved several times, images in addition to the displayed image are available on the right monitor.



1 Scroll to previous image/to previous scene.

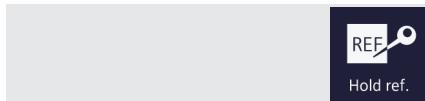
2 Scroll to next image/to next scene.

8a2a18b22b862d970a53dbdb3a704221 / 1 / For approval for release
Information class: clinical

Holding_the_reference_image_FD

Holding the reference image

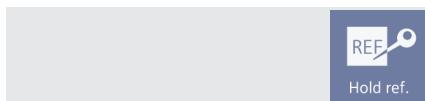
The **Hold reference** function allows you to select a particular image to permanently display as the reference image on the right monitor.



1 Press this button.

The display on the right monitor is "frozen" (labeled "Hold Ref").

The transfer of additional images and scrolling to other images is disabled on the right monitor.



2 Press the button again to cancel **Hold reference**.



Hold reference is automatically turned on for the first image transferred to the right monitor using the **Transfer A to B** button.

Hold reference is cancelled automatically when switching to image overview display.

(→ Page 176 *Displaying the image overview*)

Hold reference is reestablished once the image overview display is closed.

1fcda947abf87b790a53dbdb2d38ce9e / 1 / Draft
Information class: clinical

Using_Open_Apps_application_FD

4.5.4 Using “Cios OpenApps” (optional)

Cios OpenApps^{*} allows 3rd party vendor applications to run on your system providing more integration and streamlined workflows between the imaging system and the 3rd party applications. The 3rd party applications are installed on a separate application PC which is connected to the monitor trolley.

^{*} The Cios OpenApps is not commercially available in all countries.



The Cios OpenApps option is not available if the Video Manager option is installed.

32b2c975abf86e2b0a53dbdb04707fb0 / 1 / Draft
Information class: clinical

Selecting_an_application_OpenApps_FD

Selecting an application

Only installed and licensed Cios OpenApps applications can be selected and started. Selecting a Cios OpenApps application has to be done before starting the examination. It is not possible to change the Cios OpenApps application during an ongoing examination.

The applications installed on the system are available via a separate button which is displayed in **Advanced Mode**.



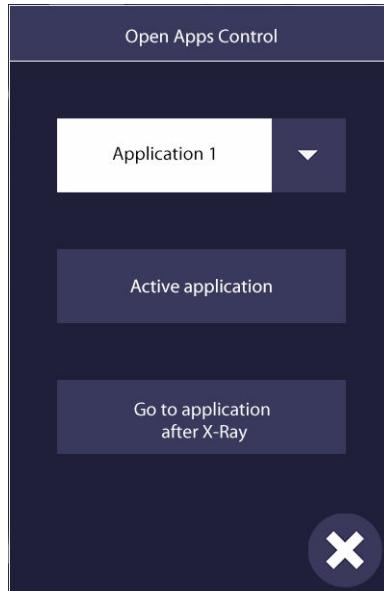
Instructions on installing Cios OpenApps applications are given in the separate operator manual “User Administration Guide”. To have a new application installed, please contact your system administrator.



- 1 Before you register a patient, change to **Advanced Mode** and press this button.

4 Examination

The Open Apps Control menu opens.



- 2 Select the required application.

a4a8ed2aabf877230a53dbdb683eec21 / 1 / Draft
Information class: clinical

Transferring_image_OpenApps_FD

Transferring images to the application

After activation, the user interface of the Cios OpenApps application will be displayed on the right monitor.

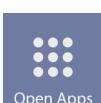
The system automatically closes the application when an emergency registration is performed or an acquisition is started. However, you can configure the Cios OpenApps application to resume automatically after the acquisition has ended.

- 1 Open patient registration on the control panel and register the patient.
- 2 Define the examination settings and acquire images.

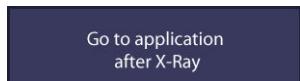


CHARM: 288242
Images acquired during boot phase of OpenApps PC

If images are acquired while the application PC is being restarted, the images are not available for transmission to the Cios OpenApps application. In this case, wait until the application PC has completely rebooted.



- 3 Change to the Open Apps Control menu.

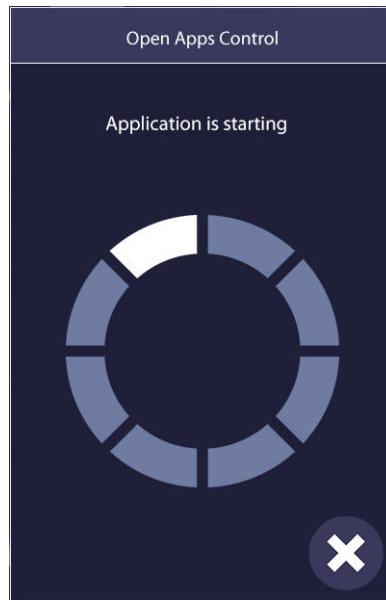


- 4 Press this button to activate automatic return to the Cios OpenApps application after completion of an acquisition.

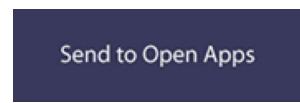


- 5 Press this button to start the application.

A message box is displayed on the control panels notifying that the application is being started.



The virtual keyboard appears on the control panels instead of the task cards.



- 6 Press this button on the virtual keyboard to transfer the current image to the Cios OpenApps application on the right monitor.



Example of a Cios OpenApps application with an image loaded

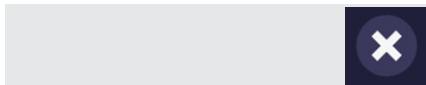
4 Examination

4fb4e288abf872800a53dbdb114f1638 / 1 / Draft
Information class: clinical

Terminating_Application_OpenApps_FD

Terminating the application

You can terminate the Cios OpenApps application in the following ways:



- ◆ Press the **Close** button on the virtual keyboard.

– or –



Press the radiation release key or pedal **once**.



If the radiation release key or pedal is pressed a second time, radiation will be released.

bfa5e61b2b8d31440a53dbdb674ba67d / 2 / Draft
Information class: clinical

Ending_the_examination_FD

4.6 Ending the examination

TOPIC INFO

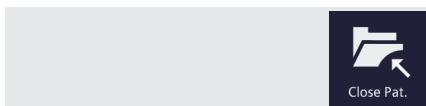
INDEX: [Examination : ending]

After you have completed your exposures, the last acquired image is displayed on the left monitor. Now you finish the examination of the current patient.

If you want to examine the next patient immediately afterwards, you can register that patient straight away. In this case the examination of the current patient is automatically finished.

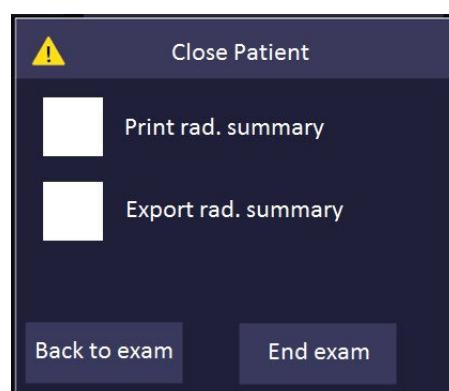
4.6.1 Closing the patient

Closing the patient ends the current examination. The patient data and images saved in a study in the local database are moved to the **Patient list**.



- 1 Press this button on the lower right of the control panel.

The **Close Patient** dialog box appears on the control panel.



- 2 Select the desired options.

Print rad. summary: Prints the radiation report on the default printer.

Export rad. summary: Sends the radiation report to the default address for export.

End exam

- 3 Press this button or press the **Close Pat.** key again on the monitor trolley keyboard.

The MPPS documentation is automatically sent to the HIS/RIS or a network address established for this purpose.

The patient data and images are cleared from the monitors.

– or –

Back to exam

Press this button to continue the examination with the registered patient.

4.6.2 Examining the next patient

Prepare Patient

- 1 Press the **Prepare Patient** menu button.

Registration

- 2 Press the **Registration** button from the drop-down button list.

The control panel switches to keyboard mode.

The **Data Entry Dialog** window opens on the left monitor.

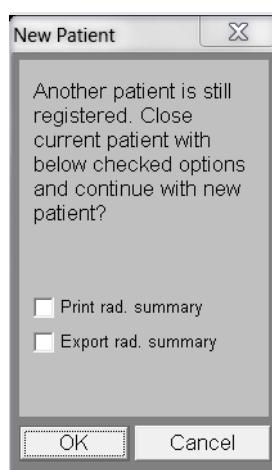


- 3 Register the next patient for examination. (→ Page 114 *Patient registration*)

Examination

Another patient registered

If another patient is still registered the **New patient** dialog box is displayed.



4 Examination

1 Select the desired options to conclude the examination (→ Page 150 *Closing the patient*).

2 Click **OK** to close the currently registered patient.

The new patient is registered for examination.

a379df4e7833b328c0a81e664e3d56ba / 2 / Draft
Information class: clinical

Performing_special_examinations

4.7 Performing special examinations

TOPIC INFO

INDEX: [Special examinations]

The following optional operating modes require special procedures deviating from the standard examination:

- Subtraction angiography (Sub)
- Roadmap (Road)
- Pediatric applications



After incorrect operation, it may be necessary for the user to repeat certain procedures, e.g. administering of contrast agent.

0a9cb80d7833beebc0a81e6671622ad9 / 1 / For approval for release
Information class: clinical

Subtraction_angiography_Sub_

4.7.1 Subtraction angiography (Sub)

TOPIC INFO

INDEX: [Subtraction angiography (Sub)]

INDEX: [Sub]

During the examination, images without contrast agent (mask) are continuously subtracted from images with contrast agent and displayed on the monitor. Depending on the contrast agent flow, they display the relevant vascular segment without superimposition in real time.

3e0ded60bb29a9c1c0a81e660b392604 / 1 / For approval for release
Information class: clinical

Progression_Sub_

Progression

Subtraction angiography is divided into three phases:

- Phase A

Time until the mask is completed (permanently defined)

- Phase B1

Time from the "inject" display on the monitor until the contrast agent has reached the area to be examined

- Phase B2

Time of the actual exposure of the examination region

d1636cd32b8e0dc50a53dbdb7bd1bb66 / 2 / Draft
Information class: clinical

Performing_subtraction_angiography_Sub_FD

Performing subtraction angiography

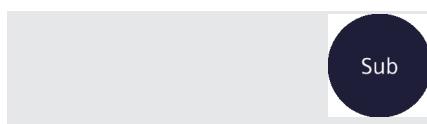
✓ Prerequisite: The patient to be examined has been registered.

1 Make the necessary settings for the examination.

(→ Page 127 *Defining the examination settings*)

2 Press this button on the control panel.

Subtraction operating mode is selected.



Phase A



◆ Release radiation with the hand switch or with the assigned footswitch.

During the generation of the mask the native image is displayed on both monitors.

Phase B

1 Keep the exposure release button pressed.

2 Inject the contrast agent as soon as the syringe symbol appears on the left monitor.

The corresponding subtraction image is displayed on the left monitor.

In the native image on the right monitor you can see the continuous filling of the blood vessel with contrast agent.



Keep the radiation release button pressed until the vessel is filled with contrast agent.

Depending on the setting of the **Landmark** function, a certain percentage of anatomical background is displayed in the subtraction images.

Fill image

◆ Let go of the radiation release button.

After radiation has been switched off the maximum fill image is calculated and displayed on the left monitor.

The vessels are highlighted in the native image on the right monitor.



The mask (phase A), subtraction series (phase B) and the fill image are saved automatically.

4 Examination

efe30e312b8ed37e0a53dbdb3cbf3a9d / 2 / Draft
Information class: clinical

Roadmap_Road_FD

4.7.2 Roadmap (Road)

TOPIC INFO

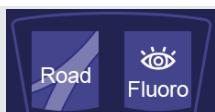
INDEX: [Roadmap (Road)]
INDEX: [Road]

In the first step of the Roadmap examination, the fill image is created as a mask from a normal subtraction (phase A and phase B).

In the second step, the display of the vessel into which the catheter is to be positioned is superimposed by current fluoroscopic images (phase C).

Fill image available

You can use the existing fill image if you have already performed a subtraction angiography during the current examination (→ Page 154 *Roadmap (Road)*).



The availability of the fill image is shown on the Road button and on the footswitch icon on the monitor. In that case, the first step of the Roadmap examination is not required.



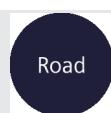
A previously created fill image can also be used if you have switched to a different operating mode (such as single image).

Generating a new fill image

If there is no suitable fill image (e.g. from a previous subtraction angiography), you have to generate a new one.

- ✓ Prerequisites: The patient to be examined has been registered.
- 1 Make the necessary settings for the examination (→ Page 127 *Defining the examination settings*).
- 2 Press this button.

The **Roadmap** mode is selected.



Phase A

- ◆ Release radiation with the hand switch or with the assigned footswitch.
- During the generation of the mask the native image is displayed on both monitors.

Phase B 1 Keep the exposure release button pressed.





- 2 Inject the contrast agent as soon as the syringe symbol appears on the left monitor.

In the native image on the right monitor you can see the continuous filling of the blood vessel with contrast agent.

The corresponding subtraction image is displayed on the left monitor.



Keep the radiation release button pressed until the vessel is filled with contrast agent.

Fill image

- 1 Let go of the radiation release button.

Radiation is stopped.

The fill image is calculated and displayed.

- 2 Start positioning the catheter (→ Page 156 *Positioning the catheter (Phase C)*).

Using the fill image from subtraction angiography

✓ Prerequisite: Subtraction angiography (**Subtraction** operating mode) was performed at some point during the current examination.

- 1 Press this button.

The **Roadmap** mode is selected.

- 2 Start positioning the catheter (→ Page 156 *Positioning the catheter (Phase C)*).



If you press the **Sub** button, the existing fill image is discarded. You will then have to regenerate the fill image.

Manually selecting the fill image

✓ Prerequisite: A subtraction data set (subtraction or Roadmap operating mode) was generated in the current examination.

Fill image with another mask

To calculate a new fill image you have to determine a suitable subtraction mask that can be used.

- 1 Press this button.

The button is highlighted white.

The **Select Mask** menu appears.



- 2 Select the required image with the arrow buttons.

Pressing the arrow repeatedly takes you incrementally from image to image. The fill image is recalculated automatically.

4 Examination

Positioning the catheter (Phase C)

If the vessels are easily discernible, position the catheter in the fill image under fluoroscopy.



1 Release radiation with the hand switch or with the assigned footswitch.

2 Position the guidewire or the catheter under fluoroscopic control.

The right monitor shows the fluoro image (native).

The left monitor shows the subtracted Roadmap image with catheter.



You can repeat fluoroscopy as often as needed while you insert the catheter.

59acf87e13b1038c0a81e6634e9f8a4 / 1 / Draft
Information class: clinical

Using_Target_Pointer_FD

4.7.3 Using the Target Pointer (optional)

This application enables the automatic detection of K-wires and displays the trajectory as a projection to the opposite edge of the image. Displaying the trajectory is intended to help the surgeon to better predict the position of the K-wire in an early phase of the insertion.

For **Single Image** and **Fluoro** acquisition modes, an additional button is available in the **Acquisition** task card for activating the **Target Pointer** application.

56c83281ab0050600a53dbdb6251609e / 1 / Draft

HZ_XP_hm_docUser_icorrect_k_wire_display

hazard-key: hm_docUser_icorrect_k-wire_display



Time gap between display of K-wire including overlay grafic and real moved K-wire.

Risk of wrong interventional decision.

- ◆ Duty of care for operator, that he/she shall be aware of this possible mismatch.

dd838c6aab00534f0a53dbdb04186000 / 1 / Draft

HZ_XP_hm_docUser_overlay_hide_k_wire

hazard-key: hm_docUser_overlay_hide_k-wire



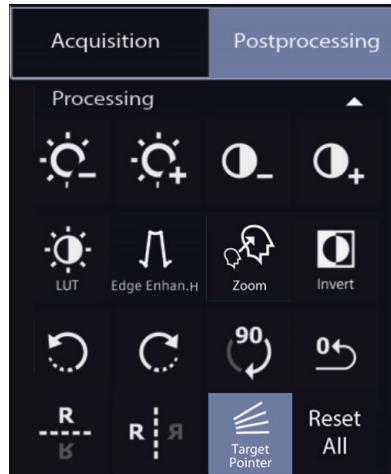
Overlay itself may hide K-wire in live X-ray image (depends on thickness of K-wire and overlay configuration).

Risk of wrong interventional decision.

- ◆ Target Pointer can be switched-off (toggle ON/OFF) to allow free view on X-ray live image.

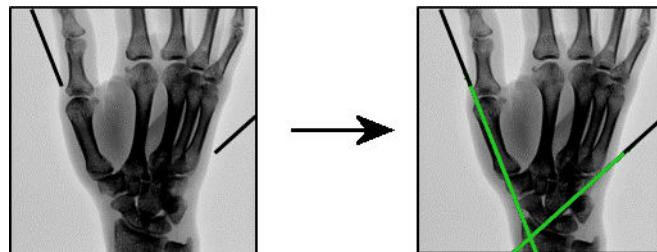
- 1 Change to **Advanced Mode** if necessary.

2 Open the **Processing** menu in the **Postprocessing** task card.



3 Press this button to switch the **Target Pointer** on.

The trajectories of all detected K-wires will be displayed in **Single Image** or **Fluoro** acquisition mode.



4 Press the activated button to switch the **Target Pointer** off.

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Information class: clinical

Pediatric_use

4.7.4 Pediatric use

TOPIC INFO

INDEX: [Pediatric use]

The **Cios Select** may be used for pediatric purposes. Use special care when imaging patients outside the typical adult size range.

The **Cios Select** provides

- a removable anti-scatter grid
- specific pediatric applications

We suggest using the available special applications for pediatric use in the application database delivered with the system. There are individual pediatric applications for each application group of the default application database. These default pediatric applications may be used for basis of the examination for all pediatric patients (in general for children up to the age of 14 years).

4 Examination

It is recommended to remove the anti-scatter grid for all pediatric patients up to the age of 7 years as well as all medical applications that are restricted to extremities.



Please note that the system has to be equipped with the optional removable scattered radiation grid for this application.

For pediatric patients older than 7 years an anti-scatter grid is recommended otherwise image quality may be compromised.

If depending on patient stature the kV increases above 100 kV it is suggested to switch to the corresponding adult program (otherwise image quality may be compromised).

Depending on the medical requirements of your respective examination, consider other dose saving measures. For example, reduce the frame rate and radiation time as much as possible.

Following these suggestions will lead to a minimalized dose for the patient.

For an orientation of dose savings please see the following table with a comparison between pediatric and standard protocols:

Object: 10 cm PMMA directly located on the FD cover (without anti-scatter grid for pediatric programs)

Application (Group)	Fluoro		Sub	
	Standard - Dose rate (mGy/min)	Pediatrics - Dose rate (mGy/min)	Standard - Dose rate (mGy/min)	Pediatrics - Dose rate (mGy/min)
Card.	1.4	0.2	1.6	0.4
Gastro	1.4	0.2	1.5	0.2
General information	0.8	0.2	1.1	0.2
Ortho	0.8	0.2	1.1	0.2
Uro	0.8	0.2	1.1	0.2
Vascular	0.8	0.2	1.0	0.2

For these existing pediatric applications we recommend to use the following settings with these groups of pediatric patients.

The age of a pediatric patient is not the only indicator which needs to be considered by choosing the best x-ray settings for a child. Other factors, such as the patient's weight, body size, and physiological and neurological development may be more appropriate indicators than chronological age.

Recommendations for pediatric patients:

Age	Example	Recommended settings
Neonate/ birth - 1 month	e.g., 1-2 kg (2.2-4.4 lb) low end estimate	Please use the 2D application with the name "pediatrics" and please use only the "low dose" preset and no grid.
0-1 year	e.g., 1 year old, ~11 kg (24 lb); recumbent length 100 cm (39.4 in.)	
1-2 year		
2-6 years	e.g., 5 years old, ~21 kg (46 lb); 113 cm (44.5 in) standing height	Please use the 2D application with the name "pediatrics" and please use only the "medium dose" preset and no grid.
7-16 years	e.g., 12 years old, ~52 kg (115 lb); 156 cm (61.5 in) standing height	Please use the 2D application with the name "pediatrics" and please use only the "medium dose" preset with a grid.
16+ years and adults	~80 kg (176 lb); standing height 170 cm (67.0 in)	Please use the normal "adult" pro- grams for all acquisition types.

4 Examination

5 Postprocessing

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Information class: clinical

Patient_data

5.1 Patient data

TOPIC INFO

INDEX: [Patient data]
INDEX: [Patient list]

All acquisitions (images, series) prepared as part of an examination are saved in a study on the hard drive of the imaging system (local database). You can access these data quickly and easily using the **Patient list**.

5.1.1 When to use the Patient list

- To examine a patient who has already been examined once before with your system and whose data are still saved in the local database
(→ Page 121 *Registering previous patients*)
- To view the images of a patient from earlier examinations in order to compare them with current results
- To postprocess or add comments to images after an examination
- To correct incorrect information on a patient stored in your system
- To print a patient's images for documentation purposes
- To archive patient data and images or to send them to another location in your hospital via the network

5.1.2 External data

To view or process data from an external storage medium or other network node, they first have to be imported.

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Information class: clinical

Searching_for_and_selecting_patient_data

5.1.3 Searching for and selecting patient data

TOPIC INFO

INDEX: [Patient data : searching for and selecting]
INDEX: [Patient list]

The studies of patients examined previously that are saved to the local database are displayed in the **Patient list**.

5 Postprocessing

(1) →

(2) →

(3) →

48

- (1) Table heading
- (2) Study entries (list of patients and their studies)
- (3) Preview images of the selected study

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Information class: clinical

Flag

Flag

TOPIC INFO
INDEX: [Flag]

An abbreviation in the **Flag** column indicates the study status:

Flag	Meaning
A/a	All/some images were sent to the archive and the receipt was confirmed (as long as the archive works with DICOM Storage Commitment)
C	Study is closed (no further acquisition possible)
D/d	All/some images were transferred to or from CD/DVD
P/p	All/some images were printed
R/r	All/some images read in via network
S/s	All/some images were sent and the receipt was confirmed (as long as the recipient works with DICOM Storage Commitment)

Flag	Meaning
#	Study is protected against deletion
*	Study was received from HIS/RIS

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Information class: clinical

Opening_the_Patient_List_FD

Opening the Patient List

- 1 Press the **Prepare Patient** menu button.



- 2 Press this button from the drop-down button list.

The control panel switches to keyboard mode.

The **Patient List** opens on the left monitor.

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Information class: clinical

Sorting_data

Sorting data

You can sort list entries according to the displayed columns:

- 1 Click the table header for the respective column.

The list is sorted in alphanumeric ascending order based on this column.

Studies with the same entry in the sorting column are further sorted by the date and time of the examination.

- 2 Click the table header of the same column again.

The sorting sequence is reversed.

0a3076b52be9f2930a53dbdb33e4bead / 2 / Draft
Information class: clinical

Filtering_data_FD

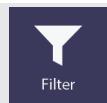
Filtering data

It is possible to only display studies that meet specific criteria by using database filters. The **Flags** of the individual studies are evaluated in this case (→ Page 163 *Searching for and selecting patient data*).

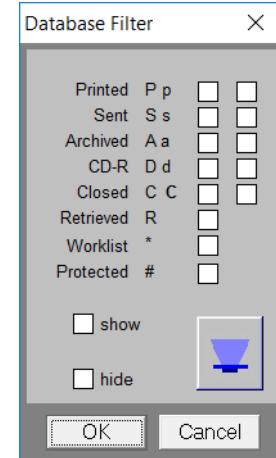
Activating a filter

- 1 Press this button in the symbol button bar on the control panel.

The **Database Filter** window appears on the left monitor.



5 Postprocessing



- 2 Activate the required check boxes.

show: only display studies with the selected flag

hide: hide all studies with the selected flag

- 3 Confirm with **OK** to apply the filter.



You can specifically delimit the list display by combining multiple filter criteria.
Example: **Printed** together with **Archived** shows the studies that have been printed but not yet archived.

Deactivating the filter



- 1 Press this button in the symbol button bar on the control panel.

The **Database Filter** window appears on the left monitor.



- 2 Click this button in the **Database Filter** window.

All studies are displayed in the **Patient List**.

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Information class: clinical

Selecting_data_FD

Selecting data

TOPIC INFO

INDEX: [Patient data : selecting]

INDEX: [Data : selecting]

Searching by the first letter

- 1 Using the keyboard in the control panel, press the first letter of the required patient.

The first name with a suitable patient name is selected in the **Patient List**.

- 2 Press this same letter button again, to select the next list entry for a patient with this first letter.

Direct selection

- ◆ Use the arrow buttons on the keyboard to select the required study.

– or –

Click the list entry with the mouse.

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Information class: clinical

Correcting_data

5.1.4 Correcting data

TOPIC INFO

INDEX: [Patient data : correcting]
INDEX: [Data : correcting]

Every now and then it is necessary to correct patient data for an examination. This is the case particularly with emergency patients that are saved to the local database with provisional data.



Patient data in studies you have already exported or sent via the network cannot be changed in the local database.

addb1cccc2beb5f5d0a53dbdb553dbb09 / 2 / Draft
Information class: clinical

Opening_the_correction_dialog_FD

Opening the correction dialog

Patient and exam data are corrected in the **Data Entry Dialog** window.



- 1 Select the study entry to be corrected in the **Patient list**.



- 2 Press this button.

The data of the selected patient are transferred to the **Data Entry Dialog** window.

491b77e4d796359dc0a81e661bb0a698 / 2 / For approval for release
Information class: clinical

Data_Entry_Dialog_window

Data Entry Dialog window

Patient and exam data of the selected study saved in the local database are entered in the **Data Entry Dialog** window.

5 Postprocessing

Data Entry Dialog

PATIENT

Last Name: Emergency
First Name: 181
Middle Name:
Title:
Suffix:
Military Rank:
Patient ID: E_181
Social Security No.:
Date of Birth: D 4 M 7 Y 2017
Age: 80
Sex: Male Female Other
Height:
Weight:

INSTITUTION

Institute Name:
Operator 1:
Operator 2:
Referring Physician:
Physician 1:

STUDY

Accession No.:
Request ID:
Study Description: Standard
Study ID:
Study Comment:

Application

Application group: Standard
Application: Standard

GROUPS

Group: EmergencyUsers

Emergency Examination Preregister Correct pat. data Back to pat. list

c7056122bec39920a53dbdb0e4953f9 / 2 / Draft
Information class: clinical

Editing_data_FD

Editing data

Which fields are displayed and therefore can be corrected depends on the configuration settings.

(→ Page 228 *Patient registration*)

Changing fields

Tab

- Use the **Tab** button (hold down the **Shift** button to go backward) or click the mouse to switch to the required field.

Correcting the entry



- On the control panel press the arrow button of the text field to move the cursor character-by-character.

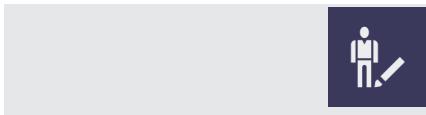
- Press this button to delete the character in front of the cursor.

– OR –



Mark the incorrect characters with the arrow buttons while holding the **Shift** button, and overwrite with the keyboard.

Saving changes



- ◆ Press this button on the control panel.
- or –



Click this button in the **Data Entry Dialog** window.

The **Data Entry Dialog** window closes.

The **Patient List** is updated based on the changes.

87f29ac62becca570a53dbdb49a2e723 / 2 / Draft
Information class: clinical

Deleting_data_FD

5.1.5 Deleting data

TOPIC INFO
INDEX: [Patient data : deleting]
INDEX: [Data : deleting]

You should delete archived images you no longer need from the local database on a regular basis. This ensures sufficient storage capacity on your system.

You can delete data as follows:

- Automatic deletion

Depending on the configuration settings, images are deleted once they reach a specific status (→ Page 238 *Deleting images automatically*).

- Manual deletion

You can individually select studies and delete regardless of data status

Deleting data manually

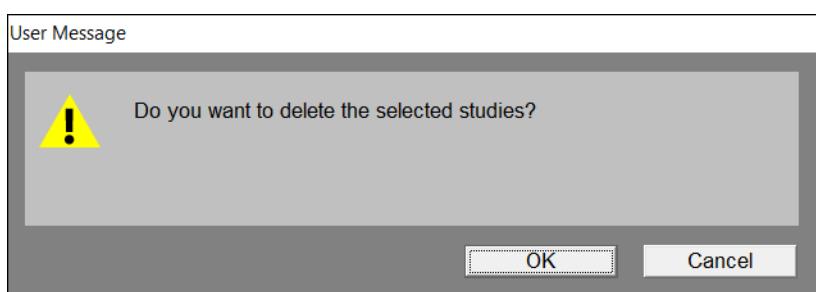


- 1 Select the entry to be deleted in the **Patient List**.

- 2 Make sure that the selected study has been archived correctly.

- 3 Press this button on the control panel.

Below messages pop up on the monitor.



- 4 Click **OK**.

The selected study and all its images are deleted.

5 Postprocessing



During image postprocessing, you can delete individual images or series of a study using the image overview (→ Page 181 *Deleting individual images/series*).

Protecting data from deletion

You can protect images on the local database against unintentional manual deletion and automatic deletion.

Setting deletion protection



- 1 In the **Patient list** select the entry you want to protect against deletion.



- 2 Press this button on the control panel.

The button is highlighted white.

Removing deletion protection



- 1 Select the deletion-protected entry in the **Patient list**.



- 2 Press this button in the symbol button bar on the control panel.

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Information class: clinical

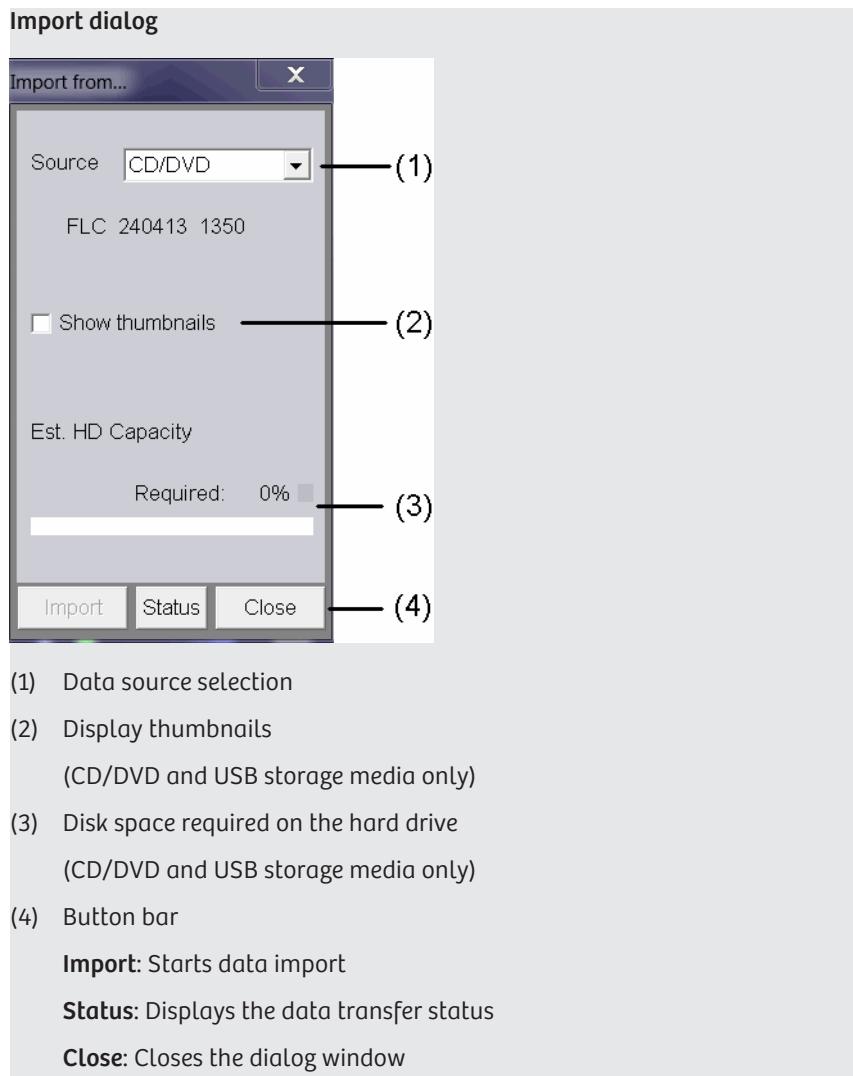
Importing_data

5.1.6 Importing data

TOPIC INFO

INDEX: [Patient data : importing]
INDEX: [Data : importing]

If the required patient data and images are on removable devices or other network nodes, import them to the local database. The data are then available in the **Patient list**.



