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CXDI-1 SYSTEM

CXDI-40EG/40EC

(Revised Read-out Circuit)

Service Manual

Application of revised read-out circuit for CXDI-40EG/40EC
- CXDI-40EG: From Body No.150001
- CXDI-40EC: From Body No.150001

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INTRODUCTION

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Manual Control No.	: BY8-2280-0E9
Name of Product	: CXDI-40EG/40EC
Distribution Control No.	:
Issued on	:

Service Manual Introduction

This service manual belongs to a series of after-sales guides Canon Inc. published as part of its comprehensive product quality guarantee program, and will make a useful tool in promoting the sales of the product, let alone repairing it.

This service manual consists of two chapters; "**GENERAL**", "**INSTALLATIONT**", "**FUNCTION EXPLANETION**", "**REPAIR GUIDE**", "**TROUBLESHOOTING**", "**PARTS CATALOG**", "**SERVICE MANUAL REPORT**" and "**TOOL**"

If the product undergoes a large modification, a new service manual of revised edition will be sent to you.
In other cases, service manual report will be sent to you to update the manual.

Note 1:

This service manual is published by Canon Inc. in accordance with Article 6 (Furnishing the Referring Materials) of the Service Assignment Contract concluded with your company.
The contract prohibits the exposure of the contents of this service manual in any from to the third party without a written consent of Canon Inc.

Note 2:

This service manual is property of Canon Inc. and the company may seek to have it returned, depending on circumstances. You are expected to keep it until then.

Note 3:

Your inquiries, suggestions etc. about the contents of this service manual should be addressed to:

Medical Products Technical Service Dept.
Canon Inc. Headquarters
30-2, Shimomaruko 3-chome, Ohta-ku, Tokyo 146-8501, Japan

CAUTION

Follow the safety instructions indicated below. Ignoring them may result in injury or accident.

1. Disassembly, Assembly, Adjustment and Maintenance

Disassembly, assembly, adjustment and maintenance must be done only by a service person who has attended a service training designated by Canon.

2. Removal of Covers

Be sure to turn OFF the power of the instrument before removing the covers for maintenance and repair. Also, do not touch the instrument with wet hands. Otherwise, you may get an electric shock that may result in death or serious injury.

3. Fuse

When the fuse is going to be replaced, be sure to turn OFF the power of the instrument and solve the problem which caused the fuse to blow. Be sure to replace the fuse with the specified type only. Otherwise, fire or electric shock may result.

4. Ground Wire

Be sure to ground the instrument to an indoor grounded connector. Otherwise, fire or electric shock may result due to leakage.

5. Modification

Never modify the product as it may result in fire or electric shock.

6. Moving Parts

This instrument incorporates moving parts. Do not perform any operation carelessly while the parts are moving. Otherwise, you may get injured.

7. Interface Connector

When other equipment is going to be connected to the instrument using the connector for interface, be sure to check after connection that leakage current is within the tolerable value.

VORSICHT

Befolgen Sie die unten angegebenen Sicherheitsanweisungen.
Mißachtung kann zu erletzungenoder Unfällen führen.

1.Zerlegung, Zusammenbau, Einstellung und Wartung

Zerlegung, Zusammenbau, Einstellung und Wartung dürfen nur von einem Wartungstechniker durchgeführt werden, der an einem von Canon vorgeschriebenen Wartungslehrgang teilgenommen hat.

2.Entfernen von Abdeckungen

Schalten Sie unbedingt die Stromversorgung des Instruments aus, bevor Sie die Abdeckungen zwecks Wartung und Reparatur entfernen.
Vermeiden Sie auch eine Berührung des Instruments mit nassen Händen.
Anderenfalls können Sie einen elektrischen Schlag erleiden, der zum Tod oder schwerer Verletzung führen kann.

3.Sicherung

Wenn die Sicherung ausgewechselt werden muß, schalten Sie unbedingt die Stromversorgung des Instruments aus, und beheben Sie die Ursache für das Durchbrennen der Sicherung.
Ersetzen Sie die Sicherung nur durch den vorgeschriebenen Typ.
Anderenfalls kann es zu einem Brand oder elektrischen Schlag kommen.

4.Erdleiter

Erden Sie das Instrument unbedingt an einer Schukosteckdose.
Anderenfalls kann es zu einem Brand oder elektrischen Schlag durch Leckstrom kommen.

5.Umbau

Jeder Umbau des Produktes ist strengstens untersagt, da dies zu einem Brand oder elektrischen Schlag führen kann.

6.Bewegliche Teile

Dieses Instrument enthält bewegliche Teile.
Führen Sie während der Bewegung der Teile keine unachtsame Tätigkeit aus.
Anderenfalls können Sie verletzt werden.

7.Schnittstellenanschluß

Wenn andere Geräte über den Schnittstellenanschluß an das Instrument angeschlossen werden, prüfen Sie nach dem Anschluß, daß der Leckstrom innerhalb des zulässigen
Bereichs liegt.

Caution regarding the setup

According to the “IEC60601-1-1:2000”, devices installed in the patient environment are restricted to “electric medical devices conforming to IEC60601-1”.

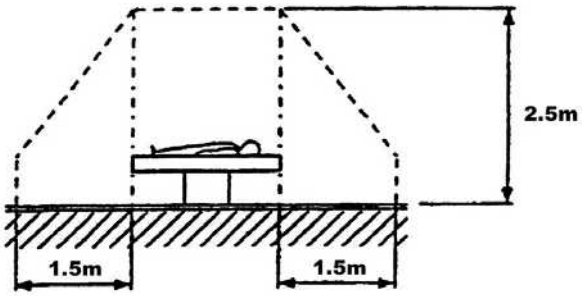
The Control PC, operation unit, and the magnetic card reader, etc. options that are parts of the CXDI-C3S are classified under the data processing device standard (IEC60950), therefore these items should not be installed in the patient environment.

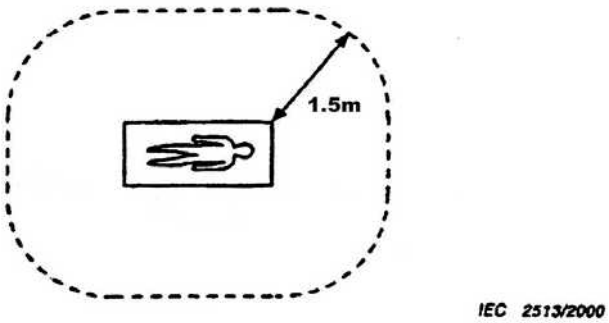
Otherwise the Control PC is only classified in CXDI-C3S.
The patient environment described below is an example cited from the “IEC60601-1-1:2000” – the measurements are only guidelines. However, the “IEC60601-1-1:2000” example must be treated as the standard.

Therefore, the CXDI-C3S must be installed in a location further than the measurements below (outside of the patient environment).

Areas where the patient moves (not only during imaging but when entering and leaving the room, etc.) are also considered as part of the patient environment, therefore the installation location should be determined upon consultation with the user regarding areas outside of the patient environment.

Example of patient environment





Note: The measurements are only guidelines.

Safety Information

Regulations

This instrument conforms to IEC 60601-1-2:2001.

For U.S.A. and Canada

This instrument is a CLASS I EQUIPMENT according to UL60601-1.

WITH RESPECT TO ELETRIC SHOCK, FIRE MECHANICAL AND OTHER SPECIFIED HAZARDS ONLY IN ACCORDANCE WITH CAN/CSA C22.2 NO. 601.1, MEDICAL EQUIPMENT CERTIFIED FOR CANADA

MEDICAL EQUIPMENT WITH RESPECT TO ELETRICAL SHOCK, FIRE AND MECHANICAL HAZARDS ONLY IN ACCORDANCE WITH UL60601-1 <CONTROL NUMBER 41C4>

Grounding reliability can only be achieved when the equipment is connected to an equivalent receptacle marked “Hospital Only” or “Hospital Grade”.

For EU Countries

The following mark shows compliance of the instrument with Directive 93/42/EEC.

CE 0197

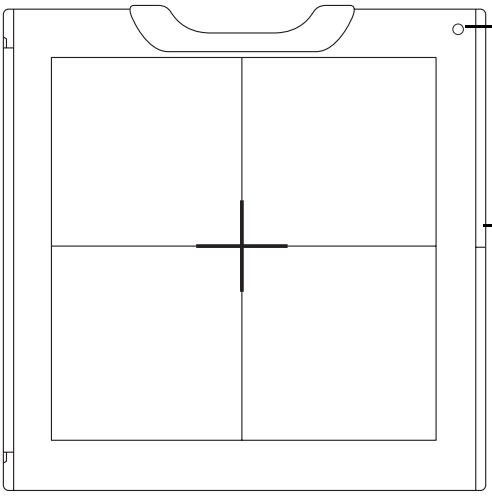
This instrument has been classified into EN55011 Group 1/Class A.

This instrument is a CLASS I EQUIPMENT according to EN 60601-1.

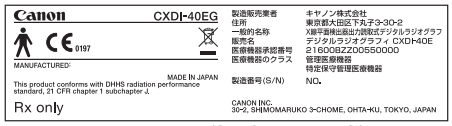
Labels and Markings on the Instrument

The CXDI-40EG has a few labels and markings on it.
Contents of those and positions where they are attached are indicated below.
The illustrations below are examples of sensor units with the grid unit slot on the left hand side.

Upright Stand Type Sensor Unit



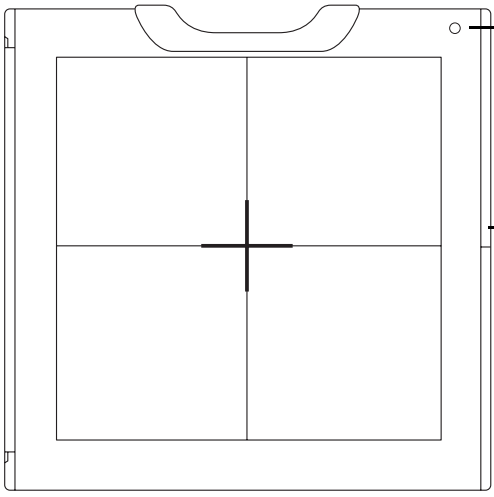
This mark indicates that this is a Type B Applied Part according to UL60601-1 and EN60601-1.
This unit can be installed in the patient environment.



Name Label (for CXDI-40EG)

Name Label (for CXDI-40EC)

Universal Stand Type Sensor Unit

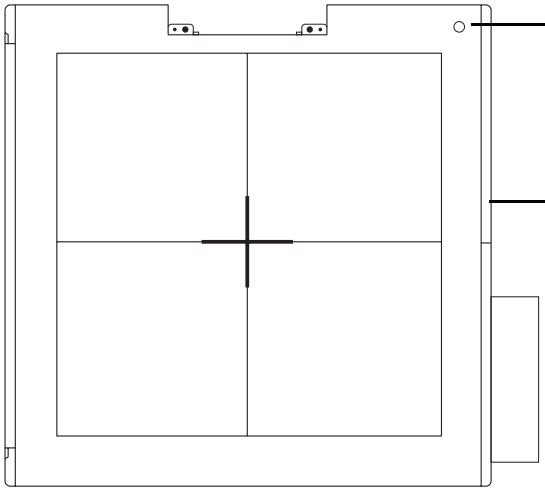


This mark indicates that this is a Type B Applied Part according to UL60601-1 and EN60601-1.
This unit can be installed in the patient environment.

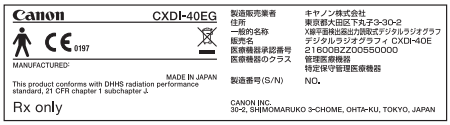
Name Label (for CXDI-40EG)

Name Label (for CXDI-40EC)

Table Type Sensor Unit



This mark indicates that this is a Type B Applied Part according to UL60601-1 and EN60601-1.
This unit can be installed in the patient environment.



Name Label (for CXDI-40EG)

Name Label (for CXDI-40EC)

Safety Information

Regulations

This instrument conforms to IEC 60601-1-2:2001.

For U.S.A. and Canada

This instrument is a CLASS I EQUIPMENT according to UL60601-1.

WITH RESPECT TO ELETRIC SHOCK, FIRE MECHANICAL AND OTHER SPECIFIED HAZARDS ONLY IN ACCORDANCE WITH CAN/CSA C22.2 NO. 601.1, MEDICAL EQUIPMENT CERTIFIED FOR CANADA

MEDICAL EQUIPMENT WITH RESPECT TO ELETRICAL SHOCK, FIRE AND MECHANICAL HAZARDS ONLY IN ACCORDANCE WITH UL60601-1 <CONTROL NUMBER 41C4>

Grounding reliability can only be achieved when the equipment is connected to an equivalent receptacle marked “Hospital Only” or “Hospital Grade”.

For EU Countries

The following mark shows compliance of the instrument with Directive 93/42/EEC.

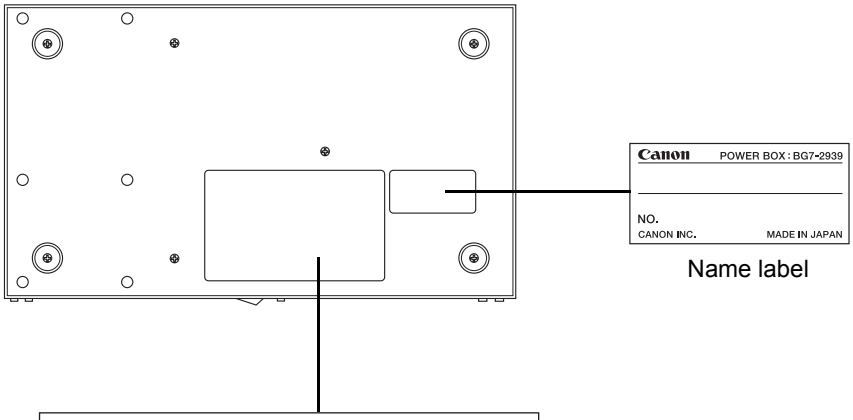
CE 0197

This instrument has been classified into EN 55011 Group 1/Class A.

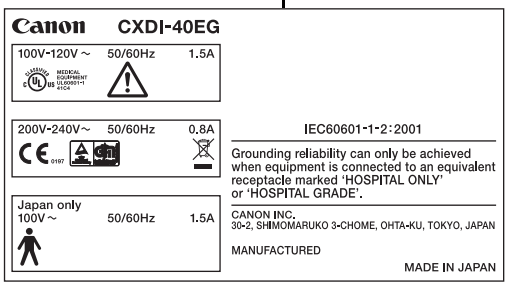
This instrument is a CLASS I EUIPMENT according to EN 60601-1.

Labels and Markings on the Instrument

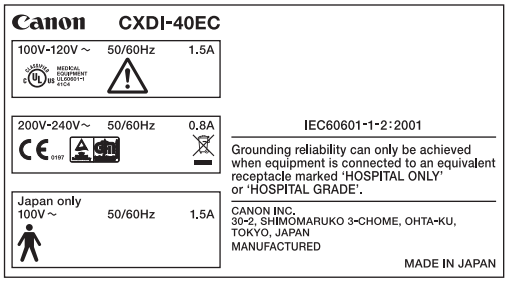
The Power Box has a few labels and markings on it.
Contents of those and positions where they are attached are indicated below.



Name label



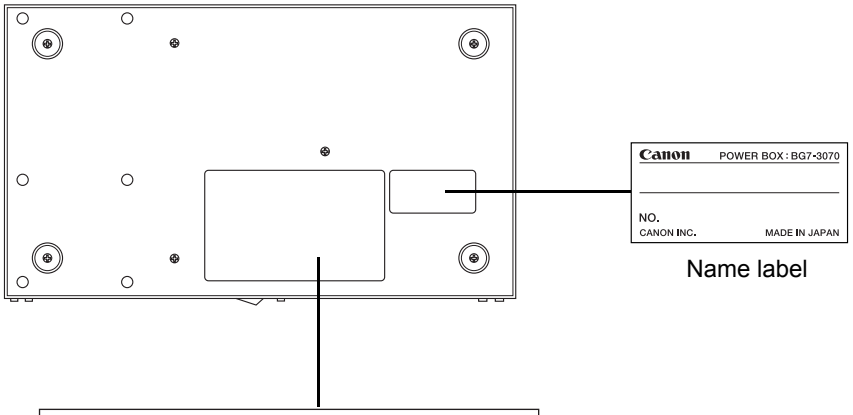
Rating label
(for CXDI-40EG)



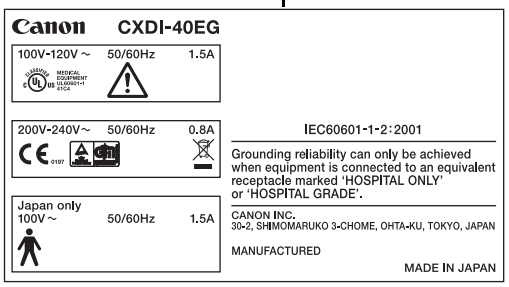
Rating label
(for CXDI-40EC)

Labels and Markings on the Instrument

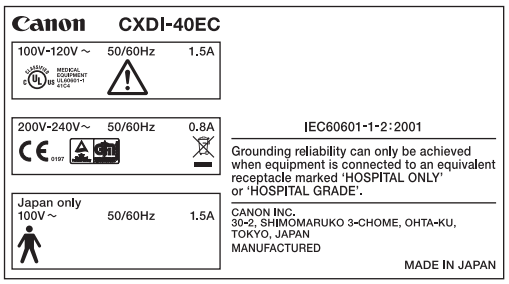
The Power Box / Auto-Collimation has a few labels and markings on it.
Contents of those and positions where they are attached are indicated below.



Name label



Rating label
(for CXDI-40EG)



Rating label
(for CXDI-40EC)

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Chapter 1

GENERAL

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1.General

CXDI-40EG (revised read-out circuit)

In the former CXDI-40EG, Aux. Shift Register Driver (PCB-D-EP), Signal Read-out Circuit (PWB-40EA) and A/D Conversion (PWB-40EAD) are located in both sides of LANMIT. Image data was read out from two directions. However, in new CXDI-40EG, one set of Aux. Shift Register Driver(PCB-D-EP), Signal Read-out Circuit (PWB-40EA) and A/D Conversion (PWB-40EAD) are located in LANMIT. Image data was read out from one direction.

Since the appearance of new CXDI-40EG is the same as that of the former CXDI-40EG, they are identified by the different serial number of the main unit.

CXDI System Software	Ver.6.4 and later
Body No.	150001 ~

CXDI-40EC (revised read-out circuit)

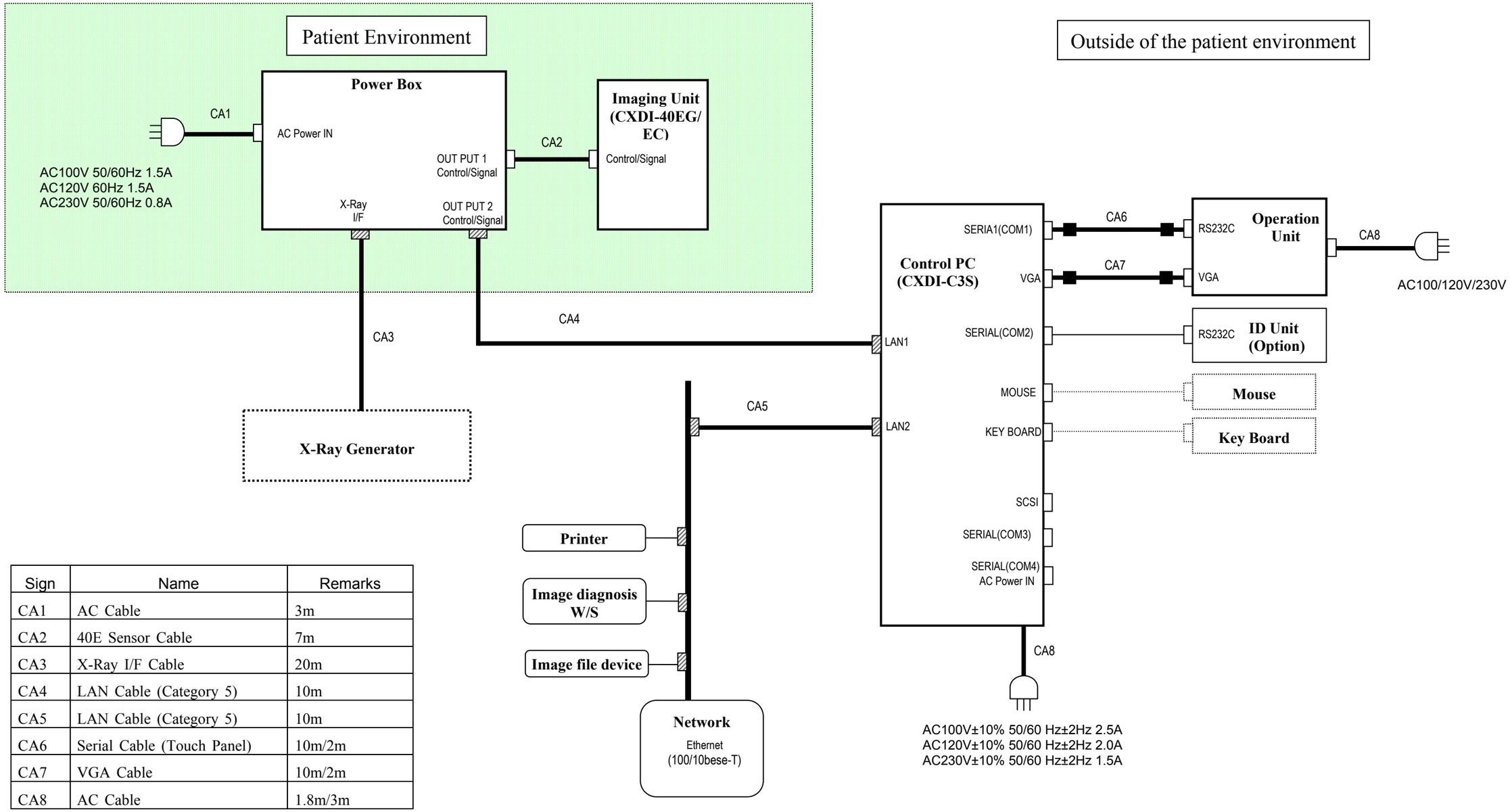
In the former CXDI-40EC, Aux. Shift Register Driver (PCB-D-EP), Signal Read-out Circuit (PWB-40EA) and A/D Conversion (PWB-40EAD) are located in both sides of LANMIT. Image data was read out from two directions. However, in new CXDI-40EC, one set of Aux. Shift Register Driver(PCB-D-EP), Signal Read-out Circuit (PWB-40EA) and A/D Conversion (PWB-40EAD) are located in LANMIT. Image data was read out from one direction.

Since the appearance of new CXDI-40EC is the same as that of the former CXDI-40EC, they are identified by the different serial number of the main unit.

CXDI System Software	Ver.6.5 and later
Body No.	150001 ~

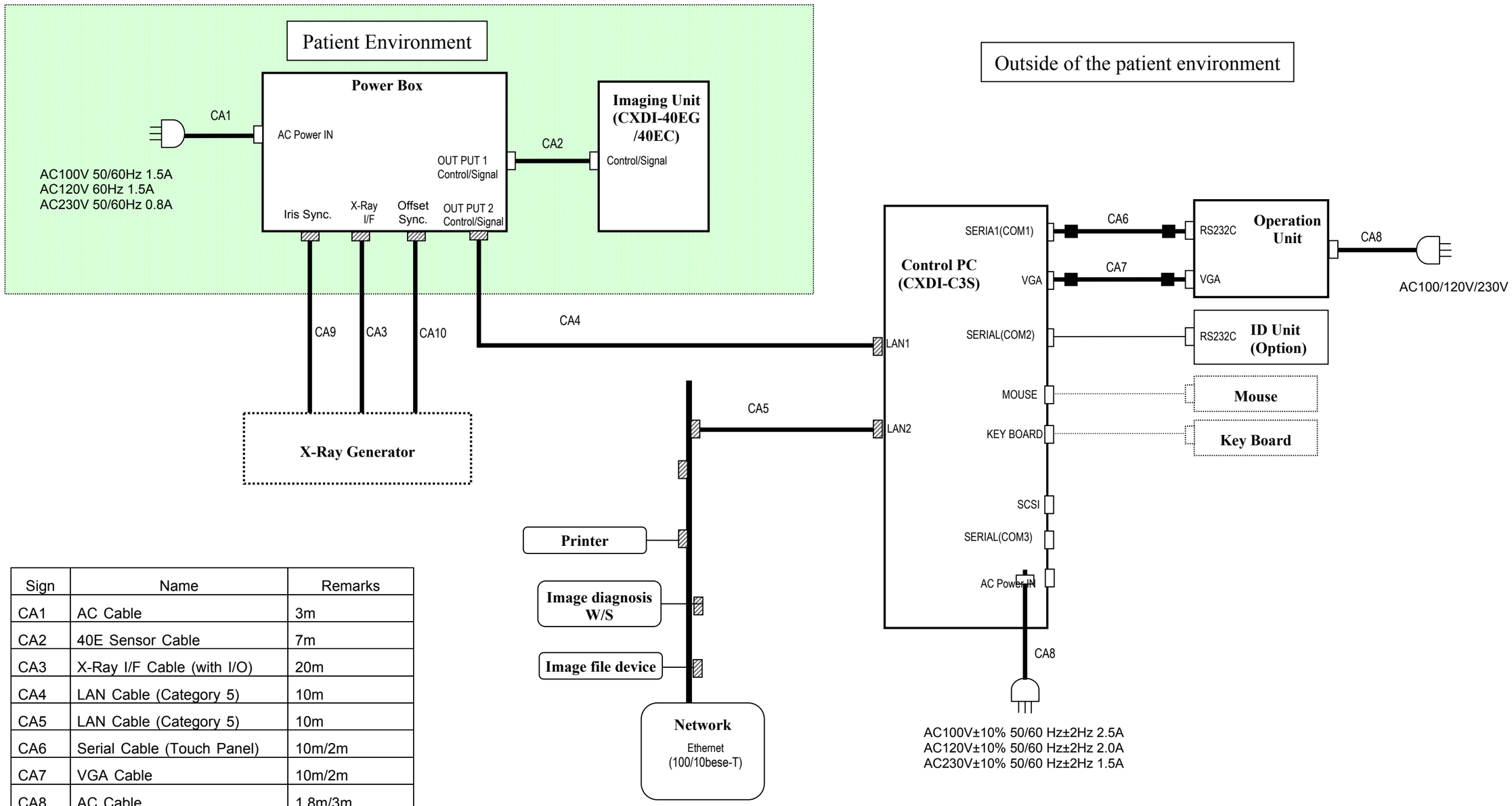
2. CXDI-1 System Block Diagram

2.1 Standard



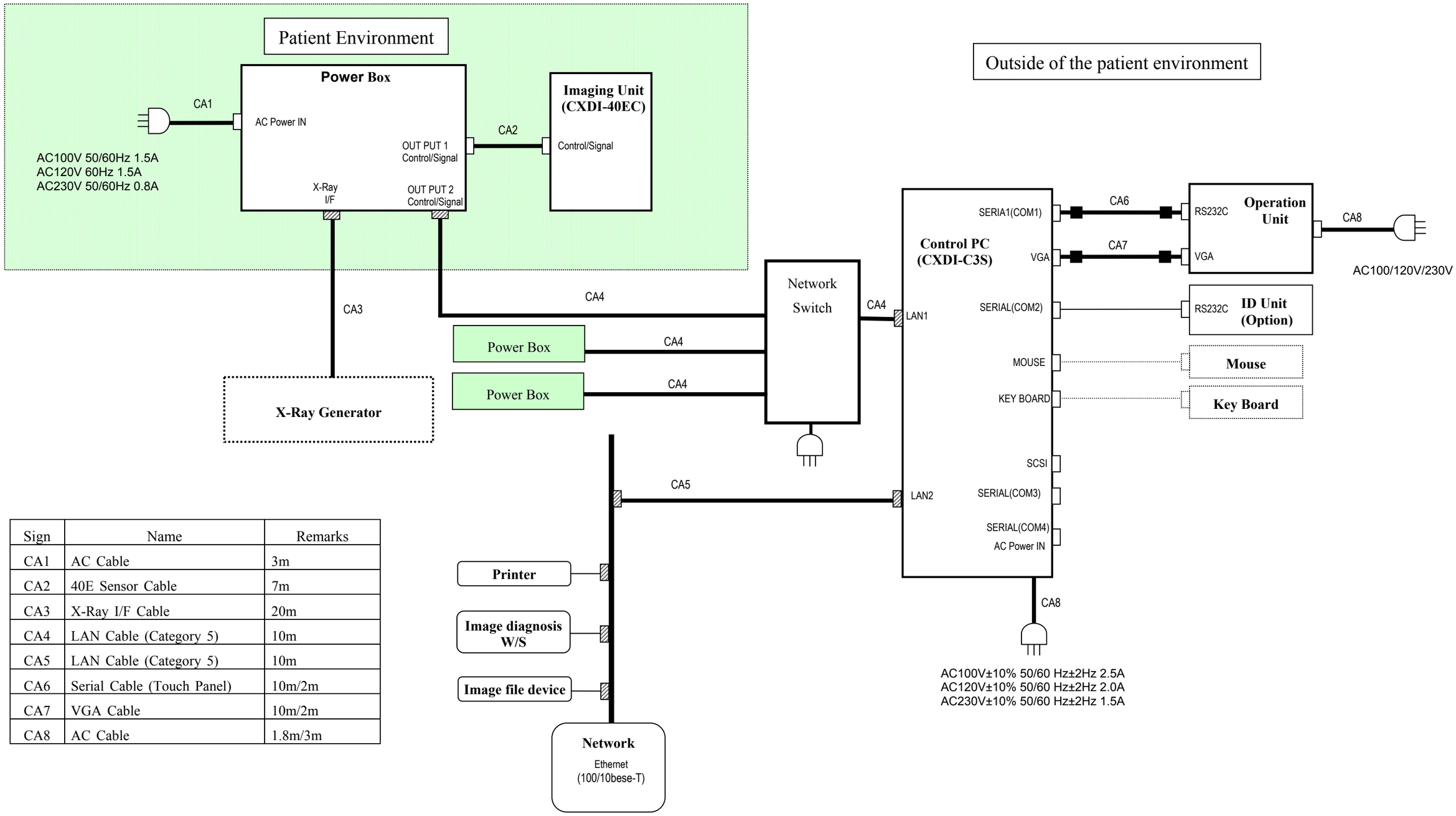
Sign	Name	Remarks
CA1	AC Cable	3m
CA2	40E Sensor Cable	7m
CA3	X-Ray I/F Cable	20m
CA4	LAN Cable (Category 5)	10m
CA5	LAN Cable (Category 5)	10m
CA6	Serial Cable (Touch Panel)	10m/2m
CA7	VGA Cable	10m/2m
CA8	AC Cable	1.8m/3m

2.2 For Auto Collimation



Sign	Name	Remarks
CA1	AC Cable	3m
CA2	40E Sensor Cable	7m
CA3	X-Ray I/F Cable (with I/O)	20m
CA4	LAN Cable (Category 5)	10m
CA5	LAN Cable (Category 5)	10m
CA6	Serial Cable (Touch Panel)	10m/2m
CA7	VGA Cable	10m/2m
CA8	AC Cable	1.8m/3m
CA9	Iris Synchronization Cable	20m
CA10	Offset Synchronization Cable	20m

2.3 Plural Connection



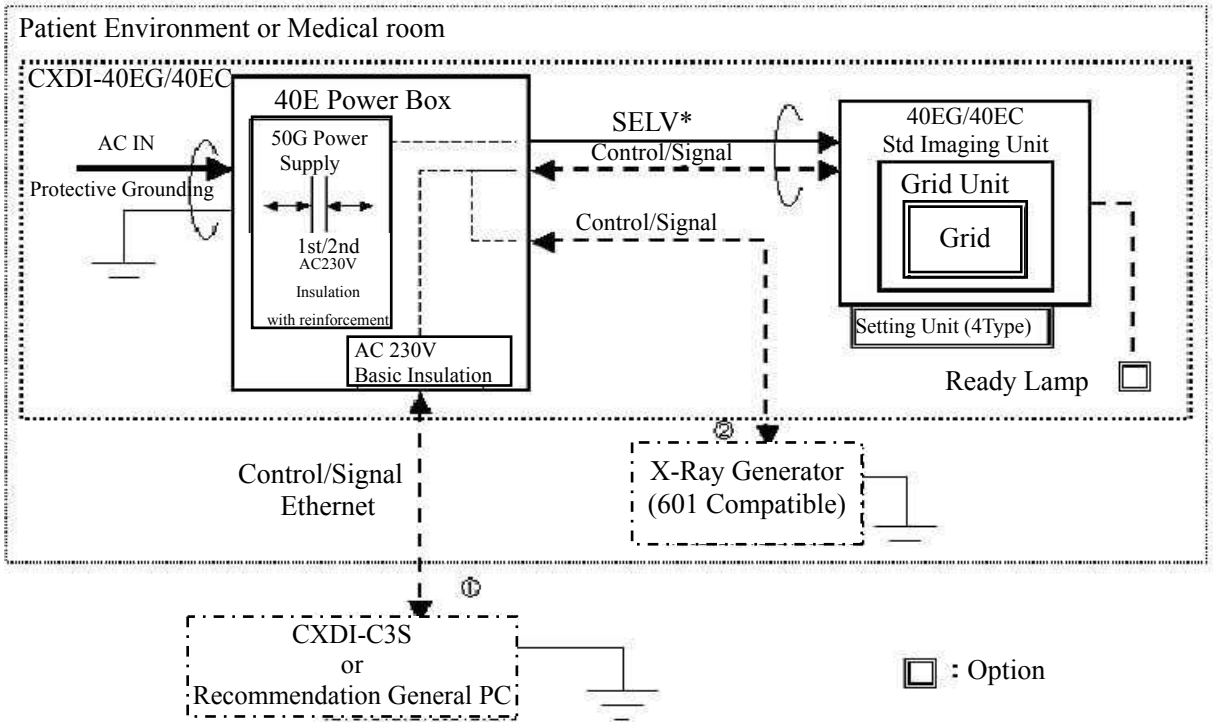
Sign	Name	Remarks
CA1	AC Cable	3m
CA2	40E Sensor Cable	7m
CA3	X-Ray I/F Cable	20m
CA4	LAN Cable (Category 5)	10m
CA5	LAN Cable (Category 5)	10m
CA6	Serial Cable (Touch Panel)	10m/2m
CA7	VGA Cable	10m/2m
CA8	AC Cable	1.8m/3m

3. System Diagram

3.1 Stand-alone

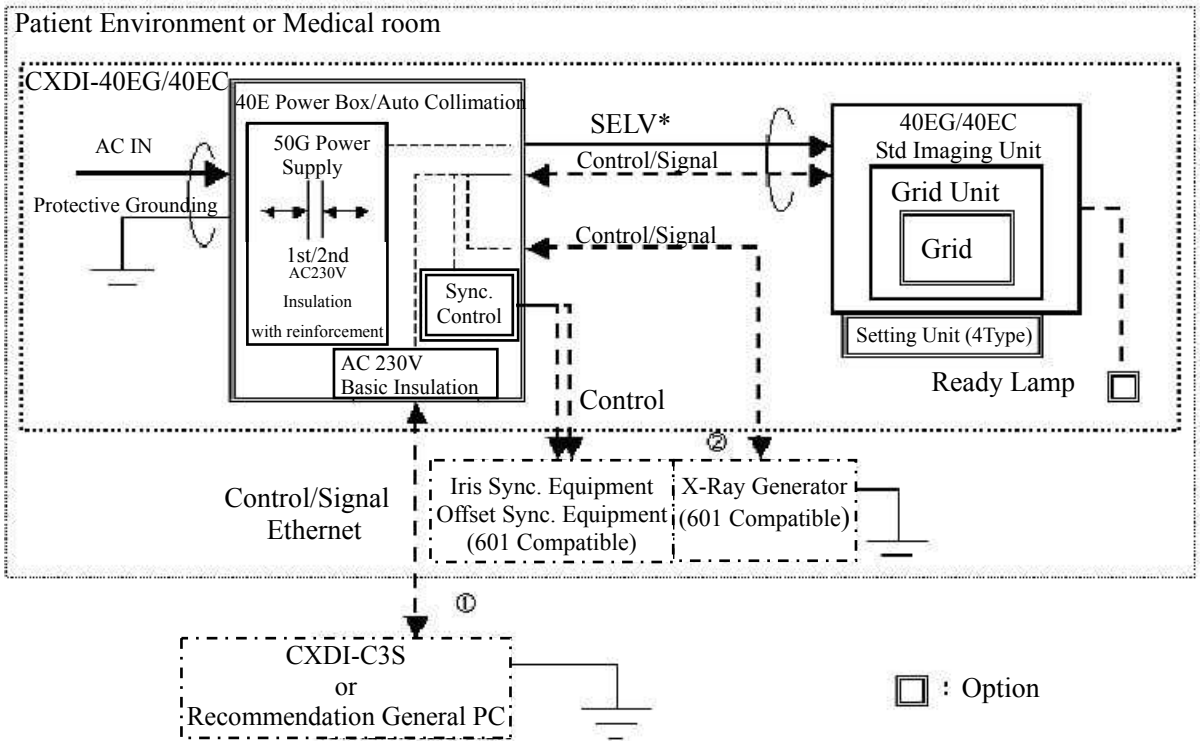
3.1.1 Standard Power Box

Stand-alone System Block Diagram (Standard Power Box)



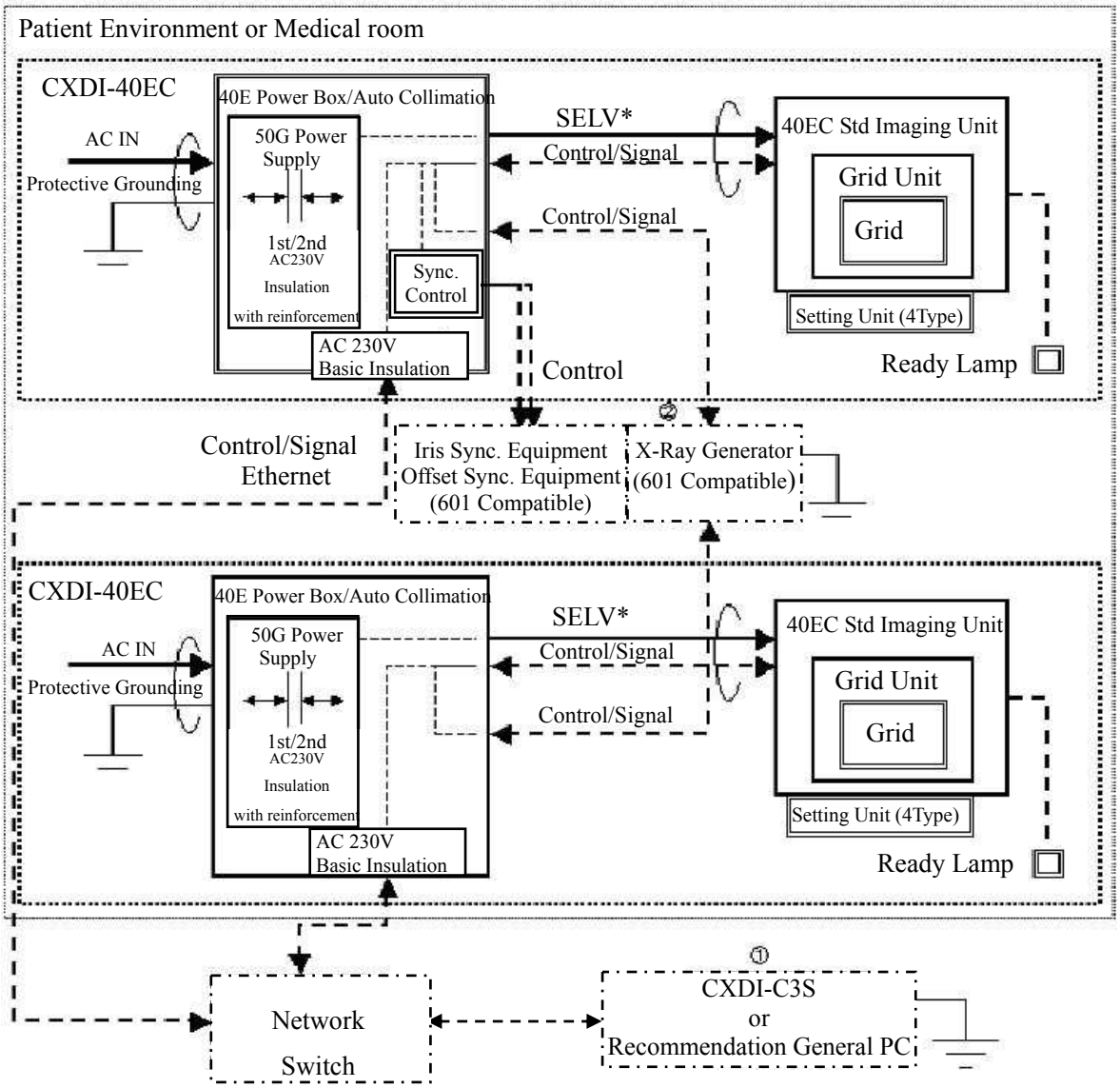
3.1.2 Power Box (Auto Collimation)

Stand-alone System Block Diagram (Power Box/Auto Collimation)

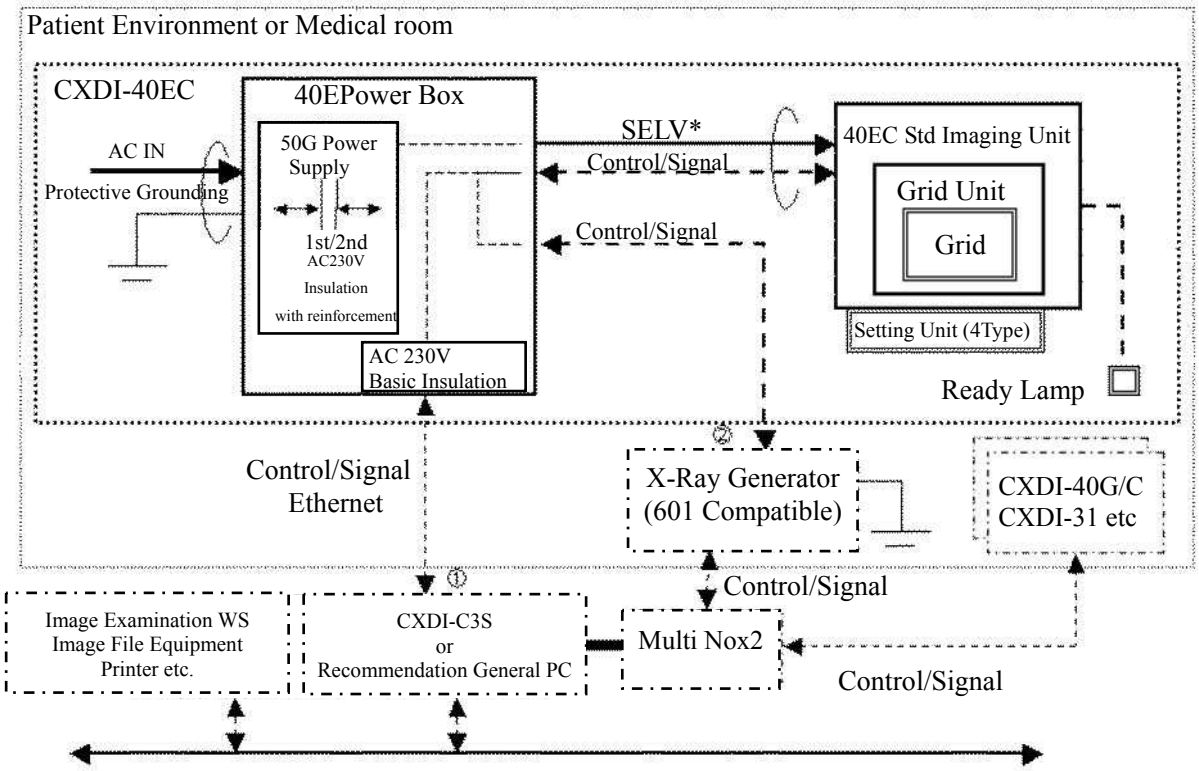


3.2 Plural Connection

3.2.1 CXDI-40EC Plural Connection

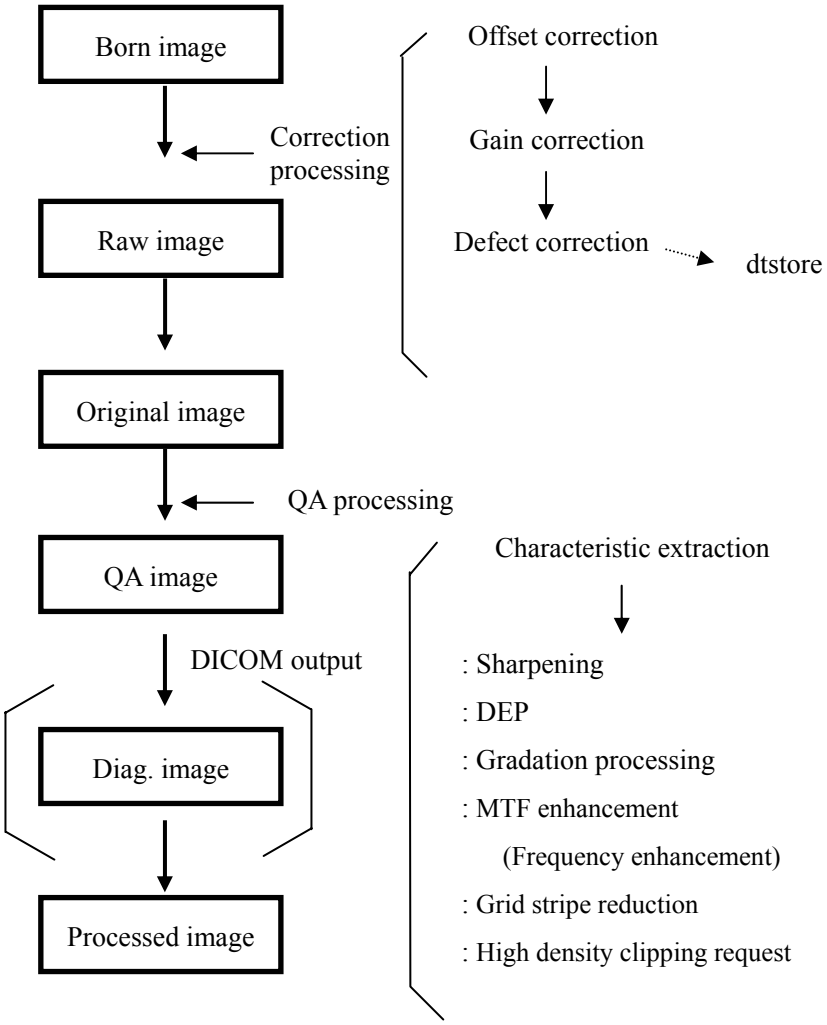


3.2.2 CXDI-40EC + Plural Connection (Other Imaging Unit)



4. CXDI Image Processing

4.1 Processing flow



4.2 Image types

(1) Born image

The image obtained with LANMIT before any correction is made.
Outside distribution of these images is prohibited, including dtstore images.

(2) Raw image

Born image after offset processing, gain correction.
This is the image with LANMIT specific characteristics corrected.

(3) Original image

Raw image after preprocessing.

(4) QA image

Original image after gradation processing, sharpening, and other processing.
The CXDI performs image processing up to this point.

(5) Diagnosis image

QA image after further image processing necessary for diagnosis.
Image processed by the user for diagnostic purposes.

(6) Processing image

Diagnosis image after post-processing.
Image modified by the user or the default processed image.

5. Specifications

CXDI-40EG, the successor of CXDI-40, consists of Imaging Unit and Power Box and compatible with Ethernet.

CXDI-40EC is ranked as the more superior performance model (high sensitivity model) than CXDI-40EG.

As well as CDXI-40EG, CXDI-40EC supports Ethernet.

Item	40EG	40EC	Remarks
Operational format	Stand-alone or vehicle-installed	<-	When installed in a vehicle, upright stand type only
Effective exposure range	430 x 430 mm	<-	
Total number of pixels	2706 x 2700 pixels	<-	
Number of effective pixels	7.2 million (2688 x 2688 pixels)	<-	
Pixel pitch	160 μm x 160 μm	<-	
Fluorescent substance	GOS	CsI	one panel
Sensor sensitivity	CsI: Same as CXDI-40C	CsI: Same as CXDI-40C	
Exposure time	0 ms to 1 sec., 1 to 3 sec.	<-	
Output gradations	12 bits (4096 gradations), A/D 14 bits	<-	
Transfer method	Ethernet between sensor unit and PC (via power box)	<-	
Preview time	Approx. 3 sec	<-	
Exposure cycle time	15 sec. (typ.)	<-	
External dimensions (Sensor unit)	550 (W) x 550 (D) x 98 (H) mm	<-	Basic sensor unit
	550 (W) x 550 (D) x 118.7 (H) mm	<-	Stand
	550 (W) x 550 (D) x 67.5 (H) mm	<-	Table
	550 (W) x 550 (D) x 101 (H) mm	<-	Universal
External dimensions (Power box)	385 (W) x 200 (D) x 65 (H) mm	<-	Standard
	389.5 (W) x 200 (D) x 65 (H) mm	<-	Auto collimation (option)
Color of sensor unit exterior	Cool white	<-	

Item	40EG	40EC	Remarks
Mass (Sensor unit)	18.2 kg	19.0 kg	Basic sensor unit
	24.3 kg	25.0 kg-	Stand
	18.4 kg	19.0 kg	Table
	18.8 kg	19.0 kg	Universal
Mass (Power box)	4.2 kg	<-	Standard
	4.4 kg	<-	Auto collimation (option)
Drop	Open-side 3 cm drop onto hard wooden board	<-	
Resistance to impact	Not considered.	<-	
Static pressure	Exterior allowing pressure of 20 kg (196.1 N) by 15 mm dia.	<-	1 minute (except when hinges are open)
Water-proofing	Outside scope of specifications	<-	
Resistance to chemicals	There must be no abnormalities after wiping with alcohol or disinfecting fluids	<-	
IC X-ray protection	No protective lead	<-	
Back-scattering prevention	Not considered	<-	
Grips	None	<-	

Item	40EG	40EC	Remarks
Grid type	Fixed grid (internal, removable)	<-	
Phototimer	Internally mountable	<-	
Environmental friendliness (RoHS supported)	Complied	<-	
Compatible control PC	CXDI-C3S or equivalent general-purpose PC available on market	<-	
Compatible operating system	Windows XP	<-	
Power ON/OFF control	None, deep sleep with low power consumption (approx. 15W)	<-	
Stand	Dedicated stand, table or universal stand	<-	
Exposure control	Exposure below table acceptable	<-	
Connectability	3 sensors per PC (via hub), sensor and power box in pairs	<-	
Linkup with X-ray tube	Provided (option)	<-	
Full image preview time	Approx. 12 sec.	<-	
Exposure preparation time	10 to 30 sec.	<-	
X-ray exposure delay	Less than 0.3 sec.	<-	
Distance between subject and sensor	33.5 ±0.5 mm	33.7 ±0.5 mm	(PID)
System control unit	General-purpose PC (C3(S)) [OS: XP], power box	<-	
Sensor DC/DC power supply	Inside power box	<-	
Sensor cable	Overall length of 7 meters, one type	<-	
X-ray monitor	None	<-	
Grid detection	Provided/not provided detection (type detection)	<-	
Sensor unit status display	Externally mounted ready lamp	<-	
Optional lock	None	<-	
Grid right side removability	Only for S-order products	<-	
Power consumption (when 1 unit is connected)	Average (40)W (continuous exposure every 15 sec.) Max. (160)VA: 100/120V Max. (200)VA: 230V	<-	
Thermal sensor	Provided.	<-	

Item	40EG	40EC	Remarks
Heat generation	Approx. 35 kcal/h	<-	15-sec. exposure cycle time
	Approx. 15 kcal/h	<-	During sleep, standby
Environmental conditions		<-	
1) Transportation and storage			
Temperature	–30 to +60°C	<-	
Humidity	10% to 60% (no condensation)	<-	
Atmospheric pressure	700 to 1060 hPa	<-	
		<-	
2) Operating environment			
Temperature	+5 to +35°C	<-	
Humidity	30% to 75% (no condensation)	<-	
Atmospheric pressure	700 to 1060 hPa	<-	
		<-	

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Chapter 2

INSTALLATION

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1. Caution

1.1 Caution during operating

Please pay attention to the following points when installing the machine.

(1) If the equipment is hoisted, lowered or transported, it must be supported at both sides by a minimum of two people so there is no danger of it falling.

(2) If a forklift, etc. is used to transport the equipment, make sure there is nothing that could impede the forklift on its route to the final destination.

(3) When installing the equipment, be sure the site meets the following criteria:

1) There must be no dripping water in the area.

2) The environment must be free of harmful elements, such as humid or acidic air, air with a saline or sulfur content, where there is poor ventilation, or where air pressure or temperature is abnormal.

3) The equipment must not be placed at an angle or subjected to vibration or shock (this includes during transportation).

4) The equipment must not be kept where chemical products are stored or where gasses are generated.

5) The site's power supply must be of the correct voltage and frequency for the equipment.

6) The site must be connected to a fully earthed cable with sufficient ground resistance to meet standard values.

(4) After installation, be sure to dispose of waste product packaging with care and with full respect for the environment.

(5) As the imaging unit is easily portable, take special care that it is not knocked, dropped or subjected to strong shocks.

(6) Use clamps to secure any excess cable for the imaging unit.

1.2 Installation restrictions

The following restrictions on installation must be observed.

(1) Only the upright stand type may be installed in a vehicle.
The table type and universal type are supported separately.

(2) A clearance of at least 15 cm must be left between a imaging unit and power box.

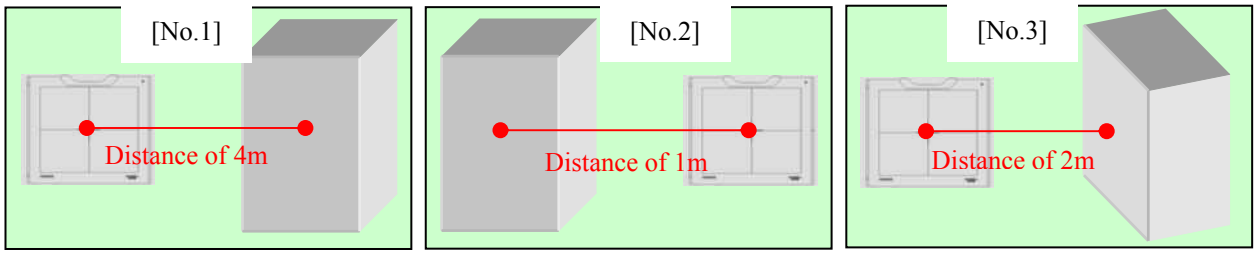
(3) It is forbidden to use of the cables (40E sensor cable, X-ray interface cable, etc.) from the power box for moving parts.
The only exception to this restriction is the 40E sensor cable which is to be connected to the imaging unit.

(4) Before proceeding with installation, ensure that the static accumulated in the bodies of the installation personnel is discharged.
Similarly, before touching the PCBs (when removing them) or cable connectors, ensure that all static is discharged.

(5) A clearance between the Toshiba X-ray generator (KXO-50S) and the imaging unit must observe the condition below. If the following condition cannot be satisfied, the image may be affected by the magnetic noise leaked from the Toshiba X-ray generator (KXO-50S).

Installation condition

No.	Positioning of Toshiba X-ray generator (KXO-50S) and the imaging unit	Distance
1	Placed horizontally. The imaging unit is on the left side	A distance of at least 4m
2	Placed horizontally. The imaging unit is on the right side	A distance of at least 1m
3	Placed vertically.	A distance of at least 2m

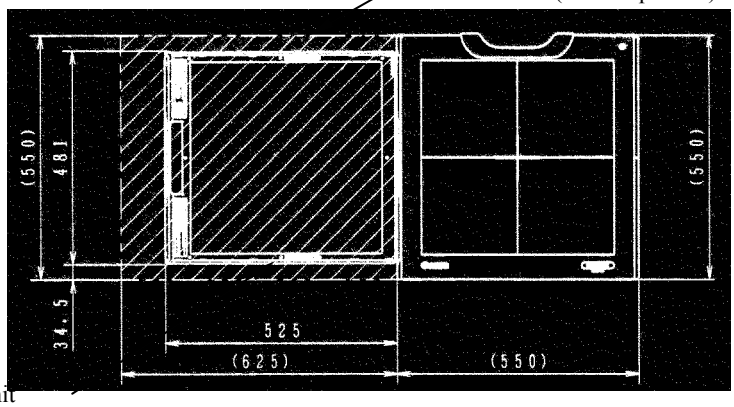


1.3 Space Required for Operation and Performing Maintenance

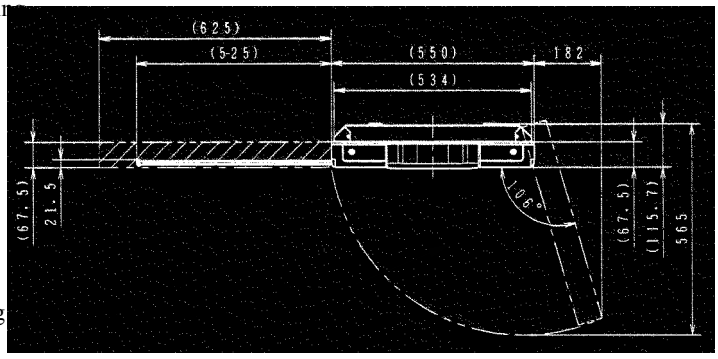
Ensure that there is enough space for operating the instrument and performing maintenance when installing the system.
Shaded parts show the space required for mounting/removing the grid unit.

1) Upright Stand Type Imaging Unit

Grid Pulling out opening Space
(Shaded portion)



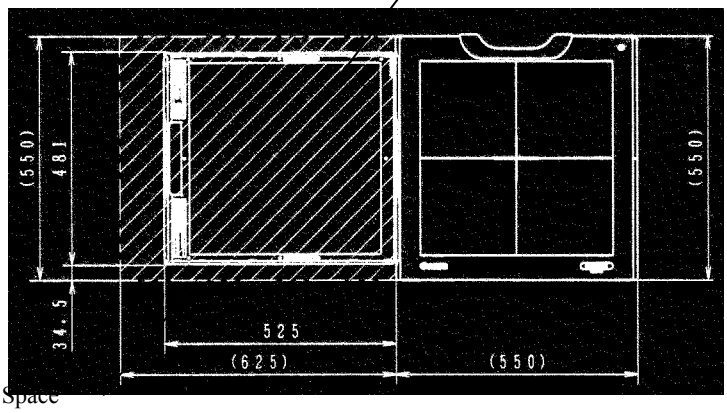
Grid unit
At detachi



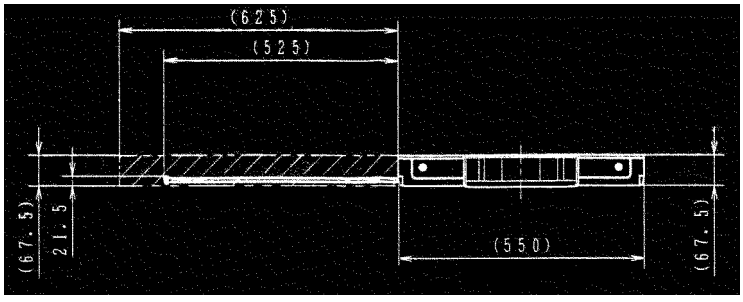
Standard Imaging

2) Table/Universal Stand Type

Grid unit
At detaching



Grid Pulling out opening Space
(Shaded portion)



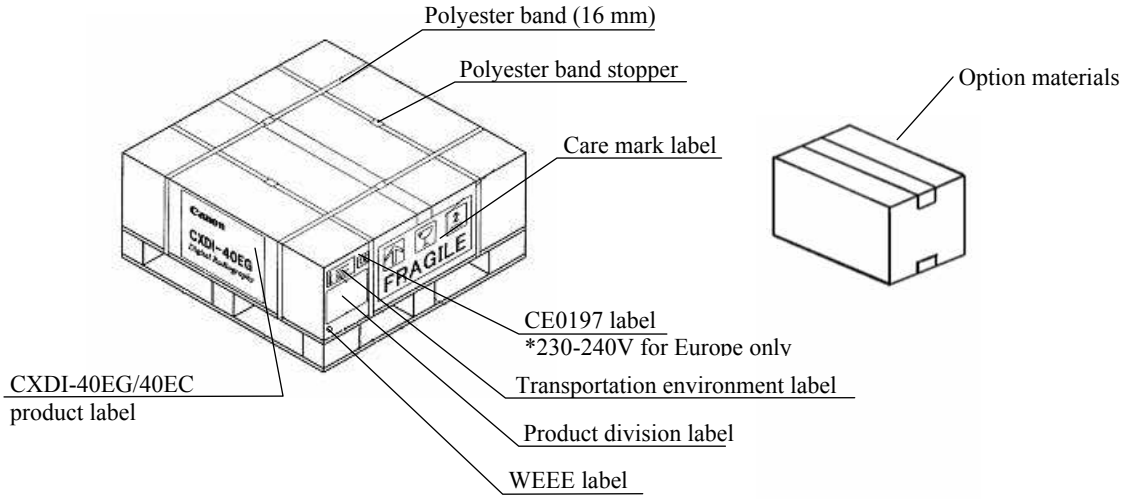
2. Unpacking and List of Materials

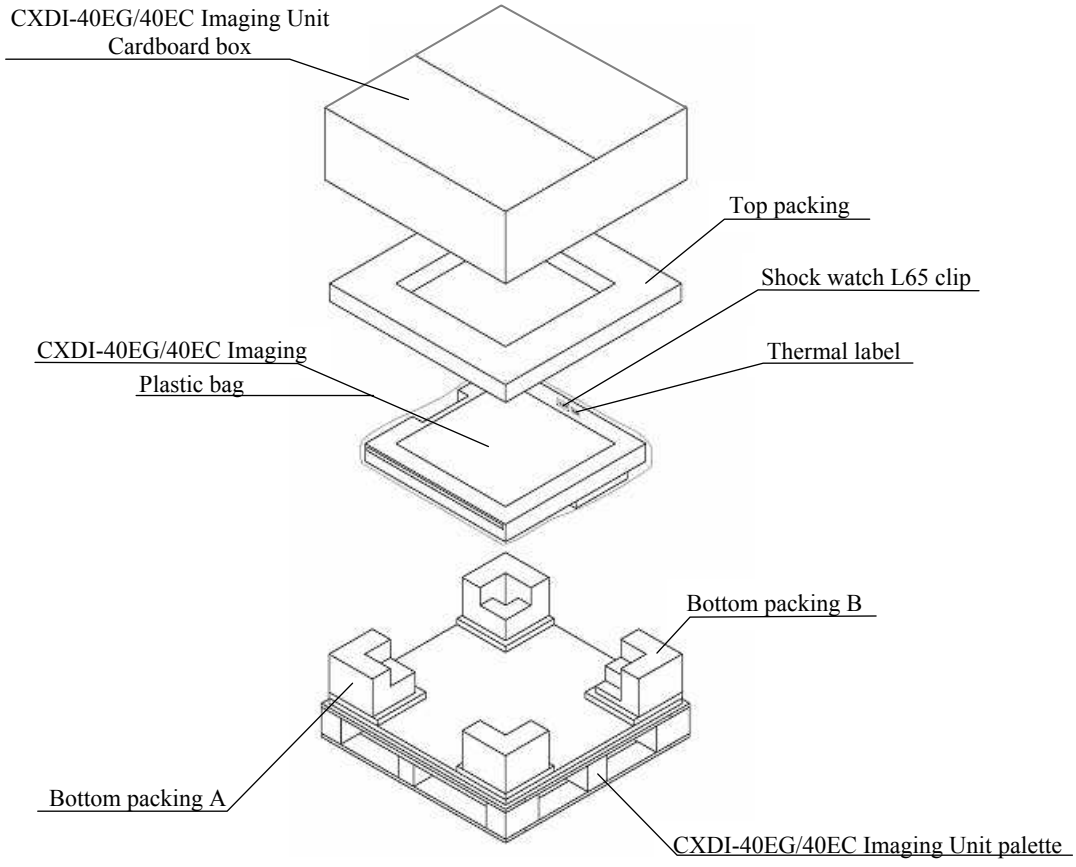
2.1 X-ray Digital Camera System (CXDI-40EG/40EC)

1) CXDI-40EG Imaging unit

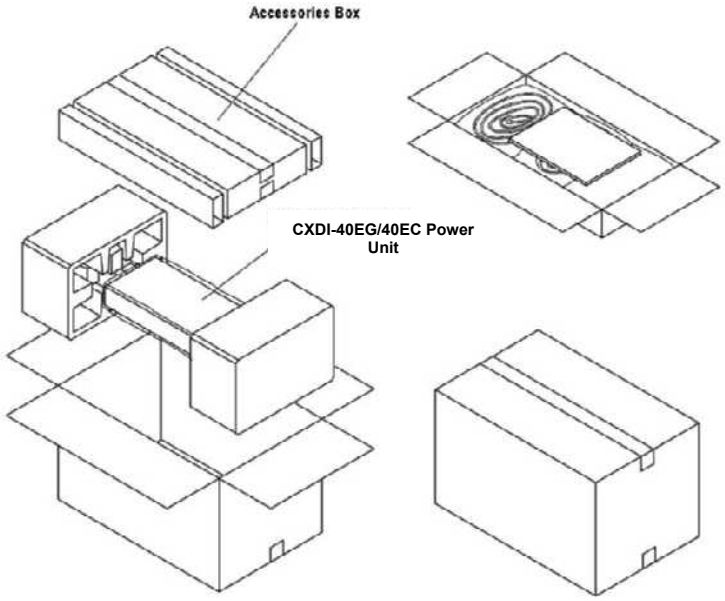
(1) Packing Diagram

- Imaging Unit

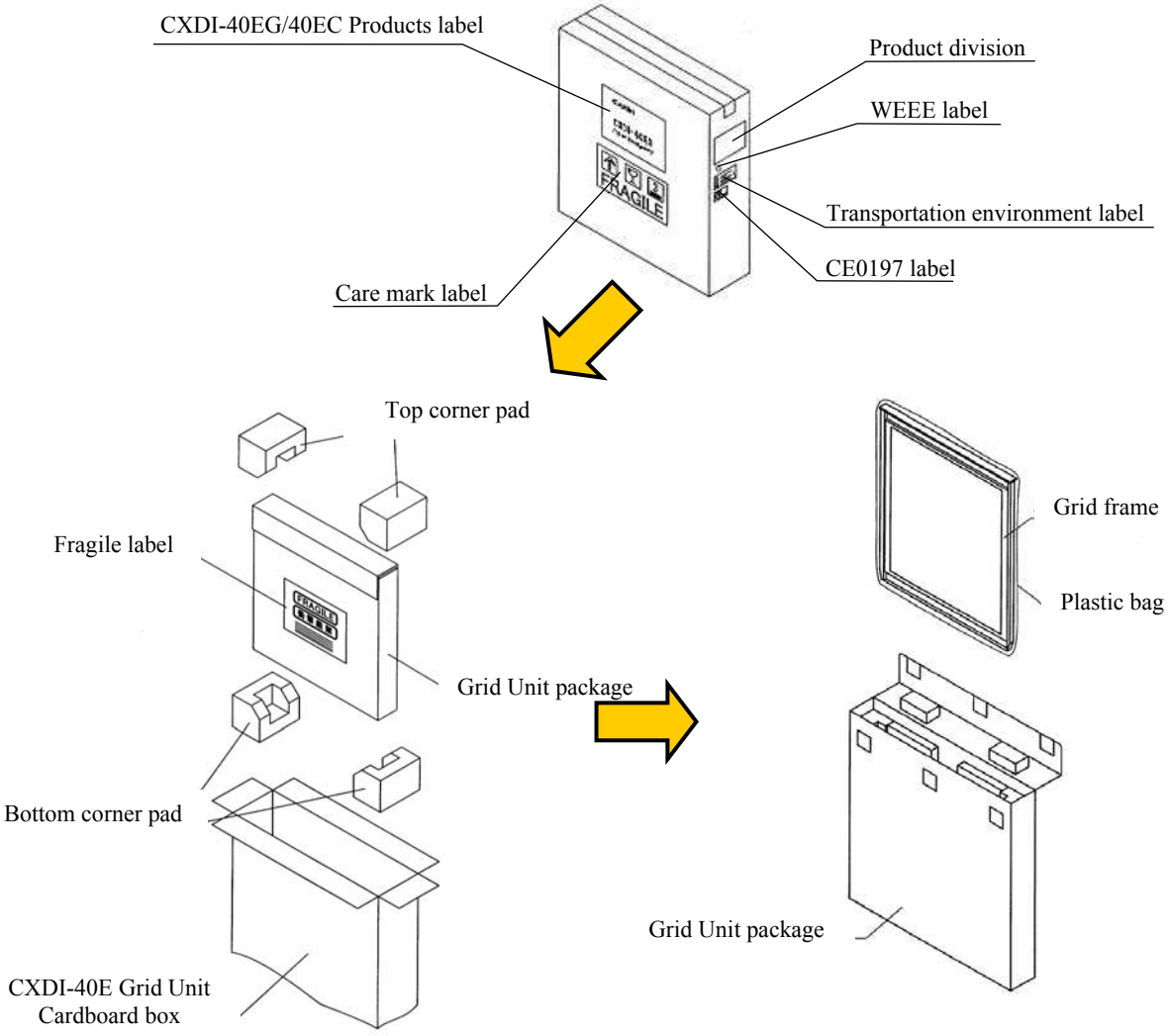




- Power Box assemble package



- Grid Unit



2) List of compnents

(1) Imaging unit

No.	Description	Qty	Remarks
1	CXI-40EG/40EC Imaging Unit	1	
2	Phototimer Anchoring Rubber t=1	4	
3	Phototimer Anchoring Rubber t=2	20	
4	Phototimer Anchoring Rubber t=6	8	
5	Phototimer Anchoring Plate S2	4	
6	Spacer	8	
7	Fixing tape	4	
8	Anchoring Material A	8	
9	Anchoring Material B	8	
10	Label for Installation	1	
11	ID Setting Pin	4	
12	Insulation Lock	11	
13	Sensor Information File FD	1	
14	Sensor Cable	1	
15	Grid unit	1	
16	Safety booklet for German	1	
17	Installation Report	1	
18	Inspection compliance	1	
19	Warranty Card	1	
20	Attached documents for Medical	1	
21	Operation manual (English/Japanese)	1 Each	

LAN cables for connecting Control PC / Power Box and a switching hub for connecting the multiple Imaging Units shall be procured at each sales company.

- LAN cable (Over category 5)\

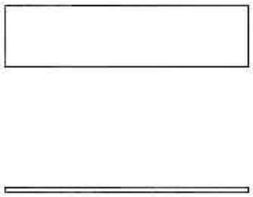
  When Control PC and Power Box are connected directly, Cross type is used, but when they are connected via a hub, Straight type is used. However, this is not applied when the hub has AUTO-MDI/MDI-X function*.

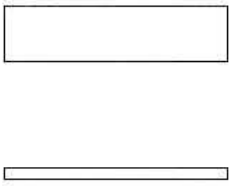
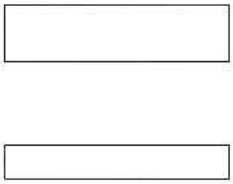
* AUTO-MDI/MDI-X :

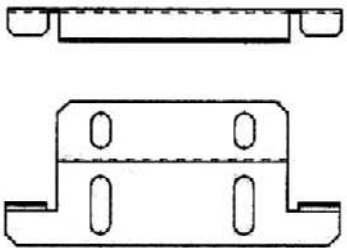
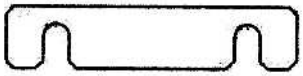
One of the functions of switching hub and broadband-router.
They can detect communication port of the other side automatically and connect in proper procedure.
MDI: Network card, etc.
MDI-X: Switching hub and broadband-router, etc.
Since AUTO-MDI/AUTO-MDI-X functions can automatically detect port type, they do not require consideration to types of LAN cable (straight or cross cable).

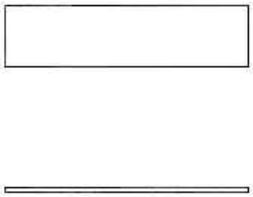
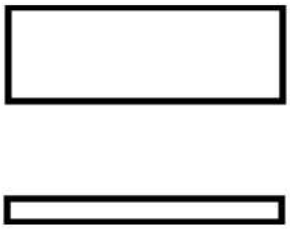
- Switching hub

  Sales companies adopt the switching hub after conducting the test and the operation check on a hub that meets the general standard.

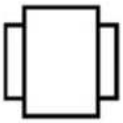
No.	1	No.	2
Description	Imaging Unit	Description	Phototimer Anchoring Rubber
Qty	1	Qty	4
Remarks		Remarks	t=1
			

No.	3	No.	4
Description	Phototimer Anchoring Rubber	Description	Phototimer Anchoring Rubber
Qty	20	Qty	8
Remarks	t=2	Remarks	t=6
			

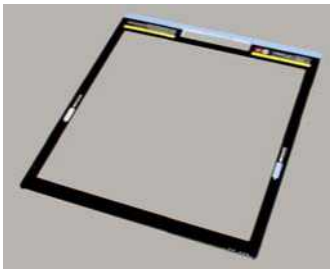
No.	5	No.	6
Description	Phototimer Anchoring Plate	Description	Spacer
Qty	4	Qty	8
Remarks		Remarks	
			

No.	7	No.	8
Description	Fixing tape	Description	Anchoring Material A
Qty	4	Qty	8
Remarks		Remarks	t=2
			

No.	9	No.	10
Description	Anchoring Material B	Description	Label for Installation
Qty	8	Qty	1
Remarks	t=4	Remarks	

No.	11	No.	12
Description	ID Setting Pin	Description	Insulation Lock
Qty	4	Qty	11
Remarks		Remarks	
			

No.	13	No.	14
Description	Sensor Information File FD	Description	Sensor Cable
Qty	1	Qty	1
Remarks		Remarks	Imaging unit/Power Box

No.	15	No.	
Description	Grid unit	Description	
Qty	1	Qty	
Remarks		Remarks	
			

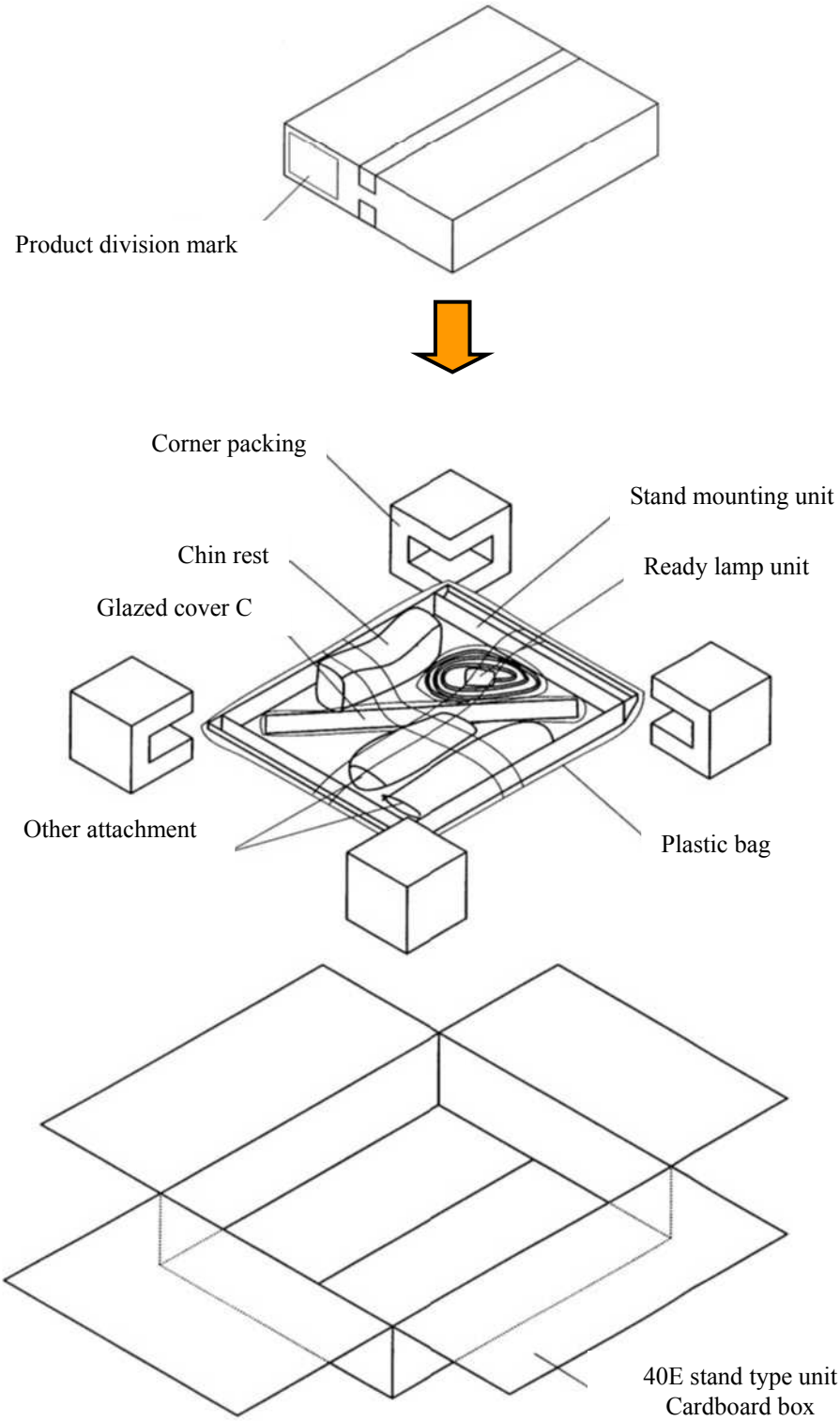
(2) Power Box

No.	Description	Qty	Remarks
1	Power Box	1	(120V/230V)
2	Cable with AC plug	1	(120V/230V)
3	X-ray I/F cable	1	
4	Operation Manual	1	(120V/230V)

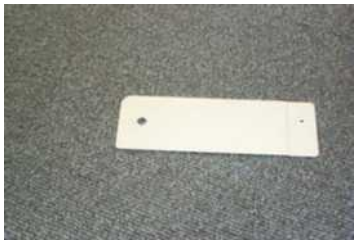
No.	1	No.	2
Description	Power Box	Description	Power cable
Qty	1	Qty	1
Remarks	I/F and Power supply (7m)	Remarks	For Power Box (120/230V)
No.	3	No.	
Description	X-ray I/F cable	Description	
Qty	1	Qty	
Remarks		Remarks	

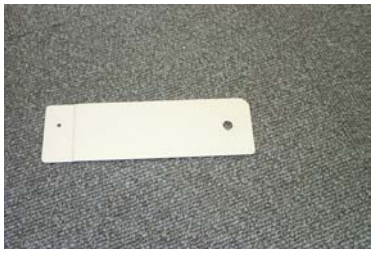
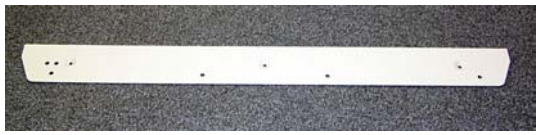
2.2 Stand Type installation unit

1) Packing diagram

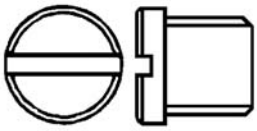


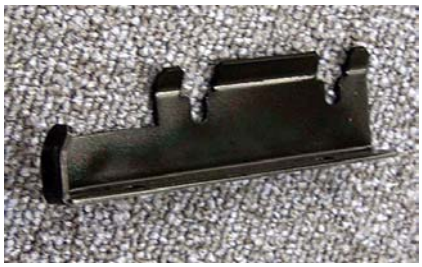
2) List of components

No.	1	No.	2
Description	Stand mounting unit	Description	Glazed cover A
Qty	1	Qty	1
Remarks		Remarks	Pair of glazed cover B
			

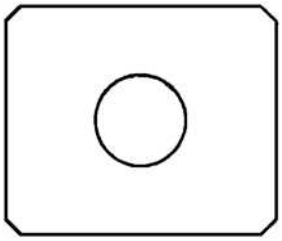
No.	3	No.	4
Description	Glazed cover B	Description	Glazed cover C
Qty	1	Qty	1
Remarks	Pair of glazed cover A	Remarks	
			

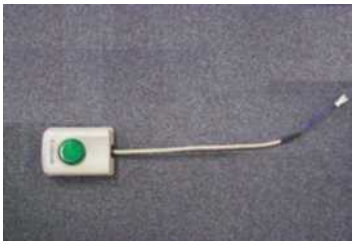
No.	5	No.	6
Description	Glazed cover D	Description	Chin rest
Qty	1	Qty	1
Remarks		Remarks	

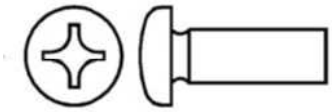
No.	7	No.	8
Description	Screw (M6)	Description	Hinge (Imaging unit side)
Qty	4	Qty	2
Remarks		Remarks	
			

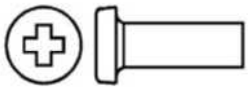
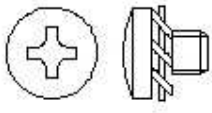
No.	9	No.	10
Description	Anchoring plate (1)	Description	Anchoring plate (2)
Qty	1	Qty	1
Remarks		Remarks	
			

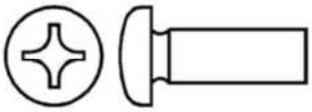
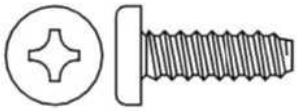
No.	11	No.	12
Description	Side aperture reinforcing board	Description	Hinge collar
Qty	1	Qty	1
Remarks		Remarks	

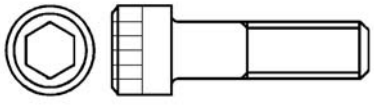
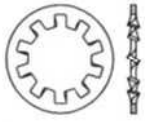
No.	13	No.	14
Description	Stand type isolation sheet	Description	Stand type isolation collar
Qty	8	Qty	4
Remarks		Remarks	
			

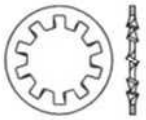
No.	15	No.	16
Description	Ready lamp unit	Description	Ready lamp unit
Qty	1	Qty	1
Remarks		Remarks	Not included in HOKUTO
			

No.	15	No.	16
Description	Mounting shaft	Description	Screw (M3x8)
Qty	1	Qty	4
Remarks	Not included in HOKUTO	Remarks	XB1-2300-806 (No.15 for Installation Not included in HOKUTO)
			

No.	17	No.	18
Description	Screw (M2.6 x 4)	Description	Screw (M3x4)
Qty	2	Qty	7
Remarks	XA1-1260-406	Remarks	XA9-0828
			

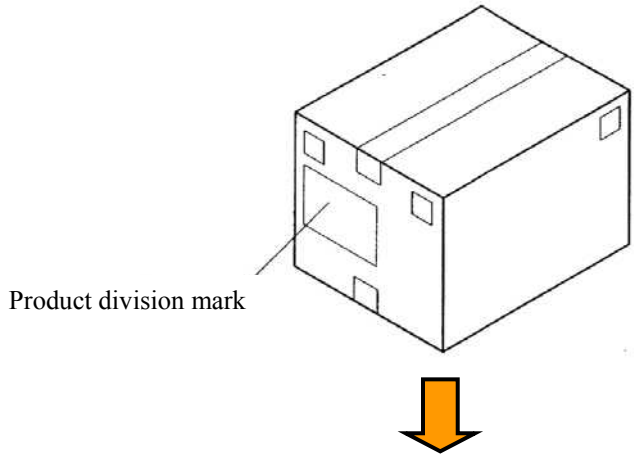
No.	19	No.	20
Description	Screw (M4x6)	Description	Screw (M3x6)
Qty	8	Qty	2
Remarks	XB1-2400-606	Remarks	XB4-7300-609
			

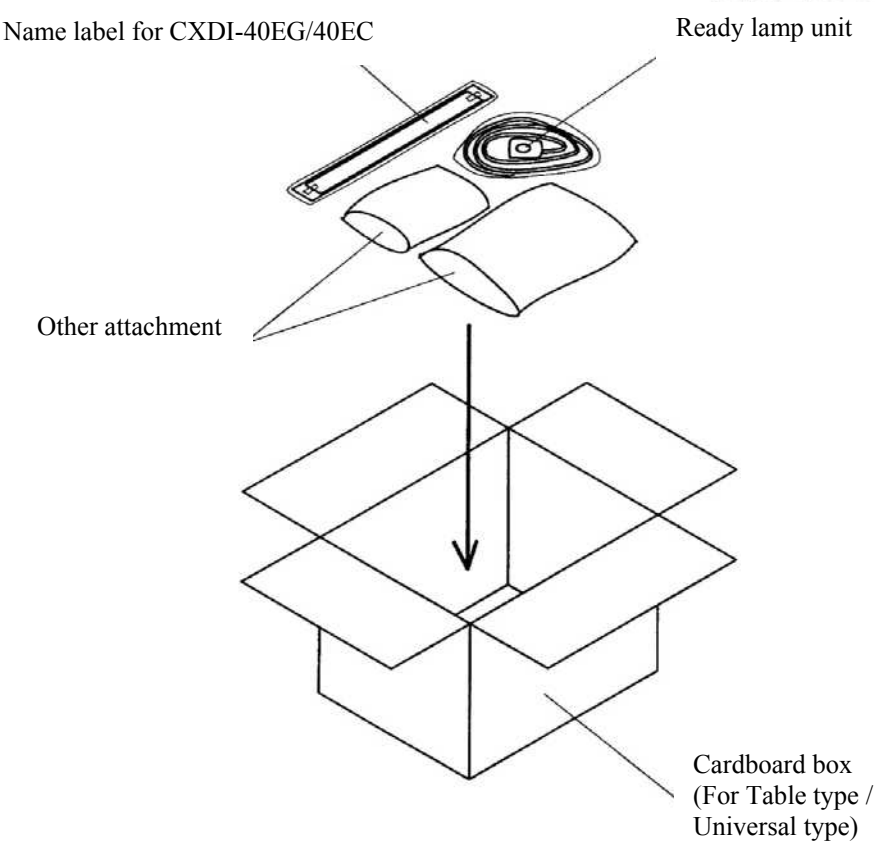
No.	21	No.	22
Description	Screw (M5x8)	Description	Washer (M2.6)
Qty	4	Qty	2
Remarks	XB7-1050-086	Remarks	XD1-4100-262
			

No.	23	No.	
Description	Toothed lock washer (for M2.6)	Description	
Qty	2	Qty	
Remarks	XD1-4100-262	Remarks	
			

2.3 Table type installation unit

1) Packing diagram

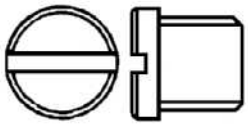
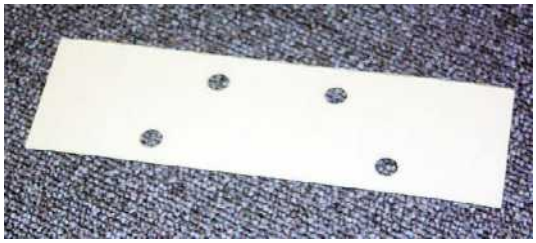


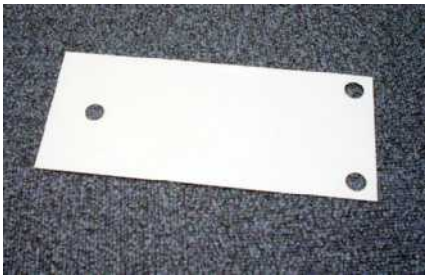


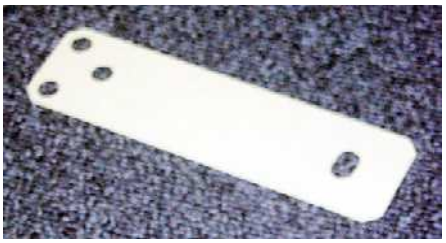
2) List of components

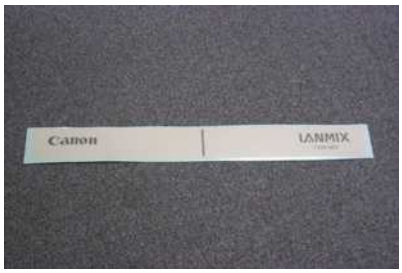
No.	1	No.	2
Description	Screw (M6)	Description	Table cover
Qty	12	Qty	1
Remarks	For shielding light	Remarks	

No.	3	No.	4
Description	Stand aperture shielding plate	Description	Screw shielding plate
Qty	1	Qty	2
Remarks		Remarks	

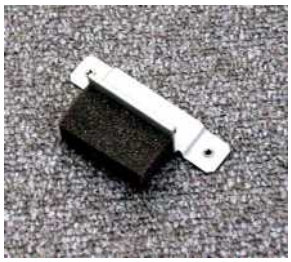
No.	5	No.	6
Description	Screw (M5)	Description	Isolation sheet (bottom 1)
Qty	4	Qty	5
Remarks	For shielding light	Remarks	
			

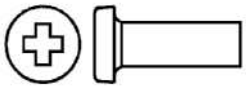
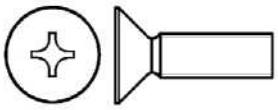
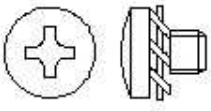
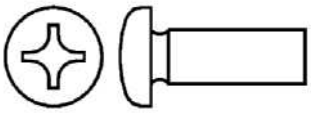
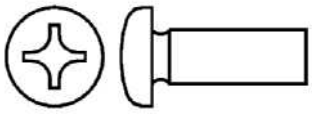
No.	7	No.	8
Description	Isolation sheet (bottom 2)	Description	Isolation sheet (bottom 3)
Qty	5	Qty	6
Remarks		Remarks	
			

No.	9	No.	10
Description	Isolation sheet (side)	Description	Table isolation collar
Qty	5	Qty	12
Remarks		Remarks	
			

No.	11	No.	12
Description	Name label	Description	Mount shaft
Qty	1	Qty	1
Remarks	40EG or 40EC	Remarks	
			

