

It is recommended that only persons who have sufficient knowledge and experience such as system designers and responsible persons deal with this product after carefully reading the product manual.

**1 The matters of safety**

**WARNING**

- Do not fabricate or do maintenance by yourself. Malfunction, Electric shock, and fire danger are considered. Contact us directly if you need the item to be repaired.
- Do not let the water touch the product. It may cause electric shock or fire due to malfunction.
- When you check or maintain the product, make it sure you turn off the power. It may cause electric shock or fire due to malfunction.
- The item should be fixed to the target tightly. Electric discharging or breakage might happen.
- Please shield your installing circumstances first since the item releases the soft X-ray. Direct X-ray exposure is not recommended owing to cause health problem.
- It includes a beryllium window on the X-ray tube unit in order to release soft X-ray for ionization. This beryllium material can cause respiratory disorder only if the person gets exposed to forms of either beryllium powder or smoke. However, our device doesn't create beryllium in neither of the mentioned forms. Please be careful not to break the device since there might be a slight chance that the device could partially degrade into the powder form, then it can cause harm defects. If the user touches the beryllium material on the device, clean oneself on the running water or rinse it off with soap directly. If the beryllium window gets dirty or damaged, call us directly for assistance.
- Do not use the product at the place where dangerous material such as inflammable or ignitable material exists. This product is not the product of anti-explosive type.
- This device is made only for industrial uses. You need to ground the device beforehand. Otherwise, there are in case of malfunction, electric shock, or fire damage.

**CAUTION**

- Do not disconnect the head cable with power applied. There is a possibility of electric shock or malfunction.
- Connect wires referring to the product manual. Wrong connection can cause failures.
- For your proper cable connection, take a look at the manual "Installation & Connection," for references. Any disordered connection is detected, the malfunction might arise.
- All cables should be connected all the time. Please careful of cable disconnections. If power or communication cables got damaged, replace them immediately. Malfunction and fire danger may happen.
- Do not install the device where the vibration can be detected. Any minor impact or vibration on the device, the malfunction or danger of accident might happen.
- Do not use the item off the range of usage(Electrostatic elimination). Malfunction or danger of accident may occur.
- If you wish to discard the head unit of X-ray device, you need to report for disuse declaration to the institution(s) where they ask to. A proper declaration procedure is necessary in order to disuse X-ray device.
- Please contact to either Korea Institute of Nuclear Safety(KINS) or a safety supervisor of Sunje directly.

**2 Check the package contents**

**Product Compositions**

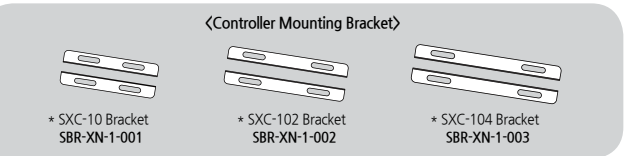
The package includes the following products composition.



- Fixing Bolt SFB-XN-1-001 1/4"-20unc x 15L / 1-4ea 1/4"-20unc x 8L / 1-4ea M4 x 0.7Pitch x 10L / 2-8ea
- D-Sub Cable SDC-SN-5-001 15Pin-15Pin(Open) / 5m / 1ea
- Power Cable SPC-MT-1-001 AC 100V, 50/60Hz, 1.8m / 1ea
- Head Cable SOC-XN-4-001 12Pin-12Pin / 10m / 1-4ea
- Power Cable SPC-MT-2-001 AC 220V, 50/60Hz, 1.8m / 1ea

**Option**

If you require extra functions with the basic accessories we provided, you need to purchase optional items in below for further assistant.



**3 Nomenclatures of parts**

**Head Unit (SXH-10L)**

**Soft X-Ray Window**  
The X-ray radiation will be released through this beryllium window from the head unit of X-ray ionizer.

**Mounting bracket**  
A bracket to fix the item on the facing target.

**Indicator Light**

**LAMP CHANGE**  
Lamp Change LED

**RUN**  
Run Indication LED

**Timer LCD**  
It displays the operation time of head unit

**Controller Connector**  
Low DC voltage are transmitted from controller unit to head unit via this controller Connector

When these cases, red LED will be on.  
a. Soft X-ray tube life time end.  
b. Some troubles with soft X-ray tube.

This indicating LED will show the operation status. In normal operating condition, the yellow LED will be on.

**Controller (SXC-10L / 102L / 104L)**

※ The following is a standard image of SXC-104L. The image might differ according to other models.

