

Planmeca Proline CC panoramic x-ray



USER'S MANUAL

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

- installation, calibration, modification and repairs are carried out by qualified authorized personnel
- electrical installations are carried out according to the appropriate requirements such as IEC364
- equipment is used according to the operating instructions

Planmecca 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.

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1 INTRODUCTION

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



Planmeca Proline CC panoramic X-ray fulfills the requirements of Directive 93/42/EEC.

NOTE

This manual is valid for software revisions: PK 3.75 or later and PG 2.25 or later.

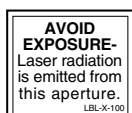
CAUTION

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

Federal law restricts this device to sale by or on the order of a dentist.

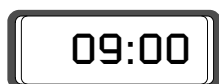
The patient positioning lights are class II laser products (21 CFR § 1040.10).



Class 1 laser product (Standard EN 60825-1:1994). The patient positioning lights are class 1, inherently safe laser lights.



All key illustrations indicate that the key should be pressed or, where indicated, pressed and held down. Pressing a key will either switch a function on or off, depending on the original setting, or change the value.



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

The exposure values given in these instructions are based on Kodak T-Mat G green sensitive film and Lanex Regular rare earth screens. If you are using a different film and screen combination you may have to use different exposure values.

The exposure values required to produce good X-ray images will vary considerably according to the build and age of the patient, the film processor used and processing procedures being followed. Therefore, the exposure values given in this guide are average values and are only meant to guide the user. Users are encouraged to develop their own radiographic techniques based on these values.

NOTE

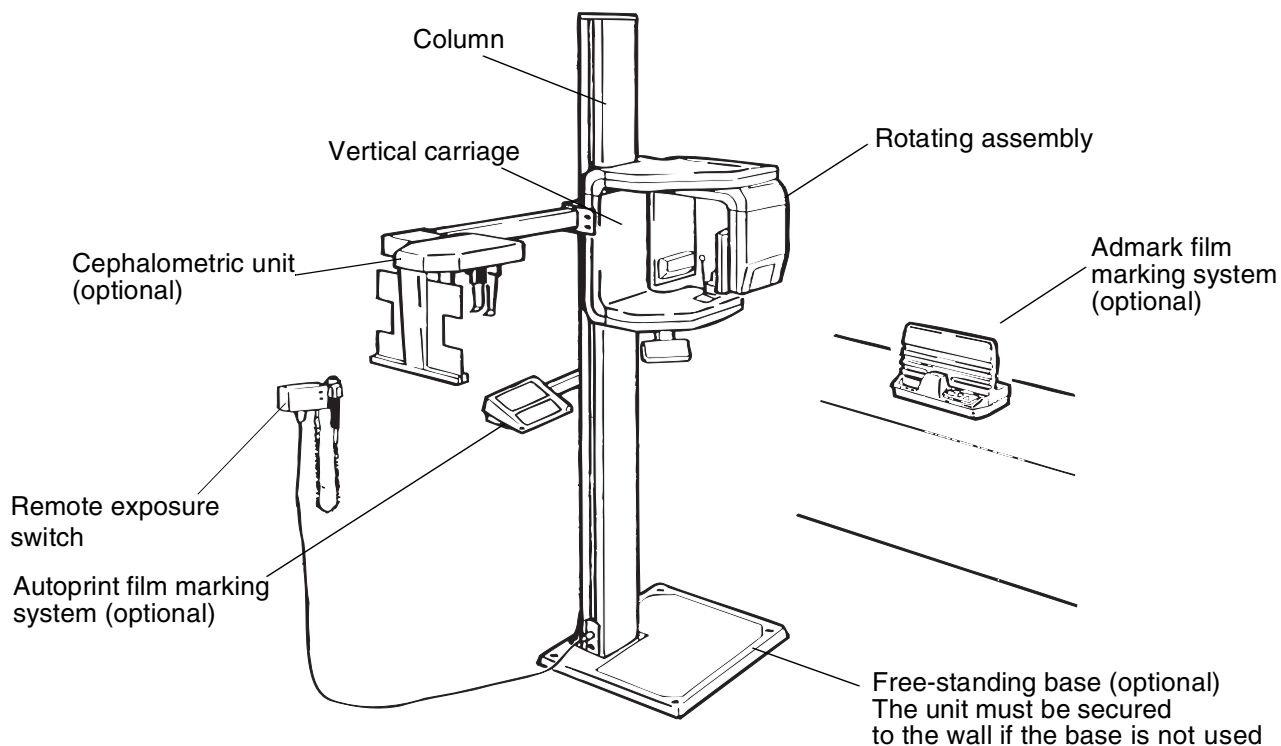
The optional Proline Cephalostat, True profile TMJ program and Transversal slicing system have separate manuals. Use these manuals in conjunction with this manual.

2 CHECKLIST - BEFORE USING THE UNIT

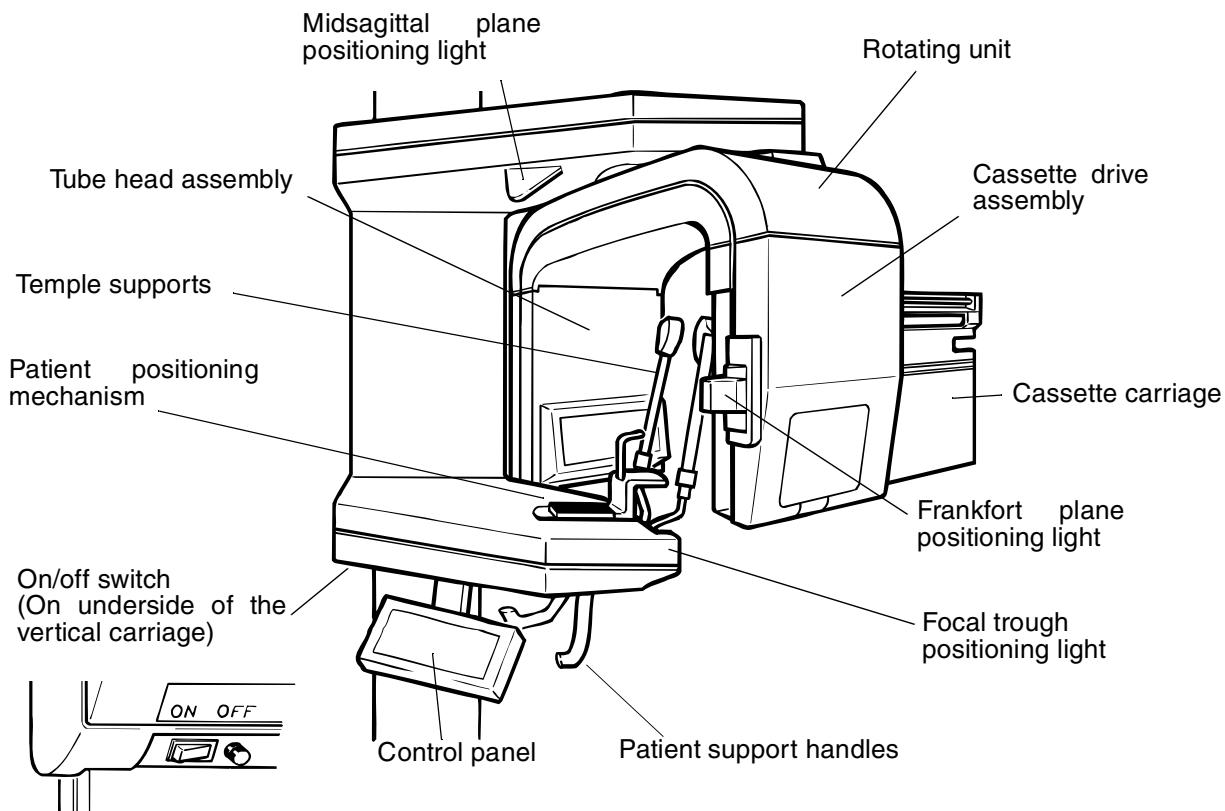
- Make sure that you are fully acquainted with the appropriate radiation protection measures and these instructions before using the unit.
- Make sure that the film processor is in working order and is ready for use.
- Make sure that you are using the correct film processing chemicals for the film you are using.
- Make sure that the processing chemicals you are using are fresh and are at the correct processing temperatures and concentrations.
- Make sure that the safelight you are using in the darkroom is suitable for the film being used.
- Make sure that the film you are going to use is fresh. Do not use old film.
- Make sure that the film and intensifying screen you are using are compatible. Do not mix films and screens of different colour sensitivity.
- Make sure that the film and screen are the right type for the technique you plan to use.
- Make sure that the intensifying screen is free of dust and is not scratched or damaged.
- Never leave the cassette open.

3 PLANMECA PROLINE CC PANORAMIC X-RAY-MAIN PARTS

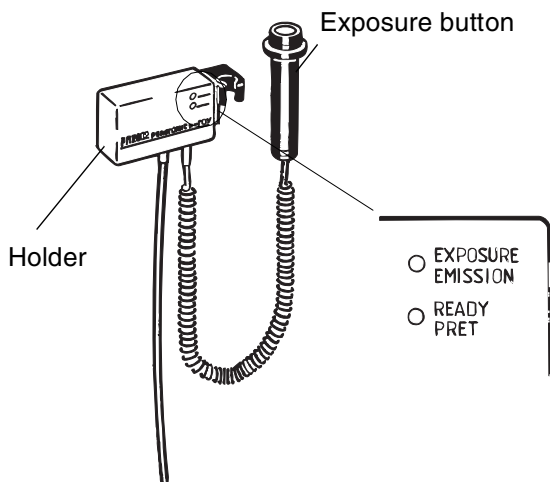
General view of the X-ray



Detailed view of the vertical carriage and rotating assembly



Remote exposure switch



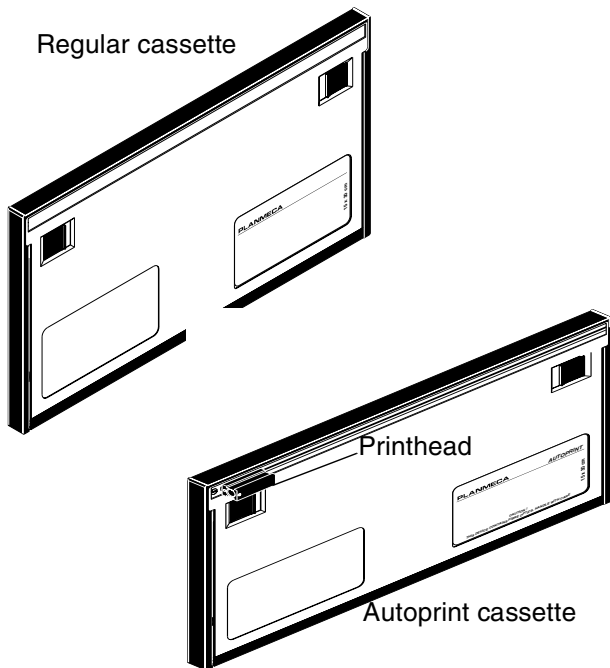
When you take an exposure you must press and **hold down** the exposure button for the whole duration of the exposure. If you remove your finger from the exposure button before the exposure cycle is completed radiation is interrupted, the rotating unit will stop moving, the temple supports will open, and an error code will appear on the main display which is on the control panel.



The error code must be cleared from the display before the unit can be used again. See section 11.2 "Error codes" on page 45 for information on how to clear error codes from the display.

The Exposure indicator light of the remote exposure switch will come on when an exposure is taken and indicates that the unit is generating radiation. If your switch is equipped with a green ready light, it will come on when the unit is correctly set up and ready to take an exposure.

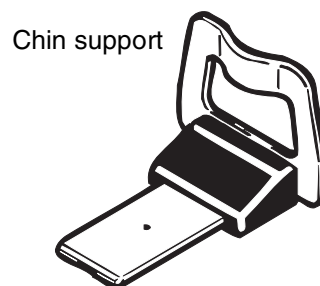
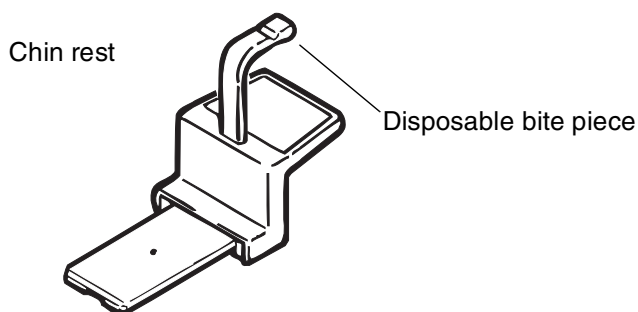
Cassettes



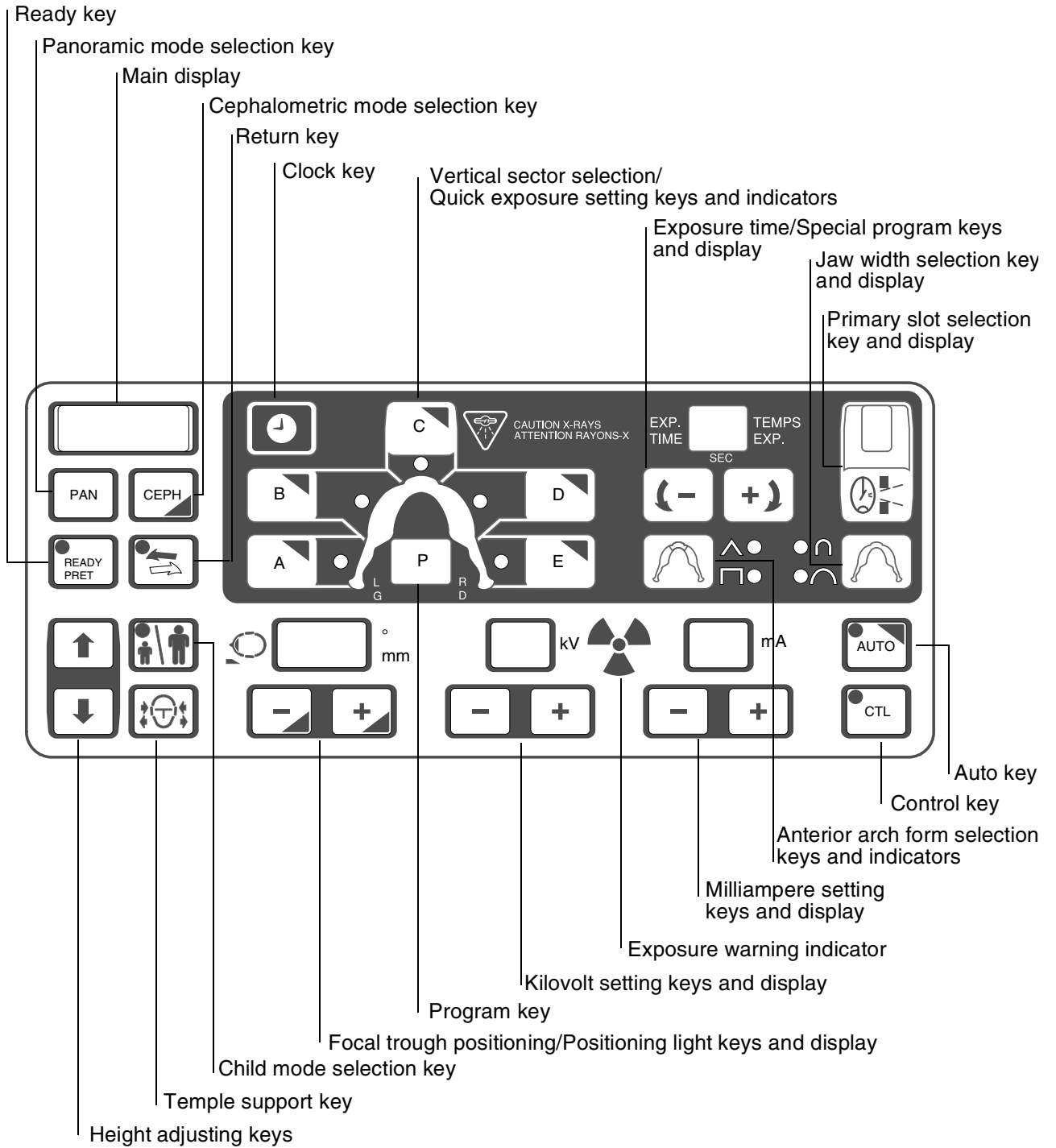
There are two versions of the panoramic film cassette, the regular version and the Autoprint version. The cassette door swings open from the top to the bottom. The Autoprint cassette must be used with the Autoprint film marking system. Be careful when handling and loading the Autoprint cassette not to damage the printhead (the small block that slides along the top of the cassette door). Never stack Autoprint cassettes or place them printhead down on a surface.

