Potential amplitude: 25 V or less
Rapid elimination of static electricity: Fastest time: 0.1 seconds

Dual AC type Series IZS42
Potential amplitude is reduced with Dual AC type.

Feedback sensor type Series IZS41
Rapid elimination of static electricity by a feedback sensor

Standard type Series IZS40
Simple operation: Can be controlled by powering the ionizer ON.

Note 1) IZS42, Installation height: 300 mm
Note 2) Conditions/With feedback sensor
Charged voltage: 1000 V → 100 V
Discharged object: Charged plate (150 mm x 150 mm, capacitance 20 pF)
Installation distance: 200 mm (Tungsten electrode needle with air purge)
Series IZS40/41/42

Dual AC type Series IZS42 (Potential amplitude reduction specification)

Potential amplitude: **25 V or less** 80% reduction compared to the conventional model
(Compared to the IZS31 series at the installation height of 300 mm)

Potential amplitude is reduced with **SMC independent Dual AC type sensor**.
Static electricity elimination may be achieved without causing damage to a device which is sensitive to electrostatic discharge (ESD).
Potential amplitude applied to the applicable workpiece is reduced even if it the workpiece is mounted within close proximity of the ionizer.

**Potential amplitude (installation height of sensor: 300 mm)**

![Graph showing potential amplitude over time](image)

**Independent Dual AC type is implemented.**

**New Dual AC type/IZS42**

Discharges + ions and - ions at the same time to allow the + and - ions to reach the workpiece evenly, thereby reducing the potential amplitude.

**Eliminating static electricity on a glass substrate**

Prevents the breakage of glass substrates due to the static electricity which is generated when the substrate is lifted from the surface plate.

**Eliminating static electricity on an electric substrate**

Prevents the breakage of electric substrates due to the static electricity which is generated when the workpiece is picked up after dicing.

**Standard type Series IZS40**

**Simple operation: Can be controlled by powering the ionizer ON.**

Static electricity removal speed is improved with the use of the IZS40. At 1000 mm, the static electricity removal speed of the IZS40 is **3.2 s**. This represents a 41% reduction in removal speed as compared to previously released models.

**Static electricity elimination data when voltage is reduced from 1000 V to 100 V.**

- **Conditions:** Ion generation frequency 30 Hz  Supply pressure: 0.1 MPa
- **The IZS40 has a high speed static electricity elimination cartridge.**

![Graph showing static electricity elimination data](image)
Feedback sensor type Series IZS41

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 (option) and continuously emitting ions with a reverse polarity.

Note) An ion balance sensor is installed.

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.
- **Continuous static electricity elimination run mode** After static electricity elimination, the ionizer changes to AC mode. Continues to eliminate static electricity to make it approach 0 V even if the ion balance is within ±30 V.

Continuous static electricity elimination run mode

**Mode** | **Ion emission waveform**
--- | ---
Energy saving run | ![Energy saving run](image)
Continuous static electricity elimination run | ![Continuous static electricity elimination run](image)
AC (Without sensor) | ![AC (Without sensor)](image)
Workpiece electrification | ![Workpiece electrification](image)

- **AC adapter power supply is available.**
- **e-con connector is used.**

Suitable for static electricity elimination of resin and rubber pieces (small parts).

**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.
Series IZS40/41/42

Reduction of adjustment and maintenance labor by auto balance sensor

**Built-in type (Standard)**

The sensor is installed within the ionizer body and may be mounted anywhere. Monitoring the amount of ion emitted from an ionizer, the autobalance sensor maintains the initial ion balance by adjusting the +/- ion supply rate.

**High accuracy type (Option)**

- The ion balance near the workpiece is accurately adjusted.
- The object is not affected by the height of installation or any disturbance interference.

**Monitoring +/– return current**

- The ion balance near the workpiece is accurately adjusted.
- The object is not affected by the height of installation or any disturbance interference.

**Low maintenance electrode cartridges are used.**

- Minimizes contamination of electrode needles by discharging compressed air at the surface of the needles.
- 2 types of electrode needle materials
  - Tungsten: Ion balance ±30 V
  - Single crystal silicon: Ion balance ±30 V, suitable for eliminating static electricity of silicon wafer

**Features 3**
Setting ionizer with remote controller

- May be used to adjust and set several ionizers remotely.
- Can recognize and control up to 16 ionizers through address setting.
- Frequency setting
- Ion balance adjustment
- Electrode contamination detection alarm level can be adjusted (3 levels).
- Built-in sensor valid/invalid may be selected.

Transition wiring may be used.

Total number of ionizers that may be connected: IZS41: Max. 8 units, IZS42: Max. 5 units.

<Conditions>
- Bar length 340 to 2500 mm, Power supply cable 3 m
- Transition wiring cable 2 m

Reduces man hours required for connecting wires to the power supply.

Safety functions

- Electrode cartridge drop prevention function
  Locking by double-action

- Drop prevention cover
  Can even more reliably prevent electrode cartridges from dropping off.

High speed static electricity elimination cartridges and energy saving static electricity elimination cartridges are available.

High speed de-ionizing cartridge

Energy saving type de-ionizing cartridge

The flow rate consumption of the energy-saving static electricity elimination cartridge is approximately 50% less than that of the high speed static electricity elimination cartridge.

The static electricity elimination speed is reduced by approximately 20 to 30%.

Ions are transferred to the workpieces efficiently by using two pneumatic nozzles to improve the static electricity elimination performance.

Elimination of static electricity with reduced air consumption through the use of one pneumatic nozzle.
Ionizer Series IZS40/41/42
Models and Functions

<table>
<thead>
<tr>
<th>Series</th>
<th>IZS42</th>
<th>IZS41</th>
<th>IZS40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method of applying voltage</td>
<td>Dual AC</td>
<td>AC, Sensing AC, DC</td>
<td>AC, DC</td>
</tr>
<tr>
<td>Sensor (Auto balance)</td>
<td>Built-in type (Standard)</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>High accuracy type (Option)</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Feedback sensor (Option)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I/O</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transition wiring may be used, Note 1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrode needle contamination detector</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incorrect high voltage ion discharge detection</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low maintenance electrode</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cartridge</td>
<td>Energy saving type de-ionizing</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>High speed de-ionizing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>With one-touch fitting (ø6, ø8, ø10)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bracket mount</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-standard bar length (Made to Order)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Accessories sold separately (per series)

<table>
<thead>
<tr>
<th>Series</th>
<th>IZS42</th>
<th>IZS41</th>
<th>IZS40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remote controller</td>
<td>●</td>
<td>●</td>
<td>—</td>
</tr>
<tr>
<td>AC adapter</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Drop prevention cover</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Electrode needle cleaning kit</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

Note 1) Order transition wiring separately.
Application Examples

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

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

Eliminating static electricity from lens
- Removes dust from lens. - Prevents adhesion of dust.

Eliminating static electricity from parts feeder
- Prevents clogging of parts feeder.
Series IZS40/41/42
Technical Data

Static Electricity Elimination Characteristics

1) Installation Distance and De-ionization Time (Electricity Elimination from 1000 V to 100 V)

IZS40, 41

1) Without air purge

- Feedback sensor installation distance: 25 mm

2) With high speed de-ionizing cartridge, With air purge

Supply pressure: 0.1 MPa (8.6 L/min [ANR] per cartridge)

- Feedback sensor installation distance: 25 mm

3) With energy saving type de-ionizing cartridge, With air purge

Supply pressure: 0.1 MPa (4.3 L/min [ANR] per cartridge)

- Feedback sensor installation distance: 25 mm

Supply pressure: 0.3 MPa (17.6 L/min [ANR] per cartridge)

- Feedback sensor installation distance: 25 mm

Supply pressure: 0.3 MPa (8.6 L/min [ANR] per cartridge)

- Feedback sensor installation distance: 25 mm

Supply pressure: 0.5 MPa (26.4 L/min [ANR] per cartridge)

- Feedback sensor installation distance: 25 mm

Supply pressure: 0.5 MPa (13.3 L/min [ANR] per cartridge)

- Feedback sensor installation distance: 25 mm

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, STM3.1-2006). Use this as a guideline purpose only for model selection because the value varies depending on the material and/or size of a subject.
IZS42

1) Without air purge

2) With high speed de-ionizing cartridge, With air purge

Supply pressure: 0.1 MPa (8.6 L/min [ANR] per cartridge)

3) With energy saving type de-ionizing cartridge, With air purge

Supply pressure: 0.1 MPa (4.3 L/min [ANR] per cartridge)
IZS40, 41
Frequency: 30 Hz

1) Supply pressure: 0 MPa

2) With high speed de-ionizing cartridge, Supply pressure: 0.3 MPa

3) With energy saving type de-ionizing cartridge, Supply pressure: 0.3 MPa

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, STM3.1-2006). Use this as a guideline purpose only for model selection because the value varies depending on the material and/or size of a subject.
IZS42

Frequency: 30 Hz

1) Supply pressure: 0 MPa

2) With high speed de-ionizing cartridge, Supply pressure: 0.3 MPa

3) With energy saving type de-ionizing cartridge, Supply pressure: 0.3 MPa
IZS40, 41
Supply pressure: 0.3 MPa, Frequency: 30 Hz
With high speed de-ionizing cartridge

IZS42
Supply pressure: 0.3 MPa, Frequency: 30 Hz
With high speed de-ionizing cartridge

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, STM3.1-2006). Use this as a guideline purpose only for model selection because the value varies depending on the material and/or size of a subject.
### Feedback Sensor Detection Range

The relationship between the feedback sensor’s installation distance 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>

*Enlarged view of sensor head*
**Ionizer Series IZS40/41/42**

### How to Order

**Type 40**
- **IZS 40**
  - 1600
  - 10B

**Type 41/42**
- **IZS 42**
  - 1600
  - 10B

**Bar type**
- **Type 41**
  - Feedback sensor type
- **Type 42**
  - Dual AC type

**Electrode cartridge type/Electrode needle material**
- **Symbol**
  - Nil
  - C
  - J
  - K
- **Electrode cartridge type**
  - High speed de-ionizing cartridge
  - Energy saving type de-ionizing cartridge
- **Electrode needle material**
  - Tungsten
  - Silicon

**Input/Output specifications**
- **Symbol**
  - Nil
  - P
  - N
- **Input/Output function**
  - Nil
  - P
  - N
- **Power supply cable**
  - With power supply cable (3 m)
  - With power supply cable (10 m)
  - Without power supply cable

**Sensor**
- **Symbol**
  - Nil
  - F
  - G
- **Sensor**
  - Built-in sensor
  - Feedback sensor
  - Auto balance sensor [High accuracy type]

**Bracket**
- **Symbol**
  - Nil
  - B
- **Bracket**
  - Without bracket
  - With bracket

**Number of brackets**
- **Symbol**
  - 06
  - 08
  - 10
- **Number of brackets**
  - With 2 pcs.
  - With 1 pc.
  - With 3 pcs.

