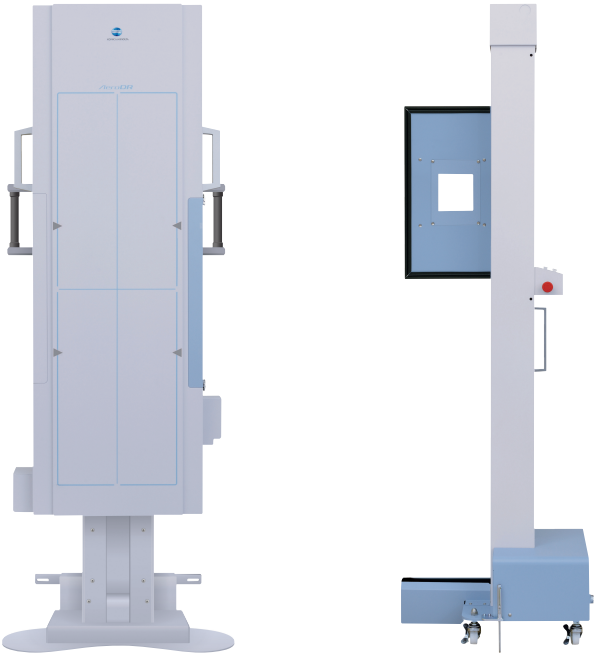
KONICA MINOLTA

DIRECT DIGITIZER

AeroDR SYSTEM

AeroDR Stitching System

Operation Manual



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Contents

Introduction

Introduction

The Direct Digitizer AeroDR SYSTEM and AeroDR SYSTEM 2 pick up an X-ray image of human body using the X-ray planar detector, and enters digital output signals into the image processing device. The system then acquires this image as diagnostic image data using the digital image acquisition device, and transfers the image data to the filing system, the printer, the image display unit and others. Especially, the AeroDR Stitching System is used in combination with a Stand for taking long images. The AeroDR Detector can be moved to take images several times and obtain medical radiation information for long images.

The devices of the AeroDR SYSTEM or AeroDR SYSTEM 2, and the DIRECT DIGITIZER CS-7 (hereafter referred to as the image processing controller), which controls the receiving, processing, and output of image data of this device, are required for the operation of the AeroDR Stitching System.

This Operation Manual describes the basic functions of AeroDR Stitching System so that you or the operator of this unit can understand the basic unit functions. When you use the AeroDR Stitching System for the first time, be sure to read this manual and start the actual operation. Also, after you have read this manual, keep this manual close to the AeroDR Stitching System and use it as a guidebook to operate the AeroDR Stitching System in the best conditions.

*** If the pages of the operation manual are smudged or illegible, replace it with a new one (Charged).**

⚠ CAUTION

- **Before using the AeroDR Stitching System, carefully read the AeroDR SYSTEM and AeroDR SYSTEM 2 Operation Manual and the image processing controller Operation Manual.**
- **In this manual, the AeroDR Interface Unit, AeroDR Generator Interface Unit, and the AeroDR Battery Charger are used in the examples. Replace the device names with the devices to be used.**

⚠ CAUTION

In the U.S.A., Federal law restricts this device to sale by or on the order of a physician.

Indications for Use:

The AeroDR Stitching System is used with Konica Minolta AeroDR SYSTEM and AeroDR SYSTEM 2 which is indicated for use in generating radiographic images of human anatomy. It is intended to replace radiographic film/screen systems in general-purpose diagnostic procedures.
This device is used for examinations of long areas of anatomy such as the leg and spine. This device is not indicated for use in mammography, fluoroscopy, tomography and angiography applications.

Summary of usability specifications (for IEC/EN 60601-1-6, IEC/EN 62366)

1) Medical purposes
   - Provision and reading of disease and injury diagnostic images.
2) Patient groups
   - No patient population who uses the device exists. Patient population who is in contact with the device exists.
   - Patient population for the read X-ray images is not specified.
3) Intended area or part of body involved in usage or application
   - The AeroDR Stitching System comes in contact with the skin of an operator.
4) Device overview/Operating principle
   - The AeroDR Stitching System consists of the AeroDR Stitching Unit, AeroDR Stitching X-ray Auto Barrier Unit and Power Supply Unit and obtains medical radiation information for long images when used with the AeroDR SYSTEM, AeroDR SYSTEM 2 and Stand for long images. The image processing controller is used as a consol.
5) Significant physical characteristics
   - Refer to ″9.1 Specifications″.
6) Significant performance characteristics
   - Refer to ″2.1 Overview of the AeroDR Stitching System″.
7) User of this device
   - To use this device, no special training is required. The target users of this device are as follows:
     A professional of sound body who fully understands the contents of this operation manual and has specialized knowledge and qualifications (for example, physician or radiologist).

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Term description

The meanings of terms used in this operation manual are as follows:

Terms	Explanation
AeroDR SYSTEM	The AeroDR SYSTEM and AeroDR SYSTEM 2 are collectively referred to as the AeroDR SYSTEM.
AeroDR Detector	Collective term indicating AeroDR 1417HQ, AeroDR 1417S and AeroDR 2 1417HQ.
AeroDR Interface Unit	• Supplies power to the AeroDR Generator Interface Unit, AeroDR Generator Interface Unit2, and access point, and supplies power to and charges the battery of the AeroDR Detector when an AeroDR I/F Cable or AeroDR UF Cable is used. It also has a hub function. • 4 AeroDR Detectors can be connected via wireless connection and 2 via wired connection. • The expansion AeroDR Interface Unit is required for connecting the third and fourth AeroDR Detectors via wired connection.
AeroDR Interface Unit2	• Supplies power to the access point, and supplies power to and charges the battery of the AeroDR Detector when an AeroDR I/F Cable or AeroDR UF Cable is used. It also has a hub function. • 4 AeroDR Detectors can be connected via wireless connection and 2 via wired connection. • The expansion AeroDR Interface Unit is required for connecting the third and fourth AeroDR Detectors via wired connection. • Relays signals between the X-ray device, the AeroDR Detector, and the image processing controller.
AeroDR Generator Interface Unit	• Relays signals between the X-ray device, the AeroDR Detector, and the image processing controller. • Up to three XIF or XGIF boards can be installed on this unit. • The exposure field interlock function can be used by installing a CIF board.
AeroDR Generator Interface Unit2	• Relays signals between the X-ray device, the AeroDR Detector, and the image processing controller. • Only one XIF or XGIF board can be installed on this unit. • CIF boards cannot be used.
AeroDR Battery Charger	Charges the AeroDR Detector. It also has the registration function for the AeroDR Detector.
AeroDR Battery Charger2	Charges the AeroDR Detector. It also has the registration function for the AeroDR Detector.
AeroDR I/F Cable	Used for wired connection with the AeroDR Detector.
Stand	The standing radiography base for taking long images where the AeroDR Stitching Unit is loaded.
Image processing controller	The image processing workstation (CS-7) is referred to as the image processing controller.

Structure of pages

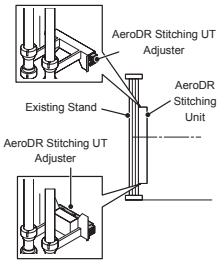
Example of page structure

(1) **1.1 ● Installing the AeroDR Stitching System**

1.1.1 Installing the AeroDR Stitching Unit

When installing the AeroDR Stitching Unit to an existing Stand, follow the procedures below.

(2) **1 Use the AeroDR Stitching UT Adjuster to attach the AeroDR Stitching Unit to the existing Stand.**



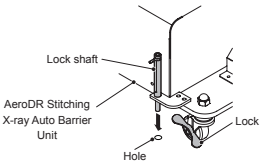
(4) HINT
- Put the AeroDR Stitching UT Adjuster on the Stand Supporter, and then install it.
- When mounting, make sure that the AeroDR Stitching UT Adjuster is securely hooked to the Stand Supporter both in width and in depth.

(5) Reference
- For the operations of the image processing controller, refer to the "Operation Manual" of the image processing controller.

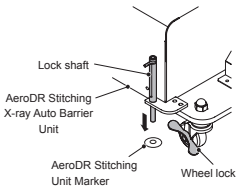
1.1.2 Installing the AeroDR Stitching X-ray Auto Barrier Unit

Install the AeroDR Stitching X-ray Auto Barrier Unit according to the following procedure.

1 Install the AeroDR Stitching X-ray Auto Barrier Unit.
- Insert the lock shaft of the AeroDR Stitching X-ray Auto Barrier Unit into the AeroDR Stitching X-ray Auto Barrier Unit installation hole on the floor and anchor it with the locks of the casters.



(3) IMPORTANT
- If no AeroDR Stitching X-ray Auto Barrier Unit installation hole is made on the facility floor, set the lock shaft on the hole in the center of the AeroDR Stitching Unit Marker put on the floor, then secure the lock shaft with the wheel lock of the caster.



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Number	Item	Description	Icon
(1)	Item heading	Describes the titles of described content.	-
(2)	Operation procedure	The operating procedure is described in sequential numerical steps.	-
(3)	Important items	Describes the important items for operation. Be sure to read them.	IMPORTANT
(4)	Hint	Describes important information.	HINT
(5)	Reference	Describes reference items. Refer to these as necessary.	Reference

Chapter 1

Safety Precautions & Warnings

This chapter describes precautions and warnings
to ensure safe use of the AeroDR Stitching System.

1.1 ● Symbols relating to safety

1.1.1 Safety alert symbol

This is a "safety alert symbol". This symbol alerts you to matters and/or operation potentially hazardous to yourself and other people. Read these messages and follow the instructions carefully.

1.1.2 Warning notice (signal words)

Signal words indicate the degree of potential hazards in the use of the product.
Signal words include the following three types, which are used according to risk of damage caused by danger and the severity of damage.

DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It may also be used to indicate hazardous situation where only physical damage is likely to occur.

1.1.3 Description of graphic symbols

	Indicates the off position for the main power switch of this device.
	Indicates the on position for the main power switch of this device.
	Indicates a Type B applied part of a medical device.
	Indicates not to turn the unit backwards and load the AeroDR Detector, and not to forget to attach the AeroDR UF Cable.
	Indicates not to turn the unit backwards and load the AeroDR Detector, and not to forget to attach the AeroDR UF Cable.
	Indicates not to move the unit in any direction other than along the direct line between the AeroDR Stitching Unit and the X-ray diagnostic device.
	Indicates not to lean on the device.

This CE mark on this product indicates that this product is in conformity with the applicable requirements set out in the Directive 93/42/EEC (Medical Device Directive) and in Directive 2011/65/EU (RoHS Directive).

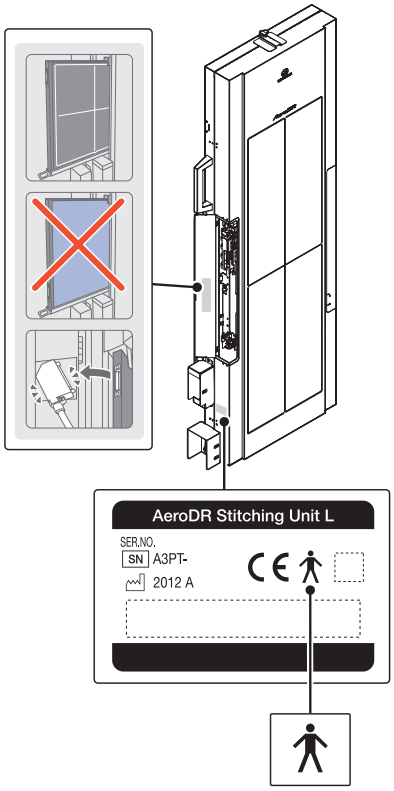
1.2 ● Warning labels

Various warning labels are attached to the AeroDR Stitching System in locations shown below. Do not remove these labels from the AeroDR Stitching System.
Warning labels are there to make sure that the user recognizes potential hazards when operating the AeroDR Stitching System.

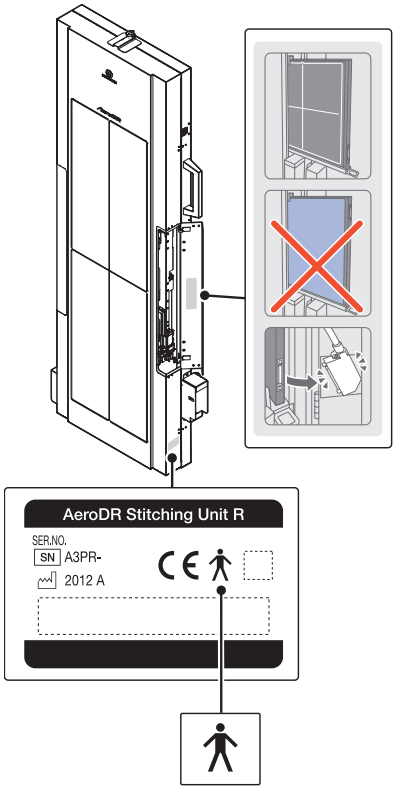
* If a warning label is too dirty or damaged to read, contact Konica Minolta technical representatives to have a new warning label attached, and redisplay by parts replacement. (There is a fee for this service.)

1.2.1 AeroDR Stitching Unit

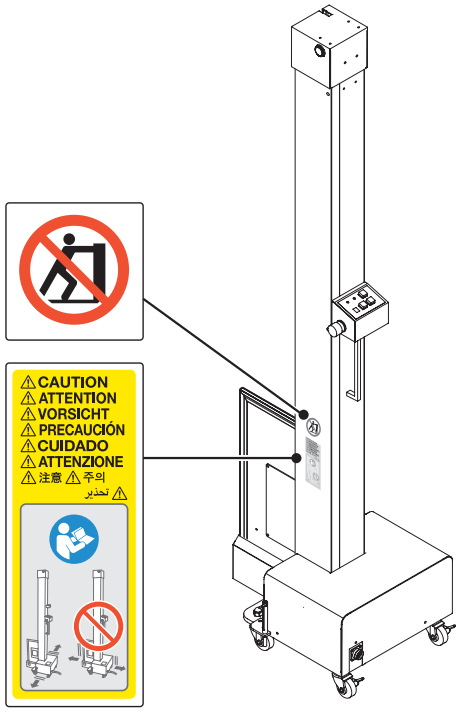
When loaded to the left side



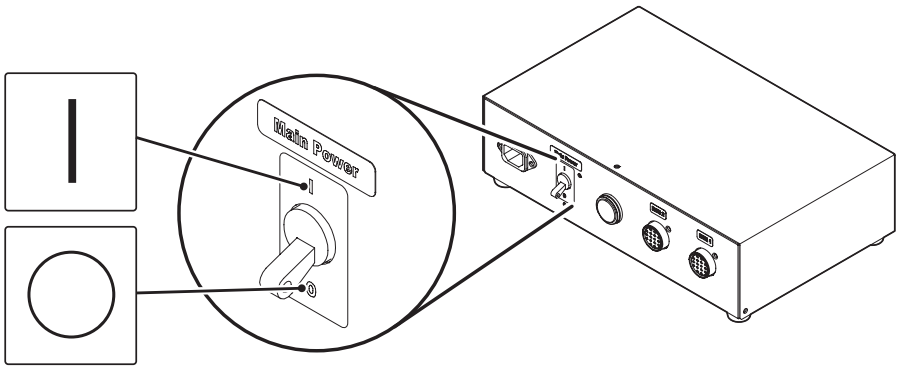
When loaded to the right side



1.2.2 AeroDR Stitching X-ray Auto Barrier Unit



1.2.3 Power Supply Unit



1.3 ● Safety precautions

Read all safety precautions thoroughly before using the AeroDR Stitching System.
Be sure to observe the safety precautions described in this section.

⚠ CAUTION

Before using the AeroDR Stitching System, read the "Safety Warnings and Cautions" of the AeroDR SYSTEM/AeroDR SYSTEM 2 Operation Manual and be familiar with the unit handling precautions.

1.3.1 Precautions before usage

⚠ WARNING

- Confirm that screws on the adapter and holder grips of the AeroDR Stitching System are firmly tightened.

⚠ CAUTION

- The operator (hospital or clinic) is responsible to the usage and maintenance of the AeroDR Stitching System. Any person other than the physician or other than certified person under law must not use this unit.
- The AeroDR Stitching System is suitable for use inside of patient environments.
- Before using the AeroDR Stitching System, check to see that the unit operates normally.
- If the AeroDR Stitching System has failed, turn its power switch Off and place a warning tag showing the "Out of order" or others. Contact Konica Minolta technical representatives.
- As the AeroDR Stitching System is not explosion-proof, do not use any flammable or an explosive gas near this unit.
- If you dispose the AeroDR Stitching System, its accessories, options, consumables, storage media and their packing materials, follow the applicable Waste Management Law (the Waste Disposal and Public Cleaning Law) and ask an authorized industrial waste disposal contractor for their disposal. For the disposal method, follow the applicable regulations and rules of local government.

For EU member states only

This symbol means: Do not dispose of this product together with your household waste!

Please refer to the information of your local community or contact our dealers regarding the proper handling of end-of-life electric and electronic equipments.

Recycling of this product will help to conserve natural resources and prevent potential negative consequences for the environment and human health caused by inappropriate waste handling.

1.3.2 Precautions for usage

⚠ WARNING

- Take the following notes when using the AeroDR Stitching System:
  - Do not subject the unit to strong shocks or excessive loads by dropping and others.
  - Do not disassemble or modify the unit.
  - Do not attach a third-party device (except for those purchased from Konica Minolta) to this unit.
  - Do not turn the Power switch Off or unplug the power cable from the receptacle when the system is operating.
  - Take care not to drop the unit on the human body.
  - Do not use the unit when it is being charged or when the power cable is connected.
  - Be careful not to get your feet caught in the cables connected to the AeroDR Stitching Unit and the AeroDR Stitching X-ray Auto Barrier Unit and fall down.
  - Route the cables carefully so that they do not become damaged.
  - Do not use damaged cables.
- If a smoke, smell, or noise is found on the unit, immediately turn the Power switch Off and unplug the power cable from the receptacle. Then, contact Konica Minolta technical representatives.
- Take the following notes to prevent a fire, electric shock, and electrical leakage:
  - Use the specified cables such as the power cable only.
  - Plug the power cable into the receptacle having the specified ratings.
  - Make sure that the power cable is plugged into receptacle correctly and securely.
  - Use the power supply having the ground (GND) terminal.
  - Unplug the power cable from the receptacle if you do not use the unit for a long time.
  - The power cable contained in the accessory pack can be used for the AeroDR Stitching System only. Do not use it for other equipment.
  - Take care not to drop the water and other liquids in the unit.
  - Take care not do drop or insert foreign materials such as metals and wires in the unit.
  - Do not handle the power plug with wet hands.

WARNING

- Take care to avoid contaminating the power plug, AeroDR I/F Cable, and AeroDR Stitching UT Cable with dust and others.
- Do not use extension cables.
- Do not use the star-burst connection of power cables.
- Take care not to damage the power cable, AeroDR I/F Cable and AeroDR Stitching UT Cable. Also, do not use the power cable if it is damaged.

• Lay the cables connected to the AeroDR Stitching Unit and AeroDR Stitching X-ray Auto Barrier Unit so that the cables do not interfere with patients.
• Be sure to work in a pair when transferring the AeroDR Stitching Unit or installing the unit to the Stand, holding the holder grips.
• If the housing is deformed or cracked, stop using the unit immediately and contact Konica Minolta technical representatives.

CAUTION

• Take the following notes when using the AeroDR Stitching System:
  - Do not use devices that emit electromagnetic waves such as high-frequency therapy equipment, mobile phones, or pocket pagers, close to this unit.
  - Take note of the reception status for radios and TVs near this unit, since an interference may occur in them when this unit is in use.
  - Use under the specified environmental conditions. Failure to do so may result in degradation of performance or malfunction of this unit.
  - Take care not to get your feet caught while operating the AeroDR Stitching Unit.

1.3.3 Precautions regarding electromagnetic waves

● EMC Statement

The AeroDR Stitching System (called This Device) has been tested and found to comply with the IEC 60601-1-2: 2007 Standard.
These limits are designed to provide reasonable protection against harmful interference in a typical medical installation. The device generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to other devices in its vicinity. However, there is no guarantee that interference will not occur in a particular installation.
Whether this device does cause harmful interference to other devices can be determined by turning this device off and on. If it causes harmful interference, the user is encouraged to try to correct the interference by 1 or more of the following measures:

• Reorient or relocate the receiving device.
• Increase the separation between the devices.
• Connect this device into a wall outlet on a circuit different from that to which the other devices are connected.
• Contact Konica Minolta technical representatives.

