PLANMECA

Planmeca ProMax®

2D & 3D s & 3D Classic

user's manual

2D imaging

EN

10033256_8

Table of Contents

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 10033256 Revision 8
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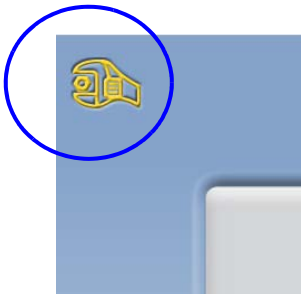
1 INTRODUCTION



This manual describes how to take 2D panoramic exposures. The manual applies to the following X-ray units:

- Planmeca ProMax 2D S2
- Planmeca ProMax 2D S3
- Planmeca ProMax 3D s
- Planmeca ProMax 3D Classic

NOTE

This manual is valid for software version 3.6.0.0.r or later. This software version is compatible with Planmeca Romexis software version 3.8.2.r or later. To check the software version of your X-ray unit, select Settings > About > 4100 Component Information > ProMax SW version.

The X-ray unit uses panoramic techniques to produce two-dimensional (2D) X-ray images for the examination of dentomaxillofacial anatomy.

You need a PC with the Planmeca Romexis program in order to save, view and modify the images.

Make sure that you are fully acquainted with the appropriate radiation protection measures and these instructions before you use the X-ray unit.

NOTE

The X-ray unit may be used by health care professionals only.

2 ASSOCIATED DOCUMENTATION

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

- User's Manual(s) for

- 2D Imaging, Original English publication: 10033256

(- 2D Tomography, Original English publication: 10036593)

(- Cephalostat, Original English publication: 10033034 or 10033035)

(- 3D Imaging, Original English publication: 10033255)

- Installation Manual,
  Original English publication: 10033260
- Technical Manual,
  Original English publication: 10033257

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

- User's Manual, Original English publication: 10014593
- Installation Manual,
  Original English publication: 10014600

NOTE

The latest versions of the User's Manuals are available on Planmeca's website (Material bank > Manuals > Imaging).

3 SYMBOLS ON PRODUCT LABELS

CE marking according to European standard (Directive 93/42/EEC)

SGS marking according to US and Canadian standards (ANSI/UL 60601-1 and CAN/CSA C22.2 No. 601.1-M90)

Date of manufacture (Standard ISO 15223-1)

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

Type B applied part (Standard IEC 60601-1)

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

Alternating current (Standard IEC 60417)

Electrostatic sensitive device (Standard IEC 60417)

4 SAFETY PRECAUTIONS

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

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

CAUTION

Do not drop the sensor. Planmeca limited warranty does not cover damage which is due to misuse, e.g. dropping the sensor, neglect, or any cause other than ordinary use.
If you have any reason to believe that the sensor might be faulty, take a test exposure before taking a patient exposure.

CAUTION

If an exposure is interrupted (e.g. exposure button is released or emergency stop button activated), the patient must be guided away from the X-ray unit before the C-arm is moved.

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

Do not touch an electrical connector and the patient at the same time.

CAUTION

If the X-ray unit shows any signs of oil leakage, disconnect the unit from mains 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.

NOTE

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

NOTE

Cone beam imaging should not be used for routine (or screening) examinations. The imaging examinations must be justified for each patient to demonstrate that the benefits outweigh the risks.

NOTE

When it is likely that evaluation of soft tissues will be required as part of the patient's radiological assessment, conventional CT or MR medical imaging should be used rather than CBCT.

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

FOR CANADIAN USERS:
All patients must be provided with a shielded apron for gonad protection and a thyroid shield. The use of a thyroid shield is especially important in children. The shielded apron and thyroid shield should have a lead equivalence of at least 0.25 mm on both sides (front and back of the patient).

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

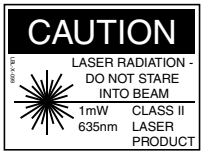
Ensure efficient air conditioning in the X-ray room. It is recommended to keep the room temperature between +20°C and +25°C at all times.

NOTE

If exposures are taken in rapid succession the X-ray tube may overheat and a cooling time will flash on the touch screen. The cooling time indicates the delay before the next exposure can be taken.

NOTE

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



NOTE

FOR US & CANADIAN 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

External equipment intended for connection to signal 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 60601-1-1, 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 X-ray 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 60601-1-1. 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

Contact your service technician if you have taken an exposure but the image does not appear in the Planmeca Romexis program. The last ten images can be manually imported into Romexis.

NOTE

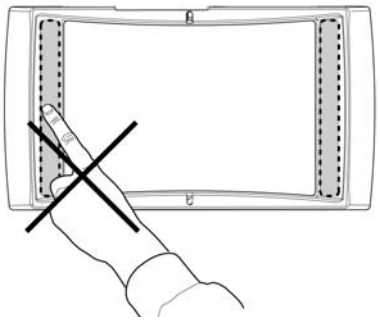
Never place or hang any objects on any part of the X-ray unit.

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

If you have any reason to believe that the C-arm might hit the patient during exposure (e.g. patients with wide shoulders), take a test exposure without radiation first. To turn radiation off, select Settings > User > 1300 Operational settings > 1310 Use Mode > 1311 Set Demo Mode.



NOTE

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

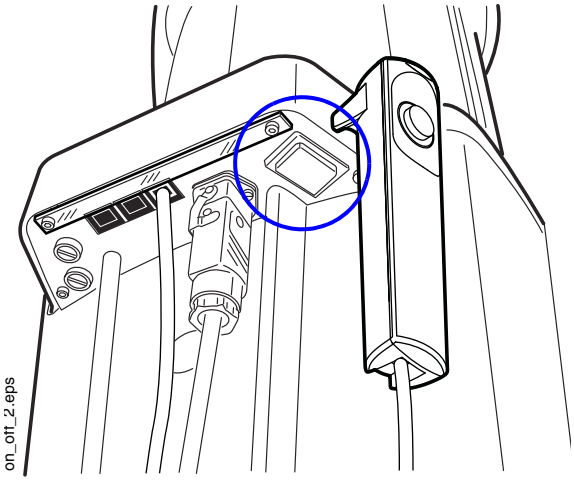
NOTE

Patients are not allowed to hang on the patient handles.

NOTE

FOR PROFACE SENSOR:
Do not touch the glass windows. Fingerprints or other stains on the glass surface destroy image quality.

5 SWITCHING X-RAY UNIT ON



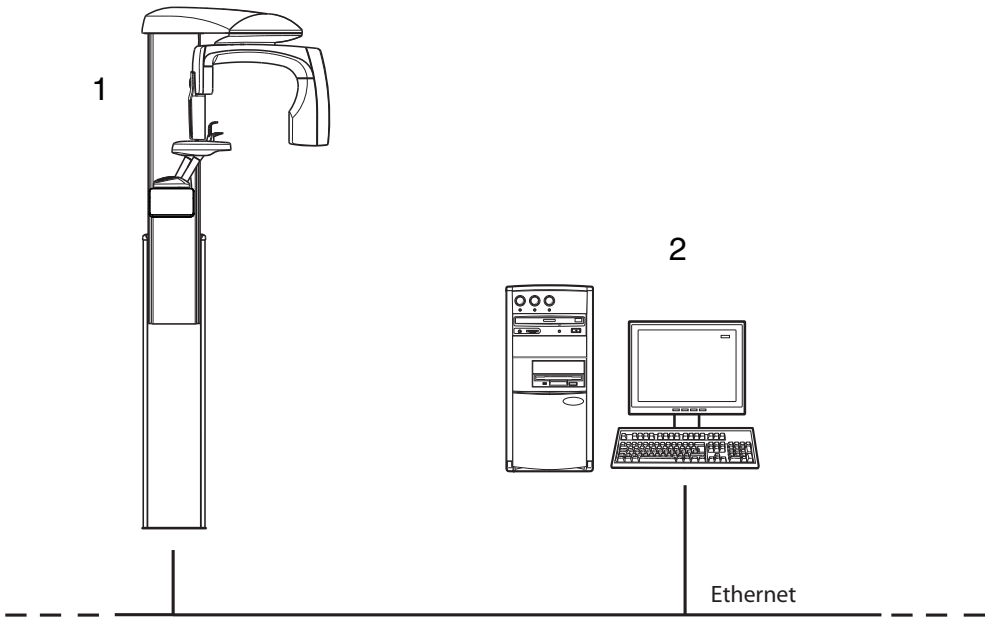
The on / off switch is located on the underside of the stationary column top.

NOTE

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

6 MAIN PARTS

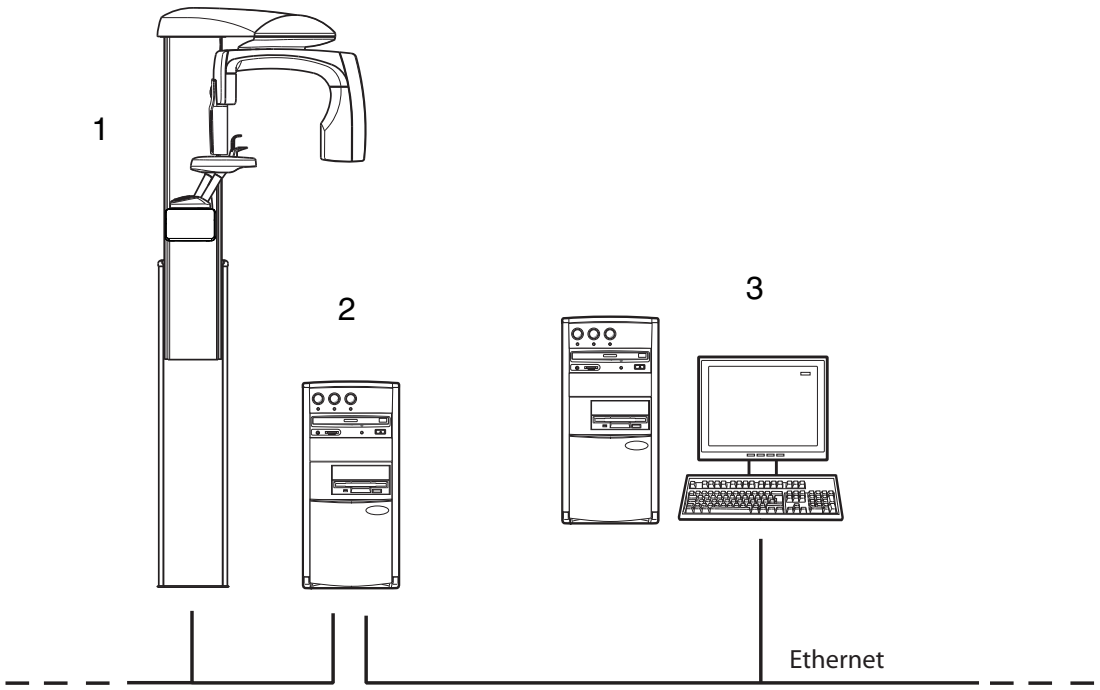
6.1 General view of 2D X-ray system



1 X-ray unit

2 Planmeca Romexis program

6.2 General view of 3D X-ray system

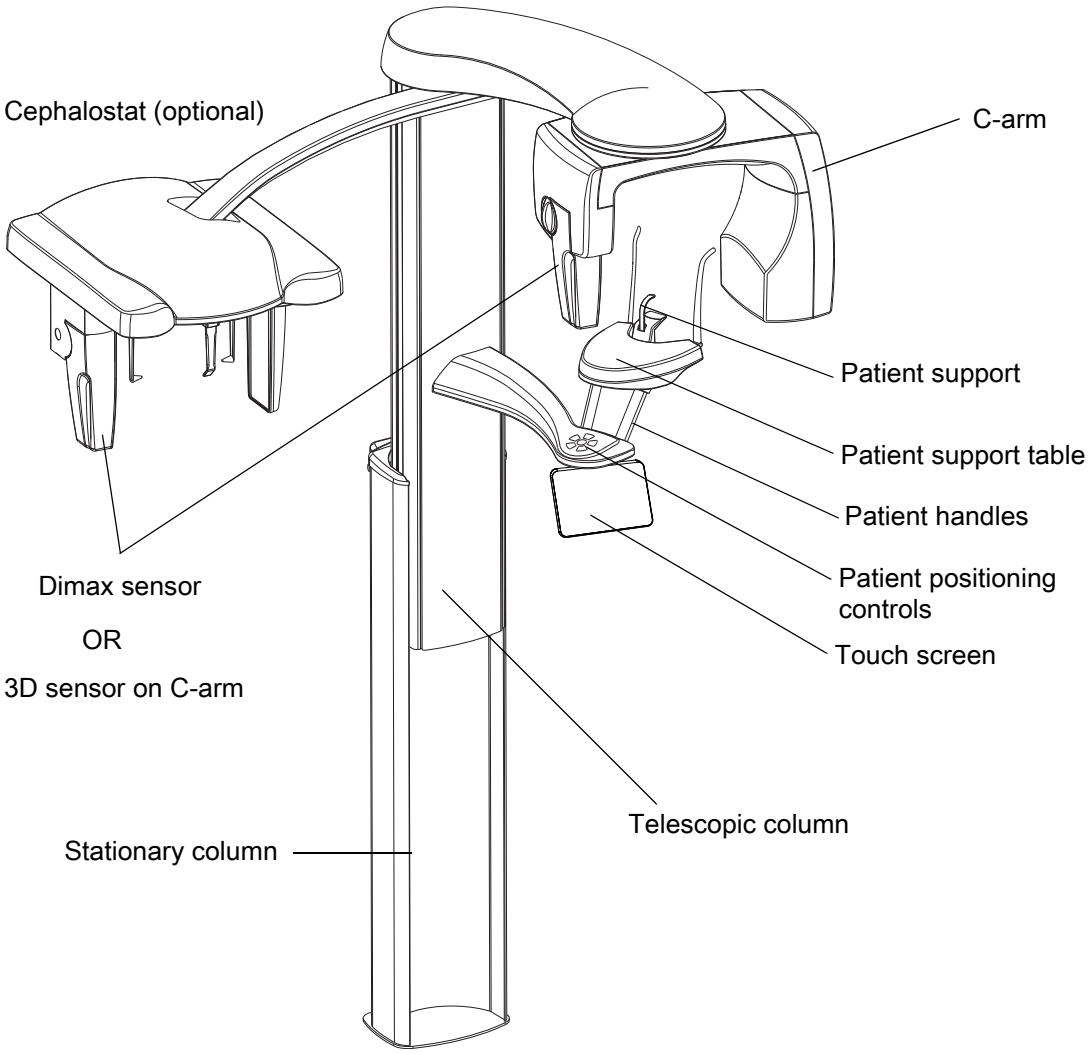


1 X-ray unit

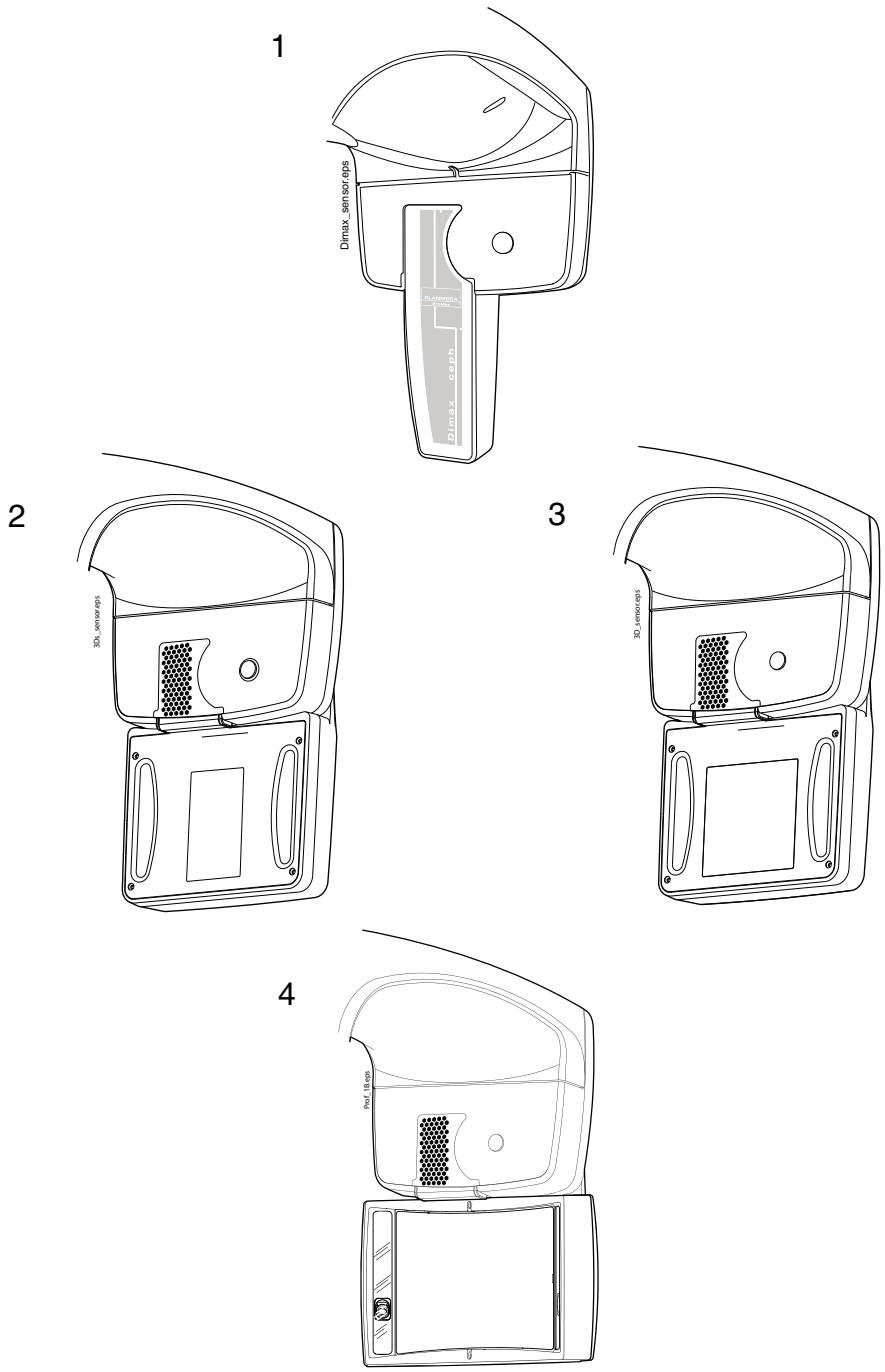
2 3D reconstruction PC

3 Planmeca Romexis program

6.3 General view of X-ray unit



6.4 Sensors



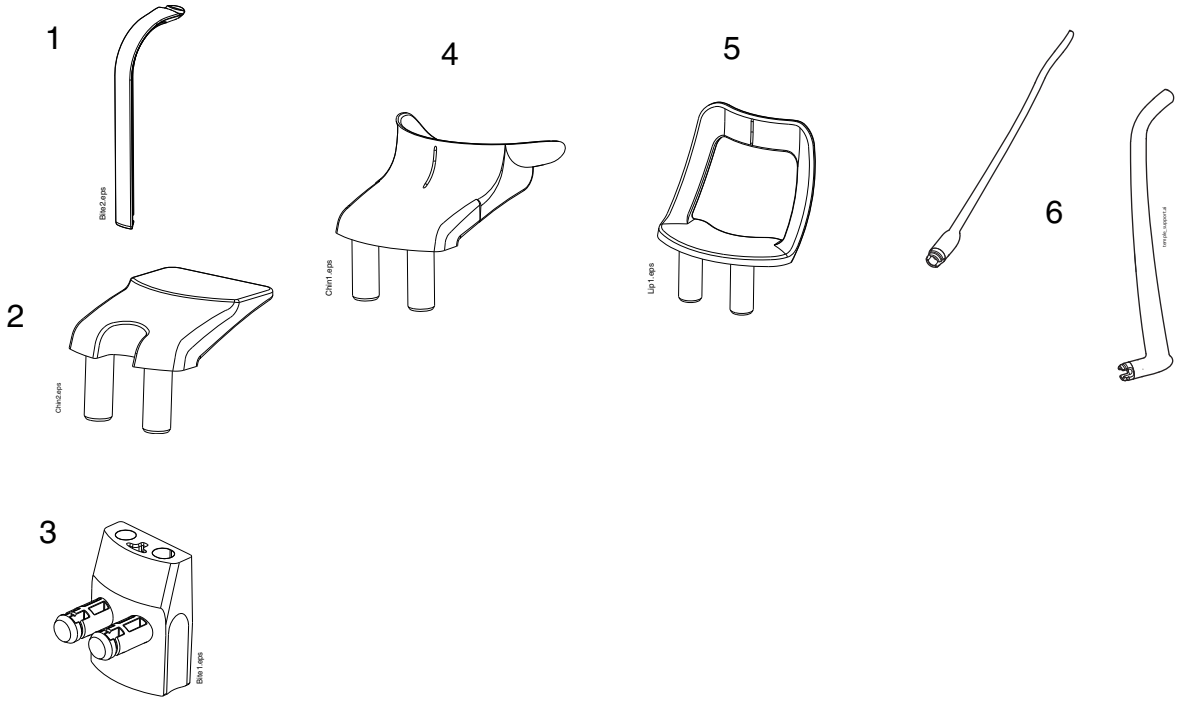
1 Dimax sensor

2 3D sensor for Planmeca ProMax 3D s

3 3D sensor for Planmeca ProMax 3D Classic

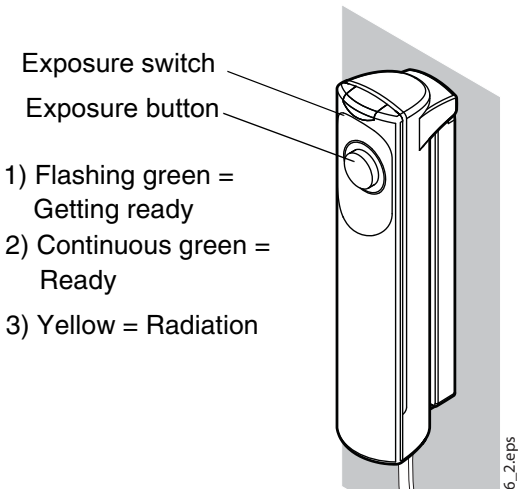
4 ProFace sensor for Planmeca ProMax 3D s and Planmeca ProMax 3D Classic

6.5 Patient supports



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

6.6 Exposure switch



The exposure switch can be mounted on the wall, or it can be hung from the hook provided on the stationary column top if a protected area is within reach.

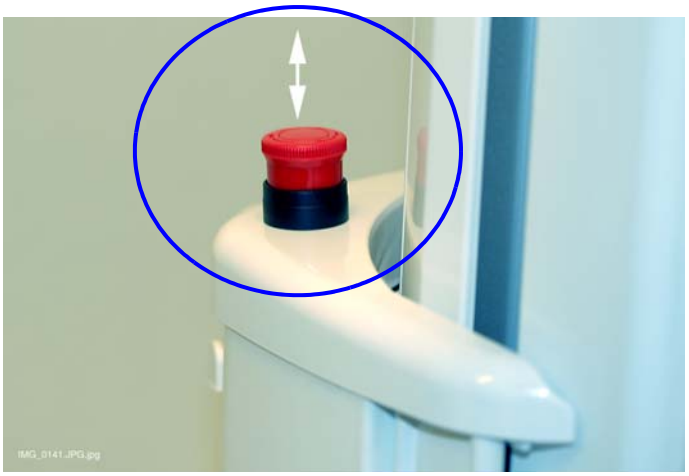
Green lights flash on the exposure button and on the touch screen when the X-ray system is getting ready for an exposure. The green lights stop flashing and stay on continuously when the X-ray system is ready for an exposure.

During exposure yellow radiation warning lights illuminate on the exposure switch and on the touch screen. They indicate that the X-ray unit is generating radiation.

6.7 Emergency stop button

The emergency stop button is located on the top of the stationary column. 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. The up / down movement will stop within a distance of 10 mm (0.4 in.).

A help message will appear on the touch screen. Guide the patient away from the X-ray unit. Then release the emergency stop button. The X-ray unit will automatically restart.



6.8 Touch screen

NOTE

The options shown on the touch screen depend on the unit configuration. The X-ray unit can be upgraded with new programs and features, contact your dealer for further information. The views and values shown in this manual are only examples.