548e62767833ce65c0a81e6671622ad9 / 1 / For approval for release
Information class: clinical

Opening_the_import_dialog

Opening the import dialog

- Click this button on the left monitor (lower left).
The **Import from...** dialog window is displayed.

1149a96a7833c5aec0a81e6671622ad9 / 3 / Draft
Information class: clinical

Data_from_removable_devices

Data from removable devices

TOPIC INFO

INDEX: [Removable devices : importing data]

Image data on a data medium in DICOM format can be read in as long as an appropriate drive is installed and configured.

5 Postprocessing

Displaying saved data

- 1 Have the required data medium on hand.

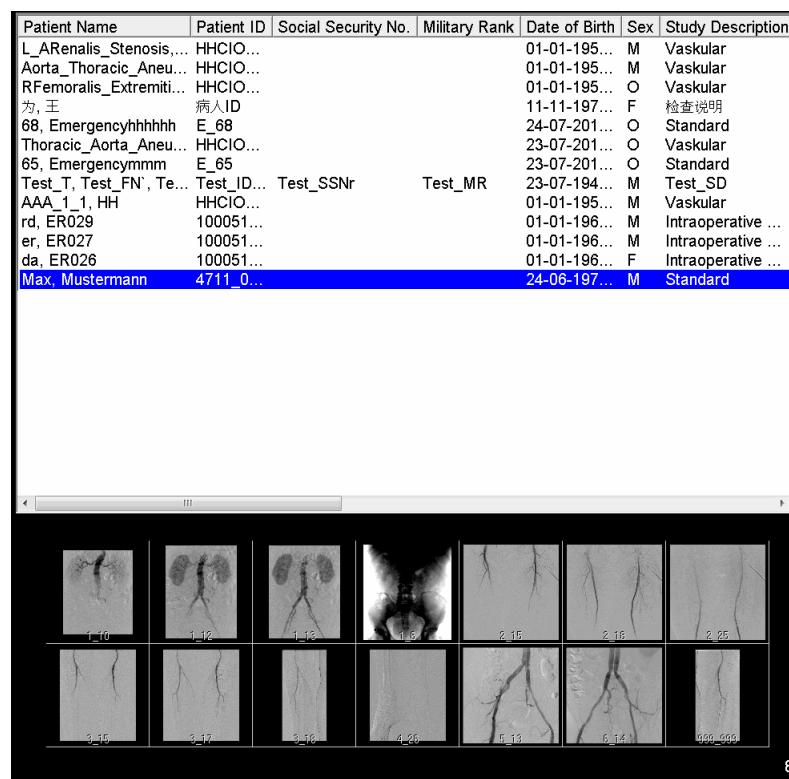
Insert the CD/DVD into the drive.

Connect the USB memory to the USB socket.

- 2 Select the applicable data medium as the data source in the **Import from...** dialog window.

The studies saved on the data medium are listed.

If activated, thumbnails are displayed for the currently selected study.



Example: Displaying the content of a CD/DVD

Importing data

- 1 Click the required study with the mouse.

Press the **Ctrl** or **Shift** button on the keyboard to select multiple entries.



- 2 Click this button in the **Import from...** dialog window.

The data are read in.

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Information class: clinical

Data_in_the_network

Data in the network

TOPIC INFO

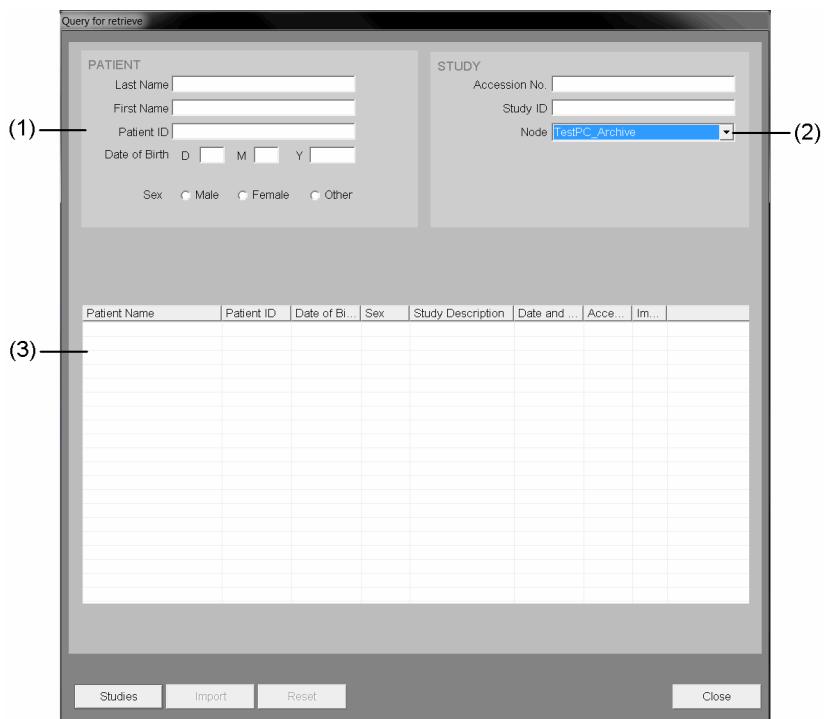
INDEX: [Network : importing data]

You can access image data on other workstations or a long-term archive using "Query & Retrieve".

Opening "Query & Retrieve"

- ◆ In the **Import from...** dialog window select the **DICOM node** entry as the data source.

The **Query for retrieve** dialog window is displayed.



- (1) Input fields for search criteria (search screen)
- (2) Network node selection (data source)
- (3) List of search results

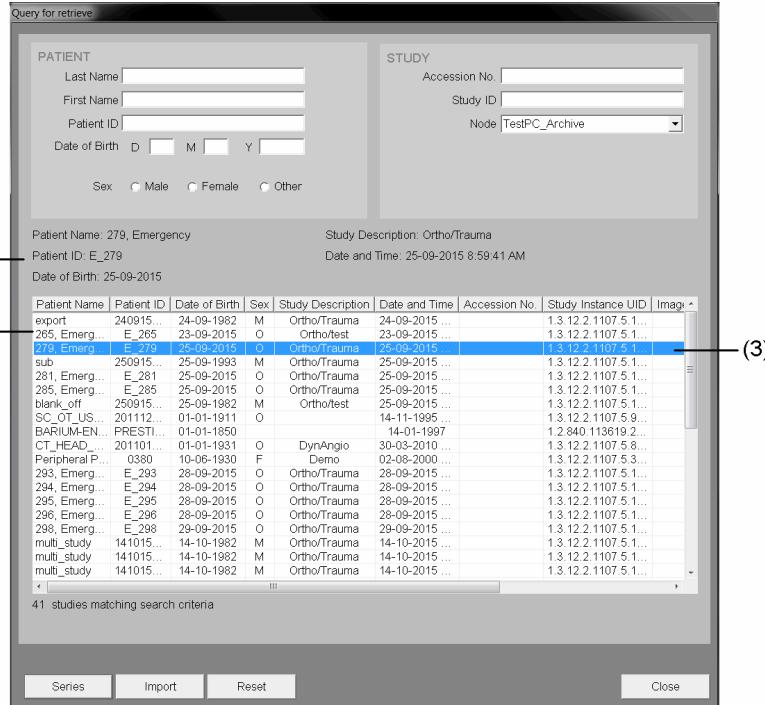
Starting a search

- 1 As search criteria enter the known patient data and further search details, if necessary.
- 2 Select the network node where you want to search for the data.
- 3 Click this button.

The patients and studies found are listed in the result area.

Studies

5 Postprocessing



(1) Details on the study currently selected in the results list

(2) List of found patients and studies

(3) Currently selected study

Displaying series

If you only require a selection of images from a specific study, then display the series contained in the study.

1 Select the corresponding study in the results list.

2 Click this button.

All series of the selected study are listed in the results area.



Use this button to display the list of found patients and studies again.

Studies

Importing data

1 Select the required data (studies or series) in the results list with the mouse.

Press the **Ctrl** or **Shift** button on the keyboard to select multiple entries.

Import

2 Click this button.

The data are read in.

5a021b557833c31fc0a81e664e3d56ba / 1 / For approval for release
Information class: clinical

2D_image_processing

5.2 2D image processing

TOPIC INFO

INDEX: [2D image processing]
INDEX: [Image processing]

As part of postprocessing, you view the results of an examination and evaluate them using 2D processing functions. You can also compare the image material from various examinations of a patient (such as the current examination and a previous examination).

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Information class: clinical

Loading_and_displaying_images_2D_

5.2.1 Loading and displaying images

TOPIC INFO

INDEX: [Images : loading and displaying]

During an examination in progress you can only edit images of the registered patient. Outside of an examination, you can load the images of any patient for processing.

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Information class: clinical

Loading_images_2D_FD

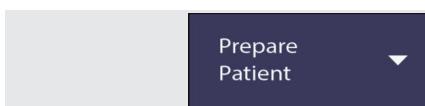
Loading images

In the **Patient list** you have access to the images of prior examinations stored on the local database. Select one or more studies of the required patient here (→ Page 163 *Searching for and selecting patient data*).

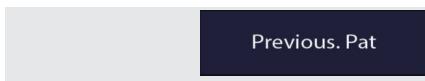
With an examination in progress, all saved images are already loaded. If needed, you can load additional images from prior examinations of the registered patient.



If the required images are no longer in the local database, then first import the data from the external source (→ Page 170 *Importing data*).



1 Press the **Prepare Patient** menu button.



2 Press this button.

3 Search for the patient, sorting and filtering the list as necessary.

4 Double-click the patient with the mouse.

The selected images are loaded and displayed on the monitors.

5 Postprocessing

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Information class: clinical

Displaying_the_image_overview_FD

Displaying the image overview

TOPIC INFO

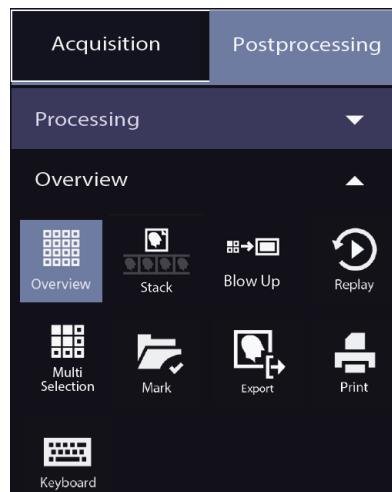
INDEX: [Image overview : displaying]

In the image overview display, the monitor layout changes specifically for 2D postprocessing. You have direct access to all loaded images and you can select them for processing either individually or in any combination.

Activating the overview

If a patient is not registered the images are displayed in the image overview after loading. With an examination in progress, you may need to switch from the live image display to the image overview display.

- 1 Change to **Advanced Mode** if necessary.
- 2 Open the **Overview** menu in the **Postprocessing** task card.



- 3 Press this button on the control panel.

– or –

On the left monitor click the 4x4 Layout button (lower left).



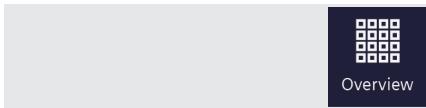
Monitor Layout

The following views are set on the monitors by default:

- Left monitor
 - 4x4 layout with all loaded images, sorted by exposure time
 - Stack display
 - 1st series selected (1st image segment is highlighted)
- Right monitor
 - 1x1 display of the (selected) 1st series

Switching off the overview

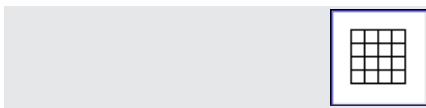
The image overview can only be switched off during an examination in progress.



- ◆ Press this button again.

The live image display is activated.

– or –



On the left monitor click the activated 4x4 Layout button (lower left).



The system switches to live image display automatically during radiation release.

1f1325e62befc29a0a53dbdb456bcc9c / 2 / Draft
Information class: clinical

[Changing_the_display_mode_FD](#)

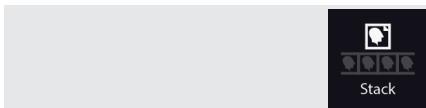
Changing the display mode

You can select from among the following displays of loaded images on the left monitor:

- Stack display: One series per image segment
- Image stripe display: One image from the selected series per image segment

Selecting stack display

Stack display is suitable as an overview of loaded studies and for direct comparison of images from several series.

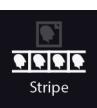


- ◆ Press this button in the **Overview** menu.

Selecting image stripe display

Image stripe display is suitable for viewing a selected series in detail (image by image).

- ◆ Press this button in the **Overview** menu.



In stack display, image segments that contain a scene are identified by an icon at the bottom right. Double-clicking the scene switches to image stripe display.



5 Postprocessing

25dbc38e2bf0693b0a53dbdb69e365c8 / 2 / Draft
Information class: clinical

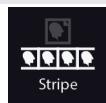
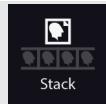
Scrolling_FD

Scrolling

TOPIC INFO
INDEX: [Scrolling]

In the **Overview** menu you establish which image should be displayed on the right monitor.

Changing image/series



- 1 Select the suitable display mode:
 - Image stripe display if you want to show a different image in the current series.
 - Stack display if you want to display a different series.
- 2 Use the mouse to scroll until the desired image or series appears in the image overview on the left monitor.
- 3 Click the relevant image segment.

The selected image is displayed on the right monitor.

Next/Previous series

If you want to show images of another series in image stripe display, you can scroll through the series without switching to stack display.

- ◆ Press one of the buttons repeatedly if necessary.



4c8ce0432bf119ef0a53dbdb12a7f317 / 2 / Draft
Information class: clinical

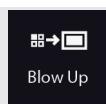
Displaying_full_screen_image_FD

Displaying full screen image

TOPIC INFO
INDEX: [Full screen image : displaying]

Basically, the image selected in the overview is displayed as a full image on the right monitor. However, if the **Hold reference** function is active the monitor display remains unchanged. In this case use the **Blow Up** function to display the required image in full size on the left monitor.

Activating full image

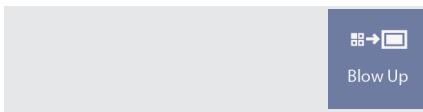


- ◆ Press this button in the **Overview** menu.



Using the Next/Previous series buttons you can switch to other series in full image view.

Switching off full image



- ◆ Press this button again.

The image overview on the left monitor switches into the most recent display mode (stripe or stack).



Outside of an ongoing examination (no patient registered), you can turn full image view on and off using the activated 4x4 layout button (lower left of screen).



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Reviewing_a_scene_FD

Information class: clinical

Reviewing a scene

TOPIC INFO

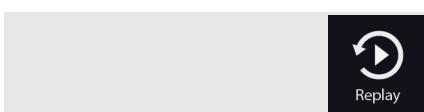
INDEX: [Reviewing : a scene]

INDEX: [Scene : reviewing]

After an examination, you can start movie mode to check the quality of the scenes you acquired.

A scene is usually reviewed on the right monitor. If **Hold reference** is active, the review takes place on the left monitor. The system switches automatically to 1x1 layout.

Starting the review

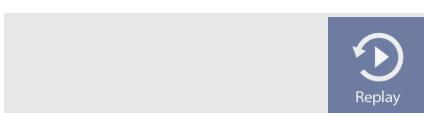


- 1 Show the required scene.

- 2 Press this button in the **Overview** menu.

The scene is replayed (replay speed matches the storage rate).

Scrolling image by image



- 1 Press this button to stop the review process.



- 2 Press one of these buttons to go backward/forward by a single image.

Different scene



- ◆ Press one of these buttons to go to the previous/next scene.

5 Postprocessing

a15b6f78b99a880a0a53dbdb350212a7 / 1 / Draft
Information class: clinical

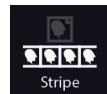
Selecting_images_FD

5.2.2 Selecting images

TOPIC INFO

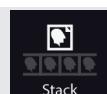
INDEX: [Images : selecting]

You have to select images before you edit them. Single and multiple selections are possible.



Stripe

- ◆ Select the suitable display mode: **[OptUnresolvedLink]Changing the display mode[/OptUnresolvedLink][OptUnresolvedLink]Changing the display mode_FD[/OptUnresolvedLink]**:



Stack

- Image stripe display if you want to select multiple images in the current series.
- Stack display if you want to select one or more series.

48178b97b5b3ba94c0a81e6620a0db27 / 2 / For approval for release
Information class: clinical

Single_selection

Single selection

TOPIC INFO

INDEX: [Images : selecting]

- ◆ Click the required image or series with the mouse.



If the left monitor has been changed to full image mode, the image displayed there is selected.

0e864f2a2bf573b90a53dbdb17398425 / 2 / Draft
Information class: clinical

Multiselection_FD

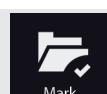
Multiselection

TOPIC INFO

INDEX: [Multiselection]

Multiselection enables you to select images from one or more series individually. Images of a multiselection are marked on both monitors by a white dot.

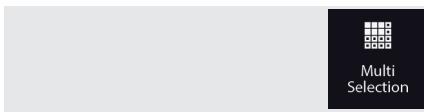
Individual images/series



- ◆ Click the desired image or series with the mouse and press this button in the **Overview** menu.

Repeat the above steps until all the required images or series have been selected.

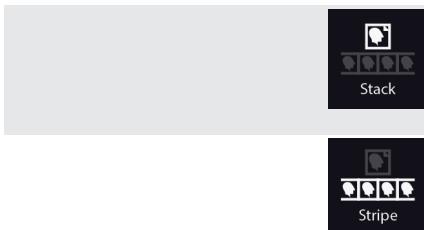
Sequential images/series



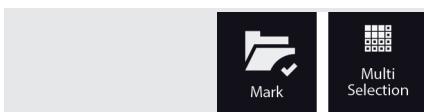
- ◆ Press this button in the **Overview** menu.

Click the desired images/series with the mouse until all the desired images or series have been selected.

Supplementing the selection



- 1 Switch the display mode if necessary.

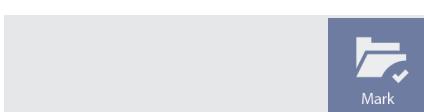


- 2 Select additional images/series using the two buttons.

The newly selected images/series are added to the multiselection previously defined.

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Information class: clinical

Deselecting_images_FD



Deselecting images

- ◆ Click the selected image or series with the mouse and press this button.

The white dot mark on the image or series disappears.

– or –

Press this button and click the selected images/series with the mouse.

The white dot mark on the image or series disappears.

b429b9802bf63f110a53dbdb3327a182 / 2 / Draft
Information class: clinical

Deleting_individual_images_series_FD



5.2.3 Deleting individual images/series

TOPIC INFO

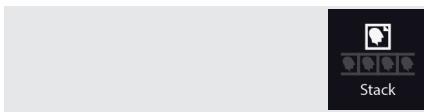
INDEX: [Deleting : individual images/series]

INDEX: [Images : deleting]

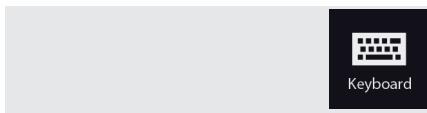
INDEX: [Series : deleting]

While the **Patient list** is used to delete complete studies (→ Page 169 *Deleting data*), you can use the image overview to select individual images or series for deletion.

- 1 In this case switch into stack display.

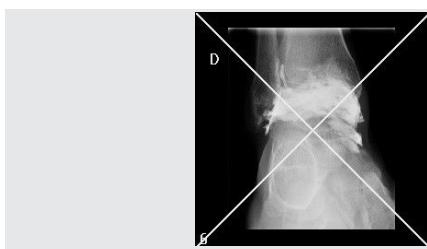


5 Postprocessing



2 Switch into keyboard mode and press the **Alt + d** buttons.

A message box is displayed on the left monitor.



3 Click the images/series to be deleted in the image overview.

The selected images are marked with an **X**.

4 Click **OK** to delete the selected images.

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Information class: clinical

[Changing the image display_FD](#)

5.2.4 Changing the image display

TOPIC INFO

INDEX: [Image display : changing]

In the loaded images you can adapt the window values (contrast and brightness), display enlarged sections, and center regions of interest in the middle of the image. You can also rotate, flip or invert images for certain diagnostic problems.



Image manipulation capabilities are limited for images imported from other modalities.

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HZ_XP_hm_docUser_wrong_LUT

hazard-key: hm_docUser_wrong_LUT

CAUTION

Incorrect or extreme image processing parameters.

Risk of limited image quality in the resulting X-ray images. Risk of incorrect decision during intervention or artifacts.

- ◆ Apply image processing parameters carefully, such as edge enhancement and windowing, and always check them carefully.
- ◆ Always check the image quality before reaching an interventional decision.

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Selecting_images_for_processing

Information class: clinical

Selecting images for processing

Changes in image display affect all images of an individual series. The image functions cannot be applied to multiple series at the same time.

- ◆ Display an image of the required series (single selection).

7708cd112c01547d0a53dbdb02ef7c3f / 2 / Draft

Windowing_images_FD

Information class: clinical

Windowing images

TOPIC INFO

INDEX: [Windowing : images]
 INDEX: [Images : windowing]
 INDEX: [Window values]
 INDEX: [Window width]
 INDEX: [Contrast]
 INDEX: [Window center]
 INDEX: [Brightness]
 INDEX: [WW]
 INDEX: [WC]

Using the windowing settings, you establish a grayscale range in which the image is displayed. This enables you to highlight the region of interest and the relevant tissue type.

During windowing you optimize image brightness (shifting the windowing center along the grayscale) and image contrast (change of window width).

The set window values are shown at the bottom right in the image.



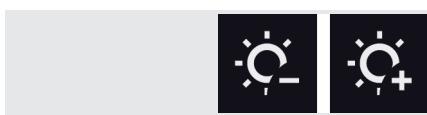
(1) **WW:** Window width – Contrast

(2) **WC:** Window center – Brightness

5 Postprocessing

Changing window values

- 1 Change to **Advanced Mode** if necessary.
- 2 Open the **Processing** menu in the **Postprocessing** task card.



- 3 Press one of these buttons to reduce/increase the brightness.
Holding the button down will continuously reduce/increase the brightness.



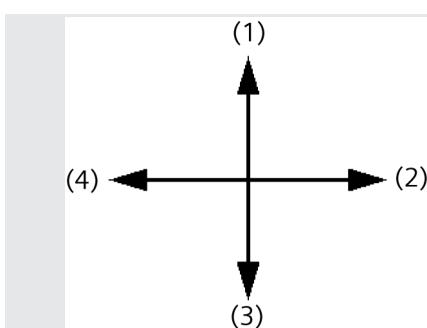
- 4 Press one of these buttons to reduce/increase the contrast.
Holding the button down will continuously reduce/increase the contrast.



The controllers set numerical brightness values. Whether the image impression turns out brighter or darker depends on which display is selected (bone black or white).

Windowing using the mouse

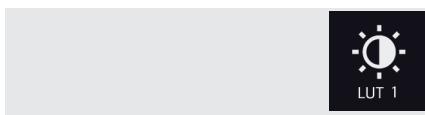
- 1 Place the mouse pointer in the required image on the left monitor.
- 2 Move the mouse with the center mouse button pressed:



- (1) Brightness - (Center +)
- (2) Contrast - (Width +)
- (3) Brightness + (Center -)
- (4) Contrast + (Width -)

Fixed window value settings (LUTs)

Using window value settings, you can select three predefined settings for the window values using LUTs (look up tables). The values can be configured specifically for an application.



- ◆ Press this button, multiple times if necessary, to switch between the LUTs.

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Information class: clinical

Inverting_images_FD

Inverting images

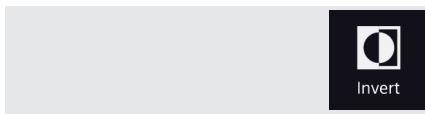
TOPIC INFO

INDEX: [Inverting : images]
INDEX: [Images : inverting]

When an image is inverted, bright areas in grayscale images are displayed dark and dark areas are displayed bright. You use this function to toggle the bone display between white and black, for example.

- ◆ Press this button.

Image inversion is switched on.



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Information class: clinical

Enhancing_edges_FD

Enhancing edges

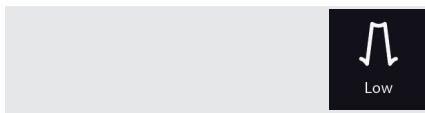
TOPIC INFO

INDEX: [Edge enhancement]

Edge enhancement is an adaptive filter that highlights all existing structures (edges) in the image. For very noisy images, setting edge enhancement to its lowest level or switching it off entirely is recommended.

- ◆ Press this button several times, if necessary.

Every time the button is pressed, the filter setting changes to low, medium, high, or off.



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Information class: clinical

Zooming_and_panning_images_FD

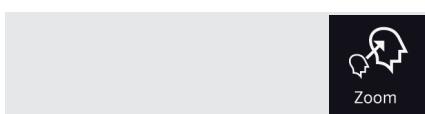
Zooming and panning images

TOPIC INFO

INDEX: [Zooming : images]
INDEX: [Panning : images]
INDEX: [Images : zooming and panning]

You can zoom in on sections of images that you are particularly interested in (zooming). The zoomed image can be panned so that the relevant section is in the center of the image (panning).

Zooming the image



- ◆ Press this button several times, if necessary.

Each time the key is pressed, the zoom level changes, i.e. from 1 (full image) to 1.5, to 2.

5 Postprocessing

Panning the image

After zooming, if the relevant image area is outside the image segment, pan it accordingly.

- ◆ Press the arrow button for the direction in which the image content to be displayed is located.



Pan image up/down



Pan image left/right



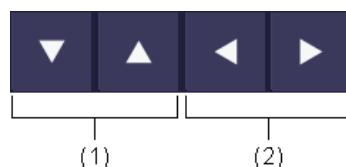
Image panning is possible only with a zoom factor > 1x.

— or —



Open the keyboard by pressing the button under the **Overview** menu in the **Postprocessing** task card.

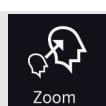
Press the arrow button for the direction in which the image content to be displayed is located.



(1) Pan image up/down

(2) Pan image right/left

Resetting Zoom/Pan



- ◆ Reset the zoom level to 1 (full image).

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Information class: clinical

Rotating_flipping_images_FD

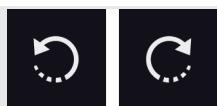
Rotating/flipping images

TOPIC INFO

INDEX: [Rotating : images]
INDEX: [Flipping : images]
INDEX: [Images : rotating/flipping]

The rotation and flip functions allow you to easily compare images of series that were acquired in a different orientation.

Selecting the image rotation



- ◆ Press one of these buttons.

With each short press of the button, image rotation increases 1° in the corresponding direction.

Pressing the button for an extended period continually increases or decreases the angle of rotation.

– or –

Press this button.

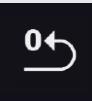
The image rotates clockwise among 0°, 90°, 180° and 270°.

- 1 Place the mouse pointer on the edge of the required image on the left monitor.
- 2 Drag the mouse pointer in the required direction of rotation.

- ◆ Press this button.

The angle of rotation is reset to 0°.

No image rotation



Flipping an image



- ◆ Press one of these buttons.

The image is flipped vertically/horizontally.

863b1bb68f645e3fc0a81e6617bd19f8 / 2 / Draft
Information class: clinical

Resetting_the_image_display_FD

Resetting the image display

TOPIC INFO

INDEX: [Resetting : image display]

5 Postprocessing

If adjusting the image parameters did not produce the desired results, you can reset the processing steps of the current session. All images are then returned to their original state.

- During an examination in progress: Status after image acquisition or after saving
- Outside an examination: Status after loading or after saving

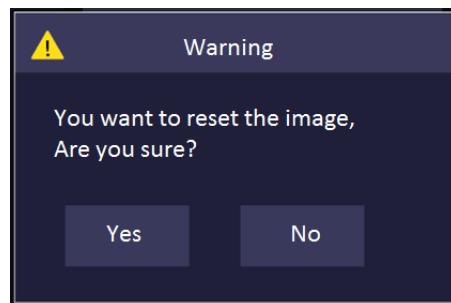


After resetting, all changes in the image display are irrevocably lost.

Reset
All

- 1 Press this button.

A confirmation dialog box is displayed on the control panel.



Yes

- 2 Press **Yes** to reset the images.

– or –

No

Press **No** to close the dialog box without changes.

cd565fb17833c995c0a81e664e3d56ba / 2 / For approval for release
Information class: clinical

Evaluating_images

5.2.5 Evaluating images

TOPIC INFO

INDEX: [Images : evaluating]

Using graphical evaluation functions you can measure distances, lengths, and angles of relevant structures, as well as add annotations. The left monitor switches automatically to 1x1 layout. When the evaluation is finished the original monitor layout is restored.



Measurements are not possible for images imported from other modalities.

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Information class: clinical

Selecting_images_for_evaluation

Selecting images for evaluation

Graphical evaluations can only be performed on a single image at a time.

- ◆ Display the required image (single selection).

8aa6ea72c06f3300a53dbdb017aa2e1 / 1 / For approval for release
Information class: clinical

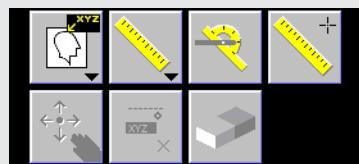
Displaying_the_evaluation_functions_FD

Displaying the evaluation functions

When you evaluate images on the monitor trolley you can perform all evaluation functions directly on the left screen with the mouse. You use the keyboard only to enter text.

- 1 Click this button on the left monitor (lower left).

The buttons for evaluation with the mouse are displayed (upper left).



- 2 Click the button for the required function.

The control panel switches to keyboard mode.

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Information class: clinical

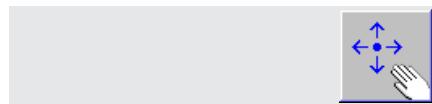
General_work_steps

General work steps

During graphical evaluation you use graphic objects (such as lines and text fields) that you draw in the image on the left monitor. The graphic objects are saved in the image automatically.

The following presents the basic steps you will use with graphic objects regardless of the evaluation function.

Selecting



You must select an existing graphic object to process it.

- 1 Click this button.

The "Selection" function is activated.

- 2 Click the graphic object.

Highlighting of the reference points (vertices, center point) indicates that the graphic object is selected.

Panning

- 1 Select the graphic object.

- 2 Press the mouse button and drag & drop the center point to the required position.

Changing dimensions

- 1 Select the graphic object.

5 Postprocessing

- 2 Press the mouse button and drag & drop the vertices in the required direction.

Deleting (individual)



- 1 Select the graphic object.

- 2 Click this button.

The selected graphic object is deleted.

Deleting (all)



- ◆ Click this button.

All graphic objects in the image are deleted.

2e831f567833c3fac0a81e6671622ad9 / 3 / Draft

Calibration

Information class: clinical

Calibration

TOPIC INFO

INDEX: [Calibration]

If you perform evaluations with distance measurements, you must calibrate the image.

