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## Operation Manual

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Panoramic Radiograph  
**ANA - BEL**

Panoramic Radiograph & Cephaloradiograph  
**ANA - BEL CM**

**Notice to the operator and maintenance supervisor**

**\* Read this instruction manual before operation. After reading this manual, safely keep this near the X-ray machine for the easy access.**

The classification is shown as follows

According to the type of protection against electric shock. : Class

According to the degree of protection against electric shock. : Type B applied part

**TAKARA BELMONT U.S.A., INC.**

B 0 2 - T 1 5 1

**Thank you very much for purchasing our equipment Model A N A - B E L series.  
Please read this operation manual carefully before operation in order to use the X-Ray  
machine properly and safely.**

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## 0 1 . INTRODUCTION

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- 1 . Read this manual carefully when you use this equipment for the first time.
- 2 . Be sure to observe warning sentences and forbidden matters at the operating time of the equipment.
- 3 . Read the operation manual from the beginning to the end.  
Reading the operation manual from halfway might lead to misunderstanding.
- 4 . Read this manual again to confirm the portion in question if you have any questions.
- 5 . Operation procedure of Panoramic radiograph is basis of X-ray radiograph.  
Your can use this procedure for other radiograph (i.e. MS, TMJ)
- 6 . Explanation of operation procedure of other radiograph are omitted, if the procedures are same as the one of Panoramic radiograph.  
Refer to operation procedure of panoramic radiograph, if you have any questions about operating procedures.
- 7 . Discharge  
Be sure to observe the contents of this operation manual.  
Even if any trouble or an accident will happen due to wrong use, we will not be responsible for them.
- 8 . Warrantee Period  
Warrantee period is two years after purchase of the equipment.  
We will repair failure or defect by this warranty. This warranty is void when failure or defect is caused by conditions beyond the manufacturer's control, such as damage resulting from mishandling, neglect, misuse, improper maintenance, accident or alteration or repair by anyone other than Belmont or authorized Belmont dealer. See warrantee card for more information.  
  
Operation condition.
- 9 . Maintenance  
Be sure to make proper maintenance of your equipment.  
Maintenance responsibility of medical equipment lies on the user.
- 1 0 . Period for repair and supplying parts  
We will supply parts of the equipment for 10 years, after the manufacturing of this equipment is discontinued.
- 1 1 .  mark means " Attention, consult accompanying documents ".

1 2 .  mark means " Protective earth(ground) ".

1 3 .  mark means " OFF (Power: disconnection from the mains) ".

1 4 .  mark means " ON (Power: connection to the mains) ".

1 5 .  mark means "Type B" Applied part

1 6 . No user serviceable items inside.

1 7 . Conformability of indicated X-RAY requirement was determined in accordance with R10 sequences that follows ISO497.

## 0 2 . WARNING



### WARNING:

Always conform to the safety work standards.

Repair work for internal parts of the equipment involves high risk. This should be strictly conducted by an authorized service personnel only.

### NOTES:

Details of WARNING are stated as follows in this manual:



#### DANGER:

Explains danger that may cause serious adverse effect to a human body.



#### WARNING:

Explains an instruction where a personal injury or a physical damage may occur.



#### CAUTION:

Explains an instruction that should be observed for safety reasons.

#### NOTE:

States descriptions which serve to improve work efficiency and to help user to understand instructions in the manual.

### DANGER

This equipment is electrical equipment. Do not splash water.

Such action causes an electric shock or a trouble of the equipment.



### WARNING

Any user should not open any cover of the equipment.



### WARNING

The management responsibility of use and maintenance of this equipment belongs to the user

The operation of this equipment is limited only to legally qualified persons.

User should not open the cover of the equipment.

Contact your dealer for service.

 **WARNING**  
This equipment should be installed in the X-ray room surrounded by walls that have over 1.0 mmPb lead equivalence. The exposure switch should be installed outside of the X-ray room.

 **WARNING**  
When earthquake is warned, do not use the equipment.  
After earthquake occurred, check the equipment and make sure the equipment works properly.

 **WARNING**  
This X-ray Unit may be dangerous to patient and operator, if safe exposure factors and operating instructions are not observed.

 **WARNING**  
Do not put things in area where the equipment moves.

 **WARNING**  
Put a X-ray protective apron on the patient.

 **WARNING**  
Disinfect the area where a patient and an operator might touch after each exposure.

 **WARNING**  
Operator should pay attention to a patient when the Sliding Unit moves up and down.

 **WARNING**  
When the equipment is not used, turn off " Power SW "

 **WARNING**  
When the equipment has trouble, turn off " Power SW " .

**WARNING**

During an X-Ray exposure, only a patient and a helper (who is permitted to enter by an operator) are allowed to stay in X-Ray room.

The helper (hereinafter helper) in this manual, is defined as person who a doctor permits to assist a patient while taking a X-ray radiograph.

**WARNING**

Do not press the exposure switch in the X-ray room.

Watch a patient and the equipment during an exposure.

When you encounter any trouble, immediately release the exposure switch.

**WARNING**

LASER, DOT NOT STARE INTO BEAM, CLASS 2 LASER PRODUCT

- 1 . Laser Beam is applied. For safety, instruct a patient not to look at the laser beam.
- 2 . Before the beam is lightened, lower the Frankfort Line Beam to the bottom.
- 3 . Do not set the beam to patient's eyes.

**CAUTION**

When the equipment and/or its' parts will be disposed, contact the dealer or our office.

**CAUTION**

Disposal Process:

Dispose used bite fork covers and films according to the disposal procedures indicated by each manufacturer and the local code.

**CAUTION**

Do not turn the Rotation Arm by hands. It might cause trouble of the equipment.

**CAUTION**

Operator shall instruct a patient not to move while X-ray exposes.

Operator shall instruct a patient not to move until the movement of ARM is finished during RESET movement.

**CAUTION**

The equipment shall be connected to the receptacle marked "Hospital Only" or "Hospital Grade".

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## 0 3 . Explanation of Equipment

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### 1 . Outline

**ANA-BEL** can take radiographs of Panorama, TMJ, and Maxillary Sinus with plural orbits.

**ANA-BEL CM** can take radiographs of Panorama, TMJ, Maxillary Sinus, and Cephalo.

### 2. Features

#### 2 . 1 . Radiograph with multiple orbits

Every kinds of Panoramic radiograph can be taken in the Maxilla-Facial radiograph such as Panorama and TMJ.

#### 2 . 2 . Panoramic radiograph with less overlap of teeth

By the orthoradial panoramic mode, a panoramic radiograph with less overlap can be taken.

#### 2 . 3 . High Frequency X-ray Generator

The X-ray generator with the High Frequency Inverter delivers high quality radiation. This enables improved image quality while reducing radiation dose.

#### 2 . 4 . X-ray Tube with minute focus

Owing to the minute X-ray Tube focus of 0.5 x 0.5mm, sharp and clear image is achieved.

#### 2 . 5 . Versatile Combination of Exposure Factors

Tube voltage can be set from 60 kV to 90 kV by 1 kV step.

Tube current can be set at 2, 4, 6, 8, 10, and 12mA.

With wide range of exposure setting, ANA-BEL can get ideal radiograph for every type of patient.

#### 2 . 6 . Patient Positioning with 3 Beam Lines

Bright and Visible three laser beams make positioning very easy and accurate.

#### 2 . 7 . Adjustable Mirror for Patient Positioning

The Angle of the mirror can be changed, both patient and operator can easily check the patient positioning.

#### 2 . 8 . Motorized Sliding Unit

The Motorized Sliding Unit enables smooth operation and fine adjustment for the precise positioning.

### 3 . Configuration

**Equipment consists of below assemblies.**

1. Mechanical Assemblies, 2. X-ray Generator, 3. X-ray Controller
4. Cephalo Assembly: ( A N A - B E L C M )

**4 . Available Radiographic Modes**

Model Radiographic Mode	A N A - B E L	A N A - B E L C M
	A N A - B E L D	A N A - B E L D C M
Panorama		
TMJ Lateral		
TMJ Front		
Maxillary Sinus		
Cephalo Lateral		
Cephalo Front		

## 0 4 . Specifications

Name	Panoramic Radiograph	Panoramic & Cephalo Radiograph
Model	A N A - B E L A N A - B E L D ( 1 )	A N A - B E L C M A N A - B E L D C M ( 2 )
Rated Line Voltage	120Vac 60 Hz 1	
Power Capacity	17A	
High Voltage Generator	High Frequency Inverter Method ( 1 0 0 k H z )	
X-ray Tube Voltage	60 kV ~ 90 kV (1 kV step)	
X-ray Tube Current	2.4.6.8.10.12 mA	
Exposure Control	MANUAL	
X-ray Tube	D - 0 5 2 S B ( Toshiba )	
X-ray Tube Focus	0.5 × 0.5 mm	
Total Filtration	2.5 mm A l ( Minimum )	
Radiographic Mode	Panorama ——— Child — Adult — Orthoradial  Maxillary Sinus  TMJ ——— Lateral — Front	Cephalo ——— Front — Lateral
Exposure Time	Panorama : 12sec · 7sec Maxillary Sinus : 8sec TMJ Lateral : 3.0sec(x4) TMJ Front : 3.0sec(x2)	Cephalo Front & Lateral: 0.1 ~ 3.2 sec
Magnification	Panorama : 1.21 ~ 1.36 Maxillary Sinus : 1.2 ~ 1.3 TMJ Lateral : Approx 1.24 TMJ Front : Approx 1.88	Cephalo Front & Lateral: 1.1
Patient Positioning	3 Beam Lines	
Film Size	Panorama : 150 x 300mm (6 " x 12 " )	Cephalo : 8 " x 1 0 "
Cassette	Panorama size	Cephalo size
Size (mm)	W:980 x D:1,246 x H:2,310	W:1,833 x D:1,246 x H:2,310
Weight	Approx 160kg	Approx 190kg

1: Device for Digital Panorama Radiograph

2: Device for Digital Panorama and Cephalo Radiograph ( Cephalo Radiograph is Film Radiograph)

Environmental condition for Operation

Temperature : 41~95F ( 5 ~ 35 )

Humidity : 30 ~ 85%

Pressure : 700 ~ 1060 hpa

Environmental condition for Storage

Temperature : 14~140F ( - 10 ~ 60 )

Humidity : 10 ~ 95%

Pressure : 700 ~ 1060 hpa

Environmental condition for Transportation

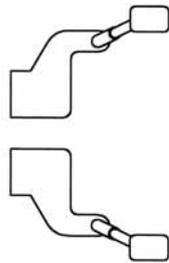
Temperature : 14~140F ( - 10 ~ 60 )

Humidity : 10 ~ 95%

Pressure : 700 ~ 1060 hpa

# 0 5 . Standard Accessories

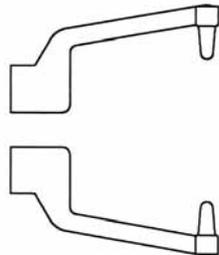
- 1 . Head Holding Rods (Panorama)  
(Maxillary Sinus)



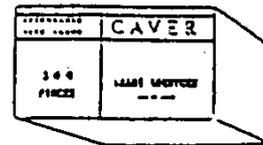
- 6 . Bite Fork (Panorama)



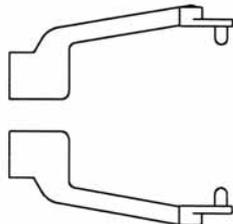
- 2 . Ear Rods (TMJ Lateral 4 sections)



- 7 . Bite Fork Cover(Disposable )



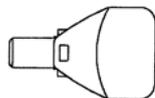
- 3 . Ear Rods (TMJ Front 2 sections)



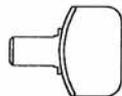
- 8 . X-ray Switch Holder



- 4 . Chinrest (Panorama)

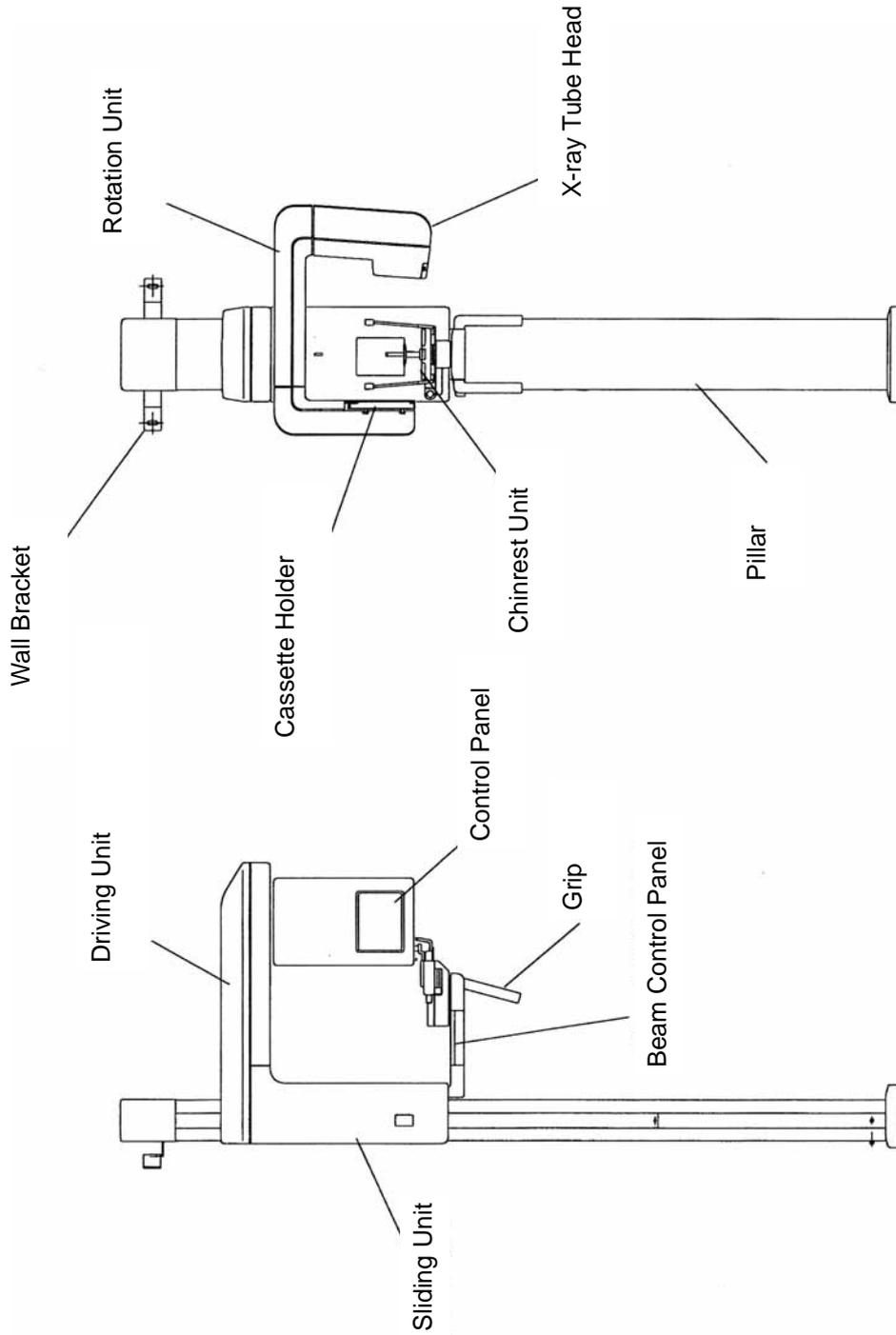


- 5 . Chinrest (Maxillary Sinus)

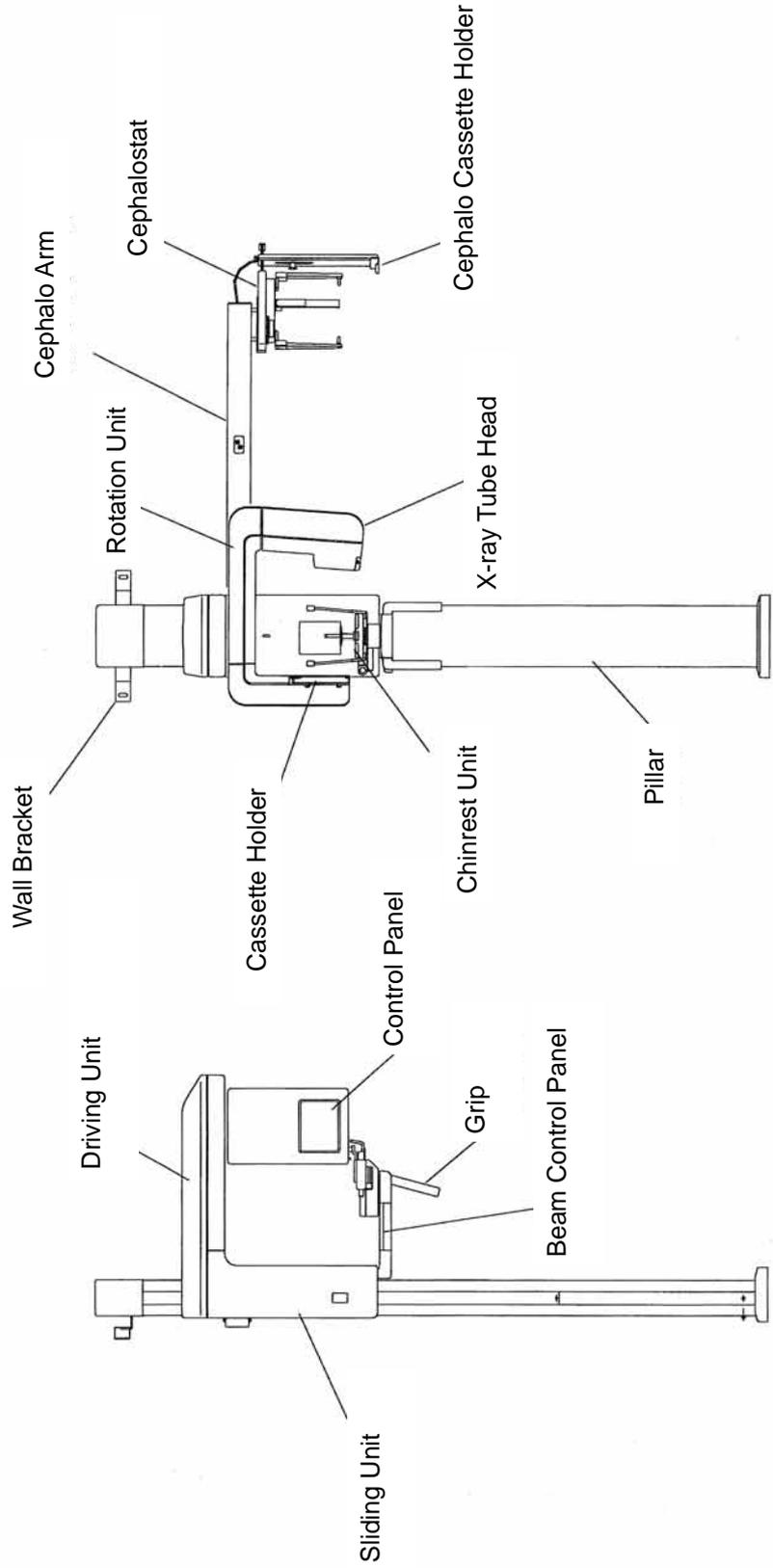


# 0 6 . Name of each parts

## 1 . ANA - BEL

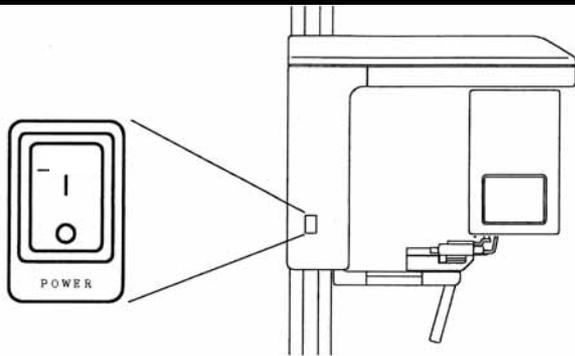


2 . ANA - BEL CM



# 0 7 . Explanation of each parts

## 1 . POWER SWITCH



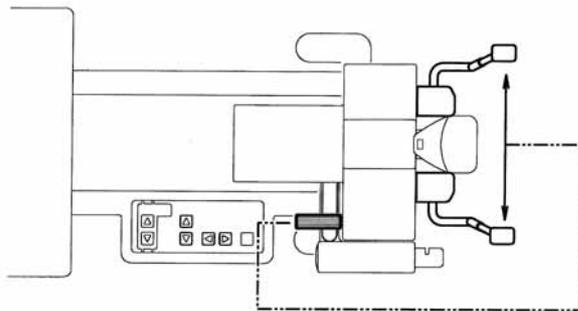
\*This switch is used to turn power ON/OFF.  
 To turn power ON:  
 Push “I” on the power switch.  
 To turn power OFF:  
 Push “ ” on the power switch.

## 2 . Beam Line Operation Panel



\* Use this to adjust positioning beam lines.

## 3 . Knob to open and close the Head Holding Rod and Ear Rod (TMJ)



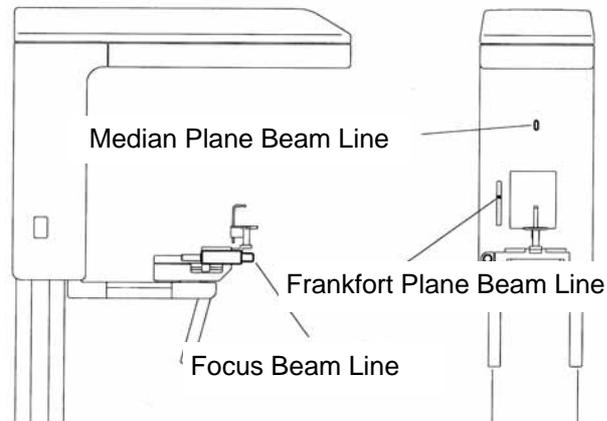
\* Use this knob to hold / release Patient’s head.

## 4 . Control Panel



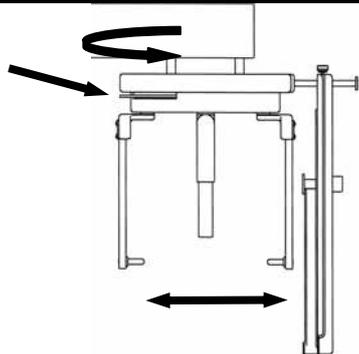
\* Set the Exposure Mode, KvP and mA by using this control panel.

**5 . Names of Beam Line for the Patient Positioning**



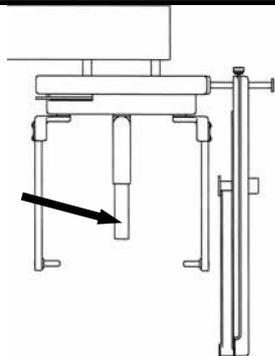
- \* Median Beam Line: Set this beam to the median line of a patient.
- \* Frankfort Beam Line: Set this beam to the Frankfort line of a patient.
- \* Focus Beam Line: Set this beam to the root of anterior teeth of upper and lower jaw of a patient.

**6 . Lever to open and close the Ear Rod (Cephalo)**



\* Use this to hold / release Patient's head

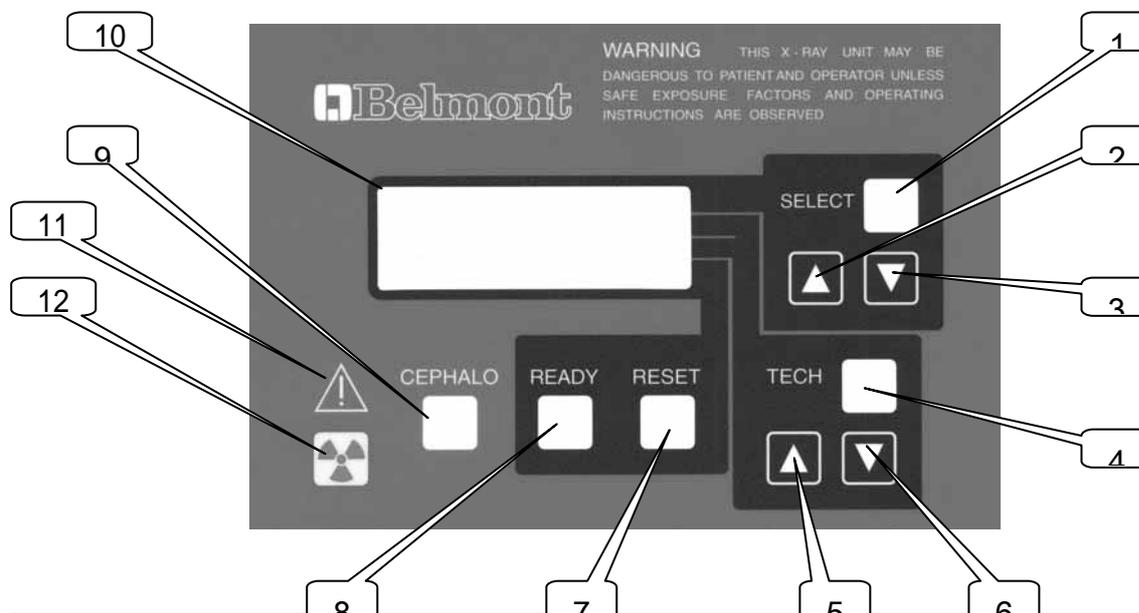
**7 . Nasion Holding Pad (Cephalo)**



\* Put patient's nasion to this pad.

