

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.
- 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 output 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.

**2 Check the package contents**

**Product compositions**

The package includes the following products composition.



Controller SXC-10BT 1ea

- Power Cable SPC-MT-1-001 AC 100V, 50/60Hz, 1.8m / 1ea
- Head Cable SOC-XN-6-001 10m / 1ea
- Power Cable SPC-MT-2-001 AC 220V, 50/60Hz, 1.8m / 1ea
- D-Sub Cable SDC-SN-4-001 25Pin / 5m / 1ea

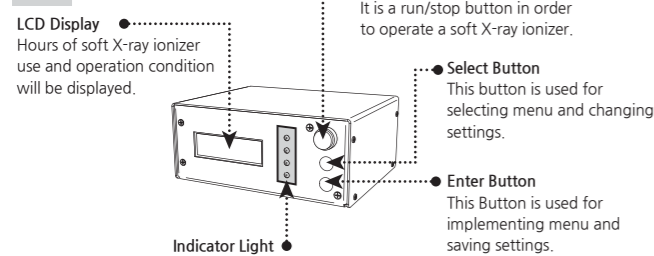
**Option**

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

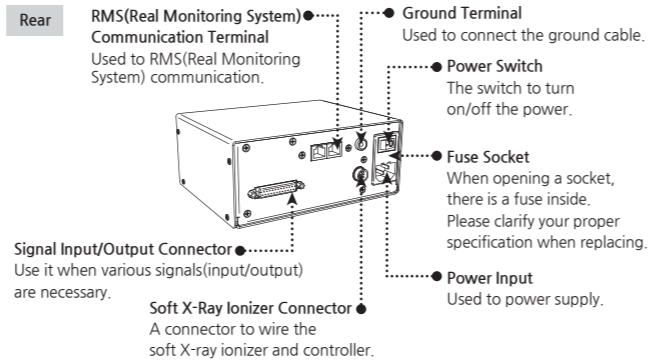
- Ground Cable SGC-MT-5-001 2.5m/ Banana Plug-Ø3[mm]
- UTP Cable SUC-B3-1-001 5m

**3 Nomenclatures of parts**

**Front**



- POWER**: Power Indicator. Blue LED will be turned on when the controller is powered on.
- INTERLOCK**: Safety(Interlock) Indicator. For user's safety purpose, green LED will be turned on when interlock is safely contacted.
- OVERTIME**: Tube Replacement Alarm Indicator. Orange LED will be turned on when the lifetime of X-ray tube is exceeded.
- ALARM**: Malfunction Indicator. When false operation, red LED will be turned on.



**4 Installation and connection**

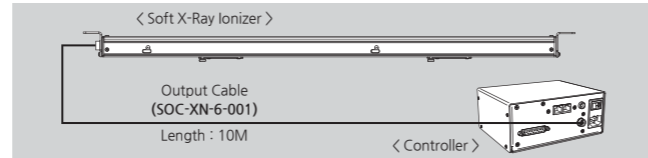
**Soft X-ray Ionizer connectable with SXC-10BT**

5kV		10kV	15kV
SXB-05N	SXB-05SP1R	SXB-10N	SXH-15NH
SXB-05NR	SXB-05SP1RL	SXB-10W	
SXB-05NRL	SXB-05SP2		
SXB-05NS	SXB-05SP2L		
SXB-05NSR	SXB-05NRD		
SXB-05NSRL	SXB-05WR		

**How to connect**

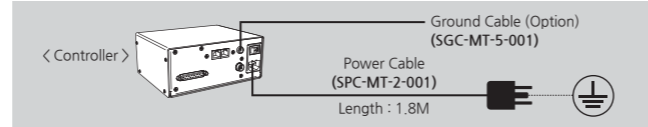
**Connecting the soft X-ray ionizer**

Please connect the soft X-ray ionizer and controller with supported "Output Cable".



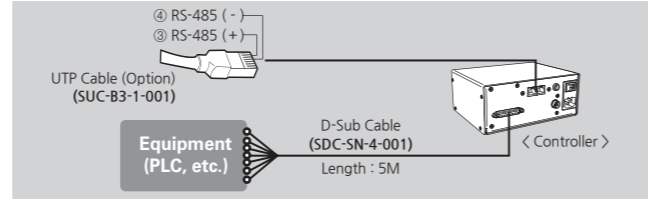
**Connecting the Ground and Power**

Using supported ground and power cables to connect the controller.