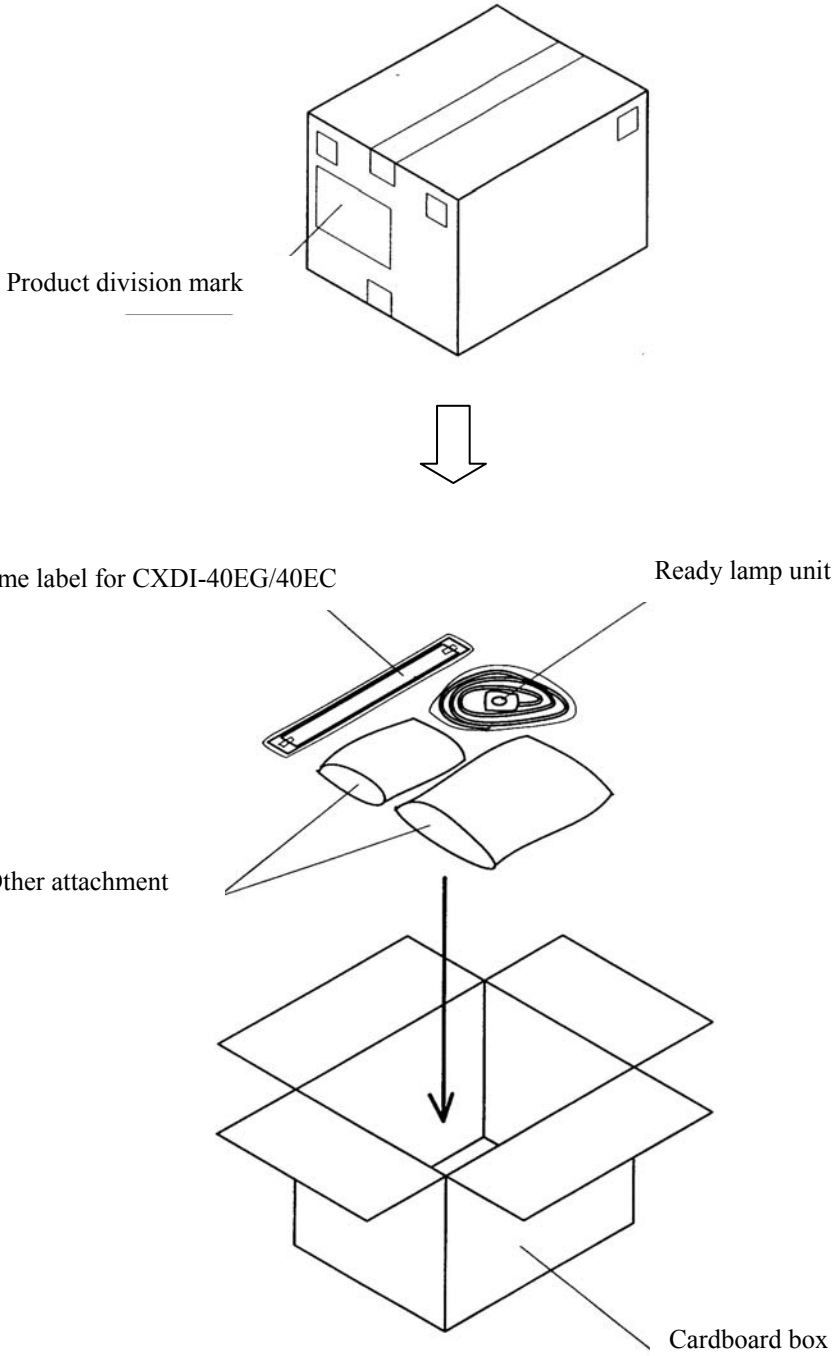
No.	13	No.	14
Description	Ready lamp unit	Description	Isolation sheet (M6 Screw)
Qty	1	Qty	12
Remarks		Remarks	

No.	15	No.	16
Description	Table shielding plate	Description	Shielding board (2)
Qty	1	Qty	1
Remarks		Remarks	
			

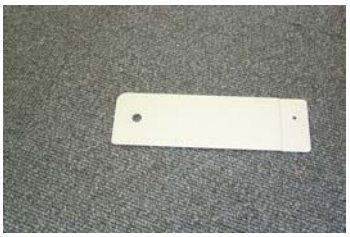
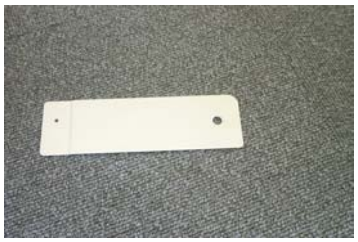
No.	17	No.	18
Description	Screw (M2 x 5)	Description	Screw (M2.6 x 3)
Qty	3	Qty	6
Remarks	XA1-1200-306	Remarks	XA1-3260-306
			
No.	19	No.	20
Description	Screw (M3x4)	Description	Screw (M3x4)
Qty	2	Qty	7
Remarks	XA9-0828	Remarks	XB1-2300-406
			
No.	21	No.	
Description	Screw (M3x8)	Description	
Qty	4	Qty	
Remarks	XB1-2300-806	Remarks	
			

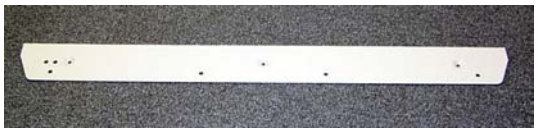
2.4 Universal type installation unit

1) Packing diagram

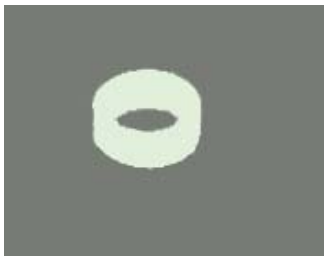


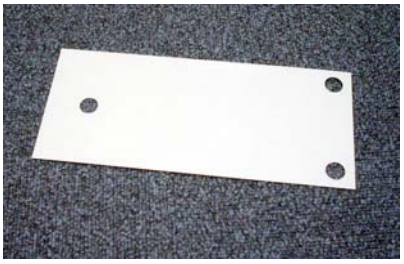
2) List of components

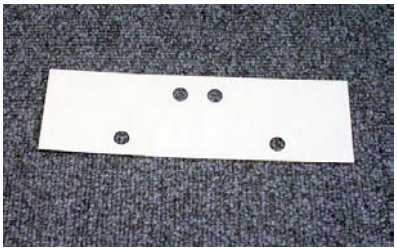
No.	1	No.	2
Description	Glazed cover A	Description	Glazed cover B
Qty	1	Qty	1
Remarks		Remarks	
			

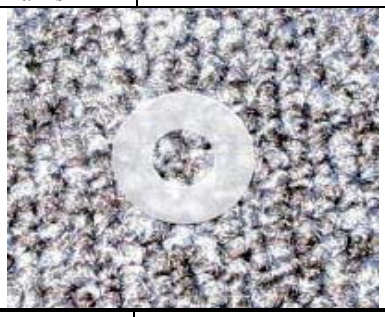
No.	3	No.	4
Description	Glazed cover C	Description	Glazed D
Qty	1	Qty	1
Remarks		Remarks	
			

No.	5	No.	6
Description	Chin rest	Description	Table aperture reinforcing board
Qty	1	Qty	1
Remarks		Remarks	

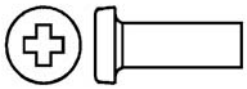
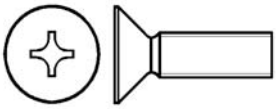
No.	7	No.	8
Description	UNIV isolation collar	Description	Screw shielding plate
Qty	4	Qty	2
Remarks		Remarks	
			

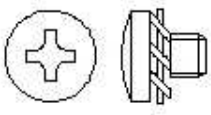
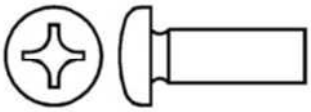
No.	9	No.	10
Description	Screw (M5)	Description	Isolation sheet
Qty	4	Qty	6
Remarks		Remarks	For Maintenance Cover
			

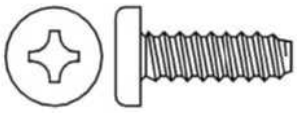
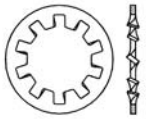
No.	11	No.	12
Description	Isolation sheet (bottom 2)	Description	Isolation sheet (bottom 1)
Qty	5	Qty	4
Remarks		Remarks	
			

No.	13	No.	14
Description	Isolation sheet (M6 screw)	Description	Mounting shaft
Qty	6	Qty	1
Remarks		Remarks	
			

No.	15	No.	16
Description	Ready lamp unit	Description	Shielding board
Qty	1	Qty	1
Remarks		Remarks	

No.	17	No.	18
Description	Screw (M2.6x4)	Description	Screw (M2.6x3)
Qty	2	Qty	4
Remarks	XA1-1260-406	Remarks	XA1-3260-306
			

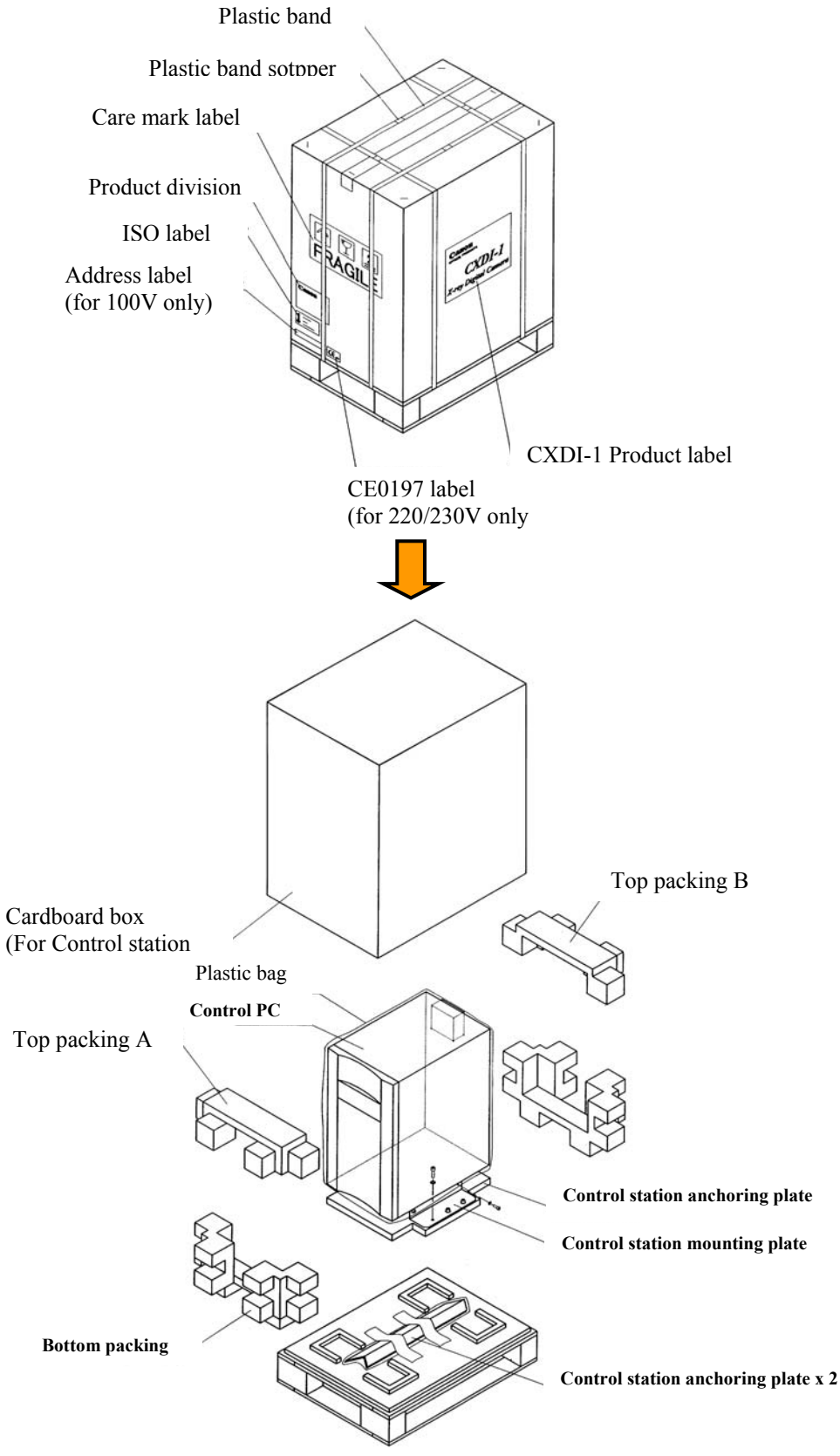
No.	19	No.	20
Description	Screw (M3x4)	Description	Screw (M3x4)
Qty	7	Qty	10
Remarks	XA9-0828	Remarks	XB1-2300-806
			

No.	21	No.	22
Description	Screw (M3x6)	Description	Washer (M2.6)
Qty	2	Qty	2
Remarks	XB4-7300-606	Remarks	XD1-4100-262
			

No.		No.	
Description		Description	
Qty		Qty	
Remarks		Remarks	

2.5 Control station (CXDI-C3/C3S)

(1) Packing diagram

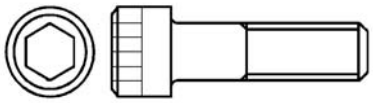
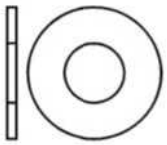


2) List of components

No.	1	No.	2
Description	Control PC Unit	Description	Cable with AC plug
Qty	1	Qty	1
Remarks		Remarks	

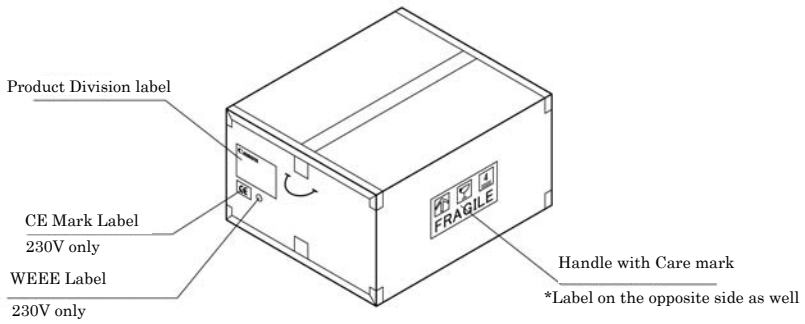
No.	3	No.	4
Description	Cable with AC plug	Description	LAN cable
Qty	1	Qty	1
Remarks	230V	Remarks	

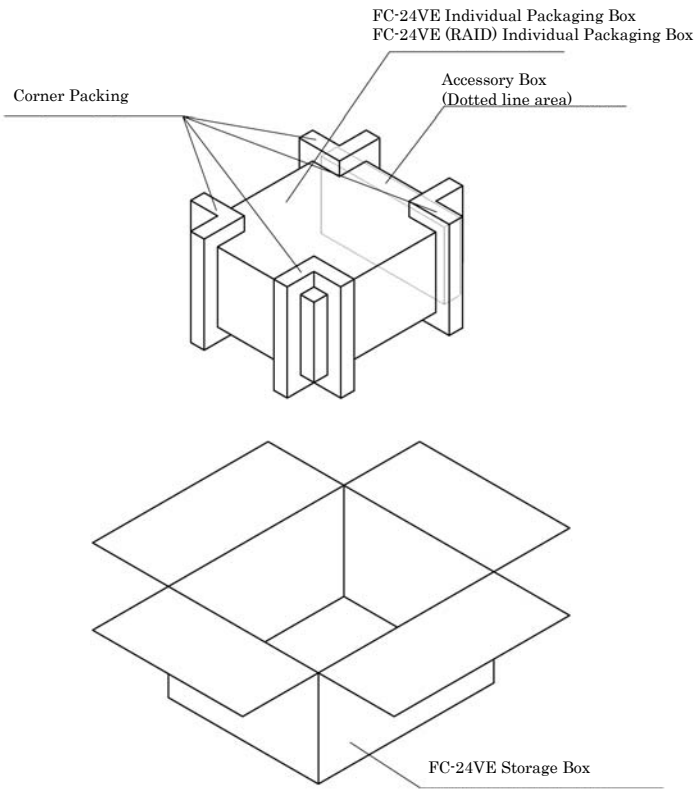
No.	5	No.	6
Description	PC anchoring plate	Description	Anchor
Qty	2	Qty	4
Remarks	Control PC	Remarks	Control PC

No.	7	No.	8
Description	Screw (M6x16)	Description	Washer (M6)
Qty	8	Qty	8
Remarks	XB7-1060-169, Control PC	Remarks	XD1-2100-609
			

2.6 Control Station FC-24VE

1) Packaging diagram





2) Product Composition

Item	100V	120V	230V	CCC Model	Remark
Control PC	1	1	1	1	
AC Power Cable	1	1	1	1	
Windows XP CD-ROM	1	1	1	1	
Vertical installation Stand	1set	1set	1set	1set	
Rubber Spacer	2	2	2	2	
Instruction Manual (Canon)	1	1	1	1	
Leaflet (NEC)	–	–	–	1	Do not hand in to Users and dispose in each Sales Company.
Users Manual (NEC)	–	1	–	–	
E-Manual CD-ROM (NEC)	–	–	–	1	
Backup CD-ROM (NEC)	–	–	–	1	
Dust-proof Filter (For system unit front)	1	1	1	2	Already installed at shipping except for CCC Model.
Dust Filter Cover	–	–	–	1	For CCC Model, install at the time of setting. (1 Extra filter included)

3 CXDI-40EC system installation procedure

3.1 Required Tool

No.	Tools name	Qty	Remarks
1	General tools	1 set	
2	Laptop PC	1	PC/AT compatible (OS:Windows XP)
3	LAN card	1	For laptop PC (If necessary)
4	Mouse	1	PS/2 type
5	Keyboard	1	PS/2 type
6	Hub	1	For connection between control PC and Laptop PC
7	10/100 BASE-T cable	2	Straight type (For connection between Laptop PC and control PC)
8	Software for service maintenance	1	BY9-6538-XXX
9	CXDI application and firmware	1	Make sure the version is ver.6.4 later.
10	CXDI software version compatibility table	1	
11	Resolution chart	1	BY9-7007-000 (If necessary)
12	Metal net	1	BY9-6486-000 (If necessary)
13	Mirror, oil-based marker, etc.	1	For adjusting the alignment with the X-ray tube
14	Electric drill	1	For opening holes

3.2 System installation procedure

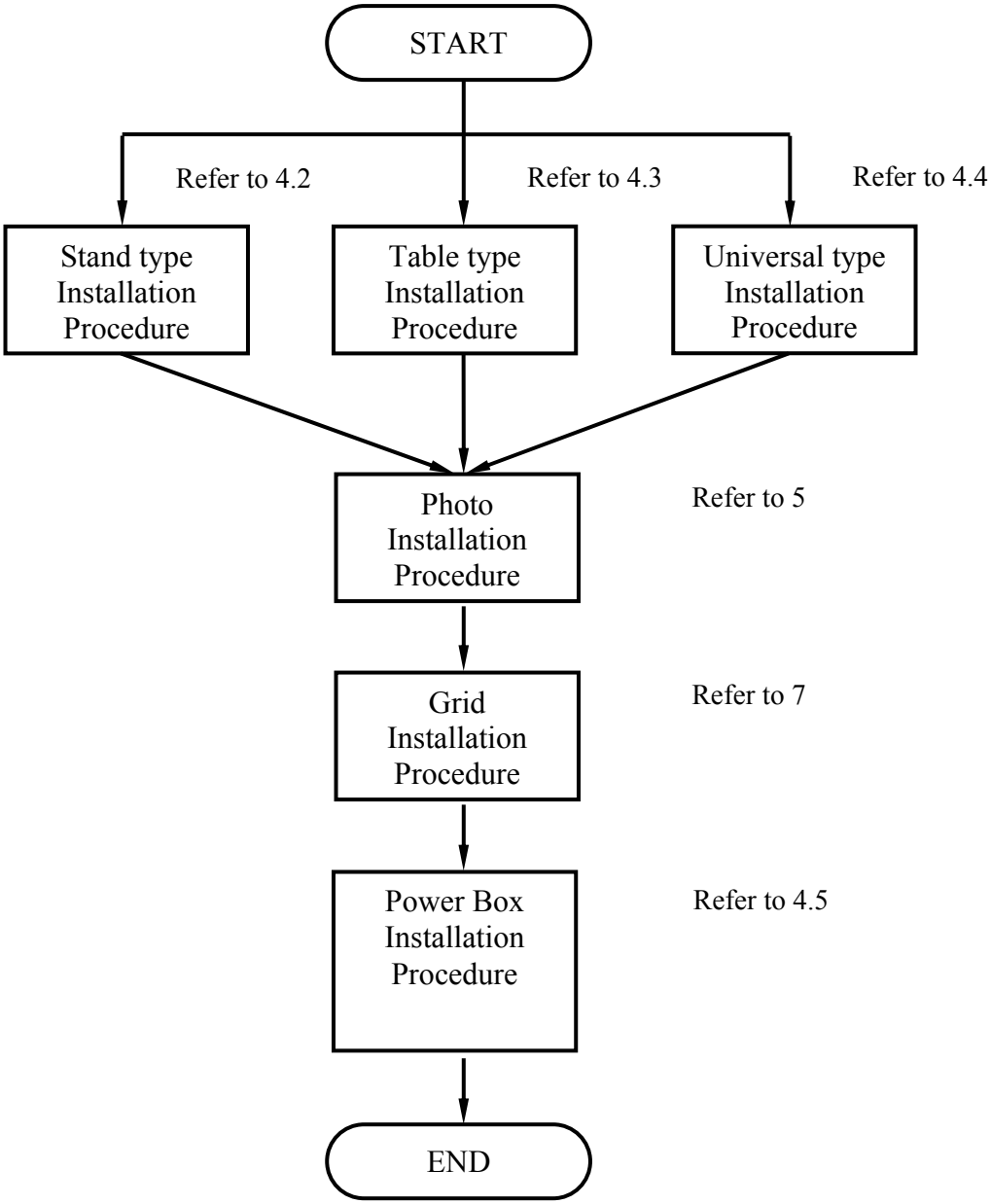
No.	Step	Conditions and checkpoints	Reference
1	Unpack and check the product's constituent parts	There must be no missing parts, damage, dents, etc.	
2	Install the phototimer	Do not scratch the sensor.	
3	Mount the imaging unit	Use the proper kit for the upright stand, table or universal stand.	
4	Connect the imaging unit and power box	- Do not drop the sensor unit. - Attach the ferrite core. - The cables must be routed in such a way that no unreasonable loads are brought to bear upon them.	
5	Connect the power box and the control PC	The cables must be routed in such a way that no unreasonable loads are brought to bear upon them.	
6	Attach and connect the operation unit	The cables must be routed in such a way that no unreasonable loads are brought to bear upon them.	
7	Connect the power box and X-ray generators	The manufacturer of the X-ray generators must be asked to handle the connections with the generators.	
8	Check date and time	Date and time must be changed according to the area where the instrument is installed.	"Checking and Setting the Date and Time".
9	Check the software program's version	The compatibility of the sensor unit and the control PC must be checked on the compatibility list, and the software program must be installed or upgraded as required.	"Checking the Firmware Version" in "Setting"
10	Identifying the imaging units and setting the number of units to be connected (inputting the sensor serial numbers)		"Identifying the Sensor Unit" in "Setting"
11	Install control PC unit serial number.		"Entering Control PC Serial Number" in "Setting"
12	Adjusting the timing with the X-ray generators		"Interface with X-ray Generator"
13	Inserting the backup floppy disk	- It must be confirmed at re-start that backup files have been made. - Data cannot be backed up with floppy disk when the imaging unit is installed in automobile.	
14	Calibration	No errors must be displayed.	Operation Manual
15	Set the Fixed ROI areas	If necessary, to set the ROI area.	Operation Manual
16	Set exposure parameter table	Set it in consultation with the technician.	"Table Setup Setting"
17	Set annotation	Set it in consultation with the technician.	"Performing the Annotation Setting"
18	Connect the network and set the output destination		"Network Connections" in "Setting"

No.	Step	Conditions and checkpoints	Reference
19	Startup settings		"Set Up Startup Menu" in "Setting"
20	Radiographic testing	- Radiography must be performed after calibration. - The images must be checked using charts. - The data must be sent to the printer and storage and the images must be checked.	"Image Quality" in "Setting"
21	Check the linearity of the transferred image density		"Linearity Check of Transfer Image Density" in "Setting"
22	Correct operation unit gamma		"Operation Unit Gamma Correction" in "Setting"
23	Body parts settings	The engineer in charge must be consulted prior to performing these settings.	Operation Manual
24	Check and perform the system settings	The engineer in charge must be consulted prior to performing these settings.	"Setting"
25	Anchoring		
26	Delete unnecessary data		"Post Installation Check" in "Setting"
27	Clean		
28	Explain operation to the user		Operation Manual
29	Adjust final parameters	The engineer in charge must be consulted prior to narrowing down the adjustments to the final values.	Operation Manual
30	Backing up valuable data	Not necessary for the systems installed in vehicles.	"Backing Up Important Setting Data" in "Setting"

4. Unit connections

4.1 Digital X-ray camera CXDI-40EG/40EC

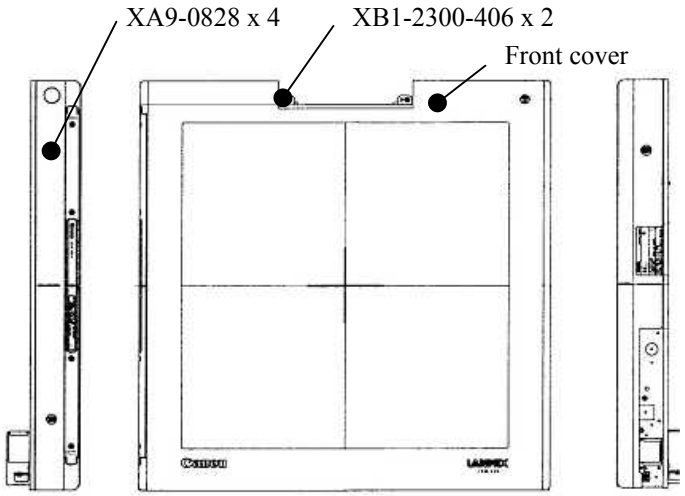
See the outline flow.



4.2 Stand Type

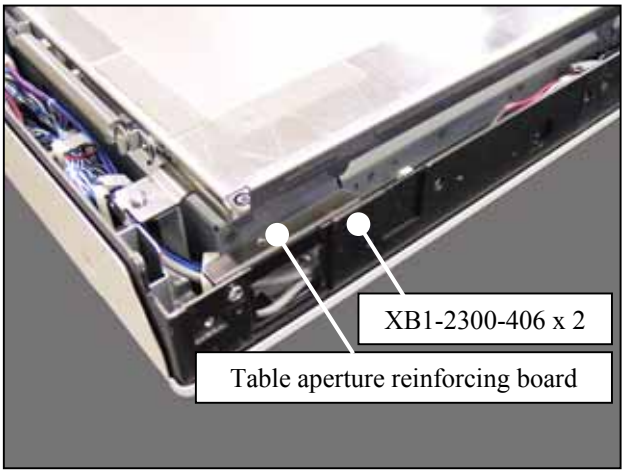
Note:
1. Remove the Grid Unit when it is inserted in the Imaging Unit.
2. DO NOT SHOCK the LANMIT Unit and DO NOT SCRATCH the surface of it during this procedure.

1) Remove the front cover
Remove the screws (XA9-0828 x 4, XB1-2300-406 x 2) and the front cover.

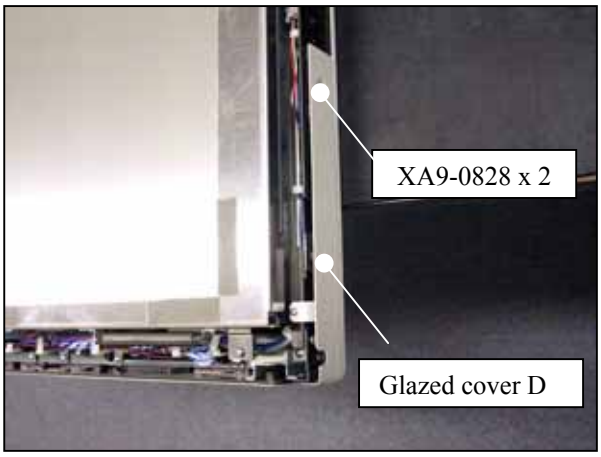


2) Remove the grid rail.

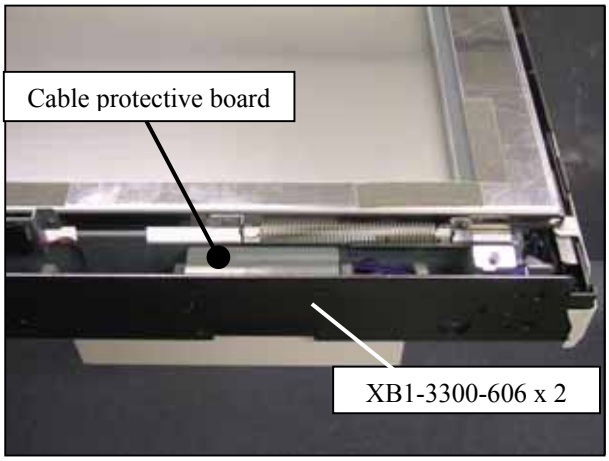
3) Install the Table aperture reinforcing board
Install the Table aperture reinforcing board to the Imaging Unit with the screws (XB1-2300-40 x 2).



4) Install the Glazed cover D
Install the Glazed cover D with the screws (XA9-0828 x 2).

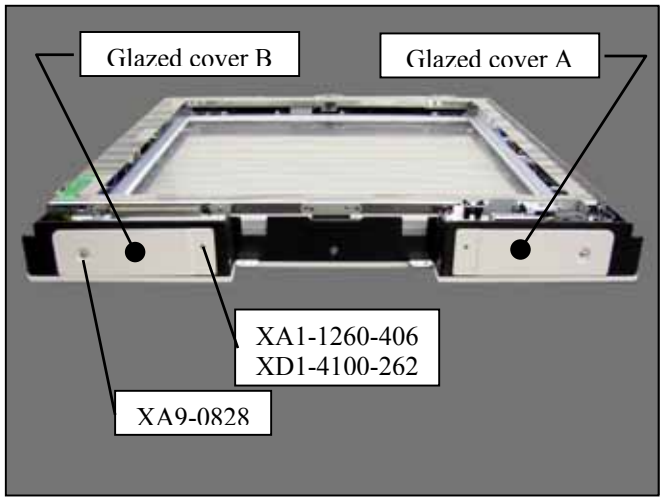


5) Install the Cable protective board
Install the Cable protective board to the lower-right part of the Imaging Unit with the screws (XB1-3300-606 x 2).

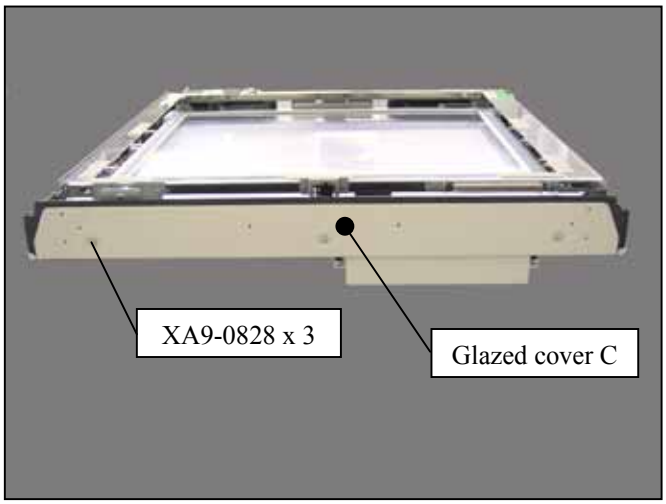


6) Installation of grid rail

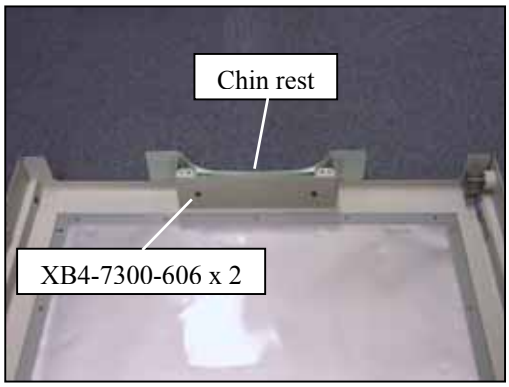
7) Install the Glazed cover A, B
Install the each Glazed cover (A, B) to the upper part of the Imaging Unit with the screws (XA9-0828, XA1-1260-406 and XD1-4100-262).



8) Install the Glazed cover C
Install the Glazed cover C to the lower part of the Imaging Unit with the screws (XA9-0828 x 3).



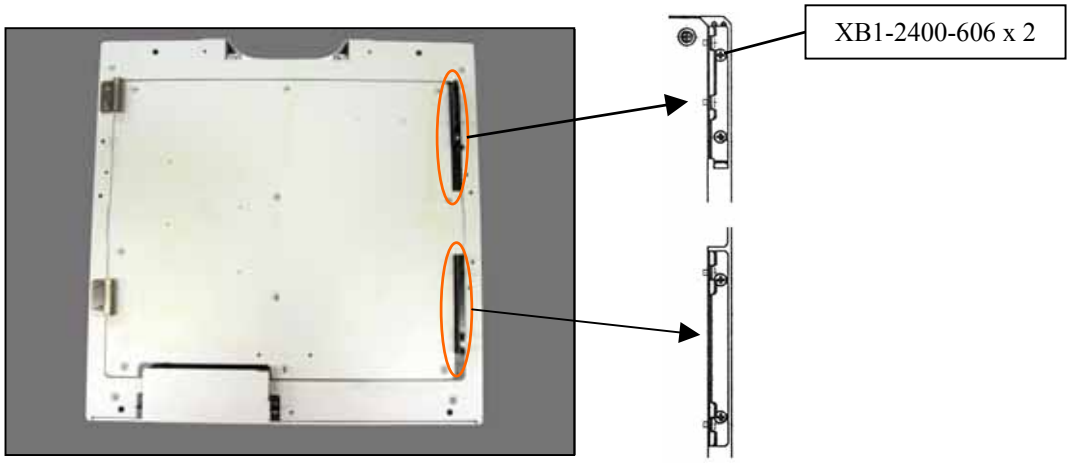
9) Install the Chin rest
Remove the nuts and bolts (with the hexangular hole) on which attached the front cover. And then install the Chin rest with the screws (XB4-7300-606 x 2).



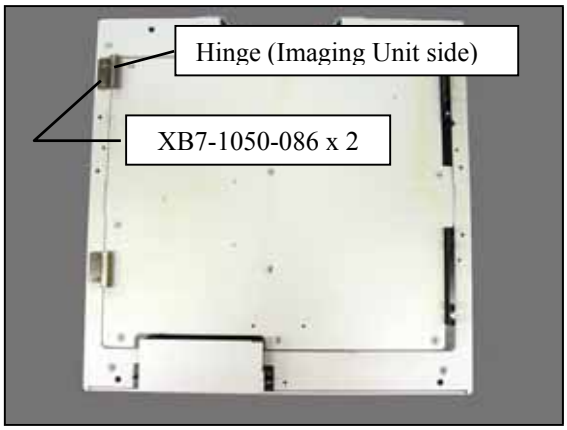
10) Install the Front cover
Install the Front cover by the reverse procedure of removing it.

Note:
The numbers of the screws are 6**(XA9-0828 x 4, XB1-2300-406 x 2).** ***The screws*** **(XB1-2300-406 x 2)** ***must be needed to install the Front cover.***

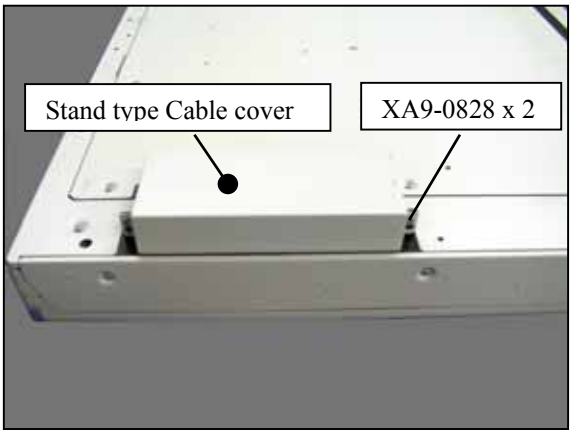
11) Install the Anchoring plate (1), (2)
Install the each plate (Anchoring plate (1), (2)) with the screws (XB1-2400-606 x 2).



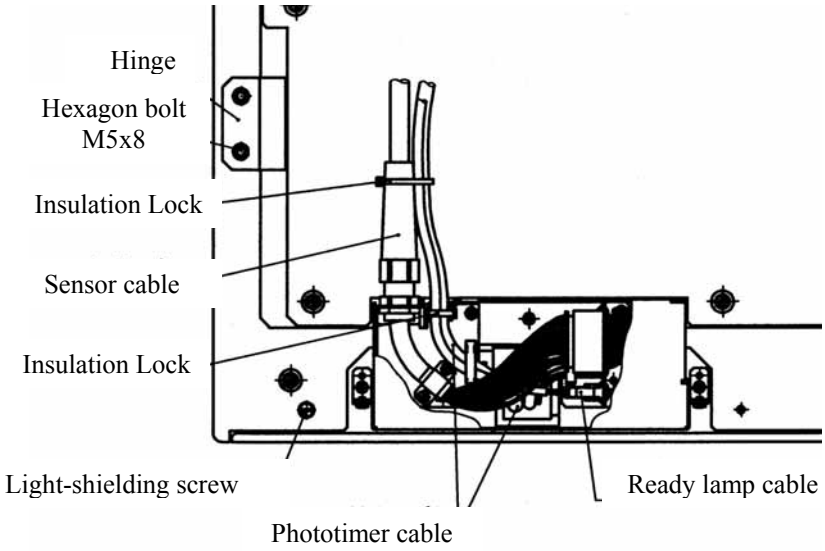
12) Install the Hinge (Imaging Unit side)
Install the Hinges to the Imaging Unit.

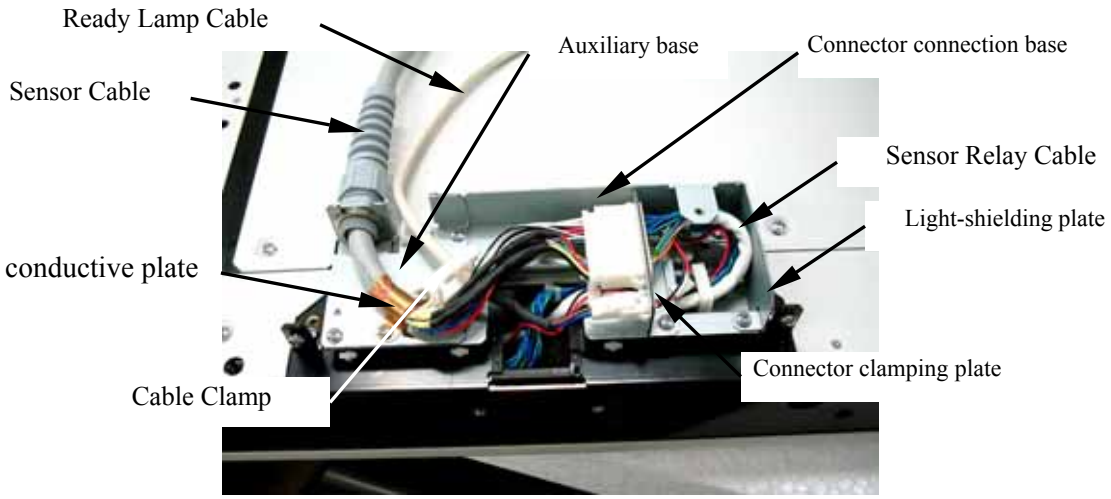


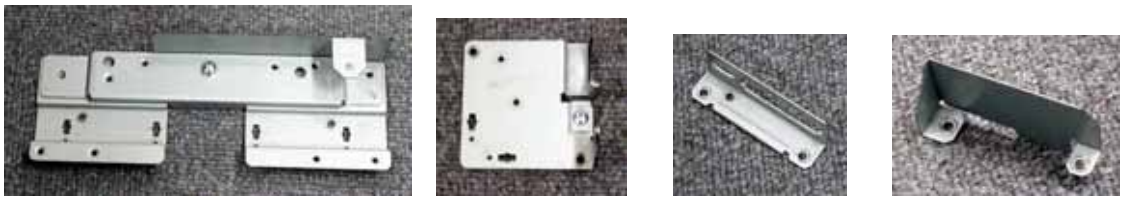
13) Remove the Stand type Cable cover
Loosen and remove the screws (XA9-0828 x 2). Remove the Stand type Cable cover.



14) Connecting the cables







Connector connection base Auxiliary base Connector clamping plate Light-shielding plate

Cable connection procedure

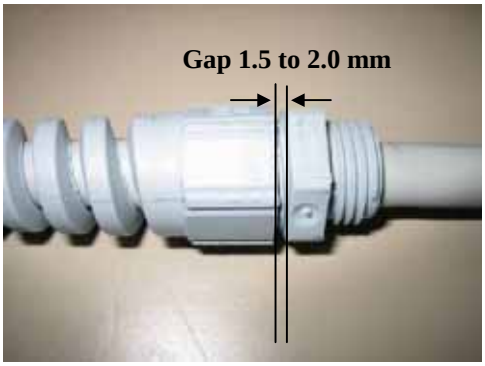
1. Secure the bushing area of the sensor cable to the auxiliary base, and secure the copper foil tape area using the conductive plate.

2. Pass the sensor cable connector through the cable clamp, and then plug it into the connector of the sensor relay cable which is secured to the connector clamping plate.

3. Pass the ready lamp cable connector through the cable clamp, and then plug it into the connector of the lamp relay cable which is secured to the connector clamping plate.

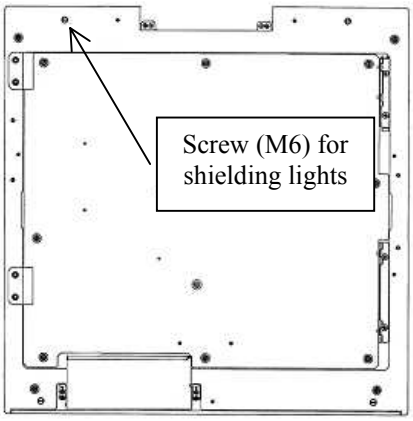
4. Secure the cable together with the phototimer cable to the clamp using the insulation lock, and then secure it together with the sensor cable using the insulation lock, and lead the cables out to the rear panel of the sensor unit.

Notes:
- Connect the cables in such a way that they are not subject to unnecessary levels of force, and ensure that the cables are not pinched or sandwiched.
- To avoid the risk of damage when the cables are removed with very large force, check tightening torque of the bush (refer the following figure).



<Sensor cable>

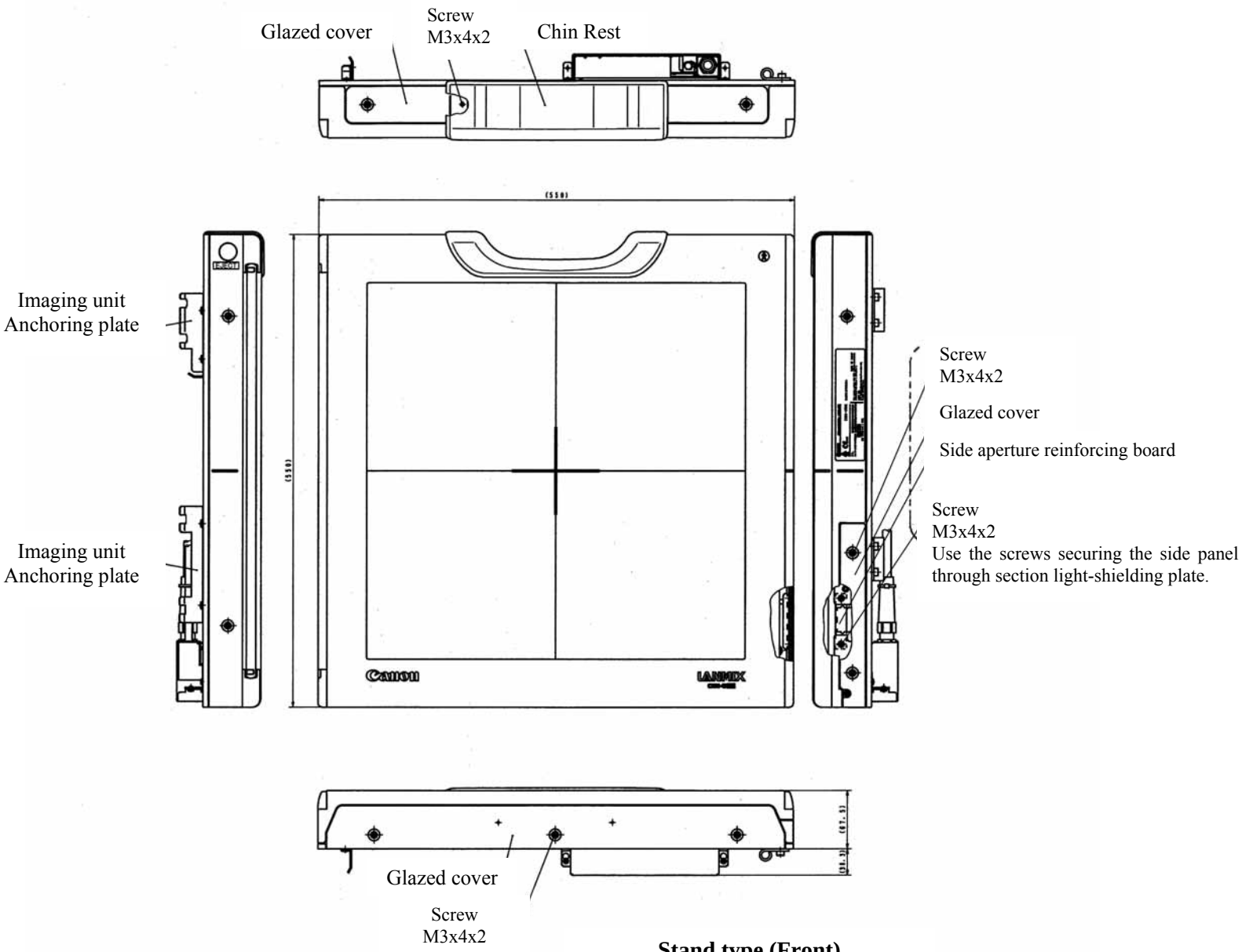
15) Install the Screw for shielding lights
Install the Screw (M6) for shielding lights to the four parts on the rear panel of Imaging Unit.



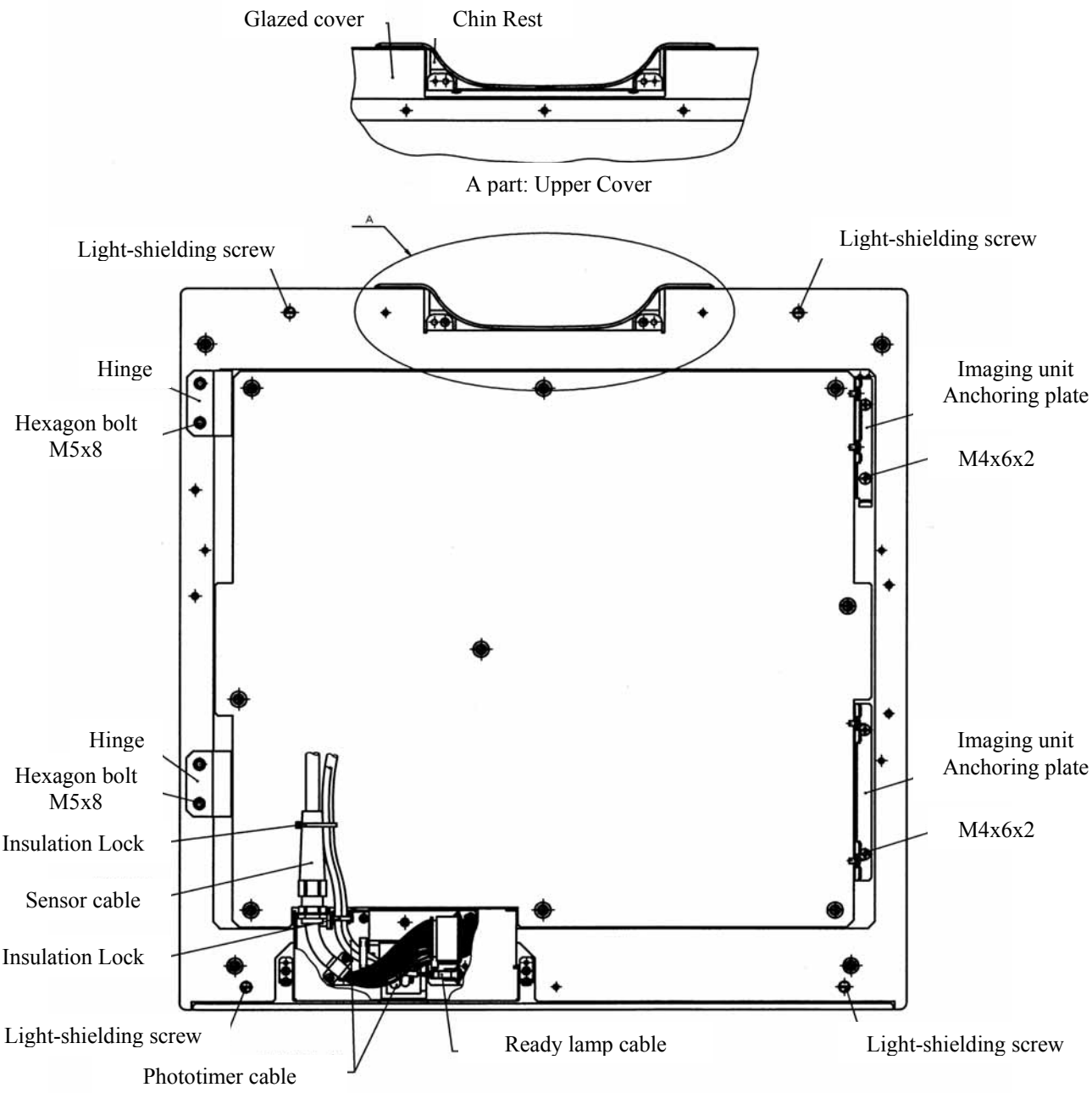
16) Install the Stand type Cable cover

17) Install the Imaging Unit to the Stand-type stand
Install the Imaging Unit to the Stand-type stand.

Note:
The Imaging Unit and Stand must be insulated with the insulation sheet.



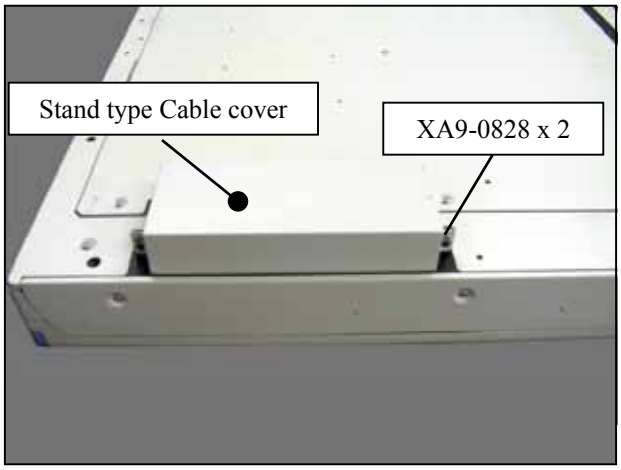
Stand type (Front)


Glazed cover
Chin Rest
A part: Upper Cover
A
Light-shielding screw
Light-shielding screw
Hinge
Hexagon bolt
M5x8
Imaging unit
Anchoring plate
M4x6x2
Hinge
Hexagon bolt
M5x8
Insulation Lock
Sensor cable
Insulation Lock
Imaging unit
Anchoring plate
M4x6x2
Light-shielding screw
Phototimer cable
Ready lamp cable
Light-shielding screw

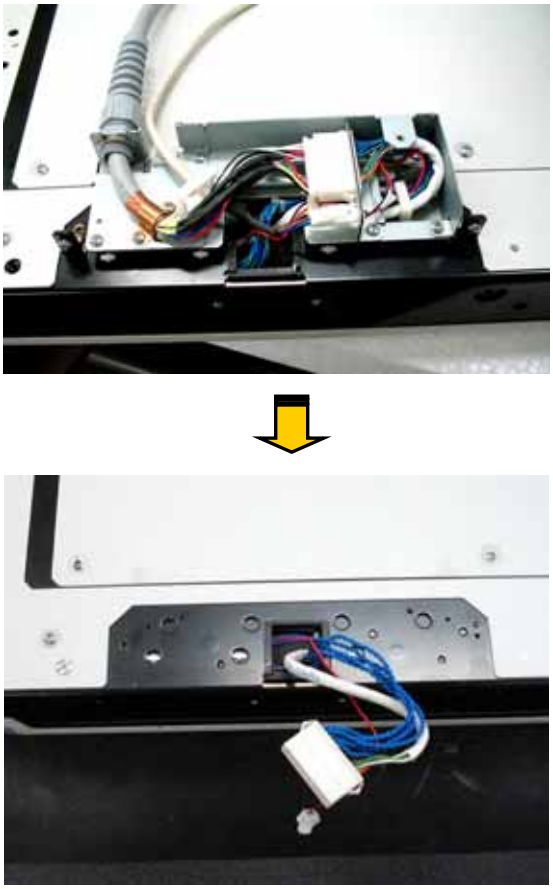
4.3 Table Type

Note:
Remove the Grid Unit when it is inserted in the Imaging Unit.

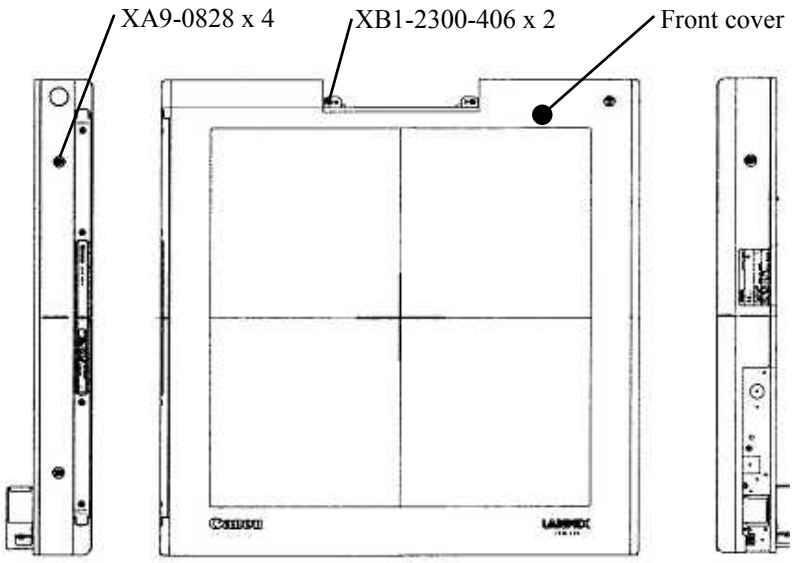
1) Loosen and remove the screws (XA9-0828 x 2) on the rear panel of the Imaging Unit. And remove the Stand type Cable cover.



2) Remove the parts mounted in the figure on the left to set to the status shown in the figure on the right and reconnect the cables to the side panel light-shielding opening.

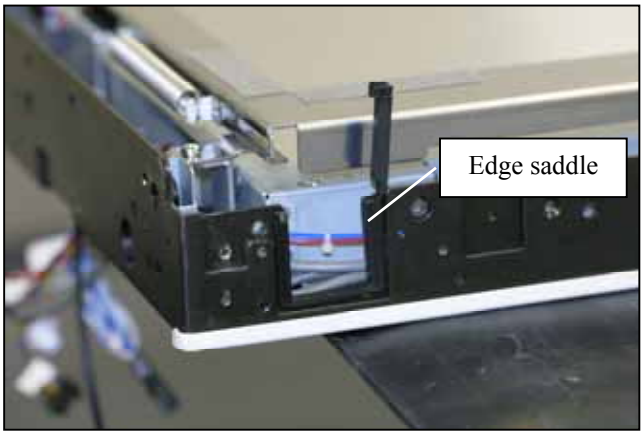


3) Turn over the Imaging Unit, remove the Screws (XA9-0828 x 4, XB1-2300-406 x 2).
And then remove the Front cover.
Note:
<u>DO NOT SHOCK the LANMIT</u> and <u>DO NOT SCRATCH the surface of it</u> during this procedure.

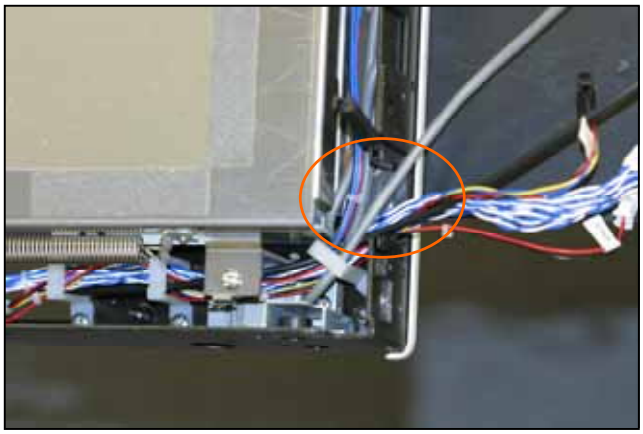


4) Remove the grid rail.

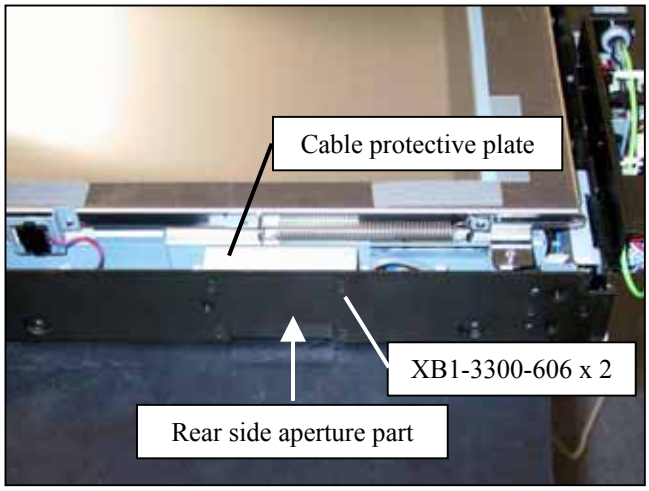
5) Install the Edge saddle to the side aperture part of the Frame.



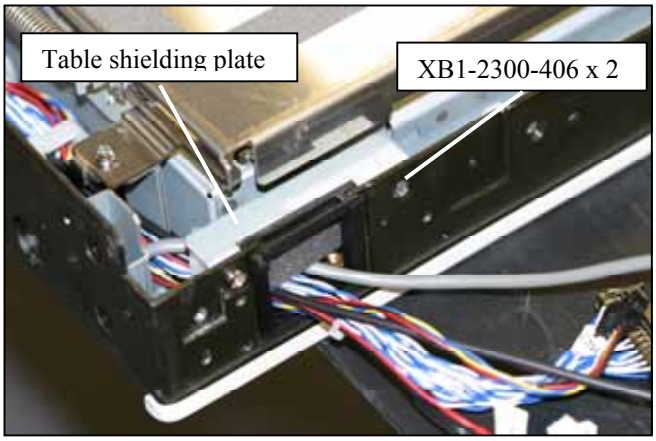
6) Change the cable wiring which goes out from the aperture part of rear side.
And extract these cables from the side aperture part. For wiring to the Table connector base, extract these cables by the suitable length.



7) Install the Cable protective plate with the Screws (XB1-3300-606 x 2).

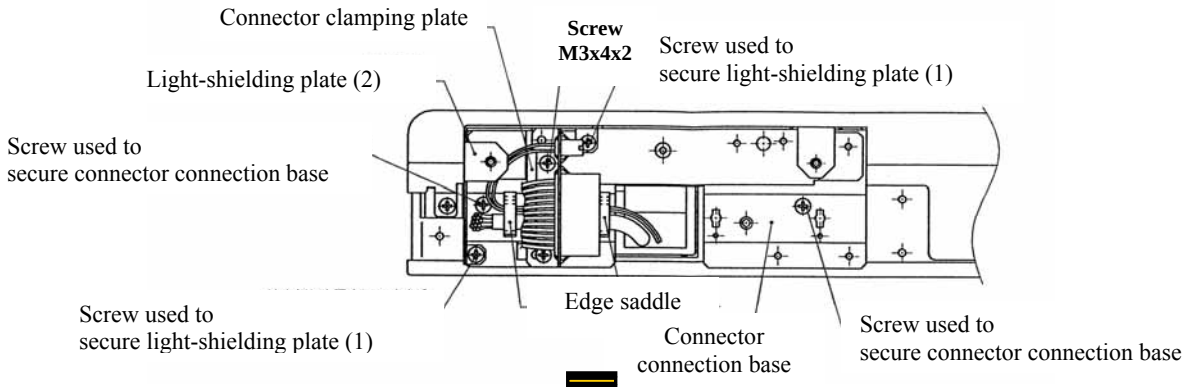


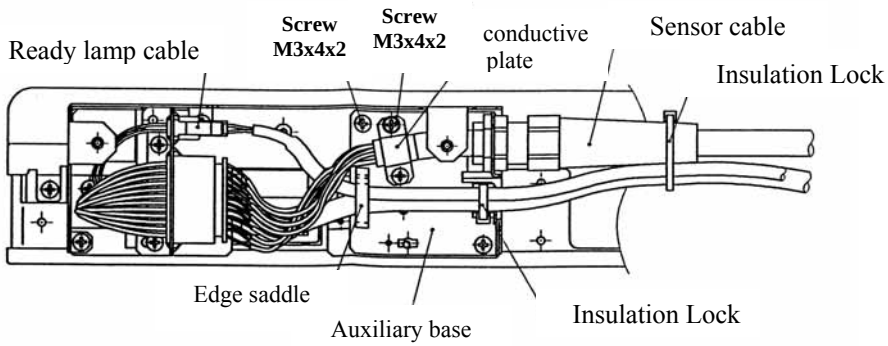
8) After closing the Edge saddle, install the Table shielding plate with the Screws (XB1-2300-406 x 2).



9) Installation of grid rail

10) Connecting the cables





Connector connection base

Auxiliary base

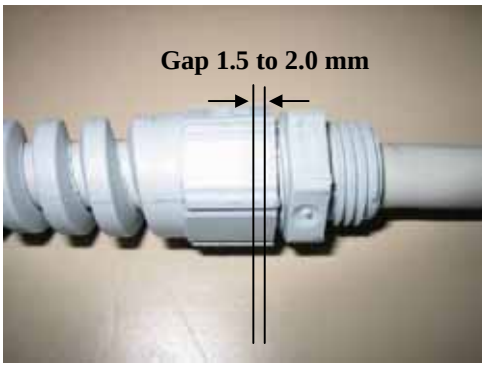
Connector clamping plate

Cable connection procedure

1. Secure the bushing area of the sensor cable to the auxiliary base, and secure the copper foil tape area using the conductive plate.
2. Pass the sensor cable connector through the cable clamp, and then plug it into the connector of the sensor relay cable which is secured to the connector clamping plate.
3. Pass the ready lamp cable connector through the cable clamp, and then plug it into the connector of the lamp relay cable which is secured to the connector clamping plate.
4. Secure the cable together with the phototimer cable to the clamp using the insulation lock, and then secure it together with the sensor cable using the insulation lock, and lead the cables out to the side panel of the sensor unit.

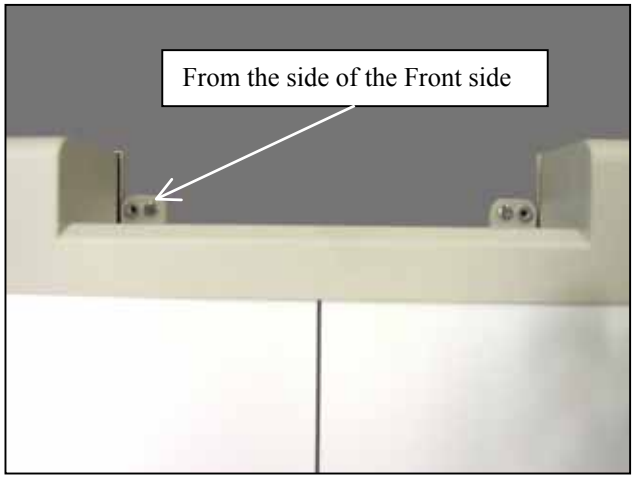
Notes:

- Connect the cables in such a way that they are not subject to unnecessary levels of force, and ensure that the cables are not pinched or sandwiched.
- To avoid the risk of damage when the cables are removed with very large force, check tightening torque of the bush (refer the following figure).

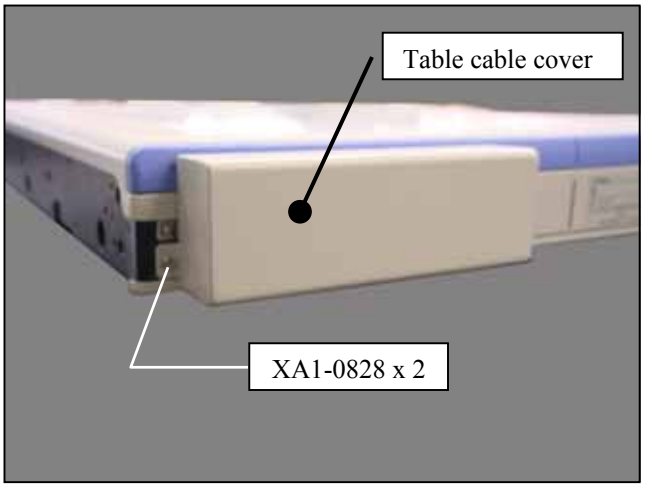


<Sensor cable>

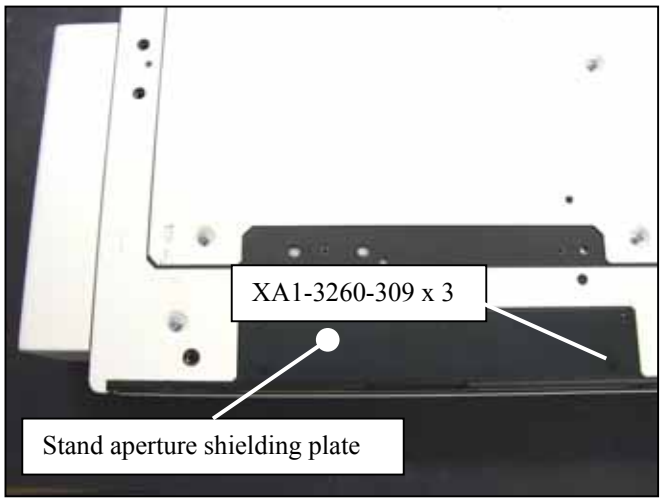
11) Install the Front cover with the Screws (XA9-0828 x 4, XB1-2300-406 x 2).
At this time, the Screws (XB1-2300-406 x 2) are fixed from the side of the Front cover.



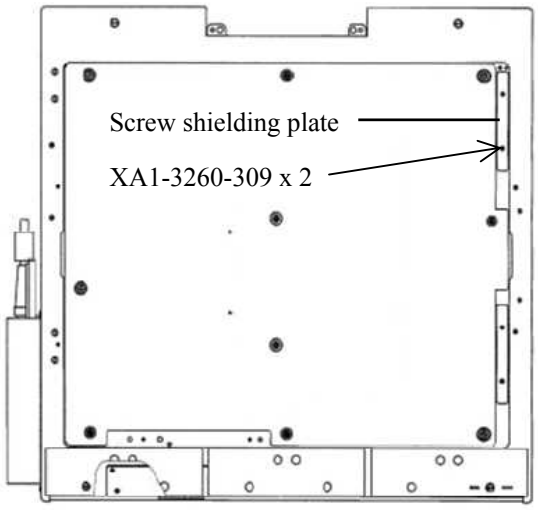
12) Install the Table cable cover with the Screws (XA1-0828 x 2).



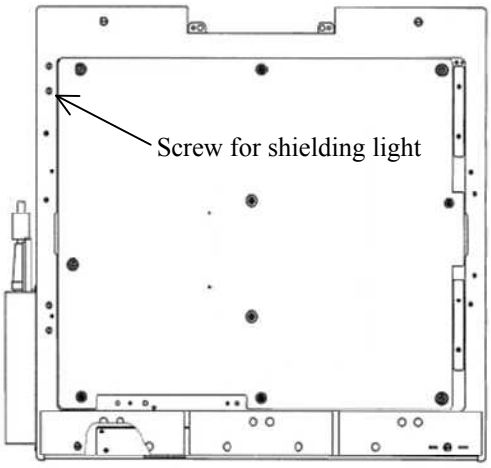
13) Turn over the Imaging Unit and install the Stand aperture shielding plate of the rear aperture part with the Screws (XA1-3260-309 x 3).



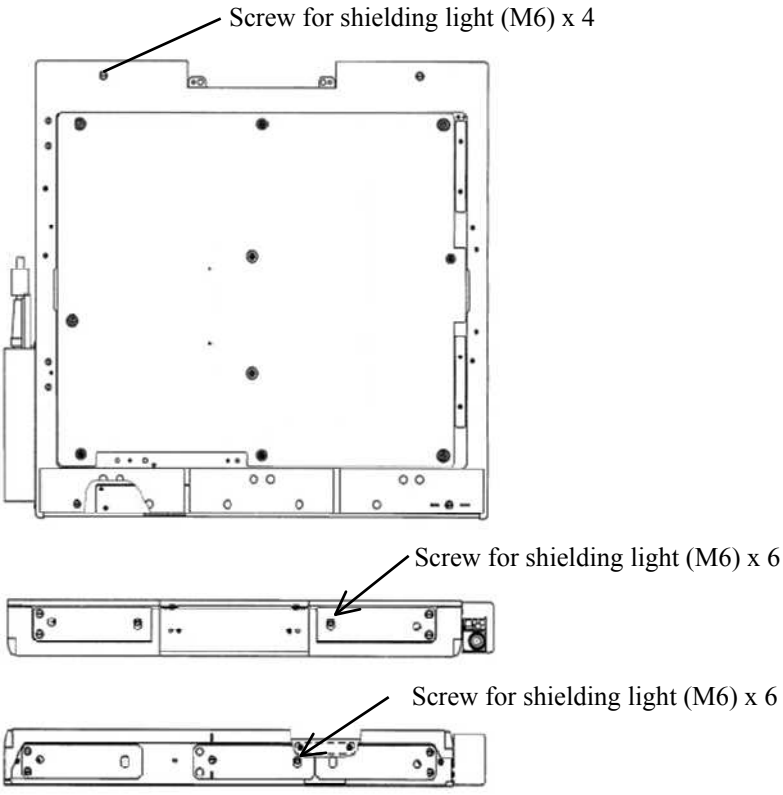
14) Install the Screw shielding plate with the Screws (XA1-3260-309 x 2).



15) Install the Screws for shielding light (M5 x 4).

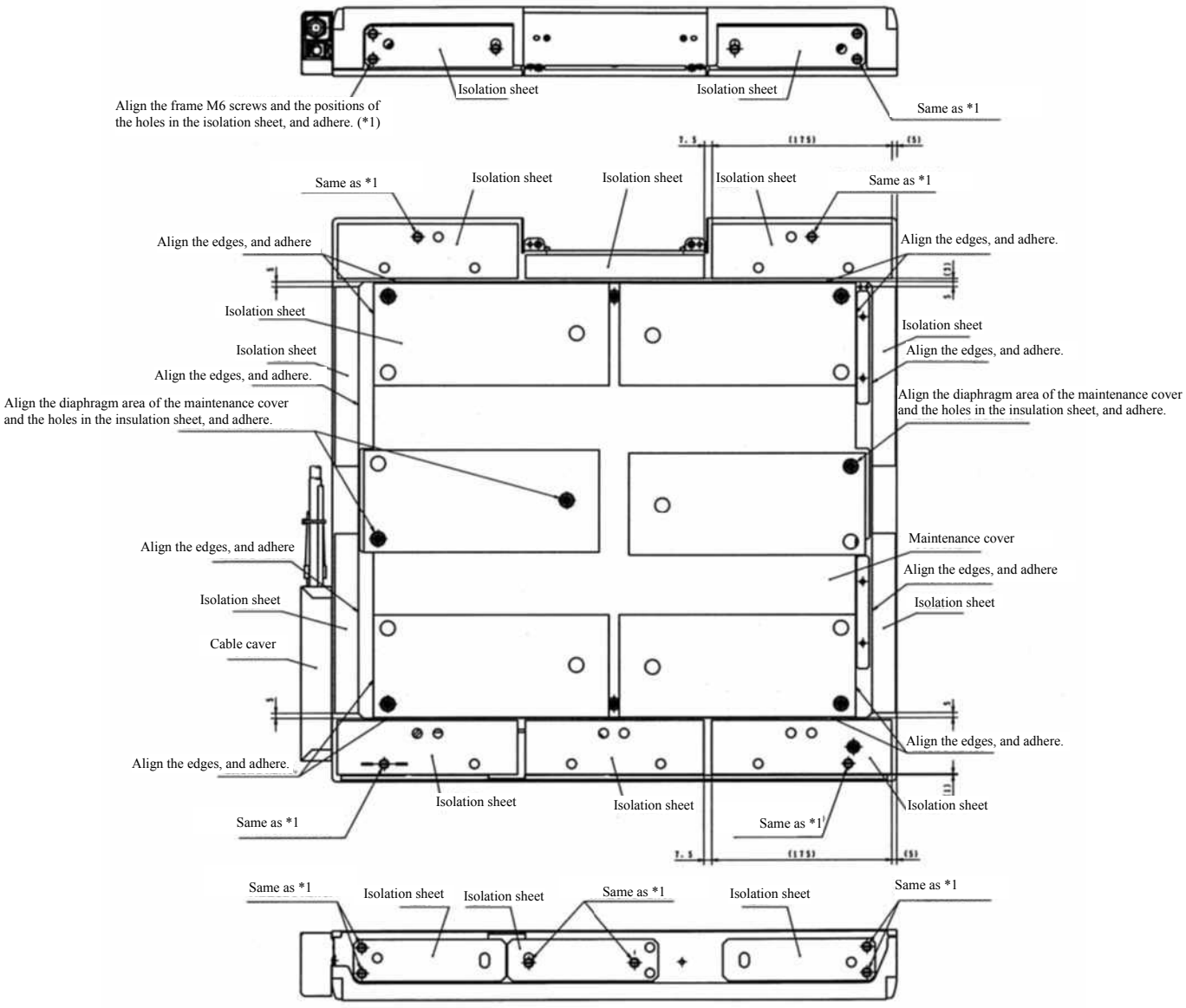


16) Install the Screws for shielding light to the M6 Screw part of the Frame which not used for installing the Imaging Unit.



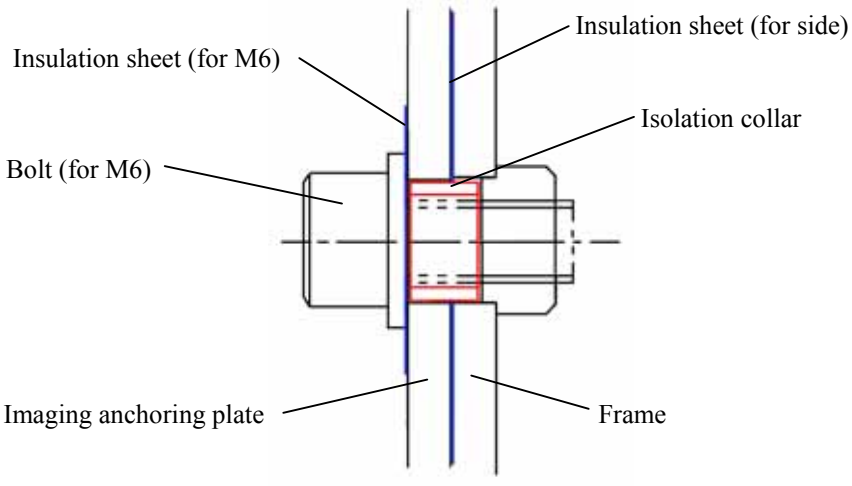
17) Install the isolation sheet. But not need to install it to the place where not touch with the stand directly.

A) Install part

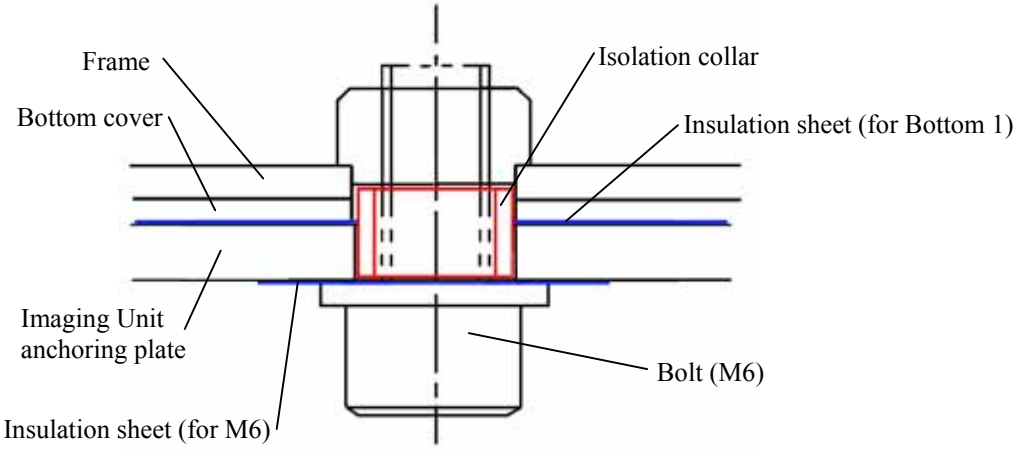


B) When installing the attachment for the Imaging Unit, use the isolation sheet for M6 Screws and the Table isolation collar. And more, the M6 Screws, Imaging anchoring plate are not implemented with the Table Installation unit.

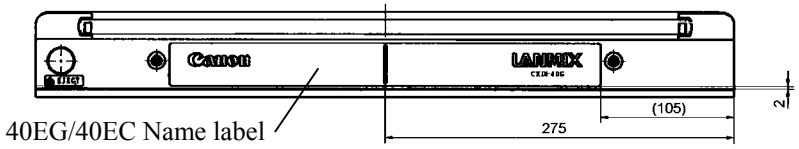
- Side view



- Bottom view



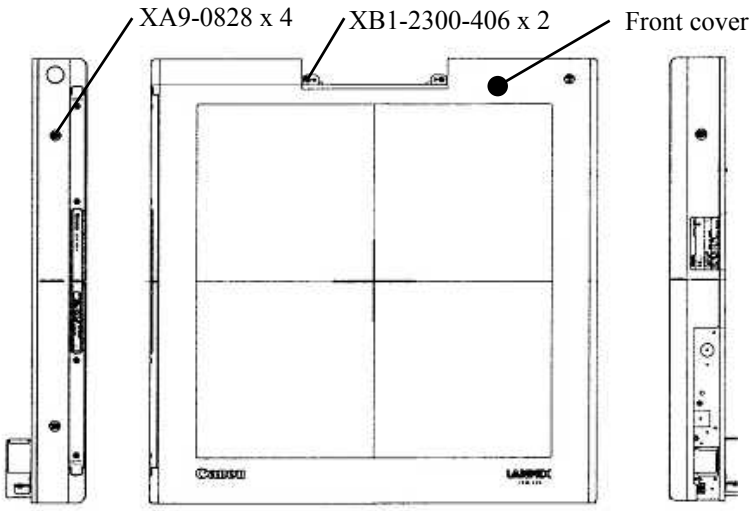
18) Install the 40EG/40EC Name label to the side part.



4.4 Universal Type

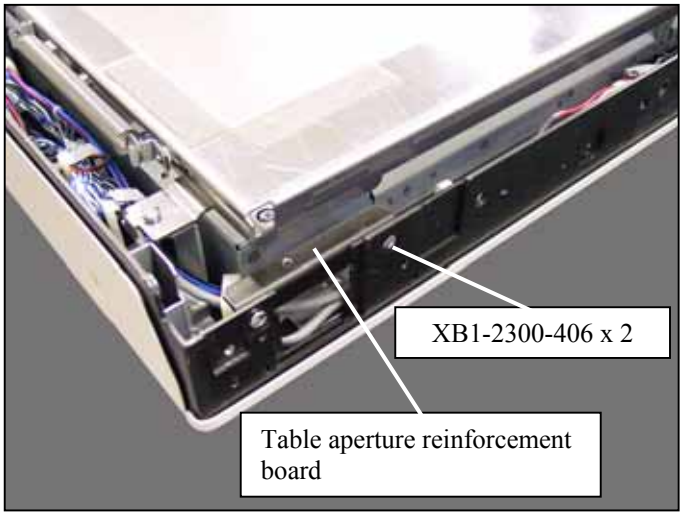
Note:
Remove the Grid Unit when it is inserted in the Imaging Unit.

1) Remove the Front cover
Remove the Screws (XA9-0828 x 4, XB1-2300-406 x 2) and the Front cover.
Note:
DO NOT SHOCK the LANMIT and DO NOT SCRATCH the surface of it during this procedure.

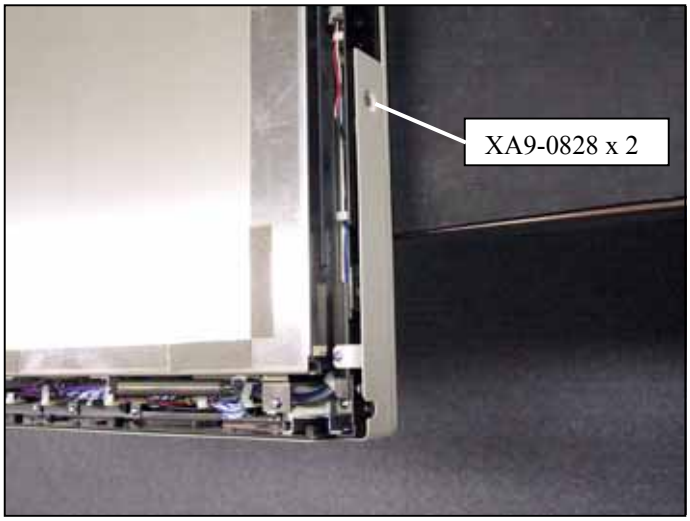


2) Remove the grid rail.

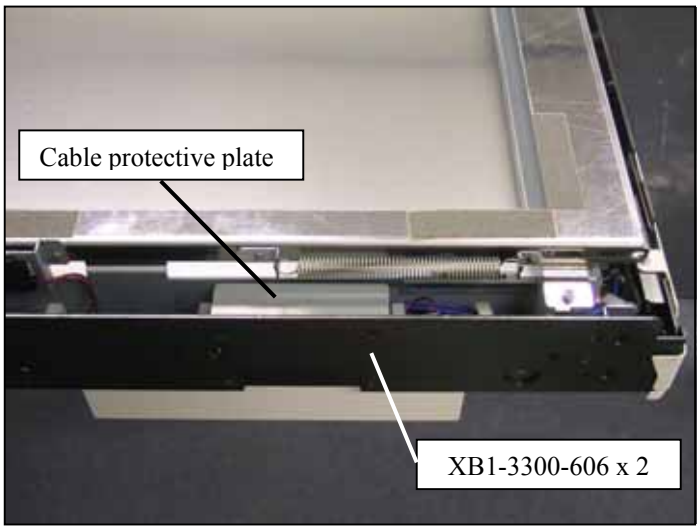
3) Install the Table aperture reinforcement board
Install the Table aperture reinforcement board to the Frame of the Imaging Unit with the Screws (XB1-2300-406 x 2).



4) Install the Glazes cover D
Install the Glazed cover D with the Screws (XA9-0828 x 2).



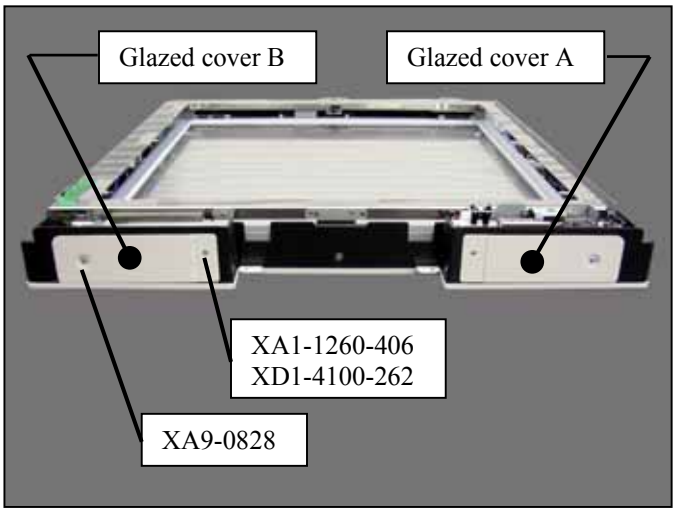
5) Install the Cable protective plate
Install the Cable protective plate to the lower-right part with the Screws (XB1-3300-606 x 2).



6) Installation of grid rail

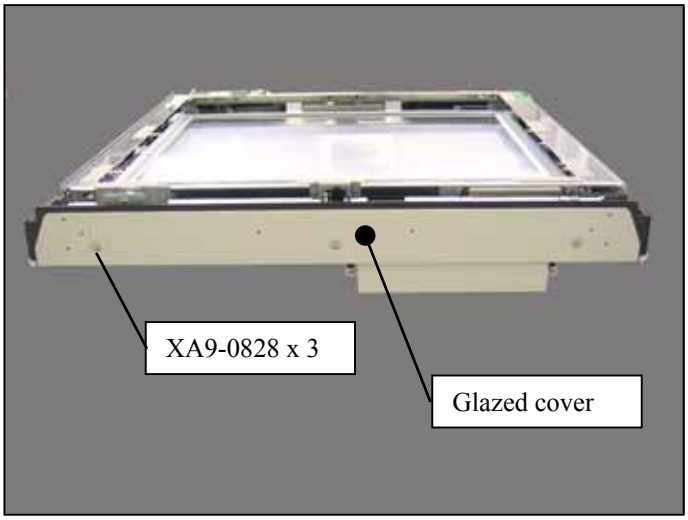
7) Install the Glazed cover A, B

Install the each Glazed cover (A, B) to the upper part of the Imaging Unit with the Screws (XA9-0828, XA1-1260-406 and XD1-4100-262).

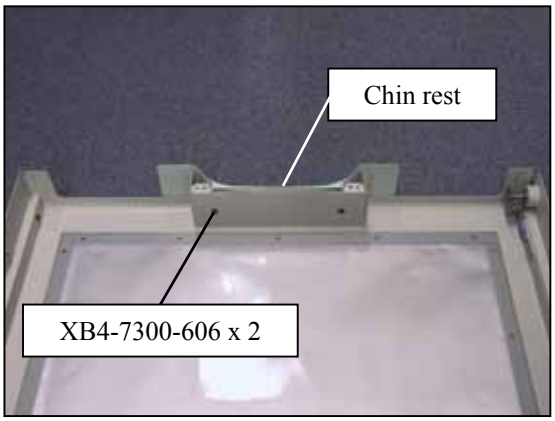


8) Install the Glazed cover

Install the Glazed cover to the bottom of the Imaging Unit with the Screws (XA9-0828 x 3).

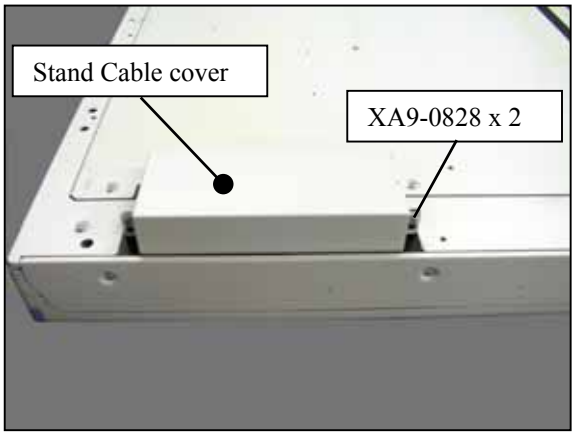


9) Install the Chin rest.
Remove the nuts and bolts (with the hexangular hole) on which attached the front cover. And then install the Chin rest with the Screws (XB4-7300-606 x 2).

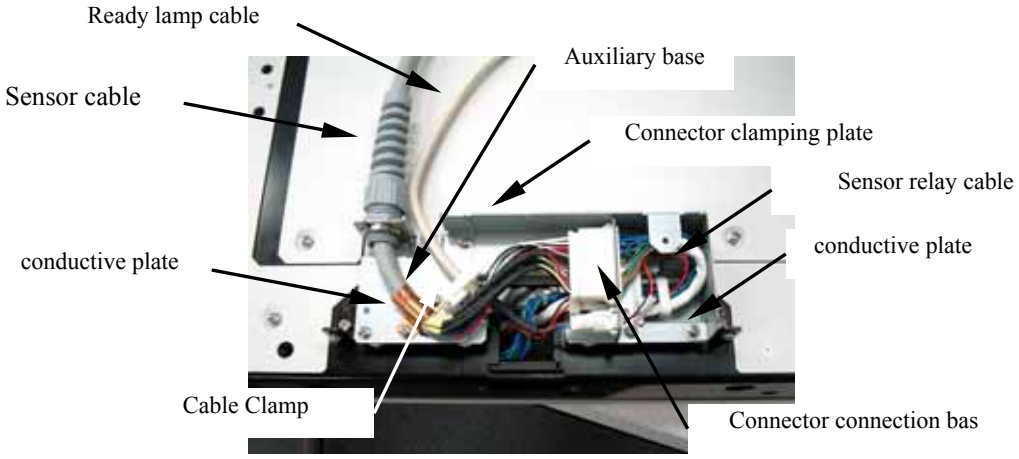


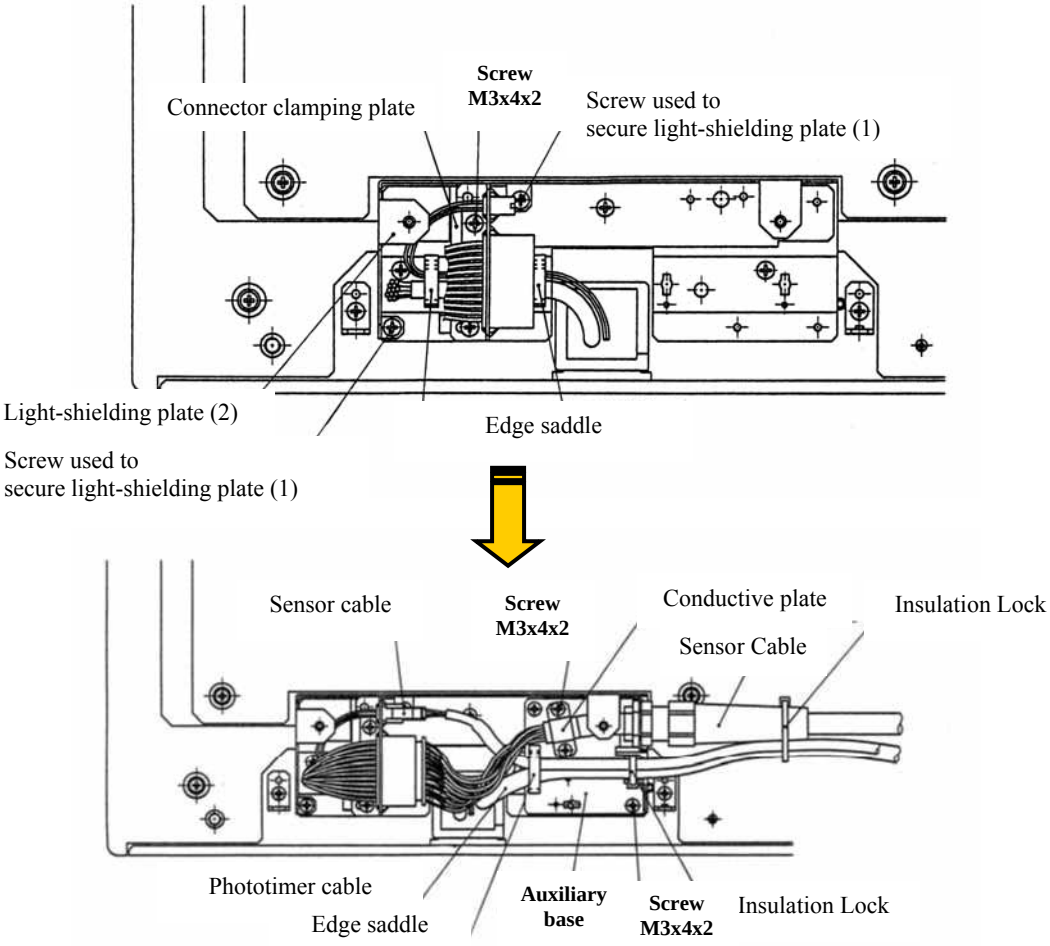
10) Install the Front cover.
Install the Front cover by the reverse procedure of removing it.
Note:
The numbers of the screws are 6**(XA9-0828 x 4, XB1-2300-406 x 2).** ***The screws*** **(XB1-2300-406 x 2)** ***must be needed to install the Front cover.***

11) Loosen the Screws (XA9-0828 x 2) at the rear part of the Imaging Unit. Remove the Stand Cable cover.



12) Connecting the cables





Connector connection bas

Auxiliary base

Connector clamping plate

Light-shielding plate

Cable connection procedure

1. Secure the bushing area of the sensor cable to the auxiliary base, and secure the copper foil tape area using the conductive plate.

