PLANMECA

Planmeca ProOne®

EN

user's manual

10016256

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The manufacturer, assembler and importer are responsible for the safety, reliability and performance of the unit only if:

- installation, calibration, modification and repairs are carried out by qualified authorised personnel
- electrical installations are carried out according to the appropriate requirements such as IEC 60364
- equipment is used according to the operating instructions.

Planmeca pursues a policy of continual product development. Although every effort is made to produce up-to-date product documentation this publication should not be regarded as an infallible guide to current specifications. We reserve the right to make changes without prior notice.

Publication number 10016256 Revision 16

Released 22 October 2018

1 Introduction

The Planmeca ProOne X-ray unit produces digital X-ray images for the diagnosis of dentomaxillofacial anatomy. The X-ray unit may be used by health care professionals only.

This manual describes how to operate the Planmeca ProOne X-ray unit. Please read these instructions thoroughly before using the unit.

You need a PC with the Planmeca Romexis program in order to save, view and modify the images. The Romexis program has a separate manual which should be used in conjunction with this manual.

CE 0598

Fulfils the requirements of Directive 93/42/EEC (Class IIb).

NOTE

The X-ray unit's software version is shown briefly on the control panel when the X-ray unit is switched on. This manual is valid for software version 1.9.1 or later. This software version is compatible with Romexis software version 5.1.1.r or later.

The display values shown in this manual are only examples and should not be interpreted as recommended values unless otherwise stated.

The Planmeca ProOne X-ray unit features preset exposure values for all imaging programs. The exposure values have been preset at the factory for each patient size. However, the exposure values required for good X-ray images vary considerably according to the build and age of the patient. The preset exposure values are average values and they are only meant to guide the user. Users are encouraged to develop their own radiographic techniques based on these values.

Make sure that you are fully acquainted with the appropriate radiation protection measures and these instructions before you use the X-ray unit. Note that your X-ray unit may not feature all the options described in these instructions.

These instructions include options that may not be available in all countries.

2 Symbols on product labels

2.1 Symbols on permanently installed X-ray units

Date of manufacture (Standard ISO 7000).

Type B applied part (Standard IEC 60417).

Separate collection for electrical and electronic equipment according to Directive 2002/96/EC (WEEE).

Refer to instruction manual/booklet (Standard ISO 7010).

Emergency stop (Standard IEC 60417)

Warning: Electricity (Standard ISO 7010).

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

General warning (Standard ISO 7010).

Protective earth (ground) (Standard IEC 60417).

2.2 Symbols on X-ray units with detachable power supply cord

Date of manufacture (Standard ISO 7000).

Type B applied part (Standard IEC 60417).

Attention, consult accompanying documents (Standard IEC 60601-1).

Separate collection for electrical and electronic equipment according to Directive 2002/96/EC (WEEE).

Warning: Electricity (Standard ISO 7010).

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

Alternating current (Standard IEC 60417)

General warning (Standard ISO 7010).

Protective earth (ground) (Standard IEC 60417).

3 Associated documentation

The X-ray unit is supplied with the following manuals:

- User’s Manual
- Installation Quick Guide
- Installation Manual
- Technical Manual
- Planmeca Device Tool Manual

These manuals are intended to be used in conjunction with the documentation for the Planmeca Romexis program. The program package contains the following manuals:

- User’s Manual
- Technical Manual

The original language of the manuals is English.

NOTE

The User's Manuals are available on Planmeca's website.

- For X-ray units, select Material bank > Manuals > Imaging.
- For software products, select Material bank > Manuals > Software.

4 Product registration

You can register your X-ray unit online at http://www.planmeca.com/register.

Follow the instructions on the registration page. Note that when you enter the X-ray unit serial number, you have to include any letters shown at the beginning of the number.

5 Safety precautions

WARNING

The following safety precautions must be observed in order to avoid the risk of personal injury or damage to the X-ray unit.

CAUTION

FOR US USERS:

Federal law restricts this device to sale by or on the order of a health care professional.

CAUTION

This X-ray unit may be dangerous to both patient and operator unless safe exposure values are used and correct operating procedures are observed.

CAUTION

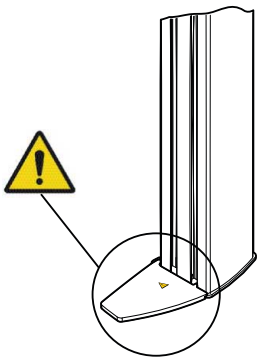
It is very important that the place where the X-ray unit is to be used and the position from which the user is to operate the X-ray unit are correctly shielded.

CAUTION

Since radiation safety requirements vary from country to country and state to state it is the responsibility of the user to ensure that all local safety requirements are met.

CAUTION

A safety plate is attached to the column. Keep this area clear at all times.



CAUTION

The patient positioning lights are laser lights. Do not stare into the laser beam.

CAUTION

Do not connect items which are not specified as part of the system.

CAUTION

Do not connect a multiple portable socket outlet (MPSO) or extension cord to the system.

CAUTION

If the X-ray unit shows any signs of oil leakage, switch the X-ray unit off and contact your service technician for help.

CAUTION

Do not use the X-ray unit in an oxygen rich environment or in the presence of flammable anesthetics.

CAUTION

Never use a defective or damaged X-ray system. Contact your service technician for help.

CAUTION

Do not modify the X-ray unit. The X-ray unit must be serviced by qualified personnel only.

NOTE

Before taking an exposure, ask any female patient of childbearing age whether she might be pregnant. The X- ray unit is not intended for use on pregnant women.

NOTE

If the X-ray unit has been stored at temperatures under +10°C for more than a few hours, time must be allowed for the unit to reach room temperature before turning it on.

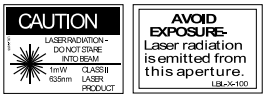
NOTE

Ensure efficient air conditioning in the X-ray room. It is recommended to keep the room temperature between +20°C and +25°C at all times.

NOTE

If the X-ray system is not connected to an Uninterruptible Power Supply (UPS), switch the X-ray unit off and disconnect the PCs from the mains during lightning storms.

NOTE



FOR US USERS:

The patient positioning lights are class II laser products (21 CFR § 1040.10).

NOTE

FOR EUROPEAN USERS:

The patient positioning lights are class 1 laser products (Standard IEC / EN 60825-1: 2007).

NOTE

EMC requirements have to be considered, and the equipment must be installed and put into service according to the specific EMC information provided in the accompanying documents.

NOTE

Portable and mobile RF communications equipment can affect the X-ray unit.

NOTE

input, signal output or other connectors, shall comply with relevant IEC standard (e.g. IEC 60950 for IT equipment and the IEC 60601 series for medical electrical equipment). In addition, all such combinations - systems - shall comply with the standard IEC 60601-1 Cl. 16.1, Safety requirements for medical electrical systems. Equipment not complying to IEC 60601 shall be kept outside the patient area (more than 2m (79 in.) from the Xray unit).

Any person who connects external equipment to signal input, signal output or other connectors has formed a system and is therefore responsible for the system to comply with the requirements of IEC 60601-1 Cl. 16.1. If in doubt, contact your service technician or local representative for help.

NOTE

Contact your service technician if you notice a decrease in image quality.

NOTE

If you take an exposure but the image does not appear in the Planmeca Romexis program, you can import the image manually into Romexis. Refer to the Planmeca Romexis User's Manual for details.

NOTE

Do not handle liquids near or on the X-ray unit.

NOTE

Never place or hang any objects on any part of the X-ray unit.

NOTE

Make sure that neither you nor your patient can get caught or hooked up on any part of the X-ray unit. Keep loose items of clothing, hair and jewellery tucked away safely.

NOTE

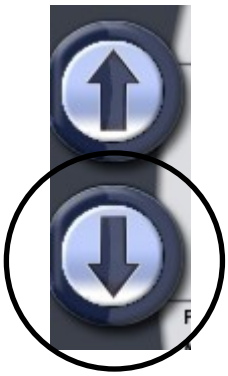
Do not attempt to remove any covers from the X-ray unit. X-ray unit covers may be removed by service personnel only.

NOTE

Do not touch the arm structures when the X-ray unit is moving.

NOTE

When positioning seated patients (e.g. in a wheelchair) always first move the C-arm down until the patient support is approximately level with the patient's mouth before you position the patient in the X-ray unit.

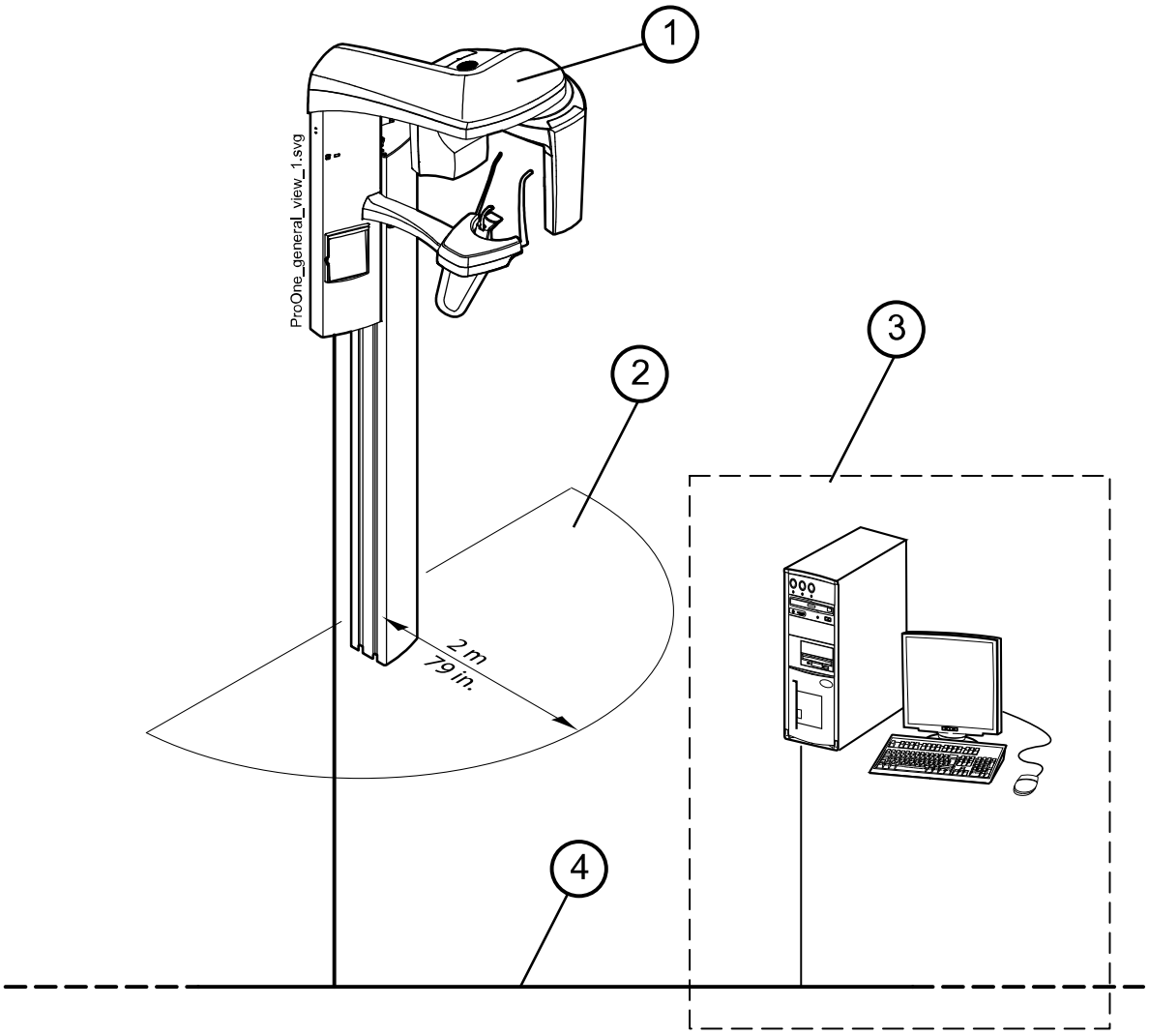


NOTE

Make sure that there is no object under the X-ray unit when you press the down button. If something is in danger of becoming trapped, release the button immediately to stop the movement. Clear any obstruction before pressing the button again.

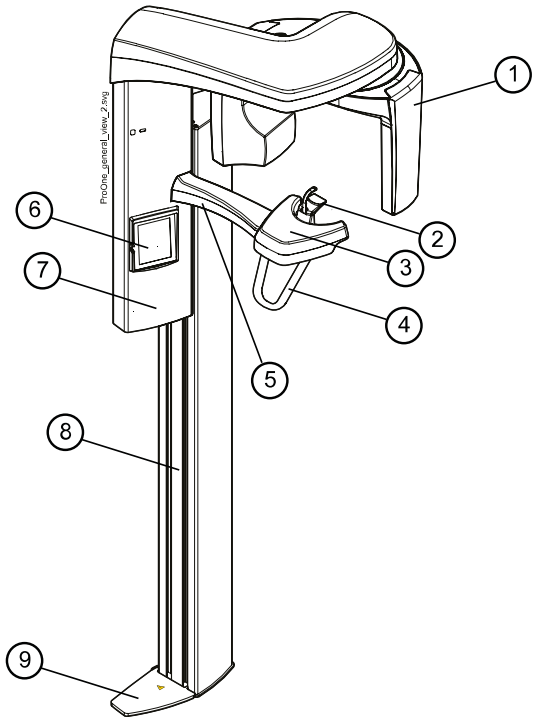
6 Main parts

6.1 General view of X-ray system



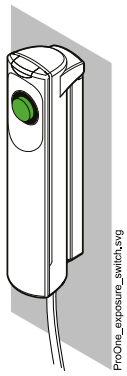
1 X-ray unit
2 Patient area
3 PC with Planmeca Romexis program (outside patient area)
4 Ethernet

6.2 General view of X-ray unit



1. C-arm
2. Patient supports (see section "Patient supports" on page 11)
3. Patient support table
4. Patient handles
5. Emergency stop button (see section "Emergency stop button" on page 12)
6. Control panel (see section "Control panel" on page 15)
7. Moving column
8. Stationary column
9. Safety plate

6.3 Exposure switch



The exposure switch can be mounted on the wall, or it can be hung from the hook located on the back of the moving column if a protected area is within reach.

When the X-ray unit is ready to take an exposure a green indicator light will come on on the exposure button. Additionally, the status bar at the bottom of the control panel display will turn green.

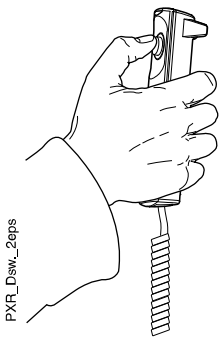
- Exposure button with indicator light

  GREEN = READY

- Exposure indicator light

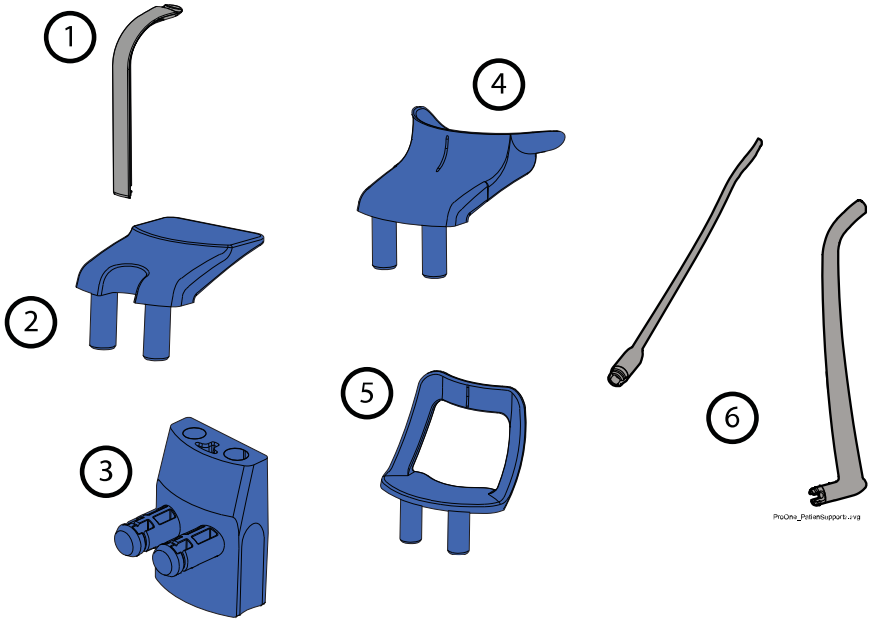
  AMBER = EXPOSURE

When you take an exposure an amber indicator light will come on on the exposure switch. It indicates that the X-ray unit is generating radiation. Additionally, a radiation warning symbol will be shown on the control panel display and you will hear a radiation warning signal.



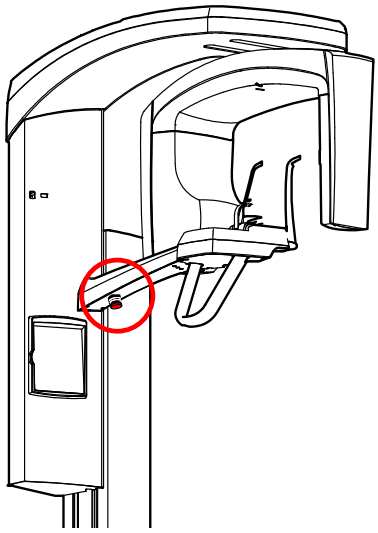
When you take an exposure you must press and hold down the exposure button for the whole duration of the exposure. If you remove your thumb from the exposure button before the exposure cycle is completed radiation is interrupted, the C-arm will stop moving and a help message will appear on the control panel. The help message must be cleared before the X-ray unit can be used again.

6.4 Patient supports



1 Bite piece
2 Chin rest
3 Adapter
4 Chin cup
5 Chin support
6 Temple supports

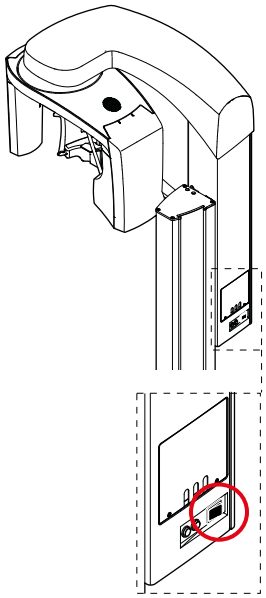
6.5 Emergency stop button



The emergency stop button is located on the underside of the patient support table arm. Press the button to stop the X-ray unit operating in an emergency. When the emergency stop button is pressed down, all movements of the X-ray unit are blocked and the unit will not generate radiation.

A help message will appear on the control panel display. Release the stop button to resume normal operation.

7 Switching X-ray unit on



The on/off switch is located on the back of the moving column. When you switch the X-ray unit on the main display will be shown on the control panel and a blue light will come on on the left side of the display. Additionally, the X-ray unit will carry out a self-test which will last a few seconds.

The X-ray unit is then ready for use.

NOTE

To prolong the lifetime of the Planmeca ProOne X-ray unit, always switch the X-ray unit off when it is not in active use.

8 Program packages

The Planmeca ProOne X-ray unit offers a wide selection of exposure programs for various diagnostic purposes. The basic program package is included as standard and the other program packages are available as options.

Each exposure program has a child setting which reduces the image size and patient dose.

Planmeca ProOne program packages

Program package	Contents
Basic programs (standard)	• Standard panoramic program • Double lateral TMJ program • Double PA TMJ program • PA rotational sinus program
Advanced programs (optional)	• Interproximal panoramic program • Orthogonal panoramic program • Panoramic bitewing program • Double lateral-PA TMJ program • 3 angles lateral TMJ program (left or right) • Lateral non-rotational sinus program (left or right) • Midsagittal non-rotational sinus program (left or right) • Cross-sections manual • Cross-sections automatic
Panoramic bitewing (optional)	• Panoramic bitewing program
Segmenting (optional)	• Horizontal and vertical segmenting for panoramic programs
DEC (optional)	• Dynamic Exposure Control for panoramic programs

9 Control panel

9.1 General about control panel

NOTE

The contents of the displays depend on the configuration of the X-ray unit. The displays shown here are from an X-ray unit that features all currently available imaging programs and functions.

NOTE

Never allow patients to touch the display when they are positioned in the X-ray unit. Touching the display during exposure will stop the imaging process.

NOTE

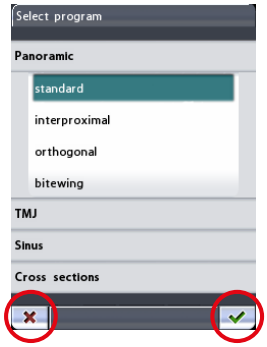
The X-ray images shown here are only examples.

To make a selection on the control panel, simply touch the display with your finger or a soft stylus on a text field or on an icon. For example, to select a program touch the program field. You will hear a signal tone when a field is activated.

NOTE

Do not use sharp objects to operate the control panel.

Only the text fields and icons on the display are touch-sensitive, and touching areas outside them will not activate an action.



To accept a selection, touch the green check mark button in the bottom right corner of the display. To cancel a selection, touch the red cross button in the bottom left corner of the display.

The display will automatically switch to stand-by mode if you do not touch the display or the exposure button for more than 30 minutes. A blue power light on the left side of the display indicates that the X-ray unit is switched on even though the display is dark. The display will switch on as soon as you touch it again.

You can set the X-ray unit so that the current time and/or date will be shown at the bottom of the display. You can choose in which format (e.g. 22.10.2008 for date and 13:49 for time) they will be shown. Refer to section "Setting time and date (U1100)" on page 86 for more information.

You can set the X-ray unit so that the estimated DAP (Dose Area Product) value will be shown on the main display for the exposure you are going to take. The DAP value indicates the highest radiation dose the patient will be exposed to during the exposure. Refer to section "Program presets (P2200)" on page 93 for more information.

You can set the X-ray unit so that the actual DAP (Dose Area Product) value will be shown on the display after each exposure. The actual DAP value indicates the actual radiation dose the patient was exposed to during the exposure. Refer to section "Functions after exposure (P2300)" on page 94 for more information.

You can set the X-ray unit so that a preview of the image will be shown on the control panel after exposure. This option allows you to evaluate the image immediately after you have taken it. Refer to section "Functions after exposure (P2300)" on page 94 for more information.

NOTE

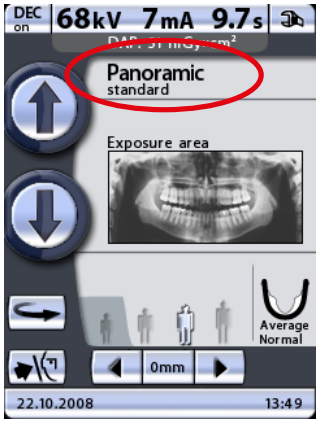
The control panel can be adjusted to respond to your individual finger touch. Refer to section "Operational settings (U1300)" on page 87 for more information.

NOTE

You can switch practice mode on if you wish to practice or demonstrate the functions of the X-ray unit without radiation. Refer to section "Operational settings (U1300)" on page 87 for more information.

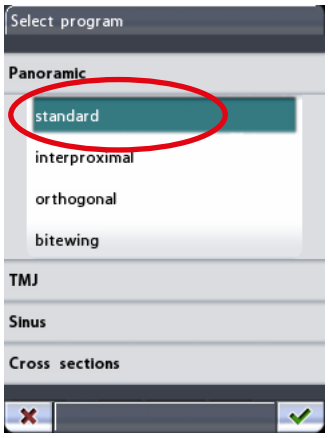
9.2 Selecting panoramic exposure program

1. To select a panoramic exposure program, touch the program field on the main display. The main display is the display that is shown when the X-ray unit is switched on.



The **Select program** display appears.

2. Select the required panoramic exposure program by touching the appropriate field on the display. The selected program will be highlighted.



NOTE

The patient positioning lights will be automatically switched on when you select the exposure program.

