Contents

1. GENERAL WARNINGS

These instructions explain how to correctly use the myray RX DC - RX DC/I X-ray device. Please carefully read this manual before using the device.

NOTE: This manual does not specify the rules and regulations for acquiring, possessing or using a source of ionizing radiation as each country has its own laws. Only the most common ones shall be mentioned and this means that it is the user's responsibility to check local standards and observe the relevant laws.

The contents of this publication are valuable trade secrets and must not be given to third parties, stored, copied, reproduced, disclosed or transferred in any manner (via computer, photocopies, translations or other means) without the prior written consent of the manufacturer.

Cefla S.C. - Imola (Italy) has a company policy of continual development. Although every effort is made to keep technical documentation up-to-date at all times some of the instructions, specifications and figures given in this manual may slightly differ from the purchased product. The manufacturer reserves the right to make changes to this manual without giving prior notice.

The original text is in Italian.

1.1. SYMBOLS

	Type of protection against direct and indirect contact: Class I Level of protection against direct and indirect contact: TYPE B.
	WARNING! Failure to observe may result in equipment damage or injury to the user and/or patient.
	NOTE: Indicates information that is especially important for the user and/or assistant.
	Earth ground.
	Alternating current.
	On.
	Off.
	Ionizing radiations.
CE 0051	Equipment in compliance with essential requirements of directive 93/42/EEC and subsequent changes.
C US 237835	Equipment abides by the essential requirements established by USA and Canada.
	Disposal symbol in accordance with Directive 2012/19/UE.
FCC ID	F.C.C. mark (Federal Communication Commission).

1.2. INTENDED USE

This x-ray unit is designed for use in the dental surgery to make endo-oral x-rays for diagnostic purposes.
This equipment can be used to produce traditional x-rays developed using chemicals or, alternatively, it can be used with digital x-ray sensors.

1.2.1. CLASSIFICATION

- **MEDICAL DEVICE classification.**
  Classification of the equipment according to the rules indicated in Annex IX of EEC Directive 93/42 and subsequent changes: **CLASS IIB.**
- **ELECTRO-MEDICAL EQUIPMENT classification.**
  Equipment classification in accordance with standard **I.E.C. 60601-1** for safety of medical equipment: **CLASS I TYPE B.**
- **RADIO EQUIPMENT AND TELECOMMUNICATIONS TERMINAL EQUIPMENT Classification.**
  Equipment classification according to Directive **99/05/EC Art.12: CLASS I**.
- **EMC classification.**
  Equipment classification in accordance with standard **CEI EN 55011: GROUP I TYPE B**.

1.2.2. ENVIRONMENTAL CONDITIONS

The equipment is to be installed in rooms that satisfy the following requirements:

- Temperature from +10 to +40°C.
- Relative humidity from 25 to 75% without condensate.
- Atmospheric pressure from 700 to 1060 hPa.
- The electrical wiring in the room in which the equipment is installed must conform to I.E.C. 60364-7-710;V2 specification (i.e. the regulations concerning the electrical wiring to be used in surgeries) or equivalent standards in force in the country where the equipment is installed.
- ELECTRICAL CONNECTIONS: The electrical wiring must have an effective ground conductor as set forth by I.E.C. -US National Electrical Codes and C.E.I. standards. In Italy, electrical wiring must comply to standards IEC 60364-7-710 which require that a ground fault circuit interrupter is installed upstream.The ground fault circuit interrupter must be as specified below:
  - contact capacity: 250V 10A in compliance with standards IEC 60898-1 and IEC 60947-2;
  - differential sensitivity: 0.03A;
  - power supply: 3x2.5 mm^2.

The color of the 3 wires should be as specified in the standards (brown power, BLUE neutral, YELLOW/GREEN ground).

- POWER SUPPLY CUT OFF (INCORPORATED x-ray unit version):
  A two-pole switch has to be installed in a position that can be easily reached by the operator in order to shut off electrical power separately from the dental unit. The contacts of the two-pole switch, that may be used as a sole device with differential-magnetothermal functions, should be at least 3 mm apart (as set forth in standard IEC 60601-1). In addition, it should have a 250V 10 A contact capacity and comply to standards IEC 61058-1 and IEC 60447. The ON position must be clearly indicated.

1.2.3. WARRANTY

Cefla S.C. - Imola (Italy) stands behind its products warranting safety, reliability and performance. The warranty is valid only under the following terms:

- Observe the conditions specified in the guarantee certificate itself.
- The equipment is only to be used as instructed in this manual.
- Equipment installation, expansion and technical support must be performed exclusively by personnel authorized by the manufacturer to carry out these operations.
- Never open the equipment casing. Installation, repairs and, in general, any other operations requiring the casing to be opened are to be performed exclusively by personnel authorized by the manufacturer to carry out these operations.
- The equipment is to be installed in rooms that follow the requirements specified in paragraph 1.2.2. Environmental conditions.
- The area where the x-ray unit is installed must comply with official regulations regarding protection against radiation in the country where the equipment is used.

SAFETY WARNINGS.

- If any person who is not an authorized technician changes the product in any way by replacing parts or components with other ones not used by the manufacturer they shall assume responsibility for the product.
- Do not forget to turn off the main switch on the equipment before leaving the surgery.
- The equipment is not protected against liquid penetration (risk of electrocution).
- The equipment is not suitable for use in the presence of a mixture of flammable anaesthetic gas with oxygen or nitrous oxide.
- This equipment must be stored properly so that it is kept in top working order at all times.
- Use of electric scapels or other electric apparatus that do not comply to standard I.E.C. 60601-1-2, in the office or nearby may cause electromagnetic or other types of interferences resulting in equipment malfunctions. In these cases shut off the power supply to the equipment before hand.
- The manufacturer shall not be held responsible for misuse, carelessness or improper use of the equipment.
- The equipment may only be used by authorised and adequately trained staff (dentists and paramedics).
- The user must be present at all times when the equipment is turned on or ready for start-up. In particular, never leave the equipment unattended in the presence of children/the mentally disabled or other unauthorised personnel in general.
- If the x-ray equipment is damaged or oil leaks, do not use the equipment and contact customer service immediately.

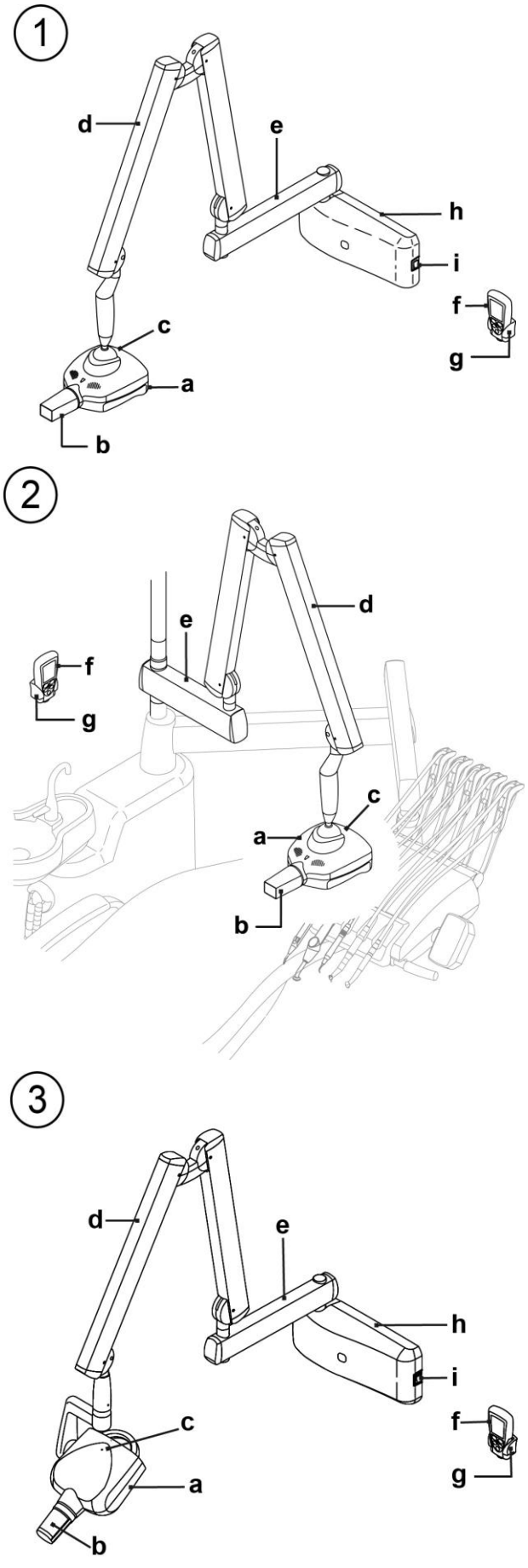
PROTECTION AGAINST IONIZING RADIATIONS.

X-rays are hazardous and adequate precautions must be taken when using them. Areas where it is possible to be exposed to x-rays shall be clearly indicated by using this symbol which should remind personnel to observe the safety rules laid down by the laws in force in the country where the equipment is used.

- Control the emission of x-rays from the greatest distance possible (at least 2 meters) from the focal spot and the X-ray irradiation beam in the opposite direction to where the rays are emitted.
- Only the authorized personnel and the patient can remain in the area when x-rays are being emitted.
- Always protect the patient's thyroid and gonads under all circumstances.
- **Whenever the patient is a child or disabled person requiring the presence of the dentist to keep the film in position it is advisable to use a pair of tongs and a special glove to protect the hand against x-rays. Use a suitable overall to protect the rest of the body against exposure to x-rays.**

2. DESCRIPTION OF THE SYSTEM

2.1. DESCRIPTION OF THE X-RAY DEVICE



The myray RX DC - RX DC/I is available in the following versions:

1- RX DC Plus wall-mounted version
2- RX DC Plus / I version incorporated in the dental unit
3- RX DC eXTend version

Description of equipment:

a X-ray generator.

Depending on the operating mode, the constant potential high frequency x-ray generator works at 60KV 7ma (En60 mode), 63KV 6ma (En63 mode) or 65KV 6ma (En65 mode).

In RX DC Plus versions the generator can rotate on a horizontal plane endlessly; on the other hand, as far as vertical movement is concerned, rotation is limited upwards by a mechanical end-stop.

In the RX DC eXTend version, the generator can turn endlessly on both a horizontal and vertical plane. Rotation is limited by mechanical end-stops.

b - Removable cone.

The generator can work with different types of collimator that are automatically recognized:

- 8” ROUND COLLIMATOR (incorporated in the generator): minimum skin/focus distance 20cm and 60mm output beam.
- REMOVABLE 12” rectangular CONE (only RX DC Plus):minimum skin/focus distance 30cm and 45x35 mm output beam (rectangular collimator attached).
- REMOVABLE 12” round CONE (standard in RX DC eXTend, optional in RX DC Plus): minimum source/skin distance 30cm and diameter of x-ray beam exiting cone 55mm (with cone attached).

The following rectangular cones to be attached to a 12” round cone are also available as optionals:

- RECTANGULAR CONE 22x35 mm
- RECTANGULAR CONE 31x41 mm.

c - Focus spot.

d - Double pantograph arm.

e - Extension arm.

The extension is available in three lengths in the WALL-MOUNTED version: 40 cm (15,7"), 60 cm (23,6") e 90 cm (35,4").

The extension has just one measure of 30 cm (11,8") in the INCORPORATED version.

f - Handheld.

The handheld can be placed either near the control unit or in a remote position. As a result, the doctor can move conveniently around the room and move out of the area where x-rays are emitted.

g Hand held holder.

h Control unit.

I - Master switch (only for WALL-MOUNTED versions).

2.2. OPERATING GUIDELINES

The myray RX DC - RX DC/I can function in different modes (MULTIMODE technology):

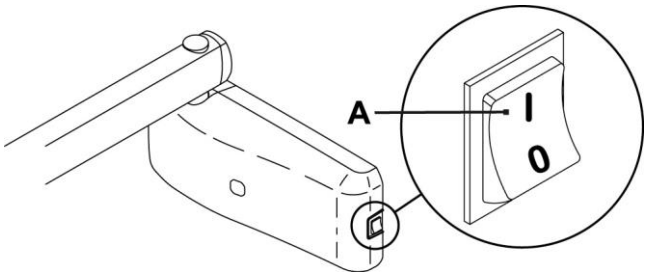
1) En60 operating mode
   X-ray emission at 60KV and 7ma. The MyRay RX DC x-ray unit automatically calculates the best exposure time (from 0.01s to 1.00s) based on the selected tooth and patient size.
2) En63 operating mode
   X-ray emission at 63KV and 6ma. The MyRay RX DC x-ray unit automatically calculates the best exposure time (from 0.01s to 1.00s) based on the selected tooth and patient size.
3) En65 operating mode
   X-ray emission at 65KV and 6ma. The MyRay RX DC x-ray unit automatically calculates the best exposure time (from 0.01s to 1.00s) based on the selected tooth and patient size.
4) AUTO operating mode
   The MyRay RX DC x-ray unit automatically suggests the best operating mode (En60, En63 o En65) and exposure time (from 0.01s to 1.00s) based on the selected tooth and patient size.

The suggested exposure time can be corrected from the handheld.
In addition, the MyRay RX DC x-ray unit has a special USER mode that can be set by the user. The user can select the best combination of load factors (operating mode and exposure time) for each tooth and patient size.

3. FUNCTIONING

3.1. SWITCHING ON AND OFF THE X-RAY DEVICE

3.1.1. TURNING ON THE X-RAY UNIT



Wall mounted version (RX DC Plus and RX DC eXTend).
The control unit is turned on and shut off from the main switch (A).
The switch lights up to signal the control unit is energized.

INCORPORATED version (RX DC PLUS / I).
The control unit is automatically turned on and off from the main switch of the dental unit.
However, the x-ray unit has its own power supply line with wall-mounted switch (not provided) used to shut off power separately from the dental unit.
Make sure the switch has been turned on when the apparatus needs to be used.

NOTE: The technical specifications of the switch are given in paragraph 1.2.2.
Whenever turned on, the equipment performs an operational test that takes a few seconds. A beep is provided at the end of the test.

NOTE: The exposure time and the parameters displayed when the unit is turned on are the last ones set before the central control unit was turned off.
If the central control unit is left untouched for a few minutes it will go into standby mode. Simply press any key on the control panel to reactivate it.

3.1.2. TURNING ON THE HANDHELD

The handheld is turned on by pressing any key, except for the one for x-ray emission.
A buzzer rings to confirm the apparatus has been turned on. The unit will be in the standard configuration described in detail in paragraph 3.1.3 and it will start searching for the base it works with.
If the base is off, the handheld will not indicate the field or the status “ready”. If the base is later turned on, the handheld will detect it within thirty seconds or by pressing any function key on the push-button panel.

NOTE: To optimize the range of the handheld while it is being used, keep it away from walls and metal instruments and above all, do not cover its antenna on top of the screen. In addition, performance may be reduced if the handheld is moved too quickly while x-rays are being taken. Error E 31 may be displayed if out of range problems occur.

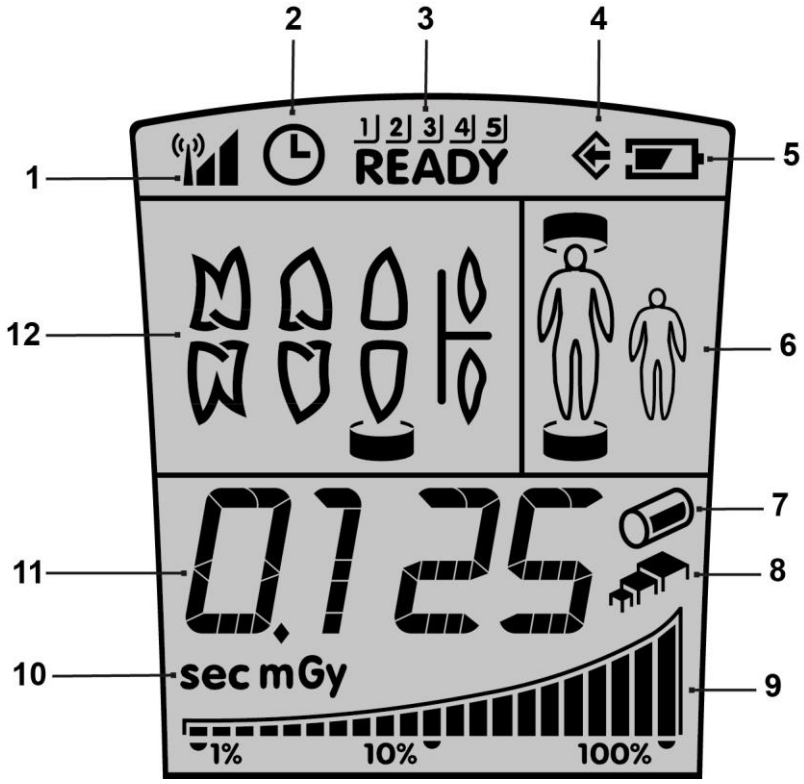
3.1.3. AUTOMATIC HANDHELD SHUT OFF

Once the control unit has been turned off the handheld automatically shuts off after approximately one minute.
The handheld also automatically shuts off when it is at a further distance from the maximum range of the control until.