● Supplementary information regarding IEC 60601-1-2: 2007

(1) Take precautions against this device especially regarding EMC. Install and put into service according to the electromagnetic compatibility (EMC) information provided in the manual (Table 1 - Table 4).
(2) Do not use mobile phones or pocket pagers in the vicinity of this device. Use of mobile phones or pocket pagers near this device can cause errors in operation due to electromagnetic wave interference, so such devices should be turned off in the vicinity of this device.
(3) Cable list
  • Power cable (5 m/3-Wire/Without shield)
  • Various AeroDR Stitching UT Cables
  • Various AeroDR I/F Cables
  • Ethernet cable (max 20 m/With shield)
(4) The use of accessories, transducers and cables other than those sold by Konica Minolta, Inc. as internal components, may result in increased emissions or decreased electromagnetic immunity of this device.
(5) Do not use this device adjacent to or stacked with other devices. If adjacent or stacked use is necessary, confirm normal operation in the configuration in which this device will be used.

Table 1

Guidelines and manufacture's declaration - electromagnetic emissions		
This device is intended for use in the electromagnetic environment specified below. The customer or the user of this device should assure that it is used in such an environment.		
Emissions test	**Compliance**	**Electromagnetic environment - guidelines**
RF emissions CISPR 11	Group 1	The device uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class B	This device is suitable for use in all establishments including the following: Domestic establishments and those directly connected to the public low-voltage power supply network that supplies power to buildings for domestic purposes.

Table 2

Guidelines and manufacturer's declaration - electromagnetic immunity			
This device is intended for use in the electromagnetic environment specified below. The customer or the user of this device should assure that it is used in such an environment.			
Immunity test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment - guidelines**
Electrostatic discharge (ESD) IEC 61000-4-2	± 6 kV contact	± 6 kV contact	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%. Mains power quality should be that of a typical commercial or hospital environment.
	± 8 kV air	± 8 kV air	
Electrical fast transient/ burst IEC 61000-4-4	± 2 kV for power supply lines	± 2 kV for power supply lines	
	± 1 kV for input/output lines	± 1 kV for input/output lines	
Surge IEC 61000-4-5	± 1 kV differential mode	± 1 kV differential mode	Mains power quality should be that of a typical commercial or hospital environment.
	± 2 kV common mode	± 2 kV common mode	
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5% U_T (>95% dip in U_T) for 0.5 cycle	<5% U_T (>95% dip in U_T) for 0.5 cycle	Mains power quality should be that of a typical commercial or hospital environment. If the user of the device requires continued operation during power mains interruptions, it is recommended that the device be powered from an uninterrupted power supply or a battery.
	40% U_T (60% dip in U_T) for 5 cycles	40% U_T (60% dip in U_T) for 5 cycles	
	70% U_T (30% dip in U_T) for 25 cycles	70% U_T (30% dip in U_T) for 25 cycles	
	<5% U_T (<95% dip in U_T) for 5 sec	<5% U_T (<95% dip in U_T) for 5 sec	
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
[NOTE] U_T is the AC mains voltage prior to application of the test level.			

Table 3

Guidelines and manufacturer's declaration - electromagnetic immunity			
This device is intended for use in the electromagnetic environment specified below. The customer or the user of this device should assure that it is used in such an environment.			
Immunity test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment - guidelines**
Conducted RF IEC 61000-4-6 Radiated RF IEC 61000-4-3	3 Vms 150 kHz to 80 MHz 3 V/m 80 MHz to 2.5 GHz	[3] V [3] V/m	Portable and mobile RF communications equipment should be used no closer to any part of this device, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance d=[1.2] √ P d=[1.2] √ P 80 MHz to 800 MHz d=[2.3] √ P 800 MHz to 2.5 GHz where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey[a], should be less than the compliance level in each frequency range[b]. Interference may occur in the vicinity of equipment marked with the following symbol: 
[NOTE] At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies. [NOTE] These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			
a Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which this device is used exceeds the applicable RF compliance level above, this device should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating this device. b Over the frequency range 150 kHz to 80 MHz, field strength should be less than [3] V/m.			

Table 4

Recommended separation distance between portable and mobile RF communications equipment and the device			
This device is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of this device can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and this device as recommended below, according to the maximum output power of the communications equipment.			
Rated maximum output power of the transmitter W	**Separation distance according to frequency of transmitter m**		
	150kHz to 80MHz d=[1.2] √ P	**80MHz to 800MHz d=[1.2] √ P**	**800MHz to 2.5GHz d=[2.3] √ P**
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	8
100	12	12	23
For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer. [NOTE] At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies. [NOTE] These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			

1.3.4 Precautions for installing, moving, and storing

CAUTION

- Because connections of the X-ray diagnostic device can only be made by Konica Minolta or its designated contractors, contact Konica Minolta or its designated contractors.
- Contact Konica Minolta or dealers specified by Konica Minolta to install or move the AeroDR Stitching System.
- Take the following notes when installing or storing the AeroDR Stitching System:
  - Do not install or store in a location where it may be adversely affected by atmospheric pressure, temperature, humidity, ventilation, sunlight, dust, salt-air, or air containing sulfur.
  - Do not install or store in a location where it is not stable, ventilation is insufficient, the difference in light-dark is great, electromagnetic waves are generated, or where is subject to vibration or shock.
  - Do not install or store in a location where chemical agents are used or stored.
  - Do not install this device facing up or upside down.
  - Run the power cables and wires so that people do not trip over them.
  - Install the AeroDR Stitching System so as not to block the vent.
- Take the following notes when installing the AeroDR Stitching Unit:
  - If you install the unit on a Stand other than the recommended stand, confirm that the AeroDR Stitching Unit can be installed on the Stand in the information provided by the Stand's manufacturer.
  - Install the AeroDR Stitching Unit in a place where the AeroDR Detector can be easily loaded.
  - Do not install the AeroDR Stitching Unit directly on a floor.
  - Do not install the AeroDR Stitching Unit in a horizontal posture.

1.3.5 Precautions regarding maintenance

WARNING

- Perform the maintenance and inspection periodically. In addition to the user periodical maintenance that needs to be performed, periodical maintenance by a service engineer is also required.
- If there are stains such as body fluids, clean and disinfect.

CAUTION

- Based on the warranty, the exchange of parts which have past (one year) for a term of a guarantee becomes handled as payment.
- Before cleaning or inspecting the AeroDR Stitching System, always turn the Power switch Off and unplug the power cable from the receptacle.
- After you have finished the cleaning or inspection of this unit, plug the power cable, AeroDR I/F Cable, and AeroDR Stitching UT Cable into receptacle securely.
- Remove dirt between the protective cover and the system, as well as dirt on the terminals with a commercial resin brush. In addition, do not clean the system using hard sharp items.
- Take the following notes when disinfecting the AeroDR Stitching System:
  - Use ethanol for disinfection, isopropanol for disinfection, commercial chlorine bleach, or 0.5% hypochlorite (10-fold dilution of household bleach) when disinfecting. However, bleach and hypochlorite are corrosive, so wash the bleach off well to avoid corrosion.
  - Dampen a lint-free, soft cloth with disinfecting solution, and use after wringing it thoroughly. Do not apply disinfecting solution onto cable connectors and LEDs when cleaning.
  - Disinfecting solution is a chemical agent, so follow the precautions of the manufacturer.

1.3.6 Precautions on service life

CAUTION

Service life

Name	Service life
AeroDR Stitching System	6 years

- The above service life is valid only if the product has been properly operated while following the precautions for use and performing the specified maintenance. (By self certification <our data>)
- The service life may differ depending on usage conditions and environment.
- Some component parts of this device are commercially available parts that have a short cycle of model changes; therefore, it might not be possible to supply service parts even within the service life. In addition, related component parts may need to be replaced to maintain compatibility at the time of model change.

Chapter 2

Product Overview

This chapter describes the overview of the AeroDR Stitching System.

2.1 ● Overview of the AeroDR Stitching System

This section describes the functions of AeroDR Stitching System and its system configuration.

2.1.1 Functions

The AeroDR Stitching System consists of the AeroDR Stitching Unit, AeroDR Stitching X-ray Auto Barrier Unit and Power Supply Unit. Transfer the AeroDR Detector loaded in the AeroDR Stitching Unit to take up to 3 images and transfer them to the image processing controller. Combining the transferred images in the image processing controller enables diagnosis of long images.

2.1.2 System configuration

The following shows the system configuration, cabling and operation examples.

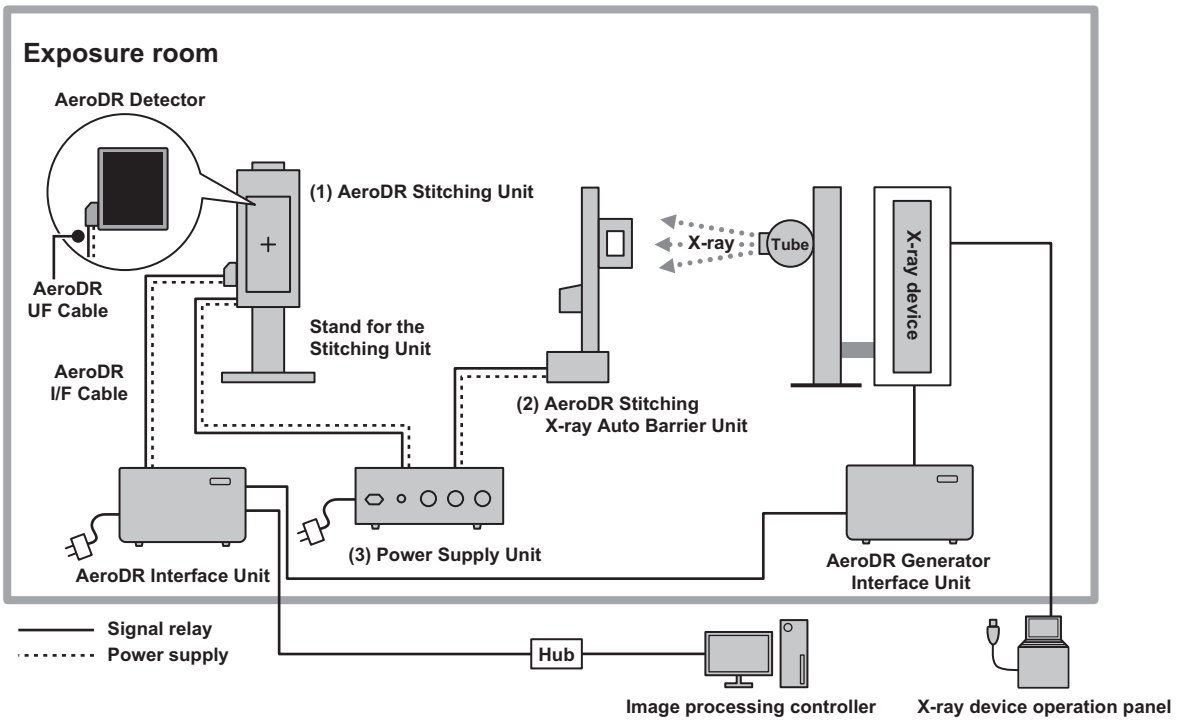
● Basic configuration example

Number	Name	Functions
(1)	AeroDR Stitching Unit	This unit is used by loading the AeroDR Detector. It moves the AeroDR Detector to the exposure positions.
(2)	AeroDR Stitching X-ray Auto Barrier Unit	This unit moves the plate that blocks X-ray irradiated outside the exposure area up and down so that the X-ray is radiated only on the AeroDR Detector.
(3)	Power Supply Unit	This unit supplies power to the AeroDR Stitching Unit and AeroDR Stitching X-ray Auto Barrier Unit.

Reference

- For functions of the AeroDR Detector, AeroDR Interface Unit and others, refer to the "AeroDR SYSTEM/AeroDR SYSTEM 2 Operation Manual".

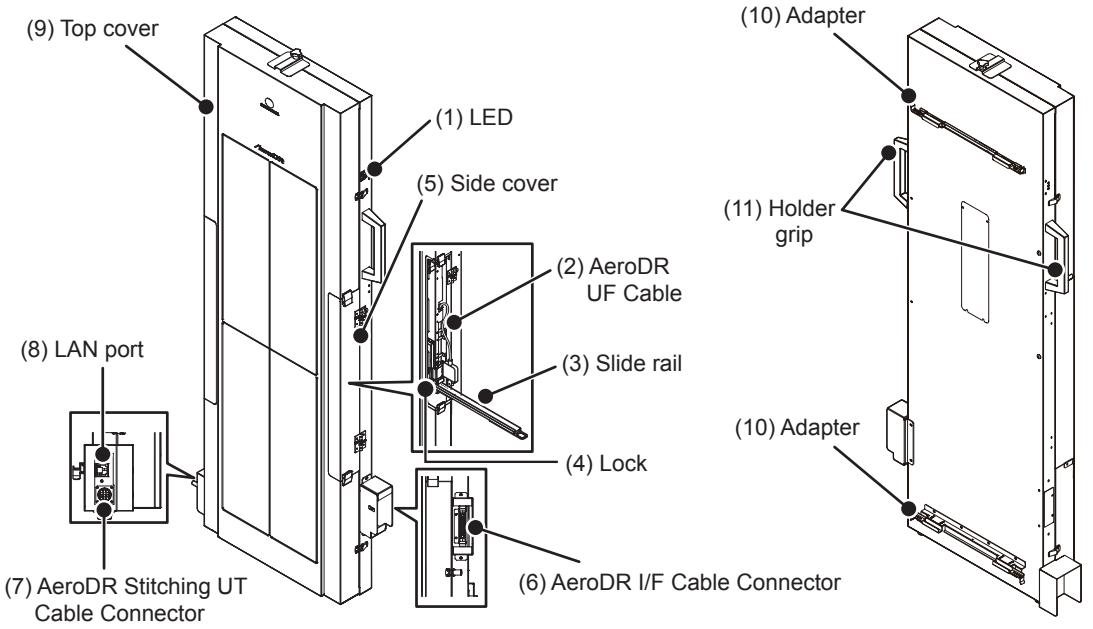
● Basic connection example



2.2 ● Component names and functions

2.2.1 AeroDR Stitching Unit

The component names and functions of the AeroDR Stitching Unit are as follows.



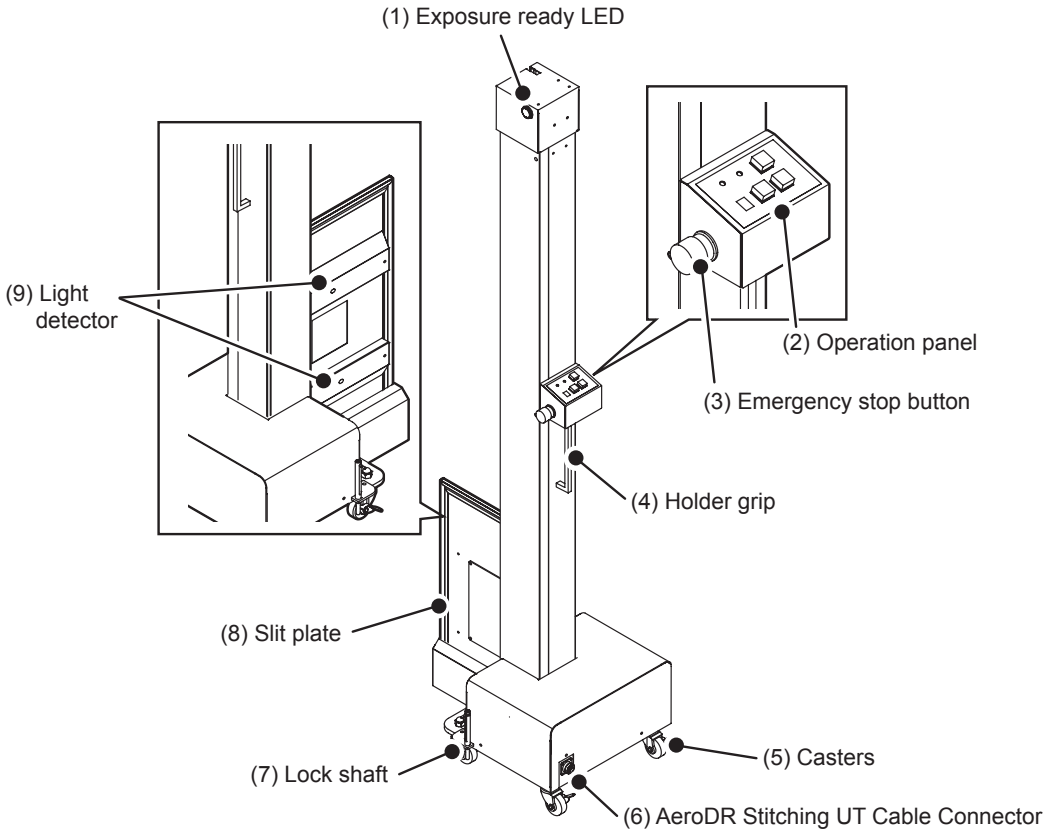
Number	Name	Functions
(1)	LED	This LED shows the AeroDR Stitching Unit condition. Reference • For the display patterns and status of the LEDs, refer to "Chapter 6 Status (LED) Display".
(2)	AeroDR UF Cable	This cable is connected when the AeroDR Detector is loaded.
(3)	Slide rail	This rail is the base where the AeroDR Detector and grid are loaded.
(4)	Lock	The locks secure the AeroDR Detector and grid.
(5)	Side cover	The AeroDR Detector and grid are loaded in this cover.
(6)	AeroDR I/F Cable Connector	This is the connector for the AeroDR I/F Cable.
(7)	AeroDR Stitching UT Cable Connector	This is the connector for the AeroDR Stitching UT Cable.
(8)	LAN port	This is the connection port for the Ethernet cable.
(9)	Top cover	This cover protects the inside components.
(10)	Adapter	This adapter is used for attaching the unit to the Stand.
(11)	Holder grip	This is the grip for carrying the AeroDR Stitching Unit.

IMPORTANT

• The positions of the LEDs and AeroDR I/F Cable Connectors may change according to the position of the side cover.

2.2.2 AeroDR Stitching X-ray Auto Barrier Unit

The component names and functions of the AeroDR Stitching X-ray Auto Barrier Unit are as follows.



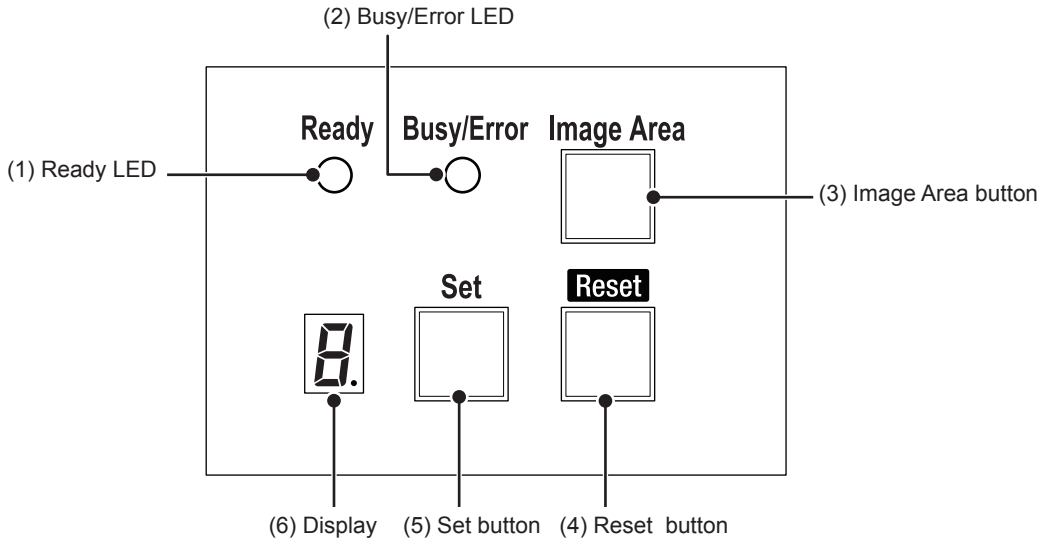
Number	Name	Functions
(1)	Exposure ready LED	This LED shows if the exposure is ready in the AeroDR Stitching System. Reference • For the display patterns and status of the LEDs, refer to "Chapter 6 Status (LED) Display".
(2)	Operation panel	This panel is used for the operation and status check of the AeroDR Stitching X-ray Auto Barrier Unit.
(3)	Emergency stop button	This button stops the electric movements of the AeroDR Stitching X-ray Auto Barrier Unit.
(4)	Holder grip	This grip is used for moving the AeroDR Stitching X-ray Auto Barrier Unit.
(5)	Casters	The casters are used for moving or immobilizing the AeroDR Stitching X-ray Auto Barrier Unit.
(6)	AeroDR Stitching UT Cable Connector	This is the connector for the AeroDR Stitching UT Cable.
(7)	Lock shaft	This shaft is used for securing the AeroDR Stitching X-ray Auto Barrier Unit.
(8)	Slit plate	This plate blocks X-ray irradiated outside exposure area while moving to exposure position.
(9)	Light detector	This detector reads irradiating light range of an X-ray device to detect height of the AeroDR Stitching Unit.

IMPORTANT

• The location of the exposure ready LED and the attachment direction of the slit plate vary depending on the facility and place of installation.