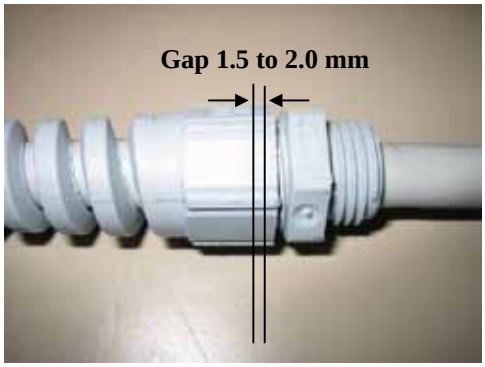
2. Pass the sensor cable connector through the cable clamp, and then plug it into the connector of the sensor relay cable which is secured to the connector clamping plate.

3. Pass the ready lamp cable connector through the cable clamp, and then plug it into the connector of the lamp relay cable which is secured to the connector clamping plate.

4. Secure the cable together with the phototimer cable to the clamp using the insulation lock, and then secure it together with the sensor cable using the insulation lock, and lead the cables out to the side panel of the sensor unit.

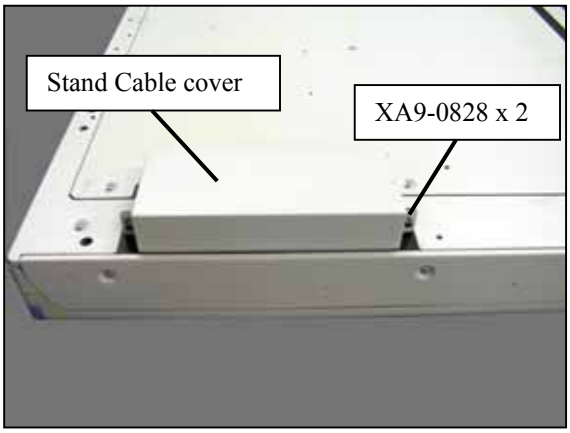
Notes:

- Connect the cables in such a way that they are not subject to unnecessary levels of force, and ensure that the cables are not pinched or sandwiched.
- To avoid the risk of damage when the cables are removed with very large force, check tightening torque of the bush (refer the following figure).

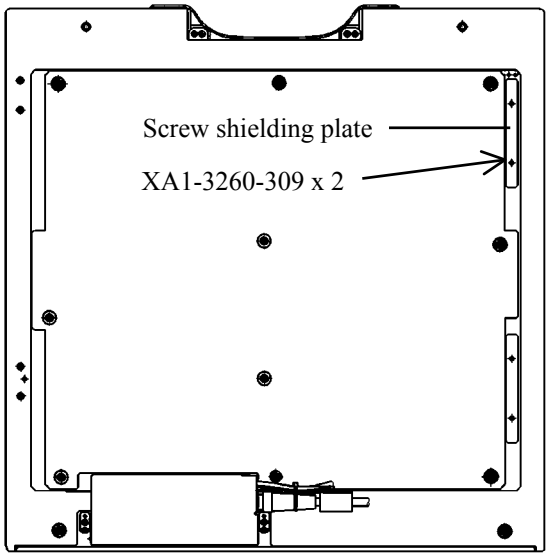


<Sensor cable>

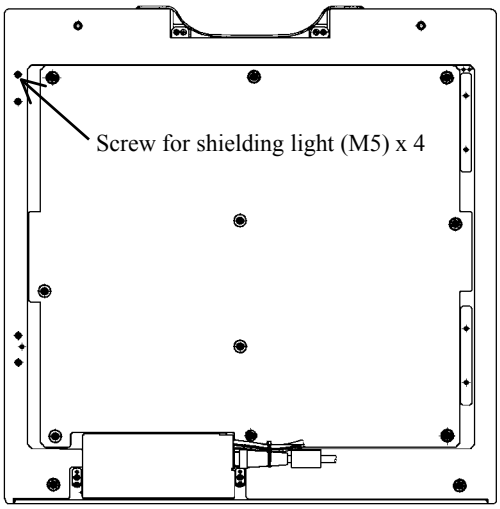
13) Install the Stand Cable cover with the Screws (XA9-0828 x 2).



14) Install the Screw shielding plate with the Screws (XA1-3260-309 x 2).
The upper and bottom plate must be installed.

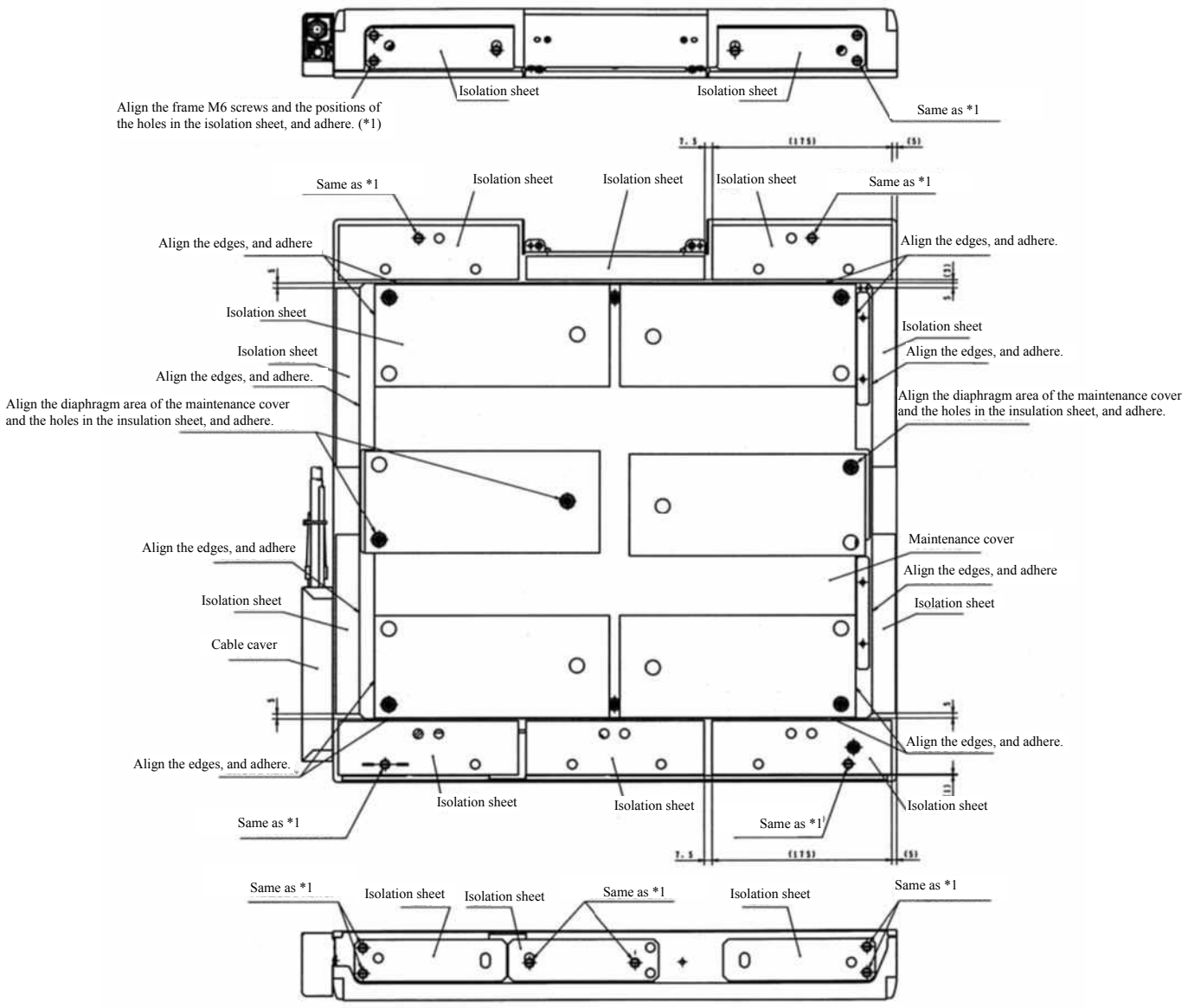


15) Install the Screws for shielding light (M5) x 4.



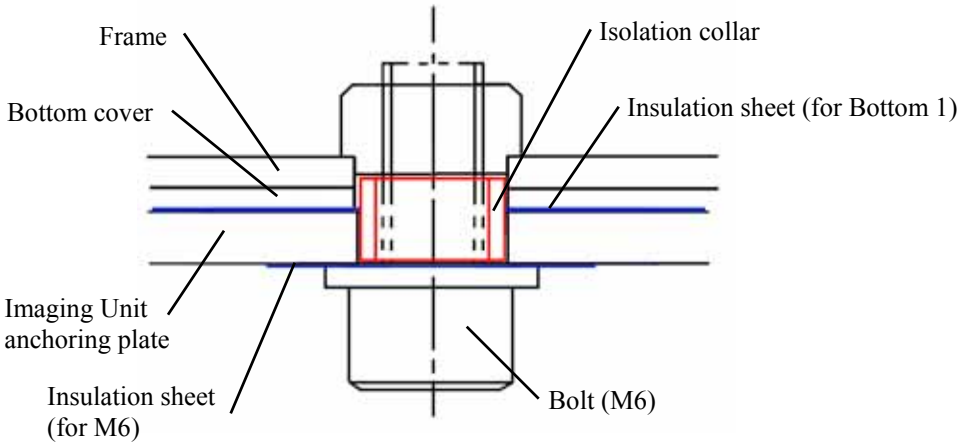
16) Install the isolation sheet. But not need to install it to the place where not touch with the stand directly.

A) Install part



B) When install the attachment part for the Imaging Unit, use the Insulation sheet for the Screws (M6) and Universal isolation collar. And more, the Screws (M6) and the Imaging Unit attachment are not implemented in the Universal Installation unit.

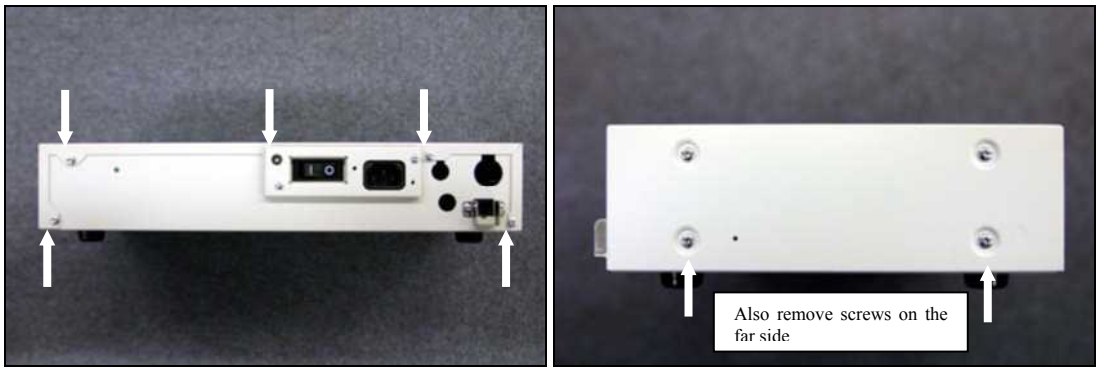
•Bottom view



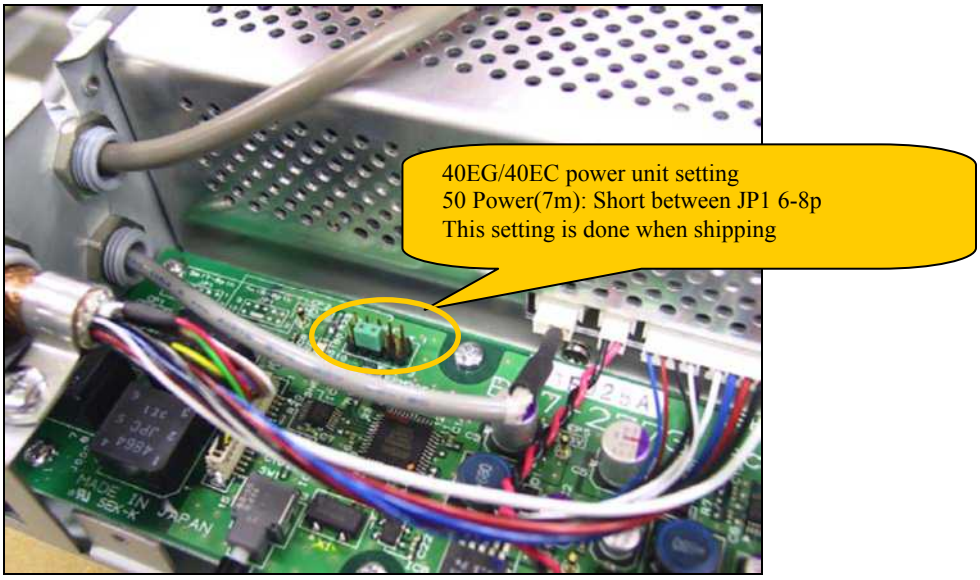
4.5 Connecting to the Power Box

(1) Removing the cover

Remove the 5 screws from the back of the power box and the 2 screws on each side at the bottom of the power box.

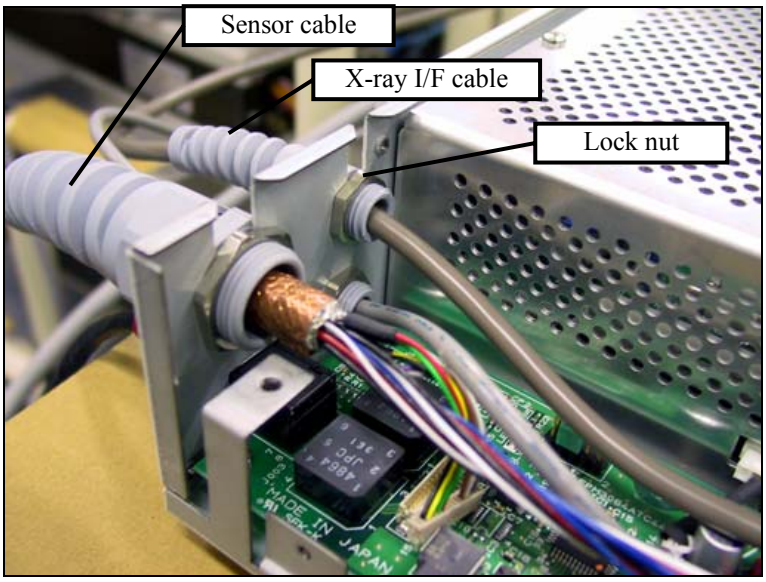


(2) Check the jumper pin settings on the PCB-50XRAY board in the power box. The power supplies for 7m and 3m are not compatible due to having different output voltages. This short pin is for determining the power, not for changing the voltage.

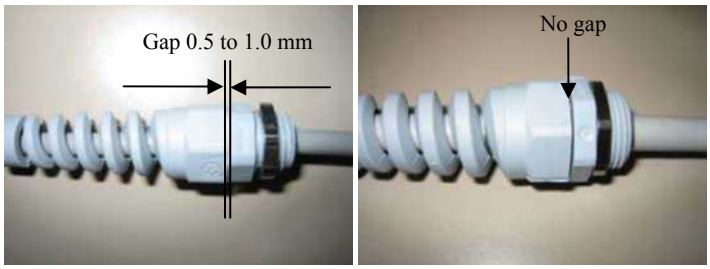


(3) Cable connections

1) Loosen the lock nut for each cable and connect the cables to the power box. Then fix the cables by tightening the lock nuts.

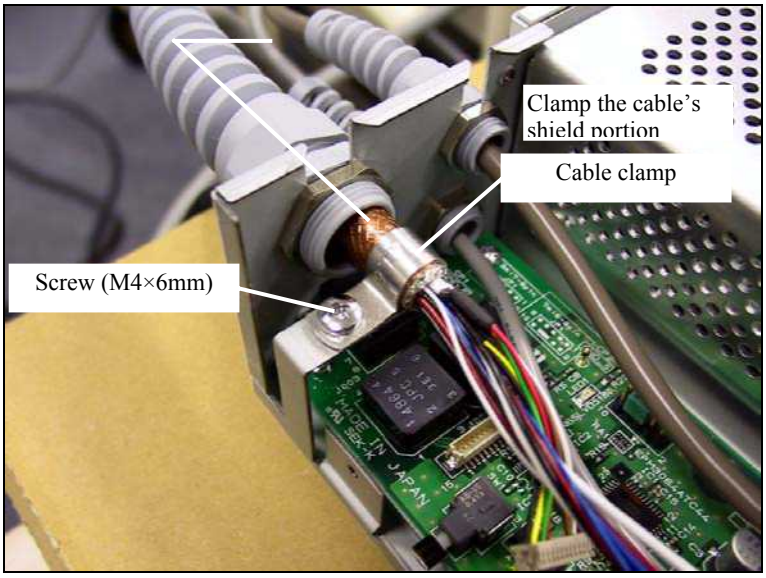


Note: To avoid the risk of damage when the cables are removed with very large force, Check tightening torque of the bush (refer the following figure).

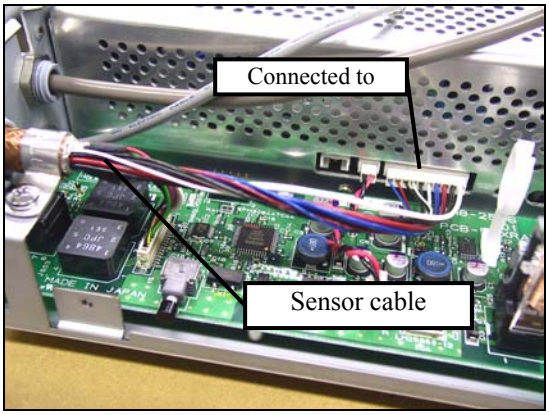


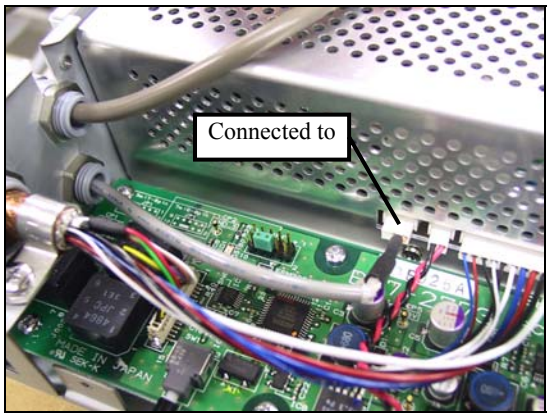
<Sensor cable> <X-RAY I/F cable, Remote cable>

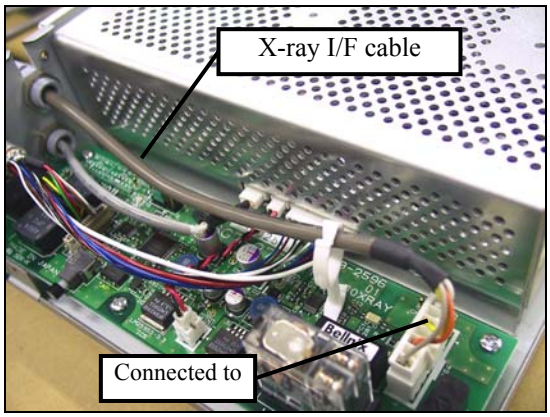
2) Attach the cable clamp to the sensor cable, and then fix it to the power box using the screw (M4 x 6 mm).



3) Connecting each cable connector.

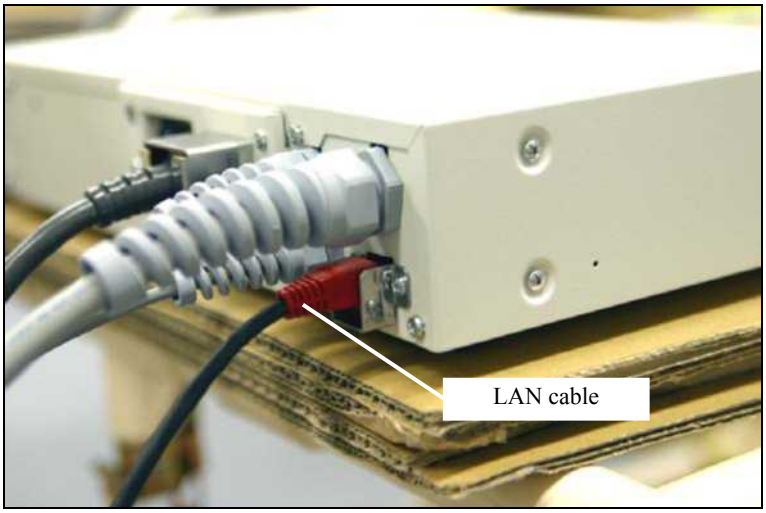




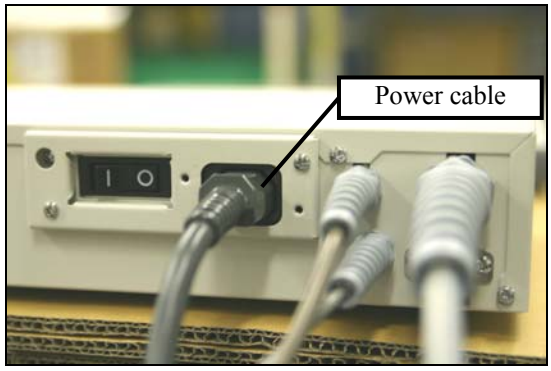


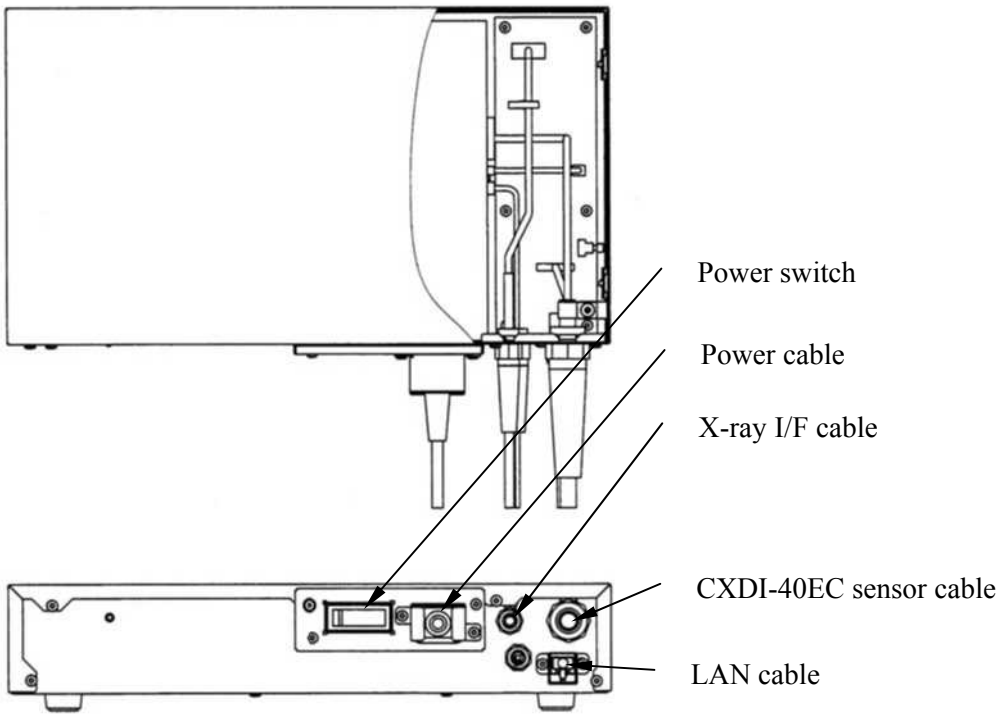
4) After completing the connections, attach the power box cover.

5) Connect the LAN cable to the back of the power box.

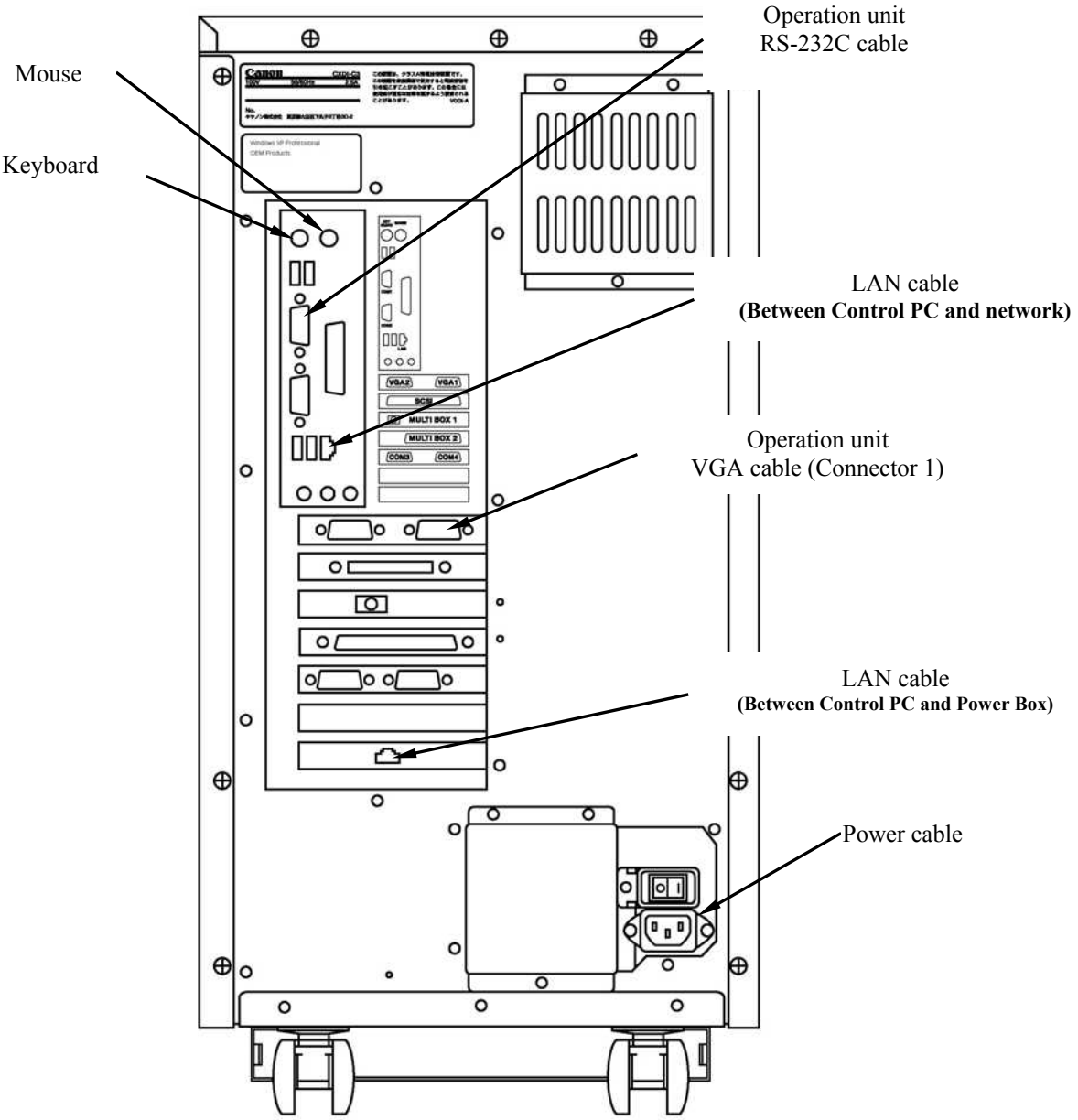


6) Connect the power cable to the back of the power box.
After connecting the power cable, fix the cable connector clamp using 2 screws (M3 x 4 mm).



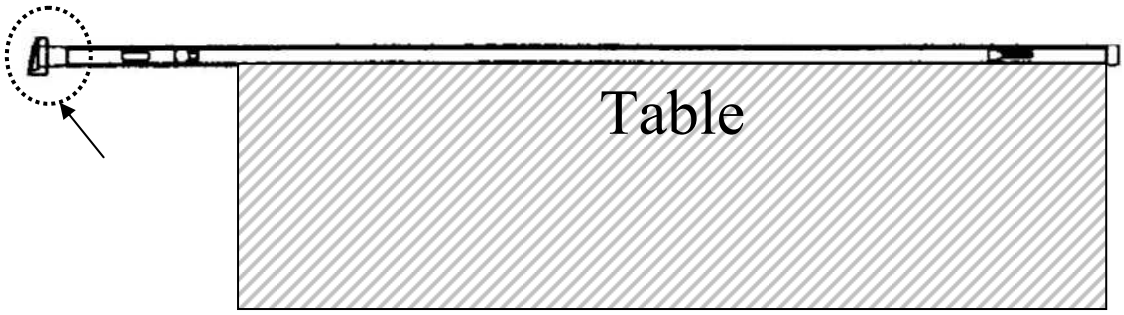


4.6 Connection diagram for Control PC rear panel



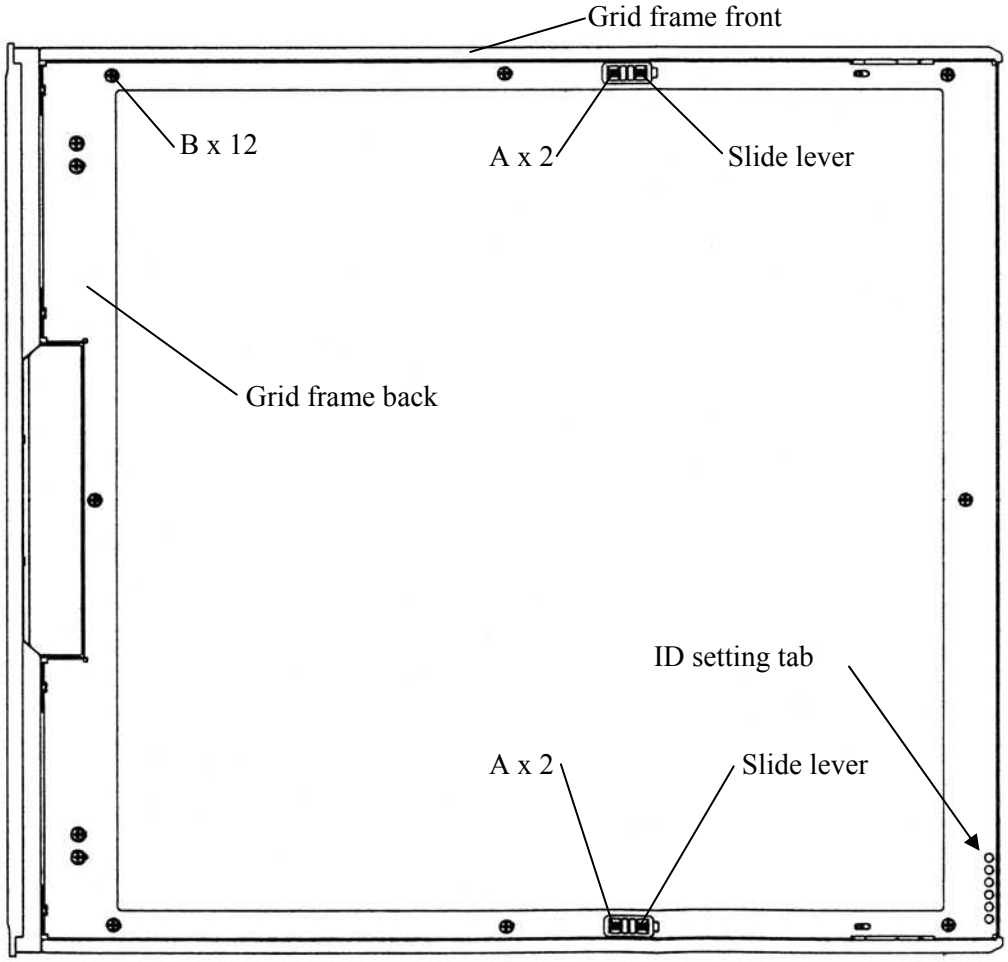
5 Grid (including ID positioning pieces setting)

Caution:
Do not place the handle on top of table, etc when removing or attaching Grid unit frame.



[Fig. 1]

1) Remove screws (Ax2), and removes the slide lever. Remove screws (Bx12), and remove the grid frame back (Fig. 2).

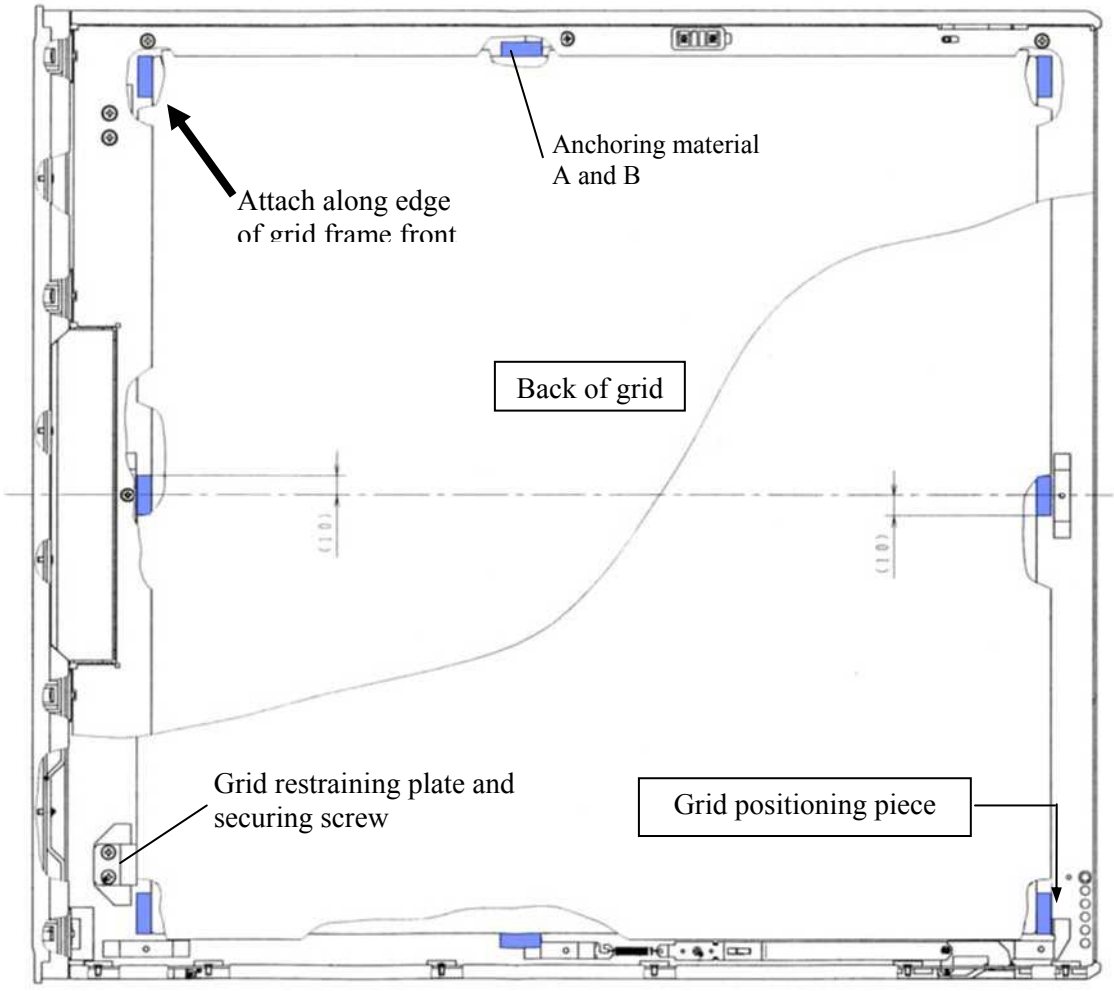


[Fig. 2]

2) Attach the anchoring material A and B to the eight places shown below (Fig. 3).
Refer to the table under described when attaching components.

Thickness of Grid (mm)	Canon option Grid	Thickness of anchoring material (mm)	Type of anchoring material
1.5 - 2.2	40LP/cm 8:1 f=110 cm aluminum (thickness 1.9 mm)	6	Combine the anchoring material A and B.
2.3 - 3.0	40LP/cm 10:1 f=110 cm aluminum (thickness 2.3 mm)	4	Anchoring material B
	40LP/cm 10:1 f=150 cm aluminum (thickness 2.3 mm)		
	40LP/cm 10:1 f=180 cm aluminum (thickness 1.9 mm)		
	40LP/cm 12:1 f=180 cm aluminum (thickness 1.9 mm)		
3.1 - 3.8	-	2	Anchoring material A

[Table 1]

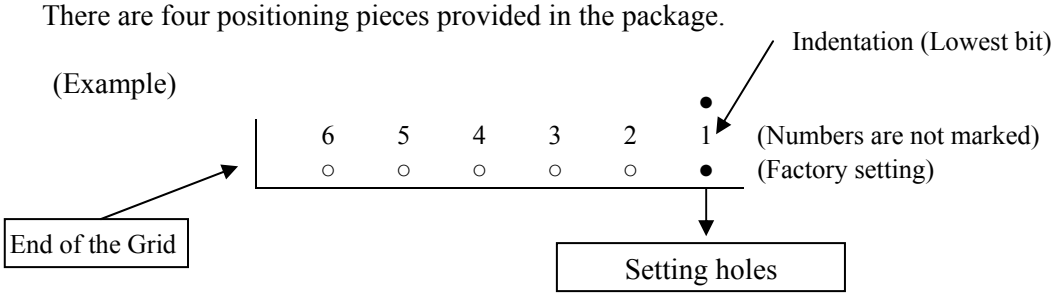


[Fig. 3]

* Align the anchoring material to the inside edge of the grid frame front when attaching.

- Place the grid on the anchoring materials A and B, while ensuring that the grid does not sit on welded parts or the lock release plate, and the side with the X-ray tube is facing up. Place the grid flush with the positioning pieces, and secure using the grid restraining plate. Fasten securing screws.

3) Based on the type of Grid, the positioning pieces should be set as shown below.
The ID positioning pieces settings for each Gird types are shown below.
There are four positioning pieces provided in the package.



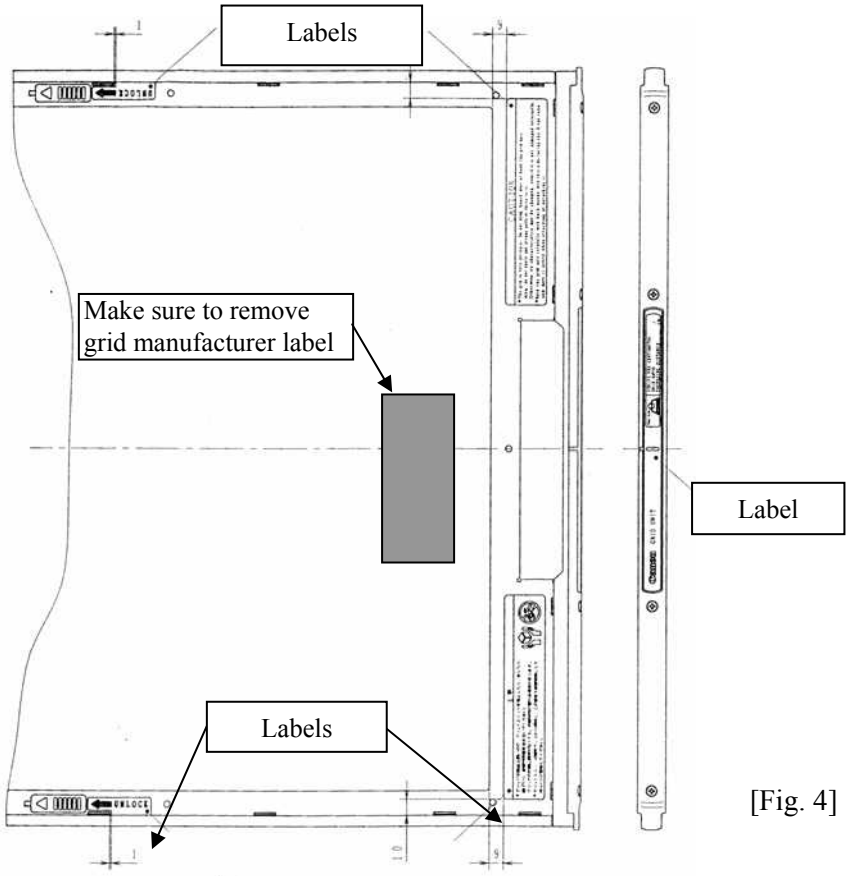
ID setting holes/ positioning pieces						Hex	Grid type (OPU display)
6	5	4	3	2	1		
○	○	○	●	○	○	0004	Aluminum Grid (40LP/cm, 12:1,180cm, AL)
○	○	○	●	○	●	0005	Aluminum Grid (40LP/cm, 10:1,180cm, AL)
○	○	○	●	●	○	0006	Aluminum Grid (40LP/cm, 10:1,150cm, AL)
○	○	○	●	●	●	0007	Aluminum Grid (40LP/cm, 10:1,110cm, AL)
○	○	●	○	○	○	0008	Aluminum Grid (40LP/cm, 8:1,110cm, AL)

[Table. 2]

4) Set the frame, and fasten the screws.

5) Remove the grid manufacturer label, and attach the supplied installation labels as shown in the figure below.

Note: Do not remove the name and specifications labels. The labels may appear in the marginal of the image area as about 1 mm width of a border.



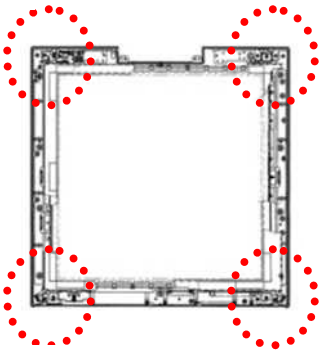
[Fig. 4]

6. Remove the Grid rail

After removing the front cover of Imaging unit, take the Grid rail out from it.

(1) Remove the screw (XB2-6300606) x 4

(a) (b)

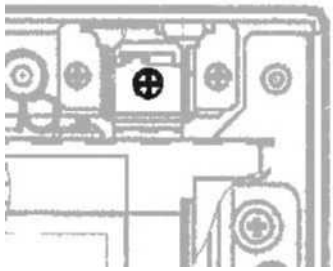


(c) (d)

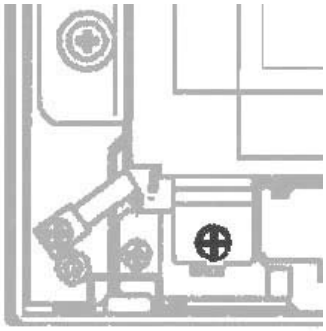
Enlargement

→

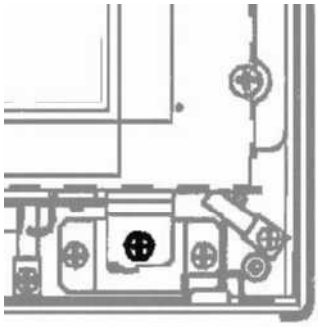
(b)



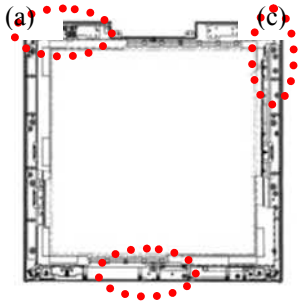
(c)



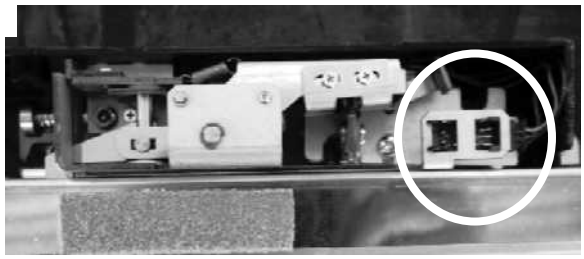
(d)



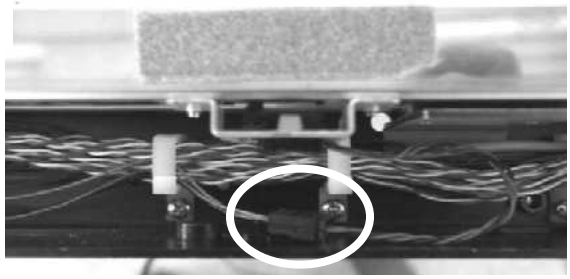
(2) Remove the cable connector. (3 positions)



(a)

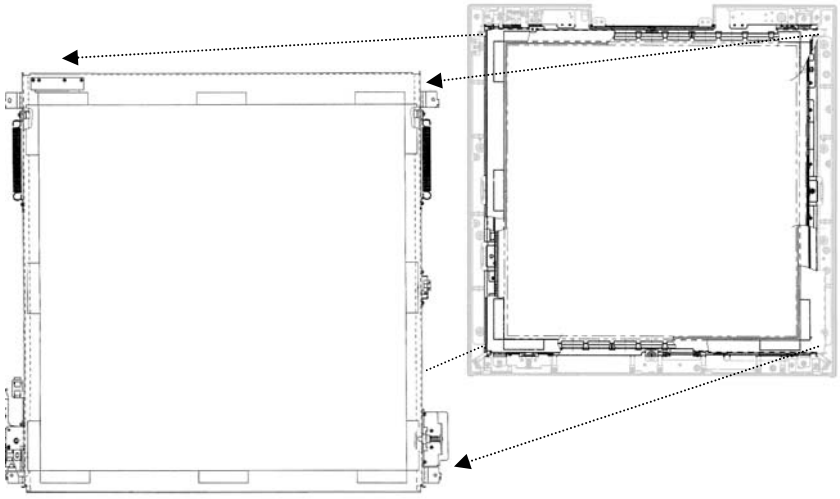


(b)



(c)

(3) The Grid rail is pulled forward and is detached.



7. Phototimer Installation

7.1 Installation overview

1. Remove the front cover from the CXDI-40EG/40EC Imaging unit.

2. Remove the three cable connector of Grid lock detector/Grid detector/Grid ID detector which on Grid rail.

3. Remove the Grid rail with five screws of Grid rail loosen.

4. Attach the phototimer or ion-chamber following the attached manufacturer installation manual.

5. Attach the Grid rail, three cable connectors above mentioned and front L cover.

7.2 Parts

When attaching the phototimer or ion-chamber, right parts must be used, because the parts of each are not compatible.
Follow the attached installation manual to use the parts of each type of phototimer or ion-chember.
The table below described shows the attached parts for attaching the phototimer to CXDI-40EG/40EC.

Parts No.	Description	Qty
BA3-9611	Rubber sheet for attaching the phototimer t=1	4
BA3-9612	Rubber sheet for attaching the phototimer t=2	20
BA3-9616	Rubber sheet for attaching the phototimer t=6	8
BA4-2417	Phototimer anchoring plate	4
BA4-2418	Spacer	8
BA4-2385	Fixing tape	4
XB1-2400-606	Binding Head Machine Screw (M4x6)	2
XB6-7300-609	Flanged Pan Head Machine Screw (M3x6)	8
XD1-4100-402	Toothed Lock Washer (M4)	2

Note:
When attaching a SIEMENS's ion chamber (thick type), use Y67-2793 (phototimer anchoring plate 2) instead of BA4-2417 (photo anchoring plate). The part Y67-2793 must be purchased as a service part since it is not supplied with the product.

Parts No.	Description	Qty
Y67-2793	Phototimer anchoring plate 2	4

7.3 Cable connections

Inside the basic sensor unit

Cable clamps for the inside of the sensor unit can be used as clamps for the phototimers and ion chambers inside the basic sensor unit. Use appropriate clamps according to phototimers or ion changers to be mounted.

For details on the connection of the cables for the phototimers and ion chambers inside the basic sensor unit, refer to the attached assembly diagram.

Lead-out area

As with the 40E sensor and lamp relay cables, lead the phototimer and ion chamber cables outside the basic sensor unit. Pass the cables led outside the basic sensor unit through the cable clamps, and lead them to the rear side of the basic sensor unit or outside of the connector joint area on the side panel.

List of Phototimer installation sheet. (According to manufacturer)

Title	Manufacturer / Type
7.6.1 HITACHI 1ch	Standard, inverse
7.6.2 HITACHI 2ch	Standard, inverse
7.6.3 HITACHI 3ch	Standard, inverse
7.6.4 SHIMAZDU 1ch	Standard, inverse
7.6.5 SHIMAZDU Ion Chamber	Standard, inverse
7.6.6 TOSHIBA Optical Fiber	Standard, inverse
7.6.7 AID Ion Chamber	Standard, inverse
7.6.8 COMET Solid	Standard, inverse
7.6.9 SIEMENS Ion Chamber (Thin Type)	Standard, inverse
7.6.10 SIEMENS Ion Chamber (Thick Type)	Standard, inverse
7.6.11 VACUTEC Ion Chamber	Standard, inverse
7.6.12 GILARDONI Solid	Standard, inverse

7.4 Other

In addition to what is shown on the accompanying assembly diagram, the rubber sheet used to mount the phototimer configured in this unit can be used where appropriate as the mounting circumstances dictate.

Reference:
Specifications of phototimers made by various manufacturers

Manufacturer	Hitachi (for upright stand)	Hitachi (for table type)	Hitachi (for upright stand)	Hitachi (for table type)
Manufacturer's model name	PDS-CXDI-11	PDS-CXDI-12	PDS-CXDI-11-2CH	PDS-CXDI-12-2CH
Light-sensor system	Photomultiplier	Photomultiplier	Photomultiplier	Photomultiplier
Number of lighting fields	1	1	2	2
Light sensor dimensions (W x H)	454 x 460	454 x 460	454 x 460	454 x 460
Light sensor thickness	2.5	2.5	2.5	2.5

Manufacturer	Hitachi (for upright stand)	Shimadzu	Shimadzu (for table type)	Toshiba (for upright stand)
Manufacturer's model name	PDS-CXDI-11-3CH	SPT-XD-S01		PTF-20L/22
Light-sensor system	Photomultiplier	Ion chamber	Photomultiplier	Optical fiber
Number of lighting fields	3	4	1	1
Light sensor dimensions (W x H)	454 x 460	450 x 450	454 x 460	454 x 460
Light sensor thickness	3.5	2.5	2.5	2.5

Manufacturer	Toshiba (for table type)	AID	COMET	Siemens (thin type)
Manufacturer's model name	PTF-20B/20	ICX122	B3 remodeled B3A remodeled	8167538X1651
Light-sensor system	Optical fiber	Ion chamber	Solid	Ion chamber
Number of lighting fields	1	3	3	3
Light sensor dimensions (W x H)	454 x 460	449.3 x 449.3	465 x 465	449 x 455
Light sensor thickness	2.5	7.1	3.4 (6 including external frame cover)	6.4

Manufacturer	Siemens (Thick type)	VACUTEC	GILARDONI	
Manufacturer's model name	8354599X1181	70145	10305800/10358400	
Light-sensor system	Ion chamber	Ion chamber	Solid	
Number of lighting fields	3	3	3	
Light sensor dimensions (W x H)	465 x 465	458 x 450	460x460	
Light sensor thickness	11.4	6.2	4.5	

7.5 Installation Procedure

7.5.1 Parts

Number	Descriptions	Qty	Types of Phototimer or Ion Chamber to be Mounted and Quantity of Required Parts					
			HITACHI Photomultiplier 1CH	HITACHI Photomultiplier 2CH	HITACHI Photomultiplier 3CH	SHIMAZU Ion Chamber	SHIMAZU Photomultiplier 1CH	TOSHIBA Optical Fiber
BA3-9611	Rubber sheet for attaching phototimer t=1	4	4	4	-	-	4	-
BA3-9612	Rubber sheet for attaching phototimer t=2	20	-	-	-	20	-	20
BA3-9616	Rubber sheet for attaching phototimer t=6	8	8	8	8	-	8	-
BA4-2417	Phototimer anchoring plate	4	4	4	4	4	4	4
BA4-2418	Spacer	8	8	8	8	-	8	-
BA4-2385	Fixing tape	4	4	4	4	4	4	4
Y67-2793	Phototimer anchoring plate 2							
XB6-7300-609	Tapping screw (M3x6)	8	8	8	8	8	8	8
XB1-2400-606	Screw (M4x6)	2	1	2	2	-	-	-
XD1-4100-402	Washer (M4)	2	1	2	2	-	-	-

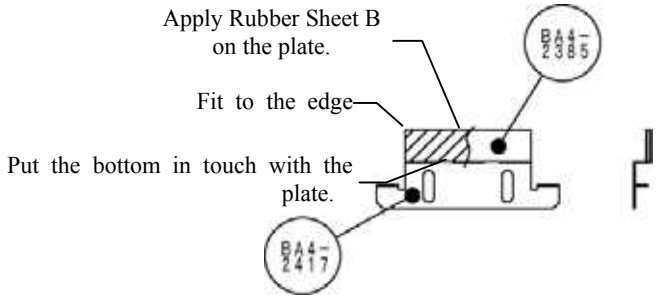
Number	Descriptions	Qty	Types of Phototimer or Ion Chamber to be Mounted and Quantity of Required Parts					
			AID Ion Chamber	COMET Solid	SIEMENS Ion Chamber	SIEMENS Ion Chamber (thick type)	VACUTEC Ion Chamber	GILARDONI Solid
BA3-9611	Rubber sheet for attaching phototimer t=1	4	-	4	4	-	4	4
BA3-9612	Rubber sheet for attaching phototimer t=2	20	8	8	8	-	8	8
BA3-9616	Rubber sheet for attaching phototimer t=6	8	-	-	-	-	-	4
BA4-2417	Phototimer anchoring plate	4	4	4	4	-	4	-
BA4-2418	Spacer	8	4	4	4	-	4	-
BA4-2385	Fixing tape	4	4	4	4	4	4	-
Y67-2793	Phototimer anchoring plate 2					4		-
XB6-7300-609	Tapping screw (M3x6)	8	8	8	8	8	8	8
XB1-2400-606	Screw (M4x6)	2	-	-	-	-	-	-
XD1-4100-402	Washer (M4)	2	-	-	-	-	-	-

7.5.2 Combination with Phototimer Anchoring Plate

Option	Types of Phototimer or Ion Chamber to be Mounted and Suitable Parts											
	HITACHI Photomultiplier 1CH	HITACHI Photomultiplier 2CH	HITACHI Photomultiplier 3CH	SHIMAZU Ion Chamber	SHIMAZU Photomultiplier 1CH	TOSHIBA Optical Fiber	AID Ion Chamber	COMET Solid	SIEMENS Ion Chamber	SIEMENS Ion Chamber (thick type)	VACUTEC Ion Chamber	GILARDONI Solid
Rubber sheet A	BA3-9616 (t=6)	BA3-9616 (t=6)	BA3-9616 (t=6)	BA3-9612x2 (t=4)	BA3-9616 (t=6)	BA3-9612x2 (t=4)	BA3-9612 (t=2)	BA3-9612 (t=2)	BA3-9612 (t=2)	N/A	BA3-9612 (t=2)	BA3-9616 (t=6)
Type of phototimer anchoring plate	A	A	B	C	A	A	D	A	A	E	C	A
Rubber sheet B	BA3-9611 (t=1)	BA3-9611 (t=1)	N/A	BA3-9612 (t=2)	BA3-9611 (t=1)	BA3-9612 (t=2)	N/A	BA3-9611 (t=1)	BA3-9611 (t=1)	N/A	BA3-9611 (t=1)	BA3-9611 (t=1)
Qty of Spacer BA4-2418	2 (t=1)	2 (t=1)	2 (t=1)	N/A	2 (t=1)	N/A	1 (t=0.5)	1 (t=0.5)	1 (t=0.5)	N/A	1 (t=0.5)	2 (t=1)

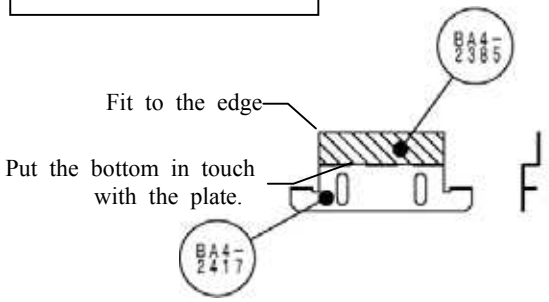
Phototimer Anchoring Plate TypeA

Match the corners of the adhesive with the rubber sheet B. Remove the slip for the adhesive facing to the phototimer when fixing the phototimer.



Phototimer Anchoring Plate TypeB

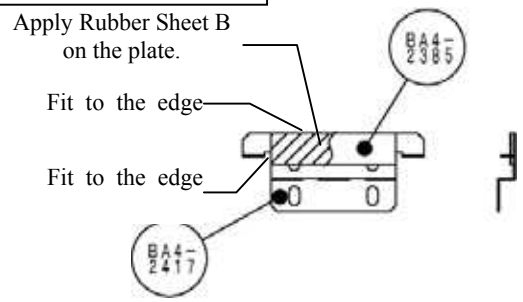
Apply the adhesive on the plate.
Remove the slip for the adhesive facing to the phototimer when fixing the phototimer.



2.Installation

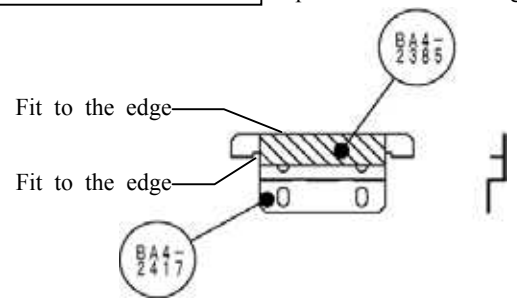
Phototimer Anchoring Plate Type C

Match the corners of the adhesive with the rubber sheet B. Remove the slip for the adhesive facing to the phototimer when fixing the phototimer.



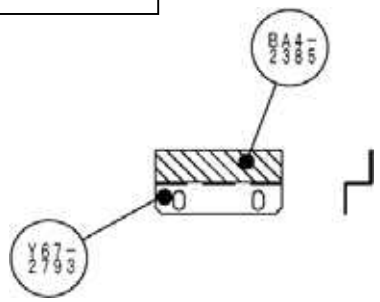
Phototimer Anchoring Plate Type D

Apply the adhesive on the plate.
Remove the slip for the adhesive facing to the phototimer when fixing the phototimer.



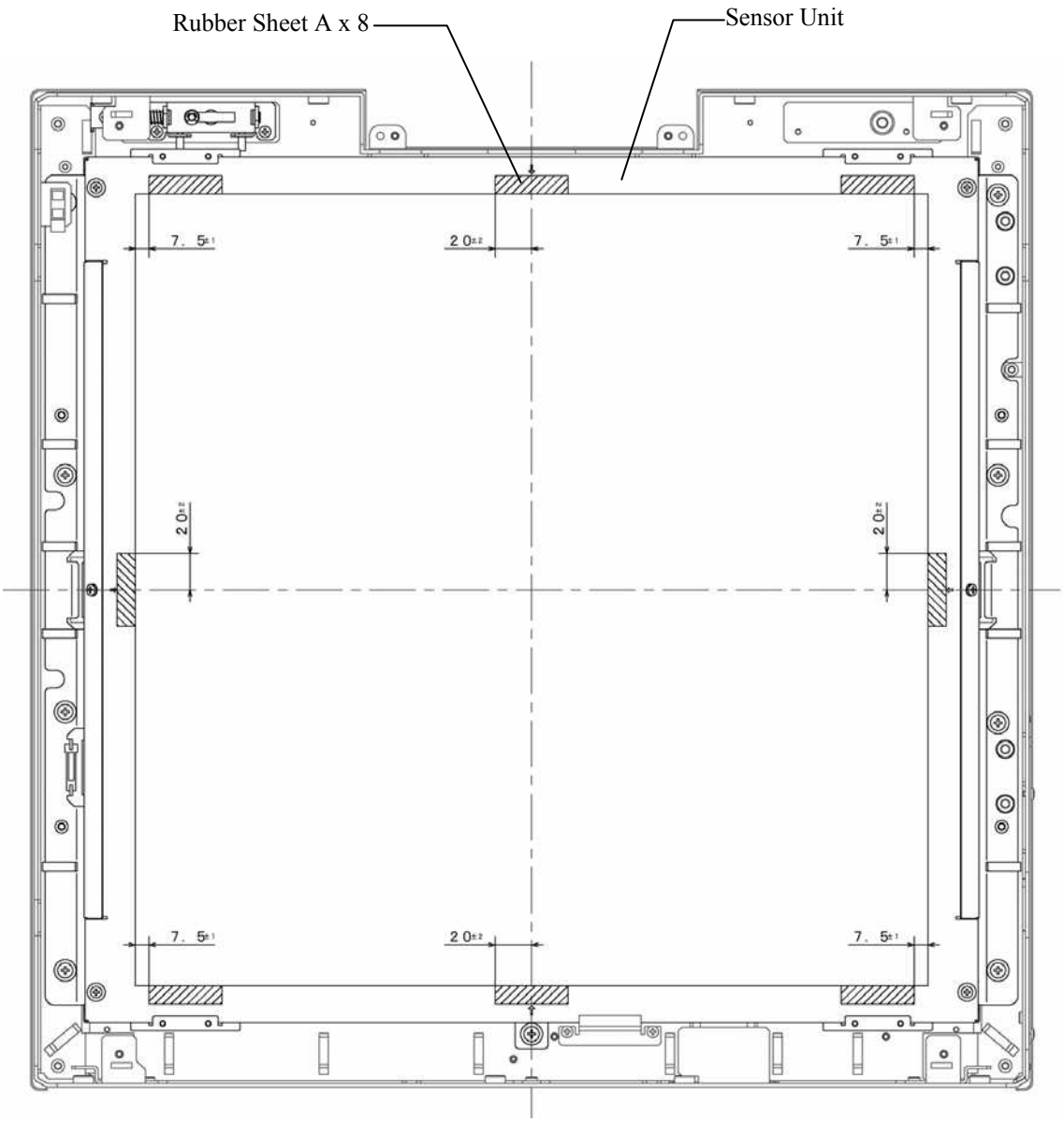
Phototimer Anchoring Plate Type E

Apply the adhesive on the plate.
Remove the slip for the adhesive facing to the phototimer when fixing the phototimer.

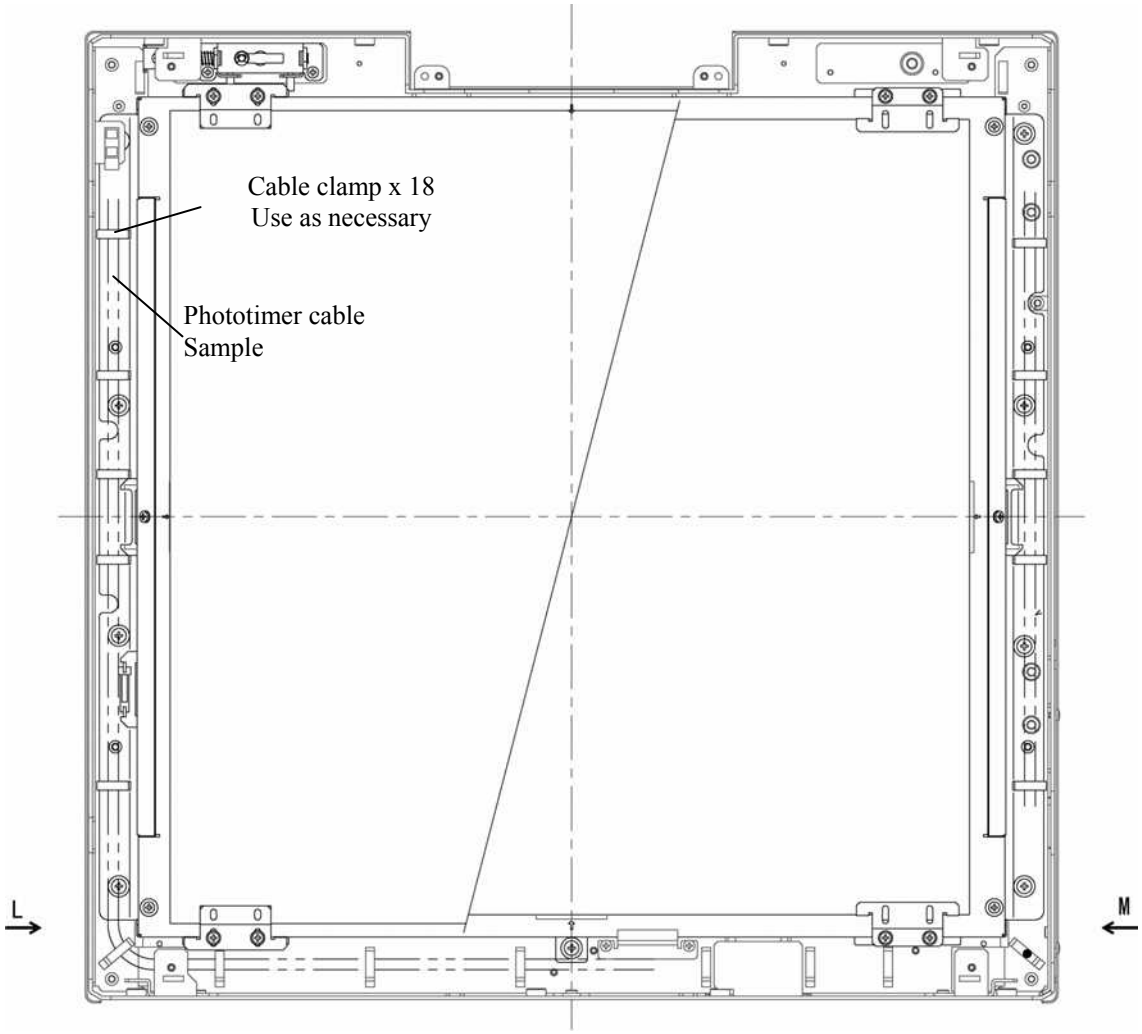


7.5.3 Attaching Rubber Sheet

Attach Rubber Sheet A on Sensor Unit.

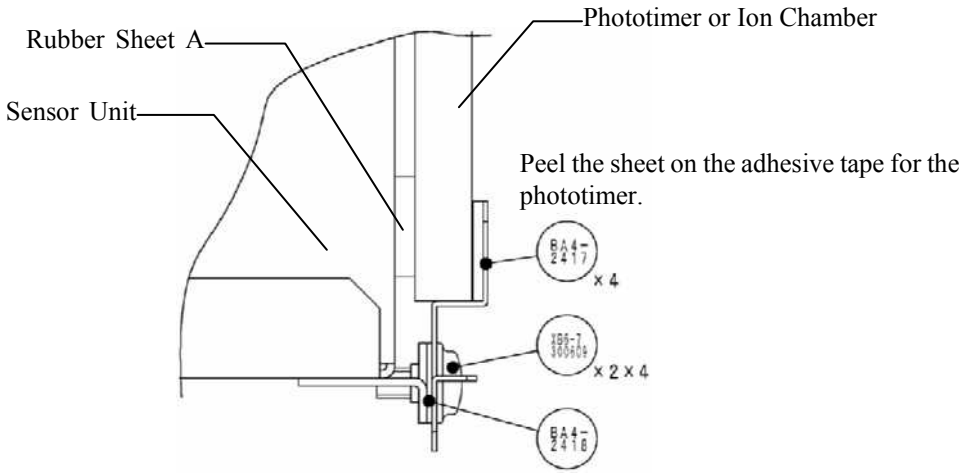


7.5.4 Installing Phototimer



View from Direction L

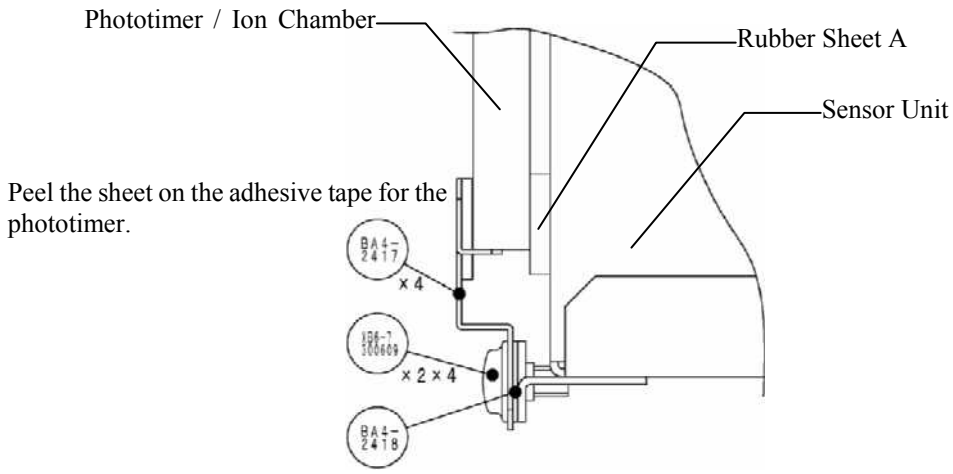
For Types A and B of Phototimer Anchoring Plate



The quantity consumed differs by type of phototimer / ion chamber to be installed.

View from Direction M

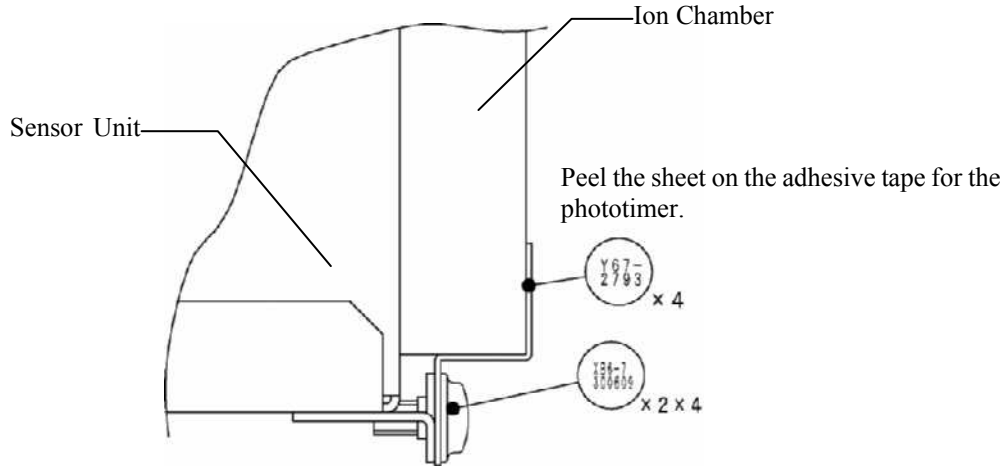
For Types C and D of Phototimer Anchoring Plate



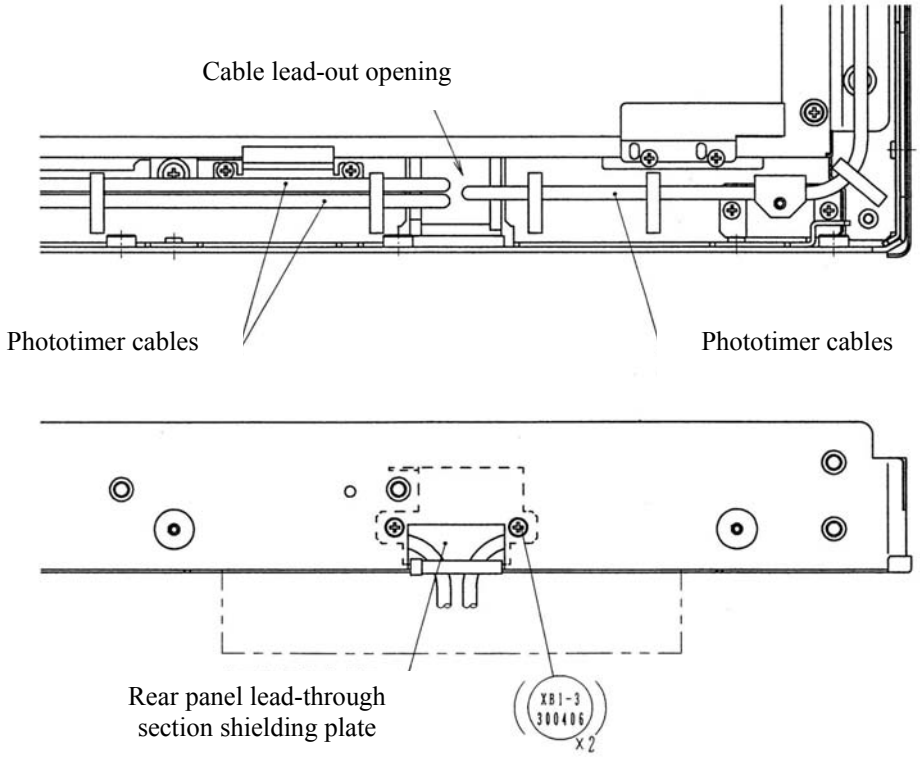
The quantity consumed differs by type of phototimer / ion chamber to be installed.

View from Direction L

Phototimer Anchoring Plate Type E

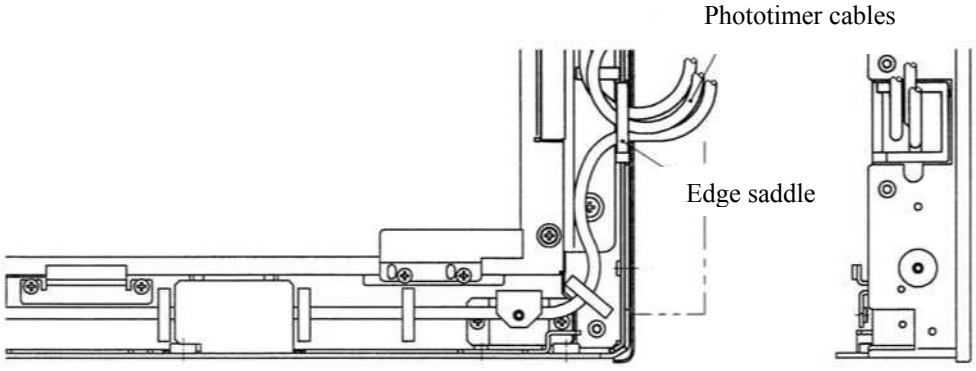


7.5.5 Leading the phototimer cable



When installing the upright stand type or universal type of stand

When installing the upright stand type or universal type of stand, temporarily remove the rear panel lead-out section shielding plate, pass the cables through the cable lead-out opening to the rear panel of the sensor unit, and re-attach the rear panel lead-through section shielding plate.



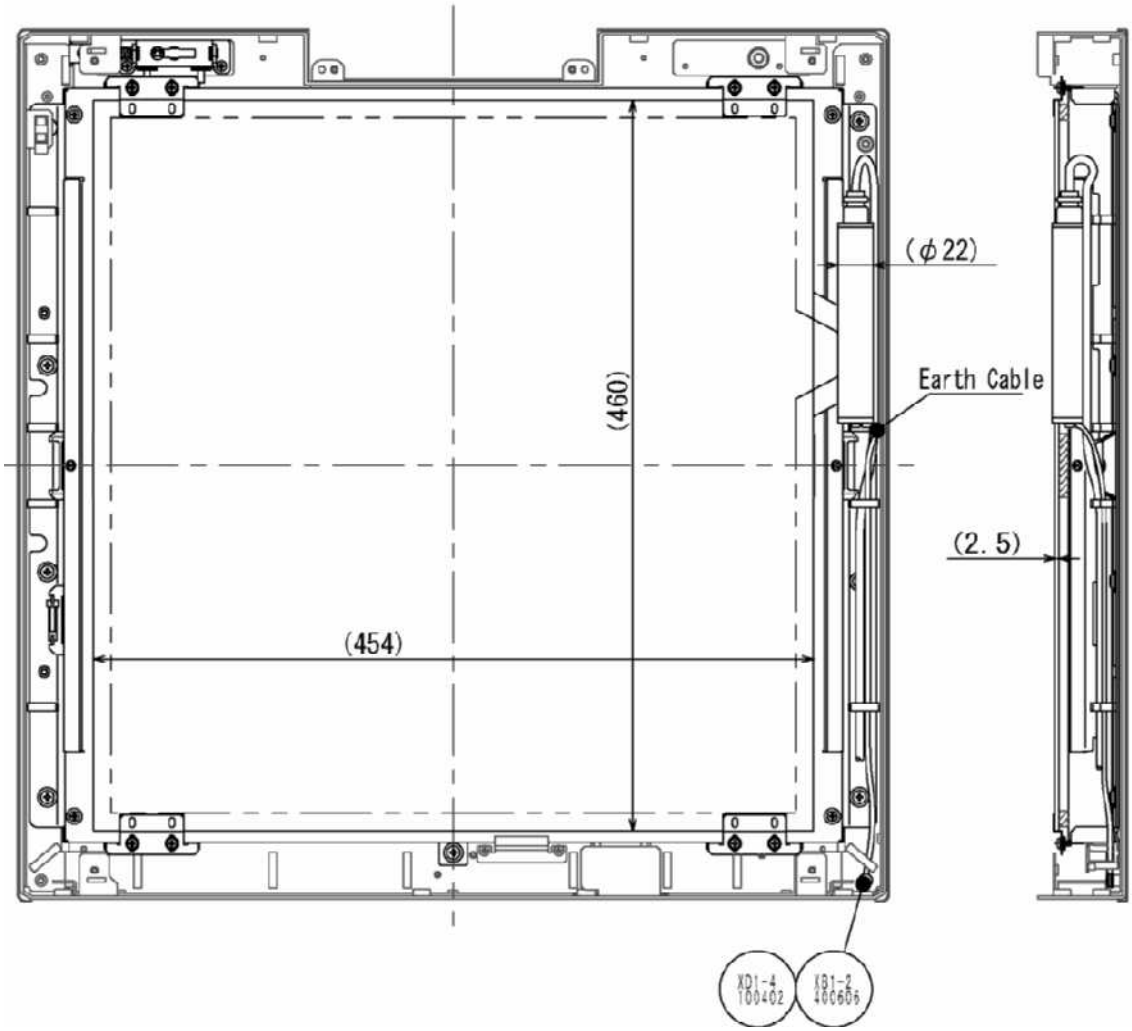
When installing the table type of stand

When installing the table type of stand, first temporarily remove the rear panel lead-through section shielding plate, and connect the phototimer cables. Then re-attach the rear panel lead-through section shielding plate, and attach the edge saddle to the frame.
Finally, lead out the phototimer and ion chamber cables to the side panel of the sensor unit.

7.6 Views of Phototimer / Ion Chamber Attached

7.6.1 Hitachi 1 ch

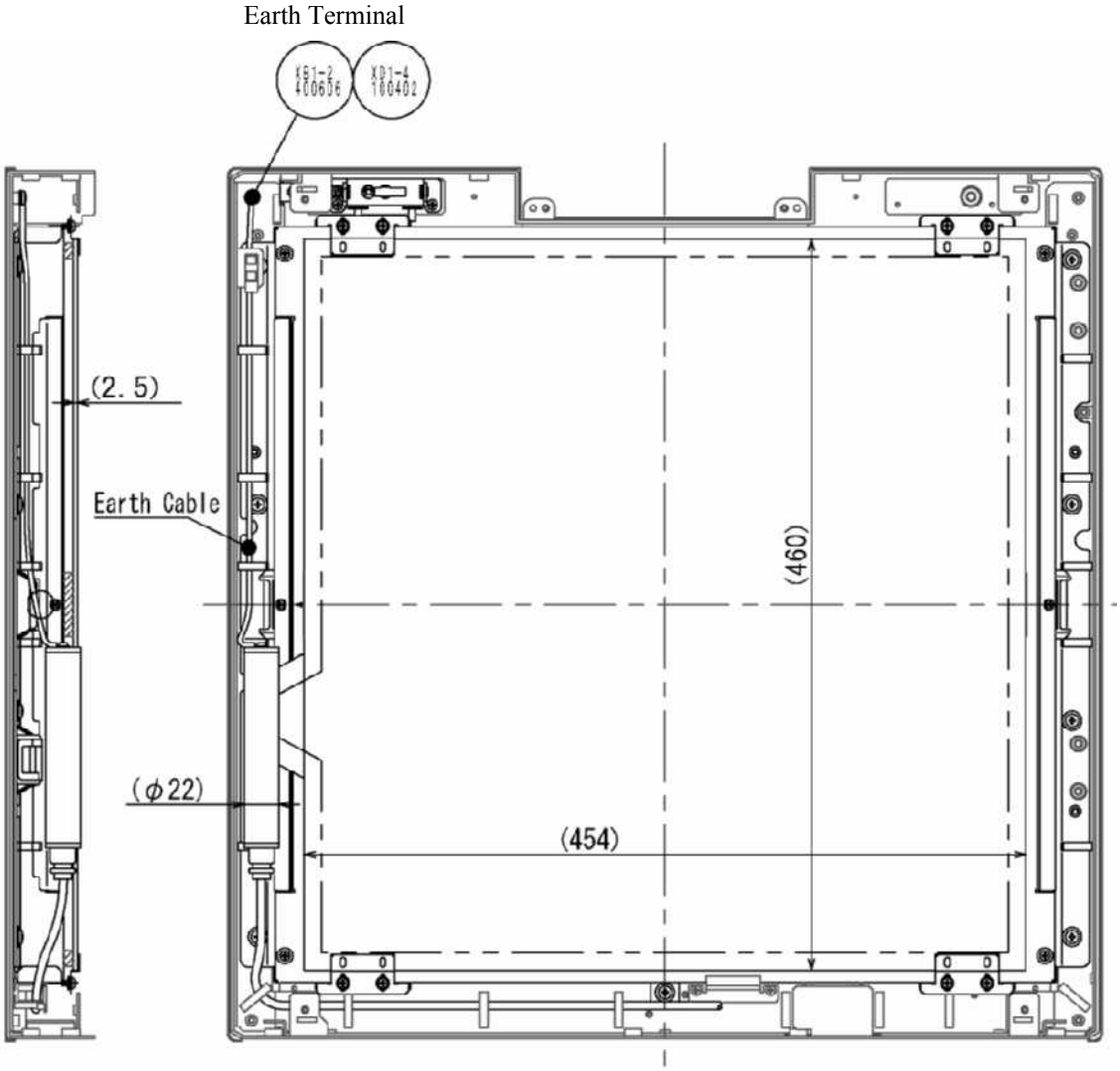
(1) Standard



Earth Terminal

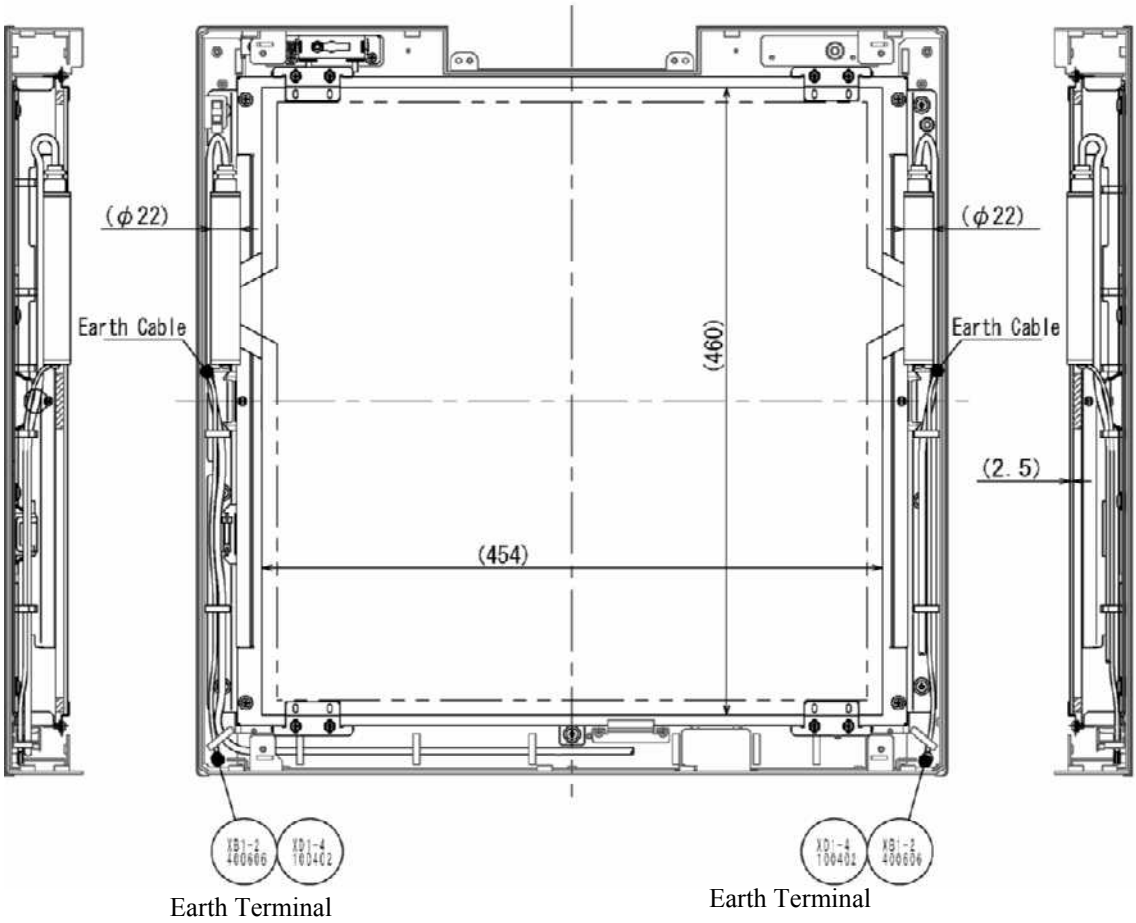
Insert XD1-4100-402 between the cell space unit of the frame and earth terminal.

(2) Inverse



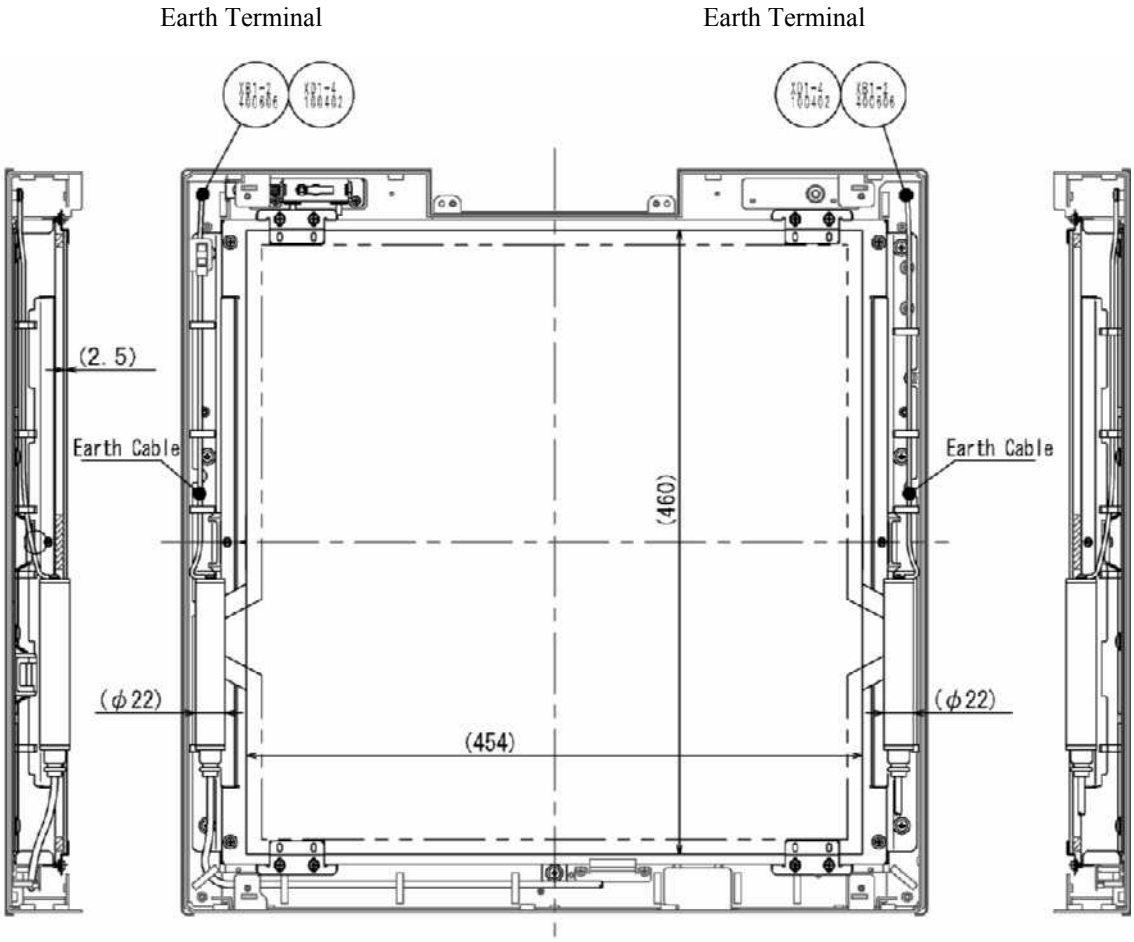
Insert XD1-4100-402 between the cell space unit of the frame and earth terminal.

7.6.2 Hitachi 2 ch
(1) Standard



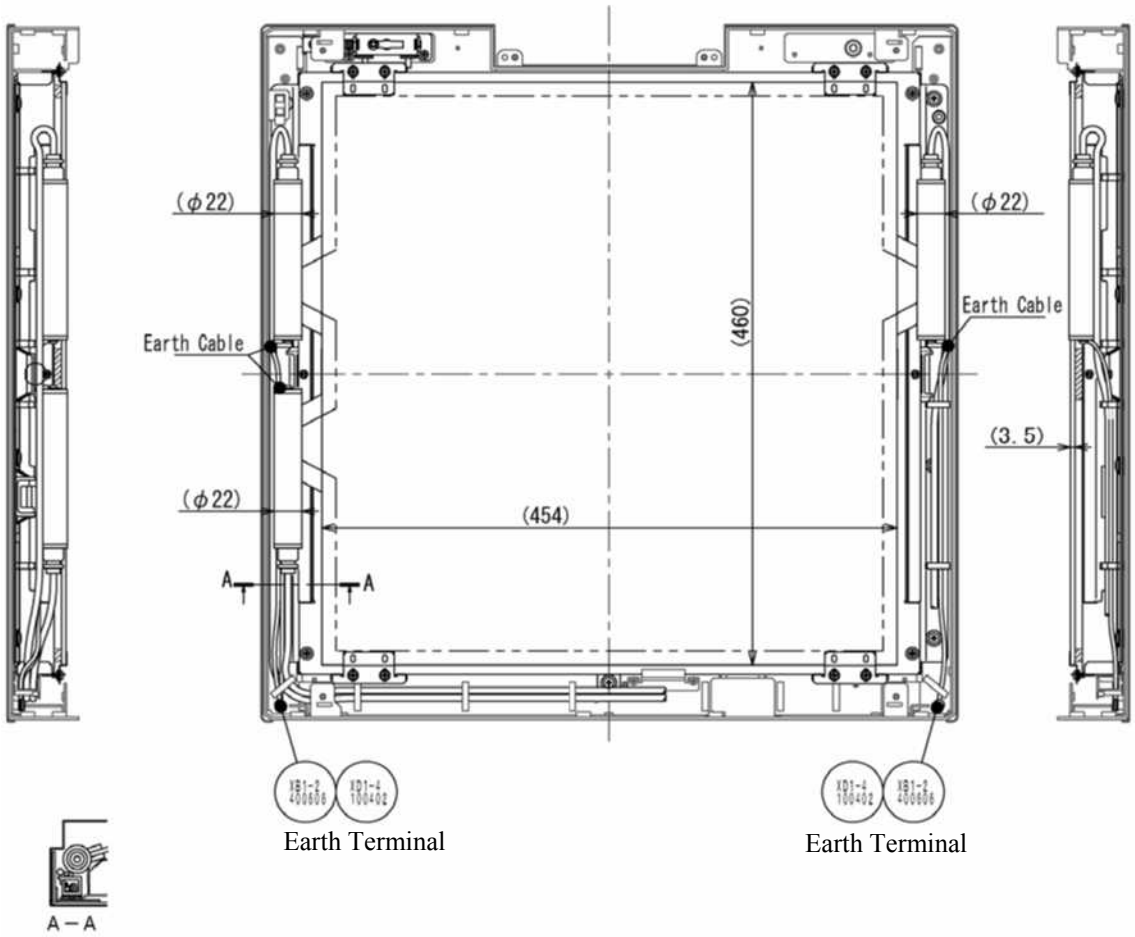
Insert XD1-4100-402 between the cell space unit of the frame and earth terminal.

