The original language of this document is German.
System Operating Instructions

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Safety Operator Manual

It must be studied thoroughly before system startup.
Operator Manual

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Safety

Information about this Operator Manual

Proper use of this system presupposes that operating personnel are familiar with the Operator Manual. This manual must be studied in detail prior to starting up the system. Pay special attention to the following sections:

- Safety Information
- Functional and Safety Checks
- Personal Safety
- Equipment Safety

The operating personnel must be instructed in correct operation. This instruction must be repeated as required at appropriate intervals. We recommend simulating emergency conditions during training so that appropriate corrective measures can be taught.

Information on text format

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

The following conventions have been used:

Instructional text

- guides you in the proper use of your system.
  - A diamond precedes text of this type.

Lists

- A square precedes text of this type.

Explanatory text

- subdivides instruction or list text into further subitems.
  - A dash precedes texts of this type.

References

- refers you to further explanations at another point in your operator manual or in other documents.
An arrow indicates texts of this type.

**Note**
is used in two different ways:
- It emphasizes safety-relevant information where there is no immediate danger.
- It contains a summary of the most important information about a subject.

This text is highlighted in gray.

**Information**
is text that provides additional useful explanations about a subject.

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

**Highlighting of safety information**
Safety information in this operator manual will be offset by a black frame. Different degrees of danger are indicated by the following safety levels and signal words:

**Warning**
Warning draws your attention to a potential risk for the health or life of persons.

**Caution**
Caution draws your attention to the risk of possible damage to the equipment in the case of inattentive operation.

**Supplements and addenda to the Operator Manual**
- Please read the supplements and addenda to the Operator Manual necessitated by technical developments.
Names and parameters

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

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

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

Values

All numbers specified are typical values unless specific tolerances are indicated.
Laws and regulations

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

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

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

Data related to individual persons is subject to data protection. Please observe the relevant legal provisions.

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

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

Scope

This Operator Manual is valid for the user acceptance test

- SIREMOBIL Compact L
Software

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

Warning

Non-released software or manipulations and changes of the software lead to malfunctions of the product.

This may injure the patient and/or damage the product.

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

Caution

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

Access to the system by a third party.

◆ Make sure that all necessary precautions are taken (with the existing level of safety) when a factory-set function or configuration is changed.

Equipotential bonding

Products for which equipotential bonding is required may only be operated in medical facilities where supplemental equipotential bonding has been installed and tested according to the specifications in DIN VDE 0107 for Germany or relevant country-specific regulations.
Electromagnetic Compatibility

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

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

Use in connection with high frequency

The following regulations for use must be observed:

- IEC/TR 1289-1/07.94/
  High frequency surgical equipment - Part 1: Operation
  High frequency surgical units - Part 1: Operation

- IEC/TR 1289-2/08.94/
  High frequency surgical equipment - Part 2: Maintenance
  High frequency surgical units - Part 2: Maintenance
Maintenance and Check

Prior to an examination, the user must make sure that all safety-relevant parts of the system are functioning properly and that the system is ready for operation.

The system is subject to mechanical and electrical wear. In the interest of the safety of patients, operators and third persons, maintenance and safety checks are required every 12 months to maintain the operating safety and function of the product.

With increased use the check should be made at shorter intervals of time.

Please observe the statements in the "Maintenance" register in this regard.

Improper handling or excessive demands can cause mechanical and electrical damage.
Malfunctions

If there are general malfunctions in the system, call SIEMENS Customer Service.

Fault and error reports

When detecting a fault the system is blocked and the fault is displayed as an error at the operating panel of the C-arm chassis.

- Each time the system is switched on an automatic check of all important functions is performed
- During routine operation the system is constantly monitored
- Temporary error messages, such as No. 5090, can be cancelled by pressing any key on the C-arm chassis (except lifting column and On/Off switch)
- Non-temporary error messages, such as 5015 or 5016, cannot be acknowledged. Additional radiation can be released here. Please notify Customer Service immediately

The error messages 7309 and 7409 are temporary error messages that can lead to unnecessary exposure to radiation of user and patient if treatment is continued.

In case the error is repeated the system must be switched off and Customer Service must be notified. For this, the following information is useful:

- Error numbers
- Selected operating mode
- Has error occurred during radiation
- Is there a correlation with an operating sequence

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

In case of risks for patients and operators (e.g. if there is no live image on the monitor and the radiation indicator is on despite this) or in case of risks for the product, you must disconnect the power plug immediately. The entire system is shut down and disconnected from the power supply. As a consequence

- radiation is switched off
- the current application program is cancelled
- current procedures are cancelled and deleted
- all image information is deleted if it is not stored on a hard disk

You may reconnect the power plug only after you have clearly identified and eliminated the cause of the danger. In all other cases, for example, system malfunction, contact Siemens Customer Service immediately.

Switching to emergency power supply

In case of a power supply interruption of more than 8 msec, the SIREMOBIL can switch off. In this case the device must be switched on again after switching to emergency power supply has taken place.
Safety

Emergency STOP

Please press the red EMERGENCY STOP switch (arrow) on the electronic unit of the SIREMOBIL Compact L C-arm chassis as soon as a dangerous situation occurs due to motor-driven movements.

- The motorized vertical lift is then blocked immediately.
- All other unit functions are not affected by this.
- Unlock the switch only when the danger has definitely passed.
- You can unlock the switch by a slight clockwise rotation.

Fire protection

Warning

In the event of fire:
Poisonous gases or fumes can result from a burning or smoldering fire.

- Switch off the system immediately.
- Pull out the mains cable from the socket.
- We recommend that all personnel be given safety training to instruct them on what to do in the event of a fire.

Please notify our Customer Service prior to starting up the system again as it may require refurbishing due to damage caused by fire.
Explosion protection

C-arms including image intensifier and X-ray tube assembly are designed according to the regulations for devices with anesthesia test (AP) according to DIN IEC 601 Part 1/VDE 0750 Part 1, main section 6, and marked by this symbol (on green dot).

⚠️ If the housing of the image intensifier unit and the single tank are damaged, the system may not be operated.

Products with anesthesia test may be repaired only by the manufacturer or a customer service authorized by the manufacturer.

Warning

In case of explosion:

Fire or smoldering fire may cause an explosion.
Overload protection

Prolonged continuous radiation at maximum tube load is permissible during fluoroscopy. This can cause the X-ray tube assembly to heat up. For this reason, the X-ray tube assembly has a thermal monitor.

**Warning**

Heating up of X-ray tube assembly through permanent radiation:  
This can lead to skin burns.

◆ Direct contact between the tube assembly housing and the patient’s skin must be avoided at a temperature ≥ 50 °C.

If the temperature rises to ≥ 50 °C

- the temperature indicator on the operating panel of the C-arm chassis lights up
- a selected high contrast characteristic curve is deselected at the end of radiation
- the characteristic curves are switched from:
  - S2 to S1
  - HC2 to HC1
  - IOD to HC1
- renewed selection of the high contrast characteristic curve is possible

If the temperature rises to ≥ 60 °C

- a switch is made to another characteristic curve during radiation
- the characteristic curves are switched from
  - S2 to S1
  - HC2 to HC1
  - IOD to HC1
- Selecting the fluoroscopic curve S2, HC2 and IOD is no longer possible

If the temperature rises to ≥ 70 °C

- the temperature indicator on the operating panel of the C-arm chassis flashes
- the radiation is aborted. No more release is possible

If the temperature falls below 50 °C

- the previously selected characteristic curve is selected again automatically
**Personal Safety**

**Open heart and skull examinations**

If you use an approved product alone or together with other products for these examinations, you must establish an equipotential bonding between the product and a point in the equipotential bonding, e.g. the tabletop.

Only then you are able to establish a connection between the patient and the product.

**Risk of crushing on the C-arm chassis**

For proper handling of the unit, hold it with your hands only with the handles provided for this purpose. Where this is not possible, pay special attention to possible risks of crushing between moving parts and their guide openings.

---

**Warning**

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

*There is risk of crushing for the hands.*

◆ Please make sure that your hands do not get in the way of travel paths of components.

---

**Warning**

Maximum lowering of C-arm (see graphic 2)

*There is risk of crushing for the feet.*

◆ In case of maximum lowering of the C-arm, please mind your feet, as there might not be enough space between I.I. and the floor.

The components marked in the illustrations indicate danger points where the patient or operating personnel can be injured.
Danger points for operating personnel

1. Danger points in case of movements and braking of the C-arm
2. Danger points in case of maximum lowering of the C-arm
3. Danger points in case of movements and braking of the C-arm
Risk of crushing on monitor trolley

You can equip your monitor trolley optionally with a printer.

**Caution**

Pushing the printer in or out

*There is risk of crushing for the hands.*

- Please mind your hands when pushing the printer into or out of its position.

Danger points for operating personnel

**Mechanical damage**

Mechanical damage of the system must be repaired and maintained by authorized service engineers in order to avoid injuries of patients, operating personnel and third parties.
Safety

Radiation protection

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

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

For the patient

- Keep the radiation field as small as possible.
- Ensure the best possible protection of the patient during exposures in the vicinity of his or her reproductive organs (use gonadal shields or lead-lined rubber covers).

For the operating personnel

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

For patients and operating personnel

- Keep the duration of fluoroscopy as short as possible.
- Keep the source-to-skin distance as large as possible.

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

Please take into account that certain materials in the X-ray beam (e.g. parts of an operation table) may deteriorate the X-ray image due to imaging of contours and inclusions in these materials. In certain rare cases, this may even lead to incorrect diagnosis. This material may also result in a higher radiation exposure.
Position and extent of the relevant operating area

(according to DIN EN 60601-1-3)

Vertical beam path
Focus 170 cm above ground

Main operating area
Dimensions in cm
Safety

Maximum scattered radiation in the relevant operating area

Measuring conditions
The values are valid for fluoroscopy with automatic dose rate control, HC-2 characteristic, with water phantom 25 x 25 x 15 [cm] directly on the I.I.

<table>
<thead>
<tr>
<th>Height above floor in cm</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.I. 17 cm/7&quot;</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td>&lt; 700 µGy/h</td>
</tr>
<tr>
<td>I.I. 23 cm/9&quot;</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td>&lt; 1.7 mGy/h</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Height above floor in cm</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.I. 17 cm/7&quot;</td>
<td>160 to 190</td>
</tr>
<tr>
<td></td>
<td>&lt; 30 µGy/h</td>
</tr>
<tr>
<td>I.I. 23 cm/9&quot;</td>
<td>140 to 200</td>
</tr>
<tr>
<td></td>
<td>&lt; 70 µGy/h</td>
</tr>
</tbody>
</table>

Radiation interruption for all operating modes
The hand as well as the foot switch are designed as push button. By releasing the respective operating element, radiation during fluoroscopy is interrupted immediately, or after completion of the storage image.
Equipment Safety

Installation, repair

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

SIEMENS cannot accept responsibility for the safety features and for the reliability and performance of the equipment as the manufacturer, if:

- the product is used in a manner other than that specified in the Operator Manual,
- installation, upgrades, resetting, modifications, or repairs are performed by personnel not authorized by SIEMENS,
- components affecting safe operation of the product are not replaced by original spare parts in the event of a malfunction,
- electrical wiring in the rooms containing the system do not meet the specifications of VDE ordinance 0107 or local regulations.

On request we can provide you with technical documentation for the system. However, this does not imply authorization to undertake repairs. We cannot be held responsible for repairs made without our express written consent.

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

Original accessories

For safety reasons, only approved original accessories from Siemens or accessories of other manufacturers approved by SIEMENS AG, Medical Solutions Group, may be used for this product.

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

Combining with other products/components

To ensure the required safety, only products/components expressly approved by Medical Solutions, SIEMENS AG, Medical Solutions Group, may be used in combination with this system.

With regard to mounting non-Siemens products to the image intensifier, please read

(→ Register Accessories and Options)
Additional components which are inserted into the beam path (e.g. positioning aids) weaken radiation and can adversely affect image quality.

**Positioning the C-arm**

In case of improper handling of the SIREMOBIL Compact L, collisions of the image intensifier and the single tank with the patient and the tabletop are possible due to the maneuverability of the C-arm.

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

When moving or transporting the unit, please make sure that the components do not bump into any obstacles. A collision can also adversely affect image quality or release radiation unintentionally.

Make sure that the brakes are locked again after having moved the C-arm.

**Disposal**

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

- If the system is put out of service, there may be local regulations and laws governing its disposal. In order to ensure that these legal regulations are complied with and to avoid environmental damage which may be caused due to the disposal of your system, please consult Siemens Customer Service.

- Batteries and packaging material must be disposed of in an environmentally safe manner according to national regulations.

- For further information on the disposal of this system, refer to the technical documentation.

(→ see section Technical Documentation)
Please observe the

Safety Operator Manual

It must be studied thoroughly before system startup.

The original version of this Operator Manual was written in the German language.
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Basic System

Function Description

Use

The SIREMOBIL Compact L system is a mobile X-ray unit for surgery, traumatology, orthopedics, for minimally-invasive surgery and for cardiology.
You can select the following operating modes for the SIREMOBIL Compact L: Fluoroscopy, Pulsed Fluoroscopy, Digital Radiography, Subtraction (optional) and Roadmap (optional).
These are required for a large variety of clinical procedures, such as intraoperative display of the bile pathways, implantation of metal parts, display of bones, fluoroscopy techniques for pain therapy as well as insertion of catheters and probes.

System Configuration

Basic version

- 17 or 23 cm image intensifier
- 3-image memory, 100-image memory, 200-image memory, 700-image memory or subtraction memory with 900 images (MOD optional)
- 1 or 2 SIMOMED or standard class monitors or 2 TFT monitors
- Single-focus tube with 1.4 kW generator
- CD-(R) reading image data (CX 200)

Options

- DICOM Bridge
- MOD (for 700 image memory and 900 image SUB memory)
- MULTISPOT 2000-2 or 2000-1/4 multiformat camera
- Codonics printer and frame grabber (for USA only)
- Video printer
- Laser light localizer with sterile cover (selectable for I.I. and/or single tank)
Basic System

- Dose measurement chamber
- Cassette holder
- Sterile cover for x-ray image intensifier, tube assembly and C-arm
- 2000-image memory
- 5000-image memory with DSA
- CD-(RW) export of image data

System overview

Overview of a SIREMOBIL Compact L system with 1 TFT monitor

1. SIREMOBIL electronic unit
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 and integrated collimator
8. Monitor
9. System ON/OFF switch
10. Data entry keyboard
(11) Storage compartment or slot for printer
(12) Storage compartment or place for printer
(13) Monitor trolley
(14) CD RW drive (optional)
(15) Radiation indicators
(16) Ambient light sensor (dependent on TFT monitor)
(17) Front handle
(18) Castors
(19) Grounding strap
(20) Cable holder (not displayed - on back of monitor trolley)

Overview of a SIREMOBIL Compact L system with 2 TFT monitors

(1) SIREMOBIL electronic unit
(2) Control panel
(3) Lifting column
To optimize the image impression dependent on the viewer and perspective, the observer can tilt both TFT monitors.
**Overview of operating elements and displays**

**Control panel at the C-arm system**

The control panel and display field for carrying out your examinations is located on the C-arm system. The individual keys and displays are grouped into individual areas according to their function.

1. Selection of the operating modes
2. Selection of Power mode, parameter setting and image reversal keys
3. Collimator setting
4. Radiation indicator, power switch and tube assembly temperature
5. Image post-processing
6. Image selection and storage
7. Vertical movement of the C-arm
8. Image rotation
9. Duration of exposure
10. Fluoroscopy parameters and selection of single tank laser light localizer (optional)
# Key allocation

## top row of keys

<table>
<thead>
<tr>
<th>Key</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>Exposure or fluoroscopic voltage (kV)</td>
</tr>
<tr>
<td>3.1</td>
<td>Display of the fluoroscopic time</td>
</tr>
<tr>
<td></td>
<td>Switch stop function of dose rate control on/off</td>
</tr>
<tr>
<td></td>
<td>Reduce/enlarge kV and mA</td>
</tr>
<tr>
<td></td>
<td>Reset fluoroscopy time</td>
</tr>
<tr>
<td></td>
<td>C-arm: Raising/lowering</td>
</tr>
</tbody>
</table>

## bottom row of keys

<table>
<thead>
<tr>
<th>Key</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Subtraction mode</td>
</tr>
<tr>
<td></td>
<td>Digital radiography mode</td>
</tr>
<tr>
<td></td>
<td>Pulsed fluoroscopy mode</td>
</tr>
<tr>
<td></td>
<td>Select high-contrast fluoroscopy</td>
</tr>
<tr>
<td></td>
<td>Enlarge live image</td>
</tr>
<tr>
<td></td>
<td>Left/right image reversal</td>
</tr>
<tr>
<td></td>
<td>Close/open iris diaphragm</td>
</tr>
<tr>
<td></td>
<td>Close/open slot diaphragm</td>
</tr>
<tr>
<td></td>
<td>Display of radiation in all modes</td>
</tr>
<tr>
<td></td>
<td>Power switch: Switch off the system</td>
</tr>
<tr>
<td></td>
<td>Monitor split horizontal/vertical</td>
</tr>
<tr>
<td></td>
<td>Zoom stored images</td>
</tr>
<tr>
<td></td>
<td>Contrast adjustment left/right monitor</td>
</tr>
<tr>
<td></td>
<td>Read images from memory forward/backward</td>
</tr>
</tbody>
</table>
Data entry keyboard on monitor trolley

You operate the application software via the keyboard on the monitor trolley to prepare (e.g. patient data input) and analyze the examination.

Key allocation

<table>
<thead>
<tr>
<th>Key combination</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTRL U</td>
<td>Start user program</td>
</tr>
<tr>
<td>Shift key</td>
<td>Return key</td>
</tr>
<tr>
<td>DEL key</td>
<td>Delete a character</td>
</tr>
<tr>
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Operation

Startup

Connect the C-arm chassis with the monitor trolley

The C-arm chassis is connected to the monitor trolley via a connection cable.

