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Installation Manual

Panoramic and Cephalo Radiograph

BelmaX CM

Notice

★Read this installation Manual thoroughly before Installation.

The classification is shown as follows

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

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

TAKARA BELMONT U.S.A., INC.



Caution!


This manual provides information and instruction for the installation, assembly, and certification procedures for the “BELMAX-CM” X-Ray.

The instructions contained in this book should be thoroughly read and understood before attempting to install the “BELMAX-CM” unit. After the installation is completed, file this manual and refer back to it when performing periodic maintenance.

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01. Introduction

1. Observe “Warning” and “Prohibition” matters in this Installation Manual.
2. Read this Installation Manual thoroughly to prevent an accident or trouble.
3. If you have any unclear matters in installation, reconfirm it by reading this Installation Manual.
4. After installation, read Operation Manual to understand operation procedures.
5. Discharge
Be sure to observe Installation Manual. If accidents or troubles of the equipment happen due to improper installation, we can not be responsible for those accidents or troubles.
6. Repair and repair parts supply
Repair and repair parts supply is available for 10 years from discontinued date.
7.  mark means “ Attention, consult accompanying documents “.

0 2. WARNING



WARNING

Always conform to the safety work standards to assure safety for workers and other people concerned. Repair work for internal parts of the equipment involves high risk. This should be strictly conducted by an authorized service personnel only.



Meanings



DANGER

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



WARNING

Explains an instruction where personal injury or 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**

This X-ray Unit may be dangerous to patient and operator unless safe exposure factors and operating instructions are observed.

**WARNING**

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

**WARNING**

The floor should be able to support 600 lbs. dead load and should be rigid.

**WARNING**

Do not put things in the area where equipment moves.

**WARNING**

Those who install X-ray apparatus should wear X-ray protector apron.

**WARNING**

Operator should pay attention to patient when moving Sliding Unit up and down

**WARNING**

LASER RADIATION, DO NOT STARE INTO A BEAM, CLASS 2 LASER PRODUCT

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

**CAUTION**

Do not turn ROTATION ARM by hand. It might cause a trouble of the equipment.

03. Pre-Installation Instructions

[1] Required tools / materials for the installation

1. Manuals

1. Installation Manual for BELMAX-CM.
2. Operation Manual for BELMAX-CM

2. Measurement Instruments and Tools

2. 1. Measurement Instruments

- 1) Digital Multi Meter with an accuracy of 1%, capable of measuring 150VAC and 20mA DC, and capable of indicating true RMS value within one second
- 2) Fluorescent Screen

2. 2. Tools

- 1) Philips Head Screwdrivers (Small and Big)
- 2) Slotted Head Screwdrivers (Small, Anti-Static type)
- 3) Nut Drivers (M6, M5, M4 and M3)
- 4) Ratchet wrench
- 5) Allen keys
- 6) Cutting Nippers
- 7) Long nose nippers
- 8) Hammer
- 9) Electric Drill
- 10) Drill bit 8.3mm = 21/64"(which can drill in wall and a floor)

2. 3. Others

- 1) Ethanol for disinfections
- 2) Waste
- 3) Cleanser

Fixing Screws for Pillar

Fixing Screws for the Wall Bracket

Wall material is concrete: Concrete Strike Anchor C8 – 2 pcs. (Included)

Wall material is wood : Coach Screw 8mm – 2 pcs. (Included)

Fixing Screws for the Pillar

Floor material is concrete: Concrete Strike Anchor C8 – 4 pcs.(Not Included)

Floor material is wood : Coach Screw 8mm – 4 pcs. (Not Included)

[2] Support Requirements

- 1) BELMAX-CM unit must be securely bolted to the floor with M8 fasteners appropriate to the floor construction.

NOTE: IN GENERAL, MAJOR STRUCTURAL MODIFICATIONS ARE NOT REQUIRED, HOWEVER THE FLOOR ON WHICH BELMAX-CM IS PLACED SHOULD BE ABLE TO SUPPORT 600 lbs. DEAD LOAD.

- 2) The wall bracket must be attached to the wall studs with minimum of two 5/16 x 3 inch lag screws. If studs are not available at the appropriate installation point. Or if stud wall construction is not used, a rigid structure capable of supporting 100 lbs. pull out must be provided.

NOTE: DO NOT USE THIS UNIT WITHOUT CORRECT BRACING

- 3) Screw slots are oversized to allow for positioning/leveling. Appropriate washers must be used on all fasteners.

[3] Electrical Requirements

1) Power Supply

BELMAX-CM X-Ray operates on a power supply of 120 VAC. A three wire GROUNDED circuit, separately connected to the central distribution panel with an over current protection device rated for 20 amperes. Recommended wire size is 12 AWG. But if the wire run distance is to exceed 50 feet, 10 AWG is required. For wire run distance in excess of 75 feet, up to 125 feet, 8 AWG is required.

2) All connections, workmanship and materials used must comply with the national Electric Code and local codes.

Environmental condition for Operation

Temperature : 41~95F (5~35°C)

Humidity : 30~85%

Pressure : 700~1060 hpa

Environmental condition for Storage

Temperature : 14~140F (−10~60°C)

Humidity : 10~95%

Pressure : 700~1060 hpa

Environmental condition for Transportation

Temperature : 14~140F (−10~60°C)