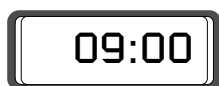
NOTE
When the optional Automatic Exposure Control (AEC) is used, the cassette must be AEC compatible (indicated with text "AEC COMPATIBLE" in the cassette label).

Patient supports



4 CONTROL PANEL - KEYS AND DISPLAYS



Main display

In normal operation the current time will appear on the main display. If the unit malfunctions an error code will be displayed. See section 11.2 "Error codes" on page 45 for a list of error codes and their meanings.

Panoramic mode selection key

Press and hold down the panoramic mode selection key when you want to enter the panoramic mode. Hold down the key until you have heard two audible signals: one when you start to press the key and one when the panoramic mode is entered. Taking a panoramic exposure is described in section 6 "PANORAMIC EXPOSURE" on page 15. The text PAN is briefly shown on the main display.

NOTE

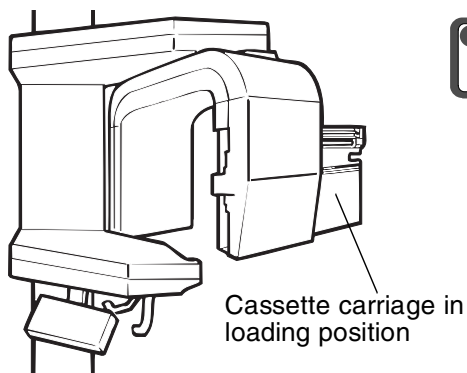
When the unit is switched on it is in the panoramic mode.

Cephalometric mode selection key

If your X-ray unit is equipped with a Cephalostat, press and hold down the cephalometric mode selection key when you want to take a cephalometric exposure. Hold down the key until you have heard two audible signals: one when you start to press the key and one when the cephalometric mode is entered.

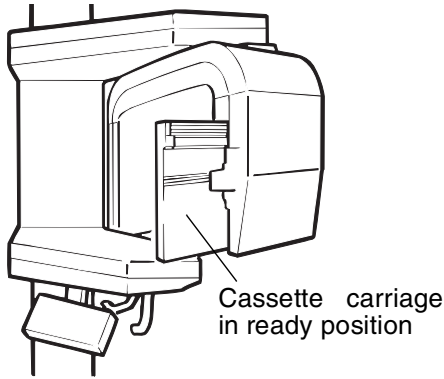
The text CEPH will appear on the main display.

Refer to the user's manual that is supplied with the Planmeca Proline CC Cephalostat.

Return key

Press the return key after an exposure has been taken to drive the rotating assembly back to the ready position and cassette carriage to the loading position. The return key can also be used to drive the cassette carriage from the ready position to the loading position. Note that the rotating assembly can be set to return automatically to the ready position, see section 8.3 "Automatic cassette carriage return" on page 37.

Ready key

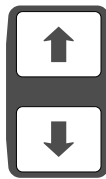


Press the ready key to drive the cassette carriage and the rotating assembly to the ready position. The temple supports will close, if they are not already closed, and the ready indicator light will come on.

NOTE

The automatic closing of the temple supports can be switched off, refer to section 8.4 “Automatic closing of the temple supports” on page 37.

Height adjusting keys



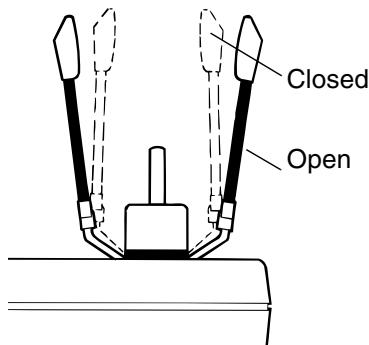
Press and hold either of the height adjusting keys to move the vertical carriage up or down so that the unit can be adjusted to suit the height of the patient. Note that the carriage will move slowly at first and then accelerate. The speed at which the carriage starts to move can be changed if required. Contact your dealer.

Child mode selector key



Press the child mode selector key when you are to take an exposure of a child or a very small adult. The indicator light will come on. Note that in this mode the exposure time, jaw form, and primary slot will automatically change, and the area of the film exposed will be reduced by approximately thirty percent.

Temple support key



Press the temple support key to open or close the temple supports, depending on the original position. Note that the temple supports will automatically close when you press the READY key if the automatic closing of the temple support is not switched off. They will automatically open after an exposure has been taken.

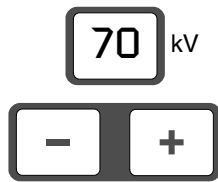
Focal trough positioning keys and display/Positioning light ON switch



The focal trough positioning keys have two functions:

Press either key once to switch on the lights that are used to position the patient.

Press and hold either key, when the patient positioning lights are on, to move the patient positioning mechanism backwards or forwards so that the patient's teeth can be positioned within the focal trough. The plus (+) key moves the patient backwards, and the minus (-) key moves the patient forwards. The number that appears on the display serves as a reference if you need to retake the exposure.

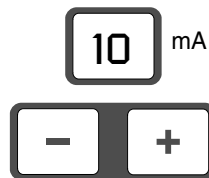
Kilovolt (kV) setting keys and display

The kilovolt setting minus (-) key decreases the kilovolt value and the plus (+) key increases it. The maximum value is 80 kV and the minimum value is 60 kV.

Exposure warning indicator

The exposure warning light will come on when you press the exposure button to take an exposure. You will also hear a warning signal. The tone of the warning signal can be changed if required. See section 8.6 “Adjusting the tone of the exposure warning signal” on page 38.

During the exposure preparation time a low-pitched signal is heard. A high-pitched signal indicates that the unit is radiating.

Milliampere (mA) setting keys and display

The milliampere setting minus (-) key decreases the milliampere value and the plus (+) key increases it. The maximum value is 12 mA and the minimum value is 4 mA.

Auto key

The auto key allows you to use certain programmed parameter values. The parameter values are stored in the memory with auto and P keys. See section 8.8 “Quick exposure settings” on page 39.

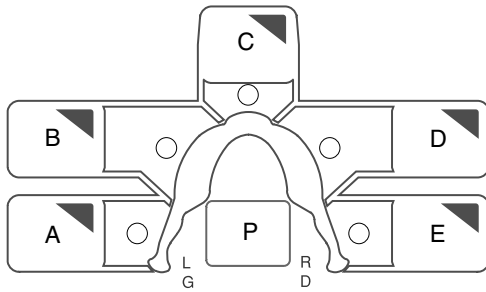
Control key

Some of the keys have second functions which can only be used when the control key is pressed to activate the additional function mode. When this key is pressed the indicator light will come on. This key is also used to clear error codes from the display, see section 11 “TROUBLESHOOTING” on page 44.

Clock key

Press the clock key once and the day and month will replace the current time on the main display. Press the key a second time and the year will appear. Press the key a third time, or wait five seconds, and the current time will reappear. If you wish to set the clock see section 8.5 “Setting the clock” on page 37.

Vertical sector selection keys



The vertical selection keys are for selecting the vertical sector or sectors of the jaw you do **not** wish to expose. When you press one of these keys the indicator light will come on. This indicates that the sector will **not** be exposed. Vertical segmenting is described in section 8.2 “Vertical sector selection” on page 36.

These keys are also used to program and select the quick exposure settings, see section 8.8 “Quick exposure settings” on page 39.

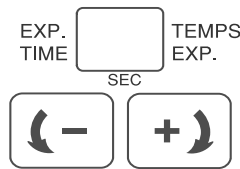
Program (P) key



Press and hold down the program (P) key to select the special exposure mode you want to use. Hold down the key until you have heard two audible signals: one when you start to press the key and one when the program mode is entered.

The latest used program number will start to flash on the main display. Press the special program keys to scroll through the program numbers. The program selection is described in section 7.1 “Program selection” on page 21.

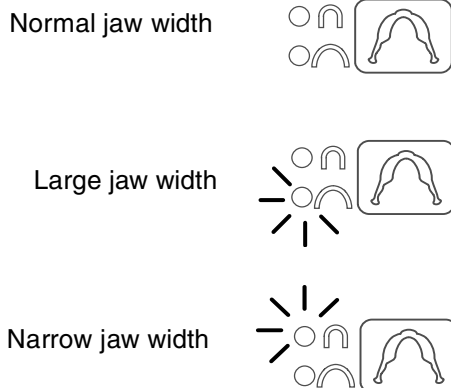
Exposure time/Special program keys and display



The exposure times for the different views will appear on this display. The exposure time will automatically change when the exposure mode is chosen, or when the child mode is selected. In the cephalometric mode the exposure time is changed with these keys, refer to the user’s manual supplied with the Planmeca Proline CC cephalostat.

These keys are used in the panoramic mode to change the program after the P key has been pressed. After the program mode has been selected, the keys are used as function control keys, see section 7 “SPECIAL PROGRAMS” on page 21, or refer to the user’s manual of the special program.

Jaw width selection key



When taking panoramic exposures this key allows you to adjust the form of the focal trough to accommodate patients with different jaw widths. When the unit is switched on the normal jaw width is automatically selected and neither indicator light will come on. Press the key once to select the large jaw width. The lower indicator light will come on. Press it a second time to select the narrow jaw width. The upper indicator light will come on. Press the key a third time and you will return to the normal jaw width.

Primary slot selection key and display



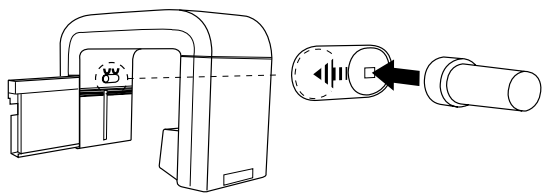
This key is used to select the different horizontal jaw segments that you wish to expose. A number will appear on the display indicating which segment has been selected, these are described in section 8.1 “Primary slot (horizontal segment) selection” on page 35. When the unit is switched on it automatically selects the normal size panoramic exposure of both jaws. The display will remain empty.

NOTE

If your X-ray unit is equipped with Cephalostat and/or Transversal slicing system, the primary slot selection is limited, see section 8.1 “Primary slot (horizontal segment) selection” on page 35.

NOTE

If your X-ray unit is equipped with Transversal slicing system, there is two secondary slots. When you are not taking a transversal exposure make sure that the narrow secondary slot is selected. The selection is made by sliding the slot mechanism, located on the cassette carriage, to the right with the magnetic slider supplied with the system. Refer to the user’s manual supplied with the Transversal slicing system.



Anterior arch form selection key

Normal anterior arch



Square anterior arch



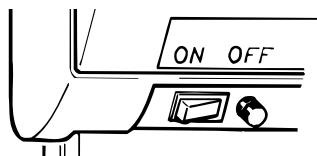
Protrusive anterior arch



When taking panoramic exposures this key allows you to adjust the form of the focal trough to accommodate patients with different anterior arch forms. When the unit is switched on the normal anterior arch form is automatically selected and neither indicator light will come on. Press the key once to select the square anterior arch form. The lower indicator light will come on. Press it a second time to select the protrusive anterior arch form. The upper indicator light will come on. Press the key a third time and you will return to the normal anterior arch form.

5 PREPARATIONS FOR THE EXPOSURE

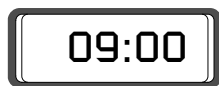
5.1 Switching the unit on



Switch the unit on with the on/off switch which is located on the underside of the vertical carriage on the left-hand side. The control panel lights will come on and the unit will carry out a self-test which will last a few seconds.



When the self-test is completed a message will appear briefly on the display stating that the unit has passed the test.



The time will then appear on the display. The unit is now ready for use.



Error code

NOTE

The unit incorporates a self-checking feature that monitors the operation of the unit. If there is a malfunction or an operating error the unit will stop working and an error code will appear on the main display. For information on what the error codes mean see section 11.2 "Error codes" on page 45.

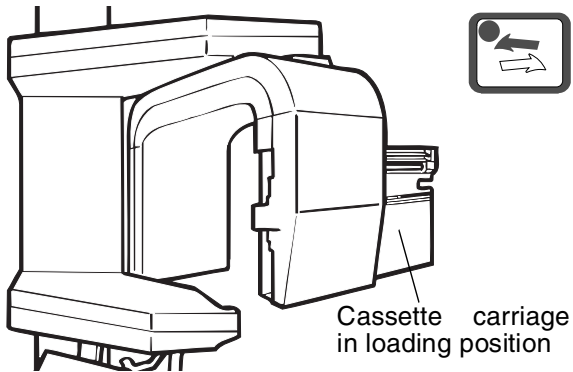


Help message

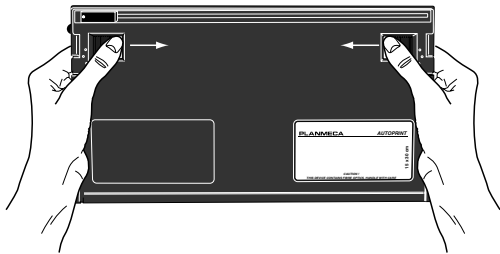
NOTE

The help message is shown on the main display if a key that has no function is pressed, or if the function is not allowed. The help message disappears when you release the key (exposure switch). For information on what the help messages mean see section 11.1 "Help messages" on page 44.

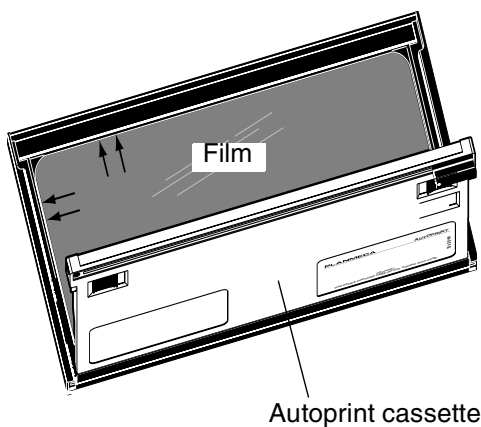
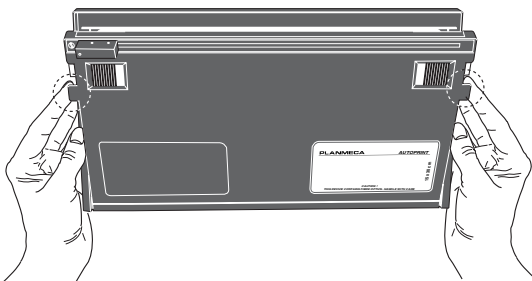
5.2 Loading the cassette



Press the return key to move the cassette carriage to the loading position if it is not already in that position.



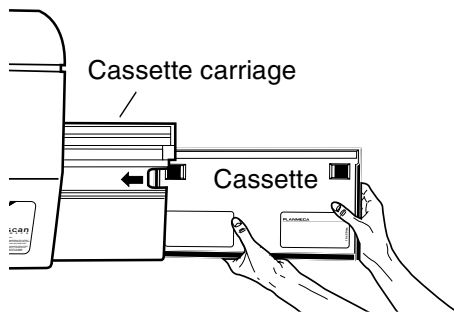
In the darkroom, push the latches inwards to open the cassette door (see figure beside) and place a film in the cassette. Handle the film in accordance with the manufacturer's instructions and be careful not to damage the intensifying screens.



