

BELRAY II

MODEL 097

DENTAL X-RAY

INSTALLATION INSTRUCTIONS (for USA & Canada)

⚠ WARNING

This X-ray equipment may be dangerous to patients and operators unless safe exposure factors and operating instructions are observed.

 Belmont[®]

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CAUTION

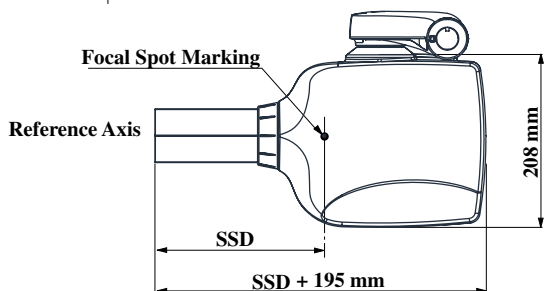
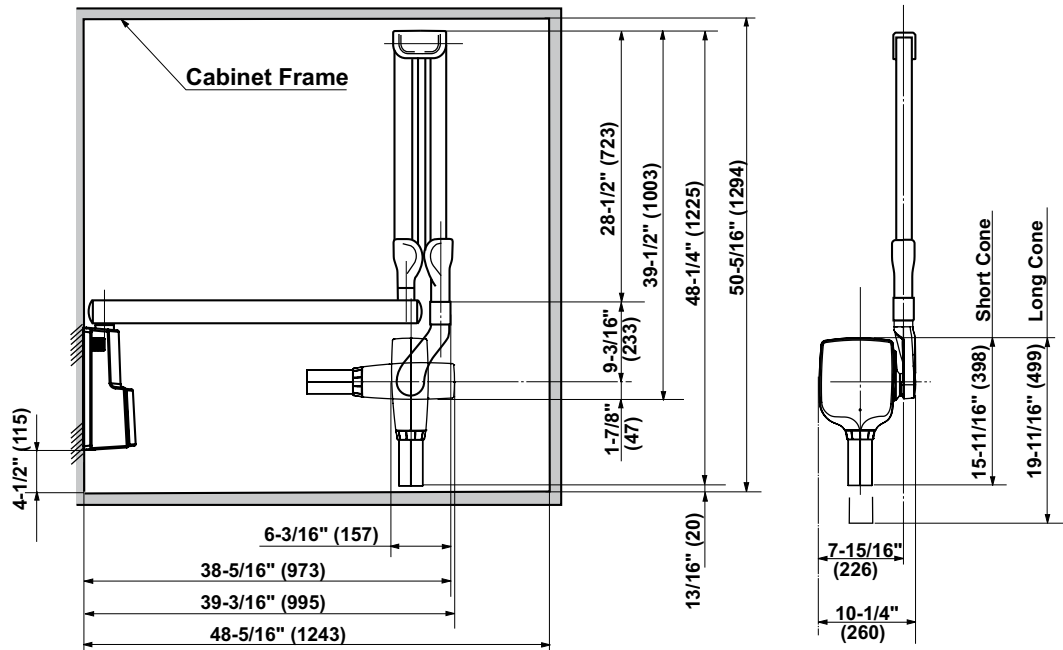
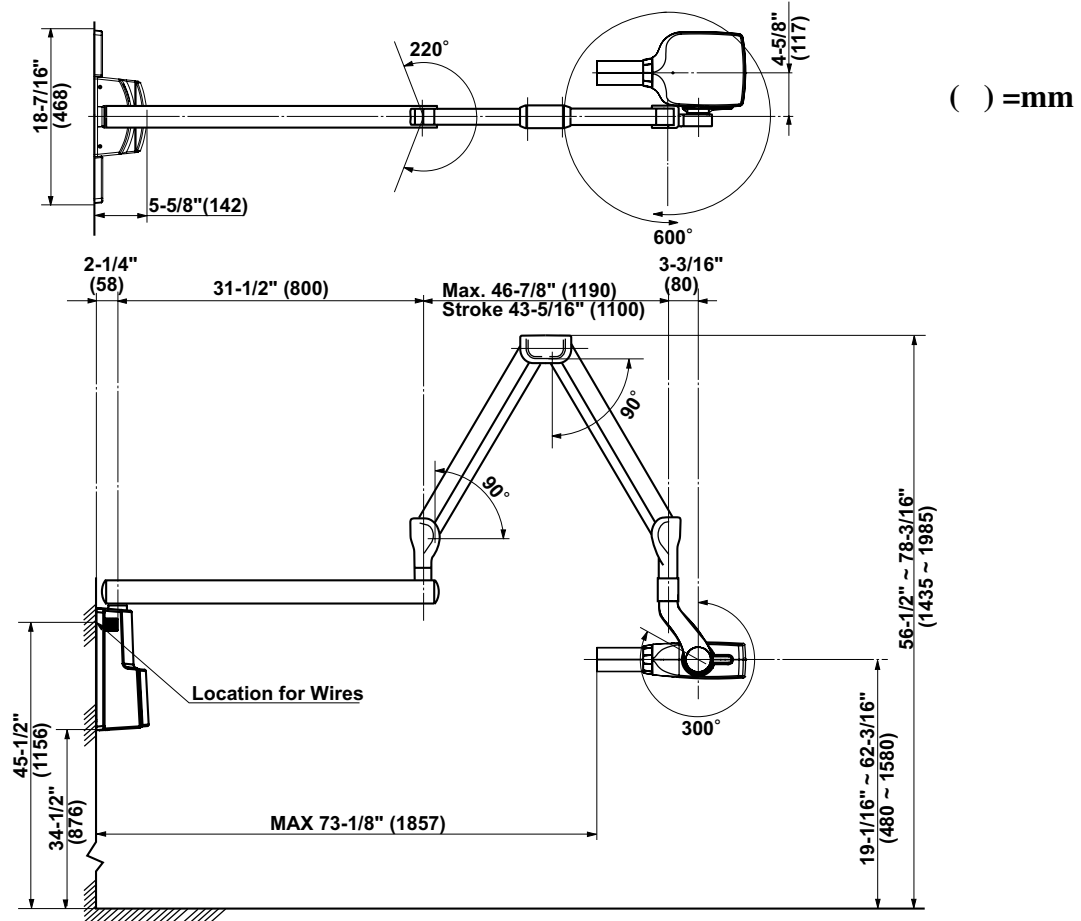
This manual provides information and instructions for the installation, assembly calibration and certification procedures for **BELMONT BELRAY II MODEL 097** dental x-ray. The instructions contained in this book should be thoroughly read and understood by dealer service personal before attempting to install the X-ray unit. After installation is completed, owners should file this manual and refer back to it to schedule periodic maintenance.

SECTION 1 : TECHNICAL DATA

[1] ELECTRICAL AND RADIATION DATA

1. X-ray tube Toshiba D-0712 (Stationary Anode)
 - a. Focal spot 0.7 mm
 - b. Target material Tungsten
 - c. Target angle 16°
 - d. Maximum anode heat content 4.3kJ (6kHU)
2. Maximum x-ray tube assembly heat content 150kJ (210kHU)
3. Rated peak tube potential 70 kVp
4. Rated tube current 4 mA / 7 mA selectable
5. Maximum rated peak tube potential 70 kVp
6. Rated line voltage 120 V AC, 60Hz , Single Phase,
12 VA (Long term rating)
0.8 kVA (Momentary rating)
7. Line voltage range 108 V AC ~ 132 V AC
8. Range of line voltage regulation 0 ~ 3 %
9. Rated line current..... 6.5 A at 70 kVp, 7 mA
10. Maximum line current 7.2 A at 70 kVp, 7 mA
11. Exposure time 0.02 ~ 3.2 sec.(ON and OFF are zero crossed)
12. Inherent filtration 1.7 mm Al Equivalent
13. Added filtration 0.5 mm Al
14. Minimum filtration permanently in useful beam 2.2 mm Al Equivalent at 70 kVp
15. Nominal roentgen output
4mA 7mA
 - a. Distal end of regular cone 4.2 7.1 mGy/sec. ± 40 %
 - b. Distal end of long cone 1.9 3.3 mGy/sec. ± 40 %(Data obtained by direct measurement in the useful beam)
16. Nominal electrical output of H. V. Generator..... 0.36kW at 70kVp, 7mA
17. Cone Source to skin distance Field size
 - a. Regular cone 8 inches (204 mm) 58 mm dia., circular
 - b. Long cone (option) 12 inches (305 mm) 58 mm dia., circular
18. Maximum symmetrical radiation field 60 mm dia. at distal end of cone
19. Leakage technique factor 70 kVp / 0.14 mA
(0.14 mA is maximum rated continuous current for 7 mA with a duty cycle 1: 50)
20. Duty cycle 1: 50 (0.5 sec. exposure with 25 sec. interval)
21. Maximum deviation of tube potential, tube current and exposure time
 - a. Below 0.1sec. setting ± 10 kVp, ± 2 mA, ± 1pulse
 - b. 0.1sec. setting & up ± 8 kVp, ± 1 mA, ± 1pulse
22. Measurement base of technique factors
 - a. peak tube potential Peak tube potential of conducting half cycle
 - b. tube current Average of tube current during one cycle of line frequency
 - c. exposure time Impulses of power line frequency
23. Half value layer 1.5 mm Al over
24. Source to the base of cone distance 81 mm
25. Environmental condition for storage -20 ~ 70°C, 10 ~ 100%, 500 ~ 1060hPa
26. Environmental condition for operation 10 ~ 40°C, 30 ~ 70%, 700 ~ 1060hPa

[2] PHYSICAL DIMENSIONS



SSD (Source to Skin Distance) :

a. Regular cone-----8 inches (203 mm)

b. Long cone-----12 inches (305mm)

Fig.1-1 Dimensions

[3] TUBE HEAD THERMAL CHARACTERISTICS

A. Interval between each exposure

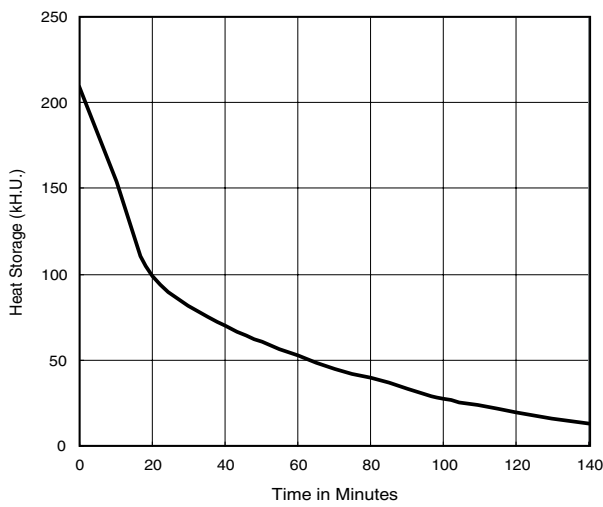
The temperature inside of the tube head rises when an exposure is made. The value of the heat generated is measured in Heat Units (HU), which is the product of tube potential, tube current and exposure time. Excessive heat will accumulate inside of the tube head if the x-ray is used without a proper cool down interval between each exposure. The excessive heat may damage the x-ray tube, high voltage generator or both.

B. Duty cycle

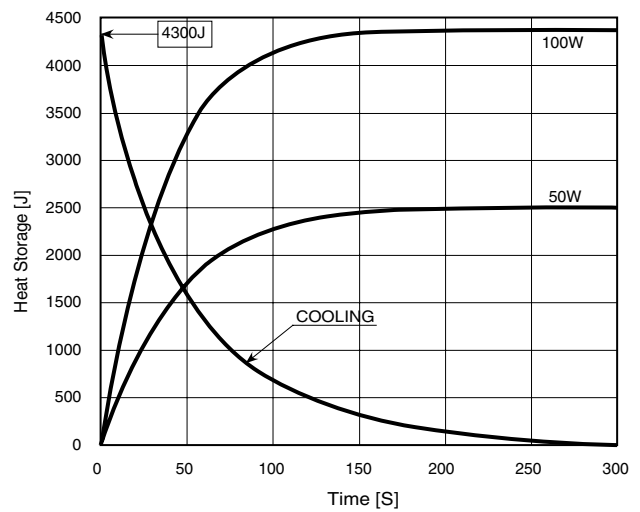
A cool down interval of 50 seconds or more must be allowed between each 1 second exposure. (a 25 second cool down must be allowed between each 0.5 second exposure.) This will avoid the accumulation of excess heat and prolong the tube head life.

C. Tube head cooling curve

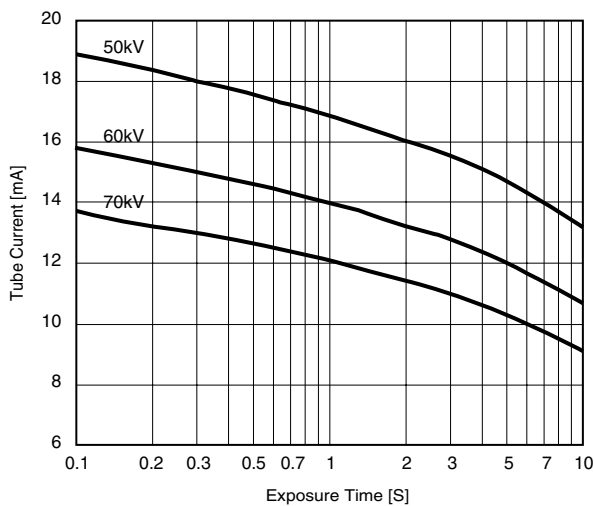
1. Tube housing cooling curve



2. Anode thermal characteristics



3. Maximum rating chart



SECTION 2 : PRE-INSTALLATION INSTRUCTIONS

[1] SUPPORT REQUIREMENTS

Main Controller :

The main controller of model 097 has a wall plate designed for mounting on two 2 x 4 wood studs with 16 inches (406mm) centers. The wall and mounting hardware must be sufficient to withstand a **100 pound (45kg) shear load and a 450 pound (205kg) with drawal force** at each of the four (ø 9 x 75mm) lag screws.

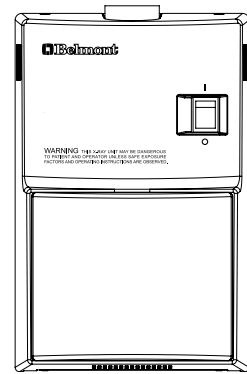


Fig.2-1 Main Controller

Sub Controller :

When mounting the model 097 sub controller, the wall and mounting hardware must be sufficient to withstand a **10 pound (4.5kg) shear load**.

