B 0 2 - I 1 5 1 E

Installation Manual

Panoramic Radiograph

ANA – BEL Series

Panoramic and Cephalo Radiograph

ANA – BEL CM Series

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

CONTENTS

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 “.

8. If you intend to use ANA-BEL/ANA-BEL CM with digital receptor (ADR), please refer to Item13, Item14 and Item15.

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 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

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 the 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 Sliding Unit moves up and down

⚠ WARNING

LASER RADIATION, DOT 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 ANA-BEL / CM.
2. Operation Manual for ANA-BEL / 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 an 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) ANA-BEL 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 ANA-BEL 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

ANA-BEL Panoramic 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.

04. Specifications

Name	Panoramic Radiograph	Panoramic and Cephalo Radiograph
Model	ANA – BEL ANA – BEL D (※1)	ANA – BEL CM ANA – BEL D CM (※2)
Rated Line Voltage	120Vac 60Hz 1φ	
Power Capacity	17A	
High Voltage Generator	High Frequency Inverter (100kHz)	
Tube Voltage	60kV~90kV (1kV step)	
Tube Current	2.4.6.8.10.12mA	
Exposure Method	Manual	
X-ray Tube	D – 052SB (Toshiba)	
Focal Spot	0.5 X 0.5 mm	
Total Filtration	2.5mmAl (Min.)	
Exposure Mode	Panorama – Child / Adult / Orthoradial MS T.M.J. – Lateral / Frontal	Cephalo – Lateral / Frontal
Exposure Time	Panorama : 12sec / 7sec MS : 8 sec T.M.J. Lateral : 3.0sec(X4) T.M.J. Frontal : 3.0sec(X2)	Cephalo Frontal / Lateral: 0.1~3.2sec
Magnification (times)	Panorama : 1.21 - 1.36 MS : 1.20 - 1.22 T.M.J. Lateral : Approx. 1.24 T.M.J. Frontal : Approx. 1.88	Cephalo Frontal / Lateral: 1.1
Positioning Beam	3 beams	
Film Size	Panorama 150X300mm (6"×12")	Cephalo: 8" X 10"
Cassette	Panorama Size	Cephalo Size
Dimension (mm)	W:980×D:1,246×H:2,310	W:1,833×D:1,246×H:2,310
Weight	Approx. 160kg	Approx. 190kg

※ 1: Device of Digital Panorama Radiograph
※ 2: Device of 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

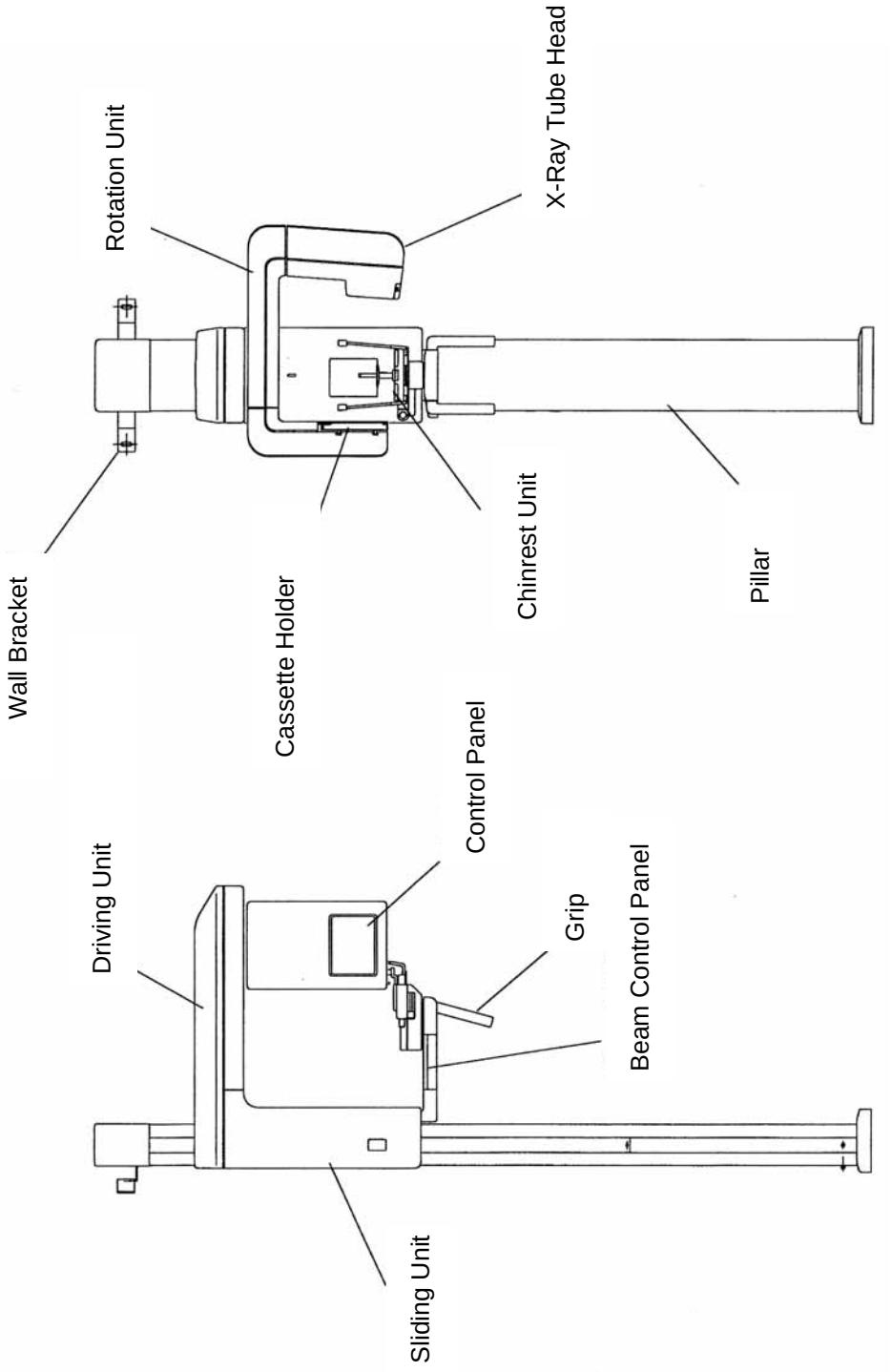
Environmental condition for Storage
Temperature : 14~140F (－10～60℃)
Humidity : 10～95%
Pressure : 700～1060 hpa

Environmental condition for Transportation
Temperature : 14~140F (－10～60℃)
Humidity : 10～95%
Pressure : 700～1060 hpa

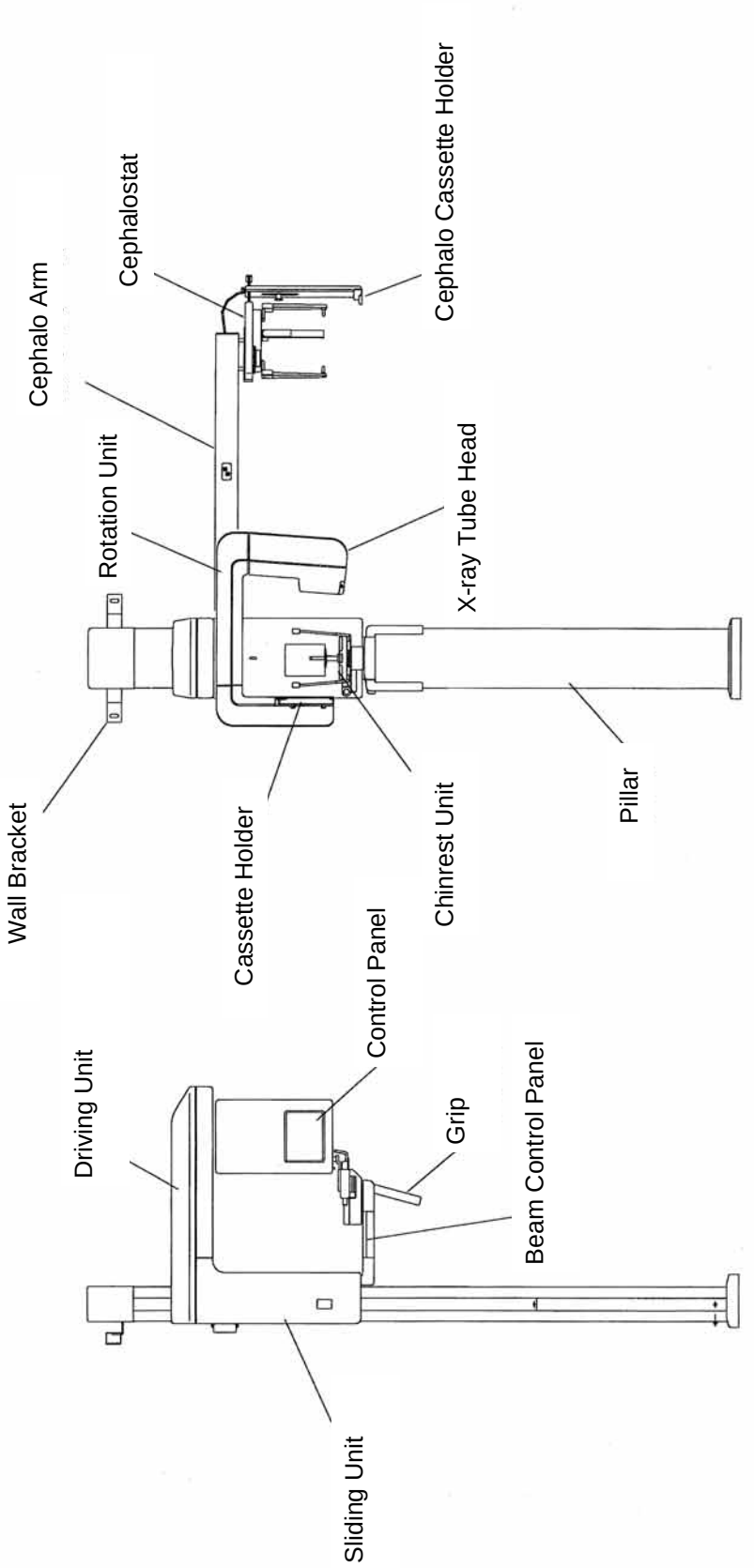
05. Name of Each Parts and Dimension

1. Name of Each Parts

ANA-BEL
ANA-BEL D



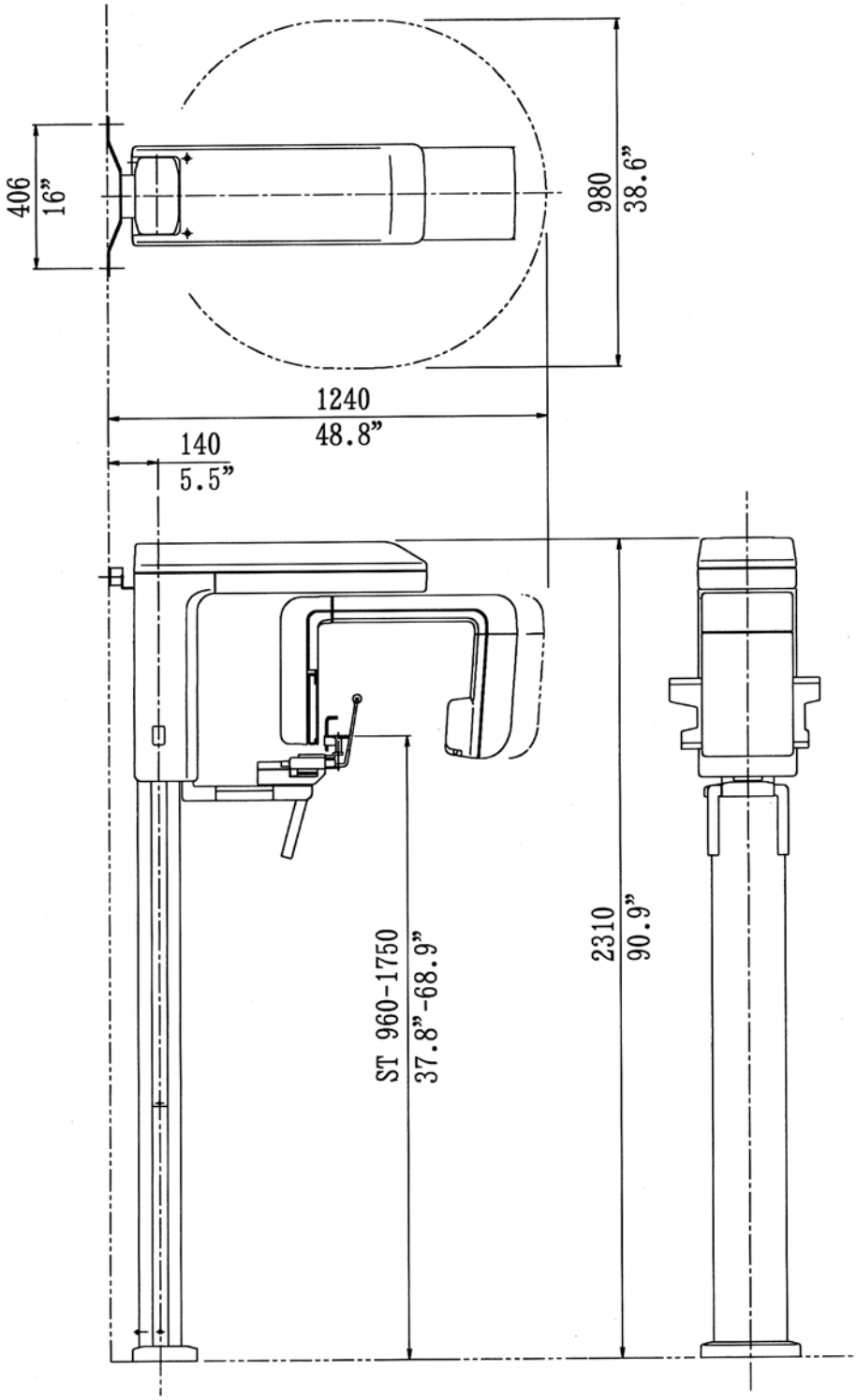
ANA – BEL CM
ANA – BEL D CM



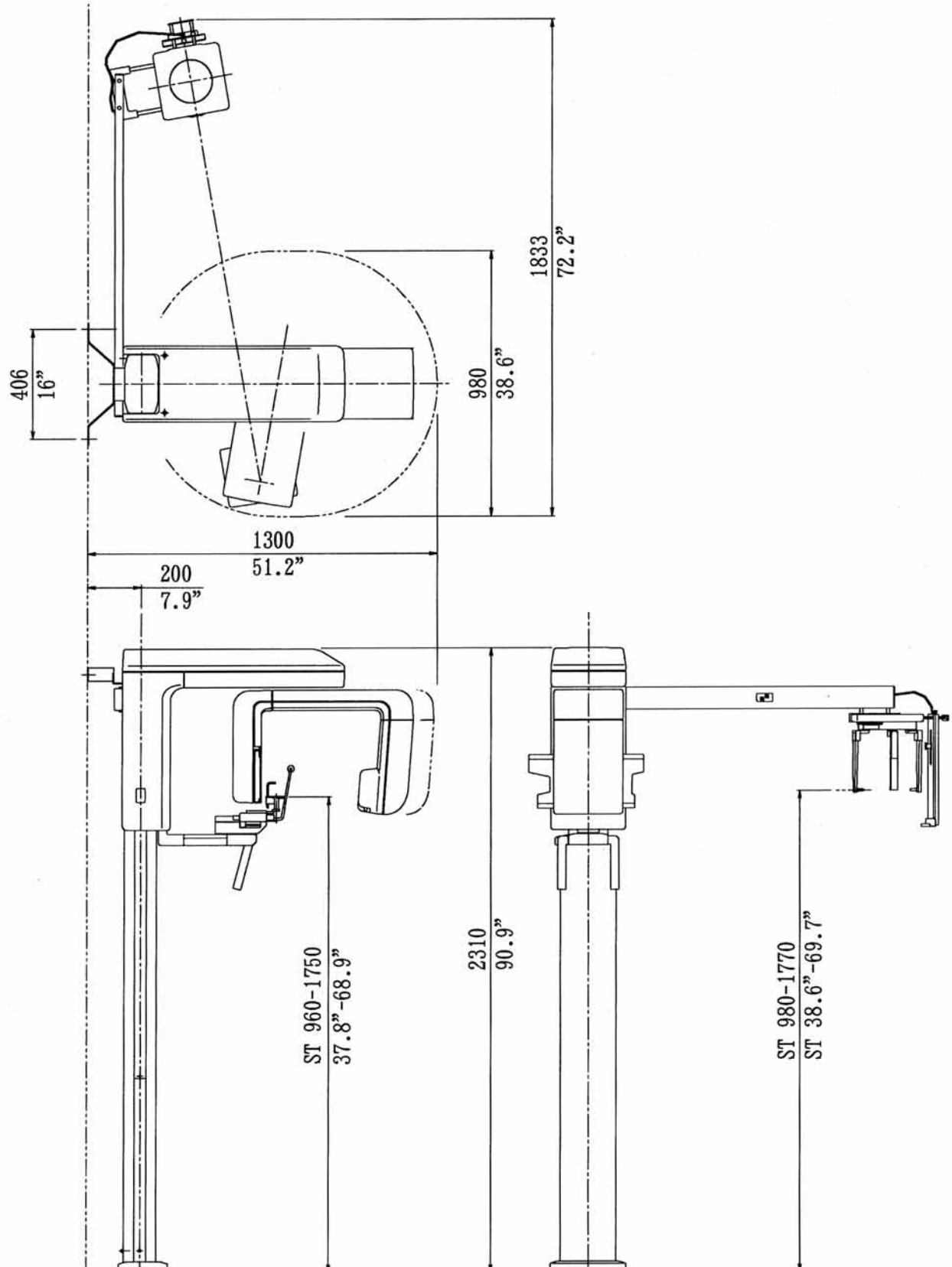
2. Dimension

ANA-BEL

ANA-BEL D



ANA-BEL CM
ANA-BEL D 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 (ANA – BEL CM)
8) Cephalo Ass'y (ANA – BEL CM)

2. Accessories for Installation

1) Shaft (ϕ10 L=400)
   Cable Tie 5 pcs.