● Operation panel of AeroDR Stitching X-ray Auto Barrier Unit

The component names and functions of the operation panel of the AeroDR Stitching X-ray Auto Barrier Unit are as follows.



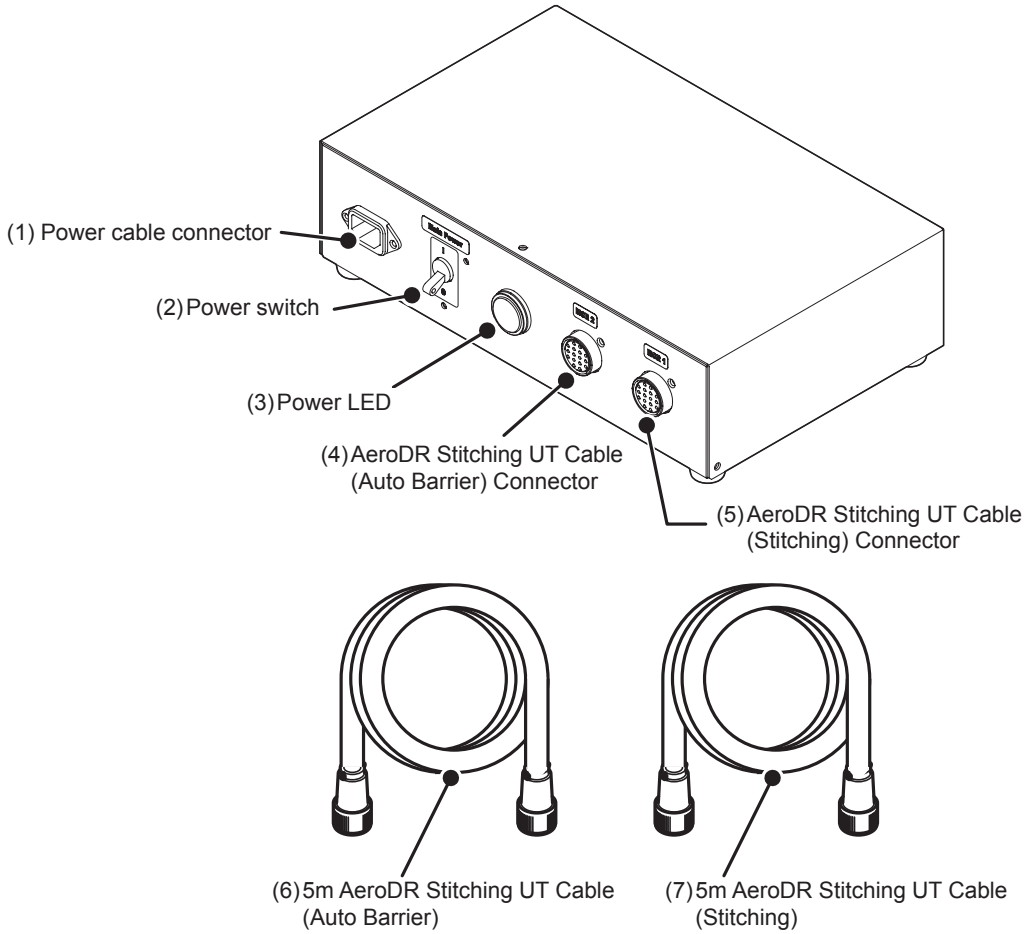
Number	Name	Feature
(1)	Ready LED	This LED shows the status of the AeroDR Stitching System.
(2)	Busy/Error LED	This LED shows the status of the AeroDR Stitching System.
(3)	Image Area button	Press this button to detect irradiation range.
(4)	Reset button	Press this button to initialize or reset the system.
(5)	Set button	Press this button to detect height of the AeroDR Stitching Unit.
(6)	Display	Displays the status of the AeroDR Stitching System or the number of images to be taken.

Reference

- For the display patterns and status of the LEDs, refer to "Chapter 6 Status (LED) Display".

2.2.3 Power Supply Unit

The component names and functions of the Power Supply Unit are as follows.



Number	Name	Functions
(1)	Power cable connector	This is the connector for the power cable.
(2)	Power switch	This switch turns ON or OFF the power of the AeroDR Stitching System.
(3)	Power LED	This LED shows the ON/OFF state of the power supply. Reference • For the display patterns and status of the LEDs, refer to "Chapter 6 Status (LED) Display".
(4)	AeroDR Stitching UT Cable (Auto Barrier) Connector	This is the connector for the 5m AeroDR Stitching UT Cable (Auto Barrier).
(5)	AeroDR Stitching UT Cable (Stitching) Connector	This is the connector for the 5m AeroDR Stitching UT Cable (Stitching).
(6)	5m AeroDR Stitching UT Cable (Auto Barrier)	This cable is connected to the AeroDR Stitching X-ray Auto Barrier Unit for power supply and communication.
(7)	5m AeroDR Stitching UT Cable (Stitching)	This cable is connected to the AeroDR Stitching Unit for power supply and communication.

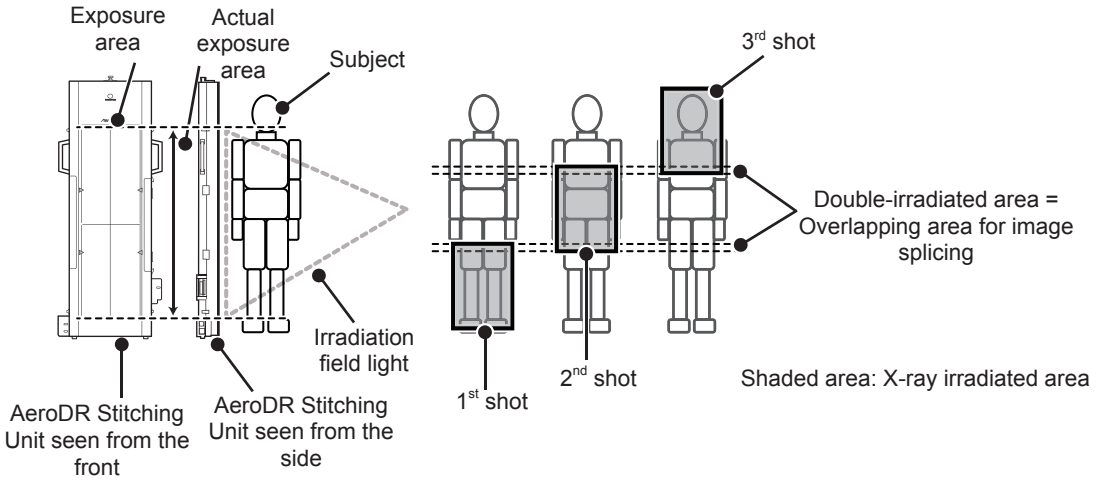
2.3 ● Using the AeroDR Stitching System

This section explains the configuration and how to use the AeroDR Stitching System.

2.3.1 About the AeroDR Stitching System

The AeroDR Stitching System produces long images of subjects by moving a 14 × 17 inch AeroDR Detector up and down inside an AeroDR Stitching Unit, taking split shots then splicing the shots into one long image.
In stitched-image exposure, the X-ray irradiation range is adjusted manually from the irradiation lamp, but the AeroDR Stitching Unit automatically detects this irradiation range, determines the best operations for this irradiation range and takes the split shots.
The basic procedure for taking images is as follows.

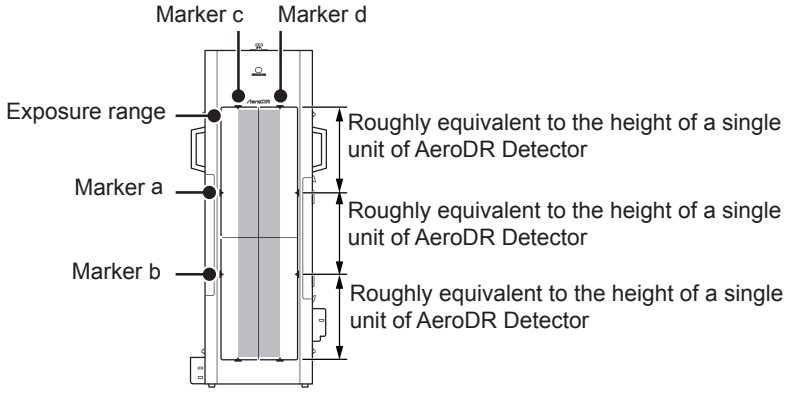
1. The operator adjusts the height of the AeroDR Stitching Unit to the targeted exposure area on the patient.
2. The AeroDR Stitching System detects the height (calibrates the height position).
3. The operator determines the irradiation range from the irradiation lamp.
4. The AeroDR Stitching System detects irradiation area.
5. Images are taken (performed by both the operator and the AeroDR Stitching System).



The area inside the square with the crossmark on the front of the AeroDR Stitching Unit is the exposure area.
The AeroDR Stitching System moves the AeroDR Detector within this area, takes 1 to 3 shots and combines the shots into a single long image.
The above example shows 3 shots being taken for the entire area and spliced into one long image.
Stitched-image exposure repeats the below processing.

The operator confirms the Ready LED on the AeroDR Stitching X-ray Auto Barrier Unit is lit → The operator takes the X-ray → The AeroDR Stitching System prepares the next shot

The patient must remain still during exposure. Exposure ends in less than 23sec.
Exposure operations end once X-ray irradiation is complete for the last shot and the patient can leave the room.
The captured images are automatically spliced into a single image on the image processing controller. In order to detect where to splice the shots, the seams are exposed twice. When taking a 3-shot image, the double-irradiated location is the marker a and marker b.



When taking a 2-shot image, the double-irradiated locations change according to the area of the irradiation field light source. For details, refer to ″4.3.2 About the Double-irradiated Locations″.
Please do not narrow the width of the irradiation field light from the width between marker c-d.

IMPORTANT

- Depending on the irradiation range angle of the X-ray tube, exposure area values may be narrower than those listed in "9.1 Specifications". Check the irradiation range of the X-ray tube before use.

2.3.2 Height Detection

When taking images with the AeroDR Stitching System, the AeroDR Stitching Unit and the AeroDR Stitching X-ray Auto Barrier Unit move at the same time.
Immediately after starting up this system or if the height of the AeroDR Stitching Unit has been changed, the height of the unit must be detected.
This height detection is done to synchronize the exposure range of the AeroDR Stitching Unit and the operating range of the AeroDR Stitching X-ray Auto Barrier Unit.
If images are taken after the height of the AeroDR Stitching Unit has been changed without first detecting the height of the unit, the images may not be spliced because of the change in areas to be connected between the 1st and 2nd shots or 2nd and 3rd shots.

- When the exposure area is not changed after the last exposure (when the exposure area is within the exposure range of the AeroDR Stitching Unit), you do not have to detect the height again.
  For how to bypass the need to detect the height every time, see "4.3.3 Example from Height Detection to Capturing Images".

2.3.3 Precaution on Height Detection and Irradiation Field Detection

Keep obstructions (books, clothing, ID cards, etc.) out from in-between the AeroDR Stitching Mask and irradiation field light source when detecting the height of the AeroDR Stitching Unit or irradiation field. The wrong area may be incorrectly detected as the irradiation field.
If obstructions get in the way, detect the height and irradiation field again.

Chapter 3

Installation and Startup/Shutdown

This chapter describes how to install and start up/shut down the AeroDR Stitching System.

3.1 ● Installing the AeroDR Stitching System

3.1.1 Installing the AeroDR Stitching Unit

When installing the AeroDR Stitching Unit to an existing Stand, follow the procedures below.

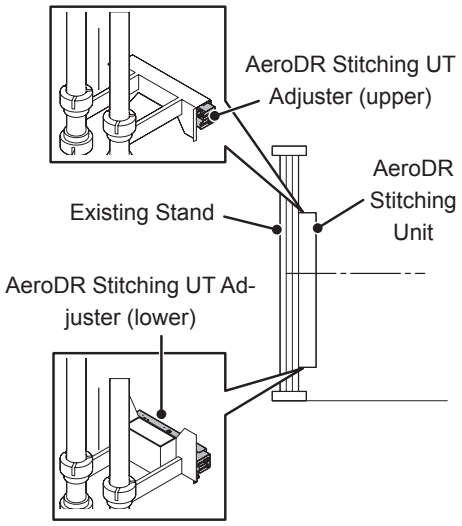
⚠ WARNING

- Be sure to work in a pair when transferring the AeroDR Stitching Unit or installing the unit to the Stand, holding the holder grips.

IMPORTANT

- Do not use buckies other than those we recommend.

1 Use the AeroDR Stitching UT Adjusters (2) to attach the AeroDR Stitching Unit to the existing Stand.



IMPORTANT

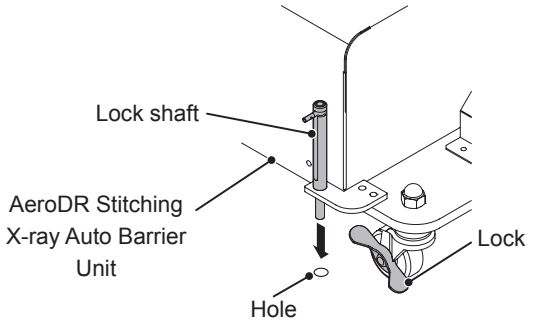
- Put the AeroDR Stitching UT Adjuster (lower) on the Stand Supporter, and then install the AeroDR Stitching UT Adjuster (upper).
- When mounting, make sure that the AeroDR Stitching UT Adjuster (2) are securely hooked to the Stand Supporter both in width and in depth.

3.1.2 Installing the AeroDR Stitching X-ray Auto Barrier Unit

Install the AeroDR Stitching X-ray Auto Barrier Unit according to the following procedure.

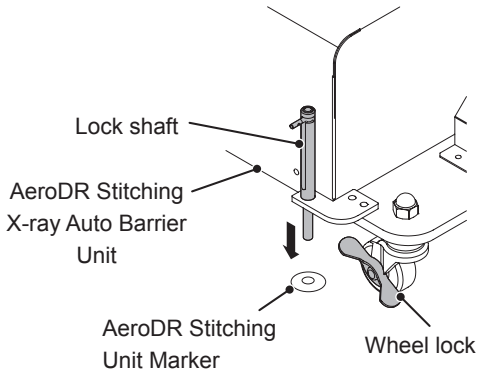
1 Install the AeroDR Stitching X-ray Auto Barrier Unit.

- Insert the lock shaft of the AeroDR Stitching X-ray Auto Barrier Unit into the AeroDR Stitching X-ray Auto Barrier Unit installation hole (×2) on the floor and anchor it with the locks of the casters.



IMPORTANT

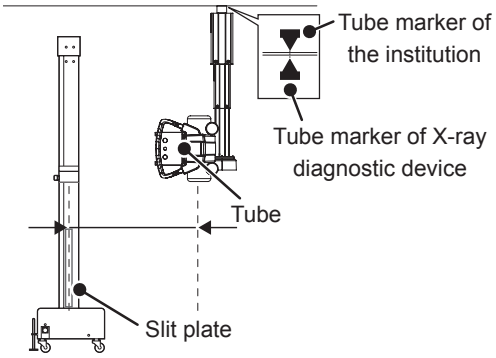
- If no AeroDR Stitching X-ray Auto Barrier Unit installation hole is made on the facility floor, set the lock shaft on the hole in the center of the AeroDR Stitching Unit Marker put on the floor, then secure the lock shaft with the wheel lock of the caster.



3.1.3 Moving the tube

Move the tube of the X-ray device according to the following procedure.

1 Move the tube where the tube marker of the institution and that of the X-ray diagnostic device meet.



IMPORTANT

- Make sure that one marker does not come outside the rectangular part of the other marker.

3.1.4 Connecting cables

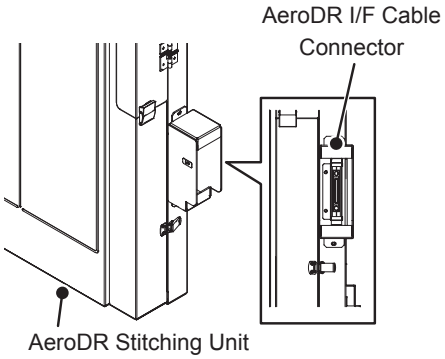
Connect cables to the AeroDR Stitching System according to the following procedure.

IMPORTANT

- Be careful not to get your feet caught in the cables connected to the AeroDR Stitching Unit and the AeroDR Stitching X-ray Auto Barrier Unit and fall down.
- Route the cables carefully so that they do not become damaged.
- Do not use damaged cables.

1 Connect the AeroDR I/F Cable to the AeroDR Stitching Unit.

- Connect the AeroDR I/F Cable from the AeroDR Interface Unit to the AeroDR I/F Cable connector of the AeroDR Stitching Unit.

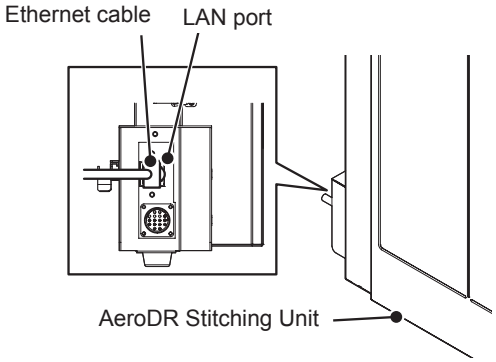


IMPORTANT

- Run the AeroDR I/F Cable around the rear side of the AeroDR Stitching Unit to prevent the cable from touching the hands or feet of the patient.

2 Connect the Ethernet cable to the AeroDR Stitching Unit.

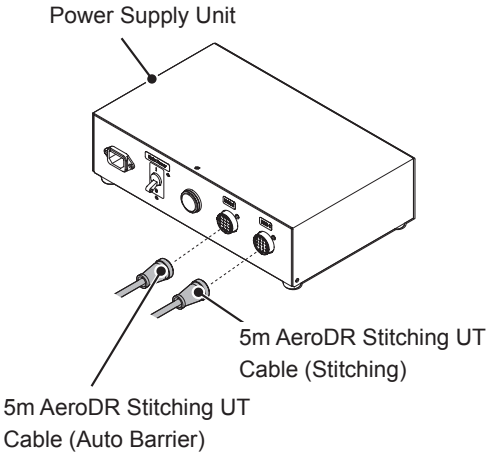
- Connect the Ethernet cable from the AeroDR Interface Unit to the LAN port of the AeroDR Stitching Unit.



IMPORTANT

- Run the Ethernet cable around the rear side of the AeroDR Stitching Unit to prevent the cable from touching the hands or feet of the patient.

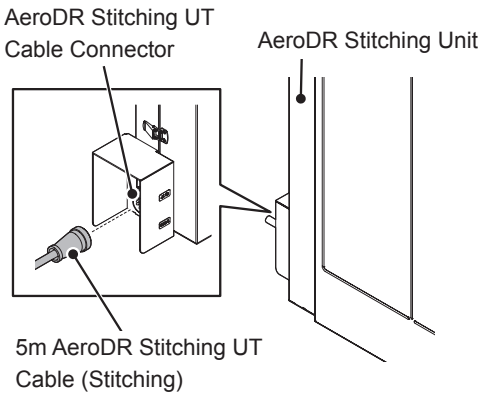
3 Connect the 5m AeroDR Stitching UT Cable (Stitching) and the 5m AeroDR Stitching UT Cable (Auto Barrier) to the Power Supply Unit.



HINT

- Connect the “MCP1” side of the 5m AeroDR Stitching UT cable (Stitching) to the MCR1 terminal of the Power Supply Unit.
- Connect the “MCP2” side of the 5m AeroDR Stitching UT cable (Auto Barrier) to the MCR2 terminal of the Power Supply Unit.

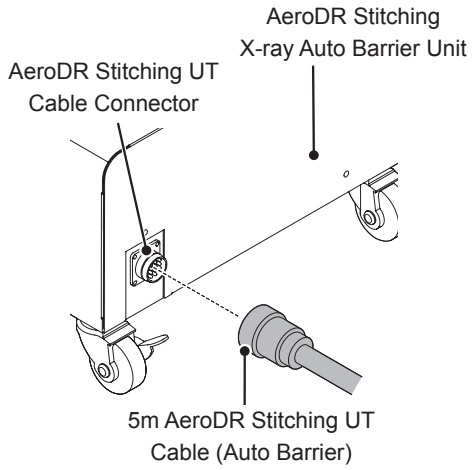
4 Connect the 5m AeroDR Stitching UT Cable (Stitching) from the Power Supply Unit to the AeroDR Stitching UT Cable Connector of the AeroDR Stitching Unit.



HINT

- Connect the “MCP3” side of the 5m AeroDR Stitching UT cable (Stitching) to the MCR3 terminal of the AeroDR Stitching Unit.

5 Connect the 5m AeroDR Stitching UT Cable (Auto Barrier) from the Power Supply Unit to the AeroDR Stitching UT Cable Connector of the AeroDR Stitching X-ray Auto Barrier Unit.