⚠ CAUTION

If the BELRAY II Model 097 is to be mounted in a manner other than what is specified in this manual or if the hardware to be used is other than what is supplied, the support capability of the wall and the strength of the hardware must be checked and verified to be adequate.

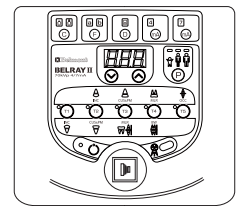


Fig.2-2 Sub Controller

[2] ELECTRICAL REQUIREMENTS

Power supply :

The model 097 x-ray system will operate on a power supply of 120VAC \pm 10% (108 ~ 132V AC) with a 3 wire GROUNDED circuit, separately connected to the central distribution panel with an over current protection device rated for 15 amperes. Recommended wire size is 14 AWG ; but if the wire run distance is to exceed 50 feet (15m), 12 AWG is required. For wire run distances in excess of 75 feet (23m) 10 AWG is required. Line voltage regulation must be within 0 ~ 3 % at 6.5 amps.

Interconnecting wiring between main controller and sub controller :

4 conductor, 20 AWG, 300V is recommended. Maximum wire run distance is 33 feet (10m).

Concealed wiring :

Route conduit and wires through wall and into (2) flush mounted junction boxes located (1) behind the main controller and (1) behind the sub controller. Recommended heights above the finished floor for the flush junction boxes are : 44-7/8" (1140mm) for the main controller and 51-5/8" (1310mm) for the sub controller. Wiring done in this manner should extend 12 inches (300mm) beyond the wall surface to allow sufficient wire for connections.

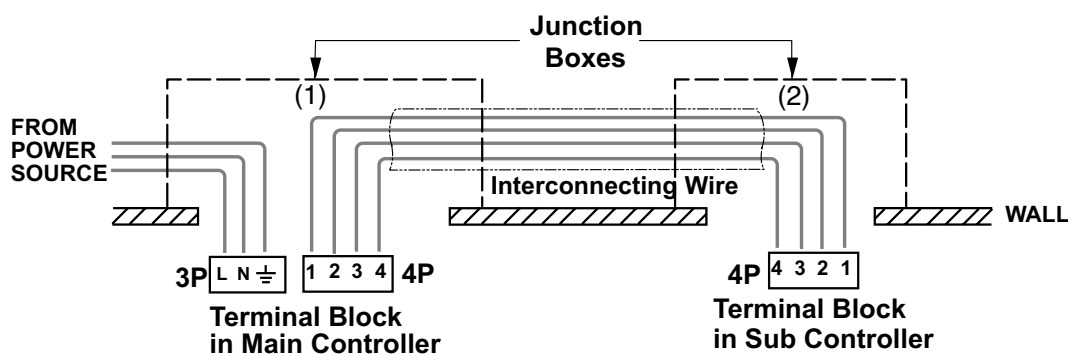


Fig.2-3 Concealed Wiring

Note : Follow local and national electrical code (NFPA 70) requirements during installation.

[3] LOCATION OF COMPONENTS

A. Main Controller, Arm and Head Assemblies :

Using the information Provided in Fig.2-4, determine the correct location for the main controller.

⚠ CAUTION

BELRAY II Model 097 x-ray unit should be installed on the wall that prevents the horizontal arm rotate 360°.

NOTE : State and local requirements supersede guide lines indicated below.

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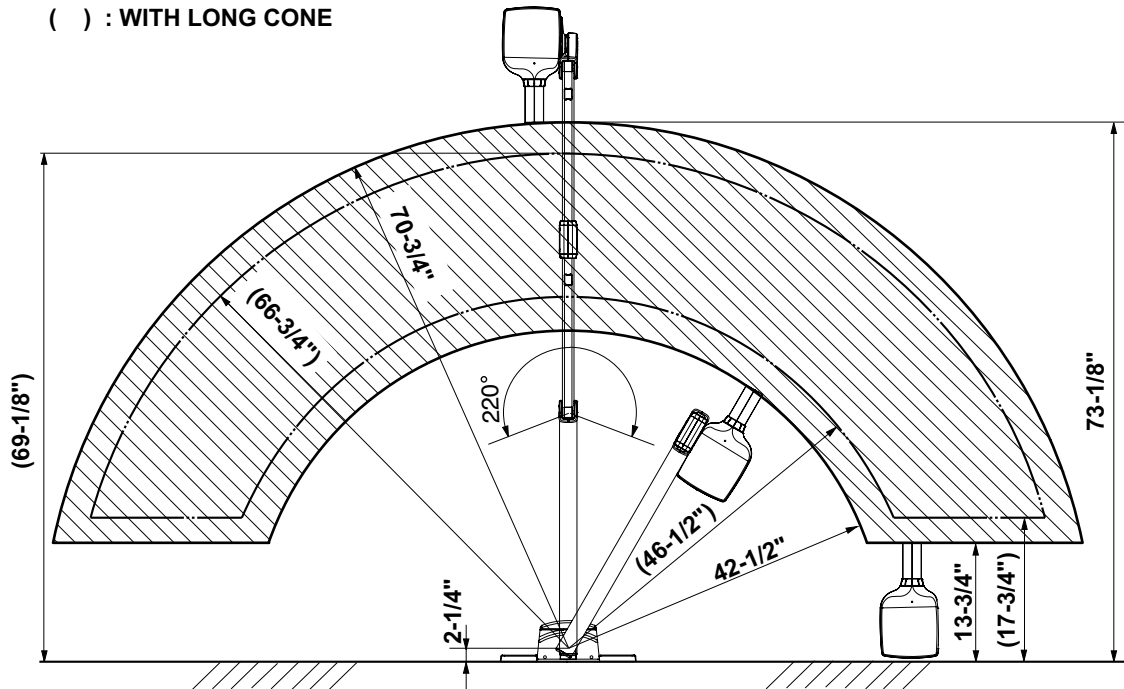


Fig.2-4 Radius of Activity for X-ray Head

B. Sub controller

When determining the location for the sub controller, the following radiation requirements concerning the operator's positioning must be considered.

The operator must :

1. have full view of the patient.
2. have full view of kV, mA, timer selections and exposure warning light.
3. be a minimum of 6 feet (1.8m) away from the patient.
4. be out of line of the useful beam of radiation or be positioned behind a protective device with x-ray protection equivalent of 1 mm of lead.

SECTION 3 : INSTALLATION INSTRUCTIONS

Within the installation and confirmation procedures are inspection/test steps which the installer must perform to insure that the installation meets the manufacturer's specifications. These steps require the installer to record the necessary information onto the "ASSEMBLER'S INSTALLATION SECTION OF THE LIMITED WARRANTY REPORT FORM" supplied, which **MUST** be returned to BELMONT along with the warranty card.

[1] INSTALLATION REQUIREMENTS

Tools :

Standard tool kit including 1.5 mm, 2 mm, 3 mm and 5 mm allen keys.

Instruments :

- Digital multimeter with an accuracy of 1%, capable of measuring 150 V AC and 10 mA DC, and capable of indicating true RMS value within 1 sec.
- Standard calculator.

Power Supply :

Prior to starting the installation, inspect the power supply and confirm that it is 120 AC $\pm 10\%$, and a 3 wire GROUNDED circuit, separately connected to the circuit breaker panel with an over current protection device rated for 15 A (Refer to Page 5, [2] ELECTRICAL REQUIREMENTS).

Record the voltage reading of power supply on "Assembler's Installation Report".

[2] UNPACKING

Unpack the entire contents of the shipping carton. Included within the shipping carton are :

<u>Hardware</u>	<u>Quantity</u>
Head with Regular Cone -----	1
Main Controller -----	1
Screw for chassis (M4 x 10 mm)-----	4
Screw for chassis (M4 x 6 mm) -----	1
Stopper Ring -----	1
Wall Plate -----	1
Side Cover -----	2
Hooks -----	4
Countersunk Screws (M4 x 6 mm)-----	2
Lag Screws for wall plate (ø9 x 75 mm) -----	4
Arm Mounting Bracket -----	1
Machine Bolt (M8 x 20 mm) -----	3
Washer (M8) -----	3
Sub Controller -----	1
Sub Controller Mounting wood screw (ø4.1 x 20 mm) -----	3
Head key -----	1
Arm collar -----	1
Balance Arm -----	1
Balance Arm Wrench -----	1
Horizontal Arm W/2 x End Caps-----	1
Screw Cover-----	2
Brake Screw (M6 x 6 mm) -----	2
Brake Plug (Brass Plug ø5 X 4 mm)-----	2
Retaining Bolt (M6 x 35 mm) -----	2
Stopper Screw (M6 x 15 mm) -----	1
Brake Spring (ø5 x 11 mm) -----	1
3P Connector for remote exposure switch -----	1
<u>Documentation</u>	<u>Quantity</u>
Installation manual -----	1
Operators manual -----	1
Limited Warranty / Report Form -----	1
Wall mounting Template-----	1
FDA Form 2579 -----	1

Inspect contents of shipping carton for damage or missing components.

[3] MAIN CONTROLLER AND ARM INSTALLATION

The instructions given below are for mounting the main controller assembly on two 2 x 4 wood studs with 16 inch (406mm) centers. Should the BELRAY II MODEL 097 be mounted in a manner other than what is specified here, the wall and the strength of the hardware used must be checked and verified being adequate to withstand a 100 pound (45kg) shear load and a 450 pound (205kg) withdrawal force at each of the four ($\phi 9 \times 75$ mm) lag screws. When using concealed wiring, a flush mounted junction box with the necessary conduit and wiring must be pre-installed at 44-7/8 inches (1140mm) from the floor and between the two studs (refer to wall mounting template).

A. WALL PLATE OF MAIN CONTROLLER

⚠ WARNING

Make sure the power supply is turned OFF at the circuit breaker panel.

1. Tape the wall mounting template to the wall, positioning it so that the holes for mounting plate lag screws are aligned with the vertical 2 x 4" studs.

NOTE : Confirm that the location of concealed wiring matches to the access hole of wall plate template.

2. Mark the hole locations for the mounting plate lag screws.
3. Use a 3/16" (5mm) dia. drill to make a pilot hole approximately 2" (50mm) deep for each mounting plate lag screws.

⚠ CAUTION

Do not use a drill larger than 3/16" (5mm) dia. for these holes.

4. Place the wire through the hole into the stud mount wall plate and mount the plate to the stud with the four ($\phi 9 \times 75$ mm) lag screws.

DO NOT FULLY TIGHTEN.

5. Hold the plate firmly against the wall, place a level across the front face. (#1 position in Fig.3-1)
If the wall is not plumb, use shims behind the plate to level.

6. Place a level across top edge of wall plate, level and tighten lag screws securely. (#2 position in Fig.3-1)

NOTE : Final leveling of wall plate is described on page 16.

B. ARM MOUNTING BRACKET

1. Using three (M8 x 20mm) bolts with washers in top mounting holes and in lower mounting hole, mount arm mounting bracket to wall plate. (Fig.3-2)

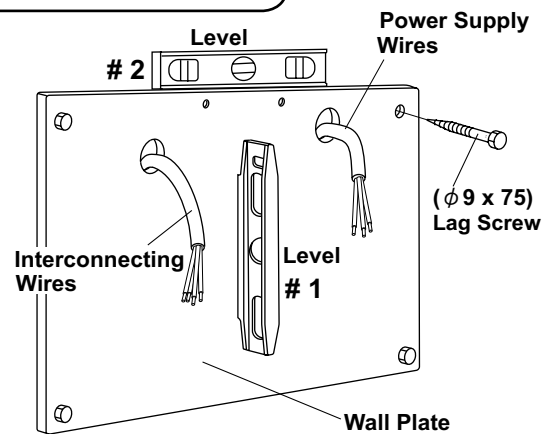


Fig.3-1 Wall Plate Installation

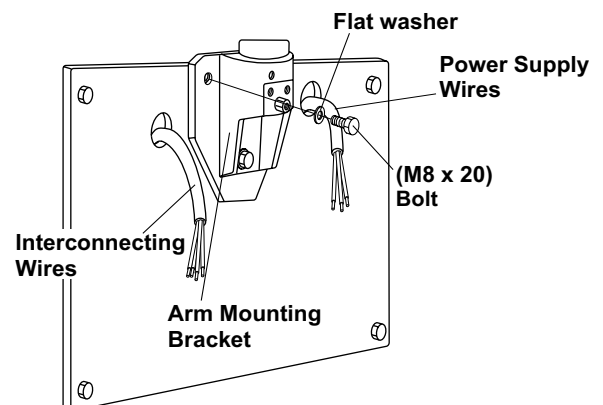


Fig.3-2 Arm Mounting Bracket Installation

C. CHASSIS OF MAIN CONTROLLER

1. Remove the restriction plate over the terminal blocks by taking out two (M 4 x 8mm) screws. (Fig.3-3)
2. Route electrical interconnecting wires and power supply wires through the access holes on chassis and mount the chassis on the arm bracket with three of four (M4 x 8mm) screws. (A screw at upper right corner will be secured at step D. 6. on page 10.) Secure the bottom corner of chassis with two (M4 x 8mm) screws to the wall plate. (Fig.3-3)

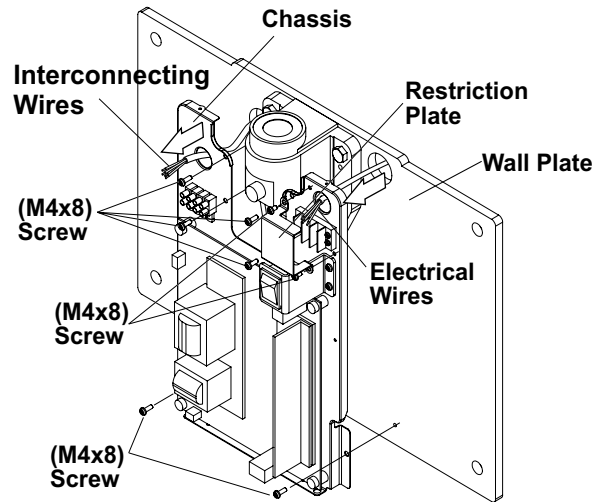


Fig.3-3 Attaching Chassis to Wall Plate

3. Cut the wires to workable length and strip 3/8" of insulation for power supply wires and 3/16" for interconnecting wires for Sub Controller. Connect power supply wires to 3P terminal block and interconnecting wires to 4P terminal block. (Fig.3-4)
4. Reattach the restriction plate. (Fig.3-3)

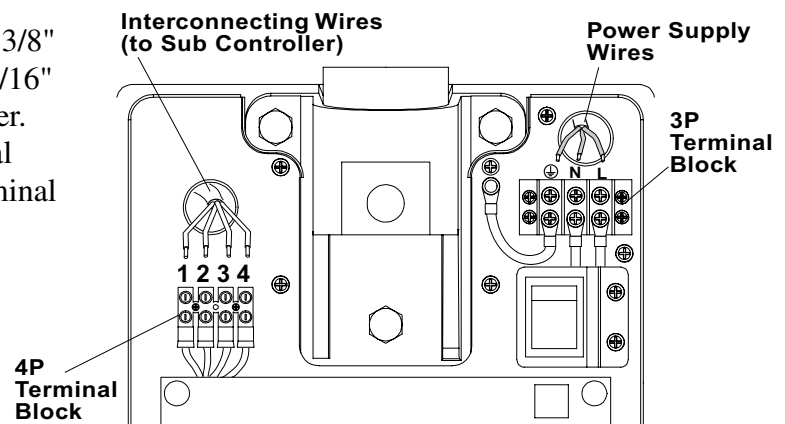


Fig.3-4 Wires Connection in Main Controller

D. HORIZONTAL ARM

1. Place a thrust washer over the hole on top of the arm mounting bracket. (Fig.3-5) Insert the cable and horizontal arm into the hole, and mount to the arm mounting bracket, as shown in Fig.3-5.
2. Insert two retaining bolts into the upper threaded holes of the arm mounting bracket and tighten securely with a Allen wrench. (Fig.3-6)

IMPORTANT :

The retaining bolts must be installed to ensure that the horizontal arm can not lift out of the arm mounting bracket.

