



Operation Manual

PRODUCT NAME

Ionizer Bar Type

MODEL / Series / Product Number

IZS51 series

SMC Corporation

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Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of “**Caution**,” “**Warning**” or “**Danger**.” They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)^{*1)}, and other safety regulations.

*1) ISO 4414: Pneumatic fluid power - General rules and safety requirements for systems and their components
ISO 4413: Hydraulic fluid power - General rules and safety requirements for systems and their components
IEC 60204-1: Safety of machinery - Electrical equipment of machines - Part 1: General requirements
ISO 10218-1: Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots
etc.



Danger

Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.



Warning

Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.



Caution

Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.



Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.

The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Our products cannot be used beyond their specifications. Our products are not developed, designed, and manufactured to be used under the following conditions or environments. Use under such conditions or environments is not covered.

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Use for nuclear power, railways, aviation, space equipment, ships, vehicles, military application, equipment affecting human life, body, and property, fuel equipment, entertainment equipment, emergency shut-off circuits, press clutches, brake circuits, safety equipment, etc., and use for applications that do not conform to standard specifications such as catalogs and operation manuals.
3. Use for interlock circuits, except for use with double interlock such as installing a mechanical protection function in case of failure. Please periodically inspect the product to confirm that the product is operating properly.



Safety Instructions

Caution

We develop, design, and manufacture our products to be used for automatic control equipment, and provide them for peaceful use in manufacturing industries.

Use in non-manufacturing industries is not covered.

Products we manufacture and sell cannot be used for the purpose of transactions or certification specified in the Measurement Act.

The new Measurement Act prohibits use of any unit other than SI units in Japan.

Limited warranty and Disclaimer/Compliance Requirements

The product used is subject to the following “Limited warranty and Disclaimer” and “Compliance Requirements”. Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.*2)
Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.
This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

***2) Vacuum pads are excluded from this 1 year warranty.**

A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.

Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.



Limitation of Use

Selection

Warning

- 1) **This product is intended for use in general factory automation equipment.**
 - If considering using the product for other applications (especially those indicated in (4) on page 3), please consult SMC beforehand.
- 2) **Use within the specified voltage and temperature range.**
 - Operation with a voltage other than that specified can cause malfunction, damage to the product, electric shock or fire.
- 3) **Use clean compressed air as fluid. (Air quality Class 2.4.3, 2.5.3, 2.6.3 or higher according to ISO 8573-1: 2012 is recommended.)**
 - Never use flammable gas or an explosive gas as a fluid and never use this product in the presence of such gases.
 - This may lead to fire or explosion. Please contact SMC if using for fluids other than compressed air.
- 4) **This product is not designed to be explosion proof.**
 - Never use in an atmosphere of potentially explosive dust, flammable gas or explosive gas. Fire or an explosion can result.

Caution

- 5) **Clean room specification is not available.**
 - When using in a clean room environment, confirm the required cleanliness before use.
 - Fine particles are generated due to wear of emitters and motor sliding during operation.

Mounting

Warning

- 1) **Reserve an enough space for maintenance and wiring.**
 - Please take into consideration that the connectors, need enough space for it to be easily attached/detached.
 - To avoid unreasonable stress applied to the connector mounting parts, bending of the cable should be more than the minimum bending radius.
 - If the cable is bent in an acute angle or load is applied to the cable repeatedly, it may cause malfunction, wire damage or fire.
 - Minimum bending radius: Power supply cable (for NPN/PNP type): IZS51-CP: 50mm
 - Power supply cable (for IO-Link type): IZS51-CQ: 50mm
 - Communication cable: IZS51-CE: 40mm, Relay cable: IZS51-CF: 50mm
- Note: This is an allowable bend radius at 20°C. Bend radius should be larger at lower than 20°C.
- 2) **Mount to the flat surface and do not apply impact load or excessive external force.**
 - Mounting on an uneven surface will apply excessive force to the housing and bracket, which may lead to damage or failure.
 - Do not drop or apply excessive shock. Otherwise, damage or an accident may occur.
- 3) **Install the product so that the product does not have an excessive deflection.**
 - For a bar length of 800mm or longer, support the product at both ends and in the middle by using brackets (IZS51-BM1 or IZS51-BM2). If the product is held only at both ends, self-weight of the product causes deflection, resulting in damage or deformation to the product.
- 4) **Avoid using in a place where noise (electromagnetic wave and surge) is generated.**
 - If the product is used in an environment where noise is generated, it may lead to malfunction or deterioration or damage of the internal elements.
 - When the presence of noise is suspected, take preventive measures against noise and avoid the crossing wires such as power line and high voltage line.

5) Tighten the screws to the specified torque.

- If the screws are tightened in excess of the specified torque range, it may damage the mounting screws or mounted areas.
- If the tightening torque is insufficient, the mounting screws and brackets may become loose.

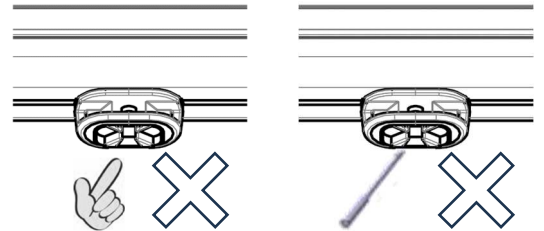
6) Do not directly touch the emitters.

- Do not directly touch the emitter with your finger. If the needle sticks to your finger, or electrical shock makes an instantaneous rapid body motion to escape from the shock, causing injury.
- If emitter or cartridge is damaged by tools, etc., it may interfere with the specified function and performance, and may also cause operation failure and accident.



High voltage caution

The emitter carries high voltage. If foreign matter is inserted or human body touches the emitter, electrical shock or instantaneous reaction of body to escape.



7) Do not affix any tape or labels to the product.

- If the tape or label contains any conductive adhesive or reflective paint, a dielectric phenomenon may occur due to ions arising from such substances, resulting in electrostatic charging or electric leakage, causing malfunction, breakage, electric shock or fire.

8) Be sure to remove power supply and air supply to the lonizer before starting the product installation.

- If installation or adjustment is performed being supplied with power, electric shock, failure or injury can result.

9) Do not damage the cable or apply a heavy object or pinch the cable. Avoid repeatedly bending or stretching the cable.

- It may cause an electric shock, fire, or breaking of wire.

10) Do not carry this product by holding its cables.

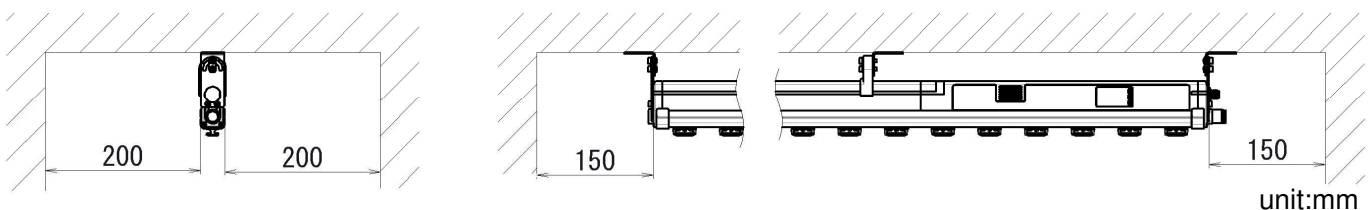
- It may cause an injury or damage to the product.

11) This product may cause interference if used in residential premises.

! Caution

1) When installing this product, provide the space shown in the figure below from a wall or structure.

- If there are electrically conductive objects such as walls or structures close to the ionizer, generated ions may not reach the target object effectively or product failure or electric shock can result due to dielectric or short-circuit.

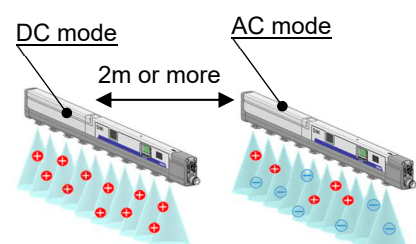


2) After installation, verify the performance of this product.

- The performance of the product varies depending on the surrounding installation and operating conditions. After installation, verify the performance of this product.

3) When installing lonizers which operate in DC mode (one polarity, positive or negative) with IZS51 close together, they should be positioned at least two meters away from each other.

- When IZS51 which operates in AC close to the lonizer which operates in DC mode, separate them by at least two meters. The offset voltage (ion balance) may not be adjusted by the built-in sensor due to the ions discharged from the lonizer which operates in DC mode.



- 4) **When the build-in sensor is on and cannot be adjusted ion balance to zero by pressing the button, turn the sensor off.**
 - The sensor may malfunction if there is an object with too much charge around it.
- 5) **Use specified brackets for fixing.**
 - If use a bracket other than specified bracket, the functions of this product may not operate normally.

Electrical connection / Piping

Warning

- 1) **Before wiring, ensure that the power supply capacity meets the specification and that the voltage is within the specification. Product damage or malfunction can result.**
- 2) **To maintain product performance, the power supply should be UL Class 2 certified by National Electric Code (NEC) or evaluated as a limited power source according to UL60950.**
- 3) **To maintain the product performance, ground the product with an earth ground cable with a resistance of 100 Ω or less. If the product is not grounded, it is not possible to secure the performance and may lead to product failure or malfunction.**
- 4) **Wiring (including insertion and removal of the power supply connector) should never be carried out with the power supply ON. Otherwise, an electrical shock or accident may occur.**
- 5) **Use specified cable for connecting this product. Do not disassemble or retrofit them. Disassembling or modifying the product may cause product, electric shock or fire. The product will not be guaranteed if it is disassembled and/or modified.**
- 6) **Ensure the safety of wiring and surrounding conditions before supplying power.**
- 7) **Do not connect or disconnect the connectors (including power source) while the power is supplied. Failure to follow this procedure may cause product malfunction.**
- 8) **If the power and high voltage cables are routed together, the product may malfunction due to noise. Route the Ionizer wires separately.**
- 9) **Confirm that the wiring is correct before operation. Incorrect wiring will lead to product damage or malfunction.**
- 10) **Flush the piping before connecting. Before piping this product, exercise caution to prevent particles, water drops, or oil contents from entering the piping.**

Operating / Storage Environment

Warning

- 1) **Operate the product in the specified ambient temperature range.**
 - Operating ambient temp. range: Ionizer 0 to 40°C, Remote controller 0 to 45°C, AC adapter 0 to 40°C.
 - Do not use the product in locations where the temperature may change suddenly even if the ambient temperature range is within the specified limits, resulting in condensation.
 - Large difference between the ambient temperature and the fluid temperature may cause condensation inside the piping or the ionizer housing. If the temperature difference is large, use a temperature controller or similar device to reduce the temperature difference.
- 2) **Do not use this product in an enclosed space.**
 - This product utilizes the corona discharge phenomenon. Do not use the product in an enclosed space as ozone and nitrogen oxides exist, even though in marginal quantities.
- 3) **Environments to avoid**
 - Never use or store under the following conditions. These may cause an electric shock, fire, etc.
 - a. Use in the environment which ambient temperature is out of the product specification.
 - b. Use in the environment which ambient humidity is out of the product specification.
 - c. Environment where abrupt temperature changes may cause condensation.
 - d. Environment where corrosive gas, flammable gas or other volatile flammable substances are stored.
 - e. Environment where the product may be exposed to conductive powder such as iron powder or dust, oil mist, salt, organic solvent, machining chips, particles or cutting oil (including water and any liquids), etc.
 - f. Paths of direct air flow, such as air conditioners.
 - g. Enclosed or poorly ventilated environment
 - h. Locations which are exposed to direct sunlight or heat radiation.
 - i. Areas where strong electromagnetic noise is generated, such as strong electrical and magnetic fields or supply voltage spikes.
 - j. Environment where static electricity is generated to the product.
 - k. Locations where strong high frequency is generated.

- l. Locations which are subject to potential lightning strikes.
- m. In an area where the product may receive direct impact or vibration.
- n. Areas where the product may be subjected to forces or weight that could cause physical deformation.

4) Ionizer, Remote controller and AC adapter are not resistant to lightening surge.

Maintenance / Check

Warning

1) Perform maintenance regularly and clean the emitters.

- Check regularly that the product is not operating with undetected failures.
- The maintenance must be carried out by an operator who has sufficient knowledge and experience.
- If the product is used for an extended period with dust present on the emitters, the product performance will be reduced.
- Maintenance detection function is installed to this product. When the emitter contamination is detected, clean the emitter.
- In cases where the maintenance detection function is not used on this product is used, perform neutralizing performance test and set maintenance cycle for periodic cleaning.
- Emitter contamination level is different depending on the installation environment.
- If the performance is not recovered after cleaning, it is possible that emitters are worn. Replace the emitter cartridge.

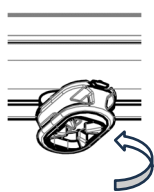
2) Be sure to remove power supply and air supply to the Ionizer before cleaning the emitter or replacing the emitter cartridge.

- Never touch the emitter with the power supplied to the ionizer. Electric shock may cause injury.
- If the emitter cartridge is removed while air is supplied, the emitter cartridge jumps out by compressed air. Replace the emitter cartridge after discharging the supply air.
- If emitter cartridges are not securely mounted to the ionizer body, they may eject or release when air is supplied to the product.
- Securely mount or remove the emitter cartridges referencing the instructions shown below.
- Securely mount or remove the emitter cartridges with hands and do not use tools.

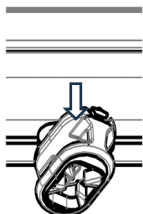


High voltage caution

- This product contains a high voltage generation circuit. When performing maintenance inspection, be sure to confirm that the power supply to the ionizer is turned off.
- Never disassemble or modify the product, as this can cause loss of product functionality, and there is also a risk of electric shock and earth leakage.

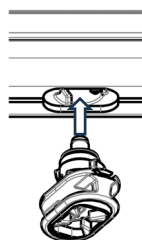


(1) Rotate the cartridge 60° in the counter-clockwise direction.

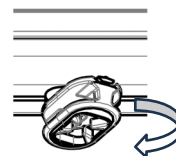


(2) Pull to remove.

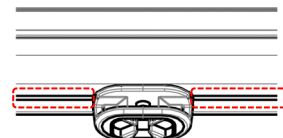
Remove of the emitter cartridge



(1) Insert the emitter cartridge.



(2) Rotate the cartridge 60° in the clockwise direction until it is parallel to the groove on the bottom of the ionizer, then secure it in place.



Mounting of the emitter cartridge

3) Do not disassemble or modify the product.

- Disassembling or modifying the product may cause product, electric shock or fire. The product will not be guaranteed if it is disassembled and/or modified.

4) Do not operate the product with wet hands.

- Never operate the product with wet hands. It may cause electric shock or other accidents.

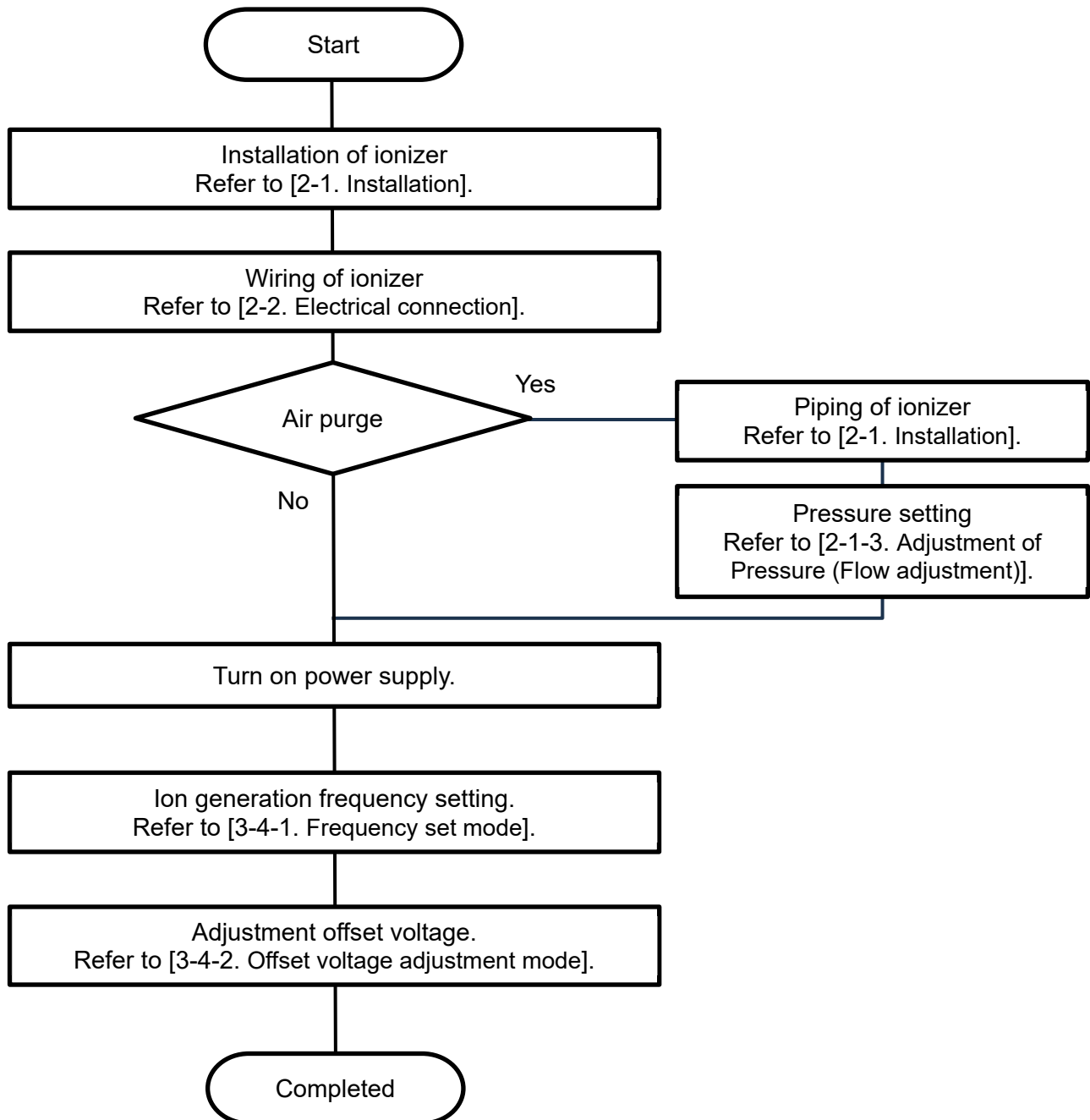
Handling

Caution

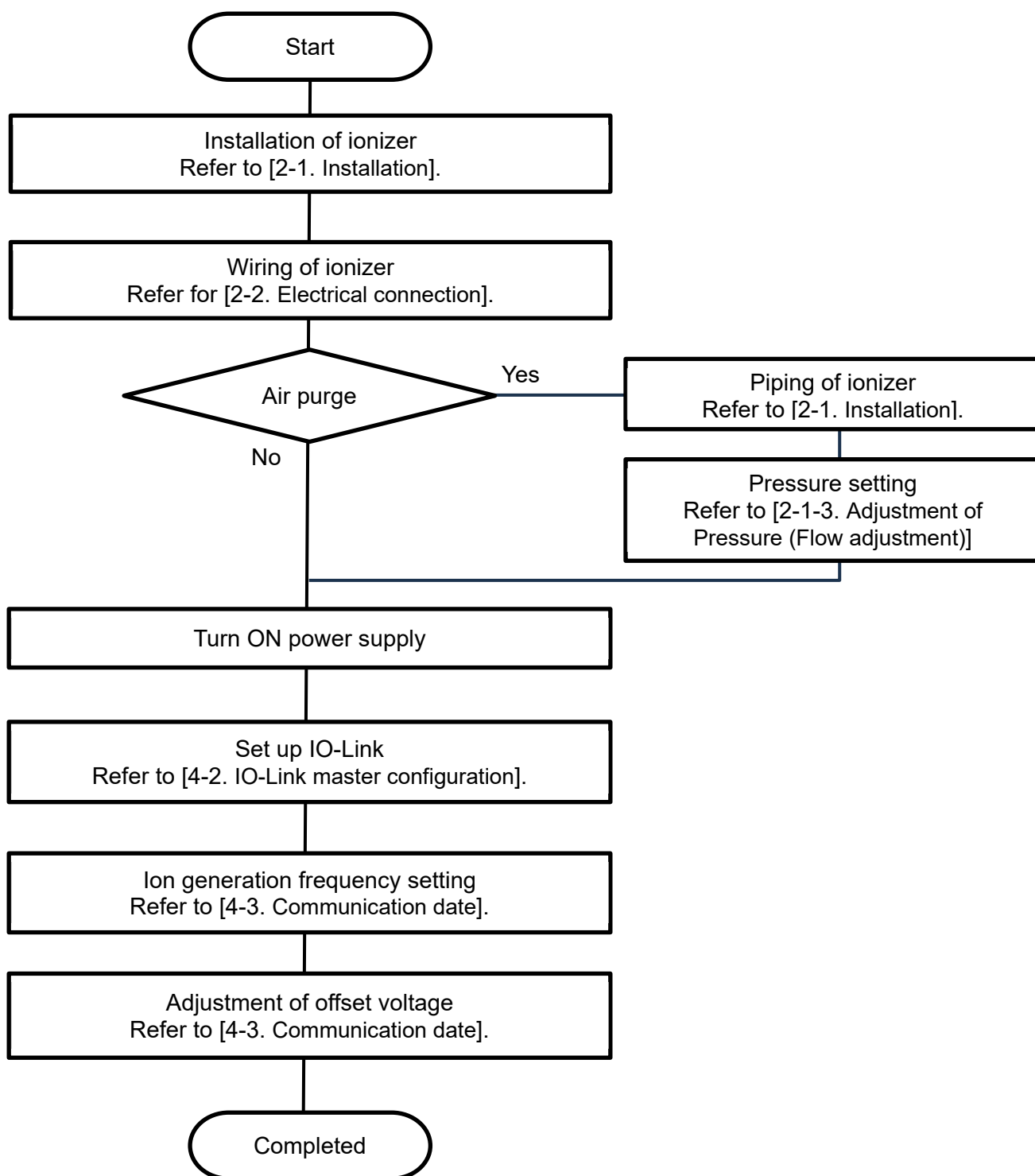
- 1) Do not apply excessive external force or shock (100m/s² or more) to the product.**
 - Even if there are no problems with the appearance of the Ionizer, the damage of the internal components may cause malfunction.
- 2) Hold the ends and the middle of the product so that moment load is not applied.**
 - Handling the product by holding either end of the product may cause deformation or damage to the product.
- 3) Power cable must be connected and disconnected by hand.**
 - Open and close too much may damage the drain cock.
 - To remove the connector, loosen the lock nut by hand and pull it straight out.
- 4) If smoking, fire or smell occurs in the product, immediately shut off the power supply.**
- 5) In model with valve unit on both side of this product, must be supplied air from piping ports on both sides.**
 - Plugs one side, may cause malfunction or damage to the product.

1. Procedures to Operation

1-1. Flow chart to operation for IZS51-□□N (NPN type), IZS51-□□P (PNP type)



1-2. Flow chart to operation for IZS51-□□L (IO-Link type)



2. Installation and Electrical Connection

- The performance of the product varies depending on the surrounding installation and operating conditions. It is recommended to investigate in advance any processes and parts where static electricity disturbances occur. Verify that the required conditions have been met in order to effectively remove static electricity before installation.
- After installation, verify the performance of this product.

2-1. Installation

2-1-1. Precautions for installation

- Be sure to stop power supply to the product before starting the product installation.
- Do not affix any tape or labels to the product. Dielectric phenomenon may occur due to ions arising from such substances, resulting in electrostatic charging or electric leakage.

2-1-2. Selection of piping port size

- Refer to the Table1. Recommended piping port size and connect piping either to one side or both sides depending on the bar length or one-touch fittings.
- In the model with valve unit, air is supplied from piping port of valve unit, and the opposite side is plugged.
- For some bar lengths, valve unit is installed to both sides of the bar. If a valve unit is installed to both sides of the bar, supply air from both piping ports.
- If a tube is used which is thicker than the recommended tube, neutralization performance will be deteriorated due to a shortage of air flow.

Outline for piping type


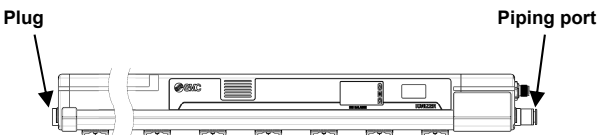
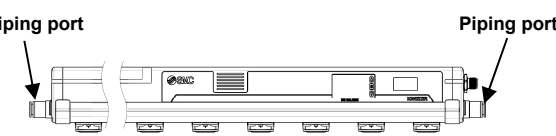

Type	Without valve unit	With valve unit
One side		
Both sides		Note) Some bar length only 

Table1. Recommended piping port size

Without valve unit: IZS51-□□□□□

Note) Refer to the table below for selecting One-touch fitting when Piping type is with piping on both sides (blank symbol) or with piping only on one side (symbol "D"). Refer to [How to order] for details selecting Piping type.

