

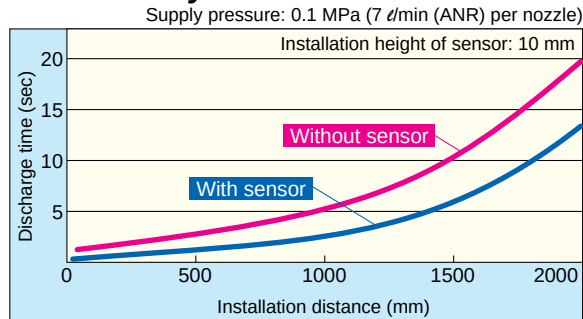
# Ionizer



## ● 2 types of sensors are available.

### ● Rapid elimination of static electricity by a feedback sensor

Continuously emits ions in accordance with the detected polarity of a workpiece.



<Conditions> Static electricity elimination features are based on data from using a charged plate (size: 150 mm x 150 mm, capacitance: 20 pF) as defined in the U.S. ANSI standards (ANSI/ESD, STM3, 1-2000). Use this as a guideline for model selection only because the value varies depending on the material and/or size of the subject.

### ● Ion balance control by an autobalance sensor

## ● Discharge time: 0.3 seconds

Conditions / Static buildup decreased from 1000 V to 100 V

Discharged object: Charged plate monitor (150 mm x 150 mm, capacitance 20 pF)

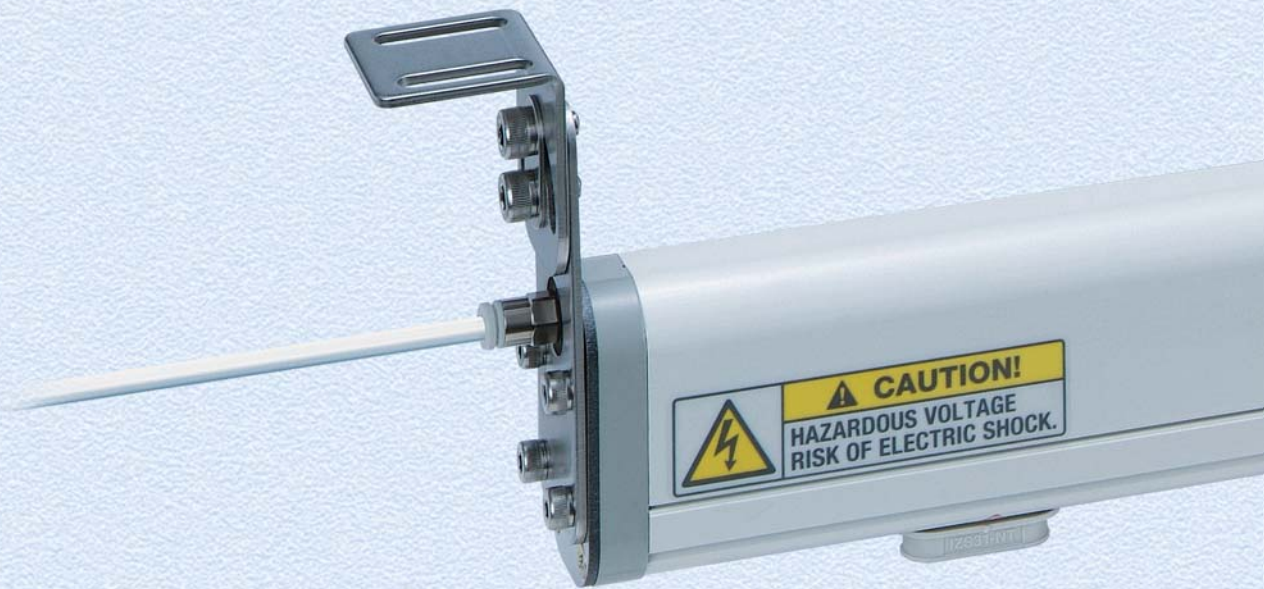
Installation distance: 200 mm (Tungsten electrode with air purge)



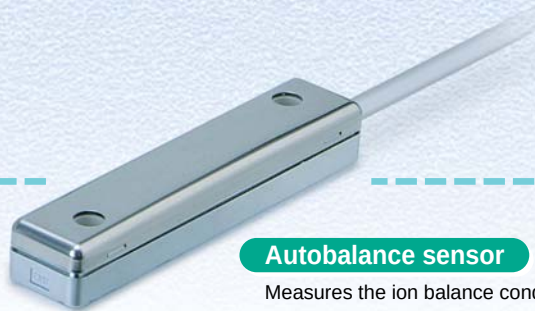
Controlled ion balance by sensor

Series **IZS31**

**SMC**  
CAT.EUS100-68A-UK



## Reduction in ion balance adjustment man-hours by using an autobalance sensor

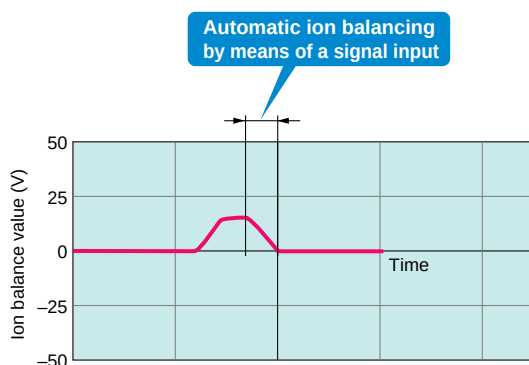


**Autobalance sensor**

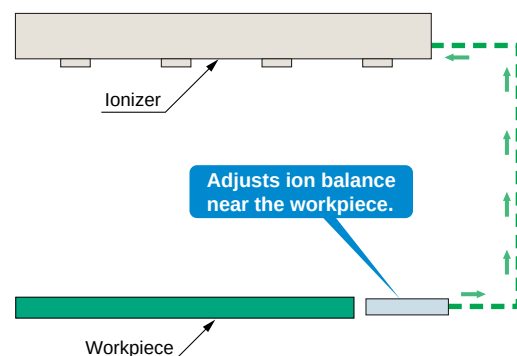
Measures the ion balance condition.

### Automatic ion balance adjustment and reduction in ion balance adjustment man-hours by using an autobalance sensor

In the pulse DC mode, the ion balance can be automatically adjusted using an autobalance sensor.



The ion balance is not affected by the height of installation or any disturbance interference since the ionizer is designed to adjust the ion balance near the autobalance sensor.

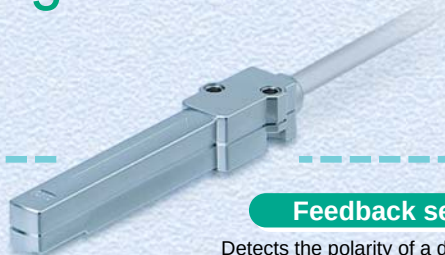


- The autobalance sensor may be connected only when adjusting the ion balance.





## Rapid elimination of static electricity by using a feedback sensor

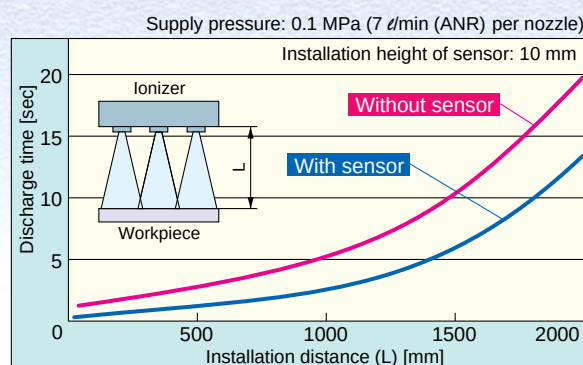
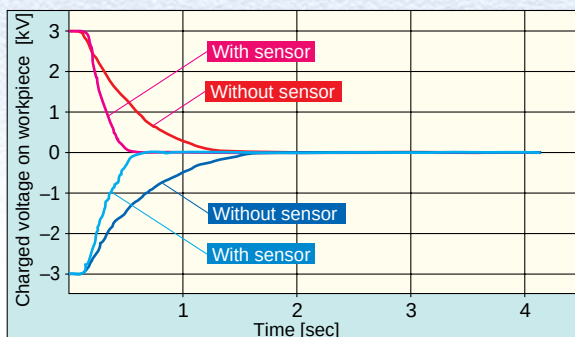


### Feedback sensor

Detects the polarity of a discharged object and measures the charged voltage.

### ■ Rapid elimination of static electricity by using a feedback sensor

- The speed of static electricity removal has been increased by reading the workpiece's electrostatic potential with the feedback sensor and then continuously emitting ions of a reverse polarity.

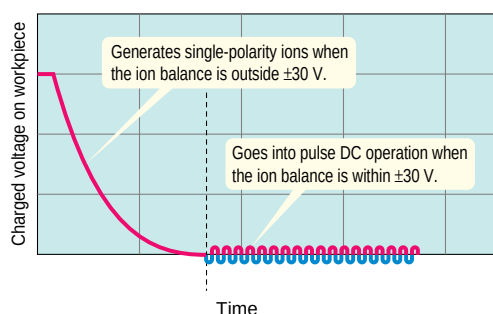


- Operation mode after static electricity removal (ion balance: within  $\pm 30$  V) can be selected.

**Energy saving mode:** Stops generating ions after static electricity removal to reduce power consumption. Air consumption can also be reduced by switching a pneumatic valve with the static electricity removal completion signal.

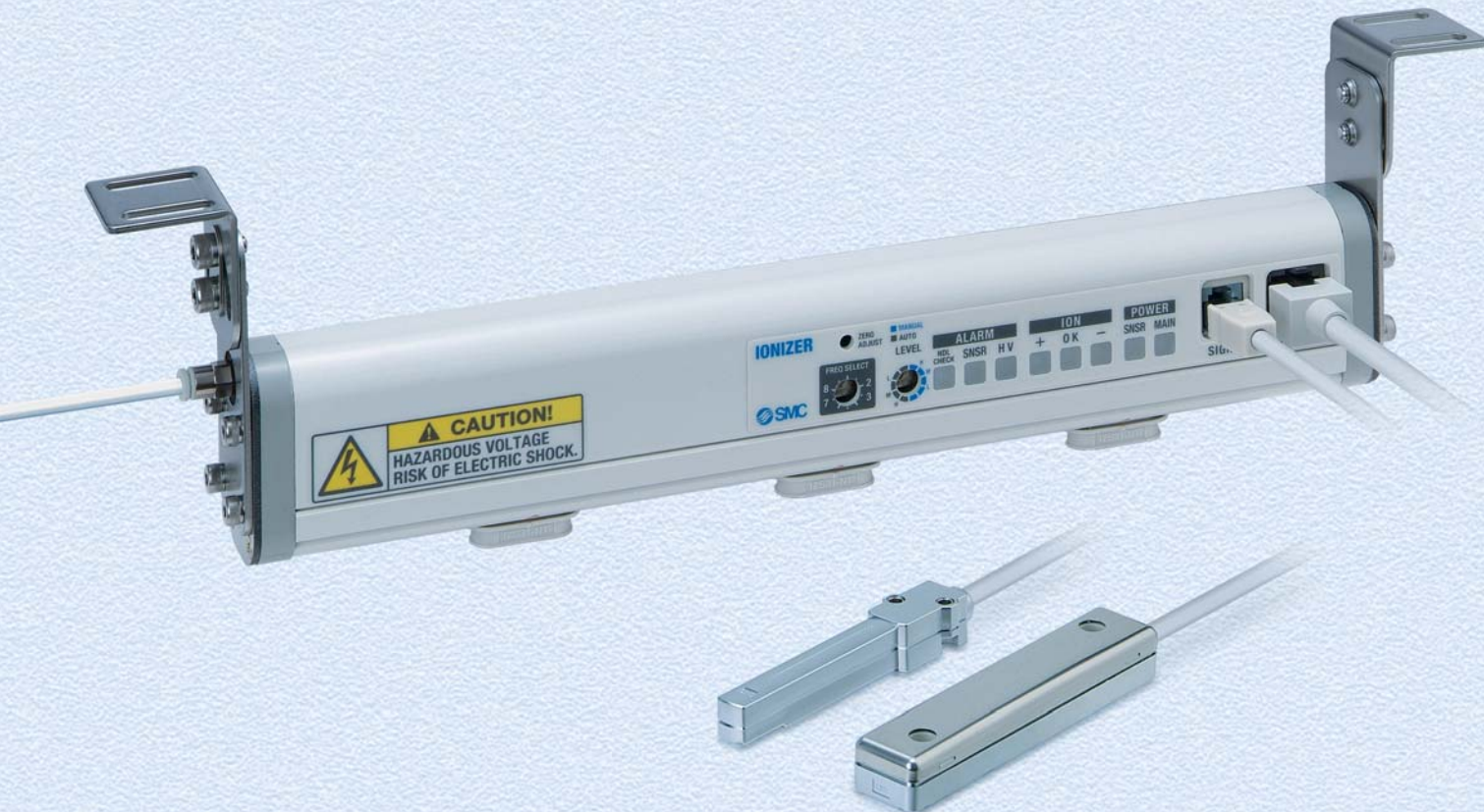
Note) The pneumatic valve must separately be procured.

**Continuous static electricity removal mode:** After static electricity removal, the ionizer changes to pulse DC operation and continues to remove static electricity to make it approach 0 V even if the ion balance is below 30 V.



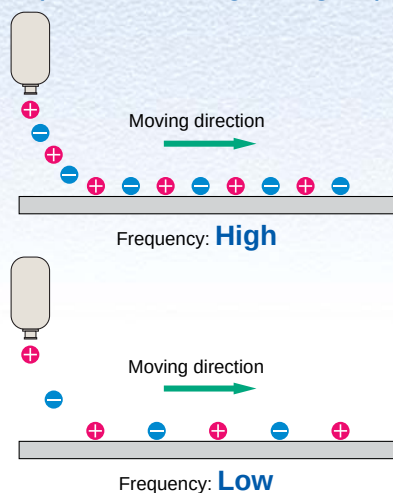
| Mode                                                     | Ion emission waveform                                                                  |
|----------------------------------------------------------|----------------------------------------------------------------------------------------|
| Sensing DC<br>Energy saving mode                         | <div> <div>+</div> <div>—</div> <div>Stop</div> </div>                                 |
| Sensing DC<br>Continuous static electricity removal mode | <div> <div>+</div> <div>—</div> <div>Static electricity removal completed</div> </div> |
| Pulse DC                                                 | <div> <div>+</div> <div>—</div> <div>Static electricity removal completed</div> </div> |
| Image of positively charged object                       | <div> <div>+</div> <div>—</div> <div>Static electricity removal completed</div> </div> |





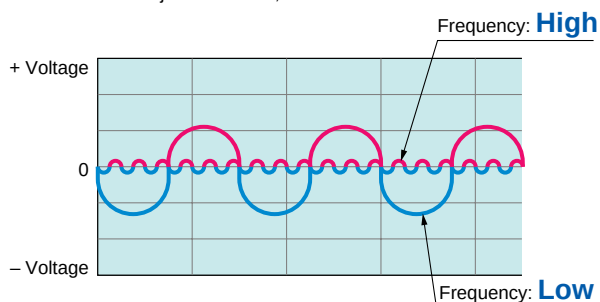
### ■ Ion generation frequency: Max 60 Hz

- Ions are discharged at high density on to workpieces moving at high speed.



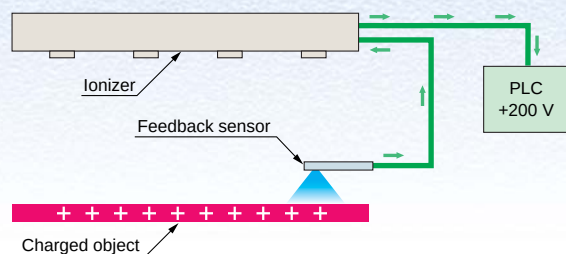
- This reduces the range of surface potential fluctuations for short installation distances after static electricity removal.

Note) The range of surface potential fluctuations varies depending on the object's material, etc.



### ■ Detects the electric potential difference and outputs an analogue voltage. (During sensing DC mode)

Outputs measured data at a 1 to 5 V level when a feedback sensor is used. By outputting the data to a PLC, etc., it is possible to control the static electricity.



### ■ Enhanced display functions

1. Visualisation of charging condition (During sensing DC mode)
2. Visualisation of ion balance (When pulse DC mode or autobalance sensor are used.)

| Workpiece polarity                                                   | LED<br>+ OK -                                                                                                                                                                                                                                                     | Workpiece electric charged voltage |                                                                                                                                                                                                                                                                                                             |
|----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Positive<br><br>Static electricity removal completed<br><br>Negative |    | +400 V or higher                   |  Light ON<br> Blinking at 4 Hz<br> Light OFF |
|                                                                      |    | +100 V to +400 V                   |                                                                                                                                                                                                                                                                                                             |
|                                                                      |    | +30 V to +100 V                    |                                                                                                                                                                                                                                                                                                             |
|                                                                      |    | Within ±30 V                       |                                                                                                                                                                                                                                                                                                             |
|                                                                      |    | -30 V to -100 V                    |                                                                                                                                                                                                                                                                                                             |
|                                                                      |    | -100 V to -400 V                   |                                                                                                                                                                                                                                                                                                             |
|                                                                      |    | -400 V or lower                    |                                                                                                                                                                                                                                                                                                             |

### ■ Can continuously emit ions of a desired polarity. (During DC mode)

Can be used to remove static electricity from quickly-charged or high-potential workpieces or to electrostatically charge them.



