SERVICE MANUAL

Panoramic Radiograph

ANA-BEL

Panoramic & Cephalometric Radiograph

ANA-BEL CM

SAFETY INSTRUCTION TO SERVICE PERSONNEL

- Be sure to read this "Service Manual" before starting repair work.
- Be sure to keep this "Service Manual" handy while performing repair work.

TAKARA BELMONT U.S.A., INC.

Before Starting Repair Work

Please be sure to read this "Service Manual" before starting repair work and fully understand the contents. Some repair works involve risks in adjustment, confirmation, etc. So be very careful about the safety when performing such works. The repair works shall be performed by a qualified personnel or a person who completed the training specialized in repair at our company.

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01. INTRODUCTION

- 1. Before starting repair work, be sure to read Operation Manual of the equipment.
- 2. The operating procedure of panoramic radiography forms the basis of all operations. So become fully familiar with its procedure before taking other radiograph.
- 3. Be sure to observe the warnings and prohibited matters in the body of this Service Manual strictly.
- 4. Read this Service Manual from the beginning in the order it is written. If you read from the middle of this manual and do the repair work, it may cause an accident, breakage of this equipment etc. due to an incorrect repair work.
- 5. If you find any unclear point during a repair work, read this Service Manual again to check about it and restart the repair work.
- Exemption from Responsibility
 Be sure to observe the contents of Service Manual. The accident and breakage of this equipment due to an incorrect repair work are out of the scope of our responsibilities.
- 7. Warranty Period for Equipment The warranty period is two years from the date of purchase. The charge-free warranty will be applied only to the cases where breakage, failure, etc. of this equipment occurred through normal use.
- Available Period for Repair Parts and Service Parts
 The repair parts and service parts are available for 10 years after discontinuing this product.
- 10. The disinstallation and disposal of equipment are within the scope of responsibilities of the customer. In the case to disinstall the equipment, consult with the dealer you purchased from or with us.

ANA-BEL/CM



02. WARNINGS

When you perform a repair work, read this "Service Manual" and follow its instructions. If repaired wrongly, it may cause a breakage of the equipment or an accident. Especially, be sure to comply with the instructions following the signal words DANGER, WARNING and CAUTION.

V NOTE

In this "Service Manual", the meanings of signal words are defined as follows:

Indicates a direct risk that is predicted to result in death or serious injury, serious property damage such as total loss of equipment and fire if you do not avoid it.

A WARNING

Indicates an indirect risk that is predicted to result in death or serious injury, serious property damage such as total loss of equipment and fire if you do not avoid it.

Indicates a risk that has a potential to result in minor injury or moderate injury, partial damage of equipment and extinction of computer data if you do not avoid it.

A NOTE

Indicates helpful information in using this equipment.



Liquids on this equipment will cause electric shock accident or equipment damage. This equipment is electric equipment. Keep liquids away from this equipment.

Shock hazard. This equipment is electric equipment and has some high-voltage portions inside. Turn off the power of equipment and unplug power cable from electrical outlet before opening cover of equipment for repair work.

▲ DANGER

Some repair works involve risks. Only qualified or trained persons may do repair works.

Some repair works involve risks. Service personnel must give instructions to outsiders to stay away from repair work area.

Do not make alterations to medical electronics equipment!

Alterations by user are prohibited.

Also, relevant pharmaceutical affairs law imposes following regulations on manufacturers.

That is, medical equipments need item-specific approval for manufacture, and "application for partial

modification approval" is required when making functional changes in medical equipments.

So unauthorized alterations are prohibited.

Radiation Protection in Dentistry

Comply with the contents of each clause regarding protection against radiation exposure prescribed in relevant medical regulations when installing and using dental X-ray equipments.

This equipment for radiograph can cause hazard to service personnel if safe exposure conditions and how to use are not complied with.



▲ WARNING

Be sure to sterilize equipment portions to be touched by patient or operator before starting repair work. After completing the repair work, sterilize equipment portions touched by service personnel.

While repairing, do not place anything that can be an obstacle within the range of equipment.

To avoid damages to equipment, measuring instruments, etc. and electric shock, service personnel must not remove covers of equipment except when necessary.

To avoid damages to equipment, measuring instruments, etc. and electric shock, turn off power of equipment and take extra care not to short-circuit with other circuit when connecting lead wire of measuring instrument to a circuit within the equipment during repair work.

To avoid damages to equipment, measuring instruments, etc. and electric shock, be sure to turn off power of equipment and use the parts specified by us when replacing machine parts and electric parts of the equipment.

To avoid X-ray exposure due to carelessness, be sure to install lead plate for X-ray protection on X-radiation aperture of X-ray generator when radiating X-rays during repair work.

Be sure to use positioning attachment specified for each exposure mode when positioning patient.



Be sure to make patient and nursing attendant to wear X-ray protective clothing. (Nursing attendant in this sentence means a person allowed by doctor.)

Be sure to operate X-ray exposure switch from outside of X-ray room.

Operator must instruct patient not to move while X-raying.

Watch patient, nursing attendant and equipment constantly while X-raying, and release X-ray exposure switch immediately if you find something abnormal.

▲ WARNING

Contact the dealer you purchased from when scraping this equipment.

After completing repair work, be sure to turn OFF power for safety.

When X-raying patient after completing repair work, take extra care for patient safety when positioning patient.

Damage etc. inside X-ray generator cannot be repaired on site. Depending on service personnel's judgment, the equipment will be returned to factory for repair or replacement.



Responsibility for managing the use and maintenance of medical equipments lies with the user (hospital or clinic). This equipment must be used by doctor or qualified person only.

As repair or check inside equipment involves risks, contact the company you purchased from.

A WARNING

When earthquake warning is issued, do not use this equipment. After an earthquake, be sure to conduct maintenance check of the equipment and confirm no abnormality before use. Default of the check and/or confirmation can harm patient.

Be sure to set up X-ray examination room and install the equipment body in the X-ray examination room.

Do not place anything that can be an obstacle within the range of equipment movement.

X-raying and approach to equipment must be done under the responsibility of user when repairer, patient, or nursing attendant allowed by doctor has a pacemaker etc.

Be sure to use positioning attachment specified for each exposure mode when positioning patient.

Be sure to make patient and nursing attendant to wear X-ray protective clothing. (Nursing attendant in this sentence means a person allowed by doctor.)

Operator must instruct patient not to move while X-raying.



Be sure to sterilize and disinfect equipment portions touched by patient or operator after X-raying and at daily closing time.

Contact our sales office near you when scraping this equipment.

A WARNING

After using equipment, be sure to turn OFF power for safety.