8390830278341dadcoa81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_docUser_note_calibrated_distance

hazard-key: hm_docUser_note_calibrated_distance

⚠ CAUTION

Misinterpretation of results.

Incorrect interventional decision!

- ◆ During Length calibration or when measuring or interpreting distances in images, note that the acquired images represent two-dimensional projections of real objects.

4da1121778342b15c0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_um_Calibration

hazard-key: hm_um_Calibration

⚠ CAUTION

Operating error

Unnecessary radiation

- ◆ Follow instruction of calibration procedure.

Calibration object: For increased accuracy it is recommended to use a calibration object which is as large as possible, but still can be displayed completely. The edges of the calibration object must be clearly recognizable and its dimensions must be known.

c4c0d6437834299ec0a81e66032f7db4 / 1 / For approval for release
HZ_XP_hm_docUser_wrong_calibration_objects__hm_docUser_note_calibration

hazard-key: hm_docUser_wrong_calibration_objects; hm_docUser_note_calibration

CAUTION

Risk of entering the incorrect calibration. Incorrect calibration display.

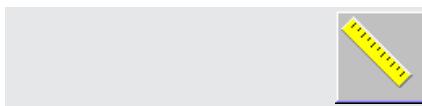
Incorrect measurement of graphic objects. Incorrect interventional decision!

- ◆ The user must carefully enter the known length of the calibration object. The calibration object must be perpendicular to the X-ray beam.



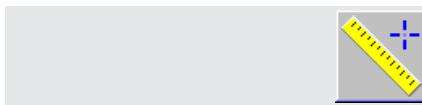
Please note that the calibrating accuracy decreases if the calibration object is not located in the same plane as the measured object.

Performing calibration



- 1 Click this button and draw a distance line along the calibration object and select it [OptUnresolvedLink]**Measuring distances**[/OptUnresolvedLink] (→ Page 191 *Measuring the distance*)

Be careful to mark the starting and end points with as close to pixel accuracy as possible in order to achieve optimal measuring accuracy (the line to be calibrated has to be selected/mark).



- 2 Click this button.

The **Calibrate** dialog box is displayed.



- 3 Enter the distance (in mm).

- 4 Click **OK**.

A length scale is displayed in the image and is applied to the remaining images of the series.

Distances already drawn in are updated.

f308a5293a9239590a53dbdb305448d4 / 1 / Draft
Information class: clinical

Measuring_distances__MDR_

Measuring the distance

TOPIC INFO

INDEX: [Measuring : distance]

INDEX: [Distance : measuring]

5 Postprocessing

Using a distance line, you can measure the distance between two points in an image. Proceed carefully when setting the starting and end points in order to obtain as high an accuracy as possible.

Ideal conditions for distance measurement are as follows:

- Object lying directly on the detector
- The reference points have the maximum possible distance in the image, i.e. an accordingly large reference object was used
- The measures of the reference object are known with a high accuracy (less than 0.1 mm)
- Reference points and measurement points are exactly in the reference plane
- User defines reference line and measurement line with an accuracy of one image element (pixel)

In reality, these conditions are usually not fulfilled.



The result of the measurement depends on the following factors, among others:

- The distance measurement and reference calibration must be carried out in the same plane where possible, and this plane must be parallel to the C-arm.
- Measurement precision is 5% under the following basic conditions: The reference object must be at least 50 mm in size and precisely recognizable at 1 mm. The plane may not deviate from the detector plane by more than 5 degrees. The plane of the measurement object may not deviate from the reference plane by more than 1 cm and may not be more than 10 cm from the isocenter.
- In addition, the perceptibility of the reference object and the precision with which the user records the object on screen represent further impacts. It is recommended to use the largest, most precisely delineated, high-contrast reference objects possible. The user is therefore responsible for limiting these impacts to the extent possible.



- 1 Click this button.
- 2 Click the starting point of the line.
- 3 Click the desired end point.

The distance line is set.

The length (in mm) and the sequential number of the graphic object are displayed at the end point of the line.



The distance measured and shown on the display does not match the real geometric dimensions of the object as no calibration has taken place.

04e0df4b3a92358f0a53dbdb107f96ad / 1 / Draft
Information class: clinical

Measuring_angles__MDR_

Measuring an angle

TOPIC INFO

INDEX: [Measuring : angle]
INDEX: [Angle : measuring]

You can define an angle by two lines, the legs of the angle that you draw on the image. Proceed carefully when setting the starting and end points in order to obtain as high an accuracy as possible.

Ideal conditions for angle measurement are as follows:

- Object lying directly on the detector
- The points defining the angles have the maximum possible distance in the image
- User defines reference line and measurement line with an accuracy of one image element (pixel)
- Reference points and measurement points are exactly in the reference plane

In reality, these conditions are usually not fulfilled.



The result of the angle measurement depends on the following factors, among others:

- The angle measurement may only be performed in a projection plane parallel to the C-arm detector plane. The precision of the angle measurement in this projection plane is $\pm 1^\circ$ at a side length of at least $\frac{1}{4}$ of the image width.
- In addition, the precision with which the user records the object on screen represents further impacts. It is recommended to draw an angle with the longest possible sides into the image. The user is therefore responsible for limiting these impacts to the extent possible.



1 Click this button.

2 Draw the first line in the image by setting the starting point and end point.

The first leg of the angle is set.

3 Draw the next line in the image by setting the starting point and end point.

The angle is set.

The drawn angle (in $^\circ$) and the sequential number of the graphic object are displayed at the end points of the legs.

Either an inner or outer angle is indicated depending on the starting point and end point of the second leg.



The angle measured and shown on the display does not match the real geometric dimensions of the object as no calibration has taken place.

5 Postprocessing

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Information class: clinical

Annotating_images_FD

Annotating images

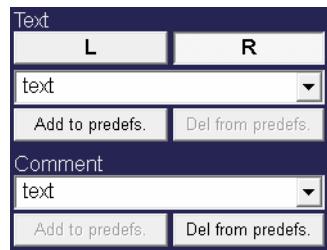
TOPIC INFO

INDEX: [Annotating : images]
INDEX: [Images : annotating]

In addition to side identification and annotating interesting or anomalous areas in an image, you can add image comments. Comments always appear centered at the bottom edge of the image and are transferred automatically to all images of the series.

- ◆ Click this button.

The input dialog box for text and comments is displayed.



Setting the side identification

By identifying the side of the patient you avoid a mistake in image orientation. The side identification is applied automatically to the remaining images of the series.

- 1 Select the appropriate patient side in the text and comments dialog box.
- 2 Using the mouse, click the appropriate location in the image (e.g. at the edge of the image).

The selected identification **L** or **R** is inserted at the position of the mouse pointer.

Inserting annotations

- 1 Select the annotation from the **Text** selection list.

– or –

Click the text field of the **Text** selection list and overwrite the displayed text with the keyboard.

- 2 Click the required position in the image.

Adding a comment

- 1 Select the text from the **Comment** selection list.

– or –

Click the text field of the **Comment** selection list and overwrite the displayed text with the keyboard.

- 2 To delete a comment from the images, use this button to delete it from the text field of the **Comment** selection list.



Creating predefined texts

You can save frequently used texts and comments as templates and select them from the list as needed.

- 1 Enter the text in the text field of the corresponding selection list.

Add to predef.

- 2 Click this button.

The text is added to the list as a new entry.

Up to 20 entries each can be created in the **Text** and **Comment** selection lists.

Deleting predefined texts**Del from predef.**

- 1 Select the entry you no longer require from the corresponding selection list.

- 2 Click this button.

The text is deleted from the list.

3553818f7833d0c6c0a81e664e3d56ba / 2 / For approval for release
Information class: clinical

Saving_images

5.2.6 Saving images

TOPIC INFO

INDEX: [Saving : images]
INDEX: [Images : saving]

After completing postprocessing of a prior examination, all changes in the image are saved when you close the patient. If you want to save intermediate states, manually save the images in the required processing phase. The images are saved as copies of the original in the corresponding study.



To save images while an examination is in progress see (→ Page 141 *Saving and displaying images*)**[OptUnresolvedLink]Saving and displaying images**
(Saving and displaying images)[/OptUnresolvedLink].

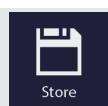
fc49039a2c0e46940a53dbdb03999d15 / 1 / For approval for release
Information class: clinical

Saving_a_single_image_FD

Saving a single image

✓ Prerequisite: Multiple images are not selected (→ Page 180 *Multiselection*).

- 1 Display the required image (individual selection).
- 2 Press this button.



a92cc2ef2c0edbc20a53dbdb3e5106ad / 2 / Draft
Information class: clinical

Saving_multiple_images_FD

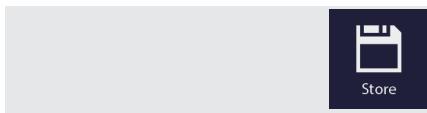
Saving multiple images

With the appropriate image selection you can save a portion or all images of one or more series, as well as segments of series.

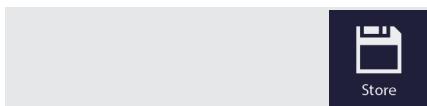
Images/series

- 1 Select the required images/series in multiselection
(→ Page 180 *Multiselection*).

5 Postprocessing



2 Press this button.



1 Show the scene.

2 Select the desired sequential images (→ Page 180 *Multiselection*).

3 Press this button.

The images are saved as a new scene.

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Information class: clinical

Subtraction_processing

5.3 Subtraction processing

TOPIC INFO

INDEX: [Subtraction processing]

When subtraction is performed, two X-ray exposures are acquired of the region of interest, one without contrast agent and one with contrast agent. Afterwards both exposures are subtracted.

In the subtraction image, areas with the same attenuation and areas with a (slightly) different attenuation, e.g. vessels with contrast agent, can be discerned clearly.

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Information class: clinical

Postprocessing_functions__SUB_

5.3.1 Postprocessing functions

The following functions are available to postprocess subtraction images during or after an examination:

- Anatomical background
- Change mask
- Pixel shift

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Information class: clinical

Loading_and_displaying_images__Sub_

5.3.2 Loading and displaying images

Native images from examinations acquired in Subtraction or Roadmap operating mode (option) are stored in the local database together with the subtraction images. Both image types can be displayed simultaneously on both monitors.

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Information class: clinical

Loading_images_Sub_FD

Loading images

With an examination in progress, the images required for subtraction processing are already loaded and saved. For subsequent processing, load the subtraction data from the local database.

Prepare Patient

Previous. Pat

- 1 Press the **Prepare Patient** menu button.

- 2 Press this button from the drop-down button list.

The control panel switches to keyboard mode.

The **Patient List** opens on the left monitor.

- 3 Double-click the subtraction study of the desired patient.

The selected images are loaded and displayed on the monitors.

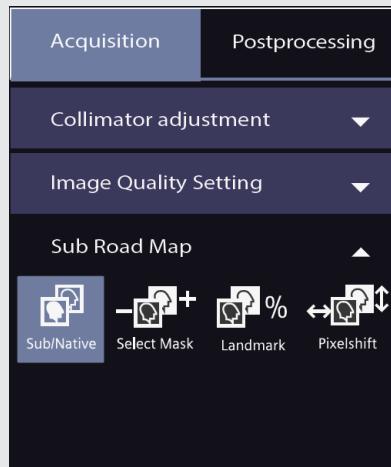
18a2723e2c10b9090a53dbdb0e34fba5 / 1 / For approval for release
Information class: clinical

Changing_the_monitor_layout_Sub_FD

Changing the monitor layout

After loading the images, 2-channel display is activated with both monitors in 1x1 layout. The left screen shows the subtraction images, the right screen the corresponding native images. This setting can be switched if necessary.

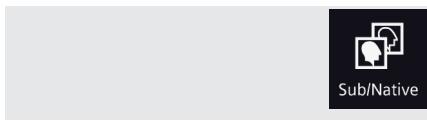
- 1 Change to **Advanced Mode** if necessary.
- 2 Open the **Sub Road Map** menu in the **Acquisition** task card.



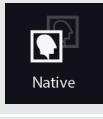
- 3 Press this button to switch between the monitor layouts.



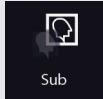
5 Postprocessing



2-channel display (only for full image display on the left monitor):
Simultaneous display of the subtraction image (left monitor) and corresponding native image (right monitor).



1-channel display – native images: Only native images are shown on both monitors. Applies particularly when the image overview is activated on the left monitor.



1-channel display – subtraction images: Only subtraction images are shown on both monitors. Applies particularly when the image overview is activated on the left monitor.

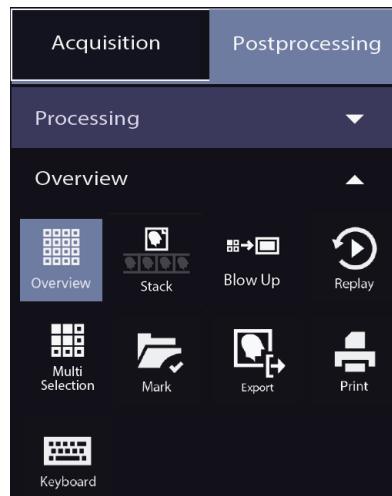
8f4517b82c121ed10a53dbdb7c0dc771 / 2 / Draft
Information class: clinical

Displaying_images_Sub_FD

Displaying images

After switching the monitor to 1-channel display, use the image overview display to show the required images.

- 1 Change to **Advanced Mode** if necessary.
- 2 Open the **Overview** menu in the **Postprocessing** task card.



- 3 Switch on image overview if necessary.
- 4 Use the functions for image display in the same manner as for standard examinations (without subtraction).

- Changing the display mode (*→ Page 177 Changing the display mode*)
- Scrolling (*→ Page 178 Scrolling*)

In stack display the Peak OP image (OP image with the highest value) of the respective series is displayed.

- Reviewing a scene (*→ Page 179 Reviewing a scene*)

In 2-channel display, the subtraction scene plays on the left monitor, the corresponding native scene on the right monitor.

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Information class: clinical

Changing_the_image_display_Sub_FD

5.3.3 Changing the image display

As with standard examinations (without subtraction) you can window, zoom/pan, rotate, and flip subtraction and native images.

(→ Page 182 *Changing the image display*)

The following presents special functions for use exclusively with subtraction data set.

Including anatomical background (Landmark)

Normally the anatomical surrounding of vessels of interest are not visible in images that are displayed subtracted. By adding the masking image, the surrounding tissue can be highlighted more or less.

- 1 Press this button.

The **Landmark** menu appears.



- 2 Set the degree of inclusion with the arrow.

0%: Fully subtracted (without anatomical background)

100%: Native display

Making the image and mask coincide exactly (Pixel shift)

During acquisition of the subtraction series, the patient or the C-arm system may have moved. The images that are to be subtracted may not be congruent. The anatomical background, especially in the area of image contrasts, is therefore not canceled out.

Through a suitable shift of the mask by a few pixels, you eliminate the displacement of fill image and mask. Applying a pixel shift will also have an effect on the representation of the fill image.



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The image shift with pixel shift is used in forward direction for subtraction scenes; that is, for subsequent images, not backward for previous images.

You can use manual and auto pixel shift multiple times one after the other or in combination as soon as the previously changed pixel shift is accepted.

Pixel shift Landmark menu

- 1 Display the required subtraction series (single selection).



- 2 Press this button.

The **Pixel shift Landmark** menu appears.

The subtraction series is shown in image stripe display on the left monitor.

5 Postprocessing

The currently selected image of the subtraction series is shown on the right monitor.

Selecting the image

- ◆ Use the arrows to display the first image with poor coverage on the right monitor.



Manual pixel shift

Shift the mask manually until the best impression of the subtraction image is achieved.



- 1 Move the mask with the arrow buttons until you get optimum coverage.
- 2 Press this button to apply the pixel shift to the current and subsequent images.

Accept

Undoing pixel shift

Accept pixel shift applies the changed pixel shift to the affected images and saves it. In the event of an error, you can cancel the last step or all steps.

- ◆ Press this button to restore the state prior to opening the **Pixel shift Landmark** menu.

Reset
All

6 Documentation

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6 Documentation

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Information class: clinical

Filming_Printing

6.1 Filming/Printing

You can expose the images of a study on film or print them on paper for documentation and reporting.



Make sure the printer is switched on before you send images to print.



Filming and printing are the same process except that they use different output devices. If the term "filming" or "printing" is used alone in the following, the description applies equally for the other process.

Standard printing

You can print the displayed image or a selection of multiple images simply by pressing a button. The print job is processed with standard settings (simplified print procedure).

Changing print settings

If you want to check or change settings prior to printing, use the "enhanced print procedure". You can display a print preview and adapt the print layout, for example. In a second step, you forward the print job to the required printer.

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Information class: clinical

Selecting_images_print_FD

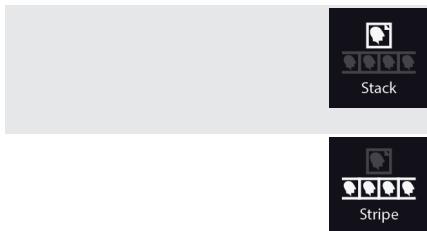
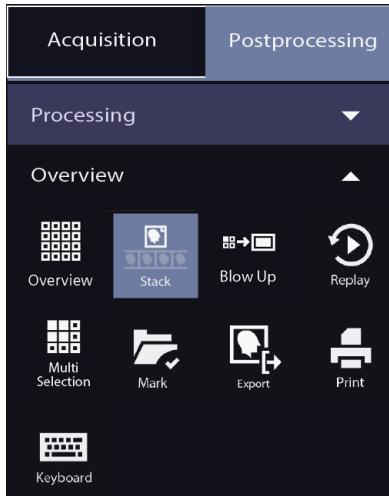
6.1.1 Selecting images

Before you start a print job, you have to select the images.

You have access to the currently loaded images through the **Postprocessing** task card on the control panel. Single and multiple image selections are possible

(→ Page 180 *Selecting images*)

- 1 Change to **Advanced Mode** if necessary.
- 2 Open the **Overview** menu in the **Postprocessing** task card.



3 Select the suitable display mode (→ Page 177 *Changing the display mode*):

- Image stripe display if you want to select multiple images in the current series.
- Stack display if you want to select one or more series.

Single image

- ◆ Click the relevant image segment in the image overview.



If the left monitor has been changed to full image mode, the image displayed there is selected.

Multiselection



- ◆ Press this button in each case to add the image or series selected in the image overview to the multiple selection.

– or –



Switch on multiselection by pressing this button.

Select the images or series.

Images of a multiselection are marked by a white dot.



The **Multiple Selection** menu has to be open/active during printing; otherwise, only the currently marked image/scene is printed.

6 Documentation

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Information class: clinical

Printing_using_default_settings_FD

6.1.2 Printing using default settings

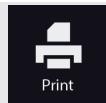
TOPIC INFO

INDEX: [Printing : using default settings]

The following default settings are used with the simplified print procedure:

- Page size and layout (page partitioning) according to the configuration settings for the Calibration object **Default Printer**.
(→ Page 232 *DICOM Properties - Printing*)
- Handling of subtraction images (not applicable to Cios Select S1 and Cios Select S3) and image text display as in the last print job. These settings can be changed in the enhanced print procedure.
(→ Page 205 *Changing print settings*)

Starting printing



- ◆ Press this button on the control panel.

The print job is started.

In the **Patient list** the selected images are marked as "printing" ("p" flag).

When the print job is complete the images are marked as "printed" ("P" flag).



After printing, the images are released for automatic deletion if necessary. Depending on the hard disc fill level, the images are deleted on the specified date.

(→ Page 238 *Deleting images automatically*)



The "printed" flag is set as soon as the images are successfully transferred to the printer driver. Not all printers (e.g., paper printers) can solve printing problems themselves. The image printout may be lost! Verify that the printouts are available before you delete images.

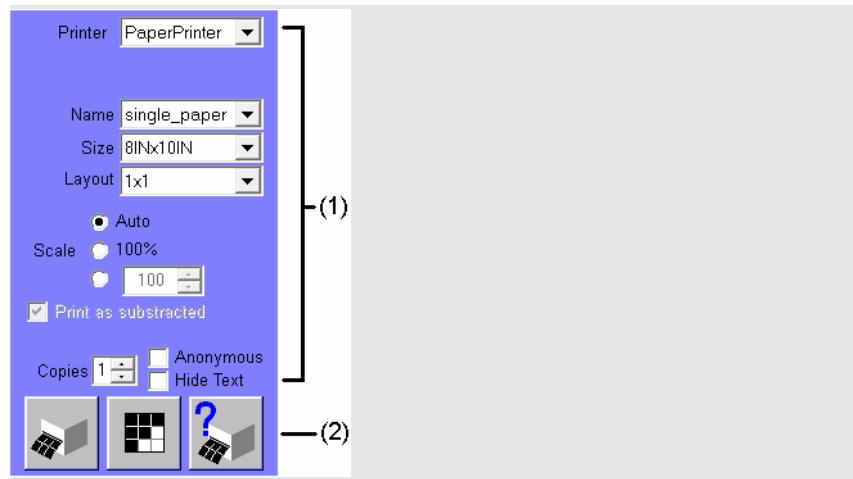
aaa872aa7833e2fec0a81e6671622ad9 / 3 / Draft
Information class: clinical

Printing_with_changed_settings

6.1.3 Printing with changed settings

In the enhanced print procedure you can change the following settings:

- Printer selection
- Layout settings
- Image text display
- Handling subtraction images
- Number of copies



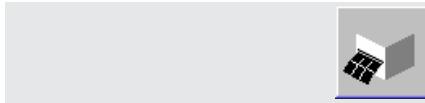
Input dialog box for print settings

(1) Print settings

(2) Buttons for print, print preview, and print status

- ◆ Click this button on the left monitor (lower left).

The input dialog box for print settings is displayed on the monitor.



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Information class: clinical

Changing_print_settings

Changing print settings

TOPIC INFO

INDEX: [Print settings]

The input dialog box for print settings initially contains the settings used for the last print session.



Changes to the settings for subtraction images and image text display are used as new default settings for standard printing.

Printer

The **Printer** selection list contains the paper and DICOM printers configured in the system.

- ◆ Select the required printer.

Layout settings

Individual print layouts under an individual name are created in the configuration for each printer (→ Page 235 *Print Layout card*).

- ◆ Select the layout settings in the selection list.

Name: Stored print layouts for the selected printer

Size: Available page sizes for the selected printer

Layout: Available page partitions for the selected printer

Image text display

The scope of image text information is defined in the configuration for each print layout.

6 Documentation

(→ Page 236 *Image text settings*)

Anonymous

- 1 Select the **Anonymous** option if you want to avoid assigning printed images to a patient.

"Anonymous" appears in the hardcopy instead of the patient name. The remaining demographic data are hidden.

Hide Text

- 2 Select the **Hide Text** option if all image text is to be hidden in the hardcopy.

Subtraction images

Subtraction images are usually printed in native display.

Print as subtracted

- ◆ If needed, select the subtracted display for printing.

Number of copies

Copies 1

- ◆ Define the number of copies.

Up to 9 copies per print job are possible.

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Information class: clinical

Displaying_a_print_preview

Displaying a print preview

TOPIC INFO

INDEX: [Print preview]

In the print preview you can see how the images will look later on the exposed film or paper hardcopy. You can also change the position of individual images where necessary.



- 1 Click this button in the input dialog box for print settings.

The images appear on the left monitor in the selected print layout.

- 2 Use the mouse wheel to display the individual pages of the print job.
- 3 Use the mouse's drag and drop function to arrange the images in the selected page layout.

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Information class: clinical

Starting_printing

Starting printing



- ◆ Click this button in the input dialog box for print settings.

The print job is started.

In the **Patient list** the selected images are marked as "printing" ("p" flag).

When the print job is complete the images are marked as "printed" ("P" flag).



After printing, the images are released for automatic deletion if necessary. Depending on the hard disc fill level, the images are deleted on the specified date.

(→ Page 238 *Deleting images automatically*)



The "printed" flag is set as soon as the images are successfully transferred to the printer driver. Not all printers (e.g., paper printers) can solve printing problems themselves. The image printout may be lost! Verify that the printouts are available before you delete images.

Print status



You can track and influence job processing for print jobs on DICOM printers.

- ◆ Click this button in the input dialog box for print settings.

The **Job status list** opens.

(→ Page 219 *Job status list*)

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Information class: clinical

Exporting

6.2 Exporting

TOPIC INFO

INDEX: [Exporting]

After an examination or postprocessing, the saved images are stored on the hard drive (local database).

This section explains how to save images and patient data from the local database, send them within the network, and save them to data media.

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Information class: clinical

Export_procedures

6.2.1 Export procedures

TOPIC INFO

INDEX: [Export procedures]

Manual export

During an examination or postprocessing, you can export the displayed image or a selection of multiple images. You can define the export destination and data format in the dialog box on the left monitor.

Automatic export

Depending on the configuration setting, at the end of the examination acquired images are sent automatically to a default address (→ Page 231 *DICOM Properties - Sending*).

You can change the default address and export settings in the dialog box used for manual export.

6 Documentation

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Information class: clinical

Export_destinations

6.2.2 Export destinations

TOPIC INFO

INDEX: [Export destinations]

Depending on the job setting, you select one of the following export destinations in the enhanced export procedure.

Removable device

You write data to removable devices to save it short term or pass it on.

The following media types are supported for saving data:

- DVD-R (minus R), DVD+R
- CD
- USB storage media (external hard drives, sticks)

The accidental use of other media, e.g., DVD-RW, can result in an error message or impair functionality.

597f5f8678341aefc0a81e66032f7db4 / 2 / For approval for release

HZ_XP_hm_docUser_loss_of_data

hazard-key: hm_docUser_loss_of_data



CAUTION

Risk that CD/DVD-R media used for exporting can become damaged or be unreadable on other CD/DVD drives.

Data loss or apparent data loss.

- ◆ Use removable devices as transfer media only. Only data media approved by Siemens Healthineers may be used.



In general, do not use storage media that require their own power supply. In addition, do not use USB storage media containing an autorun .inf file.



As a rule, you cannot release radiation during the CD/DVD write process. In exceptional cases (emergencies), you can release radiation in fluoroscopy mode. However, radiation may be disrupted.

Moreover, the export process of subtracted images to CD/DVD is interrupted during radiation release and other processing-intensive procedures (e.g., play LSH). In those cases images are stored as raw data.

You are therefore urgently advised to start write processes outside of examination hours (e.g. at the end of the office day).

Other workstation

If your system is connected to a network, you can send patient and examination data to other workstations via the network. The data can be processed or used for diagnosis there.

Archive

To archive, you send the selected patient and examination data to a DICOM network node that has been established as an archive. You can import archived data back to your local database whenever you need them.

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HZ_XP_hm_docUser_hard_disk_no_archive

hazard-key: hm_docUser_hard_disk_no_archive



CAUTION

Use of the imaging system hard drive as a long-term archive.

Loss of image data.

- ◆ Do not use the imaging system hard drive as a long-term archive. Follow the local regulations regarding the archiving of X-ray images, while taking into account the use of DICOM archive nodes.

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HZ_XP_hm_docUser_no_archive_medium

hazard-key: hm_docUser_no_archive_medium



CAUTION

Loss of image data.

Risk of unnecessary radiation exposure!

- ◆ The hard disk of the imaging system is not suitable for long-term archiving of patient and image data. There are statutory requirements governing the archiving period, data availability, and data security (data integrity), as well as recommendations concerning fire protection or water damage for the archiving of image data. The operator of the archive is responsible for observing these regulations.
- ◆ Because of advances in technical development and statutory requirements, the storage of image data and access to it cannot be realized with a single storage and media technology alone. Therefore, the migration of data may be necessary under the responsibility of the operator of the digital archive.

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Overview_of_transfer_capabilities_FD

Information class: clinical

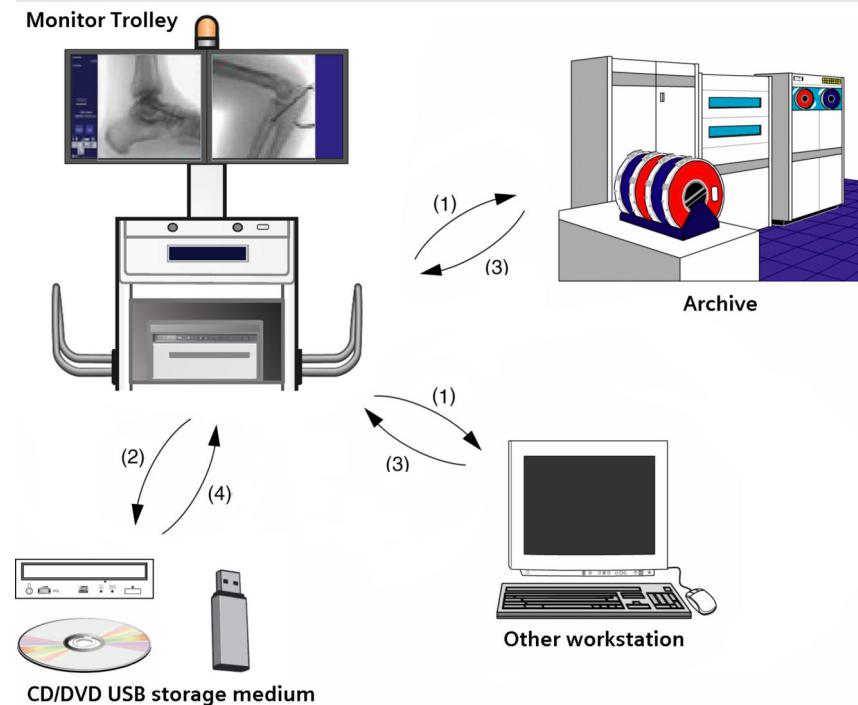
6.2.3 Overview of transfer capabilities

TOPIC INFO

INDEX: [Transfer capabilities]

The figure below shows the data backup and transfer options available to you.

6 Documentation



- (1) Export to DICOM network nodes (Archive or other workstation)
- (2) Export to removable devices (CD/DVD, USB drive)
- (3) Import from DICOM network nodes (Query & Retrieve)
(→ [Page 172 Data in the network](#))
- (4) Importing from removable devices
(→ [Page 171 Data from removable devices](#))



Please remember that not all transfer options may be available on your system. The devices and network nodes available depend on the individual configuration of your system and the options installed.

e7ca623d7833e188c0a81e664e3d56ba / 2 / For approval for release
Information class: clinical

Selecting_images_export_

6.2.4 Selecting images

Before you start an export job, you have to select the images.



You can only export objects that are stored in the local database. If data are to be transferred from one data medium to another, they must first be imported. Exporting data from other modalities is not possible however.

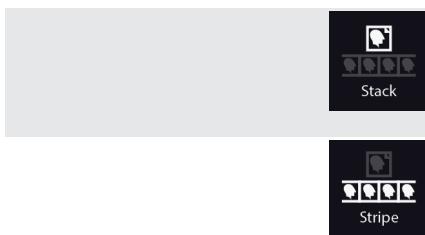
111d76f83467bada0a53dbdb60b2951a / 2 / Draft
Information class: clinical

Images_from_an_examination_in_progress_or_postprocessing_FD

Images from an examination in progress or postprocessing

You have access to the currently loaded images through the **Postprocessing** task card on the control panel. Single and multiple image selections are possible

(→ Page 180 *Selecting images*)



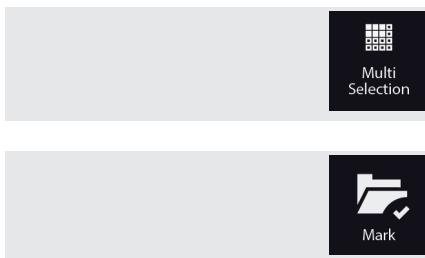
Single image

◆ Click the required image or series.