## ■ Dirt-detection on an electrode needle

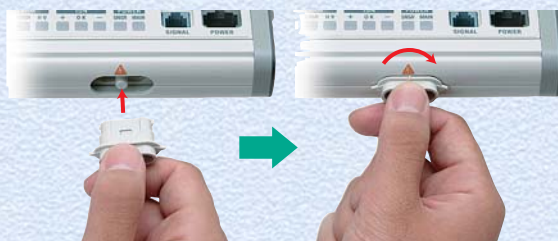
Detects electrode needle dirt upon signal input and provides maintenance output signals, reducing maintenance man-hours.



Maintenance display LED light ON

## ■ Electrode cartridge drop prevention

- Locking by double-action



- Security cover

Can additionally prevent electrode cartridges from dropping off.



When attached to the main unit

## ■ 3 types electrode needle material

- Tungsten (Ion balance:  $\pm 30$  V)
- Monocrystal silicon (Ion balance:  $\pm 30$  V Applicable to environments sensitive to metal contamination)
- Stainless steel (Ion balance:  $\pm 100$  V)



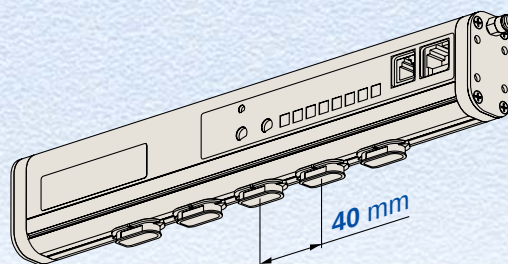
## ■ Made to Order

- Non-standard bar length: IZS31-□□□-X10

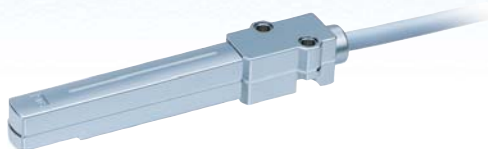
|          |                                                                                                 |
|----------|-------------------------------------------------------------------------------------------------|
| Standard | 300, 380, 620, 780, 1100, 1260, 1500, 1900, 2300                                                |
| -X10     | 460, 540, 700, 860, 940, 1020, 1180, 1340, 1420, 1580, 1660, 1740, 1820, 1980, 2060, 2140, 2220 |

- Electrode cartridge 40 mm-pitch: -X15 (Supported length: 1260 mm max.)

Note) Air purge nozzles are arranged at an 80 mm-pitch.



## Related Equipment

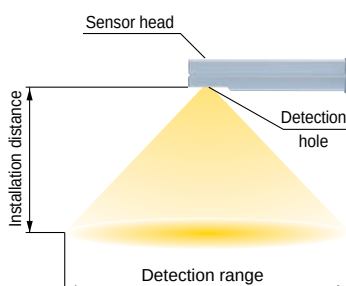


### Electrostatic Sensor / Series IZD10

Enables the “visualisation” of static electricity.

- Analogue output: **1 to 5 V**
- Measurement voltage range:  $\pm 0.4$  kV (Installation distance 25 mm)  
 $\pm 20$  kV (Installation distance 50 mm)
- Dimensions: **17 mm x 13 mm x 88 mm**
- Measurement range

Installation distance  
**10 to 50 mm**  
IZD10-110 ( $\pm 0.4$  kV)  
**New 25 to 75 mm**  
IZD10-510 ( $\pm 20$  kV)



### Electrostatic Sensor Monitor / Series IZE11

Receives an output from the IZD10 electrostatic sensor to digitally display the electrostatic potential.

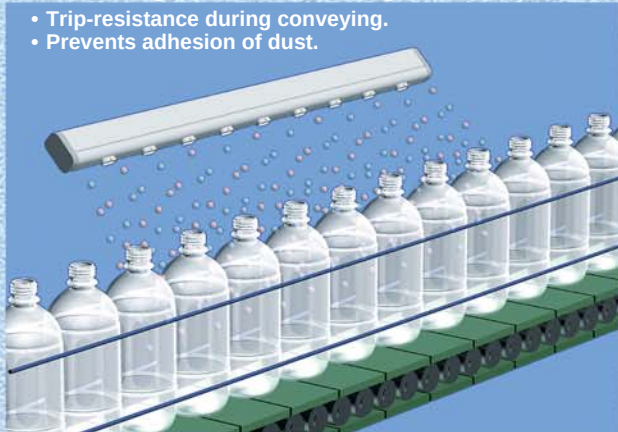
- Output: Switch output x **2** + Analogue output  
(**1 to 5 V**, **4 to 20 mA**)
- Minimum unit setting: **0.001 kV** (at  $\pm 0.4$  kV)  
**0.1 kV** (at  $\pm 20$  kV)
- Display accuracy:  $\pm 0.5\%$  F.S.  **$\pm 1$  digit** or less
- Detection distance correction function  
(adjustable in **1 mm** increments)
- Supports two types of sensors  
( $\pm 0.4$  kV and  $\pm 20$  kV) through range selection



# Application Examples

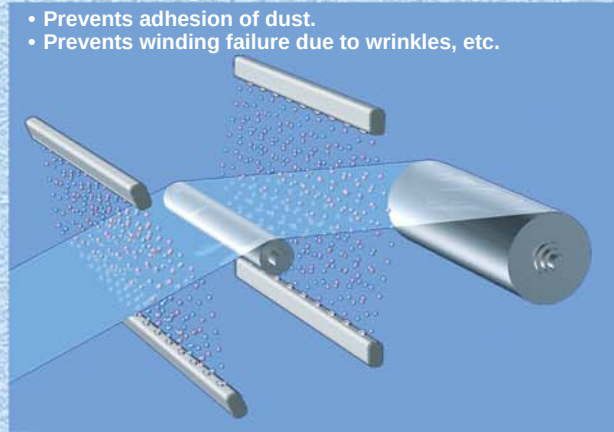
## Eliminating static electricity on PET bottles

- Trip-resistance during conveying.
- Prevents adhesion of dust.



## Eliminating static electricity on film

- Prevents adhesion of dust.
- Prevents winding failure due to wrinkles, etc.



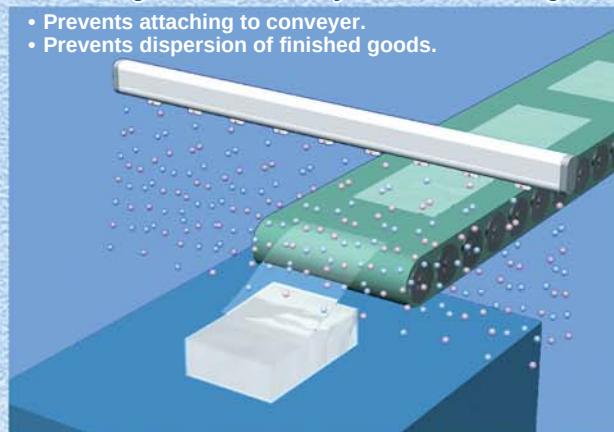
## Eliminating static electricity on molded goods

- Improves detachability of mold goods from a die.



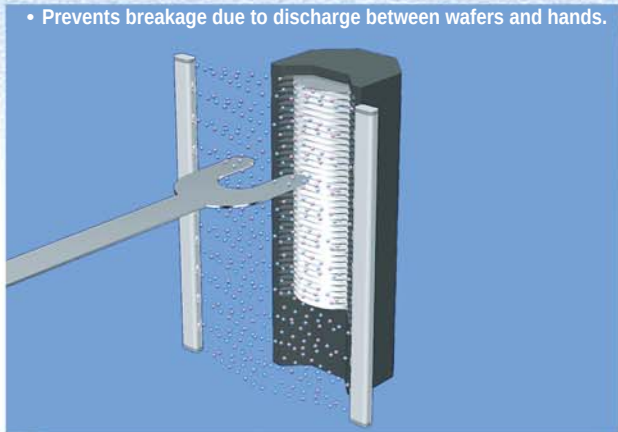
## Eliminating static electricity on film molded goods

- Prevents attaching to conveyer.
- Prevents dispersion of finished goods.



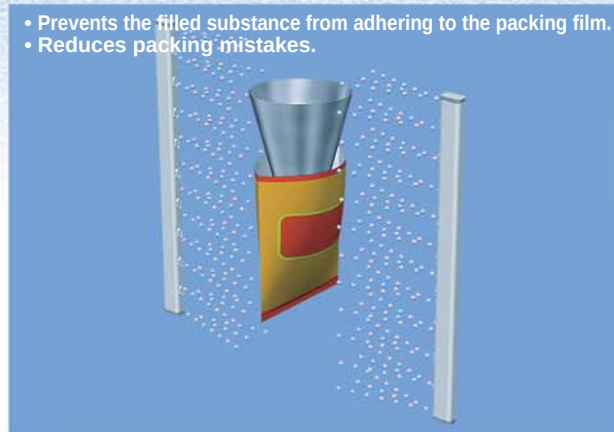
## Eliminating static electricity during wafer transfer

- Prevents breakage due to discharge between wafers and hands.



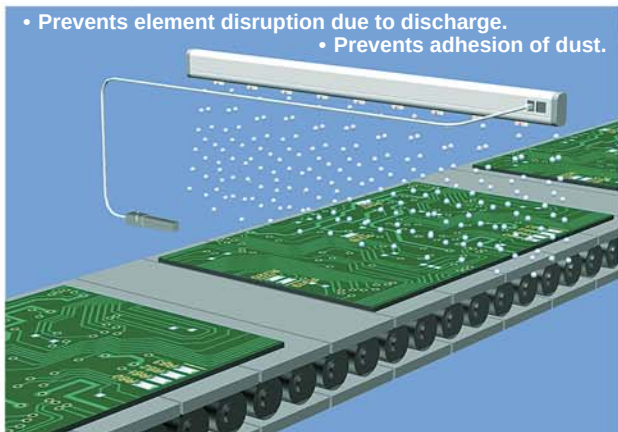
## Removal of static electricity from packing films

- Prevents the filled substance from adhering to the packing film.
- Reduces packing mistakes.



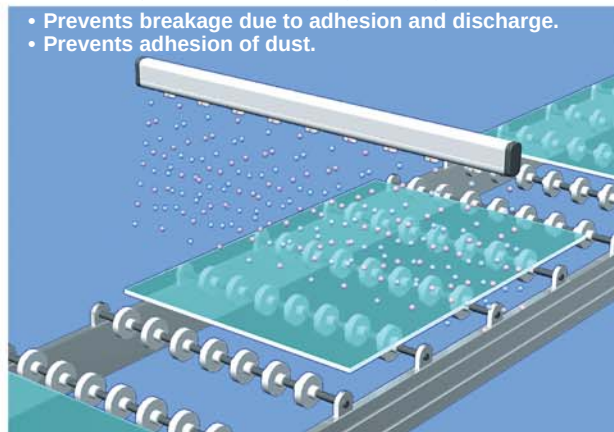
## Eliminating static electricity on an electric substrate

- Prevents element disruption due to discharge.
- Prevents adhesion of dust.



## Eliminating static electricity on a glass substrate

- Prevents breakage due to adhesion and discharge.
- Prevents adhesion of dust.

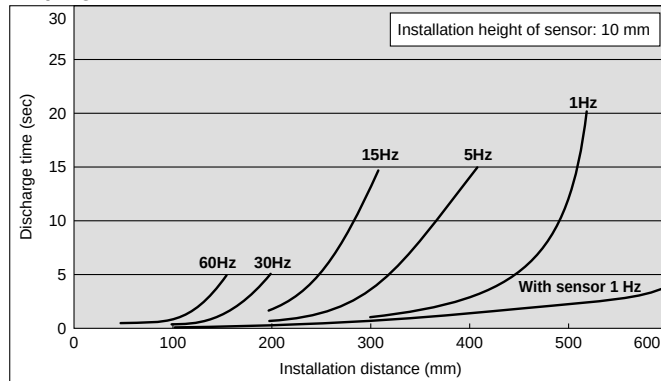


## Static electricity Removal Characteristics

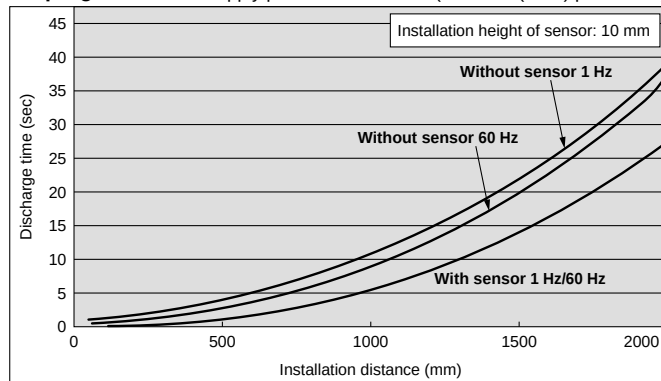
Note) Static electricity elimination features are based on data from using a charged plate (size: 150 mm x 150 mm, capacitance: 20 pF) as defined in the U.S. ANSI standards (ANSI/ESD, STM3, 1-2000). Use this as a guideline for model selection only because the value varies depending on the material and/or size of the subject.

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

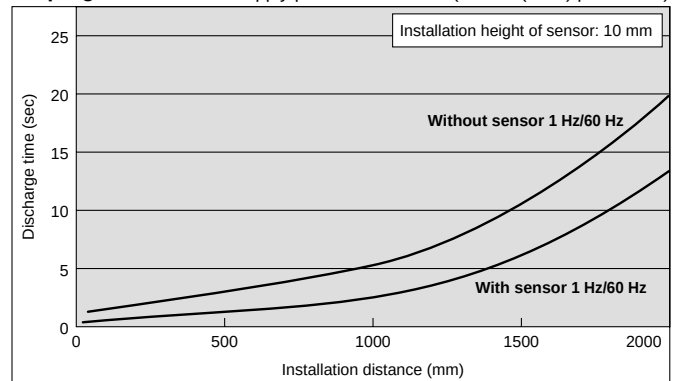
#### Air purge: No



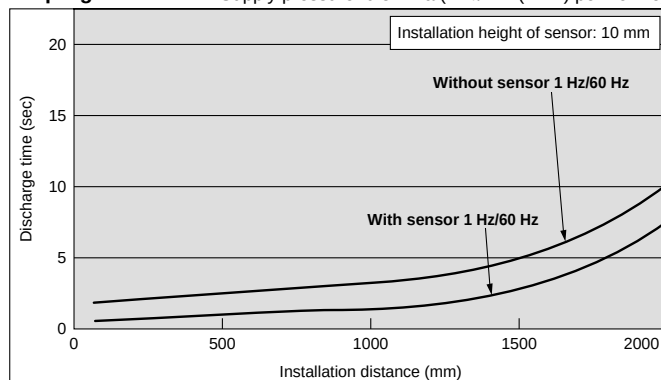
#### Air purge: Yes Supply pressure: 0.05 MPa (3.5 l/min (ANR) per nozzle)



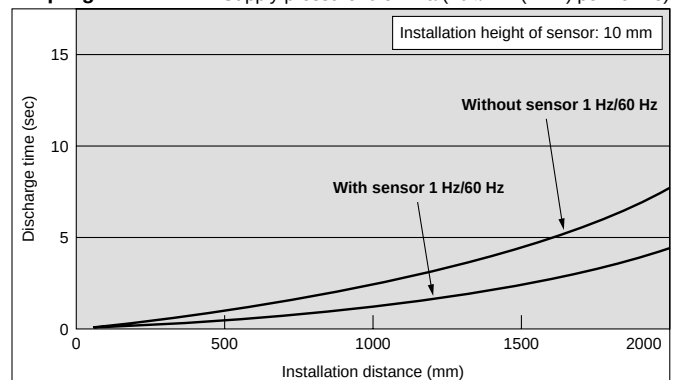
#### Air purge: Yes Supply pressure: 0.1 MPa (7 l/min (ANR) per nozzle)



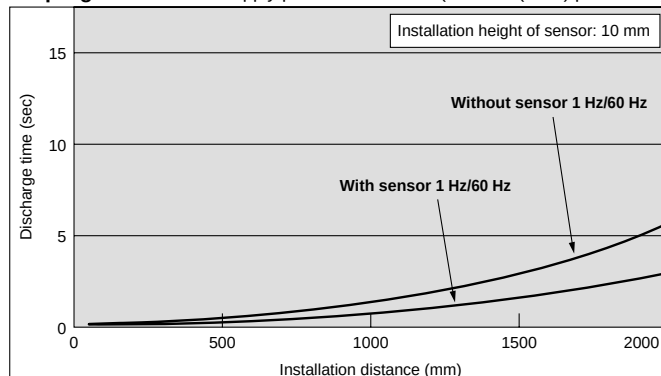
#### Air purge: Yes Supply pressure: 0.3 MPa (14 l/min (ANR) per nozzle)



#### Air purge: Yes Supply pressure: 0.5 MPa (20 l/min (ANR) per nozzle)



#### Air purge: Yes Supply pressure: 0.7 MPa (30 l/min (ANR) per nozzle)

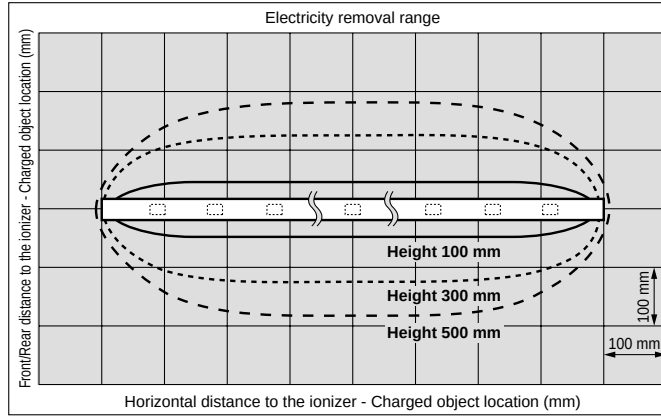


## Static electricity Removal Characteristics

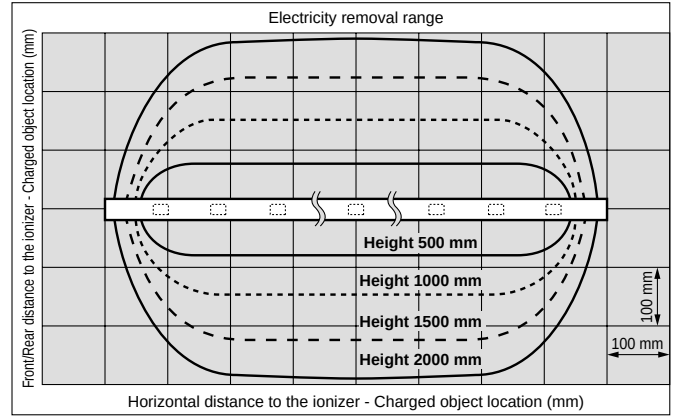
Note) Static electricity elimination features are based on data from using a charged plate (size: 150 mm x 150 mm, capacitance: 20 pF) as defined in the U.S. ANSI standards (ANSI/ESD, STM3, 1-2000). Use this as a guideline for model selection only because the value varies depending on the material and/or size of the subject.