**Head Selection Button**  
This is for when you want to select an individual head from the whole connections.

**Run/Stop Button**  
It is a Run/Stop button in order to operate a soft X-ray ionizer.

**Mounting bracket**  
A bracket to fix the item on the facing target.

**Indicator Light**

- HEAD 1** A indicator light for selecting the head unit. If the head(#1) is properly connected, the green light will be on. If not, the red light will be on.
- HEAD 2** A indicator light for selecting the head unit. If the head(#2) is properly connected, the green light will be on. If not, the red light will be on.
- HEAD 3** A indicator light for selecting the head unit. If the head(#3) is properly connected, the green light will be on. If not, the red light will be on.
- HEAD 4** A indicator light for selecting the head unit. If the head(#4) is properly connected, the green light will be on. If not, the red light will be on.
- INTERLOCK** Interlock indicator light. If the interlock is connected, the green light will be blink over time.
- REMOTE** Remote Mode indicator light. When using "Single Interlock Contacting Mode", the light will not be on. If using "Dual Interlock Contacting Mode", the yellow light will be blink over time.

**Signal Input/Output Connector**  
Use it when various signals (input/output) are necessary. (Interlock, Remote, Indicator)

**Fuse**  
Please clarify your proper specification when replacing.

**Head Connector**  
A connector that links the head unit and controller.

**Power Connector**  
Using it when power supply.

**Power Switch**  
A switch for supply/cut the power.

**4 Installation and connection**

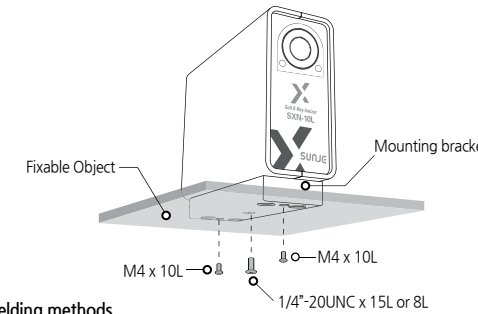
**Check the installation conditions head unit**

Please check the installation condition whether it meets proper specification.

- Shielded room.
- There must be no objects between the target area and X-ray device.
- No vibration on the fixed device.
- Be aware of any flammable or ignitable materials around the working area.
- Secure to have enough working space for quick maintenance of the device.

**Head unit fixing**

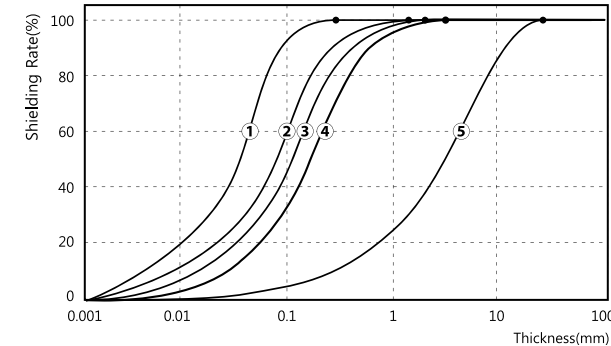
Fix the target product on the fixed area where you install by using supported fixing bolt(s).



**Shielding methods**

**Shielding Material Selection**

See the following graph for references. Select the ideal tickness and quality of shielding material.



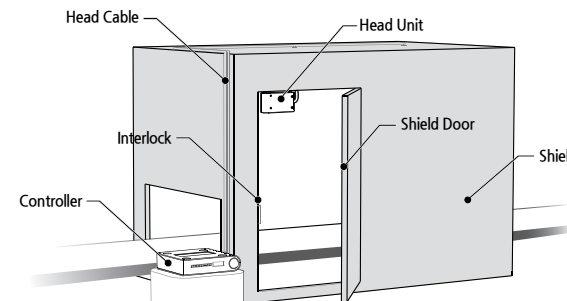
No.	Shield Material	Thickness [mm]
①	Copper	Over 0.4
②	Aluminium	Over 2.0
③	Glass	Over 3.0
④	PVC	Over 5.0
⑤	Acrylic	Over 40.0

**WARNING**

- Please shield the area where the customer is willing to install the soft X-ray device for safety issue.
- After shielding process, please connection to your own interlock system to operate the x-ray device on/off when the door is opened/closed.