- Explanatory note
- : Selectable when the piping type is with piping on both sides or with piping on one side.
 - : Selectable when the piping type is only with piping on both sides.
 - : Unselectable piping port size for Bar length.

IZS51-□T(C)□: High flow cartridge

Symbol	Applicable tube O.D.	350	380	440	560	620	800	1100	1280	1580	1880	2300	2480
4	φ4	●	●	●	-	-	-	-	-	-	-	-	-
6	φ6	○	○	○	○	○	○	○	○	○	○	○	○
8	φ8	○	○	○	○	○	○	○	○	○	○	○	○
A	φ10	○	○	○	○	○	○	○	○	○	○	○	○
5	φ3/16"	○	○	○	○	○	○	○	○	○	○	○	○
7	φ1/4"	○	○	○	○	○	○	○	○	○	○	○	○
9	φ5/16"	○	○	○	○	○	○	○	○	○	○	○	○
B	φ3/8"	○	○	○	○	○	○	○	○	○	○	○	○

IZS51-□J(K)□: Middle flow cartridge

Symbol	Applicable tube O.D.	350	380	440	560	620	800	1100	1280	1580	1880	2300	2480
4	φ4	○	○	○	○	○	○	○	○	○	○	○	○
6	φ6	○	○	○	○	○	○	○	○	○	○	○	○
8	φ8	○	○	○	○	○	○	○	○	○	○	○	○
A	φ10	○	○	○	○	○	○	○	○	○	○	○	○
5	φ3/16"	○	○	○	○	○	○	○	○	○	○	○	○
7	φ1/4"	○	○	○	○	○	○	○	○	○	○	○	○
9	φ5/16"	○	○	○	○	○	○	○	○	○	○	○	○
B	φ3/8"	○	○	○	○	○	○	○	○	○	○	○	○

IZS51-□V(S)□: Low flow cartridge

Symbol	Applicable tube O.D.	350	380	440	560	620	800	1100	1280	1580	1880	2300	2480
4	φ4	○	○	○	○	○	○	○	○	○	○	○	○
6	φ6	○	○	○	○	○	○	○	○	○	○	○	○
8	φ8	○	○	○	○	○	○	○	○	○	○	○	○
A	φ10	○	○	○	○	○	○	○	○	○	○	○	○
5	φ3/16"	○	○	○	○	○	○	○	○	○	○	○	○
7	φ1/4"	○	○	○	○	○	○	○	○	○	○	○	○
9	φ5/16"	○	○	○	○	○	○	○	○	○	○	○	○
B	φ3/8"	○	○	○	○	○	○	○	○	○	○	○	○

With valve unit: IZS51-□□□□-V

Note) Refer to the table below for selecting One-touch fitting when Piping type is with valve unit (symbol "V"). Refer to [How to order] for details selecting Piping type.

- Explanatory note
- : Valve unit is mounted on the M12 connector side of the ionizer. The opposite side is plugged.
 - : Valve units mounted on both sides of the ionizer. Please supply air from piping ports on both sides.
 - : Unselectable piping port size for Bar length.

IZS51-□T(C)□-V: High flow cartridge

Symbol	Applicable tube O.D.	350	380	440	560	620	800	1100	1280	1580	1880	2300	2480
4	φ4	-	-	-	-	-	-	-	-	-	-	-	-
6	φ6	□	□	□	□	□	□	□	□	□	□	□	□
8	φ8	□	□	□	□	□	□	□	□	□	□	□	□
A	φ10	□	□	□	□	□	□	□	□	□	□	□	□
5	φ3/16"	□	□	□	□	□	□	□	□	□	□	□	□
7	φ1/4"	□	□	□	□	□	□	□	□	□	□	□	□
9	φ5/16"	□	□	□	□	□	□	□	□	□	□	□	□
B	φ3/8"	□	□	□	□	□	□	□	□	□	□	□	□

IZS51-□J(K)□-V: Middle flow cartridge

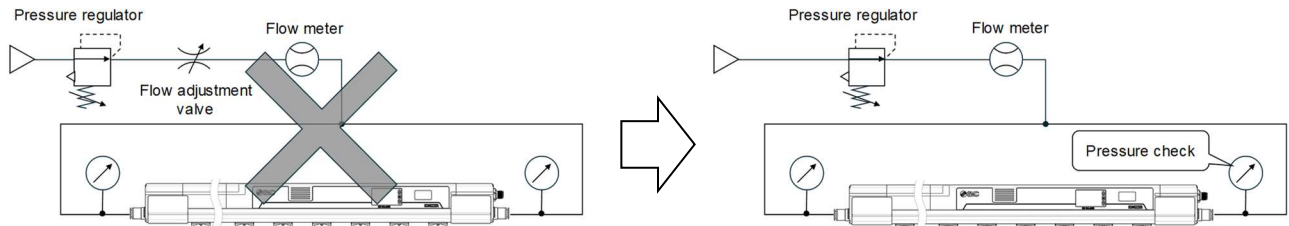
Symbol	Applicable tube O.D.	350	380	440	560	620	800	1100	1280	1580	1880	2300	2480
4	φ4	□	□	□	□	□	□	□	□	□	□	□	□
6	φ6	□	□	□	□	□	□	□	□	□	□	□	□
8	φ8	□	□	□	□	□	□	□	□	□	□	□	□
A	φ10	□	□	□	□	□	□	□	□	□	□	□	□
5	φ3/16"	□	□	□	□	□	□	□	□	□	□	□	□
7	φ1/4"	□	□	□	□	□	□	□	□	□	□	□	□
9	φ5/16"	□	□	□	□	□	□	□	□	□	□	□	□
B	φ3/8"	□	□	□	□	□	□	□	□	□	□	□	□

IZS51-□V(S)□-V: Low flow cartridge

Symbol	Applicable tube O.D.	350	380	440	560	620	800	1100	1280	1580	1880	2300	2480
4	φ4	□	□	□	□	□	□	□	□	□	□	□	□
6	φ6	□	□	□	□	□	□	□	□	□	□	□	□
8	φ8	□	□	□	□	□	□	□	□	□	□	□	□
A	φ10	□	□	□	□	□	□	□	□	□	□	□	□
5	φ3/16"	□	□	□	□	□	□	□	□	□	□	□	□
7	φ1/4"	□	□	□	□	□	□	□	□	□	□	□	□
9	φ5/16"	□	□	□	□	□	□	□	□	□	□	□	□
B	φ3/8"	□	□	□	□	□	□	□	□	□	□	□	□

2-1-3. Adjustment of Pressure (Flow adjustment)

- When air is supplied to the ionizer, adjust the flow using a regulator which should be connected immediately before the ionizer. If a flow adjustment valve is used between the ionizer and regulator, the speed of the flow from the nozzle decreases due to the pressure decrease, decreasing the neutralizing performance.
- Check the pressure around the ionizer air supply port. A pressure difference may be generated between the regulator pressure and the pressure at the ionizer air supply port due to the supply piping length and piping diameter. If a pressure gauge with regulator is used for checking the pressure, use a large capacity regulator, keep the piping as short as possible or make the piping diameter larger.
- When installing a flow meter to the pneumatic circuit supplying air to the ionizer, refer to [5-2. Pressure – Flow rate characteristics] to choose the product type so that the flow of the ionizer does not exceed the flow meter rated flow range. If the ionizer's flow consumption is larger than the rated flow of the selected flow meter, the flow supplied to the ionizer is limited, thus deteriorating neutralization performance.



2-1-4. Distance for installation

- Refer to Table2. Ion generating frequency and distance for installation below for the recommended distance between the ionizer and object to be neutralized.

Table2. Ion generating frequency and distance for installation

Ion generation frequency [Hz]	Distance from the ionizer to the de-ionized workpiece (mm)			
	Without air purge	Without air purge		
		High flow cartridge	Middle flow cartridge	Low flow cartridge
0.1	-	2000	2000	1500
0.3	700 to 800	1900 to 2000	1700 to 2000	1300 to 1500
0.5	700 to 800	1600 to 2000	1400 to 2000	1100 to 1500
0.7	500 to 700	1300 to 2000	1000 to 2000	900 to 1500
1	300 to 500	600 to 2000	400 to 2000	300 to 1500
2 and 3	300 to 400	500 to 2000	350 to 2000	300 to 1500
4 and 5	300 to 400	400 to 2000	300 to 2000	300 to 1500
7 and 8	300 to 350	300 to 2000	250 to 2000	300 to 1400
10	200 to 300	200 to 2000	200 to 2000	200 to 1400
15	200 to 300	100 to 2000	150 to 2000	200 to 1400
20 and 22	150 to 250	50 to 2000	100 to 2000	150 to 1300
27 and 30	50 to 200	50 to 2000	50 to 2000	50 to 1300
33 to 100	50 to 200	50 to 2000	50 to 2000	50 to 1300

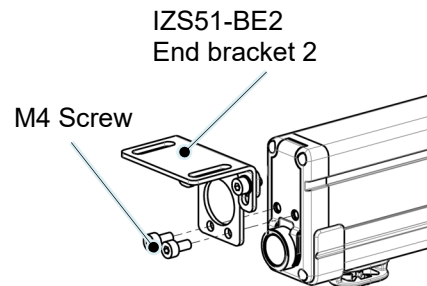
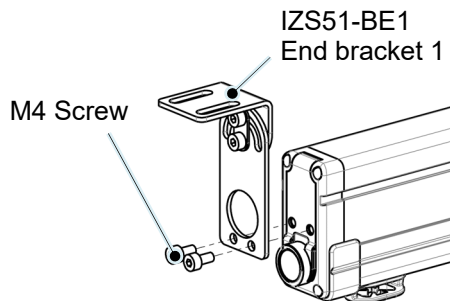
Note) The above mentioned distances are guidelines for installation of the ionizer. Confirm the static neutralization effect before installing.

2-1-5. Installation of bracket

- 2 types of end bracket and intermediate bracket are available. When end bracket 1 is used, use intermediate bracket 1. For end bracket 2, use intermediate bracket 2.

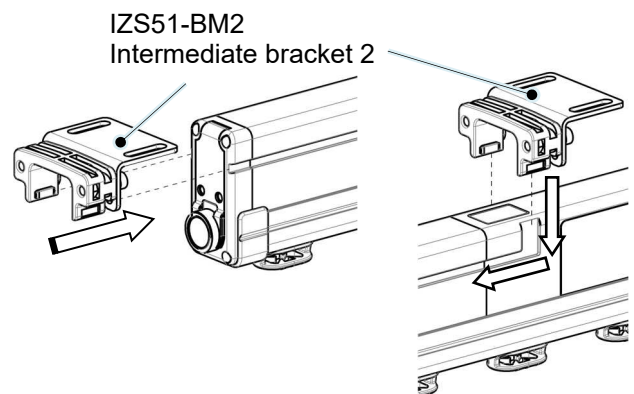
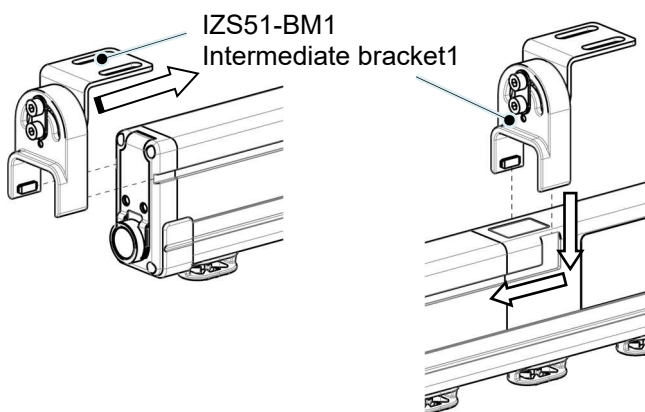
1) End bracket

- Use specified end bracket.
- For mounting, fix the end bracket at both ends of the bar using M4 screws with the specified tightening torque.
Tightening torque: 0.51 to 0.55Nm



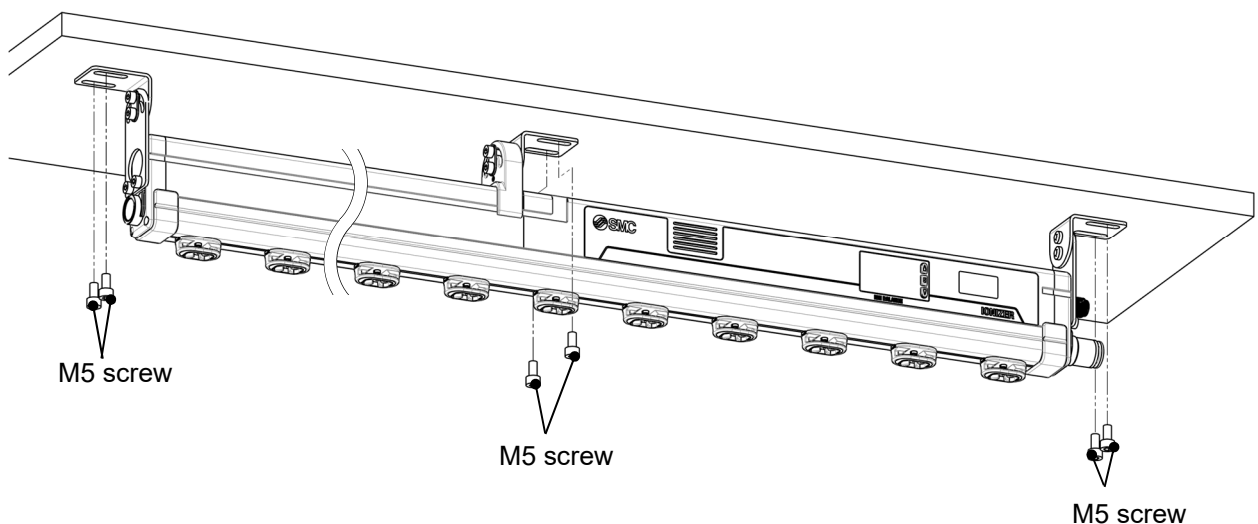
2) Intermediate bracket (for bar length of 800mm or more)

- Match the groove of the product and protrusion of the intermediate bracket and slide the bracket from the end or middle of the bar.
- Intermediate brackets should be mounted at the same intervals.



3) Installation of the Ionizer

- Fix the bracket to the specified position using M5 screws.
- Refer to [7. Outline dimensions] section for details.
(The screws should be prepared by the user. Fixed part of brackets thickness 2mm, recommended mounting screw is M5x8)



4) Mounting angle adjustment

- Adjust the mounting angle of the product for effective neutralization, and fix the product with the rotating set screw.
(M4) at each bracket.

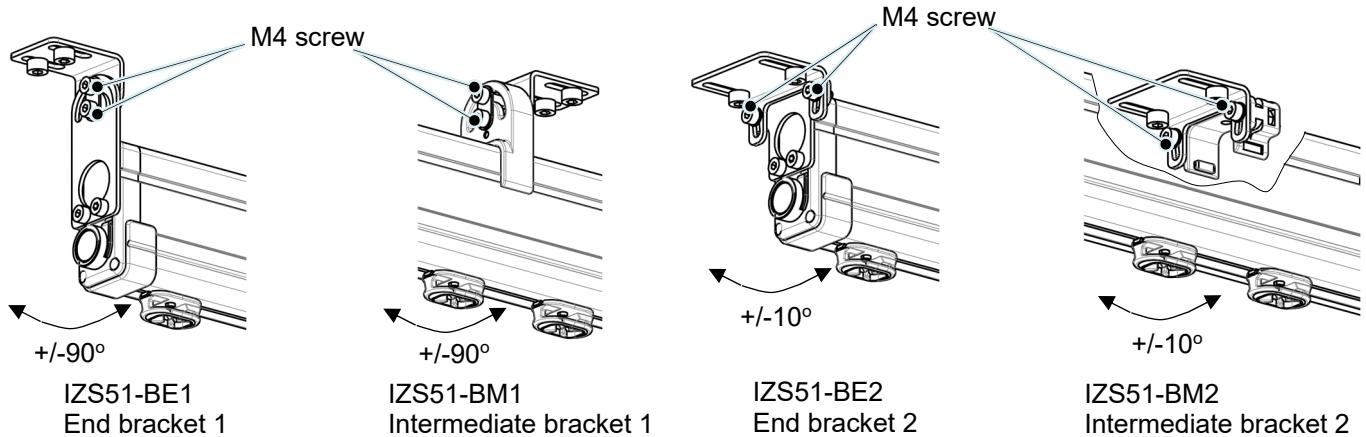
Tightening torque

IZS51-BE1 (End bracket 1): 0.72 to 0.76Nm

IZS51-BE2 (End bracket 2): 0.72 to 0.76Nm

IZS51-BM1 (Intermediate bracket 1): 0.47 to 0.49Nm

IZS51-BM2 (Intermediate bracket 2): 0.47 to 0.49Nm



2-2. Electrical connection

- Wire each cables according to the wiring diagram and table.
- Do not apply excess stress to the mounting part of the connector.
- When the power supply cable is bent, maintain the minimum bend radius.
[Minimum bend radius] Power supply cable (for NPN/PNP type): IZS51-CP 50mm
Power supply cable (for IO-Link type): IZS51-CQ 50mm
Communication cable: IZS51-CE 40mm, Relay cable: IZS51-CF 50mm

2-2-1. Ground the F.G. cable

- Make sure to ground the F.G. cable with a ground resistance of 100Ω or less.
The F.G. cable is used as a reference electric potential for static neutralization (Functional earth). If the F.G. cable is not grounded, an optimal ion balance cannot be obtained, and it may damage this product and power supply.

2-2-2. Ground at DC mode

When an ionizer is used in DC mode, make sure to ground the F.G. cable and DC(-) cable of the input power supply with a resistance of 100 ohms or less. Without grounding the DC(-) cable, the ionizers and/or power supply may be damaged.

2-2-3. Electrical connection: IZS51-□□N (NPN type), IZS51-□□P (PNP type)

[Power supply cable: IZS51-CP]

- For IZS51-□□L (IO-Link type), refer to [2-2. Electrical connection: IZS51-□□L (IO-Link type)].
- This cable supplies power to this product and connect wire of input/output signals between this product and external devices.
- This cable supplies power to this product and external equipment used to control this product.
- Connect the M12 connector of the power supply cable. The connector key code A is used for the power supply connector. Pay attention to the key alignment when connecting them.
- Connect the lead wires according to the wiring diagram. Unused wires should be cut short or insulated using insulation tape.

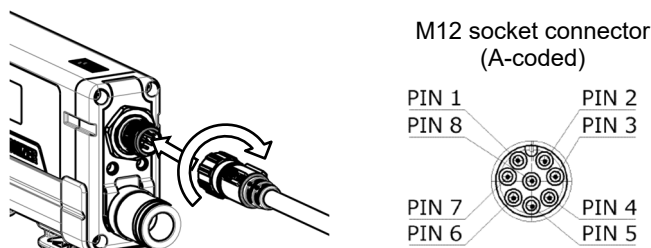
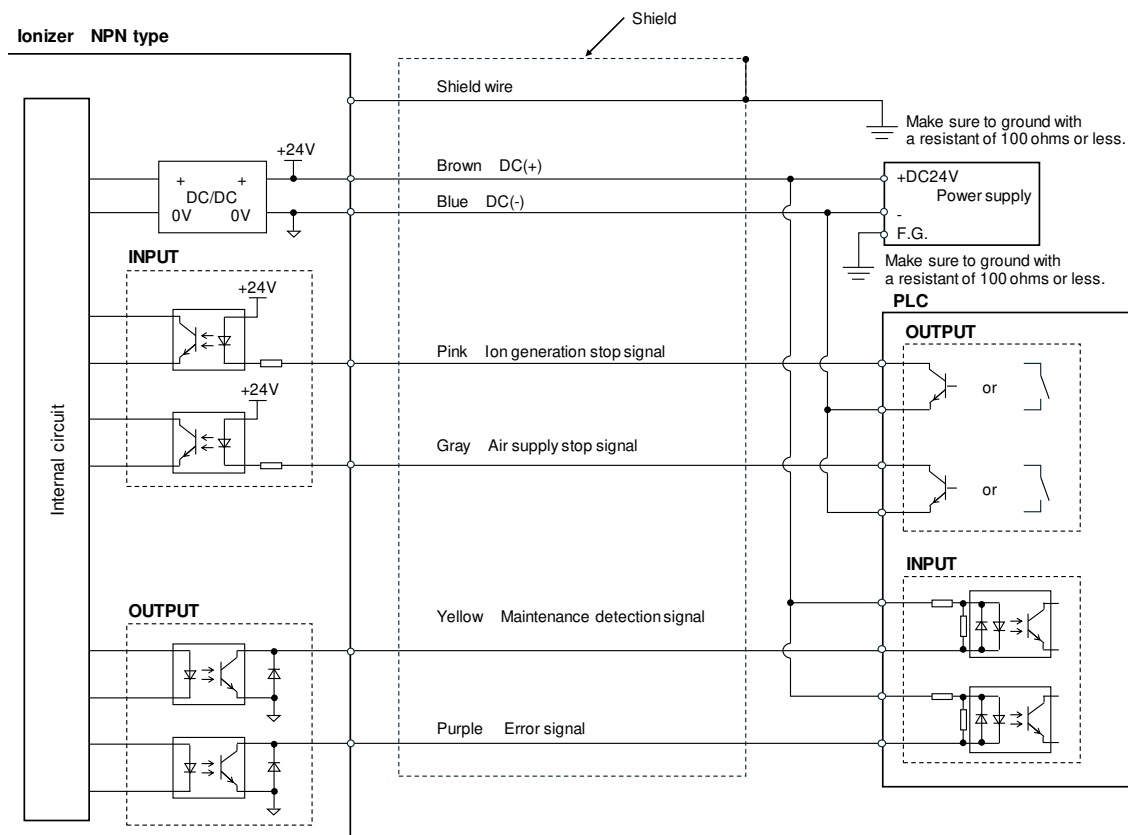


Table 3. Wiring table for power supply cable (IZS51-CP)

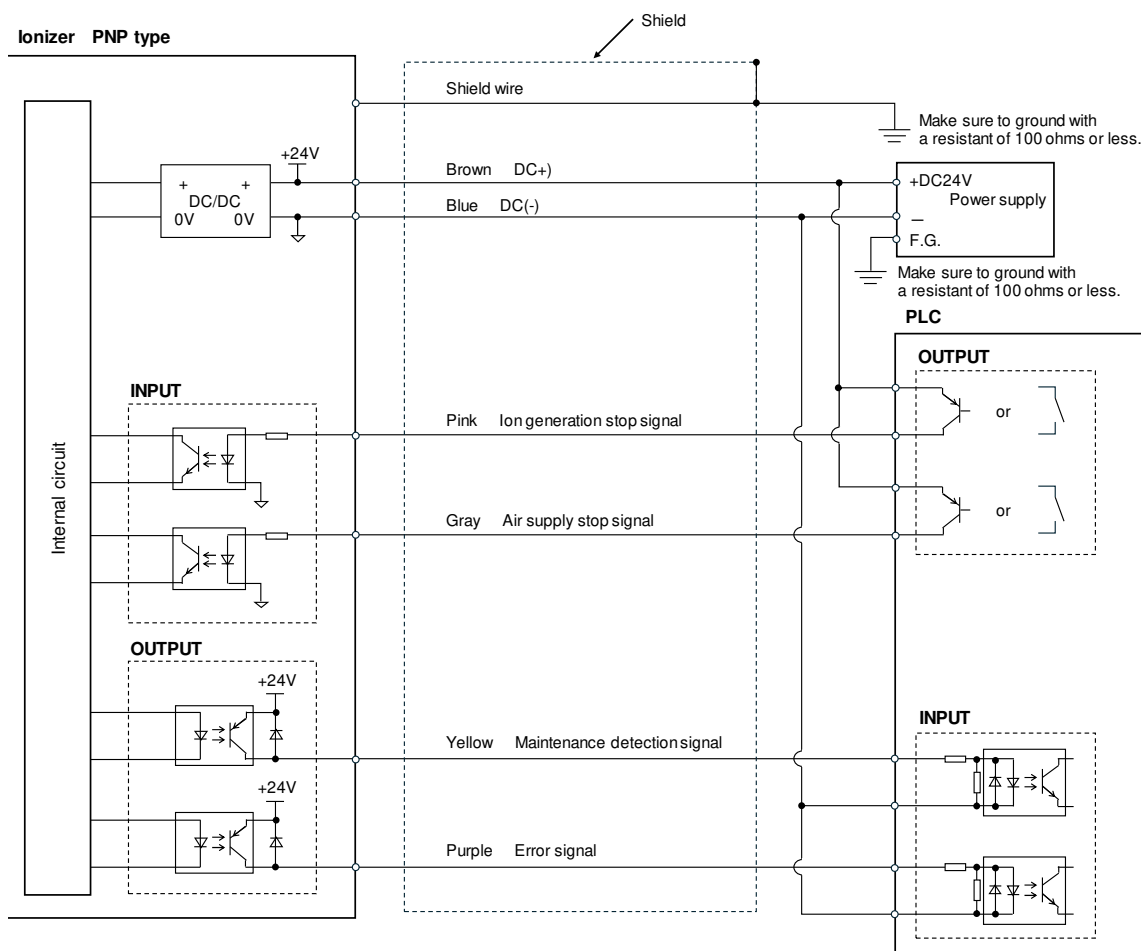
No.	Cable color	Signal	Signal direction	Description
1	Brown	DC(+)	IN	Connect the power supply to operate the ionizer.
2	Pink	Ion generation stop signal	IN	Signal input to stop ion generation ^{Note)} . NPN type: Ion generation is stopped by connecting to 0V. PNP type: Ion generation is stopped by connecting to 24VDC.
3	Blue	DC(-)	IN	Connect the power supply to operate the ionizer.
4	Gray	Air supply stop signal	IN	[Available only in the model with valve unit] Signal input to turn ON/OFF air supply when ion generation stop/air supply stop synchronization is OFF. NPN type: Connecting 0V, stop air supply by closing build-in valve. PNP type: Connecting DC+24V, stop air supply by closing build-in valve.
5	Purple	Error signal	OUT1 (B contact)	Turns off in case of power supply failure, high voltage failure, CPU failure or output signal over current. (The signal is ON when there is no problem.)
6	Yellow	Maintenance detection signal	OUT2 (A contact)	Turns ON when emitter needs cleaning.
7	White	-	-	-
8	Shield	F.G.	-	The ground terminal (F.G.) of this product. Make sure to ground with a resistance of 100Ω or less to use it as a reference electric potential for Ionizer. If the F.G. cable is not grounded, an optimal ion balance cannot be obtained, and it may damage this product and power supply.

