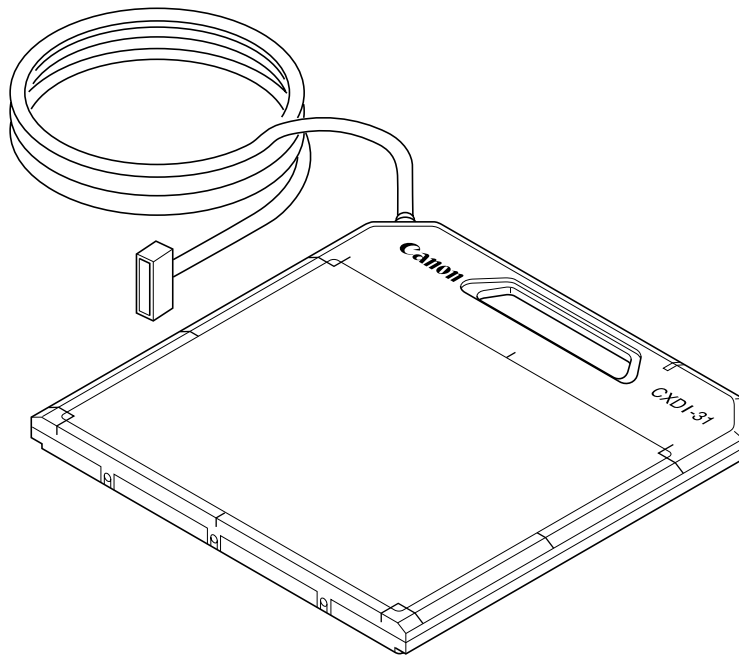


# Canon

## CXDI-31

X-ray Digital Camera  
for CXDI-1 System

## User's Manual



Before using the instrument, be sure to read this manual thoroughly.  
Also, read the manuals of the E/O box, Sensor Power Unit, Control Station, and other instruments in the system.  
Keep the manual where it is easily accessible.

## PLEASE NOTE

1. The user is responsible for the use and maintenance of the product.  
We suggest that a member of the user's staff be designated as being in charge of maintenance so as to ensure that the product is kept in a safe and good condition.  
Also, medical products must be used only by a qualified person.
2. Roentgenography, image processing, reading of image, and storage of data must be performed in accordance with the law of the country where the product is being used.  
Also, the user is responsible for maintaining the privacy of image data.
3. In no event will Canon be liable for direct or indirect consequential damage arising out of the use of this product. Canon will not be liable for loss of image data due to any reason.
4. This product may malfunction due to electromagnetic waves caused by portable personal telephones, transceivers, radio-controlled toys, etc. Be sure to avoid having objects such as these, which affect this product, brought near the product.
5. Canon reserves the right to change the specifications, configuration and appearance of the product without prior notice.

System and product names in this manual are the trademarks of each manufacturer that developed them.

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# Safety Information

## Regulations

### **For U.S.A.**

Do not make any changes or modifications to the equipment unless otherwise specified in the manual.

If such changes or modifications should be made, you could be required to stop operation of the equipment.

**NOTE:** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules.

These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.



Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Use of shielded cable is required to comply with class A limits in Subpart B of Part 15 of FCC rules.




## General Safety Information

Follow the safety instructions in this manual and all warnings and cautions printed on the warning labels. Ignoring such cautions or warnings while handling the product may result in injury or accident. Be sure to read and fully understand the manual before this product. Keep this manual for future reference.


### Meaning of Caution Signs

 <b>WARNING</b>	This indicates a potentially hazardous situation which, if not heeded, could result in death or serious injury to you or others.
 <b>CAUTION</b>	This indicates hazardous situation which, if not heeded, may result in minor or moderate injury to you or others, or may result in machine damage.
<b>NOTE</b>	This is used to emphasize essential information. Be sure to read this information to avoid incorrect operation.






## Environment of Use and Storage

 <b>WARNING</b>	<p>Do not use or store the instrument near any flammable chemicals such as alcohol, thinner, benzene, etc. Also, this instrument is not a category AP or APG equipment. If chemicals are spilled or evaporate, it may result in fire or electric shock through contact with electric parts inside the instruments. Also, some disinfectants are flammable.</p> <p>Be sure to take care when using them.</p>
 <b>CAUTION</b>	<p>Do not install the instrument in a location with the conditions listed below. Otherwise, it may result in failure or malfunction, fall or cause fire or injury.</p> <ul style="list-style-type: none"> <li>- Close to facilities where water is used.</li> <li>- Where it will be exposed to direct sunlight.</li> <li>- Close to air-conditioner or ventilation equipment.</li> <li>- Close to heat source such as a heater.</li> <li>- Prone to vibration.</li> <li>- Insecure place.</li> <li>- Dusty environment.</li> <li>- Saline or sulfurous environment.</li> <li>- High temperature or humidity.</li> <li>- Freezing or condensation.</li> </ul>
 <b>CAUTION</b>	<p>Do not place the storage box in a location with the conditions listed below:</p> <ul style="list-style-type: none"> <li>- Where the cable of the sensor unit will be strongly pulled when the sensor unit is put in the box. Otherwise, the cable may be damaged, resulting in fire or electric shock.</li> <li>- Where someone might get their foot caught in the cable of the sensor unit when the unit is put in the box. Otherwise, they could trip over, resulting in injury.</li> <li>- Within the table top lowering range. When the table top is lowered, it may hit against the storage box or sensor unit, resulting in damage to the table and units.</li> </ul>







## Connection

 <b>WARNING</b>	<p>Do not connect the instrument with anything other than specified. Otherwise, it may result in fire or electric shock.</p>
--	--


