

**ARCADIS Varic**

English  
Operator Manual

SPR2-310.620.30.02.02

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# ARCADIS Varic

Operator Manual



Manufacturer's note:

This product is provided with a CE marking in accordance with the regulations stated in

Annex II of Directive 93/42/EEC of June 14th, 1993 concerning medical devices.

The CE marking applies only to medical devices which have been put on the market according to the above-mentioned EC Directive.

Unauthorized changes to this product invalidate this declaration.

Original Language: English

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# Do you have any notes on this Operator Manual?

## Your opinion matters a lot to us!

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

☐ For feedback by fax, please use the following fax number:  
**+49 9131/84-2378**

☐ If you prefer notification by e-mail, please send your feedback to:  
**sp\_ga.med@siemens.com**

When contacting us please refer to the *entire print number shown in the footer of this page*.

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

My notes

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



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We welcome you as a user of the powerful multifunctional ARCADIS Varic C-arm system from Siemens.

## *Use of the product*

### *Intended use*

ARCADIS Varic is a mobile X-ray system for intraoperative digital imaging. To name a few, it can be used for trauma, orthopedic, vascular, cardiac and general surgical procedures.

### *Body region*

Clinical applications may include, but are not limited to, cholangiography, endoscopic, urologic, pain therapy, orthopedic, neurologic, vascular, cardiac, critical care and emergency room procedures.

The system is suitable for a large variety of clinical visualizations such as

- ☐ Visualization of bones
- ☐ Visualization of vessels, soft tissues
- ☐ Visualization of implants
- ☐ Visualization of surgical instruments



### Caution

Non-permitted use of the X-ray system outside of its stated intended use presents a

#### **risk to the patient and operating personnel**

- ◆ The X-ray system may be used in the aforementioned clinical applications and procedures only.
- 

## *Patient group*

In principle, the ARCADIS Varic can be used for examining all types of patients without restriction. When using this system, the relevant applicable country-specific requirements must be complied with.

### *Contraindications*

Prior to the examination, it must be confirmed by a physician that an examination is permissible and checked whether increased precautions are necessary.

### *Physical functionality*

The ARCADIS Varic X-ray system is a compact and powerful mobile X-ray image intensifier system with digital image processing for fluoroscopy and radiography. The system is equipped with a foot switch and a hand switch for triggering radiation.

The following modes of operation are available for the broad scope of applications ARCADIS Varic:

digital radiography, fluoroscopy, pulsed fluoroscopy, subtraction/roadmap.

### *User profile*

The system can be used properly only by suitably qualified medical personnel. This requires operating personnel to be familiar with the Operator Manual. This manual must be studied in detail prior to starting up the system. Pay special attention to the following sections:

- ☐ General safety information
- ☐ Personal safety
- ☐ Equipment safety
- ☐ Maintenance

It is the responsibility of the system operator to ensure that operating personnel are professionally and properly instructed.

As the manufacturer of the system, SIEMENS is not responsible for any impact on its safety, reliability and performance if it is not used in accordance with the Operator Manual.



*Please also read the supplements and addenda to the Operator Manual necessitated by technical developments.*

## *Training*

It is recommended that operating personnel undergo application training prior to using the system. This training can be conducted by Siemens employees.

## *Conditions of use*

The digital X-ray system ARCADIS Varic is a mobile system suitable for use in an OR. When using the system, the applicable country-specific requirements must be observed.

## *Maintenance, cleaning, and disinfection*

See → Register 10: Maintenance.

## *Essential performance characteristics*

See → Register 9: Technical Data.

## *Frequently used operating functions*

- ☐ System On/Off
- ☐ Patient registration
- ☐ Selecting the operating mode
- ☐ Recording X-ray images
- ☐ Processing X-ray images (post-processing/adding comments)
- ☐ Saving/archiving studies locally or to a PACS

## *Operating functions regarding safety*

- ☐ Emergency stop function (emergency stop switch)
- ☐ Radiation protection (collimator function)
- ☐ Moving the C-arm

### *Information about this Operator Manual*

#### *Scope*

This Operator Manual is valid for the following product:

ARCADIS Varic

#### *Names and parameters*

All names and data of patients and facilities 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.

#### *Values*

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

#### *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.

#### *Instructions*

The individual steps contained in procedural instructions guide you in the proper use of your system.

- ◆ Text of this type is identified by a diamond.

### *Conclusion*

- The result of procedural instructions is identified by a dash.

### *List*

- Text of this type is identified by a square.

### *Cross-reference*

Cross-references refer you to related topics on other pages or in other chapters.

→ Cross-references are identified by thin arrows.

### *General notes*

A note refers to information that is important for safe operation of the system without the presence of any hazard to health or life.



*A note is indicated by an exclamation mark "!" and printed in italics.*

Additional information contains tips regarding optimal system use and settings as well as other useful hints.



*Additional information is identified by the letter "i" and printed in italics.*

## *Warning notices*

A *Warning* indicates a danger which, if not observed, can lead to serious injury or even death.



### **Warning**

First the source of danger is stated.

**Then possible consequences are pointed out!**

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

*Caution* indicates a danger which, if not observed, can lead to minor or moderate injury.



### **Caution**

First the source of danger is stated.

**Then possible consequences are pointed out!**

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

## *Information about correcting errors*

Information on how to solve problems that might occur when performing operating steps is given at the end of the relevant instructions.



*In these paragraphs, the problem and the potential cause are described.  
To solve the problem, perform the operating steps specified here.*

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## *General safety information*

### *Laws and 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.

Regulations required by law and the radiation protection regulations must be observed in all countries. Values other than those indicated in this Operator Manual may be programmed where required by local country-specific regulations.

This product is provided with a CE marking in accordance with the provisions of Directive 93/42/EEC of June 14th, 1993 concerning medical devices.

Data related to individual persons are subject to data protection. Ensure compliance with all applicable laws and 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.

### *Scope*

This Operator Manual is valid for the following product:

- ☐ ARCADIS Varic



### **Warning**

Use of unreleased accessories or system modifications and changes can lead to system malfunctions.

**This can result in injury to the patient and/or damage to the equipment!**

- ◆ Only accessories released by Siemens for use with this product may be used.
-

## Software

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



### Caution

Impermissible or faulty manipulations/modifications to the software or to the connection between the ARCADIS Varic system and the power supply can lead to malfunctioning of the system.

#### **Unauthorized access and/or virus attacks possible!**

- ◆ Make sure all necessary precautions are taken (with the existing level of security) when changing a functionality or factory-set configuration.
- ◆ Make sure that the anti-virus protection is up to date (→ Register 10: Maintenance, Page 7).



### Caution

Reduced system performance due to overload of the network environment.

#### **Unexpected system behavior!**

- ◆ Only use the system in a secure and load-adapted network.
-

### *Equipotential bonding*



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.

### *Electromagnetic compatibility*

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

(→ see "Notes regarding electromagnetic compatibility (EMC)" in the Operator Manual)

However, we wish to inform you that other mobile electronic devices such as radio telephones (mobile phones) exceed the radiation limits specified in the EMC standard and can therefore disturb functions of your medical device.

### *Use in connection with 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

### *Maintenance and 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 12 months to maintain the operational safety and reliability of the product.



*Please follow the relevant instructions in the  
(→ Register 10: Maintenance).*



## **Caution**

Mechanical damage and damage to the system electrics due to improper use and excessive load on the system.

### **Injury to operating personnel, patients or third parties and damage to the product!**

- ◆ If necessary, have the system checked more frequently.
- ◆ Ensure that any defects are repaired professionally.

## **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.*

## **Performing maintenance**

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

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

## Malfunctions

In the event of malfunctions of the ARCADIS Varic system, please call SIEMENS Customer Service.

### Error messages at the C-arm system

When a malfunction is detected, the ARCADIS Varic system is disabled. An error message is displayed on the control panel of the C-arm system:



In addition, a malfunction is also displayed on the left monitor.

- ☐ All vital system functions are automatically checked each time the ARCADIS Varic is switched on.
- ☐ During routine operation, the ARCADIS Varic is continuously monitored.
- ☐ Temporary error messages, such as No. 5901, can be canceled by pressing any button on the C-arm system (except vertical up/down movement buttons).
- ☐ Non-temporary error messages, such as No. 5015 or 5016, cannot be canceled. If these errors occur, radiation release is no longer possible. Please notify Customer Service immediately.

Error messages 7309 (tube unit iris diaphragm), 7009 (slot diaphragm) and 7409 (TV camera iris) are temporary error messages that can lead to unnecessary radiation exposure of the user and patient if treatment is continued.

If errors occur repeatedly, switch off the ARCADIS Varic and notify Customer Service. Prior to that, save the log file with the recorded system activities (Menu **Options > Save Log**, → Page 9). 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?

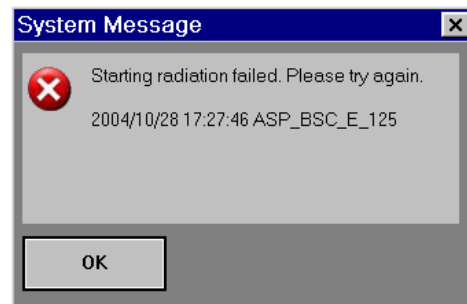


*If there are any malfunctions/failure of the radiation indicators, please contact Siemens Customer Service.*

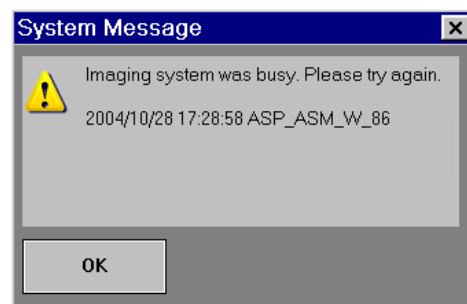
## *System messages on the monitor*

Three different types of system messages can appear on the monitor. The type of message is identified by a corresponding symbol (top left).

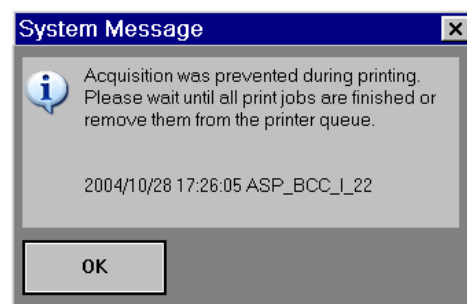
- ❑ Example of an error message:



- ❑ Example of a warning:



- ❑ Example of information:

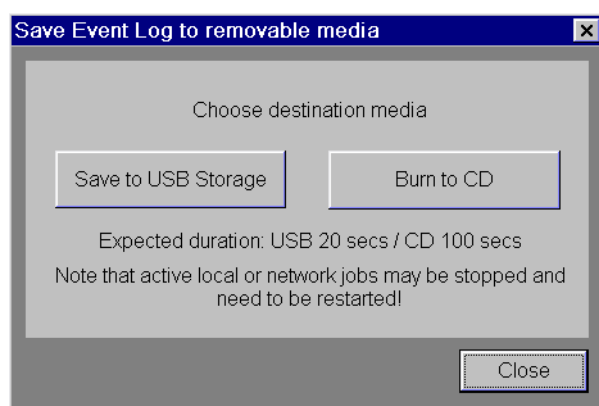


You must confirm error messages with the **OK** button or the radiation release button to be able to resume your work. However, warnings and information do not disable radiation release.

### *Saving the log file*

It is recommended to back up the log file on an external data medium (CD, USB memory medium) when system error messages occur. You can then attach the log file to an e-mail and send it to Siemens Service. Siemens Service can evaluate the recorded system activities and identify the error without the need of a site visit.

- ◆ Insert a CD into the drive of the monitor trolley or connect the USB memory medium.
- ◆ Select **Options > Save Log File** from the main menu.
  - A dialog window is displayed.



Save to USB Storage

- ◆ Click this button.
  - The log file is saved to the USB memory medium as a compressed zip file.

Or

Burn to CD

- ◆ Click this button.
  - The log file is written to the CD as a compressed zip file.

Close

- ◆ Close the dialog box with **Close**.

## *Electrical faults*

In the case of danger for patients and operators (e.g. if there is no live image on the monitor but the radiation indicator is lit) or danger for the product, you must disconnect the power plug immediately. The ARCADIS Varic will be shut down completely and disconnected from the power supply. This will

- ☐ switch off radiation
- ☐ abort the current system program
- ☐ abort and cancel current operating sequences
- ☐ delete all image information not saved to a hard disk



### Caution

Electrical faults

#### **Risk of injury to the patient and operating personnel.**

- ◆ Immediately disconnect the power plug from the socket.
- 

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 Customer Service immediately.

## *System 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.



### Caution

- ☐ System component failure during the cardiovascular examination
- ☐ The footswitch has been removed and radiation release is no longer possible

#### **Risk of injury to the patient!**

- ◆ Ensure a replacement unit is available during the examination procedure.
-



## *Switching to emergency power supply*

In the event of a power interruption of longer than 8 ms, the ARCADIS Varic can switch off. In this case the ARCADIS Varic 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 uninterruptible power supply (UPS).

## *Pulling out the power supply plug*

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

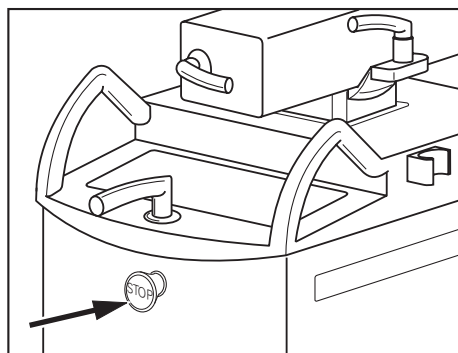
When the power plug is pulled out, switching to the uninterruptible power supply causes an acoustic signal to be emitted. The UPS switches off after 10 min. at the latest.



*As soon as the mains supply is restored, the battery of the UPS is recharged. Please remember that the UPS battery life is limited.*

## *Emergency STOP*

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



- ☐ Motorized vertical movement is then immediately disabled.
- ☐ All other system functions remain unaffected by this.

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

- ☐ The button can be unlocked by gently turning it clockwise.

### *Fire protection*

---



#### **Warning**

In the event of fire

**A fire or smoldering fire can produce toxic gases or fumes!**

- ◆ Immediately switch off the ARCADIS Varic.
  - ◆ Pull the power cable out of the wall outlet.
  - ◆ Inform all personnel of the correct procedures in case of fire as part of occupational safety training.
- 

Please inform our Customer Service prior to starting up the ARCADIS Varic again as it may require refurbishing due to damage caused by fire.

### *Explosion protection*

---



#### **Warning**

Ignitable concentration of anesthetic gases in the examination room.

**Explosion hazard!**

- ◆ The ARCADIS Varic must not be operated in such an environment.
-

### *Overload protection*

Prolonged continuous radiation at maximum tube load is permissible in fluoroscopy mode. However, this can cause the X-ray tube assembly to heat up. For this reason, the X-ray tube assembly has a thermal monitor. If necessary, power is reduced in all operating modes, in SUB/Roadmap with the next new scene/mask.

If the temperature rises to  $\geq 50\text{ }^{\circ}\text{C}$ ,

- ☐ the temperature indicator on the control panel of the C-arm system lights up.
- ☐ the selected characteristic curve is switched to S1 at the end of radiation in fluoro and pulsed fluoro.

If the temperature rises to  $\geq 60\text{ }^{\circ}\text{C}$ ,

- ☐ the selected characteristic curve is switched to S1 during radiation in fluoro and pulsed fluoro.

If the temperature rises to  $\geq 70\text{ }^{\circ}\text{C}$ ,

- ☐ the temperature indicator on the control console of the C-arm system flashes.
- ☐ radiation is aborted and cannot be released again.

If the temperature falls below  $50\text{ }^{\circ}\text{C}$ ,

- ☐ the previously deselected curve is automatically reselected.

## *Personal safety*

### *Open heart and 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 (→ Register 3: System Description, Page 10).

Only then can the patient be connected to the system.

### *Crushing hazards on the C-arm system*

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.



#### **Warning**

Moving and braking the C-arm (see Fig. 1 and 3).

#### **Risk of crushing hands!**

- ◆ Please make sure that your hands are not in the travel path of system parts.
- 



#### **Warning**

Maximum lowering of the C-arm (see Fig. 2).

#### **Risk of crushing feet!**

- ◆ Please watch your feet when the C-arm is being lowered fully, since there may not be sufficient clearance left between the I.I. and the floor.
-



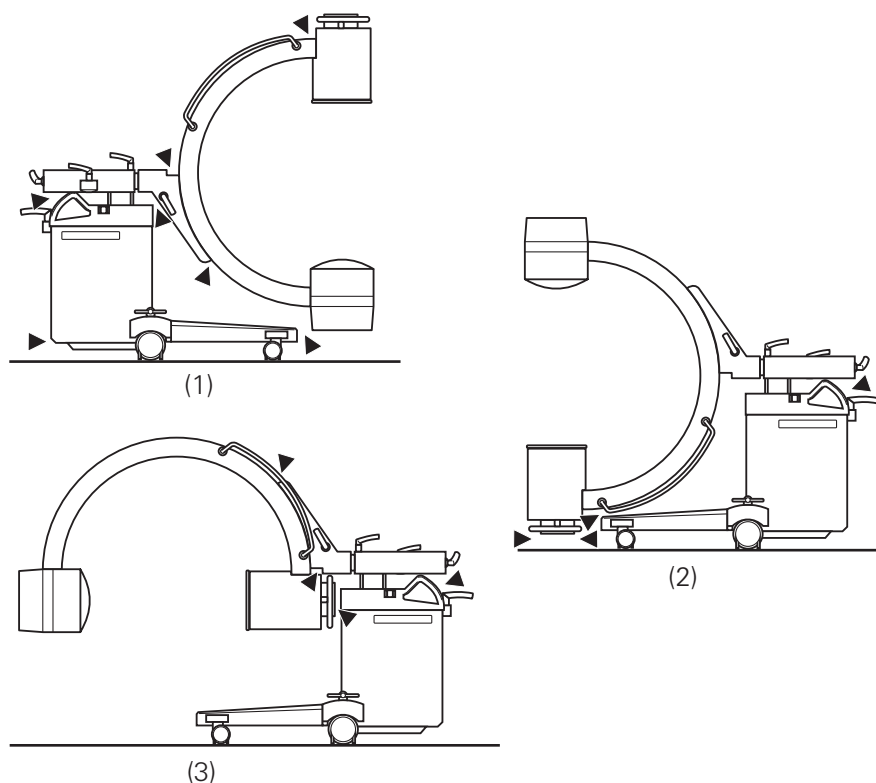
## Warning

Maximum lowering of the C-arm (see Fig. 2).

### **Radiation can be released inadvertently!**

- ◆ Please make sure that the footswitch is not located underneath the C-arm.

The components marked in the illustrations indicate danger points where patients or operating personnel might pinch, crush, or bump themselves.



- (1) Potential danger points when moving and braking the C-arm
- (2) Potential danger points when the C-arm is lowered fully
- (3) Potential danger points when moving and braking the C-arm

### *Crushing hazard on the monitor trolley*

The monitor trolley holds two rotatable monitors. Using the corresponding option, these can be height-adjusted and folded up for transport. As an option, the monitor trolley can also be equipped with a printer, which is placed in the provided bay.

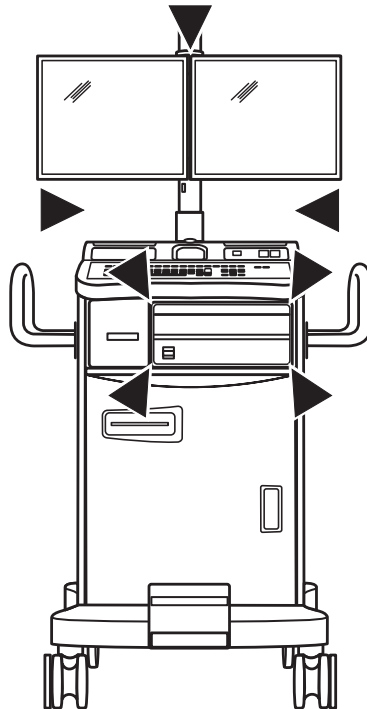


#### Caution

Risk when positioning or folding up monitors, pulling out or pushing in the printer.

#### **Risk of crushing hands!**

- ◆ Carefully watch your hands when carrying out these steps.
- 



### *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.

## Tube housing temperature



### Caution

Tube housing can become warm with continuous use, with a possible maximum temperature of 68°.

**This can burn the skin of the patient or the personnel operating the equipment.**

- ◆ At a temperature of  $\geq 50$  °C the X-ray tube assembly housing must not come into contact with the patient's skin.

## Radiation protection

The automatic dose rate control feature contributes significantly to reducing the radiation exposure of patients and operating personnel.

Nevertheless, 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.
- ☐ Ensure that the patient receives the best possible protection when exposures are taken in the vicinity of the patient's reproductive organs (use gonadal shields or lead-lined rubber covers).

### For the operating personnel

- ☐ When releasing the exposure, the operator must keep a sufficient safety distance from the X-ray tube assembly.
- ☐ Wear protective clothing in the control area during an examination.
- ☐ Wear a radiation monitoring badge or use a pen dosimeter.

### For patients and operating personnel

- ☐ Keep the fluoroscopic time as short as possible.
- ☐ Keep the source-to-skin distance as large as possible.



*Additional objects in the beam path may result in increased scattered radiation. 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.*

### *Deterministic 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, you do not have to take such injuries from radiation into consideration. It is assumed that the maximum fluoroscopic time does not exceed 5 to 15 minutes, depending on the application, and that the point of skin penetration is 30 cm (50 cm maximum) away from the image intensifier input.

The skin penetration dose for various operating modes and under standard operating conditions can be estimated using the "Dosimetric information" table under the "Technical Information" tab.

Example: An accumulated fluoroscopic time of 15 minutes and a skin penetration dose of 20 mGy/min yields a dose of 300 mGy.



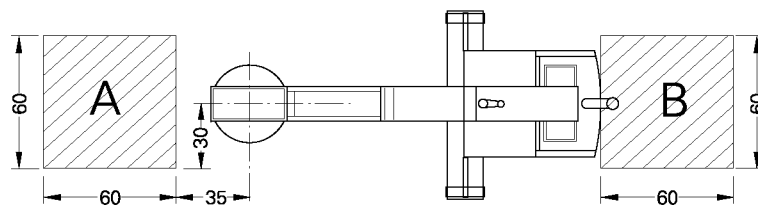
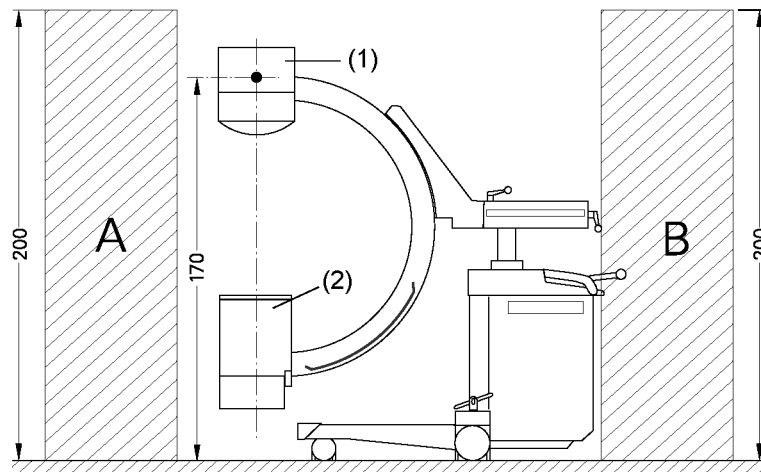
*When changing the distance from the skin penetration point to the focus, please note that the skin dose decreases with the inverse square of the distance to the focus. This means that when the distance to the focus is halved, the skin penetration dose rate quadruples.*



### *Position and extent of the main operating area*

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

Vertical beam path. Focus 170 cm (height above floor)



Main operating area. Dimensions in cm.

(1) Tube

(2) I.I. unit

## Maximum scatter radiation in the operating area

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

Height above the floor [cm]	Measurement A [ $\mu\text{Gy/h}$ ]	Measurement B [ $\mu\text{Gy/h}$ ]	Measurement C [ $\mu\text{Gy/h}$ ]	Measurement D [ $\mu\text{Gy/h}$ ]
10	529	85	37	4
20	616	94	42	4
30	774	129	43	4
40	1051	145	49	5
50	1760	213	75	9
60	2970	342	118	15
70	4342	491	147	20
80	4687	588	201	26
90	6394	845	244	28
100	8370	1245	270	32
110	8960	1367	283	34
120	8586	1353	285	37
130	7938	1254	287	37
140	7150	1057	285	39
150	6232	765	284	37
160	5162	555	283	37
170	3604	397	288	39
180	2657	314	298	40
190	2030	257	298	40
200	1696	220	298	40

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

Measurement A: Operating area A

Continuous fluoroscopy 110 kV, 2.9 mA, C-arm horizontal, downward beam direction without additional Cu filter, with scattered radiation grid

Measurement B: Operating area A

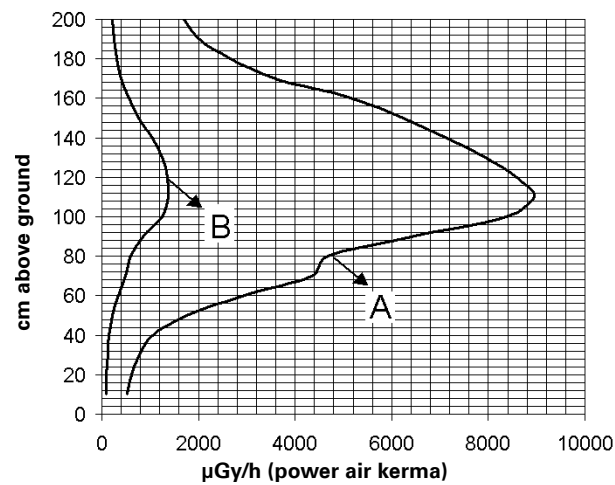
Characteristic HC2 high 68 kV, 1.3 mA, C-arm horizontal, downward beam direction without additional Cu filter, with scattered radiation grid

Measurement C: Operating area B

Continuous fluoroscopy 110 kV, 2.9 mA, C-arm horizontal, downward beam direction without additional Cu filter, with scattered radiation grid

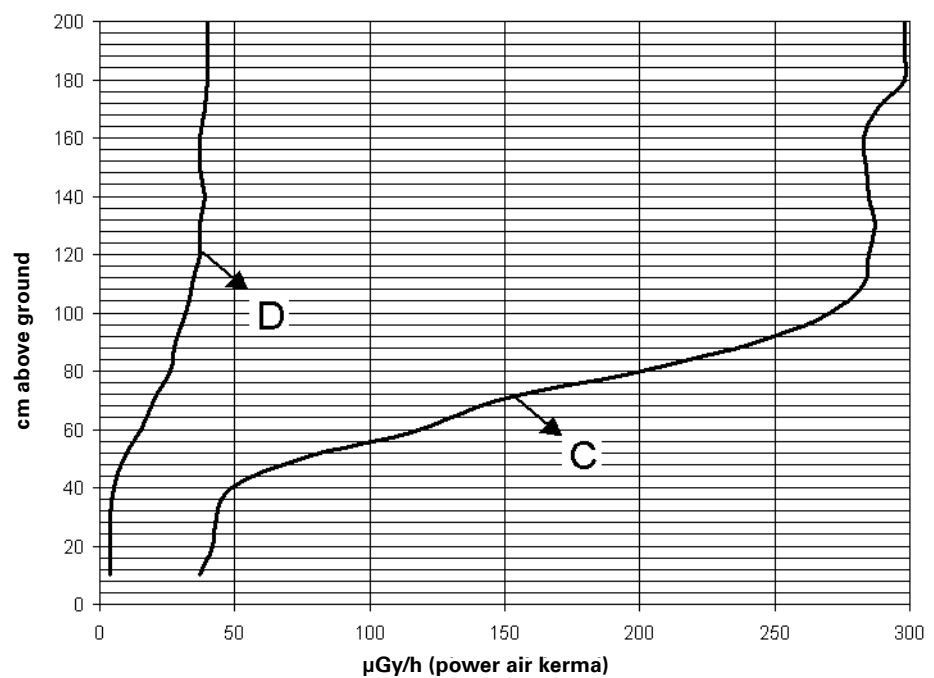
Measurement D: Operating area B

Characteristic HC2 high 68 kV, 1.3 mA, C-arm horizontal, downward beam direction without additional Cu filter, with scattered radiation grid



Measurement A  
Continuous fluoroscopy 110 kV, 3.0 mA

Measurement B  
Characteristic HC2 high, 68 kV, 1.3 mA



Measurement C  
Continuous fluoroscopy 110 kV, 3.0 mA

Measurement D  
Characteristic HC2 high, 68 kV, 1.3 mA

	<b>Height above the floor [cm]</b>	<b>Operating area A/ Measurement B</b>
I.I. 23 cm/9"	110	< 1.4 mGy/h

	<b>Height above the floor [cm]</b>	<b>Operating area B/ Measurement D</b>
I.I. 23 cm/9"	140 to 200	< 41 µGy/h

The values are valid for characteristic HC2 high, 68 kV, 1.3 mA, C-arm horizontal, downward beam direction without additional Cu filter, with scattered radiation grid.

	<b>Height above the floor [cm]</b>	<b>Operating area A/ Measurement A</b>
I.I. 23 cm/9"	110	< 9 µGy/h

	<b>Height above the floor [cm]</b>	<b>Operating area B/ Measurement C</b>
I.I. 23 cm/9"	140 to 200	< 300 µGy/h

The values are valid for continuous fluoroscopy 110 kV, 2.9 mA, C-arm horizontal, downward beam direction without additional Cu filter, with scattered radiation grid.

## *Radiation interruption for all operating modes*

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

## *Equipment safety*

### *Positioning the C-arm*

In case of improper handling of the ARCADIS Varic, the mobility of the C-arm may lead to collisions of the image intensifier and the single tank with the patient and the patient table.

If the unit is positioned in an unfavorable way, there can also be a collision between the image intensifier/single-tank and the unit base. This can cause damage to the respective components.

#### **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.

## *Installation, repair*

Modifications or upgrades to the system must comply with federal or local regulations as well as generally recognized engineering standards.

As the manufacturer, Siemens 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 authorized by Siemens;
- ☐ 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 would 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.

## *Original accessories*

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

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

## *Combinations with other systems*

To ensure the required operational safety, only products and components expressly approved by Siemens AG, Medical Solutions may be used in combination with this product.

For further details regarding the attachment of non-Siemens products to the image intensifier see  
(→ Page 25).



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

## *Attachment of dedicated options*

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

### *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.

### *Tilting resistance; mechanical strength; central ray migration*

To comply with the tilting resistance, mechanical strength and the central ray migration standards (IEC 60601-1, IEC 60601-2-32, UL 60601-1, 4 times load, IEC 60601-1-3), the additional weight attached to the image intensifier must not exceed 4.5 kg (10 lbs).

If these conditions are not fulfilled, the function may be impaired.

### *Attachment*

When a dedicated option is used on the image intensifier, it must be ensured that there is no danger due to insufficient or incorrect attachment of the option.

### *Attenuation equivalent*

According to IEC 60601-1-3, inadequate attenuation of the X-ray beam by materials between the patient and image receptor (here: I.I.) 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 ARCADIS Varic.



*If materials are placed directly in front of the image intensifier, the image quality can be impaired and the applied dose will be increased by the automatic adjustment. Additional objects in the beam path may result in increased scattered radiation.*

### *Weight counterbalance*



*Attachment of any additional loads on the image intensifier or the tube assembly side compromises the counterbalance and can lead to unintentional C-arm movement.*

Users must be alerted to this 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.



## *Image quality*

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

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

## *Electrical safety*

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

## *Electromagnetic compatibility*

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

## *Additional safety information*

- ☐ Risk of injury due to sharp edges must be avoided.
- ☐ 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, e.g. a navigation system, confirm the CE Declaration of Conformity according to Appendix II, MDD and the Declaration of Compatibility according to Article 12, MDD. In countries outside the EU the relevant national regulations must be observed.



*Product liability and warranty are restricted or expire if the above listed conditions and limit values are not complied with when attaching accessories, such as navigation systems.*



*For non-Siemens options, such as navigation systems, we generally accept no liability.*

### *Disposal*

There may be local regulations governing the disposal of your system.

- ❑ 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. To ensure that these legal regulations are complied with and to avoid potential environmental hazards which may be caused by the disposal of your product, we recommend that you consult Siemens Customer Service.
- ❑ Batteries and packaging should be disposed of in an ecologically sound manner, as specified in national regulations.
- ❑ The sterile single-use covers (I.I., 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.

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# System Description

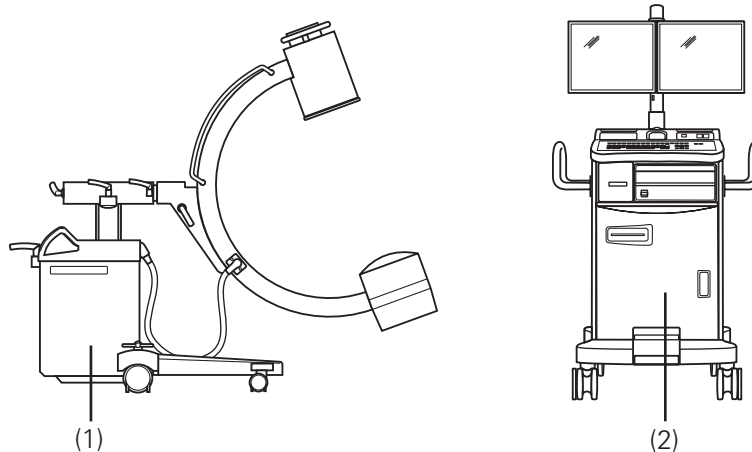


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### *Description of functions*

#### *System overview*

The ARCADIS Varic consists of a C-arm system and a monitor trolley.



- (1) C-arm system with a 23 cm image intensifier and single-focus tube with generator
- (2) Monitor trolley with keyboard, mouse, USB port, two rotatable TFT displays, DVD R/W drive and memory for 60,000 images

#### *Operating modes*

The ARCADIS Varic has the following operating modes:

- ☐ Continuous Fluoroscopy (CFC)
- ☐ Pulsed Fluoroscopy (PFC) with 8 f/s
- ☐ Digital Radiography (DR)

#### *Options*

The following options are available for the ARCADIS Varic:

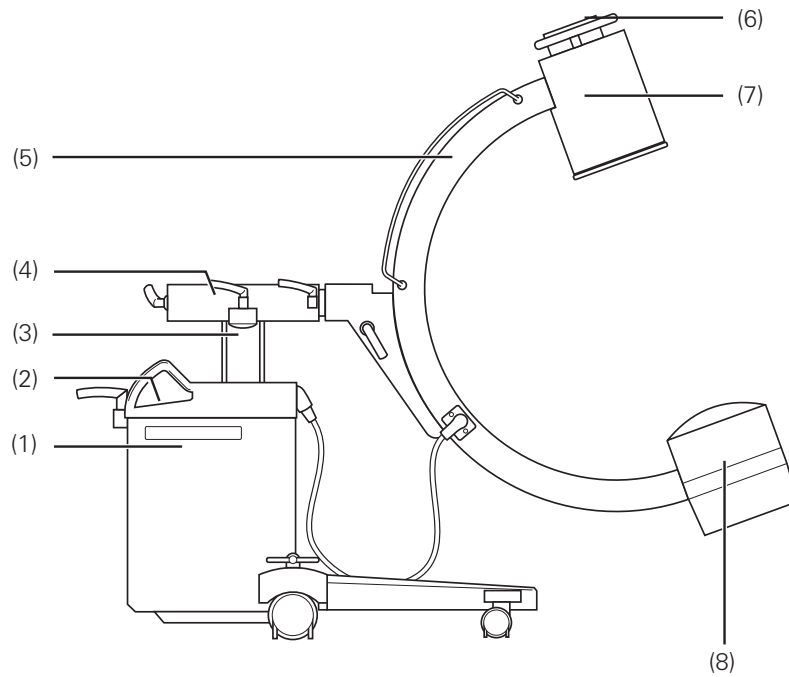
- ☐ Additional operating modes Subtraction and Roadmap
- ☐ Pulsed Fluoroscopy (PFC) 15 f/s
- ☐ Fluoro Loop
- ☐ 2 TFT high-contrast black/white displays (alternative to TFT color displays)
- ☐ Height-adjustable and foldable (park position) monitors

## System Description

- ☐ Video splitter live monitor/reference monitor  
Output for connecting an external live/reference monitor. Implemented as a splitter solution for connection with a 15-pin VGA plug (no galvanic isolation).
- ☐ Audio package
- ☐ Wireless network connection (WLAN)
- ☐ DICOM Standard (Send/Receive, Storage Commitment, Print)
- ☐ DICOM Query/Retrieve (enhancement of DICOM Standard)
- ☐ DICOM Worklist (enhancement of DICOM Standard)
- ☐ DICOM MPPS (enhancement of DICOM Standard)
- ☐ DICOM Advanced (Send/Receive, Storage Commitment, Print, Query/Retrieve, Worklist, MPPS)
- ☐ NaviLink 2D. Integrated digital navigation interface for lossless transfer of 2D image data to a navigation system
- ☐ 2D measuring function (to measure angles and distances)
- ☐ HIPAA (Health Insurance Portability and Accountability Act)
- ☐ Thermal printer SONY UP-970  
Economical, light-weight, compact printer for single-color printing on thermal paper.
- ☐ Thermal printer SONY UP-990  
Economical, light-weight, compact printer for single-color printing on thermal paper and thermal foil.
- ☐ Dose measuring chamber for dose area product/air kerma  
(valid for IEC 60601-1:2005 only)
- ☐ Integrated I.I. laser aimer
- ☐ Single-tank laser targeting device
- ☐ Multifunctional footswitch (with extended functionality)
- ☐ DHHS spacer
- ☐ Grounding cable
- ☐ Sterile covers for the image intensifier, X-ray tube assembly and C-arm
- ☐ Set of clamps
- ☐ Key switch
- ☐ Cassette exposure

## *C-arm system*

### *Components of the C-arm system*

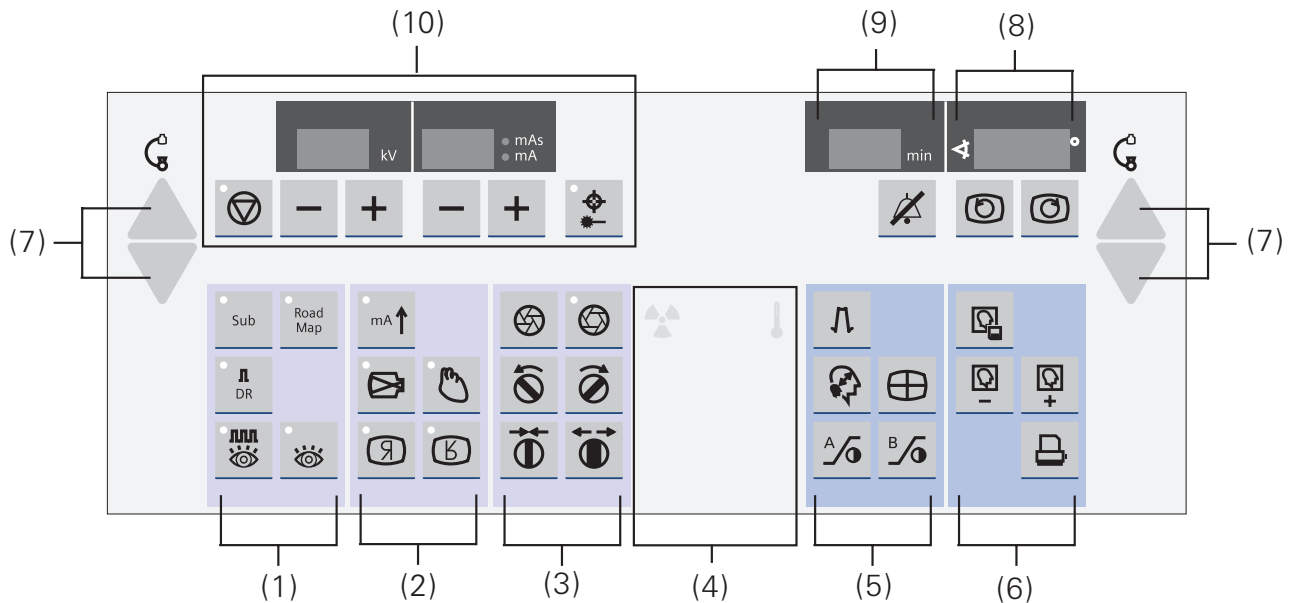


- (1) ARCADIS electronics unit
- (2) Control and display panel
- (3) Lifting column
- (4) Horizontal support arm
- (5) C-arm
- (6) Handle
- (7) Image intensifier with integrated TV camera
- (8) Single tank with X-ray tube unit and integrated collimator

### *Control and display panel on the C-arm system*

On the C-arm system you can find the control and display panel with membrane keys and digital displays for performing your examinations.

The individual keys and displays are grouped by their functions in different areas.

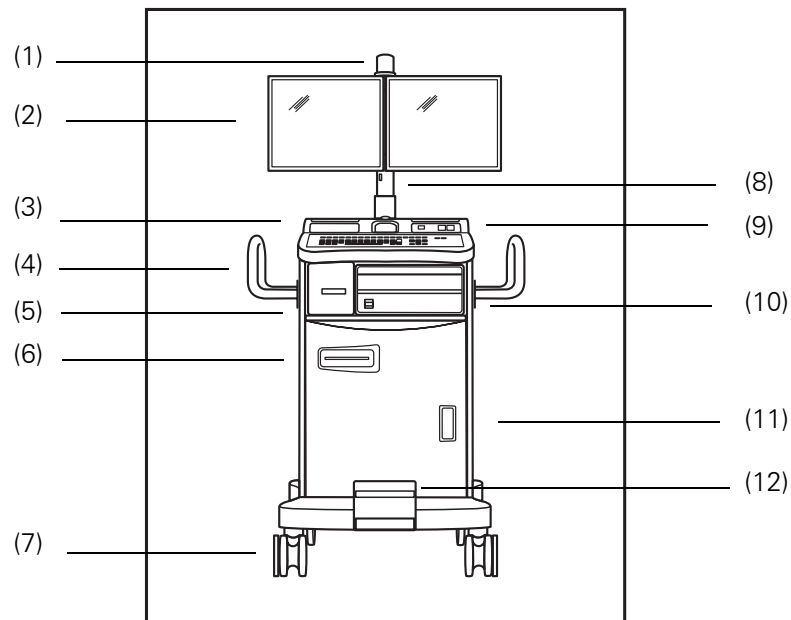


- (1) Operating mode selection
- (2) Selecting image parameters (high-contrast fluoroscopy, image quality, image display)
- (3) Collimator setting
- (4) Radiation indicator, X-ray tube assembly temperature
- (5) Image postprocessing
- (6) Image selection, storing and printing
- (7) Lift/lower C-arm
- (8) Image rotation
- (9) Display exposure time, reset exposure time (confirm warning tone)
- (10) Select and display X-ray parameters, automatic dose rate control off (ADR stop), select laser light localizer, single tank (option)



## Monitor trolley

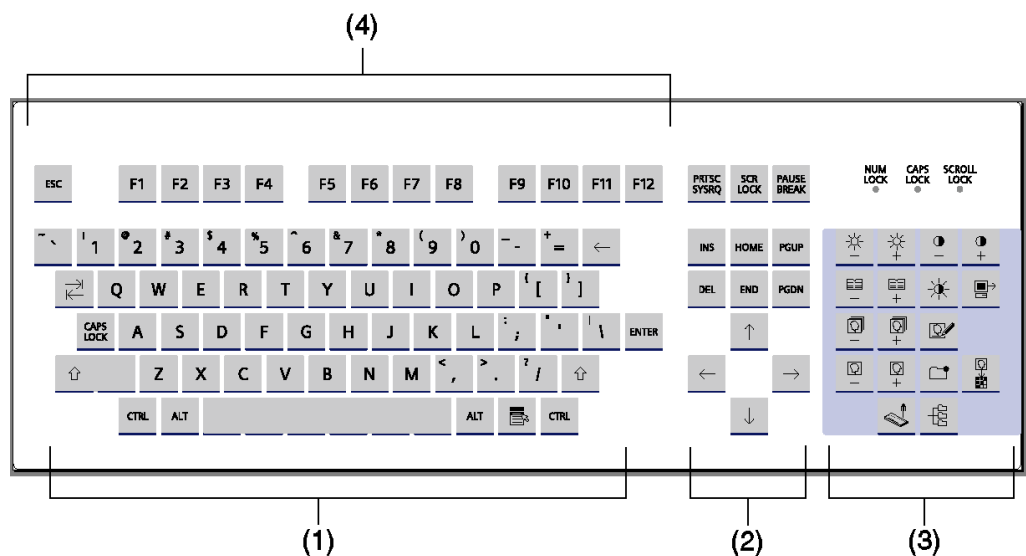
### Components of the monitor trolley



- (1) Radiation indicator
- (2) Monitors rotatable by 180°  
optional: folding monitors
- (3) Control panel with storage drawers, keyboard and mouse
- (4) Grips: for neat cable storage
- (5) Drawer for storage of CDs/DVDs, Quick Guide etc.
- (6) DVD R/W drive
- (7) Wheels with cable deflectors
- (8) Monitor column  
optional: height adjustable
- (9) Storage shelf with USB connection; On/Off switch of ARCADIS Varic  
optional: Connection for MP3 player including loudspeaker on the rear of the monitor trolley
- (10) Printer bay
- (11) Charge state of independent power supply (UPS) (see → Page 8)
- (12) Central locking brake

## Keyboard at the monitor trolley

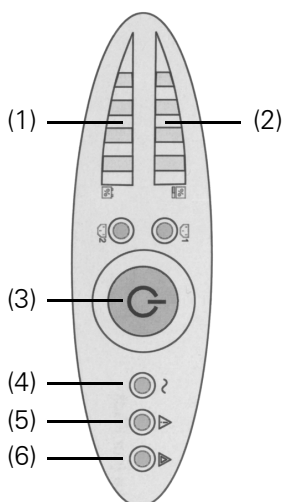
The application software for preparing (e.g. entering patient data) and evaluating examinations is operated via the keyboard at the monitor trolley.



- (1) Alphanumeric keypad
- (2) Cursor keys
- (3) Symbol keypad
- (4) Function keys

## UPS display field

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



- (1) Bar display of battery charge status
- (2) Bar display of utilization ratio
- (3) LED "UPS On" (lit during operation)
- (4) LED "Consumer protected" (lit during mains and battery operation)
- (5) LED "Interference operation" (lit additionally during battery operation)
- (6) LED "Error" (lit in case of errors)



When the "Error" LED is lit, the ARCADIS Varic is no longer protected against power outages by the UPS. Notify Siemens Service.

## Operation

### Startup

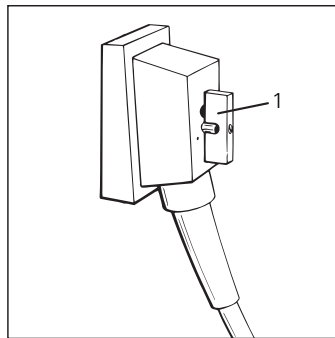
#### Connecting the C-arm system with the monitor trolley

The C-arm system is connected to the monitor trolley with a cable. This cable has plug connectors on both ends and therefore can be replaced directly on site, if necessary.



*Before starting the ARCADIS Varic, please make sure that the cables are straight (without loops).*

*Do not lay connection cables parallel to other cables.*



(1) Lever

- ◆ Plug the central plug into the socket on the left side of the C-arm system.



*If the central plug is marked with a green dot, then the green dot must also be above the connector of the basic unit, so that the C-arm system is correctly connected.*

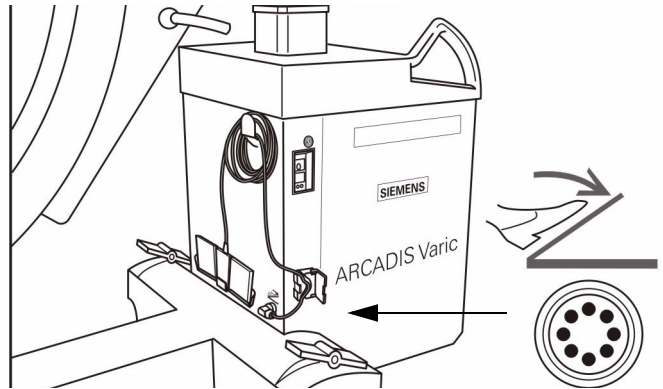


*The monitor trolley may only be connected to the corresponding C-arm system. If the monitor trolley is connected to the wrong C-arm system, an error message is displayed during system startup.*

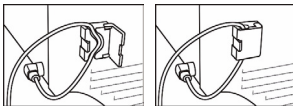
- ◆ Turn the lever to the right until it audibly clicks into place.
  - The monitor trolley is connected to the C-arm system.

### *Connecting the footswitch*

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



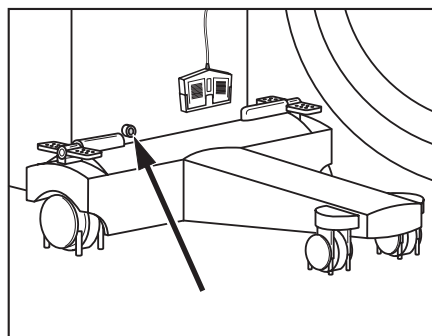
- ◆ Plug the footswitch cable into the socket labeled with the footswitch symbol at the C-arm system.
- ◆ Open the flap for cabling.
- ◆ Place the footswitch cable inside the groove for the cable and close the flap.



### *Establishing the equipotential bonding connection*

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

When performing cardiac examinations or examinations of the open skull, an additional grounding cable according to DIN 57107/VDE107 must be routed in rooms of Application Group 2.



- ◆ Clamp the grounding cable to the front face of the C-arm system (arrow) and to an equipotential bonding point in the patient vicinity.
  - Equipotential bonding is established.

### *ARCADIS Varic Switching on*

The ARCADIS Varic is operated via a grounded wall socket. The mains cable is on the monitor trolley.

- ◆ Plug the power plug into the appropriate socket.
  - Power connection is now established.
- ◆ Position the unit so that it is easy to disconnect from the mains.



#### **Warning**

Contact voltage while using the unit.

#### **Electrical shock to operator and patient**

- ◆ Connect this device only to a power supply network that has been properly grounded.
- 



- ◆ Press the **ON** switch at the monitor trolley.
  - The ARCADIS Varic is switched on.
  - The system automatically runs a self-test.

Depending on which shutdown procedure of the ARCADIS Varic was used beforehand, the system will be ready for operation again in less than a minute (following a simple shutdown) or after 3 min (following a complete shutdown) (→ Page 34).



*If the HIPAA Security Package is activated, it can take approx. 90-100 s for the ARCADIS Varic to be operational again after a simple shutdown.*



*If the ARCADIS Varic is restarted after a simple shutdown and immediately afterwards large image data amounts (500 MB and more; approx. 250 single images) are loaded, an error message may be displayed.*

- ◆ In this case, confirm the error message and repeat loading the data.

The following functions are set when the ARCADIS Varic is started:

- ❑ Operating mode: The basic setting configured for the body region "All"  
(→ Register 8: Configuration, Page 5).
- ❑ Iris diaphragm in full format (edges visible).
- ❑ Semi-transparent slot diaphragm in full format.



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

## *C-arm movements*

The C-arm can be adjusted in height by motor control.

The horizontal movement, swivel movement, angulation and orbital movement of the C-arm are performed manually. For this, you use the C-arm handle, the I.I. handle or the handle on the single tank.

### **Operating the brakes**

The levers for releasing and locking the brakes for different directions of movement are marked with different colors. A graduation in the same colors for the corresponding directions of movement is located on the housing.

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



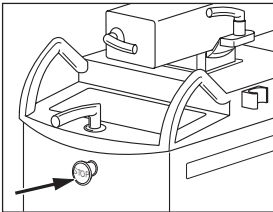
- ◆ Release the brake.
  - You can move the C-arm.

Or



- ◆ Engage the brake.
  - You can no longer move the C-arm.

### **Emergency STOP**



The electronics unit of the C-arm system is provided with a red EMERGENCY STOP button which you can use to stop motorized lifting movements immediately in a hazardous situation.



### **Warning**

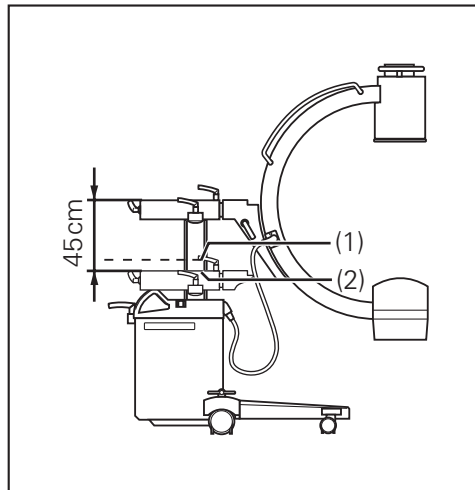
Motorized vertical movement of the C-arm.

#### **Risk of crushing!**

- ◆ In the case of danger, immediately press the EMERGENCY STOP button.
- ◆ Unlock the EMERGENCY STOP by turning it clockwise only after the hazardous situation has been resolved.

### *Lifting and lowering the C-arm*

You can lift and lower the C-arm by motor control using the arrow keys on the control panel of the C-arm system. The lifting column can be lowered to position 1 and further down to position 2.



(1) C-arm in position 1

(2) C-arm in position 2

#### **Lifting the C-arm**



- ◆ Press the Up key on the control panel of the C-arm system.
  - The lifting column moves upwards.

#### **Lowering the C-arm**



- ◆ Press the Down key on the control panel of the C-arm system.
  - The lifting column then moves to position 1 and automatically stops there. A signal sounds.
- ◆ Press the Down key on the control panel of the C-arm system once more.
  - The lifting column is lowered further.



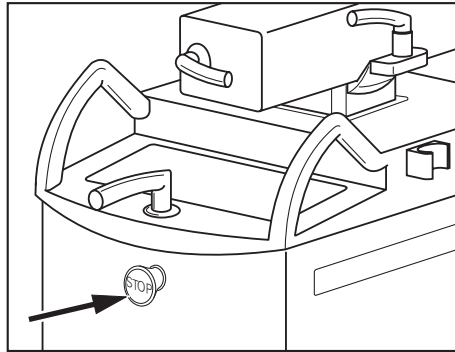
*The lifting column can be lowered to position 2. For safety reasons a signal sounds each time the Down key is pressed.*





*The lifting column cannot be moved.*

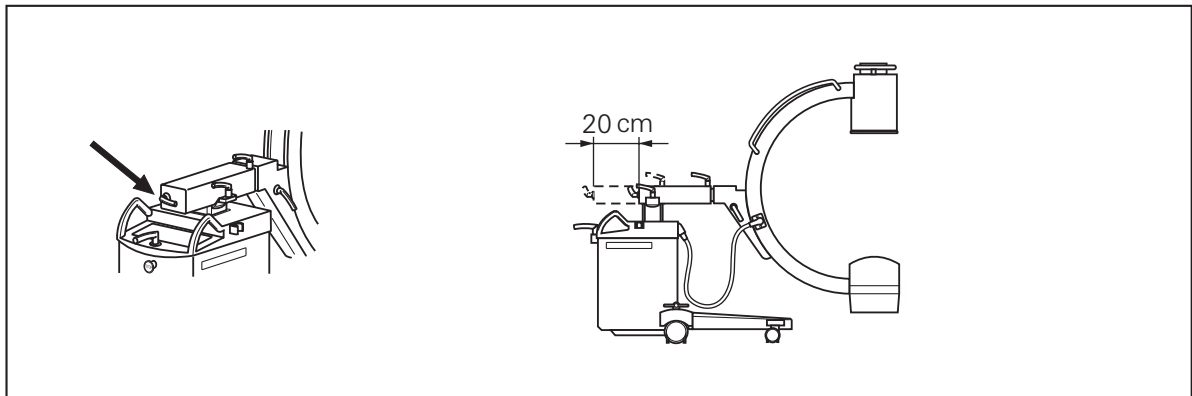
*The EMERGENCY STOP button is pressed and must be unlocked.*



- ◆ Turn the rotary knob clockwise.
- ◆ If the lifting column can still no longer be moved in any direction, then please contact Customer Service.

### *Moving the C-arm horizontally*

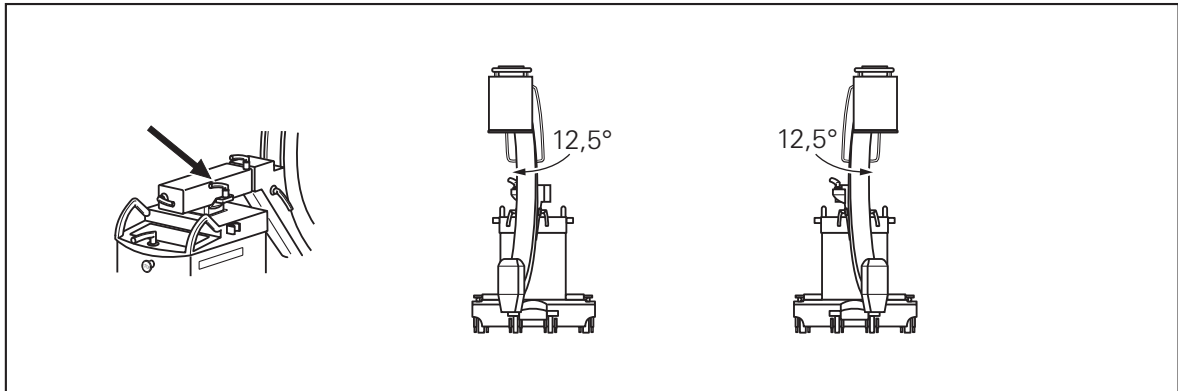
You can move the support arm horizontally by up to 20 cm.



- ◆ Release the brake marked in green (arrow).
- ◆ Move the support arm to the desired position while observing the green scale.
- ◆ Lock the brake again.

### *Swiveling the C-arm*

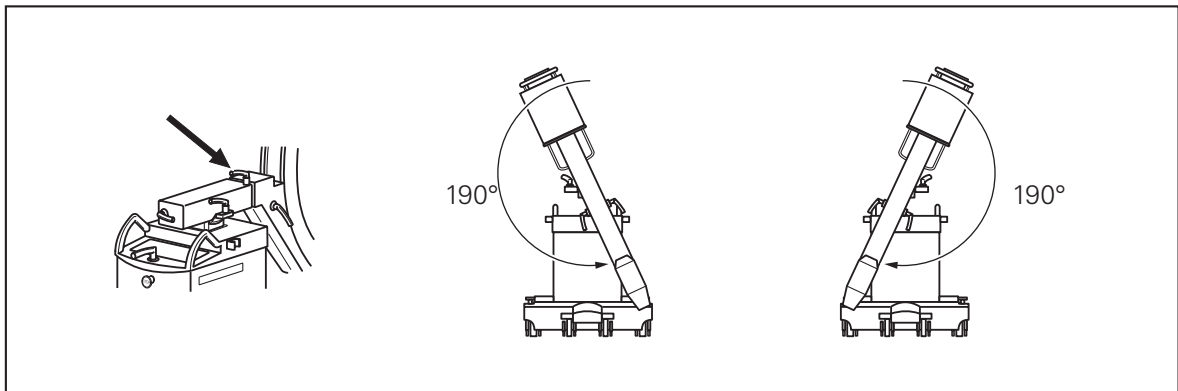
You can move the C-arm horizontally  $\pm 12.5^\circ$  about the lifting column.



- ◆ Release the brake marked in orange (arrow).
- ◆ Swivel the C-arm to the required position.
- ◆ Lock the brake again.

### *Angulating the C-arm*

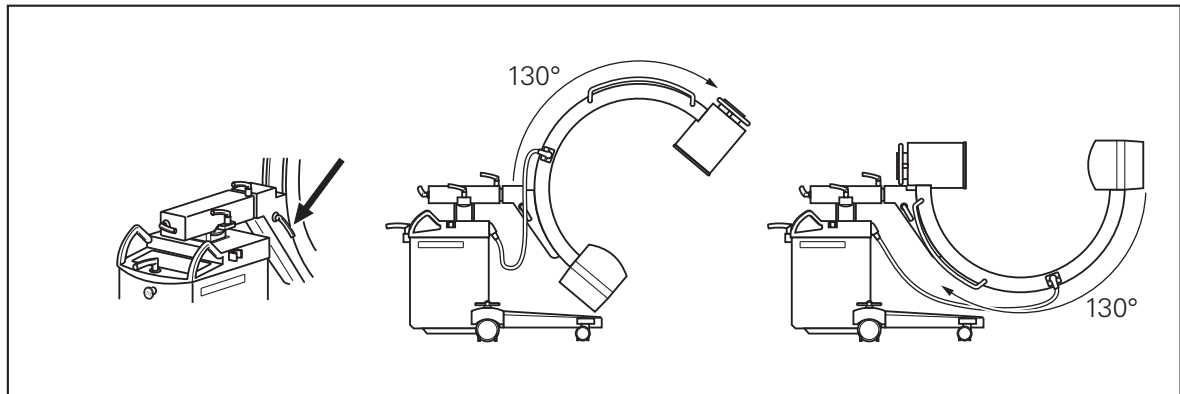
You can rotate the C-arm vertically about the horizontal support arm by  $\pm 190^\circ$ .



- ◆ Release the brake marked in yellow (arrow).
- ◆ Rotate the C-arm to the required angulated position while observing the yellow scale on the support arm joint.
- ◆ Lock the brake again.

### *Moving the C-arm orbitally*

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



- ◆ Release the brake marked in blue (arrow).
- ◆ Swivel the C-arm to the required orbital position while observing the blue scale.
- ◆ Lock the brake again.

### *Preparing exposure*

#### *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 (→ Register 11: Options, Page 13).

#### *Positioning the C-arm*

- ◆ Align the ARCADIS Varic.
- ◆ Release the brakes and set the C-arm to the required position.  
(→ Page 13)



#### **Warning**

As long as the brakes are not locked after movement, the C-arm system moves freely.

#### **Risk of injury to the patient and personnel!**

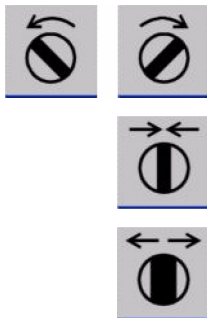
- ◆ Engage the brake.
-

## Setting the semi-transparent slot diaphragm

The semi-transparent slot diaphragm is used primarily for collimation when imaging the extremities.

Collimation enhances image contrast and reduces scattered radiation. Direct radiation that passes the soft tissue laterally is reduced to such an extent that there are no disturbing differences in brightness when images are viewed on the monitor.

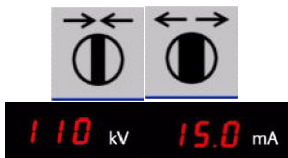
By rotating the slot diaphragm, the collimated field can be quickly oriented to the direction of the anatomy under examination (e.g. the extremities).



- ◆ Press one of the keys.
  - The semi-transparent slot diaphragms are rotated to the left/right.
- ◆ Press this key.
  - The semi-transparent slot diaphragm is closed.
- ◆ Press this key.
  - The semi-transparent slot diaphragm is opened.

## Manual slot diaphragm calibration

If it is determined during an intervention that the accuracy of the slot diaphragm has deteriorated too much, a recalibration of the slot diaphragm can be performed by pressing the buttons **OPEN** and **CLOSE** simultaneously and holding them approx. 3 sec. This process lasts about 20 sec. During this time the **kV** and **mA** indicators will flash. It is not possible to release radiation in this case.