Note) Possible to select ON/OFF of ion generation stop/air supply stop synchronization in using the model with valve unit. Refer to [3-4-5. Ion generation stop/air supply stop synchronization set mode] or [2-4. Timing chart] for details.

NPN type



PNP type



Make sure to ground the F.G. cable with a resistance of 100 ohms or less.
Without grounding, this products and/or power supply may be damage.

2-2-4. Electrical connection: IZS51-□□L (IO-Link type)

[Power supply cable: IZS51-CQ]

- A cable for supplying power to this product.
- Connect the M12 connector of the power supply cable to the T-connector.
- The connector key code B is used for the power supply cable and the T-connector. Pay attention to the key alignment when connecting them.
- Connect the lead wires according to the wiring diagram.

Table 4 Wiring table for power supply cable (IZS51-CQ)

No.	Cable color	Signal	Description
1	Brown	DC(+)	Connect the power supply to operate the ionizer.
2	-	-	-
3	Blue	DC(-)	Connect the power supply to operate the ionizer.
4			-
5	Shield	F.G.	The ground terminal (F.G.) of this product. Make sure to ground with a resistance of 100Ω or less to use it as a reference electric potential for ionizer. If the F.G. cable is not grounded, an optimal ion balance cannot be obtained, and it may damage this product and power supply.

[Communication cable: IZS51-CE]

- A cable for IO-Link communication with this product.
- Connect the communication cable socket to the T-connector.
- The connector key code B is used for the communication cable and the T-connector. Pay attention to the key alignment when connecting them.

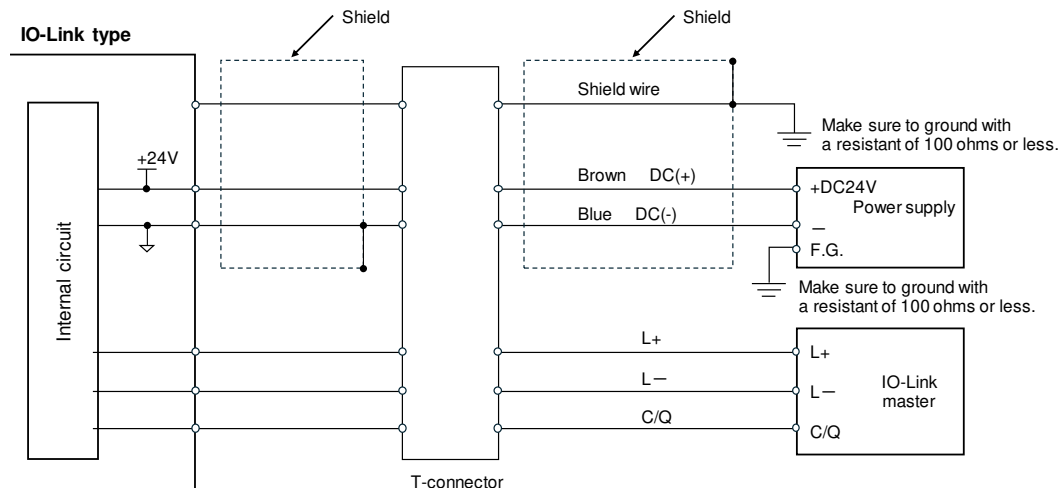
Table 5. Wiring table for communication cable (IZS51-CE))

No.	Signal	Description
1	L+	Power supply for IO-Link type.
2	-	-
3	L-	Power supply for IO-Link type.
4	C/Q	IO-Link communication data
5	-	-

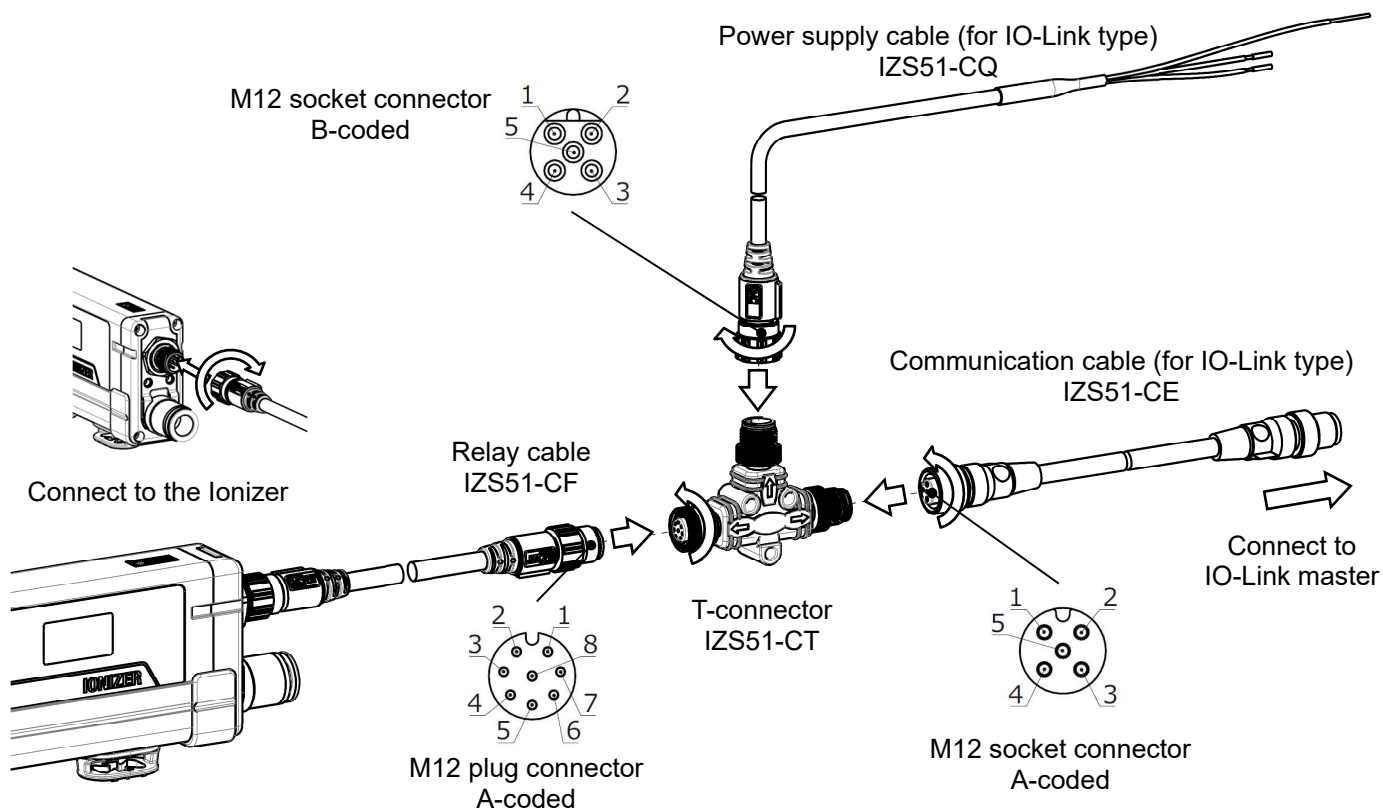
[Relay cable IZS51-CF]

- A cable for IO-Link communication with this product.
- Connect the relay cable socket to power supply connector of the ionizer and connect the relay cable plug to the T-connector socket.
- The connector key code A is used for the relay cable, power supply connector and the T-connector. Pay attention to the key alignment when connecting them.

IO-Link type

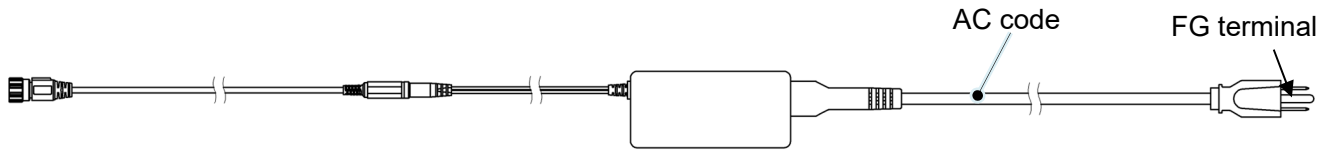


Make sure to ground the F.G. cable with a resistance of 100 ohms or less.
Without grounding, this products and/or power supply may be damage.



2-2-5. Connecting of the AC adapter

- Perform F.G. wiring with the ground terminal (F.G.) of the AC cord when AC adapter is used. If the AC cord is plugged in, plug it into a grounded outlets with less than 100Ω. Use an AC cord with ground terminal, if it is prepared by the user.
- The ground terminal (F.G.) is used as a reference electric potential for static neutralization. If the ground terminal is not grounded, the Ionizer will not be able to achieve the optimal offset voltage (ion balance).
- When an AC adapter is used, the input/output signal cannot be used.



2-3. How to check output signals

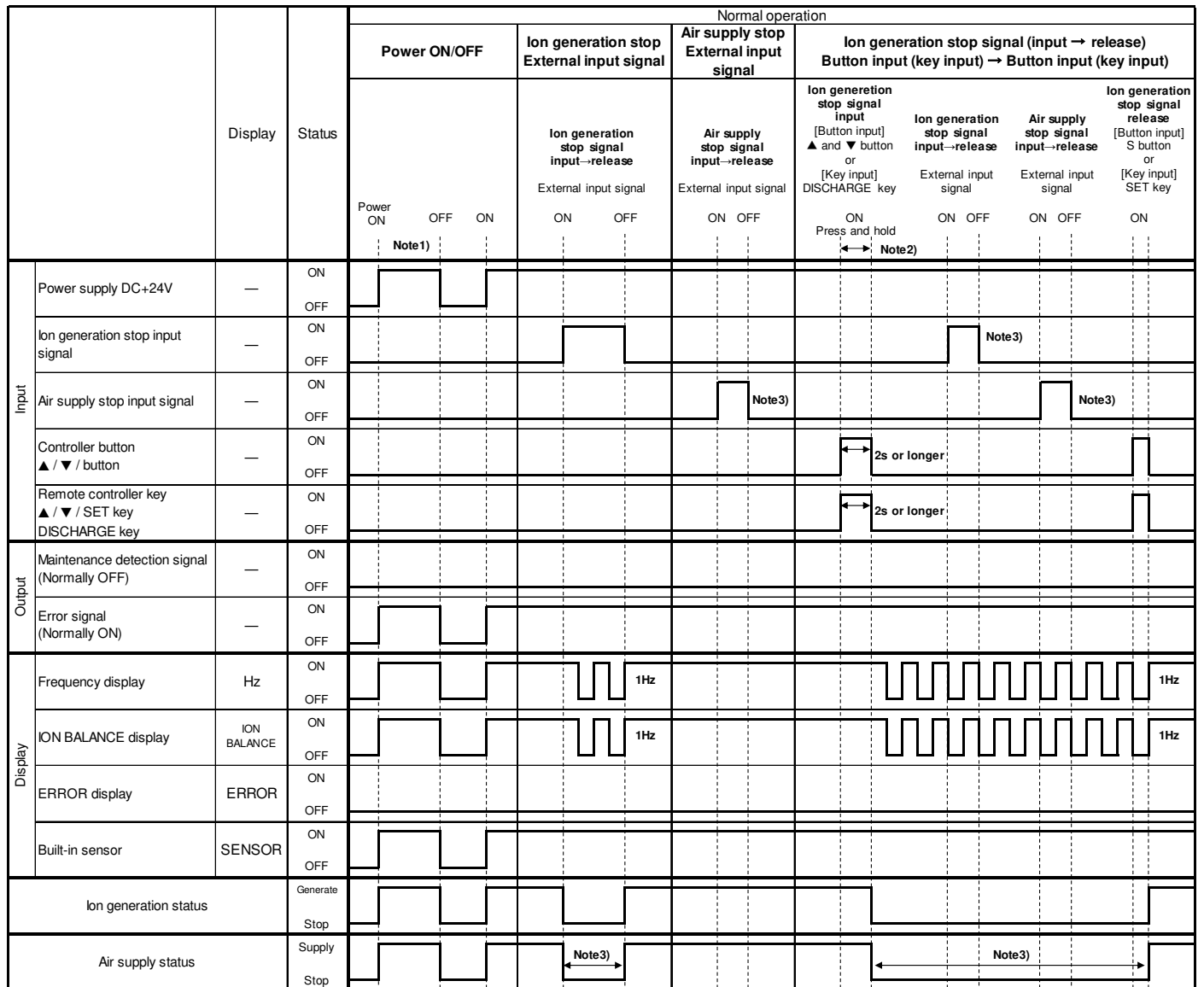
This product allows to output signal to check the wiring and operation of an equipment.

In using transistor input/output type, refer to [3-4-8. Output signals check mode] for details.

In using IO-Link type, refer to [4-3. Communication date] for details.

2-4. Timing chart

2-4-1. Normal operation: when ion generation stop/air supply stop synchronization is ON



Note 1) It takes 2 seconds to operate after the power is on.

Note 2) Press the ▲ and ▼ button simultaneously (or DISCHARGE key when operate by remote controller) for 2 seconds or longer to stop the ion generation. To release by the button, press the S button (or SET key when operate by remote controller) once or turn the power off and on again.

Note 3) [In using the model with valve unit] If ion generation stop/air supply stop synchronization is ON, stop air supply by closing build-in valve when input ion generation stop signal. Also, air supply stop signal becomes invalid.

			Display	Status	Normal operation																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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					Ion generation stop signal input [Button input] ▲ and ▼ button or [Key input] DISCHARGE key ON Press and hold	Turning the power on again Power ON Power OFF	Ion generation stop signal input [Button input] ▲ and ▼ button or [Key input] DISCHARGE key ON Press and hold	Ion generation stop signal input External input signal ON	Ion generation stop signal release [Button input] S button or [Key input] SET key ON	Ion generation stop signal input [Button input] ▲ and ▼ button or [Key input] DISCHARGE key ON Press and hold	Ion generation stop signal release [Button input] S button or [Key input] SET key ON	Ion generation stop signal release [Button input] S button or [Key input] SET key ON	Ion generation stop signal release External input signal OFF																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
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Note 4) Press the ▲ and ▼ button simultaneously (or DISCHARGE key when operate by remote controller) for 2 seconds or longer to stop the ion generation. To release by the button, press the S button (or SET key when operate by remote controller) once or turn the power off and on again.

Note 5) It takes 2 seconds to operate after the power is on.

Note 6) [In using the model with valve unit] If ion generation stop/air supply stop synchronization is ON, stop air supply by closing build-in valve when input ion generation stop signal. Also, air supply stop signal becomes invalid.

Note 7) When ion generation is stopping by either button operation (or remote controller operation) or an external input signal, it is not possible to release by the other signal. Also, even if release one signal when signal by both were inputted, another signal will remain active, and the ion generation stopped status will be maintained. To release the ion generation stop, it is necessary to release stop signal by button operation (or remote control operation) and turn off the external stop signal.

2-4-2. Normal operation: when ion generation stop/air supply stop synchronization is OFF

				Normal operation									
		Display	Status	Power ON/OFF	Ion generation stop External input signal	Air supply stop External input signal	Ion generation stop signal (input → release) Button input (key input) → Button input (key input)						
				Power ON OFF ON	Ion generation stop signal input→release External input signal ON OFF	Air supply stop signal input→release External input signal ON OFF	Ion generation stop signal input [Button input] ▲ and ▼ button or [Key input] DISCHARGE key ON Press and hold	Ion generation stop signal input→release External input signal ON OFF	Air supply stop signal input→release External input signal ON OFF	Ion generation stop signal release [Button input] S button or [Key input] SET key ON			
				Note1)			Note2)						
Input	Power supply DC+24V	—	ON										
			OFF										
	Ion generation stop input signal	—	ON							Note3)			
			OFF										
	Air supply stop input signal	—	ON				Note3)				Note3)		
			OFF										
Output	Controller button ▲ / ▼ / button	—	ON					2s or longer					
			OFF										
	Remote controller key ▲ / ▼ / SET key DISCHARGE key	—	ON					2s or longer					
			OFF										
	Maintenance detection signal (Normally OFF)	—	ON										
			OFF										
Display	Error signal (Normally ON)	—	ON										
			OFF										
	Frequency display	Hz	ON										
			OFF										
	ION BALANCE display	ION BALANCE	ON										
			OFF										
Display	ERROR display	ERROR	ON										
			OFF										
	Built-in sensor	SENSOR	ON										
			OFF										
	Ion generation status		Generate										
			Stop										
	Air supply status		Supply		Note3)			Note3)		Note3)			
			Stop										

Note 1) It takes 2 seconds to operate after the power is on.

Note 2) Press the ▲ and ▼ button simultaneously (or DISCHARGE key when operate by remote controller) for 2 seconds or longer to stop the ion generation. To release by the button, press the S button (or SET key when operate by remote controller) once or turn the power off and on again.

Note 3) [In using the model with valve unit] If ion generation stop/air supply stop synchronization is OFF, not synchronize ion generation stop signal and air supply stop signal. Inputting external signal of air supply stop, stop air supply by closing build-in valve.

			Display	Status	Normal operation									
					Ion generation stop signal (input→release) Power supply ON/OFF		Ion generation stop signal (input → release) Button input (key input) → External input signal							
					Ion generation stop signal input [Button input] ▲ and ▼ button or [Key input] DISCHARGE key ON Press and hold	Turning the power on again Power ON Power OFF Note4) Note5)	Ion generation stop signal input [Button input] ▲ and ▼ button or [Key input] DISCHARGE key ON Press and hold	Ion generation stop signal input External input signal ON	Ion generation stop signal release [Button input] S button or [Key input] SET key ON	Ion generation stop signal input [Button input] ▲ and ▼ button or [Key input] DISCHARGE key ON Press and hold	Ion generation stop signal release [Button input] S button or [Key input] SET key ON	Ion generation stop signal release [Button input] S button or [Key input] SET key ON	Ion generation stop signal release External input signal OFF	
Input	Power supply DC+24V	—	ON											
			OFF											
	Ion generation stop input signal	—	ON	Note7)										
			OFF											
	Air supply stop input signal	—	ON											
		OFF												
Output	Controller button ▲ / ▼ / button	—	ON	2s or longer		2s or longer			2s or longer		2s or longer			
			OFF											
	Remote controller key ▲ / ▼ / SET key DISCHARGE key	—	ON	2s or longer		2s or longer			2s or longer		2s or longer			
			OFF											
	Maintenance detection signal (Normally OFF)	—	ON											
		OFF												
Display	Error signal (Normally ON)	—	ON											
			OFF											
	Frequency display	Hz	ON	1Hz										
			OFF											
	ION BALANCE display	ION BALANCE	ON	1Hz										
		OFF												
ERROR display	ERROR	ON												
		OFF												
	Built-in sensor	SENSOR	ON											
		OFF												
Ion generation status			Generate											
			Stop											
Air supply status			Supply	Note6)										
			Stop											

Note 4) Press the ▲ and ▼ button simultaneously (or DISCHARGE key when operate by remote controller) for 2 seconds or longer to stop the ion generation. To release by the button, press the S button (or SET key when operate by remote controller) once or turn the power off and on again.

Note 5) It takes 2 seconds to operate after the power is on.

Note 6) [In using the model with valve unit] If ion generation stop/air supply stop synchronization is OFF, not synchronize ion generation stop signal and air supply stop signal. Inputting external signal of air supply stop, stop air supply by closing build-in valve.

Note 7) When ion generation is stopping by either button operation (or remote controller operation) or an external input signal, it is not possible to release by the other signal. Also, even if release one signal when signal by both were inputted, another signal will remain active, and the ion generation stopped status will be maintained. To release the ion generation stop, it is necessary to release stop signal by button operation (or remote control operation) and turn off the external stop signal.

2-4-3. Setting mode

		Display	Status	Setting mode							
				Switching from normal operation to various setting mode	Each setting mode				Switch to next mode	Switching from each setting mode to normal operation	
					[Button input] S button or [Key input] ID number key + SET key ON	Setting [Button input] ▲ or ▼ button or [Key input] ▲ or ▼ key Setting change	Ion generation stop signal input [Button input] ▲ and ▼ button or [Key input] DISCHARGE key ON Press and hold	Ion generation stop signal release [Button input] S button or [Key input] SET key ON			[Button input] S button or [Key input] SET key ON
						Note1)	Note1)			Note2)	
Input	Power supply DC+24V	—	ON								
			OFF								
	Ion generation stop input signal	—	ON								
			OFF								
	Air supply stop input signal	—	ON								
			OFF								
	Controller button ▲ / ▼ / button	—	ON				2s or longer				
			OFF								
	Remote controller key ▲ / ▼ / SET key DISCHARGE key	—	ON				2s or longer				
			OFF								
Output	Maintenance detection signal (Normally OFF)	—	ON								
			OFF								
	Error signal (Normally ON)	—	ON								
			OFF								
Display	Frequency display	Hz	ON								
			OFF							1Hz Note3)	
	ION BALANCE display	ION BALANCE	ON					1Hz			
			OFF								
	ERROR display	ERROR	ON								
			OFF								
	Built-in sensor	SENSOR	ON								
			OFF								
Ion generation status			Generate								
			Stop								
Air supply status			Supply								
			Stop				Note4)				

Note 1) In each setting mode, possible to stop ion generation by button operation (remote controller operation). After release ion generation stop, return to the previous setting mode.

Note 2) When in the last setting mode after switching to setting mode, pressing the S button (or the SET key) will switch to normal operation. When operate by remote controller, pressing the END key in any setting mode will switch to normal operation.

Note 3) Content of each setting mode is displayed by flashing. Refer to [3-4. Setting mode].

Note 4) The air supply status changes depending on the ion generation stop/air supply stop synchronization ON/OFF setting. Refer to [3-4-5. Ion generation stop/air supply stop synchronization set mode] for details.

2-4-4. In case of error or warning

	Display	Status	Abnormality of the CPU "CPU"	Abnormality of the power supply "PW.C" "PW.I"	Abnormality of the high voltage "HV"	Output signal over current "OC.E" (Error signal) "OC.M" (Maintenance signal) "OC.C" (Condition signal)	Maintenance warning "NDL"
Input	Power supply DC+24V	— ON OFF					
	Ion generation stop input signal	— ON OFF					
	Air supply stop input signal	— ON OFF					
	Controller button ▲ / ▼ / button	— ON OFF					
	Remote controller key ▲ / ▼ / SET key DISCHARGE key	— ON OFF					
	Maintenance detection signal (Normally OFF)	— ON OFF					
Output	Error signal (Normally ON)	— ON OFF					
	Frequency display	Hz ON OFF					
Display	ION BALANCE display	ION BALANCE ON OFF					
	ERROR display	ERROR ON OFF					
	Built-in sensor	SENSOR ON OFF					
	Ion generation status	Generate Stop					
Air supply status		Supply Stop					

Note 1) It takes 2 seconds to operate after the power is on.

Note 2) Abnormality can also be released by the ion generation stop signal or turn the power off and ON again.

Note 3) Frequency with problem is displayed by flashing error code. Refer to [3-5. Alarm function].