**Connecting the Input & Output Signal Cable and Communication Cable**

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



**Input/Output Signal Cable Specifications (D-Sub Cable)**

Division	No.	Pin Name	Labeling	Color	Function	
INPUT	1	REMOTE ON	RMT-ON	Black	Remote On/Off (Electrical Contact)	
	2	REMOTE OFF	RMT-OFF	White on Black		
	3	COMMON	RMT-COM	Brown	Interlock On/Off (Electrical Contact)	
	4	INTERLOCK	INT-ON	White on Brown		
	5	INTERLOCK	INT-OFF	Red	Remote On/Off State Output	
	6	REMOTE(N.O)	RE-N.O	White on Red		
	7	REMOTE(COM)	RE-COM	Orange		
	8	REMOTE(N.C)	RE-N.C	Black on Orange		
	9	INTERLOCK(N.O)	IN-N.O	Yellow		
	10	INTERLOCK(COM)	IN-COM	Black on Yellow		
	OUTPUT	11	INTERLOCK(N.C)	IN-N.C	Green	Interlock On/Off State Output
12		NOT USED				
13		GROUND		Black		
14		POWER (N.O)	POW-N.O	White on Green	Power On/Off State Output	
15		POWER (COM)	POW-COM	Blue		
16		POWER (N.C)	POW-N.C	White on Blue	Over Time State Output	
17		Over Time (N.O)	HEAD-N.O	Violet		
18		Over Time (COM)	HEAD-COM	White on Violet	Over Time State Output	
19		Over Time (N.C)	HEAD-N.C	Gray		
20		ALARM (N.O)	AL-N.O	Black on Gray	Alarm (Abnormal) State Output	
21		ALARM (COM)	AL-COM	White		
22		ALARM (N.C)	AL-N.C	Black on White		
RS 485		24	RS-485(+)	RS-485+	Pink	RS 485 Communication
		25	RS-485(-)	RS-485-	Sky Blue	

**5 How to set**

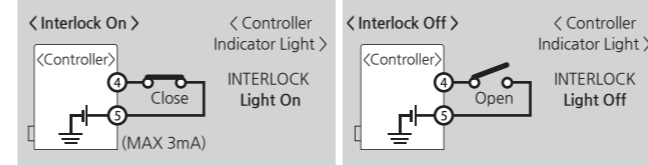
**Set the interlock**

**Interlock On**

If #4 and #5 of a D-Sub cable are connected, the interlock is on. When LED is on, it shows that the door is securely locked and totally shielded. "Interlock indicator ( INTERLOCK )" light will be turned on in the front of the controller.

**Interlock Off**

If #4 and #5 of a D-Sub cable are disconnected, the interlock is off. When LED is on, it shows that the door is securely unlocked and not shielded well. "Interlock indicator ( INTERLOCK )" light will be turned off in the front of the controller.



Article	Interlock On	Interlock Off
D-Sub Cable No.	4 - 5 Close	4 - 5 Open
State	The shield door is closed	The shield door is open
Meaning	Normal operation standby	Abnormal operation standby

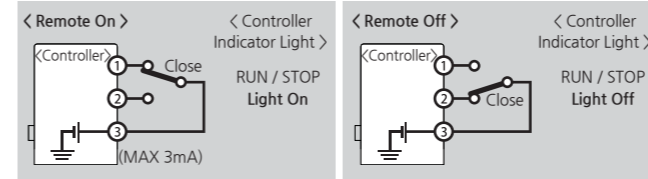
**Set the remote**

**Remote On**

Under interlock ON condition, Remote is set. Remote ON means that ion generates as Soft X-ray ionizer is working. If #1 and #3 of a D-Sub cable are connected, the remote is on.