**One-touch fitting**
- **Symbol**
  - Nil
  - P
  - N
- **One-touch fitting**
  - ø6 One-touch fitting
  - ø8 One-touch fitting
  - ø10 One-touch fitting

**Recommended piping port size**
- **Symbol**
  - Nil
  - P
  - N
- **Recommended piping port size**
  - O.D. mm
  - 340
  - 400
  - 460
  - 580
  - 640
  - 820
  - 1120
  - 1300
  - 1600
  - 1900
  - 2320
  - 2500

**Made to Order**

<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>Symbol for producible bar length: 460 + 60 x n (n: Integer from 1 to 34) (For 2, 3, 6, 11, 14, 19, 24, 31 and 34 for n, use a standard model.)</td>
</tr>
</tbody>
</table>

**Ordering example**

**IZS 40**
- 1600
- 10B
- X10

**IZS 42**
- 1600
- 10B
- X10

**Bar length**
- **Type 41**
  - 520
  - 600
  - 670
  - 760
  - 880
  - 940
- **Type 42**
  - 600
  - 940

**Recommended piping port size**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Contents</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>-X14</td>
<td>Model with electrode cartridge drop prevention cover</td>
<td>The main unit is shipped fitted with an electrode cartridge drop prevention cover available as an option.</td>
</tr>
</tbody>
</table>
Specifications

<table>
<thead>
<tr>
<th>Ionizer model</th>
<th>IZS40</th>
<th>IZS41-CG (NPN)</th>
<th>IZS41-CG (PNP)</th>
<th>IZS42-DF (NPN)</th>
<th>IZS42-DF (PNP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ion generation method</td>
<td>Corona discharge type</td>
<td>Corona discharge type</td>
<td>Corona discharge type</td>
<td>Corona discharge type</td>
<td>Corona discharge type</td>
</tr>
<tr>
<td>Method of applying voltage</td>
<td>AC, DC</td>
<td>AC, Sensing AC; DC</td>
<td>Dual AC</td>
<td>Dual AC</td>
<td>Dual AC</td>
</tr>
<tr>
<td>Applied voltage</td>
<td>±7,000 V</td>
<td>±6,000 V</td>
<td>±8,000 V</td>
<td>±8,000 V</td>
<td>±8,000 V</td>
</tr>
<tr>
<td>Ion balance</td>
<td>(Note) Fluid</td>
<td>+30 V</td>
<td>+30 V</td>
<td>+30 V</td>
<td>+30 V</td>
</tr>
<tr>
<td>Air purge</td>
<td>Operating pressure</td>
<td>0.7 MPa</td>
<td>0.7 MPa</td>
<td>0.7 MPa</td>
<td>0.7 MPa</td>
</tr>
<tr>
<td>Current consumption</td>
<td>330 mA or less</td>
<td>440 mA or less (Sensing AC: Manual run; 200 to 2000 mm),</td>
<td>700 mA or less (Automatic run; 200 to 2000 mm)</td>
<td>700 mA or less (Automatic run; 200 to 2000 mm)</td>
<td>700 mA or less (Automatic run; 200 to 2000 mm)</td>
</tr>
<tr>
<td>Power supply voltage</td>
<td>24 VDC ±10% (100 to 240 VAC: AC adapter option)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Power supply voltage in a transition wiring</td>
<td>24 VDC to 26.4 VDC</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Input signal</td>
<td>Discharge stop signal</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Output signal</td>
<td>Maintenance signal</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Error signal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effective de-ionizing distance</td>
<td>50 to 2000 mm</td>
<td>50 to 2000 mm (Sensing AC: mode: 200 to 2000 mm), Manual run: 100 to 2000 mm</td>
<td>50 to 2000 mm</td>
<td>50 to 2000 mm</td>
<td>50 to 2000 mm</td>
</tr>
<tr>
<td>Ambient and fluid temperature</td>
<td>0 to 40°C</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Ambient humidity</td>
<td>35 to 80% Rh (with no condensation)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Material</td>
<td>Ionizer cover: ABS, Electrode cartridge: PBT, Electrode needle: Tungsten, Single crystal silicon</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Impact resistance</td>
<td>100 m/s²</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

Note 1) Varies depending on the operating conditions and environment.
Note 2) Batteries are not supplied.
Note 3) Refer to the operation manual for handling of the remote controller.

Number of electrode cartridges/Bar weight

<table>
<thead>
<tr>
<th>Bar length symbol</th>
<th>340</th>
<th>400</th>
<th>460</th>
<th>580</th>
<th>640</th>
<th>820</th>
<th>1120</th>
<th>1300</th>
<th>1600</th>
<th>1900</th>
<th>2320</th>
<th>2500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of electrode cartridges</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>9</td>
<td>10</td>
<td>13</td>
<td>18</td>
<td>21</td>
<td>26</td>
<td>31</td>
<td>38</td>
<td>41</td>
</tr>
<tr>
<td>Weight (g)</td>
<td>IZS40</td>
<td>590</td>
<td>640</td>
<td>690</td>
<td>790</td>
<td>830</td>
<td>980</td>
<td>1220</td>
<td>1360</td>
<td>1600</td>
<td>1840</td>
<td>2170</td>
</tr>
<tr>
<td></td>
<td>IZS41</td>
<td>740</td>
<td>790</td>
<td>840</td>
<td>940</td>
<td>980</td>
<td>1130</td>
<td>1370</td>
<td>1510</td>
<td>1750</td>
<td>1990</td>
<td>2320</td>
</tr>
<tr>
<td></td>
<td>IZS42</td>
<td>860</td>
<td>910</td>
<td>960</td>
<td>1060</td>
<td>1100</td>
<td>1250</td>
<td>1490</td>
<td>1630</td>
<td>1870</td>
<td>2110</td>
<td>2440</td>
</tr>
</tbody>
</table>

External sensor

<table>
<thead>
<tr>
<th>Sensor model</th>
<th>IZS31-DF (Feedback sensor)</th>
<th>IZS31-DG (Auto balance sensor) [High accuracy type]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
<td>0 to 50°C</td>
<td>—</td>
</tr>
<tr>
<td>Ambient humidity</td>
<td>35 to 80% Rh (with no condensation)</td>
<td>—</td>
</tr>
<tr>
<td>Case material</td>
<td>ABS</td>
<td>ABS, Stainless steel</td>
</tr>
<tr>
<td>Impact resistance</td>
<td>100 m/s²</td>
<td>—</td>
</tr>
<tr>
<td>Weight</td>
<td>200 g (including cable weight)</td>
<td>220 g (including cable weight)</td>
</tr>
<tr>
<td>Installation distance</td>
<td>10 to 50 mm (Recommended)</td>
<td>—</td>
</tr>
<tr>
<td>Standards/Directive</td>
<td>CE, UL, CSA</td>
<td>—</td>
</tr>
</tbody>
</table>

AC adapter (Sold separately)

<table>
<thead>
<tr>
<th>Model</th>
<th>IZF10-CG</th>
<th>IZS41-CG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input voltage</td>
<td>100 VAC to 240 VAC, 50/60 Hz</td>
<td>—</td>
</tr>
<tr>
<td>Output current</td>
<td>1 A</td>
<td>—</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>0 to 40°C</td>
<td>—</td>
</tr>
<tr>
<td>Ambient humidity</td>
<td>35 to 65% Rh (with no condensation)</td>
<td>—</td>
</tr>
<tr>
<td>Weight</td>
<td>220 g</td>
<td>—</td>
</tr>
<tr>
<td>Standards/Directive</td>
<td>CE, UL, CSA</td>
<td>—</td>
</tr>
</tbody>
</table>

Remote controller (Sold separately)

<table>
<thead>
<tr>
<th>Model</th>
<th>IZS41-RC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Infrared ray type</td>
</tr>
<tr>
<td>Transmission capacity</td>
<td>5 m (Note) 1</td>
</tr>
<tr>
<td>Power supply</td>
<td>2 AAA sized batteries (sold separately)</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>0 to 45°C</td>
</tr>
<tr>
<td>Ambient humidity</td>
<td>35 to 80% Rh (with no condensation)</td>
</tr>
<tr>
<td>Weight</td>
<td>33 g (excluding dry cell batteries)</td>
</tr>
<tr>
<td>Standards/Directive</td>
<td>CE</td>
</tr>
</tbody>
</table>

Construction

Series IZS40

Series IZS41/42
Series IZS40/41/42

Accessories (for Individual Parts)

Feedback sensor
IZS31-DF

Auto balance sensor [High accuracy type]
IZS31-DG

Power supply cable
- IZS40-CP (3 m)
- IZS40-CPZ (10 m)
- IZS41-CP (3 m)
- IZS41-CPZ (10 m)

High speed de-ionizing cartridge
- IZS40-NT (Material: Tungsten)
- IZS40-NC (Material: Silicon)

Energy saving type de-ionizing cartridge
- IZS40-NJ (Material: Tungsten)
- IZS40-NK (Material: Silicon)

End bracket/IZS40-BE
Intermediate bracket/IZS40-BM

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

<table>
<thead>
<tr>
<th>Bar length symbol</th>
<th>End bracket</th>
<th>Intermediate bracket</th>
</tr>
</thead>
<tbody>
<tr>
<td>340 to 760</td>
<td>With 2 pcs.</td>
<td>None</td>
</tr>
<tr>
<td>820 to 1600</td>
<td>With 3 pcs.</td>
<td>With 1 pc.</td>
</tr>
<tr>
<td>1660 to 2380</td>
<td>With 2 pcs.</td>
<td>With 2 pcs.</td>
</tr>
<tr>
<td>2440 to 2500</td>
<td>With 3 pcs.</td>
<td></td>
</tr>
</tbody>
</table>

Made to Order

<table>
<thead>
<tr>
<th>How to Order</th>
<th>Power supply cable full length</th>
</tr>
</thead>
<tbody>
<tr>
<td>IZS[ ]-CP[ ]-X13</td>
<td>01 1 m  02 2 m</td>
</tr>
</tbody>
</table>

Model with made-to-order power supply cable
Available in 1 m increments from 1 m to 20 m.
Note 1) Use standard power supply cables for 3 m and 10 m lengths.