# 0 8 . Explanation of Control Panel

## 1 . Function of Control Panel



No	Name	Function
1	SELECT key	Press this key to change Exposure conditions (Tube voltage, Tube current, and Exposure time)
2	SELECT UP key	Setting value of exposure condition is increased.
3	SELECT DOWN key	Setting value of exposure condition is decreased.
4	TECH key	Change the exposure orbit
5	TECH UP key	Exposure mode is switched. PANORAMA: Panorama MS : Maxillary Sinus TMJ : TMJ
6	TECH DOWN key	Setting of Panoramic Orbit CHILD ORBIT: Panoramic Orbit(Child) ADULT ORBIT: Panoramic Orbit(Adult) ORTHO ORBIT : Orthoradial Orbit Setting of TMJ Radiographic Orbit LA 4 SECTION: TMJ Lateral 4 sections PA 2 SECTION: TMJ Frontal 2 sections
7	RESET key	1. Rotation ARM and Cassette Holder are set to the start position. 2. ERROR indication is cancelled. 3. READY ON is cancelled.
8	READY key	READY ON.
9	CEPHALO key	Radiographic mode is switched from the Panorama mode to the Cephalo mode.
10	Indicator	Radiographic mode and radiographic conditions, etc are displayed.

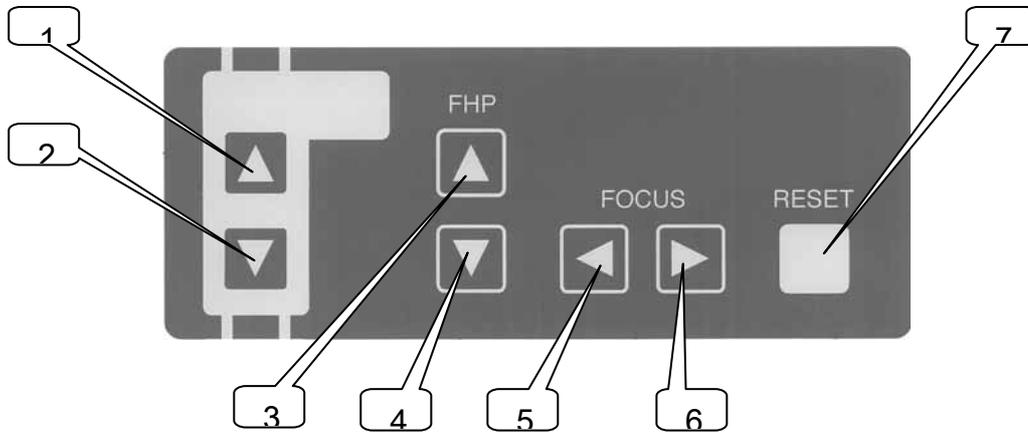
11	Safety Symbol	Attention, consult accompanying documents
12	Safety Symbol	Ionizing radiation

## 2 . Indicator

Sample of a display

7 0 k V	1 2 m A	1 2 s e c
P A N O R A M A		
C H I L D O R B I T		
P O S I = 0 0 m m	R E A D Y	

No	Setting content	Indication	Contents of Indication
	Exposure conditions	7 0 k V	Tube voltage ( 60 ~ 90kV p )
		1 2 m A	Tube current ( 2 ~ 12mA )
		1 2 s e c	Exposure time
	Exposure Mode	P A N O R A M A	Panoramic Exposure mode
		M S	Maxillary Sinus mode
		T M J	TMJ mode
		C E P H A L O	Cephalo mode
	Exposure Orbit	C H I L D O R B I T	Exposure Orbit (Child)
		A D U L T O R B I T	Exposure Orbit (Adult)
		O R T H O O R B I T	Exposure Orbit (Orthoradial)
		L A 4 S E C T I O N	Exposure Orbit (TMJ Lateral 4 sections)
		P A 2 S E C T I O N	Exposure Orbit (TMJ Front 2 sections)
		L A	Exposure (Cephalo Lateral)
		P A	Exposure (Cephalo Front)
	Distance of an anterior teeth position	- 2 5 ~ 2 5 ( m m )	Distance of anterior teeth position * Indication at Panorama and MS
	Equipment Conditions	R E A D Y	Exposure is prepared.
		R E A D Y O N	Exposure is ready
		X-RAY O N	While X-rays is irradiated, indications of "X-RAY ON" blinks.
		R E S E T	The Rotation ARM and Cassette Holder are set to the start position.
		E R R O R	An Error message is displayed when error occurs.
		C O O L * * S E C	Cooling Time of 90 seconds is required between the exposures. Remaining Cooling Time is displayed.



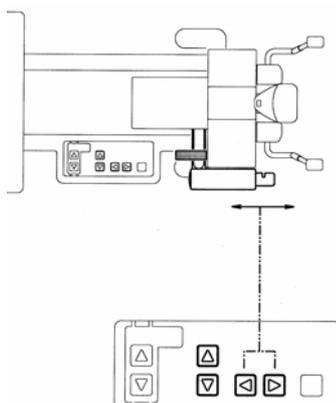
No	Name	Function
1	Sliding Unit UP key	Sliding Unit is elevated.
2	Sliding Unit DOWN key	Sliding Unit is lowered.
3	Frankfort Beam Line UP key	Frankfort Beam Line is elevated.
4	Frankfort Beam Line DOWN key	Frankfort Beam Line is lowered.
5	Focus Beam Line Forward key	Focus Beam Line is moved forward.
6	Focus Beam Line Backward key	Focus Beam Line is moved backward.
7	RESET switch	The Rotation ARM and Cassette Holder are set to the start position.

**⚠ CAUTION**

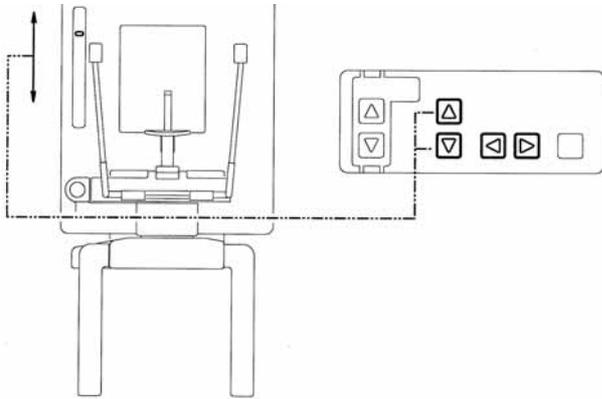
Speed of the up / down movement of Sliding Unit changes.  
 When the up / down key is depressed and held, the speed of first three seconds is slow, then speed becomes fast.  
 To make a fine adjustment, press the key then immediately release a finger from the key

**NOTE**

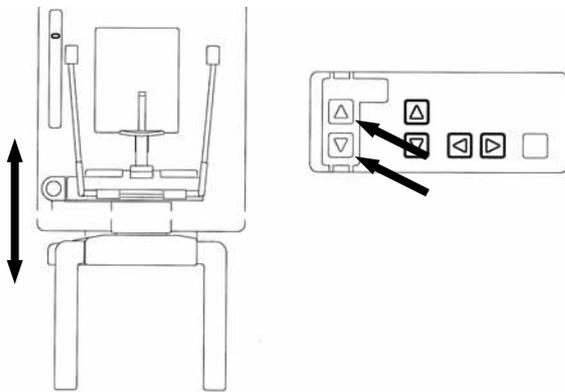
Any of above keys won't work under READY ON condition.



\* Forward and backward movement of the Focus Beam Line.

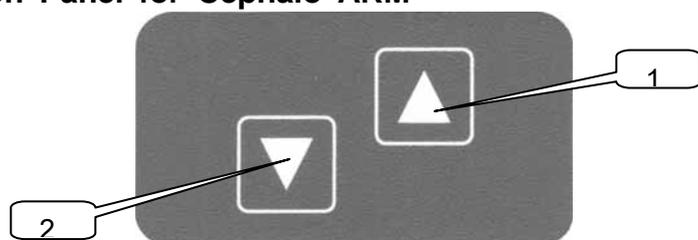


\* Up and down movement of the Frankfort Beam Line.



\* Up and down movement of the Sliding Unit.

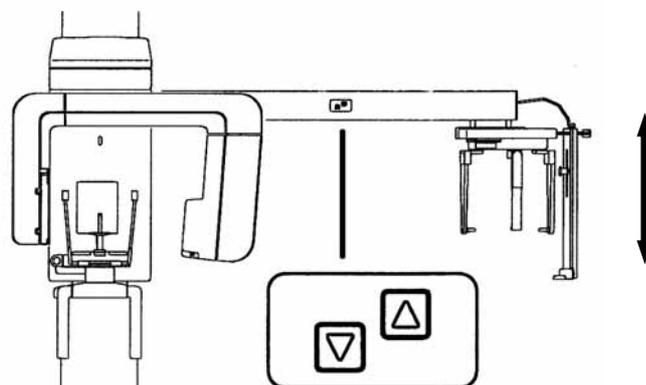
**4 . The Operation Panel for Cephalo ARM**



No	Name	Function
1	Sliding Unit UP switch	Sliding Unit is elevated.
2	Sliding Unit DOWN switch	Sliding Unit is lowered.

**⚠ CAUTION**

Speed of the up / down movement of Sliding Unit changes.  
 When the up / down key is depressed and held, the speed of first three seconds is slow, then speed becomes fast.  
 To make a fine adjustment, press the key then immediately release a finger from the key



## 0 9 . Preparation before exposure

### 1 . Prepare accessories according to the exposure mode.

#### 1 . 1 . Panorama

- 1 ) A X-ray film (Panorama size) (    )
- 2 ) A cassette (Panorama size / with Intensifying Screen) (    )
- 3 ) A pair of Head Holding Rods (Panorama)
- 4 ) A Chinrest (Panorama)
- 5 ) A Bite Fork
- 6 ) A Cover for Bite Fork ( a article of consumption )

#### 1 . 2 . Maxillary Sinus

- 1 ) A X-ray film (Panorama size) (    )
- 2 ) A cassette (Panorama size / with Intensifying Screen) (    )
- 3 ) A pair of Head Holding Rods (Panorama)
- 4 ) A Chinrest (Maxillary Sinus)

#### 1 . 3 . TMJ Lateral 4 sections

- 1 ) A X-ray film (Panorama size) (    )
- 2 ) A cassette (Panorama size / with Intensifying Screen) (    )
- 3 ) A pair of Ear Rods (TMJ Lateral 4 sections)

#### 1 . 4 . TMJ Front 2 sections

- 1 ) A X-ray film (Panorama size) (    )
- 2 ) A cassette (Panorama / with Intensifying Screen) (    )
- 3 ) A pair of Ear Rods (TMJ Front 2 sections)

#### 1 . 5 . Cephalo

- 1 ) A X-ray film of Cephalo (8" x 10")
- 2 ) A cassette of Cephalo size (with Intensifying Screen)
- 3 ) A grid for Cephalo

(    ) : For Film Radiograph

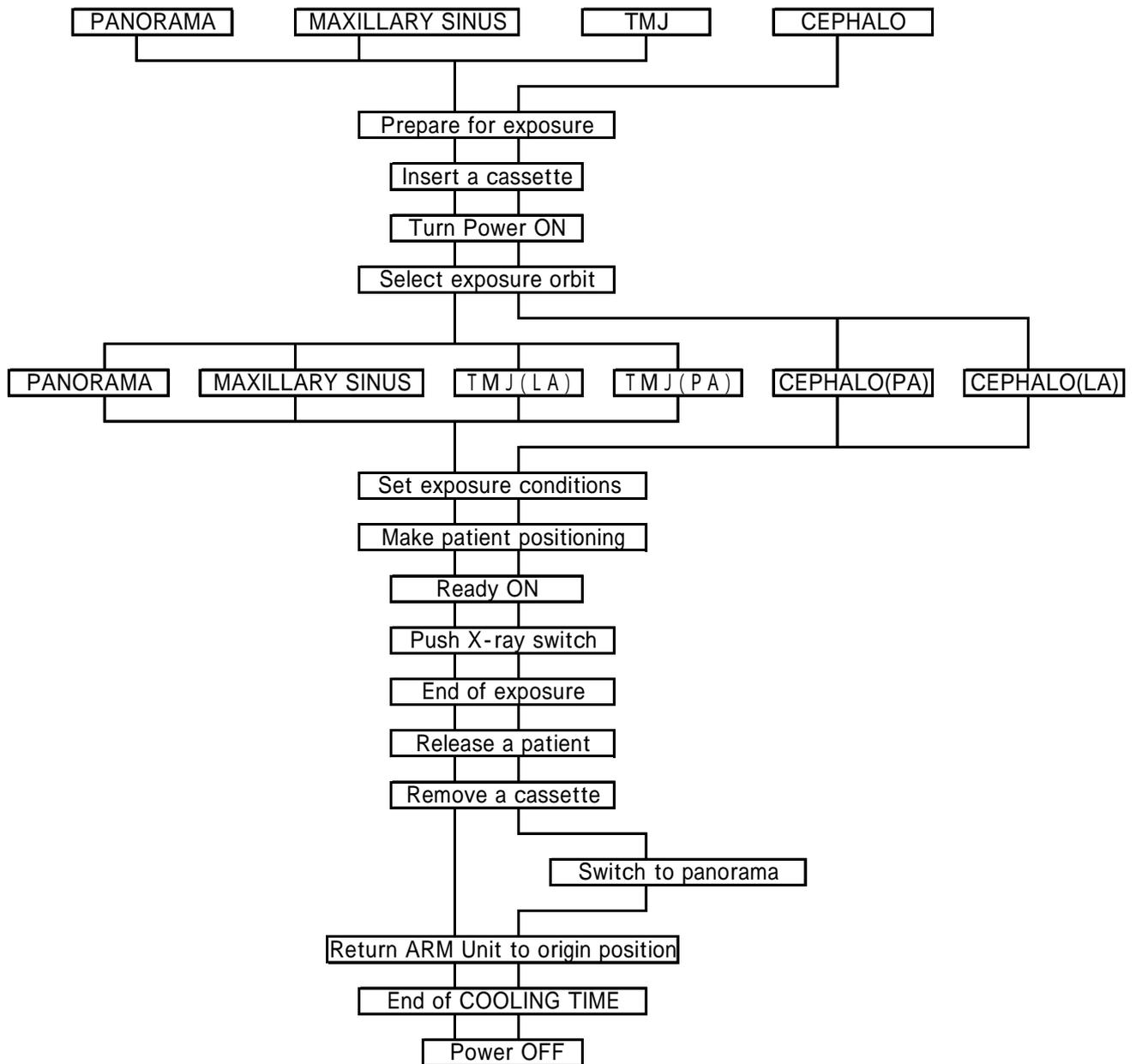
### 2 . Insert a film into a cassette

Insert a film into a cassette in a dark room or in a dark box.

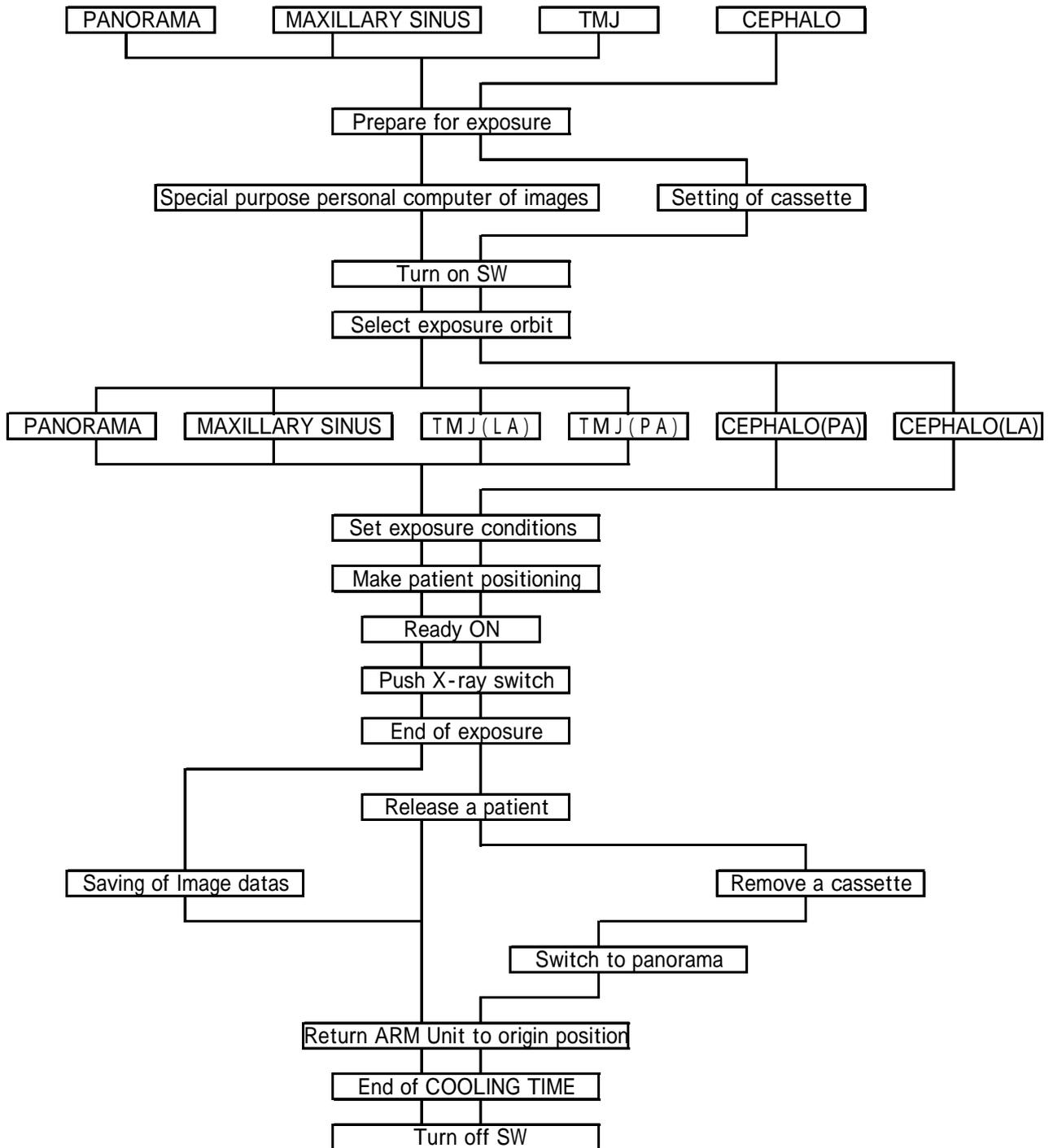
### 3 . X-ray Protector Apron

# 1 0 . Flow Chart of Exposure Operation

## Film Radiograph



### Digital Radiograph



## 1 1 . Operation Procedures for Panorama

1. Learn the Panoramic radiographic operation procedures well. You can utilize Panoramic operating procedures for other modes.
2. If procedures are the same as the ones of Panorama, explanations of operation procedures in other modes are omitted. If you have any questions, Refer to operation procedures for Panorama.

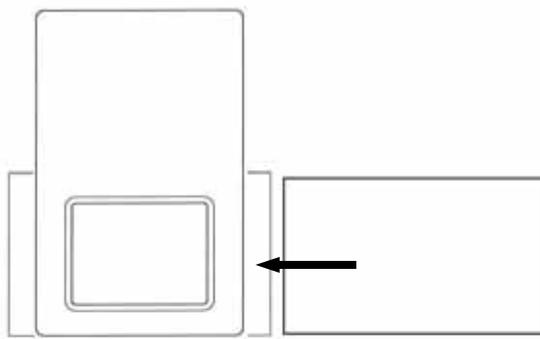
### 1. Preparation for the Exposure

- \* X-ray Protective Apron
- \* Pair of Head Holding Rods (Panorama)
- \* Chinrest (Panorama)
- \* Bite Fork
- \* Bite Fork Cover
- \* Panoramic Cassette (with a film inserted)

### 2 . Insertion of a cassette

#### NOTE

There is a directionality for a Cassette. Put a Cassette on a Cassette Holder to bring letters of **TUBE SIDE** face the X-ray Head and the top and bottom of the letters are correct.



#### For Film

- \* Put a Cassette on Cassette Holder
- Match the direction of the Cassette.

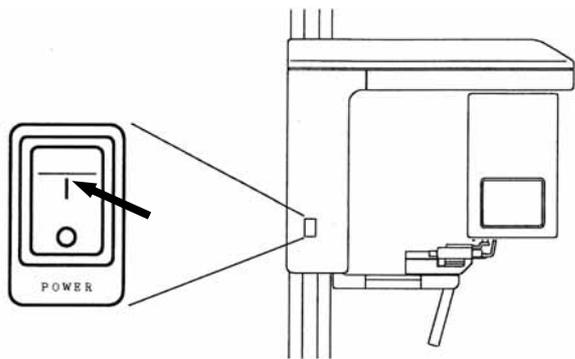
#### For Digital

- \* Skip this process

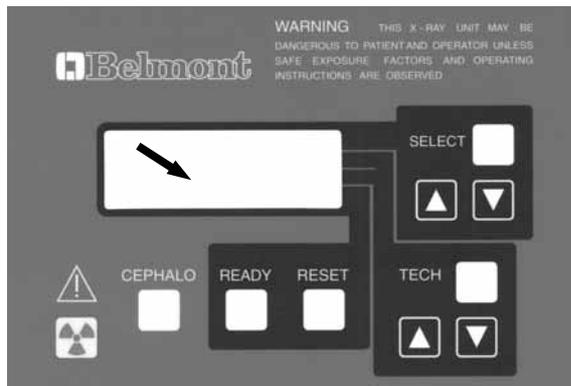
**3. Turning power ON**

**NOTE**

If no key is depressed for more than 5 Minutes, POWER is automatically turned off.



Depress "I" on the POWER switch.



Letters are displayed on the indicator of the Control Panel.

```

7 0 k V   1 2 m A   1 2 s e c
P A N O R A M A
A D U L T   O R B I T
P O S I =   0 m m   I N I T
    
```

"I N I T" is displayed while initialization is in progress.

```

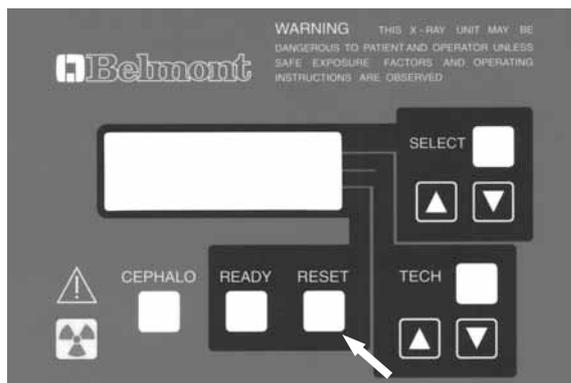
7 0 k V   1 2 m A   1 2 s e c
P A N O R A M A
A D U L T   O R B I T
P O S I =   0 m m   R E A D Y
    
```

After initialization is done, "R E A D Y" or "R E S E T" is displayed.

In case that the Rotation Unit is not at start position:

**⚠ CAUTION**

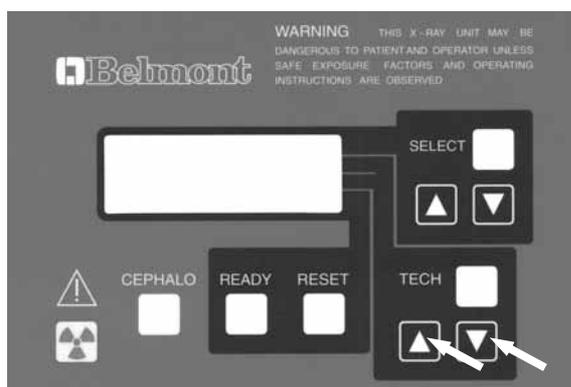
The Rotation Unit starts to rotate when the RESET key is depressed.  
Do not touch the Rotation Unit and get away from the rotation area of the Rotation Unit.



Depress **R E S E T** key on the Control Panel or the one on the Beam Operation Panel to bring the Rotation ARM to start position.



**4. Selection of Exposure Orbit**

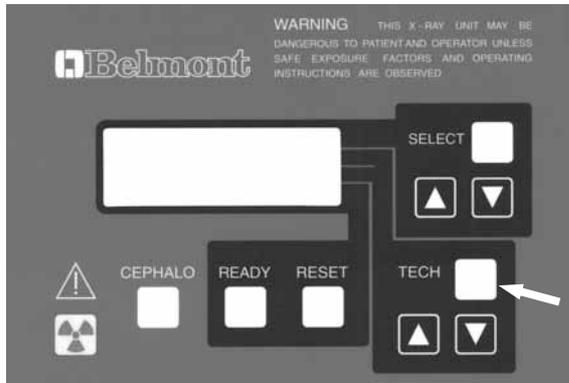


Depress either **U P** · **D O W N** key located under TECH key to display "PANORAMA".

