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 CORPORATION
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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APPENDIX : ELECTRIC BLOCK DIAGRAM
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 radiographs.

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.

6. 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 three 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.

8. 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.
02. WARNINGS

⚠️ WARNING
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.

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

⚠️ DANGER
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.

⚠️ 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.

⚠️ CAUTION
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.

💡 NOTE
Indicates helpful information in using this equipment.
**DANGER**
Liquids on this equipment will cause electric shock accident or equipment damage. This equipment is electric equipment. Keep liquids away from this equipment.

**DANGER**
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.

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

**WARNING**
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.

**WARNING**
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.

**WARNING**
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.

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

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

⚠️ WARNING
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.

⚠️ WARNING
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.

⚠️ WARNING
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.

⚠️ WARNING
Be sure to use positioning attachment specified for each exposure mode when positioning patient.
**WARNING**
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.)

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

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

**WARNING**
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.

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

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

**CAUTION**
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.
**WARNING**
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.

**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.

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

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

**WARNING**
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.

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

**WARNING**
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.)

**WARNING**
Operator must instruct patient not to move while X-raying.
WARNING
Be sure to sterilize and disinfect equipment portions touched by patient or operator after X-raying and at daily closing time.

WARNING
Contact our sales office near you when scraping this equipment.

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

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

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

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

CAUTION
Take extra care for patient safety when positioning patient.

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

CAUTION
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 Bel-Cypher N
   - Operation Manual on Bel-Cypher N

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 Bel-Cypher N
   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

<table>
<thead>
<tr>
<th><strong>Product Name</strong></th>
<th>Panoramic Radiograph</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model Name</strong></td>
<td>Bel-Cypher N</td>
</tr>
<tr>
<td><strong>Power Voltage</strong></td>
<td>120Vac 60Hz</td>
</tr>
<tr>
<td><strong>Power Capacity</strong></td>
<td>11A</td>
</tr>
<tr>
<td><strong>High Voltage Generator</strong></td>
<td>High-frequency inverter system (100kHz)</td>
</tr>
<tr>
<td><strong>X-ray Tube Voltage</strong></td>
<td>60kV~80kV (1kV step)</td>
</tr>
<tr>
<td><strong>X-ray Tube Current</strong></td>
<td>2 to 8mA (2mA step)</td>
</tr>
<tr>
<td><strong>Exposure Control</strong></td>
<td>Manual</td>
</tr>
<tr>
<td><strong>X-ray Tube</strong></td>
<td>D-052SB (made by Toshiba Corp.)</td>
</tr>
<tr>
<td><strong>X-ray Tube Focus</strong></td>
<td>0.5mm</td>
</tr>
<tr>
<td><strong>Total Filtration</strong></td>
<td>2.8mmAl (minimum)</td>
</tr>
</tbody>
</table>

#### Exposure Mode
- **Panoramic radiography**
  - Adult
  - Child
- **TMJ Lateral 4 sections**
- **Panoramic Bitewing**
  - Adult
  - Child

#### Exposure Time
- **Panorama**: 10 sec
- **Panoramic Bitewing**: 4.6 sec
- **TMJ Lateral 4 sections**: 2.5 sec (X4)

#### Magnification
- **Panorama**: 1.2 to 1.3
- **Panoramic Bitewing**: 1.2 to 1.3
- **TMJ Lateral 4 sections**: 1.2

#### Beam for Patient Positioning
- 3 beams

#### Dimensions (mm)
- W: 906 x D:1,126 x H:2,200

#### Weight
- Approx. 364lb (165kg)
System Requirements
Temperature : 5 ~ 35°C
Humidity : 30 ~ 85%
Pressure : 700 ~ 1060 hPa

Storage Environment
Temperature : −10 ~ 60°C
Humidity : 10 ~ 95%
Pressure : 700 ~ 1060 hPa

Transportation Environment
Temperature : −10 ~ 60°C
Humidity : 10 ~ 95%
Pressure : 700 ~ 1060 hPa
6. TROUBLESHOOTING

6.1 Unable to Turn On Power

Follow "No" if problem is not resolved

Check Fuse F1, F2 on the rotation Unit

YES
Replace Fuse

NO
Refer (09-2/12<133>)

Unplug Power code. Measure the resistance value between CP1 –CPGG. Does resistance value exceed 100 ohm?

