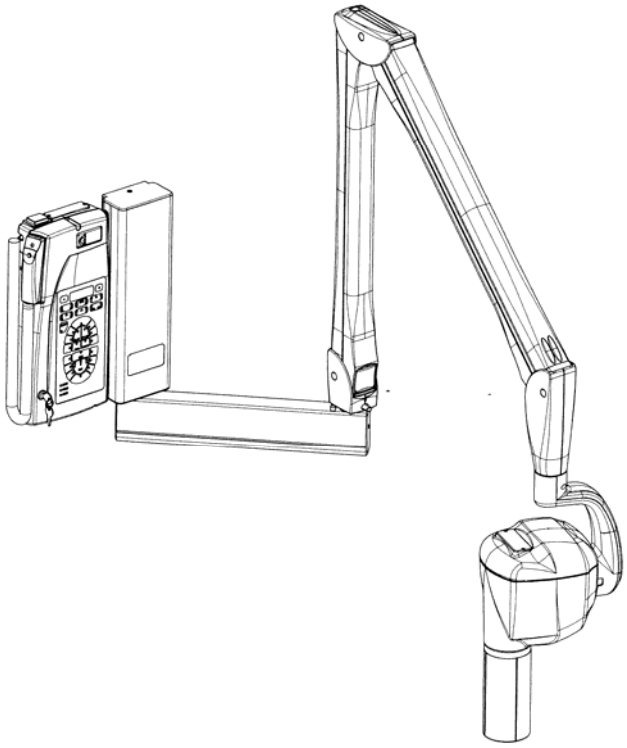
X-Mind® AC

intra-oral x-ray system

USER MANUAL

CE
0434



This manual should always be kept near the installation

03/2001 Edition

SUMMARY

INTRODUCTION

The radiographic system described in this manual is a "**wall installation**".

SATELEC® S.A.S. reserves the right to modify its products and manual without notice.

SATELEC® S.A.S. shall not be liable for any incorrect use of the information contained in this manual.

PRELIMINARY INFORMATION

Before using the "**X-Mind® AC**" radiographic system, we recommend you carefully read and follow the instructions contained herein, to get the maximum out of the equipment.

Always pay close attention to the **CAUTION, WARNING, and PLEASE NOTE** messages when operating the system.

LEGEND

CAUTION

*The word **CAUTION** identifies possible incidents, which could endanger **the operator's personal safety or cause personal injuries.***

WARNING

*The word **WARNING** identifies those incidents, likely to affect **the radiographic system's performance.***

PLEASE NOTE

The words <**PLEASE NOTE>** are used to highlight particular points to facilitate maintenance or make important information clearer.

INFORMATION FOR THE USER

Dear Customer,
Thank you for choosing the "**X-Mind® AC**" radiographic system.

It is designed and manufactured by "de Götzen® S.r.l." in collaboration with SATELEC® S.A.S. and is the result of many years of experience in the field of radiology and in the application of advanced electronics.

This high performance system represents a further development in technological research at the service of dental radiography.

It is supplied with all the necessary technical documentation, which must always be kept close at hand for reference.

PLEASE NOTE

This manual does not contain all the recommendations and obligations regarding the holding of a source of ionising radiations – as these vary from State to State – but only the most common ones. The user must consult his country's legislation to be sure he is complying with all local obligations.

WARRANTY CONDITIONS

Any inappropriate use or any arbitrary tampering with the equipment, shall exempt "de Götzen® S.r.l." and SATELEC® S.A.S., as manufacturer and importer of the "**X-Mind® AC**" system, from providing any service under warranty or from any other liability.

The warranty is valid only if the following precautions are taken:

- ✓ Any repairs, modifications, adjustments, re-calibrations must be performed only by "de Götzen® S.r.l." for SATELEC® S.A.S.
- ✓ The installation must be carried out by professionally qualified technicians and in accordance with regulations in force
- ✓ The system must be installed and used in compliance with the instructions given in this Manual and for the purposes and applications for which it was designed
- ✓ The power supply must be adequate to supply the required power indicated in the radiographic system's nameplate data

TERMS OF TRANSPORT

The "X-Mind® AC" radiographic system travels at the receiver's own risk.

All claims for damage or loss in respect of the shipment must be pointed out in the presence of the shipping agent.

In the case of missing parts or actual or suspected damage, the receiver shall indicate the proper reservations on the waybill or consignment note.

SAFETY WARNINGS

Below are a few safety recommendations to be followed when using the "**X-Mind® AC**" radiographic system.

PROTECTION AGAINST RADIATION

"The general principles regarding safety and protection of workers and people" must always be applied when using the unit:

1. Justification of the practice
2. Protection Optimization (ALARA)
3. Reduction of the limits of individual doses and risks

Only authorized and qualified personnel must use the radiographic system.

All personnel present during the radiographic examination must comply with safety measures provided in respect of protection from radiation.

For his own safety, the operator must always keep a distance of more than 2 metres from the radiographic unit.

To protect the patient from unnecessary exposure to radiation, additional anti-radiation protections may be used whenever necessary (i.e. aprons, collars, etc…)

This symbol serves to highlight the hazardous nature of X-Rays

ELECTRICAL SAFETY

The radiographic system contains high voltage.

When inspecting internal parts, always turn off the power before touching any electric part.

The unit must be used only in environments that are in compliance with all electrical safety standards set down for medical environments.

The unit is NOT fitted with protection against penetration of liquids; it will therefore be necessary to ensure that no water or other liquids penetrate inside to avoid short circuits or corrosion.

Always disconnect the radiographic system from the power supply before beginning cleaning and disinfecting operations.

MECHANICAL RISK

Before removing the tube head from the positioning arm, RELEASE THE SPRING because the joint might burst open and hit the operator.

PROTECTION AGAINST EXPLOSION

The radiographic system MUST NOT be used in the presence of disinfectant, flammable or potentially explosive gases or vapours that could catch fire and cause damage.
If these disinfectants have to be used, let the vapour completely disperse before turning on the radiographic system.

1. "X-Mind® AC" RADIOGRAPHIC SYSTEM

The "**X-Mind® AC**" radiographic system guarantees the maximum safety for both the operator and the patient.