(2) Inverse



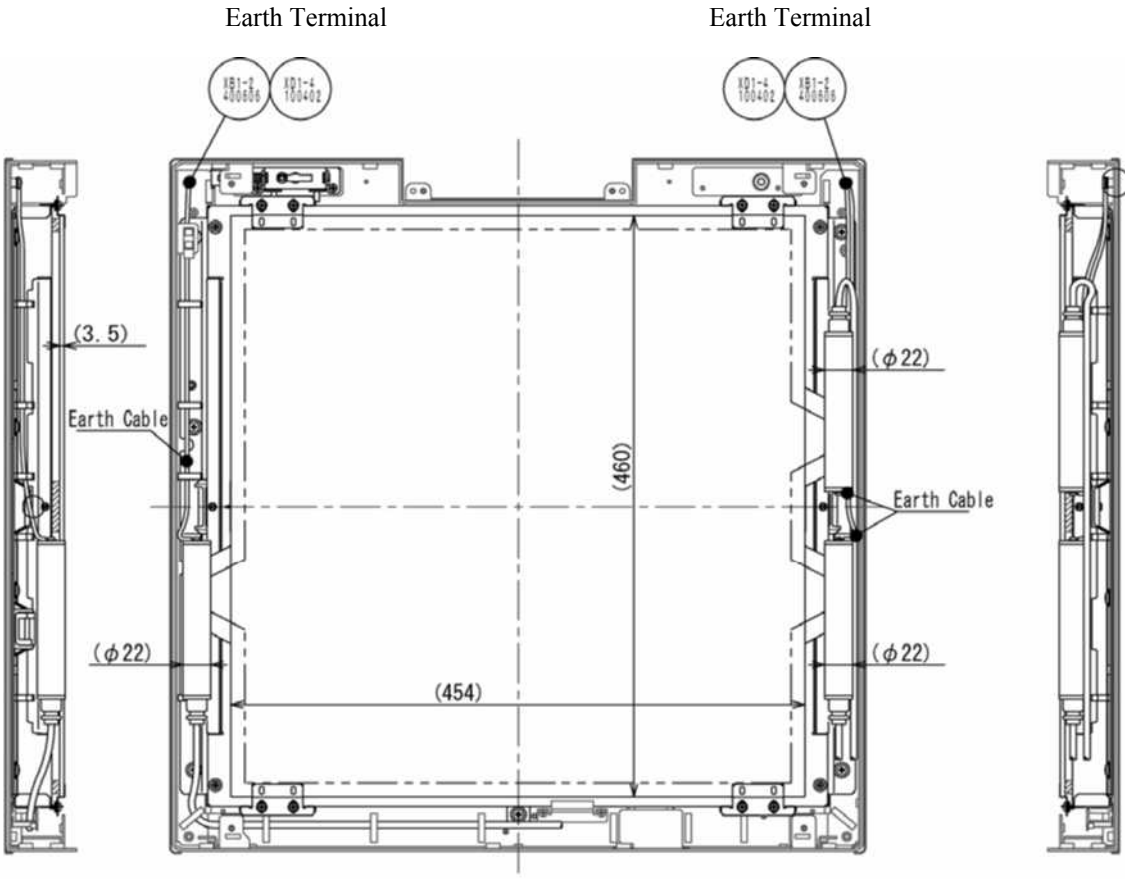
Insert XD1-4100-402 between the cell space unit of the frame and earth terminal.

7.6.3 Hitach 3 ch
(1) Standard



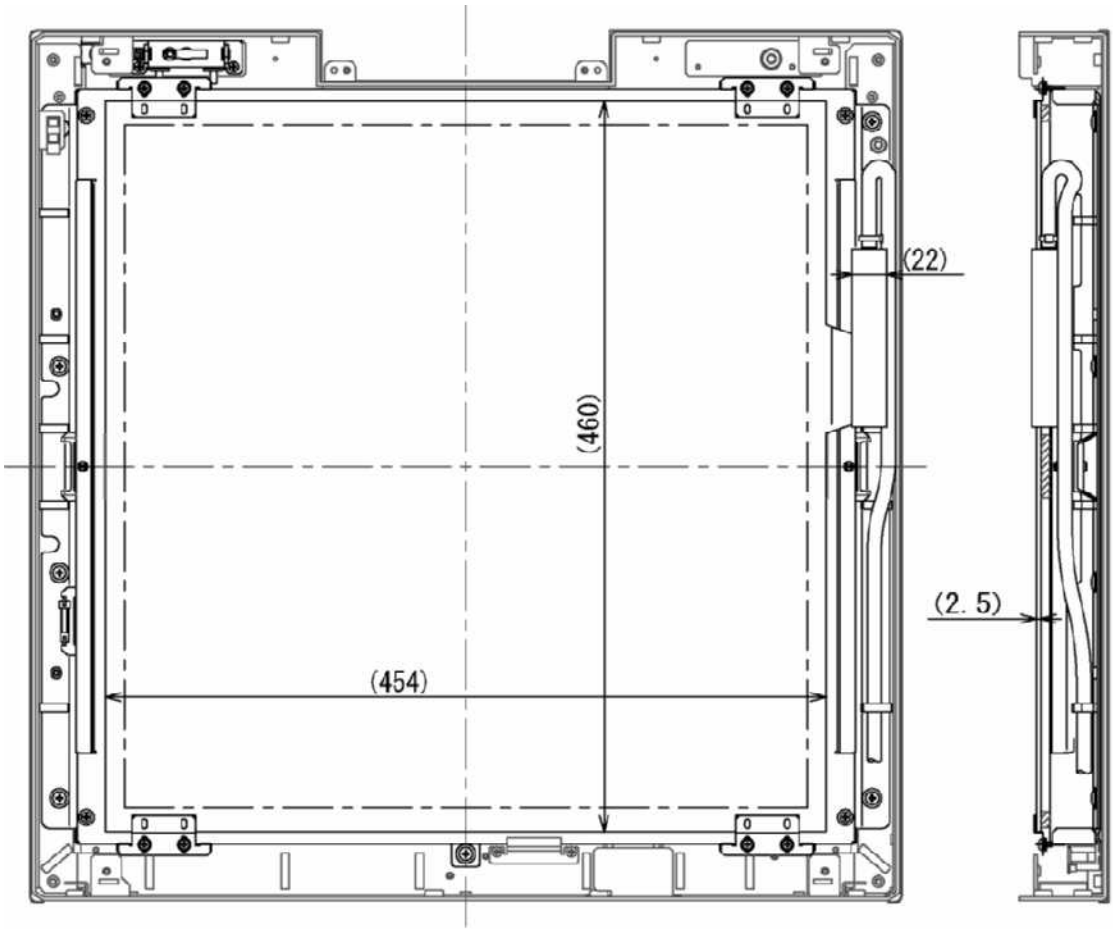
Insert XD1-4100-402 between the cell space unit of the frame and earth terminal.

(2) Inverse

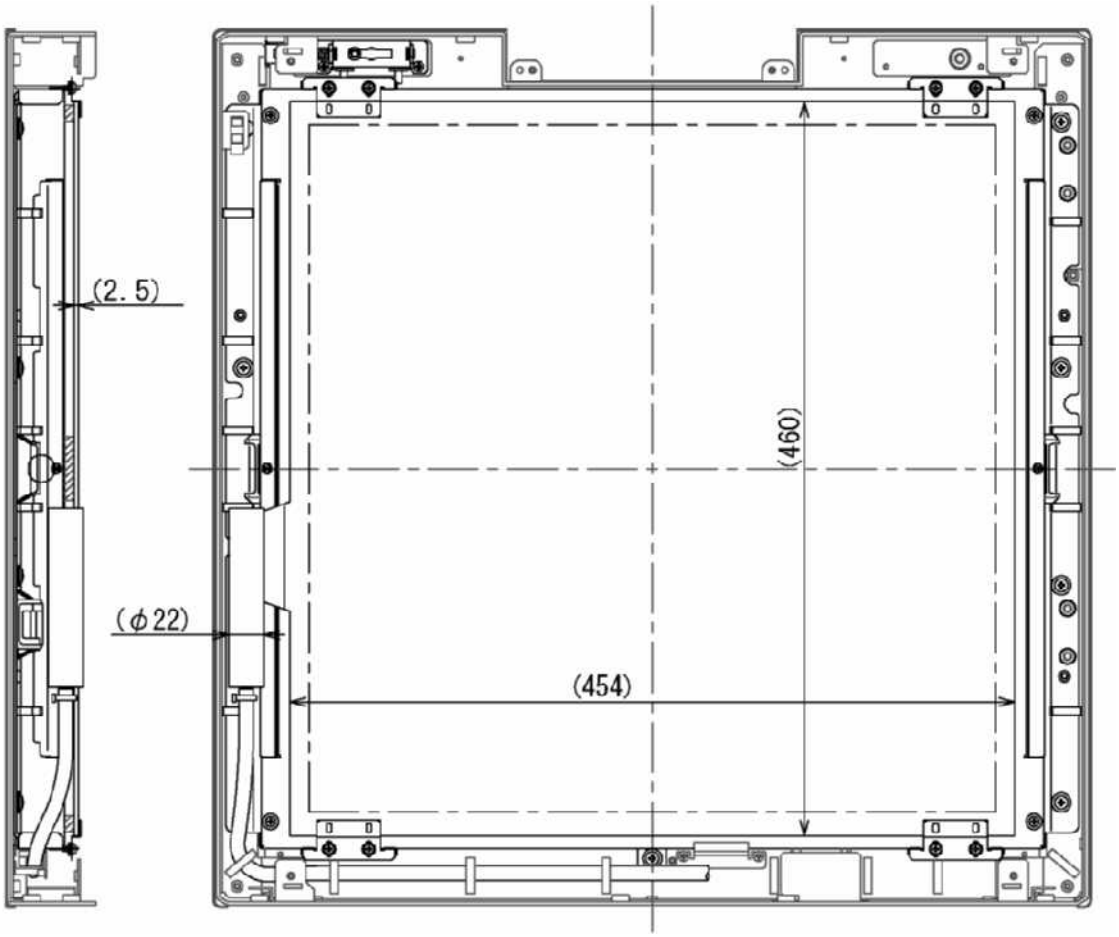


Insert XD1-4100-402 between the cell space unit of the frame and the ground wire terminal.

7.6.4 Shimazdu 1 ch
(1) Standard

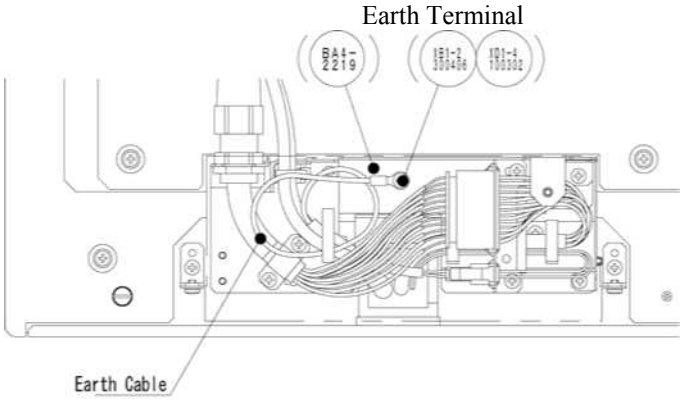


(2) Inverse

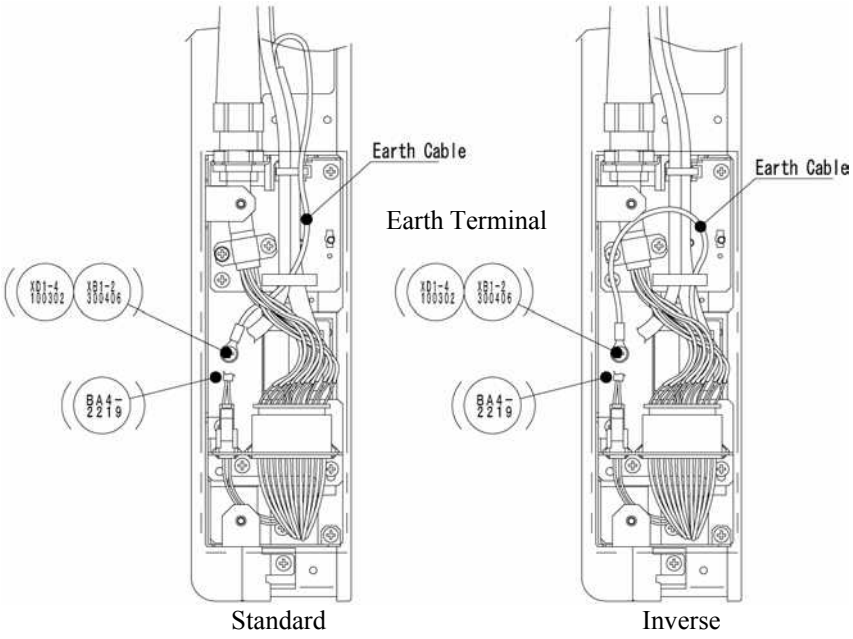


(3) Connecting Earth Cable

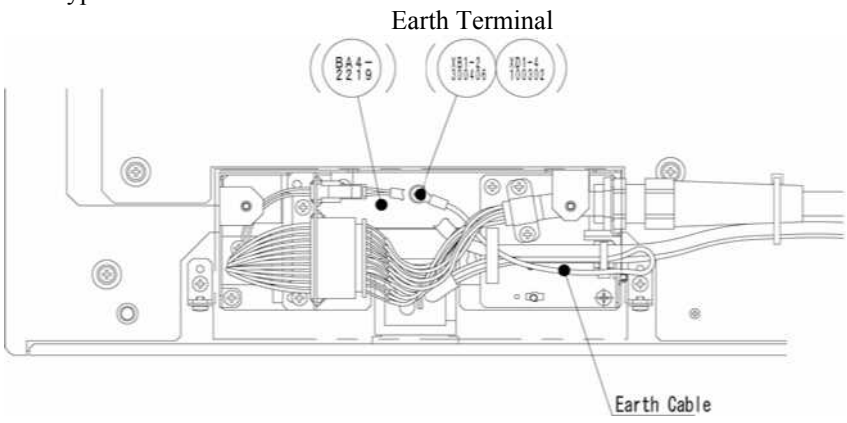
1) Uplight Stand Type



2) Table Type

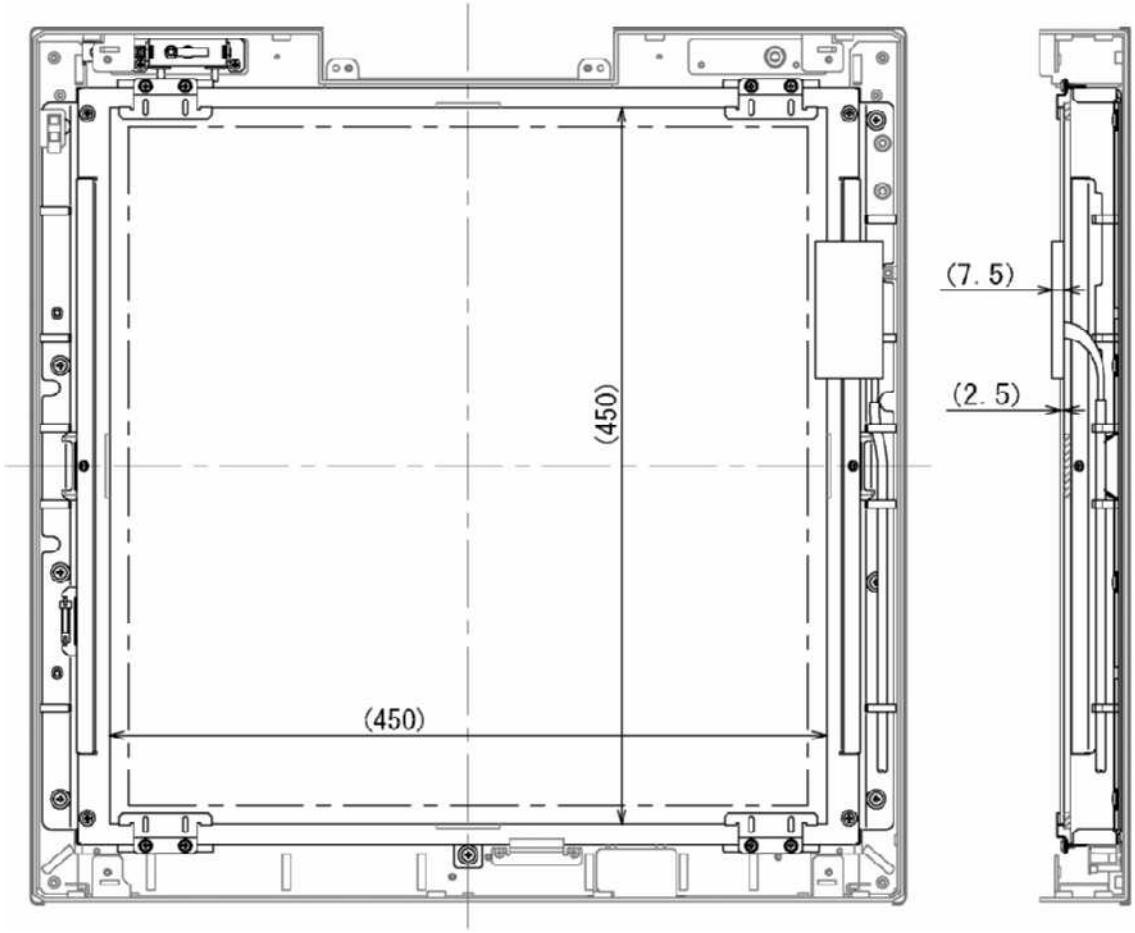


3) Universal Type

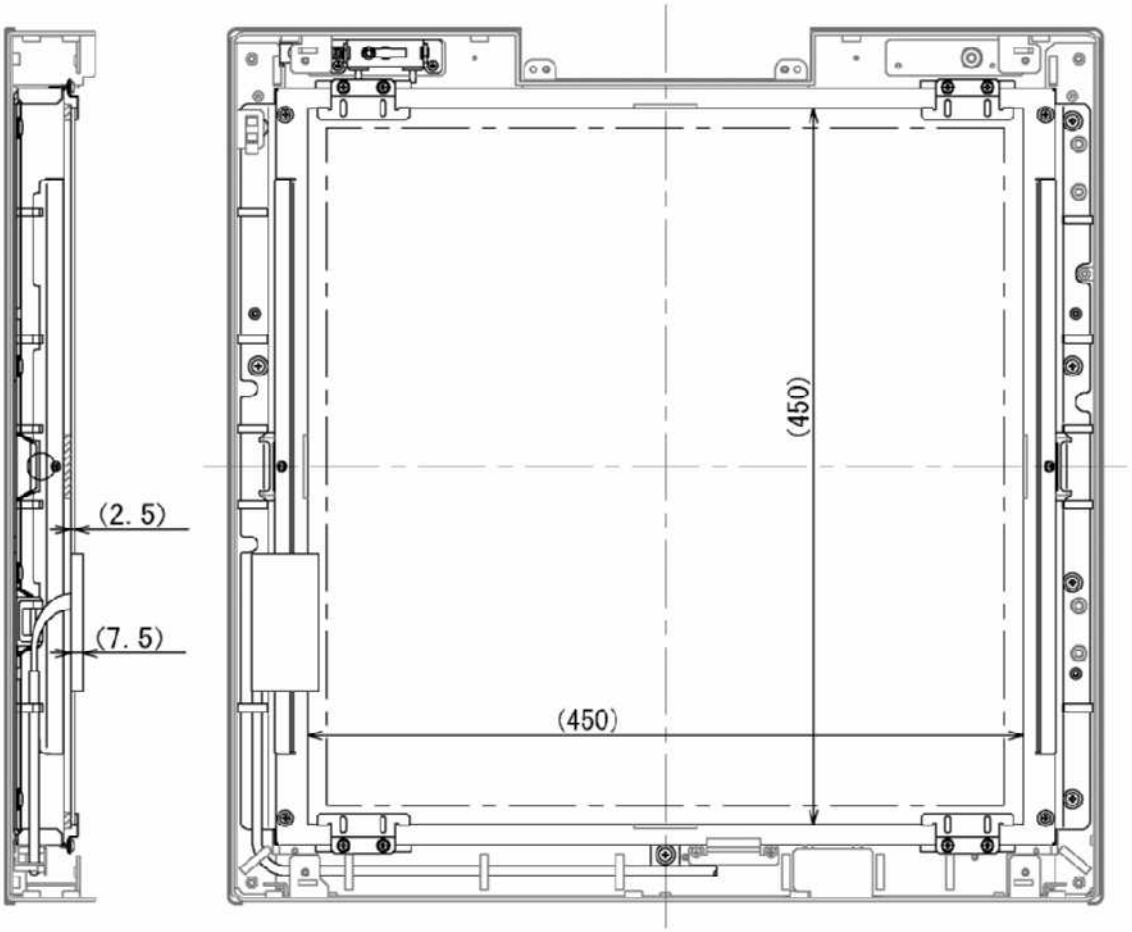


Insert the earth cable between the cell space unit for BA4-2219 and earth terminal.

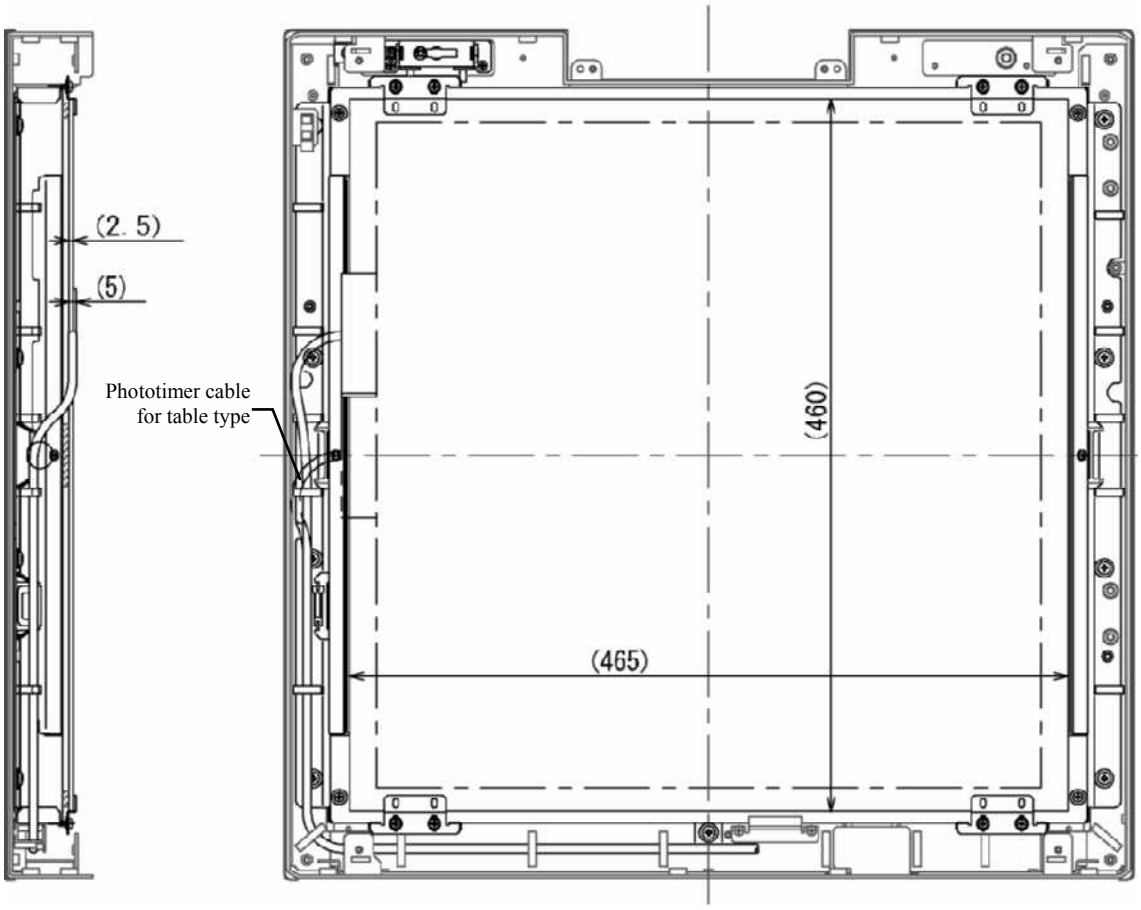
7.6.5 Shimadzu Ion Chamber
(1) Standard



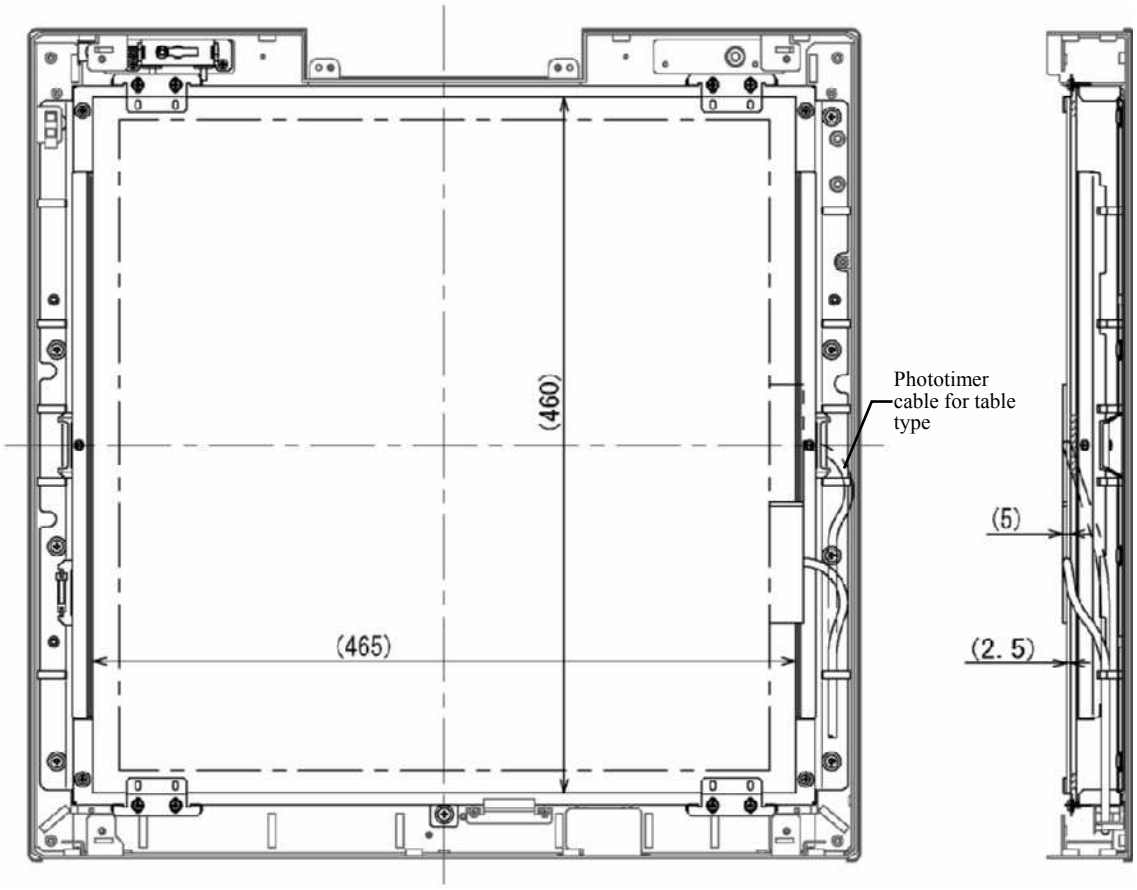
(2) Inverse



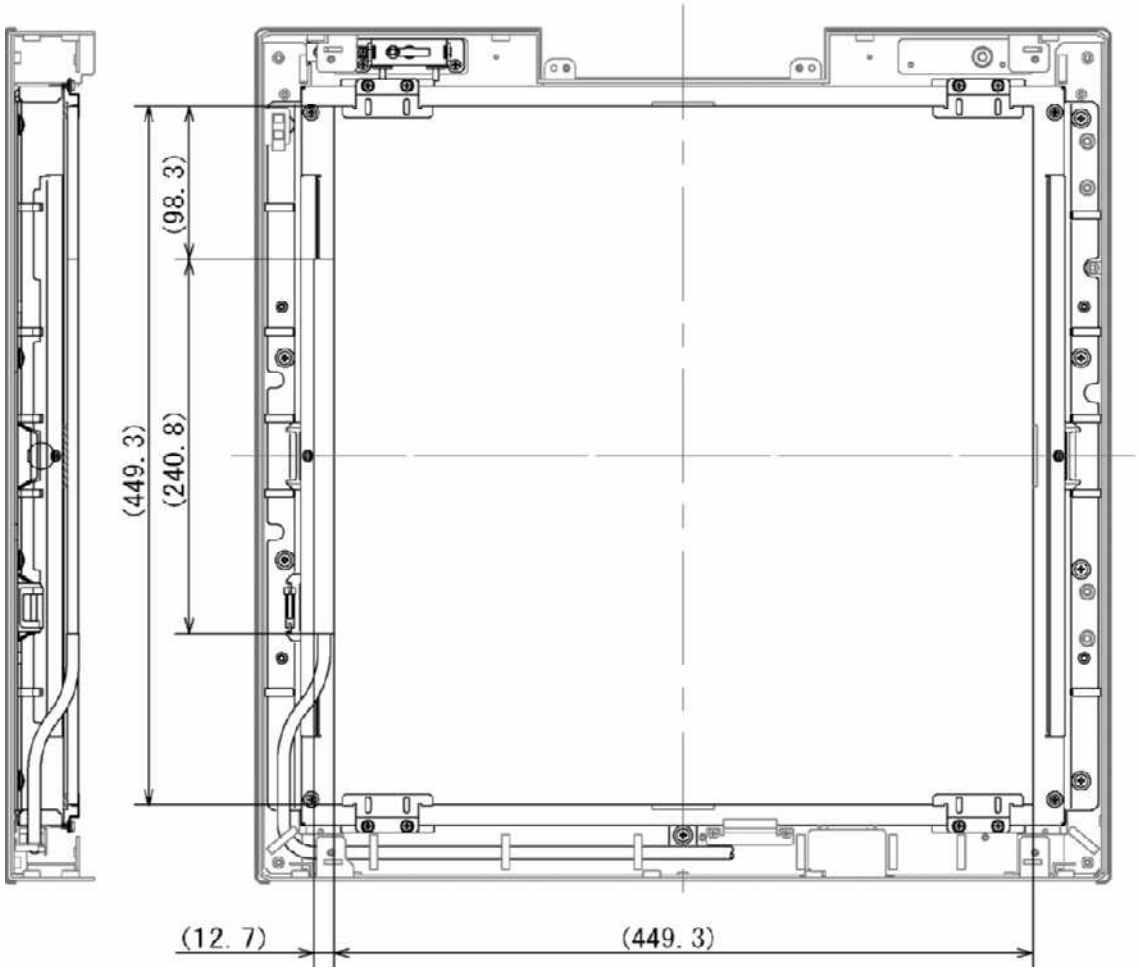
7.6.6 TOSHIBA Optical Fiber
(1) Standard



(2) Inverse Type

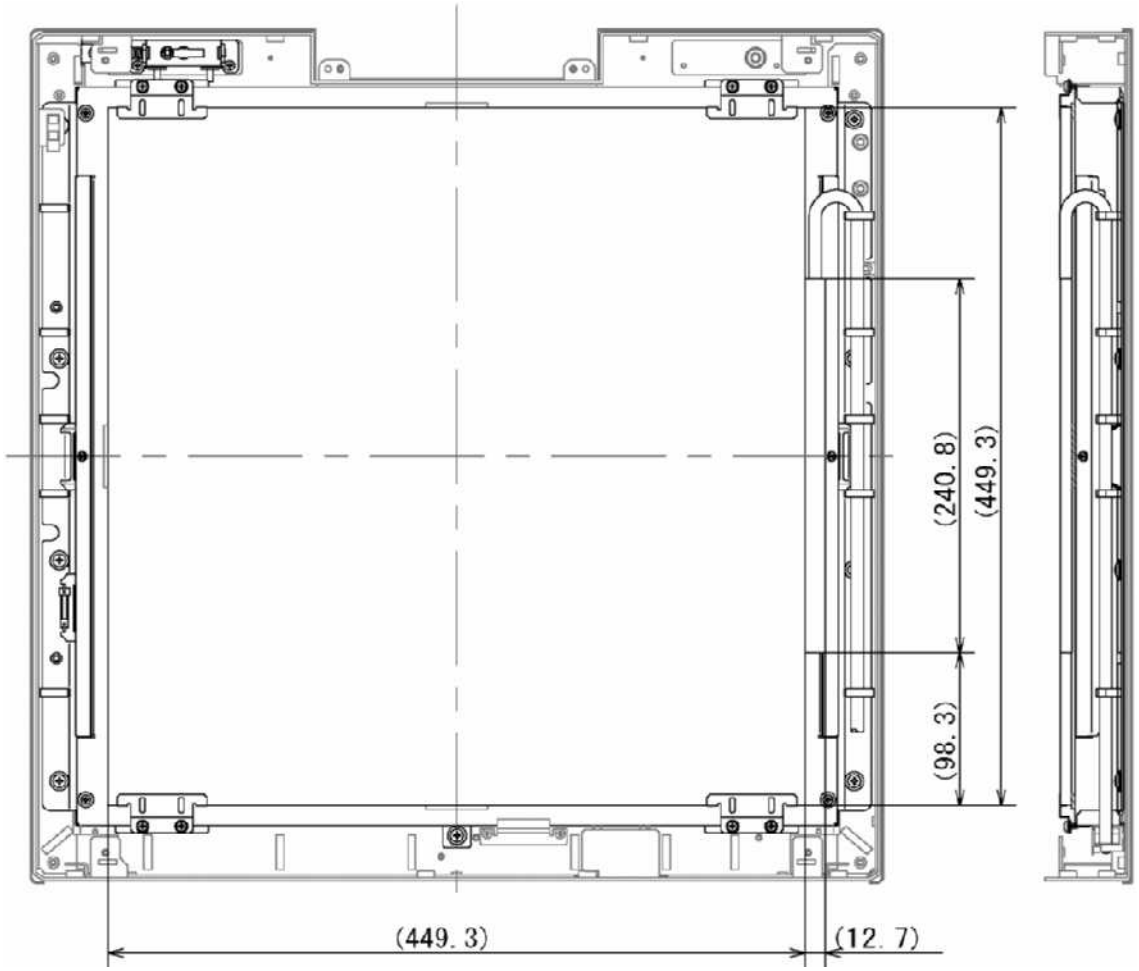


7.6.7 AID Ion Chamber
(1) Standard



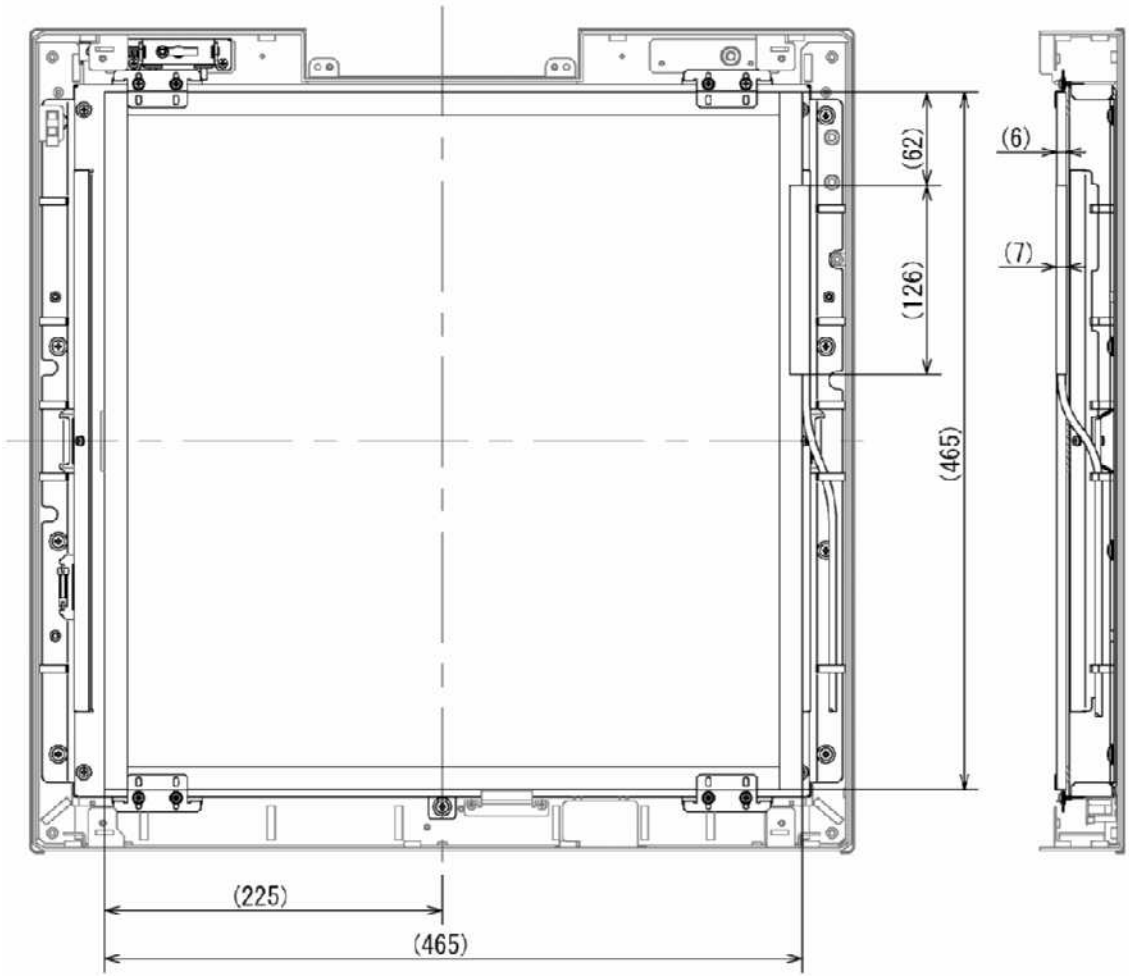
Thickness of Receptor: 7.1 mm Thickness of Amplifier: 7.4 mm

(2) Inverse



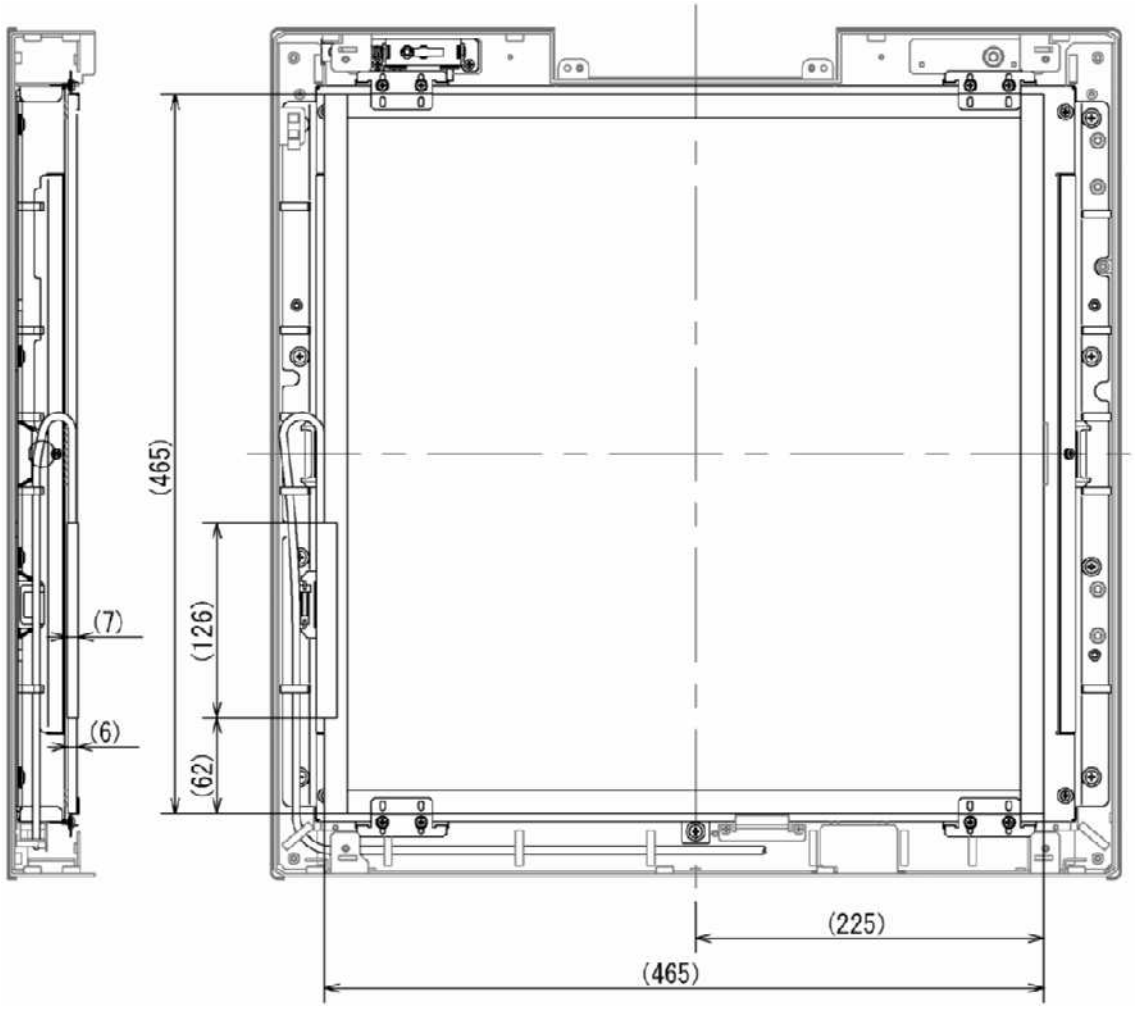
Thickness of Receptor: 7.1 mm Thickness of Amplifier: 7.4 mm

7.6.8 COMET Solid
(1) Standard



Remove the phototimer cable harness and the L plate.

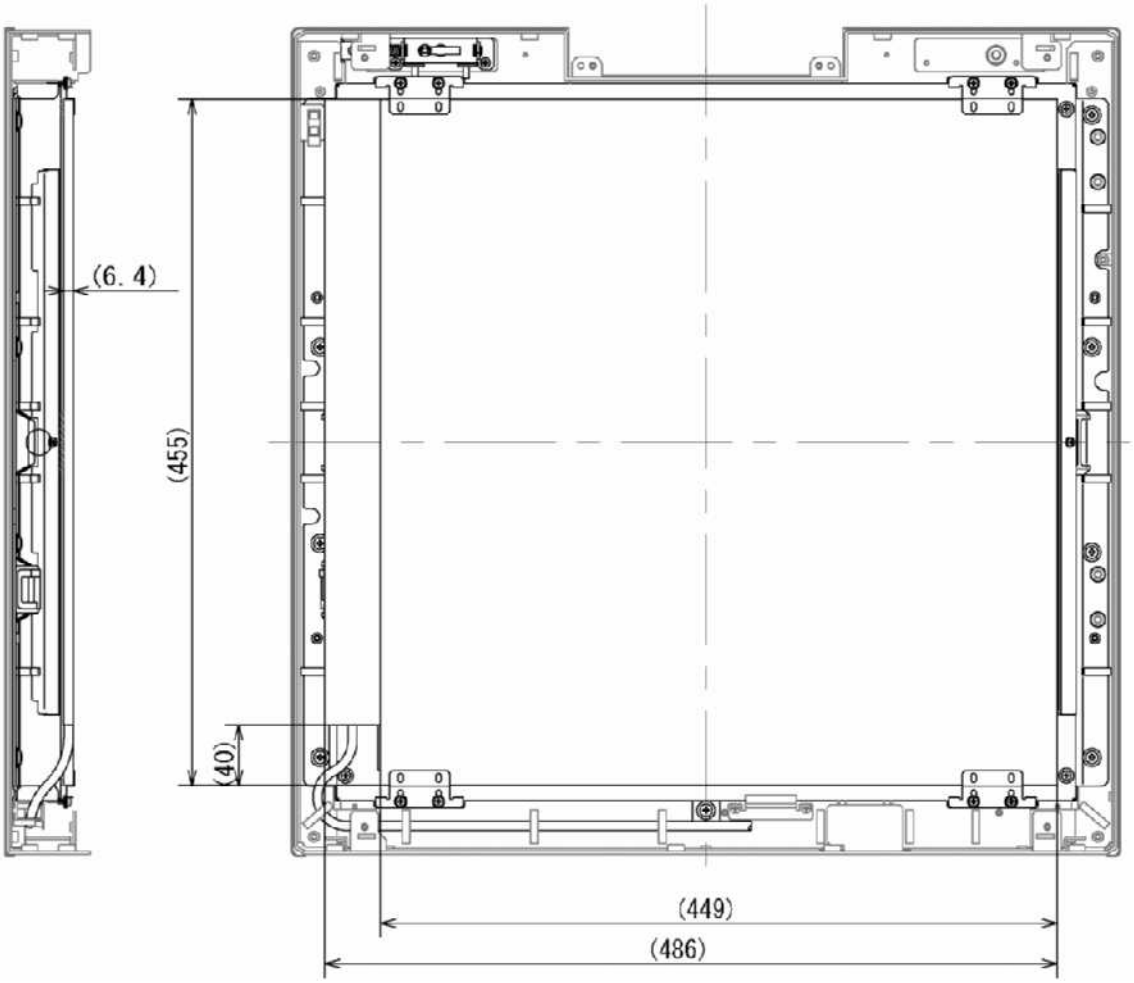
(2) Inverse



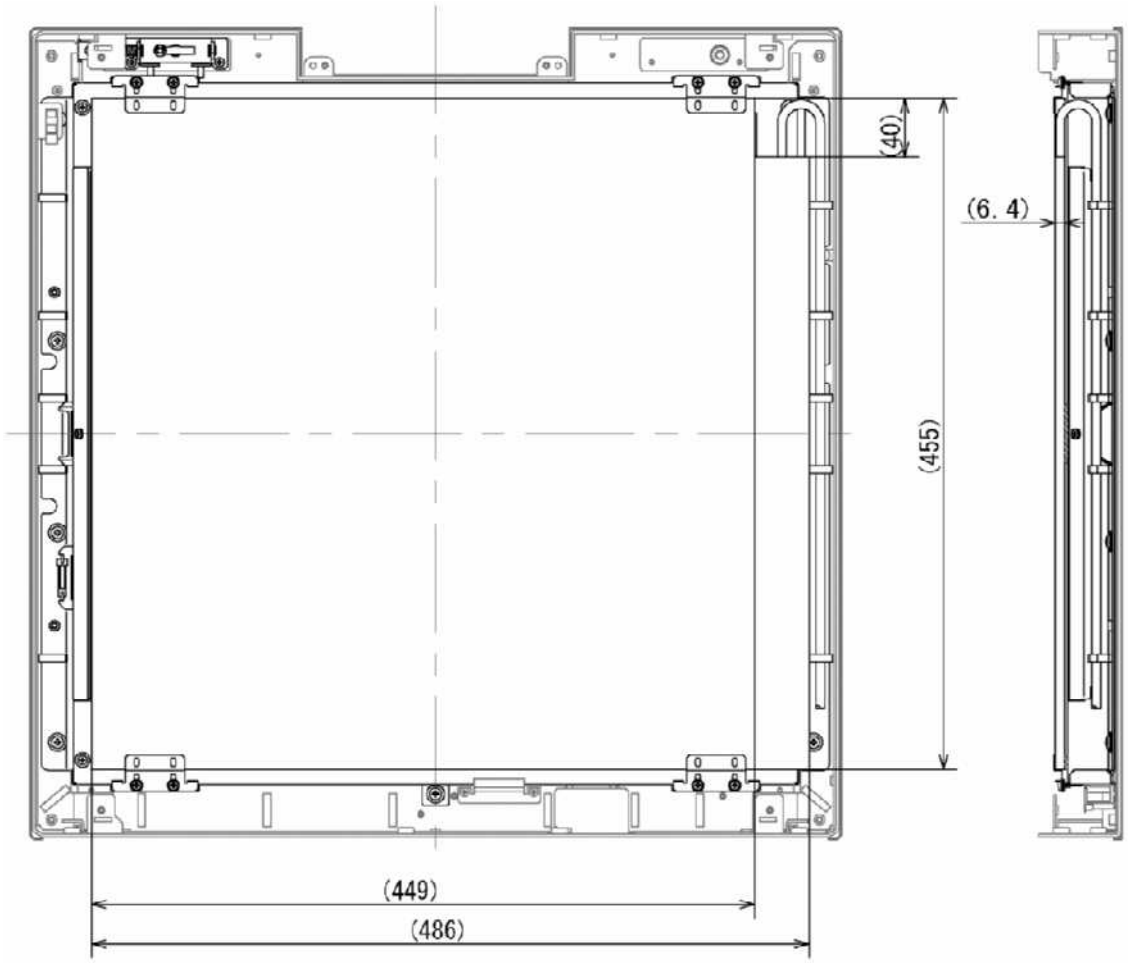
Remove the phototimer cable harness and the L plate.

7.6.9 SIEMENS Ion Chamber – Thin Type

(1) Standard

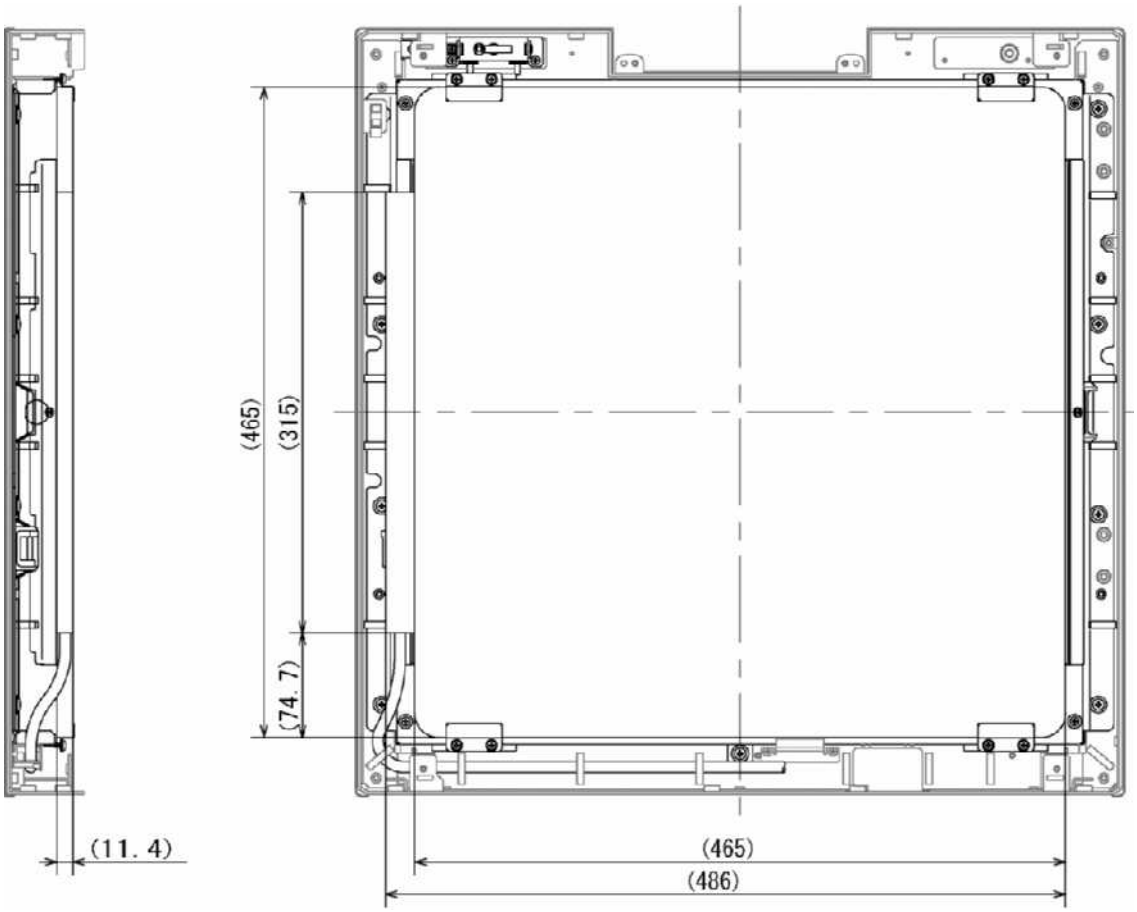


(2) Inverse

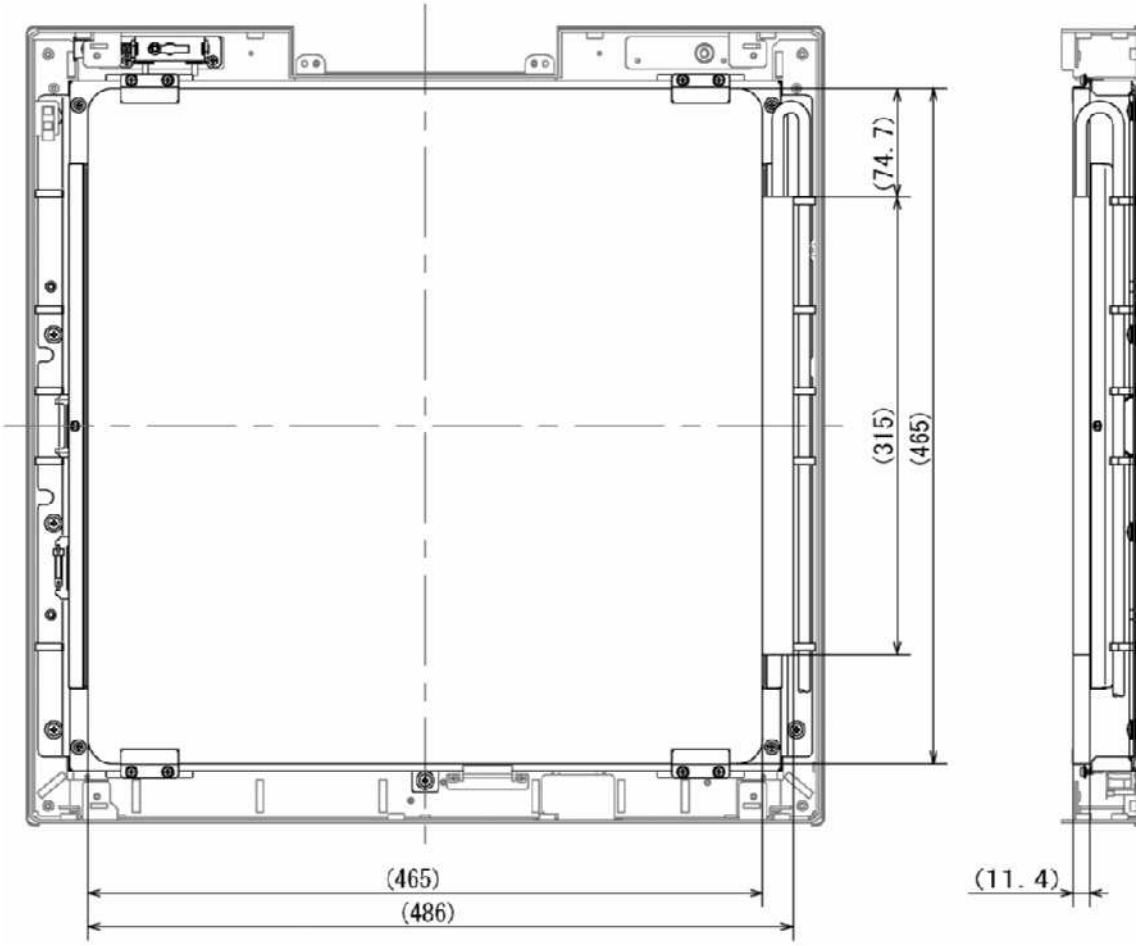


7.6.10 SIEMENS Ion Chamber – Thick Type

(1) Standard

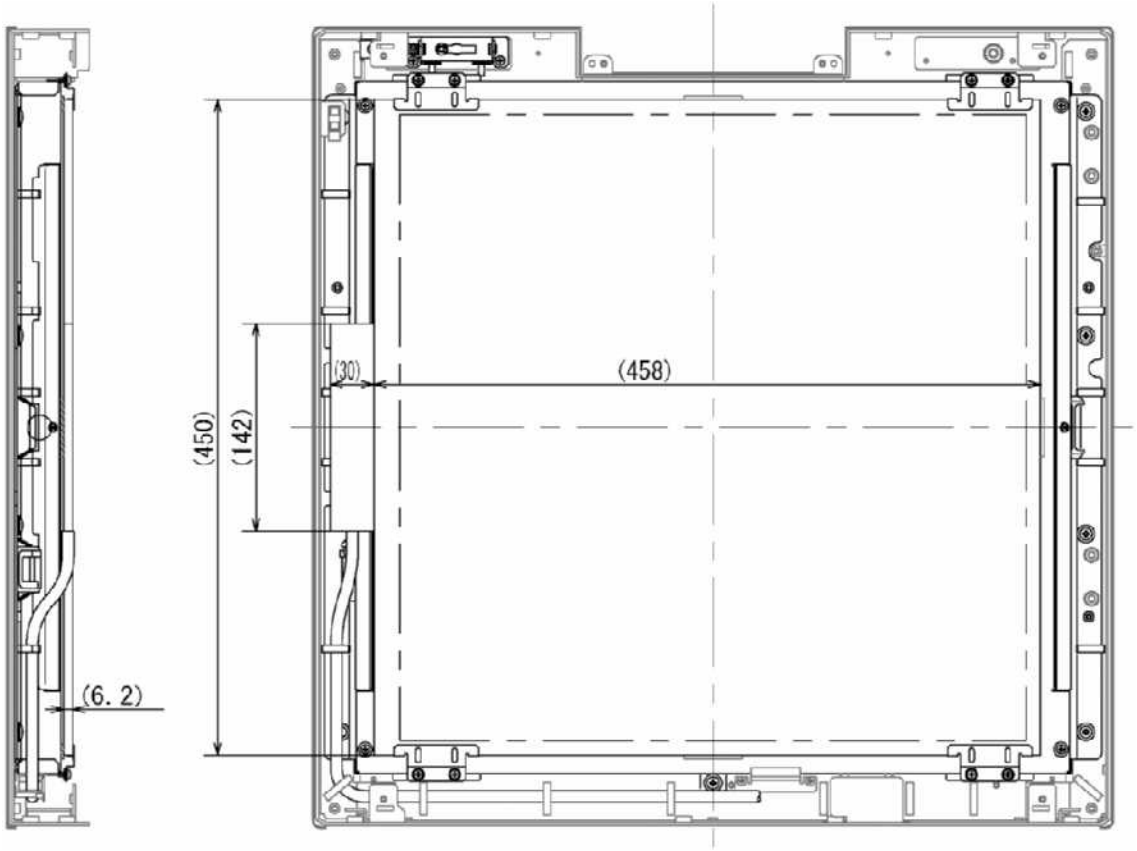


(2) Inverse

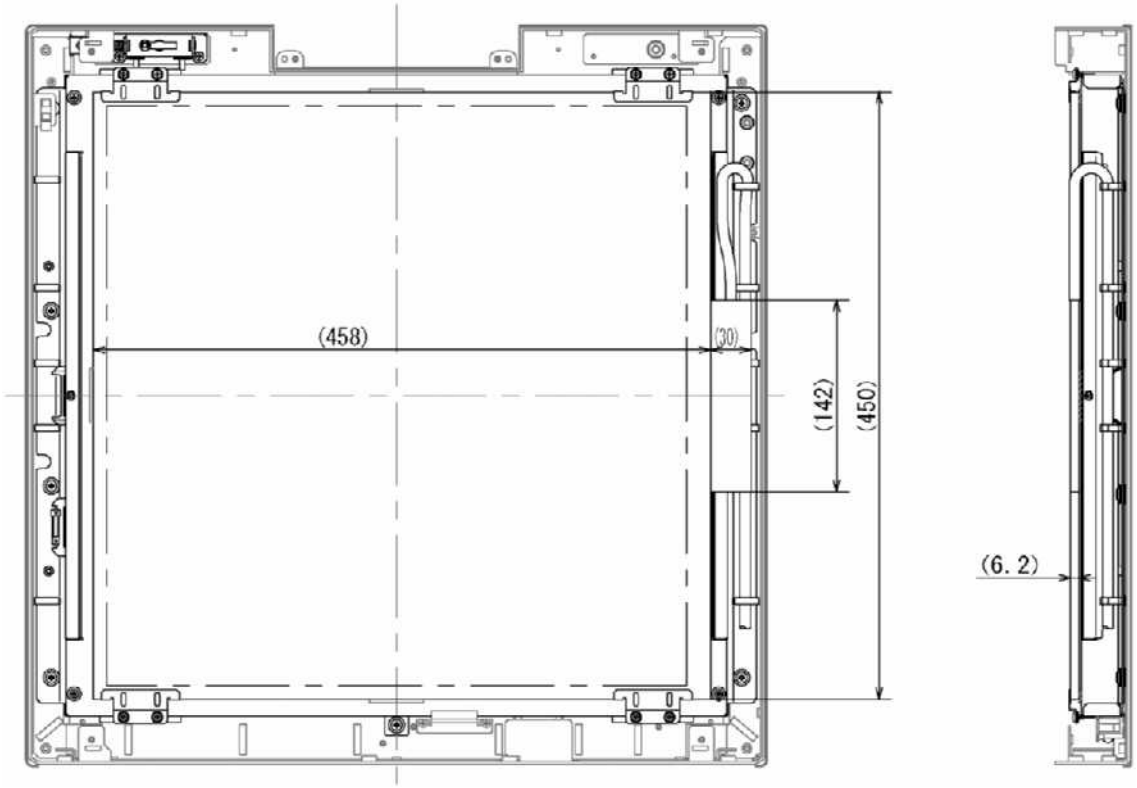


7.6.11 VACUTEC Ion Chamber

(1) Standard

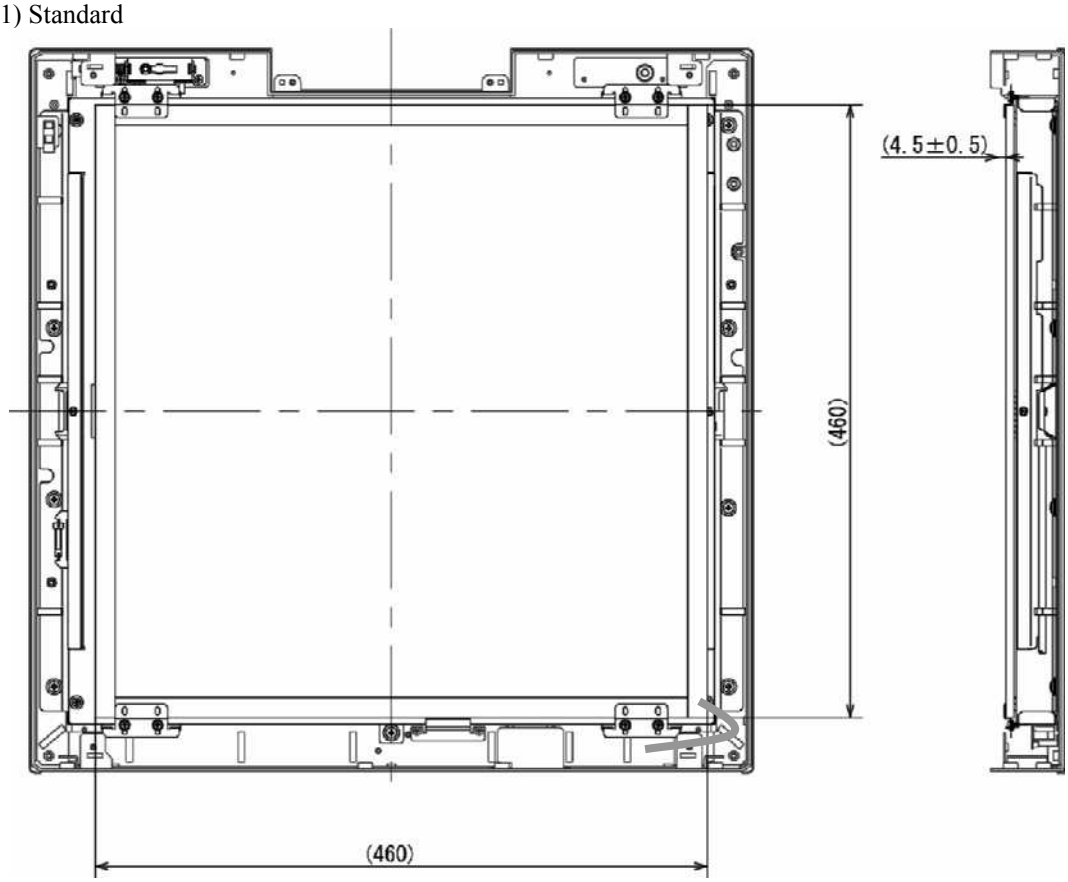


(2) Inverse

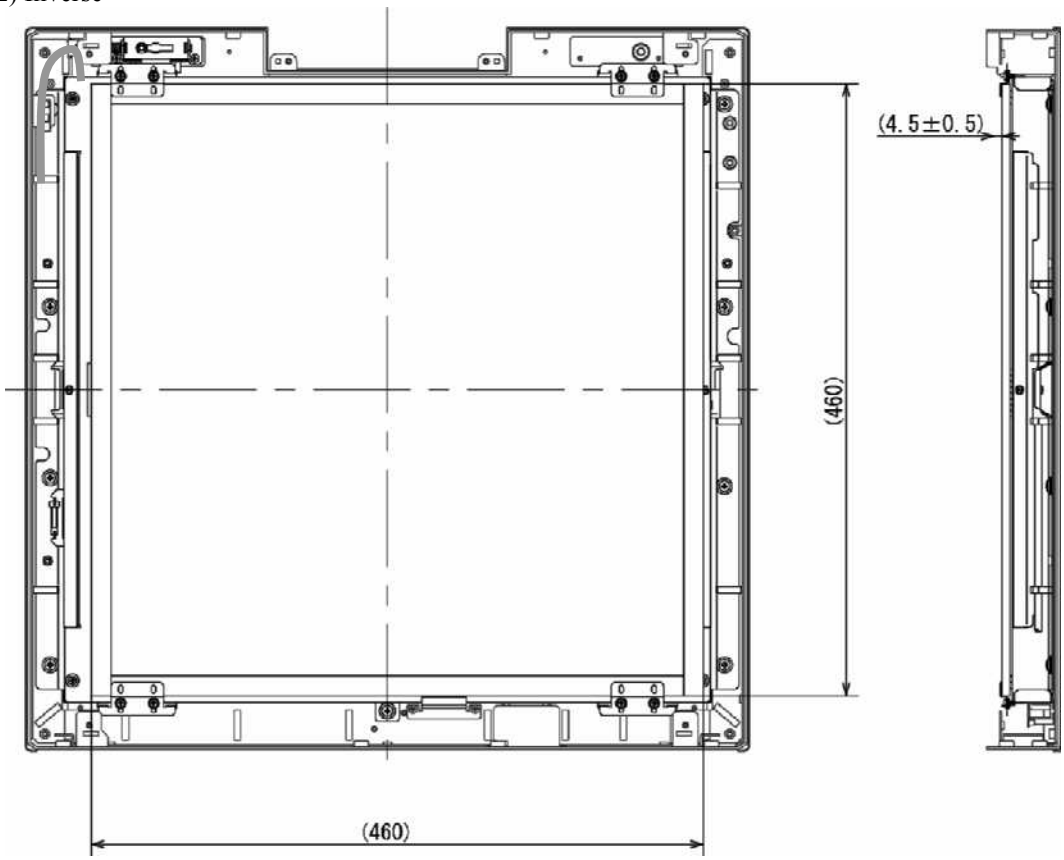


7.6.12 GILARDONI Solid

(1) Standard



(2) Inverse



8. Starting up and shutting down the System

Perform the following sequences when starting up and shutting down the system.

1. Sequence for Starting up the System
   Perform the following sequence when turning the system power on.

   If you do not perform the correct sequence, the imaging unit cannot be recognized, resulting in an error.

   (This is because the system communicates with the imaging unit when turning the system on.)

The power box cannot be turned on in conjunction with turning on the control PC.

1) Turn on the main power of the 40EG power box.

2) Turn on the control PC.

Note:

Ccrstart.bat should be registered in Windows Startup.

2. Sequence for Turning the Power off (Shutdown)

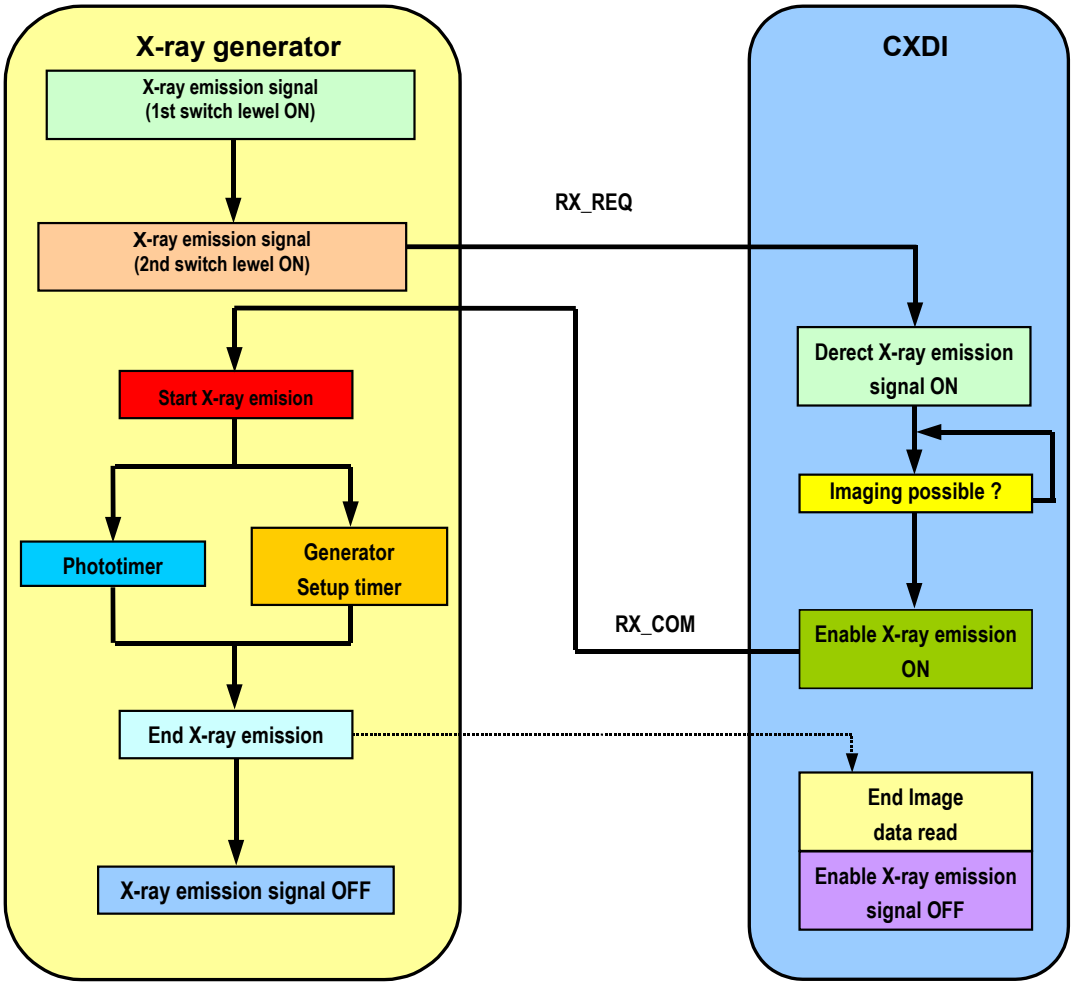
1) From OPU, select SYSTEM → [SHUTDOWN] or [SHUTDOWN after transfer]

The control PC automatically turns off.

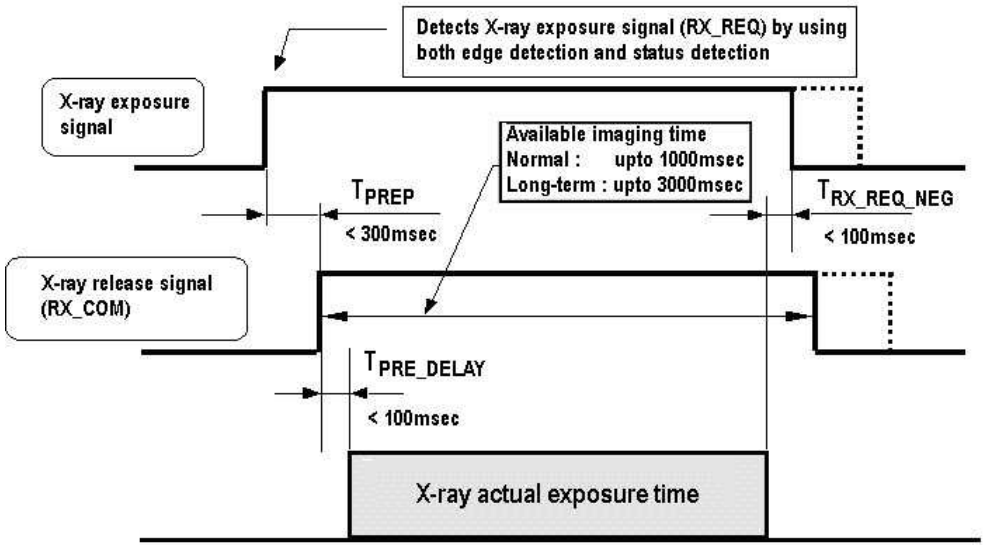
2) Turn off the main power of the power box.

9. X-ray Controller Interface

9.1 Interface Signal Description



9.2 When normal imaging



T_{PREP}
Time taken to assert the X-ray exposure authorization signal (RX_COM) after the X-ray exposure request (RX_REQ rise) from the X-ray generator has been received.

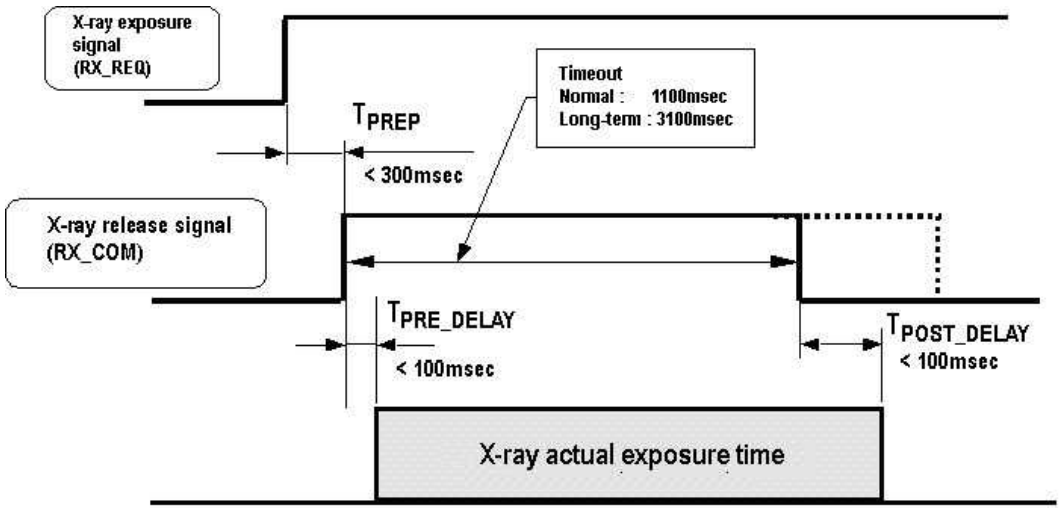
T_{ACC_enable}
Output period of X-ray exposure authorization signal (RX_COM)

$T_{RX_REQ_NEG}$
Time taken for the X-ray exposure request signal (RX_REQ) to be negated after X-ray exposure is completed

T_{PRE_DELAY}
Time taken for the exposure to the X-rays after the X-ray exposure authorization signal (RX_COM) has been asserted

T_{POST_DELAY}
Time taken for stopping the X-rays after the X-ray exposure authorization signal (RX_COM) has been negated

9.3 When timeout due to RX_REQ not negating

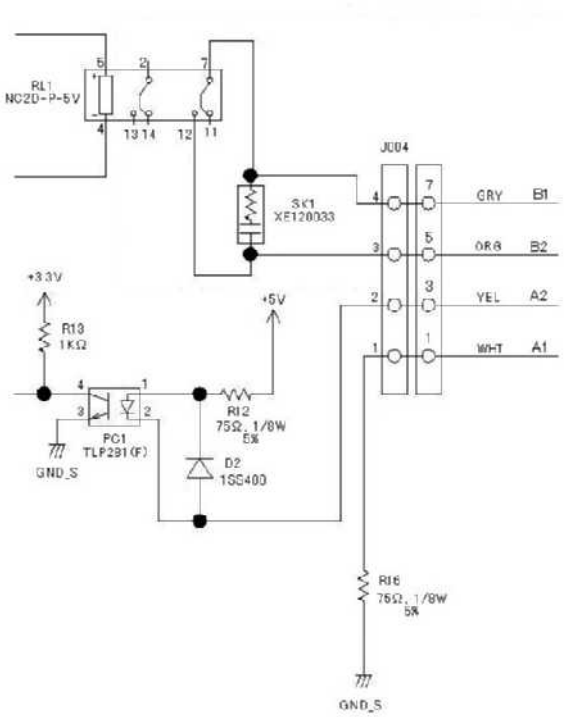


9.4 Signal names and functions in the connection with the X-ray generator

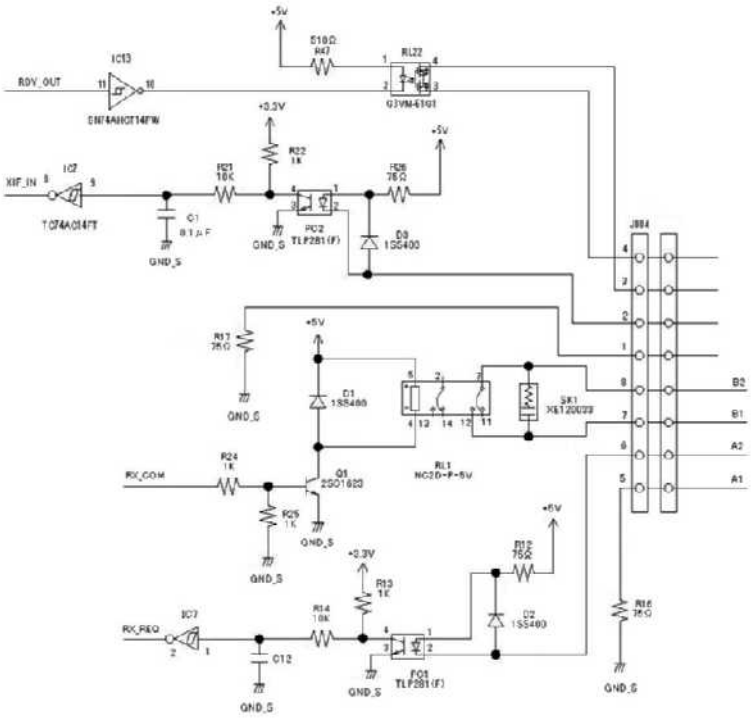
<X-ray Sync Signal>

Signal name	Functions
RX_REQ	X-ray exposure signal Indicates that an X-ray exposure is ordered at the X-ray generator side. This signal needs to be retained at least for T_{PREP} period. X-ray release signal (RX_COM) is not output if the T_{PREP} is less than the necessary period. It takes about 1 second in the worst case scenario before the operation can be resumed when RX_REQ is negated in this period. Time required to assert RX_COM after receiving the RX_REQ from the X-ray generator T_{PREP} ..... Max. 300 ms Since a captured image is read from the sensor when RX_REQ is negated (or RX_COM is time out) as a trigger, reading action is delayed if RX_COM does not negate and time out is used as the trigger, resulting in delay of image display timing. We recommend using a configuration in which RX_REQ is negated. Time required from X-ray exposure completion to negating RX_REQ $T_{RX_REQ_NEG}$ ..... min.0 max.100ms * Image display timing is delayed if this is not fulfilled.
RX_COM	X-ray release signal Checks whether or not imaging is ready at the CXDI side after receiving X-ray exposure signal (RX_REQ) from the X-ray generator. This signal is output to the X-ray generator side when imaging is ready. Time required from asserting RX_COM to exposing X-ray T_{PRE_DELAY}..... min.0 max.100ms * Available imaging time is reduced if this is not fulfilled. Time required to stop X-ray exposure after RX_COM halts T_{POST_DELAY} ..... min.0 max.100ms * Shading could occur on images if this is not fulfilled.

9.5 The connection X-ray generator equipment



Standard Power Box Unit

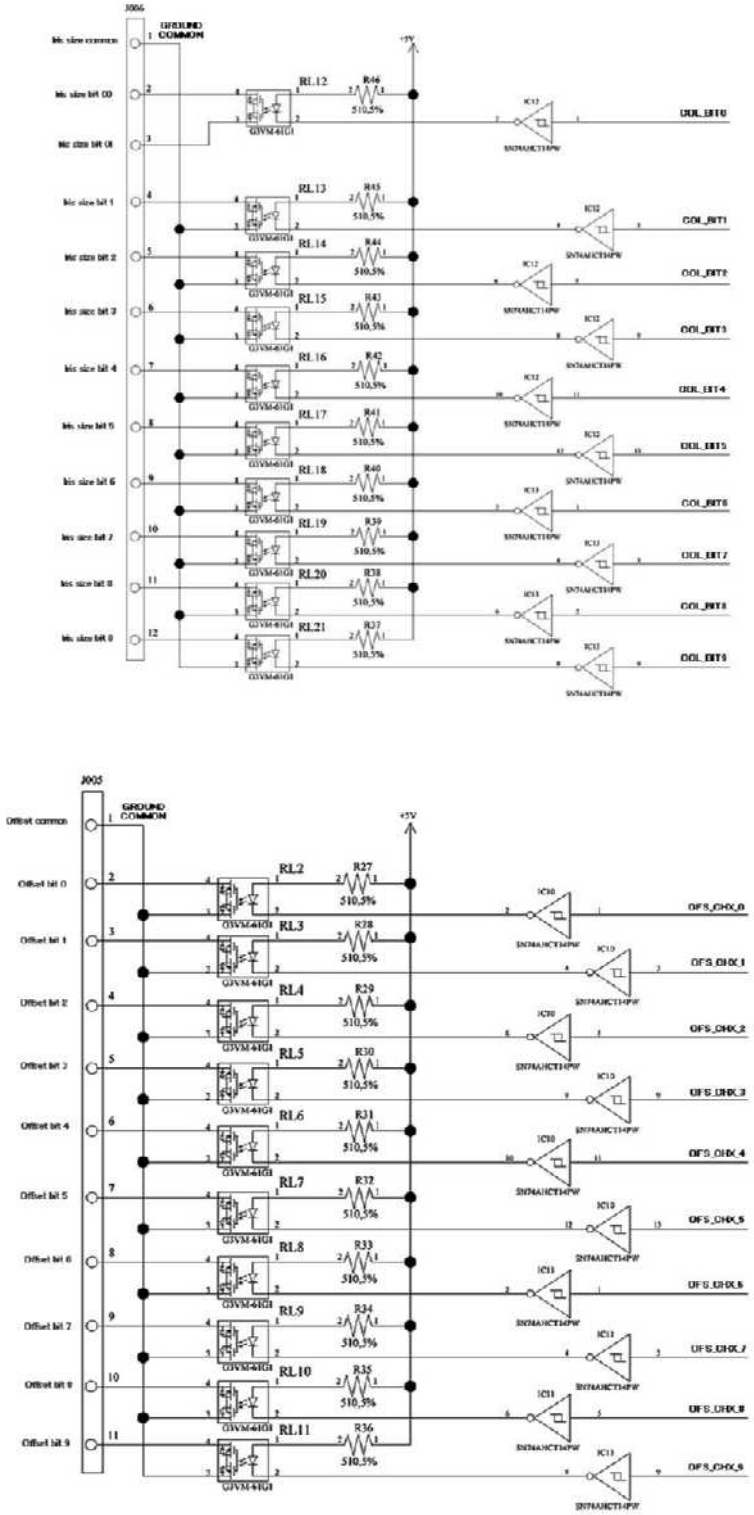


Power Box Unit/Auto Collimation

Connection conditions

1. The X-ray exposure signal line must be insulated, and its total impedance must be 100 ohms or less.
2. The maximum contact voltage of the X-ray exposure authorization signal line is AC 250V and DC 30V, and its current ranges from 10mA to 2A.
   Only the secondary power supply can be connected.

9.6 Connections showing the synchronization correlation of the iris and offset position with the X-ray generator



Power Box Unit/Auto Collimation

Connection conditions

The maximum contact voltage of the Iris synchronization signal line and Offset line are DC 48V, and its current ranges max. 400mA.

Only the secondary power supply can be connected.

9.7 Rating and Characteristics for Relay and Photo Coupler (on PWB-40XRAY Board)

(1) RL1 (Power Relay/Plug-in terminal type)

1) Rating (Operational coil)

Rated voltage (V)	Rated current	Coil resistance	Coil Inductance (mH)		Pick-up voltage	Dropout voltage	Maximum voltage	Power consumption
	(mA)	(Ω)	Armature OFF	Armature ON	(V)	(V)	(V)	(mW)
DC5V	72	69.4	69.5	86.0	80% and lower	10% and higher	135% (at 50 °C)	Approx 360

2) Rating (Switch/Contact)

types	Single stable
arrangement	2 Form C
Contact material	Au-clad AgNi type
Relating capacity	AC250 5A DC30V 5A
Max. switching power	1250VA 150W
Max. switching voltage	250V AC
Max. switching current	5A
Min. switching capacity	100μA 1V DC

3) Characteristics

Item		Content
Operate time		Max. 20ms
Reset time		Max. 10ms
Maximum open/close frequency	Mechanical	18,000 times/hour
	Rated load	1,800 times/hour
Withstand voltage	Between coil contacts	2,000 Vrms
	Between same poles	1,000 Vrms
life	Mechanical	$5x10^7$ times
	Electrical	10^5 at 5A 250V AC $5x10^5$ at 5A 30V DC
Ambient temperature		-40°C to +70°C (no freezing nor condensation)
Maximum operating frequency		50 times/Sec.

2) PCI (Photo-coupler)

1) Maximum Ratings (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING
LED	Forward Current	I_F(RMS)	50 mA
	Forward Current	$_{\Delta}I_F$/°C	-0.7(Ta≥53°C)
	Pulse forward current[1]	I_{FP}	1 A
	Reverse Voltage	V_R	5 V
DETECTOR	Collector-Emitter Voltage	V_{CEO}	80 V
	Emitter-Collector Voltage	V_{ECO}	7 V
	Collector Current	I_C	50 mA
	Collector Power Dissipation (1 Circuit)	P_C	150 mW
Total Package Power Dissipation (1 Circuit)		P_T	200 mW
Isolation Voltage[2]		BVs	2500 Vms

2) Electrical Characteristics(Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP	MAX.	UNIT
LED	Forward Voltage	V_F	I_F=10 mA	1.0	1.15	1.3	V
	Reverse Current	I_R	V_R=5 V	-	-	10	μA
	Capacitance	C_t	V=0, f=1 MHz	-	30	-	pF
	Max. Forward voltage	V_{FM}	I_{FM}=0.5 A	-	3	4	V
DETECTOR	Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C=0.5 mA	80	-	-	V
	Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	I_E=0.1 mA	7	-	-	V
	Collector Dark Current	I_{CEO}	V_{CE}=48 V Ambient Light Below (100lx)	-	0.01 (2)	0.1 (10)	μA
			V_{CE}=48 V, Ta=85 Ambient Light Below (100lx)	-	2 (4)	50 (50)	
SWITCH CHARACTRISTIC	Rise Time	t_r	V_{CC}=10 V I_C=2 mA R_L=100Ω	-	2	-	μs
	Fall Time	t_f		-	3	-	
	Turn-On Time	t_{ON}		-	3	-	
	Turn-Off Time	t_{Off}		-	3	-	
	Turn-On Time	t_{ON}	V_{CC}=5 V I_F=16 mA R_L=1.9 kΩ	-	2	-	μs
	Storage Time	t_S		-	25	-	
	Turn-Off Time	t_{OFF}		-	40	-	

Note: Because of the construction, leak current might be increased by ambient light. Please use photo-coupler with less ambient light

[1] pulse amplitude 100μs, frequency 100Hz
[2] AC, 1min R.H.≤60 LED side pins shorted together and DETECTOR side pins shorted together

3) RL2-22(MOS FET Relay)

(1) Absolite Maximum Rating(Ta=25°C)

Item		Symbol	Rating	Unit	Measurement Conditions
Input	LED forward current	I_F	50	mA	
	Repetitive peak LEDforward current	I_{FP}	1	A	100μs pulses, 100pps
	LED forward current reduction rate	$_{\Delta}I_F$/°C	-0.5	mA/°C	Ta≥25°C
	LED reverse voltage	V_R	5	V	
	Connection temperrature	T_J	125	°C	
Output	Output dielectric strength	V_{OFF}	60	V	
	Continuous load cureent	I_O	400	mA	
	ON current reduction rate	$_{\Delta}I_{ON}$/°C	-4.0	mA/°C	Ta≥25°C
	Connection temperature	T_J	125	°C	
Dielectric stregth between input and output[See note 1]		V_{I-O}	1500	Vrms	AC1 for 1 min
Operating temperature		Ta	-40 to 85	°C	With no icing or condensatiuon
Storage temperature		T_{stg}	-55 to 125	°C	With no icing or condensatiuon
Soldering temperature		-	260	°C	10s

(2) Electrical Characteristics (Ta=25°C)

Item		Symbol	Measurement Conditions	Min	Typ	Max	unit
Input	LED forward current	V_F	I_F=10 mA	1.0	1.15	1.3	V
	reverse current	I_R	V_R=5 V	-	-	10	μA
	Capacity between terminals	C_T	V=0,f=1 MHz	-	30	-	pF
	Trigger LED forward current	I_{FT}	I_O=400 mA	-	1.6	3	mA
Output	Max. Resistance with output ON	R_{ON}	I_F=5 mA I_o=400 mA	-	1	2	Ω
	Current leakage when the relay is open	I_{LEAK}	V_{OFF}=60 V	-	-	1.0	μA
Capacity between I/O terminals		C_{I-O}	f=1MHz,Vs=0V	-	0.8	-	pF
Insulation resistance		R_{I-O}		1000	-	-	MΩ
Turn-ON time		t_{ON}	I_F=5mA R_L=200Ω V_{DD}=20V	-	0.8	2.0	ms
Turn-OFF time		t_{OFF}		-	0.1	0.5-	

Note 1 The dielectric strength between the input and output was checked by applying voltage between all pins as a group on the LED side and all pins as a group on the light-receiving side.

(3) Recommended Operating Conditions

Item	Symbol	Min	Typ	Max	Unit
Output dielectric strength	V_{DD}	-	-	48	V
Operating LED forward current	I_F	5	7.5	25	mA
Continuous load current	I_O	-	-	400	mA
Operating temperature	Ta	-20	-	65	°C

10 Network Settings

10.1. Objective

The CXDI-40EG/40EC imaging part communicates with the control PC by using Ethernet [IEEE802.3u (100Base-TX)] to transfer X-ray images.
The control PC performs DICOM transfer in order to use Ethernet to transfer the obtained images to the printer and storage device.

This section describes how to set up the TCP/IP that is necessary for the network connection. Set up the following four items:

1) TCP/IP setting for the control PC network card
2) Network setting for Screwcap.ini
3) Network setting stored in the CXDI-40EG/40EC sensor
4) Connection setup for a multiple number of sensor units

10.2. Preparation

- Keyboard
- Mouse

Connect the keyboard and mouse to the back of the control PC.
Check if the system is connected, and then turn the system on.
If restrictions have been set on the operation of the operating system, release them.