**Remote Off**

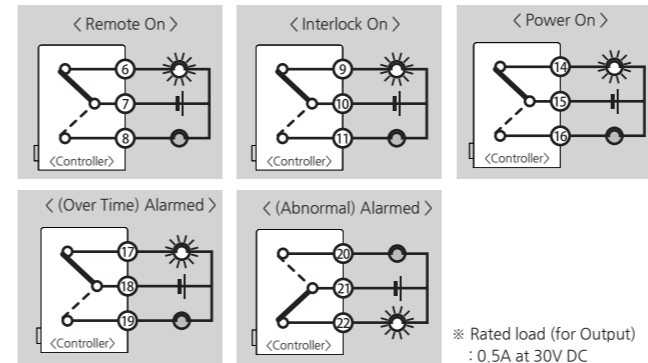
Under interlock ON condition, Remote is set. Remote OFF indicates that the Soft X-ray ionizer is not operating. If #2 and #3 of a D-Sub cable are connected, the remote is off. ※ The Run/Stop button is available when you don't use remote. ※ If the interlock is in off, the Soft X-ray ionizer will not operate even though the remote is on.



Article	Remote On	Remote Off
D-Sub Cable No.	1-3 Close	2-3 Close
State	Soft X-ray ionizer starts operating	Soft X-ray ionizer stops operating
Meaning	Ion starts forming	Ion stops forming

**Output status signal**

category	Remote Status Output	Interlock Status Output	Power Status Output	Over Time Alarm Status Output	Alarm(Abnormal) Status Output
D-sub Cable No.	6-7 Close	9-10 Close	14-15 Close	17-18 Close	21-22 Close
Status	Remote On	Interlock On	Power On	(Over Time) Alarmed	(Abnormal) Alarmed
Meaning	Ion forming	Normal Operation Standby	Power applied	Allowable tube lifetime elapsed.	Soft X-ray ionizer Malfunction
Controller Indicator	Run/Stop Indicator On	Interlock Indicator On	Power Indicator On	Tube Replacement Alarm Indicator On	Malfunction Indicator On
	RUN / STOP	INTERLOCK	POWER	OVERTIME	ALARM



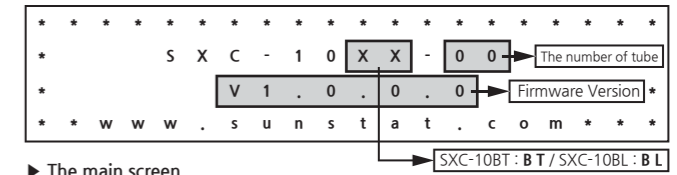
**Error code verification**

- Err 2 : Internal system error of a Soft X-ray ionizer (Please contact us if the unit doesn't work properly. Within the warranty period, the expected charges will be free on your side.)
- Err 4 : Ionization level of the Soft X-ray ionizer is lower than the minimum current (Replace the tube of the Soft X-ray ionizer. Contact us immediately.)
- OVERTIME : Informs the arrival of the solid cycle of the consumables (Tube replacement is recommended at the next PM)

**6 SXC-10BT operations**

**When it powers on**

After displys for 2 seconds, it switch to the main screen.



**The main screen**

**Normal condition**

< Page 1 >



< Page 2 >

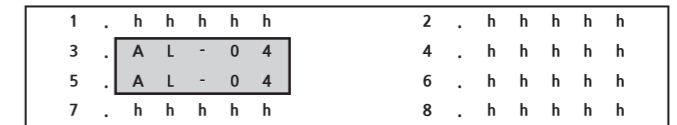


- It indicates total used hours of tube.
- It shows "----" on display when the tube doesn't connected.
- When the 9 tubes connected, push select button to go to < Page2 >. (Under 8 tubes, it doesn't go to < Page 2 >.)

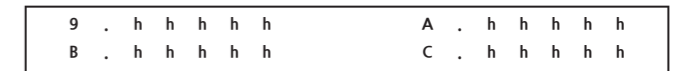
**When the alarm occurred**

ex) When the H/V alarm occurred in no.3 and no.5 tube

< Page 1 >



< Page 2 >

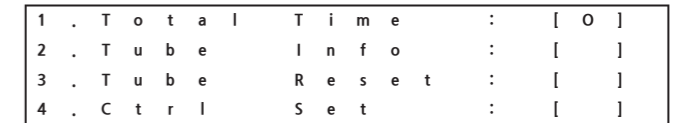


- It shows alarm information and tube number that alarm occurred.
- It shows alarm information and usage time of the tube that alarm occurred every 5 seconds alternately.
- Alarm information meaning

	AL-04 (H/V abnormal)	AL-02 (Internal system error)
SXC-10BT	Always display	Always display
SXC-10BL	Display while Soft X-Ray ionizer working	Display in case of Interlock On

**Menu**

Press the enter button to switch to the menu screen.