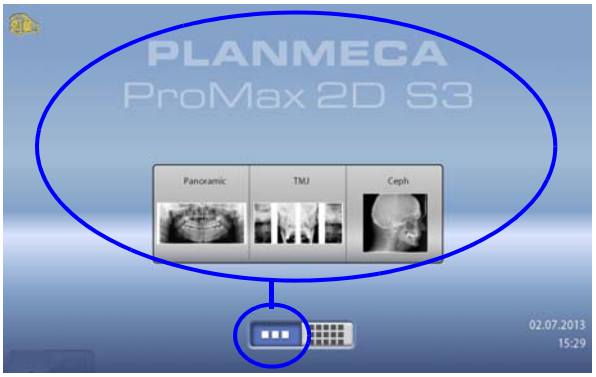
NOTE

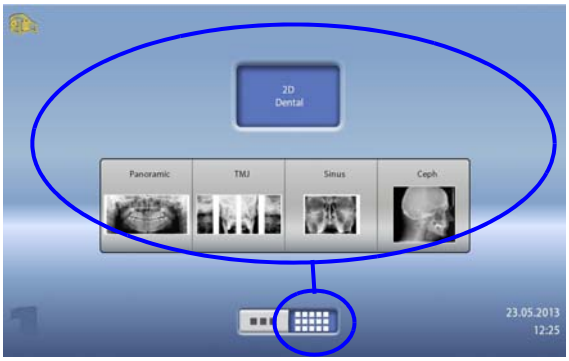
The illustrations shown on the touch screen are based on approximate patient anatomy. The actual exposure area depends on the individual anatomy of the patient.

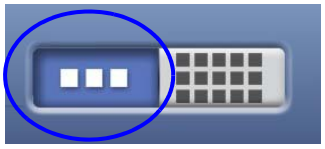
NOTE

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

You can use the buttons at the bottom of the main screen to change the appearance of the main view.



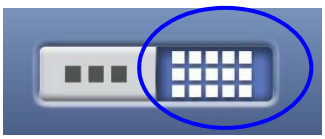




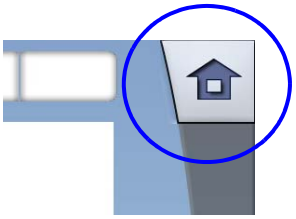
- **Left button:**
  To view the ProMax model and up to five most recently used programs, select the left button at the bottom of the main screen. The most recently used program is shown first. This is the default view of the main screen.

NOTE

If you wish to use fast forward buttons on this view, select Settings > Program > 2200 Program Features > Fast Forward ON. Using a fast forward button takes you directly to the last screen where you can take an exposure.



- **Right button:**
  To view two program bars on top of each other, select the right button at the bottom of the main screen.



- **Home button:**
  To return to the main view from another screen, select the home button at the top right corner of the screen.

- **Forward button:**
  To accept a selection and to go to the next screen, touch the forward button.

- **Fast forward button:**
  To accept a selection and to skip the next screen, touch the fast forward button.

- **Accept button:**
  To accept a selection, touch the green check mark button.

- **Cancel button:**
  To cancel a selection, touch the red cross button.

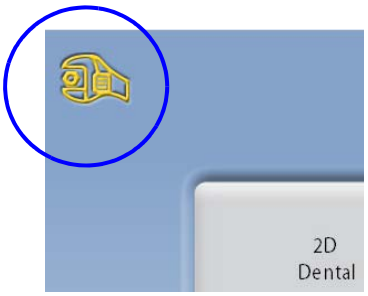
- **Pause button:**
  To pause a function (instead of cancelling it), touch the pause button.

- **Making selections:**
  To make a selection on the touch screen, simply touch a button or a field with your finger or a soft stylus. The selected option is highlighted. To deselect an option, touch the button or field again (or select an other option if available).

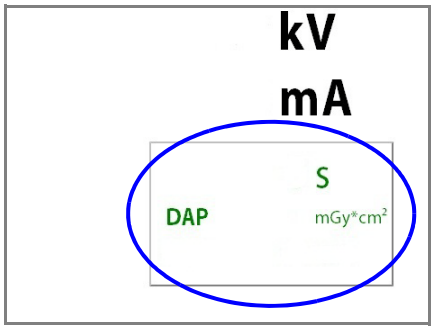
NOTE

Do not use sharp objects to operate the touch screen.

- **Scrolling lists:**
  To scroll a list down or up, slide your finger on the screen.



- **Changing settings:**
  To change a setting, select the settings icon at the top left corner of the main view. This takes you to the settings menu where you can adjust the settings of the X-ray unit. Refer to section 12 “SETTINGS” on page 60 for details.



- **Checking exposure time and DAP values:**
  The estimated values for exposure time and DAP (Dose Area Product) are shown with black text on the touch screen before you take an exposure. The actual values are shown with green text after the exposure.

- **About stand-by mode:**
  The screen will automatically switch to stand-by mode if you do not touch the screen or the exposure button for more than thirty minutes. In stand-by mode the green light on the exposure button indicates that the X-ray unit is switched on even though the screen is dark. The screen will switch on as soon as you touch it again.

- **Selecting demo mode:**
  You can turn demo mode on if you wish to practice or demonstrate the functions of the X-ray unit without radiation (Settings > User > 1300 Operational settings > 1310 Use Mode > 1311 Set Demo Mode).

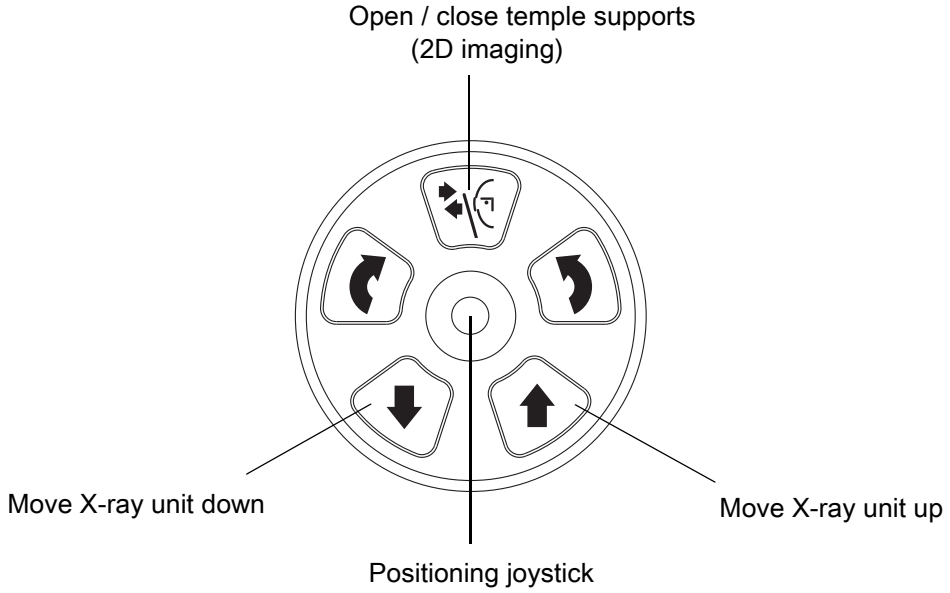
6.9 Patient positioning controls

NOTE

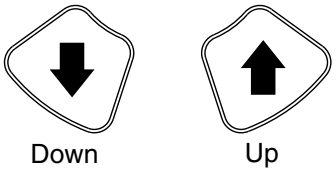
Never allow patients to press the positioning controls when they are positioned in the X-ray unit.

NOTE

Pressing any of the positioning controls (button or joystick) will switch the patient positioning lights on. The lights will automatically switch off after two minutes. To switch them off earlier, press the positioning joystick.



X-ray unit up / down



The X-ray unit up and down buttons are used to adjust the X-ray unit to suit the height of the patient.

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

NOTE

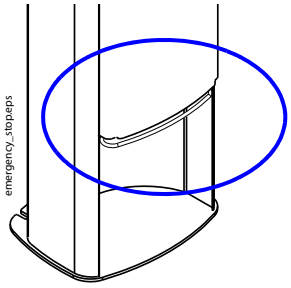
If for some reason either of the buttons gets stuck during operation, you can stop the up / down movement by pressing any of the other control buttons or the positioning joystick. This is a safety measure that guarantees that the up / down movement can be stopped in an emergency.

NOTE

Be careful that the X-ray unit does not hit the ceiling when you press the up button. The maximum height can be adjusted to suit offices with low ceiling, contact your service technician for help.

NOTE

Make sure that there is no object under the telescopic column when you press the down button. If something is in danger of becoming trapped, release the button immediately to stop the movement.



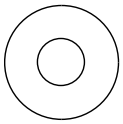
NOTE

The column movement stops automatically if the emergency stop plate at the bottom is pressed upwards. Clear any obstruction before moving the column again.

NOTE

When positioning wheelchair patients always first move the X-ray unit down before you position the patient in the unit.

Positioning joystick



The positioning joystick is used for adjusting the positioning lights. It is used when the patient is positioned in the X-ray unit.

Open / close temple supports

Press the temple support button to open the temple supports in 2D imaging. The temple supports can be closed by pressing the temple support button again.

7 PROGRAMS

The X-ray unit uses SCARA (Selectively Compliant Articulated Robot Arm) technology for arm movements. Planmeca ProMax 2D S3 and Planmeca ProMax 3D units have three joints (S3 = SCARA 3) and allow limitless imaging possibilities. Planmeca ProMax 2D S2 units have two joints (S2 = SCARA 2) and offer a more limited selection of exposure programs.

NOTE

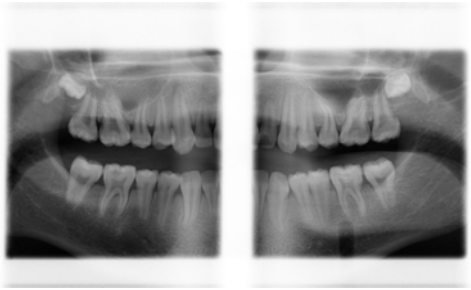
The image width and height depend on the X-ray unit model and sensor. The images shown here are only examples.

7.1 Panoramic programs

Standard

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

Bitewing



This program produces bitewing 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.

NOTE

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

Interproximal

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

NOTE

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

Orthogonal

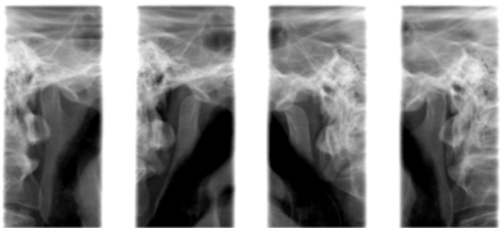
The basic imaging geometry is the same as in the standard panoramic program but the X-ray beam is perpendicular to the jaw.

NOTE

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

7.2 Temporomandibular joint (TMJ) programs

Double lateral



1/2 2/2 2/2 1/2

Lateral exposures of closed (1/2) and open (2/2) temporomandibular joints.

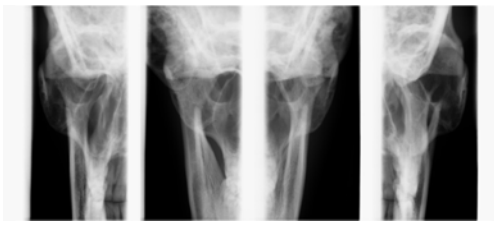
- **Planmeca ProMax 2D S3 & Planmeca ProMax 3D:**

  The imaging position and angle can be adjusted. The default imaging angle is 17°.

- **Planmeca ProMax 2D S2:**

  The imaging position can be adjusted.

Double posteroanterior



1/2 2/2 2/2 1/2

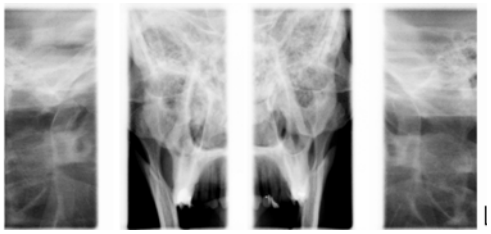
Posteroanterior exposures of closed (1/2) and open (2/2) temporomandibular joints.

- **Planmeca ProMax 2D S3 & Planmeca ProMax 3D:**

  The imaging position and angle can be adjusted. The default imaging angle is 17°.

  Posteroanterior exposures are taken perpendicular to the long axis of the condyle (90° - 17° = 73°). The condyle angle is shown as default angle.

Double lateral-posteroanterior

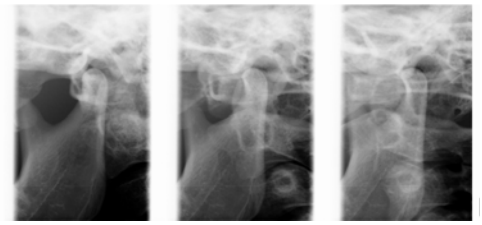


1/2 2/2 2/2 1/2

Lateral (1/2) and posteroanterior (2/2) exposures of closed or open temporomandibular joints. The imaging angles (lateral and PA) are adjustable (default angle: 17°).

Posteroanterior exposures are taken perpendicular to the long axis of the condyle (90° - 17° = 73°). The condyle angle is shown as default angle.

Three angles lateral

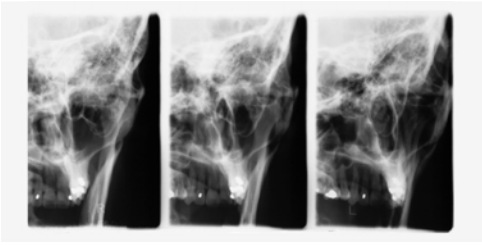


3/3 2/3 1/3

Three lateral multi-angle TMJ exposures (left or right).

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

Three angles posteroanterior



3/3 2/3 1/3

Three posteroanterior multi-angle TMJ exposures (left or right).

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

Posteroanterior exposures are taken perpendicular to the long axis of the condyle (90° - 17° = 73°). The condyle angle is shown as default angle.

7.3 Sinus programs

Posteroanterior

Posteroanterior sinus exposure.

Posteroanterior linear

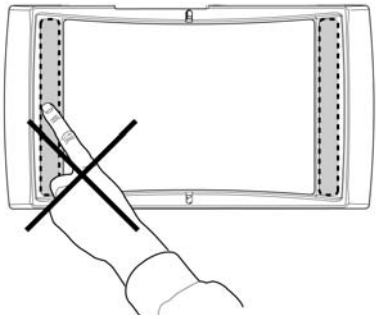
Posteroanterior linear sinus exposure.

Lateral

Lateral exposure of the left or right sinus area.

8 PREPARATIONS FOR EXPOSURE

8.1 Attaching and removing sensor



NOTE

The available sensors are shown in section 6.4 “Sensors” on page 11.

NOTE

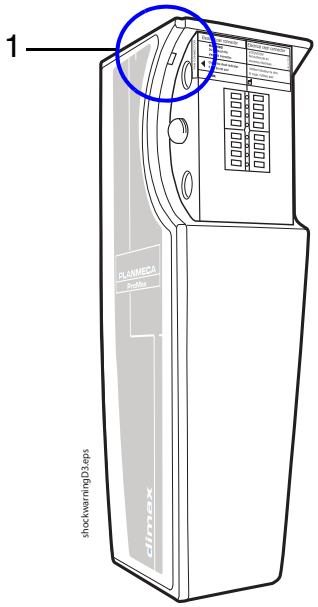
FOR PLANMECA PROMAX 2D X-RAY UNITS:
If the Dimax sensor is attached to the cephalostat (optional), the sensor must be moved to the C-arm as described below.

NOTE

FOR PROFACE SENSOR:
Do not touch the glass windows when you hold the sensor. Fingerprints or other stains on the glass surface destroy image quality.

NOTE

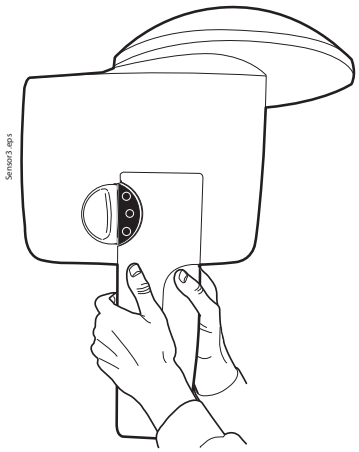
FOR PLANMECA PROMAX 3D X-RAY UNITS:
If you wish to use a Dimax sensor, select Settings > Program > 2200 Program Features > Panoramic System Dimax and change the sensor as described below.



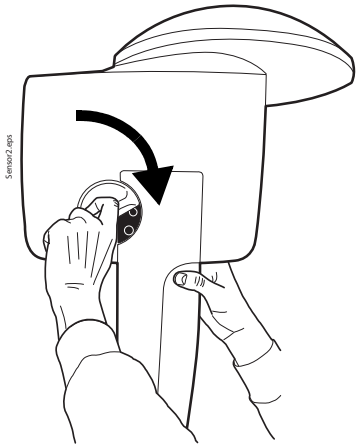
CAUTION

Do not drop the sensor. Planmeca limited warranty does not cover damage which is due to misuse, e.g. dropping the sensor, neglect, or any cause other than ordinary use.
Do not use the sensor if the shock indicator (1) is red - contact your service technician for help.
If you have any reason to believe that the sensor might be faulty, take a test exposure before taking a patient exposure.

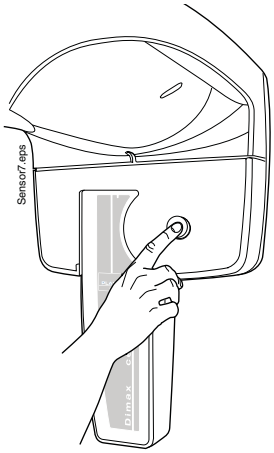
8.1.1 Attaching sensor to C-arm



1. Push the sensor onto the connector on the C-arm.



2. Turn the locking knob over the fastening mechanism. This will secure the sensor in position.

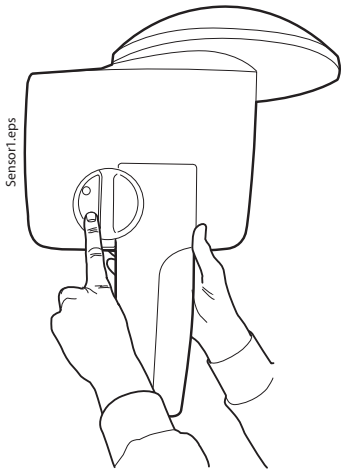


3. Push in the C-arm electrical connector button on the other side. This will make the electrical connection between the sensor and C-arm.

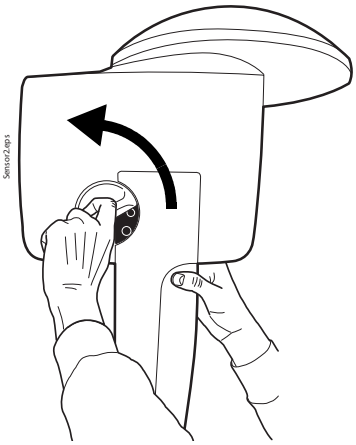
8.1.2 Detaching sensor from C-arm

NOTE

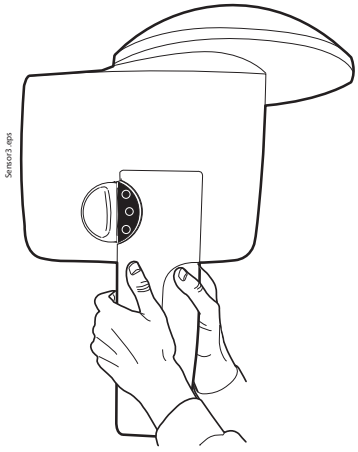
Do not remove the sensor during imaging process.



1. Push in the C-arm electrical connector. This will disconnect the electrical connection between the sensor and C-arm.

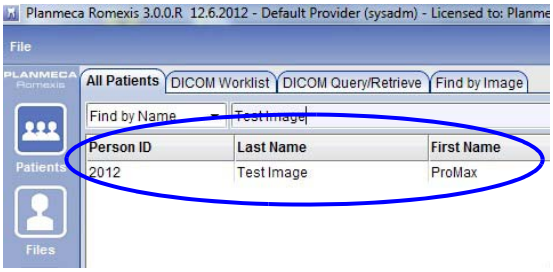


2. Turn the locking knob 180 degrees. This will release the locking mechanism.

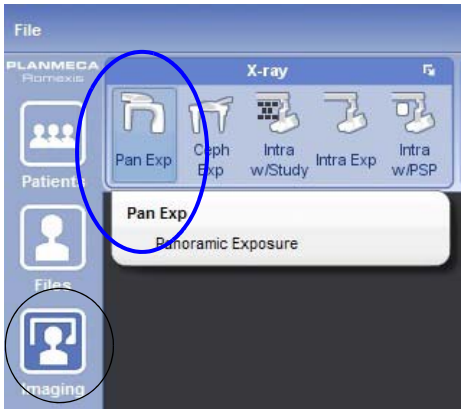


3. Carefully pull the sensor out.

8.2 Preparing Planmeca Romexis



First select the patient.



Then click the panoramic exposure button.

Refer to the Planmeca Romexis User's Manual for details on Romexis functions.

8.3 Preparing patient

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 arm structures of the X-ray unit.

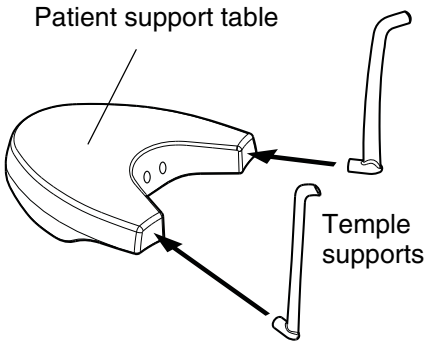
NOTE

High contrast objects, such as gold teeth or amalgam, may cause artefacts in the image.

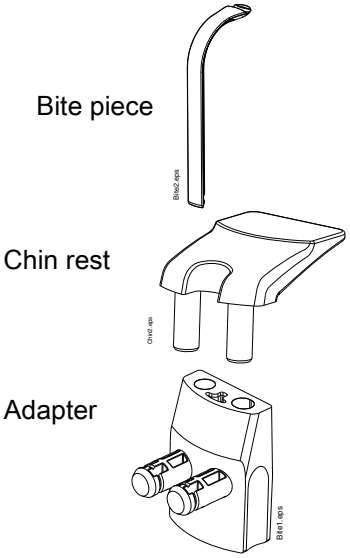
Place a protective lead apron over the patient's back if required.

9 PANORAMIC EXPOSURE

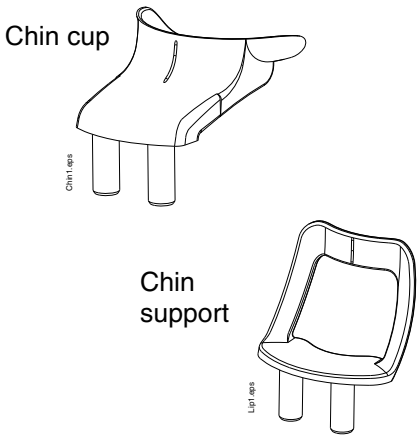
9.1 Before exposure



Insert the temple supports into the holes in the patient support table as shown.



Insert the chin rest and a bite piece into the adapter. Insert the adapter into the holes in 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.

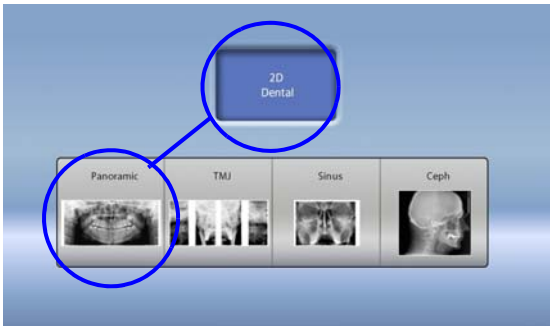
NOTE

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

9.2 Selecting exposure settings

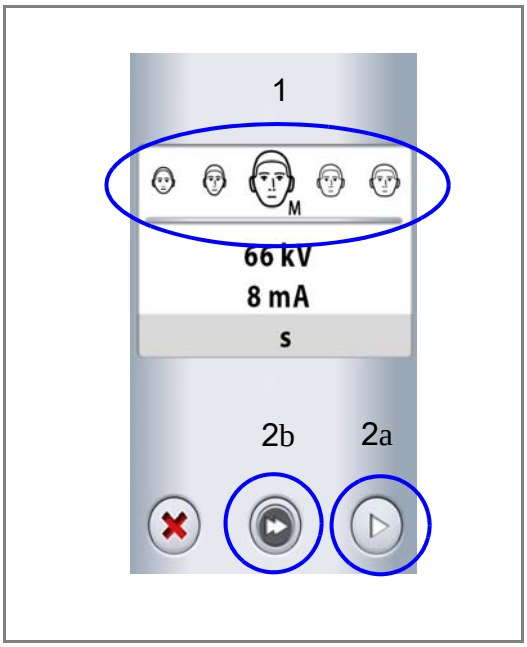
Refer to section 6.8 “Touch screen” on page 14 for general information on how to make or cancel selections on the touch screen.

9.2.1 Selecting program



Select the panoramic program.

