3 types of the sensors are available.

- Autobalance sensor [High-precision type]
  Adjusts offset voltage near the workpiece to reduce any disturbance interference!

- Autobalance sensor [Body-mounting type]

- Rapid neutralization of static electricity by a feedback sensor: 0.3 seconds
  Conditions / Discharge time from 1000 V to 100 V
  Discharged object: Charged plate (150 mm x 150 mm, capacitance 20 pF)
  Installation distance: 200 mm (Tungsten emitter with air purge)

Continuous emission of ions in accordance with the polarity applied onto a workpiece.

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

<Conditions> Static neutralization 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, STM3.1-2006). Use this as a guideline purpose only for model selection because the value varies depending on the material and/or size of a subject.

Controlled offset voltage by sensor
Feedback sensor/
Rapid neutralization of static electricity

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

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

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

- Run mode after static neutralization (electrostatic potential: within ±30 V) can be selected.

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

Note) The pneumatic valve must be separately procured.

**Continuous static neutralization run mode:** After static neutralization, the ionizer switches to pulse DC mode and continues to neutralize static electricity to make it approach 0 V even if the electrostatic potential is within ±30 V.

- **Table:**

<table>
<thead>
<tr>
<th>Mode</th>
<th>Ion emission waveform</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensing DC</td>
<td>+</td>
</tr>
<tr>
<td>Energy saving run</td>
<td>-</td>
</tr>
<tr>
<td>Sensing DC Continuous static neutralization run</td>
<td>+</td>
</tr>
<tr>
<td>Pulse DC</td>
<td>+</td>
</tr>
<tr>
<td>+ charged image</td>
<td>+</td>
</tr>
</tbody>
</table>
Autobalance sensor/Reduction of adjustment and maintenance labor

Autobalance sensor [High-precision type]

- The offset voltage near the workpiece is accurately adjusted.
- Reduces the variation in the offset voltage of the static neutralization area due to the effect from the installation height and disturbance.

The mode can be selected from “Manual Run” mode which performs adjustment only when connected, and “Automatic Run” mode which always performs adjustment while connected.

Autobalance sensor [Body-mounting type]

- Offset voltage near the workpiece can be mounted on the body, and can be installed in any places.

The offset voltage in the initial state is controlled so that the voltage is maintained at a constant value by monitoring the ion emitted from the ionizer using the ground line, and adjusting the + and - ion supply rate.

- The offset voltage near the workpiece is accurately adjusted.
- Reduces the variation in the offset voltage of the static neutralization area due to the effect from the installation height and disturbance.

Autobalance sensor [Body-mounting type]

- Offset voltage of static neutralization area
### Emitter cartridge variations

**High speed static neutralization cartridge**, focusing on discharge time and energy saving

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

**Low maintenance cartridge**, focusing on offset voltage and reducing maintenance labor

- Stain on emitter is reduced by compressed air.

### 3 types of emitter materials

- **Tungsten**: Offset voltage within ±30 V
- **Single crystal silicon**: Offset voltage within ±30 V, suitable for neutralizing static electricity of silicon wafer
- **Stainless steel**: Offset voltage within ±100 V, low-cost type, suitable for environments sensitive to heavy metal contamination such as food processing

* Only for high speed static neutralization cartridge
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 neutralization for short distance
- Prevention of irregular static neutralization
  Emitter cartridge 40 mm-pitch: -X15
  (Standard: 80 mm-pitch)
  (Length: 1260 mm or less)
  Note) 80 mm-pitch in case of air purge

Applicable to purge pressure of 0.7 MPa
- Air purge: Yes, With sensor: 1 Hz/60 Hz
- Supply pressure: 0.05 MPa
  (3.5 L/min (ANR) per nozzle)
- Supply pressure: 0.7 MPa
  (30 L/min (ANR) per nozzle)

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. (During sensing DC mode)
- Outputs measured data at a 1 to 5 V level when a feedback sensor is used. By outputting the data to a PLC, etc., it is possible to control static electricity.

Indicator functions
- Visualization of charging condition
  (During sensing DC mode)

<table>
<thead>
<tr>
<th>Workpiece electric polarity</th>
<th>LED color</th>
<th>Workpiece electric potential</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>Green</td>
<td>+400 V or higher</td>
<td>Light ON</td>
</tr>
<tr>
<td>Static neutralization completion</td>
<td>Red</td>
<td>+100 V to +400 V</td>
<td>Flash at 4 Hz</td>
</tr>
<tr>
<td>Negative</td>
<td>Yellow</td>
<td>+30 V to +100 V</td>
<td>Light OFF</td>
</tr>
<tr>
<td></td>
<td>White</td>
<td>-100 V to -400 V</td>
<td>Light OFF</td>
</tr>
<tr>
<td></td>
<td>Orange</td>
<td>-400 V or lower</td>
<td>Light OFF</td>
</tr>
</tbody>
</table>

Visualization of offset voltage
(When pulse DC mode or autobalance sensor are used.)
- Contamination of emitter can be checked at the same time.
- Light ON: Within ±30 V
- Flash: Around ±30 V
- Light OFF and Alarm output: Adjustment is not possible.

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

This reduces the range of surface potential fluctuations for short installation distances after static neutralization.

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

When attached to the body
**Power supply cable**

- **X13** Non-standard power supply cable length
  - Power supply cable full length: 1 m to 20 m

**AC adapter**

- **X196** Ionizer driving AC adapter
  - Input voltage: 100 V to 240 V, Output voltage: 24 VDC

---

### 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

#### Emitter cartridge

- High speed static neutralization cartridge
- Low maintenance cartridge

- Emitter material
  - Tungsten
  - Silicon
  - Stainless steel

#### Sensor

- Feedback sensor
- Autobalance sensor
  - [High-precision type]
  - [Body-mounting type]

#### Autobalance sensor

- [Body-mounting type]
Application Examples

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

Neutralizing static electricity on molded goods
- Improves detachability of molded goods from a die.

Neutralizing static electricity during wafer transfer
- Prevents breakage due to discharge between wafers and hands.

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

Neutralizing static electricity on film molded goods
- Prevents attaching to conveyer.
- Prevents dispersion of finished goods.

Neutralizing static electricity from packing films
- Prevents the filled substance from adhering to the packing film.
- Reduces packing mistakes.

Neutralizing static electricity on an electric substrate
- Prevents element disruption due to discharge.
- Prevents adhesion of dust.