2) Fixing Screws

Fixing for Sliding Unit and Rotation Unit	Hexagon Head Bolt	M8 X 25	4 pcs.
Positioning for Sliding Unit and Rotation Unit	Taper Pin	ϕ5 X 25	2 pcs.
Fixing for Chinrest Unit	Socket Head Screw	M6 X 20	4 pcs.
Mounting Sliding Unit Cover	Bind Screw	M3 X 8	2 pcs.
	Screw	M3 X 8	2 pcs.
	Socket Head Screw	M3 X 8	2 pcs.
Mounting Rotation Unit Cover	Bind Screw	M3 X 8	2 pcs.
Mounting Upper Cover of Pillar	Flat Head Screw	M3 X 6	2 pcs.
*Mounting Back Cover of Sliding Unit	Flat Head Screw	M6 X 8	4 pcs.
*Mounting Cephalo Arm	Socket Head Screw	M6 X 16	4 pcs.
*Positioning for Cephalo Arm	Taper Pin	ϕ5 X 25	2 pcs.
*Fixing for Cephalo Cassette Stopper	Flat Head Screw	M4 X 8	2 pcs.

* Only for ANA – BEL CM

3) Fixing Bolt for Sliding Unit and Rotation Unit
   M8 X 25 Hexagon Head Bolt (4 pcs.), Washer 8φ (4 pcs.), Spring Washer 8φ (4 pcs.), Taper Pin (2 pcs.)

4) Fixing Bolt for Sliding Unit and Rest Unit
   Socket Head Screw M6 X 20 (6 pcs.)

5) Mounting Screw for Rotation Unit Cover
   Bind Screw M3 X 8 (2 pcs.)

Nylon Washer φ 3 (2 pcs.)

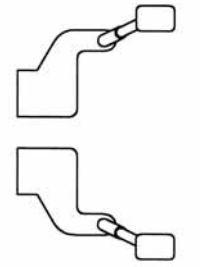
6) Mounting Screw for Sliding Unit Cover

Socket Head Screw	M3 X 10	(6 pcs.)
Bind Screw	M3 X 8	(2 pcs.)
Screw with spring washer	M3 X 8	(2 pcs.)
Nylon Washer	φ 3	(6 pcs.)

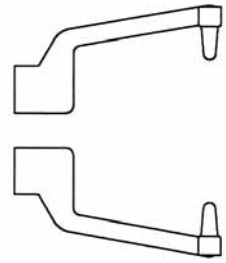
3. Accessories

2. 1. Accessories

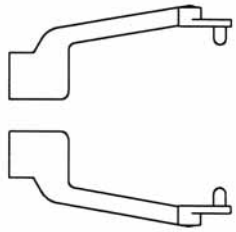
1. Head Holding Rods for Panorama and MS



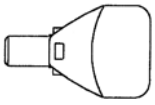
2. Ear Rods for T.M.J. LA



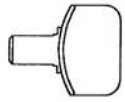
3. Ear Rods for T.M.J. PA



4. Chinrest for Panorama

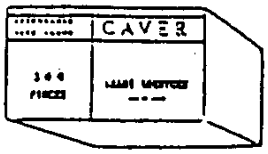


5. Chinrest for MS



6. Bite Block for Panorama

7. Bite Block Cover (Disposable)



8. Exposure Switch Holder

9. Felt patches for Cephalo Cassette 2 pcs.

Cassette for Panorama	1 pce. (Option)
Cassette for Cephalo	1 pce. (Option)

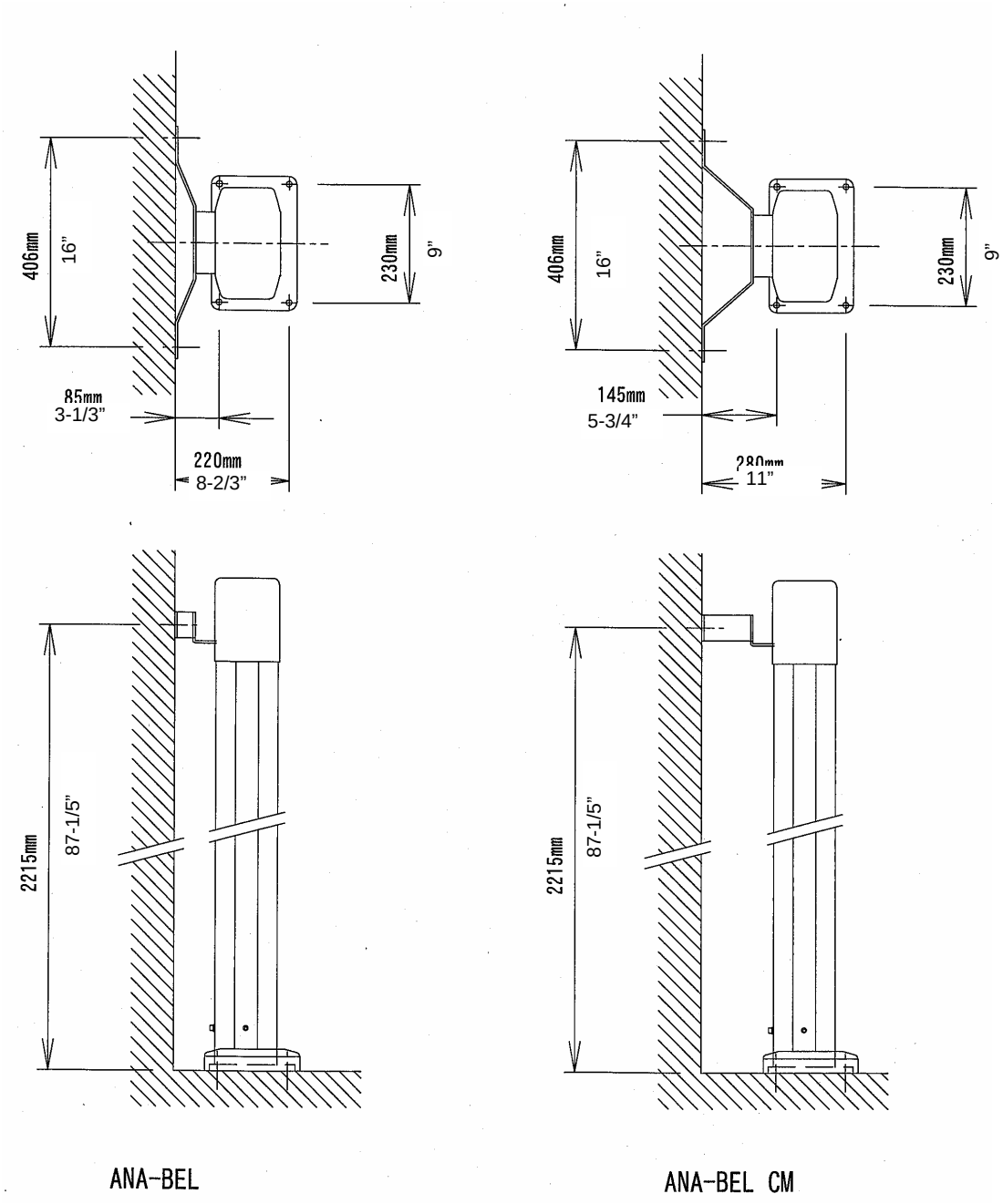
07. Installation Instructions

Fixing to the wall

⚠ Notice

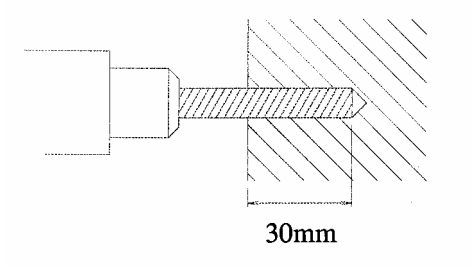
The Wall bracket must be attached to wall studs with minimum of two 5/16 x 3 inch lag screws If Stud are not available at the appropriate installation point. Or if stud wall construction is not used, a rigid structure capable of supporting 100 lbs. pull out must be provided.

NOTE: DO NOT USE THIS UNIT WITHOUT CORRECT BRACING



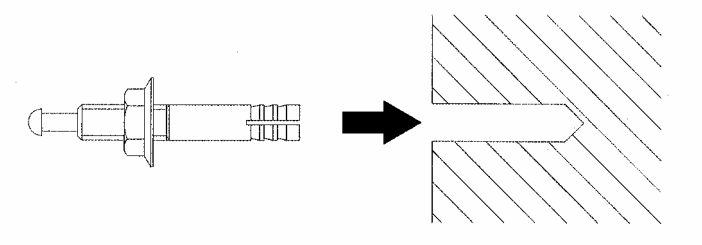
When concrete strike anchors（C8-50）are used

①Drill 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.

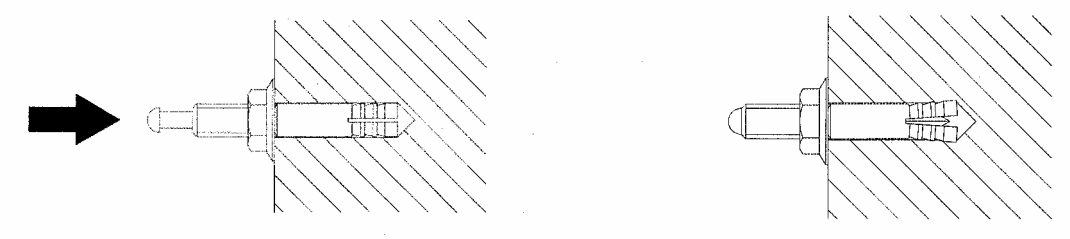


②Attach M8 nuts on concrete strike anchors.
Turn nut and leave 5 to 6 screw threads above a nut.

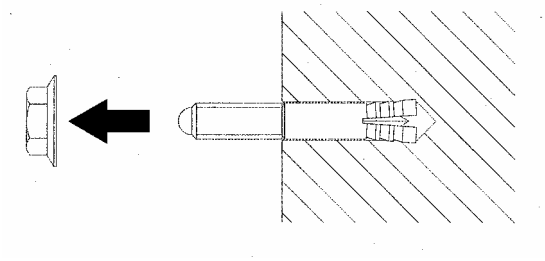
③Insert a concrete strike anchor into a hole.



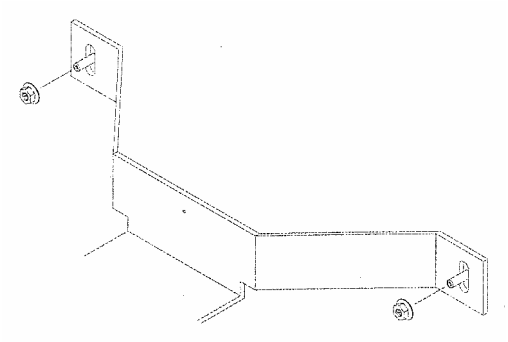
④Strike the pin until the pin is flush with top of the anchor.



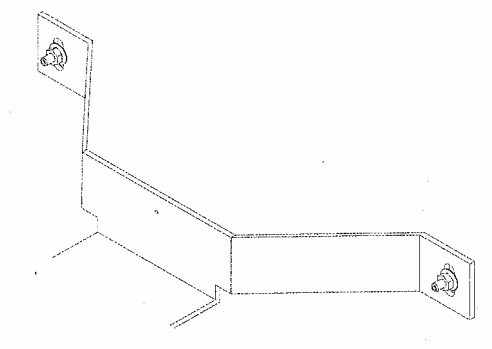
⑤Remove the M8 nut.



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



⑦Tighten M8 nuts.



⑧Confirm that the apparatus is securely fixed.

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

① Move the apparatus to the place where the ANA-BEL is installed.

②Tighten coach bolts through holes of the mounting bracket.
If needed, drill holes prior to this step

③ Confirm that the apparatus is securely fixed.

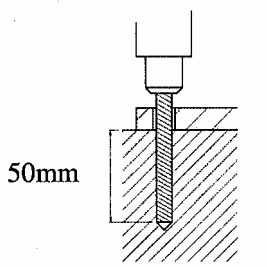
How to fix on the floor

⚠Warning
ANA-BEL 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 ANA-BEL IS PLACED SHOULD BE ABLE TO SUPPORT 600 lbs. DEAD LOAD.

When concrete strike anchors（C8-80）are used

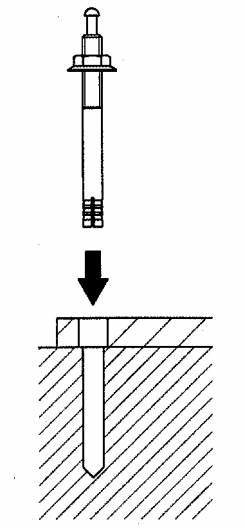
① Move the apparatus to the place where it will be installed.

② Drill four holes of 2” (50mm) depth through the holes of pillar stand by using 21/64” (8.3mm)drill bit.

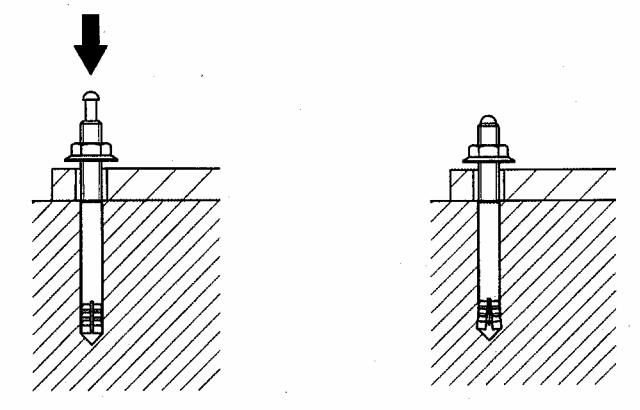


③ Insert a concrete strike anchor into each hole.

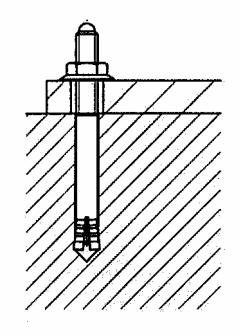
④ Attach a M8 nut on a concrete strike anchor.
Turn a nut and leave 8 to 10 screw threads above the nut.