YES
Check the resistance value of each line that exceeds 100 ohm by disconnecting connector on CPU

NO
Refer (09-4/12<302>)

Check F1 on CPU Board

YES
Replace CPU Board

NO
Refer (09-4/12<302>)

Check the voltage between CP1&CPGG (+24Vdc) on CPU Board

YES
Replace CPU Board

NO
Refer (09-4/12<302>)

Check connection between Switching Power Supply Unit and CPU Board

YES
Secure connections

NO

Replace Power Board 5

NO
Refer (09-2/12<140>)

Replace Switching Power Supply Unit

Refer (09-2/12<135>)
6.2. Arm doesn't rotate

- **Check the Structure of Rotation Mechanism**
  - **YES** → Adjust Rotation Mechanism
  - **NO** → Refer (09-1/12)

- **Check the connection of wires and connectors between motor, sensor and motor board**
  - **YES** → Secure connections
  - **NO** → Refer (09-2/12)

- **Check the movement of photo micro sensor. Is the surface of a sensor clean?**
  - **YES** → Clean the surface of a sensor. Or replace a sensor.
  - **NO** → Refer (09-2/12<127>)

- **Check the resistance value between two pins (BK-BL, BL-RD, RD-OR, OR-GN & GN-BK) Are resistance values**
  - **YES** → Replace Rotation
  - **NO** → Refer (09-2/12<101>)

- **Replace Rotation Pulse Motor Board**

Refer (09-2/12<136>)

Refer (09-6/12<302>)
6.3. Y-axis Doesn't Move

Check ball screw on Y-axis

- YES: Adjust ball screw
- NO: Refer (09-2/12(115))

Check the connection of wires and connectors between motor, sensor and motor board

- YES: Secure connections
- NO: Refer (09-2/12)

Check the movement of photo micro sensor. Is the surface of a sensor clean?

- YES: Clean the surface of a sensor. Or replace a sensor
- NO: Refer (09-2/12(124))

Check the resistance value between two pins (BK-BL, BL-RD, RD-OR, OR-GN & GN-BK) Are resistance values

- YES: Replace Rotation Motor
- NO: Refer (09-2/12(121))

Replace Pulse Motor Board for Y-Axis

- YES: Replace CPU Board
- Refer (09-2/12(136))
- Refer (09-2/12(127))
6.4. Tube Temperature Error, Unable to irradiate X-Ray

Does LED D14 on CPU Board lit up?  
YES → Replace CPU Board

NO → Refer (09-6/12(302))

Confirm the connection between CN4 and 14 pin on CPU Board

NO → Refer (09-6/12(302))

YES → Secure connections

YES → Wait till Tube Temperature cools down

NO → Measure Tube Temperature

YES → Replace Thermal Sensor

Refer (09-4/12(215))
6.5. **Positioning Beam Doesn't Lit**

Unplug Power code. Measure the resistance value between CP4–CPCG on CPU Board. Does resistance value exceed 500 ohm?

- **NO** Refer (09-2/12<127>)
- **YES** Check the resistance value of each line that exceeds 500 ohm by disconnecting connector connected to Laser Marking Projector.

Check the voltage between CP4&CPCG (+3.5Vdc) on CPU Board

- **NO** Refer (09-2/12<127>)
- **YES** Replace CPU Board

Confirm connection between CPU Board and each Laser Marking Projectors

- **NO** Refer (09-2/12<127>)
- **YES** Secure connections

Replace laser beam that doesn't lit
6.6. Unable to Irradiate X-rays

Is Red LED on Inverter Board “ON”?