7 0 k V    1 2 m A    1 2 s e c  
**PANORAMA**  
 ADULT ORBIT  
 POSI =    0mm    READY

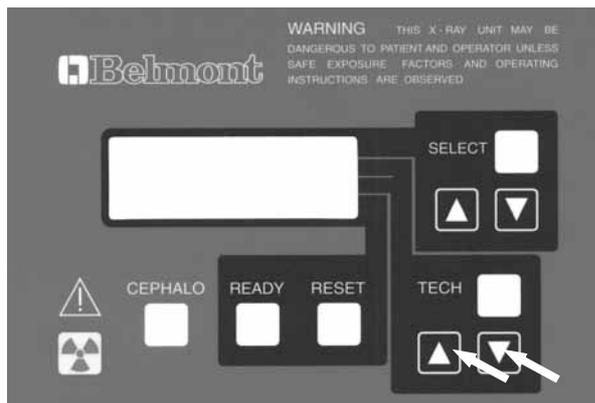
B 0 2 - T 1 5 1

1 1



Depress **TECH** key to get into ORBIT selection mode.

7 0 k V    1 2 m A    1 2 s e c  
P A N O R A M A  
**C H I L D O R B I T**  
P O S I =    0 m m    R E A D Y



Depress either **UP** · **DOWN** key located under TECH key to select exposure orbit.

CHILD ORBIT: Panorama Child  
ADULT ORBIT: Panorama Adult  
ORTHO ORBIT: Orthoradial Orbit

7 0 k V    1 2 m A    1 2 s e c  
P A N O R A M A  
**A D U L T O R B I T**  
P O S I =    0 m m    R E A D Y

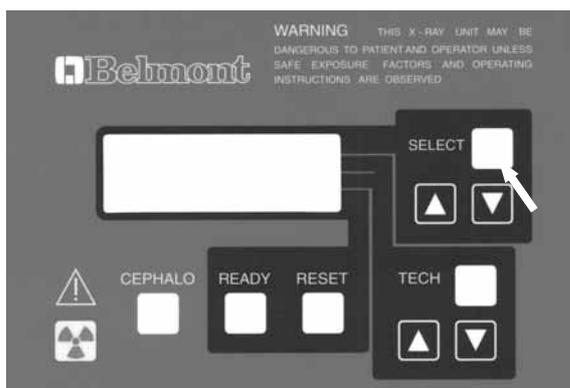
**5. Setting of exposure conditions**

17. Set a exposure condition by referring to the exposure condition table.

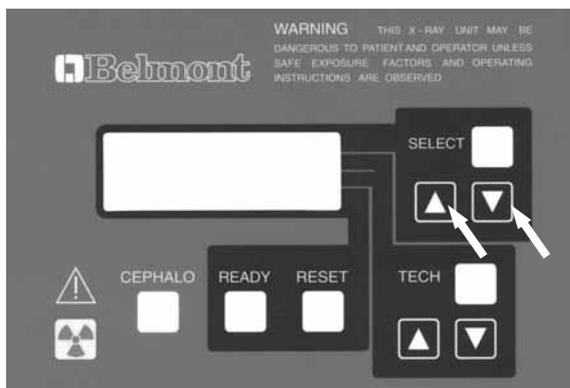
**5. 1. Setting of a Tube Voltage**

**NOTE**

Tube voltage (kV) can be set in the range of 60kV to 90kV by 1kV step.



Depress **SELECT** key to blink tube voltage display.



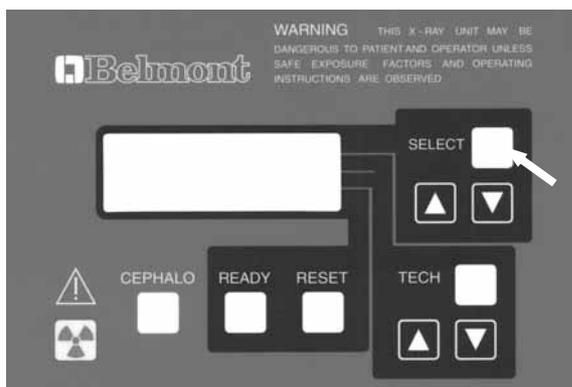
Depress either **UP**·**DOWN** key on **SELECT** repeatedly to set Tube voltage.



**5. 2. Setting of a Tube current**

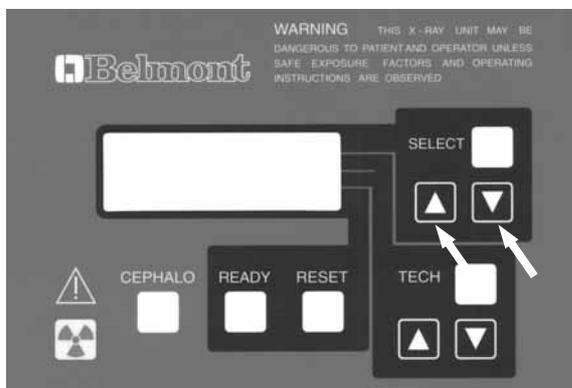
**NOTE**

Tube current (mA can be set by either of 2, 4, 6, 8, 10, and 12mA.



Depress **SELECT** key to blink Tube current display.

8 0 k V   **1 2** mA   1 2 s e c  
 PANORAMA  
 ADULT ORBIT  
 POSI = 0 mm READY



Depress either **UP** · **DOWN** key on SELECT repeatedly to set Tube current.

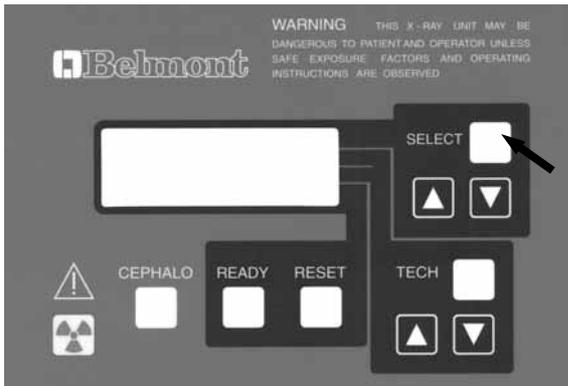
8 0 k V   **1 0** mA   1 2 s e c  
 PANORAMA  
 ADULT ORBIT  
 POSI = 0 mm READY

**5. 3. Setting of an exposure time**

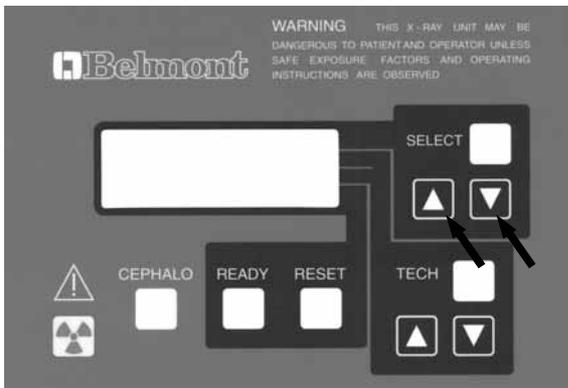
Set the Exposure time for Panoramic radiograph or Cephalo radiograph.  
The Exposure time for other radiographs can't be changed.

**NOTE**

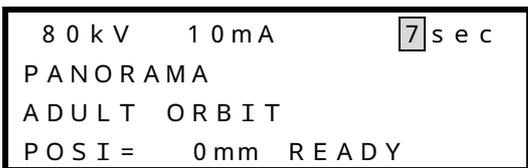
Either 12 seconds or 7 seconds can be selected for exposure time of Panoramic radiograph.



Depress **S E L E C T** key to blink Exposure time display.



Push either **U P** · **D O W N** on SELECT to set an exposure time.

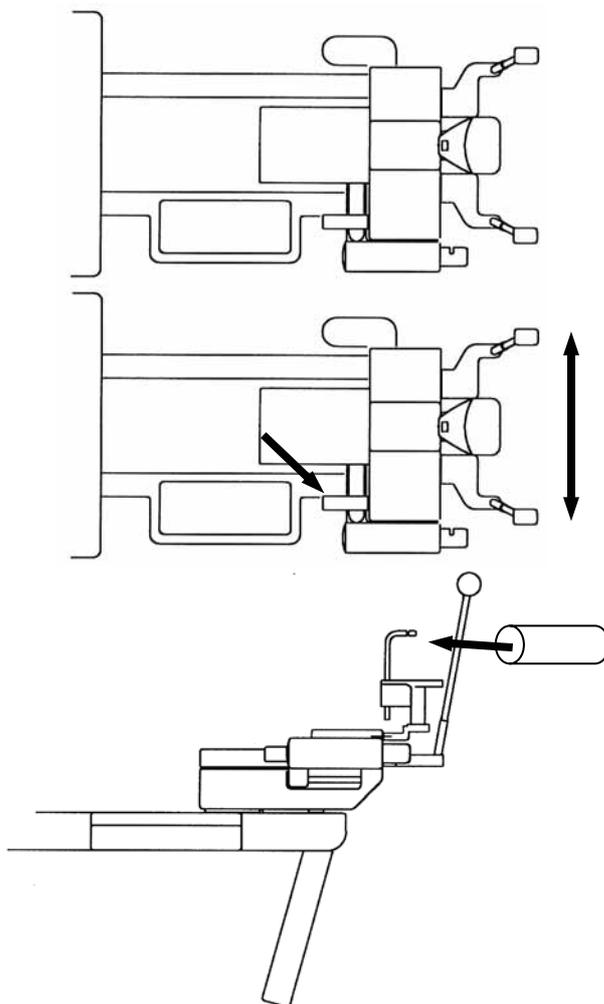


## 6. Patient Positioning

### NOTE

Patient positioning is the most important process to obtain the best radiographs.

#### 6. 1. Mounting of Chinrest and Insertion of Head Holding Rod (Panorama)



Mount a Chinrest (Panorama) on the Chinrest Unit.  
Insert a pair of Head Holding Rods (Panorama).

Rotate the knob of Chinrest Unit to open Head Holding Rods maximally.

Incrust a Bite Fork Cover on a Bite Fork, and insert in a Chinrest (Panorama).

### ⚠ CAUTION

Be sure to change a Bite Fork Cover for every patient and dispose the used Bite Fork Cover.

6. 2. Put a X-ray protective apron on a patient and on an assistant.

6. 3. Guide a patient near to the equipment.



\* Depress either **UP** **DOWN** key on Beam Control Panel or the one on the Sliding Unit to move height of Chinrest (Panorama). Depress up or down key to bring chinrest height close to patient's mandible.

6 . 4 . Instruct a patient to stand toward the Pillar with foot under a Chinrest (Panorama).

6 . 5 . Ask a patient to stand with his or her back and neck as straight as possible. Then hold grips.

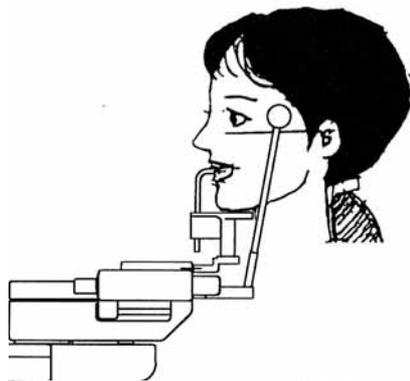
6 . 6 . Position patient



Depress either **UP** · **DOWN** key on Beam Control Panel, to move Chinrest (Panorama) lightly touches patient's mandible.

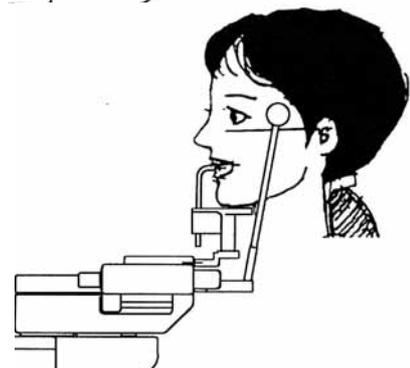
**⚠ CAUTION**

Pay enough attention to patient's safety when Sliding Unit moves up and down.

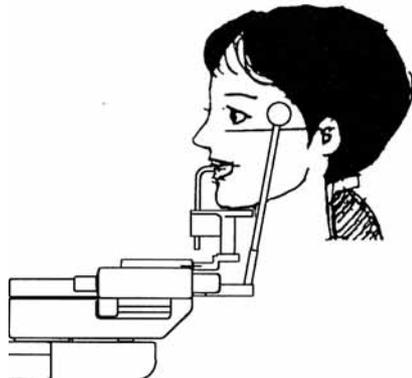


Instruct a patient to bite a groove of Bite Fork with upper and lower anterior teeth. Instruct a patient to put chin on a Chinrest.

\* For an edentulous patient  
Roll clean gauze on a Bite Fork, and instruct patient to bite it.



Adjust the beam height so that the beam hits the patient's miniscule of the ear (hole). Then adjust the patient's head as to beam indicates Frankfort Plane (from miniscule of the ear to bottom of the eye orbit)



Lightly close the Head Holding Rods to position patient's head.

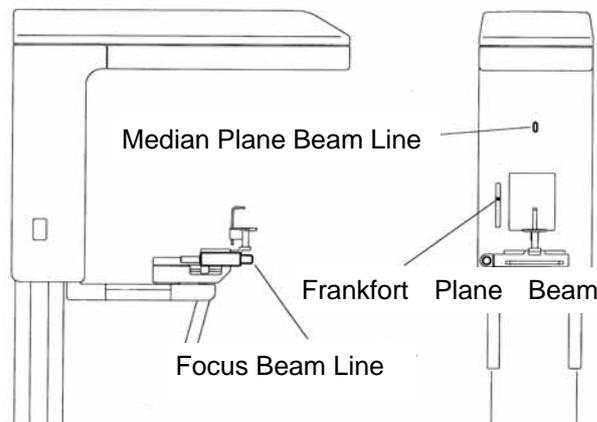
6 . 7 . Turn Positioning Beams ON.

<b>⚠ CAUTION</b>
<ol style="list-style-type: none"> <li>1. Laser Beams are used to position a patient.</li> <li>2. Warn a patient not to look directly at the laser beam line.</li> <li>3. Do not set the beam line to patient's eyes.</li> </ol>

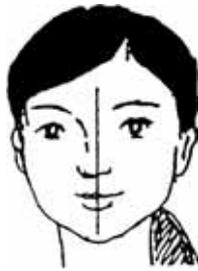
<b>NOTE</b>
<p>Positioning beams have AUTO POWER OFF function. Laser beam will be automatically turned off in 60 seconds after the beam is lit ON, or under READY ON condition.</p> <p>In order to turn the laser on, depress "Forward Movement" key or "Backward Movement" key on FOCUS Beam switch.</p>



Depress either **Forward Movement** or **Backward Movement** key of FOCUS switch on the Beam Operation Panel to turn Patient Positioning Beams on.



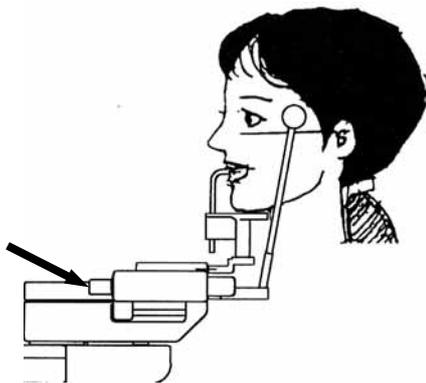
"Median Beam Line", "Focus Beam Line", and "Frankfort Plane Beam Line" are equipped



Adjust the patient's head so that the Median Line Beam comes to the center of the patient's face,



Depress either **UP** · **DOWN** key of Frankfort Beam on Beam Operation Panel and align Frankfort Beam Line with Frankfort Plane of a patient.

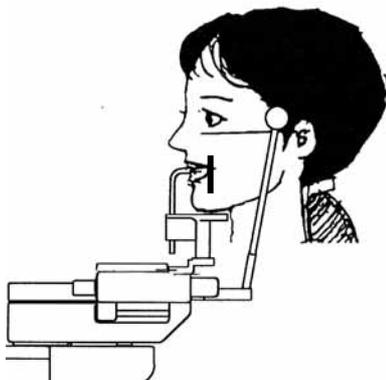


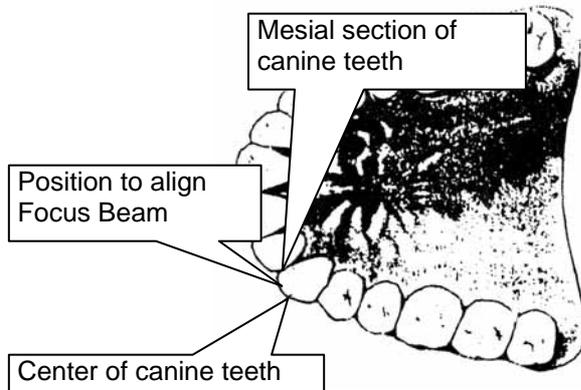
Carefully close Head Holding Rods to support the patient's head.



Depress either **Forward Movement** · or **Backward Movement** key of FOCUS Beam switch on Beam Operation Panel, and align Focus Beam Line with roots of upper and lower anterior teeth.

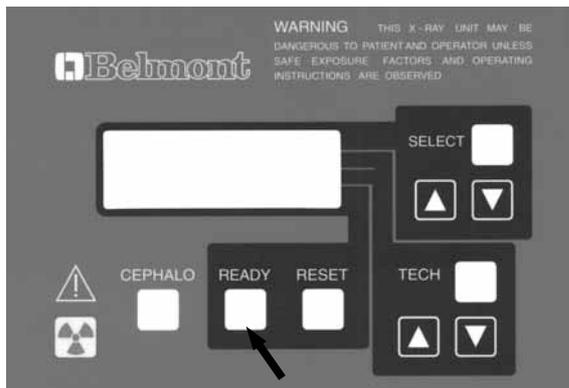
\* When you align the Focus Beam Line, look a patient from the side.





\* Align the Focus Beam Line around Mesial section of canine teeth

**7 . READY ON**



Depress **READY** key on the Operation Panel to turn READY ON.

```

8 0 k V   1 0 m A   1 2 s e c
P A N O R A M A
A D U L T   O R B I T
P O S I =   0 m m   < R E A D Y O N >
    
```

After 「 < R E A D Y > 」 Indicator blinks several time, the indication will be changed to 「 < R E A D Y O N > 」 , now you are ready for X-ray exposure.

**8 . X-ray Exposure**

**⚠ WARNING**

- 1 . Other people except a patient and an operator should be outside of X-ray room.
- 2 . The X-ray exposure switch should be depressed from outside of a X-ray room.
- 3 . Carefully observe a patient while X-ray is irradiated, release an Exposure switch immediately when any trouble happens.
- 4 . Instruct a patient not to move while X-ray is irradiated.

**⚠ CAUTION**

The Rotation Unit starts to rotate and X-ray will be irradiated when an exposure switch is depressed. Move away from the rotation area of the rotation unit.

**NOTE**

- 1 . The exposure switch is deadman type. X-ray irradiation and the movement of the Rotation Unit will stop as soon as the exposure switch is released.
- 2 . If exposure switch is released while X-ray is irradiated, release a patient and depress **RESET** key to bring Rotation Unit to the start position. Place a new X-ray film and take a radiograph again.

9 . 1 . Depress the exposure switch and hold until the end of the exposure.

9 . 2 . The Rotation Unit will start to rotate, "X-RAY ON" will be displayed on the Indicator, and X-ray irradiation will start.

8 0 k V	1 0 m A	1 2 s e c
P A N O R A M A		
A D U L T O R B I T		
P O S I =	0 m m	< X - R A Y O N >

9 . 3 . While X-ray is irradiated, 「 X - R A Y O N 」 display blinks and an audible warning will sound.

9 . 4 . After the end of exposure, X-RAY indication display is turned OFF, an audible warning stops, and the Rotation Unit stops to rotate.

**9 . COOLING TIME****NOTE**

- 1 . X-ray cannot be irradiated during a COOLING TIME.
- 2 . Any key operation except **RESET** cannot be operated during a COOLING TIME.
- 3 . Do not turn power OFF during a COOLING TIME.
- 4 . In order to protect the X-ray Tube, the cooling function of X-ray Tube is programmed.

1 0 . 1 . COOLING TIME will be automatically set after every exposure.

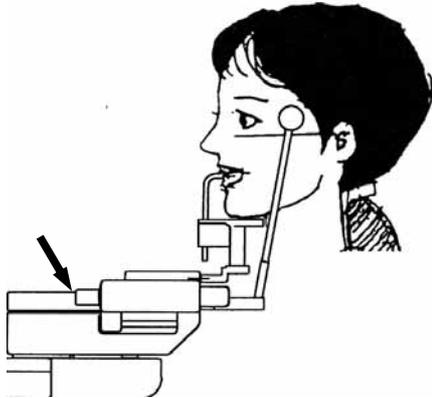
8 0 k V	1 0 m A	1 2 s e c
P A N O R A M A		
A D U L T O R B I T		
P O S I =	0 m m	C O O L 9 0 S E C

「 C O O L 9 0 S E C 」 is displayed and blinks until end of a COOLING TIME.

8 0 k V	1 0 m A	1 2 s e c
P A N O R A M A		
A D U L T O R B I T		
P O S I =	0 m m	R E A D Y

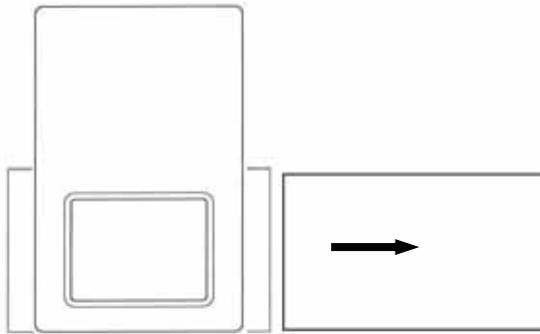
After a COOLING TIME is finished, 「 R E A D Y 」 is indicated

**1 0 . Release of a patient**



\* Carefully open Head Holding Rods and release a patient.

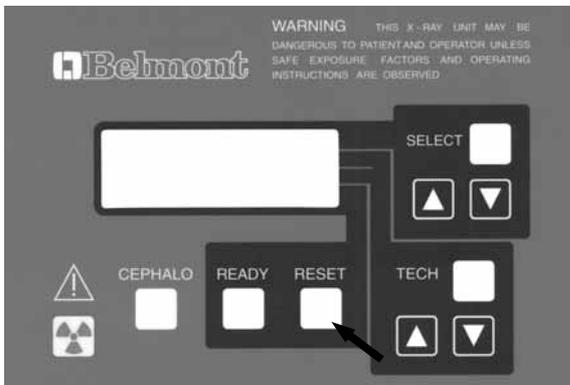
**1 1 . Removal of Cassette ( Film exposure )**



**1 2 . Return the Rotation Unit to the Start Position**

**⚠ CAUTION**

Depress **RESET** key on the Operation Panel or **RESET** key on the Beam Operation Panel to bring the Rotation Unit to starts position  
Stay away from rotation area.

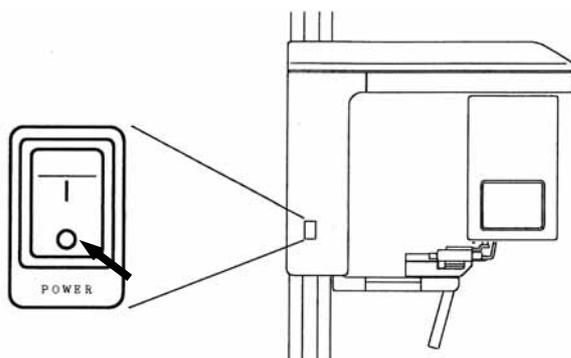


Depress **RESET** key on the Operation Panel or the one on the Beam Operation Panel.



**1 3 . Turning Power OFF**

**⚠ WARNING**  
To prevent the risk of accident, turn the power switch off when the unit is not in use.



\* Depress “ ” key on POWER switch.

# 1 2 . Operation Procedures for Maxillary Sinus

1. Learn the Panoramic radiographic operation procedures well. You can utilize Panoramic operating procedures for other modes.
2. If procedures are the same as the ones of Panorama, explanations of operation procedures in other modes are omitted. If you have any questions, Refer to operation procedures for Panorama.

## 1 . Preparation for the Exposure

- \* X-ray Protective Apron
- \* Pair of Head Holding Rods (Panorama)
- \* Chinrest (Maxillary Sinus)
- \* Panoramic Cassette (with a film inserted)

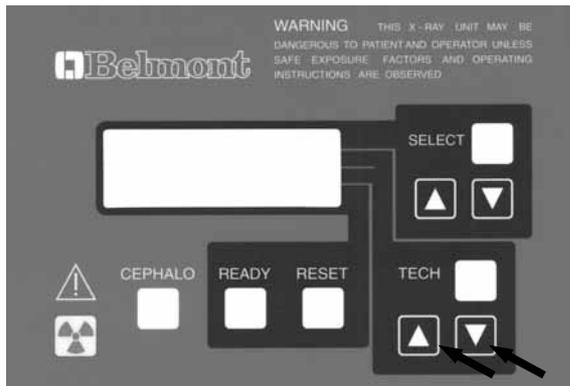
## 2 . Insertion of a cassette

Refer to 1 1 . 2 Insertion of Cassette in Operation procedure for Panoramic radiograph

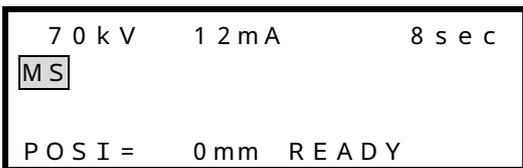
## 3 . Turning Power ON

Refer to 1 1 . 3 Turning Power On in Operation procedure for Panoramic radiograph

## 4 . Selection of Exposure Orbit



Depress either **UP** · **DOWN** key located under the TECH key to display "MS".