3.1.4. HANDHELD STAND-BY ACCORDING TO TIME

The entire x-ray unit will switch over to stand-by (even if the base is on) and the handheld will automatically shut off after approximately five minutes of non-use to save battery power.
The handheld turns back on displaying the last selection made by the user whenever any key, except for the X-ray emission key, is pressed. To edit the standby time, refer to chapter 4 that deals with the handheld’s “Advanced options”.

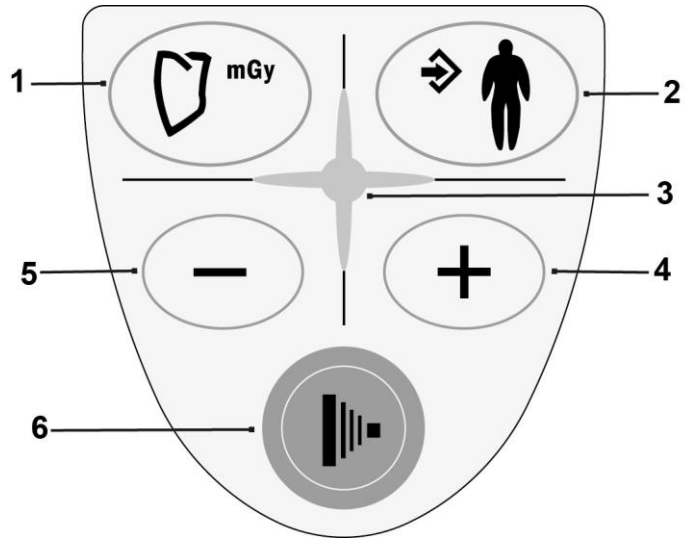
3.2. HANDHELD DISPLAY FUNCTIONS



1	Field present for dialoging with “base”
2	Pause for cooling
3	Handheld identification number
4	Memorizing
5	Battery status
6	Body build selection
7	8” round collimator on (12” rectangular collimator not attached)
8	USER mode on
9	Graduated bar for thermal load
10	Time/dose unit of measure
11	Exposure time and dose display
12	Tooth selection

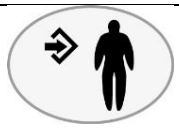
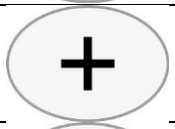
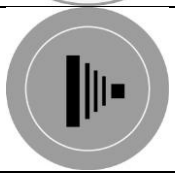
3.3. CONTROL PAD

As illustrated in the figure below, the handheld has four function keys and a single x-ray emission key.



1 “Dentition area selection” key
2 “Body build selection” key
3 X-ray emission light
4 "Increase" key
5 "Decrease" key
6 "X-ray emission light" key

The main functions of the keys on the handheld vary according to how they are pressed:

KEY	BRIEFLY PRESSED (less than 3 sec.).	PRESSED LONGER (more than 3 sec.).
	Changes over from ADULT to CHILD and vice versa (takes place when key is released).	Saves the selected setting (exposure time, sensitivity, etc…). The memo icon( ) lights up when the data item can be saved.
	It will change over the various types of teeth to select the area to be examined.	It displays the values corresponding to the tooth exposure times in mGy and in mGy*cm^2 if pressed again.
	Increases the exposure times in steps, according to the set scale.	Increases the scroll speed of the values in increasing order.
	Decreases the exposure times in steps, according to the set scale.	Increases the scroll speed of the values in decreasing order.
	NO EFFECTS ARE OBTAINED IF THE KEY IS PRESSED LESS THAN A SECOND.	Starts x-ray exposure (the button has to be held down while the x-rays are being emitted, “dead man” function).

NOTE: “Dead man” function: the system that starts x-ray exposure with the dedicated key on the wireless handheld allows x-rays to be emitted only when the user presses and holds down the exposure key. X-ray emission will stop if the key is released ahead of time.

NOTE: The function related to pressing the key briefly is performed by pressing the key which will activate the function assigned to it.On the other hand, to perform the function carried out when the key is held down longer, press the key until the relative function is started. The buzzer will ring shortly to signal the function has started.

NOTE: Warm-up: When the equipment has not been used for a prolonged period (more than 3 months) or when turned on for the first time, a number of emissions with short times (0.01-0.02 sec.) are recommended and then some pictures with 0.1 sec. intervals to better stabilize the operation of the x-ray tube before using it.

3.4. CHECKING THE PARAMETERS

Before actually taking an exposure, make sure the exposure parameters for the examination in progress are correctly set:

- Controlling the type of collimator selected.

Make sure the cone icon shown on the handheld matches the desired cone:

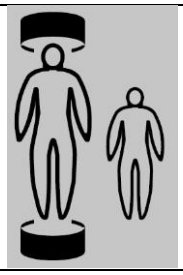
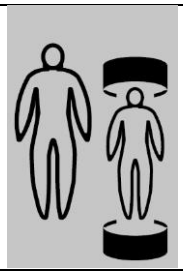
ICON  ON: indicates that the x-ray unit is using the built in round cone (diameter 60mm, focal spot-skin distance 20cm).

ICON  OFF: indicates that the external removable rectangular or round cone is attached to the x-ray device (source-skin distance 30cm).

Refer to paragraph 5.3 to set the type of movable collimator used.

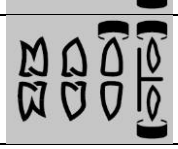
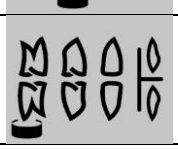
NOTE: After the rectangular collimator (12") has been attached or detached, the icon and set exposure times will automatically be modified within a few seconds.

- Checking the selected body build.
  - "Child" selected: indicates the x-ray unit is set for patients with small builds.
  - "Adult" selected: indicates the x-ray unit is set for patients with average-large builds.

	
Average/large build (ADULT) selected	Small build (child) selected

NOTE: After the change has been made, the preset exposure times will automatically be modified.

- Checking the selected type of intraoral exam.

	Upper molars		Lower incisors
	Upper canines/bicuspids or rear "bite-wing"		Lower canines/bicuspids
	Upper incisors or front "bitewing"		Lower molars

3.5. FACTORY SETTINGS

The myray RX DC - RX DC/I x-ray unit is supplied with the following factory settings:

- Operative mode: AUTO.
- Sensitivty: level 19.
- Handheld stand by: 5 minutes
- Exposure times as per standard R'20: 0.010 - 0.011 - 0.012 - 0.014 - 0.016 - 0.018 - 0.020 - 0.022 - 0.025 - 0.028 - 0.032 - 0.036 - 0.040 - 0.045 - 0.050 - 0.056 - 0.063 - 0.071 - 0.080 - 0.090 - 0.100 - 0.110 - 0.125 - 0.140 - 0.160 - 0.180 - 0.200 - 0.220 - 0.250 - 0.280 - 0.320 - 0.360 - 0.400 - 0.500 - 0.560 - 0.630 - 0.710 - 0.800 - 0.900 - 1.000

NOTE: These times comply with current standards I.E.C. 60601-2-7 (1999) and the ISO 497 series R'20 recommendations and CANNOT BE MODIFIED.

3.6. BATTERIES AND CHARGE LEVEL INDICATION

The handheld runs on two widely available AA alkaline batteries to assure sufficient stand-alone operation.
The charge level of the batteries is given on the screen as follows:

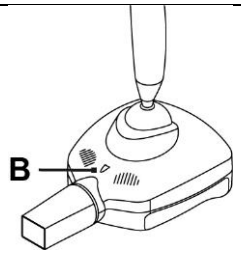
Battery fully charged (a symbol does not appear in the area that shows the battery charge level).

Battery half-charged.

Battery charge level low or almost dead (causing the handheld to automatically shut off).

NOTE: The batteries should be removed from the handheld if it is not going to be used for an extended period.

3.7. X-RAY GENERATOR INDICATOR LIGHT



In RX DC Plus versions, the x-ray generator comes with an indicator light (B) that signals apparatus status.
Colors legend:

- myray color (purple) > x-ray unit on (regular condition)
- Flashing myray color (purple) > stand-by (low consumption)
- Blue > x-ray one – head released
- Yellow > x-rays being emitted
- Red > fault

In the RX DC eXTend version, the indicator light is not available.

4. USE OF THE X-RAY DEVICE

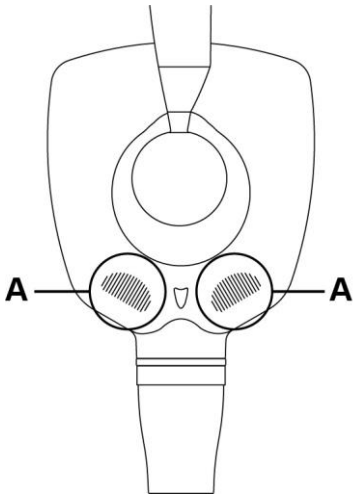
4.1. PATIENT POSITIONING

A positioner or alignment device specific for the selected image receiver should always be used to assure the x-rays are correctly aligned regardless of the position the patient's head is in.

4.2. POSITIONING THE X-RAY HEAD

Position the x-ray head so that the cone is aligned with the image receiver.

4.2.1. HYPERSPHERE TECHNOLOGY



RX DC Plus versions feature Hypersphere technology that allows the x-ray head to turn endlessly on both the horizontal and vertical planes.
The x-ray head is initially blocked by an electromechanical brake. The head can be tilted into the position required to take the x-ray by touching the unlock areas (see points A.as shown in the figure).
The head can be tilted into the position required to take the x-ray by touching the unlock areas. To lock it again, release the unlock areas.

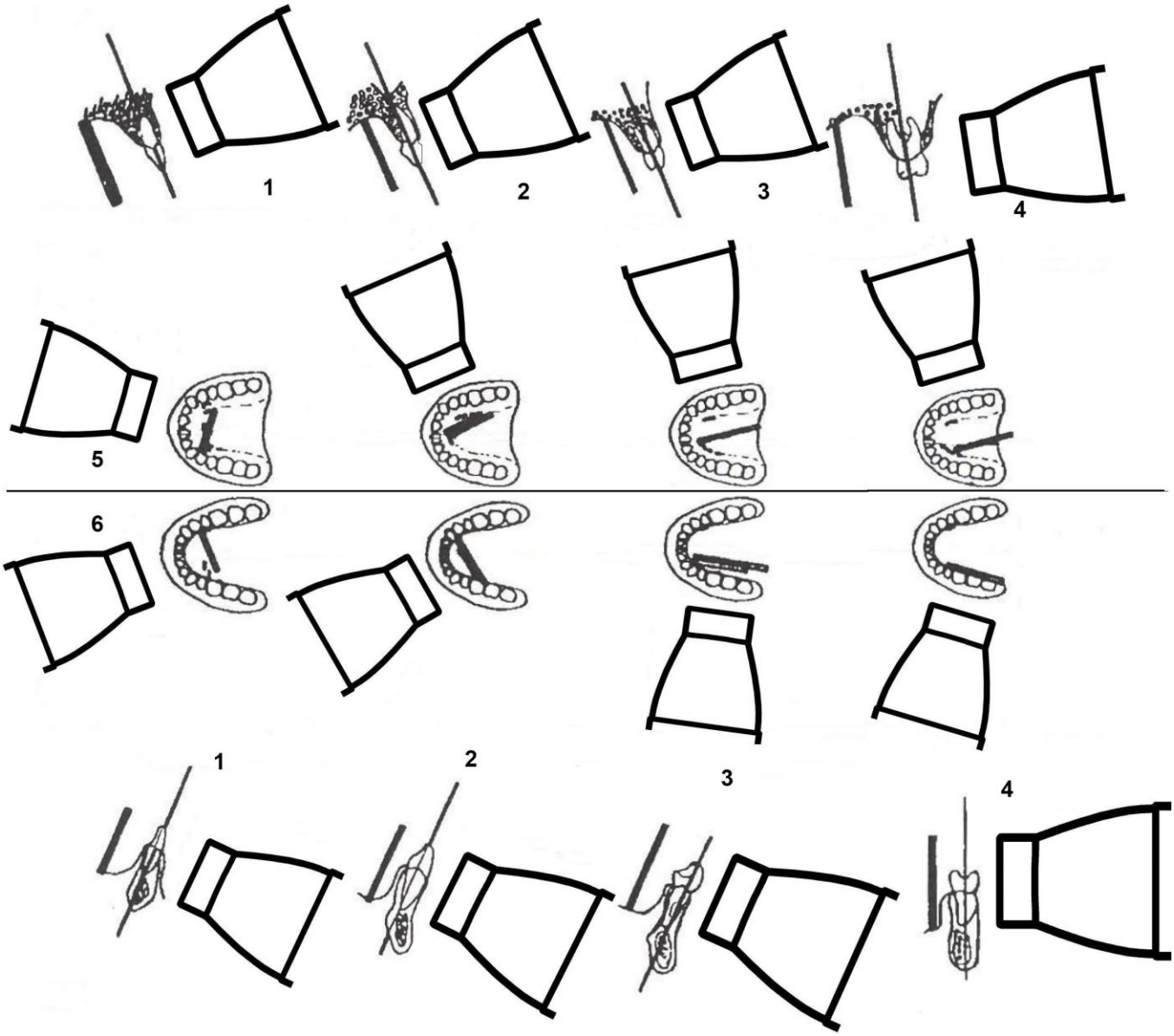
NOTE: Firmly hold the head with both hands when putting it in place.

It is possible to set a safety unlocking mode that allows the head to be turned only by pressing both unlock buttons. This prevents the head from unlocking unexpectedly after one of the two unlock buttons has been accidentally pressed. To activate this mode, refer to "Advanced options" in chapter 5.

4.3. POSITION OF THE X-RAY PLATE OR SENSOR

The parallel technique, where applicable, provides more accurate images in terms of size compared to the bisecting technique. A rectangular collimator, with 30 cm (12"), focus-skin distance, is always preferable to obtain better quality pictures. To avoid exposing the image receiver only partly (whether it is a sensor or photostimulable phosphorus plate system) an alignment device that gives rectangular collimators guidelines should be used. These lines are usually given on the alignment ring.

- Parallel technique.



1 Incisors
2 Canines
3 Premolars
4 Molars
5 Upper arch
6 Lower arch

- The x ray emission axis is perpendicular to the image receiver (for example a sensor or photostimulated phosphor plate) which in turn is parallel with the tooth's long axis.
- As a result, the picture of the tooth will only be deformed by the divergence of the x rays in relation to the focus spot.
- Radiographic enlargement may reach up to 15%.
- For some "special" pictures, for example occluded ones, it may be necessary to remove the rectangular collimator and use the round one if a positioner is not present.

4.4. SETTING THE EXPOSURE MODE AND TIME

The exposure parameters are set by following the directions given below::

1) Select the tooth to be examined
2) Select the patient size

The exposure time is automatically shown on the handheld screen.

NOTE: Each tooth and patient size selected is displayed for approximately 1 second according to the operating mode (En60, En63 or En65) used.

The suggested exposure time can be changed with keys + and −. Exposure times ranging from 0.01s and 1.00s belonging to the R'20 scale can be set. Random exposure times different from the ones provided in the R'20 scale cannot be set.

When the exposure time displayed differs from the default setting, icon comes on.

To save the new setting, make sure icon is on and then press and hold down key for approximately 2 seconds. The handheld will beep to confirm the setting has been saved. At this point, make sure icon is off.

NOTE: If the exposure time is not saved, the change made will be lost after a new entry or as soon as the handheld changes over to stand-by.

WARNING:
After customized settings have been made, the "Original exposure values charts" are no longer valid.

If icon is displayed while the exposure time is changed, it means the set time cannot be saved for the selected tooth-patient size combination. In any case, the x-rays can be taken with the set time.

WARNING:
When the suggested exposure time is changed, the sensitivity factor is also modified (by default set to F=19). Once this change has been saved, it is applied to all the teeth and both patient sizes.