3. Insert brake plug, brake spring and brake screw (M6 x 6 mm) into the threaded hole of the hex fitting located on the arm mounting bracket. DO NOT FULLY TIGHTEN. (Fig.3-6)

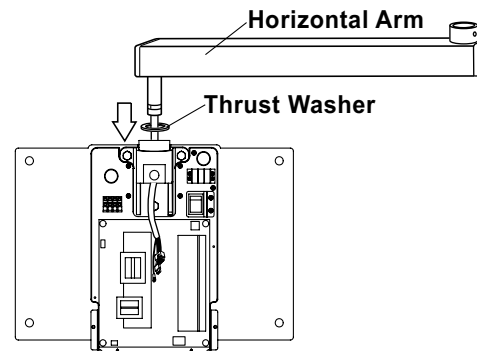


Fig.3-5 Horizontal Arm Installation-1

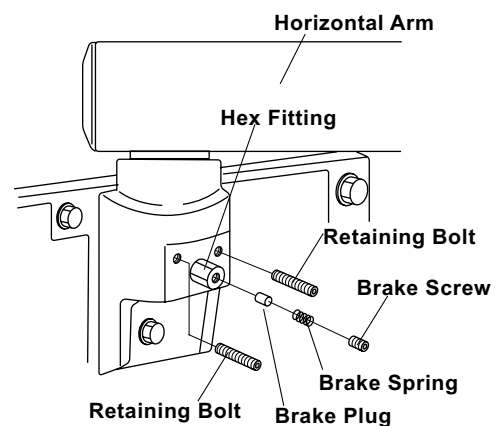


Fig.3-6 Horizontal Arm

- Place a level on the horizontal arm and confirm that the arm is level throughout its left and right swing positions. (Fig.3-7)

NOTE : Final leveling of horizontal arm is described on Page 16.

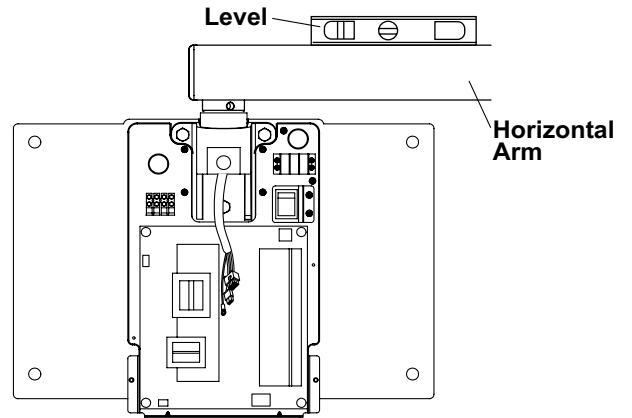


Fig.3-7 Level confirmation

- Connect 2P and 3P connectors of horizontal arm cable to the respective connectors on power PC Board. (Fig.3-8)
- Connect the 2 wires with ring terminals from the arm cable and 3P terminal block with a M4 screw. (Fig.3-8)

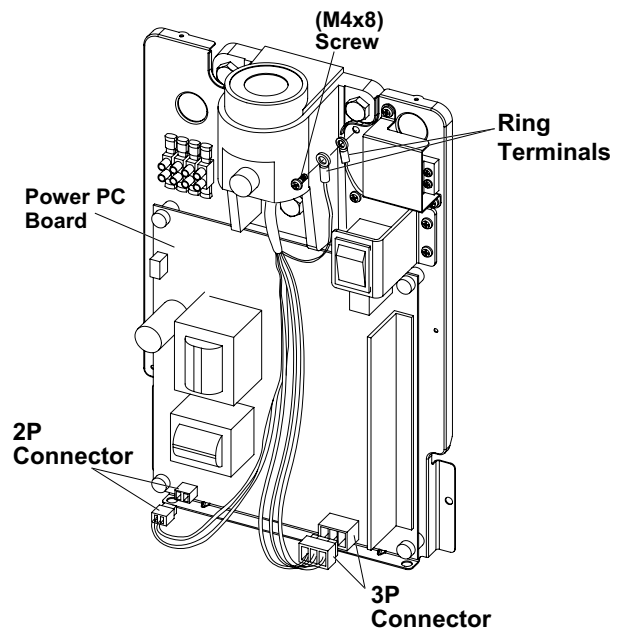


Fig.3-8 Connecting 2P and 3P Connectors on Power PC Board

E. FRONT COVER

NOTE : The front cover for the main controller should not be closed until all installation and the post-installation inspections and confirmation are completed.

- Set the pins located on the bottom of the front cover into holes on the bottom of metal chassis, and then push the top side toward the wall to close. (Fig.3-9A)
- Install two (M3 x 8mm) screws into the top of the cover and confirm that the cover is securely attached. (Fig.3-9B)

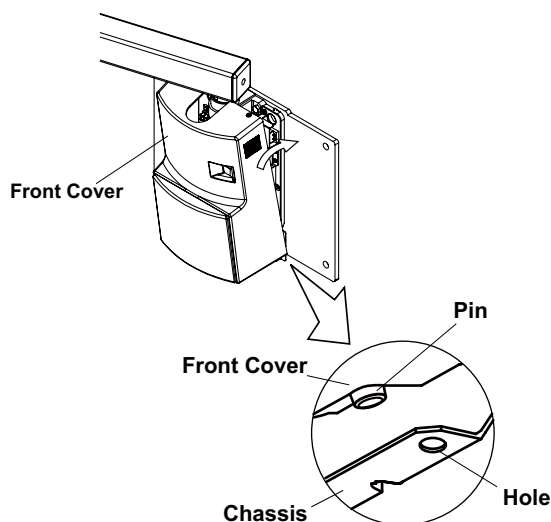


Fig.3-9A Attaching Front Cover-1

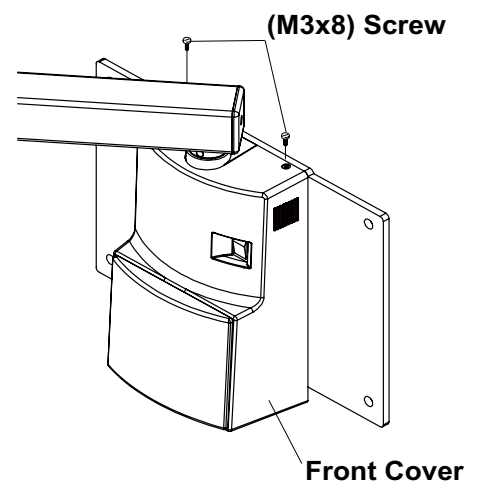


Fig.3-9B Attaching Front Cover-2

F.SIDE COVER ASSEMBLY

1. After the front panel of the main controller is installed, attach four hooks to the wall plate with (M4 x 6mm) screws supplied.
2. Side in the side covers from right and left side of the wall plate as the hooks catch the side covers.

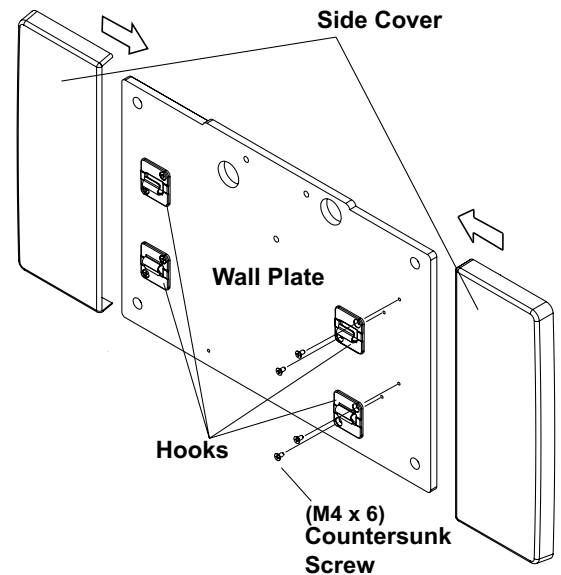


Fig.3-10 Side Cover Installation

G.BALANCE ARM ASSEMBLY

⚠WARNING

Do not release Arm holding band until the X-ray head has been installed.
Balance arm assembly is spring loaded and can cause equipment damage and injury if not handled in the proper manner.

1. During this procedure, do not remove Arm holding band.
2. Remove two (M3 x 8mm) screws from the underside of the horizontal arm to open the bottom cover. (Fig.3-11)
3. Route the cable with 8P connector from the balance arm shaft through the horizontal arm. Insert the balance arm into the horizontal arm. The cable should be fed through the bottom cover opening on the bottom of the horizontal arm. (Fig.3-12A)
4. Connect 8P connector of the balance arm cable to 8P connector of the horizontal arm cable. Secure the wires from the balance arm to the bottom cover with nylon cable clamp to prevent the damage from twisting. (Fig.3-12B)
5. Re-attach the bottom cover to the horizontal arm with two screws.(Fig.3-12A)

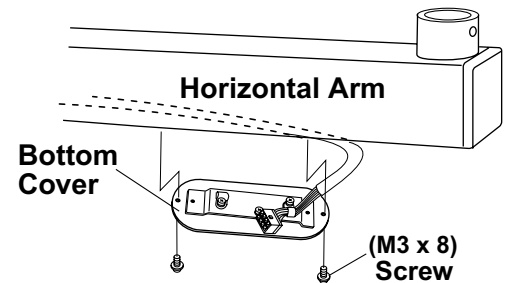


Fig.3-11 Horizontal Arm Bottom Cover

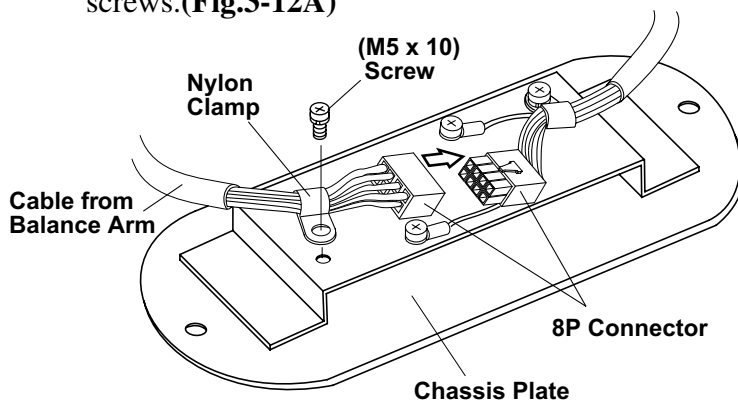


Fig.3-12B Connection of Cables and fixing on Bottom Cover

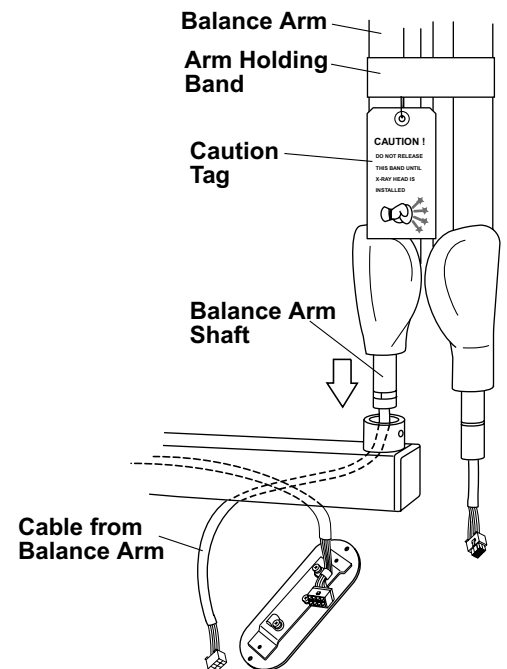


Fig.3-12A Balance Arm Installation

6. Insert the brake plug and brake screw (M6 x 6mm) into the horizontal arm collar. (Fig.3-13)
Do not fully tighten.

7. Remove the end cap screw and open end cap from horizontal arm.

Insert the stopper screw into upper threaded hole inside horizontal arm and tighten securely.