Note) Ionizer mounting screws attached, M4 x 8, 2 pcs.
Sold Separately

Electrode cartridge drop prevention cover

**IZS40 - E 3**

- Number of fixed electrode cartridges
  - IZS40-E3: 3
  - IZS40-E4: 4
  - IZS40-E5: 5

- Number of required drop prevention covers

<table>
<thead>
<tr>
<th>Bar length symbol</th>
<th>IZS40-E3</th>
<th>IZS40-E4</th>
<th>IZS40-E5</th>
</tr>
</thead>
<tbody>
<tr>
<td>340</td>
<td>—</td>
<td>—</td>
<td>1</td>
</tr>
<tr>
<td>400</td>
<td>2</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>450</td>
<td>1</td>
<td>1</td>
<td>—</td>
</tr>
<tr>
<td>500</td>
<td>—</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>600</td>
<td>—</td>
<td>—</td>
<td>2</td>
</tr>
<tr>
<td>800</td>
<td>1</td>
<td>—</td>
<td>2</td>
</tr>
<tr>
<td>1100</td>
<td>1</td>
<td>—</td>
<td>3</td>
</tr>
<tr>
<td>1300</td>
<td>2</td>
<td>—</td>
<td>3</td>
</tr>
<tr>
<td>1600</td>
<td>2</td>
<td>—</td>
<td>4</td>
</tr>
<tr>
<td>1900</td>
<td>2</td>
<td>—</td>
<td>5</td>
</tr>
<tr>
<td>2300</td>
<td>1</td>
<td>—</td>
<td>7</td>
</tr>
<tr>
<td>2500</td>
<td>2</td>
<td>—</td>
<td>7</td>
</tr>
</tbody>
</table>

Remote controller/IZS41-RC

AC adapter

**IZF10 - C**

For IZS40

- AC adapter
  - G1: AC adapter + AC cord
  - G2: AC adapter (without AC cord)

For IZS41/42

- AC adapter
  - G1: AC adapter + AC cord
  - G2: AC adapter (without AC cord)

AC adapter + AC cord is only for use in Japan. (Rated voltage 125 V, plug JIS C8303, inlet IEC60320-C8) External input and output cannot be used when the AC adapter is being used.

**Transition wiring cable**

**IZS41 - CF**

- Transition wiring cable
  - G1: Full length 2 m
  - G2: Full length 5 m
  - G3: Full length 8 m

**Made to Order**

How to Order

**IZS41 - CF - X13**

Model with Made-to-order transition wiring cable

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

Note 1) 10 m or longer power cables are not CE Marking-compliant.

Note 2) Use standard power supply cables for 2 m, 5 m and 8 m lengths.

Note 3) Transition wiring is not possible for the IZS40.

Electrode needle cleaning kit/IZS30-M2

Mounted part of electrode cartridge

Electrode cartridge drop prevention cover

When attached to the body
Wire cables according to the circuitry and wiring chart.

1. Grounding of F.G. cable
Make sure to ground the F.G. cable (green) with a resistance of 100 Ω or less. The F.G. cable is used as a reference electric potential for de-ionization. If the ground terminal F.G. is not properly grounded, the ionizer will not achieve the optimal ion balance. Therefore, please connect the ground terminal using a resistance of 100 Ω or less.

2. Connection circuit (“POWER” connector)
Wiring of the IZS40
e-con is adopted for the connector of the IZS40. Connector with cable or without cable may be selected when placing an order for the power supply cable. When only an e-con is required, place an order for it as a part. (Cable is not supplied.)

How to connect the cable of the connector
1) Cut the cable as shown in the figure to the below. Refer to the following table for the applicable wire size.

Applicable wire

<table>
<thead>
<tr>
<th>AWG No.</th>
<th>Conductor cross section mm²</th>
<th>Finish O.D. mm</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>26-24</td>
<td>0.14-0.2</td>
<td>ø0.8-ø1.0</td>
<td>ZS-28-C</td>
</tr>
</tbody>
</table>

2) Insert the cable which was cut into the back of the connector.
3) Confirm that the cable is inserted into the back of the connector and press part A with your finger to hold tentatively.
4) Use a tool such as pliers to firmly tighten the center of Part A.
5) The connector cannot be reused once crimped. If cable insertion fails, use a new connector.

Connection Circuit/IZS40

If cables are prepared by the user, the cable colors shown in the diagram may change according to the cable colors by the user.
### Wiring/IZS41, 42

**Connector housing pin numbers**

<table>
<thead>
<tr>
<th>Pin no.</th>
<th>Cable color</th>
<th>Description</th>
<th>Signal direction</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>Brown</td>
<td>24 VDC</td>
<td>IN</td>
<td>Power supply is connected to operate the ionizer.</td>
</tr>
<tr>
<td>B1</td>
<td>Blue</td>
<td>GND</td>
<td>IN</td>
<td>Make sure to ground with a resistance of 100 Ω or less to use it as a reference electric potential for ionizer.</td>
</tr>
<tr>
<td>A2</td>
<td>Green</td>
<td>F.G.</td>
<td>—</td>
<td>Power supply is connected to operate the ionizer.</td>
</tr>
<tr>
<td>B2</td>
<td>Light green</td>
<td>Discharge stop signal</td>
<td>IN</td>
<td>Signal input to turn ON/OFF the ion discharge.</td>
</tr>
<tr>
<td>A3</td>
<td>Light green</td>
<td>Discharge stop signal</td>
<td>IN</td>
<td>Signal input to turn ON/OFF the ion discharge.</td>
</tr>
<tr>
<td>B3</td>
<td>Light green</td>
<td>Discharge stop signal</td>
<td>IN</td>
<td>Signal input to turn ON/OFF the ion discharge.</td>
</tr>
<tr>
<td>A4</td>
<td>Gray</td>
<td>Electrode contamination detection signal</td>
<td>IN</td>
<td>Input signal when determining the necessity of electrode needle maintenance.</td>
</tr>
<tr>
<td>B4</td>
<td>Yellow</td>
<td>Maintenance signal</td>
<td>OUT(Contact point A)</td>
<td>Turns ON when electrode needs cleaning.</td>
</tr>
<tr>
<td>A5</td>
<td>Purple</td>
<td>Error signal</td>
<td>OUT(Contact point B)</td>
<td>Turns OFF when power supply failure, ion discharge error, connected sensor failure, or CPU operation failure. (ON when there is no problem.)</td>
</tr>
<tr>
<td>B5</td>
<td>White</td>
<td>Unused</td>
<td>—</td>
<td></td>
</tr>
</tbody>
</table>
Wiring Circuit/IZS41, 42

NPN specification

Ionizer (IZS41, 42)

Internal circuit

- Power supply 24 VDC
- GND

+ 24 V
- DC/DC
- GND
- GND

Isolation circuit (Photo coupler)

+ 24 V
- Isolation circuit (Photo coupler)

OUTPUT

- Isolation circuit (Photo coupler)

OUTPUT

- Isolation circuit (Photo coupler)

OUTPUT

- Isolation circuit (Photo coupler)

OUTPUT

Isolation circuit (Photo coupler)

Isolation circuit (Photo coupler)

Isolation circuit (Photo coupler)

Isolation circuit (Photo coupler)

OUTPUT

Yellow
- Maintenance signal

Gray
- Electrode contamination detection signal

Black
- Discharge stop signal

Green F.G.
- Ionizer (IZS41, 42)

Brown (2 pcs.) 24 VDC

Blue (2 pcs.) GND

Light green
- Discharge stop signal

Gray
- Electrode contamination detection signal

Yellow
- Maintenance signal

Purple
- Irregular signal

Shield

NPN specification

Wiring Circuit/IZS41, 42

- Ionizer (IZS41, 42)
- Shield

- Power supply 24 VDC
- GND

+ 24 V
- DC/DC
- GND
- GND

Isolation circuit (Photo coupler)

+ 24 V
- Isolation circuit (Photo coupler)

OUTPUT

- Isolation circuit (Photo coupler)

OUTPUT

- Isolation circuit (Photo coupler)

OUTPUT

- Isolation circuit (Photo coupler)

OUTPUT

- Isolation circuit (Photo coupler)

OUTPUT

Isolation circuit (Photo coupler)

Isolation circuit (Photo coupler)

Isolation circuit (Photo coupler)

Isolation circuit (Photo coupler)

OUTPUT

Yellow
- Maintenance signal

Gray
- Electrode contamination detection signal

Black
- Discharge stop signal

Green F.G.
- Ionizer (IZS41, 42)

