

Static neutralization/ dust removal and collection unit Desktop Duster Box Operation Manual

ZVB Series



Thank you for purchasing SMC's ZVB series, static neutralization/ dust removal and collection unit.
Please read the operation manual carefully before operating the product and make sure you understand its capabilities and limitations.
Please keep the operation manual handy for future reference.

To obtain the operation manual about this product, please refer to the SMC website (URL <https://www.smworld.com>) or contact SMC directly.

Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions are categorized into three groups, "Caution", "Warning" and "Danger" depending on the level of hazard and damage, and the degree of emergency. They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC), Japan Industrial Standards (JIS)¹⁾ and other safety regulations.

- ⚠ Caution :** Caution indicates a hazard with a low level of risk, which if not avoided, could result in minor or moderate injury.
- ⚠ Warning :** Warning indicates a hazard with a medium level of risk, which if not avoided, could result in death or serious injury.
- ⚠ Danger :** Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

Installation

- ⚠ Warning**
Avoid using in a place where noise (electromagnetic wave and surge) is generated. It may cause failure or damage to the product. Take measures to prevent noise at source and avoid power and signal lines from coming into close contact.
- 2. Do not allow foreign matter, workpiece or tool to enter the ionizer nozzle.**
There is an emitter inside the nozzle. If the emitter gets in contact with metallic workpieces or tools, electrical shock may cause injury. If emitter is damaged, it may interfere with the specified function and performance, and may also cause operation failure and accident.
- 3. When the dust collector is operating, air is discharged vigorously from the exhaust port.**
Prevent exhausted air from contacting people or objects Piping (I.D. 32mm) or dust collecting bag must be connected to the exhaust port.

Wiring and Piping

- ⚠ Warning**
1. Power supply required to the product is 24 VDC and 1A.
When power is supplied to the product without using the exclusive AC adapter, make sure to use a stabilization power supply and connect wiring to the DC plug that is provided with the product as an accessory.
- 2. D-class ground connection (ground with a resistance of less than 100Ω) MUST be used to the product.**
Without grounding, the product will not provide the designed performance.
- 3. For air piping, use SMC tubing of diameter ø8(ZVB20), ø10(ZVB40) or equivalent.**
- 4. It is recommended to use supply air which purity class is 2:4:3 2:5:3 2:6:3 of ISO8573-1:2010 (JIS B8392-1:2012) or higher. The air containing mist or dust will cause the performance to decrease and shorten the maintenance cycle. Install a dryer (IDF series), air filter (AF/AFF series), and/or mist separator (AFM/AM series) to the upstream of the product to obtain clean compressed air.**
- 5. Air connections should only be made with the pressure supply turned off.**
Flush the system before piping to prevent foreign matter from entering inside the product.

Environment

- ⚠ Warning**
1. Operate in an environment in the specified ambient temperature and fluid temperature ranges (0 to 55°C).
Avoid sudden temperature changes even within specified temperature range, as it may cause condensation.
- 2. Do not use this product in an enclosed space. This product utilizes the corona discharge phenomenon.**
Although the amount is very small, Ozone and NOx are generated. Ozone condensation can increase if used in an enclosed space, which can affect the human body, so ventilation is necessary. Even when the room is ventilated, operating more than one product in a small space may increase the ozone density.

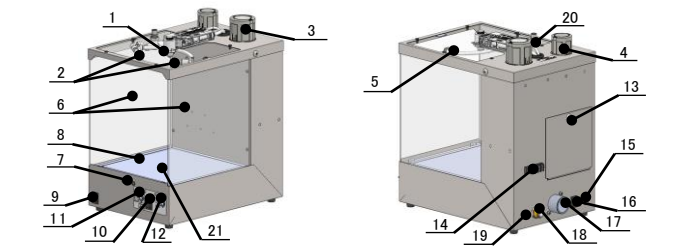
Maintenance

- ⚠ Warning**
1. Perform maintenance regularly and clean the emitters. (every 2 weeks suggested).
The maintenance must be performed by an operator who has sufficient knowledge and experience. If the ionizer is used for a long time and there is dust on the electrodes, performance of the product will be reduced. When the NDL LED (maintenance signal LED) is ON, the emitter will need to be cleaned. If the emitter gets worn and static electricity elimination ability does not recover even after cleaning, replace the emitter.
- 2. Before starting inspection, cleaning or replacing the emitter, or replacing the valves, be sure to turn OFF the power and air supply to the main body.**
If the emitter is touched while the product is energized, this may cause an electric shock or accident.

Handling

- ⚠ Caution**
1. Do not drop, hit or apply excessive shock to the product.
Even if the body is not damaged, the internal components may be damaged, leading to a malfunction.