It is designed in compliance with the following European Directives:

- directive 93/42/EEC on MEDICAL DEVICES as amended
- directive 73/23/EEC on LOW VOLTAGE and subsequent integrations
- directive 89/336/EEC on ELECTROMAGNETIC COMPATIBILITY
- directive EURATOM 96/29 on ionising radiation

and in compliance with the following American Standard:

- American Radiation Performance Standard 21 CFR, Subchapter J

The following protective measures were adopted in the design and construction of the unit:

- ✓ Protection against the risk of electric injuries, ensured by an earthed protection conductor
- ✓ Protection against leakage radiation, made negligible by the shielded casing
- ✓ Protection against excessive radiation, with the immediate activation of the safety device
- ✓ Protection against continuous service, since the system is designed, according to standards, not to allow use in radioscopy
- ✓ Protection against exposure mistakes, by the network compensation software, assuring constant blackening
- ✓ Protection for the patient against dangerous radiation, obtained by improving the quality of the radiation with the addition of an aluminium filter, in compliance with standards
- ✓ Protection for the operator against irradiation ensured by the extendable cable of the control switch which allows for a safety distance of more than 2 metres
- ✓ Protection against involuntarily selection of "film" or "digit", obtained, according to standards, by means of confirmation via the selection key

"ELECTRO-MEDICAL" CLASSIFICATION

Under paragraph §5 of the general safety regulations EC EN 60 601-1/1998 on safety of medical equipment, the system is classified as: **Class I - Type B**

"MEDICAL DEVICES" CLASSIFICATION

Under the classification rules indicated in attachment IX of the EEC Directive 93/42 on medical devices, the system is classified as: **Class IIb**

2. SYSTEM COMPONENTS

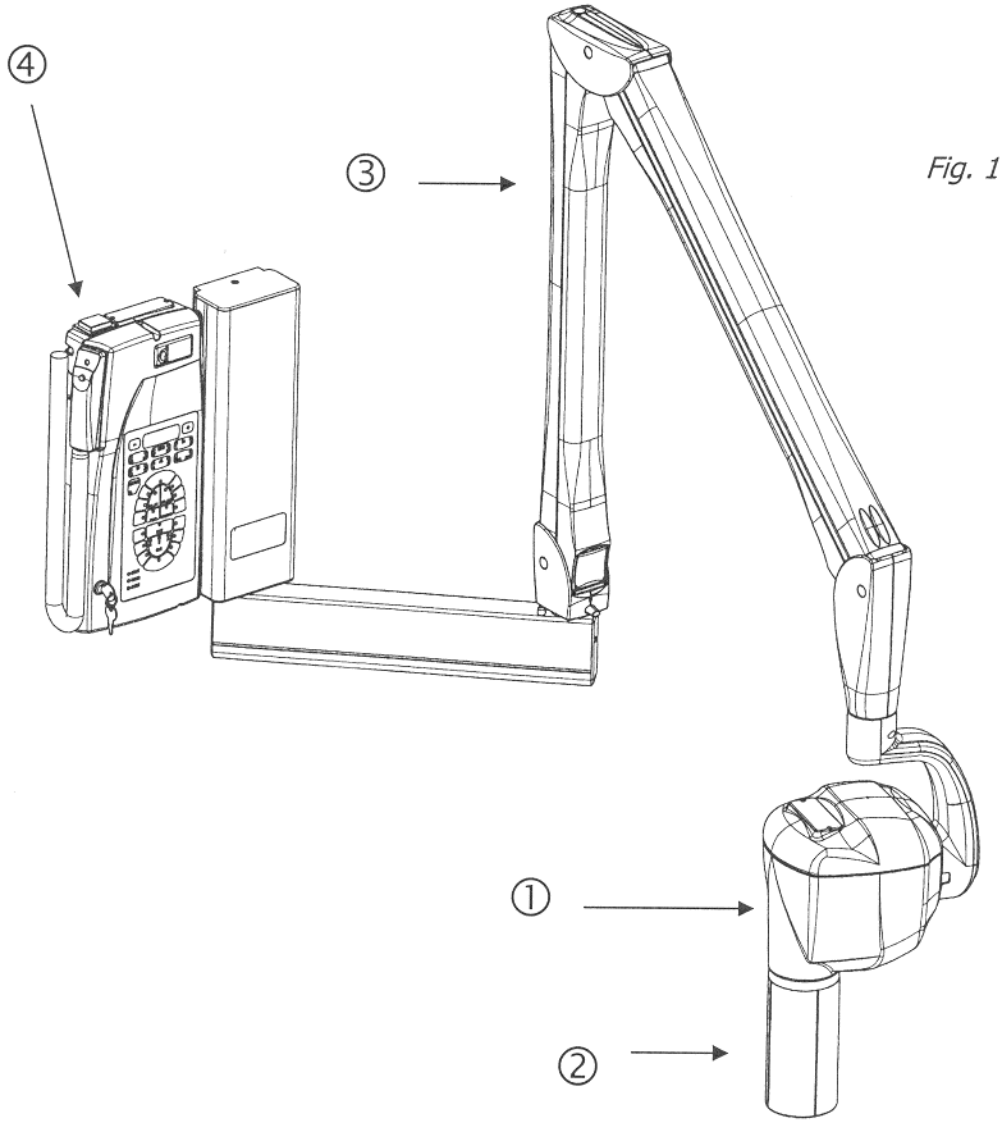


Fig. 1

The "**X-Mind® AC**" radiographic system (*Fig. 1 – page 10*) consists of:

① Tube head

The tube head is of the "mono block" type with following characteristics:

- alternating current with "single impulse" technology
- radiographic voltage equal to 70 kVp
- radiographic current equal to 8 mA

The high voltage transformer, the X-ray tube and the expansion chamber are submerged in highly dielectric insulating oil inside a light alloy container.
The "expansion chamber" guarantees an adequate compensation to oil expansion for the entire temperature range.
The "tube" is located in the back part of the container, thus allowing for a focal spot to skin distance that is 50% higher than traditional structures.

② Spacer Cone

Made of transparent polycarbonate, it allows for:

- correct focal spot to skin distance
- dimension, direction and centring of the X-ray beam
- realization of different radiographic techniques (bisecting and parallel techniques)

③ Pantograph type arm

Thanks to the new shape and new mechanisms of the positioning arm, it can be adjusted in height and depth allowing it to precisely explore any spot in its reach.
It is made of light alloy with an "ABS" coating.

④ Switchboard

The switchboard is the control panel used to manage the times and to safely use the tube head.
For making the exposure, there is the "CONTROL BUTTON" with safety button.
The switchboard can be connected to 2 No. tube heads.
The switchboard features the "self-compensating" technology.

PLEASE NOTE

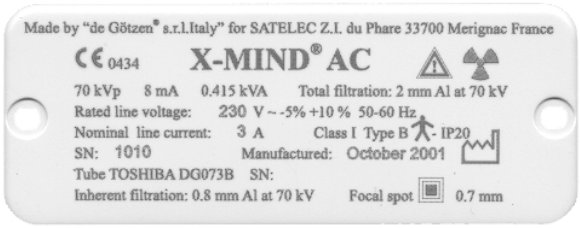
Depending on the line voltage fluctuation, the microprocessor automatically modifies the predetermined exposure time guaranteeing a constant dose to the patient. This technological expedient avoids the repetition of the exposures because of over/under exposure faults.