Brown (2 pcs.) 24 VDC

Blue (2 pcs.) GND

Light green
Ionizer Series IZS40/41/42

Dimensions

Ionizer/IZS40

End bracket/IZS40-BE

Intermediate bracket/IZS40-BM

n (Number of electrode cartridges), L Dimension

<table>
<thead>
<tr>
<th>Part no.</th>
<th>n</th>
<th>L (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IZS40-340</td>
<td>5</td>
<td>340</td>
</tr>
<tr>
<td>IZS40-400</td>
<td>6</td>
<td>400</td>
</tr>
<tr>
<td>IZS40-460</td>
<td>7</td>
<td>460</td>
</tr>
<tr>
<td>IZS40-580</td>
<td>9</td>
<td>580</td>
</tr>
<tr>
<td>IZS40-640</td>
<td>10</td>
<td>640</td>
</tr>
<tr>
<td>IZS40-820</td>
<td>13</td>
<td>820</td>
</tr>
<tr>
<td>IZS40-1120</td>
<td>18</td>
<td>1120</td>
</tr>
<tr>
<td>IZS40-1300</td>
<td>21</td>
<td>1300</td>
</tr>
<tr>
<td>IZS40-1600</td>
<td>26</td>
<td>1600</td>
</tr>
<tr>
<td>IZS40-1900</td>
<td>31</td>
<td>1900</td>
</tr>
<tr>
<td>IZS40-2320</td>
<td>38</td>
<td>2320</td>
</tr>
<tr>
<td>IZS40-2500</td>
<td>41</td>
<td>2500</td>
</tr>
</tbody>
</table>

Applicable tube O.D. A

<table>
<thead>
<tr>
<th>O.D.</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>06</td>
<td>13</td>
</tr>
<tr>
<td>08</td>
<td>15</td>
</tr>
<tr>
<td>10</td>
<td>22</td>
</tr>
</tbody>
</table>
**Series IZS40/41/42**

**Dimensions**

**Ionizer/IZS41, 42**

<table>
<thead>
<tr>
<th>Applicable tube O.D.</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>06</td>
<td>13</td>
</tr>
<tr>
<td>08</td>
<td>15</td>
</tr>
<tr>
<td>10</td>
<td>22</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Part no.</th>
<th>n (Number of electrode cartridges), L Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>IZS4...-340</td>
<td>5</td>
</tr>
<tr>
<td>IZS4...-400</td>
<td>6</td>
</tr>
<tr>
<td>IZS4...-460</td>
<td>7</td>
</tr>
<tr>
<td>IZS4...-580</td>
<td>9</td>
</tr>
<tr>
<td>IZS4...-640</td>
<td>10</td>
</tr>
<tr>
<td>IZS4...-820</td>
<td>13</td>
</tr>
<tr>
<td>IZS4...-1120</td>
<td>18</td>
</tr>
<tr>
<td>IZS4...-1300</td>
<td>21</td>
</tr>
<tr>
<td>IZS4...-1600</td>
<td>26</td>
</tr>
<tr>
<td>IZS4...-1900</td>
<td>31</td>
</tr>
<tr>
<td>IZS4...-2320</td>
<td>38</td>
</tr>
<tr>
<td>IZS4...-2500</td>
<td>41</td>
</tr>
</tbody>
</table>

**End bracket/IZS40-BE**

**Intermediate bracket/IZS40-BM**
**Dimensions**

**Feedback sensor/IZS31-DF**

[Diagram of Feedback sensor/IZS31-DF]

**Auto balance sensor [High accuracy type]/IZS31-DG**

[Diagram of Auto balance sensor [High accuracy type]/IZS31-DG]

**Power supply cable**

<table>
<thead>
<tr>
<th>Part no.</th>
<th>L (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IZS40-CP</td>
<td>3000</td>
</tr>
<tr>
<td>IZS41-CP</td>
<td>9800</td>
</tr>
<tr>
<td>IZS40-CPZ</td>
<td></td>
</tr>
<tr>
<td>IZS41-CPZ</td>
<td></td>
</tr>
</tbody>
</table>
## Dimensions

### Remote controller

![Remote controller diagram](image)

### Transition wiring cable/IZS41-CF

![Transition wiring cable diagram](image)

<table>
<thead>
<tr>
<th>Part no.</th>
<th>L (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IZF41-CF02</td>
<td>2000</td>
</tr>
<tr>
<td>IZF41-CF05</td>
<td>5000</td>
</tr>
<tr>
<td>IZF41-CF08</td>
<td>8000</td>
</tr>
</tbody>
</table>
## 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
- **Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

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

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

### 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, combustion 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 interlock 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/Compliance Requirements

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

Read and accept them before using the product.

### Limited warranty and Disclaimer

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

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

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

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

4) Vacuum pads are excluded from this 1 year warranty.

A vacuum pad is a consumable part, so it is warranted for a year after it is delivered. Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

### Compliance Requirements

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

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

### Safety Instructions

Be sure to read “Handling Precautions for SMC Products” (M-E03-3) before using.
Specific Product Precautions 1

Be sure to read this before handling.

### Caution

1. **Selection**
   - **Clean specification is not available with this product.**
     - This product is not washed. When bringing into a clean room, flush for several minutes and confirm the required cleanliness before using. A minute amount of particles are generated due to wearing of the electrodes while the ionizer is operating.

2. **Warning**
   - **Mounting**
     - **3. Install the product so that the entire bar does not have an excessive deflection.**
       - For a bar length of 820 mm or more, support the bar at both ends and in the middle by using brackets (IZS40-BM). If the bar is held only at the both ends, self-weight of the bar causes deflection, resulting in damage to the bar.

3. **Warning**
   - **Mounting**
     - **4. 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. **Warning**
   - **Mounting**
     - **5. Observe the tightening torque requirements when installing the ionizer.**
       - 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. Refer to the operation manual for details.

5. **Warning**
   - **Mounting**
     - **6. 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.

### Warning

1. **Selection**
   - **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 on page 18), please consult SMC beforehand.

2. **Selection**
   - **2. Use this product within the specified voltage and temperature range.**
     - Using outside of the specified voltage can cause a malfunction, damage, electrical shock, or fire.

3. **Selection**
   - **3. Use clean compressed air as fluid. (Air quality Class 2.6.3 specified in ISO 8573-1: 2001 is recommended.)**
     - This product is not explosion proof. Never use a flammable 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. **Selection**
   - **3. Use clean compressed air as fluid. (Air quality Class 2.6.3 specified in ISO 8573-1: 2001 is recommended.)**
     - This product is not explosion proof. Never use a flammable 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.

5. **Selection**
   - **3. Use clean compressed air as fluid. (Air quality Class 2.6.3 specified in ISO 8573-1: 2001 is recommended.)**
     - This product is not explosion proof. Never use a flammable 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.

### Caution

1. **Selection**
   - **1. Clean specification is not available with this product.**
     - This product is not washed. When bringing into a clean room, flush for several minutes and confirm the required cleanliness before using. A minute amount of particles are generated due to wearing of the electrodes while the ionizer is operating.

2. **Mounting**
   - **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.

3. **Mounting**
   - **1. Mount this product on a plane surface.**
     - If there are irregularities, cracks or height differences, excessive stress will be applied to the housing or brackets, resulting in damage or other trouble. Also, do not drop or apply a strong shock. Otherwise, damage or an accident can occur. Also, do not drop or apply a strong shock. Otherwise, damage 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.

### Warning

1. **Selection**
   - **1. Clean specification is not available with this product.**
     - This product is not washed. When bringing into a clean room, flush for several minutes and confirm the required cleanliness before using. A minute amount of particles are generated due to wearing of the electrodes while the ionizer is operating.

2. **Warning**
   - **Mounting**
     - **7. 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.

3. **Warning**
   - **Mounting**
     - **8. Installation should be conducted after turning off the power supply.**

### Caution

1. **Selection**
   - **1. Clean specification is not available with this product.**
     - This product is not washed. When bringing into a clean room, flush for several minutes and confirm the required cleanliness before using. A minute amount of particles are generated due to wearing of the electrodes while the ionizer is operating.

2. **Warning**
   - **Mounting**
     - **3. Install the product so that the entire bar does not have an excessive deflection.**
       - For a bar length of 820 mm or more, support the bar at both ends and in the middle by using brackets (IZS40-BM). If the bar is held only at the both ends, self-weight of the bar causes deflection, resulting in damage to the bar.

3. **Warning**
   - **Mounting**
     - **4. 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. **Warning**
   - **Mounting**
     - **5. Observe the tightening torque requirements when installing the ionizer.**
       - 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. Refer to the operation manual for details.

5. **Warning**
   - **Mounting**
     - **6. 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.

### Unit: mm

- **Sensor cable:** 25 mm
- **Transition wiring cable:** 38 mm
- **Power supply cable:** 38 mm

---

**Series IZS40/41/42**

---

**Warning**

- **8. Installation should be conducted after turning off the power supply.**

---

**Caution**

- **1. Install the IZS4□ series 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.
Warning
1. Confirm that the power supply voltage is enough and that it is within the specifications before wiring.
2. 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.
3. To maintain the product performance, ground the product with an earth ground cable with a resistance of 100 \( \Omega \) or less according to this manual.
4. Be sure to turn off the power supply before wiring (including attachment/detachment of the connector).
5. To connect a feedback sensor or auto balance sensor to the ionizer, use the cable included with the sensor. Do not disassemble or modify the ionizer.
6. When applying the power supply, pay special attention to the wiring and/or surrounding environment until the safety is confirmed.
7. Do not connect or remove any connectors including the power supply, while power is being supplied. Otherwise, the ionizer may malfunction.
8. 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.
9. Be sure to confirm that there are no wiring errors before starting this product. Faulty wiring will lead to product damage or malfunction.
10. Flush the piping before using. Before piping this product, exercise caution to prevent particles, water drops, or oil contents from entering the piping.

Warning
11. Transition wiring of ionizer
For transition wiring of ionizers, use a transition wiring cable for connection between ionizers. Use a power supply cable for connection between ionizer and power supply or external equipment. (Transition wiring is not possible with the IZS40.) The number of ionizers that may be connected using transition wiring varies depending on the power supply cable; the length of the transition wiring cable; the use of external sensor(s) and/or models. Refer to the table shown below “Connectable number of ionizers with transition wiring”.

The IZS41 and IZS42 can be connected in the same transition wiring, but mixed wiring of the NPN and PNP I/O specifications is not possible. Please contact SMC when connecting conditions other than specified in the table below are applied.

<table>
<thead>
<tr>
<th>Bar length symbol</th>
<th>Power supply cable length: 3 m</th>
<th>Power supply cable length: 10 m</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>10</td>
<td>11</td>
<td>12</td>
</tr>
</tbody>
</table>

It is recommended that the power supply used to operate the ionizers have a current capacity twice that of the total current consumption of the ionizers to be used. Power supply voltage should be from 24 to 26.4 VDC.