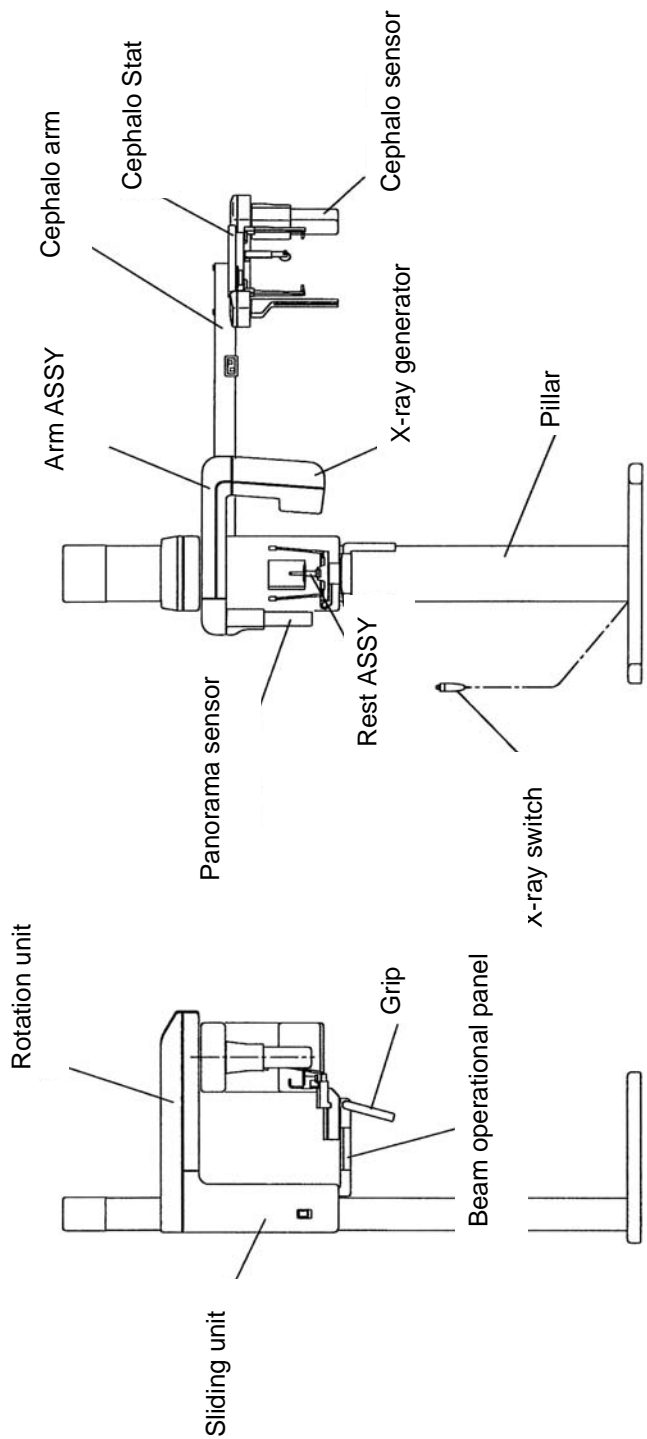
Humidity : 10~95%

Pressure : 700~1060 hpa

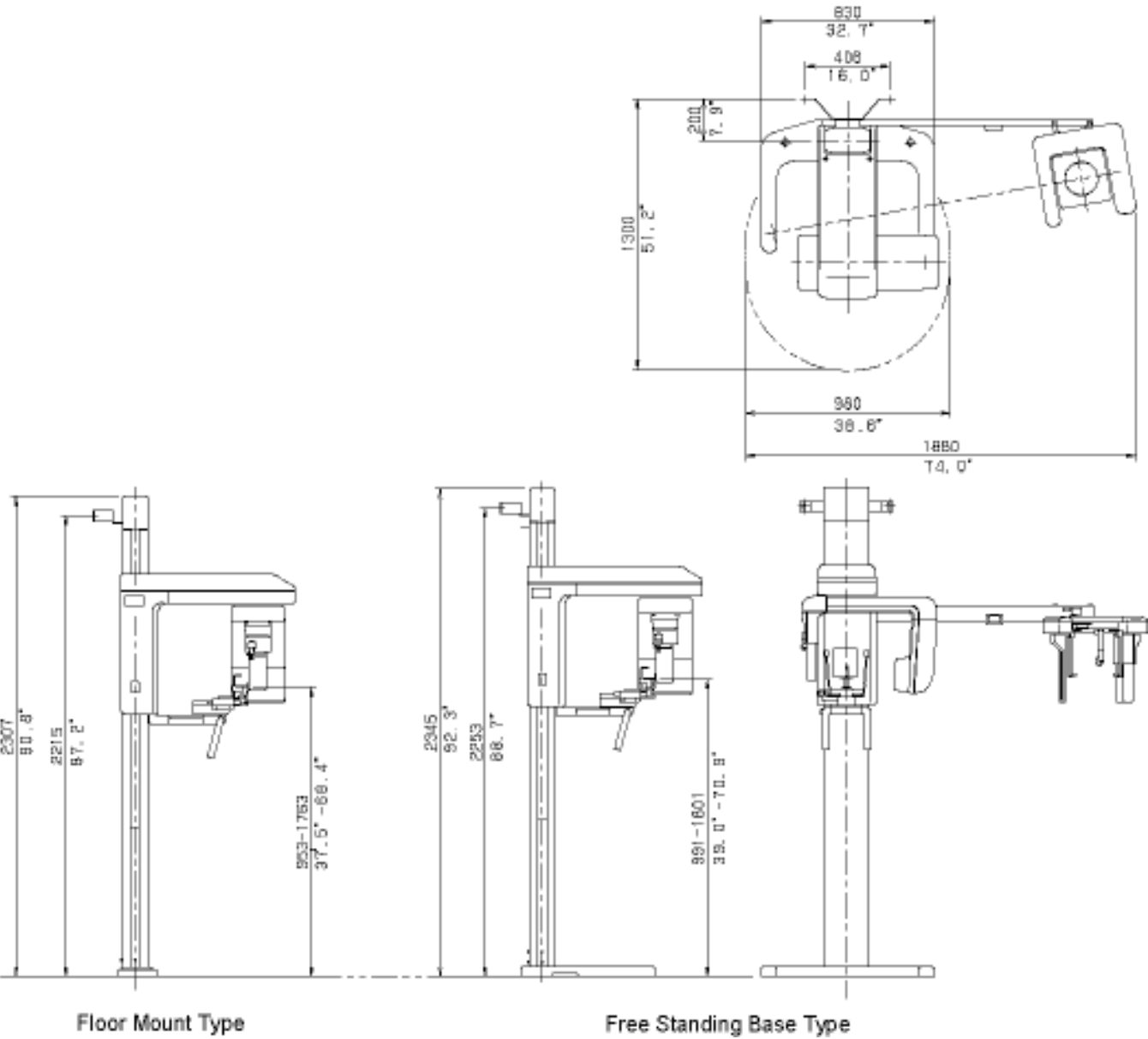
05. Name of Each Parts and Dimension

Name of Each Part

BelmaX CM



2. Dimensions
BelmaX CM



06. List of Parts and Accessories

1. Parts of Equipment

- 1) Pillar
- 2) Rotation Unit
- 3) Chinrest Unit
- 4) Upper Cover of Pillar
- 5) Rotation Unit Cover
- 6) Sliding Unit Cover
- 7) Cephalo Arm
- 8) Base

2. Accessories for Installation

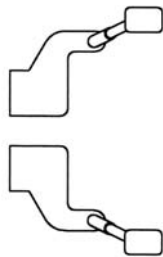
- 1) Shaft(ϕ 10 L=400)
- 2) Cable Band (5 pcs.)
- 3) Mounting Upper Cover of Pillar
- 4) Countersunk Screw (M3×6 2pcs.)
- 5) Mounting Back Cover of Sliding Unit
Countersunk Screw (M6×8 4pcs.) (BelmaX CM)
- 6) Mounting Cephalo Arm
Socket Head Screw (M6×16 4Pcs.) (BelmaX CM)
- 7) Positioning of Cephalo Arm
taper pin (Φ 5×25 2pcs.) (BelmaX CM)
- 8) Fixing Bolt for Sliding Unit and Rotation Unit.
Hexagon Bolt (Φ 8×35 4pcs.), Washer (Φ 8 4pcs.), Spring Washer (Φ 8 4pcs.), and
Taper Pin (ϕ 5×25 2 pcs.)
- 9) Fixing Bolt for Sliding Unit and Rest Unit.
Socket Head Screw (M6×20 6pcs.)
- 10) Mounting Screw for Rotation Unit Cover
Bind Screw M3 ×8 (2pcs.) Nylon Washer (Φ 3 2pcs.)
- 11) Mounting Screw for Sliding Unit Cover
Socket Head Screw (M3×10 6 pcs.) Bind Screw (M3×8 2 pcs.)
Setscrew (M3×8 2pcs.) Nylon Washer (Φ 3 6pcs.)
- 12) Mounting Screw for Base and Block (with Base)
- 13) Mounting Screw for Pillar and Block (with Base)

- 14) Fixing Bolt for Base (with Base)
- 15) Fixing Bolt for Pillar (Floor Fixation)
- 16) Fixing Bolt for Wall Bracket

3. Accessories

2. 1. Accessories

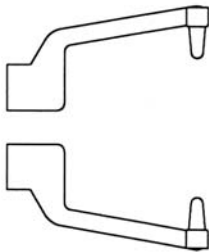
1. Head Holding Rods for Panorama and MS



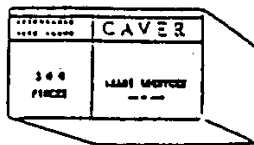
6. Bite Block for Panorama



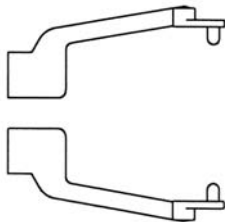
2. Ear Rods for T.M.J. LA



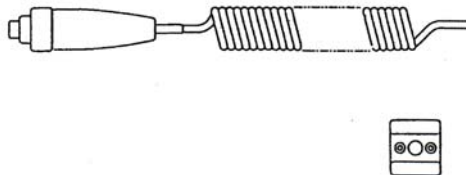
7. Bite Block Cover (Disposable)



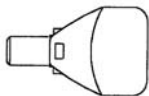
3. Ear Rods for T.M.J. PA



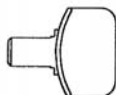
8. Exposure Switch Holder



4. Chinrest for Panorama




5. Chinrest for MS



07. Installation Instructions

Fixing to the wall



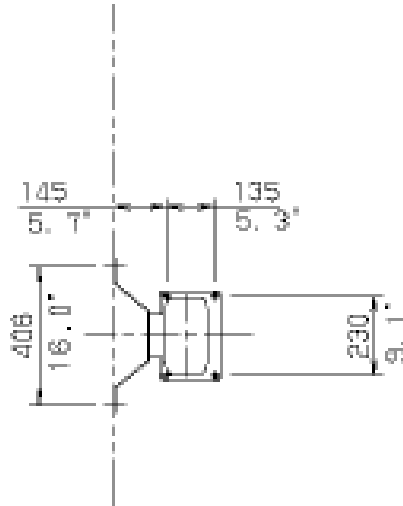
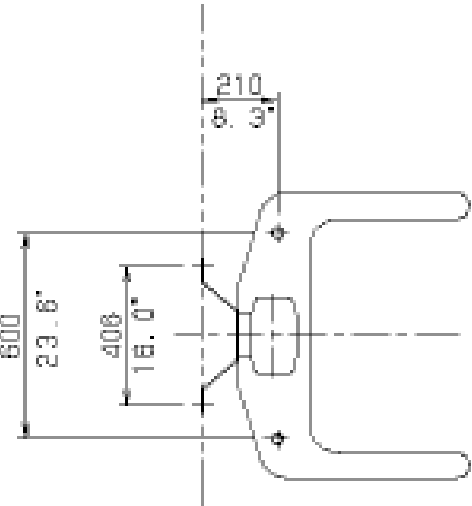
Notice

The Wall bracket must be attached to wall studs with minimum of two 5/16 x 3 inch lag screws If Stud are not available at the appropriate installation point. Or if stud wall construction is not used, a rigid structure capable of supporting 100 lbs. pull out must be provided.

NOTE: DO NOT USE THIS UNIT WITHOUT CORRECT BRACING

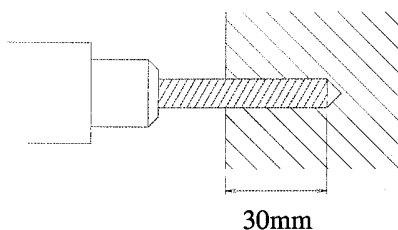
Free Standing Base Type

Floor Mount Type



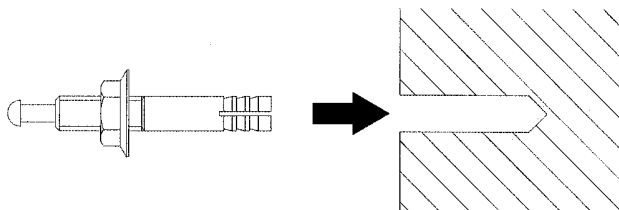
When concrete strike anchors (C8-50) are used

- ① Drill two holes of 1-1/5" (30mm) depth with a drill bit of 21/64" (8.3mm) diameter on the wall where the wall mounting bracket is fixed.