Keep everyone out of X-ray room except repairer when radiating X-rays for repair.

To avoid equipment failure, do not rotate arm by hand.

Keep patient unmoved until arm reset operation completed after X-raying.

Take extra care for patient safety when positioning patient.

Take extra care for patient safety when moving sliding unit up and down.

Do not look straight at positioning laser beam for your safety. Also, give this caution to patient and nursing attendant.



03. PREPARATION FOR REPAIR WORK

1. Manuals

- This Service Manual on ANA-BEL/CM
- Operation Manual on ANA-BEL/CM

2. Measuring Equipments

- 1) Digital multi-meter
- 2) Oscilloscope
- 3) Lead wire for measurement
- 4) Insulation-resistance meter
- 5) X-ray detecting paper
- 6) Scale

3. Tools

- 1) Phillips-head screwdrivers (Large-size and small-size)
- 2) Flathead screwdriver (Small-size, insulated-type)
- 3) Box drivers (for M3, 4, 5, 6 screws)
- 4) Hexagonal wrench (a set of wrenches)
- 5) Nipper
- 6) Long-nose pliers
- 7) Electric soldering iron (insulated-type), solder
- 8) Taps for thread
- 9) Tap handle
- 10) Electric drill
- 11)Drill
- 12) Crimp tool (for crimping terminal)

4. Jigs for Adjustment

- 1) Test piece for ANA-BEL
- 2) Lead plate with thickness of 3mm or more (for X-ray protection)
- 3) Brass plate filter
- 4) Aluminum filter with thickness of 35mm
- 5) X-ray detecting paper

5. Repair and Service Parts

1) Depending the contents of repair, please prepare necessary boards, parts, wire harness, etc.

6. Other

- 1) Depending the contents of repair, please prepare screws, nuts, crimping terminals, grease, etc.
- 2) Alcohol for disinfection
- 3) Cloth
- 4) Clearing solvent



04. SPECIFICATION

Product Name	Panoramic Radiograph	Panoramic & Cephalometric Radiograph		
	ANA-BEL	ANA-BEL CM		
Model Name	ANA-BEL D (*1)	ANA-BEL D CM (*2)		
Power Voltage	90Vac ~ 132Vac 180Va	ac ~ 264Vac (50/60Hz) 1Ø		
Power	2.	0kW		
High Voltage Generator	High-frequency invo	erter system (100kHz)		
X-ray Tube Voltage	60kV~ 90ł	<v (1kv="" step)<="" td=""></v>		
X-ray Tube Current	2.4.6.8	.10.12mA		
Exposure Control	Ma	anual		
X-ray Tube	D-052SB (made	e by Toshiba Corp.)		
X-ray Tube Focus	0.5×	0.5mm		
Total Filtration	2.5mmA	l (minimum)		
Exposure Mode	Panoramic radiography Child Adult Orthoradial projection Maxillary sinus radiography TMJ Lateral radiography Frontal	Cephalo – Frontal Lateral		
Exposure Time	Panorama : 12sec/7sec Maxillary sinus : 8sec TMJ lateral : 3.0sec(×4) TMJ frontal : 3.0sec(×2)	Cephalo frontal/lateral: 0.12 ~ 3.2sec		
Magnification	Panorama : 1.21 to 1.36 Maxillary sinus : 1.2 to 1.22 TMJ lateral : Approx. 1.24 TMJ frontal : Approx. 1.88	Cephalo frontal/lateral: 1.1		
Beam for Patient Positioning		eams		
Film Size	Panorama: 150×300mm	Cephalo: 8"×10"		
Cassette	Panorama size	Cephalo size		
Dimensions (mm)	W: 980×D:1,246×H:2,310	W:1,833×D:1,246×H:2,310		
Weight	Approx. 160kg	Approx. 190kg		

*1: Equipment for Digital Panorama Radiograph

*2: Equipment for Digital Panorama and Cephalo Radiographs (Cephalo Radiograph: Film Radiograph)



 $\begin{array}{ll} Transportation Environment\\ Temperature: -10 \sim 60^{\circ}C\\ Humidity: 10 \sim 95\%\\ Pressure: 700 \sim 1060 \ hPa \end{array}$



05. EQUIPMENT SETTINGS

Description of Equipment Settings

1. Basic Operation

- 1) Turn on the power of the device.
- 2) After equipment initialization completed, set the X-ray tube voltage setting to "0kV" as follows:
 - Press SELECT key to blink the X-ray tube voltage setting display.
 - Hold down SELECT DOWN key.
- 2) Enable the equipment setting mode as follows:
 - Hold down SELECT key and press READY key.
- 4) Use TECH UP/DOWN key to select the content of equipment setting.
- 5) Use SELECT key to blink the equipment setting display.
- 6) Use TECH UP/DOWN key to determine the content of equipment setting.
- 7) Cancel the equipment setting mode as follows:
 - Hold down SELECT key and press READY key.

2. Mode-specific Operations

- 1) With or Without CEPHALO Setting Mode: OFF/R/L
 - Without Cephalo: OFF
 - With Cephalo on the right: R
 - With Cephalo on the left: L
- 2) PREHEAT Voltage Setting Mode: 0 ~ 255

The mode for setting the tube current reference voltage.

- If decreased the value, the rising of tube current becomes slower.
- If increased the value, the rising of tube current becomes faster.
- 3) EXHIBITION ON/OFF Setting Mode: ON/OFF
 - Operation mode for exhibition
 - When set to ON, if release the equipment setting and press RESET key, the equipment repeats return-to-origin operation and radiography operation.
- 4) XRAY COUNT Display Mode
 - Number of irradiations display mode
 - If press SELECT key and hold down SELECT DOWN key, the number of irradiations will be cleared.
- 5) POWER OFF ON/OFF Setting Mode: ON/OFF

Auto power-off function setting mode

• When set to ON, the power turns off automatically in five minutes after the final key operation.

• When set to OFF, the power will not turn off until turning POWER switch to OFF.



6. TROUBLESHOOTING

1. Unable to Turn On Power

If the surface of circuit protector is bulging and in a "trip" condition, unplug from outlet, wait for 60 seconds or more, and fully insert the plug into the outlet. The plug can be burning hot. Be careful not to get burned.

After eliminating the cause, turn on power again.