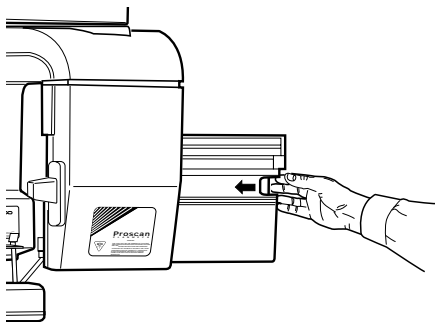
When you are using the Autoprint cassette position the film so that it touches the inner left-hand and upper edges of the cassette. With the regular cassette position the film so that it touches the bottom edge. The film must be on the intensifying screen.



Close the cassette carefully by pressing the door from below the latches with your thumbs. Make sure that the latches click into their positions.



Slide the cassette into the cassette carriage. Make sure that you insert the cassette in the direction of the arrow marked on the door and that the cassette is pushed completely into the cassette carriage.



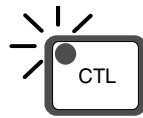
5.3 Preparing the patient

Ask the patient to remove any spectacles, hearing aids, dentures, and personal jewellery such as earrings, necklaces, and hairpins.

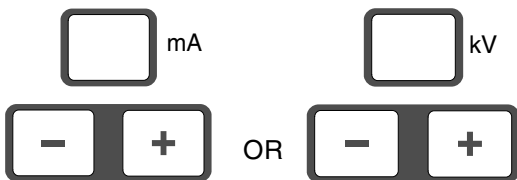
Place a protective lead apron over the patient's back if required.

Demonstrating the unit without taking an exposure

If the patient is nervous you may have to reassure them by demonstrating the unit. This "dummy run" should be carried out with the radiation switched off.



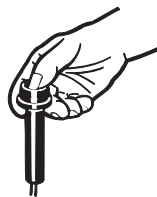
Press the control key to activate the additional function mode. The indicator light will come on.



Press any of these keys to switch the radiation off. The kV and mA values will clear from the displays which indicates that the radiation has been switched off.



Press the ready key to drive the unit to the ready position. The cassette will move to the ready position, the ready light will come on, and the temple supports will close.



Press and hold down the exposure button for the duration of the "exposure" (18 seconds) to demonstrate the movement of the unit. The rotating unit will move through one exposure cycle.

To switch the radiation on again repeat the keying sequence you used to switch the radiation off.

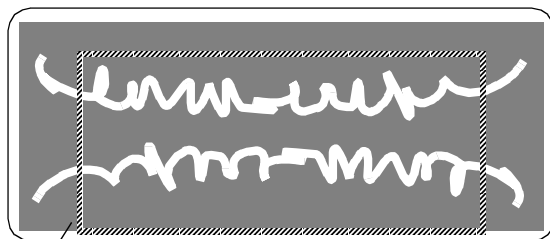
6 PANORAMIC EXPOSURE

All exposure values given in this section are based on Kodak T-Mat G film and Lanex Regular screens. If you are using a different film and screen combination you may have to adjust these values.

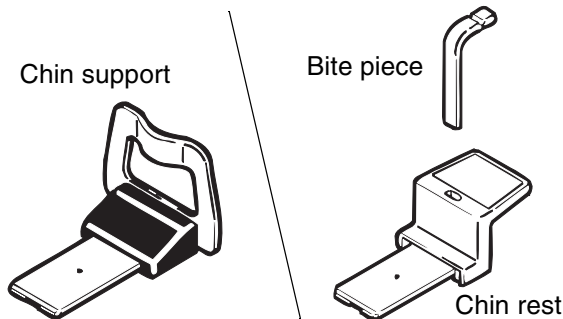
NOTE

The Automatic Exposure Control (AEC) can be used in the panoramic mode. See instructions given in section 9 "AUTOMATIC EXPOSURE CONTROL (AEC) (OPTIONAL)" on page 41.

This procedure will produce a full size panoramic exposure of both jaws. If the child mode is selected the width and height of the exposed area will be slightly less. This will reduce the area exposed on the film by about 30 percent. You can also take an exposure of preselected primary slots or vertical sectors of the jaw. See sections 8.1 "Primary slot (horizontal segment) selection" on page 35, and 8.2 "Vertical sector selection" on page 36.



Normal panoramic exposure
Area exposed in CHILD mode



Use the chin rest for this procedure. Insert a new bite piece into the hole in the top of the rest.

NOTE

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



NOTE

If the unit is not in the panoramic mode, press and hold down the panoramic mode selection key.



The text PAN will appear briefly on the main display.



If the patient is a child or a very small adult select the child mode. The indicator light will come on.

NOTE

When you take panoramic exposures using the child mode with the X-ray units that have been upgraded to use the transversal slicing system, only the width of the exposed area (exposure time) is reduced.



Select the correct jaw width for the patient to be X-rayed, see section “Jaw width selection key” on page 9.

NOTE

If the jaw width is not selected, the normal jaw width is used.

NOTE

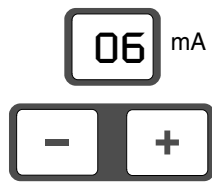
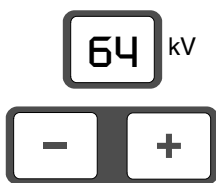
The jaw width selection is not necessary if the child mode is used as the narrow jaw width is automatically selected.



Select the correct anterior arch form for the patient to be X-rayed, see section “Anterior arch form selection key” on page 10.

NOTE

If the anterior arch form is not selected, the normal anterior arch form is used.



Select the correct exposure values for the patient being X-rayed according to the values in the following table. If you are using a different film screen combination you may have to adjust the exposure values.

PANORAMIC EXPOSURE VALUES

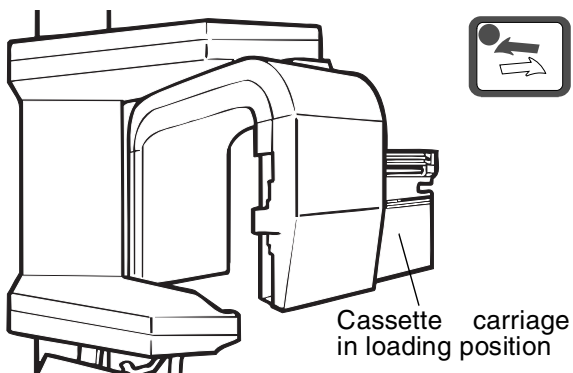
Based on Kodak T-Mat G film and Lanex regular screens

PATIENT	kV VALUE	mA VALUE
Child up to 6 years of age ^a	60	4
Child 7-12 years of age	62	5
Adult female or small male	64	6
Adult male	68	7
Large adult male	70	9

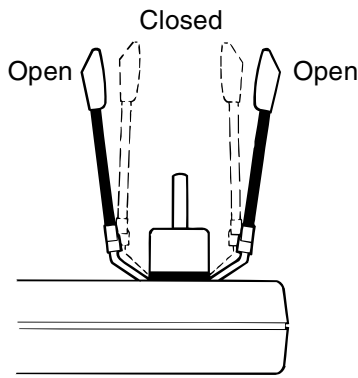
a. Use the CHILD MODE.

NOTE

In case the unit is in the AEC mode the default exposure values are used. These values cannot be changed by the user.

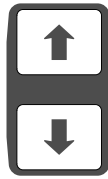


Press the return key to move the rotating assembly to the ready position and the cassette carriage to the loading position if they are not already in that position.

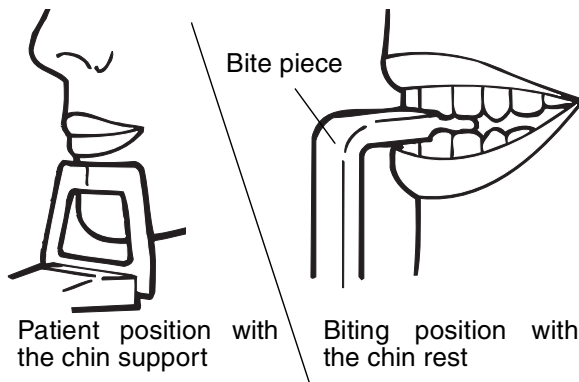


Press the temple support key to open the temple supports if they are not already open.

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



Press either of the height adjusting keys to adjust the height of the vertical carriage until the chin rest is slightly higher than the patient's chin. By positioning the chin rest slightly higher than the patient's chin the patient will be encouraged to stretch up to reach the chin rest. This will help to stretch and straighten the patient's cervical vertebrae

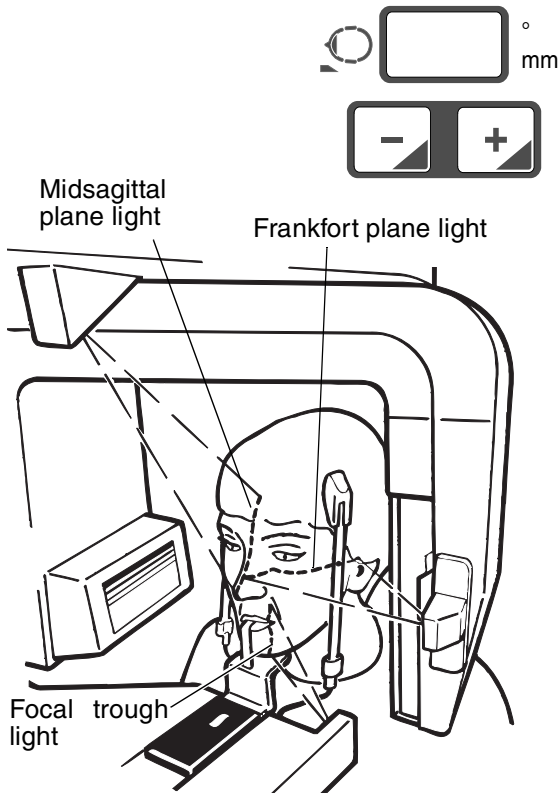


Ask the patient to step forward, grasp the patient handles, stretch up and place their chin on the chin rest. Slide the bite piece up or down until the patient is able to bite it. The incisal edges of the maxillary and mandibular teeth must be in the groove in the bite piece.

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

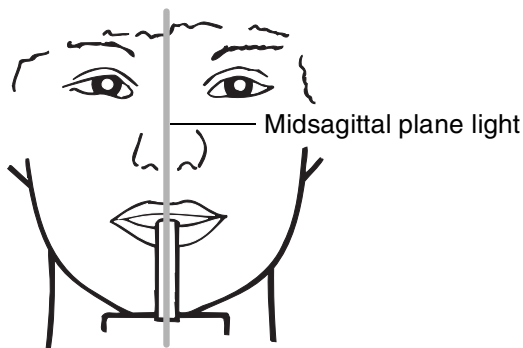


Press the temple support key to close the temple supports.

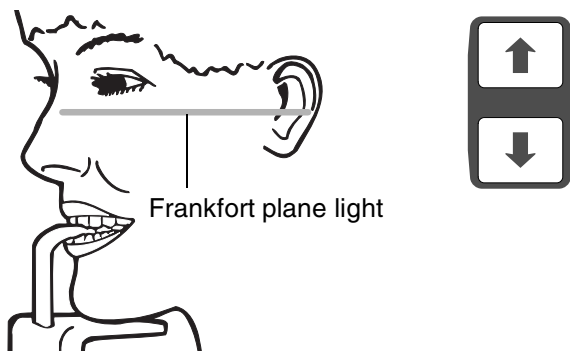


Press either of the focal trough positioning keys to switch the three patient positioning lights on. Note that the lights will automatically switch off after 25 seconds if you do not use these keys to adjust the position of the patient positioning mechanism. If the lights go out before you have positioned the patient press either key a second time to switch the lights on again.

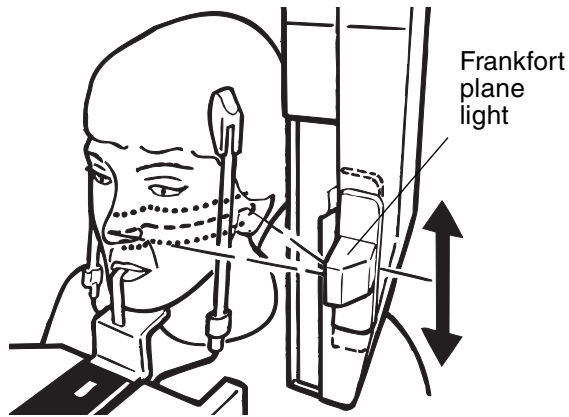
Stand behind the patient and make sure that the patient's shoulders are level and the neck muscles relaxed.



Position the patient's head so that the midsagittal plane coincides with the midsagittal plane light beam. Make sure that the patient is looking straight ahead as the light may appear to be correctly positioned but the patient's head could be turned slightly to one side.

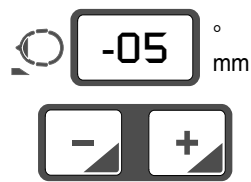


Position the patient's head so that the Frankfort plane coincides with the Frankfort plane light beam. To do this support the back of the patient's head with your hand and then adjust the tilt of the patient's head by raising or lowering the vertical carriage with these keys. The patient's back should be straight. If necessary stretch and straighten the patient's cervical vertebrae by moving the vertical carriage up slightly.

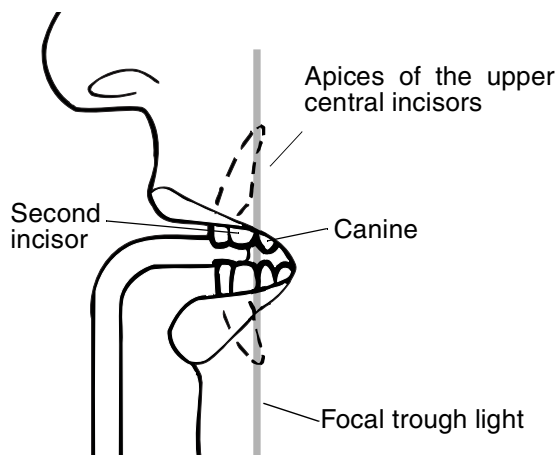


Note that the Frankfort plane light, located on the side of the cassette drive assembly, can be slid up and down to accommodate different head sizes.

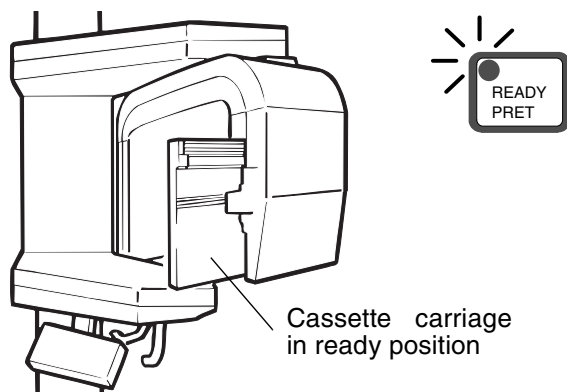
Position the apices of the patient's upper central incisors within the image layer (focal trough) of the unit.



To do this press and hold either of the focal trough positioning keys to move the patient positioning mechanism, and patient, backwards or forwards until the focal trough light, which indicates the centre of the focal trough, falls between the second incisor and the canine. For an average patient positioning the teeth as described above will place the apices of the upper central incisors within the focal trough. The minus (-) key moves the patient forwards, and the plus (+) key moves the patient backwards. Check that the Frankfort plane light and the midsagittal plane light are still correctly positioned. Reposition them if necessary.



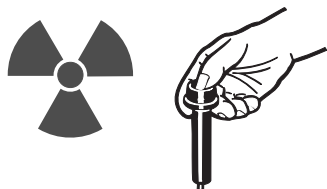
The number that appears on the display is the distance the patient positioning mechanism must have been moved, backwards or forwards, for the patient's teeth to be positioned within the focal trough and it serves as a reference if you need to retake the exposure.



Press the ready key to drive the unit to the ready position. The indicator light will come on.

Ask the patient to close their lips on the bite block, swallow, place their tongue flat against the roof of the mouth, breathe normally, and stand as still as possible.

Move at least two meters (seven feet) from the X-ray. Protect yourself from unnecessary radiation.



Press and hold down the exposure button on the remote control for the duration of the exposure (18 seconds). The rotating assembly will move through one exposure cycle. During the exposure cycle the radiation warning light will come on and you will hear the radiation warning tone. When the rotating assembly has completed the exposure cycle the temple supports will automatically open and the patient can then be guided from the unit.