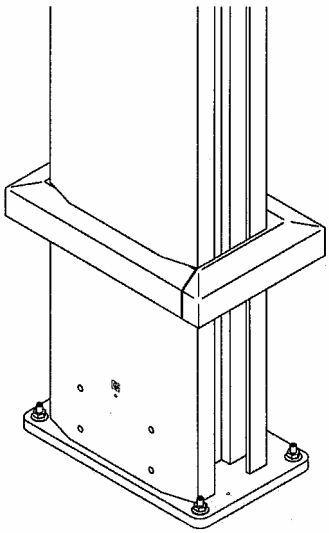
⑤ Strike the pin until pin is flush with top of the anchor.



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

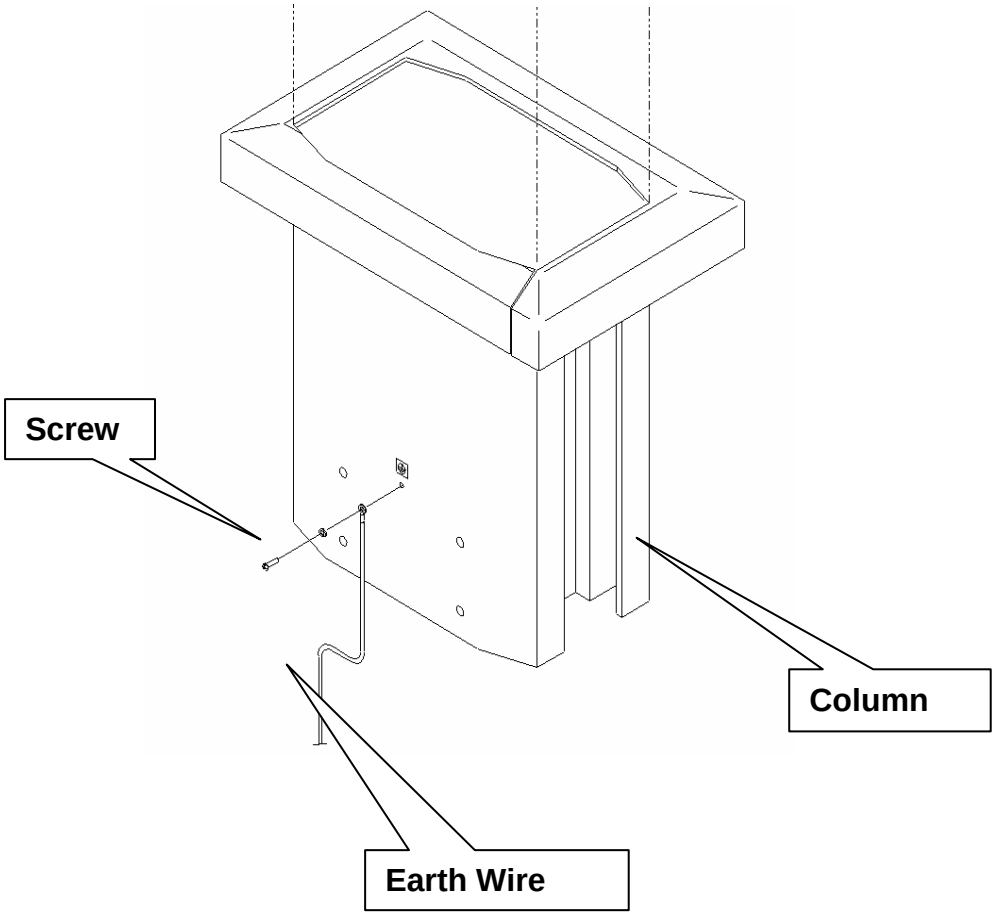


⑦ Be sure that the apparatus is securely fixed.



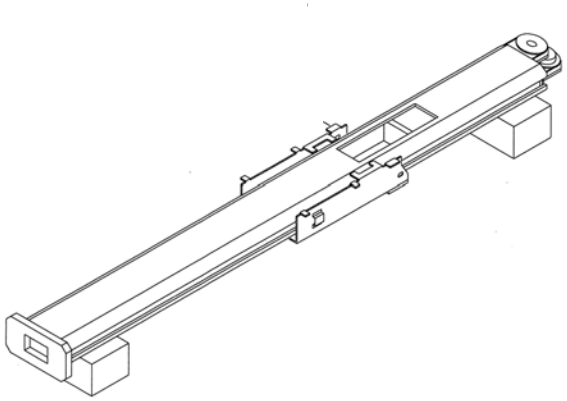
Method of installing the earth wire

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.



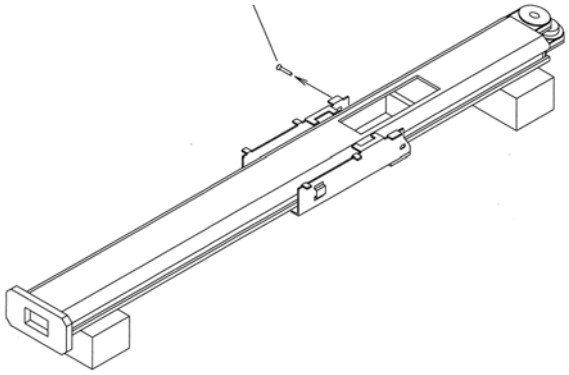
1. Installation Procedure

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

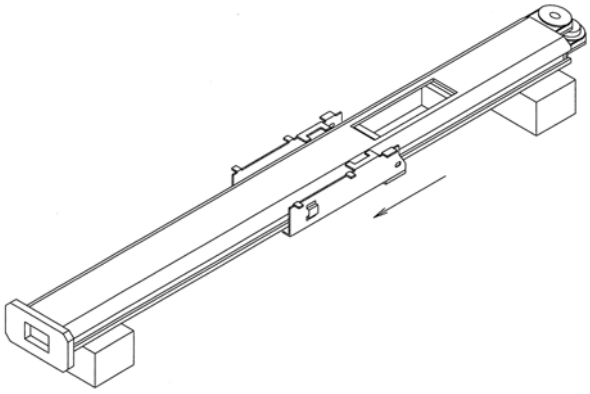


2. Remove the screw (M6 X 65) which fixes the counter weight frame to the main body.

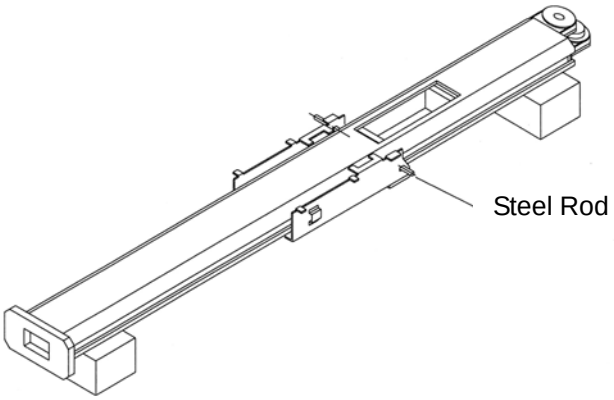
Flat head cap screw



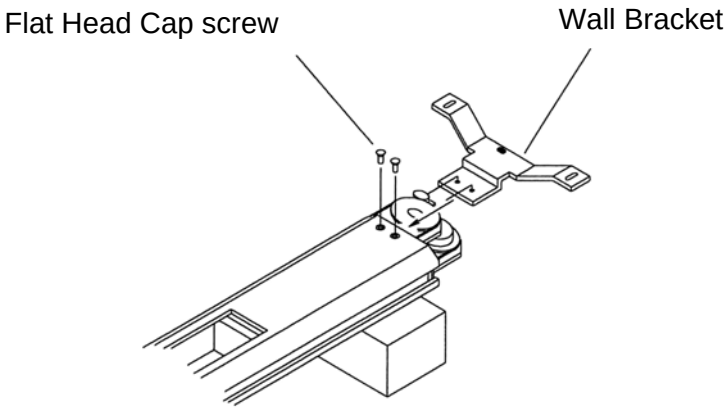
3. Move the Sliding Unit until the hole of Sliding Unit and the one of counter weight frame align.



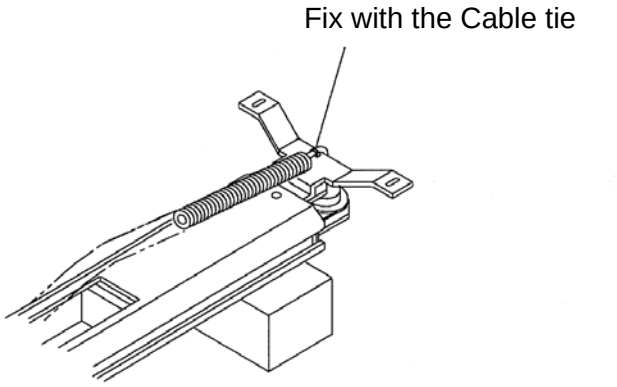
4. Insert the steel rod (provided) into the hole on the Pillar.



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



6. Fix 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.

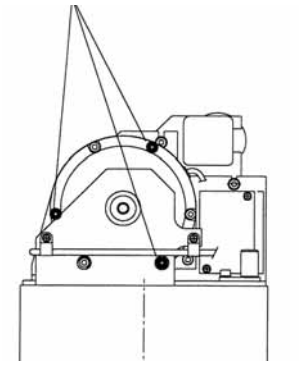


7. Elect the Pillar and mount on the floor.

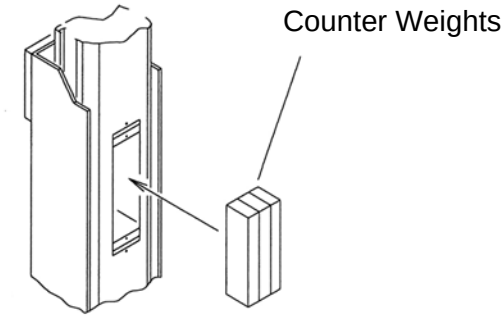
8. Fix the Pillar base and Wall Bracket.

9. Remove screws to release brake located at upper part of the Pillar.
   Caution: Sliding Unit might move. Be careful not to pinch fingers.

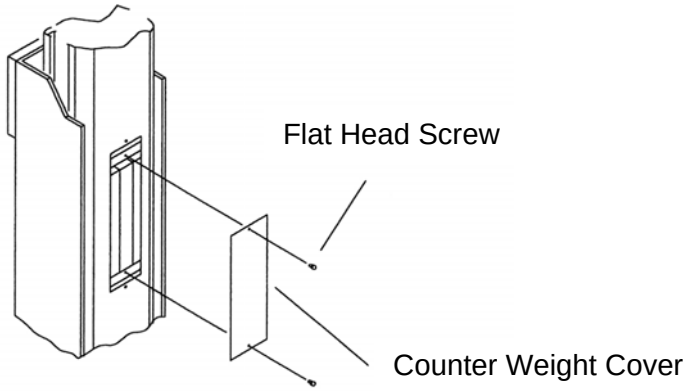
Screws for Brake Release



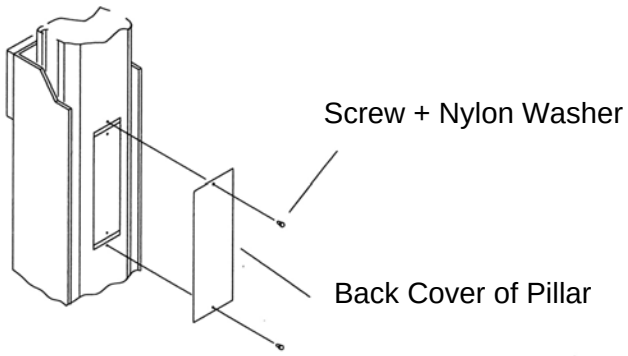
10. Put Counter Weights into Counter Weight Frame from back side of the Pillar.



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

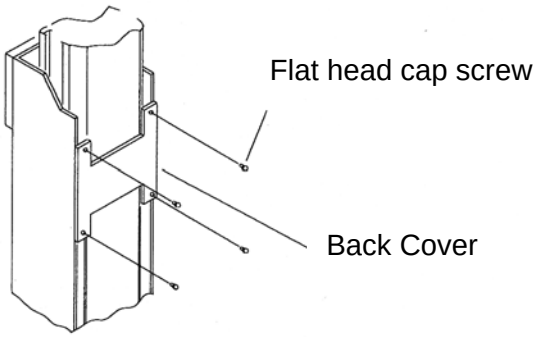


12. Attach the Pillar Cover on the back side of Pillar.



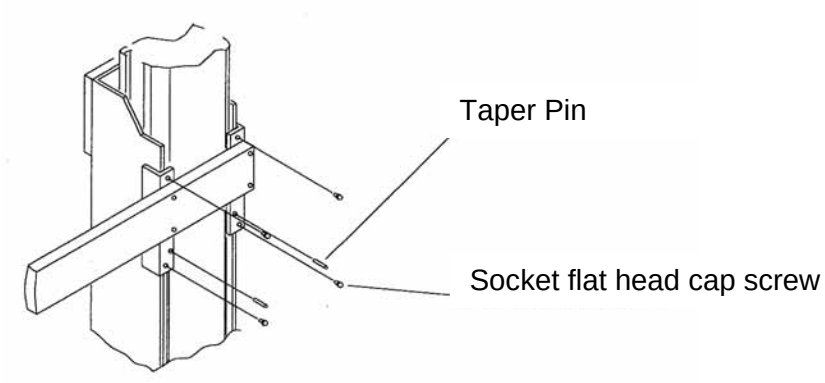
13 – 1. In case of ANA – BEL

Attach the Back Cover on back side of the Sliding Unit.

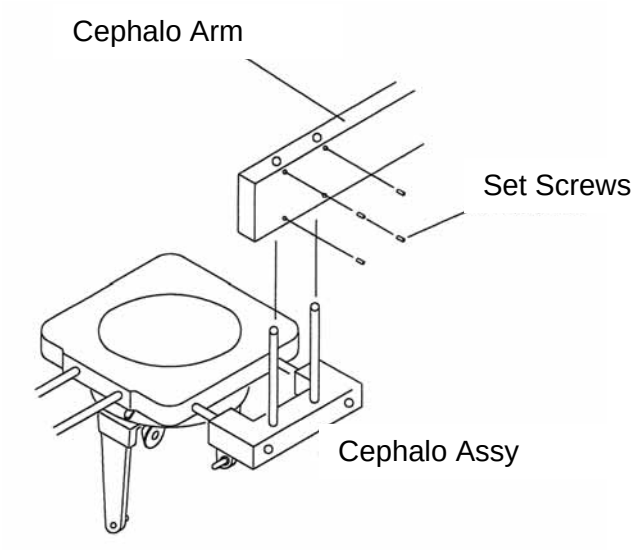


13 – 2. In case of ANA – BEL CM

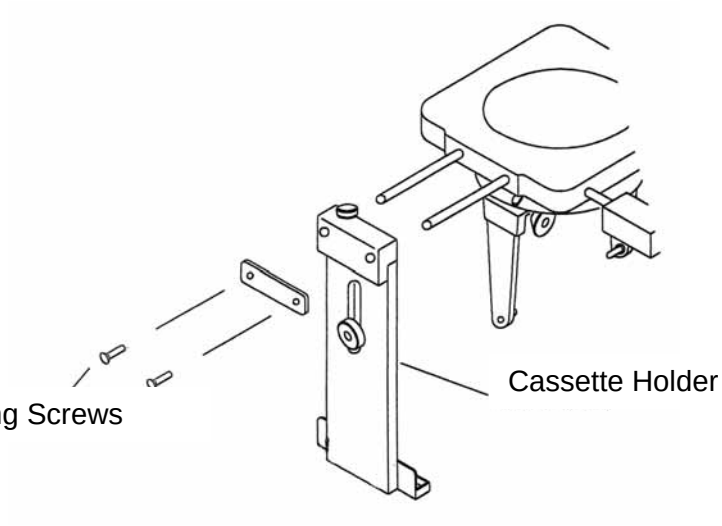
1) Attach the Cephalo Arm on the back side of Sliding Unit. Align the Cephalo arm by using taper pins. Then fix it by Socket flat head cap screws.