Note 4) The status at the time of problem holds the status before the problem.

3. Setting

3-1. Operation mode

- The product has 2 operation modes. AC mode or DC mode (Either positive ions or negative ions are continuously discharged during operation).
- 1) AC mode
 - Positive ions and negative ions are generated alternately according to the frequency set by the frequency set mode.
 - If the offset voltage (ion balance) is displaced by the installation environment of the ionizer, adjust the offset voltage.
 - Refer to [3-4-1. Frequency set mode] for frequency setting and [3-4-2. Offset voltage adjustment mode] for the adjustment of the offset voltage (ion balance).
 - 2) DC mode
 - Positive ions are generated when “**DC+**” is set for the frequency mode. Negative ions are generated by setting “**DC-**”.
 - Refer to [3-4-1. Frequency set mode] for further details.

3-2. Name of parts

3-2-1. Ionizer

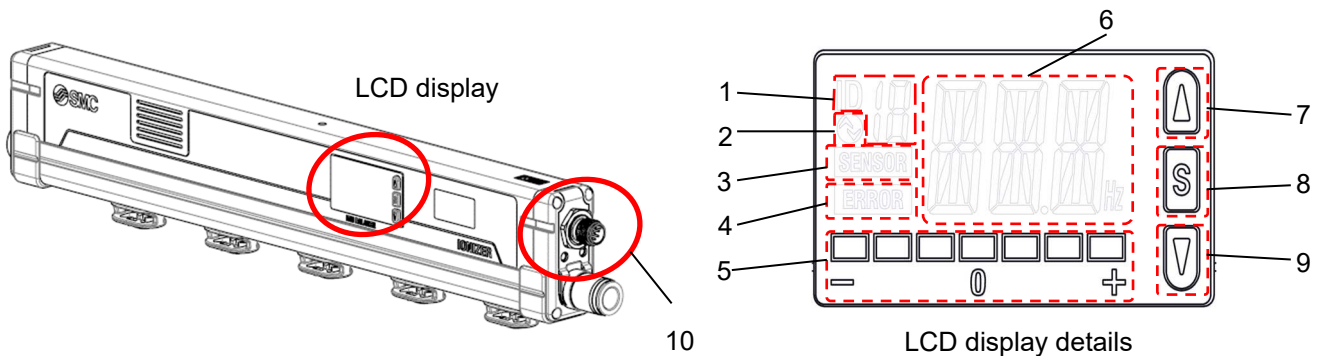


Table 6. Name of Ionizer IZS51 parts

No.	Name	Indication	type	Description
1	ID number display	ID□	LCD (White)	Displays the ID number (0 to 15) of the Ionizer ^{Note1)} .
2	Communication status display		LCD (White)	Flashing when the IO Link communication is established. Turns on when the communication is not established or when there is a communication error ^{Note2)} .
3	Sensor display	SENSOR	LCD (White)	Light up in white when balance control function is ON.
4	Error display	ERROR	LCD (White)	Light up in white when any errors are detected.
5	Ion balance display	ION BALANCE	LCD (White)	Indicates the ion balance status by lighting up during operation. Flashes during offset voltage adjustment. Turns ON when ion balance is maximum or minimum during offset voltage adjustment.
6	Frequency display	0.1 to 100Hz DC+, DC-	LCD (Green, Red)	Displays frequency setting by lighting in green during operation. Displays selected frequency by flashing in green during setting. Displays detected error details by flashing in red in case of abnormality.
7	▲ button	▲	Push button	Increase the set value.
8	S button	S	Push button	Change the mode and set a set value.
9	▼ button	▼	Push button	Decrease the set value.
10	M12 connector	-	Connector	Connect the power supply cable or relay cable.
11	One-touch fitting	-	Piping port	Piping port for air supply.

Note 1) Turns ON only in transistor input/output type.

Note 2) Turns ON (or flashes) only in IO-Linik type.

3-2-2. Remote controller

Applicable models: IZS51-□□N, IZS51-□□P

- An infrared ray type remote controller is used for these models. Communication cannot be established if there are obstacles between the remote controller and ionizer. When operating with a remote controller, install the ionizer with the receiving part exposed, and point the sending part of the remote controller at the receiving part of the ionizer. Maximum communication distance of the remote controller is 5 meters.
- Before performing settings with a remote controller, make sure to set the same ID number as same as the number displayed in LCD of the ionizer to be controlled to the remote controller, and enable the communication. The default ID number is 0.
- After completing settings with the remote controller, cancel the communication between the remote controller and ionizer. It is not possible to start operation of the ionizer until communication is canceled. (Without any signal received to the ionizer from the remote controller for 30 seconds, communication will be canceled automatically.)
- When communication is canceled, frequency display will turn ON (green) in the frequency set.

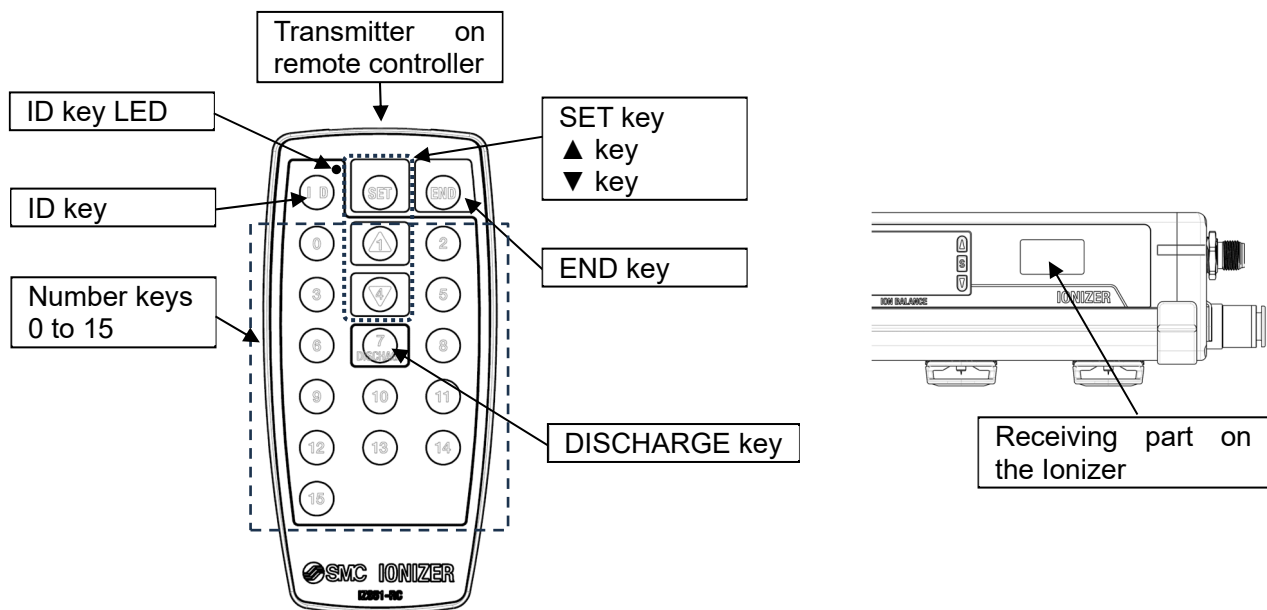


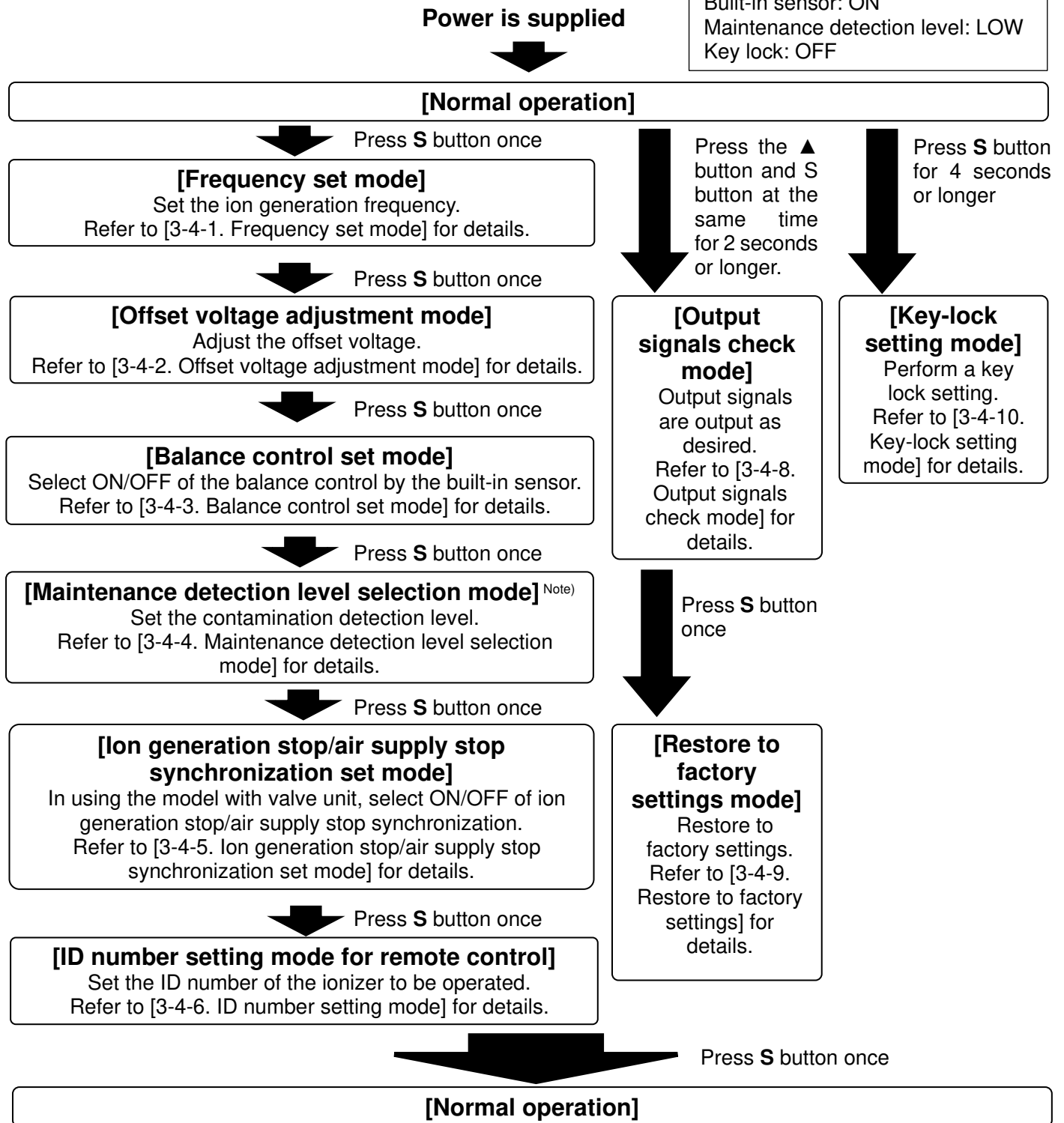
Table 7. Name of each key

Name	Description
ID key	Input when enabling the ID number setting.
Number key	Sets the ID number. Not operable when the ID key is OFF (LED of the ID key should be ON).
▲ key	Increase the set value.
SET key	Change the mode and set a set value.
▼ key	Decrease the set value.
END key	Used to clear the communication with the ionizer. Switches to normal operation.
DISCHARGE key	Used to stop ion generation from the ionizer.

3-3. Setting of the Ionizer

3-3-1. When set by button operation

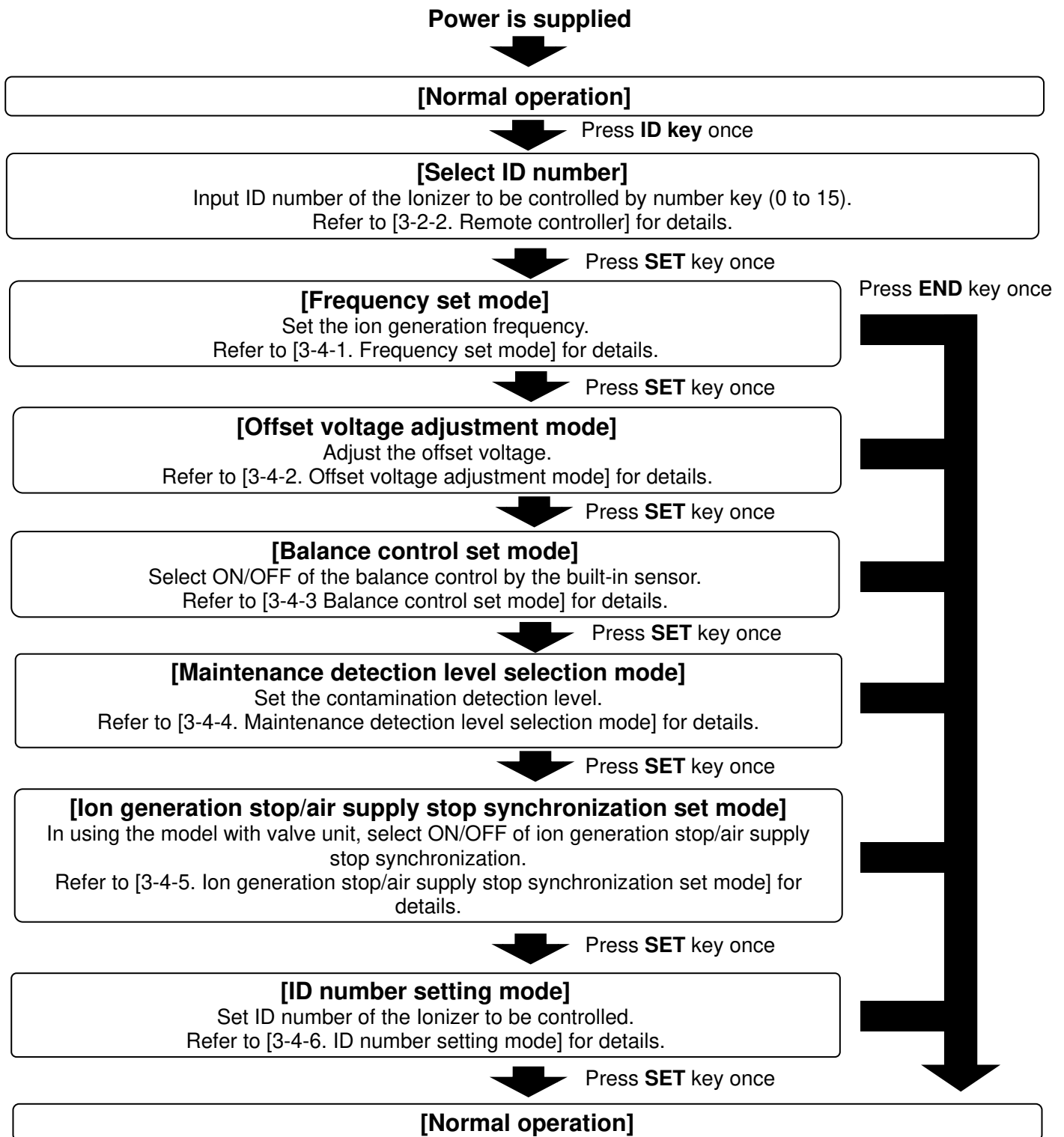
Default settings
Frequency setting: 100Hz
Built-in sensor: ON
Maintenance detection level: LOW
Key lock: OFF



Note) In each setting mode, the Ionizer moves on to the ion generation stop mode by pressing ▼ and ▲ button simultaneously for 2s or longer and stops the ion generation. (Operation is not possible while the key lock is ON or externally input signal is ON. In addition, if valve unit included and ion generation stop/air supply stop synchronization is ON, air supply is stop by closing built-in valve.) To release from stop, press the S button once or turn the power off and on again. Refer to [3-4-7.

Ion generation stop mode] for further details.

3-3-2. When set by remote controller operation



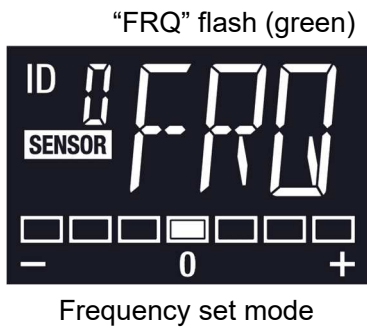
Note) In each setting mode, the Ionizer moves on to the ion generation stop mode by pressing DISCHARGE key for 2s or longer and stops the ion generation. (Operation is not possible while the key lock is ON or externally input signal is ON. In addition, if use model with valve unit and ion generation stop/air supply stop synchronization is ON, air supply is stop by closing built-in valve.) To release from stop, press the S button once or turn the power off and on again. Refer to [3-4-7.

Ion generation stop mode] for further details.

3-4. Setting mode

3-4-1. Frequency set mode

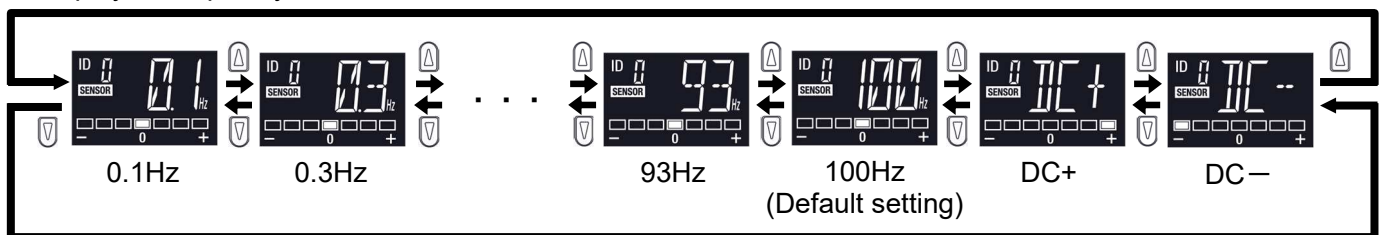
- Set the ion generation frequency.



[Ion generation frequency setting]

- Press the S button once in normal operation. The frequency display will change to “FRQ” flashing in green.
- The Ion generation frequency is set by pressing the ▲ button or ▼ button. And hold to switch the frequency continuously.
- When operate by remote controller, change to frequency set mode by pressing SET key, and set ion generation frequency by pressing the ▲ key or ▼ key.

Display of frequency



[Change to the next mode]

- Press the S button once to store the frequency setting and change to the next mode.
- When operated by remote controller, press the SET key once to store the settings and change to the next mode. Also press the END key once to store the settings change to normal operation.
- When the power is supplied the saved setting will be displayed.

*Factory setting

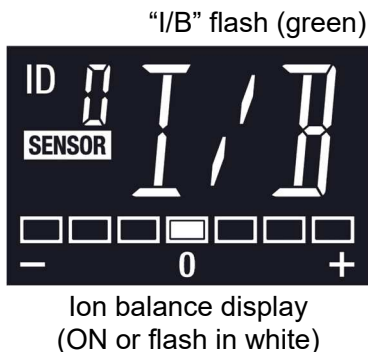
Default frequency setting is “100 Hz”. Set the optimum frequency depending on the operating environment and installed distance.

*Caution

If the mode is changed to ion generation stop mode during the frequency setting and the mode is released by turning off the power supply, the setting during change is not stored. Change the setting again.

3-4-2. Offset voltage adjustment mode

- Offset voltage is adjusted before shipment. However, readjustment of the offset voltage is possible where it is required depending on the installation environment. (The same applies when the ionizer is moved and installed in a different location.)
- When there are ionizers installed near the ionizer whose offset voltage is to be adjusted, stop the ionizers which are not adjusted for the offset voltage before starting adjustment.



Offset voltage adjustment mode

[Offset voltage adjustment]

- Press the S button twice in normal operation. The frequency display will change to “**I/B**” flashing in green and ion balance display will flash, and setting of the offset voltage adjustment becomes possible.
- When balance control by the built-in sensor is on, the Ion balance display shows the ion balance detected. Adjust so that the indicator becomes central.
- The indicator turns on when it approaches the center, and flashes as it moves away from it. At the positive ion adjustment limit, the indicator at the end of the positive side (right end of the display) turns ON (white). At the negative ion adjustment limit, the indicator at the end of the negative side (left end of the display) turns ON (white).
- For highly precise offset voltage adjustment, adjust by monitoring with a charge plate monitor.
- Press ▼ or ▲ button for adjustment. Press the ▲ button once to increase + ion, press and hold to continuously increase. Press the ▼ button once to increase - ion, press and hold to continuously increase.
- When balance control by the build-in sensor is on and cannot be adjusted ion balance to zero by pressing the button, turn balance control OFF. The sensor may malfunction if there is an object with too much charge around it.
- When operate by remote controller, change to offset voltage adjustment mode by pressing SET key, and set offset voltage by pressing the ▲ key or ▼ key.

Display of ion balance

ON	Flash (1Hz)	Flash (1Hz)	Flash (1Hz)	Flash (1Hz)	Flash (1.5Hz)	Flash (1.5Hz)	ON	Flash (1.5Hz)	Flash (1Hz)	Flash (1Hz)	Flash (1Hz)	Flash (1Hz)	ON

[Change to the next mode]

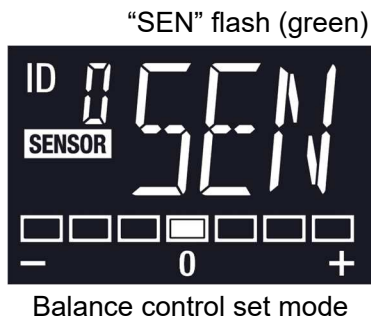
- Press the S button once to store the frequency setting and change to the next mode.
- When operated by remote controller, press the SET key once to store the settings and change to the next mode. Also press the END key once to store the settings change to normal operation.
- When the power is supplied the saved setting will be displayed.

*Caution

If the mode is changed to ion generation stop mode during offset voltage adjustment or the mode is released by turning off the power supply, the change to the setting will not be stored. Change the setting again.

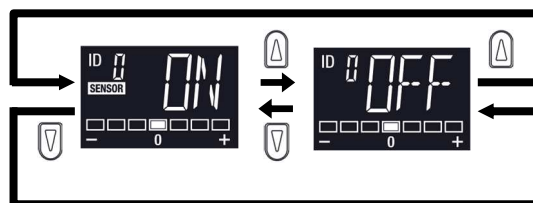
3-4-3. Balance control set mode

- This product has a built-in sensor to balance the ions generated.
- Balance control set mode turns the balance control by the built-in sensor on and off.
- The sensor may not operate correctly if an object with much charge comes too close to the sensor. In that case, please turn off the balance control.



[Balance control setting]

- Press the S button three times in normal operation. The frequency display will change to “**SEN**” flashing in green.
- Each time pressing the ▼ or ▲ button, the balance control ON/OFF will alternate.
- When balance control is ON, frequency display flashes “ON” (green) and sensor display turns on (white).
- When balance control is OFF, frequency display flashes “OFF” (green) and sensor display turns off.



[Change to next mode]

- Press the S button once to store the frequency setting and change to the next mode.
- When operated by remote controller, press the SET key once to store the settings and change to the next mode. Also press the END key once to store the settings change to normal operation.
- When the power is supplied the saved setting will be displayed.

*Factory setting

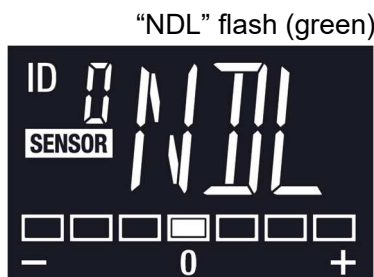
Default balance control setting is ON.

*Caution

If the mode is changed to ion generation stop mode during setting ON/OFF of balance control or the mode is released by turning off the power supply, the change to the setting will not be stored. Change the setting again.

3-4-4. Maintenance detection level selection mode

- If this product is used for an extended period of time, contamination such as dust will stick to the emitters, reducing the static neutralization performance.
- The timing of when maintenance is required varies depending on the environment in which it is installed.
- This product has a function which monitors the emitter contamination all the time. When the emitter contamination is detected, it is indicated by the maintenance signal and SENSOR display.
- In maintenance detection level selection mode, the detection level of the emitter contamination can be set.



Maintenance detection level selection mode

[Maintenance detection level selection method]

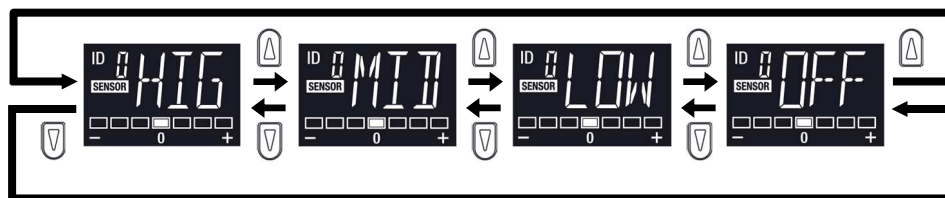
- Press the S button four times in normal operation. The frequency display will change to “NDL” flashing in green.
- The maintenance detection level is set by pressing the ▲ button or ▼ button.
- When operate by remote controller, change to maintenance detection level set mode by pressing SET key, and set ion generation frequency by pressing the ▲ key or ▼ key.