Power Supply

 <b>WARNING</b>	<p>Be sure to turn OFF the power of each instrument before connecting or disconnecting the cables. Also, do not handle them with wet hands. Otherwise, you may get an electric shock that may result in death or serious injury.</p>
 <b>WARNING</b>	<p>Be sure to hold the plug or connector to disconnect the cable. If you pull the cable, the core wire may be damaged, resulting in fire or electric shock.</p>
 <b>WARNING</b>	<p>Do not cut or process the cables. Also, do not place anything heavy, including the instrument on it, step on it, pull it, bend it, or bundle it. Otherwise, the cable may be damaged, which may result in fire or electric shock.</p>
 <b>WARNING</b>	<p>Do not turn ON the system power when condensation is formed on the instrument. Otherwise, it may result in fire or electric shock.</p>
 <b>CAUTION</b>	<p>Because the instrument's cable is long, take care so cables do not get tangled during use. Also, be careful not to get your feet caught in the cable.</p>


Handling

 <b>WARNING</b>	<p>Always be sure to keep checking the condition of the system and the patient to ensure they are normal during the use of the instrument. If any problem is found, take appropriate measures, such as stopping the operation of the instrument, as required.</p>
 <b>WARNING</b>	<p>Never disassemble or modify the product as it may result in fire or electric shock. Also, since the instrument incorporates parts that may cause electric shocks and other hazardous parts, touching them may cause death or serious injury.</p>
 <b>WARNING</b>	<p>Do not hit or drop the instrument. The instrument may be damaged if it receives a strong jolt, which may result in fire or electric shock if the instrument is used without it being repaired.</p>
 <b>WARNING</b>	<p>Wipe the CFRP plate of the sensor unit with ethanol or glutaraldehyde solution to disinfect it each time a different patient uses the instrument, in order to prevent infection. If the optional grid unit is being used, disinfect its surface. Please consult a specialist for the procedure for disinfection.</p>
 <b>CAUTION</b>	<p>Do not spill liquid or chemicals onto the instrument or, in cases where the patient is injured, allow it to become wet with blood or other body fluids, as doing so may result in fire or electric shock. In such situation, protect the instrument with disposable covering as necessary.</p>
 <b>CAUTION</b>	<p>Turn off the power of each instrument for safety when they are not going to be used.</p>





## Handling

 CAUTION	<p>This instrument incorporates lead, which may pollute the environment if the instrument is abandoned. Please ask a professional waste disposal company to handle disposal, or contact Canon representative or distributor before disposing of the instrument.</p>
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## When Problem Occurs

 WARNING	<p>Should any of the following occur, immediately turn OFF the power of each instrument, unplug the power cable from the AC outlet, and contact Canon representative or distributor.</p> <ul style="list-style-type: none"> <li>- When there is smoke, odd smell or abnormal sound.</li> <li>- When liquid has been spilled into the instrument or a metal object has entered through an opening.</li> <li>- When the instrument has been dropped and it is damaged.</li> </ul>
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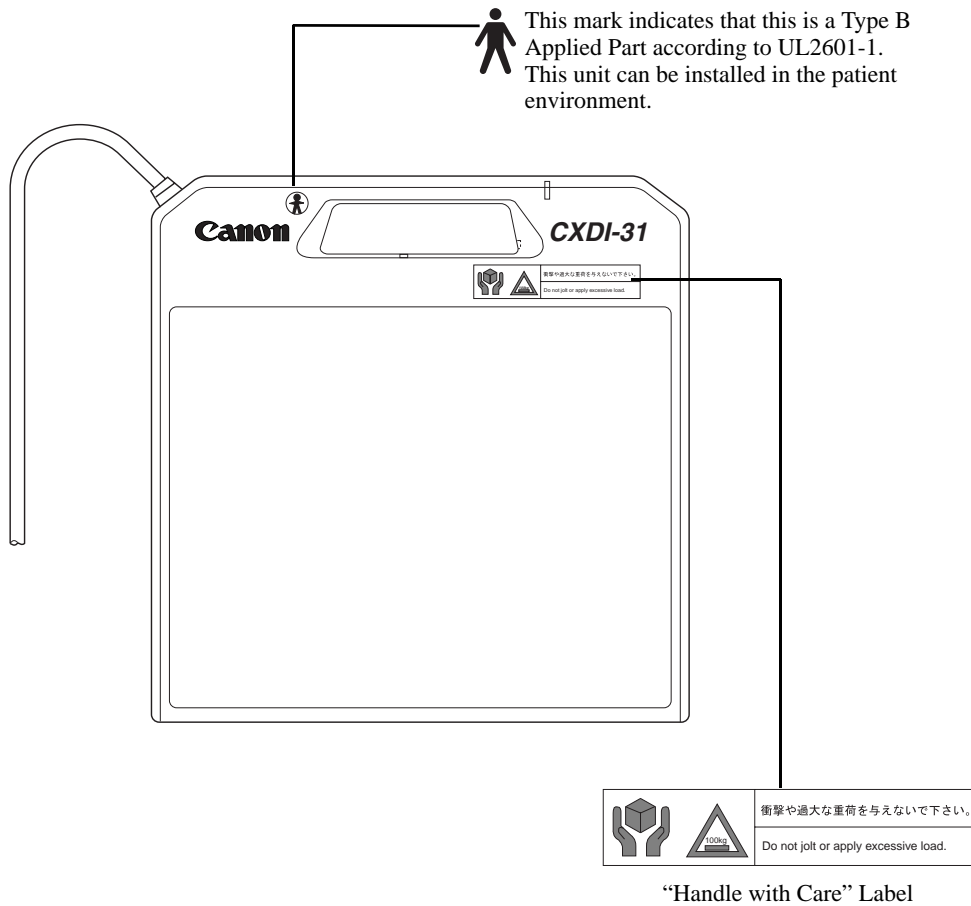
## Maintenance and Inspection

 WARNING	<p>For safety reasons, be sure to turn OFF the power of each instrument when the inspections indicated in this manual are going to be performed. Otherwise, it may result in electric shock.</p>
 WARNING	<p>When the instrument is going to be cleaned, be sure to turn OFF the power of each instrument, and unplug the power cable from the AC outlet. Never use benzine, thinner or any other flammable cleaning agents. Otherwise, fire or electric shock may result.</p>
 WARNING	<p>The instrument must be repaired by a qualified engineer only. If it is not repaired properly, it may cause fire, electric shock, or accident.</p>
 CAUTION	<p>For safety reasons, be sure to inspect the instrument before using it.</p>