The monitor trolley must only be connected to the associated C-arm system.

Before system startup, make sure the cables have no loops or bends.

Do not lay connection cable parallel to other cables.

Connect the monitor trolley with the C-arm system:

- For this purpose, plug the central plug of the connection cable from the monitor trolley to the C-arm system into the socket on the left side of the basic unit.
- Before that, turn the lever (1) completely to the left.
- Next insert the plug and turn the lever by approx. 1½ rotations to the right, until it audibly snaps into place and cannot be turned any further.
  - The monitor trolley is connected to the C-arm system.
Establishing equipotential bonding connection

The SIREMOBIL Compact L system can be connected to a protective ground terminal via a equipotential bonding connection, which is located on the C-arm system.

During cardiac examinations or open skull surgery, you must additionally lay a ground wire according to DIN 57107/VDE107 for rooms of application group 2.

◆ Clamp the cable to the center suspension arm of the C-arm system (arrow) and to a point of the equipotential bonding (e.g. tabletop).

◆ Establish the power connection by plugging the power plug into the associated socket.
  – The power cable is located on the monitor trolley.
Switching on the complete system

In order to protect the units from startup by unauthorized persons, the monitor trolley has a key switch.

![Diagram of key switch on monitor trolley]

(1) The key switch is located on the right-hand side of the monitor trolley.

![Image of key switch]

The unit can only be started when it has been unlocked.
◆ Unlock the unit.

The SIREMOBIL Compact L system is operated via a grounded socket.
◆ Plug the power plug into the appropriate socket.
   – Power connection is now established.

![Image of power cable]

The power cable is located on the monitor trolley.

The unit should be operated only in a hospital network which is protected against computer viruses.
Press the "ON" key on the monitor trolley.
- The entire unit is switched on.

Before switching on the unit, a safety test program is carried out automatically.
- If there is an error, an error message is issued on the control console.

After approx. 40 s, the unit is ready and the following functions are set:
- Fluoroscopy mode with user program 1 or cassette operation if a cassette is inserted
- Iris diaphragm in full format or cassette position
- Slot diaphragm in full format
- TV camera in basic position (rotate)
- Stand-alone operation for monitor trolley (not for Memoskop C-E)

With image memory CX 200 present only the fluoroscopy operating mode is possible during the run-up phase. "Minimum Mode" is displayed on monitor "A" during this phase.
- If there is an operating mode change during the run-up phase (e.g. Subtraction or Road Map), the error message "4732" is displayed.
- After confirmation of this message radiation continues to be possible in the fluoroscopy operating mode.

Perform the daily function and safety check before starting the examination.
**Movements of the C-arm system**

The tilt of the unit in operating position must not be more than ± 5° from the horizontal.

In order to move the C-arm, use the handle if possible.

- **Release brake:**
  - Movement possible

- **Engage brake:**
  - Movement not possible

**Warning**

As long as the brakes are not engaged after a movement, the C-arm system remains freely moveable. There is a risk of injury for patient and personnel.

- Engage the brake.

**Raising and lowering the C-arm system**

You can raise and lower the C-arm motor-controlled by using the arrow keys on the control panel of the C-arm system.

**Raising the C-arm**

- To move the C-arm upwards, press the upwards key.
  - In this case no signal sounds.
Lowering the C-arm

◆ To move the C-arm downwards, press the downwards key.
  – The lifting column moves to position 1 (see above) and stops there automatically.
  – A stop signal (3-times beep) sounds simultaneously.
◆ To lower the lifting column further press the downwards key once again.
  – The lifting column can then be moved by a further 5 cm to the lowest point (position 2, see above).
  – In this area a signal (3 times beep) sounds for safety reasons each time the downwards key is pressed.
◆ The lift motor remains stationary if both keys are pressed simultaneously.

⚠️ The lifting column cannot be moved while there is radiation during cassette operation.

Warning

Please note that there can be risk of crushing if the lifting column is not properly handled.
⇒ See chapter “Safety”, Risk of crushing.

Warning

◆ Please press the red EMERGENCY STOP button on the electronic unit of the SIREMOBIL Compact L, as soon as a dangerous situation occurs due to motor-driven movements.
  – With this, the motorized vertical lift is blocked.

Unlock the knob only when the danger has definitely passed.
◆ You can unlock the knob by slight clockwise rotation.

If the lifting column cannot be moved for whatever reason, first check whether the EMERGENCY STOP button has been pressed and unlock it as described above.
C-arm horizontal movement

You can move the support arm horizontally by approx. 20 cm.

- For this purpose, release the brake marked green (arrow) and move the support arm.
- Once you have placed the support arm in the desired position, you must re-engage the brake immediately.

C-arm swivel range

You can swivel the C-arm horizontally around the C-arm system column ± 12.5°.

- For this purpose, release the brake marked orange (arrow) and swivel the C-arm.
- Once you have placed the C-arm in the desired position, you must re-engage the brake immediately.
**C-arm angulation**

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

- For this purpose, release the brake marked yellow (arrow) and rotate the C-arm.
  - Scale on support arm joint.
- Once you have placed the C-arm in the desired position, you must re-engage the brake immediately.

**C-arm orbital movement**

You can swivel the C-arm from + 90° horizontally to - 40° vertically (in total 130°).

- For this purpose, release the brake marked blue (arrow) and swivel the C-arm.
  - Marking on outer side of C-arm.
- Once you have placed the C-arm in the desired position, you must re-engage the brake immediately.
Preparing for exposure

Positioning C-arm system

◆ Pre-position the SIREMOBIL Compact L system.
◆ Release the brake and move the C-arm into the desired position (see section Movements of the C-arm system).

Primary collimation and image display

Semi-transparent slot diaphragm

The semi-transparent slot diaphragm is mainly for displaying extremities. Collimation increases image contrast and reduces scattered radiation. The direct radiation passing along the soft tissue sides is reduced so that no significant brightness differences occur in the monitor image.

By turning the slot diaphragm, the collimated field, e.g. for extremities, can be swiftly adjusted to the position of the object.

Turn the semi-transparent slot diaphragm left/right

Close the semi-transparent slot diaphragm

Open the semi-transparent slot diaphragm

Iris diaphragm

The iris diaphragm is a collimator and serves as radiation protection for patients and all persons who participate in the examination. Smaller collimations cause less scattered radiation and thus higher image contrast. With maximum aperture the iris diaphragm must be visible in the fluoroscopic image at least in two places.

When switching on the unit, the iris diaphragm opens automatically in full format.

◆ Close iris diaphragm.

◆ Open iris diaphragm.
  – LED is on if the iris diaphragm is fully opened with cassette inserted.
**Collimator display without radiation on the monitor**

When you open/close the iris diaphragm or move the semi-transparent slot diaphragm without radiation, you can trace the position of the diaphragm on the displayed image (LIH) with a collimated line/circle. If you then release radiation, the diaphragms are in the position shown on the image.

**Image intensifier format selection**

- Overview: LED off
- Zoom format: LED on

**Image reversal**

- Left/right image reversal
  - LED on with active function
- Top/bottom image reversal
  - LED on with active function

*Image reversal only affects the life monitor (i.e. for 2 monitor operation monitor A).*

**Image position**

The display of the object on the monitor depends on the positioning of the unit to the patient.

Example:

- Patient in supine position (left side of the patient at the C-arm)
- X-ray image intensifier above patient
- Image reversal not selected (light emitting diodes dark)
- Display of the rotation angle is 0° (camera in basic position)
**Image rotation**

Image rotation makes it possible to position the object on the monitor in the desired viewing position.

**Display of the image rotation**

- Rotation angle ± 220°

- By pressing one of the keys the respective rotation direction is initiated. At the same time, on the upper edge of the monitor a position marker for the image rotation is displayed (only possible after radiation). The marker is to be positioned in the position which is to be displayed above after fluoroscopy has been carried out.

When the marker has been positioned (upon releasing the key), a calculated image is displayed in the expected position on the monitor and the position marker is located in the upper edge of the image again and flashes.

A flashing marker always indicates a calculated image.

**When radiation is switched "on", the live image is displayed on the monitor in the desired position.**

**Schematic representation**

With the Memoskop CX 200, image rotation is in real time without display of the position mark.
Selecting the operating mode

In connection with the digital image processing and image storage, post processing is enabled in all operating modes.

**Fluoroscopy**

For fluoroscopy, several fluoroscopy curves are available which determine the exposure parameters for fluoroscopy. Certain curves for certain applications can be selected. For example, one for normal fluoroscopy and one for high-contrast fluoroscopy (factory setting).

**Pulsed Fluoroscopy**

In this operating mode, a reduced radiation exposure of up to 70 % is possible for the patient and the operating personnel.

The dose reduction depends on the set factor for noise reduction. Depending on the level of noise reduction, a different number of fluoroscopy images is integrated.

Depending on the factor of noise reduction and the selected reduction, the radiation-pause ratio changes and thus the frame rate.

**Digital radiography**

Digital radiography (DR) enables an electronic instant image of the patient on the monitor.

**Subtraction**

The subtraction memory Memoskop C-SUB and Memoskop CX 5000 DSA provide the option to perform digital subtraction angiography (DSA) and roadmapping.

These instructions describe the different basic versions.
Fluoroscopy

When switching on the unit, the fluoroscopy mode is automatically preselected.

◆ When pressing the key you select the Fluoroscopy mode.
  – The LED lights up.
◆ You can browse through the different programs by repeatedly pressing the key.

High contrast fluoroscopy

◆ When pressing the key you switch between normal and high contrast characteristic curve.
  – LED is on - high contrast characteristic curve selected.
◆ Repeated pressing of the key selects the normal characteristic curve again.
  – LED is off - normal characteristic curve selected.

◆ The characteristic curves and their selection are identical for pulsed fluoroscopy.
These characteristic curves can be set in the Fluoroscopy and Pulsed Fluoroscopy programs (see register "Digital Image Memory Memoskop").

In case of overheating of the X-ray tube assembly, the overload protection of the characteristic curve switches. See chapter “Safety under overload protection.”
Pulsed Fluoroscopy

◆ When pressing the key you select the Pulsed Fluoroscopy mode.
– The LED lights up.
◆ You can browse through the different programs by repeatedly pressing the key.

When selecting the noise reduction factor (integration of image components), the pulse width of the radiation is affected and thus also dose reduction.

High Contrast Fluoroscopy
(see previous page).

Framerate for pulsed fluoroscopy
– The given images per second are the result of a stable automatic dose rate control subject to the noise reduction factor and the selected dose reduction.

Camera frequency 50 Hz

<table>
<thead>
<tr>
<th>Dose reduction</th>
<th>Noise reduction factor</th>
<th>Measured frame rate in f/s</th>
</tr>
</thead>
<tbody>
<tr>
<td>small</td>
<td>8</td>
<td>approx. 1.6</td>
</tr>
<tr>
<td>small</td>
<td>16</td>
<td>approx. 0.9</td>
</tr>
<tr>
<td>medium</td>
<td>8</td>
<td>approx. 1.2</td>
</tr>
<tr>
<td>medium</td>
<td>16</td>
<td>approx. 0.6</td>
</tr>
<tr>
<td>large</td>
<td>4</td>
<td>approx. 1.1</td>
</tr>
<tr>
<td>large</td>
<td>8</td>
<td>approx. 0.7</td>
</tr>
<tr>
<td>large</td>
<td>16</td>
<td>approx. 0.4</td>
</tr>
</tbody>
</table>

Camera frequency 60 Hz

<table>
<thead>
<tr>
<th>Dose reduction</th>
<th>Noise reduction factor</th>
<th>Measured frame rate in f/s</th>
</tr>
</thead>
<tbody>
<tr>
<td>small</td>
<td>8</td>
<td>approx. 1.7</td>
</tr>
<tr>
<td>small</td>
<td>16</td>
<td>approx. 1.1</td>
</tr>
<tr>
<td>medium</td>
<td>8</td>
<td>approx. 1.4</td>
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<tr>
<td>medium</td>
<td>16</td>
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<tr>
<td>large</td>
<td>4</td>
<td>approx. 1.3</td>
</tr>
<tr>
<td>large</td>
<td>8</td>
<td>approx. 0.8</td>
</tr>
<tr>
<td>large</td>
<td>16</td>
<td>approx. 0.5</td>
</tr>
</tbody>
</table>
**Releasing Fluoroscopy/Pulsed Fluoroscopy**

You can release fluoroscopy or pulsed fluoroscopy with the foot switch (see foot switch description) or the release switch on the hand switch.

- If radiation is present, the radiation indicators on the control panel of the C-arm system and the monitor trolley light up.
- When switching off fluoroscopy or pulsed fluoroscopy, the last image on the monitor remains.

**Display of the fluoroscopic data**

The current fluoroscopy values are displayed on the control panel.

**Fluoroscopic time limit**

After a fluoroscopic time of 5 minutes\(^1\) a warning signal sounds.

By pressing the Reset key the acoustic warning is switched off. The fluoroscopic time display remains. 5 minutes after resetting the warning signal sounds again. If the fluoroscopic time is not reset, radiation is blocked 10 minutes after the last reset.

During new fluoroscopy the fluoroscopic times are added, so that the total fluoroscopic time can be recorded after completion of the examination.

---

\(^1\) At the customer’s wish, this parameter can be changed by SIEMENS Customer Service in accordance with country-specific regulations.
Automatic dose rate control

Functionality
The dose rate control keeps the mean value of the video signal within the dominant independent of the thickness of the object relatively constant, thus an optimal image display for diagnosis on the monitor is guaranteed.

The position of the dominant is centered towards the image intensifier input.

Three dose rate levels are preset in 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 adjustable characteristic curves of the dose rate control can be found in the register "Curves and Diagrams" under “SIREMATIC curves”.

Stop function
In cases where a readjustment of the automatic dose rate control is not desired, the adjusted kV value can be recorded with the Dose Rate Control Stop key.

When inserting metal objects into the beam path (e.g. bone nails) or during fluoroscopy of objects with significantly different thickness (e.g. hip prosthesis), it is recommended to record the value which has just been adjusted at the beginning of the fluoroscopy with the “Dose Rate Control Stop” key.

- Press this key to switch on the stop function.
  - The LED lights up.
  - The automatic brightness control is locked.
  - The kV ± keys are unlocked.
- Manual kV setting is possible.
- An I.I. format switch cancels the stop function.

- Press this key again to switch off the stop function.
  The LED is on.
  - The automatic brightness control is locked.
  - The kV ± keys are unlocked.

Manual setting of the kV values

For "Dose Rate Control Stop", a manual setting of the kV values is possible.

1 Not always possible due to country-specific requirements.
The kV values can be manually reset with the +/- kV keys.

The mA values allocated to the kV values result from the SIREMATIC curves (see register “Curves and Diagrams”).

**Digital radiography**

**Digital radiography function**

Digital radiography (DR) enables an electronic instant image with best image quality.

DR is recommended as final exposure, e.g. as replacement for cassette exposure.

When releasing DR operation, a short radiation impulse is released, whose length depends on an integration factor which can be selected in different levels.

The factor can be selected in 4 levels (4, 8, 16, 32) (see register “Digital Image Memory Memoskop”, Parameter menu).

**Selecting DR and releasing digital radiography**

- When pressing the key you select the Digital Radiography (DR) mode.
  - The LED lights up.
- You can browse through the different programs by repeatedly pressing the key.

You can release the digital radiography with the release switch on the hand switch or the left foot switch (see foot switch description).

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

**Displaying exposure data**

The exposure data field in the control panel displays the current DR exposure data.
Characteristic curves in digital radiography

- 850 W characteristic curve is used by default.

For DR operation the following applies:

- With the 850 W characteristic curve, only one radiation release is possible within 7 seconds.
  A repeated release within 7 seconds automatically results in switching to the characteristic curve with reduced performance (550 W).

⇒ Description of the characteristic curves (see register "Curves and Diagrams").

Stop function

In cases where a readjustment of the automatic dose rate control is not desired, the adjusted kV value can be recorded with the “Dose Rate Control Stop” key.

- Press this key to switch on the stop function.
  - The LED lights up.
  - The automatic brightness control is locked.
  - The kV ± keys are unlocked.

- Manual kV setting is possible.

- An I.I. format switch cancels the stop function.

- If the stop function was selected during transition of a fluoroscopy mode, this fluoroscopic characteristic curve is retained.

- A flashing kV/mA display indicates a required radiation break.

- Press this key again to switch off the stop function.
  - The LED is off.
  - The automatic brightness control is released.
  - The kV ± keys are locked.

Manual setting of the kV values¹

For “Dose Rate Control Stop”, a manual setting of the kV values is possible.

The kV values can be reset with the kV ± keys.

¹ Not always possible due to country-specific requirements.
The Subtraction and Roadmap operating modes are described in chapter Memoskop.

An exposure grid measuring the same as the cassette format can be inserted into the cassette holder with the cassette. The exposure grid is supplied as standard with the cassette holder.

- Always insert the exposure grid up to the end stop in the cassette holder.

**Exposure release**

*With hand switch*

The exposure is released with a hand switch. The hand switch can be inserted on both sides of the C-arm system.

1. Key for saving images
2. Release switch

**Exposure**

- Press the release switch.
  - Radiation is released for the respectively selected operating mode and for cassette exposures.
  - The current fluoroscopy values or DR exposures are displayed on the control panel.

**Saving images**

- With this key you can save images during current fluoroscopy
  - from the monitor to the memory
    (for models with 1 monitor)
Basic System

- from monitor A to monitor B and to the memory
  (for models with 2 monitors)

*With foot switch*

The exposure is released with a foot switch.