10.3. Setup method

10.3.1. TCP/IP setting for the control PC network card

Perform the set up by referring to “C3S Service Manual” -> the chapter “System Manual” -> “Network Setup”.

Default values
IP Address:192.168.100.10
SubnetMask:255.255.255.0

10.3.2. Network setting for Screwcap.ini

The CXDI software communicates with the imaging part through screwcap.dll by using the communication protocol for sending and receiving commands and responses.

In conjunction with the communication, Screwcap.ini retains the information of the connected CXDI-40EG/40EC and control PC such as network addresses.

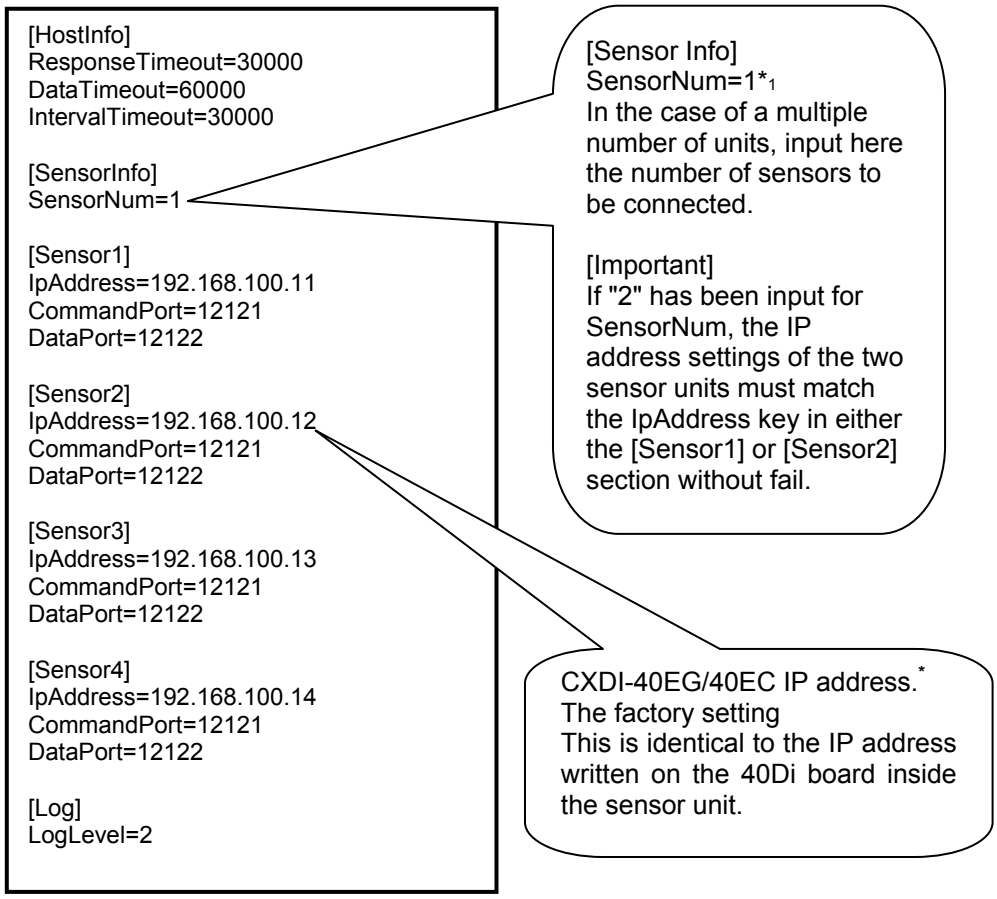
It is necessary to edit Screwcap.ini to communicate with the imaging part.

Screwcap.ini factory setting is the following default setting (see the figure below).If a single CXDI-40EG/40EC (or 50G) sensor unit to be connected to the control PC, Screwcap.ini does not require editing, and only a check need be conducted.

If a multiple number (2 or more) of CXDI-40E (or 50G) sensor units are to be connected to the control PC, Screwcap.ini must be edited. (* Refer to "10.3.4. Connection setup for a multiple number of sensor units.")

Screwcap.ini is located in the following directory:

D:\ccr\screwcap.ini



*1 "SensorNum=1" is the default value when C3S [Ethernet] or C3 [Cap&Ethernet] has been selected for the installer of the system software.

Only the [Sensor1] section is supported.

When the SensorNum key has been set to "2," "3" or "4" (SensorNum=2, 3 or 4), the [Sensor1, Sensor2], [Sensor1, Sensor2, Sensor3] or [Sensor1, Sensor2, Sensor3, Sensor4] sections are supported, respectively.

*2 CXDI-40EG/40EC IP address: This must be identical to the IP address stored in "3.3 Network settings stored in CXDI-40EG/40EC sensor" in the next section.

Note: All editing using keys other than the SensorNum keys is forbidden.

10.3.3. Network setting stored in the CXDI-40EG/40EC sensor

The factory default setting is shown in the table below.

There is no need to change the settings when a single CXDI-40EG/40EC sensor unit is to be connected to the control PC.

If a multiple number (2 or more) of CXDI-40E (or 50G/50C) sensor units are to be connected to the control PC, the sensor IP address and subnet mask settings for one or more of the sensor units must be changed. (* Refer to "10.3.4. Connection setup for a multiple number of sensor units.")

Item to be set	Factory default value
Sensor IP address	192.168.100.11
Subnet mask	255.255.255.0
Gateway address	000.000.000.000
Host IP address	192.168.100.10
Port number for command	12121
Port number for data	12122

To change the settings, follow the instructions in "7. Imaging Unit IP Address setting" found in the "Tool Software Operation Manual for Ethernet."

The sensor IP address and subnet mask are the only items listed in the above table whose settings can be changed.

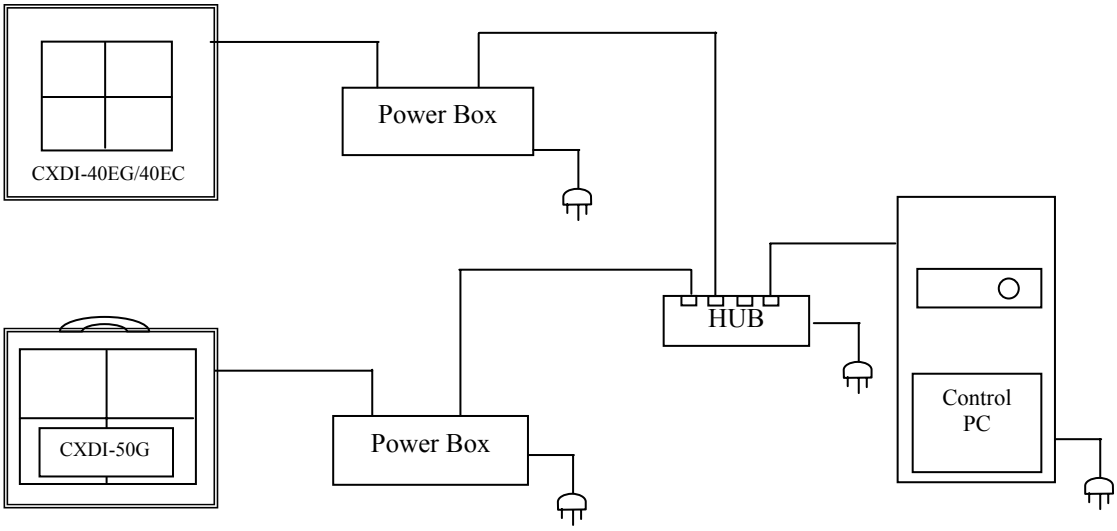
10.3.4. Connection setup for a multiple number of sensor units

When the control PC is to be connected to a multiple number (2 or more) of CXDI-40E (or 50G/50C) sensor units, it is recommended that the equipment be connected via a hub using straight cables (supporting category 5 or higher). You can use both straight and crossover cables when using a hub that provides Auto MDI/Auto MDI-X function.
Use of units other than a hub, such as a dual-port LAN card or multiple number of LAN cards, is not recommended (since no guarantees are made for operation).
When the control PC is to be connected to a single CXDI-40E (or 50G/50C) sensor unit, connect the equipment using a crossover cable as in the past.

**** Note:*** Bear in mind that when connecting the equipment to a hospital LAN, for instance, if the environment is not a favorable one for Ethernet (there is too much traffic or high noise levels), the equipment may not be able to demonstrate its performance to the full. Therefore, the construction of a network consisting solely of the CXDI system is strongly recommended.

* The LAN cables and hub are procured from the sales companies (or distributor).

Connect as shown below if a multiple number of sensor units are to be connected.
Example: CXDI-40EG/40EC + CXDI-50G + control PC



10.3.4.1. General flow for setup procedure

1)Proceed with the system connections between the single sensor unit and control PC.
2) Changethe IP address and subnet mask settings.
3) Check the IP address and subnet mask settings.
4) Perform steps 1) to 3) for every sensor to be connected.
5) Edit the screwcap.ini file.
6) Start up the system software.
7) Set the CCR console menu.
8) Reboot the system software.

10.3.4.2. Detailed setup procedures

Example: CXDI-40EG(40EC) + CXDI-50G + control PC

*1: Sensor1: CXDI-40EG(40EC)

*2: Sensor2: CXDI-50G

*1: [Sensor1] section in screwcap.ini file

*2: [Sensor2] section in screwcap.ini file

Note: Do not connect a multiple number of sensor units simultaneously by following steps 1) to 3).

1)First, connect the first sensor unit (here, the CXDI-50G) to the control PC via the hub.

2) Change the IP address setting to "192.168.100.12" in order to allocate CXDI-50G as [Sensor2]. The purpose of allocating the first sensor unit as [Sensor2] is to avoid conflict between the two sensor IP addresses when the second sensor unit has been connected.

To change the setting, follow the instructions in the "Tool Software Operation Manual for Ethernet" and then the instructions under "7. Imaging Unit IP Address setting."

3) Be absolutely sure to check that the IP address setting of the CXDI-50G has been changed. To check the setting, use the ping command of the command prompt or follow the instructions in the "Tool Software Operation Manual for Ethernet." and then the instructions under "7. Imaging Unit IP Address setting."

4) Connect the second sensor unit (here, the CXDI-40EG/40EC) to the control PC via the hub. There is no need to change the IP address of [Sensor1] since it is allocated to the CXDI-40EC as the default.

5) After connecting the multiple number of sensor units, edit the SensorNum key in the [SensorInfo] section of the screwcap.ini file to "SensorNum-2," and save the file.

6) After editing the screwcap.ini file, start up the system software.

7) Switch over to the CCR console menu on the DOS screen, select 1 => 0 => 7 to set "Max Capture Devices=2," and input the fixed sensor serial numbers of the sensor units.

8) Upon completion of the CCR console menu setting, restart the system software.

This completes the connection of the multiple sensor units.

Reference·

- When connecting three or four CXDI-40E (or 50G/50C) sensor units to the control PC, the units must be connected one by one, and the above steps 1) to 8) must be followed to ensure that there is no conflict between the sensor IP addresses by allocating the IP addresses in the sequence of the [Sensor3] to [Sensor1] or [Sensor4] to [Sensor1] sections in the screwcap.ini file.
- If the number of CXDI-40EG/40EC (or 50G/50C) sensor units is to be increased in an environment where the control PC is connected to a single CXDI-40EG/40EC (or 50G/50C) sensor unit, they are connected with LAN cables via a hub. In a case like this, the additional sensor units are first connected via the hub to the control PC, and their sensor IP address settings are changed. After confirming the setting change, the existing sensor units must be connected with LAN cables via the hub and the above steps 1) to 8) must be followed.

11. Setting the Fixed ROI Areas

(1) Purpose

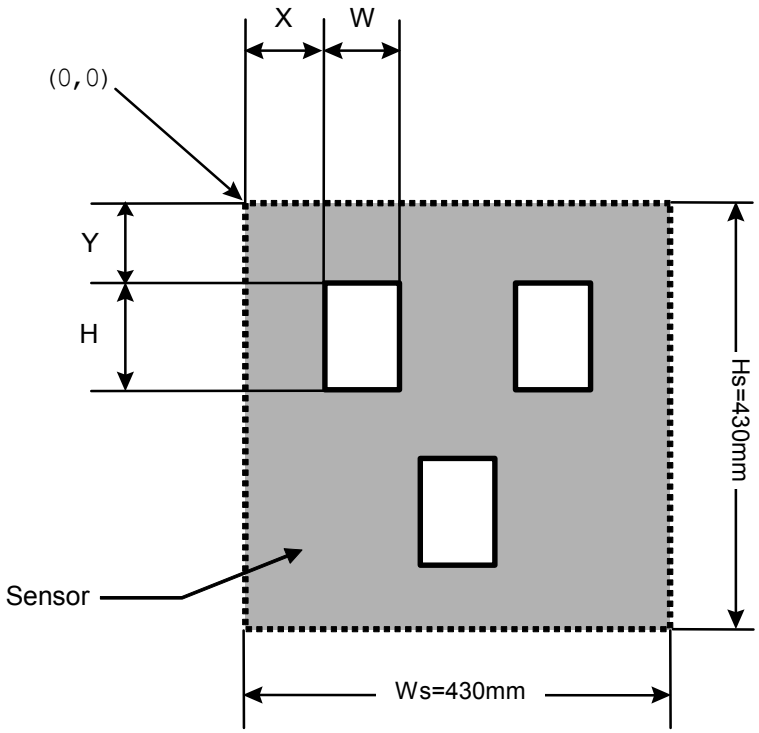
Set the fixed ROI area on the sensor to expose by the fixed ROI area because user can not get the proper image by the Auto ROI area.

(2) Setting method

1) Investigate the actual size and position of the ROI that is required.

2) Designate the SIZE, POSITION, and NUMBER (max 5) on the sensor.

* However, in the case of using the new function "Display of AEC (Automated Exposure Control) Field in Preview Screen" added from CXDI System Software Ver.6.2, NUMBER that can be specified is max 3.



3) Convert the size and position of the ROIs in 2) to pixel values. The pixel size of the sensor is 160μm. For multiple values, use X', Y', W', H', X", Y", W", and H" for calculations.

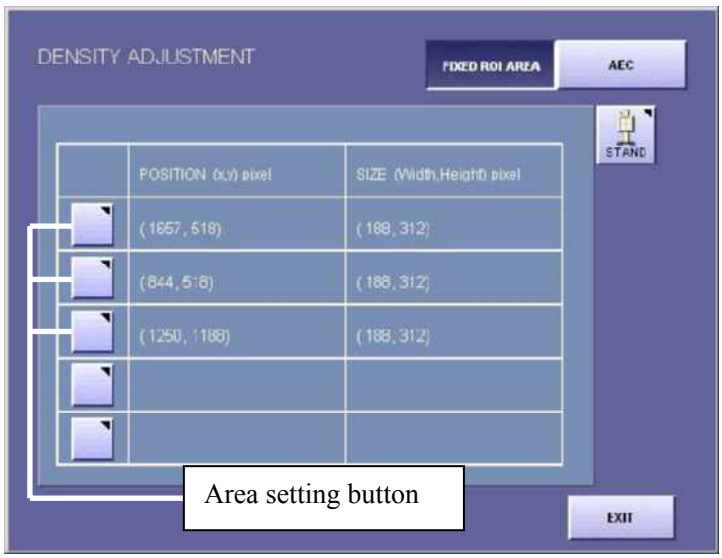
X/160 μm	Let this value equal A
Y/160 μm	Let this value equal B
W/160 μm	Let this value equal C
H/160 μm	Let this value equal D

4) Open the "DENSITY ADJUSTMENT CONTROL" screen when the normal imaging screen is active.

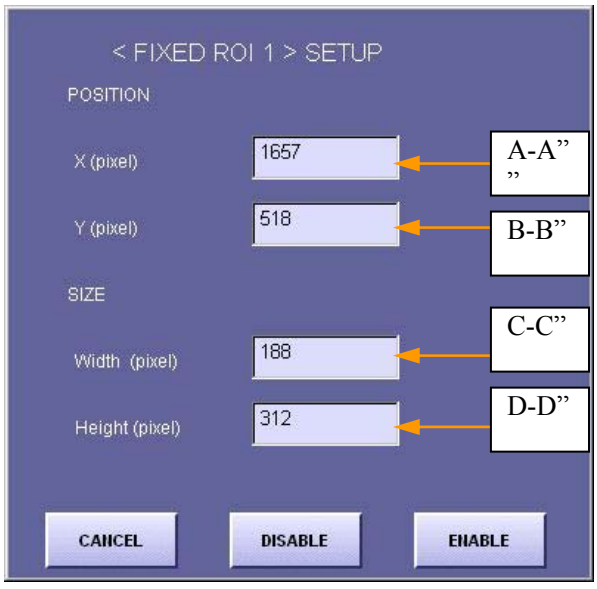
SYSTEM→SETUP MENU→SYSTEM SETTINGS→ DENSITY ADJUSTMENT CONTROL

5) The “DENSITY ADJUSTMENT CONTROL” screen appears. Confirm that the sensor is set with a sensor switch button. Press the [Fixed ROI Area] key.

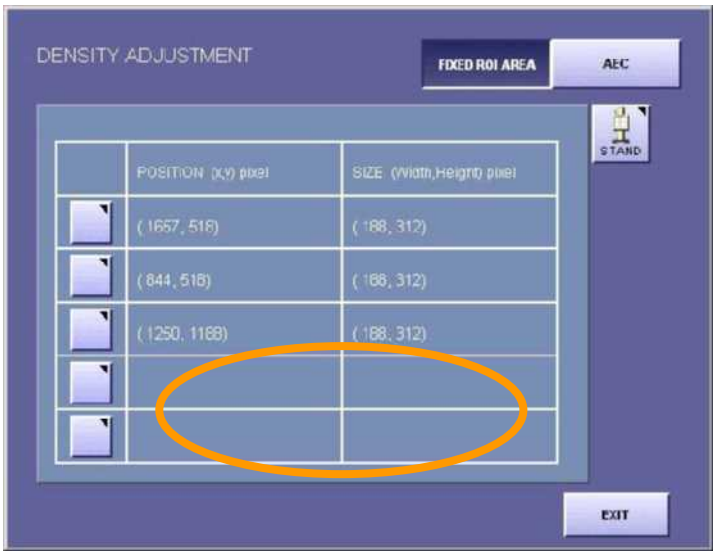
6) Press the [Area setting] key.



7) The fixed ROI 1 setting screen appears. Input values A to D from step 3) into the edit box, and press [ENABLE]. To set multiple fixed ROIs, input A’ to D’ and A” to D” into fixed ROI 2 settings and fixed ROI 3 settings respectively.



8) The display returns to the “DENSITY ADJUSTMENT CONTROL” screen. Confirm that POSITION and SIZE fields not set in step 5) to step 7) are disabled (dimmed). If they are not dimmed, press the [Area setting] key, and press [DISABLE] in fixed ROI * settings.



9) After Confirming all settings, and press [EXIT].

10) The display returns to the system settings screen. Press [OK].

11) “Change settings?” appears. Press [OK]. Be careful, because if [CANCEL] is pressed, all changes made to the settings are deleted.

12) Return to the normal imaging screen, and turn off the power to the CXDI.

12. Adjusting the photo timer

<Outline>
The photo timer installed in the imaging unit is adjusted so that the exposure time of the X-rays generated by the X-ray generators is to OFF using the optimal value.

* This work necessitates performing some adjustments inside the X-ray generators. In order to ensure that the work will proceed smoothly, discuss the schedule and other details with the representative of the manufacturer of the X-ray generators.

<Preparations>
(1) Start up the CXDI system. (Normal radiography mode)

(2) Perform calibration.

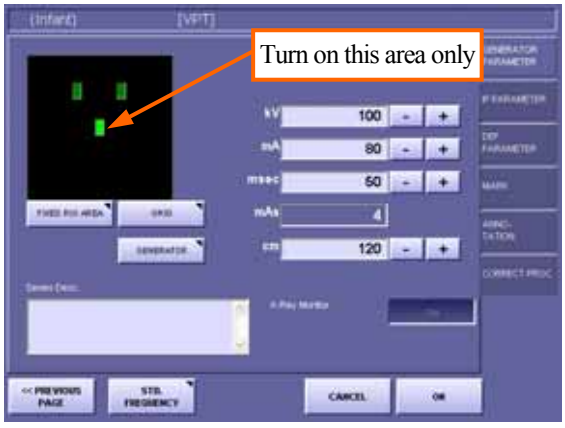
(3) Change parameters of VPT button as follows.
* This operation must be done by the "VPT" button which uses "fixed ROI". The adjustment cannot be performed properly by the body parts buttons which use auto ROI.

1) From SYSTEM > EDIT EXPOSURE MODE, select VPT button.

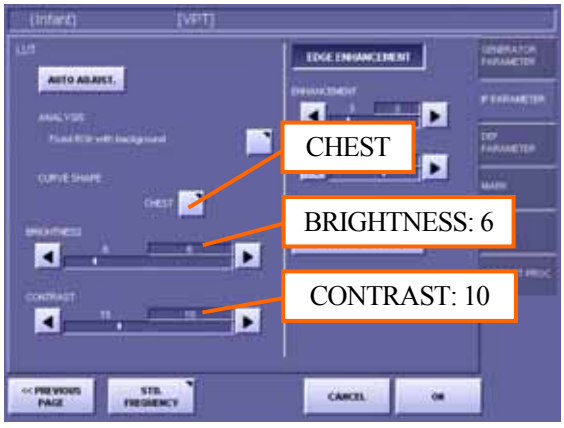
2) Press the NEXT PAGE button to enter the parameter editing screen and then set the following parameters.

(A) GENERATOR PARAMETER SCREEN
Set only the center of the fixed ROI area to ON.
(During the adjustment, the acrylic sheet may be used to cover the fixed ROI area selected here.)

(B) IP PARAMETER SCREEN
CURVE SHAPE: CHEST
BRIGHTNESS: 6
CONTRAST: 10



[GENERATOR PARAMETER SCREEN]



[IP PARAMETER SCREEN]

3) Press the OK button to save the parameters you changed.

<Adjustment>
It is advisable to leave the photo timer adjustments in the hands of the individual representing the manufacturer of the X-ray generators.
Basically, it is essential that the manufacturer's representatives perform these adjustments at the same time as the film screen and/or screen system adjustments.

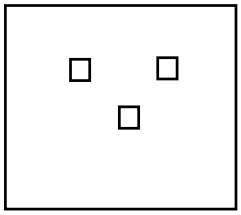
(1) Have ready the 5 cm, 10cm, and 20cm photo timer adjustment acrylics sheet, proceed to X-ray at 70k V, 100kV and 120kV, respectively, and adjust the photo timer in such a way that the Rex value as in the list below. (At this step, it is mainly the sensitivity difference that is based on the radiation quality of the photo timer which is adjusted.)

Imaging Unit	Rex value
CXDI-40EG, CXDI-50G	650
CXDI-40EC, CXDI-50C	325

(2) Adjust the radiation dosage gradually using the option buttons (such as the H.S button, L.S button, "+" (plus) and "-" (minus) button) on the X-ray generator, and decide on the final dosage.
For instance, the L.S button is for providing about 1.5 times the default dosage.
If, in overall terms, the sensitivity has shifted slightly or it differs slightly from one body part to another, use the H.S, L.S, "+" and "-" buttons on the X-ray generator to adjust the sensitivity as required.

Reference: If the Rex value is set as in the list when the acrylic sheet was X-rayed under the conditions set by the above "Adjustment button", this value will be in the order of 300 to 350 when the "Chest front" button is used and the chest front of a person is X-rayed under the following conditions.

Automated ROI#3(CHEST PA)/ with back ground
CURVE SHAPE: CHEST
BRIGHTNESS: 16
CONTRAST: 10



With auto ROI, all the areas are turned off.

Imaging unit	Rex value
CXDI-40EG, CXDI-50G	Approx. 300 - 350
CXDI-40EC, CXDI-50C	Approx. 150 -175

13. Settings

13.1 Checking and Setting the Date and Time

1) Purpose

The date and time is set to Japan standard time at factory shipment.

Reset the date and time to your local value as necessary.

2) Procedure

2-1) When CXDI application start, open the ADMINISTRATOR SETUP MENU.

SYSTEM → SETUP MENU → ADMINISTRATOR SETUP

2-2) When the "ADMINISTRATOR SETUP MENU" appears, and presses the [DATE] button.

2-3) The dialog (Date / Time Properties) appears, and set the value properly each of the fields which the tab sheet (Date Time and Time Zone sheet) has. And then press [OK].

13.2 Checking the Firmware Version

1) Purpose

1-1) Failing to use the proper versions of the firmware and PLD code with the CXDI application can result in an error, and system operation cannot be guaranteed. Therefore, the versions of the firmware must be checked to ensure that they are correct. (The combination of this firmware refers to CXDI Software Combination List.)

2) Notes

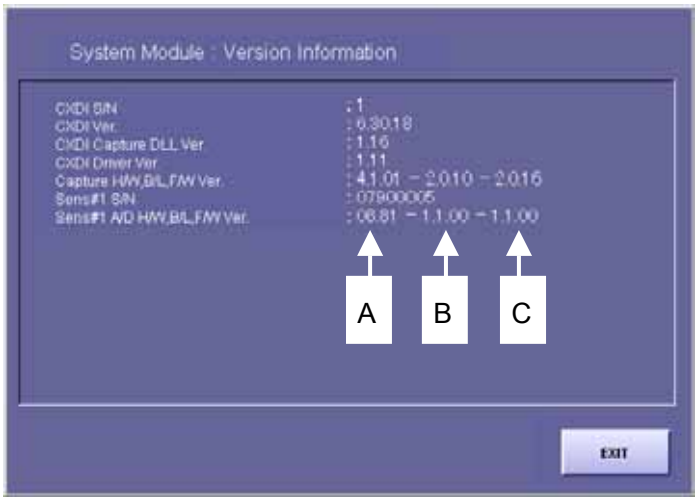
2-1) This check should always be performed at installation, and if necessary, the firmware versions should be upgraded.

2-2) This check cannot be performed with only the control PC. Connect the imaging units and other equipment, and start up in the normal imaging status.

3) Procedure

3-1) Checking the firmware alone

a. Start up the CXDI system.
b. Display the version information from the user mode.
SYSTEM > SETUP MENU > VERSION INFORMATION
c. Confirm the firmware version.



A. Hardware version

Product type and Sub No.: Product type is identified from Sensor serial No. set to the Imaging unit. Sub No. indicates the states of the dipswitch2-1 to 4.

B. Firmware initialization code version

This is the version of the initialization code written on the PWB-40Edi board.

Initialization code will be downloaded and settings will be reset to the default (factory)

Settings by turning ON the power while pressing the initialization switch on the power

Box.

Display “1.1.0” on the screen indicates version 1.01.00.

C. Firmware normal code version

This is the version of the normal code installed on the PWB-40Edi board. Usually the system operates with this code. It must be updated as required.

Display “1.1.00” on the screen indicates version 1.01.00.

3-2) Checking the firmware and PLD code

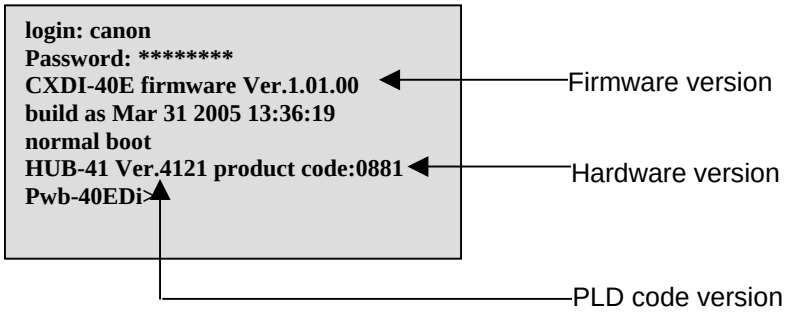
(1) Connect the keyboard and mouse.

(2) Start up the CXDI system.

(3) Close the CXDI host software if it starts up.

(4) Connect Telnet by referring to "Concerning Telnet Connections" in the Tool Software Operation Manual.

(5) Check the versions of the firmware and PLD code on the screen displayed after the login.



(6) After you finish checking, close HyperTerminal.

13.3 40E Installing Firmware and PLD Code

1) Purpose

Install the 40E Firmware and PLD code into the Flash ROM of the PWB-40Edi board in the imaging unit.

2) Notes

Be sure to check that the CXDI is connected to the system.

3) Procedure

3-1) Installing the firmware

Write the firmware by referring to “3.Firm Write Tool Software (Firmwrite.exe)” in the Tool Software Operation Manual .

Where to write: IC1 (Flash ROM) on PWB-40Edi board.

3-2) Installing PLD code

Write PLD code by referring to “2.HUB PLD Write Tool Software (pldwrite.exe)” in the Tool Software Operation Manual.

Where to write: IC6 (Flash ROM) on PWB-40Edi board

13.4 Checking the Sensor Serial No.

1) Purpose

If the sensor serial number stored in PWB-40EDi and the sensor serial number stored on the hard disk of the control PC fail to match as a result of replacing the PWB-40EDi board or sensor unit, it will not be possible to detect the connected sensors when the CXDI application is launched, and a sensor error message will be displayed. For this reason, check the numbers and rewrite them if necessary.

2) Notes

2-1) Check the sensor serial No. whenever:
a When the PWB-40EDi board has been replaced

b When a sensor unit has been replaced

2-2) This checking procedure must be performed with the Control PC, Imaging Unit and all the other equipments connected and started up.

3) Procedure

3-1) Refer to " 6 Sensor serial number setting " in the " Sensor serial number setting," and check the sensor serial numbers. Rewrite them if necessary.

13.5 Set Up Startup Menu

1) Purposes

1-1) Register the CXDI application software to the “Startup Group”.

The CXDI application software is scheduled to start automatically at the CXDI system starting

1-2) Change the window view size

Hide the other application screen view except the CXDI application software.

* Reference: The CXDI runs with the console window minimized with system software version 6.06.00 and up.

1-3) Delete the CXDI application software from the “Startup Group”.

The CXDX application software is not started at the CXDI system starting.

2) Notes

2-1) The CXDI application software is not registered in the “Startup Group” at the factory setting.

Therefore register the CXDI application software to the “Startup Group” after the system installation.

2-2) The window view size of the program registered in “Startup Group” has one own size with the each short-cut icon. Be sure to set the window view size of CXDI application software at the same time with the register to the “Startup Group”.

3) Register the CXDI application software to the “Startup Group” procedure.

3-1) Connect keyboard and mouse to the control PC.

3-2) Turns the all CXDI system power on after the all installation finished. And after that Windows XP starts.

3-3) Open the “Taskbar and Start Menu” from the Start Menu.

Start⇒Settings⇒Taskbar and Start Menu

3-4) “Taskbar and Start Menu Properties” appears. Click “Start Menu” tab, and then click

Taskbar and Start Menu Properties⇒Start Menu⇒Classic Start⇒Menu Customize

3-5) Click Add, and Create Shortcut appears. Click Browse.

3-6) Browse appears. Find a file named “ccrstart.bat” in drive [D:\ccr] and click OK.

3-7) D:\ccr\ccrstart.bat appears in the Command line. Click Next.

3-8) Select Program Folder appears. Select Startup folder and click [Next].

3-9) Select a name for the shortcut appears. Type ccrstart.bat. Click [Finish].

3-10) Close the Taskbar [Start], and login again to Windows XP.

Start⇒Shut Down⇒Log off cxdi.

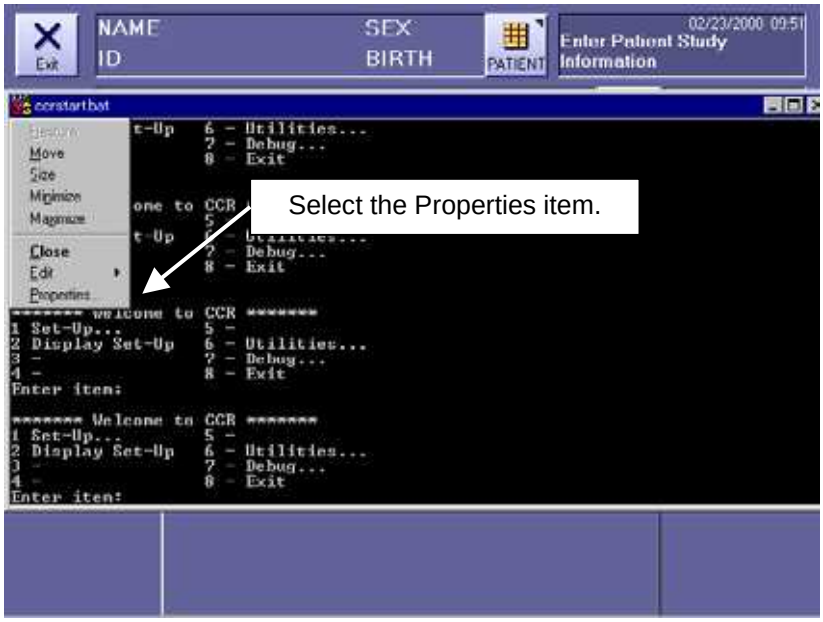
3-11) After login the computer, make sure that the CXDI application starts up.

4) Change the window view size

4-1) After the CXDI application software start, press [Alt] + [Tab] key to show the “Debug mode” prompt screen.

4-2) After the command prompt screen appears, click the icon (called System icon) where is in right-top of its window.

4-3) System icon menu appears. Select Properties from the menu. [Fig 1]



[Fig 1]

4-4) Click the “Font” tab from the “ccrstart.bat” properties and change its size to “6 x 13”.

4-5) Click the “Layout” tab and change the “Height” of the “Screen Buffer Size” to 5000. Click [OK].

4-6) The “Apply Properties to Shortcut” appears and check the item of the “Modify shortcut which started this window”. Click [OK].

5) Delete CXDI application software from the “Startup Menu Group”.

5-1) Connect the keyboard and the mouse to the control PC.

5-2) Turns the CXDI system power on, Windows XP start.

5-3) After the CXDI application software start, press [Alt] + [Tab] key to show the “Debug mode” prompt screen.

5-4) Select “8 – Exit” to close the CXDI application software on the “Welcome to CCR”.

5-5) After the CXDI application software closed and Window XP Desktop appear, open the “Taskbar & Start Menu…” with “Start Menu” tab clicking.

Start>Settings>Taskbar and Start Menu

5-6) “Taskbar and Start Menu Properties” appears. Click “Start Menu” tab, and then click Taskbar and Start Menu Properties⇒Start Menu⇒Classic Start⇒Menu Customize

5-7) The “Remove Shortcuts/Folders” dialog box appears after click the “Remove” button. And double-click the “Startup folder”

5-8) Remove the “ccrstart.bat” item from it.

5-9) After “Remove” button clicked, the confirmation of deleting file appears. If you are going to remove it, click “Yes” button.

5-10) After confirm that the “ccrstart.bat” item is removed from “Startup Group”, close all the application on the desktop and re-login to Windows XP.

5-11) Make sure that the CXDI application software will not start automatically after login to Windows XP. And then shutdown Windows XP, turn the CXDI system power off.

- When the CXDI application is deleted from the Start menu due to repair or other reasons, be sure to always perform the procedures outlined in “Adding CXDI application software onto the Start menu” and “Changing the window size” when the repair is complete.

13.6 Identifying the Sensor Units

1) Purpose

In order for the control PC to identify the sensor units connected, the sensor serial number of each sensor unit is input to the Control PC.

2) Notes

2-1) These operations must always be implemented at the installation stage and when any of the Imaging Units (sensor) or Control PC (hard disk) has been replaced or when the combination of equipment has been changed.

2-2) The sensor serial numbers must always be input. If the serial numbers of the sensor unit and Control PC do not match, “Sensor Unit: Detect Error (-5100)” will be displayed on starting up the system. These numbers are the same as what is input to the 50Di PCB. (Refer to “ Checking the sensor serial numbers”.)

3) Preparations (What to have ready)

Tool keyboard, tool mouse

4) Procedure

4-1) Start up the CXDI unit.

4-2) Once the normal sensor screen has appeared on the operation unit, use the keyboard to enter the debugging mode (Use [ALT] + [TAB].).

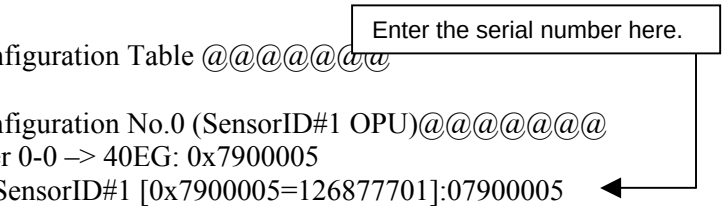
4-3) “Welcome to CCR” appears. Select “1 Set-Up...”

4-4) “Setting Mode (0:Normal, 1:Expert)[0=0x0]:” appears. Select “0:Normal.”

4-5) “CCR SETUP MENU” appears. Select “7 Scan Sensor Setup.”

4-6) The "Capture Device Configuration Table" now appears. Input the number of sensor units connected to the control PC in the underlined (_) section of "Max Capture Devices" below.

4-7) Enter the serial number to “A/D Board Serial Number for SensorID#1”.



@@@@@@@ Capture Device Configuration Table @@@@@@@
Max Capture Devices [1=0x1]:**1**
@@@@@@@ Capture Device Configuration No.0 (SensorID#1 OPU)@@@@@@@
-------A/D Board Serial Number 0-0 –> 40EG: 0x7900005
A/D Board Serial Number for SensorID#1 [0x7900005=126877701]:07900005
Custom Type [0:NO CUSTOM 1:STAND 2:TABLE 3:UNIV 4:CASSETTE] [0=0x0]:0
Field of View Rotation (0:No 1:Yes) [0=0x0]:0
EXI constant [0.000000]: 0.000000
---- Need to re-start program to validate this change.

4-8) When “CCR SETUP MENU” appears, press the [Esc] key to return to “Welcome to CCR.”

4-9) Select the command “8 - Exit” from “Welcome to CCR” menu to exit the CXDI application.

4-10) After “Windows XP desktop” screen appears, start the CXDI application again.

13.7 Entering Control PC Serial Number

1) Purpose

Set the product serial number (Control PC) to the “Device Serial Number” of the “DICOM header”.

2) Procedure

2-1) Start up the CXDI system.

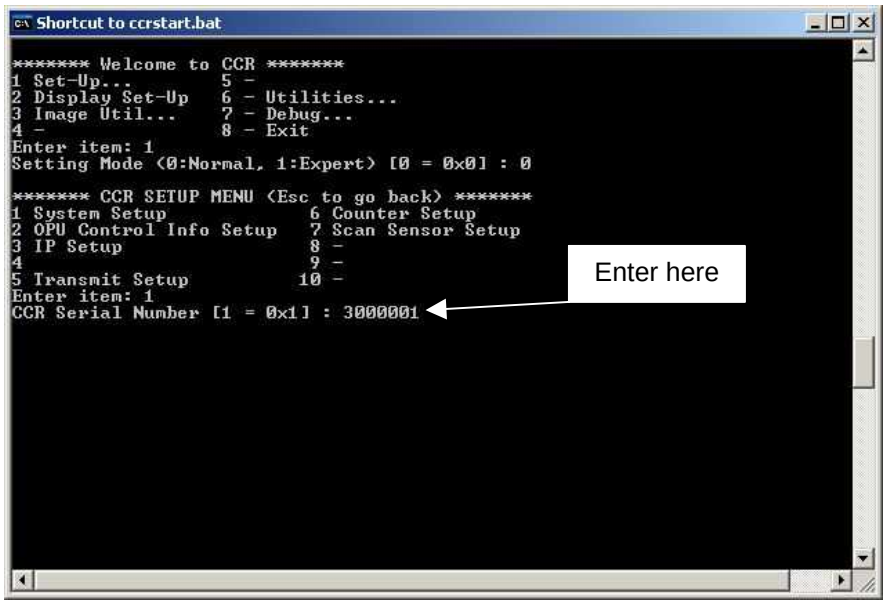
2-2) After the exposure screen appears on the operation unit, use the keyboard to enter Debug mode. (Use [Alt] + [Tab].)

2-3) “Welcome to CCR” screen appears. Select the command “1. Set-Up…”

2-4) The “Setting Mode (0: Normal, 1: Expert) [0=0×0]:” is prompted. Select “0: Normal”

2-5) “CCR SETUP MENU” appears. Select the command ”1. System Setup”.

2-6) “CCR Serial Number [0=0×0] : ” appears. Enter the six-digit number indicated on the naming label of the control PC unit. Press [Enter] key until “CCR SETUP MENU” appears. [Fig 1]



[Fig 1]

2-7) Press [Esc] key after “CCR SETUP MENU” appears to return to “Welcome to CCR” screen.

2-8) Select “8-Exit”to exit CXDI application software.

2-9) This returns you to the Windows NT desktop. Restart the CXDI application, and perform the procedure from steps 2) to 5). Check that the serial number for the “CCR Serial Number” item was entered correctly in step 6).

*** Restart the CXDI application. The screen displays the following message:**

Alert System Info Error (-6) A/D board info is updated. Click “OK”

13.8 Table Setup Settings

1) Purpose

Adjust the CXDI operation unit's TABLE SETUP to match the exposure conditions (X-ray tube voltage, X-ray tube current, msec or mAs value) of the X-ray generator.

2) Procedure

2-1) Start the CXDI system.

2-2) Open the TABLE SETUP Change window from the Normal Exposure window.

System ⇒ SETUP MENU ⇒ SYS. SETUP ⇒ TABLE SETUP

2-3) Select the tabs to be changed and change the X-ray tube voltage, X-ray tube current, and msec value data to match the exposure conditions of the X-ray generator.

* See the operation manual for the details of settings.

2-4) After finishing the changes, return to the Normal Exposure window and check that the TABLE SETUP has been changed.

13.9 Performing the Annotation Settings

1) Purpose

The settings for imprinting the annotation onto the film and the settings of the characters used for the annotation are performed.

2) Procedure

2-1) Once the normal radiographic screen has started, open the annotation setting screen.

SYSTEM → SETUP MENU → SYS. SETUP → ANNOTATION

2-2) The annotation setting screen now appears. Proceed with the settings that will make it possible to put the data desired by the user.

*** See the operation manual for the details of settings.**

13.10 Network Connections

Network settings

1) Purpose
These settings are for connecting the CXDI to the network.

1-1) Set the CXDI's IP address, subnet mask and default gateway in Windows XP.

1-2) Set the printer and storage output destinations and parameters on the user screen.

2) Checkpoints

2-1) This item involves checking the details of the checks performed on network setting parameters among the pre-installation inspection details and setting these parameters.

*** Refer to "Appendix: Investigation Report" for the pre-installation investigation details.**

2-2) Perform the settings of this item carefully since any errors made in these settings will make it impossible for connection to be made to the network or the images to be transmitted properly, etc.

3) Windows XP settings

3-1) Connect the keyboard and mouse to the control PC.

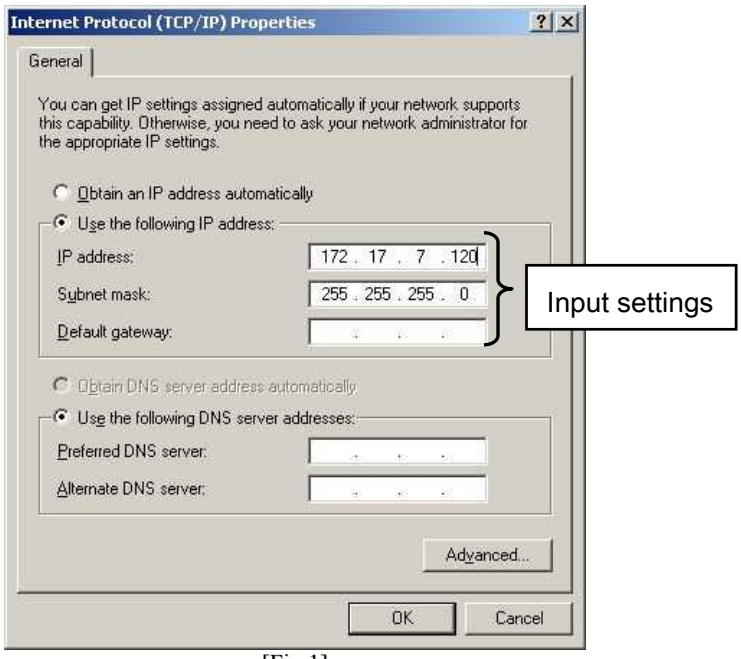
3-2) After turning on the Operation unit's power and then the Control PC's power, start Windows XP.

3-3) The Windows XP desktop screen appears. Right-click the [My Network] icon, and select My Network Places from the menu.

3-4) When [Network Connection] appears, double click on Local Area Connection 3Com Gigabit Lom (3C904).

3-5) When Local Area Connection Properties appears, click on the General tab, select [Internet Protocol (TCP/IP)], and click Properties.

3-6) Based on the pre-install of inspection details set the IP address, subnet mask and default gateway.



[Fig 1]

3-7) Upon completion of the setting, restart the Windows XP.

3-8) Check the communication test in the sequence below to verify whether the CXDI is now part of the network. To check the connections at the TCP/IP level, use the "ping" command from the command prompt.

Start → Programs → Command Prompt

When the IP address of the connection destination is "173.17.7.123," for instance, the following messages will be repeated.

- If the CXDI has been connected properly:
  Pic:>ping 172.17.7.123 (input on the DOS screen)
  Pinging 17217.7.123 With 32 bytes of data:
  Reply from 172.17.7.123:bytes=32 time <10ms TTL=255
  Reply from 172.17.7.123:bytes=32 time <10ms TTL=255
  Reply from 172.17.7.123:bytes=32 time <10ms TTL=255
  Reply from 172.17.7.123:bytes=32 time <10ms TTL=2550
- If the CXDI has not been connected properly:
  Pic:> ping 172.17.7.123 (input on the DOS screen)
  Pinging 17217.7.123 With 32 bytes of data:
  Request time out
  Request time out
  Request time out
  Request time out

4) Set the printer and storage device which serves as the external output destinations. In this case, one printer and one storage device are set.

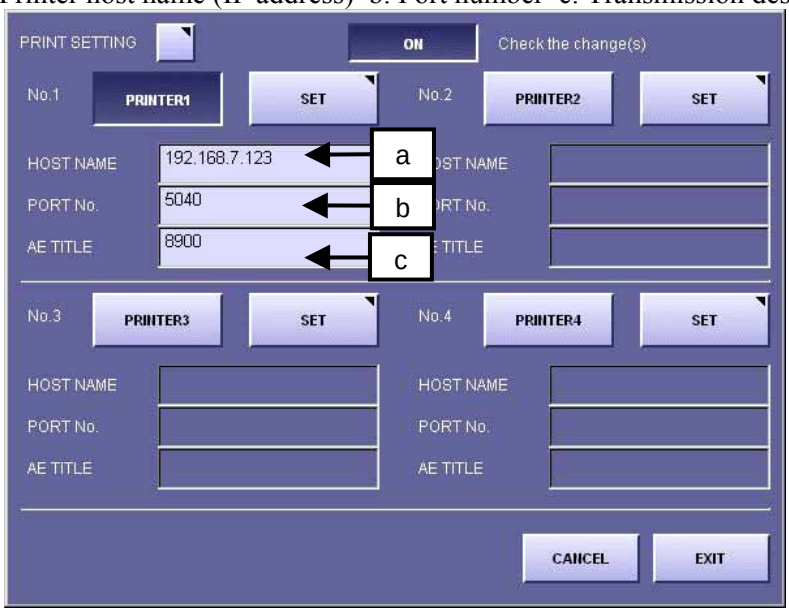
4-1) Printer settings

A. Open the output destination setting screen from the user menu.
System → SETUP MENU → DESTINATION → PRINTER

* Up to four printers (2 of which can be used for output at the same time) can be set.

B. Press the "Printer1" button, and input the following items based on the pre-installation investigation details.

a. Printer host name (IP address) b. Port number c. Transmission destination title

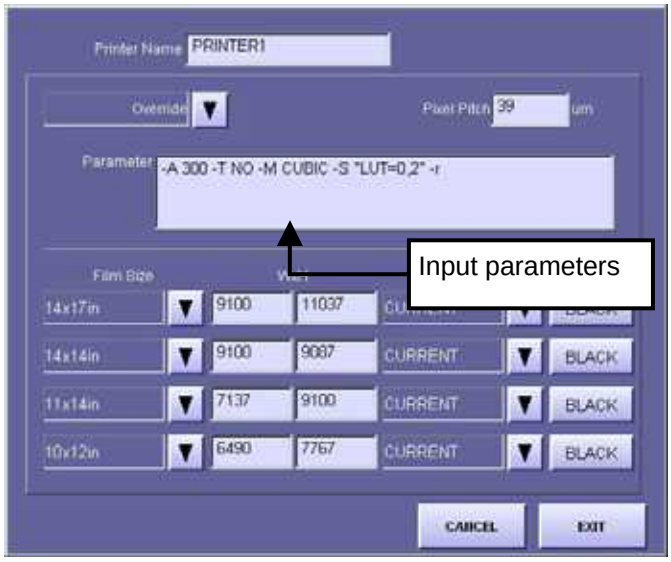


[Fig 2]

C. Press the "SET" button, and input the parameters of the printer to be connected based on the pre-installation inspection details. (Refer to another sheet for details of the parameters.)

*** A space delimiter must be input between each of the parameters.**

By pressing the "Override" button, you can select a printer from all the registered printers. In this case, basically you do not have to enter parameters. However, if "?" is displayed within the parameters, you may have to enter the required parameter at the user's site.

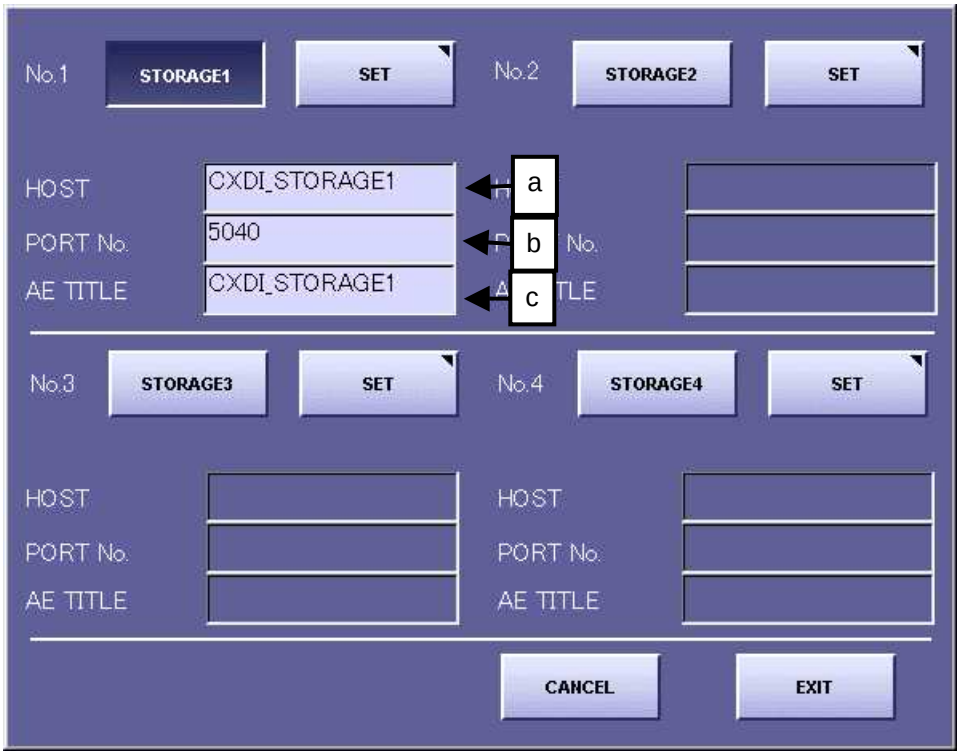


[Fig 3]

4-2) Storage settings

A) Open the output destination setting dialog from the user menu.
System → SETUP MENU → DESTINATION → STORAGE
*** Up to four storage units (2 of which can be used for output at the same time) can be set.**

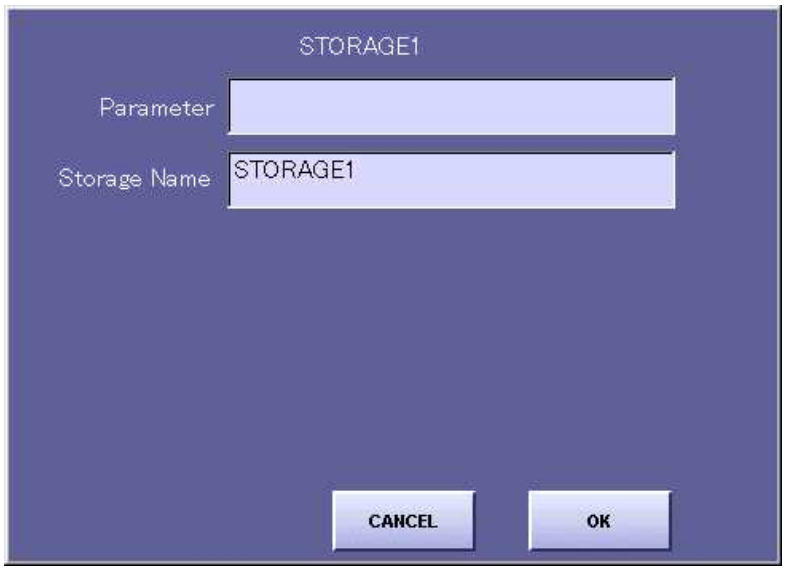
B) Press the "Storage1" button, and input the following items based on the pre-installation investigation details.
a. Storage host name (IP address) b. Port number c. Transmission destination title



[Fig 4]

C. Press the "SET" button, and input the parameters.
(Normally, the parameters need not be set. They must be input only when the need arises.)

- **A space delimiter must be input between each of the parameters.**



[Fig 5]

D. After setting the output destinations, follow the procedure below to check whether images can actually be transmitted. Return to the user menu, capture a sample image (one X-ray image), and transmit the image to the printer and storage. There are two errors that may result if the image cannot be transmitted:

   a. “DICOM Connect Error. Cannot connect to the target. Check network or port number setting. Retry?”
   b. “DICOM Transfer Error. Error occurred during the association. Retry?”

   Message (a) indicates that connection at the TCP/IP level is not possible and that the physical connections or the subnet mask and other settings must be checked again.

   Message (b) indicates that communication at the TCP/IP level is problem-free but that DICOM level communication has failed. In this case, check again that AE_TITLE of CXDI has been sent properly to the transmission destination and that the IP address, port number and AE_TITLE of the transmission destination which are set with CXDI have been set properly.

“AE_TITLE” of the transmission destination is case sensitive fields. (Permit upper-case letter or lower case letter, etc)

Parameter List (Separate Document 1)

DICOM storage device

In the CXDI, DICOM data transfer is performed using the transfer software module "send_image" .The settings for these parameters are described below.

Parameter	Meaning	Description
-m maxPDU Maximum PDU value in byte units	* The CXDI automatically uses 131072 internally for operation. * Designating a specific value allows overwriting of the above value.	* The DICOM standards do not allow values of 1301073 or higher to be set. * This is used when the operator who manages the connected storage device requests a size change. * In DICOM printing, note that the argument title changes to -u. (→ See the printing parameters.)
-t calledTitle Called App Entity Title	* The AE Title setting field is automatically applied to this setting. * Designating a specific value allows overwriting of the above value.	* Note that the meaning is opposite of the DICOM printing argument -t. (→See the printing parameters.) * The entry for the OPU output device title is used here.
-c callingtitle calling App Entity Title	* The CXDI automatically uses CANON_CCR internally for the operation. * Designating a specific value allows overwriting of the above value.	* Note that the meaning is opposite of the DICOM printing argument -c. (→See the printing parameters.) * This is used when the operator who manages the connected storage device requests a change in the installed identification information (version).
-s SOPName (for reference) This parameter designates whether class be connected for performing association at the beginning of transfer.(CR/T/MR/NM/SC/US)	* This is not used in the CXDI.	
-I A-RELEASE-RES is ignored.	* This parameter is used simply as "-I"	* This is used when the error message "130012 Peer aborted Association (or never connected)" occurs even though the DICOM data transfer was successful. → This is used differently based on the connected storage devices.
-d FAC This parameter dumps a specific facility log. (DCM/DUL/SRV)	* This parameter is used simply as "-d" * This parameter is used to make the transfer software put the debugging character string on the console.	* This parameter does not affect DICOM data transfer. * This parameter outputs the CXDI log based on Windows NT.

Parameter	Meaning	Description
-v This parameter dumps the transfer log.	* This parameter is used simply as "-v". * DUL and SRV are dumped. * This parameter is used to make the transfer software put the debugging character string on the console.	* This parameter does not affect DICOM data transfer.
-jn This is the time to take timeout.	* Sets the time to take timeout in seconds.	* This parameter is to be changed when taking timeout.
-k level=0 1 2 3	* A variety of specifications have since been needed in conjunction with DICOM modality LUT support.	If DICOM Modality LUT OD is enabled, set appropriate options to suit each output destination.

Argument: Values necessary for executing a function, subroutine, procedure, or other operation is passed to them. Arguments are assigned to functions and subroutines when executed. For example, the argument in f (x) is x.
PDU: Protocol data unit
The types of PDU's include get-request, get-next-request, get-response, set-request, nd trap.
Note

For details about the "-v" parameter, see "Checking the Error Log".

Note

The parameters "-v" and "-d" put the log on the console. Therefore, be sure <u>to always erase these parameters before operation by the user.</u>

If –k:DICOM Modality LUT OD is enabled, set appropriate options to suit each output destination.

level = 0: Do not delete (default when not specified)
1: Delete Window Center/Width
2: Delete Window Center/Width and Rescale Intercept/Slope/Type
3: Delete Rescale Intercept/Slope/Type (compatible with releases up to Ver.4.20)

Other than a loadable LUT or γ=1.0 has been specified with the output destination-specific LUT function.
For storage: Specify -k3(or -k2).
If IMG Rescale Type = 0D is unidentifiable to storage, resulting in an error: Specify -k3.
(If only one storage is connected, simply set DICOM Modality LUT OD to "Disabled.")
The implementation allows Window Center/Width with Rescale Type = 0D specified to be interpreted as "optical densityx1000."
For storage: Specify -k1.
The CXDI Window Center/ Width output value (implementation) is fixed at 2048/4096.)

Note

With AGFA impax Ver. 4.5.0, the specification of -k0 demonstrated a successful density-intensity conversion. But because the corresponding text in the DICOM specifications document is ambiguously written such that the status of implementation by other manufacturers is unknown, please be advised to consult the storage manufacturer for each connection destination or work out on a trial and error basis. Also note that an external storage option specification (if (DICOM modality LUT OD is set to "Enabled," OD tags <0028, 1052 - 1054> are assigned and Level: 0 is assumed) is not supported.

Parameter List (Separate Document 2)
DICOM printer

In the CXDI, DICOM printers are administered separately according to printer product.

The transfer software module is “print_stuff”. The settings for these parameters are described below.

Parameter	Meaning	Description
-C copies This parameter uses a number to designate the number of copies.(1/2/...)	* This parameter is used in the DICOM Basic Film Session (2000, 0010). * When the number of copies is designated, film sheets are printed in the quantity specified in a single printing operation. * This parameter is necessary when printing multiple sheets for a single data transfer operation.	* This parameter is set according to the user’s requirement. * In the DICOM library TYPE3, the value is transferred together with the Tag. However, if the value is unknown, the value is either is transferred as a character string with length 0, or the element itself is not transferred. → The printer default values are used if this parameter is not entered.
-y priority Priority in the DICOM printer (HIGH/MED/LOW)	* This parameter is used in the DICOM Basic Film Session (2000, 0020). * This parameter determines where this transfer image is inserted into the queue in the DICOM printer. At HIGH, the image is printed first among the queued images.	* This parameter is set according to the user’s requirement. * In the DICOM library TYPE3, the value is transferred together with the Tag. However, if the value is unknown, the value is either transferred as a character string with length 0, or the element itself is not transferred. → The printer default values are used if this parameter is not entered. * Note this parameter does not determine where this transfer image is inserted into the CXDI queue.
-D destination Film destination (MAGAZINE/PROCESSOR/BIN_i)	* This parameter is used in the DICOM Basic Film Session (2000, 0040). * Film is sent to the output device designated by RECEIVE MAGAZINE or the automatic developer.	→ The printer default values are used if this parameter is not entered. * The film is usually discharged to the default output device.
-F film type Film media type (“BLUE FILM” / “CLEAR FILM” / “PAPER”)	* This parameter is used in the DICOM Basic Film Session (2000, 0030). * Film is printed as the designated film type.	→ The printer default values are used if this parameter is not entered. * Although many types of films cannot be detected, the film type can be selected in the KELP2180. * In this parameter, be sure to put quotation marks (“ ”) around 0x20 since it comes between BLUE and FILM.

Parameter	Meaning	Description
-L sessionLabel Film session label (character string)	* This parameter is used in the DICOM Basic Film Session (2000, 0050). * The label for the film session is for designation purposes only, and generally it is not displayed directly on the print image.	→ The parameter is not transferred over DICOM if it is not designated. * This parameter may be displayed in some form or another depending on the installed printer. For example, it may be displayed in the Control Panel for the printer or in the corner of the film.
-f films Number of film box to be printed	* Currently, this parameter is not operating.	
–i Format Format at print	* This parameter is used in the DICOM Basic Film Box (2010, 0010). * This is not necessary, as for automatically designated on CXDI.	* If this parameter is not designated, transfer software uses automatically STANDARD1 1, for reason this parameter must be transferred in the DICOM.
-l FilmSizeID Film size 14 inch x 17 inch / 17 inch x 14 inch / 11 inch x 14 inch / -l FilmSizeID / 10 inch x 14 inch 10 inch x 12 inch / 24 cm x 24 cm / 24 cm x 30 cm	* This parameter is used in the DICOM Basic Film Box (2010, 0050). * This parameter designates the size of the film to be printed	→ The parameter is not transferred over DICOM if it is not designated. In this case, the printer default values are used. When this parameter is not transferred, problems can occur since unsuitable default values may be used. * Some printers do not print until a supply magazine of the designated size is loaded, and others print even though the designated size is different from the currently loaded supply magazine.
-M magnification Interpolation method (NONE/REPLICATE/BILINEAR/CUBIC)	* This parameter is used in the DICOM Basic Film Box (2010, 0060). * This parameter designates the interpolation method since the printer has a higher resolution than the CXDI in most cases. * Generally, CUBIC provides the best results, followed by BILINEAR. The REPLICATE option is not suitable for CXDI image applications.	→ The printer default values are used if this parameter is not entered. When this parameter is not transferred, problems can occur since unsuitable default values may be used.
-m smoothing Type of smoothing (character string)	* This parameter is used in the DICOM Basic Film Box (2010, 0080). * This parameter designates the smoothing method for the image. * In the DICOM standards, this parameter setting is valid only when CUBIC is selected for the magnification parameter above. * In the DICOM standards, value to be transferred is not predetermined.	→ The parameter is not transferred over DICOM if it is not designated. In this case, the printer default values are used. When this parameter is not transferred, problems can occur since unsuitable default values may be used. * This parameter is determined by asking the printer engineer or by viewing the conformance statement.

Parameter	Meaning	Description
	* The designation method varies according to the printer. For example, the MLP190 uses -m NORMAL.	
-S configuration Adjustment information (character string)	* This parameter is used in the DICOM Basic Film Box (2010, 0150). * This parameter sets the printer (image quality) adjustment from the SCU side. * In the DICOM standards, value to be transferred is not predetermined. * The designation method varies according to the printer.	→ If this parameter is not designated, it is not transferred over DICOM. In this case, the printer default values are used. When this parameter is not transferred, problems can occur since unsuitable default values may be used. * This parameter is determined by asking the printer engineer or by viewing the conformance statement.
-O Orientation Film orientation (PORTRAIT/LANDSCAPE)	* This parameter is used in the DICOM Basic Film Box (2010, 0040). * In versions before 2.0, printers must operate based on this parameter. * When using image cutout from 17 x 17 inch size in the CXDI, this parameter is set and transferred automatically.	→ If this parameter is not designated, it is not transferred over DICOM. In this case, the printer default values are used. * Starting from version 2.0, the image can be rotated from the CXDI side without using this parameter.
-A max_density Maximum density (Dx100)	* This parameter is used in the DICOM Basic Film Box (2010, 0130). * This parameter designates the density of the digital value for 0 (4095 for reverse display) of the CXDI transfer data image pixels. (In the CXDI, 0 indicates black.) * In the CXDI, this parameter is used to adjust the density. Therefore, be sure to always check that it is operating.	→ If this parameter is not designated, it is not transferred over DICOM. In this case, the printer default values are used. When this parameter is not transferred, problems can occur since unsuitable default values may be used.
–a min_density Minimum density (Dx100)	* This parameter is used in the DICOM Basic Film Box (2010, 0120). * This parameter designates the density of the digital value for 4095 (0 for reverse display) of the CXDI transfer data image pixels. (In the CXDI, 4095 indicates white.) * This parameter is not transferred in many cases since the minimum density cannot be increased in most printers.	→ If this parameter is not designated, it is not transferred over DICOM. In this case, the printer default values are used. When this parameter is not transferred, problems can occur since unsuitable default values may be used.

Parameter	Meaning	Description
-B border_density Border density (Dx100) (BLACK/WHITE/D x 100)	* This parameter is used in the DICOM Basic Film Box (2010, 0100). * This parameter determines the area density around the image on the film.	→ If this parameter is not designated, it is not transferred over DICOM. In this case, the printer default values are used.
-G empty_image_density Empty image density (BLACK/WHITE/D x 100)	* This parameter is used in the DICOM Basic Film Box (2010, 0110). This parameter designates the density of the empty image area during multi-formatting.	→ If this parameter is not designated, it is not transferred over DICOM. In this case, the printer default values are used.
-T trim Trimming (NO/YES)	* This parameter is used in the DICOM Basic Film Box (2010, 0140). * This parameter adds lines around the image. * The CXDI is normally adjusted so that the trimming does not appear.	→ If this parameter is not designated, it is not transferred over DICOM. In this case, the printer default values are used. * For example, the default value for this parameter in Agfa printers is YES. Therefore, the NO option needs to be specifically designated if it is desired.
-P polarity Polarity (NORMAL/REVERSE)	* This parameter is used in the DICOM Basic Image Box (2020, 0020). * Reverse image density	→ If this parameter is not designated, it is not transferred over DICOM. In this case, the printer default values are used.
-r pixel_pitch Transfer pixel pitch for designating the request image size (Pixel Pitch in um)	* This parameter is used in the DICOM Basic Image Box (2020, 0010). * Position of the image on film * The cumulative value for the horizontal size of the image (raw) at the designated pixel pitch is used for the request image size. * The CXDI automatically uses 131072 internally for operation. * The above value can be overwritten by designating a specific value.	→ If this parameter is not designated, it is not transferred over DICOM. In this case, the type of image that is printed depends on the settings at the printer side.
-N annoFmt Annotation position (1/2/3)	* This parameter is used in the DICOM Basic Annotation Box (2030, 0010). * This parameter designates the position of the character string to be annotated.	* If using annotation, always be sure to transfer the annotation position.
-n annotation Annotation (character string)	* This parameter is used in the DICOM Basic Annotation Box (2030, 0020). * This parameter designates the character string to be annotated.	* If this parameter is not designated, it is not transferred over DICOM. In this case, the printer default values are used. * Also, in this case, the type of image that is printed depends on the settings at the printer side.

Parameter	Meaning	Description
-u maxPDU Maximum PDU value in byte units	* The CXDI automatically uses 131072 internally for operation. * The above value can be overwritten by designating a specific value.	* The DICOM standards do not allow values of 1301073 or higher to be set. * This parameter is used when the operator of the connected storage device requests a size change. * In DICOM storage devices, note that the argument title changes to -m. (→See the storage device parameters.)
-c callingTitle Called App Entity Title	* The AE Title setting field is automatically used in this setting. * The above value can be overwritten by designating a specific value.	* Note that the meaning is opposite of the argument -c for DICOM storage devices. (→See the storage device parameters.) * The entry for the OPU output device title is used here.
-t callingTitle Calling App Entity Title	* The CXDI automatically uses CANON_CCR internally for the operation. * The above value can be overwritten by designating a specific value.	* Note that the meaning is opposite of the argument -t for DICOM storage devices. (→See the storage device parameters.)
-g N-GET Printer compatibility mode	*This parameter is used simply as "-g". * In the CXDI default settings, the printer information is not designated. In this case, the printer side sends all the information that it has (DICOM official specifications). * When the -g option is added, the essential information only is collected. This information includes the Printer Status and Printer Status Info. (To prevent installation when the printer does not satisfy the above DICOM specifications.)	→ Normally, this option is not used. This parameter has been provided as a remedy when a printer error occurs when optional devices are not used.
-S Silent mode	* This parameter is used simply as "-s". * This parameter is used to prevent the transfer software from displaying the debugging character string on the console.	* This parameter does not affect DICOM data transfer. → Silent mode does not need to be designated since the CXDI automatically makes the setting internally.
-p This parameter dumps the association parameter.	* This parameter is used simply as "-p". * This parameter is used to set the transfer software so that the debugging character string is displayed on the console.	* This parameter does not affect DICOM data transfer.

Parameter	Meaning	Description
-v This parameter dumps the transfer log.	* This parameter is used simply as "-v" * This parameter is used to set the transfer software so that the debugging character string is displayed on the console. * Both the -p and -v parameters should be used. These settings override the -s parameter.	* This parameter does not affect DICOM data transfer.
-V filename This parameter dumps the transfer log.	* The parameter is used for analysis after the transfer software saves the debugging character string displayed on the console to a file with a designated filename. It is used only when problems occur.	* This parameter does not affect DICOM data transfer.
-I A-RELEASE-RES is ignored.	* This parameter is used simply as "-I"	* This is used when the error message [130012 Peer aborted Association (or never connected)]occurs even though the DICOM data transfer was successful. → This is used based on the connected printers.
-jn This is the time to take timeout.	* Sets the time to take timeout in seconds.	* This parameter is to be changed when taking timeout.
-k level = 0 1 2	* The -k option has been implemented to normalize DICOM headers	

Note

The parameters -p, -v, and -V filename display the log on the console. Therefore, be sure to always erase these parameters before operation by the user.

In the past, -k2 was used to fix troubles, but it has now been set as the default has been changed to -k2 to ensure precise compliance with the DICOM code. At sites wishing to adhere to their existing window values, -k1 should be used.

level: 0:Do not delete DICOM tags. (Transfer all headers similar to storage.)
1:Delete Groups 0008, 0010, 0018, 0019 and 0020.
2:Delete Groups 0008, 0010, 0018, 0019, 0020 and Elements (0028,0030), (0028,1050), (0028,1051), (0028,1052), (0028,1053), (0028,1054). Default

Note

In Ver.4.21, attach -k2 expressly to produce similar output. The previous option had -k1 as its default. The k option defaults to -k2, if k option is not specified.

Image Pixel Spacing (0028,0030)
Window Center (0028,1050)
Window Width (0028,1051)
Rescale Intercept (0028,1052)
Rescale slope (0028,1053)
Rescale Type (0028,1054)

For groups 0008, 0010, 0018, 0019, 0020, refer to DICOM manifesto.

Examples of parameters used with different makers and types of printers (reference)

Name	Default Parameters	Significance
Kodak MLP190	-A 320 -T NO -M CUBIC –m NORMAL -S CS000 (entered in param member) 80 (entered in pixelPitch member) 14 x 17 4096 (entered in W member) 5120 (entered in H member)	• Trimming OFF • Cubic spline interpolation • Smoothing: normal • Maximum density: 3.20 • Curve shape 0 (density linear) as Config Info
Kodak KELP2180 + Kodak Print Spooler Model 100	-A 320 -T NO -M CUBIC –m NORMAL -S CS000 (entered in param member) 79 (entered in pixelPitch member) 14 x 17 4090 (entered in W member) 5120 (entered in H member) 11 x 14 3194 (entered in W member) 4096 (entered in H member)	• Trimming OFF • Cubic spline interpolation • Smoothing: normal • Maximum density: 3.20 • Curve shape 0 (density linear) as Config Info
Agfa DryStar 3000	-A 320 -T NO -M CUBIC -m 140 -S “PERCEPTION_LUT=200” (entered in param member) 80 (entered in pixelPitch member) 14x17 4256 (entered in W member) 5174 (entered in H member)	• Trimming OFF • Cubic spline interpolation • Smoothing: slightly sharp (edges emphasized) • Maximum density: 3.20 • S “PERCEPTION_LUT=200(LINEAR)” (If the output fails to be linear with “LINEAR”, on-site adjustments with the printer manufacturer must be performed.
Kodak Imation DryView 8700 + Pacs LINK IMN 9410	-A 310 -T NO -M CUBIC -m ? -S LUT=0?, 2? (?: Site Dependent) (entered in param member) 78 (entered in pixelPitch member) 14x17 4096 (entered in W member) 5220 (entered in H member)	• Trimming OFF • Cubic spline interpolation • Smoothing must be adjusted at the user’s site. • Maximum density: 3.10 • S LUT = m, n is designated as the Config Info but m and n are adjusted on-site by the Kodak service engineer. Basically, adjustment is performed to achieve a linear output.
Kodak Imation DryView 8700 + GW	-A 310 -T NO -M CUBIC -m ? -S LUT=?, ? (?: Site Dependent) (entered in param member) 78 (entered in pixelPitch member) 14x17 4096 (entered in W member) 5220 (entered in H member)	• Trimming OFF • Cubic spline interpolation • Smoothing must be adjusted at the user’s site. • Maximum density: 3.10 • S LUT = m, n is designated as the Config Info but m and n are adjusted on-site by the Kodak service engineer. Basically, adjustment is performed to achieve a linear output.
Kodak Imation DryView 8700+8800	-A 320 -T NO -M CUBIC –S “LUT=m, n”-m (on-site adjustment) (entered in param member) 78 (entered in pixelPitch member) 4096 (entered in W member) 5220 (entered in H member)	• Trimming OFF • Cubic spline interpolation • Maximum density: 3.20 • S LUT = m, n is designated as the Config Info but m and n are adjusted on-site by the Kodak service engineer. Basically, adjustment is performed to achieve a linear output.

		• The Kodak service engineer is responsible for setting the smoothing type on-site since it can be changed with each printer. • The rest is done by the printer itself.
Kodak Imation DryView 8700+9440	-A 320 -T NO -M CUBIC –S "LUT=m, n"-m (on-site adjustment) (entered in param member) 78 (entered in pixelPitch member) 4096 (entered in W member) 5220 (entered in H member) The model 8800 has a rotation function but we understand that Imation has not publicly acknowledged the use of this function.	• Trimming OFF • Cubic spline interpolation • Maximum density: 3.20 • S LUT = m, n is designated as the Config Info but m and n are adjusted on-site by the Kodak service engineer. Basically, adjustment is performed to achieve a linear output. • The Kodak service engineer is responsible for setting the smoothing type on-site since it can be changed with each printer. • The rest is done by the printer itself.
Kodak Imation Dry View 8500+	-A 310 -T NO -M CUBIC -m ? -S LUT=0?, 2? (?: Site Dependent) (entered in param member) 78 (entered in pixelPitch member) 14x17 3388 (entered in W member) 4277 (entered in H member)	• Trimming OFF • Cubic spline interpolation • Smoothing must be adjusted at the user's site. • Maximum density: 3.10 • -S • LUT = m, n is designated as the Config Info but m and n are adjusted on-site by the Kodak service engineer. Basically, adjustment is performed to achieve a linear output.
Nishimoto EL2000N	-A 320 -T NO -M CUBIC -S 15 (entered in param member) 80 (entered in pixelPitch member) 4444 (entered in portraitW member) 5296 (entered in portraitH member) 5296 (entered in landscapeW member) 4444 (entered in landscapeH member) "Prepare images using CXDI" : Yes A simple calculation yields a resolution of 4444 x 5400 for the display area of the model EL2000. However, 5376@80 μm is set in the perpendicular direction of the model EL2000 since the maximum size of the CXDI images is 2688@160 μm. In this case, a small non-image area should be output as the border in the up/down direction on the film according to the calculation. In actual fact, however, the image will protrude in some cases depending on how the transport speed and other factors have been adjusted.	• Trimming OFF • Cubic spline interpolation • Maximum density: 3.20 • "15" in Config Info is linear. • The rest is done by the printer itself. Up to 5376 pixels can be set for H.

	The specifications are as follows although they cannot be set at the present time: 14" x 14" : W=4444, H=4444 (for portraits) 11" x 14" : W=4444, H=3660 (for portraits)	
Fuji CR-DPL/LPD/FM-DPL + FN-PS551	-A 300 -T NO -M CUBIC -m MEDIUM -S –P NORMAL –B BLACK –k 2 –S ? (Site Dependent) (entered in param member) 14x17 3520 (entered in W member) 4280 (entered in H member) 14x14 3520 (entered in W member) 3490 (entered in H member) 11x14 2540 (entered in W member) 3600 (entered in H member)	• Trimming OFF • Cubic spline interpolation • SHARP, MEDIUM or SMOOTH can be selected from among the presettings as the smoothing type. An AVR of 0.8 or so is appropriate. The setting is performed for each printer on-site. • -S should be adjusted at the user's site. • LUT can be selected from among the eight presettings 1 through 8 using Config Info. The setting is performed for each printer on-site. • With -k 2, the Window Center/Level for DICOM TAG (0028,1050) and (0028, 1051) are also deleted. • Maximum density: 3.00 A density of 3.20 cannot be designated. For this reason, a non-linear LUT is required.
Konica Drypro 722 + Printlink	-A 320 -T NO -M CUBIC -m 2 -S "KC_LUT=1" –O PORTRAIT –P NORMAL –B BLACK (entered in param member) 80 (entered in pixel pitch member) 14x17 4424 (entered in W member) 5324 (entered in H member) 14x14 4424 (entered in W member) 4372 (entered in H member) 11x14 3436 (entered in W member) 4424 (entered in H member)	• Trimming OFF • Cubic spline interpolation • Smoothing type 1: BILINEAR 2: Sharp by spline interpolation 3: Slightly weak by spline interpolation 4: Weaker by spline interpolation • Maximum density: 3.20 Maximum density 3.20 could not be achieved before.
Konica Li-62P + Printlink	-A 320 -T NO -M CUBIC -m 2 -S "KC_LUT=1" –O PORTRAIT –P NORMAL –B BLACK 80 (entered in pixel pitch member) 14x17 4268 (entered in W member) 5108 (entered in H member) 14x14 4268 (entered in W member) 4104 (entered in H member) 11x14 3204 (entered in W member) 4268 (entered in H member)	• Trimming OFF • Cubic spline interpolation • Smoothing type 1: BILINEAR 2: Sharp by spline interpolation 3: Slightly weak by spline interpolation 4: Weaker by spline interpolation • Maximum density: 3.20 Before, maximum density 3.20 could not be achieved.

Printer Model Specifications (Reference)

Name	Specifications	Maximum equivalent area in CXDI
Kodak MLP190	80μm x 4096 x 5120	2048 x 2560 (@160 μm)
Kodak KELP2180 + Kodak Print Spooler Model 100	79 μm x 4090 x 5120 (value after passing through the print spooler) • The above settings are the size of the effective area when the image passes through the print spooler and the image is plotted up to the annotation area. In other words, these settings do not display an annotation area, instead handling it as an image area. • If the data is transferred without setting [Image creation in CXDI], the Requested Image Size setting is used in DICOM. In this case, the annotation area is automatically displayed in the 2180 printer. As a result, a maximum image area of 79 μm x 4090 x 4996 must be designated. In this case, the CXDI relies on the 2180 for image rotation (Film Orientation), but images larger than 1.7 MB cannot be rotated by the 2180. Therefore, operation without the setting for [Image creation in CXDI] cannot be performed in the 2180. (Although operation is possible by setting Requested Image Size only for using DICOM without the setting for [Image creation in CXDI], this option is not installed in the CXDI.) • Although the resolution of the printer itself is 79 μm x 4090 x 5260, this complete resolution cannot be used when the image passes through the spooler. When "_" is used in AE Title, the association is rejected. Use the Disable function for N-EVENT-REPORT to disable this setting. The FilmSize parameter can be used. The MediaType (BLUE, CLEAR) parameter is also supported. • Although the Film Orientation parameter is supported up to 1.7 MB, in actuality, DR images cannot be rotated. Like the DryView8700, the images must be rotated by the CXDI side. • When Requested Image Size is expanded, the maximum plotting size is limited (79 um x 4090 x 4996) so that the annotation area can be obtained. When a Requested Image Size expansion error occurs, the image is interpolated and printed at the suitable size. In this case, the error does not return to the CXDI side. For example, the image is printed at 310 mm even if 326 mm is designated. • If an expansion error occurs in the spooler when Multi Display Format is used, the print queue cannot be processed. • The system is in a critical state when a Failure status is indicated. A user message is displayed indicating this state, and images are no longer transferred. (Fully installed) • During the Warning status, image transfer is performed while the user message is displayed (Fully installed). • If operation is aborted due to an error, a new association could not be established when the data was resent from the CXDI. GW was reset to recover the error.	2018 x 2528(@160 μm)

	• Inserting annotations in the image can lead to problems at the hospital. In the QCW, use annotations that are outside of the image. • The designated film size is 11 x 14 inch film, and automatic selection of the magazine and printing has been confirmed. • Annotations in the image are problematic in the US and EU. Thus, although DICOM annotation was used, it was not printed. Although annotation can be transferred without any errors in DICOM, an annotation error occurred in the log when transferring from the gateway to the 2180, and printing was not performed. Data was transferred from KCR to the validation tool, and the DICOM transfer method was compared to CXDI. However, the only differences were in the image size, aspect ratio, and annotation position. • Although the annotation position is 1 in terms of conformance, it is 0 as sent from KCR. The result did not change even after the change.	
Agfa DryStar 3000	80 μm x 4256 x 5174 • In the standard Agfa system, the annotation option is selected. Therefore, the full image area will not be printed correctly unless you ask the serviceman to deselect the annotation option.	2128 x 2587 (@160 μm)
Imation DryView 8700+8800	78 μm x 4096 x 5220 Note: The 8700 printer cannot display in landscape orientation. Also, the maximum density is 3.1. If the 8800 box is not added, this printer cannot be used by the CXDI. However, it can be used starting from CXDI version 2.0. • If there is an Imager Pixel Spacing tag (0018, 2264), the imager will fail.	1996 x 2544 (@160 μm)
Fuji CR-DPL /FM-DPL + FM-PS551	100 μm x 3520 x 4280 (value after passing through the print spooler) • The above settings are the allowable area size in a configuration not using annotation. • Annotation will be supported from the next version. Annotation in currently possible in US-ASCII only. IDs are designated 1 to 6 and correspond to the top left, top center, top right, bottom left, bottom center, and bottom right, respectively. The maximum area size with annotation support is 3500 x 4170 for 35 cm x 43 cm and 2538 x 3522 for B4. • Use the Disable function for N-EVENT-REPORT to disable this setting. • A function is provided for disabling the returning of warning messages. 0107 (Attribute list error) Return/Not return 0116 (Attribute Value out of Range) Return/Not return B604 (Image has been demagnified) Return/Not return • The Film Size parameter can be used. The Media Type (BLUE, CLEAR) parameter can also be used. • The Film Orientation parameter is fully supported. • The following presets are made so that LUT has the	2200 x 2675 (@160 μm)

	DMAX = 3.2D equivalent curve required by CXDI. Gamma type #17 (SAR system) Density Shift Contrast Point 1 1.57 0.10 1.00 Point 2 2.29 0.15 1.00	

Error Return Values and Log Output for print_stuff (Reference)

Error example	Return value and log output
Success	Return value: 0x00 There is no log output in this case.
Invalid parameter	Return value: 0x00000001 CXDI description : DICOM connection error (CCRTRANS_ERR_DICOMPARAM) The log output in this case is shown below. ---------- ** -s Silent mode; do not print results of all print commands ** -v Use verbose mode for DUL and SRV facilities ** x Canon Hidden Special Mode node The host name that is running a print server port TCP/IP port number of print server file One or more files that contain preformatted images for printing ----------
The server has not started up.	Return value: 0x00180012 CXDI description : DICOM connection error (CCRTRANS_ERR_NOT_CONNECT) ---------- The log output in this case is shown below. 18-135933[d2]ERR: d0012 Attempt to connect to unknown host: test 18-135933[d2]ERR: 130012 Peer aborted Association (or never connected) 18-135933[d2]ERR: 180012 Failed to establish association ----------
After a command request was sent to the server, an error was returned in response.	Return value: 0x10 CXDI description: DICOM response error (CCRTRANS_ERR_RESP) The log output in this case is shown below. ---------- (Not determined) ----------
After a command request was sent to the server, a warning was returned in response.	Return value: 0x18 CXDI description : DICOM response warning (CCRTRANS_WRN_RESP) The transfer process was successful, but a warning was returned from the server. The log output in this case is shown below. ---------- (Not determined) ----------
The printer status has returned an error.	Return value: 0x20 CXDI description : DICOM printer status error (CCRTRANS_ERR_PRN_STATUS) The log output in this case is shown below. ---------- (Not determined) ----------

The printer status has returned a warning.	Return value: 0x28 CXDI description: DICOM printer status warning (CCRTRANS_WRN_PRN_STATUS) The transfer process was successful, but a warning was returned as the printer status. The log output in this case is shown below. ---------- (Not determined) ----------
Other errors	Return value: Values other than those above CXDI description : DICOM communications error (CCRTRANS_ERR_DICOM_TRANSE) The log output in this case depends on the specific error. A typical example is shown below. ---------- 18-140933[d2]ERR : c0082 SRV Send (DATA SET) failed in SRV_SendDataSet 18-140933[d2]ERR : 190082 SRV Request failed in SRV_NCreateRequest 18-140933[d2]ERR : 70012 NULL_key passed to routineDUL_ReleaseAssociation ----------

Precautions for connecting the server (reference)

Equipment	Restrictions on connections
Kodak Miil	Transmitting the 0019 shadow group causes a failure, and the group is not received properly with the default. Its reception is enabled by setting the strictValidation parameter to Off in Miil.
Fujitsu Dr. ABLE	• Transmission is currently performed with the "1 study multi series/1 series 1 image" setting. However, since a multi format is used for the screen displays for each series under the Dr.ABLE specifications, the switching operations are a hassle. The user will find it more convenient if it is at all possible to change the setting to "1 study 1 series/1 series multi image." (These unusual data specifications were requested with the full understanding of their unusualness.) • With DICOM, the body parts (such as the abdomen and head) and their directions (such as PA and AP) belong to the series information. It therefore follows that a different series is required for a different body part or body part direction. This aspect is restricted by the DICOM standard rather than by the installation and other steps taken by us. To put it the other way around, multiple images with different body parts and their directions cannot be put together as a series. To remedy this problem, devising a way of enabling the viewers to reference different series at the same time at some future point in time will be helpful.
Hitachi	• Transmission is currently performed with the "1 study multi series/1 series 1 image" setting. However, since a multi format is used for the screen displays for each series, the switching operations are a hassle. The user will find it more convenient if it is at all possible to change the setting to "1 study 1 series/1 series multi image." • This problem arises with the Fujitsu equipment as well. Refer to the section on Fujitsu.

send_image error return values and log output (reference)

Example of error	Return value and log output
Successful	Return value: 0x00 No log output at this time
Invalid parameter exists.	Return value: 0x00000001 CXDI interpretation: DICOM connect error (CCRTRANS_ERR_DICOMPARAM) See below for the log output at this time: ---------- -t Set called AE title to title in Association RQ -v Place DUL and SRV facilities in verbose mode node Node name for network connection port TCP / IP port number of server application image A list of one or more images to send ----------
Server fails to start.	Return value: 0x00180012 CXDI interpretation: DICOM connection error (CCRTRANS_ERR_NOT_CONNECT) See below for the log output at this time: ---------- 18-132600[127]ERR: 60012 TCP Initialization Error: Invalid argument 18-132600[127]ERR: 130012 Peer aborted Association (or never connected) 18-132600[127]ERR: 180012 Failed to establish association ----------
As a result of providing the server with a command request, an error was returned as response.	Return value: 0x10 CXDI interpretation: DICOM response error (CCRTRANS_ERR_RESP) See below for the log output at this time: ---------- (To be determined) ----------

As a result of providing the server with a command request, a warning was returned as response.	Return value: 0x18 CXDI interpretation: DICOM response warning (CCRTRANS_WRN_RESP) The transmission processing was successful but a warning was returned from the server. See below for the log output at this time: ---------- (To be determined) ----------
Other errors	Return value: other than above CXDI interpretation: DICOM communication error (CCRTRANS_ERR_DICOM_TRANSE) The log output is many and varied. It depends on the error. One example is shown below. ---------- 18-140933[d2]ERR: c0082 SRV Send (DATA SET) failed in SRV_SendDataSet 18-140933[d2]ERR: 190082 SRV Request failed in SRV_NCreateRequest 18-140933[d2]ERR: 70012 NULL key passed to routine: DUL_ReleaseAssociation ----------

Concerning the Dry View 8700 (reference)

LUT (Lookup Table)

- Image adjustment parameters that can be changed by users

  Density : This can be set up to the maximum density of 3.1D.

  Contrast : This can be set from 1 to 15.

- mage adjustment parameters that cannot be changed by users

  Lookup tables called TFTs (Transfer Function Tables) are provided internally, and changes can be made only in the service mode.

Fifteen types of characteristic curves are registered in one of these TFTs, and users can change one of these curves as the contrast.

Over 30 TFTs are registered in the printer, and a name is allocated to each one.

For instance, 15 types of linear straight lines are registered in the TFT called “WRKST2A.”

By setting this WRKST2A TFT, adjustments can be made by combining 15 types of linear straight lines (which cannot be changed by users) with 15 types of characteristic curves (which can be changed by users).

Concerning connections

Two types of the Dry View 8700 are available.

- Dry View 8700 Plus

  The 8700 Plus is a printer which can be connected to two diagnostic units. When used in combination with the 8800 multi input manager, it can be connected to up to eight diagnostic units. Images are processed as described above.

- Dry View 8700 Dual

  It is possible to connect two 8700 Dual units to the 8800 multi input manager. By using these in combination, up to seven diagnostic units can be connected. The 8700 Dual does not come with image processing functions

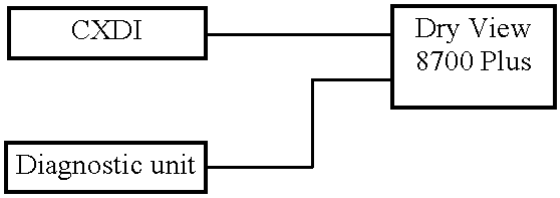
Modality connection I/F

This I/F is the external interface which connects “Dry View 8700” with each modality. Select the following item depending on the modality which would be connected.

- Digital Signal: DEIB (Digital External Interface Box)
- Video Signal: EVEIB (Enhanced Video External Interface Box)
- Keypad, Auto Filming: UKEIB (Universal Keypad External Interface Box)

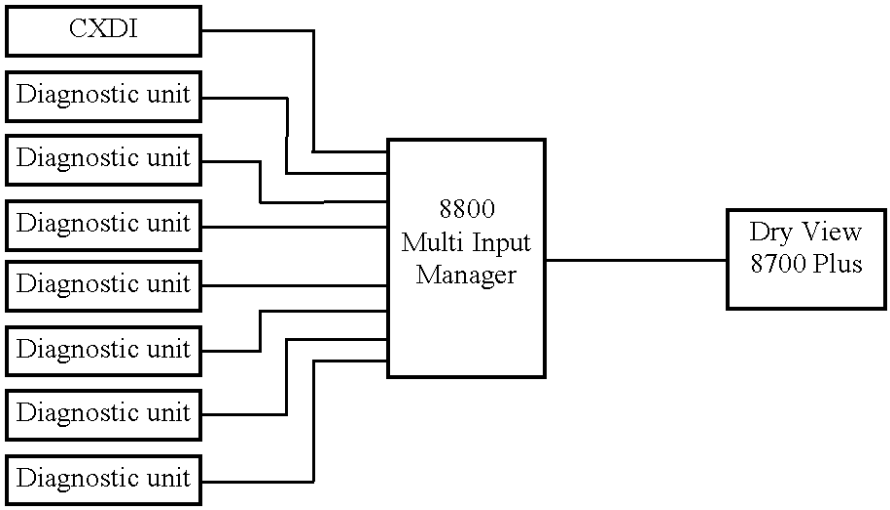
Dry View 8700 Plus

Up to 2 units can be connected.



