Ionizer

3 types of the sensors are available.

- **Autobalance sensor [High-precision type]**
  Adjusts ion balance near the workpiece to reduce any disturbance interference!

- **Autobalance sensor [Body-mounting type]**

**New**

- **Rapid elimination of static electricity by a feedback sensor**: 0.3 seconds
  Condition: Static buildup decreased from 1000 V to 100 V
  Discharged object: Charged plate (150 mm x 150 mm, capacitance 20 pF)
  Installation distance: 200 mm (Tungsten electrode needle with air purge)
  Continuously emits ions in accordance with the polarity applied onto a workpiece.

Supply pressure: 0.1 MPa (7 l/min (ANR) per nozzle)

<table>
<thead>
<tr>
<th>Installation distance (mm)</th>
<th>Static electricity elimination time (sec)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td>500</td>
<td>15</td>
</tr>
<tr>
<td>1000</td>
<td>10</td>
</tr>
<tr>
<td>1500</td>
<td>8</td>
</tr>
<tr>
<td>2000</td>
<td>5</td>
</tr>
</tbody>
</table>

Installation height of sensor: 10 mm

- **Controlled ion balance by sensor**

**Series IZS31**

---

**New ROHS**

---

**Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com**
Feedback sensor / Rapid elimination of static electricity

- Rapid elimination of static electricity by a feedback sensor
  - The speed of static electricity elimination has been increased by reading the workpiece’s electrostatic potential by the feedback sensor and continuously emitting ions with a reverse polarity.
  - Run mode after static electricity elimination (ion balance: within ±30 V) can be selected.
    - Energy saving run mode: Stops generating ions after static electricity elimination to reduce power consumption. Air consumption can also be reduced by controlling the pneumatic valve with a static electricity elimination completion signal.
    - Continuous static electricity elimination run mode: After static electricity elimination, the ionizer changes to pulse DC mode and continues to eliminate static electricity to make it approach 0 V even if the ion balance is below 30 V.

Features 1

Supply pressure: 0.1 MPa (7 l/min (ANR) per nozzle)
Installation height of sensor: 10 mm

- Feedback sensor detects the polarity of a discharged object and measures the charged voltage.

- Time [sec]
  - With sensor
  - Without sensor

- Charged voltage [kV]
  - With sensor
  - Without sensor

- Installation distance L [mm]

- Features
  - Energy saving run mode
  - Continuous static electricity elimination run mode
  - Stop

- Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
**Autobalance sensor / Reduction in adjustment and maintenance man-hours**

**Autobalance sensor [High-precision type]**
- The ion balance near the workpiece is accurately adjusted.
- The object is not affected by the height of installation or any disturbance interference.
- "Ion balance adjustment at external signal input" or "ion balance adjustment at any time" can be selectable.
- The autobalance sensor may be connected only when adjusting the ion balance.

**Autobalance sensor [Body-mounting type]**
- Can be mounted on the body, and can be installed in any places.
  - Monitoring the amount of ion emitted from an ionizer, the autobalance sensor maintains the initial ion balance by adjusting the +/- ion supply rate.
  - The autobalance sensor may be connected only when adjusting the ion balance.

**Features 2**
- **Ion balance**
  - Monitoring +/- return current
Electrode cartridge variations

Electrode cartridge with rapid elimination of static electricity, focusing on static electricity elimination time and energy saving

- High-efficiency nozzle design improves discharge time with low air consumption.

Electrode cartridge with low maintenance, focusing on ion balance and reducing maintenance time

- Stain on electrode needle is reduced by compressed air.

3 types of electrode needle materials

- Tungsten: Ion balance ±30 V
- Monocrystal silicon: Ion balance ±30 V, suitable for eliminating static electricity of silicon wafer
- Stainless steel*: Ion balance ±100 V, low-cost type, suitable for environments sensitive to heavy metal contamination such as food processing

* Only for electrode cartridge with rapid elimination of static electricity

Features 3

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Applicable to workpiece moving at high speed
- Switching over frequency: Max. 60 Hz
  Ions are discharged at high density at workpieces moving at high speed.

Effective static electricity elimination for short distance
- Prevention of irregular static electricity elimination
  Electrode cartridge 40 mm-pitch: -X15
  (Standard: 80 mm-pitch)
  (Length: 1260 mm or less)
  Note) 80 mm-pitch in case of air purge

Indicator functions
- Visualization of charging condition
  (During sensing DC mode)
- Visualization of ion balance
  (When pulse DC mode or autobalance sensor are used.)

Safety functions
- Electrode cartridge drop prevention
  Locking by double-action
- Security cover
  Can even more reliably prevent electrode cartridges from dropping off.

Continuous ion emission of a desired polarity during DC mode
- Can be used to remove static electricity from fast-charged or high-potential workpieces or to electrostatically charge them.

Detects the electric potential difference and outputs in an analog voltage.
- 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 static electricity.

Features 4
**Made to Order**

Ionizer / Series IZS31

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Contents</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>X10</td>
<td>Non-standard bar length</td>
<td>Model with 80 mm-pitch electrode cartridges</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The main unit is shipped fitted with an electrode cartridge security cover</td>
</tr>
<tr>
<td></td>
<td></td>
<td>available as an option.</td>
</tr>
<tr>
<td>X14</td>
<td>Model with electrode cartridge security cover</td>
<td>Model with 40 mm-pitch electrode cartridges</td>
</tr>
<tr>
<td></td>
<td></td>
<td>This model comes fitted with electrode cartridges arranged at a 40 mm-pitch.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Standard pitch: 80 mm)</td>
</tr>
<tr>
<td>X210</td>
<td>High-voltage/control unit detachable short type</td>
<td>Model with 80 mm-pitch electrode cartridges</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A short type ionizer (full length of 180 mm and 220 mm) can be installed in</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a small space. The high-voltage unit (ionizing unit) and control unit are</td>
</tr>
<tr>
<td></td>
<td></td>
<td>detachable from each other.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The distance between them is also optional according to the length of selected</td>
</tr>
<tr>
<td></td>
<td></td>
<td>connection cables.</td>
</tr>
<tr>
<td>X211</td>
<td>High-voltage/control unit detachable short type</td>
<td>Model with 40 mm-pitch electrode cartridges</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Non-standard bar length is 1260 mm. The air purge nozzles are arranged at an</td>
</tr>
<tr>
<td></td>
<td></td>
<td>80 mm-pitch.</td>
</tr>
</tbody>
</table>

**Power supply cable**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Contents</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>X13</td>
<td>Non-standard power supply cable length</td>
<td>Power supply cable full length: 1 m to 20 m</td>
</tr>
<tr>
<td>X196</td>
<td>Ionizer driving AC adapter</td>
<td>Input voltage: 100 V to 240 V, Output voltage: 24 VDC</td>
</tr>
</tbody>
</table>

**Variations**

- **Bracket**
  - End bracket
  - Center bracket

- **Bar length (mm)**
  - 300, 380, 620, 780, 1100, 1260, 1500, 1900, 2300

- **Power supply cable**
  - 3 m, 10 m

- **Electrode cartridge**
  - Electrode cartridge with rapid elimination of static electricity
    - Electrode needle material
      - Tungsten
      - Silicon
      - Stainless steel
  - Electrode cartridge with low maintenance
    - Electrode needle material
      - Tungsten
      - Silicon

- **Sensor**
  - Feedback sensor
  - Autobalance sensor (High-precision type)
  - Autobalance sensor (Body-mounting type)

- **Features 5**

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Application Examples

Eliminating static electricity on PET bottles
• Trip-resistance during conveying
• Prevents adhesion of dust.

Eliminating static electricity on molded goods
• Improves detachability of molded goods from a die.

Eliminating static electricity during wafer transfer
• Prevents breakage due to discharge between wafers and hands.

Eliminating static electricity on a film
• Prevents adhesion of dust.
• Prevents winding failure due to wrinkles, etc.

Eliminating static electricity on film molded goods
• Prevents attaching to conveyer.
• Prevents dispersion of finished goods.

Eliminating 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.
Series IZS31
Technical Data 1

Static Electricity Elimination Characteristics

1) Installation distance and static electricity elimination time (Static electricity elimination time from 1000 V to 100 V)

Electrode cartridge with rapid elimination of static electricity

- Supply pressure: 0.02 MPa (1 ℓ/min (ANR) per nozzle)
- Supply pressure: 0.1 MPa (7 ℓ/min (ANR) per nozzle)
- Supply pressure: 0.3 MPa (14 ℓ/min (ANR) per nozzle)
- Supply pressure: 0.5 MPa (20 ℓ/min (ANR) per nozzle)

Note: Static electricity elimination features are based on the data using the 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 purpose only for model selection because the value varies depending on the material and/or size of a subject.

Approved
Approved

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Electrode cartridge with low maintenance

⚠️ Caution
Be sure to perform air purge when using a low-maintenance electrode cartridge. Without air purge, low-maintenance efficiency will decrease.

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)

Installation distance (mm) vs. Static electricity elimination time (sec) for different supply pressures and frequencies.

Supply pressure: 0.02 MPa (1 l/min (ANR) per nozzle)

Supply pressure: 0.05 MPa (3.5 l/min (ANR) per nozzle)

Supply pressure: 0.1 MPa (7 l/min (ANR) per nozzle)

Supply pressure: 0.3 MPa (14 l/min (ANR) per nozzle)

Supply pressure: 0.5 MPa (20 l/min (ANR) per nozzle)

Be sure to perform air purge when using a low-maintenance electrode cartridge. Without air purge, low-maintenance efficiency will decrease.

Approved

Approved

Approved

Technical Data
Series IZS31
Technical Data 2

Static Electricity Elimination Characteristics

Note: Static electricity elimination features are based on the data using the charged plate (size: 192 mm x 192 mm, capacitance: 20 pF) as defined in the U.S. ANSI standards (ANSI/ESD STM3, 1-2000). Use this as a guideline purpose only for model selection because the value varies depending on the material and/or size of a subject.

