

SST-3100 FMTS System

(V1 & V2)

User Manual

SUMMIT P/N 09527 REV. A



Document Version: V1.0





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SST-3100 Distribution

No.	Model No.	Description
1	SST-3100 (V1)	Motorized (auto-tracking) system 
2	SST-3100 (V2)	Motorized (auto-tracking) system with a mobile patient table 

Revision Record

Revision No.	Date	Reason for Change
1.0	Oct 1, 2018	Original

Applied Standards

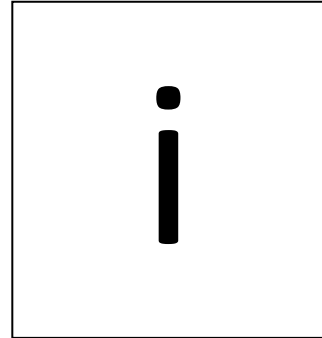
No.	Standard No.	Title of Standard
1	ANSI/AAMI ES60601-1: A1:2012 & C1:2009/(R)2012 & A2:2010/(R)2012	Medical Electrical Equipment - Part 1: General Requirements for Basic Safety and Essential Performance (IEC 60601-1:2005, MOD) (Consolidated Text) (Includes ANSI/AAMI ES60601-1:2005/(R)2012 and A1:2012, C1:2009/(R)2012 And A2:2010/(R)2012)
2	CSA CAN/CSA-C22.2 NO. 60601-1:14	Medical electrical equipment - Part 1: General requirements for basic safety and essential performance

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Safety Information



Introduction






The policy of SYFM Co., Ltd, is to manufacture X-ray equipment that meet high standards of performance and reliability. We enforce strict quality control techniques to eliminate the potential for defects and hazards in our products.

The intended use of this equipment is to provide a sub system for positioning an X-ray source and X-ray bucky for the purpose of acquiring X-ray images of the desired parts of a patient's anatomy. Use of this equipment in any other fashion may lead to serious personal injury.






The safety guidelines provided in this section of the manual are intended to educate the operator on all safety issues in order to operate and maintain the crane in a safe manner.

General Symbols






This manual uses three types of messages to emphasize information or potential risks to personnel or equipment. To ensure safety, read all Safety Information provided herein and observe all.

Symbols	Description
	<p>General mandatory action sign: To signify a mandatory action</p>
	<p>Refer to instruction manual/booklet: To signify that the instruction manual/booklet must be read</p>
	<p>General prohibition sign: To signify a prohibited action</p>
	<p>General warning sign: To signify a general warning. An instruction that draws attention to the risk of injury or death.</p>
	<p>Caution: An instruction that draws attention to the risk of damage to the product or proper use of the product.</p>
Note	<p>Note: Provides additional information such as expanded explanations, hints or reminders</p>

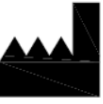


Electric & Electronic Symbols

Symbol	Description (IEC 60687/IEC 60417)	Number
	"ON" (power): To indicate connection to the mains, at least for Mains switches or their positions, and all those cases where safety is involved.	5007
	"OFF" (power): To indicate disconnection from the mains, at least for mains switches or their positions, and all those cases where safety is involved.	5008
	Alternating current: To indicate on the rating plate that the equipment is suitable for alternating current only; to identify relevant terminals.	5032
	Direct current: To indicate on the rating plate that the equipment is suitable for direct current only; to identify relevant terminals.	5031
	Grounding: Marked at the ground connected location.	5019

Packing Symbols

Symbol	Description (ISO 7000)	Number
	Fragile, handle with care	0621
	Keep dry	0626
	This way up	0623
	Temperature limitation	0632
	Humidity limitation	2620

Label Symbols

Symbol	Description (ISO15223-1)	Number
	Manufacturer	3082
	Date of manufacture	2497
	Serial number	2498

General Safety

Numerous design features, operational safeguards and mechanical and electrical interlocks have been incorporated into this product's design for the safety of both the operator and patient and to protect the equipment from damage.

Note

Personnel operating and maintaining this product should receive training and be familiar with all aspects of operation and maintenance. To ensure safety, read this **SAFETY** section thoroughly before using the equipment and observe all **WARNINGS, CAUTION** statements and **NOTE** located throughout the manual.

Note

Only a qualified, authorized Service Provider should service/repair electrical or mechanical components.

The following are general safety precautions:

- Do not remove any covers for any purpose.
- Do not defeat or bypass built-in equipment safety features.
- Do not attempt any repairs if the equipment fails to operate correctly. Immediately call a qualified person authorized to repair the equipment.
- Do not attempt to relocate the equipment, or connect or disconnect any communication cables. Call a qualified person authorized to alter the equipment before attempting to relocate the equipment.
- Observe all warnings and cautions, stated or implied in procedures.
- Follow all safety labels on the equipment.
- Carefully read the product manual before operating the equipment.

Note

Follow all local, state and Federal guidelines and regulations on the disposal of hazardous material(s).

Electrical and Mechanical Safety

Only a qualified, authorized Service Provider should replace electrical or mechanical components.

◆ Electrical Safety

Sources of potentially lethal voltages/currents are physically and electrically isolated from both the operator and patient by insulated cables and mechanically secured covers and access panels.

- Do not remove any panels, for any reason.
- Do not expose, in any way, cables or their mating sockets.

◆ Mechanical Safety

The following are mechanical safety precautions:

- Keep fingers, hands and tools clear of moving parts.
- Always maintain observance of the patient position while positioning the equipment.
- Always maintain observance of other equipment in the area while positioning the equipment to prevent collision and potential damage.
- Unless specifically instructed, do not operate equipment with any covers removed.