HINT

- Connect the “MCP4” side of the 5m AeroDR Stitching UT Cable (Auto Barrier) to the MCR4 terminal of the AeroDR Stitching X-ray Auto Barrier Unit.

3.1.5 Startup

Start up the AeroDR Stitching System according to the following procedure.

1 Turn on the Power Supply Unit.

IMPORTANT

- Make sure to detect the height of the AeroDR Stitching Unit every time you initialize the AeroDR Stitching System and turn on the Power Supply Unit.

Reference

- For the startup of the Power Supply Unit, refer to ″3.2 Startup and shutdown″.
- For the initialization and height detection of the AeroDR Stitching Unit, refer to ″4.2.1 Procedure for the exposure with the AeroDR Stitching System (before the patient enters the room)″.

3.1.6 Installing the AeroDR Detector

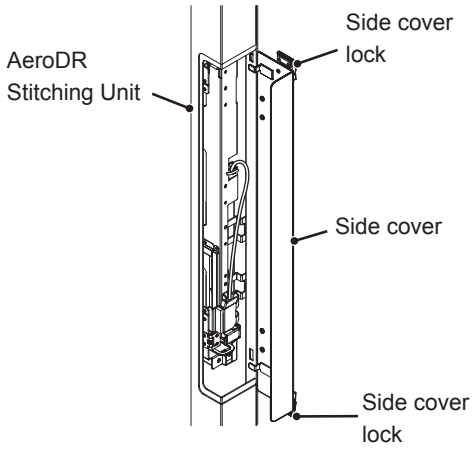
Install the AeroDR Detector into the AeroDR Stitching Unit according to the following procedure.

1 Turn on the AeroDR Detector.

Reference

- For the startup of the AeroDR Detector, refer to ″3.2 Startup and shutdown″.

2 Release the side cover locks (2) of the AeroDR Stitching Unit to open the side cover.

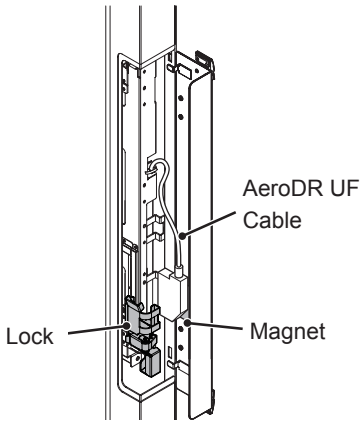


HINT

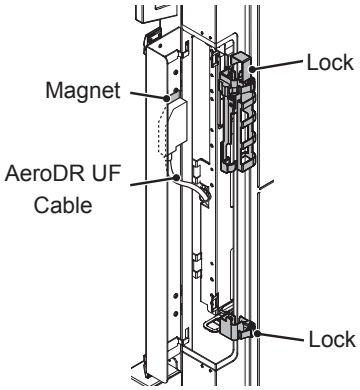
- The locations of the side covers will vary according to the facility and place of installation.

3 Release the locks and attach the AeroDR UF Cable to the magnet inside the side cover.

● **When loaded to the right side**

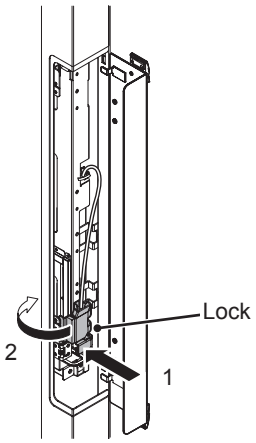


● **When loaded to the left side**

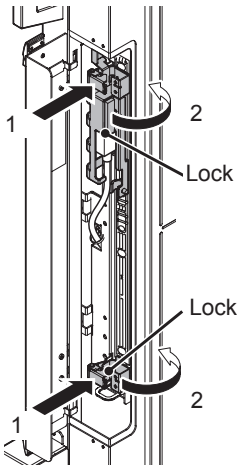


HINT

- Release the locks as shown in the figure below.
  - When loaded to the right side

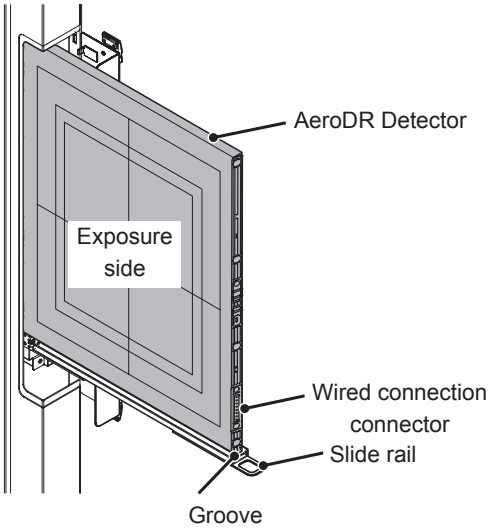


  - When loaded to the left side

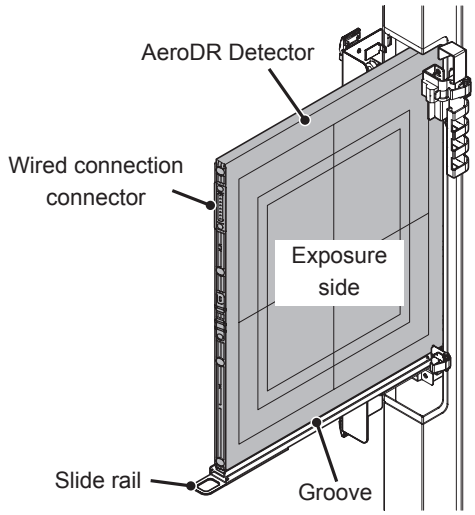


4 Pull out the slide rail, set it in the groove of the rear side of the AeroDR Detector and load the detector in the AeroDR Stitching Unit.

● **When loaded to the right side**

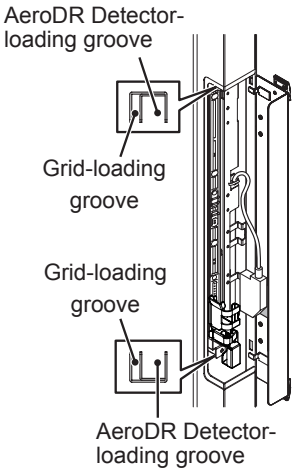


● **When loaded to the left side**

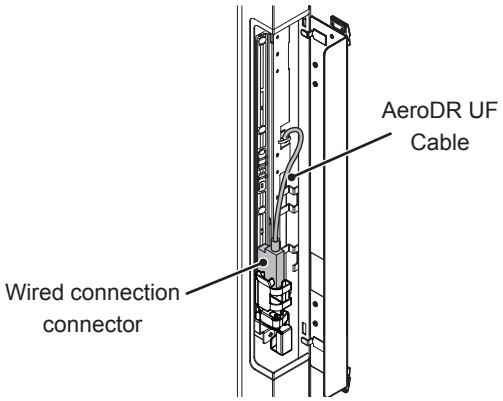


IMPORTANT

- Load and remove the AeroDR Detector or grid in an appropriate way and do not drop them.
- Be careful of the loading direction of the AeroDR Detector.
- Set the grid in the thin groove on the front side of the slide rail.
- Align the AeroDR Detector and grid with the upper and lower grooves, and load them vertically.

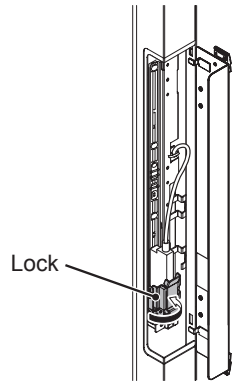


5 Connect the AeroDR UF Cable to the wired connection connector of the AeroDR Detector.

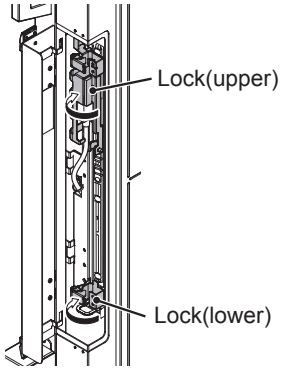


6 Engage the lock.

● **When loaded to the right side**



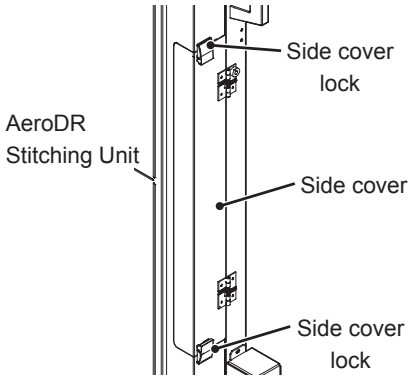
● **When loaded to the left side**



IMPORTANT

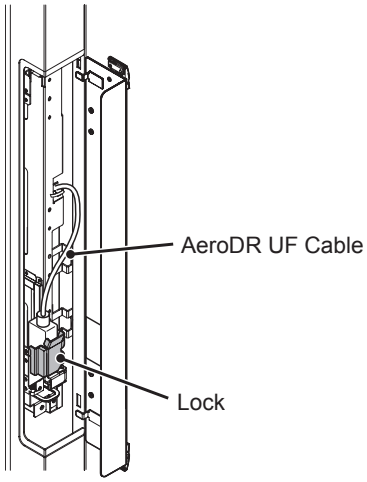
- Lock the lock (lower) first.

7 Close the side cover of the AeroDR Stitching Unit and engage the side cover locks (2).

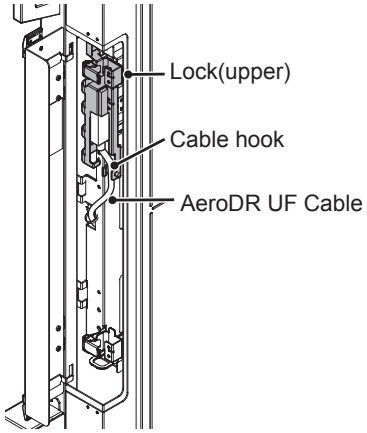


IMPORTANT

- When the AeroDR Detector is not loaded, store the AeroDR UF Cable inside the locks.
  - When loaded to the right side



  - When loaded to the left side
    Hook the AeroDR UF Cable on the cable hook of the lock (upper) when retracting the cable.



3.2 ● Startup and shutdown

Start up and shut down each system unit by the following operations.

Reference

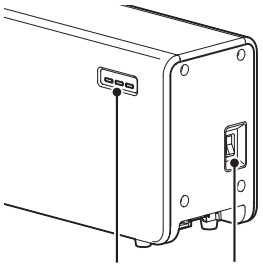
- Refer to the ″Operation Manual″ of the image processing controller regarding on/off for the image processing controller.

3.2.1 Startup of each system device

Start each system unit in the following procedure.

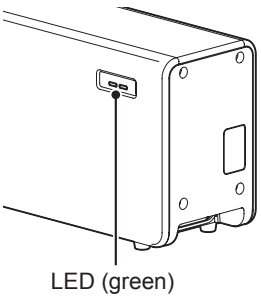
1 Start the AeroDR Interface Unit.

- Turn the power switch of the AeroDR Interface Unit on, and confirm that the LED (green) lights.



The AeroDR Generator Interface Unit starts up.

- When the power switch of the AeroDR Interface Unit is put in the ON position, power is supplied to the AeroDR Generator Interface Unit and the LED (green) blinks.

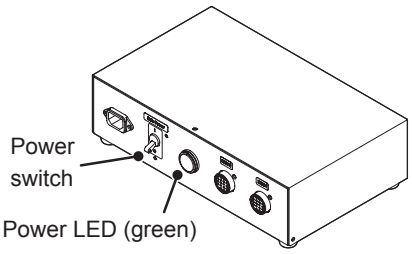


2 Start the image processing controller.

- Start the image processing controller by turning the power switch of the image processing controller on.

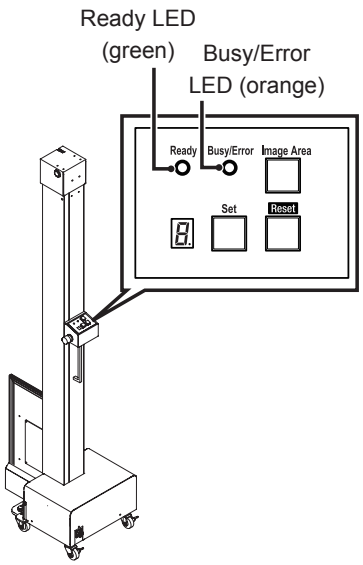
3 Start the AeroDR Stitching System.

- Put the power switch of the Power Supply Unit in the ON position with the power cable connected and confirm that the power LED (green) lights.



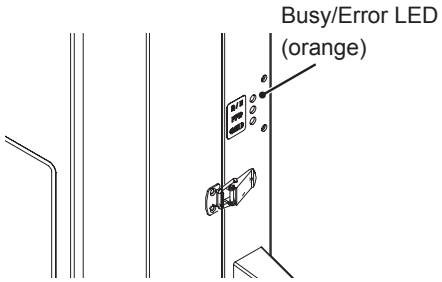
The AeroDR Stitching X-ray Auto Barrier Unit starts up.

- When the power switch of the Power Supply Unit is put in the ON position, power is supplied and the Busy/Error LED (orange) of the AeroDR Stitching X-ray Auto Barrier Unit blinks and then Ready LED (green) lights.



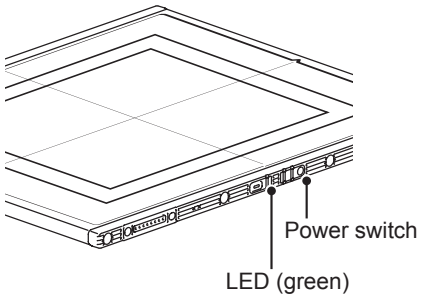
The AeroDR Stitching Unit starts up.

- When the power switch of the Power Supply Unit is put in the ON position, power is supplied and the Busy/Error LED (orange) of the AeroDR Stitching Unit blinks and then goes out.



4 Start the AeroDR Detector.

- If mounted on the AeroDR Battery Charger, remove the AeroDR Detector.
- Next, press the power switch of the AeroDR Detector for 2 seconds and turn it on, and confirm that the LED (green) is slowly flashing or lit.



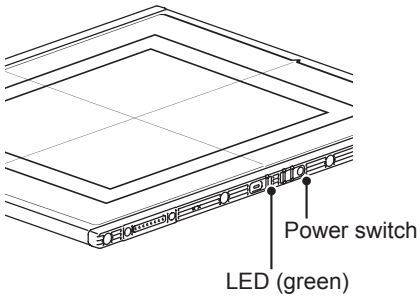
5 Confirm that the AeroDR Detector is ready for use on the image processing controller.

3.2.2 Shutdown of each system device

Shut down each system unit in the following procedure.

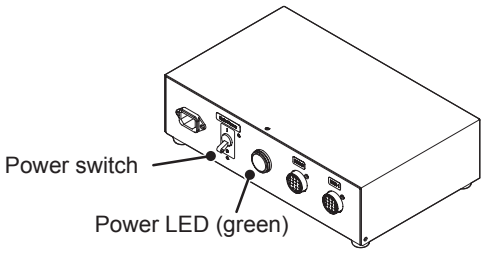
1 Shut down the AeroDR Detector.

- Press the power switch of the AeroDR Detector for 5 seconds to turn it off, and confirm that the LED (green) is turned off.



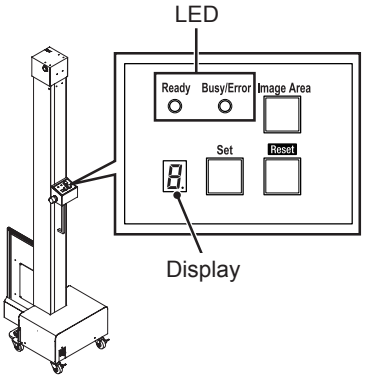
2 Shut down the AeroDR Stitching System.

- Put the power switch of the Power Supply Unit in the OFF position and confirm that the Power LED (green) goes out.



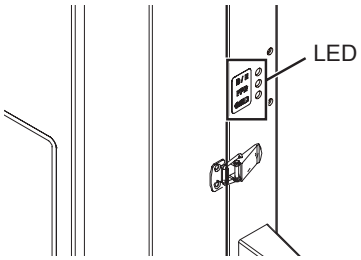
The AeroDR Stitching X-ray Auto Barrier Unit shuts down.

- When the power switch of the Power Supply Unit is put in the OFF position, the power supply to the AeroDR Stitching X-ray Auto Barrier Unit shuts off and the LED and display of the AeroDR Stitching X-ray Auto Barrier Unit go out.



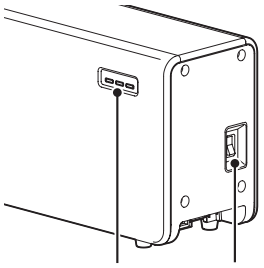
The AeroDR Stitching Unit shuts down.

- When the power switch of the Power Supply Unit is put in the OFF position, the power supply to the AeroDR Stitching Unit shuts off and the LED of the AeroDR Stitching Unit goes out.



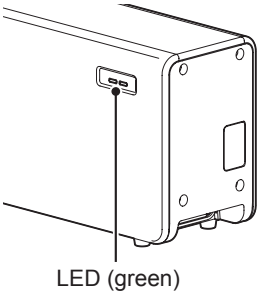
3 Shut down the AeroDR Interface Unit.

- Turn the power switch of the AeroDR Interface Unit off, and confirm that the LED (green) is turned off.



The AeroDR Generator Interface Unit shuts down.

- When the power switch of the AeroDR Interface Unit is put in the OFF position, the power to the AeroDR Generator Interface Unit shuts off and the LED (green) of the AeroDR Generator Interface Unit goes out.



4 Shut down the image processing controller.

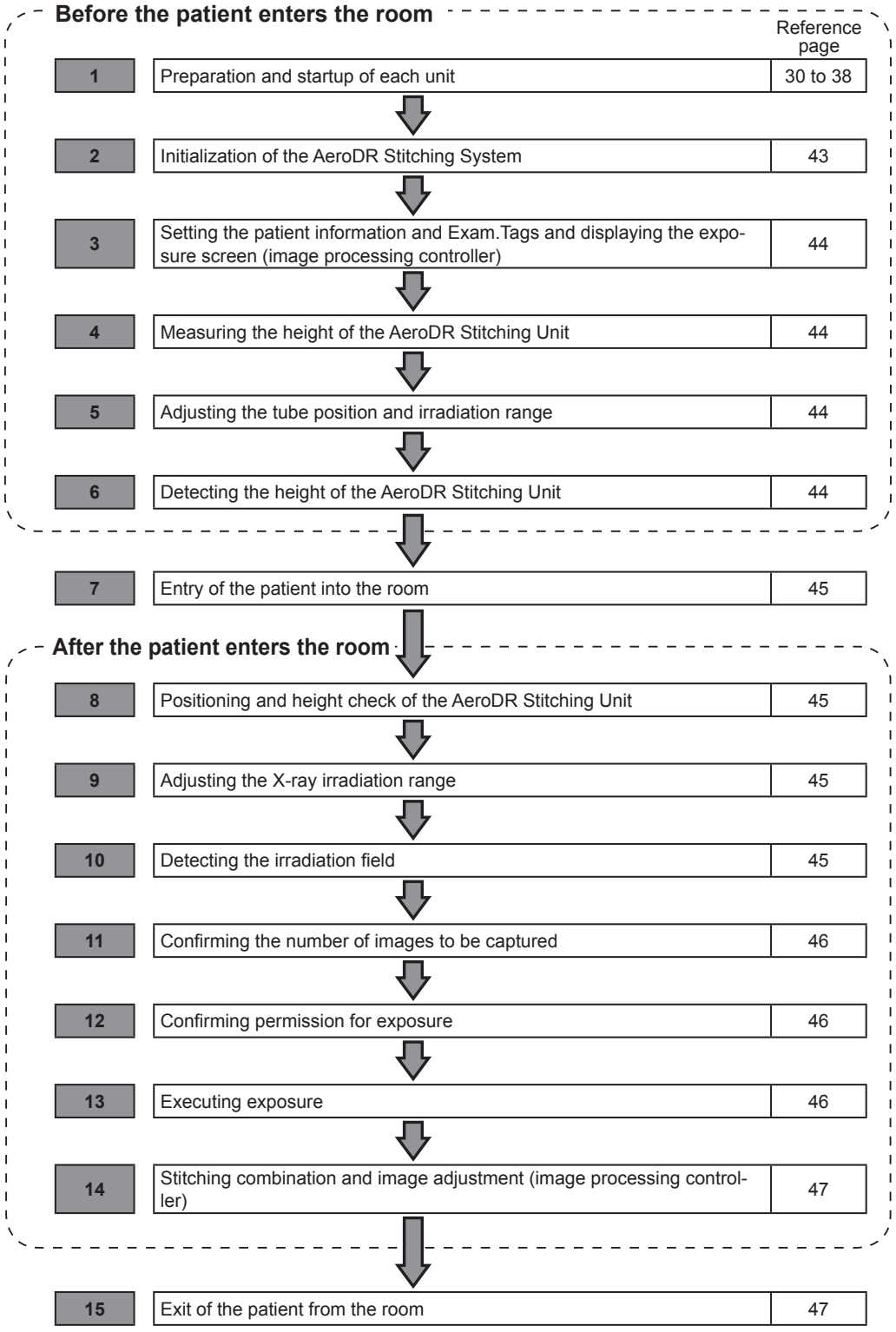
Chapter 4

Exposure Operation

This chapter describes the exposure flow and exposure operation as well as how to use the AeroDR Stitching System for exposure.