There are four panoramic exposure programs: Standard, Interproximal, Orthogonal and Bitewing.

NOTE

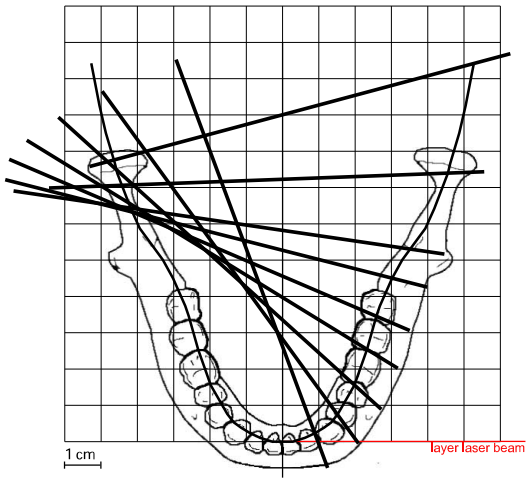
The panoramic program “Standard” is included in the basic program package. Other panoramic programs are optional.

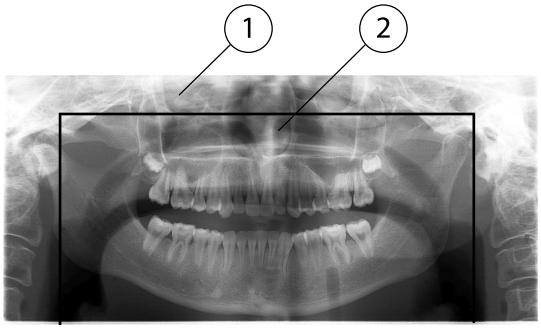
NOTE

When the child setting (smallest patient size) is selected, the image size and patient dose are automatically reduced.

- **Standard panoramic program**

  The Standard panoramic program has a traditional path and angles of the beam.





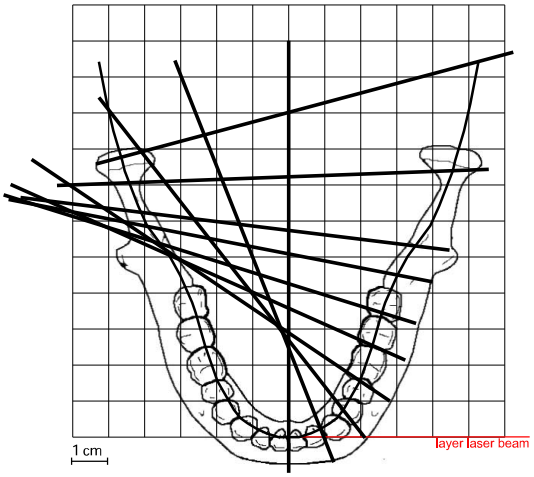
1 Image size for adult setting

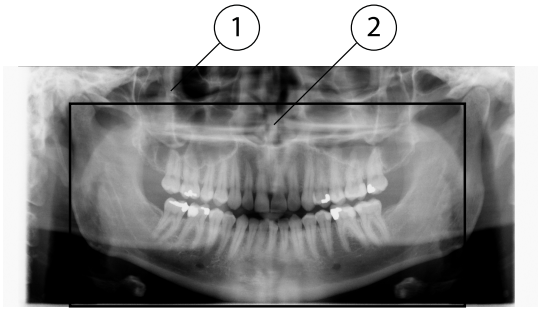
2 Image size for child setting

- **Interproximal program**

  In the Interproximal program the basic imaging geometry is the same as in the standard panoramic program but the angle of the X-ray beam is more parallel to the interproximal contacts of the teeth.

  This program is used for caries detection.





1 Image size for adult setting
2 Image size for child setting

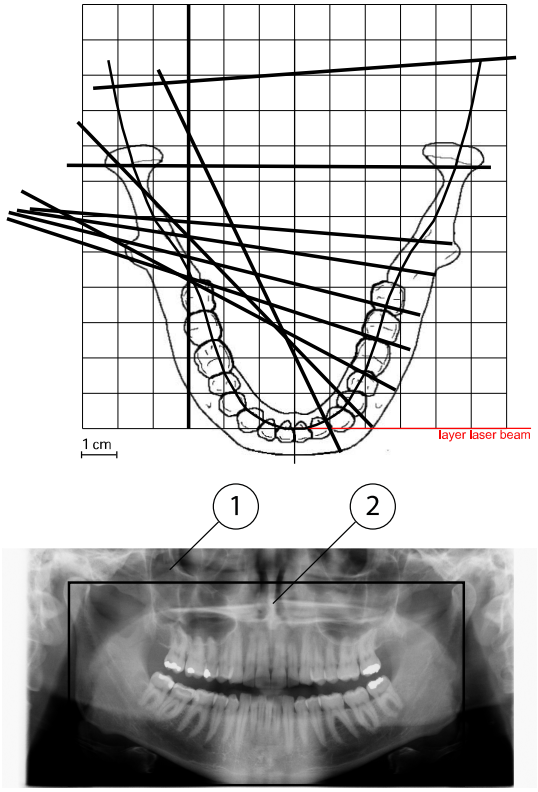
NOTE

This program is optimized for interproximal imaging and a shadow of the opposite side teeth may therefore be visible in the radiograph.

- **Orthogonal program**

  In the Orthogonal program the basic imaging geometry is the same as in the standard panoramic program but the angle of the X-ray beam is more perpendicular to the jaw.

  This program is useful for periodontal studies.



1 Image size for adult setting
2 Image size for child setting

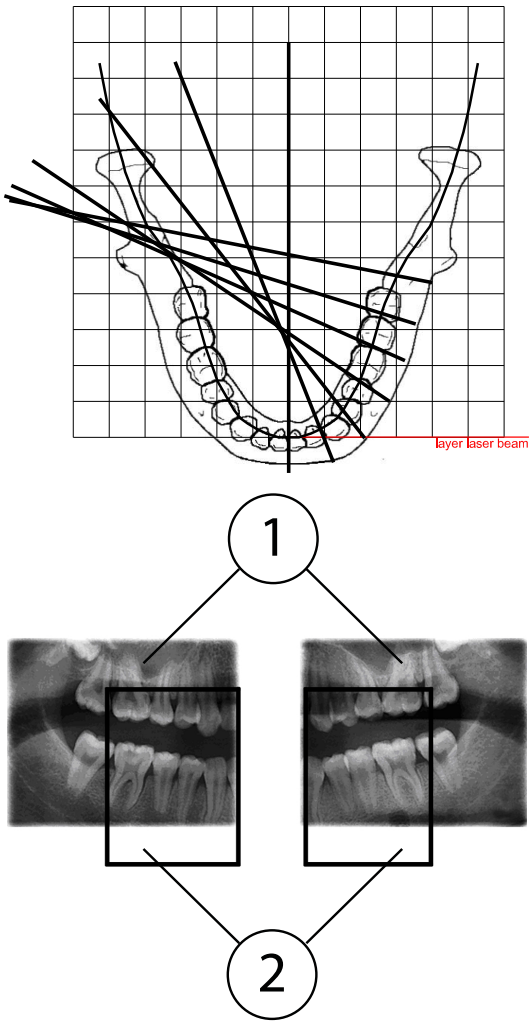
NOTE

This program is optimized for orthogonal imaging and a shadow of the opposite side teeth may therefore be visible in the radiograph.

- **Bitewing program**

  The Bitewing program produces bitewing-like images from premolar and molar areas including parts of maxilla, mandible and rami. The bottom of the maxillary sinus as well as the mandibular canal and the mental foramen are also visible.

  The bitewing program uses improved interproximal angulation projection geometry.



1 Image size for adult setting

2 Image size for child setting

NOTE

This program is optimized for interproximal imaging and a shadow of the opposite side teeth may therefore be visible in the radiograph.

3. Accept the selection and return to the main display by touching the green check mark button in the bottom right corner of the display.

9.2.1 Selecting exposure area for panoramic exposures (optional)

NOTE

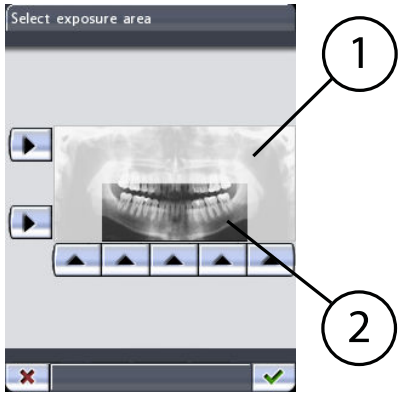
Segmenting is an optional feature. Refer to section "Program licences (P2100)" on page 91 for more information.

This optional segmenting function allows you to take panoramic exposures of different jaw segments. It will reduce the radiation dose as only diagnostically interesting areas need to be X-rayed.

1. Touch the exposure area field on the main display.

The **Select exposure** area display appears. The display shows an image which is divided into two horizontal and five vertical segments.

2. Touch the corresponding arrow button(s) to deselect the segment(s) that should not be exposed.



1 Deselected segments - no exposure

2 Segments to be exposured

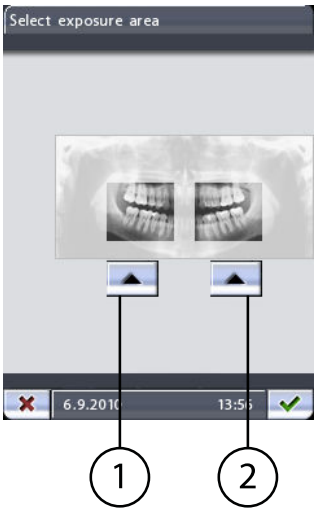
The segments which will not be exposed are shown faded. The segments which will be exposed are shown in full colour.

Touching the arrow of a deselected segment again will change the colour of the segment back to normal.

NOTE

The image shown on the display is only an example. The exposed image will not equal the example image.

3. In the optional Bitewing program you can deselect the patient's right or left side by touching the corresponding arrow button on the control panel.



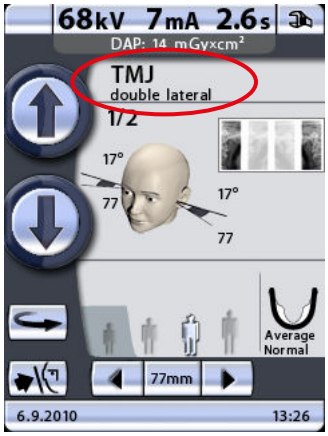
1 Patient's right side

2 Patient's left side

4. Accept the selections you have made, and return to the main display by touching the green check mark button in the bottom right corner of the display.

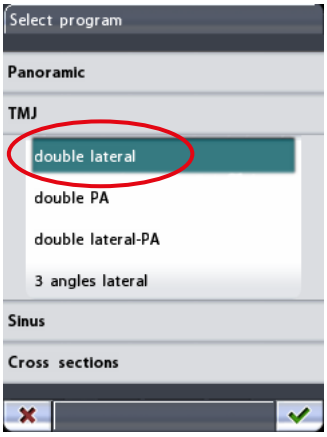
9.3 Selecting temporomandibular joint (TMJ) exposure program

1. To select a temporomandibular joint (TMJ) exposure program, touch the program field on the main display. The main display is the display that is shown when the X-ray unit is switched on.



The **Select program** display appears.

2. Select the required TMJ exposure program by touching the appropriate field on the display. The selected program will be highlighted.



NOTE

The patient positioning lights will be automatically switched on when you select the exposure program.

There are four TMJ exposure programs: Double lateral, Double PA, Double lateral-PA and 3 angles lateral.

NOTE

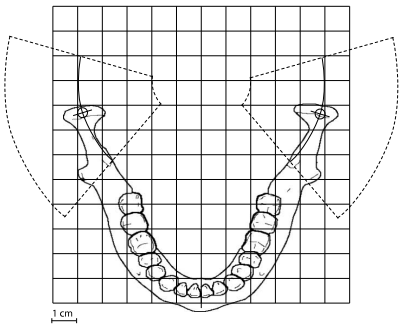
The temporomandibular programs “Double lateral” and “Double PA” are included in the basic program package. If needed, the “Double PA” program can be disabled by a service technician. The “Double lateral-PA” and “3 angles lateral” programs are optional.

NOTE

When the child setting (smallest patient size) is selected, the image size and patient dose are automatically reduced.

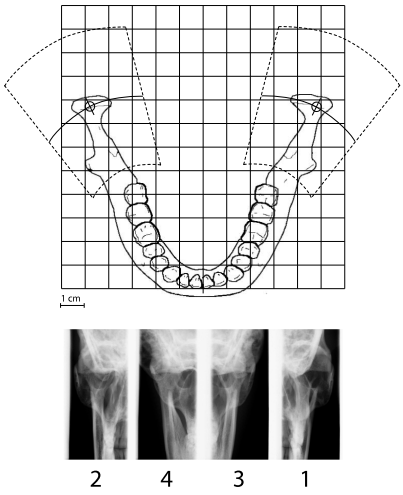
- **Double lateral**

  Lateral TMJ exposures of open and closed temporomandibular joints. The imaging angle is adjustable (factory default angle: 17°).



- **Double PA**

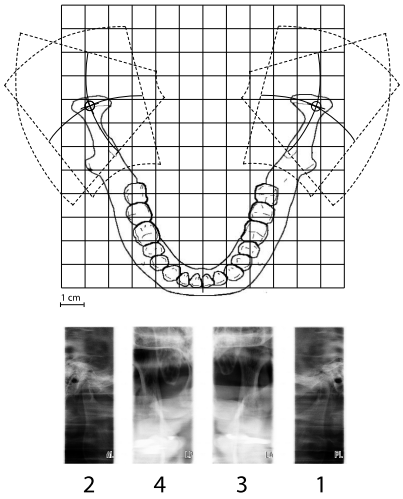
  Posteroanterior TMJ exposures of open and closed temporomandibular joints. The imaging angle is 60° and it is not adjustable.



- **Double lateral-PA**

  Lateral and posteroanterior TMJ exposures of open or closed temporomandibular joints.

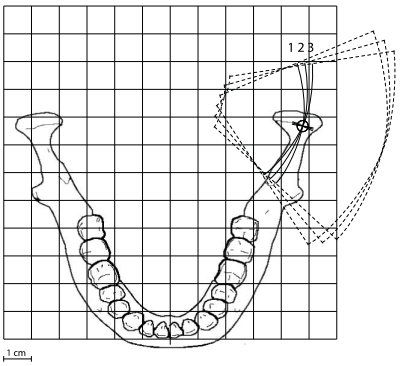
  The imaging angle for the lateral exposure is adjustable (factory default angle: 17°). The imaging angle for the posteroanterior exposure is 60° and it is not adjustable.



- **3 angles lateral, left/right**

  Three lateral multi-angle left-hand or right-hand side TMJ exposures.

  The imaging angle for image no. 2 is adjustable (three imaging angles: factory default angle 17° ±7°). The selected imaging angle is in image no. 2.

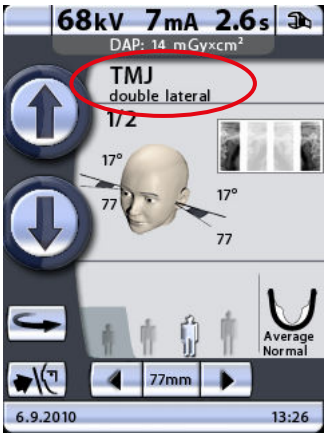


3 2 1

3. Accept the selection and return to the main display by touching the green check mark button in the bottom right corner of the display.

9.3.1 Selecting imaging position for temporomandibular joint (TMJ) exposures

1. Touch the image position field in the middle of the display to select the imaging position.

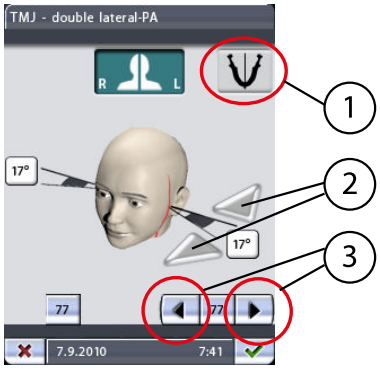


1 Image field position

2 Target position

The X-ray image in the top right corner of the field shows in which order the images will appekar on the radiograph. The active exposure is shown in full colour. The number in the top left corner indicates the number of the active exposure.

2. On the display that appears you can adjust the imaging position by touching the target position arrows in the bottom right corner.



1 Symmetric/asymmetric setting
2 Imaging angle arrows (lateral exporusre)
3 Target position arrows

The arrow pointing to the left will move the target position forward and the arrow pointing to the right will move the target position backward. The target position on the other jaw side will move accordingly if the icon for symmetric/asymmetric setting shows an undivided jaw (one line in the middle). The number that is shown on the display demonstrates the position of the layer light and serves as a reference for later retakes.

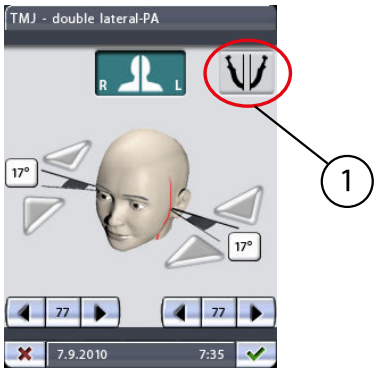
NOTE

The imaging position can also be adjusted by touching the target position arrows on the main TMJ display.

The imaging angle can be adjusted for lateral TMJ exposures. To adjust the imaging angle for the exposure you are going to take touch the imaging angle arrows next to the degree marking. Touching the upwards pointing arrow will decrease the angle and touching the downwards pointing arrow will increase the angle. The imaging angle on the other jaw side will change accordingly if the icon for symmetric/asymmetric setting shows an undivided jaw (one line in the middle).

NOTE

The default imaging angle for lateral exposures (17 degrees) can be changed by the user. Refer to section "Program presets (P2200)" on page 93 for more information.



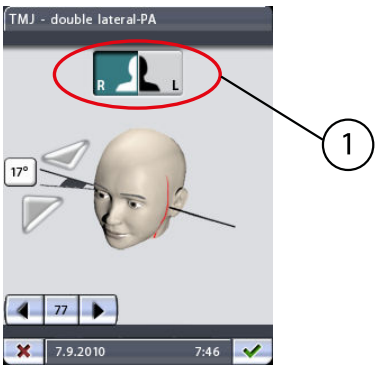
1 Symmetric/asymmetric setting

If the patient’s right and left side are asymmetric you will need to set the target position and imaging angle (lateral views) separately on the other side. To do this, touch the icon for symmetric/asymmetric setting to

select the asymmetric setting and adjust the other side as required. In the asymmetric setting the icon shows a divided jaw (two lines in the middle).

NOTE

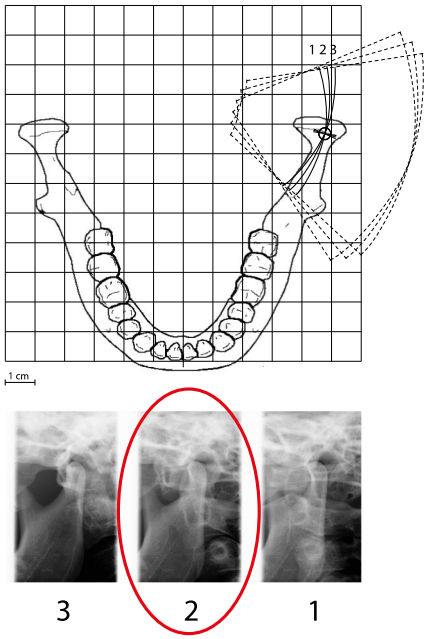
In the asymmetric setting, touching the target position arrows on the main TMJ display will adjust the imaging position only on the patient's left side.



The right/left buttons at the top of the display allow you to select on which side the exposures will be taken. You can set the unit to take TMJ exposures on one side or on both sides. The button(s) of the selected side(s) will be highlighted. Note that the buttons refer to the patient's (not your) right and left side.

NOTE

In multi-angle exposures the selected imaging angle is in image no. 2.



1st exposure: selected angle -7°, 2nd eposure: angle selected by the user (factory default angle: 17°), 3rd exposure: selected angle +7°.

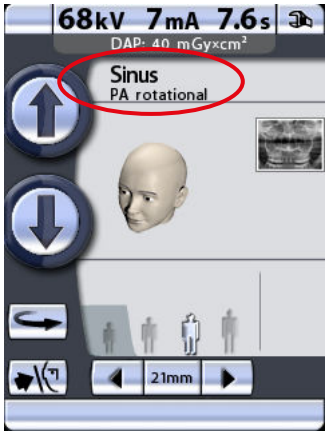
2 Imaging angle selected by the user

3. Accept the selection and return to the main display by touching the green check mark button in the bottom right corner of the display.

9.4 Selecting sinus exposure program

1. To select a sinus exposure program, touch the program field on the main display.

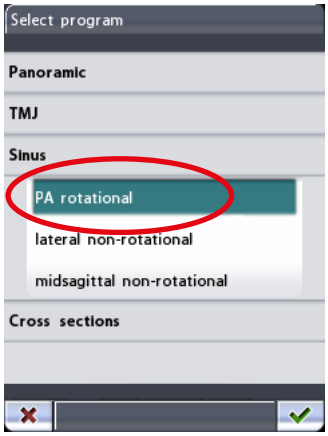
   The main display is the display that is shown when the X-ray unit is switched on.



   The **Select program** display appears.

2. Select the required sinus exposure program by touching the appropriate field on the display.

   The selected program will be highlighted.



NOTE

The patient positioning lights will be automatically switched on when you select the exposure program.

There are three sinus exposure programs: PA rotational, Lateral non-rotational and Midsagittal non-rotational.

NOTE

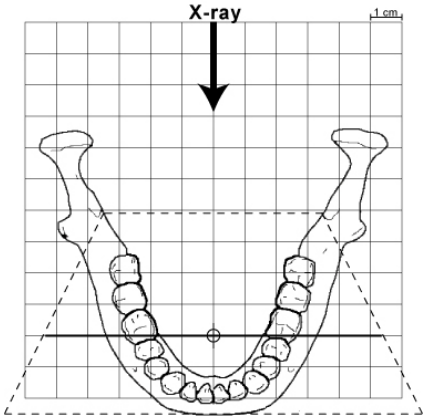
The sinus program “PA rotational” is included in the basic program package. Other sinus programs are optional.

NOTE

When the child setting (smallest patient size) is selected, the image size and patient dose are automatically reduced.

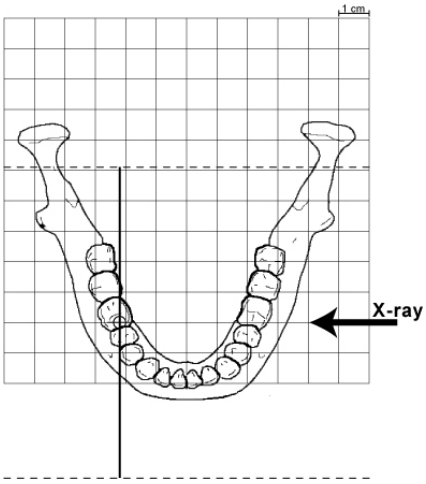
- **PA rotational**

The PA rotational program produces a posteroanterior rotational sinus exposure.



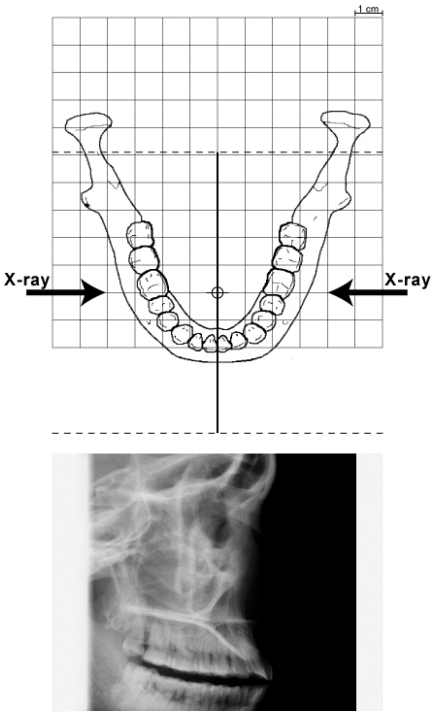
- **Lateral non-rotational**

  The Lateral non-rotational program produces lateral non-rotational exposures of the left or right sinus area.



