

VSN-104E

INSTRUCTION MANUAL



Head : VSH-10E



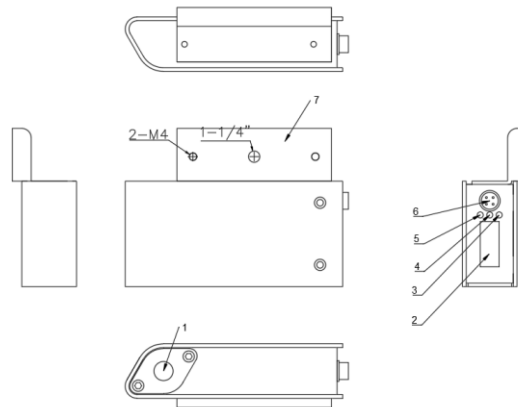
Controller : VSC-104E

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1. Part Names and Functions

■ Head (VSH-10E)



1) Soft X-Ray window

A window that irradiates soft X-ray that ionizes the air to eliminate static electricity.

2) Timer LCD

The usage time (hour) of the head is displayed.

3) Alarm Indicator (Red Light)

It turns on in case of abnormal head operation.

4) Timer Indicator (Yellow Light)

It turns on when it operates over the guaranteed operation time, and the yellow lamp will be lighted.

5) Run Indicator (Green Light)

It turns on when the soft X-ray is being irradiated and a static elimination is occurring.

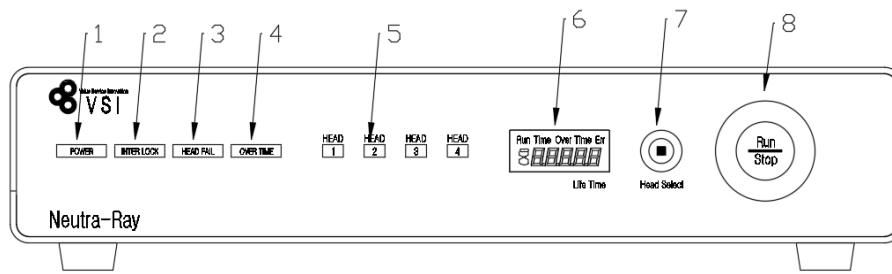
6) Head Connector

It connects the 4pin connector that connects to the controller.

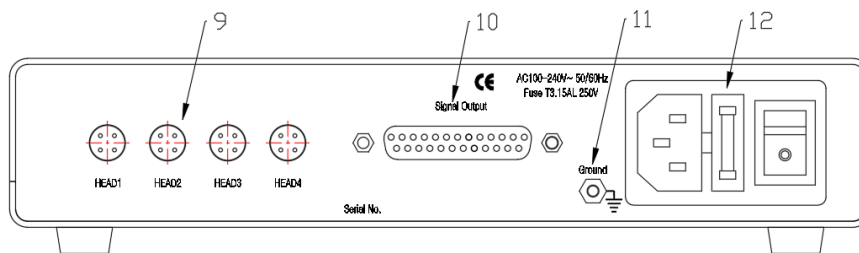
7) Head Bracket

It is a bracket that is used to install the head and has tap holes are machined.

■ Controller (VSC-104E)



Front Panel

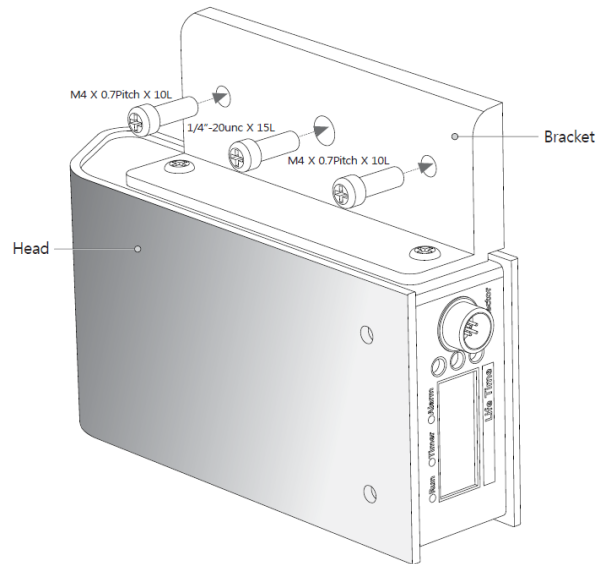


Rear Panel

- ① **Power(Green Light)** : Green light will come on when the controller is powered.
- ② **Interlock(Yellow Light)** : It is a safety indicator lamp before soft X-ray is irradiated and it comes on when the interlock is connected.
- ③ **Head Fail (Red Light):** It will come on when abnormal head operation occurs.
- ④ **Over Time (Yellow Light):** It will come on when the Head Timer Indicator is turned on.
- ⑤ **Head Indicator (Green Light):** The head number is turned on when the head is selected by the head select switch or when HeadFail occurs.
- ⑥ **Timer LCD:** Displays operation time of the head.
- ⑦ **Head Select Switch:** It is a switch that selects the head.
- ⑧ **Run/Stop Switch:** It is a switch that operates irradiates soft X-ray.
- ⑨ **Head Connector:** Connects the 4pin connector that connects to the head.
- ⑩ **Signal Output Connector:** A connector that is used to connect with external devices.
- ⑪ **Ground Terminal:** This is the controller ground bolt.
- ⑫ **AC Inlet** : This is the AC power inlet.

