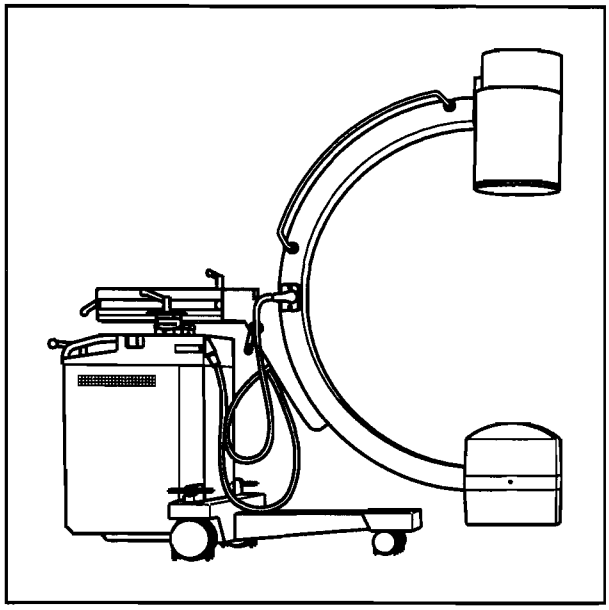
SIEMENS



Operating Manual

SIREMOBIL Compact L

CE
0123

Order No.: SPR2-130.620.03.01.02
Printed in the Federal Republic of Germany
AG 03/01

Siemens AG
Medical Solutions
Henkestraße 127
D-91052 Erlangen
Germany

Registered offices: Berlin and Munich
Siemens AG
Wittelsbacher Platz 2
D-80333 München
Germany

Please observe

Safety operating instructions

Order No.: SPR2-130.621.19

These must be studied exactly before system startup.

Important information from the manufacturer

CE
0123

This product is provided with a CE marking in accordance with the regulations stated in Appendix II of the Directive 93/42/EC of June 14th, 1993 concerning medical devices.

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

Unauthorized changes to this product invalidate this declaration.

The original version of this manual was written in the German language.

Operating Manual
Overall Table of Contents

Register: Lists

Register: Safety

Register: Basic System

Register: Memoskop

Register: Curves and Graphs

Register: Accessories

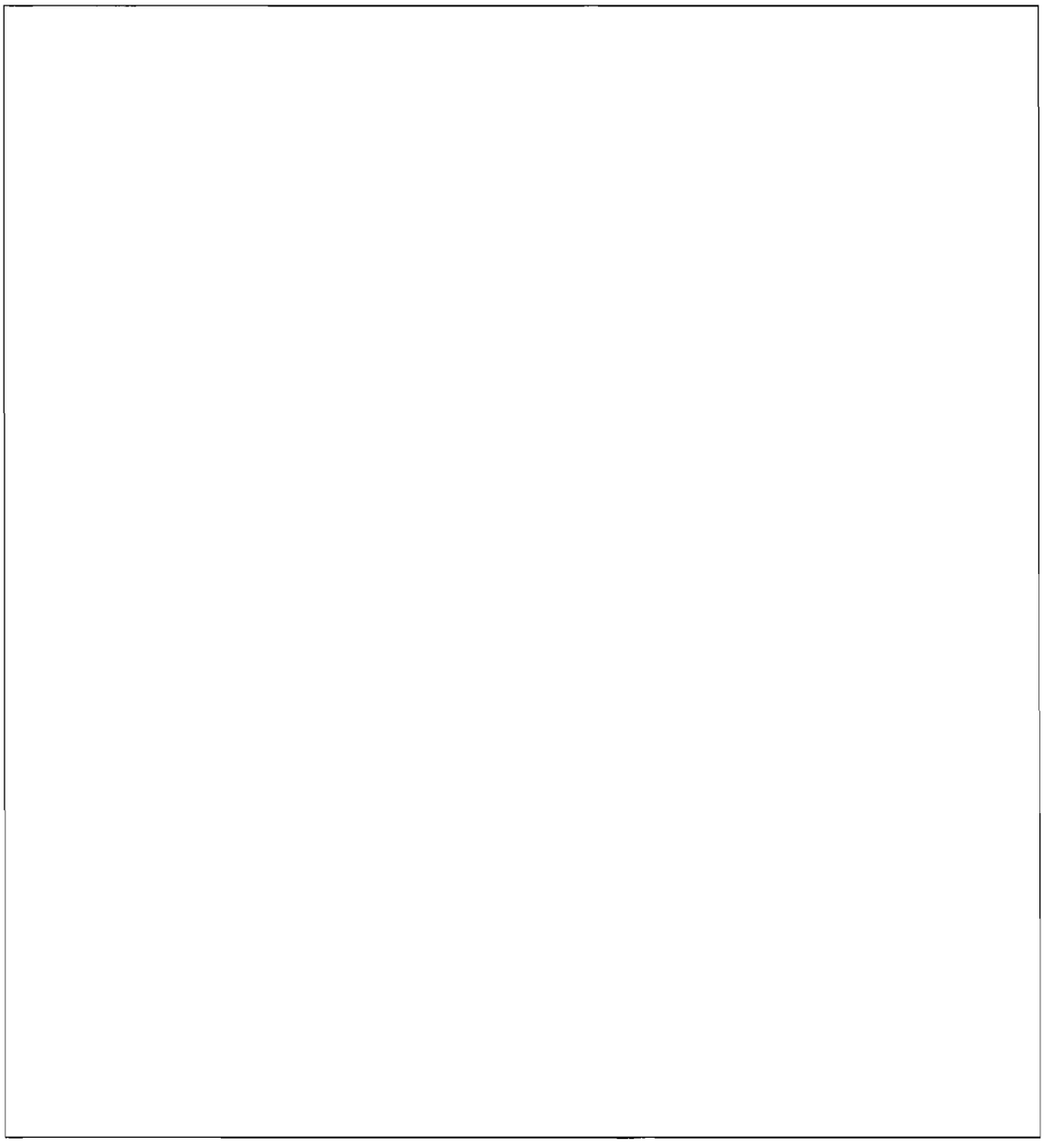
Register: Short Operating Instructions

SIEMENS

Operating Instructions
SIREMOBIL Compact L

Safety

SP



SPR2-130.621.19.01.02

Please observe

Safety operating instructions

These must be studied exactly before system startup.

The original version of this manual was written in the German language.

SP

Siemens AG, Medical Solutions
Henkestraße 127, D-91052 Erlangen, Germany
Registered offices: Berlin and Munich
Siemens AG, Wittelsbacher Platz 2, D-80333 München, Germany

Order No.: SPR2-130.621.19.01.02
Printed in the Federal Republic of Germany
AG 03/01

Operating Instructions
Safety

General Information

Using the operating instructions

Information on the text format

These operating instructions include text styles and graphics that make it easier to understand the text.

The following types of text are used:

Instructional text

guides you in the proper use of your system.

◆ This text is preceded by a diamond.

Lists

❑ This text is preceded by a square.

Explanatory text

reinforces an instructional text or a list with additional points.

– This text is preceded by a dash.

References

refer you to further explanations in another section of your operating instructions or in a separate document.

⇨ This text is preceded by an arrow.

Notice

is used two different ways:

❑ refers to safety information which does not involve immediate danger

❑ contains a summary of the most important information in a text

This text is highlighted in gray.

Information

is text which gives additional, useful explanations.

This text is preceded by the information pictogram and is italicized.

Identification of safety warnings

Throughout the operating instructions, safety-related information is offset by a black frame and potential hazards are identified as follows:

Warning

Warnings are information provided with special emphasis when there is the potential for personal injury to operator or patient.

Caution

Cautions are information provided with special emphasis when there is the potential for damage to the equipment.

Supplements to the operating instructions

- Please note the supplement to the operating instructions made necessary by further technical developments.

⇨ These may be found in the Supplement **Register.**

Values

All values are typical values unless specific tolerances are indicated.

Pictograms

This pictogram is used to indicate equipotential bonding.

Proper use of the product

Proper use of this product presupposes that the user has the required training and knowledge of the operating instructions.
The operating instructions must be reviewed in detail prior to starting up the system.

The installer and operator are responsible for complying with all local regulations regarding the installation and operation of the system.

The user must be trained in the proper operation of the product. Instruction is to be repeated at predetermined intervals.
We recommend simulating emergency conditions during training so that appropriate corrective measures can be taught.

Laws and regulations

CE Mark

This product is identified by the CE mark in compliance with regulation 93/42/EWG of the EEC dated June 14, 1993 pertaining to medical devices.

National regulations

In all countries, the legally established regulations are to be observed.
Values other than those indicated in these operating instructions may be programmed where required by local country-specific regulations.

Legally required tests

All legally required tests must be performed at the prescribed time intervals:

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

Software

The operating and applications software used in this system is copyright protected.
Only software released by Siemens for this system may be used.

Warning

Use of unreleased software and/or modifications to software can lead to system malfunctions which, in turn, may result in injury to the patient and/or damage to the equipment.

Data protection

Person-specific data is subject to data protection.

- Ensure compliance with all applicable laws and regulations.

Disposal

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

- To avoid environmental damage and/or personal injury, we recommend that you consult Siemens customer service prior to removing the product from service.
- Batteries must be disposed of in an environmentally safe manner.

Operating safety and safety precautions

Installation and start-up

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

As manufacturer, SIEMENS will not be held responsible for the safety features, reliability and performance of the system if:

- ❑ the system is used in a manner other than that specified in the operating instructions.
- ❑ installation, upgrades, resetting or repairs are performed by personnel not authorized by Siemens.
- ❑ components affecting product safety are not replaced with original Siemens spare parts.
- ❑ electrical wiring in the rooms containing the system does not met the specifications of DIN VDE 0107 or other local regulations.

If desired, we will provide the technical documentation regarding the system. However, this does not imply an authorization for repairs to be performed by non-Siemens technical personnel.

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

When any work is performed on the system, we would recommend that you obtain a certificate indicating the nature and scope of the work performed. The certificate should specify the changes made to nominal data or the type of work performed, including date, company name and signature.

Maintenance

In the interest of safety for patients, operators and third parties, it is recommended that the operating safety and function of the equipment be maintained by inspections every 12 months. Tests should be performed at shorter intervals if the system is subject to above-average use.

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

Ensure compliance with federal or local regulations requiring more frequent inspections and maintenance.

System operation with line voltage supply

In case of danger to the patient, operator or system, disconnect the system from the main power source. The entire system will be shut down and taken off-line, thereby:

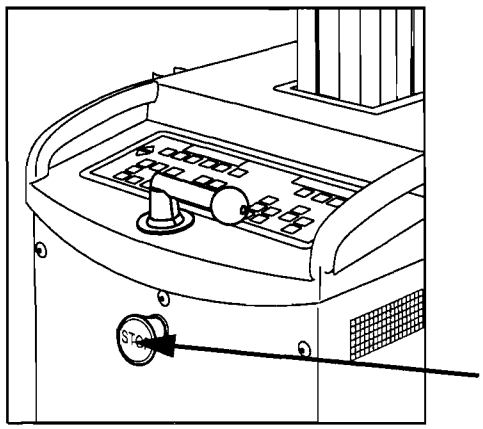
- ❑ shutting off radiation
- ❑ interrupting the current system program
- ❑ interrupting and deleting current operating sequences
- ❑ deleting all image information not stored on a hard disk.

Only after the cause of the hazardous situation has been clearly identified and remedied may the system be reconnected to the line voltage. In all other cases, e.g. for malfunctions, notify Siemens customer service immediately.

EMERGENCY STOP

Activation:

- ◆ Please press the red EMERGENCY STOP button (arrow) on the electronics unit of the SIREMOBIL Compact L basic unit immediately if a dangerous situation results from motorized movements.
  - The motorized vertical movement will then be disabled immediately.
  - All other system functions are not affected by this.



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

- ◆ You can unlock the button by turning it gently clockwise.

Switch over to emergency power

If there is a network interruption longer than 8 msec, the SIREMOBIL can switch off. In this case, the system must be restarted after being switched to emergency power.

Equipotential bonding

Systems which require equipotential bonding may only be operated in medical facilities where the supplemental equipotential bonding has been installed and tested according to the specifications in DIN 57107/VDE 0107/6.81 section 5 or the relevant local and federal regulations.

Cardiac and cranial examinations

- If the system is used alone or with other units for cardiac or cranial examinations, an additional conductive connection between the unit and a point of potential equalization, e.g. the tabletop, must be made.
- Only then should the patient be connected to the device.

Use in connection with high frequency surgical equipment

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

Points of injury

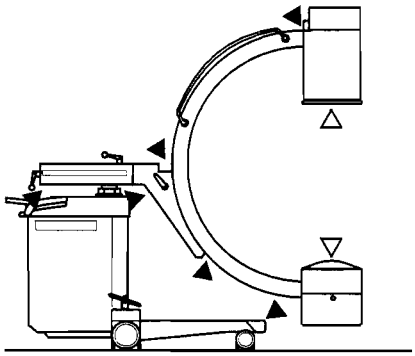


Fig. 1

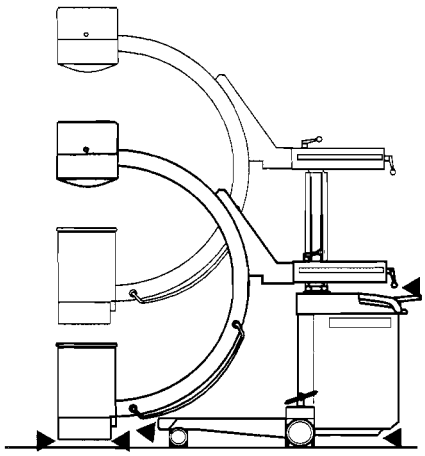


Fig. 2

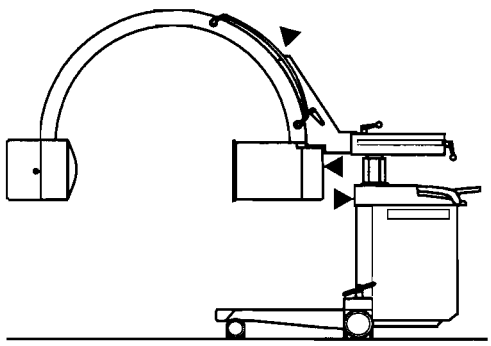


Fig. 3

▼ Points of injury for operators

Warning

When the C-arm is positioned as in Fig. 2, please watch your feet whenever the C-arm is being lowered. This is important since there is no clearance between the I.I. and the floor with the C-arm lowered fully (see Fig. 2).

For the same reason, please also make sure that the footswitch is not located underneath the I.I. Otherwise maximum lowering of the C-arm could result in contact between the I.I. and the footswitch, causing accidental release of radiation.

▽ Points of injury for patients

The high maneuverability of the C-arm may cause the image intensifier or single-tank to collide with the patient or the patient table, when the SIREMOBIL Compact L is not operated as specified.
For unfavorable positioning of the unit, collision can also take place between the image intensifier/single-tank and the unit base. This can cause damage to the components affected.
The system should be moved only manually, by the handles provided for this purpose. Whenever exceptions must be made, note the points of potential injury between the movable system parts and their guide openings. The system areas marked in the drawings indicate points of crushing or impact hazards for the patient or the operator.

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

Collisions

Please take special care when moving or transporting the unit that the system parts do not strike against an obstruction. This could also result in an impairment of the image quality under certain circumstances.

Malfunctions

If the system malfunctions, call SIEMENS customer service.

Malfunctions or error messages

❑ All system functions are automatically checked each time the system is switched on.
During routine operation, the system is continuously monitored.

When an error occurs, the system is blocked and the error is displayed on the system control panel.

❑ Temporary error messages e.g. No. 5090, can be removed by pressing any key on the basic system (with the exception of the lifting column and the on/off switch).
Error messages 5090, 7309 and 7409 are temporary error messages. They serve to warn the operator that further use of the system may lead to unnecessary radiation exposure for the operator and the patient.

If errors occur repeatedly, switch off the system and notify customer service. Have the following information ready:
- Error number
- Operating mode selected
- Was radiation activated when the error occurred?
- Is the error related to an operating process?

❑ Error messages such as No. 5015 or 5016 cannot be removed. When these messages are displayed, radiation can no longer be released. Notify customer service immediately.

Fire protection

- In case of fire, switch the system OFF and disconnect the system from the power source.
- Then immediately activate the on-site emergency shutdown, mains or disconnect switch.

Warning

Poisonous gases or fumes can result from a burning or smoldering fire. We recommend that all official safety personnel be instructed in handling fire emergencies in advance.

- Please contact Siemens customer service prior to restarting the system, if the system requires refurbishing due to fire damage.

Explosion protection

The C-arm including the image intensifier and X-ray tube assembly have been designed according to the specifications for systems with the Anesthetics test (AP) as stated in DIN IEC 601 part 1/VDE 0750 part 1 section 6, and are identified by the symbol (on a green triangle) to the left.

Warning

If the image intensifier housing or single tank generator are damaged, the system may no longer be operated.

AP systems may be installed and started-up only by the manufacturer or authorized third parties.

Overload protection

Prolonged continuous radiation at maximum tube load is permissible during fluoroscopy. However, this can cause the X-ray tube assembly to heat up.

For this reason, the SIREPHOS X-ray tube assembly has a thermal monitor.

If the temperature rises to ≥ 50°C
- the temperature indicator glows on the system operating panel.
- a selected high contrast characteristic curve is reset when fluoroscopy is completed.
- the characteristic curve will be changed from
  S2 to S1
  HC2 to HC1
  IOD to HC1.
- the high contrast characteristic curve can be reselected.

If the temperature rises to ≥ 60°C
- the system will switch to another characteristic curve during radiation release.
  The characteristic curve will be switched from
  S2 toS1
  HC2 toHC1
  IOD to HC1.
- Selection of characteristic curves S2, HC2 and IOD will no longer be possible.

If the temperature rises to ≥ 70°C
- the temperature display on the system operating console will begin flashing.
- Radiation will be switched off and will no longer be possible.

If the temperature drops back below 50°C
- the previously selected curve will automatically be reselected.

Warning

To avoid burns, the tube assembly housing must not come in contact with the patient's skin at a temperature of ≥ 50°C.

Correct image orientation

Correct image orientation on the monitor and/or film is the responsibility of the operator.

Correct orientation of image and patient data

Correct orientation of image and patient data when saving images is the responsibility of the operator.

Make sure to press the "NEXT-PAT" key and to enter the new patient name prior to beginning work on the next patient.

Electromagnetic compatibility

This medical device complies with the recommended standard for electromagnetic compatibility (EMC).

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

Protecting the system from fluids

Do not allow fluids to enter the system either during normal operation or during cleaning and disinfection as this may damage the system or cause a system malfunction.

Checks and inspections

Daily checks

Prior to the examination

The user must check that all safety-related devices are functional and that the system is ready to operate.

- Check the function of the foot brakes and the system steering.
- Check the counter-balance after releasing the brake.
- Visually inspect all indicators and signal lamps.
- Visually inspect the I.I. housing and the housing of the single tank generator.

For cardiac or cranial examinations

- You have to establish an additional conductive connection between the system and a point of potential equalization, e.g. the patient table, prior to the examination.

During the examination

- Check the patient supports on the patient table.
- When moving the system, remove any obstacles on the floor that may block the wheels.

The radiation ON indicator on the system control panel and the signal lamps on the monitor trolley must glow as long as radiation is activated.

Warning

Switch the system "OFF" immediately if a live image appears on the monitor or the radiation indicator glows although the radiation release switch is not activated.
Notify Siemens customer service immediately.

Monthly checks

◆ Run a check of the automatic dose rate control.

This simple procedure will allow you to check the automatic dose rate control function without an object in the beam path.

◆ Open the iris and slot diaphragms to maximum aperture.

◆ Press the dose rate control "Stop" function

◆ Select 110 kV with the +/- keys

◆ Release radiation
– The monitor image is overexposed.

◆ Release the dose rate control "Stop" function

◆ Release radiation
– The monitor image should not be overexposed.

A kV value of ≤45 kV must be displayed.

Checking the EMERGENCY STOP function for motor-driven system movements:

◆ Switch the system on

◆ Move the lifting column

◆ Press the EMERGENCY STOP button
– Lifting column movement is not possible

◆ Unlock the EMERGENCY STOP button again as described in the chapter "EMERGENCY STOP".

Radiation protection

Important points to remember

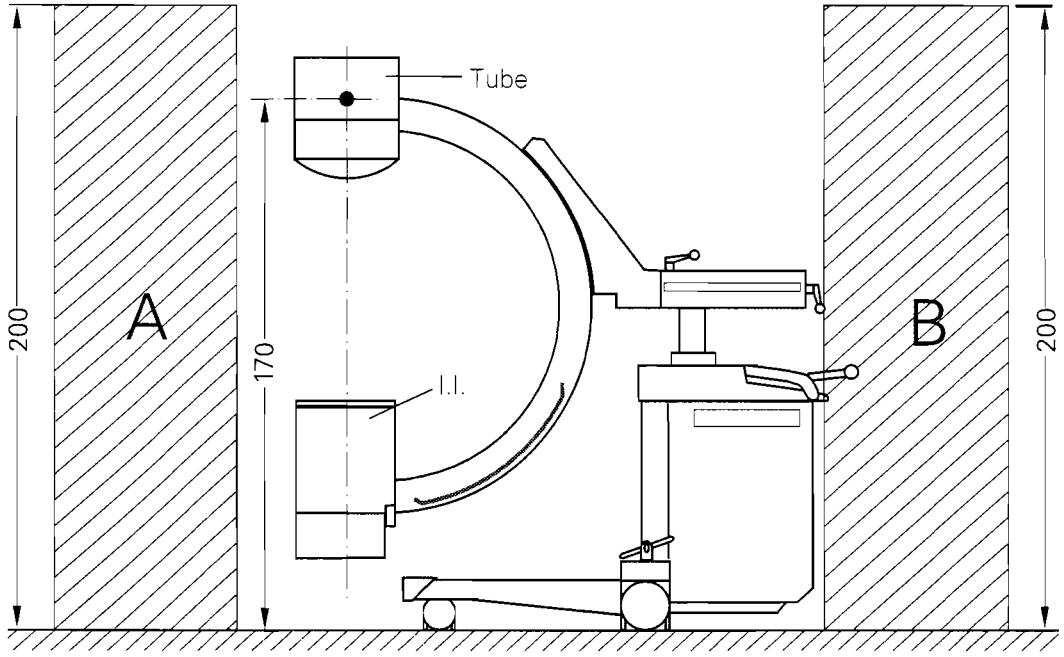
Automatic dose rate control contributes considerably to the reduction of radiation exposure for the patient and the operator.

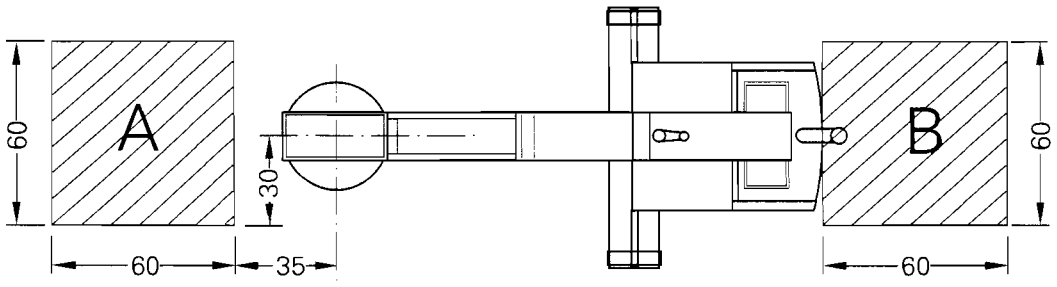
However, please adhere to the following recommendations to keep the absorbed dose as low as possible for the patient:

- ❑ Collimate the exposure field as small as possible (use the slot and iris diaphragms)
- ❑ Keep the fluoroscopic time as short as possible
- ❑ Protect the patient using gonadal shields or lead-lined rubber covers when using radiation for examinations near the reproductive organs
- ❑ Wear protective clothing when working in the examination area
- ❑ Use a radiation monitoring badge or a pen dosimeter
- ❑ Maintain the maximum possible distance from the source of radiation
- ❑ Maintain the maximum possible focus - skin distance
- ❑ Be aware that certain materials can lead to increased dose exposure (e.g. parts of an operating room table) when located in the beam path

Location and size of the critical examination region

(according to DIN EN 60601-1-3





Vertical beam
Focus 170 cm above floor

Important examination region
Dimensions in cm

Maximum scatter radiation in the critical examination region

	Height above floor in cm	**A**
17 cm / 7" I.I.	120	< 700 µGy/h
23 cm / 9" I.I.	120	< 1.7 mGy/h

	Height above floor in cm	**B**
17 cm / 7" I.I.	160 to 190	< 30 µGy/h
23 cm / 9" I.I.	140 to 200	< 70 µGy/h

The values are valid for fluoroscopy mode with automatic dose regulation, HC-2 characteristic curve and 25x25x15 [cm] water phantom, directly at the I.I.

Interrupting radiation for all operating modes

The hand and foot switches are designed as push button switches.
Radiation is interrupted after the last image is stored when releasing either operating element.

Safety information regarding accessories

Combinations with other systems

In the interests of safety, only the products / components expressly released by SIEMENS AG, Medical Engineering Group, may be used with this system.

Components that are brought into the beam path (e.g. operating table) will attenuate radiation and degrade image quality.

Original accessories

To ensure product safety, use only original Siemens accessories or accessories approved by Siemens.
The operator is responsible for any damages caused when accessories not approved by Siemens are used.

Cleaning and disinfection

Warning

Switch OFF the system and disconnect the line voltage plug prior to cleaning.

