

NEW

OMRON

# Static Sensors and Ionizers

## Series Catalog



### "Visible" Static Electricity

Measuring Static Electricity In-line



### Thorough Ionization

Best Ion Balance in its Class

realizing

# Sensing and Controlling Static Electricity

With more compact parts and more intricate electronic devices at production sites, countermeasures against static electricity are vitally important to improve product quality and increase yield. The problem onsite is how to make invisible static electricity "visible" and how to define effective ionization. OMRON contributes to static electricity countermeasures and improving product quality by providing Electrostatic Sensors and High-performance Ionizers with the best ion balance characteristics in their class.



*for High Quality Products*

# "Visible" Static Electricity

# Sensing

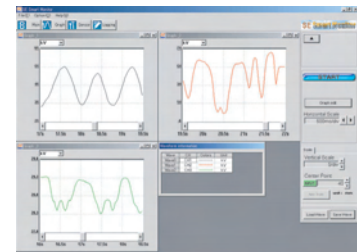
## Direct Display of Static Charge

### Electrostatic Sensor ZJ-SD100/ZJ-SDA11

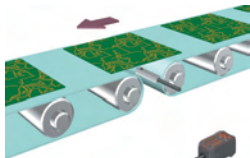
Compact Sensor Head (6 × 6 × 65 mm) with visual display of workpiece static charge on a Smart Digital Amplifier.

Multi-point measurement and easy computer logging of static electricity.

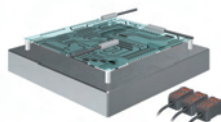
Distance compensation, workpiece area compensation, and highly accurate static charge measurement using a Displacement Sensor.



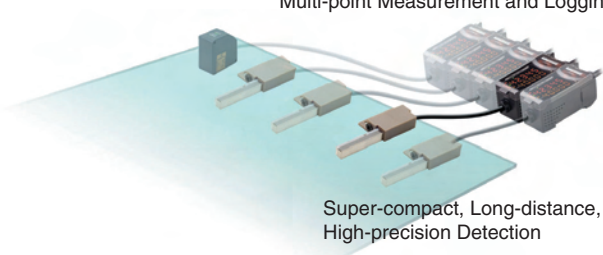
Static Electricity Countermeasures with Multi-point Measurement and Logging



Measurement of Charge on PCBs during Conveying



Measurement of Charge on Liquid Crystal Substrates



Super-compact, Long-distance, High-precision Detection

# High-speed, High-performance Ionization

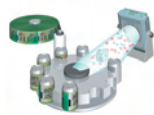
# Ionization

## Fan Type

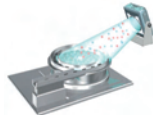
### Dual-mixing Variable-DC Method

#### Fan Type Ionizer ZJ-FA

Discharge time: 3 s max., high-performance ion balance of ±10 V max. Uses a DC Ionizer with high ion levels and achieves excellent ion balance with a unique fan construction and automatic balance control.



Preventing adhesion of foreign particles when labeling



Ionizing resin parts



Ionizing cell manufacturing lines during assembly



Advanced Type

General-purpose Type

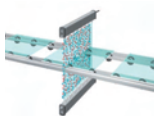
## Bar Type

### Dual-mixing Variable-DC Method

#### Air Purge Ionizer ZJ-BA

Discharge time: 3 s max., high-performance ion balance of ±30 V max. The built-in Ion Balance Sensor automatically controls the positive and negative ion balance.

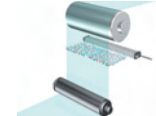
Enables high-speed ionization with positive and negative mode functions.



Ionizing while conveying liquid crystal substrates



Preventing rebounding of PET bottles



Preventing wrapping film from curling



Positive mode for generating many positive ions



Negative mode for generating many negative ions

## Blow Type

### High-frequency AC Method

#### Air Push Ionizer KS1

High-frequency (68 KHz) AC method with excellent ion balance.

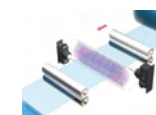
Many nozzle variations for a variety of applications, e.g., spot/screen ionization.



Ionization of both sides of PCBs



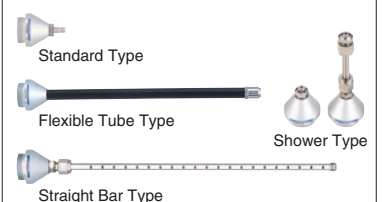
Spot ionization of parts



Ionization of films



### Wide Range of Nozzles



# ZJ-SD

from the FACTORY

Smart Electrostatic Sensor  
ZJ-SD Series

## Smart Static Electricity Sensing: Making Static Electricity Visible

The unpredictable nature of static electricity creates the need for a sensor for constant in-line monitoring to properly capture static electricity. Smart collection of effective data to improve production site countermeasures is now possible.



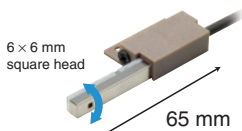
## Smart In-line Measurement of Production Site Static Electricity

### Compact Sensor Head and Smart Amplifier

Hand-held devices and large measuring devices are not suitable for easily measuring static charges of workpieces in-line. The Sensor Head of the Smart Electrostatic Sensor is small (6 × 6 × 65 mm) and the bracket has a rotating mechanism, making it possible to mount it even where space is limited.