Replace the end cap with cap screw and place a screw cover. (Fig.3-13)

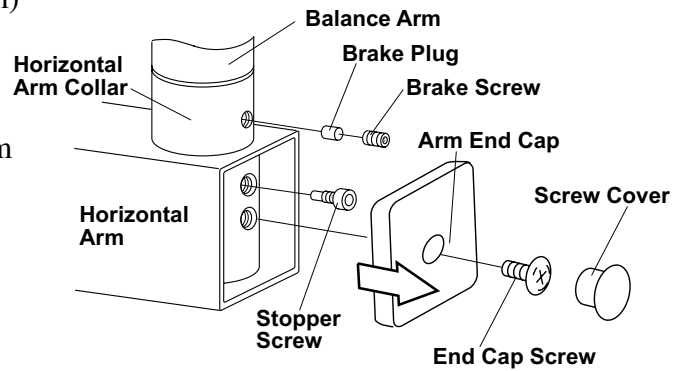


Fig.3-13 Attaching Balance Arm to Horizontal Arm

CAUTION

If stopper screw is not tightened securely, the Balance Arm can lift out of the horizontal arm.

[4] HEAD ASSEMBLY INSTALLATION

WARNING

Do not release Arm holding band until the X-ray head has been installed.
Balance arm assembly is spring loaded and can cause equipment damage and injury if not handled in the proper manner.
Refer to the Caution Tag on the band.

1. Remove the arm collar screw (M4 x 8mm) from the arm collar. Slide the arm collar upward and temporarily hold it in position with adhesive tape. (Fig.3-14)

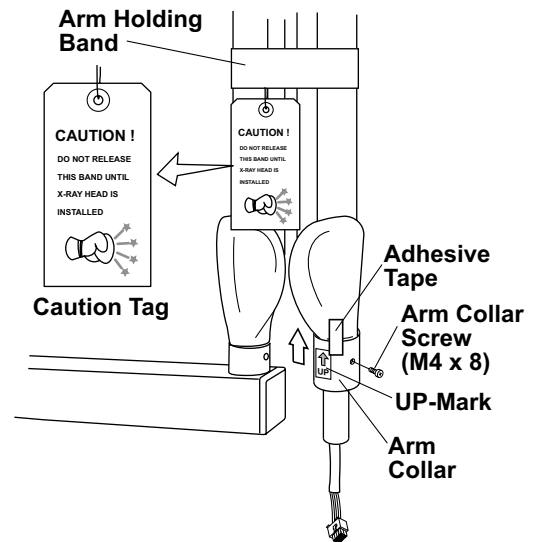


Fig.3-14 Setting Arm Collar on Balance Arm

2. Open the yoke inside cover of x-ray head by removing (M4 x 15mm) countersunk screw (Fig.3-15)

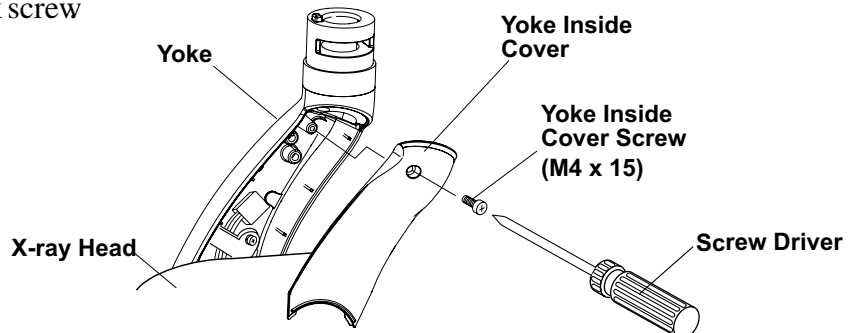


Fig.3-15 Removing Yoke Inside Cover

3. Making sure the stopper ring is placed on the yoke, insert the wiring from the balance arm assembly through the head shaft and into the yoke. (**Fig-3-16**)
4. Insert the shaft of the balance arm into the head yoke, and while holding the head in position, insert the head key securely into the retaining groove. (**Fig-3-16**)
5. Remove adhesive tape and slide the arm collar downward. Fix it in place with the arm collar screw. Remove the UP-mark from the arm collar. (**Fig-3-16**)

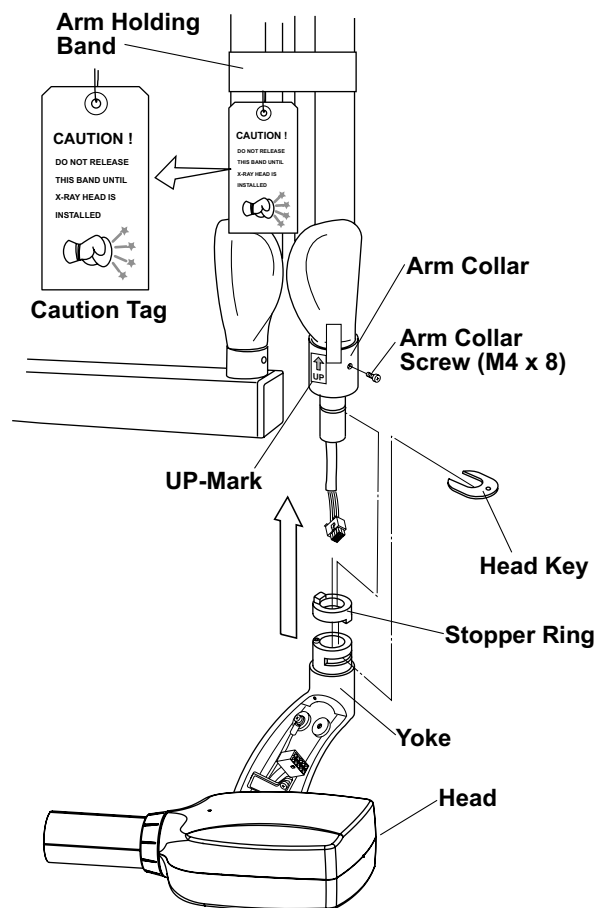


Fig.3-16 X-ray Head Installation

6. Loosen the (M5 × 10mm) screw and remove the nylon cable clamp from the yoke housing. Place cable clamp on the balance arm cable. Connect the **6P** connectors, and then attach the balance arm cable to the yoke housing with the nylon cable clamp. (**Fig-3-17**)
7. Reattach the yoke inside cover with the screw (M4 × 15mm). (**Fig-3-15**)
8. Remove arm holding band.

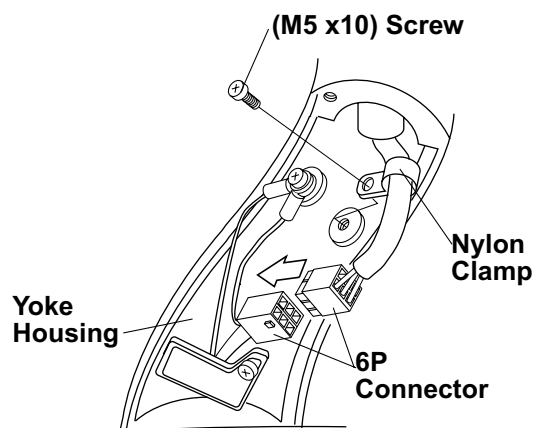


Fig.3-17 Connection 6P Connector in Yoke

[5] SUB CONTROLLER INSTALLATION

The wall and the strength of the hardware used must be checked and verified as being adequate to withstand a 10 pound (4.5kg) shear load. A flush mounted junction box with the necessary conduit and wiring should be pre-installed at 51-5/8" (1310mm) from the floor.

1. Remove two (M3 x8mm) screws from the bottom side of the controller and open the front panel. **(Fig.3-18)**
2. Disconnect the **4P** connector from the timer PC Board. **(Fig.3-19)**
3. Route the interconnecting wires from the main controller through access hole of chassis and mount on the wall with four (ø4.1 x 20mm) wood screws. **(Fig.3-19)**
4. Cut 4 interconnecting wires from main controller to a workable length. Strip 3/16" insulation off the wires and connect them to the **4P** terminal block. Terminal number for each wire should be matched to the terminal number in the main controller. **(Fig.3-20)**

⚠ CAUTION

Miswiring causes permanent damage to both timer PC board and power PC board.

5. If wire length is too long, push it back into the access hole of the wall. This will prevent mechanical damage to the timer PC Board when replacing the front cover.
6. Reattach the **4P** connector to the timer PC Board **(Fig.3-19)**

7. Set the pins located on the upper side of the front panel into holes on the top of chassis and attach the front cover to the chassis with two (M3 x 8mm) screws from bottom side of the controller. **(Fig.3-18 & 3-21)**

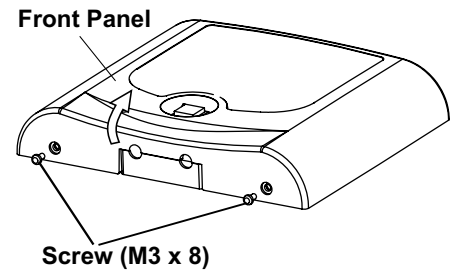


Fig.3-18 Opening Front Panel

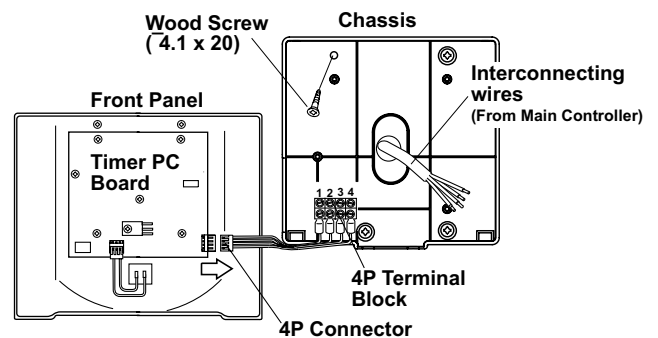


Fig.3-19 Attaching Sub Controller Chassis

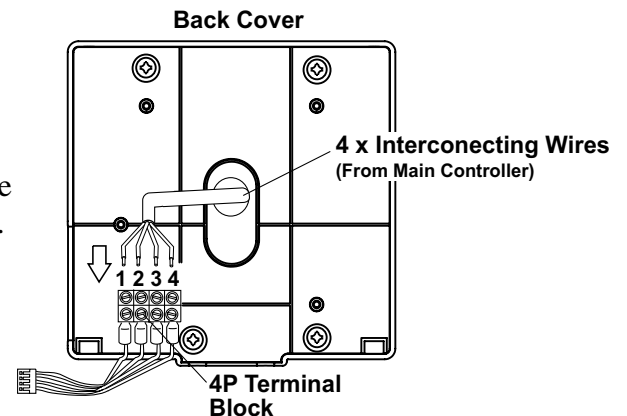


Fig.3-20 Interconnecting Wires Connection in Sub Controller

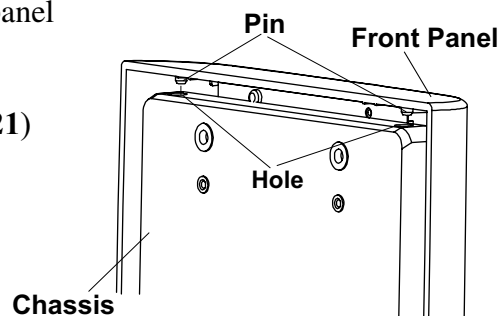


Fig.3-21 Bottom of Sub Controller

[6] HAND EXPOSURE SWITCH (OPTION)

An optional hand exposure switch can be connected to the sub controller. Since this exposure switch has a coiled cord, operator can stand the most suitable position for operation.

The exposure switch on the front panel of sub controller and this hand exposure switch can be used. If local code prohibits use of both switches, disconnect the connector of either one of the switches.

1. Confirm the contents of optional hand exposure switch kit. (Fig.3-22)

Hand exposure switch -----	1
Hook -----	1
Screw for hook (ø3 x 8mm Tapping screw) -----	1

2. Remove two (M3 x8mm) screws from the under side of the controller and open the front panel.

3. Connect the connector at the end of hand exposure switch coil cord to CN3 connector on the timer PC board. (Fig.3-23)

4. Insert the bushing of coil cord into the slot at the bottom of the chassis, reattach the front cover and secure two (M3 x 8mm) screws again. (Fig.3-23)

5. Place the hook on the top corner (right or left) of controller and attach it with the tapping screw (ø3 x 8mm). (Fig.3-24)

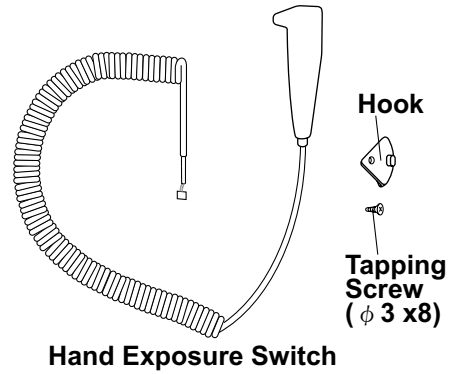


Fig.3-22 Hand Exposure Switch Kit

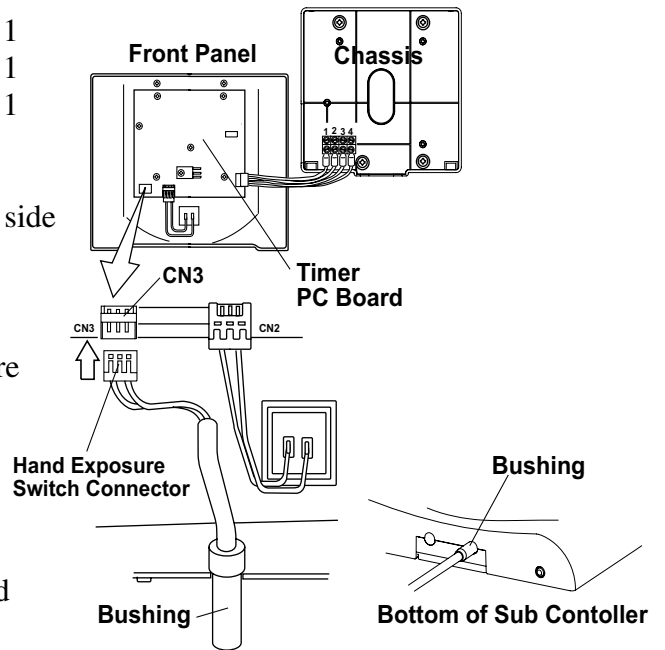


Fig.3-23 Connecting Hand Exposure Switch

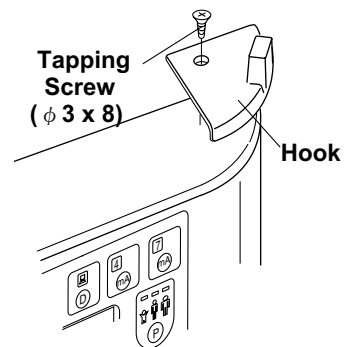


Fig.3-24 Attaching Hand Exposure Switch Hook

SECTION 4 : POST INSTALLATION INSPECTION

[1] ARM ASSEMBLY

1. Incorrect leveling of the wall plate and wall bracket can cause arm drift. First, check leveling with horizontal arm in position #1. (Fig.4-1) If not correct, bracket must be adjusted by placing shims behind the wall plate.