### 1) Static electricity removal range / Ionizer depth direction

Air purge: No

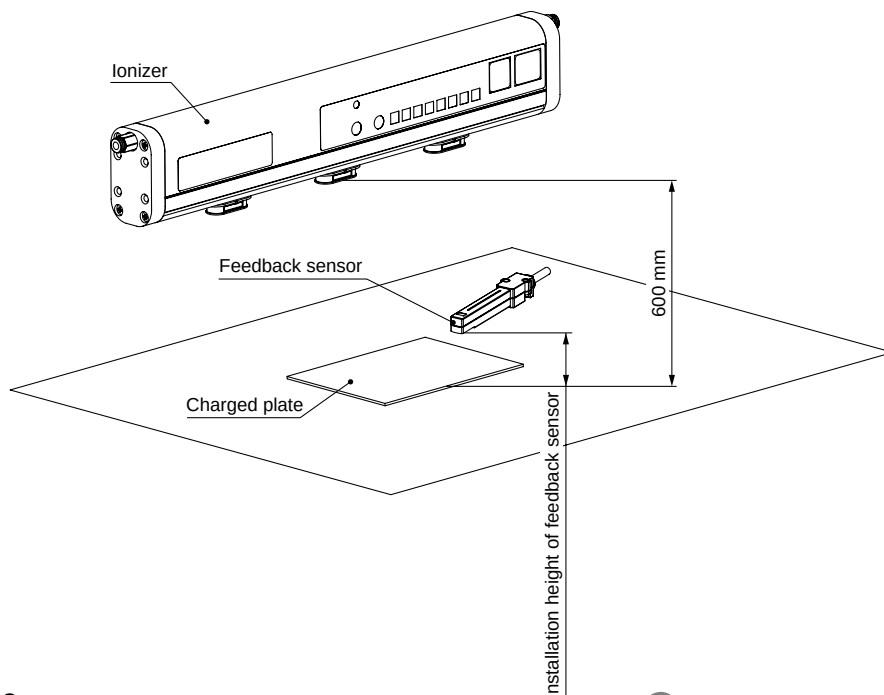
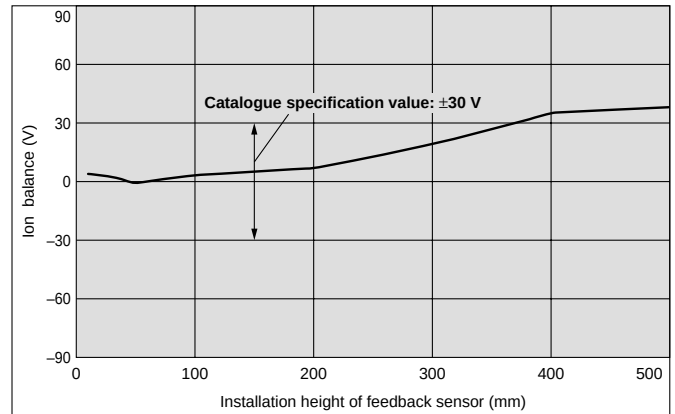
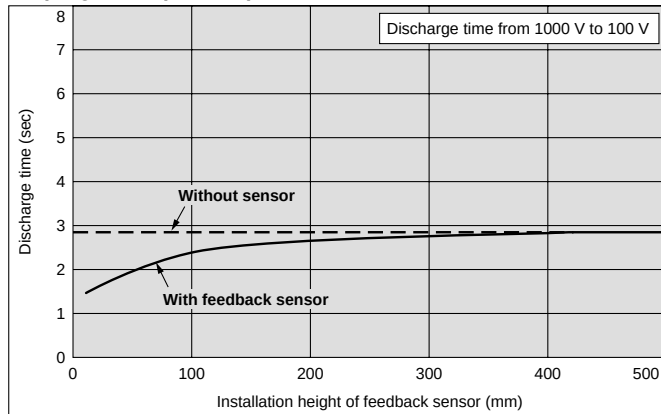


Air purge: Yes (0.05 MPa to 0.7 MPa)



### 2) Installation height of feedback sensor and discharge time / Ion balance

Air purge: Yes (0.1 MPa)





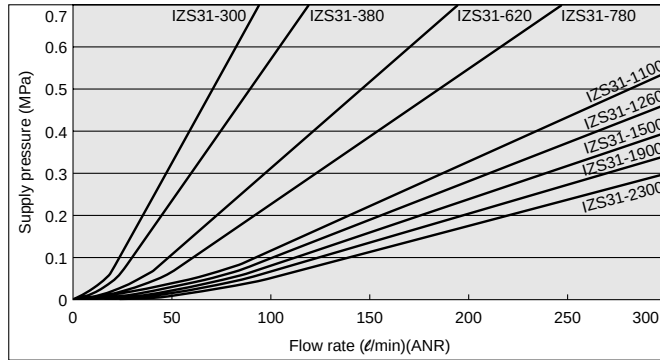
# Series IZS31

## Technical Data 3

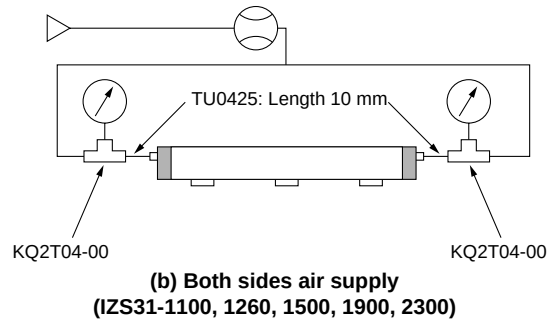
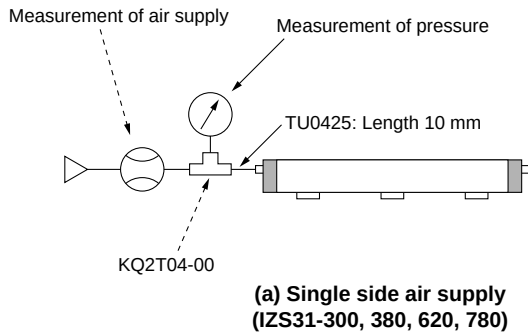
### Static electricity Removal Characteristics

Note) Static electricity elimination features are based on data from using a charged plate (size: 150 mm x 150 mm, capacitance: 20 pF) as defined in the U.S. ANSI standards (ANSI/ESD, STM3, 1-2000). Use this as a guideline for model selection only because the value varies depending on the material and/or size of the subject.

#### 4) Flow rate — pressure characteristics

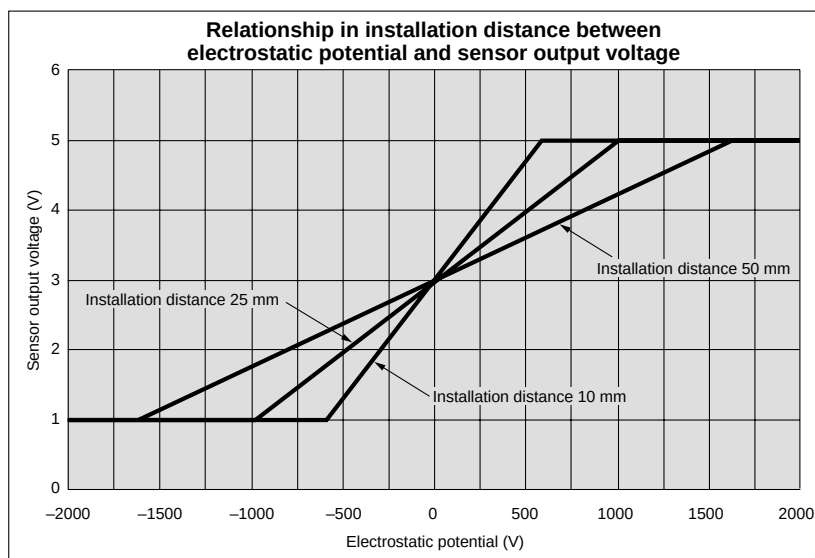


#### How to measure



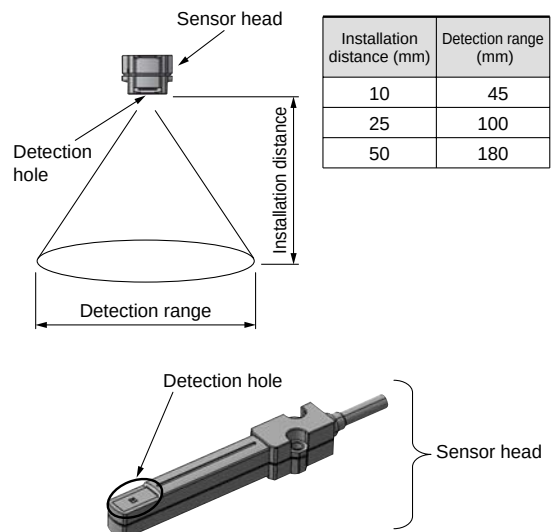
### Sensor Monitor Output (When feedback sensor is used)

Note) The installation distance in the figure refers to the distance from the object undergoing static electricity removal to the electrostatic sensor.



#### Feedback sensor detection range

The relationship between the installation distance of the electrostatic sensor and the detection range is as follows:



# Ionizer

# Series IZS31



## How to Order

**Ionizer** **IZS31** - **780** **CP** **-** **X13**

**Bar type** **CP**

**Bar length**

| Symbol | Bar length |
|--------|------------|
| 300    | 300 mm     |
| 380    | 380 mm     |
| 620    | 620 mm     |
| 780    | 780 mm     |
| 1100   | 1100 mm    |
| 1260   | 1260 mm    |
| 1500   | 1500 mm    |
| 1900   | 1900 mm    |
| 2300   | 2300 mm    |

**Electrode needle material**

|   |                 |
|---|-----------------|
| - | Tungsten        |
| C | Silicon         |
| S | Stainless steel |

**Output**

|   |            |
|---|------------|
| - | NPN output |
| P | PNP output |

**Power supply cable**

|   |                                |
|---|--------------------------------|
| - | With power supply cable (3 m)  |
| Z | With power supply cable (10 m) |
| N | None                           |

**Made to Order**  
Refer to the below table.

**Sensor**

|   |                         |
|---|-------------------------|
| - | Without sensor          |
| F | With feedback sensor    |
| G | With autobalance sensor |

**Bracket**  
(End bracket, Centre bracket)

|   |                     |
|---|---------------------|
| - | Without bracket     |
| B | With bracket (Note) |

Note) The number of centre brackets differ depending on the bar length. (Refer to the below table.)

**Number of brackets**

| Bar length (mm)    | End bracket | Centre bracket |
|--------------------|-------------|----------------|
| 300, 380, 620, 780 |             | None           |
| 1100, 1260, 1500   | With 2 pcs. | With 1 pc.     |
| 1900, 2300         |             | With 2 pcs.    |

## Made to Order (Refer to page 23 for details.)

### Ionizer / Series IZS31

| Symbol     | Contents                                      | Specifications                                                                                                                                                                                     |
|------------|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>X10</b> | Non-standard bar length (80 mm-pitch)         | 460, 540, 700, 860, 940, 1020, 1180, 1340, 1420, 1580, 1660, 1740, 1820, 1980, 2060, 2140, 2220                                                                                                    |
| <b>X14</b> | Model with electrode cartridge security cover | The main unit is shipped fitted with an electrode cartridge security cover available as an option.                                                                                                 |
| <b>X15</b> | Model with 40 mm-pitch electrode cartridges   | This model comes fitted with electrode cartridges arranged at a 40 mm-pitch (standard pitch: 80 mm).<br>Note) Maximum bar length is 1260 mm. The air purge nozzles are arranged at an 80 mm-pitch. |

### Power supply cable

| How to Order                                                                                                                                                                                                                                                                                                                | Contents / Specifications |                   |    |     |    |     |   |     |   |     |                                                                                                                                                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-------------------|----|-----|----|-----|---|-----|---|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>IZS31 - CP</b> <b>X13</b><br><b>Power supply cable full length</b> <table border="1"> <thead> <tr> <th>Symbol</th> <th>Cable full length</th> </tr> </thead> <tbody> <tr><td>01</td><td>1 m</td></tr> <tr><td>02</td><td>2 m</td></tr> <tr><td>8</td><td>8 m</td></tr> <tr><td>9</td><td>9 m</td></tr> </tbody> </table> | Symbol                    | Cable full length | 01 | 1 m | 02 | 2 m | 8 | 8 m | 9 | 9 m | Model with made-to-order power supply cable<br>Available in 1 m increments from 1 m to 10 m.<br><br>Note 1) Use standard power supply cables for 3 m and 10 m lengths. |
| Symbol                                                                                                                                                                                                                                                                                                                      | Cable full length         |                   |    |     |    |     |   |     |   |     |                                                                                                                                                                        |
| 01                                                                                                                                                                                                                                                                                                                          | 1 m                       |                   |    |     |    |     |   |     |   |     |                                                                                                                                                                        |
| 02                                                                                                                                                                                                                                                                                                                          | 2 m                       |                   |    |     |    |     |   |     |   |     |                                                                                                                                                                        |
| 8                                                                                                                                                                                                                                                                                                                           | 8 m                       |                   |    |     |    |     |   |     |   |     |                                                                                                                                                                        |
| 9                                                                                                                                                                                                                                                                                                                           | 9 m                       |                   |    |     |    |     |   |     |   |     |                                                                                                                                                                        |

## Special Individual Specifications (Contact an SMC sales representative.)

- Change in the direction of access to power supply cable  
The direction of access to the power supply cable is changed to the right-hand side of the main unit.
- Note) The power supply cable is connected directly to the main unit. A connector is not used.



**Accessories**

**Feedback sensor / IZS31-DF**



**Autobalance sensor / IZS31-DG**



**Power supply cable**

- IZS31-CP (3 m)
- IZS31-CPZ (10 m)



**Electrode cartridge**

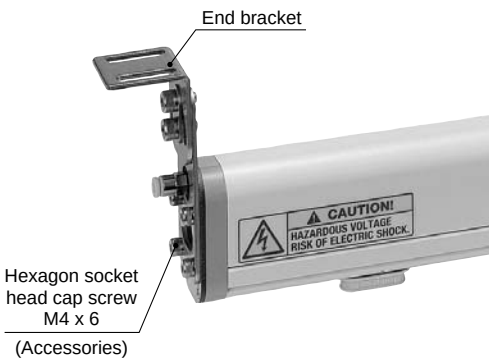
- IZS31-NT (Material: Tungsten)
- IZS31-NC (Material: Silicon)
- IZS31-NS (Material: Stainless steel)



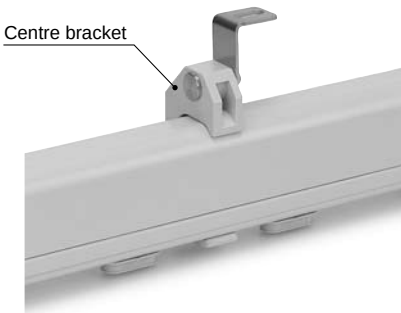
**Bracket**

Note) The model number is for a single bracket.