Dry View 8700 Plus + 8800 Multi Input Manager

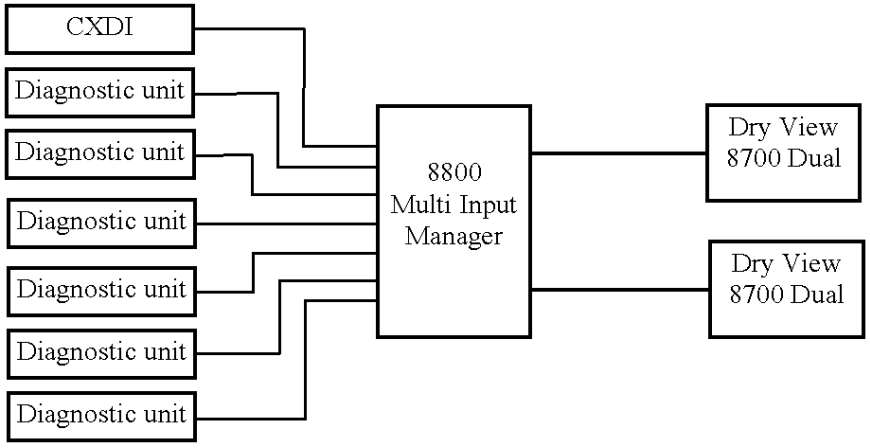
Up to 8 units can be connected.



Dry View 8700 Dual + 8800 Multi Input Manager

Up to 2 printers can be connected (only with Dry View 8700 Dual)

Up to 7 units can be connected.



13.11 Linearity Check of Transfer Image Density

1) Purpose

An SMPTE image is used to check whether the density linearity of the image printed out by the printer and the image displayed on the high-definition monitor matches the density linearity of the image transferred by the CXDI.

2) Notes

2-1) This checking procedure should be performed before the procedure in the section of "Operation Unit Gamma Correction".

2-2) The adjustment and checking procedures below should be completed before performing this procedure.

A) The printer and high-definition monitor connections and setting adjustments should be completed. The printer and monitor image output settings should be set to LINEAR.

For example, if the KODAK MLP190 is connected, the printer parameter "-S configuration" must be set to "-S CS000". For other printers, refer to "Printers and Parameter Examples Reference" in "Network Connections", and set so that the curve shape is 0 (density linear).

B) Be sure to calibrate the printer and high-definition monitor units separately before performing this procedure.

C) When the imaging screen is "tray type", change it to "category type" by selecting:

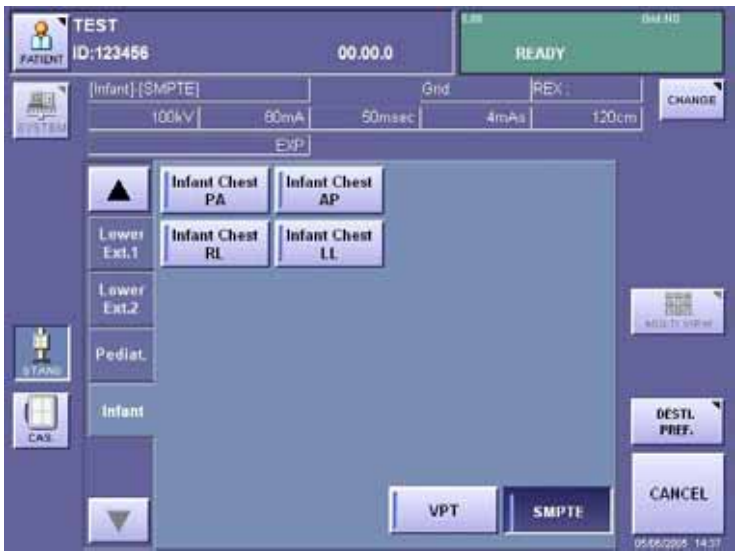
System → SETUP MENU → CUSTOMIZE DISPLAY.

3) Rough adjustment

3-1) Start up the CXDI system.

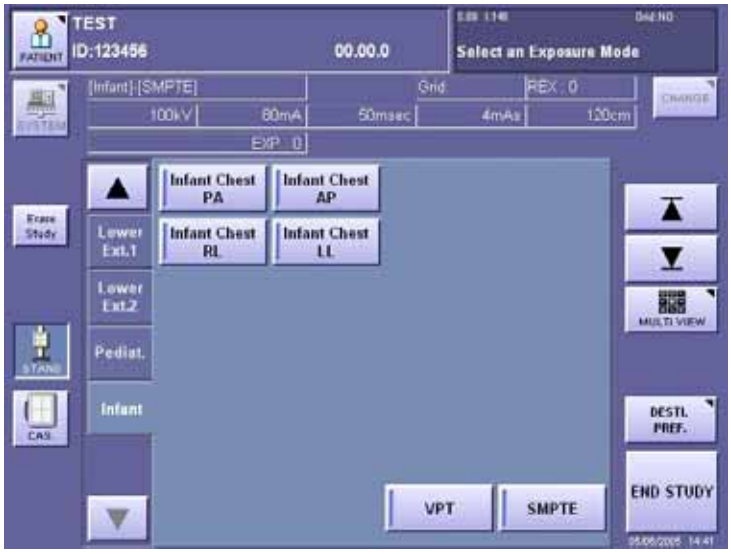
3-2) Using the two knobs at the rear of the operation unit, adjust the brightness and contrast of the touch panel screen for optimum visibility.

3-3) On the exposure screen, select the exposure mode "SMPTE" and wait until "READY" appears. [Fig. 1]



[Fig. 1]

3-4) Press the exposure switch on the X-ray generator, and after the exposure, press the END STUDY button. Transfer the SMPTE pattern image to the printer or the high-definition monitor. [Fig. 2]



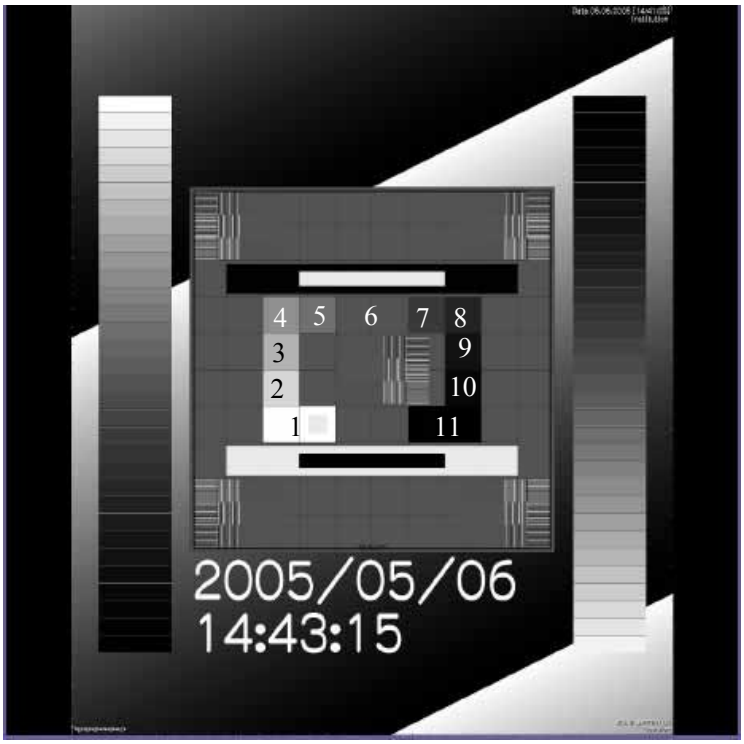
[Fig. 2]

3-5) Measure the densities of the 11 locations (0% to 100%) of test image grayscale on the film or on the monitor. [Fig. 3]

- Measure the SMPTE image density on the film is measured using a densitometer.

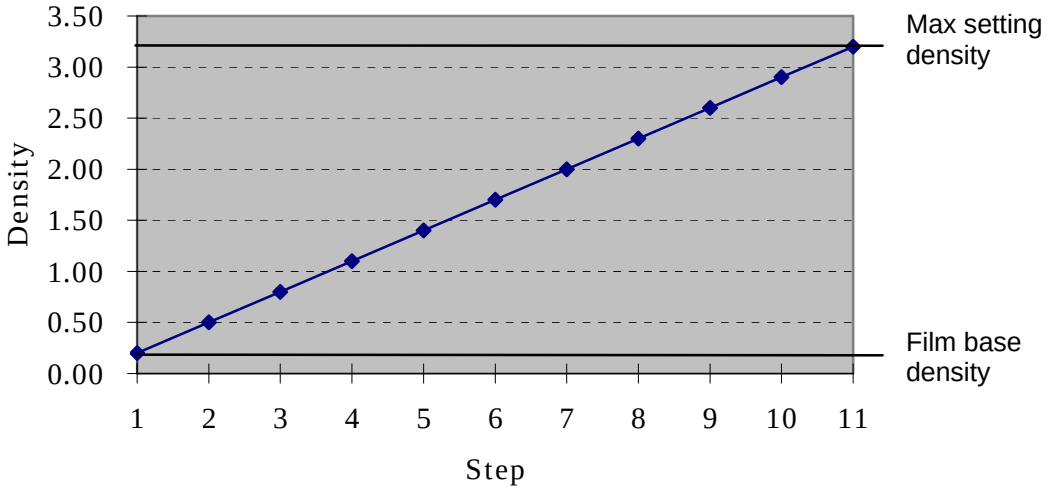
  Measure the SMPTE image density on the high-definition monitor using the gradation analysis software.

- The data for the SMPTE test image grayscale transferred by the CXDI are the values for the maximum density (3.20 in the case of the MLP 190) in the printer settings which have been changed in 11 uniform steps.



[Fig. 3]

3-6) Create the graph below based on the data measured in step 5).



As shown in the above graph, the measurement values need only to nearly form a straight line from the minimum density to the maximum density.

The important point here is that the measurement values make a straight line and a maximum density corresponding to the settings is output.

If the measurement values deviate too far from the straight line and a maximum density corresponding to the settings is not output, printer and monitor output linearity settings, calibration, and other adjustments are necessary.

* The above graph is an example of measurements when the maximum density is set to 3.2 D and the printed film is measured with a densitometer. Refer to the data below when the maximum density is set to 3.1 D, or when gradation analysis software is used to take measurements on the monitor.

* The LINEAR output cannot be set for some printer models.

  In this case, try to select an output setting as close as possible to LINEAR.

Ideal density values in LINEAR LINE

Step	1	2	3	4	5	6	7	8	9	10	11
3.2 D	0	0.32	0.64	0.96	1.28	1.60	1.92	2.24	2.56	2.88	3.20
3.1 D	0	0.31	0.62	0.93	1.24	1.55	1.86	2.17	2.48	2.79	3.10
12 Bit	0	410	819	1229	1638	2048	2457	2867	3276	3686	4095
8 Bit	0	26	51	77	102	128	153	179	204	230	255

Possible causes of non-linearity in measurement values:

* Inadequate calibration of printer and high-definition monitor

* Inadequate settings for CXDI printer parameters

* Faults in printer or high-definition monitor

4) Fine adjustment

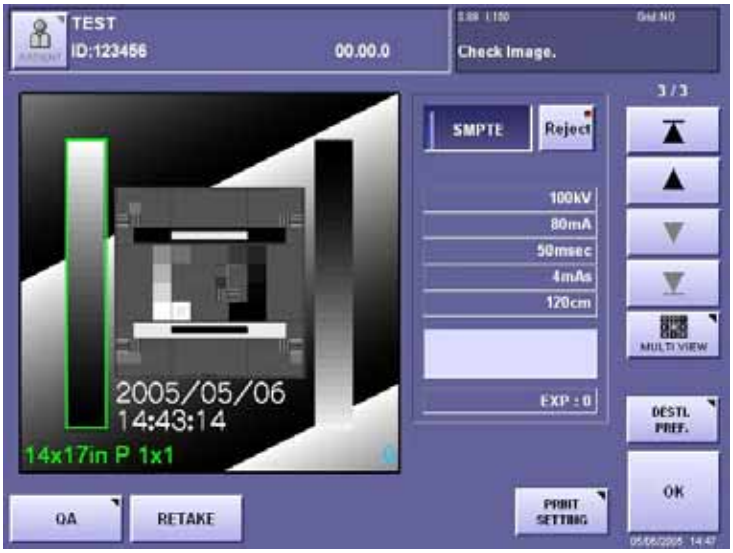
4-1) As the step (3)-3) above, make the system “READY” by selecting the exposure mode “SMPTE” on the exposure screen. [Fig. 4]

[Fig. 4]

4-2) On the X-ray generator press the exposure button. After the exposure, adjust the trim so that the gray scale may be located in the center of the image. [Fig. 5]

- For correct density measurement of the 32-step chart, the gray scale must be printed in the center of an image to eliminate the shading feature.

* Data may not from a straight line near the minimum and maximum densities due to characteristics of the printer. Rotate the image on the QA screen, and reprint or retake measurements.



[Fig. 5]

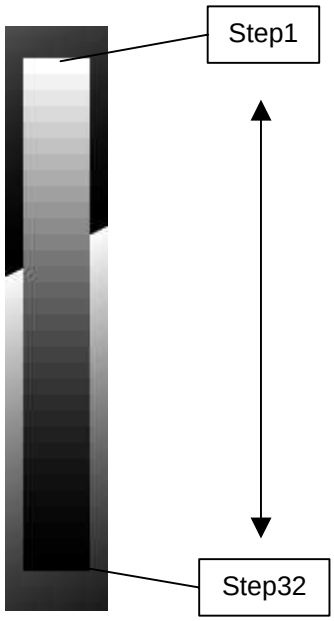
4-3) Select the END STUDY and transfer the SMPTE pattern image to the printer or the high-definition monitor. [Fig. 6]

[Fig. 6]

4-4) On a printed film or on the monitor, measure the density of 32 steps of the grayscale on the test image. [Fig. 7]

*1: Measure the SMPTE image density on the film using a densitometer. The SMPTE image density on the high-definition monitor is measured using the gradation analysis software.

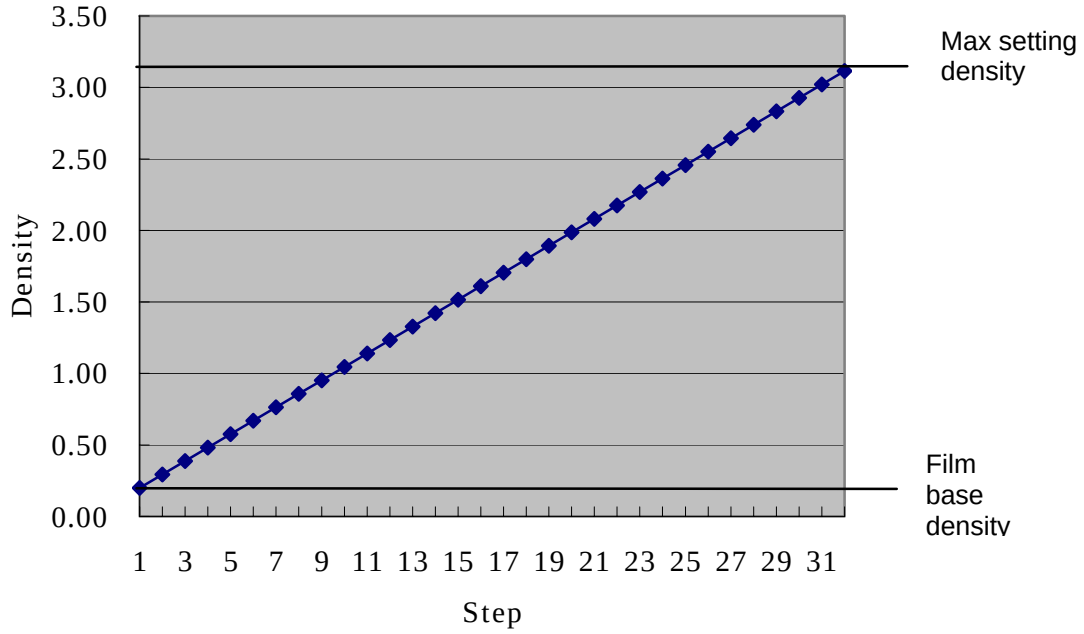
*2: The data for the SMPTE test image grayscale transferred by the CXDI are the values for the maximum density (3.20 in the case of the MLP 190) in the printer settings which have been changed into 32 uniform steps.



[Fig. 7]

4-5) As the step (3)-6), create a graph based on the data measured in step 4), and make sure that the data from the minimum density to the maximum density nearly form a straight line.

Characteristics of the printer may prevent the data from forming a straight line near the minimum and maximum densities. Rotate the image on the QA screen, and reprint or retake measurements.



Ideal Density Data for Linear Line

Step	1	2	3	4	5	6	7	8	9	10	11
3.2 D	0	0.10	0.21	0.31	0.41	0.52	0.62	0.72	0.83	0.93	1.03
3.1 D	0	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00
12 Bit	0	132	264	396	528	660	792	924	1056	1188	1320
8 Bit	0	8	16	24	32	41	49	57	65	74	82

Step	12	13	14	15	16	17	18	19	20	21	22
3.2 D	1.14	1.24	1.34	1.45	1.55	1.65	1.75	1.86	1.96	2.06	2.17
3.1 D	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10
12 Bit	1453	1585	1717	1849	1981	2113	2245	2377	2509	2641	2774
8 Bit	90	98	106	114	122	131	139	147	155	164	172

Step	23	24	25	26	27	28	29	30	31	32
3.2 D	2.27	2.37	2.48	2.58	2.68	2.79	2.89	2.99	3.10	3.20
3.1 D	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10
12 Bit	2906	3038	3170	3302	3434	3566	3698	3830	3962	4095
8 Bit	180	188	196	205	213	221	229	238	246	255

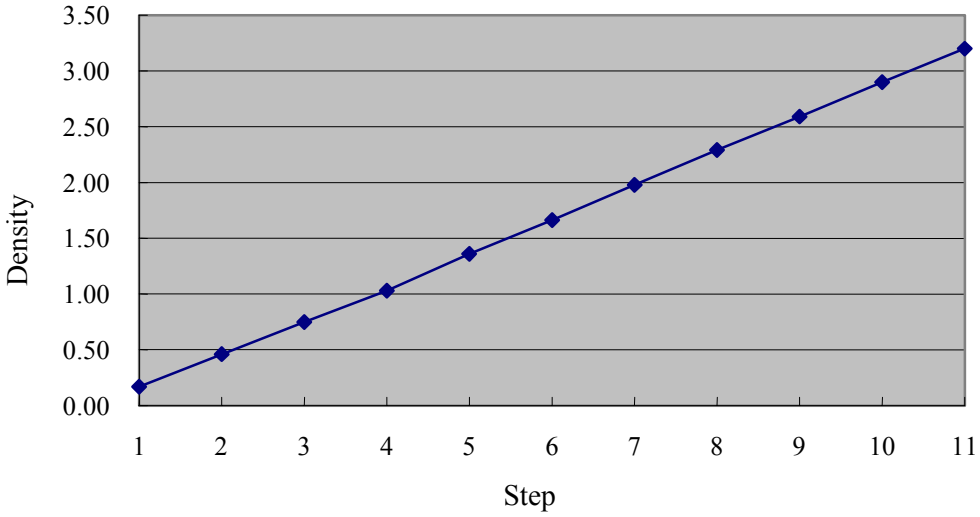
<**Reference 1**>

In the data and graph below, the data was obtained by setting the Kodak MLP 190 to curve shape 0 (density linear), a maximum density of 3.20, the SMPTE test image was printed out, and the image data was measured.

As shown in the graph, the data from the minimum density (film base density) to the maximum density nearly form a straight line.

SMPTE Density

Step	1	2	3	4	5	6	7	8	9	10	11
Percentage	0	10	20	30	40	50	60	70	80	90	100
Density (D)	0.17	0.46	0.75	1.03	1.36	1.66	1.98	2.29	2.59	2.90	3.20



* The printer parameter settings in this case are:

A 320 -T NO -M CUBIC -m NORMAL -S CS000

<**Reference 2**>

Example when the graph does not form a straight line

In the data and graph below, the data was obtained by using the Kodak MLP 190 to print out the SMPTE test image, and the image data was measured.

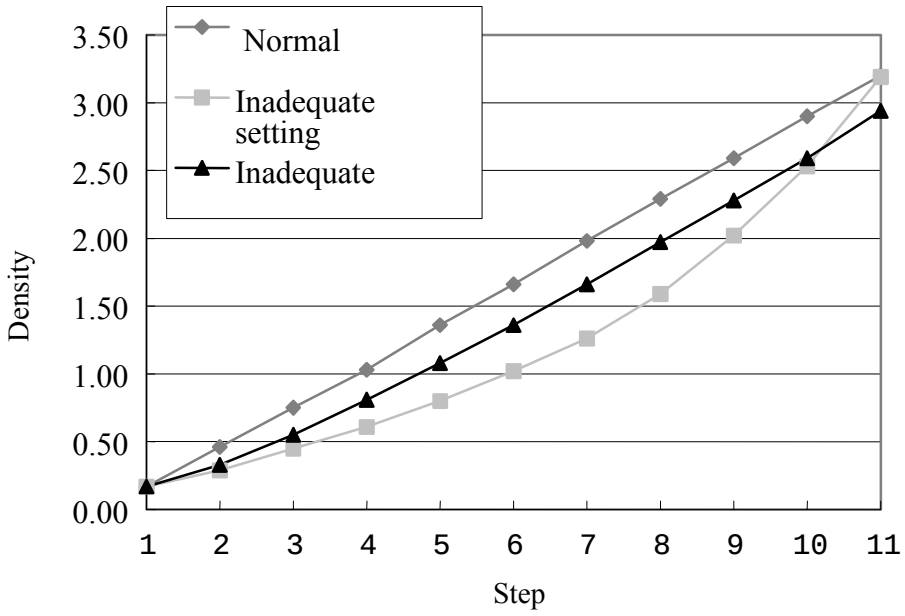
(1): Shows normal data.

(2): Shows the case when the CXDI printer parameters are not set linearly.

(3): Shows the case when the printer was not calibrated properly.

SMPTE Density

Step	1	2	3	4	5	6	7	8	9	10	11
Percentage	0	10	20	30	40	50	60	70	80	90	100
(1) Normal	0.17	0.46	0.75	1.03	1.36	1.66	1.98	2.29	2.59	2.90	3.20
(2) Inadequate parameter settings	0.17	0.29	0.45	0.61	0.80	1.02	1.26	1.59	2.02	2.53	3.19
(3) Inadequate	0.17	0.33	0.55	0.81	1.08	1.36	1.66	1.97	2.28	2.59	2.94



* For improper parameters, the printer parameter “-S CS000” was not entered.

* For the inadequate calibration, the printer calibration data was set too low.

13.12 Operation Unit Gamma Correction

1) Purpose

This procedure is performed so that the image that is printed out or displayed on a high-definition monitor conforms exactly to the exposure image on the operation unit.

2) Notes

2-1) The procedure in “Linearity Check of Transfer Image Density” must be completed.

2-2) If image adjustment for the printer or high-definition monitor has not been made, use the “Gamma Correction Calculation Tool” in order to correct the gamma of high definition monitor image to be a same as printer image.

2-3) Gamma correction is an image correction process for monitors and film. It is different from the contrast setting or grayscale setting.

This procedure is simply a visual adjustment. As a result, differences may occur depending on the operator performing the procedure. Therefore, be sure to consult with the responsible technician before performing this adjustment.

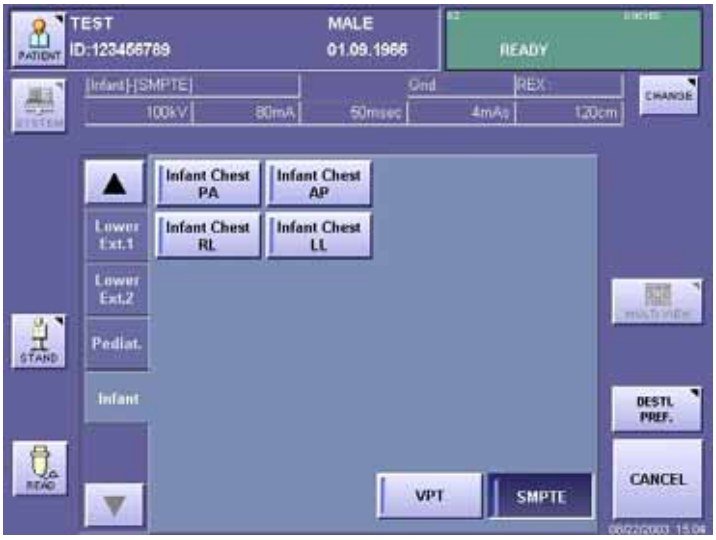
2-4) To make the gamma of operation unit adjust in detail, use the “Gamma Correction Calculation Tool”.

3) Comparison of operation unit image and print image or monitor image.

3-1) Start up the CXDI system.

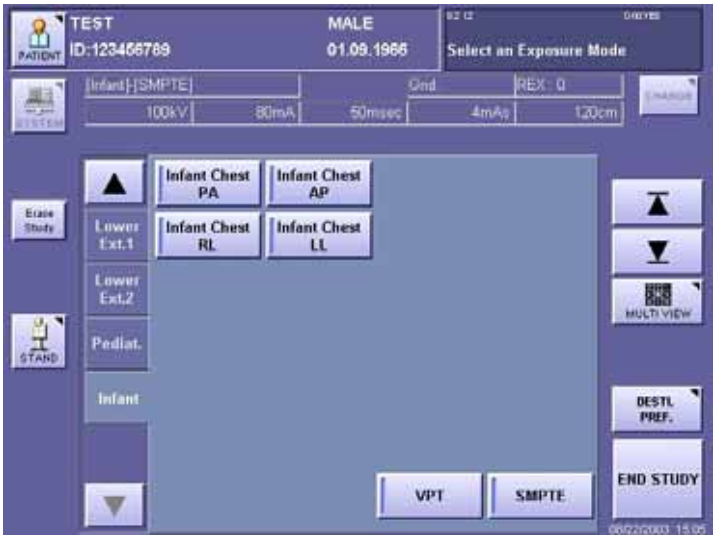
3-2) Use the two adjustment knobs at the rear of the operation unit to adjust the brightness and contrast of the touch panel screen for optimum visibility.

3-3) On the exposure screen, select the exposure mode “SMPTE” and wait until “READY” appears. [Fig. 1].



[Fig. 1]

3-4) On the X-ray generator, press the exposure button, and after the exposure, select "END STUDY". Transfer the SMPTE pattern image to the printer or the high-definition monitor. [Fig. 2]



[Fig. 2]

3-5) Take the SMPTE pattern image again. On the QA screen, compare the image displayed on the operation unit screen with the film image printed in Step 3-4) above or with the image on the high-definition monitor. Make sure there is no difference in contrast and gradation between those images. Check both preview and magnify images.

If there are any differences between these images, perform the procedure described in "4) Operation Unit Image Gamma Correction"

If there are no differences between these images, the steps are complete.

4) Operation Unit Image Gamma Correction

4-1) On the QA screen displayed on Step (3) 5) above, select the "Option" tab and the "Gamma Adjustment" button is appeared, and then press this button. [Fig. 3]

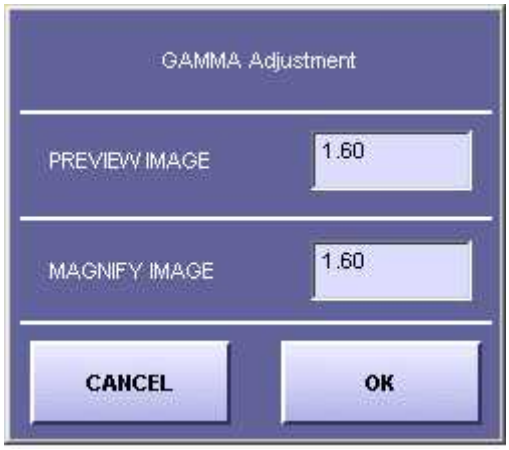
[Fig. 3]

4-2) The “Gamma Adjustment’ window appears. Change the value for the PREVIEW IMAGE, and press OK. The gamma correction for the operation unit screen is performed. [Fig. 4]

(Make sure the gamma value for the test image has changed on the operation unit screen.)

The gamma value is adjustable from 1.00 to 2.50.

When the image on the operation unit is lighter (whiter) than the film image, increase the value. On the contrary, if the image on the operation unit is darker (blacker) than the film image, decrease the value. The default gamma value is 1.60.



[Fig. 4]

4-3) When the gamma value for the preview image is adjusted, then adjust the gamma value for the magnify image. The default gamma value for the magnify image is 1.60.

4-4) The correction steps are complete.

13.13 Changing the Total Image Count

1) Purpose

When the imaging unit is replaced (including the replacement of the LANMIT) for servicing, the total image count displayed on the user screen can be returned to “0”if necessary.

2) Notes

2-1) The CXDI is connected by the system.

2-2) Set the CXDI application so that it does not start up.

2-3) Files are overwritten, and so be careful when performing the procedure.

2-4) As an extra precaution, write down the numerical values before overwriting them.

2-5) The overwritten counter becomes valid the next time that the CXDI is started up.

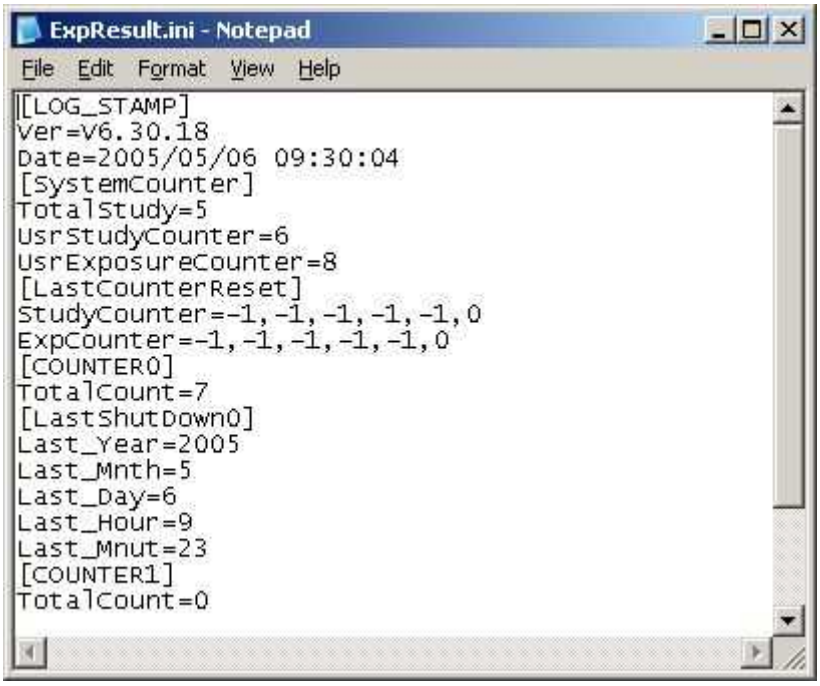
3) Procedure

3-1) Turn on the control computer, and then start up Windows XP.

3-2) Right click on My Computer on the Desktop screen of Windows XP, and open Explorer.

3-3) A file called “ExpResult.ini” is contained in the CCR folder.

Open this file. (D:\CCR\ExpResult.ini) [Fig 1]



[Fig 1]

3-4) Changing the items below contained in the file allows you to change the settings for the counter in the user screen.

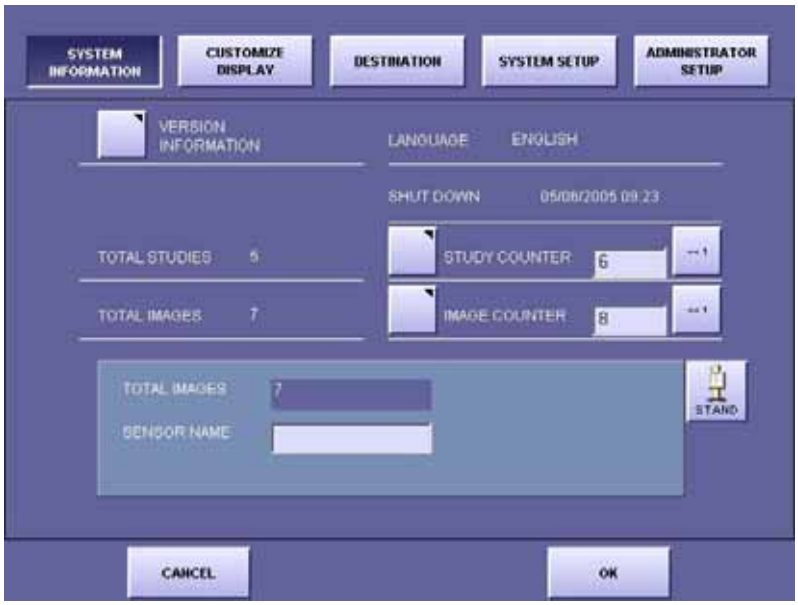
ExpResult.ini file	Screen Display	Note
[SystemCounter]		
TotalStudy=	TOTAL STUDIES	
UsrStudyCounter=	STUDY COUNTER	Can be overwritten at the user screen
UsrExposure Counter=	IMAGE COUNTER	Can be overwritten at the user screen
[LastCounterReset]		
StudyCounter=	Year, month, day, hour, minute	
ExpCounter=	Year, month, day, hour, minute	
[COUNTER 0]		
TotalCount=	Total number of images obtained with sensor unit 1.	
[COUNTER1]		
TotalCount=	Total number of images obtained with sensor unit 2.	
[COUNTER2]		
TotalCount=	Total number of images obtained with sensor unit 3.	
[COUNTER3]		
TotalCount=	Total number of images obtained with sensor unit 4.	

3-5) After overwriting the values, overwrite the file “ExpResult.ini” and save.

3-6) Close all windows that are open on the Desktop, and then start up the CXDI application.

3-7) Open the “System Information” screen, and check that the changed items have been set correctly. [Fig 2]

“TOTAL IMAGES” indicates the total number of images obtained with all sensors automatically.



[Fig 2]

13.14 Backing Up When Installing

1) Purpose

In case of re-installing the CXDI application, the necessary files ex) the exposure position and other parameters must be backed up so that can be restored at the status of first installation.

2) Necessary items

2-1) Removable drive such as MO drive, USB memory or external HDD that can connect to USB 2.0

3) Notes

3-1) Before performing backup procedure, delete any “BodyPart” and image data exposed for tests.

Deleting image data: Refer to the “Deleting Data” item.

Deleting “BodyPart”: Refer to the CXDI Series Operation Manual.

3-2) Backup should be performed immediately before handing over the product to the customer only for new installations.

4) Connections

4-1) Check that all equipment is turned off.

4-2) Connect the keyboard and mouse removal drive to the control PC.

5) Settings

5-1) Turn on the operation unit power and then the control PC power.

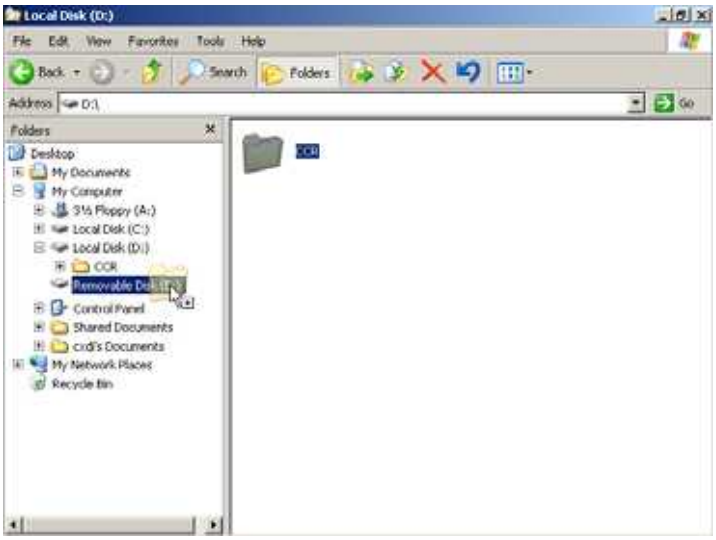
5-2) The CXDI application starts. Press the [Alt] + [Tab] keys to switch the program to the Command Prompt screen.

5-3) The message “Welcome to Canon CXDI” appears. Input [8] and press the [Enter] key. (Select “8 Exit”.)

5-4) The Windows XP desktop screen appears.

5-5) Right click on My Computer on the Desktop screen, and select Explorer from Menu.

5-6) Explorer appears. Copy the CCR folder onto Removable Drive.



13.15 Backing up Setting Data to FD

1) Purpose

"Important setting data (setting information which differs for each customer.)" is backed up to floppy disks and hard disks in consideration of possible setting data loss, hard disk corruption or other data errors.

In the event that setting data is lost or the hard disk is corrupted, this "Important setting data" can be quickly restored to the condition before the trouble occurred by copying from the backup data.

2) Notes

2-1) Performing this backup work means that the CXDI system will be used with the floppy disk inserted in the floppy disk drive.
Be sure to eject the floppy disk from floppy disk drive in order to avoid damaging it, in case of changing the layout or moving the control PC.
Likewise, when mounting the system in a vehicle, vibrations may cause damage to the floppy disk drive.
Therefore, after backing up the latest data to the floppy disk, be sure to eject the floppy disk.

2-2) Based on the reason in note 1) above, do not perform backups in an environment that is exposed to vibrations. Therefore, never perform backups when the control PC is loaded in a car.
In V4.0 and later versions, the default FD-Buck Up setting is ON. When backup to a floppy disk is not allowed, set it to OFF.

2-3) At the product shipment stage, it must be checked that [Boot/1. Removable Device] in the system BIOS settings is set to [Disabled]. However, as a precaution, check that "Boot/1. Removable Device" is actually set to "Disabled". If the setting is changed to "Legacy Floppy", the control PC may not start properly when a floppy disk is inserted. For more information, see "System BIOS Settings" under "CXDI-C3/C3S"

2-4) Be sure to always format the floppy disk that you are using before performing backups.

2-5) The backup procedure described here covers the case when backing up for the first time after installation. For the second and subsequent times, data is automatically backed up to the floppy disk whenever the user changes the exposure mode buttons or other settings.

2-6) This backup procedure cannot be performed with just the control PC. Connect the imaging units and other equipment, and start up in the normal exposure status.

3) Procedure

3-1) Remove the left side cover of the control PC.

3-2) Insert a formatted floppy disk (1.44 MB) in the floppy disk drive.

- Make sure the write protect of the floppy disk is unlocked at this time.

3-3) Reattach the left side cover of the control PC.

3-4) Start up the CXDI system. If you have changed the parameters including the exposure mode button, back up all “ini.files” to a floppy disk when you restart the system again.

- When you first back up the files, the back up operation may take some time because there are many files to be copied.

3-5) Make sure that all files have been copied and switch off the CXDI system.

The files copied to a floppy disk are the “C:\ccrbup”, and they are the latest backup data. If the data stored in the drive D is damaged and there is no trouble in the drive C, restore the CXDI setting data using the data in “C:\ccrbup”.

13.16 Tool Modes (/np mode)

1) Purpose

The tool modes (startup options) are intended in order to check operation, and are used to launch the CXDI application on the control PC by itself, and to display items that are not normally displayed.

2) Notes

The following operation must be performed before using the "/np" mode. Especially, be sure to back up the exposure mode names and the customized settings before the operation.

2-1) When using "/np" with the same settings as that of the connected sensor unit

"BodyPart**.ini" file can be used as it is.

Example:

	Connection	/np setting
Sensor1	Table	Table
Sensor2	Stand	Stand

2-2) In case of using "/np" with different settings from that of the connected sensor unit
Move the "BodyPart**.ini" file in the "BodyParts" folder to the desktop, etc. However, do not move the Reference folder. If the "BodyPart**.ini" file is left in the "BodyParts" folder, system will not be able to be started, as the sensor type of the "BodyPart" and the settings do not match.
Example:

	Connection	/np setting
Sensor1	Table	Table
Sensor2	Stand	Stand

3) Preparation

3-1) Connect the keyboard and the mouse to the control PC.

3-2) Delete the "ccrstart.bat" file from startup.

3-3) Disconnect the imaging unit from the control PC.

4) Startup method

4-1) Start up Windows XP.

4-2) Start the Command Prompt screen.

Start ⇒ Program ⇒ Accessories ⇒ Command Prompt

4-3) Command Prompt screen appears, type the commands following instruction below to start the CXDI application. (Press the [Enter] key after typing the command.)

No.	Command Prompt	Command	Note.
1	C:\>	D:	
2	D:\>	cd ccr	"Space" delimiter is required between "cd" and "ccr".
3	D:\ccr>	ccrxxxxx /np	"Space" delimiter is required between "xxxxx" and "/". "xxxxx" is different in version.

4-4) If the message "Sensor not connected" appears at starting of the CXDI application, click [OK] button, Change to the "Debugging mode" with the keys ([Alt] + [Tab]) using.

4-5) When Welcome to CCR appears, select "1. Set-Up...".

4-6) When Setting Mode (0: Normal, 1: Expert) [0=0x0]: appears, select “0: Normal.”
4-7) When CCR SETUP MENU appears, select “7 Scan Sensor Setup”.
4-8) When Capture Device Configuration Table appears, enter the number of sensor to which make the “Max Capture Device” recognized.
4-9) The dummies of “A/D Board Serial Number” are appeared: Enter the sensor serial number for necessary type.

------A/D Board Serial Number 0 0 -> 50G : 0x199
------A/D Board Serial Number 0-1 -> 12 : 0x2009
------A/D Board Serial Number 0-2 -> 31 : 0x3002
------A/D Board Serial Number 0-3 -> 40G : 0x123

For example, when the upright stand model is connected to Sensor 1, and the 50G cassette 14x17 connected to Sensor 2:

Enter “**123**” for “A/D Board Serial Number for Sensor ID#1”
Enter “**199**” for “A/D Board Serial Number for Sensor ID#2”

The CXDI application can now be launched on the control PC with the same conditions in effect as if an imaging unit were connected.

@@@@@@@@ Capture Device Cofigration Table @@@@@@@@
Max Capture Devices [2 = 0x2] : 2
@@@@@@@@ Capture Device Configration No.0 (SensorID#1 OPU)@@@@@@@@
------A/D Board Serial Number 0-0 -> 50G : 0x199
------A/D Board Serial Number 0-1 -> 12 : 0x2009
------A/D Board Serial Number 0-2 -> 31 : 0x3002
------A/D Board Serial Number 0-3 -> 40G : 0x123
A/D Board Serial Number for SensorID#1 [0x199 = 409] : 0x123
Custom Type[0:NO CUSTOM 1:STAND 2:TABLE 3:UNIV 4:CASSETTE 5:CASSETTE 14X17] [0 = 0x0] : 0
Field of View Rotation(0:No 1:Yes) [0 = 0x0] : 0
Constant for Exposure Index [1.800000] : 1.800000
@@@@@@@@ Capture Device Configration No.1 (SensorID#2 OPU)@@@@@@@@
------A/D Board Serial Number 0-0 -> 50G : 0x199
------A/D Board Serial Number 0-1 -> 12 : 0x2009
------A/D Board Serial Number 0-2 -> 31 : 0x3002
------A/D Board Serial Number 0-3 -> 40G : 0x123
A/D Board Serial Number for SensorID#2 [0x0 = 0] : 0x199
Custom Type[0:NO CUSTOM 1:STAND 2:TABLE 3:UNIV 4:CASSETTE 5:CASSETTE 14X17] [0 = 0x0] : 0
Field of View Rotation(0:No 1:Yes) [0 = 0x0] : 0
Constant for Exposure Index [-1.000000] : -1.000000
---- Need to re-start program to validate this change.

4-10) When CCR SETUP MENU appears, press the [Esc] key to return to Welcome to CCR.

4-11) Select the command “8 - Exit” in the “Welcome to CCR” menu to exit the CXDI application.

4-12) After exit the CXDI application and Windows XP desktop appears, starts the command prompt screen (Start ⇒ Program ⇒ Command Prompt). And type the command “ccrxxxxx /np” to start the CXDI application again.

a. When the CXDI application program is starting up, the message “There is no BodyPart for SensorID#*. ** TYPE BodyPart will be created” appears. Click [OK]. (* differs according to the type of the sensor.)

→ The above message appears when a /np mode is used with a setting different to that of the connected sensor.

b. The messages “System X-ray tube parameters (APERTURE,OFFSET) are wrong. will you reset these wrong parameters??” and “The X-ray tube parameters (APERTURE,OFFSET) in the BodyPart.ini file are wrong. Do you want to reset the wrong parameters?” appear. Click [OK] for each.

→ These above messages might be appeared if /np mode is used with a different setting.

5) Going out of /np mode

Connect the sensor unit to the control PC.

Before using the system in normal condition, perform the following steps:

5-1) If /np mode has been used with a different setting as that of the connected sensor, as mentioned in “(3) Notes”, delete the BodyPart**.ini file made in the BodyParts folder, and return the BodyPart**.ini file which has been moved into the BodyParts folder.

5-2) Enter the command “ccrstart.bat” on command prompt to boot the CXDI application.

Follow the procedure from 3) to 9) in previous section. And check these one will be preformed properly without any problems.

5-3) Register the ccrstart.bat file to the StartUp.

14. Adjusting the Alignment

1. Outline

Align the center of the sensor unit with the center of the X-ray tube. Be sure that the crossing angle is perpendicular.

* Alignment of the sensor should be performed based on the assumption that the X-ray generator is set in the correct horizontal and vertical position. If the X-ray generator is displaced to a large extent, the alignment of the sensor may not compensate the misalignment of the X-ray generator. In this case, you need to ask the manufacturer of X-ray generator to align the position of the X-ray generator again.

* If the table type is used, align the sensor unit before mounting a top panel.

* If anchoring is required for the stand or the table you are going to install, be careful not to disturb the alignment. For details of anchoring, please refer to the Service Manuals of stand type.

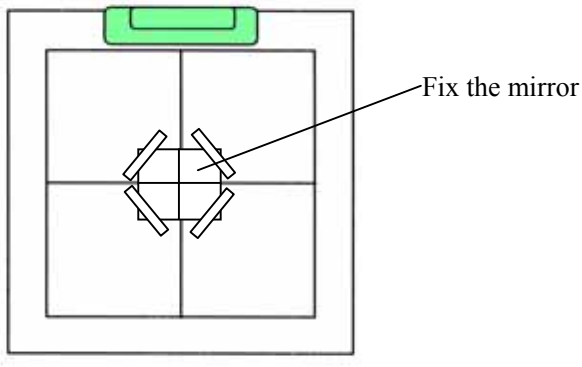
2. Tools (should be prepared by distributors)

Alignment Adjustment Spacer, Mirror (first-face mirror), Tape, Oil-based Marker, Measure, Rope, and other requirements.

3. Adjustment

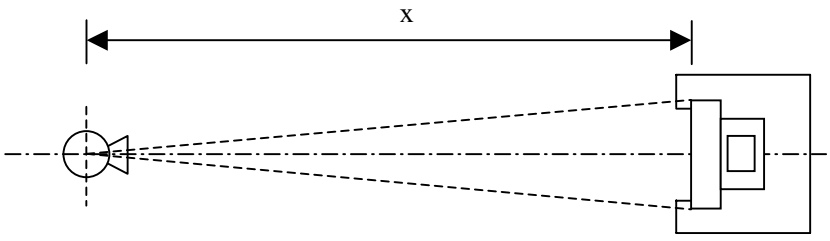
3.1 Stand

(1) Fix the mirror (first-face mirror) at the center of the sensor unit.



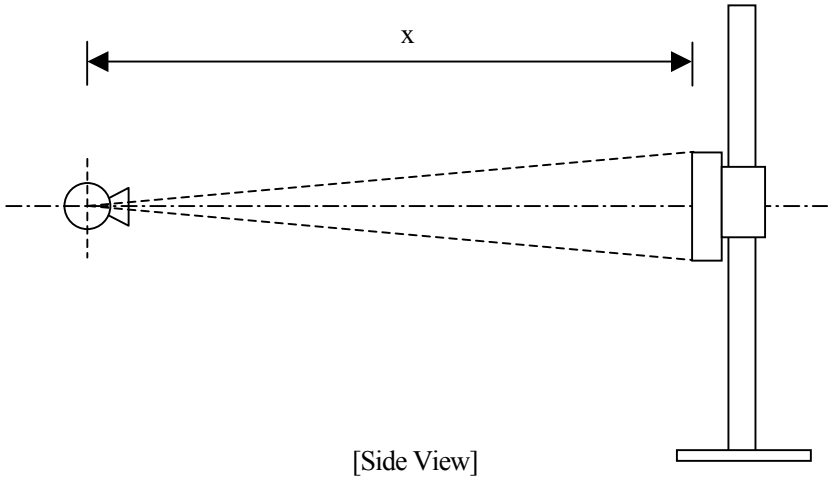
(2) Place the stand temporarily in the position to space enough distance for the exposure.
Distance from the tube to the sensor unit should be 180cm.

● Using a measure or rope, align the horizontal position of the sensor unit to the center of the tube so that the distance from the tube to the right and left side of the sensor is symmetric.



[Top View]

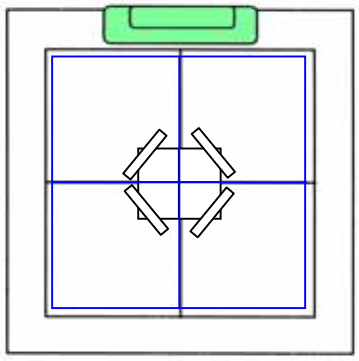
● Using a measure or rope, align the vertical position of the sensor unit to the center of the tube so that the distance from the tube to the top and bottom side of the sensor is symmetric.



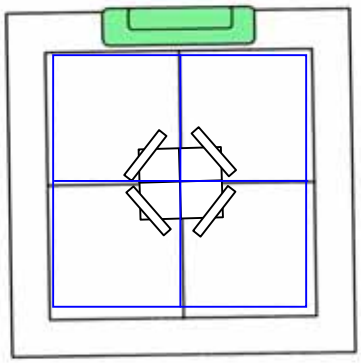
[Side View]

(3) Turn on the irradiation ramp of the X-ray generator, cross line of the X-ray tube is cast over the sensor unit. Align the position to meet the requirements described in 1) and 2) below.

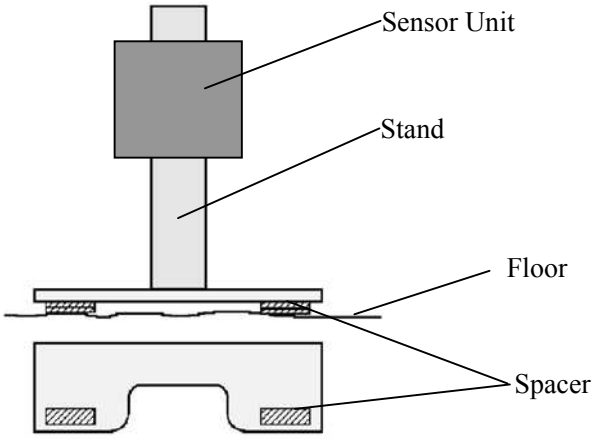
1) Align the cross line of X-ray tube with the cross line of the sensor unit. If the position is mismatched as shown in [NG] below, the sensor unit and the stand are not horizontal. In this case, put the spacer between the stand base and the floor to align the slight differences.



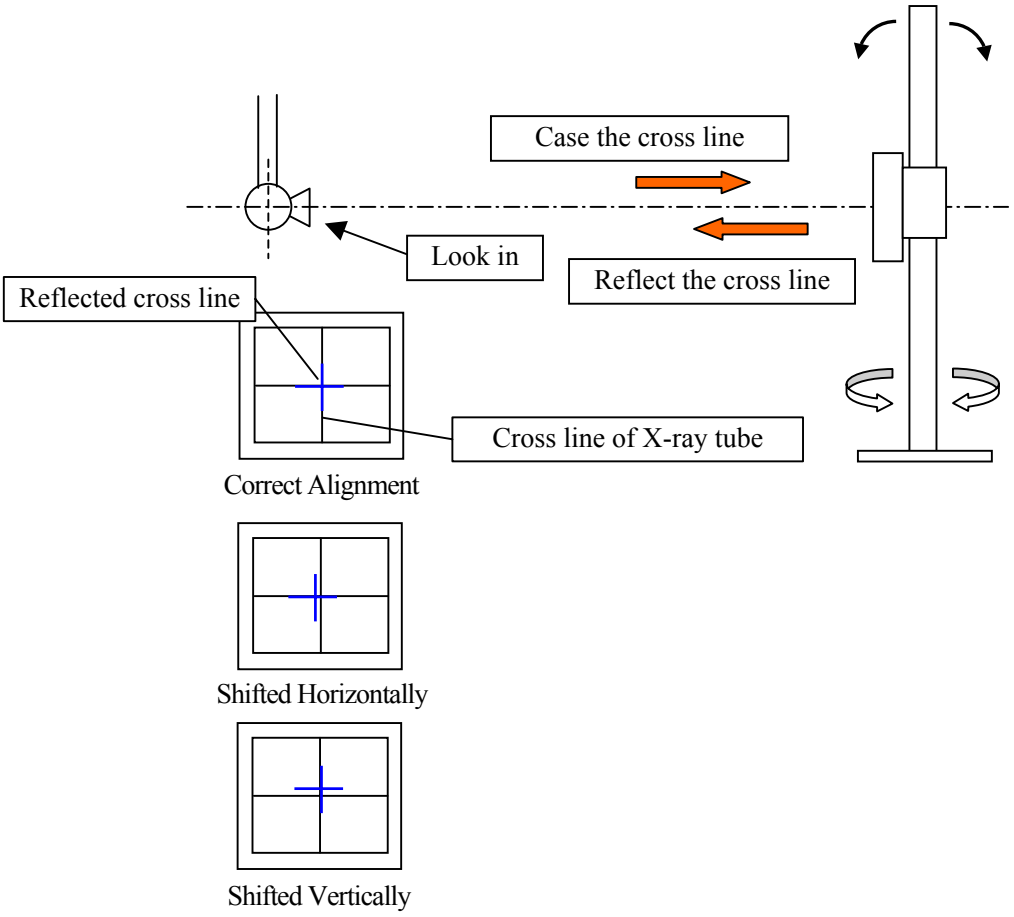
[OK]



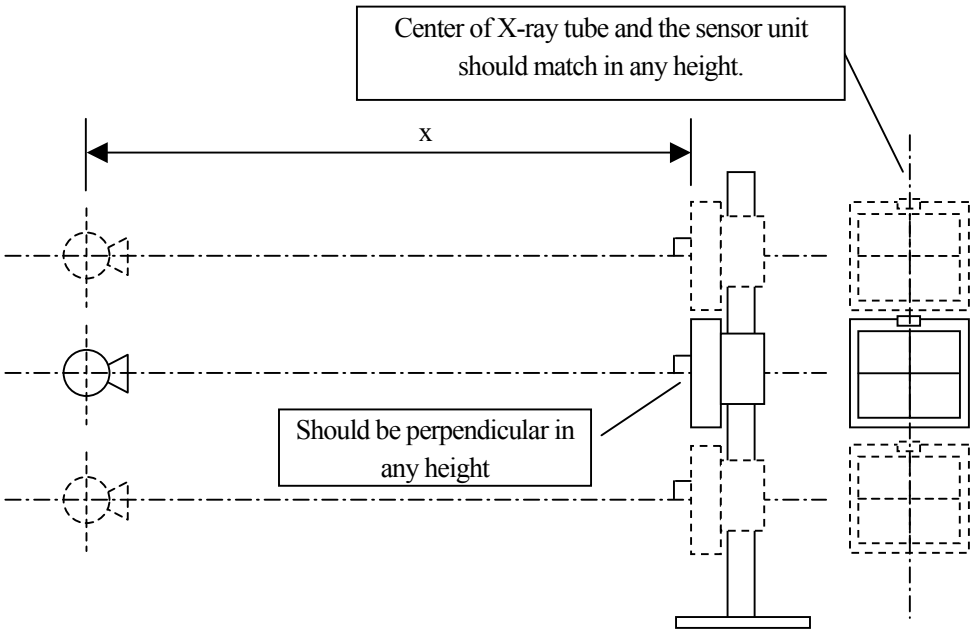
[NG]



2) Look in the X-ray tube to check the cross line reflected from the mirror matches the cross line on the X-ray tube. If it does not match, move it right and left or put the spacer before and behind the stand base to align the slight differences.

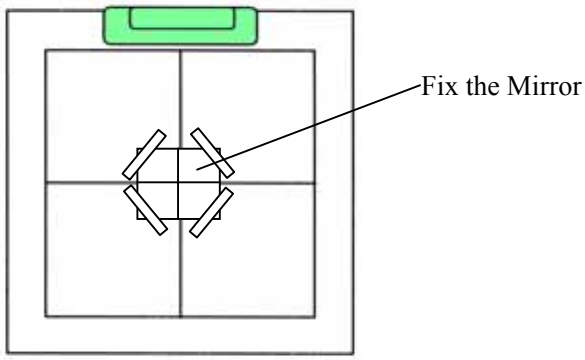


(4) Regardless the height of the X-ray tube and the sensor unit, it should keep the positional relation aligned in step (3) above.

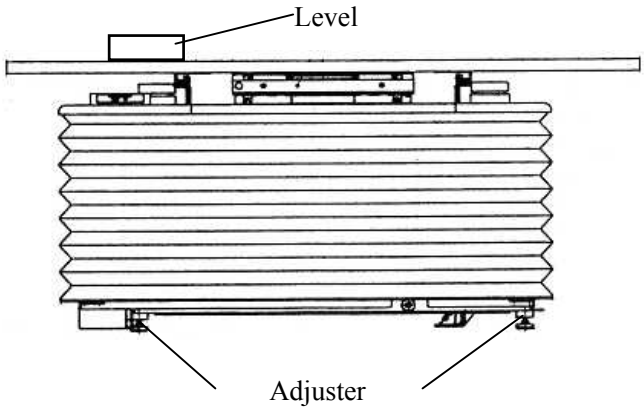


3.2 Table

(1) Fix the mirror (first-face mirror) at the center of the sensor unit.

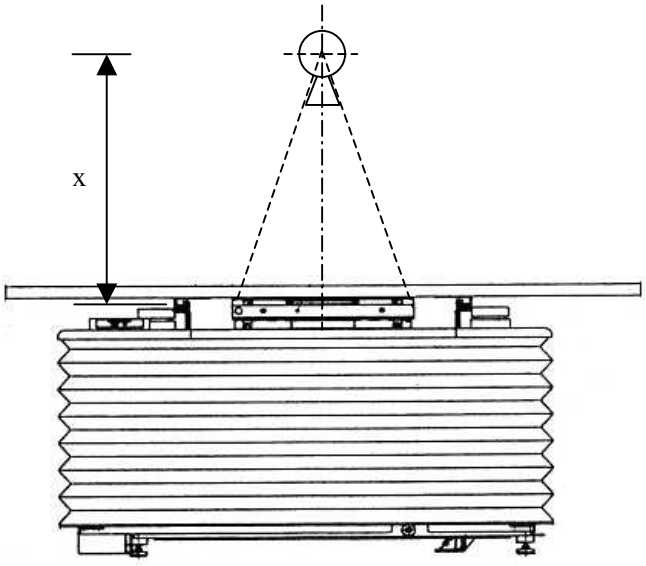


(2) Place the level on the sensor unit. Align the table and the sensor horizontally by the adjuster of the table or the spacer.



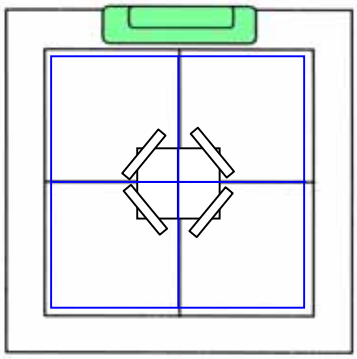
(3) Adjust the height of the table to space the appropriate exposure distance.
Distance from the tube to the sensor unit should be 150cm.

●Using a measure or rope, align the vertical and horizontal position of the sensor unit to the center of the tube so that the distance from the tube to side to side and up and down of the sensor is symmetric.

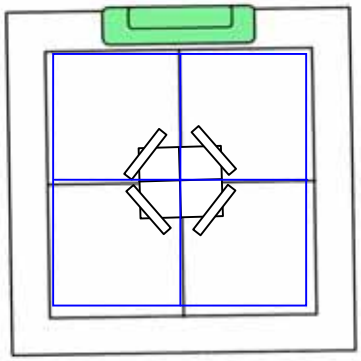


(4) Turn on the irradiation ramp of the X-ray generator, cross line of the X-ray tube is cast over the sensor unit. Align the position to meet the requirements described in 1) and 2) below.

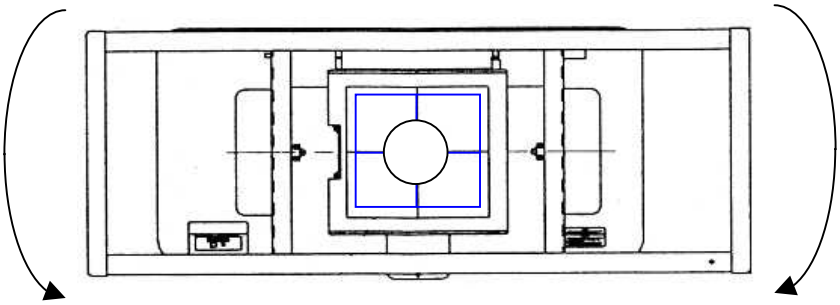
1) Align the position so that the cross lines of X-ray tube and the sensor unit exactly match. If the position is mismatched as shown in [NG] below, the sensor unit and the stand are not aligned horizontally to the X-ray tube. In this case, put the spacer between the base of the stand and the floor to align the slight differences.



[OK]

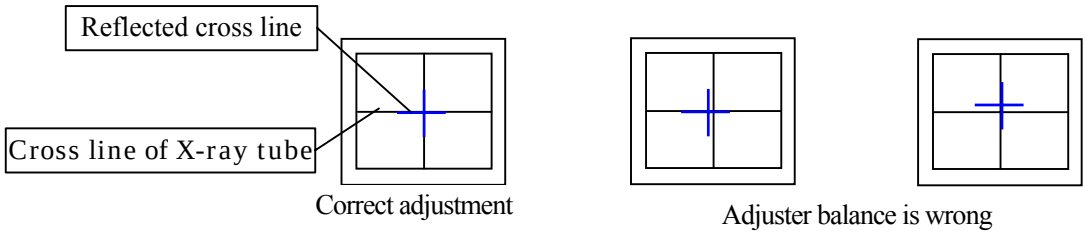


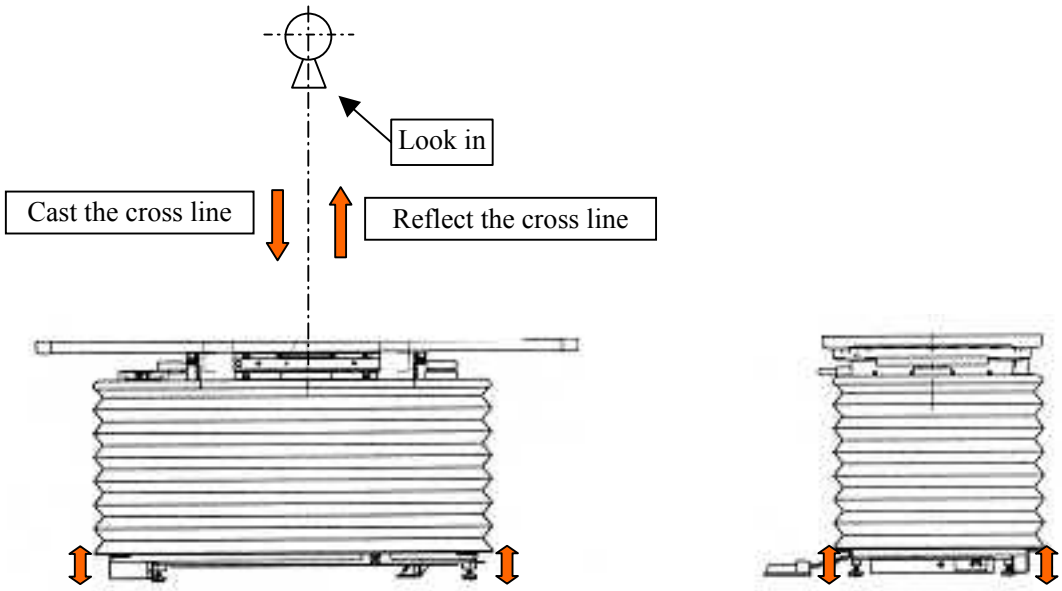
[NG]



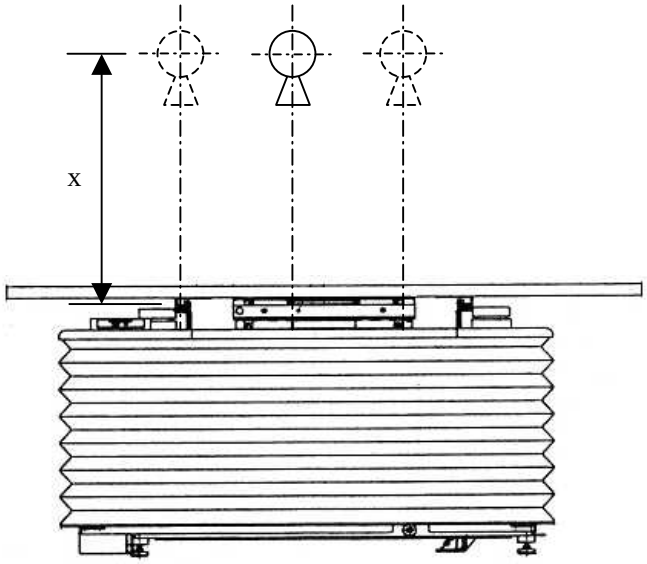
[Top View]

2) Look in the X-ray tube to check the cross line reflected from the mirror matches the cross line on the X-ray tube. If it does not match, adjust the height of the table by the adjuster or the spacer to align the slight differences.





(4) Regardless the height of the X-ray tube and the sensor unit, it should keep the positional relation aligned in step (3) above.



15. Image Quality

(1) Purpose

To check that the images are not affected by extraneous magnetic noise (emanating from CT or MRI apparatus, CRT monitors and other equipment that generate magnetic fields near the sensor unit)

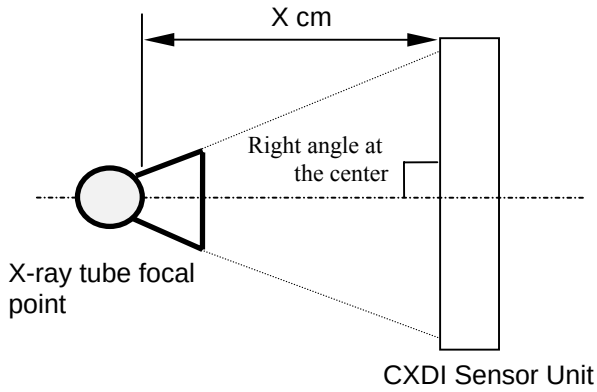
1) Resolution check

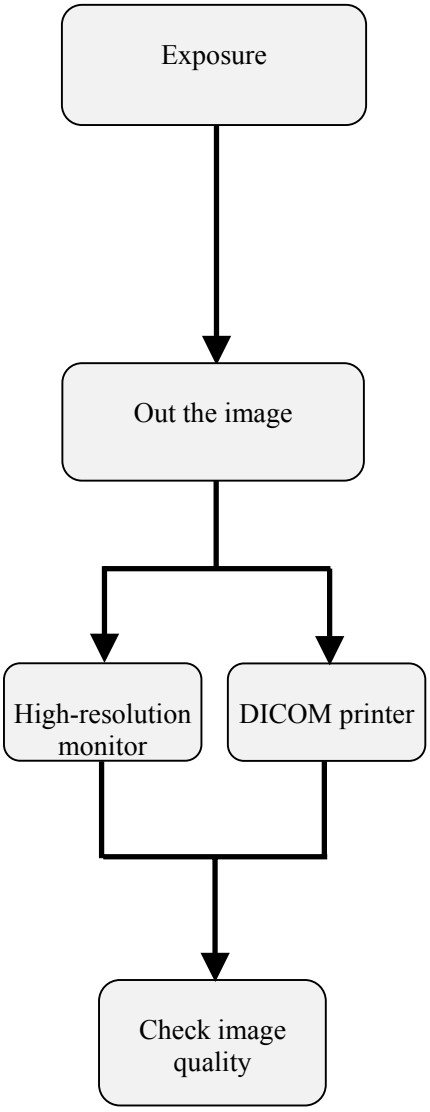
Tools used

(1) Phantom

(2) High-resolution monitor or DICOM printer

Procedure

Procedure/Item	Operation/Conditions
[Positioning] Position the X-ray tube and CXDI Sensor Unit	1. Adjust the distance between the focal point of the X-ray tube and the CXDI sensor unit. X cm: Differs according to the grid being used. 
Calibration	2. Perform calibration SYSTEM > CALIBRATION
Self-test	3. Perform self-test. SYSTEM > SELF TEST Must pass all the tests.

Procedure/Item	Operation/Conditions
	4. Irradiate X-ray and capture the image of a phantom. 5. Output the image to a high-resolution monitor or DICOM printer. 6. Set the high-resolution monitor and DICOM printer by referring to their instruction manuals. 7. Check that there is no artifacts, shading, grid stripes, etc. on the image.

16. Fixing the Control PC

1) Parts

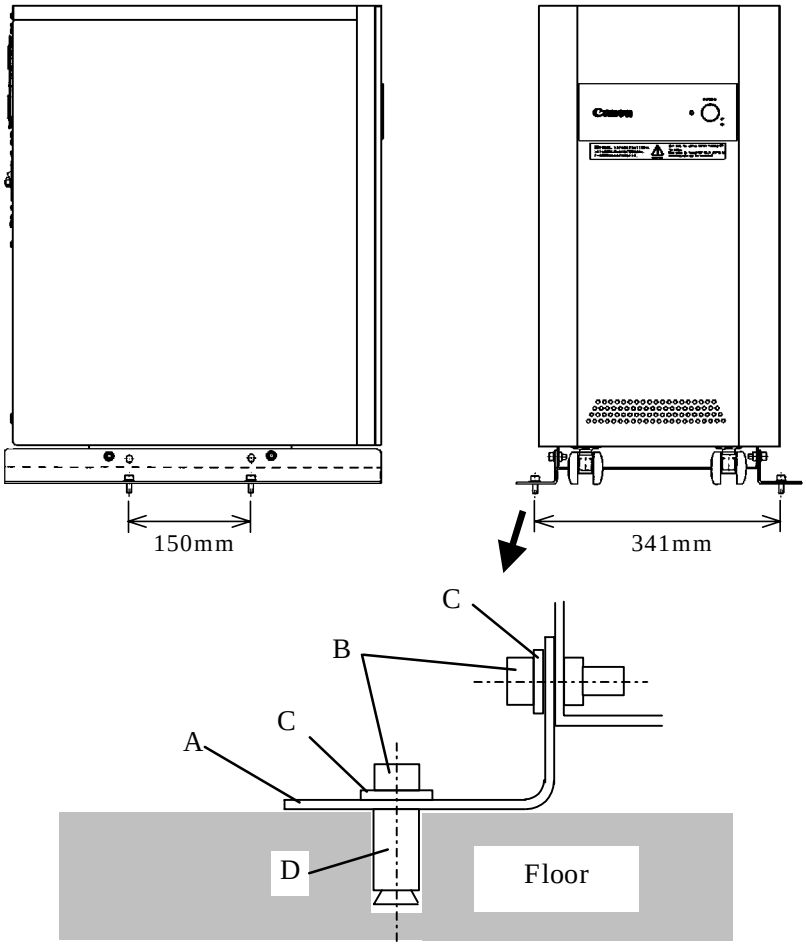
Key No.	Component	Quantity	Remarks
A	Control PC anchoring plate	2	Attachment
B	Screw (XB7-1060-169)	8	Attachment
C	Washer (XD1-2100-609)	8	Attachment
D	Anchor	4	Attachment

2) Anchoring

a. Attach the Control PC anchoring plate to the both side of Control PC.

b. The hole is made for the floor by the drill (diameter 11mm) and anchor is driven in this hole. And fix Control PC on the floor with this anchor.

Do not make a hole to the floor when there is a cable or pit in the below the floor level. Be sure that Control PC is fixed with no loose.



Enlarge view of anchor securing section

17 Post-installation checks

1) Check sheet

Checkpoint	Checkpoint details	Check
Checking the imaging unit	Align the unit with the X-ray tube	☐
	Check that the unit does not interfere with the cables.	☐
Checking the date and time	Set the date.	☐
	Set the time.	☐
	Set the time zone.	☐
Checking the software version	Check that the CXDI application, firmware and PLD code versions all match.	☐
Identifying and registering the imaging units	Register the serial numbers of the sensors	☐
Inputting the control PC serial number	Input the serial number of the control PC to be used.	☐
Checking the operation unit	Set the contrast.	☐
	Set the brightness.	☐
	Set the gamma correction.	☐
Checking the exposure condition table	kV	☐
	mA	☐
	msec or mAs	☐
Checking the annotation	Check that the setting have been made in accordance with the customer's request.	☐
Network connections	IP address	☐
	Subnet mask	☐
	Default gateway	☐
Preparations prior to exposure	Perform calibration.	☐
	Perform self-test.	☐
Checking image transfer to printers and storages	Check that the setting have been made in accordance with the customer's request. - Data checks Checking that several sets of test data are transferred to the storage and PACS and that there are no discrepancies in the data (1) The IDs, names and other data must be correct. (2) The transfer sequence must be correct.	☐
Checking image transfer to external memory device	Check that the image is transferred properly.	☐
Checking the image quality	Use SMPTE pattern to check the density on a linear chart. Check that there is no artifacts, shading, etc.	☐

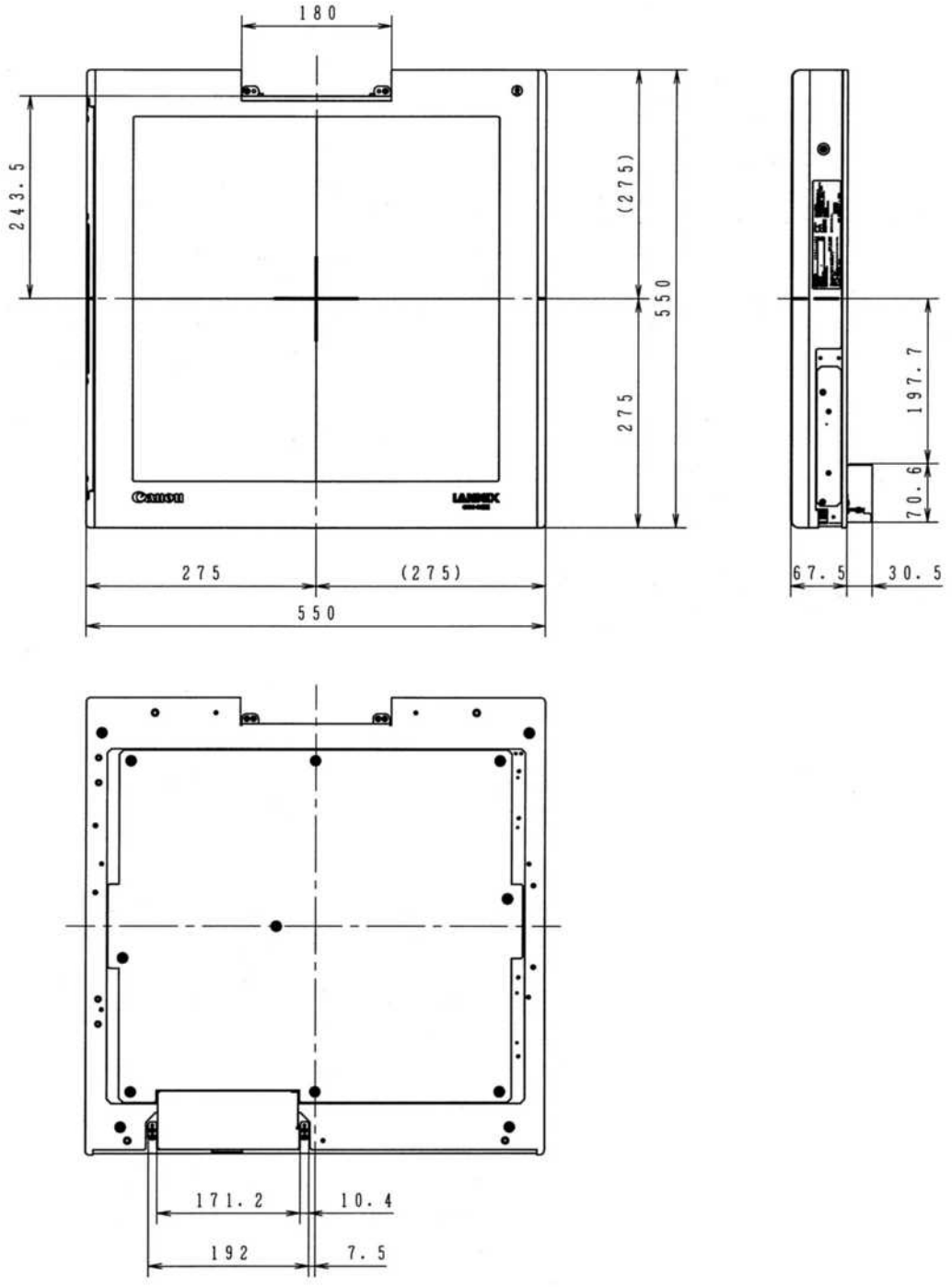
Checkpoint	Checkpoint details	Check
Deleting unnecessary data (there must be no unnecessary data such as the images used for testing)	dtque	☐
	dtstore	☐
	dttmp	☐
	old	☐
	Windows XP trash box	☐
Checking the window displays (no unnecessary windows must appear; the same applies after rebooting)	Operate from the Windows XP desktop.	☐
	Taskbar	☐
Inserting the backup floppy disk and checking the backup files	Create the backup files in floppy drive by re-starting. (Cannot be used in automobile)	☐
Backing up ccr folder	D:ccr	☐
Registering in startup. (Check by rebooting)	Check that the CXDI application starts.	☐
	Check that no /d, /np or other flags have been raised.	☐
Communication with X-ray generators	kV, mA, msec, body part settings, etc.	☐

[Table.1]

18 Dimensional Drawing(1)

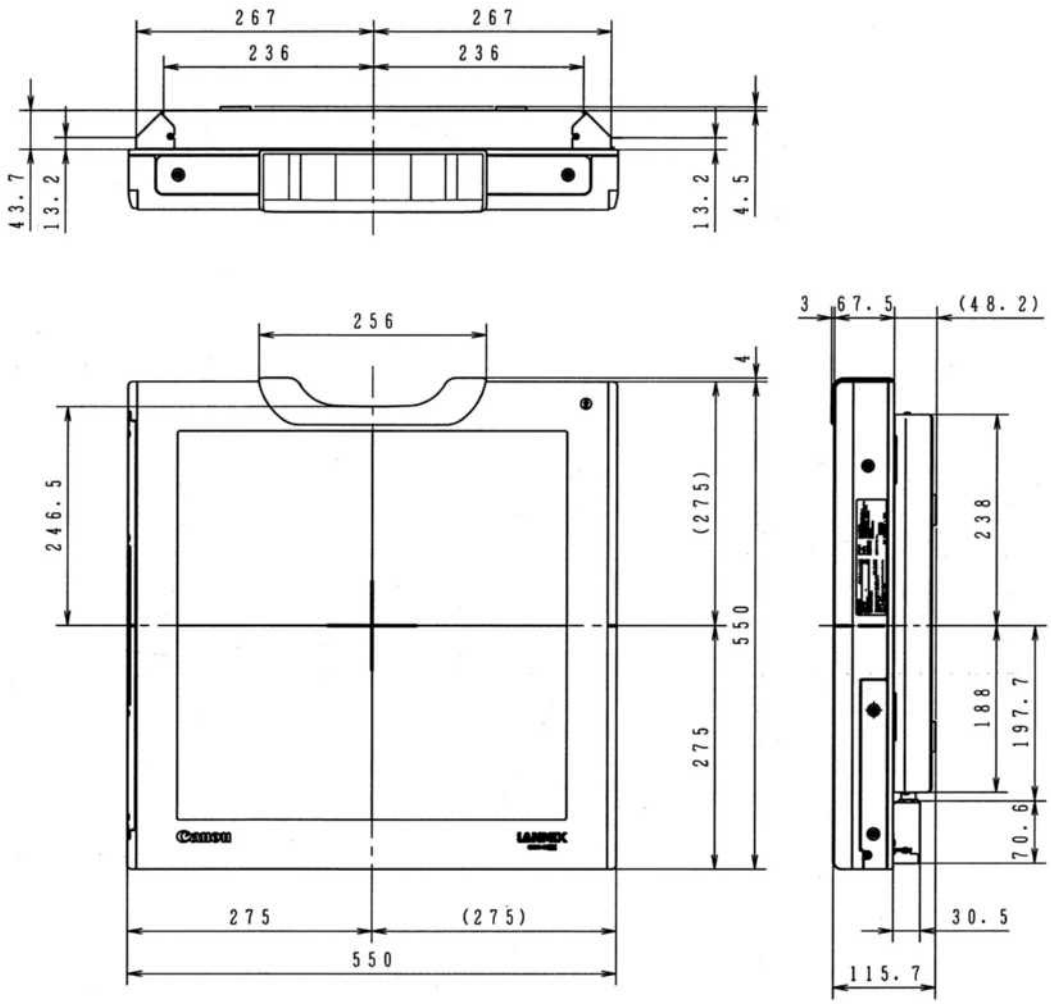
18.1 CXDI 40EG/40EC

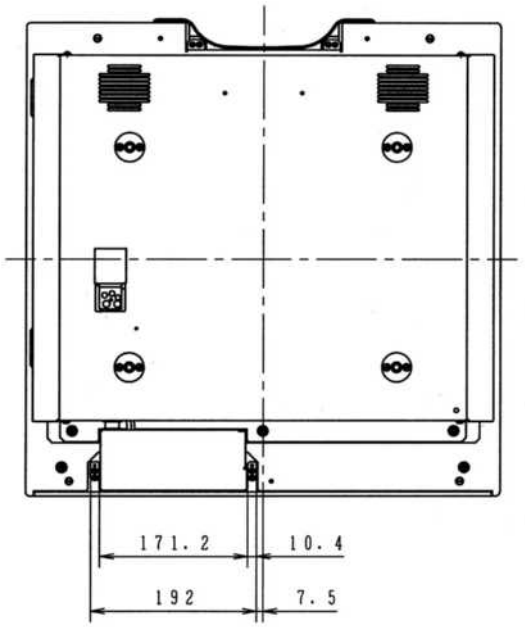
(1) Standard Imaging Unit



CX40EG Mass: 19.4 Kg
CX40EC Mass: 20.2 Kg
(Without Grid)
Dimensional tolerance: +1/-1
Unit: mm

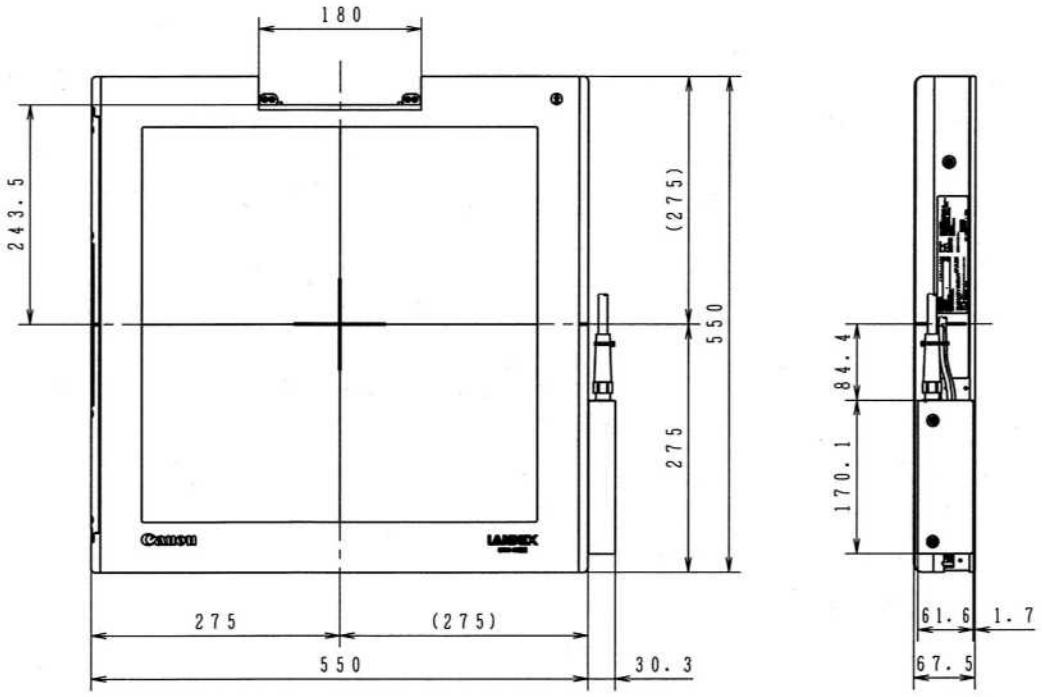
2) Stand Type


267
267
236
236
43.7
13.2
13.2
4.5
256
4
246.5
(275)
550
275
275
(275)
550
3
67.5
(48.2)
238
188
197.7
70.6
30.5
115.7



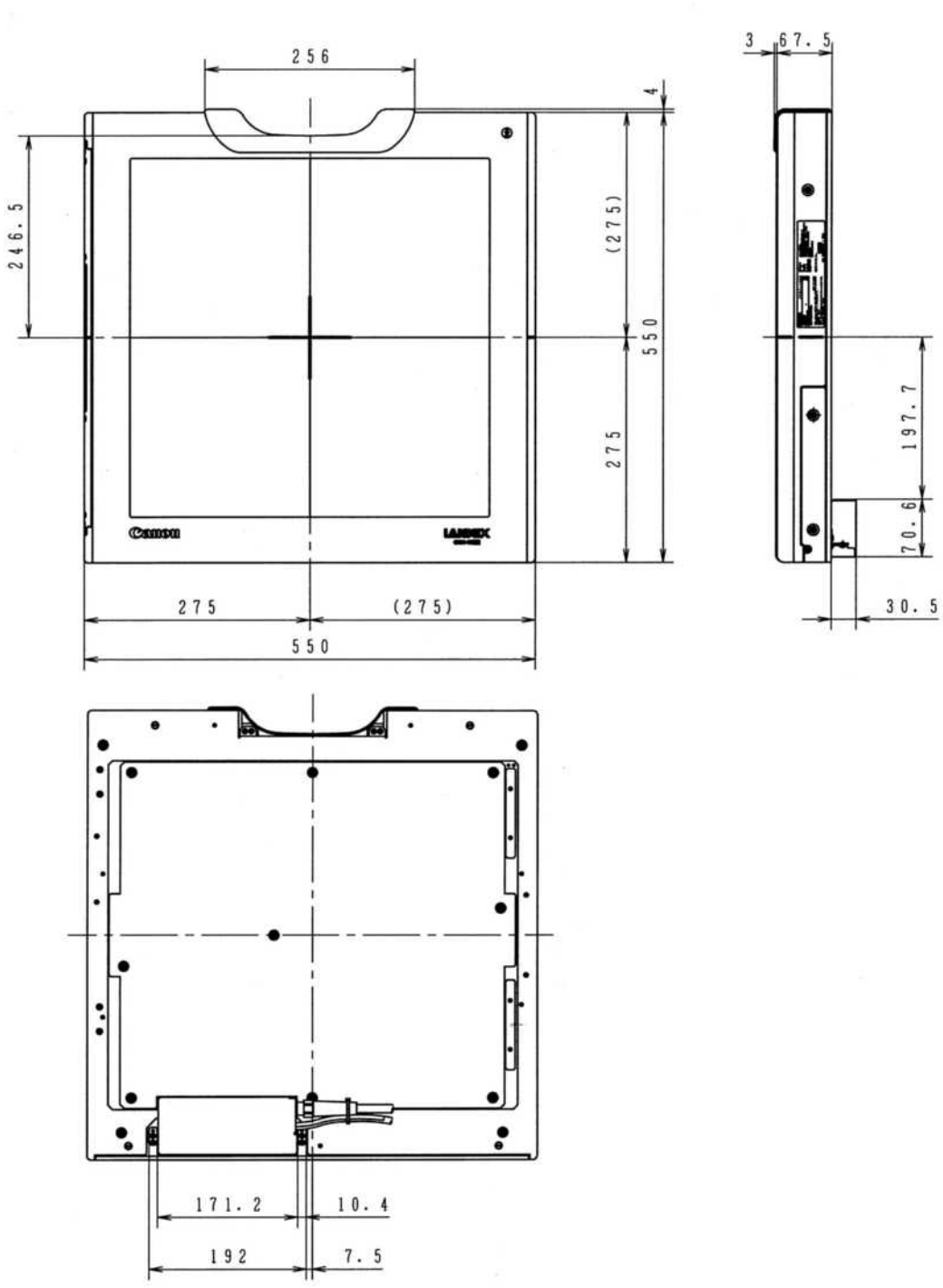
CX40EG Mass: 25.5 Kg
CX40EC Mass: 26.2 Kg
(Without Grid)
Dimensional tolerance: +1/-1
Unit: mm

3) Table Type



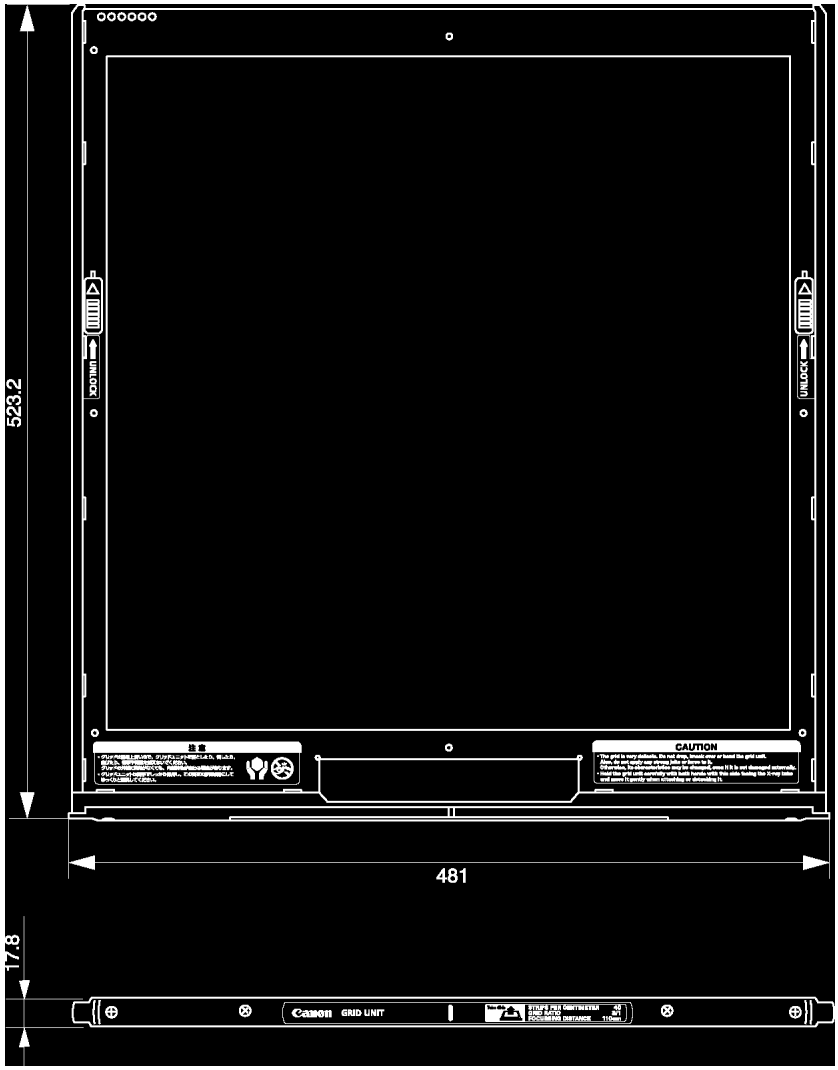
CX40EG Mass: 19.6 Kg
CX40EC Mass: 20.2 Kg
(Without Grid)
Dimensional tolerance: +1/-1
Unit: mm

4) Universal Type



CX40EG Mass: 20.0 Kg
CX40EC Mass: 20.2 Kg
(Without Grid)
Dimensional tolerance: +1/-1
Unit: mm

18.2 Grid Unit



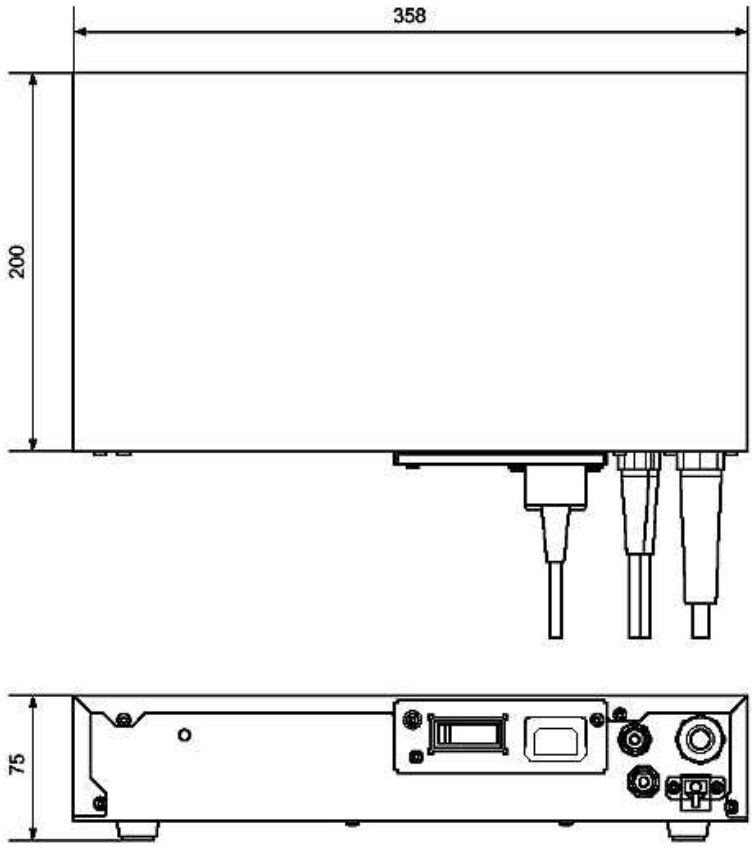
Mass: 1.2 Kg
(Only frame)
Dimensional tolerance: +1/-1
Unit: mm

Reference:

The standard of the reference grid is made of the Mitaya Co., and a standard grid is as follows.