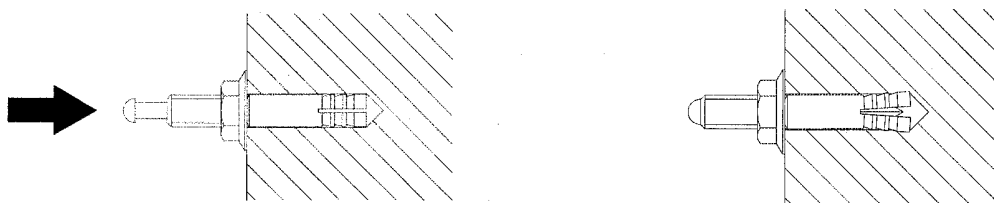


- ② Attach M8 nuts on concrete strike anchors.
Turn nut and leave 5 to 6 screw threads above a nut.

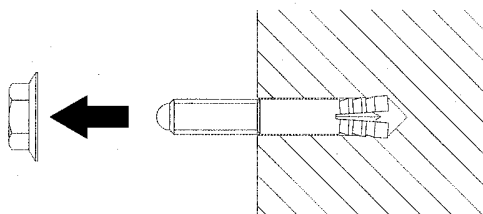
- ③ Insert a concrete strike anchor into a hole.



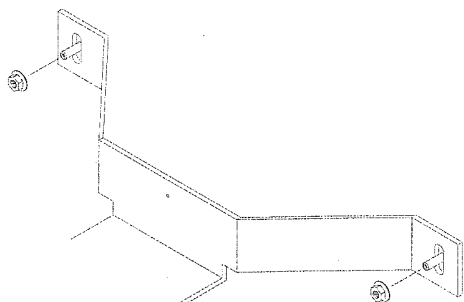
- ④ Strike the pin until the pin is flush with top of the anchor.



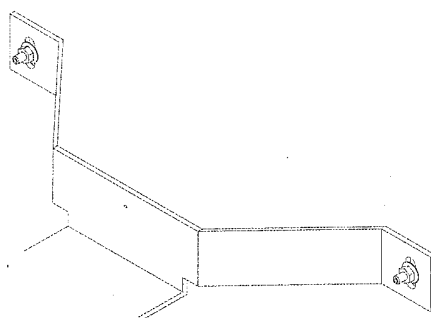
- ⑤ Remove the M8 nut.



- ⑥ Move the equipment to where you place BELMAX-CM, place two holes of the wall bracket on the screw thread of the concrete strike anchors.



- ⑦ Tighten M8 nuts.



- ⑧ Confirm that the apparatus is securely fixed.

When coach bolts (diameter = 8mm, length = 40mm) are used

- ① Move the apparatus to the place where the BELMAX-CM is installed.
- ② Tighten coach bolts through holes of the mounting bracket.
If needed, drill holes prior to this step
- ③ Confirm that the apparatus is securely fixed.

How to fix on the floor

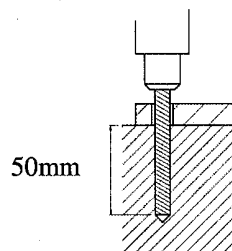
Warning

BELMAX-CM unit must be securely bolted to the floor with M8 fasteners appropriate to the floor construction (lag screw, concrete strike anchor, etc)

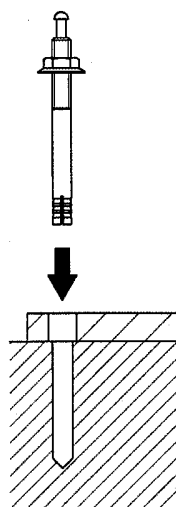
NOTE: IN GENERAL, MAJOR STRUCTURAL MODIFICATIONS ARE NOT REQUIRED, HOWEVER THE FLOOR ON WHICH BELMAX-CM IS PLACED SHOULD BE ABLE TO SUPPORT 600 lbs. DEAD LOAD.

When concrete strike anchors (C8-80) are used

- ① Move the apparatus to the place where it will be installed.
- ② Drill four holes of 2" (50mm) depth through the holes of pillar stand by using 21/64" (8.3mm) drill bit.



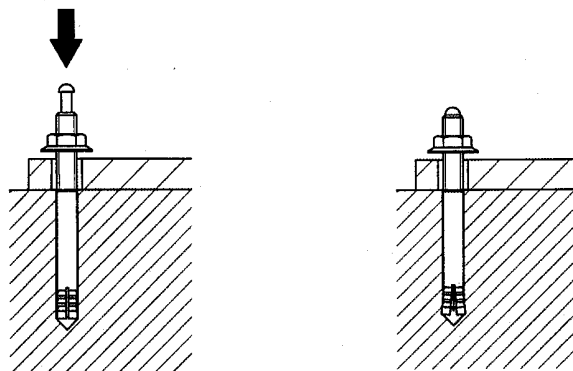
- ③ Insert a concrete strike anchor into each hole.
- ④ Attach a M8 nut on a concrete strike anchor.
Turn a nut and leave 8 to 10 screw threads above the nut.



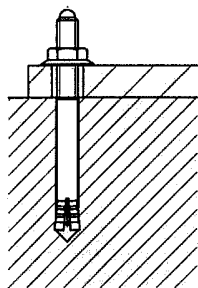
B 0 2 – I 1 6 7 E

0 7

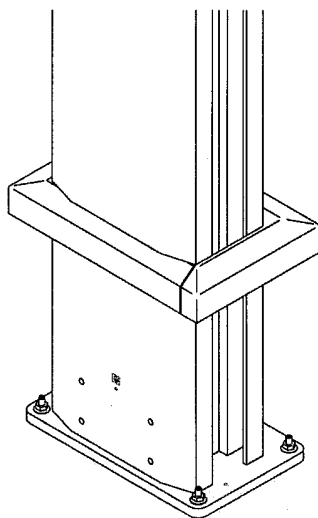
- ⑤ Strike the pin until pin is flush with top of the anchor.



- ⑥ Fix concrete strike anchor by tightening a M8 nut.

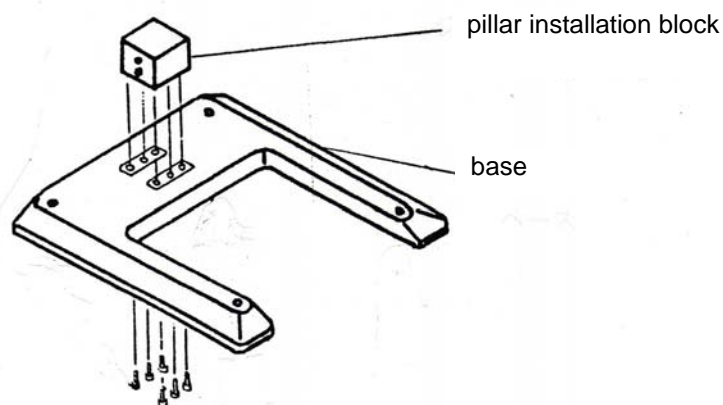


- ⑦ Be sure that the apparatus is securely fixed.



With Free Standing Base

- 1) Install the pillar installation block on the base with the Socket Head bolt, and set it up.

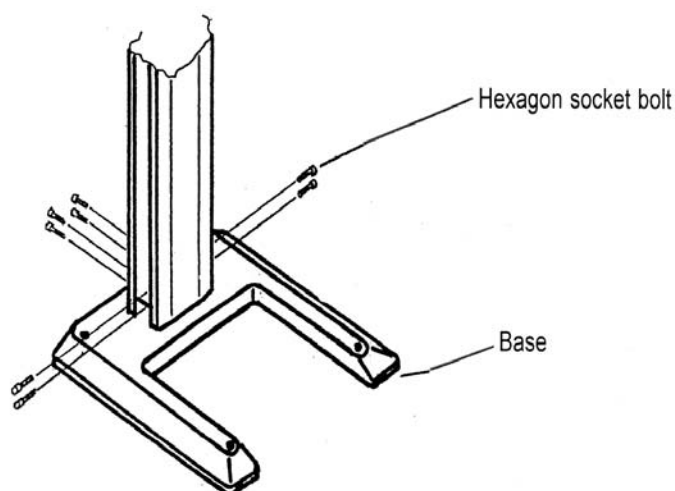


- 2) Bring up Pillar with being careful not to come off wire from pulley ditch.

- 3) Insert the pillar to the pillar installation block with the insertion bolt.

- 4) Lift the side of Pillar, insert the Pillar onto Joint Block exactly.