Compact Sensor Head

Smart Amplifier



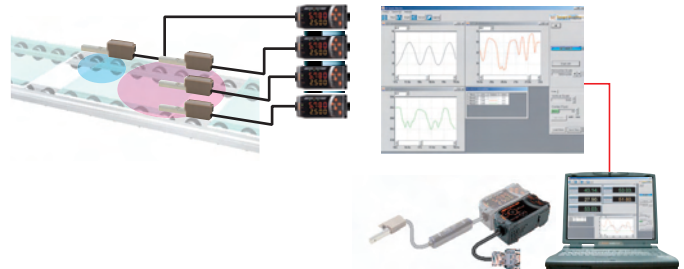
The bracket on the Head enables changing the sensing direction even after installation.



Direct display of static charge

### Smart Static Electricity Monitoring

For effective discharge, measurements must be made at more than one location and changes over time need to be monitored. With the ZJ-SD, multi-point measurements from up to 5 Units can be made easily if a Calculating Unit is connected between Amplifiers. And the Electrostatic Sensor measurement data can be displayed and logged on a personal computer via an Interface Unit and used for static electricity countermeasures.



## Our Highest Priority: Easy Onsite Operation

### Simple Settings Using Key Operations

A seven-segment, two-row display is provided for workpiece charge and threshold displays. Settings are easy to make using Up, Down, Left, and Right Keys.

Judgment Output Indicators

OPE1, OPE2, and OPE3 three-color indicators

Intuitive Operation Using Up, Down, Left, and Right Keys.



Dual Digital Display  
Displays the charge and threshold after the power is turned ON.

LED character height: 7 mm

### Remote Detection

Use the ZX-XC□A (order separately) to extend the cable to 2, 5, or 9 m.



Smart Sensing

# Best Long-distance, High-precision Measurements in the Industry

The ZJ-SD provides the highest detection accuracy in the industry when combined with a ZX Displacement Sensor. And even more precise measurements are possible with the compensation function that adjusts to the size of the workpiece.

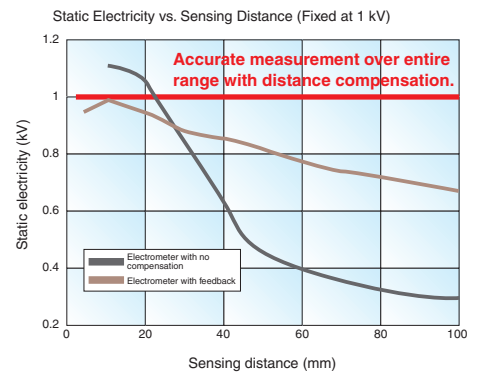
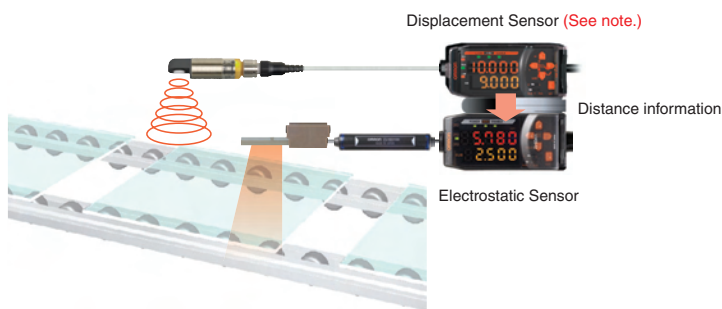
## Workpiece Distance Compensation

### Long-distance, High-precision Measurements

The best sensing range in the industry at 100 mm/ ±50 kV.

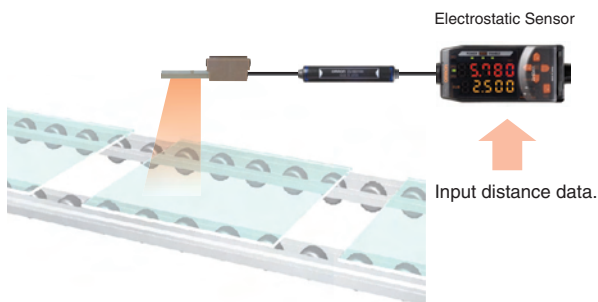
Sensors that measure static charges are greatly affected by the measurement distance. The ZJ-SD solves this problem by combining with a ZX-series Displacement Sensor to enable communicating distance information and thus achieve high-accuracy measurements.

Note: Ultrasonic Displacement Sensors are also available. Contact your OMRON representative for details.



### Unaffected by Measurement Distance

In addition to distance data compensation performed by the Displacement Sensor, errors from distance fluctuations can also be reduced by directly inputting the installation distance into the Amplifier.



## Workpiece Size Compensation

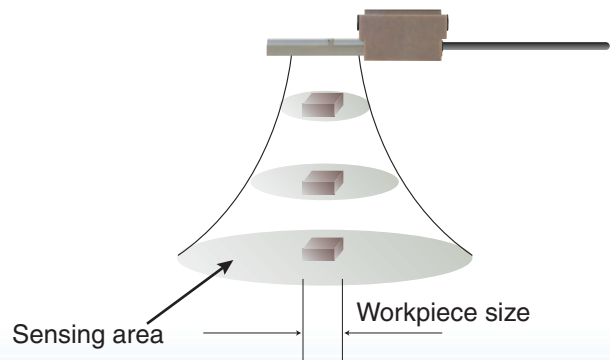
### Accurate Static Charge Measurements for Small Workpieces

The Electrostatic Sensor's sensing area is approximately five times the installation distance.