Caution

Never spray the system with cleaning solutions.
Do not allow fluids or cleaning solutions to seep into the system since this may cause damage to the equipment.

System parts

All parts coming in contact with patients must be cleaned prior to each use.

- Clean the parts with a damp cloth.
- For cleaning, use water or a lukewarm solution of water and a commercially available cleaner.
- Do not use abrasive cleaners or organic solvents or cleansers containing benzine, alcohol, spot removers, etc., due to possible material incompatibility.

Monitor screen

Caution

Do not use acids or alkaline solutions to clean the screen since this may damage the monitor screen. Monitors with anti-glare, non-reflective surfaces should only be cleaned with a soft cloth. Monitors should be cleaned at least every other month.

- 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.

Keyboard

- Wipe off the keyboard with a clean, damp cloth only.
- For cleaning, use a solution of 2/3 water and 1/3 alcohol.
  Do not pour the solution onto the keyboard.

Disinfection

Warning

Switch OFF the system and disconnect the line voltage plug prior to beginning disinfection.

Warning

As is commonly known, certain ingredients in disinfectants may be hazardous to your health. When using any disinfectant, ensure that the concentration of vapors does not exceed the legally established limits. Follow the manufacturer's instructions for the use of the product.

Caution

Disinfectant sprays should generally not be used; the spray can seep into the system and safety features can no longer be guaranteed. Sprays could cause damage to electrical parts or create a flammable air / vapor mixture.

Caution

Phenol-based disinfectants and chlorine-releasing preparations can weaken materials and are generally not recommended. The same restrictions apply to undiluted solutions with a high alcohol content, e.g. for disinfecting hands.

To disinfect surfaces, we recommend commercial liquid solutions of aldehyde-based or ampholytic surfactant-based disinfectant,
e. g. Tensodur 103, Korsolin, Cidex.

⇨ Please consult the product operating instructions for any special information on disinfection.

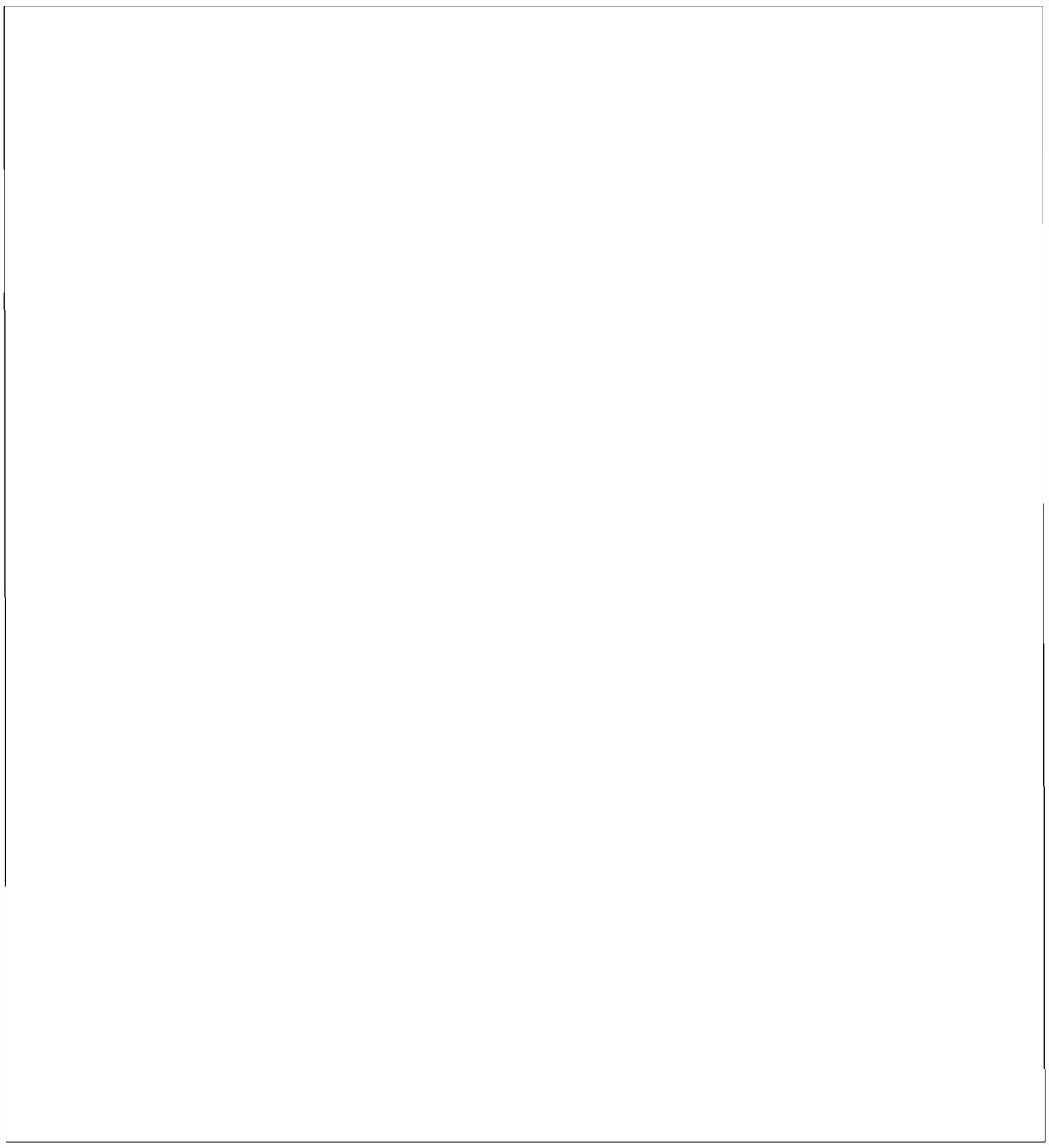
For notes

SIEMENS

Operating Instructions
SIREMOBIL Compact L

Basic System

SP



SPR2-130.621.20.01.02

Please observe

Safety operating instructions

Order No.: SPR2-130.621.19

These must be studied exactly before system startup.

The original version of this manual was written in the German language.

SP

Siemens AG, Medical Solutions
Henkestraße 127, D-91052 Erlangen, Germany
Registered offices: Berlin and Munich
Siemens AG, Wittelsbacher Platz 2, D-80333 München, Germany

Order No.: SPR2-130.621.20.01.02
Printed in the Federal Republic of Germany
AG 03/01

Operating Instructions
Basic System

For notes

System overview

Application and product description

The SIREMOBIL Compact L is a mobile C-arm image intensifier system designed for use in surgery, trauma centers, orthopedic surgery, endoscopy and intensive care.
Digital image processing and storage allows image post processing in all operating modes.

Operating modes

The SIREMOBIL Compact L has 5 customizable user programs available in each of its operating modes: Fluoroscopy, Pulsed Fluroscopy, Digital Radiography and Subtraction (optional).

Fluoroscopy

There are several characteristic curves available to determine exposure parameters for fluoroscopy. Specific curves can be selected for different applications, i.e., one for normal fluoroscopy and one for high contrast fluoroscopy (factory setting).

Pulsed Fluoroscopy

This operating mode allows a reduction in radiation dose of up to 70% for the patient and the operator.

Dose reduction depends upon the noise reduction factor you have set. According to the level of noise reduction, many different fluoroscopic images can be integrated.

The noise reduction factor and the reduction selected will change the radiation interval ratio and with it, the frame rate.

Digital Radiography

Digital radiography (DR) provides an instant electronic image of the anatomy on the monitor.

Subtraction
The Memoskop C-SUB subtraction memory option gives you additional performance features such as digital subtraction angiography (DSA) and roadmapping.

These operating instructions describe the various basic configurations.

System configuration

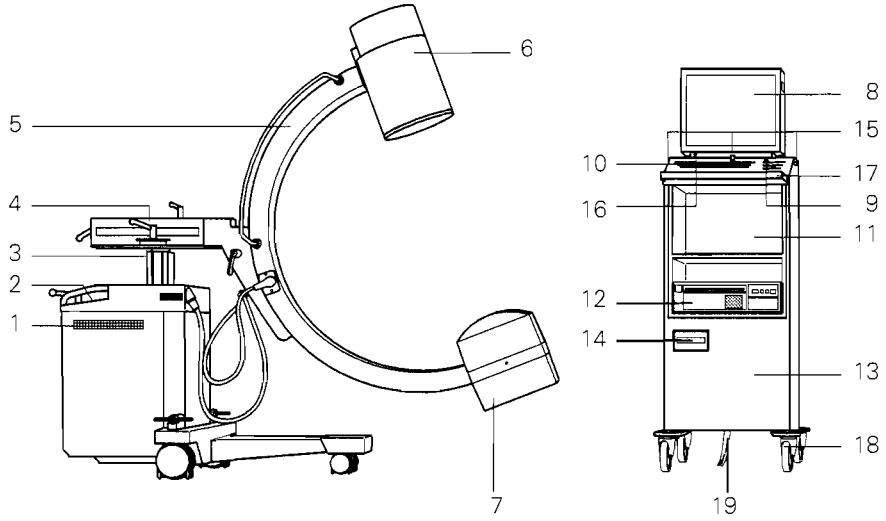
Basic version

- ❑ 17 cm or 23 cm image intensifier
- ❑ 3-image memory, 100-image memory, 700-image memory or subtraction memory for 900 images (MOD is optional)
- ❑ 1 or 2 SIMOMED or standard class monitors
- ❑ Single-focus tube with 1.4 kW generator

Options

- ❑ DICOM Bridge
- ❑ MOD (for 700 images memory and SUB memory with 900 images)
- ❑ MULTISPOT 2000-2 or 2000-1/4 multiformat camera
- ❑ Video printer
- ❑ Video recorder
- ❑ Laser light localizers with sterile cover (can be selected for I.I. and/or single tank)
- ❑ Dose measurement chamber
- ❑ Cassette holder
- ❑ Sterile covers for the image intensifier, X-ray tube assembly and C-arm

System overview of a SIREMOBIL Compact L single-monitor system



(1) SIREMOBIL electronics cabinet

(2) Control panel

(3) Lifting column

(4) Horizontal support arm

(5) C-arm

(6) Image intensifier with integrated TV camera

(7) Single tank with X-ray tube unit and integrated collimator

(8) Monitor

(9) System ON/OFF switch

(10) Data entry keyboard (optional)

(11) Compartment for multiformat camera (optional)

(12) Compartment for printer or video recorder (optional)

(13) Monitor trolley

(14) MOD drive

(15) Radiation indicators

(16) Ambient light sensor

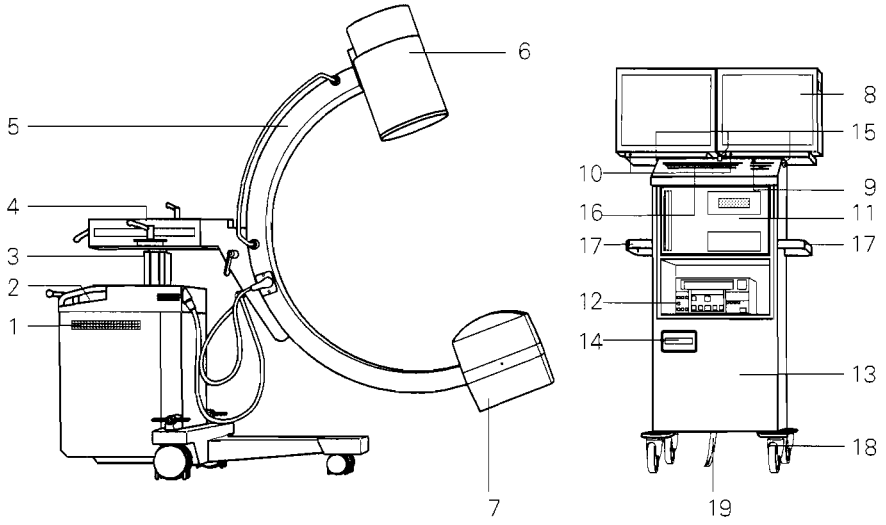
(17) Front handle

(18) Castors

(19) Grounding strap

(20) Cable holder (not depicted - on back of monitor trolley)

System overview of a SIREMOBIL Compact L dual-monitor system



(1) SIREMOBIL electronics cabinet

(2) Control panel

(3) Lifting column

(4) Horizontal support arm

(5) C-arm

(6) Image intensifier with integrated TV camera

(7) Single tank with X-ray tube unit and integrated collimator

(8) Monitor A (left); Monitor B (right)

(9) System ON/OFF switch

(10) Data entry keyboard (optional)

(11) Compartment for multiformat camera (optional)

(12) Compartment for printer or video recorder (optional)

(13) Monitor trolley

(14) MOD drive

(15) Radiation indicators

(16) Ambient light sensor

(17) Handles

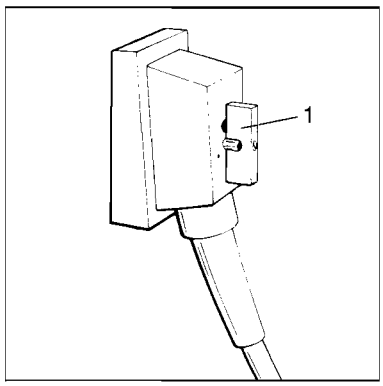
(18) Castors

(19) Grounding strap

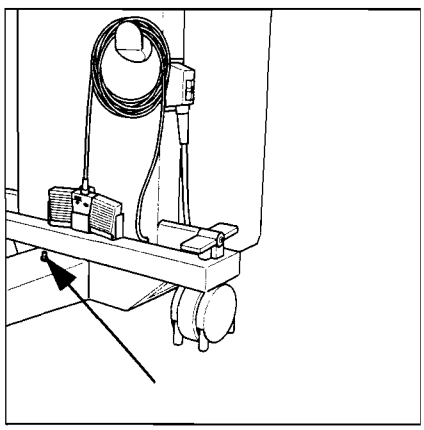
(20) Cable holder (not depicted - on back of monitor trolley)

Start-up

System connection



- Connect the monitor trolley to the basic system.
- Plug the center connector of the cable for connecting the monitor trolley to the basic system in the socket on the left side of the basic system.
- First turn lever (1) all the way counterclockwise.
- Then plug in the connector and turn the lever approx. 1 1/2 turns clockwise until it audibly locks into place and can no longer be turned any further.



- Establish the equipotential bonding connection (if applicable)
- When performing cardiac or cranial examinations, you have to route an additional grounding cable according to DIN 57107/VDE107 in rooms of Application Group 2.
- Clamp the grounding cable to the center suspension arm of the basic system (arrow) and to a point of equipotential bonding (e.g. the patient table).
- Establish the line voltage connection by plugging the power plug into the appropriate socket.
  – The line voltage cable is on the monitor trolley.

Switching the system on

◆ Press the "ON" switch at the monitor trolley
– The entire system is switched on.

❑ The system automatically runs a self-test when it is switched on.
– If an error occurs, an error message will be displayed on the control panel.

❑ After approximately 40 seconds, the system is ready for operation and the following functions have been set:
– Fluoroscopy mode with user program 1 or cassette mode, if a cassette is inserted.
– Iris diaphragm is in full-format or cassette position.
– Slot diaphragm is in full-format.
– TV camera is in starting position (rotation).
– Stand alone mode for monitor trolley (only with Memoskop C and C-SUB)

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

Switching the system off

◆ Press the "OFF" switch on the monitor trolley.

or

◆ Press the "OFF" switch on the system control panel.

After a delay of approx. 10 seconds, the system can be switched back on.

Displays on the monitor

❑ Various data can be displayed on the monitor depending on the memory version or configuration.
For example:

1. Patient name (Last name, first name, middle name abbr.)
2. Patient-ID and birth date
3. Hospital name
4. Current date/time
5. Time of stored image
6. Contrast level
7. Program name
8. Operating mode of the image displayed (LIH, DR, PFL, SUB, ROADMAP)
9. Number of stored image / scene
10. Monitor selection A or B (for dual-monitor configuration)
11. Name of the subtraction scene can be entered above the patient name
12. Cumulative area dose product
13. Company name
14. Hardcopy documentation active
15. Status line (current information, e.g. injection, send active)

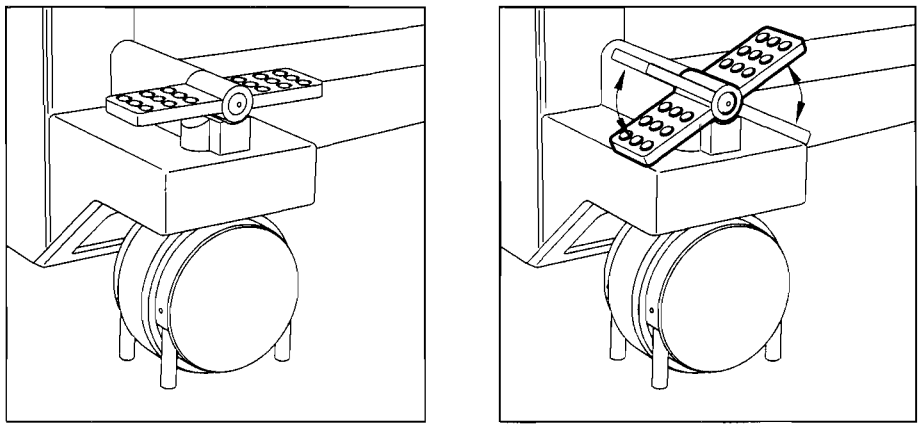
System movements

The SIREMOBIL Compact L basic system is equipped with 3 wheels for easy steering in any direction.

The SIREMOBIL Compact L basic system can be locked in place with the foot brake (pedal).

When in operation, the system must be level within ±5°.

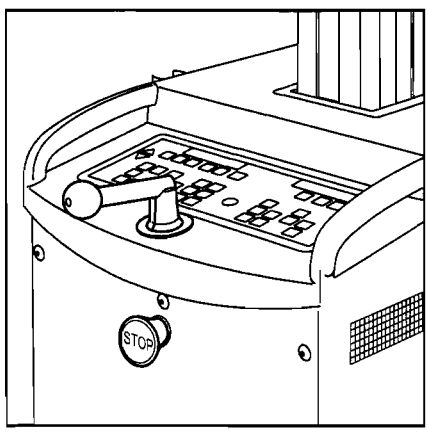
Foot brake



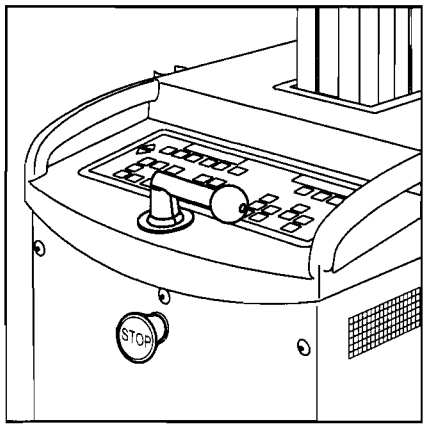
left figure: foot brake released; right figure: foot brake locked, both sides

◆ Release or lock the foot brake with the pedal (both sides).

Moving the SIREMOBIL Compact L basic system



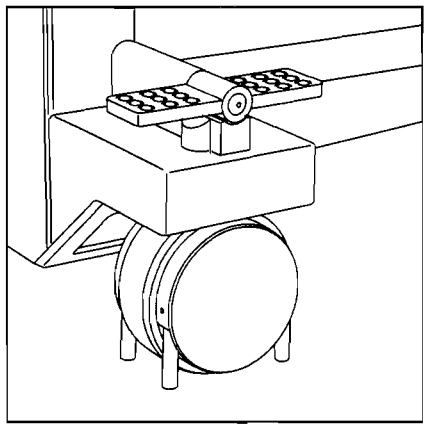
❑ The steering lever can be locked into three different positions: for movement straight ahead, or to the right or left.
– Above: steering lever shown in the position for forward travel.



❑ 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 unit will always move parallel to the lever position.

Cable deflectors



❑ To ensure easy maneuverability, cables lying on the floor are pushed aside by the cable deflectors at the wheels of the electronics cabinet, so that system movement is not blocked.

Moving the C-arm system

Use the handle to move the C-arm system.

Release the brake:
- The unit can be moved.

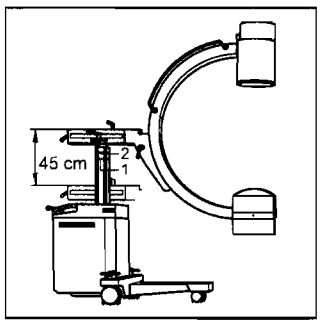
Apply the brake:
- The unit cannot be moved.

Warning

Make sure to apply the brakes after moving the C-arm system.

Raising and lowering the C-arm

(motorized movement without the brakes)



- Press the Down button to move the C-arm downwards.
  - The lifting column then moves to position 1 (see above) and automatically stops there.
  - A stop signal sounds simultaneously (3-fold beep).
- To lower the lifting column further, press the Down button again.
  - The lifting column can then be moved down 5 cm further to its bottom point (position 2; see above).
  - In this area, a signal (3-fold beep) is sounded for reasons of safety each time the Down button is pressed.

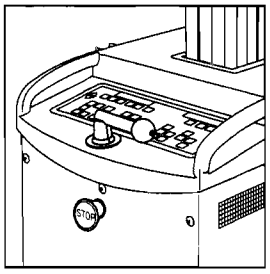
- Press the Up button to move the C-arm upwards.
  - No signal will be sounded in this case.
- Press both buttons simultaneously; the lifting motor stops.

No movement of the lifting column is possible during radiation in the cassette mode.

Warning

Please note that improper use of the lifting column may cause crushing hazards.

⇨ See chapter "Safety", Points of injury.



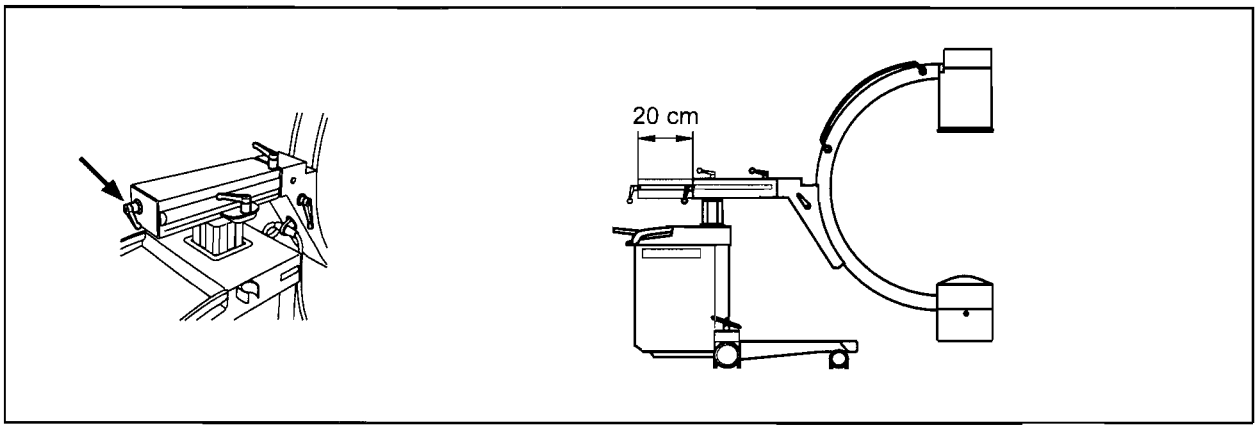
Warning

- Please press the EMERGENCY STOP button on the electronics unit of the SIREMOBIL Compact L immediately as soon as a dangerous situation results from motorized movements.
  – This disables all motorized vertical movement.

  Unlock the rotary knob only after the danger has clearly been eliminated.
- You can unlock the rotary knob by turning it gently clockwise.

If the lifting column cannot be moved at any time, please check if the EMERGENCY STOP button is pressed and unlock it as described above if necessary.

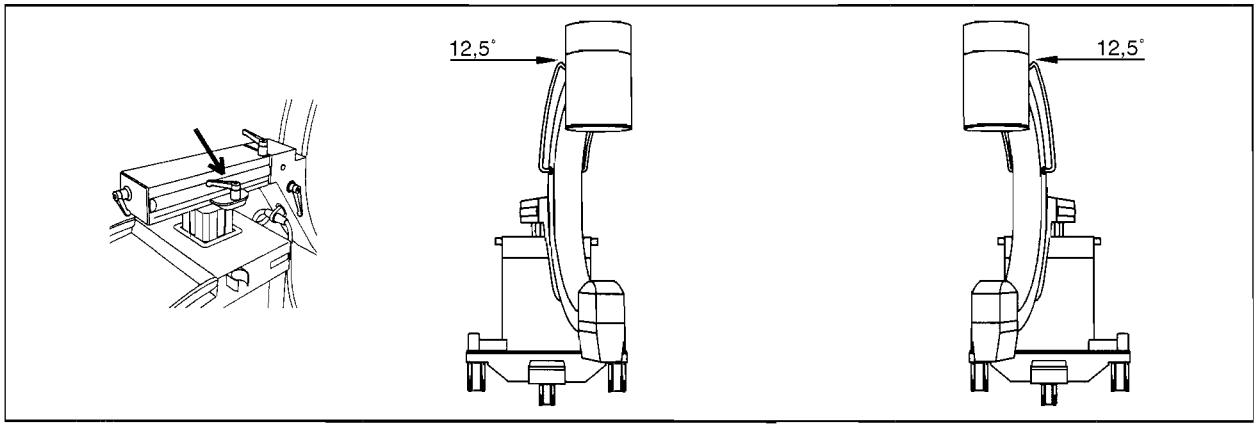
C-arm horizontal movement



You can move the support arm a maximum of 20 cm horizontally.

- Release the brake (arrow) and move the support arm.
- As soon as you have set the support arm to the required position, you must lock the brake again immediately.