“HIG”: No influence to the static neutralization time.

“MID”: Before the static neutralization time becomes slow.

“LOW”: Static neutralization time is slower than the initial state.

“OFF”: Maintenance detection is OFF.



[Change to the next mode]

- Press the S button once to store the frequency setting and change to the next mode.
- When operated by remote controller, press the SET key once to store the settings and change to the next mode. Also press the END key once to store the settings change to normal operation.
- When the power is supplied the saved setting will be displayed.

*Factory setting

Default maintenance detection level is “LOW”.

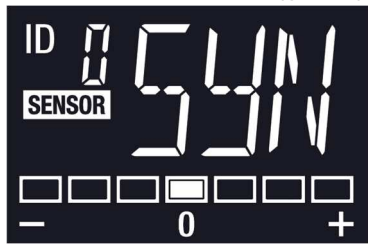
*Caution

If the mode is changed to ion generation stop mode during maintenance detection level select or the mode is released by turning off the power supply, the change to the setting will not be stored. Change the setting again.

3-4-5. Ion generation stop/air supply stop synchronization set mode

- Possible to stop air supply by closing built-in valve in using the model with valve unit.
- Selects synchronization ON (which stops air supply synchronized with ion generation stop) or OFF (which stops air supply by external input signal rather than synchronizing with ion generation stop).

"SYN" flash (green)



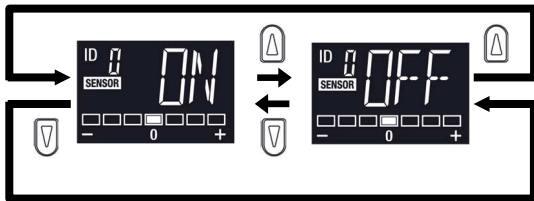
Ion generation stop/air supply stop synchronization set mode

[Ion generation stop/air supply stop synchronization set method]

- Press the S button five times in normal operation. The frequency display will change to "SYN" flashing in green.
- The frequency display alternates "ON" and "OFF" flashing in green each time the ▼ or ▲ button is pressed.

ON: Synchronize ion generation stop and air supply stop. When input ion generation stop signal, air supply is stopped by closing built-in valve, and air blow from emitter cartridge is stop.

OFF: Input air supply stop signal, air supply to Ionizer will stop by closing built-in valve. Not possible to stop air supply by Ion generation stop signal.



[Change to the next mode]

- Press the S button once to store the frequency setting and change to the next mode.
- When operated by remote controller, press the SET key once to store the settings and change to the next mode. Also press the END key once to store the settings change to normal operation.
- When the power is supplied the saved setting will be displayed.

*Factory setting

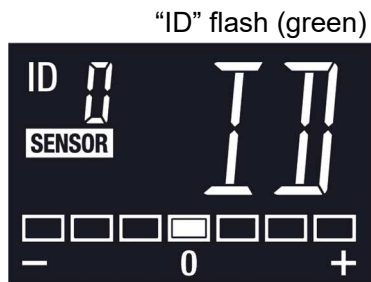
Default synchronization setting is ON.

*Caution

If the mode is changed to ion generation stop mode during Ion generation stop/air supply stop synchronization set or the mode is released by turning off the power supply, the change to the setting will not be stored. Change the setting again.

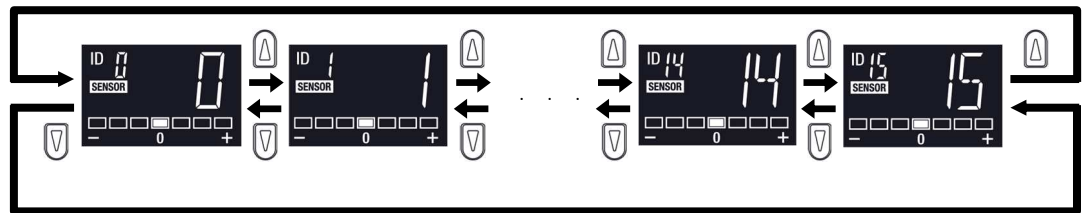
3-4-6. ID number setting mode

- Possible to set only transistor input/output type (IZS51-□□N, IZS51-□□P) can be operated remote controller.
- Not possible to set IO-Link type (IZS51-□□L), ID number display is OFF.



[ID number setting]

- Press the S button six times in normal operation. The frequency display will change to "ID" flashing in green.
- After switching to the ID number setting mode, switch the number in the ID number display between 0 and 15 by pressing ▼ or ▲ button.
- When operate by remote controller, change to ID number setting mode by pressing SET key.
- After switching to the ID number setting mode, possible to select the ID number for the ionizer to be operated by using ID number keys.



[Change to the next mode]

- Press the S button once to store the frequency setting and change to the next mode.
- When operated by remote controller, press the SET key once to store the settings and change to the next mode. Also press the END key once to store the settings change to normal operation.
- When the power is supplied the saved setting will be displayed.

*Factory setting

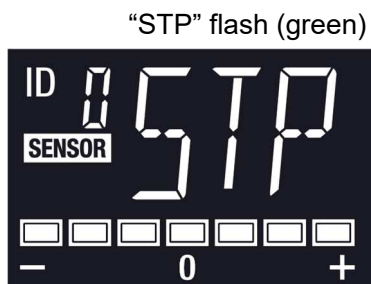
Default ID number is 0.

*Caution

If the mode is changed to ion generation stop mode during ID number setting or the mode is released by turning off the power supply, the change to the setting will not be stored. Change the setting again.

3-4-7. Ion generation stop mode

- In addition to the external input signal, the product will stop ion generation temporarily by pressing buttons.
- If ion generation stop/air supply stop synchronization is ON in using the model with valve unit, stop air supply by closing build-in valve when input ion generation stop signal.



“STP” flash (green)

Ion balance display
(flash in white)

Ion generation stop mode

[Ion generation stop setting]

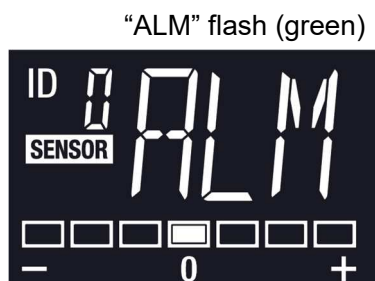
- In each setting mode, ion generation is stopped by pressing the ▼ and ▲ button simultaneously for 2s or longer.
- At that time, "STP" is displayed in frequency display (flash in green) and ion balance display is flash in white.
- When operate by remote controller, ion generation is stopped by pressing the DISCHARGE key for 2s or longer.
- In output signals check mode, restore to factory settings mode or key-lock setting mode, above operations are not possible.

[Ion generation stop release]

- To release the mode, press the S button or the SET key once to return to the previous setting mode.
- Although the ion generation stop mode can be released by turning the power supply off and on again, the changes set in the previous mode will not be stored. It is necessary to change the setting again.

3-4-8. Output signals check mode

- This product allows to output signal to check the wiring and operation of an equipment.

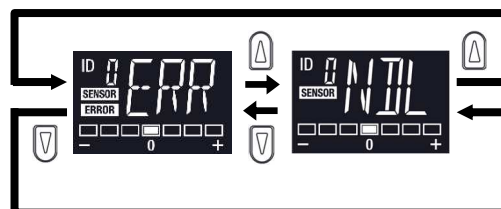


“ALM” flash (green)

Output signals check mode

[How to check output signals]

- Press the ▲ button and S button simultaneously for 2s or longer in normal operation. The frequency display will change to “ALM” flashing in green.
- Select the signals to check the output by pressing the ▲ or ▼ button. Possible to select error signal output or maintenance detection signal.



“ERR”: Error signal is ON.

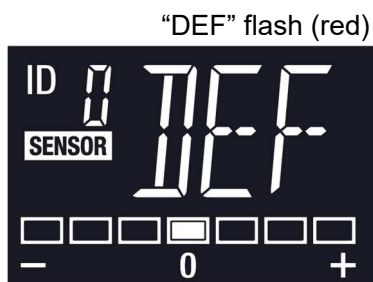
“NDL”: Maintenance detection signal is ON.

[Change to the next mode]

- Press the S button once to store the frequency setting and change to the next mode.
- When operated by remote controller, press the SET key once to store the settings and change to the next mode. Also press the END key once to store the settings change to normal operation.

3-4-9. Restore to factory settings mode

- Possible to restore each setting of Ionizer to factory settings.



Restore to factory settings mode

[How to restore to factory settings]

- After switching to [Output signals check mode] by pressing the ▲ button and S button simultaneously for 2s or longer in normal operation, press the S button once more. The frequency display will change to “DEF” flashing in red, and becomes [Restore to factory setting mode].
- Pressing ▲ button or ▼ button for 2s or longer, the frequency display will turn ON to “RES” in red, and restore to factory settings.

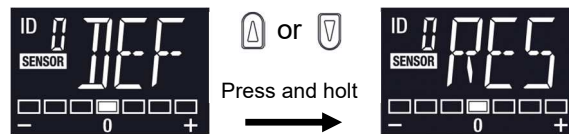
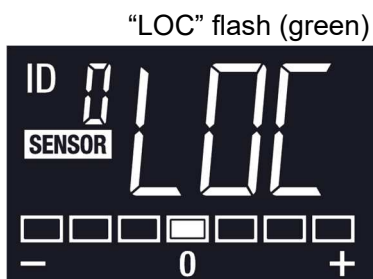


Table 8. Factory settings

Frequency	100Hz
Balance control	ON
Maintenance detection level	LOW
Ion generation stop/air supply stop synchronization	ON
ID number	0

3-4-10. Key-lock setting mode

- This product has a key lock function which disables any button operation.



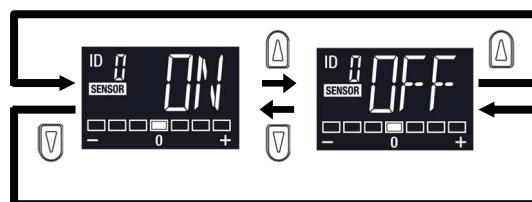
Key-lock setting mode

[Key-lock setting]

- Press the S button for 4s or longer in normal operation. The frequency display will change to “LOC” flashing in green, and setting of Key-lock becomes possible.
- The frequency display alternates “ON” and “OFF” flashing in green each time the ▼ or ▲ button is pressed.

ON: Key-lock function is ON.

OFF: Key-lock function is OFF.



[Change to the next mode]

- Press the S button once to store the settings and change to normal operation.
- When power is supplied, the saved setting will be displayed.


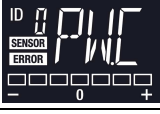
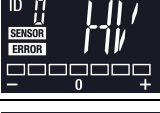
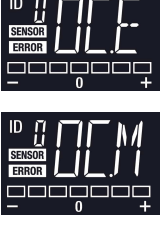

*Factory setting

Default key-lock setting is “OFF”.

3-5. Alarm function

- When a problem occurs, an output signal or LCD display notification is generated.
- Depending on the content of abnormality, this product either continues or stops operation.

Table 9. Alarm list

Alarm name	Output signal	Operation of the ionizer after alarm	LCD						Description	How to return to work after a problem is solved
			Display	Frequency	ERROR	ION BALANCE	SENSOR	ID number		
Abnormality of the CPU	Error signal OFF (B contact)	Stop		Flash (Red)	ON (White)	OFF	OFF or ON (White) ^{Note}	ON (White) ^{Note}	When CPU operates abnormally due to noise etc.	Turn the power off and on again.
Abnormality of the power supply	Error signal OFF (B contact)	Stop		Flash (Red)	ON (White)	OFF	OFF or ON (White) ^{Note}	ON (White) ^{Note}	When the connected power supply voltage is outside of the specification.	To be reset automatically.
Abnormality of the high voltage	Error signal OFF (B contact)	Stop		Flash (Red)	ON (White)	OFF	OFF or ON (White) ^{Note}	ON (White) ^{Note}	When the high voltage is discharged abnormally.	- Ion generation stop signal OFF and ON again. - Turn the power off and on again.
Output signal over current	- Maintenance detection signal OFF (A contact) - Error signal OFF (B contact))	Continue		Flash (Red)	ON (White)	OFF	OFF or ON (White) ^{Note}	ON (White) ^{Note}	When over current is applied to the output circuit and protective circuit is activated.	To be reset automatically.
Maintenance warning	Maintenance detection signal ON (A contact)	Continue		ON (Green)	OFF	ON (White) ^{Note}	OFF or ON (White) ^{Note}	ON (White) ^{Note}	When static neutralization performance is reduced due to contamination, abrasion or breakage of emitters.	- Ion generation stop signal OFF and ON again. - Turn the power off and on again.

Note) The screen at the time abnormality occurs holds the status before the abnormality.

Details of the alarms:

1) Abnormality of the CPU

- If the controller CPU operation is abnormal due to electrical noise, the abnormal signal is OFF, and “CPU” is displayed in frequency display flashing red and “ERROR” display is turned ON.
- When the alarm occurs, the ion generation will be stopped.
- To prevent noise, perform the following actions and take countermeasures.
 - If the source of noise is nearby, move this product away from the source.
 - Route the power line and this product cables separately.
 - If noise may enter the product from the power supply, install a noise filter to this product power supply.
- After resolving the cause, supply power again.

2) Abnormality of the power supply

- When the power supply connected to this product is not within the specified range of 24 V +/-10%, the abnormal signal is OFF, and “PW.C” is displayed in frequency display flashing red and “ERROR” display is turned ON.
- When the alarm occurs, the ion generation will be stopped.
- The problem is automatically released by changing the power supply voltage to 24V+/-10%.

3) Abnormality of the high voltage

- When abnormal discharge occurs during this product operation, the abnormal signal is OFF, and “HV” is displayed in frequency display flashing red and “ERROR” display is turned ON.
- When the alarm occurs, the ion generation will be stopped.
- After resolving the cause, input the ion generation stop signal ON once and then OFF or supply power again.

4) Maintenance warning

- The maintenance signal is ON when contamination, abrasion or damage to the emitters is detected. "NDL" is displayed in frequency display flashing green to indicate that cleaning or replacement of emitter cartridges needs to be performed.
- This product operates even when the maintenance warning is generated.
- When emitters are contaminated, the error can be solved by cleaning them. However, when they are degradation or damaged, it is necessary to replace emitter cartridges with new one.
- After resolving the cause, input the ion generation stop signal ON once and then OFF or supply power again.

4. IO-link communication

4-1. Overview of IO-link functions

[Communication function]

- This product can control and check the offset voltage and the ion generating status using cyclic data communication via the IO-Link system.

[Product status monitoring function]

- The failure status and warning status of the product can be monitored by IO-Link communication.

[Data storage function]

- The data storage function stores the IO-Link device parameter settings to the IO-Link master. With the data storage function, the IO-link device can be replaced easily without re setting the equipment configuration or setting parameters.
- When the device parameters are set and downloaded to the device using the IO-Link setting tool, the parameters in the downloaded device will be activated. After that, these parameters are uploaded to the data storage in the master by system command (backup communication command).
- When the device is replaced with an IO-Link device of the same model due to failure or other reasons, the parameter settings stored in the master are downloaded automatically, and the device can be operated with the parameter settings of the previous device.
- The device parameter setting is applicable to three types of back up levels of the master setting ("Disable", "Backup & Restore", and "Restore"). "Backup" implies the activation of upload and "Restore" implies the activation of download.

[Operation of this product when IO-LINK communication is interrupted]

- When the IO-Link communication is interrupted, the product will continue operating while maintaining the setting from before the interruption. It will automatically recover and be controllable when IO-Link communication is reconnected.

4-2. IO-Link master configuration

- To assign this product to the IO-Link master, install the IODD file in the setting tool of the IO-Link master.
- IODD (I/O Device Description) file is a definition file that provides all properties and parameters required for establishing functions and communication of the device. The IODD file includes the main IODD file and a set of image files such as vendor logo, device picture, and device icon.
- Refer to the operation manual for the IO-Link master for details of installing the IODD file to the setting tool of the IO-Link master.

Product No.	IODD file ^{Note)}
IZS51-L	SMC-IZS51-L-yyyymmdd-IODD1.1

Note) "yyyymmdd" indicates the file preparation date. yyyy is the year, mm is the month and dd is the date. The IODD file can be downloaded from the SMC Website (<https://www.smcworld.com>).

When connecting to IO-Link, make sure to first upload all parameters from the ionizer.

- When parameters of this product is changed by IO-Link communication, it is necessary to first upload the parameters for the ionizer, reflect the parameter display setting of the IO-Link setting tool, and change the parameters. The parameter upload status can be checked with the product original parameter "Upload first for setting parameters". (Refer to "Product original parameter")

4-3. Communication date

[Service data]

- The tables below indicate the parameters that can be read or written by a simple access parameter (Direct Parameter Page1) and ISDU parameters that are applicable to various parameters and commands.

●Direct Parameter Page1

DPP1 address	Access	Parameter	Initial value (Decimal)	Description
0x07	R	Vender ID	0x0083 (131)	“SMC Corporation”
0x08				
0x09	R	Device ID	0x00029A (666)	IZS51-L
0x0A				
0x0B				

●ISDU parameter

Index (Decimal)	Sub index	Access ^{Note1)}	Parameter	Initial value	Remarks
0x0002 (2)	0	W	SystemCommand	-	Refer to “SystemCommand” for details.
0x000C (12)	0	R/W	DeviceAccessLock	0x0000	Refer to “DeviceAccessLock” for details.
0x0010 (16)	0	R	VendorName	SMC Corporation	
0x0011 (17)	0	R	VendorText	www.smcworld.com	
0x0012 (18)	0	R	ProductName	-	IZS51-L ^{Note2)}
0x0013 (19)	0	R	ProductID	-	IZS51-L ^{Note2)}
0x0014 (20)	0	R	ProductText	Ionizer	
0x0018 (24)	0	R/W	ApplicationSpecificTag	****	Characters between 16 and 32 can be set.
0x0019 (25)	0	R/W	FunctionTag	****	Characters between 16 and 32 can be set.
0x0020 (26)	0	R/W	LocationTag	****	Characters between 16 and 32 can be set.
0x0024 (36)	0	R	DeviceStatus	-	Refer to “DeviceStatus” for details.
0x0025 (37)	0	R	DetailedDeviceStatus	-	Refer to “DetailedDeviceStatus” for details.
0x0028 (40)	0	R	ProcessDataInput	-	The latest value of ProcessDataInput can be read.
0x0029 (41)	0	R	ProcessDataOutput	-	The latest value of ProcessDataOutput can be read.

Note 1) "R" indicates Read and "W" indicates Write.

Note 2) Parameters will be displayed after uploading.

●SystemCommand (Index2)

- The commands shown in the table below can be issued in SystemCommand of ISDU Index 0x002.
- The button of each system command is displayed on the IO-Link setting tool.
- Click the button to send the system command to the product.
- Writeable commands are shown below.

Data type: 8bit UInteger

Command (Decimal)	Command name	Description
0x80 (128)	Device Reset	Resets the device. * Certain failure status can be released by device reset. When a failure status cannot be released, follow the procedure in "How to release error after recovery" in [4-4. Alarm function].
0x81 (129)	Application Reset	The operating time of the lonizer will be reset.
0x82 (130)	Restore Factory Settings	The setting values of the whole system excluding the operating time will be restored to the factory setting.
0x83(131)	Back-to-Box	The device parameters will be restored to factory settings. Communication will stop and will not be possible until power supply again.

●DeviceAccessLock parameter (Index12)

The device access lock conditions are as described in the table below.

Data type: 8bit Record

Value	Description
0	DS lock release (Initial value)
4	Local user interface lock

●DeviceStatus parameter (Index36)

The readable device status are as follows.

Data type: 8bit UInteger

Value	Definition	Description
0	Operating normally	-
1	Maintenance is required	Maintenance notification
2	Out of operating range	Out of range of power supply voltage specification, Limit of ion balance adjustment
3	Function check	Incorrect high voltage
4	Failure	CPU failure

●DetailedDeviceStatus (Index37)

Event details of the readable device status are as follows.

Sub index	Event name	Event class		Event code	Description
		Definition	Value		
1	CPU failure	Error	0xF4	0x1800 (6144)	CPU failure
2	Incorrect high voltage	Error	0xF4	0x1801 (6145)	Abnormal high-voltage discharge is generated
3	IOL power supply failure	Warning	0xE4	0x1830 (6192)	IO-Link master power supply voltage is outside the specification range
4	CTL power supply failure	Warning	0xE4	0x1831 (6193)	Controller power supply voltage is outside the specification range
5	IB Adj over range	Warning	0xE4	0x1832 (6194)	The adjustment limit value for + or - ion has been reached.
6	Maintenance notification	Notification	0x54	0x1840 (6280)	Maintenance notification

Refer to [4-4. Alarm function] for releasing failure alarms.

●Product original parameters

Index Hex (Decimal)	Sub index	Access ^{Note1)}	Parameter	Date type ^{Note2)}	Initial value	Data storage ^{Note3)}	Value	Description
0x40 (64)	0	R	Series	U8	1	N	1: IZS51-L	Displays the model information.
0x41 (65)	0	R/W	Balance control	U8	1	Y	0: Balance control is OFF 1: Balance control is ON	Sets ON/OFF of the balance control by build-in sensor.
0x42 (66)	0	R/W	Maintenance detection level	U8	0	Y	0: Low 1: Middle 2: High 3: OFF	Sets maintenance detection level.
0x43 (67)	0	W	Offset voltage adjustment	U8	—	N	1: (+) Slightly increases + ion 2: (+ +) Largely increases + ion 4: (-) Slightly increases - ion 8: (- -) Largely increases - ion	Adjusts the offset voltage.
0x44 (68)	0	R/W	Ion generation	U8	0	N	0: Ion generation stop 1: Ion generation [Only in using the model with valve unit] If ion generation/Air supply synchronization is ON, Air supply to the ionizer is stopped by closing built-in valve, when switch to ion generation stop.	Switches the ion generating status.
0x45 (69)	0	R/W	Air supply	U8	0	Y	0: Air supply stop 1: Air supply *[Only in using the model with valve unit] If ion generation/Air supply synchronization is OFF, Air supply to the ionizer is stopped by closing built-in valve, when switch to Air supply stop.	Switches the air supply status.
0x46 (70)	0	R/W	Ion generation/Air supply synchronization setting	U8	1	Y	0: Ion generation/Air supply synchronization OFF 1: Ion generation/Air supply synchronization ON	Sets ON/OFF of the ion generation and Air supply synchronization.
0x47 (71)	0	R/W	Output signals check mode	U8	0	Y	0: Normal operation 1: Output signals check mode	Switches between Normal operation and Output signal check mode.
0x48 (72)	0	W	Output signal selection	U8	0	N	0: No error 1: CTL power supply failure 2: IOL power supply failure 4: CPU failure 8: Incorrect high voltage 16: Maintenance notification	Selects output signal at output signals check mode.
0x100 (256)	0	R	Operating time	U16	0	N	(In 1h unit)	Displays operating time.
0x102 (258)	0	R/W	Frequency	U16	1000	Y	1 : 0.1 [Hz] 330 : 33 [Hz] 3 : 0.3 [Hz] 390 : 39 [Hz] 5 : 0.5 [Hz] 470 : 47 [Hz] 7 : 0.7 [Hz] 560 : 56 [Hz] 10 : 1 [Hz] 680 : 68 [Hz] 20 : 2 [Hz] 700 : 70 [Hz] 30 : 3 [Hz] 720 : 72 [Hz] 40 : 4 [Hz] 750 : 75 [Hz] 50 : 5 [Hz] 780 : 78 [Hz] 70 : 7 [Hz] 810 : 81 [Hz] 80 : 8 [Hz] 850 : 85 [Hz] 100 : 10 [Hz] 890 : 89 [Hz] 150 : 15 [Hz] 930 : 93 [Hz] 200 : 20 [Hz] 1000 : 100 [Hz] 220 : 22 [Hz] 32768 : DC+ 270 : 27 [Hz] 32769 : DC- 300 : 30 [Hz]	Sets the frequency.

Note 1) "R" indicates Read and "W" indicates Write.

Note 2) Refer to the table below for the symbols.

Note 3) "Y" indicates that the parameter setting data is saved to the master, and "N" indicates that the parameter is not saved.

Symbol	Data type (IO-Link standard)	Data length Bit [byte]	Description
U8	UIntegerT	8 [1]	Unsigned integer
U16		16 [2]	

[ProcessData]

Process data is the data exchanged periodically between the master and device.

The discharged state, ion balance, diagnosis information, and other data are configured in this product as shown in the table below.