- **Midsagittal non-rotational**

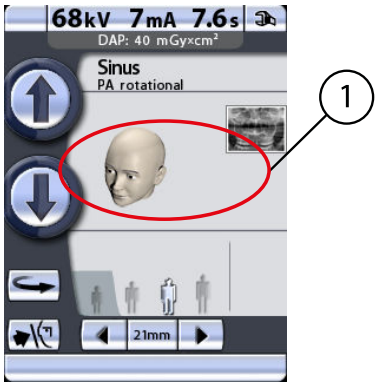
The Midsagittal non-rotational program produces lateral non-rotational sinus exposures in the middle of the jaw. The exposures can be taken from the left or right jaw side.



3. Accept the selection and return to the main display by touching the green check mark button in the bottom right corner of the display.

9.4.1 Selecting imaging position for sinus exposures

1. Touch the image position field in the middle of the display to select the imaging position for posteroanterior exposures, or to select the imaging side for lateral or midsagittal exposures.

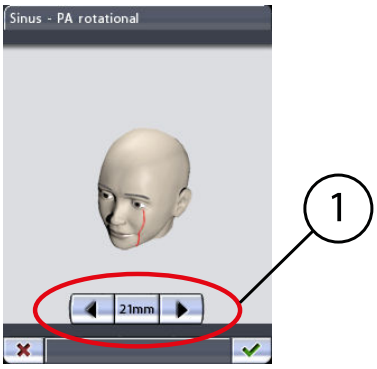


1 Image position field

The X-ray image in the top right corner of the field shows where the exposed image will appear on the radiograph.

2. To select the imaging position for posteroanterior exposures, touch the target position arrows at the bottom of the display.

   The arrow pointing to the left will move the target position forward and the arrow pointing to the right will move the target position backward. The marking on the patient's face demonstrates the imaging position.

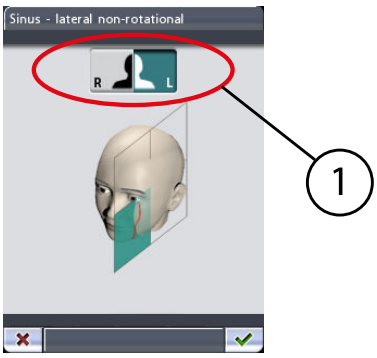


1 Target position arrows

NOTE

The imaging position can also be adjusted by touching the target position arrows on the main sinus display for posteroanterior exposures.

3. To select the imaging side for lateral or midsagittal exposures, touch the right or left side button at the top of the display.



1 Patient's right/left side

The button of the selected side will be highlighted. Note that the buttons refer to the patient's (not your) right and left side.

4. Accept the selection and return to the main display by touching the green check mark button in the bottom right corner of the display.

9.5 Selecting cross-sectional exposure program (optional)

NOTE

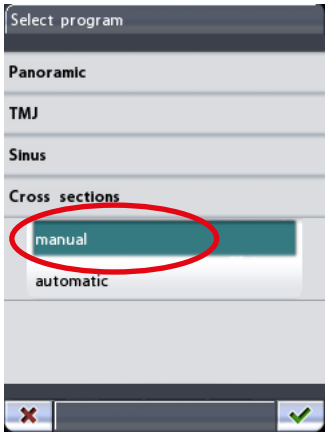
Cross-sectional programs are not included in the basic program package. Both cross-sectional programs are optional.

1. To select a cross-sectional exposure program, touch the program field on the main display.

   The main display is the display that is shown when the X-ray unit is switched on.

   The **Select program** display appears.

2. Select the required cross-sectional exposure program by touching the appropriate field on the display.



   The selected program will be highlighted.

NOTE

The patient positioning lights will be automatically switched on when you select the exposure program.

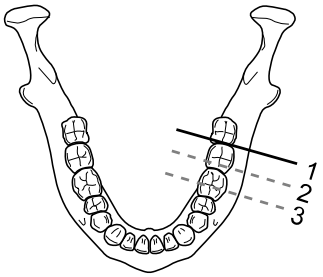
There are two cross-sectional exposure programs: Cross-sections manual and Cross-sections automatic.

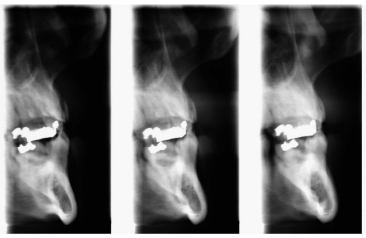
NOTE

When the child setting (smallest patient size) is selected, the image size and patient dose are automatically reduced.

- **Cross-sections manual**

  The manual program produces 1-3 cross-sections on the left or right side of the upper or lower jaw in the premolar, molar or TMJ areas. The imaging position is set manually between exposures.

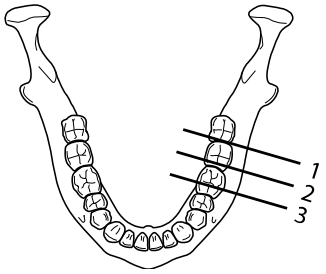




3 2 1

- **Cross-sections automatic**

  The automatic program produces three cross-sections on the left or right side of the upper or lower jaw in the premolar, molar or TMJ areas. The imaging position will be automatically moved between exposures. The movement step (distance from middle to middle) is adjustable, and it can be 1-10 mm.

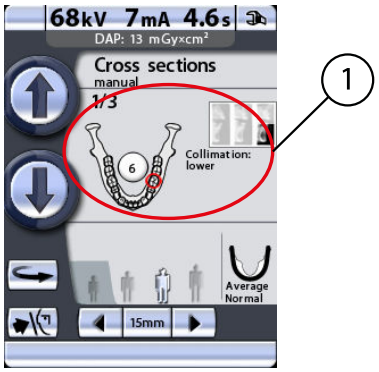


3 2 1

3. Accept the selection and return to the main display by touching the green check mark button in the bottom right corner of the display.

9.5.1 Selecting imaging position for cross-sectional exposures

1. Touch the image position field in the middle of the display to select the imaging position.

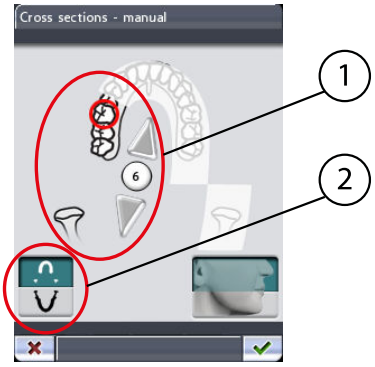


1 Image position field

The X-ray image in the top right corner of the field shows in which order the images will appear on the radiograph. The active exposure is shown in full colour. The number in the top left corner indicates the number of the active exposure.

On the display that appears you can select the imaging position.

2. Select the upper or lower jaw by touching the corresponding jaw half in the bottom left corner.



1 Tooth number (5-8) or TMJ

2 Upper/lower jaw

The icon of the selected jaw half will be highlighted.

Select the left or right jaw side by touching the corresponding jaw side in the middle of the display. The selected jaw side will be shown in full colour.

Select the target position (tooth number 5-8 or TMJ) by either touching the corresponding position on the jaw icon or by tapping the small arrows next to the tooth number. The upwards pointing arrow moves the target position forwards on the dental arch and the downwards pointing arrow moves the target position backwards on the dental arch. The selected target position will be marked with a red circle.

Each preprogrammed target position has a fixed magnification:

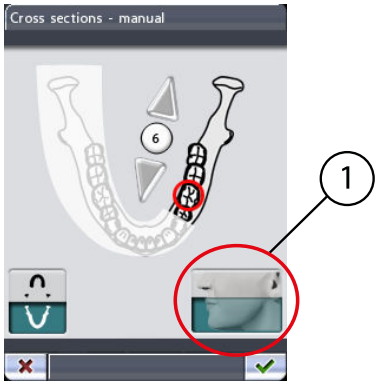
Tooth No. (according to Planmeca numbering system)	Magnification
5	1.48
6	1.51

Tooth No. (according to Planmeca numbering system)	Magnification
7	1.56
8	1.61
TMJ	1.89

NOTE

The tooth numbering system can be changed by the user. Refer to section "Program presets (P2200)" on page 93 for more information.

3. Touch the collimation field in the bottom right corner of the display to select the exposure area.



1 Collimation (upper jaw/lower jaw/full size exposure)

You can set the collimation field so that only one jaw half (upper/lower jaw) or both jaw halves (full size exposure) will be exposed. Turning collimation on will reduce the radiation dose as the exposed area is smaller.

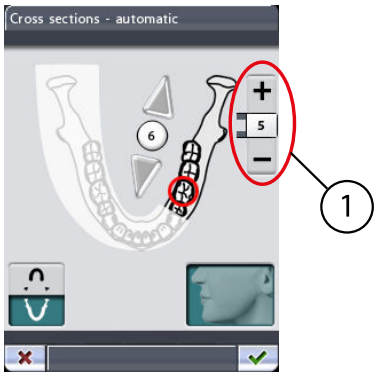
The area that will be exposed is highlighted. Touch the collimation field again to turn collimation off.

If you take only one or two exposures you will have to stop the exposure procedure by touching the stop button at the bottom of the display.

Between exposures a display is shown where you can change the exposure values (kV and mA) and move the target position.

In the manual exposure program you can decide how many exposures you wish to have in one image. The minimum is one and the maximum is three.

In the automatic program the target position will be automatically moved between exposures. The movement step is adjustable between 1-10 mm. Select the movement step by touching the plus or minus button next to the step value.

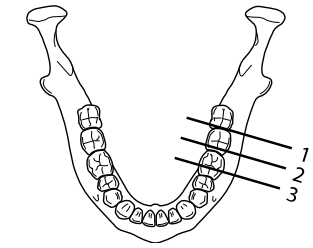


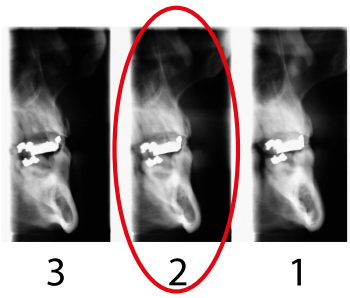
1 Movement step

NOTE

In the automatic program the selected target position is in cross-section no. 2.

1st exposure: cross-section no.1, 2nd exposure: cross-section no.2 and 3rd exposure: cross-section no.3.





2 Position selected by user

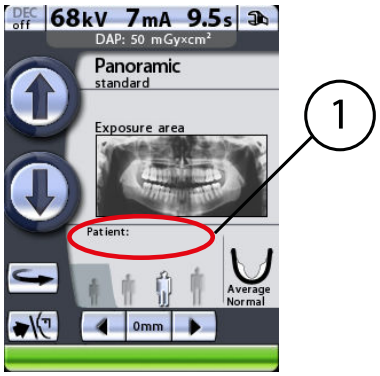
4. Accept the selection and return to the main display by touching the green check mark button in the bottom right corner of the display.

9.6 Entering patient name

NOTE

This function is available only if a USB memory stick is connected to the X-ray unit and the Save images on USB memory stick function is switched on. Refer to section "Imaging without PC (P2600)" on page 101 for more information.

1. To enter a patient name, touch the patient name field.



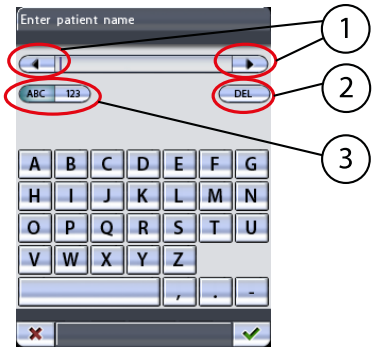
1 Patien name field

NOTE

We recommend that you always enter the patient name before you take an exposure. This will ensure that images of different patients cannot be mixed up.

The **Enter patient** name display appears.

2. Enter the patient name/number by touching the letters/numbers on the display.



1 Move cursor to the left/right
2 Delete letter/number
3 Letters/numbers

The display will show letters or numbers depending on which side of the **ABC/123** button is selected. The selected option will be shown highlighted.

When the display shows letters, touching the **ABC** button again will toggle between upper case and lower case letters. The first letter of a word will always be capitalized.

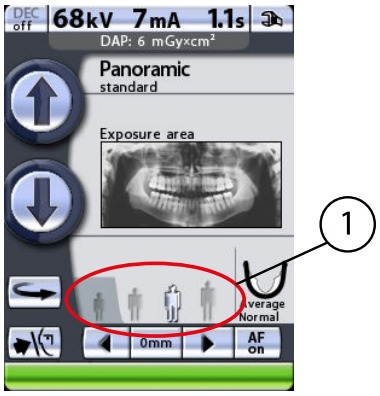
To move the cursor to the left or right, touch the arrow button on the left or right side of the patient name/number.

To delete a letter or a number, touch the **DEL** button. Characters will be deleted one at a time and in reverse order of entry.

3. Accept the name and return to the main display by touching the green check mark button in the bottom right corner of the display.

9.7 Selecting patient size

1. Select the patient size by touching the corresponding size symbol in the patient size field on the main display.



1 Patient size field:

- Child on darker background (shadow)
- Adult sizes on higher background

The selected patient size will be highlighted.

NOTE

The exposure values will automatically change according to the selected patient size.

Select the smallest patient size symbol for a child. Selecting the smallest patient size will automatically change the jaw size setting to “Small”.

NOTE

When the smallest patient size (child setting) is selected, the image size and patient dose are automatically reduced.

Select the second patient size symbol for a small adult. Select the third patient size symbol for an average-sized adult. Selecting either of the patient sizes in the middle will automatically change the jaw size setting to “Average”.

Select the biggest patient size symbol for a large adult. Selecting the biggest patient size symbol will automatically change the jaw size setting to “Large”.

NOTE

Jaw size and shape selection is not possible in sinus programs.

NOTE

Manual selections (exposure values or jaw size) will override any automatic settings.

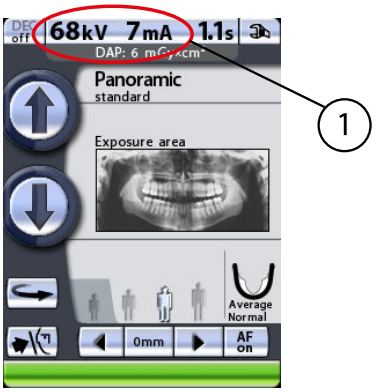
9.8 Selecting kilovolt and milliampere values

NOTE

The exposure values will automatically change according to the selected patient size.

The exposure values have been preset at the factory for each patient size. The preset exposure values are average values and they are only meant to guide the user.

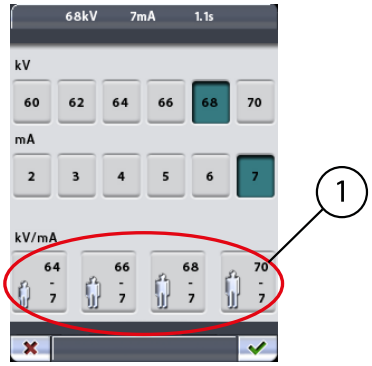
1. To change the preset exposure values, touch the kV/mA field on the main display.



1 kV/mA field

The exposure parameter display appears.

2. Select the required exposure values by touching the appropriate kV and mA values.



1 Quick buttons

The selected values will be highlighted.

The preset exposure values for each patient size are shown in the quick buttons at the bottom of the display.

NOTE

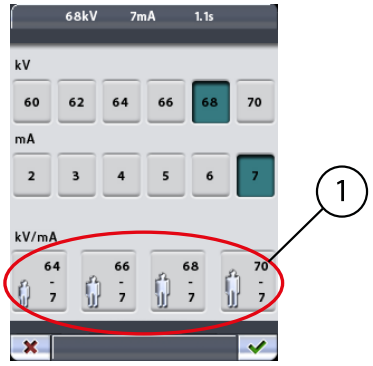
Selecting kV and mA values manually will override the automatic quick button setting.

3. Accept the selection and return to the main display by touching the green check mark button in the bottom right corner of the display.

9.8.1 Changing exposure values for quick buttons

The quick button exposure values have been preset at the factory. If needed, the preset values can be changed by the user.

1. To change the preset values, first select the required kV and mA values by touching the corresponding fields on the parameter display and then touch and hold the desired quick button until you hear a signal tone.



1 Quick buttons

The quick button will now show the new exposure values.

NOTE

To view the preset exposure values, refer to the tables in sections *Panoramic exposure*, *Temporomandibular joint exposure*, *Sinus exposure* and *Cross-sectional exposure (optional)*.

2. Accept the selection and return to the main display by touching the green check mark button in the bottom right corner of the display.

9.9 Selecting jaw size and shape

This function adjusts the form of the focal trough to accommodate patients with different jaw sizes and shapes.

NOTE

The jaw size setting will automatically change according to the selected patient size.

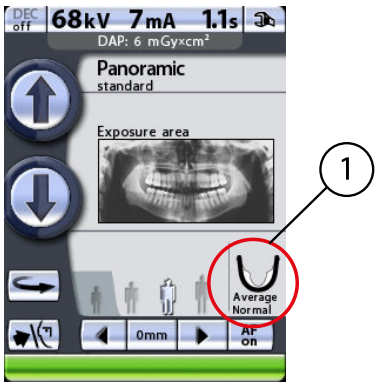
NOTE

Jaw size and shape selection is not possible in sinus programs.

Changing the patient size will automatically change the setting for jaw size:

- Selecting the smallest patient size will automatically change the jaw size setting to “Small”. Additionally, the image size and patient dose will be reduced.
- Selecting either of the patient sizes in the middle will automatically change the jaw size setting to “Average”.
- Selecting the largest patient size will automatically change the jaw size setting to “Large”.

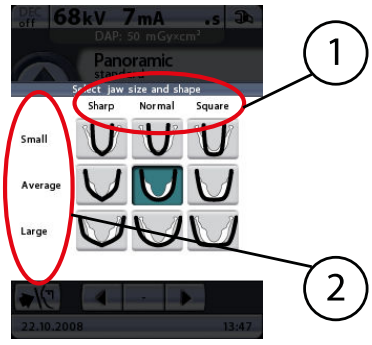
1. To select jaw shape, or to change the automatic jaw size setting, touch the jaw field on the main display.



1 Jaw field

A display showing different jaw sizes and shapes appears. The marking on the jaw icon demonstrates the focal layer.

2. Select the required jaw shape (or size) by tapping the corresponding icon on the display. The selected jaw icon will be highlighted.



1 Jaw shape

2 Jaw size

NOTE

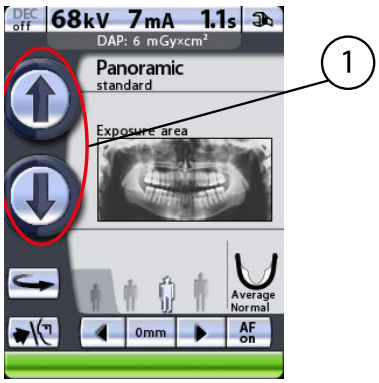
Selecting jaw size manually will override the automatic setting.

NOTE

Jaw shape selection (sharp, normal or square) is possible in panoramic programs only.

9.10 Adjusting unit height

1. Touch and hold either of the height adjusting buttons to move the C-arm up or down so that the X-ray unit can be adjusted to suit the height of the patient.



1 Height adjust buttons

The movement will stop when you release the button.

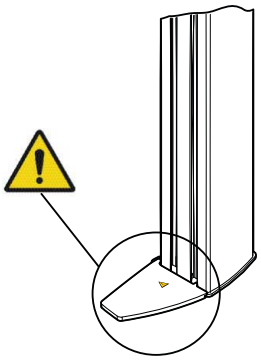
The X-ray unit moves slowly at first, then faster.

NOTE

When positioning seated patients (e.g. in a wheelchair) always first move the C-arm down until the patient support is approximately level with the patient's mouth before you position the patient in the X-ray unit.

NOTE

Make sure that there is no object under the X-ray unit when you press the down button. If something is in danger of becoming trapped, release the button immediately to stop the movement. Clear any obstruction before pressing the button again.

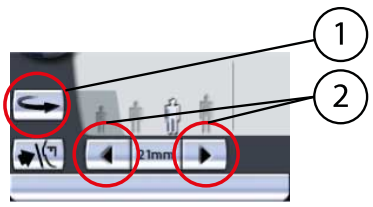


CAUTION

A safety plate is attached to the column. Keep this area clear at all times.

9.11 Returning C-arm to patient entry position

1. Touch the C-arm return button to move the C-arm to the patient entry position.



1 C-arm return button

Alternatively, you can touch either of the target position arrows to move the C-arm to the patient entry position.

NOTE

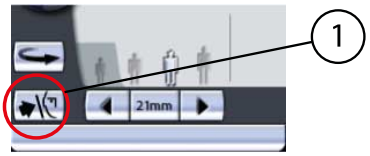
The C-arm will automatically move to the patient entry position when you select an exposure program.

NOTE

You can set the X-ray unit so that the C-arm will automatically return to the patient entry position at the end of an exposure cycle. Refer to section "Functions after exposure (P2300)" on page 94 for more information.

9.12 Opening/closing temple supports

1. Touch the temple support button to open or close the temple supports.



1 Temple support button

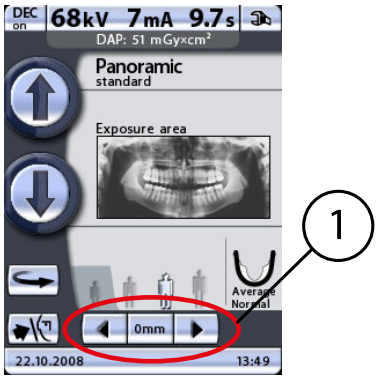
The arrow shown on the temple support button points to the right when the temple supports are open. The arrow points to the left when the temple supports are closed.

NOTE

The temple supports will automatically open when you select an exposure program. They will also open at the end of an exposure cycle.

9.13 Adjusting layer light position

1. Touch and hold either of the arrows in the target position field to adjust the position of the layer light.



1 Target position field

The arrow pointing to the left moves the C-arm forward and the arrow pointing to the right moves the C-arm backward. The C-arm movement will stop when you release the button.

The number in the target position field indicates the position of the layer light and serves as a reference for later retakes.

NOTE

Touching either of the target position arrows will move the C-arm to the patient entry position, if it is not already there.

NOTE

Touching either of the target position arrows will switch on the patient positioning lights, if they are not already on.

9.14 Switching DEC on/off (optional)

NOTE

Dynamic Exposure Control (DEC) is an optional feature. Refer to section "Program licences (P2100)" on page 91 for more information.

NOTE

Dynamic Exposure Control (DEC) is available for Standard, Interproximal and Orthogonal panoramic programs. However, DEC cannot be used if only the lower horizontal jaw segment is imaged (partial exposure).

1. Touch the DEC button to switch Dynamic Exposure Control (DEC) on or off for the exposure you are going to take.

Dynamic Exposure Control (DEC) automatically provides optimal exposure values for each patient during exposure. This function adjusts the exposure values individually for each patient based on their anatomic structure and bone density. Switching DEC on improves the image quality as the function produces images of more consistent brightness and contrast.

When DEC is switched on the kV value will be adjusted by max ±4 kV. However, if the starting value is e.g. 68 kV the value will be increased by only 2 kV (available kV scale: 60-70). The mA value will be adjusted by max +4/-3 mA. However, if the starting value is e.g. 7 mA the value will not be further increased (available mA scale: 2-7).