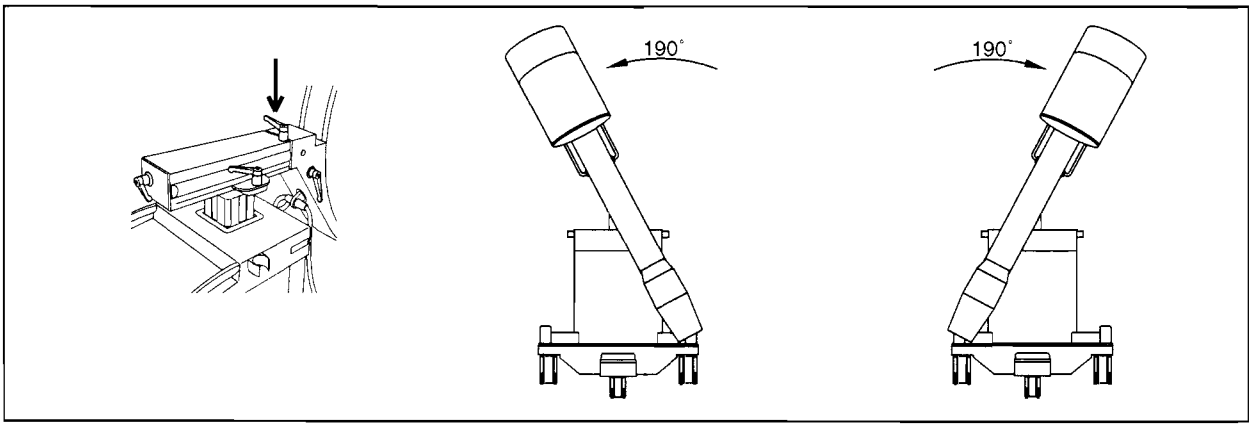
C-arm swivel range



You can move the C-arm horizontally ±12.5° about the basic system column.

- Release the brake (arrow) and swivel the C-arm.
- Once you have set the C-arm to the required position, you must lock the brake again immediately.

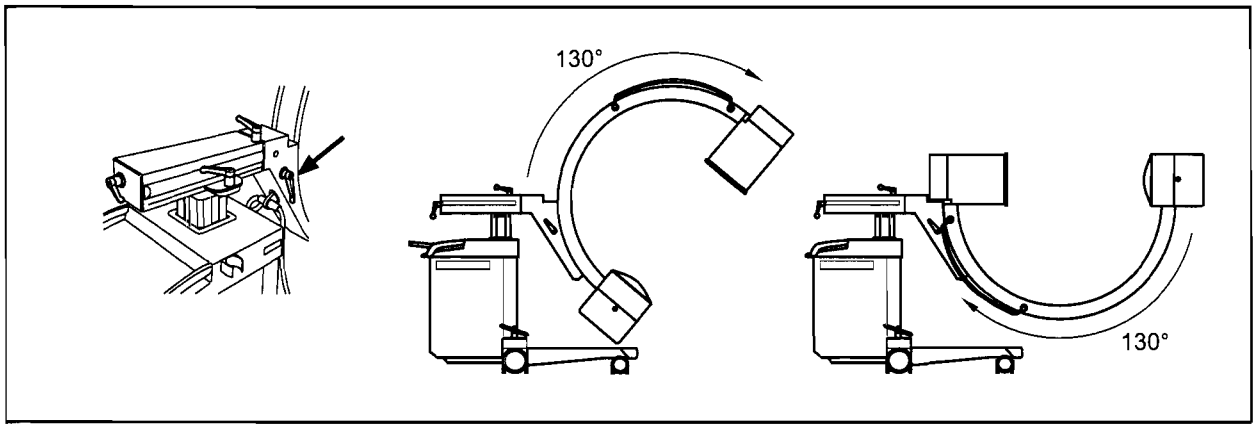
C-arm angulation



You can move the C-arm vertically ±190° about the horizontal support arm.

- Release the brake (arrow) and rotate the C-arm.
  - Scale on joint of support arm.
- Once you have set the C-arm to the required position, you must lock the brake again immediately.

C-arm orbital movement



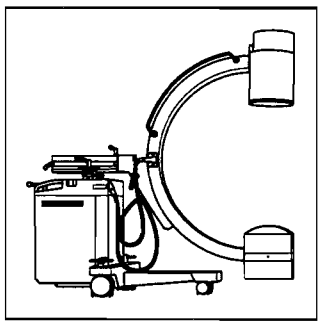
You can swivel the C-arm from +90° horizontal to -40° vertical (total range: 130°)

- Release the brake (arrow) and swivel the C-arm.
  - Marking on outside surface of C-arm.
- Once you have set the C-arm to the required position, you must lock the brake again immediately.

Transport in transport position

When transporting the SIREMOBIL Compact L as well as the monitor trolley, the incline of the ramp or floor should not exceed ±10°, otherwise the system could become unstable.

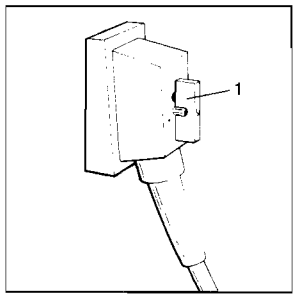
Transport position for the SIREMOBIL Compact L



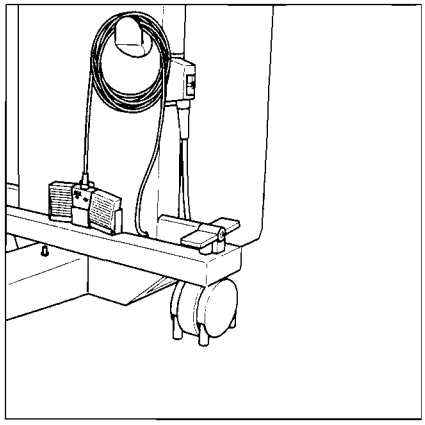
- ◆ Release all brakes on the C-arm.
- ◆ Set the C-arm to the transport position shown in the drawing.
- ◆ Move the lifting column all the way down to Position 2.
- ⇨ See the section "Raising and lowering"
- ◆ Move the horizontal carriage all the way back if possible.
- ◆ Lock all brakes on the C-arm again.

Disconnecting the SIREMOBIL

- ◆ Switch the SIREMOBIL Compact L off.
- ◆ Disconnect the line voltage plug from the outlet by pulling on the plug **only**, **not** on the cable.



- ◆ Disconnect the central plug of the connection cable to the monitor trolley: turn the lever (1) 1 1/2 turns to the left and disconnect the plug.
- ◆ If attached, disconnect the grounding cable from the SIREMOBILCompact L cabinet.



- Roll up the footswitch cable at the front of the electronics cabinet and attach the footswitch.

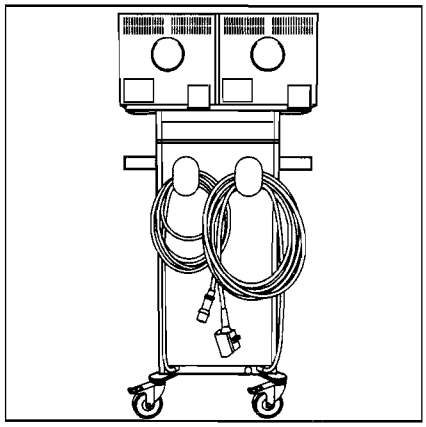
When attaching the footswitch, be careful not to crimp the cable.

Transport

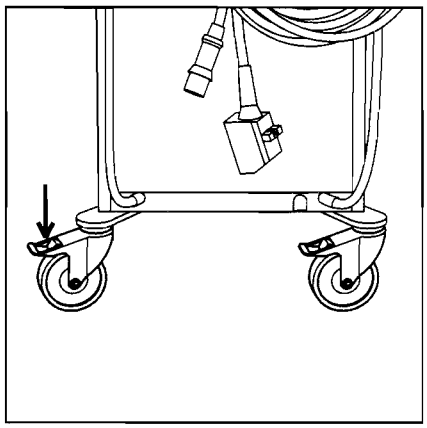
- Release the foot brake
- Use the steering lever and the handles for transport.

Ensure that the transport route is free of obstructions on the floor.

Monitor trolley transport position and transport



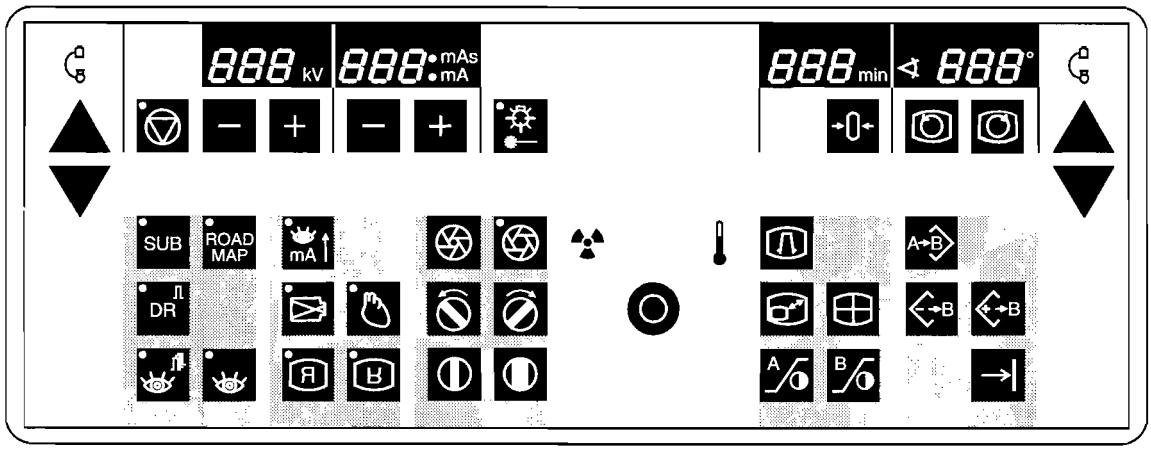
◆ Roll up the line voltage cable and the cable to the SIREMOBIL Compact L electronics cabinet in the back of the monitor trolley as shown.



◆ For transport release the locking brakes on the wheels (arrow).

Overview of operating elements and displays

System control panel



Line voltage switch

Switch the system OFF

C-arm vertical movement

Raise the C-arm

Lower the C-arm

Operating mode keys

When an operating mode is selected, the integrated LED lights up.
The current operating mode is deselected when switching to another mode.

Fluoroscopy

Pulsed fluoroscopy

Digital Radiography

Subtraction

Roadmap

Selects high-contrast fluoroscopy
(cannot be selected for Subtraction and Roadmap)

- LED on:
  High-contrast fluoroscopy characteristic curve is selected
- LED off:
  High-contrast fluoroscopy characteristic curve is deselected

Exposure and fluoroscopic data

Displays the exposure or fluoro voltage (kV)

Adjusts the exposure voltage (kV) or

Adjusts the fluoro voltage in the dose rate control Stop function (LED is on.)

Displays the mAs values for cassette mode

or

mA values for Fluoro

Adjusts the mAs values for cassette mode

Image processing

Image intensifier format selection
- The LED lights when zoom is selected.

Selects the noise reduction factor
(not selectable for Subtraction, Roadmap and cassette operation)
- LED on: selects a smaller factor
  (for faster movements)
- LED off: selects a larger factor
  (for slower movements)

Image reversal right /left

Image reversal up/down

Image rotation indicator

Rotates the TV camera (image rotation left/right) and subsequently displays a computed image (without radiation)

Collimator settings

Closes the iris diaphragm

Opens the iris diaphragm

Rotates the semi-transparent slot diaphragm left or right

Closes the semi-transparent slot diaphragm

Opens the semi-transparent slot diaphragm

Image post-processing

Edge enhancement, selectable in 3 levels (monitor A only),
- on monitor B for Subtraction and Roadmap

Electronic zoom for stored images
(For Memoskop C and Memoskop C-SUB only)

Horizontal or vertical monitor split, can be set in the user program.
Images with different image reversal cannot be displayed simultaneously (monitor split is shut off).

Contrast adjustment for the left monitor (Monitor A)
- Selectable adjustment in 4 levels, or
- Autowindow (AUT), i.e. the system automatically calculates the optimal contrast value (LUT) with reference to the image center.

Contrast adjustment for the right monitor (Monitor B)
- Selectable adjustment in 4 levels, or
- Autowindow (AUT), i.e., the system automatically calculates the optimal contrast value (LUT) with reference to the image center.
- Adjustable in 6 levels for Subtraction or Roadmap scenes in the Window level menu.

(No function for the single-monitor configuration)

Image selection

Stores images
- From the monitor to memory (for single-monitor configurations)
- From monitor A to memory with display on monitor B (for dual-monitor configurations)

Reads images from memory, pages backward

Reads images from memory, pages forward

Releases hardcopy documentation
- from monitor A or B (can be set in the user program)

Fluoroscopic time

Displays the FL time

Reset key
- Shuts off the FL acoustic alarm
- Resets the FL time and the area dose product to zero

I.I. laser aimer (optional)

⇨ Refer to Register 6 (only if option present).

Warning

Do not look directly into the laser beam!

Laser targeting device on the single tank (optional)

⇨ Refer to Register 7 (only if option present).

Warning

Do not look directly into the laser beam!

If a laser targeting device is installed on the single tank, it can be switched on and off with this key.

If no laser targeting device is installed on the single tank, this key has no function.

- ❑ The laser targeting device on the single tank is switched off during and after a system run-up or reset.
- ❑ The laser targeting device on the single tank automatically switches off after 5 min.

Dose rate control - Stop function

Switches the Stop function on or off

Radiation indicator

Indicates radiation for all operating modes

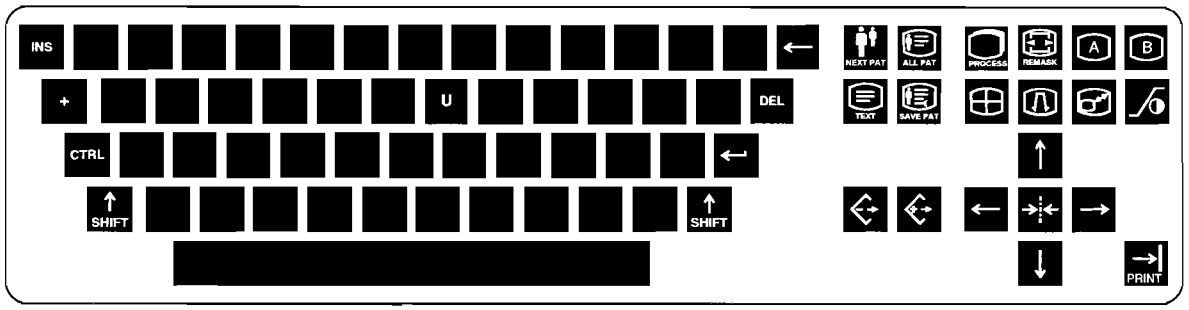
- The radiation warning indicators light up simultaneously on the monitor trolley.

X-ray tube assembly temperature

Displays the temperature of the X-ray tube assembly

- Indicator on: X-ray tube assembly temperature is ≥ 50°C.
- Indicator flashing: X-ray tube assembly temperature is ≥ 70°C.

Data entry keyboard on the monitor trolley



Alphanumeric keyboard with special keys

CTRL U

Start the user program by pressing "CRTL" and "U" simultaneously (refer to Memoskop Digital Image Memory)

Patient data

NEXT PAT

Next patient
- Allows patient data entry
- Deletes images and data from the monitors (the "hospital line" remains)
- Resets the fluoroscopic time / area dose product
- Switches over to the fluoroscopy mode with the current user program
- Resets the area dose product (optional)

ALL PAT

Patient directory (for MEMOSKOP C and MEMOSKOP C-SUB only)

Displays patient list

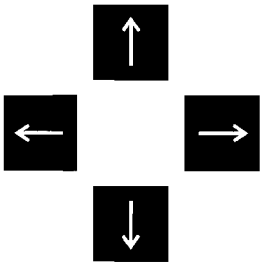
TEXT

Switching the patient data on and off, this means that the text displayed on the monitor/image disappears or appears again by pressing the key once more.

SAVE PAT

- Switches write protection on for patient images
- Cancels again the write protection of images of a patient

Cursor movements



Cursor keys
- Move the cursor in the desired direction
- Select a line in the patient directory
- Roam function (refer to the Memoskop operating instructions)

Home key
- Cursor skips to the starting position for patient data entry
- Ends a command in the user program

Shift key
- Shutter function (refer to the Memoskop operating instructions)
- Used for standard keyboard functions as well

Return key
- Confirms a command
- Advances to the beginning of the next line

DEL key
- Deletes the marked characters

All keys which are shown black have the standard keyboard functions.

Monitor selection

Selects monitor A
- For image post-processing

Selects monitor B (for dual-monitor configuration only)
- For image post-processing

Image post-processing

Edge enhancement
- Selectable in 3 levels
- Displayed only on the selected monitor with the dual-monitor configuration.

Zoom function for stored images
(only for Memoskop C and C-Sub)

Monitor split
- 16-image collage on monitor A with hard disk memory
  The images are selected with the cursor keys and confirmed with Return
- 2-image collage horizontal or vertical on monitor A without hard disk memory and with single-monitor configuration
- 2-image collage horizontal or vertical on monitor B without hard disk memory and with dual-monitor configuration
- Images with different image reversal cannot be displayed simultaneously (split is switched off)

Contrast adjustment
- 4-level adjustment, manually selectable
- Autowindow (AUT), i.e. the system automatically calculates the optimal contrast value (LUT) with reference to the image center
- Display on monitor A or B depending on the monitor selected
- 6-level adjustments in the Window-level menu for Subtraction or Roadmap scenes

Post-processing of subtraction scenes

Post-processing for subtraction:
Selection of a new mask and
Selection of the pixel shift function

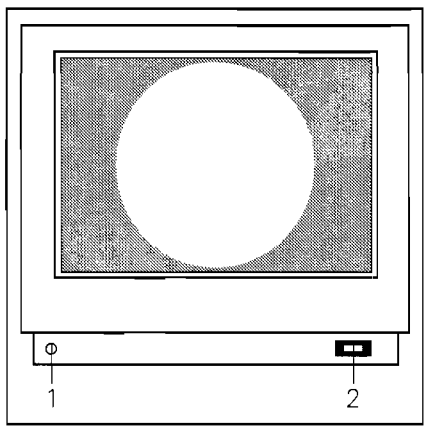
Image selection

Paging
Reads images from memory, pages backward
- Display on monitor A or monitor B, as selected

Paging
Reads images from memory, pages forward
- Display on monitor A or monitor B, as selected

Releases documentation (only if this function is integrated) or hardcopy.
- From monitor A or B (can be preset in the user program)

Display elements on the SIMOMED Monitor / Standard Monitor (100Hz)

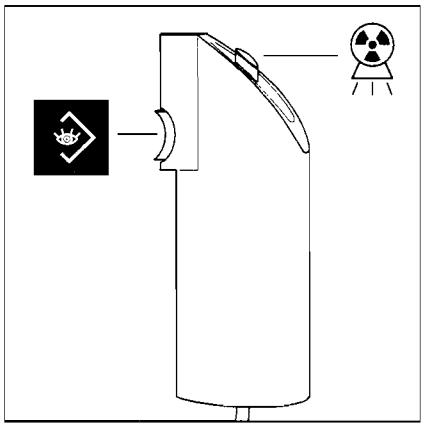


(1) Ambient light sensor

(2) Signal lamp
On: the monitor is switched on.

After the basic settings are entered, they should not be changed.

Hand switch



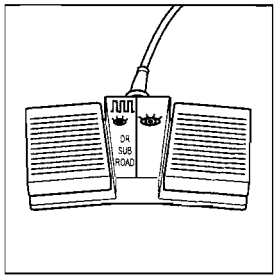
❑ Can be connected on either side of the electronics cabinet.

Releases radiation for all operating modes and for cassette exposures.

Stores images from the current fluoroscopic scene
- from the monitor to memory
  (for single-monitor configurations)
- from monitor A to monitor B and to the memory
  (for dual-monitor configurations only)

Foot switch

Radiation release



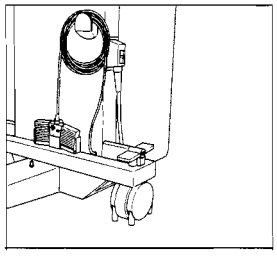
- ❑ The right-hand pedal releases fluoroscopy in all operating modes.
- ❑ Using the left-hand pedal, you can release radiation for the other operating modes according to the following table:

Select operating mode	Left-hand pedal	Right-hand pedal
Fluoroscopy	DR	DL
Pulsed fluoroscopy	PFC	DL
Digital radiography	DR	DL
SUB	SUB	DL
ROADMAP	ROADMAP	DL
CASSETTE	--	--

Warning

Please make sure that the footswitch is not located below the I.I. when the C-arm angulation is set to 180°. Otherwise the I.I. may accidentally contact the footswitch and thus inadvertently release radiation.

Transport position



During transport the footswitch should be deposited in its transport clip with its cable properly rolled up.

Primary collimation and image display

Semi-transparent slot diaphragm

The semi-transparent slot diaphragm is used primarily for collimation when imaging the extremities.
Collimation enhances image contrast and reduces scatter radiation. It also prevents burn-out in the image caused by the difference in density between bone and neighboring soft tissue.

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

Rotates the semi-transparent slot diaphragm left/right

Closes the semi-transparent slot diaphragm

Opens the semi-transparent slot diaphragm

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 set to the maximum setting, it must be visible in at least 2 places in the fluoro image.

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

Closes the iris diaphragm

Opens the iris diaphragm
- The LED lights up when a cassette is inserted and the iris is open to max. aperture.

Collimator display on the monitor without radiation

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 line / circle superimposed.

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

Image intensifier format selection

Full format: LED is off

Zoom format: LED is on

Image reversal

Image reversal left/right
- LED is on when this function is selected

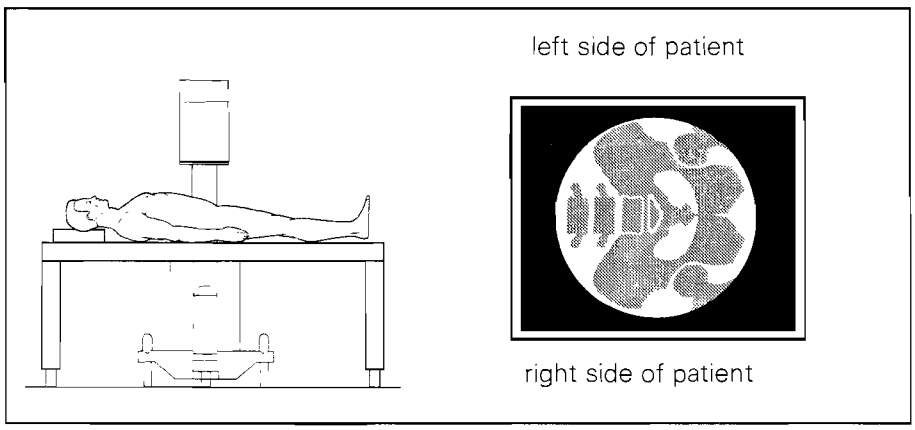
Image reversal up/down
- LED is on when this function is selected

The image reversal is effective only on the live monitor (i.e. monitor A in dual monitor mode).

Image position

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

Example:
- Patient in the supine position (patient's left side at the C-arm).
- Image intensifier above the patient.
- Image reversal deselected (LED is off).
- Rotation angle of 0° is displayed (camera in the starting position).



Position display principle

Image rotation

Image rotation allows you to bring the object on the monitor into the desired viewing position.

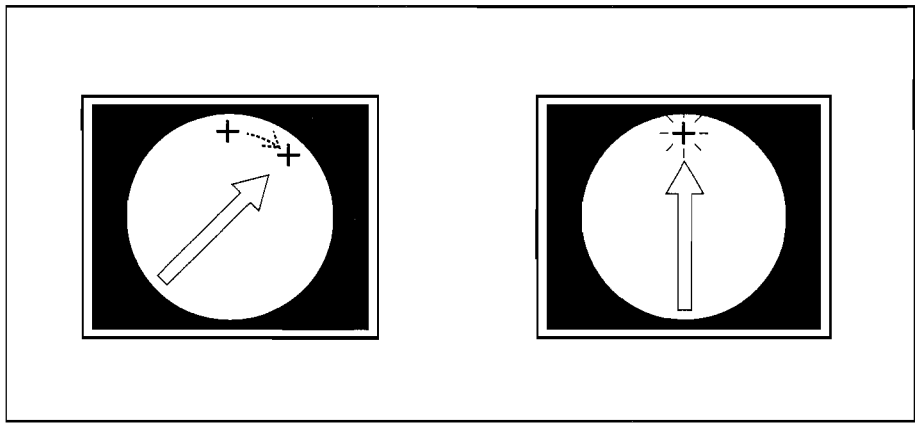
Image rotation indicator
– Rotation angle ± 220°

- When pressing one of the keys, the image is rotated in the corresponding direction. At the same time, a position marker for the image rotation is displayed at the top edge of the monitor (possible only after radiation).
  Position the marker at the location you would like to be displayed at the top of the next fluoro image.

After positioning the marker (and after releasing the key), a computed image will be displayed in the selected position.The position marker will be located back at the top edge of the image and will be flashing.

A flashing position marker always indicates a computed image.

When radiation is "on", a live image appears on the monitor in the desired position.



Position marker principle

Operating modes

Fluoroscopy

When the system is switched on, it automatically defaults to fluoroscopy mode.

- ◆ Press this key to select "fluoroscopy" operating mode.
  – LED on
- ◆ Repeated activation of this key allows you to page through the various programs.