●ProcessDataInput

Bit offset	Item	Remarks
23	Ion generating	0: Stop 1: Ion generation
22	Air supply	0: Stop 1: Air supply
21	Output signals check mode	0: Normal operation 1: Output signals check mode
8 to 17	Ion balance	10-bit signed integer
7	Error diagnosis	0: OFF 1: ON
6	CPU failure	0: - (No error) 1: CPU failure
5	IOL power supply failure	0: - (No error) 1: IOL power supply error
4	CTL power supply failure	0: - (No error) 1: CTL power supply error
3	Incorrect high voltage	0: - (No error) 1: Incorrect high voltage
2	Maintenance notification	0: - (No detection) 1: Maintenance notification

Bit offset	23	22	21	20	19	18	17	16
Item	Ion generation	Air supply	Output signals check mode	Reserved			Ion balance	

Bit offset	15	14	13	12	11	10	9	8
Item	Ion balance							

Bit offset	7	6	5	4	3	2	1	0
Item	Error diagnosis	CPU failure	IOL power supply failure	CTL power supply failure	Incorrect high voltage	Maintenance notification	Reserved	

●ProcessDataOutput

Bit offset	Item	Remarks
15	Process data output valid	0: Disabled 1: Enabled
14	Ion generation	0: Stop 1: Ion generation
13	Air supply	0: Stop 1: Air supply
0	Offset voltage adjustment	10-bit signed integer

Bit offset	15	14	13	12	11	10	9	8
Item	Process data output valid	Ion generation	Air supply	Reserved			Offset voltage adjustment	

Bit offset	7	6	5	4	3	2	1	0
Item	Offset voltage adjustment							


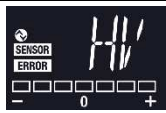



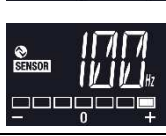

The process data of this product is of Big endian type.

When the transmission method of the upper communication is of Little endian type, the byte order will be changed. Refer to the table below for the main endian types.

Endian type	Upper communication protocol
Big endian	PROFIBUS, PROFINET etc.
Little endian	EtherNet/IP, EtherCAT, CC-Link, IE Field etc.

4-4. Alarm function

- IO-Link communication events and LCD are used for the notification of failures.
- Note that ion generation may either continue or stop depending on the type of failure.

Event description (Index37 Event name)	Ionizer operation after generating alarm	LCD						How to release error after recovery
		Display	Frequency	ERROR	ION BALANCE	SENSOR	IO-Link	
CPU failure	Stop		Flash (Red)	ON (White)	OFF	OFF or ON (White) ^{Note)}	Flash (White) ^{Note)}	Turn the power off and on again.
Incorrect high voltage	Stop		Flash (Red)	ON (White)	OFF	OFF or ON (White) ^{Note)}	Flash (White) ^{Note)}	- Turn the power off and on again. - Ion generation stop signal OFF and ON again.
IOL Power supply failure	Stop		Flash (Red)	ON (White)	OFF	OFF or ON (White) ^{Note)}	Flash (White) ^{Note)}	To be reset automatically
CTL Power supply failure	Stop		Flash (Red)	ON (White)	OFF	OFF or ON (White) ^{Note)}	Flash (White) ^{Note)}	To be reset automatically
IB Adj over range	継続		ON (Green)	OFF	Flash (White)	OFF or ON (White) ^{Note)}	Flash (White) ^{Note)}	To be reset automatically
								
Maintenance notification	継続		ON (Green)	OFF	ON (White) ^{Note)}	OFF or ON (White) ^{Note)}	Flash (White) ^{Note)}	To be reset automatically

Note) The screen at the time abnormality occurs holds the status before the abnormality.

Refer to "DetailedDeviceStatus" for event details.

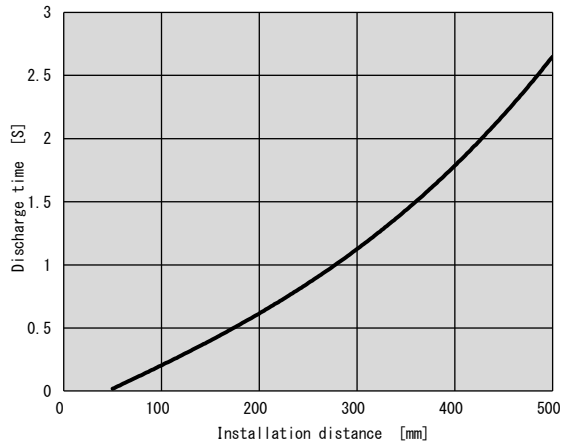
5. Performance

5-1. Static Neutralization Characteristics

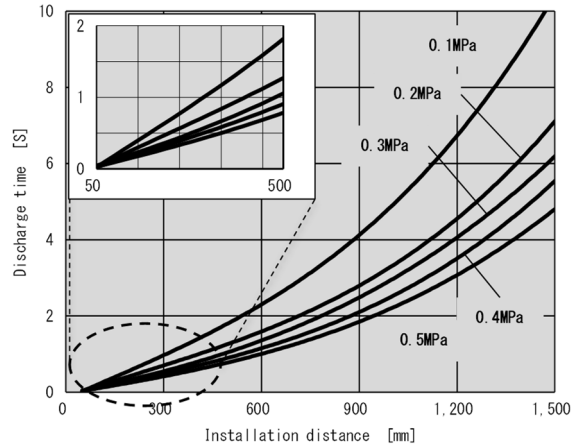
- Performance data shown in this chapter is based on an electrified plate (dimensions: 150 x 150 mm, electrostatic capacity: 20pF) defined by ANSI standard (ANSI/ESD STM3.1-2015). Use this data as a guideline for selection, as the performance data may vary depending on the material and size of the workpiece.

(1) Installation distance and Discharge time (Discharge time from 1000V to 100V)

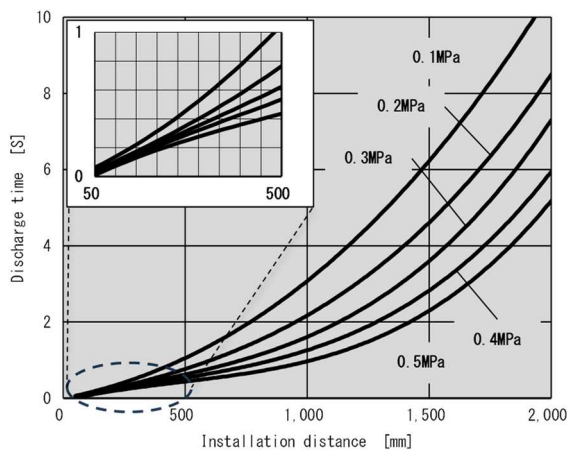
For cartridges without air purge



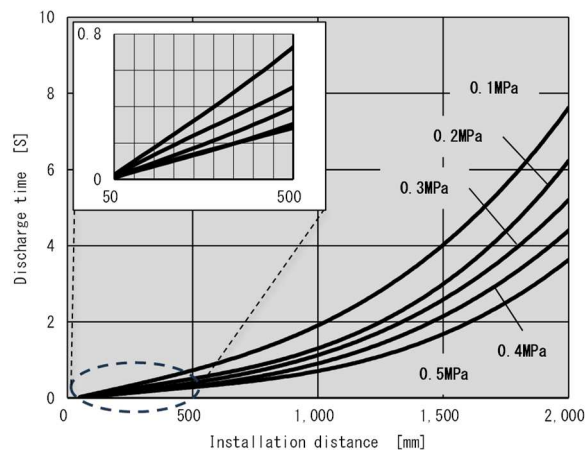
Low flow cartridge



Middle flow cartridge

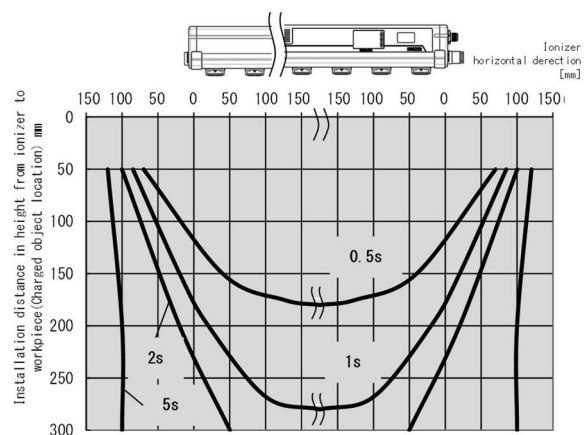
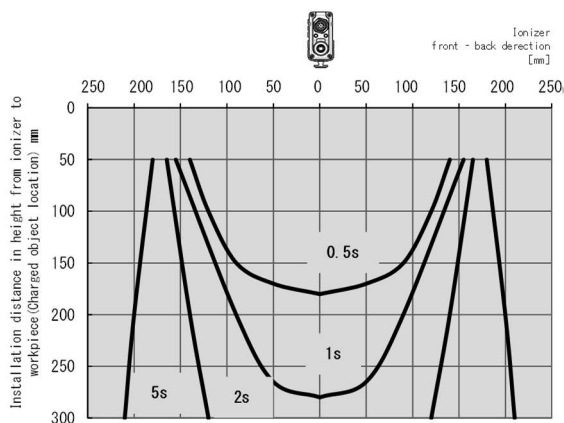


High flow cartridge

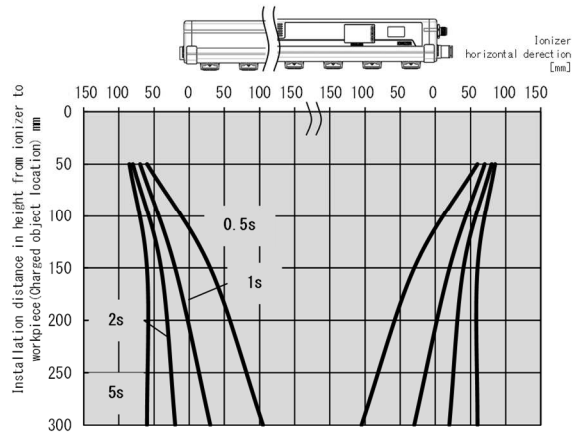
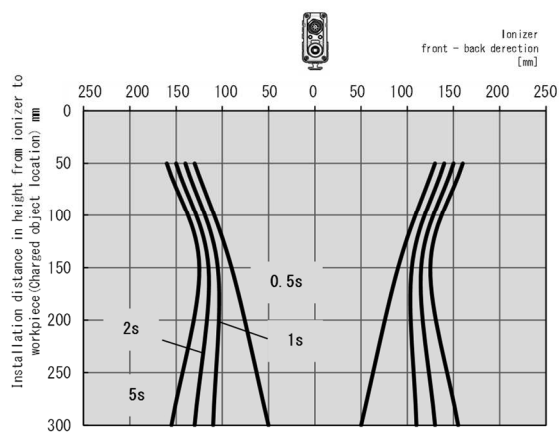


(2) Static Electricity Elimination Range

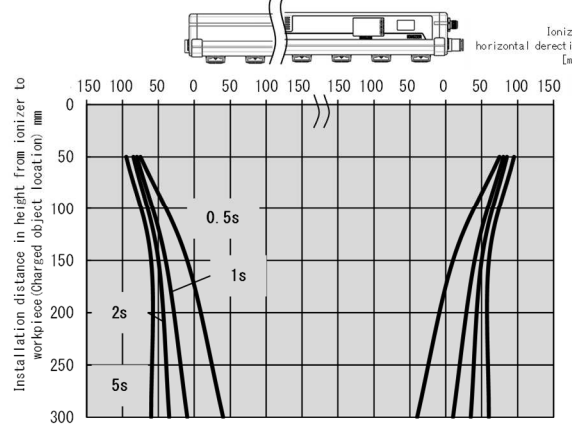
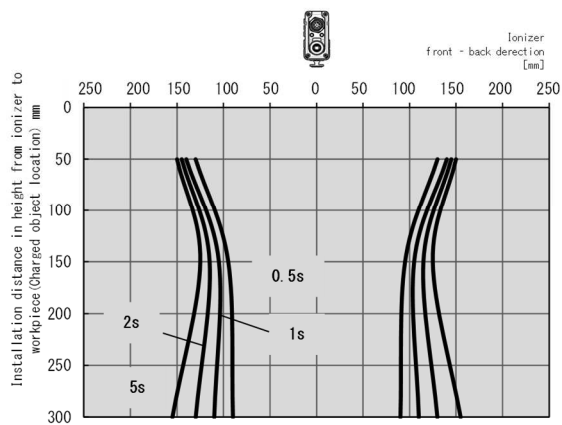
For cartridges without air purge



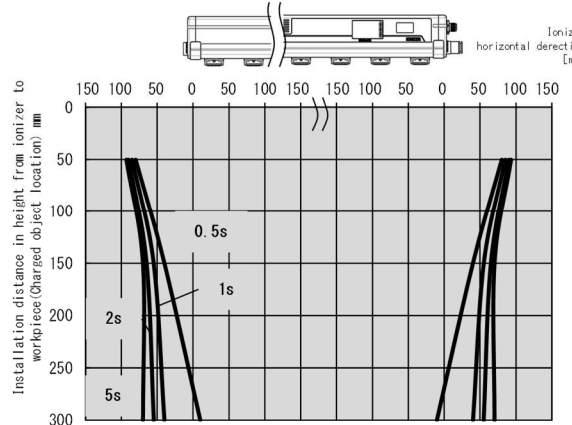
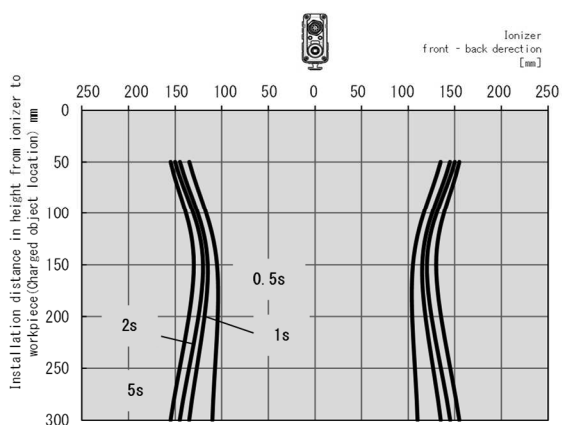
Low flow cartridge, Supply pressure : 0.3MPa



Middle flow cartridge, Supply pressure : 0.3MPa

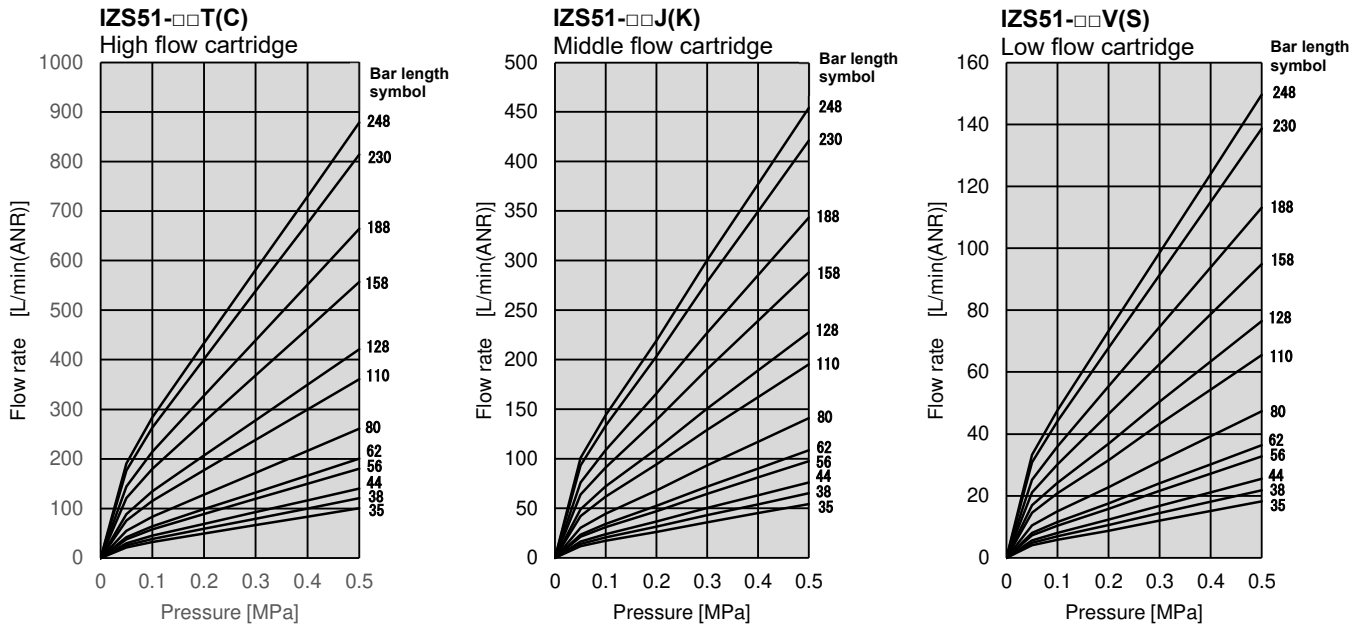


High flow cartridge, Supply pressure : 0.3MPa

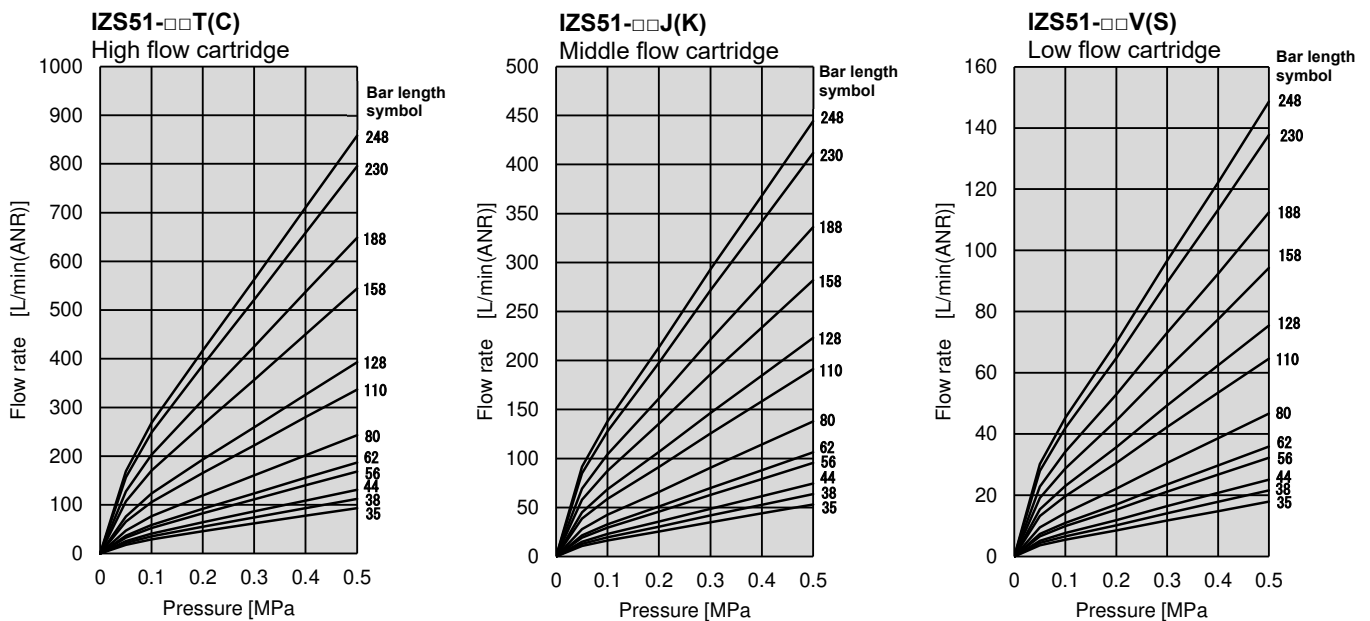


5-2. Pressure – Flow rate characteristics

[Without valve unit]

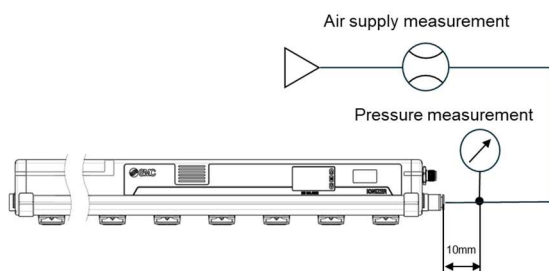


[With valve unit]

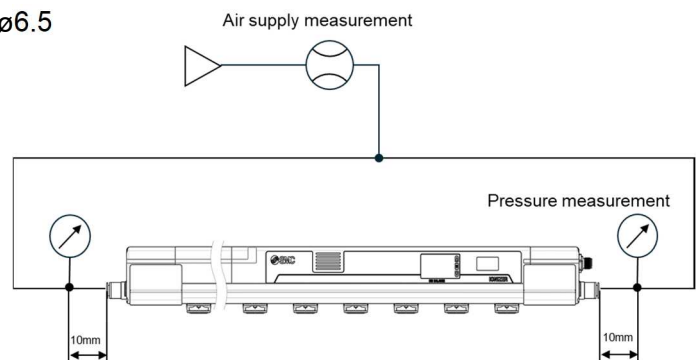


Measuring method schematic

- a) Air supply from one side Tube: O.D. $\phi 10 \times$ I.D. $\phi 6.5$
IZS51-35,38,44,56,62,80,110,128
- b) Air supply from both sides Tube: O.D. $\phi 10 \times$ I.D. $\phi 6.5$
IZS51-158,188,230,248



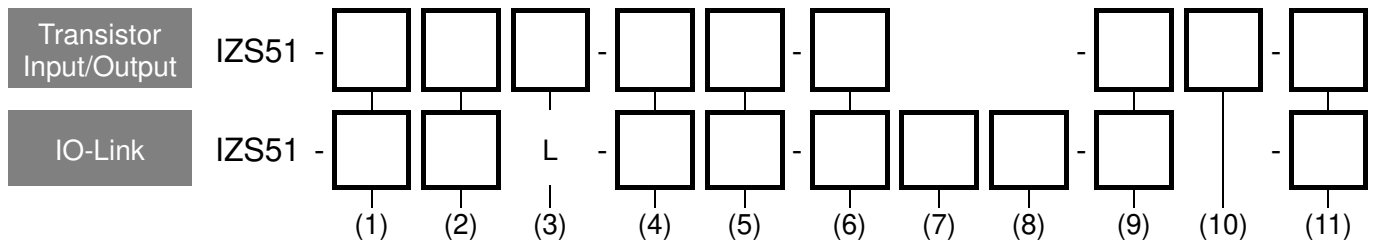
a) Air supply from one side



b) Air supply from both side

6. How to order

6-1. Ionizer



(1) Bar length

Symbol	Bar length (mm)	Symbol	Bar length (mm)
35	350	110	1100
38	380	128	1280
44	440	158	1580
56	560	188	1880
62	620	230	2300
80	800	248	2480

(2) Emitter cartridge type/emitter material

Symbol	Type	Materials
T	High flow cartridge	Tungsten
C		Silicon
J	Middle flow cartridge	Tungsten
K		Silicon
V	Low flow cartridge	Tungsten
S		Silicon

(3) Input/Output specification

Symbol	Type
N	NPN
P	PNP

(4) Piping

Symbol	Type
Nil	With piping on both sides
D	With piping only on one side ^{Note 1)}
V	With valve unit ^{Note 1), Note 2)}

Note 1) Air supply from M12 connector side.

(Opposite side is plugged.)

Note 2) Valve units are mounted on both sides of the ionizer when Emitter cartridge type is High flow cartridge (symbol: T or C) and Bar length is 1580, 1880, 2300 or 2480.

(5) One-touch fittings

Symbol	Metric size	Symbol	Inch size
4	φ4 straight	5	φ3/16" straight
6	φ6 straight	7	φ1/4" straight
8	φ8 straight	9	φ5/16" straight
A	φ10 straight	B	φ3/8" straight

Note) The selectable One-touch fittings depend on Emitter cartridge type and Piping type. Refer to the table below for recommended piping port size.

(6) Power supply cable

Symbol	Length
N	None
3	3m
5	5m
Z	10m
S	0.5m
1	1m
3	3m

(7) Communication cable (For IO-Link type)

Symbol	Length
N	None
E	0.5m
G	1m
J	3m

(8) Relay cable (For IO-Link type)

Symbol	Length
N	None
3	3m
5	5m
Z	10m

Note) Included T-connector (1pc)

(9) Bracket

Symbol	Type
Nil	None
B	With bracket 1
W	With bracket 2

(10) Remote controller

Symbol	Type
Nil	None
R	Included

(11) Made to order

Symbol	Type
-X10	Non-standard bar length
-X14	With emitter cartridge drop prevention cover

Recommended piping port size

Without valve unit: IZS51-□□□-□

Note) Refer to the table below for selecting One-touch fitting when Piping type is with piping on both sides (blank symbol) or with piping only on one side (symbol "D").