YES

Check the Fuse (F1) on Inverter Board

NO

Replace Inverter Board

NO

Confirm connections between Inverter Board and X-Ray generator
CN4.1〜F0
CN4.2〜F1
CN4.3〜F2
Confirms connection of wire harnesses and connectors on CN6 line (Inverter Board and CPU Board)

YES

Are wiring connections on Inverter Board OK?

NO

Secure connections

YES

At the Ready condition, check the incoming voltage between 1 & 3 pin on CN3. Is incoming Voltage OK?

NO

Replace Inverter Board

YES

Check Fuse F1 & F2 on Rotation section

NO

*A) Replace Fuse

YES

At the Ready condition, does D15 lit up?

NO

Replace CPU Board

YES

At the Ready condition, does +24Vac come on both ends of D3 on power Board5?

NO

Check wire harness between CPU Board and Power Board 5

YES

Does K-C relay on CPU Board work at the Ready Condition?

NO

Replace Power Board 5

YES

Check the voltage between CP13 – CPCG on CPU Board
(Voltage should be)
60kV: 3.00Vdc(±0.02V)
70kV: 3.50Vdc(±0.02V)
80kV: 4.00Vdc(±0.02V)

NO

Replace CPU Board

YES

*B) Check the voltage between CP14 – CPCG on CPU Board
(Voltage should be)
2mA: 0.80Vdc(±0.10V)
4mA: 2.00Vdc(±0.20V)
6mA: 3.00Vdc(±0.30V)
8mA: 4.00Vdc(±0.40V)

NO

Replace CPU Board

YES

Replace Inverter Board

NO

Replace X-Ray Head

Remarks: *A) If fuse is replaced, always check *B).

When part is replaced, always confirms Tube current and feedback voltage of X-ray tube.
6.7. Exposure Switch doesn’t work

- **Does LED D22 on CPU Board lit up?**
  - **YES** → Replace Exposure Switch
  - **NO** → Keep on pushing ON/OFF of an Exposure switch. Check with Multi Meter.

- **Keep on pushing ON/OFF of an Exposure switch. Check with Multi Meter.**
  - **YES** → Replace Exposure Switch
  - **NO** → Replace CPU Board

- **Confirm connection between Exposure switch and CPU Board**
  - **NO** → Secure connections of wire harness and connectors
  - **YES** → Replace Exposure Switch
6.8. Communication Error between PC and Main CPU Board

- Confirm connection between CPU Board and PC
  - Yes
  - No → Secure connection of Wire harnesses and Connectors
- Replace CPU Board
  - No → Repair PC
7. RESPONSE TO ERROR MESSAGE

When an error occurred in the equipment, the error message appears on the PC Screen. Take a measure to resolve the error.

1. **Inverter Error**
   Follow the Trouble Shooting 6.6. Unable to Irradiate X-rays

2. **Tube Temperature Error**
   Follow the Trouble Shooting 6.4. Tube Temperature Error, Unable to irradiate X-Ray

3. **Y Axis Motor Error**
   Follow the Trouble Shooting. 6.3. Y-axis Doesn’t Move

4. **Rotation Motor Error**
   Follow the Trouble Shooting. 6.2. Arm doesn’t rotate

5. **X-Ray Switch Error**
   Follow the Trouble Shooting. 6.7 Exposure Switch doesn’t work

6. **Communication Error between PC and Main CPU**
   Follow the Trouble Shooting. 6.8. Communication Error between PC and Main CPU Board
**Adjustment of Tube Current**

Preheat level can be adjusted by RV1 (Adjusting Resistor) on Inverter Board.

Adjusting Method:
1. Hit & Hold CTL+ALT+T to get into Test mode.
2. Click Rest on PC Screen
3. Set Exposure conditions as Panorama, Adult, 70kV & 4mA
4. Click Ready on PC Screen
5. Confirms wave shown on the oscilloscope.