**Shield installation compositions**

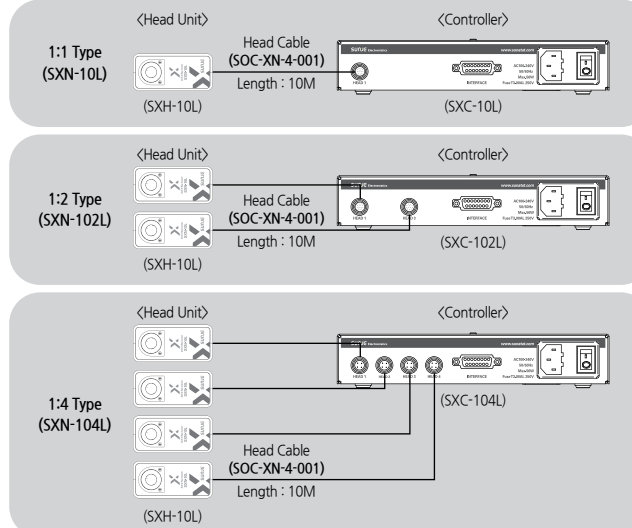
Please refer to the "Installation Compositions" for your references. Please keep your working environment of the leakage radiation level within the range of 10μSv/hr all the time.



**How to connect**

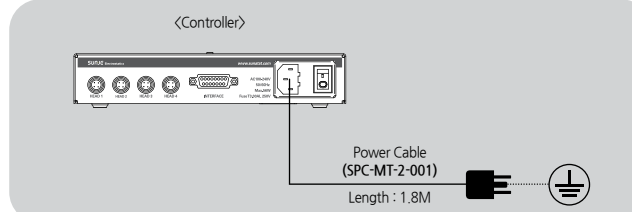
**Connecting to the Head Unit**

Please connect the head and controller unit with supported "Head Cable".



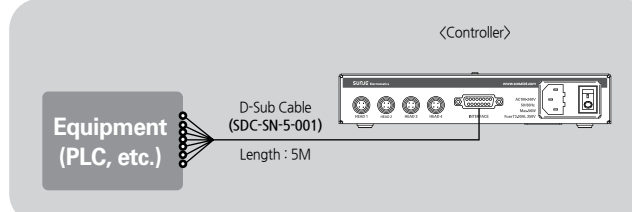
**How to Connect Earth Ground and Power Supply**

Using supported ground and power cables to connect the controller.



**Connecting the Input/Output Signal**

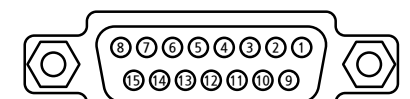
Please connect the controller and external machinery equipment with supported "D-Sub Cable".



**Input/Output Signal NO.**

15Pin D-Sub

**INTERFACE**



<1-8: Output / 9-15: Input >


**Input/Output Signal Specifications**

Division	No.	Pin Name	Descriptions	Function
OUTPUT	1	GND	GND	-
	2	Power State	Indicator Power State	Power Status output
	3	Interlock State	Indicator Interlock State	Interlock status output
	4	Run State	Indicator Run State	RUN status output
	5	Alarm State	Alarm Output	Alarm state output
	6	N.C	No Connected	No Connected
	7	N.C	No Connected	No Connected
	8	N.C	No Connected	No Connected
INPUT	9	Remote-Mode	Remote Mode Select	Single Contacting / Dual Contacting Mode Select (Electrical Contact)
	10	Mode-COM	GND	
	11	Remote-ON	Remote ON	1 contacts using 11-13: Close → ON
	12	Remote-OFF	Remote OFF	11-13: Close → OFF
	13	Remote-COM	GND	11-13: Open → ON(Keep) 12-13: Close → OFF
	14	Interlock-COM	GND	Interlock ON / OFF(Electrical Contact)
	15	Interlock-ON	Interlock ON/OFF	


5 How to set

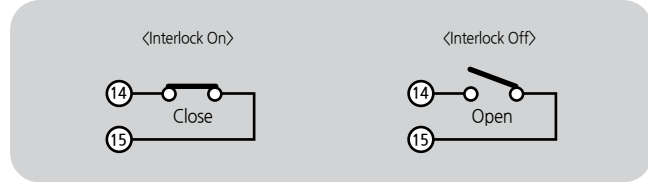
▶ Set the interlock



Interlock On

An interlock will be on if #14 or #15 of D-Sub cable is contacted. The interlock on stands for the status when the unit is connected properly and the shielding door is totally closed during operation. "Interlock indicator (  INTERLOCK )" light will be blink in the front of the controller.