User Maintenance / Servicing

Unless specifically instructed herein, all maintenance and serving of the equipment should be performed by qualified, authorized Service Providers. None of the electronic assemblies, cables or mechanical assemblies are user serviceable.

◆ Cleaning and Disinfecting

Some cleaning solutions, disinfectants and other chemicals can be destructive to the equipment or pose a risk of fire. The manufacturer is not responsible for damages or injuries that may result from the use of non-authorized chemicals on or near the equipment.



Warning

Do not operate the equipment when cleaning the equipment.
Before cleaning the equipment, please turn the power off.



Caution

Do not spray cleaning solution directly onto the equipment. Moisten a cloth with a 70% isopropyl alcohol solution for use on plastics and enameled metal. Apply to patient contact areas after each contact.



Caution

Do not immerse the equipment in liquid, do not autoclave equipment.

Hardware / Software Modifications

The equipment is complete as installed. The addition or subtraction of hardware or software not authorized by the manufacturer can lead to:

- ◆ Potential health risk to operator and/or patient.
- ◆ X-Ray imaging artifacts that can interfere with proper image interpretation.
- ◆ Equipment malfunction and/or damage.



Warning

Do not try to defeat or bypass built-in safety features.



Warning

Do not try to move equipment or disconnect any communication or power cables. Refer such actions to qualify authorized personnel only.



Warning

Follow all safety labels placed on the equipment.

Environmental Safety and Operating Environment

The equipment is designed to operate in ambient air, free of corrosive compounds. The manufacturer is not responsible for injury or damages resulting from any equipment exposed to flammable or flame promoting gases (ether, alcohol or an oxygen enriched environment).

The following environmental conditions are appropriate for the equipment. Operation under conditions outside of these ranges could damage the equipment.

PARAMETER	LIMITS
Acceptable Temperature Range	5°C to 30°C or 41°F to 86°F
Acceptable Relative Humidity	10% to 75% (non-condensing)



Warning

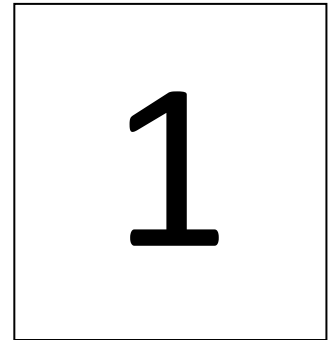
Operate the equipment outside of its operating environment limits may lead to malfunction of or damage to the equipment.

Manufacturer's Responsibility

Allow only authorized, properly trained personnel to operate the equipment. Ensure that all individuals authorized to use the equipment are aware of the danger of excessive exposure to X-Ray radiation.

This equipment is sold with the understanding that the manufacturer, its agents, and representatives do not accept any responsibility for overexposure of patients or personnel to X-Ray radiation. No responsibility is assumed for any unit that has not been serviced by qualified authorized service personnel.

Introduction



1.1 Introduction

This manual provides installation, service and operation information for SST-3100.

1.2 Description

SST-3100 is a mechanical subsystem requires to be integrated into a radiographic system.

SST-3100 has been designed and developed for various X-ray examination techniques in proper examination circumstances.

1.3 Dimensions

Refer to the following drawing for the dimension of the entire system.