OPTIONAL

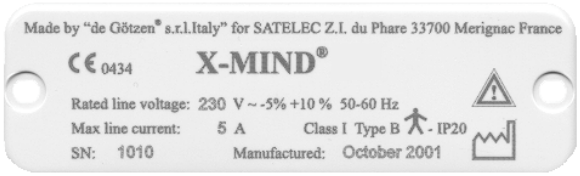
- short 8" (20cm) cone – **NOT AVAILABLE IN UK**
- cone with a rectangular section sized 44x35mm
- second "CONTROL BUTTON" with extendable cable
- RX signalling lamp for external use

3. IDENTIFICATION TAGS

The identification tags on the tube head, on the switchboard and on the cone indicate the model number, the serial number, the manufacturing date and the symbols of the main technical characteristics.



ID TAG OF THE TUBE HEAD



ID TAG OF THE SWITCHBOARD

ID TAG OF THE LONG 12" CONE

ID TAG OF THE SHORT 8" CONE

ID TAG OF THE RECTANGULAR CONE

GRADUATED SCALE TAG ON TUBE HEAD

Pictograms used

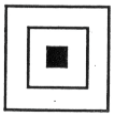
This symbol guarantees that the radiographic system complies with the regulations contained in the European Directive EEC 93/42 on Medical Devices

The degree of protection against direct and indirect electrical contacts is B type

Refer to Manual's instructions

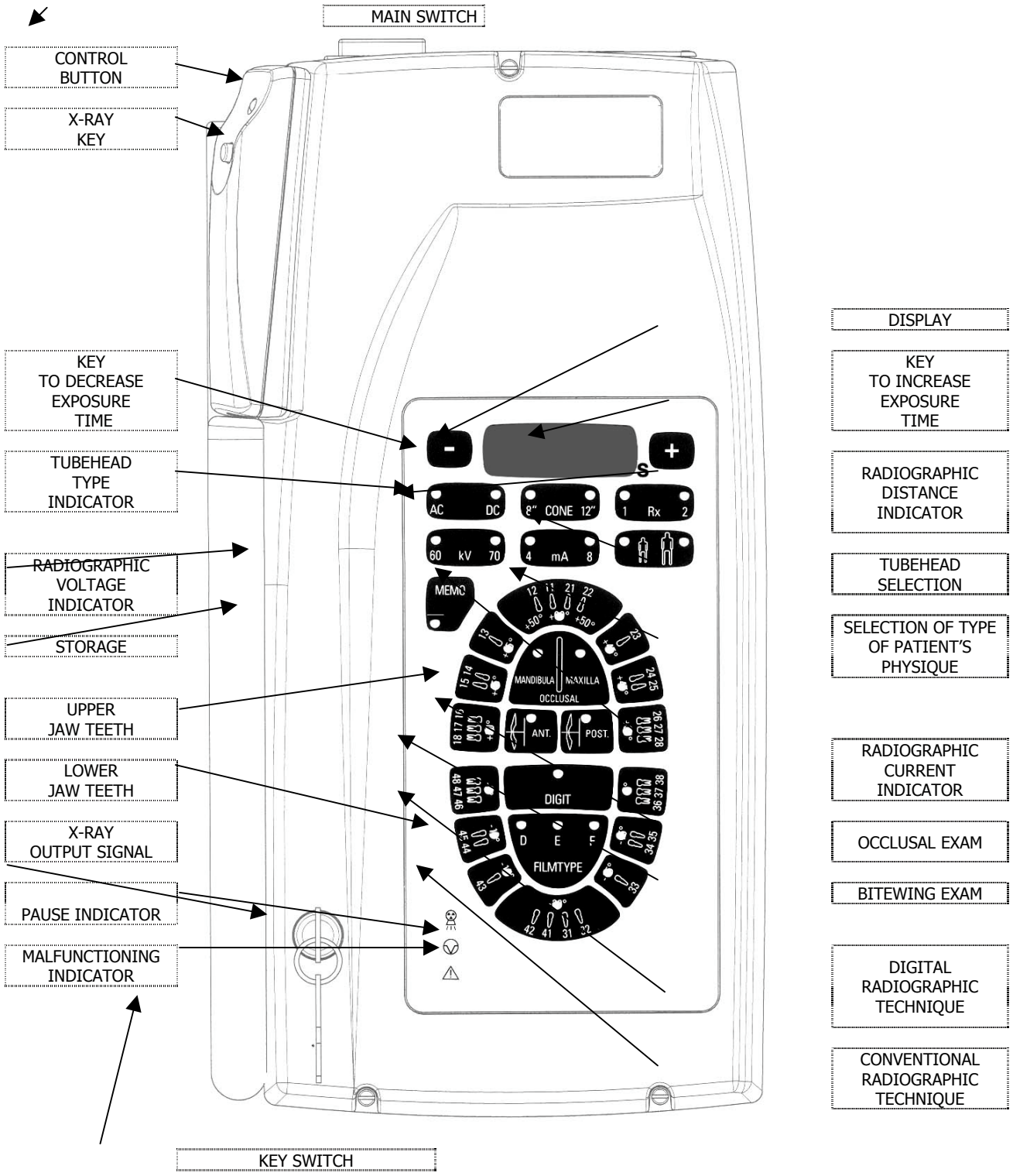
Symbol indicating danger due to "ionising radiations"

Manufacturing date



Size of the focal spot

4. CONTROL PANEL



5. SYSTEM CONFIGURATION

A. The **"X-Mind® AC"** radiographic system is factory configured for an operative "standard mode" which determines:

No. 2 **"X-Mind® AC"** tube heads	⇨	On the control panel by pressing the RX button  Led 1 lights up. By pressing again the button, Led 2 lights up.
A radiographic distance SSD = 31cm (Source-Skin distance) with long 12" cone	⇨	on the control panel Led 12"  is lit
with film type "D"	⇨	on the control panel Led "D"  is lit
CONTROL BUTTON to perform the exposure	⇨	The switchboard houses a key with extendable cable

The configuration may be changed if:

– type "E" and "F" films are used – a digital system is used	⇨	by pressing the keys of the control panel refer to §6 "USE INSTRUCTIONS"
– the short 8" (20cm) cone is used – one single radiographic unit is used – 2 CONTROL BUTTON are used	⇨	by changing the dip-switch position THIS OPERATION MUST BE CARRIED OUT BY THE INSTALLER ONLY

B. The following exposure times have been stored in the **"X-Mind® AC"** radiographic system:

0.080 - 0.100 - 0.125 - 0.160 - 0.200 - 0.250 - 0.320 - 0.400 - 0.500
0.630 - 0.800 - 1.00 - 1.250 - 1.600 - 2.000 - 2.500 - 3.200 sec.

