

SIEMENS

Instructions for use

MOBILETT XP / XP ECO / XP Hybrid

The New Dimension in Mobile X-ray Imaging

SP



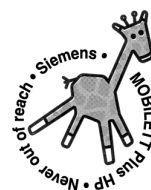


Manufacturer's note:

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

The CE marking applies only to medico-technical products/medical products introduced in connection with the above-mentioned comprehensive EC directives.

The original language of this document is english.



Operator Manual

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Safety

General Safety Information

Information on this Operator Manual

Proper use of this equipment presupposes that the operating personnel is familiar with the operating instructions. These instructions must be carefully studied before using the equipment. Special attention must be given to the following sections:

- ☐ Safety Information
- ☐ Functional and Safety Checks
- ☐ Protection Measures

If legally-binding regulations govern the start-up and/or operation of the MOBILETT, it is the responsibility of the installer and/or the operator to observe these regulations.

Validity

This "Instructions for use" is valid for

- ☐ MOBILETT XP No. 018 18 363 incl. variant ECO
- ☐ MOBILETT XP Hybrid No. 018 18 454

Warnings

Warning Warning is used to indicate the presence of a hazard which can cause personal injury or death.



Warning

At first the source of danger is stated!

Then possible consequences are pointed out

◆ In conclusion you receive information on how to rule out any danger.

Caution Caution is used to indicate the presence of a hazard which can cause damage to the equipment if this is used improperly.



Caution

At first the source of danger is stated!

Then possible consequences are pointed out

◆ In conclusion you receive information on how to rule out any danger.

General Notes

Note Notice is used to notify users of operator information which is important but not hazard-related.



A note is marked with an exclamation mark "!" and it is written in italics.

Troubleshooting information

Information on how to solve problems that might occur when performing operating steps, are given at the end of the respective instruction.



In these paragraphs, the problem and the potential source of error is described.

◆ Perform these operating steps to solve the problem.

Maintenance

To ensure the safety of the patients, the operators, and third parties, the equipment must be checked every 12 months to maintain its reliability and serviceability according to the maintenance guide.

All parts of the MOBILETTs which, if worn, may create a safety hazard, must be checked by skilled personnel at regular intervals of 12 months, and replaced, if required. This should be done by the Siemens customer service department within the framework of maintenance.

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

For detailed information please refer to the maintenance plan
(→ Page 73)

Checks, Tests

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



Special attention must be given to checking the displays and pilot lights for proper operation (visual check).

Perform the checks and tests according to the daily check list.

The radiation indicator may light during operation only while the radiography switch is operated.



Warning

The radiation indicator glows although the radiation release switch is not activated!

Undesired radiation exposure possible

- ◆ Switch off the MOBILETT immediately.
 - ◆ Please notify the Siemens customer service.
-

Installation of protective conductor

If you are not sure that the protective conductor installation is in faultless condition, you must proof the device before further use.

Emergency Shutdown

The mains connector and the main switch must be easily accessible so that the unit can be quickly disconnected from the mains if there is a safety hazard.

Fire protection



Warning

In case of fire!

A fire or smouldering fire can produce toxic gases or vapours

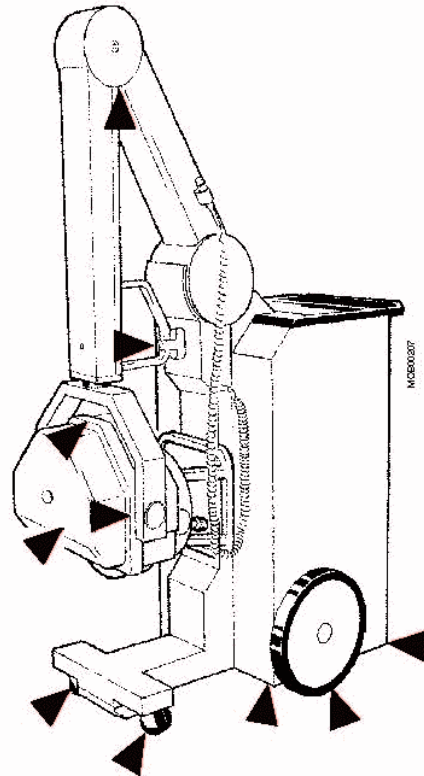
- ◆ Switch the MOBILETT off immediately (turn the main switch to **O**).
 - ◆ Pull the power cable out of the wall outlet.
 - ◆ Inform all personnel of correct procedures in case of fire as part of occupational safety training.
-

When clean-up and restoration work is completed, contact Siemens customer service prior to restarting the MOBILETT.

Personal Protection Measures

Mechanical Safety, Hazard Areas

The positions indicated by the black arrows in the following figure show potential danger points.



Caution

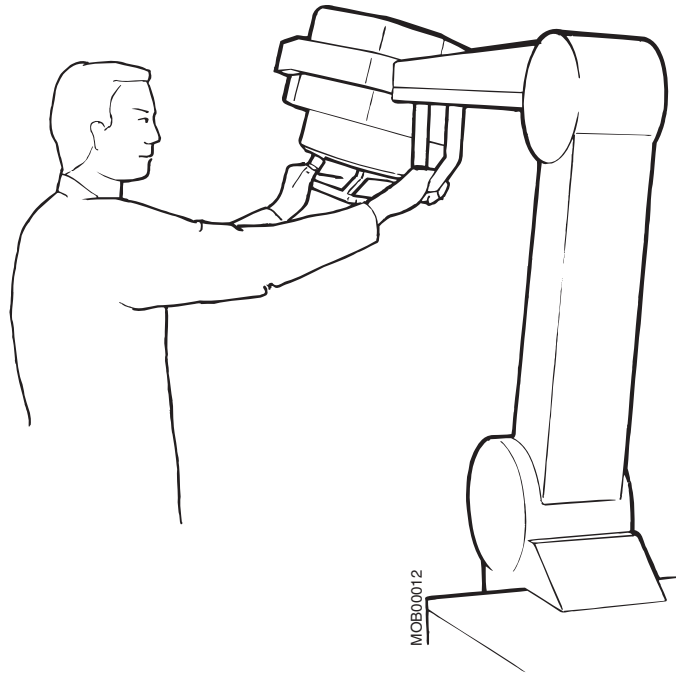
System movements can cause injury of the operator and collision with other devices!

Injuries, bruises or contusion of the operator and/ or damage to the system

- ◆ Ensure that no body parts are near the indicated potential points of danger.

Arm system

Always use the handles on the arm system and the tube assembly when lowering the X-ray tube assembly from the raised position into the parking position.



Caution

Tube assembly movements can cause injury of the operator!

Injuries, bruises or contusion of the operator

- ◆ Hold onto the handles to avoid squeeze injuries during the positioning of the tube assembly.

Radiation Protection

For the patient

- ☐ Keep the radiation field as small as possible.
- ☐ Provide the best possible protection for reproductive organs (gonad protective caps or lead-rubber covers) during exposure in the vicinity of these organs.
- ☐ Please make sure that there is the maximum possible distance between focus and skin of the patient.

For the operating personnel

- ☐ When releasing the exposure, there must be the maximum possible protective distance between the operator and the source of radiation.
- ☐ Wear protective clothing (lead-rubber apron), if you must be in close vicinity to the patient during an exposure.
- ☐ Wear a radiation monitoring badge or a pen dosimeter if necessary.

For the patient and the operating personnel

- ☐ When operating the remote control make sure that there are no other running infrared remote controlled systems in line-of-sight. This includes systems behind a window or lead glass.
- ☐ Please note that certain materials can lead to increased radiation exposure (e.g. parts of the operation table), if they are located in the beam path.

Equipment-Related Safety Measures

Installation, Repair

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

As manufacturers, assemblers, installers or importers Siemens cannot assume responsibility for the safety features and for reliability and performance of the equipment, specially if

- ☐ installation, equipment expansions, readjustments, modifications or repairs are not carried out by persons authorized by us.
- ☐ components affecting safe operation of the MOBILETT are not replaced by original spare parts in case of malfunction.
- ☐ electrical installation of the room concerned does not meet the requirements of DIN VDE 0100 Part 710 / IEC 60 364-7-710 regulation, or the corresponding national regulations.
- ☐ the MOBILETT is not used in accordance with the instructions for use.

On request, we will make technical documents for the product available to you at a charge which will be invoiced. This does not imply an authorization to undertake repairs. We accept no responsibility for repairs performed without our expressed written approval.

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

Original accessories

To ensure product safety, use only original Siemens accessories or accessories approved by Siemens that comply with standards and statutory regulations (IEC/EN 60 601-1 resp. IEC/EN 60 601-1-1).

The operator is responsible for any damages caused when accessories not approved by Siemens are used.



Contact Siemens customer service for more information.

Explosion Protection

The MOBILETT is not intended for operation in areas prone to explosion.

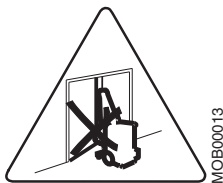
Transport

Prior to Transport

Before transporting the unit, ensure that:

- ☐ The arm system is lowered and secured by the transport safeguard.
- ☐ The power cable is disconnected from the wall outlet and wound into the cable winder.
- ☐ The parking brake is released.

Warning Label Transport



Do not use the MOBILETT to open doors. During transport, avoid bumping the wheels or the tube assembly into sharp edges/corners.

Damage to the accessories.

- ◆ Turn the MOBILETT around and move it backwards through doors and narrow rooms.
- ◆ Always be careful during transport of the unit, especially in the vicinity of the patient.

Disposal

Public legal directives can contain special regulations regarding disposal of this equipment. To avoid environmental pollution and human injury, we therefore request that you contact us if you wish to cease operation of the equipment with the intention of disposing of it.

Radiation Protection Material	<ul style="list-style-type: none">❑ Lead, placed in the single tank, approx. 1.9 kg.❑ Lead, placed in the multi-leaf collimator, approx. 1.0 kg.❑ Lead in solderings on the circuit boards, approx. 0.3 kg.
Transformer Oil	<ul style="list-style-type: none">❑ Oil, in the single tank, approx. 8.6 kg.
Plastic Material	<ul style="list-style-type: none">❑ Insulating material, PVC, from the cables, approx. 0.5 kg.
Electrolytic Capacitors	<p>The capacitors must be discharged. Please contact your Siemens customer service.</p> <ul style="list-style-type: none">❑ The capacitors in the capacitor bank, approx. 28 kg.❑ Capacitors in remaining electronics, approx. 0.8 kg.
Mechanical Hazard	<p>Please contact your Siemens customer service.</p> <ul style="list-style-type: none">❑ The tension in the spring pack must be released.❑ The vacuum of the tube in the single tank must be released by cautiously filling in air.
Batteries	<ul style="list-style-type: none">❑ The backup battery on circuit board, approx. 0.05 kg.❑ Maintenance free sealed lead-acid batteries, 24 x 2.5 kg, MOBILETT XP Hybrid only.❑ Remote control (option) battery, approx. 50 g.

Functional description

Device overview

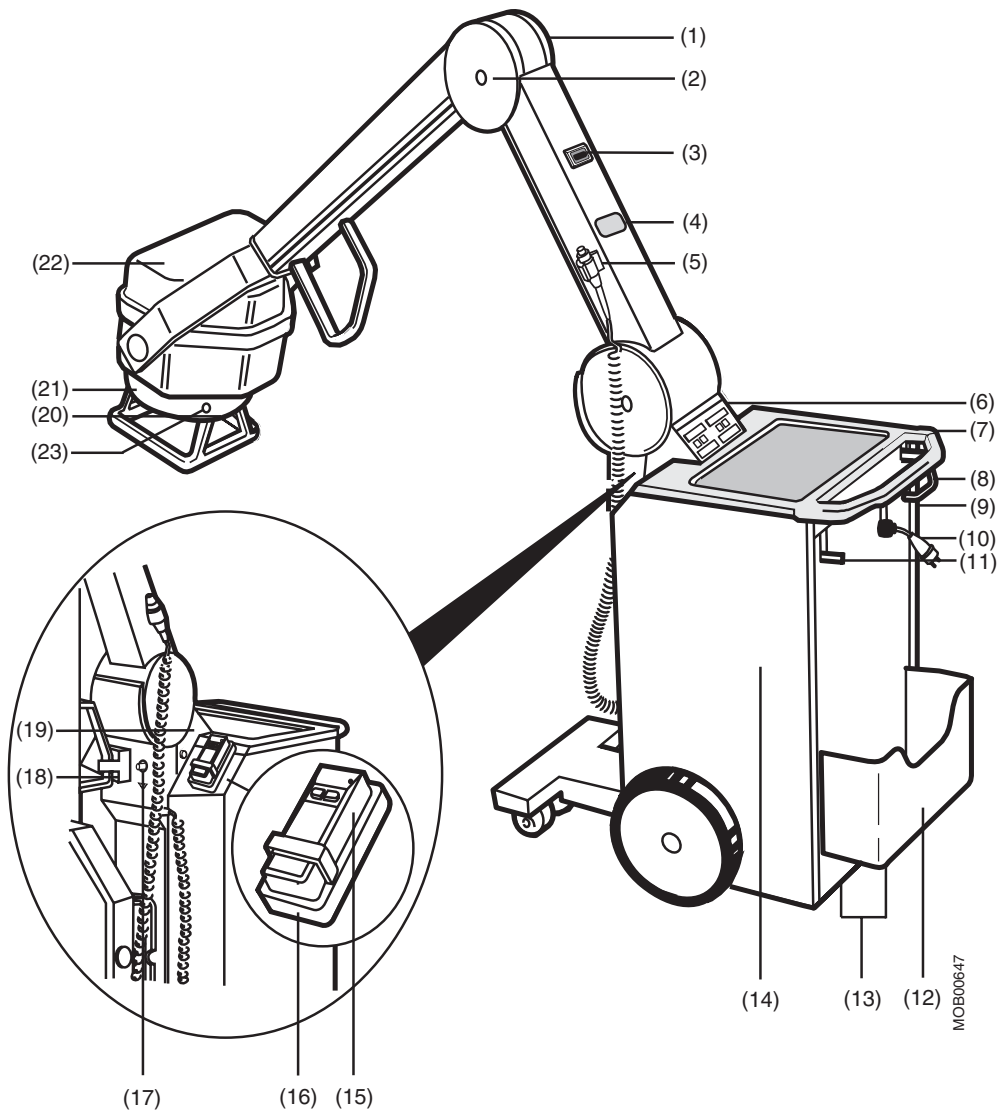
The MOBILETTs are mobile radiographic systems designed for use in wards, intensive care and premature-birth wards, emergency departments, operating theatres as well as the central X-ray department.