Neutralizing static electricity on a glass substrate
- Prevents breakage due to adhesion and discharge.
- Prevents adhesion of dust.
1) Installation distance and discharge time (Discharge time from 1000 V to 100 V)

High speed static neutralization cartridge

Air purge: No

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

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

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

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

Air purge: Yes Supply pressure: 0.02 MPa (1 L/min (ANR) per nozzle)

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

Note: Static neutralization 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, STM3.1-2006). For “Sensing DC” mode, the installation height of the sensor is 10 mm. Use this as a guideline purpose only for model selection because the value varies depending on the material and/or size of a subject.
Low maintenance cartridge

⚠️ Caution

Be sure to perform air purge when using a low-maintenance electrode cartridge. Without air purge, low-maintenance effect 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)

Air purge: Yes  Supply pressure: 0.7 MPa (30 L/min (ANR) per nozzle)
Static Neutralization Characteristics

2) Static neutralization range

High speed static neutralization cartridge

Air purge: No

High speed static neutralization cartridge, Low maintenance cartridge

Air purge: Yes (0.05 MPa to 0.7 MPa)

3) Installation height of feedback sensor and discharge time/Offset voltage

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)

Note) Static neutralization 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, STM3.1-2006). Use this as a guideline purpose only for model selection because the value varies depending on the material and/or size of a subject.
Static Neutralization Characteristics

4) Flow rate — Pressure characteristics

![Graph showing flow rate vs. pressure for different supply pressures.](image)

How to measure

- **Air supply measurement**
  - Pressure measurement
  - Tube O.D. 4 mm, I.D. 2.5 mm: Length 10 mm

(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.

![Graph showing the 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

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

#### Bracket
- End bracket with 2 pcs.
- Center bracket with 1 pc. or 2 pcs.

#### Output
- Nil
- NPN output
- PNP output

#### Power supply cable
- With power supply cable (3 m)
- With power supply cable (10 m)
- Without power supply cable

#### Symbol
- X10
- X14
- X15
- X210
- X211

### Made to Order

#### Ionizer/Series IZS31

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>X10</td>
<td>Non-standard bar length (80 mm-pitch)</td>
</tr>
<tr>
<td>X14</td>
<td>Model with security cover</td>
</tr>
<tr>
<td>X15</td>
<td>Model with 40 mm-pitch emitter cartridges</td>
</tr>
<tr>
<td>X210</td>
<td>High-voltage/control unit detachable short type</td>
</tr>
<tr>
<td>X211</td>
<td>High-voltage/control unit detachable short type Model with 40 mm-pitch emitter cartridges</td>
</tr>
</tbody>
</table>

### Non-standard power supply cable length

| IZS31 - CP | X13 |

#### Power supply cable full length

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Cable full length</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>1 m</td>
</tr>
<tr>
<td>02</td>
<td>2 m</td>
</tr>
<tr>
<td>19</td>
<td>19 m</td>
</tr>
<tr>
<td>20</td>
<td>20 m</td>
</tr>
</tbody>
</table>

### Ionizer driving AC adapter (100 to 240 VAC)

| IZS31 - F | X196 |

#### Power supply specifications

<table>
<thead>
<tr>
<th>Symbol</th>
<th>NPN specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>P</td>
<td>P</td>
</tr>
</tbody>
</table>

### Individual Special Order

- 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 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)**

- Power can be directly supplied from an AC source.
- The ionizer is driven by connection into 100 to 240 VAC.
**Ionizer Series IZS31**

### Accessories

**Feedback sensor**
IZS31-DF

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

**Autobalance sensor**
[Body-mounting type]
IZS31-DE
- Connection cable A/B (1 pc. each)
- Sensor bracket (1 pc.)
- Hexagon socket head cap screw for sensor bracket (2 pcs.)

**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)

**High speed static neutralization cartridge**
- IZS31-NT
  (Material: Tungsten)
- IZS31-NC
  (Material: Silicon)
- IZS31-NS
  (Material: Stainless steel)

**Low maintenance cartridge**
- IZS31-NJ
  (Material: Tungsten)
- IZS31-NK
  (Material: Silicon)

**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.)

### Bar length

<table>
<thead>
<tr>
<th>Bar length (mm)</th>
<th>300, 380, 620, 780</th>
<th>1100, 1260, 1500</th>
<th>1900, 2300</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity</td>
<td>2 pcs.</td>
<td>With 1 pc.</td>
<td>With 2 pcs.</td>
</tr>
</tbody>
</table>

**Note** The model number is for a single bracket.

---

**Feedback sensor**
IZS31-DF

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

**Autobalance sensor**
[Body-mounting type]
IZS31-DE
- Connection cable A/B (1 pc. each)
- Sensor bracket (1 pc.)
- Hexagon socket head cap screw for sensor bracket (2 pcs.)

**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)

**High speed static neutralization cartridge**
- IZS31-NT
  (Material: Tungsten)
- IZS31-NC
  (Material: Silicon)
- IZS31-NS
  (Material: Stainless steel)

**Low maintenance cartridge**
- IZS31-NJ
  (Material: Tungsten)
- IZS31-NK
  (Material: Silicon)

**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.)
Options

Security cover

IZS31 — E 3

Number of fixed emitter cartridges

<table>
<thead>
<tr>
<th></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>1260</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>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>1260</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>

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

IZS31 Standard part no.— X14

Security cover

When attached to the body

Screwdriver for balance adjustment trimmer/IZS30-M1

Cleaning kit/IZS30-M2
## Specifications

### Ion generation method
- **Corona discharge type**

### Method of applying voltage
- Sensing DC, Pulse DC, DC

### Electricity discharge output
- 1700 V

### Offset voltage
- **Note 1**: Within ±30 V (Stainless steel emitter: Within ±100 V)

### Air purge
- Fluid: Air (Clean and dry)
- Operating pressure: 0.7 MPa or less **Note 2**
- Connecting tubing O.D.: φ4

### Power supply voltage
- 21.6 to 26.4 VDC (Within 24 VDC ±10%)

### Current consumption
- **Sensing DC mode**
  - 200 mA or less (While standing by: 120 mA or less)
- **Pulse DC mode**
  - Autobalance sensor [Body-mounting type]: 200 mA or less
  - Autobalance sensor [High-precision type]: 300 mA or less
  - When sensor is not used: 170 mA or less
- **DC mode**
  - 170 mA or less

### Input signal
- Discharge stop signal: Connected to 0 V (Voltage: 5 VDC or less, Current consumption: 5 mA or less)
- Maintenance detection signal: Connected to +24 VDC (Voltage: Between 19 VDC and power supply voltage, Current consumption: 5 mA or less)

### Output signal
- Static electricity removal completion signal: Max. load current: 100 mA
- Residual voltage: 1 V or less (Load current at 100 mA)
- Error signal: Max. applied voltage: 28 VDC
- Sensor monitor output: Voltage output 1 to 5 V (Connect a 10 kΩ or larger load.)