9.2.2 Selecting patient size



1. Select the patient size:
   - XS = Child
   - S = Small adult
   - M = Medium-sized adult
   - L = Large adult
   - XL = Extra large adult
2. Select
   a. the forward button or
   b. the fast forward button if you want to skip the next screen.

NOTE

Selecting child patient (XS) will automatically reduce the exposure area and patient dose.

NOTE

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

9.2.3 Adjusting exposure values for current exposure

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.

NOTE

FOR X-RAY UNITS WITH DIMAX SENSOR:
The preset exposure values are optimized for taking exposures at enhanced resolution (Romexis setting). You can use lower exposure values when taking exposures at normal resolution.

NOTE

Always try to minimize the radiation dose to the patient.

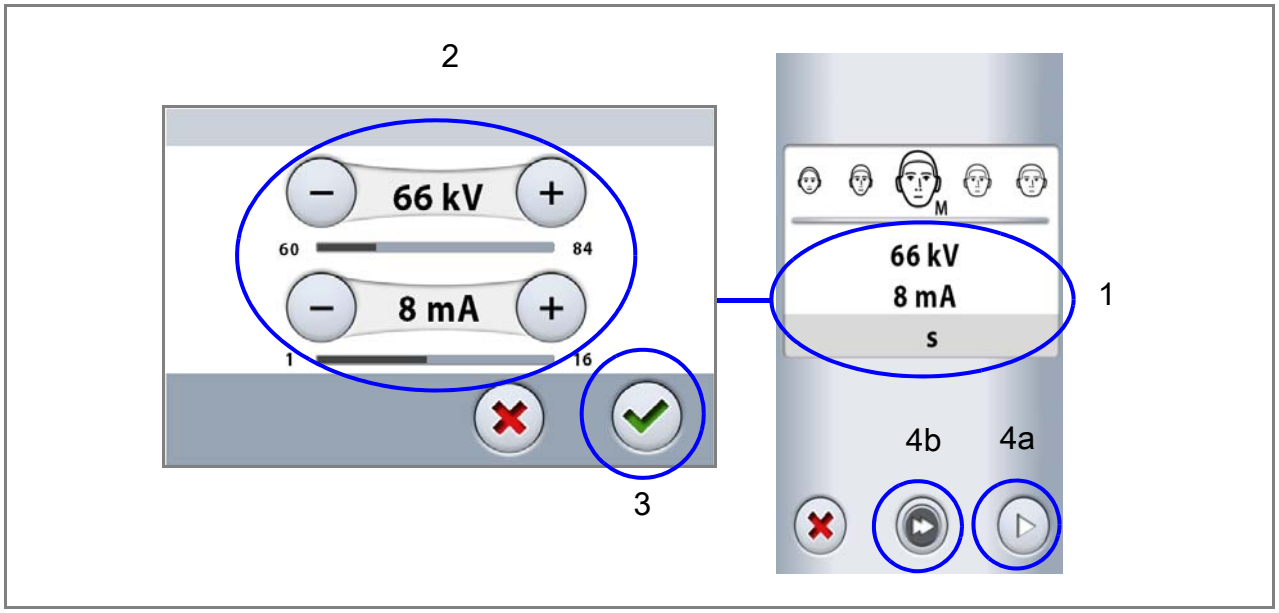
The preset exposure values are shown in the following table.

Factory presets for panoramic exposures

PATIENT SIZE	kV VALUE	mA VALUE
Child (XS)	62	5
Small adult (S)	64	6.3
Medium-sized adult (M)	66	8
Large adult (L)	68	10
Extra large adult (XL)	70	12.5

If you need to adjust the preset exposure values for this exposure:

1. Select the kV / mA field.
2. Use the minus or plus buttons to set the exposure values you wish to use. To improve the image contrast, reduce the kV value. To reduce the radiation dose, reduce the mA value.
3. Select the green check mark button.
4. Select
   a. the forward button or
   b. the fast forward button if you want to skip the next screen.



NOTE

You can adjust the preset exposure values permanently as described in section 12.2.1 “Programs (2100)” on page 68.

9.2.4 Selecting program type

Select the program type from the drop-down menu at the top. Refer to section 7.1 “Panoramic programs” on page 19 for details.

9.2.5 Selecting jaw size and shape

Use the jaw size and shape button on the left of the screen to select the

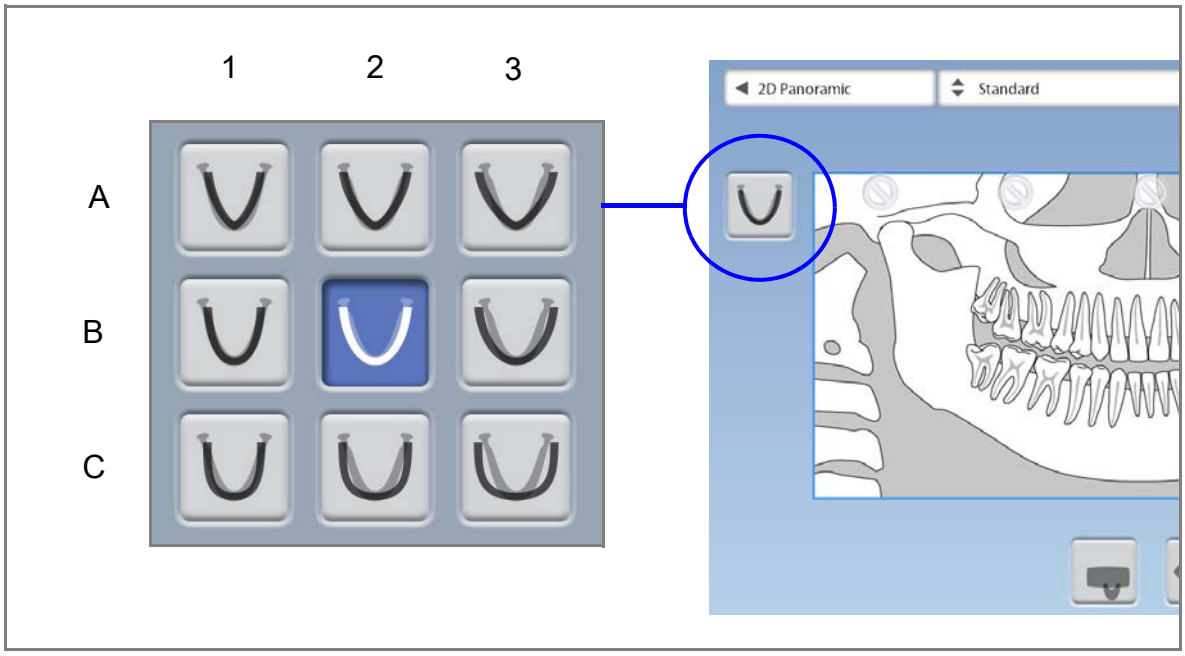
- jaw size of the patient:

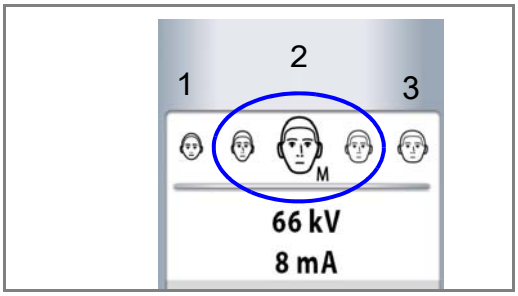
1. Small
2. Medium
3. Large

and

- jaw shape of the patient:

A. V-shaped
B. Standard
C. U-shaped





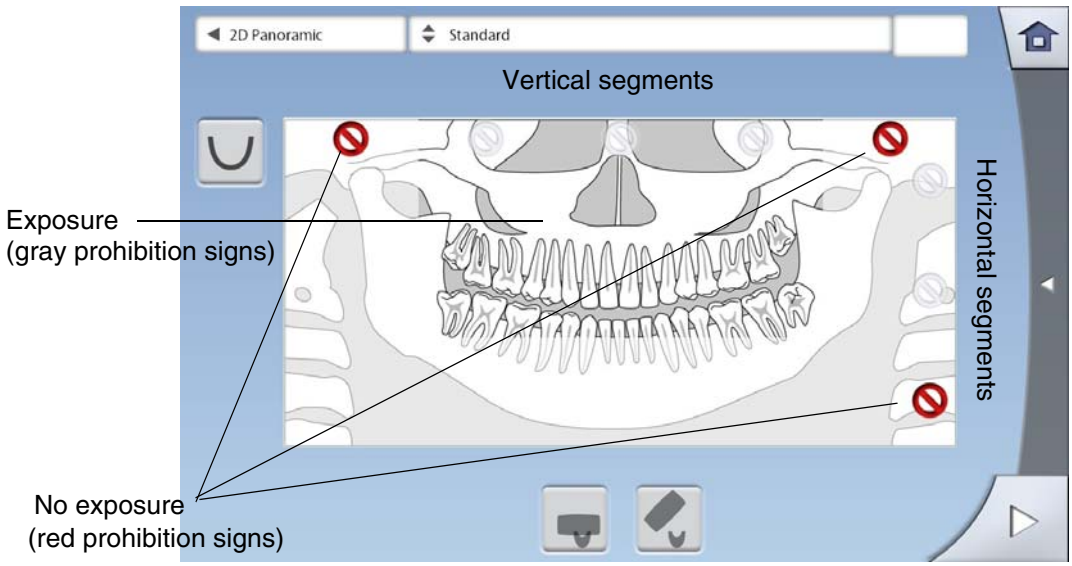
NOTE

The jaw size will automatically change according to the selected patient size (XS = 1, S & M & L = 2, XL = 3).

9.2.6 Selecting segmentation

The function allows you to take exposures of different jaw segments. This will reduce the radiation dose of the patient.

The illustration on the screen is divided into three horizontal segments and five vertical segments. Select the segments that should NOT be exposed. The prohibition signs of these segments turn red.



NOTE

It is not possible to expose two separate horizontal segments.

NOTE

The illustration on the screen is only an example. The actual size of the exposed area depends on the patient's individual anatomy.

9.3 Patient positioning

9.3.1 Selecting patient entry position

Use the buttons at the bottom of the screen to select the patient entry position.

- Selecting the left button will position the C-arm around the patient support. This is the traditional closed patient entry position.
- Selecting the right button will move the C-arm to the back, away from the patient positioning area. This full view position allows you to monitor and adjust the patient's position freely from all directions.

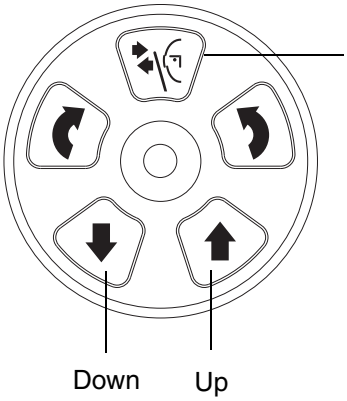
NOTE

If needed, the full view position (right button) can be disabled (Settings > User > 1300 Operational settings > 1330 Patient positioning). This might be necessary if there is no space for the C-arm to move back.

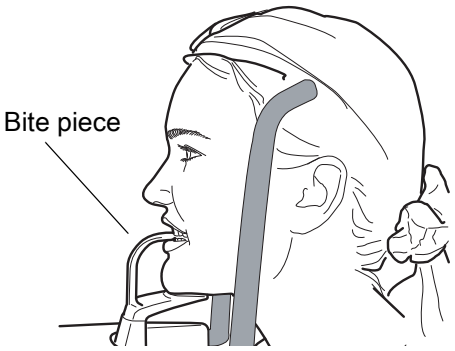
NOTE

Planmeca ProMax 2D S2 units offer only one patient entry position. This entry position is the closed patient entry position where the C-arm is positioned around the temple supports.

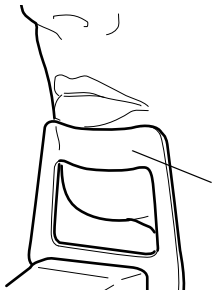
9.3.2 Positioning patient in X-ray unit



1. Press the temple support button to open the temple supports if they are not already open.
2. Guide the patient to the X-ray unit.
3. Adjust the X-ray unit to suit the height of the patient. To do this, press either of the height adjusting buttons until the chin rest is approximately level with the patient's lower jaw.



4. Ask the patient to step forward, grasp the patient handles, stretch and straighten their back and neck, and bite the bite piece. The upper and lower incisors must be in the groove in the bite piece.



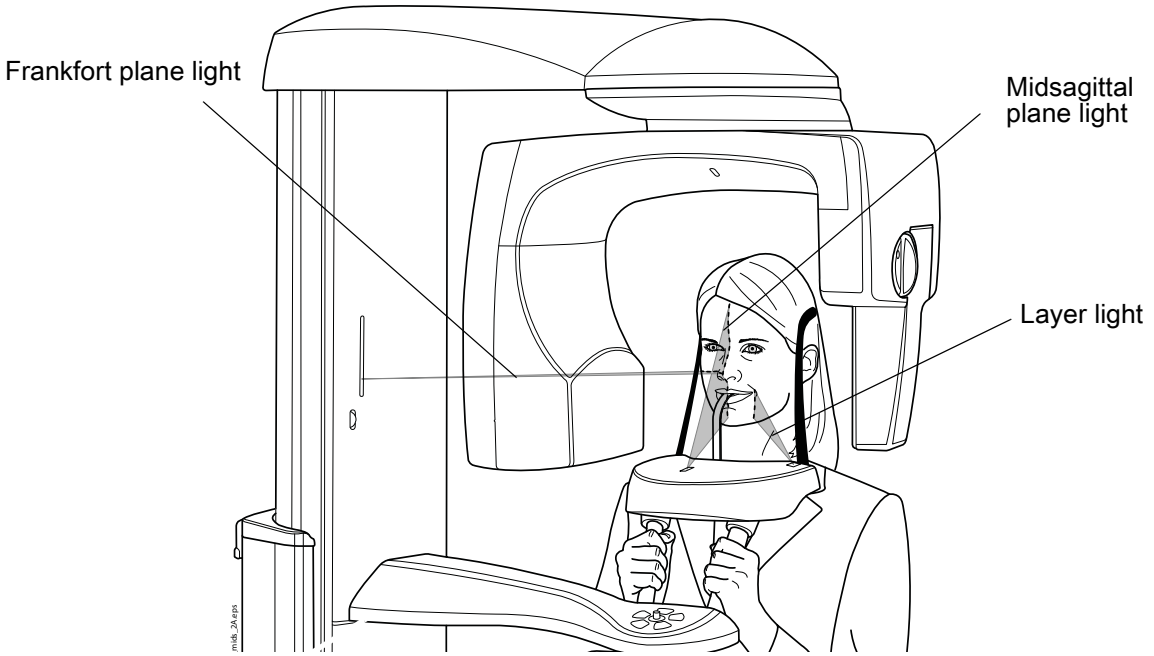
NOTE

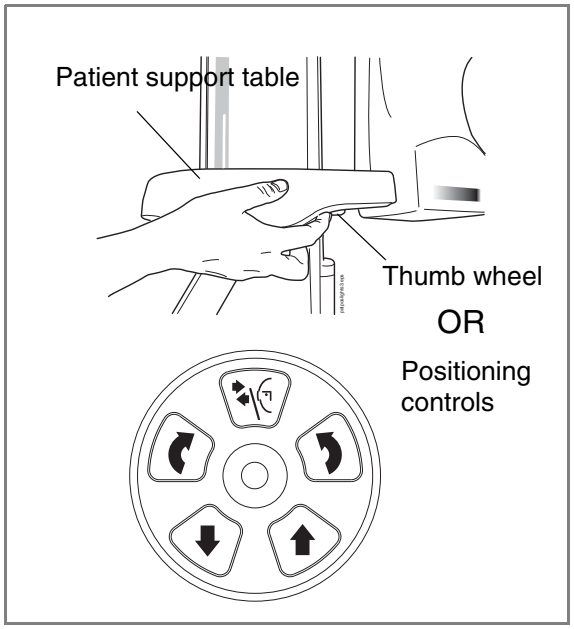
If you are using the chin support, position the patient so that the chin touches the top bar as shown.

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.

The positioning lights come on:





The positioning lights will automatically switch off after two minutes. To switch them off earlier, press the positioning joystick.

To switch them back on, do one of the following:

- Press the thumb wheel on the underside of the patient support table.
- Press any of the positioning controls (button or joystick).

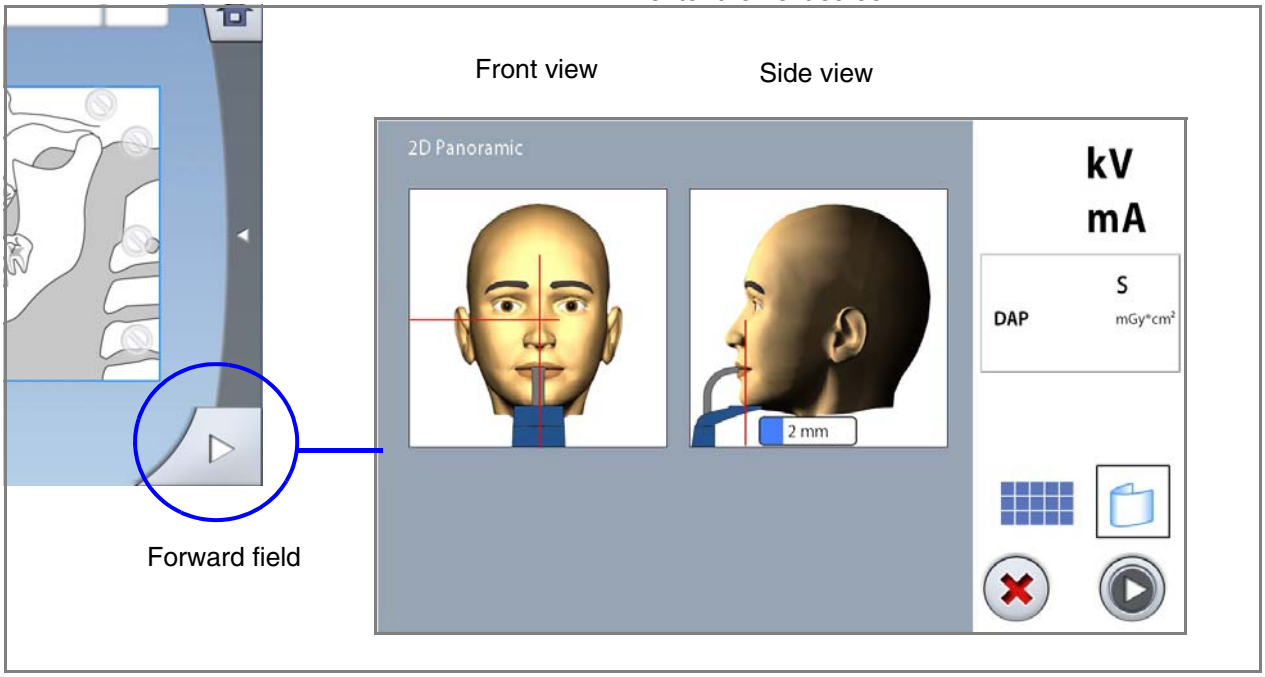
9.3.3 Adjusting patient's head position

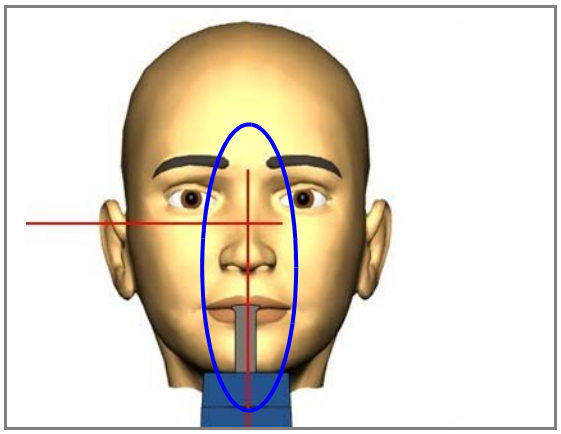
The positioning lights and the illustrations on the touch screen help you to position the patient's head correctly.

NOTE

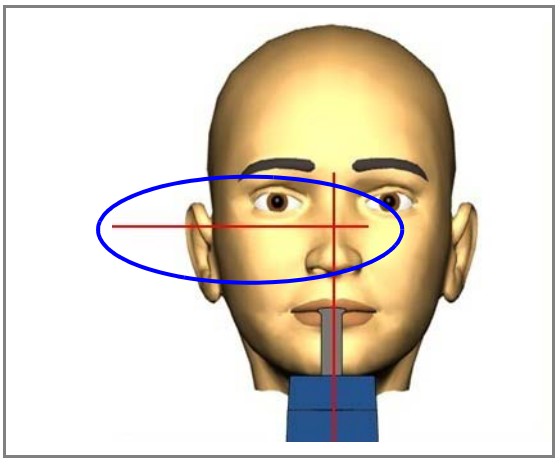
The illustrations are for guidelines only.

1. Use the forward field at the bottom right corner to enter the next screen.

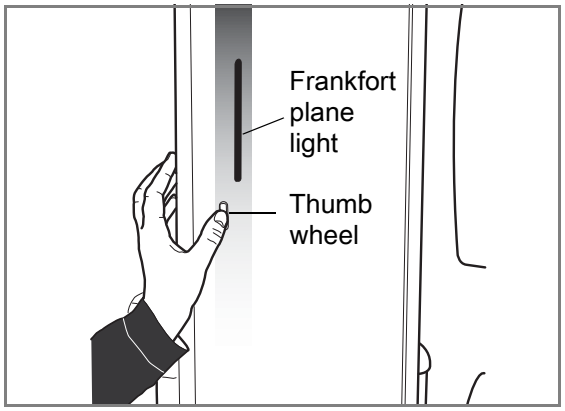




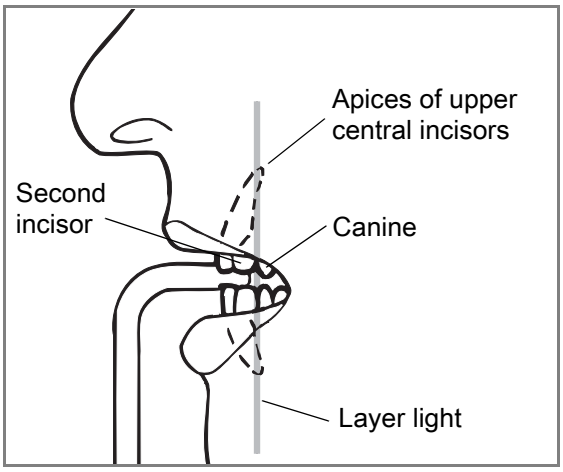
2. Position the patient's midsagittal plane so that it coincides with the midsagittal plane light.



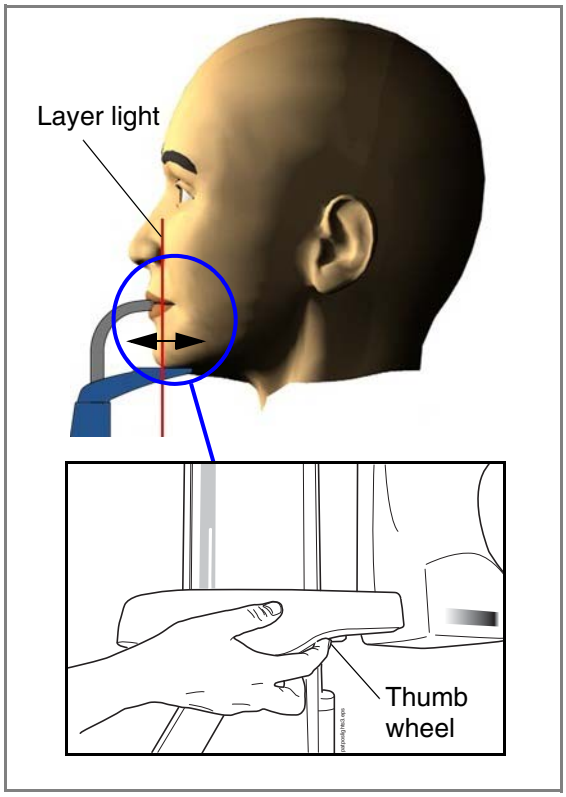
3. Position the patient's Frankfort plane so that it coincides with the Frankfort plane light. To do this, adjust the tilt of the patient's head by raising or lowering the X-ray unit with the height adjusting buttons. The patient's back and neck should be straight.



The Frankfort plane light is located inside the column. The light's position can be adjusted if needed. This is done by rotating the thumb wheel below the light slot.



4. Position the apices of the patient's upper central incisors within the image layer of the X-ray unit.



To do this, rotate the thumb wheel on the underside of the patient support table to move the layer light 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 image layer.