## 5 . Setting of Exposure Conditions

1 7 . Set exposure conditions by referring “Maxillary Sinus” in the exposure condition table.

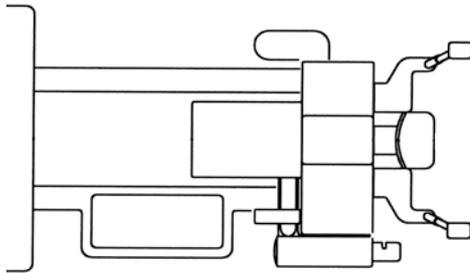
Refer to 1 1 . 5 Setting of Exposure Conditions in Operation Procedure for Panorama

## 6 . Patient Positioning

### NOTE

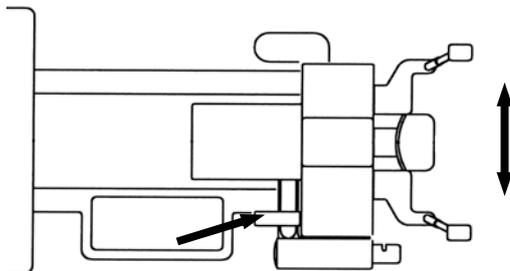
Patient positioning is the most important process to obtain the best radiographs.

6 . 1 . Mounting of Chinrest and Insertion of Head Holding Rod (Maxillary Sinus)



Mount Chinrest (Maxillary Sinus) on the Chinrest Unit.

Insert a pair of Head Holding Rods (Maxillary Sinus)



Rotate the knob of Chinrest Unit to open Head Holding Rods maximally.

6 . 2 . Instruct a patient and an assistant to wear a X-ray protective apron.

6 . 3 . Guide a patient near to the equipment.



\* Depress either **UP** **DOWN** key on the Beam Control Panel or the one on the Sliding Unit to move height of Chinrest (Maxillary Sinus). Depress up or down key to bring the chinrest height close to patient's mandible.

6 . 4 . Instruct a patient to stand in the same position as Panoramic radiography.

6 . 5 . Ask a patient to stand with his or her back and neck as straight as possible. Then hold grips.

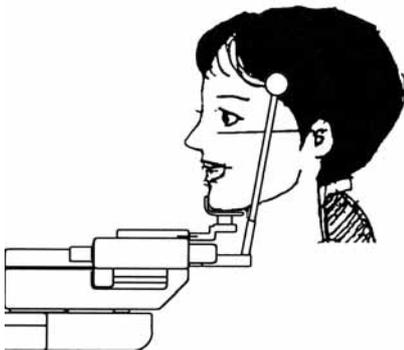
## 6 . 6 . Position patient



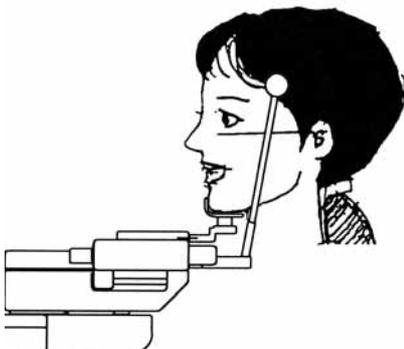
Depress either **UP** · **DOWN** key on Beam Control Panel to move the Chinrest (Maxillary Sinus) lightly touches patient's mandible.

**⚠ CAUTION**

Pay enough attention to patient's safety when the Sliding Unit moves up and down.



Adjust the beam height so that the beam hits the patient's miniscule of the ear (hole). Then adjust the patient's head as to beam indicates Frankfort Plane (from miniscule of the ear to bottom of the eye orbit)



Lightly close the Head Holding Rods to position patient's head.

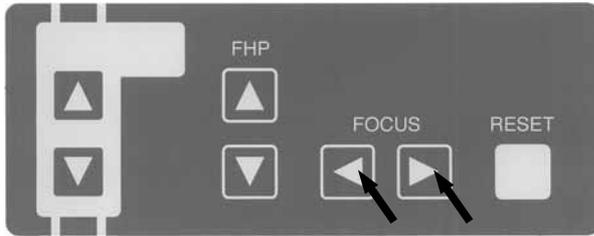
## 6 . 7 . Turn Positioning Beams ON.

**⚠ CAUTION**

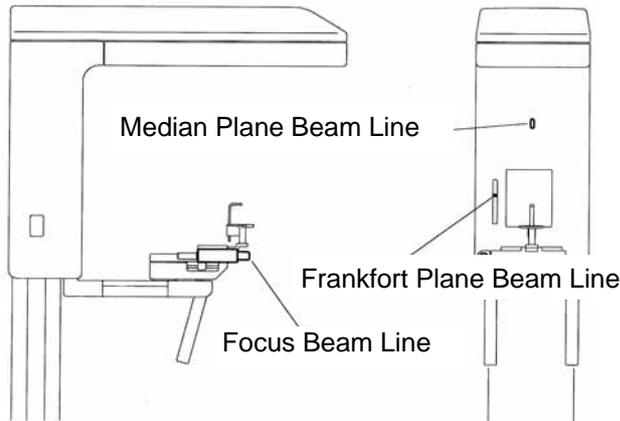
1. Laser Beams are used to position a patient.
2. Warn a patient not to look directly at the laser beam line.
3. Do not set the beam line to patient's eyes.

**NOTE**

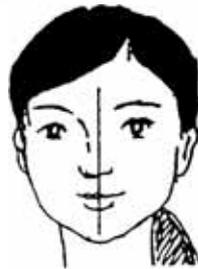
Positioning beams have AUTO POWER OFF function. Laser beam will be automatically turned off in 60 seconds after the beam is lit ON, or under READY ON condition.  
In order to turn the laser on, depress "Forward Movement" key or "Backward Movement" key on FOCUS Beam switch.



Depress either **Forward Movement** or **Backward Movement** key of FOCUS switch on the Beam Operation Panel to turn Patient Positioning Beams on.



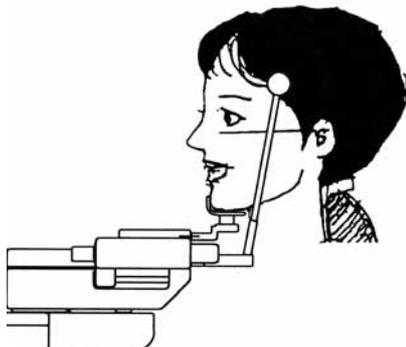
"Median Beam Line", "Focus Beam Line", and "Frankfort Plane Beam Line" are equipped



Adjust the patient's head so that the Median Line Beam comes to the center of the patient's face,



Depress either **UP** or **DOWN** key of Frankfort Beam on Beam Operation Panel and align Frankfort Beam Line with Frankfort Plane of a patient.



Carefully close the Head Holding Rods to support the patient's head.



Depress either **Forward Movement** or **Backward Movement** key of FOCUS Beam switch on the Beam Operation Panel, and align Focus Beam Line with roots of upper and lower anterior teeth.

## 7 . READY ON

Refer to 1 1 . Operation Procedure for Panorama 7 . R E A D Y O N

## 8 . X-ray Exposure

Refer to 1 1 . Operation Procedure for Panorama 8 . X-ray Exposure

## 9 . COOLING TIME

Refer to 1 1 . Operation Procedure for Panorama 9 . COOLING TIME

## 1 0 . Release of a patient

Refer to 1 1 . Operation Procedure for Panorama 1 0 . Release of a patient

## 1 1 . Removal of a cassette

Refer to 1 1 . Operation Procedure for Panorama 1 1 . Removal of a Cassette

## 1 2 . Return Rotation Unit to Start Position

Refer to 1 1 . Operation Procedure for Panorama 1 2 . Return Rotation Unit to Start Position

## 1 3 . Turning Power OFF

Refer to 1 1 . Operation Procedure for Panorama 1 3 . Turning Power OFF

# 1 3 . Operation Procedures for TMJ Lateral (4 sections)

1. Learn the Panoramic radiographic operation procedures well. You can utilize Panoramic operating procedures for other modes.
2. If procedures are the same as the ones of Panorama, explanations of operation procedures in other modes are omitted. If you have any questions, Refer to operation procedures for Panorama.

## 1 . Preparation for the Exposure

- \* X-ray Protective Apron
- \* Pair of Ear Rods (TMJ Lateral)
- \* Panoramic Cassette (with a film inserted)

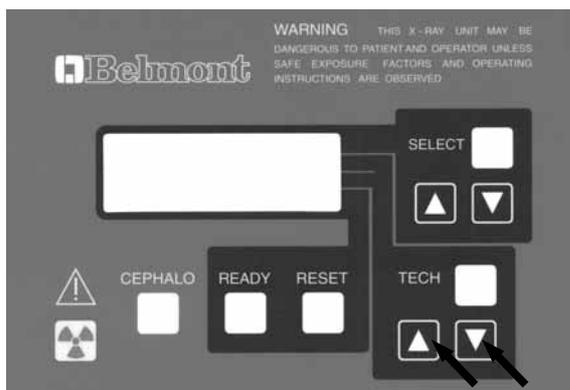
## 2 . Insertion of a cassette

Refer to 1 1 . 2 Insertion of Cassette in Operation procedure for Panoramic radiograph

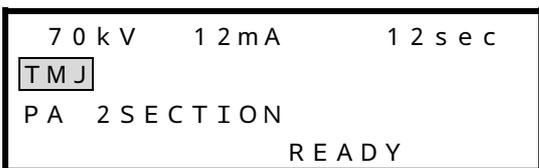
## 3 . Turning Power ON

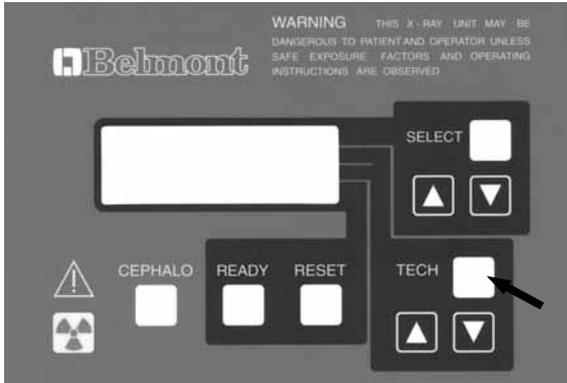
Refer to 1 1 . 3 Turning Power On in Operation procedure for Panoramic radiograph

## 4 . Selection of Exposure Orbit

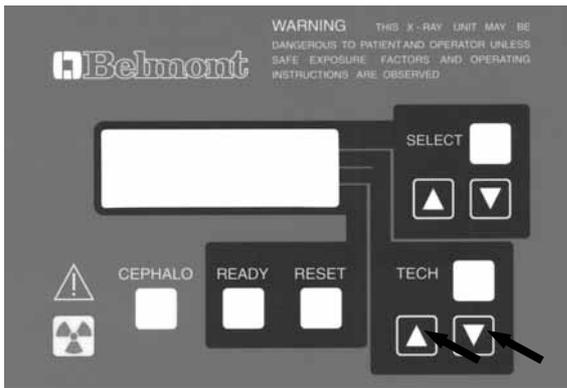
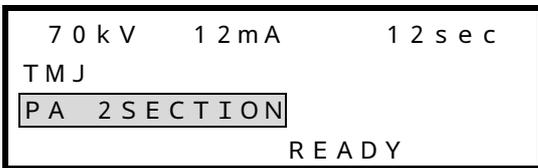


Depress either **UP** · **DOWN** key located under TECH key to display “TMJ”.



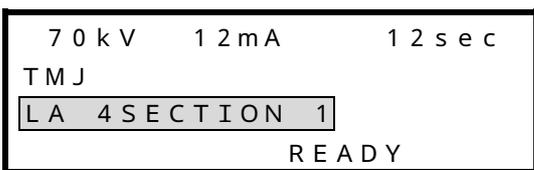


\* Depress **TECH** key to get into the Orbit selection mode.



\* Depress **UP** or **DOWN** key located under TECH key to select the exposure mode

\* "LA 4 SECTION 1".



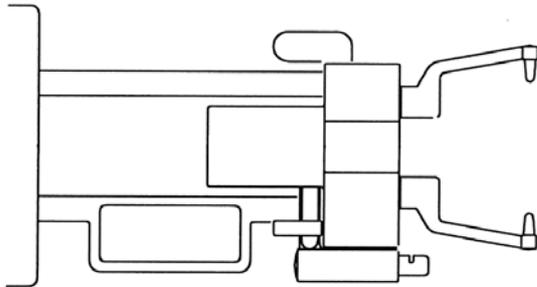
## 5 . Setting of Exposure Conditions

1 7 . Set exposure conditions by referring "TMJ Lateral (LA)" in the exposure condition table.

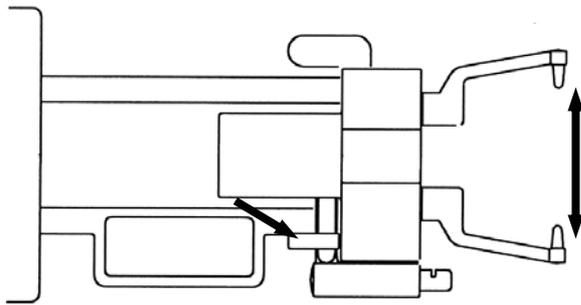
Refer to 1 1 . 5 Setting of Exposure Conditions in Operation Procedure for Panorama

**6 . Patient Positioning**

6 . 1 . Mounting Ear Rods(TMJ Lateral)



Mount Ear Rods (TMJ Lateral) on the Chinrest Unit.



Rotate the knob of the Chinrest Unit to open Ear Rods (TMJ Lateral) maximally.

6 . 2 . Instruct a patient and an assistant to wear X-ray protective apron.

6 . 3 . Guide a patient near to the equipment.



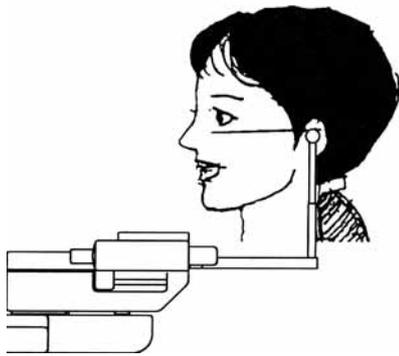
Depress either **U P** **D O W N** key on the Beam Control Panel or the one on the Sliding Unit to move position of Ear Rods(TMJ Lateral). Bring ear rods close to patient's external auditory foramen.

6 . 4 . Instruct a patient to stand in the same position as Panoramic radiography.

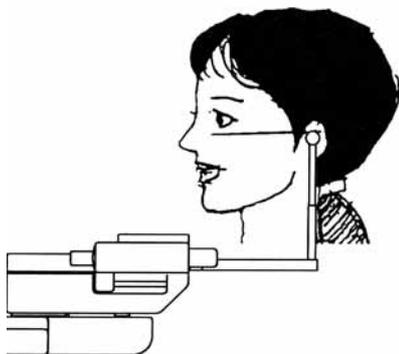
6 . 5 . Ask a patient to stand with his or her back and neck as straight as possible. Then hold grips.



Depress either **U P** **D O W N** key on the Beam Control Panel or the one on the Sliding Unit to move position of Ear Rods(TMJ Lateral). Align ear rods to patient's external auditory foramen.



Adjust the beam height so that the beam hits the patient's miniscule of the ear (hole). Then adjust the patient's head as to beam indicates Frankfort Plane (from miniscule of the ear to bottom of the eye orbit)



Rotate the knob of Chinrest ASSY to insert Ear Rods (TMJ Lateral) into auricular holes of a patient and fix Ear Rod lightly.

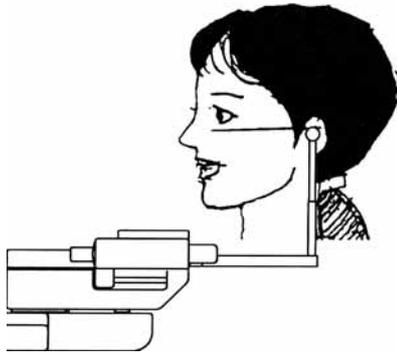
6 . 6 . Turn Positioning Beams ON

<b>⚠ CAUTION</b>
<ol style="list-style-type: none"> <li>1. Laser Beams are used to position a patient.</li> <li>2. Warn a patient not to look directly at the laser beam line.</li> <li>3. Do not set the beam line to patient's eyes.</li> </ol>

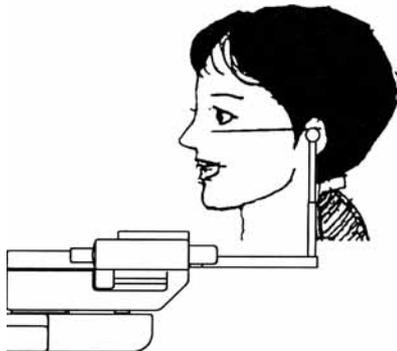
<b>NOTE</b>
<p>Positioning beams have AUTO POWER OFF function. Laser beam will be automatically turned off in 60 seconds after the beam is lit ON, or under READY ON condition.</p> <p>In order to turn the laser on, depress "Forward Movement" key or "Backward Movement" key on FOCUS Beam switch.</p>



Depress either **Forward Movement** or **Backward Movement** key of FOCUS switch on the Beam Operation Panel to turn Patient Positioning Beams on.



Adjust the beam height so that the beam hits the patient's miniscule of the ear (hole). Then adjust the patient's head as to beam indicates Frankfort Plane (from miniscule of the ear to bottom of the eye orbit)



Rotate the knob of the Chinrest ASSY to insert Ear Rods (TMJ Lateral) into auricular holes of a patient and fix Ear Rod.

## 7 . READY ON

Refer to 1 1 . Operation Procedure for Panorama 7 . READY ON

## 8 . X-ray Exposure

### WARNING

- 1 . Other people except a patient and an operator should be outside of X-ray room.
- 2 . The X-ray exposure switch should be depressed from outside of a X-ray room.
- 3 . Carefully observe a patient while X-ray is irradiated, release an Exposure switch immediately when any trouble happens.
- 4 . Instruct a patient not to move while X-ray is irradiated.

### CAUTION

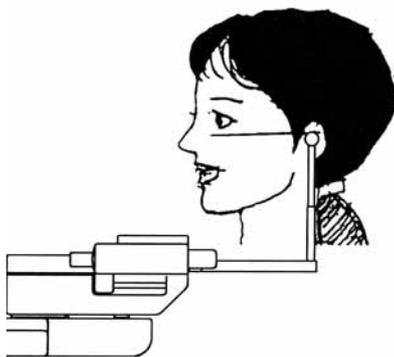
The Rotation Unit starts to rotate and X-ray will be irradiated when an exposure switch is depressed. Move away from the rotation area of the rotation unit.

### NOTE

- 1 . The exposure switch is deadman type. X-ray irradiation and the movement of the Rotation Unit will stop as soon as the exposure switch is released.
- 2 . If exposure switch is released while X-ray is irradiated, release a patient and depress **RESET** key to bring Rotation Unit to the start position. Place a new X-ray film and take a radiograph again.

8 . 1 . TMJ Lateral 4 sections consist of a series of two exposures. 1<sup>st</sup> exposure for the diagnosis of TMJ with mouth closed and 2<sup>nd</sup> exposure for TMJ with mouse open.

8 . 2 . Ask patient to close the mouth

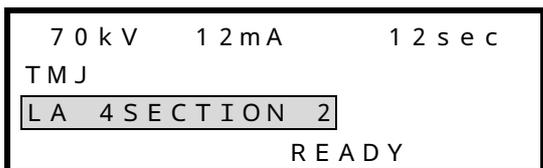


8 . 3 . Depress an exposure switch and hold until the end of exposure.

8 . 4 . The Rotation Unit starts to rotate, X-RAY is indicated on indicator, and buzzer starts to sound intermittently.

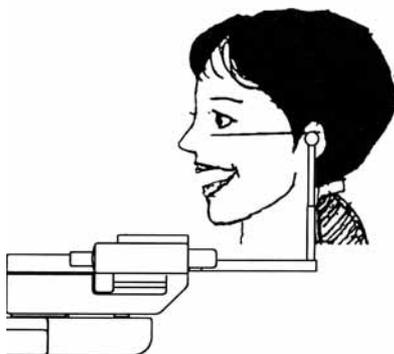
8 . 5 . While X-RAY is irradiated, 「 X - R A Y O N 」 display blinks and an audible warning will sound.

8 . 6 . After the end of first exposure, X-RAY indication display is turned OFF, an audible warning stops, the Rotation Unit stops to rotate, then returns to the start position automatically.



\* Indication of "LA 4 SECTION 1" will be changed to "LA 4 SECTION 2".

8 . 7 . Ask patient to open the mouth by lowering mandible



8 . 8 . Depress “READY” key to get into READY ON condition.

7 0 k V	1 2 m A	1 2 s e c
T M J		
L A 4 S E C T I O N 2		
< R E A D Y O N >		

\* Indication of “READY” will be changed to “< R E A D Y O N >”.

8 . 9 . Depress an exposure switch and hold until the end of exposure.

8 . 10 . The Rotation Unit will start to rotate, “X-RAY ON” will be displayed on Indicator, and X-ray irradiation will start.

8 . 11 . While X-ray is irradiated, 「 X - R A Y O N 」 display blinks and an audible warning will sound.

8 . 12 . After the end of 2<sup>nd</sup> exposure, X-RAY indication display is turned OFF, an audible warning stops, and Rotation Unit stops to rotate.

## 9 . COOLING TIME

Refer to 1 1 . Operation Procedure for Panorama 9 . COOLING TIME

## 1 0 . Release of a patient

Refer to 1 1 . Operation Procedure for Panorama 1 0 . Release of a patient

## 1 1 . Removal of a Cassette (Film Exposure)

Refer to 1 1 . Operation Procedure for Panorama 1 1 . Removal of a Cassette.

## 1 2 . Return Rotation Unit to Start Position

Refer to 1 1 . Operation Procedure for Panorama 1 2 . Returning ARM Unit to Start Position.

## 1 3 . Turning Power OFF

Refer to 1 1 . Operation Procedure for Panorama 1 3 . Turning Power OFF.

# 1 4 . Operation Procedures for TMJ Frontal (2 sections)

1. Learn the Panoramic radiographic operation procedures well. You can utilize Panoramic operating procedures for other modes.
2. If procedures are the same as the ones of Panorama, explanations of operation procedures in other modes are omitted. If you have any questions, Refer to operation procedures for Panorama.

## 1 . Preparation for the Exposure

- \* X-ray Protective Apron
- \* Pair of Ear Rods (TMJ Front)
- \* Panoramic Cassette (with a film inserted)

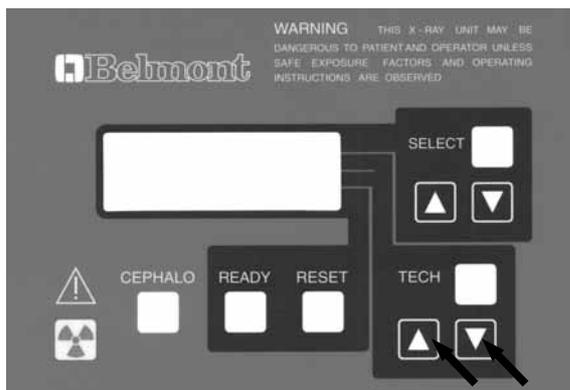
## 2 . Insertion of a cassette

Refer to 1 1 . Operation Procedure for Panorama 2 . Mounting of a Cassette

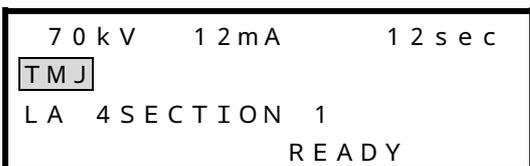
## 3 . Turning Power ON

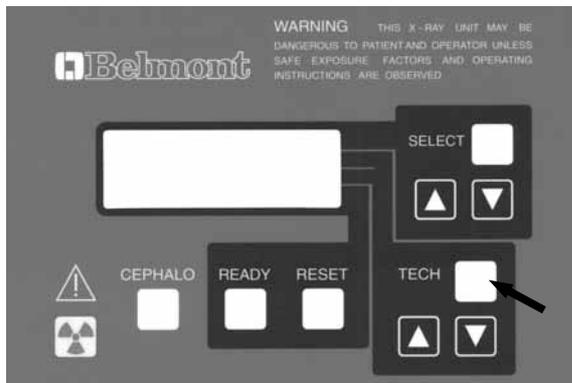
Refer to 1 1 . Operation Procedure for Panorama 3 . Turning Power ON

## 4 . Selection of Exposure Orbit

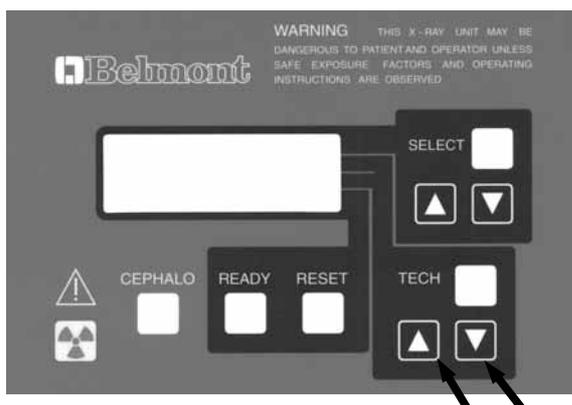
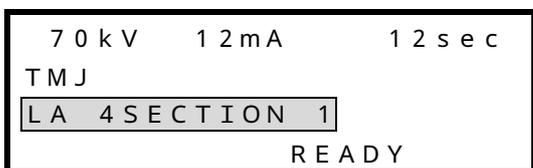


Depress either **UP** • **DOWN** key located under TECH key to display "TMJ".