If the left monitor has been changed to full image mode, the image displayed there is selected.

Multiselection



The **Multiple Selection** menu has to be open/active during export; otherwise, only the currently marked image/scene is exported.

98f88a69346894950a53dbdb6fcc36ac / 2 / Draft
Information class: clinical

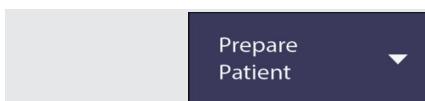
Complete_studies_FD

Complete studies

To save or archive complete studies, select the data sets in the **Patient list**.

(→ Page 163 *Searching for and selecting patient data*)

1 Press the **Prepare Patient** menu button.



6 Documentation

Previous. Pat

- 2 Press this button from the drop-down button list.
- 3 Search for the required patient by sorting and filtering the list as necessary.
- 4 Select the required study or studies.

63be74c0b0a097ccc0a81e667bdd2658 / 1 / For approval for release
Information class: clinical

Preparing_the_removable_devices

6.2.5 Preparing the removable devices

Depending on the routine you use, one or several drives and connections for external data media will be established for your system.

Working with data media

Follow the instructions of the manufacturer for handling and storage of CD/DVDs.

Drives

Your system comes with a CD/DVD writer for data storage.

d7e822837833de2ec0a81e6671622ad9 / 1 / For approval for release
Information class: clinical

Inserting_a_CD_DVD

Inserting a CD/DVD

TOPIC INFO

INDEX: [Removable devices]

CDs/DVDs can be written to on one side only.

- ◆ Place the CD/DVD into the drive with the label facing upwards.



Never shut down the Cios Select or disconnect the monitor trolley from the C-arm system while data is being written to CD/DVD.

1e1d09deb0a1ecb2c0a81e666d7477f2 / 2 / Draft
Information class: clinical

Connecting_the_USB_storage_medium

Connecting the USB storage medium

dacd5a5b78342960c0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_docUser_unplugg_USB

hazard-key: hm_docUser_unplugg_USB



CAUTION

Risk of connecting/disconnecting USB devices during the exposure.

Such behavior can lead to system instability. This can also impact other processes, such as exposure jobs in progress. Loss of data, interference in exposure process.

- ◆ Do not insert or disconnect USB devices during exposure or other critical processes.

e0270c2e78341b3dc0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_docUser_loss_of_data_USB

hazard-key: hm_docUser_loss_of_data_USB

CAUTION

Risk of disconnecting USB devices during ongoing data transfer.

Loss of data and damage to the data medium possible.

- ◆ Do not disconnect the USB device during active data transfer (such as export).
- ◆ Use removable devices as transfer media only. Removable devices are not permitted for archiving purposes.

- ◆ Connect the USB plug into the USB jack.

b18d2c9e3469e3450a53dbdb2177630a / 2 / Draft

Exporting_using_default_settings_FD

Information class: clinical

6.2.6 Exporting using default settings

TOPIC INFO

INDEX: [Exporting : using default settings]

During the simplified export procedure, the settings established as defaults are used. The default settings can be changed in the enhanced export procedure (→ Page 215 *Changing the export settings*).

Starting export

On the control panel there is an export button.

- ◆ Press this button.

The export job is started.

After successful completion of the export job to a network node, the selected images are marked as sent ("S" flag) or archived ("A" flag) in the **Patient List**.



After exporting, the images are released for automatic deletion if necessary. Depending on the hard disc fill level, the images are deleted on the specified date.

(→ Page 238 *Deleting images automatically*)



The "sent" or "archived" flag is set as soon as the images are successfully transferred to the network nodes. Even when the addressee works with Storage Commitment, the flags only identify the receipt and storage of the data on the recipient's hard drive. A misinterpretation of the flags can result in a loss of data during the prescribed storage period. For this reason, follow the regulatory requirements regarding the archiving procedure.



Note that the exported images are not transmitted as raw data, but including all of the applied processing steps. They cannot be restored to their original state. Do not use these images for the primary diagnosis!

3f748c757833dd15c0a81e664e3d56ba / 2 / For approval for release
Information class: clinical

Exporting_with_changed_settings

6.2.7 Exporting with changed settings

TOPIC INFO

INDEX: [Exporting : manually]

In the enhanced export procedure you can change the following settings:

- Export destination selection
- Data format
- Image properties
- Handling subtraction images
- Saving with a DICOM Viewer

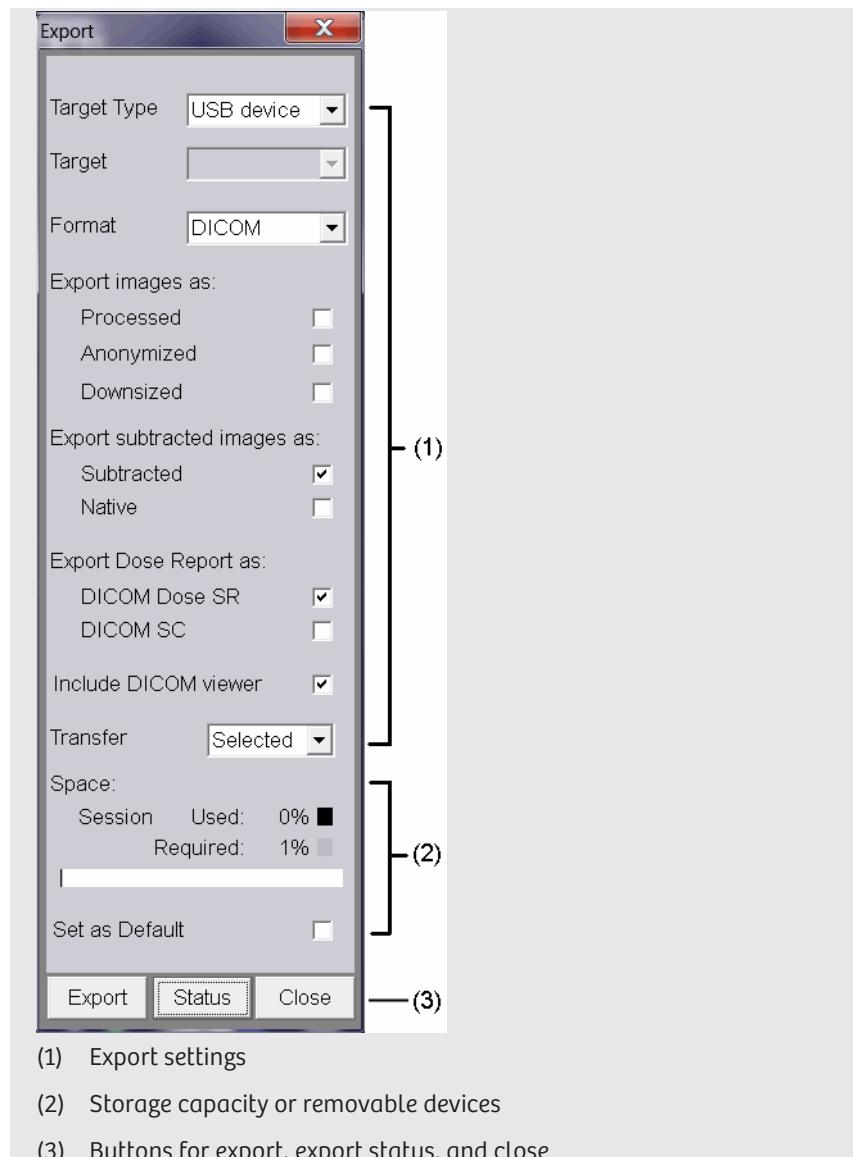
0221c6107833d96dc0a81e6671622ad9 / 2 / For approval for release
Information class: clinical

Export_to_dialog_box

"Export" dialog box

- ◆ Click this button on the left monitor (lower left).
The **Export** dialog box appears on the monitor.





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Information class: clinical

Changing_the_export_settings

Changing the export settings

TOPIC INFO

INDEX: [Export settings]

In the **Export** dialog box you can first enter settings that will be used as the defaults.

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6 Documentation

Export destination ◆ Select the required destination medium from the **Target Type** selection list.

- **DICOM node:** Another workstation, archive, PACS
- **CD/DVD:** Inserted CD or DVD
- **USB device:** Connected USB data medium



When DVD recording is active, export to DVD is not possible.

Export address When selecting "DICOM node" you have to enter a network address configured in the system as the destination.

- ◆ Select the network node from the **Target** selection list.

Data format The systems and applications in which the exported data can be opened and processed depend on the data format.

- ◆ Select the data format in the **Format** selection list.
- **Private:** Format that is only readable by FLC imaging systems
- **DICOM:** Standardized file format in medical imaging
- **TIFF:** PC graphics format
- **AVI:** PC video format



When "DICOM node" is selected as the export destination, only the DICOM format can be used.

Image properties Depending on the data format, prior to export images can be prepared differently in terms of graphics and text embedding as well as file size.



When **Private** is selected as the data format, the data must be exported in its original state.

Export images as:	
Processed	<input type="checkbox"/>
Anonymized	<input type="checkbox"/>
Downsized	<input type="checkbox"/>

- ◆ Select the image properties in the **Export images as** area.

- **Processed:** changes in the image display compared to the original are used (such as window values, image rotation/flip, zoom, pan, edge filter) and evaluation graphics are "burned" into the image.
- **Anonymized:** "Anonymous" appears in the image instead of the patient name. The remaining demographic data are hidden.
- **Downsized:** The files are made smaller by reducing the image resolution 50% and the bit depth to 8 bits/pixel.



To save the image brightness and contrast, select **Processed**.

Subtraction images You can export images of a specific image type or multiple image types from subtraction series.

Export subtracted images as:

- | | |
|------------|-------------------------------------|
| Subtracted | <input checked="" type="checkbox"/> |
| Native | <input type="checkbox"/> |

- ◆ Select the image types in the **Export subtracted images as:** area.

- **Subtracted:** Images in subtracted display
- **Native:** Native images without mask and without Peak OP image

Radiation Summary Report

Two different file formats are possible if the radiation summary report is exported in DICOM format.

Export Dose Report as:

- | | |
|---------------|-------------------------------------|
| DICOM Dose SR | <input checked="" type="checkbox"/> |
| DICOM SC | <input type="checkbox"/> |

- ◆ Select the file format in the **Export Dose Report as:** area.

- **DICOM Dose SR:** Structured Report (DICOM SR)
- **DICOM SC:** Image with “burned in” text.

DICOM Viewer

When exporting to a removable device, a DICOM Viewer is saved to the CD/DVD or USB medium together with the image data. This allows for viewing the exported images on any computer. The DICOM Viewer starts directly from the data medium (automatically after inserting/connecting). No installation of files takes place on the computer in question.

Include DICOM viewer

- ◆ Deselect this option if you do not want to save the DICOM Viewer.

Scope of data

Transfer

All

- ◆ Specify the scope of the images to be exported.

- **Selected:** all selected images (especially individually selected images)
- **Marked:** all marked images
- **All:** all images in the study

Checking disk space

If a removable device is indicated as the export destination, the current storage capacity and required disk space are displayed.

- 1 Use the display to check where there is sufficient space available on the medium.
- 2 Change the data medium if necessary before starting the export.



2d15cf767833e1e5c0a81e6671622ad9 / 2 / For approval for release
Information class: clinical

Starting_export

Starting export

- ◆ Click this button in the **Export** dialog box.

The export job is started.

After successful completion of the export job to a network node, the selected images are marked as sent (“S” flag) or archived (“A” flag) in the **Patient List**.

After exporting, the images are released for automatic deletion if necessary. Depending on the hard disc fill level, the images are deleted on the specified date.

(→ Page 238 *Deleting images automatically*)





The “sent” or “archived” flag is set as soon as the images are successfully transferred to the network nodes. Even when the addressee works with Storage Commitment, the flags only identify the receipt and storage of the data on the recipient's hard drive. A misinterpretation of the flags can result in a loss of data during the prescribed storage period. For this reason, follow the regulatory requirements regarding the archiving procedure.

Export status

Status

You can track and influence job processing for all export jobs.

- ◆ Click this button in the **Export** dialog box.

The **Job status list** opens.

(→ Page 219 *Job status list*)

9d0750527833d844c0a81e6671622ad9 / 2 / For approval for release

Establishing_default_settings

Information class: clinical

Establishing default settings

Export jobs for automatic export and for sending the radiation summary report at the end of the examination are performed using default settings.

- 1 Select the required export settings in the **Export** dialog box.

- 2 Select the **Set as Default** option.

Set as Default

Close

- 3 Click this button.

Changed default settings are stored.

b10515327833d6fdc0a81e664e3d56ba / 1 / For approval for release

Checking_the_data_transfer

Information class: clinical

6.3 Checking the data transfer

TOPIC INFO

INDEX: [Transfer : checking]

All jobs for importing, exporting, and printing/filming data are performed in the background.

The processing of jobs can be viewed in the status bar, enabling you to react in case of error.

6.3.1 Indicators in the status bar

The corresponding icon is displayed in the status bar on the left monitor (lower left) for data transfers in progress. The icons indicate the action being performed and whether an error has occurred.

Action	Not active	Active	Error
Write to CD/DVD	No icon		No icon

Action	Not active	Active	Error
Read from CD/DVD	No icon		No icon
Write to USB device	No icon		No icon
Read from USB device	No icon		No icon
Export to DICOM network node (sending)	No icon		
Import from DICOM network nodes (receiving)	No icon		No icon
Printing/filming to DICOM-printer	No icon		

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Information class: clinical

Viewing_and_processing_jobs

6.3.2 Viewing and processing jobs

In the **Job status list** you can learn about the following jobs running in the background – sorted by transfer type:

- Printing/filming to DICOM printer (DICOM Film)
- Export to DICOM network node (DICOM Send)
- Import from DICOM network nodes (DICOM Retrieve)
- Write to CD/DVD
- Read from CD/DVD
- Write to USB storage medium
- Read from USB storage medium

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Information class: clinical

Job_status_list

Job status list

Several methods are available for opening the **Job status list**:

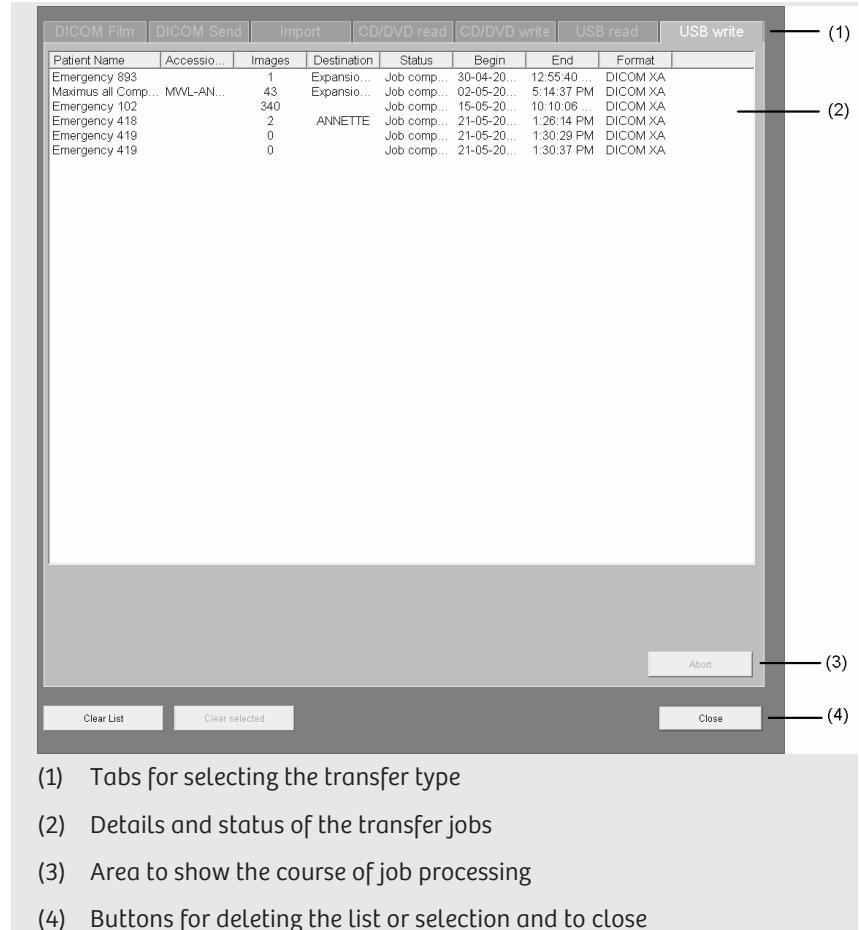
- ◆ Click the **Status** button in the **Import from, Export** dialog box, or print settings dialog box.

– or –

Click the icon for the applicable data transfer on the left monitor.

The **Job status list** is displayed. The task card for the applicable data transfer is displayed.

6 Documentation



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Information class: clinical

Influencing_job_performance

Influencing job performance

The work steps available in the list depend on the transfer type and the status of a job.

Selecting jobs

Some actions are limited to the transfer jobs selected in the list.

- ◆ Click the required jobs in the list (press and hold **Ctrl** for multiple selection)

Restarting DICOM Send

Failed export jobs to DICOM network nodes can be repeated with the same settings or redirected to a new address.

- ◆ Click **Send**.

The selected jobs are restarted with the original destination address.

– or –

Click **Redirect**.

The selected jobs are diverted to the DICOM network node currently set in the **Export** dialog box.

Aborting jobs

- ◆ Click **Abort**.

All transfer jobs are cancelled and the start of other planned jobs in the list is prevented.



A data transfer in progress for which there are additional images (such as a print job with multiple images on a page) is not cancelled.

Clearing lists

- ◆ Click **Clear List**.

All jobs that have ended or for which data transfer preparation has been completed are hidden.

– or –

Click **Clear selected**.

Of the **selected** jobs in the list, all that have ended or for which data transfer preparation has been completed are hidden.

793f2a007833e050c0a81e664e3d56ba / 1 / For approval for release
Information class: clinical

Reports

6.4 Reports

TOPIC INFO

INDEX: [Reports]

Certain examination data are saved in the form of structured reports.

Cios Select offers the following types of reports:

- Radiation Summary Report

Use: The reports serve to document examination and treatment data. They are mostly generated automatically. Depending on the type of report you can read, edit/supplement, print, and export them.

Prerequisite: The examination of a registered patient is the prerequisite for a report to exist.

Formats: Reports are saved in two different formats. This allows them to be opened in different applications.

- Secondary Captures (DICOM SC)

Allows loading into a viewer, for example; PACS compatible.

- Structured Report (DICOM Dose)

Data format that is compatible with other DICOM systems; reports must be exported to these systems in DICOM-SR format.

18207ec63470bb840a53dbdb3eb537c1 / 1 / For approval for release
Information class: clinical

Selecting_a_study_FD

6.4.1 Selecting a study

One radiation summary report is created in the local database for each study.

6 Documentation



- Select an image or series of the required study in the **Postprocessing task** card on the control panel.

— OR —

Previous. Pat

In the **Patient list** select the study if the applicable data have not been loaded.

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Information class: clinical

Radiation_summary_report

6.4.2 Radiation summary report

TOPIC INFO
INDEX: [Radiation summary report]

The radiation summary report contains the cumulated values for the number of exposures, duration, and dose over the course of an examination. The generation of this report is a fully automated process.



- (1) Patient and examination data, cumulative radiation data
- (2) Detailed information on the acquired series and images
- (3) Buttons for scrolling in the report, exporting, and printing the report, as well as closing the dialog box

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Information class: clinical

[Opening_the_report](#)

Opening the report

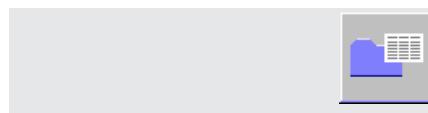
TOPIC INFO

INDEX: [Radiation summary report]

✓ Prerequisite: A study or a series/image is selected.

◆ Click this button on the left monitor (lower left).

The radiation summary report is displayed on the monitor.



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Information class: clinical

[Exporting_the_report](#)

Exporting the report

The default settings established in the **Export to...** dialog box are used when exporting the report. This is particularly true of the file format when DICOM format is set.

◆ Click this button.

The report is exported to the default address.

1478cf57833de9bc0a81e6671622ad9 / 3 / Draft
Information class: clinical

[Printing_a_report](#)

Printing a report

TOPIC INFO

INDEX: [Printing : a report]

When you send the report directly to the default printer, the settings established for standard printing are used. To use other printer settings or a different printer, open the print preview first.

Standard print

Print on filmsheet

1 Deselect the **Print on filmsheet** option, if necessary.

Print

2 Click this button.

The report is printed on the default printer.

Changing print settings

Print on filmsheet

1 Select the **Print on filmsheet** option.

Print

2 Click this button.

The report is opened in print preview. Make the necessary print settings and start the print job here (→ Page 205 *Changing print settings*).

6 Documentation

7 Configuration

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7 Configuration

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Information class: clinical

User_Settings

7.1 User Settings

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Information class: clinical

Opening_closing_a_configuration_window_FD

7.1.1 Opening/closing a configuration window

TOPIC INFO

INDEX: [User settings]
INDEX: [Configuration]
INDEX: [Settings]

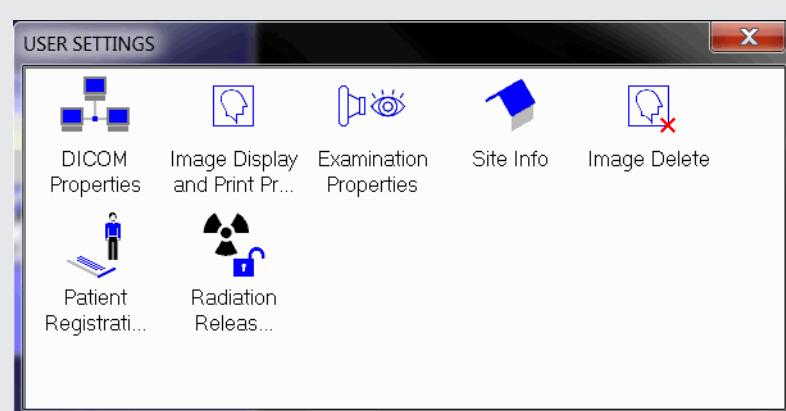
- 1 Press this button on the monitor trolley control panel.

Manage Tool is displayed on the monitor.



- 2 Click this icon on the **Settings** subtask card in the **Manage Tool**.

The menu for defining user settings is displayed.



- 3 Double-click the required settings icon.
- 4 Change the settings as required.
- 5 Click **Apply** to accept the changes.
- 6 Click **OK** to confirm the changes and close the settings window.
- 7 Click **Cancel** to reject your changes and close the settings window.
- 8 Press the **Close** button on the keyboard to exit the **Manage Tool**.



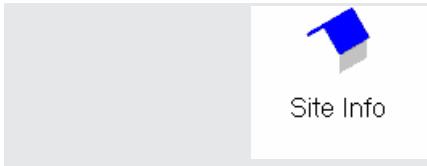
c42129e57833edd7c0a81e6671622ad9 / 2 / Draft
Information class: clinical

Site_info

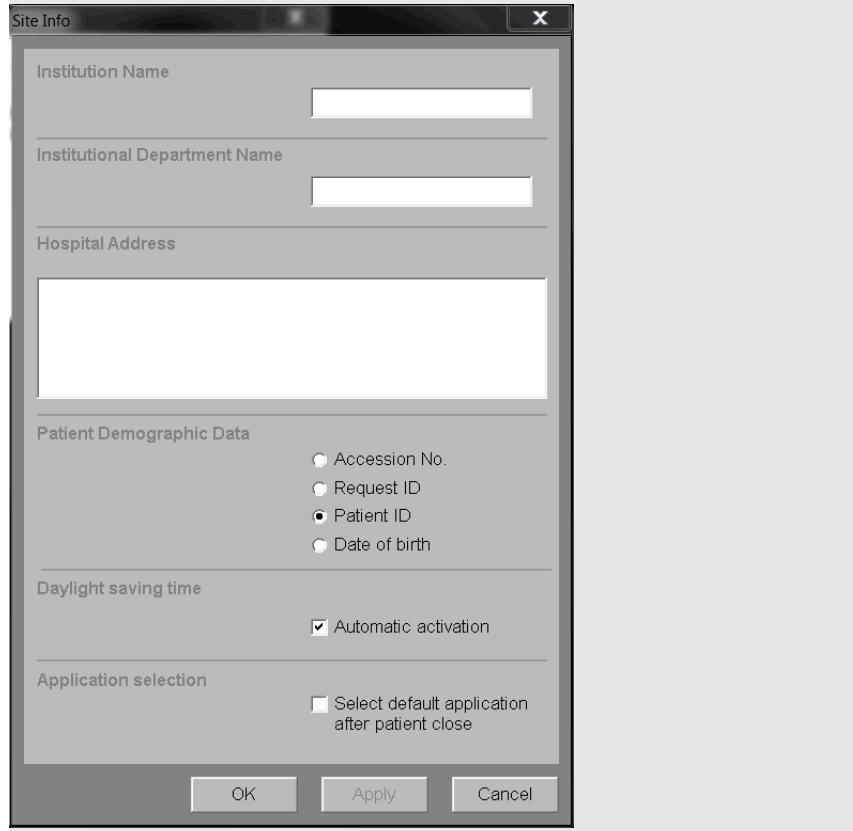
7.1.2 Site info

TOPIC INFO

INDEX: [Site info : user settings]



In the **Site Info** dialog box you establish site-specific settings, such as the name and address of your facility.



Institution Name

- ◆ Enter the name of your hospital or practice (64 characters maximum).



A change of the **Institution Name** will have no effect on already acquired images.

Institutional Department Name

- ◆ Enter the name of your department or ward (64 characters maximum).

Hospital Address

- ◆ Enter the address of your hospital or practice.

Patient Demographic Data

- ◆ Select the patient data to display on the monitor in addition to the patient name:

Accession No.

Request ID

Patient ID

7 Configuration

Date of birth

Daylight saving time

- ◆ Select **Automatic activation**.

When **Automatic activation** is selected, the system automatically switches to daylight saving time.

Application selection

- ◆ Activate the **Select default application after patient close** check box.

When **Select default application after patient close** is selected, the system automatically switches to the default application after closing patient.

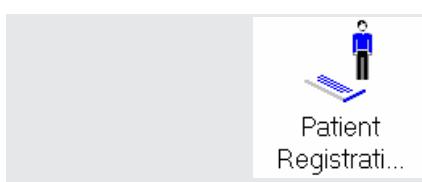
bba998f77833eb76c0a81e6671622ad9 / 2 / Draft
Information class: clinical

Patient_registration

7.1.3 Patient registration

TOPIC INFO

INDEX: [Patient registration : user settings]



In the **Patient Registration Input Fields** dialog box you establish what information can be entered during patient registration.

Entries can only be made with the mouse.

The screenshot shows the 'Patient Registration Input Fields' dialog box. It contains a grid of 20 entries, each with a 'Visible' checkbox and a 'Mandatory' checkbox. The entries are arranged in two columns:

	Visible	Mandatory	Visible	Mandatory	
Last name	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Accession No.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
First name	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Request Procedure ID	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Middle name	<input type="checkbox"/>	<input type="checkbox"/>	Study Description	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Title	<input type="checkbox"/>	<input type="checkbox"/>	Study ID	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Suffix	<input type="checkbox"/>	<input type="checkbox"/>	Study Comment	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ID	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Institute Name	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Date of Birth	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Operator 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Military Rank	<input type="checkbox"/>	<input type="checkbox"/>	Operator 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Social Security Number	<input type="checkbox"/>	<input type="checkbox"/>	Referring Physician	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Sex	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Performing Physician 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Weight	<input type="checkbox"/>	<input type="checkbox"/>			
Age	<input checked="" type="checkbox"/>	<input type="checkbox"/>			
Height	<input type="checkbox"/>	<input type="checkbox"/>			

Below the grid, there is a section for 'Name-display format' with a 'Change' button and a note: 'Current format: Last name Middle name First name'. At the bottom are 'OK', 'Apply', and 'Cancel' buttons.

- ◆ Activate or deactivate the respective entries.

Visible: Entry will be shown in the **Data Entry Dialog** window.

Mandatory: Entry must be completed in the **Data Entry Dialog** window.
(Entry will be shown in the **Data Entry Dialog** window in **bold** letters).

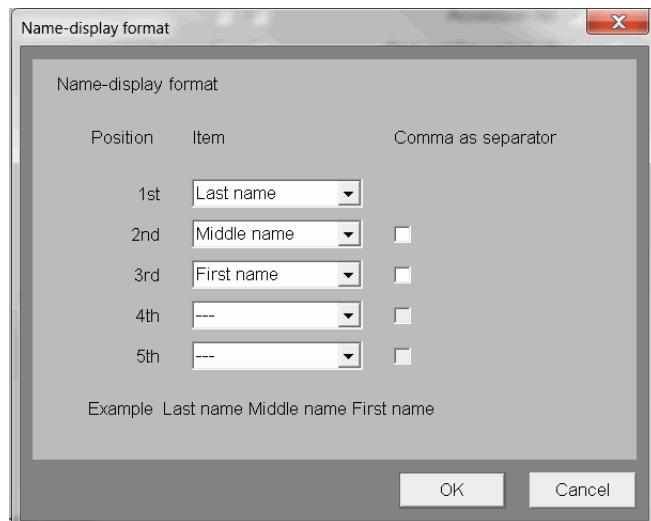
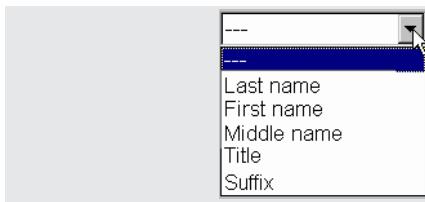
Name-display format

Set the parts of the patient name to be displayed:

1 Click **Change**.

2 Select the parts of the patient name that should be displayed (maximum five).

3 Click the corresponding check box if a comma should be placed between the parts of the name.



4 Click **OK**.

The patient name composition that has been established is displayed.

This composition will be used when displaying patient names in images and on hardcopies/filmsheets.

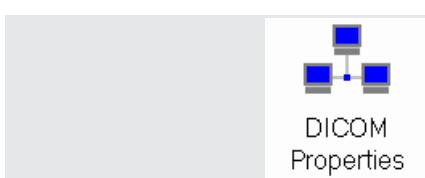
3e557fa17833ee73c0a81e6671622ad9 / 2 / Draft
Information class: clinical

DICOM_Properties

7.1.4 DICOM Properties

TOPIC INFO

INDEX: [DICOM Properties : user settings]



In the **DICOM Properties** dialog box you establish the settings for DICOM functions, such as saving, sending, and printing of images.

7 Configuration

f4f796333b0d12550a53dbdb4e031db2 / 1 / For approval for release
Information class: clinical DICOM_Properties__General_FD

DICOM Properties - General

TOPIC INFO
INDEX: [DICOM Properties : General]

DICOM Properties

General Protocol codes Sending Printing

Storage Commitment

Waiting time hours
Number of retries

Worklist query

RIS Timer min
Modalities to query CR XA
 DX RF
 Other

OK Apply Cancel

Storage Commitment
Waiting time: the time the imaging system waits for storage commitment after a study/images have been sent to an archive server.

Number of retries: if the archive server is not available, the imaging system performs the selected number of retries.

If a DICOM node for which storage commitment is configured does not send a confirmation within the configured waiting time/number of retries, neither the **S** (sent) or **A** (archived) flag is set.

Worklist query
RIS Timer: You can set the update interval (in minutes) for receiving worklist data from the HIS/RIS (hospital/radiology information system).
Possible settings: Update: 0 ... 1440 minutes (24 hours), 0 = no update
Modalities to query: selection of modality/modalities to use for worklist queries.
Any modality with a two-letter name can be entered for the worklist query (**Other**).