NOTE

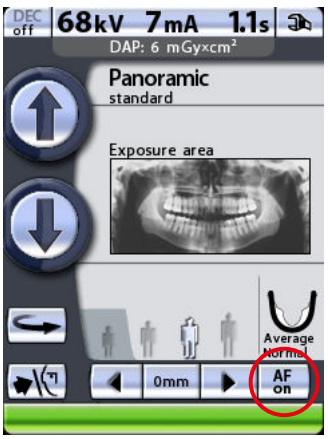
DEC target value can be adjusted if the images appear to be too bright or too dark. Refer to section "Program presets (P2200)" on page 93 for more information.

9.15 Switching Autofocus (AF) on/off

NOTE

Autofocus is available for Standard, Interproximal and Orthogonal panoramic programs.

1. Touch the AF button to switch Autofocus (AF) on or off for the exposure you are going to take.



Autofocus adjusts the layer position automatically. The function positions the image layer individually for each patient based on the position and angle of the apices of the upper central incisors.

Refer to section "Taking an exposure with Autofocus (AF)" on page 55 for more information.

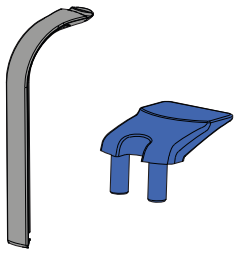
10 Panoramic exposure

This procedure will produce a full size panoramic exposure of both jaws.

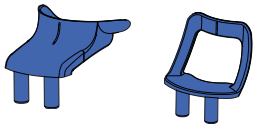
NOTE

If the optional segmenting function is activated on your X-ray unit, you can take a partial exposure by selecting only certain vertical or horizontal segments of the jaw, refer to section "Selecting exposure area for panoramic exposures (optional)" on page 20.

Use a bite piece for this procedure. Insert the chin rest and a bite piece into the adapter on the patient support table.

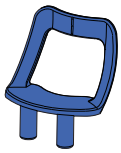


For edentulous patients or for patients who are unable to use the bite piece you can use the chin cup or the chin support. You may have to place a roll of gauze or cotton between the patient's jaws to raise the upper ridge to the correct position.



NOTE

We recommend that you use the chin support when taking bitewing exposures.



NOTE

We recommend that you use the bite piece when taking exposures with the Autofocus function (AF ON).

Ask the patient to remove any spectacles, hearing aids, dentures, hairpins, and personal jewellery such as earrings, necklaces and piercings as these can produce shadows or reflections in the image. The patient should also remove any loose items of clothing (e.g. scarf, tie) that might get caught in the unit's arm structures.

Place a protective lead apron over the patient's back if required.

Select the panoramic program you require, refer to section "Selecting panoramic exposure program" on page 16. Select the patient size as described in section "Selecting patient size" on page 38.

The exposure values will automatically change according to the selected patient size and exposure program. The preset exposure values are shown

in the following tables. The preset exposure values are average values and they are only meant to guide the user. If needed, you can change the preset values as described in section "Selecting kilovolt and milliampere values" on page 38.

NOTE

Always try to minimize the radiation dose to the patient.

Exposure values for standard, interproximal and orthogonal panoramic programs

Patient size	kV value	mA value
Child	64	7
Small adult	66	7
Average-sized adult	68	7
Large adult	70	7

NOTE

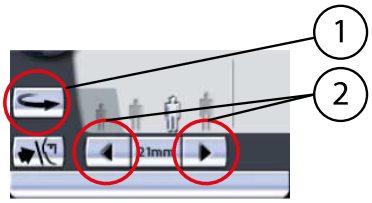
If the optional DEC (Dynamic Exposure Control) function is activated on your X-ray unit, you can switch it on as described in section "Switching DEC on/off (optional)" on page 44. DEC adjusts the exposure values individually for each patient during exposure.

Exposure values for panoramic bitewing programs

Patient size	kV value	mA value
Child	70	4
Small adult	70	5
Average-sized adult	70	6
Large adult	70	7

10.1 Patient positioning

1. Touch the C-arm return button to move the C-arm to the patient entry position if it is not already there.



1 C-arm return button

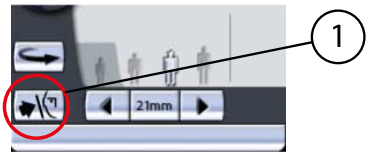
2 Target position arrows

Alternatively, you can touch either of the target position arrows to move the C-arm to the patient entry position.

NOTE

You can set the X-ray unit so that the C-arm will automatically return to the patient entry position at the end of an exposure cycle. Refer to section "Functions after exposure (P2300)" on page 94 for more information.

2. Touch the temple support button to open the temple supports if they are not already open.

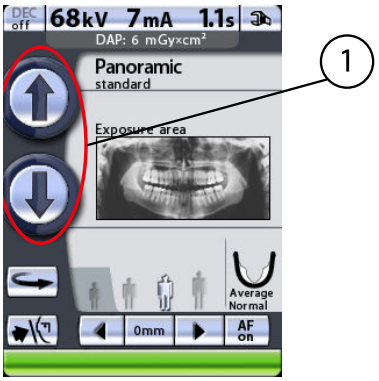


1 Temple support button

Guide the patient to the unit so that they are facing the chin rest.

3. To adjust the height of the unit, press either of the height adjusting buttons on the display until the chin rest is at the level of the patient's chin.

Stretch and straighten the patient's neck.

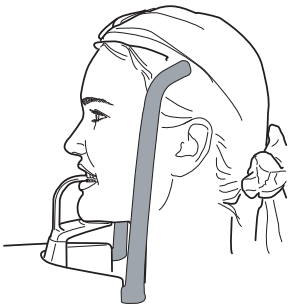


1 Height adjust buttons

The unit moves slowly at first, then faster.

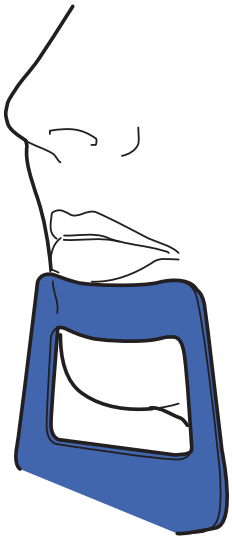
4. Ask the patient to step forward, grasp the patient handles, stretch up and bite the bite piece.

The upper and lower incisors must be in the groove in the bite piece.



NOTE

Patients are not allowed to hang on the patient handles. The pull-down force applied to the patient handles may not exceed 15 kg (33 lb).



NOTE

We recommend that you image patients with poor health in a sitting position.

NOTE

If you are using the chin support, position the patient so that the chin, just below the lower lip, touches the top bar.

NOTE

If you are using the chin support or chin cup, use for example a cotton roll to ensure that the patient's upper and lower incisors do not overlap.

5. Close the temple supports by touching the temple support button.

1 Temple support button

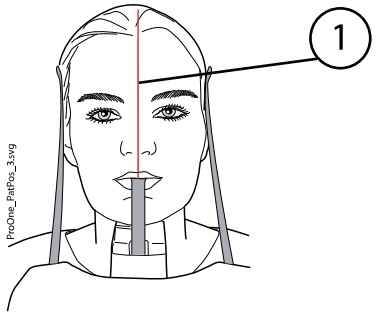
The three patient positioning lights will automatically switch on when you select the exposure program. They will switch off after four minutes. If

the lights go out before you have positioned the patient, you can touch either of the target position arrows to switch the lights back on.

Stand behind the patient and make sure that the patient's shoulders are level and the neck muscles relaxed.

6. Position the patient's head so that the midsagittal plane coincides with the midsagittal plane light beam.

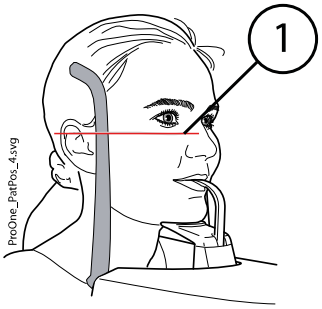
   Make sure that the patient is looking straight ahead as the light may appear to be correctly positioned but the patient's head could be turned slightly to one side.



1 Midsagittal plane light

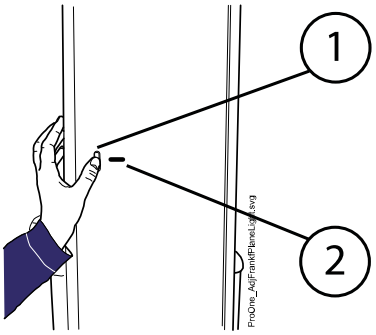
7. Position the patient's head so that the Frankfort plane coincides with the Frankfort plane light beam.

   To do this support the back of the patient's head with your hand and then adjust the tilt of the patient's head by raising or lowering the unit with the height adjusting buttons. The patient's back should be straight. If necessary, stretch and straighten the patient's neck by moving the unit up slightly.



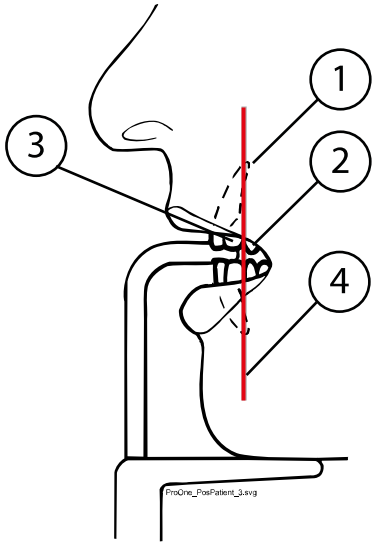
1 Franfort plane light

Note that the Frankfort plane light, located on the side of the column, can be moved up or down to accommodate different head sizes. This is done by moving the adjusting lever that is located next to the light slot.

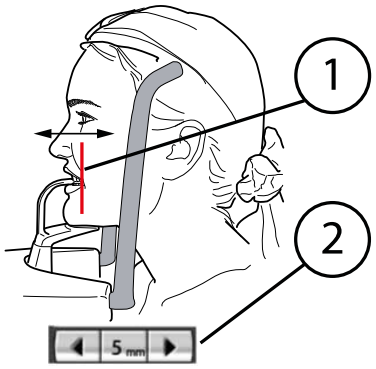


1 Adjusting lever
2 Frankfort plane light slot

8. Position the apices of the patient's upper central incisors within the image layer (focal trough) of the unit.



1 Apices of the upper central incisors
2 Canine
3 Second incisor
4 Layer light



1 Layer light
2 Target pos. arrows

To do this, touch and hold either of the target position arrows to move the layer light - which indicates the centre of the focal trough - until it falls between the second incisor and the canine. For an average patient, this procedure will place the apices of the upper central incisors within the focal trough.

The arrow pointing to the left moves the C-arm forward and the arrow pointing to the right moves the C-arm backward. The number in the target position field indicates the position of the layer light and serves as a reference for later retakes.

NOTE

If you are using the chin support or chin cup, ask the patient to open their lips slightly and position the layer light as described above.

9. Check that the Frankfort plane light and the midsagittal plane light are still correctly positioned.

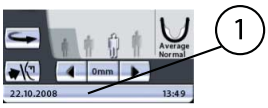
   Reposition them if necessary.

10.2 Taking an exposure

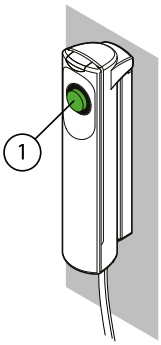
NOTE

Make sure that you have selected the right patient and the panoramic exposure mode in the Romexis program before you take an exposure. Refer to the Romexis User's Manual.

The status bar at the bottom of the display will turn green when the unit is ready to take an exposure.



1 Status bar
- Green = Ready for exposure
- Grey = Not ready for exposure



On the exposure button a green indicator light will come on. The Romexis program will show the **Waiting for Exposure** message on the computer screen.

1 Green ready indicator light

1. Ask the patient to close their lips on the bite piece, swallow, place their tongue flat against the roof of the mouth, breathe normally, and stand as still as possible.
2. Move to a protected area.
3. Press and hold down the exposure button for the duration of the exposure.

1 Amber exposure light

The C-arm will move through one exposure cycle.

During the exposure cycle the radiation warning light on the exposure switch and on the display will come on and you will hear a radiation warning tone. When the C-arm has completed the exposure cycle the temple supports will automatically open. You can now guide the patient from the unit.

NOTE

Maintain audio and visual contact with the patient and unit during exposure. If the C-arm stops moving during exposure, or moves in an erratic way, release the exposure button immediately.

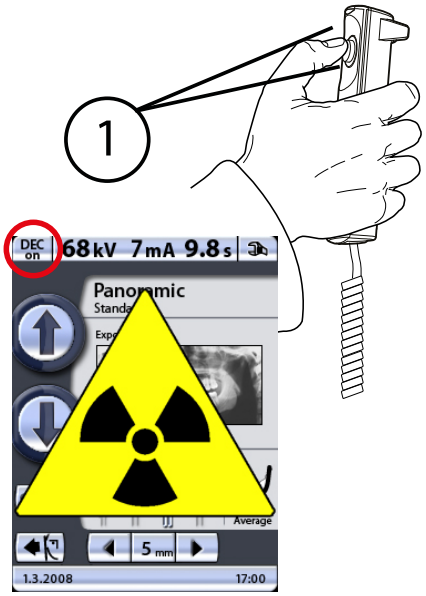
NOTE

If exposures are taken in rapid succession the X-ray tube will overheat and a cooling time will be shown on the display (e.g. Cooling: 21 s). The cooling time indicates the delay before the next exposure can be taken.

When you have taken the exposure the image will be shown on the computer screen. Note that you must accept the image in the Romexis program - only accepted images will be stored in the database. Refer to the Romexis User's Manual for further information.

10.2.1 Taking an exposure with DEC

1. Touch the **DEC** button to switch Dynamic Exposure Control (DEC) on.



1 Amber exposure indicator light

If the optional DEC (Dynamic Exposure Control) function is switched on, the exposure will be taken in two stages and the C-arm will move twice. The exposure values (kV and mA) will be adjusted during the first (short) exposure. The second exposure will produce the actual image and the C-arm will now move through one complete exposure cycle.

2. Press and hold down the exposure button for the duration of both exposures.

NOTE

Do not release the exposure button before the end of the second exposure.

10.2.2 Taking an exposure with Autofocus (AF)

NOTE

The layer light is switched off when Autofocus is selected.

NOTE

Always switch Autofocus on before starting the imaging process in the Romexis program.

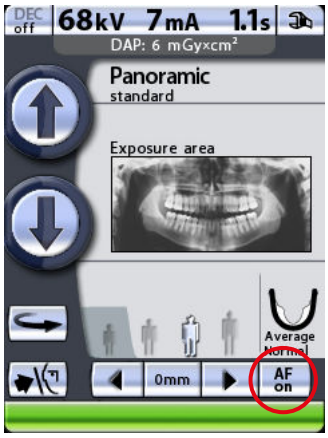
NOTE

Images taken with Autofocus cannot be saved on a USB memory stick.

NOTE

We recommend that you use the bite piece when taking exposures with Autofocus.

1. Touch the AF button to switch Autofocus (AF) on.



Autofocus adjusts the layer position automatically. The function positions the image layer individually for each patient based on the position and angle of the apices of the upper central incisors.

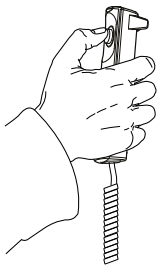
The exposure will be taken in two stages and the C-arm will move twice.

2. Position the patient.

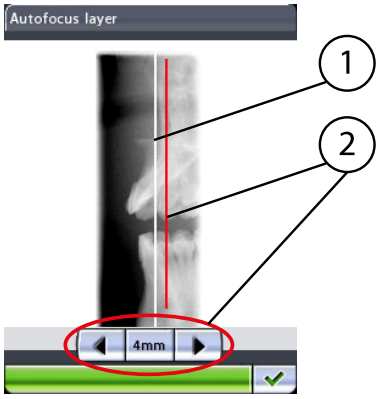
Position the patient as described in section "Patient positioning" on page 49.

3. Take the first exposure.

Take the first exposure (scout image) as described in section "Taking an exposure" on page 53.



The first exposure is a short, low-dose exposure during which the optimal position for the image layer is calculated.



1 Calculated position

2 Manually adjusteed layer

The image will appear on the control panel and computer screen.

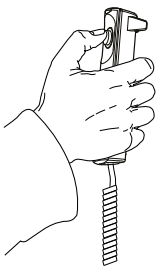
The calculated layer position is shown with a white line on the image. If necessary, you can adjust the layer position by touching the arrow buttons on the control panel display. The new position will be shown with

a red line. The selected layer position will be shown at the bottom of the display (e.g. 4 mm).

NOTE

Make sure the patient does not move between exposures.

4. Press the exposure button again to take the second exposure (final image).



The second exposure will produce the actual image and the C-arm will now move through one complete exposure cycle.

11 Temporomandibular joint exposure

11.1 Double TMJ exposure (lateral, PA or lateral-PA)

This procedure will produce open and closed views of the left and right temporomandibular joints.

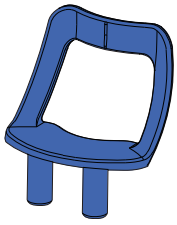
Note that this is a double exposure and the C-arm will travel through two exposure cycles.

NOTE

You can set the X-ray unit so that the imaging position is automatically moved forward for the open view in lateral and PA double exposures. Refer to section "Program presets (P2200)" on page 93 for more information.

NOTE

For lateral-PA double exposures the imaging angle is automatically changed between exposures.



Use the chin support for this exposure. Insert the chin support into the adapter on the patient support table.

Ask the patient to remove any spectacles, hearing aids, dentures, hairpins, and personal jewellery such as earrings, necklaces and piercings as these can produce shadows or reflections in the image. The patient should also remove any loose items of clothing (e.g. scarf, tie) that might get caught in the unit's arm structures.

Place a protective lead apron over the patient's back if required.

11.1.1 First exposure - jaw closed

1. Select the double TMJ exposure program you require.

   Refer to section "Selecting temporomandibular joint (TMJ) exposure program" on page 22. Select the patient size as described in section "Selecting patient size" on page 38.

2. Select the image position parameters (target position, imaging angle, symmetric/asymmetric setting and left/right side exposure).

   Refer to section "Selecting imaging position for temporomandibular joint (TMJ) exposures" on page 25.

   The exposure values will automatically change according to the selected patient size. The preset exposure values are shown in the following table. The preset exposure values are average values and they are only meant to guide the user. If needed, you can change the preset values as described in section "Selecting kilovolt and milliampere values" on page 38.

   NOTE

   Always try to minimize the radiation dose to the patient.

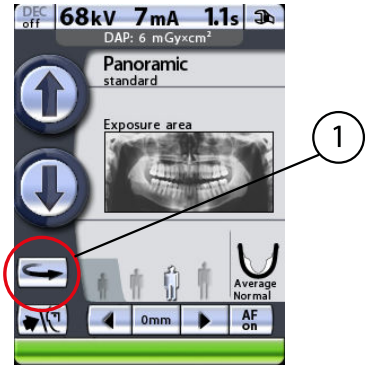
Exposure values for double TMJ programs

Patien	kV value	mA value
Child	64	7
Small adult	66	7

Exposure values for double TMJ programs

Patien	kV value	mA value
Average-sized adult	68	7
Large adult	70	7

3. Touch the C-arm return button to move the C-arm to the patient entry position if it is not already there.



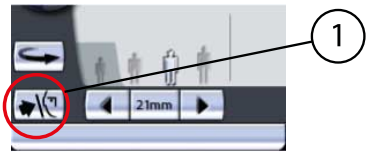
1 C-arm return button

Alternatively, you can touch either of the target position arrows to move the C-arm to the patient entry position.

NOTE

You can set the X-ray unit so that the C-arm will automatically return to the patient entry position at the end of an exposure cycle. Refer to section "Functions after exposure (P2300)" on page 94 for more information.

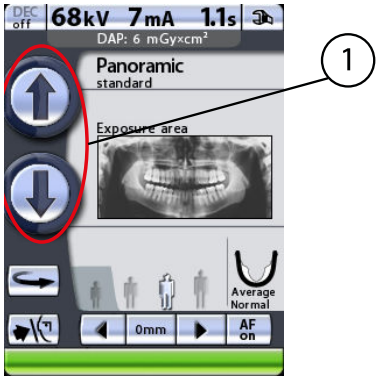
4. Touch the temple support button to open the temple supports if they are not already open.



1 Temple support button

Guide the patient to the unit so that they are facing the chin support. Explain to the patient that you will take a double exposure and that the unit will rotate twice.

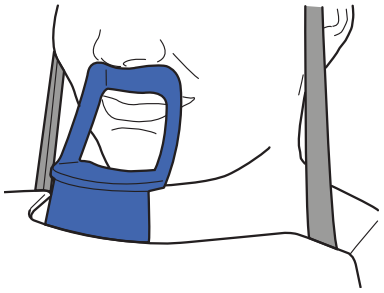
5. To adjust the height of the unit, press either of the height adjusting buttons on the display until the opening in the chin support is approximately level with the patient's mouth.



1 Height adjust buttons

The X-ray unit moves slowly at first, then faster.

6. Ask the patient to step forward, grasp the patient handles and press their lips against the chin support.



The patient's nose must rest on top of the support and their mouth must be closed, their teeth together.

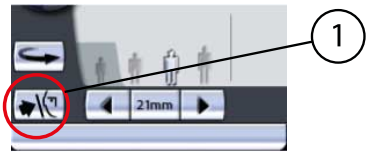
NOTE

Patients are not allowed to hang on the patient handles. The pull-down force applied to the patient handles may not exceed 15 kg (33 lb).

NOTE

We recommend that you image patients with poor health in a sitting position.

7. Close the temple supports by touching the temple support button.

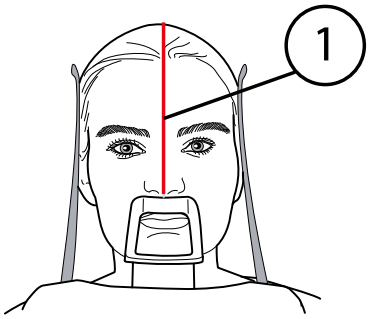


1 Temple support button

Stand behind the patient and check that the patient's shoulders are level and the neck muscles relaxed.

The three patient positioning lights will automatically switch on when you select the exposure program. They will switch off after four minutes. If the lights go out before you have positioned the patient, you can touch either of the target position arrows to switch the lights back on.

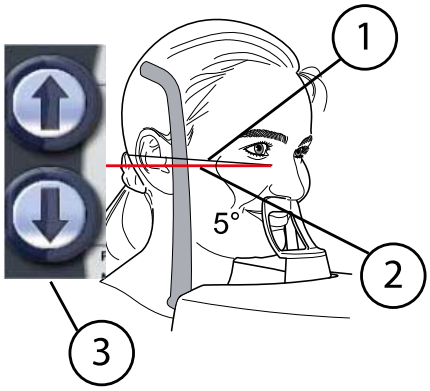
8. Position the patient's head so that the midsagittal plane coincides with the midsagittal plane light beam.



1 Midsagittal plane light

Make sure that the patient is looking straight ahead as the light may appear to be correctly positioned but the patient's head could be turned slightly to one side.

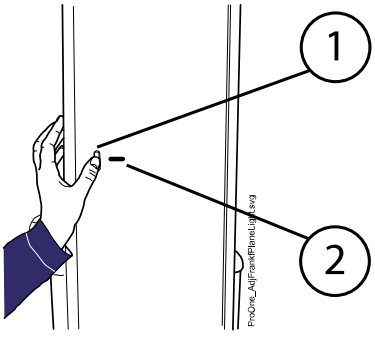
9. Position the patient's head so that the Frankfort plane is tilted down five degrees.



1 Franfort plane
2 Franfort plane light
3 Height adjusting buttons

To do this support the back of the patient's head with your hand and, using the Frankfort plane light as a reference line, adjust the position of the patient's head by raising or lowering the unit with the height adjusting buttons. Make sure the patient's back is straight.