**End bracket / IZS31-BE**



**Centre bracket / IZS31-BM**



Note) The number of centre brackets required, as listed below, depends on the bar length. Two end brackets are always required regardless of the bar length.

| Bar length (mm)    | Quantity    |                |
|--------------------|-------------|----------------|
|                    | End bracket | Centre bracket |
| 300, 380, 620, 780 | 2 pcs.      | None           |
| 1100, 1260, 1500   |             | With 1 pc.     |
| 1900, 2300         |             | With 2 pcs.    |

# Series IZS31

## Option

### Electrode cartridge security cover

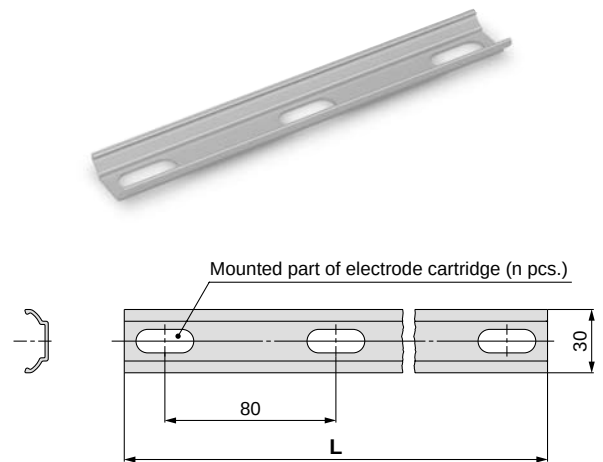
## IZS31-E 3

#### Number of fixed electrode cartridges

|          |   |
|----------|---|
| IZS31-E3 | 3 |
| IZS31-E4 | 4 |
| IZS31-E5 | 5 |

#### Number of required security covers

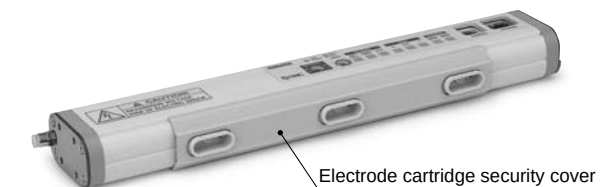
| Bar length<br>(mm) | Number of required security covers |          |          |
|--------------------|------------------------------------|----------|----------|
|                    | IZS31-E3                           | IZS31-E4 | IZS31-E5 |
| 300                | 1                                  | —        | —        |
| 380                | —                                  | 1        | —        |
| 620                | 1                                  | 1        | —        |
| 780                | —                                  | 1        | 1        |
| 1100               | 3                                  | 1        | —        |
| 1260               | 1                                  | 3        | —        |
| 1500               | —                                  | 2        | 2        |
| 1900               | 1                                  | 5        | —        |
| 2300               | —                                  | 2        | 4        |



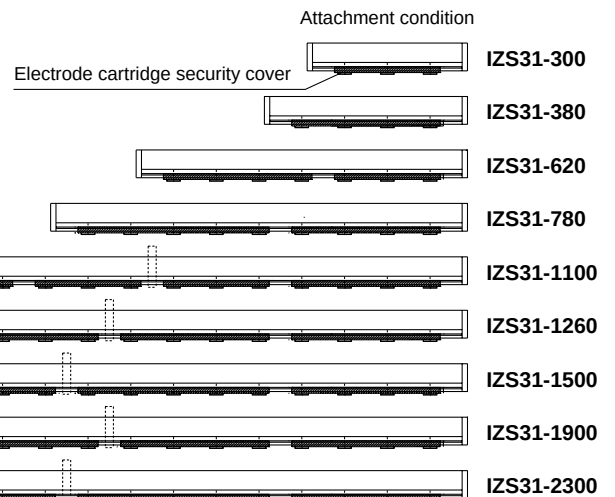
| Part no  | L   |
|----------|-----|
| IZS31-E3 | 200 |
| IZS31-E4 | 280 |
| IZS31-E5 | 360 |

The model number requires the suffix “-X14” to indicate that the main unit is to be shipped fitted with an electrode cartridge security cover.

### IZS31 Standard part no. -X14



When attached to the main unit



### Screw driver for ion balance adjustment trimmer / IZS30-M1

### Electrode needle cleaning kit / IZS30-M2





## Specifications

| Ionizer model                                              |                                              | IZS31-□□ (NPN specification)                                                                                        | IZS31-□□P (PNP specification)                                                       |
|------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Ion generation method                                      |                                              | Corona discharge type                                                                                               |                                                                                     |
| Method of applying voltage                                 |                                              | Sensing DC, Pulse DC, DC                                                                                            |                                                                                     |
| Output for emitting electricity                            |                                              | ±7000 V                                                                                                             |                                                                                     |
| Ion balance <small>Note 1)</small>                         |                                              | ±30 V (Stainless electrode needle: ±100 V)                                                                          |                                                                                     |
| Air purge                                                  | Fluid                                        | Air (Clean and dry)                                                                                                 |                                                                                     |
|                                                            | Operating pressure                           | 0.7 MPa or less                                                                                                     |                                                                                     |
|                                                            | Connecting tubing O.D.                       | ø4                                                                                                                  |                                                                                     |
| Power supply voltage                                       |                                              | 24 VDC ±10%                                                                                                         |                                                                                     |
| Current consumption                                        | Sensing DC mode                              | 200 mA or less (While standing by: 120 mA or less)                                                                  |                                                                                     |
|                                                            | Pulse DC mode                                | 200 mA or less (When sensor is not used: 170 mA or less)                                                            |                                                                                     |
|                                                            | DC mode                                      | 170 mA or less                                                                                                      |                                                                                     |
| Input signal                                               | Emission of static electricity is suspended. | Contact input signal with no voltage                                                                                |                                                                                     |
|                                                            | Maintenance                                  |                                                                                                                     |                                                                                     |
| Output signal                                              | Static electricity removal is completed.     | Max. load current: 100 mA<br>Residual voltage: 1 V or less (At load current 100 mA)<br>Max. applied voltage: 28 VDC | Max. load current: 100 mA<br>Residual voltage: 1 V or less (At load current 100 mA) |
|                                                            | Maintenance output                           |                                                                                                                     |                                                                                     |
|                                                            | Irregularity                                 |                                                                                                                     |                                                                                     |
|                                                            | Sensor monitor output <small>Note 2)</small> | Voltage output 1 to 5 V (Connect a 10 kΩ or larger load.)                                                           |                                                                                     |
| Effective discharge distance                               |                                              | 50 to 2000 mm (Sensing DC mode: 200 to 2000 mm)                                                                     |                                                                                     |
| Operating ambient temperature, Operating fluid temperature |                                              | 0 to 50°C                                                                                                           |                                                                                     |
| Operating ambient humidity                                 |                                              | 35 to 80%Rh (With no condensation)                                                                                  |                                                                                     |
| Material                                                   |                                              | Cover of ionizer: ABS, Electrode needle: Tungsten, Monocrystal silicon, Stainless steel                             |                                                                                     |
| Vibration resistance                                       |                                              | Durability 50 Hz    Amplitude 1 mm    XYZ each 2 hours                                                              |                                                                                     |
| Shock resistance                                           |                                              | 10 G                                                                                                                |                                                                                     |
| Compliance with overseas standards / directives            |                                              | CE (EMC directive: 89/336/EEC, 92/31/EEC, 93/68/EEC, 2004/108/EC,<br>Low voltage directive: 73/23/EEC, 93/68/EEC)   |                                                                                     |

Note 1) For the case where air purge is performed between a charged object and an ionizer at a distance of 300 mm.

Note 2) For cases where the potential of a charged object is measured using a feedback sensor, the relationship between the potential being measured, the sensor monitor output voltage and the detection range of the sensor will vary depending on the sensor's installation distance. Refer to page 3.

## Number of Electrode Cartridges and Weight

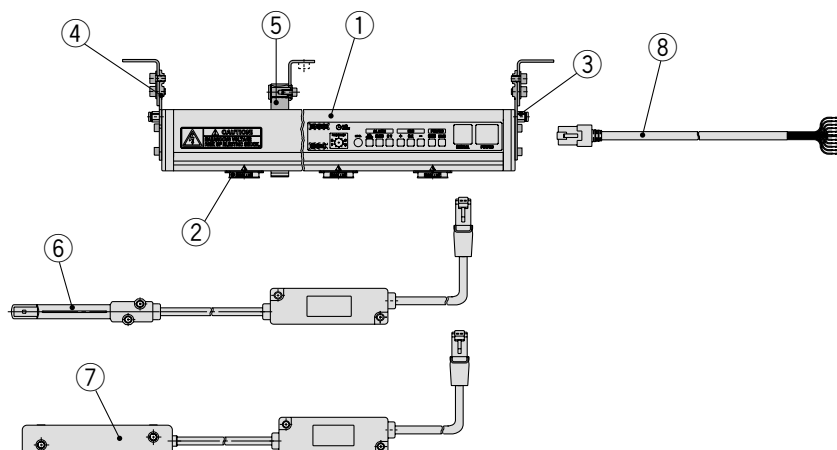
| Bar length (mm)                | 300 | 380 | 620 | 780 | 1100 | 1260 | 1500 | 1900 | 2300 |
|--------------------------------|-----|-----|-----|-----|------|------|------|------|------|
| Number of electrode cartridges | 3   | 4   | 7   | 9   | 13   | 15   | 18   | 23   | 28   |
| Weight (g)                     | 470 | 530 | 720 | 850 | 1100 | 1220 | 1410 | 1730 | 2040 |

## Sensor

| Sensor model                                   | IZS31-DF<br>(Feedback sensor)                                                                                  | IZS31-DG<br>(Autobalance sensor) |
|------------------------------------------------|----------------------------------------------------------------------------------------------------------------|----------------------------------|
| Operating ambient temperature                  | 0 to 50°C                                                                                                      |                                  |
| Operating ambient humidity                     | 35 to 80%Rh (With no condensation)                                                                             |                                  |
| Case material                                  | ABS                                                                                                            | ABS, Stainless steel             |
| Vibration resistance                           | Durability 50 Hz Amplitude 1 mm XYZ each 2 hours                                                               |                                  |
| Shock resistance                               | 10 G                                                                                                           |                                  |
| Weight                                         | 200 g (Including cable weight)                                                                                 | 220 g (Including cable weight)   |
| Installation distance                          | 10 to 50 mm (Recommended)                                                                                      | —                                |
| Compliance with overseas standards / directive | CE (EMC directive: 89/336/EEC, 92/31/EEC, 93/68/EEC, 2004/108/EC, Low voltage directive: 73/23/EEC, 93/68/EEC) |                                  |

## Construction

| No. | Description         |
|-----|---------------------|
| 1   | Ionizer             |
| 2   | Electrode cartridge |
| 3   | One-touch fitting   |
| 4   | End bracket         |
| 5   | Centre bracket      |
| 6   | Feedback sensor     |
| 7   | Autobalance sensor  |
| 8   | Power supply cable  |



## Functions

### 1. Operation mode

There are 3 different operation modes (Sensing DC mode / Pulse DC mode / DC mode) for series IZS31, these can be selected based upon the application and operating condition.

#### (1) Sensing DC mode

The discharge time is reduced by detecting the workpiece's charge condition with a feedback sensor which feeds the data back to the ionizer and causes ions with the polarity best suited for static electricity removal to be emitted. The static electricity removal completion signal turns off when the workpiece's electrostatic potential falls within  $\pm 30$  V. <sup>Note)</sup>

This mode is suited for removing static electricity from heavily charged workpieces.

Either "Energy Saving Mode" or "Continuous Static Electricity Removal Mode" can be selected as the operation method depending on the ionizer's operation mode after the completion of static electricity removal.

|                                            |                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Energy saving mode                         | The ionizer stops discharging upon completion of static electricity removal. It resumes discharging when the workpiece's electrostatic potential exceeds $\pm 30$ V. <sup>Note)</sup><br>For the removal of static electricity from conductive workpieces, "Energy Saving Run" is recommended.                                                                               |
| Continuous static electricity removal mode | Even after the completion of static electricity removal, this method continues to remove static electricity using DC pulses while controlling the ion balance, so that the workpiece's electrostatic potential falls within $\pm 30$ V.<br>For the removal of static electricity from nonconductive workpieces, "Continuous Static Electricity Removal mode" is recommended. |

Note) When the feedback sensor is installed at a height of 25 mm.

#### (2) Pulse DC mode

Alternatively emits positive and negative ions.

When an autobalance sensor is used, the ionizer automatically adjusts the ion balance to within  $\pm 30$  V.

If the ion balance exceeds  $\pm 30$  V due to electrode needle contamination, the ionizer outputs a maintenance output signal.

This mode is suited for removing spatial static electricity or preventing workpieces from becoming electrostatically charged.

##### ■ When an autobalance sensor is used.

Either "Manual Operation" or "Automatic Operation" can be selected as the operation method depending on the method of ion balance adjustment.

|                     |                                                                                                                                                                                                                                                                                    |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Manual operation    | When a maintenance start signal is input or the ionizer is turned on, this method adjusts the ion balance. For the removal of static electricity from moving workpieces, "Manual Operation" is recommended. Start system operation after the completion of ion balance adjustment. |
| Automatic operation | This method continuously adjusts the ion balance. For the removal of static electricity from stationary workpieces or the removal of spatial static electricity, "Automatic Operation" is recommended.                                                                             |

##### ■ When an autobalance sensor is not used.

Use the ion balance adjustment trimmer to adjust the ion balance. This requires the separate use of a measuring instrument to verify the ion balance.

#### (3) DC mode

Continuously emits positive and negative ions. Parts other than the work piece need to be appropriately grounded to prevent them from being charged. This mode cannot emit both positive and negative ions at the same time.

## Functions

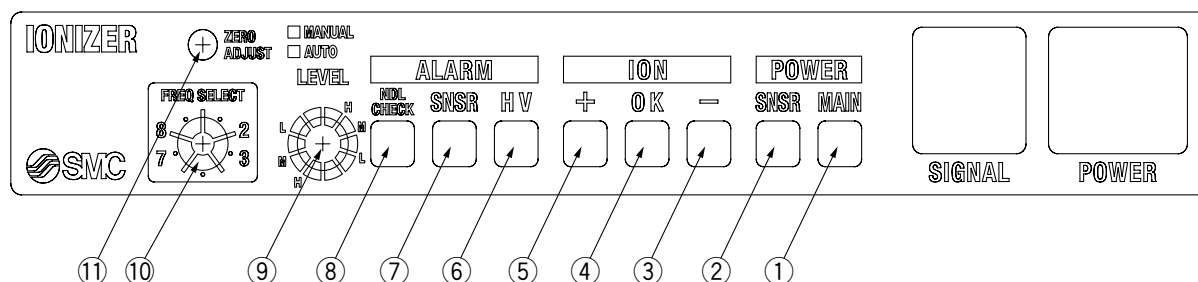
### 2. Dirt-detection on an electrode needle

When a maintenance start signal is input, the ionizer detects any deterioration that may interfere with the electrode needles' capability to remove static electricity. If the needles need to be cleaned due to such deterioration, a maintenance display LED comes on and the ionizer outputs a maintenance output signal.

Note) Deterioration in static electricity removal capability cannot be detected by only connecting a feedback sensor or autobalance sensor.

Verify the capability by periodically inputting a maintenance start signal.

### 3. Display/Setting component description



| No. | Description                                   | Type          | Contents                                                                                                                       |
|-----|-----------------------------------------------|---------------|--------------------------------------------------------------------------------------------------------------------------------|
| 1   | Power supply display                          | LED (Green)   | Illuminates when power is supplied. Blinks when the supply voltage is abnormal.                                                |
| 2   | Sensor display                                | LED (Green)   | Illuminates when the feedback sensor or autobalance sensor is connected.                                                       |
| 3   | Negative display                              | LED (Blue)    | Functionality differs depending on the operation mode.<br>Refer to Section 4, "Determining the Model and Settings" on page 10. |
| 4   | Static electricity removal completion display | LED (Green)   |                                                                                                                                |
| 5   | Positive display                              | LED (Orange)  |                                                                                                                                |
| 6   | Irregular high voltage display                | LED (Red)     | Illuminates when an abnormal current flows through an electrode needle.                                                        |
| 7   | Irregular sensor display                      | LED (Red)     | Illuminates when the feedback sensor or autobalance sensor is not operating normally.                                          |
| 8   | Maintenance display                           | LED (Red)     | Illuminates when electrode needle contamination is detected. Blinks while the contamination is being detected.                 |
| 9   | Maintenance level selection switch            | Rotary switch | Functionality differs depending on the operation mode.<br>Refer to Section 4, "Determining the Model and Settings" on page 10. |
| 10  | Frequency selection switch                    | Rotary switch |                                                                                                                                |
| 11  | Ion balance adjustment trimmer                | Trimmer       | Used to adjust the ion balance when the autobalance sensor is not used.                                                        |



## Determining the Model and Settings 1 / Sensing DC Mode

**1. Sensing DC mode** (Refer to page 14 when using the ionizer in the pulse DC mode, or refer to page 18 when using it in the DC mode.)

### 1) Selection of bar length

- Select the appropriate length suited for a work size by referring to “Static electricity Removal Characteristics” and “Static electricity Removal Range”, etc.

### 2) Installation of the ionizer

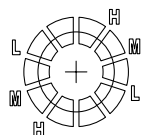
- Install within 200 to 2000 mm. Although the main unit can also be used at other distances, it may fail to operate normally depending on the conditions of use. Before use, always verify that the main unit is functioning normally.

### 3) Installation of the sensor

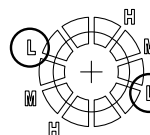
- Install the feedback sensor with the detection hole facing the charged surface.
- Installation at a height from 10 to 50 mm is recommended. Although the sensor can also be used at other heights, it may fail to operate normally depending on the conditions of use. Before use, always verify that the sensor operates normally.
- (Refer to “Installation height of feedback sensor and discharge time/ion balance” on page 2 as a guide.)
- When the ionizer and feedback sensor are connected, the sensing DC mode is automatically selected.

### 4) Configuration of dirt-detection level on an electrode needle

- Maintenance level selection switch
- Set the switch to either H (high), M (middle) or L (low). At settings other than these, the ionizer does not perform electrode needle dirt-detection.



H (High) ..... Level that does not effect the discharge time.  
M (Middle) ... Level immediately before the discharge time is extended.  
L (Low) ..... Level at which the discharge time is longer than it was initially.

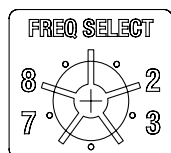


\* Settings with the same letter share the same level.

Note) Dirt-detection starts when the maintenance start signal is input.

### 5) Configuration of frequency selection switch

- Use this switch to select “Energy Saving Mode” or “Continuous Static Electricity Removal Mode”.
- This switch is used to select ion generation frequency for “Continuous Static Electricity Removal Mode,” after the completion of static electricity removal.



| How to run                                 |                                                                                                                                                                                                                                                                           |  | Switch setting                                                                                                  |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------------------------------------------------------------------------------------|
| Energy saving mode                         | Automatically stops emitting electricity even after completing the static electricity removal.                                                                                                                                                                            |  |                                                                                                                 |
| Continuous static electricity removal mode | Continuously eliminates static electricity with pulse DC by controlling the ion balance so that the charged potential on a workpiece would be within $\pm 30$ V even after completing the static electricity removal. The ionizer generates ions at the preset frequency. |  | <p>0...1 Hz<br/>1...3 Hz<br/>2...5 Hz<br/>3...10 Hz<br/>4...15 Hz<br/>5...20 Hz<br/>6...30 Hz<br/>7...60 Hz</p> |

## Determining the Model and Settings 1 / Sensing DC Mode

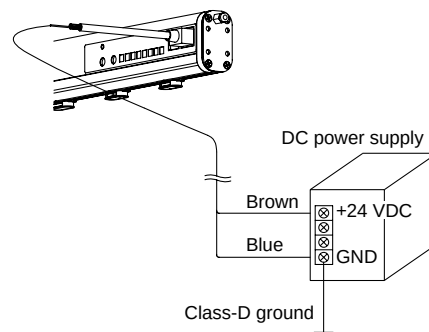
### 6) Wiring of power supply cable

- Connect the dedicated power supply cable.