IMPORTANT :

If the end of the horizontal arm shown in position #1 is pitched below level, then the tube head will drift away from the wall. If the end of the horizontal arm in position #1 is pitched above level, then the arm will require only minimum adjustment of the brake screw. (Fig.3-13)

2. Check leveling in position #2. if not correct, adjust Horizontal Arm as follows : (Fig.4-1)
 - a. Slightly loosen two top mounting bolts for arm mounting bracket.
 - b. Shift the bracket left or right until the arms are accurately leveled.
 - c. Move the horizontal arm to position # 1.
 - d. Fully tighten two top mounting bolts.
 - e. Fully tighten bottom mounting bolt.

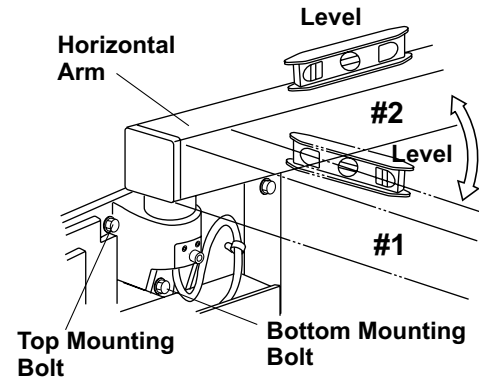


Fig.4-1 Horizontal Arm Adjustment

NOTE : Slight tendencies to drift can be corrected by tightening brake screw in horizontal arm. Do not tighten beyond what is required to prevent drift.

[2] BALANCE ARM TENSION ADJUSTMENT

1. Place the balance arm assembly into position.
2. If either balance arm drifts higher or lower from the set position, remove the spring adjuster cover and adjust the balance arm spring tension with the balance arm wrench. (Fig.4-2)

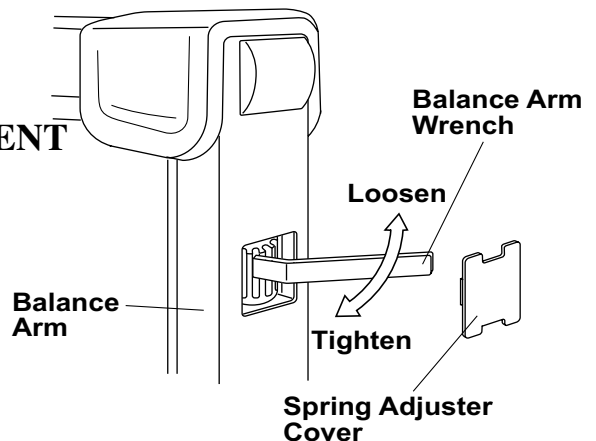


Fig.4-2 Balance Arm Tension Adjustment

[3] HEAD POSITIONING

- A. Place head into position.
- B. If head drifts from the set position, adjust the brake screws according to the following procedures. (Fig.4-3)
 1. Loosen the yoke side cap screw ($\varnothing 3 \times 8\text{mm}$ tapping screw) and remove the yoke side cap.
 2. Adjust the six brake screws using a screw driver.
 3. After adjustment, reattach the yoke side cap and screw.

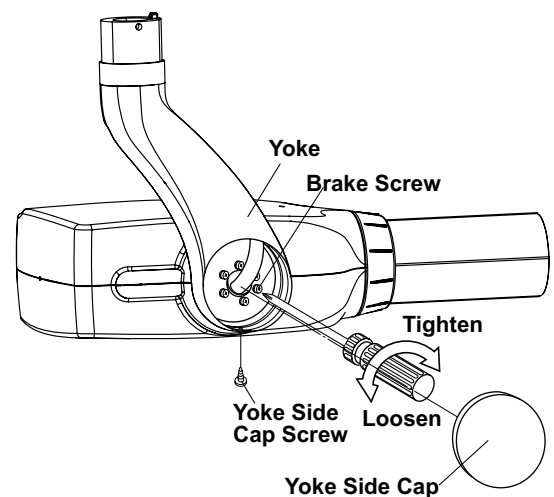


Fig.4-3 Head Positioning

SECTION 5 : CONTROL IDENTIFICATION AND OPERATION
[1] MAJOR COMPONENTS AND CONTROL IDENTIFICATION

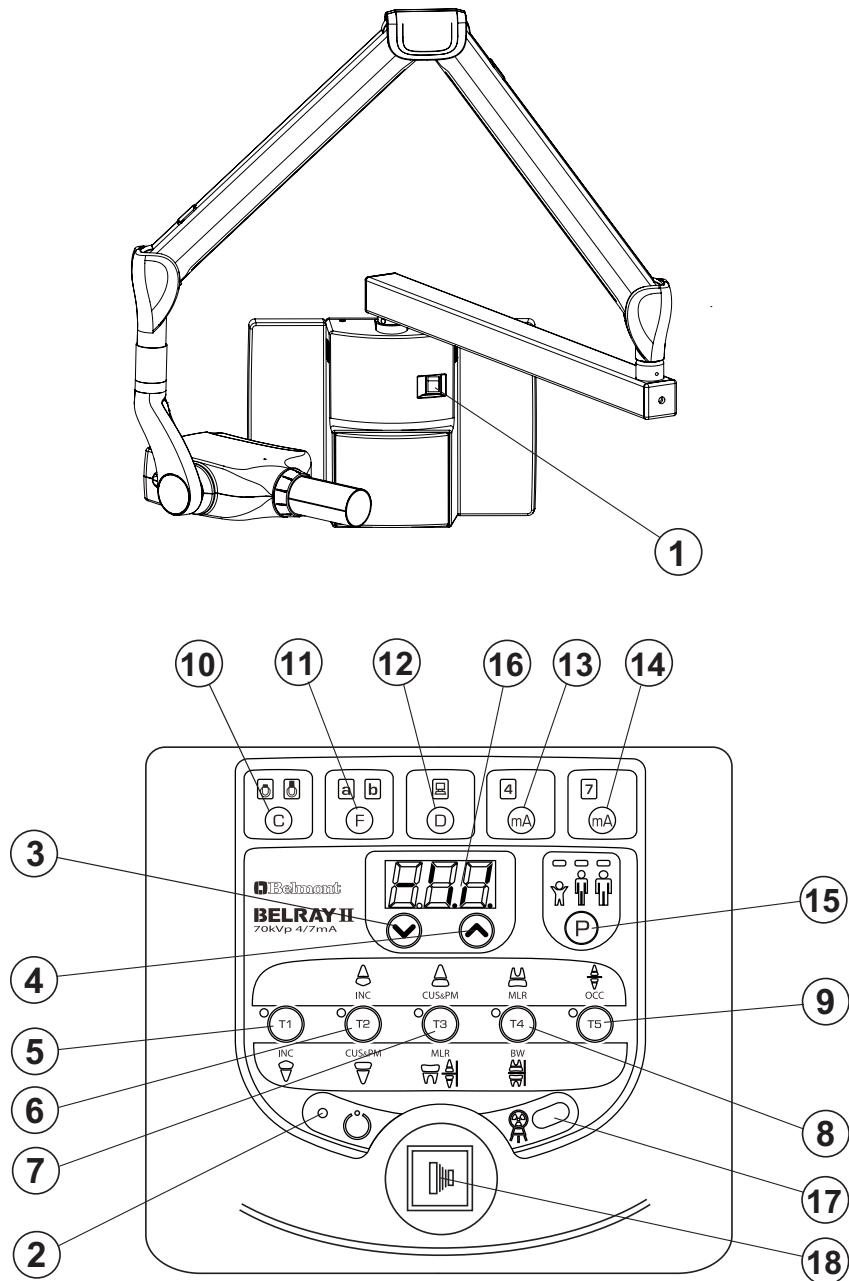


Fig.5-1 Major Components and Control Identification

- | | |
|---|------------------------------------|
| (1) Main Power Switch | (10) Cone Type Selection Switch |
| (2) Ready Light | (11) Film Speed Selection Switch |
| (3) Exposure Time Adjusting Switch (Down) | (12) Digital Imaging Switch |
| (4) Exposure Time Adjusting Switch (Up) | (13) 4mA Selection Switch |
| (5) Tooth Selection Switch (T1) | (14) 7mA Selection Switch |
| (6) Tooth Selection Switch (T2) | (15) Patient Size Selection Switch |
| (7) Tooth Selection Switch (T3) | (16) Exposure Time Display Window |
| (8) Tooth Selection Switch (T4) | (17) Exposure Warning Light |
| (9) Tooth Selection Switch (T5) | (18) Exposure Switch |

[2] FUNCTION OF CONTROLS

(1) Main Power Switch

Pushing the upper side of this switch to the ON position energizes the x-ray unit. (Ready light and pre-select light for cone type, film or digital, mA, and patient size illuminate.)

It is recommended to keep this switch OFF when the unit is not in use, in order to prevent an accidental exposure.

IMPORTANT : To prevent the risk of an accidental exposure, push the lower side of this switch to the OFF position, when the unit is not in use.

(2) Ready Light

This light illuminates when the line voltage is within operable range (108 ~ 132Vac).

When this light is not on, exposure can not be made.

(3)(4) Exposure Time Adjusting Switches

By momentarily pushing the (⤴ or ⤵) switch, the exposure time displayed increases (or decreases) by one increment. By keeping the switch depressed more 2 sec., the exposure time displayed increases (or decreases) continuously until the switch is released.

Model 097 has the following 23 exposure time settings :

0.00, 0.02, 0.03, 0.04, 0.05, 0.06, 0.08, 0.10, 0.13, 0.16, 0.20, 0.25, 0.32, 0.40
0.50, 0.63, 0.80, 1.00, 1.25, 1.60, 2.00, 2.50, 3.20 (sec.)

(5) ~ (9) Tooth Selection Switches (T1 ~ T5)

Pushing one of these switches sets the exposure time automatically for the following (10) ~ (15).

(5) T1 : Incisor of Mandible

(6) T2 : Incisor of Maxilla, Cuspid & Premolar of Mandible

(7) T3 : Cuspid & Premolar of Maxilla, Molars of Mandible, Bite Wing

(8) T4 : Molar of Maxilla, Bite Wing Molars

(9) T5 : Occlusal

If the T1 switch (5) is depressed more than 3 sec., unit goes into “ Lock Mode”.

In lock mode, the only functional switch is the power switch. To exit from the lock mode, depress the T1 switch more than 3 sec. again.

(10) Cone Type Selection Switch

Depressing this switch for more than 2 sec. selects the cone type : 8” standard cone or 12” optional long cone. (If the optional rectangular cone is to be used, select the 8” standard cone setting.)

(11) Film Speed Selection Switch

a. BELRAY II has 16 film speed settings : (F.00 ~ F.15)

Two speed settings are pre-set at the factory (a & b) and can be selected with (11).

a = Film speed No. F.09 (equivalent to ISO speed group “ D” or Kodak Ultra-Speed film)

b = Film speed No. F.04 (equivalent to ISO speed group “ F/E” or Kodak InSight film)

b. Pushing this switch momentarily displays the selected film speed setting in the **Exposure Time Display Window** (16).

Depressing this switch for more than 2 sec. changes the film type being selected.

c. If the **Digital Imaging Switch** (12) is depressed, both of the film speed indicating light (a & b) are turned off.

(12) Digital Imaging Switch

If a digital imaging system is used, shorter exposure time is often required. BELRAY II has 16 speeds for digital imaging : (d.00 ~ d.15). Pushing this switch momentarily displays the speed being selected in the **Exposure Time Display Window** (16). With the factory speed setting d.06, the exposure time becomes half of F.06 setting.

TABLE 1. Speed Setting and Exposure Time (Regular Cone) [unit : sec.]

Speed Setting	mA	Child					Adult					Obese				
		T1	T2	T3	T4	T5	T1	T2	T3	T4	T5	T1	T2	T3	T4	T5
F.09	4	0.20	0.32	0.40	0.50	0.80	0.32	0.50	0.63	0.80	1.25	0.40	0.63	0.80	1.00	1.60
	7	0.10	0.20	0.20	0.32	0.40	0.20	0.32	0.40	0.50	0.63	0.20	0.40	0.40	0.63	0.80
F.04	4	0.08	0.13	0.16	0.20	0.32	0.13	0.20	0.25	0.32	0.50	0.16	0.25	0.32	0.40	0.63
	7	0.05	0.08	0.10	0.13	0.16	0.08	0.13	0.16	0.20	0.32	0.10	0.16	0.20	0.25	0.32
d.06	4	0.06	0.10	0.10	0.16	0.20	0.10	0.16	0.20	0.25	0.40	0.10	0.20	0.25	0.32	0.40
	7	0.03	0.05	0.06	0.08	0.13	0.05	0.08	0.10	0.13	0.20	0.06	0.10	0.13	0.16	0.25

TABLE 2. Speed Setting and Exposure Time (Long Cone) [unit : sec.]

Speed Setting	mA	Child					Adult					Obese				
		T1	T2	T3	T4	T5	T1	T2	T3	T4	T5	T1	T2	T3	T4	T5
F.09	4	0.40	0.63	0.80	1.00	1.60	0.63	1.25	1.25	2.00	2.50	0.80	1.25	1.60	2.00	3.20
	7	0.25	0.40	0.50	0.63	1.00	0.40	0.63	1.80	1.00	1.60	0.50	0.80	1.00	1.25	2.00
F.04	4	0.16	0.25	0.32	0.50	0.63	0.25	0.50	0.50	0.80	1.00	0.32	0.50	0.63	1.00	1.25
	7	0.10	0.16	0.20	0.25	0.40	0.16	0.25	0.32	0.40	0.63	0.20	0.32	0.40	0.50	0.80
d.06	4	0.13	0.20	0.25	0.32	0.50	0.20	0.32	0.40	0.50	0.80	0.25	0.40	0.50	0.63	1.00
	7	0.06	0.13	0.13	0.20	0.25	0.10	0.20	0.25	0.32	0.40	0.13	0.25	0.25	0.40	0.50

(13) 4mA Selection Switch

By momentarily depressing this switch, the tube current is set at 4mA.