- Fluoroscopy is released in all operating modes with the switch on the right side
- With the left-hand switch you can release radiation for the other operating modes according to the following overview:

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<th>Right switch</th>
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</thead>
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<td>Fluoroscopy</td>
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<td>DR</td>
<td>Fluoroscopy</td>
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<td>Subtraction</td>
<td>SUB</td>
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<td>ROADMAP</td>
<td>ROADMAP</td>
<td>Fluoroscopy</td>
</tr>
<tr>
<td>CASSETTE</td>
<td>--</td>
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*Warning*

Please make sure that the foot switch is not below the I.I. at 180° angulation of the C-arm, as otherwise there could be unintentional radiation release through contact with the I.I. when the C-arm is lowered to its maximum.
Switching off the entire system

Before you disconnect the system from power you need to switch it off. It is then shut down automatically.

Caution
Disconnecting the power supply without shutting down the system. Loss of data or damage of the system possible.

◆ Switch the system off properly before disconnecting it from power.

Switching off the SIREMOBIL Compact L system

◆ Press the “Off” button on the monitor trolley or on the control panel of the C-arm system.

Switching the entire system back on again is only possible after 10 s.
Transport

The SIREMOBIL Compact L C-arm system is moveable on 3 wheels in each direction.
The SIREMOBIL Compact L C-arm system is engaged via a foot switch (foot lever)

When transporting the SIREMOBIL Compact L C-arm system as well as the monitor trolley in transport position, the tilt of the floor against the horizontal must not be more than ± 10°. Please observe this to prevent the unit from falling over.

Transport position of the SIREMOBIL Compact L

- Release all brakes on the C-arm.
- Move the C-arm into the illustrated transport position.
- Move the lifting column all the way down into position 2.
  ➔ see paragraph “Lifting and lowering”
- Move the horizontal carriage to the rear as far as possible.
- Engage all brakes on the C-arm again.

Unplug the power connector

- Switch SIREMOBIL Compact L off.
- Pull out the power connector from the power supply socket.
  Do not pull on the cable, but only on the plug!
Unplugging the central plug

◆ Disconnect the central plug of the connection cable to the monitor trolley by turning the lever (1) by 1½ rotations to the left and removing the plug.

◆ Remove any present equipotential bonding connection from the SIREMOBIL Compact L C-arm system.

◆ Wind up the connection cable of the foot switch at the front of the unit and hang up the foot switch on it.

When hanging up the foot switch, make sure that the cable is not kinked.
Moving the C-arm system

- You can release or block the foot switch with the foot lever (both sides).

Transport

- Release the foot brake.
- For transport, use the steering lever and the handles.

The steering lever has 3 stop positions: for straight or transversal movement to the right or the left.

- In the figure: Steering lever in straight position
Steering lever in stop position right or left for transversal movement.
- Lift the steering lever and turn it in the desired direction.
  - The unit always moves parallel to the lever position.

*Cable deflectors*

Any cables lying on the ground which might inhibit the maneuverability of the unit are pushed aside by cable deflectors. The unit is not blocked.

When transporting the unit, please make sure that the wheels do not run into any obstacles.
Transport position of the monitor trolley

◆ Wind up the mains cable and the connection cables to the SIREMOBIL Compact L C-arm system at the rear of the monitor trolley.

Moving the monitor trolley

◆ For transport, release the brakes on the wheels (arrow).
For notes
Please observe the

**Safety Operator Manual**

It must be studied thoroughly before system startup.

The original version of this Operator Manual was written in the German language.
Operator Manual
Memoskop

Memoskop C-E, C-E 100, C and C-SUB

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<td>Subtraction and Roadmap operating modes</td>
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<td>Postprocessing of subtraction scenes</td>
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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 following versions:
C-E, C-E 100, C, C-MOD, C-SUB and C-SUB-MOD. Depending on the version, different functions are possible. The main characteristics are listed in the overview.

Functions of the Memoskop C-E, C-E 100, C/C-MOD, C-SUB, C-SUB-MOD

Functions of the Memoskop C-E
- 5 different user programs (adjustable by the user if a keyboard is available, otherwise adjustable only by a service engineer)
- Adjustable dose rate
- Automatic windowing
- 3-image memory

Functions of the Memoskop C-E 100
as described for Memoskop C-E, additionally:
- Shutter
- Zoom/Roam
- 16-fold image display
- Video recorder mode
- 100-image memory
- DICOM bridge (optional)

Functions of the Memoskop C/C-MOD
as described for C-E 100, additionally:
- Shutter
- Zoom/Roam
- 16-fold image display
- Video recorder mode
- 700-image memory
MOD disk (optional)
Magneto-optical disk

Functions of the Memoskop C-SUB, C-SUB-MOD
as described for Memoskop C and Memoskop C-E, additionally:

- Subtraction
- Roadmap
- Landmark
- Pixel shift/Remask
- Positive/negative image display
- 900-image memory
Displays on the monitor

Different data can be displayed on the monitor, depending on the memory type or configuration. For example:

1. Patient name (surname, first name, second name abbreviated)
2. Patient ID and date of birth
3. Hospital name
4. Current date/time
5. Time of the stored image
6. Contrast level
7. Name of program
8. Operating mode of the displayed image (LIH, DR, pulsed fluoroscopy, SUB, ROADMAP)
9. Number of the stored image/scene
10. Monitor selection A or B (for model with 2 monitors)
11. Name of scene can be entered in the subtraction scene above the patient name
12. Accumulated dose area product
13. Company name
14. Hardcopy active
15. Status bar (current information, e.g. injecting, sending active)
**Patient registration**

*Manual*

- Touch this key to select the patient data screen.
- The selection "NEXT PAT" is not possible with the cassette inserted.

If desired, save the image beforehand.

The next patient input mask appears.

- You can now enter the following data and switch with the arrow keys from one field to the next.

The entered birth date is checked for its logic. If it is not correct, the field must be entered properly before you can move on.

- The sex can be selected with the arrow keys (alternatively: female, male, undefined).

The patient input mask for Memoskop CE shows:

```
Patient data

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

Press ↓ to continue.
Press → ← to exit.
```
The patient input mask for Memoskop C, CE 100 and C SUB shows:

The patient ID is an ID number allocated by the HIS (Hospital Information System).

The access number is allocated by the hospital staff, to distinguish between several patient entries for a patient.

◆ Before closing the mask, save the patient data entered with the "Home" key.

If you close this input mask without entry, no data is displayed.
If this patient data mask was not opened (e.g. emergency patient), the current date of the day is used for X-rays (not Memoskop C-E).

Incorrect or incomplete patient data can be changed in the user menu under item M "Correcting the patient name".

For Subtraction scenes you can enter the scene directly on the patient image; however, this must be entered exactly a line above the patient name, so that it is saved.
For this purpose, move the cursor into this line.
Worklist query

For Memoskop C and C SUB, the worklist query can only be requested in connection with a worklist-capable DICOM bridge.

◆ Press this key to select the Patient Data mask.

The next patient input mask appears:

```
Patient Data

Name
Last:___________________________
First:___________________________
Middle:_________________________
Prefix:__________________________
Suffix:___________________________
ID:_________________________________________

Sex...........:<nnn>
Birthdate.....:<Date> (DD.MM.YYYY)
Accession No.:_____________

Press ‼ to continue.
Press '+' to exit.
Press ALLPAT for Worklist Query
```

With this key, select the general worklist query.

The following message appears:

```
Worklist Query Results

Worklist Query Processing
```
Afterwards, the following mask is displayed:

- Select a patient using the arrow keys:
- An arrow identifies the patient you have selected.
- In the lower part of the mask, the patient information is displayed.
- Confirm this by pressing the “Return” key. The patient data are copied to the system.
The following monitor display appears (also see chapter Basic System, page 11):

Special worklist query

Here, a special search criterion can be entered:

- When using the "Universal" keyboard, the symbol "$" for any number of letters.
- When using the "Roman" keyboard, the symbol "=" for any number of letters.
- When using both keyboards, the symbol "?" can be used as wildcard for any letter.

These entries can be made in any field of the patient input mask.
Example:

In the patient data mask, “M??er” is entered as surname.

```
Patient Data

Name
Last: M??er..........................
First:................................
Middle:..............................
Prefix:..............................
Suffix:..............................
ID:.................................

Sex:<nnn>
Birthdate:<Date> (DD.MM.YYYY)
Accession No.:..........

Press ↓ to continue.
Press → to exit.
Press ALLPAT for Worklist Query
```

Confirm the entry with ALLPAT and wait until the input mask is uploaded:

```
Worklist Query Results

Patient name: Date:

Maier Beate 16.01.59
Mayer Peter 08.04.68
Meier Udo 27.10.84

Name: Maier Beate
Sex: male
ID: 987686
Station Name: COP
Physician: RTA, EVA
Accession No.: 6803113
Procedure: ABDOM_C233
Date/time: 11-03-2001 10:45

Press ↓ to accept
Press → to exit.
```
All names with five letters starting with “M” and ending with “er” are displayed.

- When entering “M$” via the “Universal” keyboard, all names starting with “M” are displayed.
- When entering “M=” via the “Roman” keyboard, all names starting with “M” are displayed.

- Select a patient using the arrow keys:
  - An arrow identifies the patient you have selected.
  - In the lower part of the mask, the patient information is displayed.

Confirm this by pressing the “Return” key. The patient data are copied to the system.

Error messages

The following display shows error messages:

List of possible error messages:

- Init of DICOM bridge fails
- Check network cable or storage node
- No patients in worklist
- Too many worklist responses
- Required parameters missing
- Worklist function not available
  This display appears in case a DICOM bridge is not worklist-capable, in case no DICOM bridge is available or if the Memoskop software does not correspond to the software current at the time of worklist introduction.
Patient directory

Selection and display of patient images

Please observe the following information:

The correct image orientation on the monitor/film is the responsibility of the operator.

The correct assignment of image and patient data when storing images is the responsibility of the operator. Therefore, please take care that you press the “NEXT-PAT” button and enter the new patient name before treatment of the next patient.

The hard disk of the imaging system is not suitable for use as a long-term archive for image or patient data.

If the storage capacity of the hard drive is exceeded, the oldest unprotected patients are overwritten.

Longer patient lists exceed the number of lines that can be displayed on the screen. For this reason, an arrow on the upper or lower edge indicates that there are additional patients.
Example of a patient directory for Memoskop C-E 100

In this example 43 images are protected, 57 can still be saved
(P) means the images of the patient are protected
(D) means the images of the patient have been printed

- With this key, select the patient directory.

- Select a patient using the arrow keys:
  - An arrow identifies the patient you have selected.

- For the model with 2 monitors, the first image of the patient is now displayed on monitor A.

- Terminate the patient selection with the “Home” key.

- For the model with 1 monitor, the first patient image is now displayed.

- Select the desired monitor A or B:
  - (only possible for model with 2 monitors)
  - You can now display the images of the currently selected patient with the image transfer keys.
    - By pressing + you can go to the next image, by pressing - to the previous image.
Example of a patient directory for Memoskop C

In this example 123 images are protected, 577 can still be saved
(P) means the images of the patient are protected
(T) means the images of the patient have been transferred (e.g. into a network)
(D) means the images of the patient have been printed
(R) means the images of the patient have been restored

◆ With this key, select the patient directory.
◆ Select a patient using the arrow keys:
  – An arrow identifies the patient you have selected.
   ❑ For the model with 2 monitors, the first image of the patient is now displayed on monitor A.
   ❑ For the model with 1 monitor, the first patient image is now displayed.
◆ Terminate the patient selection with the “Home” key.
◆ Select the desired monitor A or B:
  – (only possible for model with 2 monitors)
  – You can now display the images of the currently selected patient with the image transfer keys.
    By pressing + you can go to the next image, by pressing - to the previous image.
Memoskop

**Memoskop C-SUB/C-SUB-MOD**

<table>
<thead>
<tr>
<th>PROTECTED (P): 137</th>
<th>FREE SPACE: 763</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAME:</td>
<td>Date:</td>
</tr>
<tr>
<td>Müller Marcus S.</td>
<td>05.11.98</td>
</tr>
<tr>
<td>Schmitt Peter M.</td>
<td>05.11.98</td>
</tr>
<tr>
<td>Fischer Stephan H.</td>
<td>05.11.98</td>
</tr>
</tbody>
</table>

Example for a patient directory with Memoskop SUB

In this example 137 images are protected, 763 can still be saved
(P) means the images of the patient are protected
(T) means the images of the patient have been transferred (e.g. into a network)
(D) means the images of the patient have been printed
(R) means the images of the patient have been restored
SUB means: Number of subtraction scenes
SGL means: Number of single images
SUM means: Total number of images for the respective patient

◆ With this key, select the patient directory.

◆ Select a patient using the arrow keys:
  – An arrow identifies the patient you have selected.

  ❑ The first image for this patient appears on monitor A.

  ◆ Terminate the patient selection with the "Home" key.

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

◆ You can now display the images of the currently selected patient with the image transfer keys.
  You can display the next image by pressing + and the previous image by pressing -.  

  ❑ The operating mode of the saved image is displayed in the upper left of the monitor.

  ❑ Image numbering
    – Individual images of a patient are numbered consecutively, starting with no. 1.
    – Images of a scene receive a consecutive scene and image number, separated by a forward slash.
◆ If you now want to display the images within a subtraction scene, press the “SUB” or “PROCESS” key on the monitor keyboard. (Subtraction scenes can only be displayed on monitor B).

◆ You can now browse within the SUB scene with the image transfer keys.
   – If you hold the keys down you can display the images one after the other on the monitor (CINE LOOP). The images are displayed with the frequency they were recorded in.

◆ To exit the SUB scene, press the “SUB” or “PROCESS” key again.

**Write protection**

You can protect images from being overwritten when saving new images. Protected images are marked with a “P” after the image number. The number of the protected and unprotected images is displayed above the patient directory.

**Selecting the write protection**

◆ With this key, select the patient directory.

◆ Select a patient name.

◆ Press the “SAVE PAT” key:
   – A “P” is displayed after the number of the saved images.

**Canceling the write protection**

◆ Select the patient directory.

◆ Select the patient name.

◆ Press the “SAVE PAT” key.
  – The “P” after the number of the image disappears.
Subtraction and Roadmap operating modes

Subtraction mode

Principle of the SUB memory

The subtraction procedure enables an isolated display of the vascular system after injection of the contrast medium by means of background subtraction. Images without contrast medium (mask) are continuously subtracted digitally from images with contrast medium and displayed on the monitor. Depending on the contrast medium flow, they display the respective vascular segment without superimposition.

As the images are subtracted in real-time mode, the vessels and contrast medium dynamic in the vessel can already be seen during examination.

The subtraction procedure enables the hemodynamic display as well as display of maximum vascular filling and roadmapping technique for the interventional techniques such as dilatation and embolization.

Phases of subtraction

The subtraction procedure can be divided into three phases.

Phase A

- The time until the mask creation is complete.

Phase B1

- The time from the "inject" display on the monitor up to when the injection medium has reached the area to be examined.

Phase B2

- The important time during exposure in the area to be examined.

In order not to overload the memory unnecessarily with images which are of little interest, the period of phase B1 and the storage transfer-rate of phases B1 and B2 can be set in the subtraction menu.
Subtraction procedure

- Create new patient, if required.
- Position the region to be examined.
- Check the collimation.
- Select subtraction on the C-arm system.
- You can browse through the different programs by repeatedly pressing the key.
  - You can optionally allocate a scene name.
- For this purpose, move the cursor to the line above the patient name by pressing the “Return” key and enter the scene name.
- Release fluoroscopy and hold the fluoroscopy switch down.
  - The native image is displayed on monitor A.
- Inject the contrast medium into the blood vessel when the prompt for “inject” is displayed on the monitor (top center).

Continue to hold the fluoro switch down until the contrast medium has passed through the vessel and can be seen on the monitor.

- Continuous filling of the blood vessel with contrast medium can be observed.
- The result is a live subtraction with dynamic contrast medium filling.
- Once the radiation has been switched off, a subtraction image with summed contrast medium filling (SUB max.) is displayed on monitor B, the MAX OP image (the image of the subscene with the strongest filling phase) is displayed on monitor A.
- The SUB-max image as well as the Max OP image are stored on the hard disk.
Postprocessing of subtraction scenes

If no patient is currently loaded, you can select a new patient from the list via the patient selection (as described for the patient directory Memoskop-SUB), and load the subtraction images onto the monitor (as described under the patient directory section).

Remask and Pixel Shift

Remask

- Press the Remask key to start the function.

- Select a native image as mask by scrolling backward or forward.

- Deactivate Remask by pressing again.

- Press one of the image scroll keys to display the new image.

Pixel Shift

- The Remask function also enables the Pixelshift function.

- Now the current mask can be moved in the desired direction with the arrow keys: left, right, up, down:
  - Each pressing of the arrow keys results in a pixelshift of 1/8th pixels in the desired direction.

The moved mask is subtracted online from the respective native image and displayed on the monitor.

If you press the "Home" key in the Remask mode, the mask shift is set to 0. This means that no mask shift has taken place.
Shutter

If the primary side was not collimated during examination of the patient, this can be carried out with electronic shutters during postprocessing, to cover the overexposed areas.

The horizontal and vertical collimators of the shutters can be moved independently of each other. It can affect an individual image as well as a complete scene. The function is available for both monitors.

Activation

The shutter is moved by pressing the following keys at the same time.

The vertical shutter is closed.

The vertical shutter is opened.

The horizontal shutter is opened.

The horizontal shutter is closed.
Shutter with zoom function

When zoom is enabled, the shutter is zoomed with the image as long as it is positioned within the zoomed area. If this function is not deselected, it remains active for the entire scene.

If the zoom is disabled, the zoomed shutter is also reset.
Roam

If images are displayed in zoom mode, only the centers of the images are visible, the margins are not visible. Scrolling of an image to display other areas not readily visible is called roaming. Radiation must be switched off to enable roaming.

◆ Enable the zoom mode with the zoom key.
The enlarged center of the image is displayed.