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

NOTE

Make sure that you have selected the correct patient and exposure mode in the Planmeca Romexis program.

9.4 Selecting Dynamic Exposure Control (DEC)

NOTE

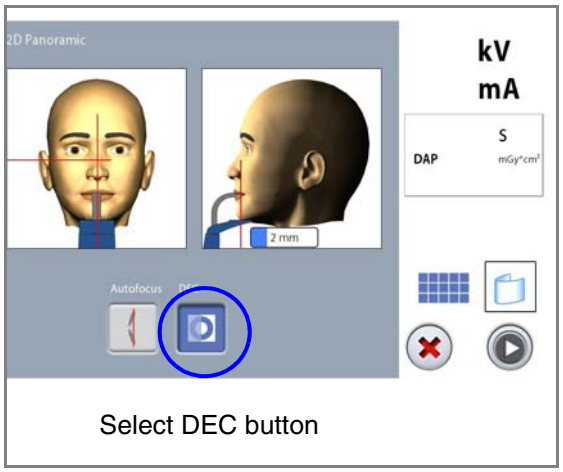
Dynamic Exposure Control (DEC) is an optional feature for Planmeca ProMax 2D units.

NOTE

DEC and vertical segmenting can be used simultaneously. However, the right-most vertical segment cannot be deselected.

NOTE

DEC and horizontal segmenting cannot be used simultaneously.



Select DEC button

Select the DEC button.

Dynamic Exposure Control (DEC) automatically provides optimal exposure values for each patient during exposure. The 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.

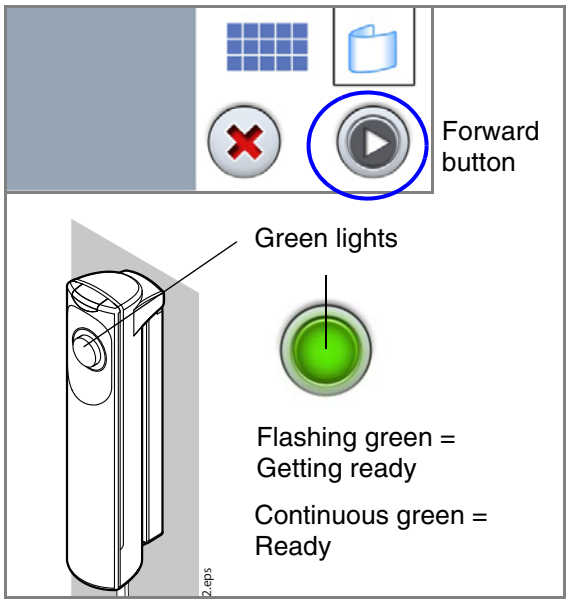
When DEC is switched on the exposure values are automatically adjusted during exposure. The kV value is adjusted by max ±4 kV and the mA value is adjusted by max +4 / -3 mA within the available scale.

9.4.1 Adjusting DEC density

If the images appear to be too bright or too dark, DEC density can be adjusted. Select Settings > Program > 2200 Program Features > Pan DEC Density and use the minus or plus sign to adjust the setting.

The setting can be adjusted between 20% (lower exposure values -> brighter image) and 200% (higher exposure values -> darker image). The recommended setting is 100% (default setting).

9.5 Taking an exposure

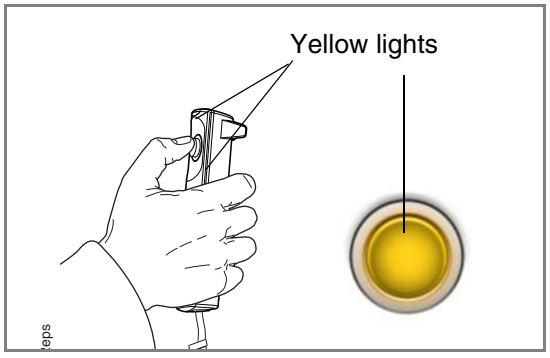


1. Select the forward button.

   Green lights flash on the touch screen and exposure button when the X-ray system is getting ready for an exposure. The green lights stop flashing and stay on continuously when the X-ray system is ready for an exposure.

2. Ask the patient to swallow, place their tongue flat against the roof of the mouth and stay as still as possible.

3. Move to a protected area.



4. Press and hold down the exposure button for the duration of the exposure.

   The C-arm moves around the patient's head. During exposure yellow radiation warning lights illuminate on the exposure switch and on the touch screen, and you hear a radiation warning tone. Additionally, a radiation warning symbol is shown on the touch screen.

NOTE

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

5. The image is shown on the computer screen.
   - Note that you must accept the image in the Planmeca Romexis program. Refer to the Romexis User's Manual.

6. Guide the patient away from the X-ray unit.

9.6 Taking an exposure with Autofocus

NOTE

Autofocus is an optional feature for Planmeca ProMax 2D S3 units. It is available for standard, interproximal and orthogonal panoramic programs.

NOTE

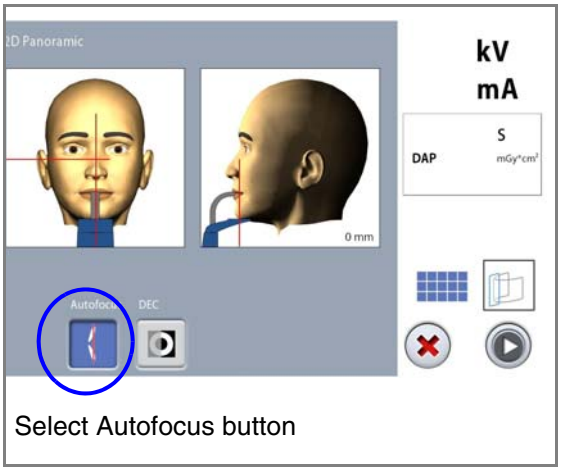
To turn Autofocus on, select Settings > Program > 2200 Program Features > Autofocus ON.

NOTE

The layer light is switched off when Autofocus is selected.

NOTE

If Autofocus is selected, DEC is automatically switched off for the first exposure (scout image).



Select Autofocus button

1. Select the Autofocus button.

   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.

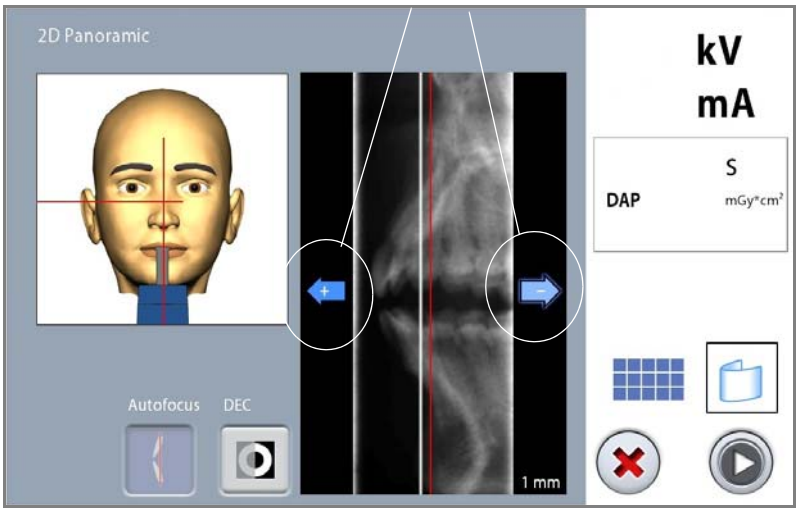
   The exposure is taken in two stages and the C-arm moves twice.

2. Take the first exposure as described in section 9.5 “Taking an exposure” on page 38. The first exposure is a short, low-dose exposure during which the optimal position for the image layer is calculated.

3. The image appears on the touch screen and on the computer screen. The calculated layer position is shown with a white line on the image.

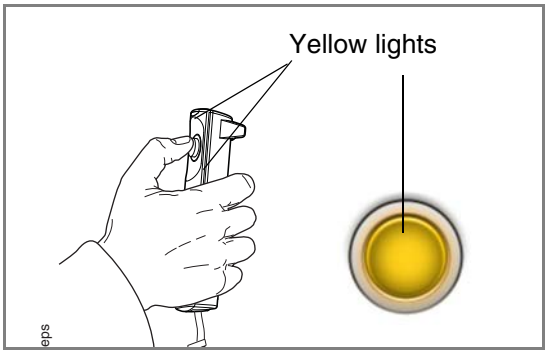
- If needed, you can adjust the layer position by using the plus or minus sign on the touch screen. The new position is shown with a red line on the image.

Adjust layer position manually



NOTE

Make sure that the patient does not move between exposures.



4. Press and hold down the exposure button again to take the second exposure. The second exposure will produce the actual image and the C-arm will now move through one complete exposure cycle.

   During exposure yellow radiation warning lights illuminate on the exposure switch and on the touch screen, and you hear a radiation warning tone. Additionally, a radiation warning symbol is shown on the touch screen.

NOTE

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

5. The image is shown on the computer screen.
   - Note that you must accept the image in the Planmeca Romexis program. Refer to the Romexis User's Manual.

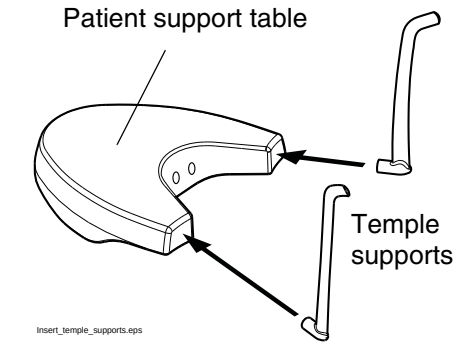
6. Guide the patient away from the X-ray unit.

10 TEMPOROMANDIBULAR JOINT (TMJ) EXPOSURE

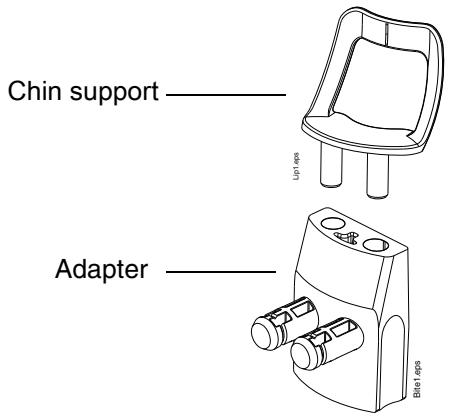
Double TMJ programs produce closed and open views of the left and right temporomandibular joints.

Three angle TMJ programs produce three exposures with different angles from the left or right temporomandibular joint.

10.1 Before exposure



Insert the temple supports into the holes in the patient support table as shown.

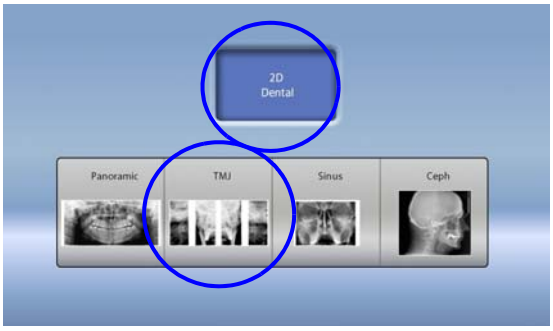


Insert the chin support into the adapter. Insert the adapter into the holes in the patient support table.

10.2 Selecting exposure settings

Refer to section 6.8 “Touch screen” on page 14 for general information on how to make or cancel selections on the touch screen.

10.2.1 Selecting program



Select the TMJ program.

10.2.2 Selecting patient size

Select the patient size as described in section 9.2.2 “Selecting patient size” on page 28.

10.2.3 Adjusting exposure values for current exposure

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

NOTE

Always try to minimize the radiation dose to the patient.

The preset exposure values are shown in the following tables.

Factory presets for lateral and lateral-PA TMJ exposures

PATIENT SIZE	kV VALUE	mA VALUE
Child (XS)	62	4
Small adult (S)	64	5
Medium-sized adult (M)	66	6.3
Large adult (L)	68	8
Extra large adult (XL)	70	10

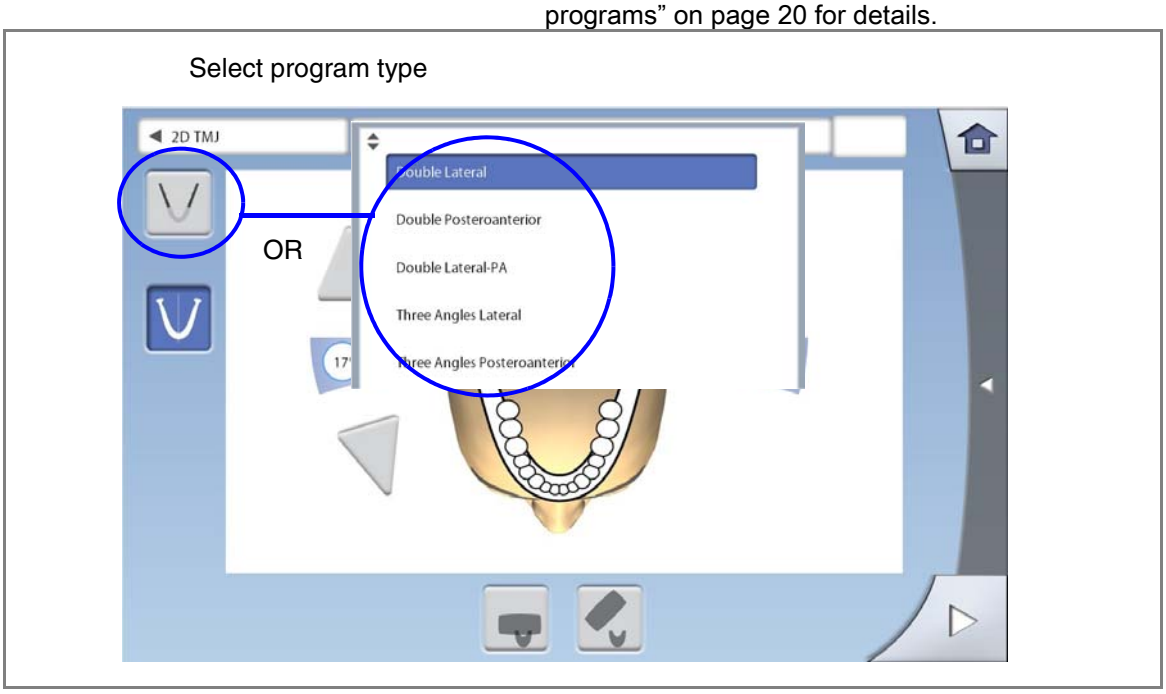
Factory presets for posteroanterior TMJ exposures

PATIENT SIZE	kV VALUE	mA VALUE
Child (XS)	64	4
Small adult (S)	66	5
Medium-sized adult (M)	68	6.3
Large adult (L)	70	8
Extra large adult (XL)	72	10

You can adjust the preset exposure values (kV and mA) as described in section 9.2.3 “Adjusting exposure values for current exposure” on page 29.

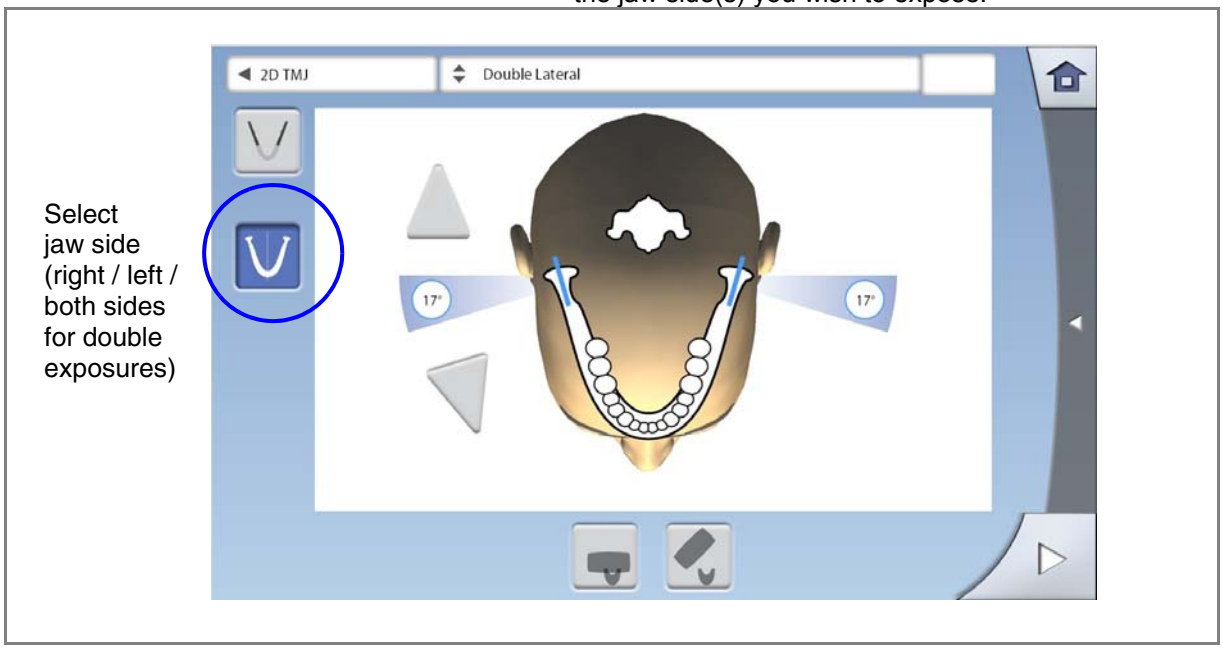
10.2.4 Selecting program type

Select the program type from the drop-down menu at the top. Alternatively, you can use the first button on the left of the screen to select the program type you wish to use. Refer to section 7.2 “Temporomandibular joint (TMJ) programs” on page 20 for details.



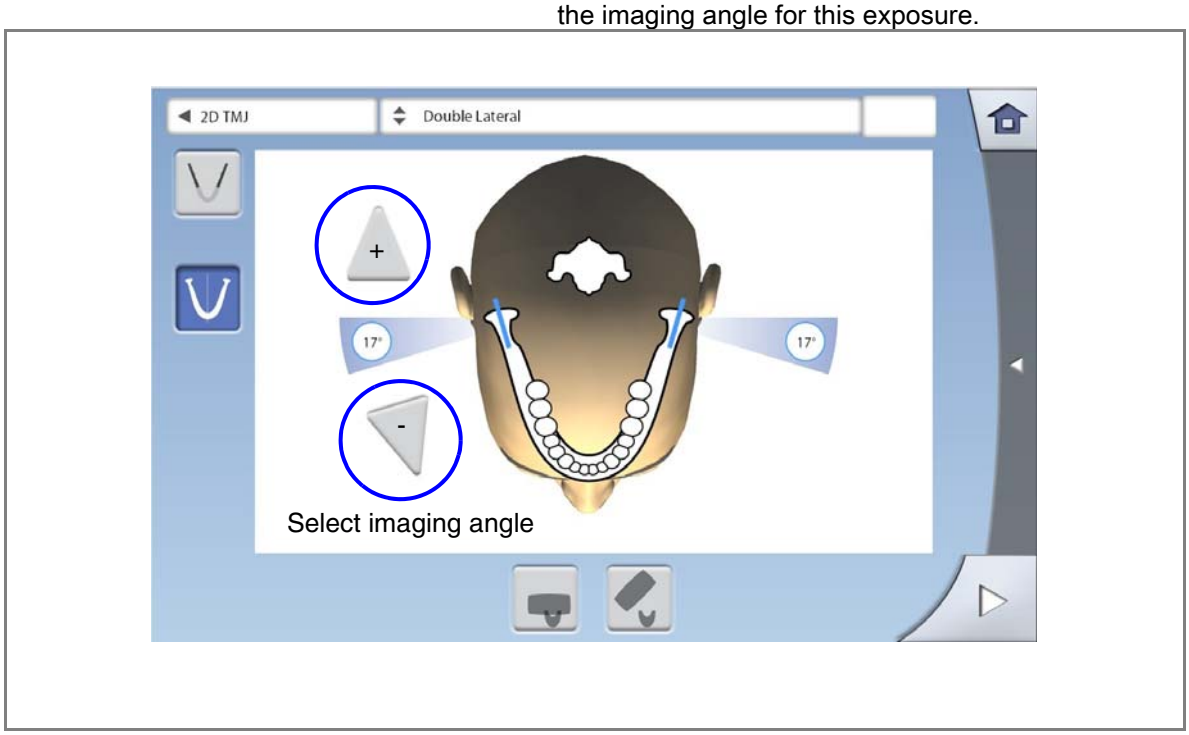
10.2.5 Selecting jaw side

Use the second button on the left of the screen to select the jaw side(s) you wish to expose.



10.2.6 Selecting imaging angle (Planmeca ProMax 2D S3 & Planmeca ProMax 3D units)

Use the arrow buttons in the middle of the screen to select the imaging angle for this exposure.



NOTE

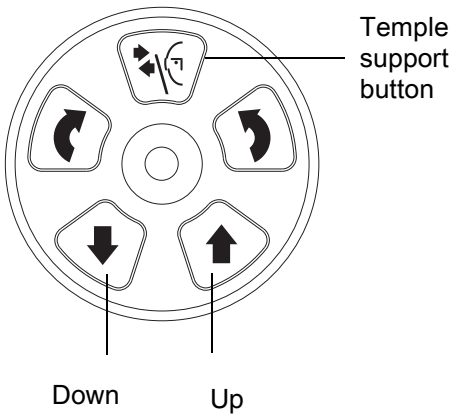
To change the default angle (17 degrees), select Settings > Program > 2200 Program Features > Lateral TMJ Default Angle or PA TMJ Default Angle and adjust the setting with the plus or minus sign.

10.3 Patient positioning

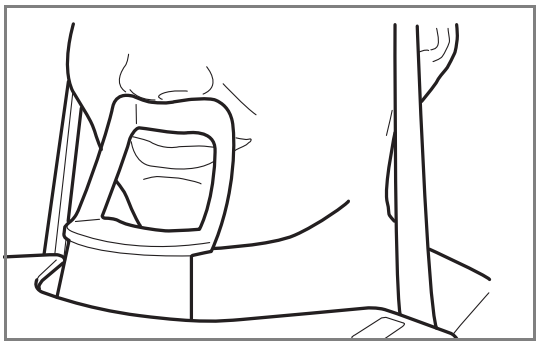
10.3.1 Selecting patient entry position

Select the patient entry position as described in section 9.3.1 “Selecting patient entry position” on page 32.

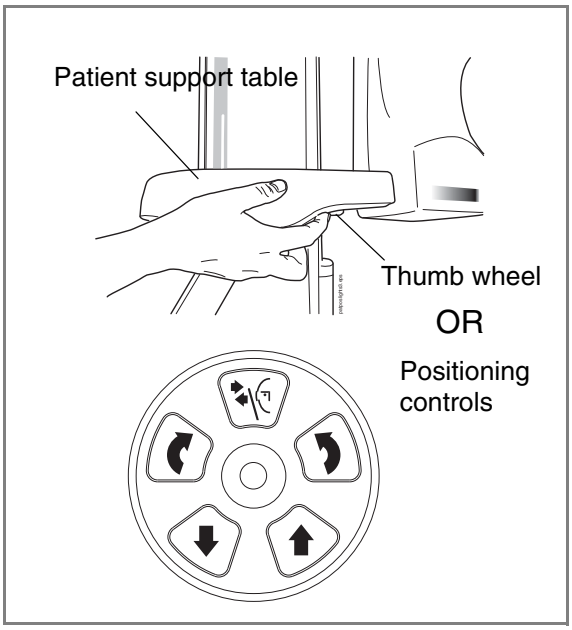
10.3.2 Positioning patient in X-ray unit



1. Press the temple support button to open the temple supports if they are not already open.
2. Guide the patient to the X-ray unit.
3. Adjust the X-ray unit to suit the height of the patient. To do this, press either of the height adjusting buttons until the opening in the chin support is approximately level with the patient’s mouth.



4. Ask the patient to step forward, grasp the patient handles, stretch and straighten their back and neck, 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, and their teeth must be together.



The positioning lights for the midsagittal plane, Frankfort plane (and TMJ position, depending on unit configuration) come on. The lights will automatically switch off after two minutes. To switch them off earlier, press the positioning joystick.

To switch them back on, do one of the following:

- Press the thumb wheel on the underside of the patient support table.
- Press any of the positioning controls (button or joystick).