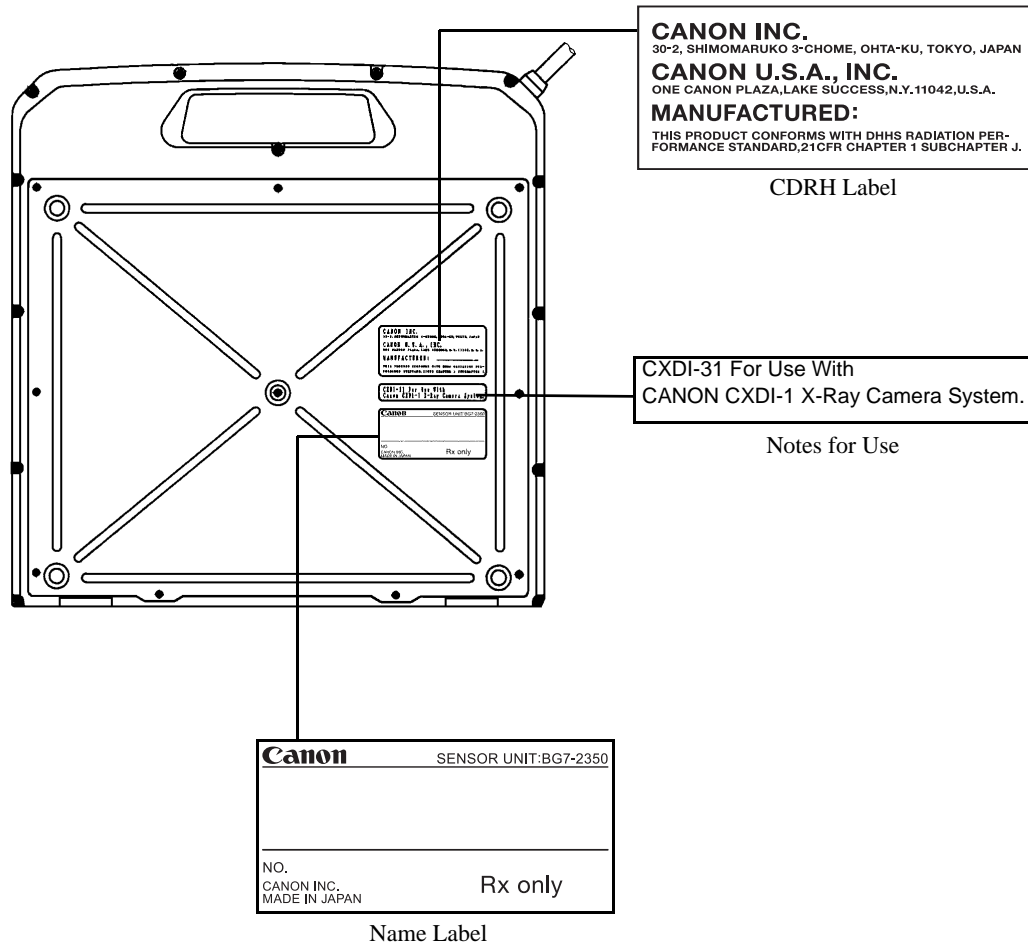
## Labels and Markings on the Instrument

The CXDI-31 has a few labels and markings on it.  
Contents of those and positions where they are attached are indicated below.

### Front



Rear



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# Contents

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Safety Information .....	(1)
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# 1. Overview

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The *Canon CXDI-31* is a portable X-ray digital camera that can take images of any part of the body.

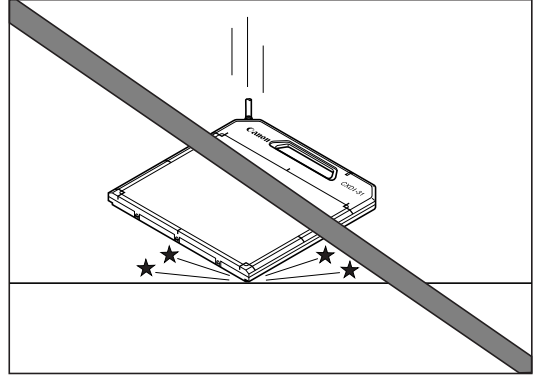
It directly converts the X-ray images captured by the LANMIT (Large Area New MIS Sensor and TFT) sensor into a high-resolution digital images.

## 2. Notes for Using the Instrument

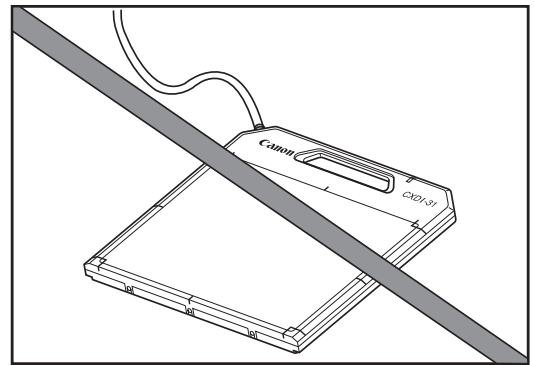
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### Handling

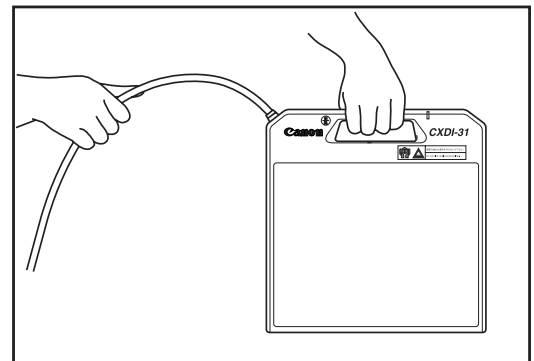
Handle the instrument carefully, as it may be damaged if something is hit against it, dropped, or receives a strong jolt. Also, handle the optional grid unit with care too.



Do not twist or pull the cable. Otherwise, the cable may be damaged. If the cable is twisted, turn the sensor unit to untwist the cable. Do not use the instrument with the cable twisted.