### Effective distance of static neutralization
- 50 to 2000 mm (Sensing DC mode: 200 to 2000 mm)

### Ambient temperature, Fluid temperature
- 0 to 50°C

### Ambient humidity
- 35 to 80% Rh (No condensation)

### Material
- Cover of ionizer: ABS, Emitter: Tungsten, Single crystal silicon, Stainless steel

### Vibration resistance
- Durability 50 Hz, Amplitude 1 mm, XYZ each 2 hours

### Impact resistance
- 10 G

### Compliance with overseas standards/directive
- UL U.S. Standard for Electrostatic Air Cleaner, UL867, fourth edition
- CSA Canadian Standard for Electrostatic Air Cleaner, CAN/CSA C22.2 No.187-M1986

### Ionizer Model

<table>
<thead>
<tr>
<th>Bar length (mm)</th>
<th>300</th>
<th>380</th>
<th>620</th>
<th>780</th>
<th>1100</th>
<th>1260</th>
<th>1500</th>
<th>1900</th>
<th>2300</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of emitter 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>
<td>28</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>
<td>2040</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></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>200 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>10 to 50 mm (Recommended)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Compliance with overseas standards/directive</td>
<td>CE (EMC directive: 2004/108/EC, Low voltage directive: 73/23/EEC, 93/68/EEC)</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### Construction

**IZS31-DE**
- When mounting on the body

![Diagram of IZS31-DE](image-url)
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.

(1) Sensing DC mode
The discharge time is reduced by detecting the workpiece’s charge condition with a feedback sensor which feeds the data back to the ionizer and causes ions with the polarity best suited for static neutralization to emit. The static neutralization completion signal turns off when the workpiece’s electrostatic potential falls within ±30 V. (Note)
This mode is suited for neutralizing static electricity from heavily charged workpieces.
Either “Energy Saving Run” or “Continuous Static Neutralization Run” can be selected depending on the ionizer’s operation after static neutralization is completed.

<table>
<thead>
<tr>
<th>Energy saving run</th>
<th>The ionizer stops discharging automatically after the of static neutralization is completed. It resumes discharging when the workpiece’s electrostatic potential becomes outside of ±30 V. (Note) For static neutralization from conductive workpieces, “Energy Saving Run” is recommended.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous static neutralization run</td>
<td>Even after the completion of static neutralization, this method continues to neutralize static electricity using DC pulses while feeding back the data, so that the workpiece’s electrostatic potential falls within ±30 V. (Note) For static neutralization from nonconductive workpieces, “Continuous Static Neutralization Run” is recommended.</td>
</tr>
</tbody>
</table>

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

(2) Pulse DC mode
Alternatively emits positive and negative ions.

- **When an autobalance sensor (high-precision type) is used.**
  
  The ionizer automatically adjusts the offset voltage of the static neutralization area to within ±30 V. If the offset voltage exceeds ±30 V due to contamination of the emitter, the ionizer outputs the maintenance output signal. The offset voltage can be adjusted and maintained at the workpiece position.

  Either “Manual Run” or “Automatic Run” can be selected depending on the operating method of the offset voltage adjustment.

<table>
<thead>
<tr>
<th>Manual run</th>
<th>When the maintenance detection signal is input, or the ionizer is turned ON, the offset voltage of the static neutralization area is adjusted. In the case of the static neutralization of a moving workpiece, “Manual Run” is recommended. Start the operation of the system after the offset voltage is adjusted.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automatic run</td>
<td>This method continuously adjusts the offset voltage. For static neutralization from stationary workpieces or prescribed spatial static neutralization, “Automatic Run” is recommended.</td>
</tr>
</tbody>
</table>

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

- **When a sensor is not used.**
  
  Use a balance adjustment trimmer to adjust the offset voltage. This requires the separate use of a measuring instrument to verify the offset voltage.

(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. Maintenance detection

When a maintenance detection signal is input, the ionizer detects any deterioration that may interfere with the emitters’ capability to neutralize static electricity. If the emitters need to be cleaned due to such deterioration, the maintenance detection indicator LED comes on and a maintenance detection signal turns ON. Ion emission continues even if the maintenance detection signal is turned ON.

Note) Deterioration in static electricity neutralization 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

No. Description Type Contents
1 Power supply indicator LED (Dark green) Illuminates when power is supplied. Flashes when the supply voltage is irregular.
2 Sensor indicator LED (Dark green) Illuminates when the feedback sensor, autobalance sensor [high-precision type], or autobalance sensor [body-mounting type] is connected.
3 Negative indicator LED (Blue) Functionality differs depending on the run mode. Refer to “Model Selection and Settings” on page 650, 654, 657.
4 Completion indicator LED (Dark green) Functionality differs depending on the run mode. Refer to “Model Selection and Settings” on page 650, 654, 657.
5 Positive indicator LED (Orange) Functionality differs depending on the run mode. Refer to “Model Selection and Settings” on page 650, 654, 657.
6 Irregular high-voltage indicator LED (Red) Illuminates when an irregular current flows through an emitter.
7 Irregular sensor indicator LED (Red) Functionality differs depending on the run mode. Refer to “Model Selection and Settings” on page 648, 652, 653, 656.
8 Maintenance detection indicator LED (Red) Illuminates when the emitter contamination is detected. Flashes when the maintenance detection is in progress.
9 Maintenance level selection switch Rotary switch Functionality differs depending on the run mode. Refer to “Model Selection and Settings” on page 648, 652, 653, 656.
10 Frequency selection switch Rotary switch Functionality differs depending on the run mode. Refer to “Model Selection and Settings” on page 648, 652, 653, 656.
11 Balance adjustment trimmer Trimmer Adjusts the offset voltage when the autobalance sensor [high-precision type] or autobalance sensor [body-mounting type] is not used.
Model Selection and Settings 1/Sensing DC Mode

1. Sensing DC mode (Refer to page 652 when using the ionizer in the pulse DC mode, or refer to page 656 when using it in the DC mode.)

1) Bar length selection
   - Select the appropriate length suited for a work size by referring to “Static Neutralization Characteristics” and “Static Neutralization 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 discharge time/Offset voltage” on page 640 as a guide.)
   - When the ionizer and feedback sensor are connected, the sensing DC mode is automatically selected.

4) Maintenance detection level setting
   - Select the detection level of the maintenance period of the emitter with the maintenance detection 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 emitter stain-detection.

5) Frequency selection switch setting
   - Select “Energy Saving Run” or “Continuous Static Neutralization Run”.
   - In case of “Continuous Static Neutralization Run”, select the ion generation frequency after static neutralization is completed.