2) Static electricity elimination range

Electrode cartridge with rapid elimination of static electricity

Air purge: No

Electrode cartridge with rapid elimination of static electricity, electrode cartridge with low maintenance

Air purge: Yes (0.05 MPa to 0.7 MPa)

3) Installation height of feedback sensor and static electricity elimination time / Ion balance

The height of a feedback sensor should be 50 mm or less. When using a feedback sensor at higher than 50 mm, refer to the graphs below.

Air purge: Yes (0.1 MPa)

Catalog specification value: ±30 V

Approved

Approved

Note: Static electricity elimination features are based on the data using the 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 purpose only for model selection because the value varies depending on the material and/or size of a subject.

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Series **IZS31**

**Technical Data 3**

**Static Electricity Elimination Characteristics**

Note: Static electricity elimination features are based on the data using the 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 purpose only for model selection because the value varies depending on the material and/or size of a subject.

### 4) Flow rate — Pressure characteristics

![Graph showing flow rate vs. pressure characteristics](image)

**How to measure**

- **Air supply measurement**
- **Pressure measurement**

(a) Single side air supply (IZS31-300, 380, 620, 780)

(b) Both sides air supply (IZS31-1100, 1260, 1500, 1900, 2300)

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

Note: The installation distance in the figure refers to the distance from the target to the electrostatic sensor.

**Relationship in installation distance between electrostatic potential and sensor output voltage**

![Graph showing relationship between installation distance and electrostatic potential](image)

**Feedback sensor detection range**

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

<table>
<thead>
<tr>
<th>Installation distance (mm)</th>
<th>Detection range (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>45</td>
</tr>
<tr>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td>50</td>
<td>180</td>
</tr>
</tbody>
</table>

![Diagram showing feedback sensor detection range](image)
Ionizer Series IZS31

How to Order

Made to Order
(Refer to page 27 through to 30 for details.)

Symbol
X10
X14
X15
X210
X211
Contents
Non-standard bar length (80 mm-pitch)
Model with electrode cartridge security cover
Model with 40 mm pitch electrode cartridges
High-voltage/control unit detachable short type
High-voltage/control unit detachable short type
Specifications
The main unit is shipped fitted with an electrode cartridge security cover available as an option.
This model comes fitted with electrode cartridges arranged at a 40 mm pitch. (Standard: 80 mm-pitch)
A short type ionizer (full length of 180 mm and 220 mm) can be installed in a small space.
The high voltage unit (ionizing unit) and control unit are detachable from each other.
The distance between them is also optional according to the length of selected connection cables.

Non-standard power supply cable length

How to Order

IZS31 - CP X13

Symbol
Power supply cable full length
01
1 m
02
2 m

Note 1) 11 m or longer power supply cables are not CE Marking compliant.
Note 2) Use standard power supply cables for 3 m and 10 m lengths.

Ionizer driving AC adapter (100 to 240 VAC)

How to Order

IZS31 - F X196

Symbol
Power supply cable full length
01
1 m
02
2 m
19
19 m
20
20 m

Applicable output specifications
Nil
P
NPN specification
PNP specification

Individual Special Order

(Please 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 body.
Note) The power cable is connected directly to the body. A connector is not used.

Specifications

Contents
Electrode cartridge type / Electrode needle material
Electrode type
Electrode needle material
Symbol
Bar length
C
Rapid elimination of static electricity
Silicon
D
Low maintenance
Silicon

Output
Nil
PNP output
Z
With power supply cable (3 m)
N
Without power supply cable

Sensor
Nil
Without sensor
E
Autobalance sensor [Body-mounting type]*
F
With feedback sensor
G
Autobalance sensor [High-precision type]*

Bracket
Nil
Without bracket
B
With bracket (P)

Note) The number of center brackets differ depending on the bar length. (Refer to the below table.)
Not assembled.

Number of brackets

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

Made to Order
(Refer to page 27 through to 30 for details.)

Symbol
X10
X14
X15
X210
X211
Contents
Non-standard bar length (80 mm-pitch)
Model with electrode cartridge security cover
Model with 40 mm pitch electrode cartridges
High-voltage/control unit detachable short type
High-voltage/control unit detachable short type
Specifications
The main unit is shipped fitted with an electrode cartridge security cover available as an option.
This model comes fitted with electrode cartridges arranged at a 40 mm pitch. (Standard: 80 mm-pitch)
A short type ionizer (full length of 180 mm and 220 mm) can be installed in a small space.
The high voltage unit (ionizing unit) and control unit are detachable from each other.
The distance between them is also optional according to the length of selected connection cables.

Non-standard power supply cable length

How to Order

IZS31 - CP X13

Symbol
Power supply cable full length
01
1 m
02
2 m
19
19 m
20
20 m

Note 1) 11 m or longer power supply cables are not CE Marking compliant.
Note 2) Use standard power supply cables for 3 m and 10 m lengths.

Ionizer driving AC adapter (100 to 240 VAC)

How to Order

IZS31 - F X196

Symbol
Power supply cable full length
01
1 m
02
2 m
19
19 m
20
20 m

Applicable output specifications
Nil
P
NPN specification
PNP specification

Individual Special Order

(Please 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 body.
Note) The power cable is connected directly to the body. A connector is not used.
## Ionizer Series IZS31

### Accessories

<table>
<thead>
<tr>
<th>Feedback sensor</th>
<th>IZS31-DF</th>
<th>Autobalance sensor [High-precision type]</th>
<th>IZS31-DG</th>
<th>Autobalance sensor [Body-mounting type]</th>
<th>IZS31-DE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Connection cable A/B for connecting autobalance sensor to the body</td>
<td></td>
<td>Electrode cartridge with rapid elimination of static electricity</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>For driving: IZS31-CF (12P)</td>
<td></td>
<td>IZS31-NT (Material: Tungsten)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>For I/O signals: IZS31-CR (6P)</td>
<td></td>
<td>IZS31-NC (Material: Silicon)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IZS31-NS (Material: Stainless steel)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Power supply cable
- IZS31-CP (3 m)
- IZS31-CPZ (10 m)

### Connection cable A/B for connecting autobalance sensor to the body
- For driving: IZS31-CF (12P)
- For I/O signals: IZS31-CR (6P)

### Electrode cartridge with low maintenance
- IZS31-NJ (Material: Tungsten)
- IZS31-NK (Material: Silicon)

### Electrode cartridge with rapid elimination of static electricity
- IZS31-NT (Material: Tungsten)
- IZS31-NC (Material: Silicon)
- IZS31-NS (Material: Stainless steel)

### End bracket / IZS31-BE

### Center bracket / IZS31-BM

### Sensor bracket / IZS31-BL
(For mounting IZS31-DE on the body)
- Provided with 2 hexagon socket head cap screw for sensor bracket (2 pcs.)

### Table: Bar length (mm) vs. Quantity

<table>
<thead>
<tr>
<th>Bar length (mm)</th>
<th>End bracket</th>
<th>Center bracket</th>
</tr>
</thead>
<tbody>
<tr>
<td>300, 380, 620, 780</td>
<td>2 pcs.</td>
<td>None</td>
</tr>
<tr>
<td>1100, 1260, 1500</td>
<td>With 1 pc.</td>
<td></td>
</tr>
<tr>
<td>1900, 2300</td>
<td>With 2 pcs.</td>
<td></td>
</tr>
</tbody>
</table>

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

Note: The model number is for a single bracket.

---

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**Series IZS31**

**Options**

Electrode cartridge security cover

**IZS31** — E 3

<table>
<thead>
<tr>
<th>Number of fixed electrode cartridges</th>
<th>IZS31-E3</th>
<th>IZS31-E4</th>
<th>IZS31-E5</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>1</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>380</td>
<td>—</td>
<td>1</td>
<td>—</td>
</tr>
<tr>
<td>620</td>
<td>1</td>
<td>1</td>
<td>—</td>
</tr>
<tr>
<td>780</td>
<td>—</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>1100</td>
<td>3</td>
<td>1</td>
<td>—</td>
</tr>
<tr>
<td>1350</td>
<td>1</td>
<td>3</td>
<td>—</td>
</tr>
<tr>
<td>1500</td>
<td>—</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>1900</td>
<td>1</td>
<td>5</td>
<td>—</td>
</tr>
<tr>
<td>2300</td>
<td>—</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

**Number of required security covers**

<table>
<thead>
<tr>
<th>Bar length (mm)</th>
<th>Number of required security covers</th>
<th>IZS31-E3</th>
<th>IZS31-E4</th>
<th>IZS31-E5</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>1</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>380</td>
<td>—</td>
<td>1</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>620</td>
<td>1</td>
<td>1</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>780</td>
<td>—</td>
<td>1</td>
<td>1</td>
<td>—</td>
</tr>
<tr>
<td>1100</td>
<td>3</td>
<td>1</td>
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</tr>
<tr>
<td>1350</td>
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</tr>
<tr>
<td>1500</td>
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<td>2</td>
<td>—</td>
</tr>
<tr>
<td>1900</td>
<td>1</td>
<td>5</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>2300</td>
<td>—</td>
<td>2</td>
<td>4</td>
<td>—</td>
</tr>
</tbody>
</table>

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

**IZS31 Standard part no. — X14**

**Screwdriver for ion balance adjustment trimmer / IZS30-M1**

**Electrode needle cleaning kit / IZS30-M2**

![Screwdriver for ion balance adjustment trimmer / IZS30-M1](image1)