2) Cephalostat Assembly.
Insert two supporting rods of the Cephalostat into the holes of Cephalo arm from underneath as far as they go, then fix with four set screws.

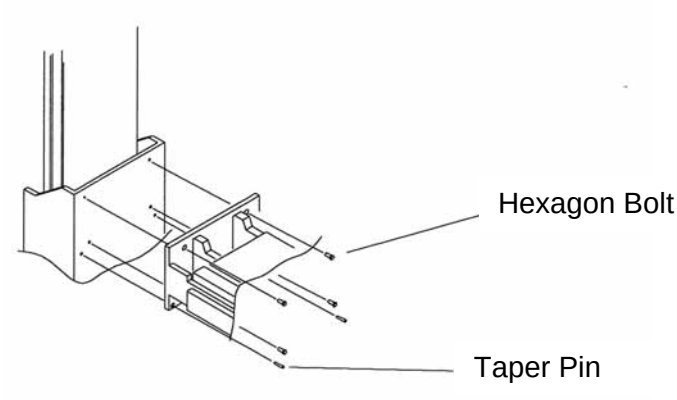


3) Fix the Cassette Holder to the Cephalo Assy
Attach the cassette holder with two screws.

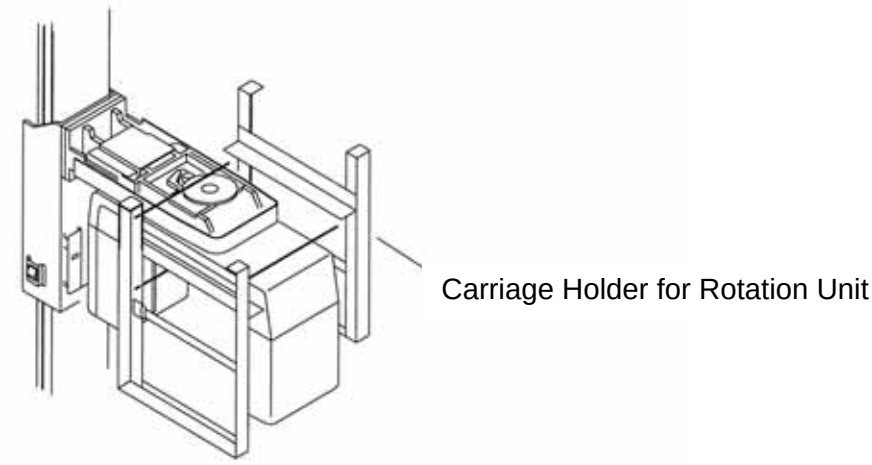


4) Connect the wire from Cephalo Arm to the CNK Board on front side of the Sliding Unit.

14. 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.

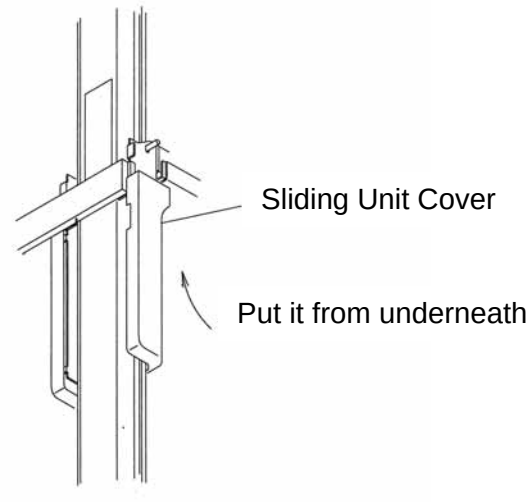


15. Remove Carriage Holders from the Rotation Unit

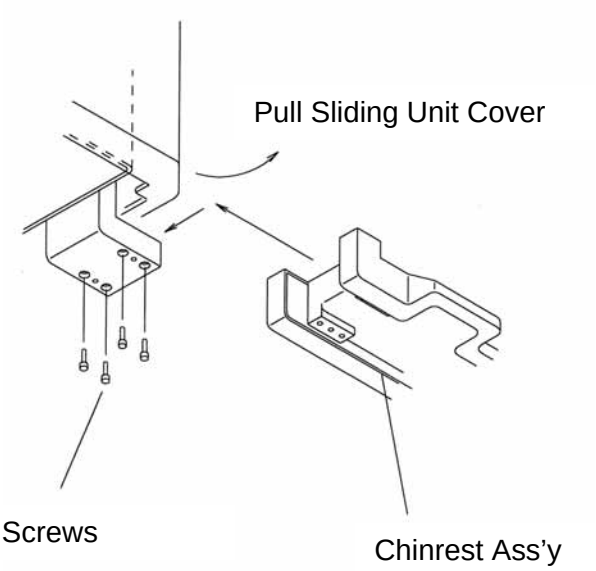


16. Connect the wire harness from the Rotation Unit to the CNK Board and the CNL2 Board located on front side of the Sliding Unit.

17. Put the Sliding Unit Cover son the Sliding Unit.

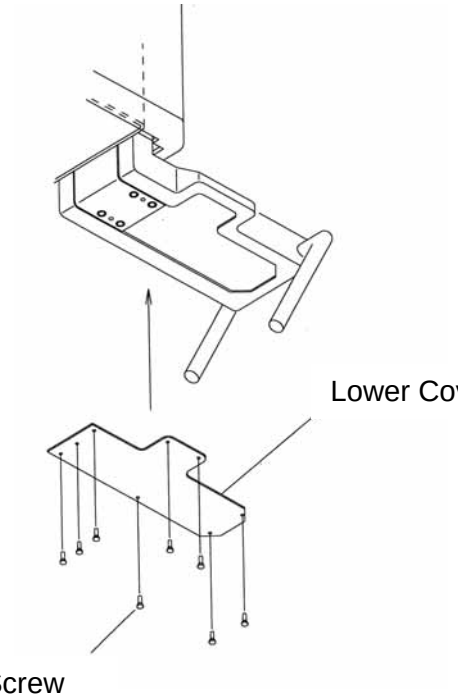


18. Insert the Chinrest Ass'y to lower part of the Sliding Unit while pulling the sliding unit cover. Fix the chinrest ass'y by four cap screws.

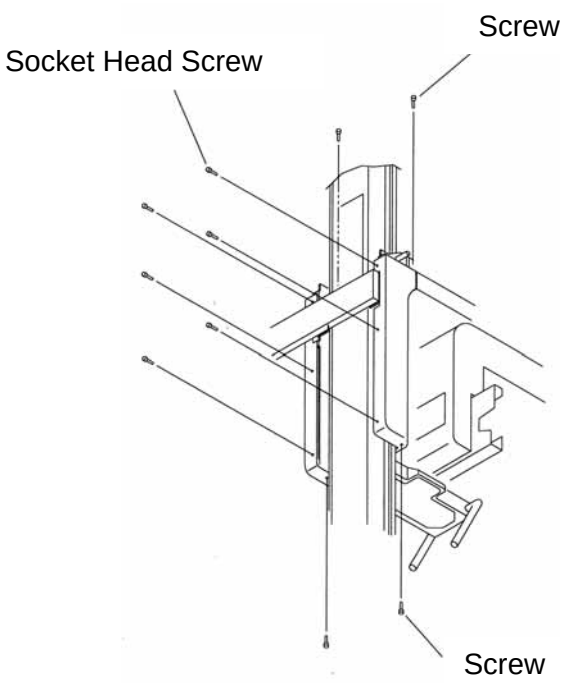


19. Connect wire harness from the Sliding Unit to the connector in Chinrest Ass'y.

20. Fix the lower cover to the bottom of the Chinrest Ass'y.

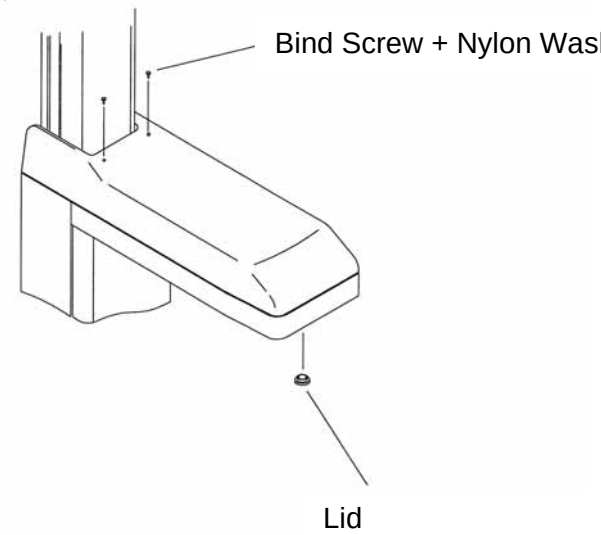


22. Fix the Sliding Unit Cover to the Frame.

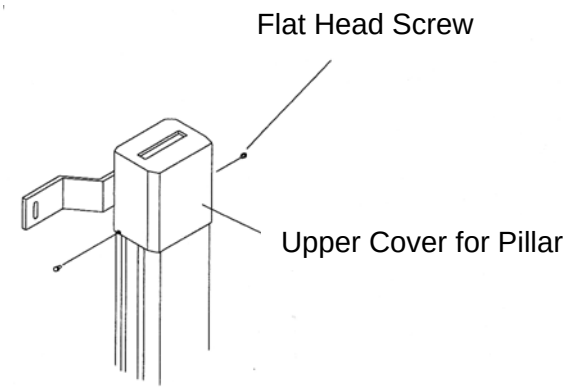


23. Remove the steel rod which is inserted to the Frame of the Sliding Unit.

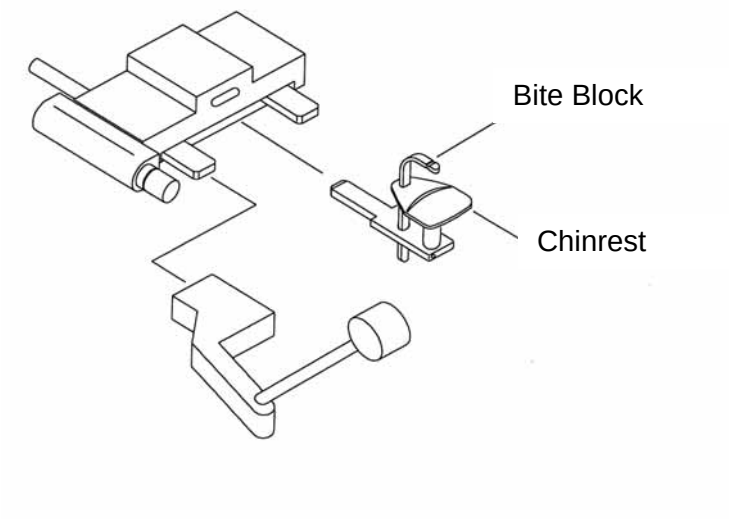
24. Fix the Rotation Unit Cover by two screws from the top and by a screw from the bottom. Put the lid to the bottom hole.



25. Fix the Upper Cover on Pillar by two flat head screws.



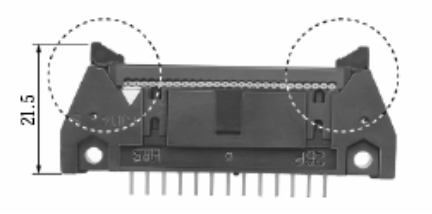
26. Put the Chinrest and Head Holding Rods to the Chinrest Unit.



2. Wire Harness Connection

1. Sliding Unit

Connect the wire harness CNL2 (3P) from the Rotation Unit to the CNL2 (3P) located inside of the Sliding Unit.
Connect the wire harness CN1 (34P) from the Rotation Unit to the CN1 (34P) on the CNK Board located inside of the Sliding unit.
Lock wire harness firmly.



Connect the wire harness N2 (3P) from the Rotation Unit to the CN2 (3P) on the CNK Board located inside of the Sliding Unit.
(only for ANA- BEL CM) Connect the wire harness CN6 (4P) from the Cepahlo Arm to the CN6 (4P) on the CNK Board located inside of the Sliding Unit.
(only for ANA – BEL CM) Connect the wire harness CNSW2 (3P) from the Cephalo Arm to the CNSW2 (3P) on the CNK Board located inside of the Sliding Unit.
Be careful not to pinch a wire harness.

2. Chinrest Unit

Connect the wire harness CNR1 (6P) to the CNR1 (6P) located inside of the Chinrest Unit.
Connect the wire harness CNR2 (6P) to the CNR2 (6P) located inside of the Chinrest Unit.
Connect the wire harness CNM (4P) to the CNM (4P) located inside of the Chinrest Unit.
Be careful not to pinch a wire harness.

3. Power Plug

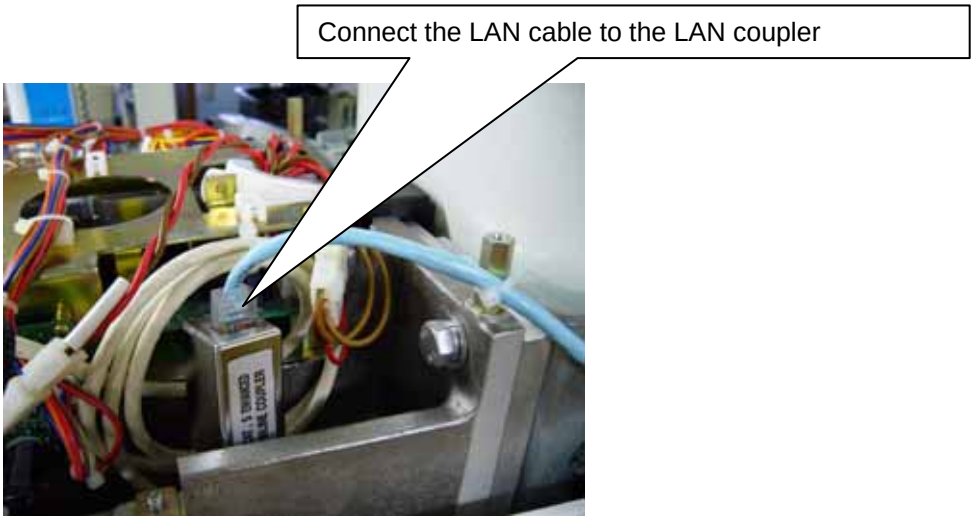
Connect the Power Plug to the power outlet which conforms to the rating mentioned on the description plate.

Connection Check Table

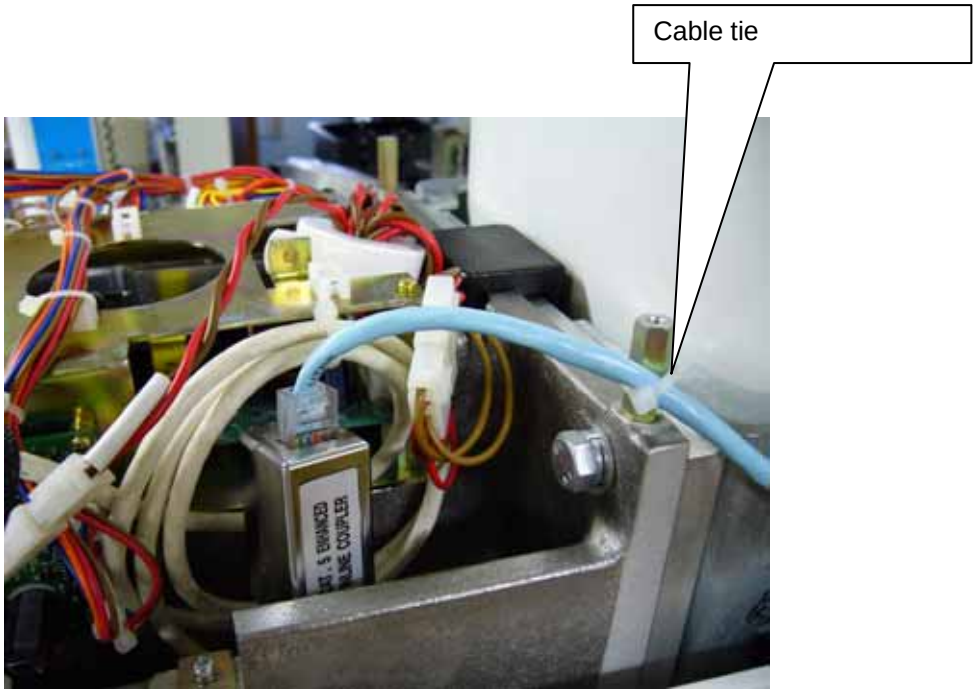
Portion	Name of Connector		Check
Sliding Unit	CNL2(3P)		
	CN1(34P)	CNK BOARD	
	CN2(3P)	CNK BOARD	
	CN6(4P) (only for ANA – BEL CM)	CNK BOARD	
	CNSW2(3P) (only for ANA – BEL CM)	CNK BOARD	
Rest Unit	CNR1(6P)		
	CNR2(6P)		
	CNM(4P)		

4. Connection of LAN cable (only for Digital)

1) Connect the LAN cable to the LAN coupler located inside of the rotation Unit.