### Details of operation

<table>
<thead>
<tr>
<th>Switch setting</th>
<th>Freq select</th>
<th>Details of operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy saving run</td>
<td>+ ion → Stop → − ion</td>
<td>Automatically stops emitting electricity even after static neutralization is completed.</td>
</tr>
<tr>
<td>Continuous static neutralization run</td>
<td>+ ion → Pulse operation → − ion</td>
<td>Continuously neutralizes static electricity with pulse DC by controlling the offset voltage so that the charged potential on a workpiece would be within ±30V even after static neutralization is completed. The ionizer generates ions at the preset frequency.</td>
</tr>
</tbody>
</table>

Note: Stain-detection starts when a maintenance start signal is input.
Model Selection and Settings 1/Sensing DC Mode

6) Wiring of power supply cable
   - Connect the dedicated power supply cable.
   - Refer to the dimensions of the power supply cable/IZS31-CP on page 662 for the cable specifications.

   ![Power supply diagram]

   **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>+24 VDC</td>
<td>○</td>
<td>Ionizer driving power supply</td>
</tr>
<tr>
<td>DC1(−)</td>
<td>Blue</td>
<td>0 V</td>
<td>○</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>

   * Be sure to ground the DC1 (−) [Blue] with a ground resistance of 100 Ω or less. 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>+24 VDC</td>
<td>○</td>
<td>Input/Output signal power cable</td>
</tr>
<tr>
<td>DC2(−)</td>
<td>Black</td>
<td>0 V</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</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(NPN) Turned to the run mode when connected to DC2 (−). [Black]</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(PNP) Turned to the run mode when connected to DC2 (+). [Red]</td>
</tr>
<tr>
<td>IN2</td>
<td>Gray</td>
<td>Maintenance detection signal</td>
<td>△</td>
<td>Input signal when determining the necessity of emitter 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 neutralization completion signal</td>
<td>△</td>
<td>Turned ON when the workpiece’s electrostatic potential is within ±30 V or when the emitter contamination is being detected.</td>
</tr>
<tr>
<td>OUT2</td>
<td>Yellow</td>
<td>Maintenance detection signal</td>
<td>△</td>
<td>Turned ON when the emitter 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>

   ○: Minimum wiring requirement for ionizer operation
   △: Wiring necessary to use various functions
   −: Wiring not required in the sensing DC mode. Exercise caution to ensure that this wire does not short-circuit to other wires.

7) Air piping
   - For single-side piping, block the unused port with the M-5P plug supplied with the ionizer.
Model Selection and Settings 1/Sensing DC Mode

8) LED indicators

- **POWER LED**—Indicates the state of power supply input and sensor connection.
  - Illuminates when power is supplied. (Dark green)
  - Flashes when the power supply is irregular.
  - Illuminates when the feedback sensor is connected. (Dark green)

- **ION LED**—Indicates the workpiece’s state of electrostatic charging.
  - Illuminates when the workpiece is positively charged. (Orange)
  - Illuminates when the workpiece electrostatic potential is low. (Dark green)
  - Illuminates when the workpiece is negatively charged. (Blue)

- **ALARM LED**—Indicates abnormal states of the ionizer.
  - Illuminates when an abnormal current flows due to a short circuit of the emitter. (Red)
  - Illuminates when the feedback sensor is not operating normally. (Red)
  - Illuminates when contamination of the emitter is detected. (Red)
    - Flashes when the maintenance detection is in progress.

### POWER LED

<table>
<thead>
<tr>
<th>LED</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAIN</td>
<td>Illuminates when power is supplied. (Dark green) (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

<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.

### ALARM LED

<table>
<thead>
<tr>
<th>LED</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>HV</td>
<td>Illuminates when an abnormal current flows due to a short circuit of the emitter. (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 contamination of the emitter is detected. (Red) (Flashes when the maintenance detection is in progress.)</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 a short circuit of the emitter. 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>Maintenance detection</td>
<td>Gives notification that the emitter 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 emitters, and turn the power supply on again.</td>
</tr>
</tbody>
</table>

### 10) Timing chart

#### Timing chart in normal operation

<table>
<thead>
<tr>
<th>Electric charge of workpiece</th>
<th>30 V</th>
<th>0 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply 24 VDC Input</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>Discharge stop signal (IN1)</td>
<td>ON (Operation permitted)</td>
<td>OFF</td>
</tr>
<tr>
<td>Static neutralization completion signal (OUT1)</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>Sensor monitor output (OUT4)</td>
<td>ON (Output)</td>
<td>OFF</td>
</tr>
<tr>
<td>Indication of electric charge (ION LED) led</td>
<td>ON (Indication)</td>
<td>OFF</td>
</tr>
</tbody>
</table>

#### Timing chart when the maintenance is detected.

<table>
<thead>
<tr>
<th>Power supply 24 VDC Input</th>
<th>ON</th>
<th>OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discharge stop signal (IN1)</td>
<td>ON (Operation permitted)</td>
<td>OFF</td>
</tr>
<tr>
<td>Static neutralization completion signal (OUT1)</td>
<td>ON (Static neutralization in progress)</td>
<td>OFF</td>
</tr>
<tr>
<td>Maintenance detection signal (IN2)</td>
<td>ON (SW ON)</td>
<td>OFF</td>
</tr>
<tr>
<td>Maintenance detection output signal (OUT2)</td>
<td>ON (SW ON)</td>
<td>OFF</td>
</tr>
<tr>
<td>Maintenance detection indicator (NDL CHECK ALARM)</td>
<td>ON (Indication)</td>
<td>OFF (Flash)</td>
</tr>
</tbody>
</table>

- Static neutralization completion signal is turn ON when the maintenance detection is in progress.

⚠️ Caution

Ions are emitted from the ionizer when the maintenance detection is in progress 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 Neutralization Characteristics” and “Static Neutralization Range”, etc.

2) Ionizer installation
   · Install the ionizer within 50 to 2000 mm of the object requiring static neutralization. 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 offset voltage using a high-precision type sensor, install the sensor immediately below 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 offset voltage 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 detection 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 offset voltage.
   - **Autobalance sensor [Body-mounting type]**
     Configuration is not necessary.