Construction



No.	Description	Remarks	No.	Description	Remarks
1	Ionizer	With diffusion nozzle	11	Operation time set switch	Operating time can be set
2	Additional air flow nozzle	Nozzle diameter ø1.0	12	Additional air flow pulse operation time set switch	Pulse selection
3	Regulator for adjusting supply pressure to the dust collector	With pressure gauge	13	Cover for valve maintenance	
4	Regulator for adjusting supply pressure for additional air flow	With pressure gauge	14	Terminal block	
5	Top cover assembly	Static electricity restriction grade (PET)	15	AC adapter (DC plug) entry	
6	Side cover	Static electricity restriction grade (PET)	16	ON/OFF switch for dust collector	
7	Photoelectric sensor		17	Exhaust port of the dust collector	
8	Mesh	Detachable	18	Compressed air supply port	ZVB20: ø8, ZVB40: ø10
9	Power supply switch		19	Grounding screw	
10	Timer change-over switch		20	Restrictor (optional)	With flow adjustment restrictor for use with additional air flow option
			21	Suction slope	

Operation Method

- Turn ON the main power supply switch and the dust collector switch after confirming safety guidelines are met.
Make sure the exhaust port is directed away from objects or operators. The dust collector discharges adsorbed substances from the exhaust port at a high speed.
- Supply pressure of 0.4 to 0.8 MPa (recommended values) to the piping that is connected (by opening the valve or regulator prepared by user). Adjust the pressure of the regulator connected to the air flow adjustment to be within the range of 0.1 to 0.3MPa Adjust the pressure of the regulator connected to the dust collector to be within the range 0.2 to 0.4 MPa (ZVB20) and 0.3 to 0.5 MPa (ZVB40).
- Operating time setting
[When performing continuous operation] *1
Set the timer change-over switch to "OFF" (continuous).
*1 During detection of workpiece (worker's hand) by photoelectric sensor or when you want to continue operation while the external switch is set to ON.
[When performing timer operation]
Set the timer change-over switch to "ON" and set the operation time set switch to any of "2s", "5s", and "10s".
- Set the additional air flow pulse operation time with the Additional air flow pulse operation time set switch. The operation time can be selected from continuous (no pulse), 50ms, or 100ms.
- Check the actual static and dust eliminating condition of the workpiece.
When the additional air flow is too strong, adjust the pressure or air flow rate by rotating the handle of the regulator connected to the air flow adjustment or the additional air flow adjusting restrictor (option).
- When not using the dust collector, turn the switch off.

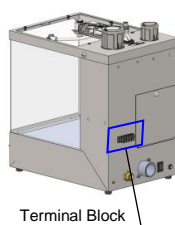
Ionizer Functions

Symbol	Color	Description	Contents
PWR	Green	Power supply indicator	LED is ON when the power supply is ON. LED flashes when the power supply or CPU is abnormal.
ION/HV	Green/Red	Ion discharge / Incorrect high voltage LED	Green LED is ON: discharge in progress Red LED is ON: high voltage error Red LED flashing: CPU error
NDL	Green	Emitter maintenance indicator	LED is ON: ion generation decreased LED flashing: CPU error

Alarm name	Contents	How to release error
Power supply failure	When power supply which is connected to the product is not within the range of 24 V ±10%, the abnormal signal will be turned OFF (ON when it is normal) and discharge signal will be turned OFF. and the PWR LED (green) will flash to indicate the error. When the failure occurs, ion generation will be stopped.	To resolve the error, reset the product automatically by connecting a power supply which provides a power supply voltage of 24 V ±10%.
Incorrect high voltage	When incorrect electric discharge is generated during operation, the abnormal signal will be turned OFF (ON when it is normal) and the ION/HV LED (red) will light up to indicate the error. When the failure occurs, ion generation will be stopped.	The incorrect electric discharge could be caused by condensation or dust on the emitters. To resolve the error, input the reset signal or supply power again after remedying the cause of the incorrect electric discharge.
CPU ALM	When CPU makes an abnormal operation due to noise or other reasons, the abnormal signal will be turned OFF (ON when it is normal), and the PWR (green), ION-HV (red) and NDL (green) LED will flash to indicate the error. When the failure occurs, ion generation will be stopped.	To prevent noise, perform the following actions and take countermeasures. 1. Keep the product away from sources of noise. 2. Route the power line and cable of the product separately. 3. Install a noise filter to the power supply of the product. To resolve the error, supply power again after fixing the cause of the error.
Maintenance warning	The maintenance signal is ON when static electricity neutralization performance has decreased due to contamination, wear or damage to the emitters. The NDL LED (green) will turn ON to indicate that cleaning or replacement of the emitters needs to be performed. The product continues operation even when the maintenance warning has been generated.	When emitters are contaminated, the error can be solved by cleaning them. However, when they are worn out or damaged, it is necessary to replace the emitter assembly. To resolve the error, input the discharge stop signal or supply power again after remedying the cause of the error.