2)Fix LAN cable by using a cable tie.

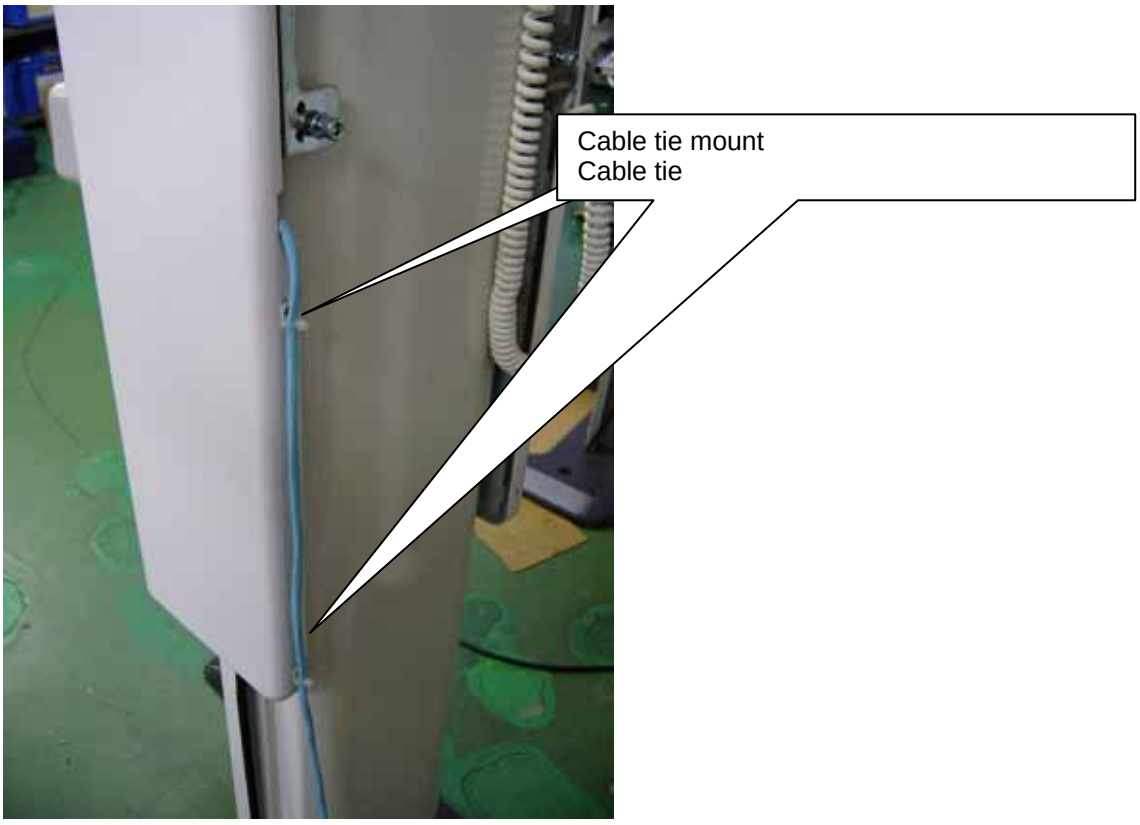


3) Remove screws(right side, 3 places) on the sliding unit.
Pull right side of the sliding unit cover, and pass the LAN cable through the opening of the cover.

4) Put the sliding unit cover back.

5) Hold the LAN Cable by a cable tie mount and fix it by a M3 x 10 screw.

6) Fix the LAN cable by a cable tie



7) Connect the LAN cable to the PC.

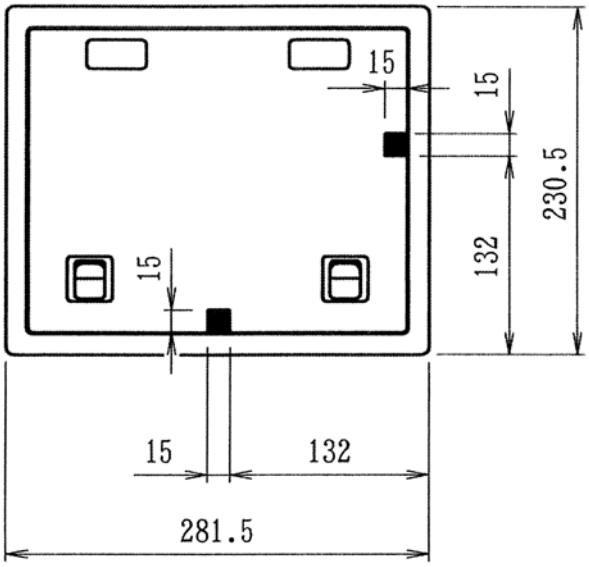
3. ANA – BEL CM (with Cephalo)

Positions of Felt patches for the Cephalo Cassette

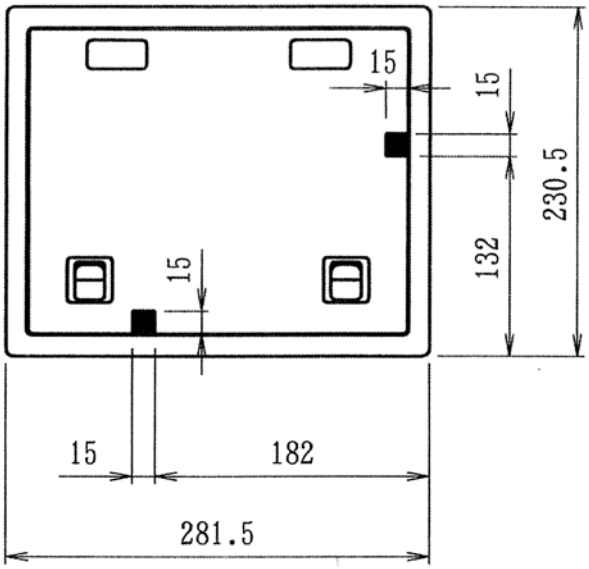
Note: Before putting Felt patches, wipe the surface with alcohol.

Put Felt patches to the following positions.

Right side Cephalo setup



Left side Cephalo setup



08. Post-Installation Instructions

1. Check listed items by referring 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?		☐ OK	☐ 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	☐ OK	☐ NG	
		Allophone	☐ OK	☐ NG	
		Off-flavor	☐ OK	☐ NG	
5)	Does the Power Code have a scratch or a crack?		☐ OK	☐ NG	

2. Operation

1)	After Power On, does the main body have a problem?	Heat	☐ OK	☐ NG
		Allophone	☐ OK	☐ NG
		Off-flavor	☐ OK	☐ NG
2)	After depressing the "RESET" key, is “READY” displayed?		☐ OK	☐ NG
3)	When a cassette is not placed, by depressing “READY” switch, is an error message displayed and does buzzer sound?		☐ OK	☐ NG
4)	Does main body move with up / down switch?		☐ OK	☐ NG
5)	Does up / down operation of main body have a problem?	Allophone	☐ OK	☐ NG
6)	Does up / down operation accelerate after keep depressing up / down switch for more than 3 sec.?		☐ OK	☐ NG
7)	Does Sliding Unit stop at the highest and the lowest position?		☐ OK	☐ NG
8)	Positioning Beams in Panorama and MS mode.			
	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 Up / down operation of Frankfort Beam work by depressing up / down switch.		☐ OK	☐ NG
	8-3) Does Frankfort Beam stop at the max position after keep depressing up / down switch?		☐ OK	☐ NG
	8-4) Dose Forward / backward operation of Focus Beam work by depressing forward / backward switch?		☐ OK	☐ NG

8-5) When Focus Beam moves to the maximum positions, are the values on display +25 and –25? ☐ OK ☐ NG

8-6) Is Focus Beam position value on display same as actual movement distance of Focus Beam? ☐ OK ☐ NG

Beams in T.M.J. LA mode

9) 9-1) 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

9-2) Does Forward / backward switch of Focus Beam work by depressing forward / backward switch? ☐ OK ☐ NG

10) 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

11) Check in Panorama mode

11-1) Does equipment work normally with exposure operation at 0kV, 0mA, 7sec. and Panorama N mode?

Allophone	☐ OK	☐ NG
Vibration	☐ OK	☐ NG

12) Check in T.M.J. LA mode

12-1) Does equipment work normally with exposure operation at 0kV, 0mA, 7sec. and T.M.J LA mode?

Allophone	☐ OK	☐ NG
Vibration	☐ OK	☐ NG

12-2) After the first exposure, Does Rotation Arm Unit return to start position automatically. ☐ OK ☐ NG

12-3) After the second exposure, Does Rotation Arm Unit stop at the end position. ☐ OK ☐ NG

13) Is Power turned off automatically after 5 minutes from the last operation? ☐ OK ☐ NG

14) After power is turned off automatically, Will power be turned on again normally? ☐ OK ☐ NG

Cephalo Function (Only for ANA – BEL CM)

15) Both Cephalo mode and Panorama mode are able to be switched. ☐ OK ☐ NG

16) Check in Cephalo mode

16-1) During "SET FILM" is displayed, Does “READY” switch become invalid? (“READY” switch should not work) ☐ OK ☐ NG

3. Exposure and Radiograph

1) Check exposure field

1-1) Exposure filed aligns with second collimator ☐ OK ☐ NG

2) Check in Panorama mode

Panorama N, Tube Voltage 60kV/Tube Current 6mA/Time 7sec ☐ OK ☐ NG

Exposure Field 275∼280mm mm

Upper and lower field of non-exposure 4∼7mm mm

Cephalo Radiograph (Only for ANA – BEL CM)

3) Cephalo PA
CEPHALO PA, Tube Voltage 70kV/Tube Current 12mA/Time 1.6sec ☐ OK ☐ NG

3-1) Upper and lower field of non-exposure 4∼7mm mm

Right and left field of non-exposure 8∼12mm mm

4) Cephalo LA
CEPHALO LA, Tube Voltage 70kV/Tube Current 12mA/Time1.25sec ☐ OK ☐ NG

4-1) Upper and lower field of non-exposure 4∼7mm mm

4-2) Right and left field of non-exposure 8∼12mm mm

Are Right and left Ear Rod Ring aligned? ☐ OK ☐ NG

5. 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 3-1/3” (85mm) for ANA-BEL, 5-3/4” (145mm) for ANA-BEL CM.

2．Compliance with International Standards

ANE-BEL, ANA-BEL CM complies with the following standards
IEC 60601－2－7 （1998）
IEC 60601－2－28（1993－03）
IEC 60601－2－32（1994－03）

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 the excesse 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．ANA-BEL 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℃)
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℃)
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 electric power for output of 90kV, 12mA.

1.08ｋW

3．Standard Tube Voltage, Current and Time

１２０ｍＡｓ（７５ｋＶ、１０ｍＡ、１２ｓｅｃ）

4．Minimum Tube Current and Time

２４ｍＡｓ（２ｍＡ、１２ｓｅｃ）

5．Nominal Capacity of Anode Input

１.７５ｋＷ

6．Maximum Capacity of Anode Heat

３５ｋＪ（５０ｋＨＵ）

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°

１０．Size of X-ray Tube Focus

０.５×０.５（ｍｍ）

１１．Characteristic Filtration of X-ray Tube

０.８ｍｍＡｌ

１２．Nominal Tube Voltage of X-ray Tube

５０～１００ｋＶ

１３．Rating of X-ray Tube Filament

３.５～４.９Ｖ　３.５Ａ

Refer to Characteristic Drawing of Emission for Cathode

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

About 150 Vp (PWM)

15. Weight of X-ray Generator

About 7.13 kg

16. 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

17. Type of X-ray Generator

CLASS I

18. Standard Angle to assemble X-ray Generator

Horizontal / perpendicular

19. Target Angle to assemble X-ray Generator

5°

20. Precision to install focus of X-ray Generator at time of construction of X-ray Generator

±0.5mm

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

0.5×0.5 (mm)

22. 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

Name of part	Aluminum equivalent
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

10. Maximum Energy Input per 1 hour

1728mAs / h

11. Rotation Speed of ARM

0.85km/h.

12. Rotation Force of ARM

3.7kgf.

13. Staments of Reference Loading Condition

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

14. Laser Marking

Class : 2 products (IEC60825-1: 2001)
Wave Length: 670mm
Standard : 1mW

15. 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

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℃ 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)

B02－I151E

09

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.

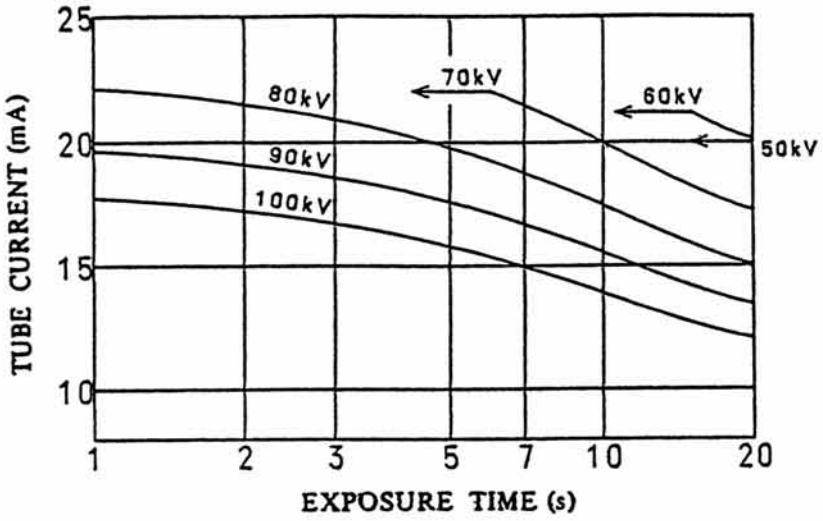
1. The tube shall be handled or operated only by qualified personnel.
   Only a specialist with knowledge of X-ray tube should assemble, maintain and remove the tube.
2. The tube-envelope is made of glass. In transporting and handling, sufficient care should be taken not to give strong impact or vibration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

MAXIMUM RATING CHARTS

(ABSOLUTE MAXIMUM RATING CHARTS)