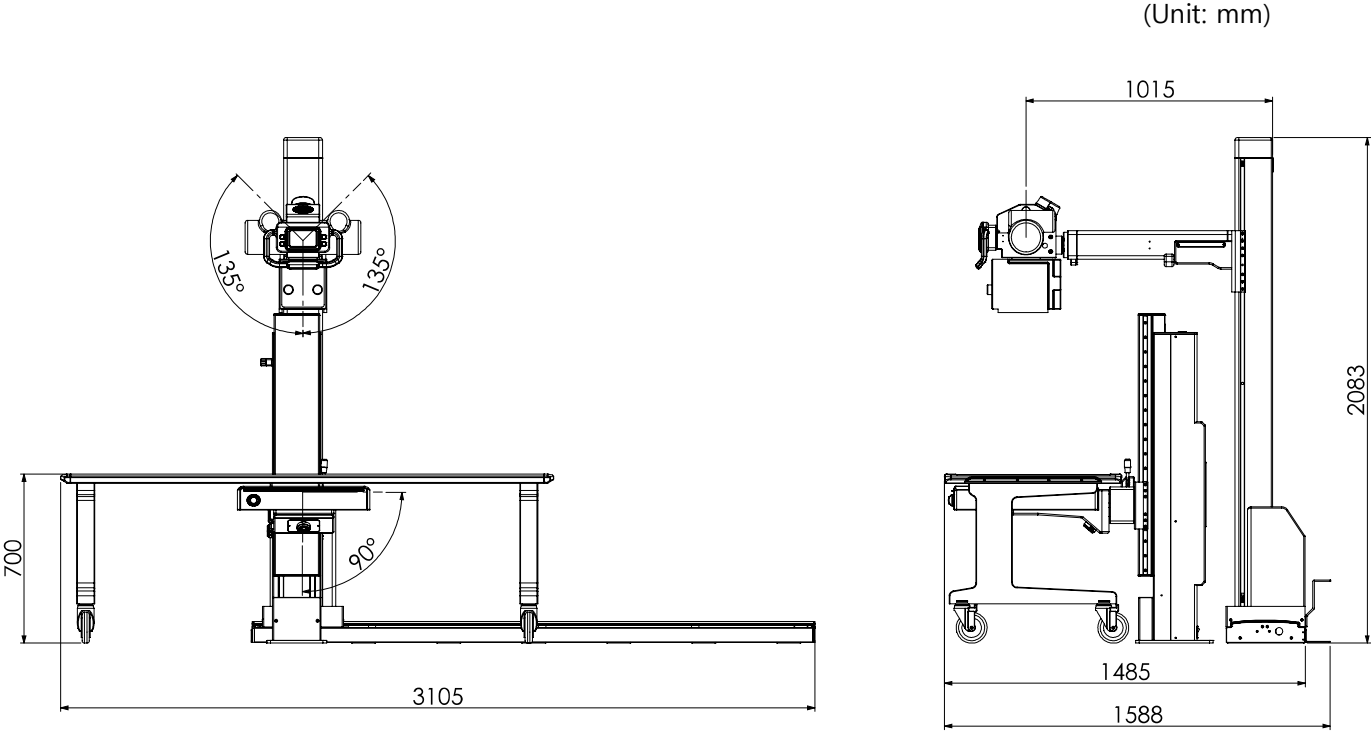


Figure 1-1. System Dimensions

1.4 Specifications

Refer to the following table for the specifications and details of the system.

Floor Mounted Tube Stand (Manual & Motorized)	
Control panel with 5" touchable LCD screen on the tube housing.	
Workflow is enhanced through direct manipulation of examination parameters listed below.	
<ul style="list-style-type: none"> ● SID (Source-image distance) measurement ● Angle of tube rotation 	
Movements	Vertical / Longitudinal travel controlled by electric magnet brake
	Tube rotation: $\pm 135^\circ$
Travel Range	Vertical (Tube): 149 cm ± 1 cm
	Longitudinal (Column): 190 cm ± 1 cm
Bucky Wall Stand (Motorized)	
The stand can be equipped with cassettes or a portable detector for optimal coverage and high patient throughput.	
Motorized Movement	Vertical travel with electric magnet brake
Vertical Travel Range (central beam - floor)	135 cm
Bucky Rotation Range	$0^\circ \sim 90^\circ$
Power Requirement	120V~/220-240V~, 50/60Hz, 500VA
Mobile Patient Table (*Option)	
Mobile: Individual locking casters	
Table Top Dimension	197 x 72.8 x 70 cm
Table Height	70 cm
Max. Patient Load	250 kg

Table 1-1. Specifications

1.5 Abbreviations

%	Percent
AWG	American Wire Gauge
Btu	British Thermal Unit
°C	Degree Celsius
CE	Communautés Européenes
cm	Centimeter
C.R.S	Cold Rolled Steel
°F	Degree Fahrenheit
ga	Gauge
hPa	Hecto Pascal
inHg	Inches Mercury
Kg	Kilogram
kJ	Kilojoule
Lb	Pound
M	Meter
max.	Maximum
min.	Minimum
mm	Millimeter
Sq/Ft	Square Foot
Sq/M	Square Meter
UL	Underwriters Laboratories

1.6 Product Labels

Refer to the follows for the product labels of the system.