2. Installation and Operation

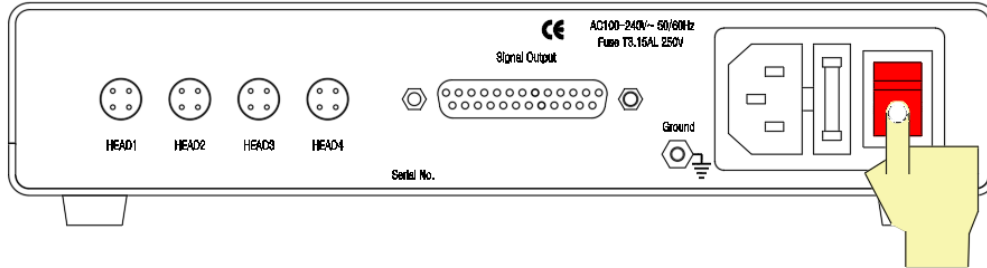
■ Head Installation



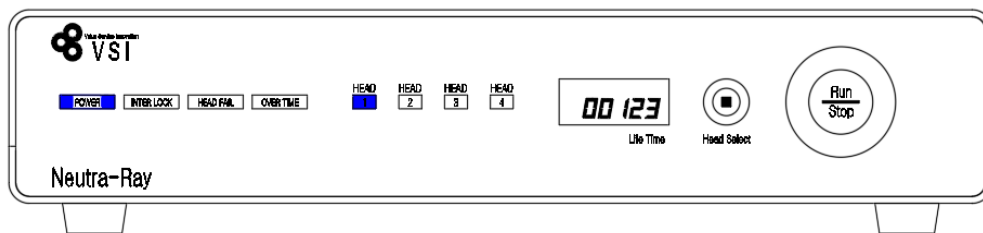
- ① Fix the device using the holes on the fixture bracket and the screws supplied, at a desired location.
✘ Please install the head in a shielded equipment.
- ② Install the head in a shielded location, the controller at a place with easy access, and connect the power and ground cables.
- ③ Connect the Head and the controller using the connection cable provided.

■ Controller Operation Method (VSC-104E)

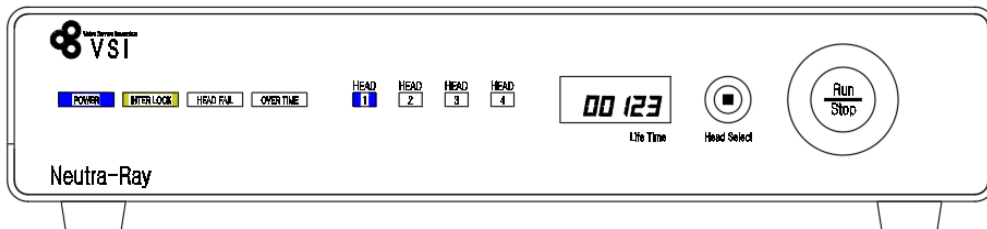
- ① Turn on the power switch on the rear panel of the controller. (Red lamp will be lighted on the switch)



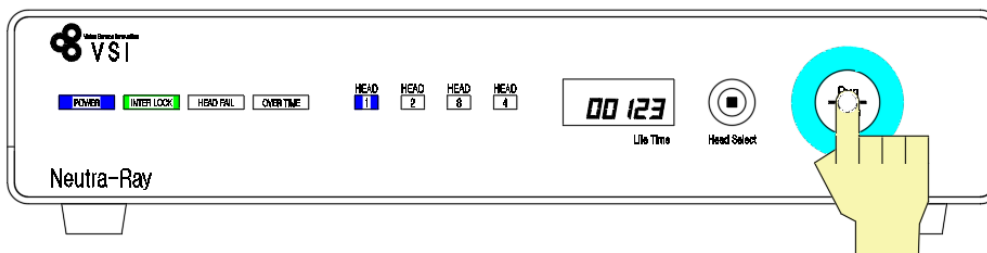
- ② If the power is normally applied, the front power lamp will light up.



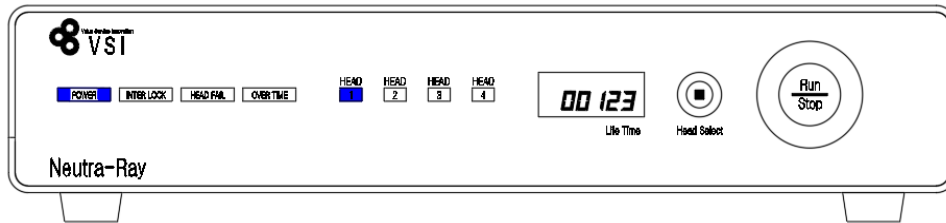
- ③ **[Interlock input]** By closing the DSUB I/O Connector pin 24 and 25 with contact input on the rear panel of the controller, the ionizer is ready to be irradiated. Check the interlock lamp status on the front panel of the controller (For the safety instructions, please refer to “[1](#)) Interlock Input Signal” on Page 11).