The exposure time can also be modified by changing the sensitivity factor. Press keys and at the same time , the actual sensitivity factor will be displayed.

Use keys + and − to change the value from 3 to 25. If the displayed value differs from the default setting, icon comes on. To quit this mode, press key or . The change made to the sensitivity factor, is applied to all the teeth and both patient sizes.

The selected operating mode is always used for each tooth and patient size combination in modes En60, En63 and En65.
In AUTO mode, each tooth and patient size combination is associated to the best mode from amongst the ones available. In this mode it is not possible to assign a mode other than the default one to each combination.
To set the mode, refer to paragraph 4.5 “Setting the mode and exposure time in USER mode”.
To change the mode amongst En60, En63, En65 and AUTO refer to paragraph 5.2 “Setting the operating mode”.

4.5. SETTING THE MODE AND EXPOSURE TIME IN USER MODE

In USER mode, it is possible to assign an exposure time and a mode from amongst En60, En63 and En65 to each tooth-patient size combination.
The default setting corresponds to the AUTO mode settings with sensitivity factor F=19.
To activate USER mode regardless of the mode currently being used, press keys and − at the same time.
Icon will come on to signal USER mode is active.

To deactivate USER mode press keys and − again (icon goes off).

The exposure parameters are set by following the directions given below::
1) Select the tooth to be examined
2) Select the patient size

The exposure time is automatically shown on the handheld screen.

NOTE: It is not possible to access the sensitivity factor menu in USER mode. In addition, keys + and − are inoperative in User mode.

The exposure times and mode assigned to the tooth – patient size combinations are custom set by following the directions given below:

1) Press and hold down key about two seconds. Customized settings can be entered and icon comes on.
2) Select the desired tooth-patient size combination.
3) The exposure time can be changed with keys + and −.

NOTE: Exposure times ranging from 0.01s and 1.00s belonging to the R’20 scale can be set.

4) Press keys and simultaneously to open the menu used to select the operating mode.
5) Select the operating mode with keys and .
6) Quit the menu and press key to make the entry operative (if key is pressed, the menu will be quit without changing the previous setting).
7) Press and hold down key for approximately two seconds to confirm the entry and disable customized settings (icon goes out).

NOTE: It is possible to set the exposure parameters for several combinations. To do this, repeat steps 2 to 6 before going on to step 7.

4.6. PROCEDURE TO BE FOLLOWED WHEN TAKING THE X-RAY

- Pick up the handheld and move to a safe distance (at least 2 meters) maintaining visual contact with the patient and x-ray unit during the exposure. Make sure “ready” is indicated.

READY

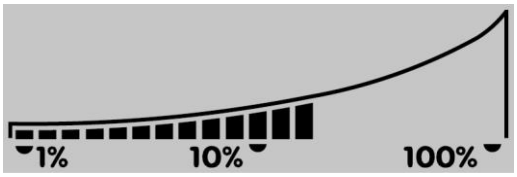
- Tell the patient to stay still.
- Press and hold down the “Exposure” key on the handheld until the audible warning sound (beep) stops and the yellow light goes out.

"X-ray emission light" key

Light on control panel illuminated during x-ray emission.

NOTE: If the “EMIT X-RAY” key is released at any time, exposure will be interrupted and error code E01 will appear on the display.

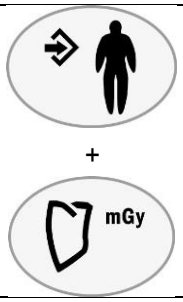
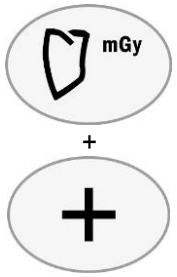
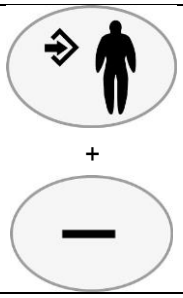
- Once exposure has been completed, it is possible to proceed with the next exposure unless the x-ray unit has reached the maximum allowable temperature. The percentage the cone exceeds the maximum allowable temperature is always shown on the screen (see icon below).



- Once the temperature has been reached, wait the pause time for cooling signaled by symbol .
- At this point the exposure function will be disabled until the screen shows “ready” again
- As soon as “READY” appears on the handheld, another exposure can be taken.

5. ADVANCED OPTIONS

The handheld allows the user to view, edit and set some operating parameters by simply combining the keys provided. Follow the steps given below to access:

KEY COMBINATION	DESCRIPTION OF COMMAND
	Press these two keys to adjust the sensitivity levels (determined based on the table given below and type of sensor/receiver used), modifying the current value from the minimum to the maximum allowable one (on a scale from 3 to 25), with keys "+" and "-".Press key "size" to confirm the desired level and go back to the main screen. This menu is not available in USER mode.
	Hold down these two keys to go to the set up menu (from P 01 to P 07). Press key “Build” to make the selection. Once within the individual configurations, they can be scrolled with keys “+” and “-” and selected by pressing key “Build” again. Key "tooth" quits set up without saving the setting. The configurations are given in detail below: - P 01: Sets the stand by time (from a minimum of 5 to a maximum of 30 minutes). - P 02: Assigns an identification tag to the x-ray unit’s base (from 1 to 5 or none). - P 03: Shows the list of software versions. - P 04: Handheld code display. P 05: Activates/deactivates the safety unlock mode (see section 5.1). (only RX DC Plus). - P 05: Reserved. (only RX DC eXTend). - P 06: Selects the operating mode (En60, En63, En65 and AUTO). - P 07: Sets the type of removable cone used.
	Activating/deactivating the USER mode. Icon  comes on to signal USER mode is activated.

5.1. SETTING THE SAFETY UNLOCK MODE

The myray RX DC - RX DC/I x-ray unit has a safety unlock for the ball joint.
The default setting allows the ball joint to be disengaged by simply touching one of the keys present on the front of the head. To prevent accidental contact with the keys from unexpectedly disengaging the ball joint (and therefore causing undesired movement of the head), the safety unlock mode can be activated. In this mode, the ball joint is disengaged only if both keys are activated at the same time.

To set the safety unlock mode, press keys  and  to go to the set up menu.

Scroll the parameters up to parameter P05 and press key  . Scroll the options to select “ON” and press key  .

Press key  to quit the set up menu.

5.2. SETTING THE OPERATING MODE

The myray RX DC - RX DC/I x-ray unit features the following operating modes:

- **En60**: all the x-rays are taken at 60KV and 7mA
- **En63**: all the x-rays are taken at 63KV and 6mA
- **En65**: all the x-rays are taken at 65KV and 6mA
- **AUTO**: the system automatically selects the best setting from amongst En60, En63 and En65 for each tooth-patient size combination

NOTE: The current setting is displayed on the handheld for approximately 1 second for each tooth-patient size selected before the relative exposure time is shown.

To set the operative mode, press keys and to go to the set up menu.

Scroll the parameters up to parameter P06 and press key . Scroll the options to find the desired operating mode and then press key .

Press key to quit the set up menu.

5.3. SETTING TYPE OF MOVABLE COLLIMATOR

The MyRay RX DC x-ray unit features the following movable collimators:

- Rectangular 35x45 mm (RX DC Plus only)
- Round ø55 mm
- Rectangular 31x41 mm (to apply on round collimator ø55 mm)
- Rectangular 22x35 mm (to apply on round collimator ø55 mm)

NOTE: For an ideal use of the x-ray unit, set the collimator depending on the type used.

To set the type of collimator, press keys and to go to the set up menu.

Scroll the parameters up to parameter P07 and press key . Scroll the options to find the type of collimator used and then press key .

Press key to quit the set up menu.

5.4. RESTORING FACTORY SETTINGS

To restore the factory settings (see paragraph 3.5) press keys and to go to the set up menu.

Press keys and simultaneously. "rESS" will briefly appear and the handheld will be rebooted.

6. ERROR MESSAGES

NOTE: In presence of strong wireless communication traffic, the connection between handheld and generator may break down. To restore the connection run the "Restoring factory settings" procedure.

ERROR	CAUSE	SOLUTION
E01	X-RAY KEY RELEASED TOO EARLY	Hold down the key until the image has been captured.
E02	SHOOTING SEQUENCE NOT COMPLETED	Handheld most likely lost the signal. Try to repeat exposure. If the problem persists, contact technical service.
E03	HANDHELD INTERNAL TEST ERROR	Take out the batteries and then put them back in after waiting a few seconds. If the problem persists, contact technical service.
E04 E05 E08	HANDHELD AUTO DIAGNOSIS TEST FAILED	Contact technical service department.
E06	GENERAL HANDHELD ERROR	Try to repeat exposure. If the problem persists, contact the technical service department.
E07	RF SIGNAL TOO LOW	Handheld lost the signal. Try to repeat exposure. If the problem persists, contact the technical service department.
E09	HANDHELD SERIAL NUMBER INCORRECT OR NOT INITIALIZED	Contact technical service department.
E10 E12 E13 E16	X-RAY UNIT INTERNAL ERROR	Contact technical service department
E11	COLLIMATOR SELECTION NOT CONSISTENT	After turning the rectangular collimator on or off, wait a few seconds to allow the icon on the handheld to be updated.
E14 E15	GENERAL GENERATOR ERROR	Contact technical service department
E17	DEVICE OVERHEATING	Wait approximately 15 minutes for automatic system reset
E18 E19	HEAD RELEASED	Check the supply system. If the problem persists, contact the technical assistance department.
E30	SUPPLY VOLTAGE TOO HIGH/LOW	Repeat the x-ray. If the problem persists, contact the technical assistance department.
E31 E32	INTERNAL ADJUSTMENT PROBLEM	Reduce the distance between the remote control and x-ray head and then repeat the x-ray. Follow the information given on how to properly use the hand held's antenna. If the problem persists, contact the technical service department.
E33	REMOTE CONTROL ERROR	X-ray generator or arm cord may be faulty. Contact technical service department.

NOTE: As regards the other error codes, CONTACT the technical service department.

7. PERIODIC MAINTENANCE

WARNING:
Any technical maintenance work required must be carried out by qualified personnel or by a specialised technician authorised by the manufacturer. It is the user's responsibility to check that routine maintenance is carried out by an authorised technician at least every 2 years. The maintenance methods are specified in the Technical Service Manual possessed by the Authorised Technicians.

8. CLEANING AND DISINFECTION

The X-ray device can be a source of cross-contamination between patients.
For this reason it should be disinfected on the outside every day after use.
If digital X-ray sensors are used make sure they are always used with disposable hygienic covers.
Use soft disposable paper towels to disinfect the x-ray device. Do not use harsh products or soak in liquids.
To avoid damaging the plastic materials use products containing:

- **Ethanol 96%.**
  Concentration: maximum 30 g per 100 g of disinfectant.
- **Propanole**.
  Concentration: maximum 20 g per 100 g of disinfectant.
- **Combination of ethanol and propanol.**
  Concentration: the combination of the two should be maximum 40 g per 100 g of disinfectant.

Compatibility tests between plastics and the following products have been carried out with no negative consequences:

- Incidin Spezial (Henkel Ecolab);
- Omnizid (Omnident);
- Plastisept (ALPRO) (not tuberculocide as not an alcohol-based disinfectant);
- RelyOn Virkosept (DuPont);
- Green & Clean SK (Metasys) (not tuberculocide as not an alcohol-based disinfectant).

- Do not use products containing isopropyl alcohol (2-propanol, iso-propanol).
- Do not use products that contain sodium hypochlorite (bleach).
- Do not use cleaners that contain phenol.
- Do not spray the selected products directly on the surfaces.
- Never combine products with each other or with liquids other than the products listed above.
- All products must be used as directed by the manufacturer.

- The recommended products have been tested: they are technically compatible with the device materials.
- Damages to surfaces and materials due to the use of different products can not be excluded even if they are not included in the exceptions mentioned above.

Cleaning and disinfecting instructions.
Clean and disinfect with disposable non-abrasive paper (avoid using recycled paper) or sterile gauze.
Do not use sponges or, in any case, any material that can be reused.

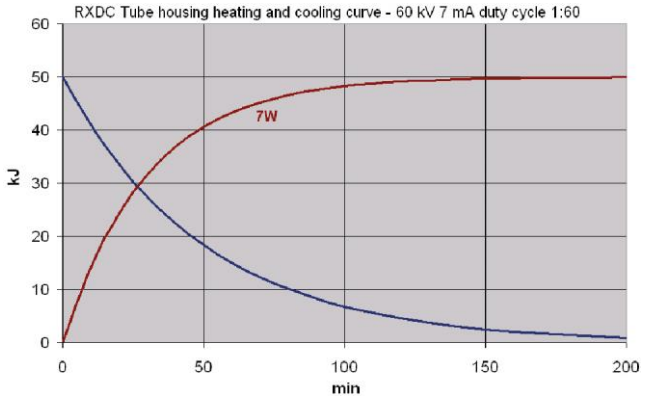
- Turn off the device prior to cleaning and disinfecting the external parts.
- Never lubricate the pivot point of the x-ray cone as proper operation of the locking system may be compromised.
- All material used to clean and disinfect must be thrown away.

9. DISPOSING THE EQUIPMENT WHEN NO LONGER USED

As set out in Directives 2011/65/EU and 2012/19/UE, on the restrictions of the use of certain hazardous substances in electrical and electronic equipment and on their disposal, this type of waste must not be treated as municipal waste, therefore sorted and collected separately.
When new equipment that is similar is purchased, the old equipment must be given to the dealer for disposal.
As regards reuse, recycling and other forms of recovery of waste, the manufacturer carries out the functions defined by current local laws.
A high level of separate collection of waste electrical and electronic equipment is indispensable to efficiently recycle, treat and dispose of the equipment. Recycling and treatment operations should comply with minimum standards to assure human health and high environmental protection as well as favour recycling of the materials included in the equipment.
The symbol indicating separate collection for electrical and electronic equipment consists of the crossed out bin marked on the equipment.

WARNING!
Under local legislation, fines can be imposed if the equipment is disposed in an illegal manner.

10. TECHNICAL DATA

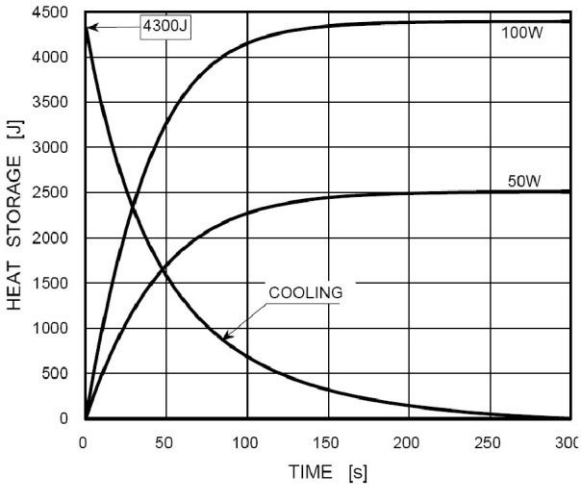


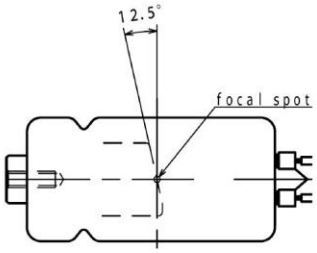
SPECIFICATIONS

- Rated voltage: 230Vac/115Vac (according to the model).
- Max. mains voltage fluctuation: ±10%.
- Maximum current: 6A for the 230Vac version;10A for the 115Vac version at 60KV 7mA.
- Frequency: 50/60Hz.
- Maximum power absorbed: 1,4KVA.
- Apparent line resistance: 0,5Ω(230Vac), 0,2Ω(115Vac).
- Fuses: 6.3A T for the 230Vac version; 10A T for the 115Vac version.
- Generator: constant potential type.
- High nominal voltage: 60 / 63 / 65KV.
- Maximum current: 6 / 7mA.
- Power requirements at 0.1 sec: 420W (60KV 7mA), 378W (63KV 6mA), 390W (65KV 6mA).
- Current reference time: 0.7 mAs (7mA – 0.1s) / 0.6 mAs (6mA – 0.1s).
- Focal spot:
  RX DC Plus: 0.4mm.
  RX DC eXTend: 0.7mm.
- Total filtration: 2.5mm Al @ 65KV.
- Half-value layer (HVL): >2mm Al @ 65KV.
- Leaked radiation: <0.25mGy / h at 1 metre from focusing at 65KV 6mA,duty cycle 1:60.
- Ability to be reproduced: 0.05.
- Electrical classification: Class I - Type B, intermittent service.
- Set exposure time: from 0.010 to 1.000 seconds.
- Accuracy of times indicated: ±10%.
- mGy display precision: ±30%.