Enter the workpiece size to measure the static charge of workpieces smaller than the sensing area. (See note.)

The ZJ-SD can compensate the static charge based on a comparison of the installation distance recorded in the Preamplifier and the size of the sensing area.

Note: Except for the workpiece, static charge inside the sensing area must be 0 V. Use a measurement error of approximately 10% as a guide for a measurement distance of 5 mm and a workpiece of 10 mm in diameter.




*Long distance,  
Highly accurate detection*

## Ordering Information


### Electrostatic Sensor

#### Sensor Head


Appearance	Sensing distance	Model
	5 to 100 mm	ZJ-SD100

#### Accessories (Order Separately)


##### Calculating Unit

Appearance	Model
	ZX-CAL2



##### SmartMonitor Sensor Setup Tool for Personal Computer Connection

Appearance	Name	Model
 +CD-ROM	Communications Interface Unit and software for setup and display	ZJ-SFW11

#### Amplifier

Appearance	Power supply	Output method	Model
	DC	NPN output	ZJ-SDA11


#### Preamplifier Mounting Brackets

Appearance	Model	Remarks
	ZX-XBT1	Included with Sensor Head.
	ZX-XBT2	For DIN Track mounting

#### Cables with Connectors on Both Ends (for Extension)

Cable length	Model	Quantity
1 m	ZX-XC1A	1
4 m	ZX-XC4A	
8 m	ZX-XC8A	

#### Sensor Head Mounting Bracket for Distance Compensation

Appearance	Model	Remarks
	ZJ-XBU1	Used for distance compensation using a Displacement Sensor.

## Specifications

### Sensor Head

Item	Model	ZJ-SD100
Applicable Amplifier		ZJ-SDA11
Sensing distance		5 to 100 mm
Measurement voltage		Standard mode: $\pm 50$ KV, Precision mode: $\pm 5$ KV max. (See note 1.)
Display resolution		Standard mode: 10 V, Precision mode: 1 V (See note 2.)
Linearity (See note 3.)		$\pm 5\%$ FS (See note 4.)
Response time		20 ms
Ambient temperature range		Operating and storage: 0 to 50°C (with no condensation or icing)
Ambient humidity range		Operating and storage: 35% to 85% (with no condensation)
Dielectric strength		1,000 VAC, 50/60 Hz, 1 min (See note 5.)
Vibration resistance		Sensor Head: 3-mm double amplitude at 10 to 55 Hz for 45 min each in the X, Y, and Z directions, Preamplifier: 1.5-mm double amplitude at 10 to 55 Hz for 2 h each in the X, Y, and Z directions
Degree of protection		IP20
Connection method		Pre-wired Connector (standard length: 2 m)
Weight (packed state)		Approx. 150 g
Materials		Sensor Head: Stainless steel Preamplifier: PC
Accessories		Instruction sheet, Preamplifier Mounting Brackets (ZX-XBT1)

Note 1. The measurement may become saturated if the Sensor is too close to an object being measured, even if it is within the measurement voltage range. Use the distance from the measurement surface (mm) times 1 KV as a guide.  
2. This is the minimum value obtainable when a ZJ-SDA11 Amplifier Unit is connected.

3. When the ambient temperature is stable at 25°C.  
4. When the measurement distance is 10 mm and the measurement voltage is -5 to 5 KV.  
5. When a Preamplifier is used (excluding the Sensor Head).