Terminal Block

For specifications without photoelectric sensor, use the product by connecting it to an external switch prepared by yourself or connecting a photoelectric sensor to the terminal block. By connecting a load (lamp, PLC, etc.) to the terminal block, it is possible to output the signal *1 during operation of ZVB.



Terminal Block	Function	Terminal No.	Description of signal
1 2 3 4	Input	2	Input (NPN input)
		4	0V
1 2 3 4	Output	1	Output (NPN output)*2
		3	24V

Connection method

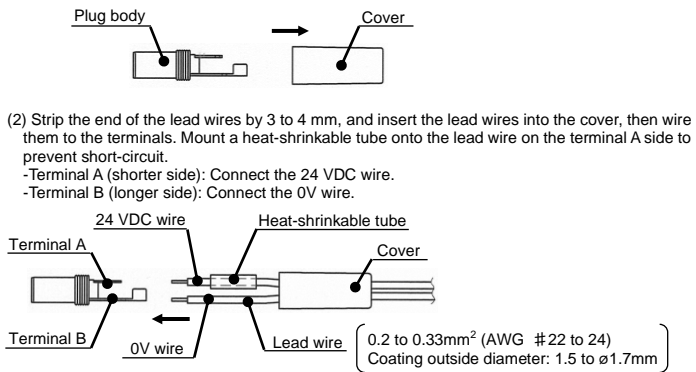
Connected equipment	Connection method
External switch	Connect this to No. 2 and No. 4. (Short-circuiting them starts the operation.)
Photoelectric sensor (NPN type)	Cover the 24V wire, 0V wire, and output wire of the photoelectric sensor to No. 3, No. 4, and No. 2, respectively.
Load (lamp, PLC, etc.)	Connect this to No. 1 and No. 3

- *1 This signal shows that the main circuit is in the ON state, and does not show the operation condition of the ionizer.
- *2 The maximum load current is 0.2 A.

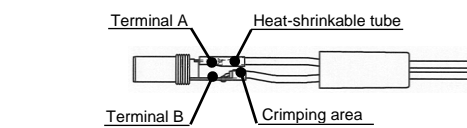
Wiring of the DC plug

If the AC adapter is not selected as an option, wire the attached DC plug with the procedure below.

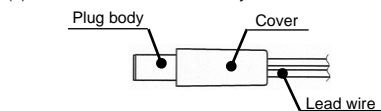
- Unscrew the cover from the DC plug body.



- Solder the wires and bend and clamp the crimping area of terminal B with pliers. Protect the terminal A side with a heat-shrinkable tube.



- Mount the cover onto the body and confirm that the lead wires are correctly connected.



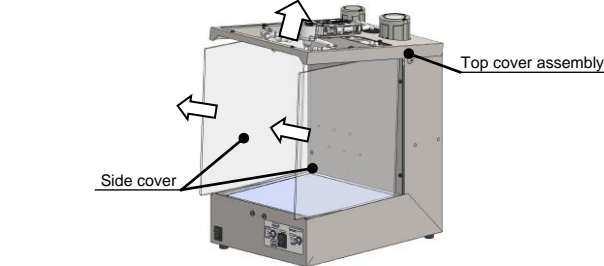
Removal of side cover

Both sides or one side of the side covers can be removed from the desktop duster box. By removing the side cover(s), it is possible to mount the desktop duster box on the conveyor line and place workpieces from the side of the body. However, the amount of dust scattered outside will be larger than usual due to an increase in the opening area.

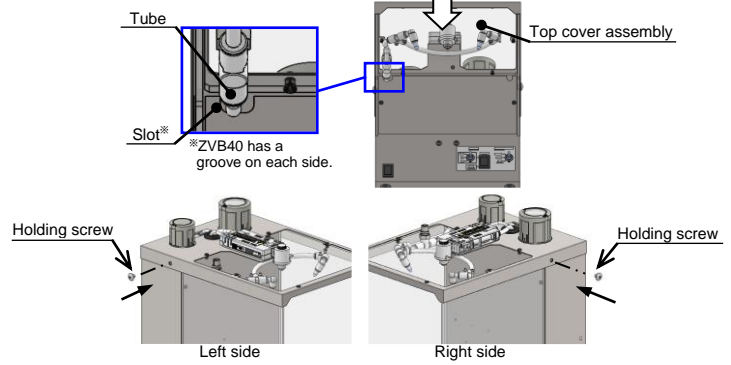
- Remove the holding screws (2pcs.) on the side of the desktop duster box.