WEIGHTS

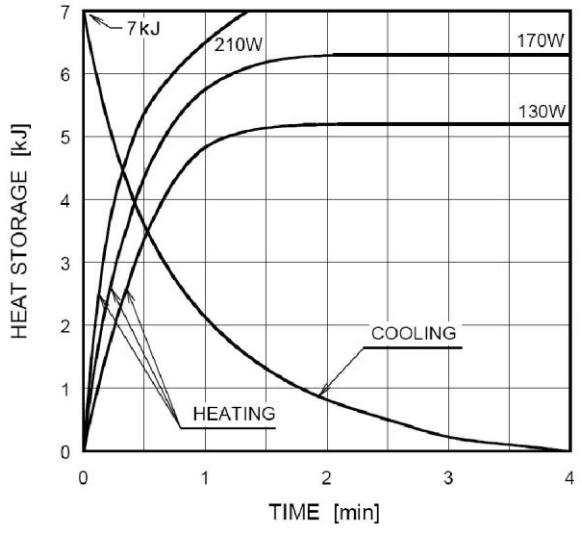
- Weight of the unit with packaging: 38Kg (84lb) max.
- Weight of the x-ray device: 25kg (55lb).
- Weight of the hand-held control panel: 0,3kg (0.7 lb).

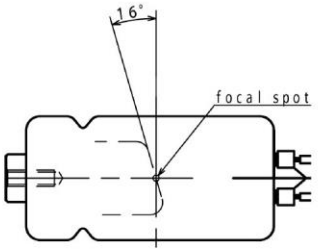




RADIOGENIC TUBE F.S.=0.4 mm

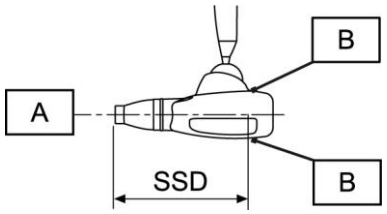
- Radiogenic tube: TOSHIBA D-041.
- Focal spot: 0.4 mm in compliance with IEC 336 / 1993.
- Tolerance for position of the focal spot along the reference axis: ± 2%.
- Nominal high voltage and maximum allowable current: (65KV, 7mA) ± 10%.
- Anode construction material: Tungsten (W).
- Anode inclination: 12.5°
- Anode thermal load: 4.3 KJ (6 KHU).
- Maximum continuous heat dissipation: 100 W.
- Operating cycle: 1:60 (1 second exposure - 60 seconds pause time).





RADIOGENIC TUBE F.S.=0.7mm

- Radiogenic tube: TOSHIBA D-0711.
- Focal spot: 0.7mm in compliance with IEC 336 / 1993.
- Tolerance for position of the focal spot along the reference axis: ± 2%.
- Nominal high voltage and maximum allowable current: (65KV, 7mA) ± 10%.
- Anode construction material: Tungsten (W).
- Anode inclination: 16.0°.
- Anode thermal load: 7.0 KJ (10 KHU).
- Maximum continuous heat dissipation: 210 W.
- Operating cycle: 1:60 (1 second exposure - 60 seconds pause time).

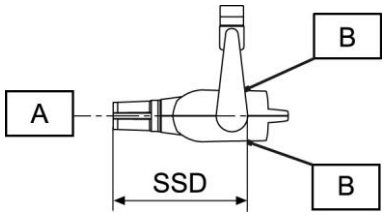


CONE TECHNICAL SPECIFICATIONS (RX DC Plus)

- With rectangular collimator: SSD = 30 cm (12”) X-ray beam less than or equal to 45 x 35 mm.
- Without rectangular collimator: SSD = 20cm (8”) X-ray beam less than or equal to Ø60mm.

A) REFERENCE AXIS

B) FOCAL SPOT IDENTIFICATION



CONE TECHNICAL SPECIFICATIONS (RX DC eXTend)

- With round collimator: SSD = 30cm (12”) X-ray beam less than or equal to 55mm.
- Without round collimator: SSD = 20cm (8”) X-ray beam less than or equal to Ø60mm.

A) REFERENCE AXIS

B) FOCAL SPOT IDENTIFICATION

HANDHELD BATTERIES

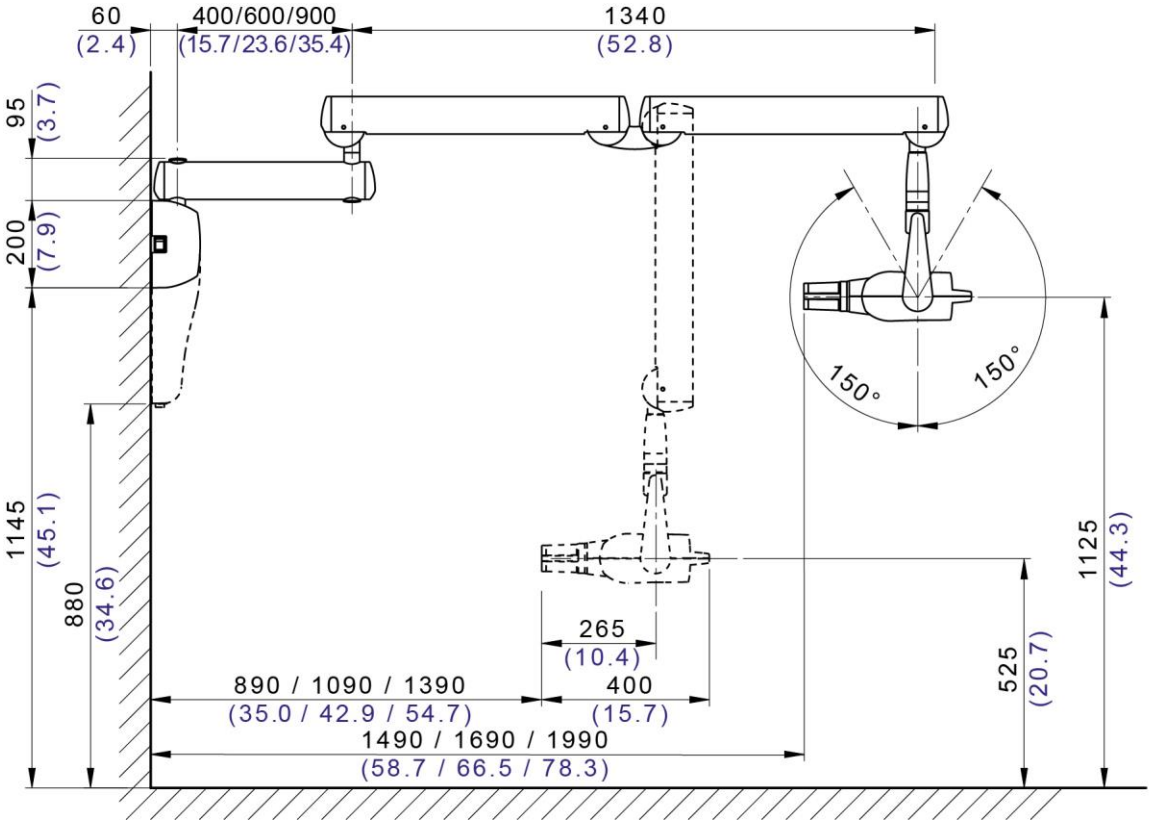
- Type: 2 x AA Alkaline 1.5 V.

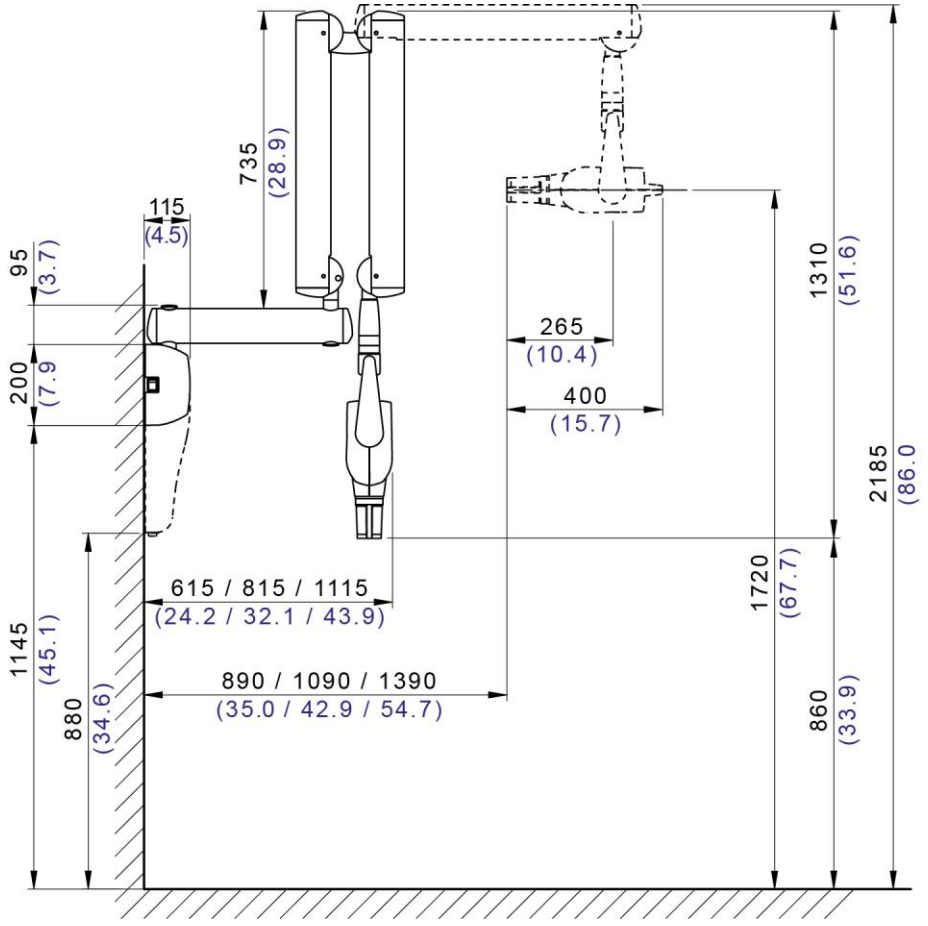
TECHNICAL FACTOR MEASURE

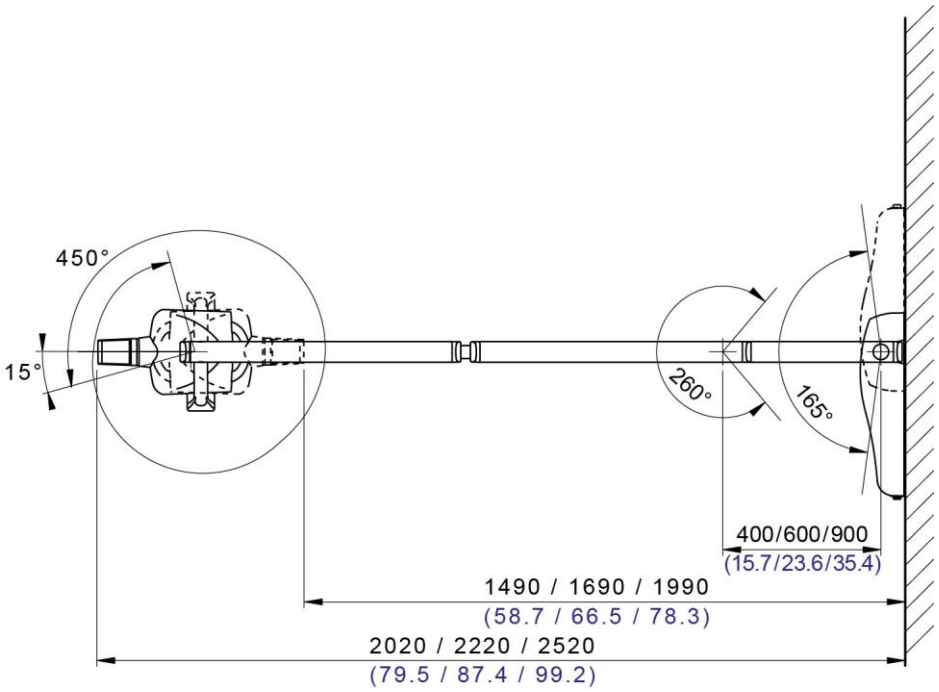
The high voltage value is measured with a non-invasive instrument.
The anode current is controlled inside with measurement resistors and circuits to obtain very precise measurements. Operation of the circuits is checked at the time of testing. Once assembled, the anode current can no longer be directly measured.
The exposure time should be evaluated by measuring the time that elapses from the moment in which high voltage exceeds 75% of the nominal value to the moment in which it drops below this value. Considering the high gradient of the rising and trailing edges of the anode voltage and squaring due to inherent filtration, use of a threshold ranging from 25% to 75% may be considered non-influential.

11. DIMENSIONAL CHARACTERISTICS

All dimensions are expressed in millimetres (inches).