Grid Density LP/cm	**Grid Ratio**	**Focal length cm**	**Thickness mm**	Mass **Kg**
40	12:1	180	2.7	2.1
	10:1	180	2.3	1.8
		150		
		110		
	8:1	110	1.9	1.5

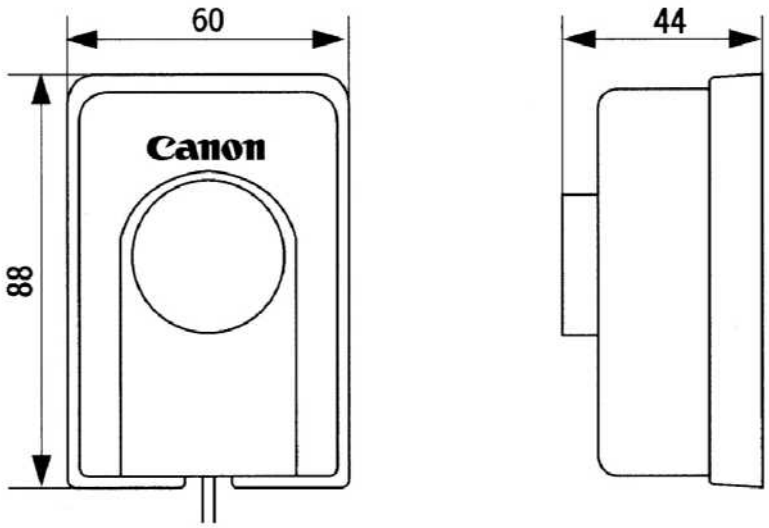
18.3 Power Box



Mass: 4.2(4.4)* Kg
Unit: mm

* ( ) Power Box./Auto Collimation

18.4 Ready Lamp Unit

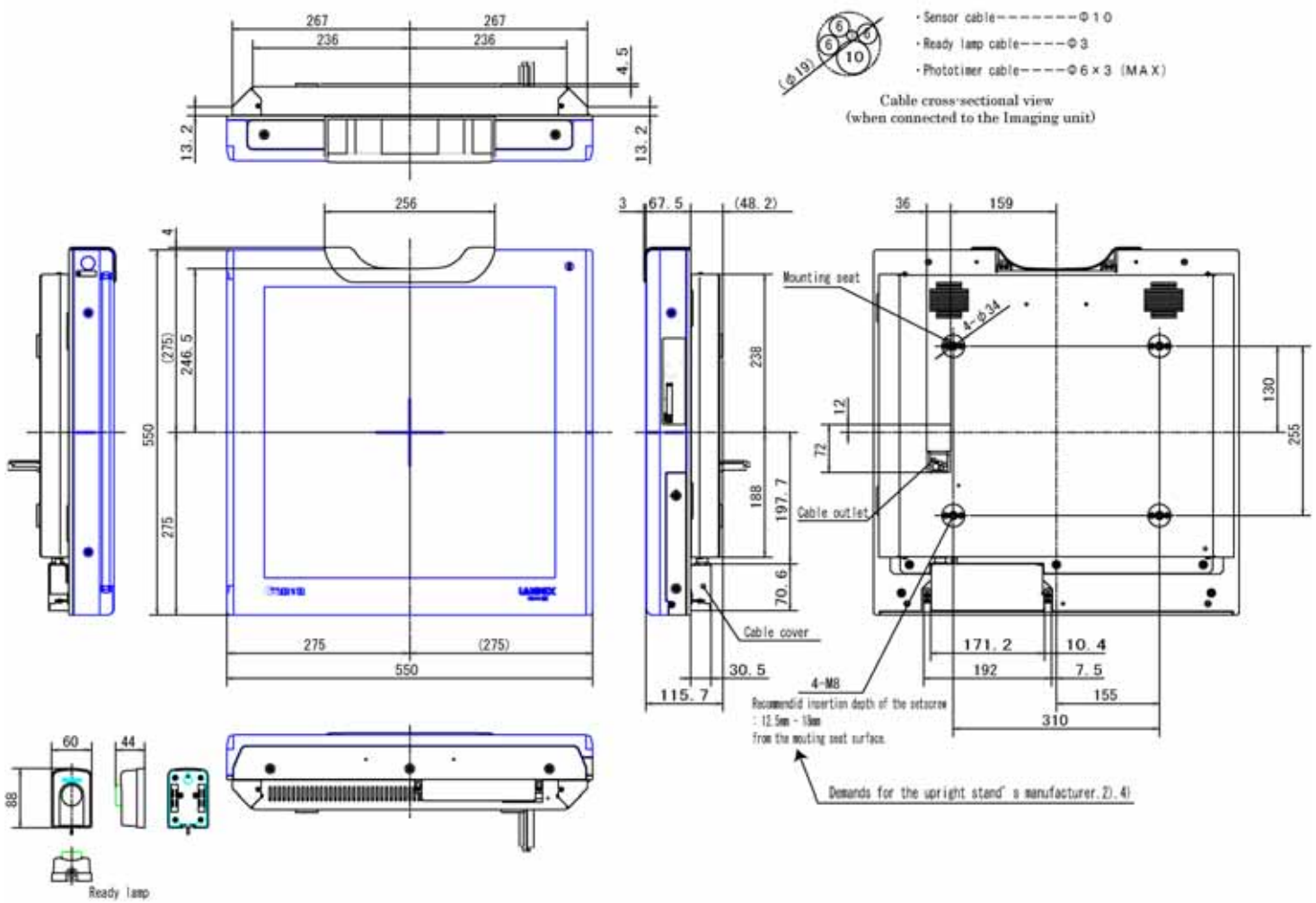


Mass: 0.5 Kg
Unit: mm

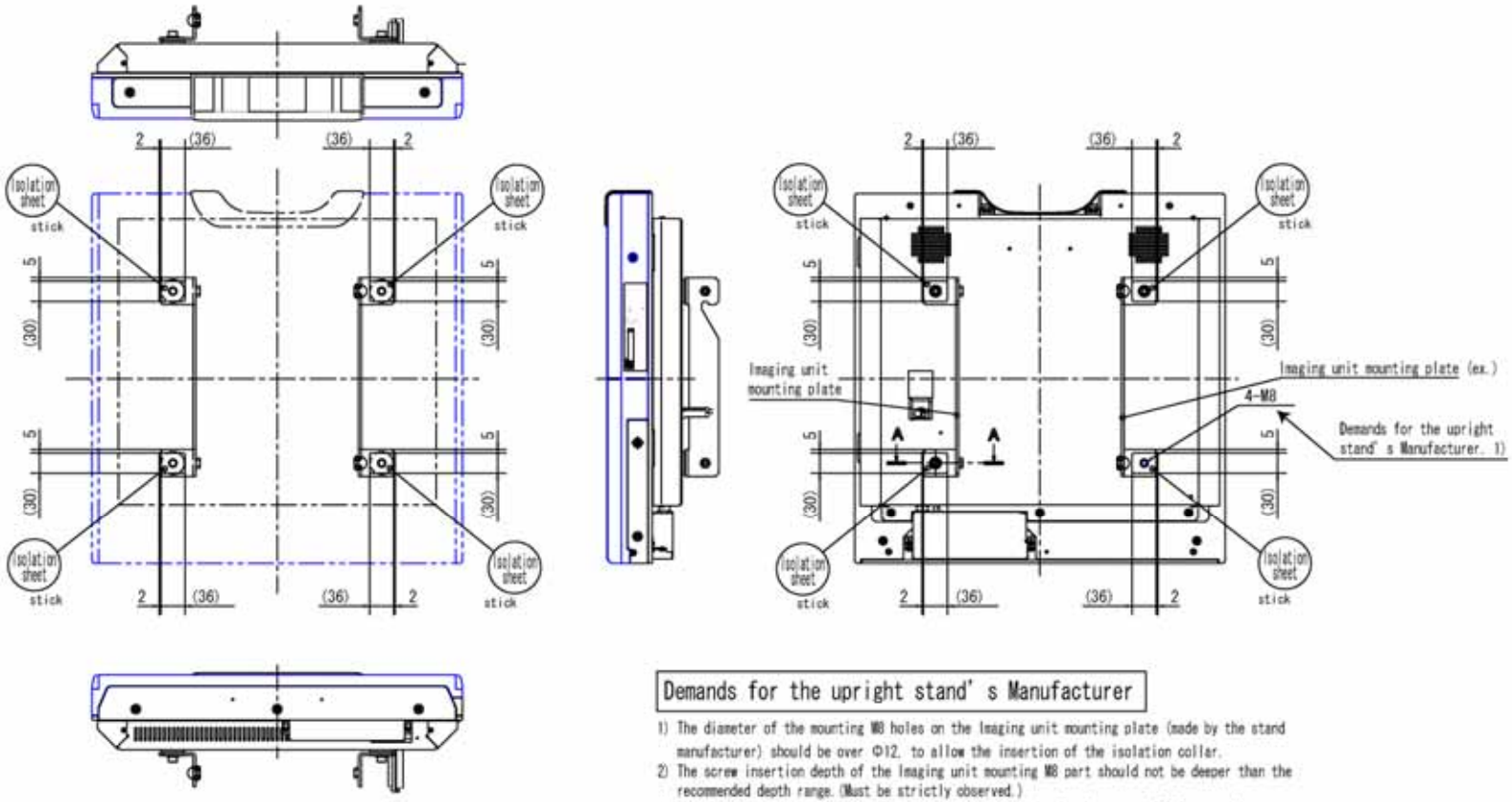
19. Dimensional Drawing (2)

19.1 Stand Type

1) Installation



2) Isolation-1



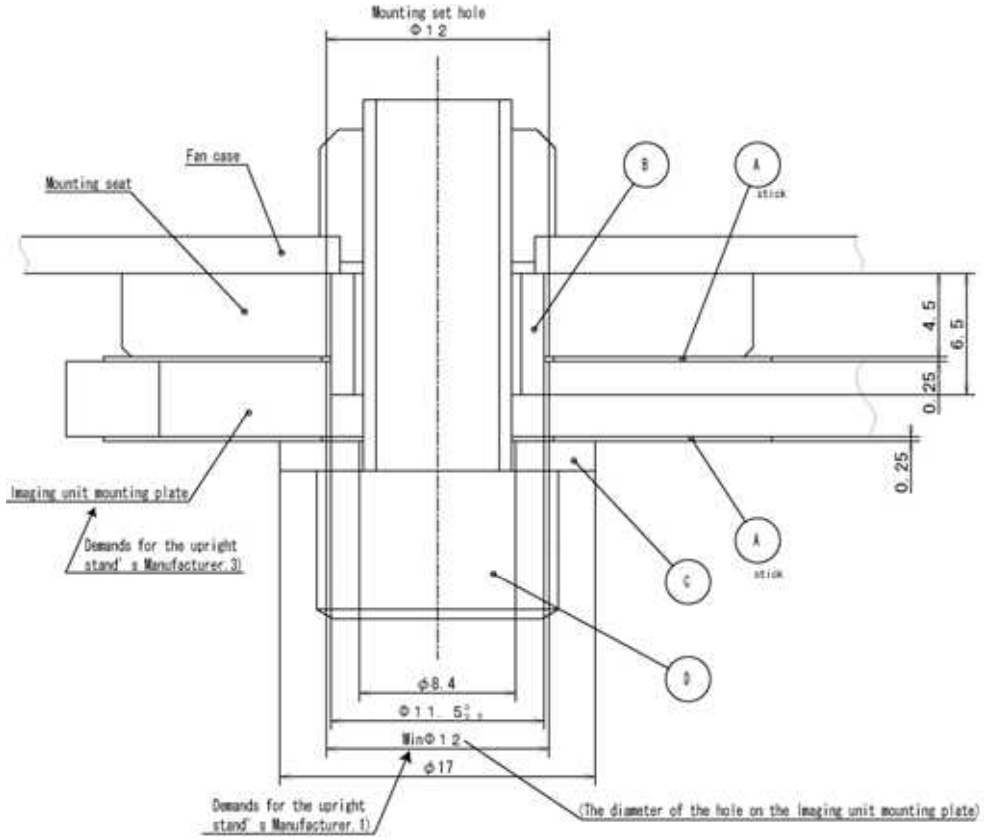
Note:

1) This figure shows how to stick the isolation sheet (which electrically isolation the Imaging unit and the stand) when mounting the Imaging unit onto the stand.
2) The isolation sheet must be stuck after selecting the locations requiring electrical isolation (such as locations where contact with parts of the stand is possible).
3) The isolation sheet must be attached to the mouting plate of the Imaging unit by matching the holes on the sheet with the holes on the plate.
4) If necessary, it should be possible to alter the shape or the installation position of the isolation sheet at the time of setup.
5) The electrical isolation of the Imaging unit and the stand must be verified at the time of setup.

Demands for the upright stand' s Manufacturer

1) The diameter of the mounting M8 holes on the Imaging unit mounting plate (made by the stand manufacturer) should be over Φ12, to allow the insertion of the isolation collar.
2) The screw insertion depth of the Imaging unit mounting M8 part should not be deeper than the recommended depth range. (Must be strictly observed.)
3) The thickness of the Imaging unit mounting plate must be in the range of 2-5mm, and it must be strong enough for mounting the Imaging unit.
4) Mounting bolt that match the thickness of the Imaging unit mounting plate must be prepared.

3) Isolation-2

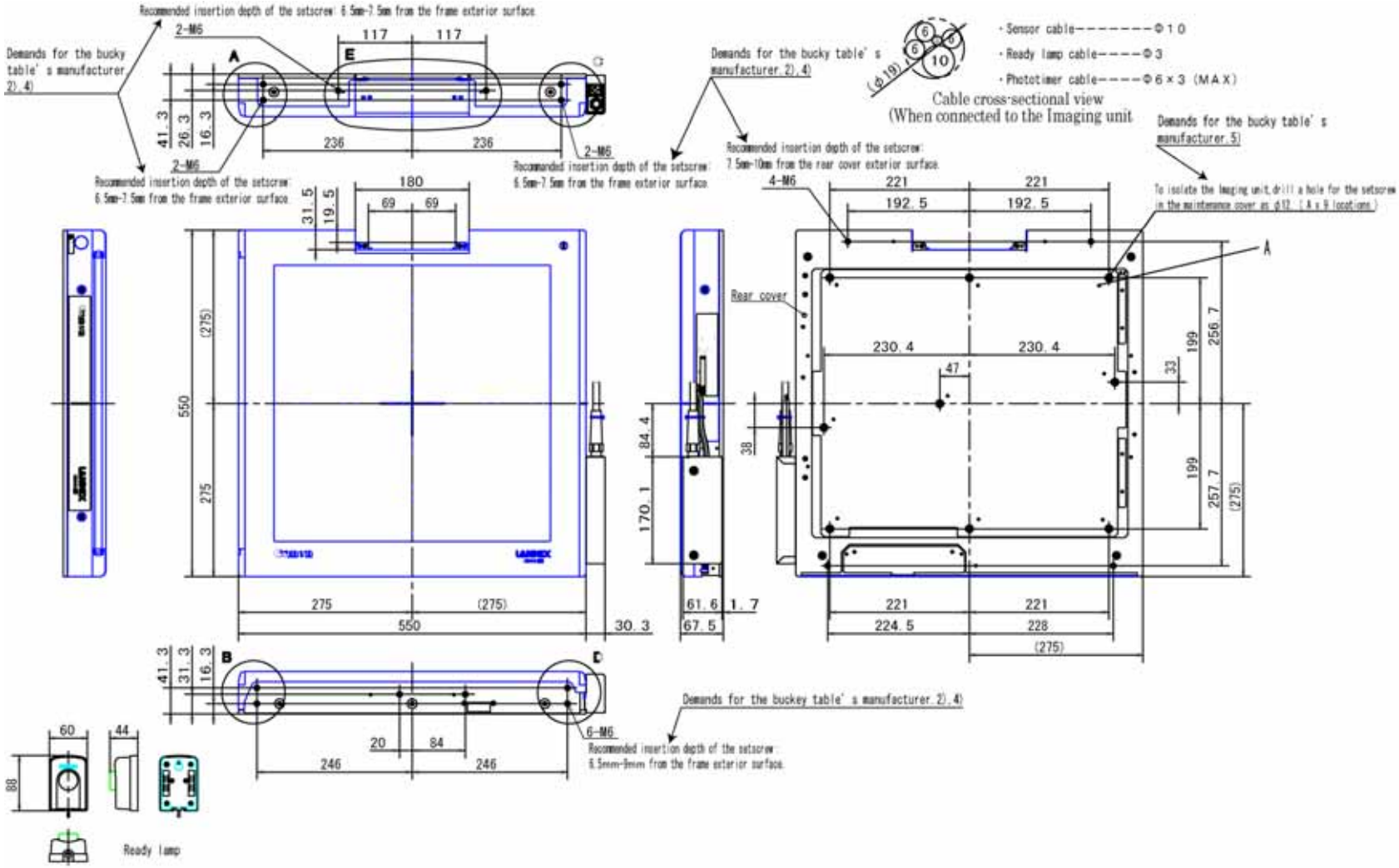


A-A Detailed cross-sectional view
(mounting part, 4 locations)

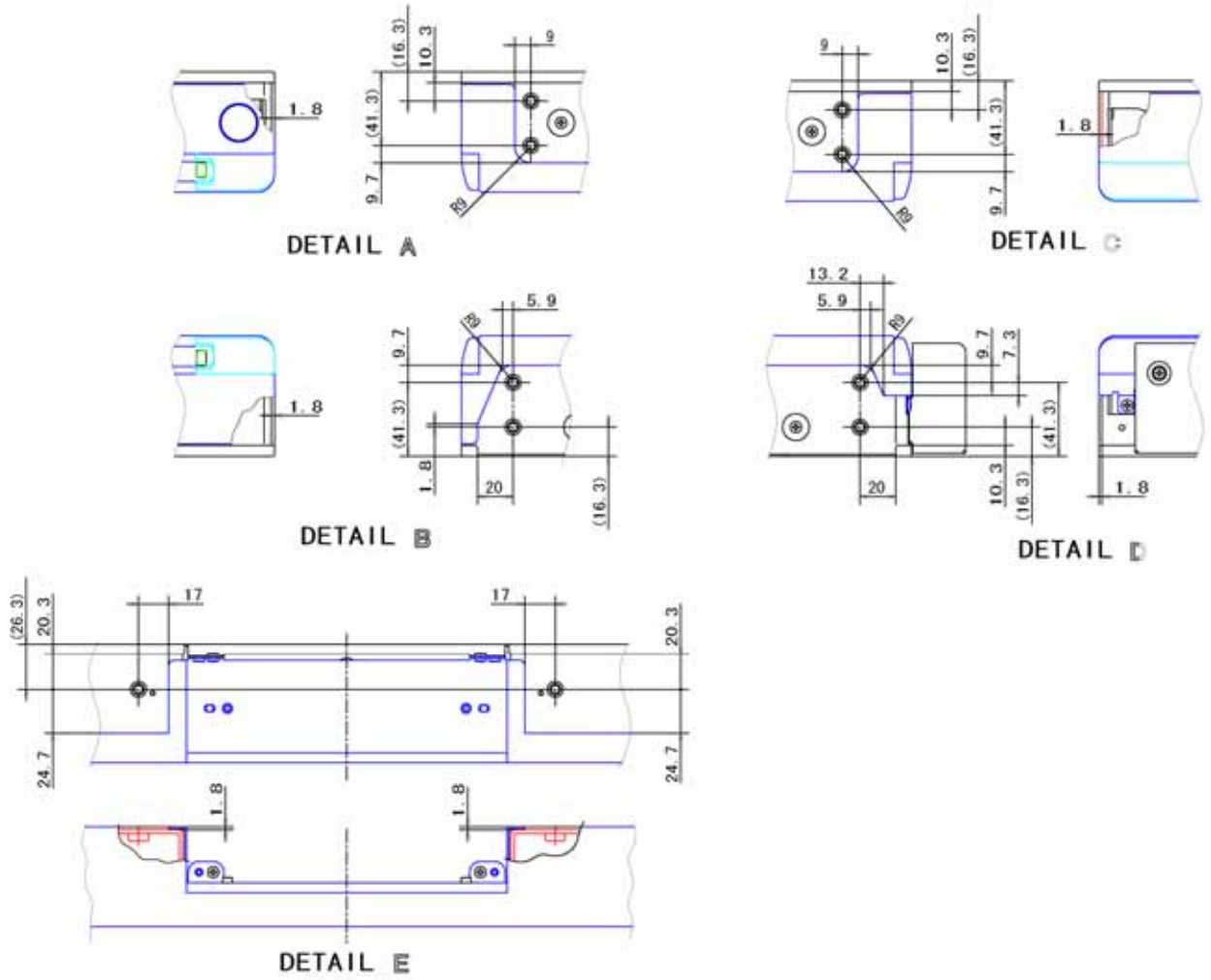
A : Isolation sheet (Polyester sheet)
B : Isolation collar (ABS)
C : Flat washer (steel)
D : M6 bolt (steel)

19.2 Table Type

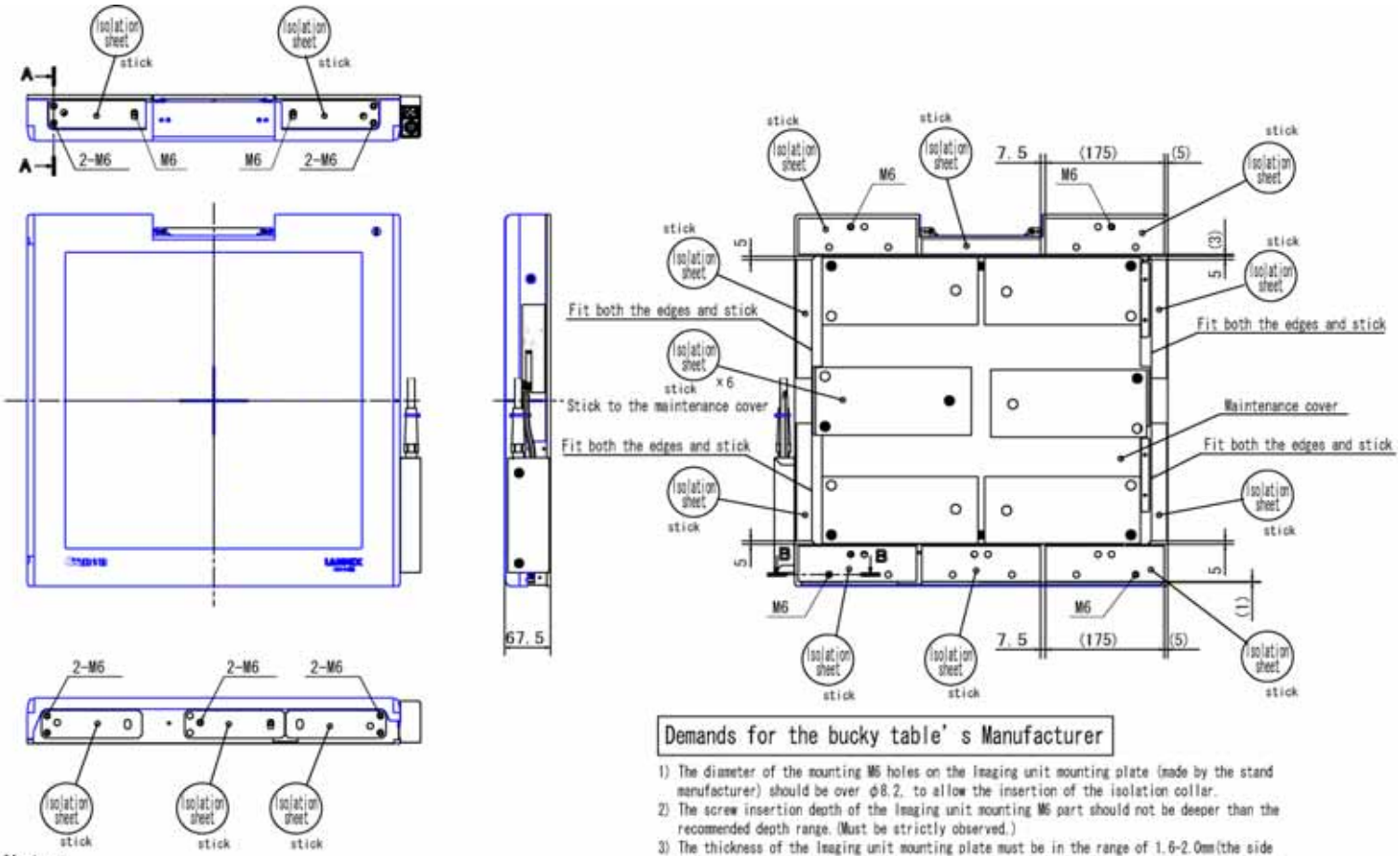
1) Installation-1



2) Installation-2



3) Isolation-1



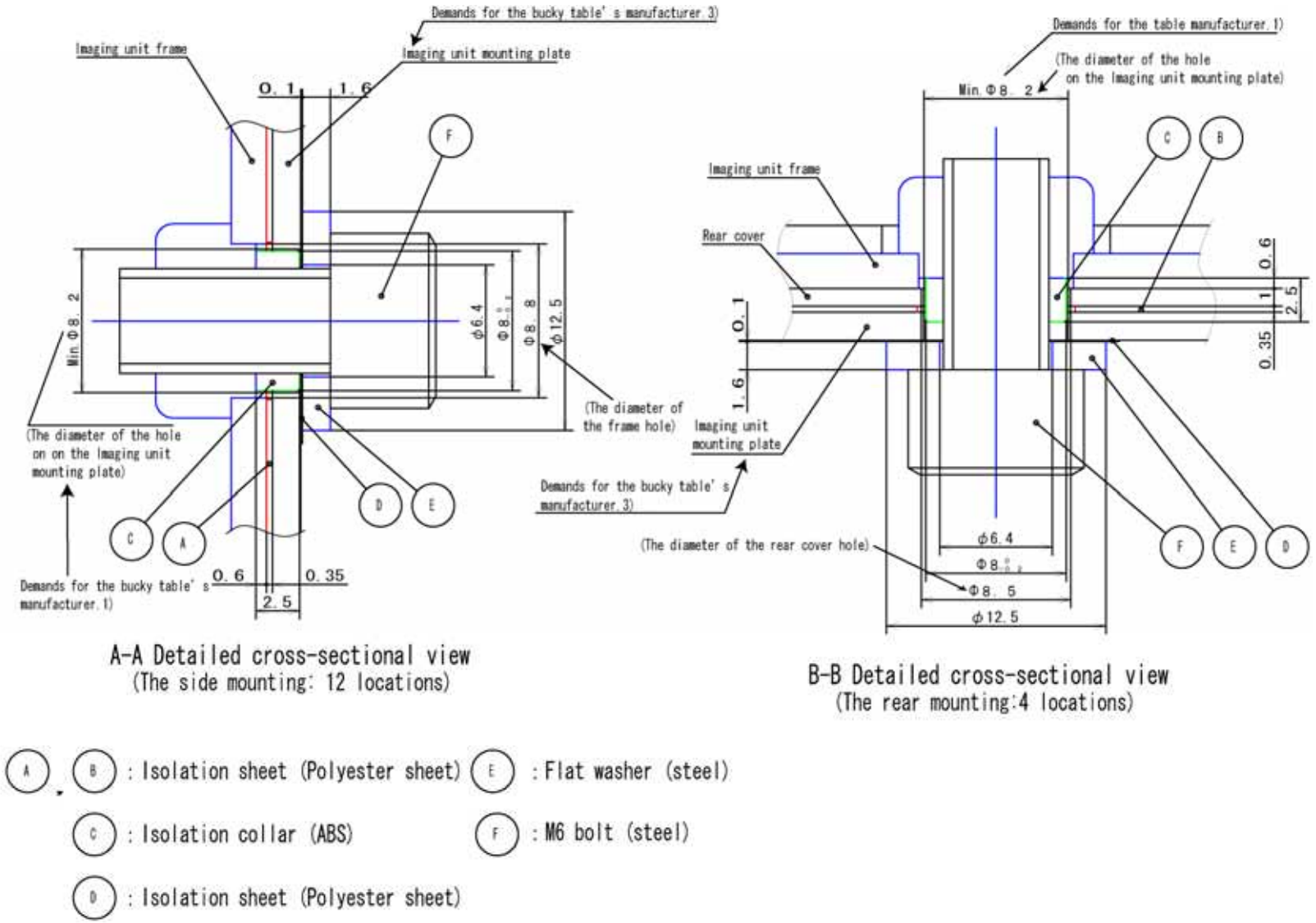
Note:

1) This figure shows how to stick the isolation sheet (which electrically isolation the Imaging unit and the stand) when mounting the Imaging unit.
2) The isolation sheet must be stuck after selecting the locations requires electrical isolation (such as locations where contact with pairs of the table is possible.)
3) The isolation sheet must be attached to the Imaging unit properly.
(Do not attach it over M6 screw.)
4) If necessary, it should be possible to alter the shape or the installation position of the isolation sheet with the holes on the plate.
5) The electrical isolation of the Imaging unit and the table must be verified at the time of setup.

Demands for the bucky table's Manufacturer

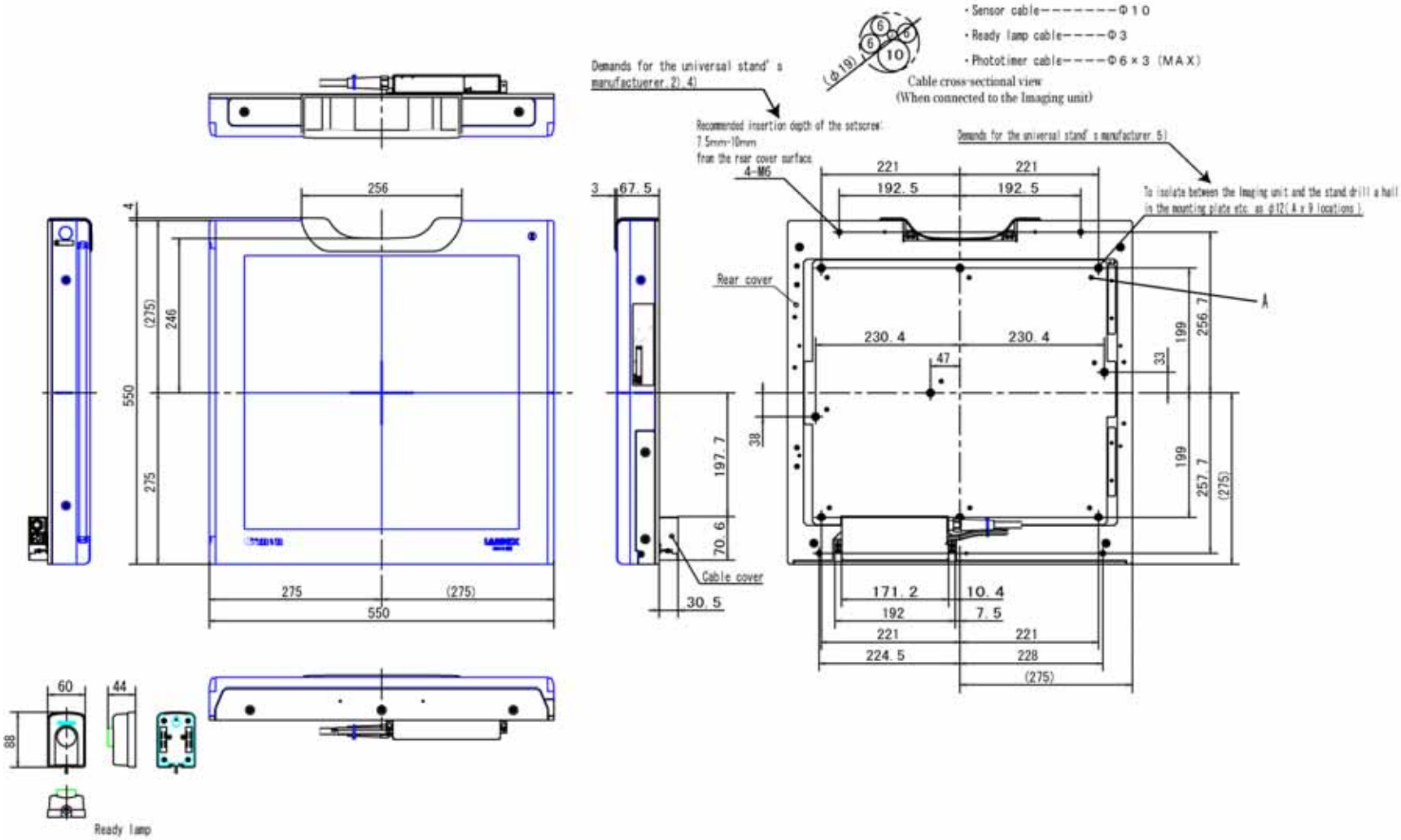
1) The diameter of the mounting M6 holes on the Imaging unit mounting plate (made by the stand manufacturer) should be over ϕ8.2, to allow the insertion of the isolation collar.
2) The screw insertion depth of the Imaging unit mounting M6 part should not be deeper than the recommended depth range. (Must be strictly observed.)
3) The thickness of the Imaging unit mounting plate must be in the range of 1.6-2.0mm(the side mounting), 1.0-1.8mm(the rear mounting), and it must be strong enough for mounting the Imaging unit.
4) Mounting bolt that match the thickness of the Imaging unit mounting plate must be prepared.
5) To isolate between the Imaging unit and the stand, drill a hole for the setscrew in the maintenance cover as ϕ12.

4) Isolation-2

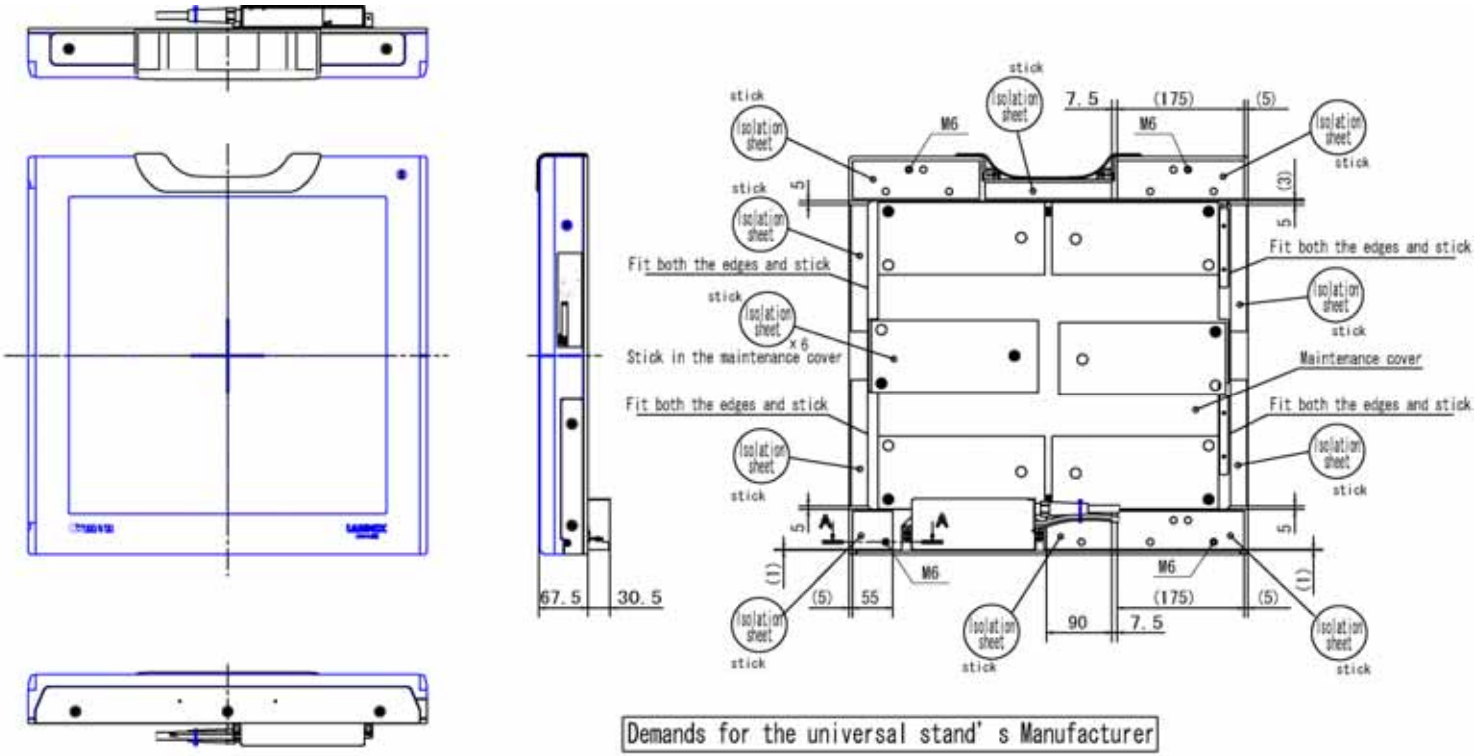


19.3 Universal Type

1) Installation



2) Isolation-1



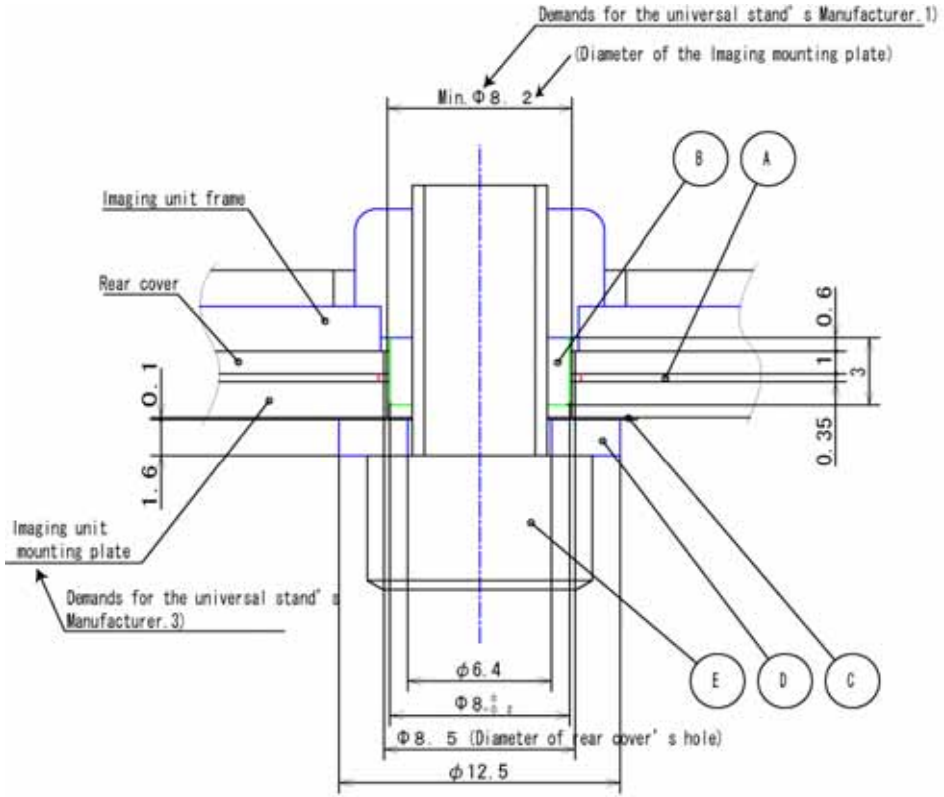
Note:

1) This figure shows how to stick the isolation sheet (which electrically isolation the Imaging unjit and the stand) when mounting the Imaging unit.
2) The isolation sheet must be stuck after selecting the locations requires electrical isolation (such as locations where contact with pairs of the table is possible.)
3) The isolation sheet must be attached to the Imaging unit properly.
(Do not attach it over M6 screw.)
4) If necessary, it should be possible to alter the shape or the installation position of the isolation sheet with the holes on the plate.
5) The electrical isolation of the Imaging unit and the table must be verified at the time of setup.

Demands for the universal stand's Manufacturer

1) The diameter of the mounting M6 holes on the Imaging unit mounting plate(made by the stand manufacturer), should be over ϕ8.2, to allow the insertion of the isolation of the isolation collar.
2) The screw insertion depth of the Imaging unit mounting M6 part should not be deeper than the recommended depth range. (Must be strictly observed.)
3) The thickness of the Imaging unit mounting plate must be the range of 1.5mm-2mm, and it must be strong enough for mounting the Imaging unit.
4) Mounting bolt that match the thickness of the Imaging unit mounting plate must be prepared.
5) To isolate between the Imaging unit and the stand, drill a hole for the setscrew in the maintenance cover as ϕ12.

3) Isolation-2



A-A Detailed cross-sectional view
(The rear mounting part,4locations)

A : Isolation sheet (Polyester sheet)

B : Isoration collar (ABS)

C : Isolation sheet (Polyester sheet)

D : Flat washer (steel)

E : M6 Bolt (steel)

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Chapter 3

FUNCTION

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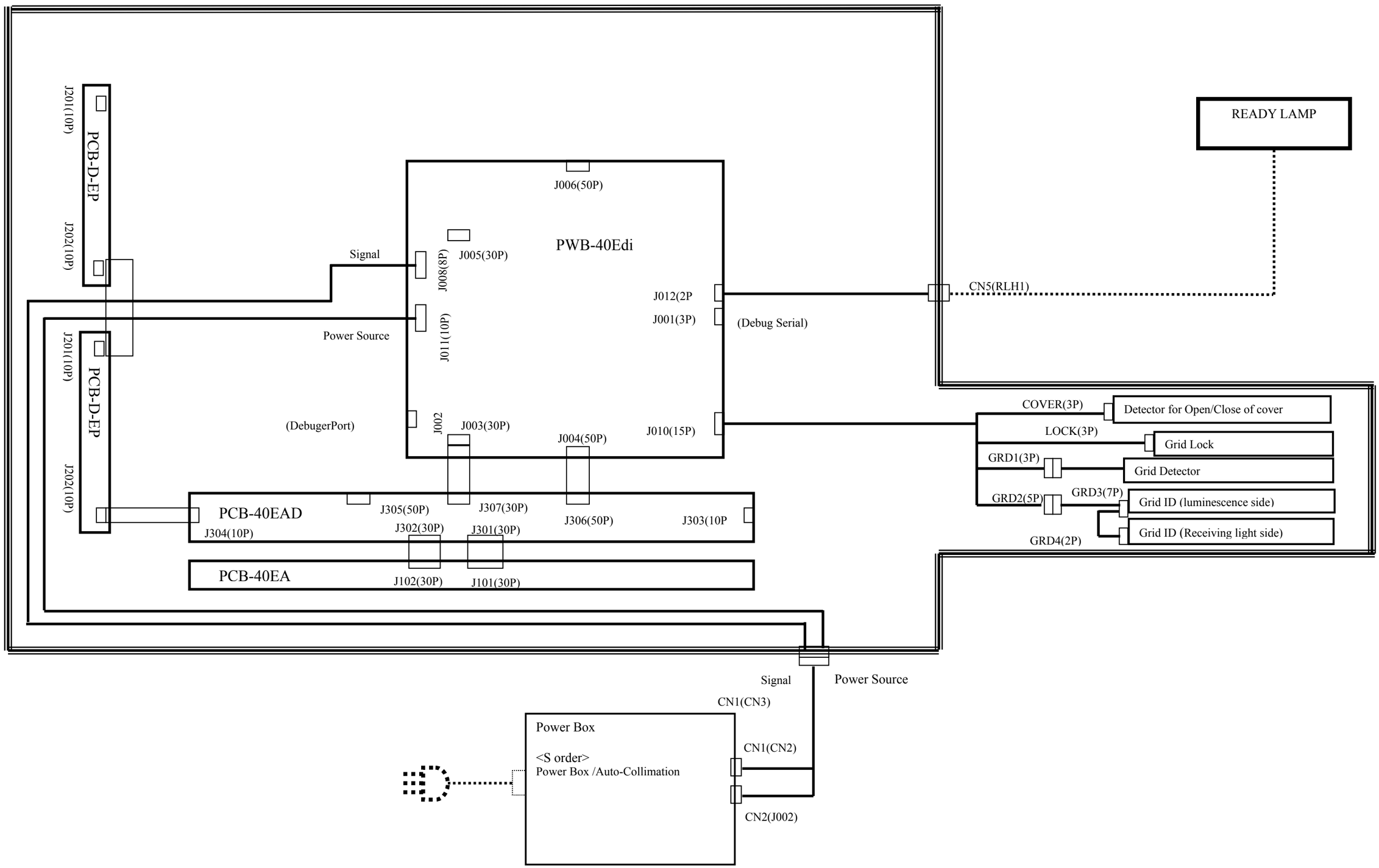
1. Imaging Unit

1.1 Imaging Unit Block Diagram

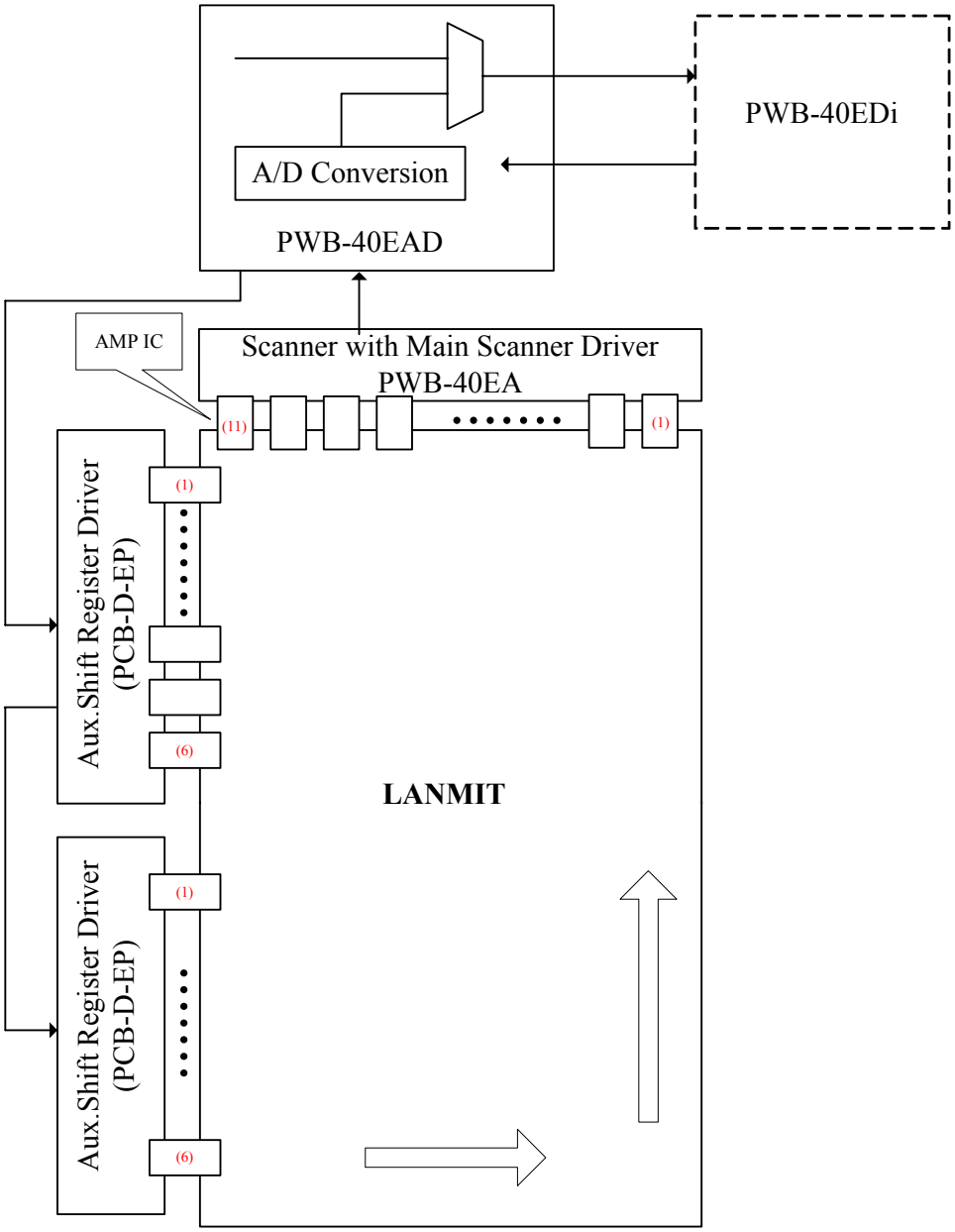
CXDI-40EG/40EC (Revised read-out circuit)



1.2 LANMIT UNIT Block Diagram

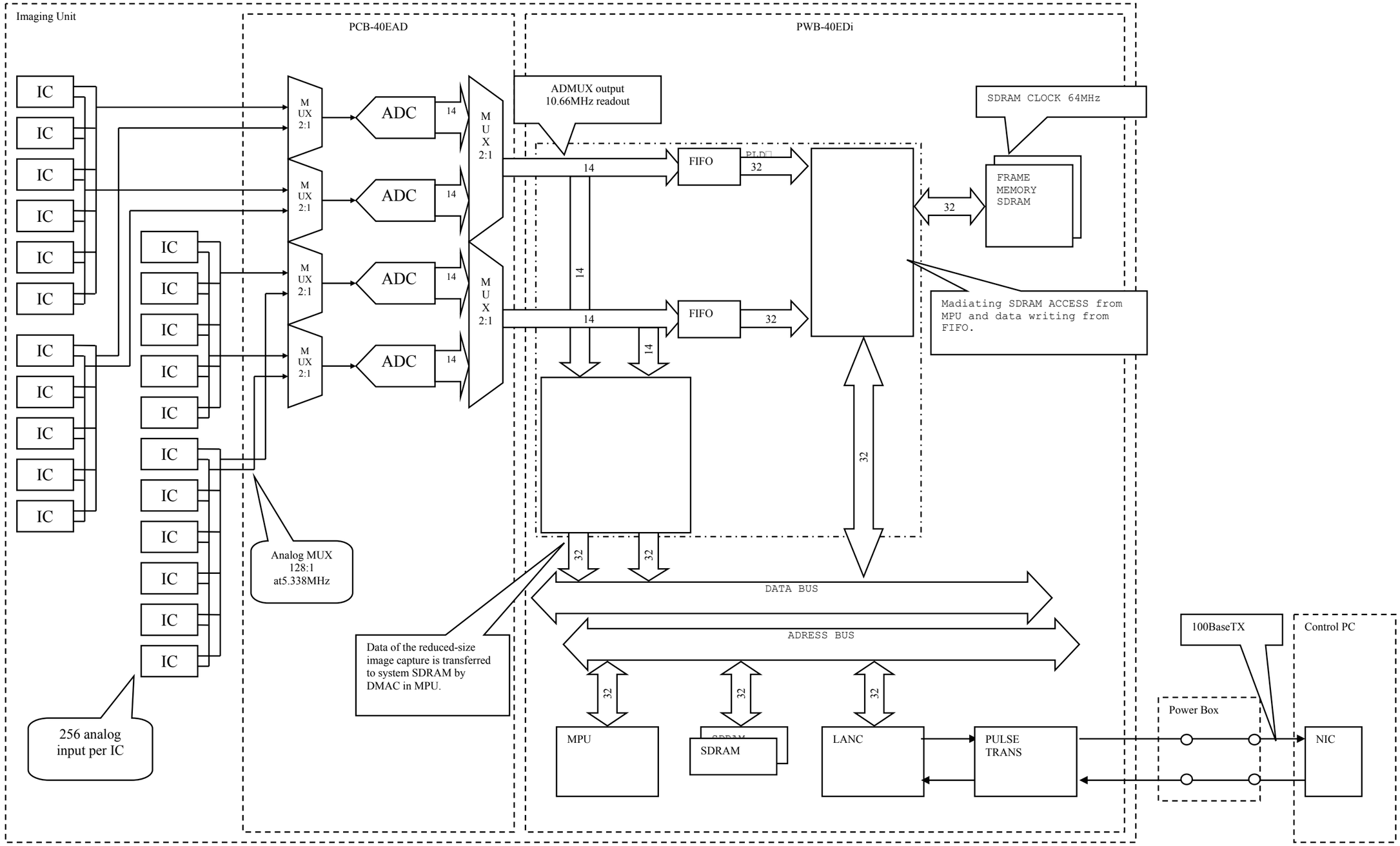
CXDI-40EG/40EC (Revised read-out circuit)

Reads in the direction of arrows on LANMIT



*1 The LANMIT is single Sensor Panel unit, which works as two dummy panel units.
The inside of ( ) are expressed the quantity.

1.3 PWB-40EDi Block Diagram



1.4 Sensor unit

The sensor unit consists mainly of the basic sensor unit (LANMIT sensor, AD board, Di board, grid mechanism, cover, etc.), grid unit, phototimer mounting unit and 40E sensor cable.

After the X-ray images are converted into visible light using a fluorescent screen, they are electrically stored in the sensor.

The electrical signals (images) stored in the sensor are read out, A/D converted, and stored in the frame memory for the time being.

At the same time as the images are stored, they are reduced in size, and transferred through the power box to the control PC via the general-purpose interface (Ethernet 100Base-TX).

Upon completion of the reduced-size image capture, the images in the frame memory are now transferred in the same way.

1.4.1 Sensor data file disks

The data files unique to the sensor (LANMIT) are recorded on floppy disks.

The "sensor data" refers to the sensitivity, deficiencies and other data unique to the sensor unit.

The sensor data is recorded inside the sensor unit, and automatically downloaded to the control PC as sensor data files by the control software.

1.4.2 40E sensor cables

These cables are used to connect the 40E basic sensor unit with the power box.

- •Communication line connected via the power box between the 40E basic sensor unit and control PC
- •Power line for supplying power from the power box to the 40E basic sensor unit
- •Communication line (7 meters long) between the 40E basic sensor unit and power box

1.4.3 Grid unit

This unit has an ID function for identifying grid types. The five types of grids in the table below are provided.

	Grid ratio	Convergence distance	Grid density
1	12:1	180cm	40 1p/cm
2	10:1	180cm	40 1p/cm
3	10:1	150cm	40 1p/cm
4	10:1	110cm	40 1p/cm
5	8:1	110cm	40 1p/cm

1.4.4 PWB-40EDi board

This board has the functions described below.

(1) LANMIT-40E drive
The LANMIT-40E (henceforth "LANMIT") is driven through the PCB-40EAD and PCB-D-EP boards connected to this board.

(2) X-ray exposure synchronization
Communication with the X-ray generator is conducted in synchronization with the LANMIT operation and X-ray exposure in synchronization with the image capture operation is provided.

(3) Image data capture, transfer and command communication
The data (14 bits/pixel, 2688 x 2688 pixels) resulting from the A/D conversion of the LANMIT output signals performed on the PCB-40EAD boards are received, and stored in the SDRAM.
The image data captured via Ethernet (100Base-TX) is output to the control PC. The commands specifying the operation mode of the PWB board or LANMIT are also communicated through Ethernet.

(4) Temperature detection
The ambient temperature is detected by thermal sensors on the PWB, and if the prescribed temperature has been reached, a warning, etc. is displayed.
40EC: A warning appears when the thermal sensor detects 56 °C (exposure remains enabled), and an error occurs when it detects a temperature of 57 °C or more (exposure is disabled).

40EG: A warning appears when the thermal sensor detects 48 °C (exposure remains enabled), and an error occurs when it detects a temperature of 49 °C or more (exposure is disabled).

(5) Grid installation status and grid ID detection
The installed or not installed status of the grids and the grid IDs are detected.

(6) Serial communication
Communication with an externally connected general-purpose terminal is enabled under the RS-232C standards. (Debugging applications)

(7) Ready lamp control

(8) Log recording
The power-on time, number of exposures, exposure sequence and other data are recorded in the flash ROM. Logs can be read out by serial communication via Ethernet.

(9) Sensor information storage
The data unique to the sensor is stored in the flash ROM. It can be read out to an external device using commands via Ethernet.

(10) Remote updating
The firmware and HUB41 PLD codes are updated from the control PC via Ethernet.

(11) Transmission of auto-collimator (offset/diaphragm linkup control) signals
Offset/diaphragm linkup control signals are sent to the power box for the auto-collimator.

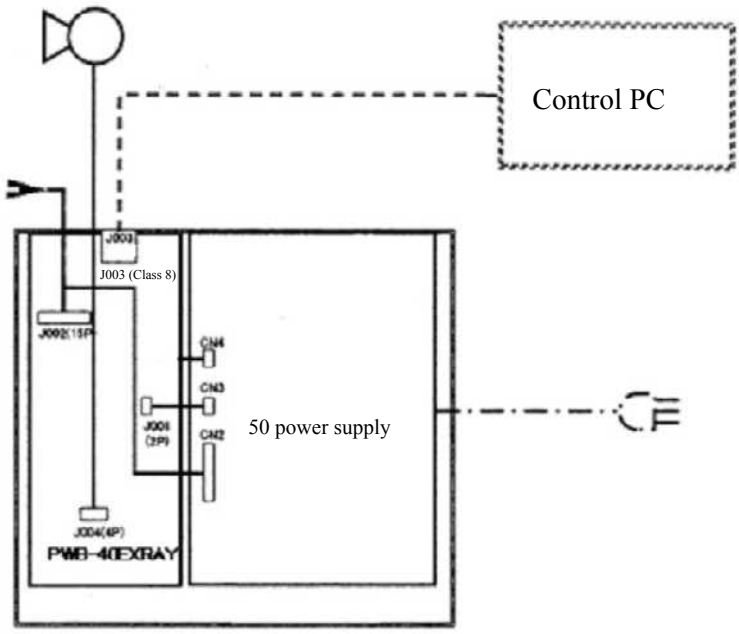
(12) Voltage levels inside PWB

	GND side	+ side	Rating
1	J011_2	J011_1	8 [V] or more
2	J011_4	J011_3	5.15-6.5 [V]
3	J011_6	J011_5	8 [V] or more
4	J011_8	J011_7	20 [V] or more
5	J011_10	J011_9	–10 [V] or less
6	IC14_10	C3 + connector	3.3 [V] ± 2 %
7	IC4_10	C4 + connector	1.8 [V] ± 2 %
8	IC17_10	C5 + connector	1.5 [V] ± 2 %
9	I24_1	C282 + connector	5 [V] ± 2 %

1.4.5 PCB-40EAD board

The data (14 bits/pixel, 2688 x 2688 pixels) resulting from the A/D conversion of the LANMIT output signals performed on the PCB-40EAD board is transferred to the PWB-40EDi board.

2 Power box



There are two types of power boxes: the normal power box and power box used for the auto-collimator.

• 40E power box
• Power box / 40E auto-collimator

It must be borne in mind that the order is different in each case.

Main functions
(1) Supply of power to the sensor unit (internal 50G power supply <7m> unit)
(2) Interfacing with the X-ray generator
(3) Relay of Ethernet communications while simultaneously providing isolation from the network to ensure safety (AC 230V, basic insulation)
(4) Provision of switches for starting the sensor unit firmware, initializing codes

The power box consists of the PWB-40EXRAY board (X-ray interface) and power supply, and it comes with functions to transfer signals to and from the sensor unit, supply power, and transfer signals to and from the X-ray generator.
Each sensor unit must be connected to one power box and vice versa, and multiple numbers of units cannot be connected to one box and vice versa.

2.1 PWB-40EXRAY board

This board comes with the functions described below.

(1) Interfacing with the X-ray generator
(2) Relay of Ethernet communications while simultaneously providing isolation (AC 230V, basic insulation)
(3) 50 power supply 7m setting (JP1 #6-#8 shorted)
(4) Provision of switches for starting the sensor unit firmware, initializing codes

2.2 50 power supply

(1) AC/DC power supply used mainly for the sensor unit
Rated input voltage: AC 100-120V, AC 200-240V
Rated output voltage: 9.5V for CH1, 9.5V for CH2, 6.8V for CH3, –11.5V for CH4, 27V for CH5

(2) Additional functions

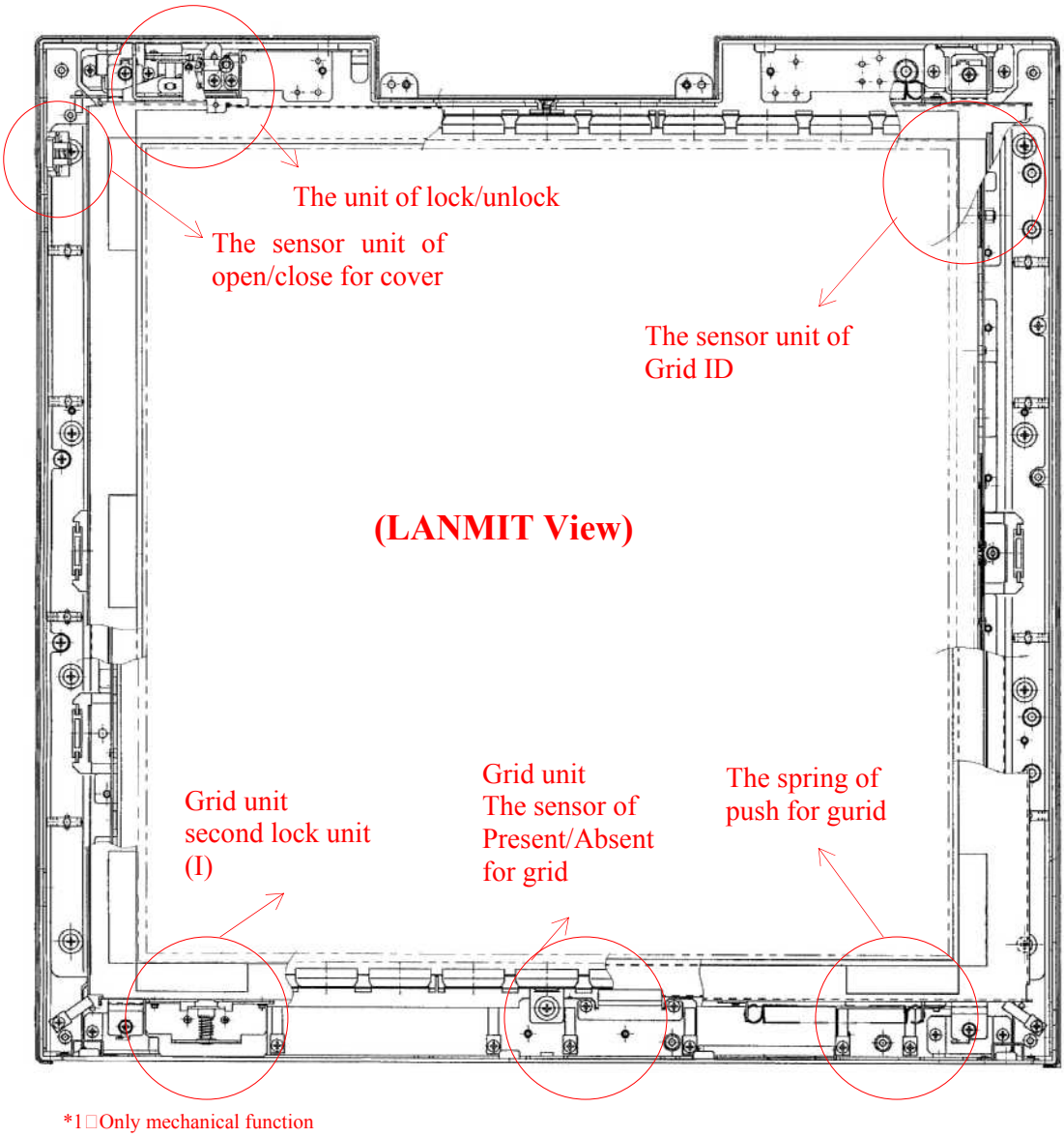
a. Overcurrent protection: Suspended auto reset when an overcurrent is detected
CH1, CH2: Detection/suspended auto reset at 105% or more of peak current (3.5A)
CH3: Detection/output OFF at 200% or more of nominal current (2.5A)
CH4: Detection/suspended auto reset at 105% or more of nominal current (0.2A)
CH5: Detection/suspended auto reset at load current (500mA)

Note: Output OFF is also initiated for CH4 and CH5 when the CH3 function has been activated.

b. Overvoltage protection: Shutdown of output when an overvoltage is detected
An overvoltage is detected at 115% or more of the rated voltage.

3 Grid attachment removal sequence

3.1 The sensor unit of grid



*1□Only mechanical function

The above figure is removed upper cover.

3.2 Grid attachment and removal sequence

a) From completely removed status to complete insertion
At start time the status is: “Lid: Closed”, “Lock: Locked”, “Present/Absent: Absent”.

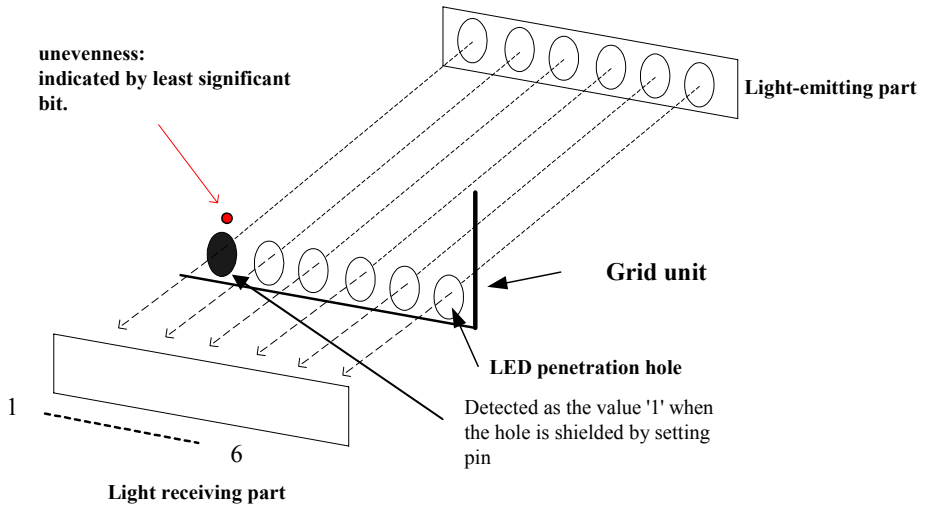
1: The status changes to “Lid: Open”, “Lock: Unlocked”. The order of the change does not matter.
2: The status changes to “Present/Absent: Present”.
3: The status changes to “Lock: Locked”.
4: ID detection will be performed to read the ID. If all of the holes are open, then an ID detection error will be generated; if all holes are plugged, that will be interpreted as the grid is upside down.

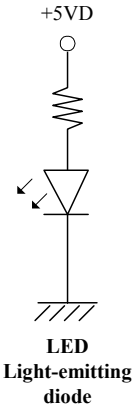
b) From complete insertion to complete removal
At start time the status is: “Lid: Open”, “Lock: Locked”, “Present/Absent: Present”.

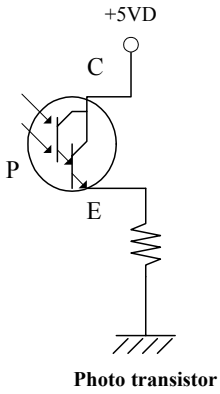
1: The status changes to “Lock: Unlocked”.
2: The status changes to “Present/Absent: Absent”.
3: The status changes to “Lid: Closed”, “Lock: Locked”. The order of the change does not matter.
4: ID detection will be performed. If not all of the holes are open, then an ID detection error will be generated.

If there is any deviation from the sequence above, an error will be generated.

3.3 Grid ID detection







(Example) Grid ID Code

LED penetration hole						BIN	HEX
6	5	4	3	2	1		
○	●	○	○	●	○	010010	12h
○	○	○	○	○	●	000001	01h

4 Available Imaging Time (Normal Imaging/Long-term Imaging)

[Overview]

There are two available imaging times as follow:

1) Normal imaging (0 - 1000 msec)

2) Long-term imaging (1001 - 3000 msec)

The maximum imaging time is now 3 seconds for the CXDI-40EG/40EC sensor, which can be set on the GUI.

(The products corresponds to later the CXDI-40G.)

[Precaution]

- The preview display becomes slower when using long-term imaging.
- The preview display may also become slower when performing normal imaging using the part button that is set to long-term imaging (imaging time settings: 1001 msec to 3000 msec).
- Imaging preparation time: 10 seconds for normal imaging and 30 seconds for long-term imaging. In imaging preparation time, the imaging unit changes from sleep status (sensor in standby status) to ready status (possible to perform imaging).
  (The imaging cycle time[*1] becomes longer.)

[*1] Time required preparing for the next imaging after a single imaging is done. Normal imaging: 15 sec, long-term imaging: 30 sec.

[Technical Description]

1. The maximum value for imaging condition

- When using the CXDI-40EG/40EC sensor, the maximum value of the exposure time is 3000 msec, which can be set on the screen.
- The maximum value of the tube current is 1600 mA. - The maximum mAs value is 4800mAs due to the maximum value of the exposure time changing to 3000.

The maximum value of the tube current is 1600mA. The maximum value of the mAs value is changed from the 3000 maximum value of the exposure time to 4800 mAs.

	Exposure time	Tube current	mAs value
Up to CXDI V5.1	1000msec ↓	5000mA ↓	5000mAs ↓
CXDI-11- CXDI-31 sensor	1000msec	***1600mA***	***1600mAs***
CXDI-40G or later version sensor	***3000msec***	***1600mA***	***4800mAs***

2. Imaging condition check at the time of upgrade

If any of the kV, mA, mAs, cm (except msec) values recorded in the imaging condition table or in each body part information exceeds the limit of the sensor, when the CXDI starts up, a warning message will be displayed (Fig. 4-1) and the value will be automatically modified to be at or below the limit. (However, thinking from the range of values that can be used with the generator, the probability of the warning message is very low.)

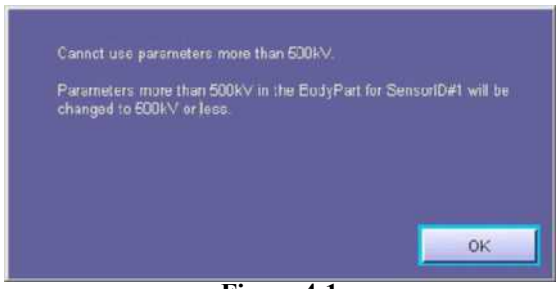


Figure 4-1

3. Adding values to the imaging conditions table

It is possible to add values up to 3000 msec, 4800 mAs to the imaging conditions table. However, at the time of the actual imaging, if the exposure is performed with a CXDI-11 - CXDI-31 sensor, it is not possible to set values higher than 1000 msec, 1600 mAs.

4. Imaging conditions table

It is possible to add values up to 3000 msec and 4800 mAs to the system settings - imaging conditions table on the settings screen. However, if 1001 - 3000msec, 1601 - 4800mAs values are added, a warning message will be displayed only once, saying the values cannot be used with the CXDI-11 - CXDI-31 sensors. [Figure 4-2]

If at the time of a regular exposure or a calibration exposure, the imaging body part of a CXDI-11 - CXDI-31 sensor was selected, values higher than 1000 msec, 1600 mAs cannot be selected from the imaging conditions table.

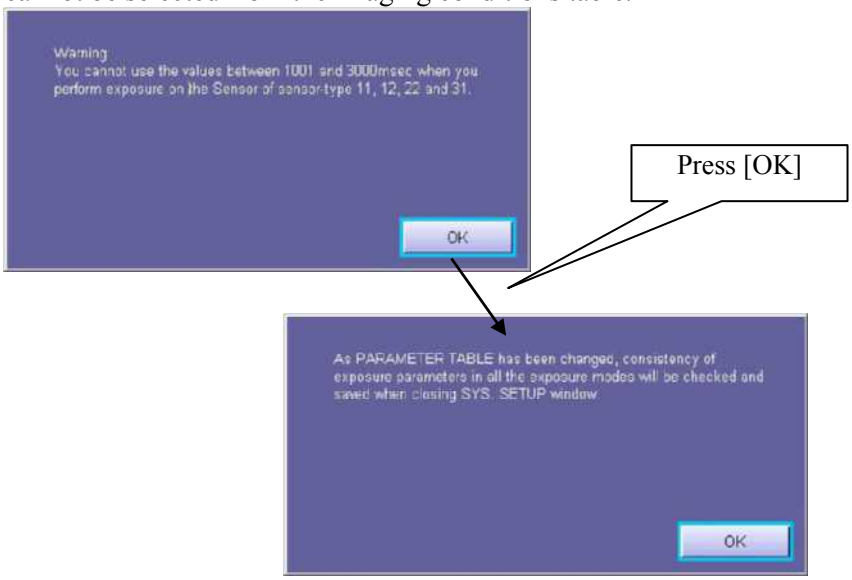


Figure 4-2

5. msec maximum value checking

Even if the values recorded in the msec values of calibration/imaging body part within the BodyPart.ini exceed the maximum msec value of the sensor, the OPU can perform the exposure using those values without checking. (This function was already implemented before CXDI v5.1.)
It is the same when using the msec imaging conditions table, if a value bigger than the sensor's maximum msec value is written in the BodyPart.ini file, the value will not be automatically replaced with the value of the imaging conditions table, but can be used for the exposure as it is.

Note:

In the case of mAs lead, the msec will be automatically recalculated based on the mA, mAs, and the msec value will be automatically overwritten.

6. kV, mA, mAs, cm maximum value check

If any of the kV, mA, mAs, cm values of the calibration/imaging body part recorded within the BodyPart.ini file exceeds the maximum value of the sensor, when the CXDI starts up, a warning message will be displayed and the value will be automatically modified to be at or below the limit. (If the imaging conditions table is used, a table value not exceeding the maximum value of the sensor will be specified.)

5 About the Power Box Initialization Switch

Initialization Switch

The LAN can be started with the factory settings when you turn on the power (the main power of the power box and remote switch) by holding down the initialization switch (see figure *1) of the power box.

The 40EG/40EC firmware contains the initialization and normal codes.

(They are stored in the PWB-40EDi flash ROM)

Normally, the normal code runs on a steady basis, and only normal code is updated when upgrading the firmware.

Use the initialization code when the normal code cannot start for some reason or when you have lost the Ethernet settings. Using the initialization code sets the Ethernet-related settings to the default settings and allows you to perform the startup operation for the initialization code.

In this case, the connection can be made by setting the Ethernet settings in the control PC to the 40EG/40EC default*2.

This default connection allows you to upgrade the firmware again and also check and set the Ethernet settings again in order to recover the system.

*1 Initialization Switch: Switch 1 mounted on PWB-40EXRY
*2 Default settings: IP Address=192.168.100.11 (**factory setting**)

6 Operating system access method

This section describes the procedure for closing the CXDI screen and accessing Windows XP.

6.1 What to have ready

Keyboard, mouse

6.2 Precautions

•This procedure must not be undertaken while the CXDI host is operating (while image QA processing, image transfer or communication with RIS or with X-ray generator is underway, etc.).

•The procedure must be undertaken by service engineers only.
(It must not be undertaken by the user. Since important settings and files are stored, the system may no longer operate properly and trouble may occur in the CXDI equipment if any mistakes are made in this operation.)

•Users operating the HIPAA (Health Insurance Portability and Accountability Act) must release the restrictions placed on the operating system's operations since a keyboard has been connected.
As soon as the objectives of the service have been accomplished, the restrictions on the operating system's operations must be put back in place.

6.3 Procedures

(1) Procedure for releasing the restrictions placed on the operating system's operations
The following steps must be taken to release the restrictions on the operating system's operations.
To take these steps, the keyboard must be connected while the restrictions on the operating system's operations are in place, and the CXDI system software must be running.

1) Press the [SYSTEM] button.

2) Press the [CXDI RESTART] button.

3) Press the [OK] button while holding down the shift key.

4) The operating system's logon screen now appears. Log on using [cxdiadmin] as the user name and [ccrdebug] as the password.

5) Execute SelectOsOperation.bat which is in the CCR folder.

6) The Select OS operation window shown below now appears. Press the [Yes(Y)] button.

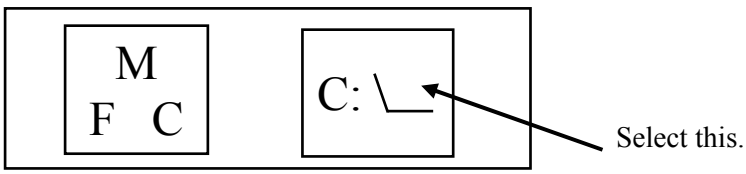
7) The Enable OS operation window shown below now appears. Press the [OK] button.

8) The Logoff window shown below now appears. Press the [OK] button.

Once auto logon is set under the [cxdi] user name and ccrstart.bat is set to be executed automatically, the restrictions placed on the operating system's operations will be released automatically.
If the setting established will not initiate auto logon, log on under the [cxdi] user name, and execute ccrstart.bat.

9) As soon as the CCR operation screen appears, press [Tab] while holding down [Alt] on the keyboard.

10) The selection screen shown below now appears on the screen. Press [Tab] while holding down [Alt] on the keyboard to select the command prompt screen.



11) The Ccr Console Menu now appears. Press the [Esc] key to display the [***Welcome to CCR***] screen (see Fig. 1), input [8], and press the [Enter] key.

```
******* Welcome to CCR *******
1 Set-Up...   5 -
2 Display Set-Up        6 - Utilities...
3 Image Util...         7 - Debug...
4 -                     8 - Exit
Enter item:
```

(Fig. 1)

12) The "Press any key to continue..." message is shown. Press any key to close the CCR startup software.

13) The Windows XP desktop screen appears.

(2) Procedure for placing the restrictions on the operating system's operations

The following steps must be taken to place the restrictions on the operating system's operation.

To take these steps, the keyboard must be connected while the restrictions on the operating system's operation are not in place, and it must be possible to operate the files in the CCR folder.

1) Close CCR (by selecting 8. Exit on Ccr Console Menu).

2) Execute SelectOsOperation.bat which is in the CCR folder.
The Select OS window shown below now appears. Press the [No(N)] button.

3) The Disable OS operation window shown below now appears. Press the [OK] button.

4) The Logoff window shown below now appears. Press the [OK] button.

5) Once auto logon is set under the [cxdi] user name and ccrstart.bat is set to be executed automatically, the restrictions on the operating system's operations will be placed automatically. If the setting established will not initiate auto logon, log on under the [cxdi] user name, and execute ccrstart.bat.

Notes

- To ensure that the placement of the restrictions on the operating system's operation will take effect, first execute SelectOsOperation.bat. It is then necessary to log on under the [cxdi] user name which is used during operation, and execute ccrstart.bat.
- It must be borne in mind that if a user name other than [cxdi] is used to log on before executing ccrstart.bat, the placement of the restrictions on the operating system's operation will be set for the user who has logged on. It must be ensured that the placement of the restrictions on the operating system's operation is not set for the [cxdiadmin] user name.

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Chapter 4

REPAIR GUIDE

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CONTENS

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4. Operation Required for Replacing Parts 7

1. Precautions

Observe the following precautions when assembling or disassembling;

(1) Be sure that turn off the power before assembling or disassembling.

(2) Assembly procedure is omitted because it is basically reverse of disassembly procedure.

(3) Apply adequate amount of specified grease as indicated.

(4) When painted screws are removed during assembly, paint them after assembly to prevent them from becoming loose.

(5) Minor parts such as washers are omitted to simplify the description.
Be sure to attach them in the same location when assembling.
Also, be sure to always replace toothed washer with a new one to ensure good electric conductivity.

(6) The sensor unit is sensitive to static electricity.
Be sure to take anti-static measures when replacing.

(7) Do not expose the sensor unit to light for an extended period.
Otherwise, the sensor will deteriorate.
Do not leave the sensor unit with the cover removed.

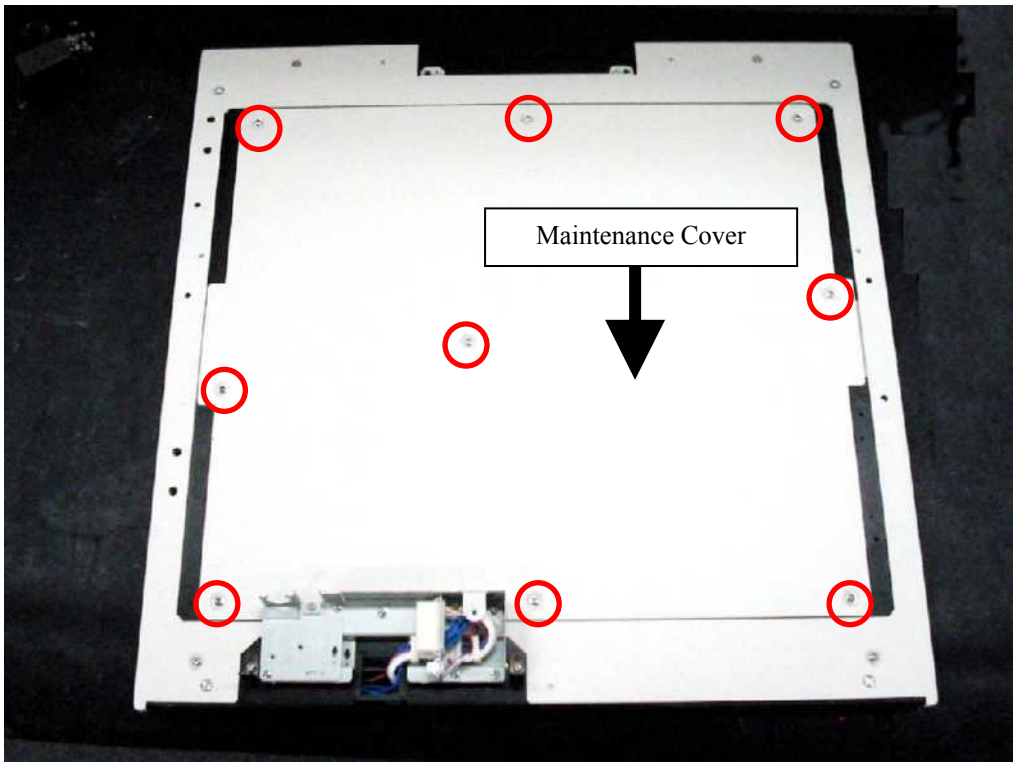
2. Assembly / Disassembly

2.1 Imaging Unit

(1) Disassembly

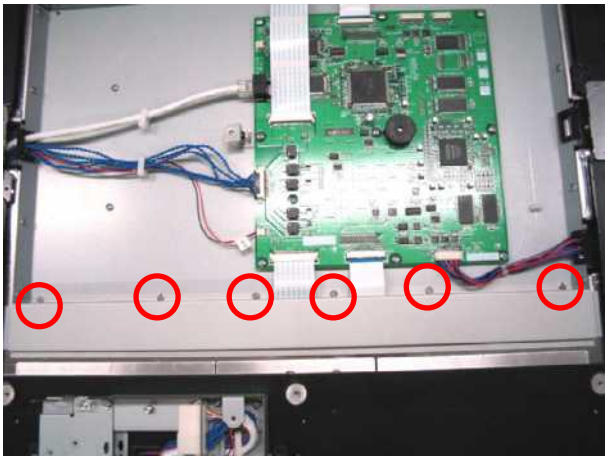
1) Turn the sensor unit over.
Remove the maintenance cover with the screws (x 9) taken off.

Notes:
Before this procedure, remove the sensor unit from Stand or Table.



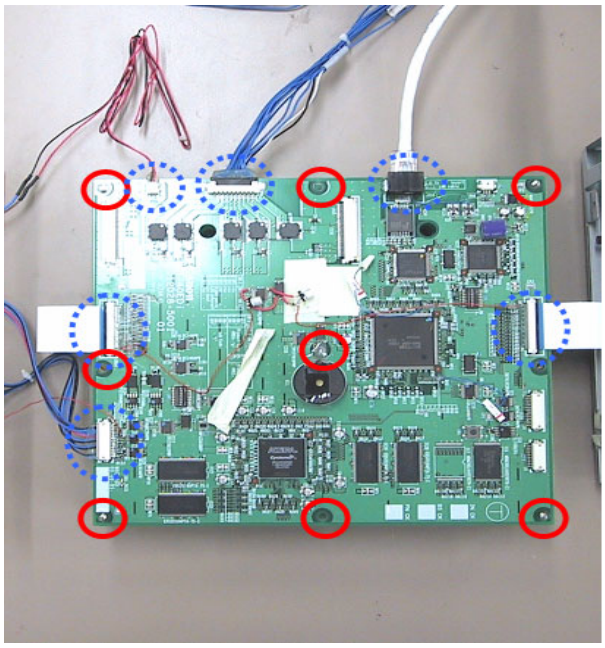
[Fig. 1 Sensor Unit Rear side]

2) Remove the shielding plate with screws (x 6) taken off.



[Fig.2]

3) Remove the PWB-40 EDi Unit from the sensor unit with the screws (x 9) taken off.
And take PWB connectors (x 6) off simultaneously.

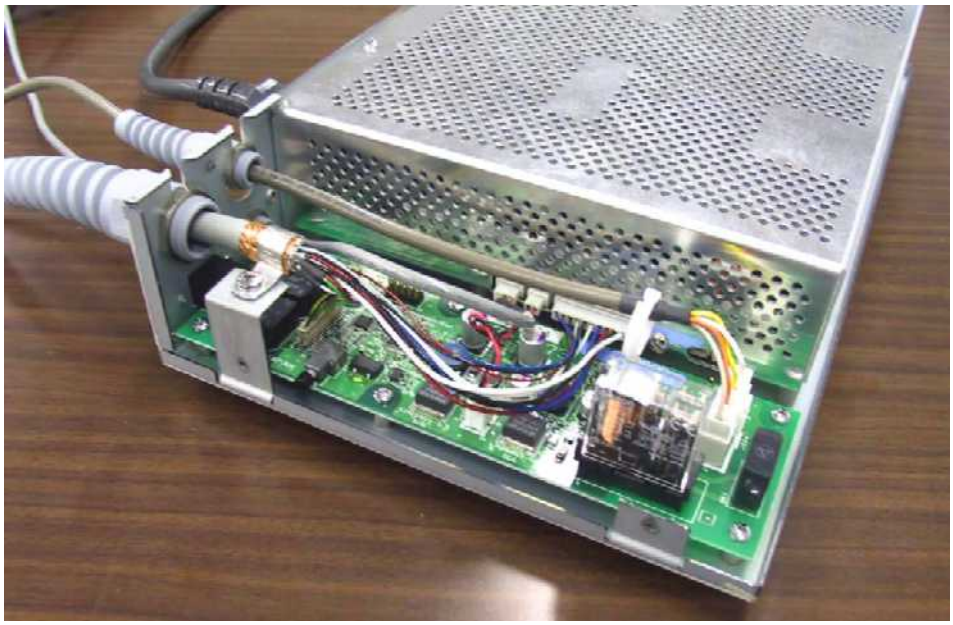


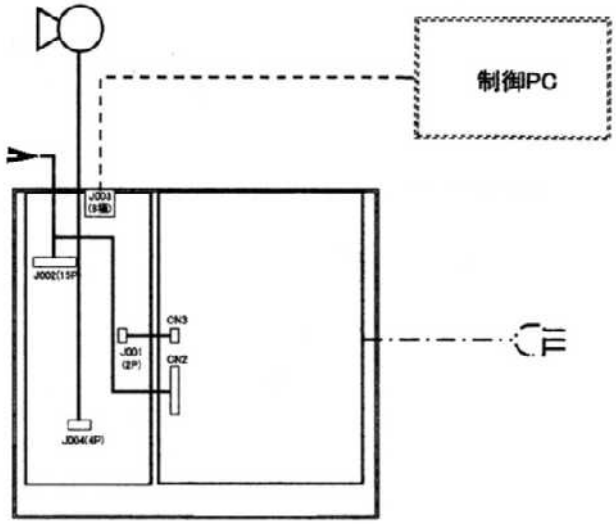
(2) Assembly

1) Assembling the PWB-40EDi is reverse of disassembling basically.

2) Once the FFC is removed when the PWB-40EDi is exchanged, the FFC must be exchanged with new one.
And perform the following procedures below mentioned.

2.2 Attaching the PWB-40EXRAY





1. Remove the connector of each cable.
   (1) Sensor cable (J002/CN2)
   (2) X-ray I/F cable (J004)
   (3) PWB-40EXRAY board/50 Power supply (J001/CN3)

2. Loosen the screw fixes the PWB-40EXRAY and remove it.

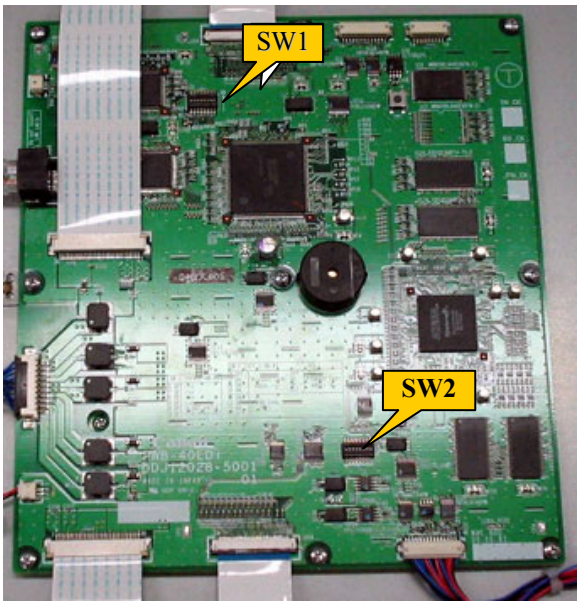
Note:

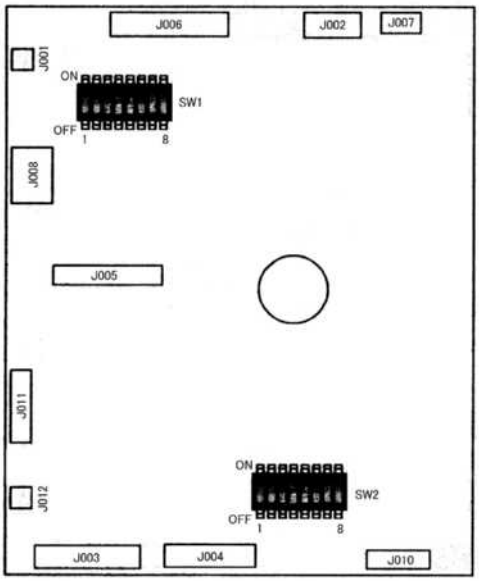
The power supply cable must be removed before assembling.