1.6.1 Bucky Stand

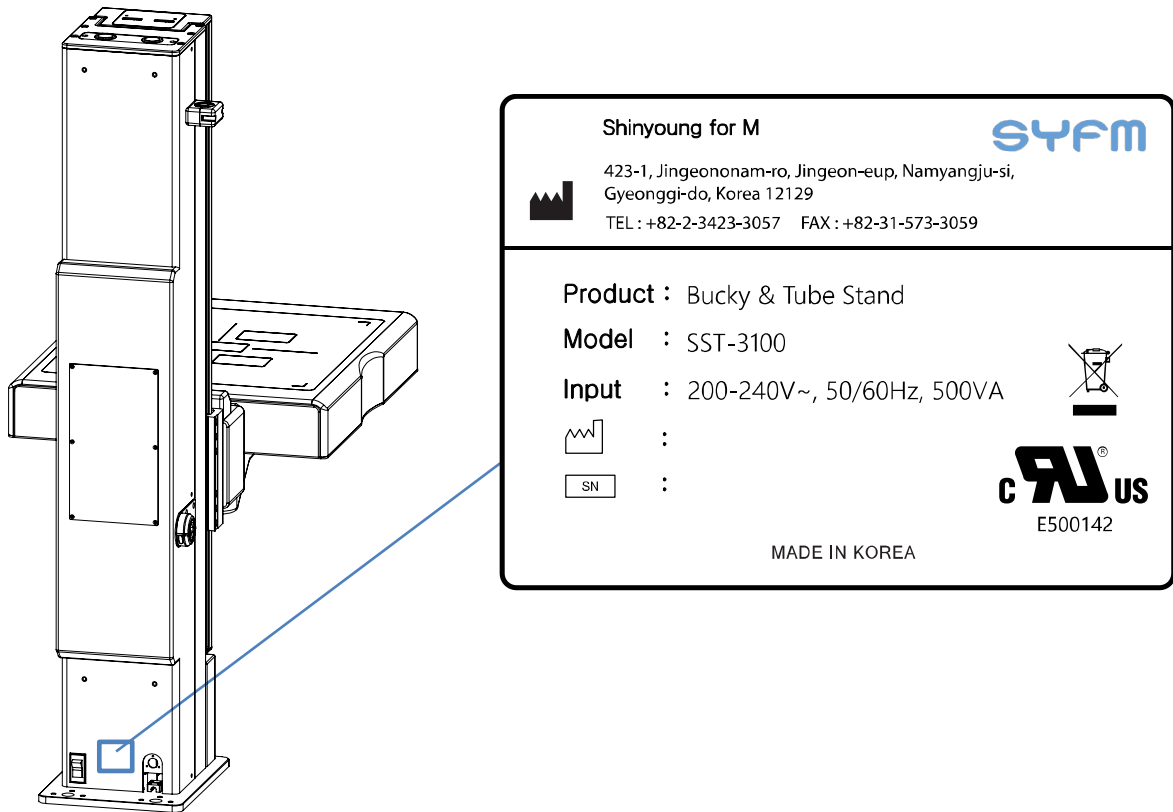
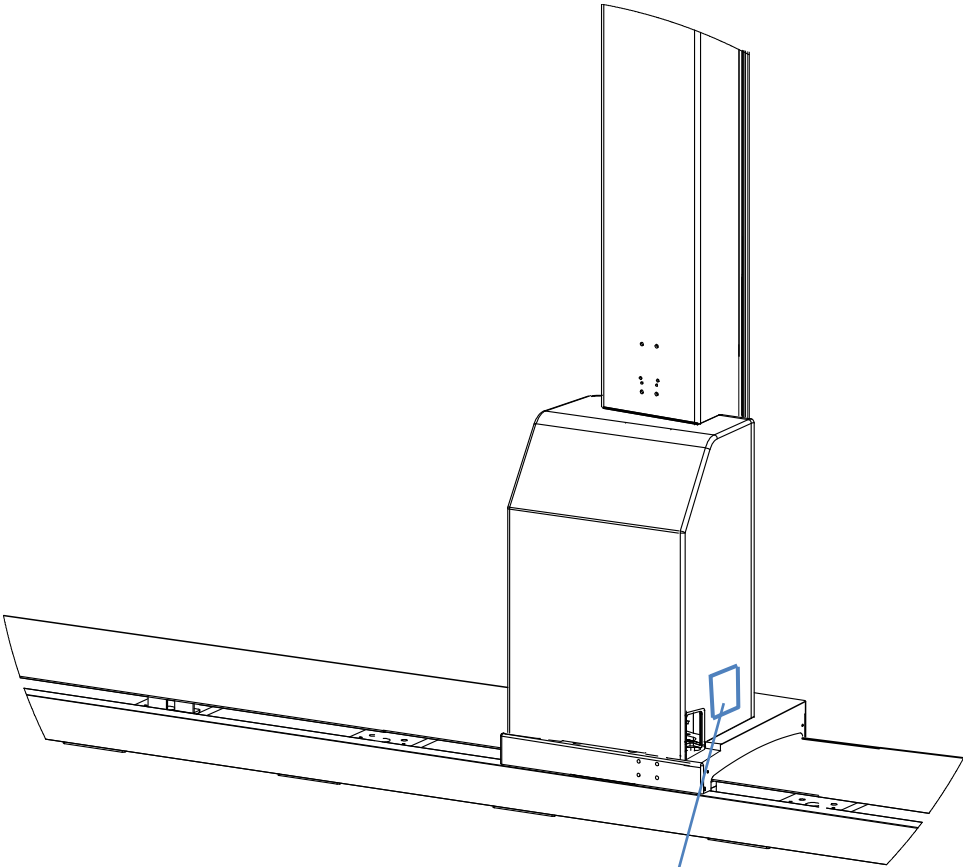


Figure 1-2. Product Label & Location (Bucky Stand)

1.6.2 Tube Stand & Patient Table








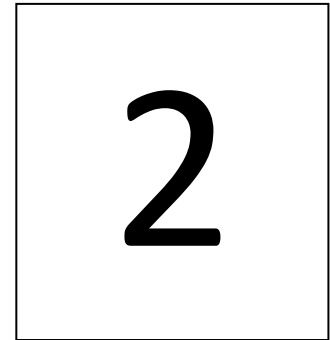
Shinyoung for M		SYFM	
	423-1, Jingeononam-ro, Jingeon-eup, Namyangju-si, Gyeonggi-do, Korea 12129		
	TEL : +82-2-3423-3057 FAX : +82-31-573-3059		
Product : Bucky & Tube Stand			
Model : SST-3100			
Input : 200-240V~, 50/60Hz, 500VA			
	:		
	:		
MADE IN KOREA			E500142

Figure 1-3. Product Label & Location (Tube Stand)

Operation



2.1 Introduction

This chapter is about the operation of SST-3100. It is required to learn about the travel range of all the movements of the entire system before operating the system.