4.1 ● Exposure flow

The flow of the exposure with the AeroDR Stitching System is as follows.



4.2.1 Procedure for the exposure with the AeroDR Stitching System (before the patient enters the room)

The procedure for the exposure with the AeroDR Stitching System to be made before the patient enters the room is as follows.

IMPORTANT

- When initialization has been performed after starting up this device, step 2 is not necessary. Follow step 3 and after.
- When the exposure area is not changed after the last exposure (when the exposure area is within the exposure range of the AeroDR Stitching Unit), steps 4 through 6 are not necessary. Follow ″4.2.2 Procedure for the exposure with the AeroDR Stitching System (after the patient enters the room)″ and after. For how to bypass the need to detect the height every time, see ″4.3.3 Example from Height Detection to Capturing Images″.

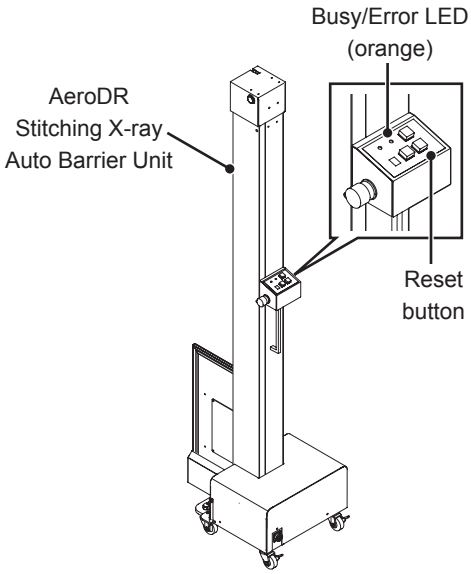
1 Confirm that preparation and startup have been completed for the AeroDR Stitching System.

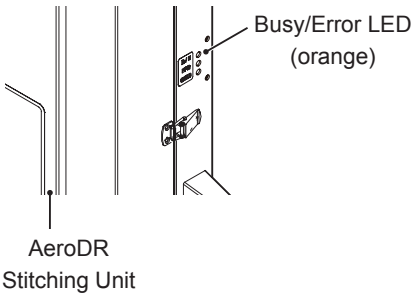
Reference

- For the preparation and startup of the AeroDR Stitching System, see ″3.1 Installing the AeroDR Stitching System″.

2 Press and hold the Reset button of the AeroDR Stitching X-ray Auto Barrier Unit for 1.5 seconds to initialize the AeroDR Stitching X-ray Auto Barrier Unit.

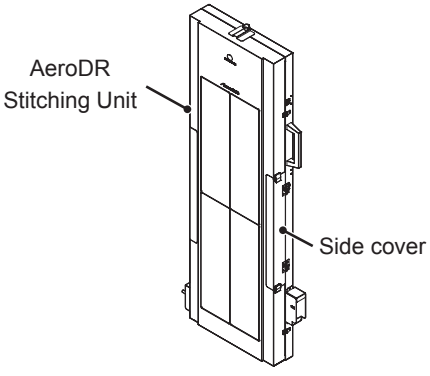
- The Busy/Error LED blinks on the AeroDR Stitching Unit and AeroDR Stitching X-ray Auto Barrier Unit.





IMPORTANT

- Do not open the side cover of the AeroDR Stitching Unit while the Busy/Error LED (orange) of the AeroDR Stitching Unit is blinking.



3 Register information on examination on the image processing controller to be used to take long images.

Reference

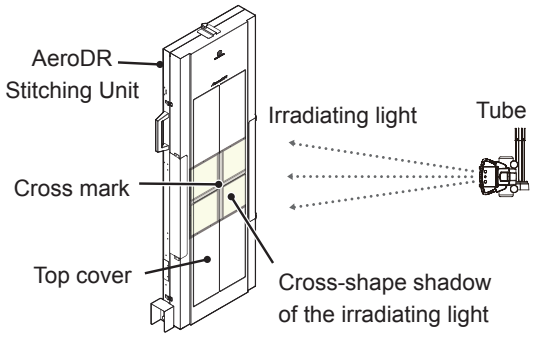
- For the operations of the image processing controller, refer to the "Operation Manual" of the image processing controller.

4 Adjust the height of the AeroDR Stitching Unit to the height of the patient and site for exposure.

IMPORTANT

- Make sure to detect the height of the AeroDR Stitching Unit every time you change the height of the AeroDR Stitching Unit
- For how to bypass the need to adjust the height every time, see "4.3.3 Example from Height Detection to Capturing Images".

5 Adjust the position of the tube of the X-ray device so as to match the center of the cross-shape shadow of the irradiating light with the center (cross mark) of the top cover on the AeroDR Stitching Unit.



IMPORTANT

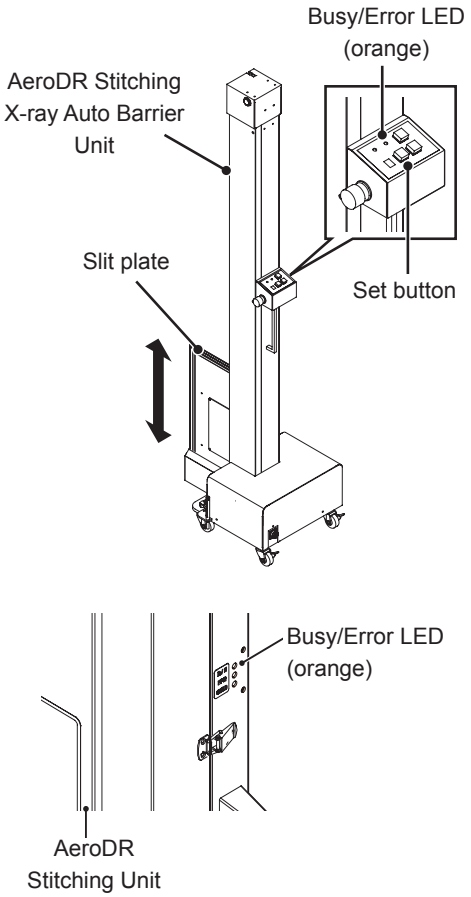
- Adjust the position of the tube so that the SID (distance from the AeroDR Detector) stays unchanged.
- Set the irradiating light range to the length of an AeroDR Detector.

6 Press and hold the Set button of the AeroDR Stitching X-ray Auto Barrier Unit for 1.5 seconds to detect the height of the AeroDR Stitching Unit.

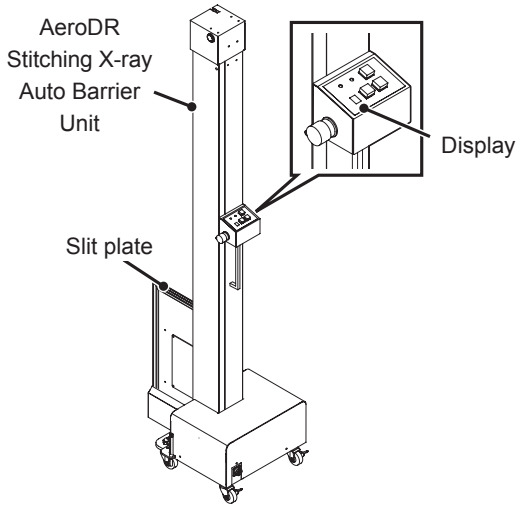
IMPORTANT

- The light detector cannot detect the height of the Stitching Unit when the irradiating light turns off during the detection. Detect the height of the unit right after the irradiation of light.
- Make sure to detect the height of the Stitching Unit every time you turn on the Power Supply Unit or change the height of the Stitching Unit.

- The Busy/Error LED blinks on the AeroDR Stitching Unit and AeroDR Stitching X-ray Auto Barrier Unit and the slit plate moves up and down.



• When the height of the Stitching Unit is detected, ″0″ blinks on the display of the AeroDR Stitching X-ray Auto Barrier Unit and the slit plate moves into position according to the height of the Stitching Unit.

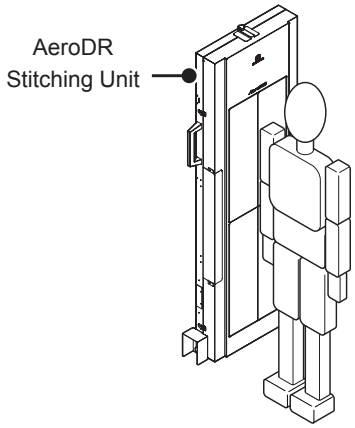


4.2.2 Procedure for the exposure with the AeroDR Stitching System (after the patient enters the room)

The procedure for the exposure with the AeroDR Stitching System to be made after the patient enters the room is as follows.

1 Let the patient enter the exposure room.

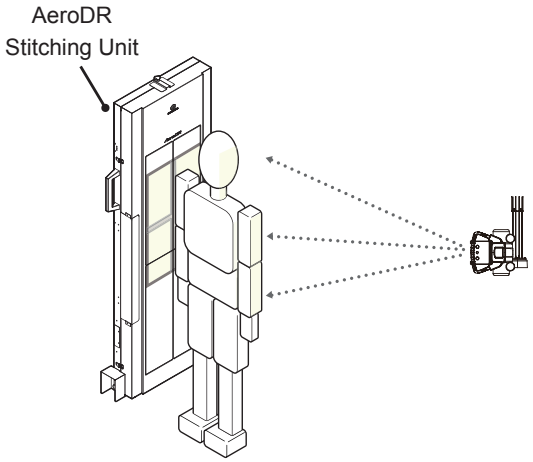
2 Lead the patient to the front of the AeroDR Stitching Unit and let him/her position himself/herself.



IMPORTANT

• If it is necessary to fine-tune the height of the AeroDR Stitching Unit according to the height or build of the patient, temporarily let the patient get away from the AeroDR Stitching Unit and detect the height of the AeroDR Stitching Unit referring to step 4 and after in ″4.2.1 Procedure for the exposure with the AeroDR Stitching System (before the patient enters the room)″.

3 Adjust the X-ray irradiation range.



Reference

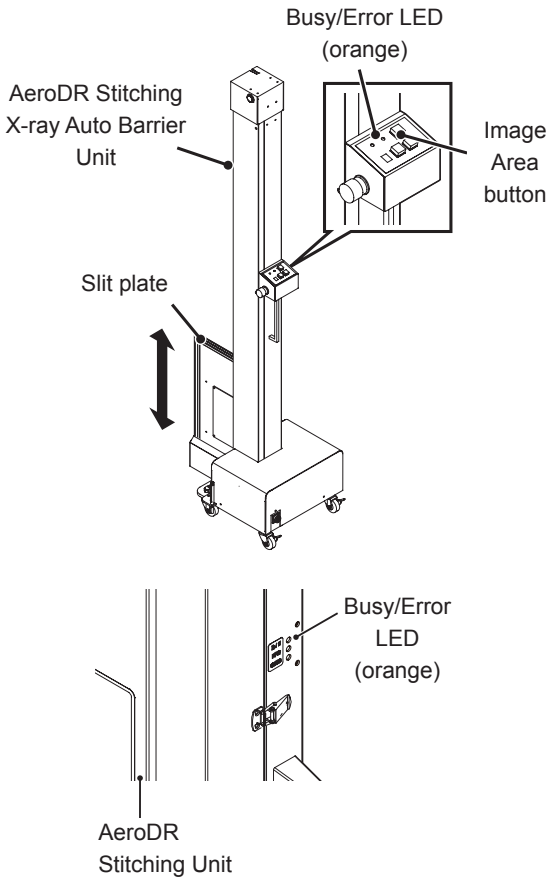
• For the adjustment of X-ray irradiation range, refer to ″4.3.1 Exposure of the Irradiation Field Light″.

4 Press the Image Area button of the AeroDR Stitching X-ray Auto Barrier Unit to detect the irradiation range.

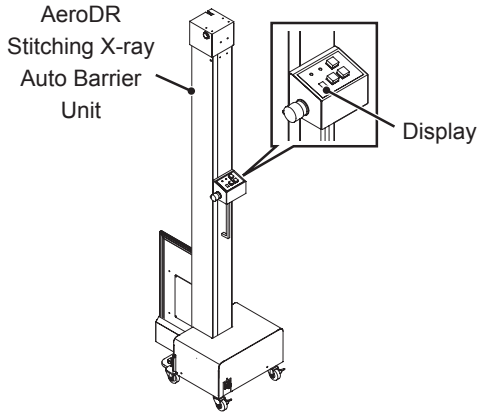
IMPORTANT

• The light detector cannot detect the irradiation range when the irradiating light turns off during the detection. Detect the irradiation range right after the irradiation of light.
• When ″0″ is displayed on the display of the Auto Barrier Unit or to change the number of images to be captured, adjust the irradiation range again, then press and hold the reset button for 1.5 seconds and move the slit plate to the prescribed position.

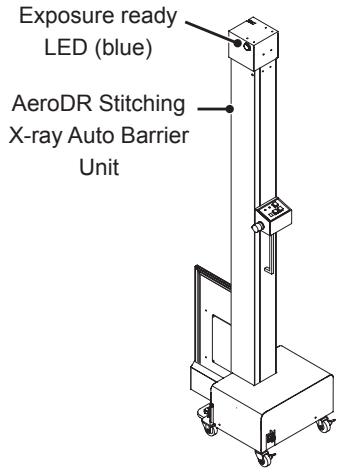
• The Busy/Error LED blinks and the slit plate moves up and down on the Stitching System and Auto Barrier Unit.



5 After the detection of irradiation range, the number of images to be taken appears on the display of the AeroDR Stitching X-ray Auto Barrier Unit.



6 Confirm that the exposure ready LED (blue) of the AeroDR Stitching X-ray Auto Barrier Unit lights up and that X-ray images can be taken.

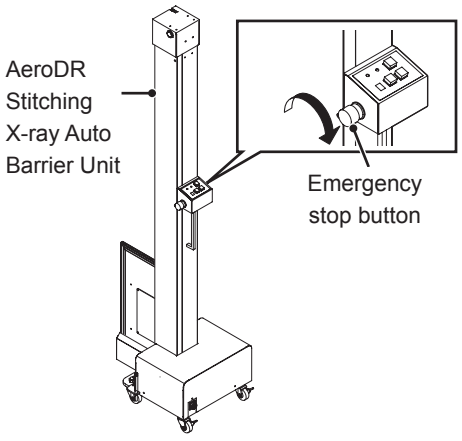


7 Press the exposure switch of the X-ray device to start taking images.

• When the exposure is completed, images are stored in the AeroDR Detector and will then be sequentially converted to digital data and sent to the image processing controller. After that, the exposure ready LED (blue) goes out and the slit plate moves to the next position where the image will be taken.

IMPORTANT

• Make sure that the Exposure ready LED (blue) lights up before taking images.
• To stop the Stitching X-ray Auto Barrier Unit in case of an emergency, press the emergency stop button on the Stitching X-ray Auto Barrier Unit.
• To release the emergency stop, rotate the emergency stop button.



• To initialize, press and hold the reset button of the Auto Barrier Unit for 1.5 seconds.
• Check that "E" is not displayed on the display of the Auto Barrier Unit.

8 Repeat steps 6 to 7 according to the number of the images to be taken.

- When all images are completely taken, the slit plate moves to the default position (the lowest point or the highest point).

IMPORTANT

- The AeroDR Detector cannot be removed until the transfer of the last image is completed.

9 Check that the exposed image is displayed on the image processing controller.

HINT

- If the AeroDR Detector remains unused for a long period of time (time can be set), it transitions to the sleep mode.
- When the image processing controller is ready for exposure, it wakes from the sleep mode.

Reference

- For the operations of the image processing controller, refer to the "Operation Manual" of the image processing controller.

10 Inform the patient of the completion of exposure and let him/her exit the exposure room.

4.2.3 Operation after taking images

When you finish taking images, follow the procedure below.

1 Open the side cover of the AeroDR Stitching Unit and take out the AeroDR Detector and grid.

IMPORTANT

- Check the LED on the Stitching Unit for confirming whether or not an AeroDR Detector or grid is installed on the unit.
- The AeroDR Detector will not be recharged when the AeroDR Interface Unit is turned off with the AeroDR Detector installed on the Stitching Unit.

HINT

- It is no problem if the power of the AeroDR Detector and image processing controller remains on in this step.

Reference

- For the display patterns and status of the LEDs, refer to "Chapter 6 Status (LED) Display".
- To take out the AeroDR Detector, refer to "3.1.6 Installing the AeroDR Detector".

2 Shut down the AeroDR Stitching System.

- Turn off the power of the Power Supply Unit and confirm that the power LED goes out.

Reference

- For the shutdown operation of the AeroDR Stitching System, refer to "3.2 Startup and shutdown".

3 Disconnect the 5m AeroDR Stitching UT Cable (Stitching) and Ethernet cable from the AeroDR Stitching Unit.

HINT

- When using the Stitching radiography base, you do not have to disconnect the cable.

4 Transfer the AeroDR Stitching X-ray Auto Barrier Unit.

IMPORTANT

- When transferring the Stitching X-ray Auto Barrier Unit without turning off the power, try not to apply load on cables.

5 When sharing the existing Stand with another system, remove the AeroDR Stitching Unit from the Stand and store the unit.

IMPORTANT

- When transferring the Stitching Unit or removing the unit from the Stand, make sure that two people work together, holding the holder grips.
- Remove the AeroDR Stitching UT Adjuster (lower) from the Stand Supporter first, and then remove the AeroDR Stitching UT Adjuster (upper).
- When standing the Stitching Unit for storage, make sure the following:
  - To prevent fall, secure the unit with a rope, passing through the holder grips of the unit.
  - Provide damage prevention measures so that the AeroDR Stitching UT Adjuster (upper) does not damage wall etc.

4.3 ● Precautions and Examples for Taking Images

This section explains precautions and examples for taking images.

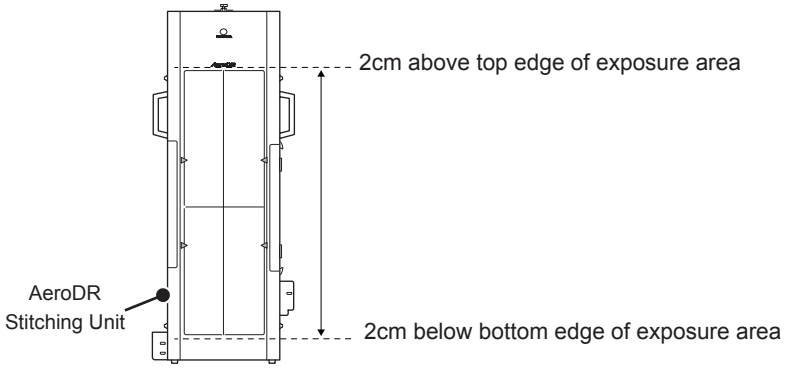
4.3.1 Exposure of the Irradiation Field Light

● Exposure area of the irradiation field light

The AeroDR Stitching System determines the exposure area by detecting the top and bottom edges of irradiation field lamp. The horizontal width does not effect detection of the exposure area.

Keep the top and bottom edges of the irradiation field light within the exposure area of the AeroDR Stitching Unit.

However, if an edge of the exposure area on the patient overlaps the top or bottom edge of the AeroDR Stitching Unit and the X-ray irradiated area is forcedly fitted entirely within the frame, the X-ray dose in that edge area may not suffice for taking an image. In such case, the irradiation field range can be enlarged up to 2cm outside the frame of the exposure area to enable the image to be taken.



X-rays irradiated outside of the frame are not included in the image. Moreover, if the irradiation field is set beyond 2cm, the setting is judged incorrect and an error is generated.

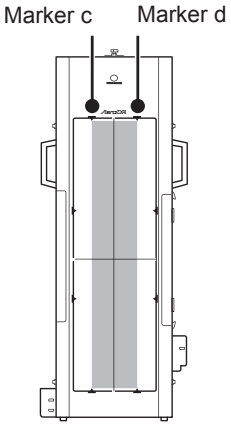
IMPORTANT

- Depending on the irradiation range angle of the X-ray tube, exposure area values may be narrower than those listed in ″9.1 Specifications″. Check the irradiation range of the X-ray tube before use.