High-contrast fluoroscopy

- ◆ Press this key to change between the standard and the high-contrast characteristic curve.
  – LED on - High-contrast characteristic curve is selected.
- ◆ Press this key again to reselect the standard characteristic curve.
  – LED off - standard fluoroscopic characteristic curve is selected.
- ❑ The characteristic curves and their selection are the same for pulsed fluoroscopy.

These characteristic curves can be set in the Fluoroscopy and Pulsed Fluoroscopy programs (refer to Register 4, Memoskop Digital Image Memory).

If the X-ray tube assembly overheats, the overload protection will change the characteristic curve. Refer to the chapter on "Safety" under "Overload protection".

Pulsed fluoroscopy

- Press this key to select the "Pulsed Fluoroscopy" operating mode.
  – LED on.
- Repeated activation of this key allows you to page through the different programs.

Selecting a low noise reduction factor (integrating image sections) reduces the pulse width of the beam and, therefore, the radiation dose as well.

High-contrast fluoroscopy

(Refer to the preceding page).

Frame rate for pulsed fluoroscopy

– The frame rates listed occur under automatic dose rate control and depend upon the noise reduction factor and dose reduction selected.

Camera frequency 50Hz

Dose reduction	Noise reduction factor	Frame rate measured in f/s
low	8	approx. 1.6
low	16	approx. 0.9
medium	8	approx. 1.2
medium	16	approx. 0.6
high	4	approx. 1.1
high	8	approx. 0.7
high	16	approx. 0.4

Camera frequency 60Hz

Dose reduction	Noise reduction factor	Frame rate measured in f/s
low	8	approx. 1.7
low	16	approx. 0.1
medium	8	approx. 1.4
medium	16	approx. 0.8
high	4	approx. 1.3
high	8	approx. 0.8
high	16	approx. 0.5

Activating fluoroscopy / pulsed fluoroscopy

Fluoroscopy or pulsed fluoroscopy is activated with the footswitch (refer to the description for the footswitch) or the button on the handswitch.

- ❑ If radiation is being activated, the radiation ON indicators light up on the operating console of the electronics cabinet and on the monitor trolley.
- ❑ At termination of fluoroscopy or pulsed fluoroscopy, the last image remains on the monitor.

Fluoro data display

The current fluoroscopic values are displayed on the control panel.

Fluoroscopic time limit

When the fluoroscopic time exceeds 5 minutes[1] , an audible alarm sounds.

The acoustic signal can be stopped by pressing the reset key. The fluoroscopic timer continues to display the amount of fluoro time used. The acoustic signal is sounded again 5 minutes after resetting. If you do not reset the fluoroscopic timer, radiation will be blocked 10 minutes after the last reset.

If fluoroscopy is reactivated, the fluoro time is added to the time already elapsed so that the total examination time can be logged at the end of the examination.

[1]Can be changed on request by SIEMENS customer service within country-specific regulations.

Automatic dose rate control

Procedure

Utilizing the process of dose rate control, the mean value of the video signal is held constant within the dominant largely independent of the object transparency. This ensures optimal image quality for on-screen diagnosis.

The dominant position is centered to the image intensifier input.

Three dose rate levels are set at the factory; low, medium, high.
For 23 cm / 9" I.I. (0.11 / 0.185 / 0.37 µGy/s)
For 17 cm / 7" I.I. (0.13 / 0.22 / 0.44 µGy/s)

⇨ The characteristic curves that can be set for dose rate control are located in Register 4 under Fluoroscopy or Pulsed Fluoroscopy and in Register 5 of "SIREMATIC curves".

Stop function

In cases where the automatic dose rate control function is not desired, the established kV value can be held by pressing the "dose rate control Stop" key.

When metallic objects (e.g. intermedullary nails) are introduced into the beam path or when examining objects of varying thickness (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 to switch the Stop function on.
  - LED off.
  - The automatic brightness control is enabled.
  - The kV ± keys are disabled.
- ◆ Press this key again to switch off the Stop function.
  - The LED then lights up.
  - The automatic brightness control is disabled.
  - The kV ± keys are enabled.
- ❑ Manual kV-setting is possible.
- ❑ Change-over of the I.I. format cancels the Stop function.

Manual input of kV values[1]

kV values can be manually set with "dose rate control Stop" function on.

The kV values can be manually adjusted with the +/-kV keys.

⇨ mA values assigned to the kV values result from the SIREMATIC curves (refer to Register 5).

[1]Not always possible given the country-specific requirements.

Digital radiography

Digital radiography function

Digital radiography (DR) makes it possible to acquire an instant electronic image of the highest quality.

DR is recommended for the final exposure e.g. as a substitute for cassette exposure.

When activating DR mode, a short radiation pulse is released, whose duration depends upon an integration factor selectable in levels.

❑ The factor can be selected in 4 levels (4, 8, 16, 32)
(Refer to Register 4 of Memoskop Digital Image Memory, User programs.)

Selecting DR and activating digital radiography

◆ Press this key to select the digital radiography operating mode (DR).
– LED on.

◆ Repeated activation of this key allows you to page through the different programs.

Release digital radiography with the button on the handswitch or with the left pedal of the footswitch. (Refer to the description of the footswitch).

❑ Radiation is automatically switched off when an image is stored, even if the release switch is still activated.

Display of exposure data

The exposure data field on the operating console displays the current DR exposure values.

Characteristic curves for digital radiography

❑ 850 W characteristic curve is standard.

The following restriction applies to DR mode:

❑ Radiation may be activated only **once** within 7 seconds with the 850 W characteristic curve.
If radiation is repeatedly released in under 7 seconds, the system will automatically switch over to the characteristic curve with reduced output (550W).

⇨ Description of characteristic curves
(Refer to Register 5 of the Operating Instructions "Curves and Diagrams").

Stop function

In cases where the automatic dose rate control function is not desired, the established kV value can be held by pressing the "dose rate control Stop" key.

◆ Press this key to switch the Stop function on.
- LED off.
- The automatic brightness control is enabled.
- The kV ± keys are disabled.

◆ Press this key again to switch off the Stop function.
- The LED then lights up.
- The automatic brightness control is disabled.
- The kV ± keys are enabled.

❑ Manual input of kV values is possible.

❑ Switching the I.I. format cancels the Stop function.

❑ If the Stop function was selected when changing over from a Fluoroscopy operating mode, this FL curve will be retained.

❑ The kV/mA lamp flashes for a required pause in radiation.

Manual input of kV values[1]

kV values can be manually set with the "dose rate control Stop" function on.

kV values can be manually adjusted with the +/-kV keys.

[1] Not always possible due to country-specific regulations.

Subtraction

(refer to Memoskop Digital Image Memory, Register 4)

- You can select SUBTRACTION by pressing this key.
  – The LED then lights up.
- You can browse through the various programs by pressing the key repeatedly.

Roadmap

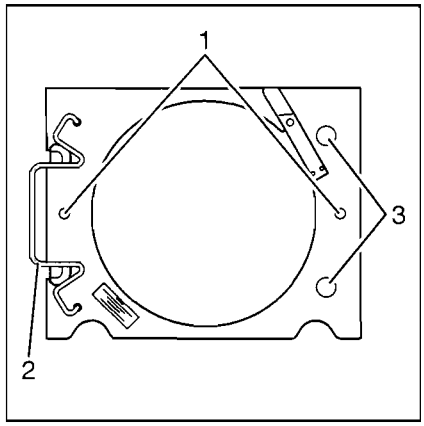
(refer to Memoskop Digital Image Memory, Register 4)

- You can select ROADMAP by pressing this key.
  – The LED then lights up.
- You can browse through the various programs by pressing the key repeatedly.

Cassette exposure

Cassette holder

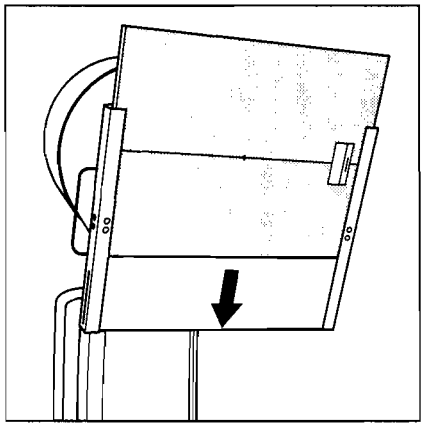
The cassette holder may only be attached in one specific position at the image intensifier. The center positioning pins on the cassette holder (1) must lock into the indents in the plastic ring of the image intensifier.
Follow the instructions given on the warning label affixed to the cassette holder.



Cassette size

Only 24 cm x 30 cm (10 inch x 12 inch).

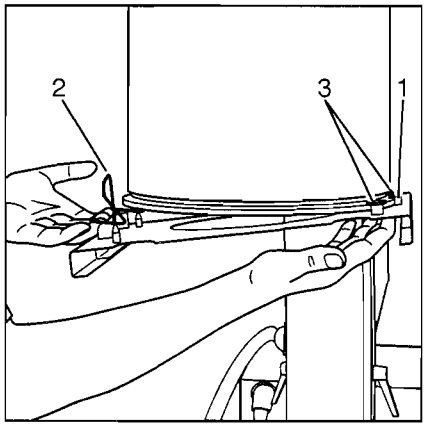
Exposure grid



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

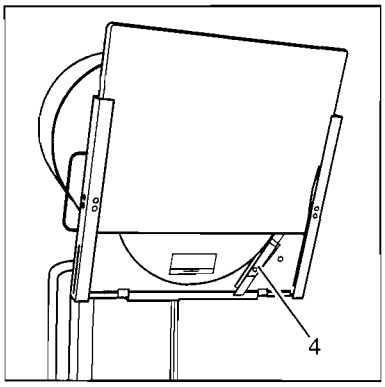


- Attach the cassette holder right (seen from the front) to the image intensifier so that the positioning pin (1) locks into the indent in the front ring of the image intensifier.
- Open the springs (2) and lift the cassette holder over the front ring at the image intensifier.

Warning

Springs and positioning pins (3) must be locked securely to keep the cassette holder in place. Both positioning pins must be locked in the indents.

Inserting the cassette

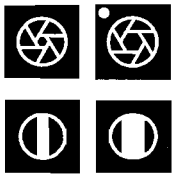


- Always insert the cassette up to the end stop in the cassette holder. (Switch 4 is automatically activated).

Selecting direct radiography

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.

Collimation for cassette exposures or storing the diaphragm positions



❑ When inserting the cassette, the iris diaphragm and the semi-transparent slot diaphragm open completely.

– The LED in the key "Open iris diaphragm" is on.

If you wish to retain the diaphragm position for an exposure in Fluoroscopy, PFL, DR or SUB modes, proceed as follows **prior** to inserting the cassette:

◆ Press both keys simultaneously
– The position of the iris diaphragm is retained.

◆ Press both keys simultaneously
– The position of the slot diaphragm is retained.

◆ Press both keys simultaneously
– The position of the slot diaphragm is retained.

❑ An acoustic signal sounds when the system has stored the positions.

Deleting the stored 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.

Input of exposure data

The SIREMOBIL Compact L does not have an automatic exposure control for cassette technique.

If a cassette is loaded after restarting the system, 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.
By activating one of the kV or mAs +/- keys, the default values 40 kV and 5 mAs will be displayed. You can then change these values.
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.

kV display

Enters the kV values

mAs display

Enters the mAs values

SIREMOBIL Compact L exposure table
for film/screen combinations of class 200

Organ		kV	without grid		with grid Pb r17, N70, fo85	
			mAs	BP*	mAs	BP*
Shoulder	ap	70			5	20
Shoulder	ax	70			6.3	21
Upper arm	ap	70			3.2	18
Upper arm	lat	70			3.2	18
Lower arm	ap	60	1	10	2	16
Lower arm	lat	60	1.3	11	5	17
Hip	ap	73			16	26
Hip	ax	85			12.5	28
Upper thigh	ap	73			10	24
Upper thigh	lat	73			10	24
Lower thigh	ap	60	1.6	12	6.3	18
Lower thigh	lat	60	1.3	11	5	17
Cervical spine	ap	70			16	25
Cervical spine	lat	70			16	25
Thoracic spine	ap	73			50	31
Thoracic spine	lat	85			40	33
Lumbar spine	ap	81			40	32
Lumbar spine	lat	90			63	36

* Exposure points

SIREMOBIL Compact L exposure table
for film/screen combinations of class 400

Organ		kV	without grid		with grid Pb r17, N70, fo85	
			mAs	BP*	mAs	BP*
Shoulder	ap	70			2.5	17
Shoulder	ax	70			3.2	18
Upper arm	ap	70			1.6	15
Upper arm	lat	70			1.6	15
Lower arm	ap	52	1	7	2	13
Lower arm	lat	52	1.3	8	5	14
Hip	ap	73			8	23
Hip	ax	85			6.3	25.1
Upper thigh	ap	73			5	21
Upper thigh	lat	73			5	21
Lower thigh	ap	57	1	9	4	15
Lower thigh	lat	55	1	8	3.2	14
Cervical spine	ap	70			8	22
Cervical spine	lat	70			8	22
Thoracic spine	ap	73			25	28
Thoracic spine	lat	85			20	30
Lumbar spine	ap	81			20	29
Lumbar spine	lat	90			32	33

* Exposure points

Releasing the exposure

- ◆ Use the button on the handswitch to release the exposure.
- ❑ The radiation indicators light up during the exposure. The radiation indicators light up somewhat 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

- ❑ After removing the cassette, the exposure data remains until another operating mode is selected.

Removing the cassette holder

- ◆ Holding the spring, gently push the cassette holder downward lifting it over the front ring to remove it.

Selecting a different operating mode

You must remove the cassette before changing over to another operating mode.

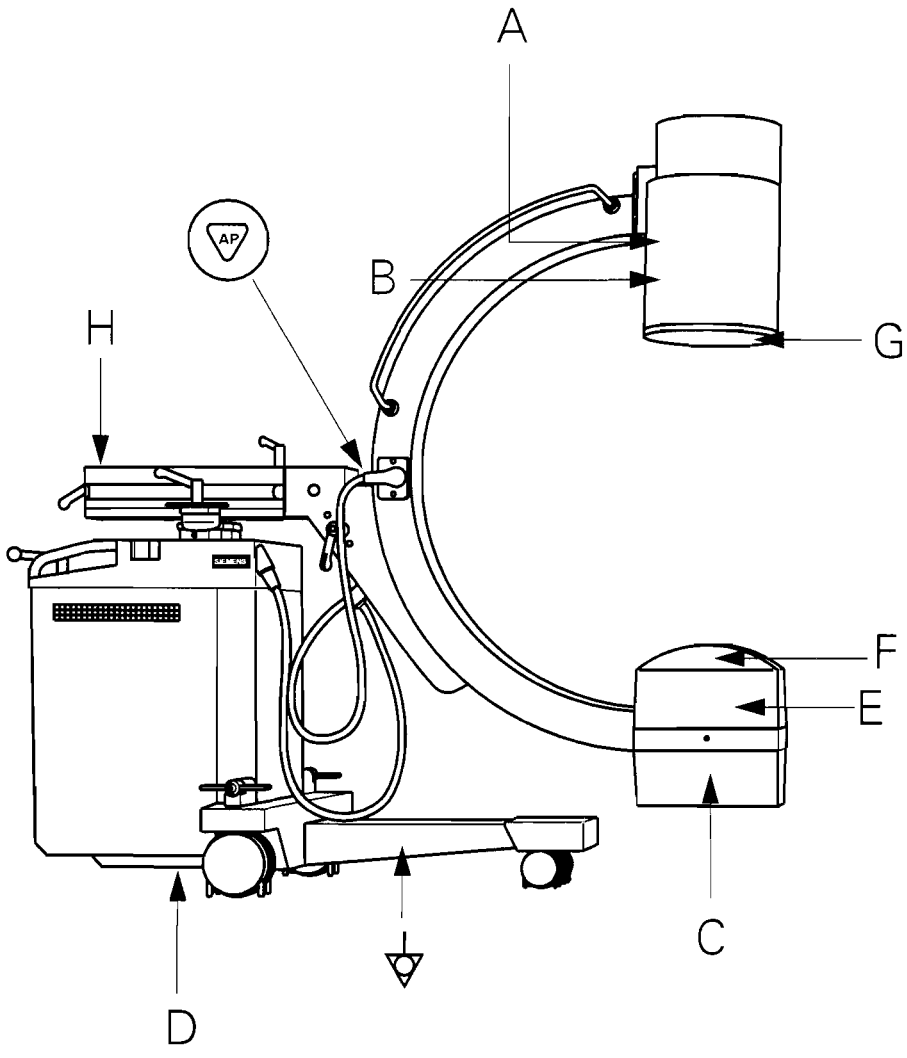
- ◆ Select the desired operating mode

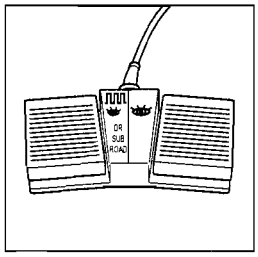
or

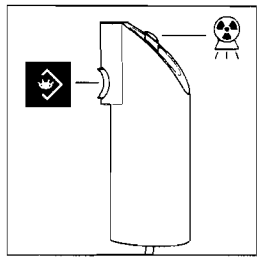
- ◆ Release fluoroscopy without selecting an operating mode
  - In this case, the system reverts to the operating mode selected prior to the cassette exposure mode.

Technical description

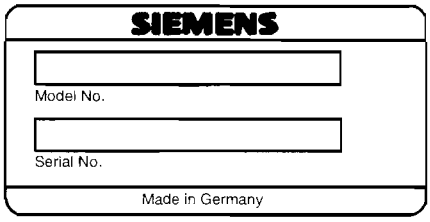
Position of labels





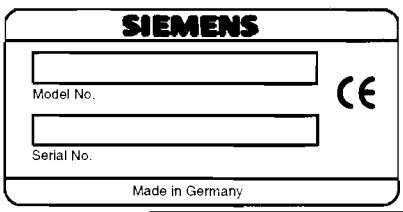


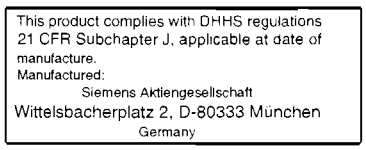
ENTIRE IMAGE INTENSIFIER *



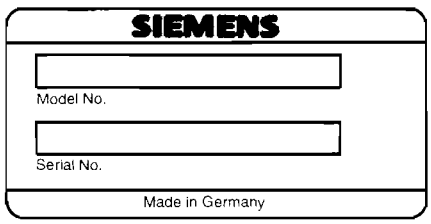
A

IMAGE INTENSIFIER (SIRECON)

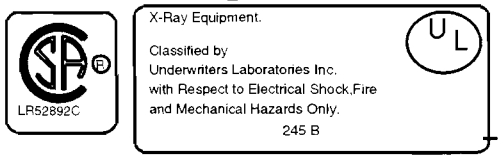




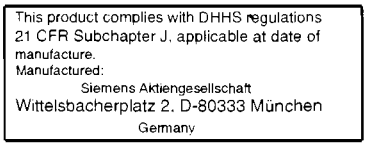
B

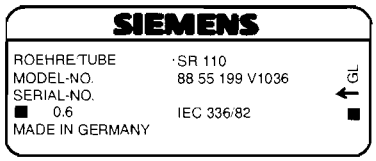


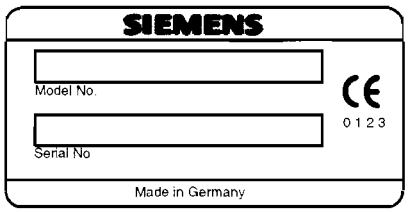
I.I. TUBE



SIREPHOS X-RAY TUBE HOUSING

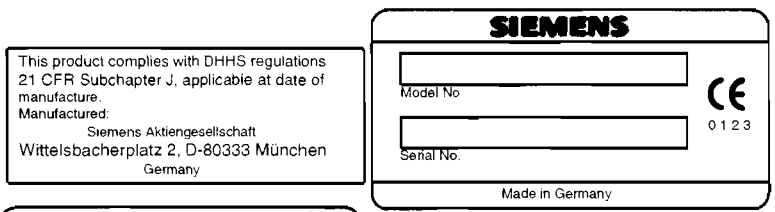


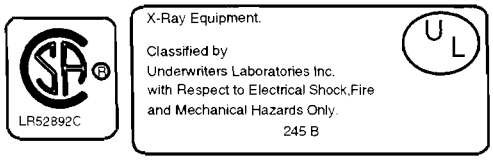


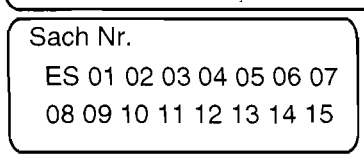


C

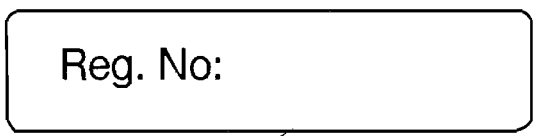
X-RAY REGULATIONS







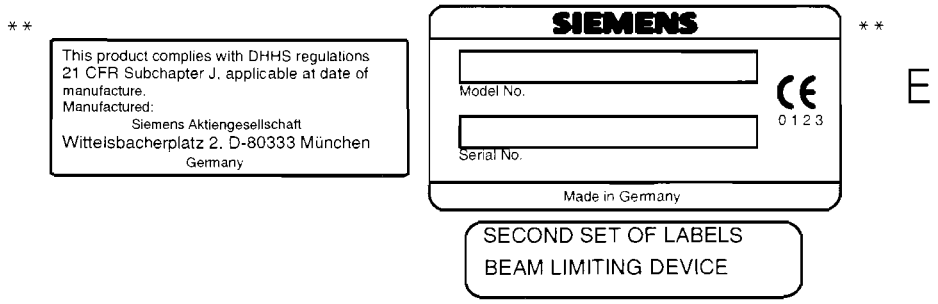
D

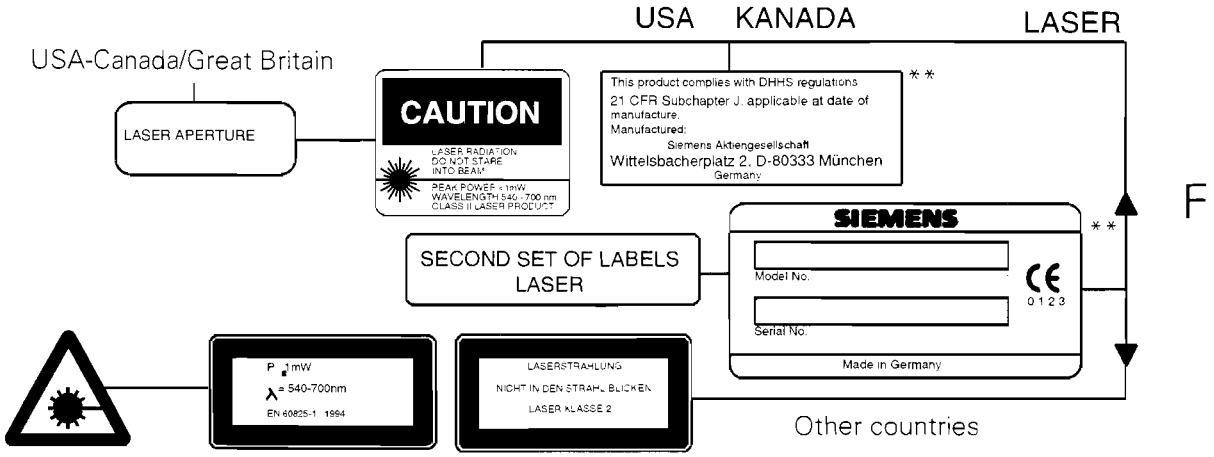


* Label concealed

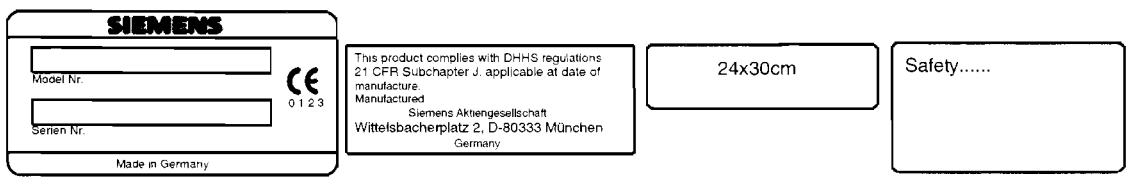
For China only

RADIATION FIELD COLLIMATOR





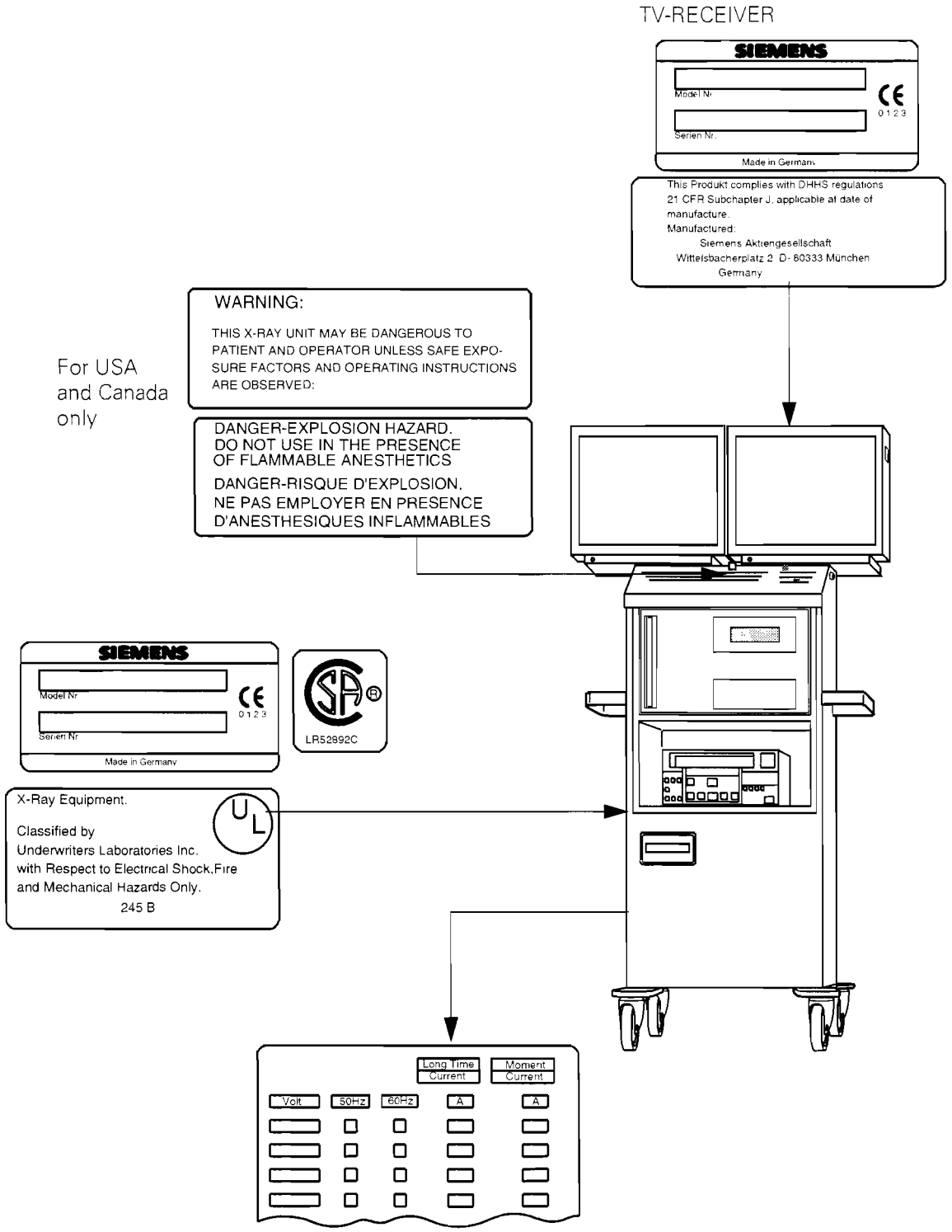
Cassette holder G



For Germany only
or inserted in Lina pocket and included with delivery, 7" and 9"