PLEASE NOTE

These times are in compliance with current CEI EN 60601-2-7 (1999) norms and with the ISO 497 series R'10 recommendations.

PLEASE NOTE

These programmed exposure times MAY NOT be modified.

C. In the **"X-Mind® AC"** radiographic system, to further simplify and speed up the operations to select times of exposure, certain exposure times have been predefined, which depend on:

- the radiographic distance: 12" or 8"
- the radiographic technique: FILM or DIGIT
- the patient's body size: ADULT or CHILD
- the type of intra-oral test: PERIAPICAL, OCCLUSAL, BITE-WING

PLEASE NOTE

If one so desires, it is possible to change the "PREDEFINED EXPOSURE TIME VALUES", so that when the system is turned on longer or shorter exposure times are available.

6. USE INSTRUCTIONS

Below is the suggested operative sequence for a correct exposure:

1. TURN ON THE SWITCHBOARD to give power to the radiographic system

a. Set the "KEY SWITCH" to the "I" position (ON)

b. Set the "MAIN SWITCH" located on the upper part of the switchboard to the "I" position (ON)

- ➲ the green light turns on indicating that the system is powered
- ➲ the Leds of the set radiographic parameters automatically light up
- ➲ the exposure time is shown on the display

c. **THE RADIOGRAPHIC SYSTEM IS NOW READY FOR USE**

CAUTION

If a fault is detected when the system is turned on, the anomaly is indicated as follows:

- ***an intermittent beep sounds***
- ***the "MALFUNCTIONING INDICATOR" ⚠ Led comes on intermittently***
  The fault code (E ….) appears on the display
  (see §12 "FAULT MESSAGES")
- ***All CONTROL PANEL functions are inhibited***

In this case turn off the switchboard and then turn it back on.
If the fault persists, call the "Technical Support".

PLEASE NOTE

The exposure time and radiographic parameters appearing on the display are the last that were set before the switchboard was turned off.

PLEASE NOTE

If installed, outside the office, the RX signalling lamp, corresponding to the selected tube head turns on.

PLEASE NOTE

If the switchboard remains inactive for a few minutes, it switches to the stand-by mode.
Press any key of the CONTROL PANEL to restore it to the operative mode.

2. CHECK THE SELECTED EXPOSURE PARAMETERS

Before making the exposure check that the CONTROL PANEL selected parameters (from step 1 to step 6) are suitable for the radiographic exam.

STEP 1 ➲ Check the selected tube head

The 

Led of the desired tube head should be turned on:

Led **Rx1 ON**
indicates that the tube head connected to the switchboard XRAY1 terminal block is selected

Led **Rx2 ON**
indicates that the tube head connected to the switchboard XRAY2 terminal block is selected

To change the selection, press the "Rx".

STEP 2 ➲ Check the selected type tube head

The "AC" 

Led should be lit.
If "AC" Led is not lit call the technical support.

STEP 3 ➲ Check the selected radiographic distance

The 

Led of the SSD required should be lit.

Led 12" SSD = 31cm

Led 8" SSD = 20cm

If Led is not lit call the technical support.


CAUTION

The assembled cone must be the cone corresponding to the selected SSD.

STEP 4 ➲ Check the selected radiographic technique

IF YOU ARE WORKING WITH CONVENTIONAL FILMS

Check that the 

Led is lit on the desired speed film.

Led **"D" ON**
indicates that the System is set for use with "D" speed film

Led " **E" ON**
indicates that the System is set for use with "E" speed film

To change the speed film press the "FILMTYPE" and keep it pressed for 3 sec. until the acoustic signal.

PLEASE NOTE
After the modification, default exposure values will be automatically changed.

PLEASE NOTE
The "F" speed is NOT available with use of the "8" cone (SSD=20 cm) in the **"X-Mind® AC**" radiographic system.

IF YOU ARE WORKING WITH A DIGITAL ACQUISITION SYSTEM (CCD OR EQUIVALENT)

Check that the 

Led is lit.

To change the speed film press the "DIGIT" and hold it down for 3 sec. until the acoustic signal.

PLEASE NOTE
After the modification, default exposure values will be automatically changed.

STEP 5 ➲ Check the type of patient selected

The  Led of the patient selected should be lit.

Led **Child ON**
indicates that the system is set for a patient with a small physique

Led **Adult ON**
indicates that the System is set for a patient with a large physique

To change the selection press the button located between the two icons "CHILD/ADULT".

PLEASE NOTE
After the modification, default exposure values will be automatically changed.

STEP 6 ➲ Check the intra-oral test selected

FOR A PERIPERICAL EXAM

The Led relating to the desired tooth must be on.

To change the selection, press the key relating to the desired tooth.

FOR AN OCCLUSAL EXAM

Check that the 

Led is lit.

Led **MANDIBULA ON**
indicates that the system is set for the OCCLUSAL exam of the LOWER JAW

Led **MAXILIA ON**
indicates that the system is set for the OCCLUSAL exam of the UPPER JAW

To change the selection press the "OCCLUSAL".

FOR A BITE-WING EXAM

Check that the Led 

or the Led 

is lit.

Led **ANT. ON**
indicates that the system is set for the exposure time needed for the FRONT BITEWING EXAM

Led **POST. ON**
indicates that the system is set for the exposure time needed for the BACK BITEWING EXAM

To change the selection, press the key of the desired exam "BITE-WING".

POSITIONING THE PATIENT

Following the standard intra-oral procedures:

- positioning the patient
- positioning the patient's head

3. POSITIONING FILM/SENSOR

Positioning either the film or the digital sensor depending on the technique to be used:

- bisecting angle technique (short cone technique)
- parallel technique (12" cone technique)

4. POSITIONING CONE

Following the standard positioning procedures bring the cone of the tube head towards the patient and precisely in the direction of the film or digital sensor.

PLEASE NOTE

To correctly orient the cone it is advisable to use the graduated scale indicated on the tube head.

5. CHECK THE SELECTED TIME ON THE DISPLAY

Before proceeding with the exposure check the selected time on the display.

To modify use  key or  key

 ***WARNING***

This modification made to the exposure time is momentary and will be lost unless it is saved. (see §9 "PROGRAMMING DEFAULT EXPOSURE VALUES")

PLEASE NOTE

To restore the previous values, press one of the keys with the Led turned off on the CONTROL PANEL.