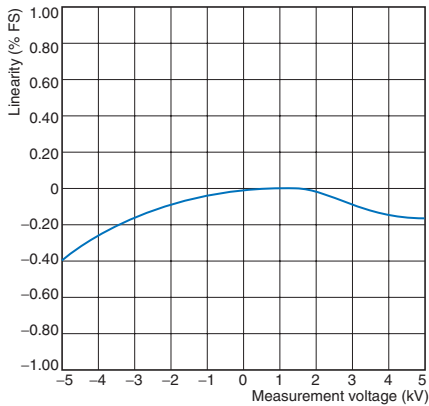
### Ionizer

Item	Model	ZJ-SDA11
Measurement period		1 ms
Possible average count settings (See note 1.)		1, 2, 4, 8, 16, 32, 64, 128, 256, 512, or 1,024
Linear output (See note 2.)		Current output: 4 to 20 mA/F.S, Max. load resistance: 300 $\Omega$ Voltage output: $\pm 4$ V ( $\pm 5$ V, 1 to 5 V (See note 3.)), Output impedance: 100 $\Omega$
Judgment outputs (3 outputs: OPE1, OPE2, and OPE3)		NPN open-collector output, 30 VDC, 20 mA max. Residual voltage: 1.2 V max.
Bank shift input, zero reset input, timing input, reset input		ON: Short-circuited with 0-V terminal or 1.5 V or less OFF: Open (leakage current: 0.1 mA max.)
Functions		Measurement value display, display reverse, scaling, peak and bottom hold, distance compensation, present value display, limit number of display digits, monitor focus, mask hold, sensing area compensation, output value display, zero reset, linear output compensation, distance trigger, warning output, setting value display, zero reset memory, peak hold, delay hold, bank switching, resolution display, various timers, bottom hold, delay time setting, enable display, initialization, sample hold, timing inputs, zero reset display, teaching, peak-to-peak, key lock, judgment output display, direct threshold value setting, hold, clamp value setting, ECO mode, hysteresis adjustment, average hold, precise measurement mode
Indications		Operation indicators (OPE1 (orange), OPE2 (green), OPE3 (yellow), 7-segment main digital display (red), 7-segment sub-digital display (yellow), power ON indicator (green), zero reset indicator (green), enable indicator (green)
Power supply voltage		24 VDC $\pm 10\%$ , Ripple (p-p): 10% max.
Current consumption		24-VDC power supply: 140 mA max.
Ambient temperature range		Operating and storage: 0 to 50°C (with no icing or condensation)
Ambient humidity range		Operating and storage: 35% to 85% (with no condensation)
Insulation resistance		20 M $\Omega$ (at 500 VDC)
Dielectric strength		1,000 VAC, 50/60 Hz, 1 min
Shock resistance		Destruction: 300 m/s <sup>2</sup> 3 times each in 6 directions (up/down, left/right, and forward/backward)
Vibration resistance		Destruction: 0.7-mm double amplitude at 10 to 150 Hz for 80 min each in the X, Y, and Z directions
Connection method		Pre-wired (standard length: 2 m)
Weight (packed state)		Approx. 350 g
Materials		Case: PBT (polybutylene terephthalate), Cover: Polycarbonate
Accessories		Instruction sheet

Note 1. The response time of the linear outputs is calculated as follows: Measurement period  $\times$  (Average count setting + 1).  
The response time of the judgment outputs is calculated as follows: Measurement period  $\times$  (Average count setting + 1).  
2. The output can be switched between a current output and voltage output using a switch on the bottom of the Amplifier.  
3. Setting is possible using the monitor focus function.

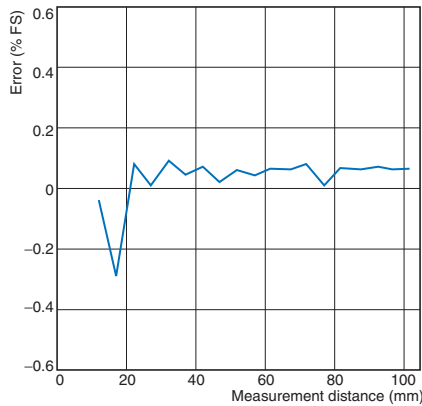
Engineering Data (Typical)

Measurement Voltage vs. Linearity



Measurement object: Charged plate (150 × 150 mm, 20 pF)  
 Measurement distance: 10 mm  
 Measurement mode: Standard

Measurement Distance vs. Error



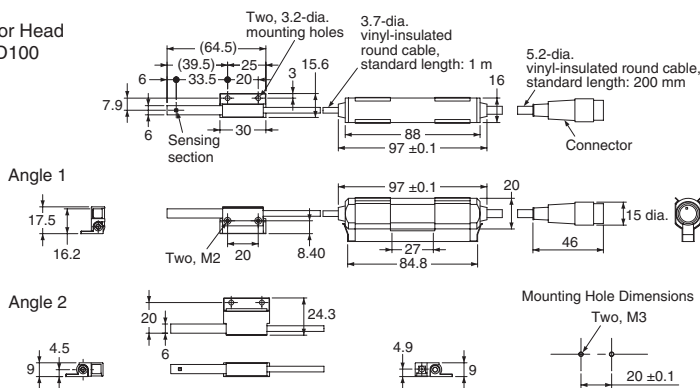
Measurement object: Charged plate (150 × 150 mm, 20 pF)  
 Measurement voltage: 5 kV  
 Measurement mode: Standard  
 Measurement after teaching the measurement distance to the Amplifier.

Dimensions

(Unit: mm)

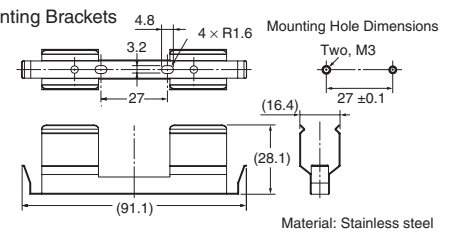
Electrostatic Sensor

Sensor Head  
ZJ-SD100

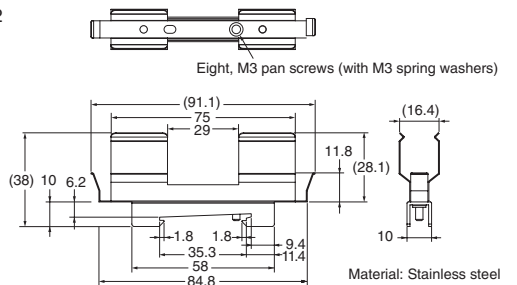


Accessories (Order Separately)