H

* Label concealed
** Label concealed external


TV-RECEIVER
SIEMENS
Model Nr.
Serien Nr.
CE 0123
Made in Germany
This Produkt complies with DHHS regulations 21 CFR Subchapter J, applicable at date of manufacture.
Manufactured:
Siemens Aktiengesellschaft
Wittelsbacherplatz 2 D-80333 München
Germany
For USA and Canada only
WARNING:
THIS X-RAY UNIT MAY BE DANGEROUS TO PATIENT AND OPERATOR UNLESS SAFE EXPOSURE FACTORS AND OPERATING INSTRUCTIONS ARE OBSERVED:
DANGER-EXPLOSION HAZARD.
DO NOT USE IN THE PRESENCE OF FLAMMABLE ANESTHETICS
DANGER-RISQUE D'EXPLOSION.
NE PAS EMPLOYER EN PRESENCE D'ANESTHESIQUES INFLAMMABLES
SIEMENS
Model Nr
Serien Nr
CE 0123
Made in Germany
LR52892C
X-Ray Equipment.
Classified by
Underwriters Laboratories Inc.
with Respect to Electrical Shock,Fire
and Mechanical Hazards Only.
245 B
Long Time Current
Moment Current
Volt
50Hz
60Hz
A
A

Technical data

All technical data are typical values, unless specific tolerances are given.

Complete system

Nominal voltage/ nominal frequency:	100V, 110V, 120V, 127V, 200V, 230V, 240 V ±10%; 50 /60 Hz ± 1Hz.
Nominal connection current:	20 A to 127~V, 15 A at 200V~ corresponds to the rated value of the fuse in the mains input of the product.
Internal line impedance:	Ri < 0.3 Ohm at 100 - 127V~ Ri < 0.8 Ohm at 200 - 240V~
Mean power consumption:	max. 2.5 kVA
Weight:	Basic system approx. 257 kg Monitor trolley with 1 SIMOMED monitor approx. 129 kg Monitor trolley with 2 SIMOMED monitors approx. 147 kg
Environmental conditions:	Temperature range: +10°C to +37°C Rel. humidity: 15% to75%, non-condensing Barometric pressure: 700 hPa to 1060 hPa
Protection against electric shock	
Protection class:	Class I, according to IEC 601-1
Degree of protection:	IP20 according to IEC 529
Radio interference suppression:	EN 60 601-1-2 (9/94) Product group 1, limit class B
Flammability class:	Class AP (Anesthetics test) according to EN 60 601-1

Single tank	consisting of **generator** and **X-ray tube assembly**
Generator	
Fluoroscopy:	40 kV to 110 kV / 0.2 to 8.9 mA (max. 550 W)
Digital Radiography:	40 kV to 110 kV / 0.2 to 12.2 mA (max. 850 W)
Direct Radiography:	40 kV to 110 kV / 6.9 to 20 mA (max. 1430 W)
mAs values:	1 mAs to 150 mAs in 23 steps maximum
Current-time reference product:	1.6 mAs/102 kV
Tolerances:	kV ± 10% (measured with spectrometric kV method) mAs ± 10% ± 0.2 mAs mA ± 8% ± 0.1 mA (measured in rectified high-voltage circuit) Fluoroscopic time 1 digit (6 s) ± 5%
Power rating:	1.4 kW (102 kV/1.6 mAs)
Response times:	min. 50 ms at 40 kV/20 mA max. 10 s
X-ray tube assembly:	SIREPHOS single tank high-frequency generator Inverter frequency 15 kHz up to 26 kHz
Inherent filtration:	≥ 3 mm Al equivalent
X-ray tube:	Stationary anode, focal spot nominal value 0.6
C-arm unit	
C-arm orbital movement:	130° (-40° to +90°)
C-arm angulation:	± 190°
C-arm horizontal movement:	20 cm
C-arm depth:	73 cm
C-arm swivel range:	± 12.5°
C-arm vertical lift:	45 cm, motor-driven
Source-I.I. distance:	100 cm
Tube-I.I. distance:	78 cm

Image intensifier:
SIRECON 17-2HDR-C, nominal diameter 17 cm (7"),
Format switch-over 17 cm / 10 cm (7" / 4")

or

SIRECON 23-2HDR-C, nominal diameter 23 cm (9")
Format switch-over 23 cm / 15 cm (9" / 6")

Scattered radiation grid at I.I. input:
Round grid; Pb 8/40, f_o90
Unit attenuation factor m = 1.5

Collimator system:
Iris diaphragm for concentric collimation and semi-transparent slot diaphragm for collimation with unlimited rotation.

Cassette holder (optional):
Format 24 cm x 30 cm (10 inch x 12 inch) with grid Pb r17 N70, f_o90

TV system:
VIDEOMED DC, 50/60 Hz,625/525 lines,
CCD sensor with 470,000 pixels at 50 Hz, 410,000 pixels at 60 Hz

Monitors:
- ❑ Flickerfree SIMOMED or standard monitors 100/120 Hz, single or dual monitor version with automatic room light adaptation
- ❑ Monitors 50/60 Hz

Image diagonal:
44 cm (17")

MULTISPOT 2000 (optional)

Film format:
8" x 10"

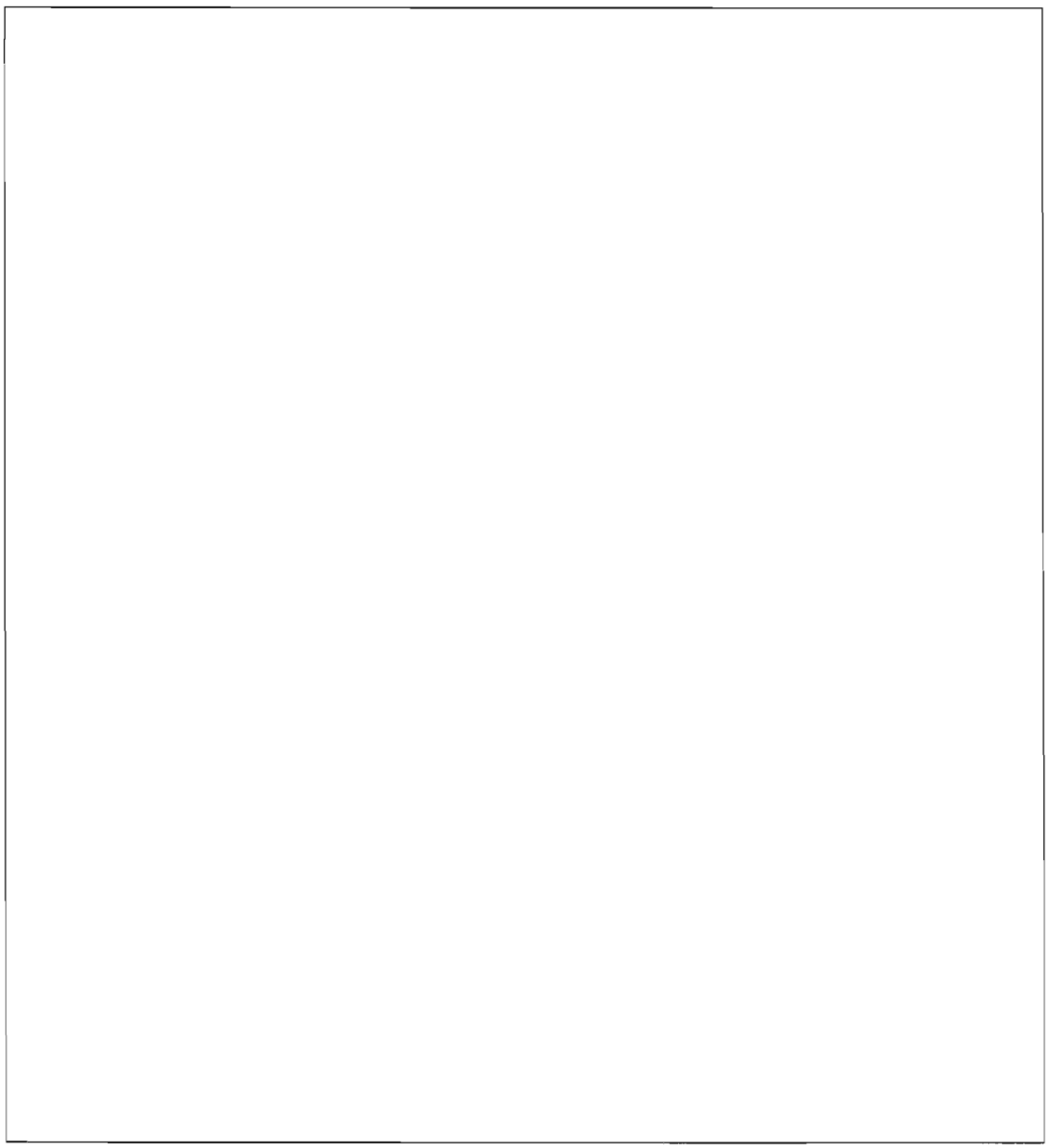
Film segmentation:
2-on-1 or full format / 4-on-1

SIEMENS

Operating Instructions
SIREMOBIL Systems

Memoskop Digital Image Memory

SP



SPR2-130.621.18.04.02

Please observe

Safety operating instructions

These must be studied exactly before system startup.

The original version of this manual was written in the German language.

SP

Siemens AG, Medical Engineering
Henkestraße 127, D-91052 Erlangen, Germany
Registered offices: Berlin and Munich
Siemens AG, Wittelsbacher Platz 2, D-80333 Munchen, Germany

Order No.: SPR2-130.621.18.04.02
Printed in the Federal Republic of Germany
AG 10/00

Operating Instructions
Memoskop

Memoskop C-E, C-E 100, C and C-SUB Digital Image Memory

The Memoskop is a digital image processing system available in the C-E, C-E 100, C, C-MOD, C-SUB and C-SUB-MOD versions. Different functions are available depending on the version. The most important features are listed in the overview.

Functions of Memoskop C-E

- ❑ 5 different user programs (may be installed by the user if keyboard is available; otherwise technical service support is required)
- ❑ Adjustable dose rate
- ❑ Automatic windowing
- ❑ 3-image memory

Functions of Memoskop C-E 100

As described for C-E,

plus

- ❑ Shutter
- ❑ Zoom/Roam
- ❑ 16-image collage
- ❑ Video recorder operation
- ❑ 100-image memory

Functions of Memoskop C / C-MOD

As described for C-E,

plus

- ❑ Shutter
- ❑ Zoom/Roam
- ❑ 16-image collage
- ❑ Video recorder operation
- ❑ 700-image memory
- ❑ MOD-Disk (optional)
  Magneto optical storage disk
- ❑ DICOM-Bridge Option

Functions of Memoskop C-SUB, C-SUB-MOD

As described for C and C-E

plus

- ❑ Subtraction
- ❑ Roadmap
- ❑ Landmark
- ❑ Pixelshift / Remask
- ❑ Positive / negative image display
- ❑ 900-image memory

User programs

The user programs enable the operator to adapt the system to the applications most frequently used. User programs are available in all the operating modes.

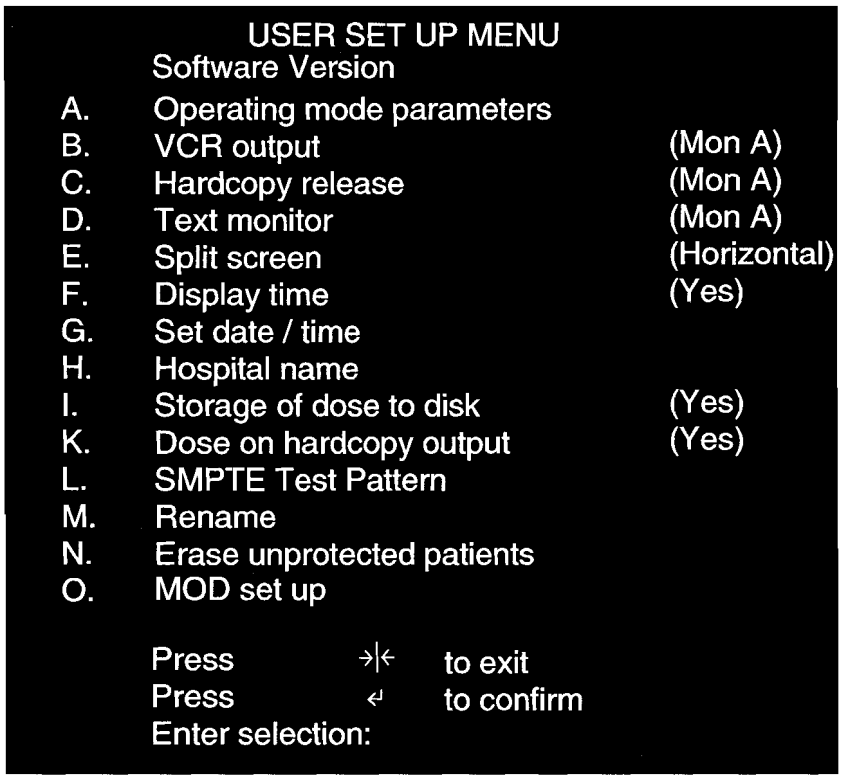
Starting the user menu

Programs can be selected using the data entry keyboard.

CTRL U

- Simultaneously press the "CTRL" and "U"keys to start the user program. The main "user set up menu" is displayed.

User menu



Display of the parameter menu on the monitor

1) The software version of your system is indicated first on the screen.

2) Items I and K are only available with the dose measurement chamber option
M and N are not available on Memoskop C-E
O is only available with the MOD option

Selection of menu parameters

Parameter selection

Menu item	Function/ Text on the monitor	Parameters available
A	Operating mode parameters	Fluoroscopy, Pulsed Fluoroscopy, DR, Subtraction, Roadmap and Window Level
B	VCR output	Monitor A, Monitor B
C	Hardcopy release	Monitor A, Monitor B
D	Text monitor	Monitor A, Monitor B BOTH monitors
E	Split screen	Vertical / Horizontal
F	Display time	NO /YES
G	Set date / time	
H	Hospital name	
I*	Storage of dose to disk	NO / YES
K*	Dose on hardcopy output	NO / YES
L	SMPTE Test Pattern	
M*	Rename	
N*	Erase unprotected patients	
O*	MOD set up	

* Items I and K are only available with the dose measurement chamber option
M and N are not available on Memoskop C-E
O is only available with the MOD option

A...O ◆ Select the desired function using the data entry keyboard.

◆ Confirm this by pressing the "Return" key.

◆ Select a parameter by pressing the arrow keys (except for A and L)
- G: Enter the date and time.
- H: Enter the name of the hospital.
- M: Enter the new name.

◆ Confirm by pressing the "Return" key.

◆ Press the "Home" key to exit.

Operating modes

Menu items	Operating modes / Text on the monitor	Programs / values available
1	FLUOROSCOPY Program number 1	1, 2, 3, 4, 5
2	PULSED FLUOROSCOPY Program number 2	1, 2, 3, 4, 5
3	DIGITAL RADIOGRAPHY Program number 3	1, 2, 3, 4, 5
4	SUBTRACTION Program number 4	1, 2, 3, 4, 5
5	ROADMAP Program number 5	1
6	Window Level	1, 2, 3, 4, 5, 6

1...6 ◆ Select the desired program.

◆ Confirm this by pressing "Return".

◆ Select a program number by pressing the arrow keys.

◆ Confirm this by pressing the "Return" key.

◆ Press the "Home" key to exit.

Standard programs

A standard program has been configured at the factory for every operating mode.

Operating mode	FL	PFL	DR	SUB	Roadmap
Program name	Standard	Standard	Standard	Standard	Standard
Dose rate	Mid	Mid	High	High	High
SIREMATIC normal	HC 1	HC 1	----------	----------	----------
SIREMATIC push	HC 2	HC 2	----------	----------	----------
Noise reduction low	MD 1	4	8	----------	----------
Noise reduction high	MD 2	8	16	----------	----------
Dose reduction low	----------	high	----------	----------	----------
Dose reduction high	----------	high	----------	----------	----------
Auto LIH disk transfer	no	no	----------	----------	----------
Auto transfer all images	----------	no	----------	----------	----------
Auto transfer each image	----------	----------	yes	----------	----------
Disk transfer rate	0	----------	----------	3	----------
Subtraction	----------	----------	----------	Max	Max
Landmark	----------	----------	----------	without	without
Video signal at the documentation output	----------	----------	----------	positive	positive
Image display	----------	----------	----------	positive	positive
Duration of Phase B1	----------	----------	----------	0	----------
Disk transfer rate	----------	----------	----------	3	----------

This setting can be changed, as described in the menus that follow. The fields identified with ---------- cannot be changed or are not applicable.

Fluoroscopy

Menu item	Text on the monitor	Parameters available
	FLUOROSCOPY PROGRAM X	1, 2, 3, 4, 5
1	Program name	Name can be entered
2	Dose rate	LOW, MID, HIGH
3	Sirematic normal	S1, S2, LD, HC1, HC2, IOD
4	Sirematic push	S1, S2, LD, HC1, HC2, IOD
5	Noise reduction low	1, 2 ,4, 8, 16, 32, MD1, MD2
6	Noise reduction high	1, 2, 4, 8, 16, 32, MD1, MD2
7	Auto LIH disk transfer	YES; NO
8	Disk transfer rate	0, 0.5, 1, 2, 3, 4, 5, 6 f/s
9	Delete this program*	YES; NO

* not possible for program 1.

1...9 ◆ Select the desired menu item.

◆ Confirm this by pressing "Return".

◆ Select a parameter with the arrow keys.

◆ Confirm this by pressing the "Return" key.

◆ Press the "Home" key to exit.

Pulsed Fluoroscopy

Menu item	Text on the monitor	Parameters available
	PULSED FLUOROSCOPY PROGRAM X	1, 2, 3, 4, 5
1	Program name	Name can be entered
2	Dose rate	LOW, MID, HIGH
3	Sirematic normal	S1, S2, LD, HC1, HC2, IOD
4	Sirematic push	S1. S2, LD, HC1, HC2, IOD
5	Noise reduction low	4, 8, 16
6	Dose reduction low	LOW, MID, HIGH
7	Noise reduction high	4, 8, 16
8	Dose reduction high	LOW, MID, HIGH
9	Auto transfer all images	YES; NO
10	Auto LIH disk transfer	YES; NO
11	Delete this program*	YES; NO

* not possible for program 1

For possible settings, refer to the Basic System chapter, section "Pulsed Fluoroscopy" under frame rate.

1...11 ◆ Select the desired menu item.

◆ Confirm this by pressing "Return".

◆ Select a parameter by with the arrow keys.

◆ Confirm this by pressing the "Return" key.

◆ Press the "Home" key to exit.

Digital Radiography

Menu item	Text on the monitor	Parameters available
	DIGITAL RADIOGRAPHY PROGRAM X	1, 2, 3, 4, 5
1	Program name	Name can be entered
2	Dose rate	MID, HIGH
3	Noise reduction low	4, 8, 16, 32
4	Noise reduction high	4, 8, 16, 32
5	Auto transfer each image	YES; NO
6	Delete this program*	YES; NO

* not applicable to program 1

1...6 ◆ Select the desired menu item.

◆ Confirm this by pressing "Return".

◆ Select a parameter with the arrow keys.

◆ Confirm this by pressing the "Return" key.

◆ Press the "Home" key to exit.

Subtraction

Menu item	Text on the monitor	Parameters available
	SUBTRACTION PROGRAM X	1, 2, 3, 4, 5
1	Program name	Name can be entered
2	Subtraction	Min, Max
3	Dose rate	MID, HIGH
4	Landmark	None, 10%, 20%, 30%
5	Video signal at the documentation output	Positive, Negative
6	Image display	Positive, Negative
	Phase B1	
7	Duration of phase B1	0...100s
8	Disk transfer rate (frame rate)	0, 0.5, 1, 2, 3, 4, 5, 6 f/s**
	Phase B2	
9	Disk transfer rate	0, 0.5, 1, 2, 3, 4, 5, 6 f/s**
10	Delete this program*	YES; NO

* not possible for program 1

**** Attention: Do not select disk transfer rate "0".**

1...10 ◆ Select the desired menu item.

◆ Confirm this with the "Return" key.

◆ Select a parameter with the arrow keys.

◆ Confirm this by pressing the "Return" key.

◆ Press the "Home" key to exit.

Roadmap

Menu item	Text on the monitor	Parameters available
	ROADMAP PROGRAM X	1
1	Program name	Name can be entered
2	Subtraction	Min, Max
3	Dose rate	MID, HIGH
4	Landmark	None, 10%, 20%, 30%
5	Video signal at the documentation output	Positive, Negative
6	Image display	Positive, Negative

1...6 ◆ Select the desired menu item.

◆ Confirm this by pressing the "Return" key.

◆ Select a parameter with the arrow keys.

◆ Confirm this by pressing the "Return" key.

◆ Press the "Home" key to exit.

Windowing

Windowing is defined as the mapping of pixels to output values which are visualized within a window section.

Manual windowing

In Subtraction and Roadmap modes, you can set 256 values for 6 different LUTs (Look Up Tables) in the Window Level Menu.

Selecting extreme pixel values results in limited output and in addition, loss of image information. Carefully consider the values you select. For values above 200, only a narrow range of input pixel values can be seen, e.g. they are pure white or pure black.

Menu item	Text on the monitor	Parameters available	Value as supplied
	WINDOW LEVEL		
1	/1Brightness	0...255	100
2	/1Contrast	0...255	195
3	/2 Brightness	0...255	105
4	/2Contrast	0...255	205
5	/3Brightness	0...255	110
6	/3Contrast	0...255	215
7	/4Brightness	0...255	115
8	/4Contrast	0...255	225
9	/5Brightness	0...255	120
10	/5Contrast	0...255	235
11	/6Brightness	0...255	127
12	/6Contrast	0...255	245

1...12 ◆ Select the desired menu item.

◆ Confirm this by pressing "Return".

◆ Select a parameter with the arrow keys.

◆ Confirm this by pressing the "Return" key.

◆ Press the"Home" key to exit.

MOD Set Up

Available with the MOD option only

Menu item	Parameter / Text on the monitor	Parameters available
	MOD set up	
1	File format for MOD	DICOM, TIFF
2	Store to MOD	Patient list
3	Restore from MOD	
4	Format / delete MOD	
5	Delete patients on MOD	Patient list

Use MOD type 540 MB with 512 bytes per sector only.

1...5 ◆ Select a menu item.

16. Select a file type
    – To display the Tiff-format on your PC with a MOD drive, you can use e.g. Microsoft Office 95 or 97.

17. Store to MOD
    – The number of images stored is displayed on the monitor in a 3-digit format; e.g. 002 / 010
    2 = number of images stored
    10 = total number of images to be stored

Radiation cannot be released during data transfer from or to the MOD!

18. You can restore images from the MOD to the hard disk of the SIREMOBIL (DICOM format only).
    To do this, select the DICOM parameter.