DC

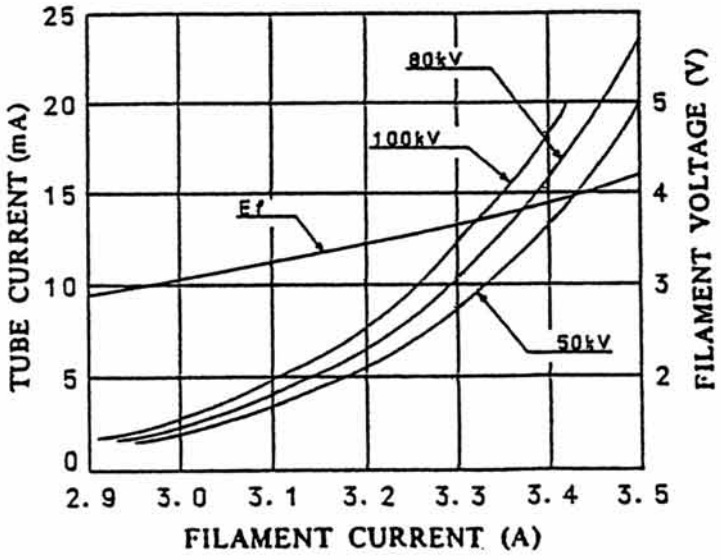
FOCAL SPOT : 0.5 mm



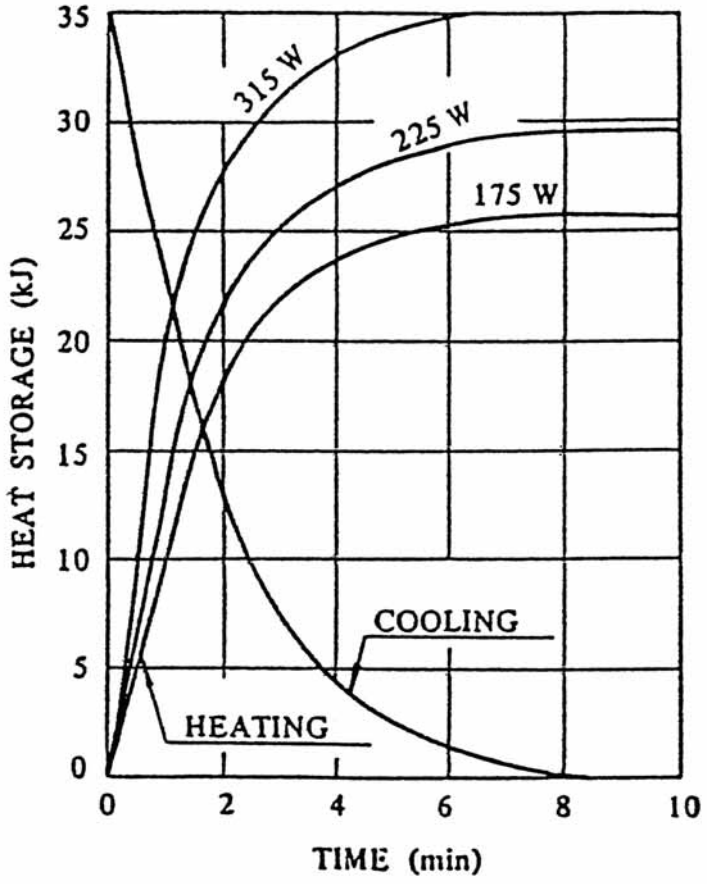
EMISSION & FILAMENT CHARACTERISTICS

DC

FOCAL SPOT : 0.5 mm

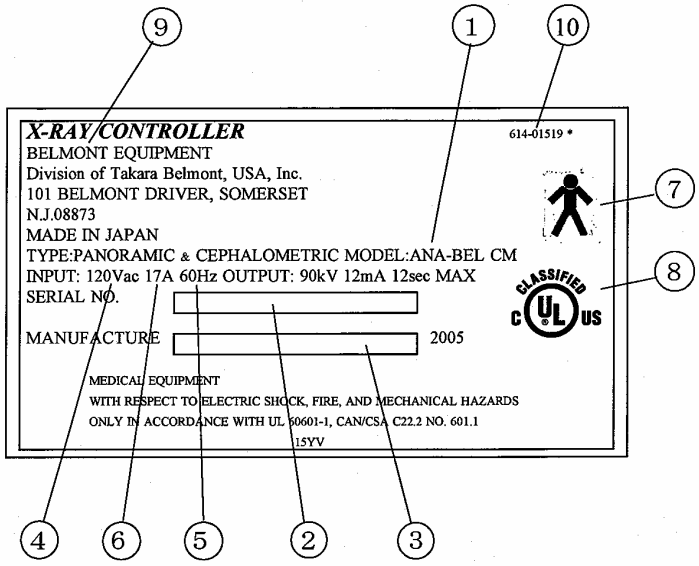


ANODE THERMAL CHARACTERISTICS



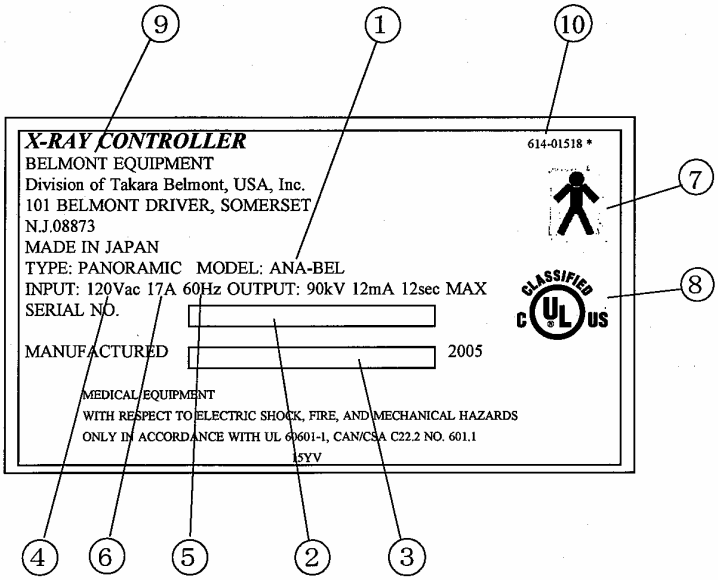
10. Detailed explanation of the equipment

X-RAY CONTROLLER (for ANA-BEL CM)



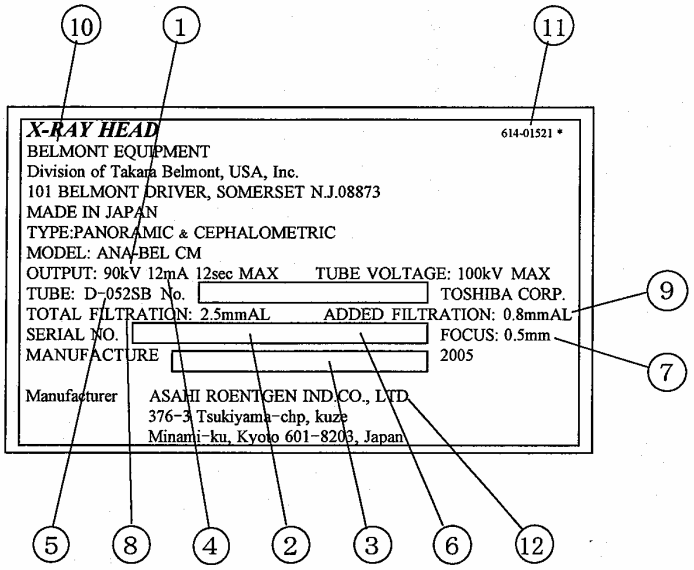
① Model Name
② Serial Number
③ Manufacturing Date
④ Power Voltage
⑤ Supply Frequency
⑥ Power
⑦ TYPE B Applied Part
⑧ UL Mark
⑨ Indication of origin
⑩ DWG. No.

X-RAY CONTROLLER (for ANA-BEL)



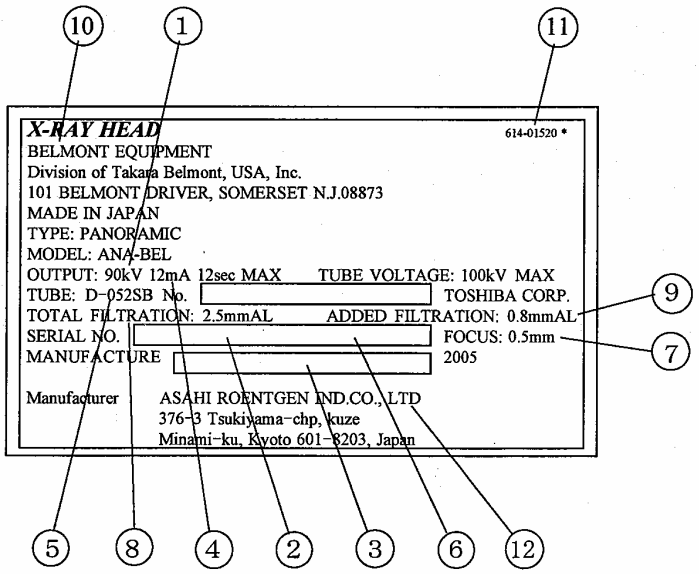
① Model Name
② Serial Number
③ Manufacturing Date
④ Power Voltage
⑤ Supply Frequency
⑥ Power
⑦ TYPE B Applied Part
⑧ UL Mark
⑨ Indication of origin
⑩ DWG. No.

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

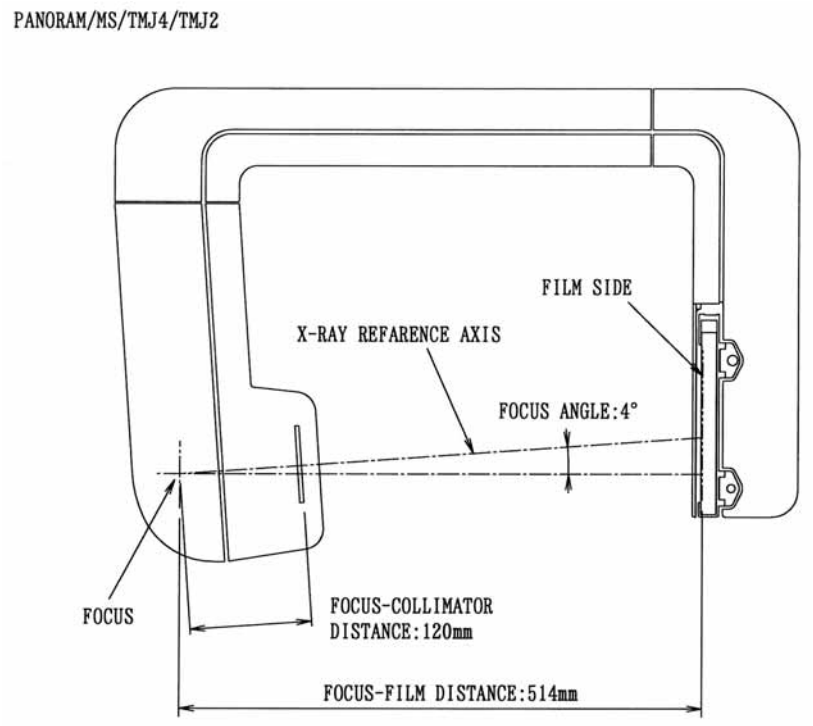
X-RAY HEAD (for ANA-BEL)



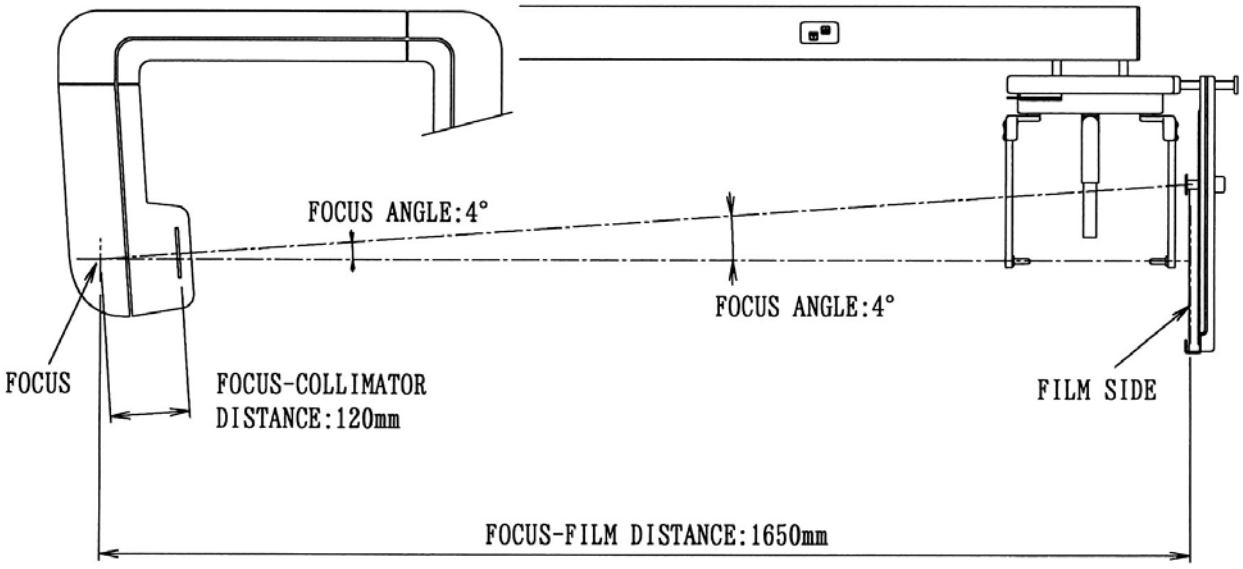
① Model Name
② Serial Number
③ Manufacturing Date
④ Maximum X-ray Rated
⑤ X-ray Tube Type
⑥ Tube Number
⑦ Focus Size
⑧ Total Filtration
⑨ Addendum Filtration
⑩ Indication of distributor
⑪ DWG. No.
⑫ Idication of origin

11. X-ray Tube Focus and Film Layout

PANORAMA/MS/TMJ4/TMJ2 Radiography



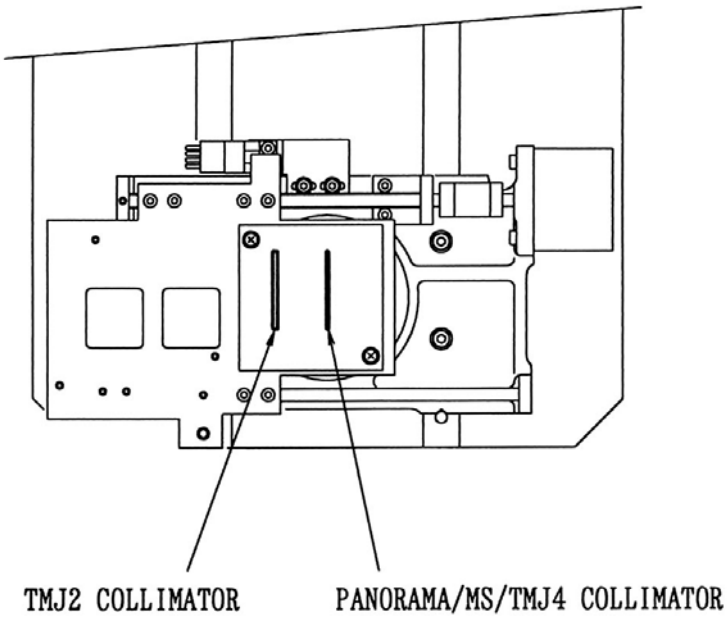
Cephalometric Radiography



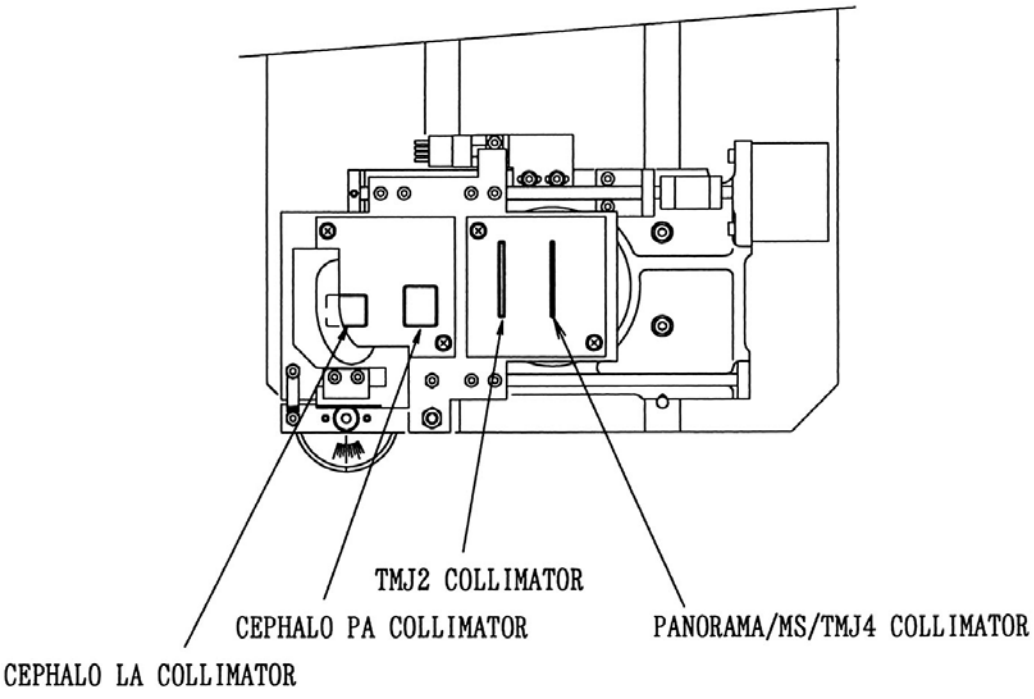
12. Radiographic Mode, COLLIMATOR and Exposure Field.