- Blowout of MOTOR CPU BOARD fuse F1 (3.15A)
- Check if electric wire is in contact with body of equipment due to breaking, pinching, etc.
- Breaking of electric wire of rotary shaft
- Defective switching power supply
- Defective INV BOARD
- Blowout of MAIN CPU BOARD fuseF1 (3.15A)

2. Arm Doesn't Rotate

- Blowout of MOTOR CPU BOARD fuse F3 (3.15A)
- Defective motor driver
- Defective motor

3. Y-axis Doesn't Move

- Blowout of MOTOR CPU BOARD fuse F2 (3.15A)
- Defective motor driver
- Defective motor

4. Cassette Doesn't Move (ANA-BEL/ANA-BEL CM)

- Blowout of MAIN CPU BOARD fuse F4 (3.15A)
- Defective motor driver
- Defective motor

5. Horizontal Beam Doesn't Move

- Check if it's position for cephalometric radiograph
- Defective REST SW BOARD (when pressing switch makes no sound)
- Defective horizontal beam motor
- Defective microswitch for detecting vertical position
- Defective MOTOR CPU BOARD
- Defective CNK BOARD

6. Focus Beam Doesn't Move

- Check if it's position for cephalometric radiograph
- Defective REST SW BOARD (when pressing switch makes no sound)
- Defective MOTOR CPU BOARD
- Defective CNK BOARD



7. Body Doesn't Move Up and Down

- 1) When operating on Beam Line Operation Panel
 - •Defective REST SW BOARD (when pressing switch makes no sound)
 - Breaking of curl cord
 - Defective sliding unit elevation motor driver
 - Remove the top cover, turn on power and check the blinking interval of driver's LED.
 - Overload protection function (Number of LED blinks: 2 times)
 - 1. Eliminate the cause that hinders the vertical motion (obstacle, overload)
 - 2. Check if pressing operation button makes a sound of brake.
 - When it makes no sound, replace BRAKE BOARD.
 - 3. Replace the driver
 - Open-phase protection function (Number of LED blinks: 3 times)
 - 1. Replace sliding unit elevation motor
 - 2. Replace the driver
 - Overvoltage protection function (Number of LED blinks: 4 times) Undervoltage protection function (Number of LED blinks: 5 times)
 - 1. Check if the voltage between MOTOR CPU BOARD check pins CP1 and CP2 is 24Vdc. When the deviation is large, replace SW power supply.
 - 2. Replace the driver
 - Overspeed protection function (Number of LED blinks: 6 times)
 - Defective MOTOR CPU BOARD and replacement
 - Defective MOTOR CPU BOARD
 - Check that output voltage of CP8 varies while pressing UP/DOWN switch. If it does not vary, replace the board.
- 2) When operating on CM switch
 - Defective CM SW BOARD (when pressing switch makes no sound)
 - Defective sliding unit elevation motor driver Remove the top cover, turn on power and check the blinking interval of driver's LED. After eliminating the cause, turn on power again.
 - Defective MOTOR CPU BOARD Check that output voltage of CP8 varies while pressing UP/DOWN switch.
 - Defective CNK BOARD

8. Primary Slit Doesn't Move

- Blowout of BEAM MOTOR BOARD fuse F1 (3A)
- Defective BEAM MOTOR BOARD
- Defective motor
- Blowout of MAIN CPU BOARD fuse F3 (3.15A)
- Defective MAIN CPU BOARD

9. Head Doesn't Rotate

- Blowout of BEAM MOTOR BOARD fuse F1 (3A)
- Defective BEAM MOTOR BOARD
- Defective motor
- Blowout of MAIN CPU BOARD fuse F2 (3.15A)
- Defective MAIN CPU BOARD



10.Unable to Irradiate X-rays

• Check if MOTOR CPU BOARD D16 and MAIN CPU BOARD D36 light when READY ON.

- Check which red LED of INV BOARD is lit.
 - Error contents

DL1: LV Lights when output voltage drops abnormally such as output short-circuit.

DL2: OV Lights when output voltage rises abnormally

DL3: OC Lights when output current rises abnormally.

DL4: TH Lights when INV BOARD temperature rises abnormally.

Response

DL1: Check the wiring from INV BOARD to head

Check the input voltage between 1 and 2 pins of CN1 when READY ON. 120Vac DL2, DL3: Check between MAIN CPU BOARD check pins CP11 and CP5 (kV),

CP14 and CP5 (PREHEAT), and CP15 and CP5 (mA).

DL4: Turn off power and recheck 30 minutes later.

Table 1	Voltage between	kV	ref	CP11	and	CP5
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	60kV	70kV	80kV	90kV
2mA	2.82	3.27	3.71	4.14
4mA	2.88	3.34	3.78	4.21
6mA	2.94	3.39	3.84	4.31
8mA	3.00	3.45	3.91	4.40
10mA	3.11	3.53	4.00	4.50
12mA	3.19	3.63	4.09	4.60

Table 2 Voltage between mA ref CP15 and CP5 (Tube voltage is optional)

Tube Current	CP15-CP5
2mA	1V
4mA	2V
6mA	3V
8mA	4V
10mA	5V
12mA	6V



07. RESPONSE TO ERROR MESSAGE

When an error occurred in the equipment, the error message appears on the indicator of control panel. Take a measure to resolve the error.

1. CASSETTE: Cassette Mounting Error (ANA-BEL/ANA-BEL CM)

- 1) Film cassette is not mounted on the right position. Mount it on the right position.
- Abnormality of film cassette detection sensor Adjust the sensor position or replace the sensor.

2. CST MT: Cassette Feed Motor Operation Error(ANA-BEL/ANA-BEL CM)

- 1) Abnormality of cassette feed detection sensor Adjust the sensor position or replace the sensor.
- Blowout of MAIN CPU BOARD F4 (3.15A) Replace the fuse.
- 3) Defective motor driver Replace the driver.
- 4) Defective motor Replace the motor.

3. 1COL MT: First Collimator Motor Operation Error

- 1) Abnormality of first collimator detection sensor Adjust the sensor position or replace the sensor.
- Blowout of BEAM MOTOR BOARD F1 (3A) Replace the fuse or BEAM MOTOR BOARD
- Defective motor Replace the motor
- Blowout of MAIN CPU BOARD fuse F3 (3.15A) Replace the fuse. Replace MAIN CPU BOARD.

4. HEAD MT: Head Rotation Motor Operation Error

- 1) Abnormality of head rotation motor detection sensor Adjust the sensor position or replace the sensor.
- 2) Blowout of BEAM MOTOR BOARD F1 (3A) Replace the fuse or BEAM MOTOR BOARD.
- Defective motor Replace the motor.
- Blowout of MAIN CPU BOARD F3 (3.15A) Replace the fuse. Replace MAIN CPU BOARD.

5. CST POS: Cassette Position Error(ANA-BEL/ANA-BEL CM)

- 1) Preparatory operation for radiography is stopped as cassette was moved after getting READY ON.
- 2) Replace MAIN CPU BOARD.