19. You can format the MOD and/or erase it.

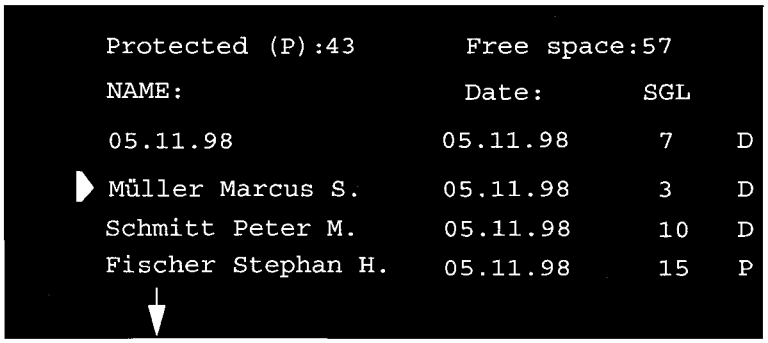
20. You can erase the images of individual patients from the MOD (DICOM format only).

The rest of the procedure is menu-guided.

Patient directory

Selection and display of patient images

Memoskop C-E 100



Example of a patient directory for Memoskop C-E 100

In the example shown here, 43 images are protected; 57 can still be saved.
(P) indicates the images for this patient have been saved
(D) indicates the images for this patient have been printed

If the memory capacity of the hard disk is full, the oldest, unprotected patient images will be overwritten.

Longer patient lists may exceed the number of lines displayed on the screen. An arrow at the upper or lower edge of the screen indicates that there are additional patients.

◆ Select the patient directory using this key.

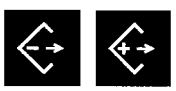
◆ Select a patient using the arrow keys:
– An arrow indicates the patient name selected.

❑ With the dual-monitor configuration, the first image of the patient appears on monitor A.

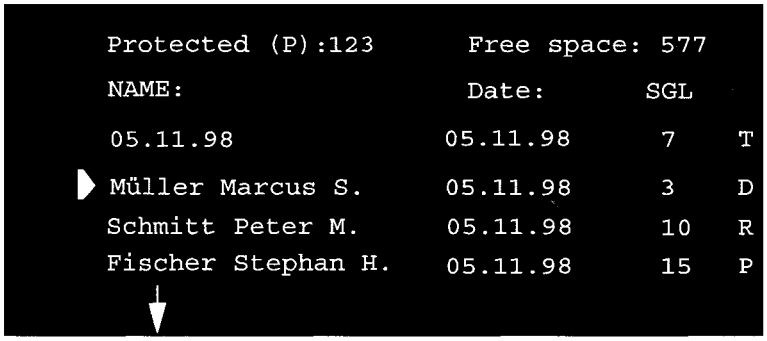
◆ Exit patient selection by pressing the "Home" key.

❑ With the single-monitor configuration, the first patient image appears on the monitor.

◆ Select the desired monitor A or B:
– (for dual-monitor configurations only).
– Now you can view the images of the patient just selected using the "paging" keys.
With + you can select the next image, with - the previous image.



Memoskop C / C-MOD



Example of a patient directory for Memoskop C

In the example shown here, 123 images are protected; 577 can still be saved.
(P) indicates the images for this patient have been saved
(T)indicates the images for this patient have been transferred (e.g. in a network)
(D) indicates the images for this patient have been printed
(R) indicates the images for this patient have been restored to disk

If the memory capacity of the hard disk is full, the oldest, unprotected patient images will be overwritten.

Longer patient lists may exceed the number of lines displayed on the screen. An arrow at the upper or lower edge of the screen indicates that there are additional patients.

◆ Select the patient directory using this key.

◆ Select a patient using the arrow keys:
– An arrow indicates the patient name selected.

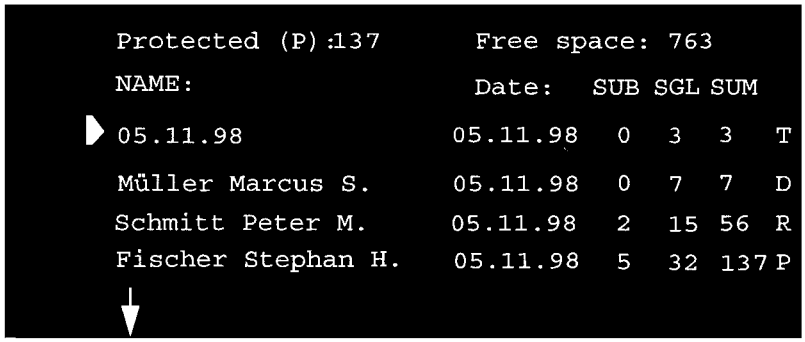
❑ With the dual-monitor configuration, the first image of the patient appears on monitor A.

◆ Exit patient selection by pressing the "Home" key.

❑ With the single-monitor configuration, the first patient image appears on the monitor.

◆ Select the desired monitor A or B:
– (for dual-monitor configurations only).
– Now you can view the images of the patient just selected using the "paging" keys.
With + you can select the next image, with - the previous image.

Memoskop C-SUB / C-SUB-MOD



Example of a patient directory for Memoskop SUB

In the example shown here, 137 images are protected, 763 can still be saved.
(P) indicates the images for this patient have been saved.
(T) indicates the images for this patient have been transferred (e.g. in a network).
(D) indicates the images for this patient have been printed.
(R) indicates the images for this patient have been restored to disk.
SUB indicates: the number of subtraction scenes
SGL indicates: the number of single images
SUM indicates: the total number of images for the respective patient

If memory capacity of the hard disk is full, the oldest, unprotected patient images will be overwritten.

Longer patient lists may exceed the number of lines displayed on the screen. An arrow at the upper or lower edge of the screen indicates that there are additional patients.

- Select the patient directory using this key.

- Select a patient using the arrow keys:
  – An arrow indicates the patient name selected.

❑ The first image of the patient appears on monitor A.

- Exit patient selection by pressing the "Home" key.

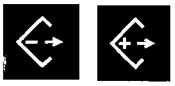
- Select the desired monitor A or B
  (subtraction images are displayed on monitor B only).

- Now you can view the images of the patient just selected using the "paging" keys.
  With + you can select the next image, with - the previous image.

❑ The operating mode of the stored image is displayed at the top of the monitor screen.

❑ Image numbering
- Single images of a patient are consecutively numbered, starting with number 1.
- Images of a scene are assigned consecutive scene numbers and image numbers, separated by a slash.

◆ If you wish to view the images within a subtraction scene, press the "SUB" or "PROCESS" key on the monitor keyboard.
(Subtraction scenes can only be viewed on monitor B.)



◆ The "paging" keys allow you to page through the SUB scene (forward/backward).
- By holding down the keys, you can view the images in a loop (CINE LOOP). The images are displayed at the same frame rate as they are acquired.

◆ Press again the "SUB or PROCESS" key to exit the SUB scene.

Patient registration

◆ Press this key to select the patient data mask.

❑ If a cassette is inserted, you cannot select "NEXT PAT".

If desired, images can be saved prior to entering patient data.

The following patient data mask appears.

◆ You can now enter the following information and skip to any field using the arrow keys.

The birth date entered will be checked. If it is incorrect, you will not be allowed to exit the field.

◆ The sex can be selected with the arrow keys (options: male, female, other)

```
            Patient Data


     Last name.........: Müller
     First name........: Marcus
     Middle name.......: Schmitt
     Birth date(DD-MM-YYYY):12-05-1958
     Sex...............: male
     Patient ID........: A1153359
     Accession number..: 19981103


     Press  ↵   to continue
     Press  →|←  to exit
```

The patient ID is the identification number assigned by the HIS (hospital information system).

The access number is assigned by the hospital staff for the purpose of distinguishing between several patient entries made for the same patient.

Save the entered patient data before you exit the mask with the "Home" key.

If you exit this mask without entering information, no information will be displayed.
If this patient data mask was not opened, (e.g. emergency room patient), the current date will be used as the patient name for radiographic exposures (not for Memoskop C-E).

Incorrect or incomplete patient data can be changed in the user menu by selecting item M "Rename").

You can name subtraction scenes directly in the patient image; however, the name must be entered exactly one line above the patient name so that it is saved. To do this, move the cursor to the line above the patient name.

Write protection

You can save images with write protection, so that they cannot be overwritten when new images are saved. Write-protected images are designated with a "P" after the image number.
The number of write-protected images and unprotected images is displayed in the top line of the patient directory.

Selecting write protection

◆ Select the patient directory using this key.

◆ Select a patient name.

◆ Press the "SAVE PAT" key:
– A"P" appears following the number of saved images.

Canceling write protection

◆ Select the patient directory.

◆ Select the patient name.

◆ Press the "SAVE PAT" key.
– The"P" following the number of images disappears.

Subtraction operating mode

Principle of the SUB memory

The subtraction technique enables isolated display of the vascular system by means of background subtraction following intra-arterial injections of contrast agent.

Images without contrast agent (masks) are continuously digitally subtracted from images with contrast agent (opacification) and displayed on the monitor. Depending on the contrast agent response, the vessel is visualized free of superpositioning.

Since the images are subtacted in real time, vessels and contrast agent dynamics in the vessel can already be observed during the examination.

The subtraction technique enables hemodynamic display, display of peak vascular opacification, and roadmapping for interventional procedures, such as dilatation and embolization.

Subtraction phases

The subtraction procedure can be subdivided into three phases.

Phase A

❑ The length of time until the mask is ready.

Phase B1

❑ The length of time from "injection" displayed on the monitor until the contrast agent has reached the region being examined.

Phase B2

❑ The critical time during the acquisition of the region being examined.

So as not to unnecessarily overload the memory with images of little or no interest, the time of phase B1 and the disk transfer rate of phases B1 and B2 can be set in the subtraction menu.
(Refer to Subtraction menu).

Landmark

With digital image subtraction, it is sometimes useful to be able to see the anatomy surrounding the highly-contrasted blood vessels.

- Select the desired section for Landmarking in the user menu under Subtraction.
  You can select from among the following alternatives:
  10%, 20%, 30% or no Landmark.
  All patients and their respective scenes will then be displayed with this new value.

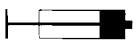
Subtraction procedure

- ◆ Enter a new patient, if required.
- ◆ Position the region to be examined.
- ◆ Check the collimation.

- ◆ Select subtraction on the basic unit.
- ◆ By repeatedly pressing the key, you can page through the various programs.
- ❑ You can enter a scene name, if desired.

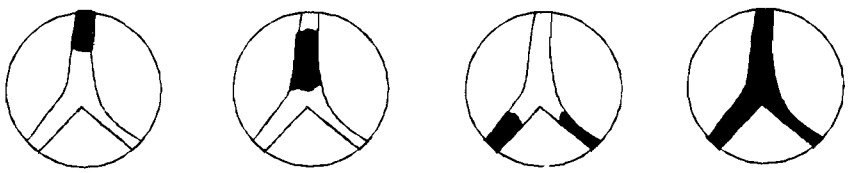
- ◆ Move the cursor by pressing the "Return" key to the line above the patient name and enter the scene name.

- ◆ Activate the fluoro button and hold down the fluoroscopy switch.
  The native image is displayed on monitor A.



- ◆ Inject the contrast agent into the blood vessel, as soon as "Injection" appears on the screen (in the center, above).

Continue to hold the fluoro switch until the vessel is completely filled with contrast agent and is clearly displayed on the monitor.



- ❑ Continuous filling of the blood vessels with contrast agent can be observed.
- ❑ The result is live subtraction with dynamic contrast agent display.
- ❑ After radiation has been switch off, a subtraction image with summation of contrast agent fill images (SUB max.) is displayed on monitor B;
  the MAX OP (peak opacification or the image from the scene that shows the maximum fill phase) is displayed on monitor A.
- ❑ The Max SUB image as well as the Max OP image are stored to the hard disk.

Roadmap operating mode

The Roadmapping technique allows the user to place a catheter accurately in the vessel under fluoroscopic control.

In the first step of this procedure, the Max OP (min. OP) image from a normal subtraction series is used as the mask. In the second step, the vascular display is superimposed by the current fluoroscopic image in which the catheter is located.

Roadmap procedure

- Position the region to be examined.

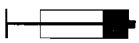
- Check the collimation.
- Select Roadmap.

- Release radiation via hand switch or foot switch (left pedal) and hold down the switch.

During Roadmap mode the edge enhancement  can only be selected on the monitor trolley.

❑ The live image appears on the left monitor.

❑ After a few seconds "Injection" is displayed on the screen (in the center, above).



- Inject the contrast agent.

Continue to hold the fluoro release button until the vessel has been completely filled with contrast agent and is clearly displayed on the monitor.

- End fluoroscopy by releasing the fluoro switch.

Using the catheter

- Release radiation via hand switch or left foot switch.
- **Position the guide wire or catheter under fluoroscopic control (in Roadmap operating mode).**

❑ Monitor A displays the fluoroscopic image,
Monitor B displays the subtracted Roadmap image with the catheter.

❑ You can repeat fluoroscopy as many times as necessary while moving the catheter.

❑ When reselecting Roadmap, a new scene is started.

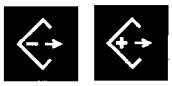
Post-processing subtraction scenes

If no patient name is currently entered, you can select a patient name from the list under patient selection (as described for the Memoskop SUB patient directory) and load the subtraction images on the monitor (as described under the section entitled "Patient directory").

Remask und Pixel Shift

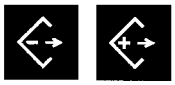
Remask

◆ Press the Remask key to start the function.



◆ Select a native image as mask by paging backward or forward.

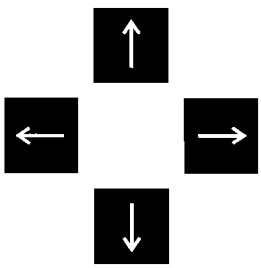
◆ Deactivate Remask by pressing the key again.



◆ Press one of the "paging" keys to display the new image.

Pixel Shift

◆ The Pixel Shift function is activated at the same time as the Remask function.



◆ When the Remask mode is activated, the current mask can be shifted with the arrow keys in the desired direction, left, right, upward, downward:
  – Each activation of one of the arrow keys causes the image to shift by 1/8th pixel in the desired direction.

The shifted mask is subsequently subtracted on-line from the native image and the result is displayed on the monitor.

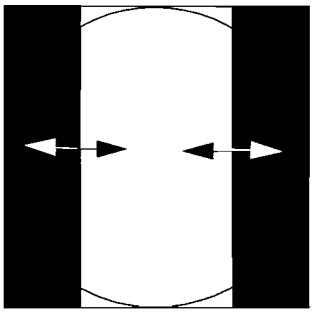
Pressing the "Home" key in Remask mode causes the mask shift to be reset to zero. This means no shift between mask and native image in the subtraction scene has taken place.

Shutter

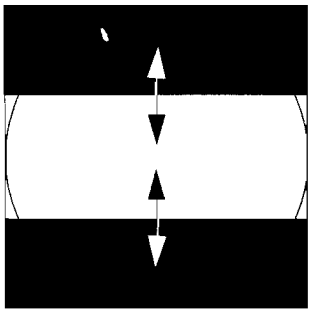
If primary collimation was not performed during the patient examination, this can be performed using electronic shutters during post-processing in order to cover overexposed sections around the region of interest.

The horizontal and vertical components of the shutter can be moved independently of each other. They can be used to modify a single image or a complete scene. The function is available on both monitors.

vertical shutter



horizontal shutter



Activation

The shutter can be moved by pressing the following keys simultaneously:

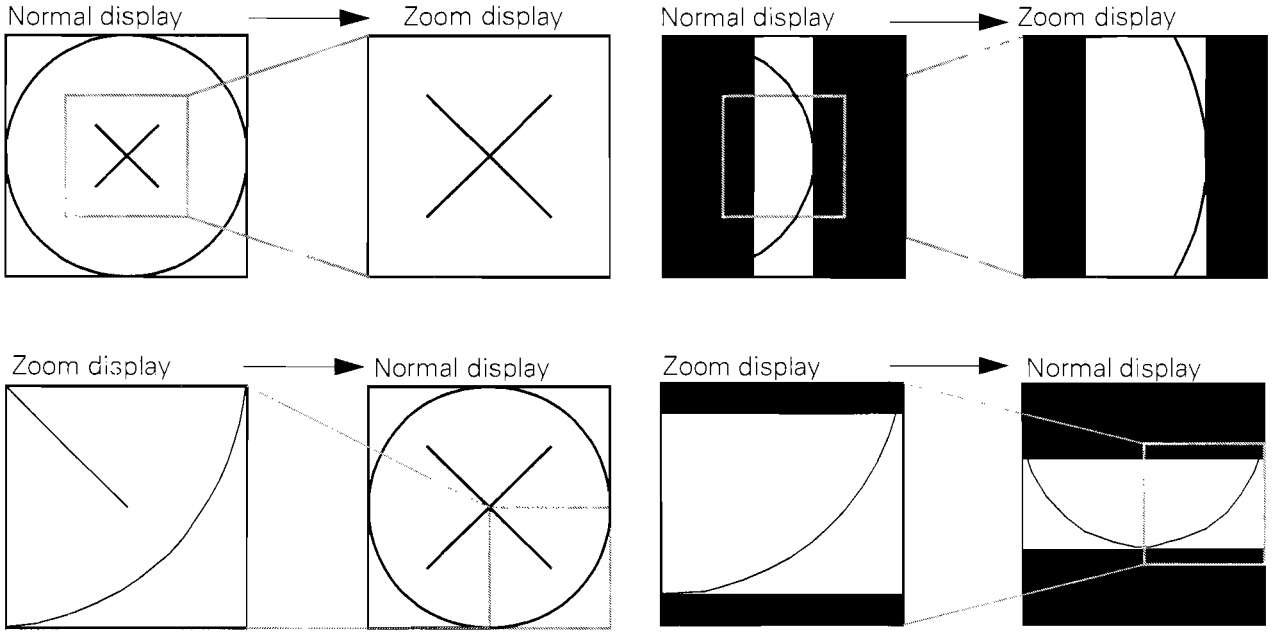
The vertical shutter closes.

The vertical shutter opens.

The horizontal shutter opens.

The horizontal shutter closes.

Shutter with Zoom function



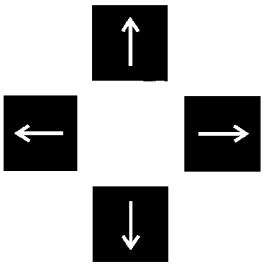
When Zoom is activated, the shutter is zoomed with the image, if it is located within the zoomed section of the image. If the function is not deactivated, it will remain active for the entire scene.

When Zoom is deactivated, the shutter Zoom function is canceled as well.

Roam

If images are displayed in Zoom mode, only the center areas of the images are visible; the borders of the images cannot be seen. The Roam function allows you to scroll the image in order to display other areas not readily visible.
Radiation must be switched off to activate Roam.

- Activate Zoom mode with the Zoom key.
  The zoomed center of the image is displayed.



- Move the zoomed image using the arrow keys in the desired direction.
  Each time the arrow key is activated, the image is shifted 5 pixels (not zoomed) in the desired direction.
  Now the edges of the image are visible.

The Zoom and Roam functions are available for both monitors.

- Deactivates Roam.

When deselecting and reselecting Zoom mode, the previous Roam image is erased and the image center is displayed once again.

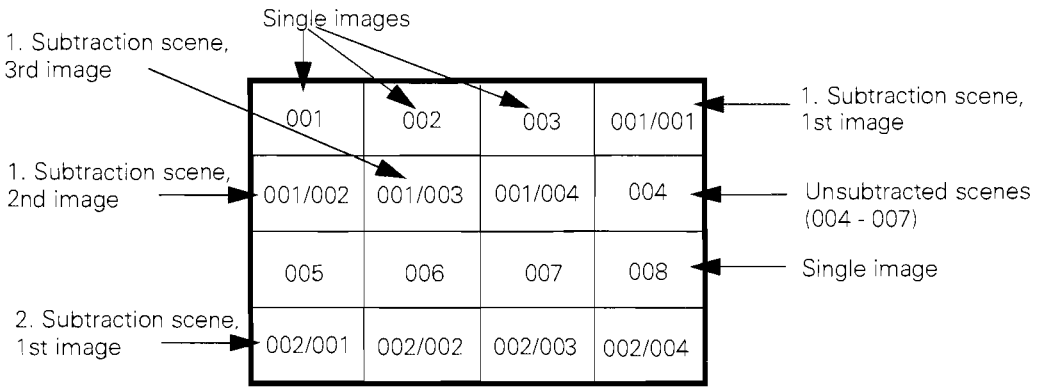
16-image collage

There are two keys that activate image split:
one is located directly on the control panel of the C-arm,
the other is on the monitor trolley keyboard.

The image key on the monitor trolley can be used to create a 16-image (4 x 4) collage display for Memoskop C and C-SUB. This function is not available with radiation switched on.
(Refer to the description of operating elements under Basic System).

- Select the image using the arrow keys and confirm with "Return."

Example:



Unsubtracted scenes are displayed as single images (refer above).

Positive / Negative image display

- By pressing the CTRL + R keys simultaneously, you can switch from positive to negative image display and vice versa.

This function is available for both monitors.

Positive or negative image display can also be selected for operating programs in the Subtraction or Roadmap modes.

Using the video recorder

The video recorder is ready to operate as long as the power switch is on and the display lights up. It begins recording automatically when radiation is activated (except for DR).

- It switches off automatically when radiation is switched off.
- The scene is automatically recorded by the video recorder.

Please note: when radiation is switched on, the video recorder will automatically overwrite any cassette located in the drive. Remove the cassette if you do not wish to record.

Video recorder functions must be set on the video recorder.

Follow the operating instructions for the video recorder.

To replay images or scenes, press "Start" on the video recorder. The images will be displayed on monitor A.

Technical data

MEMOSKOP C-E

Memory capacity: 3 images

Matrix: 512 x 512 (50Hz)
512 x 444 (60Hz)

Operating modes:
- ❑ Fluoroscopy with last image hold (LIH) or an image from the current fluoro scene
- ❑ Pulsed Fluoro with last image hold (LIH)
- ❑ Digital Radiography with last image hold (LIH)

Image processing:
- ❑ Recursive filtration, Summation or motion detection for noise suppression
- ❑ Spatial frequency filtration for edge enhancement
- ❑ Contrast enhancement, Auto Window.
- ❑ Horizontal or vertical monitor split

MEMOSKOP C-E 100

Memory capacity: 100 images

Matrix: 512 x 512 (50Hz)
512 x 444 (60Hz)

Operating modes:
- ❑ Fluoroscopy with last image hold (LIH) or an image from the current fluoro scene.
- ❑ Pulsed Fluoro with last image hold (LIH) or storage of all images
- ❑ Digital Radiography with last image hold or storage of all images

Image processing:
- ❑ Recursive filtration, Summation or motion detection for noise suppression
- ❑ Spatial frequency filtration for edge enhancement
- ❑ Contrast enhancement, Auto Window
- ❑ Horizontal or vertical monitor split
- ❑ 16-image collage
- ❑ Shutter
- ❑ Zoom/Roam

MEMOSKOP C

Memory capacity: 700 images

Matrix: 512 x 512 (50Hz)
512 x 444 (60Hz)

Operating modes:

- ❑ Fluoroscopy with last image hold (LIH) or an image from the current fluoro scene.
- ❑ Pulsed Fluoro with last image hold (LIH) or storage of all images
- ❑ Digital Radiography with last image hold or storage of all images

Image processing:

- ❑ Recursive filtration, Summation or motion detection for noise suppression
- ❑ Spatial frequency filtration for edge enhancement
- ❑ Contrast enhancement, Auto Window
- ❑ Horizontal or vertical monitor split
- ❑ 16-image collage
- ❑ Shutter
- ❑ Zoom/Roam

MEMOSKOP C-SUB

Memory capacity: 900 images

Matrix: 512 x 512 (50Hz)
512 x 444 (60Hz)

Operating modes:

- ❑ Fluoroscopy with last image hold (LIH) or an image from the current fluoro scene
- ❑ Pulsed Fluoro with last image hold (LIH) or storage of all images
- ❑ Digital Radiography with last image hold (LIH) or storage of all images
- ❑ Digital Angiography
- ❑ Digital Subtraction Angiography (DSA)
- ❑ Roadmap

Image processing:

- ❑ Recursive filtration, Summation or motion detection for noise suppression
- ❑ Spatial frequency filtration for edge enhancement
- ❑ Contrast enhancement, Auto Window
- ❑ Horizontal or vertical monitor split
- ❑ 16-image collage
- ❑ Shutter
- ❑ Zoom/Roam
- ❑ Pixelship/Remask
- ❑ Landmark

Premask phase Digital Subtraction Angiography

- ❑ 4.5 seconds for Subtraction and Roadmap

MOD

(not available for Memoskop CE)

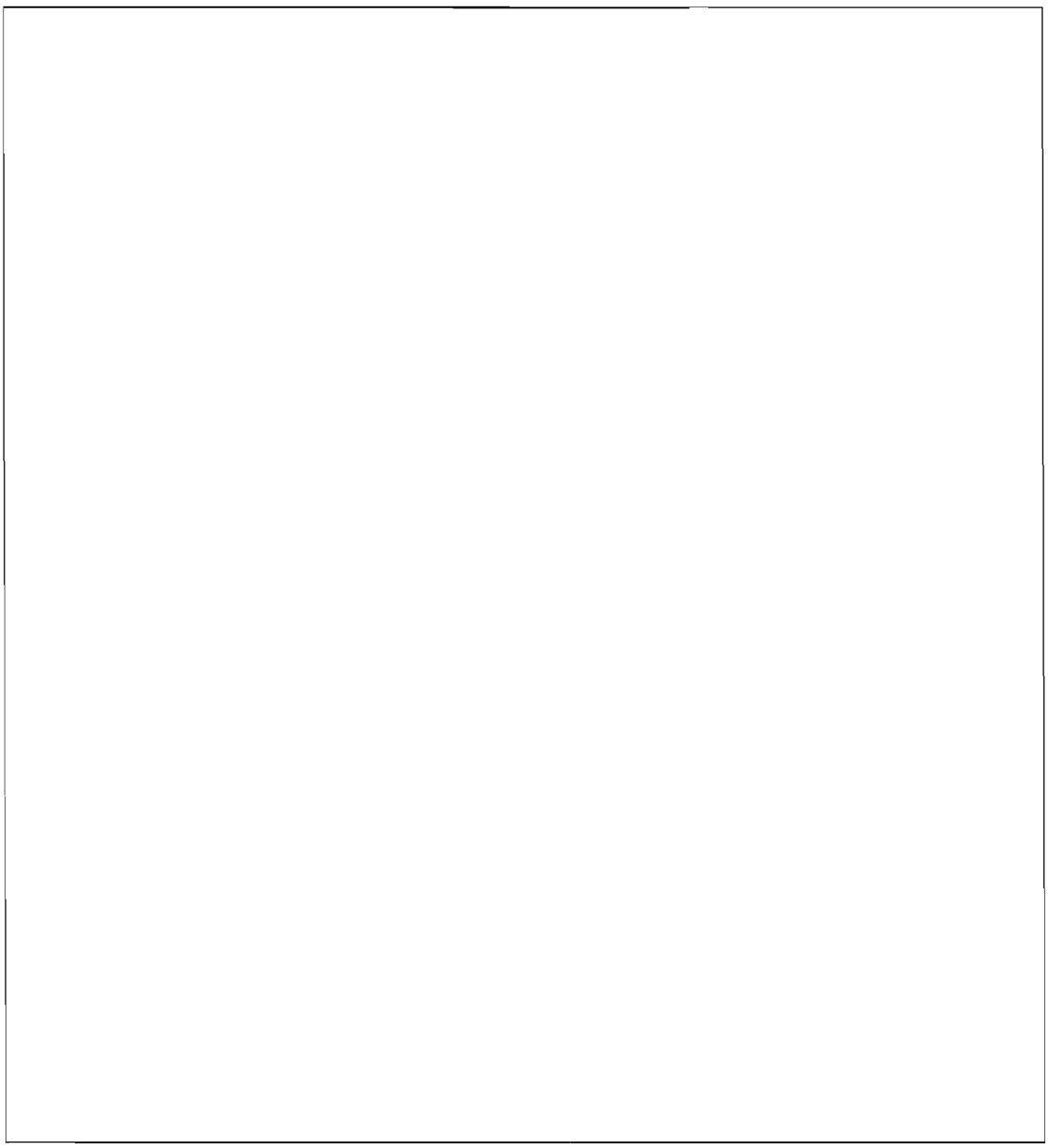
- ❑ 3.5"magneto-optical disk,
  approx. 900 images for 50 Hz version.
- ❑ approx. 900 images for 60 Hz version
- ❑ DICOM or TIF format.