![Electrode needle cleaning kit / IZS30-M2](image2)
Specifications

<table>
<thead>
<tr>
<th>Ionizer model</th>
<th>IZS31-DF (PNP specification)</th>
<th>IZS31-DE (PNP specification)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ion generation method</td>
<td>Corona discharge type</td>
<td>Corona discharge type</td>
</tr>
<tr>
<td>Method of applying voltage</td>
<td>Sensing DC, Pulse DC, DC</td>
<td>Sensing DC, Pulse DC, DC</td>
</tr>
<tr>
<td>Electricity discharge output</td>
<td>≤7000 V</td>
<td>≤7000 V</td>
</tr>
<tr>
<td>Ion balance (mm)</td>
<td>≤50 (Stainless steel electrode needle: ≤100 V)</td>
<td>≤50 (Stainless steel electrode needle: ≤100 V)</td>
</tr>
<tr>
<td>Air purge</td>
<td>Fluid</td>
<td>Fluid</td>
</tr>
<tr>
<td>Operating pressure</td>
<td>0.7 MPa or less (note 1)</td>
<td>0.7 MPa or less (note 1)</td>
</tr>
<tr>
<td>Connection tubing O.D.</td>
<td>ø4</td>
<td>ø4</td>
</tr>
<tr>
<td>Power supply voltage</td>
<td>24 VDC ±10%</td>
<td>24 VDC ±10%</td>
</tr>
<tr>
<td>Current consumption</td>
<td>Sensing DC mode: 200 mA or less (Whole standing by: 120 mA or less)</td>
<td>Sensing DC mode: 200 mA or less (Whole standing by: 120 mA or less)</td>
</tr>
<tr>
<td></td>
<td>Pulse DC mode</td>
<td>Autobalance sensor [Body-mounting type]: 300 mA or less</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Autobalance sensor [High-precision type]: 200 mA or less</td>
</tr>
<tr>
<td></td>
<td>DC mode</td>
<td>170 mA or less</td>
</tr>
<tr>
<td>Input signal</td>
<td>Discharge stop signal</td>
<td>Connected to GND (Voltage: 5 VDC or less, Current consumption: 5 mA or less)</td>
</tr>
<tr>
<td></td>
<td>Maintenance signal</td>
<td>Connected to +24 V (Voltage: Between 19 VDC and 28 VDC, Power supply voltage: Current consumption: 5 mA or less)</td>
</tr>
<tr>
<td></td>
<td>Static electricity removal complete signal</td>
<td>Max. load current: 100 mA</td>
</tr>
<tr>
<td></td>
<td>Maintenance output signal</td>
<td>Residual voltage: 1 V or less (Load current at 100 mA)</td>
</tr>
<tr>
<td></td>
<td>Error signal</td>
<td>Max. applied voltage: 28 VDC</td>
</tr>
<tr>
<td>Output signal</td>
<td>Sensor monitor output (note 2)</td>
<td>Voltage output 1 to 5 V (Connect a 10 kΩ or larger load)</td>
</tr>
<tr>
<td>Effective distance of static electricity elimination</td>
<td>50 to 2000 mm (Sensing DC mode: 200 to 2000 mm)</td>
<td></td>
</tr>
<tr>
<td>Ambient temperature, Fluid temperature</td>
<td>0 to 50°C</td>
<td>0 to 50°C</td>
</tr>
<tr>
<td>Ambient humidity</td>
<td>35 to 80% RH (No condensation)</td>
<td>35 to 80% RH (No condensation)</td>
</tr>
<tr>
<td>Material</td>
<td>Cover of ionizer: ABS, Electrode needle: Tungsten, Monocrystal silicon, Stainless steel</td>
<td>ABS, Stainless steel, Residual voltage: 1 V or less (Load current at 100 mA)</td>
</tr>
<tr>
<td>Vibration resistance</td>
<td>Durability 50 Hz Amplitude 1 mm XYZ each 2 hours</td>
<td>Durability 50 Hz Amplitude 1 mm XYZ each 2 hours</td>
</tr>
<tr>
<td>Shock resistance</td>
<td>10 G</td>
<td>10 G</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CSA Canadian Standard for Electrostatic Air Cleaner, CAN/CSA C22.2 No.187-M1986</td>
</tr>
</tbody>
</table>

Note 1: When the air purge is performed between a charged object and an ionizer at a distance of 300 mm
Note 2: When the electrode cartridge with low maintenance is used, the operating pressure must be 0.05 MPa or more.
Note 3: When the potential of a charged object is measured by a feedback sensor, the relationship between the potential being measured and the sensor monitor output voltage, and the detection range of the sensor vary depending on the sensor’s installation distance. Refer to page 4.

Number of Electrode Cartridges/Weight

<table>
<thead>
<tr>
<th>Bar length (mm)</th>
<th>300</th>
<th>380</th>
<th>520</th>
<th>780</th>
<th>1100</th>
<th>1500</th>
<th>1900</th>
<th>2300</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of electrode cartridges</td>
<td>3</td>
<td>4</td>
<td>7</td>
<td>9</td>
<td>13</td>
<td>15</td>
<td>18</td>
<td>23</td>
</tr>
<tr>
<td>Weight (g)</td>
<td>470</td>
<td>530</td>
<td>720</td>
<td>850</td>
<td>1100</td>
<td>1220</td>
<td>1410</td>
<td>1730</td>
</tr>
</tbody>
</table>

Sensor

<table>
<thead>
<tr>
<th>Sensor model</th>
<th>IZS31-DF (Feedback sensor)</th>
<th>IZS31-DG (Autobalance sensor [High-precision type])</th>
<th>IZS31-DE (Autobalance sensor [Body-mounting type])</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
<td>0 to 50°C</td>
<td>0 to 50°C</td>
<td>0 to 50°C</td>
</tr>
<tr>
<td>Ambient humidity</td>
<td>35 to 80% RH (No condensation)</td>
<td>35 to 80% RH (No condensation)</td>
<td>35 to 80% RH (No condensation)</td>
</tr>
<tr>
<td>Case material</td>
<td>ABS</td>
<td>ABS, Stainless steel</td>
<td>ABS</td>
</tr>
<tr>
<td>Vibration resistance</td>
<td>Durability 50 Hz Amplitude 1 mm XYZ each 2 hours</td>
<td>Durability 50 Hz Amplitude 1 mm XYZ each 2 hours</td>
<td>Durability 50 Hz Amplitude 1 mm XYZ each 2 hours</td>
</tr>
<tr>
<td>Shock resistance</td>
<td>10 G</td>
<td>10 G</td>
<td>10 G</td>
</tr>
<tr>
<td>Weight</td>
<td>220 g (including cable weight)</td>
<td>220 g (including cable weight)</td>
<td>110 g (including cable weight)</td>
</tr>
<tr>
<td>Installation distance</td>
<td>15 to 50 mm (Recommended)</td>
<td>15 to 50 mm (Recommended)</td>
<td>15 to 50 mm (Recommended)</td>
</tr>
</tbody>
</table>

Construction

IZS31-DE
When mounting on the body

No. | Description
--- | ---
1 | Ionizer
2 | Electrode cartridge
3 | One-touch fitting
4 | End bracket
5 | Center bracket
6 | Feedback sensor
7 | Autobalance sensor [High-precision type]
8 | Power supply cable
9 | Autobalance sensor [Body-mounting type]
10 | Connection cable A (12P)
11 | Connection cable B (8P)
12 | Sensor bracket

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
## Series IZS31

### Functions

#### 1. Run mode

There are 3 different run modes (Sensing DC mode/Pulse DC mode/DC mode) for the IZS31, which can be selected based on the application and operating condition.

| Energy saving run | The ionizer stops discharging automatically after the static electricity elimination is completed. It resumes discharging when the workpiece's electrostatic potential exceeds \( \pm 30 \) V.\(^{(Note)}\)
| Continuous static electricity emission run | Even after the completion of static electricity elimination, this method continues to emit static electricity using DC pulses while controlling the ion balance, so that the workpiece's electrostatic potential falls within \( \pm 30 \) V.\(^{(Note)}\)

\(^{(Note)}\) When the feedback sensor is installed at a height of 25 mm.

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

#### 2. Pulse DC mode

Alternatively emits positive and negative ions.

- **When an autobalance sensor (high-precision type) is used.**
  - 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. The ion balance is adjusted and retained at the position of the workpiece.
  - Either "Manual Run" or "Automatic Run" can be selected depending on the method of ion balance adjustment.

- **When an autobalance sensor (body-mounting type) is used.**
  - Controls to keep the initial ion balance. If the ion balance cannot be kept due to electrode needle contamination, the ionizer outputs a maintenance output signal. Use a balance adjustment trimmer to set the ion balance (requires a separate measuring instrument to verify the ion balance).

- **When a sensor is not used.**
  - Use a 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 object need to be appropriately grounded to prevent from being charged. This mode cannot emit both positive and negative ions at the same time.
Functions

2. Stain-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 eliminate static electricity. If the needles need to be cleaned due to such deterioration, the maintenance indicator LED comes on and a maintenance output signal turns ON. Ion emission continues even if the maintenance output signal is turned ON.

Note) Deterioration in static electricity elimination capability cannot be detected by only connecting a feedback sensor, autobalance sensor [high-precision type], or autobalance sensor [body-mounting type]. Verify the capability by periodically inputting a maintenance start signal.