AC adapter must not be used when ionizer is used in a transition wiring. When ionizers are connected with transition wiring, the same input signal serves as input to all the ionizers. When a signal is output from at least one ionizer in the connection, the signal will be output from the power supply cable.

Connect the power supply cable to the “POWER” connector of the 1st ionizer, and connect the “LINK” connector of the 1st ionizer to the “POWER” connector of the 2nd ionizer with a transition wiring cable. Follow the same procedure to connect subsequent ionizer(s) and after with transition wiring cables.

Transition wiring cable: LINK for the 1st ionizer → POWER for the 2nd ionizer
Power supply cable: → POWER for the 1st ionizer

Mounting

Caution
2. 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.
3. When installing the IZS41 or IZS42 in proximity with an ionizer which operates in DC mode, they should be positioned at least 2 meters away from each other. When using the IZS41 or IZS42 near the ionizer in DC mode, keep clearance of at least 2 m between them. Ion balance may not be adjusted by the internal sensor due to the ions which are discharged from the DC mode ionizer.
**Warning**

1. Observe the fluid temperature and ambient temperature range.
   Fluid temperature and ambient temperature ranges are: 0 to 40°C for ionizer, 0 to 50°C for feedback sensor and auto balance sensor (high accuracy type), 0 to 40°C for AC adapter, and 0 to 45°C for remote controller. Do not use the sensor in locations where the temperature may change suddenly even if the ambient temperature range is within the specified limits, resulting in condensation.
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 humidity range.
   b. Avoid using in a place that exceeds an ambient heat range.
   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, blow 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 main body.
   n. Avoid using in a place where there is a force large enough to deform this product or weight is applied to the product.

4. Do not use an air containing mist or dust.
   The air containing mist or dust will cause the performance to decrease and shorten the maintenance cycle. Install a dryer (IDF series), air filter (AF/AFF series), and/or mist separator (AFM/AM series) to obtain clean compressed air (air quality of Class 2.6.3 or higher according to ISO 8573-1:2001 is recommended for operation).

5. Ionizer, feedback sensor, auto balance sensor, remote controller, and AC adapter are not resistant to lightning surge.

**Warning**

1. When cleaning the electrode needle or replacing the electrode cartridge, be sure to turn off the power supply or air supply to the body.
   Touching an electrode needle when it is electrified may result in electric shock or other accidents. If the electrodes are touched while the product is energized, this may cause an electric shock or accident. If an attempt to replace the cartridges is performed before removing air supply, the cartridges may eject unexpectedly due to presence of the supply air. Remove air supply before replacing the cartridges. If cartridges are not securely mounted to the bar, they may eject or release when air is supplied to the product. Securely mount or remove the cartridges referencing the instructions shown below.

2. When mounting/dismounting the cable, use your finger to pinch the claw of the plug, then attach/detach it correctly.
   If the modular plug is at a difficult angle to attach/detach, the jack’s mounting section may be damaged and cause a disorder.

**Caution**

1. Do not drop, bump or apply excessive impact (100 m/s² or more) while handling.
   Even though it does not appear to be damaged, the internal parts may be damaged and cause a malfunction.
2. When installing the product, handle the product so that no moment is applied to the controller and the ends of the bar.
   Handling the product by holding either end of the bar may cause damage to the product.
3. When mounting/dismounting the cable, use your finger to pinch the claw of the plug, then attach/detach it correctly.
   If the modular plug is at a difficult angle to attach/detach, the jack's mounting section may be damaged and cause a disorder.

**Maintenance**

3. Perform the detection procedure in the absence of workpieces. (IZS41, 42)
4. 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.
5. Do not operate this product with wet hands.
   Otherwise, an electrical shock or accident may occur.

**Handling**

1. Periodically inspect the ionizer and clean the electrode needles.
   Periodically inspect the electrostatic sensor to check if it is operated while being out of order. Only a person having an adequate knowledge and experience about the system is allowed to inspect the sensor. If particles attach to the electrode needle by using for long periods of time, the static electricity eliminating performance will be lowered. 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 will be lowered.
   If the modular plug is at a difficult angle to attach/detach, the jack's mounting section may be damaged and cause a disorder.

2. If the detection sensor, feedback sensor, auto balance sensor, remote controller, and AC adapter are not resistant to lightning surge.

**Danger High Voltage**

This product contains a high voltage generation circuit. When performing maintenance inspection, be sure to confirm that the power supply to the ionizer is turned off. Never disassemble or modify the ionizer, as this may not only impair the product’s functionality but could cause an electric shock or electric leakage.

**Operating Environment/Storage Environment**

### Series IZS40/41/42

**Specific Product Precautions 3**

Be sure to read this before handling.
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. **Digital Flow Switch/Series PF2A**
   - Decreases the air consumption by flow control.

3. **Mist Separator/Series AFM**
   - Eliminates oil mist which is difficult to eliminate with an air filter.

4. **2-Color Display Digital Flow Switch/Series PFM**

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

6. **Digital Pressure Switch/Series ISE30A**
   - The pressure control prevents the ability of static electricity removal from being reduced in accordance with the reduction of air pressure.

7. **2 Port Solenoid Valve/Series VX**
   - Pilot Type 2 Port Solenoid Valve for Dry Air/Series VQ

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
   - Hollow fiber elements with over 99.99% filtering efficiency do not contaminate work pieces.
## Ionizer Series Variations

### Ionizer/Nozzle type Series IZN10

Dust removal and static electricity elimination by air blow
- Eliminates dust clinging to lamp cover.

![Removing dust from lamp cover](image)

**Ion balance ±10 V** (in case of energy saving static electricity elimination nozzle)

**Slim design: Thickness dimension 16 mm**

1. **Electrode needle contamination detector**
   - Outputs maintenance signal when detects stain or wear of an electrode needle always.
   - Detects optimal maintenance time, reduced labor for maintenance.

2. **Built-in power supply substrate**
   - High-voltage power supply cable/external high-voltage power supply are unnecessary.

### Ionizer/Fan type Series IZF10

**Compact fan type with simple functions**
- **Compact design:** 80 x 110 x 39 mm
- **Weight:** 280 g
- 2 types of fans available
  - Static electricity elimination time: 1.5 seconds
    - (When eliminating static electricity from 1000 V to 100 V at a distance of 300 mm from the workpiece)
  - Low-noise fan: 48 dB (A) (Measured at a distance of 300 mm from the workpiece)
- Rapid static electricity eliminating fan: 57 dB (A)

**Ion balance:** ±13 V
- Based on ANSI/ESD-STM3.1-2006 standards
- With alarm function
- High-voltage error, electrode needle contamination detector

### 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”.
- Potential measurement: ±20 kV (detected at a 50 mm distance)
  - ±0.4 kV (detected at a 25 mm distance)
- Detects the electrostatic potential and outputs in an analog voltage.
  - Output voltage: 1 to 5 V (Output impedance: Approx. 100 Ω)
- Broadens your coverage of electrostatic potential measurement applications.

**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 (±20 kV)
- Display accuracy: ±0.5% F.S. ±1 digit or less
- Detection distance correction function (adjustable in 1 mm increments)
- Supports two types of sensors (±0.4 kV and ±20 kV) through range selection.

### 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**
- Measurement range: ±20.0 kV
- Minimum display unit: 0.1 kV (±1.0 to ±20.0 kV)
  - 0.01 kV (0 to ±0.99 kV)
- Compact and lightweight: 85 g (excluding dry cell batteries)

- backlight for reading in the dark
- LOW battery indicator
- Peak/BOT value indication
- Zero-clear function
- Auto power-off function

---

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Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.
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]
  - Rapid elimination of static electricity by a feedback sensor: 0.3 seconds

**Conditions**
- 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)

Continuous emissions of ions in accordance with the polarity applied to the workpiece.

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

**Table:**

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Static electricity elimination time (sec)</th>
</tr>
</thead>
<tbody>
<tr>
<td>With sensor</td>
<td>20</td>
</tr>
<tr>
<td>Without sensor</td>
<td>30</td>
</tr>
</tbody>
</table>

**Graph:**

- Installation height of sensor: 10 mm
- Static electricity elimination time (sec)
- Installation distance (mm)

With sensor: Decreases static buildup to 100 V from 1000 V in 0.3 seconds.

New

RoHS

Controlled ion balance by sensor

Series IZS31
Feedback sensor / Rapid elimination of static electricity

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

**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.

**Features**
- **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.
- **Note**: The pneumatic valve must be separately procured.
- **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.

---

**Graphs**
- Charged voltage vs. Time
- Static electricity elimination time vs. Installation distance

---

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

**Installation height of sensor**: 10 mm
**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]
**New**
- 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.

- **Ion balance**

---

**Features 2**
Electrode cartridge variations

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

  [Electrode cartridge with rapid elimination of static electricity]
  - Air supply
  - Reducing static electricity elimination time by high-speed air purge

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

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

  [Electrode cartridge with low maintenance]
  - Air supply
  - Air covers the electrode needle.

  • Stain on electrode needle is reduced by compressed air.

  • New

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

Electrode cartridge with low maintenance
Reduces stain on electrode needle.

Conventional needle
Needs regular maintenance.
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

This reduces the range of surface potential fluctuations for short installation distances after static electricity elimination.
Note) The range of surface potential fluctuations varies depending on the object’s material, etc.

Applicable to purge pressure of 0.7 MPa
Air purge: Yes, With sensor: 1 Hz/60 Hz

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.