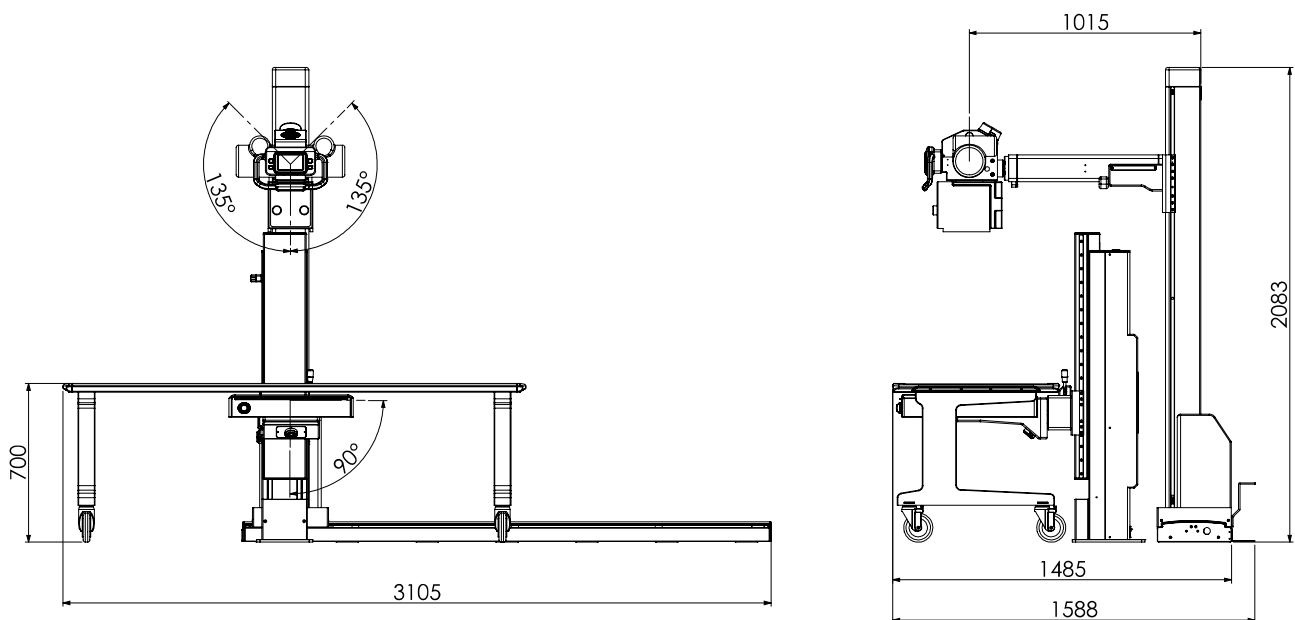


Figure 2-1. System Operating Range

2.2 Power On / Off

To supply the power to the system, turn the power ON by pressing the power switch located on the table. Check all cable connection between the stands and table before turning ON the power.

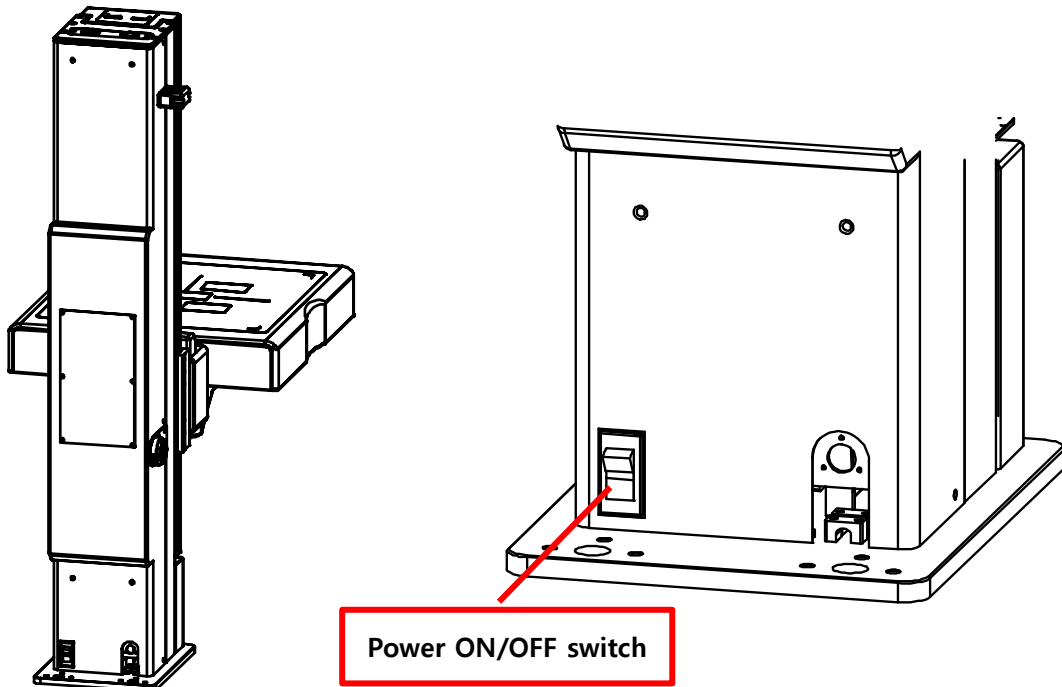


Figure 2-2. Power ON/OFF Switch



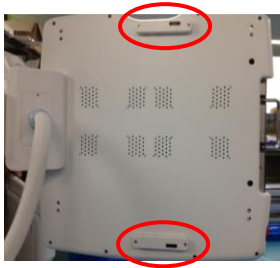
Caution

Before powering on the system, please check that there is nothing on the detector surface or on the tube stand rail cover.

2.3 System Operation

It is important to learn how to operate each component of the system.

There are anti-collision sensors to prevent collisions between the stands and user during operation.



1. Bucky sensor:

This sensor is to avoid any collision between the tube stand and the bucky stand when they move up/down.



2. Top column sensor:

This sensor is to avoid any collision between the tube stand and the bucky stand when they move up/down.