3. Indicator description

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Type</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Power supply indicator</td>
<td>LED (Dark green)</td>
<td>Illuminates when power is supplied. Flashes when the supply voltage is irregular.</td>
</tr>
<tr>
<td>2</td>
<td>Sensor indicator</td>
<td>LED (Dark green)</td>
<td>Illuminates when the feedback sensor, autobalance sensor [high-precision type], or autobalance sensor [body-mounting type] is connected.</td>
</tr>
<tr>
<td>3</td>
<td>Negative indicator</td>
<td>LED (Blue)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Completion indicator</td>
<td>LED (Dark green)</td>
<td>Functionality differs depending on the run mode. Refer to “Model Selection and Settings” on page 13, 17, 20.</td>
</tr>
<tr>
<td>5</td>
<td>Positive indicator</td>
<td>LED (Orange)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Irregular high-voltage indicator</td>
<td>LED (Red)</td>
<td>Illuminates when an irregular current flows through an electrode needle.</td>
</tr>
<tr>
<td>7</td>
<td>Irregular sensor indicator</td>
<td>LED (Red)</td>
<td>Illuminates when the feedback sensor, autobalance sensor [high-precision type], or autobalance sensor [body-mounting type] is not operating normally.</td>
</tr>
<tr>
<td>8</td>
<td>Maintenance indicator</td>
<td>LED (Red)</td>
<td>Illuminates when the electrode needle contamination is detected. Flashes while the contamination is being detected.</td>
</tr>
<tr>
<td>9</td>
<td>Maintenance level selection switch</td>
<td>Rotary switch</td>
<td>Functionality differs depending on the run mode. Refer to “Model Selection and Settings” on page 11, 15, 16, 19.</td>
</tr>
<tr>
<td>10</td>
<td>Frequency selection switch</td>
<td>Rotary switch</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Balance adjustment trimmer</td>
<td>Trimmer</td>
<td>Used to adjust the ion balance when the autobalance sensor [high-precision type] or autobalance sensor [body-mounting type] is not used.</td>
</tr>
</tbody>
</table>
**Series IZS31**

**Model Selection and Settings 1 / Sensing DC Mode**

1. **Sensing DC mode** (Refer to page 15 when using the ionizer in the pulse DC mode, or refer to page 19 when using it in the DC mode.)

1) **Bar length selection**
   - Select the appropriate length suited for a work size by referring to “Static Electricity Elimination Characteristics” and “Static Electricity Elimination Range”, etc.

2) **Ionizer installation**
   - Install the ionizer within 200 to 2000 mm. Although the ionizer 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 ionizer is functioning normally.

3) **Sensor installation**
   - 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 static electricity elimination time/Ion balance” on page 3 as a guide.)
   - When the ionizer and feedback sensor are connected, the sensing DC mode is automatically selected.

4) **Stain-detection level setting on an electrode needle**
   - Maintenance level selection switch
   - Set the switch to either H (High), M (Middle), L (Low). At settings other than these, the ionizer does not perform the electrode needle stain-detection.

   ![Stain-detection level settings](image)

   **Note**: Stain-detection starts when a maintenance start signal is input.

5) **Frequency selection switch setting**
   - Select "Energy Saving Run" or "Continuous Static Electricity Elimination Run".
   - In case of "Continuous Static Electricity Elimination Run", select the ion generation frequency after static electricity elimination is completed.

<table>
<thead>
<tr>
<th>Details of operation</th>
<th>Switch setting</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Energy saving run</strong></td>
<td>Automatically stops emitting electricity even after static electricity elimination is completed.</td>
</tr>
<tr>
<td><strong>Continuous static electricity elimination run</strong></td>
<td>Continuously eliminates static electricity with pulse DC by controlling the ion balance so that the charged potential on a workpiece would be within ±30V even after static electricity elimination is completed. The ionizer generates ions at the preset frequency.</td>
</tr>
</tbody>
</table>

   ![Frequency selection settings](image)

   **Note**: Settings with the same letter share the same level.
Model Selection and Settings 1 / Sensing DC Mode

6) Wiring of power supply cable
   - Connect the dedicated power supply cable.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Cable color</th>
<th>Description</th>
<th>Connection needs</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC1(+)</td>
<td>Brown</td>
<td>Power supply 24 VDC</td>
<td>O</td>
<td>Ionizer driving power supply</td>
</tr>
<tr>
<td>DC1(−)</td>
<td>Blue</td>
<td>Power supply GND [FG]</td>
<td>O</td>
<td></td>
</tr>
<tr>
<td>OUT4</td>
<td>Dark green</td>
<td>Sensor monitor output</td>
<td>△</td>
<td>Outputs the workpiece’s electrostatic potential as an analog signal. (1 to 5 V)</td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Cable color</th>
<th>Description</th>
<th>Connection needs</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC2(+)</td>
<td>Red</td>
<td>Power supply 24 VDC</td>
<td>O</td>
<td>Input/Output signal power cable</td>
</tr>
<tr>
<td>DC2(−)</td>
<td>Black</td>
<td>Power supply GND</td>
<td>O</td>
<td></td>
</tr>
<tr>
<td>IN1</td>
<td>Light green</td>
<td>Discharge stop signal</td>
<td>O</td>
<td>Signal for ionizer run/stop (NPN spec.) Turned to the run mode when connected to DC2 (−). [Black] (PNP spec.) Turned to the run mode when connected to DC2 (+). [Red]</td>
</tr>
<tr>
<td>IN2</td>
<td>Gray</td>
<td>Maintenance start signal</td>
<td>△</td>
<td>Input signal when determining the necessity of electrode needle maintenance</td>
</tr>
<tr>
<td></td>
<td>White</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>Orange</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>OUT1</td>
<td>Pink</td>
<td>Static electricity elimination completion signal</td>
<td>△</td>
<td>Turned ON when the workpiece’s electrostatic potential is within ±30 V or when the electrode needle contamination is being detected.</td>
</tr>
<tr>
<td>OUT2</td>
<td>Yellow</td>
<td>Maintenance output signal</td>
<td>△</td>
<td>Turned ON when the electrode needle maintenance is necessary.</td>
</tr>
<tr>
<td>OUT3</td>
<td>Purple</td>
<td>Irregular signal</td>
<td>△</td>
<td>Turned ON in normal operation. Turned OFF in case of high-voltage error, sensor error, CPU error.</td>
</tr>
</tbody>
</table>

O: 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.
8) LED indicators

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

<table>
<thead>
<tr>
<th>LED</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAIN</td>
<td>Illuminates when power is supplied. (Dark green)</td>
</tr>
<tr>
<td></td>
<td>(Flashes when the power supply is irregular.)</td>
</tr>
<tr>
<td>SNSR</td>
<td>Illuminates when the feedback sensor is connected. (Dark green)</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>LED</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
<td>Illuminates when the workpiece is positively charged. (Orange)</td>
</tr>
<tr>
<td>OK</td>
<td>Illuminates when the workpiece electrostatic potential is low. (Dark green)</td>
</tr>
<tr>
<td>–</td>
<td>Illuminates when the workpiece is negatively charged. (Blue)</td>
</tr>
</tbody>
</table>

- The workpiece’s state of electrostatic charge can be checked by reading the LED indicators.

<table>
<thead>
<tr>
<th>Workpiece electric polarity</th>
<th>LED</th>
<th>Workpiece electric charge voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>+OK</td>
<td>+400 V or higher</td>
</tr>
<tr>
<td></td>
<td></td>
<td>+100 V to +400 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>+30 V to +100 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Within ±30 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>–30 V to –100 V</td>
</tr>
<tr>
<td>Negative</td>
<td>–OK</td>
<td>–100 V to –400 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>–400 V or lower</td>
</tr>
</tbody>
</table>

■ ALARM LED—Indicates abnormal states of the ionizer.

<table>
<thead>
<tr>
<th>LED</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>HV</td>
<td>Illuminates when an abnormal current flows through an electrode needle. (Red)</td>
</tr>
<tr>
<td>SNSR</td>
<td>Illuminates when the feedback sensor is not operating normally. (Red)</td>
</tr>
<tr>
<td>NDL CHECK</td>
<td>Illuminates when the electrode needle contamination is detected. (Red) (Flashes while the contamination is being detected.)</td>
</tr>
</tbody>
</table>
### Model Selection and Settings 1 / Sensing DC Mode

#### 9) Alarm

<table>
<thead>
<tr>
<th>Alarm item</th>
<th>Description</th>
<th>Corrective actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-voltage error</td>
<td>Gives notification of the occurrence of an abnormal current, such as high-voltage leakage. The ionizer stops ion emission, turns on the HV ALARM indicator, and turns OFF the error signal (OUT3).</td>
<td>Turn OFF the power supply, solve the problem, then turn the power supply on again. Alternatively, turn the discharge stop signal (IN1) OFF, then ON.</td>
</tr>
<tr>
<td>Sensor error</td>
<td>Gives notification that the feedback sensor has become unable to operate normally. The ionizer stops ion emission, turns on the SNSR ALARM indicator, and turns OFF the error signal (OUT3).</td>
<td>Turn OFF the power supply, solve the problem, then turn the power supply on again. Alternatively, turn the discharge stop signal (IN1) OFF, then ON.</td>
</tr>
<tr>
<td>CPU error</td>
<td>Gives notification of the occurrence of a failure in the CPU due to noise, etc. The ionizer stops ion emission, all of the LED indicators flash, and turns OFF the error signal (OUT3).</td>
<td>Turn OFF the power supply, solve the problem, then turn the power supply on again. Alternatively, turn the discharge stop signal (IN1) OFF, then ON.</td>
</tr>
<tr>
<td>Electrode needle maintenance</td>
<td>Gives notification that the electrode needle maintenance is necessary. The NDL CHECK ALARM indicator comes on and a maintenance output signal (OUT2) turns ON.</td>
<td>Turn OFF the power supply, clean or replace the electrode needles, and turn the power supply on again.</td>
</tr>
</tbody>
</table>

#### 10) Timing chart

**Timing chart in normal operation**

Electric charge of workpiece: 30 V to 0 V

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply 24 VDC</td>
<td>ON</td>
</tr>
<tr>
<td>Discharge stop signal (IN1)</td>
<td>ON (Optional permission)</td>
</tr>
<tr>
<td>Static electricity elimination completion signal (OUT1)</td>
<td>ON (Static electricity elimination in progress)</td>
</tr>
<tr>
<td>Sensor monitor output (OUT4)</td>
<td>ON (Output)</td>
</tr>
<tr>
<td>Indication of electric charge (ION LED)</td>
<td>ON (Indication)</td>
</tr>
</tbody>
</table>

**Timing chart when the electrode needle contamination is detected.**

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply 24 VDC</td>
<td>ON</td>
</tr>
<tr>
<td>Discharge stop signal (IN1)</td>
<td>ON</td>
</tr>
<tr>
<td>Static electricity elimination completion signal (OUT1)</td>
<td>ON (Electrode needle stain-detection in progress) 2 s</td>
</tr>
<tr>
<td>Maintenance start signal (IN2)</td>
<td>SW ON (100 ms or more)</td>
</tr>
<tr>
<td>Maintenance output signal (OUT2)</td>
<td>SW ON</td>
</tr>
<tr>
<td>Maintenance indicator (NDL CHECK ALARM)</td>
<td>LED (Indication) Flash</td>
</tr>
</tbody>
</table>

- Static electricity elimination completion signal is turn on when the electrode needle stain-detection is in progress.