- ④ **[Ionizer Irradiation ON]** Push Run/Stop button on the front panel of the controller once (For the Remote Ionizer Irradiation ON method, please refer to “[2](#)) Remote Signal Input Contents” on Page 12). During regular irradiation, the area around Run/Stop button will be lighted with white light, and LCD will display hourglass symbol.



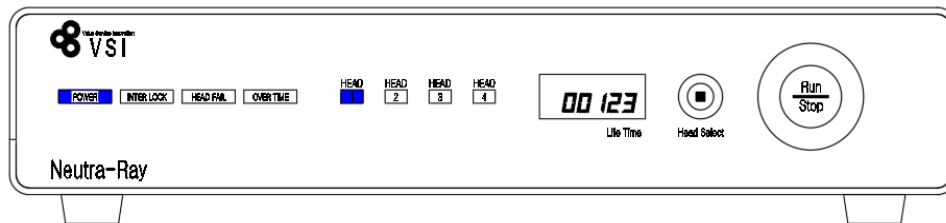
- ⑤ **[Ionizer Irradiation OFF]** Push Run/Stop button on the front panel of the controller once (For the Remote Ionizer Irradiation ON method, please refer to “2) Remote Signal Input Contents” on Page 12). When the device turns off normally, the light around Run/Stop button will turn off and the hourglass symbol will disappear.



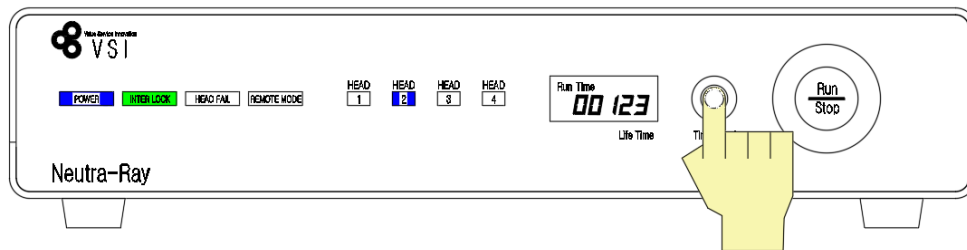
■ HEAD Time Check

The head usage time can be checked using the head select switch.

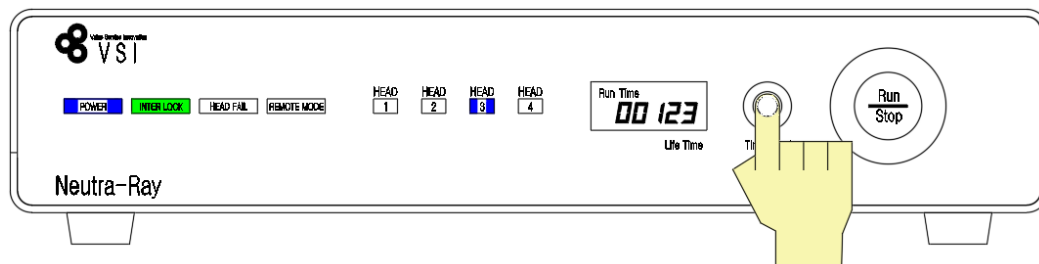
- ① The initial LCD display will show the usage time of the Head1. Blue light is turned on at the Head1.



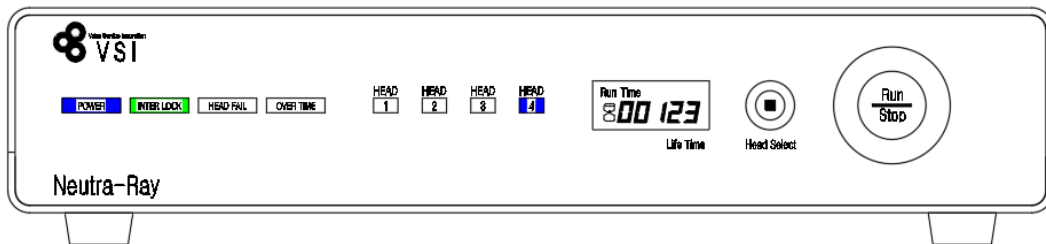
- ② By pressing the head select switch once, the usage time of the Head2 is available and the blue light is turned on at the Head2.



- ③ By pressing on the head select switch one more time, the usage time of the Head3 is available and the blue light is turned on at the Head3.



- ④ By pressing on the head select switch one more time, the usage time of the Head4 is available and the blue light is turned on at the Head4.