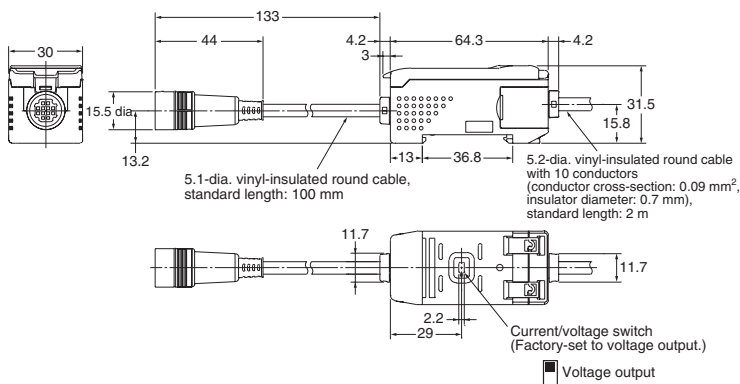
Preamplifier Mounting Brackets  
ZX-XBT1



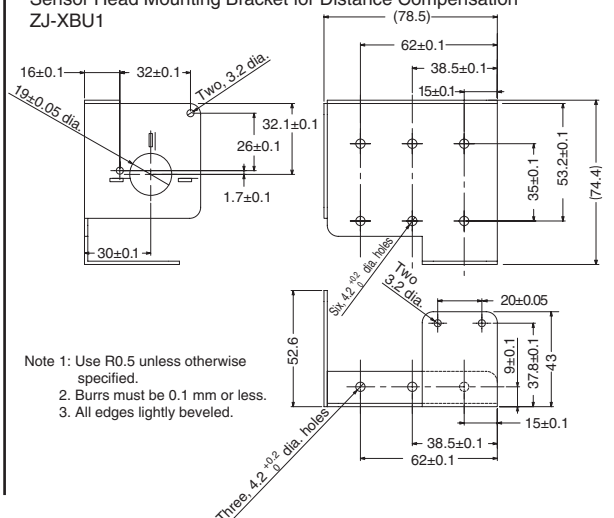
ZX-XBT2



Amplifier  
ZJ-SDA11



Sensor Head Mounting Bracket for Distance Compensation  
ZJ-XBU1



# ZJ-FA10

from the FACTORY

## Advanced Ionizer with Visible Discharge Status

Is your ionization complete?  
Is your ionizer working normally?  
The ZJ-FA10 reduces on-site anxiety with its easy-to-read display and sensing functions.

**Ionizer**

Advanced Fan Type

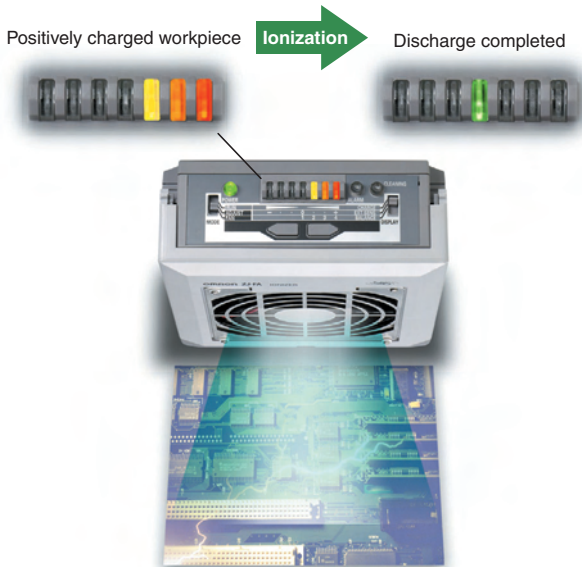
ZJ-FA10



## Sensing

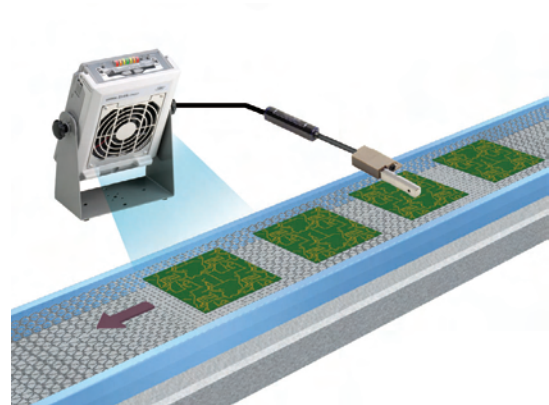
### Sensing Charge and Discharge Status

Sensing workpiece charge and discharge status using the sensor on the face of the ZJ-FA10.  
Easy-to-read indicator display on top of the ZJ-FA10.



### Connect an Electrostatic Sensor Head

More accurate checking of remote workpiece charge and discharge status is possible by connecting the ZJ-SD100 Electrostatic Sensor Head.



## Visualization

### Easy-to-read Indicators

All indicators are located on top of the ZJ-FA10 for greater visibility. Charge/discharge status, ion balance/cleaning alarms, and other operation status can be checked easily. Alarm signals can also be sent as external outputs.

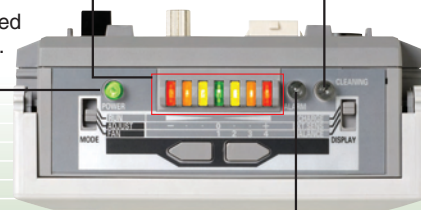
#### Multi-level indicator

Switches between sensing charge and discharge status, ion balance, and fan speed (air volume).

#### Cleaning indicator

Two-level warning/alarm indication

Power supply indicator



#### Error alarms

Lit when discharge errors occur. Stops discharge at the same time.