Interlock Off

An interlock will be off if #14 or #15 of D-Sub cable is not contacted. The interlock off stands for the status when the unit is not properly connected and the shielding door is opened during operation. "Interlock indicator (  )" light will be turned off in the front of the controller.



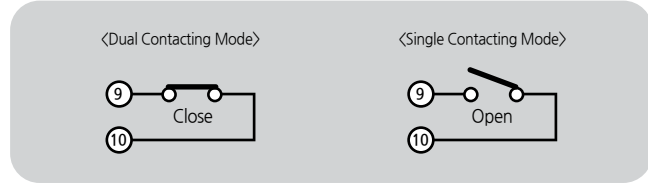
Article	Interlock On	Interlock Off
D-sub Cable No.	14 - 15 Close	14 - 15 Open
State	The shield door is closed	The shield door is open
Meaning	Ready for Ionization	Still in process for Ionization
Controller Indicator Light	 INTERLOCK	 INTERLOCK



▶ Set the remote mode

In the remote mode, there are "Dual Contacting Mode" and "Single Contacting Mode".

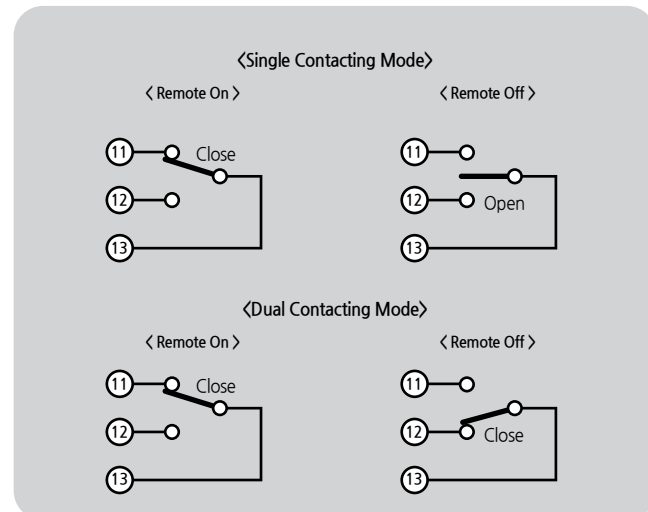
- If remote mode on / off(9) is connected to com(10) in the interface. (Dual interlock contacting mode)  
 - If remote mode on / off(9) is not connected (e.g. Open) to com(10) in the interface. (Single interlock contacting mode)  
 If dual interlock contacting mode is entered, remote LED will be blink. The remote can be operated only if the interlock is on. In interlock off, the head unit will not be perated even though the remote is on.

Dual Contacting Mode : Remote on / Remote off (Have a 2 contacting)  
 Single Contacting Mode : Remote on (Have a 1 contacting)



Article	Dual Contacting Mode	Single Contacting Mode
D-Sub Cable No.	9 - 10 Close	9 - 10 Open
Controller Indicator Light	 REMOTE	 REMOTE

▶ Single contacting mode / Dual contacting mode remote set


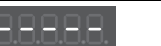
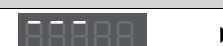
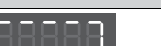
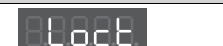
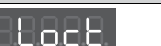
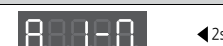





**CAUTION** • The remote off will be operated preferentially when 12pin and 13pin closed regardless of Single point contact / Dual point contact mode.

▶ Status output signal

Article	LED Color	LED State	Output Status
Run / Stop	Green	On	Run state (No relation whether the head unit will be present or not)
	-	Off	Stop state
	Green	Blinking	Emergency state (Interlock open when run state)
Interlock	Green	On	Interlock close(#15) of interface at the back of the device
	-	Off	Interlock open of interface at the back of device when Emergency state
Remote	Yellow	On	Indicating R-Mode(#9) close at the back of Dual contacting mode
	-	Off	Indicating r-mode open / emergency state at the back of Single contacting mode
Head 1	Red	On	When alarm signals(high: 5v) of the head unit(Head #1) is inputted
	-	Blinking	If low/high current is detected from the current sensing Circuit when running
	Green	On	If there are no alarm signal but Head #1 gets connected When stop or run
Head 2	Red	On	When alarm signals(high: 5v) of the head unit(Head #2) is inputted
	-	Blinking	If low/high current is detected from the current sensing Circuit when running
	Green	On	If there are no alarm signal but Head #2 gets connected When stop or run
Head 3	Red	On	When alarm signals(high: 5v) of the head unit(Head #3) is inputted
	-	Blinking	If low/high current is detected from the current sensing Circuit when running
	Green	On	If there are no alarm signal but Head #3 gets connected When stop or run
Head 4	Red	On	When alarm signals(high: 5v) of the head unit(Head #4) is inputted
	-	Blinking	If low/high current is detected from the current sensing Circuit when running
	Green	On	If there are no alarm signal but Head #4 gets connected When stop or run
H1/H2/H3/H4	Red	On	When Head #1 is not connected / emergency / interlock open
	Red	On	When Head #2 is not connected / emergency / interlock open
	Red	On	When Head #3 is not connected / emergency / interlock open
H1/H2/H3/H4	Red	On	When Head #4 is not connected / emergency / interlock open
	Red	On	When Head #1 is not connected / emergency / interlock open
	Red	On	When Head #2 is not connected / emergency / interlock open
H1/H2/H3/H4	Red	On	When Head #3 is not connected / emergency / interlock open
	Red	On	When Head #4 is not connected / emergency / interlock open
	Red	On	All the cases where none of the head units are connected