◆ Move the zoomed image in the desired direction with the arrow keys.
  Each time the arrow key is activated, the image is shifted 5 pixels (not zoomed) in the desired direction.
The margin areas of the image now become visible.

The Zoom as well as the Roam functions are available for both monitors.

◆ Disabling Roam.
If you deselect the Zoom mode and reselect it again, previous roaming is deleted and the image center is displayed again.
16-image collage

The screen layout can be enabled with two keys: one directly on the control console of the C-arm, the other on the keyboard of the monitor trolley.

For the image memory of Memoskop C and C-SUB, you can carry out the 16-image split on the monitor cart. The function is not possible if radiation is switched on. (Also see description Operating Elements in the Basic System).
◆ Select the image with the arrow keys and confirm with Return.

Example:

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

Positive/negative image display

◆ By pressing the CTRL and R keys at the same time, you can switch from positive to negative image display and vice versa.

The function is available for both monitors.

You can also select the positive or negative image display in the Subtraction or Roadmap mode programs.
**Roadmap mode**

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

In the first step, the Max OP (min. OP) image is created as mask from a normal subtraction. In the second step, the vascular display in which the catheter is intended to be positioned, is superimposed by the current fluoroscopic images.

**Roadmap procedure**

- Position the region to be examined.
- Check the collimation.
- Select Roadmap.
- Release radiation via the hand or foot switch (left pedal) and hold the switch down.

During Roadmap, the edge enhancement can only be operated from the monitor trolley.

- The live image is displayed on the left monitor.
- After a few seconds, the “inject” display appears on the monitor (upper center).
- Now inject the contrast medium.

Continue holding the fluoro switch down until a continuous filling of the blood vessel with contrast medium is visible.

- End fluoroscopy by releasing the switch.

**Using the catheter**

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

- Monitor A displays the fluoroscopic image, monitor B shows the subtracted roadmap image with the catheter.
- You can repeat fluoroscopy as often as needed while you insert the catheter.
- If you select Roadmap again, start a new roadmap scene.
**User programs**

The user programs make it possible to adjust the system to the applications which are used most frequently. User programs are available in all operating modes.

Before the start of an operation, you must ensure that the examination settings in the operating modes are correct.

**Starting the user menu**

Program selection is carried out with the keyboard keys.

- Press the "CTRL" and "U" key at the same time to start the user program. The main menu "User Set Up Menu" is displayed.
User menu

Monitor display of the parameter menu

1) At the top of the monitor the software version of your system is displayed

2) Items I and K are only visible and possible with the dose measurement chamber option
   M and N not for Memoskop C-E
   O only possible with MOD option
   P only functional in connection with worklist-capable DICOM bridge
# User Setup Menu

<table>
<thead>
<tr>
<th>Menu item</th>
<th>Function/text on the monitor</th>
<th>Available parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Mode Parameters</td>
<td>Fluoroscopy, Pulsed Fluoroscopy, DR, Subtraction, Roadmap and Window Level</td>
</tr>
<tr>
<td>B</td>
<td>VCR output</td>
<td>Monitor A, Monitor B</td>
</tr>
<tr>
<td>C</td>
<td>Documentation</td>
<td>Monitor A, Monitor B</td>
</tr>
<tr>
<td>D</td>
<td>Text monitor</td>
<td>Monitor A, Monitor B BOTH monitors</td>
</tr>
<tr>
<td>E</td>
<td>Split Screen</td>
<td>Vertical/Horizontal</td>
</tr>
<tr>
<td>F</td>
<td>Display of time</td>
<td>NO/YES</td>
</tr>
<tr>
<td>G</td>
<td>Set Date/Time</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>Hospital Name</td>
<td></td>
</tr>
<tr>
<td>I*</td>
<td>Storage of dose on disk</td>
<td>NO/YES</td>
</tr>
<tr>
<td>K*</td>
<td>Dose on hardcopy output</td>
<td>NO/YES</td>
</tr>
<tr>
<td>L</td>
<td>SMPTE Test Pattern</td>
<td></td>
</tr>
<tr>
<td>M*</td>
<td>Rename</td>
<td></td>
</tr>
<tr>
<td>N*</td>
<td>Erase Unprotected Patients</td>
<td></td>
</tr>
<tr>
<td>O*</td>
<td>MOD Setup</td>
<td></td>
</tr>
<tr>
<td>P*</td>
<td>Worklist</td>
<td></td>
</tr>
</tbody>
</table>

* Items I and K are only visible and possible with the dose measurement chamber option
  M and N not for Memoskop C-E
  O only possible with MOD option
  P only functional with worklist-capable Dicom bridge

Before deleting images the user must be certain that the images have been correctly archived.
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 this by pressing the “Return” key.

Press the “Home” key to exit.

**Operating modes**

<table>
<thead>
<tr>
<th>Menu item</th>
<th>Mode/text on the monitor</th>
<th>Available programs/values</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>FLUOROSCOPY</td>
<td>1, 2, 3, 4, 5</td>
</tr>
<tr>
<td></td>
<td>1. Program number</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>PULSED FLUOROSCOPY</td>
<td>1, 2, 3, 4, 5</td>
</tr>
<tr>
<td></td>
<td>2. Program number</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>DIGITAL RADIOGRAPHY</td>
<td>1, 2, 3, 4, 5</td>
</tr>
<tr>
<td></td>
<td>3. Program number</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>SUBTRACTION</td>
<td>1, 2, 3, 4, 5</td>
</tr>
<tr>
<td></td>
<td>4. Program number</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>ROADMAP</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>5. Program number</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Window Level</td>
<td>1, 2, 3, 4, 5, 6</td>
</tr>
</tbody>
</table>

Select the desired program.

Press “Return” to confirm.

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 was pre-installed for each operating mode.

### Fluoroscopy

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Program name</td>
<td>Standard</td>
<td>Pelvis</td>
<td>High Contrast/Spine</td>
<td>Low/Paediatric</td>
<td>Gastro/Thorax</td>
</tr>
<tr>
<td>2. Dose rate</td>
<td>Mid *)</td>
<td>Mid</td>
<td>High</td>
<td>Mid</td>
<td>Mid</td>
</tr>
<tr>
<td>3. Sirematic normal</td>
<td>S2</td>
<td>S2</td>
<td>HC2</td>
<td>S1</td>
<td>S2</td>
</tr>
<tr>
<td>4. Sirematic push</td>
<td>HC2</td>
<td>HC2</td>
<td>IOD</td>
<td>S2</td>
<td>IOD</td>
</tr>
<tr>
<td>5. Noise reduction - low</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>6. Noise reduction - high</td>
<td>MD2</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>7. Auto LIH disk transfer</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>8. Disk transfer rate</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

*) for US: Dose rate "High"

### Pulsed Fluoroscopy

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Program name</td>
<td>Puls Standard</td>
<td>Puls Pelvis</td>
<td>Puls High Contrast/Spine</td>
<td>Puls Low/Paediatric</td>
<td>Puls Gastro/Thorax</td>
</tr>
<tr>
<td>2. Dose rate</td>
<td>Mid *)</td>
<td>Mid</td>
<td>High</td>
<td>Mid</td>
<td>Mid</td>
</tr>
<tr>
<td>3. Sirematic normal</td>
<td>S2</td>
<td>S2</td>
<td>HC2</td>
<td>S1</td>
<td>S2</td>
</tr>
<tr>
<td>4. Sirematic push</td>
<td>HC2</td>
<td>HC2</td>
<td>IOD</td>
<td>S2</td>
<td>IOD</td>
</tr>
<tr>
<td>5. Noise reduction - low</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>6. Noise reduction - low</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>7. Noise reduction - high</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>8. Dose reduction - high</td>
<td>Mid</td>
<td>High</td>
<td>Mid</td>
<td>High</td>
<td>Mid</td>
</tr>
<tr>
<td>9. Auto transfer each image</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>8. Auto LIH disk transfer</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

*) for US: Dose rate "High"
### Digital Radiography

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Program name</td>
<td>DR Standard</td>
<td>DR Pelvis</td>
<td>DR High Contrast/Spine</td>
<td>DR Low/ Paediatric</td>
<td>DR Gastro/ Thorax</td>
</tr>
<tr>
<td>2. Dose rate</td>
<td>Mid</td>
<td>Mid</td>
<td>High</td>
<td>Mid</td>
<td>High</td>
</tr>
<tr>
<td>3. Noise reduction - low</td>
<td>8</td>
<td>4</td>
<td>8</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>4. Noise reduction - high</td>
<td>16</td>
<td>8</td>
<td>16</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>5. Auto disk transfer</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### Subtraction

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Subtraction</td>
<td>Max</td>
<td>Max</td>
<td>Max</td>
<td>Min</td>
<td>Max</td>
</tr>
<tr>
<td>3. Dose rate</td>
<td>High</td>
<td>High</td>
<td>Mid</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>4. Landmark</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>20%</td>
</tr>
<tr>
<td>5. Videosignal docu. output</td>
<td>Pos</td>
<td>Pos</td>
<td>Pos</td>
<td>Pos</td>
<td>Pos</td>
</tr>
<tr>
<td>6. Image display</td>
<td>Pos</td>
<td>Pos</td>
<td>Pos</td>
<td>Pos</td>
<td>Pos</td>
</tr>
<tr>
<td>Phase B1:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Duration of the phase B1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>8. Disk transfer rate</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Phase B2:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Disk transfer rate</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

### Roadmap

<table>
<thead>
<tr>
<th></th>
<th>Road Map Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Program name</td>
<td></td>
</tr>
<tr>
<td>2. Subtraction</td>
<td>Max</td>
</tr>
<tr>
<td>3. Dose rate</td>
<td>High</td>
</tr>
<tr>
<td>4. Landmark</td>
<td>No</td>
</tr>
<tr>
<td>5. Videosignal docu. output</td>
<td>Pos</td>
</tr>
<tr>
<td>6. Image display</td>
<td>Pos</td>
</tr>
</tbody>
</table>
Changing the user programs

Fluoroscopy

<table>
<thead>
<tr>
<th>Menu item</th>
<th>Text on the monitor</th>
<th>Available parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Program name</td>
<td>Can be entered</td>
</tr>
<tr>
<td>2</td>
<td>Dose</td>
<td>low, medium, high</td>
</tr>
<tr>
<td>3</td>
<td>Sirematic normal</td>
<td>S1, S2, LD, HC1, HC2, IOD</td>
</tr>
<tr>
<td>4</td>
<td>Sirematic push</td>
<td>S1, S2, LD, HC1, HC2, IOD</td>
</tr>
<tr>
<td>5</td>
<td>Noise reduction-low</td>
<td>1, 2, 4, 8, 16, 32, MD1, MD2</td>
</tr>
<tr>
<td>6</td>
<td>Noise reduction-high</td>
<td>1, 2, 4, 8, 16, 32, MD1, MD2</td>
</tr>
<tr>
<td>7</td>
<td>Auto LIH disk transfer</td>
<td>YES; NO</td>
</tr>
<tr>
<td>8</td>
<td>Disk transfer rate</td>
<td>0, 0.5, 1, 2, 3, 4, 5, 6 f/s</td>
</tr>
<tr>
<td>9</td>
<td>Delete this program *</td>
<td>YES; NO</td>
</tr>
</tbody>
</table>

* not possible for program 1.

1...9

◆ Select the desired menu item.

◆ Press “Return” to confirm.

◆ Select a parameter by pressing the arrow keys.

◆ Confirm this by pressing the “Return” key.

◆ Press the “Home” key to exit.
Pulsed Fluoroscopy

<table>
<thead>
<tr>
<th>Menu item</th>
<th>Text on the monitor</th>
<th>Available parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>PULSED FLUOROSCOPY PROGRAM X</td>
<td></td>
<td>1, 2, 3, 4, 5</td>
</tr>
<tr>
<td>1</td>
<td>Program name</td>
<td>Can be entered</td>
</tr>
<tr>
<td>2</td>
<td>Dose</td>
<td>low, medium, high</td>
</tr>
<tr>
<td>3</td>
<td>Sirematic normal</td>
<td>S1, S2, LD, HC1, HC2, IOD</td>
</tr>
<tr>
<td>4</td>
<td>Sirematic push</td>
<td>S1, S2, LD, HC1, HC2, IOD</td>
</tr>
<tr>
<td>5</td>
<td>Noise reduction-low</td>
<td>4, 8, 16</td>
</tr>
<tr>
<td>6</td>
<td>Dose reduction-low</td>
<td>low, medium, high</td>
</tr>
<tr>
<td>7</td>
<td>Noise reduction-high</td>
<td>4, 8, 16</td>
</tr>
<tr>
<td>8</td>
<td>Dose reduction-high</td>
<td>low, medium, high</td>
</tr>
<tr>
<td>9</td>
<td>Auto transfer each image</td>
<td>YES; NO</td>
</tr>
<tr>
<td>10</td>
<td>Auto LIH disk transfer</td>
<td>YES; NO</td>
</tr>
<tr>
<td>11</td>
<td>Delete this program *</td>
<td>YES; NO</td>
</tr>
</tbody>
</table>

* not possible for program 1

For possible settings, see basic system "Pulsed fluoroscopy" under frame rate.

1...11

◆ Select the required menu item.

◆ Press "Return" to confirm.

◆ Select a parameter by pressing the arrow keys.

◆ Confirm this by pressing the "Return" key.

◆ Press the "Home" key to exit.
Digital radiography

<table>
<thead>
<tr>
<th>Menu item</th>
<th>Text on the monitor</th>
<th>Available parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DIGITAL RADIOGRAPHY</td>
<td>1, 2, 3, 4, 5</td>
</tr>
<tr>
<td></td>
<td>PROGRAM X</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Program name</td>
<td>Can be entered</td>
</tr>
<tr>
<td>2</td>
<td>Dose</td>
<td>medium, high</td>
</tr>
<tr>
<td>3</td>
<td>Noise reduction-low</td>
<td>4, 8, 16, 32</td>
</tr>
<tr>
<td>4</td>
<td>Noise reduction-high</td>
<td>4, 8, 16, 32</td>
</tr>
<tr>
<td>5</td>
<td>Auto disk transfer</td>
<td>YES; NO</td>
</tr>
<tr>
<td>6</td>
<td>Delete this program *</td>
<td>YES; NO</td>
</tr>
</tbody>
</table>

* not possible for program 1

1...6

- Select the required menu item.
- Press “Return” to confirm.
- Select a parameter by pressing the arrow keys.
- Confirm this by pressing the “Return” key.
- Press the “Home” key to exit.

In order to ensure sufficient image quality, images are completely acquired after start of acquisition, even if no more radiation is released. The effective acquisition time depends on the preset integration factor and is a maximum of 1.8 seconds. After complete image acquisition, radiation is automatically switched off, even if the radiation release key remains pressed.
Subtraction

<table>
<thead>
<tr>
<th>Menu item</th>
<th>Text on the monitor</th>
<th>Available parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SUBTRACTION PROGRAM X</td>
<td>1, 2, 3, 4, 5</td>
</tr>
<tr>
<td>1</td>
<td>Program name</td>
<td>Can be entered</td>
</tr>
<tr>
<td>2</td>
<td>Subtraction</td>
<td>min, max</td>
</tr>
<tr>
<td>3</td>
<td>Dose</td>
<td>medium, high</td>
</tr>
<tr>
<td>4</td>
<td>Landmark</td>
<td>WITHOUT, 10%, 20%, 30%</td>
</tr>
<tr>
<td>5</td>
<td>Video signal at the documentation output</td>
<td>positive, negative</td>
</tr>
<tr>
<td>6</td>
<td>Image display</td>
<td>positive, negative</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Phase B1</strong></td>
</tr>
<tr>
<td>7</td>
<td>Duration of Phase B1</td>
<td>0...100 s</td>
</tr>
<tr>
<td>8</td>
<td>Disk transfer rate (Framerate)</td>
<td>0, 0.5, 1, 2, 3, 4, 5, 6 f/s **</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Phase B2</strong></td>
</tr>
<tr>
<td>9</td>
<td>Disk transfer rate</td>
<td>0, 0.5, 1, 2, 3, 4, 5, 6 f/s **</td>
</tr>
<tr>
<td>10</td>
<td>Delete this program *</td>
<td>YES; NO</td>
</tr>
</tbody>
</table>

* not possible for program 1

1...10

◆ Select the required menu item.

◆ Press “Return” to confirm.

◆ Select a parameter by pressing the arrow keys.

◆ Confirm this by pressing the “Return” key.

◆ Press the “Home” key to exit.
## Roadmap

<table>
<thead>
<tr>
<th>Menu item</th>
<th>Text on the monitor</th>
<th>Available parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>1...6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Program name</td>
<td>Can be entered</td>
</tr>
<tr>
<td>2</td>
<td>Subtraction</td>
<td>min, max</td>
</tr>
<tr>
<td>3</td>
<td>Dose</td>
<td>medium, high</td>
</tr>
<tr>
<td>4</td>
<td>Landmark</td>
<td>WITHOUT, 10%, 20%, 30%</td>
</tr>
<tr>
<td>5</td>
<td>Videosignal at the documentation output</td>
<td>positive, negative</td>
</tr>
<tr>
<td>6</td>
<td>Image display</td>
<td>positive, negative</td>
</tr>
</tbody>
</table>

- Select the required menu item.
- Press "Return" to confirm.
- Select a parameter by pressing the arrow keys.
- Confirm this by pressing the "Return" key.
- Press the "Home" key to exit.
Windowing

Making different shades of grey visible within a window section is called windowing.

Manual windowing

For Subtraction and Roadmap you can set 256 values for 6 different LUTs (look-up tables) in the Window Level menu.

By selecting extreme pixel values, the result is limited and thus image information gets lost. For this reason, select the values carefully. For values above 200 for example, only a small band of pixel values is visible, only black and white is visible.