- Selecting Menu**: You can select a menu sequentially via pushing the select button.
- Run the Menu**: You can run the menu via pushing the enter button.

**1. Total Time**

Indicating each tube's usage time



It shows each tube's usage time and alarm information.

※ Refer to operational method on page 04 ▶ Main screen \*

**2. Tube Info (Tube Information)**

Indicating each tube's information : It is possible to check each tube's condition. (Usage time, Alarm, Overtime)

Tube 1 alarm display showing Time, Alarm, and Over Time status.

- 1. \*Tube1\* - You can change a tube number sequentially via pushing the select button.
2. Time condition - It indicates tube's usage time.
3. Alarm condition - 1) AL-04 : H/V abnormal 2) AL-02 : Internal system error
4. Overtime condition - 1) On : It means that replacement cycle is come. 2) Off : It means that the tube is still available.

3. Tube Reset

Checking the tube reset information. 1) Normal conditions - Display showing Tube 1, 3, 5, 7 and 2, 4, 6, 8 status.

- You can run the tube reset in interlock off condition.
- It shows each tube's reset information. (Up to 8ea)
- It indicates informations as the number of time reset.
ex) If you run time reset 3 times, then you can see the information from no.1 to no.3.
No.4 shows current tube's usage time. From no.5, it shows " - - - - ".
- If you run time reset over 8 times, then 9th information will be indicated in no.8.
- You can check each tube's reset information via pushing the select button sequentially.

2) When the Alarm or Overtime occurred - Display showing Tube 1, 3, 5, 7 and 4, AL-04, 6, 8 status.

- The tube that has alarm occurred or overtime used shows status information instead of the current time.
\* AL-04 : H/V abnormal / Over : Overtime (It doesn't indicates internal error.)
- It is possible to reset in the tube that has alarm, overtime problems.
\* Reset sign on the display in the lower left will blink.
\* Even if you reset before the overtime, the time of use is maintained.

3) How to Tube Reset

CAUTION - When tube operates, heat is generated, heat is right after operation, so be careful not to touch it. There is a risk of burn.
\* A H/V connector of tube is protruded. After unscrew the bolts, pull the unit vertically. Please be careful when replacing H/V connector.
\* After replacement, check if tube and Soft X-Ray Ionizer body are connected correctly. Unless they are connected properly, ground could be unstable.
\* Do not unscrew any bolts other than fixing bolts. If unscrewed, it can occur fire, electric shock, and breakages.

\* Tube reset of SXB-05NRD is available only with SXB-DS. Please check the SXB-DS manual.

- ① Tube separation - Turn off the power switch at the rear of the controller, and separate the tube
② Tube combination - When the tube replacement is complete, turn on the power switch at the rear of the controller.
\* Refer to the Soft X-ray Bar Manual for tube replacement.

③ Checking the tube reset information - Display showing Tube 1, 3, 5, 7 and 2, 4, 6, 8, AL-04 status.

- It is possible to reset in the tube that has alarm, overtime problems.
- Select the tube that need reset in Interlock off condition.

④ For tube reset execution - Display showing Tube 1, 3, 5, 7 and 2, 4, 6, 8, Proc status.

- Execute the tube reset pushing Run/Stop button for more than 5 seconds.
- After execute tube reset, wait about 5 seconds.

⑤ - 1 When tube reset succeed - Display showing Tube 1, 3, 5, 7 and 2, 4, 6, 8, Reset status.

- When tube reset succeed, controller will be stop.
- Controller will be operated normally after turn off and turn on the switch at the rear of the controller sequentially.

⑤ - 2 When tube reset failed - Display showing Tube 1, 3, 5, 7 and 2, 4, 6, 8, Error status.

- When tube reset failed, controller will be stop.
- Turn off and turn on the switch at the rear of the controller sequentially, and try again after checking the tube reset method.

4. Ctrl Set (Controller Setting)

RMS(Real Monitoring System) for communication Address Setting and setting of the number of connected tube.

Address setting display showing Address, Tube Number, I/F, Alarm, and Alarm LMT.