6. MAKE THE EXPOSURE

Now that the exposure parameters are optimal, make the exposure.

1. Press the "CONTROL BUTTON" on the switchboard

WARNING

If "CONTROL BUTTON" Np. 2 (optional) is installed:

⇨ use "CONTROL BUTTON" No. 1 for tube head 1 (Rx1)
⇨ use "CONTROL BUTTON" No. 2 for tube head 2 (Rx2)

2. Using the extendable cable of the "CONTROL BUTTON" to keep a safe distance (2 metres) from the tube head and be able to constantly check the radiographic exposure
3. Advise the patient to remain still
4. Press the key  "X-RAY" and hold it down until the acoustic signal (beep) stops and the yellow "X-RAY OUTPUT SIGNAL"  Led switches off

PLEASE NOTE

If the "X-RAY" key is released early, the exposure is immediately interrupted and the E12 fault message appears on the display.

7. THE END OF EXPOSURE

At the end of the exposure:

a. the green "PAUSE INDICATOR"  Led indicates the pause period
b. the display indicates the actual duration of the exposure
c. all the switchboard functions are inhibited

PLEASE NOTE

The pause time is necessary to allow the X-ray tube to cool down.
This time is calculated by the microprocessor, depending on the exposure time, at a ratio of 1:32 (32 seconds of pause are required for each second of exposure).

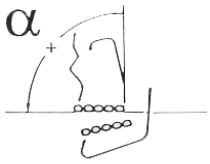
A NEW EXPOSURE WILL BE POSSIBLE AFTER THE GREEN LED HAS GONE OFF
(REPEAT THE OPERATIVE SEQUENCE FROM POINT 2 TO POINT 8)

WARNING

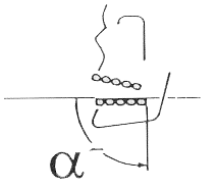
To check if the switchboard is working properly, compare the measured time to the actual duration visualized during the pause period.
(see INSTALLATION AND MAINTENANCE MANUAL §11 "CHEKING THE EXPOSURE FACTORS")

7. CHART OF DEFAULT EXPOSURE VALUES FOR THE 12" CONE

The chart indicates the **"X-Mind® AC"** radiographic system's predefined exposure values *(see §5 "SYSTEM CONFIGURATION")*



12" CONE
(SSD = 31 cm)



⇨ CONVENTIONAL RADIOGRAPHIC TECHNIQUE (FILM)

ADULT																		
PROGRAMMED EXPOSURE TIMES (sec.)		0.080	0.100	0.125	0.160	0.200	0.250	0.320	0.400	0.500	0.630	0.800	1.000	1.250	1.600	2.000	2.500	3.200
Film **D**	**MAXILLA**								I	CP Bp	M	Op						
	MANDIBLE							I	CP	M Ba	-	Oa						
Film **E**	**MAXILLA**						I	CP Bp	M	Op								
	MANDIBLE					I	CP	M Ba	-	Oa								
Film **F**	**MAXILLA**					I	CP Bp	M	Op									
	MANDIBLE				I	CP	M Ba	-	Oa									

CHILD																		
PROGRAMMED EXPOSURE TIMES (sec.)		0.080	0.100	0.125	0.160	0.200	0.250	0.320	0.400	0.500	0.630	0.800	1.000	1.250	1.600	2.000	2.500	3.200
Film **D**	**MAXILLA**							I	CP Bp	M	Op							
	MANDIBLE						I	CP	M Ba	-	Oa							
Film **E**	**MAXILLA**					I	CP Bp	M	Op									
	MANDIBLE				I	CP	M Ba	-	Oa									
Film **F**	**MAXILLA**				I	CP Bp	M	Op										
	MANDIBLE			I	CP	M Ba	-	Oa										

⇨ DIGITAL RADIOGRAPHIC TECHNIQUE (CCD or similar)

ADULT																	
PROGRAMMED EXPOSURE TIMES (sec.)	0.080	0.100	0.125	0.160	0.200	0.250	0.320	0.400	0.500	0.630	0.800	1.000	1.250	1.600	2.000	2.500	3.200
MAXILLA			I	CP Bp	M	Op											
MANDIBLE		I	CP	M Ba	-	Oa											

CHILD																	
PROGRAMMED EXPOSURE TIMES (sec.)	0.080	0.100	0.125	0.160	0.200	0.250	0.320	0.400	0.500	0.630	0.800	1.000	1.250	1.600	2.000	2.500	3.200
MAXILLA		I	CP Bp	M	Op												
MANDIBLE	I	CP	M Ba	-	Oa												

LEGEND

I	INCISOR
C	CANINE
P	PREMOLAR
M	MOLAR

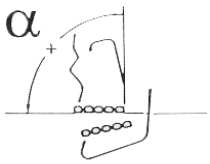
Ba	ANTERIOR BITE-WING
Bp	POSTERIOR BITE-WING
Oa	ANTERIOR MANDIBLE OCCLUSAL
Op	POSTERIOR MANDIBLE OCCLUSAL

PLEASE NOTE

To modify the default exposure times.
(see §9 "PROGRAMMING DEFAULT EXPOSURE VALUES")

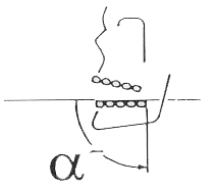
8. CHART OF DEFAULT EXPOSURE VALUES FOR THE 8" CONE

The chart indicates the **"X-Mind® AC"** radiographic system's predefined exposure values *(see §2 "SYSTEM CONFIGURATION")*



8" CONE
(SSD = 20 cm)

NOT AVAILABLE IN UK



⇨ CONVENTIONAL RADIOGRAPHIC TECHNIQUE (FILM)

ADULT															
PROGRAMMED EXPOSURE TIMES (sec.)		0.080	0.100	0.125	0.160	0.200	0.250	0.320	0.400	0.500	0.630	0.800	1.000	1.250	1.600
Film **D**	**MAXILLA**					I	CP Bp	M	Op						
	MANDIBLE				I	CP	M Ba	-	Oa						
Film **E**	**MAXILLA**			I	CP Bp	M	Op								
	MANDIBLE		I	CP	M Ba	-	Oa								
Film **F**	**MAXILLA**	NOT AVAILABLE													
	MANDIBLE														

CHILD															
PROGRAMMED EXPOSURE TIMES (sec.)		0.080	0.100	0.125	0.160	0.200	0.250	0.320	0.400	0.500	0.630	0.800	1.000	1.250	1.600
Film **D**	**MAXILLA**				I	CP Bp	M	Op							
	MANDIBLE			I	CP	M Ba	-	Oa							
Film **E**	**MAXILLA**		I	CP Bp	M	Op									
	MANDIBLE	I	CP	M Ba	-	Oa									
Film **F**	**MAXILLA**	NOT AVAILABLE													
	MANDIBLE														