<table>
<thead>
<tr>
<th>Menu item</th>
<th>Text on the monitor</th>
<th>Available Parameters</th>
<th>Value Status when shipped</th>
</tr>
</thead>
<tbody>
<tr>
<td>WINDOW LEVEL</td>
<td>Brightness</td>
<td>0...255</td>
<td>100</td>
</tr>
<tr>
<td>1</td>
<td>/1Brightness</td>
<td>0...255</td>
<td>195</td>
</tr>
<tr>
<td>2</td>
<td>/1Contrast</td>
<td>0...255</td>
<td>105</td>
</tr>
<tr>
<td>3</td>
<td>/2Brightness</td>
<td>0...255</td>
<td>205</td>
</tr>
<tr>
<td>4</td>
<td>/2Contrast</td>
<td>0...255</td>
<td>110</td>
</tr>
<tr>
<td>5</td>
<td>/3Brightness</td>
<td>0...255</td>
<td>215</td>
</tr>
<tr>
<td>6</td>
<td>/3Contrast</td>
<td>0...255</td>
<td>115</td>
</tr>
<tr>
<td>7</td>
<td>/4Brightness</td>
<td>0...255</td>
<td>225</td>
</tr>
<tr>
<td>8</td>
<td>/4Contrast</td>
<td>0...255</td>
<td>120</td>
</tr>
<tr>
<td>9</td>
<td>/5Brightness</td>
<td>0...255</td>
<td>235</td>
</tr>
<tr>
<td>10</td>
<td>/5Contrast</td>
<td>0...255</td>
<td>127</td>
</tr>
<tr>
<td>11</td>
<td>/6Brightness</td>
<td>0...255</td>
<td>245</td>
</tr>
<tr>
<td>12</td>
<td>/6Contrast</td>
<td>0...255</td>
<td></td>
</tr>
</tbody>
</table>

◆ Select the required menu item.
◆ Press “Return” to confirm.
◆ Select a parameter by pressing the arrow keys.
◆ Confirm this by pressing the “Return” key.
◆ Press the “Home” key to exit.
**MOD Setup**

only available with MOD option

<table>
<thead>
<tr>
<th>Menu item</th>
<th>Parameter/text on the monitor</th>
<th>Available parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOD Setup</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Type of Format to MOD</td>
<td>DICOM, TIFF</td>
</tr>
<tr>
<td>2</td>
<td>Store to MOD</td>
<td>Patient Browser</td>
</tr>
<tr>
<td>3</td>
<td>Restore from MOD</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Format/Delete MOD</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Delete patient on MOD</td>
<td>Patient Browser</td>
</tr>
</tbody>
</table>

Please only use MODs of the type 540 MB with 512 byte per sector.

1...5  

◆ Select a menu item.

3. Select the file format
   - For displaying the Tiff format on your PC with MOD drive you can use Microsoft Office 95 or 97 for example.

4. Store to MOD
   - During storage the number of the images is displayed as three digits on the monitor, e.g. 002/010
     2 = number of stored images
     10 = total number of images to be stored

During data transfer from or to the MOD, radiation is not possible!

5. From the MOD, you can restore images to the hard disk of the SIREMOBIL (only DICOM format)
   For this you must select the DICOM parameter.

6. You can format the MOD

7. You can delete individual patients on the MOD (only DICOM format)
   The further procedure is menu-guided on the display.
Worklist menu

The Worklist Menu becomes effective in connection with a worklist-capable Dicom bridge.

**SELECTION OF WORKLIST PARAMETERS**

1. Scheduled station AE title:
2. Station name:
3. Modality
4. Date start: <current date, DD.MM.YYYY>
5. Date stop: <current date, DD.MM.YYYY>
6. Time start: 00:00
7. Time stop: 23:59

Press → \[\] to exit
Press \[\] to confirm
Enter selection:
Memoskop CX 200

Digital image memory

The Memoskop CX 200 is a digital image processing system. Depending on the version, different functionalities are available. The main characteristics are listed in the overview.

Functions of the Memoskop CX 200

Standard functions

- 5 different user programs
- Adjustable dose rate
- Automatic windowing
- Shutter
- Zoom/Roam
- Subtraction
- Roadmap
- Landmark
- Pixel shift/Remask
- Positive/negative image display
- 200-image memory
- CD-(R) reading image data

Options

- 2000-image memory
- 5000-image memory with DSA
- CD-(RW) export of image data
- DICOM standard (DICOM send, DICOM print, DICOM Worklist)
Different data can be displayed on the monitor, depending on the memory type or configuration.

For example:

1. Patient name (last name, first name, middle name)
2. Patient ID and birthdate
3. Hospital name
4. Current date/time
5. Time of the stored image
6. Contrast level
7. Name of program
8. Operating mode of the displayed image (LIH, DR, pulsed fluoroscopy, SUB, ROADMAP)
9. Number of the stored image/scene
10. Monitor selection A or B (for model with 2 monitors)
11. Name of scene can be entered in the subtraction scene above the patient name.
12. Accumulated dose area product
13. Company name
14. Hardcopy active
15. Status bar (current information, e.g. injecting, sending active)
Patient registration

Manual

◆ Press this key to select the Patient Data mask.
❑ The selection “NEXT PAT” is not possible with the cassette inserted.

If desired, save the image beforehand.

The patient input mask for Memoskop CX 200 is displayed:

◆ You can now enter the patient data and switch with the arrow keys from one field to the next.

Exception:
For the “Sex” and “Service description” input fields the relevant selection list is activated with the Return key.
The patient ID is an ID number allocated by the HIS (Hospital Information System).

The access number is allocated by the hospital staff, to distinguish between several patient entries for a patient.

◆ Before closing the mask, save the patient data entered with the “Exit” key.

If you exit this input mask without making an entry, the current date is used as patient name when X-rays are taken.

Incorrect or incomplete patient data can be changed in the All Pat menu (“Patient Directory”) under text “Edit/Modify”.

For Subtraction scenes you can enter the scene directly on the patient image; however, this must be entered exactly a line above the patient name, so that it is saved.

For this purpose, move the cursor into this line.
Worklist query

The worklist query can only be called up in connection with the DICOM option.

◆ Press this key to select the Patient Data mask.

With this key, start the general worklist query.

The result of the worklist query is displayed.

◆ Select a patient using the arrow keys.
◆ The selected patient is highlighted.

◆ Confirm this by pressing the “Return” key. The patient data are copied to the patient mask.

◆ Confirm the selection by pressing the “Home” key.
The following monitor display appears (also see chapter Basic System, page 11):

![Monitor Display](image)

*Special worklist query*

Here, a special search criterion can be entered:

- When using the "Universal" keyboard, the symbol "$" for any number of letters.
- When using the "Roman" keyboard, the symbol "=" for any number of letters.
- When using both keyboards, the symbol "?" can be used as wildcard for any letter.

These entries can be made in any field of the patient input mask.
Example:

In the patient data mask, “M??er” is entered as surname.

Confirm the entry with ALLPAT and wait until the input mask is uploaded:
All names with five letters starting with “M” and ending with “er” are displayed.

- When entering “M$” via the “Universal” keyboard, all names starting with “M” are displayed.
- When entering “M=” via the “Roman” keyboard, all names starting with “M” are displayed.

◆ Select a patient using the arrow keys.
◆ The selected patient is highlighted.

Confirm this by pressing the “Return” key. The patient data are copied to the patient mask.

**Error messages**

The following display shows error messages:
List of possible error messages:

- Check network cable or storage node
- No patients in worklist
- Too many worklist responses
- Required parameters missing
Patient directory

Selection and display of patient images

Please observe the following information:

- The hard disk of the imaging system is not suitable for use as a long-term archive for image or patient data.

- The correct image orientation on the monitor/film is the responsibility of the operator.

- The correct assignment of image and patient data when storing images is the responsibility of the operator. Therefore, please take care that you press the “NEXT-PAT” button and enter the new patient name before treatment of the next patient.

- If the storage capacity of the hard drive is exceeded, the oldest unprotected patients are overwritten.

- Longer patient lists exceed the number of lines that can be displayed on the screen. For this reason, an arrow on the upper or lower edge indicates that there are additional patients.
Example for a patient directory with Memoskop CX 200

(P) means that the images of the patient are protected
(T) means the images of the patient have been transferred (e.g. into a network)
(D) means the images of the patient have been printed
(R) means the images of the patient have been restored
SUB means: Number of subtraction scenes
SUM means: Total number of images for the respective patient

◆ With this key, select the patient directory.
◆ Select a patient using the arrow keys.
  – The selected patient is highlighted.
◆ The first image for this patient appears on monitor A.
◆ Confirm the selection of the patient by pressing the “Return” key.
  – Patient selection stops.
◆ Select the desired monitor A or B
  (subtraction images are only displayed on monitor B).
◆ You can now display the images of the currently selected patient with the image transfer keys. You can display the next image by pressing + and the previous image by pressing –.

- The operating mode of the saved image is displayed in the upper left of the monitor.
- Image numbering.
  - Individual images of a patient are numbered consecutively, starting with no. 1.
  - Images of a scene receive a consecutive scene and image number, separated by a forward slash.

◆ If you now want to display the images within a subtraction scene, press the “SUB” or “PROCESS” key on the monitor keyboard. (Subtraction scenes can only be displayed on monitor B).

◆ You can now browse within the subtraction scene with the image transfer keys.
  - If you hold the keys down you can display the images one after the other on the monitor. The images are displayed with the frequency they were recorded in.

◆ To exit the subtraction scene, press the “SUB” or “PROCESS” key again.
**Preview bar**

Swift switching between scenes is possible via the permanently active preview bar.

- Within the preview bar you can select the desired scene with the arrow keys.
- The first image of the scene is displayed on monitor A.
Write protection

You can protect images from being overwritten when saving new images. Protected images are marked with a "P" after the picture number.

Selecting the write protection

◆ With this key, select the patient directory.

◆ Select a patient.

◆ Press the “SAVE PAT” key:
  – A “P” is displayed after the number of the protected images.

Canceling the write protection

◆ Select the patient directory.

◆ Select the patient.

◆ Press the “SAVE PAT” key:
  – The “P” after the number of the image disappears.
Subtraction and Roadmap operating modes

Subtraction mode

Principle of the SUB memory

The subtraction procedure enables an isolated display of the vascular system after injection of the contrast medium by means of background subtraction. Images without contrast medium (mask) are continuously subtracted digitally from images with contrast medium and displayed on the monitor. Depending on the contrast medium flow, they display the respective vascular segment without superimposition.

As the images are subtracted in real-time mode, the vessels and contrast medium dynamic in the vessel can already be seen during examination. The subtraction procedure enables the hemodynamic display as well as display of maximum vascular filling and roadmapping technique for the interventional techniques such as dilatation and embolization.

Phases of subtraction

The subtraction procedure can be divided into three phases.

Phase A

- The time until the mask creation is complete.

Phase B1

- The time from the "inject" display on the monitor up to when the injection medium has reached the area to be examined.

Phase B2

- The important time during exposure in the area to be examined.

In order not to overload the memory unnecessarily with images which are of little interest, the period of phase B1 and the storage transfer-rate of phases B1 and B2 can be set in the subtraction menu.
Subtraction procedure

- Create new patient, if required.
- Position the region to be examined.
- Check the collimation.
- Select subtraction on the C-arm system.
- You can browse through the different programs by repeatedly pressing the key.
- You can optionally allocate a scene name.
- For this purpose, move the cursor to the line above the patient name by pressing the "Return" key and enter the scene name.
- Release fluoroscopy and hold the fluoroscopy switch down. The native image is displayed on monitor A.
- Inject the contrast medium into the blood vessel when the prompt for "inject" is displayed on the monitor (top center).

Continue to hold the fluoro switch down until the contrast medium has passed through the vessel and can be seen on the monitor.

- Continuous filling of the blood vessel with contrast medium can be observed.
- The result is a live subtraction with dynamic contrast medium filling.
- Once the radiation has been switched off, a subtraction image with summed contrast medium filling (SUB max.) is displayed on monitor B, the MAX OP image (the image of the subscene with the strongest filling phase) is displayed on monitor A.
- The SUB-max image as well as the Max OP image are stored on the hard disk.
Postprocessing of subtraction scenes

If no patient is currently loaded, you can select a new patient from the list via the patient selection (as described for the patient directory Memoskop CX 200), and load the subtraction images onto the monitor (as described under the patient directory section).

Remask and Pixel Shift

Remask

◆ Press the Remask key to start the function.

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

◆ Deactivate Remask by pressing again.

◆ Press one of the image scroll keys to display the new image.

Pixel Shift

◆ The Remask function also enables the Pixelshift function.

◆ Now the current mask can be moved in the desired direction with the arrow keys: left, right, up, down:
  – Each pressing of the arrow keys results in a pixelshift of 1/8th pixels in the desired direction.

The moved mask is subtracted online from the respective native image and displayed on the monitor.

If you press the "Home" key in the Remask mode, the mask shift is set to 0. This means that no mask shift has taken place.
**Shutter**

If the primary side was not collimated during examination of the patient, this can be carried out with electronic shutters during postprocessing, to cover the overexposed areas.

The horizontal and vertical collimators of the shutters can be moved independently of each other. It can affect an individual image as well as a complete scene. The function is available for both monitors.

**Activation**

The shutter is moved by pressing the following keys at the same time.

- The vertical shutter is closed.

- The vertical shutter is opened.

- The horizontal shutter is opened.

- The horizontal shutter is closed.
When the zoom is enabled, the shutter is zoomed with the image as long as it is positioned within the zoomed area. If this function is not deselected, it remains active for the entire scene.

If the zoom is disabled, the zoomed shutter is also reset.
Roam

If images are displayed in zoom mode, only the centers of the images are visible, the margins are not visible. Scrolling of an image to display other areas not readily visible is called roaming. Radiation must be switched off to enable roaming.

◆ Enable the zoom mode with the zoom key. The enlarged center of the image is displayed.

◆ Move the zoomed image in the desired direction with the arrow keys. Each time the arrow key is activated, the image is shifted 5 pixels (not zoomed) in the desired direction. The margin areas of the image now become visible. The Zoom as well as the Roam functions are available for both monitors.

◆ Disabling Roam.

If you deselect the Zoom mode and reselect it again, previous roaming is deleted and the image center is displayed again.

Positive/negative image display

◆ By pressing the CTRL and R keys at the same time, you can switch from positive to negative image display and vice versa. The function is available for both monitors.

You can also select the positive or negative image display in the Subtraction or Roadmap mode programs.
**Roadmap mode**

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

In the first step, the Max OP (min. OP) image is created as mask from a normal subtraction. In the second step, the vascular display in which the catheter is intended to be positioned, is superimposed by the current fluoroscopic images.

**Roadmap procedure**

- Position the region to be examined.
- Check the collimation.
- Select Roadmap.
- Release radiation via the hand or foot switch (left pedal) and hold the switch down.

During Roadmap, the edge enhancement can only be operated from the monitor trolley.

- The live image is displayed on the left monitor.
- After a few seconds, the "inject" display appears on the monitor (upper center).
- Now inject the contrast medium.

Continue holding the fluoro switch down until a continuous filling of the blood vessel with contrast medium is visible.

- End fluoroscopy by releasing the switch.

**Using the catheter**

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

- Monitor A displays the fluoroscopic image, monitor B shows the subtracted roadmap image with the catheter.
- You can repeat fluoroscopy as often as needed while you insert the catheter.
- If you select Roadmap again, start a new roadmap scene.
User programs

The user programs make it possible to adjust the system to the applications which are used most frequently. User programs are available in all operating modes.

Before the start of an operation, you must ensure that the examination settings in the operating modes are correct.

Starting the user menu

Program selection is carried out with the keyboard keys.

- Press the "CTRL" and "U" key at the same time to start the user program. The main menu "User Setup Menu" is displayed.

User Setup Menu

![User Setup Menu Diagram]
### User Setup Menu

<table>
<thead>
<tr>
<th>Menu item</th>
<th>Function/text on the monitor</th>
<th>Available parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fluoroscopy</td>
<td>1, 2, 3, 4, 5</td>
</tr>
<tr>
<td>2</td>
<td>Pulsed Fluoroscopy</td>
<td>1, 2, 3, 4, 5</td>
</tr>
<tr>
<td>3</td>
<td>DR</td>
<td>1, 2, 3, 4, 5</td>
</tr>
<tr>
<td>4</td>
<td>Roadmap</td>
<td>1, 2, 3, 4, 5</td>
</tr>
<tr>
<td>5</td>
<td>Subtraction</td>
<td>1, 2, 3, 4, 5</td>
</tr>
<tr>
<td>C</td>
<td>System Configuration</td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>LUT</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>External storage (CD)</td>
<td></td>
</tr>
</tbody>
</table>

Before deleting images the user must be certain that the images have been correctly archived.

- Select a menu item by pressing the respective key.

- Press the "Home" key to exit.
## Standard programs

A standard program was pre-installed for each operating mode.