Special Features

- ☐ Combined battery/mains power operation, MOBILETT XP Hybrid only
- ☐ Double articulated arm system for extended reach
- ☐ Small and compact for quick and easy handling

Functional description

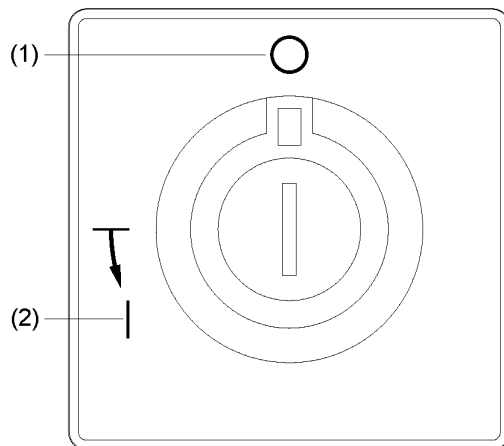
Parts and Controls The following figure shows parts and controls of the MOBILETT.



- (12) Cassette compartment
- (13) Support wheels
- (14) Carriage unit
- (15) Remote control (Option)
- (16) Remote holder (Option)
- (17) Potential equalizer connector
- (18) Transport safeguard
- (19) Vertical column
- (20) DAP - Ionization chamber (Option)
- (21) Collimator
- (22) X-ray radiator
- (23) Collimator light button (on both sides) ON/OFF

Main switch

The switch for switching the MOBILETT XP/XP Hybrid on and off is located on the front of the device.



(1) Key position OFF (O)

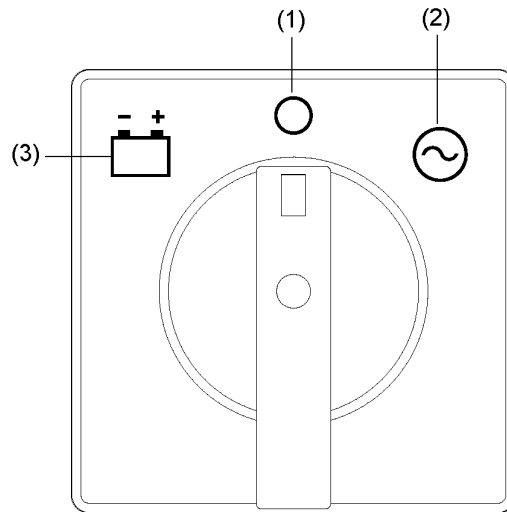
(2) Key position ON (I)



The key switch can be used to switch off radiation if a fault occurs.

Mode selection switch

The mode selection switch for the MOBILETT XP Hybrid is used for switching between mains power operation and battery operation.



- (1) Position OFF
- (2) Position Mains Power Operation
- (3) Position Battery Operation

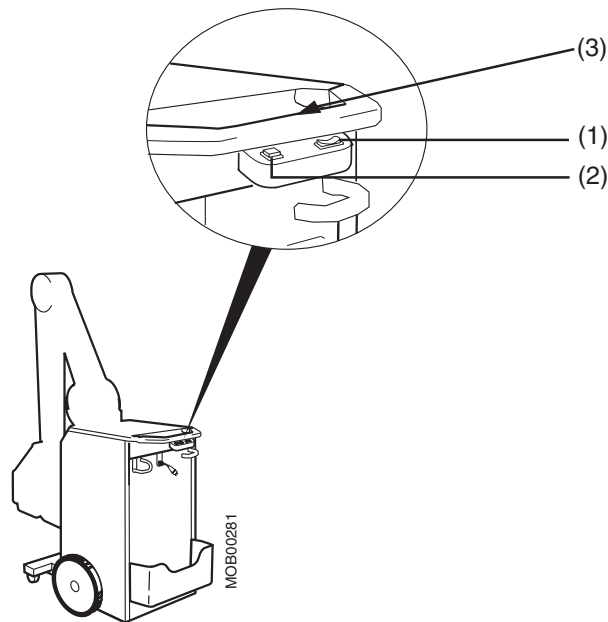


In order to protect the generator, it is not possible to switch directly from position (2) to position (3) and vice versa. You always have to stop at position (1) and enable the switch, before you can turn the requested position.

Motor Driving Control

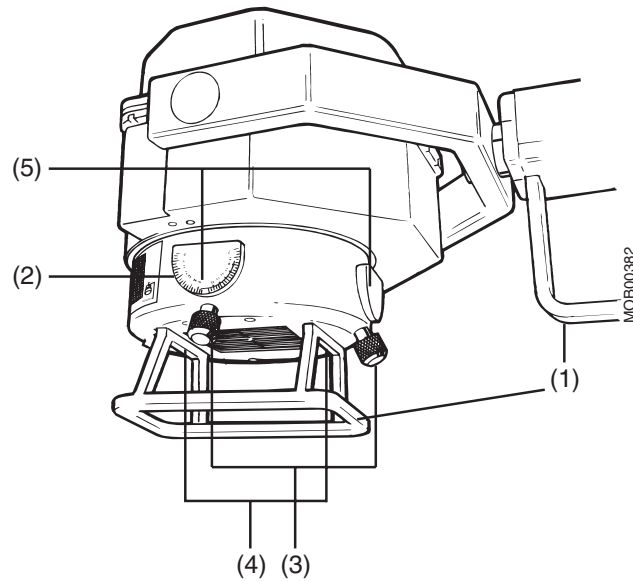


Motor Driving Control is available for MOBILETT XP Hybrid only.



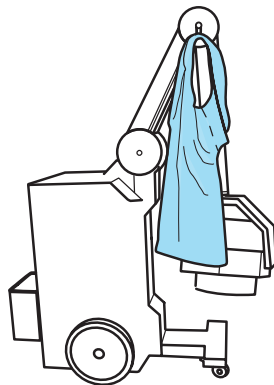
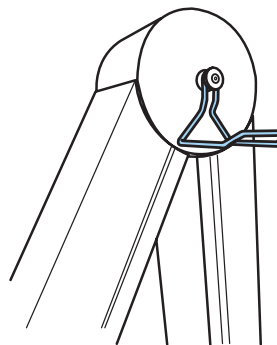
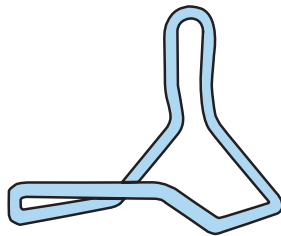
- (1) Direction control forwards / reverse
- (2) Speed control slow / fast
- (3) Safety switching elements (back of the motor control)

X-ray Tube Assembly with Multi-leaf Collimator



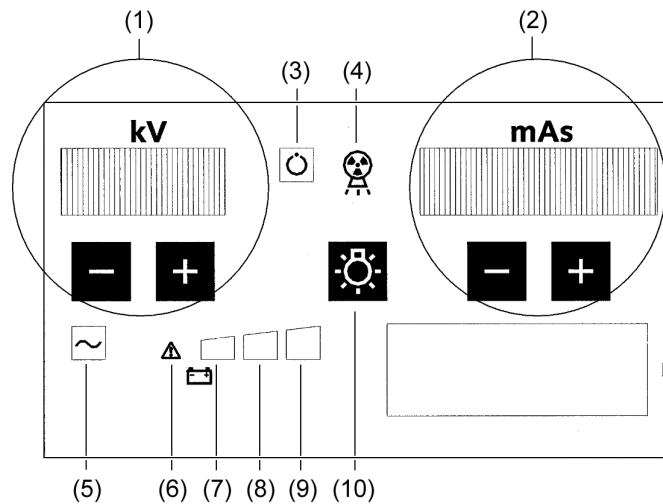
- (1) Handle
- (2) Measuring tape
- (3) Adjustment knobs for the collimator
- (4) Slots for additional filters and DAP Ionization chamber (Option)
- (5) Angle gauge

Hanger for lead apron



Remove lead apron before positioning the tube.

Control and display panel



- (1) kV display and kV adjust buttons for increase (+) and reduction (-)
- (2) mAs display and mAs adjust buttons for increase (+) and reduction (-)
- (3) LED Display " ready for operation" (GREEN)
- (4) LED Display " Exposure" (YELLOW)
- (5) LED Display " Mains power operation" (YELLOW)
- (6) Battery indicator " Error" (RED)
- (7) Battery charge indicator " Low" (YELLOW)
- (8) Battery charge indicator " Medium" (YELLOW)
- (9) Battery charge indicator " Full" (YELLOW)
- (10) Collimator light button

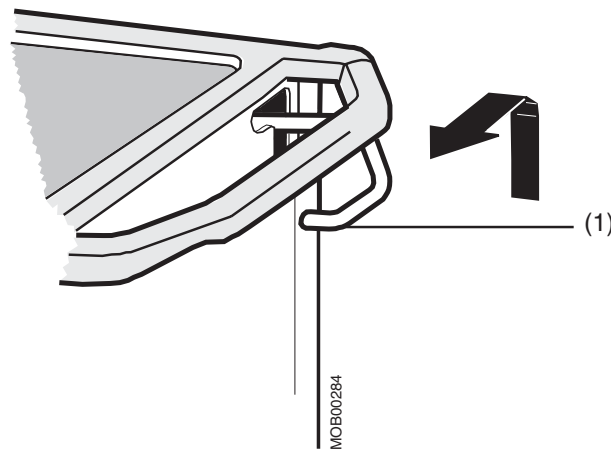
Equipotential bonding

The MOBILETT can be connected to a Protective Earth Terminal with the potential equalizer connector found next to the transport safeguard. This will ensure that the MOBILETT has the same electrical potential as other units connected to the same Protective Earth Terminal.

Arm system

The MOBILETT is provided with a counterbalanced, double articulated arm system. The X-ray tube assembly and the arm system remain in position without any additional locks.