▶ FND display

Article	Firmware Version	Stop
Display		
Explanation	Power off → on : Firmware version will be shown for 3 seconds on the controller display.	If the device displays 'STOP', then following sign "----" will be shown on the controller display.
Article	Run	
Display		
Explanation	If you push the "Run Key" button, the following sign "----" will be rotated sequentially to show whether it is in working order.	
Article	Interlock open in the stop state	Interlock open in the run state
Display		
Explanation	The "Lock" sign will be shown. All LEDs : Off	The "Lock" will blink in every 200msec cycle. * Run LED : Blinking / Rest of LEDs : Off
Article	Alarm	
Display		
Explanation	Alarm Indication Head NO. Alarm Type (0 : H/V Alarm, 1 : Current Consumption Alarm)	
Explanation	When an alarm occurs more than two, the head number will change in every 2sec cycle.	
Article	Display the time used for a head unit	
Explanation	<ul style="list-style-type: none"> <li>The "Head Selection" button is available to select each individual head units, and the selected head units will be light on the LED display panel.</li> <li>When you push the "Head Select" button at the initial time, the "lifetime of Head1" will be shown for 3 seconds.</li> <li>When in Lifetime state pressing a "Head Select" button, the head unit will be consecutively changed. It will go back to the initial state if it stays for 3 seconds in either one of the head selections. (H1→H2→H3→H4→H1→...)</li> <li>If it is not connected to the head unit, "no-H" (  ) will be displayed.</li> <li>If it is not communicated with the head unit, "no-L" (  ) will be displayed.</li> <li>There will be no display when in emergency state(The interlock open during running).</li> </ul>	

6 Problem solving

▶ Emergency

If interlock is open when running

- Symptoms : Other LEDs will be off and run/stop LED will blink. (Every 0.5sec)  
 The "Lock" will blink on controller display.  
 - Solution : Power(AC) off. The operating termination cannot be done unless the ac power is off.

▶ If Run/Stop button doesn't operate properly

Article	Cause
Interlock Open	When #14 & #15 are open in the back of interface.
Remote-off Close	When #12 is close in the back of interface.
Emergency	If interlock is open when running.

▶ LED check

Once the power is applied, all the LEDs will be on for testing whether to check they are failing (e.g. All LEDs consecutively turns on every 500 millisecond) during operation. Even though LEDs are on for 1.5sec, these procedure is actually a normal operation.