6. INVERTER: Inverter Error

- 1) Check if MOTOR CPU BOARD D16 and MAIN CPU BOARD D36 light when READY ON.
 - 1. When D16 doesn't light
 - Breaking of electric wire of rotary shaft
 - Defective MOTOR CPU BOARD
 - Defective MAIN CPU BOARD
 - 2. When D36 doesn't light
 - Breaking of electric wire of rotary shaft
 - Defective MAIN CPU BOARD
 - Defective MOTOR CPU BOARD
 - 3. When D16 and D36 light
 - Defective K-L1
 - Defective MOTOR CPU BOARD
- 2) Check which red LED of INV BOARD is lit.

Error contents

DL1: LV Lights when output voltage drops abnormally such as output short-circuit.

DL2: OV Lights when output voltage rises abnormally

DL3: OC Lights when output current rises abnormally.

DL4: TH Lights when INV BOARD temperature rises abnormally.

Response

DL1: Check the wiring from INV BOARD to head

Check the input voltage between 1 and 2 pins of CN1 when READY ON. 120Vac When the voltage is lower than 120Vac

- Breaking of electric wire of rotary shaft
- Defective K-L1

DL2, DL3: Check between MAIN CPU BOARD check pins CP11 and CP5 (kV), CP14 and CP5 (PREHEAT), and CP15 and CP5 (mA).

DL4: Turn off power and recheck 30 minutes later.

Table 1 Voltage between KV fel Of 11 and Of 5					
	60kV	70kV	80kV	90kV	
2mA	2.82	3.27	3.71	4.14	
4mA	2.88	3.34	3.78	4.21	
6mA	2.94	3.39	3.84	4.31	
8mA	3.00	3.45	3.91	4.40	
10mA	3.11	3.53	4.00	4.50	
12mA	3.19	3.63	4.09	4.60	

Table 1 Voltage between kV ref CP11 and CP5

Table 2 Voltage between mA ref CP15 and CP5 (Tube voltage is optional)

Tube Current	CP15-CP5
2mA	1V
4mA	2V
6mA	3V
8mA	4V
10mA	5V
12mA	6V



7. THERMAL: Tube Temperature Error

1) As the head temperature is abnormally high, leave the equipment for 30 minutes or more before taking next radiograph.

8. RS CPU: Communication Error with MOTOR CPU BOARD

Check the continuity of rotary shaft harness.
 In the case of breaking, replace the harness, use spare wire as a temporary measure.
 In the case where the continuity exists, replace MOTOR CPU BOARD or MAIN CPU BOARD.

9. Y MT: Y-axis Motor Operation Error

- Abnormality of Y-axis detection sensor Adjust the sensor position or replace the sensor.
- 2) Blowout of MOTOR CPU BOARD F2 (3.15A) Replace the fuse or MOTOR CPU BOARD
- Defective motor driver Replace the motor driver.
- Defective motor Replace the motor.

10. ROT MT: Rotation Motor Operation Error

- Abnormality of rotation detection sensor Adjust the sensor position or replace the sensor.
- Blowout of MOTOR CPU BOARD F3 (3.15A) Replace the fuse or MOTOR CPU BOARD.
- Defective motor driver Replace the motor driver.
- Defective motor Replace the motor.

11. BEAM MT: Indicator Operation Error

When indicator (beam operation portion) is operating

- 1) Replace the sensor.
- When indicator (beam operation portion) is not operating
- 1) Replace the motor.
- 2) Replace MOTOR CPU BOARD.

12. UNIT MT: Planetary Portion Operation Error

- 1) When operating Beam Line Operation Panel
 - Defective sliding unit elevation motor driver Remove the top cover, turn on power and check the blinking interval of driver's LED. After eliminating the cause, turn on power again.
 - Overload protection function (Number of LED blinks: 2 times)
 - 3. Eliminate the cause that hinders the elevation motion (obstacle, overload) 4. Check if pressing operation button makes a sound of brake.
 - When it makes no sound, replace BRAKE BOARD.
 - 3. Replace the driver
 - Open-phase protection function (Number of LED blinks: 3 times)
 - 1. Replace sliding unit elevation motor.
 - 2. Replace the driver.



- Overvoltage protection function (Number of LED blinks: 4 times) Undervoltage protection function (Number of LED blinks: 5 times)
 - Check if the voltage between MOTOR CPU BOARD check pins CP1 and CP2 is 24Vdc.
 - When the deviation is large, replace SW power supply.
 - 2. Replace the driver.
- Overspeed protection function (Number of LED blinks: 6 times)
 - Defective MOTOR CPU BOARD Check that output voltage of CP8 varies while pressing UP/DOWN switch. If it does not vary, replace the board.
- 2) When operating CM switch
 - Defective CM SW BOARD (when pressing switch makes no sound)
 - Defective sliding unit elevation motor driver Remove the top cover, turn on power and check the blinking interval of driver's LED. After eliminating the cause, turn on power again.
 - Defective MOTOR CPU BOARD Check that output voltage of CP8 varies while pressing UP/DOWN switch.
 - Defective CNK BOARD

13. RS PC: Communication Error with PC (ANA-BEL D/ANA-BEL D CM)

Check the continuity of CCD sensor.

When breaking: Replace the harness.

When continuity exists: Replace MAIN CPU BOARD or CCD sensor.

14. RS PC: Communication Error with PC (ANA-BEL D/ANA-BEL D CM)

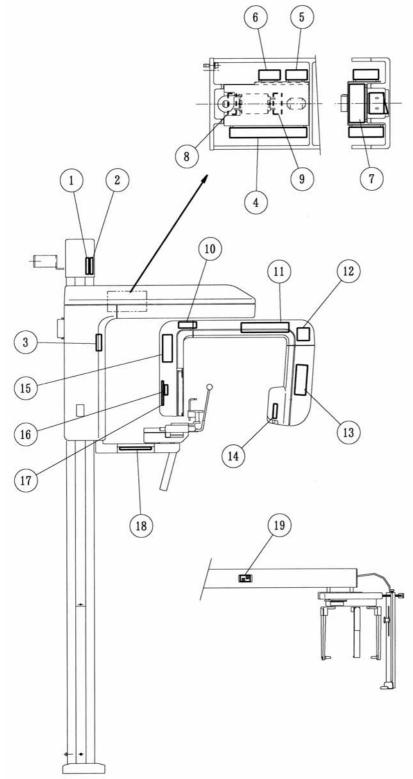
CCD sensor is not initialized: Initialize CCD sensor by personal commuter.