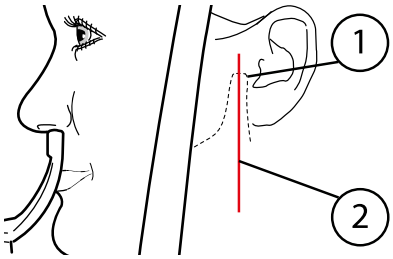
Note that the Frankfort plane light, located on the side of the column, can be moved up or down to accommodate different head sizes. This is done by moving the adjusting lever that is located next to the light slot.



1 Adjusting lever
2 Frankfort plane light slot

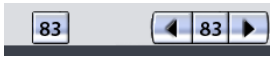
10. To fine-adjust the position of the layer light manually, touch and hold either of the target position arrows until the layer light is positioned at the patient's temporomandibular joint.

    The layer light will be automatically positioned at the back, in the area of the patient's temporomandibular joint.



1 Temporomandibular joint

2 Layer light



The arrow pointing to the left moves the C-arm forward and the arrow pointing to the right moves the C-arm backward. The number in the target position field indicates the position of the layer light and serves as a reference for later retakes. The target position on the other jaw side will change accordingly if the icon for symmetric/asymmetric setting on the display shows an undivided jaw (one line in the middle).

The imaging angle can be adjusted for lateral TMJ exposures as described in section "Selecting imaging position for temporomandibular joint (TMJ) exposures" on page 25.

Check that the Frankfort plane light and the midsagittal plane light are still correctly positioned. Reposition them if necessary.

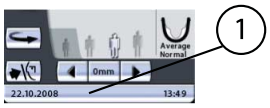
NOTE

Make sure that you have selected the right patient and the panoramic exposure mode in the Romexis program before you take an exposure. Refer to the Romexis User's Manual.

NOTE

Images can be saved on a USB memory stick instead of the computer. Refer to section "Imaging without PC (P2600)" on page 101 for more information.

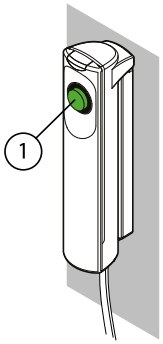
The status bar at the bottom of the display will turn green when the unit is ready to take an exposure.



1 Status bar

- Green = Ready for exposure
- Grey = Not ready for exposure

On the exposure button a green indicator light will come on. The Romexis program will show the **Waiting for Exposure** message on the computer screen.



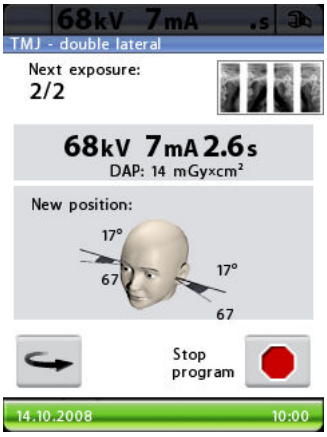
1 Green ready indicator light

11. Ask the patient to stand as still as possible.
12. Move to a protected area.
13. Press and hold down the exposure button for the duration of the exposure.

The C-arm will move through one complete exposure cycle and then automatically return to the ready position. The temple supports will remain closed and hold the patient in position for the second exposure. During the exposure cycle the radiation warning light on the exposure switch and on the display will come on and you will hear a radiation warning tone.

NOTE

Maintain audio and visual contact with the patient and unit during exposure. If the C-arm stops moving during exposure, or moves in an erratic way, release the exposure button immediately.



Between exposures a display is shown where you can change the exposure values (kV and mA) and view the imaging position for the second exposure.

To change the exposure values, touch the exposure value field in the middle of the display and select new values on the display that appears.

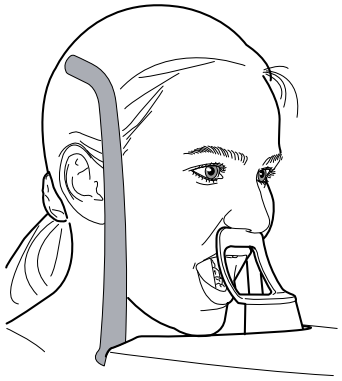
The X-ray image in the top right corner of the display shows in which order the images will appear on the radiograph. The active exposure is shown in full colour. The number in the top left corner (2/2) indicates the number of the active exposure.

You can move the C-arm to the starting position, if it is not already there, by touching the C-arm return button in the bottom left corner.

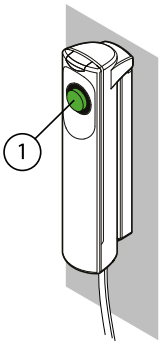
If necessary, you can stop the exposure procedure by touching the stop button in the bottom right corner.

11.1.2 Second exposure - jaw open

1. Ask the patient to open their mouth as far as possible. Make sure that the patient's upper lip is still touching the chin support.

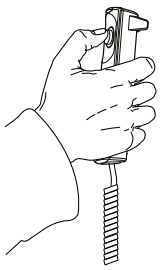


On the exposure button a green indicator light will come on. The Romexis program will show the **Waiting for Exposure** message on the computer screen.



1 Green ready indicator light

2. Ask the patient to stand as still as possible.
3. Move to a protected area.
4. Press and hold down the exposure button for the duration of the second exposure.



During the exposure cycle the radiation warning light on the exposure switch and on the display will come on and you will hear a radiation warning tone. When the C-arm has completed the second exposure cycle the temple supports will automatically open. You can now guide the patient from the unit.

NOTE

Maintain audio and visual contact with the patient and unit during exposure. If the C-arm stops moving during exposure, or moves in an erratic way, release the exposure button immediately.

NOTE

If exposures are taken in rapid succession the X-ray tube will overheat and a cooling time will be shown on the display (e.g. Cooling: 21 s). The cooling time indicates the delay before the next exposure can be taken.

When you have taken the exposure the image will be shown on the computer screen. Note that you must accept the image in the Romexis

program - only accepted images will be stored in the database. Refer to the Romexis User's Manual for further information.

11.2 Multi-angle TMJ exposure (3 angles lateral)

This procedure will produce three lateral exposures with different angles from the patient's left or right temporomandibular joint.

Note that the C-arm will move three times during the exposure cycle.

Use the chin support for this exposure. Insert the chin support into the adapter on the patient support table.

Ask the patient to remove any spectacles, hearing aids, dentures, hairpins, and personal jewellery such as earrings, necklaces and piercings as these can produce shadows or reflections in the image. The patient should also remove any loose items of clothing (e.g. scarf, tie) that might get caught in the unit's arm structures.

Place a protective lead apron over the patient's back if required.

Select the TMJ exposure program "3 angles lateral" as described in section "Selecting temporomandibular joint (TMJ) exposure program" on page 22. Select the patient size as described in section "Selecting patient size" on page 38.

Select the image position parameters (target position, imaging angle and left/right side exposure) as described in section "Selecting imaging position for temporomandibular joint (TMJ) exposures" on page 25.

The exposure values will automatically change according to the selected patient size. The preset exposure values are shown in the following table. The preset exposure values are average values and they are only meant to guide the user. If needed, you can change the preset values as described in section "Selecting kilovolt and milliampere values" on page 38.

NOTE

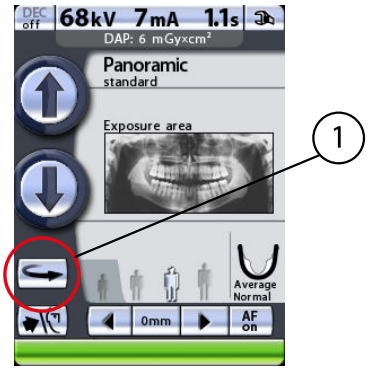
Always try to minimize the radiation dose to the patient.

Exposure values for multi-angle TMJ programs

Patien	kV value	mA value
Child	64	7
Small adult	66	7
Average-sized adult	68	7
Large adult	70	7

11.2.1 Patient positioning

1. Touch the C-arm return button to move the C-arm to the patient entry position if it is not already there.



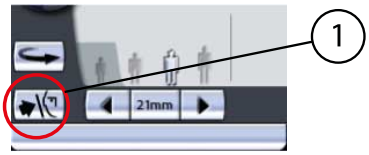
1 C-arm return button
2 Target position arrows

Alternatively, you can touch either of the target position arrows to move the C-arm to the patient entry position.

NOTE

You can set the X-ray unit so that the C-arm will automatically return to the patient entry position at the end of an exposure cycle. Refer to section "Functions after exposure (P2300)" on page 94 for more information.

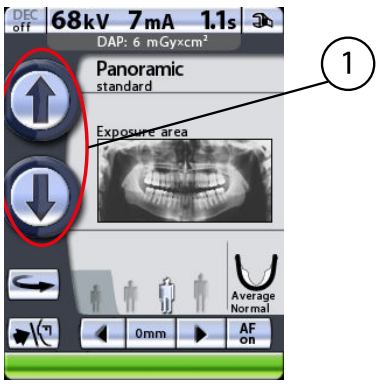
2. Touch the temple support button to open the temple supports if they are not already open.



1 Temple support button

Guide the patient to the unit so that they are facing the chin support. Explain to the patient that you will take a multi-angle exposure and that the C-arm will move three times during the exposure cycle.

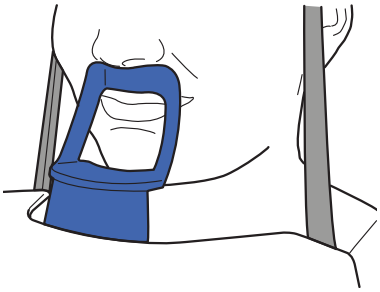
3. To adjust the height of the unit, press either of the height adjusting buttons on the display until the opening in the chin support is approximately level with the patient's mouth.



1 Height adjust buttons

The X-ray unit moves slowly at first, then faster.

4. Ask the patient to step forward, grasp the patient handles and press their lips against the chin support.



The patient's nose must rest on top of the support and their mouth must be closed, their teeth together.

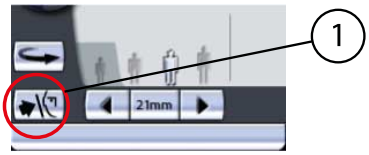
NOTE

Patients are not allowed to hang on the patient handles. The pull-down force applied to the patient handles may not exceed 15 kg (33 lb).

NOTE

We recommend that you image patients with poor health in a sitting position.

5. Close the temple supports by touching the temple support button.

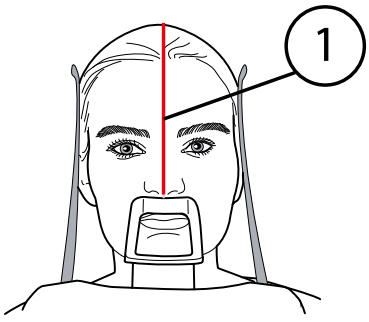


1 Temple support button

Stand behind the patient and check that the patient's shoulders are level and the neck muscles relaxed.

The three patient positioning lights will automatically switch on when you select the exposure program. They will switch off after four minutes. If the lights go out before you have positioned the patient, you can touch either of the target position arrows to switch the lights back on.

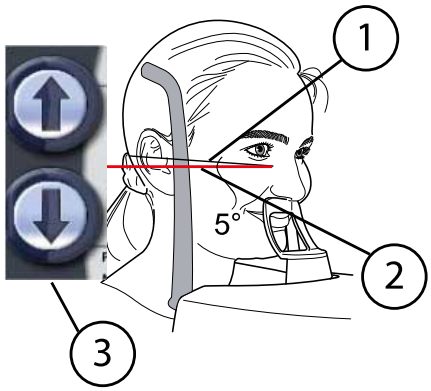
6. Position the patient's head so that the midsagittal plane coincides with the midsagittal plane light beam.



1 Midsagittal plane light

Make sure that the patient is looking straight ahead as the light may appear to be correctly positioned but the patient's head could be turned slightly to one side.

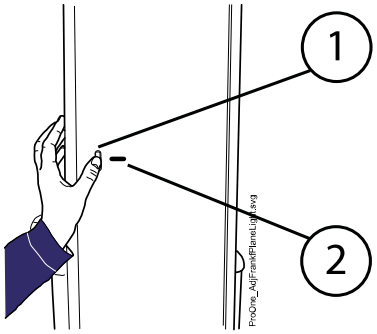
7. Position the patient's head so that the Frankfort plane is tilted down five degrees.



1 Franfort plane
2 Franfort plane light
3 Height adjusting buttons

To do this support the back of the patient's head with your hand and, using the Frankfort plane light as a reference line, adjust the position of the patient's head by raising or lowering the unit with the height adjusting buttons. Make sure the patient's back is straight.

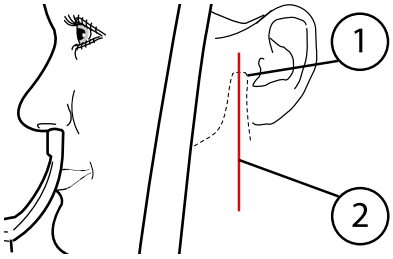
Note that the Frankfort plane light, located on the side of the column, can be moved up or down to accommodate different head sizes. This is done by moving the adjusting lever that is located next to the light slot.



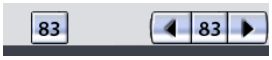
1 Adjusting lever
2 Frankfort plane light slot

8. To fine-adjust the position of the layer light manually, touch and hold either of the target position arrows until the layer light is positioned at the patient's temporomandibular joint.

The layer light will be automatically positioned at the back, in the area of the patient's temporomandibular joint.



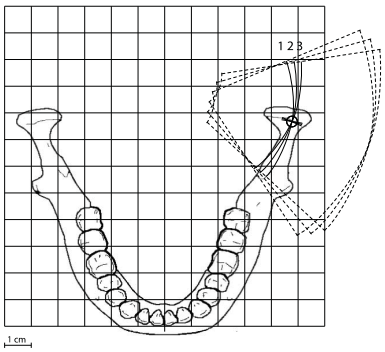
1 Temporomandibular joint
2 Layer light



The arrow pointing to the left moves the C-arm forward and the arrow pointing to the right moves the C-arm backward. The number in the target position field indicates the position of the layer light and serves as a reference for later retakes.

NOTE

The layer light is always positioned on the patient's left side, even when taking multi-angle exposures of the patient's right temporomandibular joint.



3 angles lateral, left:

- 1 st exposure = selected angle -7°
- 2 nd exposure = angle selected by user (factory default 17°)
- 3 rd exposure = selected angle +7°

The imaging angle can be adjusted as described in section "Selecting imaging position for temporomandibular joint (TMJ) exposures" on page 25.

The imaging angle for the first exposure is the selected angle minus seven degrees, and the imaging angle for the third exposure is the selected angle plus seven degrees. The imaging angle will be automatically changed between exposures.

9. Check that the Frankfort plane light and the midsagittal plane light are still correctly positioned.

   Reposition them if necessary.

11.2.2 Taking an exposure

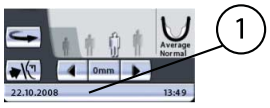
NOTE

Make sure that you have selected the right patient and the panoramic exposure mode in the Romexis program before you take an exposure. Refer to the Romexis User's Manual.

NOTE

Images can be saved on a USB memory stick instead of the computer. Refer to section "Imaging without PC (P2600)" on page 101 for more information.

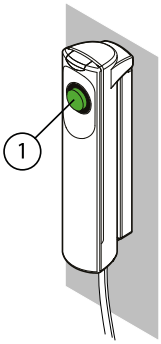
The status bar at the bottom of the display will turn green when the unit is ready to take an exposure.



1 Status bar

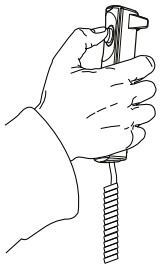
- Green = Ready for exposure
- Grey = Not ready for exposure

On the exposure button a green indicator light will come on. The Romexis program will show the **Waiting for Exposure** message on the computer screen.



1 Green ready indicator light

1. Ask the patient to stand as still as possible.
2. Move to a protected area.
3. Press and hold down the exposure button for the duration of the exposure.



The C-arm will move three times during the exposure cycle. The radiation warning light on the exposure switch and on the display will come on and you will hear a radiation warning tone. When the C-arm has completed the third exposure cycle the temple supports will automatically open. You can now guide the patient from the unit.

NOTE

Maintain audio and visual contact with the patient and unit during exposure. If the C-arm stops moving during exposure, or moves in an erratic way, release the exposure button immediately.

NOTE

If exposures are taken in rapid succession the X-ray tube will overheat and a cooling time will be shown on the display (e.g. Cooling: 21 s). The cooling time indicates the delay before the next exposure can be taken.

When you have taken the exposure the image will be shown on the computer screen. Note that you must accept the image in the Romexis program - only accepted images will be stored in the database. Refer to the Romexis User's Manual for further information.

12 Sinus exposure

This procedure will produce an exposure of the maxillary sinus along the selected plane.

Use the chin support for this exposure. Insert the chin support into the adapter on the patient support table.

Ask the patient to remove any spectacles, hearing aids, dentures, hairpins, and personal jewellery such as earrings, necklaces and piercings as these can produce shadows or reflections in the image. The patient should also remove any loose items of clothing (e.g. scarf, tie) that might get caught in the unit's arm structures.

Place a protective lead apron over the patient's back if required.

Select the sinus program you require, refer to section "Selecting sinus exposure program" on page 28. Select the patient size as described in section "Selecting patient size" on page 38.

Select the imaging position or side as described in section "Selecting imaging position for sinus exposures" on page 30.

The exposure values will automatically change according to the selected patient size. The preset exposure values are shown in the following table. The preset exposure values are average values and they are only meant to guide the user. If needed, you can change the preset values as described in section "Selecting kilovolt and milliampere values" on page 38.

NOTE

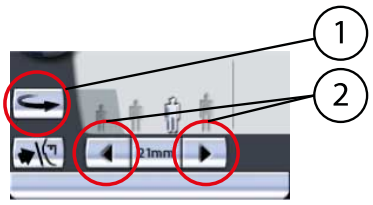
Always try to minimize the radiation dose to the patient.

Exposure values for sinus programs

Patient size	kV value	mA value
Child	64	7
Small adult	66	7
Average-sized adult	68	7
Large adult	70	7

12.1 Patient positioning

1. Touch the C-arm return button to move the C-arm to the patient entry position if it is not already there.



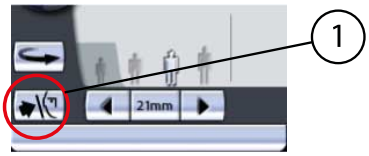
1 C-arm return button
2 Target position arrows

Alternatively, you can touch either of the target position arrows to move the C-arm to the patient entry position.

NOTE

You can set the X-ray unit so that the C-arm will automatically return to the patient entry position at the end of an exposure cycle. Refer to section "Functions after exposure (P2300)" on page 94 for more information.

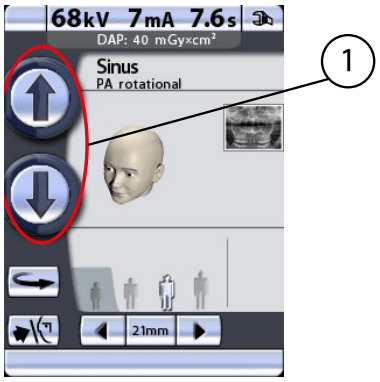
2. Touch the temple support button to open the temple supports if they are not already open.



1 Temple support button

Guide the patient to the unit so that they are facing the chin support.

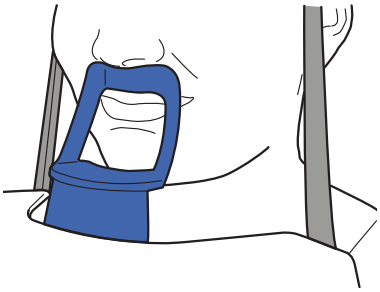
3. To adjust the height of the unit, press either of the height adjusting buttons on the display until the opening in the chin support is approximately level with the patient's mouth.



1 Height adjust buttons

The unit moves slowly at first, then faster.

4. Ask the patient to step forward, grasp the patient handles and press their lips against the chin support.



The patient's nose must rest on top of the support and their mouth must be closed, their teeth together.

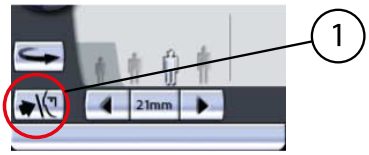
NOTE

Patients are not allowed to hang on the patient handles. The pull-down force applied to the patient handles may not exceed 15 kg (33 lb).

NOTE

We recommend that you image patients with poor health in a sitting position.

5. Close the temple supports by touching the temple support button.

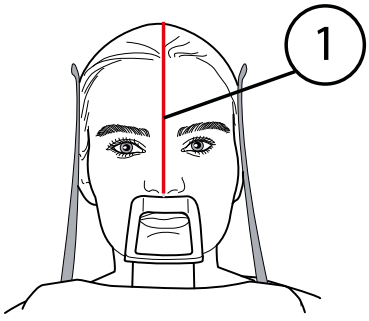


1 Temple support button

Stand behind the patient and check that the patient's shoulders are level and the neck muscles relaxed.

The three patient positioning lights will automatically switch on when you select the exposure program. They will switch off after four minutes. If the lights go out before you have positioned the patient, you can touch either of the target position arrows to switch the lights back on.

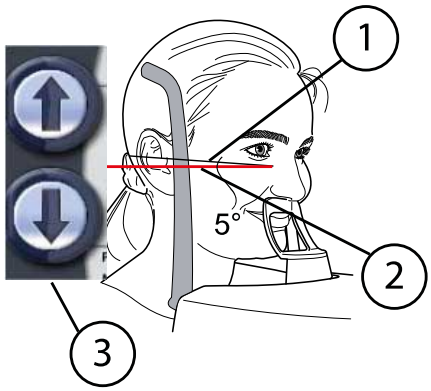
6. Position the patient's head so that the midsagittal plane coincides with the midsagittal plane light beam.



1 Midsagittal plane light

Make sure that the patient is looking straight ahead as the light may appear to be correctly positioned but the patient's head could be turned slightly to one side.

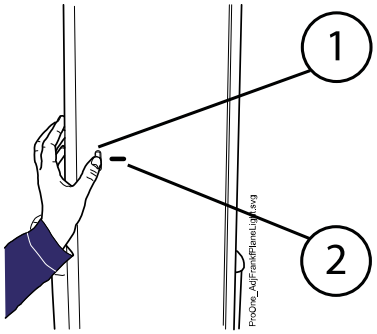
7. Position the patient’s head so that the Frankfort plane is tilted down five degrees.



1 Franfort plane
2 Franfort plane light
3 Height adjusting buttons

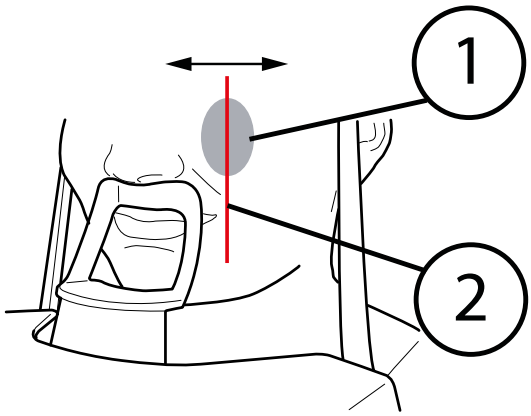
To do this support the back of the patient’s head with your hand and, using the Frankfort plane light as a reference line, adjust the position of the patient’s head by raising or lowering the unit with the height adjusting buttons. Make sure the patient’s back is straight.

Note that the Frankfort plane light, located on the side of the column, can be moved up or down to accommodate different head sizes. This is done by moving the adjusting lever that is located next to the light slot.



1 Adjusting lever
2 Frankfort plane light slot

8. To fine adjust the position of the layer light manually, touch and hold either of the target position arrows until the layer light is in the correct position for the exposure you wish to take.



1 Sinus area
2 Layer ligth

The layer light will be automatically positioned in the region of the maxillary sinus.

For posteroanterior exposures you can fine-adjust the position of the layer light manually. To do this, touch and hold either of the target position arrows until the layer light is in the correct position for the exposure you wish to take.