### *Setting the iris diaphragm*

The iris diaphragm is a collimator which serves to reduce radiation exposure to the patient and third parties. Smaller collimation produces less scatter radiation and therefore better image contrast. When the iris diaphragm is fully opened, it must be visible in at least 2 places in the fluoro image.



*The X iris leaves are set such that at least two leaves are visible.*

When switching on the ARCADIS Varic, the iris diaphragm automatically opens to the full format.



- ◆ Press this key.
  - The iris diaphragm is closed.



- ◆ Press this key.
  - The iris diaphragm is opened.
  - The LED lights up.



*When you open/close the iris diaphragm or move the semi-transparent slot diaphragm without radiation, you can see the position of the collimator on the LIH image displayed with a superimposed line/circle.*

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

### *Selecting the noise reduction factor*



- ◆ Press this key.
  - A low integration factor is selected (for recording fast-moving objects). When a low integration factor is selected, the LED lights up.
  - If the key is pressed again, the LED goes out. A higher integration factor is selected (for very slow movements).

### *Selecting the image intensifier format*

You can select a zoom format.



- ◆ Press this key.
  - The LED lights up when this function is selected.

### *Setting image reversal*



- ◆ Press this key.
  - The image is flipped vertically.
  - The LED lights up when this function is selected.



- ◆ Press this key.
  - The image is flipped horizontally.
  - The LED lights up when this function is selected.



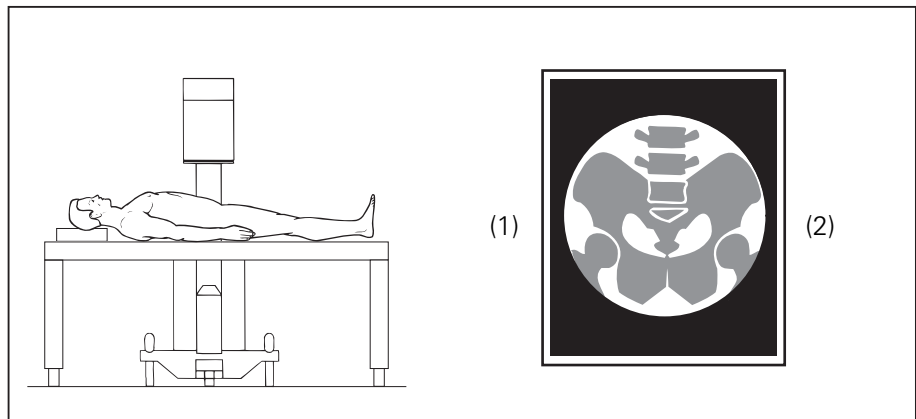
*The image reversal is effective only on the left (live) monitor.*

### *Positioning an image for fluoroscopy*

To have the image appear on the monitor in the desired orientation during fluoroscopy, you must rotate it.

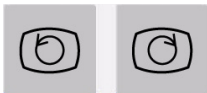


*Object display on the monitor depends upon the C-arm system position relative to the patient.*



(1) right side of patient

(2) left side of patient



The rotation angle is displayed on the C-arm system ( $\pm 360^\circ$ ). The rotation angle is displayed absolute (proportional to the original position) as well as relative (proportional to the previous image).

- ◆ Press one of the keys.
  - The image is rotated in the respective direction.



## Selecting the operating mode

You can select the following operating modes for the ARCADIS Varic:

### Fluoroscopy

For fluoroscopy (CFC) you can choose between several exam sets with different characteristic curves to determine exposure parameters for fluoroscopy. Every application allows to choose between different optimized programs. The standard setting of the ARCADIS Varic after startup is the basic setting configured for the body region "All", which is typically *Continuous fluoroscopy* (→ Register 8: Configuration, Page 5).

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

- ❑ 1 K<sup>2</sup> matrix; 30 f/s frame rate; 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 selected between K = 1 ("OFF" setting) and K = 32 and can be assigned to an exam set and stored.

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 continuous fluoroscopy, the fracture elements are reduced by extension, fixed temporarily in the best possible position and then fixed permanently by applying a plaster cast.

### Pulsed fluoroscopy

This operating mode (frame rates up to 15 f/s) allows a reduction in the radiation dose of up to 70% for the patient and operator. The pulse duration is generally 7 milliseconds. According to the level of noise reduction, many different fluoroscopic images can be integrated. For frame rates less than or equaling 2 frames per second, a type of intermittent continuous fluoroscopy is used where the pulse duration varies depending on the noise reduction set.

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

- ❑ 1 K<sup>2</sup> matrix; typical frame rate 4-15 f/s; 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 selected between K = 1 ("OFF" setting) and K = 8 and can be assigned to an exam set and stored.

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 continuous fluoroscopy, the fracture elements are reduced by extension, fixed temporarily in the best possible position and then fixed permanently by applying a plaster cast, with the additional advantage of dose savings for the patient and medical staff.

### **Digital Radiography**

Digital Radiography (DR) provides an electronic instant image of the patient on the monitor. DR is recommended for final exposures. The exposure time depends on the noise reduction set.

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

- ❑ 1 K<sup>2</sup> matrix; 1 f/s frame rate, with image integration, depending on the setting; X-ray pulse with 7 ms up to approx. 1400 ms width, depending on the noise reduction set.

Typical clinical procedure:

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

### **Subtraction/ Roadmap (option)**

The subtraction memory option allows you to perform a 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 interventional procedures.

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

- ❑ 1 K<sup>2</sup> matrix; continuous fluoroscopy; storage rate usually 3 to 8 f/s; image integration (as a function of the K factor set), i.e. number of K exposures are integrated into one image; the K factor can be set between K = 1 and K = 32 by an authorized technician.

Typical clinical procedure:

- ❑ Display of an arterial vessel for localizing vascular stenoses with injection of a contrast medium to enable the contrast-enhanced display of the vascular filling (subtraction of the native image (mask) from the contrast-enhanced image).
- ❑ Alternative to native image display, subsequent inversion of the displayed image allows you to display a catheter introduced into the vessel path using the Roadmap function.



*For information on performing an examination with Subtraction or Roadmap refer to (→ Register 5: Examination, Page 21).*

### Selecting an operating mode

The operating modes can be selected directly at the control panel of the C-arm system or in the **Examination** task card.

The operating modes can also be selected via the corresponding button on the optional multifunctional footswitch, if used. The switch from one mode to another is confirmed with a confirmation tone. You can then release radiation again right away.

(→ Register 11: Options, Page 8)



*When an operating mode is selected, the LED of the corresponding key lights up on the control panel. On the imaging system the operating mode is indicated by a symbol or text display. The current operating mode is deselected when switching to another mode.*



*By repeatedly pressing an operating mode key that is already activated, you can scroll through the exam sets assigned to the corresponding operating mode. This is only possible if a patient has already been registered.*

## Continuous Fluoroscopy (CFC)



- ◆ Press this key.
  - Fluoroscopy mode is selected.
  - The LED lights up.



*Upon startup of the ARCADIS Varic, the basic setting configured for the body region "All", which is usually **Fluoroscopy**, is used as the automatic default (→ Register 8: Configuration, Page 5).*

## Pulsed Fluoroscopy (PFC)



- ◆ Press this key.
  - Pulsed Fluoroscopy mode is selected.
  - The LED lights up.

## Digital Radiography (DR)



Digital Radiography (DR) provides an electronic instant image with best image quality. DR is recommended for final exposures.

On activation of digital radiography a short radiation pulse is released.

- ◆ Press this key.
  - Digital Radiography mode is selected.
  - The LED lights up.



*In order to ensure sufficient image quality, images are completely acquired after the start of acquisition, even if no more radiation is released. The effective acquisition time depends on the preset integration factor and is a maximum of 1.8 seconds.*

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

### High-contrast fluoroscopy (Power Mode)



*"High contrast" is not possible in the DR, SUB and Roadmap modes.*

- ◆ Press the key (in CFC or PFC mode).
  - *High contrast* is selected.
  - The LED lights up.
- ◆ Press this key again to switch "high contrast" off.
  - *High contrast* is deselected.

The maximum radiation time for "high contrast" is 15 s (CFC and PFC). During the exposure an acoustic warning signal is emitted. At the end of the maximum radiation time, radiation is automatically switched off.



*If the X-ray tube overheats, high-contrast fluoroscopy cannot be selected; the overload protection will switch over the characteristic curve.*

*(→ Register 2: Safety, Page 13)*

*If you select a different operating mode or change the exam set, the selection of SIREMATIC curves will change. This depends on the setting of exam sets.*

## Subtraction (SUB)

The subtraction technique enables an isolated display of the vascular system after injection of the contrast medium by means of background subtraction.  
(→ Register 5: Examination, Page 21)



- ◆ Press this key.
  - The *Subtraction* mode is selected.
  - The LED lights up.

## Roadmap

The Roadmap technique enables the user to position a catheter precisely in a blood vessel under fluoroscopy.  
(→ Register 5: Examination, Page 23)



- ◆ Press this key.
  - The *Roadmap* mode is selected.
  - The LED lights up.

## Display of pulse frequency

Sometimes the displayed pulse frequency does not correspond to the pulse frequency defined in the examination program. However, a highly improbable combination of settings must have been selected:

- ☐ Create user-specific exam set for body region "All" with bones displayed white, high dose and PFC 10 p/s.
- ☐ Now, PFC mode and the exam set stated above will be saved in the basic settings for the "All" body region.
- ☐ If the system is switched off and back on, and a patient is newly registered, now 8 p/s will be displayed in "Basic" mode instead of 10 p/s (CFC).

If you now switch to "Extended" mode and register a new patient, 10 p/s will be correctly displayed. If you then switch back to "Basic" mode, and register a new patient, 10 p/s is also correctly displayed here.

## Setting the X-ray parameters manually

The default X-ray parameters can be changed manually with the +/- keys for kV/mA.

### Automatic dose rate control

Using automatic dose rate control (ADR), the mean value of the image gray values is kept constant within the dominant largely independently of the object transparency and position. This ensures optimal image quality for on-screen evaluation.

(→ Register 9: Technical Data, Page 4)

Three factory default settings for the dose rate are set: reduced dose, standard dose, increased dose (for 23 cm/9" I.I. (0.11/0.185/0.37 µGy/s).

### Activating ADR stop

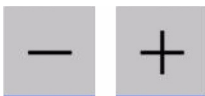
When metallic objects (e.g. intermedullary nails) are introduced into the beam path or when examining objects of varying density (e.g. hip prosthesis) under fluoroscopy, it is recommended that you set the kV just established with the

**Dose Rate Control Stop** key at the start of fluoroscopy.



- ◆ Press this key.
  - The stop function is switched on, the LED lights up.
  - Automatic dose control is disabled.
  - The +/- keys for kV/mA are enabled.

### Setting the X-ray parameters manually



You can set the kV/mA values manually by activating the **Dose Rate Control Stop** key.

- ◆ Press the +/- keys briefly.
  - The kV/mA values are increased/reduced.
  - The set values are displayed.

or

- ◆ Keep the +/- keys pressed for a period of time.
  - This results in a continuous increase/decrease of the particular X-ray parameters.

Once the upper or lower limit of the setting range is reached, an acoustic signal is emitted every time you press the key again.



*The mA values assigned to the kV values result from the SIREMATIC curves.*

*(→ Register 9: Technical Data, Page 3)*

*On reaching the end of the curve, the iris diaphragm is opened. The LED flashes. If the iris diaphragm is opened to maximum, an acoustic signal sounds.*

### *Radiation release*

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

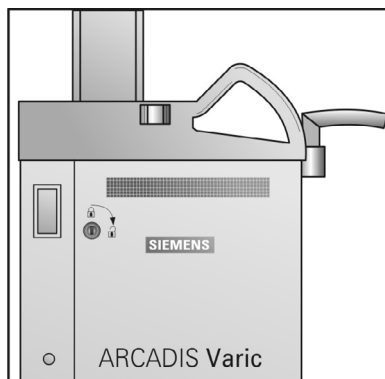
Complete image integration as a function of the set k factor (up to max.  $k = 8$ , depending on the operating mode) is ensured even for very short exposures ("toe tapping").



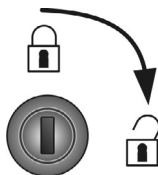
*k factor: a number of k exposures are integrated into one image; the k factor can be selected between  $k = 2$  and  $k = 32$  and can be assigned to an exam set and stored (IEC 60601-2-7:1998 29.1.103 d).*

### *Key switch*

To ensure that radiation is released by authorized personnel only, the C-arm includes a key switch.



The key switch is located on the left side of the C-arm (viewed from the direction of travel).



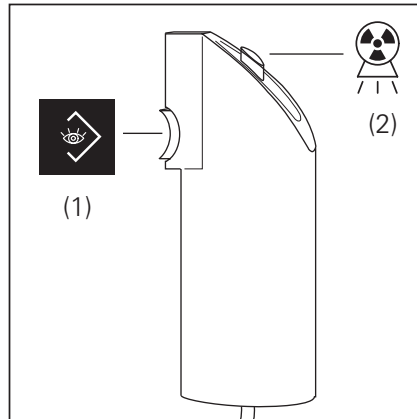
- ◆ Prior to releasing radiation, turn the key switch to the right until it is horizontal.
  - Radiation now can be released either with the hand switch or the foot-switch.
- ◆ Return the key switch back to its original position.
  - Radiation can no longer be released with either the hand switch or foot-switch.
  - The key can now be removed.



## *Radiation release with the hand switch*

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

The hand switch can be connected on either side of the C-arm system.



(1) Key for saving images (hold down key for < 2 seconds) and scenes (hold down key for > 2 seconds)

(2) Release button

### **Releasing radiation**



- ◆ Use the button to release the exposure.
  - Radiation is released in the selected operating mode.
  - The current radiation parameters are displayed on the control panel of the C-arm system.



*During or at the end of the exposure, an acoustic warning signal sounds (can be configured).*

## Confirming a warning signal

After 5 minutes of fluoroscopy time, a warning signal sounds. This can be reset at the control panel. If no reset is performed, radiation is automatically disabled after another 5 minutes (total of 10 minutes after the last reset).



*These settings are country-specific and can be changed by Siemens Service in accordance with the applicable regulations.*



- ◆ Press the **Reset key** on the control panel of the C-arm system.
  - The acoustic warning signal is deactivated.

## Storing images (during radiation)



- ◆ Press this button on the hand switch during radiation.
  - The image currently generated and displayed is saved.  
(→ Register 5: Examination, Page 17)

## Storing images (after radiation)



- ◆ Press this button 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 ARCADIS Varic transfers images from monitor A to monitor B and then stores them in the local database.*

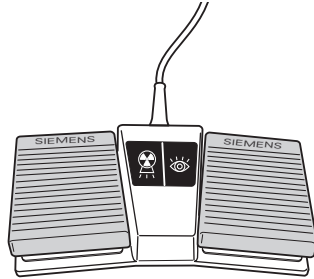


*Images/scenes can also be stored via the corresponding button on the optional multifunctional footswitch, if used.*

*(→ Register 11: Options, Page 8)*

### *Radiation release with the footswitch*

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



Standard footswitch



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



*For operation of the multifunctional footswitch (option) see  
(→ Register 11: Options, Page 8).*



### **Warning**

When the C-arm is rotated by 180° and fully lowered, the I.I. and the footswitch may come into contact.

#### **Unintentional release of radiation!**

- ◆ Please make sure that the footswitch is not located underneath the I.I.

### **Releasing radiation**

The right footswitch is always used to activate fluoroscopy (CFC) (standard setting).

The left footswitch is used to activate the currently selected operating mode.

*Exception:* If fluoroscopy (CFC) is selected, the left pedal is assigned the digital radiography (DR) mode.



*The functionality of the two pedals can be reversed by Siemens Service upon request.*

- ◆ Keep the foot pedal pressed during radiation release.

### Shutdown

Before disconnecting the ARCADIS Varic from the mains, you must shut it down.

During the shutdown procedure the imaging system is powered down. There are two different procedures, each with a different reset time.

The shutdown procedure used depends on how you switch off the ARCADIS Varic:

#### Simple shutdown



- ◆ Press the **OFF** switch on the monitor trolley.
  - The C-arm system is immediately switched off.
  - The imaging system and monitor A switch off after the system has been shut down.

The image system is shut down to "hibernate" before it is switched off by using the **OFF** button. When the ARCADIS Varic is switched on again, it will normally be ready for operation after approx. one minute.



*Depending on the configuration, it may take longer than one minute for the ARCADIS Varic to be ready for operation again.*

It is possible to switch on again in approx. 5 seconds after you used the switch off button (even during shut down).

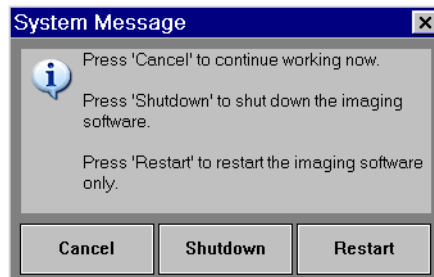
Switching off (simple shut down) can be used up to 15 times in a row. After the tenth shut off using the OFF button, a dialog opens in which you can select simple or complete shut down. After the 15th switch off using the OFF button, a complete shut down automatically occurs with appropriate notification.



*If you want to ensure a very short power-up time of your ARCADIS Varic system, we recommend that you initiate a complete shutdown yourself before the maximum number of 15 simple shutdown procedures is reached. You can do this during a break between examinations, for example, and then switch the ARCADIS Varic on again in time before the next examination.*

## *Switching the system off: complete shut down in the main menu*

- ◆ Select **Options > End Software Session** in the main menu at the monitor trolley.
  - The **System Message** dialog box is displayed.



- ◆ Click **Shutdown**.
  - The imaging system is completely shut down.



- ◆ Press the **OFF** switch on the monitor trolley.
  - The C-arm system, the imaging system and the monitors are switched off.

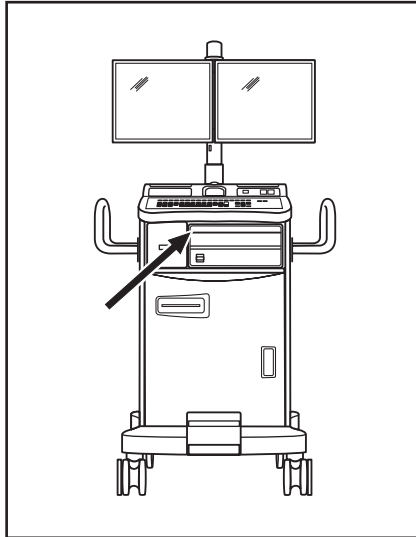
Using the **End Software Session** menu command (or automatically upon 16th switch off using the OFF button), the imaging system is completely shut down before it switches off. When the ARCADIS Varic is switched on again after a complete shutdown, it may take more than 3 minutes, depending on the configuration and previous use, for it to reach operational readiness.



*The **Restart** button in the **System Message** dialog box only shuts down the syn-go user interface and the application programs and then restarts them. This can be used, for example, when installing a virus protection update (→ Register 10: Maintenance, Page 10).*

### *Reactivating the system*

If the imaging system cannot be shut down properly after pressing the **OFF** button and does not react any more, you must deactivate the ARCADIS Varic system as follows:



- ◆ Open the monitor trolley drawer partway and press the **Reset** button on the bottom of the key panel.
  - All running processes are aborted and the ARCADIS Varic is shut down.
- ◆ Switch the ARCADIS Varic on again and let it boot up completely.
  - Now you can either continue using the ARCADIS Varic or shut it down.



*If the ARCADIS Varic is not fully operational despite the reset, please notify Customer Service.*

### *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 foot brake.



#### Caution

In general, care should be taken when transporting the C-arm system and the monitor trolley.

#### **Risk of injury to persons and risk of material damage!**

- ◆ Always be sure to move the equipment slowly and carefully.



#### Caution

When transporting the C-arm system and the monitor trolley in the transport position, the floor inclination must not exceed  $\pm 10^\circ$ .

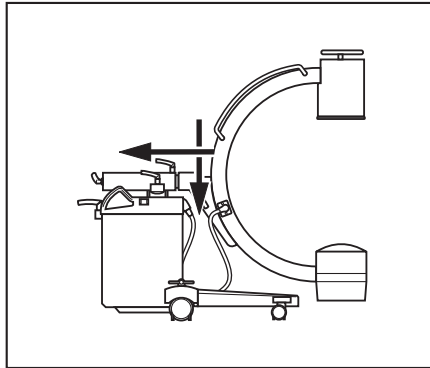
#### **The C-arm system can tip over!**

- ◆ Avoid an inclination angle of more than  $\pm 10^\circ$ .
-

### *Transport and parking position of the C-arm system*

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

#### **Preparing the C-arm**



- ◆ Release all brakes of the C-arm.
- ◆ Set the C-arm to the transport position shown in the drawing.
  - Angulation 0°/Orbital position 0°.
- ◆ Lower the lifting column down to position 2.  
(→ Page 14)
- ◆ Move the horizontal carriage all the way back.
- ◆ Lock all brakes on the C-arm.

#### **Disconnect the power plug**

- ◆ Switch off the ARCADIS Varic and wait for it to shut down.
- ◆ Pull the power plug out of the wall outlet.



*Pull on the plug, not on the cable!*

*The ARCADIS Varic can be switched on again after approx. 5 s.*

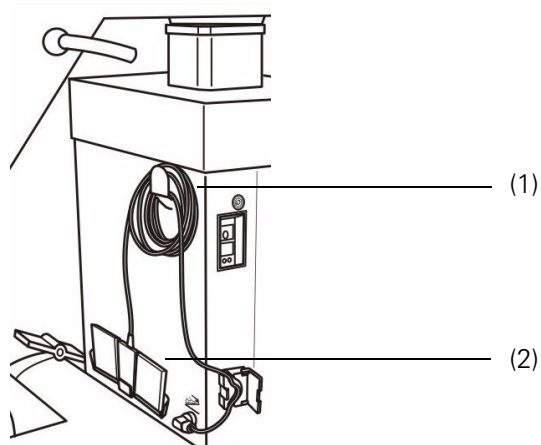
*Please note that after finishing an examination, the ARCADIS Varic must be shut down properly before it is disconnected from the power supply.*



### Unplugging the central plug

- ◆ Turn the lever counterclockwise for unlocking and remove the plug.
  - The central plug is disconnected from the monitor trolley.
- ◆ If attached, disconnect the grounding cable from the C-arm system.

### Rolling up the footswitch cable



(1) Rolling up the footswitch cable

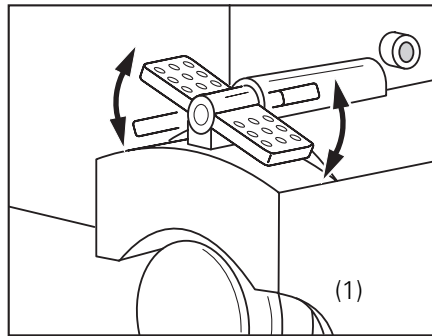
(2) Footswitch holder

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

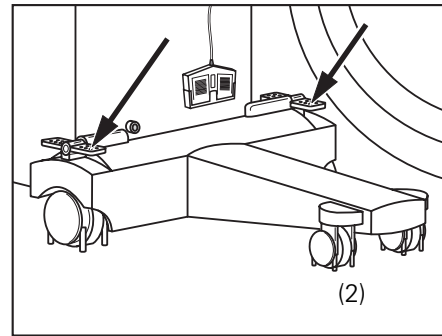


*When attaching the footswitch, please be careful not to kink the cable.*

### Driving the unit

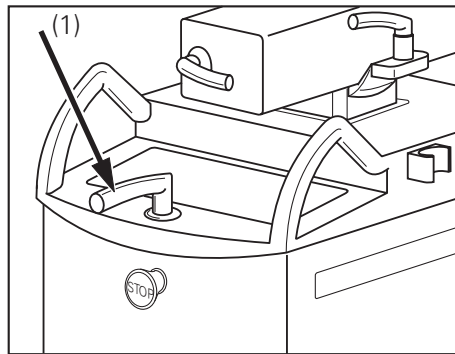


(1) Foot brake locked (pedal tilted)

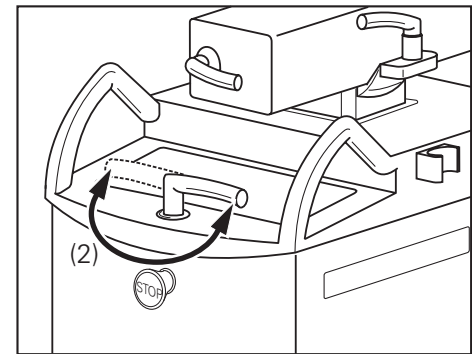


(2) Foot brake released (pedal horizontal)

- ◆ Release the foot brake.



(1) Steering lever shown in the position for forward travel



(2) The steering lever can be locked into position for transverse travel to the right or left

- ◆ Lift the steering lever and turn it in the desired direction.



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

- ◆ Move the C-arm system by hand.
  - If the steering lever is in a transverse position, the C-arm system moves parallel to the lever position.

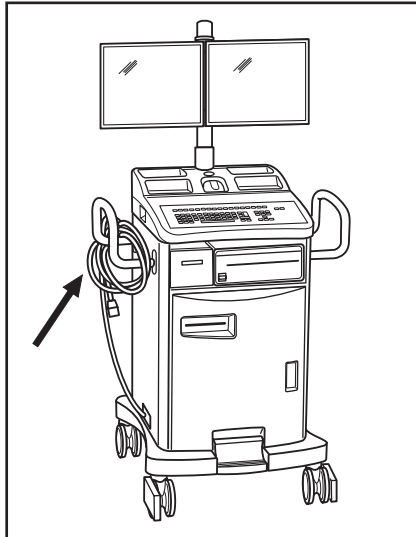


*When transporting the C-arm system make sure there are no obstructions on the floor.*

## Monitor trolley transport position

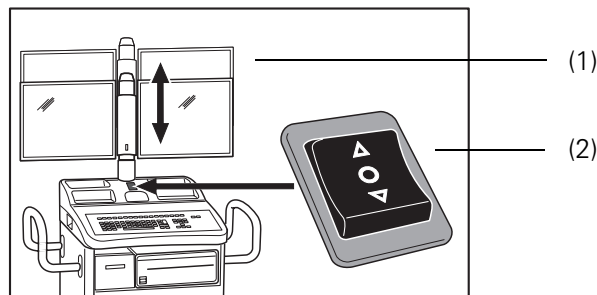
Prior to transport, the rolled-up power cable and the connection cable for the C-arm system should be placed on the grips of the monitor trolley.

### Depositing the connection cable



- ◆ Place the rolled-up cables on the grips of the monitor trolley.

## Park position of optional monitors

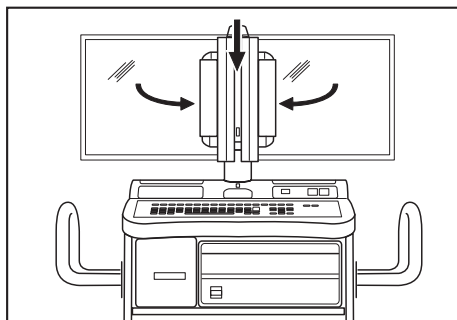


- (1) Height-adjustable monitors
- (2) Toggle switch for height-adjustment of the monitors

The height of the monitors can be adjusted with the black toggle switch.

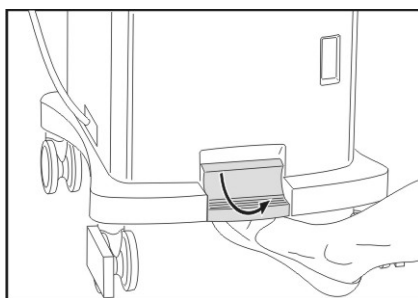


- ◆ Press the arrow symbol for **Down** on the toggle switch.
  - The monitors automatically move downwards.



- ◆ When the lowest position has been reached, the monitors can be folded.

### *Moving the monitor trolley*



- ◆ Release the central brake at the front of the monitor trolley (see arrow) to start moving the trolley.

### *Locking the monitor trolley*

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



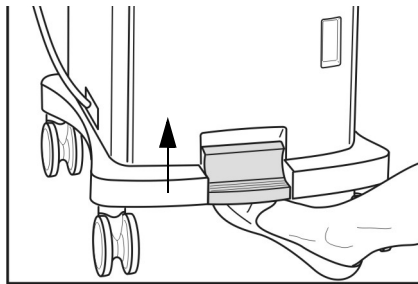
#### **Warning**

As long as the brake at the front is not locked, the monitor trolley can move freely.

**There is a risk of injury to persons and damage to equipment!**

- ◆ Lock the brake at the front of the monitor trolley.
- 

### *Setting the direction of the monitor trolley*



- ◆ In order to set the direction of the monitor trolley, push the center brake upwards with your foot until it stops/engages.



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## *Introduction 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.

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, call up emergency registration. 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 call it up from the database and then examine the patient.

### **Preregistration**

If you want to prepare the system to examine a patient at a later 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 call up 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), you can query and retrieve data for the patient to be examined for preregistration or registration.

### *The Patient Registration window*

The **Patient Registration** window is subdivided into four areas into which you can enter topically coherent data.

The screenshot shows the 'Patient Registration' window with four main sections, each labeled with a number in parentheses:

- (1) **PATIENT**: Contains fields for Last name, First name, Middle name, Title, Suffix, Other Patient Name(s), Other Patient ID(s), Patient ID, Date of Birth (with a date picker), Sex (radio buttons for Male, Female, Other), Age (with a unit dropdown), Height (with a unit dropdown), Weight (with a unit dropdown), and Additional info. A 'Details...' button is at the bottom.
- (2) **HOSPITAL**: Contains dropdown menus for Referring physician, Requesting physician, Admitting diagnosis, Ward, and a text field for Admission ID.
- (3) **PROCEDURE**: Contains text fields for Accession No, Request ID, and Requested procedure(s), a dropdown for Study, and a text area for Study comment.
- (4) **INSTITUTION**: Contains a dropdown for Institution name, two dropdowns for Performing physician, and two dropdowns for Operator.

At the bottom of the window are buttons for 'Preregister', 'Exam', 'Search', 'Cancel', 'Emergency', and 'Help'.

(1) Personal data of the patient (PATIENT)

(2) Hospital-specific data (HOSPITAL)

(3) Study-specific data (PROCEDURE)

(4) Institution data (INSTITUTION)



*The input fields can be adapted by Siemens Service.*

## 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.

You can register an emergency patient either in the **Emergency Registration** or in the **Patient Registration** window.



*If you release radiation without having registered a patient for the examination, a corresponding dialog box is displayed. After radiation has been released again, an emergency patient is automatically registered. You can register an emergency patient by releasing radiation twice with the hand switch or footswitch. Thus entries at the monitor trolley are unnecessary.*

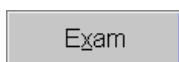
### **Provisional patient data**

The patient is registered with provisional data as an emergency patient. As soon as you have more time after the examination, you must complete the patient and examination data of your emergency patient using the **Patient Browser**.

### Emergency Registration window



- ◆ First finish off or interrupt the current examination.
- ◆ Press the button in the tool bar of the **Patient Browser**.
- or —
- ◆ Call up **Patient > Emergency** in the main menu.
  - The **Emergency Registration** window opens.

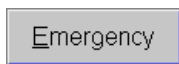


- ◆ Click the **Exam** button in the **Emergency Registration** window.
  - The **Emergency Registration** window is closed.
  - The **Examination** task card is opened.



*By clicking **Cancel** you can stop emergency registration at any time, e.g. if you have accidentally called up the Emergency Registration window instead of the Patient Registration window.*

## *Emergency registration in the Patient Registration window*



- ◆ First finish off or interrupt the current examination.
- ◆ Press the key on the symbol keypad.
  - The **Patient Registration** window is displayed.
- ◆ Click the **Emergency** button in the **Patient Registration** window.
  - The **Patient Registration** window is closed.
  - The **Examination** task card is opened.

### *Registering a new patient*

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 data of this patient must be entered before an examination.

#### **Registering**

If you register a patient and want to examine this patient immediately afterwards, enter all the examination-relevant data into the corresponding input fields.

#### **Preregistration**

If you only want to preregister the patient for later examination, you must fill in at least the mandatory input fields. These are emphasized by bold letters (sex, name, patient ID and date of birth).

### *Calling up the Patient Registration window*

The data of a new patient are entered into the empty **Patient Registration** window.

You can call up patient registration from the **Patient** menu, via icon buttons on the **Viewing** task card as well as from the **Patient Browser**.



- ◆ Press the key on the symbol keypad.

Or



- ◆ Click the corresponding button on the **Viewing** task card/**Patient** subtask card or in the tool bar of the **Patient Browser**.

Or

- ◆ Select **Patient > Register**.
  - The **Patient Registration** window opens.



*If you call up patient registration from the **Patient Browser** make sure that you have not selected a patient or study there. Otherwise the selected data are transferred to the **Patient Registration** window.*

## Entering data

After you have called up patient registration, the cursor is in the input field for patient name in the **PATIENT** area.

The **Exam** and **Preregister** buttons remain deactivated until you have entered all the information required to register or preregister a patient.

## Personal data

Name, patient ID, age, and sex of the patient are mandatory entries. This information uniquely identifies the patient in your databases.



*If you do not enter a **Patient ID**, your system automatically generates an identification code from the date, time, abbreviation for daylight-saving or standard time, and the identification number of your system (unique worldwide).*



### Caution

For internal identification of patient data, e.g., studies, series and images, the system time is used. By resetting the system time, duplicate identifiers may be created.

### Data may be assigned to the wrong patient!

- ◆ If it is necessary to reset the system time for synchronization, wait until the new system time is later than before.

- 
- ◆ Enter the personal data of the patient (at least the mandatory input fields) in the **PATIENT** area.



*The valid input format for the **Date of Birth** is displayed in the status line. Enter the year of birth using four digits.*



*If you do not know the date of birth you can enter the estimated **Age**. The system then calculates a date of birth from the current date. In the selection field next to it you can specify whether the age is in years, months or days (for example for infants).*

### *Hospital-specific data*

In the **HOSPITAL** area, you can enter the referring physician, the preliminary diagnosis, and the hospital ward where the patient is located.

- ◆ Enter the hospital-specific data via the keyboard.

Or

- ◆ Select the entries you require from the selection lists.

### *Examination data*

In the **PROCEDURE** area, data from the HIS/RIS system (option), if connected, are entered automatically.

- ◆ Do not enter any data here.



*After you have registered the patient, the data for the upcoming examination can be entered in the **Examination** task card.*

### *Institution data*

In the **INSTITUTION** area, you enter the information about the examining institution and the personnel performing the examination. This information can be helpful if the examination results are passed on to a different organization for reporting.

- ◆ Enter the institution data via the keyboard.

Or

- ◆ Select the entries you require from the selection lists.

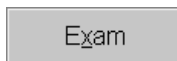


## *Completing data entry*

After you have entered all the necessary patient data in the **Patient Registration** window, you can register the patient for the ensuing examination or preregister him or her for examination later on.

### *Registering a patient for examination*

If you want to examine the patient directly afterwards, register the patient now. The ensuing examination is conducted with the data that you have entered.

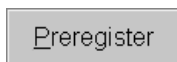


- ◆ Click the **Exam** button.
  - The **Examination** task card is displayed.
  - Now you can start examining the patient.

### *Preregistering a patient*

You can preregister the patient with the data entered if you want to perform the examination later on. You can then access the patient data again when you start the examination.

(→ Page 12)



- ◆ Click the **Preregister** button.
  - The patient is included in the scheduler. The input fields of the **PATIENT** area in the **Patient Registration** window are empty again. You can enter the data of the next patient.

### *Registering a known patient*

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

You can search for the patient in the databases and transfer the information stored into the **Patient Registration** window.

#### **Resuming a commenced study (e.g. IVP)**

If you cancelled a study with "End Examination", you can continue this study later. Just select the study from the **Patient Browser**, load the data into **Patient Registration** and then start the examination. 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.

#### **HIS/RIS query**

If the patient's data have already been entered via a HIS/RIS system, you can query and retrieve the data from the hospital network and transfer them to the scheduler. The patient is then preregistered.



*The scheduler is updated via the HIS/RIS system at regular intervals. If the patient registered for examination does not appear in the scheduler, although he/she has been entered via the HIS/RIS, update the scheduler manually by double-clicking the scheduler icon. This is advisable in particular after switching on or restarting the ARCADIS Varic.*

## Searching in the Patient Registration window

You can search for patient data in the databases from the **Patient Registration** window and then use the data for registration.



In **Registration Configuration** you can define which databases (e.g. local database, local archive) are to be searched.

(→ Page 21)

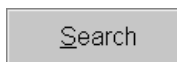
### Starting a search

- ◆ Call up the empty **Patient Registration** window.
- ◆ Enter the data known to you in the **Last name** and **Patient ID** fields.



If you know only part of the name or part of the ID of the patient you are looking for, you can use the asterisk "\*" as a wildcard.

It does not matter whether your entries contain upper or lower case letters.

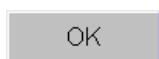
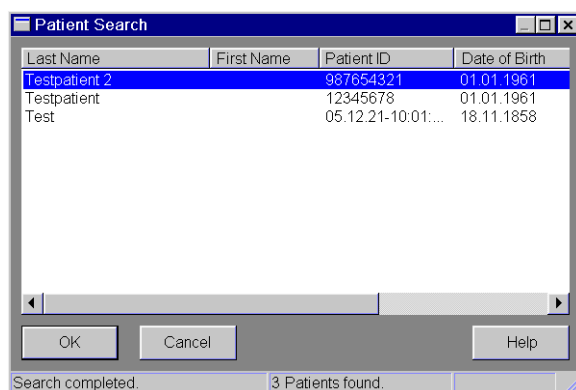


- ◆ Click **Search**.
  - The databases of your system are now searched for the patient with the data entered.
  - During the search, the **Cancel** button is displayed instead of the **Search** button. Thus you can cancel long search processes.

### *Accepting patient data*

If only one patient was found at the end of the search, this patient's personal data are automatically transferred to the **Patient Registration** window.

As soon as a second patient was found, your system displays the **Patient Search** window with the hit list.



- ◆ Select the patient in the search list and click **OK**.

Or

- ◆ Double-click the required patient.
  - The personal data of the selected patient, for preregistered patients all data entered previously, are placed in the **Patient Registration** window.



*Repeat your search with changed entries and/or extend the search to further databases.*

### *Patient data not recognized*

If a patient is already registered in the local database with "Last Name, First Name", the data may be saved differently in the systems. This is not visible to the user, however.

In this case, the patient data are not found and the error message "Certain identifying characteristics are missing". In order to access the patient data nevertheless, proceed as follows:

- ◆ Delete the patient data from the local database.
- ◆ Re-register the patient data.

## *Searching in the Patient Browser*

You can also use the **Patient Browser** to search for a patient in the scheduler, a database and in the local archive (inserted data medium). You can then transfer the data to the **Patient Registration** window. You can simplify your search by filtering and sorting the patient data.

(→ Page 28)

- ◆ First select the database from which you want to transfer the patient data.
- ◆ Click the required patient entry in the navigation or content area of the **Patient Browser**.

— or —

- ◆ Select the study or studies of the patient that you want to perform or repeat.
- ◆ Press the key on the symbol keypad.

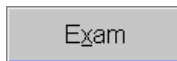
— or —

- ◆ Select **Patient > Register** to open the Patient Registration window.



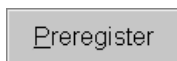
### Completing your entries

After you have transferred the patient data you searched for into the **Patient Registration** window, check that the data are correct and, if necessary, add any missing data before registering the patient.



- ◆ Click **Exam** if you want to examine the patient next.
  - The patient is registered for examination.
  - The examination data are transferred to the **Examination** task card and you can begin the examination.

Or

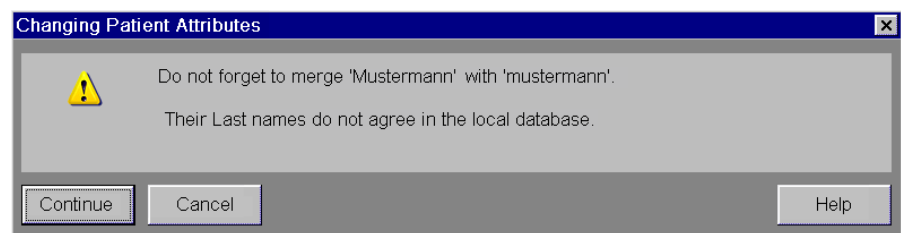


- ◆ Click **Preregister** to preregister the patient.



The **Changing Patient Attributes** window is displayed.

*If you have transferred the patient from the local database and made corrections to that patient's personal data, this message box appears.*



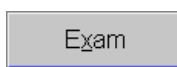
- ◆ Do not forget to correct the patient data in the original record later on.
- ◆ Close the message window with **Continue**.

### *Resuming a commenced study*

You can resume an incomplete study of a patient.

All newly generated images are appended to the existing study as a new series.

- ◆ Call up the **Patient Browser**.
- ◆ Select the relevant study.
- ◆ Call up the **Patient Registration** window.



- ◆ Click the **Exam** button.
  - The **Examination** task card is displayed and you can resume the study.

## Configuration of Patient Registration

You can adapt patient registration flexibly to the individual requirements of your examination practice.

You can change the following default settings:

- ☐ The entries in the selection lists of the **Patient Registration** window.
- ☐ Selection of the databases that you want to be searched when using the search function as well as the search procedure and display of the search results.
- ☐ Worklist settings, if a HIS/RIS system is connected.

### Calling up the configuration window

You can call up the configuration window from the **syngo Configuration panel**.

- ◆ Select **Options > Configuration** in the main menu.
- ◆ Double-click on the Patient Registration icon.
  - The **Registration Configuration** window is displayed with the **Entering Data**, **Searching**, and **HIS/RIS** cards.

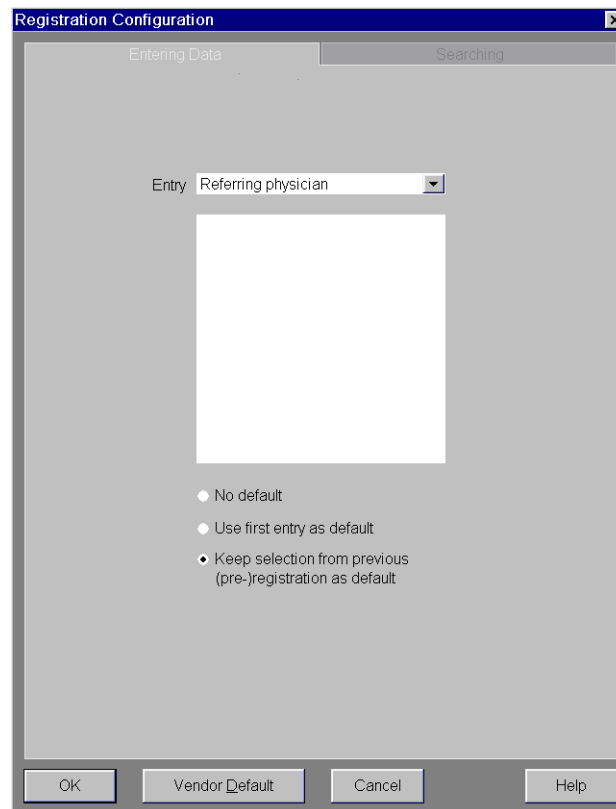


*The **HIS/RIS** card is displayed only if your system is connected to a hospital or radiology information system and configured and licensed accordingly.*



## Configuring selection lists

You can create selection lists in the **Entering Data** tab card. During patient registration, you can then make use of these entries. In this way you save time during data entry and avoid typing errors.



### Possible selection lists

You can change and add to the selection lists for the following input fields if these fields are shown in the Patient Registration window:

- ☐ Referring physician
- ☐ Admitting diagnosis
- ☐ Ward
- ☐ Institution name
- ☐ Performing physician
- ☐ Operator

### Creating entries

You can create up to 50 entries for each selection list.

Entry Performing Physician ▼

Dr. Winter  
Prof. Schwarzmann

- ◆ Under **Entering Data**, select which selection list you want to edit.
- ◆ Enter new entries in the text input field below and correct or delete the existing entries.



*The entries are automatically sorted in alphabetical order.*

### Defining default entries

For each selection list you can define whether and which entries are preselected in an input field when you call up patient registration.

- ☐ No default
- ☐ Use first element as default
- ☒ Keep selection from previous (pre-)registration as default

- ◆ Select **No default**.
  - When you call up patient registration, the input field is empty.

Or

- ◆ Select **Use first element as default**.
  - When you call up patient registration, the first entry from the selection list is already in the input field.

Or

- ◆ Select **Keep selection from previous (pre-)registration as default**.
  - When you call up patient registration, the entry you selected for the last patient you (pre-)registered is already in the input field.

## Configuring Patient Search

In the **Searching** tab card you can define which databases are to be searched during a patient search, after how many hits the search is terminated, and what information the search list is to contain.

Registration Configuration

Entering Data

Searching

Where to search

☒ Scheduler database

☒ Local database

☐ Local archive

Stop searching after

25

patient(s) found

Columns of search list

	Pos.	Width	Show		Pos.	Width	Show
First name	2	10	<input checked="" type="checkbox"/>	Height			<input type="checkbox"/>
Middle name			<input type="checkbox"/>	Weight			<input type="checkbox"/>
Last name	1	14	<input checked="" type="checkbox"/>	Additional info			<input type="checkbox"/>
Title			<input type="checkbox"/>	Institution name			<input type="checkbox"/>
Suffix			<input type="checkbox"/>	Referring physician			<input type="checkbox"/>
Patient ID	3	10	<input checked="" type="checkbox"/>	Ward			<input type="checkbox"/>
Date of birth	4	11	<input checked="" type="checkbox"/>	Location	6	18	<input checked="" type="checkbox"/>
Sex			<input type="checkbox"/>	Accession number	5	10	<input checked="" type="checkbox"/>
Age			<input type="checkbox"/>				

OK

Vendor Default

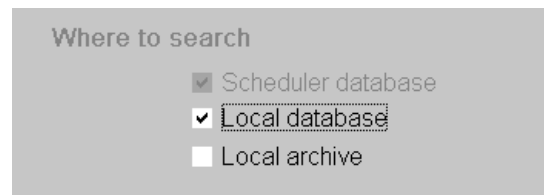
Cancel

Help

### Specifying databases

During a patient search the following databases can be searched:

- ☐ Scheduler database  
(contains all preregistered patients)
- ☐ Local database  
(contains all patients who have been examined in the past and whose data have not yet been deleted)
- ☐ Local archive  
(contains all patients that are stored on the data media currently inserted)



Where to search

- ☒ Scheduler database
- ☒ Local database
- ☐ Local archive

- ◆ Select the databases that you want to search during the patient search.



*It is not possible to exclude the scheduler from the search.*

### Limiting the number of patients found

You can have the search stopped once a certain number of patients have been found.



Stop searching after

25 patient(s) found

- ◆ Enter after how many hits you want the patient search to be stopped.

**Defining the display of the search list**

Here you can select which data items of the patients found are to be listed in the **Patient Search** window and how the display is to appear.

You can have the following information displayed:

- ☐ Personal data  
Some or all of the information you have entered in the **PATIENT** area.
  - ☐ Appointment data  
Information about the referring physician and ward from the **HOSPITAL** area.
  - ☐ Information about the institution  
The name of the hospital/practice that you have entered in the **INSTITUTION** area.
  - ☐ Location  
The network node where the data of the patient displayed in the search list are stored.
- ◆ Enter the column of the search list in which the information is to be entered.

Pos.  
2

Width  
7

Show  
☒

- ◆ Enter the column width (number of characters).
- ◆ Click the information that you want to display.

### *Introduction Patient Browser*

The **Patient Browser** supports you in the administration of the patient and examination data that are stored in the databases of your system.

With the **Patient Browser** you can search for data in a fast and uncomplicated way and then process that data in the browser or in the task cards.

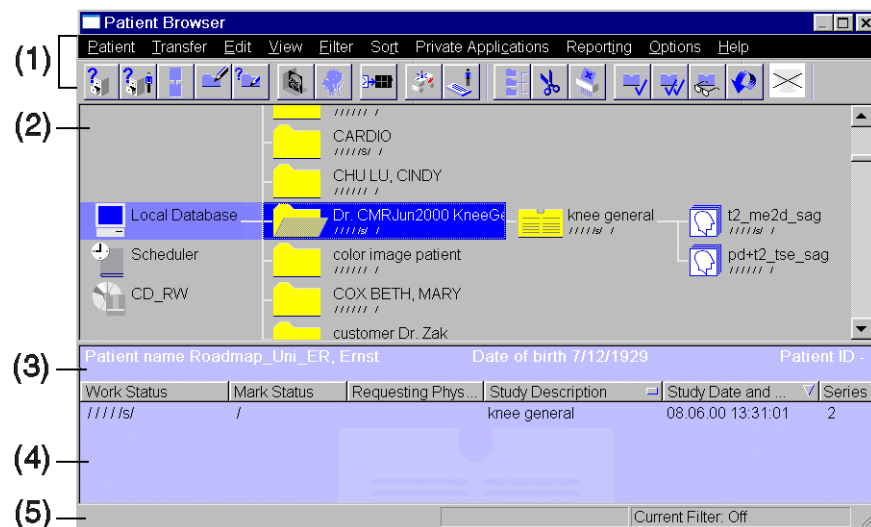
#### **When to use the Patient Browser**

- ☐ To examine a patient who has already been examined once before with your system and whose data are still saved in the local database
- ☐ To view the images of a patient from earlier examinations in order to compare them with current results
- ☐ To comment or postprocess images after an examination
- ☐ To correct incorrect information on a patient stored in your system
- ☐ To archive patient and examination data or to send them to another location in your hospital via the network
- ☐ To expose images of a patient onto film for reporting or documentation purposes

## The Patient Browser window

When you call up the **Patient Browser**, the **Patient Browser** window is displayed and placed into the foreground.

The window is subdivided into various processing areas and therefore provides you with access to your data in a clearly laid out manner.



(1) Menu and tool bar

(2) Navigation area

(3) Information box

(4) Content area

(5) Status bar

**Tool bar** You can edit the data you have selected using the menus or the icon buttons on the tool bar.

**Navigation area** The lower data levels for the selected databases, patients, studies and series are displayed graphically in the navigation area.

**Information box** In the information box you can see brief information about the patient and study selected.

**Content area** The content area contains a list of the studies or procedure steps for the patient selected in the navigation area. If you select the lower data levels, you can see which series or procedure steps are stored for a study and which images or action items are stored for a series or procedure step.

### Databases and drives

In the **Patient Browser** you can access patient and examination data that is stored in the various databases of your system or on external data media such as CDs/DVDs.

#### Local Database



The local database is the area of your system where patient data and results of current examinations are stored.



*If the data volume in the local database increases, access times become longer and examinations are slowed down. Therefore you should regularly move data from your local database to archive media.*



*If patient data are saved only locally, they will no longer be available once they have been deleted. If follow-up studies need to be performed, the patient must be registered again.*

*If you have saved the data in an archive on the network, they will still be available even after the patient has been deleted from the local database.*

#### Scheduler



The scheduler contains the data of all preregistered patients. This database gives you an overview of all patients who have been preregistered for examination. Here you can search for patients you want to register for an examination.

If available, the **HIS/RIS worklist** is displayed in the scheduler.



*The **Clear Scheduler** function allows you to delete certain scheduler entries in one step.*

*(→ Page 47)*

#### Connected drives

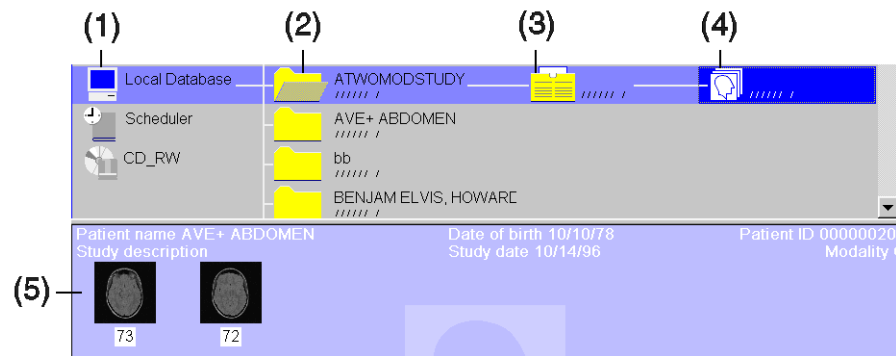


One or more CD/DVD drives are connected to your system. The icons with the drive names provide a quick way of accessing these storage media. You can export the examination data to these locations after completing an examination. However, this does not replace data backup to (long-term) archives such as a PACS.



## Data levels

In the databases and on the external data media, the patient and examination data are structured hierarchically. This structure helps you find examination results quickly.



- (1) Database
- (2) Patient
- (3) Examination
- (4) Series
- (5) Instances

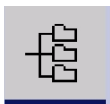


*The display of the data levels depends on the configuration.*

### *Searching for and displaying patient data*

In the **Patient Browser** window you can view all the patient and examination data stored in the databases of your system or in the main databases of other network nodes (if connected) and on external archive media.

#### **Calling up the Patient Browser**



You can call up the **Patient Browser** window either from the main menu or by using the symbol keypad.

- ◆ Press the **Patient Browser** key on the symbol keypad.

Or

- ◆ Call up the **Patient Browser** in the main menu by selecting **Patient > Browser**.

### *Data at the workstation*

You can search for patient data in the Patient Browser by navigating through the data levels of the window by mouse click or using the keyboard.

You can speed up your search by sorting the data displayed, e.g. alphabetically by the last name of the patient. You can also filter the data displayed and only view a certain subset.

### *Opening a data level*

To select certain images of a patient for processing, you can open the patient, study, and series information levels one after the other until the images you require are listed or displayed in the content area.



- ◆ Click on individual data objects in the navigation area to open all the associated entries of lower data levels.

## Filtering data

When filtering your data you can use filter criteria that are offered by default by your system. These are available to you on the menu bar or with the buttons on the tool bar.



Using the **Patient Browser** you can also create your own filter criteria in order to filter the database according to a combination of target items. You can call up the **Filter Specification** window with **Options > Filter Settings**.

### Activating a filter

- ◆ Select one of the filter criteria in the **Filter** menu of the **Patient Browser**.

Or



- ◆ Select a standard filter from the tool bar.



In the **Browser Configuration** dialog you can define which filter icons are displayed on the tool bar. To open this dialog box, select **Options > Configuration**. (→ Page 48)

### Deactivating the filter

- ◆ Call up **Filter > Off**.

Or

- ◆ Click on the icon button to have all the data displayed again (unfiltered).



### *Sorting data*

You can sort the data displayed in the Patient Browser by various criteria. This enables you to output the data in a certain sequence and makes it easier to find certain patient and examination data.

- ◆ Select a data level in the navigation area.
- ◆ Open the **Sort** menu.



*Depending on the data level displayed in the content area, different sorting criteria will be provided.*

- ◆ Click on one of the sorting criteria offered.

### *Data on external exchange media*

You can import patient and examination data archived or exported onto a data medium in DICOM format into your system (into the local database) if a drive has been installed and configured appropriately.

#### **Importing data**



- ◆ Insert the required data medium.
- ◆ Click on the icon of a data medium in the navigation area.
- ◆ Select the required patient data from the data medium in the navigation area.
- ◆ Call up **Transfer > Import**.

— or —



- ◆ Click the icon button on the tool bar.
- ◆ Call up **Transfer > Eject from...** to remove the data medium.

## Data in the network

Patient and examination data stored on other workstations or in a long-term archive can be accessed via **Patient Search**. Import the required data into your local database via the network so you can process and evaluate them on your workstation.

### Calling up Patient Search



- ◆ Call up **Patient > Search**.

— or —

- ◆ Click the icon button on the tool bar.



*If you need further data on a patient stored in your local database, select the patient in the **Patient Browser** and call up **Patient > Search Selected**. The search window will then already contain the search mask for the relevant patient.*

- The **Patient Search** dialog box is displayed.

(1) Input fields for search criteria (search mask)

(2) List of search details

(3) Display of search results

### Starting a search

- ◆ Enter the known patient data and further search details, if necessary.



*Unknown data can be replaced by the wildcard \*, e.g. T\*.*

- ◆ In the **Node** field, specify the network node where you want to search for the data.
- ◆ Start the search by clicking the **Search** button.
  - The patients, studies and series found are displayed in the results area of the **Patient Search** dialog box.

Search



*To display a list of all images of a series selected in the results area, click the **Image List** button.*

### Import data



#### Caution

Receipt of images of a patient listed under different personal data in the local database and on the sending network node (e.g. after patient was renamed on the network node).

**Possible loss of data since the images are assigned to the patient with the original personal data in the local database.**

- ◆ In this case, search for the imported data with the **Patient Browser** using suitable search and filter criteria.
- ◆ If necessary, correct the personal data of the patient concerned in your local database.

Import

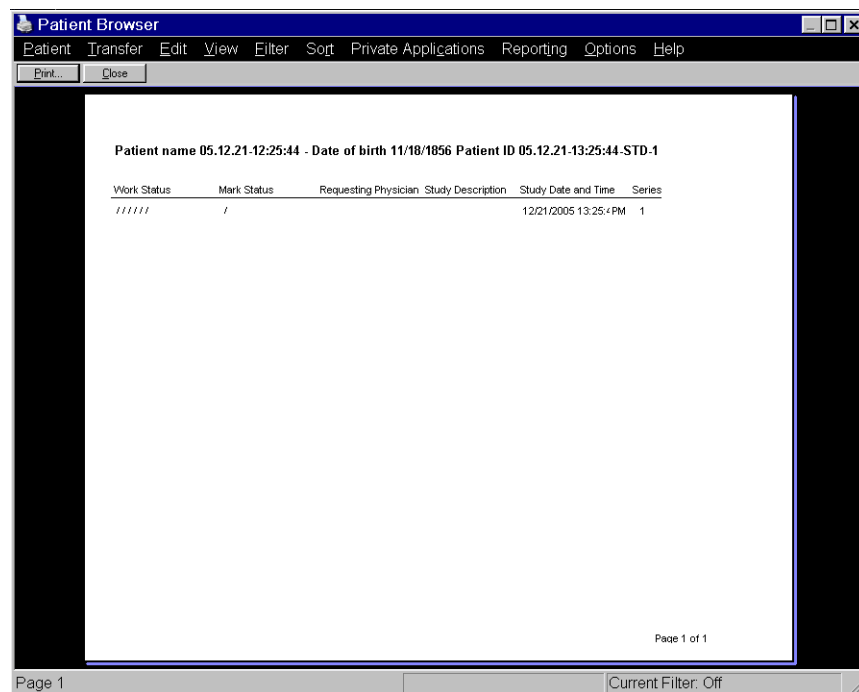
- ◆ Select the required data in the results area (or in the image list).
- ◆ Click the **Import** button.
  - The selected data are copied from the network node to your workstation and displayed in the navigation and content area of the **Patient Browser**.

## Printing a data list

If a printer is connected, you can print a list of examination data. When printing data, the information displayed in the content area is processed.

### Displaying a print preview

- ◆ Display the required patient and examination data in the content area.
- ◆ Select **Patient > Print Preview**.
  - A print preview of the data list is displayed.



- Print**
- ◆ Select **Patient > Print List**.
    - or —
  - ◆ Click **Print** in the **Print Preview**.
    - The data list is printed on the default printer.



*If you wish to print to another printer, select **Patient > Print**. You can now change the print settings in the dialog box displayed.*

### *Updating and deleting data*

Every now and then it is necessary to add or correct patient data or information relating to the study of a patient (e.g. emergency patient). You use the **Patient Browser** to search for the patient in the database and to edit the corresponding data.

With the DICOM MPPS option the system automatically generates a performance report for each examination which you complete and terminate after the examination and postprocessing.

Once the examination data have been successfully archived and are no longer needed, you can delete them from the local database.



*Please note that when deleting large amounts of data part of the system resources will be occupied for a while (up to 30 minutes for deleting all data with completely filled database). During this time the system performance during examinations with high image storage rates may be restricted.*



*To avoid interfering with routine clinical procedures, we recommend that updates, deletion and archiving of data be performed during times when the mobile C-arm system is not used.*

### *Changing patient or examination data*

The described functions for changing patient and examination data are used for correcting the local database.

#### **Possible changes**

You have the following possibilities of changing data:

- ☐ Correcting data in the **Correct** dialog box.
- ☐ Rearranging patient data in the **Patient Browser**.



**External data**

If you change a data set that has also been sent to another network node, please note the following: The changes affect the local database. The corresponding data set is not automatically updated on other network nodes. This can lead to inconsistencies between the local data set and the exported data set.

You have two possibilities to avoid these inconsistencies:

- ☐ Besides the local data set, you also correct all relevant data sets on other network nodes.
- ☐ You delete all relevant data sets on other network nodes and resend the corrected data sets.

*Safety notes for changing data*

When correcting and rearranging examination data, make sure that the images are assigned correctly and these changes are also made on the other network nodes.

**Caution**

Correcting/rearranging objects with references.

**References may be lost!**

- ◆ Rearrange the entire hierarchical group containing all objects with references in order to maintain the references.
- 

**Caution**

Rearranging of series/images into another series may lead to wrong image information, if the selected images/series are not compatible.

**Wrong diagnosis due to incorrect image information!**

- ◆ Correct the attributes which do not correspond, before you rearrange the series/images.
- 



*Please terminate the active study of the patient before correcting examination data of this patient.*

### Correcting Data

Patient and examination data can be changed and added to in the **Correct** dialog box.

#### Calling up the dialog window **Correct**

- ◆ Select the patient, study, series or images that you want to correct in the navigation or content area of the **Patient Browser**.
- ◆ Call up **Edit > Correct**.
- or —
- ◆ Click on the icon button on the tool bar.  
– The **Correct** dialog box opens.



- (1) Name and number of selected data
- (2) Entry form for correction data, divided in data areas
- (3) Entry cards for details of the individual data

**Entering data**

In the input and selection fields of the **Correct** window you can see the information that has been stored for the selected patient or selected study or series so far.

- ◆ Correct or add to the selected data.



*Depending on the data level in which you want to correct data, some fields of the **Correct** window might be dimmed. Data marked by "\*" cannot be changed.*



*When you enter very long comments in the **Comment** input field, only the first part of the text is displayed in the **Viewing** task depending on the selected layout. A third or fourth comment line is not displayed, either.*

**Signing for changes**

Modifier's name

- ◆ Enter your name under **Modifier's name**.

Or

- ◆ Select your name in the selection list.



*If you do not specify a name, the name with which you logged on to the system is taken as the modifier.*

**Saving changes**

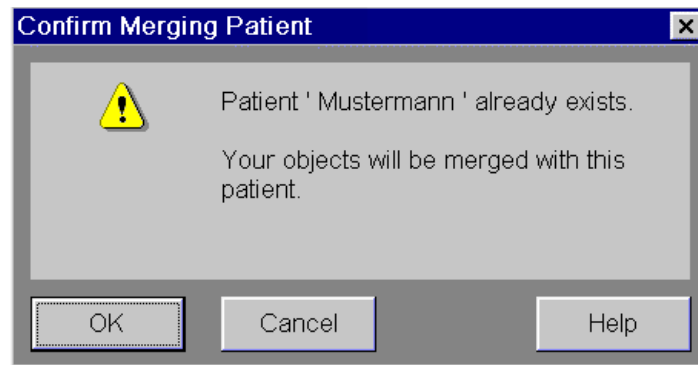
OK

- ◆ Click on **OK**.
  - The new data are saved and the changes are included in the history of changes.