NOTE

If automatic cassette carriage return is activated, see section 8.3 “Automatic cassette carriage return” on page 37, the rotating unit will return to the ready position before the temple supports open.



Press the return key to drive the rotating assembly to the ready position and the cassette carriage to the loading position. This is not necessary if the cassette carriage is set to return to the loading position automatically.

Remove the cassette from the cassette carriage and process the film.

7 SPECIAL PROGRAMS

All exposure values given in this section are based on Kodak T-Mat G film and Lanex Regular screens. If you are using a different film and screen combination you may have to adjust these values.

7.1 Program selection

There are three exposure programs in the standard Planmeca Proline CC panoramic X-ray unit: Temporomandibular joint, Sinus and P.A. cross-sectional programs. The optional exposure programs available are True profile TMJ program and Transversal slicing system.

Special exposure modes

Program number	Exposure program
P 10	Double TMJ
P 20	Sinus
P 30	P.A. cross-sectional
P 50 ^a	True profile TMJ, both condyles
P 51 ^a	True profile TMJ, left condyle
P 52 ^a	True profile TMJ, right condyle
P 60 ^a	Transversal slicing system, automatic mode
P 61 ^a	Transversal slicing system, manual mode

a. Optional program



Press and hold down the P key until you have heard two audible signals to enter the program selection mode. The latest used program number starts to flash on the main display.

NOTE

If you are entering the program selection mode for the first time, the smallest program number will start to flash on the main display.



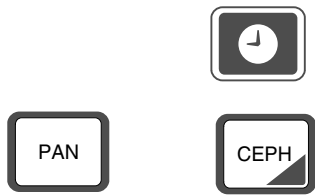
The special program keys are used to scroll the program numbers. Press the minus (-) key to decrease the value and the plus (+) key to increase the value. The program menu is cyclical, after the last (first) choice the first (last) one is displayed again.

NOTE

If you interrupt the program selection for over 10 seconds, the unit automatically exits the program selection mode and returns to the last selected mode.



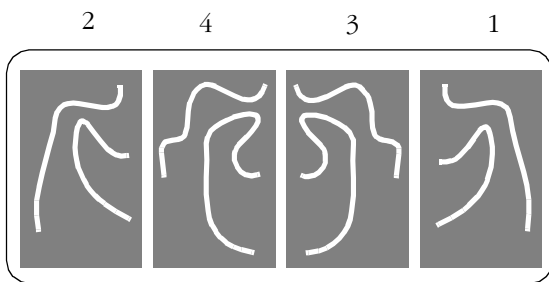
The required program number is accepted by pressing the P key. The program number stops flashing and the rotating assembly drives to the correct position.



When you want to see the current time in the special program mode press the clock key. The time is shown on the main display for three seconds.

When you want to exit the special program mode, press and hold down the panoramic or cephalometric mode selection key until you have heard two audible signals.

7.2 Temporomandibular joint exposure (P10)

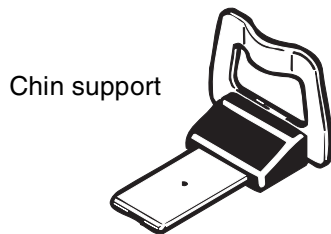


Temporomandibular joint exposure

This procedure will produce open and closed views of the left and right temporomandibular joints. If the child mode is selected the height of the exposed area will be reduced. You can also take an exposure of the upper horizontal segment of the jaw. See section 8.1 “Primary slot (horizontal segment) selection” on page 35.

Note that this is a double exposure and the rotating assembly will travel through two exposure cycles.

Use the chin support for this exposure.



Chin support

First exposure - jaw closed



Select the double TMJ program (P10), see section 7.1 “Program selection” on page 21.



Select the correct exposure values for the patient being X-rayed according to the values in the following table.

Note that there are two sets of kV values. One set for the closed jaw and a second set for the open jaw. If you are using a different film screen combination you may have to adjust the exposure values.

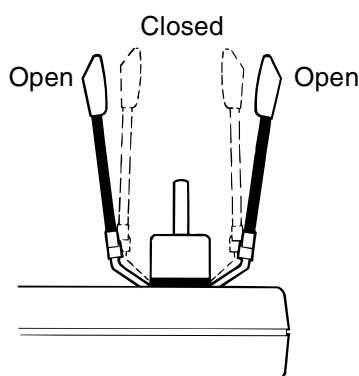
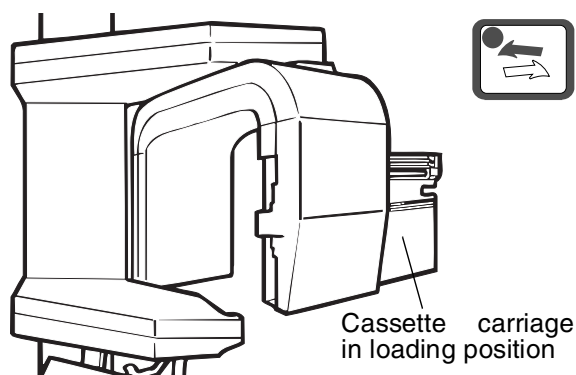
TEMPOROMANDIBULAR JOINT EXPOSURE VALUES
Based on Kodak T-Mat G film and Lanex regular screens

PATIENT	kV VALUE		mA VALUE
	Jaw closed	Jaw open	
Child 10 and over	66	64	5
Adult female or small male	70	68	6
Adult male	74	72	8
Large adult male	78	76	10

NOTE

Select the primary slot number 1 if the patient is a child or a very small adult. The height of the exposed area is reduced slightly. In the X-ray units that have been upgraded to use the transversal slicing system the reduced height panoramic exposure is not available.

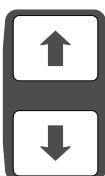
Press the return key to move the rotating assembly to the ready position and the cassette carriage to the loading position if they are not already in that position.



Press the temple support key to open the temple supports if they are not already open.

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

Press either of the height adjusting keys to adjust the height of the vertical carriage until the opening in the chin support is approximately level with the patient's mouth.

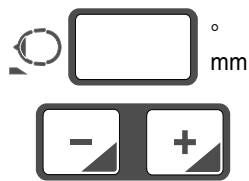




Ask the patient to step forward, grasp the patient handles and press their lips against the chin support. The patient's nose must rest on top of the support and their mouth must be closed, their teeth together.

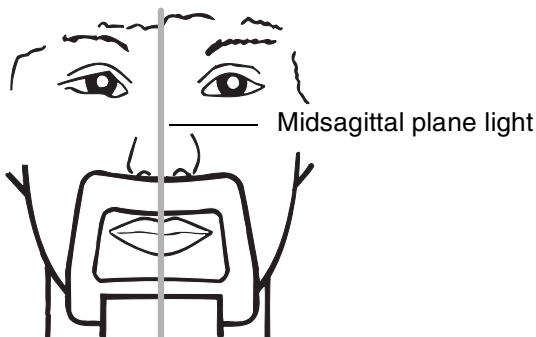


Press the temple support key to close the temple supports.

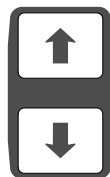
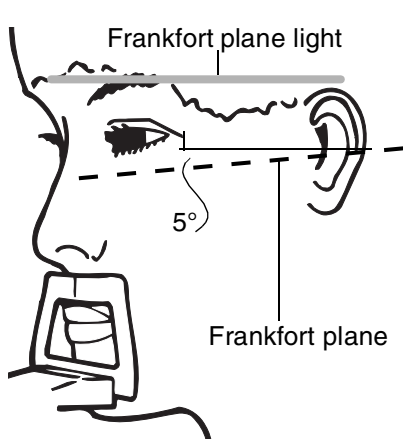


Press either of the focal trough positioning key to switch the three patient positioning lights on so that the patient can be positioned.

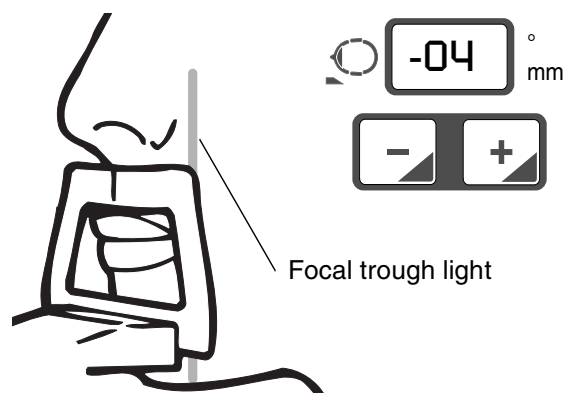
Stand behind the patient and check that the patient's shoulders are level and the neck muscles relaxed.



Position the patient's head so that the midsagittal plane coincides with the midsagittal plane light beam. Make sure that the patient is looking straight ahead as the light may appear to be correctly positioned but the patient's head could be turned slightly to one side.



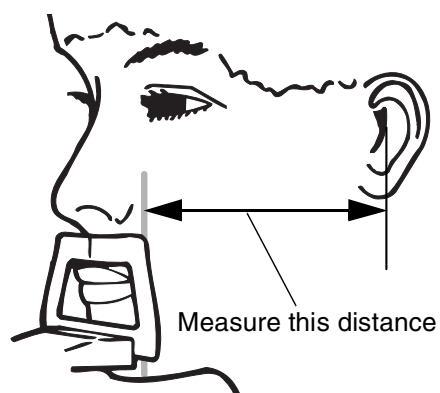
Position the patient's head so that the Frankfort plane is tilted down 5°. To do this support the back of the patient's head with your hand and, using the Frankfort plane light as a reference line, adjust the position of the patient's head by raising or lowering the vertical carriage with the height adjusting keys. Make sure the patient's back is straight.



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

To do this ask the patient to open their lips so that you can see their teeth. Then press and hold either of the focal trough positioning keys to move the patient positioning mechanism, and patient, backwards or forwards until the focal trough light, which indicates the centre of the focal trough, falls between the second incisor and the canine. For an average patient positioning the teeth as described above will place the apices of the upper central incisors within the focal trough. The minus (-) key moves the patient forwards, and the plus (+) key moves the patient backwards. Check that the Frankfort plane light and the midsagittal plane light are still correctly positioned. Reposition them if necessary.

Note the number on the Focal trough positioning display.

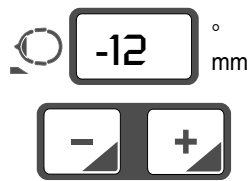
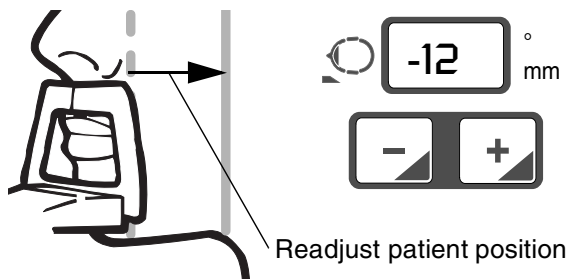


Measure the distance from the focal trough light beam to the center of the auditory meatus and then determine, from the table below, how much the patient must be moved, backwards or forwards, to be correctly positioned for the temporomandibular joint exposure.

For example: If the number on the display was -04 and the measured distance is 90 mm, you have to move patient -8mm and the final position of the patient is -12mm.

POSITIONING GUIDE FOR TEMPOROMANDIBULAR JOINT EXPOSURES

Distance from light beam to auditory meatus	Adjustment to the position of the patient
70 mm	+8 mm
75 mm	+4 mm
80 mm	0 mm
85 mm	-4 mm
90 mm	-8 mm
95 mm	-12 mm
100 mm	-16 mm



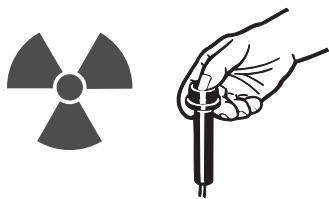
Press either of the focal trough positioning keys to readjust the position of the patient according to the measurements given in the table.



Press the ready key to drive the unit to the ready position. The indicator light will come on.

Ask the patient to stand as still as possible.

Move two meters (seven feet) from the unit. Protect yourself from unnecessary radiation.

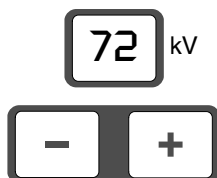


Press and hold down the exposure button on the remote control for the duration of the exposure. The rotating assembly will move through one complete exposure cycle and then automatically return to the ready position. The temple supports will remain closed and hold the patient in position for the second exposure.



The program number P 11 will appear on the main display to indicate that the first exposure is taken. After the second exposure is taken the program number P 10 will appear on the display.

Second exposure - jaw open



Reduce the kV value by 2kV for the open jaw exposure. Refer to exposure table on page 23.

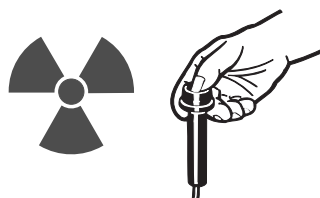


Press the ready key to drive the cassette carriage to the ready position so that the open jaw exposure can be taken.



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

Ask the patient to stand as still as possible.



Move two meters (seven feet) from the unit. Protect yourself from unnecessary radiation.

Press and hold down the exposure button on the remote control for the duration of the second exposure. When the rotating assembly has completed the second exposure cycle the temple supports will automatically open. The patient can now be guided from the unit.

NOTE

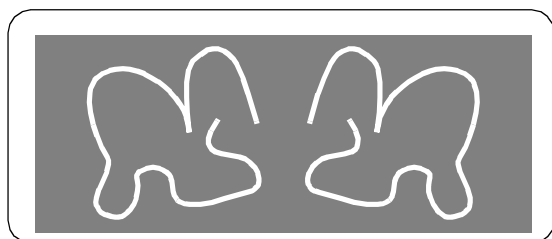
If automatic carriage return is activated, see section 8.3 “Automatic cassette carriage return” on page 37, the rotating assembly will return to the ready position before the temple supports open.



Press the return key to drive the rotating assembly to the ready position and the cassette carriage to the loading position. This is not necessary if the cassette carriage is set to return to the loading position automatically.

Remove the cassette from the unit and process the film.

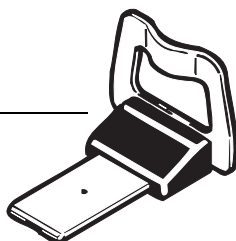
7.3 Sinus exposure (P20)



Sinus exposure

This procedure will produce an exposure of the maxillary sinus along the plane selected. If the child mode is selected the size of the exposed area will be reduced.

Chin support



Use the chin support for this exposure.



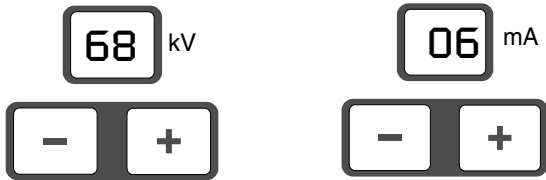
Select the Sinus program (P20), see section 7.1 “Program selection” on page 21.



Select the CHILD mode if the patient is a child or a very small adult. The indicator light will come on.

NOTE

When you take panoramic exposures using the child mode with the X-ray units that have been upgraded to use the transversal slicing system, only the width of the exposed area (exposure time) is reduced.

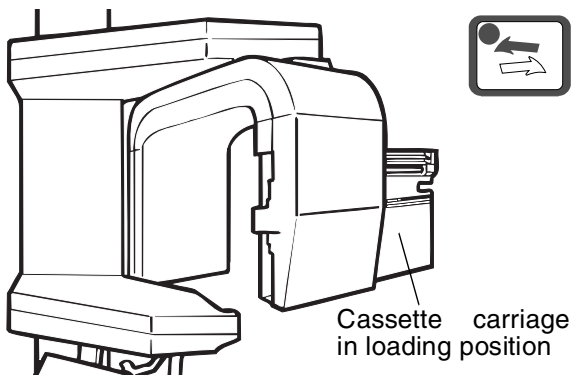


Select the correct exposure values for the patient being X-rayed according to the values in the following table. Note that the kV value for a sinus exposure is 4kV higher than the corresponding panoramic exposure.