Safety functions
- Electrode cartridge drop prevention
  Locking by double-action

■ 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>460, 540, 700, 860, 940, 1020, 1180, 1340, 1420, 1580, 1660, 1740, 1820, 1980, 2060, 2140, 2220</td>
</tr>
<tr>
<td>X14</td>
<td>Model with electrode cartridge security cover</td>
<td>The main unit is shipped fitted with an electrode cartridge security cover available as an option.</td>
</tr>
<tr>
<td>X15</td>
<td>Model with 40 mm-pitch electrode cartridges</td>
<td>This model comes fitted with electrode cartridges arranged at a 40 mm-pitch. (Standard pitch: 80 mm)</td>
</tr>
<tr>
<td></td>
<td>Model with 80 mm-pitch electrode cartridges</td>
<td>Note) Maximum bar length is 1260 mm. The air purge nozzles are arranged at an 80 mm-pitch.</td>
</tr>
<tr>
<td>X210</td>
<td>High-voltage/control unit detachable short type</td>
<td>A short type ionizer (full length of 180 mm and 220 mm) can be installed in a small space.</td>
</tr>
<tr>
<td></td>
<td>Model with 80 mm-pitch electrode cartridges</td>
<td>The high-voltage unit (ionizing unit) and control unit are detachable from each other.</td>
</tr>
<tr>
<td></td>
<td>Model with 40 mm-pitch electrode cartridges</td>
<td>The distance between them also optional according to the length of selected connection cables.</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>
</tbody>
</table>

**AC adapter**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Contents</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<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

**Sensor**

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

**Electrode cartridge**

- Electrode cartridge with rapid elimination of static electricity
- Electrode cartridge with low maintenance

- Electrode needle material
  - Tungsten
  - Silicon
  - Stainless steel

---

Features 5
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 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 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 on a glass substrate
- Prevents breakage due to adhesion and discharge.
- Prevents adhesion of dust.
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

<table>
<thead>
<tr>
<th>Air purge: No</th>
<th>Installation height of sensor: 10 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Static Electricity Elimination Characteristics</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Series IZS31</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Technical Data 1</strong></td>
<td></td>
</tr>
</tbody>
</table>

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.

Supply pressure:
- 0.02 MPa (1 l/min (ANR) per nozzle)
- 0.05 MPa (3.5 l/min (ANR) per nozzle)
- 0.1 MPa (7 l/min (ANR) per nozzle)
- 0.3 MPa (14 l/min (ANR) per nozzle)
- 0.5 MPa (20 l/min (ANR) per nozzle)
- 0.7 MPa (30 l/min (ANR) per nozzle)

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

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

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)

Supply pressure: 0.7 MPa (30 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.
**Series IZS31**

**Technical Data 2**

### Static Electricity Elimination Characteristics

**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)**

---

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.

---

Static Electricity Elimination Characteristics

---

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

---

Air purge: Yes (0.1 MPa)

---

Ionizer

Feedback sensor

Charged plate

**Installation height of feedback sensor**

---

Catalog specification value: ±30 V
Sensor head
Detection hole
Sensor head
Detection hole
Sensor head
Detection range
Installation distance
45
100
180
Installation distance
10
25
50

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>

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

Sensor Monitor Output (When feedback sensor is used)
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.
Ionizer

Series IZS31

How to Order

Ionizer

IZS31 - 780

Bar length

Bar type

Symbol

300
380
620
780
1100
1260
1500
1900
2300

Symbol

01
02
19
20

Contents

Contents

X10
X14
X15
X210
X211

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 Model with 40 mm-pitch electrode cartridges

Specifications

Specifications

460, 540, 700, 860, 940, 1020, 1180, 1340, 1420, 1580, 1660, 1740, 1820, 1980, 2060, 2140, 2220

Electrode cartridge type / Electrode needle material

Electrode cartridge type / Electrode needle material

electrode cartridge type

Nil
C
S
J
K

Electrode needle material

Tungsten
Silicon
Stainless steel
Tungsten
Silicon

Electrode cartridge type / Electrode needle material

Electrode cartridge type / Electrode needle material

electrode cartridge type

Nil
E
F
G

Electrode needle material

Tungsten
Silicon
Stainless steel
Tungsten
Silicon

Output

Output

Nil
P

NPN output

NPN output

Sensor

Sensor

Refer to the below table.

Refer to the below table.

Without sensor
Autobalance sensor [Body-mounting type]*
With feedback sensor
Autobalance sensor [High-precision type]

Bracket

Bracket

(End bracket, Center bracket)

Without bracket
With bracket (Note)

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

Number of brackets

Number of brackets

Bar length (mm)

Bar length (mm)

End bracket

Center bracket

300, 380, 620, 780
1100, 1260, 1500
1900, 2300

With 2 pcs.
With 1 pc.

Non-standard power supply cable length

Non-standard power supply cable length

How to Order

How to Order

IZS31 - CP - X13

Power supply cable full length

Power supply cable full length

Symbol

01
02
19
20

Cable full length

1 m
2 m
19 m
20 m

IZS31 - F - X196

Applicable output specifications

Applicable output specifications

Nil
P

NPN specification
PNP specification

Ionizer driving AC adapter (100 to 240 VAC)

Ionizer driving AC adapter (100 to 240 VAC)

How to Order

How to Order

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.

Individual Special Order

Individual Special Order

(Please contact an SMC sales representative.)

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.
**Accessories**

### Feedback sensor
IZS31-DF

- **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)

### Autobalance sensor
IZS31-DG

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

### Autobalance sensor
IZS31-DG

- **Feedback sensor**
  - IZS31-DF

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

- **Sensor bracket**
  - IZS31-BL
    - Provided with 2 hexagon socket head cap screw for sensor bracket (2 pcs.)

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

### Center bracket
IZS31-BM

- **Center bracket**
  - IZS31-BM
    - Provided with 2 hexagon socket head cap screw for sensor bracket (2 pcs.)

### End bracket
IZS31-BE

- **End bracket**
  - IZS31-BE
    - Provided with 2 hexagon socket head cap screw M4 x 6 (4 pcs.)

### Accessories

**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.

<table>
<thead>
<tr>
<th>Bar length (mm)</th>
<th>Quantity</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 pcs.</td>
<td></td>
</tr>
<tr>
<td>1900, 2300</td>
<td>With 2 pcs.</td>
<td></td>
</tr>
</tbody>
</table>

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

Ionizer Series IZS31
Series IZS31

Options

Electrode cartridge security cover

IZS31 — E 3

<table>
<thead>
<tr>
<th>Number of fixed electrode cartridges</th>
</tr>
</thead>
<tbody>
<tr>
<td>IZS31-E3</td>
</tr>
<tr>
<td>IZS31-E4</td>
</tr>
<tr>
<td>IZS31-E5</td>
</tr>
</tbody>
</table>

Number of required security covers

<table>
<thead>
<tr>
<th>Bar length (mm)</th>
<th>Number of required security covers</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>1</td>
</tr>
<tr>
<td>380</td>
<td>1</td>
</tr>
<tr>
<td>620</td>
<td>3</td>
</tr>
<tr>
<td>780</td>
<td>1</td>
</tr>
<tr>
<td>1100</td>
<td>3</td>
</tr>
<tr>
<td>1260</td>
<td>1</td>
</tr>
<tr>
<td>1500</td>
<td>1</td>
</tr>
<tr>
<td>1900</td>
<td>1</td>
</tr>
<tr>
<td>2300</td>
<td>1</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

Electrode cartridge security cover

When attached to the body

Screwdriver for ion balance adjustment trimmer / IZS30-M1

Electrode needle cleaning kit / IZS30-M2
Specifications

<table>
<thead>
<tr>
<th>Ion generation method</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>Ion generation method</td>
<td>Corona discharge type</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>≤30 V (Stainless steel electrode needle: ±100 V)</td>
<td>≤30 V (Stainless steel electrode needle: ±100 V)</td>
</tr>
<tr>
<td>Ion balance (Note 1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air purge</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply voltage</td>
<td>24 VDC ≤10%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current consumption</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC mode</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage output</td>
<td>Voltage output 1 to 5 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input signal</td>
<td>Connected to GND (Voltage: 5 VDC or less, Current consumption: 5 mA or less)</td>
<td>Connected to +24 V (Voltage: Between 19 VDC and power supply voltage, Current consumption: 5 mA or less)</td>
<td></td>
</tr>
<tr>
<td>Output signal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC mode</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage output</td>
<td>Voltage output 1 to 5 V</td>
<td></td>
<td></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>
<td></td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>0 to 50°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient humidity</td>
<td>35 to 85% Rh (No condensation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material</td>
<td>Cover of ionizer: ABS, Electrode needle: Tungsten, Monocrystal silicon, Stainless steel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration resistance</td>
<td>Durability 50 Hz Amplitude 1 mm XYZ each 2 hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shock resistance</td>
<td>10 G</td>
<td></td>
<td></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>Description</th>
<th>No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ionizer</td>
<td>1</td>
<td>Power supply cable</td>
</tr>
<tr>
<td>Electrode cartridge</td>
<td>2</td>
<td>Autobalance sensor [High-precision type]</td>
</tr>
<tr>
<td>One-touch fitting</td>
<td>3</td>
<td>Power supply cable</td>
</tr>
<tr>
<td>End bracket</td>
<td>4</td>
<td>Autobalance sensor [Body-mounting type]</td>
</tr>
<tr>
<td>Center bracket</td>
<td>5</td>
<td>Power supply cable</td>
</tr>
<tr>
<td>Feedback sensor</td>
<td>6</td>
<td>Power supply cable</td>
</tr>
<tr>
<td>Autobalance sensor [High-precision type]</td>
<td>7</td>
<td>Power supply cable</td>
</tr>
<tr>
<td>Power supply cable</td>
<td>8</td>
<td>Power supply cable</td>
</tr>
<tr>
<td>Autobalance sensor [Body-mounting type]</td>
<td>9</td>
<td>Power supply cable</td>
</tr>
<tr>
<td>Connection cable A (12P)</td>
<td>10</td>
<td>Power supply cable</td>
</tr>
<tr>
<td>Connection cable B (6P)</td>
<td>11</td>
<td>Power supply cable</td>
</tr>
<tr>
<td>Sensor bracket</td>
<td>12</td>
<td>Power supply cable</td>
</tr>
</tbody>
</table>

Ionizer Series IZS31

When mounting on the body

Ionizer model

IZS31-DF (Feedback sensor)
IZS31-DG (Autobalance sensor [High-precision type])
IZS31-DE (Autobalance sensor [Body-mounting type])
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 static electricity elimination time is reduced by detecting the workpiece’s charge condition with a feedback sensor which feeds the data back to the ionizer and causes ions with the polarity best suited for static electricity elimination to emit. The static electricity elimination completion signal turns off when the workpiece’s electrostatic potential falls within ±30 V. Note
This mode is suited for eliminating static electricity from heavily charged workpieces.
Either “Energy Saving Run” or “Continuous Static Electricity Elimination Run” can be selected depending on the ionizer’s operation after static electricity elimination is completed.

| Energy saving run | The ionizer stops discharging automatically after the of static electricity elimination is completed. It resumes discharging when the workpiece’s electrostatic potential exceeds ±30 V. Note
For static electricity elimination from conductive workpieces, “Energy Saving Run” is recommended. |
| Continuous static electricity elimination run | Even after the completion of static electricity elimination, this method continues to eliminate static electricity using DC pulses while controlling the ion balance, so that the workpiece’s electrostatic potential falls within ±30 V. Note
For static electricity elimination from nonconductive workpieces, “Continuous Static Electricity Elimination Run” is recommended. |

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

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

● When an autobalance sensor (high-precision type) is used.
When an autobalance sensor is used, the ionizer automatically adjusts the ion balance to within ±30 V.
If the ion balance exceeds ±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.

| 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. |

● 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>Functionality differs depending on the run mode. Refer to “Model Selection and Settings” on page 13, 17, 20.</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>Functionality differs depending on the run mode. Refer to “Model Selection and Settings” on page 13, 17, 20.</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>Functionality differs depending on the run mode. Refer to “Model Selection and Settings” on page 11, 15, 16, 19.</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>
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.