### Fluoroscopy

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Program name</td>
<td>Standard</td>
<td>Pelvis</td>
<td>High Contrast/Spine</td>
<td>Low/Paediatric</td>
<td>Gastro/Thorax</td>
</tr>
<tr>
<td>2. Dose rate</td>
<td>Mid *)</td>
<td>Mid</td>
<td>High</td>
<td>Mid</td>
<td>Mid</td>
</tr>
<tr>
<td>3. Sirematic normal</td>
<td>S2</td>
<td>S2</td>
<td>HC2</td>
<td>S1</td>
<td>S2</td>
</tr>
<tr>
<td>4. Sirematic push</td>
<td>HC2</td>
<td>HC2</td>
<td>IOD</td>
<td>S2</td>
<td>IOD</td>
</tr>
<tr>
<td>5. Noise reduction - low</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>6. Noise reduction - high</td>
<td>MD2</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>7. Auto LIH disk transfer</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>8. Disk transfer rate</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

*) for US: Dose rate "High"

### Pulsed Fluoroscopy

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Program name</td>
<td>Puls Standard</td>
<td>Puls Pelvis</td>
<td>Puls High Contrast/Spine</td>
<td>Puls Low/Paediatric</td>
<td>Puls Gastro/Thorax</td>
</tr>
<tr>
<td>2. Dose rate</td>
<td>Mid *)</td>
<td>Mid</td>
<td>High</td>
<td>Mid</td>
<td>Mid</td>
</tr>
<tr>
<td>3. Sirematic normal</td>
<td>S2</td>
<td>S2</td>
<td>HC2</td>
<td>S1</td>
<td>S2</td>
</tr>
<tr>
<td>4. Sirematic push</td>
<td>HC2</td>
<td>HC2</td>
<td>IOD</td>
<td>S2</td>
<td>IOD</td>
</tr>
<tr>
<td>5. Noise reduction - low</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>6. Dose reduction - low</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>7. Noise reduction - high</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>8. Dose reduction - high</td>
<td>Mid</td>
<td>High</td>
<td>Mid</td>
<td>High</td>
<td>Mid</td>
</tr>
<tr>
<td>9. Auto transfer each image</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>8. Auto LIH disk transfer</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

*) for US: Dose rate "High"
### Digital Radiography

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Program name</td>
<td>DR Standard</td>
<td>DR Pelvis</td>
<td>DR High Contrast/Spine</td>
<td>DR Low/ Paediatric</td>
<td>DR Gastro/ Thorax</td>
</tr>
<tr>
<td>2. Dose rate</td>
<td>Mid</td>
<td>Mid</td>
<td>High</td>
<td>Mid</td>
<td>High</td>
</tr>
<tr>
<td>3. Noise reduction - low</td>
<td>8</td>
<td>4</td>
<td>8</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>4. Noise reduction - high</td>
<td>16</td>
<td>8</td>
<td>16</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>5. Auto disk transfer</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### Subtraction

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Program name</td>
<td>Sub Standard 2B/s</td>
<td>Sub Standard 4B/s</td>
<td>Sub Extremity</td>
<td>Sub Nitrogen</td>
<td>Sub Background</td>
</tr>
<tr>
<td>2. Subtraction</td>
<td>Max</td>
<td>Max</td>
<td>Max</td>
<td>Min</td>
<td>Max</td>
</tr>
<tr>
<td>3. Dose rate</td>
<td>High</td>
<td>High</td>
<td>Mid</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>4. Landmark</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>20%</td>
</tr>
<tr>
<td>5. Videosignal docu. output</td>
<td>Pos</td>
<td>Pos</td>
<td>Pos</td>
<td>Pos</td>
<td>Pos</td>
</tr>
<tr>
<td>6. Image display</td>
<td>Pos</td>
<td>Pos</td>
<td>Pos</td>
<td>Pos</td>
<td>Pos</td>
</tr>
<tr>
<td>Phase B1:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Duration of the phase B1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>8. Disk transfer rate</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Phase B2:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Disk transfer rate</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

### Roadmap

<table>
<thead>
<tr>
<th></th>
<th>Road Map Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Program name</td>
<td></td>
</tr>
<tr>
<td>2. Subtraction</td>
<td>Max</td>
</tr>
<tr>
<td>3. Dose rate</td>
<td>High</td>
</tr>
<tr>
<td>4. Landmark</td>
<td>No</td>
</tr>
<tr>
<td>5. Videosignal docu. output</td>
<td>Pos</td>
</tr>
<tr>
<td>6. Image display</td>
<td>Pos</td>
</tr>
</tbody>
</table>
Changing the user programs

Fluoroscopy

---

**Text on the monitor** | **Available parameters**
--- | ---
FLUOROSCOPY PROGRAM X | 1, 2, 3, 4, 5
Program name | Can be entered
Dose | low, medium, high
Sirematic normal | S1, S2, LD, HC1, HC2, IOD
Sirematic push | S1, S2, LD, HC1, HC2, IOD
Noise reduction-low | 1, 2, 4, 8, 16, 32, MD1, MD2
Noise reduction-high | 1, 2, 4, 8, 16, 32, MD1, MD2
Auto LIH disk transfer | Click the checkbox
Disk transfer rate | 0, 0.5, 1, 2, 3, 4, 5, 6 f/s
Activate program | Click the checkbox

◆ Select the desired program with the arrow keys.
◆ Press “Return” to confirm.
Select the desired menu item with the arrow keys.

- Depending on the type of the field you can now enter text in the “Program name” field, select between predefined values (within dropdown menu) or activate functions (checkbox selected/not selected).
- You can activate the dropdown list with the return key and choose between the predefined values or functions (checkbox selected/not selected).

When exiting the input mask you have the opportunity to save your entries or to discard them.

- Confirm your entries by pressing the “Return” key.
- Press the “Home” key to exit, the entries are not saved.

**Pulsed fluoroscopy**

**PULSED FLUOROSCOPY PROGRAM**

<table>
<thead>
<tr>
<th>Program name</th>
<th>Noise</th>
<th>Noise</th>
<th>Dose</th>
<th>Auto</th>
<th>Schematic</th>
<th>Schematic</th>
<th>Dose</th>
<th>Dose</th>
<th>Auto</th>
<th>Active</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prog 1</td>
<td>8</td>
<td>8</td>
<td>HC1</td>
<td>HC2</td>
<td>high</td>
<td>high</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prog 2</td>
<td>8</td>
<td>8</td>
<td>HC1</td>
<td>HC2</td>
<td>high</td>
<td>high</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prog 3</td>
<td>8</td>
<td>8</td>
<td>HC1</td>
<td>HC2</td>
<td>high</td>
<td>high</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prog 4</td>
<td>8</td>
<td>8</td>
<td>HC1</td>
<td>HC2</td>
<td>high</td>
<td>high</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prog 5</td>
<td>8</td>
<td>8</td>
<td>HC1</td>
<td>HC2</td>
<td>high</td>
<td>high</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Program name: Prog 1
- Noise reduction key: 8
- Dose reduction key: HIGH
- Schematic normal: HC1
- Schematic push: HC2
- Noise reduction: HC1
- Dose reduction: HC1

Press the “Home” key to exit, the entries are not saved.
Select the desired program with the arrow keys.
◆ Press "Return" to confirm.

Select the desired menu item with the arrow keys.
◆ Depending on the type of the field you can now enter text in the "Program name" field, select between predefined values (within dropdown menu) or activate functions (checkbox selected/not selected).
◆ You can activate the dropdown list with the return key and choose between the predefined values or functions (checkbox selected/not selected).

When exiting the input mask you have the opportunity to save your entries or to discard them.
◆ Confirm your entries by pressing the "Return" key.
Press the “Home” key to exit, the entries are not saved.

**Digital radiography**

In order to ensure sufficient image quality, images are completely acquired after start of acquisition, even if no more radiation is released. The effective acquisition time depends on the preset integration factor and is a maximum of 1.8 seconds. After complete image acquisition, radiation is automatically switched off, even if the radiation release key remains pressed.

<table>
<thead>
<tr>
<th>Program name</th>
<th>Noise reduction-low</th>
<th>Noise reduction high</th>
<th>Dose</th>
<th>Auto-discharge</th>
<th>Activate setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>DR Standard</td>
<td>8</td>
<td>16</td>
<td>Mid</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>DR Panorama</td>
<td>4</td>
<td>8</td>
<td>High</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>DR High-Contrast/Spine</td>
<td>6</td>
<td>16</td>
<td>High</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>DR Low/Fluoroscopy</td>
<td>8</td>
<td>16</td>
<td>Mid</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>DR Gastro/Thorax</td>
<td>4</td>
<td>32</td>
<td>High</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

**Text on the monitor**

**Available parameters**

- **DIGITAL RADIOGRAPHY PROGRAM X**: 1, 2, 3, 4, 5
- Program name: Can be entered
- Dose: medium, high
- Noise reduction-low: 1, 2, 4, 8, 16, 32
Select the desired program with the arrow keys.

Press “Return” to confirm.

Select the desired menu item with the arrow keys.

Depending on the type of the field you can now enter text in the “Program name” field, select between predefined values (within dropdown menu) or activate functions (checkbox selected/not selected).

You can activate the dropdown list with the return key and choose between the predefined values or functions (checkbox selected/not selected).

When exiting the input mask you have the opportunity to save your entries or to discard them.

Confirm your entries by pressing the “Return” key.

Press the “Home” key to exit, the entries are not saved.
Subtraction

SUBTRACTION PROGRAM

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Subtraction</th>
<th>Landmark</th>
<th>Dose Rate</th>
<th>Negative I</th>
<th>Negative II</th>
<th>Dwell</th>
<th>Phase</th>
<th>Disk</th>
<th>Activate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-Standard 2</td>
<td>Max</td>
<td>no</td>
<td>high</td>
<td>Pos</td>
<td>Pos</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>x</td>
</tr>
<tr>
<td>Sub-Standard 4</td>
<td>Max</td>
<td>no</td>
<td>high</td>
<td>Pos</td>
<td>Pos</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>x</td>
</tr>
<tr>
<td>Sub-Extremely</td>
<td>Max</td>
<td>no</td>
<td>high</td>
<td>Pos</td>
<td>Pos</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>x</td>
</tr>
<tr>
<td>Sub-Nitrogen</td>
<td>Min</td>
<td>no</td>
<td>high</td>
<td>Pos</td>
<td>Pos</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>x</td>
</tr>
<tr>
<td>Sub-Background</td>
<td>Max</td>
<td>20%</td>
<td>high</td>
<td>Pos</td>
<td>Pos</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>x</td>
</tr>
</tbody>
</table>

Program name: Sub-Background
Subtraction: Max
Dose Rate: High
Landmark: 20%
Duration of Phase B1: 0
Phase B1 disk transfer rate: 0

Text on the monitor

<table>
<thead>
<tr>
<th>Available parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUBTRACTION PROGRAM X</td>
</tr>
<tr>
<td>Program name</td>
</tr>
<tr>
<td>Subtraction</td>
</tr>
<tr>
<td>Dose</td>
</tr>
<tr>
<td>Landmark</td>
</tr>
<tr>
<td>Duration of Phase B1</td>
</tr>
<tr>
<td>Disk transfer rate (Framerate)</td>
</tr>
<tr>
<td>Memory transfer rate for phase B1</td>
</tr>
<tr>
<td>Activate program</td>
</tr>
<tr>
<td>Negative image display</td>
</tr>
<tr>
<td>Negative image display in documentation</td>
</tr>
</tbody>
</table>

** Notice: Storage transfer rate "0" must not be set.
Select the desired program with the arrow keys.

Press “Return” to confirm.

Select the desired menu item with the arrow keys.

Depending on the type of the field you can now enter text in the “Program name” field, select between predefined values (within dropdown menu) or activate functions (checkbox selected/not selected).

You can activate the dropdown list with the return key and choose between the predefined values or functions (checkbox selected/not selected).

When exiting the input mask you have the opportunity to save your entries or to discard them.

Confirm your entries by pressing the “Return” key.

Press the “Home” key to exit, the entries are not saved.
Select the desired program with the arrow keys.

Press "Return" to confirm.
Select the desired menu item with the arrow keys.

- Depending on the type of the field you can now enter text in the "Program name" field, select between predefined values (within dropdown menu) or activate functions (checkbox selected/not selected).
- You can activate the dropdown list with the return key and choose between the predefined values or functions (checkbox selected/not selected).

When exiting the input mask you have the opportunity to save your entries or to discard them.

- Confirm your entries by pressing the "Return" key.
- Press the "Home" key to exit, the entries are not saved.

**Windowing**

Making different shades of grey visible within a window section is called windowing.

**Manual windowing**

For Subtraction and Roadmap you can set 4096 values for 6 different LUTs (look-up tables) in the Window Level menu.

By selecting extreme pixel values, the result is limited and thus image information gets lost. For this reason, select the values carefully.
Select the desired LUT.

Press “Return” to confirm.

Select the desired menu item with the arrow keys.

Enter the values via the keyboard.

When exiting the input mask you have the opportunity to save your entries or to discard them.

Confirm your entries by pressing the “Return” key.

Press the “Home” key to exit, the entries are not saved.
CD Export menu

only available with CD option

<table>
<thead>
<tr>
<th>Menu item</th>
<th>Parameter/text on the monitor</th>
<th>Available parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CD Export menu</td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>Store on CD</td>
<td>Patient Browser</td>
</tr>
<tr>
<td>R</td>
<td>Restore</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Format/Delete CD</td>
<td></td>
</tr>
</tbody>
</table>

**S, R, D**

- Select a menu item by pressing the respective key.

**S**

You can save individual images of a patient as well as the entire patient on CD.

**Storing the whole patient on CD**

The patient directory is displayed.

- Select the desired patient.

- Start saving all patient images with “Enter”.
  - The status of the burn process is displayed temporarily. At the end an info window is displayed and the CD is ejected automatically.
Saving individual images of a patient on CD

The “Transfer all images of the patient” checkbox is activated as a general rule.

◆ Deselect the checkbox with “Enter”.
◆ Select the “S” key.
  – The patient directory is displayed.
◆ Select the desired patient and confirm with “Enter”.

◆ Select the desired images.

◆ Start saving the selected patient images on CD with “Enter”.
  – The status of the save process is displayed temporarily. At the end an info
    window is displayed and the CD is ejected automatically.

During data transfer to or from the CD, radiation is not possible!

R You can restore images from the CD to the hard disk of the SIREMOBIL
(only DICOM format).

D You can format the CD and/or delete it.
The further procedure is displayed based on menus.
System configuration

<table>
<thead>
<tr>
<th>Text on the monitor</th>
<th>Available parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>System configuration</td>
<td></td>
</tr>
<tr>
<td>Hospital name</td>
<td></td>
</tr>
<tr>
<td>System date</td>
<td></td>
</tr>
<tr>
<td>System time</td>
<td></td>
</tr>
<tr>
<td>VCR output</td>
<td>Monitor A, Monitor B</td>
</tr>
<tr>
<td>Documentation</td>
<td>Monitor A, Monitor B</td>
</tr>
<tr>
<td>Text monitor</td>
<td>Monitor A, Monitor B, both</td>
</tr>
<tr>
<td>Display of time</td>
<td>Click the checkbox</td>
</tr>
<tr>
<td>Dose on hardcopy</td>
<td>Click the checkbox</td>
</tr>
<tr>
<td>Storage of dose on disk</td>
<td>Click the checkbox</td>
</tr>
<tr>
<td>DICOM parameter fields</td>
<td></td>
</tr>
<tr>
<td>Station AE title</td>
<td>Standard value: SM_COMPACT</td>
</tr>
<tr>
<td>Server Port Number</td>
<td>Standard value: 104</td>
</tr>
<tr>
<td>Station name</td>
<td>Standard value: RF</td>
</tr>
<tr>
<td>Timeout</td>
<td>Standard value: 300</td>
</tr>
</tbody>
</table>
Select the desired menu item with the arrow keys.

- Depending on the type of the field you can now enter text, select between predefined values (within dropdown menu) or activate functions (checkbox selected/not selected).

When exiting the input mask you have the opportunity to save your entries or to discard them.

- Confirm your entries by pressing the “Return” key.

- Press the “Home” key to exit, the entries are not saved.
Dicom option

Introduction

The following functions are available:
- Selection of three different receiving stations/printer or laser camera
- Selection and sending of all images of a patient to the receiving station
- Selection and sending of single images to the receiving station
- Selection and transfer of all images of a patient to the laser camera/printer
- Selection and transfer of single images of a patient to the laser camera/printer

System preparations

The Compact L should be operated only in a hospital network which is protected against computer viruses.

The sockets for the DICOM network are accessible at the rear of the monitor trolley.

◆ Connect the network cable (e.g. RJ 45) at the places shown in the figure.
Prior to beginning the data transfer, switch on the network receiving stations, e.g. Magic View or laser camera/printer and make sure they are operational.

Radiation cannot be released during data transfer!

With the Send function you transfer all or single images of a patient to the receiving station, with the Print function you transfer all or single images of a patient to a laser camera or a printer.

Sending patient images

Selecting the patient

Select the patient list with the “ALL PAT” key on the monitor trolley (refer also to chapter “Patient directory” in the Operator Manual "Memoskop" or “Digital Image Memory”).

(SUB) means "subtraction scenes", (SGL) means "single images"
(SUM) means sum of the images of a patient
(P) means the images of the patient have been protected
(T) means the images of the patient have been transferred (e.g. into a network)
(D) means the images of the patient have been printed
(R) means the images of the patient have been restored
Select a patient using the arrow keys:
- The selected patient is highlighted.

- The first image for this patient appears on monitor A.

- Press the "Home" key to exit the patient selection at any time.

- Press "S" to send.
- The selection of the three receiving stations is displayed on the right hand monitor.

You can have the names of the receiving stations entered by the service engineer.

Now select one of the three receiving stations with the respective key.
Transfer of the images can be observed on the right hand monitor. During the transfer, no image can be displayed on the right monitor.

Press the “Home” key if you want to cancel the transfer.

At the end the following message appears:
- All images for this patient have been transferred.

◆ To exit, confirm the message with the “Enter” key.

After the transfer, you can display the images on the receiving station.

Selection “Send individual images of a patient”

After selecting the patient and the receiving station, the following mask appears:

The images of the currently selected patient are displayed on the left hand monitor.
Now you can browse through the images using the "selection" keys.

You can select the contrast adjustment for the images to be transferred:
- The contrast adjustment is manually selectable in 4 levels.
- Auto Window (AUT), i.e. the system automatically calculates the optimal contrast value (LUT) with reference a region around the center of the image.

You select the just displayed/selected image with the hardcopy key.

You can also select additional images.
The process can be repeated as often as you like.

With the "Return" key all selected images are transferred from the image memory to the receiving station.

To exit, press the “Enter” key.

After the transfer, you can display the images on the receiving station.
Transferring patient images to a laser camera/printer

Selecting the patient

◆ Select the patient list with the “ALL PAT” key on the monitor trolley (refer also to chapter “Patient directory” in the Operator Manual “Memoskop” or “Digital Image Memory”).