08. PRINTED CIRCUIT BOARD LAYOUT DRAWING

1. Overall View

The printed circuit board assemblies are housed in the portions shown in the drawing.



B04-S151E

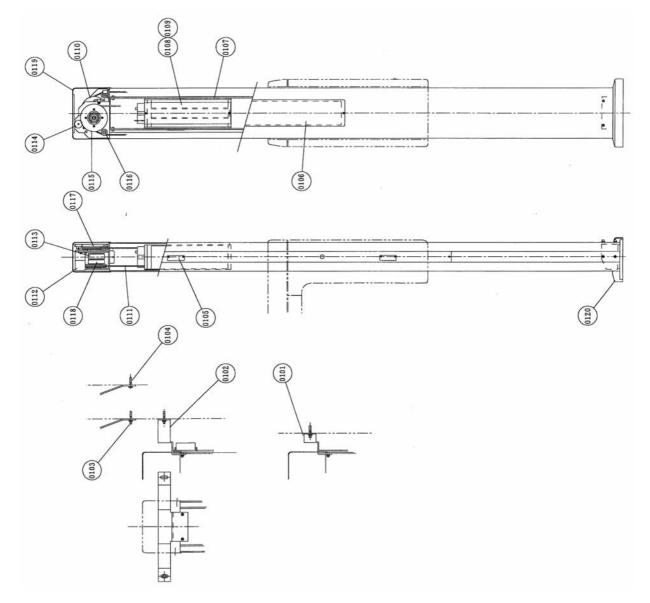


No.	Board Name
1	DC brushless motor driver
2	Brake board
3	CNK board
4	Motor CPU Board
5	Rotation motor driver
6	Y-axis motor driver
7	Switching power supply
8	NF1 board
9	NF2 board
10	Film motor driver (for X-raying using film)
11	High frequency inverter power supply
12	Head swing motor driver
13	High-voltage generator board
14	Collimator motor board
15	Main CPU board
16	LCD indicator
17	Switch board
18	Beam switch board
19	Vertical motion switch board



09. PART LIST

1. Stand



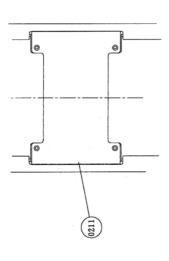


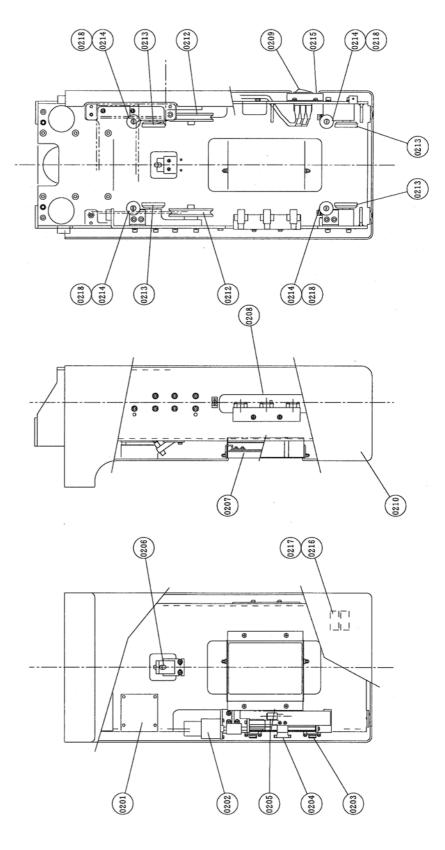
PART LIST: Stand

			Qua	Intity	
No.	Drawing No.	Part Name	ANA-BEL	ANA-BEL CM	Remarks
			ANA-BEL D	ANA-BEL D CM	
0101	408-10311	Bracket for securing to wall	1	-	For ANA-BEL only
0102	408-10312	Bracket for securing to wall	-	1	For ANA-BEL CM
					only
0103	-	High anchor Ø8×50	2	2	Alternative
0104	-	Coach bolt C8-50	2	2	Allemative
0105	408-10304	Visor	2	2	
0106	408-10305	Stand rear cover	1	1	
0107	308-03621	Weight frame	1	1	
0108	408-10398	Weight (A)	2	3	Silver
0109	408-10399	Weight (B)	1	-	Black
0110	408-10326	Brake	1	1	
0111	408-10307	Wire	1	1	
0112	977-79030-04	Brushless motor AXH015K-20	1	1	
0113	977-79030-08	Motor driver board	1	1	
0114	408-10315	Gear (Small)	1	1	
0115	408-10314	Gear (Large)	1	1	
0116	408-10318	Pulley (2)	2	2	
0117	408-10313	Pulley (1)	2	2	
0118	408-10321	Brake board	1	1	
		Stand top cover	1	1	
0120	208-01776-03	Stand bottom cover	1	1	



2. Sliding Unit





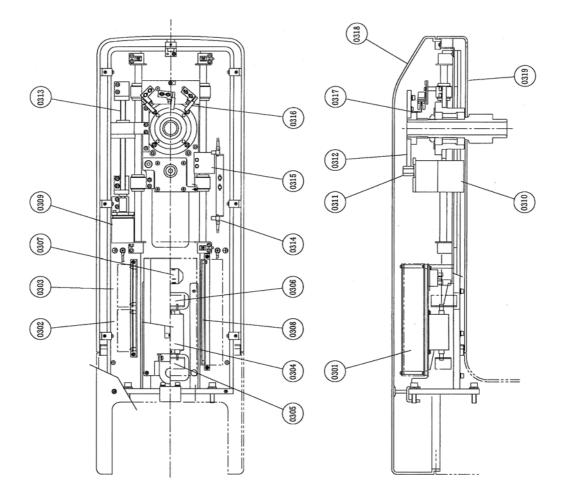


PART LIST: Sliding Unit

			Quantity		
No.	Drawing No.	Part Name	ANA-BEL	ANA-BEL CM	Remarks
			ANA-BEL D	ANA-BEL D CM	
0201	408-10156	CNK board	1	1	
0202	977-60001-07	DC motor TG-38E-LG66	1	1	
0203	964-30012-13	Microswitch ABJ241441	2	2	
0204	408-10296	Dog	1	1	
0205	962-05006	Laser marking projector LDV167LS	1	1	Horizontal beam
0206	962-05003	Laser marking projector LDV167LA	1	1	Median beam
0207	408-08591	Mirror	1	1	
0208	978-60007-02	Photomicrosensor EE-SY671	3	3	
0209	964-28001-02	POWER switch A8G-107-1G-24	1	1	
0210	108-01181	Sliding unit cover	1	1	
0211	408-10309	Rear cover	1	-	
0212	408-09751	Pulley	2	2	
0213	408-05331	Shaft	4	4	Bundled with 0218
0214	408-09751	Roller (2)	4	4	
0215	408-10253	Membrane sheet	1	1	
0216	965-85012-69	Circuit protector 15A	2	2	For 100V-spec.
0217	965-85012-67	Circuit protector 8A	2	2	For 200V-spec.
0218	030-03000-01	Bearing 6000ZZ	4	4	Bundled with 0213