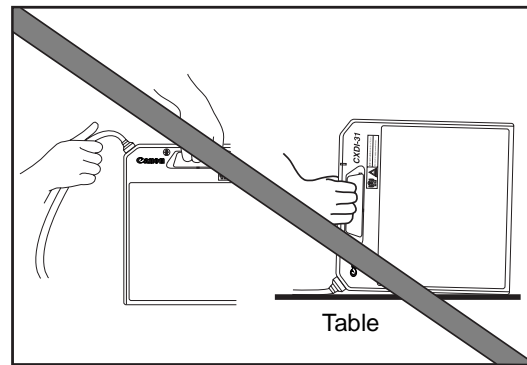
Hold the cable when using the sensor unit so that the cable will not be pulled.



Do not strongly bend the part where the cable is connected to the sensor unit.

Also, do not use the sensor unit with its top or left side (when viewed from the front) pressed against an object such as a table.

The cable connection part may be damaged if force is applied to it.



### Before Exposure

Sudden heating of the room in cold areas will cause condensation to form on the instrument. In this case, wait until condensation disappears before performing exposure.

If the instrument is used with condensation formed on it, problems may occur in the quality of the instrument.

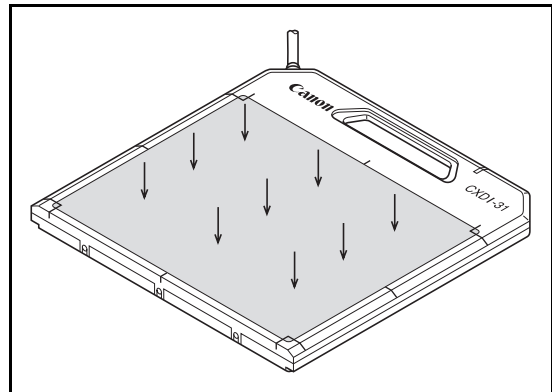
When an air-conditioner is going to be used, be sure to raise/lower the temperature gradually so that a difference in temperature in the room and in the instrument does not occur, to prevent forming of condensation.

### During Exposure

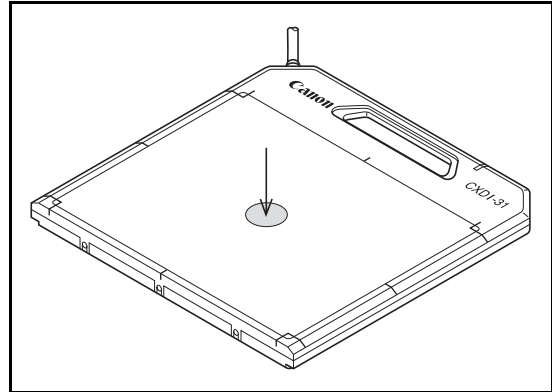
Do not apply excessive weight to the sensor unit. Otherwise, the sensor may be damaged.

#### Limit of Load

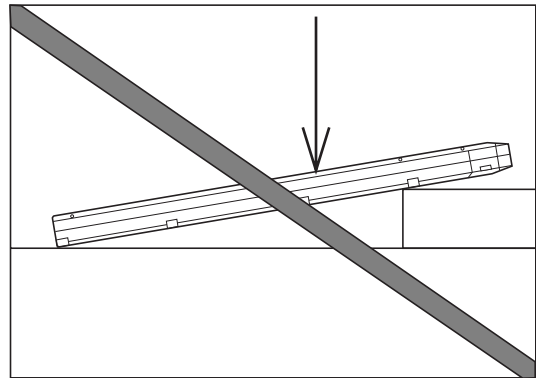
Uniform load: 150 kg over the whole area of sensor unit surface.



Local load: 100 kg on an area 40 mm in diameter.



Be sure to use the sensor unit on a flat place so it will not bend. Otherwise, the sensor may be damaged.



## During Cleaning

Do not use anything other than neutral detergent for cleaning the cover of the instrument. Otherwise, the coating will be corroded.

## Storage

Be sure to put the sensor unit into the storage box when it is not in use. The unit may be damaged if it falls or is dropped. Also, be sure to store the optional grid unit in a safe place where it will not fall or drop.

## Others

Be sure to reconnect the cables to the proper connectors. Otherwise, the instrument may malfunction or may be damaged.

For U.S.A.

Rx only-Caution:

Federal law restricts this device to sale by or on the order of a licensed practitioner.

Intended Use:

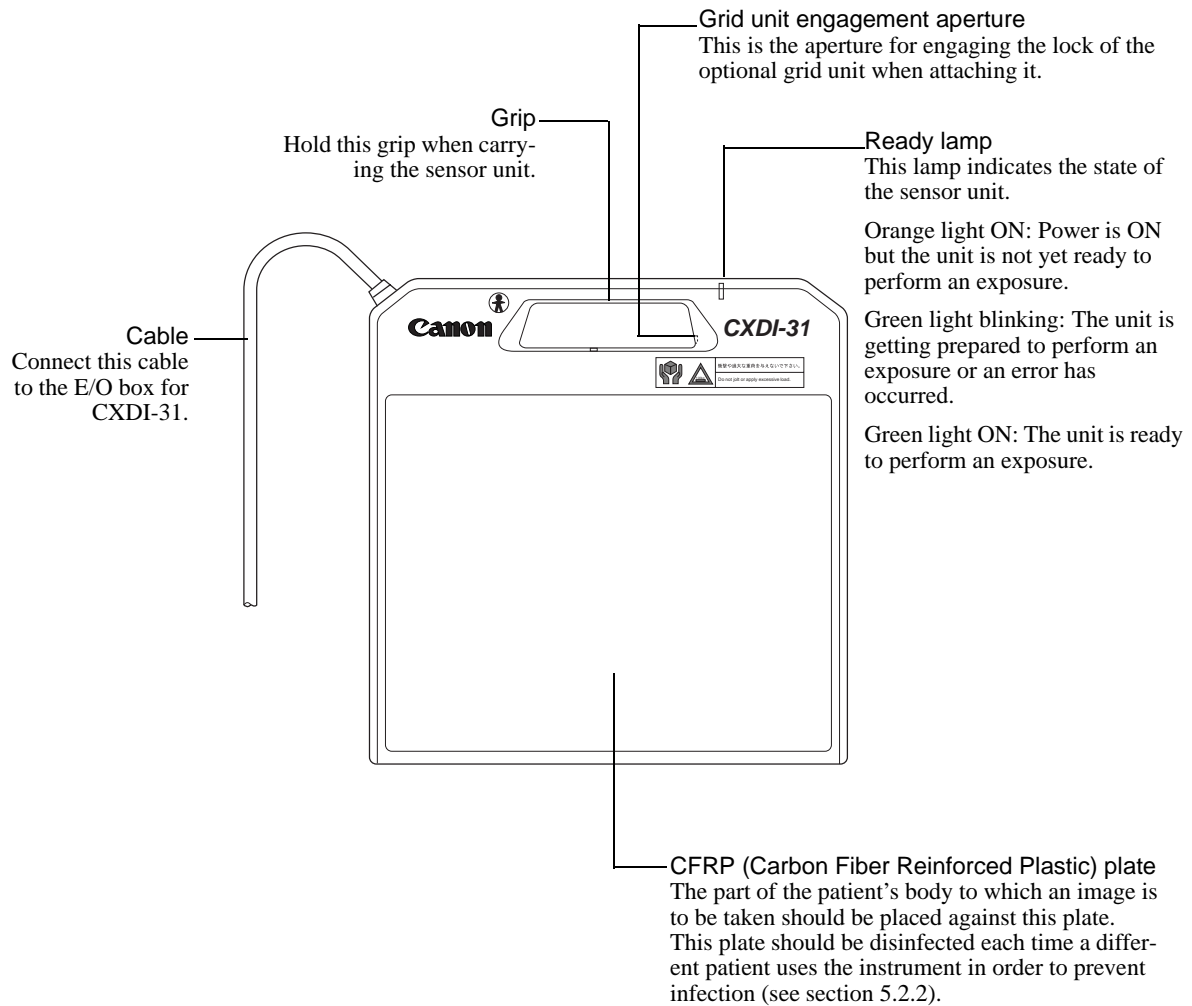
Canon X-ray digital camera CXDI-31 provides digital image capture for conventional film/screen radiographic examinations.

The device is intended to replace radiographic film/screen systems in all general purpose diagnostic procedures.

This device is not intended for mammography applications.

### 3. Description

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## 4. Operation

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### 4.1 Turning ON the Power of the System

- (1) Turn ON the power of the Sensor Power Unit (option), control PC unit of the Control Station (option) and Operation Unit (option).
- (2) Turn ON the system power switch on the control PC unit of the Control Station. The power of the whole system turns ON.

### 4.2 Turning OFF the Power of the System

Turn OFF the system power by referring to the manual of the Control Station.

*NOTE: There is no need to turn OFF the power of each instrument, as it will automatically turn OFF when the system power of control PC unit is turned OFF.*


### 4.3 Calibration

Calibration is important to ensure that a good image is achieved with the CXDI-31 by obtaining the calibration data of the sensor unit. Perform calibration when exposure conditions have changed significantly.

For procedure for calibrating, refer to “Calibrating the Instrument” in the CXDI Series Operation Manual.

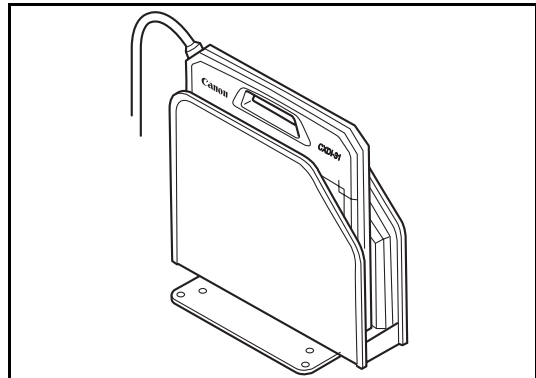
## 4.4 Storage

Store the sensor unit in the accessory storage box whenever it is not in use.

 <b>CAUTION</b>	<p>Do not place the storage box in a location with the conditions listed below:</p> <ul style="list-style-type: none"> <li>- Where the cable of the sensor unit will be strongly pulled when the sensor unit is put in the box. Otherwise, the cable may be damaged, resulting in fire or electric shock.</li> <li>- Where someone might get their foot caught in the cable of the sensor unit when the unit is put in the box. Otherwise, they could trip over, resulting in injury.</li> <li>- Within the table top lowering range. When the table top is lowered, it may hit against the storage box or sensor unit, resulting in damage to the table and units.</li> </ul>
--	--



- (1) If the optional grid unit is attached to the sensor unit, remove the grid unit and store it separately in a place where it is safe from falling or being dropped. See “Appendix: Attaching the Optional Grid Unit”.
- (2) Hold the grip of the sensor unit and place it gently into the storage box until it is positioned on the bottom of the box.

*NOTE: Do not drop the sensor unit into the storage box. Otherwise, the sensor unit may be damaged.*



## 5. Inspection and Maintenance

---

 <b>WARNING</b>	The instrument must be repaired by a qualified engineer only. If it is not repaired properly, it may cause fire, electric shock, or accident.
 <b>CAUTION</b>	For safety reasons, be sure to inspect the instrument before using it.

### 5.1 Inspection

In order to ensure that the instrument is used safely and normally, please be sure to inspect the instrument before use.


If any problem is found during the inspection, please take measures indicated in this chapter.

If problem still cannot be corrected, please contact Canon representative or distributor.

It is recommended that a record of the inspection be kept by making copies of the check lists in this section, or making a separate check list.

#### 5.1.1 Daily Inspection

##### 5.1.1.1 Before Turning ON the Power

 <b>WARNING</b>	For safety reasons, be sure to turn OFF the power of each instrument when the following inspections are going to be performed. Otherwise, it may result in electric shock.
--	--

	Inspection	Result			Remedy
		Date /	Date /	Date /	
Cable	Check that cables are not damaged or cover of cables is not torn.	Good/Bad	Good/Bad	Good/Bad	Contact Canon or distributor if there is any problem.
	Check that the plugs and locks of connectors are not loose.	Good/Bad	Good/Bad	Good/Bad	Fully insert the cables and lock them.
Sensor Unit	Check that the cover or parts are not damaged and not loose.	Good/Bad	Good/Bad	Good/Bad	Contact Canon or distributor if there is any problem.