### Merging patient data

A patient whose name was spelt incorrectly during an examination or who was once registered as an emergency patient is stored in the database twice.

As soon as you save the corrected patient name, the dialog box asks you whether you want to merge the examination data of the two patient entries or not.

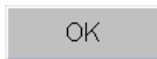


#### Caution

Patient data are merged.

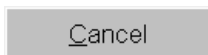
#### **Examination data may be assigned to the wrong patient!**

- ◆ Before confirming the message, make sure that the patient is one and the same.



- ◆ Click on **OK**.
  - All selected data are stored under the corrected patient name.

Or



- ◆ Click **Cancel**.
  - The correction of the data is canceled. No changes are made.

### Rearranging data

The study images of a patient are sorted hierarchically by series and studies. If required, you can change this assignment in the **Patient Browser**.



*Data can be rearranged only within a patient entry.*

The following restrictions apply for rearranging data:

- ☐ Only images of the same application area that were acquired in the same patient position can be merged.
- ☐ The data hierarchy must be maintained, e.g. a study cannot be subordinated to a series.
- ☐ Delete-protected data or data currently loaded in an application cannot be edited.

### Moving data

- ◆ Select the study, series or images in the **Patient Browser**.
- ◆ Move the selected data to the required position by drag & drop.
  - The **Rearrange** dialog box for confirming your changes is displayed.

### Signing for changes

Modifier's name

- ◆ Enter your name under **Modifier's name**.

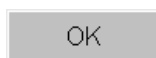
Or

- ◆ Select your name in the selection list.



*If you do not specify a name, the name with which you logged on to the system is taken as the modifier.*

- ◆ Click on **OK**.
  - The changes are saved and included in the history of changes.



### History of changes

The history of changes is a type of logbook of your local database that is created separately for each data level. Here you can always see what changes and additions have been made to the data of patient and to the information about the patient's examinations.

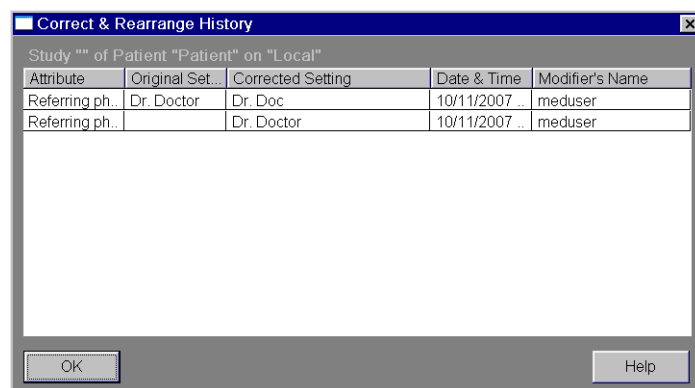
#### Opening the history of changes

- ◆ Select the patient, study, series or image stored in the local database whose history of changes you want to view.

- ◆ Call up **Edit > History**.

Or

- ◆ Click the icon button on the tool bar.
  - The **Correct & Rearrange History** window is displayed with a chronological list of changes.

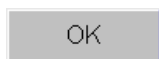


*Depending on the hierarchy level of the selected data, different information is listed in the **Correct & Rearrange History** window.*



*If an object has been moved, the entry is marked with ">" under Attribute in the **Correct & Rearrange History** window.*

#### Closing the history



- ◆ Click on **OK**.
  - The history display is closed.

## Changing the work status

The work status indicates the processing stage of patient and examination data. This status is indicated as an abbreviation in every list entry in the content area. With the exception of "read" and "verified", all work statuses are automatically set by the system.



*After storing or transferring data, always check whether the process was carried out correctly - irrespective of the work status display.*



*Under Transfer Configuration you can specify that data must have reached a certain work status before they can be archived and sent.*

### Entering the status manually

As the user you can set the following entries for studies and series in your local database:

☐ com/... Completed

☐ ver/... QA Verified

☐ rea/... Read

◆ Select **Edit > Set State** and select the work status you want to assign.

Or

◆ Click the appropriate button on the tool bar.

– The work status of the selected data objects is changed correspondingly.



## Performance documentation (MPPS)

If the DICOM MPPS option is installed, your system creates a performance report during patient registration. During examination and post-processing of the examination results, the report is updated.

Before you conclude your work on the examination by archiving, check and add missing entries to the performance report.

- ◆ Select the patient, the study, or one of the associated series or images from the **Patient Browser**.
- ◆ Call up **Patient > Show MPPS**.

Or

- ◆ Click the icon button on the tool bar.
  - The **Modality Performed Procedure Step** window is displayed.



Modality Performed Procedure Step																													
PATIENT	Patient name : Patient		Study description :																										
	Patient ID : 04.12.16-10:11:28-STD-1.3.12.2.1		Modality : XA																										
	Date of birth : 11/18/1858		Accession No. :																										
	Sex : other		Station : YBFR001176																										
MPPS	Description : <input type="text"/>		Study ID : 1																										
	Status : IN PROGRESS																												
	Comments																												
	<input type="text"/>																												
Actions	Performed actions																												
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	Action Code	Action Item																											
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	<table border="1"> <thead> <tr> <th>Series Description</th> <th>Protocol</th> <th>Performing Physician</th> <th>Operator</th> <th>Retrieved AE Title</th> </tr> </thead> <tbody> <tr> <td>Cont.</td> <td>Ortho/Trauma\All body...</td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td>Cont.</td> <td>Ortho/Trauma\All body...</td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td>DR</td> <td>Ortho/Trauma\All body...</td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>				Series Description	Protocol	Performing Physician	Operator	Retrieved AE Title	Cont.	Ortho/Trauma\All body...				Cont.	Ortho/Trauma\All body...				DR	Ortho/Trauma\All body...								
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DR	Ortho/Trauma\All body...																												
Billing	<div> <input type="button" value="Completed"/> <input type="button" value="Discontinued"/> <input type="button" value="Save"/> <input type="button" value="Cancel"/> <input type="button" value="Help"/> </div>																												





Because of digit overlaps, the display of long radiation times (> 65 s) can be difficult to read in the **Dose** card. However, this does not affect the printable radiation report.

### Adding data

- ◆ Enter a comment and a short description in the **MPPS** area, if necessary.
- ◆ Enter all performed actions in the table on the **Actions** card.
- ◆ Click the **Billing** card in the foreground and enter all action steps, the film consumption and the material into the tables.
- ◆ If you want to annotate the applied radiation dose, click the **Dose** card in the foreground and enter the text into the lower **Comment** field.



### Sending and concluding a report

If all data in the performance report are entered correctly, you can close the report and therefore also the examination. If further working steps are planned, you can save the report temporarily and conclude it later.

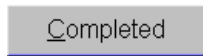
Depending on operational requirements, you can transfer the report to the HIS/RIS system.

### Saving a report



- ◆ Click the **Save** button.
  - Your entries are saved to the report and the **Modality Performed Procedure Step** window is closed.

### Concluding a report

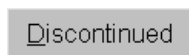


- ◆ Click the **Completed** button to conclude the report and the examination.
  - The report and the examination is concluded.



*A message indicating this is sent to the HIS/RIS system, if connected. You can no longer make changes to the performance report.*

### Exiting a report as discontinued



- ◆ Click the **Discontinued** button.
  - The examination is no longer continued.



*The report is also closed with that. A message indicating this is sent to the HIS/RIS system, if connected.*

## Delete data

If an examination has been completed and all the examination results and images have been reviewed and commented, you can archive the data and then delete it from the database.

(→ Register 7: Documentation, Page 61)

## Deleting patient data

You can delete existing data in the navigation or content area.



### Caution

Deleting non-archived images

### Data are irretrievably lost!

- ◆ Before deleting images, make sure that these were archived correctly.
- 

- ◆ Select the data you want to delete.
- ◆ Call up **Edit > Delete** in the main menu of the **Patient Browser**.

— or —



- ◆ Click on the icon button on the tool bar.
  - A dialog box is displayed in which you have to confirm again that you really want to delete the selected data.

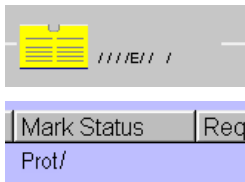
### *Protecting data from deletion*

You can protect patient and examination data from accidental deletion.

- ◆ Select the data that you want to protect against deletion in the navigation or content area.
- ◆ Call up **Edit > Protect** in the main menu of the **Patient Browser**.

— or —

- ◆ Click on the icon button on the tool bar.
  - You can now no longer simply delete the selected data. Delete protection always includes all lower data levels and the related entries of the higher data levels. For example, if you protect a study entry you can no longer delete the individual images of that study nor the patient entry.
  - Delete protection can be identified by the mark status "prot".



*Data that you have assigned delete protection to, are protected from both moving and correction.*

### *Removing delete protection*

If you want to correct, move, or delete data without a message box being displayed, you must remove the delete protection again.

- ◆ Call up **Edit > Remove Protection** in the main menu.

— or —

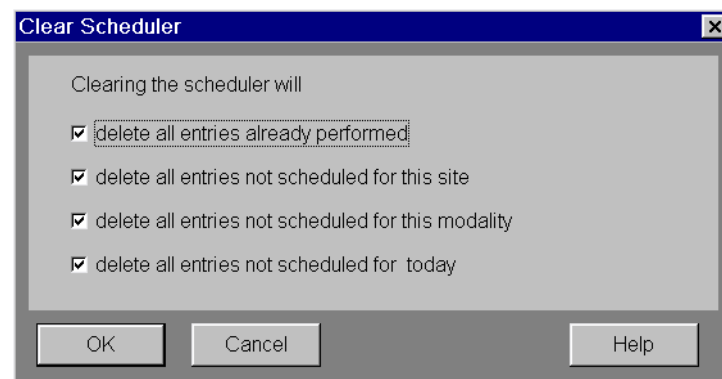
- ◆ Click on the icon button on the tool bar.
  - Delete protection is removed.



### *Deleting data in the scheduler*

The **Clear Scheduler** function allows you to delete certain scheduler entries in one step.

- ◆ Select **Edit > Clear Scheduler** in the menu bar of the **Patient Browser**.
  - The **Clear Scheduler** dialog box is displayed.



- ◆ Select the entries to be deleted by ticking the relevant check boxes.
- ◆ Confirm your selection with **OK** to save your settings and delete the corresponding procedure steps.

### *Patient Browser Configuration*

With the **Browser Configuration** dialog box you can adapt the **Patient Browser** to your method of working.

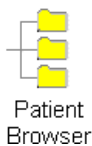
You can change the following settings:

- ☐ General settings such as the layout of the tool bar and the display of the work status.
- ☐ The hierarchical view of the information levels (patient, study, series, instance) in the navigation and content area.
- ☐ The display of the individual information levels (study, series, instance) in the content area.
- ☐ The selection lists in the **Patient Search** window.

### *Calling up the configuration window*

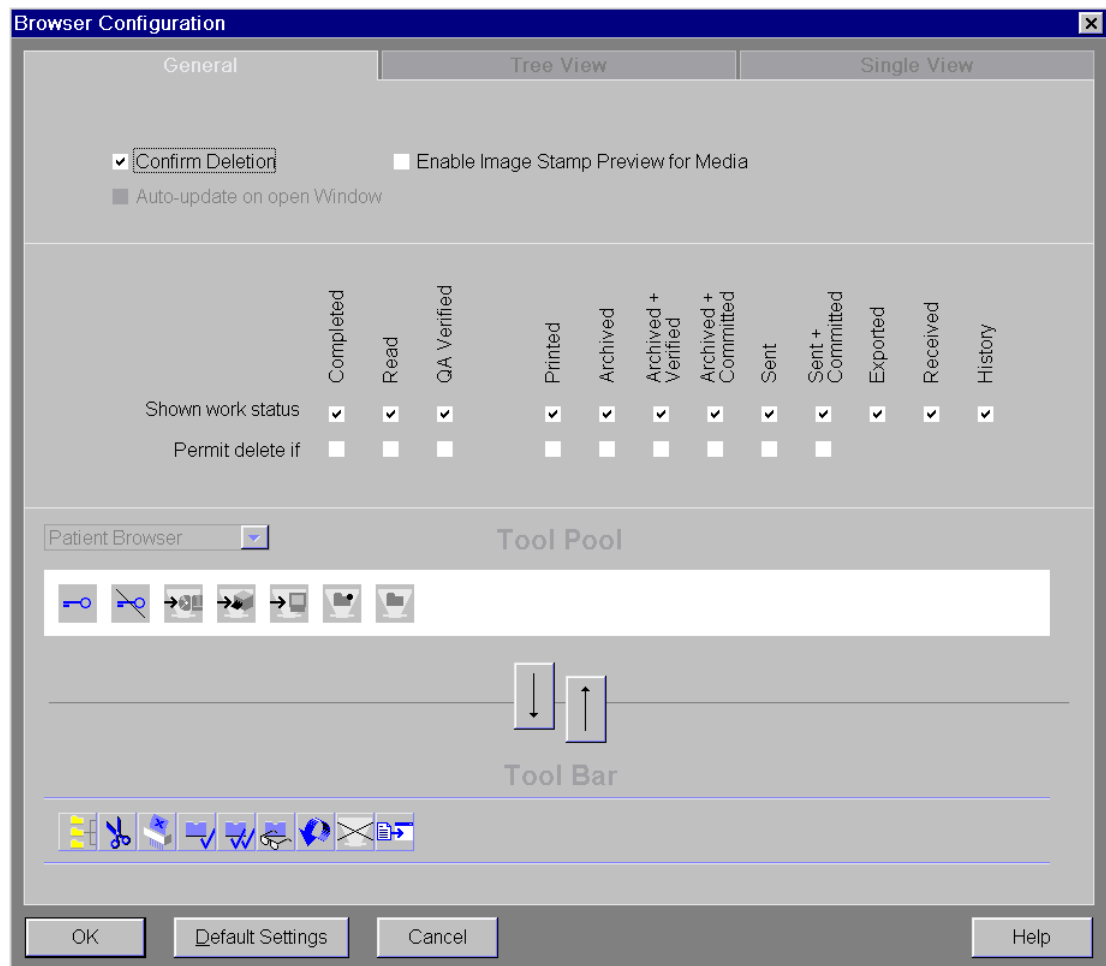
You can call up the configuration window from the **syngo Configuration panel**.

- ◆ Select **Options > Configuration** in the main menu.
- ◆ Double-click the **Patient Browser** icon.
  - The **Browser Configuration** window with the **General**, **Tree View** and **Single View** tab cards is displayed.



## General settings

On the **General** tab card you can configure the tool bar of the **Patient Browser**, define which work status is displayed for the examination data, and set the influence of the work status on delete permission. And finally, here you can establish the links to network nodes.



### Configuring the tool bar

You can place buttons for the functions of the **Patient Browser** that you require frequently on the tool bar and remove rarely used functions.



- ◆ Select an action you want to place on the tool bar as an icon button from the **Tool Pool**.
- ◆ Click the **Down arrow**.
  - The selected button is displayed in the **Tool Bar**.
- ◆ Repeat this step until the **Tool Bar** contains all the buttons you require.



*Deselect the buttons that you do not require using the **Arrow up** key.*

### Data preview for external media

In addition to the list view, the data of external media can also be shown as a thumbnail preview. The thumbnails are shown in the content area of the **Patient Browser**.

☒ Enable Image Stamp Preview for Media

- ◆ Click the check box to activate the thumbnail preview.
  - A dialog window is displayed which prompts you to confirm the activation of this function.



*Please note that loading media with a large number of images may take a long time when this option is activated.*



Work status

In the middle part of the **General** tab card you can define which work status is displayed in the content area for the examination data and in which processing state data is released for deletion.

Showing work status

	Completed	Read	QA Verified	Printed	Archived	Archived + Verified	Archived + Committed	Sent	Sent + Committed	Exported	Received	History
Shown work status	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

- ◆ Select the checkbox for a work status if you want this work status to be displayed in the content area of the **Patient Browser**.

Defining delete permission

Permit delete if	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
------------------	-------------------------------------	-------------------------------------	-------------------------------------	-------------------------------------	-------------------------------------	-------------------------------------	-------------------------------------	-------------------------------------	-------------------------------------

- ◆ Select the check box of a work status.
  - Data without this status cannot be deleted without explicit confirmation in a message box.

### *Delete confirmation*

The default setting is to have your system display a confirmation window before each deletion even if the data concerned have already reached the work status required for deletion. You can activate and deactivate this confirmation in the configuration.



#### Caution

Delete confirmation has been deactivated.

#### **Potential loss of data!**

- ◆ Delete confirmation should always be activated.

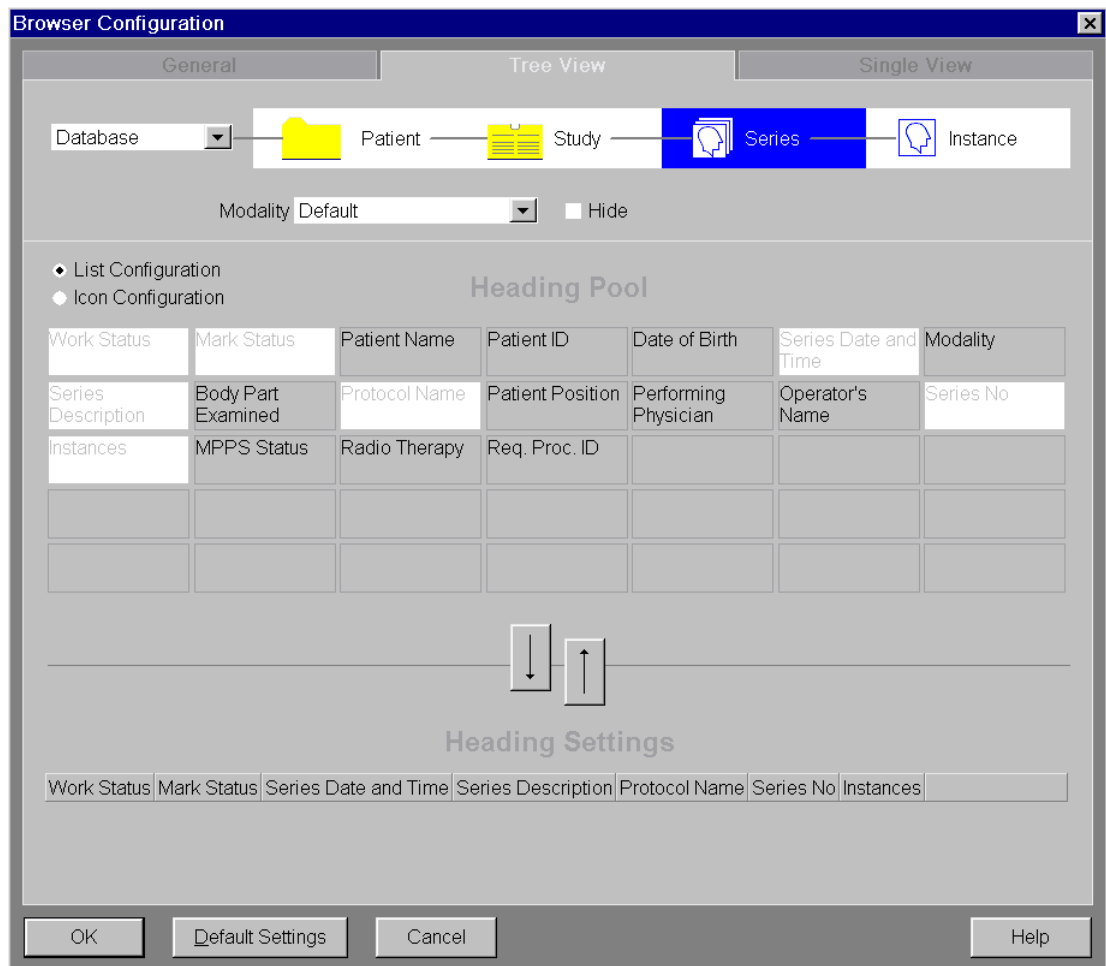
---

☒ Confirm Deletion

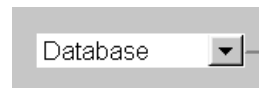
- ◆ Click the **Confirm Deletion** check box.
  - A confirmation box is displayed every time before data is deleted.

## Tree view

On the **Tree View** tab card you can define what information is listed in the content area of the **Patient Browser** in the hierarchy levels (e.g. patient). You can also hide hierarchy levels in the navigation and content areas and configure the icon display of series and images.

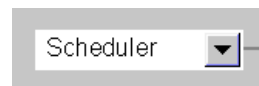


### *Selecting a database and a data level*

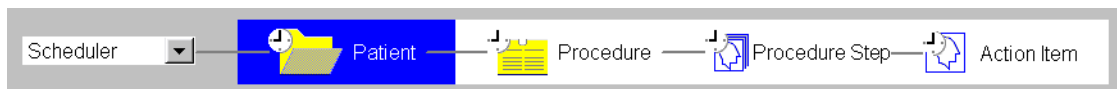


- ◆ Select **Database**.
  - The local database view is configured.

Or



- ◆ Select **Scheduler**.
  - The display of preregistered patient data is defined in the **Patient Browser**.



- ◆ Select the data level for which you want to define the entries.



*The names and information that appear on the Tree View card for the different data levels differ depending on the database that you have called up (e.g. **Study** in the local database corresponds to **Procedure** in the scheduler).*

### List entries

For the "Series" and "Instance" data levels you configure the display of the list and of the icons.

#### Selecting list/image stamp display

- ☐ List Configuration
- ☒ Icon Configuration

- ◆ Select the display option for which you want to define the entries.

#### Making entries

- ◆ In the **Heading Pool** select which entries you want to have displayed in the content area.



*Select the entries in the sequence in which you want to have them displayed in the table.*



- ◆ Click the **Down arrow** to place the entry in the **Heading Settings** for the table in the content area.



*Using the **Modality** selection list, you can define the entries depending on the imaging modality or the data type.*

### Hiding data levels

You can define whether the study, series, or instance hierarchy levels are displayed in the navigation and content area.

- ☒ Hide

- ◆ Click on the **Hide** check box to hide this data level.

## Single view

In the **Single View** tab card you can define up to which hierarchy level data are to be displayed if the navigation area is hidden. Each data entry is displayed in exactly one line.

The screenshot shows the 'Browser Configuration' dialog box with the 'Single View' tab selected. The 'Database' dropdown is set to 'Patient'. The 'Display Level' section has three radio buttons: 'Patient' (selected), 'Study', and 'Series'. The 'Level' dropdown is set to 'Patient'. Below this is the 'Heading Pool' section, which contains a table with 7 columns and 5 rows. The first row contains: 'Work Status', 'Mark Status', 'Patient Name', 'Other Patient Names', 'Patient ID', 'Other Patient ID's', and 'Date of Birth'. The second row contains: 'Sex', 'Ethnic Group', 'Military Rank', 'Additional Info', 'Medical Alerts', 'Patient Status', and 'Contrast Allergies'. The third row contains: 'Studies', 'Series', 'Instances', 'MPPS Status', and three empty cells. The fourth and fifth rows are empty. Below the table are two arrows, one pointing down and one pointing up. Below the arrows is the 'Heading Settings' section, which contains a table with 2 columns and 1 row: 'Patient Name' and 'Study Description'. At the bottom of the dialog are four buttons: 'OK', 'Default Settings', 'Cancel', and 'Help'.

Heading Pool						
Work Status	Mark Status	Patient Name	Other Patient Names	Patient ID	Other Patient ID's	Date of Birth
Sex	Ethnic Group	Military Rank	Additional Info	Medical Alerts	Patient Status	Contrast Allergies
Studies	Series	Instances	MPPS Status			

Heading Settings	
Patient Name	Study Description

### *Selecting a database and a data level*

- ◆ Select the database that you want to configure from the selection list.



The screenshot shows a configuration panel with two main sections. The first section, labeled 'Database', contains a dropdown menu. The second section, labeled 'Display Level', contains three radio buttons: 'Patient', 'Study', and 'Series'. The 'Study' radio button is currently selected, indicated by a small black dot next to it.

- ◆ With the **Display Level** radio button you can select the data level that you want to have displayed in the content area when switching from **Tree View** to **Single View**.



*In single view, the content area always shows the same data level.*



*List entries*

You can combine list entries of different information levels by varying the data level for the pool in the Heading Pool from which you then select the required entries.

**Defining data entries for Heading Pool**

Level Series

- ◆ In the selection list, define the data level from which you want to take list entries for the content area in the **Heading Pool**.
  - In the **Heading Pool** area all the possible list entries from the selected information level are displayed. The currently selected list entries are highlighted.

Heading Pool						
Work Status	Mark Status	Patient Name	Other Patient Names	Patient ID	Other Patient ID's	Date of Birth
Sex	Ethnic Group	Military Rank	Comment	Medical Alerts	Patient Status	Contrast Allergies
Studies	Series	Instances	MPPS Status			

**Making entries**



- ◆ Click a list entry in the Heading Pool and use the Down arrow key to move the entry into the **Heading Settings**.

Level Patient

PatientStudySeries

- ◆ Now select another **Level**, if necessary, to place list entries of another data level from the **Heading Pool** into the **Heading Settings**.



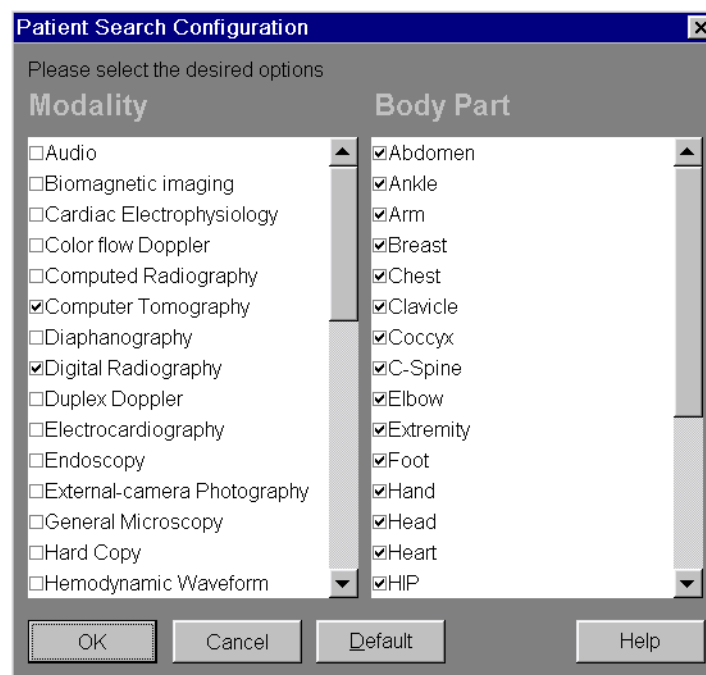
## Configuring patient search

You can adapt the user interface of the **Search** dialog window to your method of working. The entries of the **Modality** and **Body Part** selection lists are configurable.

- ◆ Call up the **syngo Configuration Panel** by activating **Options > Configuration** in the main menu.
- ◆ Double-click the **Patient Search** icon.
  - The **Patient Search Configuration** window appears.



Patient Search



- ◆ Select or deselect the desired items by clicking or deselecting the corresponding check box.
- ◆ Click the **OK** button.
  - The settings you have made are saved.

OK

Patient data



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## *Safety information relating to the examination procedure*

### *Before examination*

#### **Orientation aid for image orientation**



#### **Warning**

Incorrect image position displayed on the monitor.

#### **Surgical intervention in the wrong position!**

- ◆ Use lead letters as orientation aids during the exposure.

#### **Integrated I.I. laser aimer**

Depending on the configuration of your ARCADIS Varic, you can use the integrated I.I. laser aimer for positioning the C-arm.



#### **Warning**

Laser radiation

#### **Risk of eye injury!**

- ◆ Do not view the beam using optical instruments (laser class 1M).

#### **Single-tank laser targeting device**

Depending on the configuration of your ARCADIS Varic, you can use the integrated single-tank laser targeting device for positioning the C-arm.



#### **Warning**

Laser radiation

#### **Risk of eye injury!**

- ◆ Do not look directly into the laser beam (Class 2 laser).

#### **Examination settings**

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

**Software failure**

In case of a software failure, restart the ARCADIS Varic by switching it off and then back on using the corresponding keys on the monitor trolley (→ Register 3: System Description, Page 34, → Register 3: System Description, Page 11).

**Storage capacity**

The hard disk usage 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.



This icon, for instance, indicates that about 10 percent of the disk space is used.

*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**

Since permanent network functionality cannot always be guaranteed, reference images should be loaded from the network archive before starting an examination.

## *During examination*

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

Ensure correct image orientation (accurate to side) on the monitor and/or film.

Before storing images, check to make sure that images and patient data are assigned correctly.

Before terminating an examination, check the patient data to make sure everything is correct before starting treatment of the next patient.

The registered patient should be deselected at the end of the examination. (→ Page 20)



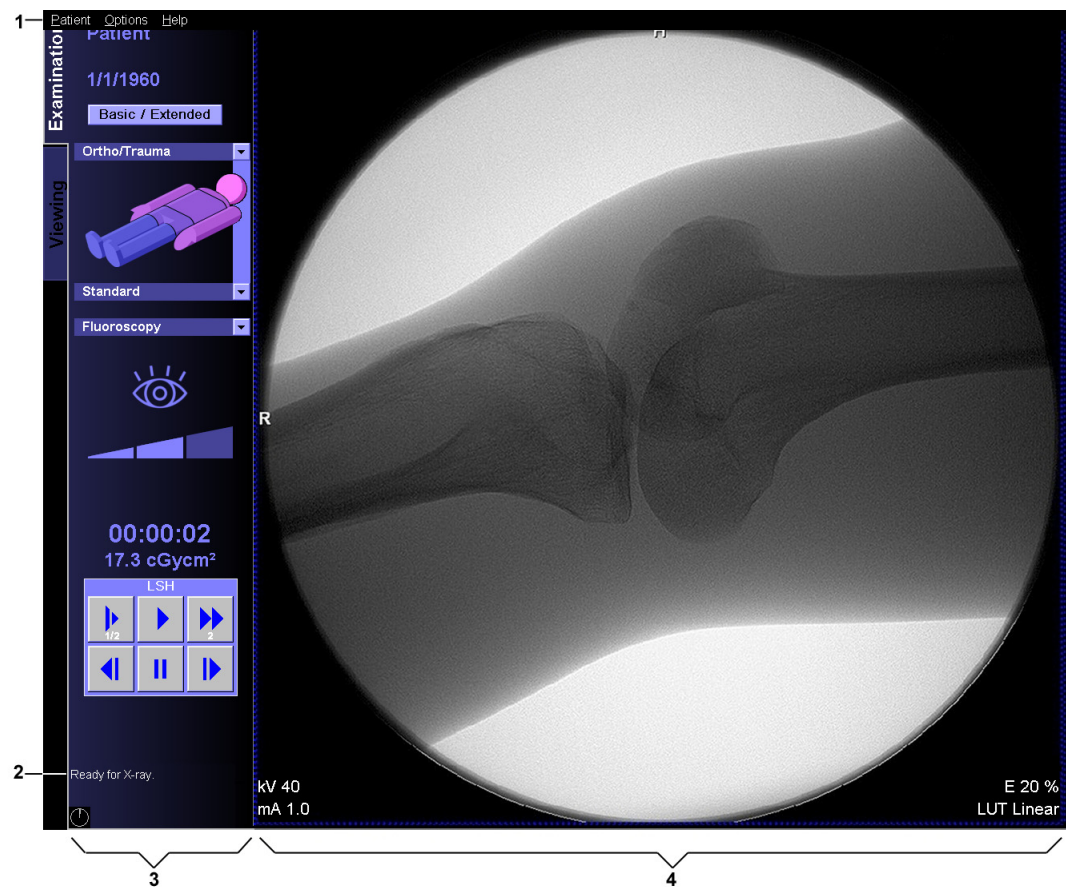
*If the exam set used is configured such that all images are saved, you must limit the series length to less than 1000 images.*

## The Examination task card

The **Examination** task card is used for setting and displaying examination-related operating and program parameters. It is also used for acquiring images and displaying current images and examination data.

### Layout of the Examination task card

The task card is displayed on the left monitor, the so-called live monitor:

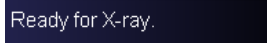


- (1) Menu bar
- (2) Status bar
- (3) Control area (shown here with maximum functionality in the **Extended** display mode)
- (4) Image area

## *Menu bar*

The user can access various functions using the menu bar. It opens when the mouse cursor is moved to the upper edge of the monitor.

## *Status bar*



Ready for X-ray.

System messages indicating the current state of the system or error messages are displayed in the lower part of the control area.

### **NaviLink 2D**



If the **NaviLink 2D** option is available in the system and communication between the navigation system and the C-arm is activated, you can see the **NaviLink 2D** icon in the status bar of the **Examination** task card.

The navigation system sends a message to the C-arm system signaling readiness for receiving images. The C-arm system receives the message, identifies the sending navigation system and responds. At this moment, communication between the two systems is activated and the **NaviLink 2D** icon appears in the status bar of the **Examination** task card. As soon as the communication connection is terminated, the **NaviLink 2D** icon disappears again.

## *Control area*

The display of the control area and the availability of functions depends on the selected display mode.

Depending on the display mode, the following data is displayed within the control area:

- ☐ Information about the current patient
- ☐ Examination settings
- ☐ The current state of the ARCADIS Varic



### Display modes

The **Basic** display mode reduces the user interface to the display of basic functions. This mode is recommended for examinations that are to be performed with the standard exposure parameters of the body region to be examined.

In the **Extended** display mode, the full functionality of the user interface is shown. This allows for detailed examination settings, with additional information displayed.

Basic / Extended

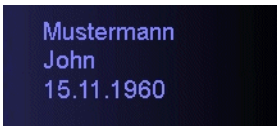
You can switch between the two display modes at any time with the **Basic/Extended** button.



(1) Control area in the **Basic** display mode

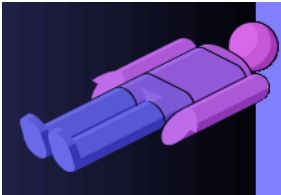
(2) Control area in the **Extended** display mode

## *Patient data*



The registered patient's last name, first name and date of birth appear in the upper control area. The data are shown in both display modes.

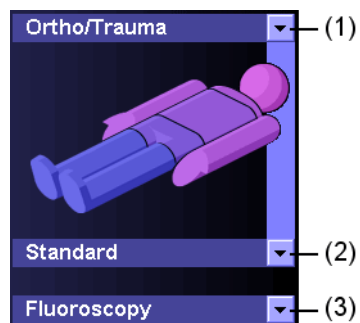
## *Virtual patient anatomy (VPA)*



The upper control area shows a schematic virtual patient anatomy for selecting a body region (VPA = **V**irtual **P**atient **A**natomy). The display is available in both display modes.

## *Selection area for examination settings (Extended display mode only)*

The selection area for examination settings offers several selection lists that can be opened by using arrow symbols.



- (1) Selection list of medical application areas
- (2) Selection list of exam sets
- (3) Selection list of operating modes

*Radiation data (Extended display mode only)*

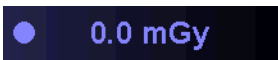
The different dose levels of the selected exam set are displayed in a progress bar.



Here, the entire fluoroscopic time since the start of the examination of a patient is displayed.



The cumulative area dose product for the current patient is displayed, if the optional dose measurement chamber is installed.



*As an alternative:* Display of air kerma values. The cumulated air kerma value is identified by a preceding dot.



*The reference location for determining the air kerma strength with the optional dose measurement chamber is 30 cm in front of the image intensifier 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 I.I.*



*Depending on country-specific regulations, you can have Siemens Service change the display so that it indicates the air kerma and cumulated air kerma value instead of the area dose product.*

### *Image area*

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 (see → Register 6: Image Processing, Page 78).



(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 **Examination** task card.

#### **Last Image Hold (LIH)**

The last fluoro image (Last Image Hold) is displayed in the **Examination** task card as soon as the exposure is terminated.

## Performing the examination

After you have registered the patient for the examination, the **Examination** task card appears automatically. Here you can check the default examination parameters. If necessary, you can change the settings in the control area or at the control panel of the C-arm system.

Individual exposures are released directly at the C-arm system with the hand switch or footswitch.



*If you x-ray a patient without having registered him/her, this patient will have the status of an emergency patient in the local database.*

## Examination settings

In the **Examination** card standard exposure parameters for the medical application area **Ortho/Trauma** are already preset. If these settings are appropriate for your examination, you can start the exposure immediately on the ARCADIS Varic (→ Page 17).

To examine other body regions, you must first select them in the **Examination** task card. You can use the **Basic** display mode if otherwise the standard exposure parameters for the corresponding body region are to be used (→ Page 12).

If, however, you want to optimize the examination settings according to your medical indication, simply call up the required parameters by using the corresponding selection lists. In this case, switch to the **Extended** display mode (→ Page 13).

## Basic display mode

In the **simple** display mode, the user only has to select the body region. The medical application area, the examination program and the operating mode are then preset automatically.



*You can define the presettings for individual body regions in the **Basic setting configuration** window (→ Register 8: Configuration, Page 5).*

### Activating the simple display mode

Basic / Extended

- ◆ Click here to switch from the expanded to the simple display mode.

## Body region

### Selecting a body region



- ◆ Click on the body region that you want to examine.
  - The activated body region is highlighted in a light color.

### Deactivating the selected body region



- ◆ Click in the area outside of all body regions.
  - The deactivated body region is displayed in the original color.

Or

- ◆ Click on another body region that you want to examine.



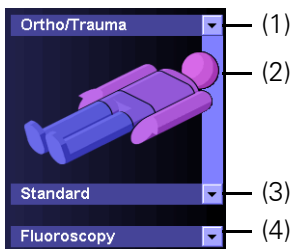
*If no body region is selected, the standard program for general purposes is activated.*

## Starting the examination

- ◆ Start your examination at the C-arm system (→ Page 17).

## Extended display mode

The different examination settings are divided into different parameter sets that are structured hierarchically. The sequence of the associated selection fields in the **Examination** task card corresponds exactly to this hierarchy. Therefore, when defining the desired settings, you simply proceed from top to bottom in the control area:



1. Selection of the medical application area
2. Selection of the body region to be examined
3. Selection of the exam set (thereby setting the dose)
4. Selection of the operating mode (thereby loading the parameter settings of the associated operating program)

### Activating the expanded display mode

Basic / Extended

- ◆ Click here to switch from the simple to the expanded display mode.

## Medical application area

First select the scheduled medical application area.

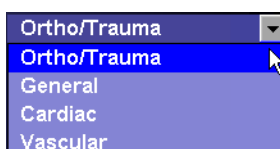
General



*You can configure which application area is automatically selected after patient registration.*

Each medical application area is assigned a specific standard program. As soon as the application area is activated, you can perform an X-ray examination right away.

### Selecting the application area



- ◆ Select the required medical application area for your examination in the list.

## Body region

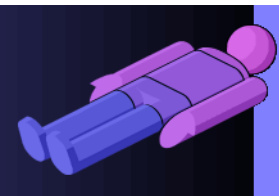
If you want to X-ray a specific body region within an application area, several examination programs adapted especially to this special body region are at your disposal. They can be selected using the VPA (**V**irtual **P**atient **A**natomy).

### Selecting a body region



- ◆ Click on the body region that you want to examine.
  - The activated body region is highlighted in a light color.

### Deactivating the selected body region



- ◆ Click in the area outside of all body regions.
  - The deactivated body region is displayed in the original color.

Or

- ◆ Click on another body region that you want to examine.



*If no body region is selected, the standard program for the selected application area is activated.*



### *Exam set*

Three different dose programs are available for each selectable body region. These programs are contained in the operating mode settings.

When a body region is selected, the **Standard Dose** program is activated:

#### **Modifying the dose**

Usually a dose rate deviating from the standard setting is reasonable only if you have to adapt the dose to the particular anatomical conditions of the patient (e.g. very slim or obese patients).

Standard ▼

- ◆ Use the selection list to select another exam set (dose program), if necessary.
  - With **Reduced Dose** you set the minimum dose rate which provides a satisfactory image quality for the selected body region.



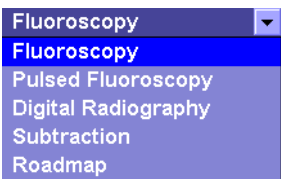
*If you change the exam set, the fluoroscopy mode is automatically set. Even if a different LUT is stored with the new exam set, the display of the current image (LIH) or of the subtracted image does not change (the current LUT is maintained).*

Operating mode

The different operating modes are defined in each examination set. They can be activated at the monitor trolley and at the C-arm system as well as with the multifunctional footswitch (option). The default setting is **Fluoroscopy**:



Switching the operating mode



- ◆ Use the selection list to select another operating mode, if necessary.
- Or
- ◆ Press the corresponding icon button at the C-arm system.  
(→ Register 3: System Description).
    - The selected operating mode is displayed as a symbol in the control area.

Standard	Symbol	Option	Symbol
Fluoroscopy		Roadmap	
Pulsed Fluoroscopy		Subtraction	
Digital Radiography			



*Using the footswitch, the operating mode can be changed temporarily, depending on the pedal actuated.*

*(→ Register 3: System Description)*

*With an additional operating element on the (optional) multifunctional footswitch you can select the operating mode permanently.*

*(→ Register 11: Options, Page 8)*

*During the exposure, the **Examination** task card always shows the symbol of the operating mode in which radiation is released. If no radiation is released, you will see the symbol of the operating mode currently selected at the control panel of the C-arm system or in the **Examination** task card.*

## Acquisition

All further steps of the examination are performed at the C-arm system.  
For detailed information please read (→ Register 3: System Description, Page 9).

## Releasing radiation

- ◆ Release radiation with the hand switch or footswitch.
  - The current fluoro image is displayed on the left (live) monitor.

## Saving and displaying images

In the Continuous Fluoroscopy, Pulsed Fluoroscopy, Subtraction and Roadmap modes, images can be stored during the examination. Images which you later want to print to a local printer, must be saved during the examination.



*Frequent activation of the Save button during fluoroscopy can delay the storage process.*

### Storing images (during radiation)



- ◆ Press this key on the control panel of the C-arm system.
  - or –
- ◆ Press this key on the hand switch.
  - The current image (or the subtraction image in Sub/Roadmap mode) is saved to the local database. All images saved in the course of an examination are stored as a series.
  - The saved image is displayed on the right (reference) monitor (→ Page 25).



*If the examination program used is configured to save all images automatically, the **Save Image** key is inactive.*

## Storing images (after radiation)



- ◆ Press this key on the control panel of the C-arm system.
  - or –
- ◆ 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 saved LIH is displayed on the right (reference) monitor (→ Page 25).

## Changing the image display



The control panel of the C-arm system provides basic tools for optimizing the image display of the **Examination** task card.

- ◆ Edge enhancement (4 levels).
- ◆ Selection of LUT steps on monitor A.
- ◆ Enlarging/reducing the image.



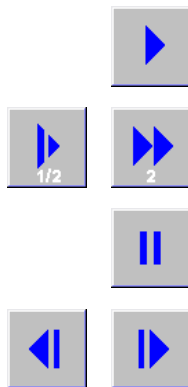
*During an examination, single frames and scenes can automatically be loaded into the **References** card (→ Page 31). Changes in edge enhancement only affect the left monitor (the image is displayed with an enhanced or less enhanced edge). The reference image on the right monitor is not affected. If the difference between the images on the left and right monitor is a distraction, it is recommended not to change the edge enhancement at the control panel of the C-arm system during the examination.*

### *Reviewing and storing a scene*

In the Continuous Fluoroscopy, Pulsed Fluoroscopy, Subtraction and Roadmap modes, scenes can be reviewed and stored (LSH, Last Scene Hold) during the examination.

#### **Reviewing a scene**

As soon as the exposure is finished, buttons for controlling scene review are displayed in the control area of the **Examination** task card.



◆ Start (review speed matches the storage rate).

◆ Review at half/double speed.

◆ Pause.

◆ Previous/next frame.



*If **Autoloop** is configured in the exam set used, review of the scene is started automatically at the end of radiation.*

#### **Storing the scene**

Prerequisite: Scene review has been stopped.

◆ Select **Patient > Save LSH Scene** from the main menu.

– or –

◆ Press function key **F9** on the keyboard.

– The last 120 images are stored in the local database.

– You can load the scene into the **Viewing** task card at any time and review it there.



*If the exam set used is configured to automatically save all images, manual saving is not necessary and therefore not possible.*

## *Completing the examination*

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 him or her at once. In this case the examination of the current patient is automatically finished.

### **Finishing an examination**

- ◆ Call up **Patient > End Exam** in the main menu.
  - or —
- ◆ Press function key **F4**.
  - The examination is concluded. Patient and examination data are deleted from the **Examination** card.
  - If the MPPS option is installed, the **Modality Performed Procedure Step** window for performance documentation is now displayed automatically. (→ Register 4: Patient data, Page 42).

### **Examining the next patient**

- ◆ Call up **Patient > Register** in the main menu and register the next patient for the examination.
  - The examination of the previous patient is completed.
  - The data of the new patient are loaded into the **Examination** card.

## Special examinations

The following optional operating modes require special procedures deviating from the standard examination:

- ☐ Subtraction angiography (SUB)
- ☐ Roadmap



*After incorrect operation, it may be necessary for the user to repeat certain procedures, e.g. administering of contrast agent.*

## Subtraction angiography (SUB)

During the examination, images without contrast medium (mask) are continuously subtracted from images with contrast medium and displayed on the monitor. Depending on the contrast medium flow, they display the relevant vascular segment without superimposition in real time.

### Progression

The subtraction angiography is divided into three phases:

- ☐ Phase A  
Time until the mask is completed (permanently defined)
- ☐ Phase B1  
The time from the "inject" display on the monitor up to when the injection medium has reached the area to be examined
- ☐ Phase B2  
Time of the actual exposure of the examination region



*If Auto Save is activated in the configuration menu, you should enter the duration for phase B1 and the storage transfer rate for phases B1 and B2 in that menu. Thus the image memory is not overloaded with unnecessary images.  
(→ Register 8: Configuration, Page 18)*

### Landmark

In some cases it is useful to see the anatomy surrounding the contrast-filled blood vessels. This can be configured gradually prior to the examination using the Landmark function.

(→ Register 8: Configuration, Page 18)

## Performing subtraction angiography



Prerequisite: The patient to be examined has been registered.

- ◆ Make the necessary settings for the examination.  
(→ Page 11)
- ◆ Set the **Subtraction** mode in the **Examination** task card or by pressing the corresponding key on the control panel.
  - The symbol for the current operating mode, **Subtraction**, is displayed.
  - The LED of the **Sub** key lights up.
- ◆ Before starting the exposure, click the **Native** tab on the right monitor.
  - The **Native** task card is placed into the foreground.
- ◆ Release radiation with the hand switch or with the assigned footswitch.
  - During the generation of the mask the native image is displayed on the right monitor.
- ◆ Inject the contrast medium as soon as the syringe symbol appears on the screen.



*Keep the radiation release button pressed until the vessel is filled with contrast medium.*

- On the left monitor you can see the continuous filling of the blood vessel with contrast medium.
- After radiation has been switched off, the left monitor shows a subtraction image with accumulated contrast medium (maximum fill image). The right monitor shows the image with the largest fill phase and anatomical background (native).



## Roadmap

In the first step of the Roadmap examination, the max. fill image is created as a mask from a normal subtraction (phase A and phase B). You can use the existing subtraction mask if you have already performed a subtraction angiography during the current examination. In that case, the first step of the Roadmap examination is not required.



*A previously created subtraction mask can also be used if you have switched to a different operating mode (such as DR). The subtraction mask symbol (display to show existing subtraction mask) will remain active.*

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).

### Generating a new fill image

If there is no suitable subtraction mask (e.g. from a previous subtraction angiography), you have to generate a new fill image.

Prerequisites: The patient to be examined has been registered.

- ◆ Make the necessary settings for the examination.  
(→ Page 11)
- ◆ Set the **Roadmap** mode in the **Examination** task card or by pressing the corresponding key on the control panel.
  - The symbol for the current operating mode, **Roadmap**, is displayed.
  - The LED of the **RoadMap** key lights up.
- ◆ Release radiation with the hand switch or with the assigned footswitch.
  - The live image is displayed on the left monitor.
- ◆ Inject the contrast medium as soon as the syringe symbol appears on the screen.



*Keep the radiation release button pressed until the vessel is filled with contrast medium.*

- ◆ Let go of the radiation release button.
  - Radiation is stopped.

## Using the fill image from subtraction angiography



Prerequisites:

A subtraction angiography (SUB operating mode) was performed at any time during the current examination.

The symbol for an existing subtraction mask is shown in the control area.

- ◆ Press the **RoadMap** key on the control panel *once*.
  - The operating mode is switched to **Roadmap**.
  - If the vessels are easy to recognize, you can now start positioning the catheter.



*If you press the **RoadMap** key twice, the existing subtraction image is discarded. You will then have to regenerate the fill image.*

## Positioning the catheter

- ◆ Release radiation with the hand switch or with the assigned footswitch.
  - The live image is displayed on the left monitor.
- ◆ Position the guide wire or the catheter under fluoroscopic control.
  - The right monitor shows the fluoroscopic image.
  - The left monitor shows the subtracted Roadmap image with catheter.



*You can repeat fluoroscopy as often as needed while you insert the catheter. If you select **RoadMap** again, you will start a new roadmap scene.*

## *References task card*

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. It contains the **Examination** and **Viewing** task cards.
- ☐ The right monitor is used to display reference images and contains the **References, Native** (for the **Subtraction** option), and **Filming** (option) task cards.

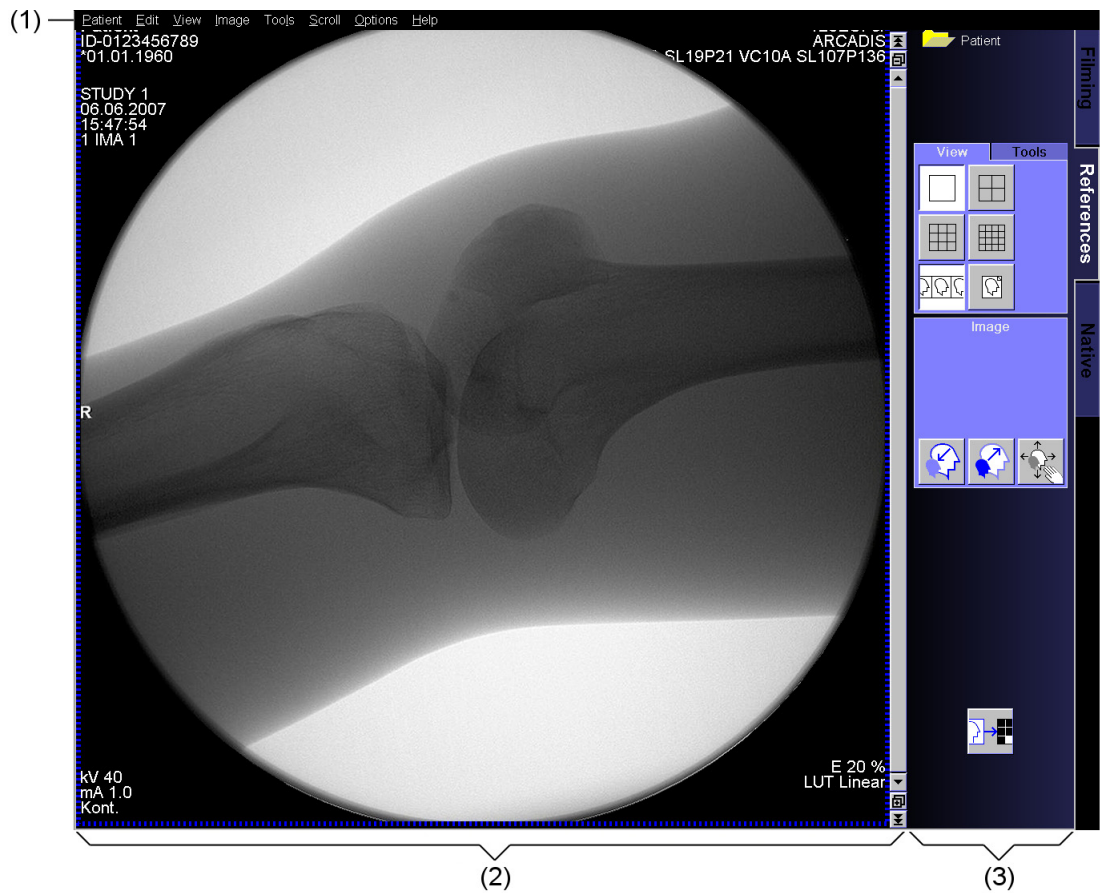
### **Reference images**

The **References** task card is used to display specific images during an examination.

Reference images may be:

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

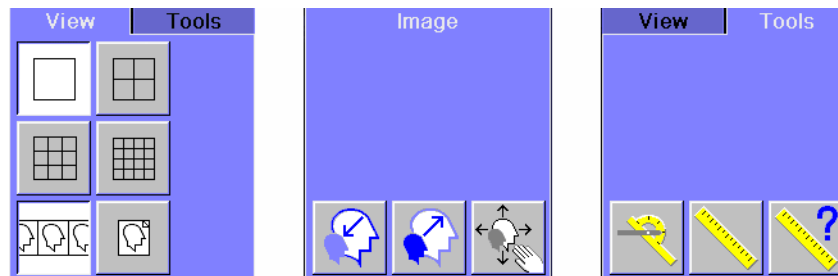
### *Layout of the References task card*



- (1) Menu bar
- (2) Image area
- (3) Control area with subtask cards

## Subtask cards

The function of the individual buttons is the same as in the **Viewing** task card. For detailed instructions on how to use the buttons, please refer to (→ Register 6: Image Processing, Page 5).



Using the **View**, **Image** and **Tools** subtask cards, you can easily change the display of reference images and perform measurements, if necessary.

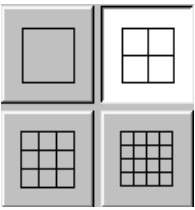




*The **Tools** subtask card is available if your ARCADIS Varic includes the "Measure angles and distances" option.*






This button copies the currently displayed image to the **Filming** task card. From there you can send it to a connected printer.




**View subtask card** The **View** subtask card contains buttons for setting the layout.

	Division of the screen (Single view, 4:1, 9:1 and 16:1)
	Image stripe display (stripe)
	Image stack display (stack)

**Image subtask card** On the **Image** subtask card you will find tools for image processing.

	Reduce image size to half (factor 0.5)
	Zoom in to double image size (factor 2.0)
	Zoom and pan

**Tools subtask card** The **Tools** subtask card contains buttons for image evaluation.

	Angle
	Distance
	Calibration

## *Displaying reference images*

Besides the live images on the left monitor, selected images, e.g. images that you may need for comparisons, can be displayed on the right monitor in the **References** task card.

If images from previous examinations of a patient are required, these must be loaded prior to the new examination.

During the examination, you can define suitable live images as references and manually transfer them to the **References** task card. Depending on the configuration settings, individual images and scenes can also be loaded automatically.

As long as you do not perform an examination, you work directly at the monitor trolley in the **Viewing** and **References** task cards. During an examination you can use the control panel of the C-arm system to control the individual functions of the **References** task card.

## *Operation at the monitor trolley*

You can load images of completed examinations from the **Patient Browser** into the **Viewing** task card, and then into the **References** task card.

Images from the hospital network (e.g. archive) can also be loaded as reference images using the **Viewing** task card. Thus you have the possibility of displaying images from other modalities (e.g. MR, CT etc.) on the **References** task card.

## *Notes*



*Since permanent network functionality cannot always be guaranteed, reference images should be loaded from the network archive before starting an examination.*



*Once a patient has been registered for an examination, only images of the registered patient can be transferred to the **References** task card.*

## Transferring Images

### Selecting images

- ◆ Load the images of the requested patient into the **Viewing** task card by using the **Patient Browser**.
- ◆ Select the reference images in the image area.



*You can also select a single frame from a series as reference image (with Subtraction option).*

### Loading images



- ◆ Click on the icon button of the **References** subtask card in the control area of the **Viewing** task card.
- or –
- ◆ Select **Patient > Copy To References** in the main menu of the **Viewing** task card.
  - The images selected in the **Viewing** task card are loaded into the **References** task card.



*You can use the **View** subtask card in the control area of the **References** task card to change the display of loaded images.*

## Holding a reference image

The **Hold Reference** function allows you to select a particular image and then record it on the right monitor.

- ◆ In the **Options** menu of the **Examination** or **Viewing** task card, select **Hold Reference**.
  - The image is recorded on the right monitor. The menu entry is marked with a check mark.
- ◆ Enable the **Hold Reference** function only after you have copied the desired reference image to the right monitor with the Save button. Otherwise, it may occur that subsequently stored images are not displayed on the right-hand monitor.



*If you save a new image, it is displayed on the right monitor and the held reference image is hidden. Scroll to the held reference image to show it again.*

- ◆ To deactivate the function, deselect **Hold Reference** in the **Options** menu.



## Operation at the C-arm system

During an examination the current live images are displayed in the **Examination** task card.

Select those live images that are suitable as reference images and transfer them to the right monitor in the **References** task card.

### Automatic storing and loading

You can set the system to automatically save images and scenes during the examination. For this purpose, the **Autostore** function must be activated in the operating program of the examination set (see → Register 8: Configuration, Page 13).

In the **Viewer Configuration** dialog box you can specify which of these data will then be automatically transferred to the **References** task card (see → Register 6: Image Processing, Page 77).

### Transferring images manually

As soon as you save an image, it is displayed on the right monitor in the **References** task card.



*Frequent activation of the Save button during fluoroscopy can delay the storage process. In this case an image other than the one last saved may be displayed. If this happens, manually scroll to the last image.*

### Saving an image



- ◆ Press this key on the control panel of the C-arm system.

Or



- ◆ Press this key on the hand switch.
  - The last acquired image is stored and displayed in the **References** task card.
  - If you continue with the examination, the last stored image is always displayed on the right monitor.



*If **Hold Reference** is activated for a particular image, this image is permanently available on the right monitor.*

*(→ Page 30)*

## *Using the References task card*

Besides transferring images, you can select other important functions of the **References** task card from the C-arm system.

### **Scrolling**



- ◆ Scrolling to the next reference image.



- ◆ Scrolling to the previous reference image.

### **Changing the image display**



- ◆ Toggling between single frame and multiple frame display.



- ◆ Selection of LUT steps on monitor B.

### **Print**



- ◆ Printout of one or several reference image(s) on the local printer.
  - If single frame display is selected, the image displayed on the right monitor is printed.
  - If multiple frame display is selected, the images selected on the reference monitor are printed individually.



*Printing does not take place immediately. Images are first transferred to the **Filming** task card and can be printed out later (provided that **Auto Expose** is deactivated).*

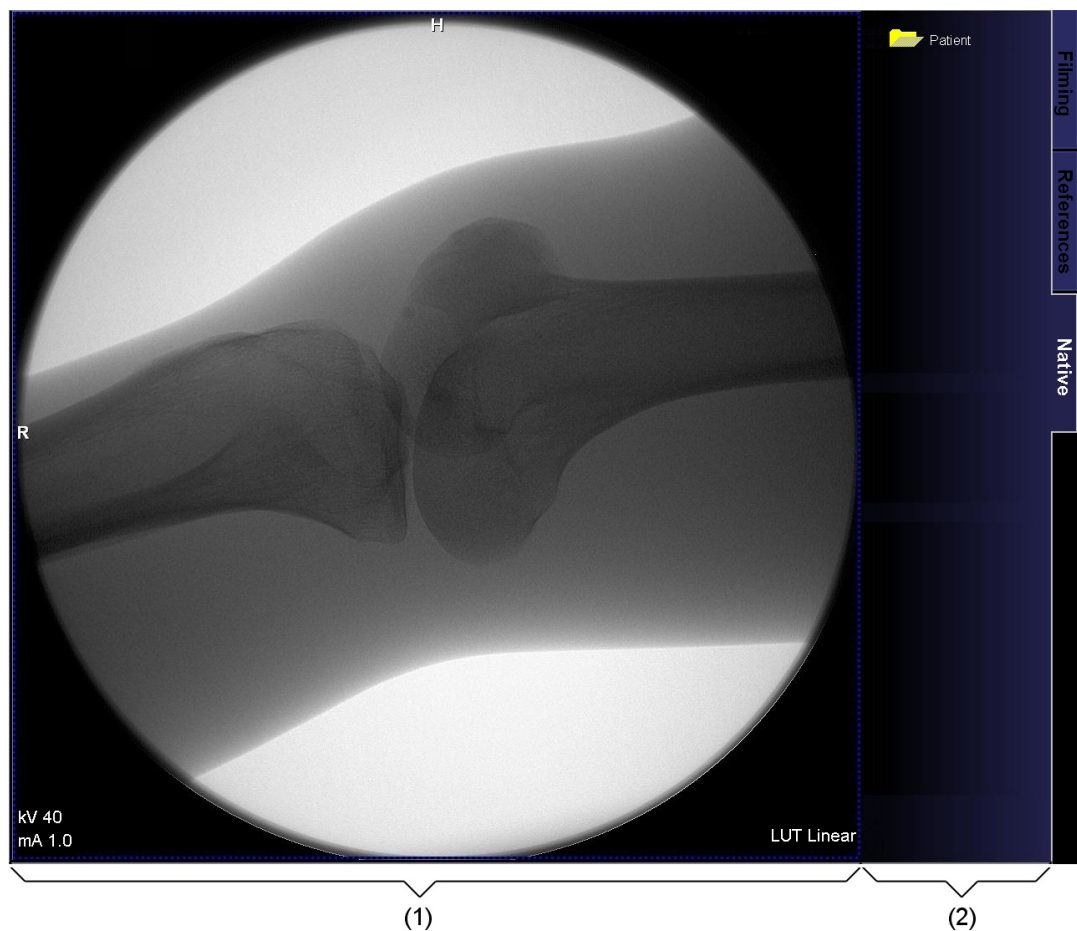
*(→ Register 7: Documentation, Page 19)*

## *Native task card*

The **Native** task card is available if your ARCADIS Varic provides the **Subtraction** operating mode (option).

The **Native** task card allows you to have subtraction images shown on the left monitor and simultaneously displayed as native (unsubtracted) images on the right monitor.

## *Layout of the Native task card*



- (1) Image area for displaying native images
- (2) Control area with patient folder and status bar

## *Displaying native images*

There are basically two cases in which you use the **Native** card for displaying unsubtracted images:

- ❑ During an examination simultaneously with the display of currently calculated subtraction images in the **Examination** card
- ❑ Outside of examinations, simultaneously with the display of subtraction images from the local database in the **Viewing** card

## *Native images during examinations*

If you are working in the **Subtraction** mode and want to have the subtracted image shown on the left monitor displayed as a native image on the right monitor at the same time, you must select the **Native** task card before releasing radiation.

### **Displaying native images**

- ◆ Before starting the exposure, click the **Native** tab on the right monitor.
  - The **Native** task card is placed into the foreground.
- ◆ Start your exposures with the hand switch or the footswitch on the C-arm system.
  - Each new exposure is simultaneously displayed as a native image on the right monitor and as a subtraction image on the left monitor.

### **Saving an image**



When an image is saved, it is automatically transferred to the **References** task card. The **Native** task card stays in the foreground.

- ◆ Press this key on the control panel of the C-arm system.
  - The last acquired image is stored.
- ◆ Click the **References** tab.
  - The stored reference image is displayed.
- ◆ Click the **Native** tab.
  - The **Native** task card is placed in the foreground again.
  - Each additional exposure is displayed as a native image on the right monitor.

### **Deactivating the Native task card**

If you want to deactivate the **Native** task card, simply select the **References** task card.