3. Rotation Unit



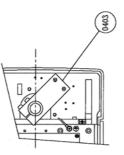


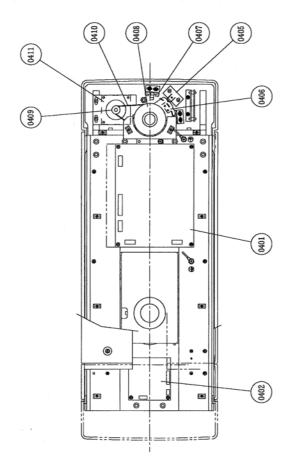
PART LIST: Rotation Unit

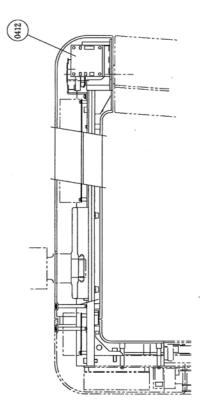
			Quantity		
No.	Drawing No.	Part Name	ANA-BEL ANA-BEL D	ANA-BEL CM ANA-BEL D CM	Remarks
0301	974-80057	Switching power supply AWM-1C150S-24	1	1	
0302	408-09935-02	Motor driver board	1	1	Y-axis
0303	408-09935-03	Motor driver board	1	1	Rotation
0304	975-00003-03	Noise filter GT-215FJ	1	1	
0305	408-08757-00	NF(1) board	1	1	
0306	408-08758	NF(2) board	1	1	
0307	965-60041-17	Relay JM1aN-ZTM-DC24V	2	2	
0308	408-10151	Motor CPU board	1	1	
0309	977-79021-02	Stepping motor PK543-NA	1	1	Y-axis
0310	977-79024-03	Stepping motor PK564AN-TG20	1	1	Rotation
0311	408-10340	Gear (Small)	1	1	
0312	308-02560	Gear (Large)	1	1	
0313	408-09682	Ball screw	1	1	
0314	978-60004-04	Photomicrosensor EE-SX671	2	2	Y-axis
0315	408-10345	Sensor fin (Y)	1	1	Y-axis
0316	978-60004-10	Photomicrosensor EE-SX673	1	2	Rotation
0317	408-10343	Sensor fin (R)	1	1	Rotation
0318	108-01182	Rotation unit cover (Top)	1	1	
0319	108-01183	Rotation unit cover (Bottom)	1	1	



4. Arm









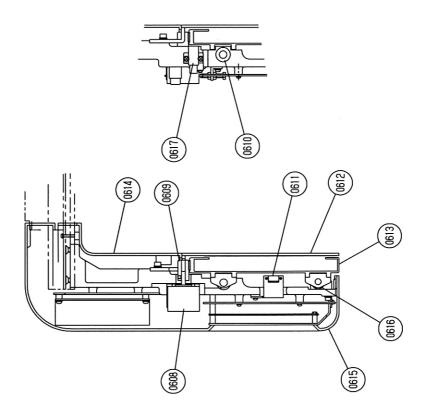
PART LIST: Arm

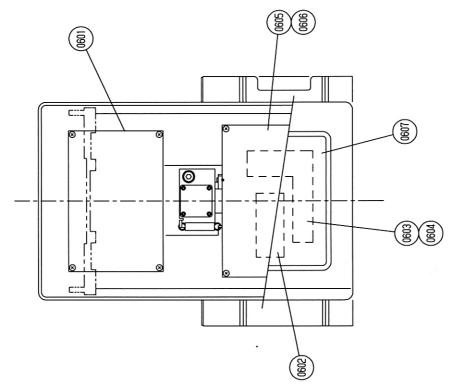
			Quantity		
No.	Drawing No.	Part Name	ANA-BEL ANA-BEL D	ANA-BEL CM ANA-BEL D CM	Remarks
0401	974-10056-01	High-frequency inverter power supply board	1	1	
0402	408-08985-13	Motor driver board	1	1	For film feed
0403	408-10423	Stationary plate	1	-	For ANA-BEL only
0404	408-10416	Angle plate	-	1	For ANA-BEL CM only
0405	937-50022-04	Plunger PBF-10-KSN	-	1	For ANA-BEL CM only
0406	408-10419	Sensor fin	-	1	For ANA-BEL CM only
0407	978-60004-07	Photomicrosensor EE-SX672	-	2	For ANA-BEL CM only
0408	408-10415	Pulley (Large)	-	1	For ANA-BEL CM only
0409	408-10414	Pulley (Small)	-	1	For ANA-BEL CM only
0410	932-21005-18	Timing belt B 100 S 3M 252	-	1	For ANA-BEL CM only
0411	977-79031-05	Stepping motor PK266M-02A	-	1	For ANA-BEL CM only
0412	408-07586-00	Motor driver board	-	1	For ANA-BEL CM only