### 5.1.1.2 After Tuning ON the Power

Perform the following inspection with the Sensor Power Unit (option) and the Control Station (option) connected:

	Inspection	Result			Remedy
		Date /	Date /	Date /	
General	Perform calibration exposure or test exposure.	Good/Bad	Good/Bad	Good/Bad	Take measures if error message is displayed by referring to the CXDI Series Operation Manual. Contact Canon or distributor if the problem cannot be solved.

### 5.1.2 Monthly Inspection


Perform the following inspection periodically once a month with the Sensor Power Unit (option) and the Control Station (option) connected. Contact Canon representative or distributor if you cannot do it.

	Inspection	Result			Remedy
		Date /	Date /	Date /	
General	Check the performance of the instrument by performing exposures using a phantom or a resolution chart.	Good/Bad	Good/Bad	Good/Bad	Contact Canon or distributor if there is any problem.
	Check the performance of sensor in the sensor unit by performing the self-test indicated in the CXDI Series Operation Manual.	Good/Bad	Good/Bad	Good/Bad	Contact Canon or distributor if there is any problem.

## 5.2 Cleaning and Disinfection


### 5.2.1 Cover

Clean the cover by the following procedure if it is dirty.

 <b>WARNING</b>	When the instrument is going to be cleaned, be sure to turn OFF the power of each instrument, and unplug the power cable from the AC outlet. Never use benzene, thinner or any other flammable cleaning agents. Otherwise, fire or electric shock may result.
--	--

- (1) Turn OFF the power of each instrument.
- (2) Unplug the power cables of the control PC unit of the Control Station (option) and the Sensor Power Unit (option) from the AC outlet.
- (3) Wipe the cover with a piece of cloth soaked in neutral detergent diluted in water and wrung dry.
- (4) Wipe the cover with a piece of cloth soaked in water and wrung dry whenever neutral detergent has been used.

### 5.2.2 CFRP (Carbon Fiber Reinforced Plastic) Plate of the Sensor Unit

 <b>WARNING</b>	Wipe the CFRP (carbon fiber reinforced plastic) plate of the sensor unit with ethanol or glutaraldehyde solution to disinfect them each time a different patient uses the instrument, in order to prevent infection. If the optional grid unit is being used, disinfect its surface. Please consult a specialist for the procedure for disinfection. If you are using disinfectant other than those specified above, or you are mixing another disinfectant with ethanol, please also consult a specialist, because they may harm the CFRP plate and grid unit.
--	--

## 6. Service Information

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### Repair

If problem cannot be solved even after taking the measures indicated in chapter 5, contact Canon representative or distributor for repair.

Please refer to the name label and let us have the following information:


Name of the unit: It is indicated on the name label.  
Serial number: 6-digit number indicated on the name label.  
Phenomenon: In detail.

### Limit for Supplying Performance Parts for Repair

Performance parts\* of this product will be stocked for eight years after discontinuance of production, to allow for repair.

\* Parts required to maintain the functioning of the product

### Disposal of the Instrument

 CAUTION	This instrument incorporates lead, which may pollute the environment if the instrument is abandoned. Please ask a professional waste disposal company to handle disposal, or contact Canon representative or distributor before disposing of the instrument.
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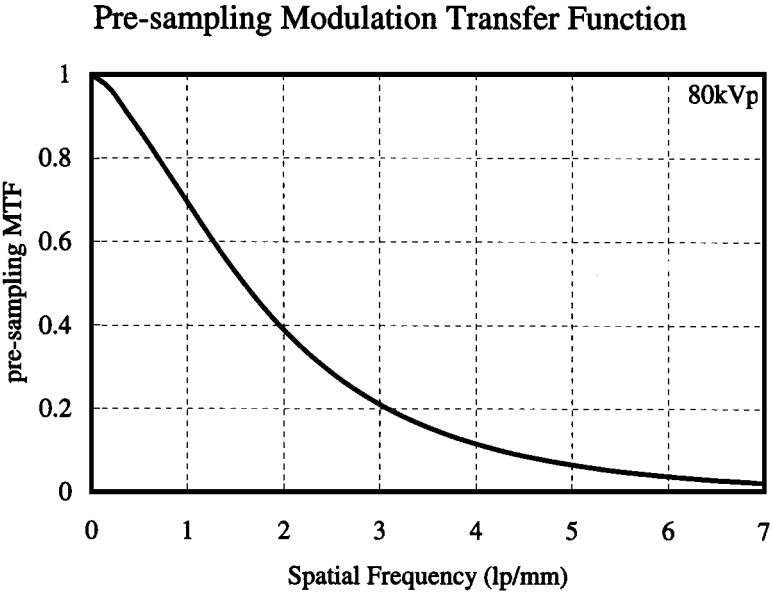
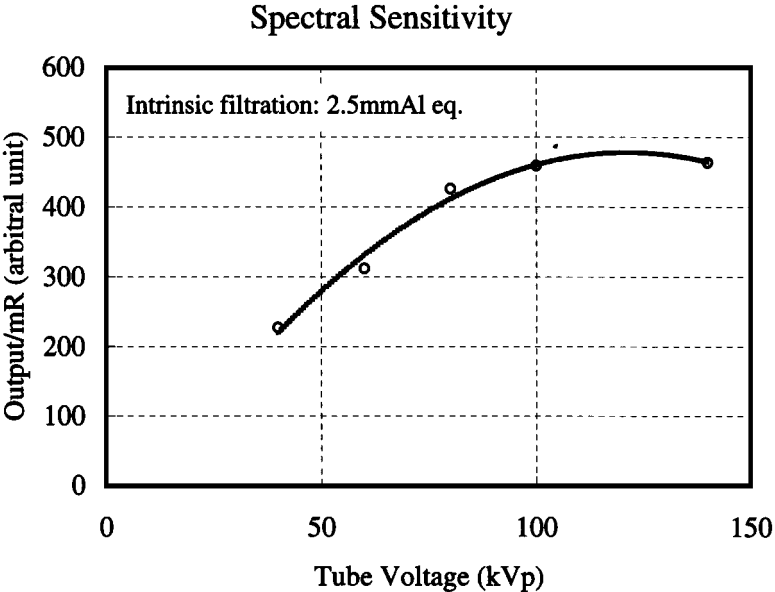
# 7. Specifications