Connect probes of storage oscilloscope to CP12 and CPCG on CPU Board.

Adjust RV1 on Inverter Board to change preheat level.

To rise preheat turn the knob to CW direction. If Inverter Error occurs, turn the knob to CCW direction.

6. When adjustment is completed, hit & hold CTL+ALT+T to get out from Test mode.

7. After adjustment is done, confirm voltage is set within ranges.

<table>
<thead>
<tr>
<th>Measuring Point</th>
<th>Tube Voltage</th>
<th>Tube Current</th>
<th>Measured Voltage (Vdc)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between CP12 &amp; CPCG on CPU Board</td>
<td>7 0</td>
<td>2</td>
<td>1.0±0.1Vdc</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>2.0±0.1Vdc</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6</td>
<td>3.0±0.1Vdc</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8</td>
<td>4.0±0.1Vdc</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measuring Point</th>
<th>Tube Voltage</th>
<th>Tube Current</th>
<th>Measured Voltage (Vdc)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between CP11 &amp; CPCG on CPU Board</td>
<td>6 0</td>
<td>8</td>
<td>3.0±0.1Vdc</td>
</tr>
<tr>
<td></td>
<td>7 0</td>
<td></td>
<td>3.5±0.1Vdc</td>
</tr>
<tr>
<td></td>
<td>8 0</td>
<td></td>
<td>4.0±0.1Vdc</td>
</tr>
</tbody>
</table>
8. PRINTED CIRCUIT BOARD LAYOUT DRAWING

1. Overall View

The printed circuit board assemblies are housed in the portions shown in the drawing.
1.1 Rotation Unit
1.2 Arm Section (High Voltage Inverter side)
1.3 Arm Section (Digital Sensor side)
1.4 Sliding Unit