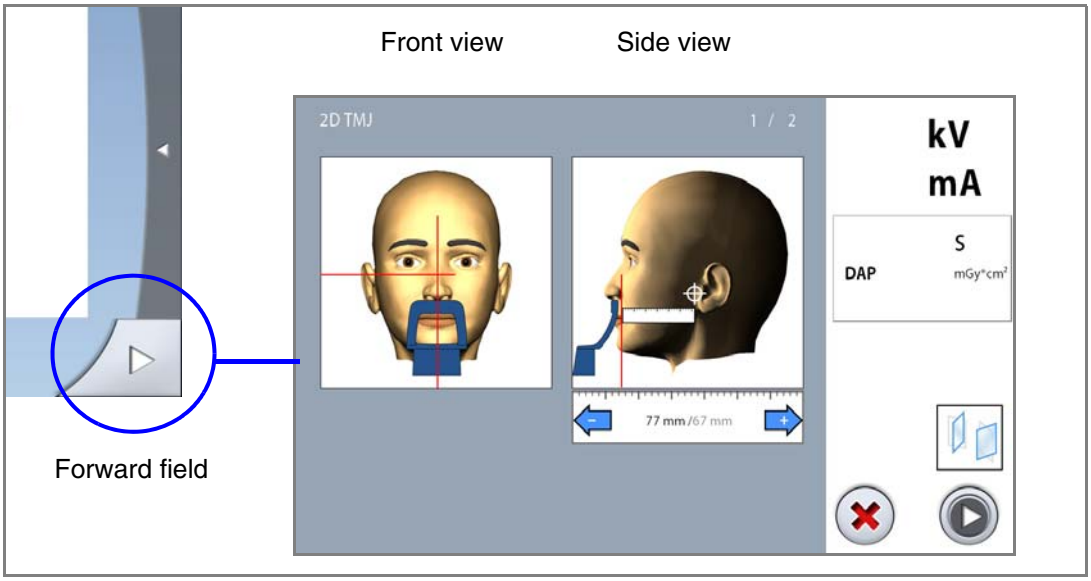
10.3.3 Adjusting patient's head position (Planmeca ProMax 2D S2 units)

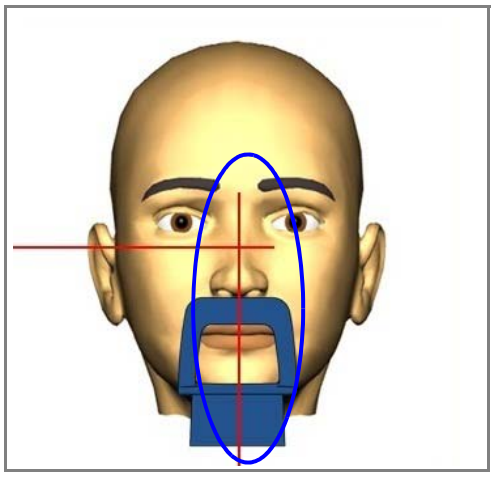
The positioning lights and the illustrations on the touch screen help you to position the patient's head correctly.

NOTE

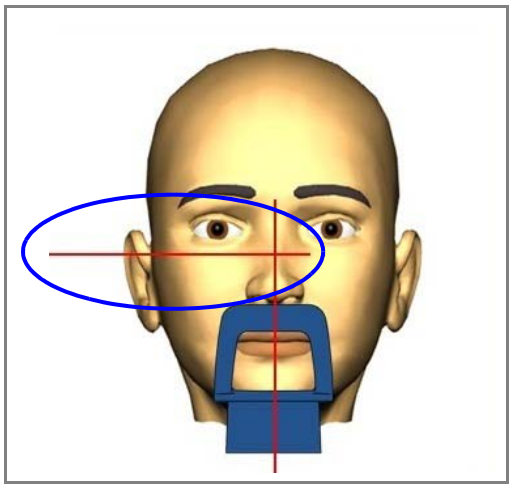
The illustrations are for guidelines only.

1. Use the forward field at the bottom right corner to enter the next screen.

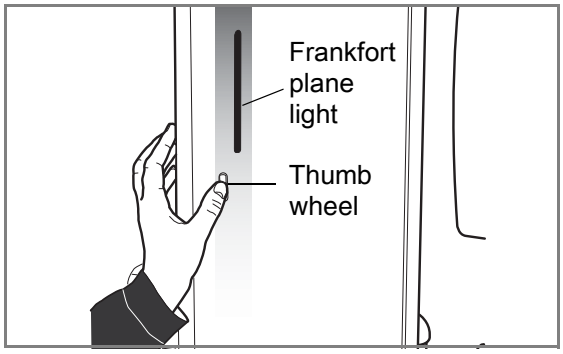




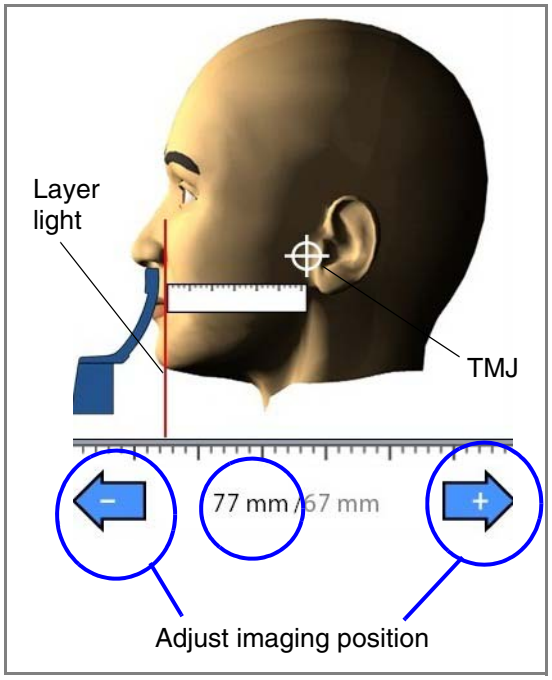
2. Position the patient's midsagittal plane so that it coincides with the midsagittal plane light.



3. Position the patient's Frankfort plane so that it coincides with the Frankfort plane light. To do this, adjust the tilt of the patient's head by raising or lowering the X-ray unit with the height adjusting buttons. The patient's back and neck should be straight.



The Frankfort plane light is located inside the column. The light's position can be adjusted if needed. This is done by rotating the thumb wheel below the light slot.



- **FOR LATERAL EXPOSURES:**

4. Use a ruler to measure the distance between the layer light and the patient's temporomandibular joint so that you can determine the imaging position. Adjust the imaging position with the minus or plus sign according to your measurement.

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

- **FOR POSTEROANTERIOR EXPOSURES:**

  It is not possible to adjust the imaging position.

NOTE

FOR DOUBLE TMJ EXPOSURES:
You can set the X-ray unit so that the imaging position is automatically moved forward for the open jaw exposure (2/2). To do this, select Settings > Program > 2200 Program Features > TMJ 2/2 Shift and adjust the setting with the minus or plus sign (e.g. 10 mm).

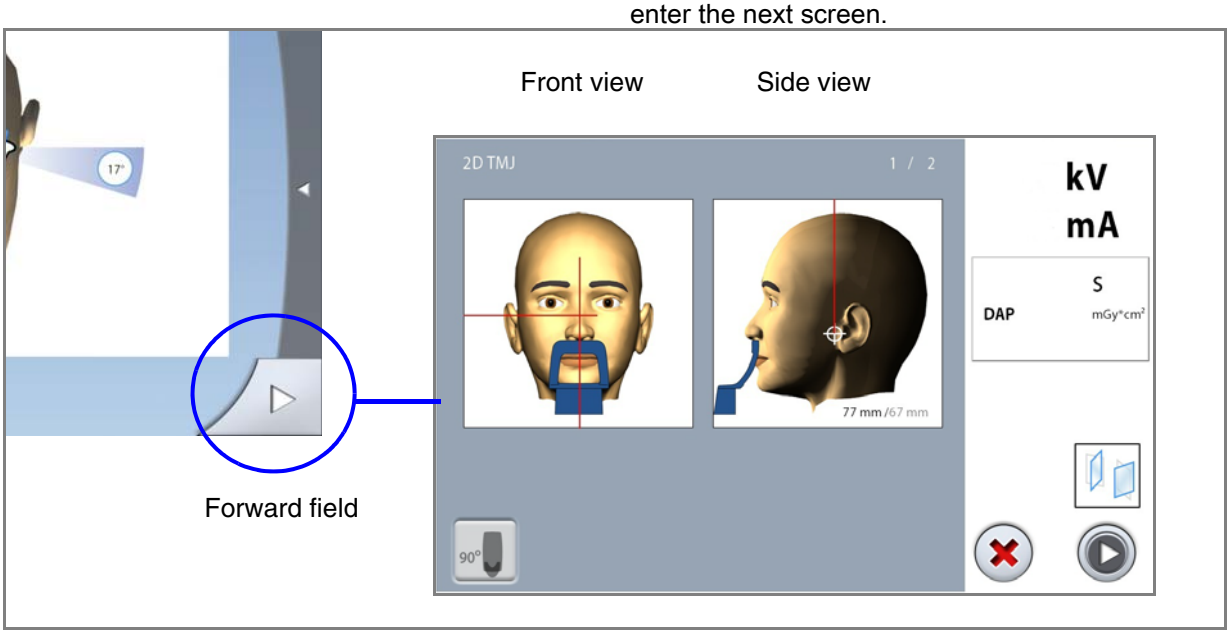
10.3.4 Adjusting patient's head position (Planmeca ProMax 2D S3 & Planmeca ProMax 3D units)

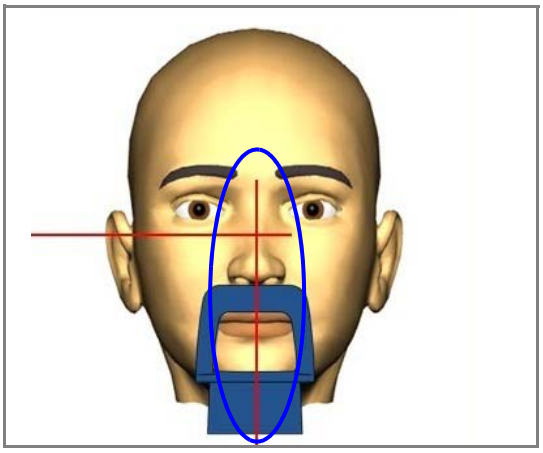
The positioning lights and the illustrations on the touch screen help you to position the patient's head correctly.

NOTE

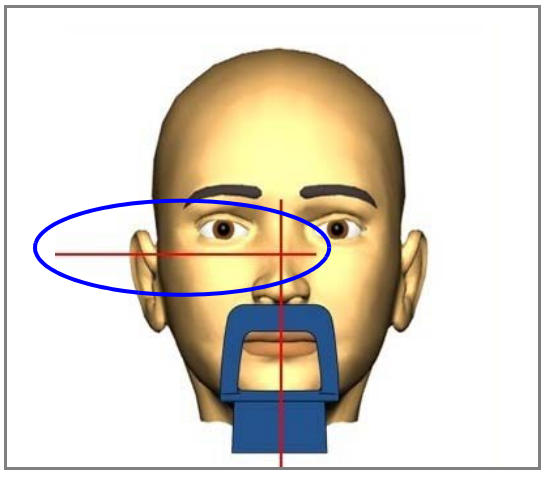
The illustrations are for guidelines only.

1. Use the forward field at the bottom right corner to enter the next screen.

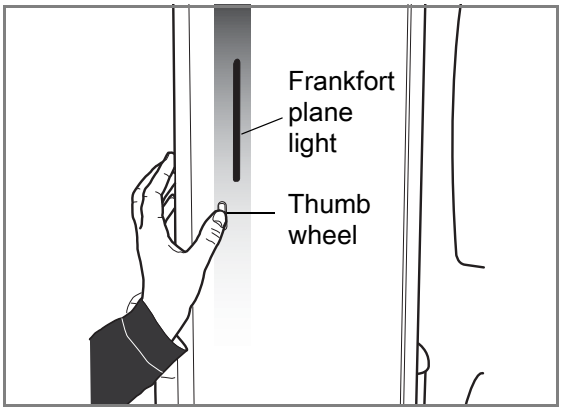




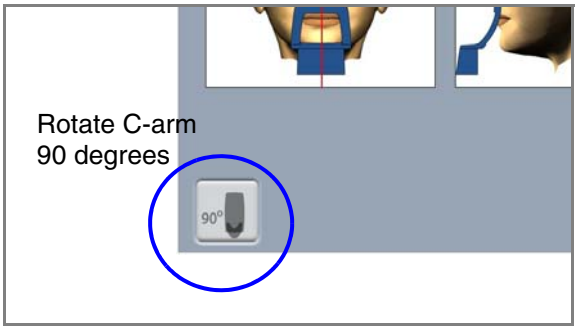
2. Position the patient's midsagittal plane so that it coincides with the midsagittal plane light.



3. Position the patient's Frankfort plane so that it coincides with the Frankfort plane light. To do this, adjust the tilt of the patient's head by raising or lowering the X-ray unit with the height adjusting buttons. The patient's back and neck should be straight.

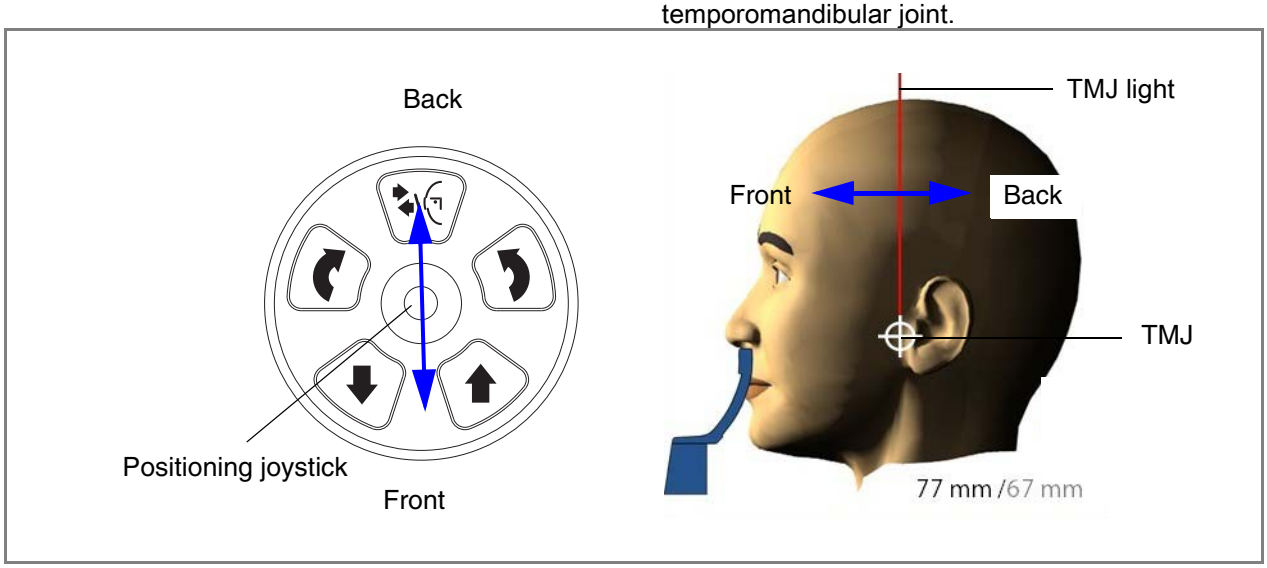


The Frankfort plane light is located inside the column. The light's position can be adjusted if needed. This is done by rotating the thumb wheel below the light slot.



4. Rotate the C-arm 90 degrees clockwise by selecting the 90° button at the bottom of the screen. This will give you a better view for checking the TMJ light position.
   Select the button again if you wish to rotate the C-arm back to the original position.

5. Use the positioning joystick to adjust the TMJ light. The TMJ light has to coincide with the patient's temporomandibular joint.



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

NOTE

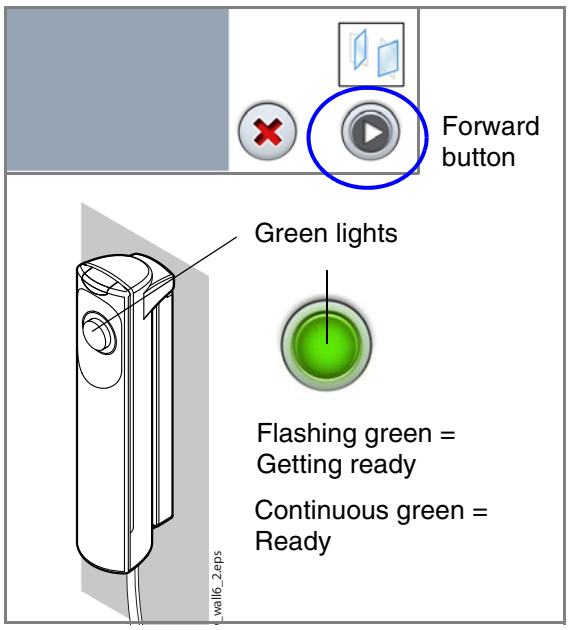
FOR DOUBLE TMJ EXPOSURES:
You can set the X-ray unit so that the imaging position is automatically moved forward for the open jaw exposure (2/2). To do this, select Settings > Program > 2200 Program Features > TMJ 2/2 Shift and adjust the setting with the minus or plus sign (e.g. 10 mm).

10.4 Taking an exposure in double TMJ programs

NOTE

Make sure that you have selected the correct patient and exposure mode in the Planmeca Romexis program.

10.4.1 First exposure - jaw closed (1/2)

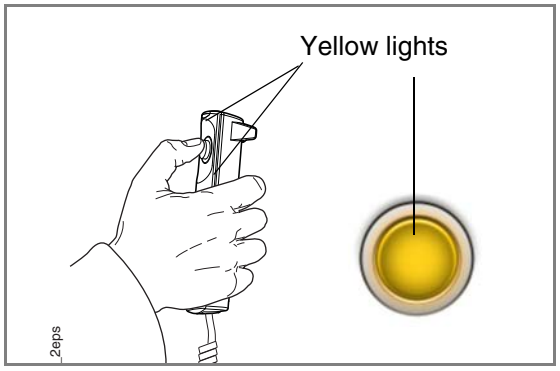


1. Select the forward button.

   Green lights flash on the touch screen and exposure button when the X-ray system is getting ready for an exposure. The green lights stop flashing and stay on continuously when the X-ray system is ready for an exposure.

2. Ask the patient to stay as still as possible. Explain to the patient that this is a double exposure and that the C-arm will move twice around the patient's head.

3. Move to a protected area.

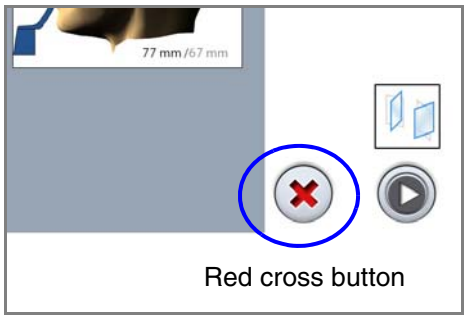


4. Press and hold down the exposure button for the duration of the first exposure.

   The C-arm moves around the patient's head. During exposure yellow radiation warning lights illuminate on the exposure switch and on the touch screen, and you hear a radiation warning tone. Additionally, a radiation warning symbol is shown on the touch screen.

NOTE

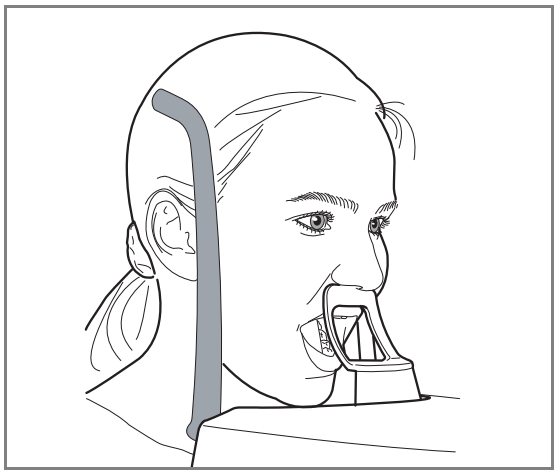
Maintain audio and visual contact with the patient and X-ray unit during exposure. If the C-arm stops moving during exposure, or moves in an erratic way, release the exposure button immediately.



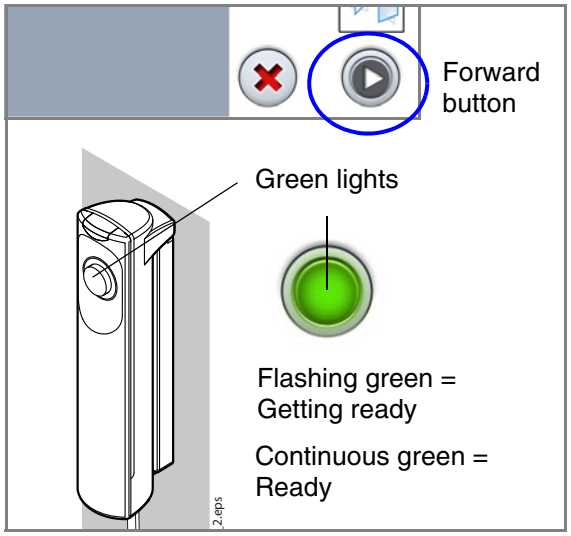
NOTE

If needed, you can stop the imaging process by touching the red cross button after you have taken the first exposure.

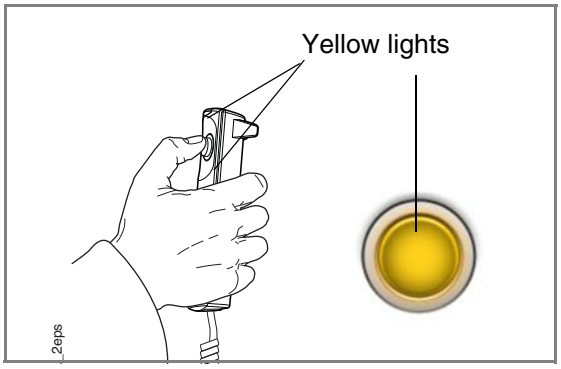
10.4.2 Second exposure - jaw open (2/2)



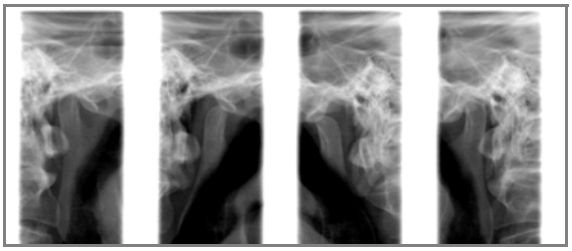
5. Ask the patient to open their mouth as wide as possible. Make sure that the patient's upper lip is still touching the chin support.



6. Select the forward button. Wait until the X-ray system is ready, i.e. until the green lights stop flashing.



7. Press and hold down the exposure button for the duration of the second exposure. The C-arm moves around the patient's head and the exposure is taken in the same way as the first exposure.



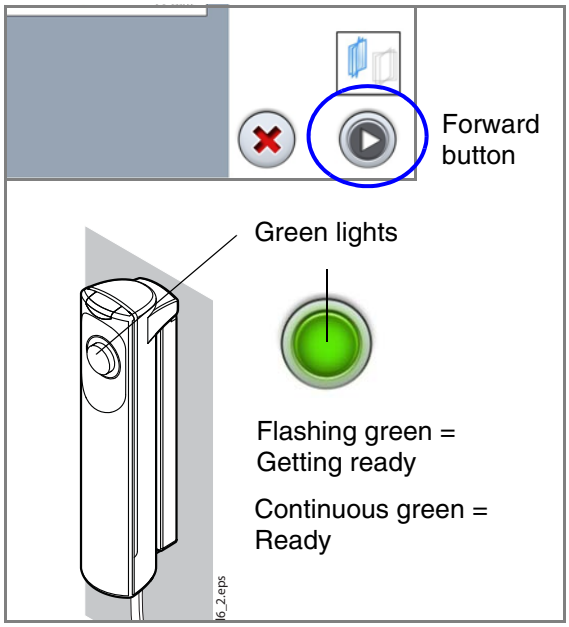
8. The image is shown on the computer screen.
   - Note that you must accept the image in the Planmeca Romexis program. Refer to the Romexis User's Manual.

9. Guide the patient away from the X-ray unit.

10.5 Taking an exposure in three angle TMJ programs

NOTE

Make sure that you have selected the correct patient and exposure mode in the Planmeca Romexis program.

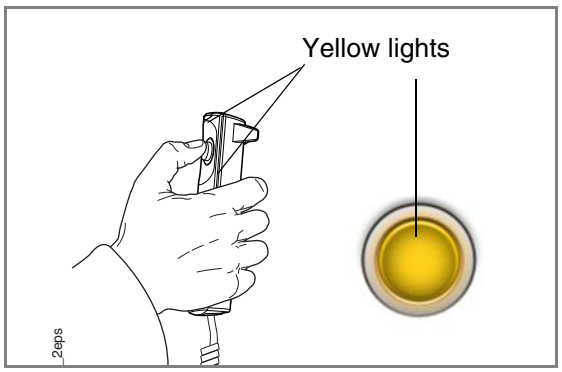


1. Select the forward button.

   Green lights flash on the touch screen and exposure button when the X-ray system is getting ready for an exposure. The green lights stop flashing and stay on continuously when the X-ray system is ready for an exposure.