#### ■ Connection with ionizer driving power supply

| Symbol  | Cable colour | Description           | Connection needs | Contents                                                                          |
|---------|--------------|-----------------------|------------------|-----------------------------------------------------------------------------------|
| DC1 (+) | Brown        | Power supply 24 VDC   | ○                | Ionizer driving power supply cable                                                |
| DC1 (-) | Blue         | Power supply GND [FG] | ○                |                                                                                   |
| OUT4    | Dark green   | Sensor monitor output | △                | Outputs the workpiece's electrostatic potential as an analogue signal (1 to 5 V). |

\* DC1 (-) [Blue] is sure to ground it according to class-D. If the terminal is not grounded, the ionizer may malfunction.



#### ■ Wiring of input/output signal power supply cable

| Symbol  | Cable colour | Description                                  | Connection needs | Contents                                                                                                                                                                                            |
|---------|--------------|----------------------------------------------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DC2 (+) | Red          | Power supply 24 VDC                          | ○                | Input/output signal power supply cable                                                                                                                                                              |
| DC2 (-) | Black        | Power supply GND                             | ○                |                                                                                                                                                                                                     |
| IN1     | Light green  | Discharge stop signal                        | ○                | Signal for enabling/disabling discharging (NPN specification) Discharging is enabled when connected to DC2 (-) [Black]. (PNP specification) Discharging is enabled when connected to DC2 (+) [Red]. |
| IN2     | Gray         | Maintenance start signal                     | △                | Signal to be input when determining the necessity of electrode needle maintenance                                                                                                                   |
| —       | White        | —                                            | —                | —                                                                                                                                                                                                   |
| —       | Orange       | —                                            | —                | —                                                                                                                                                                                                   |
| OUT1    | Pink         | Static electricity removal completion signal | △                | Signal to be output when the workpiece's electrostatic potential is outside $\pm 30$ V or when electrode needle contamination is being detected.                                                    |
| OUT2    | Yellow       | Maintenance output signal                    | △                | Signal to be output when electrode needle maintenance is necessary.                                                                                                                                 |
| OUT3    | Purple       | Irregular signal                             | △                | Outputs signal when there is irregular high voltage, irregular sensor, irregular CPU (B type contact output)                                                                                        |

○: Minimum wiring requirement for ionizer operation

△: Wiring necessary to use various functions

—: Wiring not required in the sensing DC mode. Exercise caution to ensure that this wire does not short-circuit to other wires.

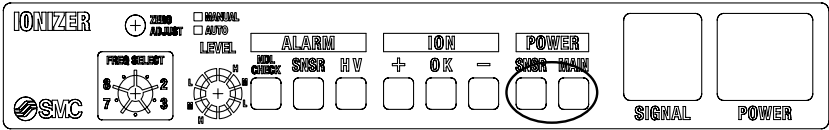
### 7) Air piping

- For single-side piping, block the unused port with the M-5P plug supplied with the ionizer.

Determining the Model and Settings 1 / Sensing DC Mode

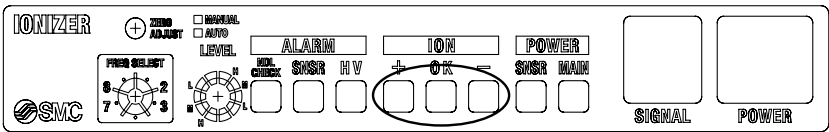
8) LED display

■ POWER LED...Indicates the state of power input and sensor connection.



| LED name |      | Function                                                                                    |
|----------|------|---------------------------------------------------------------------------------------------|
| POWER    | MAIN | Illuminates when power is supplied (Green).<br>(Blinks when the power supply is irregular.) |
|          | SNSR | Illuminates when the feedback sensor is connected (Green).                                  |

■ ION LED...Indicates the workpiece's state of electrostatic charging.

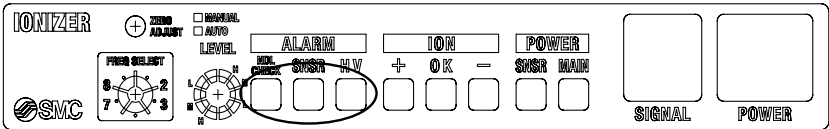


| LED name |    | Function                                                               |
|----------|----|------------------------------------------------------------------------|
| ION      | +  | Illuminates when the workpiece is positively charged (Orange).         |
|          | OK | Illuminates when the workpiece electrostatic potential is low (Green). |
|          | -  | Illuminates when the workpiece is negatively charged (Blue).           |

· The workpiece's state of electrostatic charge can be checked by reading the LED displays.

| Workpiece polarity                                                        | LED<br>+ OK - | Workpiece electric<br>charge voltage | ■ Light ON<br>■ Blinking at 4 Hz<br>□ Light OFF |
|---------------------------------------------------------------------------|---------------|--------------------------------------|-------------------------------------------------|
| Positive<br>↑<br>Static electricity<br>removal completed<br>↓<br>Negative | ■ □ □         | +400 V or higher                     |                                                 |
|                                                                           | ■ □ □         | +100 V to +400 V                     |                                                 |
|                                                                           | ■ ■ □         | +30 V to +100 V                      |                                                 |
|                                                                           | □ ■ □         | Within ±30 V                         |                                                 |
|                                                                           | □ ■ ■         | -30 V to -100 V                      |                                                 |
|                                                                           | □ □ ■         | -100 V to -400 V                     |                                                 |
|                                                                           | □ □ ■         | -400 V or lower                      |                                                 |

■ ALARM LED...Indicates abnormal states of the ionizer.



| LED name |           | Function                                                                                                                  |
|----------|-----------|---------------------------------------------------------------------------------------------------------------------------|
| ALARM    | HV        | Illuminates when an abnormal current flows through an electrode needle (Red).                                             |
|          | SNSR      | Illuminates when the feedback sensor is not operating normally (Red).                                                     |
|          | NDL CHECK | Illuminates when electrode needle contamination is detected (Red).<br>(Blinks while the contamination is being detected.) |



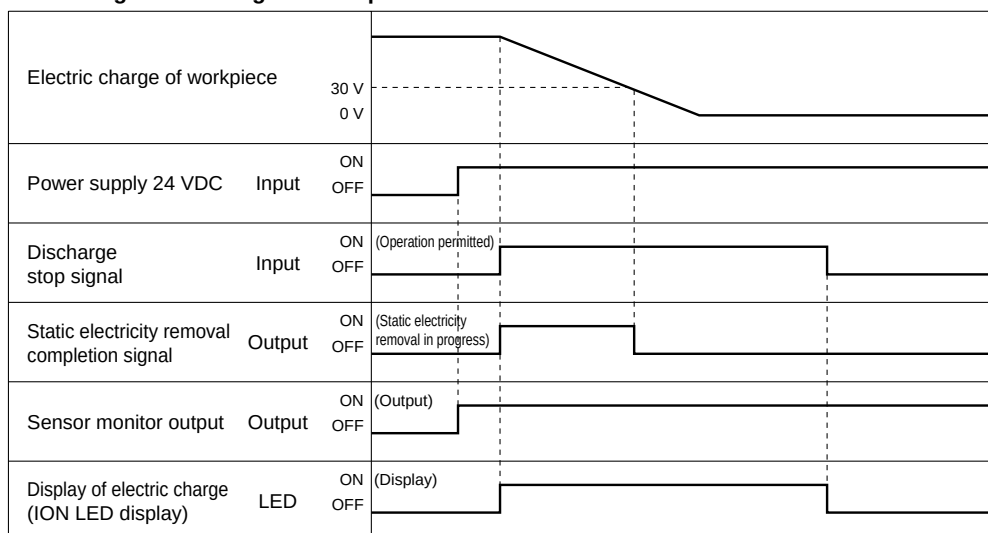
## Determining the Model and Settings 1 / Sensing DC Mode

### 9) Alarm

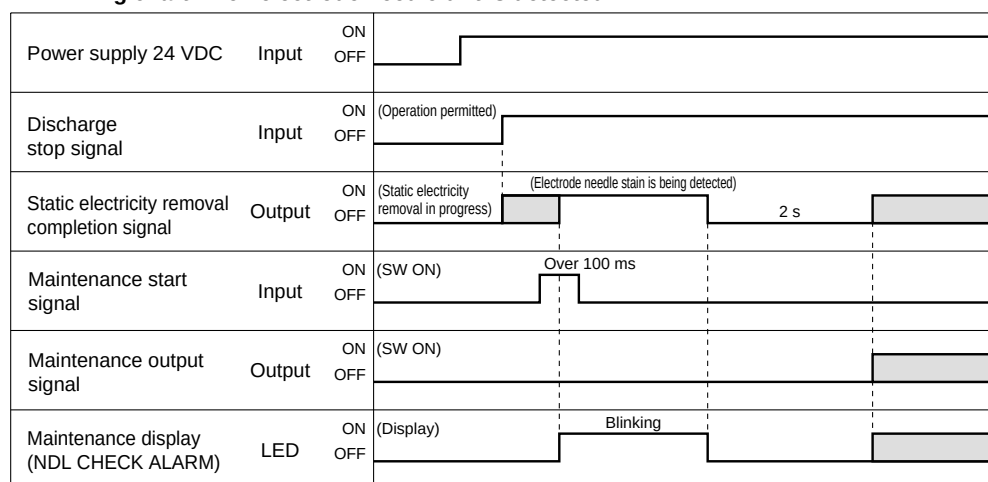
| Alarm item                   | Description                                                                                                                                                                          | Corrective actions                                                                                                               |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| High voltage irregularity    | Gives notification of the occurrence of an abnormal current, such as high-voltage leakage. The ionizer stops discharging, turns on the HV ALARM display, and outputs a fault signal. | Turn off the power, solve the problem, then turn the power on again. Alternatively, turn the discharge stop signal off, then on. |
| Sensor irregularity          | Gives notification that the feedback sensor is unable to operate normally. The ionizer turns on the SNSR ALARM display and outputs a fault signal.                                   | Turn off the power, solve the problem, then turn the power on again. Alternatively, turn the discharge stop signal off, then on. |
| CPU irregularity             | Gives notification of the occurrence of a failure in the CPU due to noise, etc. All of the LED displays blink and a fault signal is output.                                          | Turn off the power, solve the problem, then turn the power on again. Alternatively, turn the discharge stop signal off, then on. |
| Electrode needle maintenance | Gives notification that electrode needle maintenance is necessary. The NDL CHECK ALARM display comes on and a maintenance output signal is output.                                   | Turn off the power, clean the electrode needles, and turn the power on again.                                                    |

### 10) Timing chart

#### ■ Timing chart during normal operation



#### ■ Timing chart when electrode needle dirt is detected.



□ : Either ON or OFF depending on the situation.

- A signal indicating static electricity removal completion is output when the detection of electrode needle dirt is in progress.

### ⚠ Caution

Ions are emitted from the ionizer to detect electrode needle dirt and the workpiece may therefore be electrostatically charged. Perform this detection procedure in the absence of workpieces.

## Determining the Model and Settings 2 / Pulse DC Mode

### 2. Pulse DC mode

#### 1) Selection of bar length

- Determine the length suited for a work size, referring to the "Static electricity Removal Characteristics" and "Static electricity Removal Range", etc.

#### 2) Installation of the ionizer

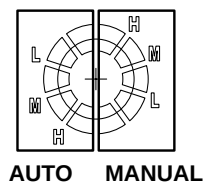
- Install the ionizer within 50 to 2000 mm of the object requiring electricity removal. However, install the main unit at a distance from 100 to 2000 mm when using an autobalance sensor. Although the main unit can also be used at other distances, it may fail to operate normally depending on the conditions of use. Before use, always verify that the main unit is functioning normally.

#### 3) Installation of the sensor

- When adjusting the ion balance using a sensor, install an autobalance sensor.
- Install the sensor immediately below the ionizer so that it is level with the workpiece.
- When an autobalance sensor is connected, the ion balance adjustment trimmer settings are nullified.

#### 4) Configuration of maintenance level selection switch

- This switch is used to select "Manual Operation" or "Automatic Operation" when an autobalance sensor is connected to adjust the ion balance.

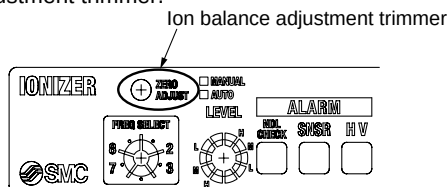


| Details of operation |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Switch setting |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| Manual operation     | When a maintenance start signal is input or the ionizer is turned on, the ionizer detects electrode needle contamination according to ion balance adjustment and detection level settings.<br>An ion balance adjustment value for each ion generation frequency is retained.<br>When the ion generation frequency is changed, adjust the ion balance.<br>After adjustment, the autobalance sensor may be removed as ion balance adjustment will not be performed again until a maintenance start signal is input. | MANUAL         |
| Automatic operation  | The ionizer continuously adjusts the ion balance. When the autobalance sensor is removed, adjust the ion balance manually using the ion balance adjustment trimmer.                                                                                                                                                                                                                                                                                                                                               | AUTO           |

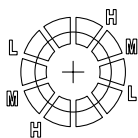
\* Set the switch according to the dirt-detection level.

### When an autobalance sensor is not used.

When an autobalance sensor is not used, set the switch to AUTO. Then, adjust the ion balance manually using the ion balance adjustment trimmer.



- Configuration of dirt-detection level on an electrode needle.
- Set the switch to either H (high), M (middle) or L (low). At settings other than these, the ionizer does not perform electrode needle dirt-detection



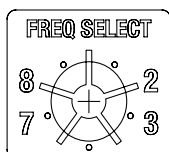
- H (High) ..... Level not influential to the discharge time
- M (Middle) ... Level immediately before the discharge time elongates.
- L (Low) ..... Level at which the discharge time is longer than it initially was.

- Dirt-detection starts when the maintenance start signal is input.
- When the switch is set to H, M or L, the ionizer performs electrode needle stain-detection and then adjusts the ion balance.

## Determining the Model and Settings 2 / Pulse DC Mode

### 5) Frequency selection switch setting

- Selects ion generation frequency



| Ion generation frequency | Switch setting |
|--------------------------|----------------|
| 1 Hz                     | 0              |
| 3 Hz                     | 1              |
| 5 Hz                     | 2              |
| 10 Hz                    | 3              |
| 15 Hz                    | 4              |
| 20 Hz                    | 5              |
| 30 Hz                    | 6              |
| 60 Hz                    | 7              |

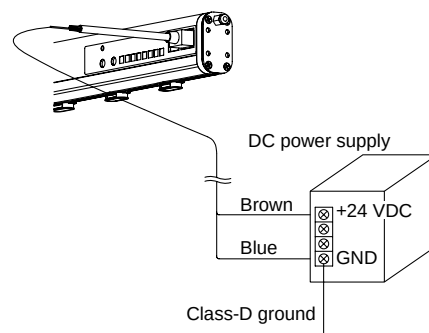
### 6) Wiring of power supply cable

- Connect the dedicated power supply cable.

#### ■ Connection with ionizer driving power supply

| Symbol  | Cable colour | Description           | Connection needs | Contents                           |
|---------|--------------|-----------------------|------------------|------------------------------------|
| DC1 (+) | Brown        | Power supply 24 VDC   | ○                | Ionizer driving power supply cable |
| DC1 (-) | Blue         | Power supply GND [FG] | ○                |                                    |
| OUT4    | Dark green   | Sensor monitor output | —                | —                                  |

\* DC1 (-) [Blue] is sure to ground it according to class-D. If the terminal is not grounded, the ionizer may malfunction.



#### ■ Wiring of input/output signal power supply cable

| Symbol  | Cable colour | Description                                  | Connection needs | Contents                                                                                                                                                                                            |
|---------|--------------|----------------------------------------------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DC2 (+) | Red          | Power supply 24 VDC                          | ○                | Input/output signal power supply cable                                                                                                                                                              |
| DC2 (-) | Black        | Power supply GND                             | ○                |                                                                                                                                                                                                     |
| IN1     | Light green  | Discharge stop signal                        | ○                | Signal for enabling/disabling discharging (NPN specification) Discharging is enabled when connected to DC2 (-) [Black]. (PNP specification) Discharging is enabled when connected to DC2 (+) [Red]. |
| IN2     | Gray         | Maintenance start signal                     | △                | Signal to be input when determining the necessity of electrode needle maintenance                                                                                                                   |
| —       | White        | —                                            | —                | —                                                                                                                                                                                                   |
| —       | Orange       | —                                            | —                | —                                                                                                                                                                                                   |
| OUT1    | Pink         | Static electricity removal completion signal | △                | Signal to be output when the workpiece's electrostatic potential is outside $\pm 30$ V or when electrode needle contamination is being detected.                                                    |
| OUT2    | Yellow       | Maintenance output signal                    | △                | Signal to be output when electrode needle maintenance is necessary.                                                                                                                                 |
| OUT3    | Purple       | Irregular signal                             | △                | Outputs signal when there is irregular high voltage, irregular sensor, irregular CPU (B type contact output)                                                                                        |

○: Minimum wiring requirement for ionizer operation

△: Wiring necessary to use various functions

—: Wiring not required in the sensing DC mode. Exercise caution to ensure that this wire does not short-circuit to other wires.