● Horizontal width of the irradiation field light (the horizontal irradiation range)

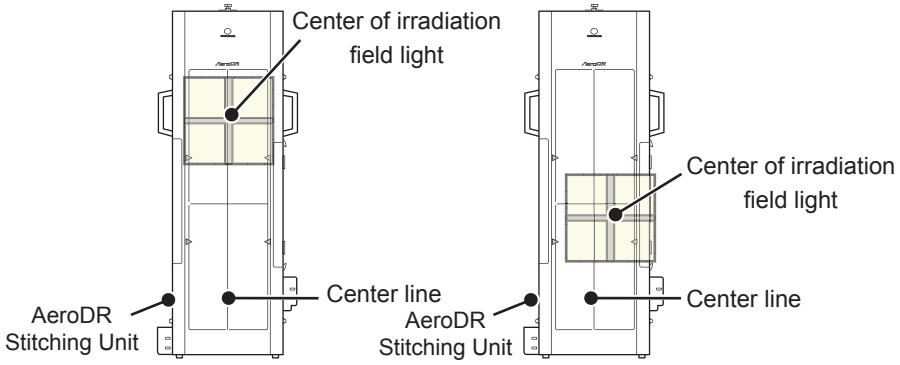
If the horizontal width of the irradiation field light is narrower than the width between marker c-d, irradiation field detection may have failed, or the performance of automatic splice may be degraded.

Therefore, when adjusting the width of the irradiation field light via the Collimator aperture, do not adjust the horizontal width to narrower than that of the width between marker c-d.



● Centering the irradiation field light

Position the center of the irradiation field light on the center line of the AeroDR Stitching Unit. The cross-shaped shadow of the irradiation field light need only to touch the center line to be properly positioned.
If the center of the irradiation field light is not aligned with the center line of the AeroDR Stitching Unit, the irradiation field may not be detected.



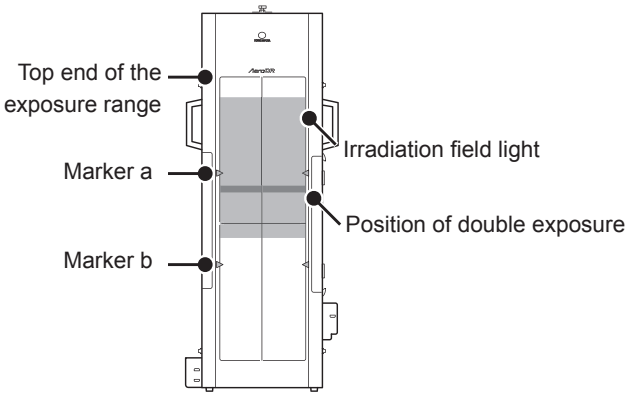
Though the right and left ends are out of the range, this is acceptable because the top and bottom ends are within the range and the center of the irradiation field light is on the center line.

Though the top and bottom ends are within the range, this is not acceptable because the center of the irradiation field light is not aligned with the center line.

4.3.2 About the Double-irradiated Locations

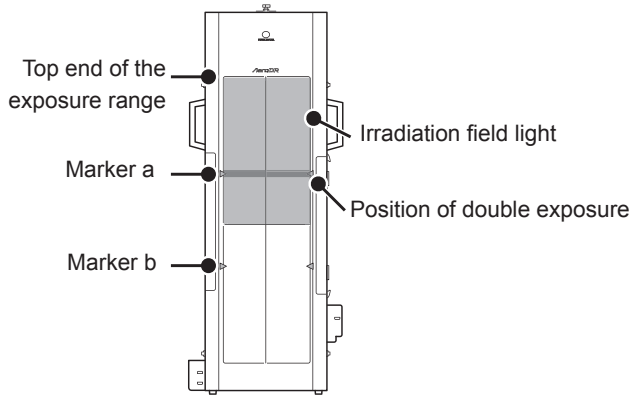
If the range of the irradiation field light is 2 images or less, and the number of shots is 2 or less, the AeroDR Stitching System changes the exposure start position within the vertical range of the projected irradiation field light and takes images.
If the range of the irradiation field light is more than 2 images, 3 shots are taken. The position of double exposure-which depends on the range and position of the irradiation field light-is as follows.

- **When the top end of the irradiation field light exists between the exposure range and the marker a**



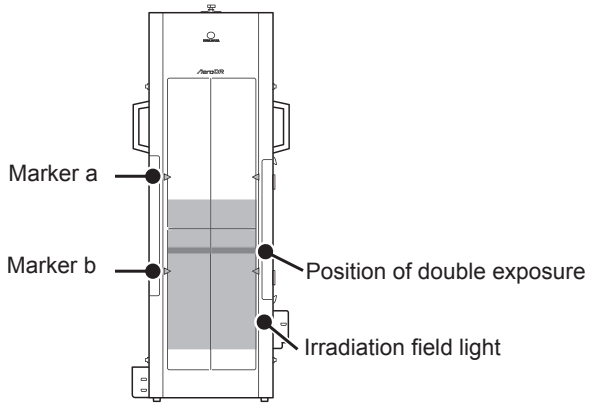
The image is captured starting from the top end of the irradiation field, and the position of double exposure is 17 inches (the length of one image) below the top end of the irradiation field light.

- **When the top end of the irradiation field light is on the top end of the exposure range**



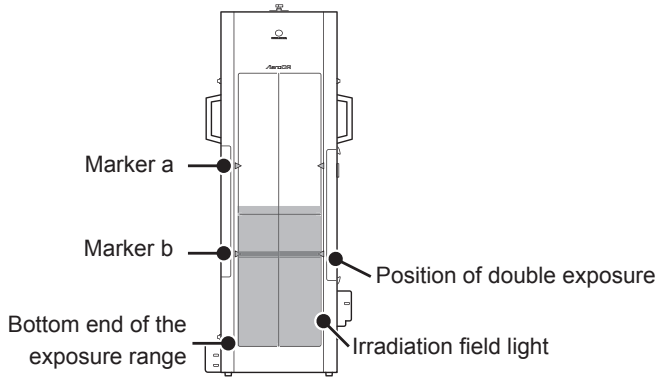
When the top end of the irradiation field light is on the top end of the exposure range, the position of double exposure is located at the marker a.

● **When the top end of the irradiation field light is located below the marker a**



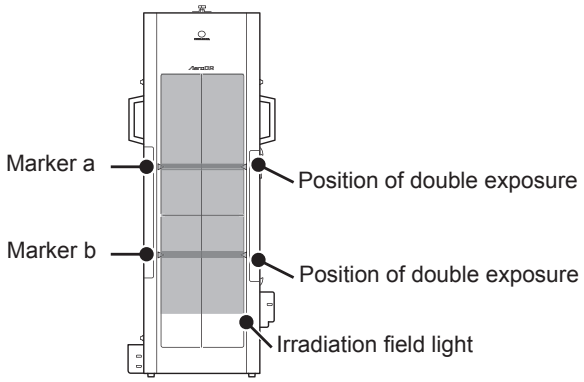
The image is captured starting from the bottom end of the irradiation field, and the position of double exposure is 17 inches (the length of one image) above the bottom end of the irradiation field light.

● **When the bottom end of the irradiation field light is on the bottom end of the exposure range**



When the bottom end of the irradiation field light is on the bottom end of the exposure range, the position of double exposure is located at the marker b.

● **When taking a 3-shot image (the range of the irradiation field light is wider than 2 images)**



When taking a 3-shot image, the double-irradiated location is the marker a and marker b.

4.3.3 Example from Height Detection to Capturing Images

This system moves the AeroDR Detector according to the position of the irradiation field in order to take images.
As long as the exposure area is within the area supported by the AeroDR Stitching Unit, the height of the AeroDR Stitching Unit does not need to be adjusted for each patient.
The height position can be marked on the Stand, etc., by referring to the examples for capturing images of the full spinal position and the full leg position.
Before the patient is brought into the lab, adjust the height of the AeroDR Stitching Unit to the marked positions relative to the site for exposure based on test information such as RIS, and perform height detection with the AeroDR Stitching Unit.
After that, the patient is brought into the lab and stood in front of the AeroDR Stitching Unit, and then the irradiation field light is adjusted to the targeted exposure area on the patient.

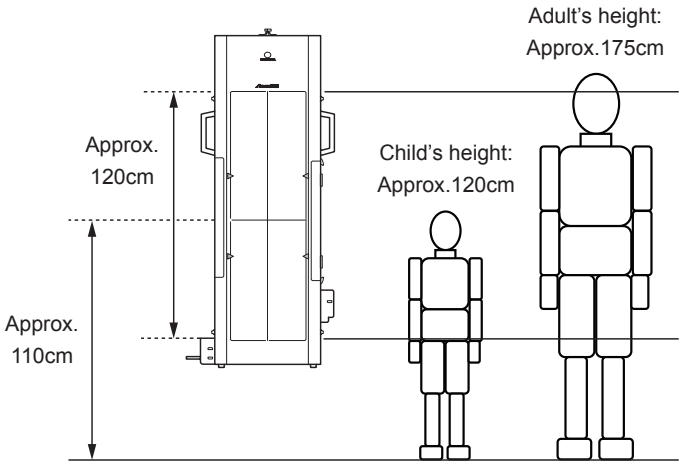
HINT

- If it is necessary to fine-tune the height of the AeroDR Stitching Unit according to the height/build of the patient, temporarily let the patient get away from the AeroDR Stitching Unit, adjust the height of the AeroDR Stitching Unit, and perform height detection.

Confirm that the targeted area is within the exposure area of the AeroDR Stitching Unit. When the irradiation field is detected, the number of shots required for that field is automatically determined and indicated on the display of the AeroDR Stitching X-ray Auto Barrier Unit. Take the number of indicated shots.
It is recommended to always input 3 shots in the test conditions. Because of machine specifications, if it is determined that more shots are required than the input test condition after the irradiation field has been detected, either the test conditions must be registered again or the irradiation field must be reduced and detected again.

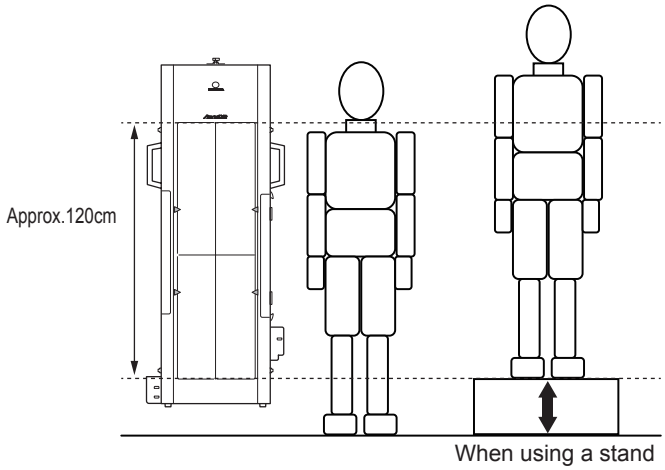
● Capturing images of the full spinal position

As in the illustration below, when capturing an image of the full spinal position, set the center of the AeroDR Stitching Unit approx. 110cm above the floor so that you can capture an image of the full spine (from under the eyeball to near the pelvis) of subjects from a child to an adult. The capture position can be determined in consideration of the patient's height, and the respective positions marked on the Stand, etc.



● Capturing images of the full leg position

As in the illustration below, when capturing an image of the full leg position, set the AeroDR Stitching Unit to the lowest point, use a stand to compensate for the distance between the possible exposure area of the AeroDR Stitching Unit and the floor, and position the patient in alignment with the AeroDR Stitching Unit so that you can capture an image of the full leg position (from the ankle to near the pelvis) of subjects from a child to an adult.
The capture position can be determined in consideration of the patient's height, the height of the stand, and the respective positions marked on the Stand, etc.



Chapter 5

Setting Operation

This chapter describes how to modify the settings of the AeroDR Stitching System.

5.1 ● Correcting the exposure position

Measure the gap between the irradiating light range and the shot image and set this gap as a correction value for the exposure position.

IMPORTANT

- If the gap between the irradiating light range and the shot image is too large, correct the exposure position. In other cases, do not perform the operation.
- There are three correction values for the exposure position you can set: ″Picture top position correction value″, ″Picture middle position correction value″ and ″Picture lower position correction value″.

Before correcting the radiation position, perform the following procedures and setting.

- Exposure preparation of the AeroDR Stitching System
- Install the AeroDR Stitching Unit approx. 1 m above the floor.
- Radiation dose setting: 80kV-20.0mAs

Reference

- For the exposure preparation of the AeroDR Stitching System, ″3.1 Installing the AeroDR Stitching System″, ″3.2 Startup and shutdown″ and ″4.2 Operating the AeroDR Stitching System″.

5.1.1 Flow chart for correcting exposure position

Measuring the picture top position correction value

Initialize the correction value for the exposure position with the image processing controller.
For further information, see ″User Tool Operation Manual″ of the image processing controller.

↓

Prepare for measurement using the image processing controller.
For further information, see ″User Tool Operation Manual″ of the image processing controller.

↓

Prepare for measurement using the AeroDR Stitching System.

↓

Measure the gap between the captured image and irradiated light using the AeroDR Stitching System.

↓

Measuring the picture middle position correction value

Prepare for measurement using the image processing controller.
For further information, see ″User Tool Operation Manual″ of the image processing controller.

↓

Prepare for measurement using the AeroDR Stitching System.

↓

Measure the gap between the captured image and irradiated light using the AeroDR Stitching System.

↓

Measuring the picuture lower position correction value

Initialize the correction value for the exposure position with the image processing controller.
For further information, see "User Tool Operation Manual" of the image processing controller.

↓

Prepare for measurement using the image processing controller.
For further information, see "User Tool Operation Manual" of the image processing controller.

↓

Prepare for measurement using the AeroDR Stitching System.

↓

Measure the gap between the captured image and irradiated light using the AeroDR Stitching System.

↓

Setting the correction value

Set the correction value with the image processing controller.
For further information, see "User Tool Operation Manual" of the image processing controller.

↓

Confirming the correction value

Confirm the preset correction value

5.1.2 Initializing the correction value for the exposure position

Before measuring and setting the correction value for the exposure position, initialize the correction value.

1 Turn on the AeroDR Stitching System.

Reference

- For the startup operation of the AeroDR Stitching System, refer to "3.2 Startup and shutdown".

2 Detect the height of the AeroDR Stitching Unit.

Reference

- For the height detection of the AeroDR Stitching Unit, refer to step 6 in "4.2.1 Procedure for the exposure with the AeroDR Stitching System (before the patient enters the room)" .

3 Set the next item of [Adjustment] on the AeroDR Stitching Unit Adjustment screen.

Reference

- For details, refer to the "User Tool Operation Manual" of the image processing controller.

● When correcting the picture top position correction value / picture middle position correction value

Item	Setting
[Picture top position correction value]	0
[Picture middle position correction value]	0
[Picture lower position correction value]	50

● When correcting the picture lower position correction value

Item	Value
[Picture top position correction value]	-50
[Picture middle position correction value]	0
[Picture lower position correction value]	0

IMPORTANT

- Do not change any setting other than the value above. It may lead to incorrect detection of the irradiation field.

4 Press [Upload].

5.1.3 Measurement preparation (image processing controller)

Use the following procedure to prepare the measurement in the image processing controller.

Reference

- For details, refer to the ″User Tool Operation Manual″ of the image processing controller.

1 Enter an ID in the [Patient ID] column on the patient registration screen.

2 Press [Perform] button.

3 Press [SPECIAL] on the body part selection screen.

4 When measuring the picture top position correction value or picture lower position correction value, select [AP Middle] and then [Ap Lower] in the [Tot.Spine] line. When measuring the picture middle position correction value, select [Ap Lower] in the [Tot.Spine] line.

5 Press [Perform].

6 Confirm that ″Please detect radiation field″ appears on the exposure screen.

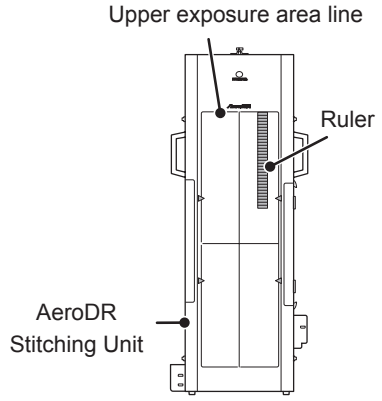
5.1.4 Measurement preparation (AeroDR Stitching System)

Use the following procedure to prepare the measurement in the AeroDR Stitching System.

● **Picture top position correction value**

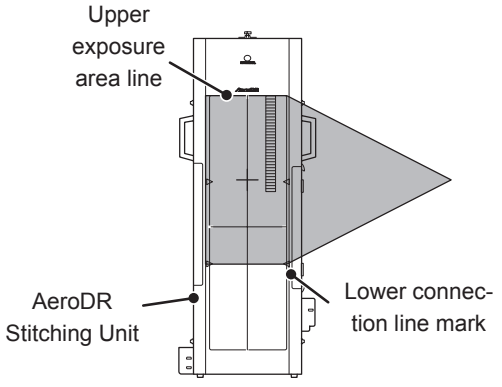
1 Attach the ruler whose scale marks can be exposed, to the AeroDR Stitching Unit along the upper exposure area line of the unit surface.

- Align the ruler scale ″0″ with the top of the exposure area line and attach the ruler to the unit.

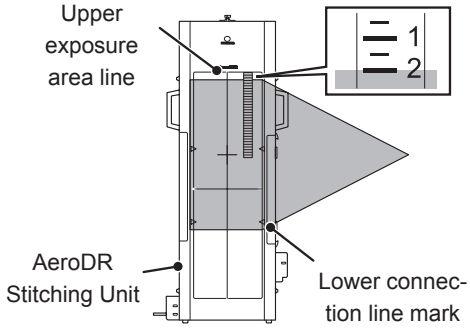


2 Expose the irradiating light to the AeroDR Stitching Unit and set the irradiation range.

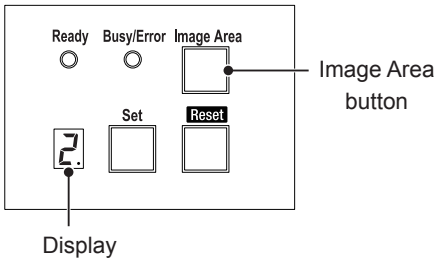
- Align the upper edge of the irradiating light with the upper exposure area line of the AeroDR Stitching Unit surface and align the lower edge of the irradiating light with the lower connection line mark of the AeroDR Stitching Unit surface.



• While keeping the irradiating light range, align the upper edge with the position located about 20mm from the upper exposure area line of the AeroDR Stitching Unit surface.



3 Press the Image Area button on the AeroDR Stitching X-ray Auto Barrier Unit to start the detection of the irradiation field and confirm that the number of image to be taken "2" appears on the display.

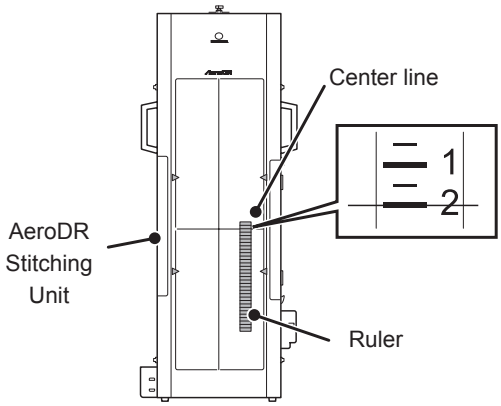


IMPORTANT

• When the number of image to be taken "3" appears, restart from Step 2 and narrow the lower edge of the irradiating light.

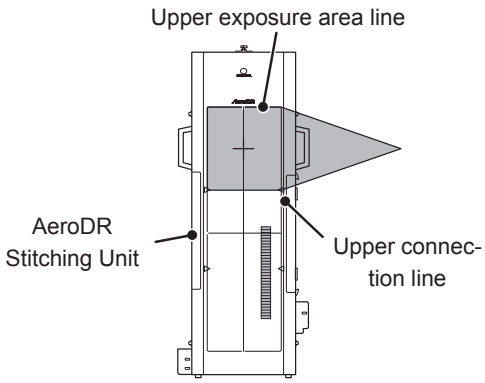
● Picture middle position correction value

1 Attach 20mm scale mark of the ruler whose scale marks can be exposed, to the center line of the AeroDR Stitching Unit surface.

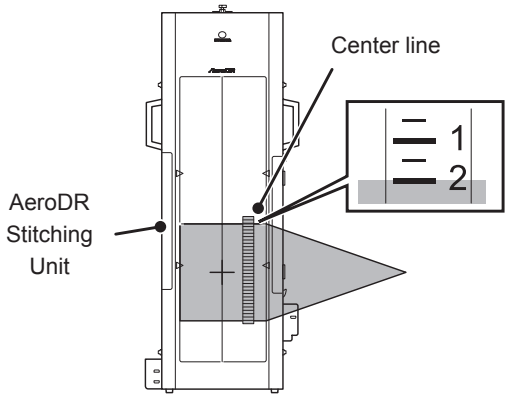


2 Expose the irradiating light to the AeroDR Stitching Unit and set the irradiation range.

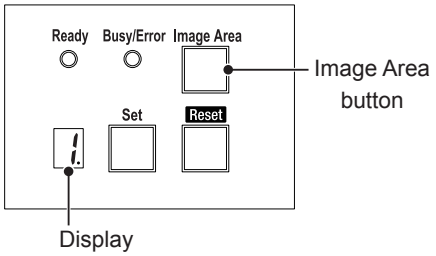
• Align the upper edge of the irradiating light with the upper exposure area line of the AeroDR Stitching Unit surface and align the lower edge of the irradiating light with the upper connection line mark of the AeroDR Stitching Unit surface.