2. Ask the patient to stay as still as possible. Explain to the patient that this is a multiple exposure and that the C-arm will move through three exposure cycles.

3. Move to a protected area.

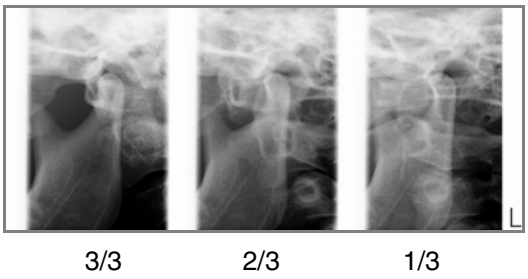


4. Press and hold down the exposure button for the duration of the exposure.

   During exposure yellow radiation warning lights illuminate on the exposure switch and on the touch screen, and you hear a radiation warning tone. Additionally, a radiation warning symbol is shown on the touch screen.

NOTE

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



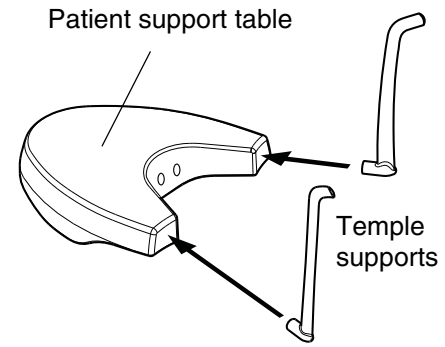
5. The image is shown on the computer screen.
   - Note that you must accept the image in the Planmeca Romexis program. Refer to the Romexis User's Manual.

6. Guide the patient away from the X-ray unit.

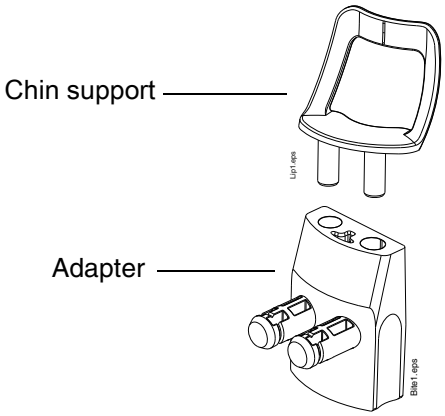
11 SINUS EXPOSURE

This procedure will produce an exposure of the maxillary sinus.

11.1 Before exposure



Insert the temple supports into the holes in the patient support table as shown.

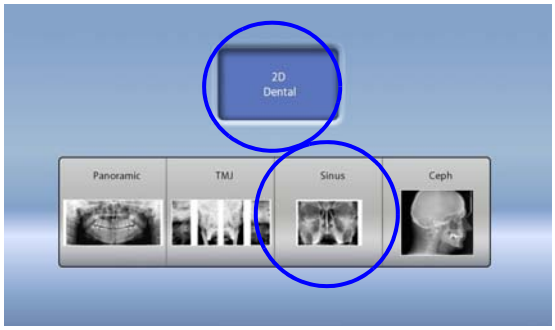


Insert the chin support into the adapter. Insert the adapter into the holes in the patient support table.

11.2 Selecting exposure settings

Refer to section 6.8 “Touch screen” on page 14 for general information on how to make or cancel selections on the touch screen.

11.2.1 Selecting program



Select the sinus program.

11.2.2 Selecting patient size

Select the patient size as described in section 9.2.2 “Selecting patient size” on page 28.

11.2.3 Adjusting exposure values for current exposure

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

NOTE

Always try to minimize the radiation dose to the patient.

The preset exposure values are shown in the following tables.

Factory presets for posteroanterior sinus exposures

PATIENT SIZE	kV VALUE	mA VALUE
Child (XS)	72	4
Small adult (S)	74	5
Medium-sized adult (M)	76	6.3
Large adult (L)	78	8
Extra large adult (XL)	80	10

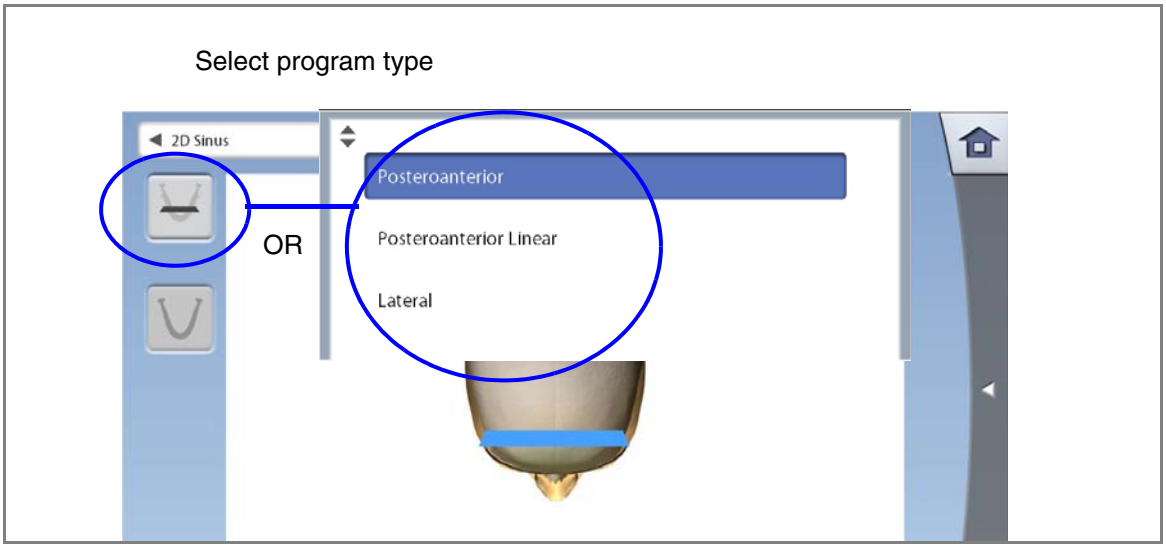
Factory presets for lateral sinus exposures

PATIENT SIZE	kV VALUE	mA VALUE
Child (XS)	60	4
Small adult (S)	62	4
Medium-sized adult (M)	64	4.5
Large adult (L)	66	5
Extra large adult (XL)	68	5

You can adjust the preset exposure values (kV and mA) as described in section 9.2.3 “Adjusting exposure values for current exposure” on page 29.

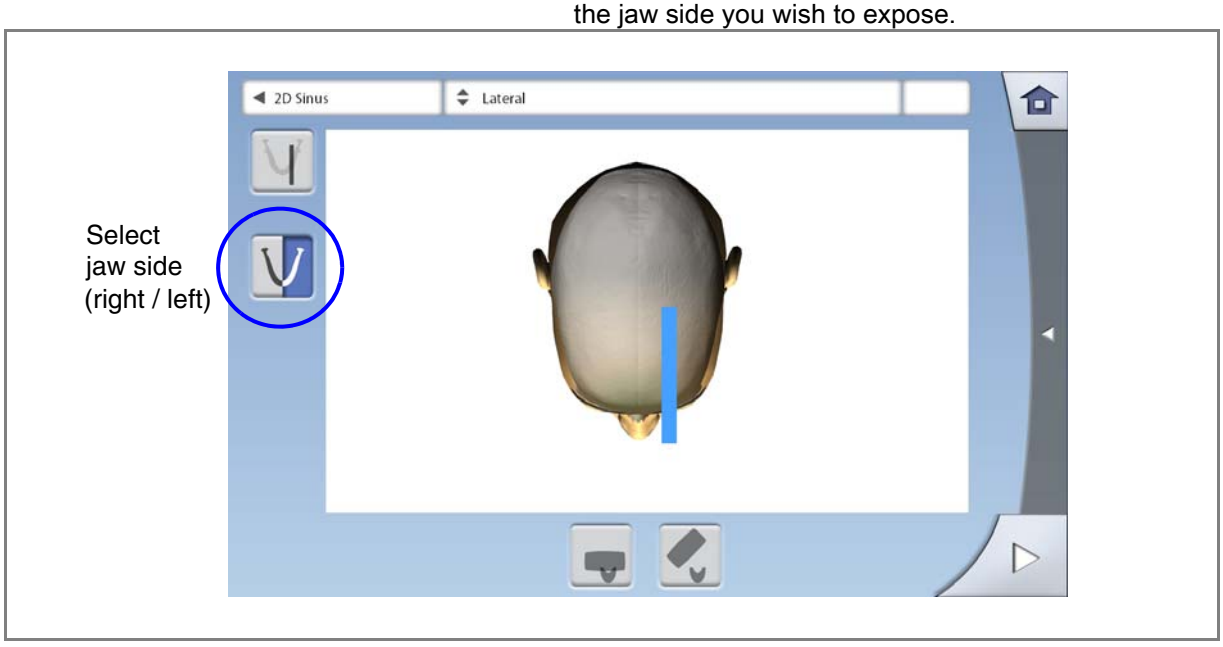
11.2.4 Selecting program type

Select the program type from the drop-down menu at the top. Alternatively, you can use the first button on the left of the screen to select the program type you wish to use. Refer to section 7.3 “Sinus programs” on page 22 for details.



11.2.5 Selecting jaw side (lateral exposures)

Use the second button on the left of the screen to select the jaw side you wish to expose.

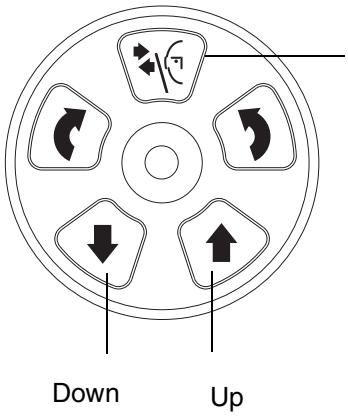


11.3 Patient positioning

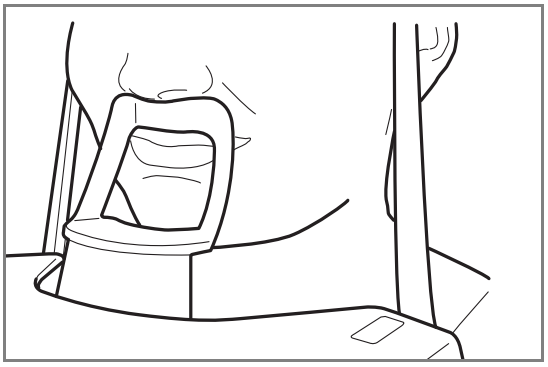
11.3.1 Selecting patient entry position

Select the patient entry position as described in section 9.3.1 “Selecting patient entry position” on page 32.

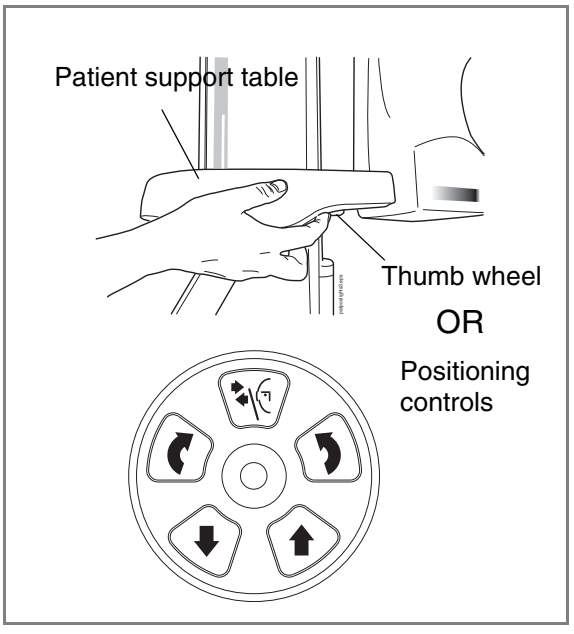
11.3.2 Positioning patient in X-ray unit



1. Press the temple support button to open the temple supports if they are not already open.
2. Guide the patient to the X-ray unit.
3. Adjust the X-ray unit to suit the height of the patient. To do this, press either of the height adjusting buttons until the opening in the chin support is approximately level with the patient’s mouth.



4. Ask the patient to step forward, grasp the patient handles, stretch and straighten their back and neck, 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.



The positioning lights for the midsagittal and Frankfort plane come on. The lights will automatically switch off after two minutes. To switch them off earlier, press the positioning joystick.

To switch them back on, do one of the following:

- Press the thumb wheel on the underside of the patient support table.
- Press any of the positioning controls (button or joystick).

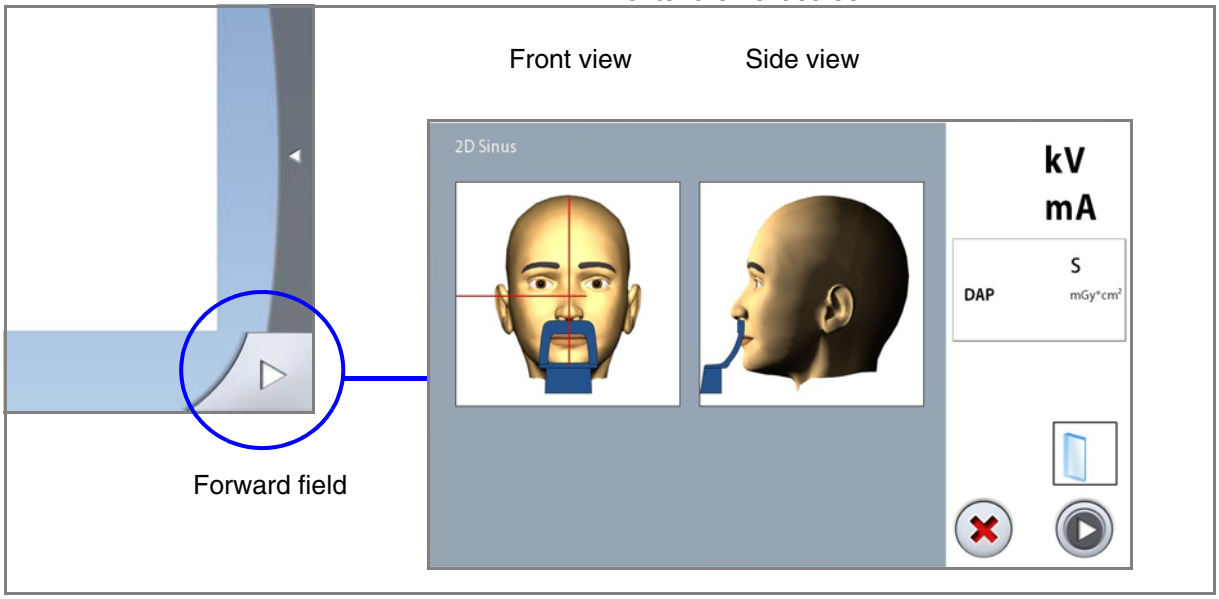
11.3.3 Adjusting patient's head position

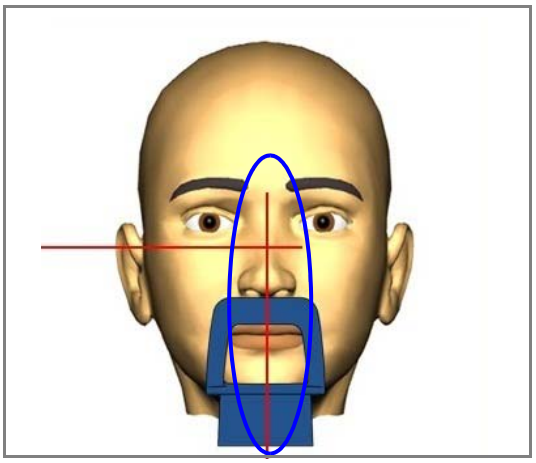
The positioning lights and the illustrations on the touch screen help you to position the patient's head correctly.

NOTE

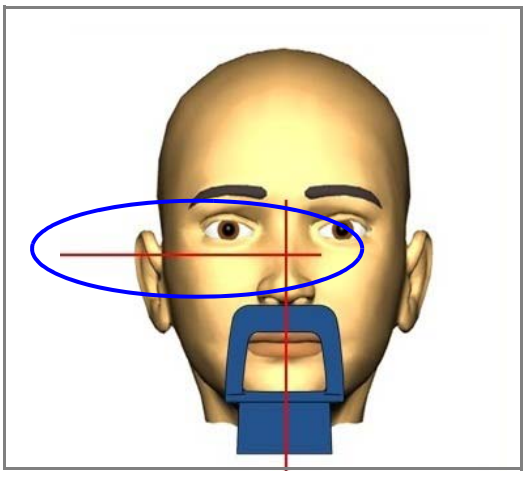
The illustrations are for guidelines only.

1. Use the forward field at the bottom right corner to enter the next screen.





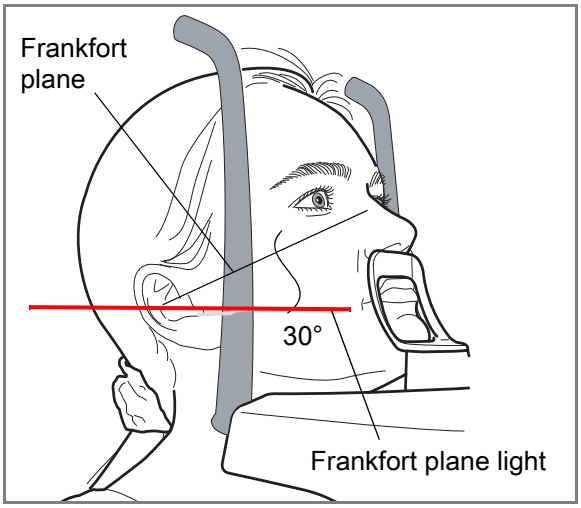
2. Position the patient's midsagittal plane so that it coincides with the midsagittal plane light.



3. Position the patient's Frankfort plane as follows.

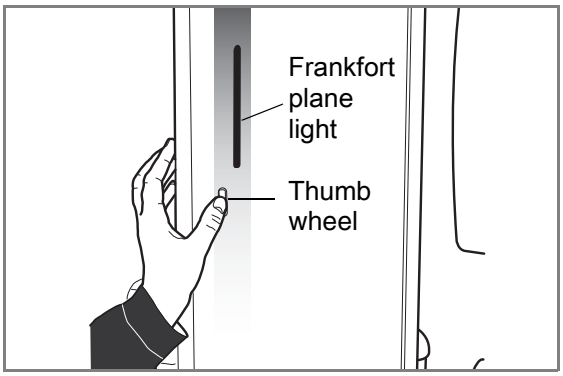
- **FOR POSTEROANTERIOR AND LATERAL PROGRAMS:**

  Position the patient's Frankfort plane so that it coincides with the Frankfort plane light. To do this, adjust the tilt of the patient's head by raising or lowering the X-ray unit with the height adjusting buttons. The patient's back and neck should be straight.



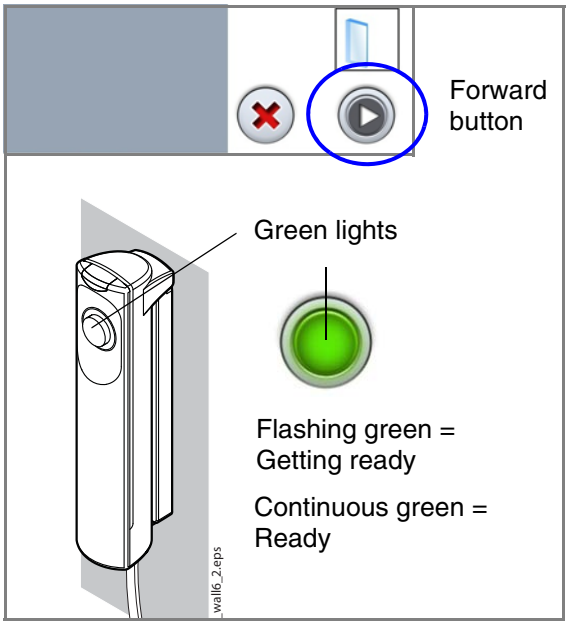
- **FOR POSTEROANTERIOR LINEAR PROGRAM:**

  Position the patient's head so that the Frankfort plane is tilted up about 30 degrees. 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 tilt of the patient's head by raising or lowering the X-ray unit with the height adjusting buttons. The patient's back and neck should be straight.



The Frankfort plane light is located inside the column. The light's position can be adjusted if needed. This is done by rotating the thumb wheel below the light slot.

11.4 Taking an exposure



NOTE

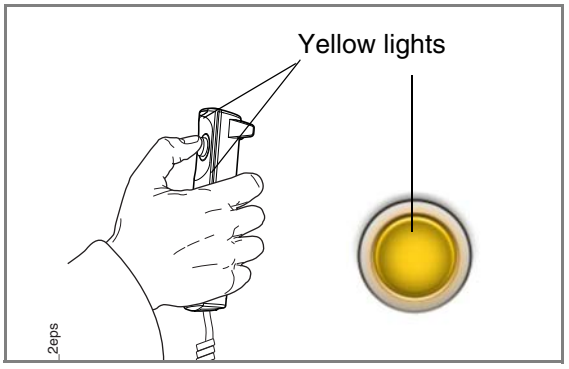
Make sure that you have selected the correct patient and exposure mode in the Planmeca Romexis program.

1. Select the forward button.

   Green lights flash on the touch screen and exposure button when the X-ray system is getting ready for an exposure. The green lights stop flashing and stay on continuously when the X-ray system is ready for an exposure.

2. Ask the patient to stay as still as possible.

3. Move to a protected area.



4. Press and hold down the exposure button for the duration of the exposure.

   The C-arm moves around the patient's head. During exposure yellow radiation warning lights illuminate on the exposure switch and on the touch screen, and you hear a radiation warning tone. Additionally, a radiation warning symbol is shown on the touch screen.

NOTE

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

5. The image is shown on the computer screen.
   - Note that you must accept the image in the Planmeca Romexis program. Refer to the Romexis User's Manual.

6. Guide the patient away from the X-ray unit.

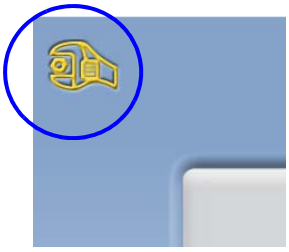
12 SETTINGS

NOTE

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.

NOTE

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



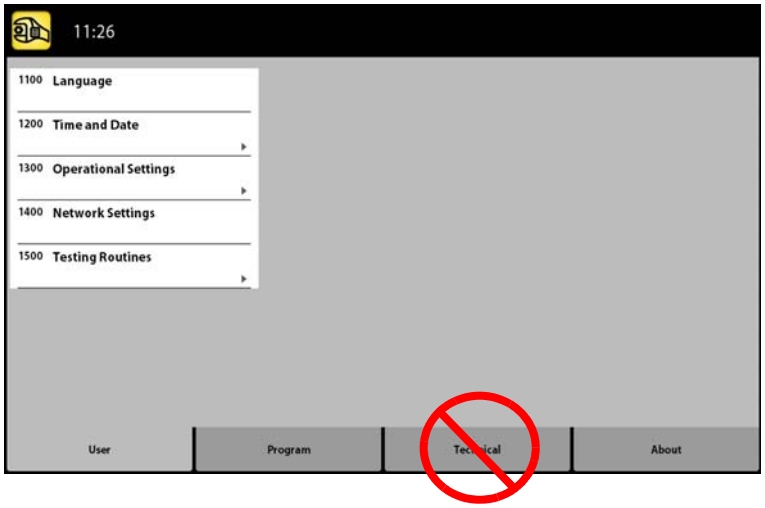
Select the settings icon at the top left corner of the main view to enter the settings menu.

Settings that can be entered by the user:

- User
- Program
- About

Settings that can be entered by service personnel only (password required):

- Technical



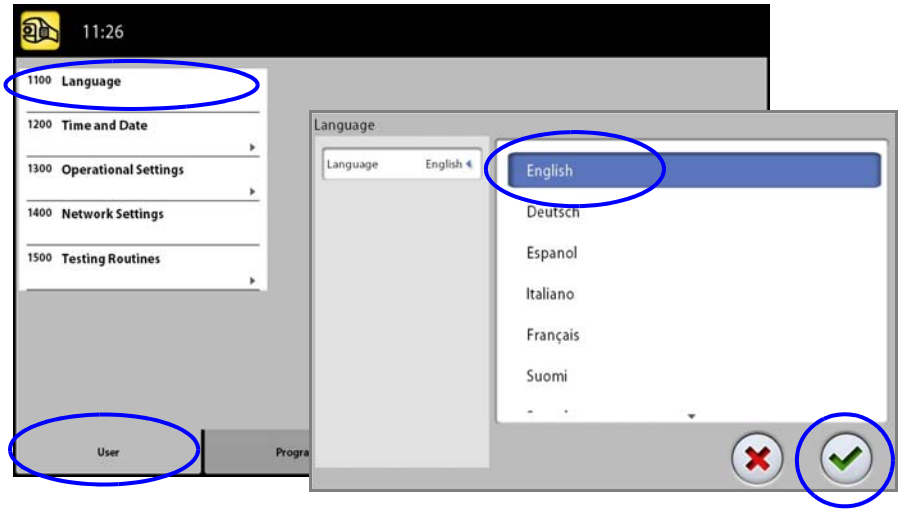
To return to the main view, select the settings icon at the top left corner.