5) Offset voltage adjustment
   - **Autobalance sensor [High-precision type]**
     When the autobalance sensor is used, the ionizer automatically adjusts the offset voltage near the sensor installation location to within ±30 V. Either “Manual Run” or “Automatic Run” can be selected depending on the method of offset voltage adjustment.
     
     | Details of operation                                                                 | Switch setting |
     |-------------------------------------------------------------------------------------|---------------|
     | Manual run                                                                          | MANUAL        |
     | When a maintenance detection signal is input, or the ionizer is turned ON, the     |               |
     | maintenance detection of the emitter is executed according to the offset voltage   |               |
     | adjustment and detection level setting. The offset voltage adjustment value for    |               |
     | each ion generation frequency is maintained. When the ion generation frequency is   |               |
     | changed, adjust the offset voltage. After the adjustment, the autobalance sensor   |               |
     | can be removed as the adjustment of the offset voltage will not be executed until  |               |
     | the maintenance start signal is input again.                                       |               |
     | Automatic run                                                                       | AUTO          |
     | The ionizer continuously adjusts the offset voltage. When the autobalance sensor   |               |
     | is removed, adjust the offset voltage manually using the balance adjustment trimmer.|               |

   * Set the switch to H, M or L according to the maintenance detection level.

   - **Autobalance sensor [Body-mounting type]**
     Control to keep the initial offset voltage. When changing the offset voltage settings, use an offset voltage adjustment trimmer on the autobalance sensor (requires a separate measuring instrument to verify the offset voltage).
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 offset voltage manually using the balance adjustment trimmer on the body.

- Set the maintenance detection level.
- Set the switch to either H (High), M (Middle), L (Low). At settings other than these, the ionizer does not perform the maintenance detection.

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>+24 VDC</td>
<td>○</td>
<td>Ionizer driving power cable</td>
</tr>
<tr>
<td>DC1(−)</td>
<td>Blue</td>
<td>0 V [FG]</td>
<td>○</td>
<td>Ionizer driving power cable</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 0 V and be sure to ground with a ground resistance of 100 Ω or less. If the lead is not grounded, the ionizer may malfunction.
- When a body-mounting type sensor is used, do not connect DC1(−) [Blue] to the power supply 0 V and be sure to ground with a ground resistance of 100 Ω or less. In case of connecting the lead to the power supply 0 V and grounding with a ground resistance of 100 Ω or less, all I/O signals are not insulated from the FG terminal.

■ 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>+24 VDC</td>
<td>○</td>
<td>Input/Output signal power cable</td>
</tr>
<tr>
<td>DC2 (−)</td>
<td>Black</td>
<td>0 V</td>
<td>○</td>
<td>Input/Output signal power cable</td>
</tr>
<tr>
<td>IN1</td>
<td>Light green</td>
<td>Discharge stop signal</td>
<td>○</td>
<td>Signal for ionizer run/stop (NPN) Turned to the run mode when connected to DC2(−). [Black] Turned to the run mode when connected to DC2(+). [Red]</td>
</tr>
<tr>
<td>IN2</td>
<td>Gray</td>
<td>Maintenance detection signal</td>
<td>△</td>
<td>Input signal when determining the necessity of emitter 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 neutralization completion signal</td>
<td>△</td>
<td>Outputs when the maintenance detection of the emitters is in progress.</td>
</tr>
<tr>
<td>OUT2</td>
<td>Yellow</td>
<td>Maintenance detection signal</td>
<td>△</td>
<td>Outputs when the emitter maintenance is necessary.</td>
</tr>
<tr>
<td>OUT3</td>
<td>Purple</td>
<td>Irregular signal</td>
<td>△</td>
<td>Outputs in case of high-voltage error, sensor error, CPU error. (B contact output)</td>
</tr>
</tbody>
</table>

- When an autobalance sensor is not used, set the switch to AUTO.
- When setting the maintenance detection level.
- When the switch is set to H, M, L, the ionizer performs the maintenance detection and then the offset voltage adjustment.
- Maintenance detection starts when a maintenance detection signal is input.
- When the switch is set to H, M, L on the MANUAL side.

6) Frequency selection switch setting

- Select the ion generation frequency.

![FREQ SELECT](Image)

<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>

Caution

- When adjusting the offset voltage in the manual run using an autobalance sensor, select a maintenance level of H, M, L on the MANUAL side.
Model Selection and Settings 2/Pulse DC Mode

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

9) 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>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 an autobalance sensor [high-precision type or body-mounting type] is connected. (Dark green)</td>
</tr>
</tbody>
</table>

   - **ION LED**—Indicates the polarity of ions being emitted and the state of offset voltage.

<table>
<thead>
<tr>
<th>LED</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>ION</td>
<td>Illuminates that positive ions are being emitted from the ionizer. (Orange)</td>
</tr>
<tr>
<td></td>
<td>When an autobalance sensor [high-precision type] is used, it indicates the state of offset voltage. (Refer to the table below.)</td>
</tr>
<tr>
<td></td>
<td>Light OFF when a sensor is not used, or an autobalance sensor [body-mounting type] is used.</td>
</tr>
<tr>
<td></td>
<td>Illuminates that negative ions are being emitted from the ionizer. (Blue)</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Offset voltage</th>
<th>OK LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under ±30 V</td>
<td>Dark green light ON (or Flash)</td>
</tr>
<tr>
<td>±30 V or more</td>
<td>Light OFF</td>
</tr>
</tbody>
</table>

   *The OK LED indicator flashes when the offset voltage is approaching the limits of the adjustable range, signaling that the time for emitter maintenance is approaching.*

   - **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>Illuminates when an abnormal current flows due to a short circuit of the emitter. (Red)</td>
</tr>
<tr>
<td>SNSR</td>
<td>Illuminates when the autobalance sensor [high-precision type] is not operating normally. (Red)</td>
</tr>
<tr>
<td>NDL CHECK</td>
<td>Illuminates when the sensor detects a necessity to perform maintenance of the emitter. (Red) (Flashes when the maintenance detection is in progress.)</td>
</tr>
</tbody>
</table>
Model Selection and Settings 2/Pulse DC Mode

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 a short</td>
<td>Turn OFF the power supply, solve the problem, then</td>
</tr>
<tr>
<td></td>
<td>circuit of the emitter. The ionizer stops ion emission, turns on the HV ALARM</td>
<td>turn the power supply on again. Alternatively, turn the discharge stop signal (IN1)</td>
</tr>
<tr>
<td></td>
<td>indicator, and turns OFF the error signal (OUT3).</td>
<td>OFF, then ON.</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 the discharge stop signal (IN1)</td>
</tr>
<tr>
<td></td>
<td>emission, all of the LED indicators flash, and turns OFF the error signal</td>
<td>OFF, then ON.</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 noise,</td>
<td>Turn OFF the power supply, solve the problem, then</td>
</tr>
<tr>
<td></td>
<td>etc. The ionizer stops ion emission, and the workpiece may therefore be</td>
<td>turn the power supply on again. Alternatively, turn the discharge stop signal (IN1)</td>
</tr>
<tr>
<td></td>
<td>electrostatically charged. Perform this detection procedure in the absence of</td>
<td>OFF, then ON.</td>
</tr>
<tr>
<td>Maintenance detection</td>
<td>The NDL CHECK ALARM indicator comes on and a maintenance detection signal</td>
<td>Turn OFF the power supply, clean or replace the emitters, and turn the power supply</td>
</tr>
<tr>
<td></td>
<td>(OUT2) turns ON.</td>
<td>on again. After turning power supply on, adjust the offset voltage.</td>
</tr>
<tr>
<td></td>
<td>Ions are continuously emitted.</td>
<td></td>
</tr>
</tbody>
</table>