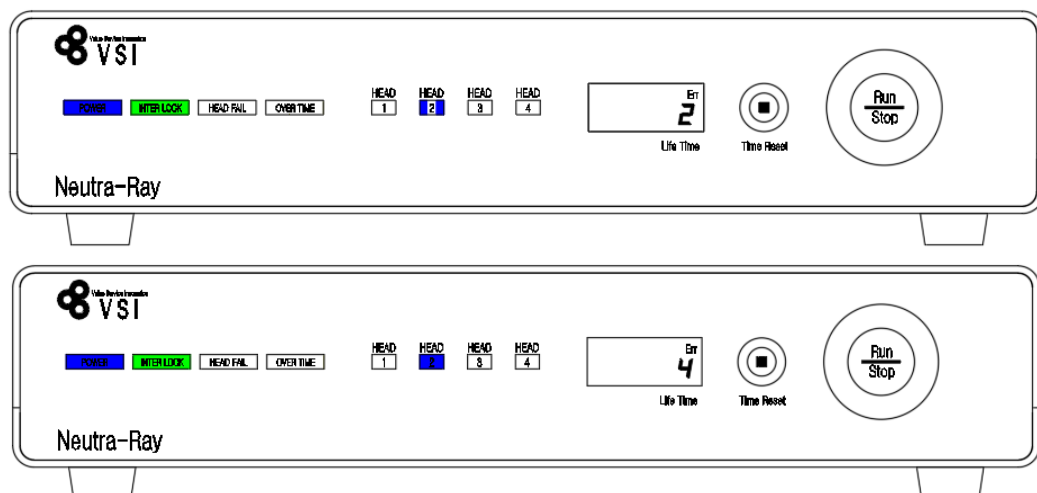


■ Controller Operation Status when Head FAIL Occurs

Due to the abnormal operation of the head, the head red light will be lighted, and the Head Fail red light will be illuminated on the controller for the head that is experiencing the fail.

- When Head Fail occurs at the channel 2.

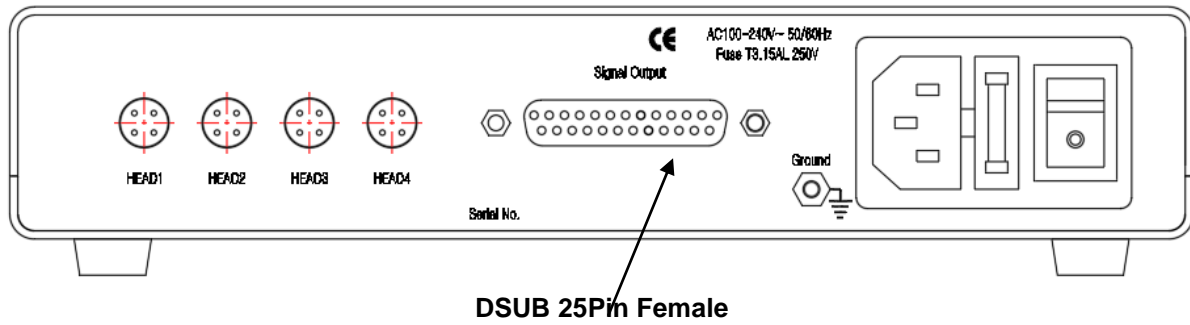
- ① Use the same method as Head Usage Time check to check the alarm information. HeadFail LED is turned on and LCD window will display either Err2 or Err4.



※ There are two kinds of Head Fail (Error code) information.

- Err 2 : A communication error of the head. Need to check the connection.
- Err 4 : Operation error of the head. Need to replace the head.

■ Controller Rear Panel Signal Input / Output Connections



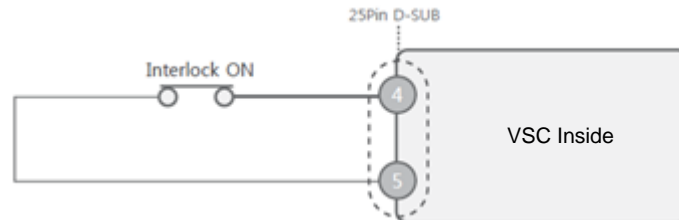
Pin	Connector Pin Name	Details
1	RMT-ON	When RMT-ON and RMT-COM are closed, the ionizer irradiates. (However, INT-ON and INT-OFF should be closed.) When the RMT-ON and RMT-COM are opened, the ionizer stops irradiating.
2	RMT-OFF	When the RMT-OFF and RMT-COM are closed, the ionizer stops irradiating.
3	RMT-COM	It is a common terminal for operating pin 1 & 2.
4	INT-ON	It is an input for the interlock purposes. When INT-ON and INT-OFF are closed, the ionizer irradiation is in the standby state and the Interlock LED lights up on the front panel of the controller.
5	INT-OFF	
6	RE-N.O	When pin 1 & 2 are closed, RE-N.O and RE-COM are closed.
7	RE-COM	It is a common terminal for pin 6 & 7 outputs.
8	RE-N.C	When pin 1& 2 are open or pin 2 & 3 are closed, RE-N.C.RE-COM is closed.
9	IN-N.O	When pin 4 & 5 are closed, INE-N.O and IN-COM are closed.
10	IN-COM	It is a common terminal for pin 9 & 10 outputs.
11	IN-N.C	When pin 4 & 5 are open, IN-N.C.IN-COM is closed.
12	-	Unused
13	GND	Ground wire
14	POW-N.O	When power is supplied to the controller, POW-NO and POW-COM are closed.
15	POW-COM	It is a common terminal for pin 14 & 16 outputs.
16	POW-N.C	When the power to the controller is turned off, POW-NC and POW-COM are closed.
17	HEAD-N.O	When the head lifespan is passed, HEAD-N.O and HEAD-COM are closed.
18	HEAD-COM	It is a common terminal for pin 17 & 19 outputs.