**Caution**

Ions are emitted from the ionizer to detect electrode needle stain and the workpiece may therefore be electrostatically charged. Perform this detection procedure in the absence of workpieces.
Series IZS31

Model Selection and Settings 2 / Pulse DC Mode

2. Pulse DC mode

1) Bar length selection
   · Select the appropriate length suited for a work size by referring to “Static Electricity Elimination Characteristics” and “Static Electricity Elimination Range”, etc.

2) Ionizer installation
   · Install the ionizer within 50 to 2000 mm of the object requiring electricity elimination. However, install the ionizer at a distance from 100 to 2000 mm when using an autobalance sensor [high-precision type]. Although the ionizer 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 ionizer is functioning normally.

3) Sensor installation
   **Autobalance sensor [High-precision type]**
   · When adjusting the ion balance using a high-precision type sensor, install the sensor immediately blow the ionizer so that it is close to the workpiece.
   · When an autobalance sensor is connected, settings of the balance adjustment trimmer on the body are nullified.
   **Autobalance sensor [Body-mounting type]**
   · When adjusting the ion balance using a body-mounting type sensor, fix it to the ionizer with a bracket and then use the connection cables A and B to connect the ionizer and sensor.
   · When an autobalance sensor is connected, settings of the balance adjustment trimmer on the body are nullified.

4) Maintenance level selection switch setting
   **Autobalance sensor [High-precision type]**
   · Select “Manual Run” or “Automatic Run” when an autobalance sensor [high-precision type] is connected to adjust the ion balance.

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

* Set the switch according to the stain-detection level.

**Autobalance sensor [Body-mounting type]**
Configuration is not necessary.

5) Ion balance adjustment
   **Autobalance sensor [High-precision type]**
   When an autobalance sensor is used, the ionizer automatically adjusts the ion balance to within ±30 V. Either “Manual Run” or “Automatic Run” can be selected depending on the method of ion balance adjustment.

<table>
<thead>
<tr>
<th>Details of operation</th>
<th>Switch setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual run</td>
<td>Approved</td>
</tr>
<tr>
<td>When a maintenance start signal is input or the ionizer is turned on, this method</td>
<td></td>
</tr>
<tr>
<td>adjusts the ion balance. For static electricity elimination from moving workpieces,</td>
<td></td>
</tr>
<tr>
<td>“Manual Run” is recommended. Start system operation after ion balance adjustment is</td>
<td></td>
</tr>
<tr>
<td>completed.</td>
<td></td>
</tr>
<tr>
<td>Automatic run</td>
<td>Approved</td>
</tr>
<tr>
<td>This method continuously adjusts the ion balance. For static electricity elimination</td>
<td></td>
</tr>
<tr>
<td>from stationary workpieces or prescribed spatial static electricity elimination,</td>
<td></td>
</tr>
<tr>
<td>“Automatic Run” is recommended.</td>
<td></td>
</tr>
</tbody>
</table>

**Autobalance sensor [Body-mounting type]**
Control to keep the initial ion balance.
When changing the ion balance settings, use a balance adjustment trimmer on the autobalance sensor (requires a separate measuring instrument to verify the ion balance).
Model Selection and Settings 2 / Pulse DC Mode

- **When a sensor is not used.**
  - When an autobalance sensor is not used, set the switch to AUTO. Then, adjust the ion balance manually using the balance adjustment trimmer on the body.
  - Configuration of stain-detection level on an electrode needle.
  - Set the switch to either H (High), M (Middle), L (Low). At settings other than these, the ionizer does not perform the electrode needle stain-detection.
  - Stain-detection is not performed.
  - Configuration of stain-detection level on an electrode needle.
  - When the switch is set to H, M, L, the ionizer performs the electrode needle stain-detection and then the ion balance adjustment.

**7) Wiring of power supply cable**
- Connect the dedicated power supply cable.

**Connection with ionizer driving power supply**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Cable color</th>
<th>Description</th>
<th>Connection needs</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC1(+)</td>
<td>Brown</td>
<td>Power supply 24 VDC</td>
<td>-</td>
<td>Ionizer driving power cable</td>
</tr>
<tr>
<td>DC1(–)</td>
<td>Blue</td>
<td>Power supply GND</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>OUT4</td>
<td>Dark Green</td>
<td>Sensor monitor output</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

- When a high-precision type sensor is used, connect DC1 (–) [Blue] to the power supply GND and be sure to ground according to Class-D. In case of connecting the lead to the power supply GND and grounding according to Class-D, all I/O signals are not insulated from the FG terminal.

- When a body-mounting type sensor is used, do not connect DC1 (–) [Blue] to the power supply GND and be sure to ground according to Class-D. If the lead is not grounded, the ionizer may malfunction.

**Connection with input/output signal power supply**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Cable color</th>
<th>Description</th>
<th>Connection needs</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC2 (+)</td>
<td>Red</td>
<td>Power supply 24 VDC</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>DC2 (–)</td>
<td>Black</td>
<td>Power supply GND</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>IN1</td>
<td>Light Green</td>
<td>Discharge stop signal</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>IN2</td>
<td>Gray</td>
<td>Maintenance start signal</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>OUT1</td>
<td>Pink</td>
<td>Static electricity elimination completion signal</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>OUT2</td>
<td>Yellow</td>
<td>Maintenance output signal</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>OUT3</td>
<td>Purple</td>
<td>Irregular signal</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

- 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.

**Caution**

- When adjusting the ion balance in the manual run using an autobalance sensor, select a maintenance level of H, M, L on the MANUAL side.

Example: When adjusting the ion balance in the manual run using an autobalance sensor, select a maintenance level of H, M, L on the MANUAL side.

**6) Frequency selection switch setting**
- Select the ion generation frequency.

<table>
<thead>
<tr>
<th>Ion generation frequency</th>
<th>Switch setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Hz</td>
<td>0</td>
</tr>
<tr>
<td>3 Hz</td>
<td>1</td>
</tr>
<tr>
<td>5 Hz</td>
<td>2</td>
</tr>
<tr>
<td>10 Hz</td>
<td>3</td>
</tr>
<tr>
<td>15 Hz</td>
<td>4</td>
</tr>
<tr>
<td>20 Hz</td>
<td>5</td>
</tr>
<tr>
<td>30 Hz</td>
<td>6</td>
</tr>
<tr>
<td>60 Hz</td>
<td>7</td>
</tr>
</tbody>
</table>

**Approved**

16

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
9) LED indicators

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

- **POWER MAIN**: Illuminates when power is supplied. (Dark green)
  (Flashes when the power supply is irregular.)

- **POWER SNSR**: Illuminates when an autobalance sensor [high-precision type or body-mounting type] is connected. (Dark green)

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

- **ION +**: Illuminates that negative ions are being emitted from the ionizer. (Blue)

- When an autobalance sensor [high-precision type] is used, the state of ion balancing can be checked by reading the LED indicator.

  - **ION OK**: Light ON (or Flash) when an autobalance sensor [high-precision type] is used, indicating the state of ion balancing. (Dark green)
  - **ION OFF**: Light OFF when a sensor is not used, or an autobalance sensor [body-mounting type] is used.

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

- **ALARM HV, SNSR, NDLC**: Illuminates when an abnormal current flows through an electrode needle. (Red)

  - **ALARM HV SNSR NDLC CHECK**: Illuminates when the electrode needle contamination is detected. (Red)

  - (Flashes while the contamination is being detected.)

8) Air piping

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

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**Series IZS31**

Model Selection and Settings 2 / Pulse DC Mode

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Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
### 10) Alarm

<table>
<thead>
<tr>
<th>Alarm item</th>
<th>Description</th>
<th>Corrective actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-voltage error</td>
<td>Gives notification of the occurrence of an abnormal current, such as</td>
<td>Turn OFF the power supply, solve the problem, then</td>
</tr>
<tr>
<td></td>
<td>high-voltage leakage. The ionizer stops ion emission, turns on the</td>
<td>turn the discharge stop signal (IN1) OFF, then</td>
</tr>
<tr>
<td></td>
<td>HV ALARM indicator, and turns OFF the error signal (OUT3).</td>
<td></td>
</tr>
<tr>
<td>Sensor error</td>
<td>Gives notification that the autobalance sensor [high-precision type or body-</td>
<td>Turn OFF the power supply, solve the problem, then</td>
</tr>
<tr>
<td></td>
<td>mounting type] has become unable to operate normally. The ionizer stops ion</td>
<td>turn the power supply on again. Alternatively, turn</td>
</tr>
<tr>
<td></td>
<td>emission, turns on the SNSR ALARM indicator, and turns OFF the error signal</td>
<td>the discharge stop signal (IN1) OFF, then</td>
</tr>
<tr>
<td></td>
<td>(OUT3).</td>
<td></td>
</tr>
<tr>
<td>CPU error</td>
<td>Gives notification of the occurrence of a failure in the CPU due to</td>
<td>Turn OFF the power supply, solve the problem, then</td>
</tr>
<tr>
<td></td>
<td>noise, etc. The ionizer stops ion emission, all of the LED</td>
<td>turn the power supply on again. Alternatively, turn</td>
</tr>
<tr>
<td></td>
<td>indicators flash, and turns OFF the error signal (OUT3).</td>
<td>the discharge stop signal (IN1) OFF, then</td>
</tr>
<tr>
<td>Electrode needle</td>
<td>Gives notification that the electrode needle maintenance is</td>
<td>Turn OFF the power supply, clean or replace</td>
</tr>
<tr>
<td>maintenance</td>
<td>necessary. The NDL CHECK ALARM indicator comes on</td>
<td>the electrode needles, and turn the power supply on</td>
</tr>
<tr>
<td></td>
<td>and a maintenance output signal (OUT2) turns ON.</td>
<td>again. After turning power supply on, adjust the ion</td>
</tr>
<tr>
<td></td>
<td>+ Ions are continuously emitted.</td>
<td>balance.</td>
</tr>
</tbody>
</table>