Explanatory note ○ : Selectable when the piping type is with piping on both sides or with piping on one side.
● : Selectable when the piping type is only with piping on both sides.
- : Unselectable piping port size for Bar length.

IZS51-□T(C)□: High flow cartridge

Symbol	Applicable tube O.D.	350	380	440	560	620	800	1100	1280	1580	1880	2300	2480
4	φ4	●	●	●	-	-	-	-	-	-	-	-	-
6	φ6	○	○	○	○	○	○	○	○	○	○	○	○
8	φ8	○	○	○	○	○	○	○	○	○	○	○	○
A	φ10	○	○	○	○	○	○	○	○	○	○	○	○
5	φ3/16"	○	○	○	○	○	○	○	○	○	○	○	○
7	φ1/4"	○	○	○	○	○	○	○	○	○	○	○	○
9	φ5/16"	○	○	○	○	○	○	○	○	○	○	○	○
B	φ3/8"	○	○	○	○	○	○	○	○	○	○	○	○

IZS51-□J(K)□: Middle flow cartridge

Symbol	Applicable tube O.D.	350	380	440	560	620	800	1100	1280	1580	1880	2300	2480
4	φ4	○	○	○	○	○	○	○	○	○	○	○	○
6	φ6	○	○	○	○	○	○	○	○	○	○	○	○
8	φ8	○	○	○	○	○	○	○	○	○	○	○	○
A	φ10	○	○	○	○	○	○	○	○	○	○	○	○
5	φ3/16"	○	○	○	○	○	○	○	○	○	○	○	○
7	φ1/4"	○	○	○	○	○	○	○	○	○	○	○	○
9	φ5/16"	○	○	○	○	○	○	○	○	○	○	○	○
B	φ3/8"	○	○	○	○	○	○	○	○	○	○	○	○

IZS51-□V(S)□: Low flow cartridge

Symbol	Applicable tube O.D.	350	380	440	560	620	800	1100	1280	1580	1880	2300	2480
4	φ4	○	○	○	○	○	○	○	○	○	○	○	○
6	φ6	○	○	○	○	○	○	○	○	○	○	○	○
8	φ8	○	○	○	○	○	○	○	○	○	○	○	○
A	φ10	○	○	○	○	○	○	○	○	○	○	○	○
5	φ3/16"	○	○	○	○	○	○	○	○	○	○	○	○
7	φ1/4"	○	○	○	○	○	○	○	○	○	○	○	○
9	φ5/16"	○	○	○	○	○	○	○	○	○	○	○	○
B	φ3/8"	○	○	○	○	○	○	○	○	○	○	○	○

With valve unit: IZS51-□□□-V

Note) Refer to the table below for selecting One-touch fitting when Piping type is with valve unit (symbol "V").

Explanatory note □ : Valve unit is mounted on the M12 connector side of the ionizer. The opposite side is plugged.
■ : Valve units mounted on both sides of the ionizer. Please supply air from piping ports on both sides.
- : Unselectable piping port size for Bar length.

IZS51-□T(C)□-V: High flow cartridge

Symbol	Applicable tube O.D.	350	380	440	560	620	800	1100	1280	1580	1880	2300	2480
4	φ4	-	-	-	-	-	-	-	-	-	-	-	-
6	φ6	□	□	□	□	□	□	□	□	□	□	□	□
8	φ8	□	□	□	□	□	□	□	□	□	□	□	□
A	φ10	□	□	□	□	□	□	□	□	□	□	□	□
5	φ3/16"	□	□	□	□	□	□	□	□	□	□	□	□
7	φ1/4"	□	□	□	□	□	□	□	□	□	□	□	□
9	φ5/16"	□	□	□	□	□	□	□	□	□	□	□	□
B	φ3/8"	□	□	□	□	□	□	□	□	□	□	□	□

IZS51-□J(K)□-V: Middle flow cartridge

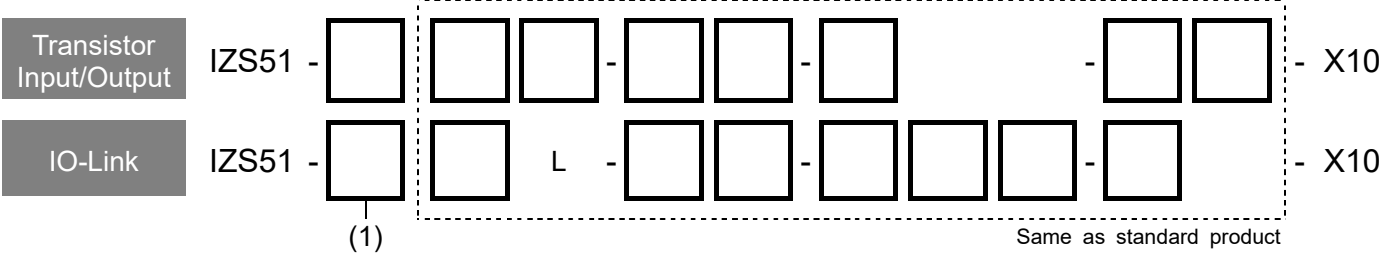
Symbol	Applicable tube O.D.	350	380	440	560	620	800	1100	1280	1580	1880	2300	2480
4	φ4	□	□	□	□	□	□	□	□	□	□	□	□
6	φ6	□	□	□	□	□	□	□	□	□	□	□	□
8	φ8	□	□	□	□	□	□	□	□	□	□	□	□
A	φ10	□	□	□	□	□	□	□	□	□	□	□	□
5	φ3/16"	□	□	□	□	□	□	□	□	□	□	□	□
7	φ1/4"	□	□	□	□	□	□	□	□	□	□	□	□
9	φ5/16"	□	□	□	□	□	□	□	□	□	□	□	□
B	φ3/8"	□	□	□	□	□	□	□	□	□	□	□	□

IZS51-□V(S)□-V: Low flow cartridge

Symbol	Applicable tube O.D.	350	380	440	560	620	800	1100	1280	1580	1880	2300	2480
4	φ4	□	□	□	□	□	□	□	□	□	□	□	□
6	φ6	□	□	□	□	□	□	□	□	□	□	□	□
8	φ8	□	□	□	□	□	□	□	□	□	□	□	□
A	φ10	□	□	□	□	□	□	□	□	□	□	□	□
5	φ3/16"	□	□	□	□	□	□	□	□	□	□	□	□
7	φ1/4"	□	□	□	□	□	□	□	□	□	□	□	□
9	φ5/16"	□	□	□	□	□	□	□	□	□	□	□	□
B	φ3/8"	□	□	□	□	□	□	□	□	□	□	□	□

Made to order

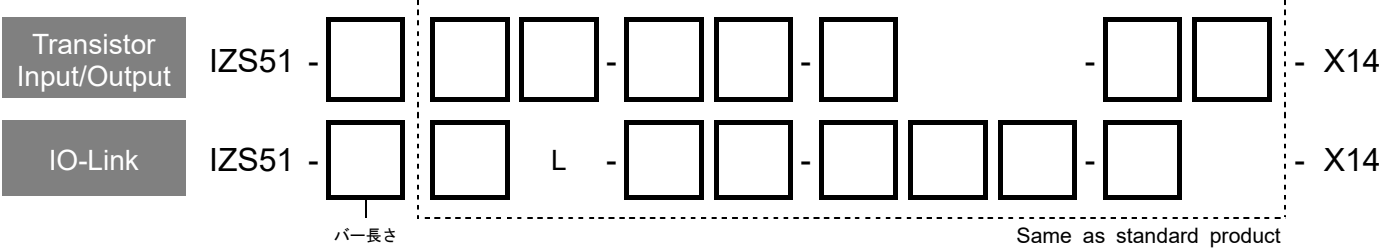
X10: Non-standard bar length



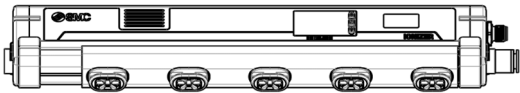
(1) Bar length

Symbol	Length (mm)	Symbol	Length (mm)	Symbol	Length (mm)	Symbol	Length (mm)	Symbol	Length (mm)
50	500	98	980	140	1400	176	1760	212	2120
68	680	104	1040	146	1460	182	1820	218	2180
74	740	116	1160	152	1520	194	1940	224	2240
86	860	122	1220	164	1640	200	2000	236	2360
92	920	134	1340	170	1700	206	2060	242	2420

X14: Model with emitter cartridge drop prevention cover



The product is shipped with emitter cartridge drop prevention cover available as an option.

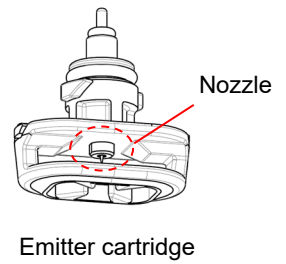


6-2. Accessories and Separately ordered item

Emitter cartridge

IZS51 - N **T**

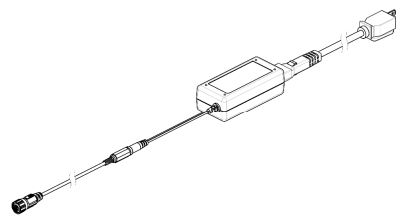
Symbol	Cartridge type	Emitter material	Nozzle color	Cartridge color
T	High flow cartridge	Tungsten	Blue	White
C		Silicon		Gray
J	Middle flow cartridge	Tungsten	Gray	White
K		Silicon		Gray
V	Low flow cartridge	Tungsten	Black	White
S		Silicon		Gray



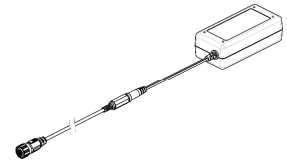
AC adaptor

IZS51 - C **G** **1**

Symbol	type
1	With AC cord
2	Without AC cord



With AC code

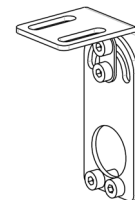


Without AC cord

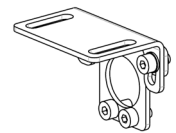
Bracket

IZS51 - B **E1**

Symbol	Type
E1	End bracket 1
M1	Intermediate bracket 1
E2	End bracket 2
M2	Intermediate bracket 2



End bracket 1



End bracket 2

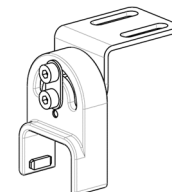
Note) Select bracket referring to the combination in the table below.
Bracket combination

Symbol	Intermediate bracket 1	Intermediate bracket 2
End bracket 1	○ (angle adjustment +/-90°)	×
End bracket 2	×	○ (angle adjustment +/-10°)

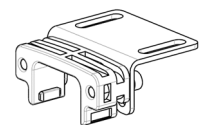
○: Possible to combine ×: Not possible to combine

Number of brackets

Bar length symbol	End bracket	Intermediate bracket
35 to 62	2 pcs.	None
80 to 158		1 pc.
188 to 230		2 pcs.
248		3 pcs.



Intermediate bracket 1

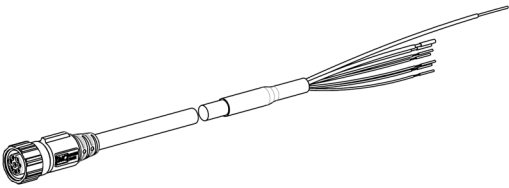


Intermediate bracket 2

Power supply cable (For NPN/PNP type)

IZS51 - C P **03**

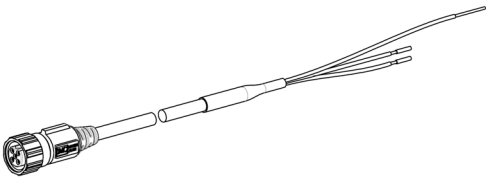
Symbol	Length
03	3m
05	5m
10	10m



Power supply cable (For IO-Link type)

IZS51 - C Q **S5**

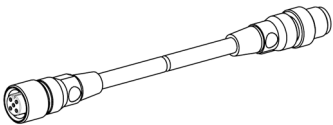
Symbol	Length
S5	0.5m
01	1m
03	3m



Communication cable (For IO-Link type)

IZS51 - C E **S5**

Symbol	Length
S5	0.5m
01	1m
03	3m

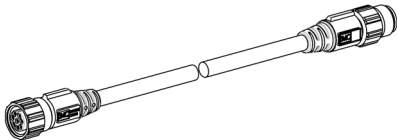


Relay cable (For IO-Link type)

IZS51 - C F **03**

Symbol	Length
03	3m
05	5m
10	10m

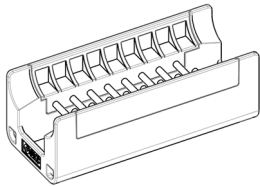
Not included T-connector



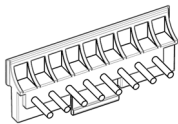
Emitter cleaning kit

IZS51 - M **3**

3	Cleaning kit
3B	Replacement brush (2pc.)



Cleaning kit

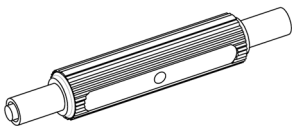


Replacement brush

Emitter cleaning kit

IZT43 - M 2

- IZT43- A003 : Replacement felt pad
- IZT43- A004 : Replacement rubber-bonded whetstone



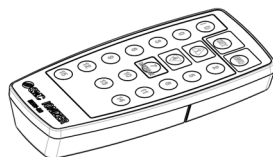
T-connector

IZS51 - C T



Remote controller

IZS51 - R C



Drop prevention cover

IZS51 - E **3**

Symbol	Number of fixed emitter cartridges
3	3 pcs.
4	4 pcs.
5	5 pcs.



Number of required drop prevention covers
Standard bar length

Symbol	Number of required drop prevention covers		
	IZS51-E3	IZS51-E4	IZS51-E5
35	0	0	1
38	2	0	0
44	1	1	0
56	0	1	1
62	0	0	2
80	1	0	2
110	1	0	3
128	2	0	3
158	2	0	4
188	2	0	5
230	1	0	7
248	2	0	7

Non-standard bar length

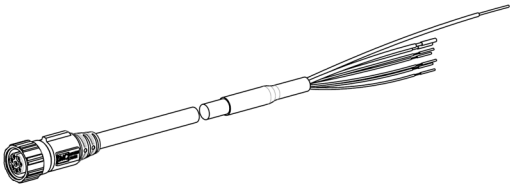
Symbol	Number of required drop prevention covers		
	IZS51-E3	IZS51-E4	IZS51-E5
50	1	0	1
68	2	0	1
74	1	1	1
86	0	1	2
92	0	0	3
98	2	0	2
104	1	1	2
116	0	1	3
122	0	0	4
134	1	1	3
140	1	0	4
146	0	1	4
152	0	0	5
164	1	1	4
170	1	0	5
176	0	1	5
182	0	0	6
194	1	1	5
200	1	0	6
206	0	1	6
212	0	0	7
218	2	0	6
224	1	1	6
236	0	1	7
242	0	0	8
278	2	0	8
296	0	1	9

Made to order

Power supply cable (For NPN/PNP type)

IZS51 - C P **01** - X13

Symbol	Length
01	1m
02	2m
04	4m
06	6m
07	7m
08	8m
09	9m
11	11m
12	12m
13	13m
14	14m
15	15m
16	16m
17	17m
18	18m
19	19m
20	10m

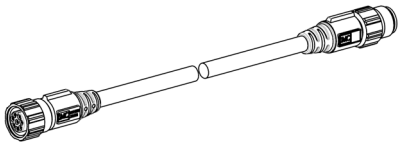


Relay cable (For IO-Link type)

IZS51 - C F **01** - X13

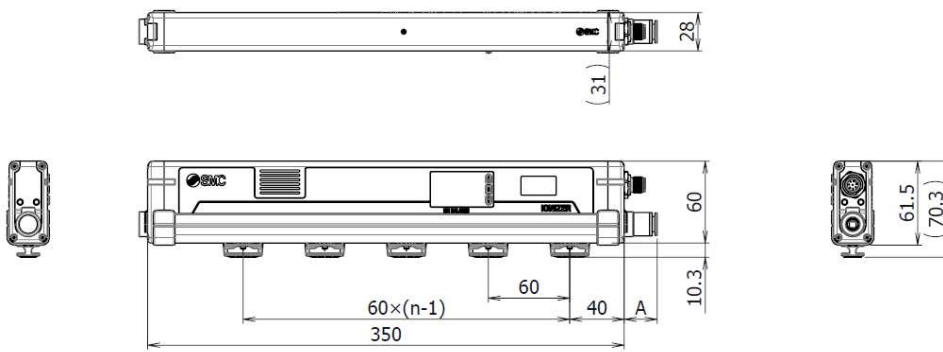
Symbol	Length
01	1m
02	2m
04	4m
06	6m
07	7m
08	8m
09	9m

Not included T-connector

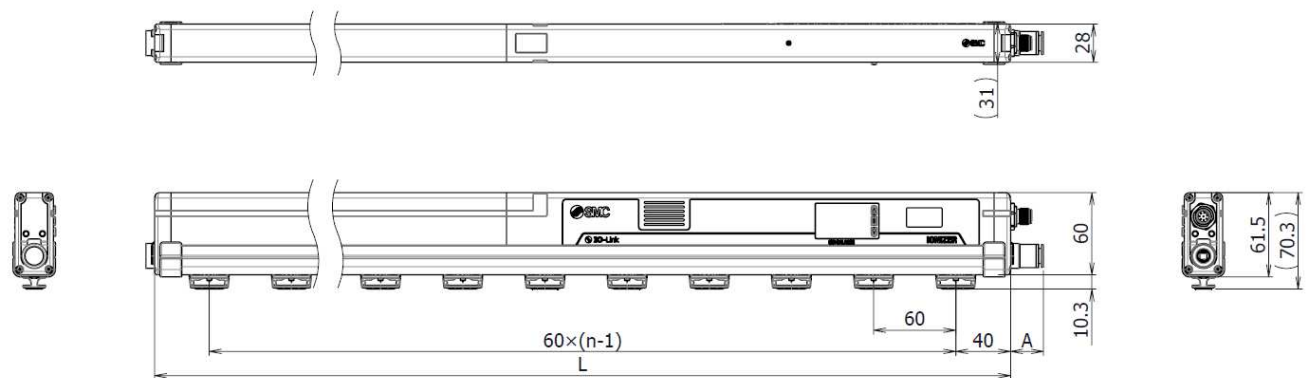


7. Outline dimensions

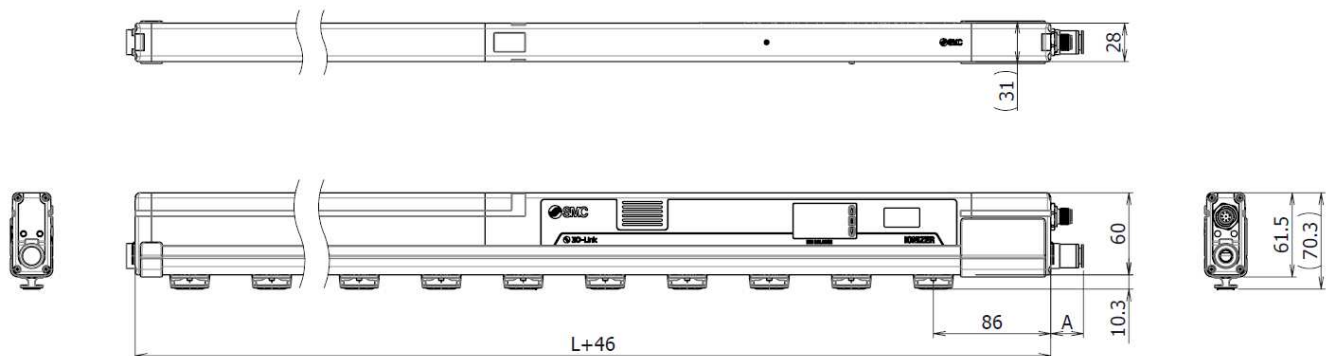
Ionizer: IZS51-350



Ionizer: IZS51-380 to 2480



Ionizer with valve unit: IZS51-V



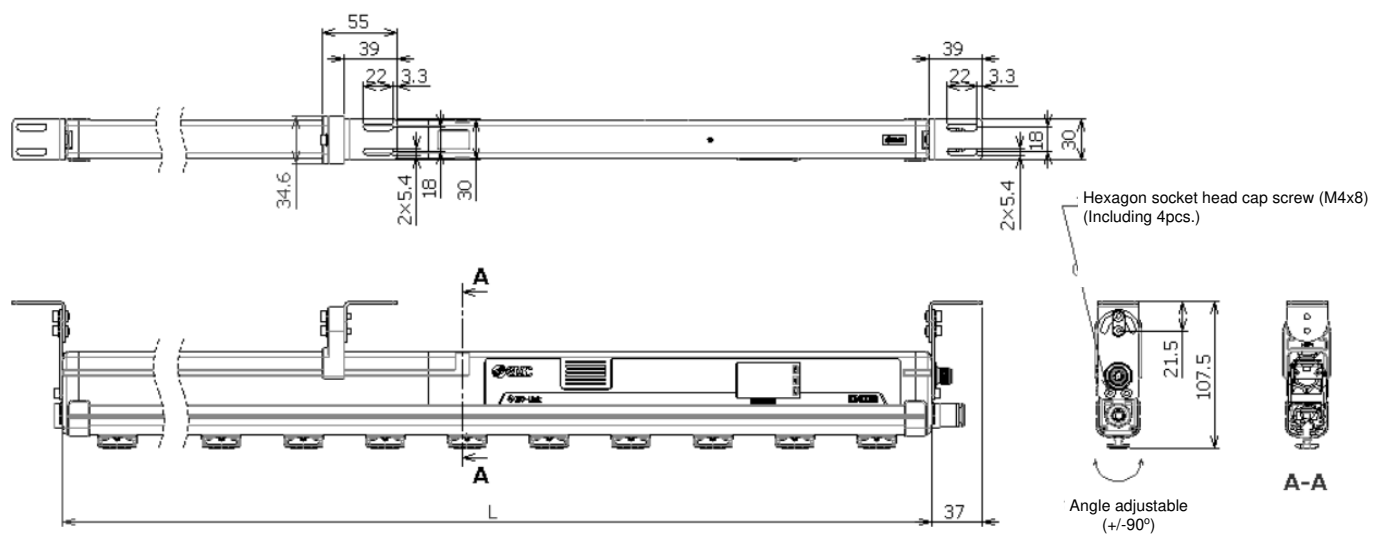
Product No.	n (pc.)	L (mm) ^{Note)}
IZS51-35	5	350
IZS51-38	6	380
IZS51-44	7	440
IZS51-56	9	560
IZS51-62	10	620
IZS51-80	13	800
IZS51-110	18	1100
IZS51-128	21	1280
IZS51-158	26	1580
IZS51-188	31	1880
IZS51-230	38	2300
IZS51-248	41	2480

Note) When selected bar length is 1580 or more with valve units on both sides, the bar length is L+92.