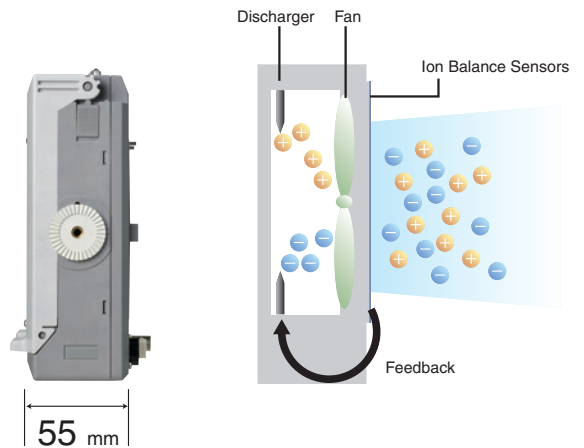


# Performance

## Efficient Ionization and Slimmer Unit with Dual-mixing Variable-DC Method

Thorough mixing and blowing of generated ions by the fan together with sensing and control of the ion balance. This method enables more sophisticated use of both ionization speed and ion balance performance. Innovations in the internal structure have made the Sensor dramatically slimmer.

*Slim*



# Setting

## Wide Range of Installation Options Perfect for Cell Manufacturing

Use the ZJ9-FA-BR01 Pipe-mounting Bracket to rotate the Sensor up, down, left, or right after installation by turning a knob. The Sensor can also be mounted to pipes in the cell manufacturing line.



Sensor can be adjusted to any direction after installation.



Pipe mounting makes the Sensor suitable for a variety of installation environments.

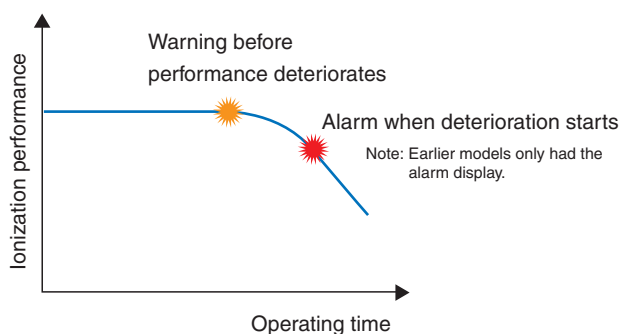
# Maintenance

## Completely Open Construction Means Simple Maintenance

The front panel opens up in three stages to a maximum of 180°. The discharger, internal parts, and the fan can be simply and effectively cleaned.

The ion output status is constantly monitored and a cleaning warning (output) given before the ionization characteristics deteriorate. The ZJ-FA10 facilitates on-site maintenance to maintain optimal ionization performance.

180°  
Wide Open!



2-level display



## Ordering Information

### Ionizer

Model
ZJ-FA10

### Accessories

	Model
Pipe-mounting Bracket (for 28-dia. pipes)	ZJ9-FA-BR01
Replacement Filters	ZJ9-FL92 (pack of 10)
Replacement Dischargers	ZJ9-NDT08F (pack of 8)

## Specifications

### Ionizer

Item	Model	ZJ-FA10
Power supply voltage		24 VDC $\pm 10\%$ ripple (p-p) 10% max.
Current consumption		600 mA max.
Discharge voltage		$\pm 7$ kV max.
Discharge method		Dual-mixing variable-DC method
Airflow		1.8 m <sup>3</sup> /min max.
Discharge time (See note.)		Within 3.0 seconds
Ion balance (See note.)		$\pm 10$ V max.
Amount of generated ozone		0.01 ppm max. (measured at a distance of 10 mm from air outlet)
Main functions		Fan speed adjustment, manual balance adjustment, charge/discharge status display, cleaning display/output, error display/output, key lock, connection to an external Electrostatic Sensor
External outputs		Warning output/cleaning output: Output from photo-MOS relay (300 mA at 30 VDC)
External Sensor		ZJ-SD-100 Electrostatic Sensor Head
Ambient temperature range		Operating and storage: 0 to 50°C (with no condensation or icing)
Ambient humidity range		Operating and storage: 35% to 65% (with no condensation or icing)
Weight (packed state)		2.7 Kg
Materials		Unit: ABS, Discharger: Tungsten
Accessories		Instruction sheet, AC adapter, I/O cable, English warning labels (3 types)

Note: Measurement location: center of air outlet at a distance of 300 mm

Discharge time: From  $\pm 1,000$  V to  $\pm 100$  V

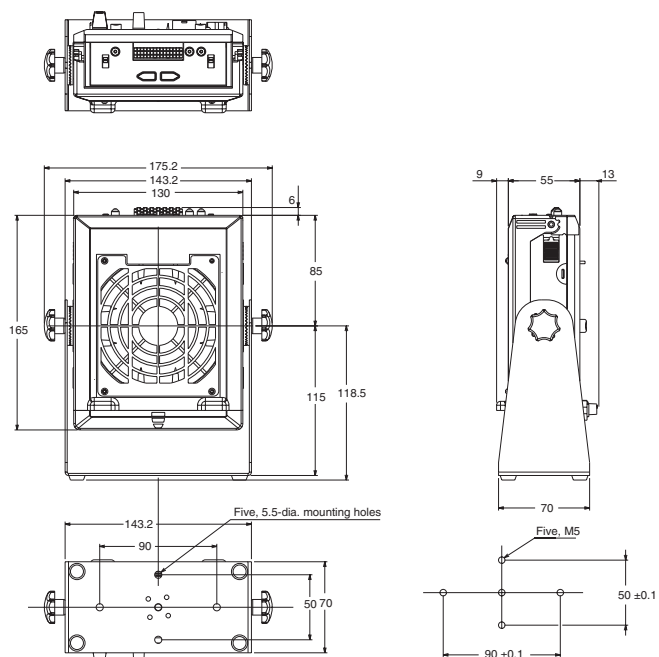
Ion balance measurement time: 10 seconds