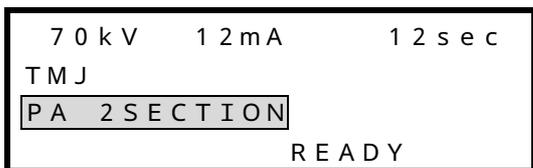


\* Depress **TECH** key to get into the Orbit selection mode.



\* Depress **UP** or **DOWN** key located under TECH key to set PA 2 section.

\* "PA 2 SECTION" indication.



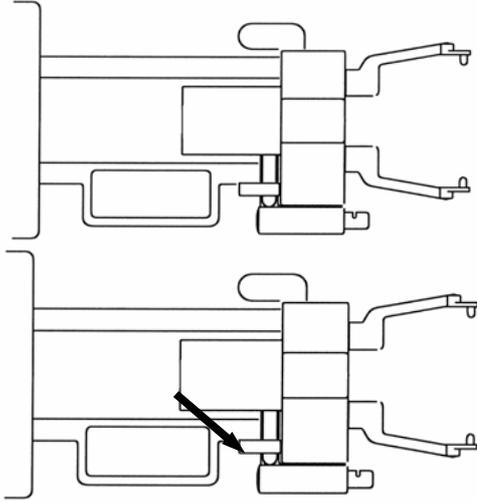
## 5 . Setting of Exposure Conditions

1 7 . Set exposure conditions by referring "TMJ Frontal (PA) 2 sections" in the exposure condition table.

Refer to 1 1 . Operation Procedure for Panorama 5 . Setting of Exposure Conditions.

**6 . Patient Positioning**

6 . 1 . Mounting Ear Rods (TMJ Front)



Mount "Ear Rods (TMJ Frontal)" on the Chinrest Unit.

Rotate the knob of the Chinrest Unit to open Ear Rods (TMJ Front) maximally.

6 . 1 . Instruct a patient and an assistant to wear X-ray protective apron.

6 . 2 . Guide a patient near to the equipment.



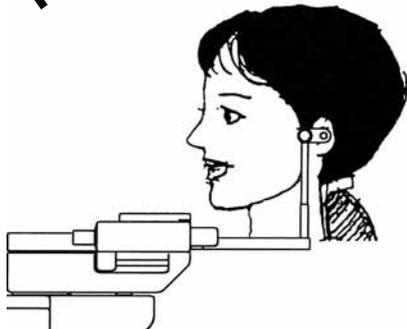
Depress either **U P** **D O W N** key on the Beam Control Panel or the one on the Sliding Unit to move position of Ear Rods (TMJ Lateral). Bring ear rods close to patient's external auditory foramen.

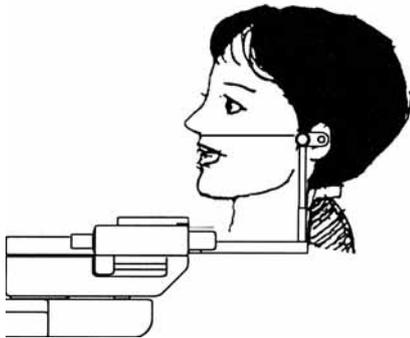
6 . 3 . Instruct a patient to stand in the same position as Panoramic radiography

6 . 4 . Ask a patient to stand with his or her back and neck as straight as possible. Then hold grips.

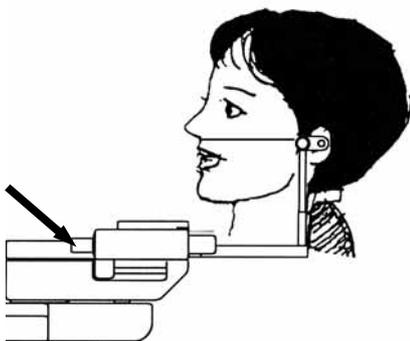


Depress either **U P** **D O W N** key on the Beam Control Panel or the one on the Sliding Unit to move position of Ear Rod(TMJ Frontal). Align ear rods to patient's external auditory foramen.





Horizontally align to the patient's naso-auricular plane.



Rotate the knob of the Chinrest ASSY to insert Ear Rod (TMJ Frontal) into auricular holes of a patient and fix Ear Rod lightly.

6 . 5 . Turn Positioning Beams ON

**CAUTION**

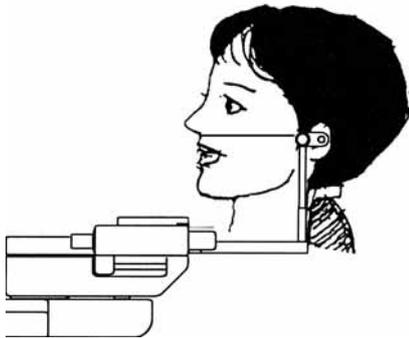
1. Laser Beams are used to position a patient.
2. Warn a patient not to look directly at the laser beam line.
3. Do not set the beam line to patient's eyes.

**NOTE**

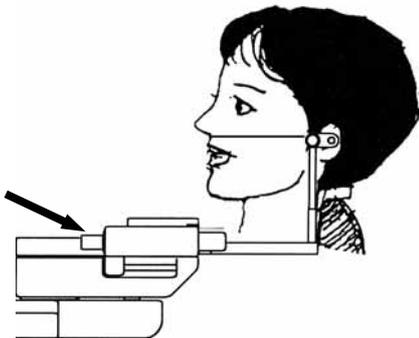
Positioning beams have AUTO POWER OFF function. Laser beam will be automatically turned off in 60 seconds after the beam is lit ON, or under READY ON condition.  
In order to turn the laser on, depress "Forward Movement" key or "Backward Movement" key on FOCUS Beam switch.



Depress either **Forward Movement** or **Backward Movement** key of FOCUS switch on the Beam Operation Panel to turn Patient Positioning Beams on.



Adjust beam height so that Frankfort beam hits the naso-auricular plane



Rotate the knob of the Chinrest ASSY to insert Ear Rods (TMJ Lateral) into auricular holes of a patient and fix Ear Rod.

## 7 . READY ON

Refer to 1 1 . Operation Procedure for Panorama 7 . READY ON.

## 8 . X-ray Exposure

### ⚠ WARNING

- 1 . Other people except a patient and an operator should be outside of X-ray room.
- 2 . The X-ray exposure switch should be depressed from outside of a X-ray room.
- 3 . Carefully observe a patient while X-ray is irradiated, release an Exposure switch immediately when any trouble happens.
- 4 . Instruct a patient not to move while X-ray is irradiated.

### ⚠ CAUTION

The Rotation Unit starts to rotate and X-ray will be irradiated when an exposure switch is depressed. Move away from the rotation area of the rotation unit.

### NOTE

- 1 . The exposure switch is deadman type. X-ray irradiation and the movement of the Rotation Unit will stop as soon as the exposure switch is released.
- 2 . If exposure switch is released while X-ray is irradiated, release a patient and depress **RESET** key to bring Rotation Unit to the start position. Place a new X-ray film and take a radiograph again.

8 . 1 . Depress an exposure switch and hold until the end of exposure.

8 . 2 . The Rotation Unit starts to rotate, X-RAY is indicated on indicator, and buzzer starts to sound intermittently.

8 . 3 . While X-RAY is irradiated, 「 X - R A Y O N 」 display blinks and an audible warning will sound

8 . 4 . After the end of the exposure, X-RAY indication display is turned OFF, an audible warning stops, and the Rotation Unit stops to rotate.

## **9 . COOLING TIME**

Refer to 1 1 . Procedure of Panorama Exposure Operation 9 . Cooling Time

## **1 0 . Release of a Patient**

Refer to 1 1 . Procedure of Panorama Exposure Operation 1 0 . Release of a Patient

## **1 1 . Removal of a Cassette (Film Exposure)**

Refer to 1 1 . Procedure of Panorama Exposure Operation 1 1 . Refer to removal of a Cassette

## **1 2 . Return Rotation Unit to Start Position**

Refer to 1 1 . Procedure of Panorama Exposure Operation, 1 2 . Moving ARM Unit to Start Position

## **1 3 . Turning Power OFF**

Refer to 1 1 . Procedure of Panorama Exposure Operation 1 3 . Turning Power OFF.

# 1 5 . Operation Procedures for Cephalo Lateral (L A)

1. Learn the Panoramic radiographic operation procedures well. You can utilize Panoramic operating procedures for other modes.
2. If procedures are the same as the ones of Panorama, explanations of operation procedures in other modes are omitted. If you have any questions, Refer to operation procedures for Panorama.

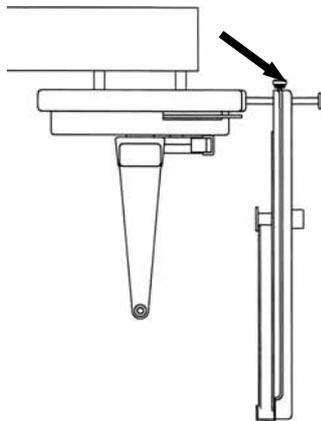
## 1 . Preparation for the exposure

- \* X-ray Protective Apron
- \* Cephalo Cassette (with a film inserted)

## 2 . Insertion of a Cassette

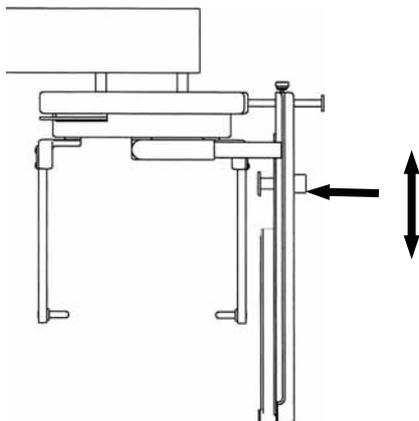
**NOTE**

There is directionality for a cassette. The Front side of a cassette should be directed to the X-ray generator.

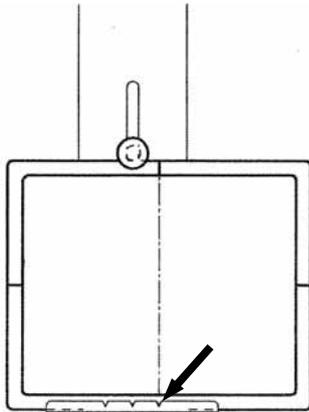


To Adjust the position of the Cassette Holder, Loosen the Cassette Position lock and move the cassette holder to its proper position, then fasten the lock.

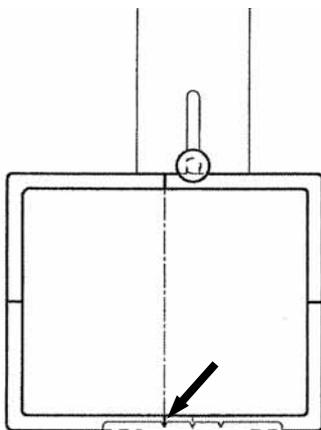
For the standard radiograph, set to "15"cm on the scale. The magnification is 1.1 times at this position.



To set a cassette, lift "Cassette Fixing Knob" set a cassette, then move "Cassette Fixing Knob" downward.



\* If the Cephalo Arm is set to Right,  
Align the center line of a cassette with right  
side of V cut on the Cassette Holder.



\* If the Cephalo Arm is set to Left,  
Align the center line of a cassette with left  
side of V cut on the Cassette Holder.

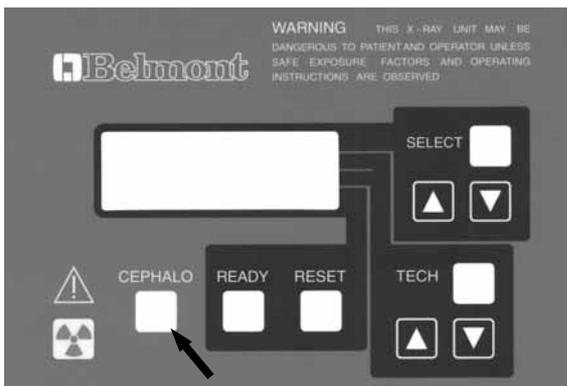
**3 . Turning Power ON**

Refer to 1 0 . Operation Procedure for Panorama 3 . Turning Power ON.

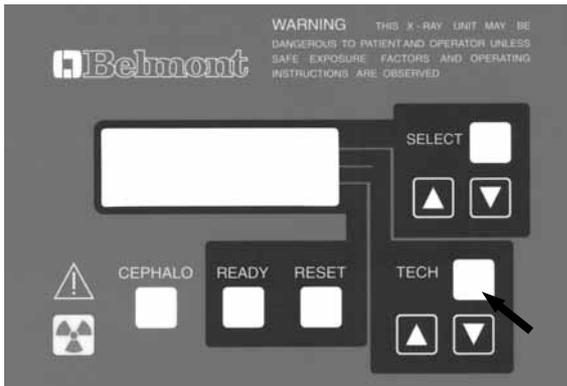
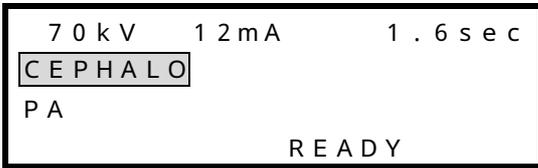
**4 . Selection of the Exposure Orbit**

**⚠ CAUTION**

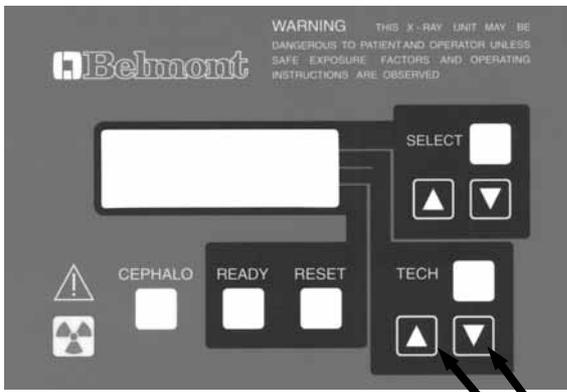
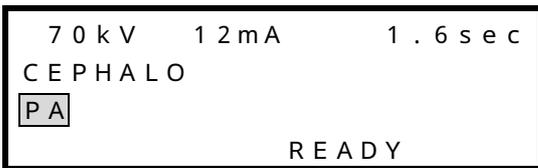
When “CEPHALO” key is depressed, the Rotation ARM automatically moves to the Cephalo radiograph position  
Move away from the rotation area.



When **C E P H A L O** key is depressed,  
indication will be changed to “CEPHALO”,  
The Rotation ARM moves to Cephalo  
radiograph position automatically.

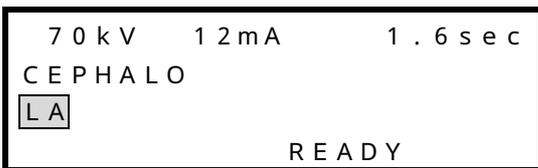


Depress **T E C H** key to get into the ORBIT selection mode.



Depress either **U P** • **D O W N** key located under TECH key to set Cephalo Lateral " L A " .

L A : Cephalo Lateral Radiograph



## 5 . Setting of Exposure Conditions

### 17. Set exposure condition by referring to the exposure condition table.

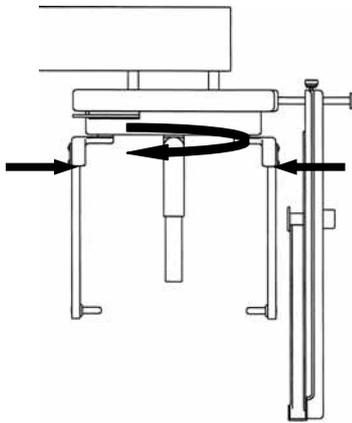
Refer to 1 0 . Operation Procedure for Panorama 5 . Setting of Exposure Conditions.

### NOTE

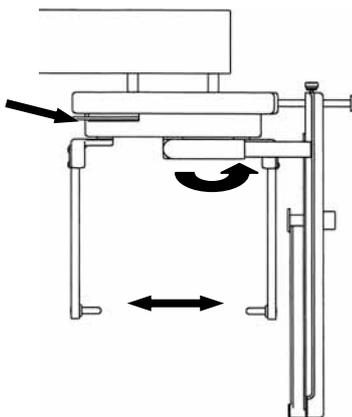
Exposure time range is from 0.1 sec to 3.2 sec. In 16 steps: (0.1 · 0.12 · 0.16 · 0.20 · 0.25 · 0.32 · 0.4 · 0.5 · 0.63 · 0.8 · 1.00 · 1.25 · 1.60 · 2.00 · 2.50 and 3.20 sec.).

## 6 . Patient Positioning

### 6 . 1 . Turn the Ear Holding Rods to the Lateral position.



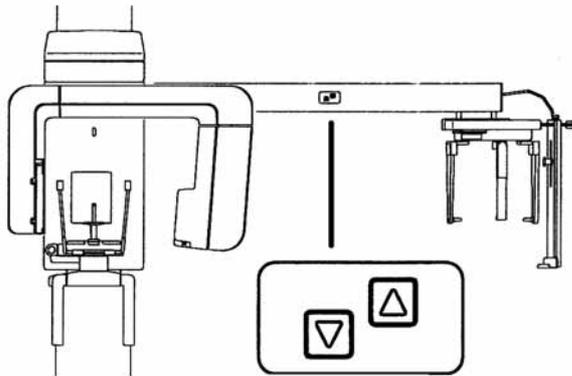
Rotate the Ear Rods by holding the Ear Rod mounting area (see drawing on left), align Ear Rods to the exposure direction of Cephalo Lateral.



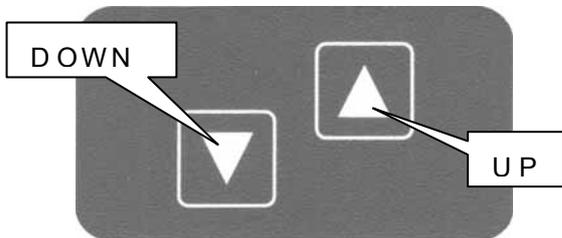
Fully open Ear Holding Rods by moving the Open-Close lever.  
Align the Forehead Rest Pad horizontally.

### 6 . 2 . Put a X-ray protective apron on a patient and on an assistant

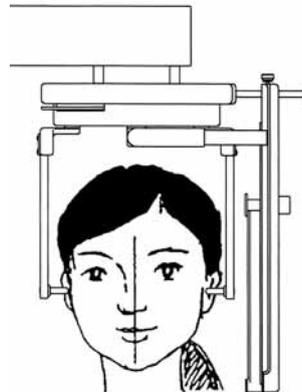
### 6 . 3 . Guide a patient near to the equipment.



\* Adjust the height of the Cephalostat Assembly by depressing **UP** or **DOWN** key on the Cephalo ARM



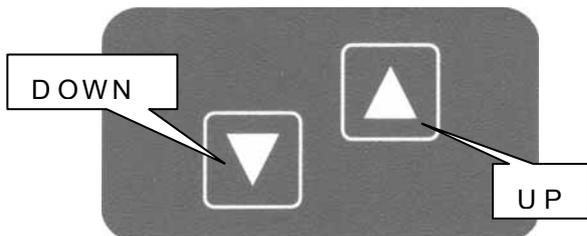
6 . 4 . Instruct a patient to "Stand behind the Cephalo ARM with both feet under center of the Cephalostat. Ask a patient to stand with his or her back and neck as straight as possible.



6 . 5 . Position a patient.

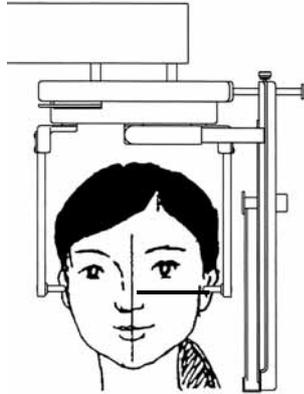
**⚠ CAUTION**

Pay enough attention to the safety of a patient when the Sliding Unit moves up and down.

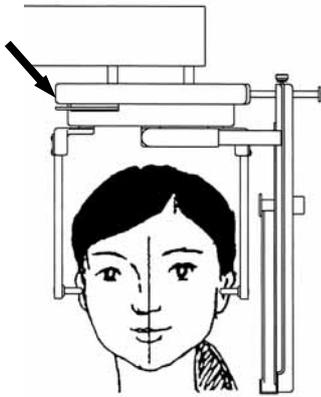


Depress either **UP** or **DOWN** key of the Cephalo ARM to align Ear Rods to the external auditory foramen of a patient.

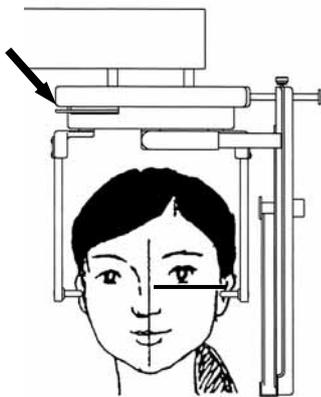
Adjust the patient's head so that the Median Line Beam comes to the center of the patient's face.



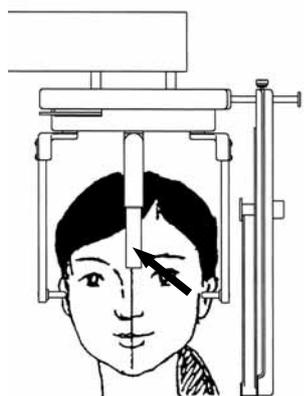
Lightly close the Ear Holding Rods

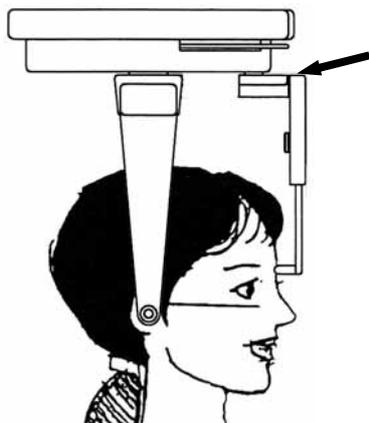


After confirming the Frankfort Plane of a patient is horizontal, carefully close the Ear Holding Rods to support the patient head.

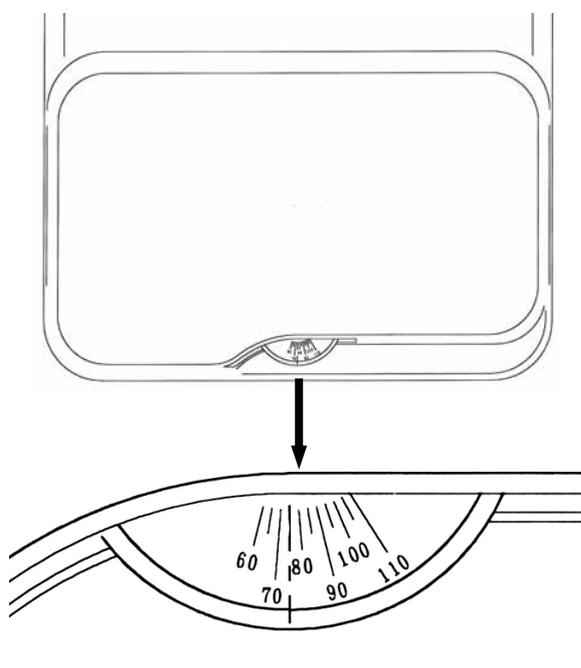


Slide the Forehead Rest up/down and back/forth so that a patient can rest gently against it.





Read the value of the scale on Forehead Rest.



The Scale to adjust soft tissue filter is located under X-ray Generator.

Set the value of the Forehead Rest (obtained in step ) here.

## 7 . READY ON

Refer to 1 1 . Operation Procedure for Panorama 7 . READY ON.

## 8 . X-ray irradiation

### ⚠ WARNING

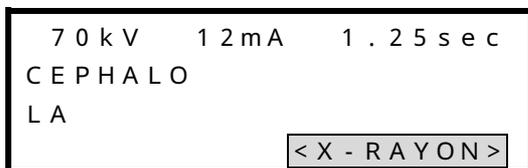
- 1 . Other people except a patient and an operator should be outside of X-ray room.
- 2 . The X-ray exposure switch should be depressed from outside of a X-ray room.
- 3 . Carefully observe a patient while X-ray is irradiated, release an Exposure switch immediately when any trouble happens.
- 4 . Instruct a patient not to move while X-ray is irradiated.

**NOTE**

- 1 . The exposure switch is deadman type. X-ray irradiation and the movement of the Rotation Unit will stop as soon as the exposure switch is released.
- 2 . If exposure switch is released while X-ray is irradiated, release a patient and depress **RESET** key to bring Rotation Unit to the start position. Place a new X-ray film and take a radiograph again.