19	HEAD-N.C	When the head lifespan is not passed, HEAD-N.C and HEAD-COM are closed.
20	AL-N.O	When the ionizer irradiation is ON, AL-NO and AL-COM are closed. When HeadFail is detected at the controller or ionizer irradiation is off, AL-NO and AL-COM are opened.
21	AL-COM	It is a common terminal for pin 20 & 22 outputs.
22	AL-N.C	When the ionizer irradiation is OFF, AL-NO and AL-COM are closed. When HeadFail is detected at the controller or ionizer irradiation is OFF, AL-NO and AL-COM are closed
23	-	Unused
24	RS485+	RS485+ communication line
25	RS485-	RS485- communication line

1) Interlock Input Signal

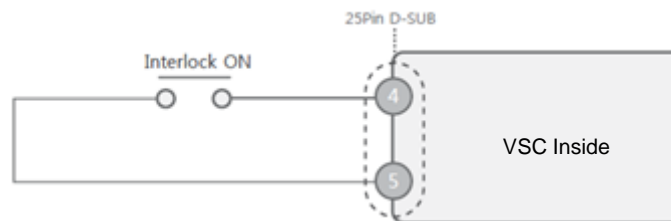
a) Interlock ON

When the interlock contact connected to D-SUB 3 & 4 are closed, it is ready to irradiate soft X-ray. The Interlock on the front panel of the controller will be lighted.



b) Interlock off

When the interlock contact connected to D-SUB 3 & 4 are opened, Run/Stop switch and the remote do not work. The interlock on the front panel of the controller will be turned off.



※ **Warning:** If humans are exposed directly to soft X-ray, it could cause damages. Therefore, the interlock must be connected. If the enclosure door is opened during the irradiation of soft X-ray, the interlock terminal will open, and the irradiation of soft X-ray will automatically stop. If the enclosure door is closed, the interlock will close, and the device will be in the ready status.

- Safety Features

If the interlock door becomes “open” status during the irradiation of soft X-ray (“Run/Stop” button is lit on the front panel of the controller), the irradiation will stop.

“Interlock” lamp and “Run/Stop” switches are turned off on the front panel of the controller.

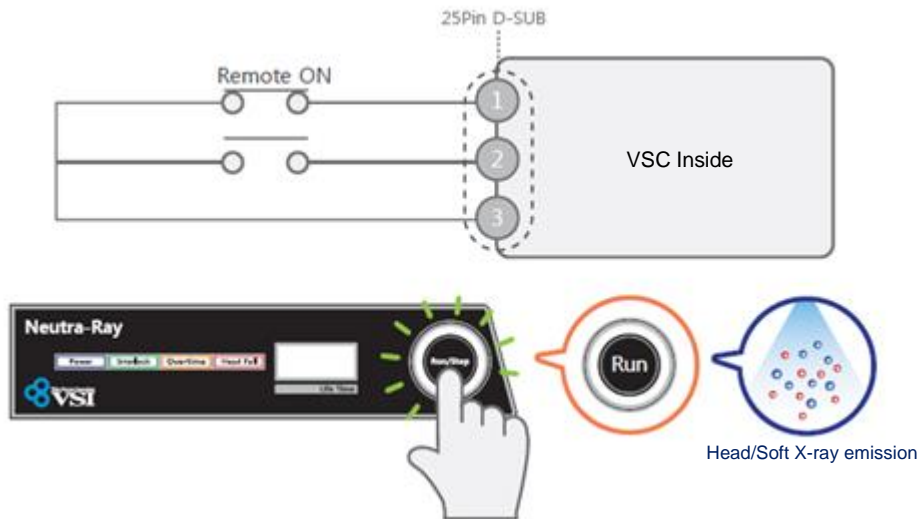
If the interlock is closed (safe status), the device will return to the safe mode and can start irradiation of soft X-ray by inputting the Remote On signal into the controller.

2) Remote Input Signal

Remotely control the photo ionizer by inputting the control signal from the external (equipment side) to the D-Sub 15pin connector.

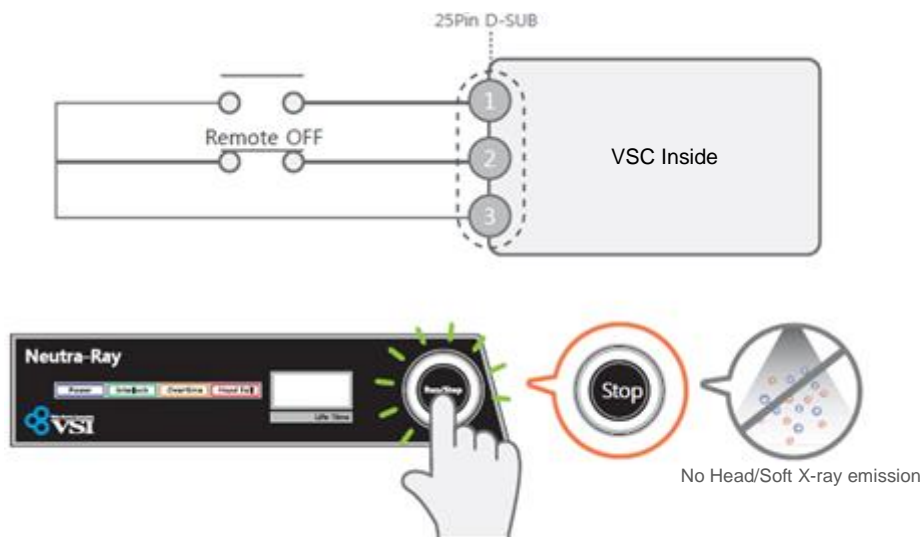
① Remote On

Only irradiates soft X-ray when D-Sub25pin 1 & 3 terminals are closed.