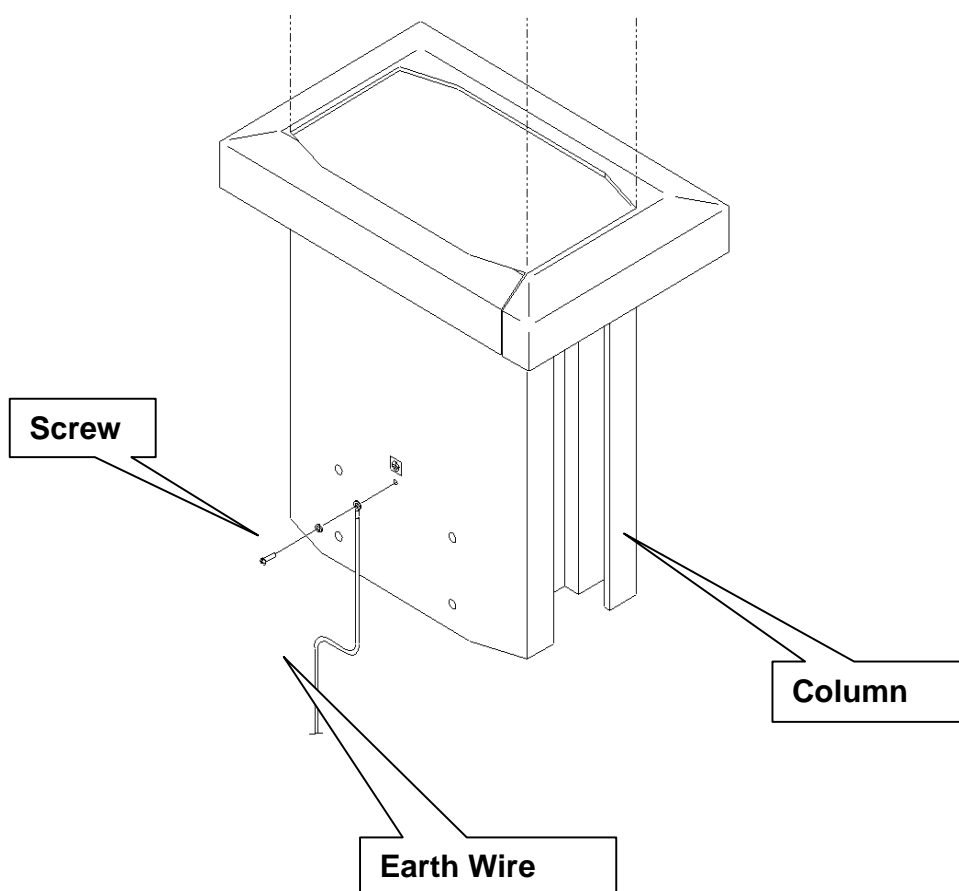
Fix Pillar and Joint Block by using 8 pcs./Hexagon Socket Bolt (M6 × 20) ,
8 pcs./Spring Washer (φ 6) , 8 pcs./Flat Washer (φ 6) .



- 5) Fix the base and the Pillar upper bracket with anchor bolts

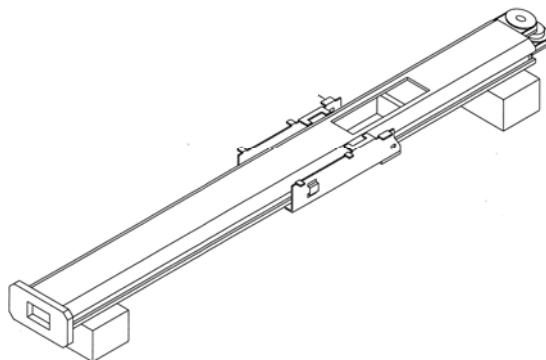
Method of installing the earth wire

- ① Run the supplied earth wire from the hole located at the bottom of the column to a grounding terminal. Secure the conductor with a screw. Refer to the figure below.



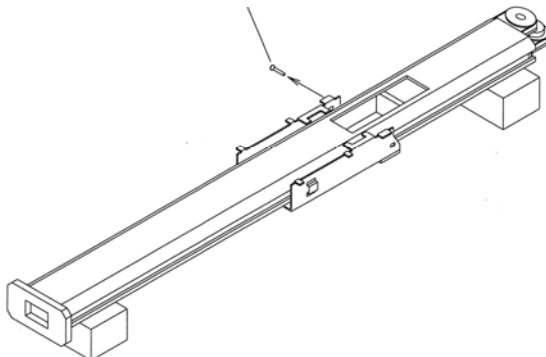
1. Installation Procedure

1. Lay the column faces down as shown, supporting it with approximately 6" of lumbers covered by the cloth, at the both ends.

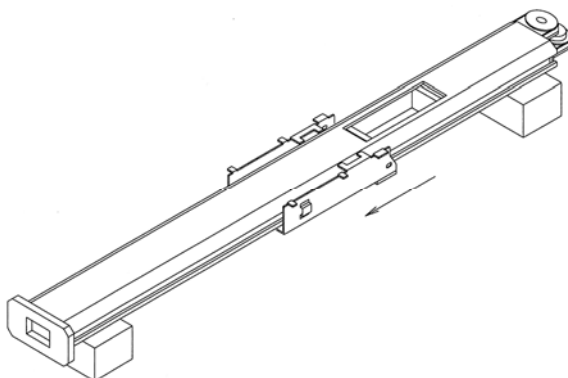


2. Remove the screw (M6 X 65) which fixes the counter weight frame to the main body.

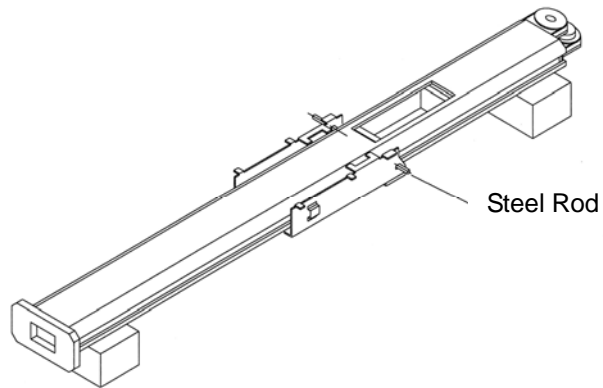
Flat head cap screw



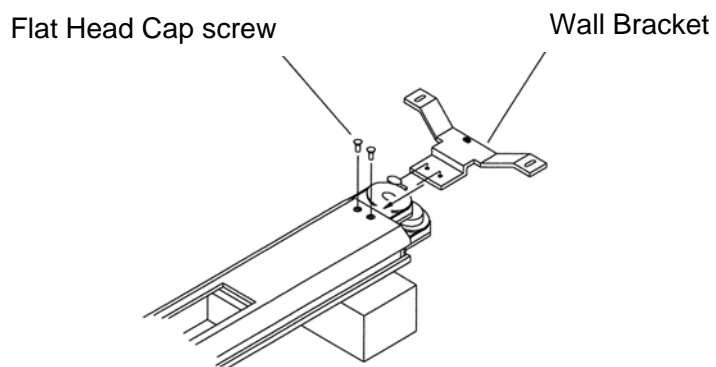
3. Move the Sliding Unit until the hole of Sliding Unit and the one of counter weight frame align.



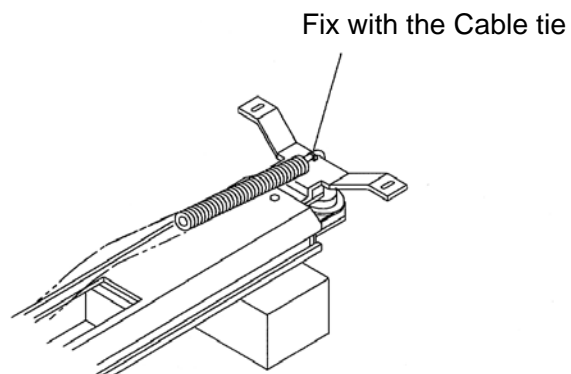
4. Insert the steel rod (provided) into the hole on the Pillar.



5. Attach the Wall Bracket to the upper part of Pillar by two flat head cap screws.

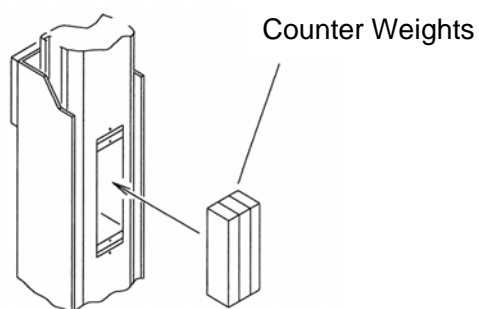


6. Attach the Electromagnetic Brake Control Cable at the upper part of Bracket by a cable tie. Connect this cable to CNK Board located on front side of the Sliding Unit.

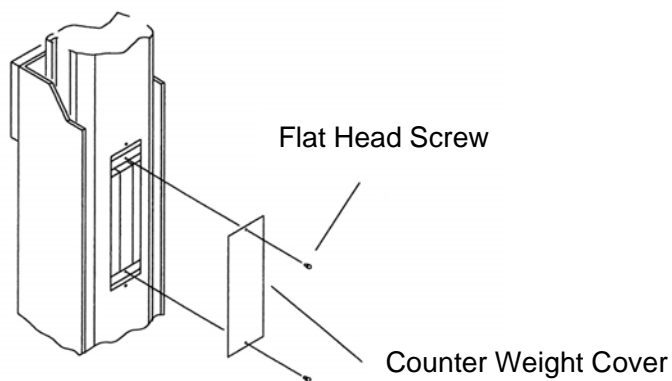


7. Erect the Pillar and mount on the floor.
8. Attach the Pillar base and Wall Bracket.

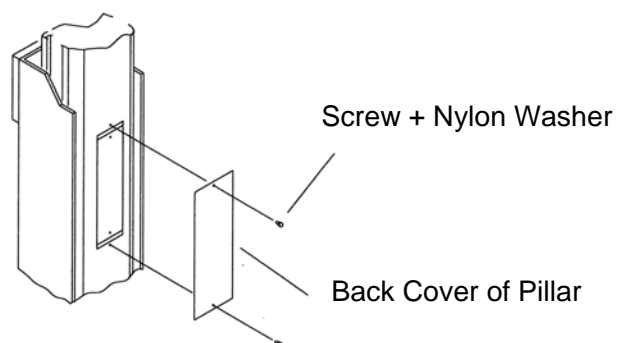
9. Put Counter Weights into Counter Weight Frame from back side of the Pillar.