1. Collimators for various Radiographic Modes.

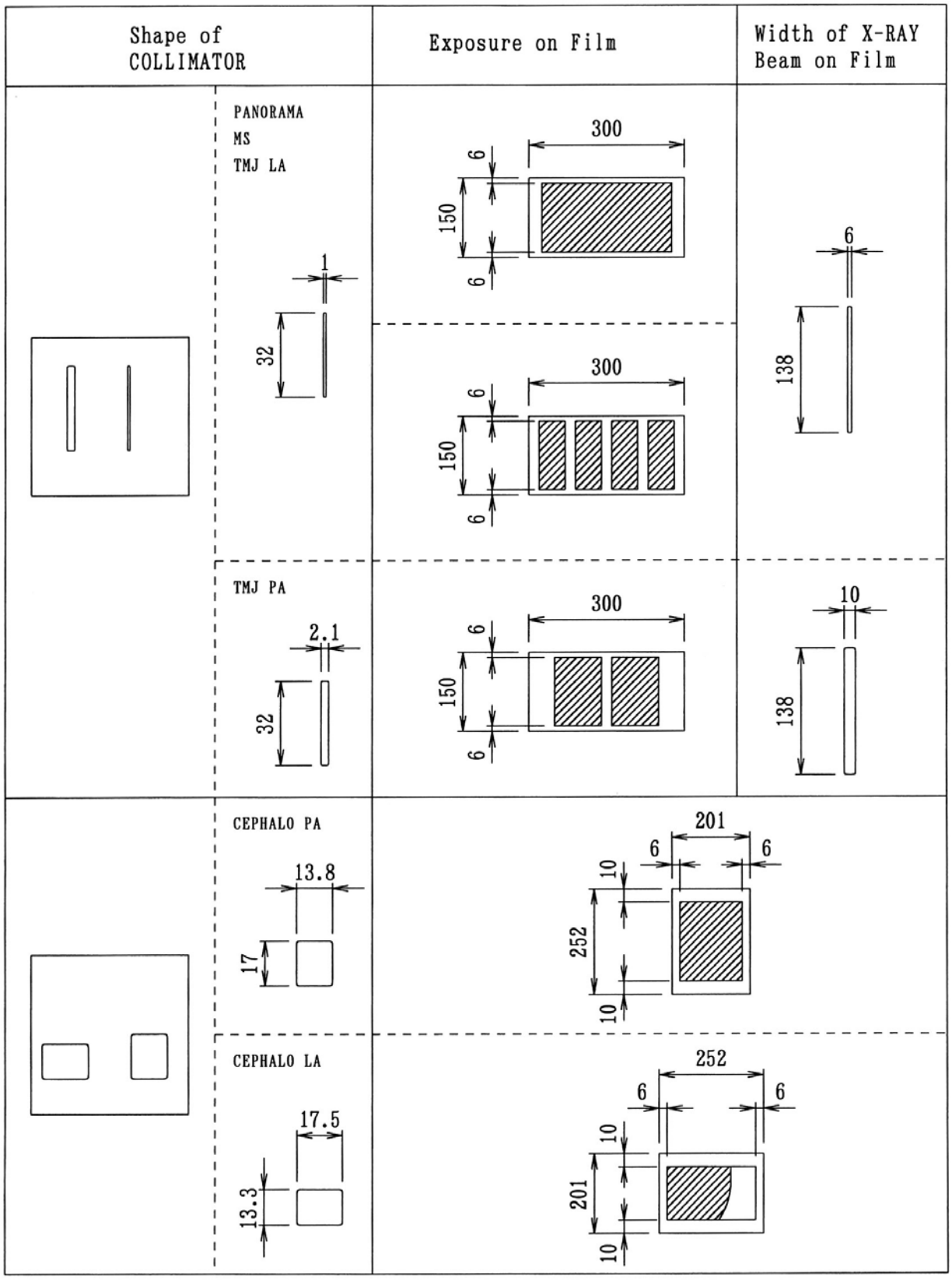
COLLIMATOR OF ANA-BEL



COLLIMATOR OF ANA-BEL CM



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



(mm)

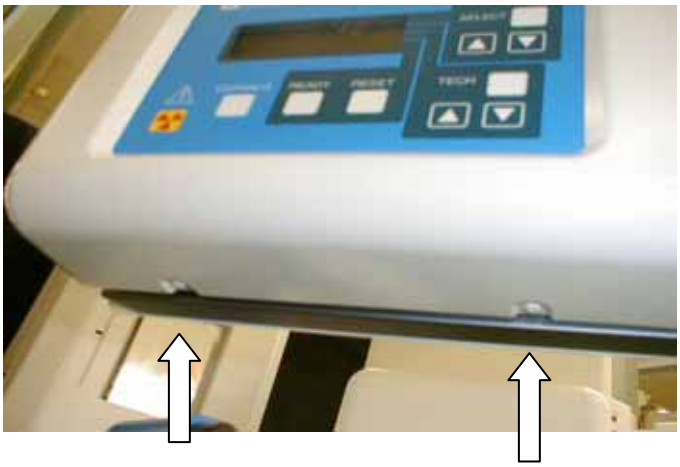
13. Mount the Digital Sensor to ANA-BEL

Notice
If you have originally purchased ANA-BEL film type and want to upgrade to Digital ANA-BEL, refer paragraph 13 & 14.

1. Removal of the Cover of the Controller

1. Push the ROTATION ARM to the position where you can see screws fixing upper cover of Controller, then remove 2 screws.

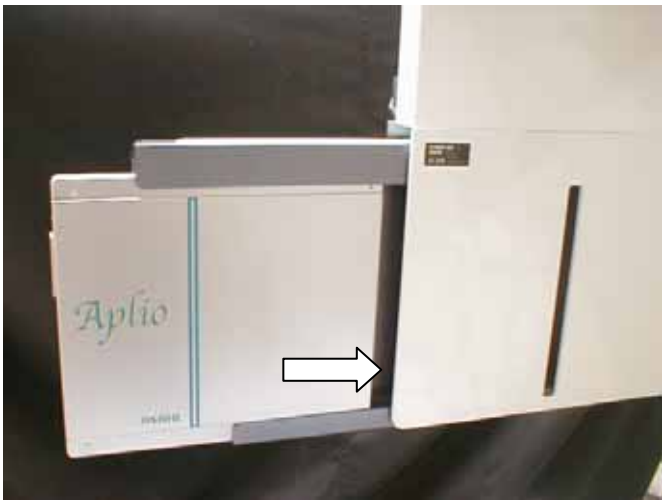
2. Remove 2 screws fixing the lower cover of the Controller.



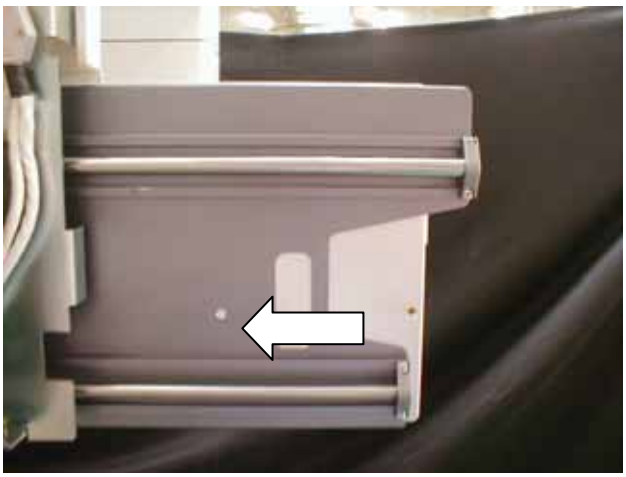
3. Remove the cover of the Controller.

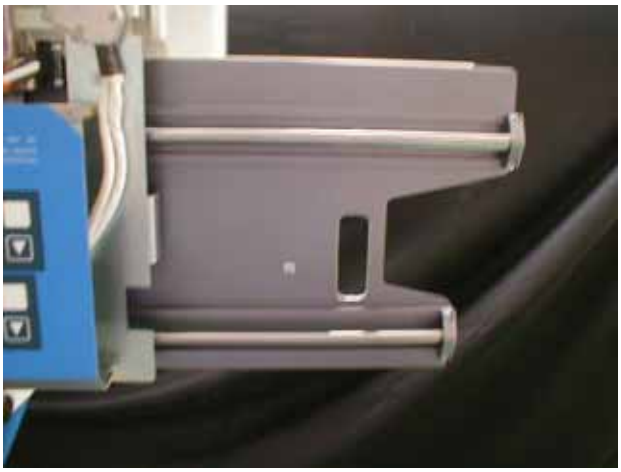
2. Mounting the Sensor Unit

1. Insert the Sensor Unit into the Cassette Holder.



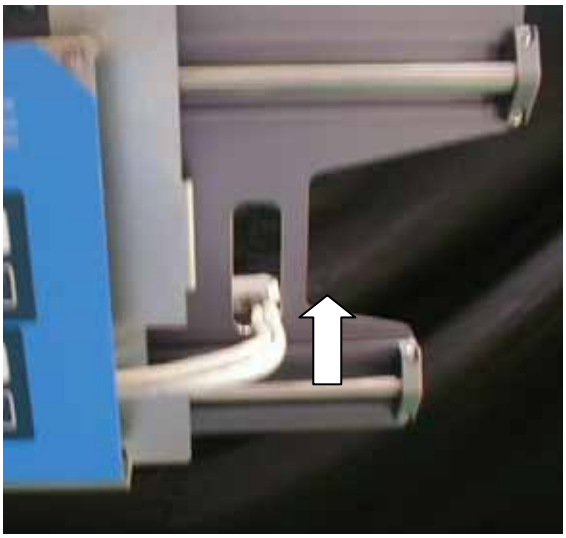
2. Align the screw hole on backside of the Sensor Unit with a hole of the Cassette Holder.



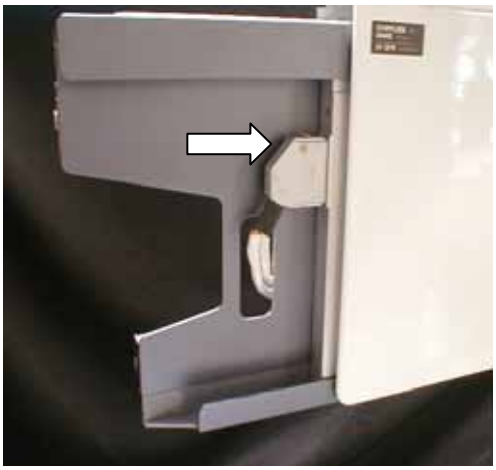


3. Fix the Cassette Holder and the Sensor Unit with screws on both right and left side.

4. Route the Digital Cable into the square opening on the Cassette Holder Frame.

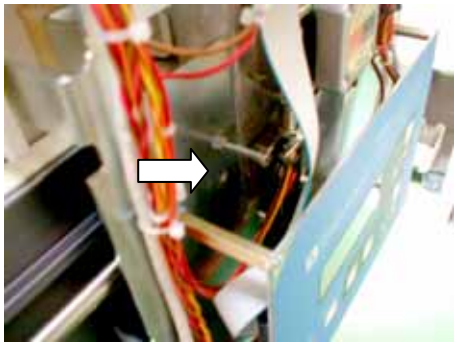


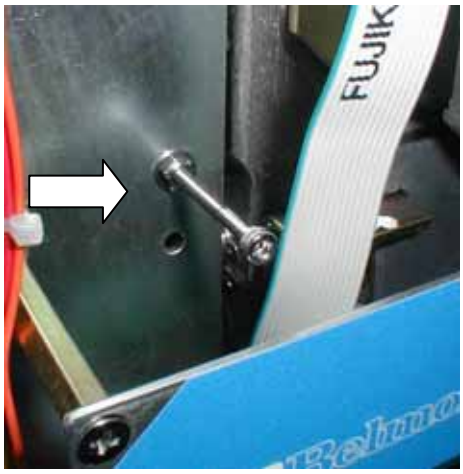
5. Connect the Digital Cable to the Sensor Unit.



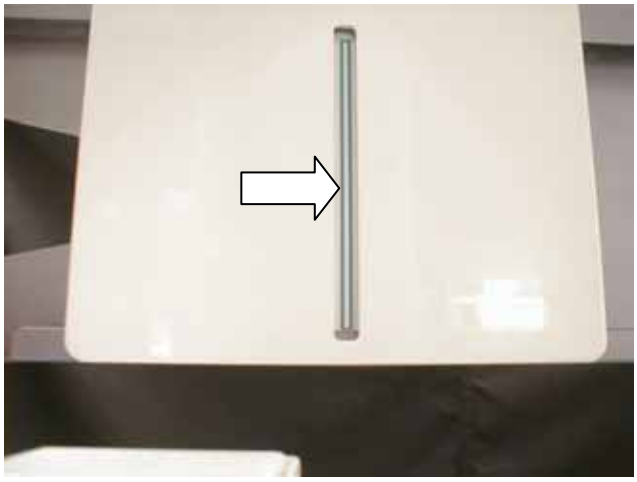
3. Fixing the Cassette Holder to the Frame

1. Remove a cap screw and a nut fixing the plate in left side above the Control Panel.

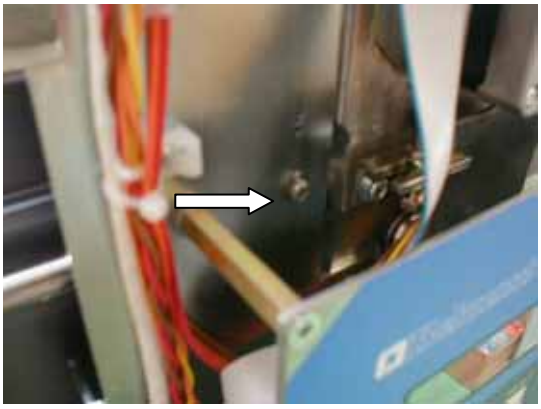


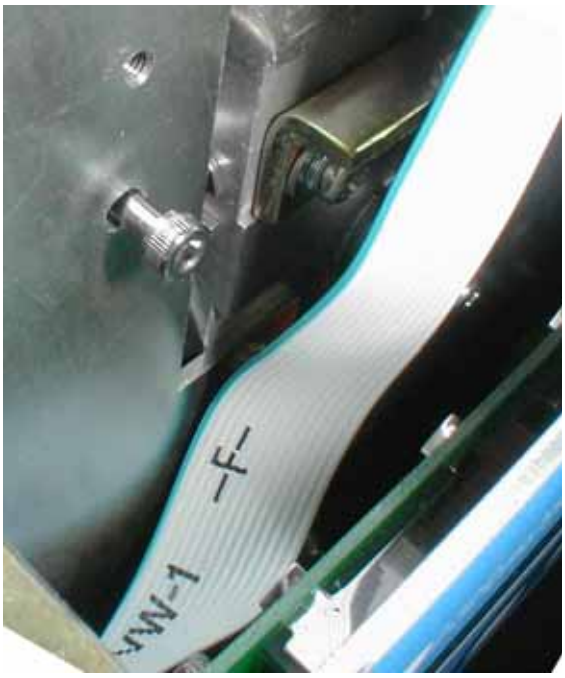


2. Align vertical lines on the Digital Sensor with the center of the Slit.



3. Insert the cap screw without a nut that was removed in step1) into the lower hole.





4. Tighten the screw and fix it to the Frame.

4. Put the cover back

1. Put the Controller cover back.

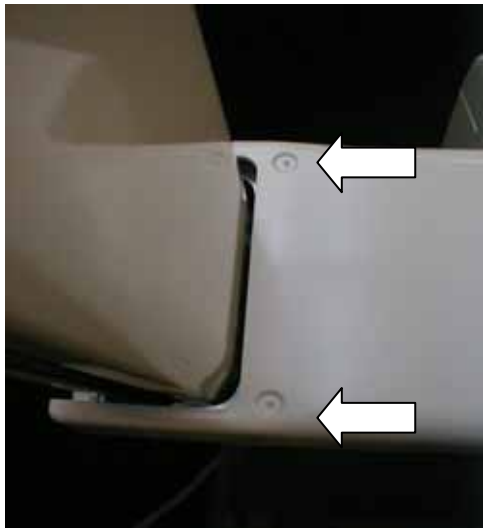
14． Connection of the digital cable

1．Remove the bottom cover of the rotation unit.