Applicable tube O.D.		A (mm)
Metric	φ4	15
	φ6	15
	φ8	17
	φ10	24
Inch	φ3/16"	17
	φ1/4"	16
	φ5/16"	17
	φ3/8"	25

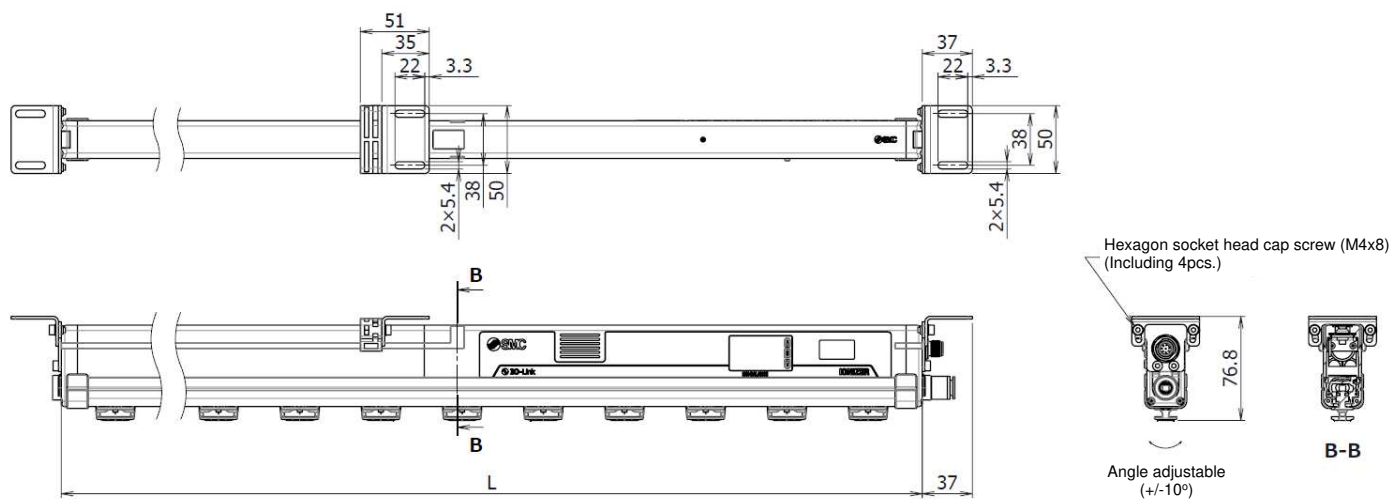
End bracket: IZS51-BE1

Intermediate bracket: IZS51-BM1

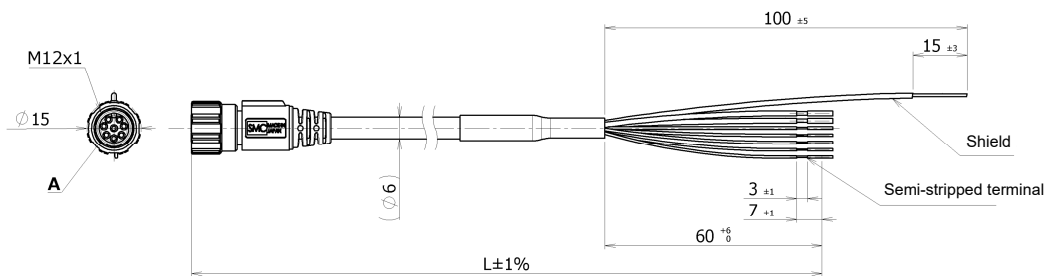


End bracket: IZS51-BE2

Intermediate bracket: IZS51-BM2



Power supply cable: IZS51-CP



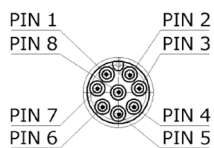
Power supply cable Length: L

Product No.	L(mm)
IZS51-CP03	3000
IZS51-CP05	5000
IZS51-CP10	9800

Cable specifications

Conductor	Number of poles	7 and shield wire
	Size	AWG20 (2 pcs.), AWG28 (5 pcs.)
Insulator	Nominal cross section	0.54mm ² (2pcs.), 0.09mm ² (5pcs.)
	O.D.	1.55mm (Brown, Blue) 0.95mm (Pink, Gray, Purple, Yellow, White)
Sheath	Material	PVC (Lead-free)
	O.D.	6mm

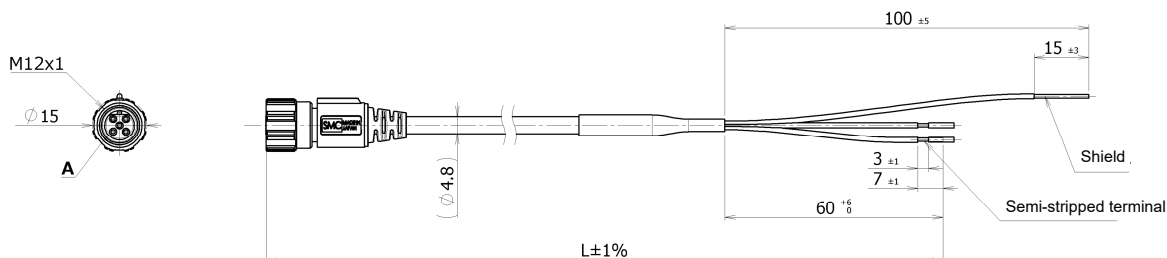
M12 socket connector
(A-coded)



Wiring table

PIN No.	Cable color	Description
1	Brown	DC(+)
2	Pink	Ion generation stop signal
3	Blue	DC(-)
4	Gray	Air supply stop signal
5	Purple	Error signal
6	Yellow	Maintenance detection signal
7	White	-
8	Shield	F.G.

Power supply cable (For IO-Link type): IZS51-CQ



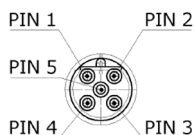
Power supply cable length: L

Product No.	L (mm)
IZS51-CQS5	500
IZS51-CQ01	1000
IZS51-CQ03	3000

Cable specifications

Conductor	Number of poles	2 and shield wire
	Size	AWG20 (2 pcs.)
Insulator	Nominal cross section	0.54mm ² (2 pcs.)
	O.D.	1.55mm (Brown, Blue)
Sheath	Material	PVC (Lead-free)
	O.D.	4.8mm

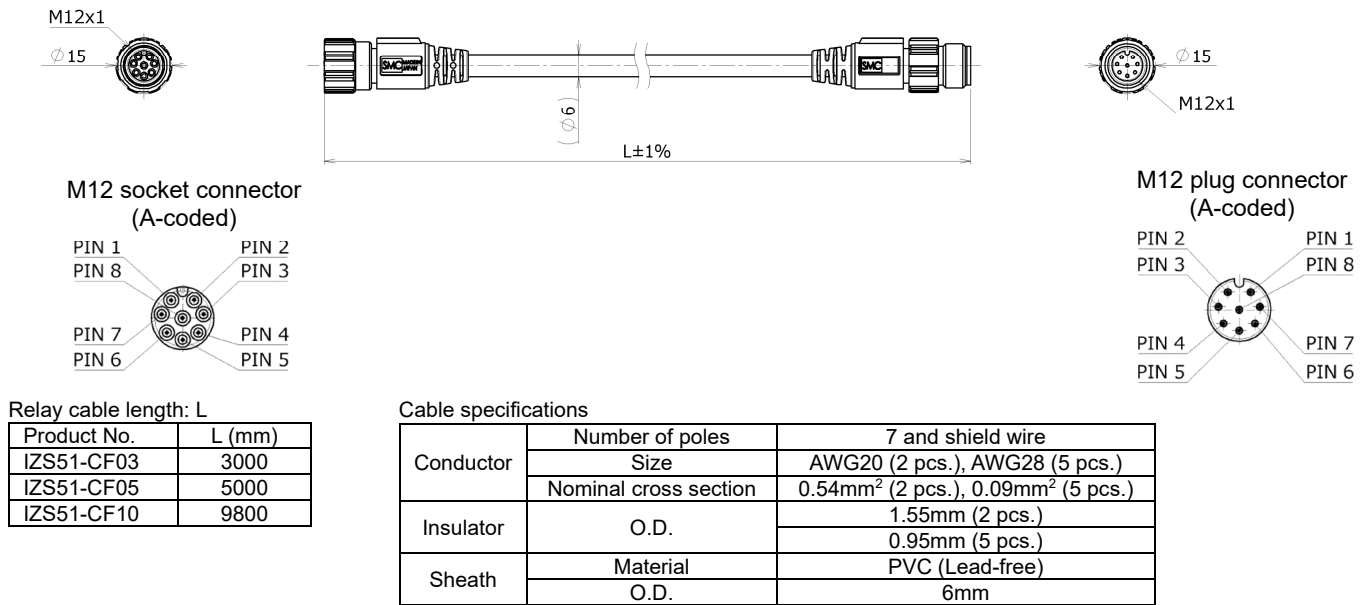
M12 socket connector
(B-coded)



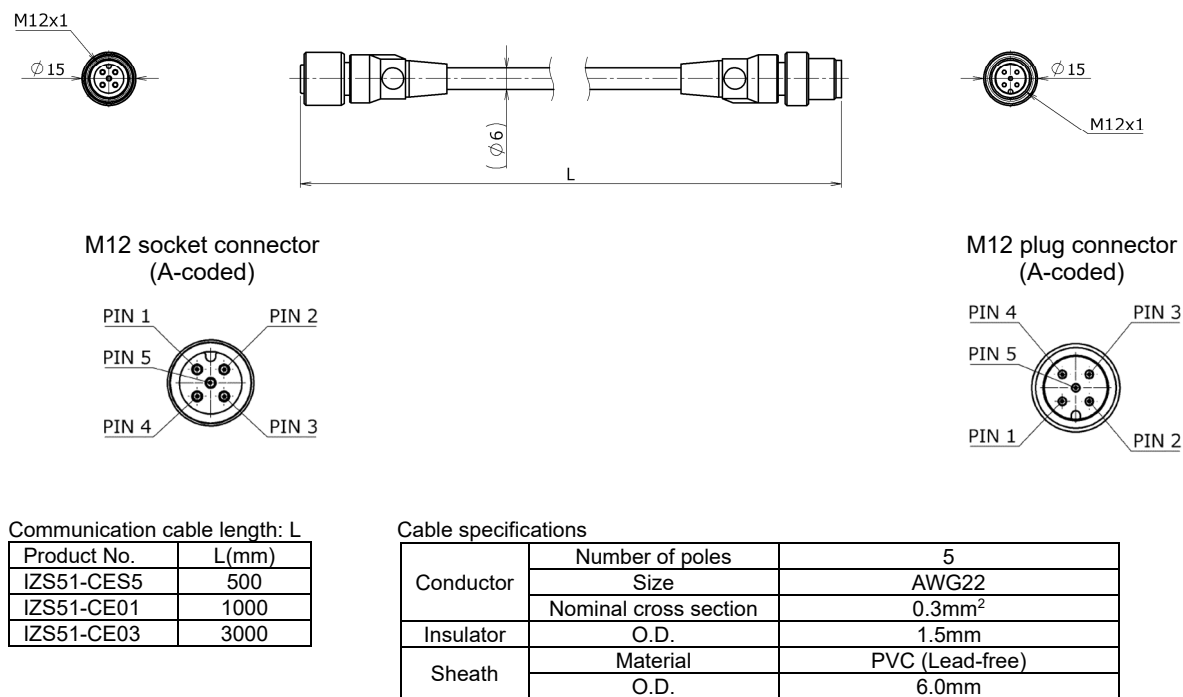
Wiring table

PIN No.	Cable color	Description
1	Brown	DC(+)
2	-	-
3	Blue	DC(-)
4	-	-
5	Shield	F.G.

Relay cable (For IO-Link type): IZS51-CF



Communication cable (For IO-Link type): IZS51-CE



8. Specifications

Ionizer

Ionizer model		IZS51-□□N (NPN type)	IZS51-□□P (PNP type)	IZS51-□□L (IO-Link type)
Ion generation method		Corona discharge method		
Method of applying voltage		AC, DC ^{Note1)}		
Applied voltage ^{Note2)}		+/-7,000V		
Offset voltage ^{Note3)}		Within +/-30V		
Air purge	Fluid	Air (Clean and dry)		
	Operating pressure	0.5MPa or less		
	Proof pressure	0.7MPa		
	Connected tube O.D.	Metric size: $\phi 4$ 、 $\phi 6$ 、 $\phi 8$ 、 $\phi 10$ Inch size: $\phi 1/16$ "、 $\phi 3/4$ "、 $\phi 5/16$ "、 $\phi 3/8$ "		
Power supply voltage		DC24V +/-10%		
Current consumption		700mA or less		
Input signal ^{Note4)}		Connect with DC(-) Voltage range: DC5V or less Current consumption: 5mA or less	Connect with DC(+) Voltage range: DC19V to supply voltage Current consumption: 5mA or less	-
Output signal ^{Note4)}		Max. load current: 100mA or less Residual voltage: 1V or less (at 100mA of load current) Max. supply voltage: DC26.4V	Max. load current: 100mA or less Residual voltage: 1V or less (at 100mA of load current)	-
IO-Link communication ^{Note5)}		-	-	Voltage range: DC18 to 30V Current consumption: 100mA or less Refer to [Communication specification of IO-Link] for detail.
Function		Auto balance, Maintenance detection, High voltage abnormality detection (ion generation stops when abnormality is detected), Ion generation stop input		
Effective static neutralizing distance		50 to 2000mm		
Ambient and fluid temperature		0 to +40°C		
Ambient humidity		35 to 80%Rh (no condensation)		
Material		Body: ABS, PBT, PC, Aluminum, SUS Emitter cartridge: PBT, SUS Emitter: Tungsten or Single crystal silicon		
IP enclosure		IP30		
Standards/Directive		CE (EMC directive, RoHS directive), UKCA		

Note 1) Apply cathode or anode to DC.

Note 2) Measured value with a high voltage probe (1000M Ω , 5pF).

Note 3) With air purge at a distance of 300mm between the workpiece and ionizer.

Note 4) Transistor input/output type

Note 5) IO-Link type

Communication specification of IO-Link

IO-Link type	Device
IO-Link version	V1.1
Configuration file format	IODD file
Communication speed	COM2(38.4kbps)
Minimum cycle time	8.0ms
Process data length	INPUT Data:3byte、Output Data:2byte
On-Request data	Compatible
Data storage	Compatible
Event	Compatible
Vender ID	131(0×0083)
Device ID	666(0×00029A)

Emitter cartridge qty., weight

Symbol for bar length	35	38	44	56	62	80	110	128	158	188	230	248
Emitter cartridge qty. (pcs.)	5	6	7	9	10	13	18	21	26	31	38	41
Weight g	730	772	844	959	1018	1192	1483	1658	1948	2238	2645	2819

AC adapter

Models	IZS51-CG1,IZS51-CG2
Input voltage	AC100V to 240V, 50/60Hz
Output current	1.9A
Ambient temperature	0 to 40°C
Ambient humidity	35 to 65%Rh (no condensation)
Weight	365g(IZS51-CG1),200g(IZS51-CG2)
Applicable standard/directive	IEC62368-1

Note) AC Inlet IEC60320 C6

The included AC cable is for use in Japan only (Rated voltage 125 V, Plug JIS C 8303)

Remote controller

Model	IZS51-RC
Type	Infrared ray type
Transmission capacity	5m (Varies depending on the operating conditions and environment)
Power supply	2 AAA sized batteries
Ambient temperature	0 to 45°C
Ambient humidity	30 to 80%Rh (no condensation)
Weight	33g (excluding dry cell batteries)

Troubleshooting

	Status	Possible causes	Investigation method and possible causes	Countermeasures
Does not operate	The product does not turn ON.	Insufficient supply voltage or current	Check the voltage and current capacity of the power supply.	Operate at the specified voltage and current consumption referring to [8. Specifications].
		Power supply incorrectly wired	Check the power supply wiring.	Ensure connections are in accordance with [2-2. Electrical connection].
LCD is not displayed correctly	"CPU" is displayed flashing in red.	Abnormality of the CPU	1) Check if there is any high current equipment installed near the ionizer. 2) Check if the power supply cable or the separate cable is routed together with any high power cable.	1) If any high current equipment is nearby, either move it away or consider an alternative location for the ionizer. 2) Route the ionizer wiring separately to high power cables. 3) Install a noise filter to the controller power supply.
	"PW.C" or "PW.I" is displayed flashing in red.	Voltage of the power supply is out of range.	Check the voltage values of the power supply.	Operate at the specified voltage range referring to [8. Specifications].
	"HV" is displayed flashing in red.	Abnormality of the High voltage	1) Check the emitter for contamination. 2) Check whether there is arcing between the bar and workpiece to be neutralized. 3) Check whether the ionizer is used in an environment subject to condensation or moisture.	1) If dust or dirt is found on the emitter, clean the emitter referring to [10. Maintenance]. 2) If there is arcing between the workpiece to be neutralized and the bar, increase the distance between them until arcing no longer occurs. 3) The ionizer must not be used in environments subject to condensation or moisture.
	"NDL" is displayed.	1) Contamination on the emitters. 2) Emitters degradation or damage.	Clean the emitter with the maintenance kit and check the static neutralization effect.	1) If dust or dirt is found on the emitter, clean the emitter referring to [10. Maintenance]. 2) If the effect is small even after maintenance of the emitter, replace the emitter cartridge.
	"STP" is displayed flashing in green.	Ion generation stop signal is input.	Check that the ion generation stop signal is not input.	When performing static neutralization, do not input the ion generation stop signal.
	No output signal.	1) Signal wired incorrectly. 2) Wrong NPN/PNP type.	1) Check the wiring referring [2-2. Electrical connection]. 2) Check the output referring [3-4-8. Output signals check mode].	Please wire correctly.
No output signal	"OC.E" is displayed flashing in red. (Error signal output over current)	Circuit protection operation due to signal overcurrent.	Check the signal load current.	Ensure that the maximum load current is not exceeded referring to [8. Specifications].
	"OC.C" is displayed flashing in red. (Maintenance signal output over current)			
Unable to input a signal	Unable to turn ON/OFF ion generation stop signal.	1) Signal wired incorrectly. 2) Wrong NPN/PNP type.	Check the wiring referring [2-2. Electrical connection].	Please wire correctly.
	Unable to turn ON/OFF air supply stop signal.	1) Signal wired incorrectly. 2) Wrong NPN/PNP type. 3) Ion generation stop/air supply stop synchronization is ON.	1) Check the wiring referring [2-2. Electrical connection]. 2) Check the setting of ion generation stop/air supply stop synchronization referring [3-4-5. Ion generation stop/air supply stop synchronization selection mode].	1) Please wire correctly. 2) Set ion generation stop/air supply stop synchronization setting to OFF referring [3-4-5. Ion generation stop/air supply stop synchronization selection mode].

	Status	Possible causes	Investigation method and possible causes	Countermeasures
Poor neutralizing performance		Insufficient adjustment of offset voltage.	1) Check the offset voltage by the measurement equipment such as the charged plate. 2) Check the ion balance using the ion balance display.	Adjust offset voltage referring to [3-5-2. Offset voltage adjustment mode].
	The effect of the ionizer is small from the time of installation.	Ionized air is not reaching the workpiece to be neutralized. 1) Distance to the workpiece is far. 2) Interference with airflow. 3) Ionized air blocked or absorbed by obstacles. 4) Ionized air from a nearby ionizer is interfering.	1) Check if it is effective by moving it closer to the workpiece. 2) Check if an external airflow could interfere with the flow of ionized air from the ionizer. 3) Check to see if there are any obstructions in the path where the ionized air reaches the workpiece to be neutralized. 4) Compare the static elimination effect of ionized air generated from the ionizer with other ionizer running and stopped to see if the ionized air generated from the ionizer is being interfered with by ionized air generated from other ionizer.	1) Install the bar close to the workpiece. 2) If an external airflow is having an effect, consider shutting off the air flow or otherwise changing the installation so that ionized air is not interfered with. 3) If there is an object between or near the ionizer and the workpiece to be neutralized, ionized air may be blocked or adsorbed and not reach the workpiece. 4) If other ionizer is nearby installed, ionized air may interfere, resulting in reduced ionizer performance. Refer to [Limitation of use] before installation to avoid interference.
		Ionizer potential reference is off.	Check F.G. (shield wire) is connected.	The ionizer neutralizes static electricity relative to ground, ensure F.G. (shield wire) always has a ground connection of less than 100Ω.
	The effect of the ionizer became small after use.	Ion generation volume is low due to contamination on the emitter.	Check the emitter for contamination.	If dust or dirt is found on the emitter, clean the emitter referring to [10. Maintenance].
		Ion generation rate decrease due to emitter degradation or damage.	Clean the emitter with the maintenance kit and check the static neutralization effect.	If the effect is small even after maintenance of the emitter, replace emitter cartridge.

9. Maintenance

Warning

- A high voltage generating circuit is mounted onto this product.
- Verify that the power supply is OFF when performing maintenance.
- Never disassemble or modify the product, as this can cause loss of product functionality and a risk of electric shock and earth leakage.
- Do not touch the end of the emitters. They have a sharp end and touching them directly with your fingers may cause injury.
- Only people who have sufficient knowledge are allowed to clean the emitters.

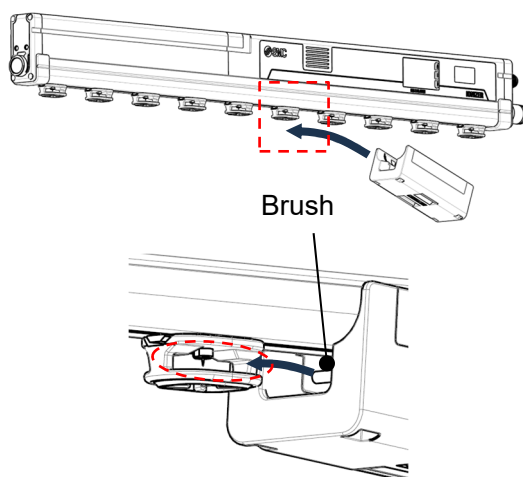
- If this product is used for an extended period of time, contamination such as dust will stick to the emitters, reducing the static neutralization performance.
- The maintenance detection function is available. When the emitter contamination is detected, clean the emitter.
- In cases where the maintenance detection function is not used, perform neutralizing performance test and set a maintenance cycle for periodic cleaning.
- Emitter contamination level is different depending on the installation environment and supply pressure.
- If the maintenance signal is output upon completion of cleaning the emitter, it may not have been cleaned sufficiently or it may be worn or damaged. If the emitters are worn out or damaged, replace the emitter cartridge.
- If the emitter is worn out or damaged, the static electricity elimination performance will decrease.

Cleaning procedure of emitter

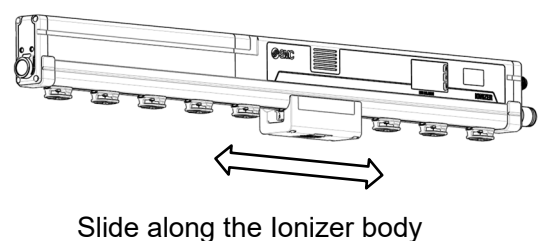
- It is highly recommended that the emitter cleaning kit (IZS51-M3 or IZT43-M2) is used to clean the emitter needles.

Cleaning procedure by using IZS51-M3

- a. Before cleaning the emitters, shutoff the power and air supply.
- b. Place the cleaning kit (IZS51-M3) on the lonizer so that the brush touches the emitter and move it along the groove to clean it.

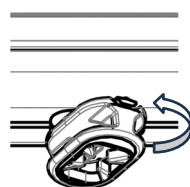


Place the cleaning kit so that the brush fits into the circled area shown in above figure.

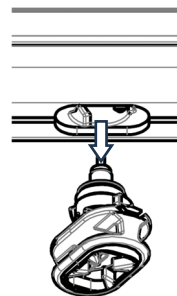


Cleaning procedure by using IZT43-M2

- a. Before cleaning the emitters, shutoff the power and air supply.
- b. The emitters may be cleaned with the emitter cartridges mounted to the lonizer body or with the cartridges removed from the lonizer body. Refer to the figure on the right for instructions on how to remove the cartridges.



- (1) Rotate the cartridge 60° in the counter-clockwise direction.



- (2) Pull to remove.

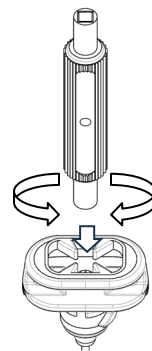
- c. The emitter cleaning kit (IZT43-M2) has felt at one end of the tool and rubber-bonded whetstone ^{Note)} at the other end of the tool.

Saturate the felt end of the emitter cleaning tool with alcohol and insert it into the back of the emitter cartridge. Turn the tool for several rotations to thoroughly remove dirt.

If it is not possible to thoroughly remove the dirt using the felt end of the cleaning tool, the rubber-bonded whetstone should be used in the same procedure as described for that of the felt end.

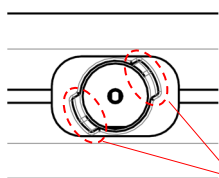
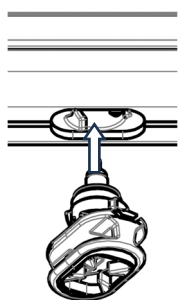
If you do not have a cleaning kit, an alcohol saturated cotton ball can be used for cleaning the electrodes. Use caution to prevent damage to the electrode needles.

The alcohol used should be reagent ethanol class 1 99.5vol% or more.

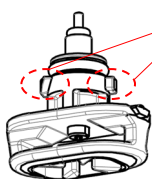


**Note) Do not use a rubber -bonded whetstone, if emitter material is silicon.
Then emitter tip may be accidentally broken off when cleaning.**

- d. When the emitter cartridges are removed for cleaning, remount them to the lonizer body according to the figure shown below. Make sure that the cartridges are securely mounted. If not, the cartridges may become dislodged when compressed air is supplied to the ionizer.

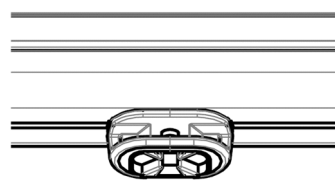
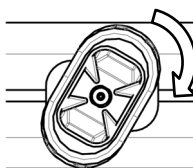
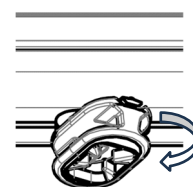


Mating mark



Protruded part

- (1) Insert the emitter cartridge with aligning the protruded part on the cartridge and the mating mark on the lonizer body.



Groove

- (2) Rotate the cartridge 60° in the clockwise direction until it is parallel to the groove on the bottom of the lonizer, then secure it in place.

- e. Confirm that the static neutralization performance is maintained after cleaning and remounting of the cartridges are completed.

Revision history

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Note: Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.
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