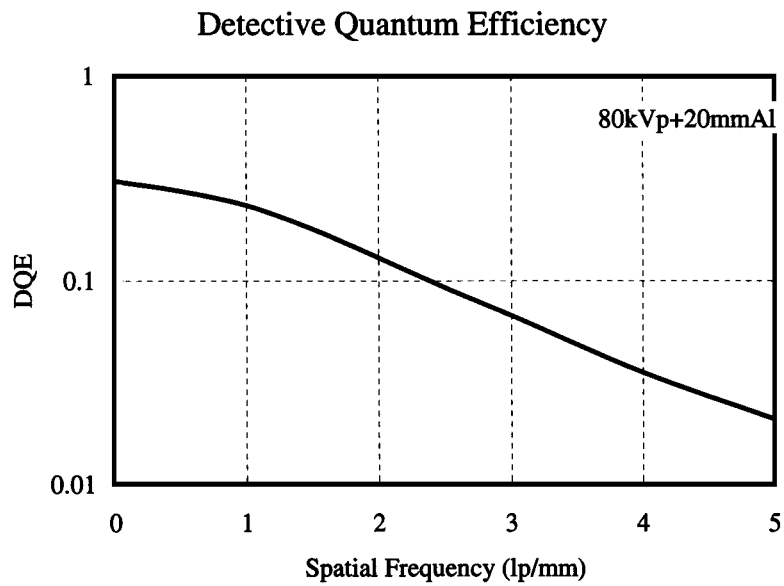
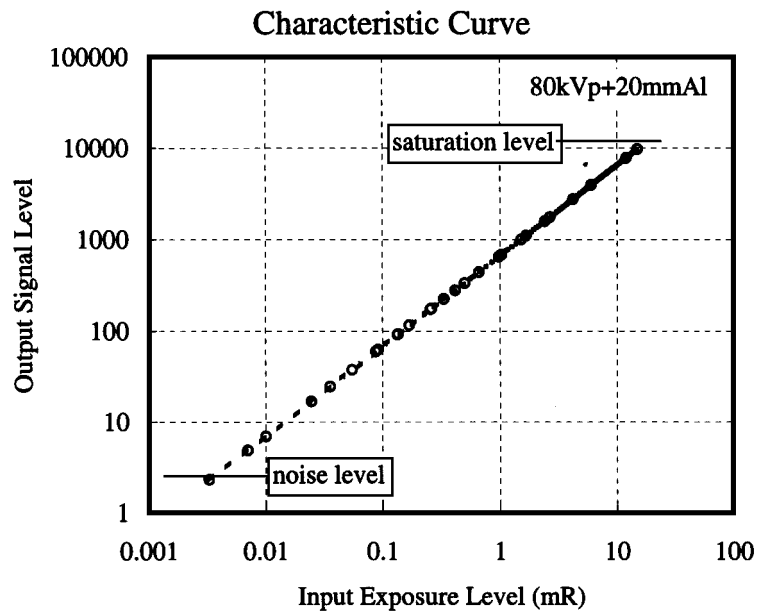
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## 7.1 Main Specifications

Purpose	General radiography
Image matrix size	2,256 × 2,878 pixels
Number of pixels	Approx. 6,490,000 pixels
Pixel size	100 μm × 100 μm
Fill factor	52%
Resolution	5 lp/mm
Dynamic range	Approx. 80 dB
DQE (0)	30% at 0.3 mR
Required patient doses	Equivalent to exposure dose of 200 speed film screen system
Gray scale	12-bit, 4,096 gray scale
Total expected life	210,000 exposures
Environmental requirements	Operation: Temperature: +10 to +35°C Humidity: 30 to 75%RH (no condensation)  Storage and transportation: Temperature: -30 to +60°C Humidity: 10 to 60%RH (no condensation) Atmospheric pressure: 700 to 1060 hPa
Power	Supplied from the Sensor Power Unit (option)
Dimensions and mass	Sensor unit: 324 (W) × 327 (H) × 20 (D) mm, 2.8 kg Cable: 4.5 m, 0.5 kg

## 7.2 Characteristics





# 8. Components

---

- Sensor unit .....1
- E/O Box for CXDI-31 .....1
- Cables .....1 set
- Storage box .....1
- Installation parts .....1 set