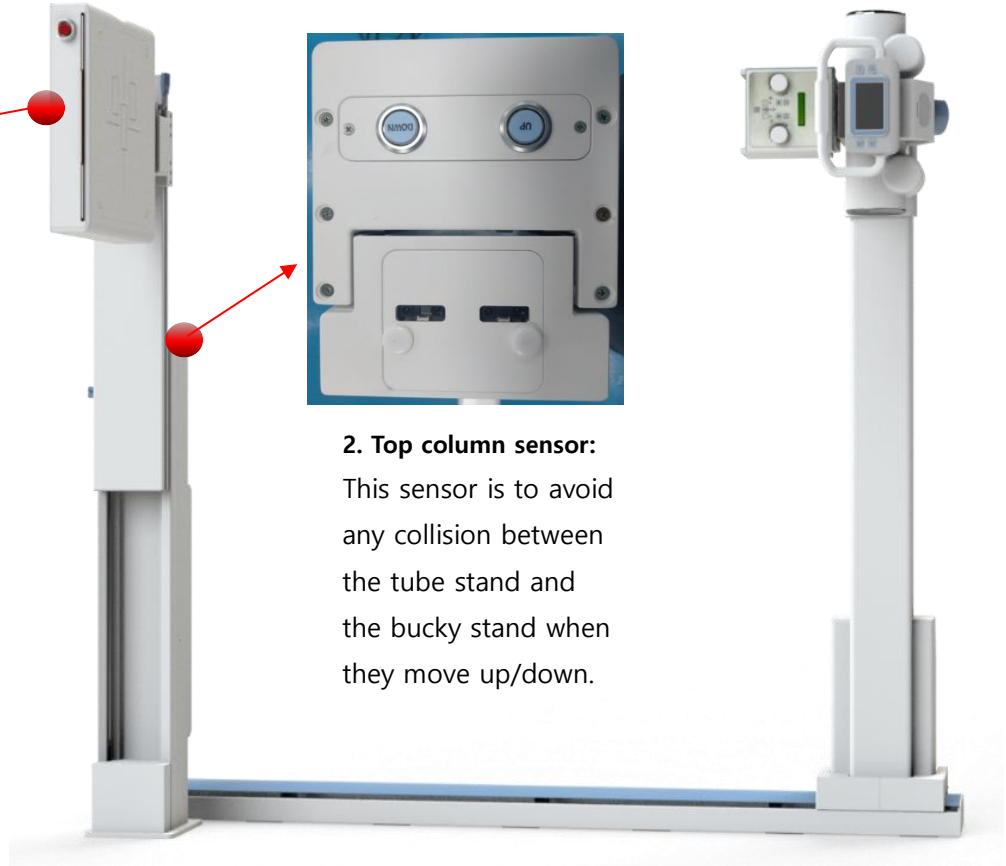


Figure 2-3. Anti-collision sensors

2.3.1 Operating Bucky Stand

It is available to move the bucky up or down either by the up/down switch located on back side of the column or connecting the foot switch to the bucky stand.



Figure 2-4. Up/Down Switch

To rotate detector, press the lever and rotate the detector at your desired position manually.