SW BOARD
9. Parts List

1. Rotation Unit
<table>
<thead>
<tr>
<th>NO.</th>
<th>Drawing No.</th>
<th>Part Name</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>0101</td>
<td>977-79024-03</td>
<td>Motor(PK564AN-TG20)</td>
<td>1</td>
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<tr>
<td>0102</td>
<td>408-09683</td>
<td>Gear(Small)</td>
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<td>0103</td>
<td>308-03385</td>
<td>Gear(Large)</td>
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<td>0104</td>
<td>308-03302</td>
<td>Boss(B)</td>
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<td>0105</td>
<td>408-07104</td>
<td>Key</td>
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<td>0106</td>
<td>923-92004-08</td>
<td>Fine U-Nut(FU07SC)</td>
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<td>0107</td>
<td>930-00017-04</td>
<td>Bearing(6007ZZ)</td>
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<td>0108</td>
<td>308-03359</td>
<td>Boss</td>
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<td>0109</td>
<td>308-03360</td>
<td>Axis Suspension</td>
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<td>308-03352</td>
<td>Base</td>
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<td>408-09671</td>
<td>Pillow Block(2)</td>
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<td>0112</td>
<td>408-11348</td>
<td>Shaft</td>
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<td>931-03004-07</td>
<td>Linear Ball Bearing (LM-13)</td>
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<td>408-09672</td>
<td>Bearing Holder</td>
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<td>0115</td>
<td>931-50011</td>
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<td>Mounting Plate</td>
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<td>408-11351</td>
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<td>932-41003-06</td>
<td>Coupling(NB-08)</td>
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<td>0121</td>
<td>977-79021-05</td>
<td>Motor(PK545-NA)</td>
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<td>408-09669</td>
<td>Motor Bracket</td>
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<td>0123</td>
<td>408-09679</td>
<td>Motor Base</td>
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</tr>
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<td>0124</td>
<td>978-60004-04</td>
<td>Photo micro sensor (EE-SX672)</td>
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<tr>
<td>0125</td>
<td>408-11350</td>
<td>Sensor Bracket (B)</td>
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<td>408-11350</td>
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<td>978-60004-07</td>
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<td>408-09678</td>
<td>Sensor Bracket (A)</td>
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<td>075-08003-03</td>
<td>Noise Filter (ESD-R-38D)</td>
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<td>0130</td>
<td>975-00003-03</td>
<td>Noise Filter (GT215J)</td>
<td>1</td>
</tr>
<tr>
<td>0131</td>
<td>408-08757-03</td>
<td>NFI Board Assy</td>
<td>1</td>
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<tr>
<td>0132</td>
<td>408-11782</td>
<td>Bracket</td>
<td>1</td>
</tr>
<tr>
<td>0133</td>
<td>965-85022</td>
<td>Circuit Protector (IN-1-A8E-13-1B)</td>
<td>2</td>
</tr>
<tr>
<td>0134</td>
<td>937-38018-68</td>
<td>Spacer(ASB-395)</td>
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</tr>
<tr>
<td>0135</td>
<td>974-80061-01</td>
<td>Switching Power Supply (PM110-14A)</td>
<td>1</td>
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<tr>
<td>0136</td>
<td>977-79023-01</td>
<td>Driver(SD5107P)</td>
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<tr>
<td>0137</td>
<td>408-11345</td>
<td>Bracket</td>
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<td>0138</td>
<td>408-09680</td>
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<tr>
<td>0139</td>
<td>408-09551</td>