10. Attach the Counter Weight Cover on the Counter Weight Frame.



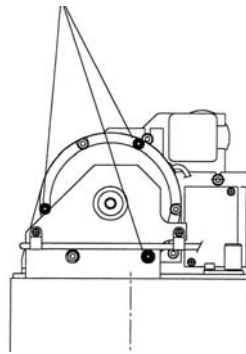
11. Attach the Pillar Cover on the back side of Pillar.



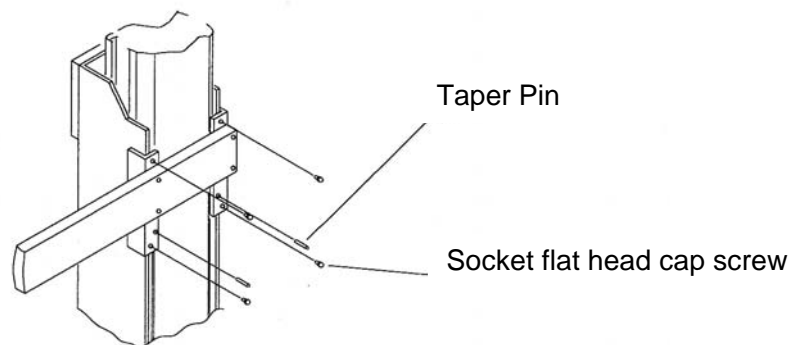
12. Remove screws to release brake located at upper part of the Pillar.

Caution: Sliding Unit might move. Be careful not to pinch fingers.

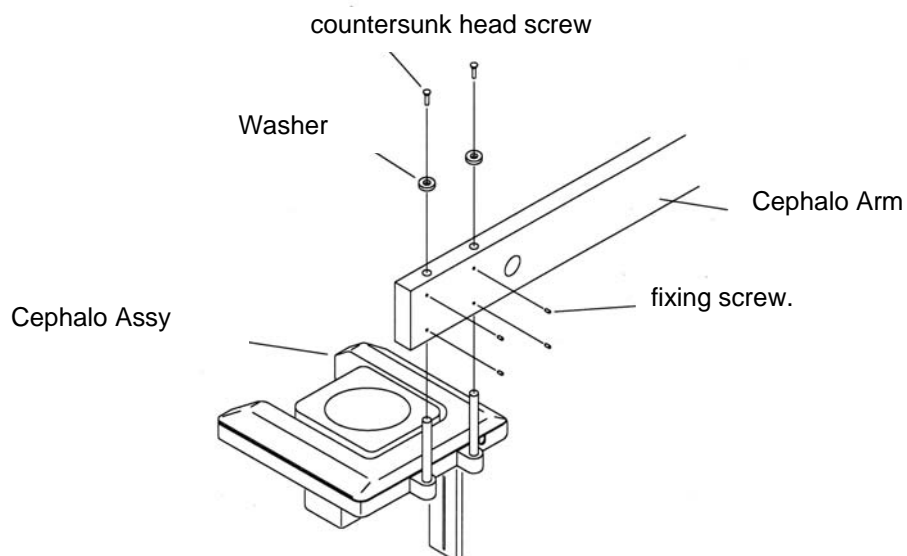
Screws for Brake Release



- 13 Attach the Cephalo Arm on the back side of Sliding Unit. Align the Cephalo arm by using taper pins. Then fix it by Socket flat head cap screws.

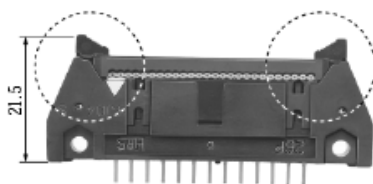


After mounting Cephalo Assy to the Cephalo Arm with countersunk head screw, tighten fixing screw.



14. Wiring of Rotation Unit, Sliding Unit, and Cephalo.

- 1) Connect harness CNL2(3P) from Rotation Unit with harness CNL2(3P) from the Sliding Unit
- 2) Connect harness CN1(34P) from the Rotation Unit with connector CN1(34P) of CNK BOARD in the Sliding Unit. Lock broken line securely



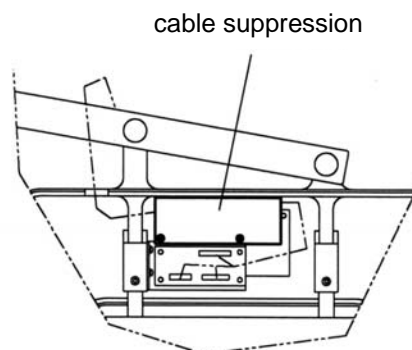
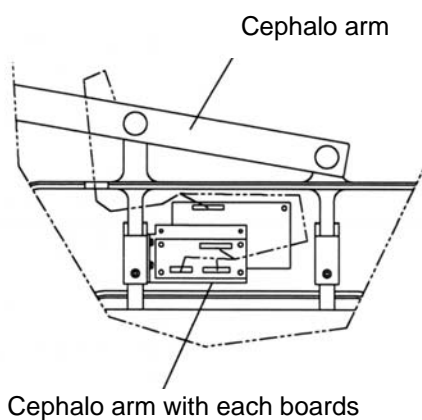
- 3) Connect harness CN2(3P) from the Rotation Unit with connector CN2(3P) of CNK BOARD in the Sliding Unit
- 4) Connect the LAN cable from PC with the switching hub.
- 5) Connect the connector of the Sliding Unit with connector from the X-ray SW

6) **For Cephalo**

- ① Connect each harness and the cable from the Cephalo arm with CNK BOARD and the hub in the Sliding Unit.

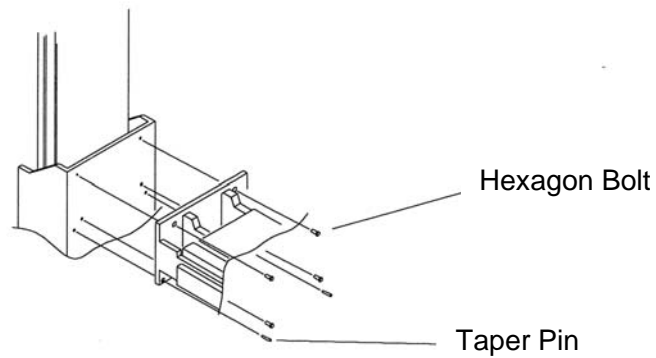
Cephalo Arm	The No. of Pin	Sliding Unit
CND1	5p	CNK BOARD (CND1)
CNSW2	3p	CNK BOARD (CNSW2)
CND2	14p	CNK BOARD (CND2)
LAN Cable	—	Switching hub

- ② After connecting, check if each harness and cables don't have any damage.
- ③ Detach the cover of the Cephalo pillar, and remove the cable suppression, and connect the harness from Cephalo arm with each boards of the Cephalo pillar.

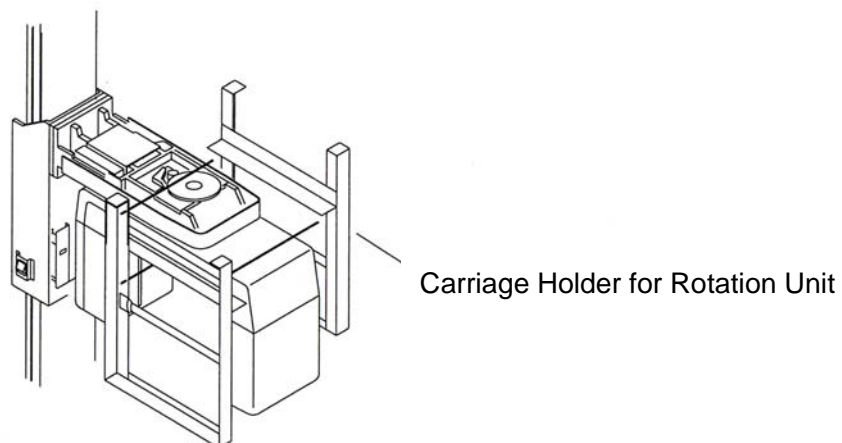


Cephalo arm	The No. of Pin	Cephalo driving part
CN3	10P	Motor driver
CND1	5P	CNM BOARD (CND1)
CND2	10P	CNM BOARD (CND2)
CND3	8P	CNM BOARD (CND3)
LAN cable		Relay Box of LAN cable

15. By holding the carriage holders with two men, hook the rotation unit ass'y onto the sliding unit.
Align rotation unit by using taper pins. Then fix it by hexagon bolts.