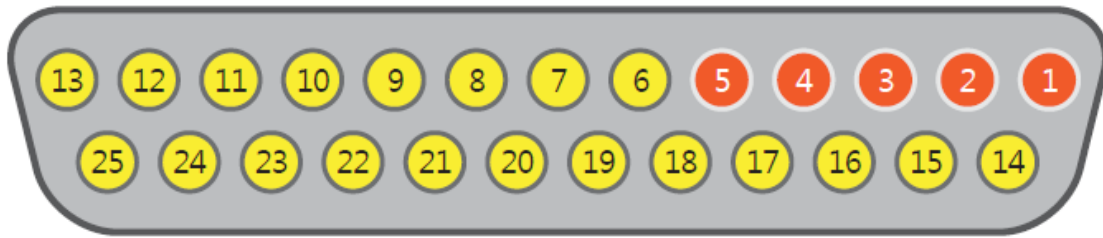


② Remote OFF

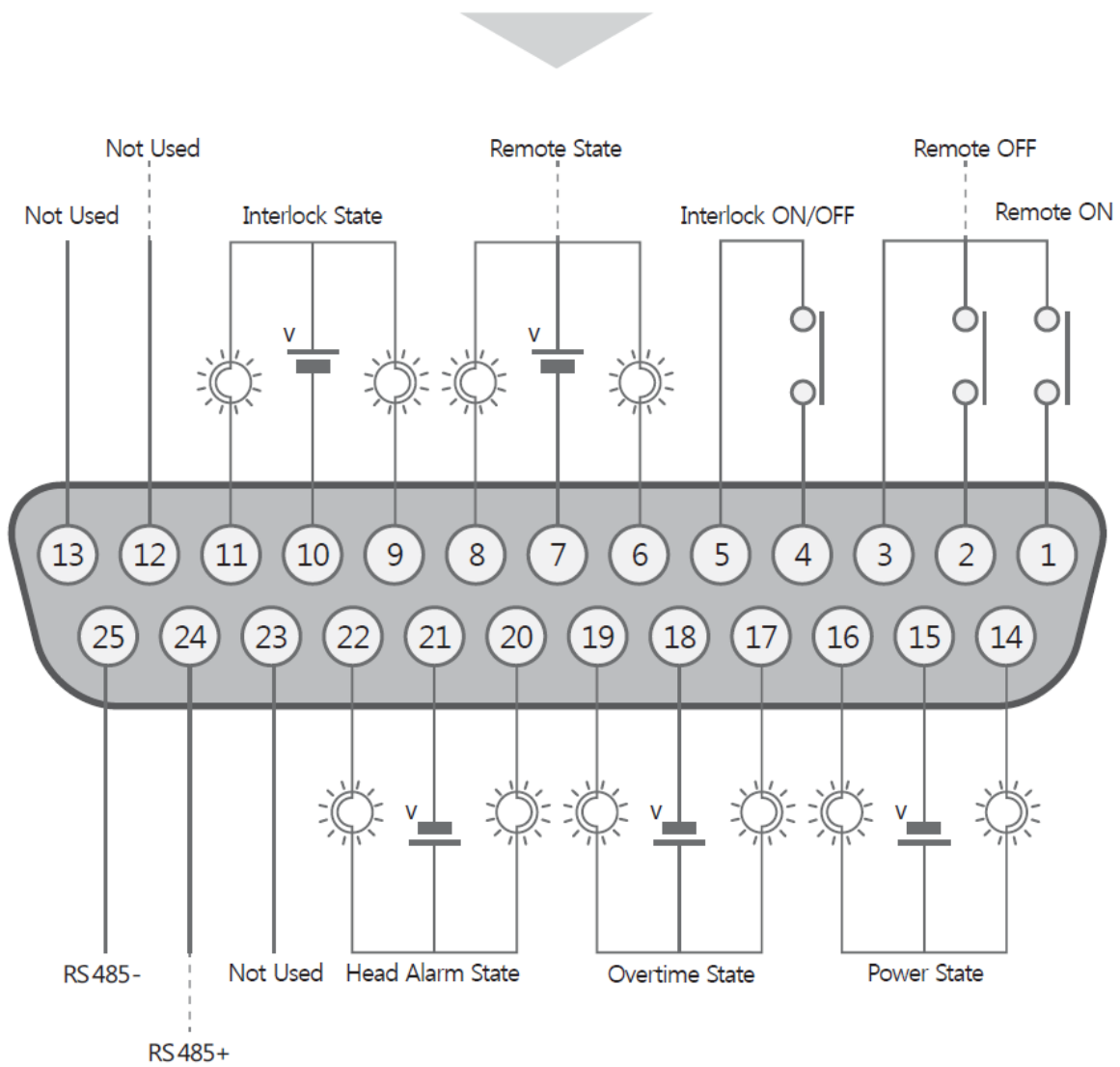
Stops soft X-ray irradiation when either D-Sub15pin 1 & 3 are opened or pin 2 & 3 are closed. (However, when the pins 2 and 3 are closed, the head irradiation ON operation cannot be performed by the switch operation of Run / Stop on the front side.)