Hand/Parking brake



(1) Hand/Parking brake

Accessories and options

The following accessories and options are available:

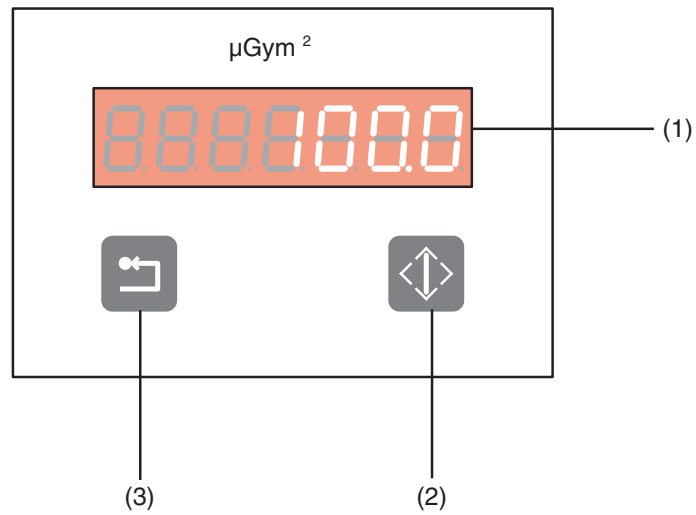
Name	Material No.	Manufacturer
Options:		
DAP measuring system	839 1919	Siemens
Remote control	839 1927	Siemens
Accessories:		
Pediatric filter 2.4 mm	0971 4981	Siemens
Pediatric filter 4.3 mm	0971 4999	Siemens
Angle gauge	90240 19	Siemens

Functional description

Options

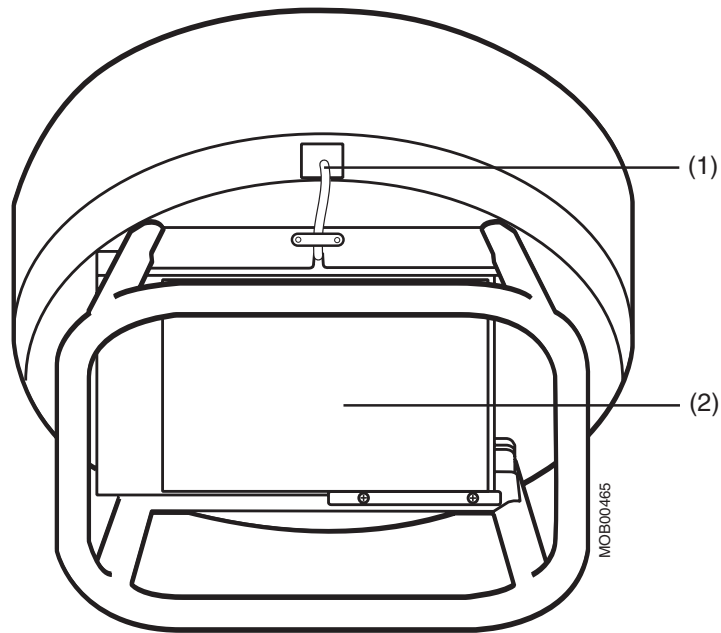
DAP measuring system (Option)

Display and control panel



- (1) Display (unit in μGym^2)
- (2) Test button
- (3) Reset button

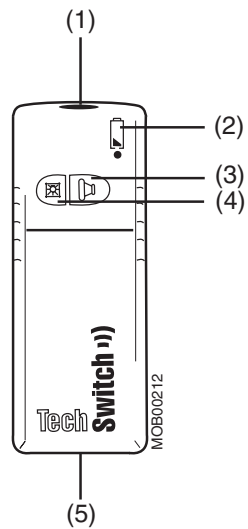
DAP-Ionization chamber



- (1) DAP Ionization chamber connector
- (2) DAP Ionization chamber

Functional description

Remote control (Option)



- (1) Infrared window
- (2) Battery indicator
- (3) Exposure release switch
- (4) Collimator light button ON/OFF
- (5) Battery compartment

Accessories

Pediatric filters

Pediatric filters are plumbiferous transparent PMMA filters designed to reduce radiation dose in examinations of children and, if applicable, adults.

They are available with 2.4 mm and 4.3 mm thickness and are inserted in the collimator slots.

The filters do not affect results of routine examinations.

Angle gauge

The angle gauge is designed for fine adjustment of the X-ray radiator position during an examination.

Functional description

Operation

Quick Operational Guide for MOBILETT XP Hybrid

Preparation



During the use of the device for x-ray imaging no other electrical devices may be used on the same fused power line.



- ◆ Connect the power cable to a grounded wall outlet and turn the mode selection switch to mains power operation.
 - The MOBILETT is mains supply operated.

or



- ◆ Pull out the plug, if necessary.
- ◆ Turn the mode selection switch to battery operation.
 - The MOBILETT is battery operated.



When operated in battery mode, the device may not be connected to the mains.

Operation

- ◆ Turn the main switch counterclockwise beyond position (I), until the display switches on. Then let the switch turn back to (I).
- ◆ Pre-position the MOBILETT.
- ◆ Release the arm system and lift up the tube assembly.
- ◆ Place the cassette at the required position.
- ◆ Switch on the collimator light.
- ◆ Check that the light field is parallel with the sides of the cassette, adjust by turning the MOBILETT and the collimator.
- ◆ Set the appropriate film focus distance, using the built-in measuring tape.
- ◆ Place the detachable protractor on the cassette and read the inclination of the cassette. Adjust the tube assembly.
- ◆ Collimate the radiation field for the desired image size and select exposure parameters.
- ◆ Release the exposure.



*Observe radiation safety regulations,
(→ Page 13)*

Quick Operational Guide for MOBILETT XP

Preparation



During the use of the device for x-ray imaging no other electrical devices may be used on the same fused power line.

- ◆ Connect the power cable to a grounded wall outlet.

Operation

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- ◆ Pre-position the MOBILETT.
- ◆ Release the arm system and lift up the tube assembly.
- ◆ Place the cassette at the required position.
- ◆ Switch on the collimator light.
- ◆ Check that the light field is parallel with the sides of the cassette, adjust by turning the MOBILETT and the collimator.
- ◆ Set the appropriate SID, using the built-in measuring tape.
- ◆ Place the detachable protractor on the cassette and read the inclination of the cassette. Adjust the tube assembly.
- ◆ Collimate the radiation field for the desired image size and select exposure parameters.
- ◆ Release the exposure.



*Observe radiation safety regulations,
(→ Page 13)*

Starting operation

Battery Charging, MOBILETT XP Hybrid only

- ◆ Connect the power cable to the wall outlet.
- The batteries will now be charged automatically.
- The device always loads when it is connected to the mains and the main switch is turned to position **O**.



*When the MOBILETT XP Hybrid is not used, always turn the main switch to position **O**.*

In battery mode the device may not be connected to the mains.

Switching on the system

The MOBILETT is operated using a grounded wall outlet or a battery (MOBILETT XP Hybrid only).

Switching on the MOBILETT XP Hybrid

- ◆ Turn on the device with the main switch (I).
- If the mode selection switch is in position Battery Operation or Mains Power Operation, after about 30 seconds, the green "Ready" lamp lights up. The generator is now ready for operation.



Should the green "Ready" lamp not light up, there is a malfunction and the generator is blocked.

- ◆ For further information see Messages
(→ Page 57)

Activating in Stand-by mode

If the MOBILETT XP Hybrid is not used for 10 minutes, it switches off automatically.

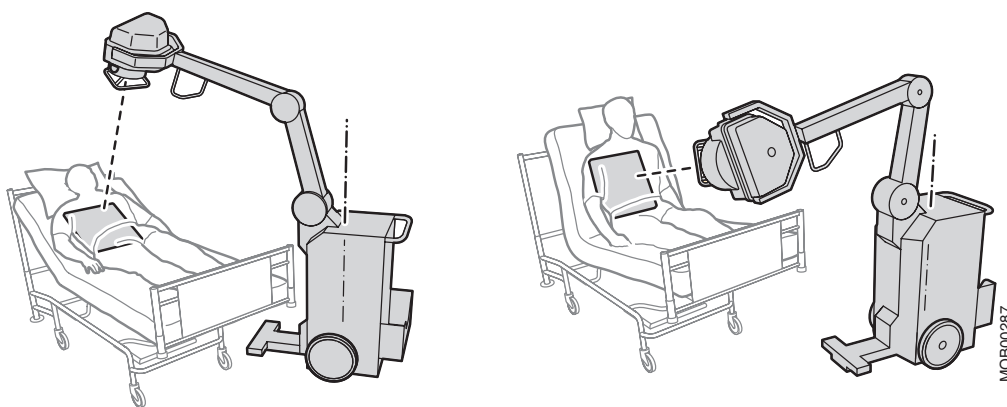
- ◆ Turn the main switch counterclockwise beyond position (I), until the display switches on.

Preparing exposure

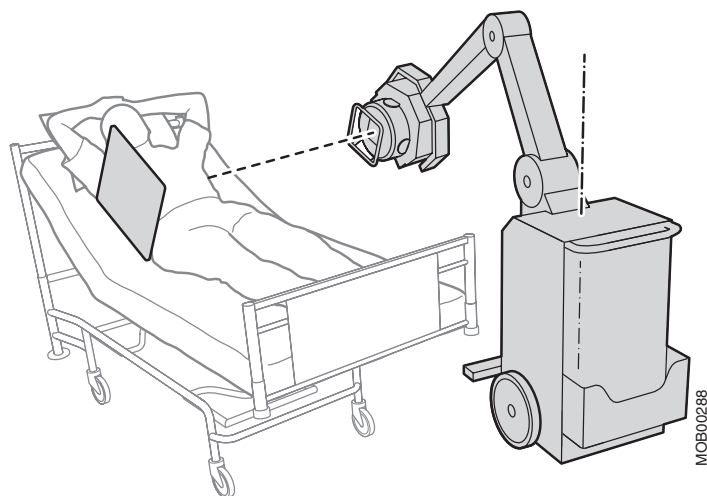
Position the MOBILETT

- ◆ Pre-position the MOBILETT.
- ◆ Release the arm system and lift up the tube assembly.
- ◆ Place the cassette at the required position.

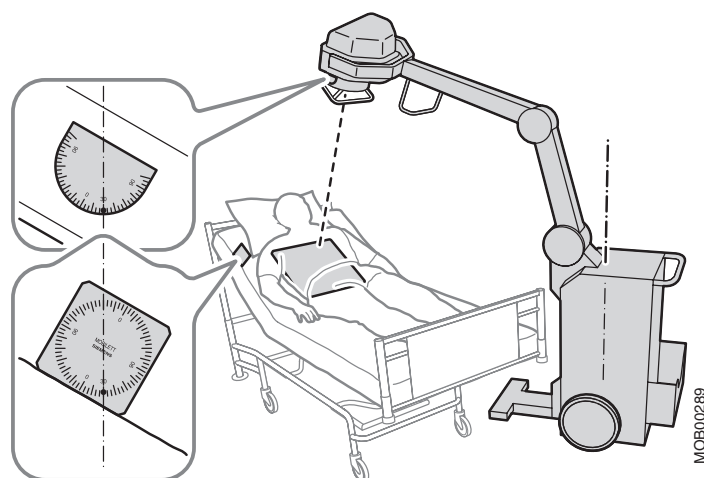
Frontal Exposure



Lateral Exposure



Angle Adjustment



Adjusting the radiation field

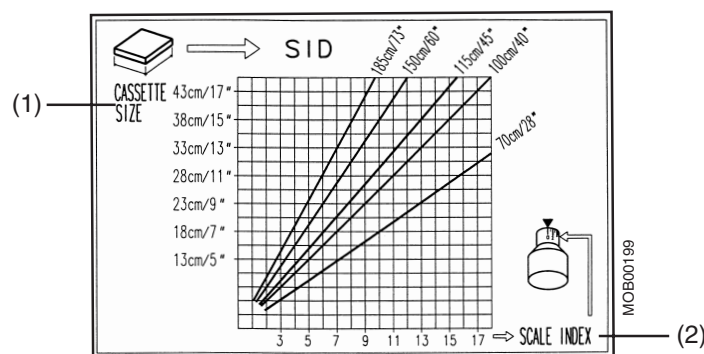
- ◆ Switch on the collimator light.
- ◆ Set the appropriate film focus distance, using the built-in measuring tape.
- ◆ Turn the collimator until the light field is parallel with the sides of the cassette.
- ◆ Place the detachable protractor on the cassette.
- ◆ Read the inclination angle and adjust it.
- ◆ Collimate the radiation field for the desired image size.

Collimating the radiation field using the diagram

A diagram is helpful when using a filter.



Never adjust the collimator to a field greater than needed for the investigated area.



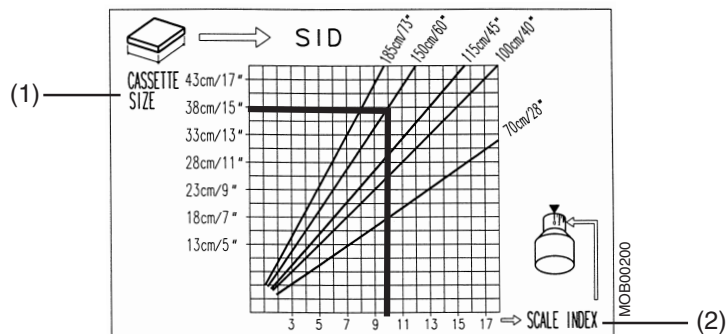
(1) Cassette size

(2) Scale index

- ◆ Follow the horizontal line from the y-axis, that belongs to the size of the used cassette, until it crosses the leaning line indicating the chosen Source Image Distance (SID).
- ◆ Follow the vertical line and read off the value on the x-axis indicating the scale index.
- ◆ Set the adjustment knobs for the collimator according to the scale index value.
- This adjustment gives a field size which corresponds to the size of the cassette. In those cases when the object to expose is smaller than the size of the cassette reduce the field size.

Example of radiation field collimating

✓ A cassette size of 38 cm and the film focus distance of 150 cm are preset.