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>Energy saving run</td>
<td>+ ion Stop</td>
</tr>
<tr>
<td>Automatic stops emits electricity even after static electricity elimination is completed.</td>
<td></td>
</tr>
<tr>
<td>Continuous static electricity elimination run</td>
<td>+ ion Pulse operation</td>
</tr>
<tr>
<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>
<td>0–1 Hz</td>
</tr>
<tr>
<td>(Example) Charged object workpiece: negative electric charge</td>
<td></td>
</tr>
<tr>
<td>Static electricity elimination completion</td>
<td></td>
</tr>
<tr>
<td>1–3 Hz</td>
<td></td>
</tr>
<tr>
<td>2–5 Hz</td>
<td></td>
</tr>
<tr>
<td>3–10 Hz</td>
<td></td>
</tr>
<tr>
<td>4–15 Hz</td>
<td></td>
</tr>
<tr>
<td>5–20 Hz</td>
<td></td>
</tr>
<tr>
<td>6–30 Hz</td>
<td></td>
</tr>
<tr>
<td>7–60 Hz</td>
<td></td>
</tr>
</tbody>
</table>
Model Selection and Settings 1 / Sensing DC Mode

6) 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 supply</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>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.

### 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</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(NPN spec.) Turned to the run mode when connected to DC2 (−). [Black]</td>
</tr>
<tr>
<td></td>
<td></td>
<td></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>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>

○: 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.

<table>
<thead>
<tr>
<th>LED</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>POWER</td>
<td>MAIN illuminate when power is supplied. (Dark green) (Flashes when the power supply is irregular.)</td>
</tr>
<tr>
<td></td>
<td>SNSR illuminate 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>ION</td>
<td>+ illuminate when the workpiece is positively charged. (Orange)</td>
</tr>
<tr>
<td></td>
<td>OK illuminate when the workpiece electrostatic potential is low. (Dark green)</td>
</tr>
<tr>
<td></td>
<td>– illuminate 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 Static electricity elimination completion</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></td>
<td></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>ALARM</td>
<td>HV illuminate when an abnormal current flows through an electrode needle. (Red)</td>
</tr>
<tr>
<td></td>
<td>SNSR illuminate when the feedback sensor is not operating normally. (Red)</td>
</tr>
<tr>
<td></td>
<td>NDL CHECK illuminate when the electrode needle contamination is detected. (Red)</td>
</tr>
<tr>
<td></td>
<td>(Flashes while the contamination is being detected.)</td>
</tr>
</tbody>
</table>
### 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

#### Timings 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</td>
<td>Input ON</td>
<td>OFF</td>
</tr>
<tr>
<td>Discharge stop signal (IN1)</td>
<td>Input ON</td>
<td>OFF</td>
</tr>
<tr>
<td>Static electricity elimination completion signal (OUT1)</td>
<td>Output ON</td>
<td>OFF</td>
</tr>
<tr>
<td>Sensor monitor output (OUT4)</td>
<td>Output ON</td>
<td>OFF</td>
</tr>
<tr>
<td>Indication of electric charge (ION LED)</td>
<td>LED ON</td>
<td>OFF</td>
</tr>
</tbody>
</table>

#### Timings chart when the electrode needle contamination is detected.

<table>
<thead>
<tr>
<th>Power supply 24 VDC</th>
<th>Input ON</th>
<th>OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discharge stop signal (IN1)</td>
<td>Input ON</td>
<td>OFF</td>
</tr>
<tr>
<td>Static electricity elimination completion signal (OUT1)</td>
<td>Output ON</td>
<td>OFF</td>
</tr>
<tr>
<td>Maintenance start signal (IN2)</td>
<td>Input ON</td>
<td>OFF</td>
</tr>
<tr>
<td>Maintenance output signal (OUT2)</td>
<td>Output ON</td>
<td>OFF</td>
</tr>
<tr>
<td>Maintenance indicator (NDL CHECK ALARM)</td>
<td>LED ON</td>
<td>OFF</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.
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 autobalance sensor is</td>
<td></td>
</tr>
<tr>
<td>removed, adjust the ion balance manually 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>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual run</td>
<td>When a maintenance start signal is input or the ionizer is turned on, this</td>
</tr>
<tr>
<td></td>
<td>method adjusts the ion balance. For static electricity elimination from</td>
</tr>
<tr>
<td></td>
<td>moving workpieces, “Manual Run” is recommended. Start system operation after</td>
</tr>
<tr>
<td></td>
<td>ion balance adjustment is completed.</td>
</tr>
<tr>
<td>Automatic run</td>
<td>This method continuously adjusts the ion balance. For static electricity</td>
</tr>
<tr>
<td></td>
<td>elimination from stationary workpieces or prescribed spatial static electricity</td>
</tr>
<tr>
<td></td>
<td>elimination, “Automatic Run” is recommended.</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.

H (High) — Level that does not affect the static electricity elimination time.
M (Middle) — Level at which the static electricity elimination time is a little bit longer than it was initially.
L (Low) — Level that gives the alarm before static electricity elimination cannot be performed.

- When an autobalance sensor is used, select the switch based on the operation mode.
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.

- Stain-detection is not performed.

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

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 [FG]</td>
<td>○ ○ [FG]</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. 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 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.

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] 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>— White</td>
<td>— — —</td>
<td>— — —</td>
<td>— — —</td>
<td>— — —</td>
</tr>
<tr>
<td>— Orange</td>
<td>— — —</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>Outputs when the electrode needle stain-detection is in progress.</td>
</tr>
<tr>
<td>OUT2</td>
<td>Yellow</td>
<td>Maintenance output signal</td>
<td>△ △</td>
<td>Outputs when the electrode needle 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>

☆: 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) 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.
  - **POWER LED**
    - **MAIN**: Illuminates when power is supplied. (Dark green)
      - (Flashes when the power supply is irregular.)
    - **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 LED**
    - +: Illuminates that negative ions are being emitted from the ionizer. (Blue)
    - OK: When an autobalance sensor [high-precision type] is used, it indicates the state of ion balancing. (Dark green)
      - Light OFF when a sensor is not used, or an autobalance sensor [body-mounting type] is used.
    - -: Illuminates that negative ions are being emitted from the ionizer. (Blue)

- **ALARM LED**—Indicates abnormal states of the ionizer.
  - **ALARM LED**
    - **HV**: Illuminates when an abnormal current flows through an electrode needle. (Red)
    - **SNSR**: Illuminates when the autobalance sensor [high-precision type] is not operating normally. (Red)
    - **NDL CHECK**: Illuminates when the electrode needle contamination is detected. (Red)
      - (Flashes while the contamination is being detected.)

The OK LED indicator flashes when the ion balance is approaching the limits of the adjustable range, signaling that the time for electrode needle maintenance is approaching.
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 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 autobalance sensor (high-precision type or body-mounting type) 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. Ions are continuously emitted.</td>
<td>Turn OFF the power supply, clean or replace the electrode needles, and turn the power supply on again. After turning power supply on, adjust the ion balance.</td>
</tr>
</tbody>
</table>

11) Timing chart

■ Timing chart in normal operation

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

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

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

<table>
<thead>
<tr>
<th>Power supply 24 VDC</th>
<th>Input</th>
<th>ON</th>
<th>OFF</th>
<th>(Operation permitted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discharge stop signal (IN1)</td>
<td>Input</td>
<td>ON</td>
<td>OFF</td>
<td>(Operation permitted)</td>
</tr>
<tr>
<td>Static electricity elimination completion signal (OUT1)</td>
<td>Input</td>
<td>ON</td>
<td>OFF</td>
<td>(Operation permitted)</td>
</tr>
<tr>
<td>Maintenance start signal (IN2)</td>
<td>Input</td>
<td>ON</td>
<td>OFF</td>
<td>(SW ON) 100 ms or more</td>
</tr>
<tr>
<td>Maintenance output signal (OUT2)</td>
<td>Input</td>
<td>ON</td>
<td>OFF</td>
<td>(SW ON)</td>
</tr>
<tr>
<td>Maintenance indicator (NDL CHECK ALARM)</td>
<td>LED ON</td>
<td>(Indication)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal processing Ion balance adjustment</td>
<td>(Indication) (SW ON) 100 ms or more</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stain-detection Ion balance adjustment</td>
<td>(Indication)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Power supply 24 VDC</th>
<th>Input</th>
<th>ON</th>
<th>OFF</th>
<th>(Operation permitted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discharge stop signal (IN1)</td>
<td>Input</td>
<td>ON</td>
<td>OFF</td>
<td>(Operation permitted)</td>
</tr>
<tr>
<td>Static electricity elimination completion signal (OUT1)</td>
<td>Input</td>
<td>ON</td>
<td>OFF</td>
<td>(Operation permitted)</td>
</tr>
<tr>
<td>Maintenance start signal (IN2)</td>
<td>Input</td>
<td>ON</td>
<td>OFF</td>
<td>(SW ON) 100 ms or more</td>
</tr>
<tr>
<td>Maintenance output signal (OUT2)</td>
<td>Input</td>
<td>ON</td>
<td>OFF</td>
<td>(SW ON)</td>
</tr>
<tr>
<td>Maintenance indicator (NDL CHECK ALARM)</td>
<td>LED ON</td>
<td>(Indication)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal processing Ion balance adjustment</td>
<td>(Indication) (SW ON) 100 ms or more</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stain-detection Ion balance adjustment</td>
<td>(Indication)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(c) When a sensor is not connected.