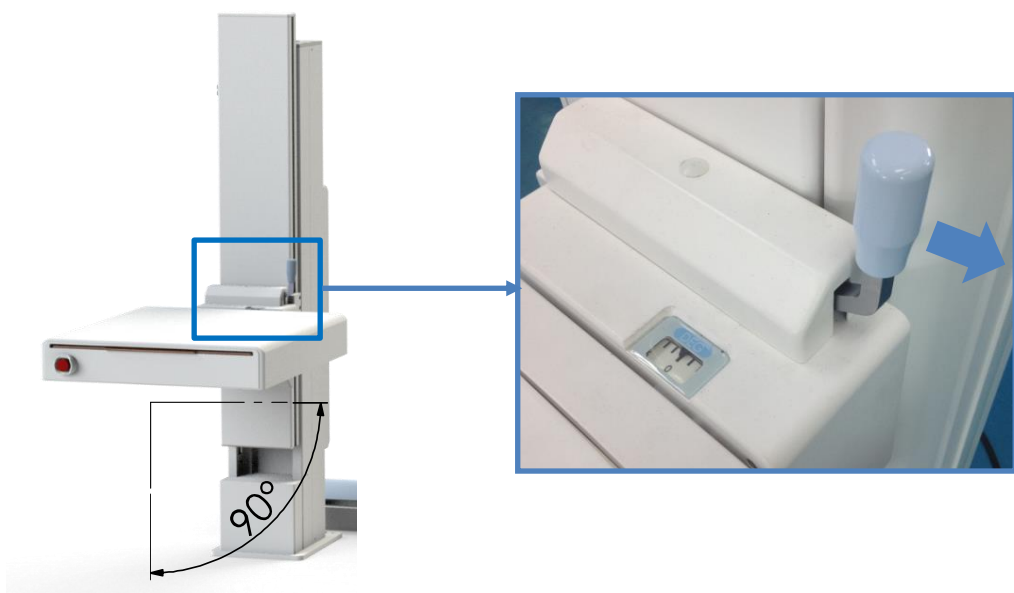


Figure 2-5. Detector Rotation

2.3.1.1 Bucky Stand Movements

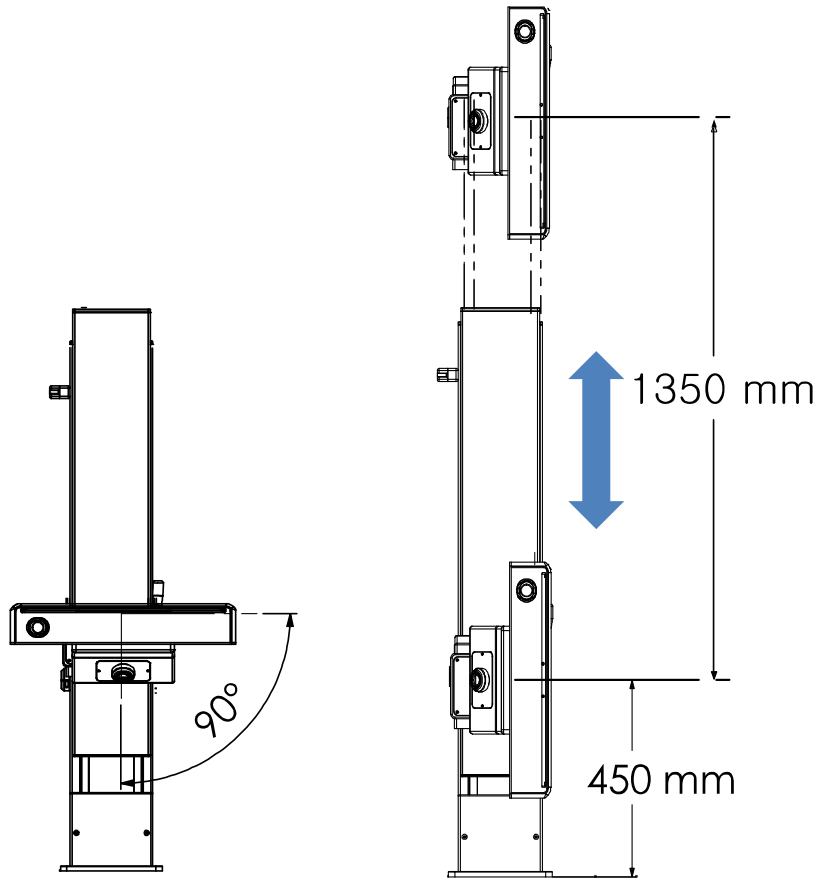


Figure 2-6. Bucky Stand Movements

2.3.2 Operating Tube Stand

The following figure explains about the major components for operating the tube stand.

Control Panel:

5" LCD display to control the movements of the tube stand.






Figure 2-7. Operation of Tube stand

2.3.2.1 Control Panel

It is mandatory to learn how to use the control panel properly with different buttons. The control panel comprises the control buttons with their corresponding symbols.



Figure 2-8. Control Panel

Control Component	Graphic	Description
UP/DOWN		Allows to manually move the tube head up/down manually while holding this button.
Rail Slide		Allows to manually move the tube stand to left or right while holding this button.
Tube Rotation		Allows to manually rotate the tube head to CW or CCW direction while holding this button.
All-Free button	N/A	Pressing and holding the button on the handle bar with a hand allows to move the tube up/down and left/right.

2.3.2.2 Tube Stand Movements

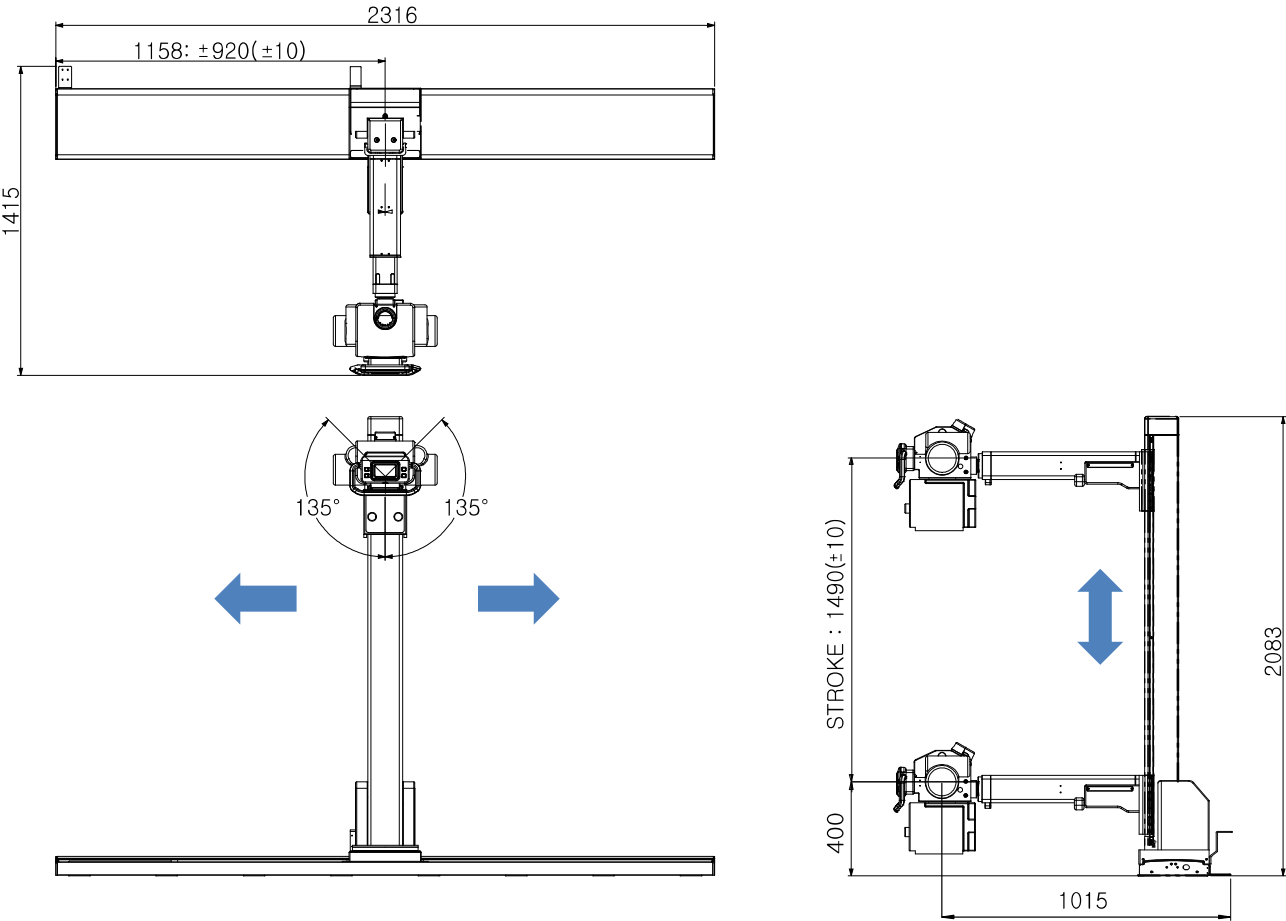


Figure 2-9. Tube stand movements



Warning

For patient’s safety, be cautious to prevent collision when the patient is on the table and moving the tube down manually.