(1) Cassette size

(2) Scale index

- ◆ Find 38 cm/15" on the y-axis. Follow the horizontal line until it crosses the inclined line for SID 150 cm/60".
- ◆ Follow the vertical line downwards until it crosses the x-axis - in this case at scale index 10.
- ◆ Turn the adjustment knob until value 10 faces the arrow.

Setting the Exposure Parameters

The exposure parameters are set by using the kV and mAs buttons.

For more detailed information see chapter Technical Data.

The exposure data are listed in chapter Dosimetry

(→ Page 93)

Exposure Points

The concept behind the exposure point system is to easily change the density or contrast of the film. Therefore, the kV and mAs may appear to change in odd steps. This will, however, allow logical density and contrast adjustments.

Exposure points are set by Siemens customer service. Examples can be found in chapter Dosimetry

(→ Page 93)

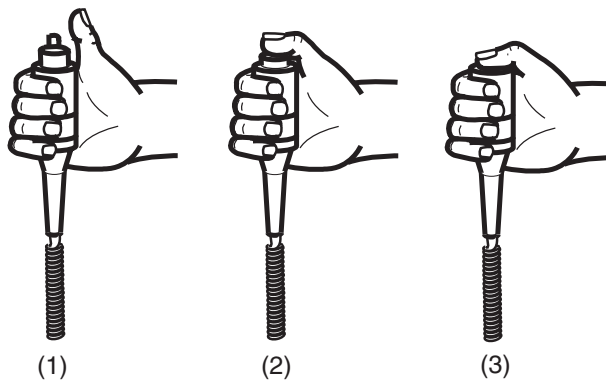
Selecting exposure parameters

- ◆ Press the kV or mAs buttons briefly.
 - The exposure value increases/decreases by one step.
- ◆ Hold the button pressed down for a period of time.
 - This results in a continuous increase/decrease of the particular exposure parameter.

Exposure Release

With exposure release switch

The exposure release switch is a two-step switch.



- (1) Original setting
- (2) Preparation
Duration: 2.5 s. Ready after four short "beeps"
- (3) Exposure
Duration: As long as the indicator is lit and the signal sounds.

Preparation

- ◆ Press the switch halfway, that is to the first position.
- The preparation cycle for exposure is activated. The green "Ready" lamp goes off and does not light up again until anode rotation has reached full speed (after approx. 2.5 s). This is indicated by four short "beeps". The generator is now ready for exposure release.



If exposure is not released within 15 s the preparation will automatically be interrupted and display message ERR 25 appears.

Exposure

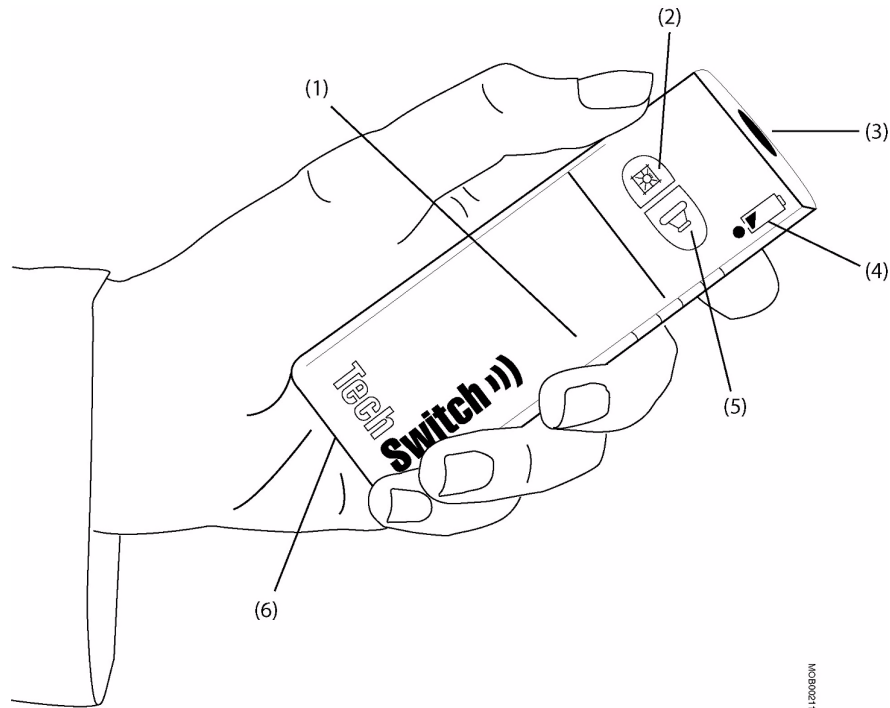
- ◆ Press the switch to the second position.
- The amber exposure indicator lights during the exposure. The indication lasts somewhat longer than the actual exposure, in order to make the operator aware of very short exposures. A longer beep indicates the end of the exposure.



It is also possible to press the button directly to the second position (3.). The exposure is then released immediately after the anode rotation has reached full speed, i.e. after approx. 2.5 s.

With IR remote control (Option)

The IR remote control comprises the following functional elements.



- (1) Remote finder
Built-in feature locates remote control if left out of its holder (starts beeping automatically within three minutes after use).
- (2) Collimator light button ON/OFF
Press to turn on collimator light.
- (3) Infrared window
- (4) Low battery indicator
Illuminates when battery is low and needs to be replaced.
- (5) Exposure release switch
Press once to activate preparation.
Press again and hold to make the exposure.
- (6) Battery compartment
(9-volt alkaline included)



The remote finder and the low battery indicator are not implemented in the spare remote control (included in the kit).

Important safety information



Caution

Other infrared remote controlled systems are in line-of-sight when operating the remote control!

Interferences with other systems possible

- ◆ Make sure that no other infrared remote controlled systems are in line-of-sight (including systems behind a window or lead glass).
 - ◆ Power down other infrared remote controlled systems in line-of-sight.
-

Preparation

- ◆ Take the remote control out of its remote holder.
- ◆ Step back from the X-ray unit (up to 36 feet / 11 m), and aim the remote control at the remote sensor on the front arm of the X-ray machine.

Exposure

The remote control is used in two-step.

- ◆ Press the exposure release switch once.
 - The preparation cycle is activated.
 - The green " Ready" lamp goes out and does not light up again until anode rotation has reached full speed (after approx. 2.5 s). This is indicated by three short " beeps". The generator is now ready for exposure release.



If exposure is not released within 15 s the preparation will automatically be interrupted and display message ERR 25 appears.

- ◆ To release the exposure, press the exposure release switch a second time, and hold it down until the exposure is terminated.
 - The amber exposure indicator lights during the exposure. The indication lasts somewhat longer than the actual exposure, in order to make the operator aware of very short exposures.
 - A longer beep indicates the end of the exposure.
- After the exposure is completed, both the X-ray unit and remote control will automatically return to stand-by mode.

Finishing operation

- ◆ Return the remote control back to the remote holder on the X-ray unit.



If the remote control is not returned to the remote holder within three minutes after use, the remote finder feature will activate causing the remote control to beep. The beeps will continue indefinitely until the remote control is located and put back in the remote holder.

The remote finder feature is not implemented in the spare remote control, included in the delivery.

Exposure with DAP measuring system (Option)

The DAP-equipment is automatically switched on when the main switch of the MOBILETT is switched on.



You must reset the DAP value prior to exposure using the Reset button. During the reset, make sure all segments of the DAP-display light up.

- ◆ Follow normal procedures to release an exposure.
- The measured DAP value will show on the DAP-display in the unit μGym^2 (Micro Gray square meter).



For multiple exposures, the DAP value will accumulate. If DAP values for every single exposure are wanted, reset the DAP-display by pressing the Reset button after each exposure.

When the system is switched off, the measured value will be lost.

Switching off

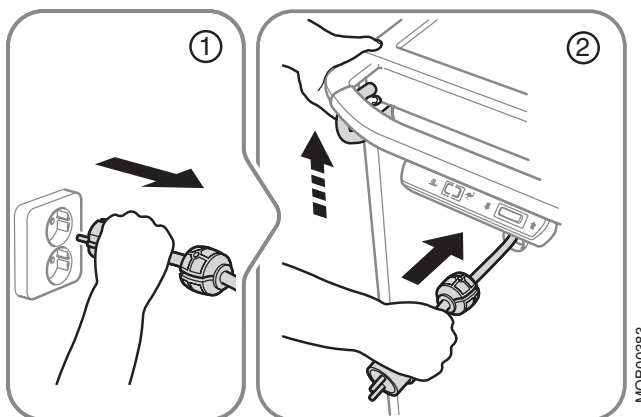
Switching off the MOBILETT

- ◆ Turn the main switch to position **O** (OFF).



Switch the MOBILETT off immediately if it is no longer used.

Disconnecting the power supply cable



Warning

Uncontrolled movements when rewinding the power cable!

Risk of injury

- ◆ Hold the power supply cable in your hand while gently pulling the brake handle.
-
- ◆ Pull the power cable out of the wall outlet (1).
 - ◆ Hold the power supply cable in your hand (2) while gently pulling the brake handle.
 - The power cable is totally rewinded into the unit.

Transport

Prior to Transport

- ◆ Functional check of the hand brake/parking brake. Lock the brake.
 - The MOBILETT cannot be moved with normal hand power. A slight skip is acceptable when using more force.
- ◆ Check the function of the transport safeguard for the arm system.
- ◆ Check that the arm system handle has locked in position when secured with the transport safeguard.



If you find an error:

- ◆ please notify Siemens customer service.

Driving the unit

If you drive the unit, please observe the following:

- ❑ The power cable must not be connected to a wall outlet.

Driving with motor power, MOBILETT XP Hybrid only

The driving control has a function designed to prevent the MOBILETT from accelerating uncontrollably. This can occur in e.g. slopes or if the MOBILETT is forced to go faster. The motor power will be shut-off until the MOBILETT slows down again. This is to prevent possible accidents where the operator loses control of the MOBILETT.



The maximum incline for the motordrive is 7°.

As long as one of the motor operation keys is pressed, the system blocks radiation release.



Caution

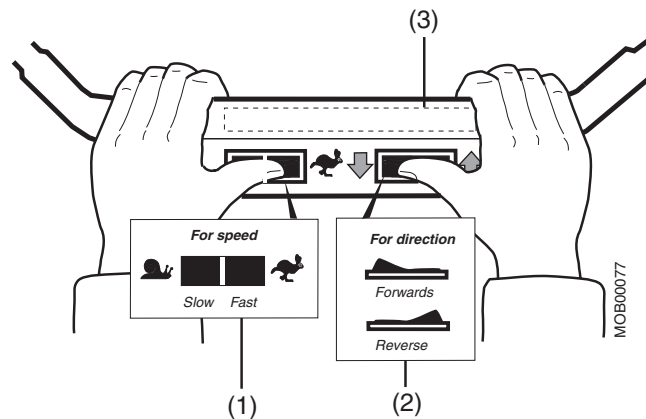
Risk of injuring the operator!

The system drive may shut off suddenly, causing the unit to brake

- ◆ Be careful if you push the system manually while the motor is on.



- ◆ Check that the power cable is not connected to a wall outlet.
- ◆ Turn the mode selection switch to position battery operation.
 - Main switch (key): On



- (1) Speed selection switch
Right knob = Fast
Left knob = Slow
- (2) Right knob for direction
Right part down = Forward
Left part down = Reverse
- (3) Safety switch element (back side of the handle)

◆ Press the driving knobs on the handle.



For single-hand operation the direction knob and the safety switch element on the back side of the handle have to be activated simultaneously.



If the MOBILETT is not moving

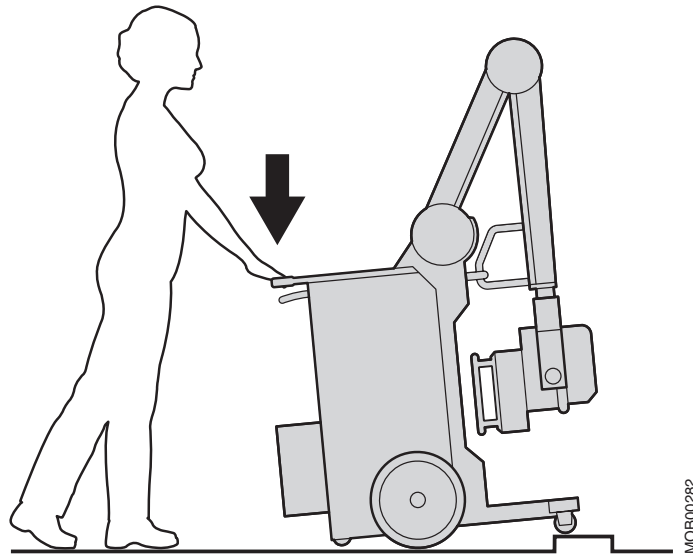
- ◆ Release the handbrake if it is activated.
- ◆ Charge the batteries if necessary.

Driving manually

- ◆ Check that the power cable is not connected to a wall outlet.
- ◆ Drive the device manually.