The arrow pointing to the left moves the C-arm forward and the arrow pointing to the right moves the C-arm backward. The number in the target position field indicates the position of the layer light and serves as a reference for later retakes.

NOTE

The layer light is always positioned on the patient's left side, even when taking exposures of the patient's right maxillary sinus.

NOTE

The layer light position cannot be adjusted for lateral or midsagittal exposures.

9. Check that the Frankfort plane light and the midsagittal plane light are still correctly positioned. Reposition them if necessary.

12.2 Taking an exposure

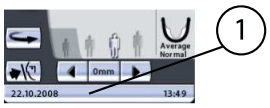
NOTE

Make sure that you have selected the right patient and the panoramic exposure mode in the Romexis program before you take an exposure. Refer to the Romexis User's Manual.

NOTE

Images can be saved on a USB memory stick instead of the computer. Refer to section "Imaging without PC (P2600)" on page 101 for more information.

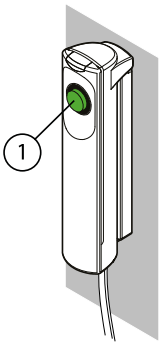
The status bar at the bottom of the display will turn green when the unit is ready to take an exposure.



1 Status bar

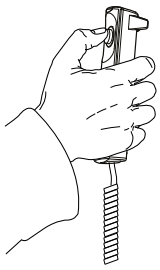
- Green = Ready for exposure
- Grey = Not ready for exposure

On the exposure button a green indicator light will come on. The Romexis program will show the **Waiting for Exposure** message on the computer screen.



1 Green ready indicator light

1. Ask the patient to stand as still as possible.
2. Move to a protected area.
3. Press and hold down the exposure button for the duration of the exposure.



The C-arm will move three times during the exposure cycle. The radiation warning light on the exposure switch and on the display will come on and you will hear a radiation warning tone. When the C-arm has completed the third exposure cycle the temple supports will automatically open. You can now guide the patient from the unit.

NOTE

Maintain audio and visual contact with the patient and unit during exposure. If the C-arm stops moving during exposure, or moves in an erratic way, release the exposure button immediately.

NOTE

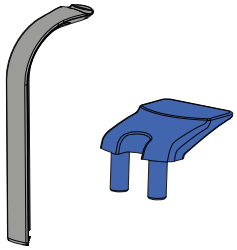
If exposures are taken in rapid succession the X-ray tube will overheat and a cooling time will be shown on the display (e.g. Cooling: 21 s). The cooling time indicates the delay before the next exposure can be taken.

When you have taken the exposure the image will be shown on the computer screen. Note that you must accept the image in the Romexis program - only accepted images will be stored in the database. Refer to the Romexis User's Manual for further information.

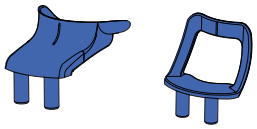
13 Cross-sectional exposure (optional)

This procedure will produce cross-sectional images on the left or right side of the upper or lower jaw.

Use a bite piece for cross-sectional exposures. Insert the chin rest and a bite piece into the adapter on the patient support table.



For edentulous patients or for patients who are unable to use the bite piece you can use the chin cup or the chin support. You may have to place a roll of gauze or cotton between the patient's jaws to raise the upper ridge to the correct position.



Ask the patient to remove any spectacles, hearing aids, dentures, hairpins, and personal jewellery such as earrings, necklaces and piercings as these can produce shadows or reflections in the image. The patient should also remove any loose items of clothing (e.g. scarf, tie) that might get caught in the unit's arm structures.

Place a protective lead apron over the patient's back if required.

Select the cross-sectional program you require, refer to section "Selecting cross-sectional exposure program (optional)" on page 31. Select the patient size as described in section "Selecting patient size" on page 38.

Select the image position parameters (jaw half, jaw side, tooth number/TMJ, collimation, and movement step in the automatic program) as described in section "Selecting imaging position for cross-sectional exposures" on page 34.

The exposure values will automatically change according to the selected patient size. The preset exposure values are shown in the following table. The preset exposure values are average values and they are only meant to guide the user. If needed, you can change the preset values as described in section "Selecting kilovolt and milliampere values" on page 38.

NOTE

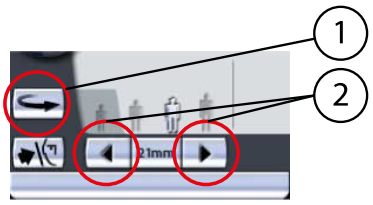
Always try to minimize the radiation dose to the patient.

Exposure values for cross-sectional programs

Patient size	kV value	mA value
Child	64	7
Small adult	66	7
Average-sized adult	68	7
Large adult	70	7

13.1 Patient positioning

1. Touch the C-arm return button to move the C-arm to the patient entry position if it is not already there.



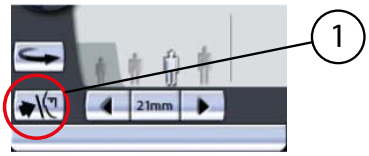
1 C-arm return button
2 Target position arrows

Alternatively, you can touch either of the target position arrows to move the C-arm to the patient entry position.

NOTE

You can set the X-ray unit so that the C-arm will automatically return to the patient entry position at the end of an exposure cycle. Refer to section "Functions after exposure (P2300)" on page 94 for more information.

2. Touch the temple support button to open the temple supports if they are not already open.

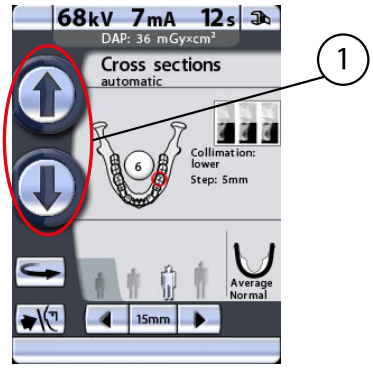


1 Temple support button

Guide the patient to the unit so that they are facing the chin rest.

3. To adjust the height of the unit, press either of the height adjusting buttons on the display until the chin rest is at the level of the patient's chin.

Stretch and straighten the patient's neck.

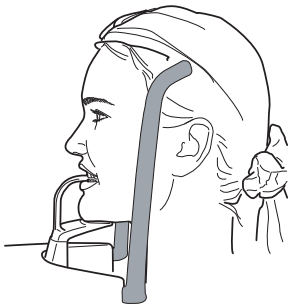


1 Height adjust buttons

The unit moves slowly at first, then faster.

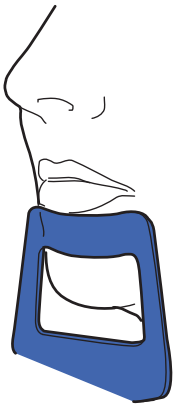
4. Ask the patient to step forward, grasp the patient handles, stretch up and bite the bite piece.

The incisal edges of the maxillary and mandibular teeth must be in the groove in the bite piece.



NOTE

Patients are not allowed to hang on the patient handles. The pull-down force applied to the patient handles may not exceed 15 kg (33 lb).



NOTE

We recommend that you image patients with poor health in a sitting position.

NOTE

If you are using the chin support, position the patient so that the chin, just below the lower lip, touches the top bar.

NOTE

If you are using the chin support or chin cup, use for example a cotton roll to ensure that the patient's upper and lower incisors do not overlap.

5. Close the temple supports by touching the temple support button.

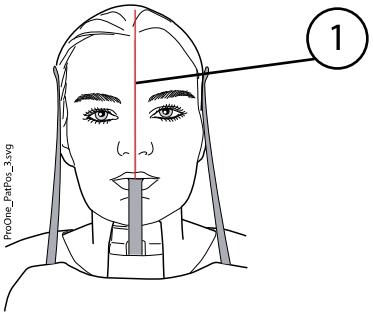
1 Temple support button

The three patient positioning lights will automatically switch on when you select the exposure program. They will switch off after four minutes. If the lights go out before you have positioned the patient, you can touch either of the target position arrows to switch the lights back on.

Stand behind the patient and make sure that the patient's shoulders are level and the neck muscles relaxed.

6. Position the patient's head so that the midsagittal plane coincides with the midsagittal plane light beam.

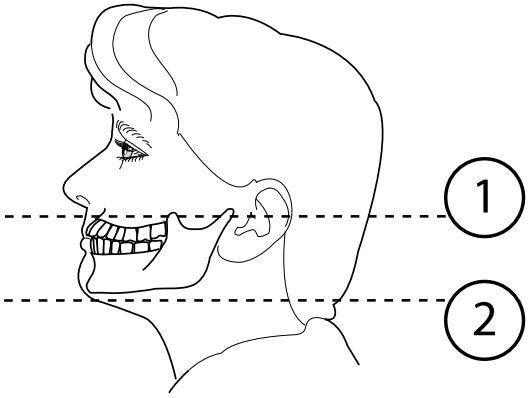
   Make sure that the patient is looking straight ahead as the light may appear to be correctly positioned but the patient's head could be turned slightly to one side.



   1 Midsagittal plane light

7. To take exposures of the upper jaw, position the maxillary alveolar ridge so that it is horizontal. To take exposures of the lower jaw, position the lower edge of the mandible so that it is horizontal.

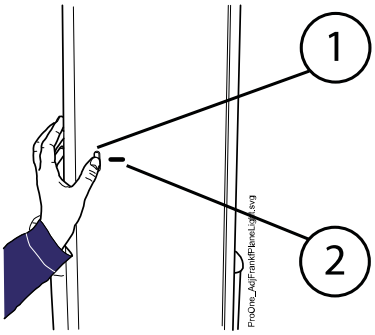
   To do this support the back of the patient's head with your hand and then adjust the tilt of the patient's head by raising or lowering the unit with the height adjusting buttons. The patient's back should be straight. If necessary, stretch and straighten the patient's neck by moving the unit up slightly.



   1 Target in upper jaw

   2 Target in lower jaw

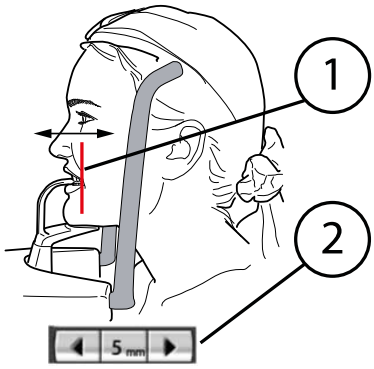
Note that the Frankfort plane light, located on the side of the column, can be moved up or down to accommodate different head sizes. This is done by moving the adjusting lever that is located next to the light slot.



1 Adjusting lever

2 Frankfort plane light slot

8. The layer light will be automatically positioned at the selected target position. To fine-adjust the position of the layer light manually, touch and hold either of the target position arrows until the layer light is positioned at the tooth (or TMJ) that you wish to expose.



1 Layer light

2 Target pos. arrows

The arrow pointing to the left moves the C-arm forward and the arrow pointing to the right moves the C-arm backward. The number in the target position field indicates the position of the layer light and serves as a reference for later retakes.

NOTE

The layer light is always positioned on the patient's left side, even when the target position is on the other jaw side.

9. Check that the midsagittal plane light is still correctly positioned. Reposition it if necessary.

13.2 Taking an exposure

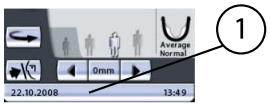
NOTE

Make sure that you have selected the right patient and the panoramic exposure mode in the Romexis program before you take an exposure. Refer to the Romexis User's Manual.

NOTE

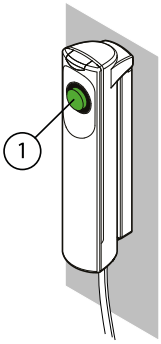
Images can be saved on a USB memory stick instead of the computer. Refer to section "Imaging without PC (P2600)" on page 101 for more information.

The status bar at the bottom of the display will turn green when the unit is ready to take an exposure.



1 Status bar

- Green = Ready for exposure
- Grey = Not ready for exposure

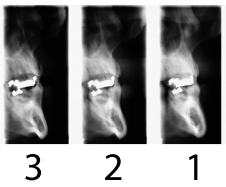


On the exposure button a green indicator light will come on. The Romexis program will show the **Waiting for Exposure** message on the computer screen.

1 Green ready indicator light

13.2.1 Manual exposure

In the manual exposure program you can take 1-3 exposures in one image.

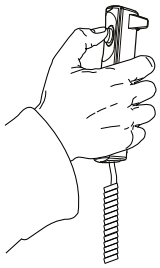


Between exposures you can manually:

- change the exposure values (kV and mA)
- change the target position
- change the position of the patient.

1. Ask the patient to close their lips on the bite piece, swallow, and remain as still as possible.

   Tell the patient how many exposures you will take so that they do not move before the end of the exposure cycle.
2. Move to a protected area.
3. Press and hold down the exposure button for the duration of the exposure.



The C-arm will move through one complete exposure cycle. During the exposure cycle the radiation warning light on the exposure switch and on the display will come on and you will hear a radiation warning tone. The C-arm will then stop and wait for you to take the next exposure.

NOTE

Maintain audio and visual contact with the patient and unit during exposure. If the C-arm stops moving during exposure, or moves in an erratic way, release the exposure button immediately.

Between exposures a display is shown where you can change the exposure values (kV and mA) and move the target position.

To change the exposure values, touch the exposure value field in the middle of the display and select new values on the display that appears.

To move the target position, touch and hold either of the target position arrows until the layer light is positioned at the tooth (or TMJ) that you wish to expose.

The X-ray image in the top right corner shows in which order the images will appear on the radiograph. The active exposure is shown in full colour. The number in the top left corner (2/3 or 3/3) indicates the number of the active exposure.

4. Take the next exposure in the same way as described above.

   You can move the C-arm to the starting position, if it is not already there, by touching the C-arm return button in the bottom left corner.

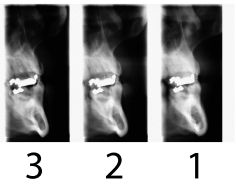
   If you take only one or two exposures you will have to stop the exposure procedure by touching the stop button in the bottom right corner. When you have taken the number of exposures that you require the temple supports will automatically open and you can guide the patient from the unit.

NOTE

If exposures are taken in rapid succession the X-ray tube will overheat and a cooling time will be shown on the display (e.g. Cooling: 21 s). The cooling time indicates the delay before the next exposure can be taken.

The image will be shown on the computer screen. Note that you must accept the image in the Romexis program - only accepted images will be stored in the database. Refer to the Romexis User's Manual for further information.

13.2.2 Automatic exposure



In the automatic exposure program you will get three exposures in one image.

1. Ask the patient to close their lips on the bite piece, swallow, and remain as still as possible.

   Tell the patient how many exposures you will take so that they do not move before the end of the exposure cycle.

2. Move to a protected area.
3. Press and hold down the exposure button for the duration of the exposure.

The C-arm will rotate backward and forward three times. During the exposure cycle the radiation warning light on the exposure switch and on the display will come on and you will hear a radiation warning tone.

NOTE

Maintain audio and visual contact with the patient and unit during exposure. If the C-arm stops moving during exposure, or moves in an erratic way, release the exposure button immediately.

At the end of the exposure cycle the temple supports will automatically open. You can now guide the patient from the unit.

NOTE

If exposures are taken in rapid succession the X-ray tube will overheat and a cooling time will be shown on the display (e.g. Cooling: 21 s). The cooling time indicates the delay before the next exposure can be taken.

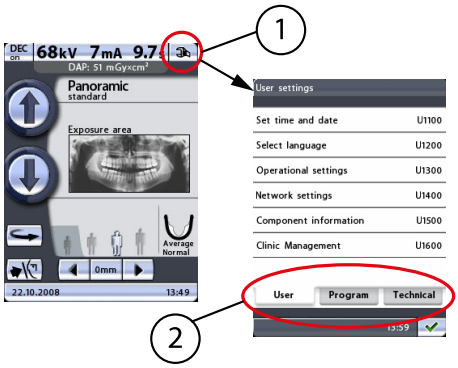
The image will be shown on the computer screen. Note that you must accept the image in the Romexis program - only accepted images will be stored in the database. Refer to the Romexis User’s Manual for further information.

14 Settings

CAUTION

Some of the settings can be used to alter the operation of the X-ray unit. Never use functions that you are not familiar with.

The Planmeca ProOne X-ray unit has a number of additional functions for special requirements. The additional functions can be entered by touching the **Service spanner** icon on the main display.



1 Service spanner

2 Functions tabs

The functions are divided into three groups: User settings (**User** tab), Program settings (**Program** tab) and Technical settings (**Technical** tab). The **User** and **Program** tabs can be entered without a password.

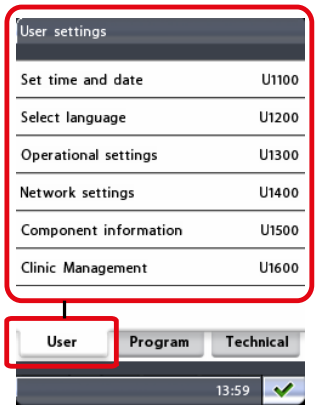
The information and functions behind the **Technical** tab are intended for service personnel only. Access to the these settings requires a password.

To return to the main display, touch the green check mark button in the bottom right corner of the display.

14.1 User settings

On the **User settings** display you can set time & date, select the language for the control panel displays and adjust or view operational and network settings. The component information needed for service and maintenance purposes is also available here.

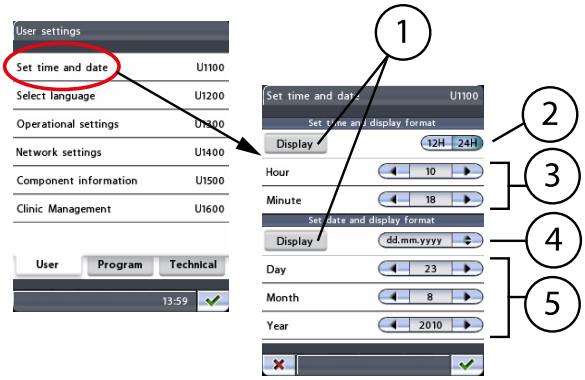
The available options are described in detail on the following pages.



Exit the **User settings** display by touching the green check mark button in the bottom right corner of the display.

14.1.1 Setting time and date (U1100)

To set the X-ray unit so that the current time and/or date will be shown at the bottom of the control panel display, first select the **Set time and date** (U1100) option on the **User settings** display. The **Set time and date** (U1100) display will appear.



1 Display time and/or date
2 Select time format
3 Set time
4 Select date format
5 Set date

- **Set time and display format**

  First touch the **Display** button to set the X-ray unit so that the current time will be shown at the bottom of the control panel display. The **Display** button will be highlighted.

  You can choose between 12 and 24 hour system for the time display. Touch the **12H** or **24H** button to select the format you wish to use. The selected format will be highlighted.

  Then set the time by touching the arrow buttons in the **Hour** and **Minute** fields.

- **Set date and display format**

  First touch the **Display** button to set the X-ray unit so that the current date will be shown at the bottom of the control panel display. The **Display** button will be highlighted.

  The date can be displayed in following formats: dd.mm.yyyy, mm.dd.yyyy or yyyy.mm.dd. When you touch the date format button a display will appear where you can select the format you wish to use.

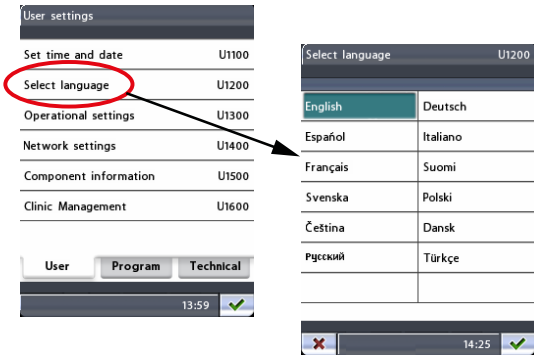
  Then set the date by touching the arrow buttons in the **Day**, **Month** and **Year** fields.

Accept the new date and time by touching the green check mark button in the bottom right corner of the display. To exit the display without saving the changes, touch the red cross button in the bottom left corner of the display.

14.1.2 Selecting language (U1200)

To change the language of the control panel displays, first select the option **Select language** (U1200) on the **User settings** display. The **Select language** (U1200) display will appear.

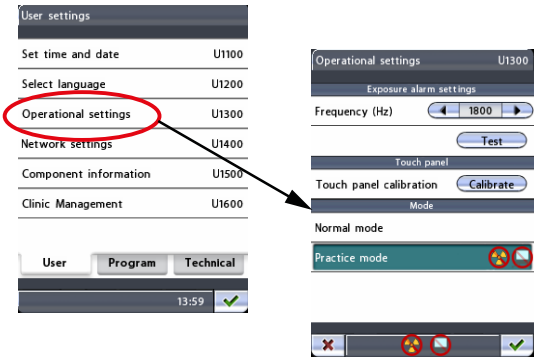
Select the language of your choice. The selected language will be shown highlighted.



Accept your selection by touching the green check mark button in the bottom right corner of the display. To exit the display without saving the changes, touch the red cross button in the bottom left corner of the display.

14.1.3 Operational settings (U1300)

To adjust the exposure warning signal, to calibrate the touch panel or to enter the practice mode, first select **Operational settings** (U1300) on the User settings display. The **Operational settings** (U1300) display will appear.



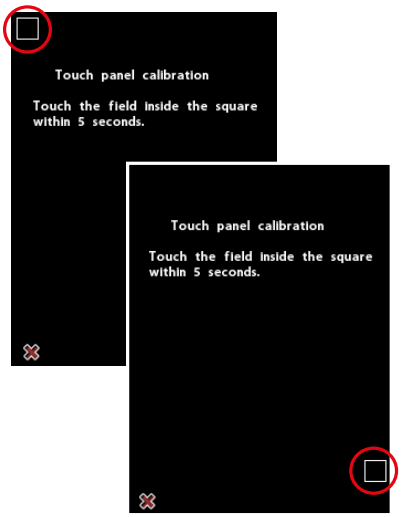
- **Exposure alarm settings**

  First touch and hold the **Test** button to hear the current frequency of the radiation warning tone. Then use the **Frequency (Hz)** arrow buttons to adjust the frequency between 500 Hz (low pitch tone) and 2000 Hz (high pitch tone) and test the frequency again.

- **Touch panel**

  Touch the **Calibrate** button to calibrate the touch panel. Touch panel calibration adjusts the panel to respond to the pressure level of your finger touch.

  A black calibration display with a white square in the top left corner will appear. Touch the square to “teach” the panel the pressure of your individual finger touch and to make it react rapidly to this pressure level. Another black calibration display with a white square in the bottom right corner will appear. Again touch the square. Note that you have to touch the square within five seconds as the calibration procedure will be cancelled once this time limit has expired.



To cancel the calibration procedure, touch the red cross button in the bottom left corner of the display.

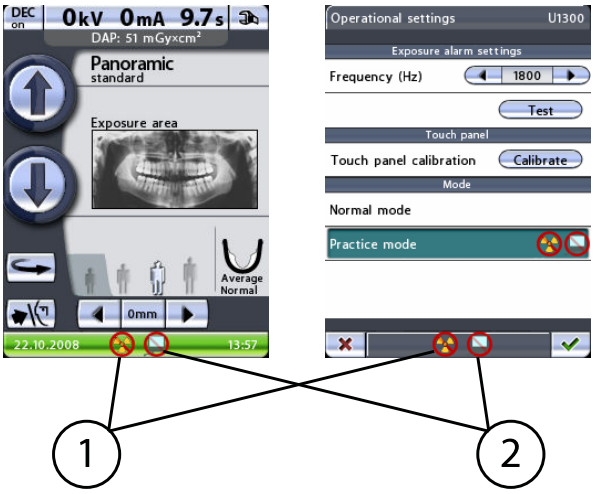
- **Mode**
  - **Normal mode**

    Touch the **Normal mode** field to switch normal operating mode on. When normal mode is in use the **Normal mode** field is shown highlighted.
  - **Practice mode**

    Practice mode enables you to practice/demonstrate program functions available on your X-ray unit. In practice mode no radiation is generated when you press the exposure button and there is no connection to a computer. The C-arm will move normally but no radiation will be generated and no radiation warning signals will be given, i.e. this is a “dummy run” function for training and demonstration purposes. For example, you might want to demonstrate the C-arm movements before taking exposures of children or nervous patients.