⇨ DIGITAL RADIOGRAPHIC TECHNIQUE (CCD or similar)

ADULT														
PROGRAMMED EXPOSURE TIMES (sec.)	0.080	0.100	0.125	0.160	0.200	0.250	0.320	0.400	0.500	0.630	0.800	1.000	1.250	1.600
MAXILLA			I	CP Bp	M	Op								
MANDIBLE		I	CP	M Ba	-	Oa								

CHILD														
PROGRAMMED EXPOSURE TIMES (sec.)	0.080	0.100	0.125	0.160	0.200	0.250	0.320	0.400	0.500	0.630	0.800	1.000	1.250	1.600
MAXILLA		I	CP Bp	M	Op									
MANDIBLE	I	CP	M Ba	-	Oa									

LEGEND

I	INCISOR
C	CANINE
P	PREMOLAR
M	MOLAR

Ba	ANTERIOR BITE-WING
Bp	POSTERIOR BITE-WING
Oa	ANTERIOR MANDIBLE OCCLUSAL
Op	POSTERIOR MANDIBLE OCCLUSAL

PLEASE NOTE

To modify the default exposure times.
(*see §9 "PROGRAMMING DEFAULT EXPOSURE VALUES"*)

9. PROGRAMMING DEFAULT EXPOSURE VALUES

WARNING

*The 17 programmed exposure times (see §5.B "SYSTEM CONFIGURATION") **MAY NOT** be modified in the* **"X-Mind® AC"** *radiographic system. However you can customize the default exposure values (see §5.C "SYSTEM CONFIGURATION")*

WARNING

After customizing, the "Chart of default exposure values" (see §7 "CHART OF DEFAULT EXPOSURE VALUES FOR THE 12" CONE" and §8 "CHART OF DEFAULT EXPOSURE VALUES FOR THE 8" CONE") ***ARE NOT VALID ANY MORE****.*

To programme the new exposure values, proceed in the following way:

1. Modify the exposure time on the display by pressing use 

key or 

key

PLEASE NOTE

The "repeat" function automatically sets in when the key is held down so the time shown on the display scrolls faster.

2. Check the 

Led

   Led "MEMO" **is OFF,** it is NOT possible to save data

   Led "MEMO" **is lit,** it is possible to save data

3. Press the 

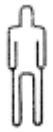
key and hold it down for 3 sec until you hear the acoustic signal to SAVE the new default exposure values

PLEASE NOTE

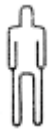
It is not possible to save data when the *"range of exposure field"* exceeds the programmed exposure time limits *(see the example at the next page)*.

Example:

⇨ PREDEFINED EXPOSURE VALUES

ADULT																			
PROGRAMMED EXPOSURE TIMES (sec.)		0.080	0.100	0.125	0.160	0.200	0.250	0.320	0.400	0.500	0.630	0.800	1.000	1.250	1.600	2.000	2.500	3.200	
Film **D**	**MAXILLA**								I	CP Bp	M	Op							
	MANDIBLE							I	CP	M Ba	-	Oa							
Film **E**	**MAXILLA**						I	CP Bp	M	Op									
	MANDIBLE					I	CP	M Ba	-	Oa									
Film **F**	**MAXILLA**					I	CP Bp	M	Op										
	MANDIBLE				I	CP	M Ba	-	Oa										

⇨ CUSTOMISED DEFAULT EXPOSURE VALUES
(The range of exposure filed has been reduced by two steps)

ADULT																			
PROGRAMMED EXPOSURE TIMES (sec.)		0.080	0.100	0.125	0.160	0.200	0.250	0.320	0.400	0.500	0.630	0.800	1.000	1.250	1.600	2.000	2.500	3.200	
Film **D**	**MAXILLA**						I	CP Bp	M	Op									
	MANDIBLE					I	CP	M Ba	-	Oa									
Film **E**	**MAXILLA**				I	CP Bp	M	Op											
	MANDIBLE			I	CP	M Ba	-	Oa											
Film **F**	**MAXILLA**			I	CP Bp	M	Op												
	MANDIBLE		I	CP	M Ba	-	Oa												

	I	CP Bp	M	Op		RANGE OF EXPOSURE FIELD
I	CP	M Ba	-	Oa		

10. RESTORING ORIGINAL VALUES

To restore factory settings, proceed as follows:

1. Turn the switchboard off
2. Keep the 

key pressed and turn the switchboard on
3. **OFF** appears on the display
4. Release the 

key
5. Press the 

key again
6. **ON** appears on the display
7. Turn the switchboard off and on: the factory settings are restored

11. DIAGNOSTIC

With the **"X-Mind® AC"** radiographic system it is possible to visualise certain functional parameters.

To visualise them, proceed as follows:

a. Press simultaneously and hold the keys down
(17) MAXILLA MOLAR + (47) MANDIBLE MOLAR

b. Press the key associated with the parameter you wish to view

KEY		DISPLAYED PARAMETER	Example	M.U.
	**BITE-WING ANT**	RADIOGRAPHIC SYSTEM VOLTAGE	220	Volt
	**BITE-WING POST**	LINE VOLTAGE	227	Volt
	**UPPER INCISOR**	MAXIMUM LINE VOLTAGE VALUE DETECTED	238	Volt
	**LOWER INCISOR**	MINIMUM LINE VOLTAGE VALUE DETECTED	215	Volt
	**OCCLUSAL**	SOFTWARE VERSION	2.3	

12. FAULT MESSAGES

The following chart gives a list of fault messages that may appear while the **"X-Mind® AC"** radiographic system is working.

The chart also includes the causes of the fault messages and how to solve them.

Fault Message	Cause	Solution
E00	RX1 tube head is NOT connected or is out of order	Call the technical support
E01	RX2 tube head is NOT connected or is out of order	Call the technical support
E02	Corrupted EEPROM data	Call the technical support
E03	EEPROM data not saved properly	Call the technical support
E05	Line voltage value not included within the set limits	Call the technical support
E07	Line voltage value not included within the -5%+10% nominal value.	Call the technical support
E08	The "X-RAY" button always seems to be pressed	Make sure it is not jammed
E09	Anomaly in the CONTROL PANEL	Call the technical support
E12	The exposure has been prematurely interrupted	Keep the "X-RAY" button pressed till the end of the exposure
E20	Anomaly in the triac/relay	Call the technical support
E21	Anomaly in the electronic circuit	Call the technical support
E22	Anomaly in the control circuit	Call the technical support
E23	Incorrect dip-switch configuration setting	Call the technical support
E24	The "X RAY" button does NOT correspond to the selected tube head	Select the "X-RAY" button that corresponds to the selected tube head or ask technical support to verify the configuration.
Err	Indicates a "MAJOR ERROR"	All radiographic system functions are disabled. Call the technical assistance.