Tilting the MOBILETT

The unit has two support wheels to facilitate the movement over thresholds and similar obstacles.



- ◆ Press down the transport handle.
- The front wheels are lifted.

Using hand/parking brake

Transporting the MOBILETT on inclined planes (> 2°)

- ◆ Put your hand on the brake handle.
- ◆ Pull the handle upwards.
- In case of emergency the unit is stopped.

Parking the MOBILETT



Caution

Parking on planes at an inclination of > 10°!

There is a risk that the device may tilt over

- ◆ Avoid an inclination of > 10°.

-
- ◆ Pull the brake handle upwards.
 - ◆ Pull the handle to the left into park position.
 - The hand brake also serves as a parking brake.

Releasing the parking brake

- ◆ Pull the brake handle upwards.
- ◆ Pull the brake handle to the right and release it.

Operation

Messages

System Messages

Acknowledging system messages

- ◆ Press any button (**kV, mAs, collimator**).
- The system message disappears. The MOBILETT is ready for operation.



The message remains or appears again.

- ◆ Please notify Siemens Customer Service.



If the message "Pause" appears, the capacitor loader is overheating. Wait until the message disappears.



If error 3 (ERR 3) appears: Switch the unit off and wait until the single tank cools down. See the tube housing cooling curve.



If the message (ERR 25) appears, exposure has not been triggered within the max. preparation time of 15 seconds.

Messages

Radiation Calculation

For MOBILETT XP / XP Hybrid not equipped with the DAP measuring system, it is possible to estimate the radiation dose area product, see section dose area product below.

Dose Area Product

The dose area product, DAP ($\mu\text{Gy} \times \text{m}^2$), is a measure both of the absorbed radiation dose and of the area exposed.

The dose area product depends on:

- ☐ the X-ray tube voltage, U (kV)
- ☐ the quantity of charge, Q (mAs)
- ☐ the permanent (inherent) filtration of the single tank (mm Al)
- ☐ the adjustment of the collimator, S_x and S_y



To get the correct DAP-value it is important that no part of the radiation field extends outside the object exposed. Make sure to collimate the light field to proper image size.

Radiation Calculation

Diagram 1 shows the values of Y ($\mu\text{Gy} \times \text{m}^2/\text{mAs}$) for tube voltage range 60-120 kV. The value of Y can be considered a conversion factor to determine the radiation dose area product (DAP). The diagram shows the maximum values of Y for the MOBILETT family. This implies that in most cases the estimated DAP is somewhat higher than the actual DAP.

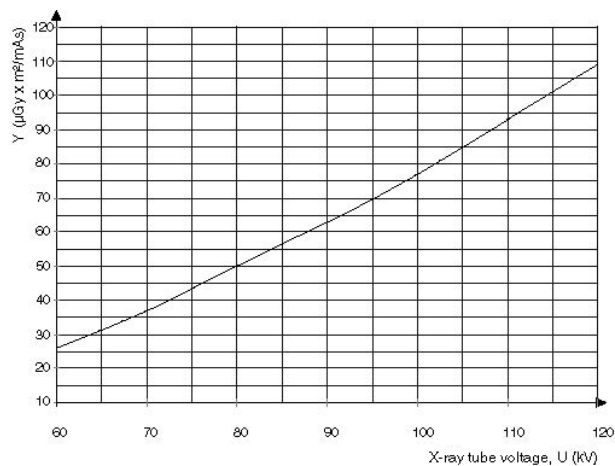


Diagram 1

Calculate the dose area product

The dose area product, DAP, is calculated with *Equation (1)*:

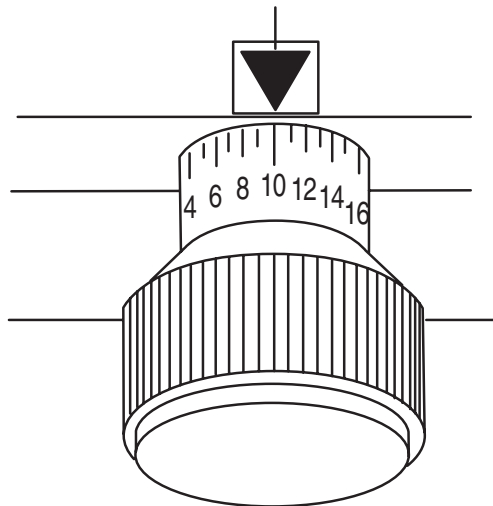
Equation (1): $DAP = Y \times S_x \times S_y \times Q \times k$

- ❑ Y ($\mu\text{Gy} \times \text{m}^2/\text{mAs}$) - conversion factor
- ❑ S_x - scale index value for collimator adjustment (x-axis)
- ❑ S_y - scale index value for collimator adjustment (y-axis)
- ❑ Q (mAs) - quantity of charge during exposure
- ❑ k (cm^2/m^2) - constant. $k = 6.40$ (cm^2/m^2)
- ◆ Read the value of Y ($\mu\text{Gy} \times \text{m}^2/\text{mAs}$) from *Diagram 1*, corresponding to the tube voltage (kV) used during exposure.
- ◆ Calculate the dose area product, DAP, with *Equation (1)*.

Radiation Calculation

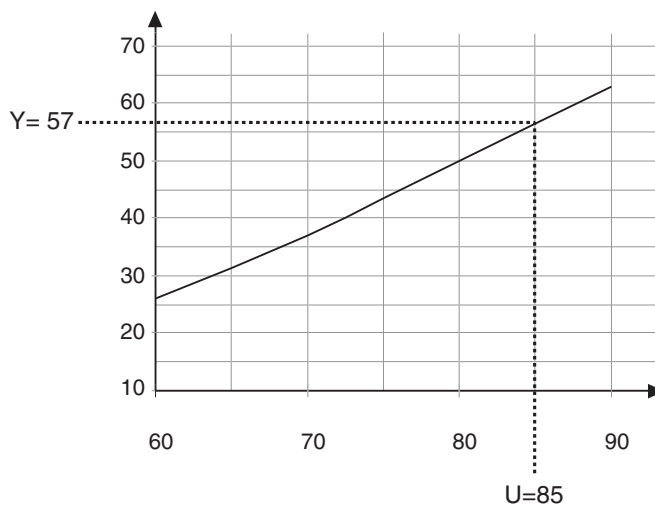
Example: Calculation DAP

Exposure with $U = 85$ kV, $Q = 10$ mAs and scale index values for collimator adjustment $S_x = 10$ und $S_y = 10$:



Scale index value for collimator adjustment

From *Diagram 1*, read the corresponding value of Y for $U = 85$ kV:



$Y = 57 \mu\text{Gy} \times \text{m}^2/\text{mAs}$

Calculate the dose area product with *Equation (1)*:

$$\begin{aligned} \text{DAP} &= 57 (\mu\text{Gy} \times \text{m}^2/\text{mAs}) \times 10 \times 10 \times 10 (\text{mAs}) \times 6.40 (\text{cm}^2/\text{m}^2) \\ &= 364800 \mu\text{Gy}\text{cm}^2 \end{aligned}$$

$$\text{Since } 1000 \mu\text{Gy} = 1 \text{ mGy, DAP} = 364\,800 \mu\text{Gy}\text{cm}^2 \approx 365 \text{ mGy}\text{cm}^2$$

Radiation Dose

The absorbed radiation dose (skin dose), D (Gy), can be estimated from the values of Y in *Diagram 1*.

The absorbed radiation dose (skin dose) is dependent on:

- ❑ the x-ray tube voltage, U (kV)
- ❑ the quantity of charge, Q (mAs)
- ❑ the source to skin distance, r (m)
- ❑ the permanent (inherent) filtration of the single tank (mm Al)

Estimate the radiation dose

The radiation dose D is calculated with *Equation (2)*:

$$\text{Equation (2): } D = Y \times Q / r^2$$

- ❑ Y ($\mu\text{Gy} \times \text{m}^2/\text{mAs}$) - conversion factor
- ❑ Q (mAs) - quantity of charge during exposure
- ❑ r (m) - source to skin distance. Use the built-in measuring tape to determine r
- ◆ Read the value of Y ($\mu\text{Gy} \times \text{m}^2/\text{mAs}$) from *Diagram 1*, corresponding to the tube voltage (kV) used during exposure.
- ◆ Calculate the radiation dose D with *Equation (2)*.

Example: Calculation radiation dose

Exposure with $U = 70$ kV, $Q = 20$ mAs and source to skin distance, $r = 1.05$ m:

From *Diagram 1*, read the corresponding value of Y for $U = 70$ kV:

$$Y = 37 \mu\text{Gy} \times \text{m}^2/\text{mAs}$$

The radiation dose D is calculated with *Equation (2)*:

$$D = 37 (\mu\text{Gy} \times \text{m}^2/\text{mAs}) \times 20 (\text{mAs}) / (1.05)^2 = 671 \mu\text{Gy}$$

The radiation dose at a distance of 1.05 m with tube voltage 70 kV and 20 mAs is

$D = 671 \mu\text{Gy}$.

Radiation Calculation

The Exposure Point System

The exposure point system allows to easily change the density or contrast on the film. Therefore, the kV and mAs may appear to change in odd steps. Step data is shown in chapter Technical Data
(→ Page 77)

Density and contrast relations

For example, pressing the kV+ button once (using whole exposure points), or pressing the mAs+ button twice, will increase film density by 25%. If double density is desired, press the kV+ button three times, or the mAs+ button six times. Observe that changing the kV affects both the density and the contrast.

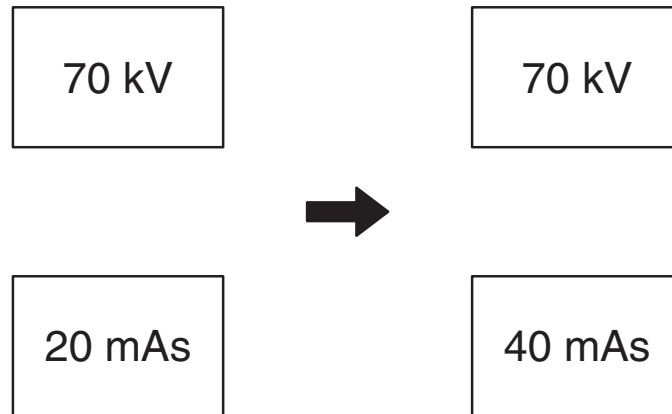
If an exposure yields accurate density but should be higher in contrast, it can easily be adjusted. Pressing the kV- button once (using whole exposure points) and the mAs+ button twice will yield the specific density and the desired contrast.

If the kV is set to step in half exposure points, it will correspond to the mAs steps (e.g. press kV+ button six times for double density).

The Exposure Point System

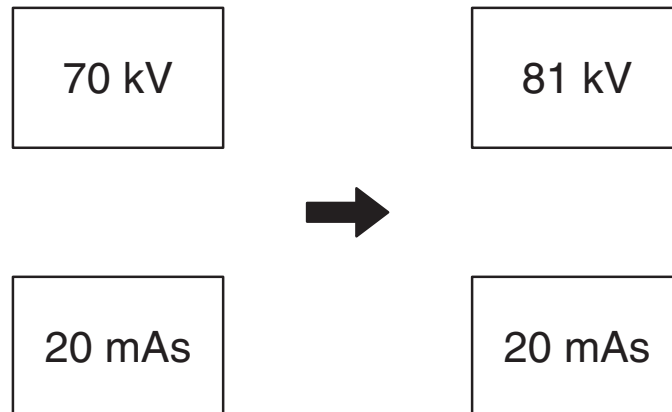
Example 1 Doubling the density using mAs

The density in the following example will be doubled by pressing the mAs+ button six times.



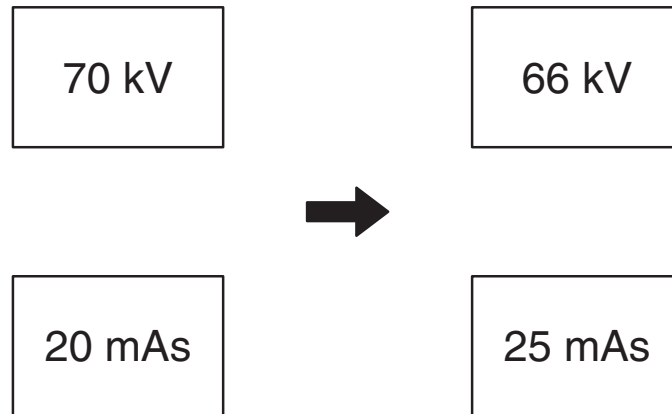
Example 2 Doubling the density using kV

Adjusting the kV will affect both density and contrast. The density in the following example will be doubled by pressing the kV+ button three times (whole exposure points).



Example 3 Keeping the density the same, but changing contrast

By pressing the kV- button once and the mAs+ button twice, the density will remain the same but yield higher contrast.