When Film switch is depressed, the tube current setting will be automatically changed to 7mA.

(14) 7mA Selection Switch

By momentarily depressing this switch, the tube current is set at 7mA.

When Digital switch is depressed, the tube current setting will be automatically changed to 4mA.

(15) Patient Size Selection Switch

This switch alters the selection of patient type/size to be radiographed (child→adult→Obese→ child) and sets the exposure time automatically.

NOTE : Setting or adjusting the exposure time manually (with ⤴ or ⤵ switch) supersedes (5) ~ (15) functions.

(16) Exposure Time Display Window

This window displays the selected exposure time. If an abnormal condition exists or a malfunction occurs, an Error Code is displayed. (See Section : [4] **ERROR CODES**)

(17) Exposure Warning Light

Illumination of this light indicates the unit is producing x-radiation.

(18) Exposure Switch

This switch initiates radiographic exposure. When making an exposure, depress and hold this switch until the **Exposure Warning Light** (17) and the audible warning shut off. Failure to keep this switch depressed will result in the premature termination of the exposure and error code E.00 will be displayed in **Exposure Time Display Window** (16).

[3] OPERATING PROCEDURES

1. Turn ON the Main Power Switch (1).
2. Confirm that Ready Light (2) is illuminated.

NOTE : The ready light will not illuminate unless the incoming line voltage is correct and within the x-ray's operable range (108 ~ 132VAC.).

3. Select the appropriate tooth type (5) ~ (9), and confirm the pre-selected conditions (cone type, film or digital, mA and patient size) are suitable for exposure.

NOTE : To manually set the exposure time, depress either of the manual Exposure Time Adjust Switches (⤴ or ⤵) until the desired exposure time appears in the Exposure Time Display Window (16). While the unit is in manual mode, other selection switches (5) ~ (15) do not affect exposure time. (All of the tooth selection lights are off.) To return to the automatic exposure time selection mode, depress any one of Tooth Selection Switches (5) ~ (9).

4. Depress the Exposure Switch (8). When the Exposure Switch is depressed, the Exposure Warning Light (17) illuminates and the audible warning sounds. Do not release the Exposure Switch until the Exposure Warning Light and audible warning automatically shut off. Failure to keep the switch depressed will result in exposure being terminated prematurely.
5. To continue to radiograph other teeth, just select appropriate Tooth Selection Switches (5) ~ (9).

IMPORTANT : To protect x-ray tubehead from heat accumulation, wait for a time interval that is equal to 50 times the selected exposure time before making additional exposures. (Example : a 25 sec. wait is necessary between exposures that are 0.5 sec. in duration.)

6. Turn OFF the Main Power Switch (1) in order to prevent accidental exposure when the unit is not in use.

NOTE : If the unit is left over 8 min. without being operated and Main Power Switch (1) is kept on, figure "1" runs through the Exposure Time Display Window (16). This does not mean that malfunction of the unit has occurred ; this is an energy saving feature. The unit returns to ready condition by pressing any one of the switches, except the Exposure Switch (18).

[4] OPTIONAL HAND EXPOSURE SWITCH

An optional hand exposure switch can be connected to the sub controller. Since this exposure switch has a coiled cord, operators can stand in the most suitable position for operation.

As controller has separate connector for this exposure switch, both exposure switch (18) on the front panel of sub controller and this hand exposure switch can be used.

If local code prohibits use of both, ask installer to disconnect the connector of either switch.

[5] ERROR CODES

If an abnormal condition exists in the unit, or a malfunction occurs, an error code is displayed in the Exposure Time Display Window (16). Please refer to the Table below.

Error Code	Condition	Step to be Taken	Possible Solution
E.00	Exposure switch was released before exposure termination.	All the tooth selection lights blink. Depress one of the tooth switches.	Release the exposure switch after the exposure light turns off.
E.01	Exposure switch was depressed within 10 sec. of previous exposure.	A 10 sec. delay is built in between each exposure. Release the exposure switch.	There should be a " wait" interval of 50 times the exposure time between successive exposures.
	Exposure time was set and exposure switch was depressed within 3 sec. of the power switch being turned on.		Wait a minimum 3 sec. after the main power switch is turned on before pressing the exposure switch.
E.02	Line voltage was less than 90% of rated voltage.		If line voltage is less than 90% of rated voltage, correct it by using a step-up transformer. (*)
E.03	Line voltage was more than 110% of rated voltage.		If line voltage is less than 110% of rated voltage, correct it by using a step-down transformer. (*)
E.04	Excess current during exposure.	Turn off the main power switch and wait for approximately 2 min. Turn on the main power switch again.	Contact customer service
E.05	Tube current at last portion of exposure was less than 3 mA at 4 mA setting or less than 5.25 mA at 7 mA setting.		Conduct the confirmation of tube current described in section 6.
E.06	Tube current at last portion of exposure was more than 5 mA at 4 mA setting or more than 8.75 mA at 7 mA setting.		
E.07	During the exposure, tube current becomes less than 2 mA at 4mA setting or less than 3.5 mA at 7 mA setting.		
E.08	During the exposure, tube current becomes more than 6 mA at 4mA setting or more than 10.5 mA at 7 mA setting.		
E.09	Malfunction of the microcomputer.		Contact customer service
E.10	Exposure switch or exposure circuit had been ON, when main power switch is turned on.	Release all the switches	Do not turn on the power while other switch is depressed.
E.11	Tube current is detected during pre-heating period.	Turn off the main power switch and wait for approximately 2 min. Turn on the main power switch again.	Contact customer service
E.12	Tube current is detected when main power switch is turned on.		

Error Code	Condition	Step to be Taken	Possible Solution
E.22	Failure of electrical communication between the power PCB and timer PCB.	Turn off the main power switch and wait for approximately 2 min. Turn on the main power switch again.	Contact customer service
E.23	Any switch on the sub controller is depressed when the main power switch is turned on. (Except the exposure switch)	Release all the switches	Do not turn on the power while other switch is depressed.

(*) Should a step up or down transformer be required to follow local and national electrical code for electrical ratings (120VAC, 60Hz, Single Phase, 0.8kVA) and installation.

[6] MAINTENANCE

BELRAY II MODEL 097 x-ray unit requires post installation confirmation and periodic maintenance checks to be performed by dealer service personnel. These procedures ensure that the x-ray unit is functioning within the manufacturer's specifications and remain in compliance with the Standard.

It is the responsibility of the owner of the unit to see that these maintenance checks are done **once every 6 months** and that they are performed by a trained, certified service technician.

The specific instructions to perform these checks are located within this Installation Manual.

A. Line voltage confirmation (page 23 ~24)

B. Tube current confirmation (page 23)

C. Inspection of arm and head movement (page 16)

D. Mechanical safety

1. The wall plate should be checked to confirm that it is securely attached to the wall.
2. The arm mounting bracket should be checked to confirm that it is securely attached to the wall mounting plate. The arm mounting bracket must be level horizontally and vertically.
3. Check and verify that the horizontal arm is not raising up and out of the arm mounting bracket. This should be verified routinely by treatment room personnel.

SECTION 6 : POST INSTALLATION CONFIRMATION

[1] CONFIRMATION OF POWER SUPPLY VOLTAGE

As specified in Electrical Requirements (page 5), power supply voltage must be within the operable range of 108 ~ 132 VAC. Confirm the power supply voltage again before turning on the unit.

1. Open the front panel of main controller by loosening two screws on top of the controller.
2. Remove the restriction plate from 3P terminal block.
3. Set the range of digital multimeter at 200 VAC, connect probes of multimeter to L and N of the 3P terminal block.

WARNING

Do not touch the restriction plate (refer to Fig.3-3) with the probes of multimeter during measurement, or a short circuit occurs.

4. Confirm that the reading is $120V \pm 10\%$ (108 ~ 132 VAC).

NOTE : BELRAY II MODEL 097 x-ray can not be operated unless the power supply voltage is within this range.

[2] CONFIRMATION OF TUBE CURRENT

BELRAY II Model 097 x-ray incorporates self diagnose and adjusting system to check if the tube current are within specified ranges at the beginning of exposure

1. Keep depressing tooth selection switches T1, T4 & T5 together until “h.○○” is appeared on the exposure time display window
2. Wait until the display changes to be “0.50”.
3. Make exposure by depressing the exposure switch.

WARNING

X-radiation is generated for 0.50 second.

4. Repeat step 2. and 3. until “Fin” is displayed. This self diagnose and adjustment is automatically done for 4mA/7mA.

[3] CONFIRMATION OF EXPOSURE WARNING LIGHT & BUZZER

A. EXPOSURE WARNING BUZZER

1. Make an exposure and confirm that the exposure warning buzzer located within the sub controller is activated during the entire exposure.

B. EXPOSURE WARNING LIGHT

Exposure warning light is located on the front panel of the sub controller,

1. Make an exposure and confirm that the warning light illuminates during the exposure.

[4] CONFIRMATION OF LINE VOLTAGE REGULATION

1. Make sure that main power switch is "OFF".
2. Set the range of digital multimeter at 200 VAC, connect probes of multimeter to L and N of the 3P terminal block in the main controller.

WARNING

Do not touch the restriction plate (refer to Fig.3-3) with the probes of multimeter during measurement, or a short circuit occurs.

3. Turn the main power switch on, and set the exposure time at 2.00 sec. with manual switch at 7mA.
4. Record the no-load line voltage (VN) indicated by the multimeter before exposure.
5. Make an exposure and record the load voltage (VL) indicated by the multimeter during exposure.

WARNING

X-Radiation is generated for 2 seconds.

NOTE : Read the multimeter when the value is stabilized (about one second after exposure started).

6. Calculate line voltage regulation R(%) in the formula below :

$$R = \frac{VN - VL}{VL} \times 100 \quad \text{Record this value in "Assemblers Installation Report".}$$

NOTE : Line voltage regulation must not exceed the range of 0 ~ 3 %. If it is greater than 3%, the size of the power supply wires must be increased. Refer to the power supply requirements outlined on page 5 to determine the correct wire size necessary. If line voltage regulation is within the range, apparent resistance of supply line can be considered to be less than 0.5 OHM.

SECTION 7 : INITIAL SETTING

[1] SPEED SETTING FOR FILM AND DIGITAL IMAGING

A. FILM SPEED

Prior to shipment of the x-ray from the factory, the following two film speeds are programmed to be selected by the Film Speed Selection Switch.

a = Film speed F.09 (equivalent to ISO speed group "D", or Kodak Ultra-speed Film)

b = Film speed F.04 (equivalent to ISO speed group "F/E", or Kodak InSight Film)

In addition to these two speeds, BELRAY II MODEL 097 x-ray can provide 16 different film speeds (F.00 ~ F.15) and any two of them can be programmed for easy selection. If the doctor uses a different film speed, or prefers darker (or lighter) radiographs, the new speed can be programmed as follows. Higher speed settings make films darker. If film speed is increased by 1, exposure time becomes 25 % longer.

1. Keep the 4mA selection switch and 7mA selection switch depressed simultaneously for more than 3 seconds. Release the switches if the ready light starts to flash.
2. Push F switch momentarily until the "a" light above the F switch illuminates. The exposure time display window shows the present film speed for "a" setting. (The factory default setting, F.09 should be displayed.) By depressing \odot or \ominus switch, increase or decrease film speed number until desired number for "a" setting is displayed.
3. To change the "b" setting from the factory default, F.05, push F switch momentarily until the "b" light illuminates. By depressing \odot or \ominus switch, increase or decrease film speed until the desired number for "b" setting is displayed.
4. Press **T1 switch** to store these settings, then turn the main power switch off.

B. SPEED FOR DIGITAL IMAGING

BELRAY II MODEL 097 x-ray has 16 speeds for digital imaging (d.00 ~ d.15). The factory setting is d.06 and with this setting the exposure time becomes half of F.06 setting.

As the sensitivity is different according to each manufacturer of digital imaging sensors, this setting should be adjusted. To get a darker image, increase the speed setting and to get a lighter image, decrease the speed setting. If the speed setting is increased by 1, exposure time becomes 12 % longer.

1. Keep 4mA selection switch and 7mA selection switch depressed simultaneously for more than 3 seconds. Release the switches if the ready light starts to flash.
2. Push D switch momentarily until the light above the D switch illuminates and the exposure time display window shows the present speed setting. (The factory default setting d.06 should be displayed.)
3. By depressing \odot or \ominus switch, increase or decrease speed until the desired number is displayed.
4. Press **T1 switch** to store these settings, then turn the main power switch off.

TABLE 1. Speed Setting and Exposure Time (Regular Cone) [unit : sec.]

Speed Setting	mA	Child					Adult					Obese				
		T1	T2	T3	T4	T5	T1	T2	T3	T4	T5	T1	T2	T3	T4	T5
F.09	4	0.20	0.32	0.40	0.50	0.80	0.32	0.50	0.63	0.80	1.25	0.40	0.63	0.80	1.00	1.60
	7	0.10	0.20	0.20	0.32	0.40	0.20	0.32	0.40	0.50	0.63	0.20	0.40	0.40	0.63	0.80
F.04	4	0.08	0.13	0.16	0.20	0.32	0.13	0.20	0.25	0.32	0.50	0.16	0.25	0.32	0.40	0.63
	7	0.05	0.08	0.10	0.13	0.16	0.08	0.13	0.16	0.20	0.32	0.10	0.16	0.20	0.25	0.32
d.06	4	0.06	0.10	0.10	0.16	0.20	0.10	0.16	0.20	0.25	0.40	0.10	0.20	0.25	0.32	0.40
	7	0.03	0.05	0.06	0.08	0.13	0.05	0.08	0.10	0.13	0.20	0.06	0.10	0.13	0.16	0.25

TABLE 2. Speed Setting and Exposure Time (Long Cone) [unit : sec.]