    Touch the **Practice mode** field to switch practice mode on. When practice mode is in use the **Practice mode** field is shown highlighted and symbols indicating that radiation and PC connection are disabled will appear in the status bar on all displays.

    To switch practice mode off, touch the **Normal mode** field.



1 No radiation

2 No PC connection

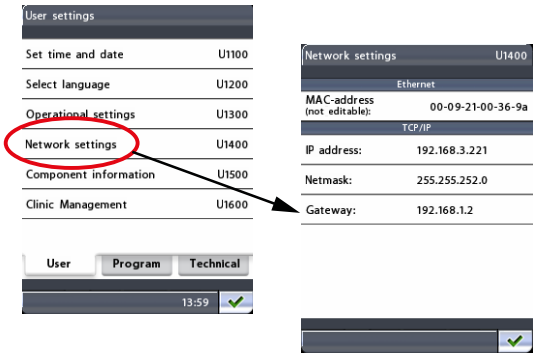
Accept your selection by touching the green check mark button in the bottom right corner of the display. To exit the display without saving the changes, touch the red cross button in the bottom left corner of the display.

14.1.4 Network settings (U1400)

NOTE

Only a service technician/local administrator may change the network settings.

To view the settings for Ethernet or TCP/IP connection, first select the option **Network settings** (U1400) on the **User settings** display. The **Network settings** (U1400) display will appear.



The Planmeca ProOne X-ray unit communicates through an Ethernet link. To enable the communication it is necessary to configure the link settings for the X-ray unit and the PC which is connected to the X-ray unit. This is done by a service technician/local administrator when the digital system is installed.

- **Ethernet**
  - MAC address

    MAC (Media Access Control) address is unit specific and it cannot be changed.
- **TCP/IP**
  - IP address

This field shows the Ethernet interface IP (Internet Protocol) address. The IP address is a unique number assigned to a specific X-ray unit and the address may be changed by a service technician/local administrator only.

- Netmask

  This field shows the subnet mask. The value may be changed by a service technician/local administrator only.

- Gateway

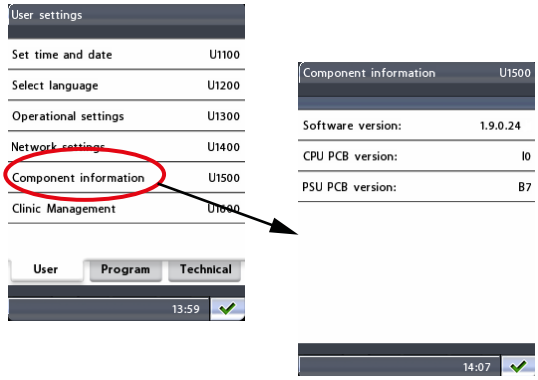
  This field shows the gateway IP (Internet Protocol) address. The value may be changed by a service technician/local administrator only.

Exit the **Network settings** (U1400) display by touching the green check mark button in the bottom right corner of the display.

14.1.5 Component information (U1500)

To view information about specified components of the X-ray unit, first select the option **Component information** (U1500) on the **User settings** display. The **Component information** (U1500) display will appear.

The **Component information** (U1500) display shows the current software version of the X-ray unit and specifies which PCB (printed circuit board) versions have been installed. The information is needed for service and maintenance purposes.



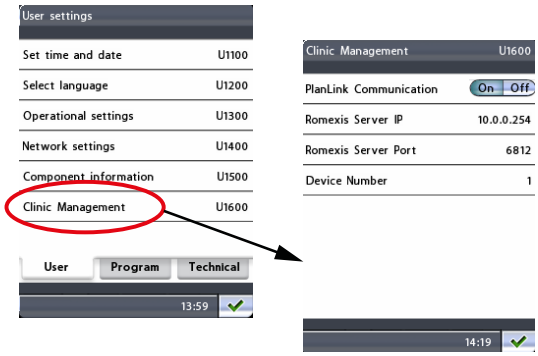
Exit the display by touching the green check mark button in the bottom right corner of the display.

14.1.6 Clinic management (U1600)

To view the network settings for the Planmeca Romexis Clinic Management module, select the option **Clinic management** (U1600) on the User settings display. The **Clinic management** (U1600) display will appear.

NOTE

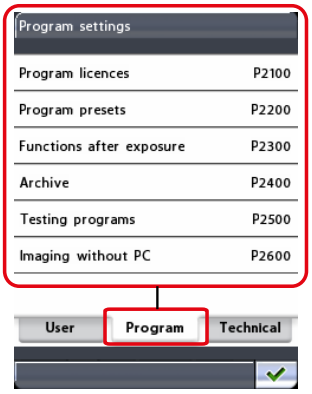
Only a service technician or local administrator may change the settings.



Exit the display by touching the green check mark button in the bottom right corner of the display.

14.2 Program settings

On the Program settings display you can activate new program features and adjust default settings for exposure programs. Here you can also specify how the X-ray unit will function after an exposure has been taken.



NOTE

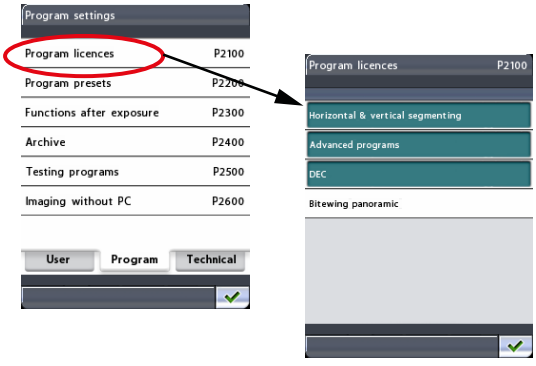
The option Imaging without PC will be shown on the display only if a USB memory stick is connected to the X-ray unit.

The available options are described in detail on the following pages.

Exit the **Program settings** display by touching the green check mark button in the bottom right corner of the display.

14.2.1 Program licences (P2100)

To activate program features, first select the option **Program licences** (P2100) on the **Program settings** display. The **Program licences** (P2100) display will appear.



Touch the program feature you wish to activate:

- **Horizontal & vertical segmenting**

  The segmenting function makes it possible to take panoramic exposures of different jaw segments. Segmenting reduces the radiation dose as only diagnostically interesting areas need to be x-rayed.

- **Advanced programs**

  The advanced program package contains following exposure programs:

  - Interproximal, orthogonal and bitewing panoramic programs
  - Double lateral-PA and 3 angles lateral TMJ programs
  - Lateral and midsagittal non-rotational sinus programs
  - Manual and automatic cross-sectional programs

- **DEC**

  Dynamic Exposure Control (DEC) adjusts the exposure values individually for each patient during exposure. Once activated, the DEC function can be switched on/off independently for each exposure.

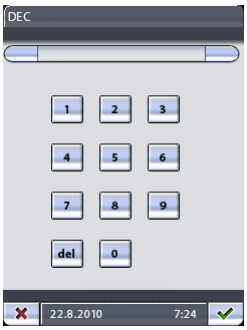
  Note that DEC target value can be adjusted, see section "Program presets (P2200)" on page 93 for details.

  NOTE

  DEC must be calibrated by a qualified service technician before the function can be used. Contact your service technician for help.

- **Panoramic bitewing**

A licence code will be requested next. Enter the licence code (6 digits) for the selected program feature.

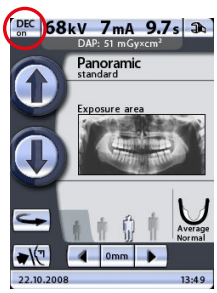


Save the licence code by touching the green check mark button, or exit the number display by touching the red cross button.

NOTE

Each licence code is unit and feature specific, i.e. it can only be used on the specified X-ray unit and for the specified program feature.

The program features that have been enabled and are in use are shown highlighted on the **Program licences** (P2100) display.



Additionally, when the program licence for DEC has been activated a **DEC on/off** button will appear in the top left corner of the main display.

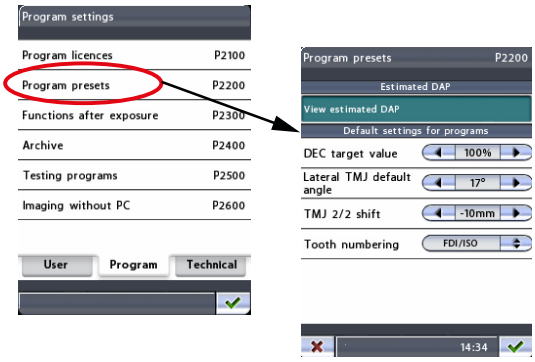
Exit the **Program licences** (P2100) display by touching the green check mark button in the bottom right corner of the display.

NOTE

If required, program features can be deactivated by selecting a highlighted feature on the Program licences (P2100) display and entering its licence code as described above.

14.2.2 Program presets (P2200)

To adjust program default settings, first select the option **Program presets** (P2200) on the **Program settings** display. The **Program presets** (P2200) display will appear.



- **Estimated DAP**

  Touch the **View estimated DAP** field to set the X-ray unit so that the estimated Dose Area Product (DAP) value will be shown on the main display. The DAP value indicates the highest radiation dose the patient will be exposed to during the exposure.

  The **View estimated DAP** field is highlighted when the function is switched on. To switch off the function, touch the **View estimated DAP** field again.

- **Default settings for programs**

  - DEC target value

    Touch the arrow buttons in the **DEC target value** field to adjust the setting for DEC (Dynamic Exposure Control) target value. DEC target value is expressed in percentage in comparison to DEC calibration value. The setting can be adjusted between 50% (lower exposure values -> brighter image) and 200% (higher exposure values -> darker image). The recommended setting is 100% (default value).

    NOTE

    DEC target value will be shown on the Program presets (P2200) display only if DEC has been activated on the Program licences (P2100) display.

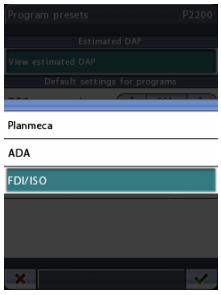
  - Lateral TMJ default angle

    Touch the arrow buttons in the Lateral TMJ default angle field to adjust the setting. The factory default imaging angle for lateral exposures is 17 degrees.

  - TMJ 2/2 shift

Touch the arrow buttons in the **TMJ 2/2 shift** field to adjust the setting for the automatic shift. The setting determines the imaging position for the second (2/2) exposure in Double lateral and Double PA TMJ programs. The shift can be adjusted between -15 mm and 0 mm. The factory default setting is -10 mm, i.e. the imaging position will move 10 mm forward for the open jaw exposure (2/2).

- Tooth numbering



Touch the arrow buttons to select the tooth numbering system you want to use in cross-sectional programs. The options are:

- Planmeca: 0-8, TMJ

- ADA: TMJ, 1-4, 13-16, 17-20, 29-32, TMJ

- FDI/ISO: TMJ, 18-15, 48-45, 25-28, 35-38, TMJ

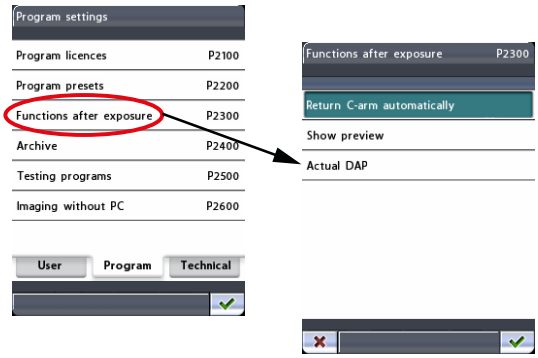
NOTE

Tooth numbering will be shown on the Program presets (P2200) display only if cross-sectional programs have been activated on the Advanced programs (P2100) display.

Accept your selection by touching the green check mark button in the bottom right corner of the display. To exit the display without saving the changes, touch the red cross button in the bottom left corner of the display.

14.2.3 Functions after exposure (P2300)

On the **Program settings** display, select the option **Functions after exposure** (P2300). The **Functions after exposure** (P2300) display will appear. Here you can specify how the X-ray unit will function after an exposure has been taken.



- **Return C-arm automatically**

  Touch the **Return C-arm automatically** field to set the X-ray unit so that the C-arm will automatically return to the patient entry position at the end of an exposure cycle. Note, however, that the automatic function works only if the exposure button is pressed and held down for the entire duration of the exposure.

  The **Return C-arm automatically** field is highlighted when the function is switched on. To switch off the function, touch the field again.

- **Show preview**

Touch the **Show preview** field to set the X-ray unit so that a preview of the image is shown on the control panel after exposure. This option allows you to evaluate the image immediately after you have taken it.

The **Show preview** field is highlighted when the function is switched on. To switch off the function, touch the field again. The preview image can be zoomed in and out to resize it, or dragged to move the image on the display. Touching the image will zoom in and show you the image in more detail at the point that was touched. Touching the image again will zoom out and bring you back to the original size. Dragging the zoomed image with your finger will move the image in the desired direction on the display.

Touch the green check mark button in the bottom right corner of the **Preview** display to return to the main display.

- **Actual DAP**

Touch the **Actual DAP** field to set the X-ray unit so that the actual Dose Area Product (DAP) value will be shown after each exposure. The actual DAP value indicates the actual radiation dose the patient was exposed to during the exposure. The value is calculated on the basis of the actual exposure settings.

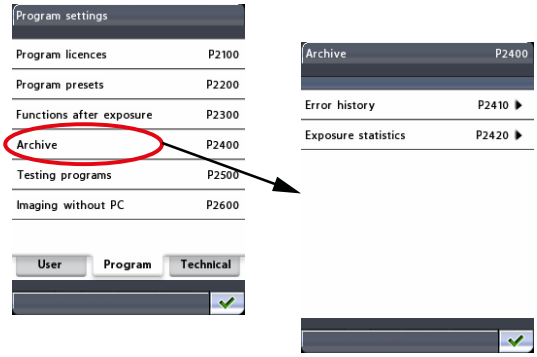
The **Actual DAP** field is highlighted when the function is switched on. To switch off the function, touch the **Actual DAP** field again.

The DAP value will be displayed as shown. To return back to the main display, touch the green check mark in the bottom right corner of the display.

On the Functions after exposure (P2300) display, accept your selection by touching the green check mark button in the bottom right corner of the display. To exit the display without saving the changes, touch the red cross button in the bottom left corner of the display.

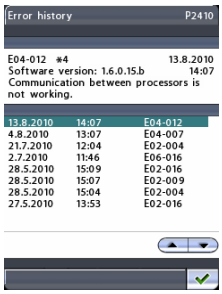
14.2.4 Archive (P2400)

On the Program settings display, select the option Archive (P2400). The Archive (P2400) display will appear. Here you can view the error history and exposure statistics.



- **Error history (P2410)**

  Touch the **Error history** field to view the error history. All the errors of the X-ray unit are listed here, including the error code, description of the error, as well as the date and time when the error occurred.

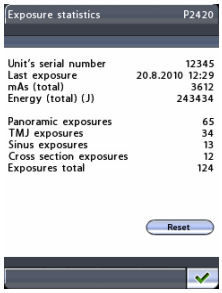


See also the section *Error history web page* later in this chapter.

- **Exposure statistics (P2420)**

  Touch the **Exposure statistics** field to view the following information: Unit's serial number / Last exposure (date and time) / mAs (total) / Energy (total) (J); number of panoramic exposures / TMJ exposures / Sinus exposures / Cross-sectional exposures / Exposures total.

  You can reset the exposure data by touching the **Reset** field in the bottom right corner of the display.

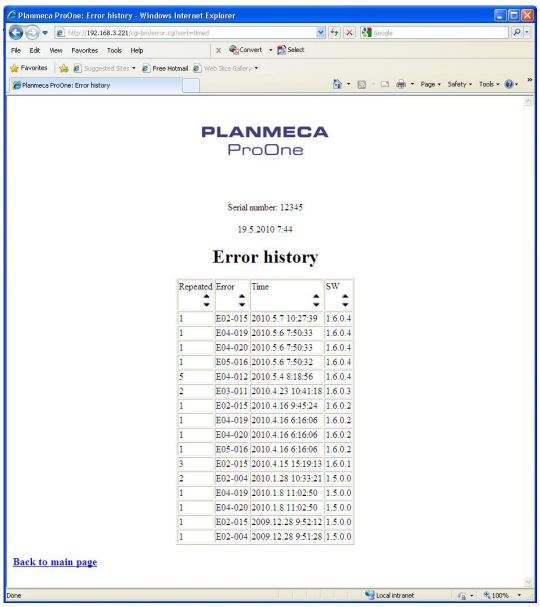


Error history web page

The error history can also be viewed with a web browser (e.g. Internet Explorer) of the computer connected to your X-ray unit.

Open the web browser and enter the IP address of your X-ray unit into the address bar. You can find the IP address on the control panel display **Network settings** (1400) (Spanner icon > User tab > Network settings > IP address).

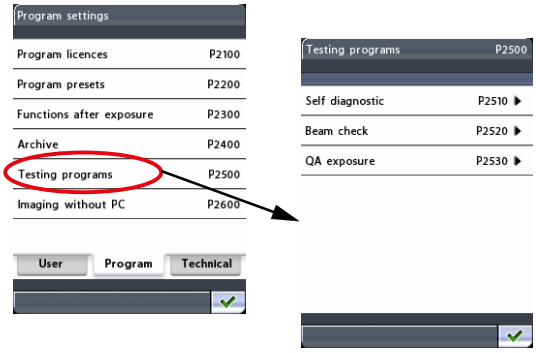
On the main page select **Error history**. The following screen opens.



The error history page contains a table listing the error codes reported by the X-ray unit. The table can be arranged by columns in ascending or descending order by clicking the arrow buttons.

14.2.5 Testing programs (P2500)

To perform self diagnostics or to take a beam check or QA exposure, first select the option **Testing programs** (P2500) on the **Program settings** display. The **Testing programs** (P2500) display will appear.

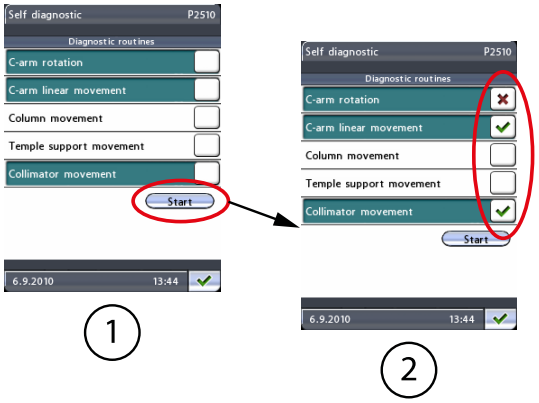


- **Self diagnostics (P2510)**

  If required, you can test that the movement motors and limit sensors of the X-ray unit function correctly.

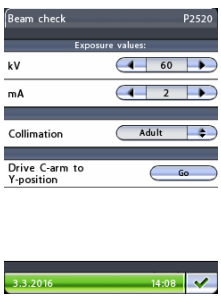
  On the **Testing programs** display, select **Self diagnostics** (P2510). The **Self diagnostics** display (P2510) will be shown. First select the function(s) that you wish to test. The selected function(s) will be highlighted.

  Then select **Start**. The testing program starts and the C-arm, column, temple supports and/or collimator start moving. The test results will be displayed as follows: green check mark = pass, red cross = fail.



  1 Functions to be selected
  2 Test results shown

- **Beam check (P2520)**



If required, you can take a beam check image to check the position of the X-ray beam on the sensor.

NOTE

The X-ray beam must be aligned and the sensor must be calibrated by a qualified service technician before a beam check is started.

On the **Testing programs** (P2500) display, select the option **Beam check**. The **Beam check** (P2520) display will be shown.

The default exposure values (60 kV/2 mA) for a beam check exposure will be shown on the **Beam check** display. If you wish to improve image contrast, select a higher kV value by touching the corresponding arrow in the kV field.

The beam position can be checked for both adult and child collimation. When you touch the button in the **Collimation** field a display will appear where you can select **Adult** or **Child**. Select Adult for the first beam check exposure.

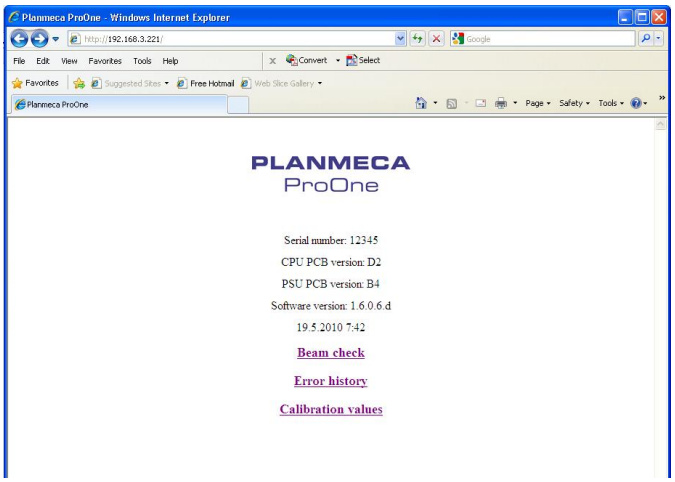
The beam check image will be shown on the web browser screen (e.g. Internet Explorer) of the computer that is connected to your X-ray unit.

Open the web browser. Enter your X-ray unit's IP address in the address bar.

NOTE

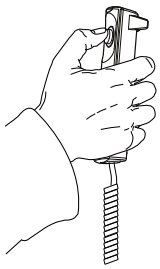
You can find the IP address on the control panel Network settings (U1400) display (Spanner icon > User tab > Network settings > IP address).

The main page opens.



Click the **Beam check** link on the ProOne main page.

The **Beam check** page opens.



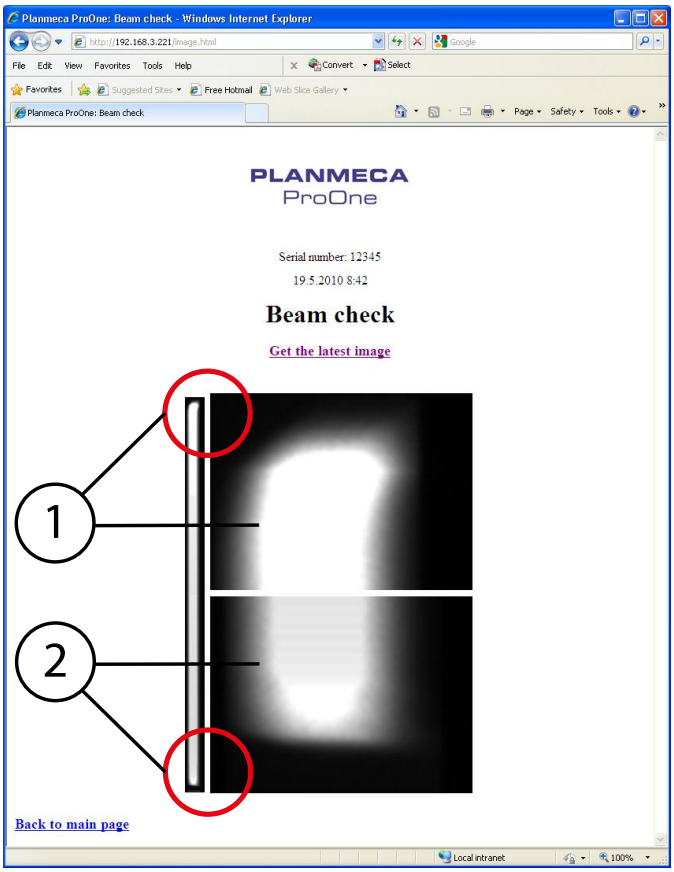
Take an exposure. Press and hold down the exposure button for the duration of the exposure.