■ Signal Input / Output Usage



● : Input(1~5) ● : Output(6~25)

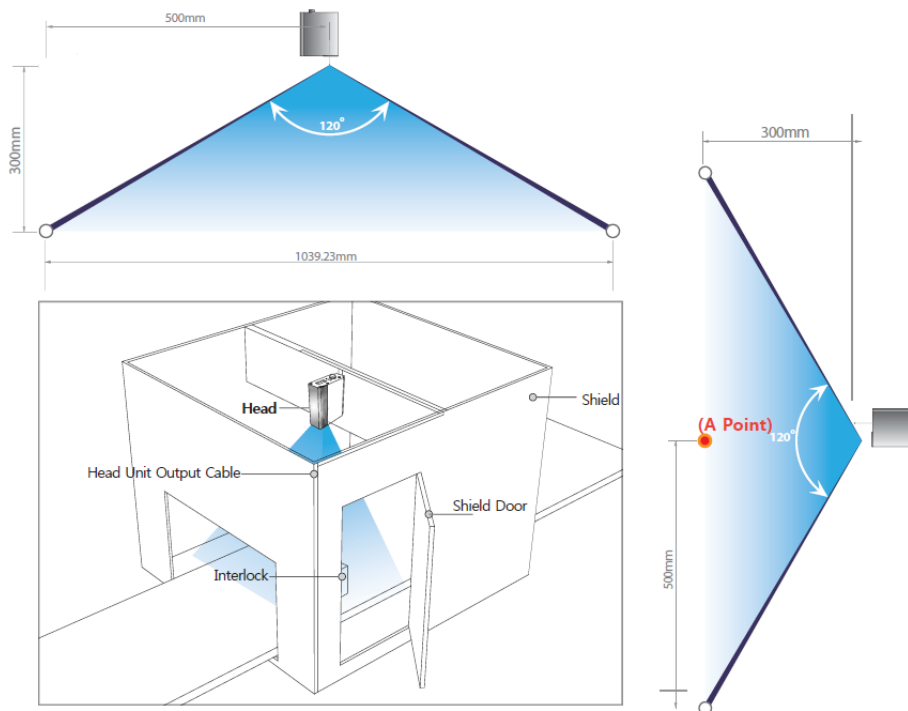


3. Safety Instructions

Head that emits soft X-ray during operation must be shielded for users' safety. Since the shielding rate differs depending on the material, please refer to the following materials to design the shield.

- Point A: Shielding 10cm from the front of the X-ray window

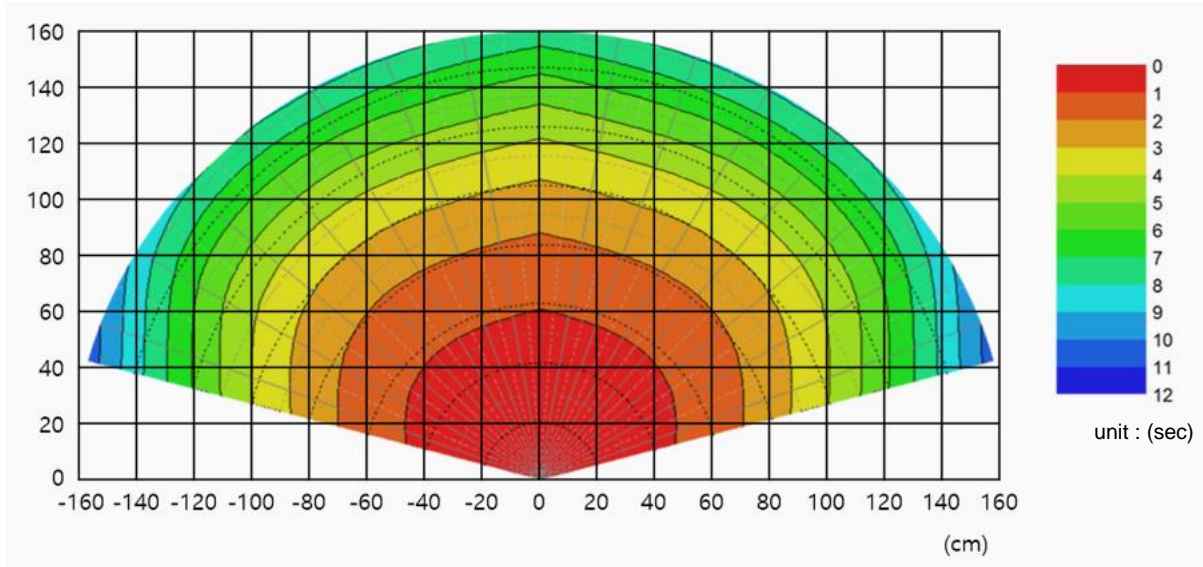
Shielding Material	Thickness [mm]
Stainless steel	0.2
Aluminum	3
glass	5
PVC	4
Acrylic	46



- The above shield thickness design is only suitable when the shield is 10cm away from the source of the X-ray. If the distance is shorter, the thickness must be increased.
- After shielding, the leaked radiation level must be lower than the legal limit (10 μ Sv/h).