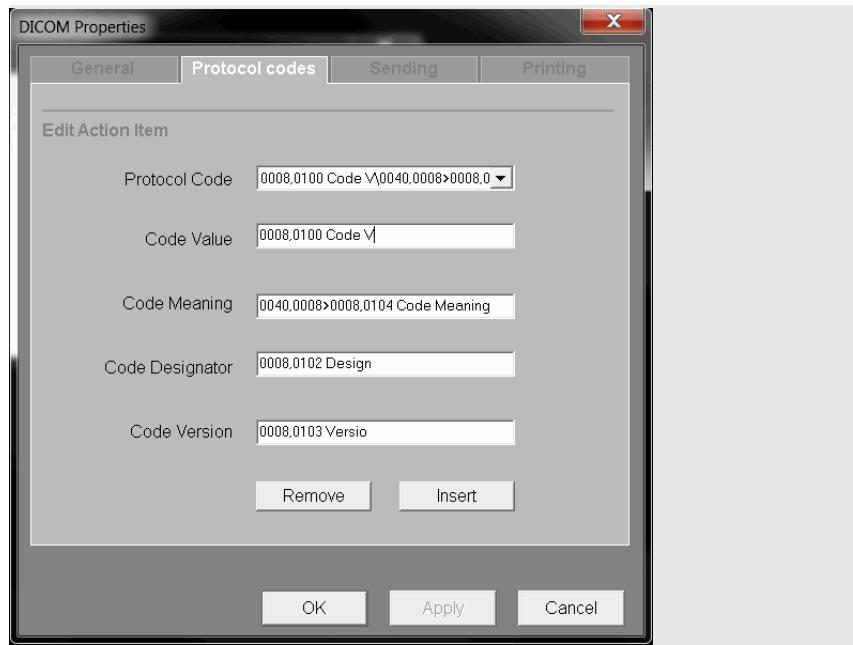
c8b132ee7833e80dc0a81e6671622ad9 / 2 / Draft
Information class: clinical

DICOM_properties__Protocol_codes

DICOM Properties - Protocol codes

TOPIC INFO

INDEX: [Protocol codes : editing]



For MPPS Close, you can define protocol codes.

Adding a new protocol code

1 Enter the code: **Code Value**, **Code Meaning**, **Code Designator**, **Code Version**.

2 Then click **Insert**.

A new **Protocol Code** is created.

Deleting a protocol code

◆ Select the entry to be deleted from the **Protocol Code** list and then click **Remove**.

f50fd5f37833e6e4c0a81e664e3d56ba / 2 / Draft
Information class: clinical

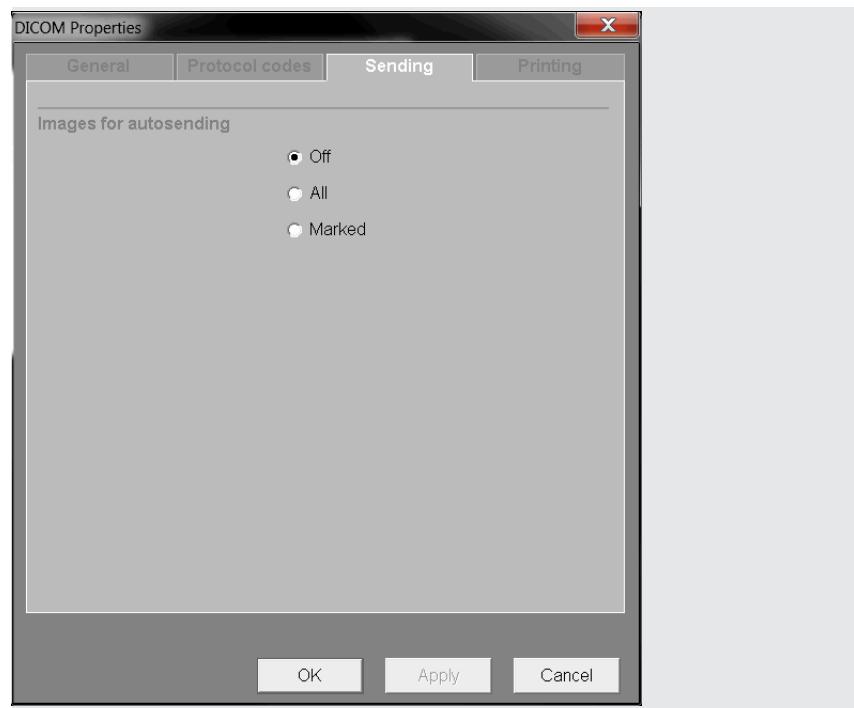
DICOM_Properties__Sending

DICOM Properties - Sending

TOPIC INFO

INDEX: [DICOM Properties : Sending]

7 Configuration



Images for autosending

Select which images are to be sent automatically:

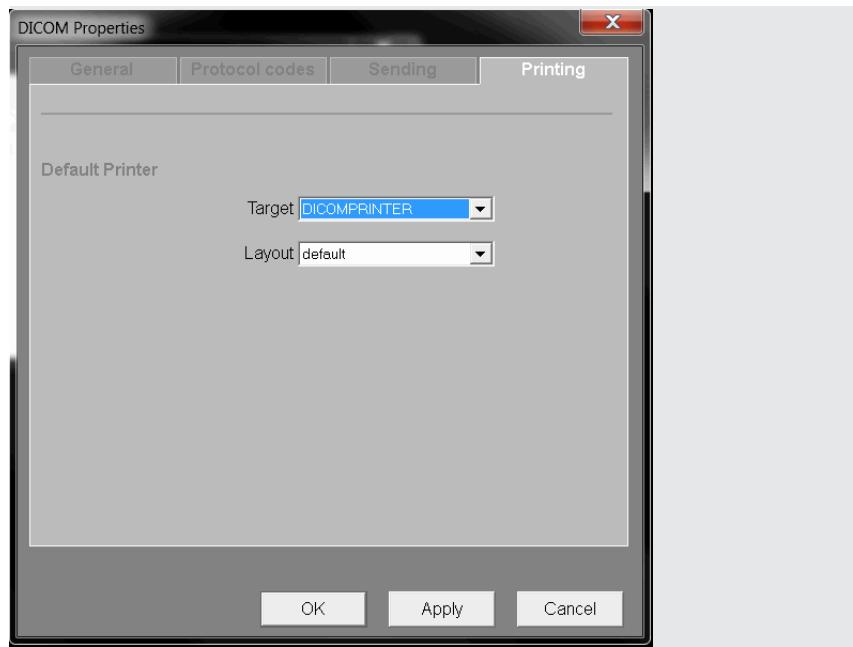
- **Off:** No images will be sent automatically.
- **All:** All acquired images will be sent automatically.
- **Marked:** Only marked images will be sent automatically.

221ed0ce7833e484c0a81e664e3d56ba / 1 / For approval for release
Information class: clinical

DICOM_Properties__Printing

DICOM Properties - Printing

TOPIC INFO
INDEX: [DICOM Properties : Printing]



Default Printer:

- **Target:** Select one of the configured printers
- **Layout:** Select one of the currently defined DICOM layouts
(Specification: first layout of the default printer)

b45aa8d17833e87ac0a81e6671622ad9 / 2 / Draft
Information class: clinical

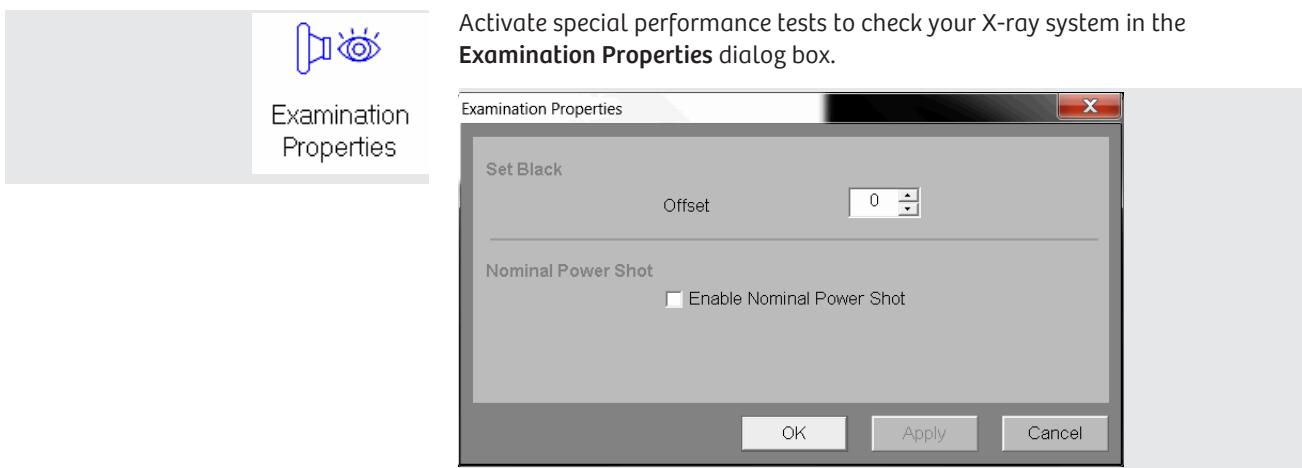
Examination_Properties

7.1.5 Examination Properties

TOPIC INFO

INDEX: [Examination properties : user settings]

Activate special performance tests to check your X-ray system in the **Examination Properties** dialog box.



Set Black

Offset: You can set an offset which will be taken into account when applying the digital collimator function.

7 Configuration

Nominal Power Shot

Enable Nominal Power Shot: For VA (Veteran's Health Administration) hospitals in the United States it is required to check the nominal power of an X-ray exposure at 100 kV for 100 ms in accordance with the IEC. When this function is active, the generator creates an exposure with the nominal power when triggering a single image exposure. The function is deactivated again automatically after triggering an exposure.

To activate the function, proceed as follows:

- 1 The check mark for **Enable Nominal Power Shot** has to be set in the user settings.
- 2 A patient has to be registered.
- 3 A new application has to be selected (regardless of which).

The Nominal Power Shot is active one time. (Single image and 100 kV are displayed at this time).

eb04efd37833eee0c0a81e6671622ad9 / 2 / Draft
Information class: clinical

Image_Display_and_Print_Properties

7.1.6 Image display and print properties

TOPIC INFO

INDEX: [Image display : user settings]
INDEX: [Print properties : user settings]



Image Display
and Print Pr...

In the **Image Display and Print Properties** dialog box you establish the information to be displayed in the images when shown on the monitor and in the hardcopy.

f5ba47597833e7afc0a81e664e3d56ba / 3 / Draft
Information class: clinical

Display_Layout_card

Display Layout card

TOPIC INFO

INDEX: [Display Layout]

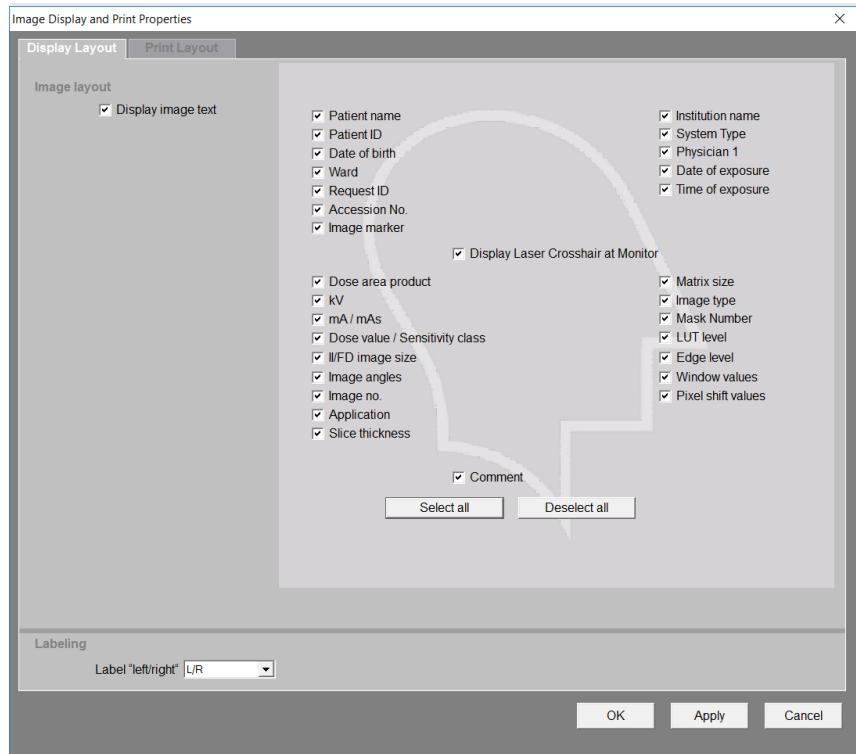


Image layout **Display image text:** Show the selected text elements in the image on the monitor.

6a7aa2fa7833ec12c0a81e664e3d56ba / 3 / Draft
Information class: clinical

Print_Layout_card

Print Layout card

TOPIC INFO
INDEX: [Print Layout]

7 Configuration

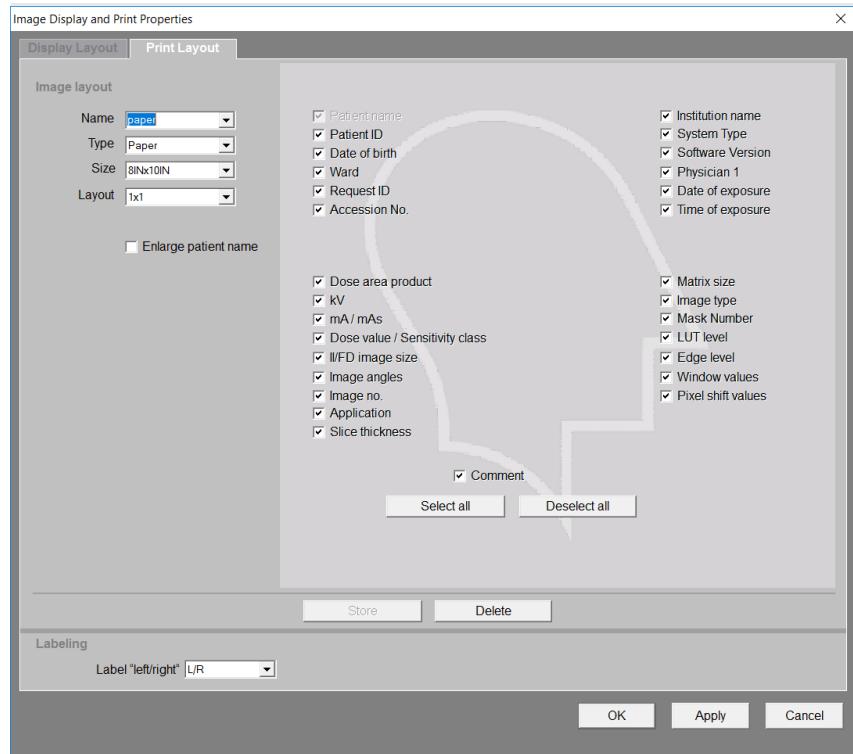


Image Layout

- **Name:** Print layout name.
- **Type:** Type of print layout (Paper, DICOM)
- **Size:** Size of the paper/filmsheet in inches
- **Layout:** Page partitioning
- **Enlarge patient name:** Print the patient name larger than the other text

d59e37c77833ea2fc0a81e664e3d56ba / 3 / Draft
Information class: clinical

Image_text_settings

Image text settings

Top left

Patient information:

- **Patient name:** Patient's last name, first name
- **Patient ID:** Patient's identification number
- **Date of birth:** Patient's date of birth
- **Ward:** Ward of examination
- **Request ID**
- **Accession No.**

Bottom left

Exposure information:

- **Dose area product:** dose area product
- **kV:** Exposure kV
- **mA/mAs:** Exposure mA/mAs

- **Dose value/Sensitivity class:** Dose value or sensitivity
- **II/FD image size:** Input format/zoom level
- **Image angles** (not applicable to **Cios Select**)
- **Image no.:** Image number
- **Application:** Application program name
- **Slice thickness** (not applicable to **Cios Select**)
- Bottom center** • **Comment:** Image comment

Top right System information:

- **Institution name:** (→ Page 226 *Site info*)
- **System Type:** Product name
- **Software Version:** Product version
- **Physician 1:** Examining physicians
- **Date of exposure:** Date acquired
- **Time of exposure:** Acquisition date and time

Bottom right Image information:

- **Matrix size:** Image matrix
- **Image type:** Image type
- **Mask Number:** Number of the mask image
- **LUT Level:** Name of the look-up table (LUT)
- **Edge level:** Edge enhancement module name
- **Window values:** Window values
 - **WW:** Window Width
 - **WC:** Window Center

Window values: for subtracted images:

- **WC:** Window Contrast
- **WB:** Window Brightness
- **Pixel shift values:** Pixel shift value X:.../Y:...

Labeling



Label "Left/right": select text for laterality labels, depending on regional practice.

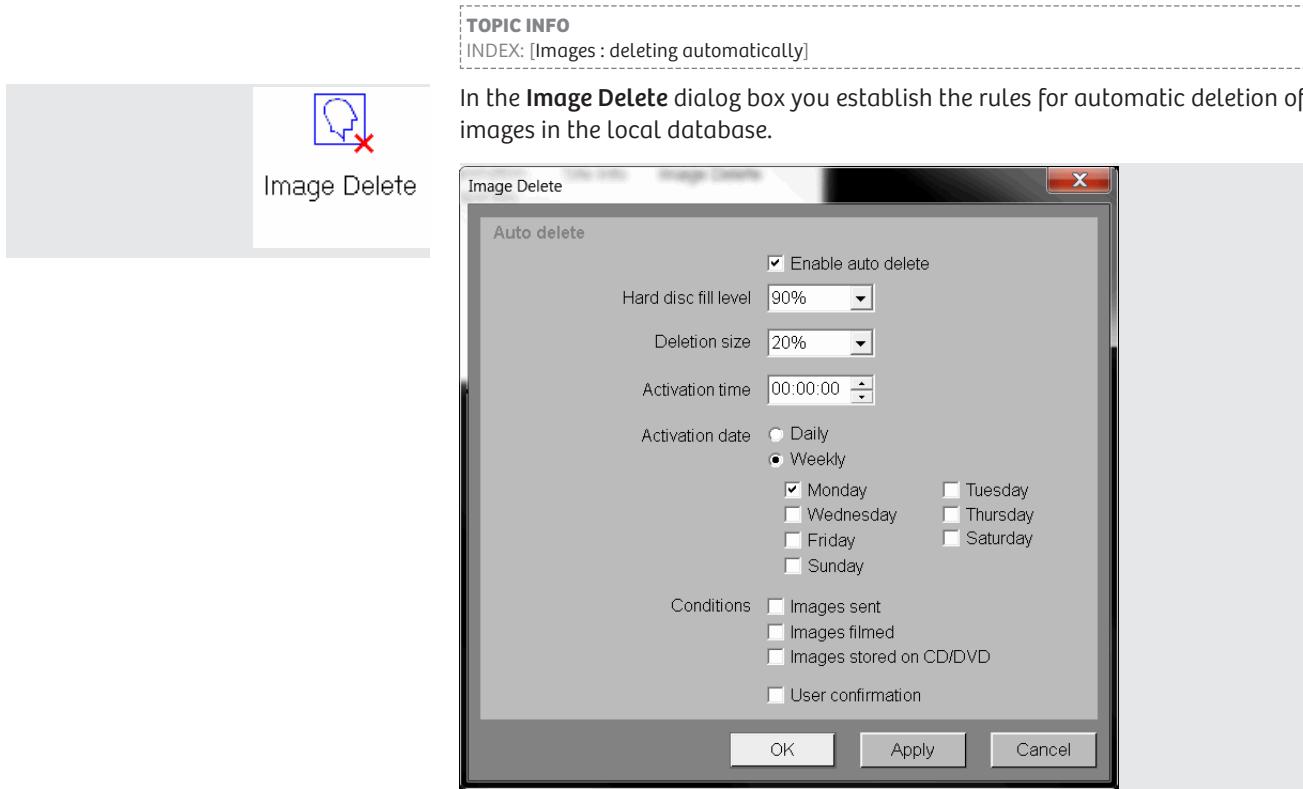
- **L/R:**
 - Display **L** (English: **Left** or German: **Links**) for left label
 - Display **R** (English: **Right** or German: **Rechts**) for right label

7 Configuration

- **G/D:**
 - Display **G** (French: **Gauche**) for left label
 - Display **D** (French: **Droite**) for right label
- **SIN/DX:**
 - Display **SIN** (Latin: **sinister**) for left label
 - Display **DX** (Latin: **dexter**) for right label

9ea56ddb7833ef4dc0a81e6671622ad9 / 2 / Draft
Information class: clinical Deleting_images_automatically

7.1.7 Deleting images automatically



Auto delete

Enable auto delete: Activate the automatic image deletion function.

If enabled, you can define the rules for automatic deletion.

- **Hard disc fill level:** Hard disc fill level (depending on the "memory extension" license key) for activation of automatic deletion (60% to 90%)
- **Deletion size:** Amount of hard disk volume to be deleted (10% to 40%)
- **Activation time:** Activation time for automatic deletion (hh:mm:ss)
- **Activation date:** Activation day for automatic deletion (**Daily/Weekly** with selection item for day)

- **Conditions:** Condition(s) for automatic deletion of images (any combination of the following conditions):
 - **Images sent:** Delete all images that have been sent to a DICOM node (with or without confirmation of receipt).
 - **Images filmed:** Delete all printed/filmed images.
 - **Images stored on CD/DVD:** Delete all images stored on CD/DVD.

At least one condition has to be set to activate the automatic delete function.

- **User confirmation:** Obtain user confirmation before starting automatic deletion (show confirmation dialog box).

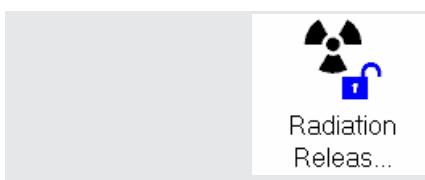
c6bc3ed47833eafac0a81e6671622ad9 / 2 / Draft
Information class: clinical

Password_for_radiation_release

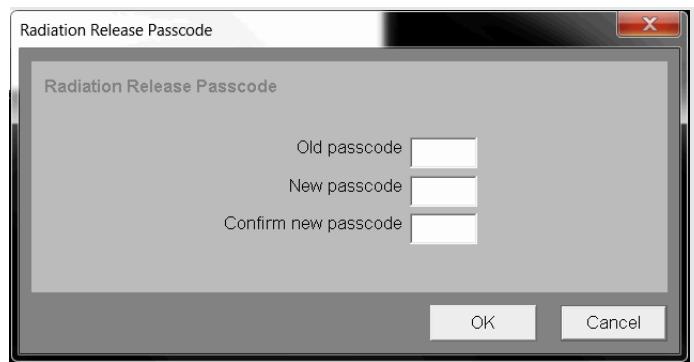
7.1.8 Password for radiation release

TOPIC INFO

INDEX: [Password : for radiation release]



In the **Radiation Release Passcode** dialog box you change the password required for radiation release.



- 1 Enter the old password.
- 2 Enter a new password (four-digit number).
- 3 Repeat entry of the new password.
- 4 Click **OK**.

7 Configuration

8 Maintenance

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8 Maintenance

5ef0626a7833f2b7c0a81e664e3d56ba / 1 / For approval for release
Information class: clinical

Functional_and_safety_checks

8.1 Functional and safety checks

TOPIC INFO

INDEX: [Functional checks]
INDEX: [Safety checks]

To ensure that the Cios Select is ready for operation and all safety features are functioning properly, you must perform regular functional and safety checks.

50418aeb3b36675d0a53dbdb01b2cb03 / 2 / Draft
Information class: clinical

Daily_checks_FD

8.1.1 Daily checks

TOPIC INFO

INDEX: [Daily checks]

Prior to the examination

- 1 Check the power plug. If the power plug is damaged, the Cios Select must not be used.
- 2 Check the power cable. If the power cable is damaged, the Cios Select must not be used.
- 3 Check the function of the locking brakes of the C-arm system and the monitor trolley as well as the steering of the C-arm system.
- 4 Check the C-arm counterbalance after releasing the brakes.
- 5 Check the loudspeakers for proper functioning. An audible signal must sound while the system starts up.
- 6 Check that all radiation indicators are functioning properly.
- 7 Inspect the flat detector housing and the single tank for mechanical damage.
- 8 Make sure the anti-scatter grid is correctly fastened on the flat detector input.

Checking the EMERGENCY STOP function for motor-driven system movements

- 1 Switch the Cios Select on.
- 2 Move the lifting column and press the EMERGENCY STOP button at the same time.

The lifting movement is stopped.

A message is displayed on the monitor indicating that EMERGENCY STOP has been actuated.

- 3 Release the EMERGENCY STOP button again.
- 4 Press one of the buttons for moving the lifting column.

The lifting movement is enabled again.

8d4803e87833f3dfc0a81e6671622ad9 / 1 / For approval for release
Information class: clinical

Monthly_checks

8.1.2 Monthly checks

TOPIC INFO

INDEX: [Monthly checks]

Functional check of the dose rate control

You can check the function of the dose rate control without an object using the simple procedure described below. A kV value of ≤ 45 kV must stabilize:

- 1 Open the rectangular and slot collimators to maximum aperture.
- 2 Press the **Tech Lock** key.
- 3 Select 110 kV with the +/- keys.
- 4 Press the **Tech Lock** key again.

The stop function is canceled; automatic dose rate control is switched on again.

- 5 Release radiation in fluoroscopy mode.

The tube voltage is reduced to a value ≤ 45 kV.

The monitor image is not overexposed.

9f26479ad7f78812c0a81e66135d6a4f / 1 / For approval for release
Information class: clinical

Checks_prior_to_special_examinations

8.1.3 Checks prior to special examinations (e.g. of the open heart and skull)

- ◆ Make sure that there is an additional conductive connection between the C-arm system and a point of potential equalization, e.g. the patient table.

6e944a28ae7a120cc0a81e66697236fd / 1 / For approval for release
Information class: clinical

Calibration

8.1.4 Calibration

83a3142fb9f51e190a53dbdb76a3eb2c / 1 / Draft
Information class: clinical

Network_administration_and_calibration_FD

Network administration and calibration

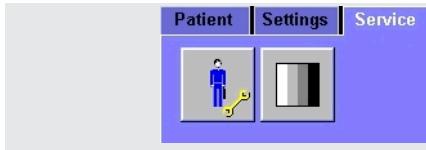
- 1 Press this button on the monitor trolley control panel.

 Manage Tool is displayed on the monitor.

The control panel switches to keyboard mode.

- 2 Click the **Settings** subtask card on the monitor.

8 Maintenance

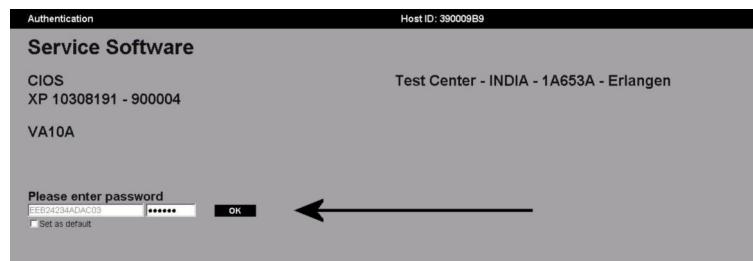


3 Click the **Service** subtask card on the monitor.



4 Double click this button.

The Service login screen appears.



4c47b6b37833f076c0a81e664e3d56ba / 2 / For approval for release
Information class: clinical

Calibrating_the_dose_measurement_chamber

Calibrating the dose measurement chamber

TOPIC INFO

INDEX: [Calibration : dose measurement chamber]
INDEX: [Dose measurement chamber : calibration]

The dose measurement chamber is calibrated on a regular basis as part of the maintenance contract (every 5 years at the latest). If you do not have a maintenance contract, Siemens Healthineers Customer Service or the manufacturer can calibrate the dose measuring chamber.

d374bcfa7833f382c0a81e664e3d56ba / 3 / Draft
Information class: clinical

Maintenance_plan_for_checking_the_system

8.1.5 Maintenance plan for checking the system

TOPIC INFO

INDEX: [Maintenance plan]

The tests and inspections required by national laws or regulations, such as DHHS regulations or RöV (constancy tests), are not part of the activities listed in this maintenance plan.

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

Maintenance work should be performed by trained technical personnel only. To keep the system in an optimum condition, we recommend that you conclude a maintenance contract. If you have any questions relating to maintenance/maintenance contract please contact our Siemens Healthineers Customer Service.



Please observe the relevant information in ([Page 22 Maintenance and inspection](#))**[OptUnresolvedLink]****Maintenance and inspection****[/OptUnresolvedLink]**.

87eeecac3b3ef1f40a53dbdb497ebab4 / 1 / For approval for release
Information class: clinical

Maintenance_intervals_FD

8.1.6 Maintenance intervals

TOPIC INFO

INDEX: [Maintenance intervals]

INDEX: [Batteries : maintenance intervals]

General information

Initial maintenance for a new system is performed after **24 months** and includes **all maintenance activities**.

Regular maintenance then takes place in 24-month intervals. It contains numerous maintenance steps that have to be performed:

Procedures to be performed	Function	Interval
External visual inspection	Damage, total system Damage to the system and network connection	24 months
Mechanical safety	Paneling, cable guards, C-arm, C-arm movements, flat detector exchangeable grid/grid holder, brakes. Wheels, lifting columns, emergency stop button, warning labels, identification labels, monitors, options (if available - e.g. laser light localizer)	24 months
Electrical safety	Cable and plug, fluoroscopy indicator, acoustic warning signal, forced switch-off for radiation, radiation release switch, radiation indicator, radiation iris, rubber voltage discharger, monitors, options (e.g. dose area product and/or air kerma measuring device), image quality total system, checks in accordance with IEC 62353	24 months
Maintenance	System ventilation, cleaning of system	24 months
Operating value inspection	Output and assess Event Log	24 months
Functional inspection	Control functions, monitor indicators of beam path opening/slot collimator positions, options	24 months
Upkeep	Housing	24 months

The stated functions are minimum requirements

8 Maintenance

Batteries

Battery replacement intervals (UPS and PC)

Procedures to be performed	Function	Interval
Operating value inspection	UPS lead gel batteries PC bios battery	First replacement after 42 months, subsequently every 48 months

The stated functions are minimum requirements

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Dose_and_consistency_test_FD

Information class: clinical

8.1.7 Dose and consistency test¹⁾

TOPIC INFO

INDEX: [Dose test]

INDEX: [Consistency test]

Carry out dose area product testing after performing the following procedure:

Preparation

- 1 Open the collimator completely (full format).
- 2 Select the "Fluoroscopy" operating mode.
- 3 Center the lead ruler on the flat detector.
- 4 Release radiation, setting the rectangular collimator to approx. 15 cm edge length.
- 5 Keep the field size (shown on the lead ruler) constant.

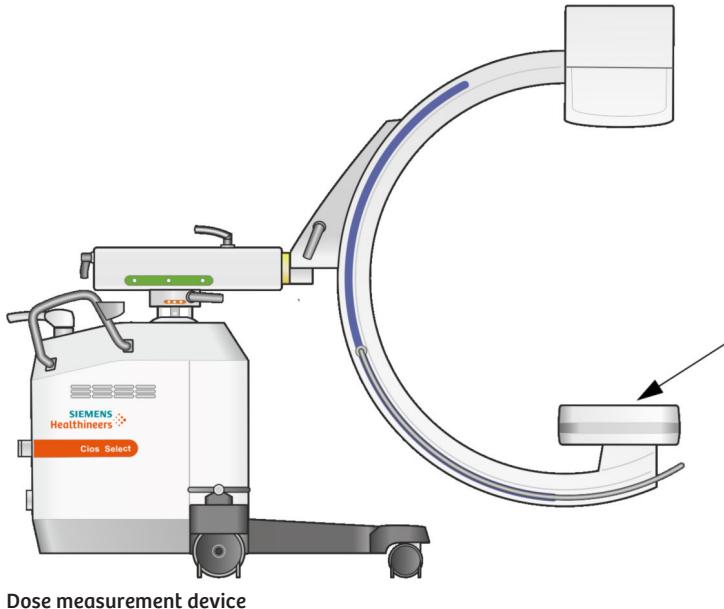


The rectangular collimator may no longer be adjusted.