### 11) Timing chart

#### 1. Timing chart in normal operation

- **Power supply**: 24 VDC
- **Discharge stop signal**: Input OFF
- **State of ion emission**: ON

#### 2. Timing chart when the electrode needle contamination is detected or ion balance is detected.

**a) When an autobalance sensor [high-precision type] is connected.**

- **Power supply**: 24 VDC
- **Discharge stop signal (IN1)**: Input OFF
- **Static electricity elimination completion signal (OUT1)**: Input OFF
- **Maintenance start signal (IN2)**: Input OFF, 100 ms or more
- **Maintenance output signal (OUT2)**: Input OFF
- **Maintenance indicator LED (NDL CHECK ALARM)**: LED ON
- **Internal Stain-detection processing**
  - (Performed when the maintenance level selection switch is set to H, M, L)

**b) When an autobalance sensor [body-mounting type] is connected.**

- **Power supply**: 24 VDC
- **Discharge stop signal (IN1)**: Input OFF
- **Static electricity elimination completion signal (OUT1)**: Input OFF
- **Maintenance start signal (IN2)**: Input OFF, 100 ms or more
- **Maintenance output signal (OUT2)**: Input OFF
- **Maintenance indicator LED (NDL CHECK ALARM)**: LED OFF
- **Internal Stain-detection processing**
  - (Performed when the maintenance level selection switch is set to H, M, L)

- **Static electricity elimination completion is turned on when the electrode needle maintenance is in progress.**

#### 3. Timing chart when a sensor is not connected.

- **Power supply**: 24 VDC
- **Discharge stop signal (IN1)**: Input OFF
- **Static electricity elimination completion signal (OUT1)**: Input OFF
- **Maintenance start signal (IN2)**: Input OFF, 100 ms or more
- **Maintenance output signal (OUT2)**: Input OFF
- **Maintenance indicator LED (NDL CHECK ALARM)**: LED OFF
- **Internal Stain-detection processing**
  - (Performed when the maintenance level selection switch is set to H, M, L)

- **Either ON or OFF depending on the situation**

#### Caution

Ions are emitted from the ionizer to detect electrode needle stain and the workpiece may therefore be electrostatically charged. Perform this detection procedure in the absence of workpieces.
### Series IZS31

#### Model Selection and Settings 3 / DC Mode

**3. DC mode**

1) **Bar length selection**
   - Select the appropriate length suited for a work size by referring to “Static Electricity Elimination Characteristics” and “Static Electricity Elimination Range”, etc.

2) **Ionizer installation**
   - Install the ionizer within 50 to 2000 mm of the object requiring electricity elimination. Although the ionizer 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 ionizer is functioning normally.

3) **Frequency selection switch setting**
   - Select “Positive Ion Emission” or “Negative Ion Emission”.

<table>
<thead>
<tr>
<th>Ion polarity</th>
<th>Switch setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive ion emission</td>
<td>8</td>
</tr>
<tr>
<td>Negative ion emission</td>
<td>9</td>
</tr>
</tbody>
</table>

4) **Wiring of power supply cable**
   - Connect the dedicated power supply cable.

**Connection with ionizer driving power supply**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Cable color</th>
<th>Description</th>
<th>Connection needs</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC1 (+)</td>
<td>Brown</td>
<td>Power supply 24 VDC</td>
<td>○</td>
<td>Ionizer driving power cable</td>
</tr>
<tr>
<td>DC1 (–)</td>
<td>Blue</td>
<td>Power supply GND [FG]</td>
<td>○</td>
<td></td>
</tr>
<tr>
<td>OUT4</td>
<td>Dark green</td>
<td>Sensor monitor output</td>
<td>—</td>
<td></td>
</tr>
</tbody>
</table>

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

**Connection with input/output signal power supply**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Cable color</th>
<th>Description</th>
<th>Connection needs</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC2 (+)</td>
<td>Red</td>
<td>Power supply 24 VDC</td>
<td>○</td>
<td>Input/Output signal power cable</td>
</tr>
<tr>
<td>DC2 (–)</td>
<td>Black</td>
<td>Power supply GND</td>
<td>○</td>
<td></td>
</tr>
<tr>
<td>IN1</td>
<td>Light green</td>
<td>Discharge stop signal</td>
<td>○</td>
<td>Signal for ionizer run/stop (NPN spec.) Turned to the run mode when connected to DC2 (–). [Black]</td>
</tr>
<tr>
<td></td>
<td>—</td>
<td>Maintenance start signal</td>
<td>—</td>
<td>(PNP spec.) Turned to the run mode when connected to DC2 (+). [Red]</td>
</tr>
<tr>
<td>IN2</td>
<td>Gray</td>
<td>—</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td></td>
<td>White</td>
<td>—</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Orange</td>
<td>—</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>OUT1</td>
<td>Pink</td>
<td>Static electricity elimination completion signal</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>OUT2</td>
<td>Yellow</td>
<td>Maintenance output signal</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>OUT3</td>
<td>Purple</td>
<td>Irregular signal</td>
<td>△</td>
<td>Turned ON in normal operation. Turned OFF in case of high-voltage error, CPU error.</td>
</tr>
</tbody>
</table>

* ○: 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 plug (M-5P-X112) supplied with the ionizer.
Model Selection and Settings 3 / DC Mode

6) LED indicators

- **POWER LED**—Indicates the state of power input and sensor connection.
  
<table>
<thead>
<tr>
<th>LED</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>POWER</td>
<td>MAIN</td>
</tr>
<tr>
<td></td>
<td>SNSR</td>
</tr>
</tbody>
</table>

- **ION LED**—Indicates the polarity of ions being emitted.
  
<table>
<thead>
<tr>
<th>LED</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>ION</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>OK</td>
</tr>
<tr>
<td></td>
<td>–</td>
</tr>
</tbody>
</table>

- **ALARM LED**—Indicates abnormal states of the ionizer.
  
<table>
<thead>
<tr>
<th>LED</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALARM</td>
<td>HV</td>
</tr>
<tr>
<td></td>
<td>SNSR</td>
</tr>
<tr>
<td></td>
<td>NDL CHECK</td>
</tr>
</tbody>
</table>

7) Alarm

<table>
<thead>
<tr>
<th>Alarm item</th>
<th>Description</th>
<th>Corrective actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-voltage error</td>
<td>Gives notification of the occurrence of an abnormal current, such as high-voltage leakage. The ionizer stops ion emission, turns on the HV ALARM indicator, and turns OFF an error signal (OUT3).</td>
<td>Turn OFF the power supply, solve the problem, then turn the power supply on again. Alternatively, turn the discharge stop signal (IN1) OFF, then ON.</td>
</tr>
<tr>
<td>CPU error</td>
<td>Gives notification of the occurrence of a failure in the CPU due to noise, etc. The ionizer stops ion emission, all of the LED indicators flash, and turns OFF an error signal (OUT3).</td>
<td>Turn OFF the power supply, solve the problem, then turn the power supply on again. Alternatively, turn the discharge stop signal (IN1) OFF, then ON.</td>
</tr>
</tbody>
</table>

8) Timing chart

<table>
<thead>
<tr>
<th>Timing chart in normal operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply 24 VDC Input</td>
</tr>
<tr>
<td>Discharge stop signal (IN1) Input</td>
</tr>
<tr>
<td>State of ion emission</td>
</tr>
</tbody>
</table>

Authorized:

Approved
Series IZS31

Circuit of Power Supply Cable Connection

(1) When a sensor is not used. / When a feedback sensor or autobalance sensor [high-precision type] is used.

NPN output

Apply Class-D grounding to the GND terminal of the ionizer driving power supply by connecting through the lead DC (–) [Blue] to the FG terminal. The leads for output signals (OUT1 to OUT3) are insulated from the insulation circuit (Photocoupler) while the sensor monitor output lead* (OUT4: Dark green) is not insulated from the FG terminal.

* Sensor monitor output lead (OUT4: Dark green) When the feedback sensor is used, the terminal outputs the potential measured by the feedback sensor as an analog signal. When the autobalance sensor is used, the terminal does not output signals.

The lead of the ionizer driving power supply (DC1) and the lead of the power supply for I/O signals (DC2) can be connected with a common power supply. When a common power supply is used, the lead DC1 (-) with Class-D grounded and leads for I/O signals are not insulated.
Circuit of Power Supply Cable Connection

(2) When an autobalance sensor [body-mounting type] is used.

**Caution**

When using the autobalance sensor (body-mounting type) near the ionizer in DC mode, keep clearance of at least 2 m between them.

- If the clearance is not enough, the ions from the ionizer in DC mode affect the control of the autobalance sensor, thus resulting in imbalance of ions.

* Apply Class-D grounding to the lead DC (–) [Blue], and do not connect to the GND terminal of the power supply. When the lead is connected to the GND terminal of the power supply and Class-D grounding is applied, leads for I/O signals are not insulated from the FG terminal.

![Diagram of Power Supply Cable Connection](IZS31-C.qxd)
Series IZS31

Dimensions

<table>
<thead>
<tr>
<th>Ionizer / IZS31-</th>
<th>L (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>300</td>
</tr>
<tr>
<td></td>
<td>380</td>
</tr>
<tr>
<td></td>
<td>620</td>
</tr>
<tr>
<td></td>
<td>780</td>
</tr>
<tr>
<td></td>
<td>1100</td>
</tr>
<tr>
<td></td>
<td>1260</td>
</tr>
<tr>
<td></td>
<td>1500</td>
</tr>
<tr>
<td></td>
<td>1900</td>
</tr>
<tr>
<td></td>
<td>2300</td>
</tr>
</tbody>
</table>

Note: Plug (M-SP-X112) 1 pc. is shipped together.