4. Decay Time

Static electricity removal performance is represented by the time taken to drop the metal plate charged at $\pm 1000\text{V}$ to $\pm 100\text{V}$ by irradiating soft X-ray.



※ **Decay Time (when mounted): Top -> Down Irradiation, Based on straight line distance.**

5. Product Specifications

HEAD	
Dimensions	56 x 115.5x 84mm
X-Ray tube	Tube voltage 11.0kV, Tube
Electron emission	Hot filament type
Weight	303g
LED indicator	Run / OverTime / Alarm

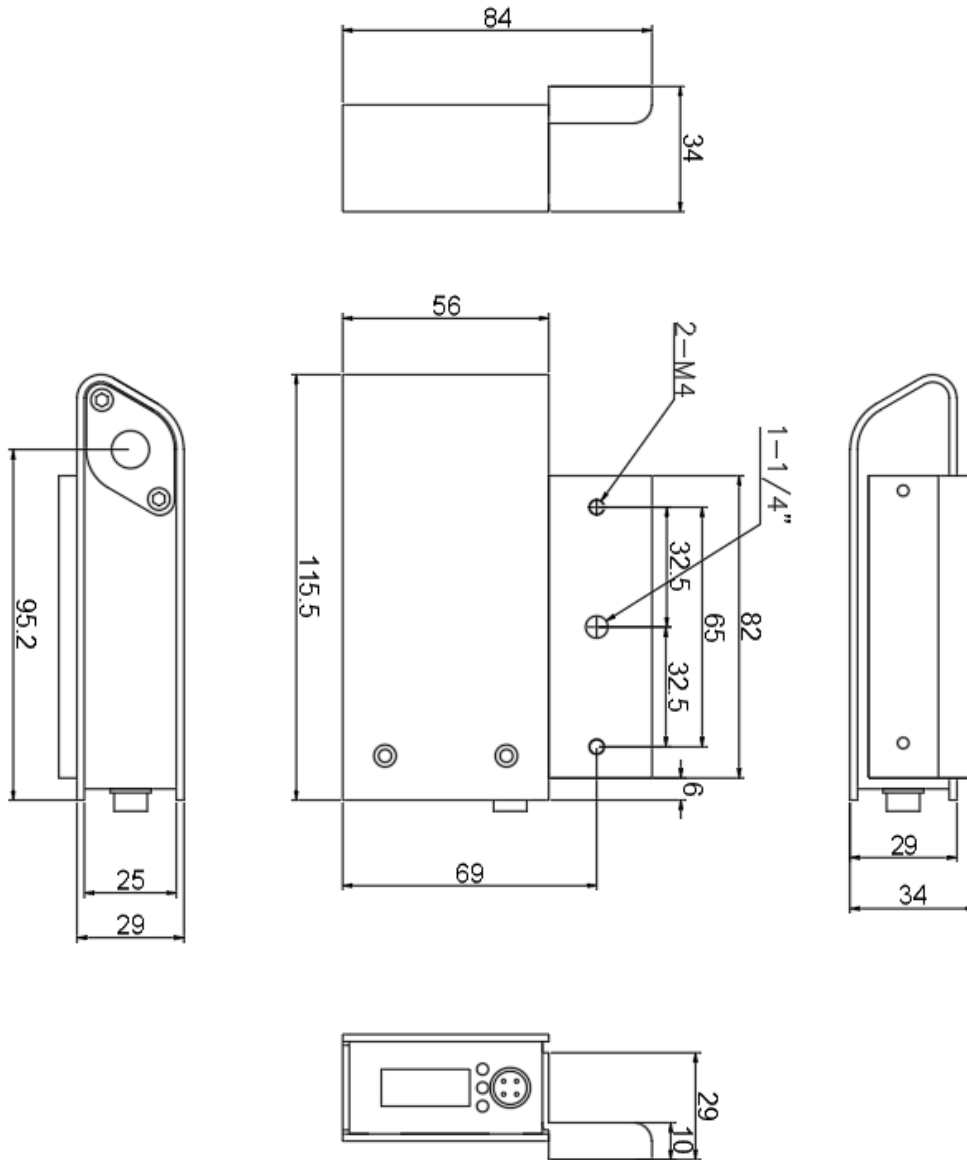
Controller	
Dimensions	215x42x136 mm
Weight	647g
Power consumption	56W
Operating temperature	0 ~ 40°C (32 ~ 122°F), 35 ~ 85% RH
LED indicator	Power/ Interlock / Head Fail / Remote mode state
Functions	Interlock On/Off, Remote On/Off Power on state, Interlock on state, Run state, fail state

6. Components Included

Head (VSH-10E) / 4ea	1:4 Type Controller (VSC-104Z) / 1ea
Output Cable / 15m / 4ea	Fixing Bolt / 1/4"-20UNC X 15L /4ea, 1/4"-20UNC X 8L /4ea M4 x 0.7pitch x 10L / 8ea
Power Cable / 1.8m / 1ea	Signal Cable / 25Pin D-Sub 5m / 1ea

7. External Dimensions

■ Head



■ Controller