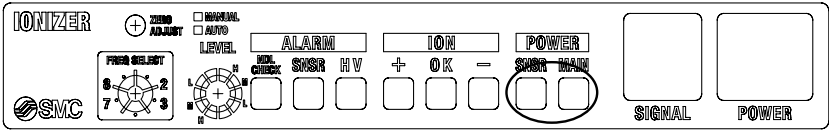
### 7) Air piping

- For single-side piping, block the unused port with the M-5P plug supplied with the ionizer.

Determining the Model and Settings 2 / Pulse DC Mode

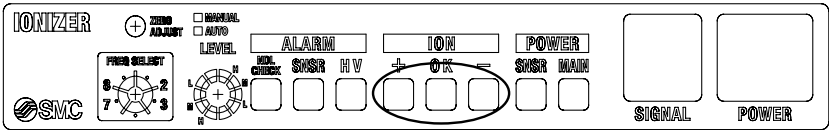
8) LED display

■ POWER LED...Indicates the state of power input and sensor connection.



| LED name |      | Function                                                                                    |
|----------|------|---------------------------------------------------------------------------------------------|
| POWER    | MAIN | Illuminates when power is supplied (Green).<br>(Blinks when the power supply is irregular.) |
|          | SNSR | Illuminates when the feedback sensor is connected (Green).                                  |

■ ION LED...Indicates the polarity of ions being emitted and the ion balance.



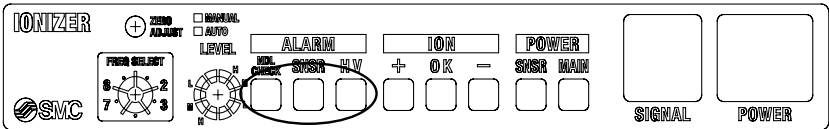
· The state of ion balancing can be checked by reading the LED display.

| LED name |    | Function                                                                                                                    |
|----------|----|-----------------------------------------------------------------------------------------------------------------------------|
| ION      | +  | Illuminates when positive ions are being emitted from the ionizer (Orange).                                                 |
|          | OK | [With autobalance sensor] Indicates the state of ion balancing (Green).<br>[Without autobalance sensor] Remains turned off. |
|          | -  | Illuminates when negative ions are being emitted from the ionizer (Blue).                                                   |

\* The OK LED display blinks when the ion balance is approaching the limits of the adjustable range, signaling that the time for electrode needle maintenance is near.

| Ion balance      | OK LED                 |
|------------------|------------------------|
| Under $\pm 30$ V | Light ON (or Blinking) |
| Over $\pm 30$ V  | Light OFF              |

■ ALARM LED...Indicates abnormal states of the ionizer.



| LED name |           | Function                                                                                                 |
|----------|-----------|----------------------------------------------------------------------------------------------------------|
| ALARM    | HV        | Illuminates when an abnormal current flows through an electrode needle (Red).                            |
|          | SNSR      | Illuminates when the autobalance sensor is not operating normally (Red).                                 |
|          | NDL CHECK | Illuminates when electrode needle stain is detected (Red).<br>(Blinks when the stain is being detected.) |



## Determining the Model and Settings 2 / Pulse DC Mode

### 9) Alarm

| Alarm item                   | Description                                                                                                                                                                          | Corrective actions                                                                                                               |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| High voltage irregularity    | Gives notification of the occurrence of an abnormal current, such as high-voltage leakage. The ionizer stops discharging, turns on the HV ALARM display, and outputs a fault signal. | Turn off the power, solve the problem, then turn the power on again. Alternatively, turn the discharge stop signal off, then on. |
| Sensor irregularity          | Gives notification that the autobalance sensor is unable to operate normally. The ionizer turns on the SNSR ALARM display and outputs a fault signal.                                | Turn off the power, solve the problem, then turn the power on again. Alternatively, turn the discharge stop signal off, then on. |
| CPU irregularity             | Gives notification of the occurrence of a failure in the CPU due to noise, etc. All of the LED displays blink and a fault signal is output.                                          | Turn off the power, solve the problem, then turn the power on again. Alternatively, turn the discharge stop signal off, then on. |
| Electrode needle maintenance | Gives notification that electrode needle maintenance is necessary. The NDL CHECK ALARM display comes on and a maintenance output signal is output.                                   | Turn off the power, clean the electrode needles, and turn the power on again.                                                    |

### 10) Timing chart

#### ■ Timing chart during normal operation

|                        |           |            |                        |
|------------------------|-----------|------------|------------------------|
| Power supply 24 VDC    | Input     | ON<br>OFF  |                        |
| Discharge stop signal  | Input     | ON<br>OFF  | (Operation permission) |
| State of emitting ions | ON<br>OFF | (Emission) |                        |

#### ■ Timing chart when electrode needle dirt is detected or ion balance is detected.

##### (a) When an auto-balance sensor is connected.

###### (1) Manual operation

|                                              |                        |           |                                                                              |
|----------------------------------------------|------------------------|-----------|------------------------------------------------------------------------------|
| Power supply 24 VDC                          | Input                  | ON<br>OFF |                                                                              |
| Discharge stop signal                        | Input                  | ON<br>OFF | (Operation permitted)                                                        |
| Static electricity removal completion signal | Output                 | ON<br>OFF | (Electrode needle stain-detection or ion balance adjustment in progress) 2 s |
| Maintenance start signal                     | Input                  | ON<br>OFF | (SW ON) Over 100 ms                                                          |
| Maintenance output signal                    | Output                 | ON<br>OFF | (SW ON)                                                                      |
| Maintenance display (NDL CHECK ALARM)        | LED                    | ON<br>OFF | (Display) Blanking                                                           |
| Internal processing                          | Dirt-detection         |           | (Performed when the maintenance level selection switch is set to H, M or L)  |
|                                              | Ion balance adjustment |           |                                                                              |

###### (2) Automatic operation

|                                              |                        |           |                                                                             |
|----------------------------------------------|------------------------|-----------|-----------------------------------------------------------------------------|
| Power supply 24 VDC                          | Input                  | ON<br>OFF |                                                                             |
| Discharge stop signal                        | Input                  | ON<br>OFF | (Operation permitted)                                                       |
| Static electricity removal completion signal | Output                 | ON<br>OFF | (Electrode needle stain-detection in progress) 2 s                          |
| Maintenance start signal                     | Input                  | ON<br>OFF | (SW ON) Over 100 ms                                                         |
| Maintenance output signal                    | Output                 | ON<br>OFF | (SW ON)                                                                     |
| Maintenance display (NDL CHECK ALARM)        | LED                    | ON<br>OFF | (Display) Blanking                                                          |
| Internal processing                          | Dirt-detection         |           | (Performed when the maintenance level selection switch is set to H, M or L) |
|                                              | Ion balance adjustment |           |                                                                             |

##### (b) When an auto-balance sensor is not connected.

|                                              |                        |           |                                                                             |
|----------------------------------------------|------------------------|-----------|-----------------------------------------------------------------------------|
| Power supply 24 VDC                          | Input                  | ON<br>OFF |                                                                             |
| Discharge stop signal                        | Input                  | ON<br>OFF | (Operation permitted)                                                       |
| Static electricity removal completion signal | Output                 | ON<br>OFF | (Electrode needle stain-detection in progress) 2 s                          |
| Maintenance start signal                     | Input                  | ON<br>OFF | (SW ON) Over 100 ms                                                         |
| Maintenance output signal                    | Output                 | ON<br>OFF | (SW ON)                                                                     |
| Maintenance display (NDL CHECK ALARM)        | LED                    | ON<br>OFF | (Display) Blanking                                                          |
| Internal processing                          | Dirt-detection         |           | (Performed when the maintenance level selection switch is set to H, M or L) |
|                                              | Ion balance adjustment |           |                                                                             |

: Either ON or OFF depending on the situation.

- A signal indicating static electricity removal completion is output when the detection of electrode needle dirt is in progress.

### ⚠ Caution

Ions are emitted from the ionizer to detect electrode needle dirt and the workpiece may therefore be electrostatically charged. Perform this detection procedure in the absence of workpieces.

## Determining the Model and Settings 3 / DC Mode

### 3. DC mode

#### 1) Selection of bar length

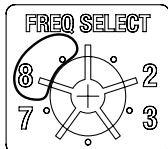
- Determine the length suited for a work size, referring to the “Static electricity Removal Characteristics” and “Static electricity Removal Range”, etc.

#### 2) Installation of the ionizer

- Install the ionizer within 50 to 2000 mm of the object requiring electricity removal. Although the main unit can also be used at other distances, it may fail to operate normally depending on the conditions of use. Before use, always verify that the main unit is functioning normally.

#### 3) Frequency selection switch setting

- Use this switch to select “Positive Ion Emission” or “Negative Ion Emission”.



| Ion polarity          | Configuration of switch |
|-----------------------|-------------------------|
| Positive ion emission | 8                       |
| Negative ion emission | 9                       |

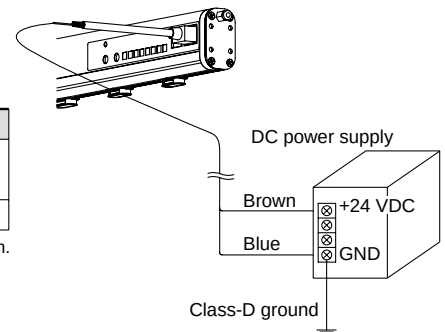
#### 4) Wiring of power supply cable

- Connect the dedicated power supply cable.

##### ■ Connection with ionizer driving power supply

| Symbol  | Cable colour | Description           | Connection needs | Contents                           |
|---------|--------------|-----------------------|------------------|------------------------------------|
| DC1 (+) | Brown        | Power supply 24 VDC   | ○                | Ionizer driving power supply cable |
| DC1 (-) | Blue         | Power supply GND [FG] | ○                |                                    |
| OUT4    | Dark green   | Sensor monitor output | —                |                                    |

\* DC1 (-) [Blue] is sure to ground it according to class-D. If the terminal is not grounded, the ionizer may malfunction.



##### ■ Wiring of input / output signal power supply cable

| Symbol  | Cable colour | Description                                  | Connection needs | Contents                                                                                                                                                                                            |
|---------|--------------|----------------------------------------------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DC2 (+) | Red          | Power supply 24 VDC                          | ○                | Input/output signal power supply cable                                                                                                                                                              |
| DC2 (-) | Black        | Power supply GND                             | ○                |                                                                                                                                                                                                     |
| IN1     | Light green  | Discharge stop signal                        | ○                | Signal for enabling/disabling discharging (NPN specification) Discharging is enabled when connected to DC2 (-) [Black]. (PNP specification) Discharging is enabled when connected to DC2 (+) [Red]. |
| IN2     | Gray         | Maintenance start signal                     | —                | —                                                                                                                                                                                                   |
| —       | White        | —                                            | —                | —                                                                                                                                                                                                   |
| —       | Orange       | —                                            | —                | —                                                                                                                                                                                                   |
| OUT1    | Pink         | Static electricity removal completion signal | —                | —                                                                                                                                                                                                   |
| OUT2    | Yellow       | Maintenance output signal                    | —                | —                                                                                                                                                                                                   |
| OUT3    | Purple       | Irregular signal                             | △                | Outputs signal when there is irregular high voltage, irregular sensor, irregular CPU (B type contact output)                                                                                        |

○: Minimum wiring requirement for ionizer operation

△: Wiring necessary to use various functions

—: Wiring not required in the sensing DC mode. Exercise caution to ensure that this wire does not short-circuit to other wires.

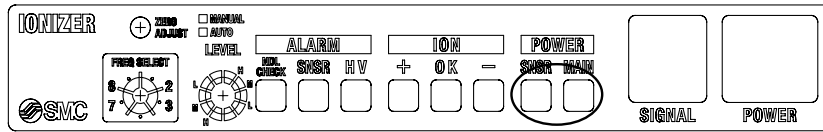
#### 5) Air piping

- For single-side piping, block the unused port with the M-5P plug supplied with the ionizer.

## Determining the Model and Settings 3 / DC Mode

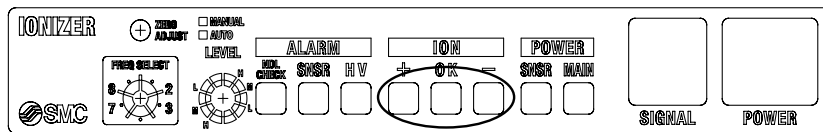
### 6) LED display

- **POWER LED**...Indicates the state of power input and sensor connection.



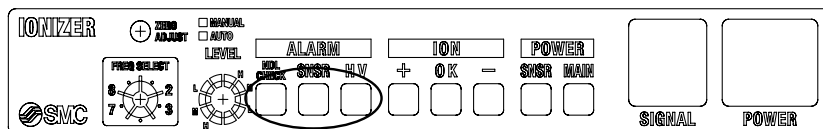
| LED name |      | Function                                                                                    |
|----------|------|---------------------------------------------------------------------------------------------|
| POWER    | MAIN | Illuminates when power is supplied (Green).<br>(Blinks when the power supply is irregular.) |
|          | SNSR | Light OFF                                                                                   |

- **ION LED**...Indicates the polarity of ions being emitted.



| LED name |    | Function                                                                    |
|----------|----|-----------------------------------------------------------------------------|
| ION      | +  | Illuminates that positive ions are being emitted from the ionizer (Orange). |
|          | OK | Light OFF                                                                   |
|          | -  | Illuminates that negative ions are being emitted from the ionizer (Blue).   |

- **ALARM LED**...Indicates abnormal states of the ionizer.



| LED name |           | Function                                                                      |
|----------|-----------|-------------------------------------------------------------------------------|
| ALARM    | HV        | Illuminates when an abnormal current flows through an electrode needle (Red). |
|          | SNSR      | Light OFF                                                                     |
|          | NDL CHECK | Light OFF                                                                     |

### 7) Alarm

| Alarm item                | Description                                                                                                                                                                          | Corrective actions                                                                                                               |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| High voltage irregularity | Gives notification of the occurrence of an abnormal current, such as high-voltage leakage. The ionizer stops discharging, turns on the HV ALARM display, and outputs a fault signal. | Turn off the power, solve the problem, then turn the power on again. Alternatively, turn the discharge stop signal off, then on. |
| CPU irregularity          | Gives notification of the occurrence of a failure in the CPU due to noise, etc. All of the LED displays blink and a fault signal is output.                                          | Turn off the power, solve the problem, then turn the power on again. Alternatively, turn the discharge stop signal off, then on. |

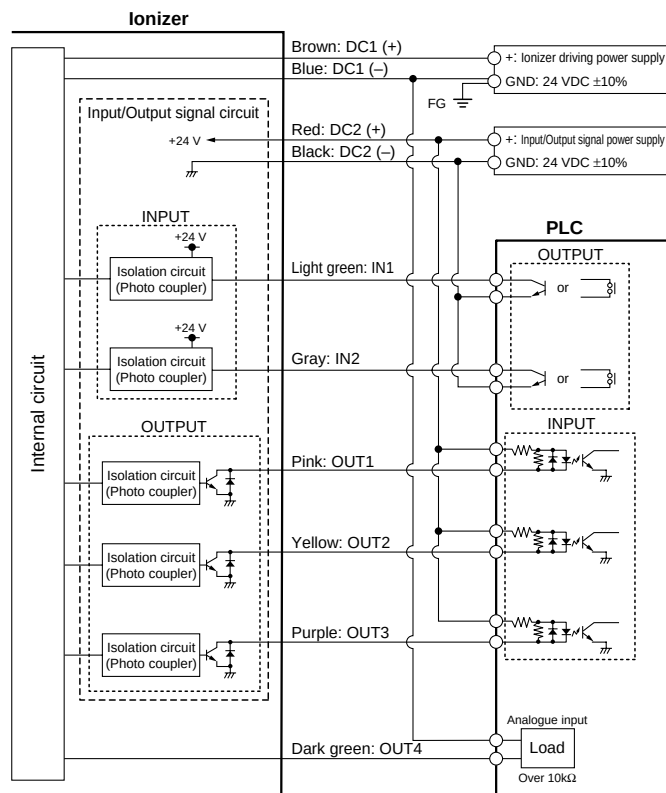
### 8) Timing chart

- **Timing chart during normal operation**

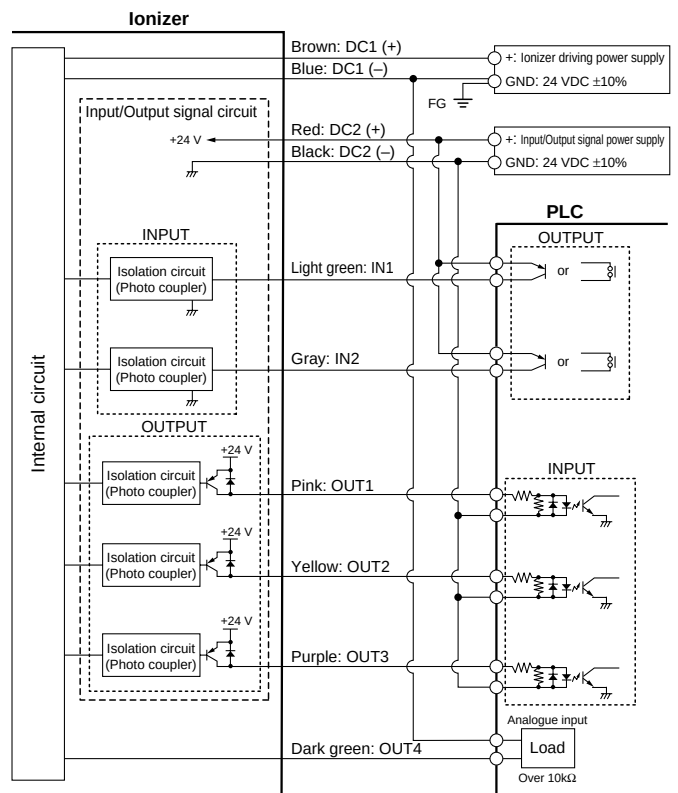
|                        |       |     |  |
|------------------------|-------|-----|--|
| Power supply 24 VDC    | Input | ON  |  |
|                        |       | OFF |  |
| Discharge stop signal  | Input | ON  |  |
|                        |       | OFF |  |
| State of emitting ions |       | ON  |  |
|                        |       | OFF |  |

## Connection Circuit of Power Cable

### ■ NPN specification



### ■ PNP specification



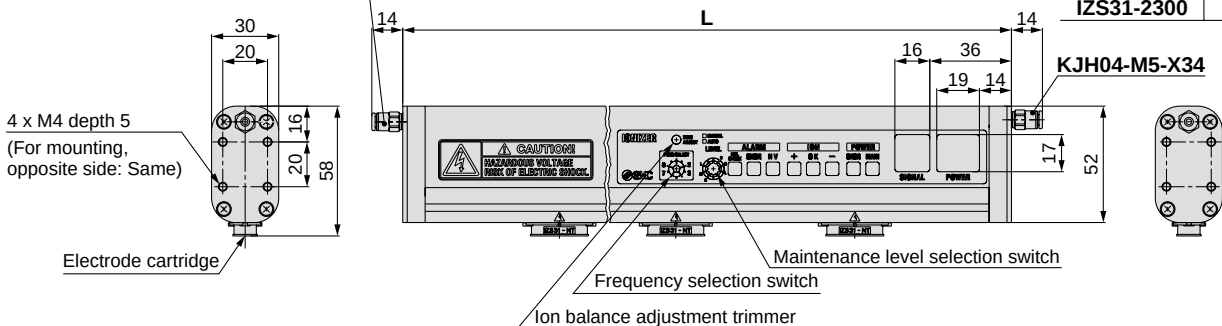
Note) The sensor monitor output (OUT4: Dark green) is not isolated from the ionizer's internal circuit and is therefore wired to the FG terminal.