Remove the Lid

2． Insert a Philips head screw driver and loosen the screw.

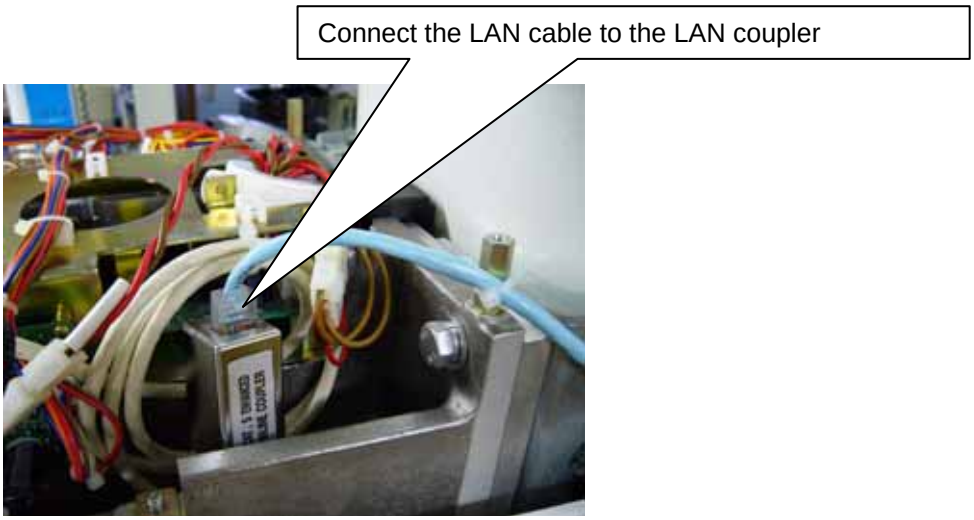
3．Remove two screws from the top of the rotation unit.



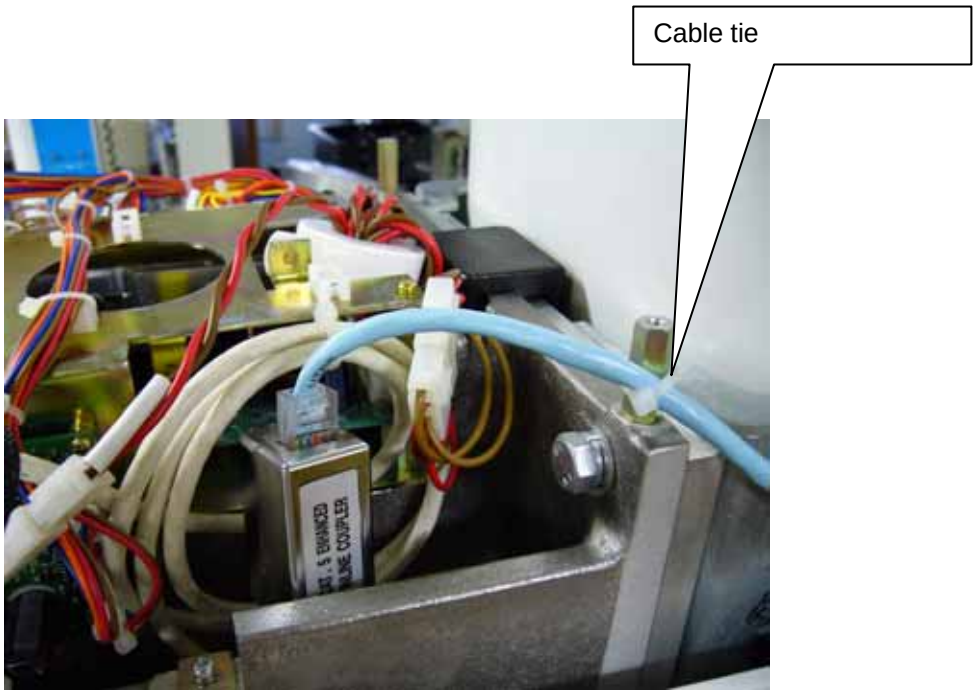
4． Remove the cover of the rotation unit.

5 . Connection of LAN cable (only for Digital)

1) Connect the LAN cable to the LAN coupler located inside of the rotation Unit.



2)Fix LAN cable by using a cable tie.

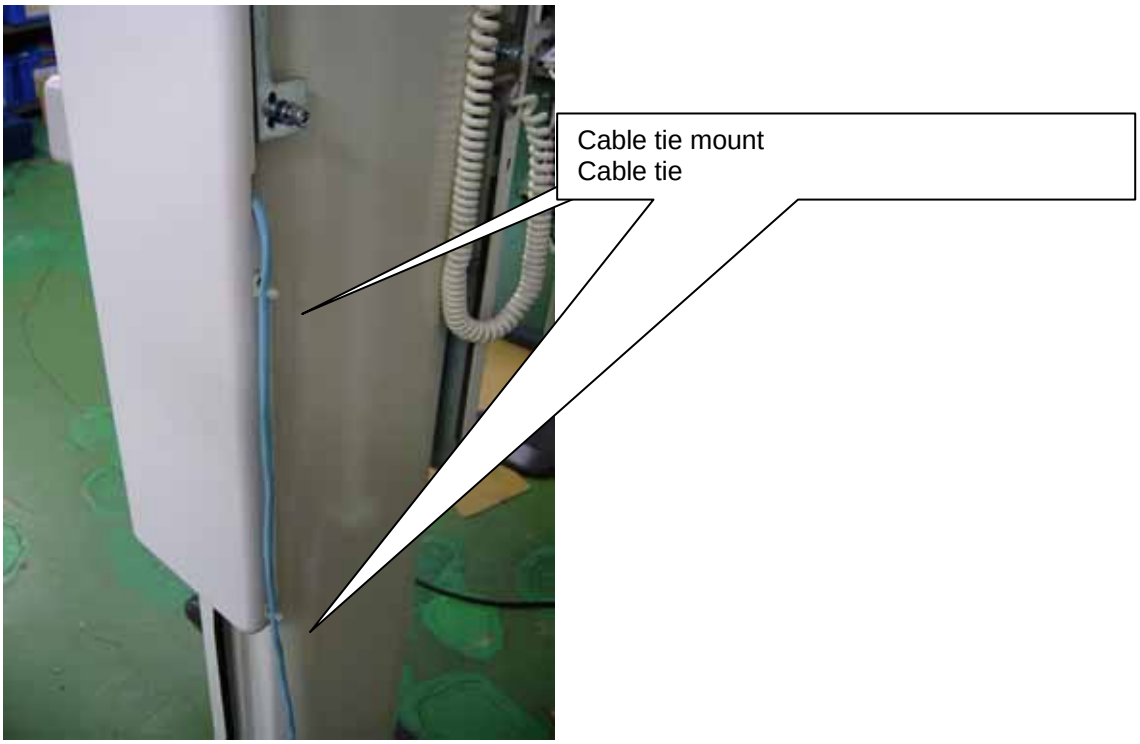


3) Remove screws(right side, 3 places) on the sliding unit.
Pull right side of the sliding unit cover, and pass the LAN cable through the opening of the cover.

4) Put the sliding unit cover back.

5) Hold the LAN Cable by a cable tie mount and fix it by a M3 x 10 screw.

6) Fix the LAN cable by a cable tie



7) Connect the LAN cable to the PC.

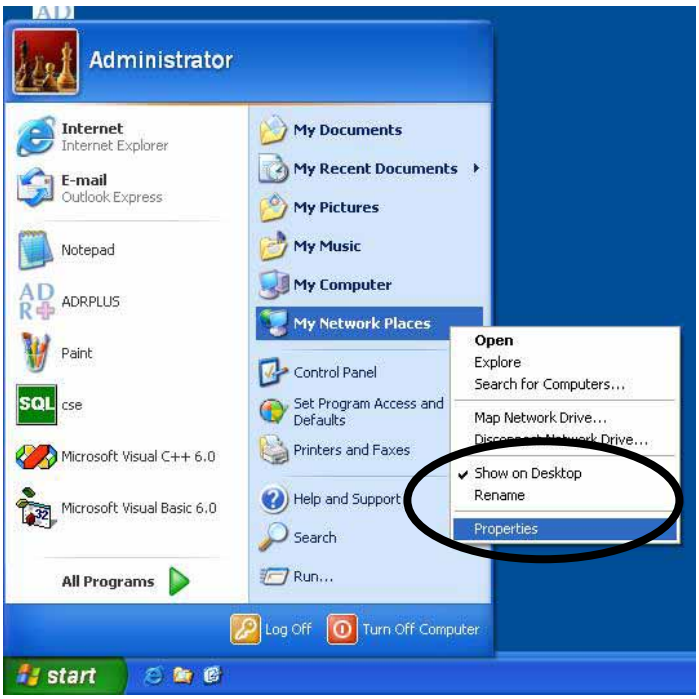
10．Turn ON the power of equipment, move the equipment up and down.
Confirm that are no noise (the cable may rub on cover and makes noise).

15．Methods to install a LAN Card for Panoramic radiograph

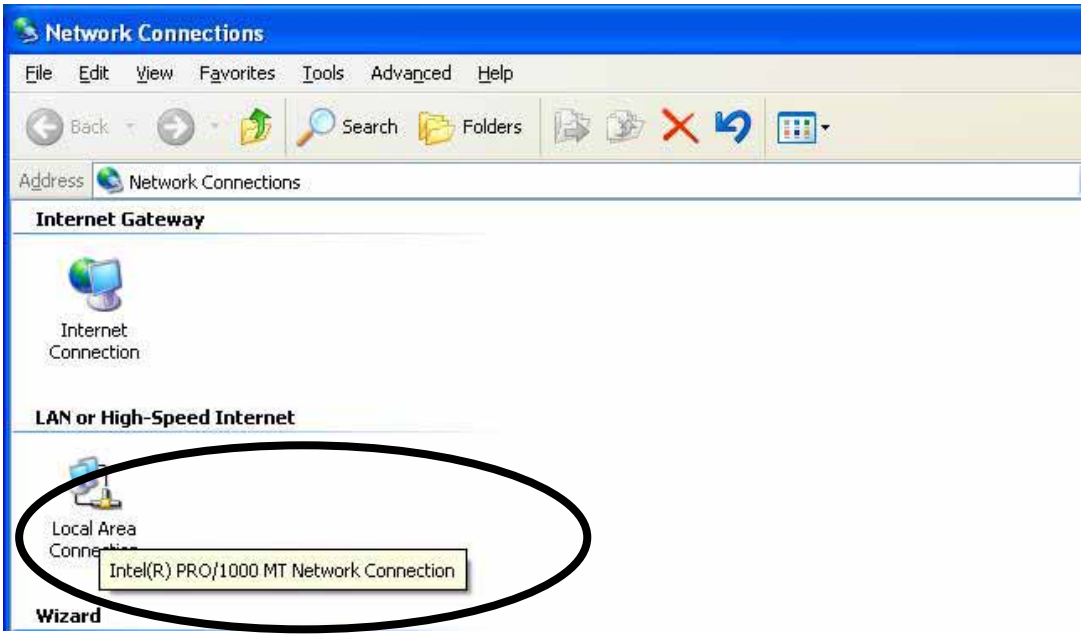
1．Turn the power of personal computer off, and unplug the power cable.

2．Open the cover of PC. Insert an expanded LAN Card.

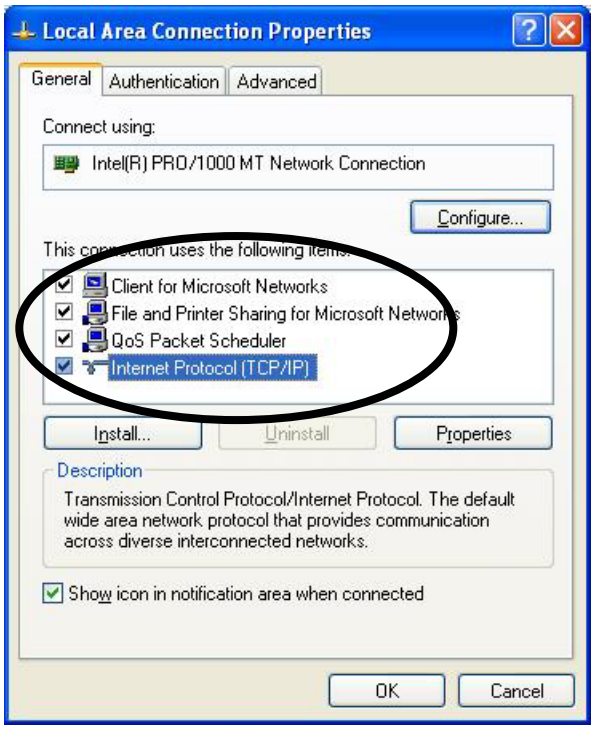
3．Start the personal computer, open Start Menu, right click My Network and select “Property”



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



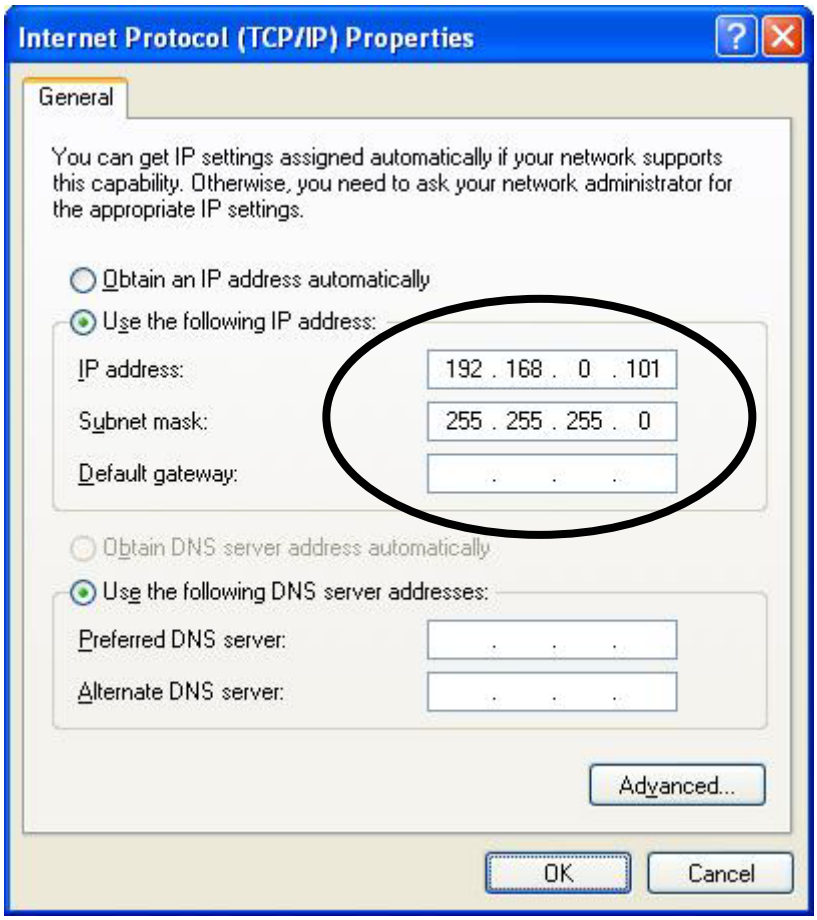
5 . Select “Internet Protocol (TCP/IP)” from General Tab, and click “Property” button.



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

IP Address 「192．168．0．101」

Subnet Mask 「255．255．255．0」



Click “OK”

16. Contact Information

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