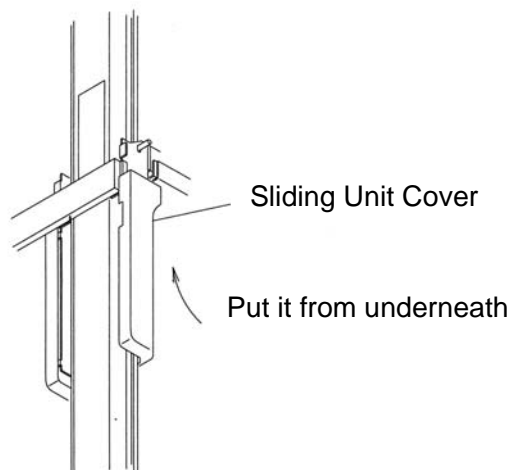
16. Remove Carriage Holders from the Rotation Unit



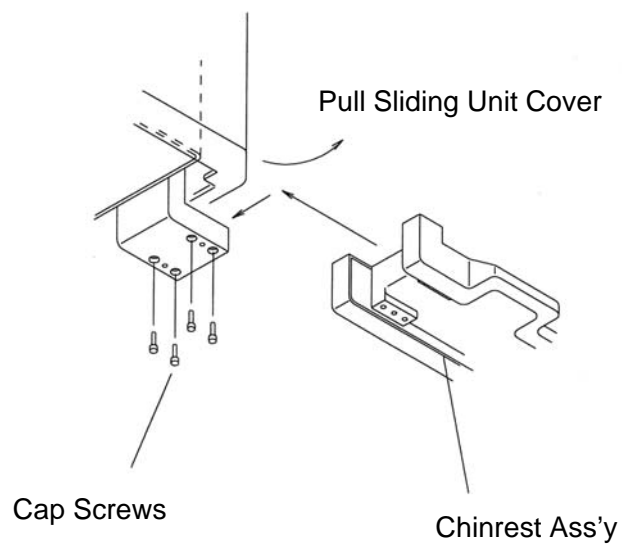
17. Connect the wire harness from the Rotation Unit to the CNK Board and the CNL2 Board located on front side of the Sliding Unit.

18. Remove the shaft that has been inserted into the pillar.

19. Put the Sliding Unit Cover on the Sliding Unit.



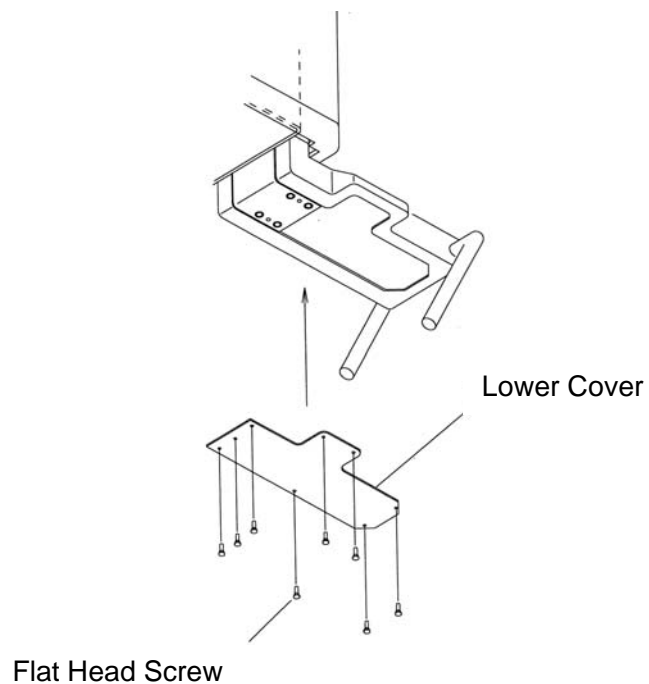
20. Insert the Chinrest Ass'y to lower part of the Sliding Unit while pulling the sliding unit cover. Attach the chinrest ass'y by four cap screws.



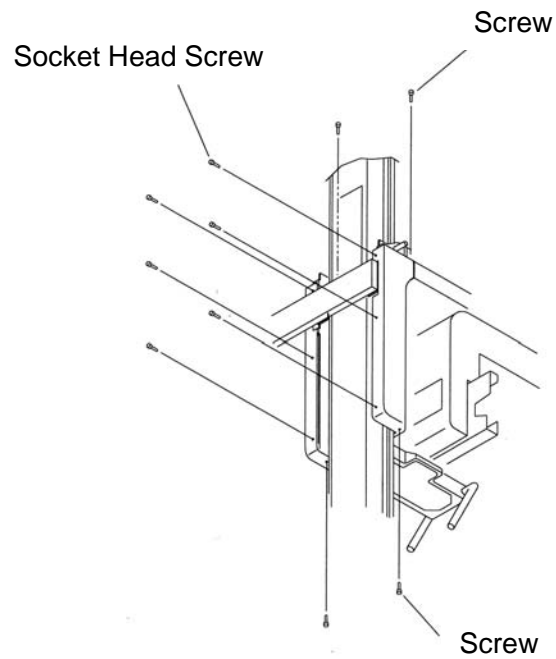
21. Connect wire harness from the Sliding Unit to the connector in Chinrest Ass'y.

Sliding Unit	The No. of Pin	Rest Unit
CNR1	6p	CNR1
CNR2	6p	CNR2
CNM	4p	CNM

22. Attach the lower cover to the bottom of the Chinrest Ass'y.

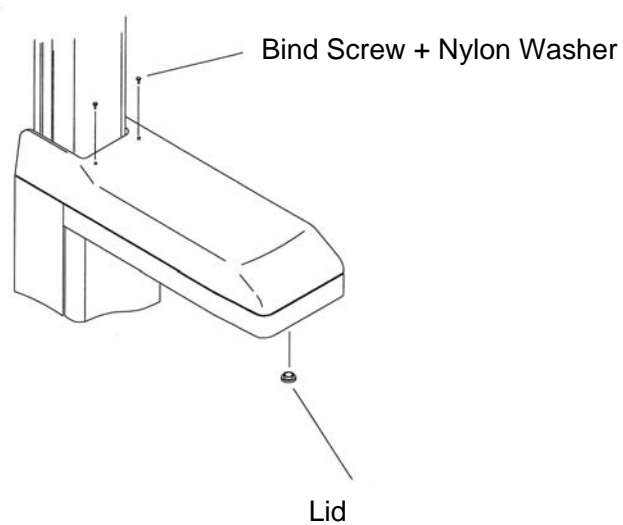


23. Attach the Sliding Unit Cover to the Frame.

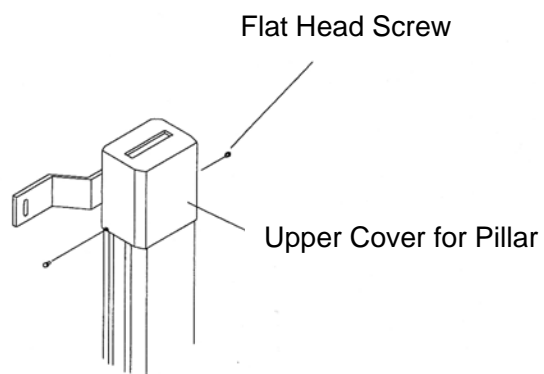


24. Remove the steel rod which was inserted to the Frame of the Sliding Unit.

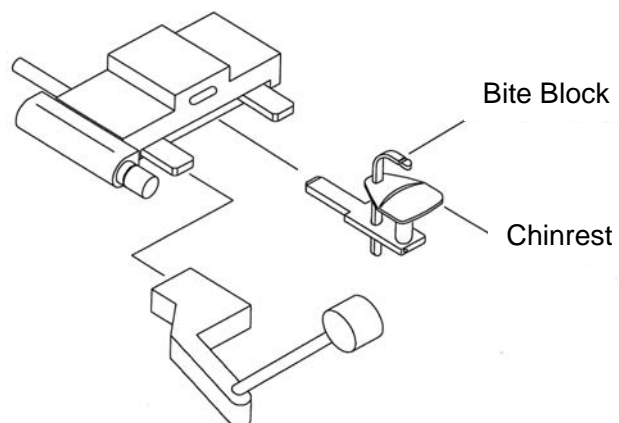
25. Attach the Rotation Unit Cover by two screws from the top and by a screw from the bottom. Put the lid to the bottom hole.



26. Attach the Upper Cover on the Pillar by using two flat head screws.



27. Insert the Chinrest and Head Holding Rods to the Chinrest Unit.



08. Post-Installation Instructions

1. Check listed items by referring to the Operation Manual
2. Confirm the operation without X-ray
Keep depressing 【FACTOR DOWN】 Key until Tube Voltage becomes 0kV. Then test operation.
3. Confirm the operation with X-ray
 3. 1. Cover radiation aperture with lead.
 3. 2. Set exposure condition by referring the Operation Manual.
 - 1) Exposure Orbit → Panorama
 - 2) Manual Exposure
 - 3) Tube Voltage: 60kV
 - 4) Tube Current: 2mA
 3. 3. Irradiate X-Ray and confirm the operation.