11) Timing chart

■ Timing chart in normal operation

<table>
<thead>
<tr>
<th>Input/output</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply 24 VDC</td>
<td>ON (Operation permitted)</td>
</tr>
<tr>
<td>Discharge stop signal</td>
<td>ON (Operation permitted)</td>
</tr>
<tr>
<td>State of ion emission</td>
<td>ON (Off ON)</td>
</tr>
</tbody>
</table>

■ Timing chart when the maintenance detection is performed or offset voltage is adjusted.

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

(1) Manual run

<table>
<thead>
<tr>
<th>Input/output</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply 24 VDC</td>
<td>ON (Operation permitted)</td>
</tr>
<tr>
<td>Discharge stop signal (IN1)</td>
<td>ON (Operation permitted)</td>
</tr>
<tr>
<td>Static neutralization</td>
<td>completion signal (OUT1)</td>
</tr>
<tr>
<td>Maintenance detection signal</td>
<td>(SW ON)</td>
</tr>
<tr>
<td>Maintenance detection signal</td>
<td>(SW ON)</td>
</tr>
<tr>
<td>Maintenance completion signal (OUT2)</td>
<td>LED</td>
</tr>
<tr>
<td>Internal processing</td>
<td>Maintenance detection signal (OUT1)</td>
</tr>
<tr>
<td>Offset voltage adjustment</td>
<td>(Performed when the maintenance level selection switch is set to H, M, L)</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Input/output</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply 24 VDC</td>
<td>ON (Operation permitted)</td>
</tr>
<tr>
<td>Discharge stop signal (IN1)</td>
<td>ON (Operation permitted)</td>
</tr>
<tr>
<td>Static neutralization</td>
<td>completion signal (OUT1)</td>
</tr>
<tr>
<td>Maintenance detection signal</td>
<td>(SW ON)</td>
</tr>
<tr>
<td>Maintenance detection signal</td>
<td>(SW ON)</td>
</tr>
<tr>
<td>Maintenance completion signal (OUT2)</td>
<td>LED</td>
</tr>
<tr>
<td>Internal processing</td>
<td>Maintenance detection signal (OUT1)</td>
</tr>
<tr>
<td>Offset voltage adjustment</td>
<td>(Performed when the maintenance level selection switch is set to H, M, L)</td>
</tr>
</tbody>
</table>

(c) When a sensor is not connected.

<table>
<thead>
<tr>
<th>Input/output</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply 24 VDC</td>
<td>ON (Operation permitted)</td>
</tr>
<tr>
<td>Discharge stop signal (IN1)</td>
<td>ON (Operation permitted)</td>
</tr>
<tr>
<td>Static neutralization</td>
<td>completion signal (OUT1)</td>
</tr>
<tr>
<td>Maintenance detection signal</td>
<td>(SW ON)</td>
</tr>
<tr>
<td>Maintenance detection signal</td>
<td>(SW ON)</td>
</tr>
<tr>
<td>Maintenance completion signal (OUT2)</td>
<td>LED</td>
</tr>
<tr>
<td>Internal processing</td>
<td>Maintenance detection signal (OUT1)</td>
</tr>
<tr>
<td>Offset voltage adjustment</td>
<td>(Performed when the maintenance level selection switch is set to H, M, L)</td>
</tr>
</tbody>
</table>

- Static neutralization completion signal is turn ON when the maintenance detection is in progress.

⚠️ Caution

Ions are emitted from the ionizer when the maintenance detection is in progress and the workpiece may therefore be electrostatically charged. Perform this detection procedure in the absence of workpieces.
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 Neutralization Characteristics" and "Static Neutralization Range", etc.

2) Ionizer installation
- Install the ionizer within 50 to 2000 mm of the object requiring static neutralization. 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.

<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>+24 VDC</td>
<td>○</td>
<td>Ionizer driving power cable</td>
</tr>
<tr>
<td>DC1 (–)</td>
<td>Blue</td>
<td>0 V [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>
   
- Be sure to ground the DC1 (–) [Blue] with a ground resistance of 100 Ω or less. If the terminal is not grounded, the ionizer may malfunction.

5) Air piping
- For single-side piping, block the unused port with the plug (M-5P-X112) supplied with the ionizer.
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 MAIN</td>
<td>Illuminates when power is supplied. (Dark green) (Flashes when the power supply is irregular.)</td>
</tr>
<tr>
<td>SNSR</td>
<td>Light OFF</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>Illuminates that positive ions are being emitted from the ionizer. (Orange)</td>
</tr>
<tr>
<td>OK</td>
<td>Light OFF</td>
</tr>
<tr>
<td>–</td>
<td>Illuminates that negative ions are being emitted from the ionizer. (Blue)</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 HV</td>
<td>Illuminates when an abnormal current flows due to a short circuit of the emitter. (Red)</td>
</tr>
<tr>
<td>SNSR</td>
<td>Light OFF</td>
</tr>
<tr>
<td>NDL CHECK</td>
<td>Light OFF</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 a short circuit of the emitter. 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

- **Timing chart in normal operation**

<table>
<thead>
<tr>
<th></th>
<th>ON</th>
<th>OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply 24 VDC Input</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discharge stop signal (IN1)</td>
<td>(Operation permitted)</td>
<td></td>
</tr>
<tr>
<td>State of ion emission</td>
<td>(Emission)</td>
<td></td>
</tr>
</tbody>
</table>
(1) When a sensor is not used./When a feedback sensor or autobalance sensor [high-precision type] is used.

NPN output

Ground the 0 V terminal of the ionizer driving power supply with a ground resistance of 100 Ω or less 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 (–) which is grounded with a ground resistance of 100 Ω or less 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.