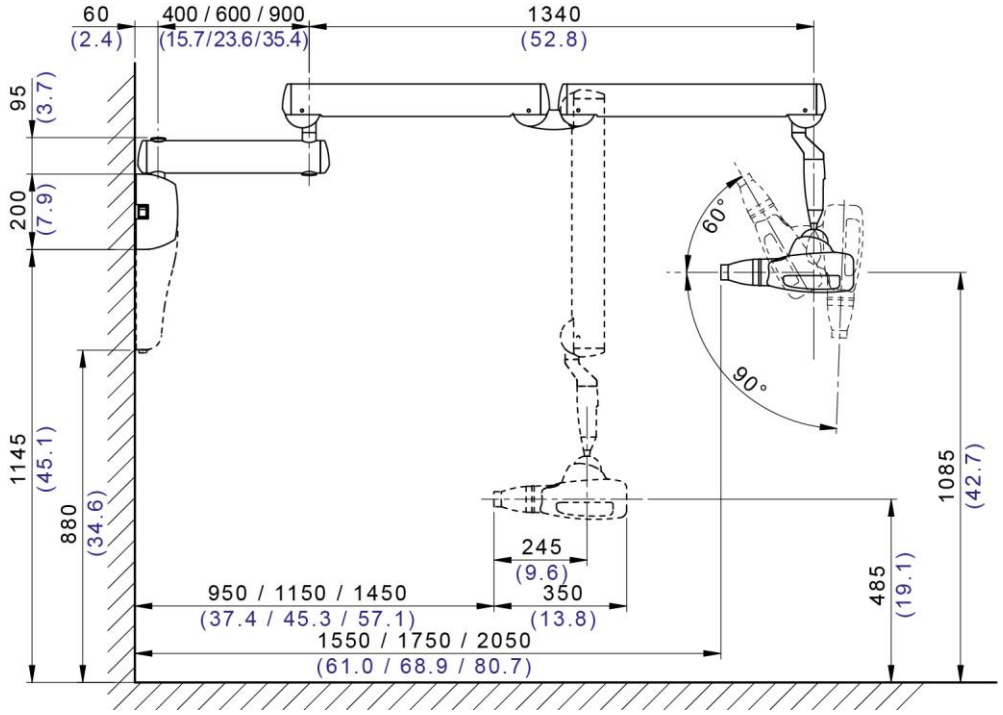


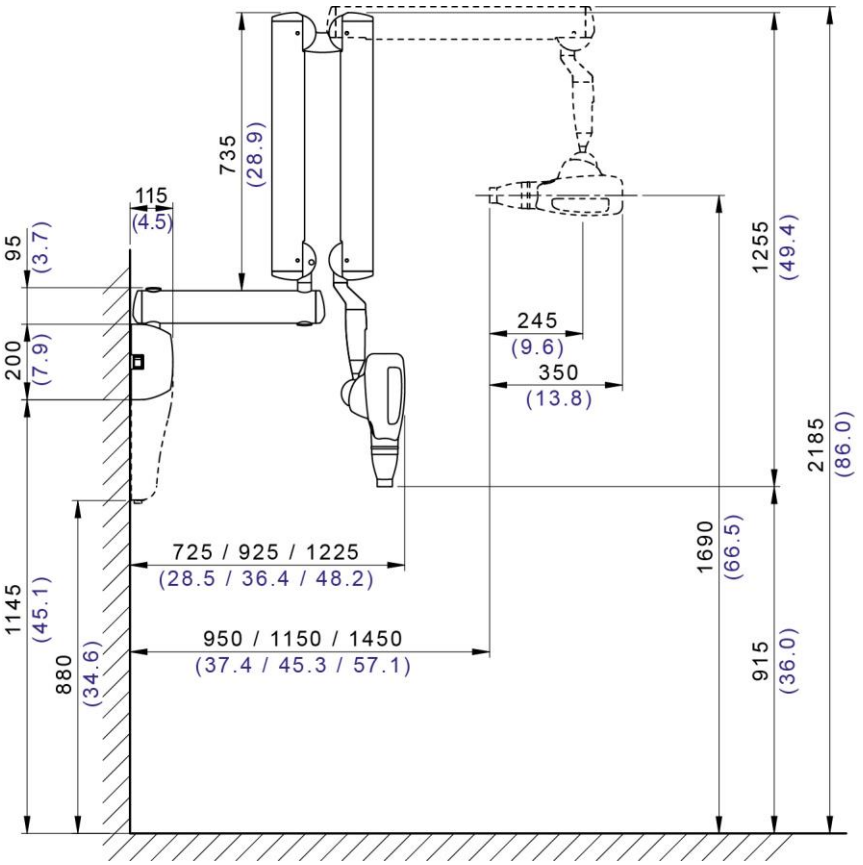


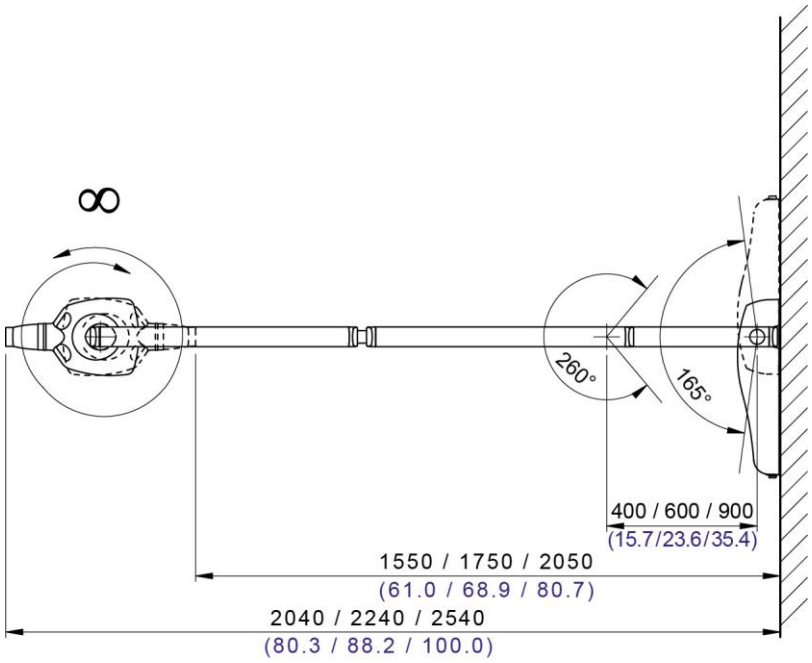

450°
15°
260°
165°
400/600/900
(15.7/23.6/35.4)
1490 / 1690 / 1990
(58.7 / 66.5 / 78.3)
2020 / 2220 / 2520
(79.5 / 87.4 / 99.2)

11.1.WALL-MOUNTED VERSION

All dimensions are expressed in millimeters (inches).

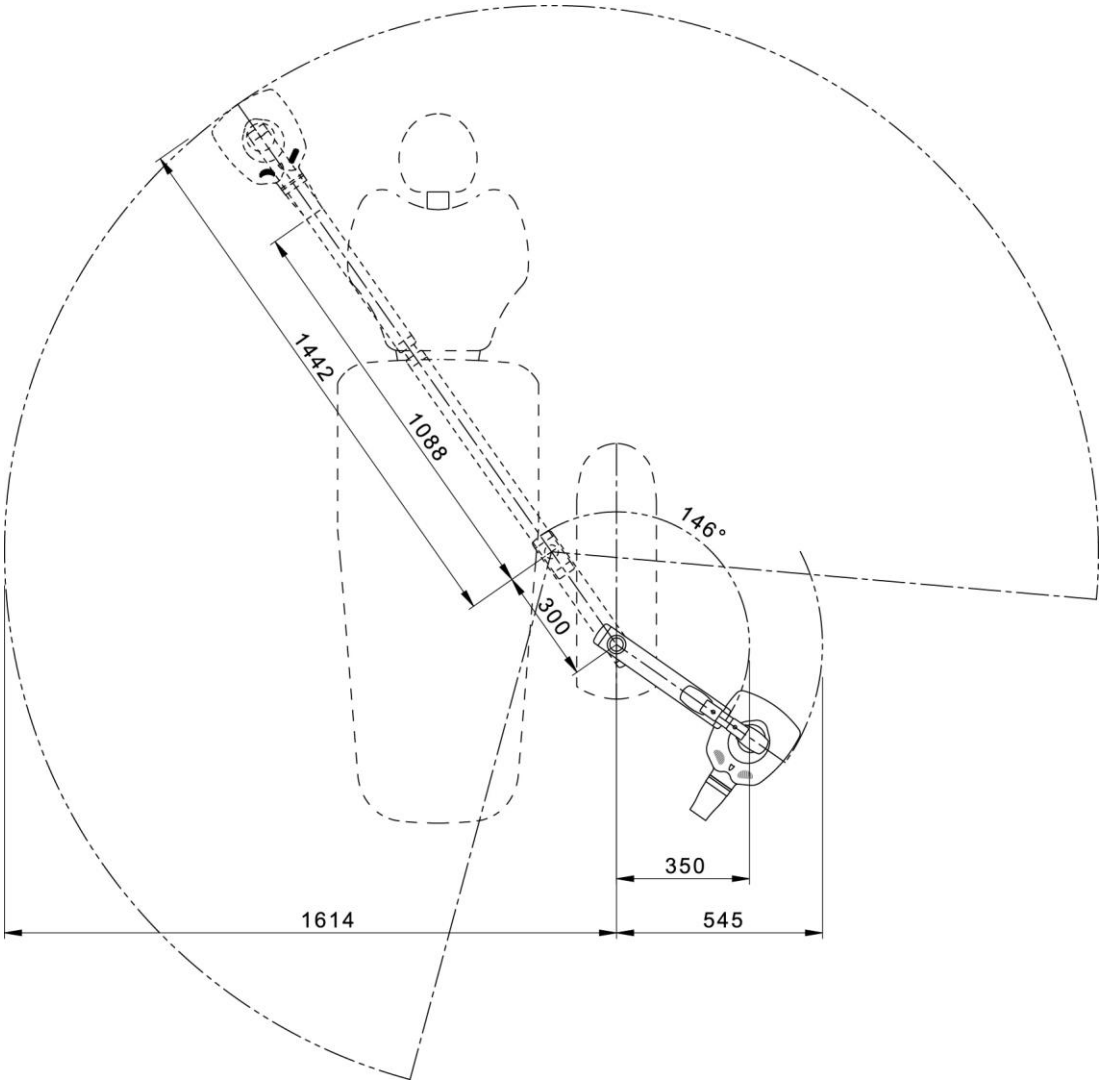





∞
260°
165°
400 / 600 / 900
(15.7/23.6/35.4)
1550 / 1750 / 2050
(61.0 / 68.9 / 80.7)
2040 / 2240 / 2540
(80.3 / 88.2 / 100.0)

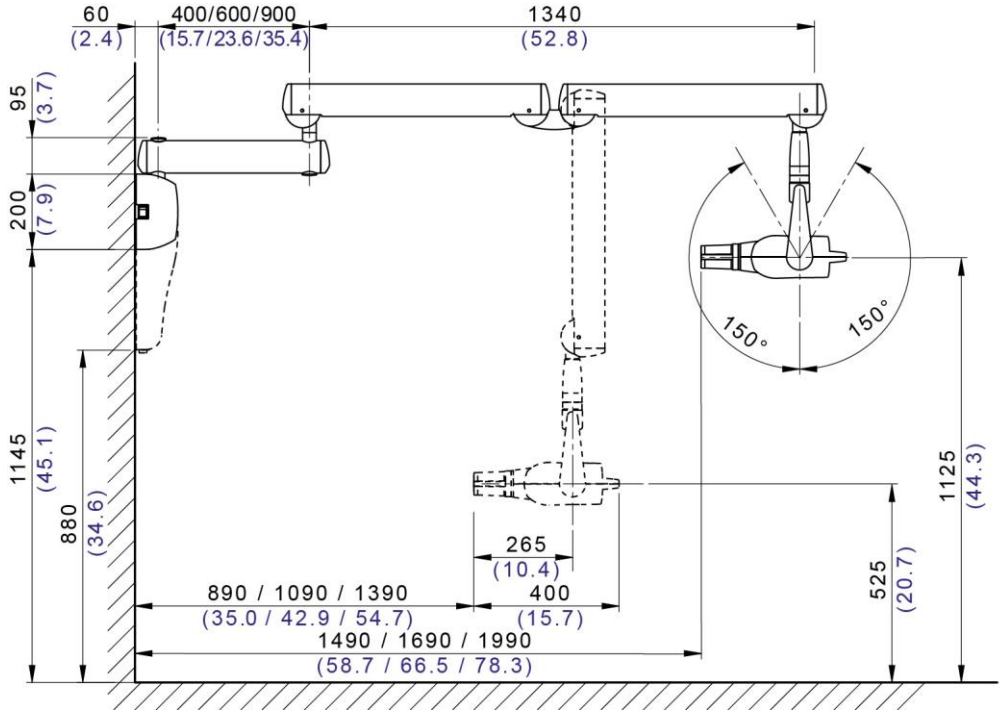
11.2.INCORPORATED VERSION

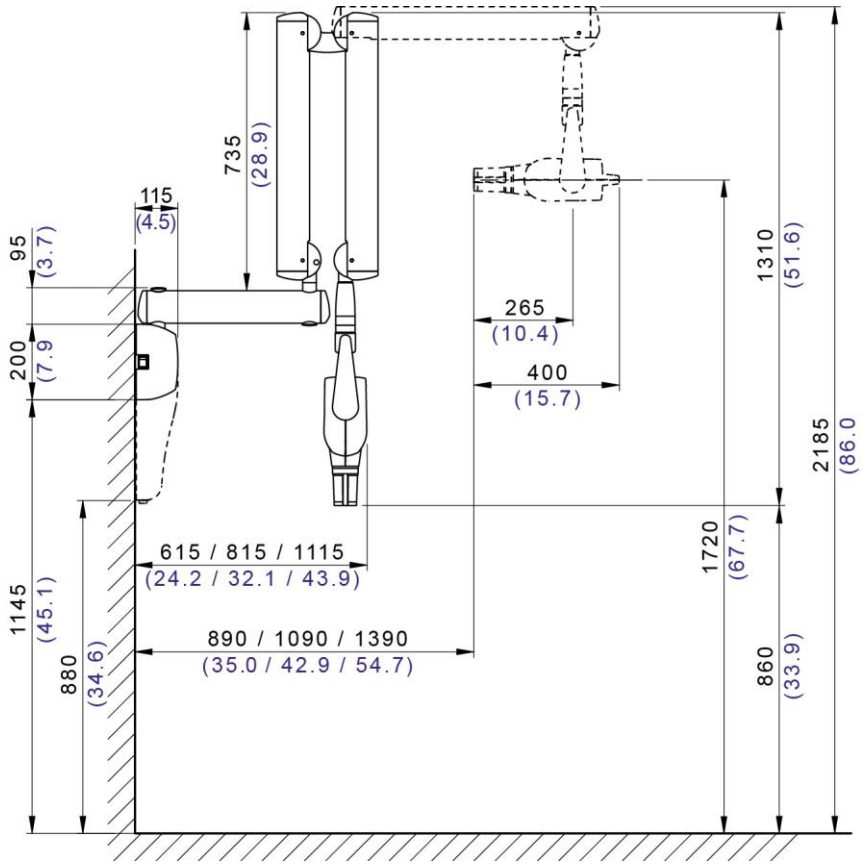
All dimensions are expressed in millimeters (inches).

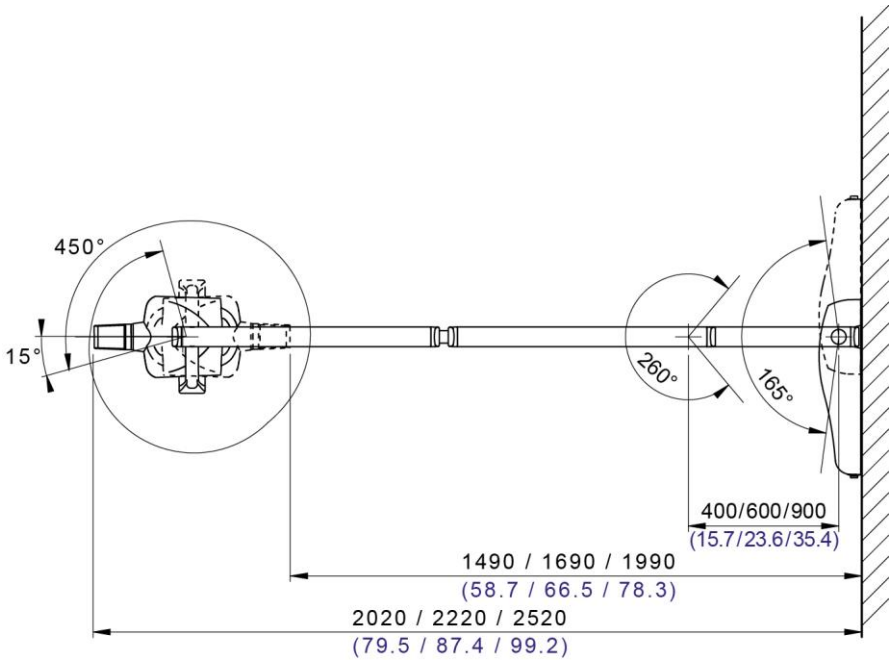


11.3.XT VERSION

All dimensions are expressed in millimeters (inches).

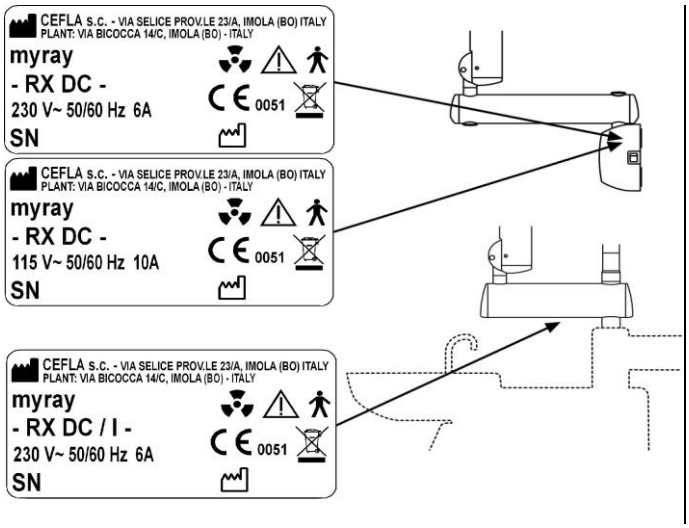




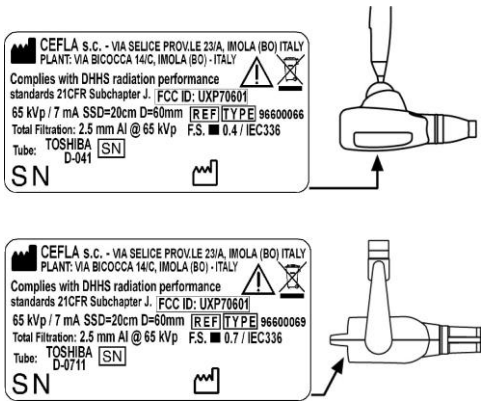

450°
15°
260°
165°
400/600/900
(15.7/23.6/35.4)
1490 / 1690 / 1990
(58.7 / 66.5 / 78.3)
2020 / 2220 / 2520
(79.5 / 87.4 / 99.2)

12. IDENTIFICATION PLATES

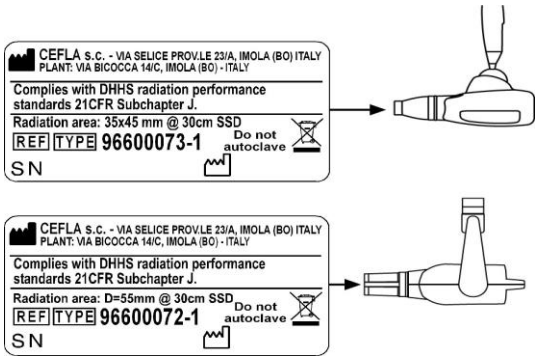
WARNING:
Never remove the identification nameplates provided on the generator, central control unit and collimator cone.