13. SYSTEM TECHNICAL DATA

POWER SUPPLY CHARACTERISTICS

♦	Type of power supply	Single phase alternate			
♦	Nominal voltage	220V	230V	240V	115V
♦	Maximum voltage variation	-5% +10%			-5% +10%
♦	Nominal current	3,5 A	3,2 A	3 A	5,5 A
♦	Frequency	50/60 Hz			50/60 Hz
♦	Absorbed power	0.8 kVA			0.8 kVA
♦	Apparent line resistance	0.5 Ω			0.2 Ω
♦	Protection fuses F1 F2 F3 F4 (quick fuse)	6.3 A – 250 V			8 A –250 V

♦ Circuit protection fuses (located on the secondary of the timer transformer)
F5 No. 1 mini-fuse 630mA to 125V axial
F6 No. 1 mini-fuse 500mA to 125V axial

TECHNICAL DATA OF THE TUBEHEAD

♦	Nominal high voltage	70 kV		
♦	Nominal current	8 mA		
♦	Nominal electric power at 0,1 s	560 W	70 kv	8 mA
♦	Reference current-time product	0.8 mAs	8 mA	0.1 sec.
♦	Load factor combination	70 kV	8 mA	
♦	Intensity of radiation in the air	38 µGy/mAs ± 20% at 1 metre away from focal spot		
♦	Total filtration	Equivalent to 2 mm Al at 70 kV		
♦	Half value layer (HVL) at 70 kV	Equivalent to 2 mm Al		
♦	Leakage Radiation	Less than 0.25 mGy/h		
♦	Linearity	10%		
♦	Reproducibility	0,05		
♦	Radiological Accuracy	± 10%		
♦	Electric Classification	Class "I" – Type "B" – Intermittent Service		

MEASUREMENT CONDITIONS

- kVp — Non-invasive measurement with delay time=50msec
- mAs — Direct measurement with digital instrument
- Exposure time (sec) — "Non-invasive" measurement

ACCURACY OF TECHNICAL DATA

- Nominal voltage of X-Ray tube — 70 kVp ± 10% overlooking initial transient
- Nominal current of the X-ray tube — 8 mA ± 10% overlooking initial transient
- Selected Exposure time — ± 10% or ± 1 pulse

SIZE AND WEIGHT

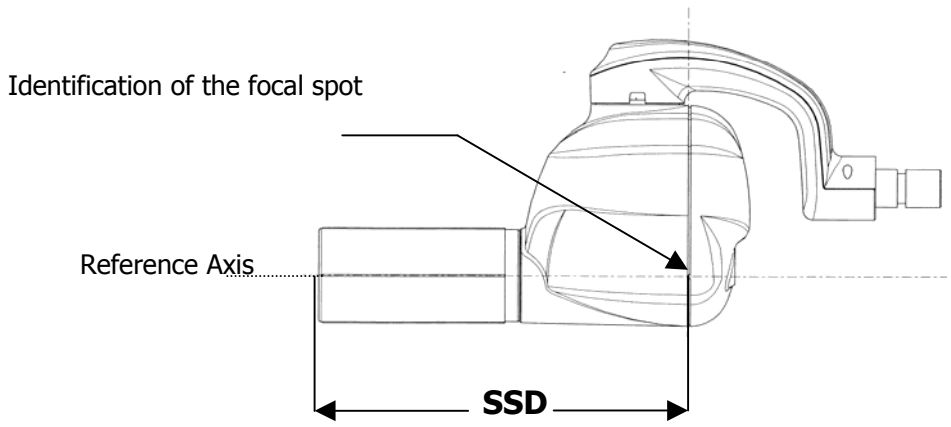
- Total weight — 29 Kg.
- Weight of tube head — 9 Kg.

ENVIRONMENTAL CHARACTERISTICS

- Operative temperature — + 5° + 40°C
- Warehouse temperature — - 15° + 50°C
- Humidity — 25% - 75%

TECHNICAL DATA OF THE CONE

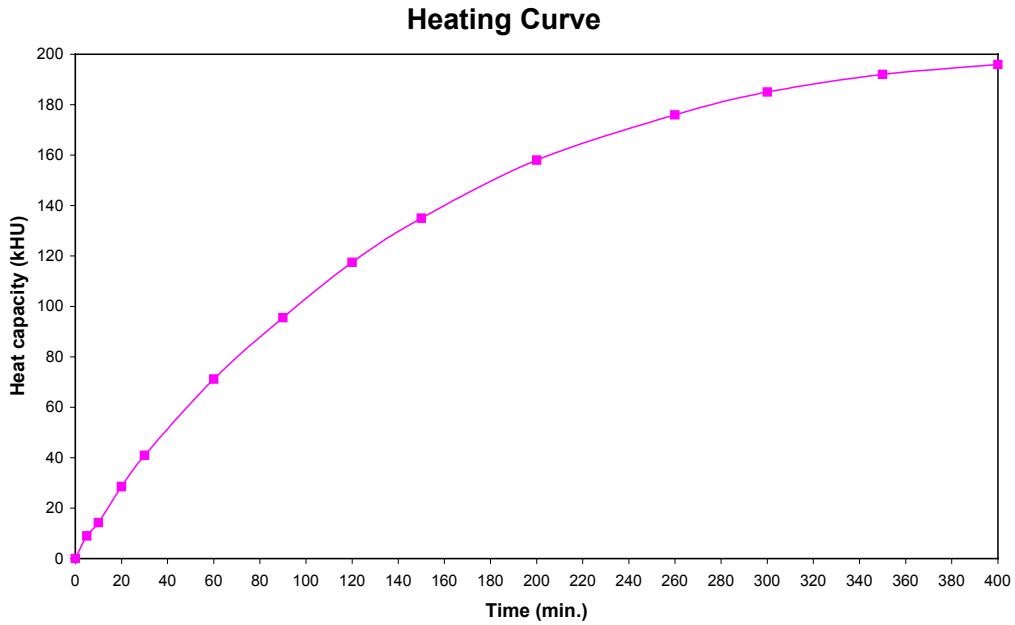
- Source-skin distance (SSD)
  - 8" cone — 200 mm (8")
  - 12" cone — 310 mm (12")
  - Rectangular cone — 310 mm (12")
- Diameter of X-ray beam
  - with 8" or 12" cone — ≤ 60 mm
  - with rectangular cone — 44x35 mm