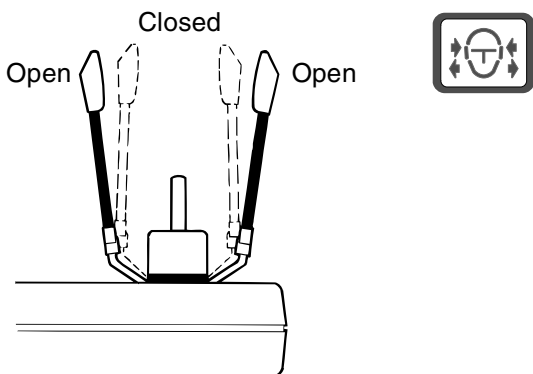
SINUS EXPOSURE VALUES
Based on Kodak T-Mat G film and Lanex regular screens

PATIENT	kV VALUE	mA VALUE
Child 10 and over ^a	64	4
Adult female or small male	68	6
Adult male	72	8
Large adult male	76	10

a. Use the CHILD MODE.



Press the return key to move the rotating assembly to the ready position and the cassette carriage to the loading position if they are not already in that position.



Press the temple support key to open the temple supports if they are not already open.

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

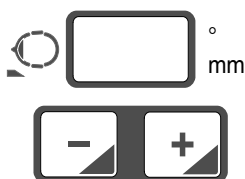


Press either of the height adjusting keys to adjust the height of the vertical carriage until the opening in the chin support is approximately level with the patient's mouth.



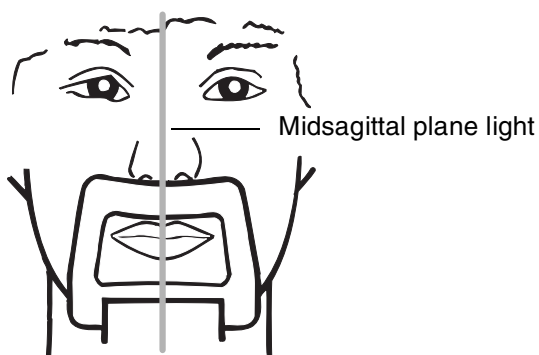
Ask the patient to step forward, grasp the patient handles and press their lips against the chin support. The patient's nose must rest on top of the support and their mouth must be closed.

Press the temple support key to close the temple supports.

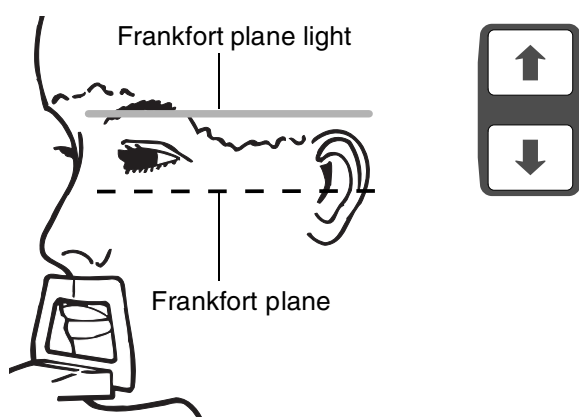


Press either of the focal trough positioning key to switch the three patient positioning lights on so that the patient can be positioned.

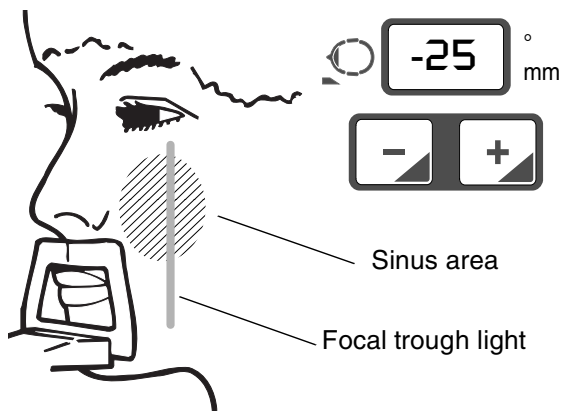
Stand behind the patient and check that the patient's shoulders are level and the neck muscles relaxed.



Position the patient's head so that the midsagittal plane coincides with the midsagittal light beam. Make sure that the patient is looking straight ahead as the light may appear to be correctly positioned but the patient's head could be turned slightly to one side.



Position the patient's head so that the Frankfort plane coincides with or, if you are unable to slide the light far enough down, is parallel to the Frankfort plane light beam. To do this support the back of the patient's head with your hand and then adjust the tilt of the patient's head by raising or lowering the vertical carriage with the height adjusting keys. The patient's back should be straight. If necessary stretch and straighten the patient's cervical vertebrae by moving the vertical carriage up slightly.

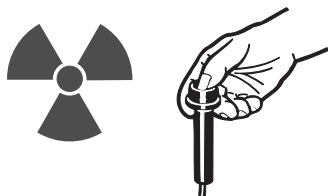


Press and hold either of the focal trough positioning keys to adjust the position of the patient positioning mechanism until the focal trough light falls on the region of the maxillary sinus that you wish to X-ray.



Press the ready key to drive the cassette carriage to the ready position. The ready light will come on.

Ask the patient to swallow and stand as still as possible. Move two meters (seven feet) from the unit. Protect yourself from unnecessary radiation.



Press and hold down the exposure button on the remote control for the duration of the exposure. The rotating assembly will move through one complete exposure cycle. At the end of the exposure cycle the temple supports will automatically open. The patient can then be guided from the unit.

NOTE

If the automatic cassette carriage return is activated, see section 8.3 “Automatic cassette carriage return” on page 37, the rotating assembly will return to the ready position before the temple supports open.



Press the return key to drive the rotating assembly to the ready position and the cassette carriage to the loading position. This is not necessary if the cassette carriage is set to return to the loading position automatically.

Remove the cassette from the unit and process the film.

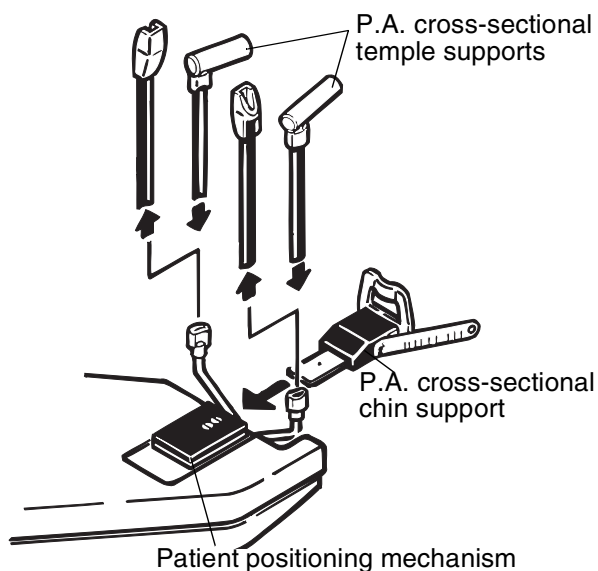
7.4 P.A. cross-sectional program (P30)



P.A: cross-sectional exposure

This program allows transversal exposures to be taken of a preselected section of the left and right condyles or the left and right sides of the jaw.

Note that the patient positioning is different for the condyle and jaw exposures.



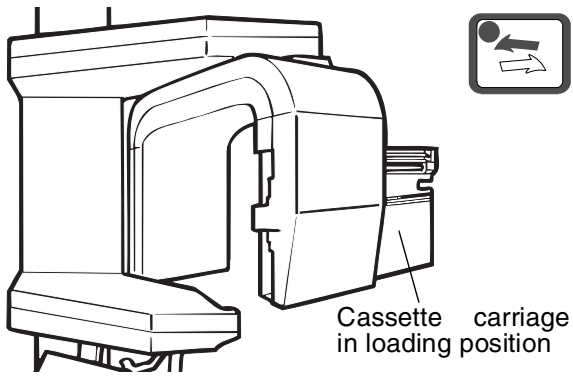
Replace the regular chin rest with the special P.A. cross-sectional chin support and the standard temple supports with the P.A. cross-sectional temple supports.



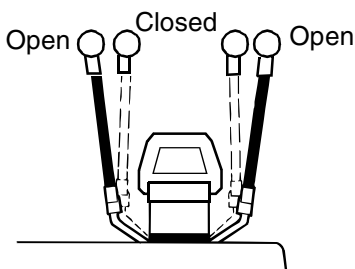
Select the correct exposure values for the patient being X-rayed according to the values suggested in the table below.

P.A. CROSS-SECTIONAL EXPOSURE VALUES
Based on Kodak T-Mat G film and Lanex regular screens

PATIENT	JAW		TMJ	
	kV VALUE	mA VALUE	kV VALUE	mA VALUE
Child 10 and over	64	4	62	6
Adult female or small male	68	6	66	6
Adult male	70	8	68	8
Large adult male	72	10	70	10

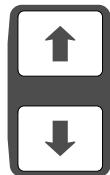


Press the return key to move the rotating assembly to the ready position and the cassette carriage to the loading position if they are not already in that position.



Press the temple support key to open the temple supports if they are not already open.

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



Press either of the height adjusting keys to adjust the height of the vertical carriage until the opening in the chin support is approximately level with the patient's mouth.

Condyle exposure position



Jaw exposure position

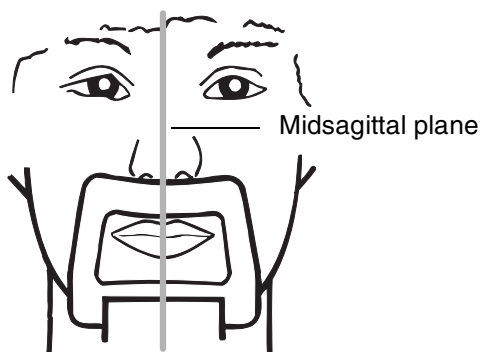
Ask the patient to step forward, grasp the patient support handles. When you are taking the P.A. cross-sectional exposure of the **condyle** ask the patient to press their **top lip** against the top of the chin support. Note that the patient's mouth can be open or closed.

When you are taking the P.A. cross-sectional exposure of the **jaw** ask the patient to close their mouth and press their **bottom lip** against the top of the chin support.

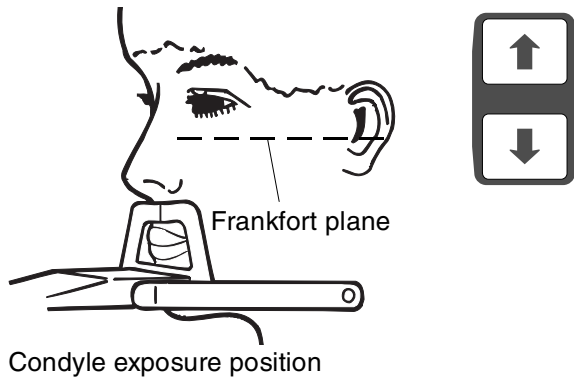


Press the temple support key to close the temple supports.

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

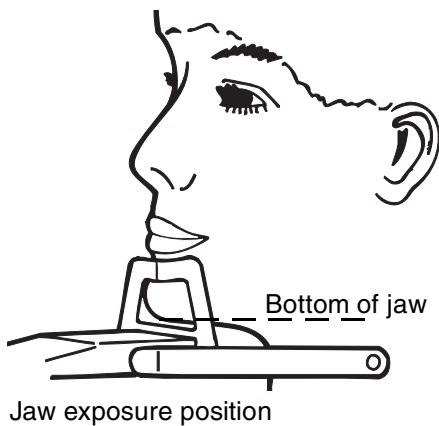


Position the patient's head so that the midsagittal plane is vertical. Make sure that the patient is looking straight ahead.



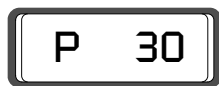
While supporting the back of the patient's head with your hand press either of the height adjusting keys to move the vertical carriage up or down so that the patient's head can be tilted to the correct angle.

If you are taking the P.A. cross-sectional exposure of the **condyle**, position the **Frankfort plane** so that it is horizontal.



If you are taking the P.A. cross-sectional exposure of the **jaw**, position the **bottom of the jaw** so that it is horizontal.

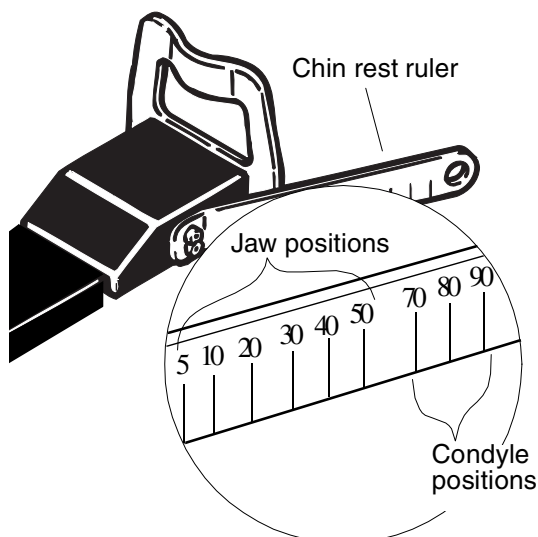
The patient's back should be straight. If necessary stretch and straighten the patient's cervical vertebrae by moving the vertical carriage up slightly.



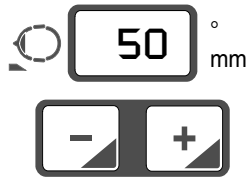
Select the P.A. cross-sectional program (P30), see section 7.1 "Program selection" on page 21.



The number 90, which corresponds to the 90 on the ruler that is attached to the chin support, will appear on the mm display.



Decide what section of the patient's jaw or condyle you wish to take an exposure of and then determine which number on the chin rest ruler is nearest to that position. View the ruler at a 90° angle when lining up the jaw or condyle position. There are nine predetermined positions, six for the jaw (5, 10, 20, 30, 40, or 50) and three for the condyle (70, 80 or 90). If the section you require appears midway between two positions on the ruler select the lower value.



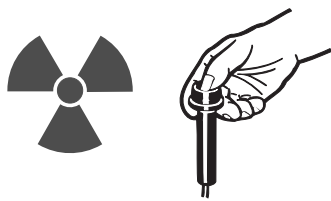
Press the minus (-) key until the number you have selected from the ruler appears on the mm display.

Note that if the patient has a large skull the tube head assembly may touch the back of the patient's head during the exposure cycle. In this case try first without radiation, see section "Demonstrating the unit without taking an exposure" on page 14. Reposition the patient if needed.



Press the ready key to drive the cassette carriage to the ready position if it is not already there. The ready light will come on.

Ask the patient to stand as still as possible. Move two meters (seven feet) from the unit. Protect yourself from unnecessary radiation.



Press and hold down the exposure button on the remote control for the duration of the exposure. The rotating assembly will move through one complete exposure cycle. At the end of the exposure cycle the temple supports will automatically open. The patient can then be guided from the unit.

NOTE

If the automatic cassette carriage return is activated the rotating assembly will return to the ready position before the temple supports open.



Press the return key to drive the rotating assembly to the ready position and the cassette carriage to the loading position. This is not necessary if the cassette carriage is set to return to the loading position automatically.

Remove the cassette from the unit and process the film.

The magnification values for the different positions are shown below.

MAGNIFICATION OF THE IMAGE ON THE FILM

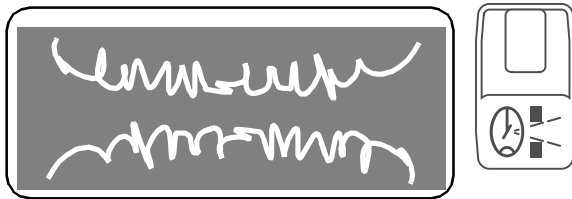
POSITION SETTING	05	10	20	30	40	50	70	80	90
VERTICAL MAGNIFICATION	1.45	1.47	1.52	1.57	1.62	1.68	1.81	1.88	1.95

8 ADDITIONAL FUNCTIONS

8.1 Primary slot (horizontal segment) selection

The primary slot guides the radiation in the right direction. The primary slot selection allows exposures of different horizontal jaw segments to be taken. This will reduce the radiation dosage as only diagnostically interesting areas need to be X-rayed.