The Exposure Point System

Functional and Safety Checks

To ensure that the system is ready for operation and all functions relevant to safety are working correctly, you must perform regular function and safety tests.

Daily checks

Please perform the following safety checks daily:

- ◆ Check the power supply plug. Do not use the MOBILETT if the power supply plug is damaged.
- ◆ Check the power cable. Do not use the MOBILETT if the power cable is damaged.
- ◆ Visual check of the collimator functions. Switch on the collimator lamp and check that the light field can be adjusted with the knobs on the collimator.
- ◆ Check the exposure indicator lamp during exposure.
- ◆ Check that the audible signal indicates the end of the exposure.
- ◆ Check the measuring tape regarding function.
- ◆ Check that the tube assembly and the arm system remain in the desired position, but are still easy to move.
- ◆ Check that the collimator rotates around the beam axis.
- ◆ For MOBILETT XP Hybrid only: Check charging status of the batteries. If low - charge to full.

Monthly checks

Please perform the following safety checks monthly:

Labels

- ◆ Check the legibility of the labels according to section Labels
(→ Page 99)
- ◆ If any labels must be replaced, please notify Siemens customer service.

DAP Measuring System (Option)

The test displays a value, default is $100.0 \mu\text{Gym}^2$. If the test value is not between $80 - 120 \mu\text{Gym}^2$, the system should be calibrated.

- ◆ Press the Test button if you want to perform the system test.



The calibration of the chamber must be checked in accordance to national regulations or laws.

Annual Maintenance

Maintenance every 12 months is necessary to keep the equipment safe and operational.

- ◆ We recommend that the maintenance is performed by the Siemens customer service.

Check of the system

Interval	Operations to perform
12 months	Mechanical test
12 months	Functional check
12 months	Checking of image quality
12 months	Checking of kV/mAs accuracy
12 months	Electrical safety checks
12 months	USA only: Checking of reproducibility

Check of system parts

Interval	Material	Material No.:
12 months	Collimator lamp	8392016
24 months	Battery pack (left) BK1/BK2	08392024
24 months	Battery pack (right) BK3/BK4	08392032
48 months	Cable winder complete	06508746
12 months	Batteries remote control (Option)	1 x 9 V alkaline

Functional and Safety Checks

Cleaning and Disinfecting

The MOBILETT shall be disconnected from the mains and switched off before it is cleaned or disinfected.

Cleaning

Do not use any abrasive detergents (because of material intolerance) or cleaning agents containing solvents (e.g. cleaning solutions, alcohol, stain remover).



Caution

The cleaning fluid has penetrated into the equipment!

The MOBILETT is damaged

◆ Do not spray the equipment.

◆ Wipe the MOBILETT with a cloth moistened with water or a lukewarm, diluted aqueous solution of a household dish washing liquid.

Cleaning of DAP chamber (Option)



Caution

High voltage inside the DAP ionization chamber!

The DAP ionization chamber is very sensitive

◆ Be sure to use a soft cloth to avoid scratching the chamber.

◆ Wipe the MOBILETT with a cloth moistened with water or a lukewarm, diluted aqueous solution of a household dish washing liquid.

Disinfection

For surface disinfection, we recommend the use of isopropyl alcohol. Disinfectants based on substituted phenols and compounds splitting of chlorine are caustic and therefore, cannot be generally recommended.

As a general rule, no disinfectants sprays must be used, since the spray mist may penetrate into the equipment which means the safety of the equipment can no longer be assured (damage to electronic components, formation of flammable air solvent vapour mixtures).

◆ Use fluid disinfectants only.



As is known, some components of disinfectants are detrimental to health. Their concentration in respiratory air must not exceed a legally determined limit. We recommend that the appropriate directions on use issued by the manufacturers of these agents be strictly observed.

Technical Data

X-ray Controls and Generator

Power connection:	Grounded wall outlet: 100 - 130 V / 200 - 240 V ± 10 %	
Nominal input power:	15 A at power input of the system	
Mains voltage:	100 - 130 V ± 10 %, 50/60 Hz; short-time current 11 A, continuous current 0.6 A 200 - 240 V ± 10 %, 50/60 Hz; short-time current 19 A, continuous current 0.5 A	
Apparent resistance of supply mains:	100 - 130 V $< 0.6 \Omega$ 200 - 240 V $< 2.5 \Omega$	
Output:	30 kW at 96 kV 10 ms 25 kW at 102 kV 100 ms, for MOBILETT XP Hybrid (acc. to IEC 60 601-2-7) 25 kW at 102 kV 100 ms, for MOBILETT XP (acc. to IEC 60 601-2-7) 20 kW at 102 kV 100 ms, for MOBILETT XP ECO (acc. to IEC 60 601-2-7) 133 kV (max.), for MOBILETT XP / XP Hybrid 125 kV (max.), for MOBILETT XP / XP ECO 450 mA (max.), for MOBILETT XP / XP Hybrid 400 mA (max.), for MOBILETT XP / XP ECO	
kVp-range:	40 - 133 kV in 24 or 47 steps, for MOBILETT XP / XP Hybrid 40 - 125 kV in 23 or 45 steps, for MOBILETT XP ECO	
kV accuracy:	$< \pm 3$ kV (40 - 60 kV) $< \pm 5$ % (60 - 133 kV)	
mAS-range (Tube current and exposure time product) <i>Mains operation 230 V</i> MOBILETT XP / XP Hybrid	At 40 - 55 kV: At 57 - 60 kV: At 63 - 68 kV: At 70 - 77 kV: At 81 - 88 kV: At 90 - 96 kV: At 102 - 109 kV: At 117 kV: At 125 - 133 kV:	mAs 0.32 - 200 mAs 0.32 - 180 mAs 0.32 - 160 mAs 0.32 - 140 mAs 0.32 - 125 mAs 0.32 - 110 mAs 0.32 - 100 mAs 0.32 - 90 mAs 0.32 - 80

Technical Data

mAS-range (Tube current and exposure time product)	At 40 - 55 kV:	mAs 0.32 - 140
	At 57 - 60 kV:	mAs 0.32 - 125
	At 63 - 70 kV:	mAs 0.32 - 110
<i>Mains operation 110 V</i>	At 73 - 77 kV:	mAs 0.32 - 100
MOBILETT XP / XP Hybrid	At 81 - 85 kV:	mAs 0.32 - 90
	At 90 - 96 kV:	mAs 0.32 - 80
	At 102 kV:	mAs 0.32 - 71
	At 105 - 117 kV:	mAs 0.32 - 63
	At 125 - 133 kV:	mAs 0.32 - 56
mAS-range (Tube current and exposure time product)	At 40 -52 kV:	mAs 0.5 -125
	At 55 -60 kV:	mAs 0.5 -110
	At 63 -66 kV:	mAs 0.5 -100
<i>Mains operation 110 V - 230 V</i>	At 70 -73 kV:	mAs 0.5 -90
MOBILETT XP variant ECO	At 77 -81 kV:	mAs 0.5 -80
	At 85 -90 kV:	mAs 0.5 -71
	At 96 -102 kV:	mAs 0.5 -63
	At 109 -117 kV:	mAs 0.5 -56
	At 125 kV:	mAs 0.5 -50
mAs-range: (Tube current and exposure time product)	At 40 - 81 kV:	mAs 0.32 - 360
	At 83 - 90 kV:	mAs 0.32 - 320
	At 96 - 102 kV:	mAs 0.32 - 280
<i>Battery Operation</i>	At 109 - 117 kV:	mAs 0.32 - 250
MOBILETT XP Hybrid only	Up to 133 kV:	mAs 0.32 - 220
mAs accuracy:	0.32 mAs - 2 mAs \pm 0.1 mAs > 2mAs \pm 5 %	
Shortest exposure time:	1 ms for MOBILETT XP / XP Hybrid 2 ms for MOBILETT XP ECO	
Max. exposure time:	5.0 s for MOBILETT XP Hybrid 3.5 s for MOBILETT XP 3.0 s for MOBILETT XP ECO	
Overload protection:	Heat units continuously calculated and monitored by the microprocessor	
Length of power cable:	6 m	
Exposure release:	release switch with 5 m (16.4 ft) coiled cord, optional IR remote control	
Weight:	Approx. 285 kg, MOBILETT XP Hybrid Approx. 210 kg, MOBILETT XP	

**Classification acc. to
IEC 60 601-1**

Protection against electrical shock	Class 1 equipment, no applied part
Protection against ingress of water	Not protected (IPX0)
Use in the presence of flammable gases	The equipment is not appropriate for operation in the presence of flammable mixtures of anaesthetics with air / oxygen or laughing gas.
Mode of operation	Continuous operation

X-Ray Tube

Stabilization:	Microprocessor-based adjustment and regulation during exposure
X-ray tube:	Siemens P135/30 R with nominal focal spot value 0.8 (acc. to IEC 60336)
Anode rotation:	8 500 r.p.m., 142 Hz (anode angle 15°)
Anode heat storage capacity:	90 000 J = 122 000 HU
Tube housing heat storage capacity:	800 000 J = 1 100 000 HU
Inherent filtration	
- Collimator:	min. 1.6 mm Al (at 70 kVp)
- Tube housing assembly:	min. 1.5 mm Al (at 70 kVp)
- Totally:	min. 3.1 mm Al according to IEC 60 522
Collimator:	Manually-adjustable multi-leaf collimator, rotatable $\pm 90^\circ$
Collimator light and light field intensity:	Halogen lamp min. 180 lux at 1 m SID
Tube housing assembly:	Maximum temperature 60°C, maximum 2000 mAs/h, nominal continuous rating 75 W until the covers reach 60°C
Leakage technique factors ¹	133 kVp/10 mAs, 200 exposures/h

¹ The leakage radiation of the tube housing assembly and attached collimator complies to the requirement of 21 CFR part 1020.3 (K) and IEC60601-1-3. For further informations see data sheet X-ray tube.

Motordrive, MOBILETT XP Hybrid only

Drive speed:	Low/high, 0.5 - 1.35 m/s
Max. incline:	7°

Batteries, MOBILETT XP Hybrid only

Batteries:	Automatic battery charging with charge indicator. Mains operation with reduced output. 24 sealed maintenance-free lead batteries, Yuasa: NP 7-12L in all 168Ah
Charging time:	12 h when completely discharged

Remote control (Option)

Compatibility:	Compatible with all TechSwitch remote exposure switch systems
Technology:	Infrared light beam, line-of-sight operation, will operate through glass and lead glass; will not operate through doors or walls
Power supply of the remote control:	9-volt alkaline battery included; 25.000+ exposures; Low Battery Indicator illuminates when battery needs to be replaced
Signature Recognition by Remote Sensor:	Proprietary coding
Operating Distance:	Up to 36 feet (10.9 m)
Operating Radius:	180°; Remote Sensor built into the front arm of X-ray unit
Remote control kit includes:	Two remote controls (one spare), IR sensor with modular cable, PCB electronics package with flat cable

Technical Data

DAP-equipment (Option)

Technology:	Ionization chamber, Display and control panel
Active area:	146 x 146 mm
Operating temperature:	15 - 40°C
Weight:	0.24 kg
Typical filtration:	< 0.4 mm Al equivalent
Warm-up time:	Ready for use 10 seconds after power on. Specified accuracy achieved 15 minutes after power on.
Chamber light transmission:	≥ 70 %
Energy dependence:	50 - 150 kV ±8 %, related to 100 kV (IEC 60 580) 40 - 50 kV ±3 %, related to 50 kV
Reproducibility:	> 99 % under constant pressure and temperature
DAP resolution:	0.1 μGym ² (0.01 μGym ² when using a system with high sensitivity)
Maximal measurable DAP:	1 x 10 ⁶ μGym ² (1 x 10 ⁵ μGym ² when using a system with high sensitivity)
Dose rate linearity:	< 2 % deviation

Environmental conditions

	Operation	Transport/Storage
Permissible ambient temperature:	+10°C ... +40°C	-20°C ... +70°C
Permissible relative humidity:	30 % ... 75 %	10 % ... 100 % ¹
Permissible air pressure area:	700 hPa ... 1060 hPa	