Plate monitor: 150 x 150 mm, 20 pF

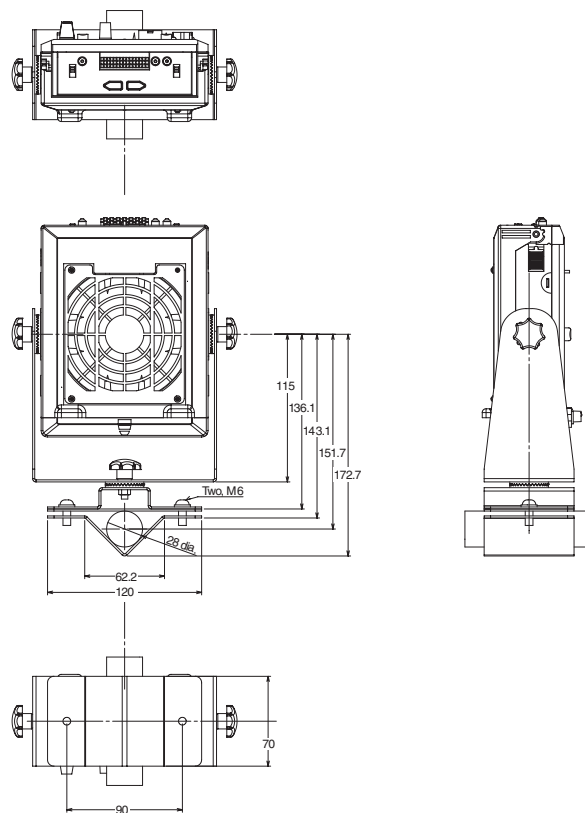
## Dimensions

(Unit: mm)

### ZJ-FA10 Ionizer

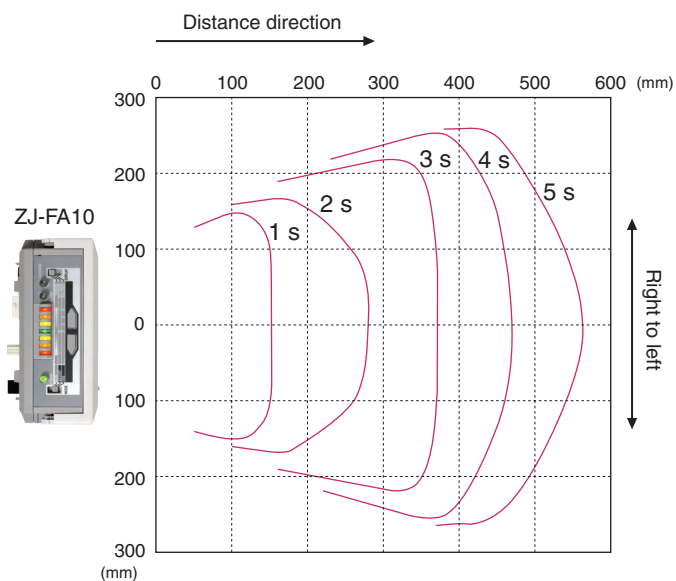


### Using ZJ9-FA-BR01 Pipe-mounting Bracket

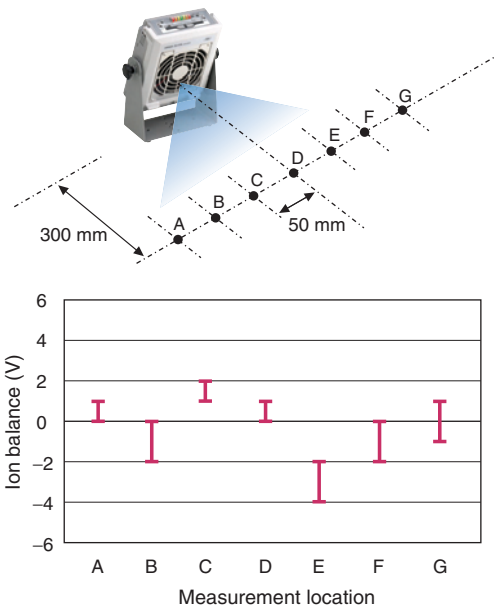


## Engineering Data (Typical)

### Discharge Area vs. Discharge Time



### Ion Balance (Position Fluctuation Characteristics)



[Measurement conditions]  
 Airflow: Maximum  
 Discharge time: From +1,000 V to +100 V  
 Plate monitor: 150 x 150 mm, 20 pF