NPN output

Ionizer

+24 V

Input/Output signal circuit

+24 V

Isolation circuit (Photocoupler)

Isolation circuit (Photocoupler)

Isolation circuit (Photocoupler)

Isolation circuit (Photocoupler)

Internal circuit

Autobalance sensor [Body-mounting type]

Red: DC2 (+)

Black: DC2 (–)

Blue: DC1 (–)

FG

PLC

Light green: IN1

Gray: IN2

Pink: OUT1

Yellow: OUT2

Purple: OUT3

OUTPUT

or

or

INPUT

Pink: OUT1

Yellow: OUT2

Purple: OUT3

INPUT

INTERNAL CIRCUIT

Autobalance sensor [Body-mounting type]

Red: DC2 (+)

Black: DC2 (–)

Blue: DC1 (–)

FG

PLC

Light green: IN1

Gray: IN2

Internal circuit

OUTPUT

or

or

INPUT

Pink: OUT1

Yellow: OUT2

Purple: OUT3

INPUT

PNP output

Ionizer

+24 V

Input/Output signal circuit

+24 V

Isolation circuit (Photocoupler)

Isolation circuit (Photocoupler)

Isolation circuit (Photocoupler)

Isolation circuit (Photocoupler)

Internal circuit

Autobalance sensor [Body-mounting type]

Red: DC2 (+)

Black: DC2 (–)

Blue: DC1 (–)

FG

PLC

Light green: IN1

Gray: IN2

Pink: OUT1

Yellow: OUT2

Purple: OUT3

OUTPUT

or

or

INPUT

Pink: OUT1

Yellow: OUT2

Purple: OUT3

INPUT

* Ground the lead DC1 (–) [Blue] with a ground resistance of 100 Ω or less without connecting to the 0 V terminal of the power supply. When the lead is connected to the 0 V terminal of the power supply and grounding is applied, leads for I/O signals are not insulated from the FG terminal.

⚠️ 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, and the offset voltage may not be adjusted.

* Keep clearance of at least 2 m.

Autobalance sensor

DC mode
Series IZS31

Dimensions

Ionizer/IZS31-□□□□□□□□

<table>
<thead>
<tr>
<th>Bar length (mm)</th>
<th>Fitting</th>
</tr>
</thead>
<tbody>
<tr>
<td>300, 380, 620, 780</td>
<td>M-5P-X112</td>
</tr>
<tr>
<td>1100, 1260, 1500, 1900, 2300</td>
<td>KJH04-M5-X34</td>
</tr>
</tbody>
</table>

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

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

Frequency selection switch
Balance adjustment trimmer
Maintenance detection level selection switch

4 x M4 x 0.7 depth 5
(For mounting, opposite side: Same)

Emitter cartridge

(For mounting, opposite side: Same)

(Bar length (mm))

80 x (n-1)

25

70

10

n (Number of emitter cartridges), L Dimension

<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>
</tr>
<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>

Maintenance detection level selection switch

High pressure warning label position at 300 mm length

Name plate position at 300 mm length
Ionizer Series IZS31

Dimensions

End bracket/IZS31-BE

Center bracket/IZS31-BM

When mounted outside in

Angle adjustment range is ± 45°.

Horizontal mounting

Downward mounting

Ionizer Series IZS31

Alphabetical Index

Length Measuring/Counter

Static Neutralization Equipment

Reduced-wiring Fieldbus System

Position Detection Switch

Flow Sensor

Pressure Sensor

Shunt Regulation Equipment
### Dimensions

#### Feedback sensor/IZS31-DF

![Diagram of Feedback sensor/IZS31-DF]

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

![Diagram of Autobalance sensor [High-precision type]/IZS31-DG]

#### Power supply cable/IZS31-CP

![Diagram of Power supply cable/IZS31-CP]

### Cable Specifications

<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>

- **No. of cable wire**: 12
- **Conductor**
  - Nominal cross section: 0.14 mm² (AWG26)
  - Outside diameter: 0.48 mm
- **Insulator**
  - Outside diameter: 0.35 mm Brown, Blue, Green, Red, Black, Light green, Gray, White, Orange, Pink, Yellow, Purple
- **Sheath**
  - Outside diameter: 6.2 mm
- **Material**: Lead-free PVC
- **Semi-stripped**: (Red)
**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

---

**Ionizer Series IZS31**

Alphabetical Index

- Flow Sensor
- Flow Switch
- Pressure Sensor
- Temperature Sensor
- Position Detection
- Switch
- Reduced-wiring
- Fieldbus System
- Static Neutralization
- Counter
- Alphabetical Index

---

663
Series IZS31
Made to Order 1
Please contact SMC for detailed dimensions, specifications, and lead times.

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

<table>
<thead>
<tr>
<th>Bar length (mm)</th>
<th>Fitting</th>
</tr>
</thead>
<tbody>
<tr>
<td>460, 540, 700</td>
<td>M-5P-X112</td>
</tr>
<tr>
<td>860, 940, 1020,</td>
<td></td>
</tr>
<tr>
<td>1180, 1340, 1420, 1580, 1660, 1740, 1820, 1980, 2060, 2140, 2220</td>
<td>KJH04-M5-X34</td>
</tr>
</tbody>
</table>

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

2 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.

How to Order
IZS31 – CP□□□-X13

Cable Specifications

<table>
<thead>
<tr>
<th>No. of cable wire</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conductor</td>
<td>0.14 mm² (AWG26)</td>
</tr>
<tr>
<td>Insulator</td>
<td>0.95 mm Brown, Blue, Green, Red, Black, Light green, Gray, White, Orange, Pink, Yellow, Purple</td>
</tr>
<tr>
<td>Sheath</td>
<td>Lead-free PVC</td>
</tr>
</tbody>
</table>

Cable length

<table>
<thead>
<tr>
<th>Cable length</th>
<th>mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>1000</td>
</tr>
<tr>
<td>02</td>
<td>2000</td>
</tr>
<tr>
<td>04</td>
<td>4000</td>
</tr>
<tr>
<td>05</td>
<td>5000</td>
</tr>
<tr>
<td>06</td>
<td>6000</td>
</tr>
<tr>
<td>07</td>
<td>7000</td>
</tr>
<tr>
<td>08</td>
<td>8000</td>
</tr>
<tr>
<td>09</td>
<td>9000</td>
</tr>
<tr>
<td>11</td>
<td>11000</td>
</tr>
<tr>
<td>12</td>
<td>12000</td>
</tr>
<tr>
<td>13</td>
<td>13000</td>
</tr>
<tr>
<td>14</td>
<td>14000</td>
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<tr>
<td>15</td>
<td>15000</td>
</tr>
<tr>
<td>16</td>
<td>16000</td>
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<tr>
<td>17</td>
<td>17000</td>
</tr>
<tr>
<td>18</td>
<td>18000</td>
</tr>
<tr>
<td>19</td>
<td>19000</td>
</tr>
<tr>
<td>20</td>
<td>20000</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 emitter cartridges

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

- The maximum bar length is 1260 mm.
- Uneven static neutralization can be prevented when the installation height is low.