12.1 User settings

12.1.1 Language (1100)

- **To change language:**

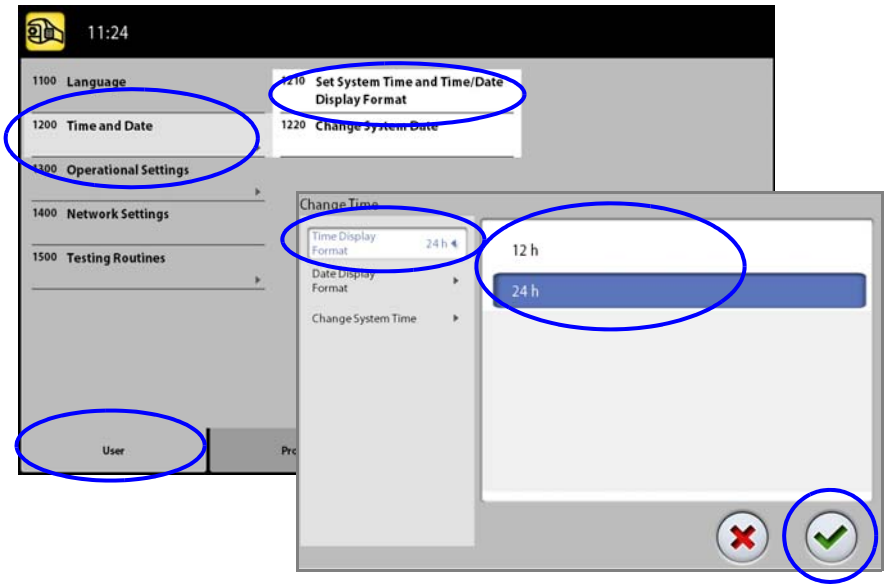
1. Select User > 1100 Language.
2. Select the language you wish to use.
3. Select the green check mark button.



12.1.2 Time and Date (1200)

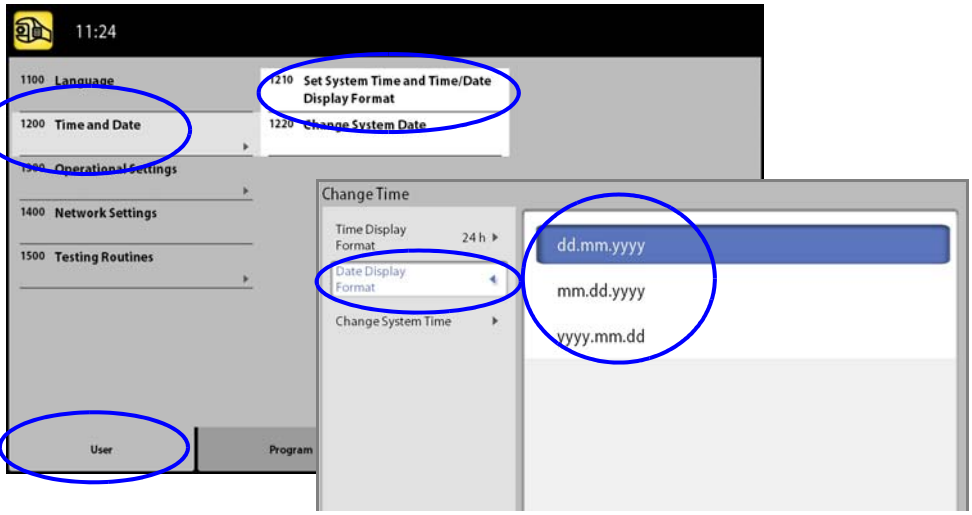
- **To set time display format:**

1. Select User > 1200 Time and Date > 1210 Set System Time and Time / Date Display Format > Time Display Format.
2. Select the display format you wish to use.
3. Select the green check mark button.



- **To set date display format:**

1. Select User > 1200 Time and Date > 1210 Set System Time and Time / Date Display Format > Date Display Format.
2. Select the display format you wish to use.
3. Select the green check mark button.

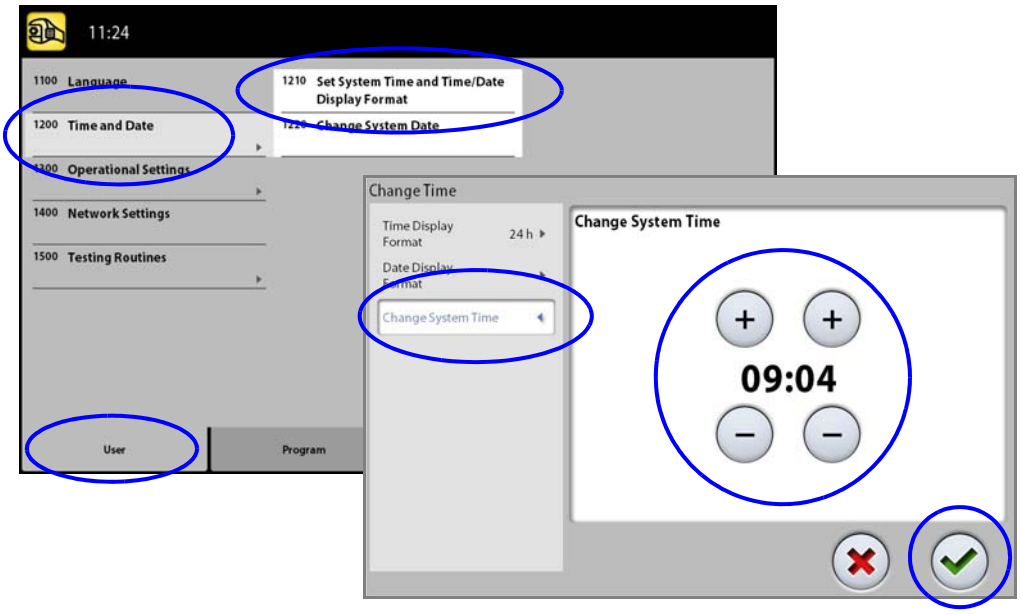


- **To set time:**

1. Select User > 1200 Time and Date > 1210 Set System Time and Time / Date Display Format > Change System Time.
2. Use the plus and minus buttons to change the time.
3. Select the green check mark button.

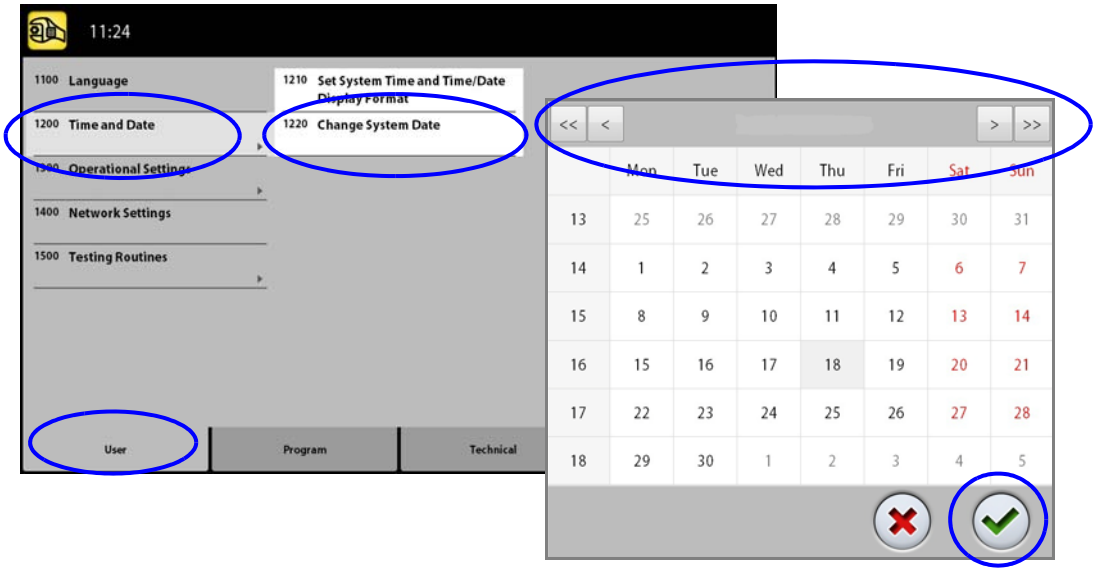
NOTE

The time is set to the local time at the factory. Change the time setting to show the correct time before you start using the X-ray unit.



- **To set date:**

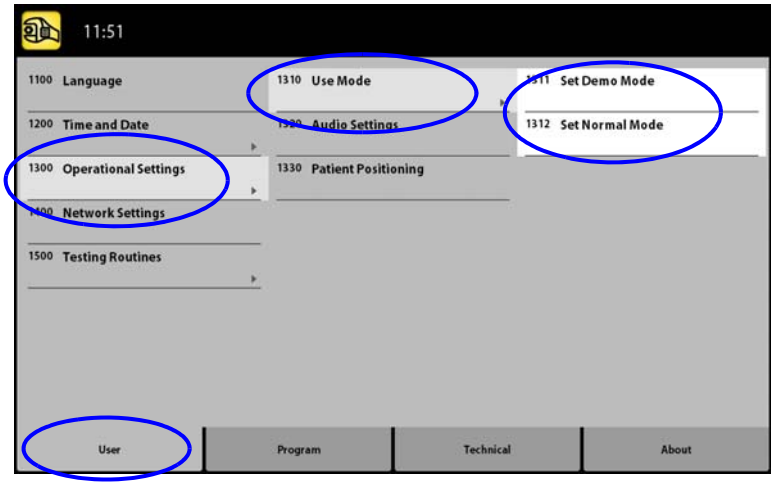
1. Select User > 1200 Time and Date > 1220 Change System Date.
2. Select the day or use the arrow buttons to change the month (single arrow) or year (double arrow).
3. Select the green check mark button.



12.1.3 Operational Settings (1300)

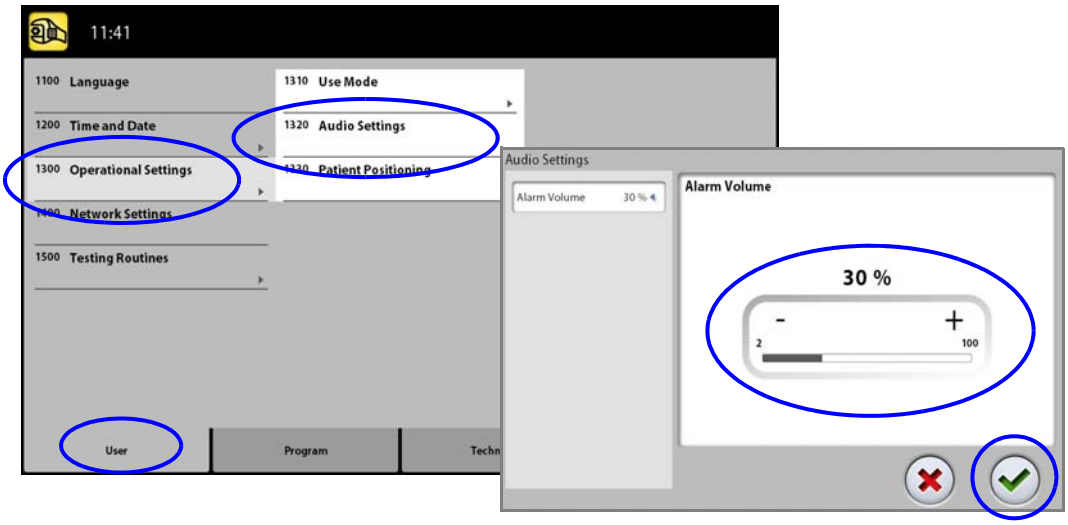
- **To select mode:**

1. Select User > 1300 Operational Settings > 1310 Use Mode.
2. Select the mode you wish to use.
   In demo mode you can practice or demonstrate the functions of the X-ray unit without radiation and PC connection.
3. Select the green check mark button.



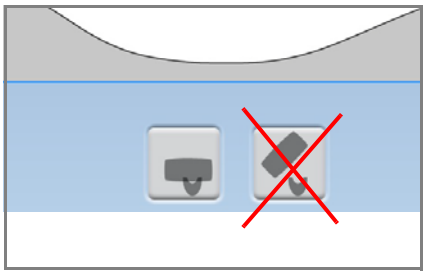
- **To control audio settings:**

1. Select User > 1300 Operational Settings > 1320 Audio Settings.
2. Use the minus or plus button to reduce or increase the volume of the radiation warning tone.
3. Select the green check mark button.



- **To manage settings for patient positioning:**

1. Select User > 1300 Operational Settings > 1330 Patient Positioning.
2. Turn an option(s) ON or OFF:



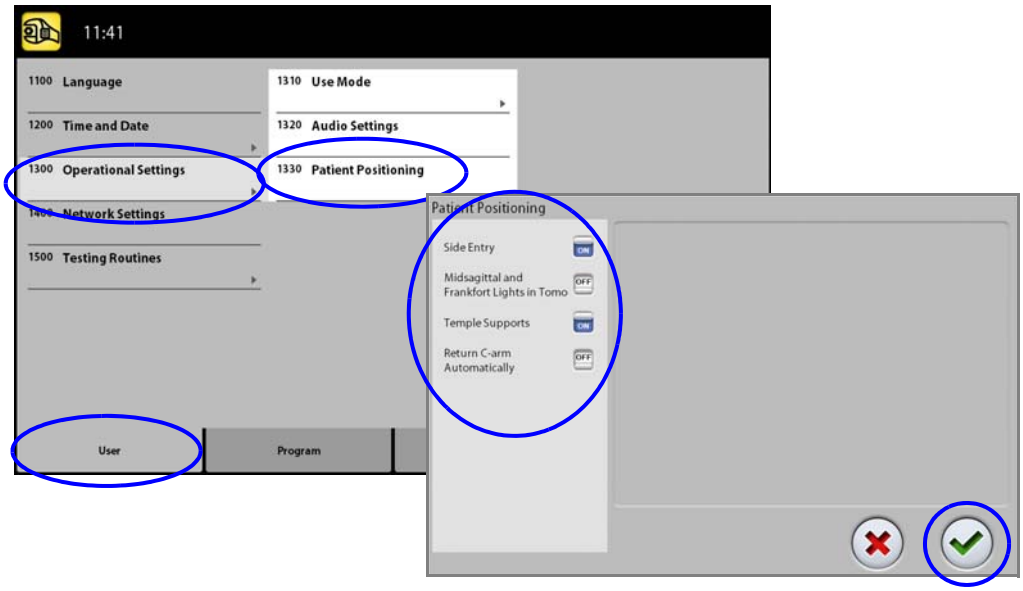
- **Side Entry:**
  Turn this option OFF if you do not wish to use the open (full view) patient entry position. This might be necessary if there is no space for the C-arm to move back.

NOTE

Planmeca ProMax 2D S2 units offer only one patient entry position. This entry position is the closed patient entry position where the C-arm is positioned around the temple supports.

- **Midsagittal and Frankfort Lights in Tomo:**
  Turn this option ON if you wish to use the midsagittal and Frankfort plane lights when you take 2D tomographic or 3D exposures.
- **Temple Supports:**
  Turn this option OFF if you do not wish to use the temple supports.
- **Return C-arm Automatically:**
  Turn this option ON if you wish to set the X-ray unit so that the C-arm will automatically return to the starting 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.

3. Select the green check mark button.



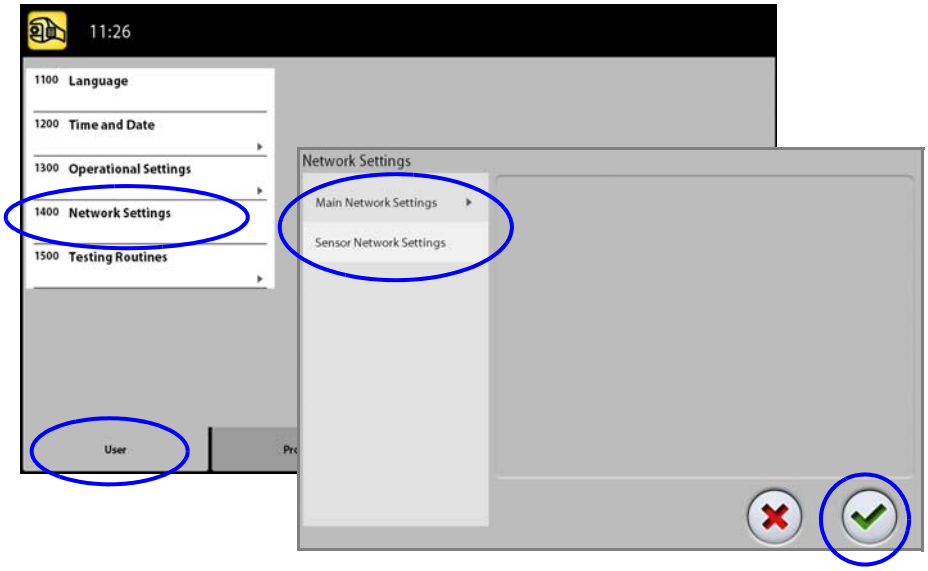
12.1.4 Network Settings (1400)

- **To view network settings:**

1. Select User > 1400 Network Settings.
2. Select the network settings you wish to view.
3. Select the green check mark button.

NOTE

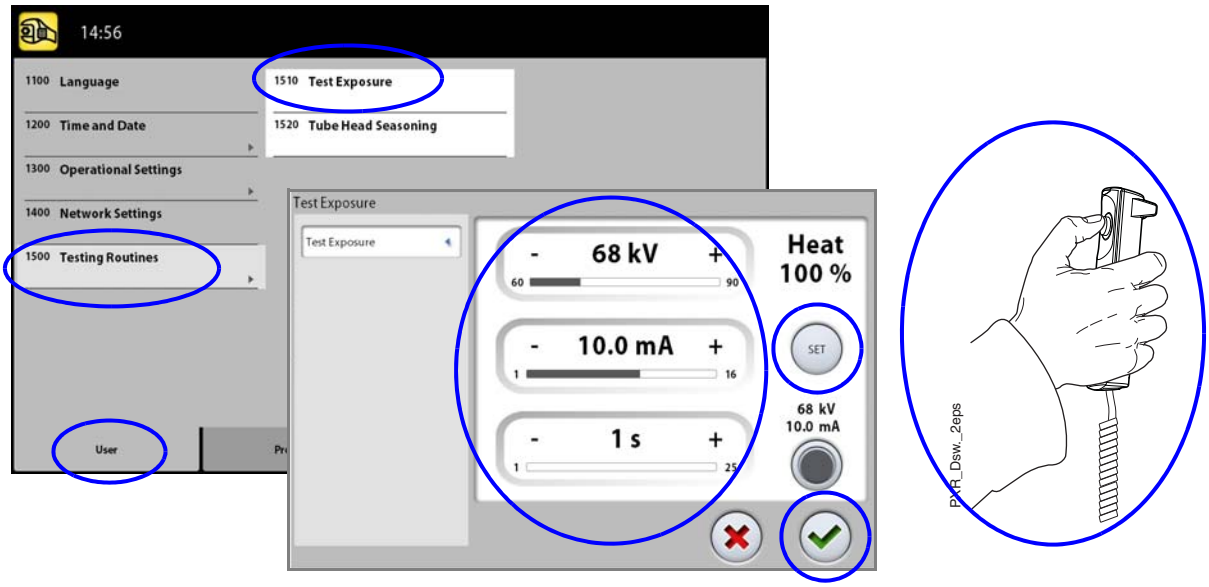
Only a service technician or local administrator may change the network settings.



12.1.5 Testing Routines (1500)

- **To take a test exposure:**

1. Select User > 1500 Testing Routines > 1510 Test Exposure.
2. Use the minus or plus buttons to set the exposure values you wish to use.
3. Select the SET button.
4. Move to a protected area.
5. Press and hold down the exposure button for the duration of the exposure. The C-arm will not move when you take a test exposure.
6. Select the green check mark button.



- **To perform tube head seasoning:**

1. Select User > 1500 Testing Routines > 1520 Tube Head Seasoning.
   This option allows you to warm up the X-ray tube, i.e. run a tube head seasoning process. This is necessary if the X-ray unit has not been used for a few days and you receive error message E332 (Arcing across X-ray tube).
2. Select the Start button.
3. Move to a protected area.
4. Press the exposure button when the word Ready appears.
   You can press and hold down the exposure button for the whole duration of the process or remove your thumb from the exposure button when the word Wait appears. Note that the seasoning process will take several minutes. After a successful process the message OK is shown.
5. Select the green check mark button.

NOTE

Contact your service technician for help if error message E332 (Arcing across X-ray tube) reappears after a successful seasoning process.

12.1.6 Clinic Management (1600)

- **To view network settings for Clinic Management:**

Select User > 1600 Clinic Management to view the network settings for the Planmeca Romexis Clinic Management module.

NOTE

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

12.2 Program settings

12.2.1 Programs (2100)

- **To turn a program(s) ON or OFF:**

1. Select Program > 2100 Programs.
2. Select a program group (e.g. 2D Panoramic).
3. Turn a program type(s) (e.g. Interproximal) ON or OFF.
4. Select the green check mark button.

NOTE

The function is available for programs that have been activated in menu 2300 Licences.

- **To permanently adjust preset exposure values:**

1. Select Program > 2100 Programs.
2. Select a program group (e.g. 2D Panoramic).
3. Select a program type (e.g. Interproximal). Program types that are not available on your X-ray unit are shown with a light gray background color.
4. Select the exposure values you wish to adjust (e.g. 66 kV / 8 mA for patient size M).
   - In combined 2D tomographic programs (cross-sectional + longitudinal) only the cross-sectional exposure values can be adjusted.
   - In 3D programs the exposure values are given separately for each image resolution. The image resolutions that are not available are shown with faded buttons. Select also the ULD (Ultra Low Dose) button if you wish to adjust the presets for the ULD function.

5. Use the minus or plus buttons to set the exposure values you wish to use.
6. Select the green check mark button.
7. Repeat for an other program type, patient size or image resolution (3D) if needed.
8. Select the green check mark button.

NOTE

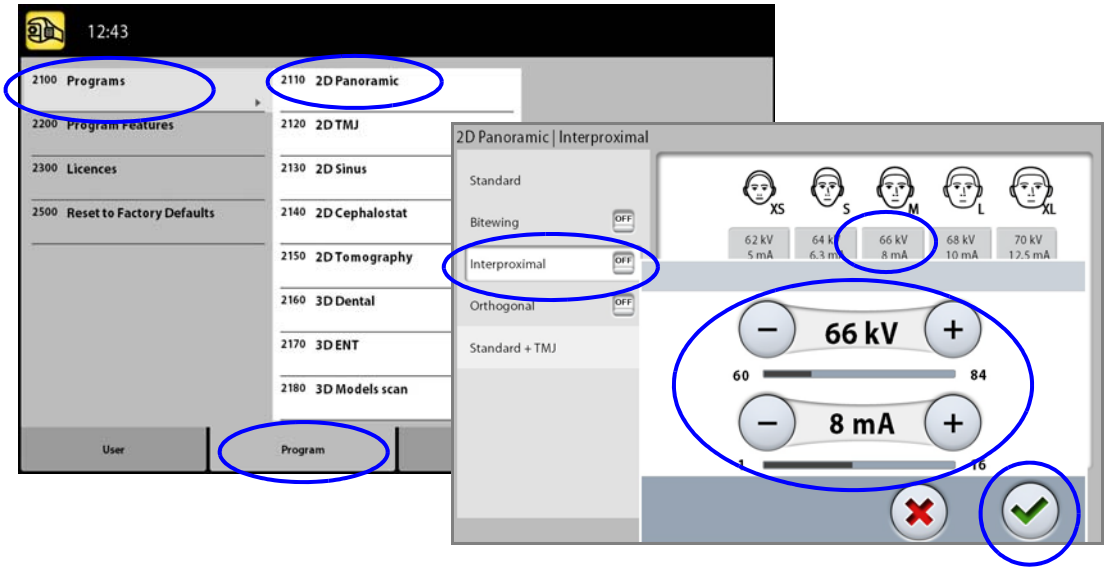
Always try to minimize the radiation dose to the patient.