CAUTION

Radiation is generated when the exposure button is pressed. Protect yourself from radiation.

Click the **Get the latest image** link on the screen to view the beam check image.

The beam check image for adult collimation will be shown on the web browser screen.



1 Detailed view of the top of the image

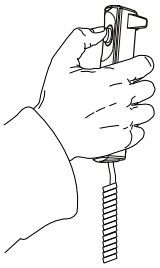
2 Detailed view of the bottom of the image

The radiation beam (white area in the image) must be positioned inside the active area of the sensor (black area in the image), i.e. the white radiation beam must be surrounded by black borders on all four sides. In an ideal case the white radiation beam is positioned exactly in the middle of the black area (both vertically and horizontally).

NOTE

If any part of the radiation beam extends outside the active sensor area, the X-ray beam must be readjusted and the sensor must be recalibrated by a qualified service technician. Contact your service technician for help.

Now take a beam check image with child collimation. On the **Beam check** (P2520) display, touch the button in the **Collimation** field and select **Child** on the display that appears.



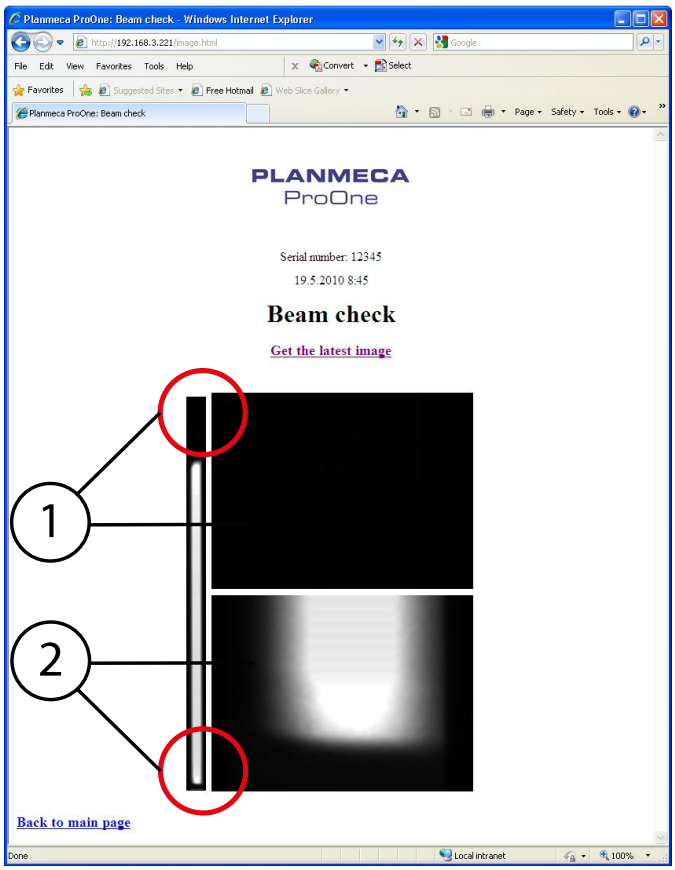
Take an exposure. Press and hold down the exposure button for the duration of the exposure.

CAUTION

Radiation is generated when the exposure button is pressed. Protect yourself from radiation.

Click the **Get the latest image** link on the screen to view the beam check image.

The beam check image for child collimation will be shown on the web browser screen.



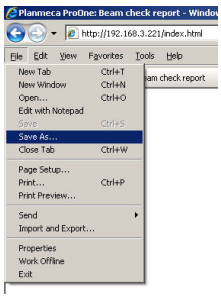
1 Upper image: Detailed view of the top of the image

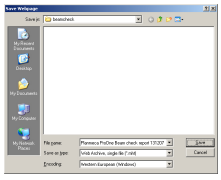
2 Lower image: Detailed view of the bottom of the image

The bottom end of the radiation beam (white area in the lower image) must be positioned inside the active area of the sensor (black area in the lower image). The upper image must be black (no radiation). In the narrow image on the left, the white radiation beam must be surrounded by black borders on all four sides.

NOTE

If any part of the radiation beam extends outside the active sensor area or if the upper image is not black, the X-ray beam must be readjusted and the sensor must be recalibrated by a qualified service technician. Contact your service technician for help.





The beam check images can be saved (or printed) using the **Save As** (or **Print**) command of the web browser.

The beam check images can be saved in any folder on the computer or network as a single file web page (.mht file).

Exit the **Beam check** (P2520) display by touching the green check mark button in the bottom right corner.

- **QA exposure (P2530)**

  If required, you can take a QA exposure to check the image quality of the X-ray unit.

  Refer to Planmeca Publication Number 10016248 (Image Quality Monitoring Instructions for Planmeca Digital X-ray Units) for a detailed description on how to take a QA exposure.

Exit the **Testing programs** (P2500) display by touching the green check mark button in the bottom right corner.

14.2.6 Imaging without PC (P2600)

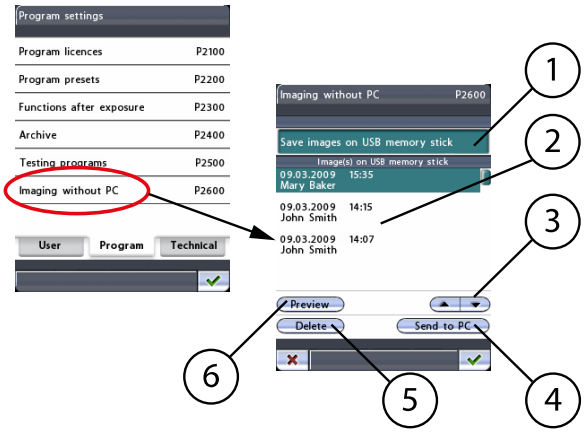
NOTE

This option will be shown on the display only if a USB memory stick is connected to the X-ray unit. When a USB memory stick is plugged in, images can be saved on the memory stick or on the computer.

NOTE

A USB memory stick must be plugged into the USB port by a service technician only. Contact your service technician for help if you need to use a USB memory stick.

Select the option **Imaging without PC** (P2600) on the **Program settings** display. The **Imaging without** PC (P2600) display will appear.



1 Green = Save on USB, White = Save on PC
2 Image list
3 Scroll up/down to select image from list
4 Send selected image to Romexis
5 Delete selected image from USB memory stick
6 Show selected image in preview window

Touch the **Save images on USB memory stick** field to switch the function on. To switch the function off, touch the field again. The field will be shown highlighted (green) when the function is switched on.

Accept your selection by touching the green check mark button in the bottom right corner of the display. To exit the display without saving the changes, touch the red cross button in the bottom left corner of the display.

The **Patient** field will appear on the main display when the **Save images on USB memory stick** function is switched on. Enter the patient name as described in section "Entering patient name" on page 36. The patient name will be shown in the image list on the **Imaging without PC** (P2600) display.

NOTE

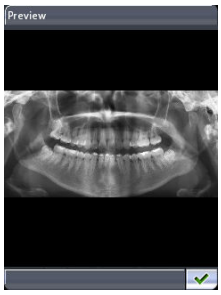
We recommend that you always enter the patient name before you take an exposure. This will ensure that images of different patients cannot be mixed up.

When you take an exposure the image will be saved on the USB memory stick and not on the computer. Note, however, that the saving process will now take a few seconds longer and you should not switch the X-ray unit off immediately after you have taken an exposure. When using a USB memory

stick, wait for approx. 15 seconds before you switch the X-ray unit off after exposure.

When you have taken an exposure the image information (date, time, patient name if used) will be shown in the image list on the **Imaging without PC** (P2600) display. Use the up or down arrow to select an image from the list. The selected image will be shown highlighted. You can then use the function buttons at the bottom of the display:

- **Preview**



Touch the **Preview** button to see a preview of the selected image on the control panel display.

The preview image can be zoomed in and out to resize it, or dragged to move the image on the display. Touching the image will zoom in and show you the image in more detail at the point that was touched. Touching the image again will zoom out and bring you back to the original size. Dragging the zoomed image with your finger will move the image in the desired direction on the display.

Touch the green check mark button in the bottom right corner of the **Preview** display to return to the **Imaging without PC** (P2600) display.

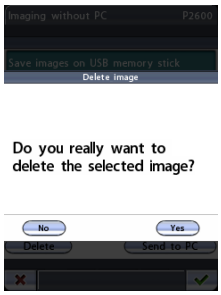
- **Send to PC**

NOTE

Make sure that you have selected the right patient and the panoramic exposure mode in the Romexis program before you send an image. Refer to the Romexis User's Manual.

Touch the **Send to PC** button to send the selected image to the Romexis program. A message confirming that the image was sent will appear on the display. Remember to accept the image in the Romexis program.

- **Delete**



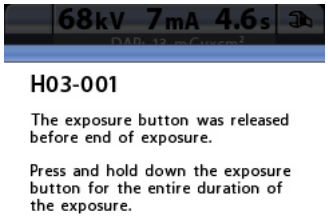
Touch the **Delete** button if you want to delete the selected image from the USB memory stick. A message asking you to confirm the action will pop up. Touch the **No** button to cancel the action, or select **Yes** to delete the image.

NOTE

Ensure that you have sent the image to the PC before you delete it. Deleted images cannot be recovered.

15 Help messages

The X-ray unit incorporates a self-checking feature that monitors the operation of the unit. If the system detects an operating error a help message (e.g. H03-001, blue line at top) will appear on the control panel.



The X-ray unit will not accept any commands from the user until the help message is cleared from the display. Touch the green check mark button to clear the message.

The following list shows, in numerical order, all the help messages that can appear on the control panel.

Code	Explanation		Comments
H02-001	Lift motor	Upper limit	The X-ray unit cannot be moved any higher. Use the height adjusting buttons (down arrow) to move the unit down.
H02-002		Lower limit	The X-ray unit cannot be moved any lower. Use the height adjusting buttons (up arrow) to move the unit up.
H02-003		Temperature	The lift motor power supply temperature has reached the upper limit or there is a short circuit. Wait for a few minutes for the lift motor power supply to cool down.
H02-014		Duty cycle	The lift motor is overheated. Wait for a few minutes for the lift motor to cool down.
H03-001	Exposure switch	Button released too early	The exposure button was released before end of exposure. Press and hold down the exposure button for the entire duration of the exposure.
H03-014	Control panel	Control panel touched	The control panel was touched during operation. Operation was interrupted.

Code	Explanation		Comments
H04-001	USB	Communication	The system cannot recognize the connected USB device. Only a USB memory stick can be plugged into the USB port.
H04-003	Ethernet		No network connection. Check the connection and cabling.
H04-021	Imaging program	Status	The imaging program is not ready. Select panoramic exposure in the Romexis imaging program.
H04-022	USB	Software update	The software on the USB memory stick is not suitable. Check the software file.
H04-023	USB	Memory stick full	The USB memory stick is full and no more images can be saved to it. Use an empty USB memory stick or, to create free memory space, delete images from the USB memory stick after you have sent the images to a PC.
H04-024	Imaging program	Status	The exposure program cannot be changed (AF ON). First close the imaging session in Romexis. You can then change the exposure program.
H05-020	USB	Power supply	The USB power supply current is too high. Only a USB memory stick can be plugged into the USB port. Check that the memory stick is not defective or damaged.
H05-021	Frankfort positioning light		The Frankfort laser power supply current is too high. To replace the Frankfort laser light, contact your service technician.
H05-022	Midsagittal positioning light		The midsagittal laser power supply current is too high. To replace the midsagittal laser light, contact your service technician.
H05-023	Layer light		The layer laser power supply current is too high. To replace the layer laser light, contact your service technician.
H06-001	Emergency stop button	Button activated	The emergency stop button has been activated. All movements of the X-ray unit are blocked, no radiation is generated. Release the emergency stop button to resume normal operation.

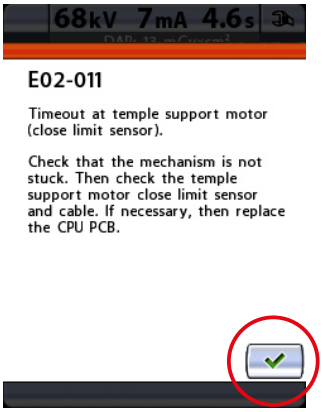
Code	Explanation		Comments
H06-003	Dimax sensor	Radiation level	The radiation level on Dimax sensor is below average or factory settings. If necessary, contact your service technician to improve image quality.
H06-004		Beam	The X-ray beam is not symmetrical. If necessary, contact your service technician to improve image quality. The collimator needs to be readjusted.
H06-008		Status	The Dimax sensor is not ready for exposure. Wait for a moment.
H06-009	X-ray tube	Heat capacity	The X-ray tube will overheat with the selected exposure values (kV/mA). Use lower exposure values or wait for the X-ray tube to cool down.
H06-010	Tube head	Temperature	The temperature of the tube head is too high. Wait for a few minutes for the tube head to cool down.
H06-014	DEC	Segmenting	The lower horizontal jaw segment (partial exposure) cannot be selected if DEC (Dynamic Exposure Control) is used.
H06-015	DEC	DEC not available	DEC (Dynamic Exposure Control) cannot be used if only the lower horizontal jaw segment is selected (partial exposure).
H07-002	Licences	Code	The entered licence code was wrong. Check that you have got the correct licence code for the desired feature on this X-ray unit.
H07-003	DEC	Calibration	DEC (Dynamic Exposure Control) is not available. Contact your service technician for help. DEC has not been calibrated.
H07-004		Target value	DEC (Dynamic Exposure Control) calibration value is out of limits. Target value has to fall between 200 and 2000.
H08-001	Software		Software downgrade is not allowed. CPU PCB version I2 or newer installed, it is not possible to downgrade the software from version 1.9.1.

16 Error messages

NOTE

Contact your service technician for help if you receive an error message.

The X-ray unit incorporates a self-checking feature that monitors the operation of the unit. If the system detects a technical fault an error message (e.g. E02-011, red line at top) will appear on the control panel.



An error message indicates that the X-ray unit has a problem that needs to be solved before further exposures can be taken. The error message gives instructions to the service technician on what actions to take.

The X-ray unit will not accept any commands from the user until the error message is cleared from the display. Touch the green check mark button to clear the message.

17 Cleaning and disinfection

NOTE

Switch the X-ray unit off before cleaning or disinfection.

NOTE

Use a Planmeca approved cleaning agent and surface disinfectant. The products are categorised here as cleaning agents and / or disinfectants according to the information provided by the manufacturers.

NOTE

Follow the instructions provided by the manufacturer of the cleaning agent, disinfectant and autoclave.

NOTE

FOR SPRAYS, LIQUIDS AND FOAMS:

Do not apply sprays, liquids or foams directly on the surfaces. Apply sparingly to a clean soft cloth and wipe the surface with the cloth.

Contact your service technician for help if sprays, liquids or foams enter the system.

Planmeca approved cleaning agents

Manufacturer	Brand name
Alpro Medical	CleanWipes
Alpro Medical	IC-100
Alpro Medical	MinutenSpray-classic
Clinell	Clinell Universal Wipes
Clinitex	R515 Detergent Multi-Surface Wipes
Ecolab	Actichlor Plus
SciCan	Optim Blue Wipes

Planmeca approved surface disinfectants

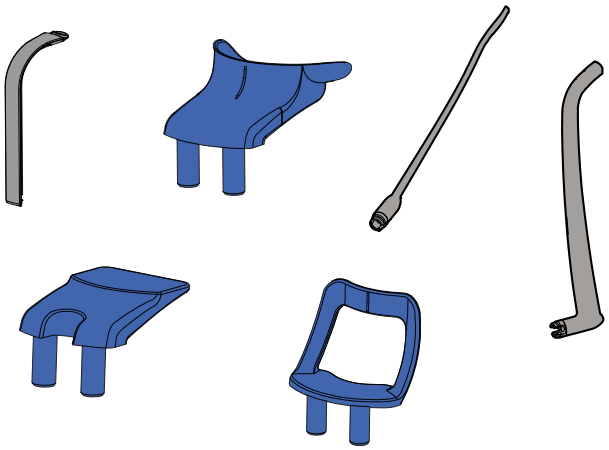
Manufacturer	Brand name
Alpro Medical	MinutenSpray-classic
Antibac	Antibac 75%
CCS HealthCare	Dax Extra
CCS HealthCare	Dax 70+
Chemi-Pharm AS / Plandent	Orbis Surface Disinfectant
Clinell	Clinell Universal Wipes
Dürr	FD 312
Ecolab	Actichlor Plus
SciCan	Optim Blue Wipes

17.1 Patient supports, patient handles and control panel

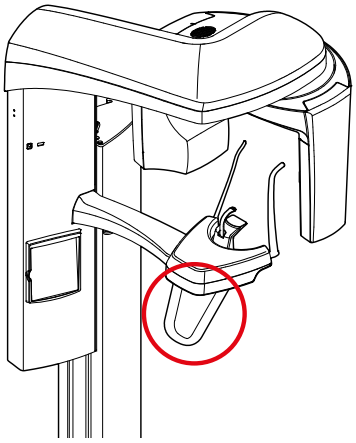
Wipe these parts after each patient using a Planmeca approved surface disinfectant.

Use a Planmeca approved cleaning agent for cleaning stains and dirt if needed.

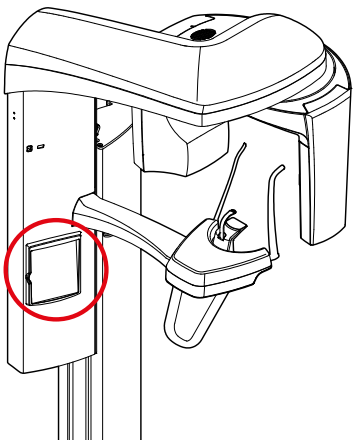
Patient supports



Patient handles



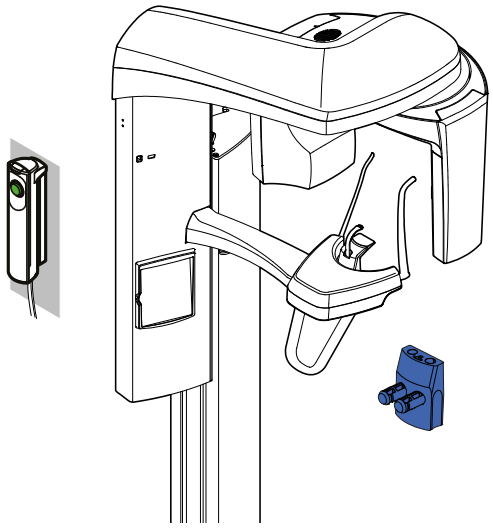
Control panel



17.2 Other surfaces

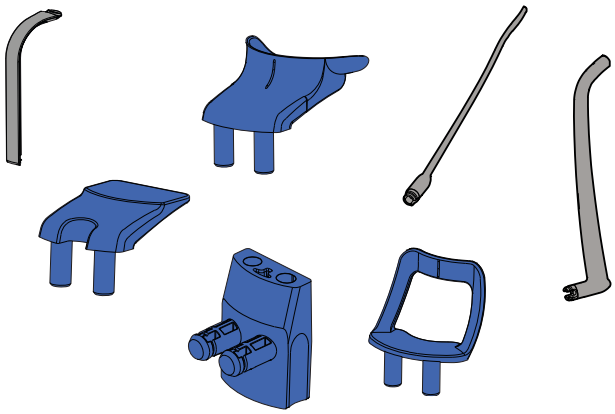
Wipe the other surfaces regularly using a Planmeca approved surface disinfectant.

Use a Planmeca approved cleaning agent for cleaning stains and dirt if needed.



NOTE

These parts can be autoclaved at 134°C (273°F). They can be autoclaved at least up to 100 times.



18 Service

The X-ray unit must be checked by a qualified Planmeca service technician once a year or after every 10 000 exposures (if this is sooner). This will guarantee patient and user safety and ensure consistent image quality.

19 Disposal

In order to reduce the environmental load over the product's entire lifecycle, Planmeca's products are designed to be as safe as possible to manufacture, use and dispose of.

Parts which can be recycled should always be taken to the appropriate processing centres, after hazardous waste has been removed. Disposal of obsolete units is the responsibility of the waste possessor.

All parts and components containing hazardous materials, as well as batteries, must be disposed of in accordance with waste legislation and instructions issued by the environmental authorities. Batteries must be disposed of in compliance with the requirements of Directive 2006/66/EEC.

The risks involved and the necessary precautions must be taken into account when handling waste products.

Disposal table

Part	Main material for disposal	Recyclable material	Waste disposal site	Hazardous waste (separate collection)
Frame, covers and patient supports: • metal	aluminium	X		
	galvanized steel	X		
	lead			X
Frame, covers and patient supports: • plastic	PUR		X	
	other plastics	X		
Motors		(X)		
Component boards		(X)		
Cables, transformers	copper	X		
	steel	X		
	transformer oil			X
X-ray tube				X
Packing	wood	X		
	cardboard	X		
	paper	X		
	polystyrene	X		
Sensor	Return sensor to Planmeca.			
Other parts			X	

X action

(X) action in cases where processing is available

20 Technical specifications

Unit feature	Details
Generator	Constant potential, resonance mode high frequency 60 - 80 kHz according to IEC 60601-2-7: 1998
X-ray tube type	D-058SB
Nominal focal spot value	0.5 according to IEC 60336 Ed. 4
Total filtration	min. 2.5 mm Al
Anode voltage	60 - 70 kV ± 5%
Anode current	2 - 7 mA ±10%
Exposure time	1 - 10 s as indicated ±10%
DEC accuracy	±10%
Duty cycle for height adjustment	1:10 or 2 min continuous use followed by 18 min not in use
Maximum heat capacity	10 000 kJ
Essential performance (heating/ cooling period)	Two consecutive panoramic images using maximum exposure values (70 kV/7 mA)
Cooling period	Automatically controlled
Max. temperature of X-ray tube assembly	+60°C (+140°F)
SID	480 mm (19 in.)
Magnification	1.22 - 1.29 (panoramic exposures)
CCD pixel size	48 µm
Image pixel size	96 µm
CCD active surface	6 mm x 146 mm (0.24 in. x 5.75 in.)
Line voltage	100 - 240 V~ / 50 - 60 Hz
Power input	Continuous operation with intermittent loading 845 W intermittent: 1:20 (70 kV, 7 mA, 10 s exposure) 35 W continuous
Line harmonics	According to IEC 61000-3-2 class A
Max. permissible apparent impedance of supply mains	0.5 Ω (100VAC)
Electrical classification	Class I, type B applied part
Internal fuse(s)	F 8A H 250 V (user replaceable) • 1 fuse on permanently installed X-ray units • 2 fuses on X-ray units with detachable power supply cord
External fuse(s)	100 - 240 V ~ / T 10A H 250V
Battery	Lithium battery: CR2025, Varta Microbattery GmbH CR2025, Panasonic
Weight	67 kg (148 lb)
Colour	White, RAL 9016

Unit feature	Details
Environmental requirements	Transport • Temperature -20°C - +60°C (-4°F - +140°F) • Relative humidity 10 - 90% RH (non-condensing) • Air pressure 700 - 1060 hPa Storage • Temperature -10°C - +50°C (+14°F - +122°F) • Relative humidity 10 - 90% RH (non-condensing) • Air pressure 700 - 1060 hPa Operating • Temperature +10°C - +40°C (+50°F - +104°F) • Relative humidity 10 - 90% RH (non-condensing) • Air pressure 800 - 1060 hPa • Max. altitude 2000 m (1.25 miles)
RoHS	2011/65/EU
IP classification	IP20

Original manufacturer

Planmeca Oy, Asentajankatu 6, FIN-00880, Helsinki, Finland

Phone: +358 20 7795 500, Fax: +358 20 7795 555,
http://www.planmeca.com

PLANMECA

Planmeca Oy | Asentajankatu 6 | 00880 Helsinki | Finland

tel. +358 20 7795 500 | fax +358 20 7795 555 | sales@planmeca.com | www.planmeca.com