<table>
<thead>
<tr>
<th>Bar length (mm)</th>
<th>Fitting</th>
</tr>
</thead>
<tbody>
<tr>
<td>300, 380, 620, 780</td>
<td>M-5P-X112</td>
</tr>
<tr>
<td>1100, 1260</td>
<td>KJH04-M5-X34</td>
</tr>
</tbody>
</table>

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

#### Center bracket/IZS31-BM-X158

- Offset bracket (2 pc.)
- Bar length: 300, 380, 620, 780, 1100, 1260 mm

#### 4 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)
- F.G. connection terminal (Note) (Inside diameter ø4.5 Lead wire length 125 ±5)

Note: Be sure to ground the F.G. terminal with a ground resistance of 100 Ω or less.

#### How to Order

**IZS31-F X196**

**Applicable output specifications**
- Nil
- NPN specification
- P
  - 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>1 A</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>
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.

How to Order

IZS31-180 R X210

Bar type

Emitter material

<table>
<thead>
<tr>
<th>Nil</th>
<th>Tungsten</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Silicon</td>
</tr>
<tr>
<td>S</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>J</td>
<td>Low-maintenance type /Tungsten</td>
</tr>
<tr>
<td>K</td>
<td>Low-maintenance type /Silicon</td>
</tr>
</tbody>
</table>

Output specification

<table>
<thead>
<tr>
<th>Nil</th>
<th>NPN output</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>PNP output</td>
</tr>
</tbody>
</table>

Bracket

<table>
<thead>
<tr>
<th>Nil</th>
<th>Without bracket</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>With bracket [Note]</td>
</tr>
</tbody>
</table>

Note) Four end brackets are bundled with the bracket model. Brackets can be attached on the high-voltage unit and control unit.

Sensor

<table>
<thead>
<tr>
<th>Nil</th>
<th>Without sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>Autobalance sensor [Body-mounting type]</td>
</tr>
<tr>
<td>F</td>
<td>Feedback sensor</td>
</tr>
<tr>
<td>G</td>
<td>Autobalance sensor [High-precision type]</td>
</tr>
</tbody>
</table>

Power supply cable

<table>
<thead>
<tr>
<th>Nil</th>
<th>With power supply cable (3 m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z</td>
<td>With power supply cable (10 m)</td>
</tr>
<tr>
<td>N</td>
<td>Without power supply cable</td>
</tr>
</tbody>
</table>

Control unit cable entry direction

<table>
<thead>
<tr>
<th>Nil</th>
<th>Left-hand entry</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>Right-hand entry</td>
</tr>
</tbody>
</table>

Full length of high-voltage unit and control unit: 220 mm

Full length of high-voltage unit and control unit plus 62 mm

With bracket

Note) Four end brackets are bundled with the bracket model. Brackets can be attached on the high-voltage unit and control unit.
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 emitter cartridges.

How to Order

IZS31-180 \( \square \) R \( \square \) - X211

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

- **Emitter material**
  - Nils
  - C Tungsten
  - S Stainless steel
  - J Low-maintenance type /Tungsten
  - K Low-maintenance type /Silicon

- **Output specification**
  - Nils
  - P NPN output

- **Bracket**
  - Nil Without bracket
  - With bracket (Note)
  - Note Four end brackets are bundled with the bracket model. Brackets can be started on the high-voltage unit and control unit.

- **Power supply cable**
  - Nils
  - With power supply cable (3 m)
  - Without power supply cable

- **Control unit cable entry direction**
  - Nil Left-hand entry
  - R Right-hand entry

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

*Note* Four end brackets are bundled with the bracket model. Brackets can be started on the high-voltage unit and control unit.

Please contact SMC for detailed dimensions, specifications, and lead times.
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**

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 emitter directly with fingers or metallic tools.**
   
   If a finger is used to touch the emitter, it may get stuck or an injury or electrical shock may occur from touching the surrounding equipment. In addition, if the emitter or cartridge is damaged with a tool, the specification will not be met and damage and/or an accident may occur.

**Danger High Voltage!**

Emitters 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 a tape or seal contains any conductive adhesive or reflective paint, a dielectric phenomenon may occur due to the generated ions, resulting in electrostatic charge or electric leakage, which may cause failure of the equipment or electric shock.

7. **Installation and adjustment should be conducted after turning off the power supply.**
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 neutralization and therefore result in a decrease in efficiency.

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

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

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.

Caution

Wiring/Piping

Warning

1. Be sure to perform wiring with a ground resistance of 100 \( \Omega \) or less in order to maintain product performance.

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

2. Be sure to turn off the power supply before wiring (including attachment/detachment of the connector).

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.

---

**Mounting**

<table>
<thead>
<tr>
<th>Charged object</th>
<th>Charged object</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 10 20 25 30 40 50</td>
<td>B 20 45 55 65 75</td>
</tr>
</tbody>
</table>

**Wiring/Piping**

---

**Warning**

1. Confirm if the power supply voltage is enough and that it is within the specifications before wiring.

To maintain product performance, a DC power supply shall be connected per UL listed Class 2 certified by National Electric Code (NEC) or evaluated as a limited power source provided by UL60950.
**Operating Environment/Storage Environment**

**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 an atmosphere 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.**
6. **Effects on implantable medical devices**
   The electromagnetic waves emitted from this product may interfere with implantable medical devices such as cardiac pacemakers and cardioverter defibrillators, resulting in the malfunction of the medical device or other adverse effects. Please use extreme caution when operating equipment which may have an adverse effect on your implantable medical device. Be sure to thoroughly read the precautions stated in the catalog, operation manual, etc., of your implantable medical device, or contact the manufacturer directly for further details on what types of equipment need to be avoided.

**Maintenance**

**Warning**

1. **Periodically (every two weeks or so) inspect the ionizer and clean the emitters.**
   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 emitter by using for long periods of time, the static neutralization performance will be lowered. Replace the emitter, if it is worn and the static neutralization performance does not return even after being cleaned.

2. **When cleaning the emitter or replacing the electrode cartridge, be sure to turn off the power supply to the body.**
   Touching an emitter when it is electrified may result in electric shock or other accidents.

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

**Handling**

**Warning**

1. **Do not drop, bump or apply excessive impact (10 G or more) while handling.**
   Even though it does not appear to be damaged, the internal parts may be damaged and cause 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.
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. **2-Color Display Digital Flow Switch/Series PFM**
   - Decreases the air consumption by setting to an appropriate pressure.

6. **Regulator/Series AR**
   - Decreases the air consumption.

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

8. **Clean Air Filter/Series SFD**
   - Built-in capillary element nominal filtration rating: 0.01 μm
   - Hollow fiber elements with over 99.99% filtering efficiency do not contaminate workpieces.