8 . 1 . Depress the exposure switch and hold until the end of exposure.

8 . 2 . "X-RAY ON" will be displayed on Indicator, and X-ray irradiation will start..



8 . 3 . While X-ray is irradiated, 「 X - RAY ON 」 display blinks and an audible warning will sound.

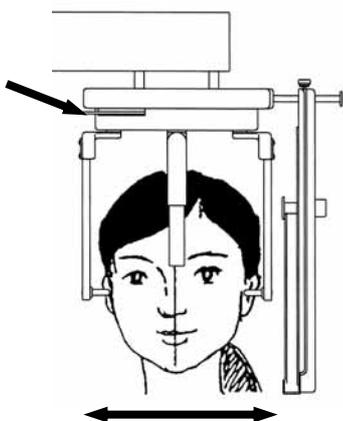
8 . 4 . After the end of exposure, X-RAY indication display is turned OFF, an audible warning stops.

**9 . COOLING TIME**

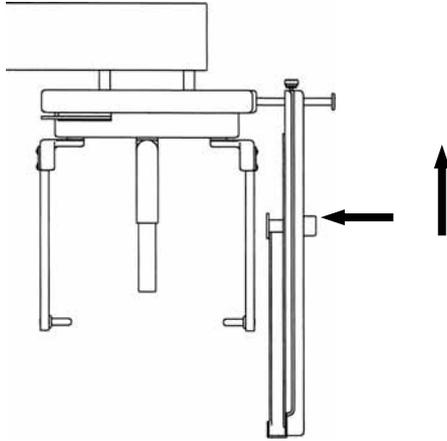
Refer to 1 1 . Operation Procedure for Panorama 9 . COOLING TIME.

**1 0 . Release of a patient**

\* Open Ear Rods to release a patient.



### 1 1 . Removal of a Cassette

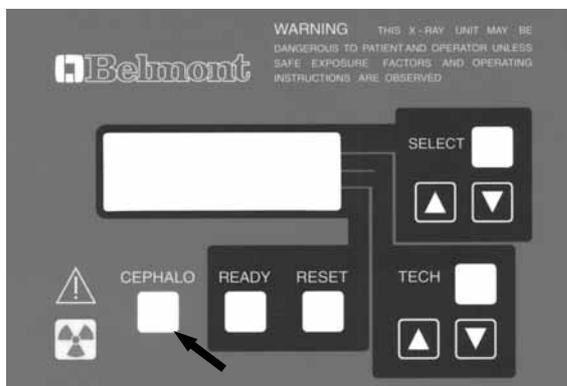


\* Lift "Cassette Fixing Knob" upward, and remove a Cassette from the Cassette Holder.

### 1 2 . Return the Rotation Unit to the Start Position

#### ⚠ CAUTION

When **C E P H A L O** key on Operation Panel is depressed, the Rotation ARM Unit starts to rotate. Move away from the rotation area.



Depress **C E P H A L O** key on Operation panel.

The Rotation ARM Unit moves to panoramic exposure position then stops automatically.

### 1 3 . Turning Power OFF

Refer to 1 1 . Operation Procedure for Panorama 1 3 . Turning Power OFF.

## 1 6 . Operation Procedures for Cephalo Front (P A)

1. Learn the Panoramic radiographic operation procedures well. You can utilize Panoramic operating procedures for other modes.
2. If procedures are the same as the ones of Panorama, explanations of operation procedures in other modes are omitted. If you have any questions, Refer to operation procedures for Panorama.

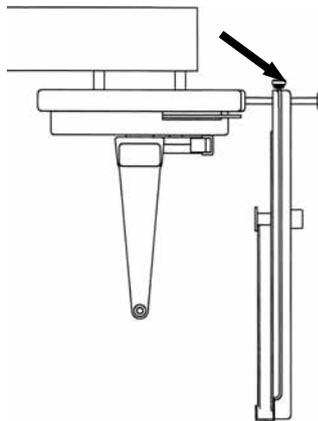
### 1 . Preparation for the exposure

- \* X-ray Protective Apron
- \* Cephalo Cassette (with a film inserted)

### 2 . Insertion of a Cassette

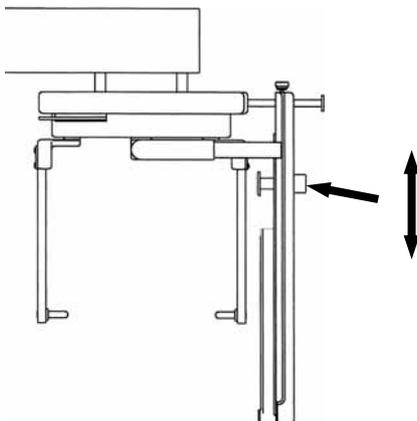
#### NOTE

There is directionality for a cassette. The Front side of a cassette should be directed to the X-ray generator.

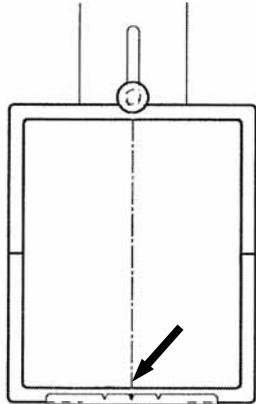


To Adjust the position of the Cassette Holder, Loosen the Cassette Position lock and move the cassette holder to its proper position, then fasten the lock.

For the standard radiograph, set to "15"cm on the scale. The magnification is 1.1 times at this position.



To set a cassette, lift "Cassette Fixing Knob" set a cassette, then move "Cassette Fixing Knob" downward.



Align the center line of a cassette with the center of V cut on the Cassette Holder.

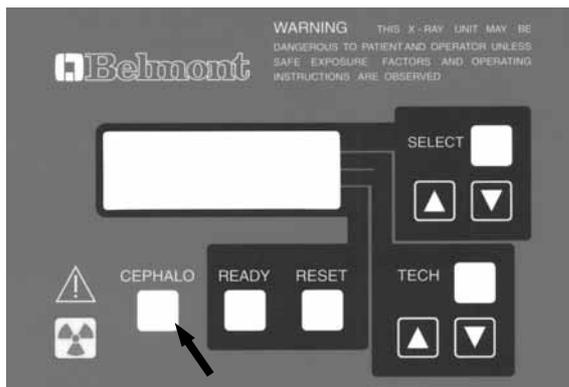
**3 . Turning Power ON**

Refer to 1 0 . Operation Procedure for Panorama 3 . Turning Power ON.

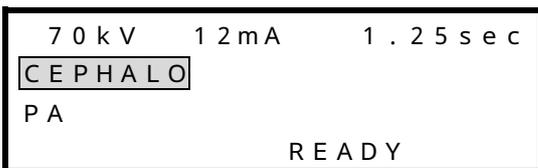
**4 . Selection of the Exposure Orbit**

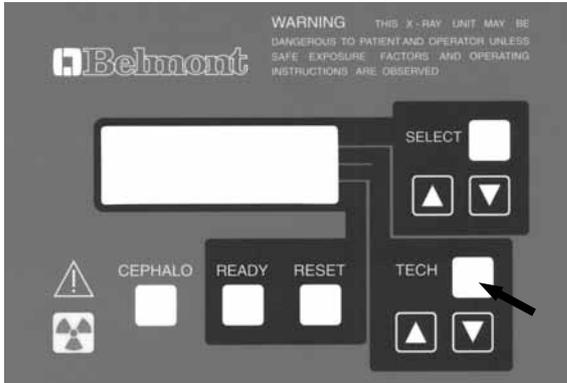
**⚠ CAUTION**

When “CEPHALO” key is depressed, the Rotation ARM automatically moves to the Cephalo radiograph position  
 Move away from the rotation area.

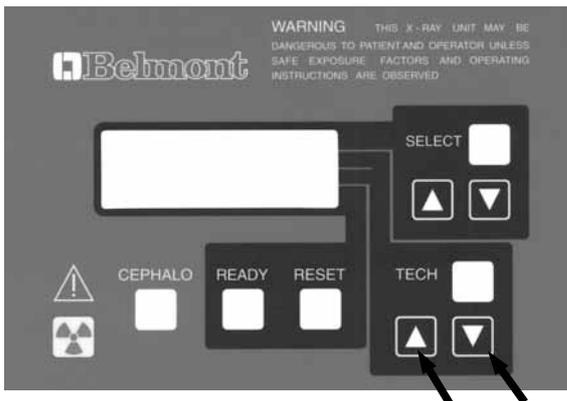
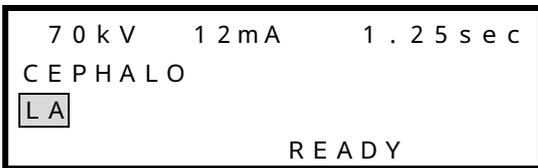


When **C E P H A L O** key is depressed, the indication will be changed to “CEPHALO”, the Rotation ARM moves to Cephalo radiograph position automatically.



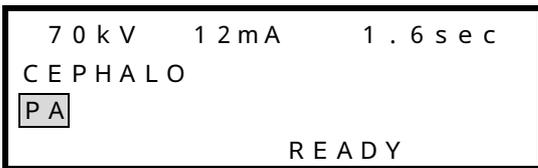


Depress **TECH** key to get into ORBIT selection mode.



Depress either **UP** · **DOWN** key located under TECH key to set Cephalo Lateral "PA".

PA : Cephalo Front Radiograph



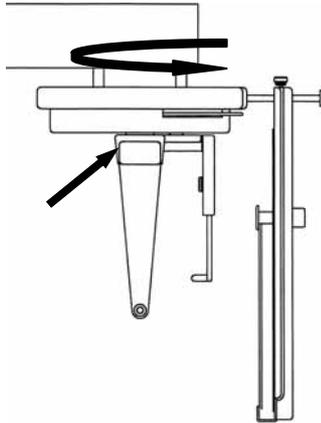
## 5 . Setting of Exposure Conditions

17. Set exposure condition by referring to the exposure condition table.

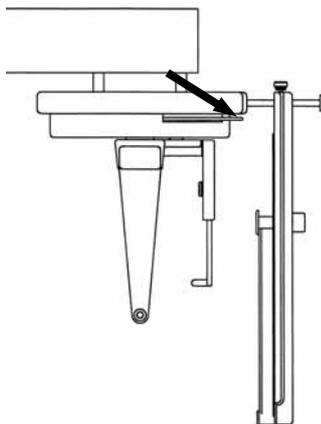
Refer to 1 0 . Operation Procedure for Panorama 5 . Setting of Exposure Conditions.

## 6 . Patient Positioning

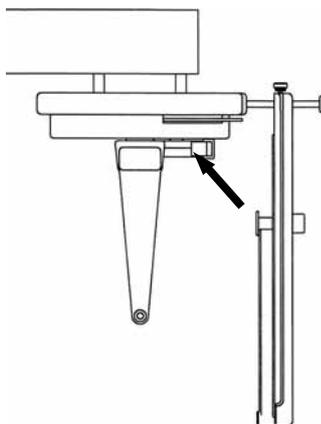
6 . 1 . Turn the Ear Holding Rods to the PA position.



Rotate the Ear Rods by holding the Ear Rod mounting area (see drawing on left), align Ear Rods to the exposure direction of Cephalo Front.



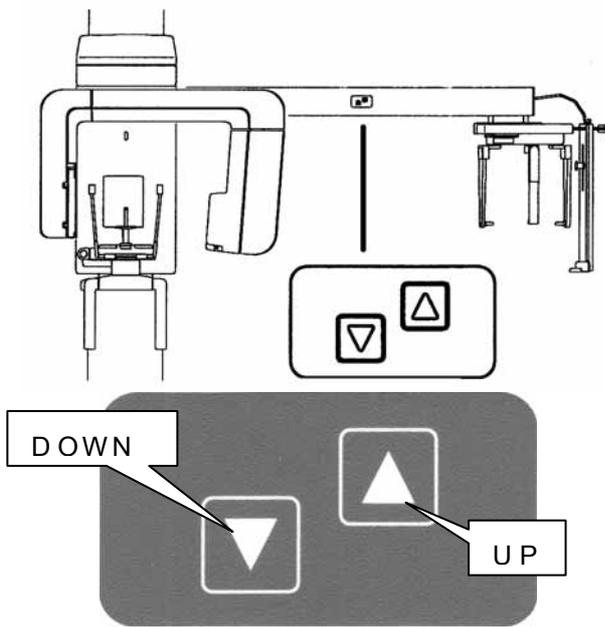
Fully open Ear Holding Rods by moving the Open-Close lever.



Align the Forehead Rest Pad horizontally.

6 . 2 . Put a X-ray protector apron on a patient and an assistant.

6 . 3 . Guide a patient near to the equipment.



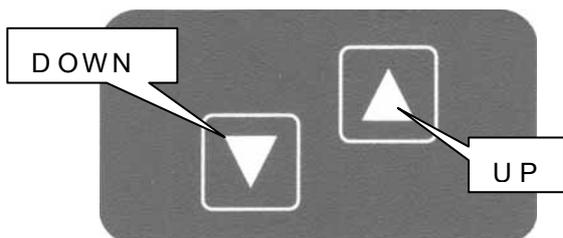
\* Push either **UP** or **DOWN** key on the Cephalo ARM, move the Sliding Unit to align Ear Rods close to the external auditory foramen.

6 . 4 . Instruct a patient "Stand facing Cephalo Cassette with both feet under center of Cephalostat. Ask a patient to stand with his or her back and neck as straight as possible."



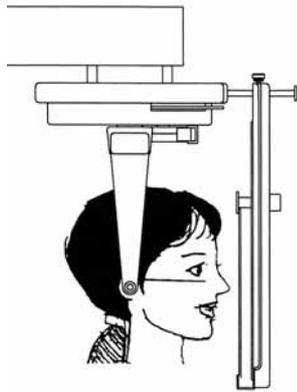
6 . 5 . Make a patient positioning.

**⚠ CAUTION**  
Pay enough attention to the safety of a patient when the Sliding Unit moves up and down.

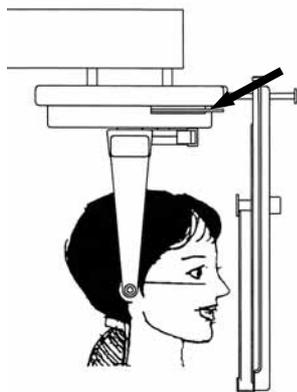


\* Depress either **UP** or **DOWN** key of the Cephalo ARM to align Ear Rods to the external auditory foramen of a patient.

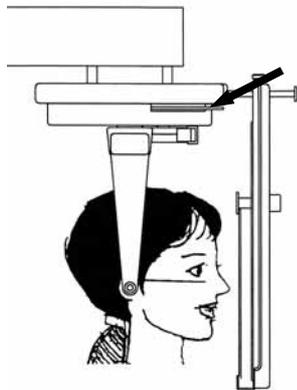
Align the patient's Frankfort Plane horizontally.



Lightly close the Ear Holding Rods by the Open-Close Lever.



After confirming the Frankfort Plane of a patient is horizontal, carefully close the Ear Holding Rods to support the patient head.



**7 . READY ON**

Refer to 1 1 . Operation Procedure for Panorama 7 . READY ON.

**8 . X-ray irradiation**

Refer to 1 5 . Operation Procedure for Cephalo Front ( PA ) 8 . X-ray irradiation

**9 . COOLING TIME**

Refer to 1 1 . Operation Procedure for Panorama 9 . COOLING TIME.

**1 0 . Release of a patient**

Refer to 1 5 . Operation Procedure for Cephalo Lateral ( L A ) 1 0 . Release of a patient

**1 1 . Removal of a Cassette**

Refer to 1 5 . Operation Procedure for Cephalo Lateral ( L A )  
1 1 . Removal of a Cassette

**1 2 . Return Rotation Unit to Start Position**

Refer to 1 5 . Operation Procedure for Cephalo Lateral ( L A )

**1 3 . Turning Power OFF**

Refer to 1 1 . Operation Procedure for Panorama 1 3 . Turning Power OFF.

## 1 7 . Table of Exposure Settings

Set exposure factors by consideration of size, age, bone density, etc. of a patient.

- Film : KODAK T M G ( Rare Earth Type )
- Intensifying Screen : KODAK L A N E X 4 0 0 ( Rare Earth Type )

### Film Radiograph

#### 1 . Panorama

##### 1 . 1 . Exposure time 12sec

###### 1 ) Panorama Child : CHILD ORBIT

AGE	SEX	k V	m A
4 ~ 5	-	6 0 ~ 6 2	1 2
6 ~ 1 1	-	6 2 ~ 6 6	1 2

###### 2 ) Panorama Adult : ADULT ORBIT

AGE	SEX	k V	m A
1 2 ~ 1 5	-	6 6 ~ 7 0	1 2
Adult	Female (S)	7 0 ~ 7 2	1 2
	Male• Female	7 4 ~ 7 6	1 2
	Male ( L )	7 6 ~ 8 0	1 2

###### 3 ) Orthoradial Orbit : ORTHO ORBIT

AGE	SEX	k V	m A
4 ~ 5	-	6 0 ~ 6 2	1 2
6 ~ 1 1	-	6 2 ~ 6 6	1 2
1 2 ~ 1 5	-	6 6 ~ 7 0	1 2
Adult	Female (S)	7 0 ~ 7 2	1 2
	Male• Female	7 2 ~ 7 6	1 2
	Male ( L )	7 6 ~ 8 0	1 2

##### 1 . 2 . Exposure time 7sec

###### 1 ) Panorama Child : CHILD ORBIT

AGE	SEX	k V	m A
4 ~ 5	-	6 8 ~ 7 0	1 2
6 ~ 1 1	-	7 0 ~ 7 4	1 2

###### 2 ) Panorama Adult : ADULT ORBIT

AGE	SEX	k V	m A
1 2 ~ 1 5	-	7 4 ~ 7 8	1 2
Adult	Female (S)	7 8 ~ 8 2	1 2
	Male• Female	8 2 ~ 8 4	1 2
	Male ( L )	8 4 ~ 8 8	1 2

###### 3 ) Orthoradial Orbit : ORTHO ORBIT

AGE	SEX	k V	m A
4 ~ 5	-	6 8 ~ 7 0	1 2
6 ~ 1 1	-	7 0 ~ 7 4	1 2
1 2 ~ 1 5	-	7 4 ~ 7 8	1 2
Adult	Female (S)	7 8 ~ 8 0	1 2
	Male• Female	8 0 ~ 8 4	1 2
	Male ( L )	8 4 ~ 8 8	1 2

**2 . Maxillary Sinus Radiography**

AGE	SEX	k V	mA
4 ~ 5	-	6 0 ~ 6 2	1 2
6 ~ 1 1	-	6 2 ~ 6 6	1 2
1 2 ~ 1 5	-	6 6 ~ 7 0	1 2
Adult	Female (S)	7 0 ~ 7 2	1 2
	Male• Female	7 4 ~ 7 6	1 2
	Male ( L )	7 6 ~ 8 0	1 2

**3 . TMJ Lateral (4 sections)**

AGE	SEX	k V	mA
4 ~ 5	-	6 4 ~ 6 6	1 2
6 ~ 1 1	-	6 6 ~ 7 0	1 2
1 2 ~ 1 5	-	7 0 ~ 7 4	1 2
Adult	Female (S)	7 4 ~ 7 8	1 2
	Male• Female	7 8 ~ 8 0	1 2
	Male ( L )	8 0 ~ 8 4	1 2

**4 . TMJ Front (2 sections)**

AGE	SEX	k V	mA
4 ~ 5	-	6 0 ~ 6 2	1 2
6 ~ 1 1	-	6 2 ~ 6 6	1 2
1 2 ~ 1 5	-	6 6 ~ 7 0	1 2
Adult	Female (S)	7 0 ~ 7 2	1 2
	Male• Female	7 2 ~ 7 6	1 2
	Male ( L )	7 6 ~ 8 0	1 2

**5 . Cephalo Lateral(L A)**

AGE	SEX	k V	m A	sec
4 ~ 5	-	6 0 ~ 6 2	1 2	0 . 4
6 ~ 1 0	-	6 2 ~ 6 6	1 2	0 . 4
1 1 ~ 1 5	-	6 6 ~ 7 0	1 2	0 . 6 3
Adult	Female (S)	7 0 ~ 7 5	1 2	0 . 8 0
	Male·Female	7 5 ~ 8 0	1 2	1 . 2 5
	Male (L)	8 0 ~ 8 5	1 2	1 . 6 0

**6 . Cephalo Front(P A)**

AGE	SEX	k V	m A	sec
4 ~ 5	-	6 0 ~ 6 2	1 2	0 . 6
6 ~ 1 0	-	6 2 ~ 6 6	1 2	0 . 6
1 1 ~ 1 5	-	6 6 ~ 7 0	1 2	0 . 8 0
Adult	Female (S)	7 0 ~ 7 5	1 2	1 . 2 5
	Male·Female	7 5 ~ 8 0	1 2	1 . 6 0
	Male (L)	8 0 ~ 8 5	1 2	2 . 0 0

**Digital Radiograph****1 . Panorama****1 . 1 . Exposure time 12sec**

## 1 ) Panorama Child : CHILD ORBIT

AGE	SEX	k V	m A
Child	-	60	8

## 2 ) Panorama Adult : ADULT ORBIT

AGE	SEX	k V	m A
Adult	Female	62	8
	Male	64	8

## 3 ) Orthoradial Orbit : ORTHO ORBIT

AGE	SEX	k V	m A
Adult	Female	62	8
	Male	64	8

**1 . 2 . Exposure time 7sec**

## 1 ) Panorama Child : CHILD ORBIT

AGE	SEX	k V	m A
Child	-	60	8

## 2 ) Panorama Adult : ADULT ORBIT

AGE	SEX	k V	m A
Adult	Female	62	8
	Male	64	8

## 3 ) Orthoradial Orbit : ORTHO ORBIT

AGE	SEX	k V	m A
Adult	Female	62	8
	Male	64	8

**2 . Maxillary Sinus Radiography**

AGE	SEX	k V	m A
Child	-	60	8
Adult	Female	62	8
	Male	64	8

**3 . TMJ Lateral (4 sections)**

AGE	SEX	k V	m A
Child	-	62	10
Adult	Female	64	10
	Male	66	10

**4 . TMJ Front (2 sections)**

AGE	SEX	k V	m A
Child	-	62	10
Adult	Female	64	10
	Male	64	10

## 1 8 . Magnification of Image

Radiographic Mode	Orbit	Magnification
P A N O R A M A : PANORAMA	C H I L D O R B I T : Child	1.24 ~ 1.34
	A D U L T O R B I T : Adult	1.21 ~ 1.32
	O R T H O O R B I T : Ortho	1.23 ~ 1.36
M S : Maxillary Sinus	: Maxillary Sinus	1.20 ~ 1.22
T M J : TMJ	L A 4 S E C T I O N : Lateral (LA)	About 1.24
	P A 2 S E C T I O N : Front (PA)	About 1.88
C E P H A L O : CEPHALO	L A : Lateral (LA)	1.1
	P A : Front (PA)	1.1

## 19 . DAILY MAINTENANCE

### Cleaning and Disinfection

Parts	How to maintenance
Bite Blocks (For Panorama)	Sterilize by AUTO-CLAVE after exposure(s) of each patient.
Head Holding Rods	
Ear Rods (TMJ Lateral 4 sections)	
Ear Rods (TMJ Front 2 sections)	
Chinrest (Panorama)	
Chinrest (Maxillary Sinus)	
Nasion Pad	
EAR Rods (For Cephalo)	
FOREHEAD REST (For Cephalo)	
All other parts which patients touch.	
All other parts which operator touch.	Make enough disinfection with alcohol for medical use, of which alcohol degree is over 76%, at end of daily operation.
Outside cover of the equipment	Wipe equipment with a dry cloth at end of daily operation.

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## **2 0 . X-ray Film(Film Radiograph)**

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**1 . TMG FILM (KODAK) is recommended**

**2 . Film Sensitivity may vary by manufacturers and by products.**

**3 . If TMG film is not used, we can not be responsible for any trouble which is derived from it.**

### **4 . Handling of X-ray Film**

4 . 1 . Prevention of dirt

Prevent film surface from dirt, water drops, developer, fixer, and fingerprints.

4 . 2 . Prevention of damage

Prevent film from fold, scratch, and flaw.

4 . 3 . Prevention of static electricity

When a film is equipped in a cassette, prevent it from damage of static electricity.

### **5 . Storage of films**

5 . 1 . Prevent from exposure in daylight, X-ray beam and scatter.

5 . 2 . Do not use expired film.

5 . 3 . Store in place where temperature does not exceed 104F ( 4 0 )

5 . 4 . Handle films in adequate darkroom, dark box, or under a safety light.

5 . 4 . Store in place where proper humidity is kept.

---

## **2 1 . INTENSIFYING SCREEN(Film Radiograph)**

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**1 . KODAK L A N E X 4 0 0 (Rare Earth Type) is recommended.**

**2 . Speed of Intensifying Screen may vary by manufacturers and by products**

**3 . If recommended Intensifying Screen is not used, we can not be responsible for any trouble which is derived from it.**

### **4 . Handling of Intensifying Screen**

4 . 1 . Prevention of dirt

Prevent Intensifying Screen from dirt, water drops, developer, fixer, and fingerprints.