### System Requirements

**To use CXDI-31, you need:**

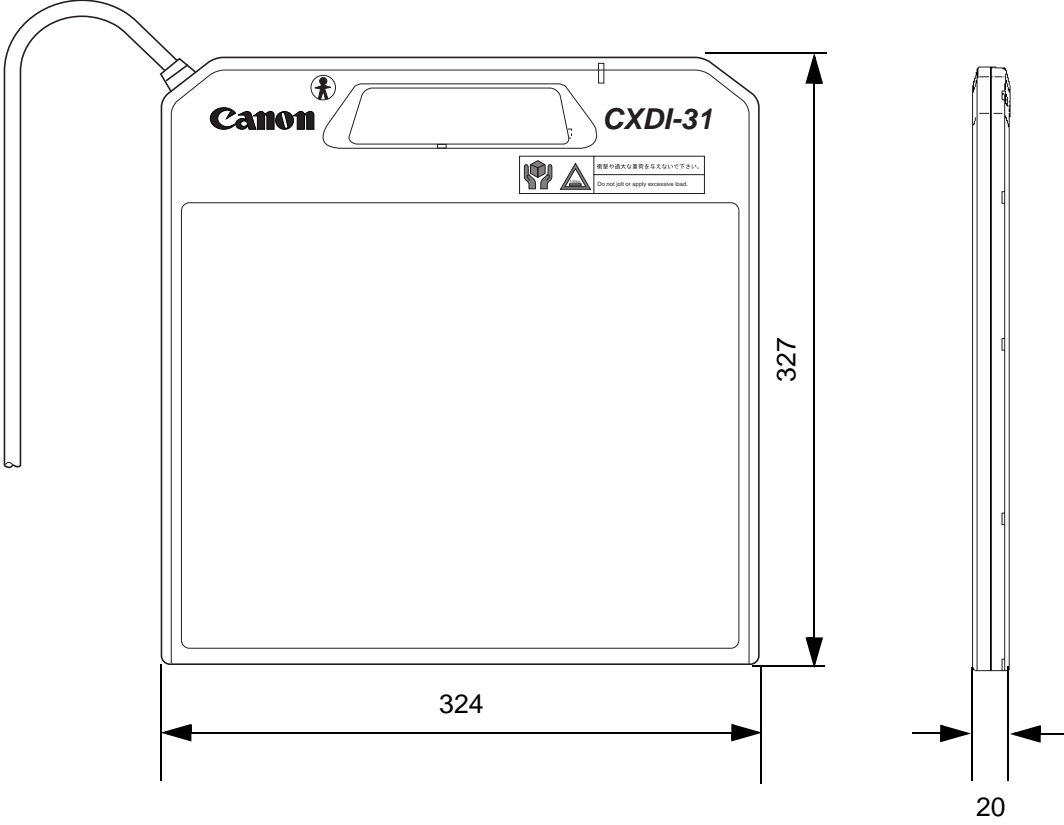
- Canon Sensor Power Unit
- Canon Control Station

**Optional:**

Grid Unit [Grid: 60 line/cm 110 cm (4:1 PORT, 4:1 LAND, 8:1 PORT, 8:1 LAND, 10:1 PORT, 10: 1 LAND)

# 9. Dimensions

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Unit: mm

## Appendix: Attaching the Optional Grid Unit

Attach the optional grid unit to the sensor unit by the procedure indicated below.

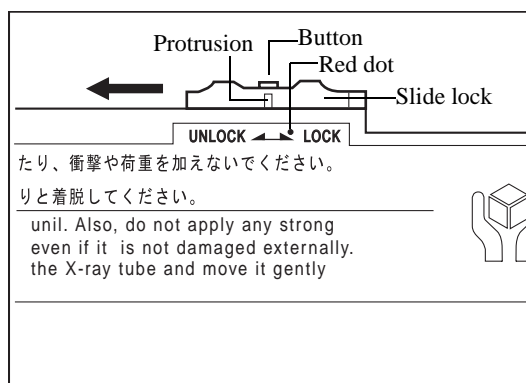
*NOTE: Structure of grid unit is delicate. Do not drop, knock over, bend, or apply force or jolt to it. Otherwise, the unit may be damaged.*

*When the grid unit is not in use, remove it from the sensor unit and store it in a safe place where it will not fall.*

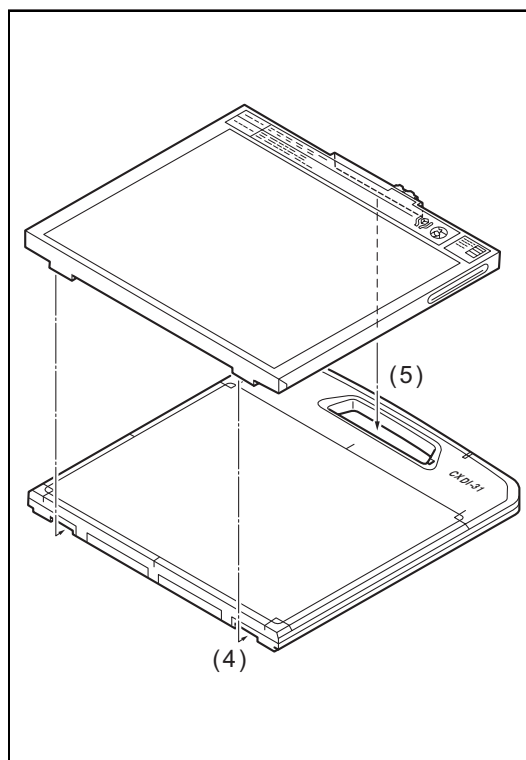
*Even if it is not extremely damaged, its characteristics may be changed, which may cause a problem in image quality.*

- (1) Blow off the dust on the front and back of the grid unit.
- (2) Place the sensor unit horizontally on a table.

- (3) Ensure that the slide lock on the grid unit is unlocked. If the protrusion on the slide lock is aligned with the red dot on the label, the slide lock is locked. Slide the lock toward the word "UNLOCK" indicated on the label while pressing the button on the lock.

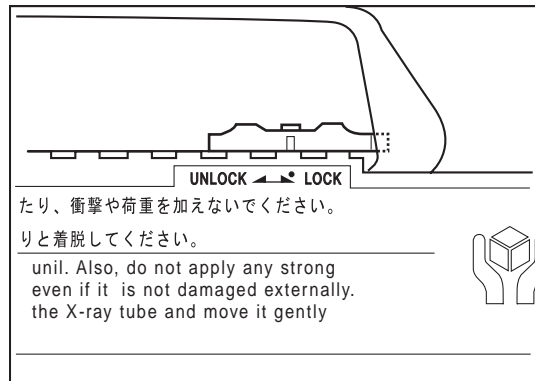


- (4) Hold the grid unit with both hands and insert the hooks on the grid unit into the notches on the sensor unit.
- (5) Gently set the grid unit over the sensor unit so that the lock mechanism on the top of the grid unit enters the hole of the grip.



- (6) While pushing the button on the slide lock, slide the lock toward the word “LOCK” indicated on the label until the protrusion on the lock is aligned with the red dot on the label.

*NOTE: Ensure that the grid unit is locked before lifting the sensor unit. Otherwise, the grid unit will fall and be damaged.*



- (7) *To remove the grid unit*

While pushing the button on the slide lock, slide the lock toward the word “UNLOCK” indicated on the table and remove the grid unit.



# Canon

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