- ◆ Click the **References** tab.
  - The **References** task card is placed in the foreground.

## *Native images from the database*

Native images from previous examinations acquired in **Subtraction** mode (option) or **Roadmap** mode (option) are stored in the local database or in your archive together with the subtraction images. Both image types can be displayed simultaneously on both monitors.

### **Loading and displaying images**



- ◆ Load the images of the requested patient into the **Viewing** task card by using the **Patient Browser**.
- ◆ Select **Sub > Sub/Native Display** in the main menu of the **Viewing** task card.
- or —
- ◆ Click this button in the **Sub** subtask card.
  - In the **Viewing** task card the subtraction images are displayed on the left monitor.
  - In the **Native** task card the corresponding native images are displayed on the right monitor.

### **Closing the patient**

After finishing your evaluation of patient images, close the folder of this patient. Now you can load images of the next patient.

- ◆ Select **Patient > Close Patient** in the main menu of the **Viewing** task card.
  - The images in the **Viewing** and **Native** task cards are unloaded. Both task cards are empty now.

## Reports

Certain examination data can be stored as structured reports (SR).  
ARCADIS Varic offers the following types of reports:

- ☐ Radiation Summary Report
- ☐ LithoReport

**Use** The reports serve to document examination and treatment data. They are mostly generated automatically. You can read, edit and print the reports and export statistics.

**Prerequisite** The reports require the examination of a registered patient.






*With the LithoReport option, please note that triggering of shots at the lithotripter is also possible only after the patient has been registered.*

**Security settings** All processes related to reporting are recorded in the audit trail. This applies to generating, opening and editing a report as well as to printing reports and exporting statistics.

**Formats** Reports are saved in two different formats. This allows them to be opened in different applications.

- ☐ Secondary Captures (SC)  
Allows loading into Viewing, for example; PACS compatible
- ☐ Structured Report (SR)  
Data format that is compatible with other DICOM systems; reports are automatically exported in DICOM-SR format

**Display in the Patient Browser** Reports are identified in the **Patient Browser** as follows, irrespective of the reporting type:

Symbol	Comment
	Symbol in the navigation area (series level)
	Symbol in the content area (instance level) Format: Secondary Capture (SC)
	Symbol in the content area (instance level) Format: Structured Report (SR)

## Radiation Summary Report

The Radiation Summary Report contains the cumulated values for the number of exposures, examination duration and dose. The generation of this report is a fully automatic process.

The screenshot shows a software window titled "Radiation Summary Report" with a subtitle "POSTPROCESSING REPORT". The window is divided into several sections:

- Top Bar:** Contains two icon buttons (1).
- Header:** The title "Radiation Summary Report" and subtitle "POSTPROCESSING REPORT" (2).
- Status Section:** Labeled "STATUS" vertically, it contains "Completion flag" set to "complete" and "Verification flag" set to "unverified" (3).
- Patient Section:** Labeled "PATIENT" vertically, it contains fields for Name (Barajas Majaro), First name (Jose), Pat.-ID (05.10.10-09:54:02-DST-1.3.12.2), Date of birth (11/18/1858), Age (147) Years, Sex (male selected, female unselected), Weight (kg), and Height (cm).
- Institution Section:** Labeled "INSTITUTION" vertically, it contains fields for Hospital, ZIP City, Street Street No, Country, and Phone: Phone No.
- Radiation Data Section:** Labeled "RADIATION DATA" vertically, it contains fields for Start of examination (2/15/2006 16:27:51), End of examination (2/15/2006 17:43:38), Total number of exposures (0), Cumulative fluoro time (00:00:00) with unit hh:mm:ss, and Cumulative area dose product (13.8) with unit cGycm2 (4).
- Bottom Bar:** Contains "OK", "Apply", and "Cancel" buttons.

- (1) Icon buttons (printing a report)
- (2) Generation status  
EXAMINATION REPORT: Treatment in process, report is being generated.  
POSTPROCESSING REPORT: Treatment is finished, the report has been completed and stored and can be postprocessed.
- (3) Work status and verification status
- (4) Content area

### *Opening a report*

#### **For the current patient**

- ◆ Select **Reporting > Open Report** in the **Viewing** task card.
  - The report for the current patient is opened.



*If several reports exist for the patient loaded in the **Viewing** task card, a dialog box is displayed in which you select the required report.*

#### **For another patient**

- ◆ Double-click the required report in the content area of the **Patient Browser**.  
Or
- ◆ Select the report in the **Patient Browser**.
- ◆ Select **Reporting > Open Report** or click the relevant button in the tool bar of the **Patient Browser**.
  - The selected report is opened.



### *Editing a report*

Apart from the work and verification status, no changes are required in the Radiation Summary Report. The other entries can therefore not be edited.

#### **Setting the status**

The status for the postprocessing report is set according to the work progress. A report with the "verified" status can be printed out for documentation purposes.

- ◆ Select the relevant work status/verification status in the selection lists in the status area.
- ◆ Click **Apply**.





### *Printing a report*

You can display a print preview of the completed report or send the report to a connected printer straight away.

#### **Calling up the print preview**

- ◆ Select **Reporting > Print Preview** in the menu of the **Patient Browser**.
  - The print preview of the report is displayed. Here you can scroll through the individual pages and check the entries.

#### **Print**

- ◆ Select **Reporting > Print** in the menu of the **Patient Browser**.

— or —



- ◆ Click this button in the report window or in the print preview.
  - The **Print Report** dialog box is opened. Here you can make the necessary print settings and start the print job.

## LithoReport

The LithoReport is generated for extracorporeal shockwave lithotripsy (ESWL) provided that the lithotripsy function is enabled on your ARCADIS Varic system and the lithotripter is connected to the C-arm system.

Part of the data are automatically recorded during treatment. Any other data can be added and postprocessed by you at any time.

The screenshot shows the 'Litho-Report Editor' window with the title bar 'Miller (Id: 1234567); Acc. num.: n.a.; Report-Id: 6001; Ver.: 1 - Litho-Report Editor'. The window is divided into several sections:

- Top Bar:** Contains two icon buttons (1) for printing and saving.
- Generation Status:** Labeled 'LithoReport EXAMINATION REPORT' (2). It includes 'Completion flag' (partial) and 'Verification flag' (unverified).
- Patient / Institution Section:**
  - Patient (3):** Fields for Date of treatment (11/24/2004), Accession Nr., Pat-ID (1234567), Name (Miller), First name (Arthur), Date of birth (1/1/1911), Age (93 Y), Sex (male), Weight (kg), and Height (cm).
  - Institution:** Fields for Institution, City, Street, Country, and Phone (56789).
  - Follow up:** Fields for Ambulant / Ward (Ambulant), Performing physician (Physician 1), Assistance (Assistant 1), and Anesthetist (Anesthetist 1).
- Diagnosis Section:**
  - Diagnosis:** Checkboxes for Ultrasound, KUB / lmg without contr. med., IVP, X-Ray, and Ultrasound.
  - Localization with:** Checkboxes for X-Ray and Ultrasound.
  - Urinary obstruction:** Dropdown menu set to 'None'.
  - First treatment/ Retreatment:** Dropdown menu set to 'Treatment 1'.
  - Primary stone location:** A diagram of the urinary system with 'R' and 'L' labels.
  - Stone size:** Dropdown menu set to '3 - 5 mm'.
  - Multiple stones:** Checkbox.
- Bottom Bar:** Contains four buttons: OK, Apply, Edit, and Cancel (4).

(1) Icon buttons (printing a report)

(2) Generation status

EXAMINATION REPORT: Treatment in process, report is being generated.  
POSTPROCESSING REPORT: Treatment is finished, the report has been completed and stored and can be postprocessed.

(3) Work status and verification status

(4) Content area

### Opening a report

After starting the ESWL treatment, the Report Editor is automatically opened in editing mode. The relevant report needs to be opened manually only for later postprocessing.

#### Opening the report for the current patient

- ◆ Select **Reporting > Open Report** in the **Viewing** task card.
  - The report for the current patient is opened.



*If several reports exist for the patient loaded in the **Viewing** task card, a dialog box is displayed in which you select the required report.*

#### Opening a report for another patient

- ◆ Double-click the required report in the content area of the **Patient Browser**.  
Or

- ◆ Select the report in the **Patient Browser**.

- ◆ Select **Reporting > Open Report** or click the relevant button in the tool bar of the **Patient Browser**.
  - The selected report is opened.



### Editing a report

The content area of the LithoReport is subdivided into 4 cards in which you can add any missing information relating to the examination and treatment.

#### Entering patient and diagnostic data

On the **Patient/Diagnosis** card, you enter data relating to the diagnosis and your organization.

- ◆ Click the **Patient/Diagnosis** card into the foreground.
  - The patient data are automatically transferred from the registration.
- ◆ Enter the missing data in the active fields.
- ◆ Click **Apply**.

Apply

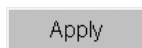
## Entering treatment data



On the **Therapy** card, you enter data in preparation for treatment.

- ◆ Click the **Therapy** card into the foreground.
  - The shockwave data of the treatment are entered automatically.
- ◆ Enter the missing data in the active fields.
- ◆ Click **Apply**.

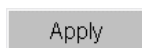
## Adding summary data



The **Summary** card already contains the permanent examination data (in particular relating to radiation). Here you can enter additional information on the examination and treatment.

- ◆ Click the **Summary** card into the foreground.
  - The patient data are automatically transferred from the registration.
- ◆ Enter the missing data in the active fields.
- ◆ Click **Apply**.

## Entering follow-up data



On the **Follow up** card, you enter the measures to be taken following the examination and treatment.

- ◆ Click the **Follow up** card into the foreground.
- ◆ Enter the missing data in the active fields.
- ◆ Click **Apply**.

**Setting the status**

For the postprocessing reports the work and verification statuses are set according to the work progress. A report with the "verified" status can be printed out for documentation purposes.

- ◆ Select the relevant work status/verification status in the selection lists in the status area.



- ◆ Click **Apply**.

Or



- ◆ Click **OK** to accept the changes and close the LithoReport.



*The **OK** button is enabled only if the patient has been closed.*

*Printing a report*

You can display a print preview of the completed report or send the report to a connected printer straight away.

**Calling up the print preview**

- ◆ Select **Reporting > Print Preview** in the menu of the **Patient Browser**.
  - The print preview of the report is displayed. Here you can scroll through the individual pages and check the entries.

**Print**

- ◆ Select **Reporting > Print** in the menu of the **Patient Browser**.

— or —



- ◆ Click this button in the report window or in the print preview.
  - The **Print Report** dialog box is opened. Here you can make the necessary print settings and start the print job.

## Export for statistical evaluations

In the **Viewing** task card you can have statistical data on a LithoReport compiled taking into account other LithoReports, and export the data in meta format. The exported file can be opened and edited with different programs, e.g. Microsoft Excel.



*A report can be exported only if it has reached the status "completed" and "verified".*

### Opening the export dialog window

In the export dialog you define the criteria for the comparison data. The program then searches the local database for all reports meeting these criteria.

- ◆ In the **Viewing** task card, open the LithoReport for which you want to compile comparison data.
- ◆ Select **Reporting > Export Statistics To** in the main menu.
  - The **Export Statistics To** dialog box is opened.

**Export Statistics To**

Reports created between

year	month	day	hour	minute
2004	11	24	00	00

and

year	month	day	hour	minute
2004	11	24	23	59

Evaluation groups

All groups

- Sex
- Age
- Ambulant / Ward
- Performing physician
- Primary stone location

Active groups

Evaluation parameters

All parameters

- Urinary obstruction
- Auxiliary procedures
- Treatment duration
- Thromboelastography

Active parameters

Result

Export Statistics

Close

**Exporting**A rectangular button with a light gray background and a thin black border. The text "Export Statistics" is centered in a black, sans-serif font.A rectangular button with a light gray background and a thin black border. The text "Close" is centered in a black, sans-serif font.

- ◆ Define the reporting period, evaluation groups and evaluation parameters as filter criteria.
- ◆ Enter the name of the output file in the **Result** field.
- ◆ Click **Export Statistics**.
  - The data search is started and the file is exported. A progress bar informs you of the progress of the export process.
- ◆ Click on **Close**.
  - The dialog box closes. The export process is continued in the background until it is successfully completed.

## Configuration

The generation, printing and exporting of reports is configured in the **Structured Reporting** dialog. Depending on the type of report (LithoReport or Radiation Summary Report), you have different configuration possibilities.

### Calling up the configuration window

You can call up the configuration window from the **syngo Configuration Panel**.

- ◆ Select **Options > Configuration** from the main menu.
- ◆ Double-click the **Structured Reporting** button.
  - The **Structured Reporting** dialog is displayed.



Structured  
Reporting

### Configuring the LithoReport

To configure a LithoReport, you perform settings on the following cards:

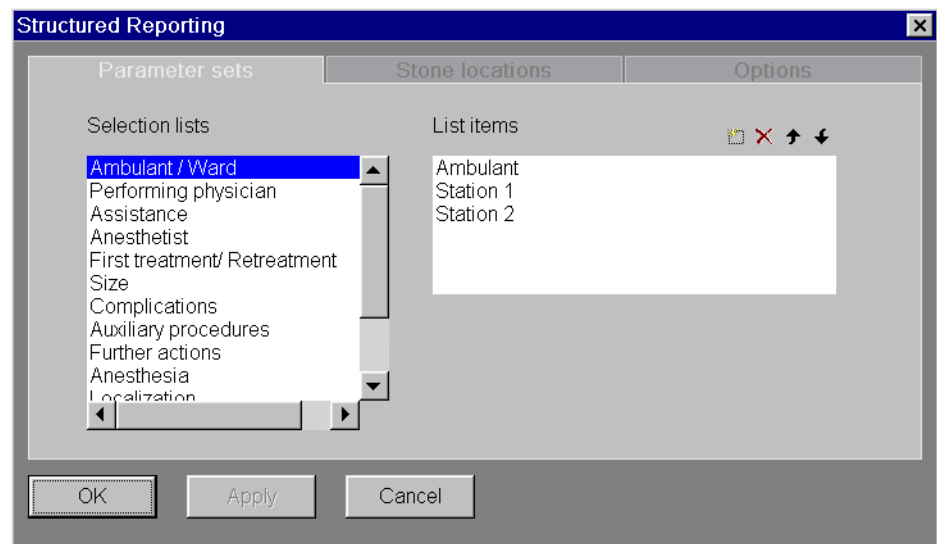
- ☐ **Parameter sets:** Here you define the contents of different selection lists.
- ☐ **Stone locations:** Here you define the position indications for nephroliths (gallstones etc.).
- ☐ **Options:** Here you perform the presettings for LithoReport printing.



### Configuring selection lists

To generate a LithoReport, you define in the **Parameter sets** card which entries are to be shown in the selection lists.

- ◆ Click the **Parameter sets** card into the foreground.



- ◆ In the left list, select the parameter for which you want to configure the selection list.
  - In the right list you can see the currently available selection possibilities for this parameter.

Using the icon buttons above the list, you can adapt the list to your requirements.

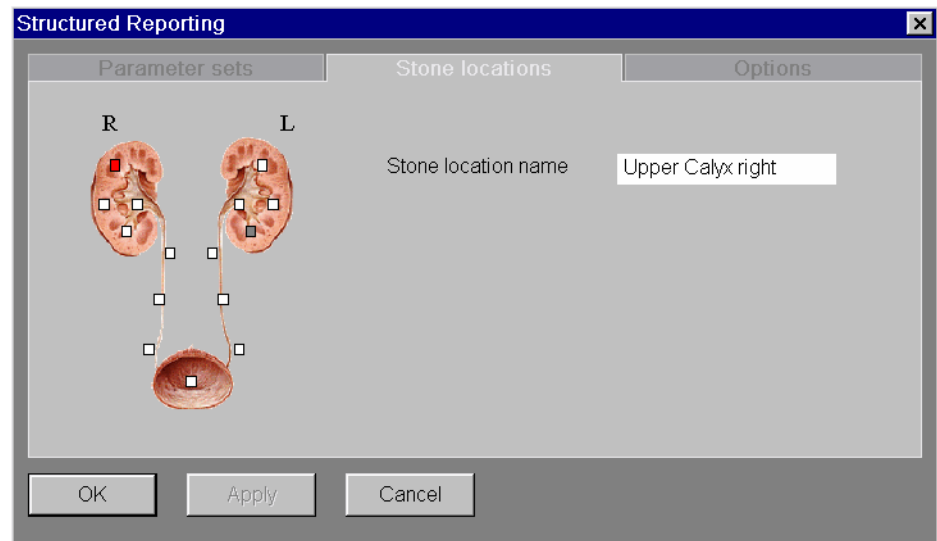
Symbol	Comment
	Inserts another list entry.
	Deletes the active list entry.
	Moves the active list entry up one line.
	Moves the active list entry down one line.

- ◆ If necessary, select the list entry that you want to edit and click on the icon of the required function.

### *Defining designations for stone locations*

On the **Stone locations** card, typical body positions for nephroliths are displayed. Every position is marked by a small square. You can give a name to each of these locations.

- ◆ Click the **Stone locations** card into the foreground.



- ◆ Click on the square of the position to be named.
  - If this position has already been named, the name will be displayed in the entry field.
- ◆ Enter a suitable name.
- ◆ Proceed in the same way to name the other positions you require.

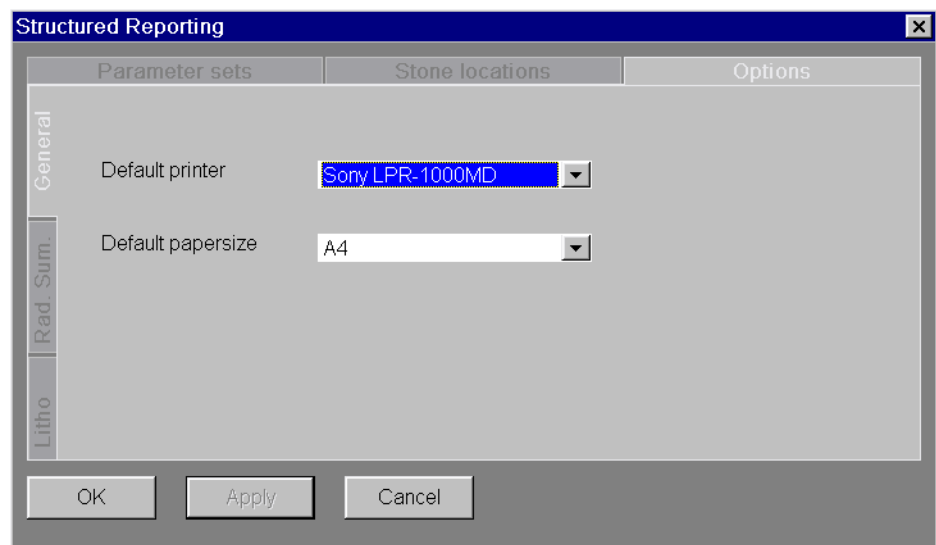
### Defining print settings

On the **Options** card, you can define print settings for the reports.

- ◆ Click the **Options** card into the foreground.
  - The card has three subcards that you can access using the tab at the left-hand edge.

#### Defining default print settings

- ◆ Click the **General** subcard into the foreground.



- ◆ Select the required printer from the **Default printer** selection list.
- ◆ Select the required paper size from the **Default papersize** selection list.

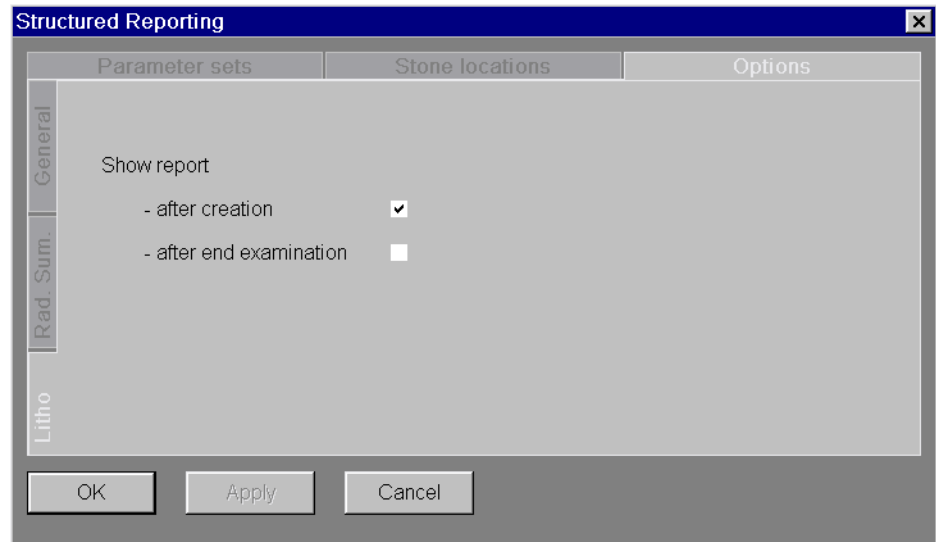


*The default print settings on the **General** subcard are valid for the LithoReport and the Radiation Summary Report.*

### Displaying the LithoReport automatically

On the **Litho** subcard, you can define when a report is to be shown automatically.

- ◆ Click the **Litho** subcard into the foreground.



- ◆ Check the check box **after creation**, if you want the report to be displayed automatically after it has been generated.
- ◆ Check the check box **after end examination**, if you want the report to be displayed automatically at the end of the examination.

### Configuring the Radiation Summary Report

The **Options** card is available for the configuration of a Radiation Summary Report. No settings are made on the other two cards.

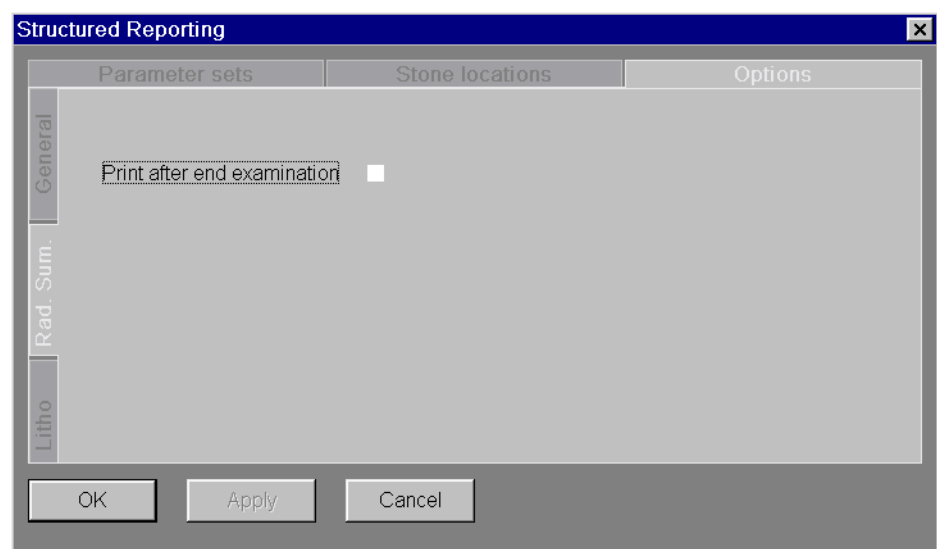
- ◆ Click the **Options** card into the foreground.
  - The **General** subcard is opened.



*The default print settings on the **General** subcard are valid for the LithoReport and the Radiation Summary Report.*  
 (→ Page 49)

### Printing the Radiation Summary Report automatically

- ◆ Click the **Rad. Sum.** subcard into the foreground.



- ◆ Check the check box **Print after end examination**, if you want to print the Radiation Summary Report automatically at the end of the examination.

### *Applying configuration settings*

After you have made all the required settings, you apply them to your system.

- ◆ Click **OK** to apply the settings and to close the configuration window.

Or

- ◆ Click **Apply** to apply the settings without closing the configuration window.



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## *Introduction*

On the **Viewing** task card, you can view the results of an examination and evaluate them. You can also compare image material of different examinations and, depending on the configuration, of different patients.

### **Loading and displaying images**

You can load the images from the **Patient Browser** into the **Viewing** task card. Here you can select one of various ways of arranging the image material and displaying it in the clearest way for your diagnostic problem.

### **Processing and evaluating images**

On the **Viewing** task card, you can then process and evaluate the images:

- ☐ You can change window values, zoom, pan, rotate, and flip images.
- ☐ You can add comments to relevant image parts.
- ☐ You can measure and evaluate distances and angles in images.

Images that are loaded into the **Viewing** task card can also be loaded into the **References** task card. This also applies for patient images from previous examinations or images that were acquired with other modalities (e.g. MR/CT).

### **Storing, filming and transferring images**

You can save the images you have processed and evaluated, you can print them or expose them on film or send them to other locations in your hospital.

### *The Viewing task card*

As soon as you have loaded images into the **Viewing** task card, the task card moves into the foreground. You can, however, switch to other applications at any time and resume image processing on the **Viewing** task card later.

The **Viewing** task card is divided into four areas.



- (1) Menu bar with specific entries for viewing and processing images
- (2) Status bar for system messages
- (3) Control area
- (4) Image area

## *Image area*

In the image area, the images that you have loaded into the **Viewing** task card are displayed.

### **Display of the image area**

The image area is subdivided into segments. One image is displayed in each segment. Depending on the division of the screen and the number of images loaded, you can only see some of the images. The remaining images are in the background. The last loaded image is displayed in the top left segment.

You can choose between the following layouts:

- ☐ Small-format layout  
An overview of many images at the same time is displayed.
- ☐ Large-format layout  
Only a few images are displayed on one page in a format large enough to show all details.

### **Image, text and graphic objects**

In the **Viewing** task card, medical images can be supplemented with graphic elements or texts.

## *Control area*

In the control area, you will find the tools you need to select image material, arrange the screen display and process images.

Here you can also control data exchange with other parts of the program and access other applications.

The display of the control area and the availability of functions depends on the selected display mode.

## *Display modes*

The **Basic** display mode is designed for standard post-processing steps. The control area is limited to the essential functions.

The **Extended** display mode contains additional functions for detailed evaluations and post-processing.

You can switch between the two display modes at any time with the **Basic/Extended** button.

Basic / Extended



- (1) Control area in the Basic display mode
- (2) Control area in the Extended display mode

## *Patient information*



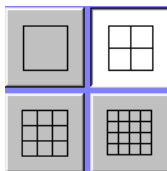
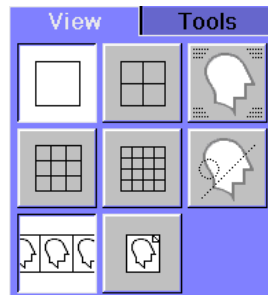
In the upper part of the control area, you can see the names of the patients whose images are currently loaded in the **Viewing** task card. In the **Viewing** task card, you can manage up to three patients.

### Subtask cards

The subtask cards contain buttons for accessing editing tools, defining display modes, transferring image data and switching to other applications.

#### View subtask card

The **View** subtask card shows keys for setting up the layout (the **Basic** display mode only has the first row of keys).



Division of the screen (full screen 1:1, 4:1, 9:1 and 16:1)



Image stripe display (stripe)



Image stack display (stack)



Showing/hiding image text



Showing/hiding graphic elements and comments

## Tools subtask card

The **Tools** subtask card includes keys for image evaluation and commenting (the **Basic** display mode only has the first row of keys).



Use a shutter



Magnifier



Insert an annotation into the image



Angle (option)



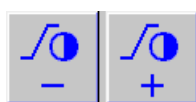
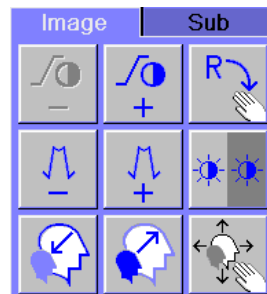
Distance (option)



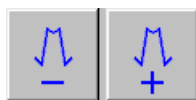
Distance calibration (option)

**Image subtask card**

The **Image** subtask card shows tool keys for image editing (the **Basic** display mode only has the first row of keys).



Switch brightness/contrast characteristic (LUT) to previous (–) and next (+)



Reduce (–) and increase (+) edge enhancement



Inverting gray-scale values



Reduce an image by factor 0.5



Enlarge an image by factor 2.0



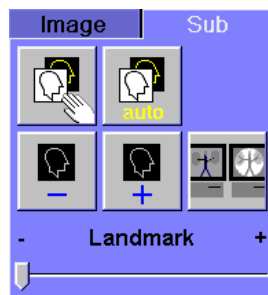
Zoom or pan the image



Rotating an image

## Sub subtask card (optional)

The **Sub** subtask card is only available with the Subtraction option.



Pixelshift



Auto Pixelshift



Change the mask – and +



Dual Channel Mode (Sub/Native Display)

☐ Subtracted image on monitor A (left)

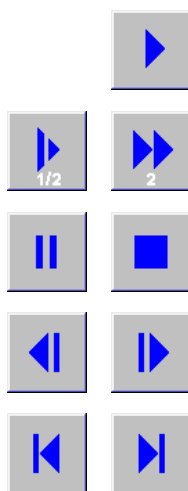
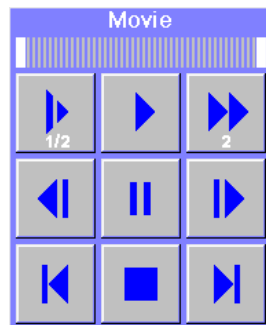
☐ Native image on monitor B (right)

Display the anatomical background





**Movie subtask card** The **Movie** subtask card contains control functions to play a scene as a movie.



- ◆ Start (review speed matches the storage rate).
- ◆ Review at half/double speed.
- ◆ Pause/stop.
- ◆ Previous/next frame.
- ◆ Show previous/next scene.

## Other control functions

The keys in the lower segment of the control area have the following functions:



Copy an image into the **References** task card



Reset all



Copy to film sheet

## *Loading and displaying images*

In the **Viewing** task card, you can view and process images that are stored in the main database of your system, and archive them on different media or in a network.

You can access these data via the **Patient Browser**. You can search for patients, studies, series or individual images and load them into the **Viewing** task card.

## *Calling up the Viewing task card*

As soon as you have loaded images into the **Viewing** task card, the task card moves into the foreground. You can, however, switch to other applications at any time and resume image processing on the **Viewing** task card later.



Basic / Extended

- ◆ Click the **Viewing** tab on the left-hand edge of the screen.
  - The **Viewing** task card is placed in the foreground.
  
- ◆ Select the desired display mode with the **Basic/Extended** button.

### *Transferring images from the Patient Browser*

You can search for image data that you have stored in the local database or in the archive using the **Patient Browser** and then load the data into the **Viewing** task card.

- ◆ Select **Patient > Browser**.
- ◆ Search for the required patient(s), study(s), series or one or more images in the navigation or content area.
- ◆ Double-click the entry or entries that you were looking for.

Or

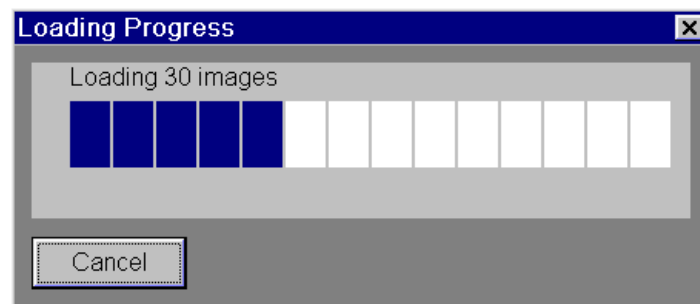
- ◆ Click the **Load To Viewer** button.

Or

- ◆ Select **Patient > Load To Viewer**.

Or

- ◆ Drag your selection onto the **Viewing** task card with the mouse (*drag & drop*).
  - The image data are loaded into the **Viewing** task card.
  - The **Loading Progress** window is displayed.



*If you transfer further images of a patient who is already loaded in the **Viewing** task card, the new images are attached to the existing ones.*

*Images of series or studies that are already in the task card are not loaded a second time.*

*When you load scenes, each scene is displayed as a separate series. If you load a series consisting of several scenes and normal images, each scene and all normal images are loaded as a separate series.*

## *Displaying images and series*

After you have loaded images into the **Viewing** task card, you can choose between different views.

### *Selecting image stripe display*

Medical images are always displayed in the image area of the **Viewing** task card grouped by studies or series.

Select image stripe display to view the loaded series of a study one after the other image by image.

- ◆ Select **View > Image Stripe**.

Or



- ◆ Click the **Image Stripe** button in the **View** subtask card.
  - Image stripe display is activated. You see the images of the first loaded series displayed in the image area from top left to bottom right.

### *Selecting image stack display*

If you want to compare the images of various series of one study, you best select stack display.

- ◆ Select **View > Series Stack**.

Or



- ◆ Click the **Series Stack** button on the **View** subtask card.
  - All images of a series are now arranged in a stack one on top of the other. You can see the first image of each series.

### *Subdividing the image area*

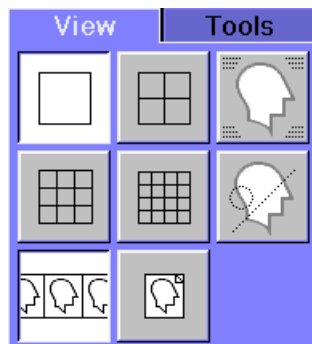
With the division of the image area, you define the number and size of the segments in the image area.

Switch to a large format display with just a few images on the screen if you want to see diagnostic details. Select a small format display to obtain an overview.

- ◆ Select a layout in the **View** menu.

Or

- ◆ Select a layout with the buttons on the **View** subtask card.



- When you select a new layout, the division of the image area is changed, but the sequence of the images displayed remains the same.

### *Showing and hiding image text*

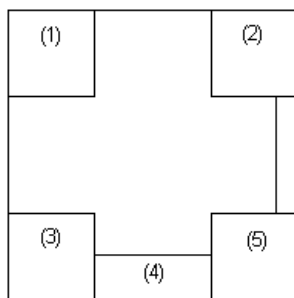
Patient and study-specific information and image settings can also be displayed on the image, thus making it easier to identify each image. The image text can also be filmed/printed.



*You can define in the configuration which image text information is to be shown by default (→ Page 78).*

#### **Text blocks**

The information displayed is arranged in blocks around the edge of the image according to its content.



- (1) Patient and study data
- (2) Hospital/system information
- (3) Image-specific settings (incl. kV and mA)
- (4) Image comment
- (5) Window values and edge enhancement

Especially with a small format layout, the images displayed can become cluttered by image text. You can then decide whether you want to have the image text shown in the image or not.

◆ Select **View > Hide Text**.

Or

◆ Click the **Hide Text** button on the **View** subtask card.



### *Displaying and hiding graphic elements*

Like text information, you can have graphics (e.g. distance lines) and annotations displayed or hidden.



- ◆ Click the **Hide Graphics** button in the **View** subtask card.

Or

- ◆ Select **View > Hide Graphics** in the menu bar.
  - The graphics and annotations are hidden.



## Scrolling and selecting images

You will usually have loaded more images and series of a patient onto the **Viewing** task card than can be displayed in the image area at once. All the images that cannot be displayed due to lack of space are placed in the background.

### Scrolling

The **Viewing** task card provides you with several alternative ways of scrolling through the loaded images of different patients, studies or series:

- ☐ By using the **Scroll** menu
- ☐ Scroll bar on the left-hand side of the image area (depending on the configuration)
- ☐ Buttons on the **View** subtask card in the control area (depending on the configuration)
- ☐ By using the dog ears in the upper right corner of the images (in the stack display)
- ☐ Keyboard and symbol keypad

Depending on the processing stage and working method you are accustomed to, you can select your individual way of working.



*In the stack display, you can simultaneously browse through several image stacks in the monitor split settings 4:1, 9:1 and 16:1. When doing this, it may be possible that you reach the end of one or several stacks while in other stacks there are more images left (e.g. if the stacks do not consist of the same number of images). In these cases, black segments are shown in the stacks that are finished as you continue scrolling. The dog ear indicates that the images are in front of or behind the black segments in the stack.*

*If you select several stacks and scroll to the previous or next series, the image stacks are moved accordingly by segments. The image text displayed will help you identify the relevant image stacks. This applies in particular if stacks with black segments have been moved; in this case scroll back to the images first.*

## Scrolling image by image

Within a study, you can scroll through the loaded images and series image by image.

### Scrolling with image stripe display



- ◆ Select **Scroll > Next Image** or **Scroll > Previous Image**.

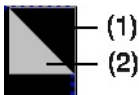
Or

- ◆ Scroll with the **Image-** or **Image+** keys of the symbol keypad.
  - You scroll backward or forward by one image.



*Explicitly selected images remain selected even if the images are moved into the background.*

### Scrolling image by image in a stack



- ◆ Click on the stack through which you want to scroll with the mouse.
- ◆ Scroll from image to image in a stack with **Image+** or **Image-** just like in image stripe display.

Or

- ◆ Click on the outer triangle (1) or on the inner triangle (2).
  - You scroll forward or backward by one image.



*If you want to scroll through a stack of images very quickly, click on a dog ear and hold the mouse button down.*

### Scrolling through several stacks image by image

- ◆ Press the **Ctrl** key and click on the stacks that you want to scroll through. If you click on a stack again, you deselect it.
- ◆ Using the **Scroll** menu, the buttons or the symbol keypad, scroll forward (**Image+**) or backward (**Image-**) through the selected stacks by one image at a time.



*If you have not selected a stack, you only scroll through the stack which has the input focus.*

### *Scrolling page by page*

A screen page can contain different numbers of segments depending on the layout selected and it may contain only images of one series or images of more than one series depending on the display mode.

You can use the menu, keyboard, or scroll bar to page through the series of a study.

#### **Scrolling with the menu**

- ◆ Select **Scroll > Page Up**.
  - You scroll forward by one page.
- ◆ Select **Scroll > Page Down**.
  - You scroll back by one page.
- ◆ Select **Scroll > Last Page**.
  - You jump to the last page of the current patient folder.
- ◆ Select **Scroll > First Page** to jump back to the first page of the current patient folder.
  - You jump to the first page of the current patient folder.



*The first image of the series is displayed in the top left segment of the image area.*

#### **Scrolling page by page with the keyboard**

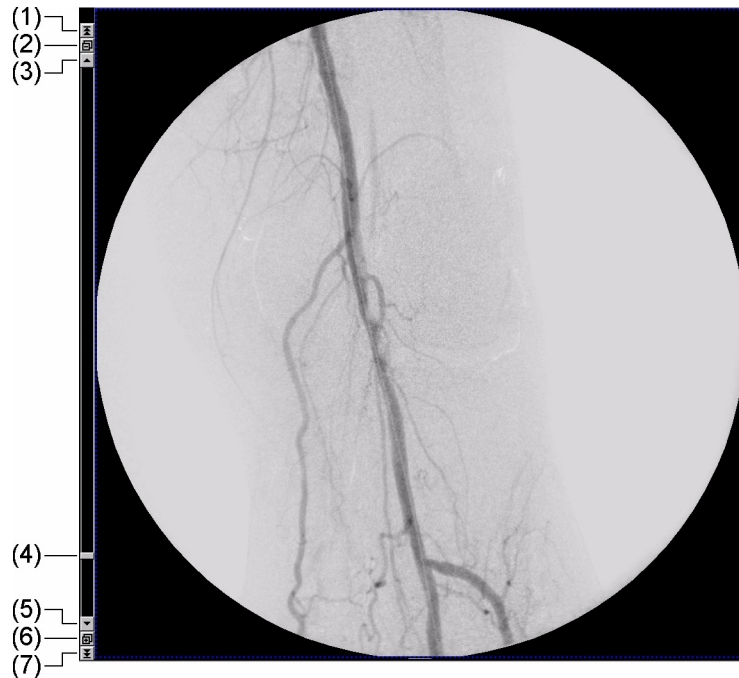
- ◆ Press the **Image up** key.
  - You scroll forward by one page.
- ◆ Press the **Page Down** key.
  - You scroll backward by one page.
- ◆ Press the **End** key.
  - The last screen page of the study is displayed.
- ◆ Press the **Home** key.
  - You jump to the first page of the study.



*The image area is filled with images. The first image of the series is displayed in the top left-hand corner of the image area.*

### Scrolling with the scroll bar

The third way of scrolling through the images and series of a study is to use the scroll bar.



- (1) Scroll arrow for first page
- (2) Scroll symbol for previous page
- (3) Scroll arrow for previous page
- (4) Slider
- (5) Scroll arrow for next page
- (6) Scroll symbol for next page
- (7) Scroll arrow for last page



*The position of the slider only refers to the specific series through which you are currently scrolling and not to all images currently loaded in the **Viewing** task card.*



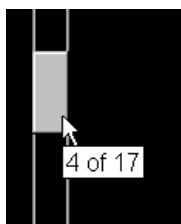
- ◆ Click the scroll arrow for next/previous page.
  - You jump backward/forward by one page/line within the series.



- ◆ Click the scroll arrow for the first/last page.
  - You jump to the corresponding screen page of the loaded series.



- ◆ Click the scroll symbol for the previous/next series.
  - You jump from the beginning/end of the series to the end of the previous series/beginning of the next series (scrolling across series).
  - If you are in the middle of a series, you first jump to the beginning/end of the current series.



- ◆ Drag the slider up or down with the mouse until the page you require is displayed. (The page number is also displayed.)



*If you click the scroll bar above or below the slider, you scroll backward or forward by one page.*

### *Scrolling from series to series*

You cannot only scroll image by image or page by page, but also by entire series if you have loaded more than one series of a study into the **Viewing** task card.



*It depends on the selected display which images are subsequently displayed in the image area. In image stripe display, for instance, the first image of the series to which you have scrolled is displayed in the first image segment. In stack display, the series stacks move to the left or right by one position, and up or down line by line.*

- ◆ Call up **Scroll > Series Next** or **Scroll > Series Previous** in the main menu.

Or

- ◆ Press the **Series-** or **Series+** key on the symbol keypad.

Or

- ◆ Scroll with the image scroll symbols in the scroll bar.



### *Scrolling from study to study*

The image area of the **Viewing** task card contains all the images of the loaded studies and series, provided they all fit on one screen page.

As soon as you have loaded the images, the images of the first study are displayed starting at the top left.

- ◆ Select **Scroll > Next Study** or **Scroll > Previous Study** in the main menu.
  - You page forward or backward by one study.

Or

- ◆ Scroll to the next or previous study using the **Study-** or **Study+** key.



### *Sequence for displaying images*

Sometimes the sequence of displaying images changes. However, a highly improbable combination of settings must have been selected:

- ☐ Images of a patient that were created using the Save button are loaded into the **Viewing** task card. Afterward, these are saved as "New series".
- ☐ After saving these images as a new series, the sequence of the images and also the continuous numbering in the image text could have changed.

## Selecting images

On the **Viewing** task card, you can not only view images, but also process and evaluate them.

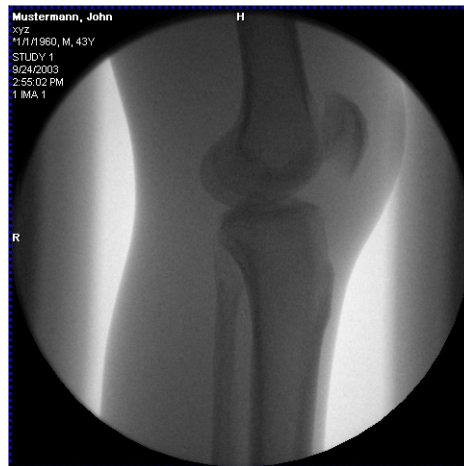
### Selection possibilities

There are two different ways of selecting images for processing:

- ☐ *explicitly* holding the **Ctrl** key down (explicitly selected images are shown with a continuous border)
- ☐ *implicitly* by working in the input focus

## Working in the input focus

The Input Focus shows the active segment of the image area. It is marked by a broken line border, i.e. it is selected implicitly.



### Default input focus

When you load images onto the **Viewing** task card, the input focus is in the default position in the top left segment of the image area.

## Placing the input focus with the mouse

- ◆ Using the left mouse button, click into the segment of the image area on which you want to place the input focus.



*An explicitly selected image or an explicitly selected graphic is deselected if you place the input focus on a segment, even if you only click on the same segment.*

## Changing the input focus using the keyboard

- ◆ Press the arrow key **left** or **right**.
  - The input focus is moved to the next column of the image area.

Or

- ◆ Press the arrow key **up** or **down**.
  - The input focus is moved to the next row of the image area.



*If an image or a graphic is selected explicitly, the arrow keys are not active.*

## Processing an image

As long as you have not selected any images explicitly, your processing steps are applied to the image in the segment that has the input focus, i.e. the image with the dashed border.

- ◆ Place the input focus on the image that you want to process.



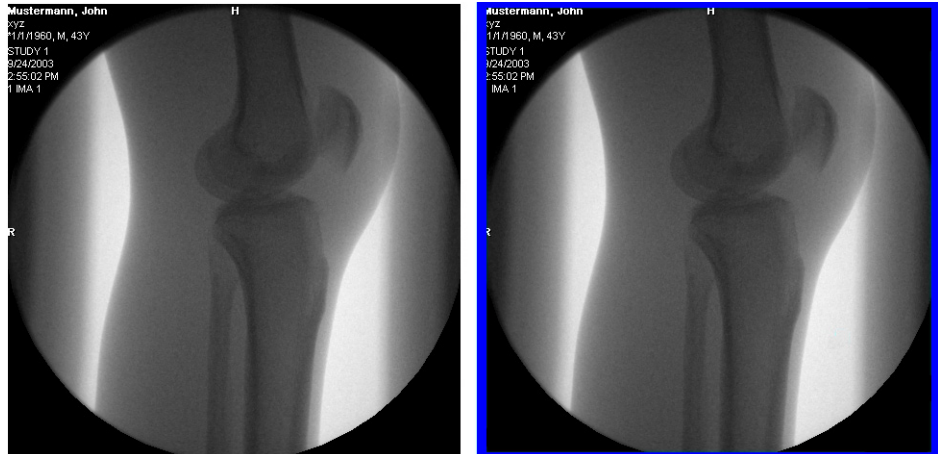
*If you cannot see an input focus in the image area, one or more images are explicitly selected in the background.*



### Selecting images explicitly

Selecting images explicitly means that you select images or series specifically and one after the other. Unlike the input focus, the explicit selection is associated with the content of the segment. Explicitly selected images remain selected even if you move them into the background.

All explicitly selected images have a continuous border.



#### Selecting images individually

- ◆ Press the **Ctrl** key and click on an image with the left mouse button.
  - The image is selected explicitly.
- ◆ Hold the **Ctrl** key down and click on further images if you want to extend your selection.
  - Several images are selected explicitly one after the other.

#### Selecting images explicitly up to the end of series

- ◆ Click on the image that you want to select explicitly holding the **Ctrl** key down or set the input focus by clicking on the image.
- ◆ Call up **Edit > Select On Succeeding** in the main menu.
  - The selected image and all the following images are now selected.



*If you have explicitly selected images of different series, the remaining images of these series are selected starting with those images.*

## Selecting a complete series explicitly

- ◆ First select an image of the required series explicitly by clicking on it holding the **Ctrl** key down or place the input focus on the image by clicking on it.
- ◆ Call up **Edit > Select Series** in the main menu.
  - The whole series is now selected explicitly.

## Selecting more than one series explicitly

- ◆ Hold the **Ctrl** key down and click on individual images of the required series.
- ◆ Call up **Edit > Select Series** in the main menu.
  - Several series are selected completely.

## Deselecting images

If the explicit selection of images does not contain the set of images you require, you can deselect individual images or all images.

- ◆ Place the input focus on an unselected segment manually with the mouse by clicking on it.

Or

- ◆ Call up **Edit > Deselect All** in the main menu.
  - All selected images are deselected again.



*After that, the standard input focus is set automatically, i.e. the top left segment is active.*

### *Selecting direct image processing*

Direct image processing (implicit selection) with the mouse is automatically applied to the image segment on which the mouse cursor is located.

#### **Setting the input focus**

- ◆ Place the mouse cursor on an image which is not selected and edit the image, for example, by windowing.
  - The input focus is placed on this image.



*If graphics were previously explicitly selected in the input focus, they remain explicitly selected.*

### Viewing images in movie mode

After an examination, you can start movie mode to check the quality of the scenes you just acquired.

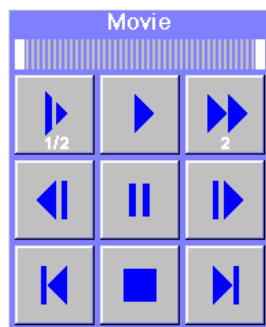


*Movie mode is possible only for scenes generated with the ARCADIS Varic. You cannot view imported series in film mode. This also applies to scenes in the "JPG lossless" format.*



*Filming mode is only active, if you set the layout **one image per page**.*

Movie mode is displayed on a large image segment. The images included in a movie are always from a *single* series. You can control the movie mode with the **Movie** subtask card or the options of the **Scroll** menu.



*Image text and graphic objects are not displayed during movie replay.*

#### Scrolling a single image

In the movie segment, you can scroll through all images of the series.



- ◆ Click on the **Step Backward** button.
  - You scroll backward by one image.



- ◆ Click on the **Step Forward** button.
  - You scroll forward by one image.

**Limiting the playback range**

The bar display labels the images of the scene with bars. The left and right borders show the first and last image of the playback range.



- ◆ Drag the border bar to the first and last image of the desired playback range.

**Starting movie mode**

In movie mode the images of one series are displayed in a loop. After the last image of the series, the first image is displayed again etc.



*Movie mode cannot be started in the following situation (the button **Start Movie Real Time** does not react): three patients are loaded in **Viewing**, a fourth patient is being registered and a scene (multiframe object) is being recorded.*

You have the following possibilities to optimize movie display and set the speed according to your requirements:

- ☐ slowly
- ☐ real time
- ☐ fast



- ◆ Select **Scroll > Realtime Movie** or click the button.
  - The film is started with the original frame rate.

Or



- ◆ Select **Scroll > Movie at half frame rate** or click the button.
  - The movie is started with half the frame rate.

Or



- ◆ Select **Scroll > Movie at double frame rate** or click the button.
  - The movie is started with double the frame rate.



*The playback speed may be reduced by postprocessing activities, edge enhancement or subtraction.*

## Stopping the movie



- ◆ Select **Scroll > Pause movie** or click the button.
  - The running movie is stopped.
  - If you continue playback of the movie, it will start from the segment where you paused.

## Stopping movie mode



- ◆ Click the **Stop** button.
  - The running movie is stopped.
  - If you continue playback of the movie, it will start from the beginning again.



*There is no indication where the film was stopped.*

## Storing the scene

Scenes of a current examination that have not yet been saved can be stored using the Last Scene Hold function.

Prerequisite: Scene review has been stopped.

- ◆ Select **Patient > Save LSH Scene** from the main menu.
  - or —
- ◆ Press function key **F9** on the keyboard.
  - The last 120 images are stored in the local database.

## *Editing images*

As soon as you have loaded all the series and/or images that you want to view and process into the **Viewing** task card, you can change the display parameters of individual images. In this way, you can emphasize areas and image contents for subsequent evaluation or reporting.

You can adapt the window values of the loaded images. You can enlarge segments and display regions of interest in the center of the screen. You can also rotate, flip or invert images for certain diagnostic problems.



*Extreme window values can impair image quality.*



*With scenes, the image processing functions are applied to all images of a series.*

### Windowing images

Imaging methods provide information in the form of gray scale images with up to several thousand different gray scale values. Windowing means to emphasize the range of gray scales of the relevant area and tissue type.

The first step in windowing therefore consists in determining the window center, i.e. the gray value of the tissue type that is central to your diagnostic problem. The smaller the window center, the brighter the image.

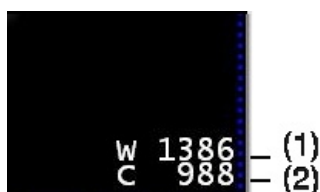
With the window width, you define how many gray scale values above and below the center value you want to see. The smaller the window width, the higher the contrast.



*Windowing of color images is not possible.*

#### Displaying window values

You can see the window values set in the bottom right-hand corner of the images.



(1) W: Window width – Contrast

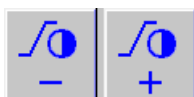
(2) C: Window center – Brightness

### Assigning fixed window settings (LUTs)

Some imaging methods allow you to display images with alternative window settings using LUTs (lookup tables).

The currently selected LUT is displayed at the bottom right of the image (with display of window values).

- ◆ Select the images that are to be assigned a different LUT.
- ◆ Click the **LUT Previous -** or **LUT Next +** button on the **Image** subtask card.





### Windowing using the mouse

You can assign new window values to images using the mouse.

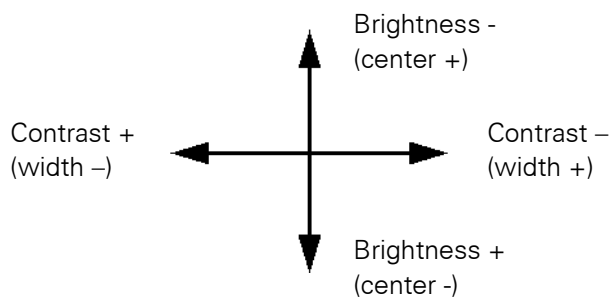


*Pay attention to the scope.*

- ◆ Click on an image segment with the center mouse button and move the mouse holding the button down.
  - The mouse cursor disappears.
- ◆ Drag the mouse up or down.
  - The window center (brightness) is changed.

Or

- ◆ Move the mouse right/left.
  - The window width (contrast) is changed.



- As soon as you release the mouse button, the new window values are also applied to all the other selected images or the selected scope of action.



*The changed window values are displayed immediately in the image (interactive windowing).*

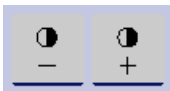
## *Windowing with the keyboard*

For fine adjustment of the window values, you can also use the keys on the symbol keypad of the keyboard.



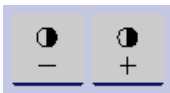
*Pay attention to the current scope.*

### **Setting the contrast**



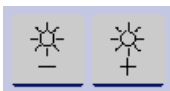
- ◆ Press the **Width-** or **Width+** button.
  - The contrast is reduced or increased in small steps.

Or



- ◆ Keep the **Width-** or **Width+** button pressed.
  - The contrast is reduced or increased in larger steps.

### **Setting the brightness**



- ◆ Press the **Center-** or **Center+** button.
  - The brightness is reduced or increased in small steps.

Or



- ◆ Keep the **Center-** or **Center+** button pressed.
  - The brightness is reduced or increased in larger steps.

## *Restoring window values*

- ◆ Select **Image > Reset Window**.
  - The selected image(s) is/are displayed with their original window values.

### Edge enhancement

Blurred images, or images with a high noise level, can be postprocessed with a filter. Edge enhancement is an adaptive filter that emphasizes existing structures (edges) in the image.



*The enhancement factor can be set within a range of 0% to 100% in 10% increments.*



- ◆ Select one or more images or series.
- ◆ Click the **Edge Filter Next** button on the **Image** subtask card.
- or —
- ◆ Select **Image > Edge Filter Next**.
  - The image is displayed with enhanced structures.



*The higher the filter setting, the more structures are enhanced and the less they are smoothed.*



- ◆ Click the **Edge Filter Previous** button on the **Image** subtask card.
- Or
- ◆ Select **Image > Edge Filter Previous**.
  - The image is displayed with less enhanced structures.

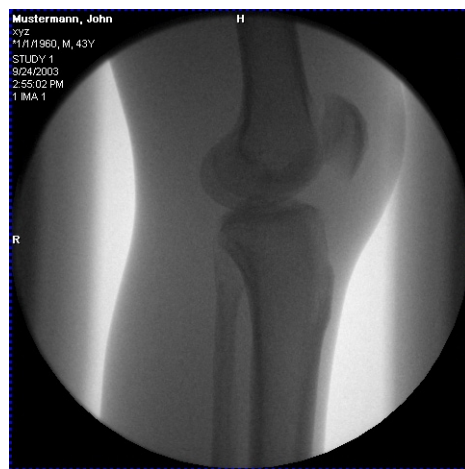
### *Zooming and panning images*

You can zoom in on sections of images that you are particularly interested in (zooming). If the enlarged image then no longer fits in the segment, you can pan it until the relevant area is in the center of the segment again.

### *Zooming images*

The **Viewing** task card provides you with several possibilities of enlarging or reducing images.

#### Displaying images in double size/half size



- ◆ Select the images that you want to edit.



- ◆ Click the **Zoom Out By 0.5** button.
  - The zoom factor of an image is halved.



Or



- ◆ Click the **Zoom In By 2.0** button.
  - The zoom factor of an image is doubled.



### Zooming with the mouse

The left mouse key is used to select or deselect images and objects. However, you can also switch over the function of the left mouse button to perform zooming and panning.

- ◆ Select **Image > Zoom/Pan**.

Or



- ◆ Click the **Zoom/Pan** button on the **Image** subtask card.



- ◆ Now position the mouse pointer in the outer area of an image.
  - The cursor changes shape.
- ◆ Drag the mouse cursor up with the left mouse button pressed.
  - The image is enlarged.

Or

- ◆ Drag the mouse cursor down with the left mouse button pressed.
  - The image is reduced.
  - As soon as you release the mouse button, the new zoom factor is applied to all the selected images or the selected scope of action.



*When zooming, make sure you do not accidentally click on a graphic element. Otherwise, you would pan the graphic element and not the content of the image.*

- ◆ Deselect **Image > Zoom/Pan** again.
  - or —
- ◆ Click the relevant button again.
  - The left mouse button is available for selecting images again.

### *Panning images*

After you have zoomed images, parts of the images might extend beyond the edge of the image segments. Therefore, before saving an image, always pan the image so that the region of diagnostic interest is in the center of the segment again.

- ◆ Select **Image > Zoom/Pan**.

— or —



- ◆ Click the **Zoom/Pan** button on the **Image** subtask card.
  - The function of the left mouse button is now switched from Select to Zoom/Pan.



- ◆ Now place the mouse cursor in the center part of the image.
- ◆ To pan the content of the image, press and hold the left mouse button while dragging the mouse upward, downward, to the left or to the right.
  - You can immediately see the result of your mouse movements in the image on which the mouse cursor is located.



*When panning, make sure you do not accidentally click on a graphic element. Otherwise, you would pan the graphic element and not the content of the image.*

### **Restoring image display**

- ◆ Select **Image > Reset Zoom & Pan**.
  - The original size with which the images were last stored in the database is restored.

### *Enlarging an image section*

Instead of zooming an image and then panning it so that the relevant section is in the center of the screen again, you can also quickly select specific image sections and display them in a segment in maximum size.

- ◆ Select the image in which you want to display an enlarged image section.

- ◆ Select **Tools > Magic Glass**.

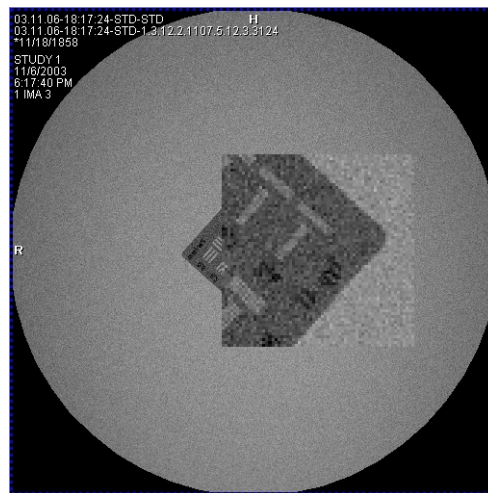
— or —



- ◆ Click the **Magic Glass** (Zoom) button on the **Tools** subtask card.

- ◆ Click on the selected image with the left mouse button.

– A rectangular image is displayed with zoom factor 2.0. In this window the enlarged area of the image around the position of the mouse key is displayed.



- ◆ Move the mouse key in the segment.
  - The content of the magnify window is automatically updated.

### **Switching off the zoom function**

- ◆ Select **Tools > Magic Glass** again.

— or —

- ◆ Click the **Magic Glass** (Zoom) button on the **Tools** subtask card.

– The magnify windows are deleted from all segments. The original size with which the images were last stored in the database is restored.



## Inverting images

When an image is inverted, bright areas in grayscale images are displayed dark and dark areas are displayed bright. The gray scale assignment in the LUT (look-up table) is inverted.

◆ Select the images that you want to edit.

◆ Select **Image > Invert Gray Scale**.

— or —

◆ Click the **Invert Gray Scale** button on the **Image** subtask card.



To reset the original view, select **Image > Invert Gray Scale** again.

### *Rotating images*

- ◆ Click on the image that you want to edit.

- ◆ Select **Image > Rotate**.

— or —



- ◆ Click the **Rotate** button on the **Image** subtask card.

- The shape of the mouse cursor indicates that you can rotate the image freely to the left or to the right.



- ◆ Place the mouse cursor at the edge of the image and rotate the image to the required position by using the mouse.

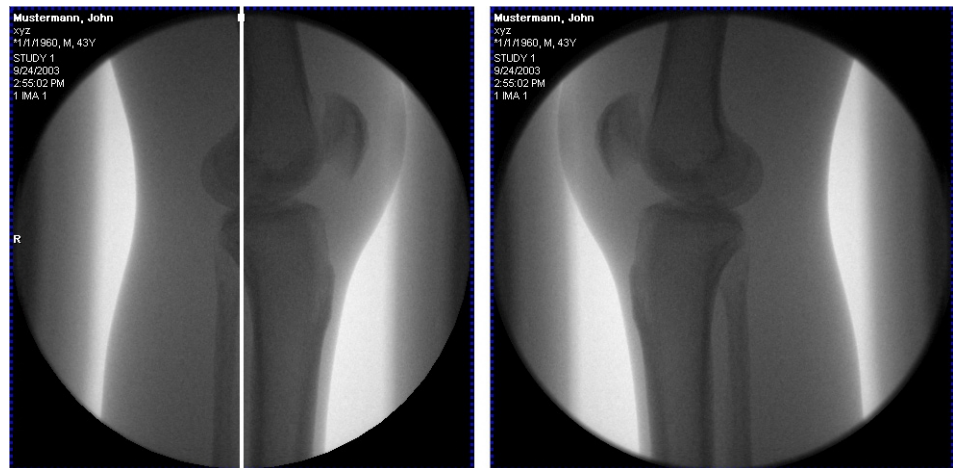
- As long as you keep the left mouse key pressed, the rotation angles are displayed in the lower control area. The first angle indicates by how many degrees the image had already been rotated with reference to the original image. The second angle indicates the current rotation.

## *Flipping images*

The Flip function allows you to easily compare images of series that were acquired in a different patient position or direction of examination.

### **Flipping images vertically**

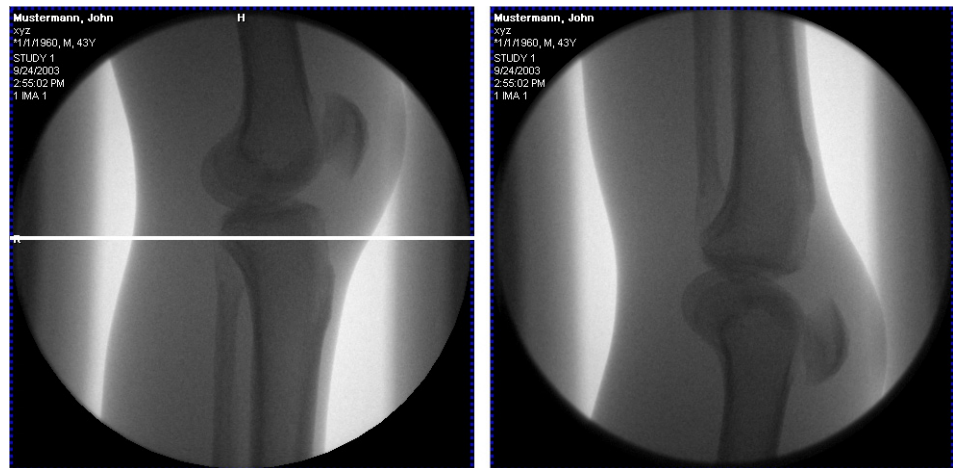
- ◆ Select the images that you want to edit.
- ◆ Select **Image > Flip Vertically**.