<td>CNI Board</td>
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<td>0139-01</td>
<td>972-05052-09</td>
<td>F2 FUSE 4A 125V</td>
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<td>0140</td>
<td>408-11364</td>
<td>Power Board 5 Assy</td>
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<tr>
<td>0141</td>
<td>937-38026-10</td>
<td>Spacer(BSF655)</td>
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<tr>
<td>0142</td>
<td>108-01244</td>
<td>Rotation unit cover (1)</td>
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<tr>
<td>0143</td>
<td>108-01245</td>
<td>Rotation unit cover (2)</td>
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</table>
2 Arm Section (High Voltage Inverter side)
<table>
<thead>
<tr>
<th>No.</th>
<th>Drawing No.</th>
<th>Part Name</th>
<th>Quantity</th>
</tr>
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<tbody>
<tr>
<td>0201</td>
<td>208-02025</td>
<td>X-ray generator Assy</td>
<td>1</td>
</tr>
<tr>
<td>0202</td>
<td>974-80052-00</td>
<td>Inverter Board</td>
<td>1</td>
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<tr>
<td>0202-01</td>
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<td>F1 Fuse 15A 125V</td>
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</tr>
<tr>
<td>0203</td>
<td>075-08003-01</td>
<td>Line Filter</td>
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<tr>
<td>0204</td>
<td>408-07867</td>
<td>Fan Bracket</td>
<td>1</td>
</tr>
<tr>
<td>0205</td>
<td>942-60019-04</td>
<td>Fan 109R (109R0624H402)</td>
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</tr>
<tr>
<td>0206</td>
<td>942-60013-03</td>
<td>Fan Guard (FG6B)</td>
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<tr>
<td>0207</td>
<td>408-11368</td>
<td>Fixing Plate for Front Panel</td>
<td>1</td>
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<tr>
<td>0208</td>
<td>408-11366</td>
<td>Shielding Tube</td>
<td>1</td>
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<tr>
<td>0209</td>
<td>408-07408</td>
<td>Filter</td>
<td>1</td>
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<tr>
<td>0210</td>
<td>408-11365</td>
<td>Shielding lead</td>
<td>1</td>
</tr>
<tr>
<td>0211</td>
<td>308-03924</td>
<td>Tube</td>
<td>1</td>
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<td>0212</td>
<td>408-11367</td>
<td>Mask</td>
<td>4</td>
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<td>0213</td>
<td>208-02141</td>
<td>Head Cover (2)</td>
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<td>0214</td>
<td>208-02142</td>
<td>Head Cover (1)</td>
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<td>0215</td>
<td>961-00020-54</td>
<td>Thermal Guard (OHD3-55B)</td>
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3 Arm Section (Digital Sensor side)
<table>
<thead>
<tr>
<th>No.</th>
<th>Drawing No.</th>
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<tbody>
<tr>
<td>0301</td>
<td>988-50201</td>
<td>Digital Sensor</td>
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<tr>
<td>0302</td>
<td>408-10713</td>
<td>CPU Board Assy</td>
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</tr>
<tr>
<td>0302-01</td>
<td>972-05052-03</td>
<td>F1 FUSE 1A 125V</td>
<td>1</td>
</tr>
<tr>
<td>0302-02</td>
<td>972-05052-03</td>
<td>F2 FUSE 1A 125V</td>
<td>1</td>
</tr>
<tr>
<td>0302-03</td>
<td>972-05052-05</td>
<td>F3 FUSE 2A 125V</td>
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<td>0302-04</td>
<td>972-05052-07</td>
<td>F4 FUSE 3A 125V</td>
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<td>0302-05</td>
<td>972-05052-07</td>
<td>F5 FUSE 3A 125V</td>
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<td>0303</td>
<td>308-03920</td>
<td>Laser marking projector Assy</td>
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<td>0304</td>
<td>408-11361</td>
<td>Logo sheet</td>
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<td>0305</td>
<td>208-02138</td>
<td>Frame</td>
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<td>0306</td>