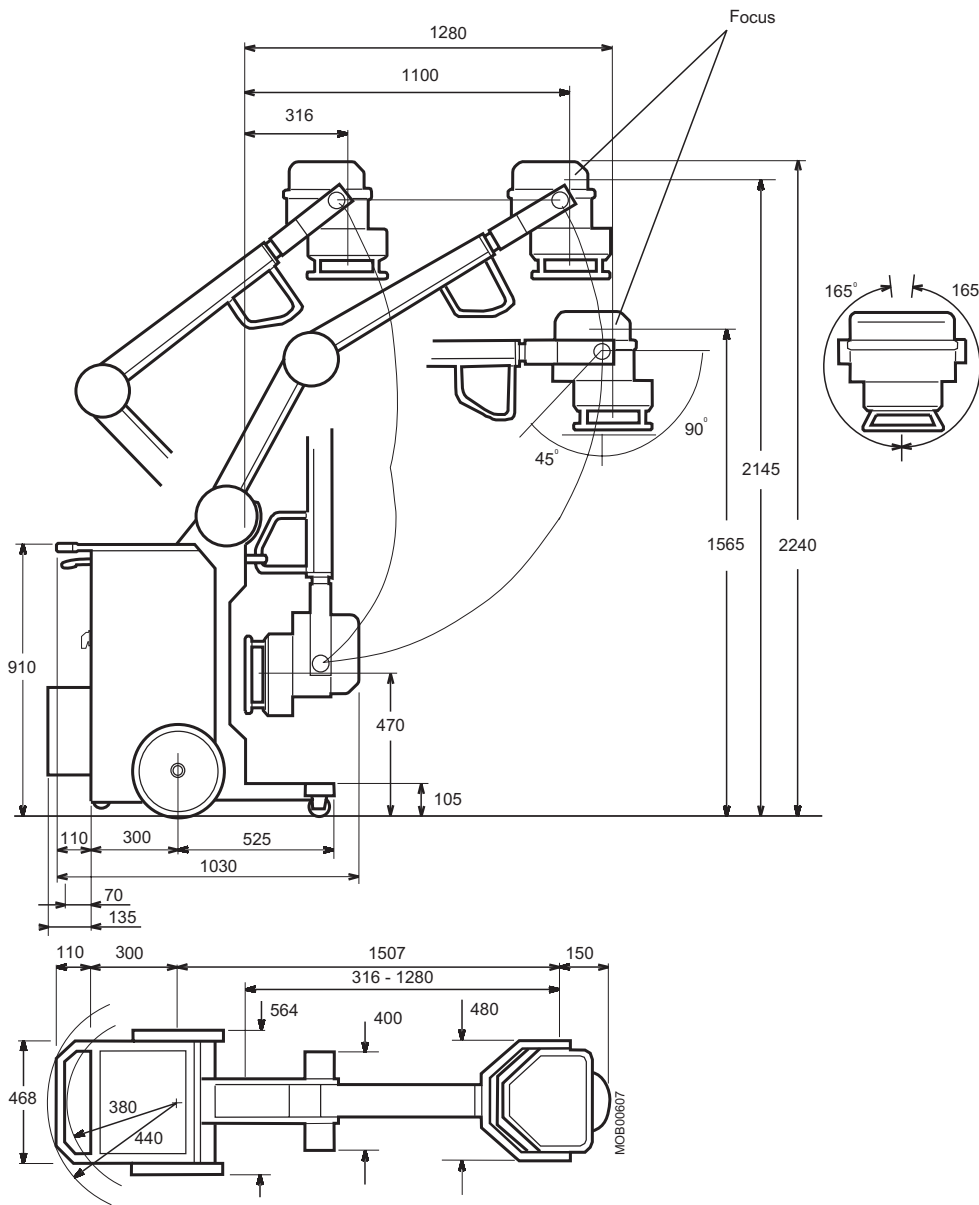
¹ maximum 15 weeks

Parts subject to wear

Hand/Emergency brake	<input type="checkbox"/> The brake linings at the wheels. <input type="checkbox"/> The braking wire between the hand brake and the braking arm.
Arm system friction linings	<input type="checkbox"/> The friction lining for lower arm, placed at lower link. <input type="checkbox"/> The friction lining for upper arm, placed at the counter acting rollers at the spring pack.
Fork friction linings	<input type="checkbox"/> The friction for the single tank movement (2), placed at the ends of the fork.
Power cable, power plug	<input type="checkbox"/> The power cable between the power plug and the unit.
Cable winder	<input type="checkbox"/> Complete cable winder, containing of the power cable and the cable winder.
Exposure cord	<input type="checkbox"/> The coiled cord between the detachable IR remote control and the unit.
Collimator lamp	<input type="checkbox"/> The halogen lamp inside the collimator which is used to indicate the size of the X-ray field.
Backup battery	<input type="checkbox"/> The battery, placed on circuit board D916, which supplies the memory circuits with power.
Transmission belts	<input type="checkbox"/> Transmission from the motor to the rear wheels, for MOBILETT XP Hybrid only.
Power batteries	<input type="checkbox"/> 24 maintenance free sealed lead-acid batteries. Approximately 1 - 2 years lifetime at normal use, for MOBILETT XP Hybrid only
IR remote control battery, option	<input type="checkbox"/> The battery, placed in the battery compartment.

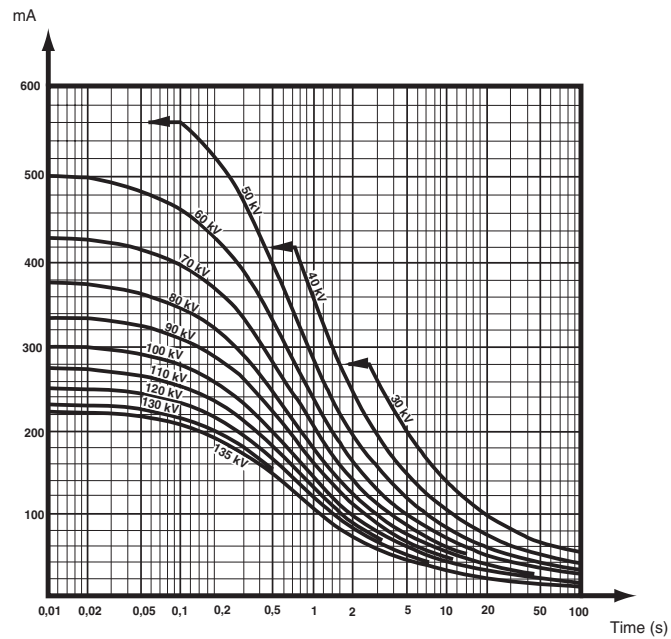
For further information,
(→ see service instructions)

Dimensions (mm)

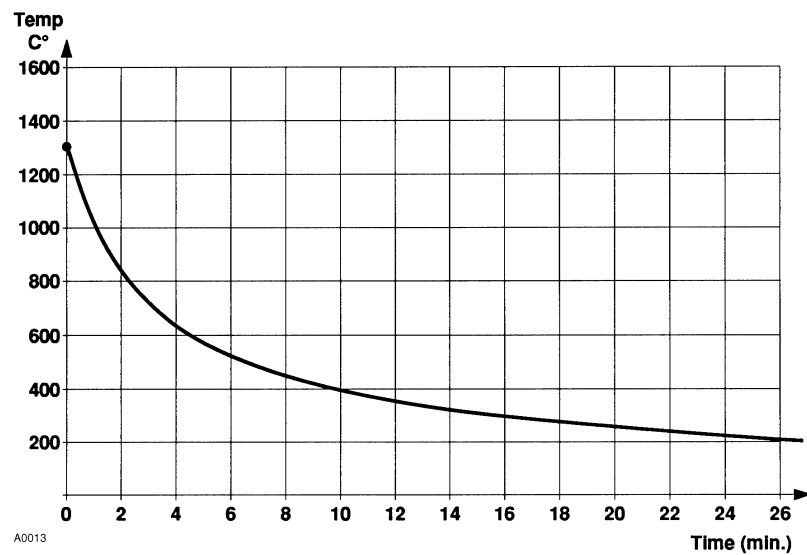


Tube Rating Charts

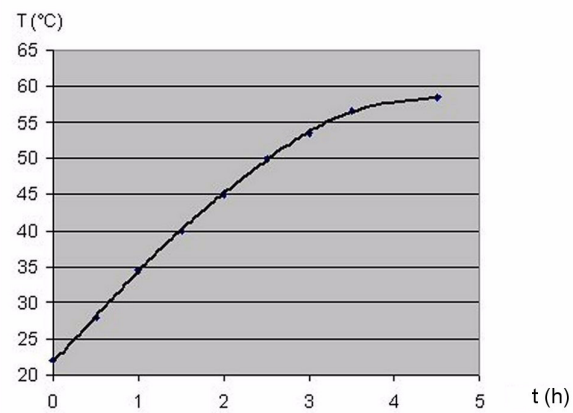
Tube loading curve



Tube cooling curve

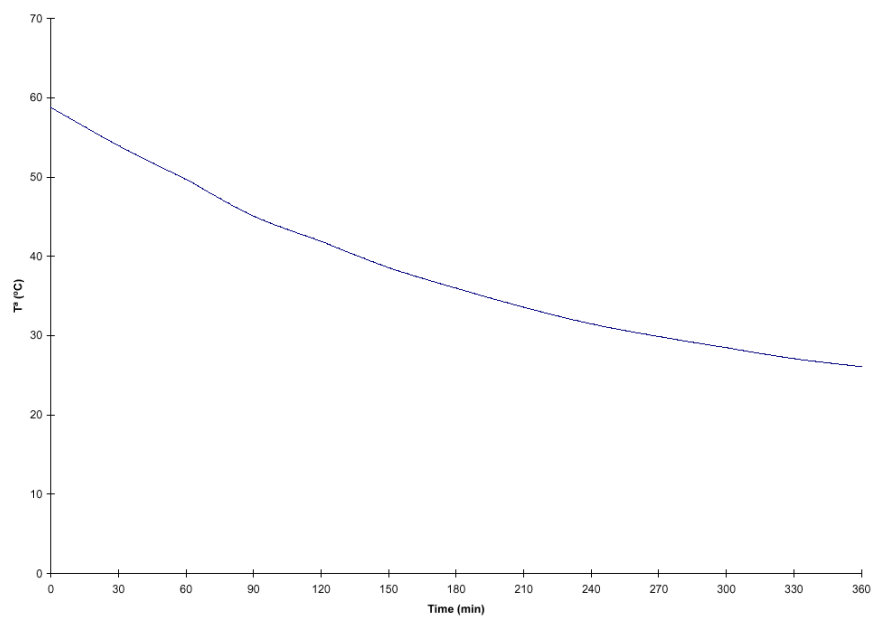


Tube housing heating curve



75 W /environmental temperature: 22°C

Tube housing cooling curve



EMC (Electromagnetic compatibility)

Medical electrical equipment needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information provided in the accompanying documents.

Portable and mobile RF communications equipment can affect medical electrical equipment.

External cables

Power cable	6 m
Exposer cable	5 m coiled cord



Warning:

The use of accessories, transducers and cables other than those specified, with the exception of transducers and cables sold by the manufacturer of the equipment or system as replacement parts for internal components, may result in increased emission or decreased immunity of the equipment or system.

Technical Data

Guidance and manufacturer's declaration - electromagnetic emission

The Mobilett XP is intended for use in the electromagnetic environment specified below. The customer or the user of the Mobilett XP should assure that it is used in such an environment.

Emissions test	Compliance	Electromagnetic environment - guidance
RF emissions CISPR 11	Group 1	The Mobilett XP uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic Equipment.
RF emissions CISPR 11	Class B	The Mobilett XP is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61 000-3-3	Not applicable	
Voltage fluctuations/ flicker emissions IEC 61 000-3-3	Not applicable	The Mobilett XP has a rated input current of more than 16 A per phase.



Warning:

The equipment or system should not be used adjacent to or stacked with other equipment and that if adjacent or stacked use is necessary, the equipment or system should be observed to verify normal operation in the configuration in which it will be used.

Guidance and manufacturer's declaration - electromagnetic immunity


The Mobilett XP is intended for use in the electromagnetic environment specified below. The customer or the user of the Mobilett XP should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Electrostatic discharge (ESD) IEC 61 000-4-2	±6 kV contact ±8 kV air	±6 kV contact ±8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %.
Electrical fast transient/burst IEC 61 000-4-4	±2 kV for power supply lines ±1 kV for input/output lines	±2 kV for power supply lines ±1 kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61 000-4-5	±1 kV differential mode ±2 kV common mode	±1 kV differential mode ±2 kV common mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61 000-4-11	<5% U_T (>95% dip in U_T) for 0.5 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycles <5% U_T (>95% dip in U_T) for 5 cycles	n.a.	Mains power quality should be that of a typical commercial or hospital environment. If the user of the Mobilett XP requires continued operation during power mains interruptions, it is recommended that the Mobilett XP be powered from an uninterruptible power supply or a battery. The Mobilett XP has a rated input current of more than 16 A per phase.
Power frequency (50/60 Hz) magnetic field IEC 61 000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
NOTE U_T is the a.c. mains voltage prior to application of the test level.			