## Image Processing

### Flipping images horizontally

- ◆ Select the images that you want to edit.
- ◆ Select **Image > Flip Horizontally**.



## 2D Evaluation (option)

The **Viewing** task card provides you with tools for measuring distances, lengths and angles.

Using a shutter, you can limit the region of interest to the necessary detail, excluding all irrelevant areas.

You can annotate images with comments to document your evaluations.

### Calibration

If you perform evaluations with distance measurements, you must calibrate the image.



*When calibrating, measuring and interpreting values, please note that the acquired images are only a two-dimensional display of three-dimensional objects.*

#### Performing a calibration

A calibration object with known measurements (e.g. length, diameter, ...) is necessary to define the longitudinal scale.



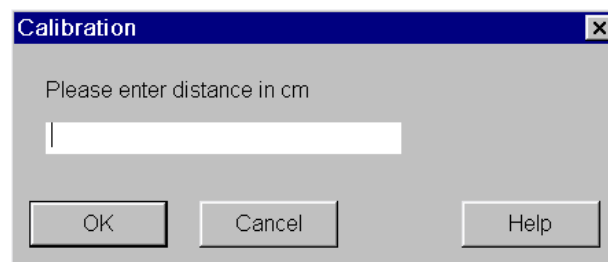
*The calibration object must be perpendicular to the central beam and within the area of the structure you intend to measure (typically in the center of the measuring field to avoid l.i. distortions).*

- ◆ Select the required image.
- ◆ Call up **Tools > Calibration**.
- or —
- ◆ Click the **Calibration** button of the **Tools** subtask card.



### Drawing a distance line

- ◆ Move the mouse cursor into the image.
  - The cursor changes shape.
- ◆ Click on the image to set the starting point and drag a line to the vertex by using the mouse.
  - As soon as you move the mouse, the line is displayed.
- ◆ Release the mouse button to finish the line.
  - The distance line is displayed.
  - The **Calibration** dialog box is displayed.



- ◆ Enter the distance (in cm).
- ◆ Confirm with **OK**.
  - Distance calibration is performed and the calibration factor is displayed in the image.
  - Distances already drawn in the image are updated.

### Canceling calibration

- ◆ Click **Cancel**.
  - The previous calibration factor is maintained.

### Deleting the distance line

- ◆ Select **Edit > Remove Calibration**.
  - The existing distance line is deleted.
  - Instead of the current length, "??" is displayed in all measurement graphics.

## Measuring distances and angles

You can measure and evaluate distances and angles in images, if the 2D Measurement option is available.

### Drawing a distance line, measuring the distance

Using a distance line, you can measure the distance between two points in an image.



*When measuring distances near the edge of the image, take into account that the I.I. distortion will result in measurement errors. These depend on the I.I. format. With full format the error of measurement is comparatively large whereas it is considerably smaller with an increasing zoom factor.*

#### Drawing a distance line



- ◆ Call up **Tools > Distance**.
  - or —
- ◆ Click on the **Distance** button of the **Tools** subtask card.
  - The cursor changes shape.
- ◆ Place the mouse cursor on the starting point of the distance line.
- ◆ Hold the left mouse button down and drag out a line.
- ◆ Release the mouse button to finish the line.

## Measuring an angle

You can define an angle by two lines, the legs of the angle, that you draw on the image. The system then calculates the angle between the two lines drawn in clockwise. If the angle is larger than 180°, the program subtracts 180°.

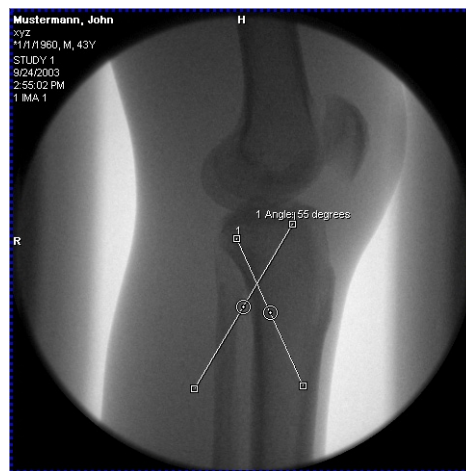
### Drawing an angle



- ◆ Call up **Tools > Angle**.

— or —

- ◆ Click on the **Angle** button on the **Tools** subtask card.
- ◆ Place the mouse cursor on a starting point for the first leg.
  - The cursor changes shape.
- ◆ Drag a line to the end point of the first leg holding the left mouse button pressed.
- ◆ Draw the second side in the same way.
  - The two legs of an angle are assigned the same number so you can distinguish several angles unambiguously.



*As soon as you start drawing the second leg, the angle is calculated and displayed.*

*The two lines between which you want to measure an angle do not have to intersect in the image. The program automatically calculates the point of intersection, even if you have not drawn it or if it is beyond the edge of the image.*



**Changing the angle**

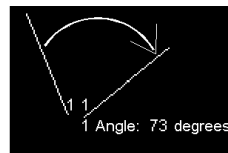
You can change the legs of an angle independently of one another.

- ◆ Move the mouse cursor into the image.
  - The shape of the mouse cursor changes at the positions where you can change a leg of the angle.
- ◆ Move the entire line or drag an end point to another location.

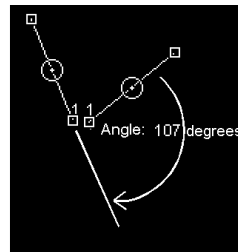
**Switching the angle direction**

You can also have the complementary angle displayed (difference of  $180^\circ$  - angle measured).

- ◆ Select the angle.
- ◆ Select **Other Angle** from the context menu (right mouse button).
  - The angle is now measured counterclockwise and the new value is displayed.



(1)



(2)

(1) Angle between the legs

(2) Complementary angle



*If the angle approximates to  $90^\circ$ ,  $180^\circ$ ,  $270^\circ$ , it is not clear whether the angle between the legs or the supplementary angle has been drawn. Therefore, annotate the angle when you display the supplementary angle.*

### *Hiding/deleting graphic elements*

You temporarily hide the graphic elements (distance lines, angles and text) or permanently remove them from the image.

#### **Hiding**

- ◆ Select **View > Hide Graphics** from the menu.
  - All drawn graphic elements are hidden.
  - The image text with the scale remains visible.
- ◆ To unhide the graphic elements, click **View > Hide Graphics** again.

#### **Delete**

Graphic elements can be deleted jointly or individually from the image in the following ways:

- ◆ Select one or several (**Ctrl** key) graphic elements.
- Or
- ◆ Open **Edit > Select All Graphics** to delete all graphics.
  - ◆ Press the **Del** key on your keyboard.
- or —
- ◆ Select **Edit > Delete Graphics**.
- or —
- ◆ Select **Delete** from the context menu (right mouse key).
- The selected graphic elements are deleted.

## Setting a shutter

You can hide irrelevant areas of the image. To do that, you place a shutter over the image.

After that, only the area within the shutter is displayed and all the surrounding areas appear black.



*Only one shutter can be set in an image or scene. When setting different shutters in different frames of a scene, the shutter in the first frame is taken into account.*

### Setting a shutter

- ◆ Call up **Tools > Shutter**.

— or —

- ◆ Click on the **Shutter** button on the **Tools** subtask card.

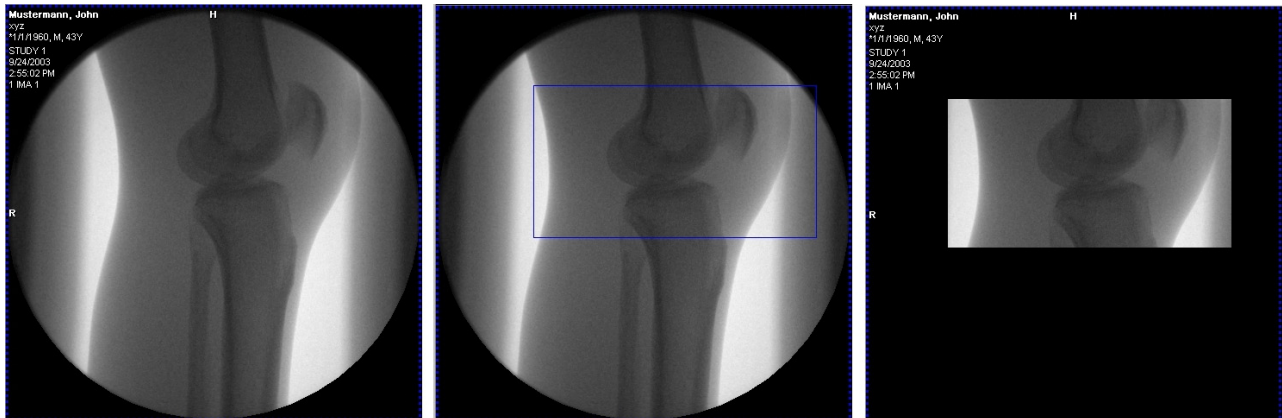


- ◆ Place the mouse cursor in the area of the image that you want displayed.
  - The cursor changes shape.
- ◆ Hold the left mouse button pressed and drag out a rectangle for the shutter.



*By clicking on the border of the image you can select a shutter which you can then move or resize.*

- ◆ Release the mouse button.
  - The area outside the shutter is displayed black.



You can transfer images in the current shutter setting to the **Filming** task card for printing (menu **Patient > Copy to Film Sheet**). If the image contains additional graphic elements, they may not be hidden (menu **View > Hide Graphics**). Otherwise, the shutter cannot be transferred to the film sheet, and printing is impossible.

## Removing the shutter

- ◆ Click on the border of the shutter.
  - The shutter is selected.
- ◆ Press the **Del** key on your keyboard.
  - The image is displayed in its original size again.



Images of a scene always have the same shutter. If they are moved or resized, that change is applied to all images.

## Text in images

You can annotate interesting or anomalous areas in an image.

Some modalities also allow you to store comments with an acquisition series. These comment texts are also displayed in the images and can be altered.



*Notes and comments are automatically saved with the image when the examination is ended or the patient file is closed.*

## Annotating images

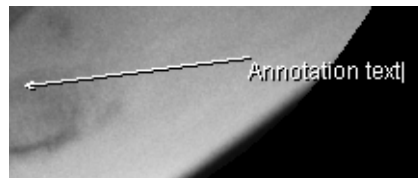
You can anchor image text with a special image detail.

- ◆ Call up **Tools > Annotation Arrow**.

— or —



- ◆ Click on the **Annotation Arrow** button on the **Tools** subtask card.
  - The cursor changes shape.
- ◆ Click into the image where you want to place the annotation and draw an arrow, keeping the left mouse button pressed.
  - The text cursor is at the end of the arrow.



Annotation text

- ◆ Enter the desired text.
  - The following special characters cannot be used in annotation texts because they interfere with saving:  
# @ ' " \ { (
- ◆ Confirm your text entry with the **Return** key.
- or —
- ◆ Click into the image outside the text.
  - The text is displayed white with shading.

## Using predefined text

Frequently used texts can simply be selected from a list once they have been configured.  
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- ◆ Call up **Tools > Annotation Arrow**.
- ◆ Using the right mouse button, click on the position in the image where you want to insert the text.
  - A selection list with predefined texts is displayed.
- ◆ Select an entry from the list by clicking it once. If necessary, use the scroll bar to display further texts.
  - The text appears immediately.

## Positioning text

Entered texts can be moved as required.

- ◆ Click on the text with the left mouse button.
  - The text is marked by small squares.
- ◆ Drag the text to the new position.

## Editing text

Previously entered image annotations can be changed at any time.

- ◆ Double-click on the text with the left mouse button.
  - The text is marked by small squares. The text cursor is at the beginning of the text.
- ◆ Now change or add to your text.
- ◆ You can finish text editing by clicking into the image outside the text frame or pressing the **Return** key.

## Deleting text

Texts can be deleted individually or together with other graphic elements.

- ◆ Select one or several (**Ctrl** key) text elements.
- ◆ Select **Delete** in the context menu (right mouse key) or press the **Del** on your keyboard.
  - The selected texts are deleted.

## *Subtraction processing*

Unlike bones for example, vessels do not show a considerably greater absorption of X-rays compared to the surrounding tissue. In X-ray exposures vessels are not especially highlighted.

When subtraction is performed, two X-ray exposures are acquired of the region of interest, one with contrast medium and one without contrast medium. Afterwards both exposures are subtracted.

In the subtraction image, areas with the same attenuation and areas with a (slightly) different attenuation, e.g. vessels that were filled with contrast medium during the exposure, can be discerned clearly.

When the SUB/Roadmap option is installed, the following functions are available to optimize subtraction images:

- ☐ Anatomical background
- ☐ Pixelshift

## *Loading and displaying images*

Native images from previous examinations acquired in the Subtraction mode (option) or Roadmap mode (option) are stored in the local database or in your archive together with the subtraction images. Both image types can be displayed simultaneously on both monitors.

- ◆ Load the images of the requested patient into the **Viewing** task card by using the **Patient Browser**.
- ◆ Select **Sub > Sub/Native Display** in the main menu of the **Viewing** task card.
- or —
- ◆ Click this button in the **Sub** subtask card.
  - In the **Viewing** task card the subtraction images are displayed on the left monitor.
  - In the **Native** task card the corresponding native images are displayed on the right monitor.



### Selecting another mask

You can select an image without contrast medium (mask), that you want to subtract from a stack of images acquired with contrast medium. To do this, scroll simultaneously through the stacks of subtraction images.

#### Selecting the next mask



- ◆ Select **Sub > Mask Next** in the main menu of the **Viewing** task card.
- or —
- ◆ Click this button.
  - The next mask is selected.

#### Selecting the previous mask



- ◆ Select **Sub > Mask Previous** in the main menu of the **Viewing** task card.
- or —
- ◆ Click this button.
  - The previous mask is selected.

### Adding the anatomical background

Normally the anatomical surroundings of vessels of interest are not visible in images that are displayed subtracted. By adding the mask image, the surrounding tissue can be highlighted more or less. The initial degree of admixture is defined in the examination set. This value can be modified.



- ◆ Select the required image.
- ◆ Using the mouse, drag the slider to the required position.
  - The selected image is displayed with anatomical background.



*You can set the anatomical background between 0% and 30%.*



## *Achieving exact covering of image and mask*

During acquisition of the subtraction series, the patient or the C-arm system may move. The images that are to be subtracted may not be congruent. The anatomical background, especially in the area of image contrasts, is thus not canceled out.

Exact covering of image and mask (= image without contrast medium) can be achieved if you shift the mask by single pixels.

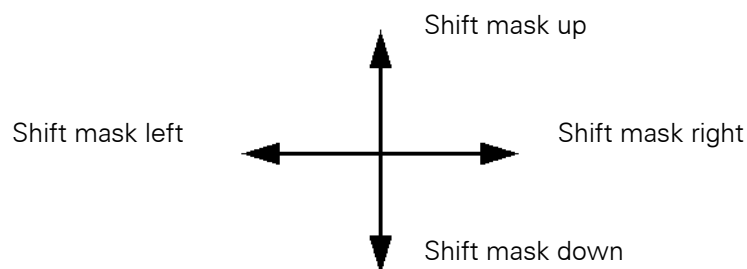
There are two possibilities for pixelshift:

- ☐ Manual pixelshift  
Shift the mask manually until the best result of the subtraction image is achieved.
- ☐ Automatic pixelshift  
Define an area (ROI) for which pixelshift is to be optimized. The ROI can be defined in one image or in a series of images in a stack. The best result is automatically calculated for this area.

### **Manual pixelshift**



- ◆ Click this button.
  - The button is displayed selected.
  - The mouse pointer changes shape (arrow).
- ◆ Move the mouse cursor in the image keeping the left mouse button pressed down.
  - The mask is shifted simultaneously (by small amounts).



*To shift the mask in big steps, move the mouse pointer at the edge of the image.  
For fine mask shifting, move the mouse pointer in the center of the image.*



- ◆ Click this button again.
  - The pixelshift function is switched off. The button is displayed deselected.

### Automatic pixelshift



- ◆ Click this button.
  - The button is displayed selected.
  - The mouse cursor changes into a rectangle.
- ◆ Move the rectangle to the position in the image where misalignment is most evident.
- ◆ Click this position in the image.
  - The mask is moved so that subtraction for the area within the rectangle is optimized.

## *Saving, transferring, documenting, closing images*

After image processing, when all the images have been displayed in an optimum way and have been evaluated, you can save and archive these images or transfer them to the Filming task card for further evaluation and documentation.

After that, you can close the images of this patient and make space in the **Viewing** task card for the images of the next patient.



*Please note the following when transferring edited images:*

*Images that were zoomed in or out, shifted or rotated in the viewer may be exported or transferred with reduced pixel matrix. Always include the original image in the transfer. We strongly recommend that you include original images in your diagnostic considerations, which should not be based solely on edited or modified images.*

## *Save images*

Once you have finished processing and evaluating the images, save your results.

You can save your images in one of two ways:

- ☐ You can save the processed images in a new series.
- ☐ You can add the images to an existing series.



*It is impossible for radiation to be released when images are being saved; this applies particularly to large numbers of images. Wait until the save process is finished, or save the images after all exposures have been made.*

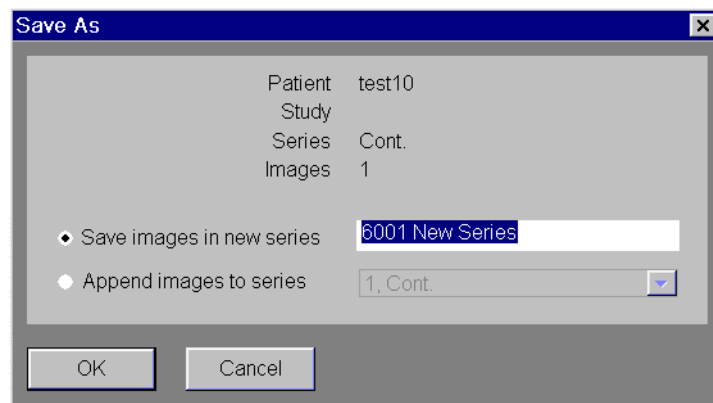


*Note that the newly saved data may not immediately be shown in the **Patient Browser**. The display should first be updated manually, in particular after comprehensive storage processes (select **View > Refresh** in the **Patient Browser**).*

### Calling up the Save As dialog box

Only images of the same study can be saved together in one series.

- ◆ First select the images or series that you want to save.
- ◆ Select **Patient > Save As**.
  - The **Save As** dialog box is displayed.



### Saving images as a new series

You can save all selected images in a new series. The old series remains unchanged. You can then easily compare processed and evaluated images with the original images of the study.

- ◆ Click the **Save images in new series** option in the **Save As** dialog box.
- ◆ Enter a new description for the series in the text input field.
- ◆ Confirm with **OK**.
  - The images are saved in a new series.

### Appending images to an existing series

If you do not want to create a new series for your processed and evaluated images, you can append them to an existing series.

- ◆ Click the **Append images to series** option in the **Save As** dialog box.
- ◆ Select the series from the selection list using the series number and description.
- ◆ For images of a subtraction or Roadmap study, select the image type.
- ◆ Confirm with **OK**.
  - The images are saved in the specified series.

### *Restoring image display*

You can reset the image processing parameters that were changed (e.g. window values, edge filter, zoom/pan) and thus reapply the values that were set when you last saved the selected image in question. This will also reset any image evaluation steps (e.g. shutter or measurements) that were performed after the relevant image was last saved.

- ◆ Select the images in the image area of the **Viewing** task card.

- ◆ Select **Edit > Reset all**.

– or –



- ◆ Click this button.

- All selected images are reset to their original state (before they were processed).

### *Archiving, sending or filming images*

After an examination or postprocessing, the images are stored in the local database from where they can be accessed for reporting or documentation, for example.

#### *Archiving images*

Using the **Archive to...** function, you can save patient and examination data to an archive via the network (only DICOM option).



*Please note that CDs/DVDs are not archive media. Saving and keeping data on CD/DVD-R does not comply with archiving requirements.*



*For images of a subtraction or Roadmap study, you can select whether you want to send native images or only the subtracted images.*

- ◆ Select the images that you want to archive.
- ◆ Select **Transfer > Archive to....**
  - The **Archive To** dialog box is displayed.
- ◆ Select the required archive destination.
- ◆ Click **Archive**.
  - The data are archived to the selected destination.  
(→ Register 7: Documentation, Page 65)



Archive

*Sending images (DICOM option)*

If your system is connected to a network, you can send patient and examination data to other workstations via the network using the **Send to....** function.



*For images of a subtraction or Roadmap study, you can select whether you want to send native images or only the subtracted images.*

**Send images to node 1**

- ◆ Select the data that you want to send.
- ◆ Select **Transfer > Send to Node 1**.
  - The data are sent to the selected address.

**Sending images to a specific network address**

- ◆ Select **Transfer > Send to....**
- ◆ Select the required network address(es) in the **Send To** dialog box.
- ◆ Click **Send**.
  - The selected data are sent to the required address(es).

### Filming Images

You can also use the **Viewing** task card to select images and copy them to **Filming** (DICOM option).



*Make sure the printer is switched on before you send images to print.*

#### Transferring images to Filming



- ◆ Select the images in the image area of the **Viewing** task card.
- ◆ Select **Patient > Copy to Film Sheet**.
- or –
- ◆ Click this button.
  - All the selected images are transferred to the "virtual film sheet" (**Filming** task card or **Film Preview** window). There you activate the **Auto Expose** option, and the images are exposed on film or printed on paper as soon as the film sheet has been filled, or they are first collected in a film job.

#### Exposing images on film

Patient images that you have collected in a film job can be printed or exposed from the **Viewing** task card. To do that, you do not need to switch to the **Filming** task card.

- ◆ Select **Patient > Expose Film Task**.
  - All images of the film job are transferred to the camera.



### *Transferring images to the References task card*

In the **Viewing** task card, you can transfer images to the **References** task card.

- ◆ Select the images or series you want to process in the **Viewing** task card.
- ◆ Select **Patient > Copy to Reference Monitor**.

– or –



- ◆ Click this button.
  - The images are copied to the References task card.  
(→ Register 5: Examination, Page 29)

### *Closing the patient*

When you have finished image processing and evaluation in the **Viewing** task card, you can close the patient. If images of several patients are loaded, you can close all patients in one step.

If images of a current examination are loaded, the patient will be closed when the examination is ended. This can also be initiated in the **Viewing** task card.

#### **Closing the patient**

- ◆ Select **Patient > Close Patient**.
  - The current patient folder is closed.

Or

- ◆ Select **Patient > Close All**.
  - All patient folders are closed.

The images are unloaded from the **Viewing** task card.

You can now load images of another patient for postprocessing.



*When closing the patient, the error message "Unloading of patient data failed" may appear. This happens if more than 320 images of a study are being unloaded. In this case, a restart must be performed.*

#### **Automatic slot diaphragm calibration**

When a patient is closed, the slot diaphragm is automatically recalibrated in order to ensure increased accuracy of the function. This process lasts about 20 sec. During this time the **kV** and **mA** indicators will flash. It is not possible to release radiation in this case. (The recalibration is carried out only if the slot diaphragm function was used for the registered patient.)



#### **Finishing an examination**

- ◆ Select **Patient > End Examination**.

The images are unloaded from the **Viewing** task card and the examination is ended.

You can now register the next patient for examination.

## Viewing configuration

In the **Viewer Configuration** window, you can adapt the user interface and program operation of the **Viewing** task card to your method of working.

You can change and make the following settings:

- ☐ Standard layout of the image area of the **Viewing** task card
- ☐ Generation of annotation text
- ☐ Presettings for saving Sub/Roadmap image data
- ☐ Standard layout of the image area of the **References** task card
- ☐ Behavior of reference images during loading
- ☐ Settings for image text display (configuration via image text editor)

## Calling up the configuration window

You can call up the configuration window from the **syngo Configuration panel**.



Viewing



ImageText  
Editor

- ◆ Select **Options > Configuration** in the main menu.
- ◆ Double-click the **Viewing** button.
  - The **Viewer Configuration** window appears.
- or —
- ◆ Double-click the **Image Text Editor** button to configure the image text display.
  - The **Image Text Configuration** window is displayed.

### *Concluding configuration*

If you have changed the settings in the cards of the configuration window, you must confirm them. If you have changed parameters by accident, you can reset these values to default values or reject all your changes.

#### **Applying changes**

- ◆ Confirm with **OK**.
  - All changes are applied.
  - The **Viewer Configuration** dialog window is closed.

Or

- ◆ Click **Apply**.
  - The changes of the current card are applied.
  - The **Viewer Configuration** dialog window remains opened.
  - The changed settings are automatically applied the next time you load data into the **Viewing** task card the next time.

#### **Resetting to default settings**

- ◆ Click **Reset to Default**.
  - The values of the current card are reset to standard values.
  - The **Viewer Configuration** dialog window remains opened.

#### **Discarding changes**

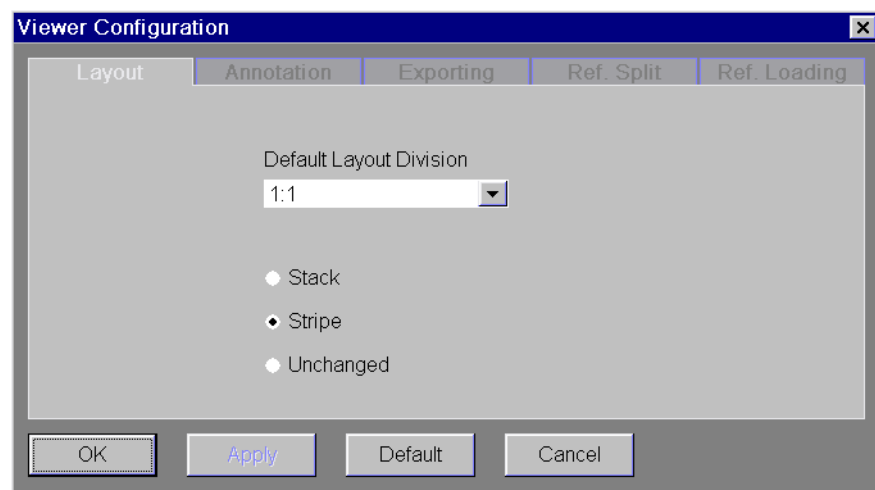
- ◆ Click **Cancel**.
  - The changes are not applied.
  - The **Viewer Configuration** dialog window is closed.

## *Division of the image area*

On the **Layout** card, you define the number and size of the segments in the image area.

The standard layout is 1:1 (full screen). This is the most suitable layout for detecting diagnostic details. For overview purposes you can set a layout with several images per page (4:1, 9:1 or 16:1).

### Changing the size of the layout



- ◆ Click the **Layout** card into the foreground.
- ◆ Select the size of the layout from the selection list.
  - After the images have been loaded into the **Viewing** task card, they are displayed in the selected layout size.

### Setting the type of layout

- ◆ Click the **Stripe** option.
  - You can view the loaded series of a study one after the other image by image.

Or

- ◆ Click the **Stack** option.
  - All images of a series are now arranged in a stack one on top of the other.

Or

- ◆ Click the **Unchanged** option.
  - All images are displayed in the type of layout that was used last.



*Gallery is the default setting for the layout type.*

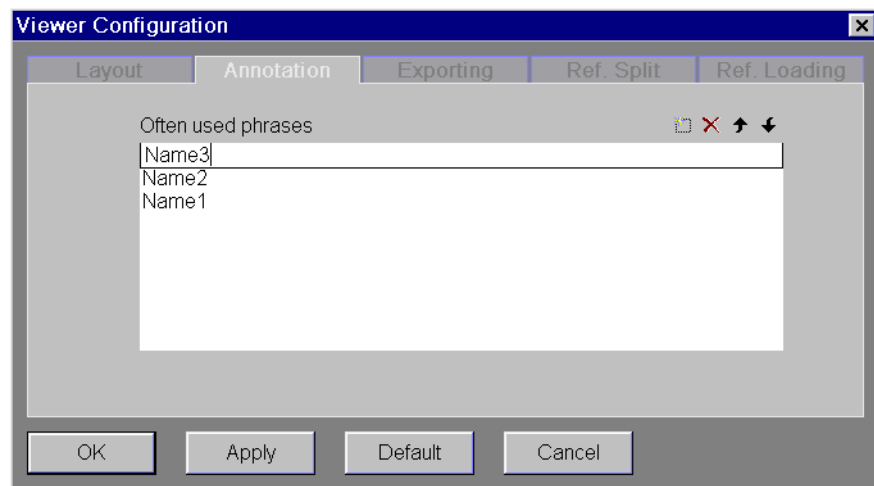
## Creating annotation texts

Texts that are often used can be created on the **Annotation** card. You can also delete texts or change existing annotations. The created texts may not exceed one line and 50 characters.



*The entered texts are available for selection, if you have enabled the **Tools > Annotate** function in the **Viewing** task card and then click into the image with the right mouse button.*

### Creating a new text



- ◆ Click the **Annotation** card into the foreground.
- ◆ Click on the **Paste** button.
- ◆ Double-click the empty box.
- ◆ Enter the new text.
- ◆ Click on the **Paste** button or press the **Enter**-key.
  - The new annotation text is placed in the top position of the list.



## Changing text

- ◆ Double-click an existing box.
- ◆ Enter the new text.
- ◆ Click on the **Enter** key.
  - The modified annotation text is displayed.

## Deleting an existing text



- ◆ Click on the **Delete** button.
  - The selected text is deleted.

## Moving texts



- ◆ Select a text in the list of annotation texts.
- ◆ Click on the **Move up** button.
  - or –
  - ◆ **Drag&drop** the text to the requested position.
    - The selected text is moved up one line.

Or

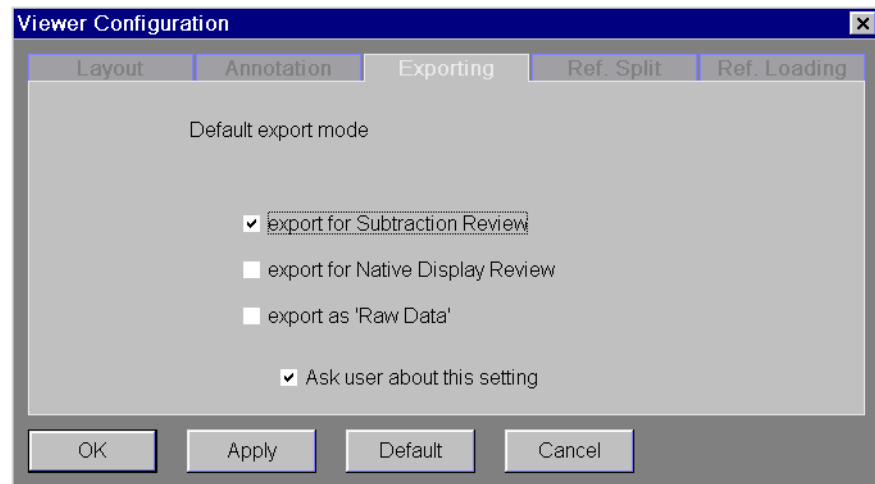


- ◆ Click on the **Move down** button.
  - or –
  - ◆ **Drag&drop** the text to the requested position.
    - The selected text is moved down one line.



## Exporting Sub/Roadmap image data

In the **Exporting** card you can define the data of Subtraction/Roadmap examinations that are to be saved during exporting and transfer (**Transfer** menu).



- ◆ Click the **Exporting** card into the foreground.
- ◆ Click one or more of the following options:
  - **export for Subtraction Image Display**  
Subtracted images are saved. These can also be viewed in non-Siemens systems. Subtraction functions can no longer be performed with these data.
  - **export for Native Image Display**  
Native images are saved. These can also be viewed in non-Siemens systems.
  - **export as 'Raw Data'**  
The original data set is saved. It can be post-processed in other ARCADIS systems or in systems with subtraction functions.



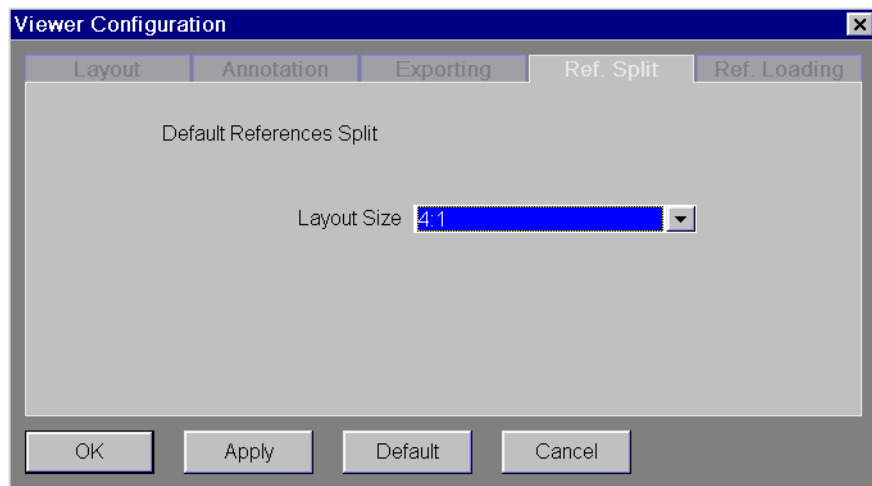
*Native Image Display is the default setting for export.*

☒ Ask user about this setting

- ◆ Check the corresponding check box, if applicable.
  - A dialog box is shown for every transfer of Subtraction/Roadmap images. This allows you to select data that differ from the default settings.

### *Layout in the References task card*

The **Ref. Split** card lets you determine how to split the image area in the **References** task card when the **Monitor split** button at the C-arm system is pressed.



- ◆ Click the **Ref. Split** card into the foreground.
- ◆ Select the size of the layout from the selection list.
  - Loaded images are displayed in the selected layout size in the **References** task card when the **Monitor split** button is selected on the C-arm system.

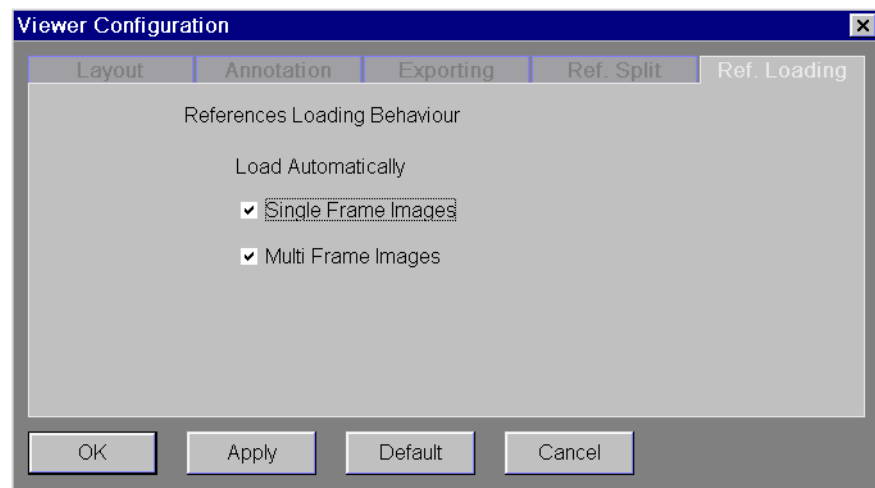


*You can set the following layout sizes: 4:1, 9:1, 16:1.  
The standard setting for the layout size is 4:1.*

### *Loading reference images during an examination*

You can set the system to automatically save images and scenes during the examination. For this purpose, the **Autostore** function must be activated in the operating program of the examination set (see → Register 8: Configuration, Page 13).

The **Ref. Loading** card lets you determine which data are to be automatically transferred to the **References** task card.



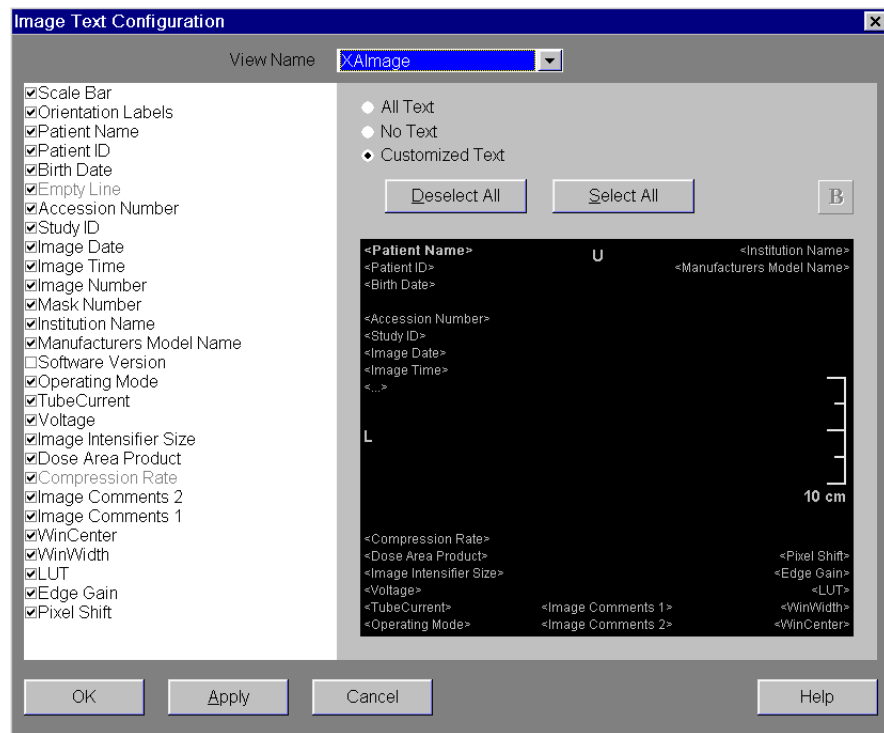
- ◆ Click the **Ref. Loading** card into the foreground.
- ◆ Click the **Single Frame Images** check box.
  - Automatically saved individual images are always loaded in the **References** task card.
- ◆ Click the **Multi Frame Images** check box.
  - Automatically saved multiframe images (scenes) are always loaded in the **References** task card.



*In the default setting, both check boxes are activated.*

## Configuring image text display

In the **Image Text Configuration** dialog you can set which image text information is to be displayed by default with individual basic formats. The dialog box is opened by clicking the Image Text Editor button in the **syngo Configuration Panel**.



- ◆ In the **View Name** selection list, select the basic format for which your configuration settings apply.
  - ◆ Select either **All Text** or **No Text**.
    - By default, all available image texts or no image text are/is displayed.
- or
- ◆ Click on the option field **Customized Text**.
  - ◆ Select the desired information in the left selection area.
    - By default, the selected image texts are displayed.



*All entries in the left selection area can be selected or deselected with the button **Select All** or **Deselect All**.*

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## Introduction for Filming/Printing

You can expose the images of an examination on film or print them on paper for documentation and reporting.



*Filming and printing are the same process except that they use different output devices. If in the following only the term "filming" is used (e.g. with software elements), the description is also applicable for printing.*

- |                          |  |
|--------------------------|--|
| <b>Film job</b>          | Selected images, series and studies that you have sent for filming are managed and executed by the system as film jobs.  |
| <b>Multiple film job</b> | In general, images of different patients are processed in different film jobs. However, you can permit images of different patients to be grouped together as a multiple film job.   |
| <b>Film task status</b>  | You can also obtain information about the extent to which film jobs in the camera/printer queue have been executed in the <b>Film Task Status</b> dialog box and intervene in the sequence of execution.   |
| <b>Film preview</b>      | Images in film jobs are not immediately printed or exposed on film, but are first transferred to a virtual film sheet. In the <b>Film Preview</b> window, you can see how the images will later be arranged on the exposed film or printout.   |
| <b>Filming task card</b> | In addition to the <b>Film Preview</b> window, the <b>Filming</b> task card is also available to you as a virtual film sheet. Besides the basic functions of the <b>Film Preview</b> window, the <b>Filming</b> task card provides a number of additional functions and configuration possibilities that enable you to adapt the filming and printing process to your specific requirements. |



*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.*

## Filming and printing

Image material is filmed/printed in two steps:

- ❑ First, specify on one of the task cards or in the **Patient Browser** which images or series you want to print or expose on film. Then transfer the selected images to the virtual film sheet.
- ❑ From the virtual film sheet, you can either send your selected images directly to a camera/printer, or you can perform additional processing steps first.



*If a local printer is connected, you can print individual images on paper or X-ray film directly in the OR.*

*(→ Page 11)*

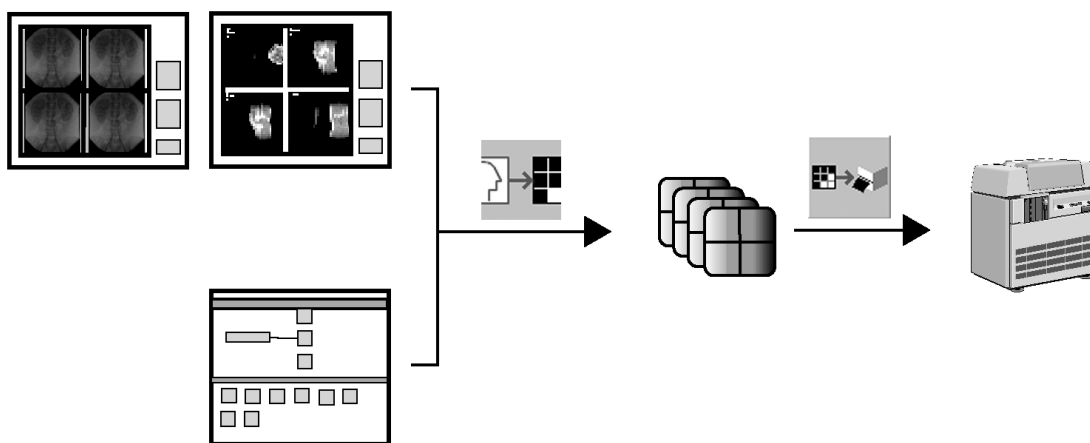


*Scenes (multiframe objects) with more than 1023 images cannot be sent to a DICOM camera.*

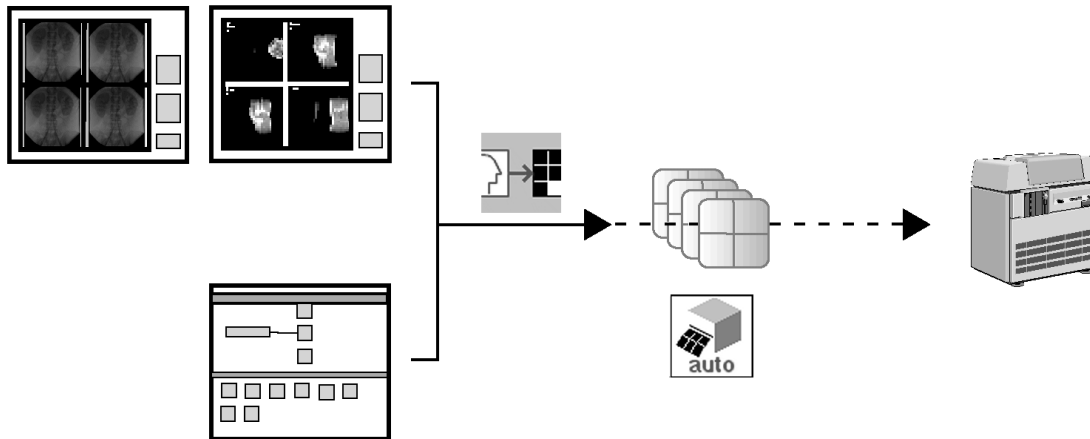
Image material can be printed or exposed on film either automatically or manually.

### Manual filming

You transfer images to the virtual film sheet. After that, you manually initiate the transfer to the camera or printer. In doing so, you can select the images that you want to expose on film or print.



**Automatic filming** You transfer images to the virtual film sheet. As soon as a film sheet is filled, the images are automatically output on camera or printer (**Automatic Exposure** function).



*We recommend keeping **Automatic Exposure** always switched off. This way, radiation release will not be impeded by images being printed out during the examination. Instead, the images to be printed will first be collected in the virtual film sheet. They can be edited after the examination and manually sent to the printer.*

## *Layouts and settings*

All film settings such as the layout of the film sheet or the selected camera/printer are defined in so-called film layouts.

### **Standard layout**

Provided that you do not make any changes to the default film settings, you always work with the general default layout defined by Siemens Service during installation of your system.

### **Changing film settings**

If you are not satisfied with the default film settings (default layout), you can change individual film settings using the virtual film sheet. The current film job is then processed with your new settings. For the next film job, the system will use the default settings again.

### **Study-specific layouts**

In the **Configuration** of the **Filming** task card, you can define special film settings for individual studies and series. Whenever you film or print images of a study or series of the same type, the system automatically uses this study-specific layout.

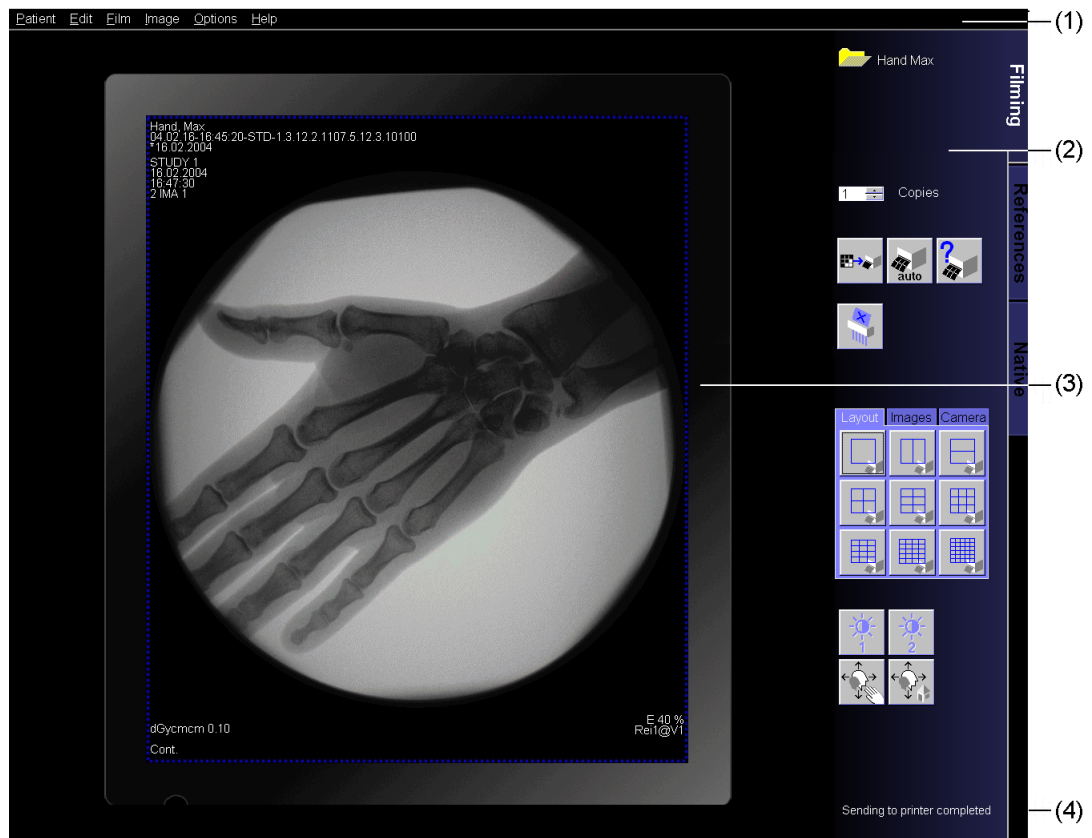
### **Print modes**

The regular page mode is the default print mode. The scalable page mode provides images with reduced quality and does not support original size.

## *The Filming task card*

If you want to change individual film sheets of the jobs in the queue or if you want to process the images again before filming, switch to the **Filming** task card.

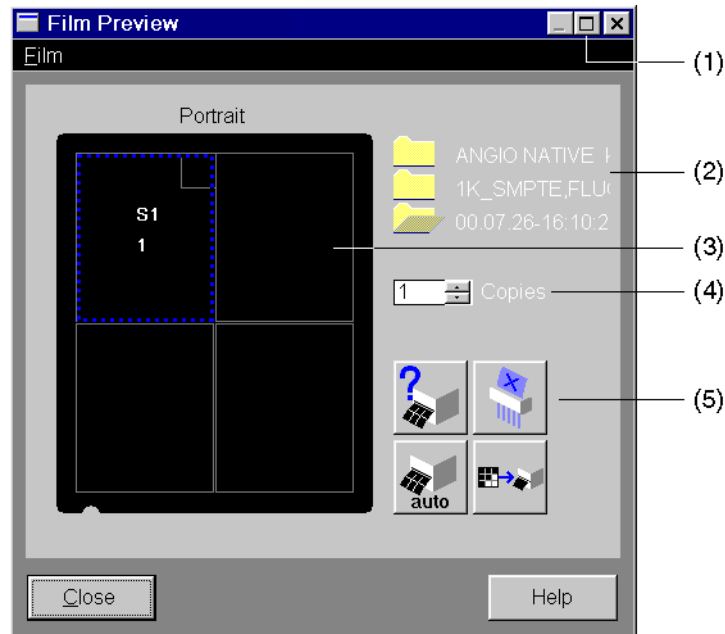
The **Filming** task card is divided in four main areas.



- (1) Menu bar with menu entries for filming
- (2) Control area allowing easy access to processing functions
- (3) Display of the film sheets (virtual film sheet)
- (4) Status bar for system messages

## The Film Preview window

If you want to obtain a quick overview of the film jobs in the queue that have not yet been sent to the camera or printer, you can use the **Film Preview** window.



- (1) Maximize to **Filming** task card
- (2) Film jobs
- (3) Display of film sheets
- (4) Spin box for selecting the number of copies
- (5) Buttons for film control and delete button



The **Film Preview** window can be opened only from the **Patient Browser** by selecting **Patient > Film Preview**.

## Automatic/manual filming

The filming and printing of examination images is performed in two steps:

- ❑ Transfer of images to the virtual film sheet.
- ❑ Transfer of these images from the virtual film sheet to a camera or printer where they are exposed on film or printed on paper.



*Make sure the printer is switched on before you send images to print.*

### Configured printers/ cameras

Siemens Service or your system administrator has configured one or several printers/cameras for your ARCADIS Varic system. At the same time, the names of output devices that you can choose from selection lists as well as the specified paper/film size were set up.



*Note that you can only print on the paper/film size that was configured for the respective output device.*

## Transferring images to the virtual film sheet

Images can be transferred for printing from different applications via the control panel on the C-arm system or at the monitor trolley.

### At the C-arm system

If a local printer is connected, you can print individual images on paper or X-ray film directly in the OR.

### Initiating local printing



- ◆ Press the **Print** key on the control panel of the C-arm system.
  - The currently selected image is copied to the virtual film sheet.
  - Depending on the setting for exposure on film, the image is transferred directly to the specified (local) printer and printed there.

### *At the monitor trolley*

You have the possibility of selecting and filming/printing single images or all images of a series, a study or a patient.

#### **Selecting images**

You decide on the **Viewing** task card or in the **Patient Browser** window which images you want to transfer to the virtual film sheet. You can use the large format layout when selecting images in the **Viewing** task card.

- ◆ Select **Patient > Browser**.
  - The **Patient Browser** opens.
- ◆ Select the images for filming in the navigation or content area.

Or

- ◆ Load the series or study containing the images that you want to film into the **Viewing** task card.
  - (→ Register 6: Image Processing, Page 13)
- ◆ Select the images for filming in the image area.

#### **Transferring Images**

- ◆ Select **Patient > Copy to Film Sheet**.

Or

- ◆ Click the **Copy to Film Sheet** button.

Or

- ◆ Press the **Copy to Film Sheet** key on the symbol keypad.
  - All the selected objects are transferred to the virtual film sheet.



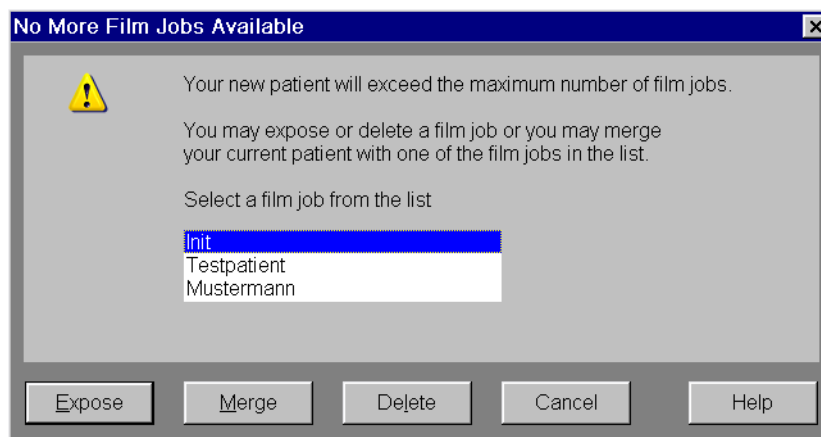
*You cannot transfer scenes from the **Patient Browser** to the **Filming** task card. If one of the images selected for transfer is a scene, you will receive a corresponding message.*



## Virtual film sheet full

In general, every time you transfer images of a series or whole studies of a patient to the virtual film sheet, a film job is created.

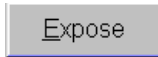
No more than 3 film jobs at a time can be managed in the virtual film sheet. If a fourth film job is transferred to the film sheet, the **No More Film Jobs Available** dialog box appears.



*This situation can usually only occur if the **Automatic Exposure** option is deactivated for the film jobs as recommended. The film jobs then remain in the virtual film sheet until you send them to filming manually and thus complete them.*

You must first expose/print or delete one of the film jobs in the queue before a new film job can be accepted.

## Exposing the selected film job



- ◆ Select one of the film jobs listed.
- ◆ Click **Expose**.
  - The selected job is filmed and the new job is placed in its position in the virtual film sheet.

## Deleting a selected film job



- ◆ Click **Delete**.
  - The selected job is deleted and the new job is placed in its position.

## Merging film jobs



- ◆ Click **Merge**.
  - The images of the new film job are appended to the end of this old film job.



*The film job remains in the virtual film sheet as a multiple film job until you transfer it to the camera or printer.*

*(→ Page 5)*

## *Sending images to the camera/printer*

Images can be transferred to the camera or printer via the same menu entries in the different task cards or in the **Patient Browser**.



*You should not release radiation while the ARCADIS Varic is processing film jobs, because system performance may be restricted during this time. It is advisable to wait until after the examination to send off film jobs.*

## *Automatic exposure*

After a film job has been transferred completely to the virtual film sheet, it can immediately and automatically be transferred to the camera/printer.



### Caution

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.



*We recommend keeping **Automatic Exposure** always switched off. This way, radiation release will not be impeded by images being printed out during the examination. Instead, the images to be printed will first be collected in the virtual film sheet. They can be edited after the examination and manually sent to the printer.*

## Automatic exposure on



This function may accelerate the workflow associated with evaluation. However, it is recommended to switch it off prior to the next examination.

- ◆ Select **Options > Auto Expose** on the right monitor.

Or

- ◆ Click the **Auto Expose** button.
  - A film sheet that is completely filled is automatically printed or exposed as soon as an image for the next (empty) film sheet is transferred.



*If the last film sheet is only partially filled, then the configuration settings determine when it is sent to be filmed.*

(→ Page 54)

## Automatic exposure off



- ◆ Deselect **Options > Auto Expose**.

Or

- ◆ Click the active **Auto Expose** button.



*Aborting automatic exposure*

*If errors occur during automatic filming, or you notice that defective images have been filmed/printed, you can abort automatic exposure at any time.*

- ◆ Deselect **Options > Auto Expose** on the right monitor.

- ◆ Eliminate the fault.

— or —

- ◆ Delete the faulty images from the virtual film sheet.

- ◆ Activate **Auto Expose** again.

— or —

- ◆ Transfer the remaining sheets to the camera/printer manually.

## Transferring images manually

If the **Auto Expose** option is deactivated, all images to be filmed are collected in the virtual film sheet as film jobs. You decide which jobs are filmed or printed at what time.



### Caution

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.

### Exposing the current film task



- ◆ Call up **Film > Expose Film Task**.
  - All images of this film job are transferred to the camera or printer.

Or

- ◆ Click the **Expose Film Task** button.
  - All images of the film job are transferred to the camera.



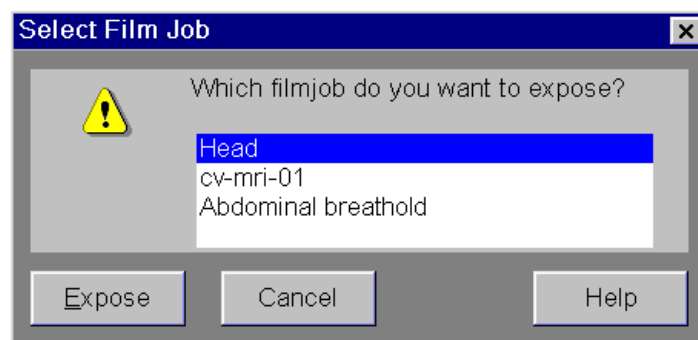
*If you only want to expose a single film sheet instead of a whole film job, then select the desired sheet in the Filming task card or in the **Film Preview** window and expose it from there.*

(→ Page 19)

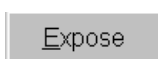
### Selecting a film job

If you have loaded several patients into the **Filming** task card, you can select the task you want to expose from the list displayed in the **Select Film Job** dialog box.

- ◆ Select **Patient > Expose Film Task**.
  - The **Select Film Job** dialog box is opened.



- ◆ Select a job.
- ◆ Click **Expose**.



### *Correcting the film size*

If the film size set for the film sheet waiting to be exposed/printed is not supported by the selected camera, the **Incorrect Film Size** dialog box is displayed.



### Selecting a different size

- ◆ Select the film size configured for the camera/printer from the selection list.
- ◆ Confirm with **OK**.
  - Filming/printing is resumed.

## *Viewing and processing film sheets and images*

Once you have deactivated the **Auto Expose** option during manual filming, you can view and process the film sheets again before finally printing them or exposing them on film.

### **Film preview**

If you want to obtain a quick overview of the film jobs in the queue that have not yet been sent to the camera or printer, you can use the **Film Preview** window.

### **Filming task card**

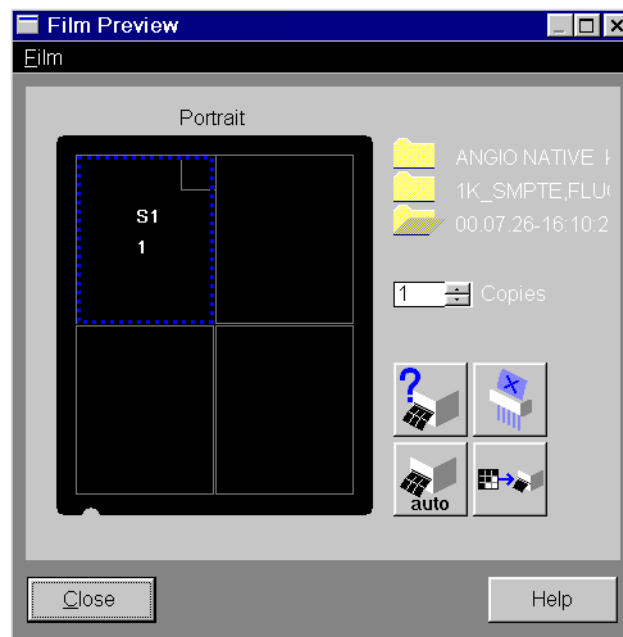
If you want to organize individual film sheets of the jobs in the queue more efficiently and clearly or if you want to process the images again before filming, switch to the **Filming** task card.

## *Film preview*

In the **Film Preview** window, you can also access some basic functions for filming without having to switch to the **Filming** task card.

### *Calling up the film preview*

- ◆ Select **Patient > Film Preview** in the **Patient Browser**.
  - The **Film Preview** window is displayed.





## Basic functions

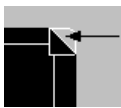
After you have called up **Film Preview**, the window will appear in front of the application you are currently working with.

### Viewing film jobs



- ◆ Click on a film job.
  - The film job is opened.

### Scroll through the display area



Using the dog ears in the top right hand corner, you can scroll through all the film sheets of the film job.

- ◆ Click once on the outer triangle.
  - The film sheet is paged forward.

Or



- ◆ Click once on the inner triangle (dog ear).
  - The film sheet is paged backward.

### Film task status



- ◆ Click the **Film Task Status** button.
- Or
- ◆ Select **Patient > Film Task Status**.
    - The **Film Task Status** dialog box is displayed.

### **Automatic exposure on**



This function may accelerate the workflow associated with evaluation. However, it is recommended to switch it off prior to the next examination.

- ◆ Click the **Auto Expose** button.

Or

- ◆ Select **Options > Auto Expose**.
  - The opened film job is automatically exposed.

### **Exposing a film job**

---



#### **Caution**

Using paper printouts for diagnosis of AX, CT and MR images.

#### **Wrong diagnosis possible!**

- ◆ Only use film material and cameras/printer appropriate for diagnostic purposes.
- 



- ◆ Click the **Expose Film Task** button.

Or

- ◆ Select **Patient > Expose Film Task**.
  - The opened film job is transferred to a camera/printer.

**Exposing/printing a film sheet**

Instead of a whole film job you can also transfer single film sheets to the camera or printer.

- ◆ Select a film sheet.
- ◆ Call up **Film > Expose Film Sheet**.
  - Only the selected film sheet is processed.

**Incorrect film size**

*If the film size set for the film sheet waiting to be exposed/printed is not supported by the selected camera, the **Incorrect Film Size** dialog box is displayed.*



- ◆ Select the film size configured for the camera/printer from the selection list.
- ◆ Confirm with **OK**.
  - Filming is resumed.

## Changing default settings

By default a layout has already been defined for every film job in the virtual film sheet and a camera or printer has been selected.

You can change these default settings in the **Film Preview** dialog box or in the **Filming** task card itself.

### Selecting a camera or printer

- ◆ Select **Film > Change Camera...**
  - A dialog box is opened in which you can select a new camera/printer.



*Note that you can only print on the paper/film size that was configured for the respective output device.*

### Changing film settings

- ◆ Click in a segment or on the border of the film sheet.
  - or —
- ◆ Select the film job.
- ◆ Select **Film > Properties...**
  - The **Film Properties** dialog box is opened in which you can change a number of layout settings for filming.

Or

- ◆ Right-click in a segment or on the border of the film sheet.
- ◆ Select **Properties** from the context menu.
  - The **Film Properties** dialog box is opened in which you can change a number of layout settings for filming.



*The **No text** option should not be used since otherwise image text and the patient name will not be visible on the film sheet. This can easily lead to confusions.*

### *Processing a film sheet*

The **Film Preview** dialog offers a number of functions for reorganizing film sheets.

#### **Deleting images**



- ◆ Click the delete button in the control area.
  - The selected image is deleted. The following images move up so that no empty segments remain.

Or

- ◆ Select **Film > Clear Document(s)**.
  - The image is deleted. The following images do not move up.
- ◆ Enter **Film > Repack**.
  - Your film material is now used more efficiently.

#### **Adding images**

If you have opened the **Film Preview** from the **Patient Browser** window, you can add further images to a film job.