<td>408-09709</td>
<td>Secondary Slit</td>
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<td>0307</td>
<td>408-11356</td>
<td>Holder</td>
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<tr>
<td>0308</td>
<td>108-01246</td>
<td>Sensor Cover (1)</td>
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<tr>
<td>0309</td>
<td>108-01246</td>
<td>Sensor Cover (2)</td>
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</table>
4 Sliding Unit
<table>
<thead>
<tr>
<th>No.</th>
<th>Drawing No.</th>
<th>Part Name</th>
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</tr>
</thead>
<tbody>
<tr>
<td>0401</td>
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<td>Laser marking projector Assy</td>
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<tr>
<td>0402</td>
<td>308-03373</td>
<td>Laser marking projector Assy</td>
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<tr>
<td>0403</td>
<td>408-11322</td>
<td>Power Switch Assy</td>
<td>1</td>
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<tr>
<td>0404</td>
<td>308-03919</td>
<td>Frame</td>
<td>1</td>
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<tr>
<td>0405</td>
<td>408-09723</td>
<td>Fixing Plate</td>
<td>2</td>
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<tr>
<td>0406</td>
<td>408-11343</td>
<td>Mirror</td>
<td>1</td>
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<tr>
<td>0407</td>
<td>108-01243</td>
<td>Sliding Unit Cover</td>
<td>1</td>
</tr>
<tr>
<td>0408</td>
<td>408-06102-01</td>
<td>Strain Relief</td>
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</table>
5 Chinrest Assy.
<table>
<thead>
<tr>
<th>No.</th>
<th>Drawing No.</th>
<th>Part Name</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>0501</td>
<td>208-02035</td>
<td>Handle (Grip)</td>
<td>1</td>
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<tr>
<td>0502</td>
<td>308-02320-01</td>
<td>Head holding Assy (Right)</td>
<td>1</td>
</tr>
<tr>
<td>0503</td>
<td>308-02320-02</td>
<td>Head holding Assy (Left)</td>
<td>1</td>
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<tr>
<td>0504</td>
<td>308-02321-01</td>
<td>Year rod Assy (Right)</td>
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<tr>
<td>0505</td>
<td>308-02321-02</td>
<td>Year rod Assy (Left)</td>
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<tr>
<td>0506</td>
<td>308-03083</td>
<td>Bite fork</td>
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<tr>
<td>0507</td>
<td>408-05861</td>
<td>Bite fork</td>
<td>1</td>
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<tr>
<td>0508</td>
<td>408-06085</td>
<td>Holder</td>
<td>1</td>
</tr>
<tr>
<td>0509</td>
<td>408-06071</td>
<td>Knob</td>
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</table>
6 Stand
<table>
<thead>
<tr>
<th>No.</th>
<th>Drawing No.</th>
<th>Part Name</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>0601</td>
<td>308-3597</td>
<td>Counter Weight Assy.</td>
<td>1</td>
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<tr>
<td>0602</td>
<td>408-09665-01</td>
<td>Wire Assy.</td>
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<tr>
<td>0603</td>
<td>408-10412</td>
<td>Bracket</td>
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<tr>
<td>0604</td>
<td>308-03596</td>
<td>Pulley Assy with Lock</td>
<td>1</td>
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<tr>
<td>0605</td>
<td>408-09756</td>
<td>Top cover</td>
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<tr>
<td>0606</td>
<td>964-50055</td>
<td>Exposure Switch</td>
<td>1</td>
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<tr>
<td>0607</td>
<td>408-09863</td>
<td>Flange</td>
<td>1</td>
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<tr>
<td>0608</td>
<td>208-02043</td>
<td>Free Standing Base</td>
<td>1</td>
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<tr>
<td>0609</td>
<td>942-40002-17</td>
<td>Hole for anchor</td>
<td>2</td>
</tr>
</tbody>
</table>
10. MAINTENANCE CHECK