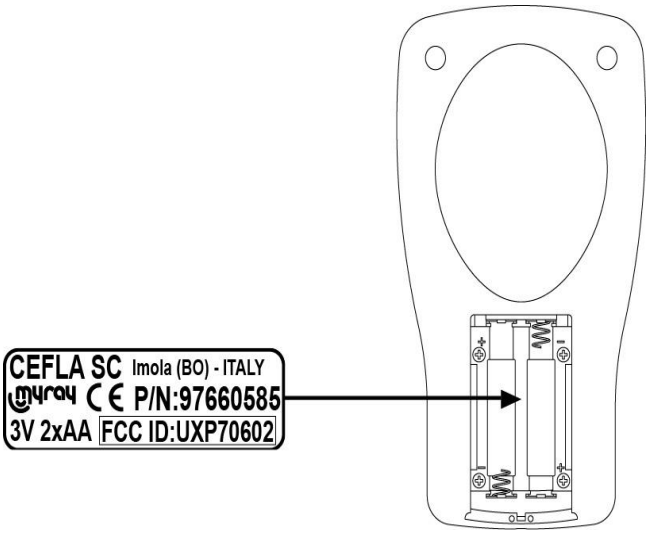
Central control unit (NAMEPLATE).
The nameplate is found beside the main switch (WALL-MOUNTED RX DC Plus and RX DC eXTend versions) and under the extension arm (RX DC PLUS / I INCORPORATED versions).
Data given on plate:
- Name of the manufacturer.
- Name of equipment.
- Rated voltage.
- Type of current.
- Rated frequency.
- Maximum power absorbed.
- Serial number.
- Date of manufacture.



X-ray unit head.
The nameplate is found on the lower cover at the back of the radiogenic unit.
Data given on plate:
- Name of the manufacturer.
- Name of equipment.
- Technical specifications.
- Model and serial number of x-ray tube.
- Device serial number.
- Date of manufacture.



Collimator.
The nameplate for the rectangular collimator is found outside it.
Details shown on the nameplate:
- Name of the manufacturer.
- Type of cone.
- Serial number.
- Date of manufacture.



Handheld.

The nameplate for the handheld is found in the battery compartment.

Data given on plate:

- Name of the manufacturer.
- Name of the equipment.
- Rated voltage.
- Number and type of batteries.
- Serial number.

Plate images are purely illustrative; refer to the plate placed on the device.

13. TIMES/SENSITIVITY CHARTS

Sensitivity	3											
Cone (focal spot-skin distance)	20 cm (8")						30 cm (12")					
Mode	En60		En63		En65		En60		En63		En65	
Patient build	A	B	A	B	A	B	A	B	A	B	A	B
Lower incisors	0.020	0.012	0.018	0.011	0.016	0.010	0.040	0.025	0.036	0.022	0.032	0.020
Lower canines/bicuspids	0.025	0.016	0.022	0.014	0.020	0.012	0.050	0.032	0.045	0.028	0.040	0.025
Upper incisors/front ”bitewing”	0.025	0.016	0.022	0.014	0.020	0.012	0.050	0.032	0.045	0.028	0.040	0.025
Lower molars	0.032	0.020	0.028	0.018	0.025	0.016	0.063	0.040	0.056	0.036	0.050	0.032
Upper canines/bicuspids/rear ”bitewing”	0.032	0.020	0.028	0.018	0.025	0.016	0.063	0.040	0.056	0.036	0.050	0.032
Upper molars	0.040	0.025	0.036	0.022	0.032	0.020	0.080	0.050	0.071	0.045	0.063	0.040

Sensitivity	4											
Cone (focal spot-skin distance)	20 cm (8")						30 cm (12")					
Mode	En60		En63		En65		En60		En63		En65	
Patient build	A	B	A	B	A	B	A	B	A	B	A	B
Lower incisors	0.022	0.014	0.020	0.012	0.018	0.011	0.045	0.028	0.040	0.025	0.036	0.022
Lower canines/bicuspids	0.028	0.018	0.025	0.016	0.022	0.014	0.056	0.036	0.050	0.032	0.045	0.028
Upper incisors/front ”bitewing”	0.028	0.018	0.025	0.016	0.022	0.014	0.056	0.036	0.050	0.032	0.045	0.028
Lower molars	0.036	0.022	0.032	0.020	0.028	0.018	0.071	0.045	0.063	0.040	0.056	0.036
Upper canines/bicuspids/rear ”bitewing”	0.036	0.022	0.032	0.020	0.028	0.018	0.071	0.045	0.063	0.040	0.056	0.036
Upper molars	0.045	0.028	0.040	0.025	0.036	0.022	0.090	0.056	0.080	0.050	0.071	0.045

Sensitivity	5											
Cone (focal spot-skin distance)	20 cm (8")						30 cm (12")					
Mode	En60		En63		En65		En60		En63		En65	
Patient build	A	B	A	B	A	B	A	B	A	B	A	B
Lower incisors	0.025	0.016	0.022	0.014	0.020	0.012	0.050	0.032	0.045	0.028	0.040	0.025
Lower canines/bicuspids	0.032	0.020	0.028	0.018	0.025	0.016	0.063	0.040	0.056	0.036	0.050	0.032
Upper incisors/front ”bitewing”	0.032	0.020	0.028	0.018	0.025	0.016	0.063	0.040	0.056	0.036	0.050	0.032
Lower molars	0.040	0.025	0.036	0.022	0.032	0.020	0.080	0.050	0.071	0.045	0.063	0.040
Upper canines/bicuspids/rear ”bitewing”	0.040	0.025	0.036	0.022	0.032	0.020	0.080	0.050	0.071	0.045	0.063	0.040
Upper molars	0.050	0.032	0.045	0.028	0.040	0.025	0.100	0.063	0.090	0.056	0.080	0.050

Sensitivity	6											
Cone (focal spot-skin distance)	20 cm (8")						30 cm (12")					
Mode	En60		En63		En65		En60		En63		En65	
Patient build	A	B	A	B	A	B	A	B	A	B	A	B
Lower incisors	0.028	0.018	0.025	0.016	0.022	0.014	0.056	0.036	0.050	0.032	0.045	0.028
Lower canines/bicuspids	0.036	0.022	0.032	0.020	0.028	0.018	0.071	0.045	0.063	0.040	0.056	0.036
Upper incisors/front ”bitewing”	0.036	0.022	0.032	0.020	0.028	0.018	0.071	0.045	0.063	0.040	0.056	0.036
Lower molars	0.045	0.028	0.040	0.025	0.036	0.022	0.090	0.056	0.080	0.050	0.071	0.045
Upper canines/bicuspids/rear ”bitewing”	0.045	0.028	0.040	0.025	0.036	0.022	0.090	0.056	0.080	0.050	0.071	0.045
Upper molars	0.056	0.036	0.050	0.032	0.045	0.028	0.110	0.071	0.100	0.063	0.090	0.056

Sensitivity	7											
Cone (focal spot-skin distance)	20 cm (8")						30 cm (12")					
Mode	En60		En63		En65		En60		En63		En65	
Patient build	A	B	A	B	A	B	A	B	A	B	A	B
Lower incisors	0.032	0.020	0.028	0.018	0.025	0.016	0.063	0.040	0.056	0.036	0.050	0.032
Lower canines/bicuspids	0.040	0.025	0.036	0.022	0.032	0.020	0.080	0.050	0.071	0.045	0.063	0.040
Upper incisors/front ”bitewing”	0.040	0.025	0.036	0.022	0.032	0.020	0.080	0.050	0.071	0.045	0.063	0.040
Lower molars	0.050	0.032	0.045	0.028	0.040	0.025	0.100	0.063	0.090	0.056	0.080	0.050
Upper canines/bicuspids/rear ”bitewing”	0.050	0.032	0.045	0.028	0.040	0.025	0.100	0.063	0.090	0.056	0.080	0.050
Upper molars	0.063	0.040	0.056	0.036	0.050	0.032	0.125	0.080	0.110	0.071	0.100	0.063

Sensitivity	8											
Cone (focal spot-skin distance)	20 cm (8")						30 cm (12")					
Mode	En60		En63		En65		En60		En63		En65	
Patient build	A	B	A	B	A	B	A	B	A	B	A	B
Lower incisors	0.036	0.022	0.032	0.020	0.028	0.018	0.071	0.045	0.063	0.040	0.056	0.036
Lower canines/bicuspids	0.045	0.028	0.040	0.025	0.036	0.022	0.090	0.056	0.080	0.050	0.071	0.045
Upper incisors/front ”bitewing”	0.045	0.028	0.040	0.025	0.036	0.022	0.090	0.056	0.080	0.050	0.071	0.045
Lower molars	0.056	0.036	0.050	0.032	0.045	0.028	0.110	0.071	0.100	0.063	0.090	0.056
Upper canines/bicuspids/rear ”bitewing”	0.056	0.036	0.050	0.032	0.045	0.028	0.110	0.071	0.100	0.063	0.090	0.056
Upper molars	0.071	0.045	0.063	0.040	0.056	0.036	0.140	0.090	0.125	0.080	0.110	0.071

Sensitivity	9											
Cone (focal spot-skin distance)	20 cm (8")						30 cm (12")					
Mode	En60		En63		En65		En60		En63		En65	
Patient build	A	B	A	B	A	B	A	B	A	B	A	B
Lower incisors	0.040	0.025	0.036	0.022	0.032	0.020	0.080	0.050	0.071	0.045	0.063	0.040
Lower canines/bicuspids	0.050	0.032	0.045	0.028	0.040	0.025	0.100	0.063	0.090	0.056	0.080	0.050
Upper incisors/front ”bitewing”	0.050	0.032	0.045	0.028	0.040	0.025	0.100	0.063	0.090	0.056	0.080	0.050
Lower molars	0.063	0.040	0.056	0.036	0.050	0.032	0.125	0.080	0.110	0.071	0.100	0.063
Upper canines/bicuspids/rear ”bitewing”	0.063	0.040	0.056	0.036	0.050	0.032	0.125	0.080	0.110	0.071	0.100	0.063
Upper molars	0.080	0.050	0.071	0.045	0.063	0.040	0.160	0.100	0.140	0.090	0.125	0.080

Sensitivity	10											
Cone (focal spot-skin distance)	20 cm (8")						30 cm (12")					
Mode	En60		En63		En65		En60		En63		En65	
Patient build	A	B	A	B	A	B	A	B	A	B	A	B
Lower incisors	0.045	0.028	0.040	0.025	0.036	0.022	0.090	0.056	0.080	0.050	0.071	0.045
Lower canines/bicuspids	0.056	0.036	0.050	0.032	0.045	0.028	0.110	0.071	0.100	0.063	0.090	0.056
Upper incisors/front ”bitewing”	0.056	0.036	0.050	0.032	0.045	0.028	0.110	0.071	0.100	0.063	0.090	0.056
Lower molars	0.071	0.045	0.063	0.040	0.056	0.036	0.140	0.090	0.125	0.080	0.110	0.071
Upper canines/bicuspids/rear ”bitewing”	0.071	0.045	0.063	0.040	0.056	0.036	0.140	0.090	0.125	0.080	0.110	0.071
Upper molars	0.090	0.056	0.080	0.050	0.071	0.045	0.180	0.110	0.160	0.100	0.140	0.090

Sensitivity	11											
Cone (focal spot-skin distance)	20 cm (8")						30 cm (12")					
Mode	En60		En63		En65		En60		En63		En65	
Patient build	A	B	A	B	A	B	A	B	A	B	A	B
Lower incisors	0.050	0.032	0.045	0.028	0.040	0.025	0.100	0.063	0.090	0.056	0.080	0.050
Lower canines/bicuspids	0.063	0.040	0.056	0.036	0.050	0.032	0.125	0.080	0.110	0.071	0.100	0.063
Upper incisors/front ”bitewing”	0.063	0.040	0.056	0.036	0.050	0.032	0.125	0.080	0.110	0.071	0.100	0.063
Lower molars	0.080	0.050	0.071	0.045	0.063	0.040	0.160	0.100	0.140	0.090	0.125	0.080
Upper canines/bicuspids/rear ”bitewing”	0.080	0.050	0.071	0.045	0.063	0.040	0.160	0.100	0.140	0.090	0.125	0.080
Upper molars	0.100	0.063	0.090	0.056	0.080	0.050	0.200	0.125	0.180	0.110	0.160	0.100

Sensitivity	12											
Cone (focal spot-skin distance)	20 cm (8")						30 cm (12")					
Mode	En60		En63		En65		En60		En63		En65	
Patient build	A	B	A	B	A	B	A	B	A	B	A	B
Lower incisors	0.056	0.036	0.050	0.032	0.045	0.028	0.110	0.071	0.100	0.063	0.090	0.056
Lower canines/bicuspids	0.071	0.045	0.063	0.040	0.056	0.036	0.140	0.090	0.125	0.080	0.110	0.071
Upper incisors/front ”bitewing”	0.071	0.045	0.063	0.040	0.056	0.036	0.140	0.090	0.125	0.080	0.110	0.071
Lower molars	0.090	0.056	0.080	0.050	0.071	0.045	0.180	0.110	0.160	0.100	0.140	0.090
Upper canines/bicuspids/rear ”bitewing”	0.090	0.056	0.080	0.050	0.071	0.045	0.180	0.110	0.160	0.100	0.140	0.090
Upper molars	0.110	0.071	0.100	0.063	0.090	0.056	0.220	0.140	0.200	0.125	0.180	0.110

Sensitivity	13											
Cone (focal spot-skin distance)	20 cm (8")						30 cm (12")					
Mode	En60		En63		En65		En60		En63		En65	
Patient build	A	B	A	B	A	B	A	B	A	B	A	B
Lower incisors	0.063	0.040	0.056	0.036	0.050	0.032	0.125	0.080	0.110	0.071	0.100	0.063
Lower canines/bicuspids	0.080	0.050	0.071	0.045	0.063	0.040	0.160	0.100	0.140	0.090	0.125	0.080
Upper incisors/front ”bitewing”	0.080	0.050	0.071	0.045	0.063	0.040	0.160	0.100	0.140	0.090	0.125	0.080
Lower molars	0.100	0.063	0.090	0.056	0.080	0.050	0.200	0.125	0.180	0.110	0.160	0.100
Upper canines/bicuspids/rear ”bitewing”	0.100	0.063	0.090	0.056	0.080	0.050	0.200	0.125	0.180	0.110	0.160	0.100
Upper molars	0.125	0.080	0.110	0.071	0.100	0.063	0.250	0.160	0.220	0.140	0.200	0.125

Sensitivity	14											
Cone (focal spot-skin distance)	20 cm (8")						30 cm (12")					
Mode	En60		En63		En65		En60		En63		En65	
Patient build	A	B	A	B	A	B	A	B	A	B	A	B
Lower incisors	0.071	0.045	0.063	0.040	0.056	0.036	0.140	0.090	0.125	0.080	0.110	0.071
Lower canines/bicuspids	0.090	0.056	0.080	0.050	0.071	0.045	0.180	0.110	0.160	0.100	0.140	0.090
Upper incisors/front ”bitewing”	0.090	0.056	0.080	0.050	0.071	0.045	0.180	0.110	0.160	0.100	0.140	0.090
Lower molars	0.110	0.071	0.100	0.063	0.090	0.056	0.220	0.140	0.200	0.125	0.180	0.110
Upper canines/bicuspids/rear ”bitewing”	0.110	0.071	0.100	0.063	0.090	0.056	0.220	0.140	0.200	0.125	0.180	0.110
Upper molars	0.140	0.090	0.125	0.080	0.110	0.071	0.280	0.180	0.250	0.160	0.220	0.140