- 1. Set the address value - You can change address value sequentially via pushing the Select button. (1~16)
2. Set the number of tube - Press Select button and you can change the number of tube in order. (1~12)
3. Overtime I/F setting (SXC-10BT Only) - Press Select button and it can be changed.
1) ON : Use as Overtime Interface 2) OFF : Use as Alarm Interface
4. Alarm I/F setting (SXC-10BT Only)
1) ON : Interface alarm indicates when Soft X-Ray Ionizer stops.
2) OFF : Interface alarm does not indicate when Soft X-ray Ionizer stops.
5. Set the alarm limit - Press Select button and you can change the number of Alarm criteria in order.(1~12)
: If an alarm occurs that is below the set standard, the operation is maintained without outputting to the I/F.

- \* You can run the controller setting in Interlock off condition.
\* When you press Enter button after setting, next setting change is possible.
\* It blinks at interval on a second while you are setting on.

After all setting is done, the screen below appears and changed setting is saved at the same time.

Please Power Off display

- It operates with changed setting figure when you turn the switch on again.
- If there is no change on setting, it does not show Power off, but moves to menu screen.

▶ Interlock Off - Tube rese, Controller setting can be run in Interlock off condition. If you try to rua Tube reset, Controller setting in Interlock On condition, you can see the screen in the below on the display.

Please Interlock Off display

- \* How to cancel : To switch to the menu screen, wait more than 5 seconds or pressing the enter button.

▶ Bar Connect - The screen in the below indicated, but that Soft X-ray Ionizer is not connected when run the tube reset.

No Bar Connect display

- \* How to cancel : To switch to the menu screen, wait more than 5 seconds or pressing the enter button.

7 RS-485 Communication (SXC-10BT)

- 1. Pin - Pin 24 : RS-485(+), Pin 25 : RS-485(-)
2. Communication Spec. - Baud : 9600, Parity Bit : None, Data Bit : 8, Stop Bit : 1

8 Communication Protocol (SXC-10BT)

Communications identifier by Model table showing kv, Product Type, and Ionizer Model.

\* Different communications identifier could be chosen by the number of connected tube / tube voltage value.

1. Data Request table showing Byte, Code, and Communication Equipment.

Table with 4 columns: Byte, Information, Comment, Remarks. Contains start code, product type, ionizer model, broadcasting, command, address, end code, and check sum.

1. Data Receive table showing Byte, ASCII, and Communication Equipment for various data points.

\* Standard : model with 7 tubes

Main communication protocol table with 4 columns: Byte, Information, Comment, Remarks. Lists data points for product type, ionizer model, address, tube connect, tube over time, tube alarm, and tube run time.

Table with 4 columns: Byte, Information, Comment, Remarks. Lists data points for tube run time, interlock state, remote state, power state, alarm state, run/stop state, end code, and carriage return/line feed.

\* Standard : model with 7 tubes

2. Control [Run] table showing Byte, Code, and Communication Equipment.

2. No Receive - Communication Equipment ← SXC-10BT

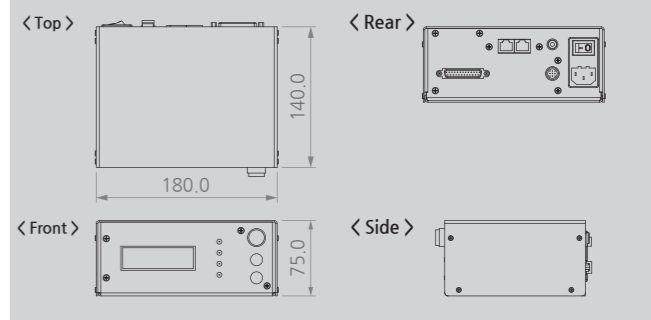
3. Control [Stop] table showing Byte, Code, and Communication Equipment.

3. No Receive - Communication Equipment ← SXC-10BT

Checksum Calculation section including a code snippet for calculating checksums.

\* Checksum inspection is the result of all data from \$ to \* as Exclusive-Or calculating.

9 Dimensions



10 Specification

Specification table with 2 columns: Parameter and Description / Value. Lists input power, power consumption, operation circumstance, alarm function, interface, controller fuse, weight, and warranty.

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

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