(SUB) means “subtraction scenes”, (SGL) means “single images”
(SUM) means sum of the images of a patient
(P) means the images of the patient have been protected
(T) means the images of the patient have been transferred (e.g. into a network)
(D) means the images of the patient have been printed
(R) means the images of the patient have been restored

◆ Select a patient using the arrow keys:
  – The selected patient is highlighted.

◆ Press the “Home” key to exit the patient selection at any time.

◆ Press “H” to print.

The selection for up to three definable laser cameras/printers is displayed on the right hand monitor.

You can have the names of the laser cameras/printers entered by the service engineer.
◆ Select the desired laser camera/printer by pressing the respective key.

<table>
<thead>
<tr>
<th>SELECT DICOM PRINTER</th>
<th>NODE NAME</th>
<th>STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Estore 2000</td>
<td>Status</td>
</tr>
<tr>
<td>2</td>
<td>AOYFT Print Tech</td>
<td>Status</td>
</tr>
<tr>
<td>3</td>
<td>MPX200 Aspergo</td>
<td>Status</td>
</tr>
</tbody>
</table>

◆ Select the desired parameter by pressing the respective key.

<table>
<thead>
<tr>
<th>DICOM PRINT</th>
<th>PRINTER OPTIONS</th>
<th>STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Film Format</td>
<td>STANDARD 1:1.5</td>
</tr>
<tr>
<td>2</td>
<td>Number of Copies</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Film Size</td>
<td>DIN x TREN</td>
</tr>
<tr>
<td>4</td>
<td>Film Orientation</td>
<td>PORTRAIT</td>
</tr>
</tbody>
</table>

◆ Select the film format

◆ By pressing the A key repeatedly, you can select from various film formats, depending on the camera.

Selection the copies

◆ Press the + key to increase the number of desired copies.
◆ Press the - key to decrease the number of desired copies.
Selection B - selecting the film size

◆ You can set the different film sizes by repeatedly pressing the B key.

Selection C - selecting the film orientation

◆ By pressing the C key repeatedly, you can choose between portrait and landscape, depending on the camera.

◆ If all entries are ok, confirm again by pressing the "Return" key.

- All images for the patient will be transferred.
- No image is displayed on monitor B during transfer.

Press the "Home" key if you want to cancel the transfer.

◆ When printing is completed, press the "Enter" key.
Selection "Send individual images"

- After selecting the patient and the printer options, the following mask appears:

- The images of the currently selected patient are displayed on the left hand monitor.

  - Now you can browse through the images using the "selection" keys.

  - You can select the contrast adjustment for the images to be transferred:
    - The contrast adjustment is manually selectable in 4 levels.
    - Auto Window (AUT), i.e. the system automatically calculates the optimal contrast value (LUT) with reference a region around the center of the image.

  - You select the just displayed/selected image with the hardcopy key.

  - You can now select additional images. The process can be repeated as often as you like.

  - With the "Return" key all selected images are transferred from the image memory to the receiving station.
To exit, press the “Enter” key.

- Do not switch the system off until data transfer is completed.

- After the transfer, the images are printed on your printer.
Please observe the Safety Operator Manual

It must be studied thoroughly before system startup.

The original version of this manual was written in the German language.
Operator Manual
Technical data

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Technical data

Curves and Diagrams

SIREPHOS 2000

Cooling curve of the X-ray tube assembly
Technical data

**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 "IOD1"**
  - Iodine max. 8.9 mA
- **SIREMATIC S “Standard”**
  - S-1 max. 3 mA
  - S-2 max. 5 mA

- In case of continuous fluoroscopy, a limitation of the characteristic curves $\geq 5$ mA due to country-specific regulations is possible.

---

1 IOD “Iodine-contrast optimized”
## Technical data

<table>
<thead>
<tr>
<th>SIREMATIC Characteristic curves</th>
<th>Fluoroscopy Pulsed Fluoroscopy</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-1 Antiisowatt characteristic with max. 3 mA</td>
<td></td>
</tr>
<tr>
<td>S-2 Antiisowatt characteristic with max. 5 mA</td>
<td></td>
</tr>
<tr>
<td>LD Low dose characteristic curve with high kV values: i.e. low radiation exposure for the patient, thus particularly suited to pediatrics – The predominantly high kV values lead to lower image contrast</td>
<td></td>
</tr>
<tr>
<td>HC-1 High-contrast characteristic with max. 4.7 mA</td>
<td></td>
</tr>
<tr>
<td>HC-2 High-contrast characteristic for applications requiring higher mA values (max. 8 mA) e.g. spine, hip, skull</td>
<td></td>
</tr>
<tr>
<td>IOD Iodine characteristic curve For special applications using iodine contrast media</td>
<td></td>
</tr>
</tbody>
</table>
Technical data

$kV/mA$ curves for digital radiography (DR)

- DR1 operation "reduced performance"
  - DR 550W max. 8 mA
- DR2 operation "normal performance"
  - DR 850W max. 12.5 mA
**Dose rate at the image intensifier input**

The dose rate is set in the factory depending on the I.I. format between 0.11 µGy/s and 0.44 µGy/s; measured behind the scattered radiation grid at the input of the X-ray image intensifier. Setting of the dose rate was carried out with a technical phantom in the kV area between 70 and 80 kV. The iris diaphragm is maximally opened for this.

**Deviation of the dose rate value from the set values at the image intensifier input**

Depending on the examined object, different fluoroscopy data (kV, mA) are set. As the amplification of the image intensifier depends on the radiation quality (kV), the dose rate values at the I.I. input vary for the same luminance at the I.I. output screen.

When fluoroscopy is carried out for a patient, compared to the phantom there are additional scattered radiation values which affect the dose rate value at the input of the X-ray image intensifier.

With the help of the correction value K, see diagram, the deviation from the set dose rate can be calculated approximately.

![Diagram showing the correction factor K vs. kV](image)

Prefiltration 3 mm Al; grid Pb 8/40

**Example**

For 70 kV the correction factor is 1.4

i.e.

For a set dose rate value of 0.22 µGy/s, the actual value is approx. 0.22 µGy/s x 1.4 equals 0.308 µGy/s.

**Setting the dose rate value**

- If desired, the default position can be reprogrammed for the dose rate.
**Technical Data**

**Entire system**

### General data

<table>
<thead>
<tr>
<th>Classification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power line connection:</td>
<td>100 V, 110 V, 120 V, 127 V, 200 V, 230 V, 240 V ± 10 %; 50/60 Hz ± 1 Hz</td>
</tr>
<tr>
<td>Nominal rating:</td>
<td>20 A to 127 V~, 15 A from 200 V~ corresponds to the nominal value of the slow-blow fuse in the power input of the product</td>
</tr>
<tr>
<td>Internal line resistance:</td>
<td>Ri &lt; 0.3 Ohm at 100 - 127 V~</td>
</tr>
<tr>
<td></td>
<td>Ri &lt; 0.8 Ohm at 200 - 240 V~</td>
</tr>
<tr>
<td>Power consumption:</td>
<td>max. 2.5 kVA</td>
</tr>
<tr>
<td>Weight:</td>
<td>Basic unit approx. 257 kg</td>
</tr>
<tr>
<td></td>
<td>Monitor trolley with 1 SIMOMED monitor approx. 129 kg</td>
</tr>
<tr>
<td></td>
<td>Monitor trolley with 2 SIMOMED monitors approx. 147 kg</td>
</tr>
<tr>
<td>Ambient conditions:</td>
<td>Temperature range: +10 °C to +37 °C</td>
</tr>
<tr>
<td></td>
<td>Rel. humidity: +15 % to +75 %, non-condensing</td>
</tr>
<tr>
<td></td>
<td>Barometric pressure: 700 hPa to 1060 hPa</td>
</tr>
</tbody>
</table>

### Classification

<table>
<thead>
<tr>
<th>Classification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection type:</td>
<td>Class I, according to IEC 601-1</td>
</tr>
<tr>
<td>Protection category:</td>
<td>IP20 according to IEC 529</td>
</tr>
<tr>
<td>Radio interference protection:</td>
<td>EN 60 601-1-2 (2001) product group 1, limit value class B</td>
</tr>
<tr>
<td>Protection against ignition of combustible materials:</td>
<td>Class AP (anesthesia test) according to EN 60 601-1</td>
</tr>
</tbody>
</table>
**Technical data**

### Generation of radiation

**Generator**

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulsed fluoroscopy:</td>
<td>Min. pulse width 7 ms</td>
</tr>
<tr>
<td></td>
<td>Pulse rate 15 f/s/23 mA</td>
</tr>
<tr>
<td></td>
<td>Max. pulse power 2.3 kW</td>
</tr>
<tr>
<td>Fluoroscopy:</td>
<td>40 kV to 110 kV/0.2 to 8.9 mA (max. 550 W)</td>
</tr>
<tr>
<td>Digital radiography:</td>
<td>40 kV to 110 kV/0.2 to 12.2 mA (max. 850 W)</td>
</tr>
<tr>
<td>Direct exposure:</td>
<td>40 kV to 110 kV/6.9 to 20 mA (max. 1430 W)</td>
</tr>
<tr>
<td>mAs values:</td>
<td>1 mAs to 150 mAs in max. 23 levels</td>
</tr>
<tr>
<td>Current-Time-Reference product:</td>
<td>1.6 mAs/102 kV</td>
</tr>
<tr>
<td>Tolerances:</td>
<td>kV ± 10 % (measured with spectrometric kV method)</td>
</tr>
<tr>
<td></td>
<td>mAs ± 10 % ± 0.2 mAs</td>
</tr>
<tr>
<td></td>
<td>mA ± 8 % ± 0.1 mA (measured in rectified high voltage circuit)</td>
</tr>
<tr>
<td></td>
<td>Fluoroscopic time 1 digit (6 s) ± 5 %</td>
</tr>
<tr>
<td>Nominal power:</td>
<td>1.4 kW (102 kV/1.6 mAs)</td>
</tr>
<tr>
<td>Exposure times:</td>
<td>min. 50 ms at 40 kV 20 mA</td>
</tr>
<tr>
<td></td>
<td>max. 10 s</td>
</tr>
</tbody>
</table>

**X-ray tube assembly**

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIREPHOS single tank high-frequency generator:</td>
<td>Inverter frequency 15 kHz to 30 kHz</td>
</tr>
<tr>
<td>Inherent filtration:</td>
<td>≥ 3 mm Al equivalent</td>
</tr>
<tr>
<td>X-ray tube:</td>
<td>Stationary anode, focal spot nominal value 0.6</td>
</tr>
</tbody>
</table>
## Technical data

**Image System**

### MEMOSKOP C-E

<table>
<thead>
<tr>
<th>Storage capacity:</th>
<th>3 images</th>
</tr>
</thead>
</table>
| Matrix:           | 512 x 512 (50 Hz)  
|                   | 512 x 444 (60 Hz) |

**Operating modes:**
- Fluoroscopy with saving the last image or one image from the current fluoroscopy
- Pulsed fluoroscopy with storage of the last image
- Digital fluoroscopy with storage of the last image

**Image processing:**
- Recursive filtration, summation or noise reduction dependent on movement
- Spatial frequency filtration for edge enhanced image display
- Contrast enhancement, auto window
- Monitor split, horizontal or vertical

### MEMOSKOP C-E 100

<table>
<thead>
<tr>
<th>Storage capacity:</th>
<th>100 images</th>
</tr>
</thead>
</table>
| Matrix:           | 512 x 512 (50 Hz)  
|                   | 512 x 444 (60 Hz) |

**Operating modes:**
- Fluoroscopy with saving the last image or one image from the current fluoroscopy
- Pulsed fluoroscopy with storage of the last image or all images
- Digital radiography with storage of the last image or all images

**Image processing:**
- Recursive filtration, summation or noise reduction dependent on movement
- Spatial frequency filtration for edge enhanced image display
- Contrast enhancement, auto window
- Monitor split, horizontal or vertical
- 16-image collage
- Shutter
- Zoom/Roam
## Technical data

### MEMOSKOP C

<table>
<thead>
<tr>
<th>Storage capacity:</th>
<th>700 images</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Matrix:</strong></td>
<td></td>
</tr>
<tr>
<td>512 x 512 (50 Hz)</td>
<td></td>
</tr>
<tr>
<td>512 x 444 (60 Hz)</td>
<td></td>
</tr>
<tr>
<td><strong>Operating modes:</strong></td>
<td></td>
</tr>
<tr>
<td>✐ Fluoroscopy with saving the last image or one image from the current fluoroscopy</td>
<td></td>
</tr>
<tr>
<td>✐ Pulsed fluoroscopy with storage of the last image or all images</td>
<td></td>
</tr>
<tr>
<td>✐ Digital radiography with storage of the last image or all images</td>
<td></td>
</tr>
<tr>
<td><strong>Image processing:</strong></td>
<td></td>
</tr>
<tr>
<td>✐ Recursive filtration, summation or noise reduction dependent on movement</td>
<td></td>
</tr>
<tr>
<td>✐ Spatial frequency filtration for edge enhanced image display</td>
<td></td>
</tr>
<tr>
<td>✐ Contrast enhancement, auto window</td>
<td></td>
</tr>
<tr>
<td>✐ Monitor split, horizontal or vertical</td>
<td></td>
</tr>
<tr>
<td>✐ 16-image collage</td>
<td></td>
</tr>
<tr>
<td>✐ Shutter</td>
<td></td>
</tr>
<tr>
<td>✐ Zoom/Roam</td>
<td></td>
</tr>
</tbody>
</table>

### MEMOSKOP C-SUB

<table>
<thead>
<tr>
<th>Storage capacity:</th>
<th>900 images</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Matrix:</strong></td>
<td></td>
</tr>
<tr>
<td>512 x 512 (50 Hz)</td>
<td></td>
</tr>
<tr>
<td>512 x 444 (60 Hz)</td>
<td></td>
</tr>
<tr>
<td><strong>Operating modes:</strong></td>
<td></td>
</tr>
<tr>
<td>✐ Fluoroscopy with saving the last image or one image from the current fluoroscopy</td>
<td></td>
</tr>
<tr>
<td>✐ Pulsed fluoroscopy with storage of the last image or all images</td>
<td></td>
</tr>
<tr>
<td>✐ Digital radiography with storage of the last image or all images</td>
<td></td>
</tr>
<tr>
<td>✐ Digital angiography</td>
<td></td>
</tr>
<tr>
<td>✐ Digital subtraction angiography (DSA)</td>
<td></td>
</tr>
<tr>
<td>✐ Roadmap</td>
<td></td>
</tr>
</tbody>
</table>
Technical data

Image processing:
- Recursive filtration, summation or noise reduction dependent on movement
- Spatial frequency filtration for edge enhanced image display
- Contrast enhancement, auto window
- Monitor split, horizontal or vertical
- 16-image collage
- Shutter
- Zoom/Roam

MOD:
- only available for Memoskop C and Memoskop C-SUB

MOD:
- Magneto-optical disk 3.5” approx. 900 images
- DICOM or TIF format

MEMOSKOP CX 200

Storage capacity: 200/2000/5000 images

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

Operating modes:
- Fluoroscopy with saving the last image or one image from the current fluoroscopy
- Pulsed fluoroscopy with storage of the last image or all images
- Digital radiography with storage of the last image or all images
- Digital angiography (depending on configuration level)
- Digital subtraction angiography (DSA), depending on configuration level
- Roadmap (depending on configuration level)

Image processing:
- Recursive filtration, summation or noise reduction dependent on movement
- Spatial frequency filtration for edge enhanced image display
- Contrast enhancement, auto window
- Shutter
- Zoom/Roam

CD-RW
- CD-R/CD-RW
- DICOM format incl. viewer
### Unit components

**C-arm**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-arm orbital movement</td>
<td>130° (-40° to +90°)</td>
</tr>
<tr>
<td>C-arm angulation</td>
<td>± 190°</td>
</tr>
<tr>
<td>C-arm horizontal movement</td>
<td>20 cm</td>
</tr>
<tr>
<td>C-arm immersion depth</td>
<td>73 cm</td>
</tr>
<tr>
<td>C-arm swivel range</td>
<td>± 12.5°</td>
</tr>
<tr>
<td>C-arm vertical lift</td>
<td>45 cm, motorized</td>
</tr>
<tr>
<td>Source-to-I.I. distance</td>
<td>100 cm</td>
</tr>
<tr>
<td>Cone-I.I. distance</td>
<td>78 cm</td>
</tr>
</tbody>
</table>

**Image intensifier**

<table>
<thead>
<tr>
<th>Model</th>
<th>Nominal Diameter</th>
<th>Format Switch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sirecon 17-2HDR-C</td>
<td>17 cm (7&quot;)</td>
<td>17 cm/10 cm (7'/4&quot;)</td>
</tr>
<tr>
<td>Sirecon 23-2HDR-C</td>
<td>23 cm (9&quot;)</td>
<td>23 cm/15 cm (9'/6&quot;)</td>
</tr>
</tbody>
</table>

**Scattered radiation grid at the I.I. input**

<table>
<thead>
<tr>
<th>Type</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Round grid</td>
<td>Pb 8/40, f 90</td>
</tr>
<tr>
<td>System attenuation factor</td>
<td>m = 1.5</td>
</tr>
</tbody>
</table>

**Collimator system:**

<table>
<thead>
<tr>
<th>System</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collimator system</td>
<td>Iris diaphragm for concentric collimation and semi-transparent slot diaphragm for unlimited rotatable collimation</td>
</tr>
</tbody>
</table>

**Imaging chain**

<table>
<thead>
<tr>
<th>Device</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>VIDEOMED DC</td>
<td>50/60 Hz, 625/525 lines</td>
</tr>
<tr>
<td>CCD sensor</td>
<td>470 000 pixels at 50 Hz, 410 000 pixels at 60 Hz</td>
</tr>
</tbody>
</table>

**Monitors**

<table>
<thead>
<tr>
<th>Monitor</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>TFT monitors</td>
<td>Flicker-free flat screen monitors</td>
</tr>
<tr>
<td></td>
<td>15&quot; monitor; 1024 x 768 pixels; max. luminance 250 cd/m²</td>
</tr>
<tr>
<td></td>
<td>17&quot; monitor; 1280 x 1024 pixels; max. luminance 250 cd/m²</td>
</tr>
<tr>
<td></td>
<td>18&quot; monitor; 1280 x 1024 pixels; max. luminance 600 cd/m²</td>
</tr>
</tbody>
</table>
## Technical data

### Options

#### Cassette holder

| Cassette holder: | Format 24 cm x 30 cm (10 inch x 12 inch) with grid Pb r17 N70, f<sub>90</sub> |

#### MULTISPOT 2000

<table>
<thead>
<tr>
<th>Film format:</th>
<th>8&quot; x 10&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Film segmentation:</td>
<td>2-fold or overview/4-fold</td>
</tr>
</tbody>
</table>
Labels

Overview

The labels shown below are attached permanently to the following sub-assemblies:

(1) I.I. unit
(2) Image intensifier
(3) Grid
(4) SIREPHOS tube assembly housing
(5) X-ray unit
(6) Tube assembly collimator
(7) Laser light localizer (optional)
(8) Support arm
(9) Cassette holder (optional)

 Equipotential bonding
(1) **I.I. unit**

![Image]

(1) Identification label of the manufacturer

(2) **Image intensifier**

![Image]

(1) Identification label of the manufacturer

This product complies with DHHS regulations 21 CFR Subchapter J, applicable at date of manufacture.