Normal height panoramic exposure



Normal panoramic exposure

Whenever the unit is switched on it is automatically set to take a full-size panoramic exposure. This is indicated by an empty primary slot selection display.

Reduced height panoramic exposure



Reduced height panoramic exposure

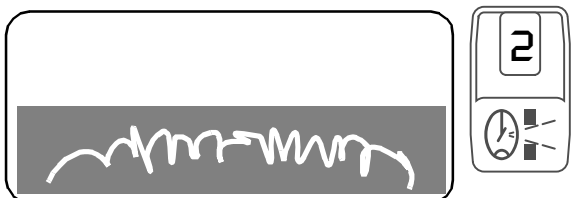
Press the key once and the number 1 will appear on the display. This will give a full width panoramic exposure that is slightly narrower in height.

The reduced height panoramic exposure, number 1, is automatically selected when the child mode is selected. Note that in the child mode the width of the exposed area is also reduced slightly.

NOTE

In the X-ray units that have been upgraded to use the transversal slicing system the reduced height panoramic exposure is not available.

Lower arch panoramic exposure



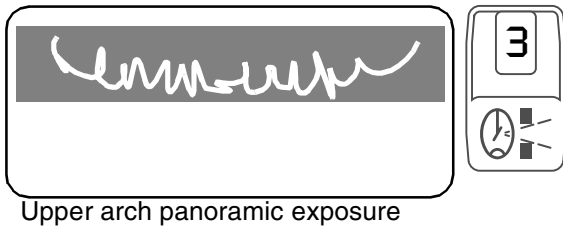
Lower arch panoramic exposure

Press the key a second time and the number 2 will appear on the display. This will give a full width exposure of the lower arch only.

NOTE

The lower arch panoramic exposure can not be taken if the X-ray unit is equipped with Cephalostat.

Upper arch panoramic exposure



Press the key a third time and the number 3 will appear on the display. This will give a full width exposure of the upper arch only.

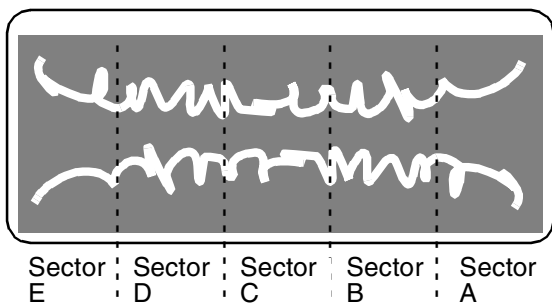
NOTE

The upper arch panoramic exposure can not be taken if the X-ray unit is equipped with Cephalostat.



Pressing the key a fourth time will return to the normal full-size exposure and the display will clear.

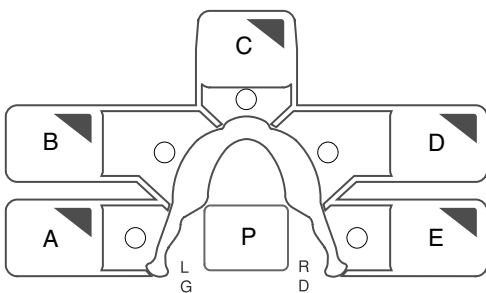
8.2 Vertical sector selection



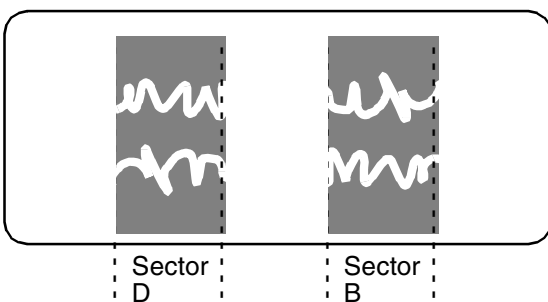
This feature allows exposures of different vertical jaw sectors to be taken. This will reduce the radiation dosage as only diagnostically interesting areas need to be X-rayed.

NOTE

The vertical sector selection can only be used with the panoramic exposure.



Press the required sector keys to **SWITCH OFF** the radiation exposure in those sectors. The corresponding indicator lights will **COME ON**. Note also that the exposure time will decrease.

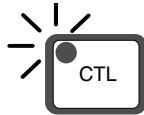


For example if keys A, C and E are pressed these three sectors will **NOT** appear on the film. The exposed film will look like the picture opposite.

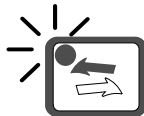
Note that the primary slot and vertical sector selections can be used simultaneously.

8.3 Automatic cassette carriage return

The X-ray can be set so that the rotating assembly will automatically return to the ready position and the cassette carriage to the loading position at the end of an exposure.



Press the control key to enter the additional function mode. The indicator light will come on.



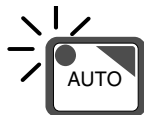
Press and hold down the return key until the indicator light comes on, about four seconds. The automatic cassette carriage return function is now activated.

To switch the automatic cassette carriage return off repeat the above keying sequence. The indicator lights will go out.

8.4 Automatic closing of the temple supports

The temple supports will automatically close when the ready key is pressed.

This function can be switched off as follows:



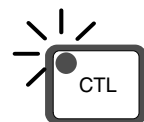
Press the auto key. The indicator light will come on.



Press and hold down the temple supports key for four seconds. The text "hLr0" will appear briefly on the main display indicating that the automatic closing of the temple support is switched off.

To switch the automatic closing of the temple support on again repeat the above keying sequence. The text "hLr1" will appear briefly on the main display indicating that the function is activated.

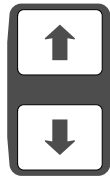
8.5 Setting the clock



Press the control key to activate the additional function mode. The indicator light will come on.



Press the clock key to enter the clock setting mode. The display digit indicating minutes will start to flash.

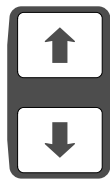


Press either of the height adjusting keys to set the correct minutes (0 - 9). The up arrow will increase the number and the down arrow key will decrease it.



Each time you press the clock key different clock digits will start to flash:

- first minutes, unit then tens
- then hours
- then days
- then months
- and finally years.



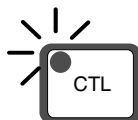
Press either of the height adjusting keys to change any of the clock settings.



Press the ready key to exit the clock mode when you have finished setting the clock.

The clock will start to run when the ready key is pressed, with seconds cleared. Use this to synchronize the clock and a time signal.

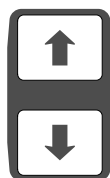
8.6 Adjusting the tone of the exposure warning signal



Press the control key to activate the additional function mode. The indicator light will come on.



Press the program key to switch the exposure warning signal on.



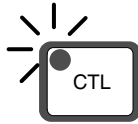
Press either of the height adjusting keys to adjust the tone of the warning signal. The up arrow will increase the tone and the down arrow key will decrease it.



Press the ready key to accept the new tone and exit the signal adjusting mode.

8.7 Recalling previous exposure settings

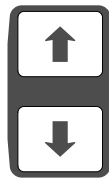
The exposure settings selected for the previous 25 exposures are stored in the memory. This information can be recalled if required.



Press the control key to activate the additional function mode. The indicator light will come on.



Press the height adjusting down key to recall the exposure settings of the last exposure taken with the unit. The settings that were selected for the exposure will appear on their respective displays.



Press either of the height adjusting keys to scroll backwards or forwards through the memory.



Press the ready key if you wish to take another exposure using any of the previously stored exposure settings. The rotating assembly will move to the ready position so that the exposure can be taken.



Press the control key if you do not wish to take an exposure using settings from a previous exposure. The unit will return to the normal mode.

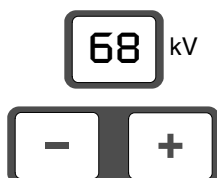
NOTE

If the special program was used, the program number will be shown on the main display.

8.8 Quick exposure settings

This feature allows you to use preprogrammed exposure settings. There are five memory locations for all the exposure modes, e.g. panoramic, sinus exposure P20 etc. Note that before using the quick exposure settings you must first store the parameters values in the memory.

Programming the quick exposure settings



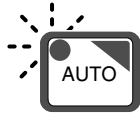
Select the kV and mA values you want to store.



NOTE

In the panoramic mode also the child mode selection can be stored in the memory.

EXP. TIME **0.4** TEMPS EXP.
SEC

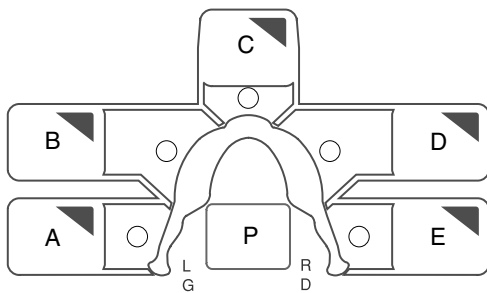


NOTE

In the cephalometric mode the exposure time is also stored in the memory.

Press the auto key to enter the quick exposure setting mode. The indicator light will start to flash.

Press the P key to enter the programming mode.

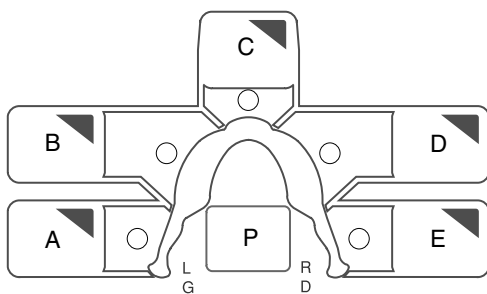


Press the memory location (A-E) in which you want to store the exposure settings. The auto key indicator light will go out and the exposure settings are stored in the memory.

Selecting the quick exposure settings



Press the auto key to enter the quick exposure setting mode. The indicator light will start to flash.



Press the required memory location (A-E). The auto key indicator light will go out and the exposure settings appear on their respective displays.

NOTE

The quick exposure setting programming and selection can be interrupted by pressing any other key than Auto, P or memory location keys.

9 AUTOMATIC EXPOSURE CONTROL (AEC) (OPTIONAL)

The Automatic Exposure Control (AEC) adjusts the exposure values in order to achieve the desired optical density and contrast on the x-ray image.

The basic idea of the AEC is to measure the patient radiation transparency during the exposure and to adjust the correct kV and mA values in order to achieve the desired optical density and contrast on the x-ray image.

Before starting the exposure the user can select the density level, patient size and kV and mA values. The patient size preselection is used to assist the system to start the exposure with the best imaging values. During the exposure, the continuous AEC function automatically adjusts the correct exposure values.

NOTE

Make sure that the cassette is AEC compatible, i.e. marked with text "AEC COMPATIBLE".

NOTE

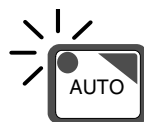
The AEC can only be used in the panoramic mode, not in special program or cephalometric modes.

NOTE

The vertical sector "A" can not be deselected when using AEC.

NOTE

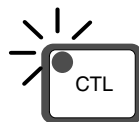
Horizontal segment selection can not be used when using AEC.



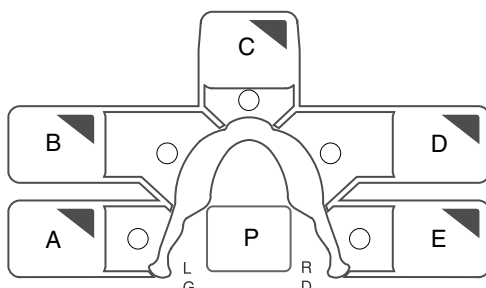
Enter the Automatic Exposure Control (AEC) mode by pressing and holding down the auto key until the indicator light will come on.

The current optical density is shown on the exposure time display for one second when the AEC mode is entered.

Selecting the optical density



Press the control key. The indicator light will come on.



Select the desired optical density by pressing the respective vertical sector selection key:

- A: very light exposure
- B: light exposure
- C: normal exposure
- D: dark exposure
- E: very dark exposure.

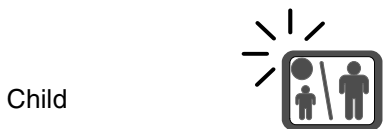
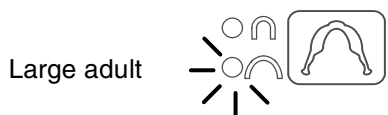
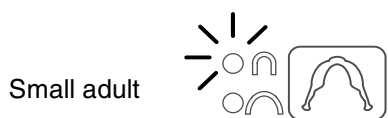
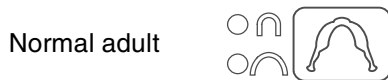
The letter indicating the selected density is shown on the exposure time display.

NOTE

If the optical density is not selected the last time selected density is used.

Patient size selection

The patient size selection adjusts the kilovolt (kV) and milliampere (mA) default starting values. After selecting the patient size the user can freely select the kV and mA values according to the patient size. The desired values can also be selected by pressing AUTO key and a selection key (A, B, C, D or E).



Press the jaw width selection key to select the patient size: small adult, normal adult and large adult. When size "normal adult" is selected neither indicator light will come on. When the size "small adult" is selected, the upper indicator light will come on, and when the size "large adult" is selected the lower indicator light will come on.

The patient size menu is cyclical, after the last choice the first one is selected again.

Press the child mode selector key when you are to take an exposure of a child. The child mode selector key indicator light as well as the upper indicator light of the jaw width selection key will come on.

NOTE

If the patient size is not selected the last time selected size is used.

Density check



By pressing the PAN key the selected density is shown for one second on the sec display.

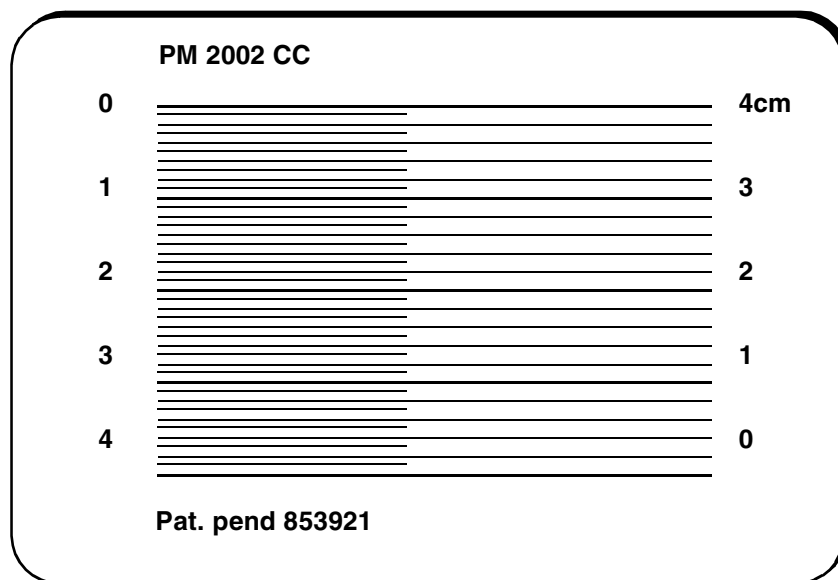
Exiting the AEC mode

Exit the AEC mode by pressing and holding down the auto key until the indicator light goes off.

10 PANORAMIC SCALE

The PLANMECA PANORAMIC SCALE is for measuring vertical features that appear on panoramic radiographs taken with a PLANMECA X-ray units. The scale is useful when carrying out dental procedures such as:

- root canal therapy; the scale can be used to take direct measurements of the root canal
- the preparation of the root canal for root post anchoring; the length of the root can be accurately measured
- an aid in periodontics; depths of bone pockets and the amount of remaining bone support can be determined.



Using the scale

For accurate results the PLANMECA PANORAMIC SCALE must only be used with panoramic radiographs taken with PLANMECA X-ray units.

Place the radiograph you wish examine on a light box. The Panoramic scale can now be placed on the radiograph and used to measure features in the vertical direction.

For patients with teeth that are severely tilted in the bucco-lingual direction the measurements taken with the PLANMECA PANORAMIC SCALE will be too short.