- ◆ Select **Film > New Film Sheet**.
  - An empty film sheet is added to the end of the film job.
- ◆ Select **Patient > Copy to Film Sheet**.
  - These images are also appended to the end of the film job.

## Processing film jobs and film sheets

In addition to the simple processing steps in the **Film Preview** dialog, you can also make complex and extensive changes to film jobs in the **Filming** card.

### Calling up the Filming task card

The **Filming** task card is in the stack of task cards on the right-hand monitor.



- ◆ Click the **Filming** tab.

Or



- ◆ Maximize the **Film Preview** window.
  - The **Filming** task card is placed in the foreground.



As soon as you transfer images to the virtual film sheet (Print button at the C-arm control panel or **Copy to Film Sheet** menu item at the monitor trolley, the **Filming** task card is automatically moved to the foreground.

## Selecting a film job

By the patient folders in the upper part of the control area you can see which film jobs are currently waiting to be transferred to a camera/printer.

### Designations

These jobs have one of the following designations:

☐ Patient name

A film job that contains the images of a patient.

☐ Multiple

A film job that contains the images of several patients.



*If there is no film job on the virtual film sheet, a patient folder with the designation **New** is displayed.*

### Opening a film job



- ◆ Click on a film job.
  - The film job is opened.



*The patient folder opens up and the color of the folder remains unchanged.*

### Selecting an entire film job

- ◆ Click again on the opened film job.
  - All the film sheets with all images of this job are selected.



*The folder icon is now highlighted (blue), and all the images of this job are shown in the film sheet display with a clear border and are therefore selected.*

### Setting multiple printout

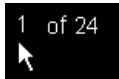


- ◆ Select the number of copies with the spin buttons.
- Or
- ◆ Enter the required number of copies using the keyboard.

## *Selecting film sheets and images*

After you have opened a film job, its images are displayed in the left-hand part of the **Filming** task card.

### **Paging through several film sheets**



- ◆ Page through the film sheets using the dog ears.

Or

- ◆ Double-click on the number of the current film sheet.
  - The display field becomes an input field.
- ◆ Overwrite the number displayed with the number of the sheet that you want to go to.
- ◆ Press the **Enter** key.
  - The film sheet you have entered is displayed.

### **Selecting a film sheet**

- ◆ Click on the border of the film sheet.
  - All the segments of the film sheet are now shown with a clear border.

### **Deselecting a film sheet**

- ◆ Click outside the film sheet with the left mouse button.

Or

- ◆ Select a single image, another film sheet or another film job.
  - Your selection is canceled.

### **Selecting multiple selection**

You can also select several film sheets at once.

- ◆ Click on the border of the first film sheet of your choice holding the **Ctrl** key down.
- ◆ Page to another film sheet.
- ◆ Hold the **Ctrl** key pressed to extend your selection by a single film sheet.

Or

- ◆ Hold the **Shift** key pressed to select all the film sheets between the two film sheets including all their images.



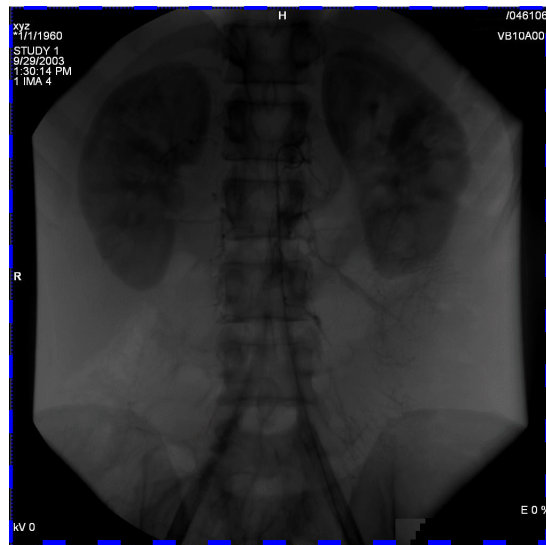
*When you have selected a film sheet, all images have a line border.*



**Selecting segments** You cannot only select whole film sheets, but also individual images of a film job.



The **Input Focus** shows the active segment of the image area. It is marked by a dashed border and shows you which image is currently being processed.



- ◆ Click on another image with the left mouse button to place the input focus on another segment.

Or

- ◆ Move the input focus using the arrow keys on the keyboard.

## Selecting one or more images explicitly

- ◆ Click into a segment holding the **Ctrl** key down.
  - The segment is marked with a line border.

## Selecting images explicitly up to the end of a series

- ◆ Click on the image that you want to select explicitly holding the **Ctrl** key down or use the input focus.
- ◆ Select **Edit > Select On Succeeding**.
  - The selected image and all the following images are now selected.

## Selecting a complete series explicitly

- ◆ Click on the image of the series that you want to select holding the **Ctrl** key down or use the input focus.
- ◆ Select **Edit > Select series**.
  - The whole series is now selected explicitly.

## Deselecting images

- ◆ Hold the **Ctrl** button pressed.
- ◆ Click on an explicitly selected image again.

Or

- ◆ Select **Edit > Deselect All**.
  - All selected images are deselected.
  - After that, the default input focus is set automatically, i.e. the top left segment is the destination of the next action.

## *Reorganizing film sheets*

Using the **Filming** task card, you can reorganize film jobs in such a way that only those images are exposed or printed that you require.

### **Deleting images or film sheets**



- ◆ Select one or more images or film sheets or use the input focus.
- ◆ Select **Edit > Delete**.

Or

- ◆ Delete the images/film sheets with this button.

Or

- ◆ Select **Film > Clear Document(s)**.
  - The images are deleted, the segments in the film job remain empty.

### **Filling empty segments**

- ◆ Select **Film > Repack**.
  - The gaps are filled.

### **Copying images or film sheets**

- ◆ First select the images/film sheets that you want to copy.
- ◆ Select **Edit > Copy**.
- ◆ Select the image in front of which you want to insert the copies.
- ◆ Select **Edit > Paste** from the main menu.
  - All the copied images are inserted in front of the selected segment.
  - The image of this segment is moved back in the film job.

### **Moving images or film sheets**

- ◆ Select the image or the images that you want to move.
- ◆ Select **Edit > Cut**.
- ◆ Select the segment in front of which you want to move the cut-out images.
- ◆ Select **Edit > Paste** from the main menu.

### **Appending a new film sheet**

- ◆ Select **Film > New Film Sheet** at any point in the film job.
  - A new (empty) film sheet is appended to the end of the film job.
- ◆ Then insert the copied or cut images into this sheet.

## Editing images

In addition to arranging film sheets, you can also change the display parameters of the images in the **Filming** task card to obtain an optimum output result.

(→ Register 6: Image Processing, Page 33)



*In the Filming task card, images are loaded with the window values with which they were last saved. If you have transferred images from the **Viewing** task card, the images are displayed with the window values last used in the Viewing card.*

### Windowing images

Using the **Window 1** and **Window 2** buttons, you can assign those window values that were permanently stored with the image data (e.g. with imported images). The images acquired at the system do not support different window values, the buttons are then deactivated (dimmed).



- ◆ Select one or more images, or work in the input focus.
- ◆ Click **Window 1** or **Window 2**.
  - The windows are assigned the values of the first or second stored window.

### Zooming and panning images



- ◆ Click the **Zoom/Pan** button.
- Or
- ◆ Select **Image > Zoom/Pan**.
  - The function of the left mouse button is now switched from *Select* to *Zoom&Pan*. Now you can zoom and pan the image.



**Image > Zoom Factor** allows for zooming with a defined factor.

### Restoring the zoom factor/position



- ◆ Select **Image > Home Zoom/Pan**.
- Or
- ◆ Click the **Home Zoom/Pan** button.
  - The images are assigned the position and zoom factor with which they were last stored in the database.

## *Changing film settings for a film job*

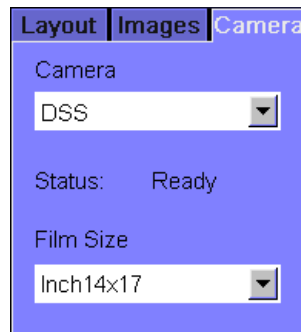
When your system is configured, a standard film layout is defined. This layout contains all the settings required for filming.

If these presettings are not suitable, you can change the following on the **Filming** task card or in the **Film Preview** dialog:

- ☐ Select another camera or printer
- ☐ Change the number of copies
- ☐ Change the layout of the film sheets
- ☐ Change the image, text and graphic display

## Selecting a camera and printer

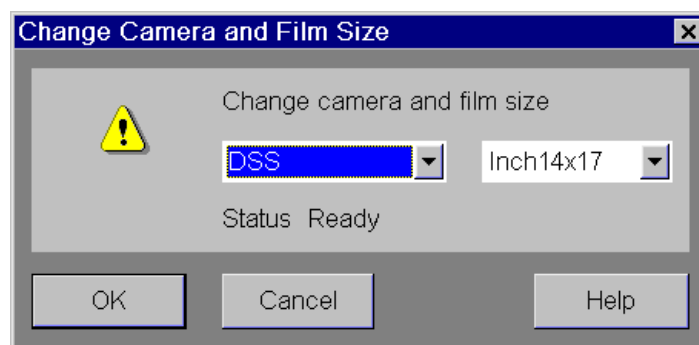
If you do not want to expose or print your current film job with the default camera, then select another camera/printer for this job.



- ◆ Click the **Camera** subtask card on the **Filming** task card into the foreground.

— or —

- ◆ Select **Film > Change Camera....**
  - The **Change Camera and Film Size** dialog box is displayed.



- ◆ Select a camera or printer from the list.
- ◆ Under **Film Size**, select the film size configured for the camera/printer.



*The newly selected camera or printer will then become the default camera or printer. These default devices will be used as long as you have not selected another camera or printer.*

*In the **Status** display, you can see whether the selected camera/printer is switched on and available.*

## *Changing the layout of the film sheet*

With the layout of the film sheet, you can define the size of each image.

### **Selecting images and film sheets**

The film sheet layout is set for selected images of a film job.

- ◆ Select an entire film job.
  - The layout is changed for all sheets of this job.

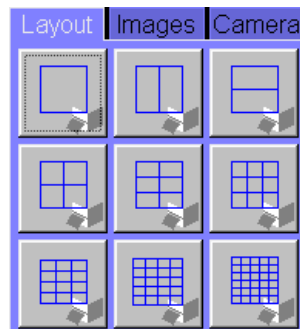
Or

- ◆ Select a film sheet.
  - The layout is changed for this single sheet only.

Or

- ◆ Select individual images, or work in the input focus.
  - The format for the relevant images is changed.

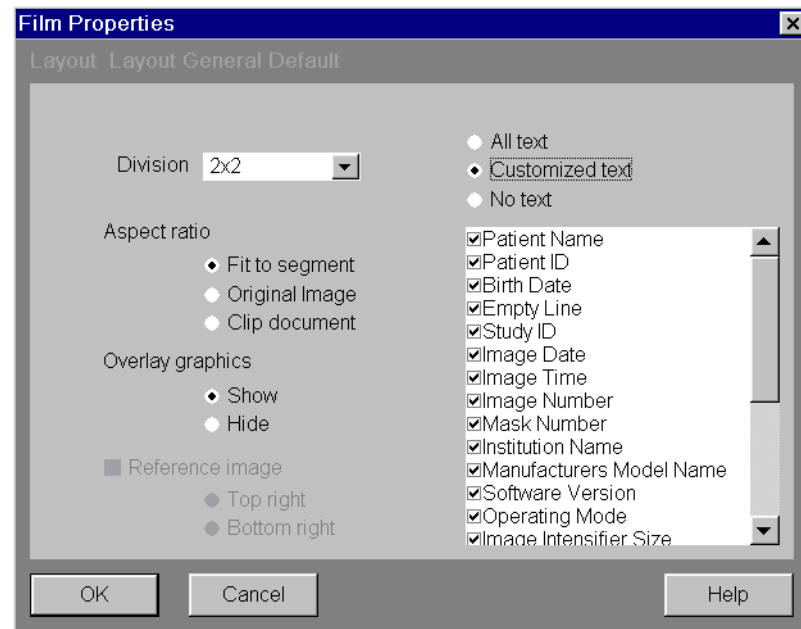
### **Changing the layout**



- ◆ Click the **Layout** subtask card on the **Filming** task card into the foreground.
- ◆ Click the button for a film layout.
  - The selected images are displayed in this format.

Or

- ◆ Select **Film > Properties...** in the main menu or **Properties** in the context menu (right mouse button).
  - The **Film Properties** dialog box is opened.



- ◆ Select a division in the **Division** selection list.

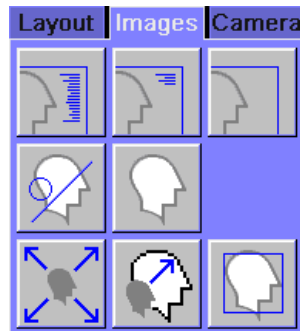


*If the film sheet division is different for the selected images or film sheets, the **Division** selection list is empty.*



## *Image, text and graphic display*

The layout of the film sheet defines the number and size of the segments on a film sheet. In the **Film Preview** window and the **Filming** task card, you can change the aspect ratio of individual images in your segments and define whether and how text and graphics are to be printed or exposed on film.



- ◆ Click the **Images** subtask card into the foreground.
- or —
- ◆ Call up the **Film Properties** dialog box.
  - The settings of the currently selected images are displayed.
  - The dots in the radio buttons are displayed gray if the settings of the images are different.



## Changing the image section



- ◆ Click the **Clip document** button.

Or

- ◆ Select **Clip document** in the **Film Properties** dialog box.
  - Rectangular images can be increased so that the shorter side of the image fills the segment. Parts of the longer side of the image are cut off (upper and lower edge of the image or the sides of the image).



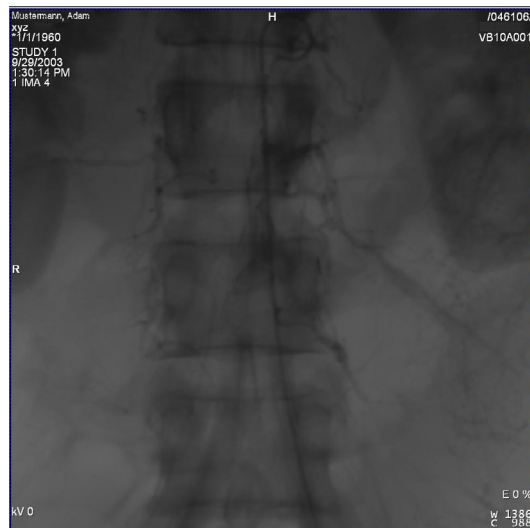
## Setting the original image



- ◆ Click the **Original Image** button.

Or

- ◆ Select the **Original Image** option in the **Film Properties** dialog box.
  - The images are displayed in the segment in their original size (max. 1% tolerance), the dimensions on the screen and on the printout are the original ones.



*If it is not possible to display images in the **Original Image** aspect ratio (1:1 scale), a message is displayed and the **Fit to segment** option is selected instead.*

**Showing/hiding text**

In the film settings, you can select whether you want to have text information about the images printed/exposed.



*Image texts and patient names should not be hidden. Otherwise, printed images can easily be mixed up.*



- ◆ Click the **All text** button.

— or —

- ◆ Select the **All text** option in the **Film Properties** dialog box.
  - All text information about the images is displayed in the segments and later filmed or printed together with the images.



- ◆ Click the **No text** button.

— or —

- ◆ Select the **No text** option in the **Film Properties** dialog box.
  - All text information in the segments is hidden.



- ◆ Click the **Customized text** button.

— or —

- ◆ Select the **Customized text** option in the **Film Properties** dialog box.
  - Only part of the text information is displayed and exposed on film or printed.



*In the **Film Properties** dialog box, you can now select which text information is to be displayed if the **Customized text** option is selected.*

### Displaying/hiding graphics and annotations



You can have graphics (e.g. ROIs) and annotations displayed or hidden.

- ◆ Click the **Show Graphics** button.

- or —

- ◆ Select the **Show** option in the **Film Properties** dialog box.
  - The graphics (e.g. ROIs) and annotations are displayed.

- ◆ Click the **Hide Graphics** button.

- or —




- ◆ Select the **Hide** option in the **Film Properties** dialog box.
  - The graphics (e.g. ROIs) and annotations are hidden.

## Checking the data transfer

From the virtual film sheet the film jobs are transferred to the camera/printer. A queue of jobs waiting to be executed will be formed.

**Display in the status bar**

During the filming process, the status bar displays icons that tell you whether errors have occurred during filming.

Action	Symbol
Camera in operation	
Film exposure interrupted	
Output of warning messages	



*The status of the printer is not shown on the status bar.*

## *Viewing and manipulating film jobs*

The **Film Task Status** dialog box contains detailed information about the filming process. You can stop the entire queue, trigger it again and repeat or delete individual film jobs.

### *Calling up the Film Task Status dialog*

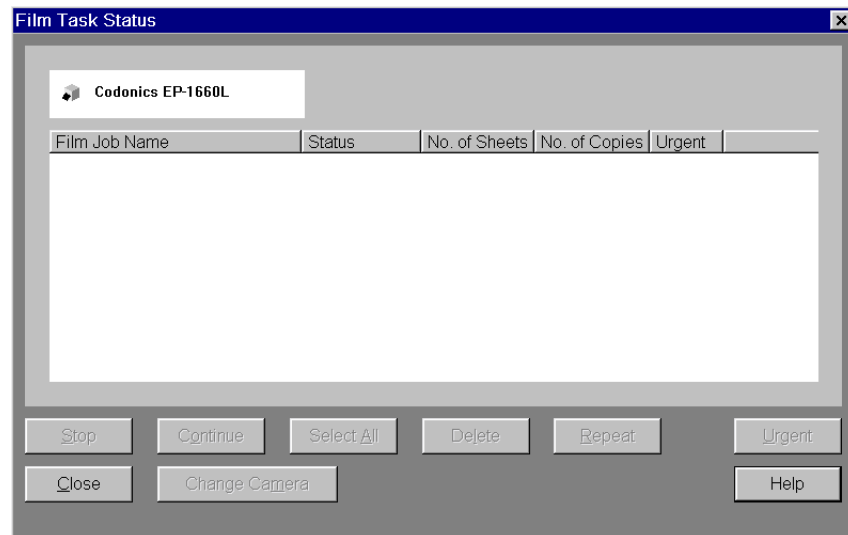
- ◆ Select **Patient > Film Task Status**.

Or

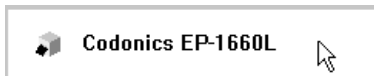
- ◆ Click the **Film Task Status** button.

Or

- ◆ Click an icon for local data transfer in the status bar.
  - The **Film Task Status** dialog box is displayed.





**Displaying the queue  
for a camera**

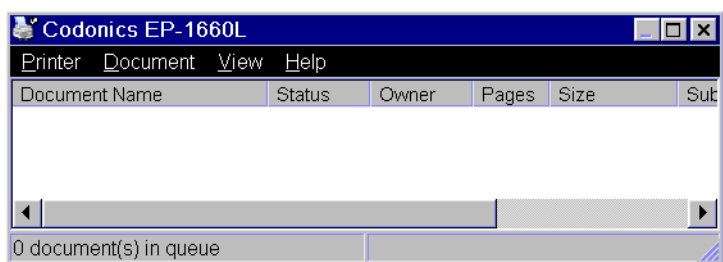
- ◆ Click one of the camera icons.
  - The queue of a camera is displayed.



*The camera whose queue is being displayed is highlighted in a different color.*

**Displaying the queue  
of a printer**

- ◆ Click on one of the printer icons.
  - The print job control box is displayed. Here you can manipulate the print jobs for the selected printer by using the menu entries of the Windows XP operating system.



## Manipulating film jobs

The status of a job determines how you can influence its execution and therefore what buttons are active.



*In the **Film Task Status** dialog box you can only edit those film jobs for which you have initiated exposure (manually via **Expose Film Task** or with **Auto Expose**).*

*Film jobs that have been completely transferred to the output device from the queue can no longer be interrupted or deleted.*

### Stopping jobs

You can stop jobs with the "Queued" or "Printing" status at any time, for example to insert a new film.



- ◆ Select one or more jobs having the "Queued" status.
- ◆ Click **Stop**.
  - All film jobs of this queue are stopped ("Stopped" status). In the job being filmed, a sheet that has been started will still be completed. All the following film sheets will not be processed.

### Resuming jobs

Once your camera is ready again, you can resume execution of the queue.



- ◆ Select one or more jobs with the "Stopped" status.
- ◆ Click **Continue**.
  - All the jobs in the queue return to their original status. Film exposure is resumed. The job that was being exposed when you clicked **Stop** is resumed at the point at which you stopped the camera.

**Repeating jobs**

Film jobs that have been exposed and are therefore completed can be repeated while they are still in the queue.

- ◆ Select the required film job that has already been exposed on film and has the "Printed" status.
- ◆ Click **Repeat**.
  - The job is assigned the "Queued" status and is copied to the end of the queue.

A rectangular button with a light gray background and a thin blue border. The word "Repeat" is centered in a dark gray sans-serif font.**Deleting jobs**

You can delete film jobs that are listed in a queue regardless of their status.

- ◆ Select one or more jobs.
  - or –
- ◆ Click **Select All**.
- ◆ Click **Delete**.
  - The selected jobs are deleted.

A rectangular button with a light gray background and a thin blue border. The text "Select All" is centered in a dark gray sans-serif font.A rectangular button with a light gray background and a thin blue border. The word "Delete" is centered in a dark gray sans-serif font.

*If you delete a job that is being exposed, the sheet that has been started will still be completed, but none of the following sheets will be exposed on film.*

### Deleting the priority of film jobs



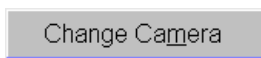
Film jobs that you want to process first can be classified as "urgent".

- ◆ Select one or more jobs with the "Queued" status.
- ◆ Click **Urgent**.
  - This job moves to the first position of all jobs with the "Queued" status.



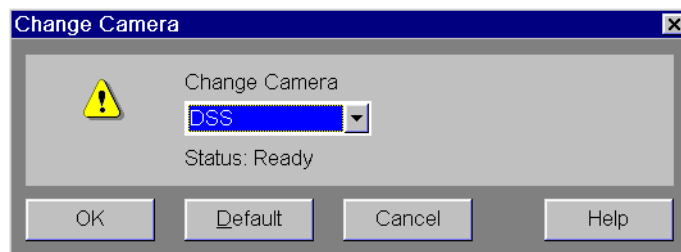
*If several jobs are classified as "urgent", they will be processed in the order listed.*

### Selecting another camera



You can select a new camera for one or more film jobs.

- ◆ Select one or more film jobs.
- ◆ Click the **Change Camera** button.
  - The **Change Camera** dialog window is opened.



- ◆ Select a new camera from the selection list.

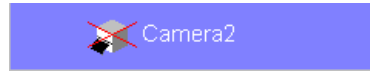


*You cannot redirect film jobs with the "Printing" status, i.e. jobs that are being processed, to another camera.*

*Redirecting film jobs from a camera to a printer is not possible.*

### Redirecting jobs from an inaccessible camera

You can redirect the queue or even individual film jobs for a camera that is defective or switched off to another camera.



A grey rectangular button with the text 'Change Camera' in a sans-serif font.

- ◆ Click the camera icon.
  - The queue of the camera is displayed.
- ◆ Click the **Change Camera** button.
  - The **Change Camera** dialog window is opened.
- ◆ Select a substitute camera from the selection list.
- ◆ Close the **Change Camera** dialog box.
  - The queue of the camera is redirected to the substitute camera. The redirected queue is marked with the note "redirect" in the header of the dialog box.

## Canceling camera redirection

Change Camera

Default



- ◆ Click the camera icon with the note "redirect".
  - The redirected queue is displayed.
- ◆ Click **Change Camera**.
  - The **Change Camera** dialog window is opened.
- ◆ Click **Default**.
  - The queue is now assigned to the original camera again. The original device designation is again displayed in the header of the **Film Task Status** dialog box.



*If you shut down the system before all the film jobs in a queue have been executed, they will remain in the queue. After rebooting the system, the film jobs are displayed in their old status again. Exception: Active film jobs for the local printer will be stopped and deleted and must be re-created later.*

## Configuration for filming/printing

You can adapt the filming and printing of images to your requirements in a flexible and individual way.

For this purpose two configuration windows for setting up the film function are available:

- ❑ In the **Filming Layout** configuration window, you can adapt the standard layout and create new layouts that are tailored to individual studies.
- ❑ In the **Filming Study Layout** configuration window, you can assign specific layouts to individual studies.

## Calling up the configuration window

You can call up the configuration windows from the **syngo Configuration panel**.

- ◆ Select **Options > Configuration** in the main menu.
- ◆ Double-click the icon of the **Filming Layout** window.
  - The **Filming Layout** window is displayed.

Or

- ◆ Double-click the icon of the **Filming Study Layout** window.
  - The **Filming Study Layout** window is displayed.



Filming  
Layout



Filming Study  
Layout

## Configuring film layouts

You can change and create film layouts using the **Film Task** and the **Series** cards in the **Filming Layout** window.

### Selecting a layout

In the **Filming Layout** configuration window, you can define the study-specific layouts.

In the **Layout name** selection list, you can specify which layout you want to change.

### Defining a study-specific layout

During installation of your system, some study-specific layouts are also installed and assigned to individual studies or series.

This has the advantage that a suitable film layout is always used for these images.

You can adapt the default settings to your requirements by creating a new study-specific layout and assigning it to a study or changing an existing layout.



- ◆ Select the layout that you want to change.

Or

- ◆ Enter a new name.
  - A new layout is generated.



*Your system can manage up to 100 layouts. If you attempt to create a 101st layout, an error message is displayed. You will then need to delete an existing layout.  
(→ Page 60)*

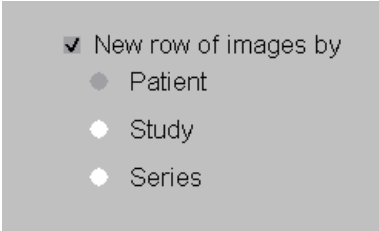


## Changing the standard layout

General Default

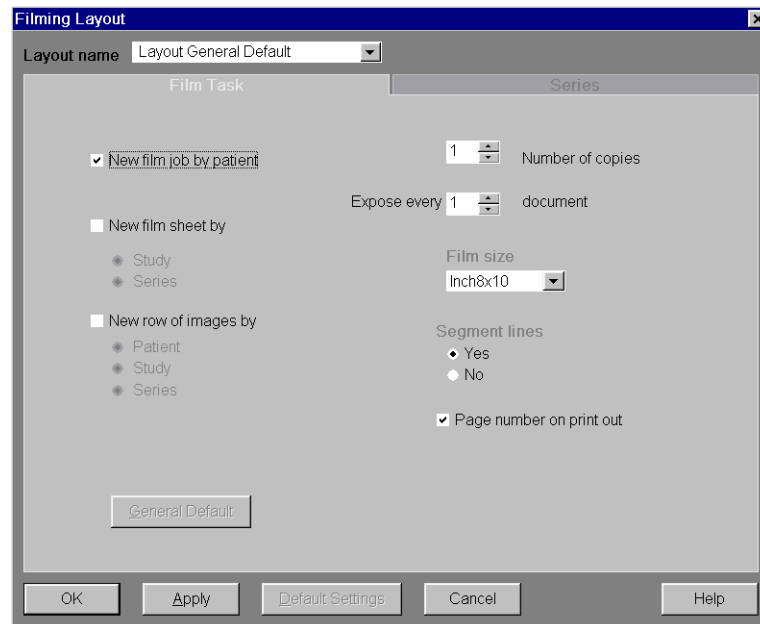
When creating a new layout, you can base it on the settings of the standard layout in the **Film Task** or **Series** cards and change it to meet your requirements.

- ◆ Click the **General Default** button.
  - The standard settings are entered in gray in the radio buttons and check boxes of the corresponding tab cards. Settings that you have changed are shown black so that you can distinguish them from the default settings.

- 
- ☒ New row of images by
    - ☒ Patient
    - ☐ Study
    - ☐ Series

## Configuring film job settings

On the **Film Task** card, you can define all the settings that determine the structure and execution of a film job.



### Determining a film job

- ◆ Select the **New film job by patient** option.
  - A film job contains only the images of one patient.

Or

- ◆ Deselect the **New film job by patient** option.
  - Multiple film jobs are allowed.

### Selecting a new film sheet

- ◆ Select the **New film sheet by** option.
  - Empty rows in film sheets are permitted.
- ◆ Select an option, e.g. **Study**.
  - A new film sheet is started for each study.

**Selecting a new row in the film sheet**

- ◆ Select the option **New row of images by**.
  - Empty fields in film sheets are permitted.

- ◆ Select an option, e.g. **Series**.
  - A new row is started in the film sheet for each series.

**Filming a partial selection**

- ◆ Use the spin buttons to set whether every n-th image or all images ( $n = 1$ ) of a film job are to be copied in the virtual film sheet and therefore exposed/printed.

**Selecting the number of copies**

- ◆ Define the number of copies.

**Selecting a film size**

- ◆ In the **Film size** selection list, select the film size configured for the camera/printer.



*The entries offered depend on the cameras and printers.*

**Selecting segment lines**

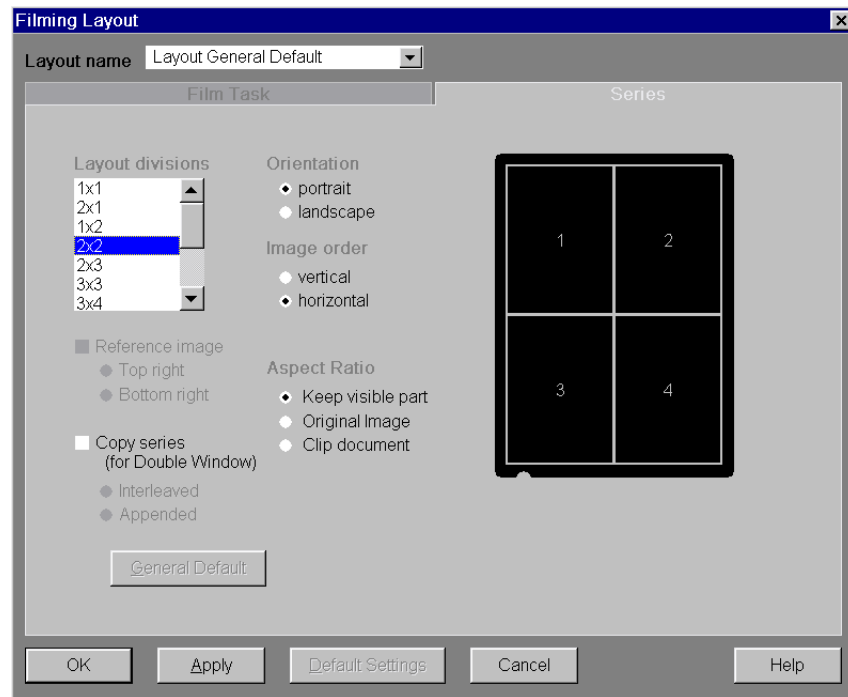
- ◆ Select the **Segment lines** option.
  - The images on the film sheets are separated by lines.

**Printing page numbers**

- ◆ Select **Page number on print out**.
  - Page numbers are added to the printout.

## Configuring film sheets

On the **Series** card, you define with what settings a film sheet is exposed or printed.



### Selecting the film sheet division

- ◆ In the **Layout divisions** selection list, you define the required number of columns and rows for a film sheet.
  - The division is shown in a diagram in the display window.

### Selecting the orientation

- ◆ Select **portrait** for exposing on film/printing on paper.
- Or
- ◆ Select **landscape** for exposing on film/printing on paper.

**Selecting the image arrangement**

- ◆ Activate the **vertical** option.
  - The images are arranged on the film sheet one after the other from top to bottom.

Or

- ◆ Activate the **horizontal** option.
  - The images are arranged one after the other from left to right.

**Creating series with copy on film sheet**

When transferring a series to the virtual film sheet, you can have a copy generated automatically and then process the copy before filming or printing.

- ◆ Click the **Copy series** option.
  - Copies of the series are generated.
- ◆ Activate the **Interleaved** option.
  - The copied series is inserted.

Or

- ◆ Activate the **Appended** option.
  - The copied series is appended to the end.

**Selecting the display**

- ◆ Activate the **Keep visible part** option.
  - The image is displayed in the segment with maximum size, without being cropped. This is the default.

Or

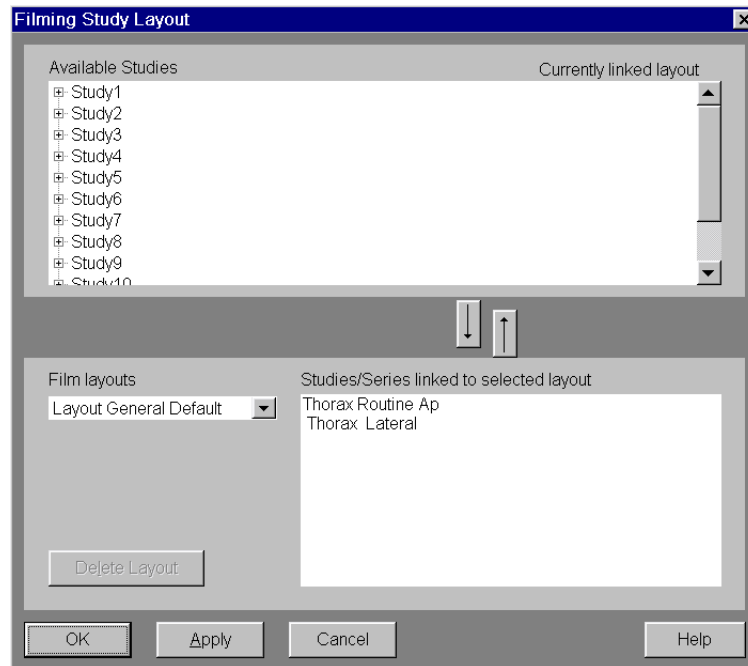
- ◆ Activate the **Original Image** option.
  - The image is displayed in its original size. Depending on the original size, the image might be cropped or displayed too small in the segment.

Or

- ◆ Activate the **Clip document** option.
  - The image is enlarged so that it fills the entire segment. The overlapping edges are cropped accordingly.

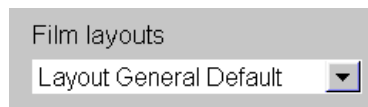
## *Linking layouts to a study or series*

In the **Filming Study Layout** window, you can assign a specific layout to a study or series. This can either be a layout you have created yourself or a layout that was created by Siemens Service when your system was configured.

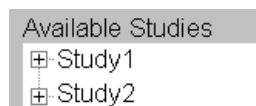


### *Assigning film layouts*

You can assign a layout by selecting a study or series stored in your system and the layout required and then linking the two.



- ◆ Select the required film layout.



- ◆ Click the + symbol in front of a study.
  - The associated series are displayed.
- ◆ Click a series or study.
- ◆ Click the **down arrow** button.
  - The layout is assigned to the selected study or series.



### *Canceling a film layout assignment*

If you want to assign a different study-specific film layout to a study or series, you must first cancel the old layout assignment.

- ◆ Select the relevant study or series in the **Studies/Series linked to selected layout** list.



- ◆ Click the **up arrow** button.
  - The study/series is now assigned the standard layout again.

### *Deleting a layout*



*Since your system can store and manage up to 100 layouts, you should regularly delete those film layouts that you no longer require for the sake of clarity.*

- ◆ Select a layout that you no longer require from the **Film layouts** selection list.
- ◆ Click the **Delete Layout** button.
  - The entry is deleted from the list.



*You cannot delete the **standard layout**.*



## Introduction to archiving

After an examination or postprocessing, the images are stored in the local database.

This section explains how to save images and patient data from the local database and send them within the network, and how to export them to data media or through the network.



*The hard disk of your image system (local database) is not suitable for long-term archiving of image and patient data.*

### Archiving data

Using the **Archive to** function, you can save patient and examination data to an archive via the network.



*You should archive patient and examination data as a routine at regular intervals.*

### Exporting data

The **Export To...** function allows you to write data to a removable storage medium (CD/DVD-R) for short-term storage or transfer.

If your system is connected to a network, you can send patient and examination data to other workstations via the network using the **Send to....** function.

### Importing data from archive media

If you need archived data again at a later date, you can reimport them with the **Patient Browser**.

### Automatic transfer

To make your working routine more effective, you can also have your patient and examination data automatically written to data media that you have defined, or sent to specific addresses in the network.

You can define the rules by and time at which automatic data transmission is to take place.

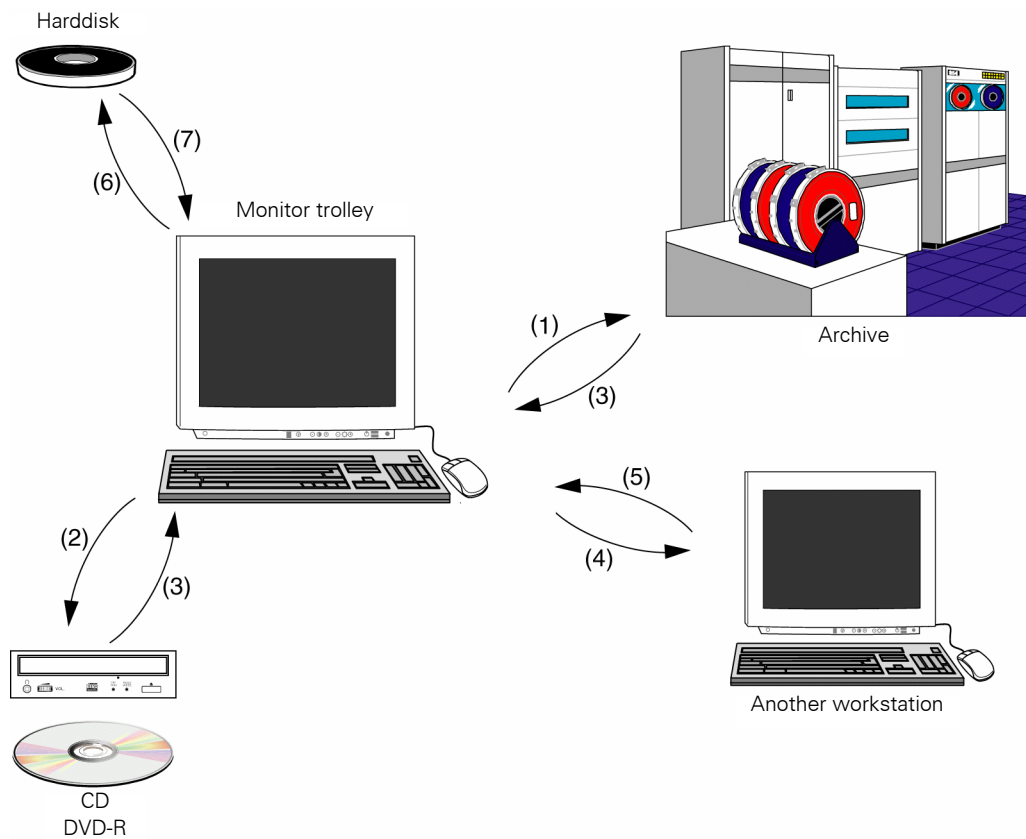
### Import/export in the file system/USB

If you want to process or otherwise use images with other programs, you can export them to a specific directory on the system hard disk or to a USB drive in several image formats (DICOM, bitmap) (**Export to Off-line**).

In the same way, you can import images in DICOM format to your application (**Import from Off-line**).

## Transfer options

The figure below shows the data backup and transfer options available to you.



- (1) Storing to the archive (**Archive to...**)
- (2) Exporting on CD/DVD-R (**Export To...**)
- (3) Importing from CD/DVD-R or from archive
- (4) Sending to other workstations (**Send to...**)
- (5) Receiving from other workstations
- (6) Exporting to a directory on the local hard disk/USB drive (**Export to Off-line**)
- (7) Importing from a directory on the local hard disk/USB drive (**Import from Off-line**)



*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.*

## Selecting data for transfer

Before you start transfer, select the relevant data objects.



*You can only archive, export, or send 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 into the main database.*



*Scenes (multiframe objects) with more than 1023 images cannot be written to CD, exported to an offline directory, or sent to a DICOM network node.*

### Patient Browser

If you want to archive or transfer patient or examination data, you usually select them from the local database of the **Patient Browser**.

### Task cards

You can also select individual objects on the task cards to start transfer.

☐ **Viewing** task card

## Calling up transfer functions

You can call up archiving, data transfer within the network, and export and import either from a menu or from icon buttons.

### Transfer menu

You can start archiving and transmission of data from the **Transfer** menu on the **Viewing** task card and in the **Patient Browser** window.

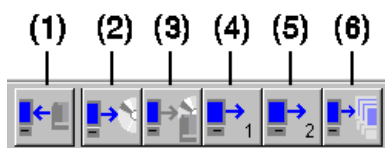


*Names such as **CD/DVD-R** and **Network/PACS** are only examples of drive and network names. The names actually used depend on the configuration of your system.*

### Buttons

Depending on your configuration, you will find different buttons for starting transfer quickly and easily in the control area of your task cards.

You will also find a series of icon buttons in the tool bar of the **Patient Browser** with which you can start transfers.



- (1) Import data
- (2) Storing data to a specified default CD/DVD-R
- (3) Storing data to a selectable local data medium (CD/DVD-R)
- (4) Sending data to the first default network destination
- (5) Sending data to the second default network destination
- (6) Sending data to a selectable network destination

### Key



You can also start transfer to the first default network destination with the **Send to default Node 1** key on the symbol keypad.

## Archiving Data

The menu item **Archive To...** is used to copy selected patient and examination data to archive media. For this, an archive server may be set up via the network. You can import archived data back to your local database whenever you need them.



*The hard disk of your image system (local database) is not suitable for long-term archiving of image and patient data.*

## General safety information

When archiving or sending data, an acknowledgement of receipt is sent from the destination address back to your computer ("Storage Commitment"). This status is shown in the Patient Browser for the respective data objects with markings.

The following markings are used with "Storage Commitment":

- ☐ **AC**  
Archived and Committed
- ☐ **SC**  
Sent and committed

However, the flags do not confirm successful long-term archiving on the receiver side.



### Caution

Misleading/misinterpretation of the flags AC/SC. The AC/SC marks signify receipt and storage of the data on hard disk at the recipient.

### Loss of data within the required period for retention!

- ◆ Observe the regulatory requirements regarding the archiving procedure.
-



### Caution

CD/DVD-R media used for data storage can be damaged or rendered unreadable.

#### **Loss of data!**

- ◆ Local media should be configured and used as archive media only if the manufacturer has approved the media for archiving purposes.
- ◆ Check whether the data are legible before deleting them from the local database.



*There are (statutory) regulations governing the archiving period, data availability, and data security (data integrity, incorruptibility), and recommendations concerning fire protection or water damage for the archiving of image data. The operator of the archive is responsible for observing these regulations.*



*Due to constant technical advancements, it may not be possible to implement storage and access for the required archiving period with a single storage technology and type of medium. Hence, migration of data may be necessary under the responsibility of the operator of the digital archive.*

### *Archiving in the network (option)*

If your system is connected to a central archive, use this to archive your patient and examination data (only with DICOM option).

The following information is of relevance for archive nodes:

☐ **Destination**

Name of the archive.

☐ **Compression**

Method by which data are compressed.

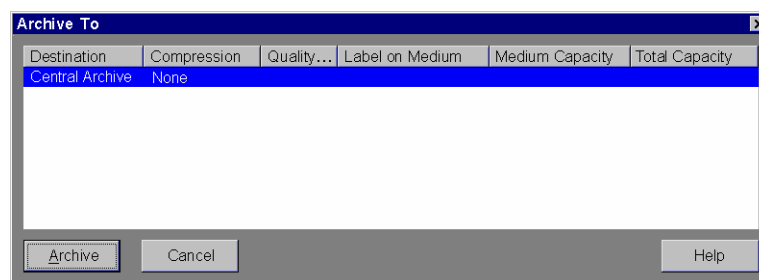
☐ **Quality factor**

Quality factor with which the data are compressed.

◆ Select the data that you want to archive.

◆ Call up **Transfer > Archive To....**

– The dialog box **Archive To** is displayed. The available archive nodes and drives are displayed.



◆ Select the required archive from the list.

◆ Click on **Archive** to transfer the data to the selected archive.



### Exporting data

Unlike the archiving function, the export function does not check for previous archiving processes, flags or the work status. In addition, data are not marked as archived, but only as exported.

### General safety information



#### Caution

When you read data from a device and simultaneously export data to the same device, one job or both jobs can fail (depending on the timing).

#### Loss of data!

- ◆ When exporting or storing data to a local device (CD, DVD, MOD, DVD-RAM), do not try to read from the same device in parallel, since this may stop the current export job and even damage the export medium. If you have stored data on the export medium in multi-session mode, these data may also become unreadable.



*To minimize the risk of data loss, use only CD/DVD-Rs approved by Siemens. CD/DVD-Rs are available through your Siemens representative.*



*Never shut down the ARCADIS Varic or disconnect the monitor trolley from the C-arm system while data is being written to CD/DVD-R.*



*As a rule, you cannot release radiation during the CD/DVD-R 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-R is interrupted during radiation release and other compute-intensive processes (e.g., play LSH). Images are in those cases 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).*



## *Backup on local data media*

### *Media for saving data*

Depending on the routine you use, one or several drives for external data media (CD/DVD-R) will be connected to your system.



*In **Transfer Configuration** you can define how the data of a patient are to be written to a medium (memory utilization and compression).*

#### **Data media**

ARCADIS Varic supports the following media types for saving data:

- ☐ DVD-R (minus R) and
- ☐ CD
- ☐ USB stick

If other media is accidentally used, e.g., DVD+R or DVD-RW, this may impair functionality.



*Data are archived to a central archive via the network. The archive can use other data media.*

#### **Handling of data media**

Please pay attention to the instructions of the manufacturer for handling and storage of CD/DVD-Rs.

#### **Drives**

Your system comes with a CD/DVD writer for data storage.

## *Inserting and ejecting media*

To export data, you must insert a suitable CD/DVD-R in the correct drive.

### **Inserting the medium**

CDs/DVDs can be written to on one side only.

- ◆ Select **Transfer > Eject from CD/DVD**.
  - The drawer slides out.
- ◆ Place the CD/DVD in the drawer with the label facing up.
- ◆ Press the eject button on the drive.
  - The drawer with the CD/DVD is retracted.

### **Ejecting medium from the drive**

If there is a CD/DVD in the drive, the drive slot cannot be opened using the button on the actual slot.

- ◆ Always remove the CD/DVD from the drive using only in the **Transfer > Eject from CD/DVD** menu.
- or –
- ◆ Click the relevant button.



### Storing on multi-session media

As your system is configured for multi-session, you can store your data to new, unrecorded CD/DVD-Rs, or CD/DVD-Rs that have already been written to. The other data on the CD/DVD-R is not lost, the new data is simply added.

#### DICOM Viewer

In the first session, a DICOM viewer is written to the CD/DVD together with the image data. This allows you to view the images stored on the medium on any computer. The DICOM viewer is launched directly from the medium (automatically after the CD/DVD is inserted, or manually by double-clicking \SYNGO\_FVSYNGO\_FV.EXE). No installation of files takes place on the computer in question.



*The DICOM viewer also allows you to store imported image information in the AVI, Bitmap and JPEG file formats. It is currently not possible to display compressed data on the DICOM viewer.*

#### Selecting data

Usually you export the data to CD/DVD-R from the **Patient Browser**, where you can simply select the required data objects.



#### Caution

Write error during the recording of additional sessions on the medium in multi-session mode.

#### **Previously stored data and data of the current session can no longer be read!**

- ◆ Do not delete the data stored on a medium from the local database until you have successfully finalized the medium and verified the legibility of the data.
- ◆ Please note that CD/DVD-Rs are not suitable for long-term archiving.

- 
- ◆ Make sure that the correct CD/DVD-R is in the drive.
  - ◆ Open the **Patient Browser**.
  - ◆ Select the patient, study, series or images that you want to store on CD/DVD-R in the navigation or content area.

### Writing data to a CD/DVD-R



- ◆ Select **Transfer > Export to...** in the menu.

– or –

- ◆ Click this button.
  - The selected data are written to CD/DVD-R.
  - The CD/DVD is automatically labeled with the date and time.



*If the patient data are not yet complete, a corresponding message is displayed. Enter the missing data in the **Correct** dialog box.*



#### **Insufficient memory available**

*If the storage capacity of the CD/DVD-R is not sufficient, the message*

**Not enough space on CD/DVD** *is displayed.*

- ◆ If you want to change the CD/DVD-R (for example, to insert a new, unrecorded CD/DVD-R), click **Eject**.

### Finalizing the medium

Once all desired data have been written to the CD/DVD, it is best to finalize the medium. This prevents the data on the medium from becoming illegible in the case of a write error during future write processes.

- ◆ Select **Transfer > Eject Finalized from CD/DVD-R**.

## *Sending patient data in the network (option)*

If your system is connected to and configured in a network, you can select patient and examination data from your local database and send them to other users in your DICOM network whenever necessary.

### *Sending data to a standard address*

During installation, Siemens Service can configure various network nodes (e.g. **Node 1** and **Node 2**) as standard addresses in the network.

- ◆ Select the data that you want to send.
- ◆ Press the **Send to Node 1** key on the symbol keypad.



Or

- ◆ Call up **Transfer > Send to Node 1** or **Transfer > Send to Node 2**.

— or —

- ◆ Click the relevant button.
  - The data are sent to the selected address.



## *Sending data to other addresses in the network*

If you want to send data to addresses other than the standard addresses or to more than one user in the network simultaneously, select the network node(s) from a list.

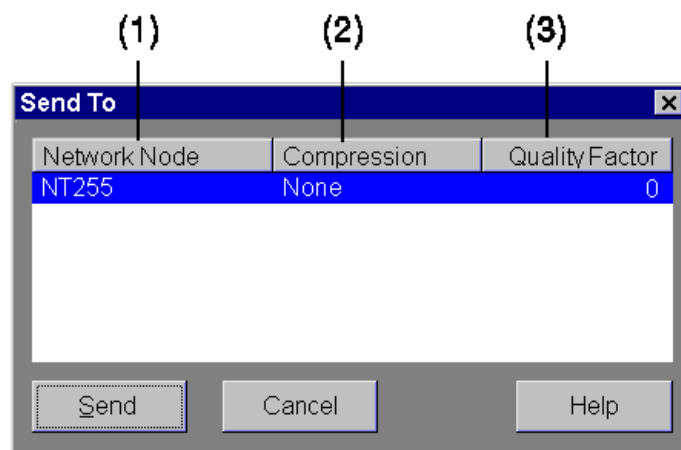
◆ First select the data that you want to send.

◆ Select **Transfer > Send to...**

— or —

◆ Click this button.

– The **Send To** dialog box is displayed with a list of all available network addresses.



(1) **Network Node**

– Name of the network node (receiver name).

(2) **Compression**

– Compression method by which the data are prepared for faster transfer.

(3) **Quality Factor**

– The quality factor states the image quality of the compressed data compared with the original data.

◆ Select one or more network nodes.

◆ Click **Send**.

– The selected data are sent to the required address(es).



## *Import/export in the file system*

If you want to use and process images on other devices, too, you can copy them from the local database to a directory on your hard disk, on a network computer or a USB drive (external hard drive, USB stick), and import them from there.



*Please note that the DICOM Viewer will not be saved in the file system during exports.*



*If you save data to a USB storage medium, please take care that it is not unplugged during the storage process. Danger of data loss!*

### **Image formats**

The following formats are supported for exporting:

- ☐ DICOM format (\*.ima)
- ☐ Windows Bitmap (\*.bmp)

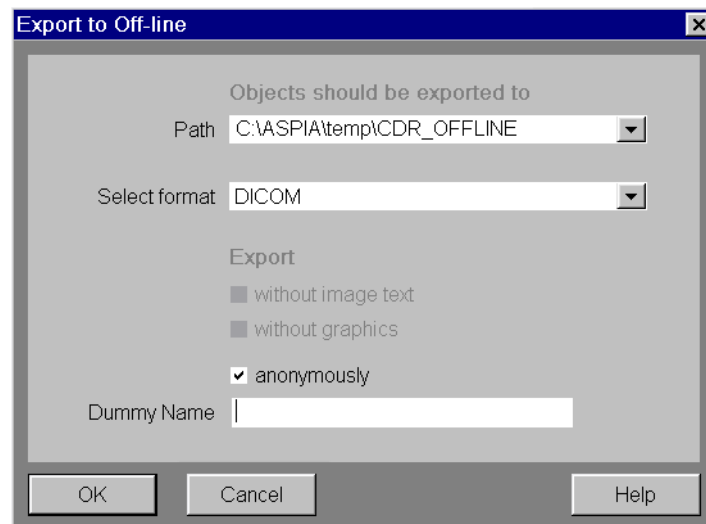


*Importing images is only possible in DICOM format, not in Windows bitmap or AVI format.*

## Exporting images to the file system

### Calling up the export dialog

- ◆ Select the required images.
- ◆ Select **Transfer > Export to Off-line**.
  - The **Export to Off-line** dialog box is displayed.



### Selecting the path

- ◆ Select the required drive and directory from the **Path** selection list.
  - Select drive F:\ to select an inserted USB stick.
- ◆ Extend the path, if necessary.



To select or create a subdirectory, add the subdirectory path to the prompted path separated by "\" (up to 8 subdirectory levels are possible from the root directory).

You can also select a directory on another computer in the network. In this case, you must enter the path as "\\computer\_name\directory".



Please make sure that the names of new directories and subdirectories do not contain blanks.

Do not use any of the following characters: ^ = \.



**Selecting an image format**

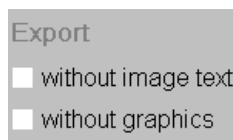
- ◆ Select the required image format from the **Select format** selection list.



Depending on the image type in question, images are exported with 8 bit/256 gray scales or 24 bit/RGB.

If you have selected a multiframe image in the **Patient Browser**, only the representative image in bitmap format is exported. In the Viewing task card you can select the individual images explicitly.

Be aware that files of the C:\Temp\CDR\_OFFLINE directory exceeding the CD/DVD-R's capacity are deleted when the **Record Off-line Files** function has been successfully performed.

**Selecting image text/ graphic**

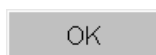
- ◆ Check the corresponding check boxes.
  - The image text and the graphic are "burnt into" the image and exported with it.



If you have selected DICOM format, the image text and the graphic is also exported as it is included in DICOM format, i.e. Export functions in the dialog window are disabled.

**Export anonymously**

- ◆ Click the **anonymously** check box.
- ◆ Enter the name under which to store the data in the **Dummy Name** field.

**Starting export**

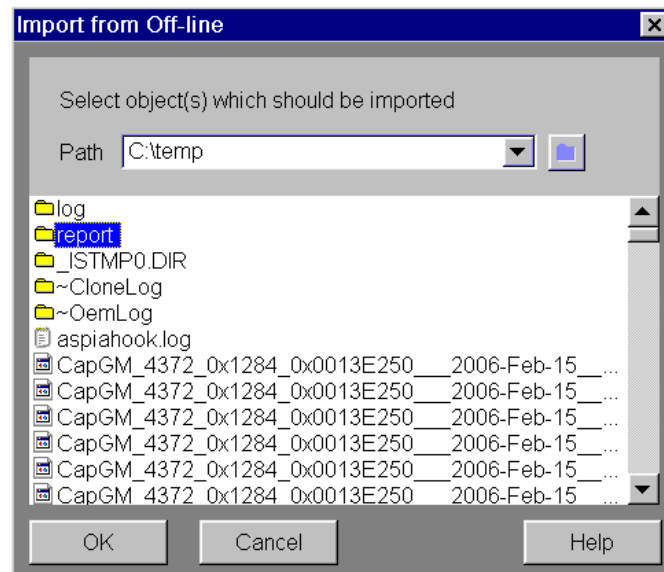
- ◆ Confirm with **OK**.
  - The selected image data is stored as individual files
  - File names follow the following scheme: Last name of the patient.modality.study description.serial number.image number.timestamp.internal number.image format
  - The timestamp follows the following format: yyyy.MM.DD.hh.mm.ss.ddddddd

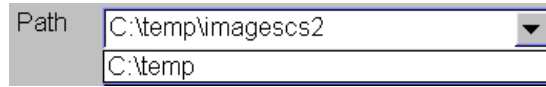
## *Importing images from the file system*

You can import individual images from specific released directories of the system hard disk or USB drives or import them into your local database across the network.

### **Calling up the import dialog**

- ◆ Select **Transfer > Import from Off-line**.
  - The **Import from Off-line** dialog box is displayed.



**Selecting files**


- ◆ Select the required drive and directory from the **Path** selection list.
  - Select drive F:\ to select an inserted USB stick.

— or —



- ◆ If necessary, navigate through the directory tree by double-clicking on a folder and using the "higher-level folder" button.



*All directories starting with the configured root directory are accessible.*

- ◆ Enter a file name.



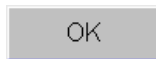
*You can specify several files at once using the wildcard "\*".*

Or

- ◆ Select the file(s) in question from the directory.



*You can select several files at once with the left mouse button using **Shift** and **Ctrl**.*



- ◆ Confirm with **OK**.

Or

- ◆ Double-click the relevant file.
  - The selected image files are imported into your local database.

### *Writing off-line files to CD/DVD*

All images in bitmap format exported previously to a specific directory, can be recorded automatically on CD/DVD-R. The path of this directory can be configured in service mode. The default setting for this path is C:\ASPIA\temp\CDR\_OFFLINE.



*As a rule, you cannot release radiation during the CD/DVD-R write process.*

*You are urgently advised to start this process outside of examination hours (e.g. at the end of the office day).*

*In exceptional cases (emergencies), you can release radiation in the Fluoroscopy operating mode. However, radiation may be disrupted.*

#### **Recording files**

- ◆ Select **Transfer > Record Off-line Files** in the main menu.
  - Recording is started in single session mode.



*Note that the CD/DVD-R and the **Local Job Status** clipboard must be empty.*

*Recording can be started only after all jobs have been deleted from the clipboard.*



*During the recording process it is not possible to copy files to the source directory.*

#### **Deleting files**

- ◆ All recorded files will be deleted from this directory after recording on CD-R is completed.





## Checking the data transfer

All the jobs for archiving, sending or exporting data are executed one after the other ("Queued").

You can classify one network job as urgent, stop jobs, repeat jobs or delete jobs to influence how the queue is executed.

**Display in the status bar**

During data transfer, icons are displayed in the status bar which tell you what operation is currently being executed or whether an error has occurred in at least one job.

Action	Not active	Active	Errors
Storing/Exporting/ Importing on data medium	No icon		
Sending/Archiving/ Receiving in the network	No icon		



*If an error occurs during data transfer, an error message appears on the status bar together with the appropriate icon.*

## Viewing jobs

The **Local Job Status** dialog box informs you about storage jobs and the export and import of data to or from your CD/DVD drives

In the **Network Job Status** dialog box, you can obtain information about jobs for data exchange through the network.



*If your system is closed down during an archiving job, the number of remaining images displayed in the Job Status dialog boxes may be incorrect when you restart the system.*

*Jobs with the status "Error", "Receiving" (or active import jobs), or "Spooling" are no longer displayed after a restart.*

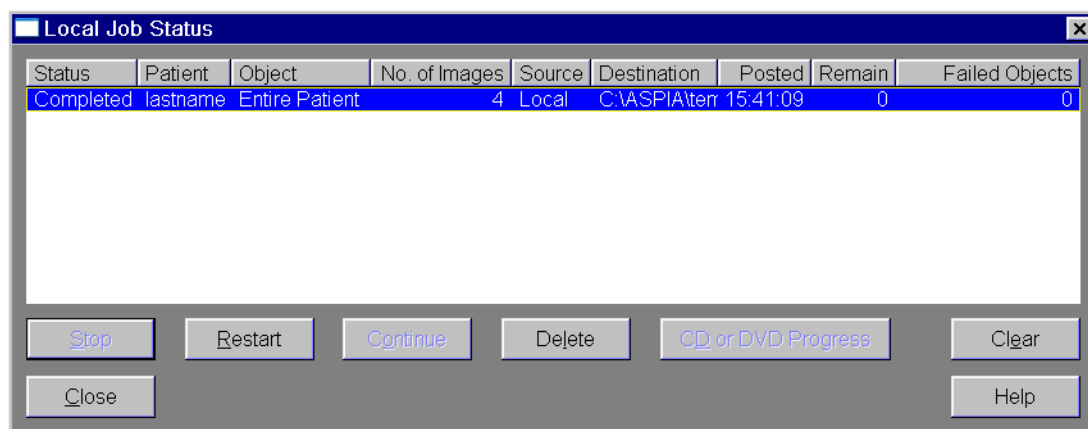
## Calling up local jobs

- ◆ Select **Transfer > Local Job Status**.

Or



- ◆ Click an icon for local data transfer in the status bar.
  - The **Local Job Status** dialog box is displayed.



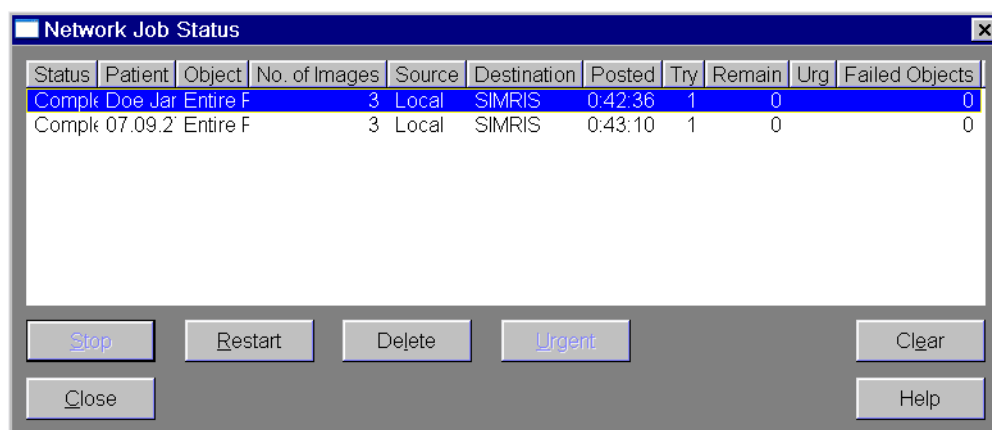
### *Calling up network jobs*

- ◆ Select **Transfer > Network Job Status**.

Or



- ◆ Click the status bar on an icon for remote data transfer.
  - The **Network Job Status** dialog box is displayed.



## *Manipulating job performance*

The steps that you can perform in the **Local Job Status...** and **Network Job Status...** dialog windows and therefore the buttons that are active depend on the status of a job.

### **Stopping jobs**

Jobs with the status "Active", "Retry" and "Queued" can be stopped at any time, for example, if you want to change the CD/DVD-R before processing the jobs.



- ◆ Select one or more jobs having the "Queued" status.
- ◆ Click **Stop**.
  - The selected jobs and all other queued jobs with the same destination address are now no longer started automatically.

### **Resuming jobs**

Jobs with "Stopped" or "Failed" status can be resumed at the point at which they were stopped (only for archive and import processes listed in the **Local Job Status** window).



- ◆ Select one or more jobs with "Stopped" or "Failed" status.
- ◆ Click **Continue**.
  - Jobs with the same destination address as the selected jobs are also resumed.



**Restarting jobs**

If you have stopped jobs or if errors occurred in jobs, you can start them again from the beginning. You can also repeat a job that has already been completed.