- 6 Remove the lead ruler.

1) Only applicable to the system with DAP meter

7 Center the dose measurement device on the flat detector (see figure).



Dose measurement

- 1 Release radiation for a short period and then actuate the **Tech Lock** key and set 70 kV.
- 2 Record the dose area product - value "A" (μGycm^2) - shown on the monitor.
- 3 Set the measured dose area product to "0" on the measuring device.
- 4 Release radiation for approx. 10 s and record the measured dose (cGy).
- 5 Record the dose area product - value "B" - shown on the monitor.
- 6 Subtract value "A" from value "B".

Calculation

Measured dose area product = measured dose (cGy) $\times 225 \text{ cm}^2$

- ◆ Compare the measured value with the dose area product displayed on the monitor.



With a correct adjustment, the displayed and calculated values agree within a maximum deviation of +/- 25%. If the deviation exceeds this percentage, please inform service.

34d7b99d7833f556c0a81e664e3d56ba / 1 / For approval for release
Information class: clinical

Service_via_network_connection

8.2 Service via network connection

TOPIC INFO

INDEX: [Service : via network connection]

8 Maintenance

The Cios Select must be connected to a network (DSL \geq 1 Mbit/s) to enable remote access service measures.

0d2f14577833f49ac0a81e664e3d56ba / 2 / For approval for release
Information class: clinical

Remote_service

8.2.1 Remote service

TOPIC INFO

INDEX: [Remote service]

If the rights are granted accordingly, Siemens Healthineers Customer Service can access the Cios Select for maintenance and installation activities via an active network connection.

Software updates via remote access

e84a08fb78343275c0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_um_RemoteSoftwareUpdate_192229

hazard-key: hm_um_RemoteSoftwareUpdate_192229



CAUTION

Software installation interferes with system functions.

Interruption of patient examination and loss of patient data.

- ◆ Do not start the installation while working with patients.

724042fa783432c3c0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_um_RemoteUpdateFailure_192230

hazard-key: hm_um_RemoteUpdateFailure_192230



CAUTION

Failure installing the update package.

A failed software installation means that the system is in an undefined state.

- ◆ Stop using the system and notify the UPTIME Service Center.

95175215783427cac0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_docUser_restart_after_service

hazard-key: hm_docUser_restart_after_service



CAUTION

No restart after service session.

Changes to the service environment may not go into effect without a system restart.

- ◆ Restart the system after a service session.

5a634e573b40948f0a53dbdb63f2bc9e / 2 / Draft
Information class: clinical

[Setting_the_access_rights_FD](#)

Setting the access rights

In the **Remote Service** window you grant service personnel access rights so that they can perform maintenance in a remote session.



The patient must be closed; otherwise, there could be problems accessing the control panels.

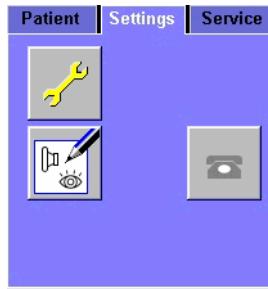


- 1 Press this button on the monitor trolley control panel.

Manage Tool is displayed on the monitor.

The control panel switches to keyboard mode.

- 2 Click the **Settings** subtask card on the monitor.



- 3 Double-click the Telephone icon.

The **Remote Service** window appears.

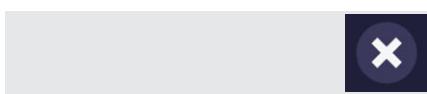


- 4 Click one of the following options to define the type of access:

- **Full access:** Service receives full access rights to your system.
- **Limited access:** Service receives limited access, that is, they can see error messages and reset passwords.
- **No access** (default setting): Service does not receive access to your system.

5 Click **OK** to apply all settings and exit the window.

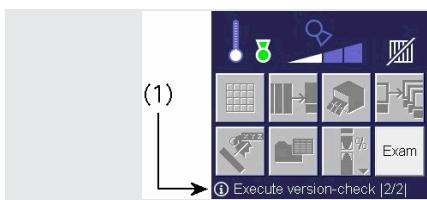
6 Press the this button on the keyboard to exit the **Manage Tool**.



71749f0d7833f008c0a81e6671622ad9 / 3 / Draft
Information class: clinical Application_support

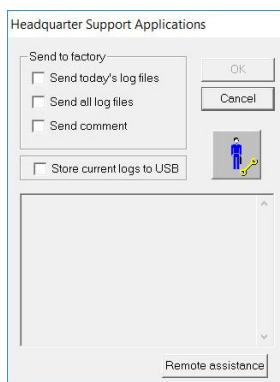
8.2.2 Application support

If you require online support for your system, you can grant access to the **Cios Select** as follows:



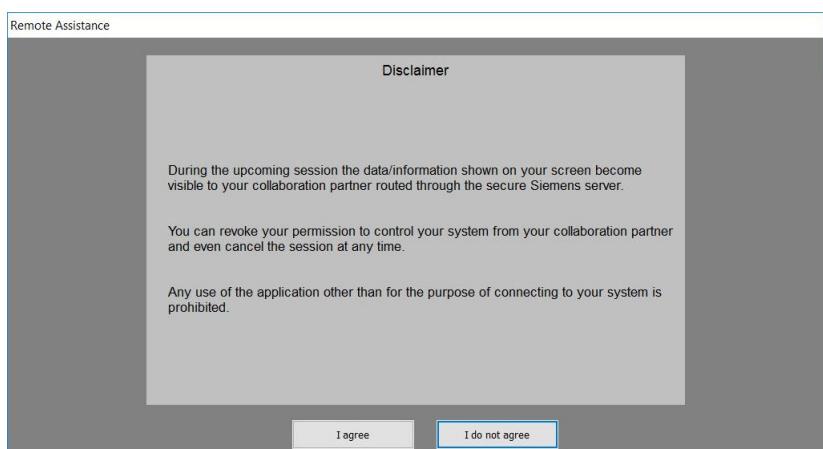
1 Right-click the **i** icon (1) on the monitor.

The **Headquarter Support Applications** screen opens:



2 Click **Remote assistance**.

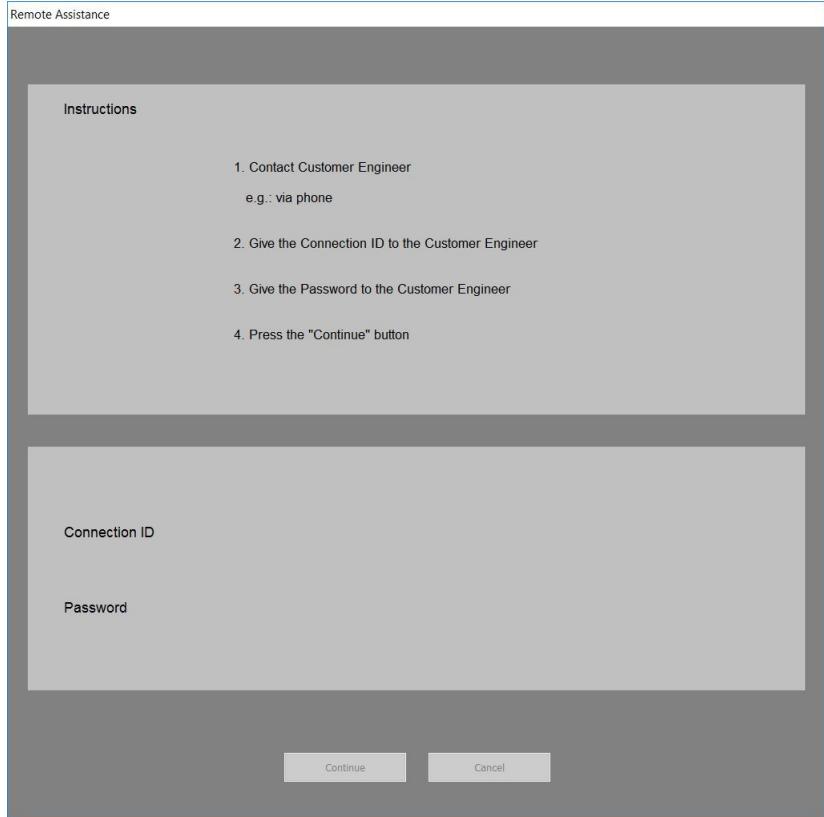
The **Remote Assistance** window opens.



3 To enable remote access to the system click **I agree**.

The dialog window with instructions and input fields for starting the remote service session opens.

If you click **I do not agree**, remote access to the system is rejected and the request canceled.



4 Enter the **Connection ID** and the **Password** that you have received from Service.

5 Click **Continue**.

The requesting technician receives the right to control the user interface.



The remote assistance status is displayed in the status area.

865456bbd4889208c0a81e666485f2ba / 1 / For approval for release
Information class: clinical

Transmitting_error_messages

8.2.3 Transmitting error messages

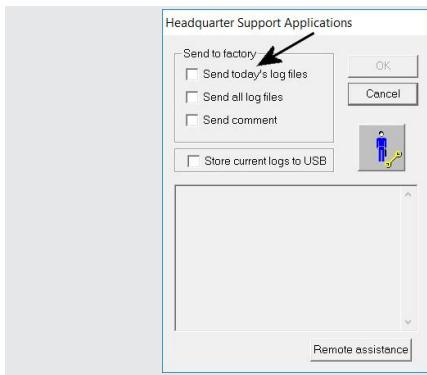
You can transmit error messages directly to the factory or save them to a USB drive.

Transmitting to the factory

1 Click the **i** icon.

The **Headquarter Support Applications** screen opens.

8 Maintenance



- 2 Under **Send to factory** mark the appropriate check box.
- 3 You can also enter a comment by marking the appropriate check box and entering text.
- 4 Confirm with **OK**.

The message and/or log files are sent.

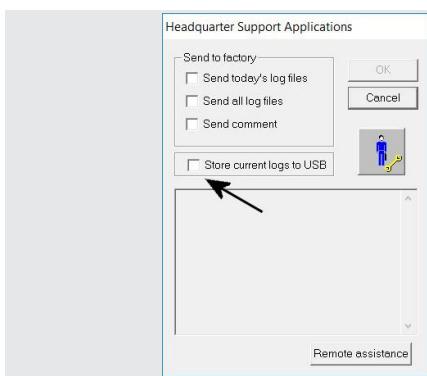


If the system is not currently connected to the network, the files are placed in a transfer folder on the system. The files are sent the next time a network connection is established.

Saving to a USB drive

- 1 Insert the USB drive into a free USB slot on the monitor trolley.
- 2 Click the corresponding box and confirm with **OK**.

The log files will be saved to the USB drive.



397ae0773b4655040a53dbdb6a0d7528 / 1 / For approval for release
Information class: clinical

Cleaning_and_disinfection_FD

8.3 Cleaning and disinfection

TOPIC INFO

INDEX: [Cleaning]

INDEX: [Disinfection]

Before cleaning or disinfecting the Cios Select, the system must be disconnected from the power supply and switched off.

24d404ea78342912c0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_docUser_system_switch_off

hazard-key: hm_docUser_system_switch_off

 **CAUTION**

Inadvertent actuation of the foot pedal.

Risk of radiation!

- ◆ Switch off the system before cleaning.

Before each examination, clean all parts that come into contact with the patient to prevent contamination of the Cios Select. Also make sure that any dust deposits on the housing of the flat detector, the single tank and the C-arm are removed prior to every treatment. Please follow the cleaning instructions as described below.

5ab92f937834208ac0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_docUser_note_improper_cleaning

hazard-key: hm_docUser_note_improper_cleaning

 **CAUTION**

Improper cleaning.

Risk of infection!

- ◆ After dealing with patients with highly infectious diseases, clean the unit wheels, in addition to regular cleaning.

f7d740077833f6ccc0a81e6671622ad9 / 2 / For approval for release

Cleaning_the_system_parts

Information class: clinical

8.3.1 Cleaning the system parts

TOPIC INFO

INDEX: [Cleaning : the system]
INDEX: [System : cleaning]

- 1 Clean the system parts with a damp cloth.
- 2 For moistening, use water or a lukewarm, diluted aqueous solution consisting of water and a household cleaning agent.



Cleaning agents and disinfectants containing chlorine derivatives can discolor cables, but will not negatively impact system functions.



Never immerse system parts (excepting the footswitch) in liquid or autoclave system parts!

Observe the respective protection and active ingredient classes in this regard.

8 Maintenance

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Information class: clinical

Cleaning_screen_surfaces_TFT_displays

Cleaning screen surfaces/TFT displays

The screen surfaces can be cleaned at any time.

- 1 Clean the monitor screen with a cotton cloth dampened with water.
- 2 Immediately dry off the monitor screen with a soft cotton cloth.
- 3 Wipe off contrast agent spots as soon as possible.

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Information class: clinical

Disinfection

Disinfection

TOPIC INFO

INDEX: [Disinfection]

For the disinfection of surfaces we recommend liquid solutions of common surface disinfectants based on aldehyde and/or amphoteric surfactants, e.g. Tensodur 103, Kohrsolin, Cidex.

Certain substituted phenol-based or chlorine-splitting disinfectants can corrode materials and are therefore not recommended.

5f791fe178341c75c0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_docUser_note_appropriate_detergents_and_germicide

hazard-key: hm_docUser_note_appropriate_detergents_and_germicide

⚠ CAUTION

Use of unsuitable cleaning agents.

Risk of contamination.

- ◆ Only use the recommended cleaning agents and disinfectants.

c7b178e978342c3dc0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_um_CleaningOfMaterial

hazard-key: hm_um_CleaningOfMaterial

⚠ CAUTION

Use of abrasive cleaning agents, liquids, or sprays.

Risk of electrical shock or damage to the system.

- ◆ Only use the recommended cleaning agents and disinfectants.
- ◆ Do not allow any cleaning fluids to enter the openings of the system (e.g. air openings, gap between covers).
- ◆ Follow the cleaning and disinfection instructions.



Please also observe the Operator Manual of the disinfectant.



Some substances contained in disinfectants are known to be hazardous to health. The concentration of such substances in the air must not exceed the legally defined limit. We recommend that you follow the manufacturers' usage instructions for these products (active ingredient classes).

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Information class: clinical

Workflows

Workflows

The following two cleaning workflows have been elaborated to address the requirements of the clinical routine:

- Quick cleaning workflow

This workflow involves the cleaning of system parts close to the sterile area.

- Full cleaning workflow

This workflow involves the cleaning of all system parts.



Do not use any brushes as they can damage the labels attached to the system.

Quick cleaning workflow

The quick cleaning workflow shall be carried out after each surgery. The procedure takes approximately 2 minutes up to 10 minutes.

1 Use a cleaning cloth and approved disinfection agents.

2 Clean/disinfect all parts which are close to the sterile field.

3 Include the following system parts into the cleaning procedure:

- the C-arm (detector, single tank, surface of the C-arm)
- the electronics unit (the side facing the C-arm)
- all control elements (C-arm control unit, remote control unit, monitor trolley control panel, hand switch, footswitch)
- the handles at the C-arm and the monitor trolley
- the monitor trolley (the side facing the OR table)

Full cleaning workflow

The full cleaning workflow takes up to 30 minutes to ensure a thorough cleaning. The cleaning procedure can also be carried out outside the OR field.

1 Use a cleaning cloth and approved disinfection agents.

2 Clean/disinfect all parts involved in the quick cleaning workflow.

3 Include the following system parts into the cleaning procedure:

- All system parts that can be reached with the hand and the cleaning cloth (except beneath the electronics unit, the monitor trolley unit, and the bellows and blinds underneath the horizontal unit)
- All wheels, cables and plugs

8 Maintenance

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Information class: clinical

Protection_classes_Protection_measures_FD

8.4 Protection classes/Protection measures

TOPIC INFO		
INDEX: [Protection classes]		
System Components	Protection Class	Protection Measures
X-ray tube assembly (Single-tank)	IPX3 waterproof	protect with sterile cover
Flat detector	IPX0 waterproof	protect with sterile cover
C-Arm	IPX3 waterproof	protect with sterile cover
Standard footswitch	IPX8 protected against immersion beyond 1 m	separate from chassis before cleaning
Hand switches	IPX3 dust protected, protected against splashing of water	separate from chassis before cleaning
Wireless footswitch ²⁾	IPX8 protected against immersion beyond 1 m	separate from chassis before cleaning

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HZ_XP_hm_um_OperatorManual_Liquids

hazard-key: hm_um_OperatorManual_Liquids



CAUTION

Put the liquid on the system.

Risk of electrical hazard or damage to the system.

- ◆ Do not put the liquid on the system.

36d1a9f1aed82495c0a81e665612896e / 1 / For approval for release
Information class: clinical

Active_ingredient_classes

8.5 Active ingredient classes

TOPIC INFO

INDEX: [Active ingredient classes]

2) Optional

The following active ingredient classes may be used to clean and disinfect the Cios Select.

Active ingredient class	Aldehydes, alkylamines, quaternary compounds, guanidine derivatives, peroxide compounds, organic acids, chlorine derivatives, alcohol, benzene, common household dishwashing liquids, detergents
-------------------------	--

8 Maintenance

9 Technical information

TOPIC INFO

INDEX: [Technical information]

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9 Technical information

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Siemens Healthineers reserves the right to change the design and specifications without notification.

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Information class: clinical

Curves_and_diagrams

9.1 Curves and diagrams

TOPIC INFO

INDEX: [Curves]
INDEX: [Diagrams]

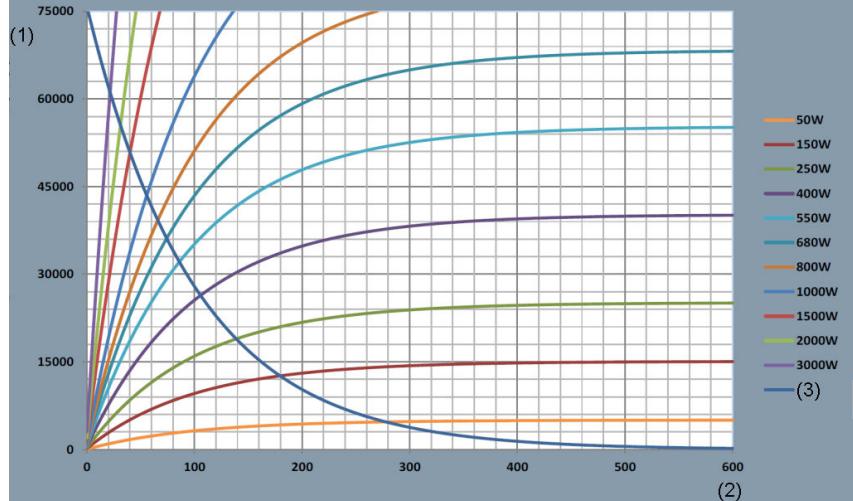
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Information class: clinical

Anode_heating_and_cooling_curves_FD

9.1.1 Anode heating and cooling curves

TOPIC INFO

INDEX: [Anode heating and cooling curves]

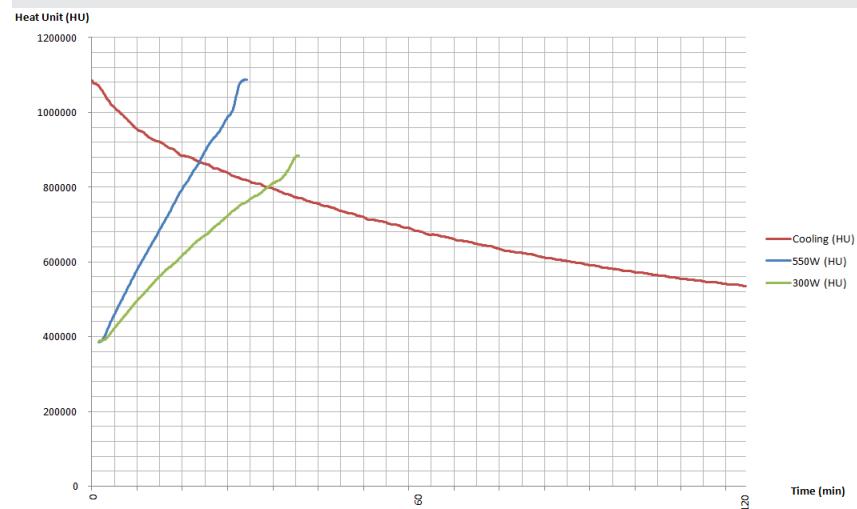


Heating and cooling curve with square cooler

- (1) Heating capacity [J]
- (2) Time [s]
- (3) Cooling

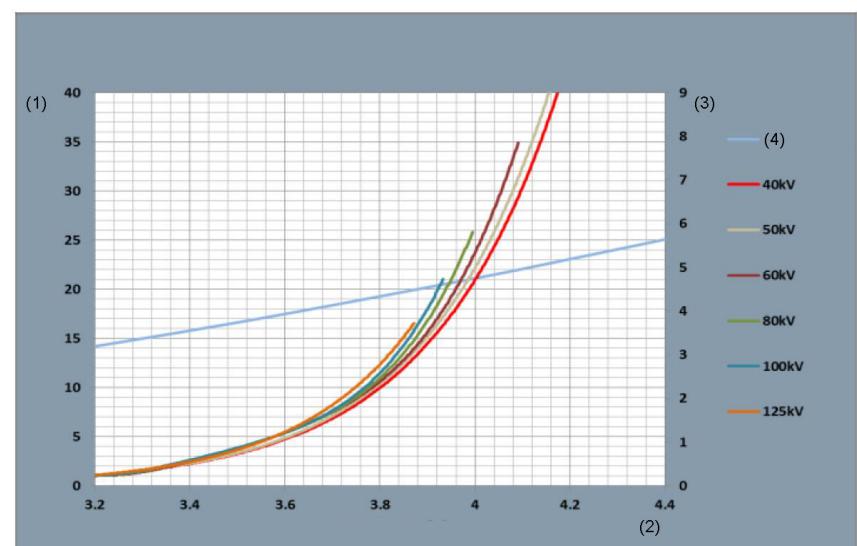
9 Technical information

Heating and cooling curves of Single Tank unit



Small focus (0.6) emission curves

□ 0.6 ~



Filament and emission characteristics of F1

- (1) Tube current [mA]
- (2) Filament current [A]
- (3) Filament voltage [V]
- (4) Filament characteristic

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Information class: clinical

Fluoro_curves

9.1.2 Fluoro curves

TOPIC INFO

INDEX: [Fluoro curves]

The following fluoro curve properties are available in the system for clinical use.

The following base values apply for all systems and fluoro curves:

- Minimum kV = 40
- Maximum kV = 110



The currents (mA) shown in the following tables indicate effective values.

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Information class: clinical

Systems_with_2_3_kW_peak_power_generator

Systems with 2.3 kW (peak power) generator

Characteristic curves for fluoroscopy

The maximum average power for normal fluoroscopy characteristic curves is 600 W. Characteristic curves with the HL add-on have a maximum average power of 1000 W (limited to 30 s radiation).

Characteristic curve	Min mA (Continuous 30 f/s)	Max mA (Continuous 30 f/s)	kV	Ø mA	Ø power (W)
FL- Card ¹⁾	0.2	7.5	80	4.2	336
FL- Card HL ²⁾	0.2	13	80	7.9	632
FL-HC ¹⁾	0.2	8.4	74	7.9	584.6
FL-HC HL ²⁾	0.2	14	76	13	988
FL IOD ¹⁾	0.2	8.9	74	7.9	584.6
FL IOD HL ²⁾	0.2	15	76	13	988
FL LD ¹⁾	0.2	5.3	90	1.5	135
FL- S ¹⁾	0.2	5.3	85	2.6	221
FL-S HL ²⁾	0.2	8.9	86	4.4	378.4

¹⁾ With the same image receptor dose

²⁾ With the same image receptor dose

9 Technical information

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Information class: clinical

Dose_rate_at_the_flat_detector_input_FD

9.1.3 Dose rate at the flat detector input

TOPIC INFO

INDEX: [Dose rate : at the flat detector input]
INDEX: [Flat detector : input dose rate]

The dose rate is set by the manufacturer, depending on the flat detector format; it is measured behind the scattered radiation grid at the input of the flat detector. Refer to the acceptance protocol §16 RöV for the system-specific dose values (Federal Republic of Germany only).

The dose rate is set in the kV range between 70 and 80 kV using a technical phantom.

Dose rate value deviation

Depending on the examined object, different fluoroscopy data (kV, mA) arise. Because flat detector sensitivity depends on beam quality (kV), the same gray values in the image may correspond to different dose rate values at the detector input.

When examining a patient in fluoroscopy mode, additional scattered radiation values are produced in comparison to the phantom values, affecting the dose rate at the flat detector input.

Setting the dose rate value

If desired, the preferential position for the dose rate can be reprogrammed.

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Information class: clinical

Dosimetric_information

9.1.4 Dosimetric information

TOPIC INFO

INDEX: [Dosimetric information]

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Information class: clinical

Air_kerma_strength

Air kerma strength

TOPIC INFO

INDEX: [Air kerma strength]
INDEX: [Skin dose]

The skin dose values were measured at a distance of 30 cm (patient entry reference point) from the image receptor input with a 20 cm PMMA phantom (equivalent to a typical patient) in accordance with IEC 60601-2-43:2010, 203.5.2.4.5.101.

Fluoroscopy

Program¹⁾ with anti-scatter grid	Zoom Level	Dose Level	Voltage [kV]	Current [mA]	Pulse rate [p/s]	Dose rate display [μGy/s]
FL_Card (Automatic dose regulation)	Zoom 0	low	80	2.0	30	98
		medium	80	3.1	30	160
		high	80	5.9	30	315
	Zoom 1	low	80	7.5	30	391
		medium	96	6.3	30	518
		high	100	8.9	30	969
FL HC (Automatic dose regulation)	Zoom 0	low	67	5.3	30	171
		medium	69	7.0	30	251
		high	70	14.0	30	497
	Zoom 1	low	80	7.5	30	394
		medium	97	5.9	30	507
		high	110	8.9	30	970
FL IOD (Automatic dose regulation)	Zoom 0	low	66	5.9	30	183
		medium	67	8.9	30	290
		high	69	15	30	531
	Zoom 1	low	80	7.5	30	394
		medium	97	5.9	30	507
		high	110	8.9	30	970
FL LD (Automatic dose regulation)	Zoom 0	low	88	1.3	30	78
		medium	91	1.7	30	119
		high	96	2.6	30	207
	Zoom 1	low	97	3.0	30	245
		medium	103	4.4	30	430
		high	110	5.3	30	568

9 Technical information

Program ¹⁾ with anti-scatter grid	Zoom level	Dose level	Voltage [kV]	Current [mA]	Pulse rate [p/s]	Dose rate display [μ Gy/s]
FL_S (Automatic dose regulation)	Zoom 0	low	79	2.1	30	100
		medium	84	2.6	30	144
		high	86	4.2	30	265
	Zoom 1	low	93	3.5	30	260
		medium	103	4.4	30	427
		high	100	7.0	30	963
Cardiac interv²⁾ (Automatic dose regulation)	Zoom 0	low	80	24	10	91.6
		medium	80	7.5	30	354
Gastro interv²⁾ (Automatic dose regulation)	Zoom 0	low	87	17	10	69.2
		medium	97	3.0	30	223
Vasc interv²⁾ (Automatic dose regulation)	Zoom 0	low	66	24	5	80.5
		medium	69	24	10	217
The highest Air kerma rate ³⁾						
FL HC, High dose (Manual setting)	Zoom 0	high	110	8.9	30	970
	Zoom 1	high	110	8.9	30	970

¹⁾ Only valid as delivered from factory. Technical changes reserved.

²⁾ Recommended program for interventional procedures.

³⁾ Highest deliverable air kerma rate.

4f426f583bac55b00a53dbdb7d4297d2 / 1 / For approval for release Dosimetric_information_in_accordance_to_IEC_60601_2_43_2010_FD
Information class: clinical

Dosimetric information in accordance to IEC 60601-2-43:2010

TOPIC INFO

INDEX: [Dosimetric information]
INDEX: [Isokerma curves]

Measuring conditions

- Specifications for interventional systems acc. to EN/IEC 60601-2-43
- Reference air kerma strength and ranges of air kerma strength according to EN/IEC 60601-2-43

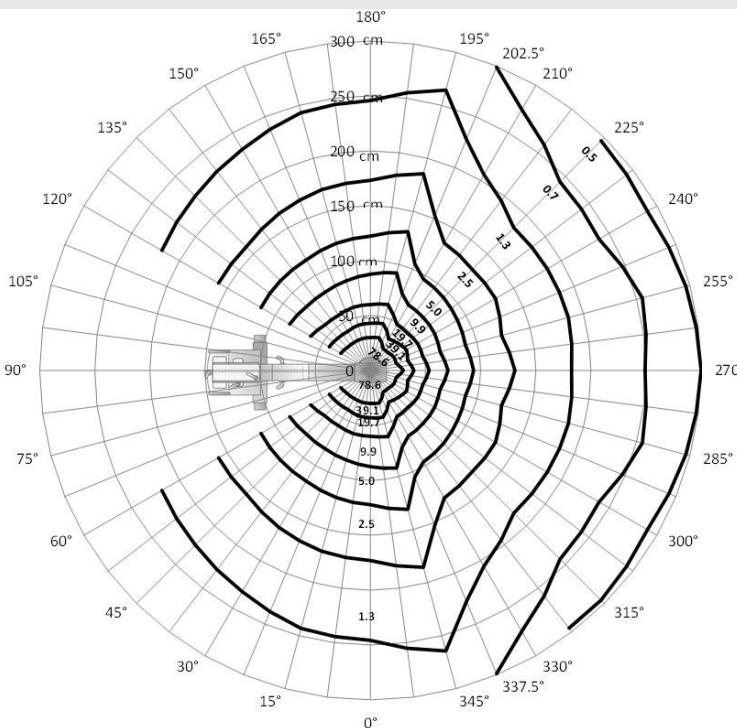
Isokerma curves

All following curves were recorded as follows:

- Beam projection vertical (tube unit above)
- SID 103 cm
- 25 cm x 25 cm x 25 cm PMMA Phantom centered/aligned central beam axis

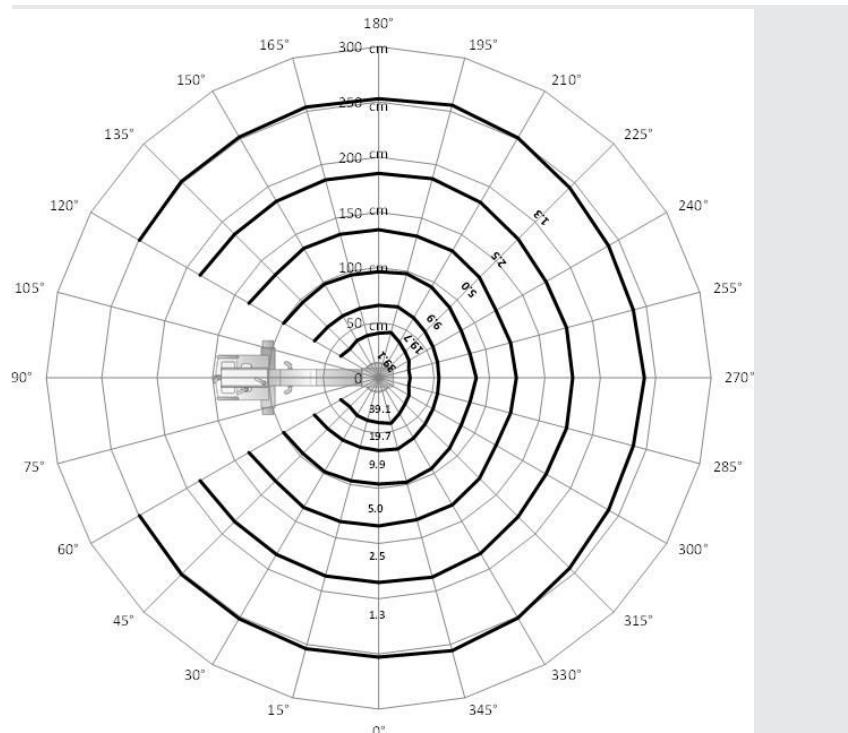
- Entrance Surface of the Phantom is at the PATIENT ENTRANCE REFERENCE POINT
- Radiation field size 10 cm x 10 cm at entrance of PMMA Phantom
- Isokerma curves 100 cm and 150 cm above the floor
- Scattered radiation of isokerma curves in $\mu\text{Gy}/(\text{Gy cm}^2)$ at 110 kV/5.3 mA and continuous according to IEC 60601-2-43:2010

The values in $\mu\text{Gy}/(\mu\text{Gy m}^2)$ according to IEC 60601-2-43:2000 can be calculated by a factor of 0,01.