<table>
<thead>
<tr>
<th>Bar length (mm)</th>
<th>Fitting</th>
</tr>
</thead>
<tbody>
<tr>
<td>300, 380, 620, 780</td>
<td>M-SP-X112</td>
</tr>
<tr>
<td>1100, 1260, 1500, 1900, 2300</td>
<td>KJH04-M5-X34 Note</td>
</tr>
</tbody>
</table>

Note) Plug (M-SP-X112) 1 pc. is shipped together.

Table:

<table>
<thead>
<tr>
<th>Part no.</th>
<th>n</th>
<th>L (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IZS31-300</td>
<td>3</td>
<td>300</td>
</tr>
<tr>
<td>IZS31-380</td>
<td>4</td>
<td>380</td>
</tr>
<tr>
<td>IZS31-620</td>
<td>7</td>
<td>620</td>
</tr>
<tr>
<td>IZS31-780</td>
<td>9</td>
<td>780</td>
</tr>
<tr>
<td>IZS31-1100</td>
<td>13</td>
<td>1100</td>
</tr>
<tr>
<td>IZS31-1260</td>
<td>15</td>
<td>1260</td>
</tr>
<tr>
<td>IZS31-1500</td>
<td>18</td>
<td>1500</td>
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<tr>
<td>IZS31-1900</td>
<td>23</td>
<td>1900</td>
</tr>
<tr>
<td>IZS31-2300</td>
<td>28</td>
<td>2300</td>
</tr>
</tbody>
</table>

Approved

(mounting, opposite side: Same)

For mounting, opposite side: Same
**Ionizer Series IZS31**

**Dimensions**

**End bracket / IZS31-BE**

![Diagram of End bracket / IZS31-BE]

**Center bracket / IZS31-BM**

![Diagram of Center bracket / IZS31-BM]

---

**Note:** Number of center brackets included in a model with brackets. (Refer to “How to Order” on page 5.)

<table>
<thead>
<tr>
<th>Bar length (mm)</th>
<th>Center bracket</th>
</tr>
</thead>
<tbody>
<tr>
<td>300, 380, 620, 780</td>
<td>None</td>
</tr>
<tr>
<td>1100, 1260, 1500</td>
<td>With 1 pc.</td>
</tr>
<tr>
<td>1900, 2300</td>
<td>With 2 pcs.</td>
</tr>
</tbody>
</table>

---

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Series IZS31

Dimensions

Feedback sensor / IZS31-DF

![Diagram showing dimensions and parts of the feedback sensor]

Autobalance sensor [High-precision type] / IZS31-DG

![Diagram showing dimensions and parts of the autobalance sensor]

Power supply cable / IZS31-CP

<table>
<thead>
<tr>
<th>Model</th>
<th>L (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IZS31-CP</td>
<td>3000</td>
</tr>
<tr>
<td>IZS31-CPZ</td>
<td>10000</td>
</tr>
</tbody>
</table>

---

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Dimensions

Autobalance sensor [Body-mounting type] / IZS31-DE

When mounting on the ionizer

Connection cable A (12P) / IZS31-CF

Connection cable B (6P) / IZS31-CR

Sensor bracket / IZS31-BL
Series IZS31
Made to Order 1
Please contact SMC for detailed dimensions, specifications, and lead times.

1 Non-standard bar length (80 mm-pitch)

Non-standard bar length (80 mm-pitch)

Symbol

X10

-Refer to “How to Order” on page 5.

2 Non-standard power supply cable length

Non-standard power supply cable length

Available in 1 m increments from 1 m to 20 m.

Note 1) 11 m or longer power cables are not CE Marking-compliant.
Note 2) Use standard power cables for 3 m and 10 m lengths.

IZS31 – CP X13

How to Order

IZS31-CP X13

Cable length

<table>
<thead>
<tr>
<th>Length (mm)</th>
<th>Cable length</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>1000 mm</td>
</tr>
<tr>
<td>02</td>
<td>2000 mm</td>
</tr>
<tr>
<td>04</td>
<td>4000 mm</td>
</tr>
<tr>
<td>05</td>
<td>5000 mm</td>
</tr>
<tr>
<td>06</td>
<td>6000 mm</td>
</tr>
<tr>
<td>07</td>
<td>7000 mm</td>
</tr>
<tr>
<td>08</td>
<td>8000 mm</td>
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<tr>
<td>09</td>
<td>9000 mm</td>
</tr>
<tr>
<td>11</td>
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<td>12</td>
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<td>15</td>
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<tr>
<td>18</td>
<td>18000 mm</td>
</tr>
<tr>
<td>19</td>
<td>19000 mm</td>
</tr>
<tr>
<td>20</td>
<td>20000 mm</td>
</tr>
</tbody>
</table>
Series IZS31
Made to Order 2
Please contact SMC for detailed dimensions, specifications, and lead times.

3 Model with 40 mm-pitch electrode cartridges
Install the electrode cartridges at a 40 mm-pitch. (Standard: 80 mm-pitch)
Note) The maximum bar length is 1260 mm. The air purge nozzles are arranged at an 80 mm-pitch.
Uneven static electricity elimination can be prevented when the installation height is low.

Bar length (mm)  Fitting
300, 380, 620, 780  M-5P-X112
1100, 1260  KJH04-M5-X34

Note) Plug (M-5P-X112) 1 pc. is shipped together.

Center bracket / IZS31-BM-X158

IZS31-X15
Ionizer full length

Fitting
M-5P-X112
KJH04-M5-X34

4 Ionizer driving AC adapter (100 to 240 VAC)
Power can be directly supplied through the AC power line.
The ionizer starts operations on connecting the power supply plug to the AC power supply of 100 to 240 V.

Heat-shrinkable tube
Output signal identification, Black for NPN, White for PNP

GND connection terminal (Ins.)
Note) Be sure to apply Class-D grounding to the GND terminal.

How to Order
IZS31 - \( \text{F} \) - X196

Applicable output specifications
- P NPN specification
- \( \text{F} \) PNP specification

Specifications

<table>
<thead>
<tr>
<th>Input voltage</th>
<th>100 VAC to 240 VAC, 50/60 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output voltage</td>
<td>24 VDC</td>
</tr>
<tr>
<td>Output current</td>
<td>1A</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>0 to 40°C</td>
</tr>
<tr>
<td>Ambient humidity</td>
<td>35 to 65% Rh</td>
</tr>
<tr>
<td>Weight</td>
<td>220 g</td>
</tr>
</tbody>
</table>

Symbol
X15
X196

N (Number of electrode cartridges), L Dimension, Weight

<table>
<thead>
<tr>
<th>Part no.</th>
<th>n</th>
<th>L (mm)</th>
<th>Weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IZS31-300</td>
<td>5</td>
<td>300</td>
<td>480</td>
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<tr>
<td>IZS31-380</td>
<td>7</td>
<td>380</td>
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</tr>
<tr>
<td>IZS31-620</td>
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<tr>
<td>IZS31-780</td>
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<td>IZS31-1100</td>
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<tr>
<td>IZS31-1260</td>
<td>29</td>
<td>1260</td>
<td>1270</td>
</tr>
</tbody>
</table>

Note) Number of center brackets included in a model with brackets. (Refer to "How to Order" on page 5.)

Symbol
KJH04-M5-X34

Bar length (mm)  Fitting
300, 380, 620, 780  M-5P-X112
1100, 1260  With 1 pc.

Note) Plug (M-5P-X112) 1 pc. is shipped together.

Approved

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Series IZS31
Made to Order 3
Please contact SMC for detailed dimensions, specifications, and lead times.

5 High-voltage/control unit detachable short type
X210

A short type ionizer (full length of 180 mm and 220 mm) can be installed in a small space. The high-voltage unit (ionizing unit) and control unit are detachable from each other. The distance between them is also optional according to the length of selected connection cables.

Part no. L
IZS31-CF01-X210 1000 mm
IZS31-CF02-X210 2000 mm
IZS31-CF03-X210 3000 mm
IZS31-CF04-X210 4000 mm
IZS31-CF05-X210 5000 mm
IZS31-CF07-X210 7000 mm
IZS31-CF10-X210 10000 mm

Order connection cables separately.

High-voltage unit full length: 180 mm
High-voltage unit full length: 220 mm

How to Order
IZS31 - 180 [R] - X210

Bar type
High-voltage unit full length
Output specification
Electrode needle material
Power supply cable
Control unit cable entry direction
Sensor
Bracket

IZS31-C.F01-X210
IZS31-C.F02-X210
IZS31-C.F03-X210
IZS31-C.F04-X210
IZS31-C.F05-X210
IZS31-C.F07-X210
IZS31-C.F10-X210

Part no. L
IZS31-CF01-X210 1000 mm
IZS31-CF02-X210 2000 mm
IZS31-CF03-X210 3000 mm
IZS31-CF04-X210 4000 mm
IZS31-CF05-X210 5000 mm
IZS31-CF07-X210 7000 mm
IZS31-CF10-X210 10000 mm

Order connection cables separately.

High-voltage unit full length: 180 mm
High-voltage unit full length: 220 mm
Series IZS31
Made to Order 4
Please contact SMC for detailed dimensions, specifications, and lead times.

High-voltage/control unit detachable short type with 40 mm-pitch electrode cartridges

A short type ionizer (full length of 180 mm and 220 mm) can be installed in a small space. The high-voltage unit (ionizing unit) and control unit are detachable from each other. The distance between them is also optional according to the length of selected connection cables. Model with 40 mm-pitch electrode cartridges

How to Order

IZS31 - 180 - R - - - X211

Bar type
High-voltage unit full length
Electrode needle material
Output specification
Power supply cable
Sensor
Control unit cable entry direction
Bracket

IZS31-CF01-X211 1000 mm
IZS31-CF02-X211 2000 mm
IZS31-CF03-X211 3000 mm
IZS31-CF04-X211 4000 mm
IZS31-CF05-X211 5000 mm
IZS31-CF07-X211 7000 mm
IZS31-CF10-X211 10000 mm

Order connection cables separately.