NOTE

You can restore the exposure values that have been preset at the factory (i.e. overrule your own settings) by selecting Program > 2500 Reset to Factory Defaults.

NOTE

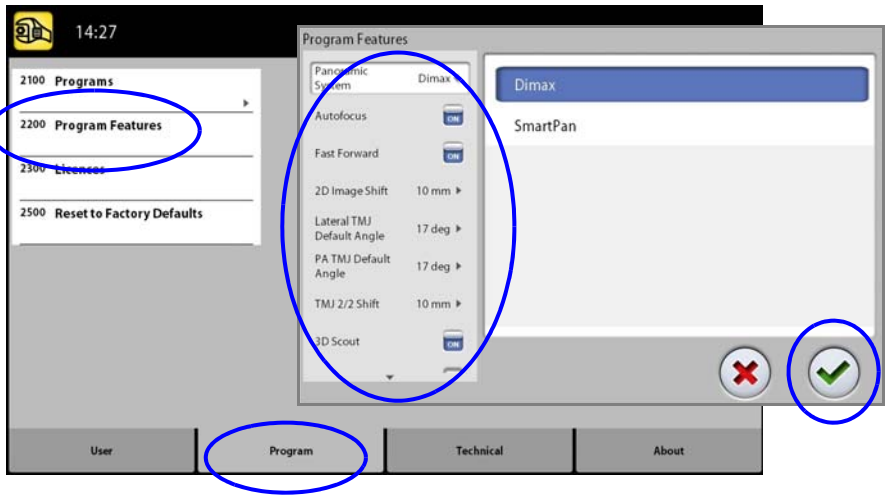
You can adjust the preset exposure values temporarily as described in section 9.2.3 “Adjusting exposure values for current exposure” on page 29.



12.2.2 Program Features (2200)

- **To manage program settings:**

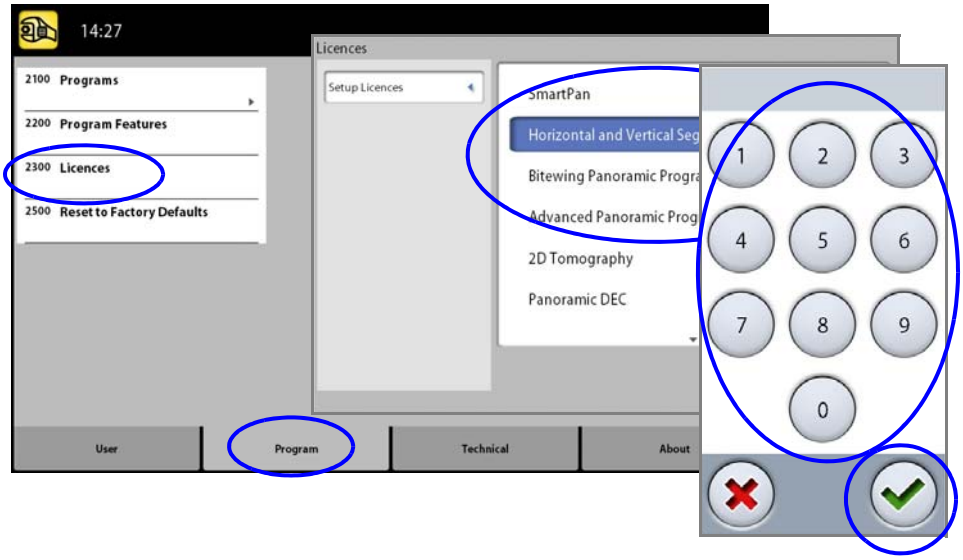
Select Program > 2200 Program Features to manage program settings. For details on a specific setting, refer to the manual section that contains the corresponding function.



12.2.3 Licences (2300)

- **To activate a program licence:**

1. Select Program > 2300 Licences.
2. Select the licence you wish to activate.
3. Enter the licence code that you have received for this licence on this X-ray unit.
4. Select the green check mark button.
5. Repeat for an other program licence if needed.
6. Select the green check mark button.



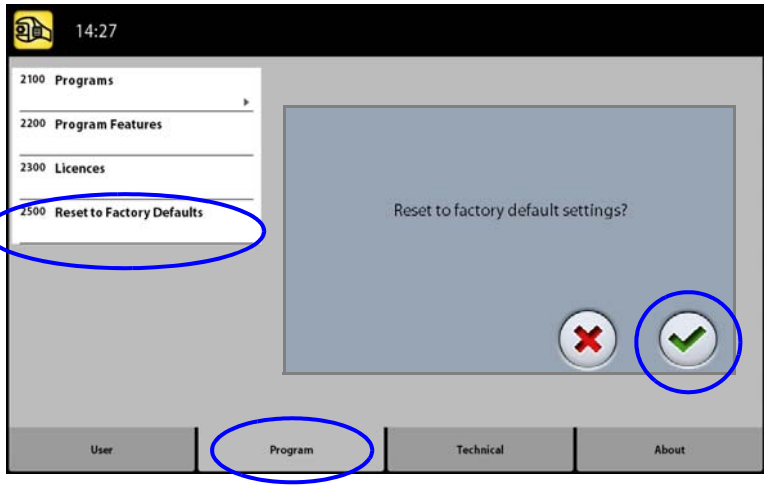
12.2.4 Reset to Factory Defaults (2500)

- **To reset to factory defaults:**

1. Select Program > 2500 Reset to Factory Defaults.
2. Select the green check mark button.

NOTE

The function will restore the exposure values that have been preset at the factory (i.e. overrule your own settings in menu Programs (2100)).

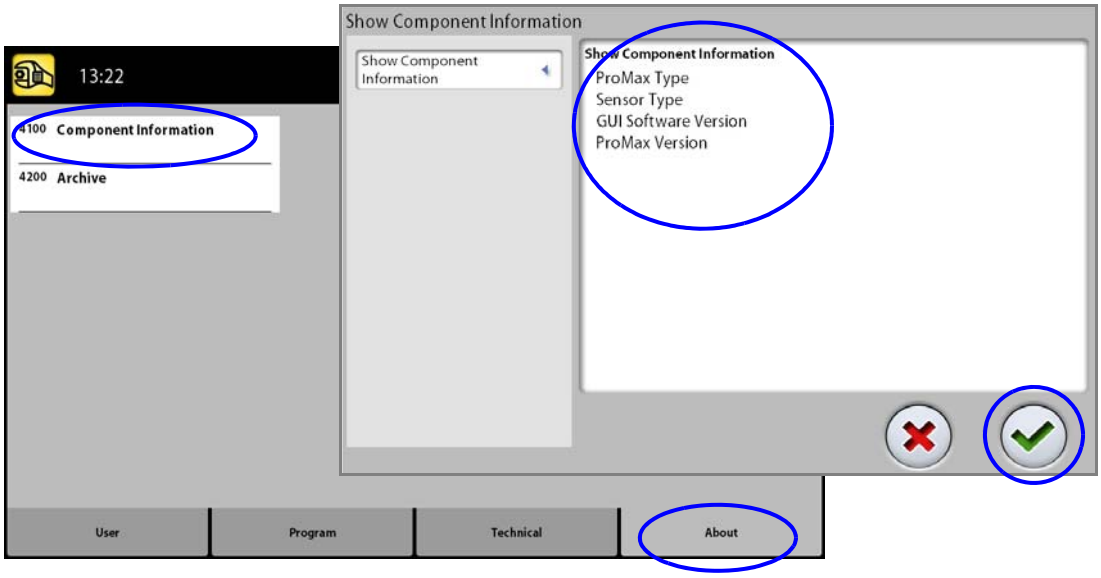


12.3 About tab

12.3.1 Component Information (4100)

- **To view component information:**

Select About > 4100 Component Information to view the set-up or current software versions of the X-ray unit.



12.3.2 Archive (4200)

- **To view error history:**

Select About > 4200 Archive > Error History to view a list of the error messages that have been generated by the X-ray unit. The errors are shown in chronological order with the latest error message on top.

- **To view exposure statistics:**

Select About > 4200 Archive > Exposure Statistics to view statistical data about the X-ray unit.

13 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. H101) appears on the touch screen.

The X-ray unit will not accept any commands from the user until the help message is cleared from the touch screen. Clear the message by touching the green check mark.

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

Code	Explanation		Comments
H101	Exposure switch	The exposure button was released before end of exposure.	Guide the patient away from the X-ray unit before moving the C-arm. Press and hold down the exposure button for the entire duration of the exposure.
H102		The exposure button is stuck or the cable is short circuited.	Release the exposure button. If necessary, contact your service technician to replace the exposure switch.
H105	Emergency stop button	The emergency stop button has been activated.	All movements of the X-ray unit are blocked, no radiation is generated. Guide the patient away from the X-ray unit. Then release the emergency stop button to resume normal operation.
H115	DEC	DEC is receiving too much radiation.	Change the exposure values.
H116		DEC is receiving too little radiation.	Change the exposure values.
H142	Height movement	Height movement is not possible because the stop plate at the bottom of the column was activated.	Clear any obstruction before moving the column again.
H144		Height movement is not possible because one (or more) of the positioning control buttons or the positioning joystick is stuck.	Release the button / joystick.
H151	Line voltage	The line voltage was too low during exposure.	Exposure was interrupted. Contact your service technician for help.
H152		The line voltage is too low.	Exposure is not possible. Contact your service technician for help.

Code	Explanation		Comments
H161	Temperature	The temperature of the tube head is too high.	Wait for a few minutes for the tube head to cool down.
H162		The temperature of the lift motor is too high.	Wait for a few minutes for the lift motor to cool down.
H163		The temperature of the power supply unit (PSU) is too high.	Wait for a few minutes for the power supply unit (PSU) to cool down.
H165		The temperature of the tube head is too high for the selected exposure values.	Wait for a few minutes for the tube head to cool down.
H166		The maximum tube head energy level was exceeded.	Wait for a few minutes for the tube head to cool down or use lower exposure values.
H171	User related messages	The sensor is not attached properly to the C-arm.	Attach and / or lock the sensor in position.
H172		The sensor is not attached properly to the cephalostat.	Attach and / or lock the sensor in position.
H175		PC program selection is in conflict with the selected X-ray unit program.	Select another exposure mode in Planmeca Romexis.
H176		Safety area limit violation in tomography mode.	Change the values for layer thickness, position or angle.
H177		Exposure is not possible with these settings.	Change the image volume settings.
H178		Exposure is not possible with these settings.	Change the settings.
H180		DEC is not available.	
H181		The imaging process was cancelled in Planmeca Romexis.	
H182		Timeout in image data transmission.	Exposure was interrupted. Contact your service technician for help.
H183		The attached sensor is not suitable for the selected program.	Change the sensor.
H184		Remove the 3D sensor.	
H185		The 3D sensor is not attached properly.	Attach and / or lock the sensor in position.
H186		No IP address defined for 3D sensor.	
H187		Problem during image data transmission.	Exposure was interrupted. Contact your service technician for help.
H189		The screen was touched during exposure.	Exposure was interrupted.
H195		The 3D Model programs must not be used for patient imaging.	Use the 3D Model programs for taking exposures of impressions or plaster casts only.
H196		Remove all 3D / panoramic patient supports before taking cephalometric images.	

14 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. E201) appears on the touch screen.

An error message indicates that the X-ray unit has a problem that needs to be solved before further exposures can be taken. The X-ray unit will not accept any commands from the user until the error message is cleared from the touch screen. Guide the patient away from the X-ray unit. Then clear the message by touching the green check mark.

15 CLEANING

NOTE
Disconnect the X-ray unit from mains before cleaning.

NOTE
Do not use cleaning solutions in aerosol or spray form directly on unit surfaces.

X-ray unit

	Autoclave up to 135°C	Wipe with soft cloth using alcohol based cleaning solution	Wipe with soft cloth using mild cleaning solution
Chin cup / rest / support	X	X	X
Bite pieces	X	X	X
Temple supports	X	X	X
Cephalostat head supports	X	X	X
Patient handles		X	X
Other surfaces (incl. touch screen)			X

Sensors

	Wipe with soft cloth (NO CLEANING SOLUTION)	Compressed air
ProFace sensor; laser windows in the middle		X
ProFace sensor; other surfaces (incl. glass windows on both sides)	X	
Other sensors	X	

16 SERVICE

To guarantee patient and user safety and to ensure consistent image quality the X-ray unit must be checked and recalibrated by a qualified Planmeca service technician once a year or after every 10 000 exposures if this is sooner.

17 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 centers, 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.

Part	Main materials for disposal	Recyclable material (X) = if available	Waste disposal site	Hazardous waste (separate collection)
Frame, covers & patient supports				
- metal	Aluminium,	X		
	galvanized steel,	X		
	lead			X
- 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	

18 TECHNICAL SPECIFICATIONS

18.1 Technical data for Planmeca ProMax product family

Classification:	
• Medical Device Directive	93/42/EEC (Class IIb)
• RoHS	2011/65/EU
• IEC 60601-1	Class I, type B
• CISPR 11	Class B
Generator	Resonant-mode, DSP-controlled, 80...160 kHz, according to IEC 60601-2-7: 1998
X-ray tube	2D / 3D s / 3D Classic / 3D Plus / 3D Mid: Toshiba D-054SB 3D Max: Toshiba D-067SB
Focal spot size	According to IEC 60336 2D / 3D s / 3D Classic / 3D Plus / 3D Mid: 0.5 x 0.5 mm 3D Max: 0.6 x 0.6 mm
Total filtration:	
• 3D	min. 2.5 mm Al + 0.5 mm Cu
• Pan / ceph	min. 2.5 mm Al
Anode voltage (X-ray units with SW prior to 3.0):	
• 3D	3D s / 3D Classic / 3D Mid: 54 - 90 kV ±5% 3D Max: 54 - 96 kV ±5%
• Pan / SmartPan	54 - 84 kV ±5%
• Ceph	60 - 84 kV ±5%
Anode voltage (X-ray units with SW 3.0 or later):	
• 3D	3D s / 3D Classic / 3D Plus / 3D Mid: 60 - 90 kV ±5% 3D Max: 60 - 96 kV ±5%
• Pan / SmartPan	60 - 84 kV ±5%
• Ceph	60 - 84 kV ±5%

Anode current (X-ray units with SW prior to 3.0):	
• 3D	3D s / 3D Classic / 3D Mid: 1 - 14 mA ±10% 3D Max: 1 - 12.5 mA ±10%
• Pan / SmartPan	1 - 16 mA ±10%
• Ceph	1 - 16 mA ±10%
Anode current (X-ray units with SW 3.0 or later):	
• 3D	3D s / 3D Classic / 3D Plus / 3D Mid: 1 - 14 mA ±10% 3D Max: 1 - 12.5 mA ±10%
• Pan / SmartPan	1 - 16 mA ±10%
• Scanning ceph	1 - 16 mA ±10%
• Planmeca ProCeph	16 mA ±10%
mAs range	min. / max. as indicated ±(10% + 0.2 mAs)
mGy range	min. / max. as indicated ±40%
Linearity of radiation output	< 0.1
Cooling period	Automatically controlled
Exposure time:	
• 3D	3D s: Pulsed, effective 4.8 - 36 s as indicated ±10% 3D Classic / 3D Plus / 3D Mid: Pulsed, effective 2.4 - 36 s as indicated ±10% 3D Max: Pulsed, effective 3.6 - 24 s as indicated ±10%
• Pan	2D / 3D Classic: 2.7 - 16 s as indicated ±10% 2D tomography: 4 - 12 s as indicated ±10%
• SmartPan	3D s / 3D Classic: 3.3 - 19 s as indicated ±10% 3D Plus / 3D Mid: 3.7 - 23 s as indicated ±10% 3D Max: 10 s as indicated ±10%
• Scanning ceph	X-ray units with SW prior to 3.0: Normal: 12 - 18.7 s as indicated ±10% High Speed: 6.4 - 9.9 s as indicated ±10% X-ray units with SW 3.0 or later: 6.4 - 9.9 s as indicated ±10%
• Planmeca ProCeph	0.1 - 0.8 s as indicated ±10%

SID:	
• 3D	3D s / 3D Classic: 527 mm (20.7 in.) 3D Plus / 3D Mid / 3D Max: 600 mm (23.6 in.)
• Pan	2D / 3D s / 3D Classic: 500 mm (19.7 in.) 3D Plus / 3D Mid: 573 mm (22.6 in.) 3D Max: 600 mm (23.6 in.)
• Ceph	1700 mm (66.9 in.)
Magnification:	
• 3D	3D s / 3D Classic: 1.57 3D Plus / 3D Mid: 1.38, 1.44 or 1.80 3D Max: 1.38, 1.41 or 1.80
• Pan	2D / 3D Classic: 1.2 - 1.5 2D tomography: 1.5
• SmartPan	3D s / 3D Classic: 1.27 - 1.5 3D Plus / 3D Mid: 1.35 - 1.8 3D Max: 1.4
• Ceph	1.13
Duty cycle for height adjustment	25 s ON / 300 s OFF
Line voltage	100 - 220 V~ / 50 - 60 Hz 230 - 240 V~ / 50 Hz
Line current	8 - 17 A
Line harmonics	Cos better than 0.9
Max. permissible apparent impedance of supply mains	0.5 Ω (100VAC)
Maximum continuous heat dissipation	< 250W
Fuses:	
• 2 user replaceable fuses	100 - 220 V~ / 16A FF H 500V 230 - 240 V~ / 8A FF H 500V
• Type	195100 ELU
Weight:	
• 2D / 3D s / 3D Classic	119 kg (263 lb)
• 3D Plus / 3D Mid	136 kg (300 lb)
• 3D Max	134 kg (296 lb)

• Scanning ceph	26 kg (57 lb)
• Planmeca ProCeph	20 kg (44 lb)
Colour	RAL 9016

Environmental requirements

Transport:

• Temperature	-20°C - +60°C
• Relative humidity	10 - 90% RH (non-condensing)
• Air pressure	700 - 1060 hPa

Storage:

• Temperature	-10°C - +50°C
• Relative humidity	10 - 90% RH (non-condensing)
• Air pressure	700 - 1060 hPa

Operating:

• Temperature	Pan / scanning ceph: +5°C - +40°C 3D / ProCeph: +10°C - +30°C
• Relative humidity	10 - 90% RH (non-condensing)
• Air pressure	700 - 1060 hPa

Image properties

3D:

• Flat panel pixel size	127 µm
• Flat panel active surface	3D s: 80 x 130 mm (3.15 x 5.12 in.) 3D Classic / 3D Plus: 130 x 130 mm (5.12 x 5.12 in.) 3D Mid: 146 x 146 mm (5.74 x 5.74 in.) 3D Max: 193 x 242 mm (7.6 x 9.5 in.)

SmartPan:

• Flat panel pixel size	127 µm
• Flat panel active surface	3D s / 3D Classic / 3D Plus: 8 x 130 mm (0.31 x 5.12 in.) 3D Mid: 8 x 146 mm (0.31 x 5.74 in.) 3D Max: 13 x 162 mm (0.51 x 6.38 in.) 3D Max MultiView: 25 x 162 mm (0.98 x 6.38 in.)

Pan / ceph CCD:

- Pixel size 48 μm
- Pan active surface 6 x 146 mm (0.24 x 5.74 in.)
- Ceph active surface 6 x 292 mm (0.24 x 11.15 in.)

Planmeca ProCeph:

- Flat panel pixel size 139 μm
- Flat panel active surface 302 x 249 mm (11.89 x 9.80 in.)

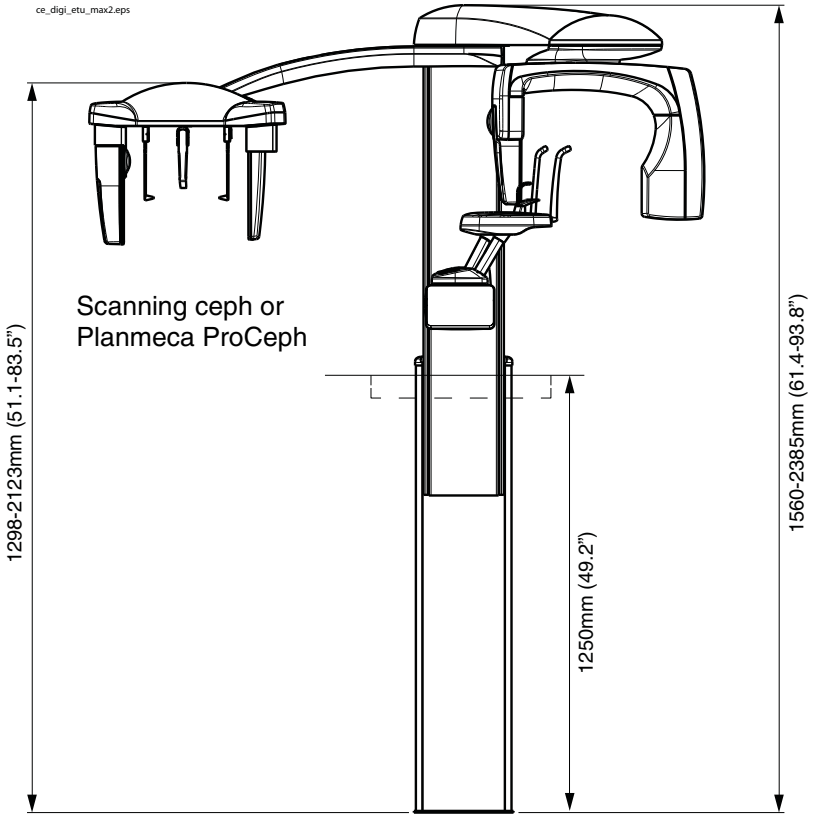
Operating conditions for X-ray units with ProFace sensor:

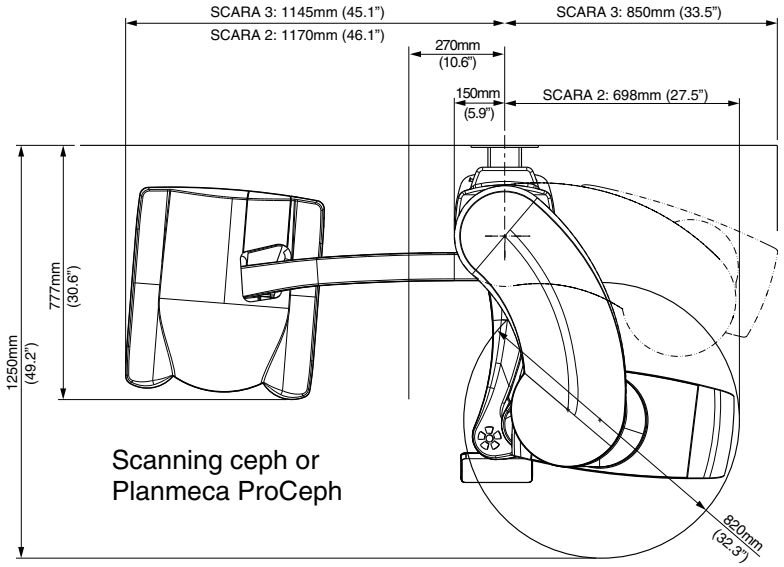
- Optimum colour temperature Approx. 6500 Kelvin
- Frequency for fluorescent lamps 100 Hz
- Even and uniform lighting
- No natural light (no windows in the room)
- No green objects next to X-ray

18.2 Original manufacturer

PLANMECA Oy, Asentajankatu 6, FIN-00880 Helsinki, FINLAND
Phone: +358 20 7795 500, Fax: +358 20 7795 555, www.planmeca.com

18.3 Dimensions





18.4 Minimum operational space requirements

NOTE

The maximum height can be adjusted to suit offices with low ceiling.

SCARA 2	Width	Depth	Height
Planmeca ProMax 2D S2 X-ray unit	1350 mm 53.1 in.	1630 mm 64.2 in.	1560 - 2385 mm 61.4 - 93.9 in.
Planmeca ProMax 2D S2 X-ray unit with cephalostat	2030 mm 79.9 in.	1630 mm 64.2 in.	1560 - 2385 mm 61.4 - 93.9 in.

SCARA 3	Width	Depth	Height
Planmeca ProMax 2D S3 X-ray unit Planmeca ProMax 3D X-ray unit	1500 mm 59.1 in.	1630 mm 64.2 in.	1560 - 2385 mm 61.4 - 93.9 in.
Planmeca ProMax 2D S3 X-ray unit with cephalostat Planmeca ProMax 3D X-ray unit with cephalostat	2150 mm 84.6 in.	1630 mm 64.2 in.	1560 - 2385 mm 61.4 - 93.9 in.

PLANMECA

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