**WARNING**

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

<table>
<thead>
<tr>
<th>Check Item</th>
<th>Purpose of Check</th>
<th>Contents of Check</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electricity Condition</strong></td>
<td>Check power supply voltage range</td>
<td>Check the compatibility between the power supply voltage connected to the equipment and the specified voltage for the equipment.</td>
<td>○</td>
</tr>
<tr>
<td><strong>Appearance and Indication</strong></td>
<td>(1) Appearance of equipment</td>
<td>a. Deformation, flaw, nameplate b. Cautions</td>
<td>○</td>
</tr>
<tr>
<td></td>
<td>(2) Inside of equipment</td>
<td>Check defacement and dust.</td>
<td>○</td>
</tr>
<tr>
<td><strong>Installation Environment</strong></td>
<td>Temperature, humidity, gas</td>
<td>Check the compatibility of environmental ambient of the place where the equipment will be used.</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>Levelness of equipment</td>
<td>Check the effect on the equipment</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>Floor and equipment stabilizing condition</td>
<td>Check vibration and movement stability of the equipment.</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>Check obstacles</td>
<td>Check that there is no obstacle within the movement range of the equipment.</td>
<td>○</td>
</tr>
<tr>
<td></td>
<td>Rust development condition</td>
<td>Check the condition of rust development functional safety.</td>
<td>○</td>
</tr>
<tr>
<td><strong>Operation Test</strong></td>
<td>Operation test before check</td>
<td>Check operating condition of the equipment.</td>
<td>○</td>
</tr>
<tr>
<td></td>
<td>Operation test after check</td>
<td>Check operating condition of the equipment.</td>
<td>○</td>
</tr>
<tr>
<td><strong>Safety Test for Electric Shock</strong></td>
<td>Insulation resistance</td>
<td>Check resistance between power line and the earth.</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>Leaked current from the outer cover</td>
<td>Check the current leaking from the outer cover of the equipment to the earth.</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>Earthing resistance</td>
<td>Check the resistance between exposed metal portion of the equipment and the earthing point.</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>Resistance of earthing wire</td>
<td>Check the resistance between the earth terminal of the equipment and earthing point.</td>
<td>●</td>
</tr>
<tr>
<td>Check Item</td>
<td>Purpose of Check</td>
<td>Contents of Check</td>
<td>Method</td>
</tr>
<tr>
<td>------------</td>
<td>-----------------</td>
<td>------------------</td>
<td>--------</td>
</tr>
<tr>
<td>Operation Accuracy of Equipment</td>
<td>Check operation of power supply circuit</td>
<td>Check the voltage of power supply circuit.</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>Check operation of radiographic circuit</td>
<td>Check the operating waveform and setting values of control circuit.</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>Check operation of operation circuit</td>
<td>Check operation of operation sequence.</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>Accuracy of positioning mechanism</td>
<td>Check deterioration of the positioning mechanism.</td>
<td>●</td>
</tr>
<tr>
<td>Indication during X-ray irradiation</td>
<td>Check operation of protection circuit</td>
<td>Check the setting values and operating condition of protection circuit.</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>Check operating condition indicator</td>
<td>Check the circuit function to indicate the operating condition.</td>
<td>●</td>
</tr>
<tr>
<td>X-ray Generator</td>
<td>Check operation of X-ray and the indication are in sync</td>
<td>Check the operation of indicator during X-ray irradiation.</td>
<td>○</td>
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<tr>
<td></td>
<td>X-ray tube housing</td>
<td>Check leakage of insulating oil.</td>
<td>○</td>
</tr>
<tr>
<td></td>
<td>Low voltage cable</td>
<td>Check wear, flaw, tension and twist.</td>
<td>○</td>
</tr>
<tr>
<td></td>
<td>Irradiation cone</td>
<td>Check looseness, deformation and damage.</td>
<td>○</td>
</tr>
<tr>
<td></td>
<td>Filter</td>
<td>Check coming off and damage.</td>
<td>○</td>
</tr>
<tr>
<td></td>
<td>Slit Plate (Collimator)</td>
<td>Check off-alignment of irradiation field and irradiation width.</td>
<td>○</td>
</tr>
<tr>
<td>Radiographic Mechanism</td>
<td>Rotation and movement of X-ray generator</td>
<td>Check slip, abnormal sound and stopping accuracy.</td>
<td>○</td>
</tr>
<tr>
<td></td>
<td>Movement of arm</td>
<td>Play, looseness, operability and stability.</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>Patient positioning mechanism</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Positioning Beams</td>
<td>Check the brightness and positioning accuracy.</td>
<td>○</td>
</tr>
<tr>
<td>Elevating Mechanism</td>
<td>Wire rope</td>
<td>Check breaking of wire and end portion.</td>
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<tr>
<td></td>
<td>Braking mechanism</td>
<td>Check the movement.</td>
<td>○</td>
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<tr>
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<td>Electromagnetic lock</td>
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<tr>
<td></td>
<td>Upward and downward movement condition</td>
<td>Check smoothness of movement</td>
<td>○</td>
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<tr>
<td>X-ray Output</td>
<td>X-ray tube voltage</td>
<td>Check X-ray tube voltage.</td>
<td>●</td>
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<tr>
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<td>X-ray tube current</td>
<td>Check X-ray tube current.</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>Exposure time</td>
<td>Check exposure time.</td>
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<table>
<thead>
<tr>
<th>Symbol</th>
<th>Checking Method</th>
</tr>
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<tbody>
<tr>
<td>○</td>
<td>Check with eyes</td>
</tr>
<tr>
<td>●</td>
<td>Check by using measuring instruments etc.</td>
</tr>
<tr>
<td>○</td>
<td>Check by operating the equipment.</td>
</tr>
</tbody>
</table>
11. CONTACT INFORMATION

Please contact our sales office or a distributor near you.

**Belmont Equipment**  
A Division of TAKARA BELMONT USA, Inc.  
101 Belmont Drive  
Somerset, NJ 08873  
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Toll Free Fax (800) 280-7504  
[www.belmontequip.com](http://www.belmontequip.com)

**TAKARA COMPANY, CANADA, LTD.**  
2706 South Sheridan Way  
Mississauga, Ontario, Canada L5J 2M4  
Toll Free (800) 268-5351  
Fax (905) 822-6203  
[www.takarabelmont.ca](http://www.takarabelmont.ca)
12. Revision data of this manual

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