2.3.2.3 Information of Display

When turning the power on, the screen in the following figure will be shown. The screen basically shows two kinds of information which are "SID" and "DEG". The "SID" shows the SID between the tube and the bucky. The "DEG" shows the current angle of the tube. Whenever the tube is tilted, the screen changes to a landscape screen or a portrait screen for convenience.

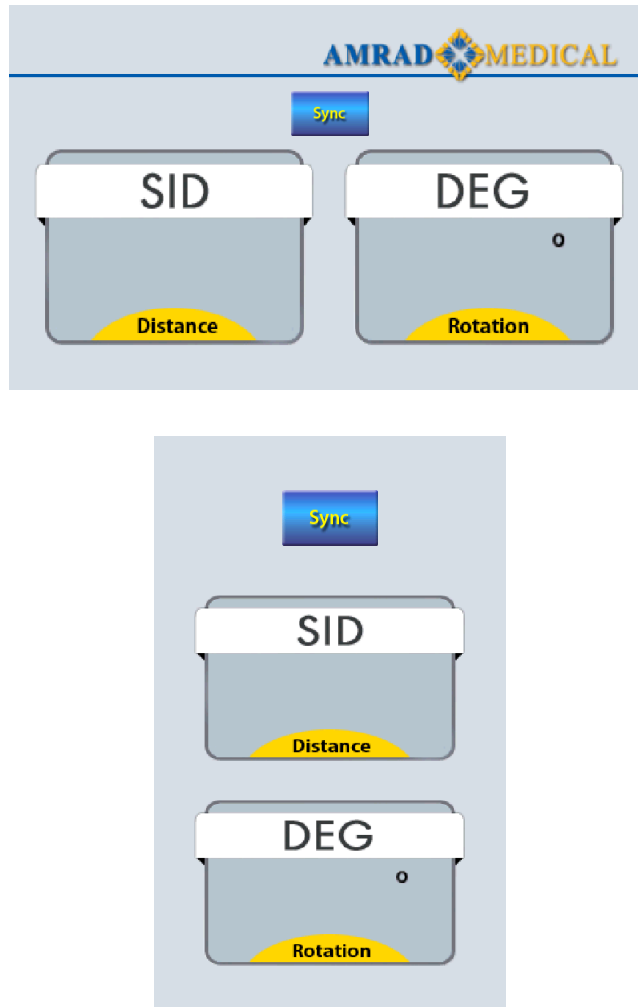



Figure 2-10. OP Display

Graphic	Description
	<p>This button activates the auto-tracking function between the <u>bucky stand</u> and the <u>tube stand</u> by rotating the tube head to face toward the bucky stand and touching the button on the screen once. Then the tube head will move up or down to align the center of the bucky.</p> <p>After that, when the bucky moves up or down, the tube head will automatically track along the bucky. Pressing this button again will deactivate the function.</p>

2.3.3 Auto-Tracking Feature (Chest Position)


When the SST-3100 system is in the chest position as shown below,  button is activated. By pressing the activated  button, the bucky stand and the tube stand will be synchronized.



Figure 2-11. Auto-tracking feature

Periodic Maintenance



3.1 Introduction

In order to ensure continued safe performance of the equipment, a periodic maintenance program must be established. It is owner's responsibility to supply or arrange for this service.

3.2 Maintenance Schedule

What to do	When to do it
Operator tasks	Every week or as needed
Service tasks	Refer to "5.2.2 Service Tasks"

Table 3-1. Maintenance schedule

Note

Due to varying operating conditions, the procedures listed below may have to be performed at greater or lesser intervals. You may have to adjust intervals according to your unit's performance.

3.2.1 Operator Tasks

Tools Required:

- Cleaning wipes
- Non-abrasive, hospital-grade cleaner

**Warning**

Turn off all electrical power to the unit and all its peripheral equipment (generator, wall stand, etc.) at power sources before service. Also, make sure that power sources are locked out and tagged "Equipment Being Serviced" before service. Some components inside of the equipment have power sources other than that of the unit itself. That's why all peripheral equipment must be turned off. You could get seriously injured if you do not.

**Warning**

This equipment is not classified as anesthetic-proof and may ignite inflammable anesthetics. Flammable agents used for skin cleaning or disinfecting may also produce an explosion hazard.

- Ensure the power has been disconnected and that the emergency switches have been activated, before starting any cleaning operation.
- Ensure no liquid gets into the unit.
- Do not immerse the equipment, including any components or accessories, in liquid.
- Do not autoclave the equipment, including any component or accessories.
- Do not use water. Water can short-circuit the electrical installation and cause corrosion to mechanical parts.
- Do not use acid or abrasive products.
- Use only a dry cloth to clean chrome-plated parts.
- For safety reasons, do not spray disinfectants.
- Do not spray cleaning or disinfection solution directly on the equipment.
- When disinfecting the examination room, ensure the unit is covered with plastic sheets.

3.2.2 Service Tasks

Only service personnel specially trained for medical X-Ray equipment should handle the service or maintenance tasks of the equipment.

What to do	When to do it
Bucky stand: Check Up/Down Chain locking bolt/nut	1 year
Bucky stand: Check the steel wires of the column	1 year
Bucky stand: Check the Up/Down motor	1 year
Tube stand: Check the Up/Down motor	1 year
Tube stand: Check the steel wires of the column	1 year
Bucky stand & Tube stand: Check the anchor bolts on floor	1 year
Bucky stand: Check if there is an oil leakage on the motor part	6 months
Bucky stand: Check condition of the detector bracket bolts	6 months
Tube stand: Check the tube locking bolt	6 months

Table 3-2. Service Tasks

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