• While keeping the irradiating light range, align the upper edge with the center line of the AeroDR Stitching Unit surface.



3 Press the Image Area button on the AeroDR Stitching X-ray Auto Barrier Unit to start the detection of the irradiation field and confirm that the number of image to be taken "1" appears on the display.



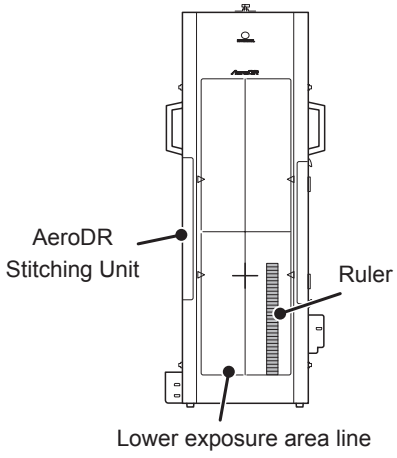
IMPORTANT

• When the number of image to be taken "2" appears, restart from Step 2 and narrow the lower edge of the irradiating light.

● **Picture lower position correction value**

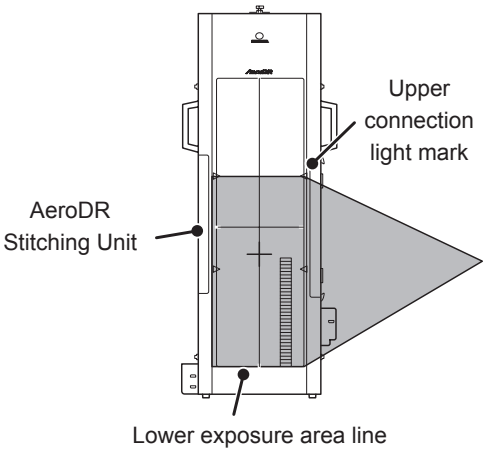
1 Attach the ruler whose scale marks can be exposed, to the AeroDR Stitching Unit along the lower exposure area line of the unit surface.

- Attach the ruler so that the scale mark ″0″ comes to the bottom edge of the exposure range.

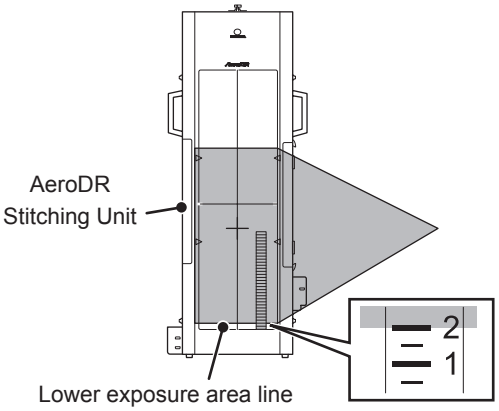


2 Expose the irradiating light to the AeroDR Stitching Unit and set the irradiation range.

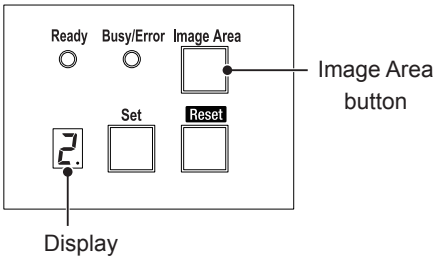
- Align the upper edge of the irradiating light with the upper connection light mark of the AeroDR Stitching Unit surface and align the lower edge of the irradiating light with the lower exposure area line of the AeroDR Stitching Unit surface.



- While keeping the irradiating light range, align the lower edge with the position located about 20mm from the lower exposure area line of the AeroDR Stitching Unit surface.



3 Press the Image Area button on the AeroDR Stitching X-ray Auto Barrier Unit to start the detection of the irradiation field and confirm that the number of image to be taken ″2″ appears.



IMPORTANT

- When the number of image to be taken ″3″ appears, restart from Step 2 and narrow the upper edge of the irradiating light.

5.1.5 Measuring the gap between the exposed image and irradiating light

Take an image and measure the gap between the exposed image and irradiating light.

1 Confirm that "Ready" appears on the exposure screen in the image processing controller.

2 Press the exposure switch of the X-ray device. (First image is taken.)
- For measuring the picture middle position correction value, go to Step 4.

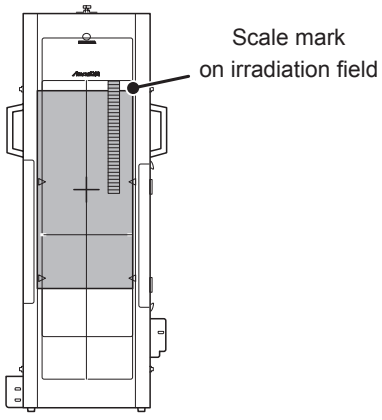
3 After taking the first image, confirm that "Ready" appears on the exposure screen in the image processing controller and press the exposure switch of the X-ray device. (Second image is taken.)

4 Press [AP Middle] on the exposure screen and press the [Viewer] button.

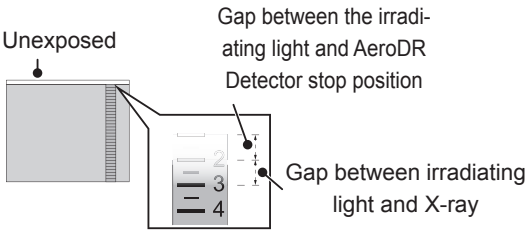
● When measuring the picture top position correction value

5 Check the upper edge scale mark on the exposed image.
- Compare the scale mark on the irradiation field and that on the exposed image and record the difference as "Picture top position correction value".

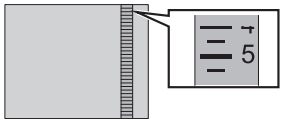
IMPORTANT
- Only the display area is extracted on the screen.



IMPORTANT
- When the X-ray area is narrower than the irradiating light range:
  When the image is taken from a scale mark of 13mm, the correction value becomes -7mm because the exposure area of the AeroDR Detector is corrected according to the irradiating light.

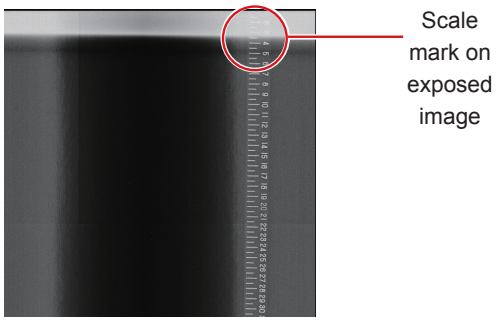


- When the setup error is a negative value:
  When the image is taken from a scale mark of 40mm, the correction value becomes 20mm because the exposure area of the AeroDR Detector is corrected according to the irradiating light.



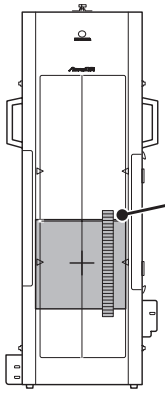
● When measuring the picture middle position correction value

5 Check the upper edge scale mark on the exposed image.
- Compare the scale mark on the irradiation field and that on the exposed image and record the difference as "Picture middle position correction value".



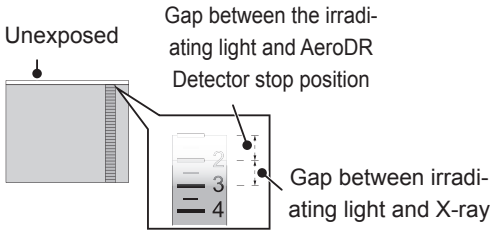
IMPORTANT

- Only the display area is extracted on the screen.

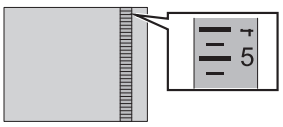


IMPORTANT

- When the X-ray scale is narrower than the irradiating light:
  When the image is taken from a scale mark of 13mm, the correction value becomes -7mm because the exposure area of the AeroDR Detector is corrected according to the irradiating light.



- When the setup error is a negative value:
  When the image is taken from a scale mark of 40mm, the correction value becomes 20mm because the exposure area of the AeroDR Detector is corrected according to the irradiating light.



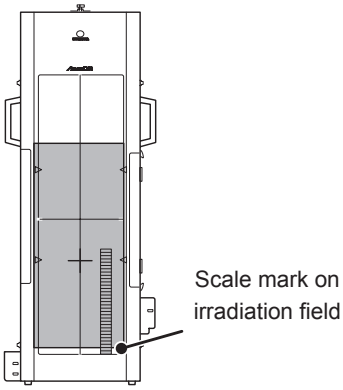
● When measuring the picture lower position correction value

5 Check the lower edge scale mark on the exposed image.

- Compare the scale mark on the irradiation field and that on the exposed image and record the difference as "Picture lower position correction value".

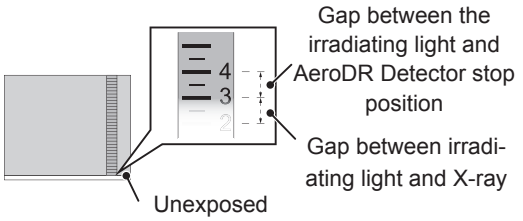
IMPORTANT

- Only the display area is extracted on the screen.

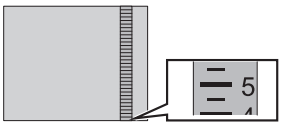


IMPORTANT

- When the X-ray scale is narrower than the irradiating light:
  When the image is taken from a scale mark of 13mm, the correction value becomes -7mm because the exposure area of the AeroDR Detector is corrected according to the irradiating light.



- When the setup error is a negative value:
  When the image is taken from a scale mark of 39mm, the correction value becomes -19mm because the exposure area of the AeroDR Detector is corrected according to the irradiating light.



6 Press [ ].

5.1.6 Setting the correction values

Use the image processing controller to set the measured gaps as correction values.

Reference

- For details, refer to the "User Tool Operation Manual" of the image processing controller.

1 Set the picture top position correction value, picture middle position correction value and picture lower position correction value measured on the AeroDR Stitching Unit Adjustment screen.

2 Press [Upload].

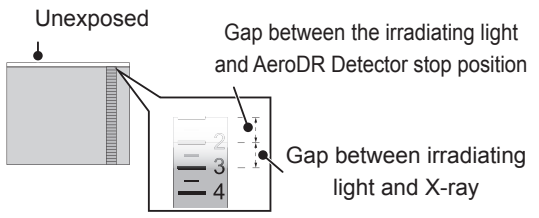
5.1.7 Confirming the correction value

After the completing the correction value upload, acquire the image again and confirm that the correction value is suitable.

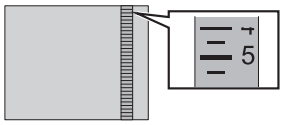
1 Refer to "5.1.3 Measurement preparation (image processing controller)", "5.1.4 Measurement preparation (AeroDR Stitching System)", and "5.1.5 Measuring the gap between the exposed image and irradiating light" and measure the picture top position correction value.

2 Confirm that the top of the acquired image is within a range of ±2cm of the target value (0 to 4cm of the ruler).

- The top edge of the image may be in the unexposed area. In such case, change the S/G value and confirm that the top edge comes to the "0cm" scale mark.



- Confirm that the top edge of the image comes to the upper side of the "4cm" scale mark.



Chapter 5

3 **Refer to "5.1.3 Measurement preparation (image processing controller)", "5.1.4 Measurement preparation (AeroDR Stitching System)", and "5.1.5 Measuring the gap between the exposed image and irradiating light" and measure the picture bottom position correction value.**

4 **Confirm that the bottom of the acquired image is within a range of ±2cm of the target value (0 to 4cm of the ruler).**

Chapter 6

Status (LED) Display

This chapter describes the LED display patterns and the status of the respective devices.

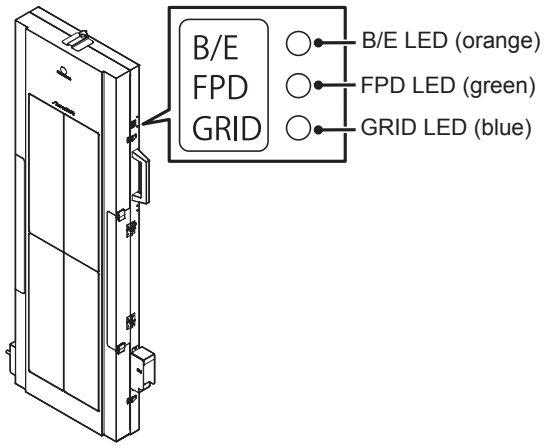
6.1 ● LED display of respective devices

Status of the respective devices can be confirmed with LEDs.
Check the status of the respective devices, referring to the ″LED display pattern″.

LED display pattern

Notation	Display pattern
	Off
	Slow flashing
	Fast flashing
	On

6.1.1 AeroDR Stitching Unit



B/E: Busy/Error LED (orange)

Display pattern	Status
	Ready and waiting
	Operating
	Error occurred

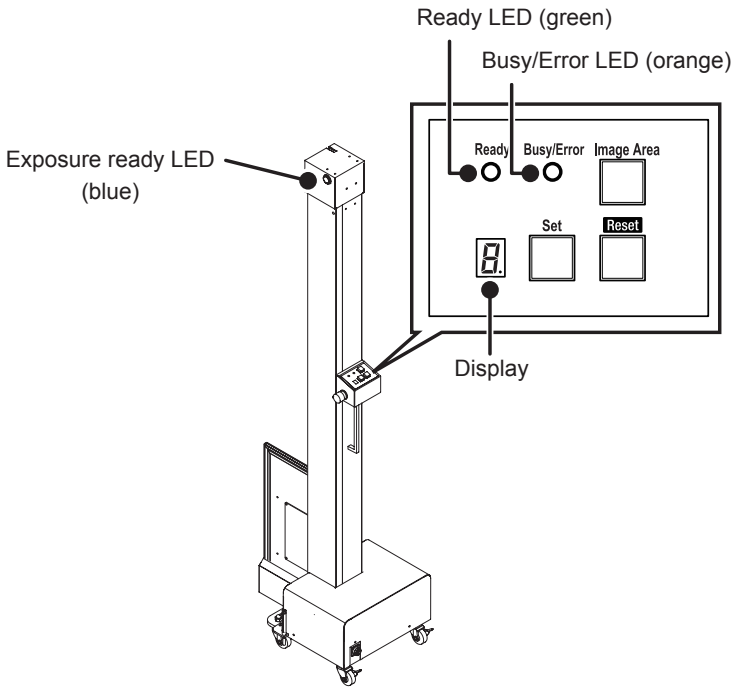
FPD: AeroDR Detector loaded LED (green)

Display pattern	Status
	AeroDR Detector loaded (unregistered on the image processing controller)
	AeroDR Detector not loaded
	AeroDR Detector loaded (registered on the image processing controller)

GRID: Grid loaded LED (blue)

Display pattern	Status
	Grid not loaded
	Grid loaded

6.1.2 AeroDR Stitching X-ray Auto Barrier Unit



Exposure ready LED (blue)

Lighting pattern	Status
	Exposure not ready
	Exposure ready

Ready : Ready LED (green)

Display pattern	Status
	Ready and waiting (unconnected to the image processing controller)
	Ready and waiting (connected to the image processing controller)

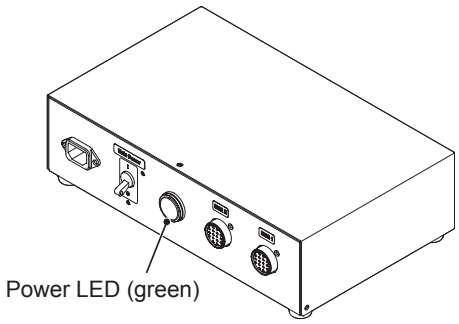
Busy/Error : Busy/Error LED (orange)

Display pattern	Status
	Ready and waiting
	Operating
	Error occurred

Display

Display pattern	Status
	The height of the AeroDR Stitching Unit has not detected.
Rotating blink	The height of the AeroDR Stitching Unit has detected.
0 blink	Waiting for detection of irradiation field
3 to 1 (lighted)	Number of exposure
E (lighted)	Error occurred

6.1.3 Power Supply Unit



Power LED (green)

Display pattern	Status
	Shutdown condition
	Operating

Chapter 7

Troubleshooting

This chapter describes problems that may occur and error codes that may be displayed, and how to resolve each of them.

7.1 ● Various problems and countermeasures

If the following problems occur in the AeroDR Stitching System, consult the respective references for countermeasures.

IMPORTANT

- After performing countermeasures, if the problem does not go away, contact Konica Minolta technical representatives.

HINT

- When an error message has been displayed in the image processing controller, check the error description and countermeasures listed in the "Operation Manual" of the image processing controller.

7.1.1 Same for the AeroDR Stitching Unit and AeroDR Stitching X-ray Auto Barrier Unit

Trouble	Detail	What to Do
Operation (resetting/ height detection/irradiation field detection) does not start.	After pressing the respective button, operation did not start and the Busy/Error LED remained lit (orange).	Check if the emergency stop button was pressed. Also, check if the side cover of the AeroDR Stitching Unit is open.
Height detection cannot be performed or failed.	After starting height detection, the display indication remained out and the Busy/Error LED of the respective unit lit (orange).	Check the following. (1) Did the Collimator light go out during irradiating light detection? (2) Is the X-ray device, AeroDR Stitching X-ray Auto Barrier Unit or AeroDR Stitching Unit out of position? (3) Does the center of the irradiating light strike the center of the AeroDR Stitching Unit correctly? (4) Has dirt or foreign matter adhered to the slit plate such that is blocks light near to the optical sensor? (5) Has the brightness of the irradiating light changed because the lamp was replaced, etc? If the above intervention does not clear the trouble, contact Konica Minolta technical representatives.
Irradiation field detection cannot be performed or failed.	After starting irradiation field detection, the number of shots was not indicated on the display and the Busy/Error LED of the respective unit lit (orange).	Check the following. (1) Did the Collimator light go out during irradiating light detection? (2) Is the X-ray device, AeroDR Stitching X-ray Auto Barrier Unit or AeroDR Stitching Unit out of position? (3) Does the irradiating light extend more than 2cm from the frame? (4) Has dirt or foreign matter adhered to the slit plate so that is blocks light near to the optical sensor? (5) Has the brightness of the irradiating light changed because the lamp was replaced, etc? If the above intervention does not clear the trouble, contact Konica Minolta technical representatives.
	Irradiation field detection does not start after pressing the Image Area button.	(1) Detect the height, if not detected. (2) Start exposure with the image processing controller, if not started. (3) If "Please detect radiation field" is displayed on the image processing controller and "0" is displayed on the Display of the AeroDR Stitching X-ray Auto Barrier Unit, reset the AeroDR Stitching X-ray Auto Barrier Unit and detect the irradiation field again.
The machine makes noises.	-	Contact Konica Minolta technical representatives.
The image processing controller started up normally, but the Ready LED keeps flashing.	The Ethernet cable is not connected.	Check that the Ethernet cable is properly connected.

7.1.2 AeroDR Stitching Unit

Trouble	Detail	What to Do
The AeroDR Detector-loading LED does not light/flash.	Power is not being supplied to the unit.	Check that the power box switch is in the ON position. Also, check that the power cable is properly connected.
The AeroDR Detector was loaded, but the AeroDR Detector-loading LED keeps flashing.	The AeroDR UF Cable is not connected.	Check that the AeroDR UF Cable inside the AeroDR Stitching Unit is properly connected to the AeroDR Detector.
The AeroDR Detector does not load.	The AeroDR Detector is bent.	Contact Konica Minolta technical representatives.
	The protective cover is deformed.	
The AeroDR Detector does not sit stably on the slide rail.	The AeroDR Detector is bent.	
	The protective cover is deformed.	
The AeroDR I/F Cable cannot be connected.	The hardwire connector of the AeroDR Detector is deformed.	Contact Konica Minolta technical representatives.
	The spring connector of the AeroDR I/F Cable is deformed.	
	Foreign matter has penetrated the hardwire connector of the AeroDR Detector.	Clean the cable and connector as explained in the ″AeroDR SYSTEM/AeroDR SYSTEM 2 Operation Manual″.
	Foreign matter has penetrated the spring connector of the AeroDR I/F Cable.	