Technical Data

Guidance and manufacturer's declaration - electromagnetic immunity

The Mobilett XP is intended for use in the electromagnetic environment specified below. The customer or the user of the Mobilett XP should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Conducted RF IEC 61 000-4-6	3 Vrms 150 kHz to 80 MHz	3 V	<p>Portable and mobile RF communications Equipment should be used no closer to any part of the Mobilett XP, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.</p> <p>Recommended separation distance</p> $d = 1.2 \times (P)^{(1/2)}$ $d = 1.2 \times (P)^{(1/2)} ; 80 \text{ MHz to } 800 \text{ MHz}$ $d = 2.3 \times (P)^{(1/2)} ; 800 \text{ MHz to } 2.5 \text{ GHz}$ <p>where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m).</p> <p>Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, ^a should be less than the compliance level in each frequency range. ^b</p> <p>Interference may occur in the vicinity of Equipment marked with the following symbol:</p> 
Radiated RF IEC 61 000-4-3	3 Vrms 80 MHz to 2.5 GHz	3 V	

NOTE 1: At 80 MHz and 800 MHz, the higher frequency range applies.

NOTE 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

^a Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the Mobilett XP is used exceeds the applicable RF compliance level above, the Mobilett XP should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the Mobilett XP.

^b Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.



The use of the accessory, transducer or cable with equipment and systems other than those specified may result in increased emission or decreased immunity of the equipment or system.

Technical Data

Recommended separation distances between portable and mobile RF communications equipment and the Mobilett XP

The Mobilett XP is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the Mobilett XP can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the Mobilett XP as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter [W]	Separation distance according to frequency of transmitter [m]		
	150 kHz to 80 MHz $d = 1.2 \times (P)^{(1/2)}$	80 MHz to 800 MHz $d = 1.2 \times (P)^{(1/2)}$	800 MHz to 2,5 GHz $d = 2.3 \times (P)^{(1/2)}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23
For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.			
NOTE 1: At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.			
NOTE 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			

Dosimetry

Exposure Tables

Standard Values

cranial

Object	Position	SID	KV	mAs	Grid	Sensitivity class
cranial	a.	115	70	8	w.o.	400
cranial	lat.	115	66	6.3	w.o.	400
cranial	axial	115	85	10	w.o.	400
Sinus	a.	115	70	16	w.o.	400
Sinus	lat.	115	70	12.5	w.o.	400

Chest

Object	Position	SID	KV	mAs	Grid	Sensitivity class
Lung	a.	130	133	1.25	w.o.	200
Lung/Heart	lat.	130	133	1.6	w.o.	200
Lung, Infant	a.	130	52 - 60	0.63	w.o.	200
Lung/Heart, Infant	lat.	130	60 - 70	0.80	w.o.	200
Ribs 1-7	a.	115	66	4	w.o.	400
Ribs 8-12	a.	115	70	12.5	w.o.	400
Sternum	a.	115	63	10	w.o.	400
Sternum	lat.	115	66	10	w.o.	400
Claviculum	a.	115	60	3.2	w.o.	400
Scapula	a.	115	63	10	w.o.	400

Dosimetry

Abdomen

Object	Position	SID	KV	mAs	Grid	Sensitivity class
Kidney/Gall-bladder	a.	115	66	5	w.o.	400
Kidney/Gall-bladder	lat.	115	81	16	w.o.	400
Urinary bladder	a.	115	66	10	w.o.	400
Stomach	a.	115	102	8	w.o.	400
Stomach, Contrast	a.	115	102	8	w.o.	400
Stomach, Survey	a.	115	73	16	w.o.	400
Stomach, Survey	lat.	115	77	25	w.o.	400

Spinal column

Object	Position	SID	KV	mAs	Grid	Sensitivity class
Cervical vertebræ	a.	130	70	16	w.o.	400
Cervical vertebræ	lat.	130	70	16	w.o.	400
Cervical vertebræ	obl.	130	70	16	w.o.	400
Thoracic vertebræ	a.	115	73	16	w.o.	400
Thoracic vertebræ	lat.	115	81	12.5	w.o.	400
Lumbar vertebræ	a.	115	77	10	w.o.	400
Lumbar vertebræ	lat.	115	90	20	w.o.	400
Lumbar vertebræ	obl.	115	81	12.5	w.o.	400
Lumbar vertebræ 5	a.	115	77	16	w.o.	400
Lumbar vertebræ 5	lat.	115	90	25	w.o.	400

Pelvis

Object	Position	SID	KV	mAs	Grid	Sensitivity class
Pelvis/Hip	a.	115	73	8	w.o.	400
Sacrum	a.	115	73	12.5	w.o.	400
Sacrum	lat.	115	90	20	w.o.	400

Upper extremities

Object	Position	SID	KV	mAs	Grid	Sensitivity class
Shoulder .	a.	115	60	8	w.o.	200
Shoulder .	axial	105	57	8	w.o.	200
Upper arm	a./lat.	105	52	5	w.o.	200
Elbow	a.	105	52	3.2	w.o.	200
Elbow	lat.	105	52	4	w.o.	200
Forearm	a.	105	52	3.2	w.o.	200
Forearm	lat.	105	52	4	w.o.	200
Wrist	d.v.	105	52	1.25	w.o.	200
				2.5		100
Wrist	lat.	105	52	2.5	w.o.	200
				5		100
Hand	d.v.	105	52	1.25	w.o.	200
				2.5		100
Hand	lat./obl.	105	52	1.6	w.o.	200
				3.2		100
Finger		105	52	1.25	w.o.	200
				2.5		100

Lower extremities

Object	Position	SID	KV	mAs	Grid	Sensitivity class
Neck of femur	axial	105	70	20	w.o.	200
Femur	a./lat.	105	70	12.5	w.o.	200
knee	a.	105	55	6.3	w.o.	200
knee	lat.	105	55	5	w.o.	200
Menisc		105	55	3.2	w.o.	200
Patella	a./lat.	105	55	3.2	w.o.	200
Leg	axial	105	55	3.2	w.o.	200
Ankle	a.	105	55	4	w.o.	200
Ankle	lat.	105	52	3.2	w.o.	200
Heel bone	lat.	105	52	2.5	w.o.	200
Heel bone	axial	105	52	5	w.o.	200
Foot	lat.	105	52	1.6	w.o.	200
Metatarsus	d.pl.	105	52	2	w.o.	200
Metatarsus	obl.	105	52	2	w.o.	200
Toes		105	52	1.25	w.o.	200

Sensitivity class

The sensitivity of the film screen system is determined by the dose required for attaining an optical density of 1.0 (over fog density and film base). The sensitivity classes are pre-defined ranges, mostly differentiated by a factor of 2. The higher the numerical value of the sensitivity class (e.g. 200), the lower the dose required.

Position:

SID = Source-Image Distance (cm)

a. = anterior

lat. = lateral

obl. = oblique

d.v = dorso-volar

d.pl. = dorso-plantar

w. = with grid

w.o. = without grid

Exposure Points

Siemens Exposure Points Table

KV	Points	mAs	KV	Points	mAs	KV	Points	mAs
–	-3	0.5	55	8	6,3	96	19	80
–	-2	0.63	57	9	8	102	20	100
–	-1	0.8	60	10	10	109	21	125
40	0	1	63	11	12,5	117	22	160
41	1	1.25	66	12	16	125	23	200
42	2	1.6	70	13	20	133	24	250
44	3	2	73	14	25	–	25	320
46	4	2.5	77	15	32	–	26	400
48	5	3.2	81	16	40			
50	6	4	85	17	50			
52	7	5	90	18	63			

The table shows how the kV and mAs values translates into exposure points. The exposure point system is used to easily manipulate film density and contrast.

For example:

Increasing the exposure points one step will yield 25% increased film density.

Increasing the exposure points one step with mAs and decreasing it one step with kV will yield higher contrast but the same density.

Labels

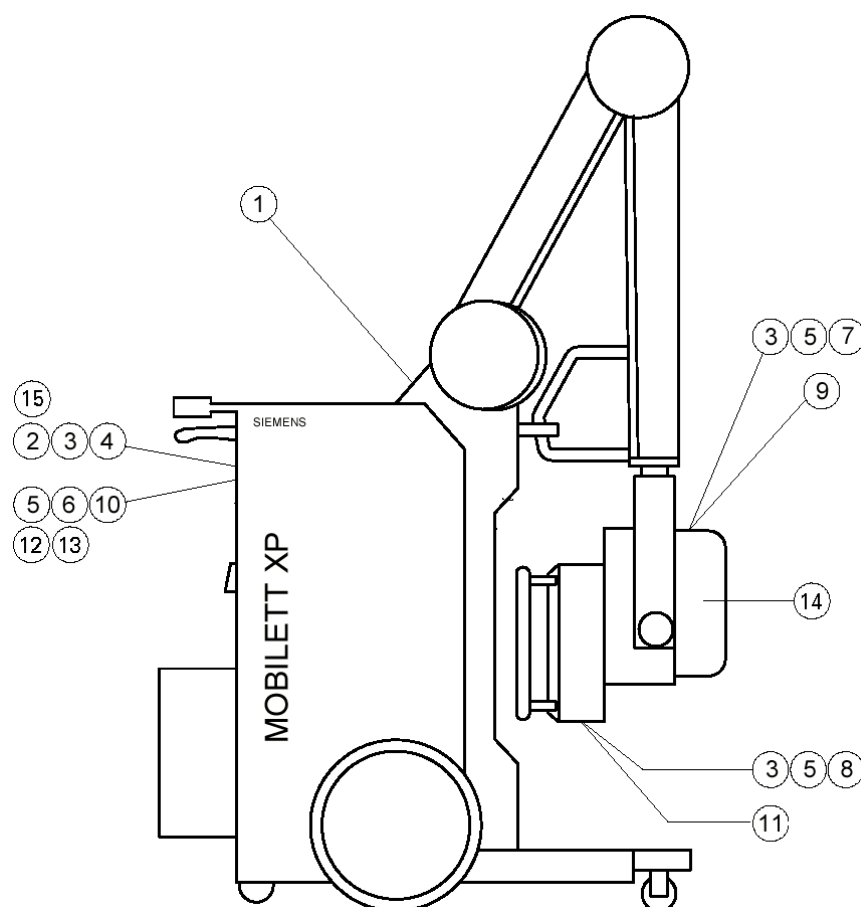
General information

The labels shown below are permanently affixed on the MOBILETT.

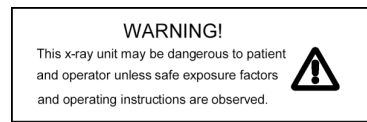
Certain labels are marked with a warning triangle. Caution: Read the operating instructions.



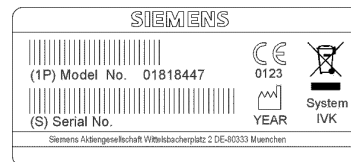
Location of Labels - CE



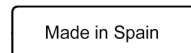
Labels



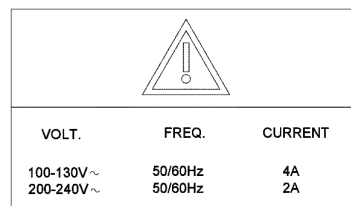
(1)
in different languages



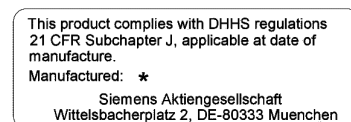
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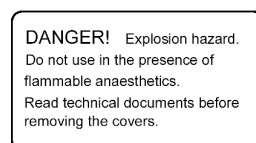
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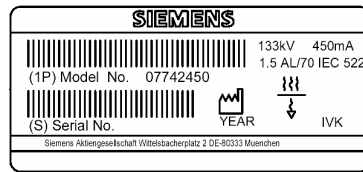
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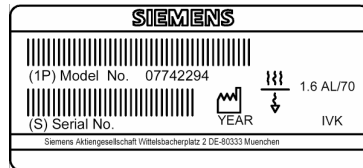
(5)



(6)
in different languages



(7)



(8)

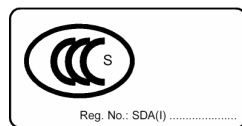


(9)



(10a)

only for Canada and USA



(10b)

only for China

MOBILETT XP:

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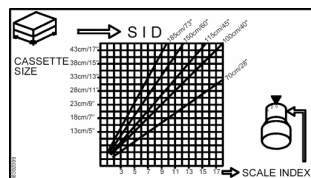
MOBILETT XP HYBRID:

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(10c)

only for GUS



(11)

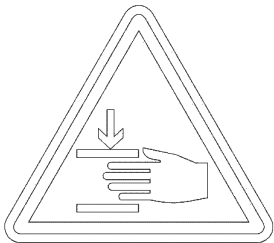
Labels

Grounding reliability can only be achieved when the EQUIPMENT is connected to an equivalent receptacle marked "Hospital Only" or "Hospital Grade"

(12)
only for Canada and USA

ONLY FOR U.S.A. 100-130V~

(13)
only for USA



(14)

西门子医疗系统集团
可移动式X线系统
Mobil X-Ray System
Mobilett **
Siemens AG, Wittelsbacherplatz 2, DE-80333 Muenchen 德国
Name and Address of the Factory:
S.A. 西门子子公司, C/Madrid 127. 28903-Getafe(Madrid), 西班牙
西班牙制造

(15)
only for China
** :
XP
XP ECO
XP Hybrid

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