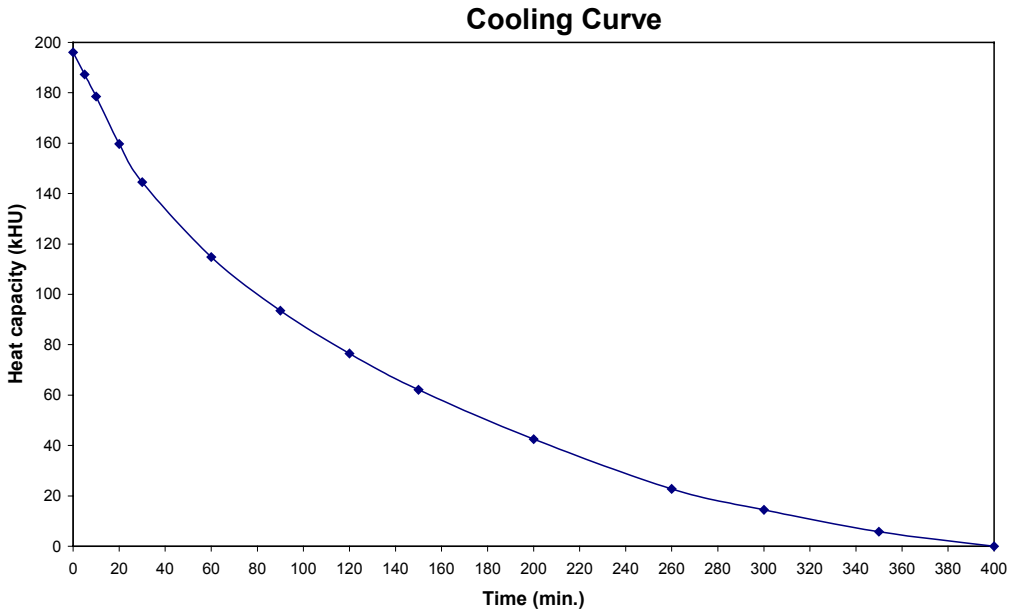


SSD = Source-skin distance 20cm (8") or 31cm (12")

THERMAL CHARACTERISTICS OF THE TUBEHEAD

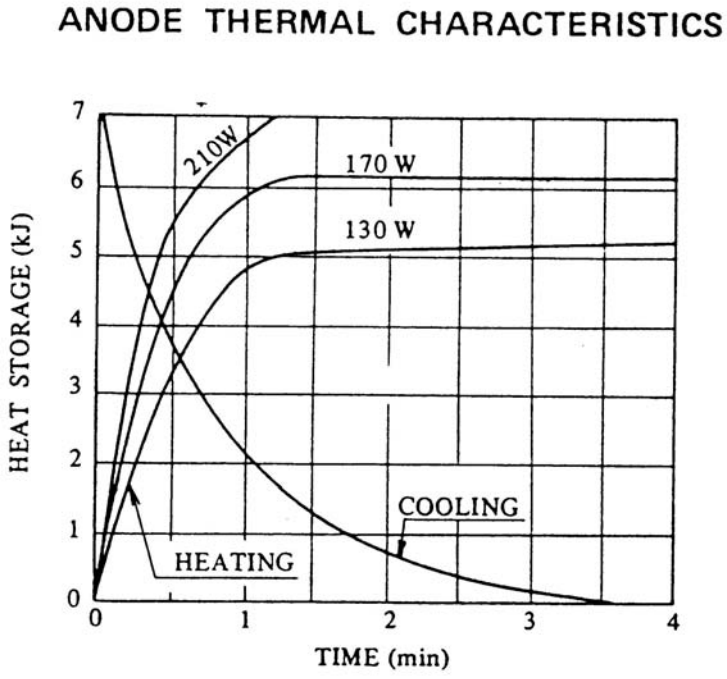
- Tube head heat accumulation capacity 140 kJ (196 kHU)
- Maximum cooling speed 1.2 kJ/min (1.8 kHU/min)





TECHNICAL DATA OF THE X-RAY TUBE

♦	X-ray tube	TOSHIBA DG 073B
♦	High voltage circuit	Single phase – self-rectifying
♦	Size of Focal Spot	0.7 in compliance with IEC 336/1993
♦	Nominal anode voltage	70 kV
♦	Nominal anode current	8 mA
♦	Nominal anode power	420W (70kV 8mA Form factor = 0.74)
♦	Exposure time	0.08 – 3.2 sec. in 17 steps
♦	Nominal high voltage and maximum current	70 kV, 8mA
♦	Tube inherent filtration	Equivalent to 0.8 mm Al at 70 kV
♦	Anode material	Tungsten
♦	Anode inclination	20°
♦	Anode heat load	7 KJ (10 kHU)
♦	Maximum continuous heat dissipation	17.5 W
♦	Operating cycle	1:32



14. CLEANING THE OUTER SURFACES

Use a soft damp cloth and soap and water, and soap to clean the outer surfaces.

The spacer cone can be cleaned with cotton wool soaked in surgical alcohol.

15. SUGGESTED MAINTENANCE

In order to ensure safety of the radiographic system, it is necessary to set up a maintenance schedule.

The owner is responsible for organising and observing a maintenance schedule. Only qualified technicians who can certify their work with a "Conformity Declaration" should carry out maintenance.

CAUTION

Run an inspection on the system and on its operation when it is installed and every twelve months thereafter.

Once a year, lubricate the pins and bushes of the wall plate and the positioning arm, as specified *(see §16 "MAINTENANCE" of INSTALLATION AND MAINTENANCE MANUAL, available on request)*

WARNING

Do not lose the adjustment key that comes with the system, as you may need it later to make readjustments.

WARNING

If parts should start to harden or squeak when moved, call the "Technical Support".

16. REPAIRS

In the event of a breakdown, send the faulty part, (**USING THE ORIGINAL PACKAGING**) to:

SATELEC® S.A.S.
Z.I. du Phare
B.P. 216
33708 MERIGNAC CEDEX
FRANCE

Tél. + 33 (0) 556 34 06 07
Fax + 33 (0) 556 34 92 92

E-mail : info@satelec.com

17. DISPOSAL

In the case of disposal, the components and the packaging must not be discarded in the environment.

Particularly, the dielectric oil as well as the shielding lead must be disposed of by means of authorized companies specialized in the disposal of waste material.

17. ATTACHMENTS

The manufacturer shall, upon request, supply any drawings, circuit diagrammes, component parts lists, instructions or other information needed by qualified technical personnel to carry out repairs on those parts of the **"X-Mind® AC"** radiographic system which can be repaired.