Cios Select 100 cm vertical $\mu\text{Gy}/(\text{Gy cm}^2)$

9 Technical information



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Information class: clinical

Notes_on_electromagnetic_compatibility__EMC_

9.2 Notes on electromagnetic compatibility (EMC)

TOPIC INFO

INDEX: [Electromagnetic compatibility (EMC)]
INDEX: [EMC]

According to the IEC 60601-2-54 Standard the product provides following / Essential Performance

- Accuracy of Loading Factors
- Reproducibility of the Radiation output
- Automatic Control System
- Imaging performance

According to the IEC 60601-2-43 Standard the product provides following Essential Performance

- Recovery management
- Radiation dose documentation

Medical electrical equipment needs special precautions regarding EMC. EMC information provided in the accompanying documents must be followed where appropriate.

Portable and mobile RF communications equipment can affect medical electrical equipment.

Accessories, transducers and cables listed in this document do not affect the compliance of the system according to IEC 60601-1-2:2014.



Fixed product cabling that cannot be removed by the user is not listed. This cabling is part of the system and was considered in all EMC measurements. Without this cabling the equipment or system would not function.



The use of accessories, transducers and cables other than those specified, with the exception of transducers and cables sold by the manufacturer of the equipment or system as replacement parts for internal components, may result in increased emission or decreased immunity of the equipment or system.

9.2.1 Guidelines and manufacturer's declaration – Electromagnetic emissions

The system is intended for use in the electromagnetic environment as specified below. The customer or the user of the system should ensure that it is operated in such an environment.

Emission (IEC 60601-1-2:2014)

Item	Reference Standard Limit	Remarks
Conducted emission (150 kHz - 30 MHz) AC Mains Terminal	Group 1 Class A	-
Radiated emission (30 MHz - 1 GHz)	Group 1 Class A	Measurement distance: 10 m

9.2.2 Guidelines and manufacturer's declaration – Electromagnetic interference immunity

The system is intended for use in the electromagnetic environment as specified below. The customer or the user of the system should ensure that it is operated in such an environment.

The system complies with the Essential Performance Requirements according to IEC 60601-1-2:2007.

Immunity (IEC 60601-1-2:2014)

Item	Reference Standard Test Level	Remarks
Electrostatic discharge, air discharge	IEC 61000-4-2 $\pm 2.0 \text{ kV}$, $\pm 4.0 \text{ kV}$, $\pm 8.0 \text{ kV}$, $\pm 15.0 \text{ kV}$	-

9 Technical information

Immunity (IEC 60601-1-2:2014)

Item	Reference Standard Test Level	Remarks
Electrostatic discharge, contact discharge	IEC 61000-4-2 $\pm 8.0 \text{ kV}$	-
Radiated RF electromagnetic fields	IEC 61000-4-3 80 MHz - 2.7 GHz, 3 V/m, 1 kHz, 80% AM	-
Electrical fast transients (Burst) Power supply lines	IEC 61000-4-4 $\pm 2.0 \text{ kV}$ 100 kHz repetition frequency	-
Electrical fast transients (Burst) Signal input/output ports	IEC 61000-4-4 $\pm 1.0 \text{ kV}$ 100 kHz repetition frequency	-
Surge Power supply lines line to ground	IEC 61000-4-5 $\pm 0.5 \text{ kV}, \pm 1.0 \text{ kV}, \pm 2.0 \text{ kV}$	-
Surge Power supply lines line to line	IEC 61000-4-5 $\pm 0.5 \text{ kV}, \pm 1.0 \text{ kV}$	-
Conducted disturbances, induced by RF fields	IEC 61000-4-6 1 kHz, 80% AM 3 V; 150 kHz - 80 MHz 6 V; in ISM and amateur radio bands between 150 kHz and 80 MHz	-
Magnetic fields	IEC 61000-4-8 30 A/m, 50 Hz or 60 Hz	-
Voltage dips and short interruptions on power supply input lines	Voltage short interruptions: 0% UT 250/300 cycles (single phase)	-

Immunity (IEC 60601-1-2:2014)

Item	Reference Standard Test Level	Remarks
Proximity fields from RF wireless communications equipment	IEC 61000-4-3 385 MHz: 27 V/m; Pulse modulation 18 Hz 450 MHz: 28 V/m; Frequency modulation ± 5 kHz deviation 1 kHz sine 710, 745, 780 MHz: 9 V/m; Pulse modulation 217 Hz 810, 870, 930 MHz: 28 V/m; Pulse modulation 18 Hz 1720, 1845, 1970 MHz: 28 V/m; Pulse modulation 217 Hz 2450 MHz: 28 V/m; Pulse modulation 217 Hz 5240, 5500, 5785 MHz: 9 V/m; Pulse modulation 217 Hz	-

9.2.3 RF component description

	Frequency range	Bandwidth	Modulation type	Effective radiated power
Wireless foot-switch	2.400 - 2.4835 GHz	2.400 - 2.4835 GHz	BT 4.0 LE (Bluetooth Low Energy)	7 mW transmission power at maximum
WLAN	2412 - 2480 MHz 4920 - 5875 MHz	2412 - 2480 MHz 4920 - 5875 MHz	WLAN IEEE 802.11	Typically 100 mW, max. 200 mW

9.2.4 Declaration of EMC environment

The Cios Select is suitable for professional healthcare facility environment according IEC60601-1-2 ed. 4.

9.2.5 Adjacent or stacked equipment

Use of this equipment adjacent to or stacked with other equipment should be avoided because it could result in improper operation. If such use is necessary, this equipment and the other equipment should be observed to verify that they are operating normally.

9.2.6 List of cables, transducers and accessories

Fixed product cabling, which cannot be removed by the user, 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.

9 Technical information

9.2.7 Usage of other accessories, cables and transducers

Use of accessories, transducers and cables other than those specified or provided by the manufacturer of this equipment could result in increased electromagnetic emissions or decreased electromagnetic immunity of this equipment and result in improper operation.

9.2.8 Portable RF communication equipment



Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to the system including cables specified by the manufacturer. Otherwise, degradation of the performance of this equipment could result.

9.2.9 Note for CISPR11 class A equipment

The emission 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 re-orienting the equipment.

9.2.10 Instructions for maintaining basic safety and essential performance with regard to electromagnetic disturbances for the expected service life

Perform an annual visual inspection of accessible connectors, screws and conducting cabinet door to ensure that its electrical connection has not deteriorated. In case of any degradation call Siemens Service to replace or repair the corresponding part. With this it is ensured that the design measures regarding to the electromagnetic compatibility of the equipment remain effective during the whole service life time.

9.2.11 Use of equipment nearby of emitters



This equipment has been tested for radiated RF immunity only at selected frequencies; use of emitters in close proximity at other frequencies could result in improper operation.

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Information class: clinical

Original_equipment_manufacturer

9.3 Original equipment manufacturer

TOPIC INFO

INDEX: [Original Equipment Manufacturer (OEM)]
INDEX: [OEM]

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

9.3.1 Introduction

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

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.

9.3.2 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:

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

c0993b8378340675c0a81e664e3d56ba / 2 / Draft

Unit_data

Information class: clinical

9.4 System data

TOPIC INFO

INDEX: [System data]

INDEX: [Technical data]

9 Technical information

24926fed3bad2e150a53dbdb6a7c73d5 / 2 / Draft
Information class: clinical

Entire_system_FD

9.4.1 Entire system

TOPIC INFO
INDEX: [System : technical data]

General data

Power requirements	100 V (- 6% - +10%), 50/60 Hz (± 1 Hz); 110 V, 120 V, 127 V, 200 V, 220 V, 230 V, 240 V ($\pm 10\%$), 50/60 Hz (± 1 Hz)
Unit fuse protection (internal)	100 V to 127 V 20 A slow-blow fuse 200 V to 240 V 15 A slow-blow fuse
Maximal power consumption	3.8 kW
Standby power consumption (for 230 V)	350 W
Internal line impedance	R _i max. 0.3 Ohm for 100 V - 127 V R _i max. 0.8 Ohm for 200 V - 240 V
Ambient conditions for operation	Temperature range: +10 °C to +35 °C Relative humidity: 20% to 75%, non-condensing Barometric pressure: 700 hPa to 1060 hPa
Ambient conditions for transport and storage	Temperature range: -20 °C to +40 °C Relative humidity: 15% to 93%, non-condensing Barometric pressure: 700 hPa to 1060 hPa



OTHER: 3rd edition IEC 60601-2-28

For ambient conditions that fall within the specified values, no waiting time is required for radiation operation.

For ambient conditions that fall outside the specified values, a waiting time of one to twelve hours must be factored in for radiation operation, depending on the location of the system.

Dimensions and weight

Chassis(l x w x h)	182.5 cm x 80cm x 159.8 cm (71.9" x 31.5" x 62.9")
Monitor cart (l x w x h)	68.6 cm x 73.6 cm x 179.1 cm (27" x 29.1" x 70.5")
C-arm system (without accessories)	275 kg (605 lbs)
Monitor trolley (including 2 monitors, UPS)	150 kg (330 lbs)

Classification

Protection against electric shock	Class 1, no applied part according to IEC 60601-1
Operating mode	Fluoro Single image SUB Roadmap

Current/voltage values

Voltage (V AC)	Long-term current consumption (A)	Short-term current consumption (A)
100	15	26
110	14	25
120	13	25
127	12	25
200	8	18
220	7	17
230	7	16
240	7	15

0383c9ad7833fe99c0a81e664e3d56ba / 1 / For approval for release
Information class: clinical

Generation_of_radiation

9.4.2 Generation of radiation

TOPIC INFO

INDEX: [Radiation : technical data]

d68d71e2783406d3c0a81e664e3d56ba / 2 / Draft
Information class: clinical

X_ray_generator

X-ray generator

TOPIC INFO

INDEX: [X-ray generator : technical data]



The values in the table provide the technical thresholds of X-ray generation. Whether these threshold values can be reached during clinical operation depends on the set configuration values.

Type of generator	HF-Generator
Nominal peak output power	2.5 kW (93 kV, 24 mA)
Inverter control frequency	25 kHz to 44 kHz
kV range	40 kV to 110 kV

9 Technical information

mA range	3 mA - 24 mA single image 0.2 mA - 14 mA continuous fluoro 3 mA - 24 mA pulsed fluoro
Pulse width	7 ms to 160 ms single image 7 ms to 40 ms pulsed fluoro
Single tank heat storage capacity (physical))	800,000/1100 kHU
mAs range	0.02 mAs to 3.76 mAs
Pulse rate	Variable frame rate 0.5 f/s to 15 f/s; 30 f/s in continuous fluoro mode
Tolerances kV	± 10%
Tolerances mA	± 20% (minimum ± 0.1 mA)
Tolerances mAs	± (10% + 0.2 mAs)

dac7424278340740c0a81e664e3d56ba / 3 / Draft
Information class: clinical

X_ray_tube_assembly__Single_tank_

X-ray tube assembly (Single-tank)

TOPIC INFO
INDEX: [Tube : technical data]

The X-ray tube assembly and image receptor are geometrically aligned such that the emitted radiation cone (radiation axis) is always perpendicular to the plane of the detector.

Type of tube	S3P-Monoblock
Focal spot nominal value	0.6/1.0
Nominal voltage	110 kV
Anode heat storage capacity (IEC 613)	75,000 J (101,000 HU)
Anode heat dissipation	40,800 J/min (55,000 HU/min)
Optical anode angle	9°
Inherent filtration (IEC 601)	3 mm Al with 70 kVp/0.1 mm Cu
Single-tank heat storage capacity (physical)	800,000 J (1,100,000 HU)
Continuous heat dissipation	80 W

a7c07042b420ec83c0a81e66008c2bb0 / 2 / Draft
Information class: clinical

Flat_detector_Data_FD

9.4.3 Flat detector

TOPIC INFO
INDEX: [Flat detector : technical data]

Material	aSi with CsI scintillator
Detector size	21 cm x 21 cm (8.3" x 8.3")
Pixel size	205 μm \pm 10%
Matrix	1004 x 1004 pixels
Digitalization depth	16 bits
Detective quantum efficiency (DQE) (typical) DQE at 80 nGy, RQA5, 1 x 1 (Fluoro) and 400 nGy, RQA5 1 x 1 (Single Image)	80% at 0 lp/mm 65% at 1 lp/mm 40% at 2 lp/mm 22% at 2.43 lp/mm (Nyquist frequency)
Modulation transfer function (MTF), typical MTF	22% at 2 lp/mm 55% at 1 lp/mm (Nyquist frequency)
Resolution on monitor with 1004 x 1004 Flat detector (measured in accordance with DIN 6868-150)	Overview (Mag 0) - acquisition: 2.43 lp/mm Overview (Mag 0) - fluoroscopy: 2.43 lp/mm Format switchover (Mag 1) - acquisition: 2.43 lp/mm Format switchover (Mag 1) - fluoroscopy: 2.43 lp/mm Format switchover (Mag 2) - acquisition: 2.43 lp/mm Format switchover (Mag 2) - fluoroscopy: 2.43 lp/mm
Anti-scatter grid (detachable)	Pb 12:1, 70 lines/cm, $f_0=100$ cm

07c69a3a78340627c0a81e664e3d56ba / 1 / For approval for release
Information class: clinical

Unit_components

9.4.4 Unit components

56f1129f3baf37f30a53dbdb33891517 / 2 / Draft
Information class: clinical

C_arm_FD

C-arm

TOPIC INFO
INDEX: [C-arm : technical data]

Orbital movement	130° (- 40° to + 90°)
Angulation	$\pm 190^\circ$
Horizontal movement	20 cm (7.9")
Immersion depth	73 cm (28.7")
Swivel range	$\pm 12^\circ$
Vertical travel	43 cm (16.9"), motorized
Source to image-receptor distance	103 cm (40.6")

9 Technical information

Free space	81 cm (31.9"), with attached grid
a3e995ae7833fb10c0a81e664e3d56ba / 2 / For approval for release Information class: clinical	Collimator_system Collimator system TOPIC INFO INDEX: [Collimator : technical data]
Iris collimator (lead)	For concentric, radiation-free collimation
Semitransparent slot diaphragm (lead)	For symmetric, radiation-free collimation, with unlimited rotation
2f5b93dbb42eb6bac0a81e664c5842ca / 1 / For approval for release Information class: clinical	Digital_video_imaging_system_FD Digital video imaging system TOPIC INFO INDEX: [Digital video imaging system : technical data]
Video matrix	1 K ²
Digital image rotation	± 360° (continuous)
aafa21b3b4318b1ac0a81e66216940ac / 2 / Draft Information class: clinical	Laser_light_localizer_FD Detector laser light localizer TOPIC INFO INDEX: [Laser light localizer : technical data]
Laser class	Class 1 (IEC 60825-1:2014)
Laser type	Semiconductor laser (laser diode)
Wave length	520 nm
Color	Green
Effective power	≤ 0.229 mW
aa2aa2377834033ac0a81e664e3d56ba / 3 / Draft Information class: clinical	Monitors Monitors TOPIC INFO INDEX: [Monitors : technical data]
Image display	TFT display
Image display	1280 x 1024 (pixels)

Image display	TFT display
Screen diagonal	48 cm (19")
Brightness (DICOM calibrated), typical	400 cd/m ² for high brightness display ³⁾ 200 cd/m ² for standard display
Max. brightness, typical	700 cd/m ² for high brightness display ¹⁾ 350 cd/m ² for standard display
Horizontal/vertical viewing angle	178°/178°

bb02069f7833fbcbc0a81e664e3d56ba / 2 / For approval for release
Information class: clinical

Dose_measuring_chamber_DAP_meter_

Dose measuring chamber (DAP meter)

TOPIC INFO

INDEX: [Dose measuring chamber : technical data]
INDEX: [DAP meter : technical data]

Technology	Semiconductor chamber
Active area	Rectangle - 90 mm x 90 mm
DAP resolution	0.01 µGym ²
Maximum measurable DAP	0.1 µGym ² /s - 2500 µGym ² /s
Reproducibility	< 1%
Energy range	40 kV - 150 kV ± 6%
Attenuation equivalent (Inherent filtration)	< 0.30 mm Al
Dose rate linearity	≥ 10 µGym ² , 2% < 10 µGym ² , 5%
Measuring readiness	20 seconds after power on
Work environment	Temperature range: +10 °C to +70 °C Rel. humidity: 15% to 75% (without condensation) Barometric pressure: 700 hPa to 1060 hPa

3) Optional

9 Technical information

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Information class: clinical

Equipment_options

9.4.5 Equipment options

7a5e1fd00f9435830a53dbdb76a664b1 / 1 / Draft
Information class: clinical

Single_tank_laser_Light_localizer_FD

Single-tank Laser light Localizer

TOPIC INFO

INDEX: [Laser light Localizer : technical data]

Laser class	Class 1 (IEC 60825-1:2007)
Laser type	Semiconductor laser (laser diode)
Wave length	650 nm
Color	Red
Effective power	≤ 3 mW

f2f814397833fd32c0a81e664e3d56ba / 1 / For approval for release
Information class: clinical

DVI_video_splitter

DVI video splitter

TOPIC INFO

INDEX: [DVI video splitter : technical data]

Outputs	DVI (2x)
Conditions for use	The displays or monitors used must be compatible with the SXGA standard 1280 x 1024 at 60 Hz

Se8793814197ce870a53dbdb567db871 / 1 / For approval for release
List_of_standards_to_be_maintained_covering_electrical_and_mechanical_safety_FD
Information class: clinical

9.5 List of standards to be maintained covering electrical and mechanical safety

TOPIC INFO

INDEX: [Standards]

Siemens Healthineers hereby certifies that the Cios Select is compliant with the following generally recognized standards covering electrical and mechanical safety:

Standard organization	Reference number and date	Title of standard
IEC	60601-1 Edition 3.1	Medical Electrical Equipment - Part 1: General Requirements for basic safety and essential performance

Standard organization	Reference number and date	Title of standard
IEC	60601-1-2 4 th 2014	Medical Electrical Equipment - Part 1-2: General requirements for basic safety and essential performance - Collateral Standard: Electromagnetic disturbances - Requirements and tests
IEC	60601-1-2 3rd 2007	Medical Electrical Equipment - Part 1-2: General requirements for basic safety and essential performance - Collateral Standard: Electromagnetic Compatibility - Requirements and Tests
IEC	60601-1-3: 2013	Medical Electrical Equipment - Part 1-3: General requirements for basic safety and essential performance - Collateral Standard: Radiation protection in diagnostic X-ray equipment
IEC	62366: 2015	Medical devices - Application of usability engineering to medical devices
ISO	14971:2012	Medical devices - Application of risk management to medical devices
IEC	62304 Ed. 1.0 2006	Medical device software - Software life cycle processes
IEC	60601-2-28 Edition 2.0 2010-03	Medical electrical equipment - Part 2-28: Particular requirements for the basic safety and essential performance of X-ray tube assemblies for medical diagnosis
IEC	60601-2-54 2015	Medical electrical equipment - Part 2-54: Particular requirements for the basic safety and essential performance of X-ray equipment for radiography and radioscopy
IEC/PAS	61910-1 2007	IEC PAS 61910-1 First Edition 2007-07, Medical electrical equipment - Radiation dose documentation - Part 1: Equipment for Radiography and Radioscopy
NEMA	PS 3.1 - 3.20 (2011)	Digital Imaging and Communications in Medicine (DICOM) Set
IEC	60825-1:2014	Safety of laser products - Part 1: Equipment classification, and requirements
IEC	10993-1:2009	Biological evaluation of medical devices -- Part 1: Evaluation and testing within a risk management process
IEC	60601-2-43 - Ed. 2.0 2010-03	Medical electrical equipment - Part 2-43: Particular requirements for the safety and essential performance of X-ray equipment for interventional procedures

401268c578340157c0a81e664e3d56ba / 2 / For approval for release
Information class: clinical

Labels

9.6 Labels

TOPIC INFO
INDEX: [Labels]

9 Technical information



All labels displayed in the operator manuals are examples only and may differ from the labels attached to the system and components.

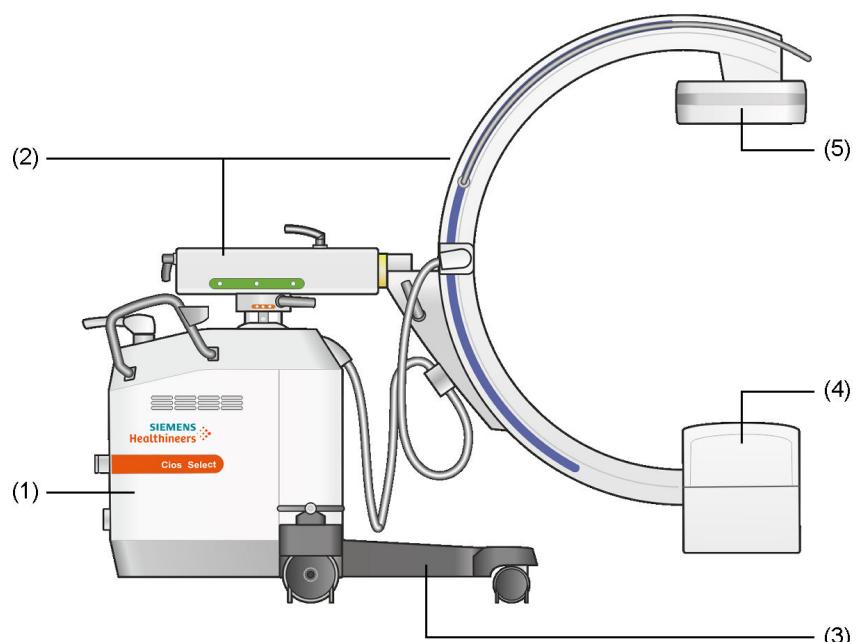
706ba97b38bbe229c0a81e6621c303a2 / 1 / Draft
Information class: clinical

C_arm_system_FD__MDR_

9.6.1 C-arm system

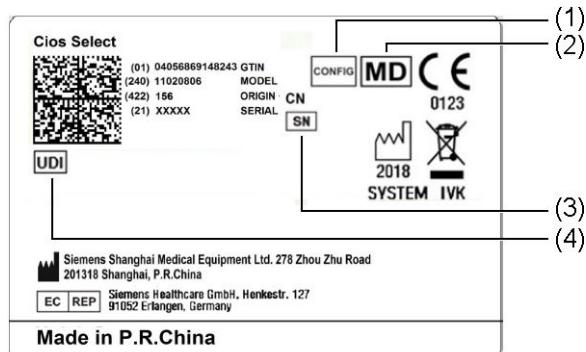
TOPIC INFO
INDEX: [C-arm : Labels]

The labels shown below are attached to the following sub-assemblies.



- (1) Base system (chassis)
- (2) Horizontal support arm and C-arm
- (3) C-arm travel frame
- (4) Single tank
- (5) Flat detector

Example of a system identification label:

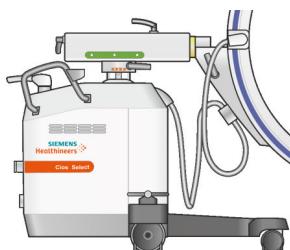


- (1) **CONFIG:** Configurable device
- (2) **MD:** Medical device
- (3) **SN:** Serial number
- (4) **UDI:** Unique device identification

dc54dea6b8af954cc0a81e6668b3a8cc / 2 / Draft
Information class: clinical

Base_system_Chassis_FD

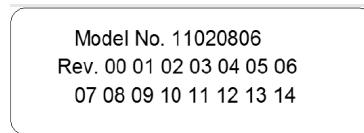
(1) Base system (Chassis)



System identification label



System identification label (production in Kemnath only)



System revision label

9 Technical information



AR Label



Brazil Label (only for Brazil)

Registro ANVISA:
10345162059

Brazil ANVISA Label (only for Brazil)



EAC label

This Label is only for Eurasian Economic Union (EEU) with EAC declaration done.



MoH label (only for Saudi Arabian)

Input voltage: Single Phase,
100V/110V/120V/127V/200V/220V/230V/240V
Input current,
Long time current: 15A/14A/13A/12A/8A/7A/7A/7A
Momentary current: 26A/25A/25A/25A/18A/17A/16A/15A
Input frequency: 50Hz/60Hz
Continous operation with intermittent loading

Power Label



Caution! Read Operator Manual



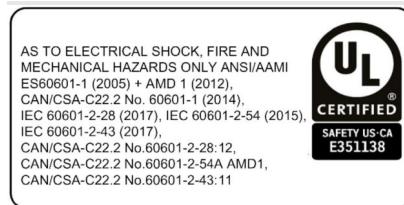
Hand crush hazard



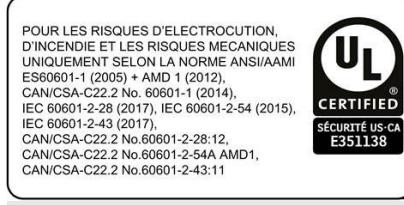
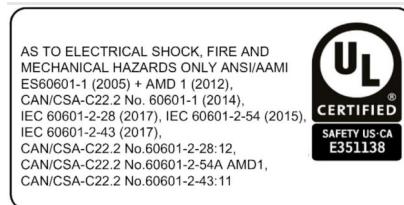
Operation on incline warning label

WARNING!

This X-ray unit may be dangerous to patient and operator unless safe exposure factors, operating instructions and maintenance schedules are observed.

DHHS radiation emission (only for USA)

UL label (only for USA)



UL label (only for Canada)

9 Technical information



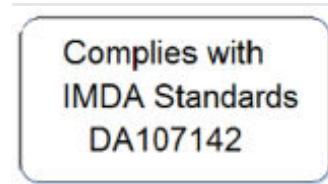
DHHS label (only for USA)



Ukraine Label (only for Ukraine)



Name Label (only for Malaysia)



Singapore IMDA label



Korean label



Main unit weight label

Diproduksi oleh:
 Siemens Shanghai Medical Equipment Ltd.
 278 Zhou Zhu Road
 201318 Shanghai
 People's Republic of China

Diimpor oleh:
 PT. Siemens Indonesia
 Jl A.Yani No. 2 Kav 67-68
 Jakarta – Indonesia

KEMENKES RI AKL. XXXXXXXXXX

Country Specification Label (only for Indonesia)

CCP-T

	(01) 04056869217482	GTIN
	(240) 11326506	MODEL
	(422) 156	ORIGIN CN
	(21) XXXXXX	SERIAL
	(20) 00	REV

IVK

CCP second set of ID label

SECOND SET OF LABELS
Chassis Control Panel

Second set of CCP label

Generator – Get

	(01) 04056869031880	GTIN
	(240) 11131623	MODEL
	(422) 156	ORIGIN CN
	(21) 60004	SERIAL

IVK

Generator ID label

SECOND SET OF LABELS
GENERATOR

Second set of generator label

141864c0b9149205c0a81e66110e0490 / 1 / For approval for release
 Information class: clinical

Horizontal_support_arm_and_C_arm_FD

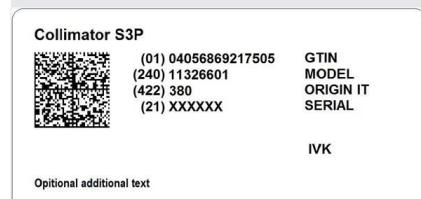
(2) Horizontal support arm and C-arm

Hand crush hazard

9 Technical information



Arrow Label



Second collimator ID label



DHHS label of collimator

SECOND SET OF LABELS COLLIMATOR

Second set of collimator label



Second DAP ID label



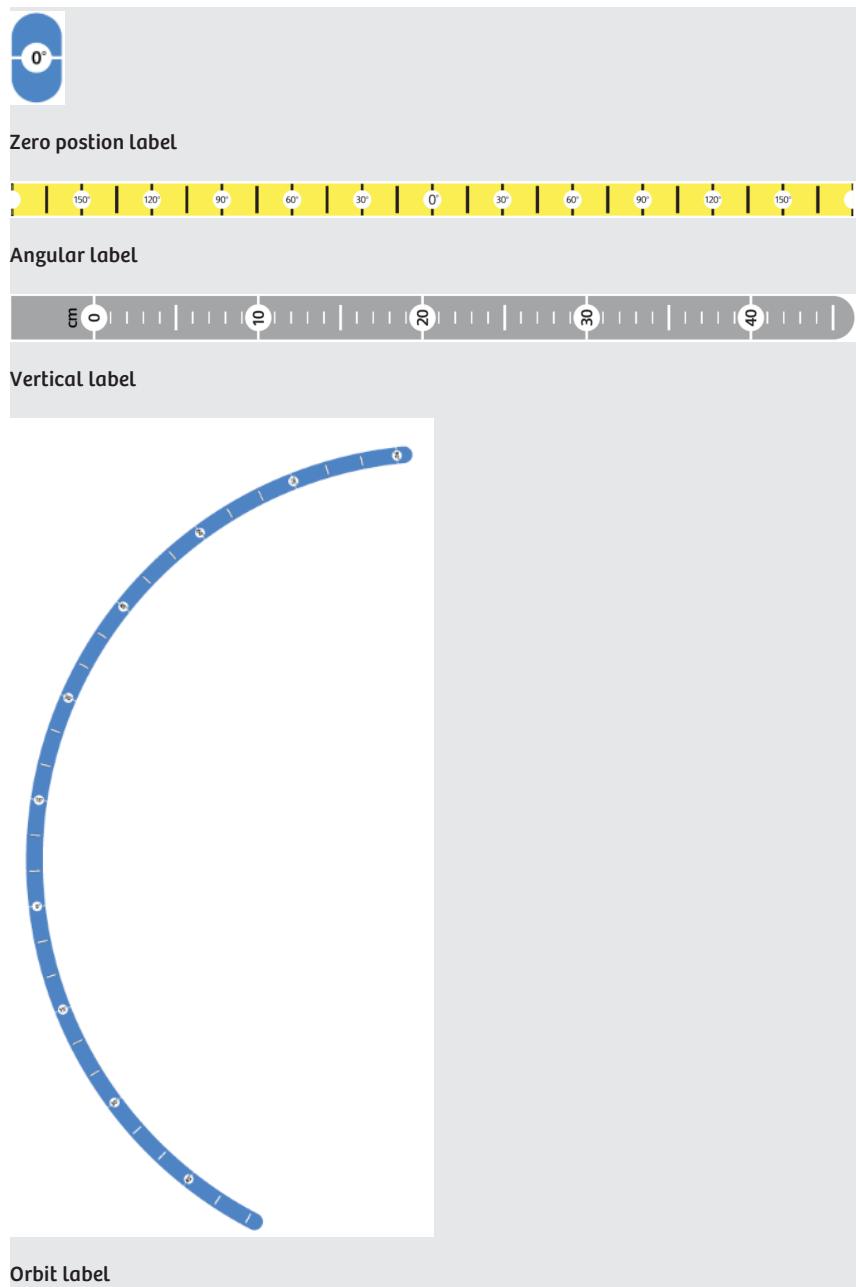
Second set of DAP label



Horizontal Label



Swivel Label

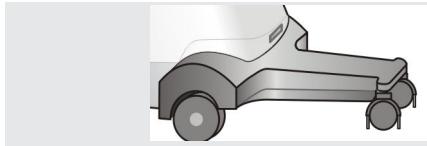


9 Technical information

c6b5471bb833fc35c0a81e665fb2a5fa / 1 / For approval for release
Information class: clinical