SIEMENS

Operating Instructions
SIREMOBIL

Curves and Graphs

SP



SPR2-130.621.13.02.02

Please observe

Safety operating instructions

These must be studied exactly before system startup.

The original version of this manual was written in the German language.

SP

Siemens AG, Medical Engineering
Henkestraße 127, D-91052 Erlangen, Germany
Registered offices: Berlin and Munich
Siemens AG, Wittelsbacher Platz 2, D-80333 München, Germany

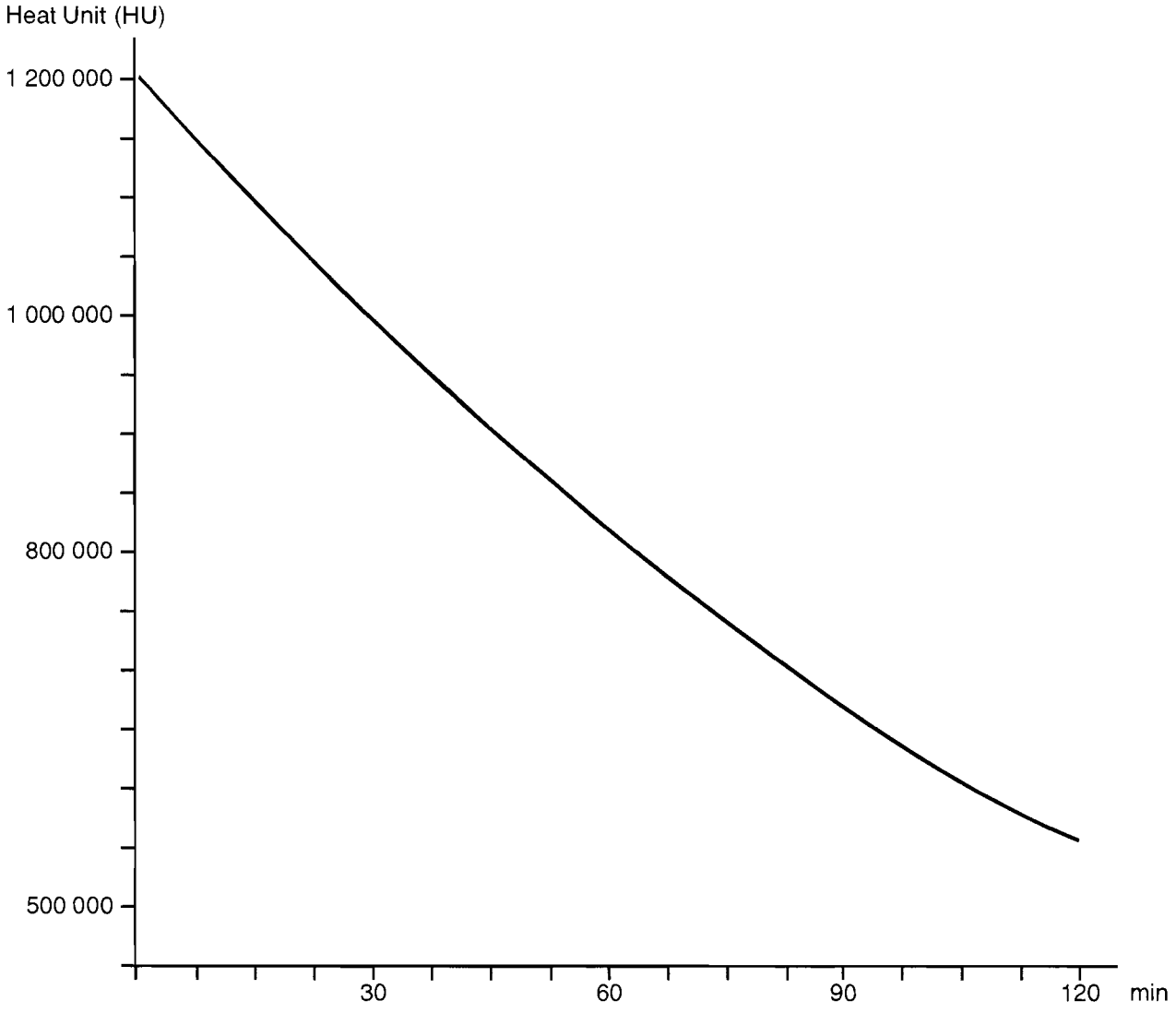
Order No.: SPR2-130.621.13.02.02
Printed in the Federal Republic of Germany
AG 08/98

Operating Instructions
Curves and Graphs

For notes

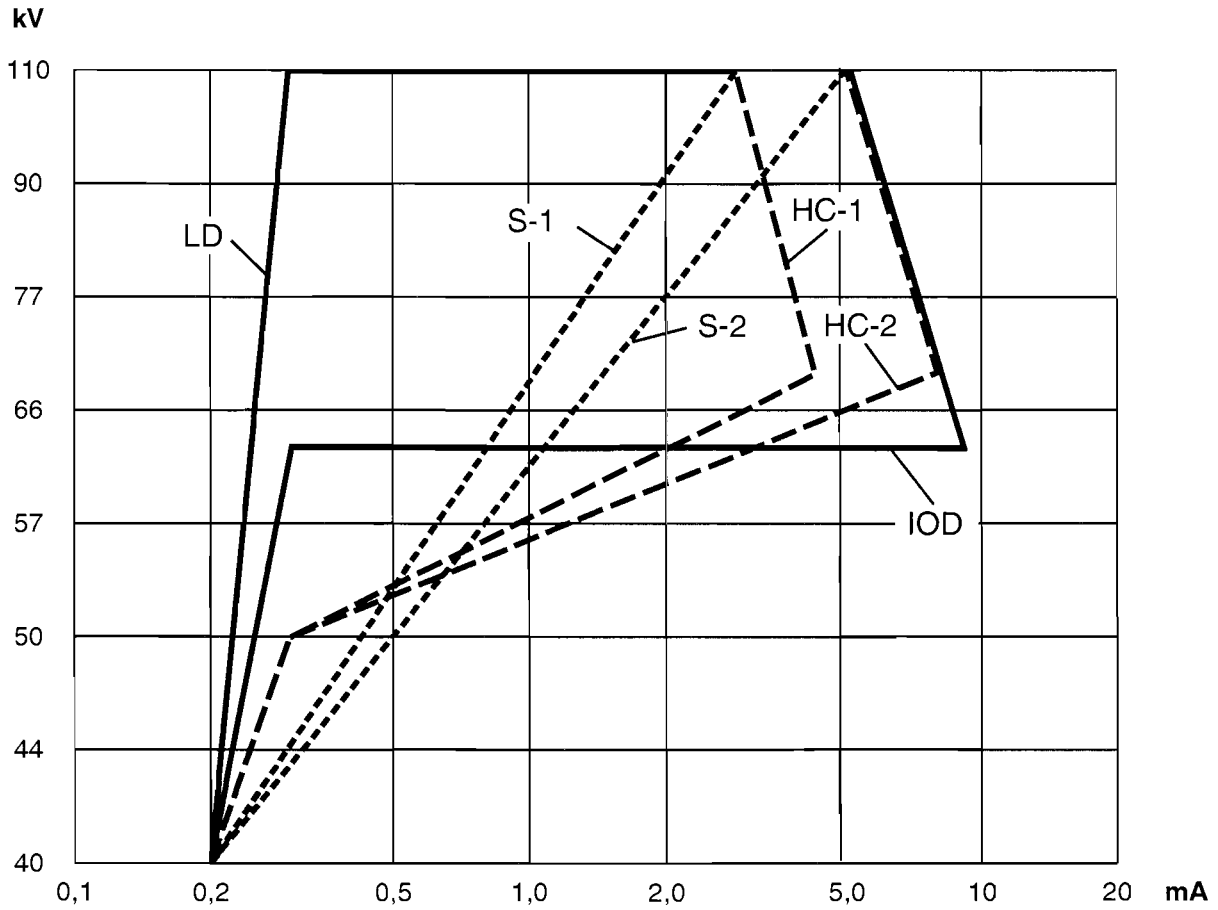
SIREPHOS 2000

Tube cooling curves



SIREMATIC curves

kV/mA curves for Fluoroscopy and Pulsed Fluoroscopy

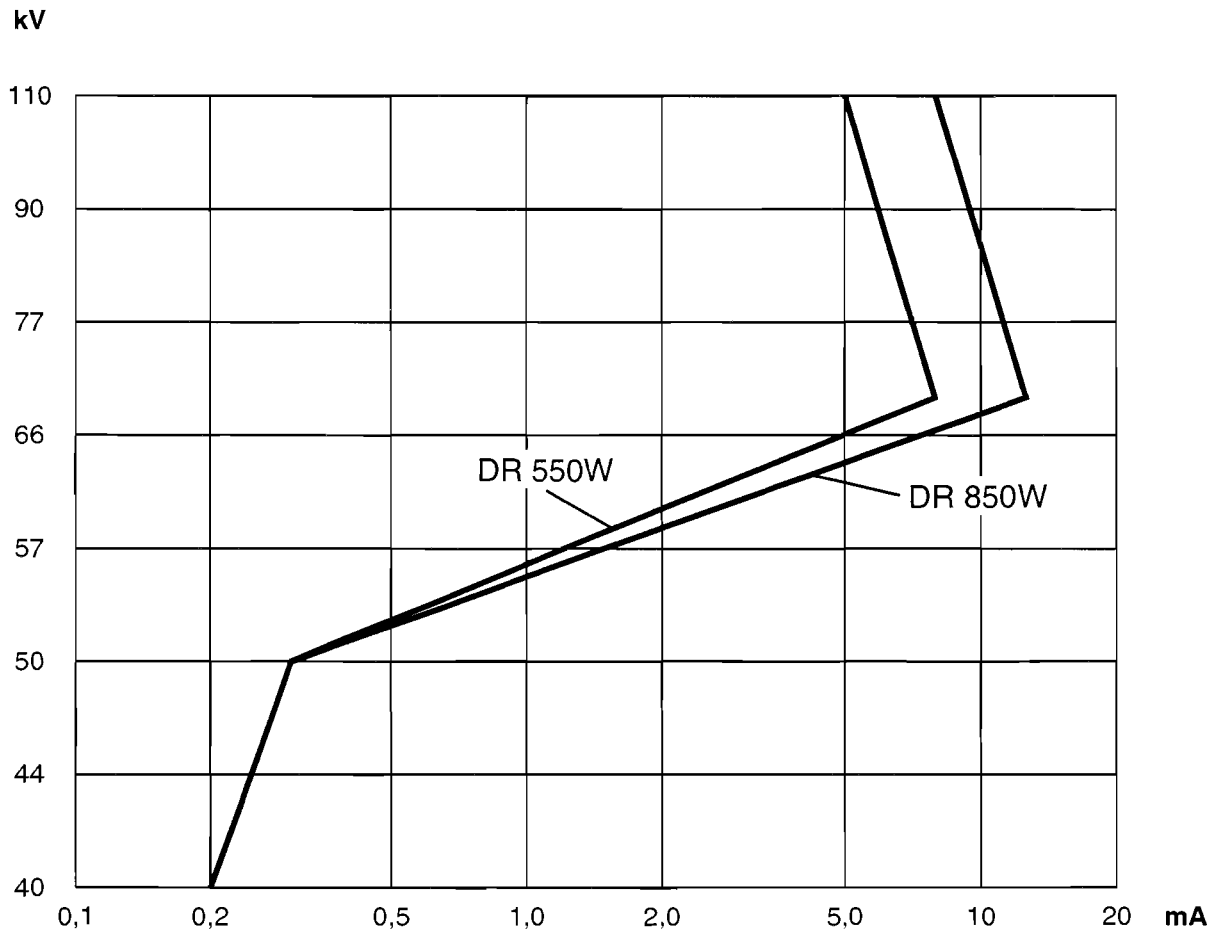


- SIREMATIC HC "High Contrast"
  - HC-1 max. 4.7 mA
  - HC-2 max. 8 mA
- SIREMATIC LD "Low Dose"
  - LD max. 3 mA
- SIREMATIC "IOD[1]"
  - Iod max. 8.9 mA
- SIREMATIC S "Standard"
  - S-1 max. 3 mA
  - S-2 max. 5 mA
- A maximum curve of ≥ 5 mA is permitted for continuous fluoroscopy to meet country-specific regulations.

[1] IOD = optimized iodine contrast

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 images requiring higher mA values (max. 8 mA) e.g. spinal column, hip, skull
IOD	IODINE curve For special applications using iodine contrast agent

kV/mA curves for Digital Radiography (DR)



- DR 1 mode "reduced output"
  – DR 550W max. 8 mA
- DR 2 mode "normal output"
  – DR 850W max. 12.5 mA

Dose rate at the image intensifier input

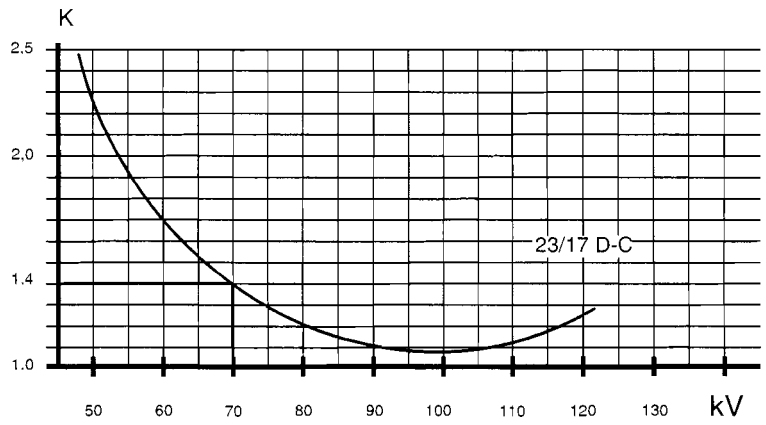
A dose rate of between 0.11µGy/s and 0.44 µGy/s measured behind the scatter radiation grid at the I.I. input is set for full format at the factory.
Using a test object, the dose rate was set in a kV range between 70 kV and 80 kV with the iris diaphragm open to maximum aperture.

Deviations from the dose rate set at the image intensifier input

Various fluoroscopic data can be entered depending on the object being examined (kV, mA). Dose rate is influenced by tube voltage and the sensitivity of the image intensifier. The sensitivity of the I.I. input screen depends on beam quality.

When examining a patient in fluoroscopy mode, additional scatter radiation values are produced in comparison to the phantom values.

Using correction value K, (refer to diagram), the deviation from the dose rate setting can be approximated.



3 mm Al prefilter, grid Pb 8/40

Example

At 70 kV, the correction factor is 1.4
i.e.
For a dose rate value set at 0.22 µGy/s, the actual value is approximately 0.22 µGy/s x 1.4 equals 0.308 µ Gy/s.

Varying the dose rate setting

- ❑ Upon request, the default value set at the factory can be programmed to a different value.

For notes

SIEMENS

Operating Instructions
SIREMOBIL Compact L

Accessories

SP

SPR2-130.621.21.01.02

Please observe

Safety operating instructions

Order No.: SPR2-130.621.19

These must be studied exactly before system startup.

The original version of this manual was written in the German language.

SP

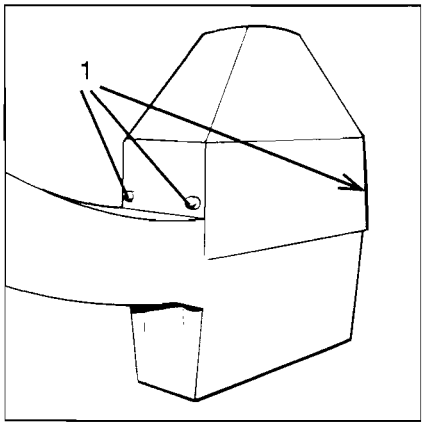
Siemens AG, Medical Solutions
Henkestraße 127, D-91052 Erlangen, Germany
Registered offices: Berlin and Munich
Siemens AG, Wittelsbacher Platz 2, D-80333 München, Germany

Order No.: SPR2-130.621.21.01.02
Printed in the Federal Republic of Germany
AG 03/01

Operating Instructions
Accessories

For notes

Spacing device[1]



The source-tube assembly cover distance (possible source-skin distance) is 202.5 mm with the standard system.

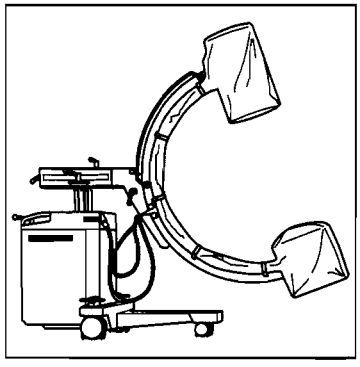
If local regulations (e.g. DHHS regulation 21 CFR 1020.32 (f)) require a larger source-skin distance, e.g. 300 mm, the system is equipped with a spacing device for a minimum source-skin distance of 302.5 mm.

If this source-skin distance is too large for special surgical examinations, the spacing device can be removed by taking off the three knurled screws (1).

The spacing device must be reattached after this type of examination to ensure the reduction in skin dose resulting from a greater source-skin distance.

[1] corresponding to country-specific requirements

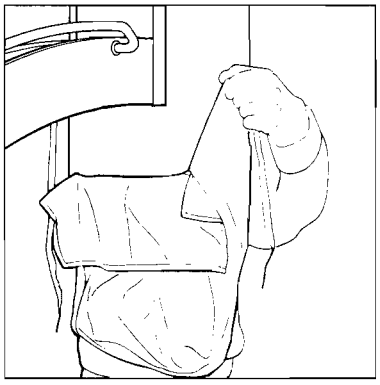
Sterilizable covers for the C-arm



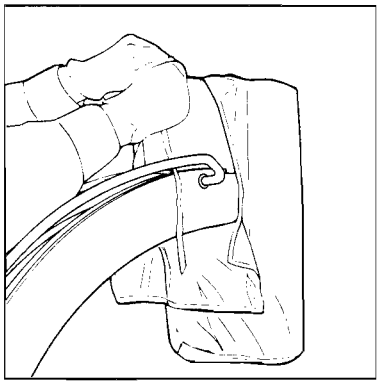
C-arm completely covered

The C-arm including the image intensifier and the X-ray tube can be covered with a two-part sterilizable cover.

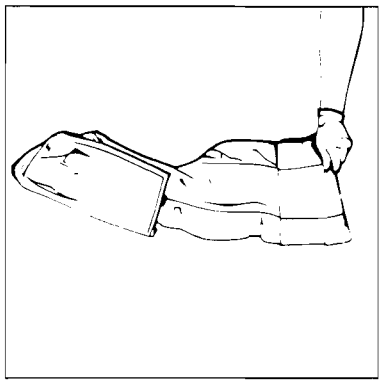
The covers are attached with sterilizable clamps.



◆ Slip the cover over the image intensifier.

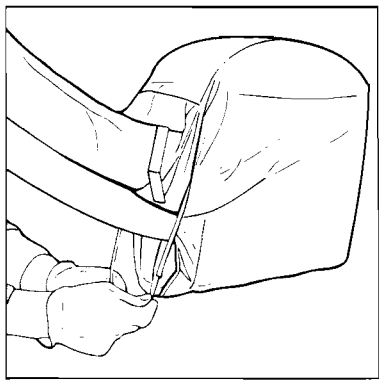


◆ Attach the cover.

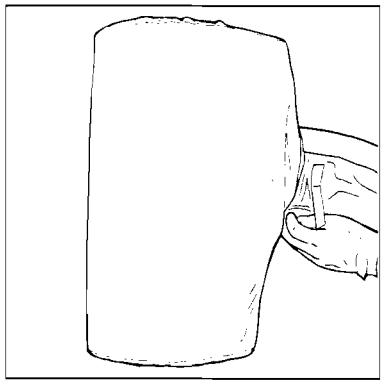


- Fold the cover for the C-arm and the X-ray tube.
  - To cover the equipment, fold the cover as shown before slipping it over the components. This ensures that the outside of the cover does not come into contact with the C-arm.

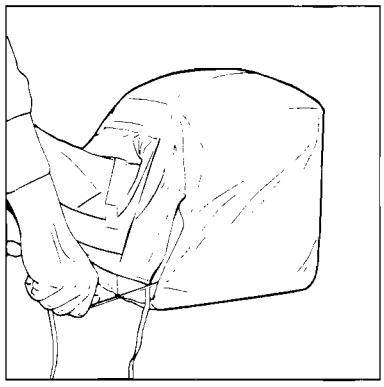
- Slip the cover over the X-ray tube and cover the C-arm.



- Attach the cover close to the X-ray tube with clamps.



◆ 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.

Clamps to keep covers in place

The clamps keep the sterilizable C-arm cover in place and can also be sterilized.

> Caution
>
> Please make sure that the clamps are properly fastened.
> Otherwise a danger of injury exists.

Grounding cable (optional)

An optional grounding cable is available for equipotential bonding in accordance with DIN 57107/VDE 0107 for rooms of Application Group 2E (cardiac catheterization).

SIEMENS

Operating Instructions SIREMOBIL

Laser Targeting Device on the X-Ray unit

SP

SPR2-130.621.16.02.02

Please observe

Safety operating instructions

These must be studied exactly before system startup.

The original version of this manual was written in the German language.

SP

Siemens AG, Medical Engineering
Henkestr. 127, D-91052 Erlangen, Germany
Registered offices: Berlin and Munich
Siemens AG, Wittelsbacher Platz 2, D-80333 München, Germany

Order No.: **SPR2-130.621.16.02.02**
Printed in the Federal Republic of Germany
AG 1098

Operating Instructions
Laser Targeting Device on the X-Ray unit

For notes

Important information

General

- The laser targeting device is an optional accessory designed for use with the SIREMOBIL Compact and Iso-C.
- These operating instructions describe the operation of the laser targeting device only.
- Correct use of the entire SIREMOBIL system presupposes that the operating personnel are familiar with the operating instructions for the SIREMOBIL.
- The adjustment of the laser targeting device should be checked for accuracy during the yearly system maintenance.
- Disinfecting the system:
  Do not use alcohol-based disinfectants for cleaning the sterilizable Plexiglas cover or the acrylic glass window over the laser diodes.

Caution
Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

The cassette holder cannot be attached to the image intensifier when using the laser targeting device.