Sensitivity	15											
Cone (focal spot-skin distance)	20 cm (8")						30 cm (12")					
Mode	En60		En63		En65		En60		En63		En65	
Patient build	A	B	A	B	A	B	A	B	A	B	A	B
Lower incisors	0.080	0.050	0.071	0.045	0.063	0.040	0.160	0.100	0.140	0.090	0.125	0.080
Lower canines/bicuspids	0.100	0.063	0.090	0.056	0.080	0.050	0.200	0.125	0.180	0.110	0.160	0.100
Upper incisors/front ”bitewing”	0.100	0.063	0.090	0.056	0.080	0.050	0.200	0.125	0.180	0.110	0.160	0.100
Lower molars	0.125	0.080	0.110	0.071	0.100	0.063	0.250	0.160	0.220	0.140	0.200	0.125
Upper canines/bicuspids/rear ”bitewing”	0.125	0.080	0.110	0.071	0.100	0.063	0.250	0.160	0.220	0.140	0.200	0.125
Upper molars	0.160	0.100	0.140	0.090	0.125	0.080	0.320	0.200	0.280	0.180	0.250	0.160

Sensitivity	16											
Cone (focal spot-skin distance)	20 cm (8")						30 cm (12")					
Mode	En60		En63		En65		En60		En63		En65	
Patient build	A	B	A	B	A	B	A	B	A	B	A	B
Lower incisors	0.090	0.056	0.080	0.050	0.071	0.045	0.180	0.110	0.160	0.100	0.140	0.090
Lower canines/bicuspids	0.110	0.071	0.100	0.063	0.090	0.056	0.220	0.140	0.200	0.125	0.180	0.110
Upper incisors/front ”bitewing”	0.110	0.071	0.100	0.063	0.090	0.056	0.220	0.140	0.200	0.125	0.180	0.110
Lower molars	0.140	0.090	0.125	0.080	0.110	0.071	0.280	0.180	0.250	0.160	0.220	0.140
Upper canines/bicuspids/rear ”bitewing”	0.140	0.090	0.125	0.080	0.110	0.071	0.280	0.180	0.250	0.160	0.220	0.140
Upper molars	0.180	0.110	0.160	0.100	0.140	0.090	0.360	0.220	0.320	0.200	0.280	0.180

Sensitivity	17											
Cone (focal spot-skin distance)	20 cm (8")						30 cm (12")					
Mode	En60		En63		En65		En60		En63		En65	
Patient build	A	B	A	B	A	B	A	B	A	B	A	B
Lower incisors	0.100	0.063	0.090	0.056	0.080	0.050	0.200	0.125	0.180	0.110	0.160	0.100
Lower canines/bicuspids	0.125	0.080	0.110	0.071	0.100	0.063	0.250	0.160	0.220	0.140	0.200	0.125
Upper incisors/front ”bitewing”	0.125	0.080	0.110	0.071	0.100	0.063	0.250	0.160	0.220	0.140	0.200	0.125
Lower molars	0.160	0.100	0.140	0.090	0.125	0.080	0.320	0.200	0.280	0.180	0.250	0.160
Upper canines/bicuspids/rear ”bitewing”	0.160	0.100	0.140	0.090	0.125	0.080	0.320	0.200	0.280	0.180	0.250	0.160
Upper molars	0.200	0.125	0.180	0.110	0.160	0.100	0.400	0.250	0.360	0.220	0.320	0.200

Sensitivity	18											
Cone (focal spot-skin distance)	20 cm (8")						30 cm (12")					
Mode	En60		En63		En65		En60		En63		En65	
Patient build	A	B	A	B	A	B	A	B	A	B	A	B
Lower incisors	0.110	0.071	0.100	0.063	0.090	0.056	0.220	0.140	0.200	0.125	0.180	0.110
Lower canines/bicuspids	0.140	0.090	0.125	0.080	0.110	0.071	0.280	0.180	0.250	0.160	0.220	0.140
Upper incisors/front ”bitewing”	0.140	0.090	0.125	0.080	0.110	0.071	0.280	0.180	0.250	0.160	0.220	0.140
Lower molars	0.180	0.110	0.160	0.100	0.140	0.090	0.360	0.220	0.320	0.200	0.280	0.180
Upper canines/bicuspids/rear ”bitewing”	0.180	0.110	0.160	0.100	0.140	0.090	0.360	0.220	0.320	0.200	0.280	0.180
Upper molars	0.220	0.140	0.200	0.125	0.180	0.110	0.450	0.280	0.400	0.250	0.360	0.220

Sensitivity	19*											
Cone (focal spot-skin distance)	20 cm (8")						30 cm (12")					
Mode	En60		En63		En65		En60		En63		En65	
Patient build	A	B	A	B	A	B	A	B	A	B	A	B
Lower incisors	0.125	0.080	0.110	0.071	0.100	0.063	0.250	0.160	0.220	0.140	0.200	0.125
Lower canines/bicuspids	0.160	0.100	0.140	0.090	0.125	0.080	0.320	0.200	0.280	0.180	0.250	0.160
Upper incisors/front ”bitewing”	0.160	0.100	0.140	0.090	0.125	0.080	0.320	0.200	0.280	0.180	0.250	0.160
Lower molars	0.200	0.125	0.180	0.110	0.160	0.100	0.400	0.250	0.360	0.220	0.320	0.200
Upper canines/bicuspids/rear ”bitewing”	0.200	0.125	0.180	0.110	0.160	0.100	0.400	0.250	0.360	0.220	0.320	0.200
Upper molars	0.250	0.160	0.220	0.140	0.200	0.125	0.500	0.320	0.450	0.280	0.400	0.250

Sensitivity	20											
Cone (focal spot-skin distance)	20 cm (8")						30 cm (12")					
Mode	En60		En63		En65		En60		En63		En65	
Patient build	A	B	A	B	A	B	A	B	A	B	A	B
Lower incisors	0.140	0.090	0.125	0.080	0.110	0.071	0.280	0.180	0.250	0.160	0.220	0.140
Lower canines/bicuspids	0.180	0.110	0.160	0.100	0.140	0.090	0.360	0.220	0.320	0.200	0.280	0.180
Upper incisors/front ”bitewing”	0.180	0.110	0.160	0.100	0.140	0.090	0.360	0.220	0.320	0.200	0.280	0.180
Lower molars	0.220	0.140	0.200	0.125	0.180	0.110	0.450	0.280	0.400	0.250	0.360	0.220
Upper canines/bicuspids/rear ”bitewing”	0.220	0.140	0.200	0.125	0.180	0.110	0.450	0.280	0.400	0.250	0.360	0.220
Upper molars	0.280	0.180	0.250	0.160	0.220	0.140	0.560	0.360	0.500	0.320	0.450	0.280

Sensitivity	21											
Cone (focal spot-skin distance)	20 cm (8")						30 cm (12")					
Mode	En60		En63		En65		En60		En63		En65	
Patient build	A	B	A	B	A	B	A	B	A	B	A	B
Lower incisors	0.160	0.100	0.140	0.090	0.125	0.080	0.320	0.200	0.280	0.180	0.250	0.160
Lower canines/bicuspids	0.200	0.125	0.180	0.110	0.160	0.100	0.400	0.250	0.360	0.220	0.320	0.200
Upper incisors/front ”bitewing”	0.200	0.125	0.180	0.110	0.160	0.100	0.400	0.250	0.360	0.220	0.320	0.200
Lower molars	0.250	0.160	0.220	0.140	0.200	0.125	0.500	0.320	0.450	0.280	0.400	0.250
Upper canines/bicuspids/rear ”bitewing”	0.250	0.160	0.220	0.140	0.200	0.125	0.500	0.320	0.450	0.280	0.400	0.250
Upper molars	0.320	0.200	0.280	0.180	0.250	0.160	0.630	0.400	0.560	0.360	0.500	0.320

Sensitivity	22											
Cone (focal spot-skin distance)	20 cm (8")						30 cm (12")					
Mode	En60		En63		En65		En60		En63		En65	
Patient build	A	B	A	B	A	B	A	B	A	B	A	B
Lower incisors	0.180	0.110	0.160	0.100	0.140	0.090	0.360	0.220	0.320	0.200	0.280	0.180
Lower canines/bicuspids	0.220	0.140	0.200	0.125	0.180	0.110	0.450	0.280	0.400	0.250	0.360	0.220
Upper incisors/front ”bitewing”	0.220	0.140	0.200	0.125	0.180	0.110	0.450	0.280	0.400	0.250	0.360	0.220
Lower molars	0.280	0.180	0.250	0.160	0.220	0.140	0.560	0.360	0.500	0.320	0.450	0.280
Upper canines/bicuspids/rear ”bitewing”	0.280	0.180	0.250	0.160	0.220	0.140	0.560	0.360	0.500	0.320	0.450	0.280
Upper molars	0.360	0.220	0.320	0.200	0.280	0.180	0.710	0.450	0.630	0.400	0.560	0.360

Sensitivity	23											
Cone (focal spot-skin distance)	20 cm (8")						30 cm (12")					
Mode	En60		En63		En65		En60		En63		En65	
Patient build	A	B	A	B	A	B	A	B	A	B	A	B
Lower incisors	0.200	0.125	0.180	0.110	0.160	0.100	0.400	0.250	0.360	0.220	0.320	0.200
Lower canines/bicuspids	0.250	0.160	0.220	0.140	0.200	0.125	0.500	0.320	0.450	0.280	0.400	0.250
Upper incisors/front ”bitewing”	0.250	0.160	0.220	0.140	0.200	0.125	0.500	0.320	0.450	0.280	0.400	0.250
Lower molars	0.320	0.200	0.280	0.180	0.250	0.160	0.630	0.400	0.560	0.360	0.500	0.320
Upper canines/bicuspids/rear ”bitewing”	0.320	0.200	0.280	0.180	0.250	0.160	0.630	0.400	0.560	0.360	0.500	0.320
Upper molars	0.400	0.250	0.360	0.220	0.320	0.200	0.800	0.500	0.710	0.450	0.630	0.400

Sensitivity	24											
Cone (focal spot-skin distance)	20 cm (8")						30 cm (12")					
Mode	En60		En63		En65		En60		En63		En65	
Patient build	A	B	A	B	A	B	A	B	A	B	A	B
Lower incisors	0.220	0.140	0.200	0.125	0.180	0.110	0.450	0.280	0.400	0.250	0.360	0.220
Lower canines/bicuspids	0.280	0.180	0.250	0.160	0.220	0.140	0.560	0.360	0.500	0.320	0.450	0.280
Upper incisors/front ”bitewing”	0.280	0.180	0.250	0.160	0.220	0.140	0.560	0.360	0.500	0.320	0.450	0.280
Lower molars	0.360	0.220	0.320	0.200	0.280	0.180	0.710	0.450	0.630	0.400	0.560	0.360
Upper canines/bicuspids/rear ”bitewing”	0.360	0.220	0.320	0.200	0.280	0.180	0.710	0.450	0.630	0.400	0.560	0.360
Upper molars	0.450	0.280	0.400	0.250	0.360	0.220	0.900	0.560	0.800	0.500	0.710	0.450

Sensitivity	25											
Cone (focal spot-skin distance)	20 cm (8")						30 cm (12")					
Mode	En60		En63		En65		En60		En63		En65	
Patient build	A	B	A	B	A	B	A	B	A	B	A	B
Lower incisors	0.250	0.160	0.220	0.140	0.200	0.125	0.500	0.320	0.450	0.280	0.400	0.250
Lower canines/bicuspids	0.320	0.200	0.280	0.180	0.250	0.160	0.630	0.400	0.560	0.360	0.500	0.320
Upper incisors/front ”bitewing”	0.320	0.200	0.280	0.180	0.250	0.160	0.630	0.400	0.560	0.360	0.500	0.320
Lower molars	0.400	0.250	0.360	0.220	0.320	0.200	0.800	0.500	0.710	0.450	0.630	0.400
Upper canines/bicuspids/rear ”bitewing”	0.400	0.250	0.360	0.220	0.320	0.200	0.800	0.500	0.710	0.450	0.630	0.400
Upper molars	0.500	0.320	0.450	0.280	0.400	0.250	1.000	0.630	0.900	0.560	0.800	0.500

Default settings
A=Adulto
B=Bambino

14. NOMINAL DOSE EMISSION VALUES

Dose in air	En60	En63	En65
mGy/s (± 30%)	9.0	8.4	8.8

Nominal emission values according to time and type of collimator:

Collimator	**Round ø 60 mm**					
SSD	20 cm					
A ($cm^{2)}$	28.26					
Mode	En60		En63		En65	
KV	60KV		63KV		65KV	
mA	7mA		6mA		6mA	
t (s)	**mGy**	**DAP mGy · cm²**	**mGy**	**DAP mGy · cm²**	**mGy**	**DAP mGy · cm²**
0.010	0.09	2.5	0.08	2.3	0.09	2.5
0.011	0.10	2.8	0.09	2.5	0.10	2.8
0.012	0.11	3.1	0.10	2.8	0.11	3.1
0.014	0.13	3.7	0.12	3.4	0.12	3.4
0.016	0.14	4.0	0.13	3.7	0.14	4.0
0.018	0.16	4.5	0.15	4.2	0.16	4.5
0.020	0.18	5.1	0.17	4.8	0.18	5.1
0.022	0.20	5.7	0.18	5.1	0.19	5.4
0.025	0.23	6.5	0.21	5.9	0.22	6.2
0.028	0.25	7.1	0.24	6.8	0.25	7.1
0.032	0.29	8.2	0.27	7.6	0.28	7.9
0.036	0.32	9.0	0.30	8.5	0.32	9.0
0.040	0.36	10.2	0.34	9.6	0.35	9.9
0.045	0.41	11.6	0.38	10.7	0.40	11.3
0.050	0.45	12.7	0.42	11.9	0.44	12.4
0.056	0.50	14.1	0.47	13.3	0.49	13.8
0.063	0.57	16.1	0.53	15.0	0.55	15.5
0.071	0.64	18.1	0.60	17.0	0.62	17.5
0.080	0.72	20.3	0.67	18.9	0.70	19.8
0.090	0.81	22.9	0.76	21.5	0.79	22.3
0.100	0.90	25.4	0.84	23.7	0.88	24.9
0.110	0.99	28.0	0.92	26.0	0.97	27.4
0.125	1.13	31.9	1.05	29.7	1.10	31.1
0.140	1.26	35.6	1.18	33.3	1.23	34.8
0.160	1.44	40.7	1.34	37.9	1.41	39.8
0.180	1.62	45.8	1.51	42.7	1.58	44.7
0.200	1.80	50.9	1.68	47.5	1.76	49.7
0.220	1.98	56.0	1.85	52.3	1.94	54.8
0.250	2.25	63.6	2.10	59.3	2.20	62.2
0.280	2.52	71.2	2.35	66.4	2.46	69.5
0.320	2.88	81.4	2.69	76.0	2.82	79.7

0.360	3.24	91.6	3.02	85.3	3.17	89.6
0.400	3.60	101.7	3.36	95.0	3.52	99.5
0.450	4.05	114.5	3.78	106.8	3.96	111.9
0.500	4.50	127.2	4.20	118.7	4.40	124.3
0.560	5.04	142.4	4.70	132.8	4.93	139.3
0.630	5.67	160.2	5.29	149.5	5.54	156.6
0.710	6.39	180.6	5.96	168.4	6.25	176.6
0.800	7.20	203.5	6.72	189.9	7.04	199.0
0.900	8.10	228.9	7.56	213.6	7.92	223.8
1.000	9.00	254.3	8.40	237.4	8.80	248.7

Collimator	Rectangular 35x45 mm					
SSD	30 cm					
A ($cm^{2)}$	15.75					
Mode	En60		En63		En65	
KV	60KV		63KV		65KV	
mA	7mA		6mA		6mA	
t (s)	mGy	DAP mGy · cm^2	mGy	DAP mGy · cm^2	mGy	DAP mGy · cm^2
0.010	0.05	0.8	0.04	0.6	0.04	0.6
0.011	0.05	0.8	0.05	0.8	0.05	0.8
0.012	0.05	0.8	0.05	0.8	0.05	0.8
0.014	0.06	0.9	0.06	0.9	0.06	0.9
0.016	0.07	1.1	0.07	1.1	0.07	1.1
0.018	0.08	1.3	0.08	1.3	0.08	1.3
0.020	0.09	1.4	0.08	1.3	0.09	1.4
0.022	0.10	1.6	0.09	1.4	0.10	1.6
0.025	0.11	1.7	0.11	1.7	0.11	1.7
0.028	0.13	2.0	0.12	1.9	0.12	1.9
0.032	0.14	2.2	0.13	2.0	0.14	2.2
0.036	0.16	2.5	0.15	2.4	0.16	2.5
0.040	0.18	2.8	0.17	2.7	0.18	2.8
0.045	0.20	3.2	0.19	3.0	0.20	3.2
0.050	0.23	3.6	0.21	3.3	0.22	3.5
0.056	0.25	3.9	0.24	3.8	0.25	3.9
0.063	0.28	4.4	0.26	4.1	0.28	4.4
0.071	0.32	5.0	0.30	4.7	0.31	4.9
0.080	0.36	5.7	0.34	5.4	0.35	5.5
0.090	0.41	6.5	0.38	6.0	0.40	6.3
0.100	0.45	7.1	0.42	6.6	0.44	6.9
0.110	0.50	7.9	0.46	7.2	0.48	7.6
0.125	0.56	8.8	0.53	8.3	0.55	8.7
0.140	0.63	9.9	0.59	9.3	0.62	9.8
0.160	0.72	11.3	0.67	10.6	0.70	11.0
0.180	0.81	12.8	0.76	12.0	0.79	12.4
0.200	0.90	14.2	0.84	13.2	0.88	13.9
0.220	0.99	15.6	0.92	14.5	0.97	15.3
0.250	1.13	17.8	1.05	16.5	1.10	17.3
0.280	1.26	19.8	1.18	18.6	1.23	19.4
0.320	1.44	22.7	1.34	21.1	1.41	22.2
0.360	1.62	25.5	1.51	23.8	1.58	24.9
0.400	1.80	28.4	1.68	26.5	1.76	27.7
0.450	2.03	32.0	1.89	29.8	1.98	31.2
0.500	2.25	35.4	2.10	33.1	2.20	34.7