4 . 2 . Prevention of damage

Prevent Intensifying Screen from fold, scratch, and flaw.

4 . 3 . Prevention of static electricity

When an Intensifying Screen is equipped in a cassette, prevent it from damage of static electricity.

### **5 . Replacement**

Replace with new one when surface is cracked.

Under such condition, adequate X-ray image can not be obtained.

### **6 . Storage of Intensifying Screen**

Store in place where temperature does not exceed 104F ( 4 0 )

Store in place where proper humidity is kept.

## 2 2 . Development(Film Radiograph)

Development is one of the most important processes in order to obtain a good X-ray radiograph.  
Develop with special care.

### 1 . Adjustment of developer

Dissolve the developer in accordance with the manufacturer's instructions.

Do not use developer or fixer over one month, regardless of the frequency of use.

### 2 . Developing Time and Developing Temperature

When developing temperature is about 68F( 2 0 ) developing time is about 3 . 5 minutes.

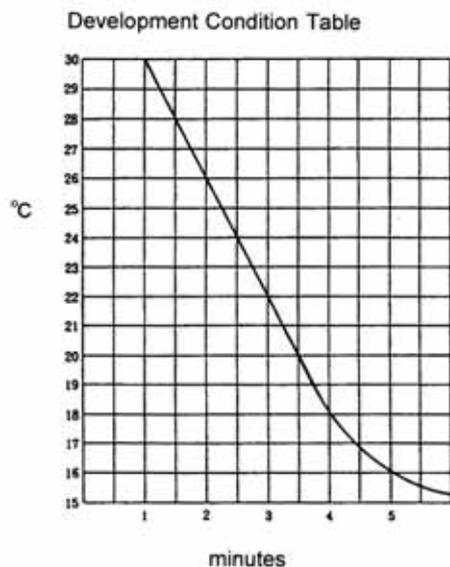
Refer to “ Development Condition Table ”

Manual Development Sample

Temperature of Developer Fixer  
68F ( 2 0 )

Development 3.5 minutes

Fixing 10 minutes



### 3 . Development point

For tank development, stir thoroughly a hunger suspending film in developer until all bubbles are removed from surface of film.

### 4 . Intermediate Washing

Conduct an intermediate washing of the film with cyclic water or a stop solution liquid for 30 seconds, at a liquid temperature of 68F ( 2 0 )

### 5 . Fixing

Dissolve fixer in accordance with the manufacturer's instructions.

Prepare the necessary amount of solution.

Fix the film at a liquid temperature of 68F ( 2 0 ) for 10 minutes.

### 6 . Washing

Circulate the washing water so that new water constantly circulates surface of film.

Wash film in water for 2 0 minutes, at a liquid temperature of 68F ( 2 0 ) .

### 7 . Drying

Dry the washed film naturally in a dust-free area.

**AUTOMATIC DEVELOPMENT MACHINE: Refer to manufacturer's manual.**

## 2 3 . Trouble Shooting and Error Code List

### 1 . POWER can not be turned ON

Check	Treatment
Is the breaker turned on?	Turn the breaker on
Is the power plug connected to outlet?	Connect the power plug

### 2 . READY can not be turned on

Check	Treatment
Is positioning of the Rotation ARM at the starting position?	Depress RESET key.
Is a cassette put on the cassette holder?	Put a cassette on the cassette holder.
Is READY ON turned on?	Depress READY key

### 3 . Buzzer keeps sounding after READY ON

Check	Treatment
Is a cassette put on the cassette holder?	Put a cassette on the cassette holder.

### 4 . Density of radiograph is thick or thin.

Check	Treatment
Are you using a recommended Film and an Intensifying Screen?	Use a recommended X-ray Film and an Intensifying Screen.

### 5 . All face of X-ray film becomes transparent or black.

Any portion of X-ray film becomes black (Automatic Developer).

Check	Treatment
Are you using developer or fixer solution over 3 weeks?	Replace with new solution.
Is temperature of developer or fixer solution rose up?	Check the temperature of developer or fixer.
Is the setting time of development and fixing correct?	Correct the setting time of development and fixing
Is developer and fixer solution filled over each roller?	Adjust quantity of solution
Are you using unexposed new X-ray Film? Is entire face of the a X-ray film transparent?	Check that daylight is not exposure on a film, light is not leaked in development machine
Exposed X-ray film to light. Is entire face of X-ray film black?	Contact vender who you brought automatic developer.

**6 . Image Display Problem with the CCD Unit.**

<b>In case that CCD Sensor has a problem</b>
Turn the power of the PC off
Turn the power of the Panoramic radiograph off.
Turn the power of the Panoramic radiograph on again
Turn the power of the PC on again and restart the PC
Check the condition of LED (green color)
If the green LED is not blinking, check the connection between the PC and the Sensor unit
In case that LED is blinking, but not turned on, check the connection between the PC and the Sensor unit
When there is no problem in the connection of the LAN cable, it could be a malfunction of the sensor unit, please contact a service engineer of your dealer

**7 . Image Display Problem with the CCD Unit.**

<b>In case that PC or image processing software has a problem</b>
Turn the power of the PC off
Turn the power of the Panoramic radiograph off.
Turn the power of the Panoramic radiograph on again
Turn the power of the PC on again and restart the PC
Check that LED of the sensor unit is changed from blinking to stable
Check the connection of the LAN cable
If above steps don't solve the problem, please contact your PC manufacturer or image processing software vender

## 8 . Error display on Control Panel

7 0 k V	1 2 m A	1 2 s e c
P A N O R A M A		
C H I L D O R B I T		
P O S I =	* * m m	C A S S E T T E

Indication	Counter Measurement
C A S S E T T E	Mount a cassette on a regular position, and push RESET key.
I N V E R T E R	Turn the power OFF, and turn the power ON again.
T H E R M A L	Turn the power OFF, then, wait for 30 minutes, and then turn the power on.
C S T M T	Depress "RESET" key
H E A D M T	Depress "RESET" key
1 C O L M T	Depress "RESET" key
Y M T	Depress "RESET" key
R O T M T	Depress "RESET" key
B E A M M T	Depress "RESET" key
U N I T M T	Depress "RESET" key
C S T P O S	Depress "RESET" key
R S C P U	Depress "RESET" key
R S P C	Depress "RESET" key
W A I T P C	Depress "RESET" key
R S M A I N	Depress "RESET" key
M O D E S E T	Depress "RESET" key

\* When the trouble cannot be resolved, turn power of the ANA-BEL OFF, unplug from the electric outlet, and call your distributor or our office.

## 2 4 . MAINTENANCE

### Warning

**High voltage is applied to inside of the equipment. Do not open the cover by yourself. Before asking for a repair, turn the power of the equipment OFF, and unplug from the power outlet. After unplugged the equipment, wait for 10 minutes before starting a service work.**

Special knowledge and special measuring tools are required to check this equipment.

To ensure that X-ray unit functions within the manufacturer’s specifications and remains in compliance with Standards, daily checking (by eyes) and a periodic maintenance by the dealer service personnel are recommended.

Maintenance by service personnel 1-2 times/year

Check Item	Purpose	Action	Method
Electricity Condition	Check voltage range	Check whether incoming voltage is within the equipment’s requirement or not.	●
External Appearance	External Appearance	A) Deformation, scratches.	⊙
		B) Warning Labels	⊙
	Inside of the equipment	Check stain and dust	●
Installation place	Temperature & Humidity	Check compatibility of the environmental conditions to operate the equipment	●
	Level of floor	Check the influence to the equipment	●
	The Installation condition of the equipment	Check vibration and movement stability of the equipment	●
	Check obstacles	Make sure that there are no obstacles within the movement range of the equipment	⊙
	Rust	Check the condition of the rust. Evaluate the influence to the safety.	⊙
Safety Test for Electric Shock	Insulation Resistance	Check the resistance between a power line and the earth	●
	Leaked current from the outer cover	Check the current which is leaked from the outer cover of the equipment to the earth	●
	Earthing resistance	Check the resistance value between an exposed metal and the earth	●
	Resistance of the Earth wire	Resistance between the earth terminal and the earthing point	●
Movement Accuracy of the equipment	Power Circuit voltage	Check the voltage of the power circuit	●
	Check Radiographic Circuit	Check the wave shape and the setting values of the radiographic circuit	●
	Check Control Circuit	Check the movements of operating sequences	●
	Accuracy of the Positioning Mechanism	Check the deterioration of the positioning mechanism	●
	Check the Movement of the Protection Circuit	Check the setting values of the protection circuit. Check the movement of the protection circuit.	●
	Check display circuit	Check the functions of display circuit	●

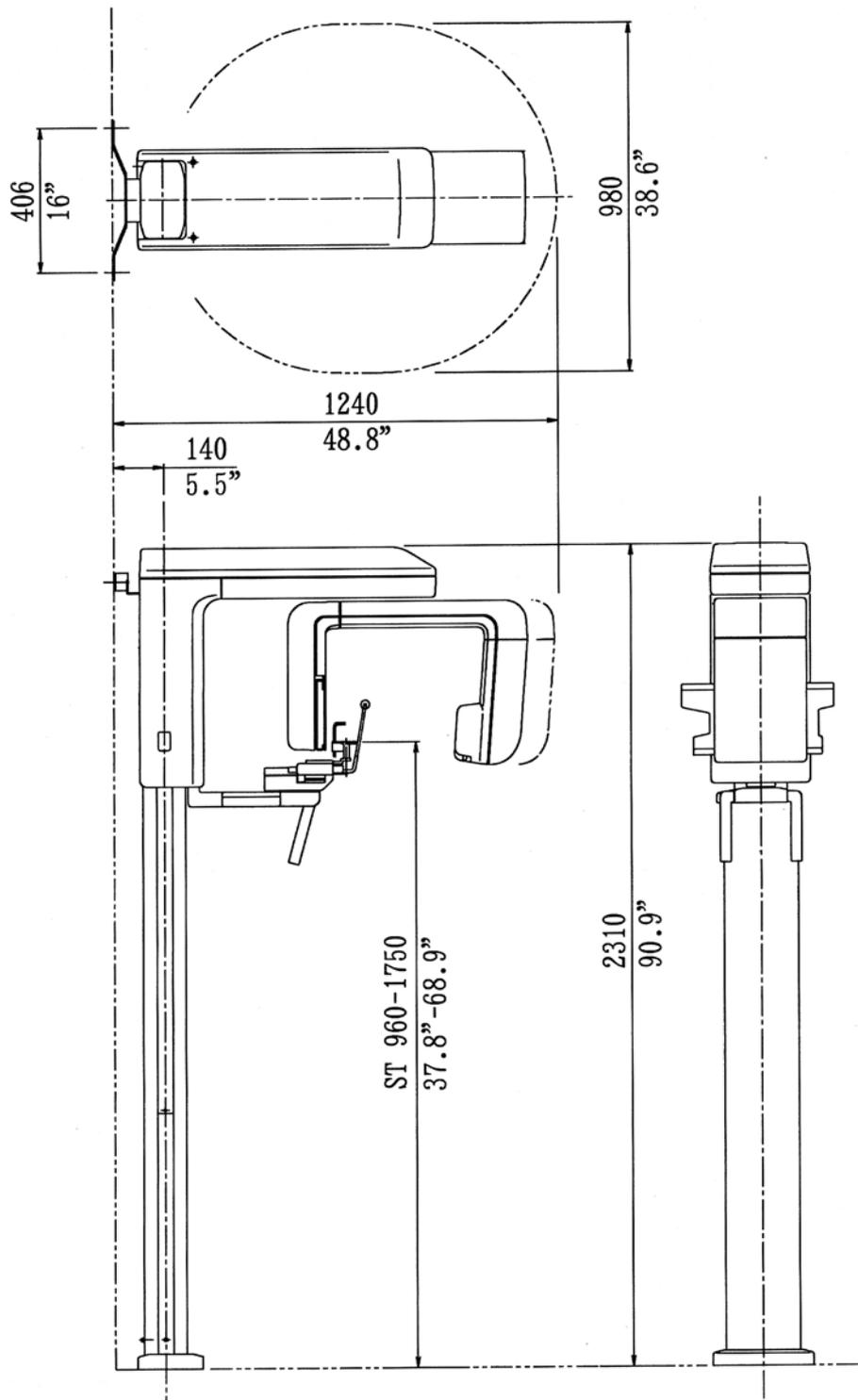
Check Item	Purpose	Action	Method
Display during an exposure	Check irradiation of X-ray and "X-RAY ON" display are in sync	Check this while X-ray is irradiated.	⊙
X-ray Generator	X-ray tube	Check the leakage of insulation oil	⊙
	Low voltage cables	Check wear, damage, tension, and twist	⊙
	Cone	Check looseness, transformation, and damage	⊙
	Filter	Check transformation and damage	⊙
	Slit Plate (Collimator)	Check off-alignment of exposure field. Confirm the exposure width	●
Radiographic mechanism	Movement of the ROTATION ARM ASSY	Check slip, abnormal sound, and stopping accuracy	⊙
	Patient Positioning Mechanism	Play, looseness, operational performance, and safety	⊙
	Positioning beams	Check the brightness and the positioning accuracy	⊙
Sliding mechanism	Wire Rope	Check cut, check the wire is securely connected to the terminal	●
	Upward / downward movements	Check smoothness of the movement	⊙
	Drop prevention mechanism	Check safety mechanism works properly	●
X-ray output	X-ray Tube Voltage	Check X-ray Tube voltage	●
	X-ray Tube Current	Check X-ray Tube current	●
	Exposure Time	Check exposure time	●
Accessories	Intensifying Screen	Check crack and scratch	⊙
	Film Cassette	Check crack and scratch	⊙

#### Checking Methods

- ⊙ : Check by eyes during a daily operation
- : Check by a service personnel.

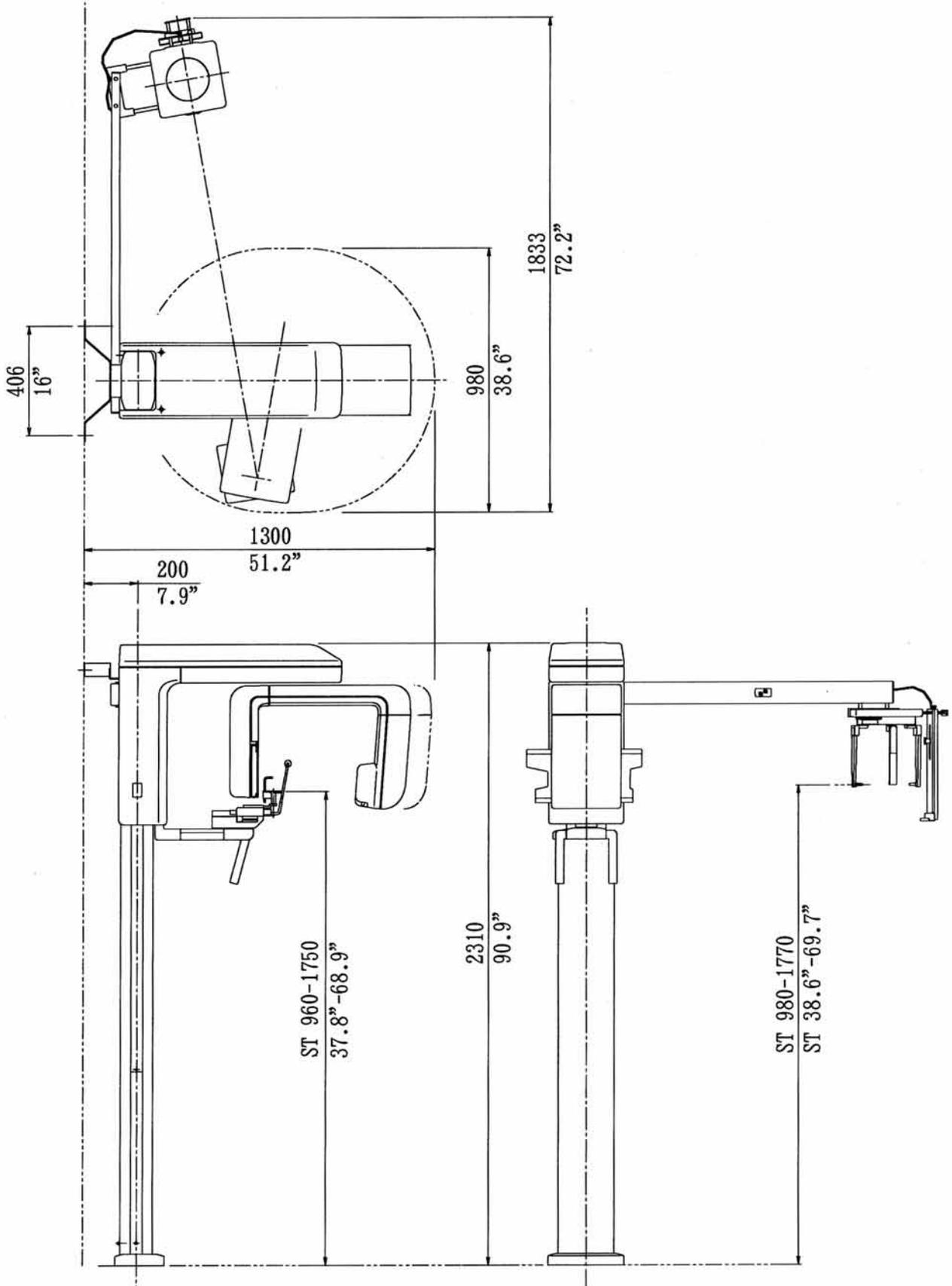
# 2 5 . Physical Dimensions

## 1 . ANA - BEL



B 0 2 - T 1 5 1

2 . ANA - BEL CM



## 2 6 . Technical data

### 1 . Wall Bracket.

The distance between the column and a wall is 6.1" (155 mm).

### 2 . Compliance with International Standards

ANE-BEL, ANA-BEL CM complies with the following standards

I E C 6 0 6 0 1 - 2 - 7 ( 1 9 9 8 )

I E C 6 0 6 0 1 - 2 - 2 8 ( 1 9 9 3 - 0 3 )

I E C 6 0 6 0 1 - 2 - 3 2 ( 1 9 9 4 - 0 3 )

### 3 . Classification

- 1 . According to the type of protection against electric shock
  - a) Equipment energized from external electrical power source.  
Class I equipment
- 2 . According to the degree of protection against electric shock  
Type B applied part
- 3 . Protection against Ingress of water  
Ordinary
- 4 . Equipment not suitable for use in the presence of a FLAMMABLE ANAESTHETIC MIXTURE WITH AIR OR WITH OXYGEN OR NITROUS OXIDE
- 5 . According to the mode of operation:  
Continuous Operation with Short-Time Loading
- 6 . Duty cycle:  
Exposure Time: 12 sec, Cooling Time: 90 sec

### 4 . Remaining Risk

- 1 . Occurrence of the excessive X-ray dosage due to malfunction of software during exposure  
Signal to Watch Dog IC (works to reset if the signal is in the same condition over 1.6 sec.) observes the operating condition of the software.
- 2 . If excessive X ray is irradiated due to the mechanical malfunction, immediately turn the X-RAY SWITCH OFF. to stop the irradiation.
- 3 . Operator instructs a patient not to move until the movement of the ROTATION ARM stops during a RESET process.
- 4 . ANA-BEL monitors the temperature of the X-ray generator from READ ON to the end of the exposure.  
If X-Ray generator malfunctions due to the unusual temperature in X-ray tube, radiography will be terminated and ERROR will be displayed.
- 5 . Operator instructs a patient not to move during an exposure.  
Also, operator should pay attention to a patient, an assistant, and the equipment during an exposure.



B 0 2 - T 1 5 1

## 5 . Environmental condition to operate the equipment is as follows.

Environmental condition to operate the equipment

The temperature: 41~95F (5 ~ 35°C)

The humidity : 30-85%

The atmospheric pressure: 700-1060hpa

## 6 . The environmental condition to transport the equipment is as follows.

Environment to transport the equipment

The temperature: 14~140F ( - 10 ~ 60°C)

The humidity : 30-85%

The atmospheric pressure: 700-1060hpa

## 7 . X-ray Generator

### 1 . Maximum electric output

Maximum X-ray tube voltage: 90kV

Maximum X-ray tube electric current: 12mA

### 2 . Nominal maximum electric power for output of 90kV, 12mA.

1.08 k W

### 3 . Standard Tube Voltage, Current and Time

1 2 0 m A s ( 7 5 k V 、 1 0 m A 、 1 2 s e c )

### 4 . Minimum Tube Current and Time

2 4 m A s ( 2 m A 、 1 2 s e c )

### 5 . Nominal Capacity of Anode Input

1.7 5 k W

### 6 . Maximum Capacity of Anode Heat

3 5 k J ( 5 0 k H U )

### 7 . Material of X-ray Tube Anode

Tungsten

### 8 . target angle of X-ray Tube

5°

### 9 . Angle of X-ray Tube Focus Angle

5°

### 1 0 . Size of X-ray Tube Focus

0.5 × 0.5 ( mm )

### 1 1 . Characteristic Filtration of X-ray Tube

0.8 m m A l

### 1 2 . Nominal Tube Voltage of X-ray Tube

5 0 ~ 1 0 0 k V

### 1 3 . Rating of X-ray Tube Filament

3.5 ~ 4.9 V 3.5 A

Refer to Characteristic Drawing of Emission for Cathode

1 4 . Supplied Voltage of Primary Side for 50-100kV Output

About 150 Vp (PWM)

1 5 . Weight of X-ray Generator

About 7.13 kg

B 0 2 - T 1 5 1

**1 6 . Leaked Dose of the X-ray Generator**

Refer to the attached document paper.

Loading Factor to measure leakage of X-ray Generator: 90kV, 12mA, 20sec

**1 7 . Type of X-ray Generator**

C L A S S I

**1 8 . Standard Angle to assemble X-ray Generator**

Horizontal / perpendicular

**1 9 . Target Angle to assemble X-ray Generator**

5°

**2 0 . Precision to install focus of X-ray Generator at time of construction of**

X-ray Generator

± 0.5 mm

**2 1 . Size of the focus at time of installation of X-ray Generator**

0.5 × 0.5 ( mm )

**2 2 . Duty Cycle**

Cooling time for this X-ray Generator is 90 seconds to avoid the accumulation of excessive heat.  
X-RAY operation is unavailable for 90 seconds after each exposure.

**8 . Aluminum equivalent**

<u>Name of part</u>	<u>Aluminum equivalent</u>
Filter	0.8mmAl
Sliding Unit Cover	2.0mmAl
Ear Rod(TMJ 1 & 2)	0.2mmAl
Head Holder	0.2mmAl
Film Cassette	1.2mmAl
Intensifying Screen	3.0mmAl
Bite Block	1.0mmAl

**9 . Rating of Line Switch**

250V, 15A

**1 0 . Maximum Energy Input per 1 hour**

1728mAs / h

**1 1 . Rotation Speed of ARM**

0.85km/h.

**1 2 . Rotation Force of ARM**

3.7kgf.

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2 6

### **1 3 . Staments of Reference Loading Condition**

90kV, 12mA, 12sec (ANA-BEL)

90kV, 12mA, 3.2sec (ANA-BEL CM)

### **1 4 . Laser Marking**

Class : 2 products (IEC60825-1: 2001)

Wave Length: 6 7 0 mm

Standard : 1 mW

### **1 5 . Line impedance**

0.3Ω

### Data of X-ray Tube

# TOSHIBA

Electron Tube, Device & Material Group  
TECHNICAL DATA

TOSHIBA X-RAY TUBE  
D-052SB

## STATIONARY ANODE X-RAY TUBE

- ◆ Especially designed for dental tomography unit.
- ◆ Low target angle adaptive for dental tomography.
- ◆ Provided with an insulation cylinder and lead cylinder.
- ◆ This tube has a 0.5 mm focus, and is available for maximum tube voltage 100 kV with DC circuit.
- ◆ Installed in the same enclosure with the high tension transformer.

### GENERAL DATA

#### ELECTRICAL:

Circuit	.....	DC
		(Center-grounded)
Operating Tube Voltage	.....	50 to 100 kV
Focal Spot	.....	0.5 mm
Input Energy (at 1.0 s):		
See rating charts	.....	1750 W



1998-05-11

MECHANICAL:

Dimensions . . . . .	See dimensional outline
Overall Length . . . . .	146 mm
Max. Diameter . . . . .	57 mm
Target Angle . . . . .	5 degrees
Inherent Filtration . . . . .	At least 0.8 mm Al equivalent at 50 kV
X-ray Coverage . . . . .	95 x 380 mm at SID 550 mm
Weight . . . . .	Approx. 780 g
Cooling Method . . . . .	Oil immersed (60°C Max.) and convection oil cooling.
Tube Holding: . . . . .	Holding the insulation cylinder or screw of the anode shank.

MAXIMUM AND MINIMUM RATINGS

(At any time, these values must not be exceeded.)