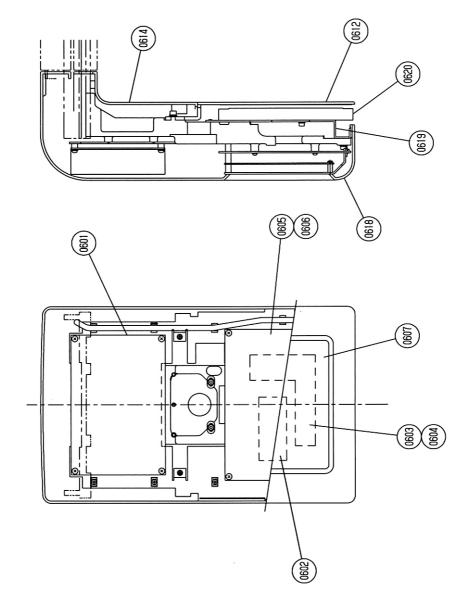
5. Cassette Holder

🛛 Film Type





Digital Type



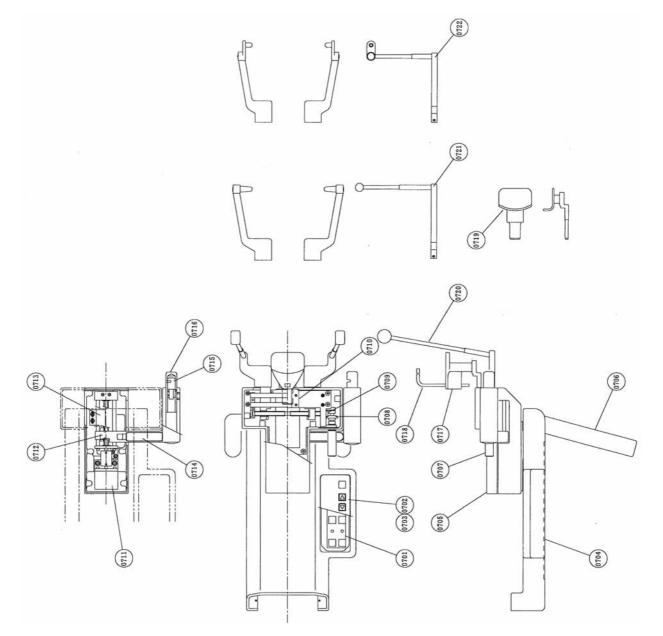


PART LIST: Cassette Holder

			Quantity				
No.	Drawing No.	Part Name	ANA-BEL	ANA-BEL CM	ANA-BEL D	ANA-BEL CM	Remarks
0601	408-10145	Main CPU board	1	1	1	1	
0602	408-10365	LCD indicator	1	1	1	1	
0603	408-10154-0 1	Switch board	1	-	1	-	For ANA-BEL only
0604	408-10154-0 2	Switch board (CM)	-	1	-	1	For ANA-BEL CM only
0605	308-03585	Frame	1	-	1	-	For ANA-BEL only
0606	308-03586	Frame (CM)	-	1	-	1	For ANA-BEL CM only
0607	308-03584	Membrane sheet	1	1	1	1	
0608	977-79011-0 3	Stepping motor	1	1			PK-544A
0609	408-10432	Pulley	1	1			
0610	931-70064-0 6	Linear ball bearing	2	2			LM10L (Holds upper side)
0611	978-60007-0 2	Photomicrosensor EE-SY671	1	1			For cassette presence detection
0612	308-03618	Secondary slit	1	1	1	1	
0613	208-02076	Cassette frame	1	1			
0614	108-01186	Cassette cover (Front)	1	1	1	1	
0615	108-01187	Cassette cover (Rear)	1	1			
0616	108-01188	Linear ball bearing	1	1			LM8L (Holds lower side)
0617	978-60011-0 3	Photomicrosensor EE-SPY312	1	1			For cassette frame origin detection
0618	108-01223	Cassette cover (Rear A)			1	1	
0619	308-03764	Sensor bracket (A)			1	1	
0620	988-50092	Digital sensor			1	1	



6. Chinrest Unit

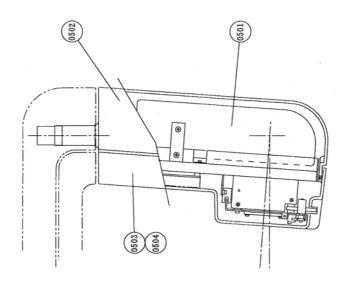


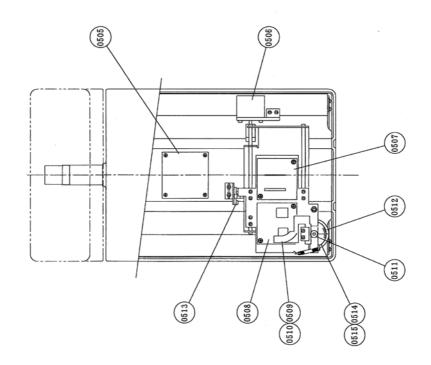


PART LIST: Chinrest Unit

			Quantity		
No.	Drawing No.	Part Name	ANA-BEL ANA-BEL D	ANA-BEL CM ANA-BEL D CM	Remarks
0701	408-10152	Switch board	1		
0702	408-10379	Frame	1		
0703	408-10331	Membrane sheet	1		
0704	408-10381	Bottom cover	1		
0705	108-01188	Holding portion cover	1		
0706	408-10380	Handle	2		
0707	408-06071	Knob	1		
0708	408-06081	Gear (Large)	1		
0709	408-06082	Gear (Small)	1		
0710	408-10396	Holder guide	1		
0711	977-79010-05	Stepping motor	1		PX243-03A
0712	978-60011	Proximity sensor	1		APS4-12S
0713	408-10387	Sensor fin	1		
0714	408-10388	Lid	1		
0715	962-05006	Laser marking projector	1		LDV167LS
0716	408-09316	Beam projector mount	1		
0717	308-02261	Rest for bite	1		
0718	408-05861	Bite fork	1		
0719	408-05083-02	Rest for maxillary sinus	1		
0720	308-03599-01/-0 2	Head holding rod	1set		
0721	308-03600-01/-0 2	Ear rod for TMJ lateral	1set		
0722	308-03601-01/02	Ear rod for TMJ frontal	1set		