<table>
<thead>
<tr>
<th>Power supply 24 VDC</th>
<th>Input</th>
<th>ON</th>
<th>OFF</th>
<th>(Operation permitted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discharge stop signal (IN1)</td>
<td>Input</td>
<td>ON</td>
<td>OFF</td>
<td>(Operation permitted)</td>
</tr>
<tr>
<td>Static electricity elimination completion signal (OUT1)</td>
<td>Input</td>
<td>ON</td>
<td>OFF</td>
<td>(Operation permitted)</td>
</tr>
<tr>
<td>Maintenance start signal (IN2)</td>
<td>Input</td>
<td>ON</td>
<td>OFF</td>
<td>(SW ON) 100 ms or more</td>
</tr>
<tr>
<td>Maintenance output signal (OUT2)</td>
<td>Input</td>
<td>ON</td>
<td>OFF</td>
<td>(SW ON)</td>
</tr>
<tr>
<td>Maintenance indicator (NDL CHECK ALARM)</td>
<td>LED ON</td>
<td>(Indication)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal processing Ion balance adjustment</td>
<td>(Indication) (SW ON) 100 ms or more</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stain-detection Ion balance adjustment</td>
<td>(Indication)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.
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] (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>—</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.
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>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>+</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</td>
<td>HV</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 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

- **Timing chart in normal operation**

<table>
<thead>
<tr>
<th>Input</th>
<th>State of ion emission</th>
<th>Discharge stop signal (IN1)</th>
<th>Power supply 24 VDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>OFF</td>
<td></td>
<td>(Operation permitted)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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**

- Brown: DC1 (+)
- Blue: DC1 (-)
- Red: DC2 (+)
- Black: DC2 (-)
- Light green: IN1
- Gray: IN2
- Pink: OUT1
- Yellow: OUT2
- Purple: OUT3
- Dark green: OUT4

**PNP output**

- Brown: DC1 (+)
- Blue: DC1 (-)
- Red: DC2 (+)
- Black: DC2 (-)
- Light green: IN1
- Gray: IN2
- Pink: OUT1
- Yellow: OUT2
- Purple: OUT3
- Dark green: OUT4

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.

**NPN output**

**Ionizer**

- Input/Output signal circuit
- Output circuit (Photocoupler)
- FG

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

- Red: DC2 (+)
- Black: DC2 (-)
- Blue: DC1 (-)
- FG

**Internal circuit**

- PLC
- OUTPUT
- or

**INPUT**

- Light green: IN1
- Gray: IN2
- or

- Pink: OUT1
- Yellow: OUT2
- Purple: OUT3

**PNP output**

**Ionizer**

- Input/Output signal circuit
- Output circuit (Photocoupler)
- FG

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

- Red: DC2 (+)
- Black: DC2 (-)
- Blue: DC1 (-)
- FG

**Internal circuit**

- PLC
- OUTPUT
- or

**INPUT**

- Light green: IN1
- Gray: IN2
- or

- Pink: OUT1
- Yellow: OUT2
- Purple: OUT3

* 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.

⚠️ 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.
Series IZS31

Dimensions

Ionizer / IZS31

Electrode cartridge

(Name plate position at 300 mm length)

Balance adjustment trimmer

Frequency selection switch

Maintenance level selection switch

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

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

(For mounting, opposite side: Same)

Electrode cartridge

KJH04-MS-X34

4 x M4 x 0.7 depth 5

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

n (Number of electrode 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>

(High pressure warning label position at 300 mm length)
Ionizer Series IZS31

Dimensions

End bracket / IZS31-BE

Center bracket / IZS31-BM

When mounted outside in

Angle adjustable range is ±45°.

Horizontal mounting

Downward mounting

Ionizer full length (L)

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>
Series IZS31

Dimensions

Feedback sensor / IZS31-DF

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

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>
Ionizer Series IZS31

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

Non-standard bar length (80 mm-pitch) X10

Refer to “How to Order” on page 5.

2 Non-standard power supply cable length  

Non-standard power supply cable length X13

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 length

Symbol L: Cable length

01 1000 mm
02 2000 mm
04 4000 mm
05 5000 mm
06 6000 mm
07 7000 mm
08 8000 mm
09 9000 mm
11 11000 mm
12 12000 mm
13 13000 mm
14 14000 mm
15 15000 mm
16 16000 mm
17 17000 mm
18 18000 mm
19 19000 mm
20 20000 mm
Series IZS31
Made to Order 2
Please contact SMC for detailed dimensions, specifications, and lead times.

3 Model with 40 mm-pitch electrode cartridges
Symbol X15

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.

<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

Symbol X196

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 Note)
(Inside diameter ø4.5 Lead wire length 125 ±5)

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

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>
High-voltage/control unit detachable short type

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

Electrode needle material
- Nil
- C: Tungsten
- S: Silicon
- J: Stainless steel
- K: Low-maintenance type / Tungsten
- L: Low-maintenance type / Silicon

Output specification
- Nil: NPN output
- P: PNP output

Bracket
- Nil: Without bracket
- B: With bracket

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

Power supply cable
- Nil: With power supply cable (3 m)
- Z: With power supply cable (10 m)
- N: Without power supply cable

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

<table>
<thead>
<tr>
<th>Part no.</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>IZS31-CF01-X210</td>
<td>1000 mm</td>
</tr>
<tr>
<td>IZS31-CF02-X210</td>
<td>2000 mm</td>
</tr>
<tr>
<td>IZS31-CF03-X210</td>
<td>3000 mm</td>
</tr>
<tr>
<td>IZS31-CF04-X210</td>
<td>4000 mm</td>
</tr>
<tr>
<td>IZS31-CF05-X210</td>
<td>5000 mm</td>
</tr>
<tr>
<td>IZS31-CF07-X210</td>
<td>7000 mm</td>
</tr>
<tr>
<td>IZS31-CF10-X210</td>
<td>10000 mm</td>
</tr>
</tbody>
</table>

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

12P modular jack
(Plug for power cable)

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

Connection cable
IZS31-CF-X210
(Cable length: Refer to the above table.)

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

How to Order

IZS31-180 R X211

Bar type
Electrode needle material
- Tungsten C Silicon
- Stainless steel S
- Low-maintenance type J / Tungsten
- Low-maintenance type K / Silicon

Output specification
- NPN output Nil
- PNP output P

Bracket
- Without bracket Nil
- With bracket B
Note: Four end brackets are bundled with the bracket model. Brackets can be attached on the high-voltage unit and control unit.

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

Power supply cable
- With power supply cable (3 m) Nil
- With power supply cable (10 m) Z
- Without power supply cable N

Control unit cable entry direction
- Left-hand entry Nil
- Right-hand entry R
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: Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

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

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

### 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/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, combustion 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 interlock 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.

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.

### 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.

### 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.

---

**Safety Instructions**

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

Warning

1. Reserve an enough space for maintenance, piping and wiring
   Please take into consideration that the One-touch fittings for supplying air, need enough space for the air tubing to be easily attached/detached.
   To avoid excessive stress on the connector and One-touch fitting, please take into consideration the air tubings minimum bending radius and avoid bending at acute angles.
   Wiring with excessive twisting, bending, etc. can cause 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.

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 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.
### 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.

![Mounting Diagram](image)

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.

![Feedback Sensor Diagram](image)

### 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.

![Wiring Diagram](image)

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.

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

Always use a UL Listed/Recognized power supply (24 VDC, Class-2 output of 2.1 A or less).
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.

Maintenance

Warning

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.

Danger High Voltage!

This product contains a high voltage generation circuit. When performing maintenance inspection, be sure to confirm that the power supply to the ionizer is turned off. Never disassemble or modify the ionizer, as this may not only impair the product's functionality but could cause an electric shock or electric leakage.

2. When cleaning the electrode 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 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.
Related Products

Ionizer Nozzle type Series IZN10

Dust removal and static electricity elimination by air blow
- Eliminates dust clinging to lamp cover.

Removing dust from lamp cover

Ion balance ±10 V (In case of energy-saving static electricity elimination nozzle)

Slim design: Thickness 16 mm

RoHS compliant

1 Electrode needle contamination detector
- Outputs maintenance signal when detects stain or wear of an electrode needle always.
- Detects optimal maintenance time, reduced labor for maintenance.

2 Built-in power supply substrate
- High-voltage power supply cable/external high-voltage power supply are unnecessary.

Electrostatic Sensor Series IZD10 / Electrostatic Sensor Monitor Series

Electrostatic Sensor Series IZD10
- The importance of the static electric control is put on confirming the “actual status”.
  - Potential measurement: ±20 kV (detected at a 50 mm distance)
    ±0.4 kV (detected at a 25 mm distance)
  - 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

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)
- 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 (±0.1 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
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**

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

7. **2 Port Solenoid Valve / Series VX**
   - Regulates to the appropriate air volume depending upon the installation condition. Decreases the air consumption.

8. **Restrictor / Series AS-X214**

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 Prevention Equipment

Contents

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

Revision history

Edition B

• Addition of Autobalance sensor (Body-mounting type)
• Addition of Electrode cartridge with low maintenance
• Made to Order
• 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

Edition C

• Change of name plate and high pressure warning label attachment positions
• Made to Order
• Change of connection cable and cable connector for high-voltage/control unit detachable short type (X210, X211)

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