11 TROUBLESHOOTING

11.1 Help messages

The following is a list of the help messages. These messages appear on the main display if a key is pressed that has no function, or if the function is not allowed for some reason. The help message disappears automatically when you release the key.

Help code	Help message explanation
HE 0	The key has no function in this mode.
HE 1	The key has no function with the control key.
HE 2	The error code must first be cleared from the display by pressing the control key.
HE 3	The unit must be driven to the ready position with the special program keys (in Transversal slicing system mode).
HE 4	The patient positioning mechanism can be moved only in the manual transversal slicing system mode.
HE 5	You are using a wrong secondary slot. Select an other slot.
HE 6	The temple support movement does not operate.
HE 7	The X-ray unit is not equipped with a Cephalostat.
HE 8	You can not change the primary slot, there is only one primary slot in the panoramic mode.
	In Transversal slicing system mode the primary slot number 7 must be used with the wide secondary slot.
HE 9	The soft tissue filter can not be moved when taking a posterior-anterior or anterior-posterior exposure.
HE 10	The X-ray unit is busy, wait until the previous function is completed.

11.2 Error codes

The Planmeca X-ray incorporates a self-checking feature that continually monitors the operation of the unit. If there is a malfunction the unit will immediately stop working and an error code will appear on the console display.



Press the control key to clear an error code from the display and check from the error list what you can do to correct the error occurred. Turn off the unit first for 30 seconds, try again without the patient and the film cassette. If the error is still present, please contact your service technician and report the error code with any other symptoms. Process also the film and examine it to see if it is completely exposed.

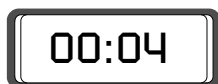
ERROR CODE	ERROR MESSAGE EXPLANATION
Er 00	You removed your finger from the remote exposure button before the unit had completed the exposure cycle. Remove the partially exposed film from the cassette, place a fresh film in the cassette and take another exposure. If the error reappears, even when you hold the exposure button down for the duration of the exposure, call your service technician.
Er 01	Short loss of power or drop in line voltage. If this occurs during an exposure remove the partially exposed film, place a fresh film in the cassette and take another exposure.
Er 05	You are using a wrong secondary slot. The wide secondary slot can not be used in the panoramic mode. Select an other slot and take an exposure.
Er06	The rotating unit is not in the end sensor (in the Transversal slicing system mode). Drive the unit to the end sensor with the special program keys.
Er 07	The rotating unit is not in the ready position. Check that the program selection is completed. Press the ready key to move the rotating unit to the ready position and then take an exposure.
Er 10	Overvoltage in tube head. Turn off the unit first for 30 seconds, try again without the patient and the film cassette: take three exposures with values 60 kV and 4 mA and one exposure with values 80 kV and 12 mA. If the error reappears after this, please contact your service technician.
Er 11	Sudden kilovolt drop. Turn off the unit first for 30 seconds, try again without the patient and the film cassette: take three exposures with values 60 kV and 4 mA and one exposure with values 80 kV and 12 mA. If the error reappears after this, please contact your service technician.
Er 12	Tube filament initializing is not done. Turn off the unit first for 30 seconds, try again without the patient and the film cassette. If the error is still present, please contact your service technician.
Er 15	The patient positioning mechanism not calibrated. Drive the mechanism from end to end at least twice. If the error is still present, please contact your service technician.
Er 20	Tube power generator time out. Turn off the unit first for 30 seconds, try again without the patient and the film cassette. If the error is still present, please contact your service technician.

ERROR CODE	ERROR MESSAGE EXPLANATION
Er 21	Up/down motor time out. Check that the up/down movement is not obstructed. If there is no visible obstruction, turn off the unit first for 30 seconds, try again without the patient. If the error is still present, please contact your service technician.
Er 22	Temple rest motor time out. If this motor runs more than 3 seconds continuously this error code occurs. Turn off the unit first for 30 seconds and then try again. If the error is still present, the temple rest motor must be inactivated. Press the control key and press and hold down the temple support key. The text HLd 0 will appear on the main display, and the supports can not be moved. The unit can be used without temple supports. Remove the supports and call your service technician.
Er 23	Layer adjust motor time out. Turn off the unit first for 30 seconds, try again without the patient. If the error is still present, please contact your service technician.
Er 24	Primary slot motor time out. Turn off the unit first for 30 seconds, try again without the patient. If the error is still present, please contact your service technician.
Er 25	Cassette motor time out. Try to drive the cassette carriage without the patient by pressing the ready and return keys. Check that the movement is not obstructed. If there is no visible obstruction, turn off the unit first for 30 seconds, try again. If the error is still present, please contact your service technician.
Er 26	Rotation motor time out. Check that the rotation movement is not obstructed. If there is no visible obstruction, turn off the unit first for 30 seconds, try again without the patient and the film cassette. If the error is still present, please contact your service technician.
Er 30	kV value does not reach given value. Turn off the unit first for 30 seconds, try without the patient and the film cassette. Take an exposure with values 60 kV and 4 mA and an exposure with values 80 kV and 12 mA. If the error is after this present, please contact your service technician.
Er 31	mA value does not reach given value. Turn off the unit first for 30 seconds, try without the patient and the film cassette. Take an exposure with values 60 kV and 4 mA and an exposure with values 80 kV and 12 mA. If the error is after this present, please contact your service technician.
Er 32	Tube filament control inoperative. Turn off the unit first for 30 seconds, try without the patient and the film cassette. Take an exposure with values 60 kV and 4 mA and an exposure with values 80 kV and 12 mA. If the error is after this present, please contact your service technician.
Er 33	Tube filament control inoperative. Turn off the unit first for 30 seconds, try again without the patient and the film cassette. If the error is still present, please contact your service technician.
Er 40	The rotation does not reach the end sensor. The cassette carriage might have touched the patient's shoulder during the exposure. Process the film and examine it to see if it is completely exposed. If any part is unclear use the vertical sector selection mode to take another exposure of this sector. Turn off the unit first for 30 seconds, try again without the patient and the film cassette. If the error is still present, please contact your service technician.
Er 41	Rotation goes over the end limit sensor. Turn off the unit first for 30 seconds, try again without the patient and the film cassette. If the error is still present, please contact your service technician.

ERROR CODE	ERROR MESSAGE EXPLANATION
Er 42	Secondary slot not in the position for the panoramic exposure. Guide the patient from the unit and remove the cassette. Select the cephalometric mode by pressing and holding down the cephalometric mode selection key. After the rotating unit stops moving select the panoramic mode by pressing the panoramic mode selection key. Press the ready key to drive the cassette carriage to the ready position. Pull the cassette carriage slightly further. Turn off the unit first for 30 seconds, and then take an exposure without a patient. If the error is still present, please contact your service technician.
Er 43	Secondary slot not in the position for the cephalometric exposure. Guide the patient from the unit. Move the soft tissue filter to the zero position by pulling the cassette carriage fully out. Press the control key to clear the error code from the display. Move the soft tissue filter back to the desired position. If the error is still present, you can take an exposure with soft tissue filter in the zero position. Contact your service technician.
Er 44	The patient positioning mechanism zero point is set incorrectly. Contact your service technician.
Er 45	The soft tissue filter position not calibrated. Contact your service technician.
Er 50	The temperature of the tube head is too low. Wait for the unit to reach the room temperature. If the error is still present, please contact your service technician.
Er 51	Temperature sensor open. Turn off the unit first for 30 seconds, try again without the patient and the film cassette. If the error is still present, please contact your service technician.
Er 52	mA or kV feedback cable open. Turn off the unit first for 30 seconds, try again without the patient and the film cassette. If the error is still present, please contact your service technician.
Er 53	Up/down motor does not consume power. If your unit is equipped with the STOP switch, check that it is not activated. Turn off the unit first for 30 seconds, try again without the patient and the film cassette. If the error is still present, please contact your service technician.
Er 54	Up/down motor consumes too much power. Turn off the unit first for 30 seconds, try again without the patient and the film cassette. If the error is still present, please contact your service technician.
Er 57	Exposure button activated when the unit is turned on. Turn off the unit for 30 seconds. If the error is still present, please contact your service technician.
Er 60	Generator processor power too low. Turn off the unit first for 30 seconds, try again without the patient and the film cassette. If the error is still present, please contact your service technician.
Er 61	Processor communication error. Turn off the unit first for 30 seconds, try again without the patient and the film cassette. If the error is still present, please contact your service technician.
Er 62	Limit sensor power missing. Turn off the unit first for 30 seconds, try again without the patient and the film cassette. If the error is still present, please contact your service technician.
Er 64	The radiation reaching the AEC sensor is very low or missing completely. Check that the cassette is AEC compatible, i.e. marked with text "AEC COMPATIBLE". If the cassette type is correct, contact your service technician.

ERROR CODE	ERROR MESSAGE EXPLANATION
Er 65	The radiation reaching the AEC sensor is too high. If the cassette is in the cassette carriage and the patient is positioned when this error occurs, contact your service technician.
Er 70	Processor communication error. Turn off the unit first for 30 seconds, try again without the patient and the film cassette. If the error is still present, please contact your service technician.
Er 71	Generator processor program memory failure. Turn off the unit first for 30 seconds, try again without the patient and the film cassette. If the error is still present, please contact your service technician.
Er 72	Keyboard processor program memory failure. Turn off the unit first for 30 seconds, try again without the patient and the film cassette. If the error is still present, please contact your service technician.
Er 73	Keyboard processor program error. Turn off the unit first for 30 second. If the error is still present, please contact your service technician.
Er 74	Keyboard processor operating improperly. Turn off the unit first for 30 seconds. If the error is still present, please contact your service technician.
Er 75	Keyboard processor operating improperly. Turn off the unit first for 30 seconds. If the error is still present, please contact your service technician.
Er 80	Keyboard processor EEPROM failure. Turn off the unit first for 30 seconds. If the error is still present, please contact your service technician.
Er 81	Generator processor EEPROM failure. Turn off the unit first for 30 seconds. If the error is still present, please contact your service technician.
Er 82	Keyboard processor configuration error. Turn off the unit first for 30 second. If the error is still present, please contact your service technician.
Er 83	Generator processor configuration error. Turn off the unit first for 30 seconds. If the error is still present, please contact your service technician.
Er 84	Tube power generator time out. Turn off the unit first for 30 seconds, try again without the patient and the film cassette. If the error is still present, please contact your service technician.
Er 90	Keyboard processor EEPROM not activated. Turn off the unit first for 30 seconds. If the error is still present, please contact your service technician.
Er 91	Keyboard processor stack overflow. Turn off the unit first for 30 seconds. If the error is still present, please contact your service technician.
Er 99	Error code generation error. Turn off the unit first for 30 seconds. If the error is still present, please contact your service technician.

11.3 Cooling time



If a large number of exposures are taken in rapid succession the X-ray tube may overheat and stop working. A cooling time will appear on the display which indicates the delay before next exposure can be taken.



If the temperature of the tube head exceeds 60° C the temperature will appear flashing on the display. The unit will resume operation when the temperature drops to the normal level. The time will then reappear on the display.

12 CLEANING

NOTE

When disinfecting the unit surfaces, always disconnect the unit from mains.

The chin support and the Cephalostat cassette holder can be cleaned with NON-ALCOHOLIC disinfection solutions.

The bite piece and the patient support handles can be cleaned with alcohol-based solutions.

Other unit surfaces can be cleaned with a soft cloth damped in a mild cleaning solution.

13 SERVICE

To guarantee user and patient safety and to ensure image quality the 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. Please refer to the **Planmeca Proline CC Panoramic X-ray technical manual** for complete servicing information.

14 DISPOSAL OF THE UNIT

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

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

All parts and components containing hazardous materials must be disposed of in accordance with waste legislation and instructions issued by the environmental authorities. The risks involved and the necessary precautions must be taken into account when handling waste products.

Disposal of Planmeca Proline CC Panoramic x-ray unit

X = action, (X) = action in cases where processing is available

Part	Main materials for disposal	Recyclable material	Waste disposal site	Hazardous waste (separate collection)
Frame and covers - metal	Aluminium, galvanized steel, lead	X X		X
- plastic	PUR, other plastics	X	X	
Motors		(X)		
Component boards		(X)		
Cables, transformers	Copper, steel, transformer oil	X X	X	
X-ray tube				X
Packing	Wood, cardboard, paper	X X X		
Other parts			X	

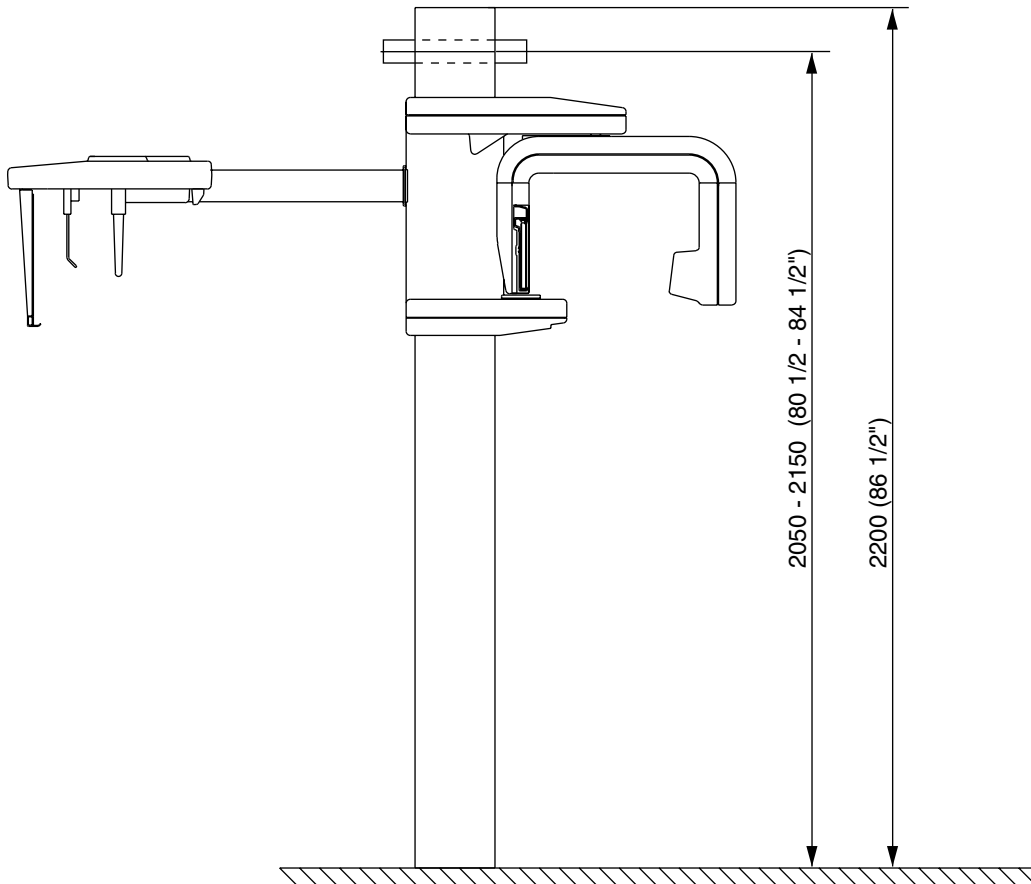
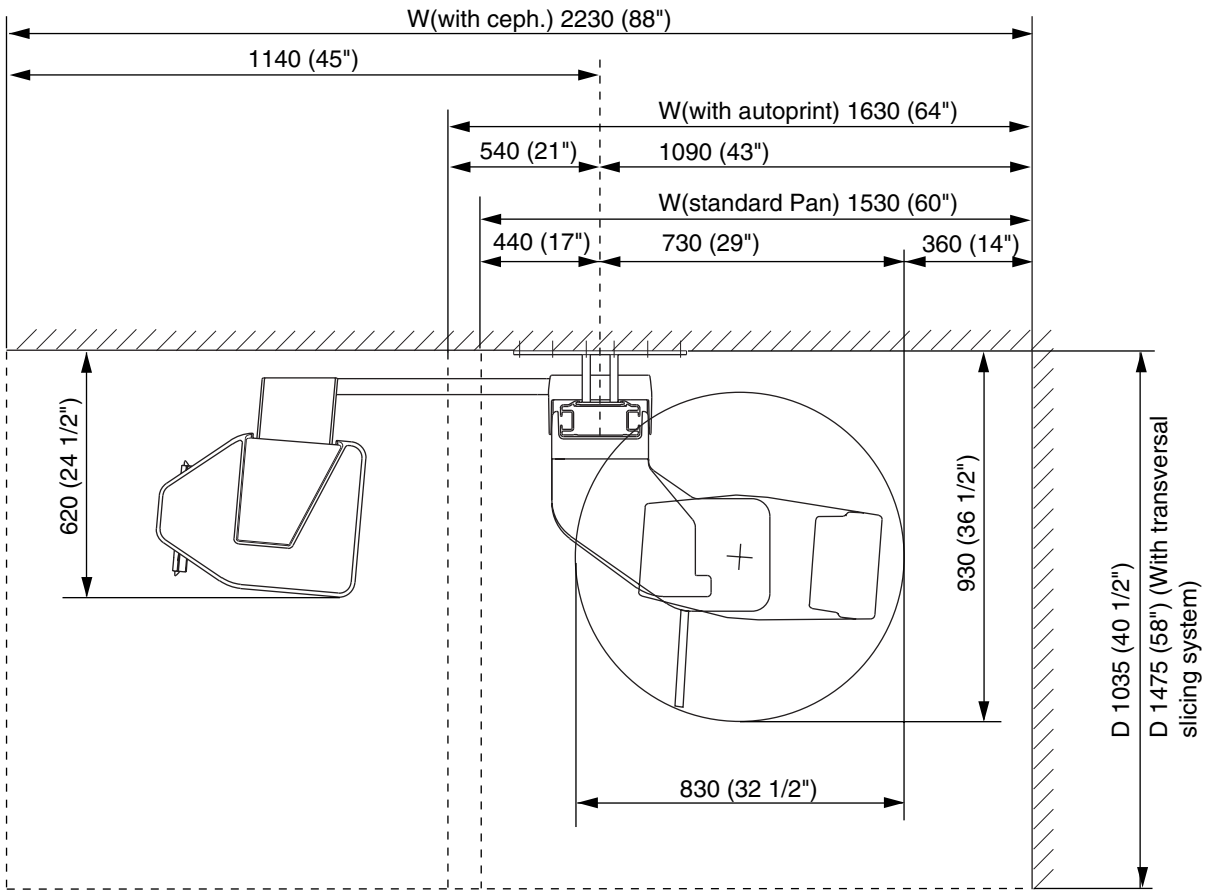
15 TECHNICAL SPECIFICATIONS