7.1.3 AeroDR Stitching X-ray Auto Barrier Unit

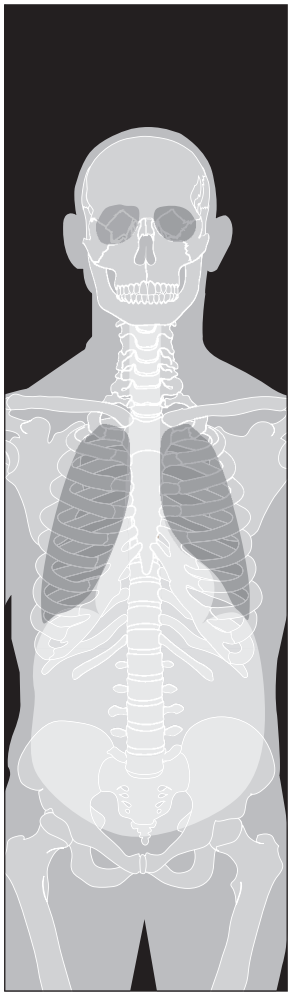
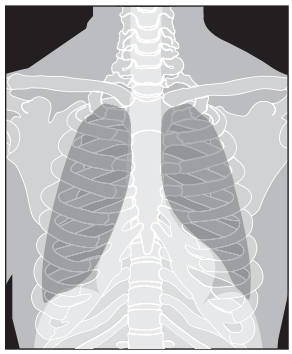
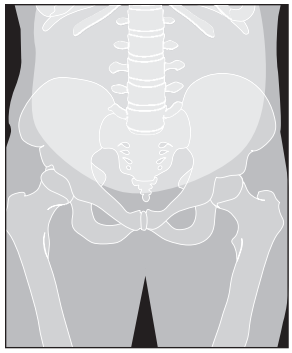
Trouble	Detail	What to Do
The Ready LED does not light/flash.	Power is not being supplied to the unit.	Check that the power box switch is in the ON position. Also, check that the power cable is properly connected.

7.1.4 Image Related

If problems can be seen in exposed images when the exposure was performed using the AeroDR Stitching System, take the respective countermeasures.

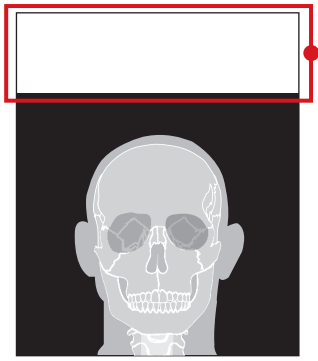
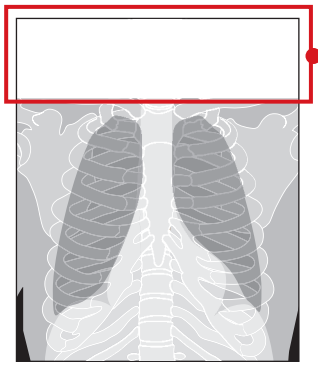
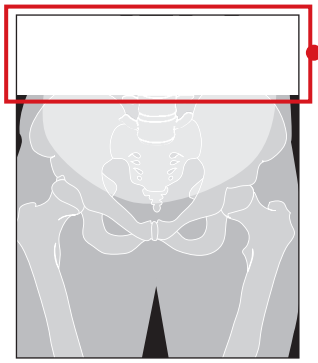
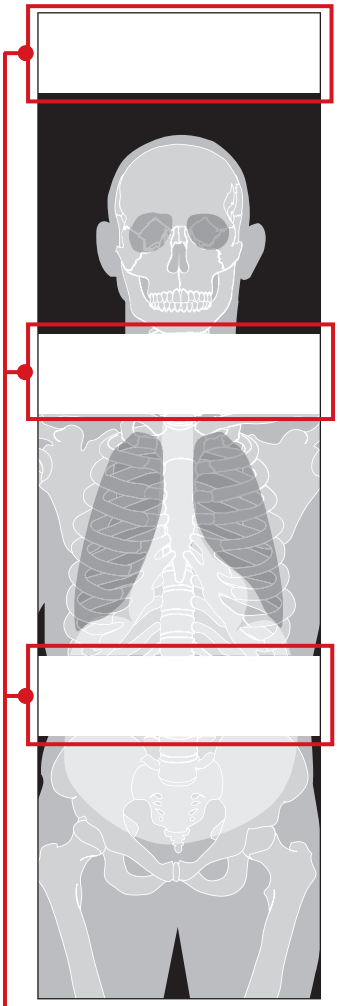
HINT

- The following shows images obtained when the images were captured correctly.

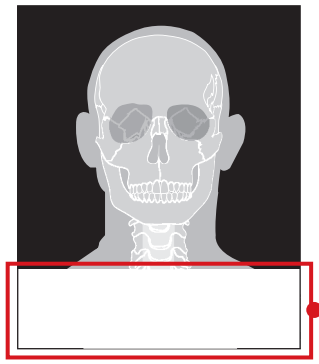
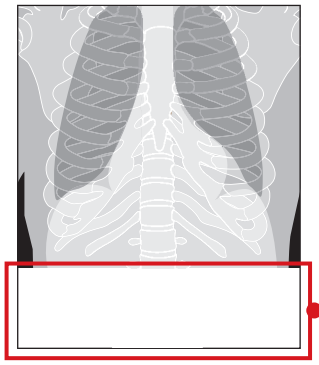
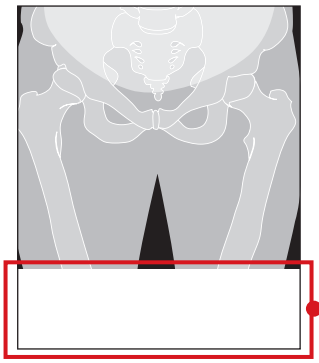
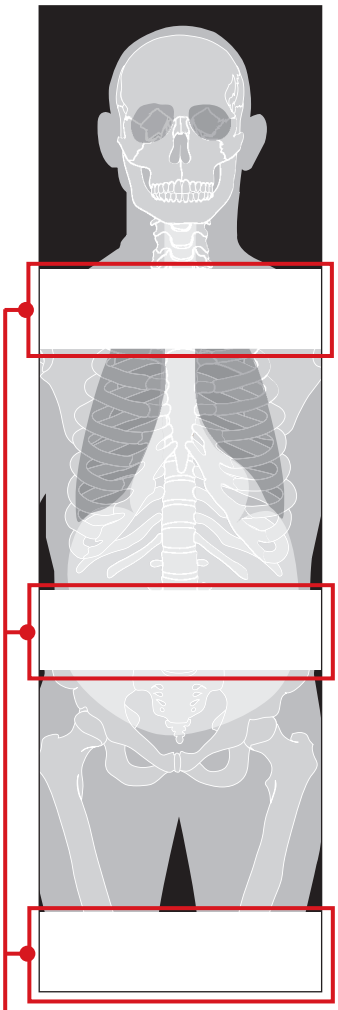
Before combining images	After combining images
Top 	
Middle 	
Bottom 	

Trouble	Detail	What to Do
There are visible problems with the captured image.	The captured shots were not properly spliced together. (The splice has been cropped and there are unexposed areas.)	As the countermeasures will vary depending on the location of the unexposed area of the exposed image, follow this table and check the items noted below. • If there are unexposed areas only on the upper sides of the images • If there are unexposed areas only on the lower sides of the images • If there are unexposed areas on both the upper and lower sides of the images
	A big difference is seen between the top and bottom edges of the irradiation field and captured image.	Check the following. (1) Is the AeroDR Stitching X-ray Auto Barrier Unit set in the correct position? (2) Is the Collimator set in the correct position? (3) Is the AeroDR Stitching Unit properly mounted on the Stand? (4) Detect height again. If no abnormalities are detected for the above checks, correct the shooting position. For the correction of the shooting position, refer to ″5.1 Correcting the exposure position″. If the above intervention does not clear the trouble, contact Konica Minolta technical representatives.
	There is fixed noise.	Clean the surface of the AeroDR Detector. Clean the surface of the AeroDR Stitching Unit. Clean acrylic plate of the slit plate.

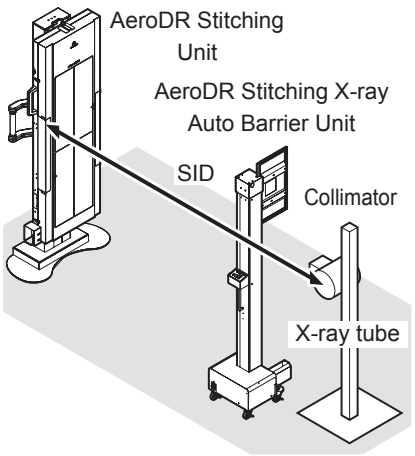
● If there are unexposed areas only on the upper sides of the images

Before combining images	After combining images	Corrective measures
Top  Middle  Bottom  Unexposed areas that are not correctly displayed.		Check the following. (1) Height detection may not have been performed. Immediately after the usual startup of the AeroDR Stitching Unit or when its height is changed, height detection must be performed for the AeroDR Stitching System. If you perform exposure without performing height detection after changing the height of the AeroDR Stitching Unit, image overlapping between the first and second images, or between the second and third may vary. As a result, an unoverlapped or unexposed area may be generated and you cannot combine the images. Refer to "4.2 Operating the AeroDR Stitching System" for the height detection procedure. (2) The angle of the collimator or X-ray tube may not be correctly set horizontal to the floor or the AeroDR Stitching X-ray Auto Barrier Unit.

● If there are unexposed areas only on the lower sides of the images

Before combining images	After combining images	Corrective measures
Top  Middle  Bottom  Unexposed areas that are not correctly displayed.		Check the following. (1) Height detection may not have been performed. Immediately after the usual startup of the AeroDR Stitching Unit or when its height is changed, height detection must be performed for the AeroDR Stitching System. If you perform exposure without performing height detection after changing the height of the AeroDR Stitching Unit, image overlapping between the first and second images, or between the second and third may vary. As a result, an unoverlapped or unexposed area may be generated and you cannot combine the images. Refer to "4.2 Operating the AeroDR Stitching System" for the height detection procedure. (2) The angle of the collimator or X-ray tube may not be correctly set horizontal to the floor or the AeroDR Stitching X-ray Auto Barrier Unit.

● If there are unexposed areas on both the upper and lower sides of the images

Before combining images	After combining images	Corrective measures
Top Middle Bottom Unexposed areas that are not correctly displayed.		Check the following. (1) Height detection may not have been performed. Immediately after the usual startup of the AeroDR Stitching Unit or when its height is changed, height detection must be performed for the AeroDR Stitching System. If you perform exposure without performing height detection after changing the height of the AeroDR Stitching Unit, image overlapping between the first and second images, or between the second and third may vary. As a result, an unoverlapped or unexposed area may be generated and you cannot combine the images. Refer to "4.2 Operating the AeroDR Stitching System" for the height detection procedure. (2) The angle of the collimator or X-ray tube may not be correctly set horizontal to the floor or the AeroDR Stitching X-ray Auto Barrier Unit. (3) The SID distance may not have been correctly set. Check that the X-ray tube and the AeroDR Stitching X-ray Auto Barrier Unit have been installed on the correct positions. In such case, contact Konica Minolta technical representatives. 

Chapter 8

Maintenance

This chapter describes the items that require periodic maintenance.

8.1 ● Maintenance and inspection items

This chapter describes the inspections and cleaning required in order to maintain the use of the AeroDR Stitching System in an optimum condition.

8.1.1 Maintenance schedule

The maintenance and inspection items that the user should perform are as follows.

Descriptions	Cleaning cycle
Check the surface of the AeroDR Stitching Unit for dirt and clean it.	1 week
Check the surface of the AeroDR Stitching X-ray Auto Barrier Unit for dirt and clean it.	1 week
Correct shooting position.	When an error occurred in combining images
Clean the AeroDR UF Cable spring connector of the AeroDR Stitching Unit.	1 week

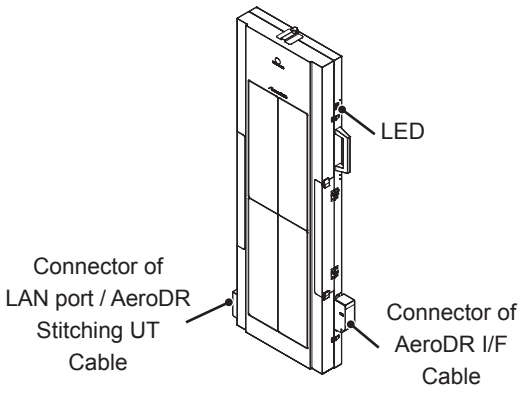
IMPORTANT

- To ensure optimum use of the AeroDR Stitching System, be sure to perform periodic maintenance.
- The above task intervals are estimates and vary according to usage.

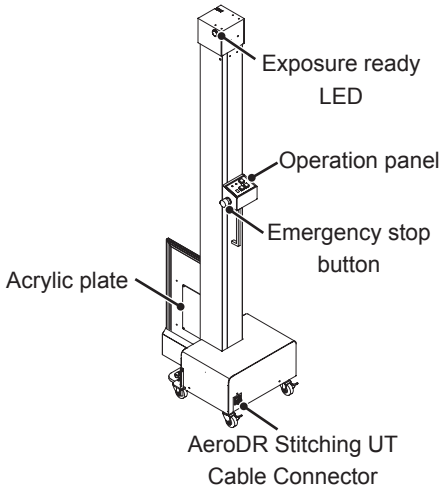
8.1.2 Cleaning

Clean the surface of AeroDR Stitching Unit, AeroDR Stitching X-ray Auto Barrier Unit and Power Supply Unit with soft lint-free cloth wrung out with dehydrated ethanol.

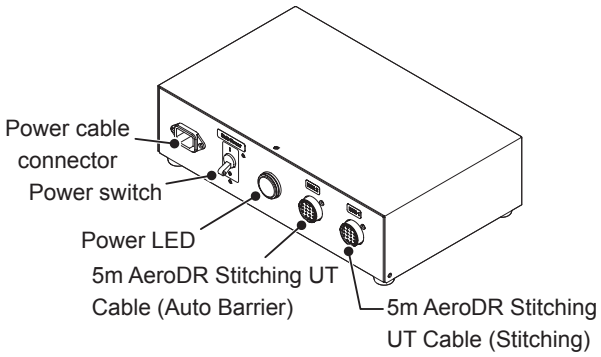
● AeroDR Stitching Unit



● AeroDR Stitching X-ray Auto Barrier Unit



● Power Supply Unit



IMPORTANT

- Be careful not to apply any cleaning chemical or liquid onto the parts below:
  - AeroDR Stitching Unit: LED, LAN port, AeroDR Stitching UT Cable Connector, AeroDR I/F Cable Connector
  - AeroDR Stitching X-ray Auto Barrier Unit: Acrylic plate of Slit plate, Emergency stop button, Exposure ready LED, top surface of Operation panel, AeroDR Stitching UT Cable Connector
  - Power Supply Unit: AeroDR Stitching UT Cable Connector, Power switch, Power LED, Power cable connector
- Do not clean with sharp or hard metal objects. If you cannot remove stains, contact Konica Minolta technical representatives.

8.1.3 Consumables

IMPORTANT

- Refer to each device's manual for information about periodic replacement parts and consumables for the image processing controller, etc.
- In particular, continued use of the battery may result in degradation and wear, and it may no longer exhibit proper functioning capabilities. For extended, safe use, it is necessary to replace parts which have become worn or degraded.

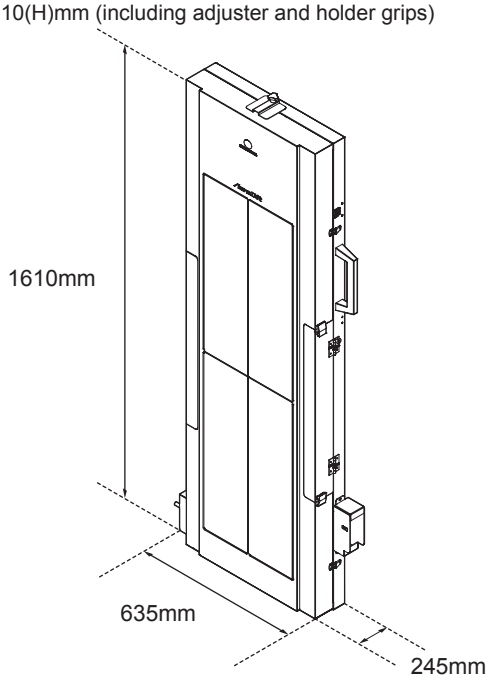
Chapter 9

Specifications

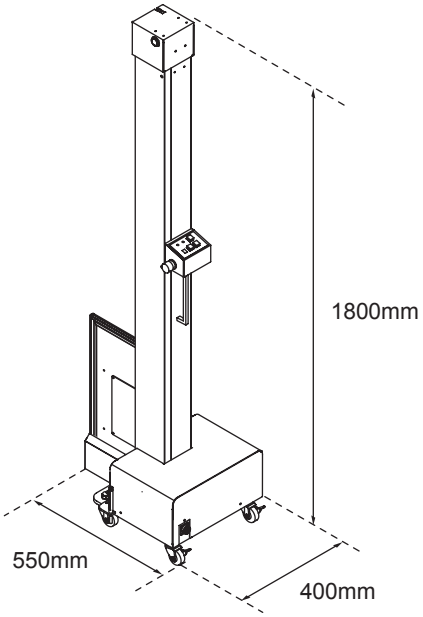
This chapter describes the specifications of each system device.

9.1 ● Specifications

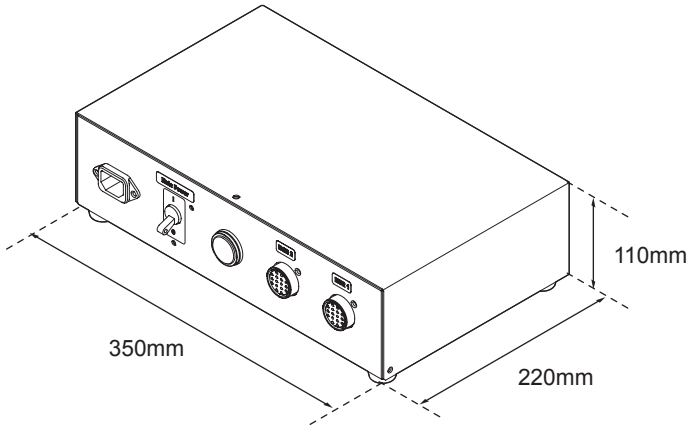
9.1.1 AeroDR Stitching Unit

Item	Description
Product name	AeroDR Stitching Unit
External dimensions	635(W) × 245(D) × 1610(H)mm (including adjuster and holder grips) 
Weight	About 28kg (excluding the AeroDR Detector and grid)
Applicable AeroDR Detector	AeroDR 1417HQ AeroDR 1417S AeroDR 2 1417HQ
Exposure area (effective image area)	SID 2.4m 47 inch 1,196.45 × 349.3mm (6,836 × 1,996 pixels) SID 2.0m 39 inch 997.04 × 349.3mm (5,697 × 1,996 pixels) SID 1.5m 32 inch 807.69 × 349.3mm (4,615 × 1,996 pixels) IMPORTANT • The exposure area depends on the X-ray tube and the collimator's maximum irradiation field angle; therefore, the ranges above may not be attainable. • The exposure area (effective image area) of SID 2.9m 39 inch is 2/2.4=5/6 for double height only.
Power supply	Power is supplied from the Power Supply Unit via a power cable.
Max. up-and-down stroke	850mm or less

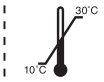
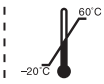
9.1.2 AeroDR Stitching X-ray Auto Barrier Unit

Item	Description
Product name	AeroDR Stitching X-ray Auto Barrier Unit
External dimensions	550(W) × 400(D) × 1800(H)mm (Including the Stitching Mask) Leg area: 400 × 350mm 
Weight	About 38kg
Mask size	For obtaining 1 image Mask hole size 86.49 (W) × 90.88 (H)mm (SID 2.4m) 99.79 (W) × 105.05 (H)mm (SID 2.0m) 126.39 (W) × 133.4 (H)mm (SID 1.5m) Dimensions of Mask 236 (W) × 1 (D) × 455 (H)mm
Max. up-and-down stroke	1,390mm or less

9.1.3 Power Supply Unit

Item	Description
Product name	Power Supply Unit
External dimensions	350(W) × 220(D) × 110(H)mm 
Weight	About 4kg
Power requirements	AC 100/110/115/120/200/220/230/240V ±10%, single phase 50/60Hz
Power consumption	Maximum value: Approx. 144VA (100-240V)

9.1.4 General AeroDR Stitching System

Item	Description	
Recommended storage and usage environment conditions	When operating	Temperature: 10 to 30°C  Humidity: 35 to 80% RH (ensure no water condensation) 
	In storage / When not operating	Temperature: –20 to 60°C*1  Humidity: 20 to 90% RH (ensure no water condensation)  *1 However, performance warranty period when storing at 60°C is 6 months after packing.
Classification	Safety IEC60601-1 internal power supply	

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