Laser protection

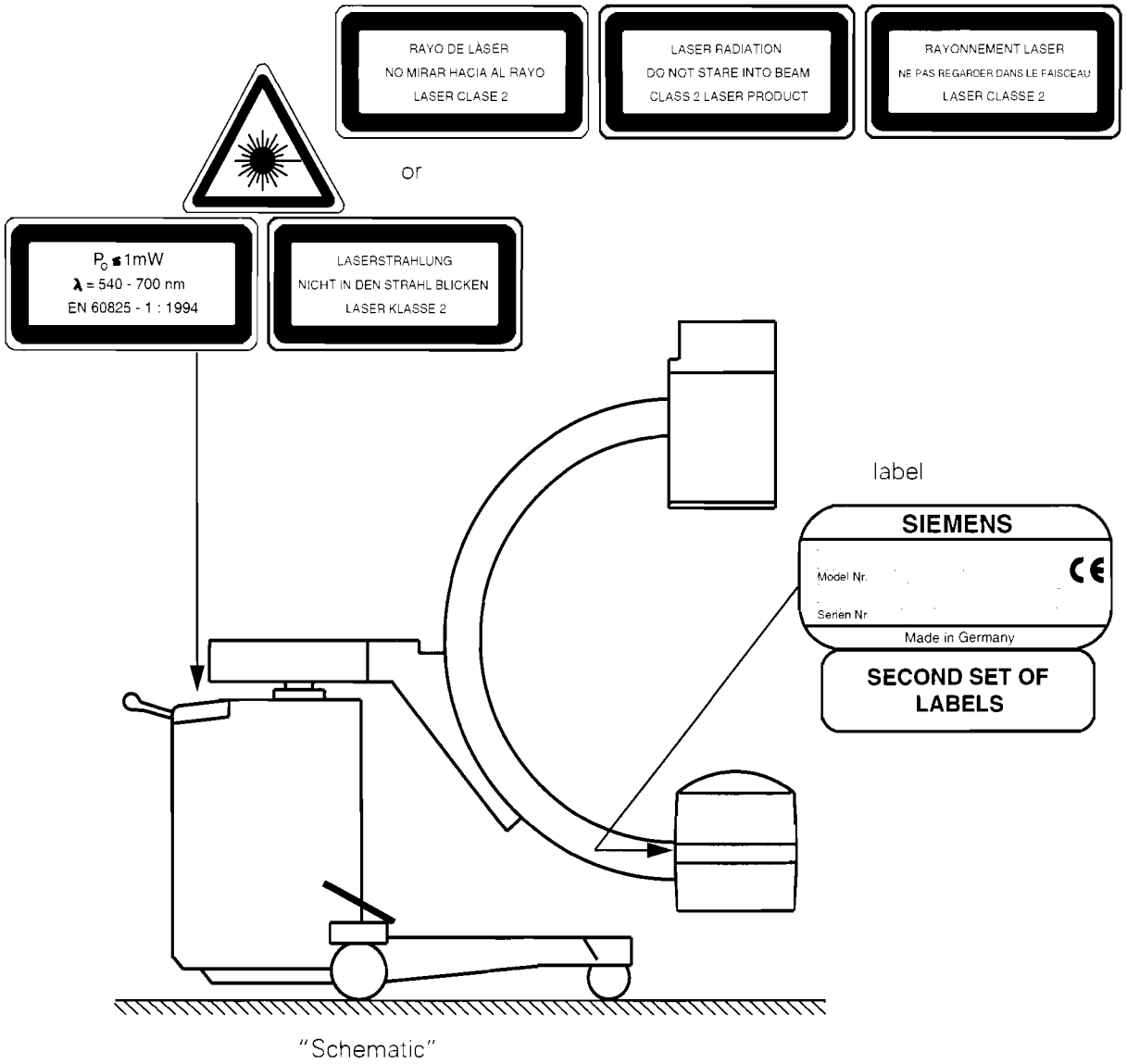
Warning

Do not look into or stare at the laser beam.

- The laser class 2 is harmless to the eye on brief exposure (looking into the beam up to 0.25s).
- The eye is normally protected by the reaction of turning away including the eyelid closure reflex.
- With Germany the operator must ensure that users are correspondingly instructed.
  Outside Germany the relevant laws and regulations governing the operation of class 2 lasers must be adhered to.

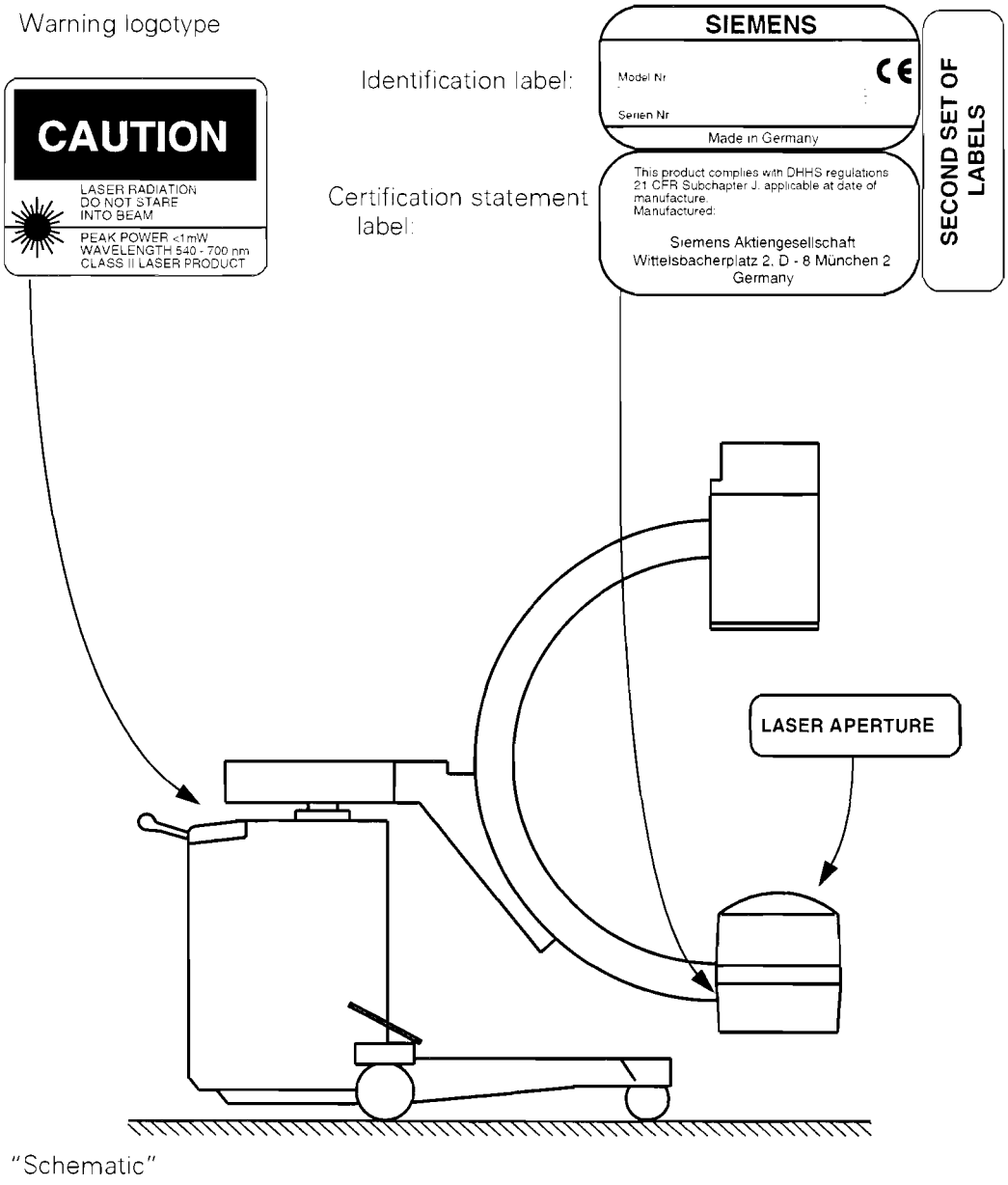
Warning labels according to IEC 825

Text in national language



"Schematic"

Warning labels for the USA and Canada



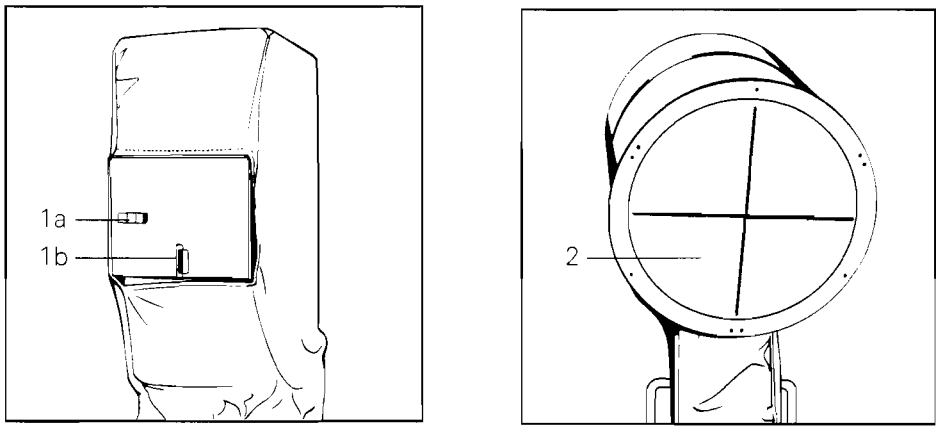
"Schematic"

Product description

Application

The primary use of the laser targeting device is in intramedullary nailing techniques where it reduces the amount of radiation and length of time presently required for distal locking of the intramedullary nail.
In addition, the laser targeting device supports the user in positioning the C-arm in every projection and in localizing foreign objects.
The laser targeting device permits safe operation and also reduced radiation exposure for patients and operating personnel.

Description

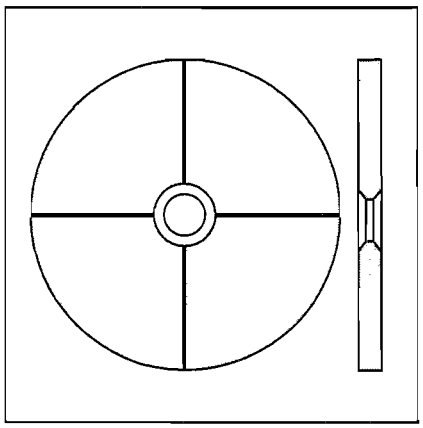


Picture on the left: SIREPHOS X-ray tube assembly with laser targeting device
Picture on the right: Laser targeting device projected on the image intensifier cap

- The laser targeting device consists of two laser diodes with optical systems (1a, 1b) mounted on the X-ray tube side of the Siremobil and a cap attached to the image intensifier (2). One set of thin lead crosshairs is embedded in the cap.
- The optical systems of the laser diodes generate two fan-shaped laser beams which are oriented perpendicular to one another and intersect in the central beam of the X-ray tube.
- The laser light cross and lead crosshairs in the image intensifier cap are adjusted in relation to one another and coincident.
- The laser targeting device is adjusted in the factory with the C-arm in the horizontal position (preferred position for intramedullary nailing).
  In other positions of the C-arm the laser light cross and image intensifier crosshairs are not completely coincident.
  These adjustments must be checked by the user. In case of deviations, they must be corrected using the two adjustment screws on the X-ray tube housing (see page 11).

- ❑ During surgery, the lead crosshairs imaged in the monitor under fluoroscopy are centered onto the object with the aid of C-arm movements.
- ❑ The X-ray generator is covered during surgery with a special sterilizable cover to ensure asepsis. The cover is made from Plexiglas. A cloth cover with a cut-out is draped over the Plexiglas and attached to the X-ray tube.
- ❑ The delivery of the laser targeting device includes a drilling template as standard accessory. The drilling template is used as target disk for intramedullary nailing.

Target disk



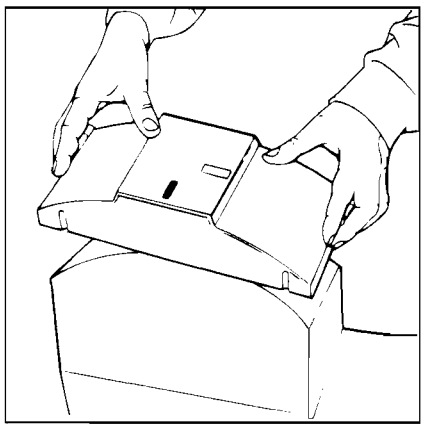
Target disk for intramedullary nailing

- ❑ Prior to use, the target disk should be adjusted to the drilling sleeve used. The hole must be countersunk from both sides.
- ❑ The diameter of the hole in the target disk has to be 0.2 mm larger than the sleeve (e.g. 12.2 mm large hole for a 12 mm sleeve).

Start-up

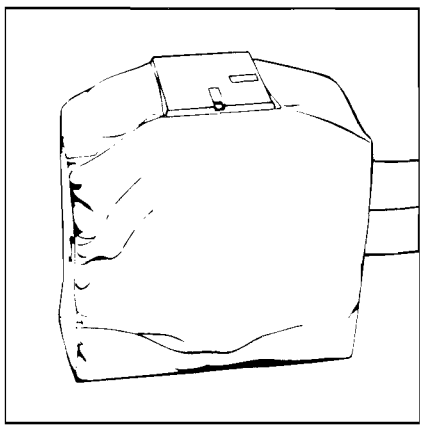
Preparations

◆ Attach the sterilized Plexiglas cover



Plexiglas cover / schematic

◆ Drape the sterilized cloth cover over the X-ray tube



Cloth cover / schematic

◆ Clamp the image intensifier cap with built-in lead crosshairs onto the image intensifier. (The scatter radiation grid remains on the image intensifier).

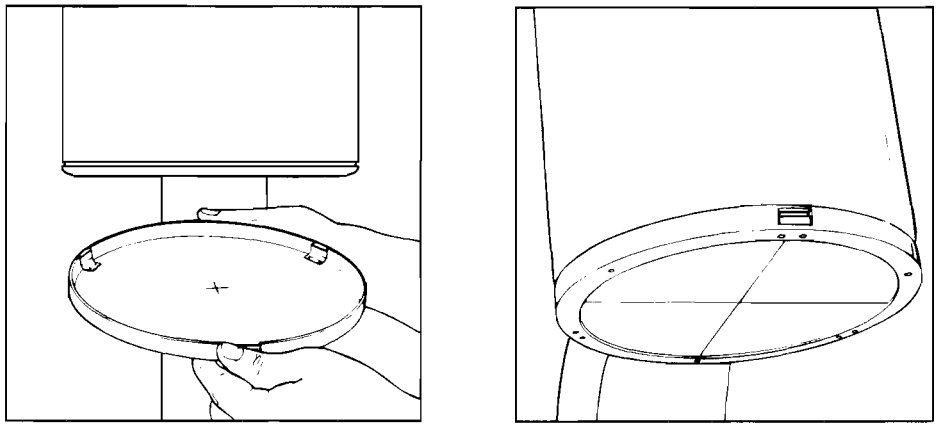


Image intensifier cap on the image intensifier / schematic

Warning

The spring clamps must be locked securely to keep the image intensifier cap on the image intensifier

Switching on the laser targeting device

◆ Switch on the SIREMOBIL system on the control panel.
(The system is ready to operate in approximately 40 seconds).

Move the C-arm into position for surgery.

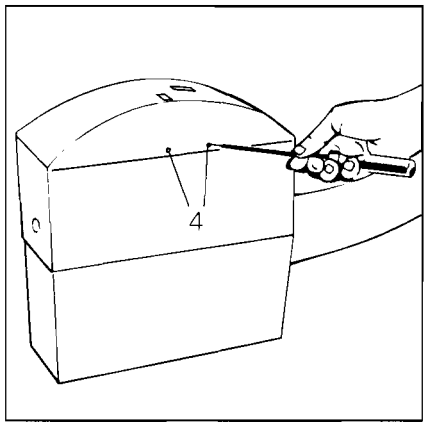
◆ Switch the laser targeting device on.
– The LED is on.

◆ Press this button again to switch the laser targeting device off.
– The LED is off.

The laser targeting device is automatically switched off after it has been in continuous operation for approximately 5 minutes.

Adjusting the laser targeting device

The adjustment is made without any object between the X-ray tube and image intensifier.
The laser light cross is projected onto the cap of the image intensifier.



Schematic

Possibilities of adjusting the laser targeting device for the corresponding C-arm position

- Turn the cap until the laser light cross is fully aligned with the lead crosshairs embedded in the cap.
- Use the two adjustment screws at the X-ray tube (4) to adjust the position of each laser beam until it is superimposed exactly on the corresponding black line on the cap.

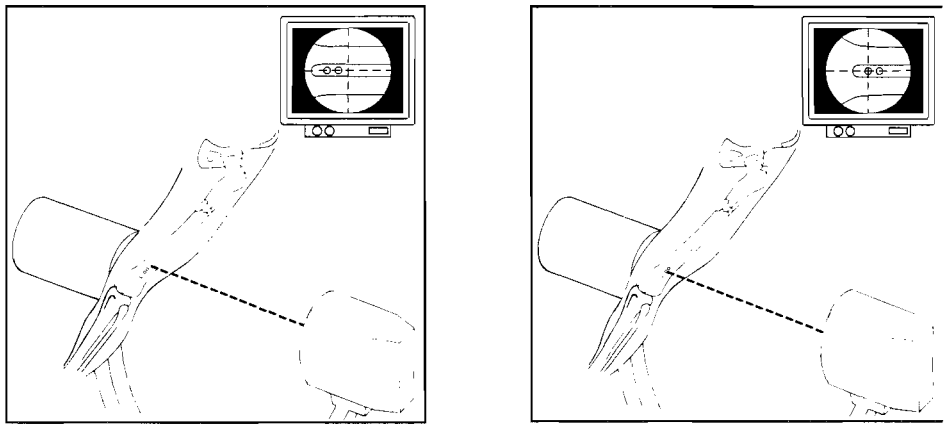
Application of the laser targeting device

- Position the C-arm over the object.
- Switch on the laser targeting device only as long as required for positioning.

Example of application: Distal intramedullary nailing

The practical use of the laser targeting device is explained by reference to distal intramedullary nailing.

The instruments used during the surgical procedure are not part of the delivery for the laser targeting device. The user is responsible for the proper use of these instruments.

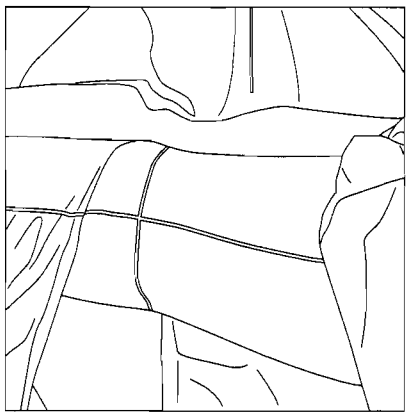


Schematic

Aligning the crosshairs and the nail hole so that they coincide.
Picture on the left: System movement required. Picture on the right: Accurate positioning

Surgical procedure

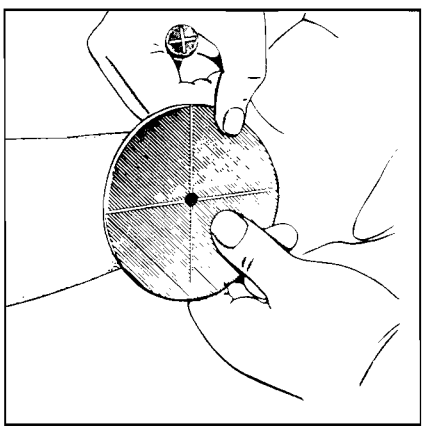
- After the nail has been inserted into the medullary canal of the bone, the nail must be locked proximally and distally with transverse locking screws.
- For distal locking of the intramedullary nail, the center of the lead crosshairs shown on the monitor is aligned under fluoroscopy with the circular drilled hole in the nail (refer to illustrations shown above).



Laser light cross projected on to the lower leg

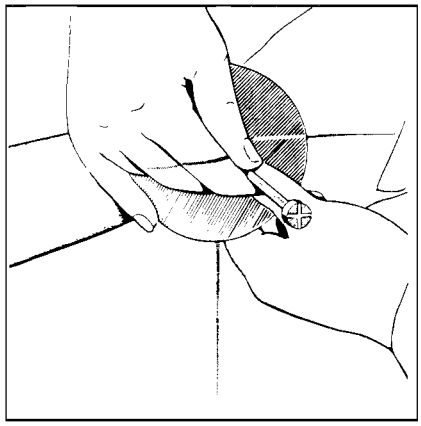
❑ When the laser targeting device is switched on, the laser light cross is visible on the patient's skin. Located exactly above the center of the hole, the laser light cross determines the drilling axis and marks the location for incision.

Marking the Corticalis



Accurate adjustment of the targeting disk in the laser light cross

❑ The target disk is placed in position so that the cross milled onto the front of the target disk and the light cross coincide. The hole in the target disk then lies exactly above the hole in the intramedullary nail.



Aligning the inserted center punch by centering the head of the punch in the laser light cross

- ❑ Then insert a punch or drilling sleeve in the hole in the disk.
- ❑ The center mark on the head of the punch is aligned with the laser light cross without changing the position of the target disk.
- ❑ The application point of the drill bit on the patient's skin is also apparent. Locating the punch hole with the drill tip is now easy.
- ❑ The smallest tilt of the drill is detected immediately, because the user is guided accurately by the laser light cross in the center of the drill.

Technical data

Laser

Laser class	Class 2 according to IEC 825
Type of laser:	Semiconductor laser (laser diode)
Wavelength:	655 nm (visible red)
Output power:	<1mW
Beam:	Beam dimensions (at exit point) 5 x 2 mm expanded: at 1 m distance 1 mm width and 0.5 m length

Ambient conditions

Operating temperature:	-10°C to +50°C
Storage temperature:	-40°C to +80°C
Relative humidity:	max. 90%

For notes

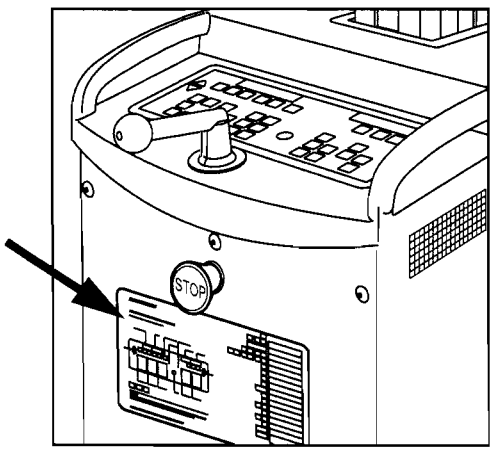
SIEMENS

SIREMOBIL Compact L

Short operating instructions

Attach the magnetic label with the printed operating instructions to the device as indicated in the diagram.

The paper version of the short operating instructions should remain in Register 14.



SP

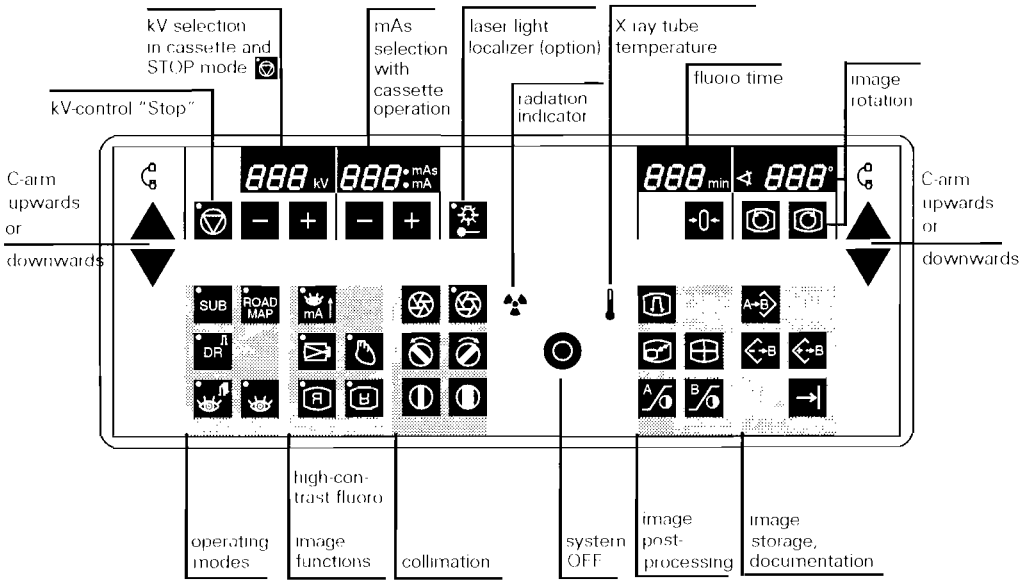
Siemens AG, Medical Solutions
Henkestr. 127, D-91052 Erlangen, Germany
Registered offices: Berlin and Munich
Siemens AG, Wittelsbacher Platz 2, D-80333 München, Germany

Order No.: SPR2-130.622.02.01.02
Printed in the Federal Republic of Germany
AG 03/01

SIEMENS

SIREMOBIL Compact L

Short operating instructions



Note!
For detailed information, especially safety-relevant notices, please refer to the system operating instructions.

System ON
(Located on monitor cart)

Operating modes:
Fluoroscopy, Pulsed fluoroscopy
Digital radiography (DR)
Subtraction, Roadmap

Radiation

Image rotation: left, right
Image reserval: left, right, up, down

Open/close, rotate slot diaphragm
Open/close iris diaphragm

With metal parts in beam path:
Press **kV control** "Stop"
Set **kV values** manually

Image intensifier format

Selection of high contrast
(if necessary)

Selection of noise reduction factor
with fast movement sequences

Image memory

Image memory

Zoom
Monitor split

Memory, paging downwards
Memory, paging upwards

Edge enhancement

Contrast adjustment for left monitor
Contrast adjustment for right monitor

Documentation

Switching off the acoustic warning signal for fluoro

Resetting the fluoroscopic time and dose displayed
(with the "NEXT PAT" key on the monitor cart, this is done automatically)

System OFF
(located on system and monitor cart)