- ◆ Select one or more jobs with "Stopping", "Stopped", "Failed" or "Completed" status.
- ◆ Click **Restart**.
  - The jobs are restarted, their status is now "Active" or "Queued".

A rectangular button with a light gray background and a thin blue border. The word "Restart" is centered in a dark gray, sans-serif font.**Deleting jobs**

You can delete jobs that are listed in the job status windows, provided they do not have the status "Receiving", "Recording" or "Spooling".

- ◆ Select one or more jobs.
- ◆ Click **Delete**.
  - These jobs will no longer be executed and they will be removed from the job list.

A rectangular button with a light gray background and a thin blue border. The word "Delete" is centered in a dark gray, sans-serif font.

*For technical reasons, large jobs will remain in the job list for a while with "Deleting" status even after they have been deleted. Do not restart or continue such a job.*

### Changing priority

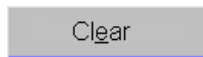
Send jobs that are to be processed first are classified as "urgent" in the **Network Job Status** dialog box (no more than one job per destination address).



- ◆ Select one send job that is to be executed first.
- ◆ Click **Urgent**.
  - The send job in the queue is then started immediately after the active jobs.

### Clearing a job list

Entries having the status "Completed", "Received", or "Error" can be removed from the job list.



- ◆ Click **Clear**.
  - The jobs are removed from the job list.

## *Configuration for archiving*

In the **Transfer Configuration** window, you can define how store, export and send jobs are executed by your system.

Here you can make or change the following settings:

- ☐ Automatic storing and sending of examination data
- ☐ Compression of data during storing, export and sending
- ☐ Work status required for storing data and storage capacity on data media

## *Calling up the configuration window*

You can call up the configuration window from the **syngo Configuration panel**.

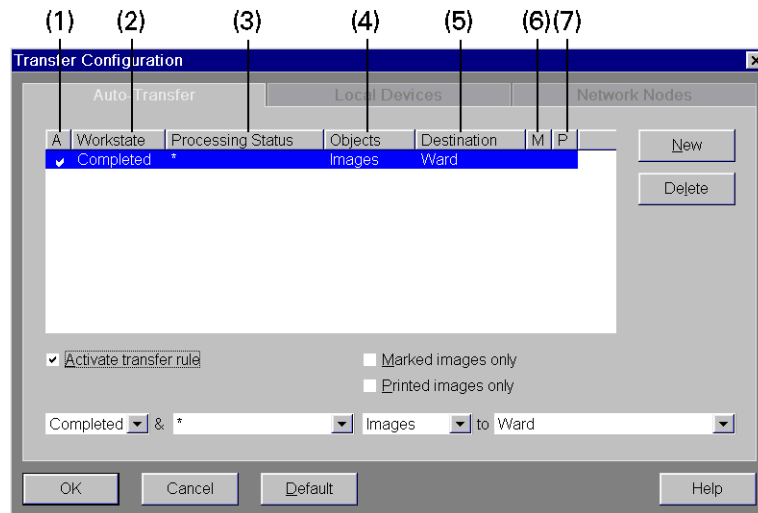


Transfer

- ◆ Select **Options > Configuration** in the main menu.
- ◆ Double-click on the icon of the **Transfer** configuration window.
  - The **Transfer Configuration** window is displayed with the **Auto-Transfer**, **Local Devices** and **Network Nodes** cards.

## Automatic transfer

On the **Auto-Transfer** card, you can define whether and by what rules patient and examination data are automatically stored or sent in the network.



- (1) **Active**  
A checkmark in the column indicates that this rule is currently being applied.
- (2) **Workstate**  
The data selected for transfer that have reached the work status specified here are automatically stored or sent in the network.
- (3) **Processing Status**  
Data that have reached the status stated here are automatically stored or sent via the network.
- (4) **Objects**  
Here you can see to what kind of data the rules refer (i.e. images, series ...)
- (5) **Destination**  
In this column, you can see to which drive or to which network address the data are automatically transferred.
- (6) **Marked**  
A checkmark in this column indicates that only marked data are automatically transferred.
- (7) **Filmed**  
A checkmark in this column indicates that only filmed data are automatically transferred.



*When emergency registration is performed, automatic data transfer is deactivated (indicated in the status bar). After normal registration automatic data transfer is reactivated.*

Creating and editing rules

Underneath the list with existing rules for automatic data transfer, you will find input fields for editing the rules or creating new rules. You can create up to ten rules.

Selecting rules

A	Workstate	Processing Status	Objects	Destination	M	P
	Verified	Sent & Committed	Series	Ward	✓	
	Read	Sent	Non Images	F:\		✓
✓	Completed	*	Images	Ward	✓	✓

- ◆ Select a rule for editing from the list.

Or

- ◆ Click **New** to create a new rule.



Creating rules

You can create a rule for automatic data transfer by combining attributes from the selection lists in the lower segment of the dialog window.

☒ Activate transfer rule

☐ Marked images only

☐ Printed images only

Completed & \* Images to Ward



The selection lists contain the following special entries:  
Selecting **None** in these selection lists means that an auto transfer route is valid if the according attribute is empty.  
Selecting **Ignore** means that the status is not relevant to the rule and changes will not be considered.  
Selecting **\*** means that any change of the corresponding attribute invokes an auto transfer job.

Completed ▾ & Received ▾

- ◆ Select the editing and processing status to be reached.
  - Automatic data transfer will only be started if both attributes have the indicated status.



*Please note that you can also assign the "completed" status manually in the **Patient Browser** and thus initiate automatic data transfer, if necessary.*

Images ▾ to Ward ▾

- ◆ Select the data type and the target.



*Automatic data transfer should always be configured at instance level.*

- ☒ Marked images only
- ☒ Printed images only

- ◆ Click this check box if you want to limit the data transfer to marked and/or filmed/printed images.
  - Other images will not be transferred automatically even if the transfer rules have been met.

### Activating rules

☒ Activate transfer rule

- ◆ Click on the **Activate transfer rule** check box.
  - The selected rule is active and used for starting automatic data transfer jobs.

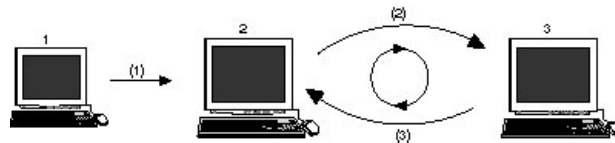


*Shut down the ARCADIS Varic and restart it after activating new transfer rules. Otherwise, the status display for data transfer may not be updated (display will be set to "Waiting" although an auto transfer was successfully completed).*

### Infinite loops

Avoid infinite loops when creating rules!

Here is an example of an unfortunate configuration with an endless loop:



(1) Computer 1 sends data to computer 2.

(2) Rule on computer 2: Send all data received to computer 3.

(3) Rule on computer 3: Send all data received to computer 2.

As soon as computer 2 receives data for the first time, these data are sent back and forth in a loop between computers 2 and 3.

### Deleting rules

Rules that will not be needed again for automatic data transfer can be deleted instead of just deactivating them.

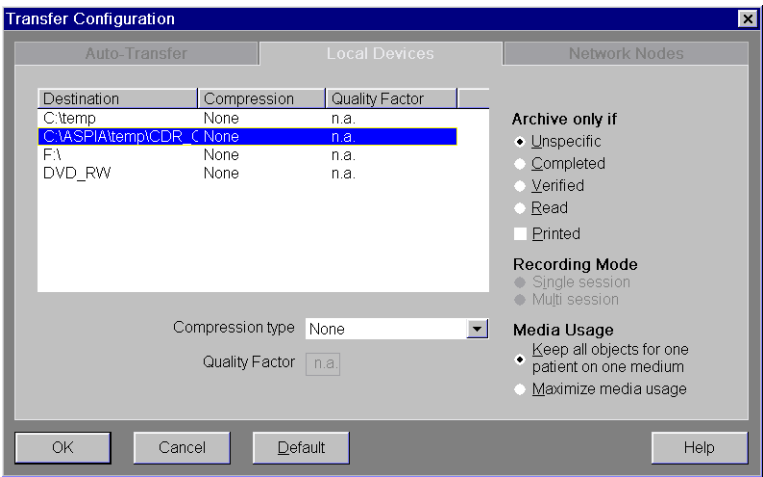
A	Workstate	Processing Status	Objects	Destination	M	P
	Verified	Sent & Committed	Series	Ward	✓	
	Read	Sent	Non Images	F:\		✓
✓	Completed	*	Images	Ward	✓	✓

Delete

- ◆ Select the rule that you want to delete from the list.
- ◆ Click **Delete**.
  - The rule is removed from the list.

Local Devices

On the **Local Devices** card, you define the default settings for storing and exporting data on the data media.





### *Defining the use of storage capacity*

If you require more than one data medium for storing or exporting, you can define whether the data of one patient can be distributed over two data media or not (if possible).

#### **Media Usage**

- ☒ Keep all objects for one patient on one medium
- ☐ Maximize media usage

- ◆ Click on the option field **Keep all objects....**
  - The data of one patient are always stored contiguously on one data medium.

Or

- ◆ Click on the radio button **Maximize media usage.**
  - The examination data of one patient are distributed over two or more data media. This will make optimum use of the storage capacity of the data media.



**Keep all objects for one patient on one medium** *only ever applies to one job.*

### *Setting data compression for storing*

Patient and examination data can be stored or exported compressed or uncompressed.

Data that were compressed before transfer will use up less storage space and are transferred more quickly. When reimporting data into your local database, compressed data are automatically decompressed.



*Images stored in your database by lossy compression can only be stored with the same quality factor.*



#### Caution

The compression method is set to irreversible compression (Lossy JPEG).

#### **Information of medical relevance may be lost.**

- ◆ Do not use images stored by lossy compression for primary diagnosis, since their image quality may not be sufficient.

- ◆ Select a drive for which you want to define data compression.

Compression type

- ◆ Select under **Compression type** whether and how the data is to be compressed.

Quality Factor

- ◆ State under **Quality Factor** (1-100%) the remaining image quality in % as compared with the original material.



*The quality factor can be specified only in the **Lossy JPEG** setting. Which quality factor is acceptable to you will depend on your requirements.*

*JPEG compression is indicated in the image segment (it is not indicated if **No Text** is selected).*

### *Defining the work status for storing*

Here you can select the work status that patient and examination data must have reached before storing. If this work status is not reached, a warning will be displayed before data transfer starts.

**Archive only if**

- ☒ Unspecific
- ☐ Completed
- ☐ Verified
- ☐ Read
- ☐ Printed

- ◆ Use the radio buttons to define the work status required as a prerequisite for storing.



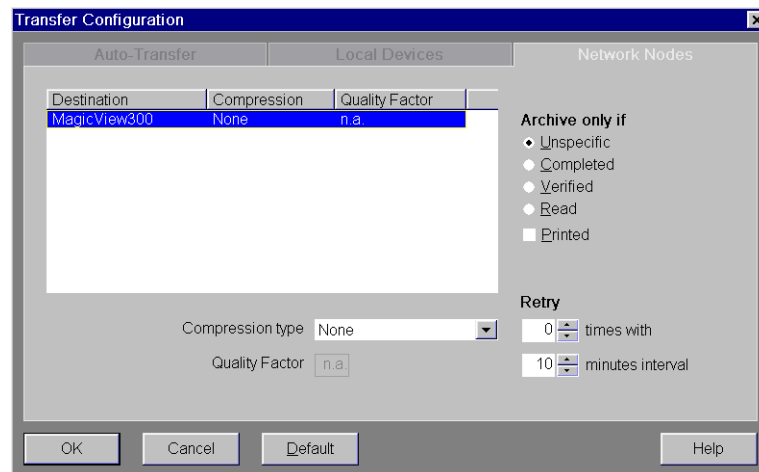
*The **Verified** and **Read** options apply to the study and series levels only.*

*If you select the **Unspecific** option, you can store data of any work status without confirmation.*

- ◆ Click on the **Printed** check box, if necessary.
  - Images must have been printed/filmed at least once before they are stored.

## Network Nodes (option)

On the **Network Nodes** card, you can define the default settings for sending data in the network. For each network address you can specify the compression type and quality factor, if necessary, as well as rules for repeated send attempts and the work status.



### *Setting data compression for sending*

Similar to storing or exporting data on external data media, you can activate data compression for sending patient and examination data through the network (depending on the configuration of your system).



#### Caution

The compression method is set to irreversible compression (Lossy JPEG).

#### **Information of medical relevance may be lost.**

- ◆ Do not use images stored by lossy compression for primary diagnosis, since their image quality may not be sufficient.

- 
- ◆ Specify the individual network addresses, the compression type and quality factor.  
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### *Setting retries*

If errors occur during data transmission in the network, they can often be remedied with a repeated attempt. You can set how many times and at what interval attempts are to be repeated.

Retry

0 times with

10 minutes interval

- ◆ Enter the number of retries or click on the arrows. (Possible values: 0 to 5; default: 0)
- ◆ Enter the time interval between the attempts. (Possible values: 5 to 60 min; default: 10 min)
  - The number of new attempts is displayed in the window **Network Job Status**.

### *Defining the work status for sending*

Here you can select the work status that patient and examination data must have reached before they can be sent. If this work status is not reached, a warning is displayed before sending.



The screenshot shows a dialog box titled "Archive only if" with a list of radio button options. The first option, "Unspecific", is selected. The other options are "Completed", "Verified", "Read", and "Printed".

Work Status	Selected
Unspecific	Yes
Completed	No
Verified	No
Read	No
Printed	No

- ◆ With the radio buttons, specify the work status desired for sending.  
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### *Configuration Examination*

It is generally not necessary to set examination parameters and thus configure exam sets, since the default standard programs delivered with the system already cover a large spectrum of dedicated applications.

If you wish to configure your own exam sets nevertheless, you can make the parameter settings in the **Examination Set Configuration** dialog window.

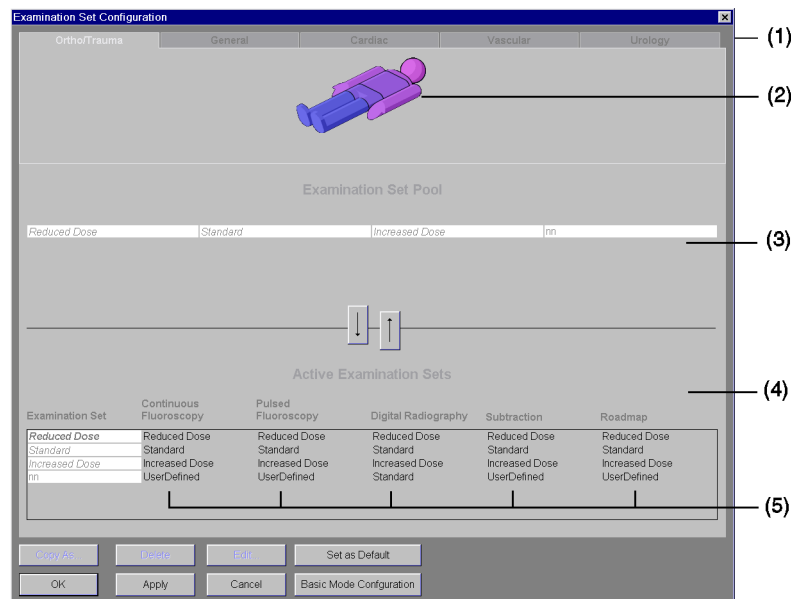
The following configuration options are available:

- ☐ Basic settings for examinations in the **Basic** display mode of the **Examination** task card. These default settings are used for the examinations of body regions.
- ☐ Administration (activating, deactivating, creating and deleting) of *exam sets*. This determines which exam sets are available for the examination. In the **Extended** display mode of the **Examination** task card, these entries are shown in the selection lists of the control area.  
The administration of *exam sets* is done in the **Examination Set Configuration** dialog box.
- ☐ Modifying system-specific parameter of *operating programs* (= parameter sets for operating modes). Thus you can define in detail the acquisition parameters of the exam set to which the relevant operating program belongs. These settings are made in special tab cards that can be called up for the corresponding exam set from the **Examination Set Configuration** dialog.

## Calling up/closing the configuration window

You can call up the configuration window from the **syngo Configuration Panel**.

- ◆ Select **Options > Configuration** in the main menu.
- ◆ Double-click this button.
  - The **Examination Set Configuration** window appears.



- (1) Medical application area
- (2) Virtual patient anatomy (VPA)
- (3) Area of available examination sets
- (4) Area of active examination sets
- (5) Operating programs with the parameter settings specific to the examination set in the individual operating modes

### Applying changes

Once you have changed the settings of the examination sets, you must confirm your entries.

- ◆ Click this button.
  - Your changes are applied to the ARCADIS Varic system.
  - The configuration dialog remains open for further entries.

Or

- ◆ Click this button.
  - Your changes are applied to the ARCADIS Varic system.
  - The configuration dialog closes.
  - The changes you made in the examination settings are automatically applied to the next examination.



## Basic settings

In the case of examinations you perform in the **Basic** display mode of the **Examination** task card, you only have to select the body region. The medical application area, the examination program and the operating mode are then pre-set automatically. You can define the pre-settings for individual body regions in the **Basic Mode Configuration** window.

### Calling up the dialog window

Basic Mode Configuration

- ◆ Click this button in the **Examination Set Configuration** window.
  - The **Basic Mode Configuration** window appears.
  - Every line contains the current default settings for a body region.

Body Region	Application Field	Examination Set	Operating Mode
All	Ortho/Trauma	Standard	Fluoroscopy
Head	Ortho/Trauma	Standard	Fluoroscopy
Upper Extremities	Ortho/Trauma	Standard	Fluoroscopy
Thorax	Ortho/Trauma	Standard	Fluoroscopy
Pelvis	Ortho/Trauma	Standard	Fluoroscopy
Lower Extremities	Ortho/Trauma	Standard	Fluoroscopy

OK Cancel

### Changing default settings

- ◆ Select the application area, examination set and operating mode for each body region from the corresponding selection lists.



*Only application areas relevant to the corresponding body region are displayed. When the application area is changed, another matching examination set and operating mode is automatically set as a default. This selection may also be modified.*

OK

- ◆ Click this button.
  - Your changes will be saved; the dialog box closes.



*Note that your changes will only become active when you close the **Examination Set Configuration** window with **OK**.*

## Managing examination sets

The examination sets are assigned to medical application areas. Within each application they are also assigned to special body regions. You will find the same assignment pattern on the **Examination** task card in the **Extended** display mode.



*Medical application fields can additionally be licensed by options. The medical application area 'Vascular', for instance, is tied to the 'SUB/Roadmap' option. If the option is not activated, the **Examination Set Configuration** will not contain a configuration card for this option, and the application area cannot be selected in the **Examination** task card.*

## Displaying a list of examination sets

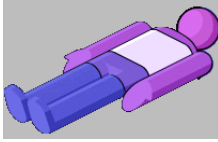
When editing examination sets, first select the medical application area and afterwards the body region. All valid examination sets for this combination are shown.

### Medical application area

Each medical application area is represented by a tab card in the **Examination Set Configuration** dialog window.

- ◆ Click on the tab of the required medical application area.
  - The selected tab card is placed in the foreground.

### Body region



Within a medical application area, the following body regions (and only these) can be selected: "Head", "Body trunk" (thorax, ventral region, cervical spine, thoracic spine), "Pelvis" (pelvis, lumbar spine, hip), "Upper extremities", "Lower extremities" as well as "All" (for general purposes).

- ◆ Click on the required body region in the "Virtual patient anatomy".
  - The activated body region is highlighted.
  - In the lower area of the **Examination Set Configuration** dialog window, the examination sets which are especially designated for this body region are displayed.

Or

- ◆ Click next to the "Virtual patient anatomy" to select the body region "All".
  - None of the body regions is highlighted.



*A medical application area does not necessarily contain examination sets for all indicated body regions. The assignment of body regions depends on the medical application area.*

## *Available/active examination sets*

The examination sets are listed in the **Examination Set Pool** and **Active Examination Sets** areas.

### **Examination set pool**

The area of available examination sets consists of all programmed examination sets that are stored in the ARCADIS Varic, but have not necessarily been activated.

### **Active examination sets**

The area of active examination sets consists of all programmed examination sets stored in the ARCADIS Varic that have been activated. These are now available for examinations. In the **Extended** display mode of the **Examination** task card, these entries are shown in the selection lists of the control area.

### **Activating exam sets**

You can activate further examination sets by moving them from the selection pool to the active pool.



- ◆ Click an examination set in the **Examination Set Pool** area.
- ◆ Click this button.

or

- ◆ Drag the examination set into the **Active Examination Sets** list using the mouse.
  - The examination set is available for examinations in the selected application area for the corresponding body region.

### **Changing the sequence**

The sequence of examination sets in this list of active programs defines the sequence in which they appear in the selection list of the **Examination** task card. Therefore the most important and most frequently used programs should be at the top of the list.

- ◆ Drag the examination sets individually to the required position within the active pool.



*A horizontal line represents the examination set that is currently being moved.*

**Deactivating exam sets**

You can deactivate individual examination sets by moving them from the active to the selection pool.

- ◆ Click an examination set in the **Active Examination Sets** area.
- ◆ Click this button.



Or

- ◆ Drag the examination set into the **Examination Set Pool** list using the mouse.



*At least one examination set must remain in the list of active examination sets. You cannot deactivate all examination sets.*

**Setting defaults**

In the case of examinations you perform in the **Extended** display mode of the **Examination** task card, you initially select the medical application area and the body region. A certain examination set is then selected automatically as a default for this combination. The default examination sets can be defined in the **Examination Set Configuration** dialog window.

Examination Set	Continuous Fluoroscopy	Pulsed Fluoroscopy	Digital Radiography	Subtraction	Roadmap
Standard	Standard	Standard	Standard	Standard	Standard
Standard_2	Standard	Standard	Standard	Standard	Standard

- ◆ Click on the desired examination set in the **Active Examination Sets** area.
  - The line is shown with a blue background.
- ◆ Click this button.
  - The examination set is set as the default for the displayed combination of application area and body region.
  - This examination set is now shown in bold print in the list.

Set as Default

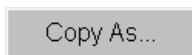
## *User-defined examination sets*

In the **Examination Set Configuration** dialog window, you can create your own examination sets with self-defined settings. In the **Examination** task card you can access these user-defined examination sets in the same way as the default standard examination sets, shown in italics.

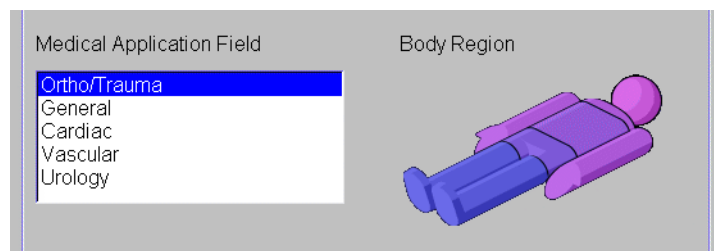
User-defined examination sets are created on the basis of an existing examination set. You can adapt the system-specific parameters to your requirements by editing the individual operating programs assigned to the examination set.

(→ Page 13)

### Creating exam sets



- ◆ Select the set you want to use as a template from the active or selectable examination sets.
- ◆ Click this button.
  - or —
- ◆ Select **Copy As** in the context menu of the name entry for the examination set.
  - The **Copy As** dialog box is opened.



- ◆ In the center area, select another medical application area and/or another body region if applicable.
  - The default settings are the same data as those of the template.
- ◆ Enter a unique name for the new examination set in the lower segment.



- ◆ Click this button.
  - The new examination set is created within the current medical application area and the selected body region and is added to the **Examination Set Pool**. If an active examination set was selected as a template, the newly created examination set is also included in the list of active examination sets list.



### Renaming an exam set

- ◆ Double-click the name entry of the examination set you want to rename.
  - or —
- ◆ Select **Rename** in the context menu of the name entry.
  - A dialog window is displayed in which you can enter the text.
- ◆ Enter a suitable name for your examination set.
- ◆ Confirm with the **Enter** (Return) key of your keyboard.
  - The new name is accepted and is displayed in the examination set lists.



*The standard examination sets delivered with the system cannot be renamed (shown in italics).*

### Deleting exam sets



- ◆ Select the examination set that you want to delete.
- ◆ Click this button.
  - or —
- ◆ Select **Delete** in the context menu of the name entry for the examination set.
  - A dialog window is displayed which prompts you to confirm deletion.
- ◆ Click this button.
  - The examination set is deleted from the examination set lists.



*The standard examination sets delivered with the system cannot be deleted (shown in italics).*

## Editing exam sets

Examination parameters are changed by editing the corresponding operating programs. Operation program settings can be defined on separate tab cards which you can call up from the **Examination Set Configuration** window after selecting the examination set.



*Changes to the parameters of an examination set should only be performed by experienced medical staff.*

*If the examination or operating parameters have been modified, a test pattern should be generated. In this way the new parameters can be verified.*

- ◆ Select the examination set whose operating parameters you want to change.
- ◆ Click this button.



Edit...

— or —

- ◆ Select **Edit** in the context menu of the name entry for the examination set.
    - The **Operating Program Configuration** window appears. Here you can define all the parameter settings for the different operating programs of the selected examination set.
- (→ Page 13)

## *Configuring the operating programs*

An examination set consists of a set of operating programs. Each of these programs defines the settings for X-ray generation and image acquisition for one single operating mode.

The operating programs are configured in the **Operating Program Configuration** dialog, which you have called up from the **Examination Set Configuration** dialog.

The Operating Program Configuration dialog contains a tab card (labeled correspondingly) for each supported operating mode. In the tab cards you can specify the parameters of the operating program in the respective operating mode. In addition, some parameters may be common to several operating modes of an examination set (e.g. edge enhancement). They are available on other tab cards that are independent of the operating mode.



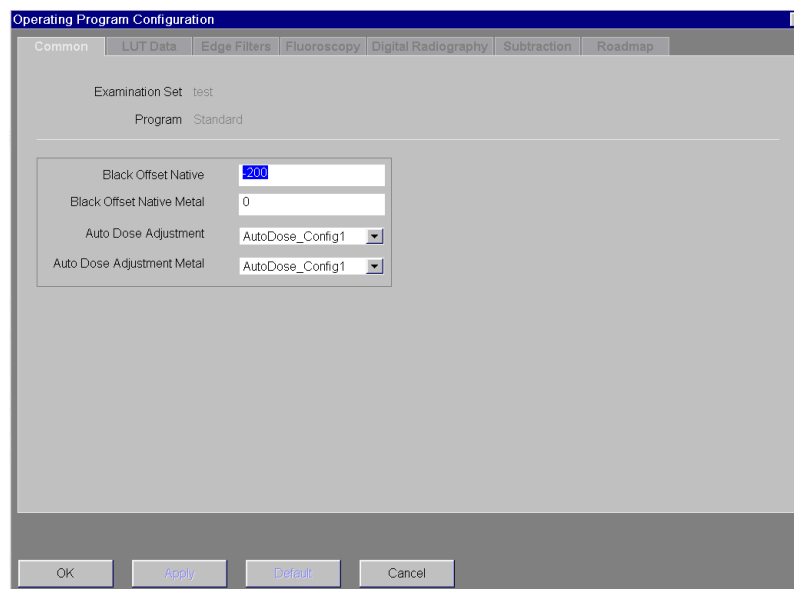
*The parameters for the Fluoroscopy, Pulsed Fluoroscopy and Digital Radiography modes are configured for every examination set. For the Subtraction option the parameters for the Subtraction and Roadmap modes are configured additionally. The parameters are individually adapted to each examination set.*



*There is a **Default** button on every tab card. With this button you can reset the parameters back to the original state (parameter settings of the underlying operating program).*

## *The Common tab card*

On this tab card you define the parameters that apply to all operating programs in each examination set.

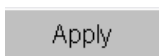


### Parameter settings

You can change the following parameters on the tab card:

Parameters	Remarks
Black Offset Native	possible values: -200 to 900
Black Offset Native Metal	possible values: -200 to 900
Auto Dose Adjustment	
Auto Dose Adjustment Metal	

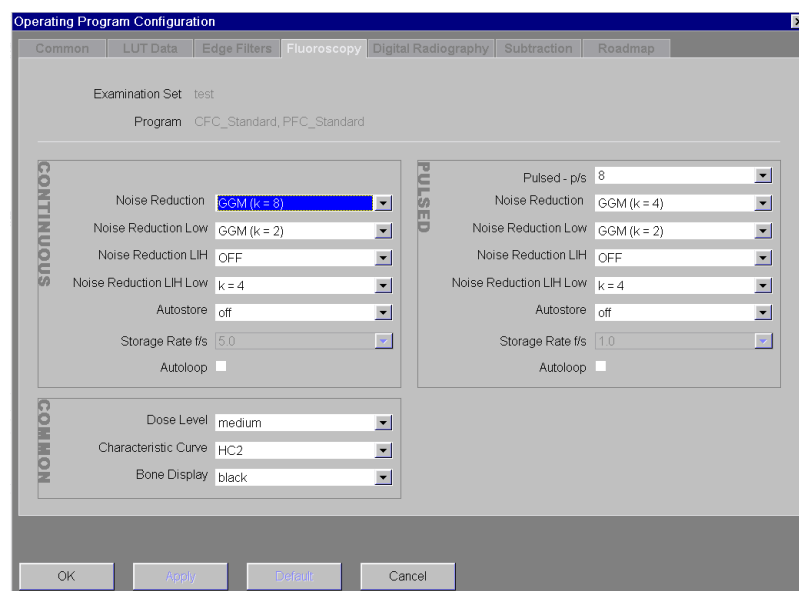
### Changing parameters



- ◆ Select the required new parameters from the selection lists.
- ◆ Click this button.
  - Your changes are applied to the ARCADIS Varic system.
  - The configuration dialog remains open for further entries.
- ◆ Continue configuring the next operating mode on the corresponding tab card.
- or —
- ◆ Click this button.
  - The dialog box closes.

## The Fluoroscopy tab card

The operating programs for continuous fluoro and pulsed fluoro are configured on the same tab card. There are some parameters that are specific to each of these operating programs (**CONTINUOUS** and **PULSED** areas), and some that are identical for both (**COMMON** area).



### Parameter settings

You can change the following parameter on the tab card of the individual area:

Parameters	Remarks
Noise Reduction	Parameter sets for noise reduction and or motion detection are possible
Noise Reduction Low	Noise Reduction Low is always less or equal to noise reduction
Noise Reduction LIH	Special noise reduction factor for LIH image to guarantee appropriate image quality even with short-time release  off (no noise reduction) k = 2, k = 4, k = 8 (noise reduction on with selected k factor); with PFC for pulse rates > 2 p/s only

Parameters	Remarks
Noise Reduction LIH Low	Special noise reduction factor for LIH image to guarantee appropriate image quality even with short-time release  off (no noise reduction) k = 2, k = 4, k = 8 (noise reduction on with selected k factor); with PFC for pulse rates > 2 p/s only
Autostore	off (no automatic storage)  last (last image is stored)  all (all images are stored)
Storage Rate f/s	only if Autostore = all  Setting in frames/s
Autoloop	Check box for activating automatic playback of a sequence of images at the end of the exposure
Pulsed p/s	Pulse rate; possible values for storage rate depend on the set value
Dose Level	Possible values: low, medium, high
Characteristic Curve	Entries can be defined using the service user interface
Bone Display	Possible values: white, black

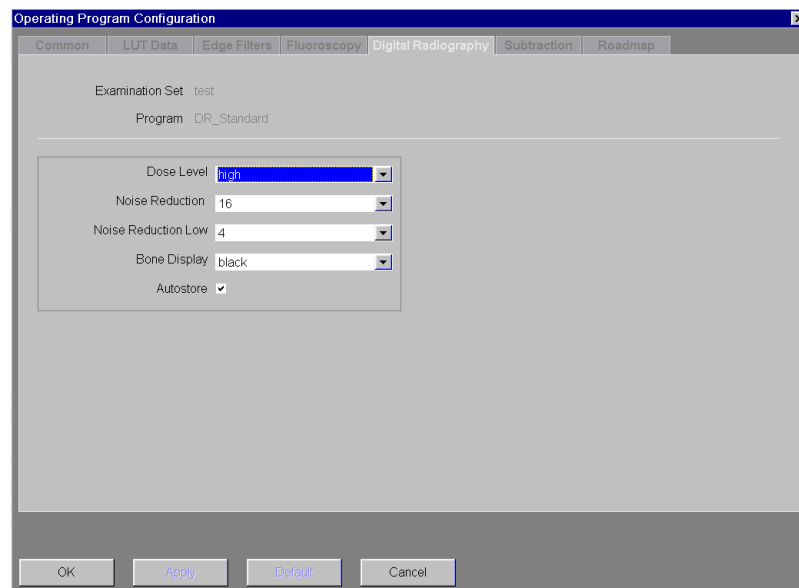
## Changing parameters

Apply

OK

- ◆ Select the required new parameters from the selection lists.
- ◆ Click this button.
  - Your changes are applied to the ARCADIS Varic system.
  - The configuration dialog remains open for further entries.
- ◆ Continue configuring the next operating mode on the corresponding tab card.
- or —
- ◆ Click this button.
  - The dialog box closes.

### *The Digital Radiography tab card*



#### **Parameter settings**

You can change the following parameters on the tab card:

Parameters	Remarks
Dose Level	Possible values: medium, high
Noise Reduction	Parameter sets for noise reduction and or motion detection are possible
Noise Reduction Low	Noise Reduction Low is always less or equal to noise reduction
Bone Display	Possible values: white, black
Autostore	Check box for activating/deactivating automatic storage of images

# Configuration

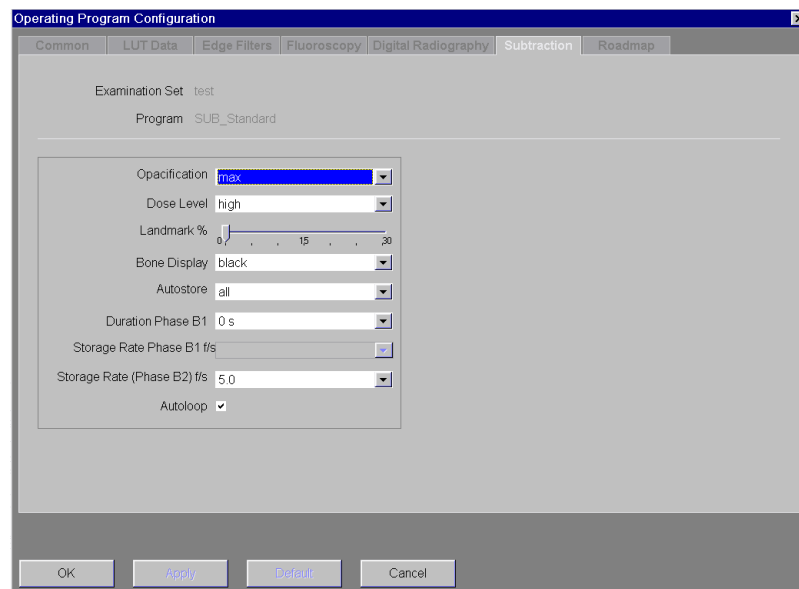
## Changing parameters



- ◆ Select the required new parameters from the selection lists.
- ◆ Click this button.
  - Your changes are applied to the ARCADIS Varic system.
  - The configuration dialog remains open for further entries.
- ◆ Continue configuring the next operating mode on the corresponding tab card.
  - or –
- ◆ Click this button.
  - The dialog box closes.

## *The Subtraction tab card*

This tab card is available only with the **Subtraction** option.





**Parameter settings** You can change the following parameters on the tab card:

Parameters	Remarks
Opacification	Possible values: min, max
Dose Level	Possible values: medium, high
Landmark	With the slider: 0 to 30%, in steps of 5%
Bone Display	Possible values: white, black
Autostore	off (no automatic storage) Phase B1, phase B2 (saves only images of the respective phase) all (all images are stored)
Duration Phase B1	Disabled if Autostore = 'off', otherwise enabled
Storage Rate Phase B1 f/s	Enabled if Autostore = 'all' and a duration phase B1 > 0 is set
Storage Rate (Phase B2) f/s	Enabled if Autostore = 'all'
Autoloop	Check box for activating automatic playback of a sequence of images at the end of the exposure

## Changing parameters

Apply

- ◆ Select the required new parameters from the selection lists.
- ◆ Click this button.
  - Your changes are applied to the ARCADIS Varic system.
  - The configuration dialog remains open for further entries.
- ◆ Continue configuring the next operating mode on the corresponding tab card.
- or —

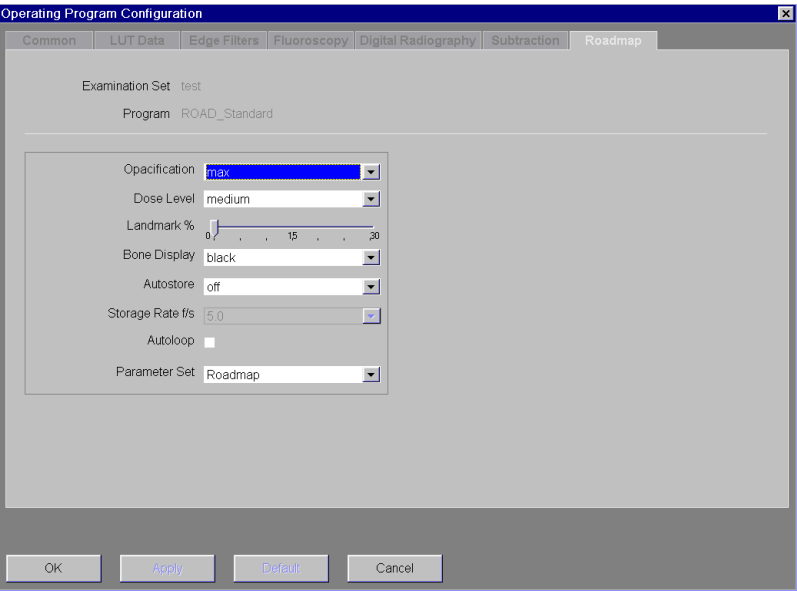
OK

- ◆ Click this button.
  - The dialog box closes.



*The Roadmap tab card*

This tab card is available only with the **Subtraction** option.



**Parameter settings**

You can change the following parameters on the tab card:

Parameters	Remarks
Opacification	Possible values: min, max
Dose Level	Possible values: medium, high
Landmark	With the slider: 0 to 30%, in steps of 5%
Bone Display	Possible values: white, black
Autostore	off (no automatic storage) all (all images are stored)
Storage Rate f/s	Only if Autostore = all Setting in frames/s
Autoloop	Check box for activating automatic play-back of a sequence of images at the end of the exposure
Parameter Set	Default parameter set for automatic vessel contour detection



*You have to select the setting "black" for the **Bone Display** parameter. Otherwise, the system will apply incorrect image brightness values and automatic vessel contour detection fails.*

## Changing parameters

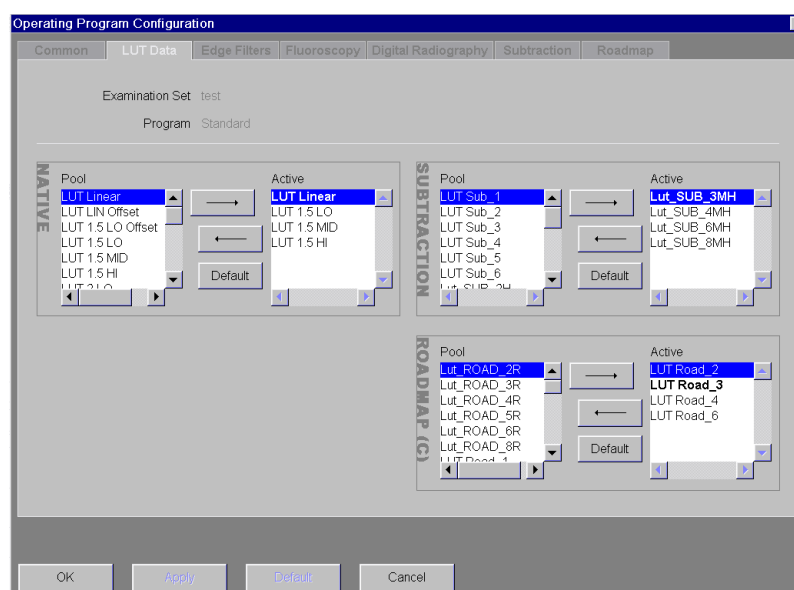


- ◆ Select the required new parameters from the selection lists.
- ◆ Click this button.
  - Your changes are applied to the ARCADIS Varic system.
  - The configuration dialog remains open for further entries.
- ◆ Continue configuring the next operating mode on the corresponding tab card.
  - or –
- ◆ Click this button.
  - The dialog box closes.

## The LUT Data tab card

The specified Look-up-Tables (LUTs) are valid for those operating modes of the current examination set which generate/display native images.

If the SUB/Roadmap option is enabled, additional LUTs (look-up tables) can be selected for those operating modes of the current examination set that generate/display subtracted images.



*Up to 4 LUT values can be activated. You can switch between them using the LUT keys for monitor A and monitor B on the C-arm system.*

## Activating LUTs (Look-up-Tables)



- ◆ In the left column (LUT pool) select the LUT that you want to activate.
- ◆ Click this button.
  - The LUT is moved into the column of active LUTs and is thus available using the respective keys.

## Deactivating LUTs



- ◆ Select the LUT that you want to activate in the right column (LUT pool).
- ◆ Click this button.
  - The LUT is moved to the LUT pool. Thus it is inactive.

## Defining the LUT default settings



The first LUT value in the Active list is set as default. Use the Default buttons to define a different LUT value as default value.

- ◆ Select the value you want as default in the right column (active LUTs).
- ◆ Click this button.
  - The default LUT value is displayed in bold on the list.

## Saving parameters



- ◆ Click this button.
  - Your changes are applied to the ARCADIS Varic system.
  - The configuration dialog remains open for further entries.

- ◆ Configure further parameters on the corresponding tab card.

— or —

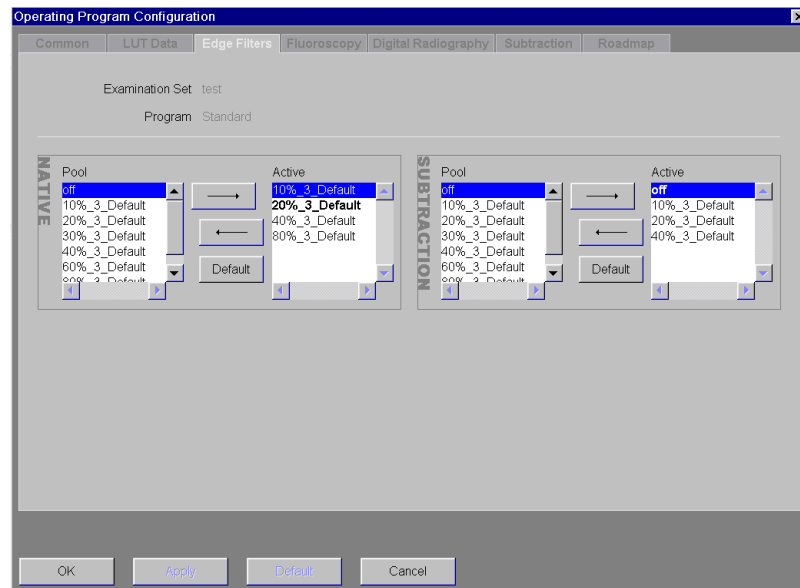


- ◆ Click this button.
  - The dialog box closes.

## The Edge Filters tab card

The edge enhancement values displayed are valid for those operating modes of the current examination set which generate/display native images.

If the SUB/Roadmap option is enabled, additional edge enhancement values can be selected for those operating modes of the current examination set that generate/display subtracted images.



### Parameter settings

The entries on the lists of available or active edge enhancement values are defined as follows:

Entry	Remarks
off	Without edge enhancement
mm%_n_Default	mm: Edge enhancement in percent n: Kernel type



*Up to 4 edge enhancement values can be activated (including "off"). You can switch between them using the edge enhancement key on the C-arm system.*

## Activating edge enhancement values



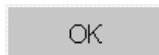
- ◆ Select the value that you want to activate in the left column (edge enhancement pool).
- ◆ Click this button.
  - The edge enhancement value is moved into the column of active values and is thus available via the respective key.

## Deactivating edge enhancement values



- ◆ Select the value that you want to activate in the right column (active edge enhancement value).
- ◆ Click this button.
  - The edge enhancement value is moved to the edge enhancement pool. Thus it is inactive.

## Saving parameters



- ◆ Click this button.
  - Your changes are applied to the ARCADIS Varic system.
  - The dialog box closes.

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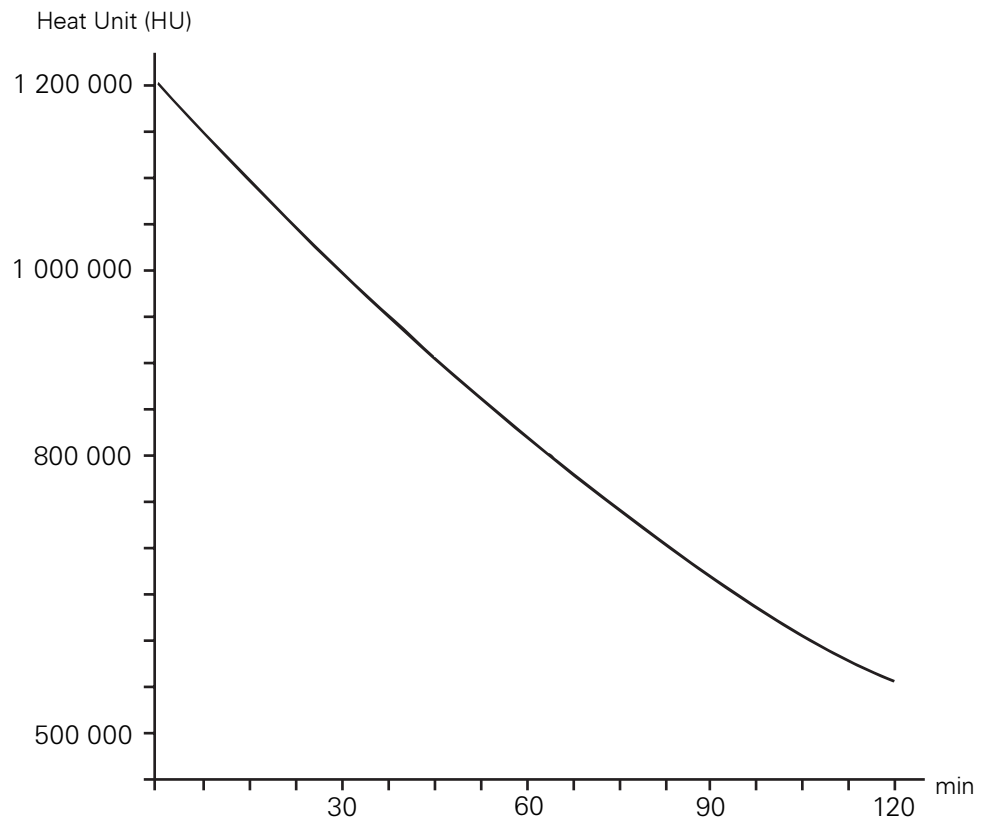
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## *Curves and diagrams*

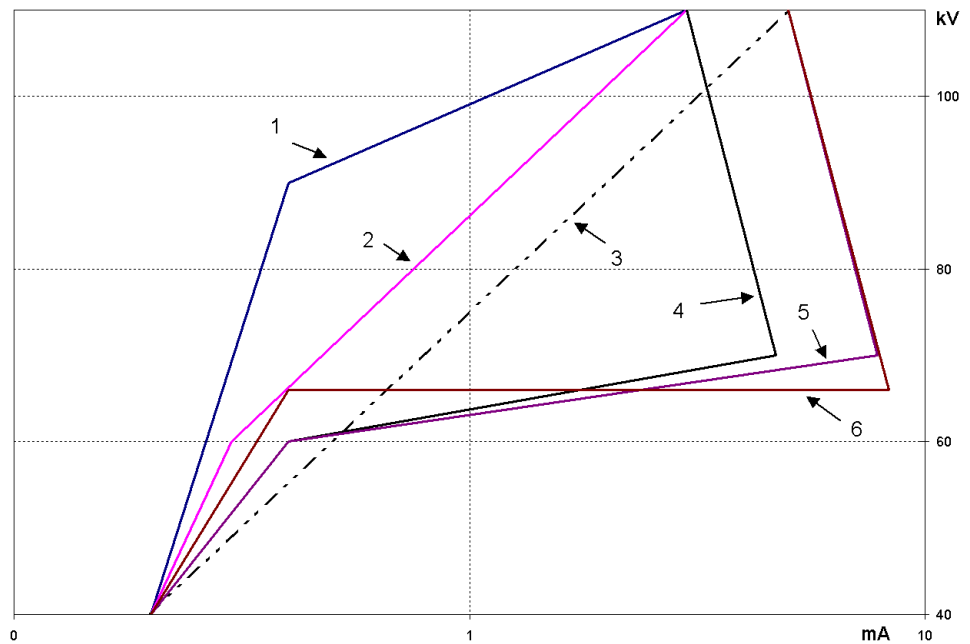
### *SIREPHOS 2000*

#### *Tube cooling curve*



## SIREMATIC curves

*kV/mA curves for Fluoroscopy and Pulsed Fluoroscopy  
(0.5 to 2 frames/s)*

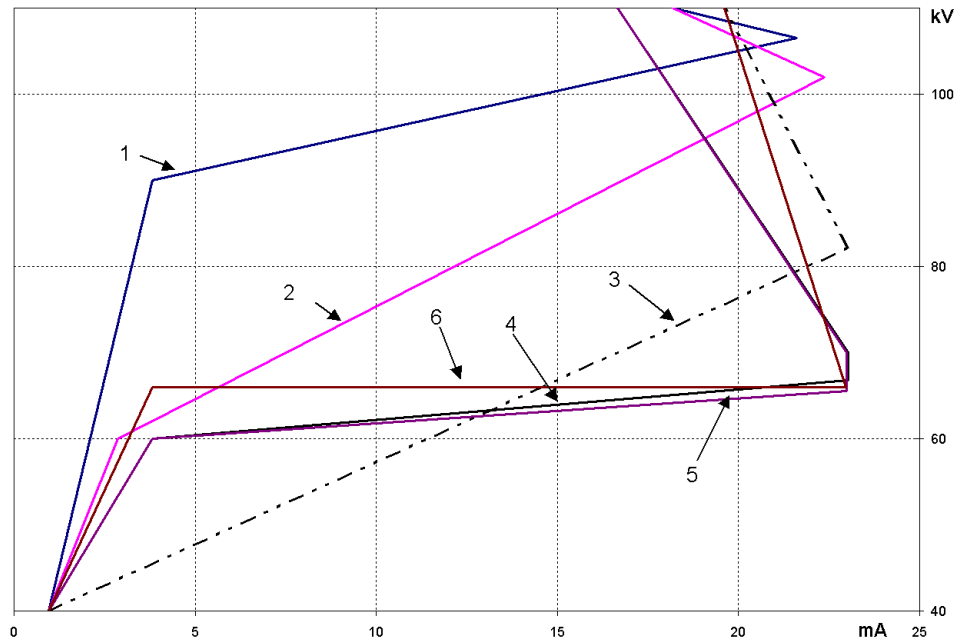


- (1) LD 330 W  
SIREMATIC LD *Low Dose*  
standard mode max. 3.0 mA  
in Power Mode 600 W max. 5.5 mA
- (2) S1 330 W  
SIREMATIC S *Standard*  
standard mode max. 3.0 mA  
in Power Mode 600 W max. 5.5 mA
- (3) S2 550 W  
SIREMATIC S *Standard*  
standard mode max. 5.0 mA  
in Power Mode 1000 W max. 9.1 mA
- (4) HC1 330 W  
SIREMATIC HC *High Contrast*  
standard mode max. 4.7 mA  
in Power Mode 600 W max. 8.5 mA
- (5) HC2 550 W  
SIREMATIC HC *High Contrast*  
standard mode max. 7.8 mA  
in Power Mode 1000 W max. 14.3 mA

- (6) IOD 550 W  
SIREMATIC IOD *Iodine-contrast optimized*  
standard mode max. 8.3 mA  
in Power Mode 1000 W max. 15.2 mA

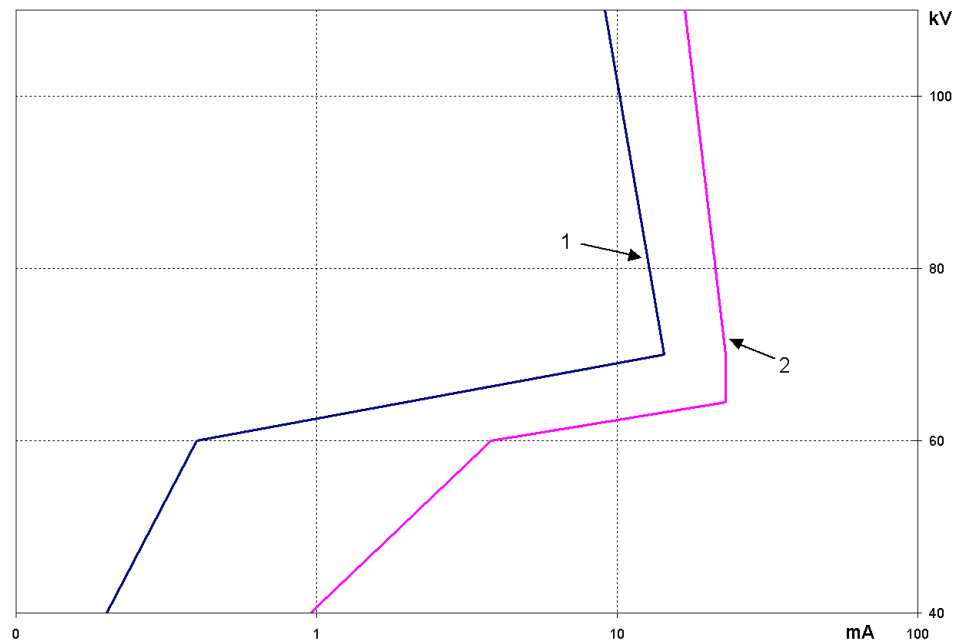
SIREMATIC curves	Fluoroscopy/Pulsed Fluoroscopy
S-1	Antiisowatt curve with max. 3 mA
S-2	Antiisowatt curve with max. 5 mA
LD	Low dose curve with high kV values: i.e. low radiation exposure for the patient, especially well-suited for pediatrics.  The characteristically high kV values result in lower image contrast.
HC -1	High-contrast curve with max. 4.7 mA
HC -2	High-contrast curve for applications requiring higher mA values (max. 7.8 mA) e.g. spinal column, hip, skull
IOD	IODINE curve  For special applications using iodine contrast agent

*kV/mA curves for Pulsed Fluoroscopy (> 2 frames/s)*



- (1) LD 330 W  
SIREMATIC LD *Low Dose*  
standard mode max. 21.8 mA  
in Power Mode 600 W max. 22.7 mA
- (2) S1 330 W  
SIREMATIC S *Standard*  
standard mode max. 22.4 mA  
in Power Mode 600 W max. 23.0 mA
- (3) S2 550 W  
SIREMATIC S *Standard*  
standard mode max. 23.0 mA  
in Power Mode 1000 W max. 23.0 mA
- (4) HC1 330 W  
SIREMATIC HC *High Contrast*  
standard mode max. 23.0 mA  
in Power Mode 600 W max. 23.0 mA
- (5) HC2 550 W  
SIREMATIC HC *High Contrast*  
standard mode max. 23.0 mA  
in Power Mode 1000 W max. 23.0 mA
- (6) IOD 550 W  
SIREMATIC IOD *Iodine-contrast optimized*  
standard mode max. 23.0 mA  
in Power Mode 1000 W max. 23.0 mA

### *kV/mA curves for Digital Radiography (DR)*



- (1) DR 1000 W  
N > 1: with noise reduction factor  
max. 14.3 mA
- (2) DR 1000 W  
N = 1: without noise reduction factor  
max. 23.0 mA

### *Dose rate at the image intensifier input*

The dose rate is factory-set between 0.11  $\mu\text{Gy/s}$  and 0.44  $\mu\text{Gy/s}$  depending on the I.I. format, measured behind the scattered radiation grid at the I.I. input.

Using a test phantom, the dose rate was set in a kV range between 70 kV and 80 kV. The iris diaphragm is maximally opened for this.

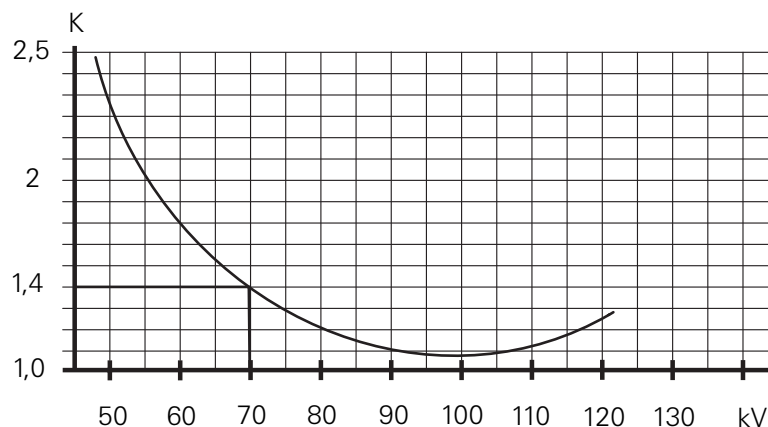
### *Deviation of the dose rate value from the set values at the image intensifier input*

Depending on the examined object, different fluoroscopy data (kV, mA) are set. The sensitivity of the image intensifier is influenced by beam quality (kV). As a consequence, different dose rates may result at the I.I. input screen for the same luminance at the I.I. output screen.

When examining a patient in fluoroscopy mode, additional scatter radiation values are produced in comparison to the phantom values, affecting the dose rate at the image intensifier input.

#### **Deviation calculation**

Using K as a correction value, (refer to diagram), the approximate deviation value from the set dose rate can be calculated.



Calculation example: With 70 kV the correction value is 1.4. That is, if the set dose rate value is 0.22  $\mu\text{Gy/s}$ , the actual value is approx.  $0.22 \mu\text{Gy/s} \times 1.4 = 0.308 \mu\text{Gy/s}$ .

#### **Setting the dose rate value**

If desired, the preferential position for the dose rate can be reprogrammed.

## Dosimetric information

3rd edition IEC 60601-2-54

### Air kerma strength

The skin dose values were measured at a distance of 30 cm from the image intensifier input with a 20 cm PMMA phantom pursuant to IEC 60601-2-54:2009, 203.5.2.4.5.101.

Program*	Curve	Format	Dose	Air kerma reference	
CFC	HC2	Normal	medium	19	mGy/min
Standard			medium push	20	mGy/min
CFC	IOD	Normal	low	12	mGy/min
Standard			medium	18	mGy/min
			high	22	mGy/min
Card	IOD	Normal	high push	33	mGy/min

Program*	Curve	Format	Noise reduction	Air kerma reference	
DR	DR 1000	Normal	k = 4	0.2	mGy/f (image)
			k = 8	0.4	mGy/f (image)
			k = 16	0.8	mGy/f (image)
			k = 32	1.6	mGy/f (image)

\*) standard examination program provided

### *Maximum air kerma strength*

The skin dose values were measured at maximum generator power at a distance of 30 cm from the image intensifier input pursuant to IEC 60601-2-54:2009, 203.5.2.4.5.101.

Program*	Curve	ADR stop**	Air kerma reference	
CFC	HC2	110 kV/5 mA	52	mGy/min
Standard	HC1	110 kV/3 mA	32	mGy/min

Program*	kV	mAs	Air kerma reference	
Cassette	110	69	12	mGy/f (image)
Exposure			72	mGy/min

\*) standard examination program provided

\*\*) In ADR stop mode, the maximum kV value is set



## *Notes concerning electromagnetic compatibility (EMC)*

Medical electrical equipment is subject to special precautions regarding EMC. These systems must be installed and put into service according to the EMC information provided in the accompanying documents.

Portable and mobile RF communications equipment can affect medical electrical equipment.



*Fixed equipment or system 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.*

### *Guidelines and manufacturer's declaration – Electromagnetic emissions*

The system is intended for use in an electromagnetic environment as specified below. The customer or the user of the system should ensure that it is operated in such an environment.

<b>Emissions test</b>	<b>Compliance</b>	<b>Electromagnetic environment - guidance</b>
RF emissions according to CISPR 11	Group 1	The system uses RF energy exclusively for its internal function. Therefore, its RF emissions are very low and not likely to cause any interference in nearby electronic equipment.
RF emissions according to CISPR 11	Class A	The system is not suitable for use in domestic establishments and establishments directly connected to a public power supply network which supplies buildings used for domestic purposes.
Harmonic emissions according to IEC 61000-3-2	Not applicable	The system is a professionally used unit with a total rated power larger than 1 kW. There are no limit values for this rated power.
Voltage fluctuations/ flicker emissions according to IEC 61000-3-3	Complies with the specified regulation	




*The device or system should not be operated standing next to or on/under other devices. If adjacent or stacked use is necessary, the equipment or system should be observed to verify normal operation in the configuration in which it will be used.*

## *Guidelines and manufacturer's declaration – Electromagnetic interference immunity*

The system is intended for use in an electromagnetic environment as specified below. The customer or the user of the system should ensure that it is operated in such an environment.

Interference immunity tests	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Electrostatic discharge (ESD) IEC 61000-4-2	± 6 kV contact discharge  ± 8 kV air discharge	± 6 kV contact discharge  ± 8 kV air discharge	Floors should be made of wood, concrete or ceramic tiles. If the floor is covered with synthetic materials, the relative humidity must be at least 30%.
Electrical fast transient disturbances/bursts according to IEC 61000-4-4	± 2 kV for power supply lines ± 1 kV for input/output lines	± 2 kV for power supply lines ± 1 kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge according to IEC 61000-4-5	± 1 kV differential-mode voltage ± 2 kV common-mode voltage	± 1 kV differential-mode voltage ± 2 kV common-mode voltage	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines according to IEC 61000-4-11	< 5% $U_T$ * (> 95% dip in $U_T$ ) for 0.5 cycles	not possible	Compliance with the low values for the leakage current requires the use of inductances. The resultant necessary remagnetization of these inductances causes in the most unfavorable case a behavior deviating from the requirements specified in IEC 60601-1-2.  Mains power quality should be that of a typical commercial or hospital environment. If the user of the system requires continued operation during power mains interruptions, it is recommended that the system be powered from an uninterruptible power supply.
Voltage dips, short interruptions and voltage variations on power supply input lines according to IEC 61000-4-11	40% $U_T$ (60% dip in $U_T$ ) for 5 cycles  70% $U_T$ (30% dip in $U_T$ ) for 25 cycles  < 5% $U_T$ (> 95% dip in $U_T$ ) for 5 seconds	40% $U_T$ (60% dip in $U_T$ ) for 5 cycles  70% $U_T$ (30% dip in $U_T$ ) for 25 cycles  < 5% $U_T$ (> 95% dip in $U_T$ ) for 5 seconds	
Note: $U_T$ is the AC mains voltage before application of the test level.			