0.560	2.52	39.7	2.35	37.0	2.46	38.7
0.630	2.84	44.7	2.65	41.7	2.77	43.6
0.710	3.20	50.4	2.98	46.9	3.12	49.1
0.800	3.60	56.7	3.36	52.9	3.52	55.4
0.900	4.05	63.8	3.78	59.5	3.96	62.4
1.000	4.50	70.9	4.20	66.2	4.40	69.3

Collimator	Round ø 55 mm					
SSD	30 cm					
A ($cm^{2)}$	23.75					
Mode	En60		En63		En65	
KV	60KV		63KV		65KV	
mA	7mA		6mA		6mA	
t (s)	mGy	DAP mGy · cm^2	mGy	DAP mGy · cm^2	mGy	DAP mGy · cm^2
0.010	0.05	1.2	0.04	0.9	0.04	0.9
0.011	0.05	1.2	0.05	1.2	0.05	1.2
0.012	0.05	1.2	0.05	1.2	0.05	1.2
0.014	0.06	1.4	0.06	1.4	0.06	1.4
0.016	0.07	1.7	0.07	1.7	0.07	1.7
0.018	0.08	1.9	0.08	1.9	0.08	1.9
0.020	0.09	2.1	0.08	1.9	0.09	2.1
0.022	0.10	2.4	0.09	2.1	0.10	2.4
0.025	0.11	2.6	0.11	2.6	0.11	2.6
0.028	0.13	3.1	0.12	2.8	0.12	2.8
0.032	0.14	3.3	0.13	3.1	0.14	3.3
0.036	0.16	3.8	0.15	3.6	0.16	3.8
0.040	0.18	4.3	0.17	4.0	0.18	4.3
0.045	0.20	4.7	0.19	4.5	0.20	4.7
0.050	0.23	5.5	0.21	5.0	0.22	5.2
0.056	0.25	5.9	0.24	5.7	0.25	5.9
0.063	0.28	6.6	0.26	6.2	0.28	6.6
0.071	0.32	7.6	0.30	7.1	0.31	7.4
0.080	0.36	8.5	0.34	8.1	0.35	8.3
0.090	0.41	9.7	0.38	9.0	0.40	9.5
0.100	0.45	10.7	0.42	10.0	0.44	10.4
0.110	0.50	11.9	0.46	10.9	0.48	11.4
0.125	0.56	13.3	0.53	12.6	0.55	13.1
0.140	0.63	15.0	0.59	14.0	0.62	14.7
0.160	0.72	17.1	0.67	15.9	0.70	16.6
0.180	0.81	19.2	0.76	18.0	0.79	18.8
0.200	0.90	21.4	0.84	19.9	0.88	20.9
0.220	0.99	23.5	0.92	21.8	0.97	23.0
0.250	1.13	26.8	1.05	24.9	1.10	26.1
0.280	1.26	29.9	1.18	28.0	1.23	29.2
0.320	1.44	34.2	1.34	31.8	1.41	33.5
0.360	1.62	38.5	1.51	35.9	1.58	37.5
0.400	1.80	42.7	1.68	39.9	1.76	41.8
0.450	2.03	48.2	1.89	44.9	1.98	47.0
0.500	2.25	53.4	2.10	49.9	2.20	52.2

0.560	2.52	59.8	2.35	55.8	2.46	58.4
0.630	2.84	67.4	2.65	62.9	2.77	65.8
0.710	3.20	76.0	2.98	70.8	3.12	74.1
0.800	3.60	85.5	3.36	79.8	3.52	83.6
0.900	4.05	96.2	3.78	89.8	3.96	94.0
1.000	4.50	106.9	4.20	99.7	4.40	104.5

Collimator	Rectangular 22x35 mm					
SSD	31 cm					
A ($cm^{2)}$	7.70					
Mode	En60		En63		En65	
KV	60KV		63KV		65KV	
mA	7mA		6mA		6mA	
t (s)	mGy	DAP mGy · cm^2	mGy	DAP mGy · cm^2	mGy	DAP mGy · cm^2
0.010	0.05	0.4	0.04	0.3	0.04	0.3
0.011	0.05	0.4	0.05	0.4	0.05	0.4
0.012	0.05	0.4	0.05	0.4	0.05	0.4
0.014	0.06	0.5	0.06	0.5	0.06	0.5
0.016	0.07	0.5	0.07	0.5	0.07	0.5
0.018	0.08	0.6	0.08	0.6	0.08	0.6
0.020	0.09	0.7	0.08	0.6	0.09	0.7
0.022	0.10	0.8	0.09	0.7	0.10	0.8
0.025	0.11	0.8	0.11	0.8	0.11	0.8
0.028	0.13	1.0	0.12	0.9	0.12	0.9
0.032	0.14	1.1	0.13	1.0	0.14	1.1
0.036	0.16	1.2	0.15	1.2	0.16	1.2
0.040	0.18	1.4	0.17	1.3	0.18	1.4
0.045	0.20	1.5	0.19	1.5	0.20	1.5
0.050	0.23	1.8	0.21	1.6	0.22	1.7
0.056	0.25	1.9	0.24	1.8	0.25	1.9
0.063	0.28	2.2	0.26	2.0	0.28	2.2
0.071	0.32	2.5	0.30	2.3	0.31	2.4
0.080	0.36	2.8	0.34	2.6	0.35	2.7
0.090	0.41	3.2	0.38	2.9	0.40	3.1
0.100	0.45	3.5	0.42	3.2	0.44	3.4
0.110	0.50	3.9	0.46	3.5	0.48	3.7
0.125	0.56	4.3	0.53	4.1	0.55	4.2
0.140	0.63	4.9	0.59	4.5	0.62	4.8
0.160	0.72	5.5	0.67	5.2	0.70	5.4
0.180	0.81	6.2	0.76	5.9	0.79	6.1
0.200	0.90	6.9	0.84	6.5	0.88	6.8
0.220	0.99	7.6	0.92	7.1	0.97	7.5
0.250	1.13	8.7	1.05	8.1	1.10	8.5
0.280	1.26	9.7	1.18	9.1	1.23	9.5
0.320	1.44	11.1	1.34	10.3	1.41	10.9
0.360	1.62	12.5	1.51	11.6	1.58	12.2
0.400	1.80	13.9	1.68	12.9	1.76	13.6
0.450	2.03	15.6	1.89	14.6	1.98	15.2
0.500	2.25	17.3	2.10	16.2	2.20	16.9

0.560	2.52	19.4	2.35	18.1	2.46	18.9
0.630	2.84	21.9	2.65	20.4	2.77	21.3
0.710	3.20	24.6	2.98	22.9	3.12	24.0
0.800	3.60	27.7	3.36	25.9	3.52	27.1
0.900	4.05	31.2	3.78	29.1	3.96	30.5
1.000	4.50	34.7	4.20	32.3	4.40	33.9

Collimator	Rectangular 31x41 mm					
SSD	31 cm					
A ($cm^{2)}$	12.71					
Mode	En60		En63		En65	
KV	60KV		63KV		65KV	
mA	7mA		6mA		6mA	
t (s)	mGy	DAP mGy · cm^2	mGy	DAP mGy · cm^2	mGy	DAP mGy · cm^2
0.010	0.05	0.6	0.04	0.5	0.04	0.5
0.011	0.05	0.6	0.05	0.6	0.05	0.6
0.012	0.05	0.6	0.05	0.6	0.05	0.6
0.014	0.06	0.8	0.06	0.8	0.06	0.8
0.016	0.07	0.9	0.07	0.9	0.07	0.9
0.018	0.08	1.0	0.08	1.0	0.08	1.0
0.020	0.09	1.1	0.08	1.0	0.09	1.1
0.022	0.10	1.3	0.09	1.1	0.10	1.3
0.025	0.11	1.4	0.11	1.4	0.11	1.4
0.028	0.13	1.7	0.12	1.5	0.12	1.5
0.032	0.14	1.8	0.13	1.7	0.14	1.8
0.036	0.16	2.0	0.15	1.9	0.16	2.0
0.040	0.18	2.3	0.17	2.2	0.18	2.3
0.045	0.20	2.5	0.19	2.4	0.20	2.5
0.050	0.23	2.9	0.21	2.7	0.22	2.8
0.056	0.25	3.2	0.24	3.1	0.25	3.2
0.063	0.28	3.6	0.26	3.3	0.28	3.6
0.071	0.32	4.1	0.30	3.8	0.31	3.9
0.080	0.36	4.6	0.34	4.3	0.35	4.4
0.090	0.41	5.2	0.38	4.8	0.40	5.1
0.100	0.45	5.7	0.42	5.3	0.44	5.6
0.110	0.50	6.4	0.46	5.8	0.48	6.1
0.125	0.56	7.1	0.53	6.7	0.55	7.0
0.140	0.63	8.0	0.59	7.5	0.62	7.9
0.160	0.72	9.2	0.67	8.5	0.70	8.9
0.180	0.81	10.3	0.76	9.7	0.79	10.0
0.200	0.90	11.4	0.84	10.7	0.88	11.2
0.220	0.99	12.6	0.92	11.7	0.97	12.3
0.250	1.13	14.4	1.05	13.3	1.10	14.0
0.280	1.26	16.0	1.18	15.0	1.23	15.6
0.320	1.44	18.3	1.34	17.0	1.41	17.9
0.360	1.62	20.6	1.51	19.2	1.58	20.1
0.400	1.80	22.9	1.68	21.4	1.76	22.4
0.450	2.03	25.8	1.89	24.0	1.98	25.2
0.500	2.25	28.6	2.10	26.7	2.20	28.0

0.560	2.52	32.0	2.35	29.9	2.46	31.3
0.630	2.84	36.1	2.65	33.7	2.77	35.2
0.710	3.20	40.7	2.98	37.9	3.12	39.7
0.800	3.60	45.8	3.36	42.7	3.52	44.7
0.900	4.05	51.5	3.78	48.0	3.96	50.3
1.000	4.50	57.2	4.20	53.4	4.40	55.9

15. INSPECTION AND MAINTENANCE

15.1.USER INSPECTION

These instructions describe the maintenance procedures for the RX DC X-ray unit.
These instructions apply to all the revisions of said equipment, as well as all the accessories that may have been provided, therefore the description of some parts may not correspond to your equipment.
Inspection and preventive maintenance must be performed at scheduled intervals to protect the health and safety of patients, users and other persons in accordance with national regulations regarding the use, maintenance of dental x-ray devices that are in force in the country where the device is installed.
In order to ensure the operational safety and functional reliability of your product, the system owner should check the equipment at regular intervals (at least once a year) or commission an authorized technician to do so.
If one or more checks to be performed are not satisfactory, please contact your dealer tech support.

Answer questions with yes (√) or no (−)

			Inspection DATE				
Step	**Description**	**Reference in User Manual**	__/__/20__	__/__/20__	__/__/20__	__/__/20__	__/__/20__
1	Check that all labels located - on the wall-mounted cover, - on the X-ray tube - inside the collimator/collimators, are intact, well attached and legible.	Section **Identification nameplates**					
2	Check there are no external damages to the equipment which could that may reduce protection against radiation.	Section **Description of the RX DC x-ray unit**					
3	Check the battery level of the wireless remote control	Section **Batteries and charge level indication**					
4	Check the remote control functionality: buttons must respond to interaction	Section **Control Panel**					
5	Check the power switch verifying that the switch is working properly and the main switch green light illuminates when the switch is in the on position.	Section **Turning the x-ray unit on and off**					
6	Check the electromechanical brake that lock/unlock the movement of the generator – Hypersphere model units only	Section **Hypersphere technology**					
7	Check proper functioning of X-ray generator indicator light - Hypersphere model units only	Section **X-ray generator indicator light**					
8	Check the exposure buzzer during a trial x-rays emission	Section **Control Panel**					
9	Verify that exposure is immediately interrupted when X-rays button is released	Section **Control Panel**					
10	Check the scissors arm balance	Section **Description of the RX DC x-ray unit**					
11	Verify that exposure is immediately interrupted when X-rays button is released	Section **Control Panel**					
12	Check the X-Ray Generator functionality performing a complete trial exposure. Select any time exposure and hold down the emission button throughout the entire exam procedure. Absence of error messages assures a proper generator functionality.	Section **Procedure to be follow ed when taking the x-ray**					

Operator Name					
Signature					

The undersigned confirms that the equipment was checked for the above criteria and that, in case of any malfunction, an authorized technician of the local dealer was informed.

All inspection and maintenance work performed by the system owner and/or service engineer must be recorded in this document and kept near the unit!.

15.2.TECHNICAL MAINTENANCE

These instructions describe the maintenance procedures for the RX DC X-ray unit. These instructions apply to all the revisions of said equipment.
In order to ensure the operational safety and functional reliability of the equipment installed, **at least once** a year an authorized service technician must perform a full inspection of the device.
When taking measurements that require a multimeter, always use a calibrated digital multimeter.
All the following tests will be carried out. Customer should be notified prior to replacing parts.

Answer questions with yes (√) or no (−)

			Inspection DATE				
Step	**Description**	**Reference in User Manual**	**__/__/20__**	**__/__/20__**	**__/__/20__**	**__/__/20__**	**__/__/20__**
1	Check that all labels located - on the wall-mounted cover, - on the X-ray tube - inside the collimator/collimators, are intact, well attached and legible.	User Manual, section **Identification nameplates**					
2	Check there are no external damages to the equipment which could that may reduce protection against radiation.	User Manual, section **Description of the RX DC x-ray unit**					
3	Pull out the collimator and panel stop ring, take off the screw cover caps and loosen the screws that secure the lower cover. Check there is no oil leakage on the tube-head.	Technical Manual, section **X-ray Head**					
4	Check the electromechanical brake that locks/unlocks the movement of the generator and adjust it if necessary – Hypersphere model units only –	Technical Manual, section **Actuator unit**					
5	Power off the unit and remove the wall mounting cover. Disconnect the unit from the main power supply and check the condition of the main power supply cable. Replace it in case of damage. Connect it back making sure the safety ground is securely connected. Install the wall mounting cover back again.	Technical Manual, section **Wall mounted plate wiring connections**					
6	Check the battery level of the wireless remote control	User Manual, section **Batteries and charge level indication**					
7	Check the remote control functionality: buttons must respond to interaction	User Manual, section **Control Panel**					
8	Check the power switch verifying that the switch is working properly and the main switch green light illuminates when the switch is in the on position.	Section **Turning the x-ray unit on and off**					
9	Check proper functioning of X-ray generator indicator light - Hypersphere model units only	User Manual, section **X-ray generator indicator light**					
10	Check the exposure buzzer during a trial x-rays emission	User Manual, section **Control Panel**					
11	Verify that exposure is immediately interrupted when X-rays button is released	Section **Control Panel**					
12	Check the scissors arm balance and adjust it if necessary	Technical Manual, section **Balancing the double pantograph arm**					
13	Perform a calibration of the X-ray tube housing	Technical Manual, section **Calibrating the X-ray Head**					

Operator Name					
Signature					

The undersigned confirms that he/she has checked the unit for the above criteria and that he/she has handed over the unit in fully functional condition.

All inspection and maintenance work performed by the system owner and/or service engineer must be recorded in this document and kept near the unit!.

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