Speed Setting	mA	Child					Adult					Obese				
		T1	T2	T3	T4	T5	T1	T2	T3	T4	T5	T1	T2	T3	T4	T5
F.09	4	0.40	0.63	0.80	1.00	1.60	0.63	1.25	1.25	2.00	2.50	0.80	1.25	1.60	2.00	3.20
	7	0.25	0.40	0.50	0.63	1.00	0.40	0.63	0.80	1.00	1.60	0.50	0.80	1.00	1.25	2.00
F.04	4	0.16	0.25	0.32	0.50	0.63	0.25	0.50	0.50	0.80	1.00	0.32	0.50	0.63	1.00	1.25
	7	0.10	0.16	0.20	0.25	0.40	0.16	0.25	0.32	0.40	0.63	0.20	0.32	0.40	0.50	0.80
d.06	4	0.13	0.20	0.25	0.32	0.50	0.20	0.32	0.40	0.50	0.80	0.25	0.40	0.50	0.63	1.00
	7	0.06	0.13	0.13	0.20	0.25	0.10	0.20	0.25	0.32	0.40	0.13	0.25	0.25	0.40	0.50

[2] PRIORITY OF SELECTIONS

Factory default setting :

Cone : Regular cone
 Film Speed : "a"
 Digital Imaging : off
 mA selection : 7 mA
 Patient Type : Adult

If necessary, these settings can be changed. For example, if digital imaging is used for pedodontistry, digital imaging and "child" (patient type) should be selected.

1. Keep 4mA selection switch and 7mA selection switch depressed simultaneously for more than 3 seconds. Release the switches if the ready light starts to flash
2. Press D switch momentarily. (Light above D switch illuminates and speed setting for digital imaging is displayed on exposure time display window.)
3. Select the patient type "child" by depressing P switch momentarily.
4. Press **T1 switch** to store these settings, then turn the main power switch off.
5. Cone type, mA selection can be changed by same procedures.

NOTE : For digital imaging, 4 mA is recommended to get good contrast and precise exposure time control.

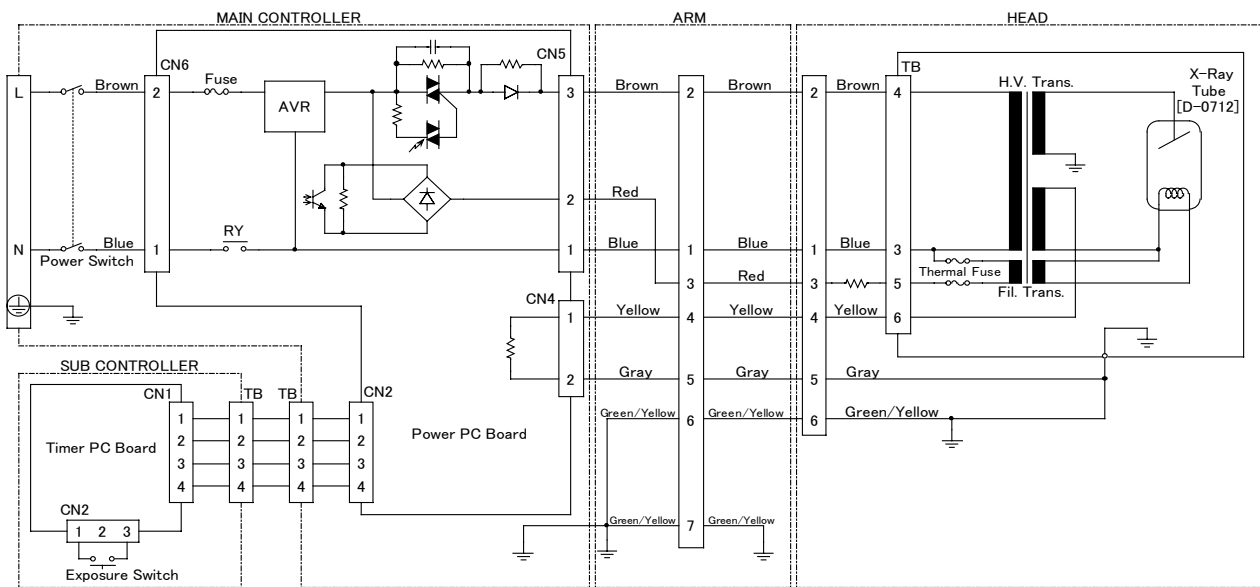
[3] ELECTRONIC CHIME ON/OFF

An electronic chime sounds when switches are depressed. If preferred, this sound can be deactivated as follows :

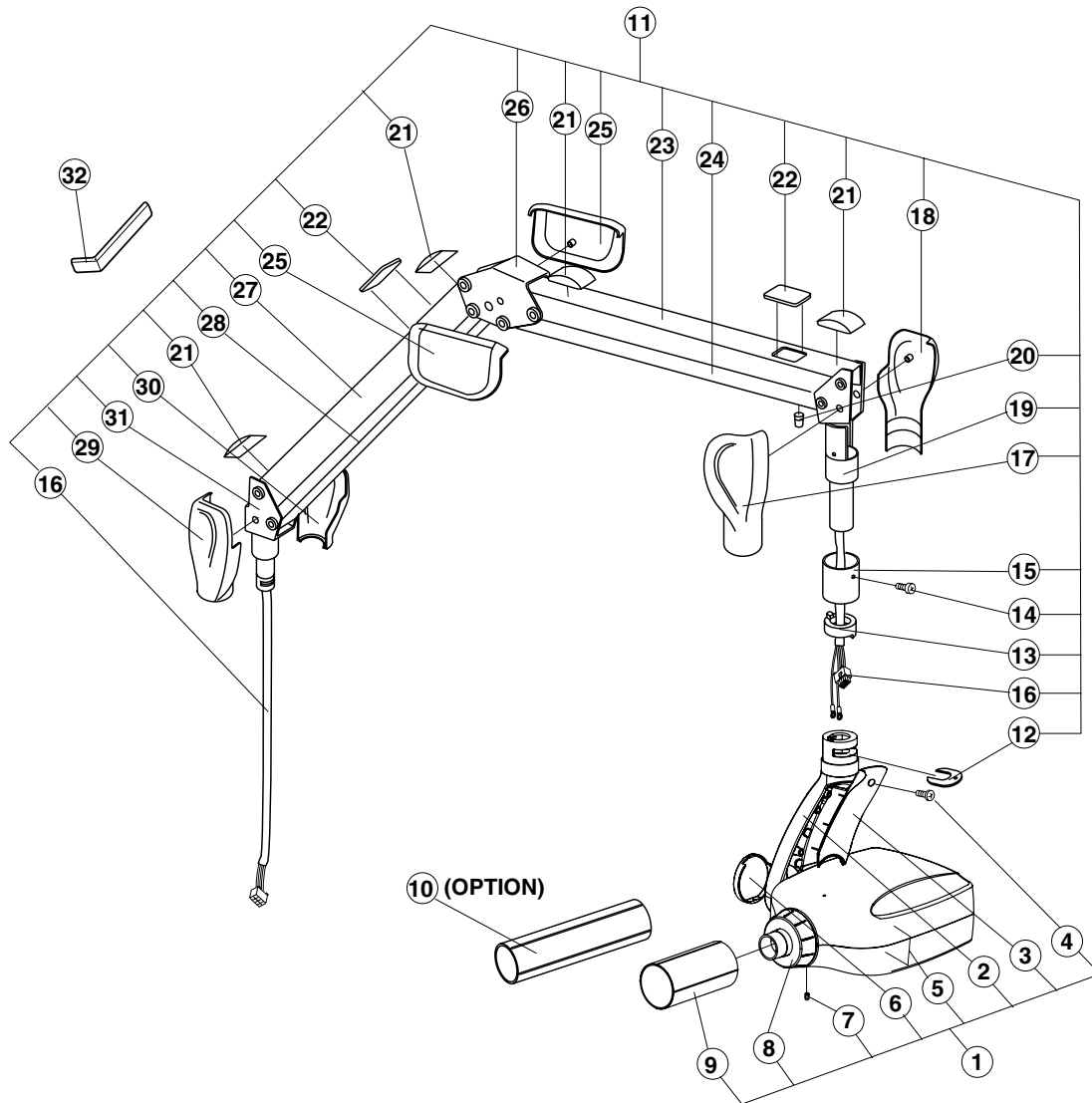
1. Keep T1 and T2 switches depressed together for more than 3 seconds.
Release the switches if the ready light starts to flash
2. "bu. 2" will be displayed in exposure time display window.
3. By depressing either Ⓐ or Ⓑ switch, display changes to "bu.0".
4. Press **P switch** (Patient type Switch) to store this setting and turn off the main power switch.

NOTE : Exposure Warning Buzzer and alarm sound of error code can not be eliminated.

APPENDIX 1 : CIRCUIT DIAGRAM



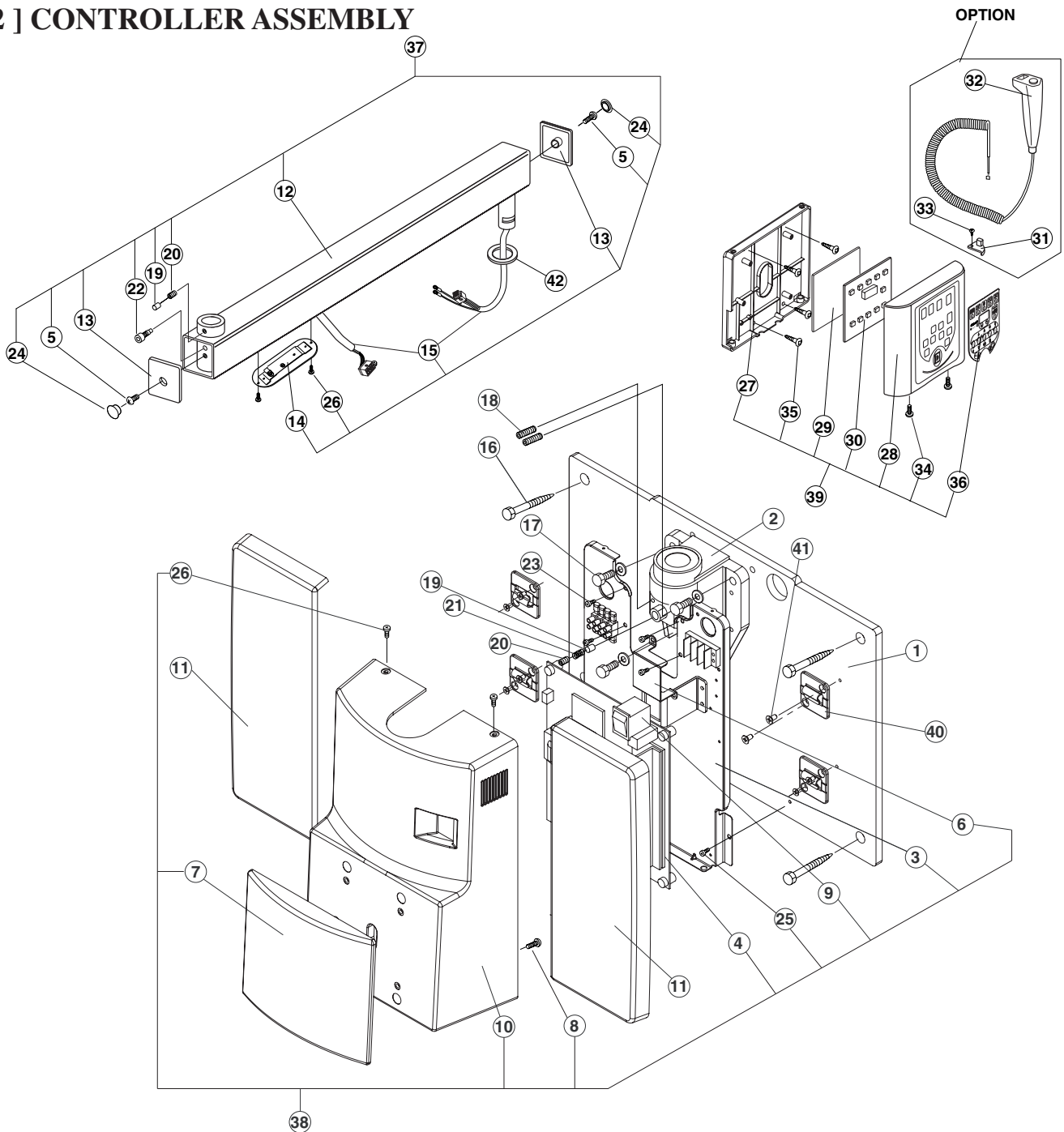
APPENDIX 2 : PARTS IDENTIFICATION [1] ARM AND HEAD ASSEMBLY



ID.No.	Parts No.	Description	QTY
1	1P01CBA0	X-RAY Head Assembly	1
2	ECPE24C0	Yoke	1
3	1A037UA0	Yoke Inside Cover	1
4	-----	Yoke Inside Cover Screw(M4 × 15)	1
5	-----	Head Housing Cover Set	2
6	1A04JJA0	Yoke Side Cap	1
7	-----	Yoke Side Cop Screw(φ 3 × 8)	1
8	1A037RA0	Lock Nut for Cone	1
9	1P01KHA0	Regular Cone	1
10	1P01KJA0	Long Cone(Optional)	1
11	1P01CDA0	Balance Arm Assembly	1
12	ECQR62A0	Head Key	1
13	ECQR24A0	Stopper Ring	2
14	-----	Arm Collar Screw(M4 × 8)	2
15	ECQR31A0	Arm Collar	1
16	1A04DZA0	Wire Harness in Balance Arm	4

ID.No.	Parts No.	Description	QTY
17	ECPE19F0	Left Cover for Joint No.3	1
18	ECPE18F0	Right Cover for Joint No.3	1
19	ECPE17B0	Joint No.3	1
20	ECQR33A0	Cushion Absorber	1
21	ECQR27B0	Crevice Cover	2
22	ECQR30C0	Spring Adjuster Cover	1
23	ECPJ60A0	Arm Cover No.2	1
24	ECPE30B0	Balance Arm No.2	1
25	ECPJ64C0	Cover for Joint No.2	1
26	ECPJ58B0	Joint No.2	1
27	ECPJ59A0	Arm Cover No.1	1
28	ECPE31B0	Balance Arm No.1	1
29	ECPJ63F0	Left Cover for Joint No.1	2
30	ECPJ62F0	Right Cover for Joint No.1	2
31	ECPE15B0	Joint No.1	1
32	ECLJ82A0	Balance Arm Wrench	4