3. PCB Settings

(1) Sensor Unit
1) PWB-40EDi

Use BG7-3109-000 (for the revised read-out circuit sensor) for repair.





<SW1>

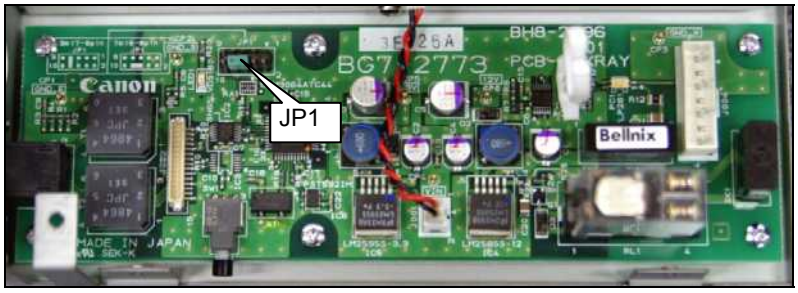
SW1	Factory Default	Function
1	OFF	Not used.
2	OFF	Ini boot On: Ibiboot OFF: Default
3	OFF	LED ETHERNET ON: for Ethernet busy LED OFF:Default
4	OFF	H-UDI ON:H-UDI used OFF:Default
5	OFF	Grid Detects ON: Disable OFF: Enable(Not used.)
6	OFF	Grid insertion Direction ON: Special(R type) OFF:Standerd(L type)
7	OFF	Not used.
8	OFF	Not used.

<SW2>

SW2		Function
1	OFF	PWB revision number. It changes when PWB is changed, etc.
2	ON	
3	ON	
4	ON	
5	OFF	Product type Firmware (from ver.1.01.03) reads product type by sensor serial number.
6	OFF	
7	OFF	
8	OFF	

- The settings from 5 to 8 of SW2 should be “OFF”. Firmware Ver.1.01.03 and later identify the product type (CXDI-40EG/40EC) from Sensor serial No.
- PWB revision number: The settings 1 - 4 of SW2 are identified.
- Note that PWB-40EDi (BG7-3109-000) for revised read-out circuit and the conventionally used PWB-40EDi (BF7-3064-070: Gold plated connectors) are not interchangeable.

(2) Power Box



1) PWB-40EXRAY

<JP1>

Short the JP1 according to the power unit.

JP1	Function
6-8 Short	Sensor cable 7m

4. Operation Required for Replacing Parts

Perform the following operations when the unit is replaced.

1) Sensor unit

(1) When sensor unit is replaced

1) Set the IP address. (This operation is not required if the default IP address is used.)

   Refer to “Imaging unit IP address setting” in the Tool Software Operation Manual.

2) Check the version of firmware and PLD code version.

   Refer to “12.2 Checking the Firmware Version” in “12 Settings” in “2. Installation”.

3) Install the firmware and PLD code as required.

   Refer to “12.3 Installing Firmware and PLD Code” in “12 Settings” in “2. Installation”.

4) Identify the sensor unit.

   Refer to “12.6 Identifying the Sensor Units” in “12 Settings” in “2. Installation”.

5) Change total number of exposures. (Basically the counter should be reset to “0” when the sensor unit is replaced.)

   Refer to “12.13 Changing the Total Image Count” in “12 Settings” in “2. Installation”.

6) Check the image quality.

   Refer to “13 Image Quality” in “2. Installation”.

7) Back up the data. (Back up the data to FD as required.)

   Refer to “12.14 Backing Up when Installing” and “12.15 Backing Up Setting Data to FD” in “12 Settings” in “2. Installation”.

(2) When PWB-40EDi is replaced

1) Set the PCB dipswitches.

   Refer to “3 PCB Settings” of “4. Repair Guide”.

2) Set the IP address. (This operation is not required if the default IP address is used.)

   Refer to “Imaging unit IP address setting” in the Tool Software Operation Manual.

3) Check the version of firmware and PLD code version.

   Refer to “12.2 Checking the Firmware Version” in “12 Settings” in “2. Installation”.

4) Install the firmware and PLD code as required.

   Refer to “12.3 Installing Firmware and PLD Code” in “12 Settings” in “2. Installation”.

5) Install the sensor serial number.

   Refer to “12.4 Checking the Sensor Serial Number” in “12 Settings” in “2. Installation”.

6) Install the sensor data file.

   Refer to “DP File Write Tool Software” in the Tool Software Operation Manual.

   To perform this operation, “Sensor Data File FD” that comes with the sensor unit is required.

7) Check the image quality.

Refer to “13 Image Quality” in “12 Settings” in “2. Installation”.

2) Power box

(1) When PWB-40EXRAY is replaced

1) Set the jumper pins on the PCB.

Refer to “3 PCB settings” in “4. Repair Guide”.

Check that the system starts up normally and that operations such as exposure, images capture and data transfer are performed normally.

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Chapter 5

TROUBLE SHOOTING

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1 Gathering Information about Problems

1.1 Outline

When trouble has occurred on the market, it is recommended that the entire board or unit (40EG/40EC, OPU, power box, C3S) be replaced on-site to restore the user's operations with the minimum downtime.
It is desirable to have the bad unit brought back and repaired. (Although it depends on the kind of the problem.)

This section explains about the information (log file) required to know what has occurred and what to be done.

1.2 Probable problems

- System connection failure and condition setting failure during installation
- Electrical and mechanical system failure, malfunctioning, bad image, noise, and communication error
- Software and specifications problem

1.3 Required information

1.3.1 When Dr. Watson Error occurs

Gather information when:

- Communication error related to Dr. Watson occurred between the OPU and the CXDI, resulting in CXDI application failure
- Display on the OPU freezes and cannot be recovered

(1) Log files

1) Environmental information (CXDI.HOST version, hardware configuration, optional software versions, external equipment configuration)

2) Dr. Watson log
C:\Documents and Settings\All Users\Application Data\Microsoft\Drwatson\drwts32.log

3) Event viewer system log
C:\WINDOWS\system32\config\SysEvent.Evt

4) The whole D:\Ccr folder
Depending on the timing the error has occurred, images may be saved in a folder before dtstore. In this case, copy dttmp and dtque folder.

1.3.2 When Error occurs

Information required differs according to whether optional module (such as DMW, generator communication module, etc.) is used or not.

(1) Log files and information required no matter optional module is used or not

1) How the system is used at the customer's site (System composition)

2) Version of CXDI host program

3) Error message and code

4) All the INI files directly under CCR folder

5) All the BodyParts folders

All of the above five items are necessary to see how the CXDI is set. If the problem has occurred in the CXDI, the information is required to have the problem occur again.

6) opu3.log and opu3_YYYYMMDDHHMMSS.log

When file size exceeds 1 MB, opu3.log makes a new "opu3.log" with a different name in "opu3_YYYYMMDDHHMMSS.log" when the system is restarted.

Ten history files in the past will be saved.

Because a new log is made when the file size is large, log at the time the error occurred may be in a file other than "opu3.log".

Since location of the log cannot be checked at the customer's site, please be sure to collect not only the opu3.log but all the history files.

7) syslog

8) Dr. Watson log

9) Event viewer system log

10) Sensor log

Other: User information, 5W1H, frequency of occurrence, reproducibility, special characteristics

(2) Required log files and information according to the used optional module

Please also gather the following files and information other than those indicated in (1).

(2-1) DMW

1) chmwm.ini

2) ccMax_ws.ini

chmwm.ini/ccMax_ws.ini will be collected automatically when all the INI files directly under CCR folder are collected.

3) chmwm.log

4) DICOM conformance statement of RIS

(2-2) Generator communication module

1) cgbig3.ini

2) StrTable.ini

StrTable.ini will be collected automatically when all the INI files directly under CCR folder are collected.

3) Character string (such as error code) that is displayed in the error dialog box

(2-3) STUDIX

1) chstudix.ini

* When using the multi-action function

2) cc_multi_st.ini

* If all the INI files immediately under the CCR folder are recovered, it will also be possible to recover chstudix.ini/cc_multi_st.ini automatically.

3) Study history files (if they are left)

4) All folders shared by STUDIX

(2-4) RISFIX

1) chrisfix.ini

If all the INI files immediately under the CCR folder are recovered, it will also be possible to recover chrisfix.ini automatically.

2) ccrhis.log

If all the risfix communication folders are recovered, it will also be possible to recover ccrhis.log automatically.

3) FTP communication log files (CXDI side)

These are used to analyze the communication files sent from RIS.

WINDOWS\System32\LogFiles folder

If not all the files can be recovered, recover the files with the dates on or around the day on which the problem occurred.

4) FTP communication log files (RIS side)

If the communication files sent from RIS to CXDI or vice versa fail to arrive, if the file contents are wrong or if some other problem in communication has occurred, ask the individual in charge to provide the log showing the times and contents of the FTP communications at the RIS and RIG sides.

1.3.3 When image is bad

1) How the system is used at the customer's site (System composition)

2) Version of CXDI host program

3) D:\ccr folder set

4) Trouble image together with the images before and after it, all Bin files and logs folder if ccr folder set cannot be obtained

5) Extracting sensor log files by "logread.exe"

1.3.4 Trouble analysis tools

This section describes the analysis tools used to remedy trouble or ascertain the status quo. The tools are useful in analysis applications on-site or at the office.

1) trnsfrm3.exe
   * Viewer software for image analysis
   * "Technical document for image analysis methods" given in SIDR-03-009 (software must be purchased separately)

2) Dcap.exe
   * Image transfer software
   * "Dcap Image Transfer Software User's Manual" given in SIDR-03-021

3) Pingtest.exe
   * Software for evaluating reliability of network communications
   * "Operation Verification Results for General-Purpose LAN Card" given in CXDI-50G, SMR04-009

2 How to back up and recover the system

2.1 Objective

This document describes how to back up and recover the system.

2.2 Technical Description

There are two system backup methods as follow:
The recovery method required depends on the way the system crashes.

Backup method
A) Backup using floppy disks
B) Backup using a hard drive

2.3 Backup method

A) Backup method using floppy disks

The network settings configured in each installation site and the customized body part settings are stored in each ini file.
All the ini files are stored on a floppy disk when starting up the control PC.
The system has a feature that stores the latest ini files on the floppy disk at the system startup by updating the ini files with modifications users made while using the system.

B) Backup method using a hard drive

The control PC has no feature that mirrors all the files including the OS to other hard drives. Therefore, to be ready for hard drive crashes, we recommend that you add another hard drive when installing the system, in order to copy the software between the hard drives using Ghost or Drive Copy, which are available on the market.
This should be conducted at the final installation stage (just before delivery to users).
As an alternative, you can also provide a hard drive that contains the OS (before activation) and drivers in case of hard drive crashes.

2.4 Recovery method

2.4.1 When problems occur in a Ccr software ini file

The system can be recovered to the last environment status just before the system was used by users when problems[*1] occur in d:\Ccr software other than the OS.

[*1] When the setting data or files are damaged

In this case,

In this case, restoration is possible by copying the Bodyparts folder and all ini files stored on the floppy disk into d:\ccr, thus overwriting the existing data in it.

2.4.2 When problems occur in Ccr software

When problems occur in files other than ini files for d: \Ccr software other than the OS, recovery can be accomplished by adding or replacing the relevant files if you can identify the defective files. Recover Ccr with the following procedure if you cannot identify the defective files:

1) Copy d: \ccr to a different directory or laptop computer.

2) Delete d: \ccr, and then newly install the CXDI software. (Note)
(Note) The same version of the software must be installed.

3) Copy the following files in Ccr that were copied in Step 1) to d: \ccr
\dtstore (captured images)
\Logs
\White.dcm
\defpix#.dat
\xxxxxx.dp

4) Newly install the optional software (DMW/Gen.communication) if you are using it.

5) To restore the user operating environment, copy the Body parts folder and all ini files stored on the floppy disk into d:\ccr, thus overwriting the existing data in it.

6) Perform the settings again that are described in the “Control PC serial number” and “Setting the imaging unit identification and the number of connecting units” in this manual “Setting Procedures”.

2.4.3 When the hard drive crashes

Recover the system using the following method when the hard drive crashes.

1) Replace the crashed hard drive with the hard drive provided in item B above, “Backup method using a hard drive”.

   * Copy \Ccr from the original hard drive to the new hard drive when the D drive in the crashed hard drive is in a normal state (a problem case caused by the OS).

   Note: Perform Step 2 after upgrading if the CXDI version you are using is newer than that in the hard drive provided by copying from hard drive to hard drive during system installation.
   (Files such as Str.ini are not compatible when the CXDI version is different.)

   * When the hard drive has crashed mechanically, proceed to Step 2 and subsequent steps.

2) Upon completion of the replacement, to restore the user operating environment, copy the Bodyparts folder and all ini files stored on the floppy disk into d:\ccr, thus overwriting the existing data in it.

   That images captured by users cannot be inherited in this case.

Note: Calibration is required when the system has been used for over one year.

Note: Perform Step 2 after upgrade if the CXDI version you are using is newer than that in the hard drive provided by copying from hard drive to hard drive during system installation.
(Files such as StrTable.ini are not compatible when the CXDI version is different.)

2.4.4 When problems occur in driver software

When drivers such as the touch panel driver are damaged, reinstall the appropriate drivers by referring to “C3S Service Manual”.

-Reference-

The following describes Windows XP activation for your reference.
(Note that this information is based on a test and information posted on Web bulletin boards because Microsoft does not provide an official document for this.)

1. With or without reactivation required

Modification	1. With or without reactivation required	Description
Reinstalling OS without hard drive formatting required	Not required	
Reinstalling OS with hard drive formatting required	Required	Because an install ID stored in the hard drive is cleared.
Replacing a mother board	Probably required	Depends on the number of on-board devices.
Move a hard drive to a different machine	Required	Due to being regarded as anything other than the hard drive being modified.
Changing external devices	Not required	Due to recognizing the PC's internal configuration only.
Adding hardware components	Not required	Only replacement of components that existed at the time of first activation is detected. Adding components is a different category.

2. Hardware components related to activation

· Display adapter (video board)
· SCSI adapter
· IDE adapter
· Network adapter (MAC address)
· Within the amount of mounted physical memory
· Processor type
· Processor serial number
· Hard disk interface
· Hard disk volume serial number
· CD-ROM/CD-RW/DVD-ROM

3. The number of changed components that require no reactivation

· Without network interface: Changes up to four elements
· With network interface: Changes up to six elements

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Chapter 6

Parts Catalog

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PARTS CATALOG

CXDI-40EG/EC
(Revised read-out circuit)

Canon

Dec 13 2007

PREFACE

This Parts Catalog contains listings of parts used

Diagrams are provided with the listings to aid the service technician in identifying clearly, the item to be orderd.
Whenever ordering parts, consult this Parts Catalog for all of the information pertaining to each item. Be sure to include, in the Parts Request, the full item description, the item part number, and the quantity.

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Use of this manual should be strictly supervised to avoid disclosure of confidential information.

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BA3-9718-000	03 - 1	BA4-2372-000	07 - 10	BH3-3286-000	05 - 18
BA4-0785-000	06 - 1	BA4-2373-000	05 - 7	BH3-3286-000	06 - 18
BA4-0785-000	07 - 1	BA4-2373-000	07 - 11	BH3-3286-000	07 - 17
BA4-1450-050	04 - 1	BA4-2374-000	05 - 8	BH3-8101-000	05 - 19
BA4-1455-030	04 - 2	BA4-2374-000	07 - 12	BH3-8101-000	06 - 19
BA4-1457-020	04 - 6	BA4-2375-000	05 - 9	BH3-8101-000	07 - 18
BA4-1459-040	04 - 3	BA4-2375-000	07 - 13	BH4-2385-100	01 - 17
BA4-1462-000	01 - 10	BA4-2377-000	06 - 11	BH4-2385-100	01 - 25
BA4-1464-000	01 - 11	BA4-2378-020	08 - 1	BH4-6217-030	01 - 18
BA4-1465-000	01 - 12	BA4-2385-000	01 - 8	BH4-6217-030	01 - 26
BA4-1466-000	01 - 13	BA4-2417-020	01 - 6	BG7-2145-030	01 - 16
BA4-1500-000	05 - 1	BA4-2418-020	01 - 7	BH4-6494-020	01 - 24
BA4-1500-000	07 - 2	BF0-5100-030	05 - 17	BH6-5728-040	01 - 15
BA4-1501-000	05 - 2	BF0-5100-030	06 - 17	BH6-6481-000	02 - 20
BA4-1501-000	06 - 2	BF0-5100-030	07 - 16	BH6-6481-000	03 - 20
BA4-1504-000	05 - 3	BF0-5468-000	06 - 14	BH6-6482-000	03 - 21
BA4-1505-020	05 - 4	BG7-2172-110	05 - 15	BH6-6484-000	01 - 2
BA4-1506-020	05 - 5	BG7-2620-060	06 - 16	BH6-6485-000	01 - 21
BA4-1518-000	05 - 11	BG7-2172-110	07 - 15	BH6-6486-000	01 - 22
BA4-1521-000	05 - 12	BG7-2609-080	01 - 9	BH6-6487-000	01 - 23
BA4-1522-000	05 - 13	BG7-2613-040	05 - 10	BH6-7582-000	02 - 21
BA4-1530-000	07 - 4	BG7-2620-060	05 - 16	BH6-7582-000	03 - 22
BA4-1541-020	06 - 4	BG7-2623-030	02 - 9	NPN	01 -
BA4-1541-020	07 - 5	BG7-2623-030	03 - 9	NPN	01 - 1
BA4-1542-000	06 - 3	BG7-2624-030	02 - 10	NPN	02 -
BA4-1542-000	07 - 3	BG7-2624-030	03 - 10	NPN	03 -
BA4-1545-000	06 - 5	BG7-2625-000	02 - 11	NPN	04 -
BA4-1545-000	07 - 6	BG7-2625-000	03 - 11	NPN	05 -
BA4-1546-000	06 - 6	BG7-2634-030	02 - 18	NPN	06 -
BA4-1546-000	07 - 7	BG7-2634-030	03 - 18	NPN	07 -
BA4-1549-000	06 - 7	BG7-2856-050	08 - 5	NPN	08 -
BA4-1550-000	06 - 8	BG7-2857-070	08 - 6	WG8-5718-000	02 - 12
BA4-1562-020	02 - 5	BG7-2939-000	01 - 14	WG8-5718-000	02 - 15
BA4-1562-020	03 - 5	BG7-2944-000	02 - 16	WG8-5718-000	03 - 12
BA4-1611-030	04 - 4	BG7-3064-070	03 - 17	WG8-5718-000	03 - 15
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BA4-1804-030	08 - 4	BG7-3067-000	03 - 23	XA1-1260-306	06 - 501
BA4-1870-020	04 - 5	BG7-3069-000	08 - 7	XA1-1260-406	02 - 503
BA4-2216-000	02 - 13	BG7-3070-000	01 - 20	XA1-1260-406	03 - 503
BA4-2216-000	03 - 13	BG7-3071-000	08 - 7	XA1-1260-406	05 - 501
BA4-2218-000	02 - 14	BG7-3095-000	03 - 16	XA1-1260-406	07 - 501
BA4-2218-000	03 - 14	Y67-2806-000	02 - 3	XA1-3260-306	06 - 502
BA4-2343-000	06 - 9	Y67-2806-000	03 - 3	XA1-3260-306	07 - 502
BA4-2344-000	06 - 10	BG7-3097-000	02 - 4	XA1-3260-406	02 - 502
BA4-2344-000	07 - 8	BG7-3097-000	03 - 4	XA1-3260-406	03 - 502
BA4-2345-000	06 - 15	BG7-3098-000	02 - 7	XA4-1260-406	04 - 506

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XA9-0828-000	02 - 2				
XA9-0828-000	02 - 23				
XA9-0828-000	03 - 2				
XA9-0828-000	03 - 24				
XA9-0828-000	05 - 14				
XA9-0828-000	06 - 13				
XA9-0828-000	07 - 14				
XB1-1400-603	01 - 504				
XB1-1400-603	08 - 501				
XB1-2300-406	02 - 501				
XB1-2300-406	03 - 501				
XB1-2300-406	04 - 502				
XB1-2300-406	06 - 503				
XB1-2300-406	08 - 502				
XB1-2300-806	05 - 506				
XB1-2300-806	06 - 504				
XB1-2300-806	07 - 505				
XB1-2300-806	08 - 503				
XB1-2301-006	04 - 504				
XB1-2400-606	01 - 502				
XB1-2400-606	05 - 502				
XB1-3300-606	02 - 505				
XB1-3300-606	03 - 505				
XB1-3300-609	04 - 505				
XB2-6300-606	02 - 504				
XB2-6300-606	03 - 504				
XB2-7300-606	08 - 504				
XB4-7300-606	05 - 503				
XB4-7300-606	07 - 503				
XB6-7300-609	01 - 501				
XB7-1050-086	05 - 504				
XD1-2100-307	04 - 503				
XD1-4100-262	05 - 505				
XD1-4100-262	07 - 504				
XD1-4100-402	01 - 503				
XD1-4200-402	08 - 505				
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XZ9-0488-000	06 - 20				
XZ9-0488-000	07 - 19				
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CXDI-40EG/EC

CXDI-40EG

B77-2571-000

CXDI-40EC

B77-2581-000

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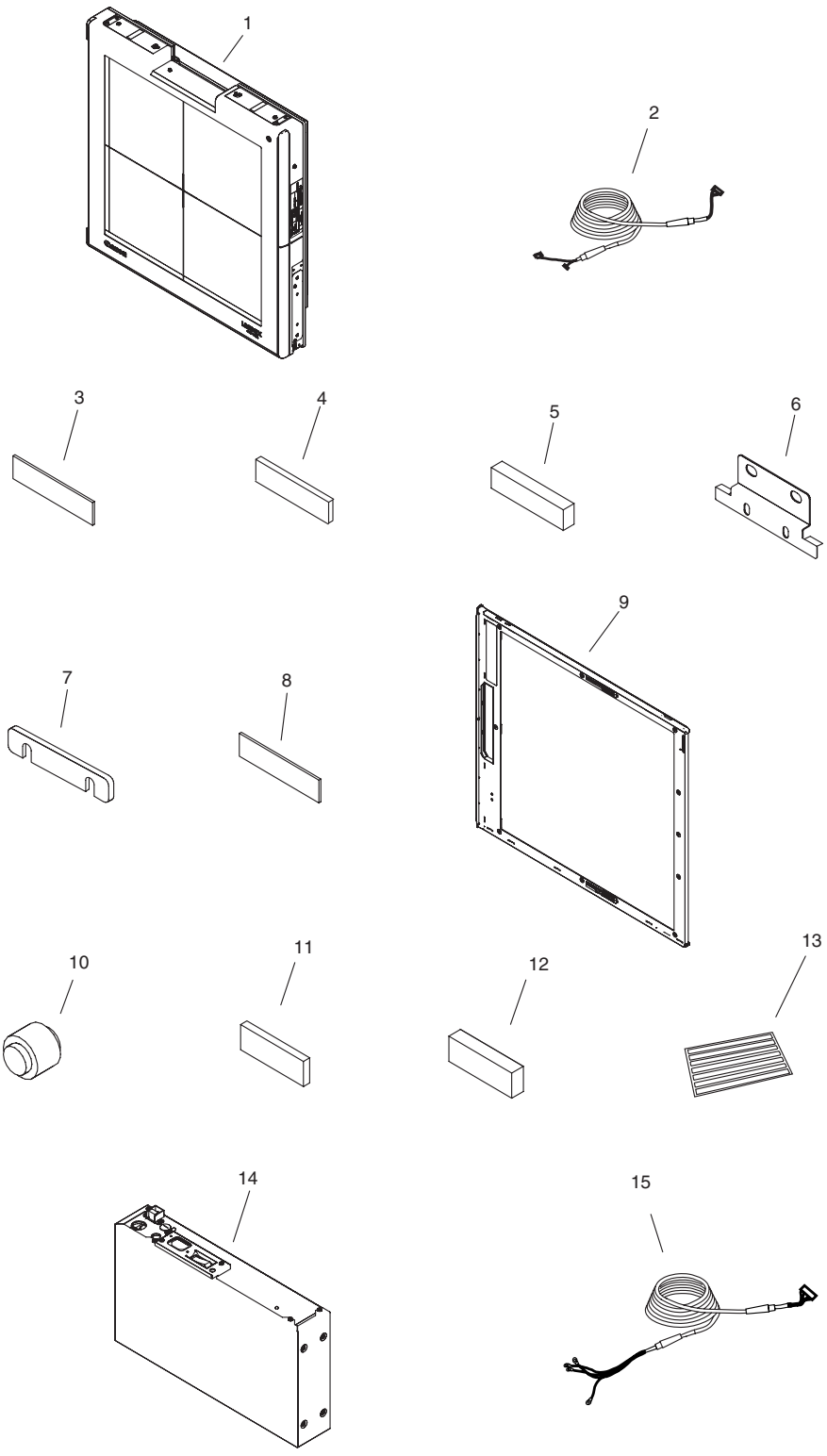
FIGURE 01
CXDI-40EG/EC



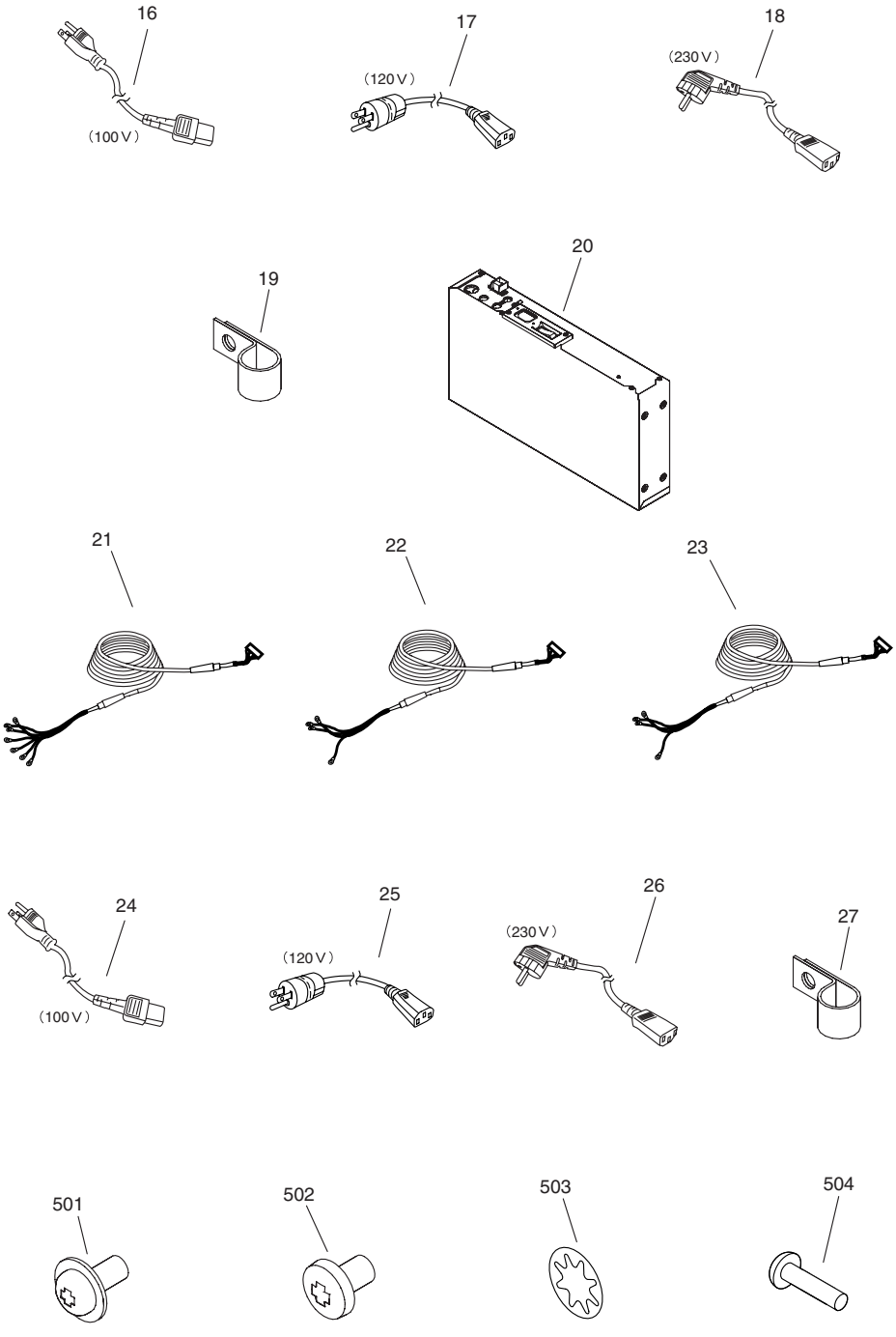

16
(100 V)
17
(120 V)
18
(230 V)
19
20
21
22
23
24
(100 V)
25
(120 V)
26
(230 V)
27
501
502
503
504

FIGURE & KEY NO.	PARTS NUMBER	RANK	Q'TY	DESCRIPTION	SERIAL NUMBER/ REMARKS	SVC
Fig.01	NPN		RF	CXDI-40EG(OSR)/EC		
1	NPN		RF	IMAGING UNIT		
2	BH6-6484-000		1	CABLE, SENSOR	FOR IMAGING UNIT	
3	BA3-9611-000		4	RUBBER SHEET, PHOTOTIMER (T=1)	FOR IMAGING UNIT	
4	BA3-9612-000		20	RUBBER SHEET, PHOTOTIMER (T=2)	FOR IMAGING UNIT	
5	BA3-9616-000		8	RUBBER SHEET, PHOTOTIMER (T=6)	FOR IMAGING UNIT	
6	BA4-2417-020		4	HOLDER, PHOTOTIMER	FOR IMAGING UNIT	
7	BA4-2418-020		8	SPACER, ADJUSTMENT	FOR IMAGING UNIT	
8	BA4-2385-000		4	TAPE, ANCHORING	FOR IMAGING UNIT	
9	BG7-2609-080		1	GRID UNIT W/O GRID		
10	BA4-1462-000		4	PIN, ID SETTING	FOR GRID UNIT	
11	BA4-1464-000		8	FIXED PLATE, A	FOR GRID UNIT	
12	BA4-1465-000		8	FIXED PLATE, B	FOR GRID UNIT	
13	BA4-1466-000		1	LABEL FOR INSTALLATION	FOR GRID UNIT	
14	BG7-2939-000		1	POWER BOX		
15	BH6-5728-040		1	CABLE, X-RAY I/F	FOR POWER BOX (NORMAL)	
16	BG7-2145-030		1	CABLE, POWER, 100V	FOR POWER BOX (NORMAL)	
17	BH4-2385-100		1	CABLE, POWER, 120V	FOR POWER BOX (NORMAL)	
18	BH4-6217-030		1	CABLE, POWER, 230V	FOR POWER BOX (NORMAL)	
19	WT2-5859-020		1	CLAMP, CABLE	FOR POWER BOX (NORMAL)	
20	BG7-3070-000		1	POWER BOX (COLLIMATION)		
21	BH6-6485-000		1	CABLE, X-RAY I/F (COLLIMATION)	FOR POWER BOX (COLLIMATION)	
22	BH6-6486-000		1	CABLE, COLLIMATION	FOR POWER BOX (COLLIMATION)	
23	BH6-6487-000		1	CABLE, OFFSET	FOR POWER BOX (COLLIMATION)	
24	BH4-6494-020		1	CABLE, POWER, 100V	FOR POWER BOX (COLLIMATION)	
25	BH4-2385-100		1	CABLE, POWER, 120V	FOR POWER BOX (COLLIMATION)	

FIGURE & KEY NO.	PARTS NUMBER	RANK	Q'TY	DESCRIPTION	SERIAL NUMBER/ REMARKS	SVC
26	BH4-6217-030		1	CABLE, POWER, 230V	FOR POWER BOX (COLLIMATION)	
27	WT2-5859-020		1	CLAMP, CABLE	FOR POWER BOX (COLLIMATION)	
501	XB6-7300-609		8	SCREW	FOR IMAGING UNIT	
502	XB1-2400-606		2	SCREW	FOR IMAGING UNIT	
503	XD1-4100-402		2	WASHER, TOOTHED LOCK	FOR IMAGING UNIT	
504	XB1-1400-603		2	SCREW	FOR POWER BOX (NORMAL/ COLLIMATION)	

FIGURE 02
IMAGING UNIT(40EG/EC)

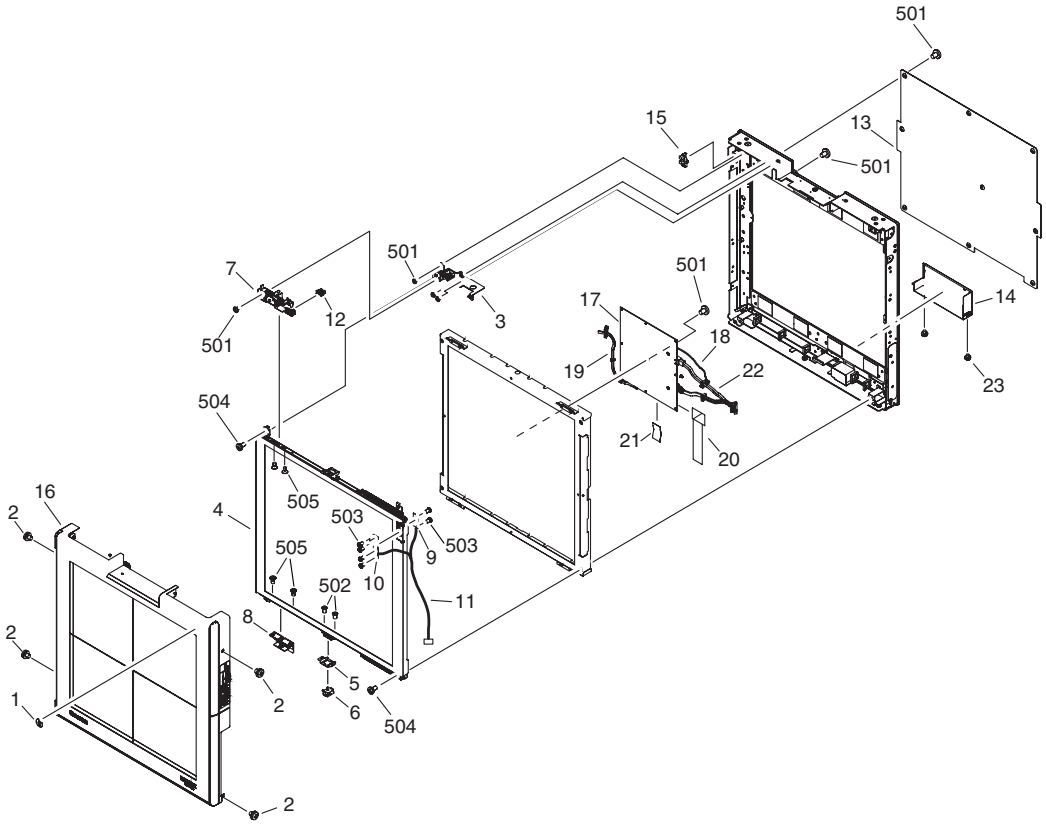


FIGURE & KEY NO.	PARTS NUMBER	RANK	Q'TY	DESCRIPTION	SERIAL NUMBER/ REMARKS	SVC
Fig.02	NPN		RF	IMAGING UNIT(40EG OSR)		
1	BA3-9718-000		1	LABEL		
2	XA9-0828-000		4	SCREW		
3	Y67-2806-000		1	RELEASE UNIT, LOCK		
4	BG7-3097-000		1	RAIL UNIT (L), GRID		
5	BA4-1562-020		1	PLATE, PHOTO INTERRUPTER		
6	BH0-4477-000		1	PHOTO SENSOR W/CONNECTOR		
7	BG7-3098-000		1	LOCK UNIT (L), GRID		
8	Y67-2758-000		1	LOCK UNIT, 2ND (L)		
9	BG7-2623-030		1	PCB UNIT, GRID ID(LUMINESCENCE		
10	BG7-2624-030		1	PCB UNIT, GRID ID (RECEIVING		
11	BG7-2625-000		1	CABLE, GRID ID		
12	WG8-5718-000		1	PHOTO INTERRUPTER W/CONNECTOR		
13	BA4-2216-000		1	COVER, MAINTENANCE		
14	BA4-2218-000		1	CABLE COVER, STAND TYPE		
15	WG8-5718-000		1	PHOTO INTERRUPTER		
16	BG7-2944-000		1	COVER UNIT, UPPER W/O LABEL		
17	BG7-3109-000		1	PCB UNIT, 40EDI	Gold Plated	
18	BG7-2634-030		1	CABLE, TRANSMIT, READY LAMP		
19	BG7-3066-000		1	CABLE, TRANSMIT, GRIDDETECTION		
20	BH6-6481-000		1	CABLE, FLAT (DI-AD) U		
21	BH6-7582-000		1	CABLE, FLAT	Gold Plated	
22	BG7-3067-000		1	CABLE, TRANSMIT, SENSOR		
23	XA9-0828-000		2	SCREW		
501	XB1-2300-406		24	SCREW		
502	XA1-3260-406		2	SCREW		
503	XA1-1260-406		6	SCREW		
504	XB2-6300-606		4	SCREW		
505	XB1-3300-606		4	SCREW		

FIGURE 03
GRID UNIT

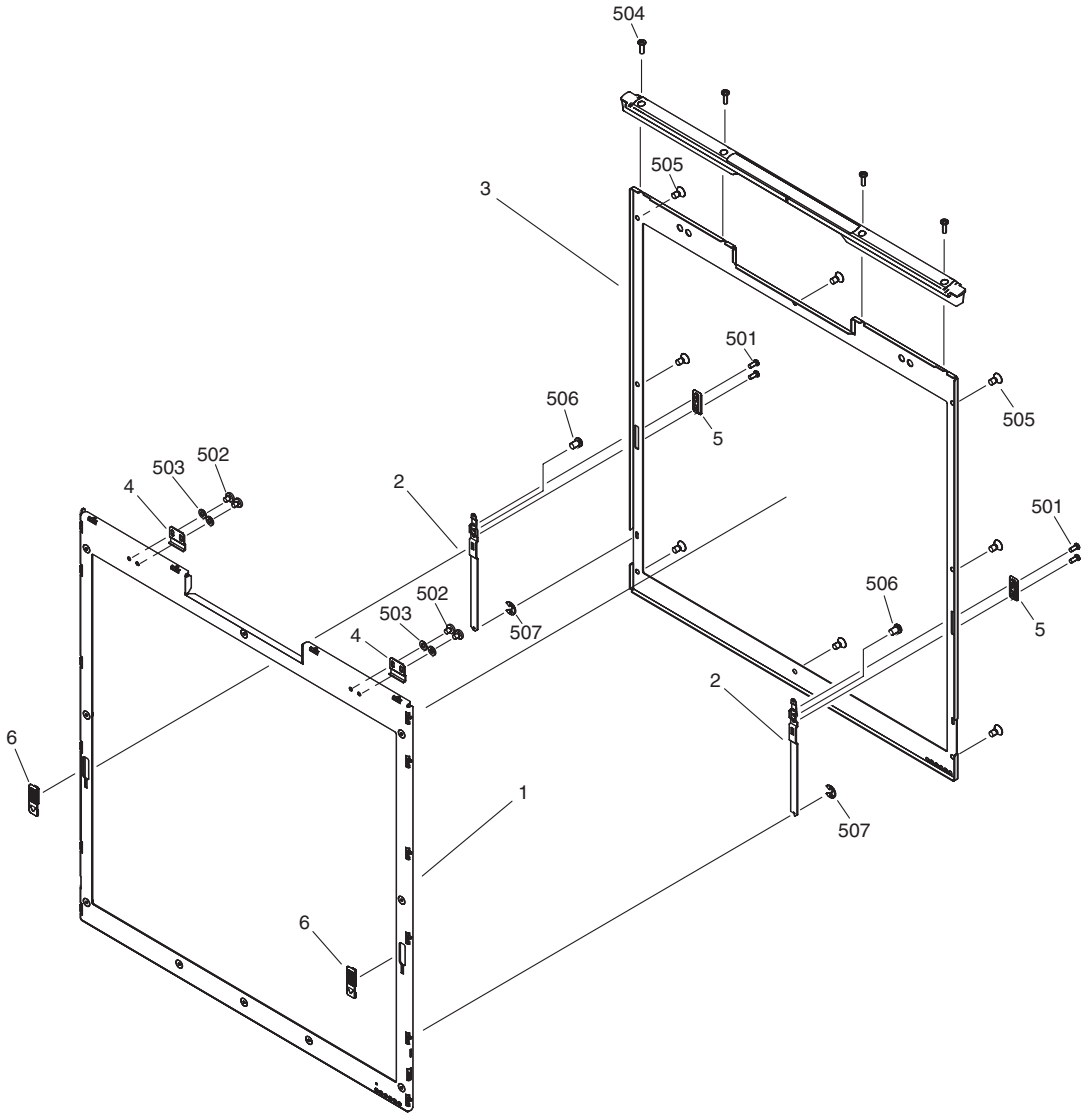


FIGURE & KEY NO.	PARTS NUMBER	RANK	Q'TY	DESCRIPTION	SERIAL NUMBER/ REMARKS	SVC
Fig.03	NPN		RF	GRID UNIT		
1	BA4-1450-050		1	FRONT FRAME, GRID UNIT		
2	BA4-1455-030		2	LEVER, LOCK, CONNECTION		
3	BA4-1459-040		1	BACK FRAME, GRID UNIT		
4	BA4-1611-030		2	STOPPER, GRID		
5	BA4-1870-020		2	LEVER, SLIDE (BACK)		
6	BA4-1457-020		2	LEVER, SLIDE		
501	XA1-1200-509		4	SCREW		
502	XB1-2300-406		4	SCREW		
503	XD1-2100-307		4	WASHER, PLANE		
504	XB1-2301-006		4	SCREW		
505	XB1-3300-609		8	SCREW		
506	XA4-1260-406		2	SCREW		
507	XD2-1100-172		2	WASHER, RETAINING		

FIGURE 04
STAND TYPE INSTALLATION UNIT

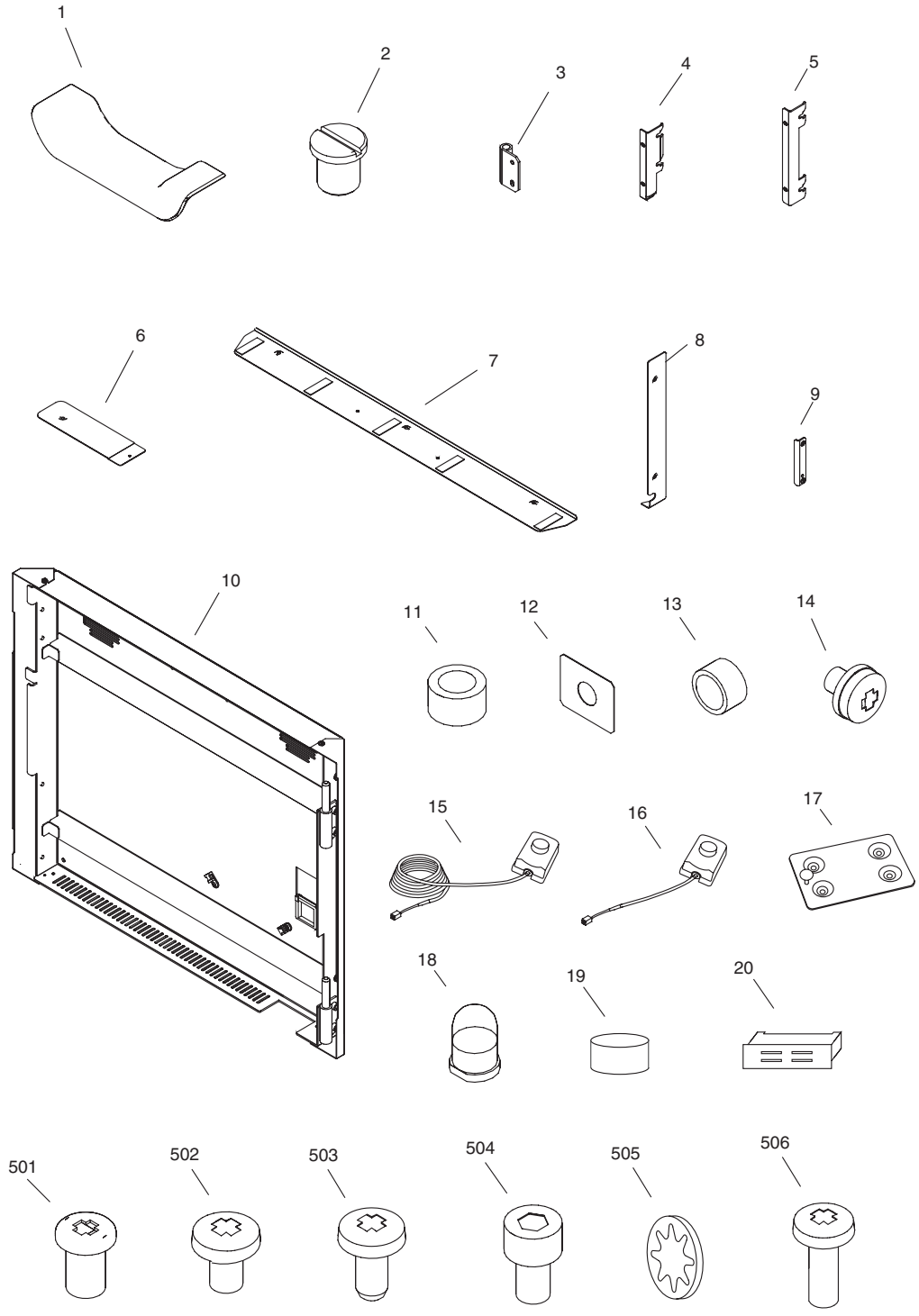


FIGURE & KEY NO.	PARTS NUMBER	RANK	Q'TY	DESCRIPTION	SERIAL NUMBER/ REMARKS	SVC
Fig.04	NPN		RF	STAND TYPE INSTALLATION UNIT		
1	BA4-1500-000		1	CHIN REST		
2	BA4-1501-000		4	SCREW, LIGHT SHIELD(M6)		
3	BA4-1504-000		2	HINGE(IMAGING UNIT SIDE)		
4	BA4-1505-020		1	ANCHORING PLATE (1)		
5	BA4-1506-020		1	ANCHORING PLATE (2)		
6	BA4-2372-000		2	GLAZED COVER, UPPER		
7	BA4-2373-000		1	GLAZED COVER, LOWER		
8	BA4-2374-000		1	GLAZED COVER, SIDE		
9	BA4-2375-000		1	REINFORCING PLATE		
10	BG7-2613-040		1	INSTALLATION UNIT, STAND TYPE		
11	BA4-1518-000		1	COLLAR, HINGE		
12	BA4-1521-000		8	SHEET, ISOLATION		
13	BA4-1522-000		4	COLLAR, ISOLATION		
14	XA9-0828-000		7	SCREW		
15	BG7-2172-110		1	READY LAMP UNIT		
16	BG7-2620-060		1	READY LAMP UNIT_FOR CXDI-H1/H4		
17	BF0-5100-030		1	BRACKET, READY LAMP (BG7-2172)		
18	BH3-3286-000		1	LAMP, TUNGSTEN		
19	BH3-8101-000		1	CAP, INDICATION		
20	XZ9-0488-000		2	MAGNET CATCH		
501	XA1-1260-406		2	SCREW		
502	XB1-2400-606		8	SCREW		
503	XB4-7300-606		2	SCREW, TAP TIGHT		
504	XB7-1050-086		4	BOLT, HEX		
505	XD1-4100-262		2	WASHER, TOOTHED LOCK		
506	XB1-2300-806		4	SCREW		

FIGURE 05
TABLE TYPE INSTALLATION UNIT

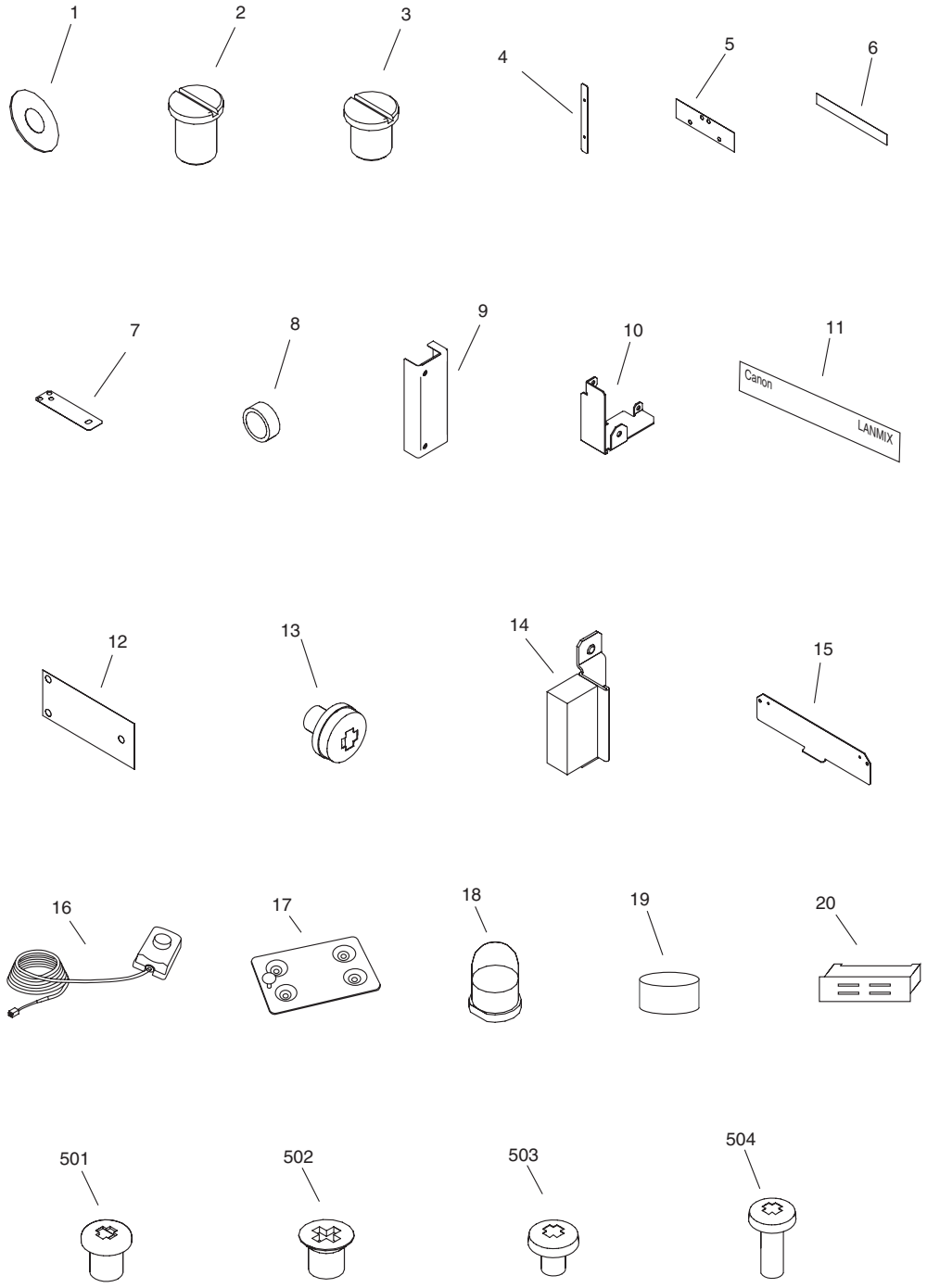


FIGURE & KEY NO.	PARTS NUMBER	RANK	Q'TY	DESCRIPTION	SERIAL NUMBER/ REMARKS	SVC
Fig.05	NPN		RF	TABLE TYPE INSTALLATION UNIT		
1	BA4-0785-000		12	SHEET, ISOLATION (M6 SCREW)		
2	BA4-1501-000		12	SCREW, LIGHT SHIELD (M6)		
3	BA4-1542-000		4	SCREW, LIGHT SHIELD (M5)		
4	BA4-1541-020		2	PLATE, LIGHT SHIELD		
5	BA4-1545-000		5	SHEET, ISOLATION (BOTTOM 1)		
6	BA4-1546-000		5	SHEET, ISOLATION (BOTTOM 2)		
7	BA4-1549-000		5	SHEET, ISOLATION (SIDE)		
8	BA4-1550-000		12	COLLAR, ISOLATION		
9	BA4-2343-000		1	CABLE COVER, TABLE TYPE		
10	BA4-2344-000		1	PLATE, LIGHT SHIELD (2)		
11	BA4-2349-000		1	LABEL FOR IMAGING UNIT	CXDI-40EG	
11	BA4-2377-000		1	LABEL FOR IMAGING UNIT	CXDI-40EC	
12	BA4-2348-000		6	SHEET, ISOLATION		
13	XA9-0828-000		7	SCREW		
14	BF0-5468-000		1	PLATE, LIGHT SHIELD		
15	BA4-2345-000		1	PLATE, LIGHT SHELD		
16	BG7-2620-060		1	READY LAMP UNIT		
17	BF0-5100-030		1	BRACKET, READY LAMP		
18	BH3-3286-000		1	LAMP, TUNGSTEN		
19	BH3-8101-000		1	CAP, INDICATION		
20	XZ9-0488-000		2	MAGNET CATCH		
501	XA1-1260-306		2	SCREW		
502	XA1-3260-306		6	SCREW		
503	XB1-2300-406		5	SCREW		
504	XB1-2300-806		4	SCREW		

FIGURE 06
UNIVERSAL TYPE INSTALLATION UNIT

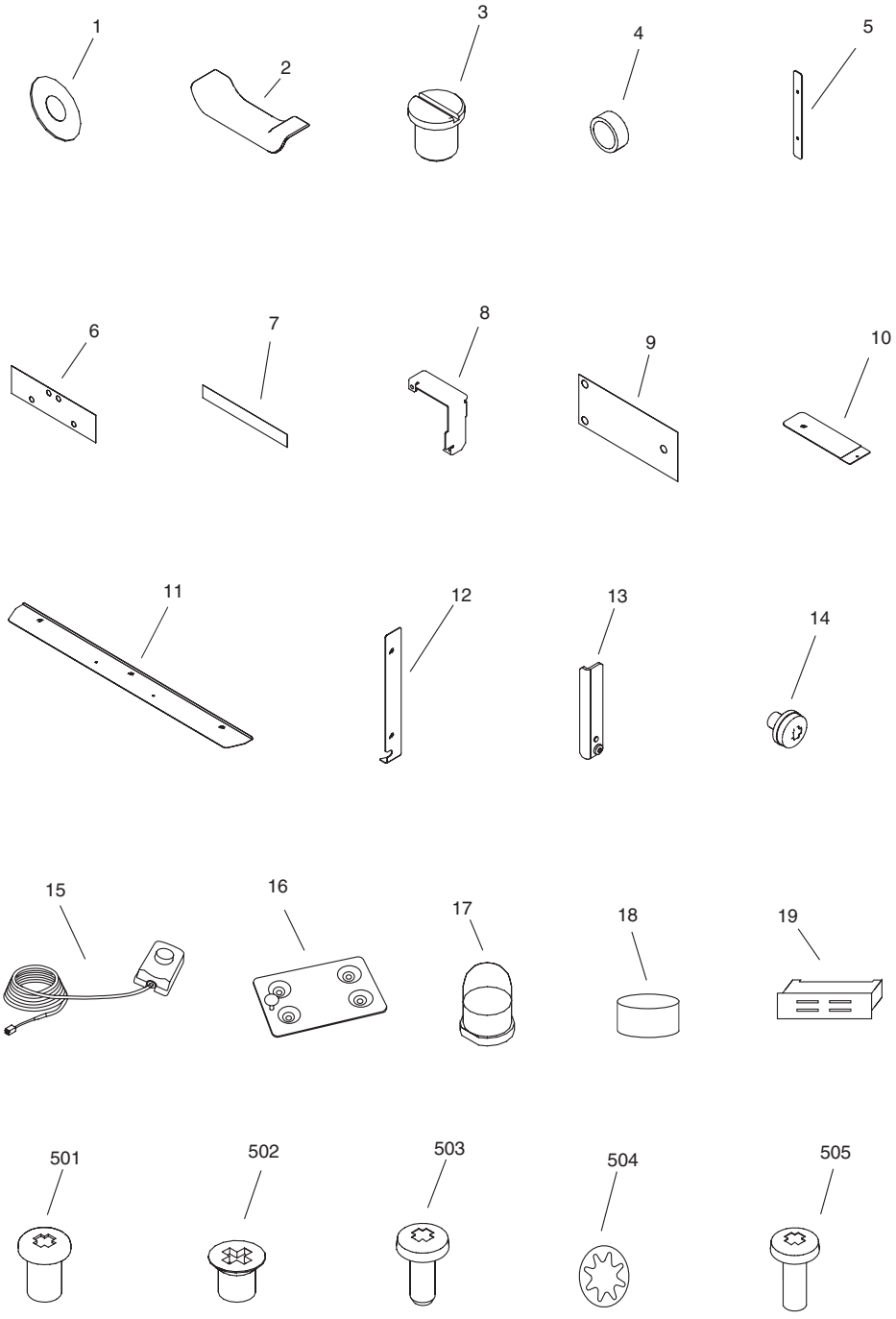


FIGURE & KEY NO.	PARTS NUMBER	RANK	Q'TY	DESCRIPTION	SERIAL NUMBER/ REMARKS	SVC
Fig.06	NPN		RF	UNIVERSAL TYPE INSTALLATION U.		
1	BA4-0785-000		4	SHEET, ISOLATION (M6 SCREW)		
2	BA4-1500-000		1	CHIN REST		
3	BA4-1542-000		4	SCREW, LIGHT SHIELD (M5)		
4	BA4-1530-000		4	COLLAR, ISOLATION		
5	BA4-1541-020		2	PLATE, LIGHT SHIELD		
6	BA4-1545-000		4	SHEET, ISOLATION (BOTTOM 1)		
7	BA4-1546-000		5	SHEET, ISOLATION (BOTTOM 2)		
8	BA4-2344-000		1	PLATE, LIGHT SHIELD (2)		
9	BA4-2348-000		6	SHEET, ISOLATION (MAINTENANCE)		
10	BA4-2372-000		2	GLAZED COVER, UPPER		
11	BA4-2373-000		1	GLAZED COVER, LOWER		
12	BA4-2374-000		1	GLAZED COVER, SIDE		
13	BA4-2375-000		1	REINFORCING PLATE		
14	XA9-0828-000		7	SCREW		
15	BG7-2172-110		1	READY LAMP UNIT		
16	BF0-5100-030		1	BRACKET, READY LAMP		
17	BH3-3286-000		1	LAMP TUNGSTEN		
18	BH3-8101-000		1	CAP INDICATION		
19	XZ9-0488-000		2	MAGNET CATCH		
501	XA1-1260-406		2	SCREW		
502	XA1-3260-306		4	SCREW		
503	XB4-7300-606		2	SCREW, TAP TIGHT		
504	XD1-4100-262		2	WASHER, TOOTHED LOCK		
505	XB1-2300-806		4	SCREW		

FIGURE 07
POWER BOX

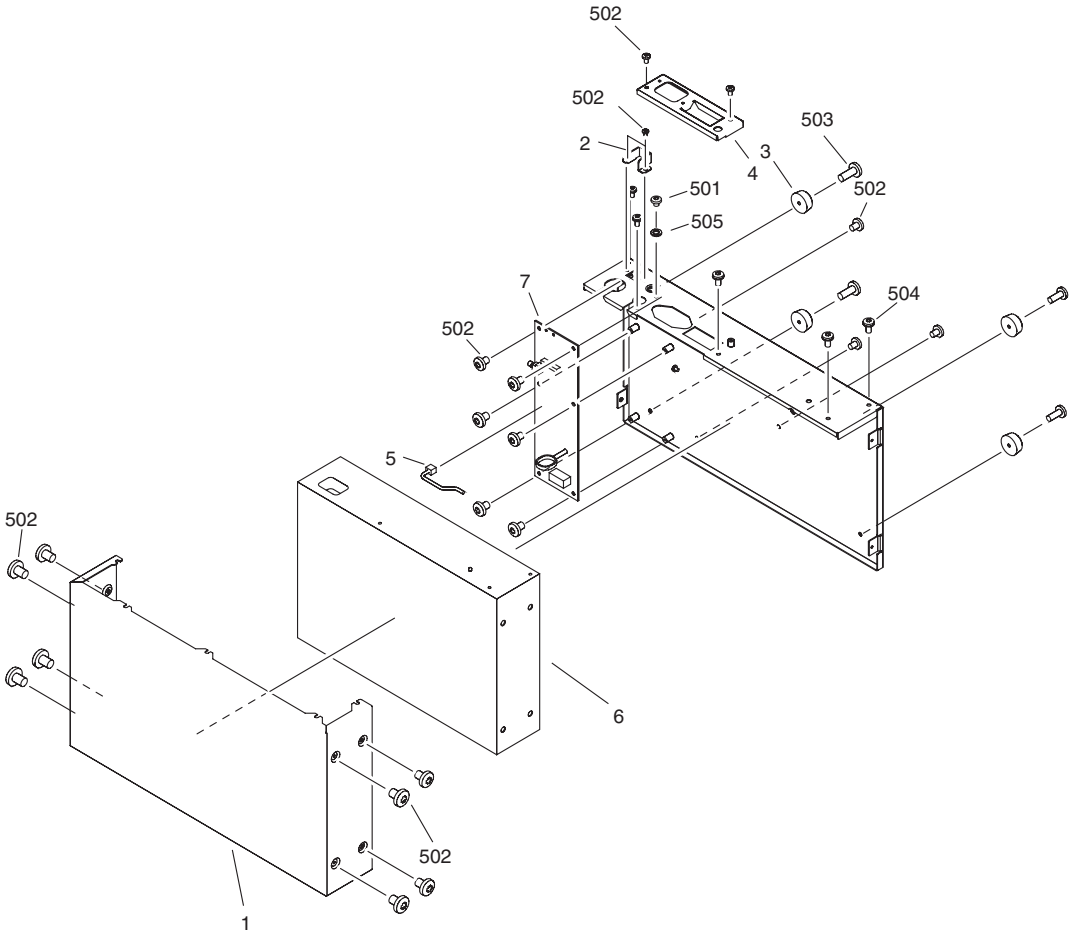
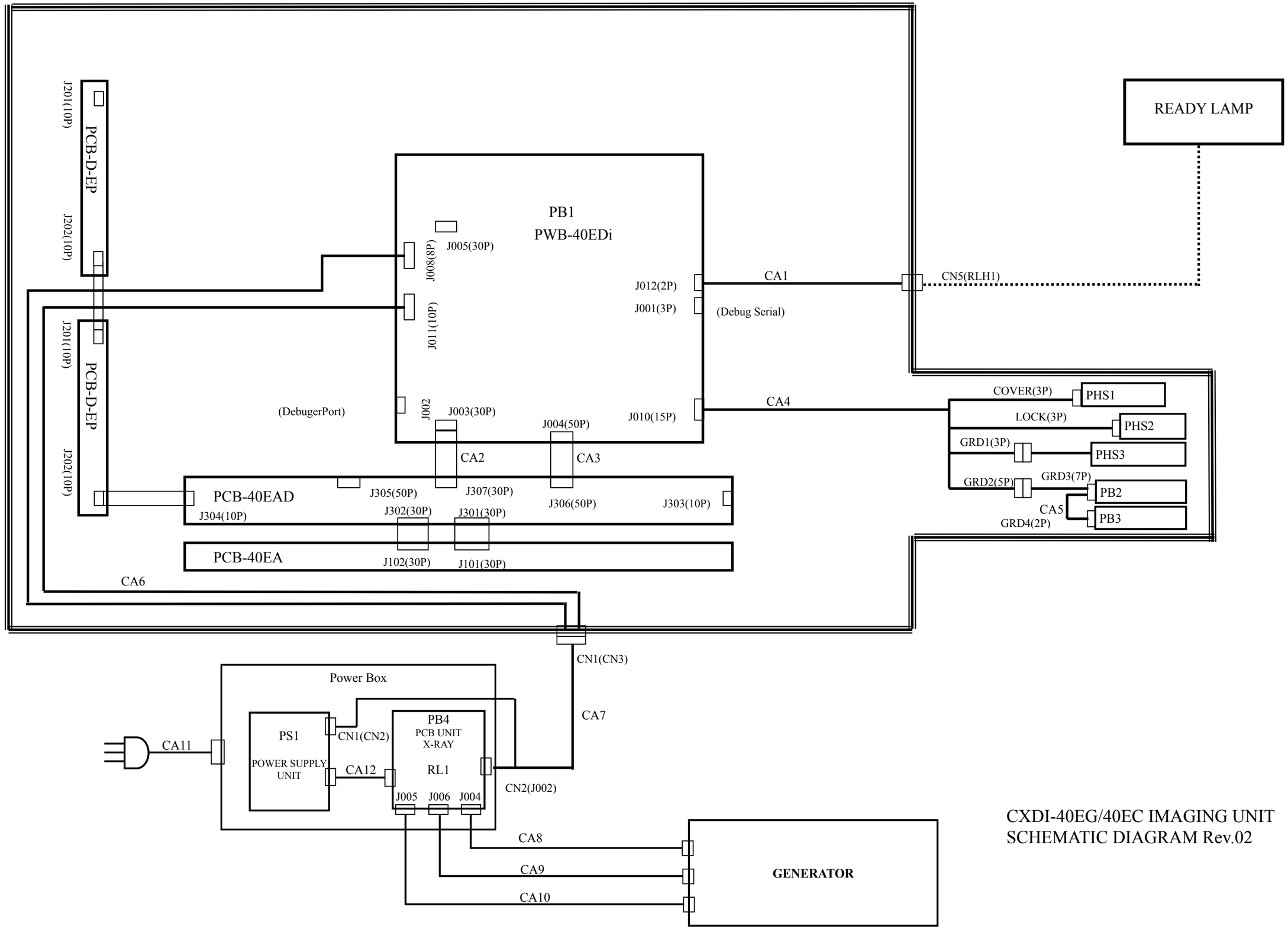


FIGURE & KEY NO.	PARTS NUMBER	RANK	Q'TY	DESCRIPTION	SERIAL NUMBER/ REMARKS	SVC
Fig.07	NPN		RF	POWER BOX	CXDI-40E POWER BOX	
1	BA4-1800-030		1	COVER, POWER BOX		
1	BA4-2378-020		1	COVER, POWER BOX	FOR COLLIMATION	
2	BA4-1802-000		1	COVER, CABLE		
3	BA4-1803-000		4	PAD		
4	BA4-1804-030		1	COVER, SWITCH		
5	BG7-2856-050		1	CABLE, POWER SUPPLY		
6	BG7-2857-070		1	POWER SUPPLY UNIT		
7	BG7-3069-000		1	PCB UNIT, X-RAY		
7	BG7-3071-000		1	PCB UNIT, X-RAY	FOR COLLIMATION	
501	XB1-1400-603		2	SCREW		
502	XB1-2300-406		21	SCREW		
503	XB1-2300-806		4	SCREW		
504	XB2-7300-606		5	SCREW, W/WASHER		
505	XD1-4200-402		1	WASHER, TOOTHED LOCK		

Prepared by
Technical Service Dept.
CANON INC.

Canon

SYMBOL	PARTS NO.	DESCRIPTION	REMARKS
CA1	BG7-2634-030	CABLE, TRANSMIT, READY LAMP	
CA2	BH6-6481-000	CABLE, FLAT	
CA3	BH6-7582-000	CABLE, FLAT	Gold Plated
CA4	BG7-3066-000	CABLE, TRANSMIT, GRID DETECTION	
CA5	BG7-2625-020	CABLE, GRID ID	
CA6	BG7-3067-000	CABLE, TRANSMIT, SENSOR	
CA7	BG7-3068-000	CABLE, SENSOR	
CA8	BH6-5728-040	CABLE, X-RAY I/F	
	BH6-6485-000	CABLE, X-RAY I/F (COLLIMATION)	
CA9	BH6-6486-000	CABLE, COLLIMATION (COLLIMATION)	
CA10	BH6-6487-000	CABLE, OFFSET (COLLIMATION)	
CA11	BH4-6494-020	CABLE, POWER (100V)	
	BH4-2385-100	CABLE, POWER (120V)	
	BH4-6217-030	CABLE, POWER (230V)	
CA12	BG7-2856-050	CABLE, POWER SULLPY	
PB1	BG7-3109-000	PCB UNIT, PWB-40EDI	One Side Readout Gold Plated
PB2	BG7-2624-030	PCB UNIT, GRID ID (RECEIVING)	
PB3	BG7-2623-030	PCB UNIT, GRID ID (LUMINESCENCE)	
PB4	BG7-3069-000	PCB UNIT, X-RAY	
	BG7-3071-000	PCB UNIT, X-RAY (FOR COLLIMATION)	
PHS1	WG8-5718-000	PHOTO INTERRUPTER W/CONNECTOR	
PHS2	WG8-5718-000	PHOTO INTERRUPTER W/CONNECTOR	
PHS3	BH0-4477-000	PHOTO SENSOR W/CONNECTOR	
PS1	BG7-2857-070	POWER SUPPLY UNIT	
RL1	WB1-0116-000	NC2D-P-DC5V	(MATSUSHITA)



CXDI-40EG/40EC IMAGING UNIT
SCHEMATIC DIAGRAM Rev.02

SDS_XIF信号 (out) *PCB-Diボード上RDS信号： bit0=/RX_REQ、bit1=/SET_DEF、bit2=ECHO_B、bit3=rsv (XIF_in信号・未使用)
bit4～7=ボード識別信号 0000：通常ボード、0001：オートコリボード、0010：+RDYボード

RDS_XIF信号(in) *PCB-Diボード上SDS信号： bit0=/RX_COM、bit1=ECHO、bit2～7=rsv(オフセット/絞り連動用信号)

参考
PCB-50Di上信号名

J002
DF13-15P
ペア間は並行に等長配線（線長差1mm以内）。同層で配線。

To 撮影部

100Ω インピーダンスコントロール

IC2
SN65LVDS180PW

IC1
EPM3064ATC44

To ETHANET CABLE

T1 4864
T2 4864

J003
TM5RL-88

IC7
TC74AC14FT

X1
SG636PCE-16M

IC8
PST592DM

RA1
10K

JP1
A1-10PA

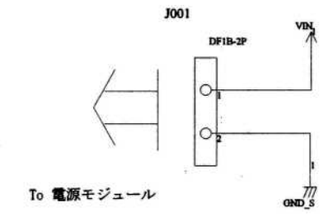
ISP用コネクタ

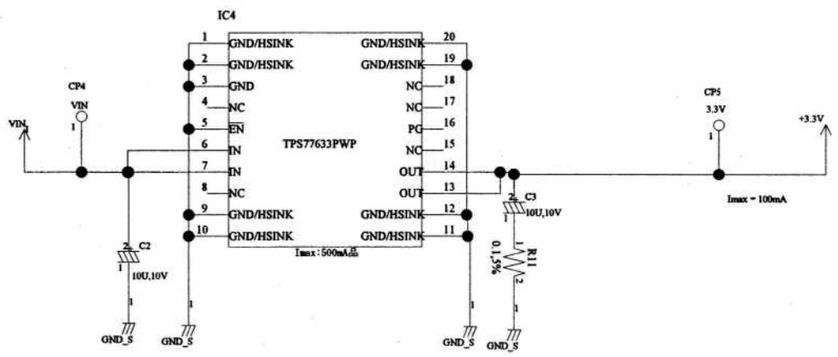
※7-8番ピンジャンパ：3m設定
※6-8番ピンジャンパ：7m設定

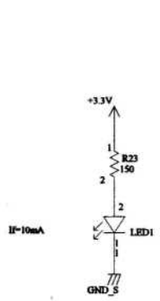
SW1
AB-15AH

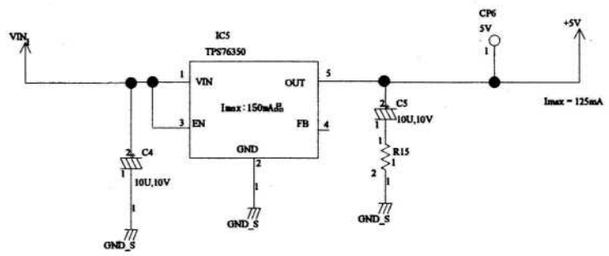
IC2
SN65LVDS180PW

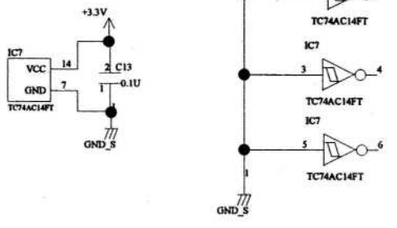
PWB-40EXRAY 1/2
SCHEMATIC DIAGRAM Rev. 01

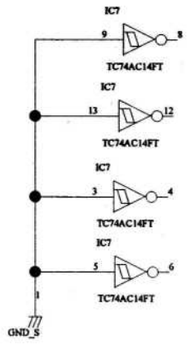


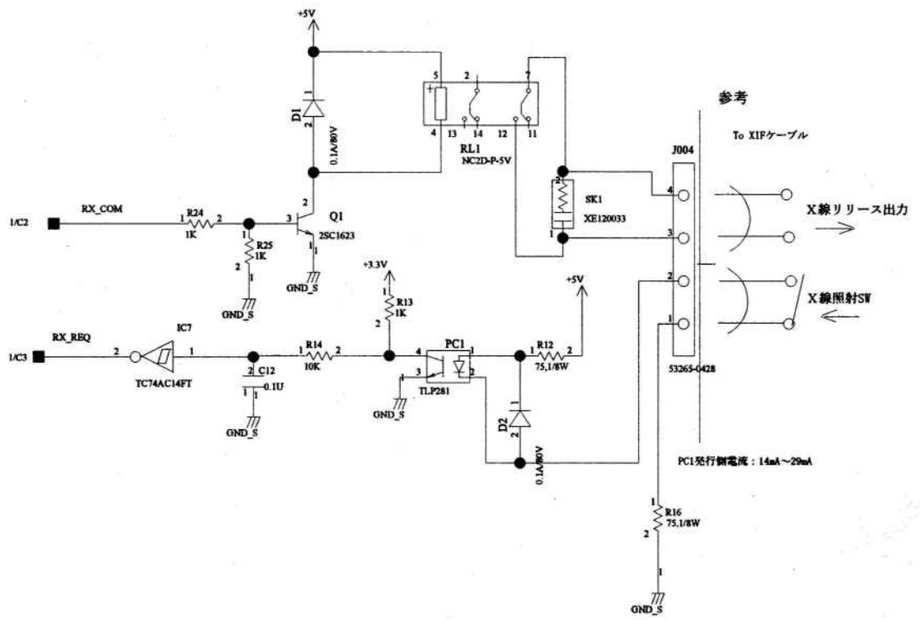












PWB-40EXRAY 2/2
SCHEMATIC DIAGRAM Rev. 01

SD[7:4]=0000：通常ボード、0001：オプションボード(40E)
0010：50G用READY出力つきボード
(本回路は40E用)

SDS_XIF信号 (out) *PCB-Diボード上RDS信号： bit0=/RX_REQ、bit1=/SET_DEF、bit2=ECHO_B、
bit3=XIF_IN、bit4～7=ボード種別信号

RDS_XIF信号(in) *PCB-Diボード上SDS信号： bit0=/RX_COM、bit1=ECHO、bit2～7=オフセット・絞り連動制御用信号

参考
PWB-50Di上信号名

J002
DF13-15P

IC2
SN65LVDS180PW

100Ω インピーダンスコントロール

To
ETHANET
CABLE

T1 4864
T2 4864

J003
TM5RL-88

CP1 GND_E
CP2 GND_S

IC1
EPM3128ATC100-10N

IC2
SN65LVDS180PW

RA1 10K

JP1
A1-10PA
ISP用コネクタ

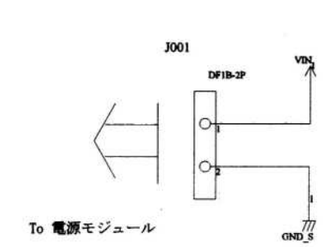
X1
SG636PCE-16M

IC7
TC74AC14FT

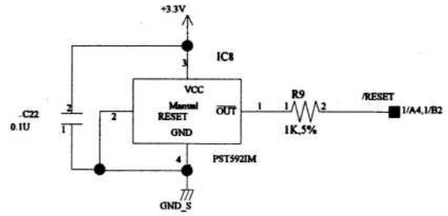
※7-8番ピンジャンパ：3m設定
※6-8番ピンジャンパ：7m設定

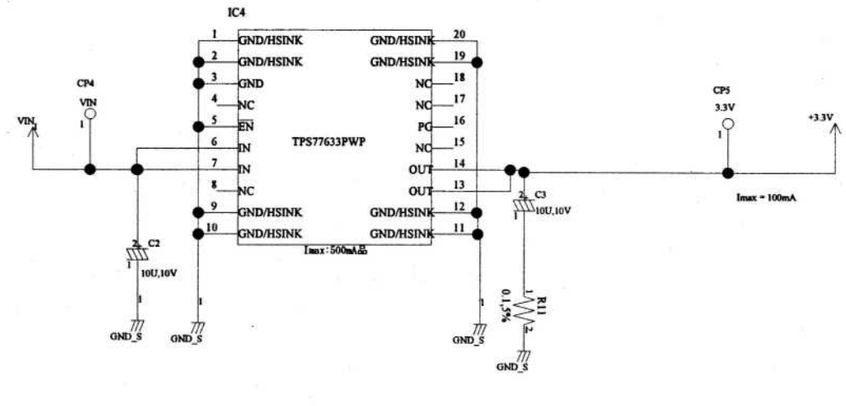
SW1
AB-15AH

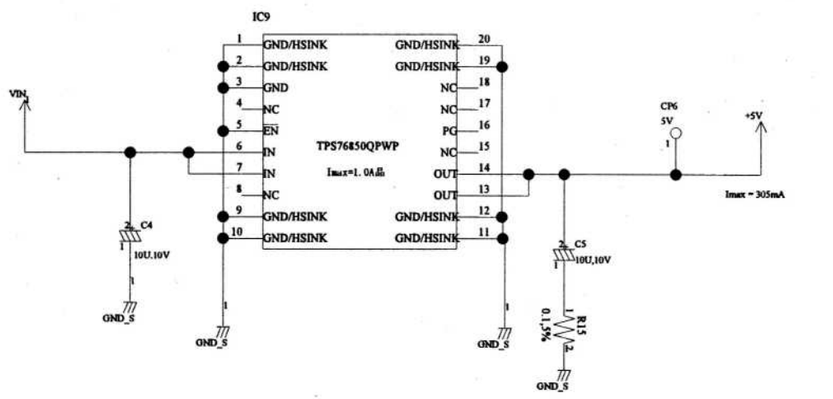
PWB-40EXRAY
(Auto Collimation Type) 1/3
SCHEMATIC DIAGRAM Rev. 01

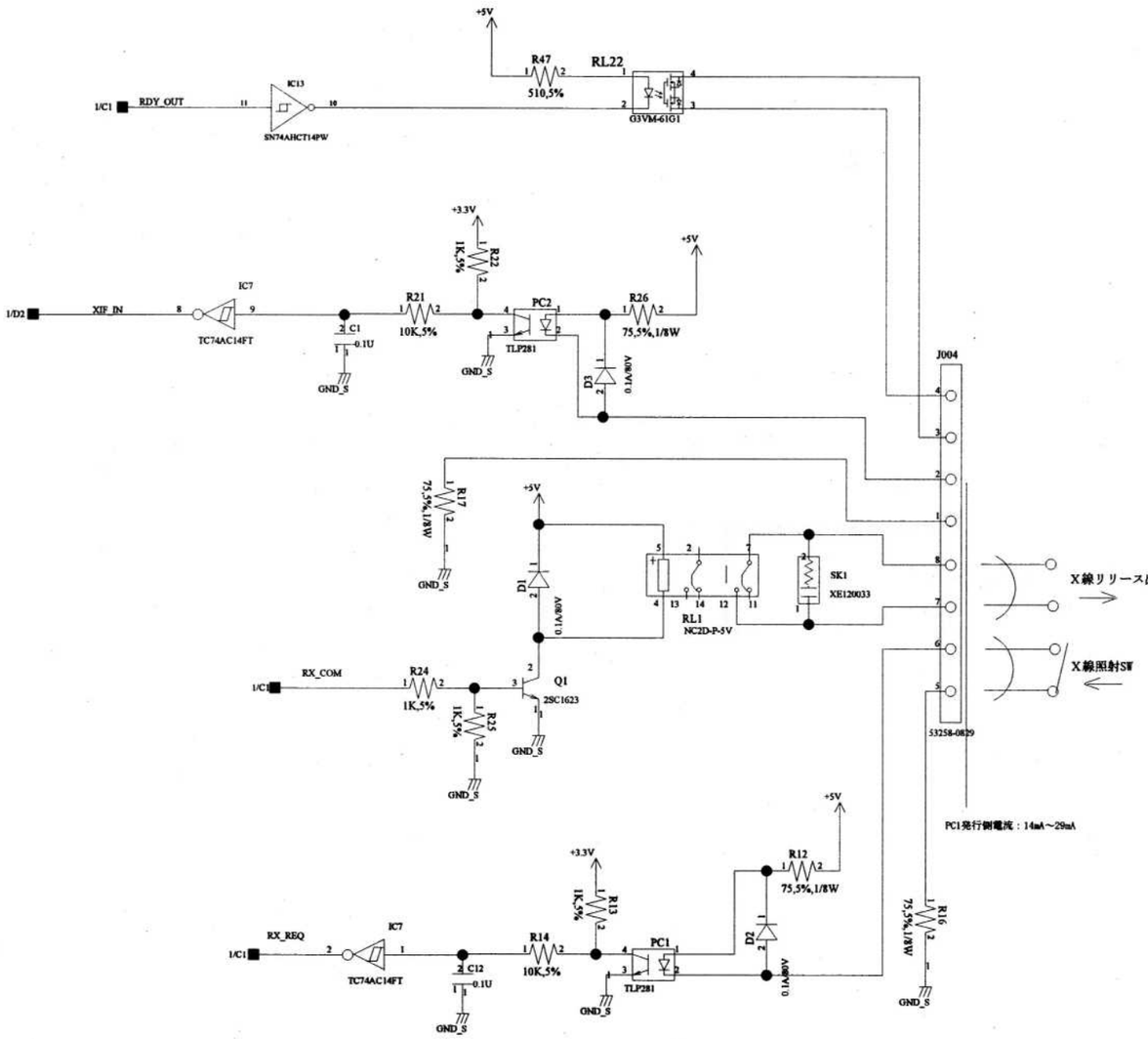


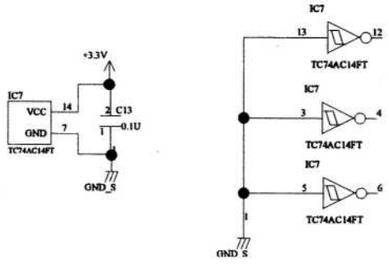
Vin =6.0V to 7.2V





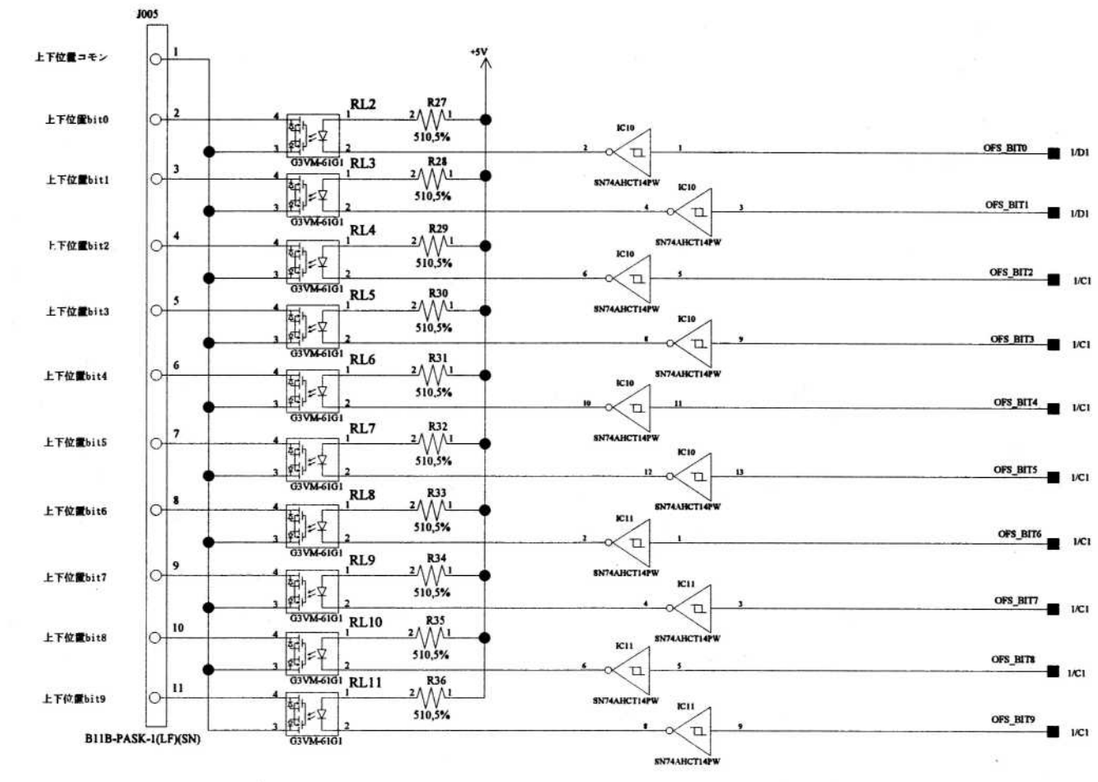




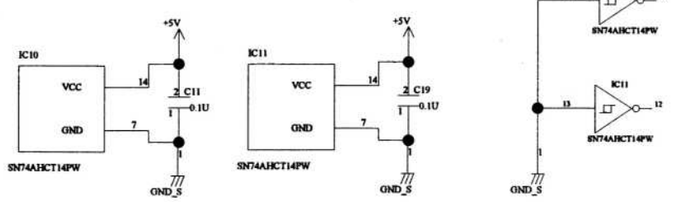


PWB-40EXRAY
(Auto Collimation Type) 2/3
SCHEMATIC DIAGRAM Rev. 01

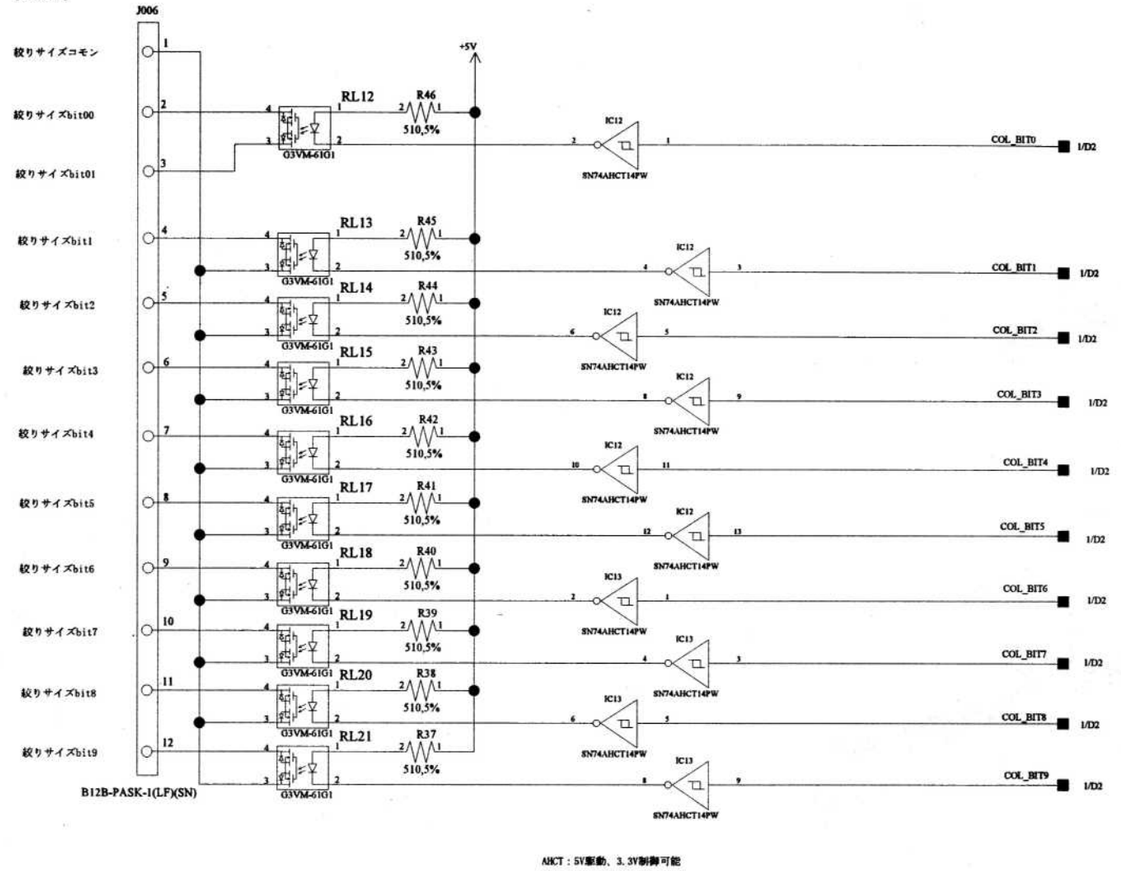
【上下位置連動信号】



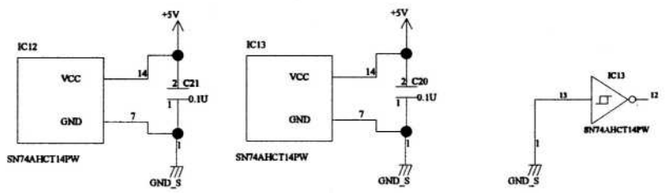
AHCT：5V駆動、3.3V制御可能



【絞り連動】



AHCT：5V駆動、3.3V制御可能



PWB-40EXRAY
(Auto Collimation Type) 3/3
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Chapter 7

Service Manual Report

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Chapter 8

Tool

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ISSUED ON: **October 2006**

SPECIAL TOOL LIST

MODEL: CANON DIGITAL RADIOGRAPHY CXDI-40EG/40EC

BINDER: SERVIC MANUAL FOR CXDI-40EG/40EC

FILE NO. 1/1

TOOL NO.	TOOL NAME	Q'TY	REMARKS
-	Dcap Image Transfer Software (Dcap.exe)	1	Service Information SIDR-03-021
-	Network Communication Evaluation Testing Tool (Pingtest.exe)	1	CXDI-50G SMR 04-009 references
	----------		
BY9-6486-000	METAL WIRE NET UNIT	N	(If necessary)
BY9-6538-XXX	Service maintenance software	1	CD-ROM, Check Software VER.XXX
BY9-6539-000	Protecting key(USB Programmed Type)	1	
BY9-7007-000	Resolution Chart	1	(If necessary)

- : Not service tools.