Part no. L
IZS31-CF01-X211 1000 mm
IZS31-CF02-X211 2000 mm
IZS31-CF03-X211 3000 mm
IZS31-CF04-X211 4000 mm
IZS31-CF05-X211 5000 mm
IZS31-CF07-X211 7000 mm
IZS31-CF10-X211 10000 mm

Connection cable from the right-hand side of the control unit

Connection cable length L 900

High-voltage unit full length: 220 mm
Air purge port: 80 mm between ports

High-voltage unit full length: 180 mm
Air purge port: 80 mm between ports

IZS31-CF01-X211 1000 mm
IZS31-CF02-X211 2000 mm
IZS31-CF03-X211 3000 mm
IZS31-CF04-X211 4000 mm
IZS31-CF05-X211 5000 mm
IZS31-CF07-X211 7000 mm
IZS31-CF10-X211 10000 mm

Order connection cables separately.

Part no. L
IZS31-CF01-X211 1000 mm
IZS31-CF02-X211 2000 mm
IZS31-CF03-X211 3000 mm
IZS31-CF04-X211 4000 mm
IZS31-CF05-X211 5000 mm
IZS31-CF07-X211 7000 mm
IZS31-CF10-X211 10000 mm

Connection cable from the right-hand side of the control unit

Connection cable length L 900

High-voltage unit full length: 220 mm
Air purge port: 80 mm between ports

High-voltage unit full length: 180 mm
Air purge port: 80 mm between ports
Safety Instructions

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

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

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

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

Warning

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

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

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

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

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

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.

2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.

3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.

2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, construction and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.

3. An application which could have negative effects on people, property, or animals requiring special safety analysis.

4. Use in an interlock circuit, which requires the provision of double interface for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

Caution

1. The product is provided for use in manufacturing industries.

The product herein described is basically provided for peaceful use in manufacturing industries.

If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.

If anything is unclear, contact your nearest sales branch.

Limited warranty and Disclaimer

The product used is subject to the following “Limited warranty and Disclaimer” and “Compliance Requirements”.

Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered.\(^2\)

Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.

2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.

This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.

3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.

2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

Caution

Be sure to read “Handling Precautions for SMC Products” (M-E03-3) before using.
**Selection**

**Warning**
1. This product is intended to be used with general factory automation (FA) equipment.
   If considering using the product for other applications (especially those stipulated in 4 on back page 1), please consult with SMC beforehand.
2. Use this product within the specified voltage and temperature range.
   Using outside of the specified voltage can cause 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. Please 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 washed. 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 tubing’s minimum bending radius and avoid bending at acute angles.
   Wiring with excessive twisting, bending, etc. can cause malfunction, wire breakage, fire or air leakage.
   Minimum bending radius:
   Power supply cable, connection cable A ………35 mm
   Sensor cable, connection cable B………………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 catalog for tubing.
2. Mount this product 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 may occur.
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 mounting the ionizer. Refer to the below 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.
<table>
<thead>
<tr>
<th>Thread size</th>
<th>Recommended tightening torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>M3</td>
<td>0.61 to 0.63 N·m</td>
</tr>
<tr>
<td>M4</td>
<td>0.73 to 0.75 N·m</td>
</tr>
<tr>
<td>M5</td>
<td>1.3 to 1.5 N·m</td>
</tr>
</tbody>
</table>
5. Do not touch the electrode needle 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 needle or cartridge is damaged with a tool, the specification will not be met and damage and/or an accident may 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 body.
   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**

**Ionizers**

**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 elimination and therefore result in a decrease in efficiency.

   ![Diagram](image)

   **Unit: mm**

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

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

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.

   ![Diagram](image)

   **Caution**

   - **Wiring / Piping**

   **Warning**

   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.

   ![Diagram](image)

   **Warning**

   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 the 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 piping this product, exercise caution to prevent particles, water drops, or oil contents from entering the piping.

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Back page 3

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Warning

1. Observe the 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.
   a) Avoid using in a place that exceeds an ambient temperature range of 0 to 50°C.
   b) Avoid using in a place that exceeds an ambient humidity range of 35 to 80% Rh.
   c) Avoid using in a place where condensation occurs due to a drastic temperature change.
   d) Avoid using in a place in the presence of corrosive or explosive gas or where there is a volatile combustible.
   e) Avoid using in a place where there are particles, conductive iron powders, oil mist, salt, solvent, blown dust, cutting oil (water, liquid), etc.
   f) Avoid using in a place where ventilated air from an air conditioner is directly applied to the product.
   g) Avoid using in a closed place without ventilation.
   h) Avoid using in direct sunlight or radiated heat.
   i) Avoid using in a place where there is a strong magnetic noise (strong electric field, strong magnetic field, or surge).
   j) Avoid using in a place where static electricity is discharged to the body.
   k) Avoid using in a place where a strong high frequency occurs.
   l) Avoid using in a place where this product is likely to be damaged by lightning.
   m) Avoid using in a place where direct vibration or shock is applied to the body.
   n) Avoid using in a place where there is a force large enough to deform the body 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 (Series IDF), air filter (Series AF/AFF), and mist separator (Series AFM/AM).

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

Maintenance

1. Periodically (every two weeks or so) 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.
   If particles attach to the electrode needle by using for long periods of time, the static electricity eliminating performance will be lowered.
   Replace the electrode cartridge, if the pins are rough and the static electricity eliminating performance does not return even after being cleaned.

2. When cleaning the electrode needle or replacing the electrode cartridge, be sure to turn off the power supply to the 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 modified products may not achieve the performances guaranteed in the specifications, and exercise caution because the product will not be warranted.

Handling

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 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

Ionizer Nozzle type Series IZN10
Dust removal and static electricity elimination by air blow
- Eliminates dust clinging to lamp cover.
- Outputs maintenance signal when detects stain or wear of an electrode needle always.
- Detects optimal maintenance time, reduced labor for maintenance.
- High-voltage power supply cable/external high-voltage power supply are unnecessary.

Electrode needle contamination detector
- Eliminating static electricity from IC chip

Built-in power supply substrate
- Removes dust from lamp cover
- Built-in power supply substrate
- Eliminating static electricity from IC chip

Electrostatic Sensor Series IZD10 / Electrostatic Sensor Monitor Series IZE11
Electrostatic Sensor Series IZD10
- The importance of the static electric control is put on confirming the “actual status”.
- Detects the electrostatic potential and outputs in an analog voltage
  - Output voltage: 1 to 5 V (Output impedance: Approx. 100 Ω)
- Possible to measure electrostatic potential
  - Potential measurement: ±20 kV (detected at a 50 mm distance) ±0.4 kV (detected at a 25 mm distance)
  - Output: Switch output x 2 + Analog output (1 to 5 V, 4 to 20 mA)
  - Minimum unit setting: 0.001 kV (at ±0.4 kV), 0.1 kV (at ±20 kV)
  - Detection distance correction function (adjustable in 1 mm increments)
  - Range switching supports two sensors. (±0.4 kV, ±20 kV)

Electrostatic Sensor Monitor Series IZE11
- Output: Switch output x 2 + Analog output (1 to 5 V, 4 to 20 mA)
- Minimum unit setting: 0.001 kV (at ±0.4 kV), 0.1 kV (at ±20 kV)
- Detection distance correction function (adjustable in 1 mm increments)
- Range switching supports two sensors. (±0.4 kV, ±20 kV)
- Display accuracy: ±0.5% F.S. ±1 digit or less
- Detection distance correction function (adjustable in 1 mm increments)
- Range switching supports two sensors. (±0.4 kV, ±20 kV)

Handheld Electrostatic Meter Series IZH10
The importance of the static electric control is put on confirming the “actual status”.
Easy-to-use handheld electrostatic meter
- Measuring range: ±20.0 kV
- Minimum unit display: 0.1 kV (±1.0 to ±20.0 kV) 0.01 kV (0 to ±0.99 kV)
- Compact & Lightweight: 85 g (excluding dry cell batteries)
- Backlight for reading in the dark
- LOW battery indicator
- Peak/Bottom display function
- Zero-out function
- Auto power-off function

Back page 5

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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 matter such as powder 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 PF2A**
   - Decreases the air consumption by flow control.

5. **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.

6. **Regulator / Series AR**
   - Decreases the air consumption by setting to an appropriate pressure.

7. **2-Color Display Digital Flow Switch / Series PFM**
   - Decreases the air consumption by setting to an appropriate pressure.

8. **Restrictor / Series AS-X214**
   - Regulates to the appropriate air volume depending upon the installation condition. Decreases the air consumption.

9. **Clean Air Filter / Series SFD**
   - Built-in capillary element
   - Nominal filtration rating: 0.01 µm
   - Adopted hollow fiber elements with over 99.99% filtering efficiency do not contaminate workpieces.
SMC Static Electricity Protection Equipment

Contents

- Examples of static electricity-related problems
- Antistatic equipment
- Static electricity elimination equipment
- Measurement equipment
- Technical data

Revision history

Edition B
- Addition of Auto-balance sensor
- Made to Order
- Change of connection cable and cable connector for high-voltage/control unit detachable short type (X210, X211)

Edition C
- Addition of Electrode cartridge with low maintenance
- Addition of center bracket to Model with 40 mm-pitch electrode cartridges (X15)
- Addition of AC adapter (X196)
- Addition of High-voltage/control unit detachable short type (X210)
- Addition of High-voltage/control unit detachable short type with 40 mm-pitch electrode cartridges (X211)
- Number of pages from 36 to 48

Made to Order

Change of name plate and high pressure warning label attachment positions

Change of connection cable and cable connector for high-voltage/control unit detachable short type (X210, X211)

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