Maximum Tube Voltage . . . . .	100 kV
Anode to Ground . . . . .	52 kV
Cathode to Ground . . . . .	52 kV
Minimum Tube Voltage . . . . .	50 kV
Maximum Tube Current:	
See rating charts . . . . .	22 mA
Maximum Filament Current . . . . .	3.5 A
Filament Voltage:	
At max. filament current (3.5A) . . . . .	3.5 to 4.9 V
Thermal Characteristics:	
Anode Heat Storage Capacity . . . . .	35 kJ (50 kWhU)
Maximum Anode Heat Dissipation Rate . . . . .	250 W (350 HU/s)

### CAUTIONS

Read this page carefully before using the tube.

Since X-ray tube will emit X-rays when it is energized with high voltage, special knowledge is required to handle it. The items below show general cautions for the tube handling.

1. The tube shall be handled or operated only by qualified personnel.  
Only a specialist with knowledge of X-ray tube should assemble, maintain and remove the tube.
2. The tube envelope is made of glass. In transporting and handling, sufficient care should be taken not to give strong impact or vibration to the tube.
3. Radiation protection of the tube unit assembled with this tube must be sufficiently taken. And the leakage technique factor of the tube unit must not exceed maximum anode cooling rate of this tube.
4. Regulations and standards require the minimum source-skin distance (SSD) and the minimum filtration of the useful beam. Use the tube after fulfilling the requirements.
5. The tube might be broken due to only one overload operation.  
Provide proper overload protection circuit. Operate the tube by selecting a proper input condition according to the conditions for operation and tube characteristics charts.
6. The X-ray shield of this tube is made of lead(Pb). Powdered or vaporized lead is harmful to the human body. The lead shield should not be machined, polished, burned, or wiped with any chemicals. The dispose of lead shield in accordance with the prevailing governmental regulations.
7. If any abnormality is found in using this tube, immediately switch off the power supply and contact TOSHIBA service department.
8. The charts of this technical data are indicating standard values.  
For usage not described here or for any unclear items, please contact TOSHIBA service department without hesitation.

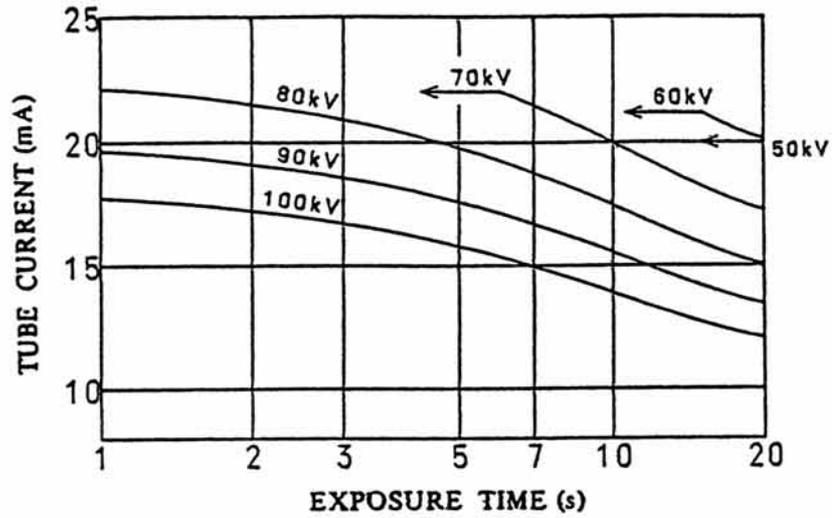
B 0 2 - T 1 5 1

2 6

MAXIMUM RATING CHARTS  
(ABSOLUTE MAXIMUM RATING CHARTS)

DC

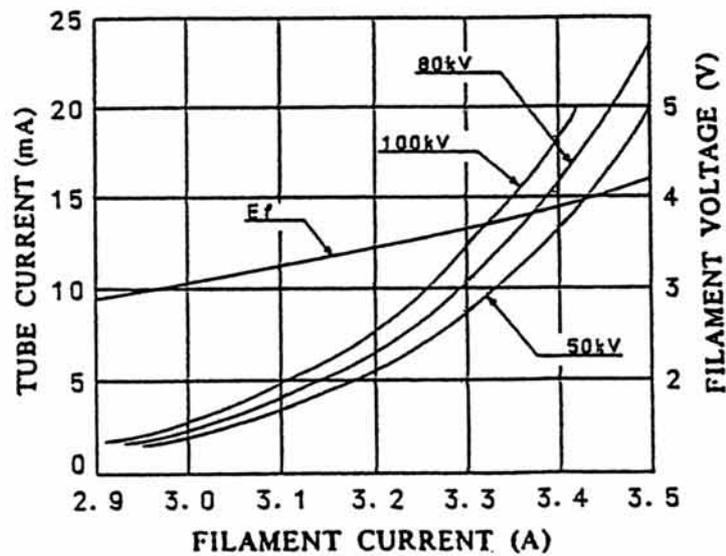
FOCAL SPOT : 0.5 mm



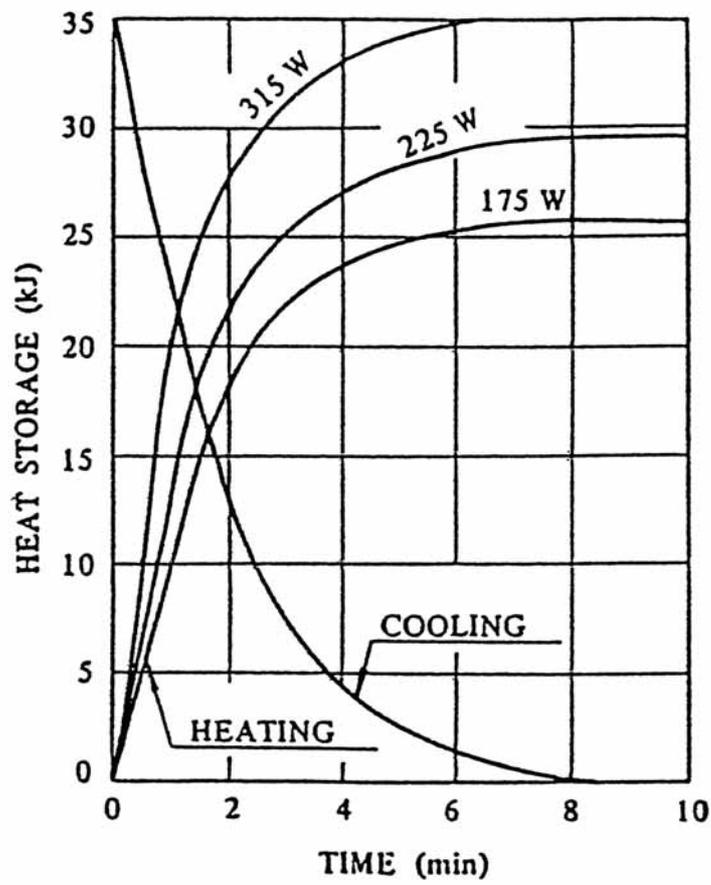
EMISSION & FILAMENT CHARACTERISTICS

DC

FOCAL SPOT : 0.5 mm

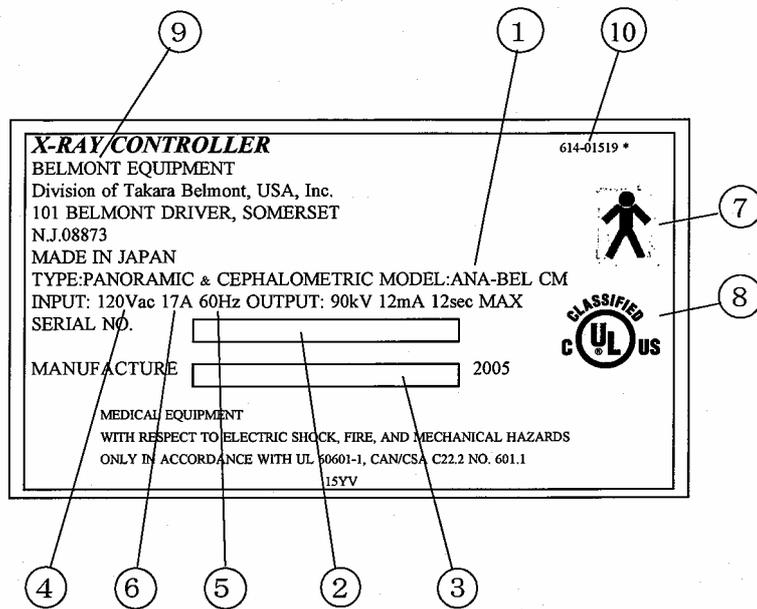


## ANODE THERMAL CHARACTERISTICS



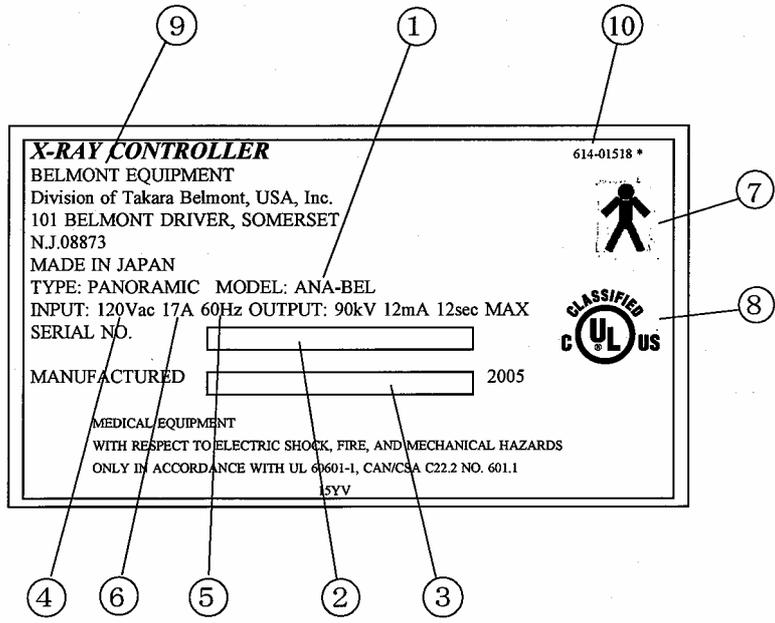
## 27 . Detailed explanation of Labels

X-RAY CONTROLLER (for ANA-BEL CM)



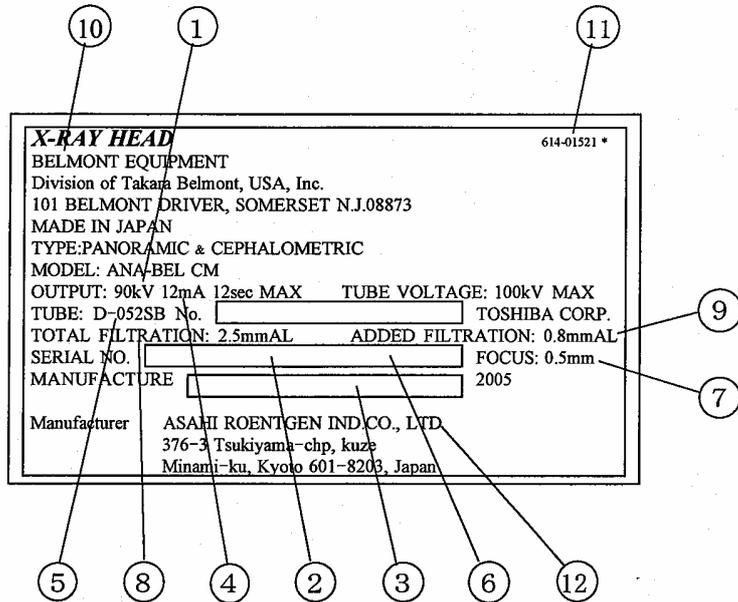
- |                      |                        |
|----------------------|------------------------|
| ① Model Name         | ⑥ Power                |
| ② Serial Number      | ⑦ TYPE B Applied Part  |
| ③ Manufacturing Date | ⑧ UL Mark              |
| ④ Power Voltage      | ⑨ Indication of origin |
| ⑤ Supply Frequency   | ⑩ DWG. No.             |

X-RAY CONTROLLER (for ANA-BEL)



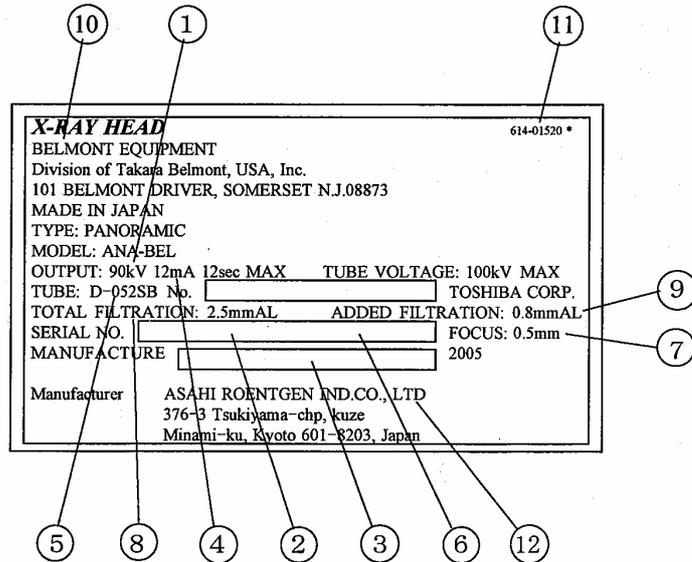
- ① Model Name
- ② Serial Number
- ③ Manufacturing Date
- ④ Power Voltage
- ⑤ Supply Frequency
- ⑥ Power
- ⑦ TYPE B Applied Part
- ⑧ UL Mark
- ⑨ Indication of origin
- ⑩ DWG. No.

X-RAY HEAD (for ANA-BEL CM)



- ① Model Name
- ② Serial Number
- ③ Manufacturing Date
- ④ Maximum X-ray Rated
- ⑤ X-ray Tube Type
- ⑥ Tube Number
- ⑦ Focus Size
- ⑧ Total Filtration
- ⑨ Addendum Filtration
- ⑩ Indication of distributor
- ⑪ DWG. No.
- ⑫ Indication of origin

X-RAY HEAD (for ANA-BEL)

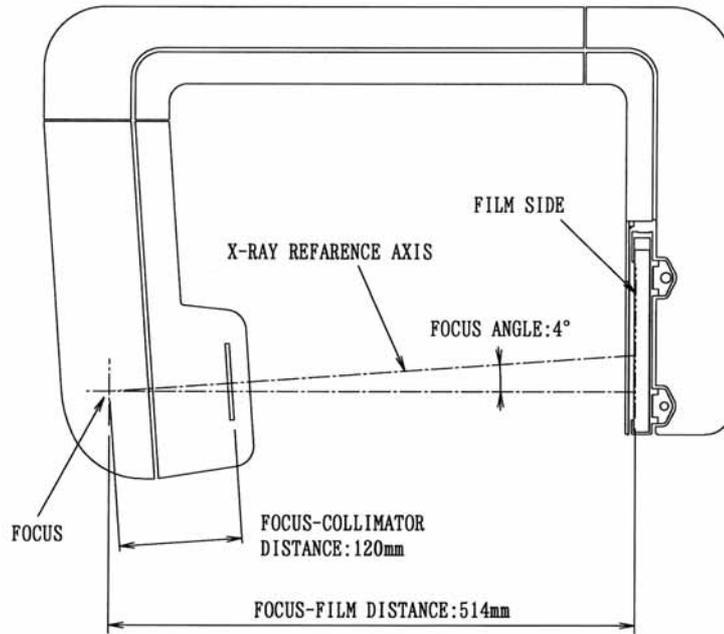


- ① Model Name
- ② Serial Number
- ③ Manufacturing Date
- ④ Maximum X-ray Rated
- ⑤ X-ray Tube Type
- ⑥ Tube Number
- ⑦ Focus Size
- ⑧ Total Filtration
- ⑨ Addendum Filtration
- ⑩ Indication of distributor
- ⑪ DWG. No.
- ⑫ Indication of origin

# 2 8 . X-ray Tube Focus and Film Layout

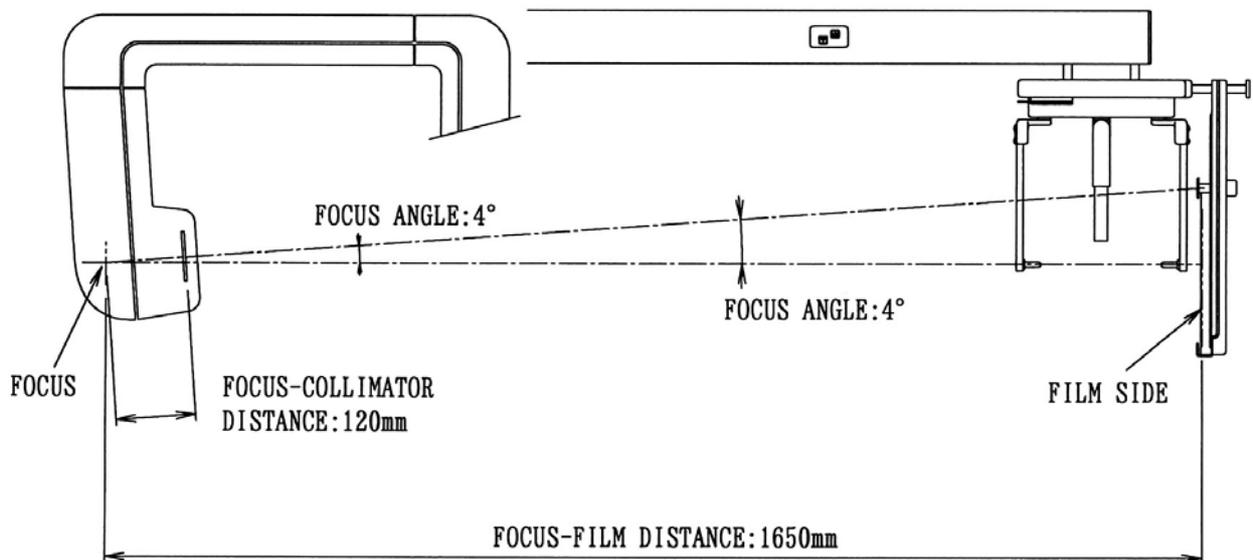
## PANORAMA/MS/TMJ4/TMJ2 Radiography

PANORAM/MS/TMJ4/TMJ2



## Cephalometric Radiography

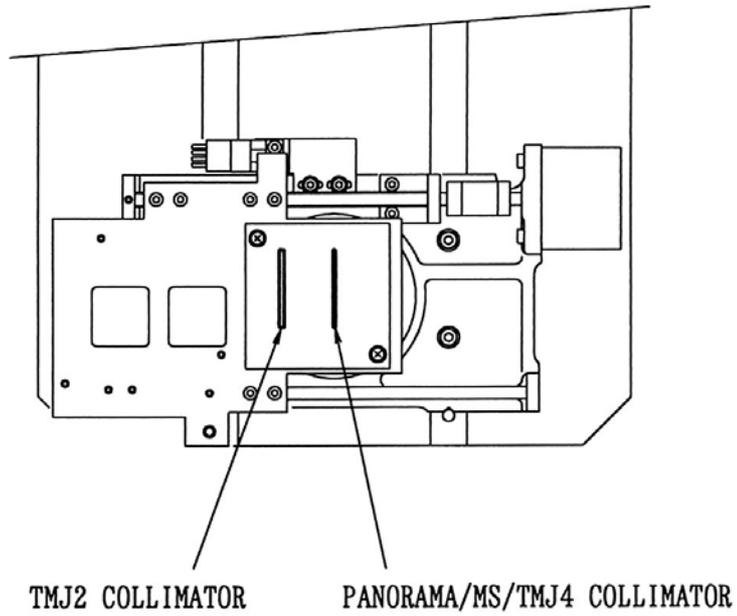
CEPHALO



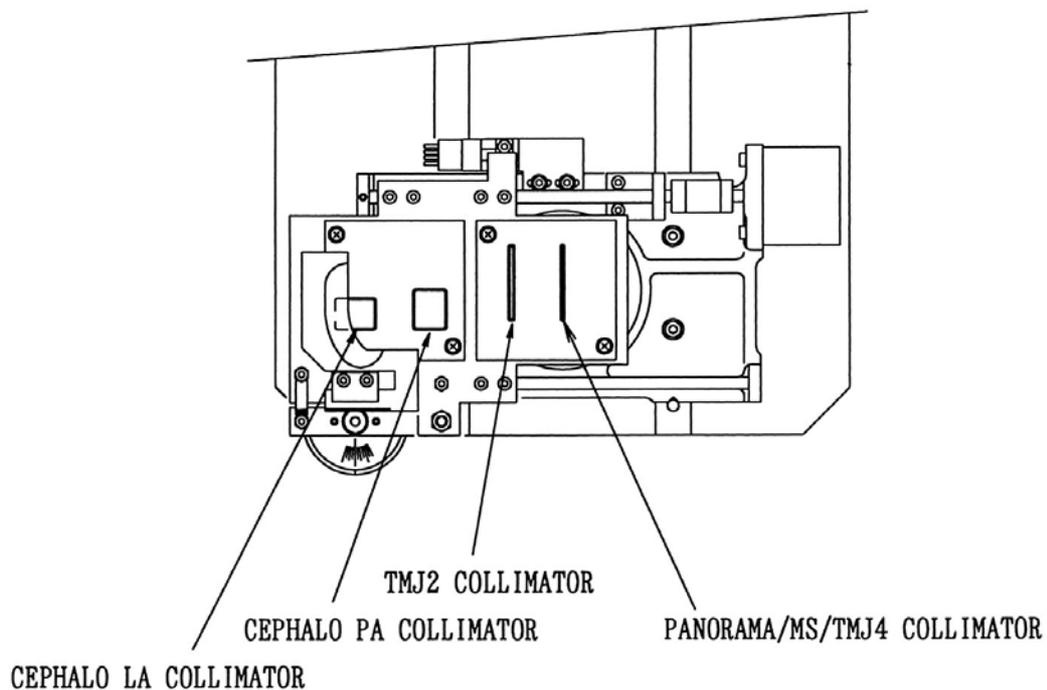
**2 9 . Radiographic Mode, COLLIMATOR and Exposure Area.**

**1 . Collimators for various Radiographic Modes.**

COLLIMATOR OF ANA-BEL



COLLIMATOR OF ANA-BEL CM



B 0 2 - T 1 5 1

**2 . Collimators for various Radiographic Modes, Exposure Area, and Beam on Film.**

Shape of COLLIMATOR	Exposure on Film	Width of X-RAY Beam on Film
<div data-bbox="220 629 424 831" style="border: 1px solid black; width: 128px; height: 90px; display: flex; justify-content: space-around; align-items: center;"> <div style="width: 10px; height: 30px; background-color: gray;"></div> <div style="width: 10px; height: 30px; background-color: gray;"></div> </div> <div data-bbox="475 331 576 427" style="margin-top: 10px;">           PANORAMA MS TMJ LA         </div> <div data-bbox="507 524 644 707" style="margin-top: 10px;"> </div>	<div data-bbox="740 353 1066 573" style="margin-bottom: 20px;"> </div> <div data-bbox="740 651 1066 871" style="margin-bottom: 20px;"> </div>	<div data-bbox="1177 488 1326 752" style="margin-bottom: 20px;"> </div>
<div data-bbox="220 1402 424 1603" style="border: 1px solid black; width: 128px; height: 90px; display: flex; justify-content: space-around; align-items: center;"> <div style="width: 20px; height: 15px; background-color: gray;"></div> <div style="width: 20px; height: 15px; background-color: gray;"></div> </div> <div data-bbox="475 927 552 958" style="margin-top: 10px;">           TMJ PA         </div> <div data-bbox="507 983 644 1167" style="margin-top: 10px;"> </div>	<div data-bbox="740 949 1066 1169" style="margin-bottom: 20px;"> </div>	<div data-bbox="1177 938 1326 1180" style="margin-bottom: 20px;"> </div>
<div data-bbox="220 1402 424 1603" style="border: 1px solid black; width: 128px; height: 90px; display: flex; justify-content: space-around; align-items: center;"> <div style="width: 20px; height: 15px; background-color: gray;"></div> <div style="width: 20px; height: 15px; background-color: gray;"></div> </div> <div data-bbox="475 1223 596 1254" style="margin-top: 10px;">           CEPHALO PA         </div> <div data-bbox="485 1283 651 1447" style="margin-top: 10px;"> </div> <div data-bbox="475 1520 596 1552" style="margin-top: 10px;">           CEPHALO LA         </div> <div data-bbox="485 1597 625 1783" style="margin-top: 10px;"> </div>	<div data-bbox="911 1223 1190 1491" style="margin-bottom: 20px;"> </div> <div data-bbox="911 1520 1206 1794" style="margin-bottom: 20px;"> </div>	

(mm)

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## 3 0 . Contact Information

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### **Belmont Equipment**

A Division of TAKARA BELMONT USA, Inc.

101 Belmont Drive

Somerset, NJ 08873

Toll Free (800) 223-1192

Toll Free Fax (800) 280-7504

[www.belmontequip.com](http://www.belmontequip.com)

### **TAKARA COMPANY, CANADA, LTD.**

2706 South Sheridan Way

Mississauga, Ontario, Canada L5J 2M4

Toll Free (800) 268-5351

Fax (905) 822-6203

[www.takarabelmont.ca](http://www.takarabelmont.ca)

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## **3 1 . Revision data of this manual**

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This manual was revised on JUL.2004.

The revised document number : B 0 2 - T 1 5 1