## Dimensions

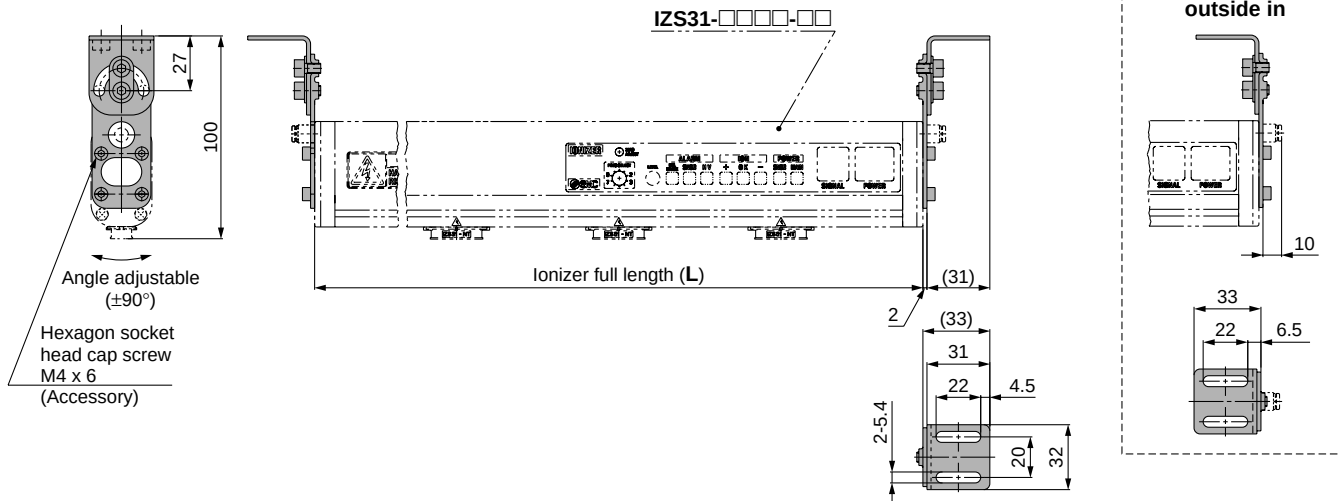
Ionizer / IZS31-□□□□-□□

| Bar length (mm)                | Fitting             |
|--------------------------------|---------------------|
| 300, 380, 620, 780             | M-5P-X112           |
| 1100, 1260, 1500<br>1900, 2300 | KJH04-M5-X34 (Note) |

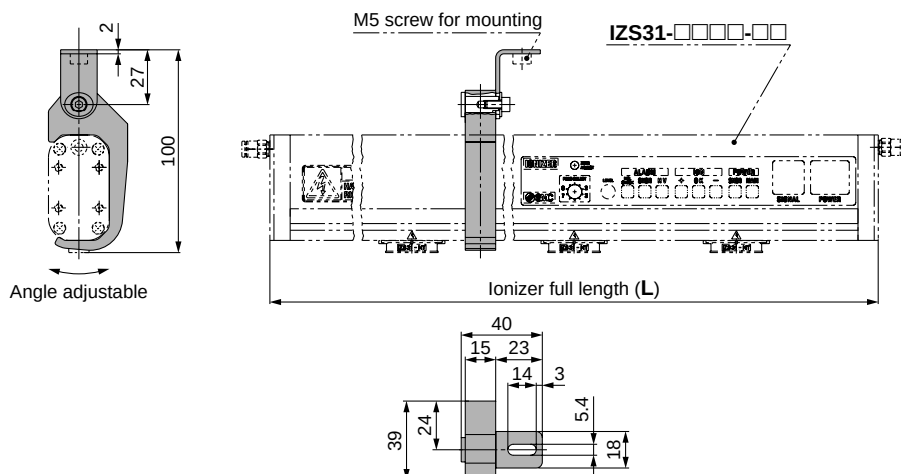
Note) Plug (M-5P-X112) is shipped together.



## End bracket / IZS31-BE



## Centre bracket / IZS31-BM



Note) Number of centre brackets included in a model with brackets (Refer to "How to Order" on page 4).

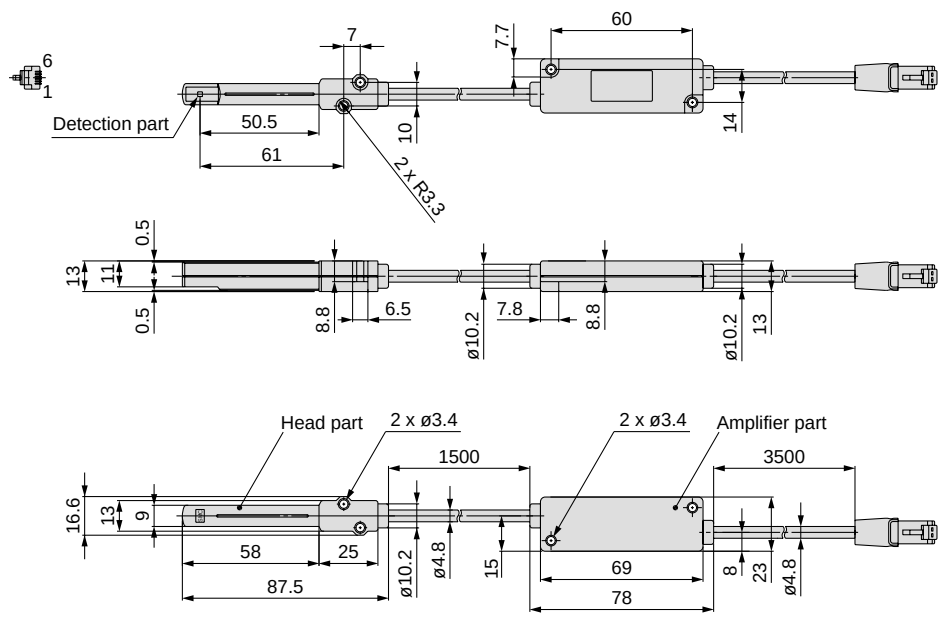
| Bar length (mm)    | Centre bracket |
|--------------------|----------------|
| 300, 380, 620, 780 | None           |
| 1100, 1260, 1500   | With 1 pc.     |
| 1900, 2300         | With 2 pcs.    |



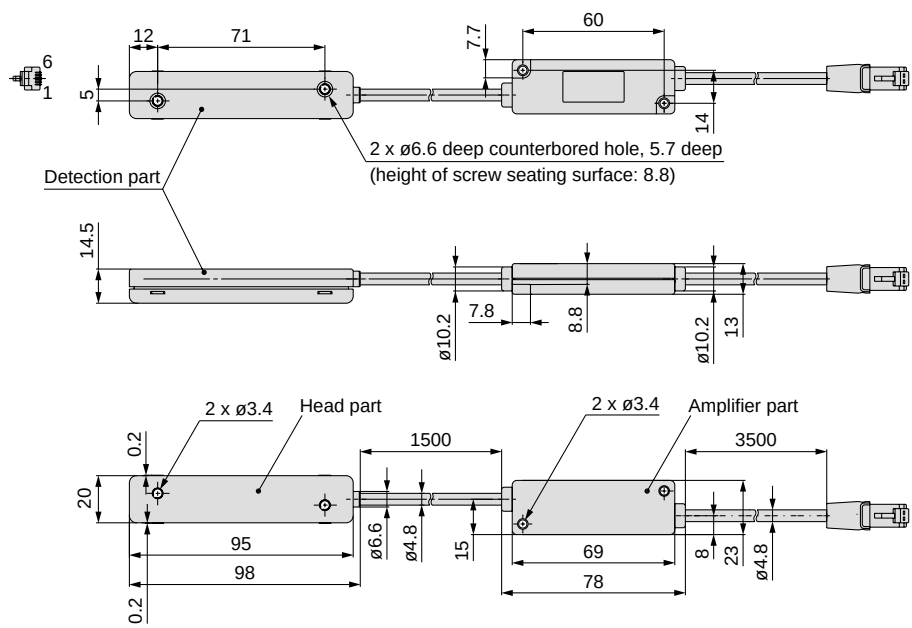
# Series IZS31

## Dimensions

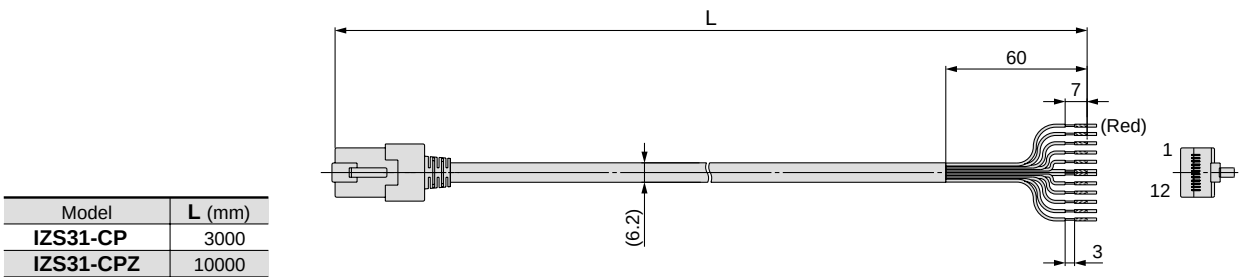
### Feedback sensor / IZS31-DF



### Autobalance sensor / IZS31-DG



### Power supply cable / IZS31-CP□



| Model     | L (mm) |
|-----------|--------|
| IZS31-CP  | 3000   |
| IZS31-CPZ | 10000  |

# Series IZS Made to Order 1

For detailed dimensions, specifications and delivery time, please contact SMC.

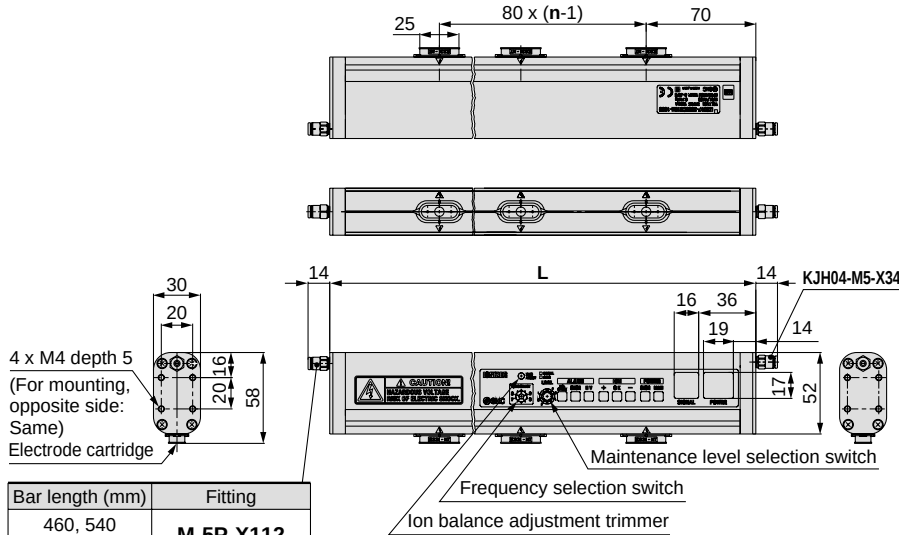


## 1 Non-standard bar length compliant

Symbol

**X10**

\* For "How to Order", refer to page 4.



| Bar length (mm)                                                                  | Fitting                                   |
|----------------------------------------------------------------------------------|-------------------------------------------|
| 460, 540, 700                                                                    | <b>M-5P-X112</b>                          |
| 860, 940, 1020, 1180, 1340, 1420, 1580, 1660, 1740, 1820, 1980, 2060, 2140, 2220 | <b>KJH04-M5-X34</b> <small>(Note)</small> |

Note) Plug (M-5P-X112) is shipped together.

n (No. of electrode cartridges),  
L Dimension, Weight

| Part no.             | n  | L (mm) | Weight (g) |
|----------------------|----|--------|------------|
| IZS31-460□□□-□□-X10  | 5  | 460    | 600        |
| IZS31-540□□□-□□-X10  | 6  | 540    | 660        |
| IZS31-700□□□-□□-X10  | 8  | 700    | 780        |
| IZS31-860□□□-□□-X10  | 10 | 860    | 910        |
| IZS31-940□□□-□□-X10  | 11 | 940    | 970        |
| IZS31-1020□□□-□□-X10 | 12 | 1020   | 1040       |
| IZS31-1180□□□-□□-X10 | 14 | 1180   | 1160       |
| IZS31-1340□□□-□□-X10 | 16 | 1340   | 1290       |
| IZS31-1420□□□-□□-X10 | 17 | 1420   | 1350       |
| IZS31-1580□□□-□□-X10 | 19 | 1580   | 1480       |
| IZS31-1660□□□-□□-X10 | 20 | 1660   | 1540       |
| IZS31-1740□□□-□□-X10 | 21 | 1740   | 1600       |
| IZS31-1820□□□-□□-X10 | 22 | 1820   | 1660       |
| IZS31-1980□□□-□□-X10 | 24 | 1980   | 1790       |
| IZS31-2060□□□-□□-X10 | 25 | 2060   | 1850       |
| IZS31-2140□□□-□□-X10 | 26 | 2140   | 1920       |
| IZS31-2220□□□-□□-X10 | 27 | 2220   | 1980       |

### No. of Centre Brackets

| Bar length (mm) | Quantity    |
|-----------------|-------------|
| 460 to 700      | None        |
| 860 to 1580     | With 1 pc.  |
| 1660 to 2220    | With 2 pcs. |

## 2 Power supply cable, made-to-order component

Symbol

**X13**

Available in 1 m increments from 1 m to 10 m.

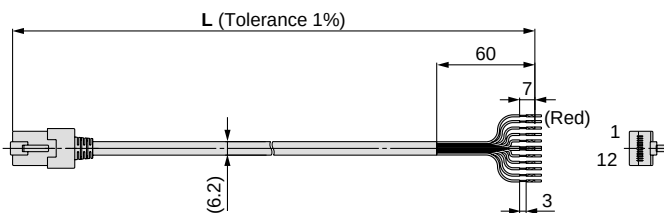
Note 1) Use standard power supply cables for 3 m and 10 m lengths.

### How to Order

IZS31-CP□-X13

#### Cable length

| Symbol | L: Cable length |
|--------|-----------------|
| 01     | 1000 mm         |
| 02     | 2000 mm         |
| 04     | 4000 mm         |
| 05     | 5000 mm         |
| 06     | 6000 mm         |
| 07     | 7000 mm         |
| 08     | 8000 mm         |
| 09     | 9000 mm         |



# Series IZS

## Made to Order 2

For detailed dimensions, specifications and delivery time, please contact SMC.



### 3 Model with 40 mm-pitch electrode cartridges

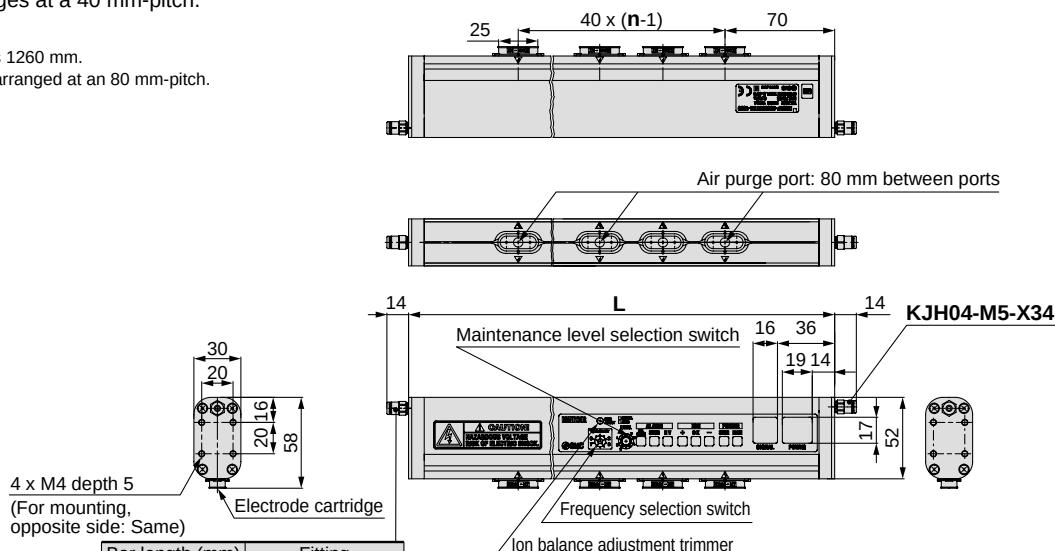
Symbol

**X15**

Install the electrode cartridges at a 40 mm-pitch.  
(Standard pitch: 80 mm).