4. Complete the following Check List**1. Power**

- | | | | | |
|----|--|--------------------------|-----------------------------|-----------------------------|
| 1) | Measurement of Input Power | Voltage | | Vac |
| 2) | Does 1) meet the rating description on the Controller plate? | <input type="checkbox"/> | OK | <input type="checkbox"/> NG |
| 3) | Rating Values of the Circuit Protector on the Sliding Unit | Voltage | | V |
| | | Current | | A |
| 4) | Are there any problems when the power plug is inserted? | Heat | <input type="checkbox"/> OK | <input type="checkbox"/> NG |
| | | Allophone | <input type="checkbox"/> OK | <input type="checkbox"/> NG |
| | | Off-flavor | <input type="checkbox"/> OK | <input type="checkbox"/> NG |
| 5) | Does the Power Code have a scratch or a crack? | <input type="checkbox"/> | OK | <input type="checkbox"/> NG |

2. Operation

- | | | | | |
|----|---|--------------------------|-----------------------------|-----------------------------|
| 1) | After Power On, does the main body have a problem? | Heat | <input type="checkbox"/> OK | <input type="checkbox"/> NG |
| | | Allophone | <input type="checkbox"/> OK | <input type="checkbox"/> NG |
| | | Off-flavor | <input type="checkbox"/> OK | <input type="checkbox"/> NG |
| 2) | After depressing the "RESET" key, is "READY" displayed? | <input type="checkbox"/> | OK | <input type="checkbox"/> NG |
| 3) | Does the main body move with up / down switch? | <input type="checkbox"/> | OK | <input type="checkbox"/> NG |
| 4) | Does up / down operation of main body have a problem? | Allophone | <input type="checkbox"/> OK | <input type="checkbox"/> NG |
| 5) | Does up / down operation accelerate after keep depressing up / down switch for more than 3 sec.? | <input type="checkbox"/> | OK | <input type="checkbox"/> NG |
| 6) | Does Sliding Unit stop at the highest and the lowest position? | <input type="checkbox"/> | OK | <input type="checkbox"/> NG |
| 7) | Positioning Beams in Panorama and MS mode. | | | |
| | 7-1) Are all positioning beams turned on by depressing up / down switch of Frankfort Beam or by depressing forward / backward switch of Focus Beam? | <input type="checkbox"/> | OK | <input type="checkbox"/> NG |
| | 7-2) Does Up / down operation of Frankfort Beam work by depressing up / down switch. | <input type="checkbox"/> | OK | <input type="checkbox"/> NG |
| | 7-3) Does Frankfort Beam stop at the max position after keep depressing up / down switch? | <input type="checkbox"/> | OK | <input type="checkbox"/> NG |
| | 7-4) Does Forward / backward operation of Focus Beam work by depressing forward / backward switch? | <input type="checkbox"/> | OK | <input type="checkbox"/> NG |
| | 7-5) When Focus Beam moves to the maximum positions, are the values on display +25 and -25? | <input type="checkbox"/> | OK | <input type="checkbox"/> NG |

Beams in T.M.J. LA mode

- 8) 8-1) Are all positioning beams turned on by depressing up / down switch of Frankfort Beam or by depressing forward / backward switch of Focus Beam? ☐ OK ☐ NG
- 8-2) Does Forward / backward switch of Focus Beam work by depressing forward / backward switch? ☐ OK ☐ NG
- 9) Are all positioning beams turned off automatically when up / down switch of Frankfort Beam or forward / backward switch of Focus Beam are not depressed for 1 minute? ☐ OK ☐ NG
- 10) Check in Panorama mode
- | | | | |
|--|-----------|-----------------------------|-----------------------------|
| 10-1) Does equipment work normally with exposure operation at 0kV, 0mA, 7sec. and Panorama mode? | Allophone | <input type="checkbox"/> OK | <input type="checkbox"/> NG |
| | Vibration | <input type="checkbox"/> OK | <input type="checkbox"/> NG |
- 11) Check in T.M.J. LA mode
- | | | | |
|--|-----------|-----------------------------|-----------------------------|
| 11-1) Does equipment work normally with exposure operation at 0kV, 0mA, 7sec. and T.M.J LA mode? | Allophone | <input type="checkbox"/> OK | <input type="checkbox"/> NG |
| | Vibration | <input type="checkbox"/> OK | <input type="checkbox"/> NG |
- 11-2) After the first exposure, Does Rotation Arm Unit return to start position automatically. ☐ OK ☐ NG
- 11-3) After the second exposure, Does Rotation Arm Unit stop at the end position. ☐ OK ☐ NG
- 12) Is Power turned off automatically after 5 minutes from the last operation? ☐ OK ☐ NG
- 13) After power is turned off automatically, Will power turn on again normally? ☐ OK ☐ NG
- 3 Cephalo Function**
- 14) Both Cephalo mode and Panorama mode are able to be switched. ☐ OK ☐ NG
- 15) Check in Cephalo mode
- 15-1) Does Cephalo mode work normally? ☐ OK ☐ NG
- 4. Externals**
- 1) Are there scratches or cracks? ☐ OK ☐ NG
- 2) Are all covers secured with screws? ☐ OK ☐ NG

9. Technical data

1. Wall Bracket.

The distance between the column and the wall is 5-3/4" (145mm).

2. Compliance with International Standards

BELMAX-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 is 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 excess X-ray dosage due to the 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 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 ROTATION ARM stops during a RESET process.
4. BELMAX-CM monitors the temperature of the X-ray generator from READ ON to the end of the exposure.
If the 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 patient not to move during an exposure.
Also, operator should pay attention to patient, assistant, and equipment during an exposure.

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 deviation**

Maximum X-ray tube voltage: 100kV, Maximum deviation +/- 10%

Maximum X-ray tube electric current: 12mA, Maximum deviation +/- 15%

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

1.08 kW

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 kW

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 mm 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

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

$\pm 0.5 \text{ mm}$

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

$0.5 \times 0.5 \text{ (mm)}$

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 the last 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.

1 3. Loading Condition

90kV, 12mA, 12sec (Panoramic)

90kV, 12mA, 3.2sec (Cephalometric)

1 4. Laser Marking

Class : 2 products (IEC60825-1: 2001)

Wave Length: 6 7 0 mm

Standard : 1 mW

1 5. Line impedance

0.3 Ω

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

D-052SB

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 kHU)
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.

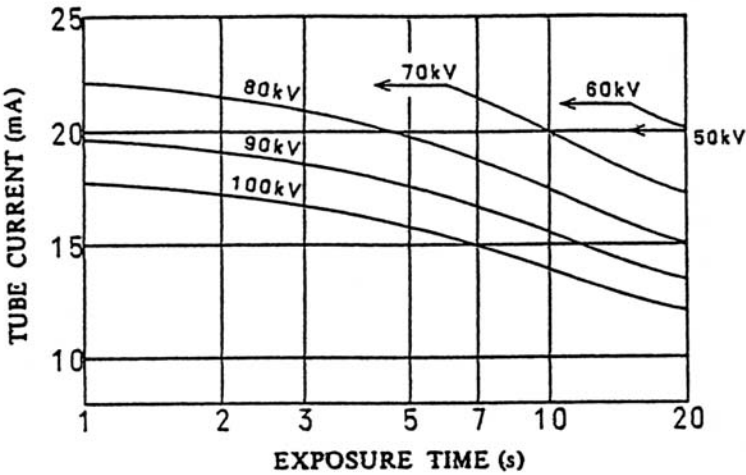
1. The tube shall be handled or operated only by qualified personnel.
Only a specialist with knowledge of X-ray tube should assemble, maintain and remove the tube.
2. The tube envelope is made of glass. In transporting and handling, sufficient care should be taken not to give strong impact or vibration 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.

D-052SB

MAXIMUM RATING CHARTS
(ABSOLUTE MAXIMUM RATING CHARTS)