Manufactured:
Siemens Aktiengesellschaft
Wittelsbacherplatz 2, D-Muenchen
Germany

(2) Approval label

(3) Approval label
Technical data

(4) Approval label

(3) I.I. grid

(1) Grid identification label
Technical data

(4) SIREPHOS tube assembly housing

(1) Special ID label with radiation input

This product complies with DHHS regulations 21 CFR Subchapter J, applicable at date of manufacture.
Manufactured:
Siemens Aktiengesellschaft
Wittelsbacherplatz 2, D-Muinchnen
Germany

(2) Approval label

(3) Tube ID label

(4) Revision status label

(5) Supplemental ID label
(5) X-ray unit

This product complies with DHHS regulations
21 CFR Subchapter J, applicable at date of
 manufacture.
Manufactured:
Siemens Aktiengesellschaft
Wittelesbacherplatz 2, D-Muenchen
Germany

X-Ray Equipment

With Respect to Electrical
Fire, Shock and Mechanical Hazards only.
245B

Sach Nr.
ES 01 02 03 04 05 06 07
08 09 10 11 12 13 14 15

(1) Identification label of the manufacturer

(2) Approval label

(3) Approval label

(4) Approval label

(5) Revision status label
(6) For China ID label only

(7) For China ID label manufacturer only

(6) Tube assembly collimator

(1) Identification label of the manufacturer

(2) Approval label

(3) Supplemental ID label
Technical data

(7) Laser light localizer C (optional)

(1) Identification label of the manufacturer

SECOND SET OF LABELS
LASER

(2) Supplemental ID label

This product complies with DHHS regulations 21 CFR Subchapter J, applicable at date of manufacture.
Manufactured:
Siemens Aktiengesellschaft
Wittelsbacherplatz 2, D-Muenchen
Germany

(3) for USA/Canada approval label

CAUTION
LASER RADIATION
DO NOT STARE INTO BEAM

PEAK POWER < 5mW
WAVE LENGTHS: 540 - 700nm
CLASS II LASER PRODUCT

(4) for USA/Canada warning label
Technical data

(5) for USA/Canada/UK warning label

(6) Countries outside of USA/Canada warning label

(7) Countries outside of USA/Canada warning label
(8) Support arm

Achtung! Röntgenstrahlung
Caution! X-Ray
Attention! rayon X

(1) for Canada warning label only

Kein Zutritt
Röntgen
Controllbereich im
Umkreis von 4,0 m

(2) attached for Germany only

(9) Cassette holder (optional)

24x30cm
10x12 ins

Sicherheitshinweis für Montage des Kassettenhalter über dem Patienten:
1. Überprüfen, ob der Kassettenhalter sicher am Bildverstärker befestigt ist.
2. Einlegen der Kassette:
   - Kassette mittig halten.
   - Nicht nach unten drücken.
   - Nicht gegen die Kassette schlagen.

This product complies with DHHS regulations
21 CFR Subchapter J, applicable at date of manufacture.
Manufacturer:
Siemens Aktiengesellschaft
Wittelsbacherplatz 2, D-München
Germany
**Technical data**

**Monitor trolley**

1. **Identification label of the manufacturer (monitor)**

2. **WARNING:**

   THIS X-RAY UNIT MAY BE DANGEROUS TO PATIENT AND OPERATOR UNLESS SAFE EXPOSURE FACTORS AND OPERATING INSTRUCTIONS ARE OBSERVED.

   for USA/Canada warning label

3. **Identification label of the manufacturer (trolley)**

4. **Approval label**
X-Ray Equipment

With Respect to Electrical
Fire, Shock and Mechanical Hazards only.
245B

Approval label

Supplemental ID label country-specific connection data

<table>
<thead>
<tr>
<th>Volt</th>
<th>Load Test Current</th>
<th>Moment Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>15</td>
<td>23</td>
</tr>
<tr>
<td>110</td>
<td>14</td>
<td>21</td>
</tr>
<tr>
<td>120</td>
<td>13</td>
<td>19</td>
</tr>
<tr>
<td>127</td>
<td>13</td>
<td>19</td>
</tr>
<tr>
<td>200</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>230</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>245</td>
<td>16</td>
<td>16</td>
</tr>
</tbody>
</table>

DANGER - EXPLOSION HAZARD.
DO NOT USE IN THE PRESENCE
OF FLAMMABLE Anaesthetics

DANGER - RISQUE D’EXPLOSION.
NE PAS EMPLOYER EN PRESENCE
D’ANESTHESIQUES INFLAMMABLES

ID label risk of explosion for USA and Canada
For notes
Please observe the

Safety Operator Manual

It must be studied thoroughly before system startup.

The original version of this Operator Manual was written in the German language.
Maintenance

Contents

Operator Manual

Maintenance

Functional and Safety Checks .................................................................................................................. 3
  Daily checks ........................................................................................................................................ 3
  Monthly checks .................................................................................................................................. 4
  Maintenance plan for checking the system ....................................................................................... 5

Cleaning and Disinfection ....................................................................................................................... 6
  Cleaning ............................................................................................................................................... 6
  Disinfection ......................................................................................................................................... 7
  Monitor trolley ..................................................................................................................................... 8
For notes
Maintenance

**Functional and Safety Checks**

To ensure that the system is ready for operation and all safety-relevant unit functions are working properly, perform functional and safety tests regularly.

**Daily checks**

**Checks before the examination**
- Check functioning of the foot brakes, control of the unit and of the monitor trolley.
- Check weight compensation after releasing the brakes.
- Check that all radiation indicators are functioning properly.
- Check the housing of the I.I. unit and the single tank.

**Checks for open heart or open skull examinations**
- Establish an additional connection between the unit and a point in the equipotential bonding, e.g. the tabletop.

**Checks during the examination**
- Establish an additional connection between the unit and a point in the equipotential bonding, e.g. the tabletop.
- When moving the unit, please make sure that the wheels do not bump into any obstacles.
Monthly checks

Functional check of the dose rate control

You can check the function of the dose rate control without an object using the simple procedure described below. A kV value of ≤ 45 kV must be stabilized:

◆ Open the iris and slot diaphragm fully.
◆ Press the Stop function of the dose rate control.
◆ Select 110 kV with the +/- keys.
◆ Release radiation.
  – The monitor image is overexposed.
◆ Press the key again to cancel the Stop function.
◆ Release radiation.
  – The monitor image is not overexposed.

Checking the EMERGENCY STOP function for motor-driven unit movements

◆ Switch the system on.
◆ Move the lifting column.
◆ Press the EMERGENCY STOP button.
  – The lifting column cannot be moved.
  – Message appears on the monitor.
◆ Unlock the EMERGENCY STOP button again.
Maintenance

Maintenance plan for checking the system

The tests or inspections required according to national laws or regulations, such as DHHS regulations or RoeV (constancy tests), are not part of the activities listed in this maintenance plan. If national rules or regulations specify more frequent checking and/or maintenance, this must be observed.

Maintenance should be performed only by trained skilled personnel. To keep the system in an optimum condition, we recommend conclusion of a maintenance contract. In the case of questions relating to maintenance/maintenance contract please contact our Siemens Customer Service.

Please observe the statements in the “Maintenance and checking” chapter in the “Safety” register in this regard.

Checking the system

<table>
<thead>
<tr>
<th>Processes to be performed</th>
<th>Function</th>
<th>Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical safety</td>
<td>Damage of the housing, system movements and options (e.g. laser light localizer, cassette holder)</td>
<td>12 months</td>
</tr>
<tr>
<td>Electrical Safety</td>
<td>Protective conductors, voltage discharge rubber, cables, and plugs</td>
<td>12 months</td>
</tr>
<tr>
<td>Functional check</td>
<td>Emergency stop device and lifting column</td>
<td>12 months</td>
</tr>
<tr>
<td>Image Quality Check</td>
<td>Image display and image processing</td>
<td>12 months</td>
</tr>
</tbody>
</table>

The stated functions are minimum requirements.
Cleaning and Disinfection

Always disconnect the SIREMOBIL Compact L from the power supply and switch it off before cleaning or disinfecting it.

Cleaning

Prior to the examination, clean all parts which come into contact with the patient.

Caution

Cleaning agents or liquids get into the unit’s interior. These can cause risks or damage to the unit. Never spray the unit!

- Use a damp cloth to clean the unit parts.
- For moistening, use water or a lukewarm, diluted aqueous solution consisting of water and a household cleaning agent.
- Do not use scouring cleaning agents or organic solvents or cleaning agents such as benzine, pure alcohol, spot remover etc. because of possible material incompatibility.
Disinfection

To disinfect surfaces, we recommend aqueous solutions of commercially available aldehyde and/or amphotenside-based surface disinfectants such as Tensodur 103, Korsolin, Cidex.

Certain substituted phenol-based or chlorine-splitting disinfectants can attack materials and are therefore not recommended. The same restrictions apply to undiluted solutions with a high alcohol content, for example, for disinfecting hands.

Caution

The spray of disinfectant sprays gets into the unit’s interior.

Sprays cause damage to electronic components or they form a flammable mixture of air and solvent.

Disinfectant sprays must never be used!

◆ Please also observe the instructions of use of the disinfectant.

Some substances contained in disinfectants are known to be hazardous to health. The concentration of such substances in the air must not exceed the statutorily defined limit. We recommend that you follow the manufacturers’ operating instructions for these products.
**Monitor trolley**

**Monitor screens/TFT displays**

You should clean the monitor screens at least every two months.

![Caution]

- 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.
- It is best to wipe off contrast medium splashes immediately.

**Keyboard**

- Wipe the keyboard only with a clean, damp cloth.
- Use only a solution of 2/3 water and 1/3 alcohol for moistening. Do not pour/spray the solution over the keyboard.
Please observe the

**Safety Operator Manual**

It must be studied thoroughly before system startup.

The original version of this Operator Manual was written in the German language.
## Accessories

<table>
<thead>
<tr>
<th>Accessories</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spacer</td>
<td>4</td>
</tr>
<tr>
<td>Sterile cover of the C-arm</td>
<td>4</td>
</tr>
<tr>
<td>Overview of C-arm keyboard</td>
<td>7</td>
</tr>
<tr>
<td>Cassette holder</td>
<td>7</td>
</tr>
<tr>
<td>Video printer</td>
<td>11</td>
</tr>
<tr>
<td>Ground wire</td>
<td>12</td>
</tr>
<tr>
<td>Laser light localizer at single tank</td>
<td>12</td>
</tr>
</tbody>
</table>
For notes
Anyone who connects additional equipment to the medical device configures the system and is therefore responsible for ensuring that the system configuration in its current version complies with the relevant standards (e.g. system standard IEC/EN 60601-1-1 and/or other applicable standards). If in doubt please consult your local contact person.

The following accessories are released for the Compact L:

<table>
<thead>
<tr>
<th>Accessories</th>
<th>Part Number</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fabric cover</td>
<td>3780967/3780959</td>
<td>Karl Dieckhoff GmbH</td>
</tr>
<tr>
<td>Set of clips</td>
<td>3778359</td>
<td>NPW Schubert GmbH &amp; Co.KG</td>
</tr>
<tr>
<td>Cassette holder</td>
<td>3780355/3780363</td>
<td>Arnold AG</td>
</tr>
<tr>
<td>I.I. laser light localizer</td>
<td>3099988</td>
<td>Z-Laser Optoelektronik GmbH</td>
</tr>
<tr>
<td>Ground wire</td>
<td>2171767</td>
<td>Nicolay Services GmbH</td>
</tr>
<tr>
<td>DHHS cap</td>
<td>8611030</td>
<td>MED CO IDB</td>
</tr>
<tr>
<td>Sterile covers</td>
<td>9717083</td>
<td>Moelinycke Health Care GmbH</td>
</tr>
<tr>
<td>Disposable cover C-transparent</td>
<td>8080462</td>
<td>Microtek Medical B.V.</td>
</tr>
<tr>
<td>Metal clamp C</td>
<td>8080454</td>
<td>Fritz Pscherer Nachf. GmbH</td>
</tr>
</tbody>
</table>
Spacer$^1$

The source-to-tube-unit-cover distance (possible source-to-skin) is 202.5 mm for the standard unit.

If, according to country-specific requirements (e.g. DHHS regulation 21 CFR 1020.32(f)), a larger source-to-skin distance of 300 mm, for example, is required, the unit is equipped with a spacer for minimum source-to-skin distance of 302.5 mm.

If this source-to-skin distance is too large for certain surgical examinations, the spacer can be removed by removing 3 knurled screws (1).

The spacer must be remounted after these special examinations to ensure a reduced skin dose again for the larger source-to-skin distance.

Sterile cover of the C-arm

The C-arm with image intensifier and X-ray tube assembly can be covered with a three-part, sterile disposable cover made of transparent plastic.

$^1$ Corresponding to country-specific requirements
◆ Move the metal bracket into the transparent disposable cover.

◆ The metal bracket is tensioned into the C-arm with the disposable cover.

◆ Pull the plastic cover over the X-ray tube assembly.
  – The plastic cover is fixed with an elastic cord.
Pull the other plastic cover over the image intensifier.

- The plastic cover is fixed with an elastic cord.

The C-arm completely covered.
Overview of C-arm keyboard

Please place the magnetic foil with the printed overview of the C-arm keyboard at the position on the unit shown in the figure.

Cassette holder

The cassette holder may only be attached in one specific position at the image intensifier. In this position the positioning pins at the cassette holder (1) must lock into the recesses in the image intensifier ring. Observe the instructions on the warning label on the cassette holder!
Accessories

_Cassette size_

Exclusively 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 supplied as standard 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 pins (1) lock into the recesses in the front ring of the image intensifier.
- Now open the spring (2) and lift it 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 recesses.

---

**Inserting the cassette**

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

---

**Selecting direct exposure**

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.

---

**Collimations for cassette exposure or saving the diaphragm position**

- When inserting the cassette, the slot diaphragm as well as the iris diaphragm opens fully.
  - The LED in the "Open iris diaphragm" key is on.

If the diaphragm setting selected for fluoroscopy, pulsed fluoroscopy, DR or SUB is to be saved, proceed as follows before inserting the cassette:

- Press both keys simultaneously.
  - The position of the iris diaphragm is saved.
Accessories

- Press both keys simultaneously.
  - The position and collimation of the slot diaphragm is saved.

- Press both keys simultaneously.
  - The position and collimation of the slot diaphragm is saved.

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

Deleting the saved diaphragm position

- If you want to delete the diaphragm storage again, press one of the diaphragm keys and the diaphragm opens completely when the cassette is inserted.

Setting the exposure data

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

If, after restarting the system a cassette is inserted again for the first time, only lines are displayed in the kV and mAs field.
You cannot release an exposure, as this is only permissible after setting the required kV and mAs values.
When you now press one of the kV or mAs +/- keys, 40 kV and 5 mAs are displayed as preferred values on the display. You can change these.
If you carry out fluoroscopy in the meantime, the previously used cassette kV and mAs values are used when inserting a cassette again.

Display of kV values

Setting of kV values

Display of mAs values

Setting of mAs values
**Releasing exposure**

- You release direct exposure with the release switch on the hand switch.
- The radiation indicators light up during the exposure. The radiation indicators light up a little longer for very short exposure times so that radiation is clearly indicated.
- During the exposure or after ending the exposure, an acoustic warning signal sounds (configurable).

**Removing the cassette**

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

**Removing the cassette holder**

- Hold the springs.
- Gently push the cassette holder downward, lifting it over the front ring to remove it.

**Switching to another operating mode**

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

- Select the desired operating mode.

Or

- Release radiation without operating mode selection.
  - In this case, the system reverts to the operating mode selected prior to the cassette exposure mode.

**Video printer**

A video print from the video printer is not suitable for diagnosis.
Accessories

*Ground wire*

Ground wire for equipotential bonding according to DIN 57107/VDE 0107 for rooms of user group 2E (heart catheter).

*Laser light localizer at single tank*

**Warning**

Do not look directly into the laser beam!

If there is a laser light localizer on the single tank, it is switched on or off with this key.

If no laser light localizer is available on the single tank, this key has no function.

- During or after system startup or Reset, the laser light localizer on the single tank is switched off.
- After 5 minutes, the laser light localizer on the single tank is switched off automatically.