Note) The maximum bar length is 1260 mm.

The air purge nozzles are arranged at an 80 mm-pitch.



4 x M4 depth 5  
(For mounting,  
opposite side: Same)

| Bar length (mm)       | Fitting                                  |
|-----------------------|------------------------------------------|
| 300, 380,<br>620, 780 | <b>M-5P-X112</b>                         |
| 1100, 1260            | <b>KJH04-M5-X34</b> <small>Note)</small> |

Note) Plug (M-5P-X112) is shipped together.

**n (No. of electrode cartridges),  
L Dimension, Weight**

| Part no.                             | n  | L (mm) | Weight (g) |
|--------------------------------------|----|--------|------------|
| <b>IZS31-300</b> □□□-□□- <b>X15</b>  | 5  | 300    | 480        |
| <b>IZS31-380</b> □□□-□□- <b>X15</b>  | 7  | 380    | 540        |
| <b>IZS31-620</b> □□□-□□- <b>X15</b>  | 13 | 620    | 740        |
| <b>IZS31-780</b> □□□-□□- <b>X15</b>  | 17 | 780    | 880        |
| <b>IZS31-1100</b> □□□-□□- <b>X15</b> | 25 | 1100   | 1140       |
| <b>IZS31-1260</b> □□□-□□- <b>X15</b> | 29 | 1260   | 1270       |



Series **IZS31**

# Safety Instructions

These safety instructions are intended to prevent a hazardous situation and/or equipment damage. These instructions indicate the level of potential hazard by a label of “**Caution**”, “**Warning**” or “**Danger**”. To ensure safety, be sure to observe ISO 4414 Note 1), JIS B 8370 Note 2) and other safety practices.

 **Caution** : Operator error could result in injury or equipment damage.

 **Warning** : Operator error could result in serious injury or loss of life.

 **Danger** : In extreme conditions, there is a possible result of serious injury or loss of life.

Note 1) ISO 4414 : Pneumatic fluid power --General rules relating to systems

Note 2) JIS B 8370: General Rules for Pneumatic Equipment

## **Warning**

### **1. The compatibility of pneumatic equipment is the responsibility of the person who designs the pneumatic system or decides its specifications.**

Since the products specified here are used in various operating conditions, their compatibility for the specific pneumatic system must be based on specifications, or post analysis and/or tests to meet the specific requirements. The expected performance and safety assurance will be the responsibility of the person who has determined the compatibility of the system. This person should continuously review the suitability of all items specified, referring to the latest catalogue information with a view to giving due consideration to any possibility of equipment failure when configuring a system.

### **2. Only trained personnel should operate pneumatically operated machinery and equipment.**

Since the product generates a high voltage, handling it incorrectly can be dangerous. Assembly, handling, and repair of pneumatics systems should be performed only by trained and experienced operators.

### **3. Do not service the machinery/equipment or attempt to remove components until safety is confirmed.**

1. Inspection and maintenance of the machinery/equipment should only be performed after confirming that safety precautions such as grounding, electric shock prevention, and various other types of damage prevention have been taken.
2. When equipment is to be removed, confirm the safety process as mentioned above. Turn off the supply pressure for this equipment and exhaust all residual compressed air in the system.
3. Before the machinery/equipment is restarted, take measures to prevent short circuiting and other such electrical failures.

### **4. Avoid using the product in the following conditions or environment. However, if the product must be used in these conditions, please contact SMC first and be sure to take all necessary safety precautions.**

1. Conditions and environments beyond the given specifications, or if product is used outdoors.
2. Installation on equipment in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverages, recreation equipment, emergency stop circuits, clutch and brake circuits in press applications, or safety equipment.
3. An application which has the possibility of having negative effects on people, property, requiring special safety analysis.



## Series IZS31

# Specific Product Precautions 1

Be sure to read this before handling.

### Selection

#### ⚠ Warning

1. This product is intended to be used with general factory automation (FA) equipment.

If considering to use the product for other applications (especially those stipulated in 4 on back page 1), consult with SMC beforehand.

2. Use this product within the specified voltage and temperature range.

Using outside of the specified voltage can cause a malfunction, damage, electrical shock, or fire.

3. Use clean compressed air for fluid.

This product is not explosion proof. Never use a flammable gas or an explosive gas as a fluid and never use this product in the presence of such gases.

Contact us when fluids other than compressed air are used.

4. This product is not explosion-protected.

Never use this product in locations where the explosion of dust is likely to occur or flammable or explosive gases are used. This can cause fire.

#### ⚠ Caution

1. This product is not cleaned. When bringing into a clean room, flush for several minutes and confirm the required cleanliness before using.

### Mounting

#### ⚠ Warning

1. Reserve an enough space for maintenance, piping and wiring

Please take into consideration that the one-touch fittings for supplying air, need enough space for the air tubing to be easily attached/detached.

To avoid excessive stress on the connector and one-touch fitting, please take into consideration the air tubings minimum bending radius and avoid bending at acute angles.

Wiring with excessive twisting, bending, etc. can cause a malfunction, wire breakage, fire or air leakage.

Minimum bending radius: Power supply cable.....35 mm  
Sensor cable.....25 mm

(Note: Shown above is wiring with the fixed minimum allowable bending radius and at a temperature of 20 °C.

If used under this temperature, the connector can receive excessive stress even though the minimum bending radius is allowable.)

Regarding the minimum bending radius of the air tubing, refer to the instruction manual or catalogue for tubing.

2. Mounting on a plane surface.

If there are irregularities, cracks or height differences, excessive stress will be applied to the frame or case, resulting in damage or other trouble. Also, do not drop or apply a strong shock. Otherwise, damage or an accident can occur.

### Mounting

#### ⚠ Warning

3. Do not use this product in an area where noise (electric magnetic field or surge voltage, etc.) are generated.

Using the ionizer under such conditions may cause it to malfunction or internal devices to deteriorate or break down. Take noise countermeasures and prevent the lines from mixing or coming into contact with each other.

4. Observe the tightening torque requirements when installing the ionizer. Refer to the following table for tightening torques for screws, etc.

If overtightened with a high torque, the mounting screws or mounting brackets may break.

Also, if under tightened with a low torque, the connection may loosen.

| Thread size | Recommended tightening torque |
|-------------|-------------------------------|
| M3          | 0.61 to 0.63 N·m              |
| M4          | 0.73 to 0.75 N·m              |
| M5          | 1.3 to 1.5 N·m                |

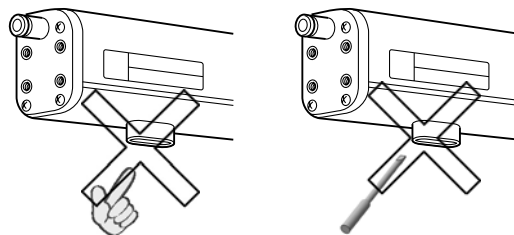
5. Do not touch the electrode pin directly with fingers or metallic tools.

If a finger is used to touch the electrode, it may get stuck or an injury or electrical shock may occur from touching the surrounding equipment.

In addition, if the electrode or cartridge is damaged with a tool, the specification will not be met and damage and/or an accident can occur.

#### ⚠ Danger High Voltage!

Electrode needles are under high voltage. Never touch them as there is a danger of electric shock or injury due to an evasive action against a momentary electrical shock caused by inserting foreign matter in the electrode cartridge or touching the electrode needle.



6. Do not affix any tape or seals to the main unit.

If the tape or seal 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.

7. Installation and adjustment should be conducted after turning off the power supply.



## Series IZS31

# Specific Product Precautions 2

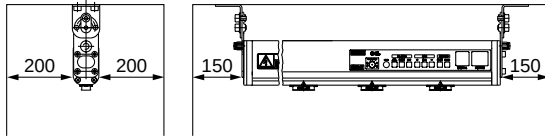
Be sure to read this before handling.

### Mounting

#### ⚠ Caution

1. Install the ionizer away from a wall as illustrated below.

If a wall is located closer than the illustration below, the ions generated will not be able to reach the object which requires static electricity removal and therefore result in a decrease in efficiency.



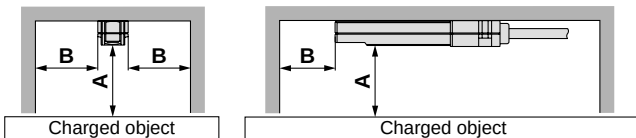
Unit: mm

**After installation, be sure to verify the effects of static electricity removal.**

The effects vary depending on the ambient conditions, operating conditions, etc. After installation, verify the effects of static electricity removal.

2. Install a feedback sensor away from the wall as illustrated below.

The ionizer may fail to measure electrostatic potentials correctly if a wall or other obstacle exists within the clearances shown in the following figure.



(mm)

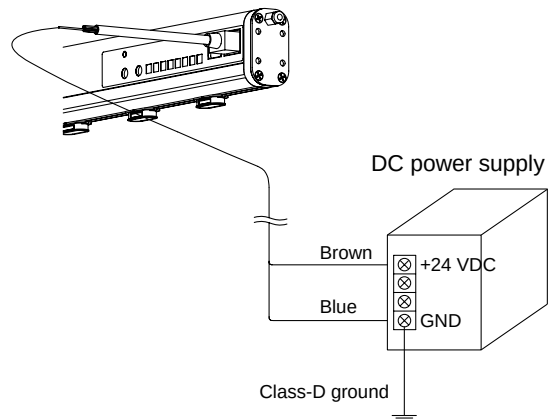
| A  | B  |
|----|----|
| 10 | 20 |
| 20 | 40 |
| 25 | 45 |
| 30 | 55 |
| 40 | 65 |
| 50 | 75 |

### Wiring / Piping

#### ⚠ Warning

1. Before wiring confirm if the power supply voltage is enough and that it is within the specifications before wiring.
2. Be sure to provide class-D grounding in order to maintain product performance.

If such grounding is not provided, not only may the ion balance be disrupted but electric shocks may also result and the ionizer or power supply may break down.



3. Be sure to turn off the power supply before wiring (including attachment/detachment of the connector).
4. To connect a feedback sensor or autobalance sensor to the ionizer, use the cable included with the sensor. Do not disassemble or modify the ionizer.
5. When applying the power supply, pay special attention to the wiring and/or surrounding environment until safety is confirmed.
6. Do not connect or remove any connectors including the power supply, while power is being supplied. Otherwise, the ionizer may malfunction.
7. If the power line and high pressure line are routed together, this product may malfunction due to noise. Therefore, use a separate wiring route for this product.
8. Be sure to confirm there are no wiring errors before starting this product.

Incorrect wiring will lead to damage or malfunction to the product.

9. Flush the piping before using.

Before using this product, exercise caution to prevent particles, water drop, or oil from entering the piping.





## Series IZS31

# Specific Product Precautions 3

Be sure to read this before handling.

### Operating Environment / Storage Environment

#### Warning

##### 1. Observe the operating fluid temperature and ambient temperature range.

Fluid and ambient temperature ranges are 0 to 50°C for the ionizer, feedback sensor and autobalance sensor. Do not use the ionizer in locations subject to sudden temperature changes even if the ambient temperature range is within the specified limits, as condensation may result.

##### 2. Do not use this product in an enclosed space.

This product utilizes a corona discharge phenomenon. Do not use the product in an enclosed space as ozone and nitrogen oxides exist in such places, even though in marginal quantities.

##### 3. Environments to avoid

Avoid using and storing this product in the following environments since they may cause damage to this product.

- Avoid using in a place that exceeds an ambient temperature range of 0 to 50 °C.
- Avoid using in a place that exceeds an ambient humidity range of 35 to 80 % Rh.
- Avoid using in a place where condensation occurs due to a drastic temperature change.
- Avoid using in a place in the presence of corrosive or explosive gas or where there is a volatile combustible.
- Avoid using in an atmosphere where there are particles, conductive iron powders, oil mist, salt, solvent, blown dust, cutting oil (water, liquid), etc.
- Avoid using in a place where ventilated air from an air conditioner is directly applied to the product.
- Avoid using in a closed place without ventilation.
- Avoid using in direct sunlight or radiated heat.
- Avoid using in a place where there is a strong magnetic noise (strong electric field, strong magnetic field, or surge).
- Avoid using in a place where static electricity is discharged to the main body.
- Avoid using in a place where a strong high frequency occurs.
- Avoid using in a place where this product is likely to be damaged by lightning.
- Avoid using in a place where direct vibration or shock is applied to the main body.
- Avoid using in a place where there is a force large enough to deform this product or weight is applied to the product.

##### 4. Do not use an air containing mist or dust.

The air containing mist or dust will cause the performance to decrease and shorten the maintenance cycle.  
Supply clean compressed air by using an air dryer (IDFA series), air filter (AF/AFF series), and mist separator (AFM/AM series)

##### 5. The ionizer and sensors are not protected against a surge caused by a lightning.

### Maintenance

#### Warning

##### 1. Periodically (for example, every two weeks) inspect the ionizer and clean the electrode needles.

Conduct a regular maintenance to see if the product is run having a disorder.

Maintenance should be conducted by a fully knowledgeable and experienced person about the equipment.

Using for a long period of time will lower the static electricity eliminating performance, if particles attach to the electrode pin.

Replace the electrode cartridge, if the pins are rough and the static electricity eliminating performance does not return even after being cleaned.

#### Danger High Voltage!

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 ionizer, as this may not only impair the product's functionality but could cause an electric shock or electric leakage.

##### 2. When cleaning the electrode pin or replacing the electrode cartridge, be sure to turn off the power supply to the main body.

Touching an electrode needle when it is electrified may result in electric shock or other accidents.

##### 3. Do not disassemble or modify this product.

Otherwise, an electrical shock, damage and/or a fire may occur. Also, the disassembled or modify products may not achieve the performances guaranteed in the specifications, and exercise caution because the product will not be warranted.

### Handling

#### Warning

##### 1. Do not drop, bump or apply excessive impact (10 G or more) while handling.

Even though it does not appear to be damaged, the internal parts may be damaged and cause a malfunction.

##### 2. When mounting/dismounting the cable, use your finger to pinch the claw of the modular plug, then attach/detach it correctly.

If the modular plug is at a difficult angle to attach/detach, the modular jack's mounting section may be damaged and cause a disorder.

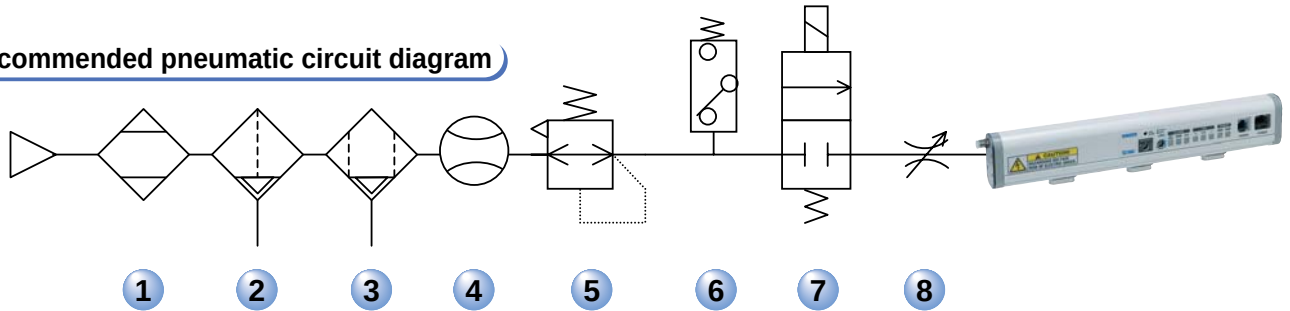
##### 3. Do not operate this product with wet hands. Otherwise, an electrical shock or accident may occur.

## Related Products

**SMC can provide all the equipment required to supply air to the ionizer.**

Consider the equipment below not only for providing an “opportunity to decrease maintenance” and “preventing damage” but also for an “energy-saving countermeasure”.

### Recommended pneumatic circuit diagram



#### 1 Air Dryer / Series IDF

Decreases the dew point of compressed air. Limits moisture generation which can lead to damage.



#### 2 Air Filter / Series AF

Eliminates solid foreign matters such as power particles in the compressed air.



#### 3 Mist Separator / Series AFM

Eliminates oil mist which is difficult to eliminate with an air filter.



#### 4 Digital Flow Switch / Series PFA2

Decreases the air consumption by flow control.



#### 2-Color Display Digital Flow Switch / Series PFM



#### 5 Regulator / Series AR

Decreases the air consumption by setting to an appropriate pressure.



#### 6 Digital Pressure Switch / Series ISE30

The pressure control prevents the ability of static electricity removal from being reduced in accordance with the reduction of air pressure.



#### 7 2 Port Solenoid Valve / Series VCA



#### 8 Throttle Valve / Series AS-X214

Regulates to the appropriate air volume depending upon the installation condition. Decreases the air consumption.





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