7. Head





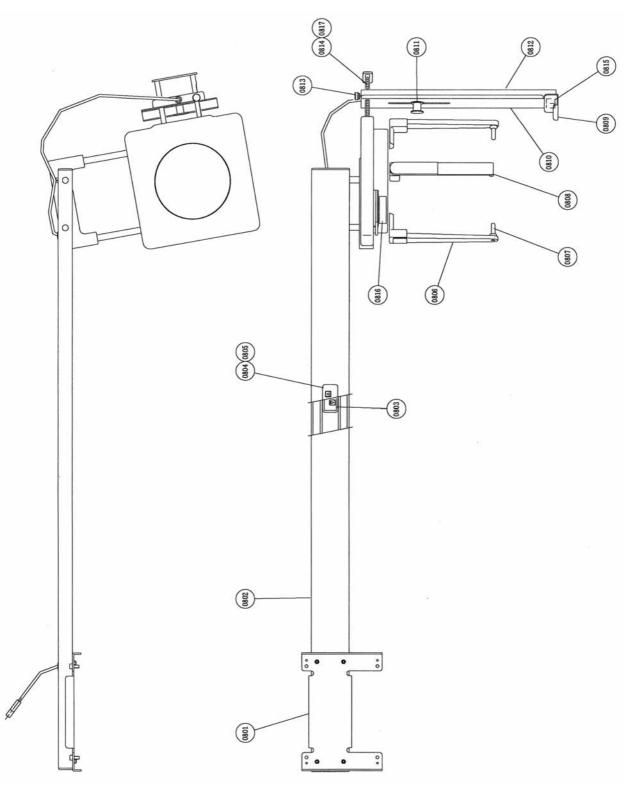


ART LIST: Head

				Quantity		
				Quantity With CM (Right)		
No.	Drawing No.	Part Name			With CM (Left)	Remarks
	J J J J		ANA-BEL ANA-BEL D	ANA-BEL CM ANA-BEL D CM	ANA-BEL CM ANA-BEL D CM	
050 1	108-01177	X-ray generator Assy	1	1	1	
050 2	108-01179	Generator cover (Rear)	1	1	1	
050 3	108-01178-0 1	Generator cover (Front)	1	-	-	For ANA-BEL only
050 4	108-01178-0 2	Generator cover (Front)	-	1	1	For ANA-BEL CM only
050 5	408-07586-0 2	Motor driver board	1	1	1	
050 6	977-79010-0 5	Stepping motor	1	1	1	PK243-03A
050 7	408-10274	Mask (Panorama)	1	1	1	
050 8	408-10275	Mask (Cephalo)	-	1	1	For ANA-BEL CM only
050 9	408-10281	Soft tissue filter	-	1	-	For models with CM on the right
051 0	408-10329	Soft tissue filter		-	1	For models with CM on the left
051 1	408-10280	Gear	-	1	1	For ANA-BEL CM only
051 2	408-10276	Knob	-	1	1	For ANA-BEL CM only
051 3	978-60004-1 3	Photomicrosensor	1	1	1	EE-SX674
051 4	408-10261	Dial	-	1	-	For models with CM on the right
051 5	408-10328	Dial	-	-	1	For models with CM on the left



8. Cephalometric Radiography Unit





PART LIST: Cephalometric Radiography Unit

	•		Qua	Intity	
No.	Drawing No.	Part Name	With CM (Right)		Remarks
110.	Drawing No.	i alt Name	ANA-BEL CM	ANA-BEL CM	romano
			ANA-BEL D CM	ANA-BEL D CM	
	408-10243	Mounting plate	1	1	
0802	308-03556	Arm	1	1	
0803	408-10162	Switch board	1	1	
0804	408-10247	Frame	1	1	
0805	408-10246	Membrane sheet	1	1	
0806	408-05027	Ear rod arm	2	2	
0807	408-05028	Ear rod	2	2	
0808	408-07440	Nasion holding pad	1	1	
0809	308-03503	Holder body	1	1	
0810	408-10119-02	Front panel	1	1	
0811	408-06099	Cassette retainer	1	1	
0812	308-03558	Holder cover	1	1	
0813	408-10093-01	Fixing knob	1	1	
0814	408-09711-02	Scale	1	-	For models with
					CM on the right
0815	978-60007-01	Photomicrosensor	2	2	EE-SY671
0816	408-02531-03	Label	1	1	
0817	408-09711-01	Scale	-	1	For models with
					CM on the left



10. MAINTENANCE CHECK

High voltage is applied to some parts inside the equipment. Take extra care when removing the case of equipment.

Before beginning repair work, turn OFF the power of equipment and unplug from electrical outlet. After unplugged the equipment, wait for 10 minutes or more before starting a repair work.

Specialized knowledge, experience and special measuring instruments are required to check this equipment. To maintain the performance of equipment, please perform daily check (with eyes) and implement periodic maintenance by dealer service personnel.

Dental X-ray Equipment Maintenance Check List

		Maintenance by service personnel: 1 or 2 times/	year
Check Item	Purpose of Check	Contents of Check	Method
Electricity Condition	Check power supply voltage range	Check the compatibility between the power supply voltage connected to the equipment and the specified voltage for the equipment.	
Appearance and Indication	(1) Appearance of equipment	a. Deformation, flaw, nameplate b. Cautions	0
indication	(2) Inside of equipment	Check defacement and dust.	0
	Temperature, humidity, gas	Check the compatibility of environmental ambient of the place where the equipment will be used.	•
	Levelness of equipment	Check the effect on the equipment	•
Installation Place	Floor and equipment stabilizing condition	Check vibration and movement stability of the equipment.	•
	Check obstacles	Check that there is no obstacle within the movement range of the equipment.	0
	Rust development condition	Check the condition of rust development functional safety.	0
Operation Test	Operation test before check	Check operating condition of the equipment.	۲
Operation Test	Operation test after check	Check operating condition of the equipment.	۲
	Insulation resistance	Check resistance between power line and the earth.	•
Safety Test for Electric Shock	Leaked current from the outer cover	Check the current leaking from the outer cover of the equipment to the earth.	•
	Earthing resistance	Check the resistance between exposed metal portion of the equipment and the earthing point.	
	Resistance of earthing wire	Check the resistance between the earth terminal of the equipment and earthing point.	•



Check Item	Purpose of Check	Contents of Check	Method	
	Check operation of power supply circuit	Check the voltage of power supply circuit.		
	Check operation of radiographic circuit	Check the operating waveform and setting values of control circuit.	•	
Operation Accuracy of	Check operation of operation circuit	Check operation of operation sequence.		
Equipment	Accuracy of positioning mechanism	Check deterioration of the positioning mechanism.		
	Check operation of protection circuit	Check the setting values and operating condition of protection circuit.		
	Check operating condition indicator	Check the circuit function to indicate the operating condition.	•	
Indication during X-ray irradiation	Check irradiation of X-ray and the indication are in sync	Check the operation of indicator during X-ray irradiation.	۲	
	X-ray tube housing	Check leakage of insulating oil.		
	Low voltage cable	Check wear, flaw, tension and twist.	0	
X-ray Generator	Irradiation cone	Check looseness, deformation and damage.	0	
	Filter	Check coming off and damage.	0	
	Slit Plate (Collimator)	Check off-alignment of irradiation field and irradiation width.	0	
Radiographic	Rotation and movement of X-ray generator	Check slip, abnormal sound and stopping accuracy.		
Mechanism	Movement of arm Patient positioning mechanism	Play, looseness, operationality and stability.	•	
	Light for positioning	Check the brightness and position accuracy.		
	Wire rope	Check breaking of wire and end portion.	0	
Flovating	Braking mechanism	- Check the movement.		
Elevating Mechanism	Electromagnetic lock			
	Upward and downward movement condition	Check smoothness of movement	0	
	X-ray tube voltage	Check X-ray tube voltage.		
X-ray Output	X-ray tube current	Check X-ray tube current.		
	Exposure time	Check exposure time.		

Symbol	Checking Method
0	Check with eyes
•	Check by using measuring instruments etc.
۲	Check by operating the equipment.



11. CONTACT INFORMATION

Please contact our sales office or a distributor near you.

Belmont Equipment

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