GENERATOR	Constant potential, microprocessor controlled operating frequency 80 kHz
X-RAY TUBES / FOCAL SPOT SIZE	Comet XL-90-5° / 0.6B 0.6 x 0.6mm Toshiba D-052SB / 0.5 x 0.5mm according to IEC 336
TARGET ANGLE	5°
TOTAL FILTRATION	2.5 mm Al
ANODE VOLTAGE	60-80 kV ± 2.5 kV
ANODE CURRENT	4-12 mA ± 1.0 mA
EXPOSURE TIME	2.5 -18 s as indicated ± 10%
FILM SIZE	15 x 30 cm
CASSETTE	Flat
SID	480 mm
MAGNIFICATION	Constant 1.2
LINE VOLTAGE	100, 117, 220-230, 240 V~ 50 or 60 Hz
REGULATION	Automatic ± 10%
LINE CURRENT	max. 8A at 230V~, 15A at 100V~
ELECTRICAL CLASSIFICATION	Class I, type B
WEIGHT	108 kg
COOLING PERIOD	Automatically controlled
AMBIENT TEMPERATURE	Operating +5°C to +40°C Storage -10°C to +50°C
HUMIDITY	25% - 75%

OPTIMUM SPACE REQUIREMENTS:

X-RAY	W	H	D
Planmeca Proline CC panoramic X-ray	1535mm 60 in	2250 mm 89 in	1250 mm 49 in
Planmeca Proline CC panoramic X-ray with Autoprint	1630 mm 64 in	2250 mm 89 in	1250 mm 49 in
Planmeca Proline CC panoramic X-ray with Cephalostat	2250 mm 89 in	2250 mm 89 in	1250 mm 49 in

SPACE REQUIREMENTS:



16 USER'S STATEMENT FOR THE PLANMECA PROLINE CC PANORAMIC X-RAY

Radiation leakage technique factors

The maximum-rated peak tube potential is **80 kVp** and the maximum rated continuous tube current is **1.2mA** for the maximum-rated peak tube voltage.

Minimum filtration

The Radiation port contains filtration of **1.5mm aluminum**. The measured half-value layer is **0.52** at 80kVp. The measured value corresponds to aluminum equivalent of **2.5mmAl**.

Rated line voltage

100, 117, 220-230, 240V ~ ±10%. Line voltage regulation 10%.

Maximum line current

Maximum **15 Amperes** at 100 V~, 8A at 230 V~

Technique factors that constitute the maximum line current condition

80kV / 12mA

Generator rating and duty cycle

1.5kW, duty cycle approximately **1:10**. The wait period is calculated using the following formula:

$$t_w = f(HS_{MAX} - HS_1) - f(HS_0)$$

where HS_{MAX} = maximum tube anode heat storage capacity (28 kJ)

HS_0 = current tube anode heat storage

HS_1 = heat storage caused by next intended exposure (kV x mA x s)

f = tube anode cooling rate as a function of heat storage (given by tube manufacturer)

Maximum deviation of peak tube potential from indicated value

±2.5kV

Maximum deviation of tube current from indicated value

±1mA

Maximum deviation of exposure time from indicated value

±5%

DEFINITION OF MEASUREMENT CRITERIA

Exposure time

The beginning and end points of the exposure time are defined at **70%** of the peak radiation waveform measured with a calibrated x-ray monitor.

Peak tube potential

Is defined as the measured high voltage mean value measured with a calibrated non-invasive kVp meter.

Tube current

Is defined using the resistance and voltage over the feedback resistor measured with a calibrated multimeter. The mA value is then the voltage divided by the resistance.

The nominal x-ray voltage together with the highest x-ray tube current obtainable from the high-voltage generator when operated at its nominal x-ray tube voltage

80 kV 12mA

The highest x-ray tube current together with the highest x-ray tube voltage obtainable from the high-voltage generator when operated at its highest x-ray tube current

12mA 80kV

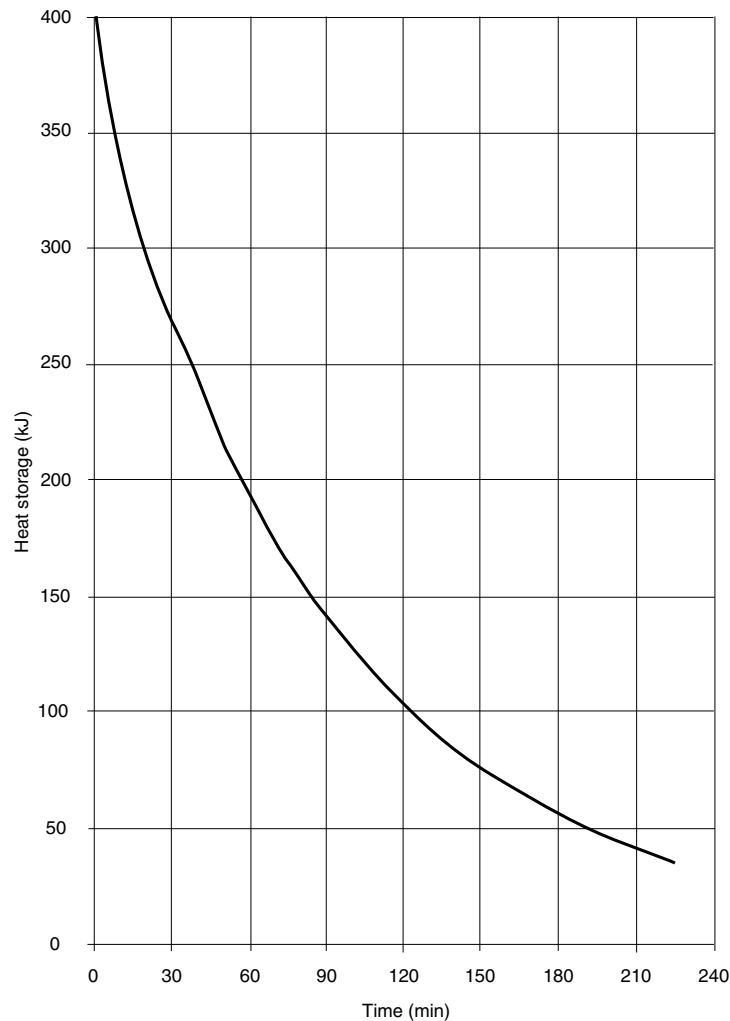
The x-ray tube voltage and x-ray tube current which result in the highest electric output power

80kV 12mA

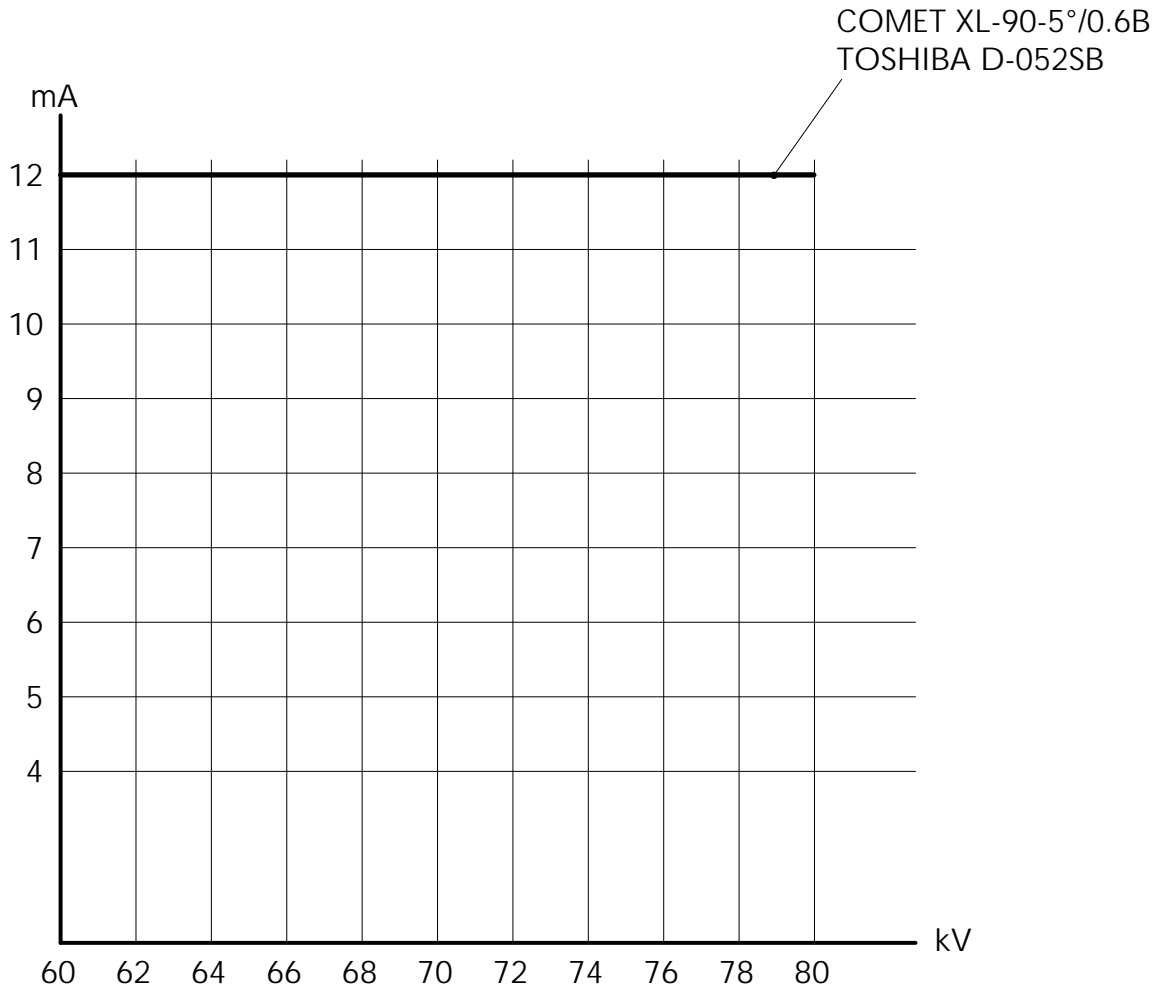
The nominal electric power for a load time of 0.1s and at the nominal x-ray tube voltage

80 kV 12mA - 1500W

Heat storage capacity of the PLANMECA Planmeca Proline CC X-ray



17 TUBE RATING CHART



TUBE RATING CHART
(EXPOSURE TIME MAX. 20 SEC.)

18 LIMITED WARRANTIES

Planmeca warrants that the Products will at the time of shipment be free from defects in material and workmanship. This Warranty will remain in force for a period of twelve (12) months from the date of installation or eighteen (18) months from the date of shipment which ever occurs first as described herein. This Warranty shall not apply to Products or parts thereof which a) have been subject to abuse, misuse, negligence or accident, or b) to which any modifications, alterations or attachments have been made without written authorization of Planmeca, or c) if the Products are installed or operated violating instructions for safe use or in a location not free from excessive dirt, dust, moisture, fumes or extremes of temperature, nor shall it apply to any Products or parts thereof which d) are normally consumed in operation or e) have normal life inherently shorter than the Warranty period specified above, for example bulbs and fuses.

LIMITED WARRANTY

THE WARRANTY SET FORTH HEREIN IS PLANMECA'S (MANUFACTURER'S) ONLY WARRANTY IN RESPECT OF PRODUCTS AND IS IN LIEU OF, AND PURCHASER HEREBY WAIVES AS TO PLANMECA (MANUFACTURER), ALL OTHER WARRANTIES, WHETHER OF MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSE OR OTHERWISE, GUARANTEES AND LIABILITIES, EXPRESS OR IMPLIED, ARISING BY LAW OR OTHERWISE. IN NO EVENT WILL PLANMECA (MANUFACTURER) BE LIABLE FOR ANY GENERAL, CONSEQUENTIAL OR INCIDENTAL DAMAGES, INCLUDING, WITHOUT LIMITATION, ANY DAMAGES FOR DELAY, LOSS OF USE AND LOSS OF PROFITS BY REASON OF PLANMECA'S NEGLIGENCE OR OTHERWISE IN CONNECTION WITH THE SALE, DELIVERY, INSTALLATION, REPAIR OR USE OF ITS PRODUCTS. NO EMPLOYEE, REPRESENTATIVE OR DEALER IS AUTHORIZED TO CHANGE THIS WARRANTY IN ANY WAY OR TO GRANT ANY OTHER WARRANTY DEALING WITH THIS SUBJECT.

Planmeca's obligation and Purchaser's sole and exclusive remedy under the Warranty shall be limited to repair or replacement of defective parts of Products, FCA Planmeca's factory, providing that written claim of the defect is sent to Planmeca within the period of Warranty and the original part is returned to its factory, transportation prepaid, and Planmeca's inspection established the existence of such defect. Planmeca shall in no event be liable for damage or delay caused by defective material, workmanship, installation or maintenance by the Purchaser or by someone else than Planmeca, and Purchaser shall receive no allowances for repairs or alterations or the cost of labour in connection therewith. Planmeca assumes no responsibility whatsoever for damages due to installation, instructions for use or maintenance nor for deterioration during periods of storage by Purchaser prior to installation and operation. Beyond the warranty set forth above Planmeca shall in no event be liable to Purchaser and/or end-users for lost profits, costs, expenses or other damage including all and any kind of damages, legal costs and attorney's fees. Purchaser agrees to indemnify and hold Planmeca harmless against any such liabilities whatsoever. All equipment not manufactured by Planmeca carries only such warranty, if any, as given by the manufacturers thereof and which is hereby assigned to Purchaser without recourse to Planmeca.

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