DC

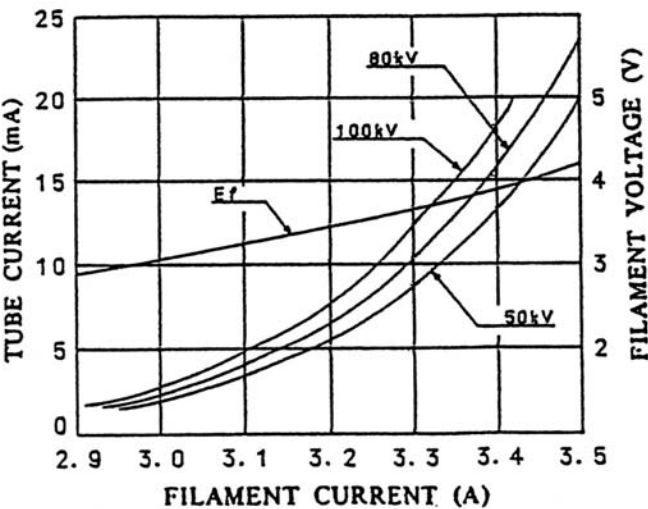
FOCAL SPOT : 0.5 mm



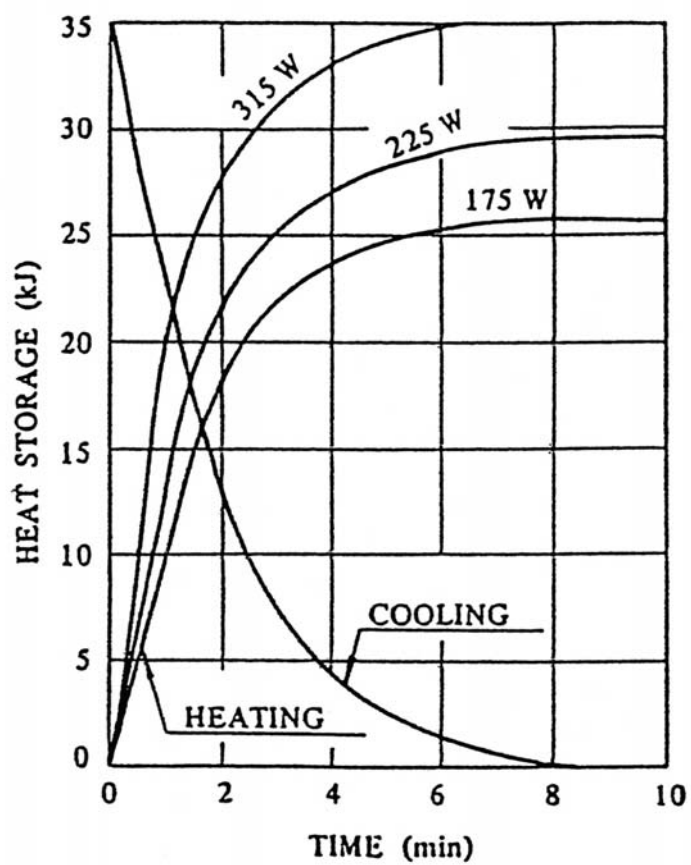
EMISSION & FILAMENT CHARACTERISTICS

DC

FOCAL SPOT : 0.5 mm

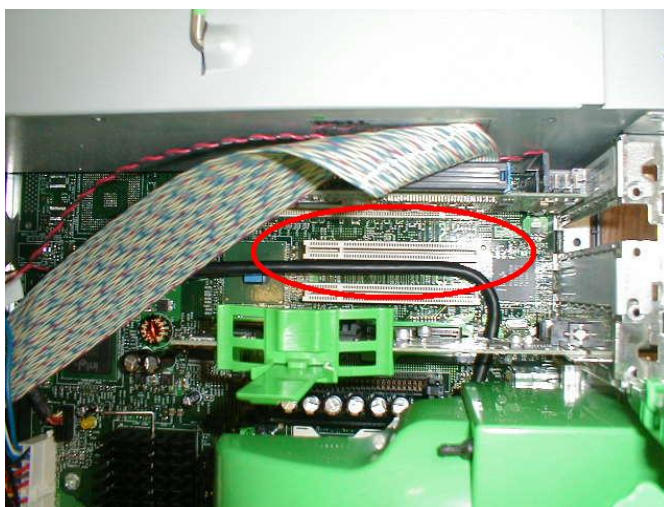


ANODE THERMAL CHARACTERISTICS



10. Methods to install a LAN Card for Panoramic radiograph

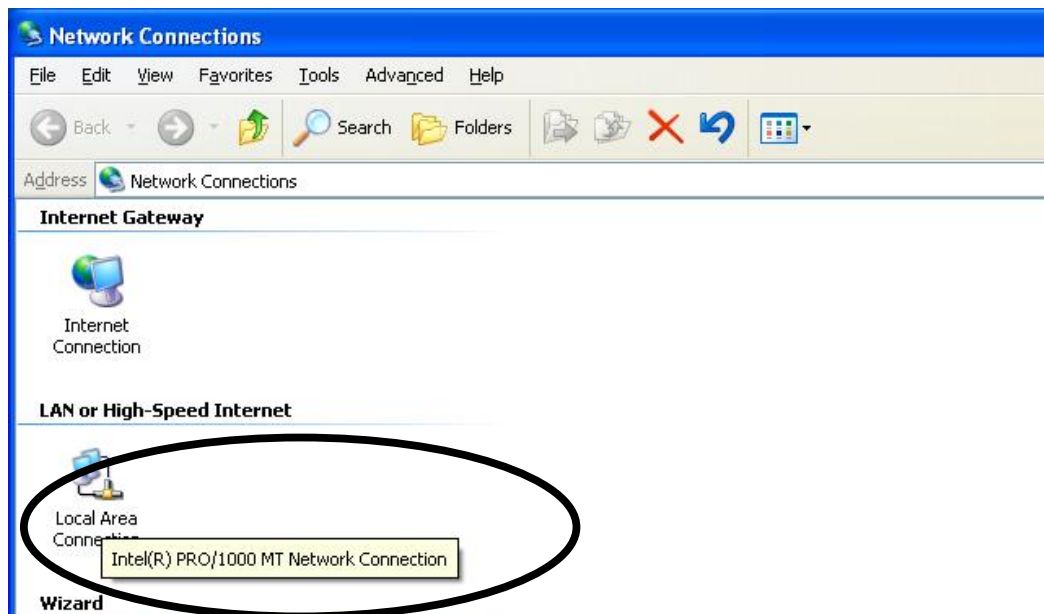
1. Turn the power of personal computer off, and unplug the power cable.
2. Open the cover of PC. Insert an expanded LAN Card.



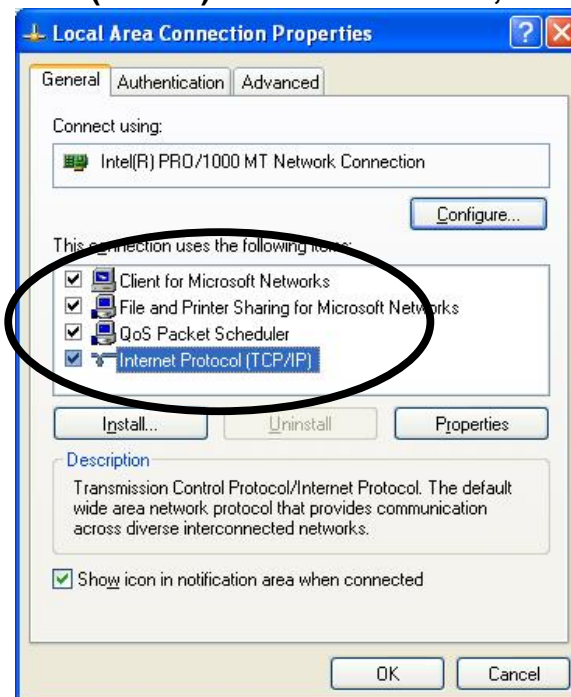
3. Start the personal computer, open Start Menu, right click My Network Places and select "Property"



4. Select “Property” from right clicked menu of Local Area Connection on the added LAN Board.

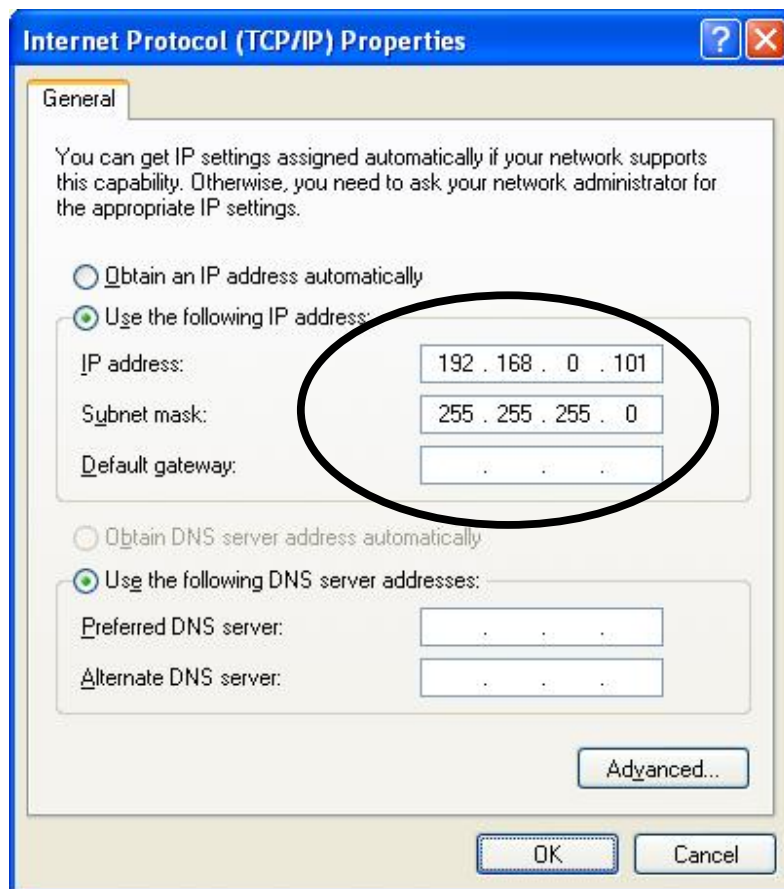


5. Select “Internet Protocol (TCP/IP)” from General Tab, and click “Property” button.



6. Select “Use following IP Address”, and enter following IP Address and Subnet Mask.

IP Address 「 1 9 2 . 1 6 8 . 0 . 1 0 1 」
Subnet Mask 「 2 5 5 . 2 5 5 . 2 5 5 . 0 」



Click “OK”

1 1. Methods to install a TWAIN driver in imaging software

1. Insert the CD-Rom supplied with BELMAX-CM.
2. Run "Setup.exe"
3. TWAIN Drive will be installed automatically.

12. Contact Information

Belmont Equipment

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Somerset, NJ 08873

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Toll Free Fax (800) 280-7504

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