- Slide the side covers while lifting the top cover assembly as shown in the figure below. The piping and wiring of the top cover assembly and body are connected, so do not lift the top cover more than required.



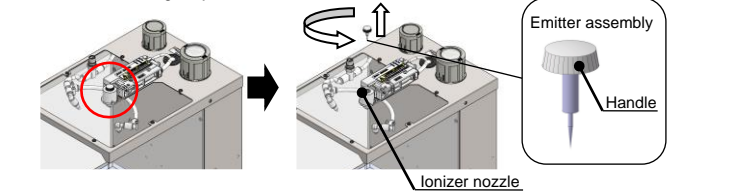
- Return the top cover assembly to the original position while placing the position of the tube to the slot in the body. Tighten the holding screws with a 1.50±0.15Nm of the tightening torque while holding the top cover assembly horizontal.



Maintenance of Ionizer

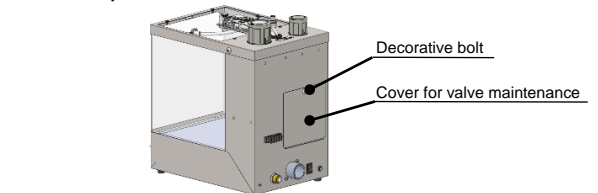
- Emitter cleaning
 - Rotate the handle of the emitter assembly (part No. IZN10-NT-X325) anti-clockwise by hand and remove it.
 - Ionizer emitter cleaning kit: The emitter is cleaned with IZS30-M2.
 - Insert the emitter assembly back to the port using caution not to damage the end of the emitter, and screw it in. Note
- Replacement of emitter
 - Rotate the handle of the emitter assembly by hand and remove it.
 - Replace it with a new emitter assembly.
 - Insert the emitter assembly back to the port using caution not to damage the end of the emitter, and screw it in. Note

- Notes:
- Screw in the emitter assembly completely until the handle of the emitter assembly gets into close contact with the mounting surface of the body.
 - If the ionizer nozzle touches the inner surface of the hole on the desktop duster box body after mounting the electrode assembly, adjust the angle of the ionizer nozzle not to touch it.
 - Use caution not to get injured with the end of the emitter.

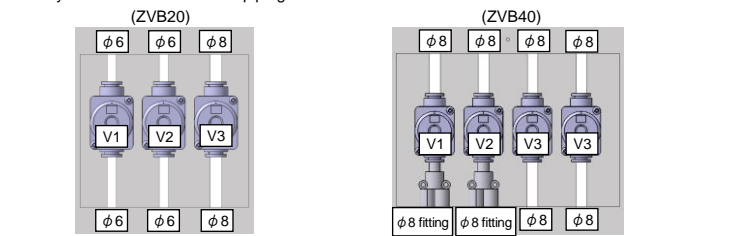


Valve Maintenance

- Rotate the decorative bolt which holds the valve maintenance cover in the counter-clockwise direction by hand to remove the cover.



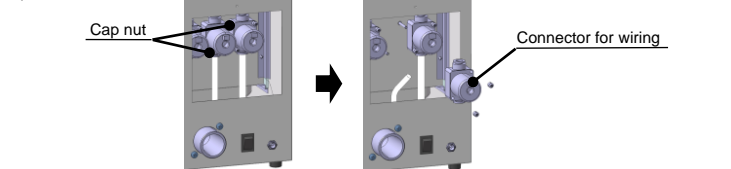
- Layout of the valves and the piping are shown below.



- V1: VXJ1120-C6-5MO-X3 (for ionizer)
 V2: VXJ1120-C6-5MO-X3 (for additional air blow)
 V3: VXJ1120-C8-5MO-X3 (for dust collection)
- V1: VXJ1120-C8-5MO-X3 (for ionizer)
 V2: VXJ1120-C8-5MO-X3 (for additional air blow)
 V3: VXJ1120-C8-5MO-X3 (for dust collection, 2pcs.)

- Remove the cap nut that holds the valve to be replaced. (Recommend using an M3 Phillips head screwdriver with magnet.)
Disconnect the piping on top and bottom of the valves and remove the connector for wiring. Replace the valves with new ones. Note

- Notes:
- Mounting orientation of the valves is specified. Make sure that the connector for wiring should be on the upper side of the valve.
 - Use a magnet driver for the replacement so that the cap nut does not fall into the product.



- Reassemble the parts such as valve and cover in the reverse order of the removal *1 to *3.

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