[2] CONTROLLER ASSEMBLY



ID.No.	Parts No.	Description	QTY
1	1A04BYA0	Wall Plate	1
2	ECPE34A0	Arm Mounting Bracket	1
3	1A0389A0	Chassis	1
4	1A03Z6A0	Power PC Board	1
5	-----	End Cap Screw(M6 × 15)	2
6	1A0387A0	Restriction Plate	1
7	1A0386A0	Front Panel	1
8	-----	Screw for Front Panel(φ 3 × 6)	1
9	1E01J8A0	Main Power Switch	1
10	1A0385A0	Front Cover	1
11	1A04JFA0	Side Cover	1
12	1A04BXA0	Horizontal Arm Frame	1
13	ECLJ36A0	Arm End Cap	2
14	ECQR70C0	Arm Bottom Cover	2
15	1P01CXA0	Wire Harness in Horizontal Arm (800mm)	(1)
	1P01CYA0	Wire Harness in Horizontal Arm (1000mm)	(1)
	1P01CZA0	Wire Harness in Horizontal Arm (300mm)	(1)
*	1P01D0A0	Wire Harness in Horizontal Arm (500mm)	(1)
*	1P01D1A0	Wire Harness in Horizontal Arm (650mm)	(1)
16	-----	Lag Screw(φ 9 × 75)	4
17	-----	Machine Bolt(M8 × 20)	3
18	ECPR44B0	Retaining Bolt(M6 × 35)	2
19	ECLS06B0	Brake Plug	1
20	-----	Brake Screw(M6 × 6)	1
21	ECLS11B0	Brake Spring	1

ID.No.	Parts No.	Description	QTY
22	-----	Stopper Screw(M6)	1
23	-----	Screw for Chassis(M4 × 10)	4
24	ECNR24A0	Hole plug for End Cap	2
25	-----	Screw for Chassis(M4 × 6)	2
26	-----	Screw for Cover(M3 × 8)	2
27	1A037WA0	Chassis for Sub Controller	1
28	1A037VA0	Front Panel for Sub Controller	1
29	ECQR58A0	Protector for Timer PC Board	1
30	1A03L4A0	Timer PC Board	1
31	ECQR68A0	Hook for Hand Exposure Switch(Optional)	1
32	-----	Hand Exposure Switch Assembly(Optional)	1
33	-----	Tapping Screw(Optional)	1
34	-----	Front Cover screw for Sub Controller(M3 × 8)	2
35	-----	Wood Screw(φ 4.1 × 20)	2
36	1A03CKA0	Switch sheet	1
37	1P01CEA0	Horizontal Arm Assbly(800mm)	(1)
	1P01CFA0	Horizontal Arm Assbly(1000mm)	(1)
	1P01B7A0	Horizontal Arm Assbly(300mm)	(1)
*	1P01CGA0	Horizontal Arm Assbly(500mm)	(1)
*	1P01CHA0	Horizontal Arm Assbly(650mm)	(1)
38	1P01CJA0	Main Controller Assembly	1
39	1P01CLA0	Sub Controller Assembly	1
40	1A04JGA0	Hook for Side Cover	1
41	-----	Screw for Hook(M4 × 6)	1
42	EEMV52B0	Thrust Washer	1

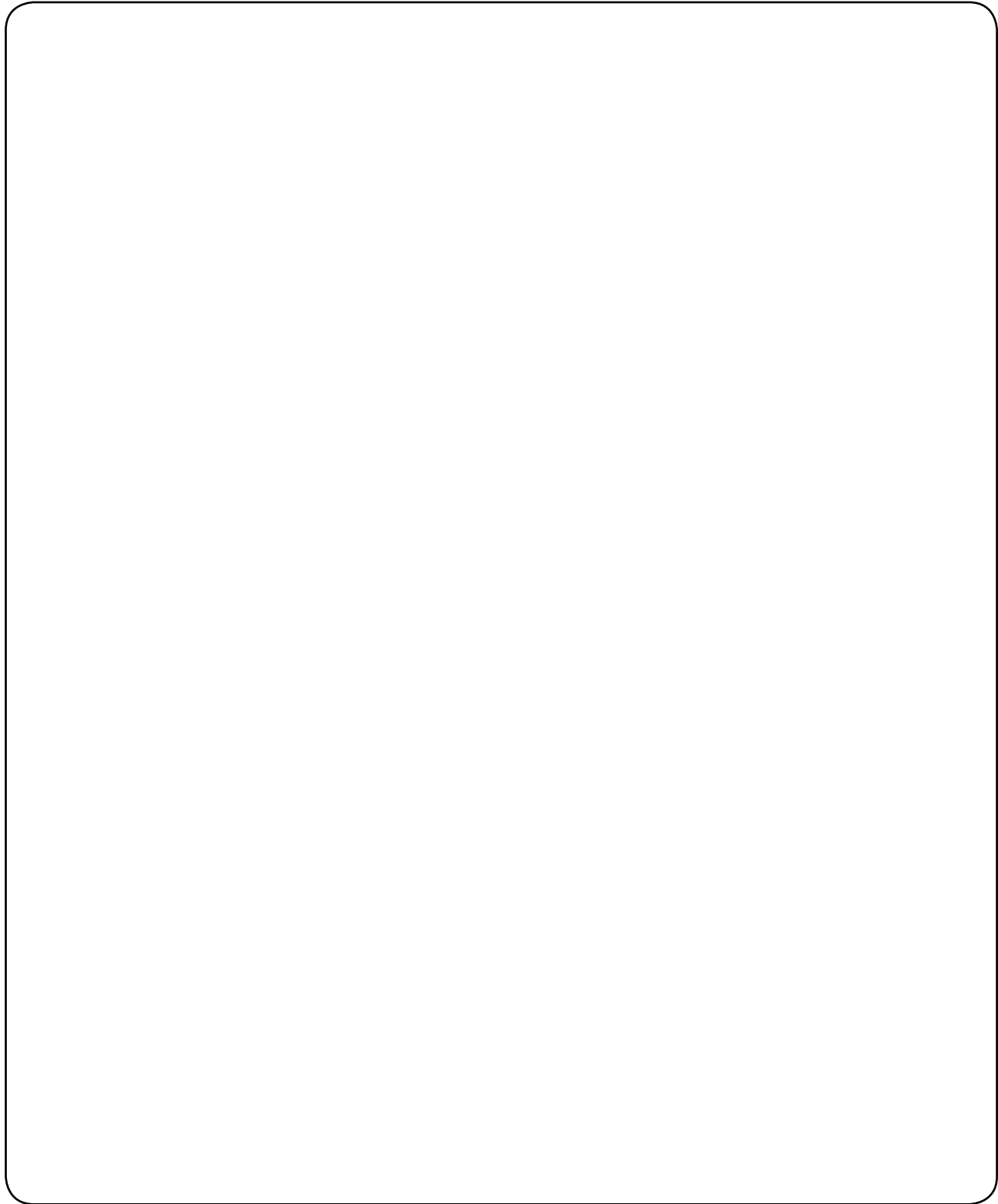
* : Not available in USA.

APPENDIX 3 : CERTIFICATION

FORM FDA 2579 FROM THE DEPARTMENT OF HEALTH AND HUMAN SERVICES MUST BE COMPLETED AND MAILED TO THE RESPECTIVE AGENCIES FOR THIS INSTALLATION TO BE CONSIDERED COMPLETE. ALSO COMPLETE THE WARRANTY CARD AND THE ASSEMBLERS INSTALLATION REPORT AND RETURN TO BELMONT EQUIPMENT CORP.

REFER TO THE SAMPLE FORM :

FOR FDA USE ONLY	DEPARTMENT OF HEALTH AND HUMAN SERVICES PUBLIC HEALTH SERVICE FOOD AND DRUG ADMINISTRATION REPORT OF ASSEMBLY OF A DIAGNOSTIC X-RAY SYSTEM	From Approved: OMB No. 0910-0213 Expiration Date: December 31, 1992 See reverse for OMB statement. <div style="font-size: 2em; font-weight: bold; display: inline-block;">D</div> <div style="font-size: 2em; font-weight: bold; display: inline-block; margin-left: 20px;">XXXXXX</div> <div style="font-size: 2em; font-weight: bold; display: inline-block; margin-left: 20px;">←</div>																																																					
<div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> <p>1. EQUIPMENT LOCATION</p> <p>a. NAME OF HOUSPITAL, DOCTOR OR OFFIC WHERE INSTALLED ✓</p> <p>b. STREET ADDRESS ✓</p> <p>c. CITY ✓ d. STATE ✓</p> <p>e. ZIP CORD ✓ f. TELEPHONE NUMBER ✓</p> </div> <div style="width: 48%;"> <p>2. ASSEMBLER INFORMATION</p> <p>a. COMPANY NAME ✓</p> <p>b. STREET ADDRESS ✓</p> <p>c. CITY ✓ d. STATE ✓</p> <p>e. ZIP CORD ✓ f. TELEPHONE NUMBER ✓</p> </div> </div>																																																							
<p>3. GENERAL INFORMATION</p> <p>a. THIS REPORT IS FOR ASSEMBLY OF CERTIFIED COMPONETS WHICH ARE(Check appropriate box(es))</p> <p><input checked="" type="checkbox"/> NEW ASSEMBLY - FULLY CHRTIFIED SYSTEM <input type="checkbox"/> REP;ACEMENT COMPONETS IN AN EXISTING SYSTEM</p> <p><input type="checkbox"/> REASSEMBLY - FULLY CHRTIFIED SYSTEM <input type="checkbox"/> AN ADDITION TO AN EXISTING SYSTEM</p> <p><input type="checkbox"/> REASSEMBLY - MIXED SYSTEM (Both certified and uncertified components)</p> <p>b. INTENDED USE(S)(Check applicable box(es))</p> <table style="width:100%; border:none;"> <tr> <td><input type="checkbox"/> GENERAL PURPOSE RADIOGRAPHY</td> <td><input type="checkbox"/> UROLOGY</td> <td><input type="checkbox"/> CT HEAD SCANNER</td> <td><input type="checkbox"/> DENTAL PANRAMIC</td> </tr> <tr> <td><input type="checkbox"/> GENERAL PURPOSE FLUOROSCOPY</td> <td><input type="checkbox"/> MAMMOGRAPHY</td> <td><input type="checkbox"/> CT WHOLE BODY SCANNER</td> <td><input type="checkbox"/> RADIATION THERAPY SIMULATOR</td> </tr> <tr> <td><input type="checkbox"/> TOMOGRAPHY (Other than CT)</td> <td><input type="checkbox"/> CHEST</td> <td><input type="checkbox"/> HEAD - NECK (Medical)</td> <td><input type="checkbox"/> C - ARM FLUOROSCOPIC</td> </tr> <tr> <td><input type="checkbox"/> ANGIOGRAPY</td> <td><input type="checkbox"/> CHIROPRACTIC</td> <td><input checked="" type="checkbox"/> DENTAL - INTRAORAL</td> <td><input type="checkbox"/> DIGITAL</td> </tr> <tr> <td></td> <td></td> <td><input type="checkbox"/> DENTAL - CEPHALOMETRIC</td> <td><input type="checkbox"/> OTHER (Specify in comments)</td> </tr> </table> <p>c. THE X-RAY SYSTEM IS (Check one)</p> <p><input checked="" type="checkbox"/> STATIONARY <input type="checkbox"/> MOBILE</p> <p>d. THE MASTER CONTROL IS IN ROOM Location of Control Box</p> <p>e. DATE OF ASSEMBLY</p> <table style="width:100%; border:none;"> <tr> <td style="text-align:center;">✓</td> <td style="text-align:center;">✓</td> <td style="text-align:center;">✓</td> </tr> <tr> <td style="text-align:center;">(mo.)</td> <td style="text-align:center;">(day)</td> <td style="text-align:center;">(yr.)</td> </tr> </table>			<input type="checkbox"/> GENERAL PURPOSE RADIOGRAPHY	<input type="checkbox"/> UROLOGY	<input type="checkbox"/> CT HEAD SCANNER	<input type="checkbox"/> DENTAL PANRAMIC	<input type="checkbox"/> GENERAL PURPOSE FLUOROSCOPY	<input type="checkbox"/> MAMMOGRAPHY	<input type="checkbox"/> CT WHOLE BODY SCANNER	<input type="checkbox"/> RADIATION THERAPY SIMULATOR	<input type="checkbox"/> TOMOGRAPHY (Other than CT)	<input type="checkbox"/> CHEST	<input type="checkbox"/> HEAD - NECK (Medical)	<input type="checkbox"/> C - ARM FLUOROSCOPIC	<input type="checkbox"/> ANGIOGRAPY	<input type="checkbox"/> CHIROPRACTIC	<input checked="" type="checkbox"/> DENTAL - INTRAORAL	<input type="checkbox"/> DIGITAL			<input type="checkbox"/> DENTAL - CEPHALOMETRIC	<input type="checkbox"/> OTHER (Specify in comments)	✓	✓	✓	(mo.)	(day)	(yr.)																											
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<p>5. ASSEMBLER CERTIFICATION</p> <p>I affirm that all certified components assembled or installed by me for which this report is being made, were adjusted and tested by me according to the instructions provided by the manufacturer(s). were of the type required by the diagnostic x-ray performance standard (21 CFR Part 1020), were not modified to adversely affect performance, and were insralled in accordance with provisions of 21 CFR Part 1020. I also affirm that all instruction manuals and other infomation required by 21 CFR Part 1020 for this assembly have been furnished to the purchaser and within 15 days from the date of assembly, each copy of this report will be distributed as indicated at the bottom of each copy.</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:33%;">a. PRINTED NAME ✓</td> <td style="width:33%;">b. SIGNATURE ✓</td> <td style="width:33%;">c. DATE ✓</td> </tr> <tr> <td colspan="3">d. COMMENTS</td> </tr> </table>			a. PRINTED NAME ✓	b. SIGNATURE ✓	c. DATE ✓	d. COMMENTS																																																	
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