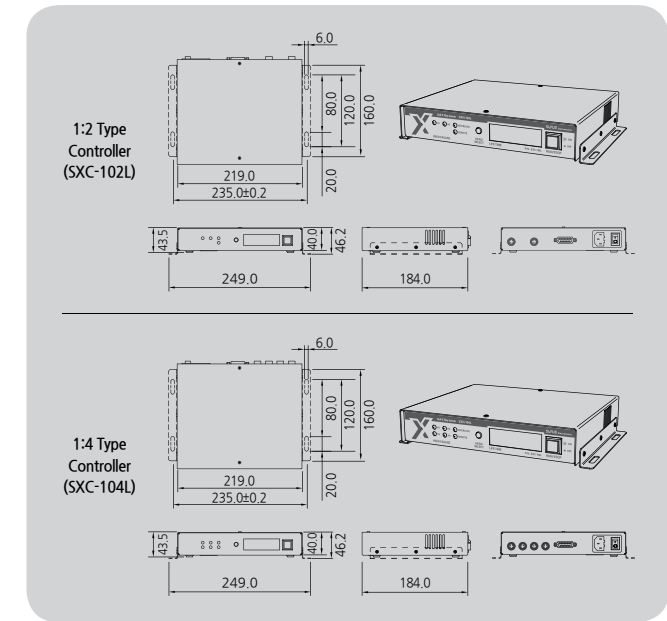
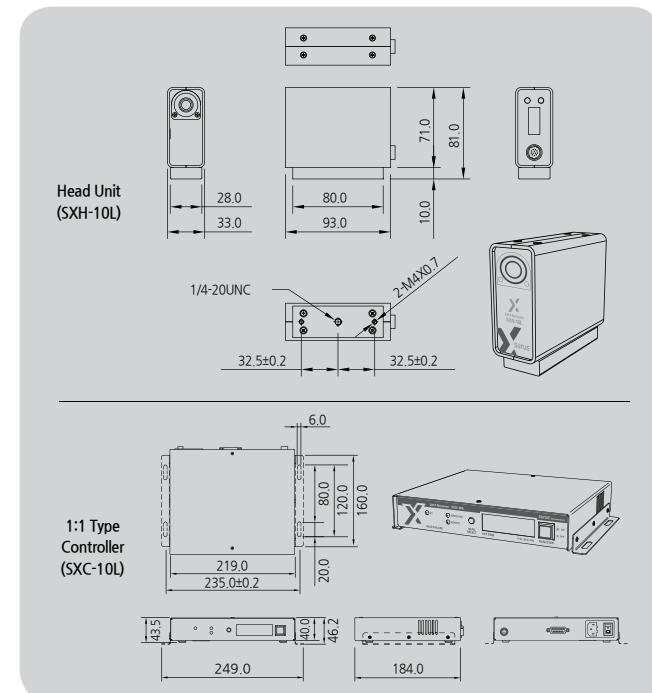
Light sequences	Run / Stop → Interlock → Remote → H1 → H2 → H3 → H4
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\* This procedure will work only once when the power is on.

▶ Checklist before called

Symptom	Confirmation Matter	Matters Of Management
Not Operating	Is your power cable still plugged in?	Please re-plug the power cable and then turn the device on again.
	Was the proper voltage level applied for this set-up?	Please use the proper level of power input for the device. (Ac 100~240v, 50/60hz)
	Is the switch off at back of the controller?	Turn on the power switch.
	Is a fuse broken?	Replace the proper fuse immediately.
	Is there any alarm LED on the head unit of device?	Purchase and replace the tube unit(replaceable).
No Signal	Is remote off?	Clear the remote off corresponding to remote setup, manual.
	Is interlock off?	Check whether the cable connection is properly done.
Decreased Performance	Have you followed the proper procedure For input/output signal cable(s)	Place interlock on corresponding to Interlock setup, manual.
	Can't possibly ground the device?	Please refer to installation & connection or(proper) grounding the device.
Head Unit Not Working (When pressing run button on the controller)	Any damages or cut on the cables?	You need to replace the cables if it gets cut or damaged.
	Properly control interlock on function on your machine?	Clear the remote off on your machine.

7 Dimensions



8 Specification

▶ Head Unit (SXH-10L)

Parameter	Description / Value	Remarks
Ion Generation Method	Soft X-ray	
Dimensions	Please refer to dimension drawing	
Source	Soft X-ray Tube	
Cooling Method	Natural Air Cooling	
Mounting Method	Bolt Mounting with Bracket	
Weight	0.36kg	
Alarm	Head Fail	
Warning	Life Time Over	
Warranty	1 Year	

\* The appearance and specification of the product may be changed without prior notice for the improvement of the product.

▶ Controller (SXC-10L / 102L / 104L)

Parameter	Description / Value	Remarks
Input Power	AC 100~240V, 50/60Hz	
Power Consumption	56W	with Head
Current Consumption	254mA	AC 220V
Fuse	250V, 3A, 5X20 Glass Type Fuse	
Operation Circumstance	0℃ ~ +50℃(32℉ ~ 122℉), 35% ~ 85% RH	
Weight	1.52kg	
Dimensions	Please refer to dimension drawing	
Alarm	Head Fail	
Warning	Life Time Over	
Interlock	Interlock On/Off Control	
Remote	Remote On/Off Control	
Interface Output	Power State, Interface State,	
	Run State, Alarm State	
Warranty	1 Year	

\* The appearance and specification of the product may be changed without prior notice for the improvement of the product.

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