Interference immunity tests	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Power frequency magnetic field (50/60 Hz)  according to IEC 61000-4-8	3 A/m	0.4 A/m	<p>This unit uses a technology that is based on electron beam deflection. Therefore, a magnetic field in the vicinity must be reduced to the compliance level, e.g. through design or shielding.</p> <p>Power frequency magnetic fields should be at levels characteristic of a typical commercial or hospital environment.</p>
			Portable and mobile RF telecommunications equipment should be used no closer to any part of the system (including cables) than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.
			Recommended separation distance:
Conducted RF disturbances according to IEC 61000-4-6	3 V <sub>rms</sub> 150 kHz to 80 MHz	3 V <sub>rms</sub>	$d = 1.2\sqrt{P}$
Radiated RF disturbances according to IEC 61000-4-3	3 V/m 80 MHz to 2.5 GHz	3 V/m	$d = 1.2\sqrt{P}$ for 80 MHz to 800 MHz
			$d = 2.3\sqrt{P}$ for 800 MHz to 2.5 GHz
			<p>Where <i>P</i> is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and <i>d</i> is the recommended separation distance in meters (m).</p> <p>Field strengths from fixed RF transmitters, as determined by electromagnetic site survey<sup>a</sup>, should be less than the compliance level in each frequency range.<sup>b</sup></p> <p>Interference may occur in the vicinity of equipment marked with the following symbol:</p> <div></div>
Note 1: At 80 MHz and 800 MHz, the higher frequency range applies.			
Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			
<sup>a</sup> Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radios, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to the fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the device or system is used exceeds the applicable RF compliance level above, the device or system should be observed to verify normal operation. Should unusual performance features be observed, additional measures (such as change in orientation or change of site of the system) may be necessary.			
<sup>b</sup> Over the frequency range of 150 kHz to 80 MHz the field strength should be less than 3 V/m.			

### *Recommended protective distances between portable and mobile RF telecommunication devices and the system*

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

Rated maximum output power of transmitter [W]	Safe distance according to frequency of transmitter [m]		
	150 kHz to 80 MHz $d = 1.2\sqrt{P}$	80 MHz to 800 MHz $d = 1.2\sqrt{P}$	800 MHz to 2.5 GHz $d = 2.3\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23
For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be determined using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.			
Note 1: At 80 MHz and 800 MHz, the higher frequency range applies.			
Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			

### *Unit data*

### *Complete system*

#### **General data**

Power requirements	100 V, 110 V, 120 V, 127 V, 200 V, 230 V, 240 V $\pm 10\%$ ; 50/60 Hz $\pm 1$ Hz
Nominal rating	20 A to 127 V~, 15 A from 200 V~ corresponds to nominal value of the slow-blow fuse in the power input of the product
Internal line resistance	Ri < 0.3 ohms at 100 - 127 V~ Ri < 0.8 ohms at 200 - 240 V~
Power consumption	max. 2.5 kVA
Weight	C-arm system approx. 235 kg Monitor trolley with 2 monitors, approx. 190 kg (with PC and UPS)
Environmental conditions for operation	Temperature range: +15 °C to +35 °C Rel. humidity: 15% to 75%, non-condensing Barometric pressure: 700 hPa to 1060 hPa
Environmental conditions for transport	Temperature range: -20 °C to +37 °C Rel. humidity: 10% to 95%, non-condensing Barometric pressure: 700 hPa to 1060 hPa



3rd edition IEC 60601-2-28

*For environmental conditions that fall within the specified values, no wait time is required for radiation operation.  
For environmental conditions that fall outside the specified values, a wait time of one to twelve hours must be factored in for radiation operation, depending on the location of the system.*

#### **Classification**

Protection against electric shock	Class 1, no applied part acc. to IEC 60601-1
Protection against ingress of fluids	IPX0 (not protected) acc. to IEC 60529
Operating mode	Continuous operation

### Current/voltage values

Voltage	Long-term current consumption	Short-term current consumption
100 V	17 A	29 A
110 V	16 A	26 A
120 V	15 A	24 A
127 V	14 A	23 A
200 V	9 A	15 A
230 V	8 A	13 A
240 V	8 A	12 A

## Generation of radiation

### Generator

Pulsed Fluoroscopy	Min. pulse width 7 ms Pulse rate 15 f/s/23 mA Max. pulsed output 2.3 kW
Fluoroscopy	40 kV to 110 kV/0.2 to 15.2 mA (max. 1000 W)
Digital Radiography	40 kV to 110 kV/0.2 to 23 mA (max. 1000 W)
Current-time-reference product	1.6 mAs/102 kV
Tolerances	kV $\pm 10\%$ (measured with spectrometric kV method) mA $\pm 8\% \pm 0.1$ mA (measured in rectified high-voltage circuit) Fluoroscopic time 1 digit (6 s) $\pm 5\%$
Power rating	1.4 kW (102 kV/1.6 mAs) Min. pulse width 7 ms Max. pulsed output 2.3 kW
Exposure times	min. 50 ms at 40 kV 20 mA max. 10 s

### *X-ray tube unit*

SIREPHOS single-tank high-frequency generator	Inverter frequency 15 kHz up to 26 kHz
Inherent filtration	3 mm Al eq. + 0.1 mm Cu
X-ray tube	Stationary anode, focal spot nominal value 0.6

### *Max. output and focuses in operating modes*

	<b>CFC/SUB/ ROADMAP/PFC (<math>\leq 2</math> f/s)</b>	<b>PFC (<math>&gt; 2</math> f/s)</b>	<b>DR (k = 1)</b>	<b>DR (k &gt; 1)</b>
Tube voltage	40 – 110 kV	40 – 110 kV	40 – 110 kV	40 – 110 kV
Tube current	0.2 – 15.2 mA	1 – 23 mA	1 – 23 mA	0.2 – 14.3 mA
Exposure time	n.a.	7 – 24 ms	7 – 42 ms	n.a.
Pulsed output	n.a.	max. 2.3 kW	max. 1.8 kW	n.a.
Mean power	max. 550 W max. 1000 W for CFC and PFC high contrast	max. 550 W max. 1000 W for PFC high contrast	n.a.	n.a.



## System components

### C-arm

C-arm orbital movement	130° (-40° to +90°)
C-arm angulation	± 190°
C-arm horizontal movement	20 cm
C-arm immersion depth	73 cm
C-arm swivel range	± 12.5°
C-arm vertical movement	45 cm, motorized
Source-I.I. distance	100 cm
Free space	78 cm

### Image intensifier

SIRECON 23-2HDR-C	Nominal diameter 23 cm (9")
Format switch-over	23 cm/15 cm (9"/6")
Size of I.I. input field	21.5 cm
Detective quantum efficiency (DQE)	≥ 61% as per IEC 61262

### Scattered radiation grid at I.I. input

Round grid	17/70 f <sub>0</sub> 100
System attenuation factor	m = 1.5

### Collimator system

Collimator system	Iris diaphragm for concentric collimation and semi-transparent slot diaphragm for collimation with unlimited rotation Fixed shutter for X-ray cassette
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### Imaging chain

Camera with CCD sensor	1024 (H) x 1024 (V)
Aspia imaging system	Features, e.g. digital image rotation +360°



*Monitors*

TFT color displays	Resolution 1280 x 1024 (pixels)
Screen diagonal	48 cm (19")
Luminance	typically 180 cd/m <sup>2</sup> /max. 250 cd/m <sup>2</sup>
s/w displays	Resolution 1280 x 1024 (pixels)
Screen diagonal	48 cm (19")
Luminance	typically 400 cd/m <sup>2</sup> /max. 600 cd/m <sup>2</sup>

## Options

### *Dose measuring chamber (DAP meter)*

#### Specifications

Technology	ionization chamber
Active area	Diameter 90 mm, area 63.2 cm <sup>2</sup>
DAP resolution	0.01 $\mu\text{Gym}^2/\text{s}$ equivalent to cGycm <sup>2</sup> /s
Maximum measurable DAP	3000.00 $\mu\text{Gym}^2/\text{s}$ equivalent to cGycm <sup>2</sup> /s
Measuring inaccuracy	< 1% under constant pressure and temperature
Energy range	40 - 125 kV $\pm$ 6%
Attenuation equivalent (Inherent filtration)	< 0.5 mm Al equivalent
Dose rate linearity	better than $\pm$ 2%
Measuring readiness	10 seconds after power on

#### Work environment

Temperature	+10 °C to +70 °C
Relative humidity	15% to 75% (without condensation)
Barometric pressure	700 hPa to 1060 hPa

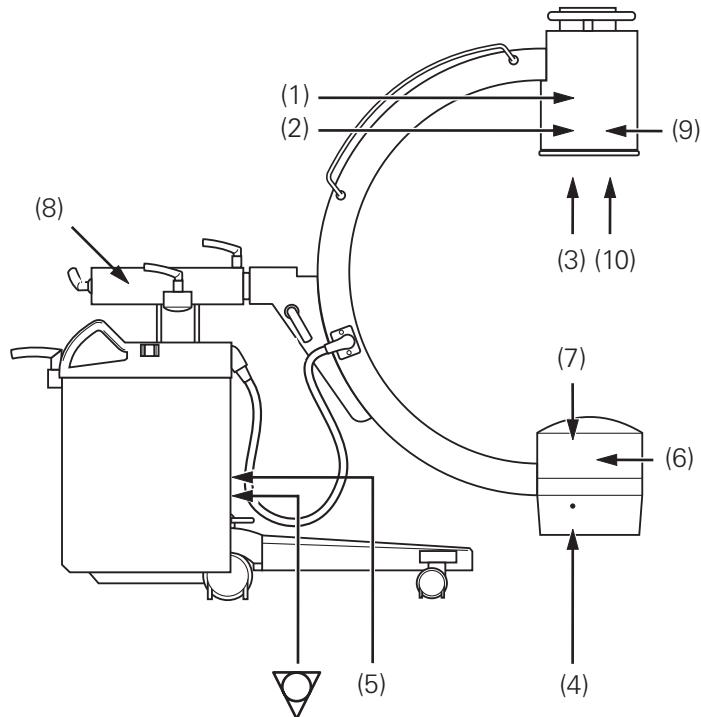
### *Cassette holder*

Format	24 cm x 30 cm (10 inches x 12 inches)
Format with grid	Pb r17 N70, f <sub>o</sub> 85

## Labels

### C-arm system

The labels shown below are attached permanently to the following sub-assemblies.



- (1) I.I. unit
  - (2) Image intensifier
  - (3) I.I. grid
  - (4) SIREPHOS X-ray tube housing
  - (5) X-ray system (control); system identification label
  - (6) Tube assembly collimator
  - (7) Single-tank laser targeting device (optional)
  - (8) Support arm
  - (9) I.I. laser aimer
  - (10) Cassette holder (option)
- Equipotential bonding

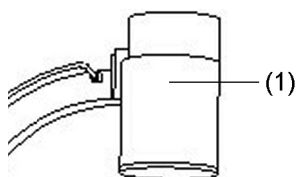


3rd edition 7.2.4



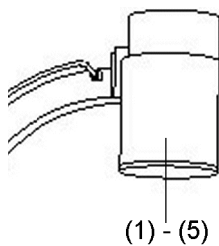
Read Operator Manual

(1) I.I. unit

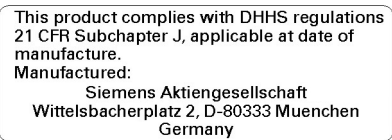


(1) Manufacturer's identification label

(2) Image intensifier



(1) Manufacturer's identification label



(2) Approval label



(3) Approval label

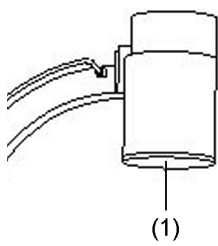


(4) Approval label



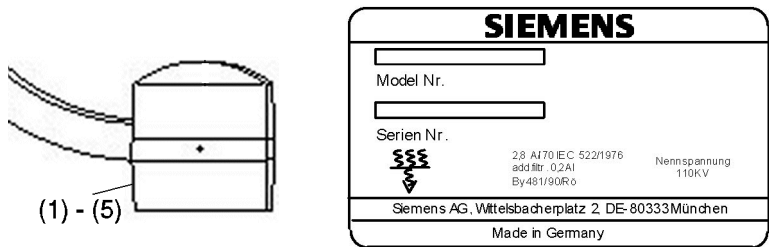
(5) Label for I.I. tube

(3) I.I. grid



(1) Identification label GRID

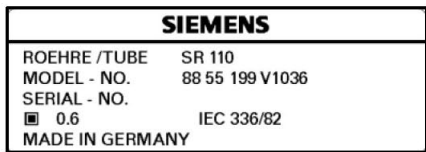
(4) SIREPHOS X-ray tube housing



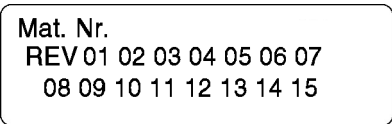
(1) Special label with beam entry



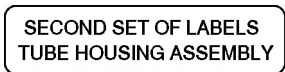
(2) Approval label



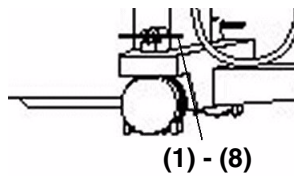
(3) Tube ID label



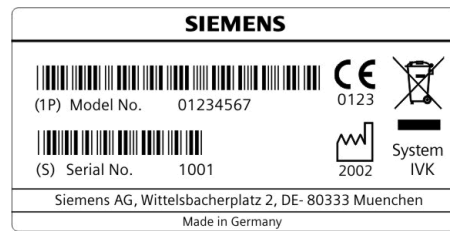
(4) Revision status label



(5) Supplementary label



## (5) X-ray system (control)



- (1) System identification:  
Manufacturer's identification label

This product complies with DHHS regulations  
21 CFR Subchapter J, applicable at date of  
manufacture.  
Manufactured:  
Siemens Aktiengesellschaft  
Wittelsbacherplatz 2, D-Muenchen  
Germany

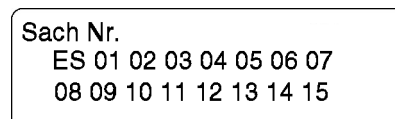
- (2) Approval label



- (3) Approval label



- (4) Approval label



- (5) Revision status label



- (6) Weight label on C-arm basic unit



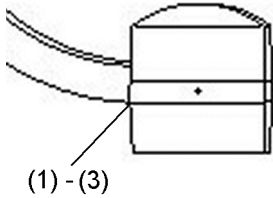


(7) Label for Brasil only

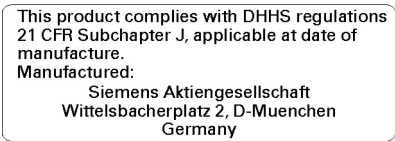


(8) Label for Venezuela only

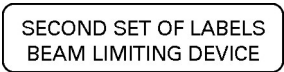
(6) Tube shutter



(1) Manufacturer's identification label

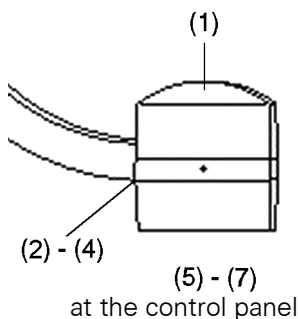


(2) Approval label



(3) Supplementary label

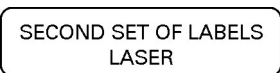
(7) Single-tank laser targeting device (option)



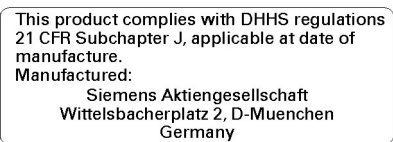
(1) For USA/Canada/Great Britain  
warning label



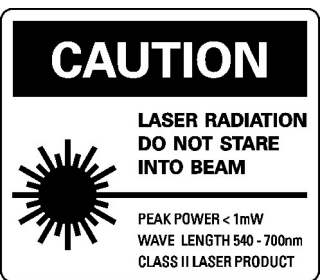
(2) Manufacturer's identification label



(3) Supplementary label



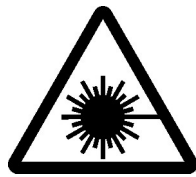
(4) For USA/Canada  
approval label



(5) For USA/Canada  
warning label



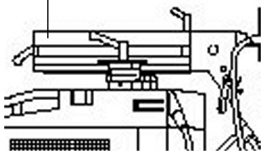
(6) Countries other than USA/Canada  
warning label



(7) Countries other than USA/Canada  
warning label

*(8) Support arm*

(1) , (2)



(1) For Canada only  
warning label

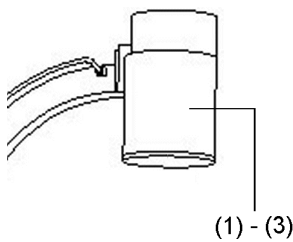


(2) Affixed for Germany/Austria only  
warning label

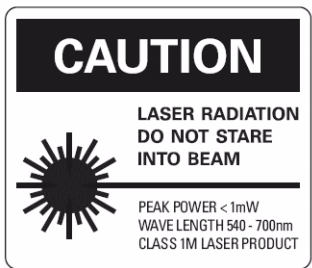


(3) For China only (warning label)

(9) I.I. laser light localizer



(1) Manufacturer's identification label

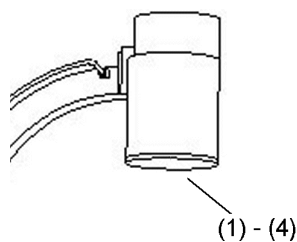


(2) For USA/Canada  
warning label

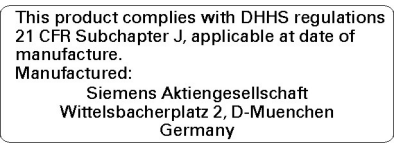


(3) For USA/Canada/Great Britain  
warning label

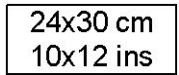
(10) *Cassette holder*



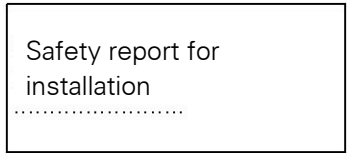
(1) Manufacturer's identification label



(2) For USA/Canada approval label

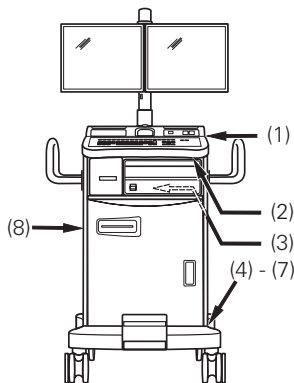


(3) Identification label, film size



(4) Identification label, safety report for installation of the cassette holder in the local language

Monitor trolley with TFT monitors



**DANGER** - EXPLOSION HAZARD.  
DO NOT USE IN THE PRESENCE  
OF FLAMMABLE ANAESTHETICS  
**DANGER** - RISQUE D'EXPLOSION.  
NE PAS EMPLOYER EN PRESENCE  
D'ANESTHESIQUES INFLAMMABLES

(1) For USA/Canada  
warning label

**WARNING!**  
THIS X-RAY UNIT MAY BE DANGEROUS TO  
PATIENT AND OPERATOR UNLESS SAFE EXPO-  
SURE FACTORS, AND OPERATING INSTRUCTIONS  
AND MAINTENANCE SCHEDULES ARE OBSERVED.

(2) For USA/Canada  
warning label

..... kg

(3a) Weight label on monitor trolley

			Long Time Current	Moment Current
Volt	50 Hz	60 Hz	A	A
100 ~	<input type="checkbox"/>	<input type="checkbox"/>	17	29
110 ~	<input type="checkbox"/>	<input type="checkbox"/>	16	26
120 ~	<input type="checkbox"/>	<input type="checkbox"/>	15	24
127 ~	<input type="checkbox"/>	<input type="checkbox"/>	14	23
200 ~	<input type="checkbox"/>	<input type="checkbox"/>	9	15
230 ~	<input type="checkbox"/>	<input type="checkbox"/>	8	13
240 ~	<input type="checkbox"/>	<input type="checkbox"/>	8	12

(3) Optional label country-specific connection data

**SIEMENS**

  
(1P) Model No. 01234567

  
(S) Serial No. 1001

Siemens AG, Wittelsbacherplatz 2, DE-80333 Muenchen  
Made in Germany

(4) Identification label of the manufacturer (Monitor trolley)



(5) Approval label



(6) Approval label

Rev.	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	38

(7) Manufacturer's revision level label



(8) Read Operator Manual





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## *Functional and Safety Checks*

To ensure that the ARCADIS Varic is ready for operation and all safety features are functioning properly, you must perform regular functional and safety checks.

### *Daily checks*

#### *Prior to the examination*

- ◆ Check the power plug. If the power plug is damaged, the ARCADIS Varic must not be used.
- ◆ Check the power cable. If the power cable is damaged, the ARCADIS Varic must not be used.
- ◆ Check the function of the foot brakes of the C-arm system and the monitor trolley as well as the steering of the C-arm system.
- ◆ Check the C-arm counterbalance after releasing the brakes.
- ◆ Check the function of all radiation indicators.
- ◆ Inspect the housing of the I.I. and the single tank for mechanical damage.

### *Monthly checks*

#### *Checking the dose rate control function*

This following simple procedure allows you to check the automatic dose rate control function without an object in the beam path. A kV value of  $\leq 45$  kV must stabilize:

- ◆ Open the iris and slot diaphragms to maximum aperture.
- ◆ Press the **Dose rate control Stop** (ADR Stop) key.
- ◆ Select 110 kV with the +/- keys.
- ◆ Press the **ADR Stop** key again.
  - The stop function is canceled; automatic dose rate control is switched on again.
- ◆ Release radiation in the fluoroscopy mode.
  - The tube voltage is reduced to a value  $\leq 45$  kV.
  - The monitor image is not overexposed.

### *Checking the EMERGENCY STOP function for motor-driven system movements*

- ◆ Switch the ARCADIS Varic on.
- ◆ 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.
- ◆ Unlock the **EMERGENCY STOP** button again.
- ◆ Press one of the keys for moving the lifting column.
  - The lifting movement is enabled again.

### *Maintenance plan for checking the system*

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. In the case of questions relating to maintenance/maintenance contract please contact our Siemens Customer Service.



*Please observe the relevant information in  
(→ Register 2: Safety, Page 5).*

### **Checking the system**

Procedures to be performed	Function	Interval
Mechanical safety	Damage to the housing, system movements and options (e.g. spacer)	12 months
Electrical safety	Ground conductor, grounding strap on the C-arm system, cables and plugs	12 months
Functional check	Emergency stop and lifting column	12 months
Image quality	Image display and image processing	12 months

The stated functions are minimum requirements.

### *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.

### *Dose and consistency test*

The ARCADIS Varic system features automatic object position detection. Proceed as follows:

- ◆ Place the object or filter into the beam path.
- ◆ Release fluoroscopy in automatic mode for approx. 10 s.
- ◆ Press the ADR stop button on the control panel.
- ◆ Attach the dose measuring chamber to the image intensifier input.
- ◆ Release fluoroscopy again to perform the dose measurement.

### *Service via network connection*

The ARCADIS Varic must be connected to a network (DSL  $\geq$  1 Mbit/s) for the service measures described below.

#### **Updating virus protection**

With the "Virus Protection Service" option you can import and install the latest virus protection files via the network connection. It is urgently recommended to do so regularly.



*The ARCADIS Varic should only be operated within a virus-protected hospital network.*

#### **Remote service access**

Siemens Customer Service has the possibility of accessing the ARCADIS Varic via an active network connection (DSL or ISDN).



*With full access, the image area of the left monitor is superimposed by a full screen message. When this message is displayed, radiation can still be released.*

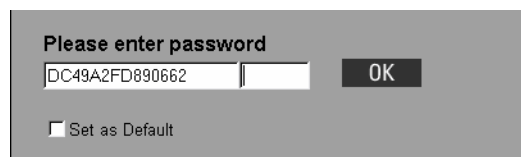
## Updating virus protection

Virus protection should be updated every 2-3 days to make sure the ARCADIS Varic has the latest virus definitions installed. The update process takes a few minutes and should be performed during a break or outside of examination hours.

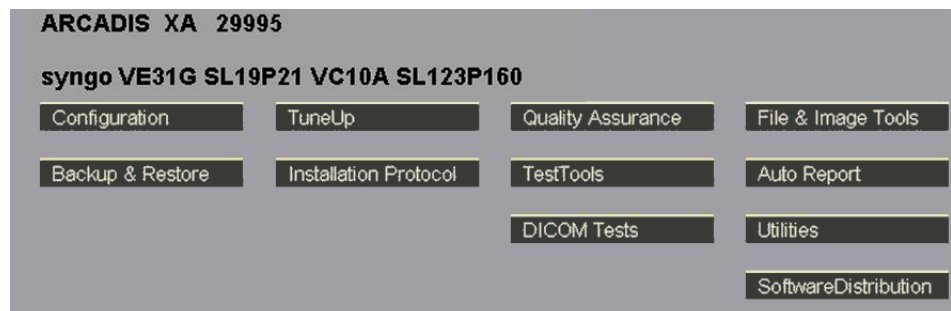
### Calling up the dialog window

To update the virus protection, open the **SoftwareDistribution** dialog window in the **Local Service** window.

- ◆ Select **Options > Customer Service > Local Service** in the main menu of the task card.
  - The **Service Software** dialog box is displayed.

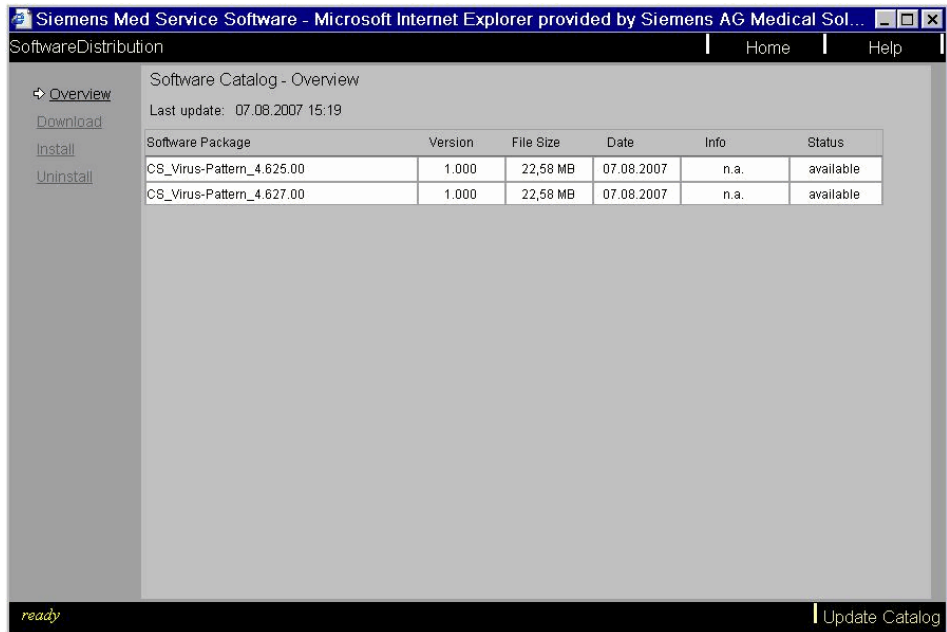


- ◆ Delete the default code in the left window of the entry area **Please enter password** and click **OK**.
  - The start window for service settings is displayed.



- ◆ Click **SoftwareDistribution**.
  - The **SoftwareDistribution** window appears.

## Selecting an update

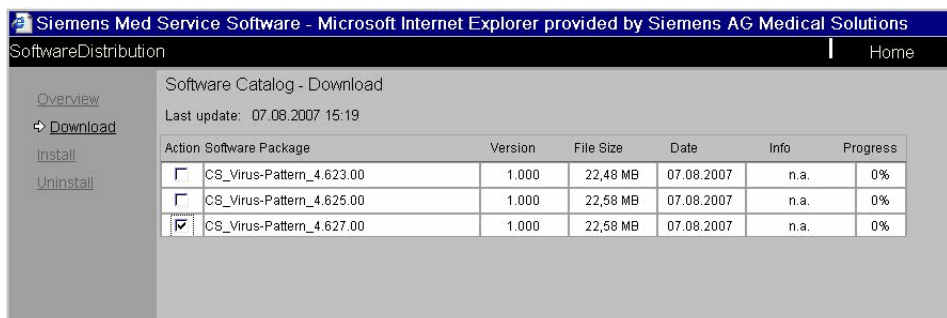


➔ Overview

Update Catalog

➔ Download

- ◆ If necessary, click **Overview** in the left window area.
  - An overview of updates is displayed.
- ◆ Click on **Update Catalog** at the lower right bottom of the window if applicable.
  - The list of updates is updated.
- ◆ Find the most recent virus definition (virus pattern) in the **Software Package** column by looking at the version information in the packet name and the **Date** column.
  - In this example, it would be "CS\_Virus-Pattern\_4.627.00" of August 7, 2007.
- ◆ Click **Download** in the left window area.
  - The Download area is displayed.



- ◆ In the **Action** column, click on the corresponding **Software Package**.



### Downloading an update



- ◆ Click on **Download** at the lower right bottom of the window.
  - The update is downloaded from the network.
  - The **Progress** column shows the download status.
  - A message window is shown when the process is successfully completed.



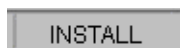
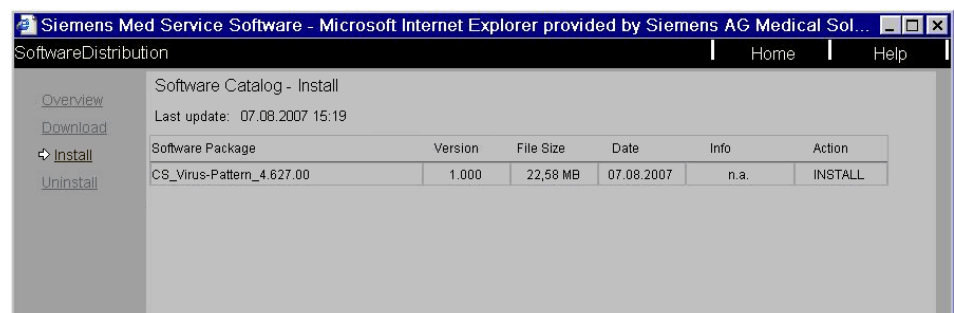
- ◆ Close the window with **OK**.

### Installing an update in the system



The latest version of the virus protection files is now stored locally in your ARCADIS Varic. You have to install them in the system to use them.

- ◆ Click **Install** in the left window area.
  - The list of installable updates is shown.



- ◆ In the **Action** column of the corresponding update, click **Install**.
  - The update is installed.
  - A message window is shown when the process is successfully completed.



- ◆ Close the window with **OK**.
- ◆ Close the **SoftwareDistribution** and **Service Software** windows with the **Close window** button.



### Installing an update in syngo

As a last step, the update of the virus protection files must be installed and activated in the *syngo* user interface.

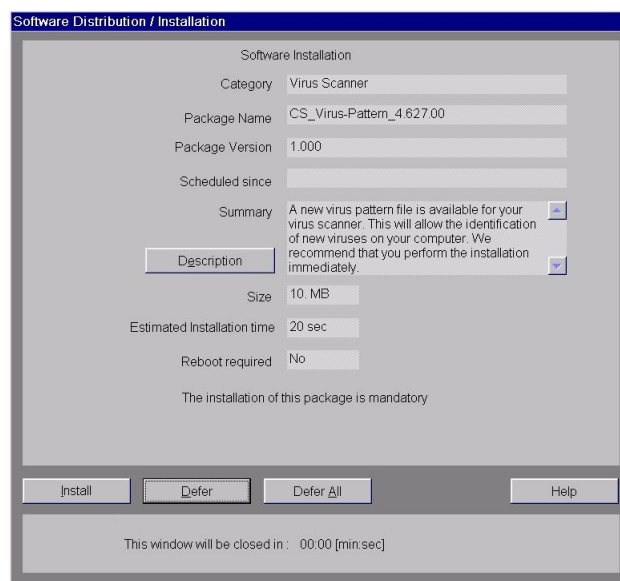
It is recommended to complete this step immediately to finish the update process. For this purpose, the *syngo* user interface must be restarted. The **Software Distribution/Installation** dialog box is automatically displayed to complete the installation for *syngo*.



*You can also open the **Software Distribution/Installation** window later (manually, without restarting). For this purpose, click the yellow exclamation mark on the status bar. This symbol will appear approx. 15 min after installing the virus update in the system.*



- ◆ Call up **Options > End Software Session** in the main menu.
  - The **System Message** dialog box is displayed.
- ◆ Click **Restart**.
  - The *syngo* user interface and the application programs are shut down and then started again.
  - After the start-up of *syngo*, the **Software Distribution/Installation** dialog box is shown.



- ◆ Click **Install**.
  - The virus protection update is installed and activated in *syngo*.
  - The **Software Distribution/Installation** dialog box is closed.

## Remote service access

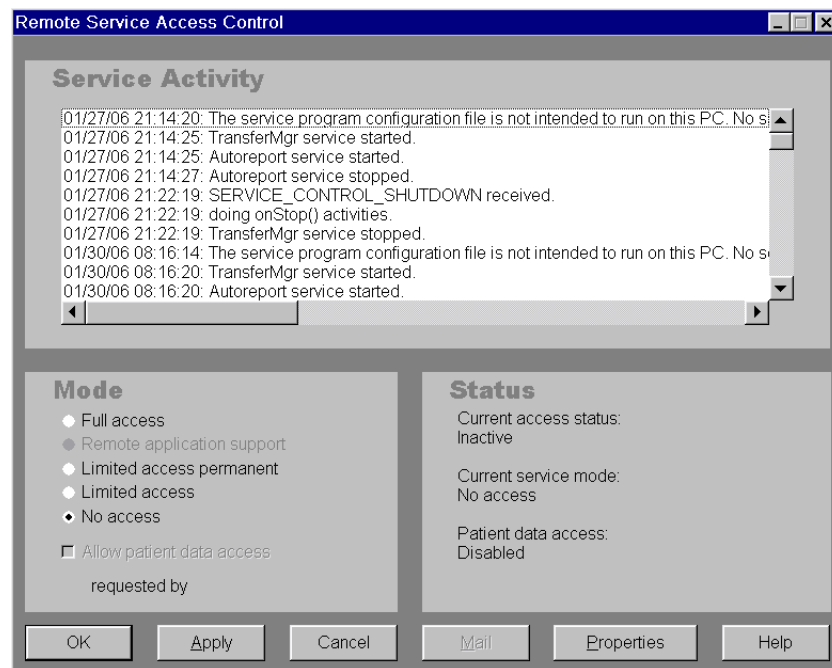
The **Remote Service Access Control** window allows you to grant Service personnel access rights so that they can perform remote maintenance.



*If the Remote Service Access Control option is activated, remote service can only be performed from "trusted systems" (systems that have exchanged "proved certificates" with your syngo system).*

## Service access

- ◆ Open **Options > Customer Service > Remote Service** to start a remote service session.
  - The **Remote Service Access Control** window is displayed.



- ◆ Wait for a response from the remote location before you grant access to your workstation.

### Granting access

- ◆ Depending on the required service activities, you will assign the service engineer full or limited access to your workstation:

- ☐ **Full access**

Allows the service technician to take control of your workstation (which disables it to you).

- ☐ **Limited access**

This mode provides access to all service functions that do not interfere with regular patient operations.

- ☐ **No access**

- ☐ **Allow patient data access**

The service engineer will only have access to patient data if you give your explicit permission upon his specific request.

### Limiting access rights

As long as you have assigned full access rights to service, i.e. maintenance is in progress, you cannot continue working with your ARCADIS Varic.



### Warning

Aborting remote service without consultation with service engineers.

**Aborting remote service cancels all service procedures and causes the ARCADIS Varic to malfunction!**

- ◆ Always consult with a service engineer before aborting remote service.

- 
- ◆ Select **Limited access** or **No access** and confirm with **OK** or **Apply** to continue working.



*For further information, please contact Siemens Service or your system administrator.*

### **Terminating the service session**

If you end a remote service session while the service engineer is still working, all currently active service programs will be terminated. This may cause the ARCADIS Varic to be inconsistent or inoperable.



*The service engineer is only notified that the session is going to be ended by you.*

- ◆ Check with the service engineer before you end the session.

### *Cleaning and Disinfection*

Before cleaning or disinfecting the ARCADIS Varic, the system must be disconnected from the power supply and switched off.

#### *Cleaning*

Before each examination, clean all parts which come into contact with the patient to prevent contamination of the ARCADIS Varic.



#### Caution

Cleaning agents or fluids penetrating into the equipment.

**This can cause danger or damage to the ARCADIS Varic!**

◆ Never spray the ARCADIS Varic.

- 
- ◆ Clean the parts with a damp cloth.
  - ◆ For moistening, use water or a lukewarm, diluted aqueous solution consisting of water and a household cleaning agent.
  - ◆ Do not use scouring cleaning agents or organic solvents or cleaning agents such as benzine, pure alcohol, spot remover etc. because of possible material incompatibility.

## 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, Korsolin, Cidex.

Certain substituted phenol-based or chlorine-splitting disinfectants can attack materials and are therefore not recommended. The same restrictions apply to undiluted solutions with a high alcohol content, for example, for disinfecting hands.



### Caution

The spray mist of disinfectant sprays may penetrate into the equipment.

**Sprays can cause damage to electronic components or the formation of flammable mixtures of air/vapor!**

- ◆ Disinfectant sprays should generally not be used.

- 
- ◆ 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 statutorily defined limit. We recommend that you follow the manufacturers' operating instructions for these products.*

### *Monitor trolley*

#### *Screen surfaces/TFT displays*

Monitors should be cleaned at least every two months.



#### Caution

Acids or alkaline solutions on the monitor screen.

#### **This may damage the monitor screen!**

- ◆ Monitors with anti-glare, non-reflective surfaces should only be cleaned with a soft cloth.

- 
- ◆ Clean the monitor screen with a cotton cloth dampened with water.
  - ◆ Remove stubborn stains with a mixture of 2/3 water and 1/3 alcohol.
  - ◆ Immediately dry off the monitor screen with a soft cotton cloth.
  - ◆ Wipe off contrast agent spots as soon as possible.



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# Options

## Accessories



*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). If you have any queries, please consult your local representative.*

*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.*

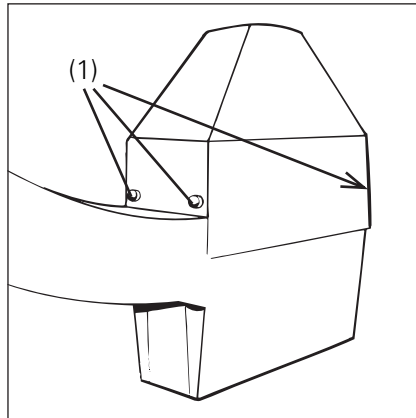
The following accessories have been approved for use with the ARCADIS Varic:

Accessories	Part Number	Manufacturer
Disposable cover C-transparent	8080462	Microtek Medical B.V
Sterile cover C fabric	3780959	Karl Dieckhoff GmbH & Co.KG
Disposable cover I.I. transparent	5139837	Raguse GmbH
Disposable cover	9717083	Moelnlycke Health Care GmbH
Set of clamps	3778359	NPW Schubert GmbH & Co.KG
Metal clamp C	8080454	Fritz Pscherer Nachf. GmbH
Grounding cable	2171767	Nicolay Services GmbH
Spacer	8611030	MED CO IDB
Wireless network connection WLAN	8082005	Siemens AG
Multi-function foot switch	10252058	Steute
I.I. laser aimer	3099988	Z-Laser Optoelektronik GmbH
Cassette holder	3780363	Arnold AG
Integrated I.I. laser	8079563	Z-laser

### *Spacer*

The distance between the source and tube assembly cover (shortest possible source-skin distance) is  $\geq 200$  mm with the standard system (acc. to IEC 601-1-3).

Country-specific regulations may require a larger source-skin distance ( $\geq 300$  mm acc. to DHHS 21CFR). This is achieved by attaching an additional spacer to the C-arm system.



(1) Knurled screws

- ◆ If this source-skin distance is too large for special examinations, the spacer can be removed by loosening the knurled screws.
  - After these examinations, the spacer must be reattached to ensure the reduction in skin dose resulting from a greater source-skin distance.

### *Grounding cable*

An optional grounding cable is available for equipotential bonding in accordance with DIN 57107/VDE 0107 for rooms of Application Group 2E (cardiac catheterization).

## Wireless network connection WLAN (option)

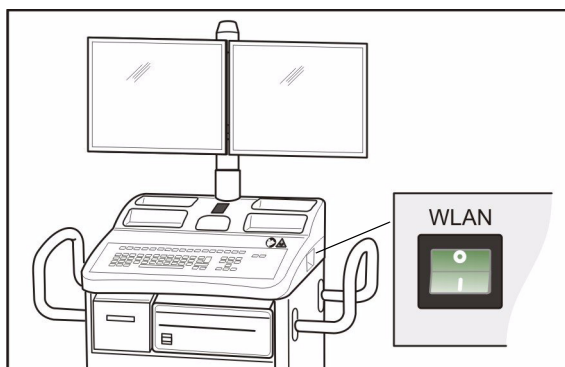
The WLAN option enables a wireless connection between the ARCADIS Varic and a (hospital) network. The dedicated WLAN unit is integrated into the monitor trolley housing and completely set up. Its ON/OFF switch is found on the side of the monitor trolley.

### Activating WLAN

- ◆ To activate WLAN, use the switch on the side of the monitor trolley.



Once the WLAN unit is switched on, it takes less than a minute for the WLAN connection to be functional.



WLAN ON/OFF switch



### Warning

The operation of WLAN may lead to disruptions of other electrical systems.

#### **This may endanger the function of life-support systems!**

- ◆ Maintain a minimum distance of 1 m between the WLAN unit and any other devices when WLAN is in operation. If this is unfeasible at times (e.g. in the operating room), then switch off the WLAN for as long as necessary.



*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.*

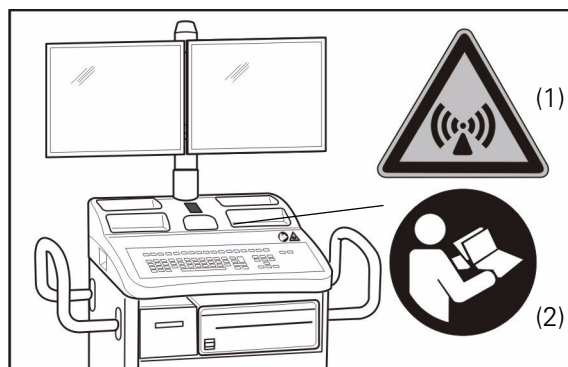


*For reasons of data security, it is recommended to encrypt the data in the WLAN according to WPA or WPA2.*



*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.*

The position of the RF beam of the activated WLAN is shown in a warning label.



(1) Warning label: non-ionizing electromagnetic field

(2) Warning: Read Operator Manual



*If WLAN is activated, this warning label must not be covered up, and 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.*

### *Operation via Ethernet cable*

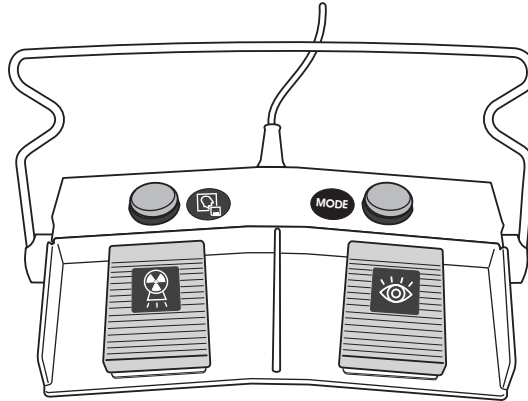
In case of operation of the ARCADIS system via Ethernet cable, the WLAN at the monitor trolley needs to be deactivated prior to switching on the system.



*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.

### *Multi-function footswitch (option)*



#### **Warning**

When the C-arm is rotated by 180° and lowered to maximum, contact between the I.I. and the footswitch could result.

#### **Unintentional release of radiation!**

- ◆ Please make sure that the footswitch is not located underneath the I.I.
- 



#### **Caution**

If the C-arm is lowered all the way and the bracket is folded up, there may be contact between the multifunctional footswitch and image intensifier or tube assembly housing.

#### **Damage to the multifunctional footswitch and image intensifier or tube assembly housing!**

- ◆ Please make sure that the footswitch is not located underneath the I.I.
-



### Selecting the operating mode

The operating mode button of the multifunctional footswitch allows you to select one of the operating modes, i.e. DR, PFC, SUB, ROADMAP, (depending on the configuration level).



- ◆ If necessary, press this button on the multifunctional footswitch several times.
  - The selected operating mode is indicated in the **Examination** task card and on the control panel of the C-arm system.
  - A confirmation sound acknowledges the successful switch of operating modes. You can then release radiation again right away.

### Releasing radiation

The right footswitch is always used to activate fluoroscopy (CFC) (standard setting).

The left footswitch is used to activate the currently selected operating mode.

*Exception:* If fluoroscopy (CFC) is selected, the left pedal is assigned the digital radiography (DR) mode.



*The functionality of the pedals can optionally be changed.*

- ◆ Keep the foot pedal pressed during radiation release.

### Storing images (during radiation)



- ◆ Press this button on the multifunctional footswitch during radiation.
  - The image currently generated and displayed is saved in the local database.

### Storing images (after radiation)



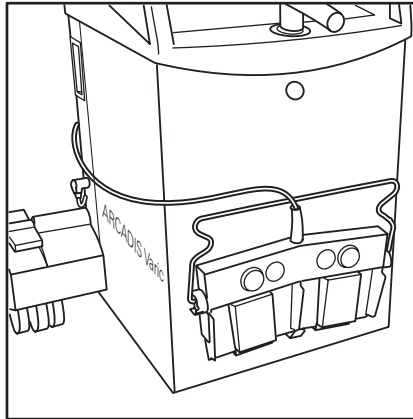
- ◆ Press this button on the multifunctional footswitch.
  - Holding the key for < 2 seconds: saves the image last recorded (LIH).
  - Holding the key for > 2 seconds: saves the scene last recorded (LSH).



*The ARCADIS Varic transfers images from monitor A to monitor B and then stores them in the local database.*

### *Stowage for transport*

Before transporting the unit, place the multi-function footswitch into its holder on the side facing away from the C-arm. The cleat to hold the rolled-up cable is on the C-arm side, as is the case with the standard footswitch.

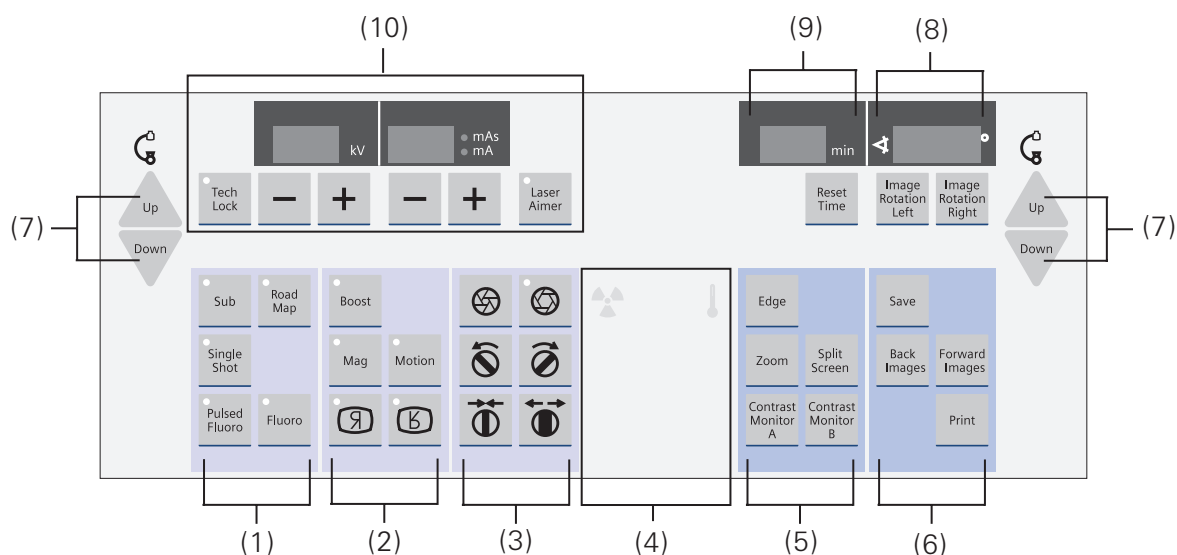


Footswitch holder

## Text-based entry keys

### Control panel, English text (option)

Most of the keys on the C-arm system control panel are labelled with text rather than symbols.



- (1) Operating mode selection
- (2) Selection of image parameters (high-contrast fluoroscopy, image quality, image display), automatic dose regulation OFF (ADR Stop)
- (3) Collimator setting
- (4) Radiation indicator, X-ray tube assembly temperature
- (5) Image postprocessing
- (6) Image selection, storing and printing
- (7) Lift/lower C-arm
- (8) Image rotation
- (9) Display exposure time, reset exposure time (confirm warning tone)
- (10) Select and display X-ray parameters, select laser light localizer, single tank (option)

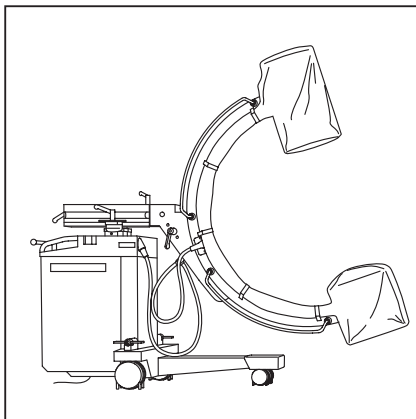
### *syngo keypad, English text (option)*

The numeric keypad on the monitor trolley for selecting *syngo* functions is labeled with the relevant text.

Bright- ness —	Bright- ness +	Contrast —	Contrast +
Back Study	Forward Study	Pos/ Neg	Send Network
Back Series	Forward Series	Note	
Back Images	Forward Images	Select Image	Copy to Film Sheet
	Patient Registr.	Patient Browser	

### *Sterile cover on the C-arm*

To protect against contamination, the C-arm including the image intensifier and the X-ray tube assembly is completely covered with a two-part sterile cover. The cover is attached with sterile clamps.



C-arm completely covered

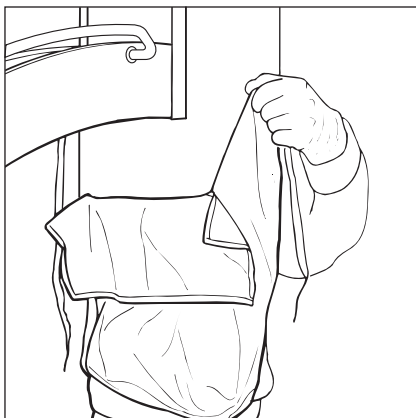


#### Caution

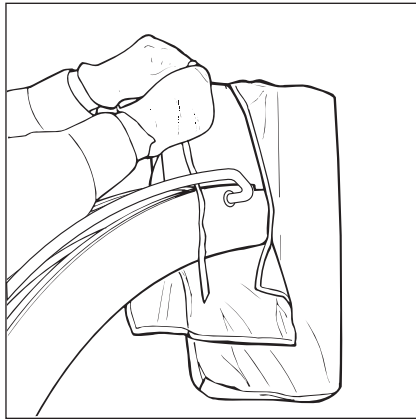
Insufficient attachment of the sterile cover.

**The patient can be injured if the cover falls down!**

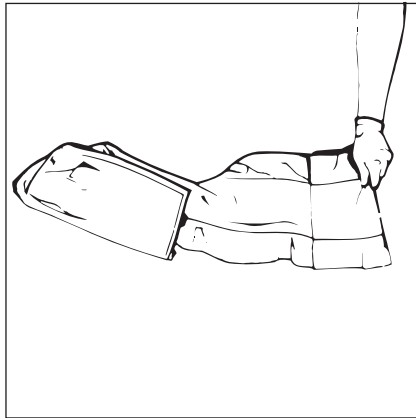
- ◆ When attaching the sterile cover with the clamps, make sure the cover is fastened properly.



- ◆ Slip the cover over the image intensifier.



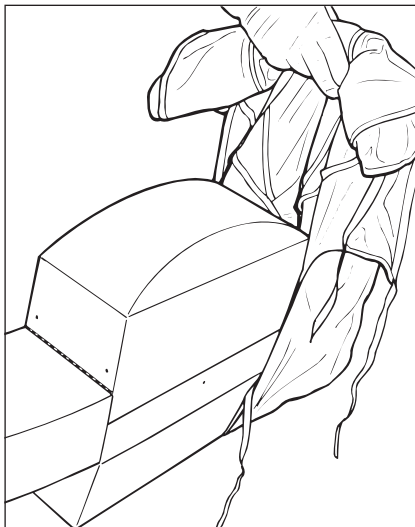
- ◆ Attach the image intensifier cover.



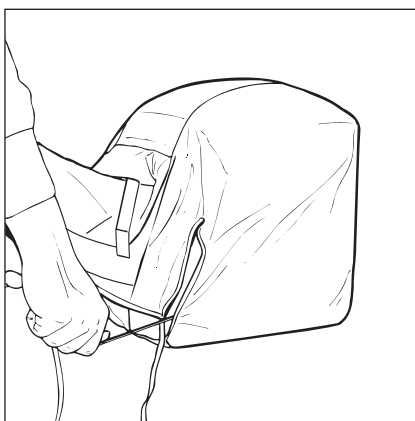
- ◆ Fold the cover for the C-arm and the X-ray tube.



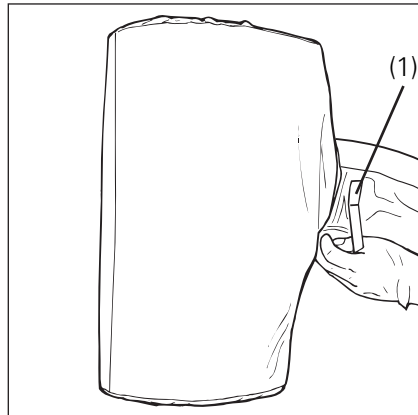
*Slipping the cover over becomes easier if you fold it first. Make sure that the outside of the cover does not come into contact with the C-arm.*



- ◆ Slip the cover over the X-ray tube and cover the C-arm.

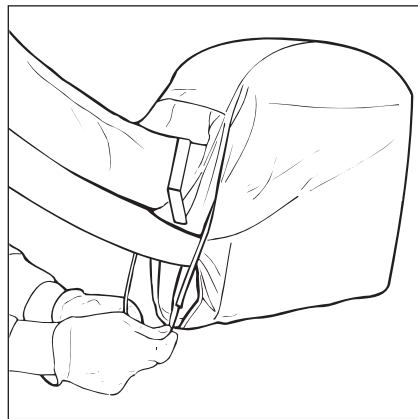


- ◆ Attach the cover close to the X-ray tube with clamps.



(1) Clamp

- ◆ Let the C-arm cover overlap the image intensifier cover and secure the C-arm cover with a clamp.



- ◆ Tie down the cover of the X-ray tube.

The C-arm is now covered completely.

### *Clamps to keep covers in place*

The clamps keep the sterilizable C-arm cover in place and can also be sterilized.



*Please make sure that the clamps are properly fastened. Otherwise there is a danger of injury.*



### *I.I. laser aimer (option)*



#### **Warning**

Laser radiation

#### **Danger of eye injury!**

- ◆ Do not view the beam using optical instruments (laser class 1M).
- 

#### **Laser specifications**

- ☐ Laser class: 1M (IEC 60825-1:1993+A1:1997+A2:2001)
- ☐ Wave length: 635 Nm
- ☐ Color: red
- ☐ Max. power: 0.8 mW (+/-10%)

### *Integrated I.I. laser aimer*

To project the target crosshairs, two Class 1M lasers are used whose exit windows are arranged offset by 90° in the holding ring for the I.I. grid:

### *Removable image intensifier laser light localizer*

The I.I. laser light localizer is attached to the image intensifier unit using a retaining strap:

- ◆ To activate the I.I. laser light localizer, press one of the two keys.
  - The I.I. laser light localizer is activated.
- ◆ To deactivate it, press one of the two keys again or wait approx. 1 min. until it switches off automatically.

### *Single-tank laser targeting device (option)*

Short-term exposure (looking into the laser beam for no longer than 0.25 s) to laser beams of Class 2 is not hazardous to 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 2 lasers must be complied with.



#### **Warning**

Laser radiation

#### **Danger of eye injury!**

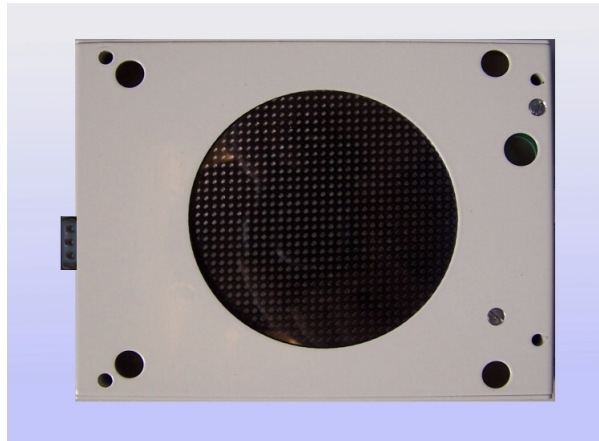
- ◆ Do not look directly into the laser beam!
- 

### *Laser specifications*

- ❑ Laser class: Class 2 acc. to IEC 825
- ❑ Laser type: Semiconductor laser (laser diode)
- ❑ Wave length: 655 nm (visible red)
- ❑ Power output: < 1 mW

### *Dose measuring chamber (DAP meter)*

If available, this option is integrated in the single tank of the ARCADIS Varic. The DAP meter determines the dose area product (DAP) and air kerma values, using an ionization chamber and an electron counter. The cumulative patient data is displayed on the monitor trolley during the examination (→ Register 5: Examination, Page 9).



Dose measuring chamber (DAP meter), integrated in the single tank

### Cassette exposure



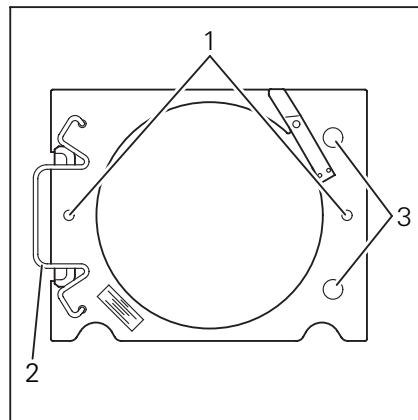
*The ARCADIS Varic does not have automatic exposure control for cassette technique.*

#### Cassette holder



*The cassette holder may only be attached in one specific position at the image intensifier. In this position the centering pins on the cassette holder (1) must sit in the recesses in the plastic ring of the image intensifier.*

*Follow the instructions given on the warning label affixed to the cassette holder!*



**Cassette size** Only 24 cm x 30 cm (10 inches x 12 inches).



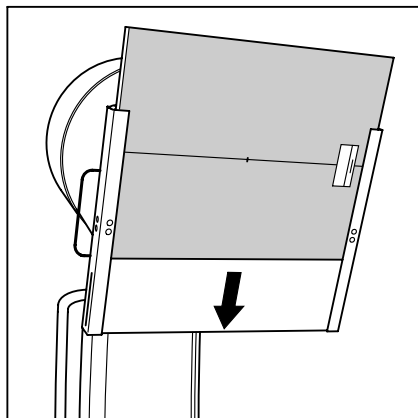
#### Caution

The cassette holder is not sufficiently shielded from leaking radiation.

#### Risk to operating personnel and patient

- ◆ Do not stand behind the cassette holder in the direction of the radiation.

### Exposure grid

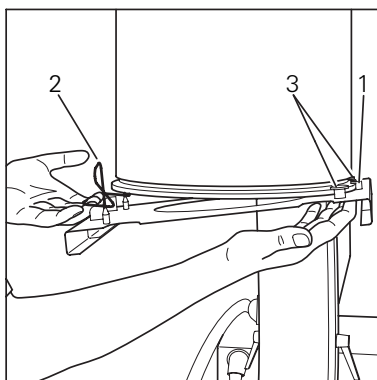


An exposure grid measuring the same as the cassette format can be inserted into the cassette holder with the cassette.

The exposure grid is delivered with the cassette holder.

- ◆ Always insert the exposure grid up to the end stop in the cassette holder.

### *Attaching the cassette holder*



#### Caution

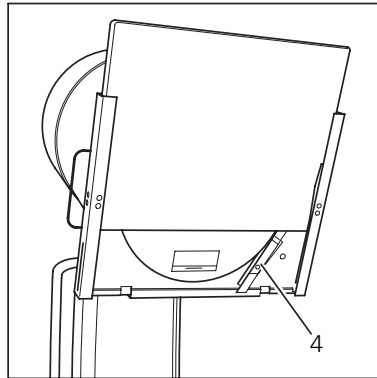
Springs or pins not correctly attached.

#### **Risk of injury if cassette holder becomes loose!**

- ◆ Make sure the springs and pins (3) are securely locked in place.
- ◆ Ensure that both centering pins sit in the recesses.

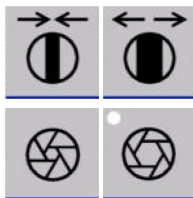
- ◆ Attach the cassette holder right (seen from the front) to the image intensifier so that the centering pins (1) sit in the recesses in the front ring of the image intensifier.
- ◆ Open the spring (2) and lift it over the front ring at the image intensifier.

### *Inserting the cassette*



- ◆ Always insert the cassette up to the end stop in the cassette holder (switch 4 is automatically activated).
  - When inserting the cassette, the switch (4) is activated. The mA indicator in the exposure data field switches to mAs. The LED for the deselected operating mode goes out.

### *Saving collimator settings*



As the cassette is inserted, both the slot diaphragm and the iris diaphragm open to maximum aperture.

The LED in the "Open iris diaphragm" key lights up.

If the diaphragm setting selected for fluoroscopy, pulsed fluoroscopy, DR or SUB is to be saved, proceed as follows *before* inserting the cassette:

- ◆ Press both keys simultaneously.
  - The position of the iris diaphragm remains the same.
- ◆ Press both keys simultaneously.
  - The position and collimation of the slot diaphragm remain the same.
- ◆ Press both keys simultaneously.
  - The position and collimation of the slot diaphragm remain the same.

An acoustic signal sounds when the system has stored the positions.

### *Deleting the diaphragm positions*

- ◆ If you wish to delete the stored diaphragm positions again, press one of the diaphragm keys and the diaphragm will open completely when the cassette is inserted.

### *Setting exposure data*

If a cassette is loaded after the system is restarted, only dashes will be displayed in the kV and mAs fields. You cannot release an exposure since this can only be done after setting the required kV and mAs values.



- ◆ Now press one of the kV or mAs +/- buttons.
  - The preference values 40 kV and 5 mAs will be displayed. You can then change these values.
- ◆ Now press one of the kV or mAs +/- buttons until the required values are set.
  - If you perform fluoroscopy in the meantime, the kV and mAs values used for the last cassette exposure will remain set when reloading the cassette.

#### **Example of kV and mAs values:**

	Display of kV values
	Display of mAs values

### *Releasing the exposure*

- ◆ Press the release button on the hand switch to release the direct exposure.
- The radiation indicators light up during the exposure. The radiation indicators light up a little longer for very short exposure times so that radiation is clearly indicated.
- During the exposure or after ending the exposure, an acoustic warning signal sounds (can be configured).

### *Removing the cassette*

- ◆ Take the cassette out of the cassette holder.
  - After removing the cassette, the exposure data remains until another operating mode is selected.

### *Removing the cassette holder*

- ◆ Hold the spring.
- ◆ Gently push the cassette holder downward, lifting it over the front ring to remove it.

### *Switching the operating mode*



*You must remove the cassette before changing over to another operating mode.*

- ◆ Select the desired operating mode.

Or

- ◆ Release fluoroscopy without selecting an operating mode.
  - If no operating mode is selected, the system automatically reverts to the operating mode selected prior to the cassette exposure.