C_arm_travel_frame_FD

(3) C-arm travel frame



Main Unit

(01) 04056869217468 GTIN
(240) 11326510 MODEL
(422) 156 ORIGIN CN
(21) XXXXX SERIAL

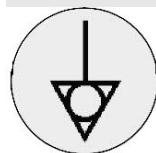
IVK

Optional additional text

Main unit identification label

Rev.	00	01	02	03	04	05	06	07	08	09	10	11
12	13	14	15	16	17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32	33	34	35	36	37

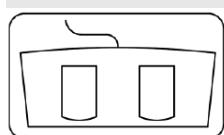
Main unit revision Label



Equipotential bonding label



Foot crush hazard



Footswitch connector label



Cios Select VA20 Standard Bom

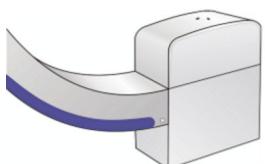
(240) 11020871 MODEL
(422) 156 ORIGIN CN
(21) XXXXX SERIAL

ID Label of Cios Select Standard Configuration BOM(production in Kemnath only)

c95d4894b9274f46c0a81e662e58a9c5 / 2 / Draft
Information class: clinical

Single_tank_FD

(4) Single tank



High voltage label



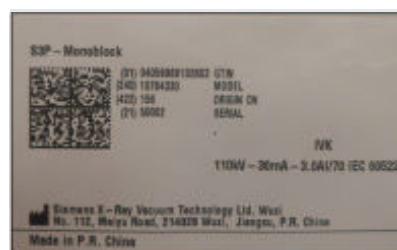
Danger of hot surface label



Radiation warning label



No stepping label



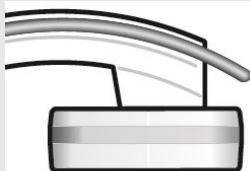
Monoblock label

9 Technical information

a3633281b9291ce0c0a81e66663d62a1 / 2 / Draft
Information class: clinical

Flat_detector_Labels_FD

(5) Flat detector



No sitting Label

LASER RADIATION
DO NOT STARE INTO BEAM
CLASS 1 LASER PRODUCT
IEC 60825-1: 2014
P0≤0.39mW; λ=650nm

Laser warning label (only for the system with the optional Laser Light Localizer)



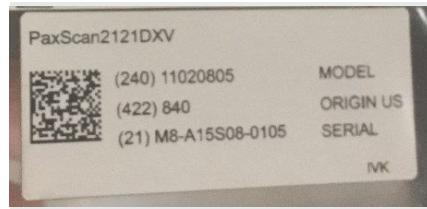
Laser radiation label (only for the system with the optional Laser Light Localizer)



Second flat detector Laser Labels (only for the system with the optional Laser Light Localizer)



DHHS label (only for USA)



Second flat detector ID Label

SECOND SET OF LABELS FD

Flat detector second set of labels

FD Holder_ASM
 (01) 04056869249988 GTIN
 (240) 11326634 MODEL
 (422) 156 ORIGIN CN
 (21) XXXX SERIAL

IVK

Flat detector holder label

cf3561abb944ba9fc0a81e666ac278b3 / 2 / Draft
 Information class: clinical

Monitor_trolley_FD

9.6.2 Monitor trolley

TOPIC INFO

INDEX: [Monitor trolley : labels]
 INDEX: [Trolley : labels]



Trolley
 (01) 04056869217475 GTIN
 (240) 11326520 MODEL
 (422) 156 ORIGIN CN
 (21) XXXX SERIAL

Optional additional text

IVK

Identification label

TCP-T
 (01) 04056869217499 GTIN
 (240) 11326507 MODEL
 (422) 156 ORIGIN CN
 (21) XXXX SERIAL
 (20) 00 REV

IVK

TCP-T second set of ID label

9 Technical information

SECOND SET OF LABELS Trolley Control Panel

Second set of TCP label



Caution! Read Operator Manual

Rev.	00	01	02	03	04	05	06	07	08	09	10	11
12	13	14	15	16	17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32	33	34	35	36	37

Revision Label



Caution label



Grounding label

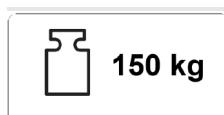
WARNING!

This X-ray unit may be dangerous to patient and operator unless safe exposure factors, operating instructions and maintenance schedules are observed.

DHHS radiation emission label (only for USA)

This product complies with DHHS regulations
21 CFR Subchapter J, applicable at date of
manufacture.
Manufactured: XXXXXXXX XXXX
Siemens Shanghai Medical Equipment Ltd.,
278 Zhou Zhu Road, 201318 Shanghai
China

DHHS Label (only for USA)



Trolley weight label

9 Technical information

040d49453c5d65400a53dbdb6e4e57b9 / 1 / For approval for release
Information class: clinical

Options_FD

10 Options

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Anyone who connects additional equipment to the medical device is considered to be configuring the system and is therefore responsible for ensuring that the current system configuration complies with the relevant standards (e.g. system standard IEC/EN 60601-1-1 and/or other applicable standards). In case of queries please speak with your local contact person.



OTHER: 3rd edition 7.9.2.12

If one of the listed accessory parts requires special operating conditions (e.g. temperature, air pressure, humidity), appropriate attention will be drawn to such in the description. Please follow the Operator Manual provided by the manufacturer.

The following accessories have been approved for use with the Cios Select:

- Spacer
- Grounding cable
- Wireless network connection (WLAN)
- Sterile cover on the detector, single tank and C-arm
- FD Laser light localizer
- Dose measuring chamber
- DVI video splitter
- Printer
- Wireless multifunctional footswitch

4a46175178342ac7c0a81e66032f7db4 / 2 / For approval for release

HZ_XP_hm_um_Appropriate_Accessory

hazard-key: hm_um_Appropriate_Accessory



CAUTION

Inappropriate accessories.

The use of accessories that do not comply with the safety requirements of this equipment can reduce the safety of the entire system.

- ◆ Use only original Siemens Healthineers accessories or accessories approved by Siemens Healthineers.

df53db4e78340e04c0a81e664e3d56ba / 3 / Draft
Information class: clinical

Spacer_option_

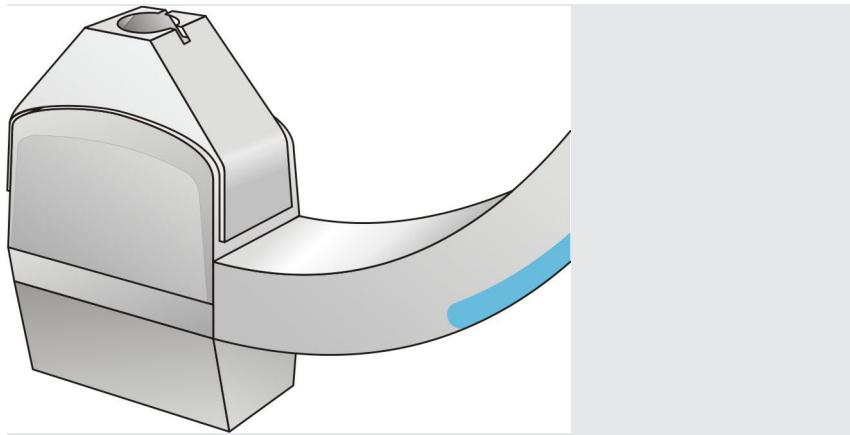
10.1 Spacer

TOPIC INFO

INDEX: [Spacer]

The distance between the source and tube assembly cover (shortest possible source-skin distance) is ≥ 200 mm with the standard system (according to IEC 601-1-3).

Country-specific regulations may require a larger source-skin distance (≥ 300 mm according to DHHS 21CFR). This is achieved by attaching an additional spacer to the C-arm system.



If this source-skin distance is too large for special examinations, the spacer can be removed by taking off the screws.

The spacer must be reattached after this type of examination to ensure the reduction in skin dose resulting from a greater source-skin distance.

2584dcac78340ab9c0a81e664e3d56ba / 3 / Draft

Information class: clinical

Grounding_cable_option_

10.2 Grounding cable

TOPIC INFO

INDEX: [Grounding cable]

An optional grounding cable is available for equipotential bonding.

Use the grounding cable for examinations of the heart and open skull (in addition to the equipotential bonding connection; also refer to
(→ Page 71 *Establishing the equipotential bonding connection*)

5036eda9bd8e6d33c0a81e662d4bfd44 / 2 / Draft

Information class: clinical

Wireless_network_connection_FD

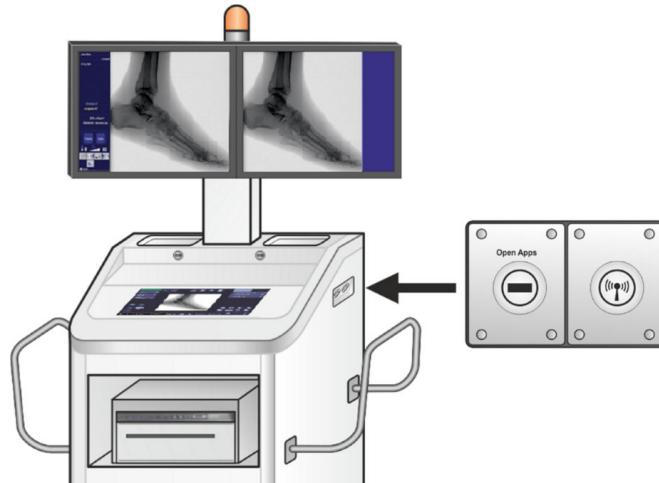
10.3 Wireless network connection (WLAN)

TOPIC INFO

INDEX: [WLAN]

INDEX: [Network connection : wireless]

The WLAN option enables a wireless connection between the Cios Select and a (hospital) network. The dedicated WLAN unit is integrated into the monitor trolley housing and is completely set up. Its On/Off switch is found on the side of the monitor trolley.



(1) WLAN On/Off switch

10.3.1 Activating WLAN

- ◆ To activate WLAN, use the switch on the side of the monitor trolley.
The WLAN switch illuminates.

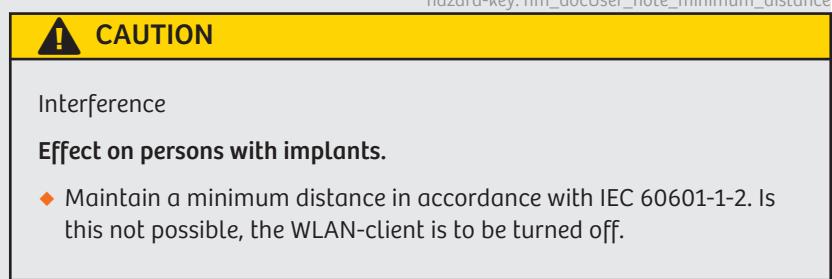


Once the WLAN unit is switched on, it takes less than a minute for the WLAN connection to be functional.

43396e5e783422dbc0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_docUser_note_minimum_distance

hazard-key: hm_docUser_note_minimum_distance



The coexistence of wireless sources operated in the same environment may affect the quality of data transfer.

The transmission speed is reduced if additional WLAN clients are operated simultaneously in the same environment.



For reasons of data security, it is recommended to encrypt the data in the WLAN according to WPA or WPA2.



In case the wireless connection is interrupted, impaired or overloaded, it is recommended to keep an Ethernet cable on hand, provided there are connection options nearby.



If WLAN is activated, no devices sensitive to high frequencies should be placed on top of the unit. Otherwise, damage to such devices or impairment to WLAN functionality could result.

10.3.2 Operation via Ethernet cable

When operating the **Cios Select** via Ethernet cable, the WLAN at the monitor trolley needs to be deactivated prior to switching on the system.



Simultaneous operation via Ethernet cable and WLAN is not possible and should be avoided by all means.

After inadvertent simultaneous operation or after a change between both options, the system must be switched off and on again.

5e9dc17eb1f00f4c0a81e6609eb0939 / 2 / Draft
Information class: clinical

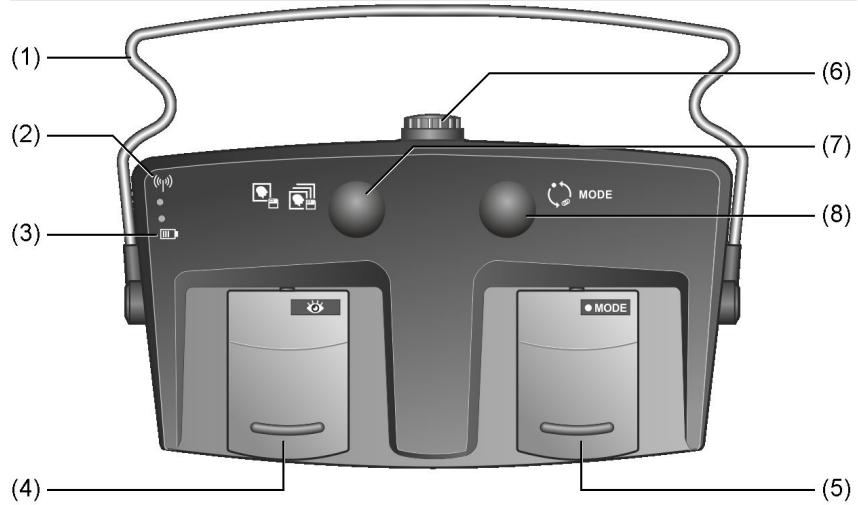
Wireless_multifunctional_footswitch

10.4 Wireless multifunctional footswitch

TOPIC INFO

INDEX: [Wireless multifunctional footswitch (optional)]

INDEX: [Footswitch : wireless multifunctional (optional)]



(1) Stirrup for preventing unintended actuation

(2) Connection status LED

(3) Battery status LED

- (4) Radiation release pedal for the selected operating mode
- (5) Radiation release pedal for fluoroscopy (standard setting)
- (6) Rotary knob of battery compartment
- (7) Save button for storing images or scenes
- (8) Operating mode button

States of the status LEDs:

LED	Subject	Mode
Battery status LED	Battery capacity	Green: Battery full or nearly full Orange: Battery almost full Orange (flashing): Battery low
Connection status LED	Radio link or pairing mode	Green: Connection active Orange: No connection active Orange (flashing): Footswitch not paired Green and orange (alternately flashing): Pairing mode activated
Battery status LED and Connection status LED	Fatal error or footswitch update	Orange (both LEDs flashing): Fatal system errors (for example, battery exhausted or memory error) Green and orange (both LEDs alternately flashing): Firmware update process running

The battery capacity is also shown on the monitor's status bar:

Symbol on status bar	Battery capacity [%]
	100 - 75
	75 - 50
	50 - 25
	25 - 0
	0

10.4.1 Using the wireless multifunctional footswitch

b374d7b8be0dd637c0a81e660e63522a / 1 / For approval for release

HZ_XP_hm_docUser_labeling_wireless_footswitch

hazard-key: hm_docUser_labeling_wireless_footswitch

CAUTION

Radiation released by a footswitch in another room.

Non-clinical exposure to ionizing radiation

- ◆ As part of the system installation, the wireless footswitch must be labeled to show which system it belongs to.

0094666ebe0b9ec9c0a81e660aa7da4d / 1 / For approval for release

HZ_XP_hm_docUser_release_x_ray_close_to_patient_interfere

hazard-key: hm_docUser_release_x-ray_close_to_patient_interfere

CAUTION

The wireless footswitch may be subject to interference from other equipment, including portable and fixed RF communication equipment, even if such equipment meets the applicable emissions requirements.

Fluoroscopy or acquisition may sporadically be interrupted.

- ◆ The operator must ensure that other wireless devices in the 2.4 GHz ISM band are not operated within a radius of approx. 5m around the system.
- ◆ Please observe and verify normal operation of the wireless footswitch prior to using it.

- 1 Take the wireless multifunctional footswitch out of the footswitch holder and place it horizontally on the floor.

This will switch on the footswitch, automatically.

- 2 Swivel the stirrup into the upright position until it locks.

The footswitch is now ready for use.



The wireless multifunctional footswitch automatically switches to standby mode if it is not used for a certain period of time. It is activated again by actuating any button or pedal.

10.4.2 Selecting the operating mode

The MODE (operating mode) button of the multifunctional footswitch allows you to select one of the operating modes: Single image, fluoro, SUB, Roadmap or a video source (depending on the configuration level).

- ◆ If necessary, press this button on the multifunctional footswitch several times.

The selected operating mode is indicated on the left monitor.

10.4.3 Release radiation

The left pedal is always used to activate fluoroscopy (Preferred setting).

The right pedal is used to activate the currently selected operating mode.

Exception: If Fluoroscopy mode is selected, the right pedal is assigned the single image operating mode.



The functionality of the pedals can optionally be changed.

a7eb811d3d4f5d97c0a81e6679c412ed / 1 / For approval for release

HZ_XP_hm_docUser_release_x_ray_close_to_patient

hazard-key: hm_docUser_release_x-ray_close_to_patient

⚠ CAUTION

X-ray release may be possible from remote location.

Unnecessary dose!

- ◆ Do not release X-ray mistakenly if not in viewing distance to the patient.



- ◆ Keep the foot pedal pressed during radiation release.

10.4.4 Storing images (during radiation)



- ◆ Press the save button (7) on the wireless footswitch during radiation.

The image currently generated and displayed is saved in the local database.

10.4.5 Storing images (after radiation)



- ◆ Press the save button (7) on the wireless footswitch.

Holding the key for < 2 seconds: saves the image last recorded (LIH).

Holding the key for > 2 seconds: saves the scene last recorded (LSH).



The images are stored in the local database. They are transferred from the left monitor to the right monitor unless the **Hold reference** function is active.

10.4.6 Replacing the batteries

f700f61bbe055604c0a81e660d5d7287 / 1 / For approval for release

HZ_XP_hm_docUser_battery_empty

hazard-key: hm_docUser_battery_empty

CAUTION

Weak batteries in wireless footswitch.

Discontinuation of interventional treatment.

- ◆ Before starting an examination, make sure the batteries have sufficient charge.

REQUIREMENT: hm_um_docUser_exchange_battery_wireless_footswitch

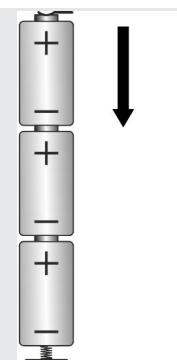


- 1 Turn the rotary knob towards "OPEN" to open the battery compartment at the bottom.

- 2 Remove batteries.

- 3 Insert new batteries (LR14) into the wireless multifunctional footswitch as shown in the diagram (see arrow for insertion direction).

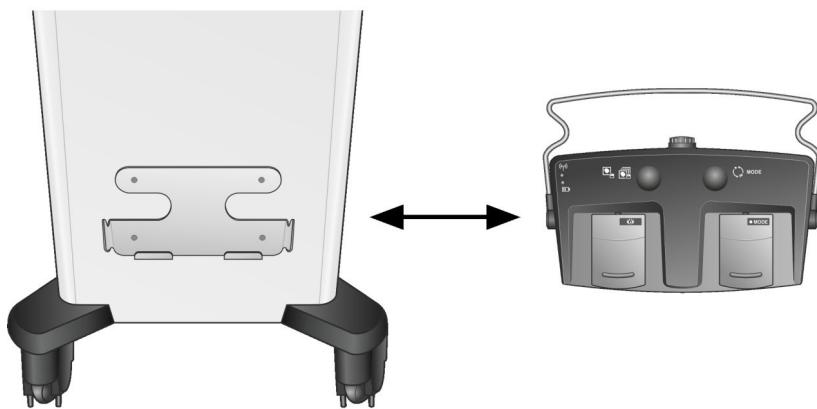
- 4 Close the battery compartment by turning the rotary knob towards "CLOSE" until it locks.



10.4.7 Storage for transport

To transport the multifunctional wireless footswitch properly, proceed as follows:

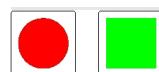
- ◆ Insert the multifunctional wireless footswitch into the holder provided on the side of the monitor trolley.





When inserting the wireless footswitch in the holder, make sure that the colored symbols on the footswitch match the ones on the holder to avoid that the wrong footswitch is inserted!

Marking signs: The wireless multifunctional footswitch is marked with a colored sign of different shape. The same mark is attached to the holder on the monitor trolley during installation. So you can avoid a mix up for installations with a multitude of wireless multifunctional footswitches. The following colored symbols are used for unique allocation of the footswitch to the holder:



783e2ad1bdc7b1a2c0a81e662d4bfd44 / 2 / Draft

Information class: clinical

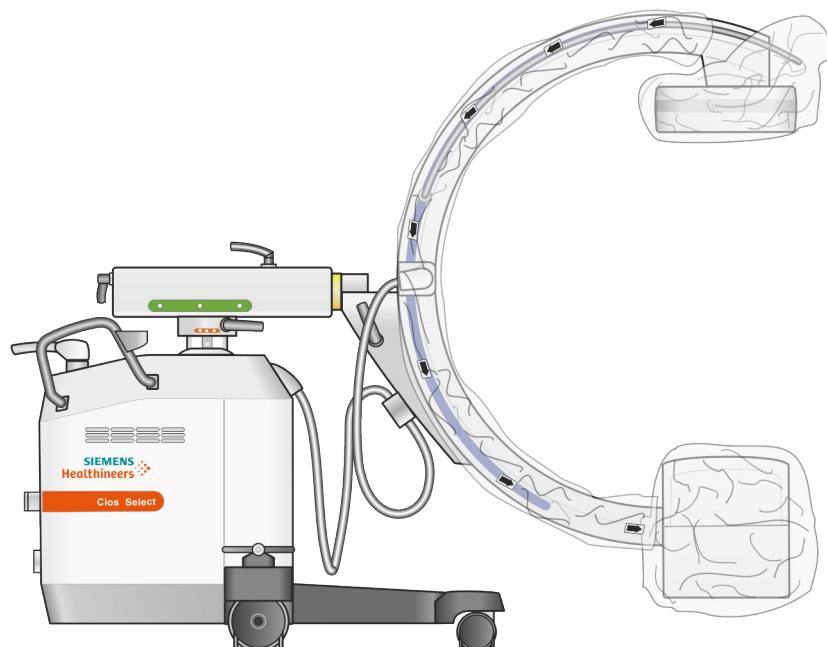
Sterile_cover_on_detector__single_tank__C_arm_FD

10.5 Sterile cover on the detector, single tank and C-arm

TOPIC INFO

INDEX: [Sterile cover : on the C-arm]
INDEX: [Sterile cover : on the single tank]
INDEX: [Sterile cover : on the detector]
INDEX: [Detector : sterile cover]
INDEX: [C-arm : sterile cover]
INDEX: [Single tank : sterile cover]

To protect it against contamination, the C-arm including the flat detector and the X-ray tube assembly are completely covered with a three-piece sterile disposable cover of transparent polythene sheet.



C-arm completely covered

963c7d017834257ac0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_docUser_note_sterile_drape

hazard-key: hm_docUser_note_sterile_drape

CAUTION

Improper attachment of the sterile cover on the C-arm.

Risk of infection!

- ◆ Follow the instructions for handling the sterile covers.



Always use sterile covers during interventions to protect the flat detector against the ingress of liquids!

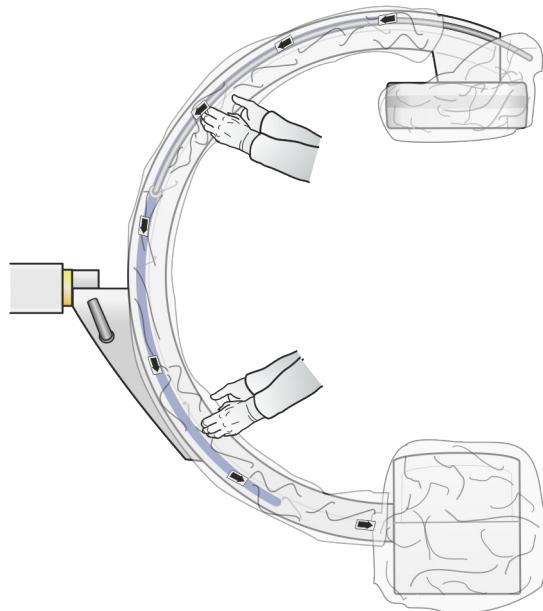


Never use the sterile cover when the packaging is damaged!

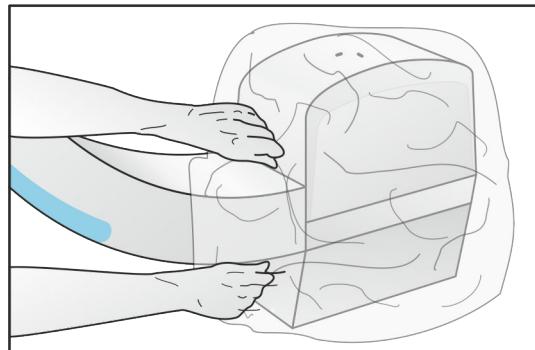
10.5.1 Affixing the sterile cover

Follow these instructions to wrap the C-arm in the sterile cover:

- 1 Attach the sterile cover to the inside of the C-arm using the adhesive strips.

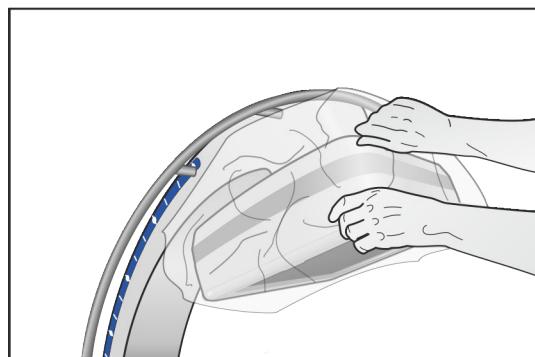


- 2 Pull the plastic cover over the single tank.



The plastic cover is fixed in place with an elastic cord.

- 3 Pull the other plastic cover over the flat detector.



The plastic cover is fixed in place with an elastic cord.

The C-arm is now covered completely.

90e63354bddad529c0a81e661e282fa3 / 2 / Draft
Information class: clinical

FD_laser_light_localizer_FD

10.6 Laser light localizer

TOPIC INFO
INDEX: [Laser light localizer]

10.6.1 Detector laser light localizer

To project the target crosshairs, two Class 1 lasers are used whose exit windows are arranged in the detector cover.

10.6.2 Single-tank laser light localizer

To project the target crosshairs, two Class 1 lasers are used whose exit windows are arranged in the single tank cover.

10.6.3 Protection Measures

Brief exposure to a class 1 laser is safe for the eye.

The aversion response and the blinking reflex will usually protect the eye.

In Germany, the operator is responsible for ensuring that the user has been instructed in the use of the laser. Outside Germany, the relevant laws and regulations regarding the use of Class 1 lasers must be complied with.

ba255e9878342442c0a81e66032f7db4 / 1 / For approval for release

HZ_XP_hm_docUser_note_risk_of_eye_injury

hazard-key: hm_docUser_note_risk_of_eye_injury

CAUTION

Looking into laser-beam

Risk of impaired vision

- ◆ There is a risk of eye injury!
- ◆ Do not look directly into the laser beam.
- ◆ Do not observe directly with optical instruments.



If relevant laws and regulations are not complied with, it may cause unexpected radiation and injury.

9549020a783409fec0a81e664e3d56ba / 2 / For approval for release
Information class: clinical

Dose_measuring_chamber_DAP_meter_

10.7 Dose measuring chamber (DAP meter)

TOPIC INFO

INDEX: [Dose measuring chamber]
INDEX: [DAP meter]

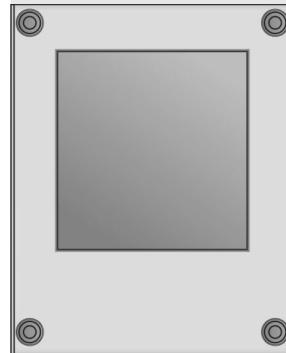
If available, this option is integrated in the single tank of the Cios Select.

The DAP meter determines the dose area product (DAP) and air kerma values.

(→ Page 246 *Dose and consistency test*) [\[OptUnresolvedLink\]Dose and consistency test \(Dose and consistency test\)\[/OptUnresolvedLink\]](#)

The cumulative patient data are displayed on the monitor trolley during the examination.

(→ Page 141 *Radiation information*) [\[OptUnresolvedLink\]Radiation information \(Radiation information\)\[/OptUnresolvedLink\]](#)



Dose measuring chamber (DAP meter), integrated in the single tank

c766fb3978340a5cc0a81e664e3d56ba / 3 / Draft
Information class: clinical

DVI_video_splitter

10.8 DVI video splitter

TOPIC INFO

INDEX: [DVI video splitter]

The Cios Select has an additional DVI video splitter option available for outputting the image signals to an external live monitor (Monitor A) and an external reference monitor (Monitor B) via the DVI connection.

To connect an external monitor, insert the DVI connection cable into the respective interface for Monitor A or B on the monitor trolley.

7eccdc2c78340bd2c0a81e664e3d56ba / 3 / Draft
Information class: clinical

Printer

10.9 Printer

TOPIC INFO

INDEX: [Printer]

A print from the printer is not suitable for diagnosis.



4aa14066a0f6a1170a53dbdb338c91b5 / 1 / Draft
Information class: clinical

Litho_Crosshair_Litho_

10.10 Litho Crosshair

10.10.1 Automatic Display

As soon as a litho system is connected and switched on and a patient is registered, the electronic crosshair is automatically displayed on the monitor.

10.10.2 Manually activating/deactivating the display



Touch this button to display or hide the electronic crosshair at any time.



The crosshair may not be hidden during lithotripsy treatment because it indicates the focus of the shock wave.



If the litho crosshair display is active, the laser crosshair does not display on the monitor.

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1,2,3 ...

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Manufacturer's notes:

This device bears a CE mark in accordance with the provisions of EU Regulation 2017/745 of April 5, 2017 concerning medical devices and the Council Directive 2011/65/EU of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

The CE marking applies only to Medical Devices which have been put on the market according to the above-mentioned EU Regulation and EU Directive.

Unauthorized changes to this product are not covered by the CE mark and the related Declaration of Conformity.

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List of <variable-set>

XP_ProductName: Cios Select [used 34x]

XP_ProdName_AcquSystem: Cios Select [used 58x]

XP_ProdName_AcquSystem_Short: Cios [used nowhere]

List of requirements of type "CHARM"

id: 288242

- "Images acquired during boot phase of OpenApps PC" (→ Page 148)

id: 320354

- "Description of display of air kerma rate" (→ Page 141)

id: SP_00169047

- [no comment available] (→ Page 132)

id: SP_00169661

- [no comment available] (→ Page 215)

id: SP_00203084

- [no comment available] (→ Page 66)

id: SP_201801

- [no comment available] (→ Page 199)

List of requirements of type "OTHER"

id: 3rd edition

– [no comment available] ([→](#) Page 15)

id: 3rd edition 7.9.2.12

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