# ZJ-FA01/02/03

from the FACTORY

Ionizer

General-purpose Fan Type

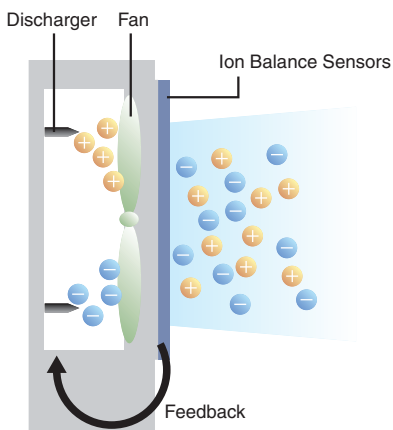
ZJ-FA01/02/03

Improved Productivity with High-speed, High-performance Ionization



## Dual-mixing Variable-DC Method

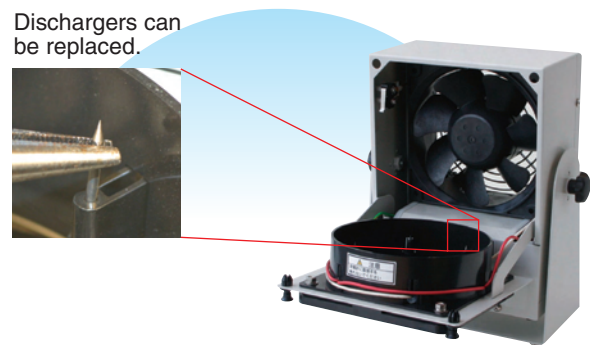
DC Ionizer achieves highest ion balance level in its class through a unique discharger and fan placement.



## Cleaning Is Easy

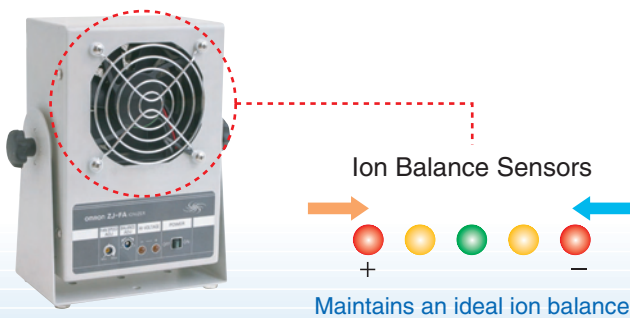
The rear panel opens, making cleaning of the discharger and fan easy.

Dischargers can be replaced using pin connectors.



## Constantly Maintain an Ideal Ion Balance

The front panel section functions as a sensor for monitoring the ion balance. Feedback from the sensor is used to constantly control the ion balance and maintain a zero balance.



## Monitoring Provides a Constantly Clean Environment

The optional ZJ-MA01 Ion Monitor can be connected.

The ion balance is indicated in five levels, and notification when cleaning is required is also provided.

The cleaning signal can be sent as an external output.



## Nomenclature

### ZJ-FA01

**Unit fixing screws and angle adjustment washer**  
Can be adjusted/secured in increments of approx. 10 degrees.

**Ion balance sensor (guard)**

Detects the levels of positive and negative ions that are generated and controls the level of each.

**Airflow adjuster**

**Ion balance adjuster**

Adjusts the positive and negative ion balance. (The balance is set at the factory, but may require adjustment when measuring in the actual operating environment.)

Front



**Opening panel**

Remove the two nylon latches to open and close the panel.

**Power supply switch**

**Power supply indicator (green)**

**High-voltage output indicator (yellow)**

Lights when high voltage is output.

**Power supply input connector**

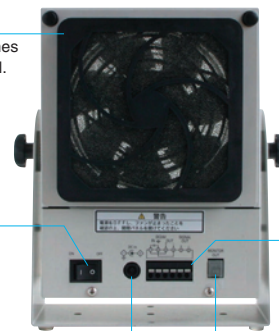
Connects to the enclosed AC adapter.

**Terminal block**

**Ion Monitor connector**

Connects to the ZJ-MA01 Ion Monitor.

Rear



### ZJ-MA01

**Cleaning indicator (red)**

Lights when cleaning is required (when ion balance control capability is exceeded).

**Power supply switch**

**Ion balance Indicators**

Indicates fluctuations in ion balance (e.g., changes in environment, dirty discharger, or proximity of charged object) in five levels.



Cleaning required



Changed ion balance

Initial Status

**Standard voltage adjuster**

Connect the tester to the standard voltage adjustment terminals on the rear panel, and adjust the measurement value to 1.00 V.

This is the standard voltage used to display the ion balance with the five indicator levels.

**External output terminal**

Outputs when the cleaning indicator is lit.

**Connector (SIGNAL IN)**

Connects to the Ionizer.



**Standard voltage adjustment terminals**

Terminals to connect the tester used to set the standard voltage.

## Ordering Information

### Ionizers

Product	Airflow	Model
Ionizer Units	High	ZJ-FA01
	Medium	ZJ-FA02
	Low	ZJ-FA03
Ion Monitor	---	ZJ-MA01

### Accessories

Product	Applicable model	Model
Replacement Filters (See note.)	ZJ-FA01	ZJ9-FL120 (pack of 10)
	ZF-FA02	ZJ9-FL80 (pack of 10)
Replacement Dischargers	ZJ-FA01	ZJ9-NDT06F (pack of 6)
	ZJ-FA02/03	ZJ9-NDT04F (pack of 4)

Note: The F120UL Guard/F80UL Guard manufactured by Japan Servo Co., Ltd. are used for the Replacement Filters.

## Specifications

### Ionizers

Item	Model	ZJ-FA01	ZJ-FA02	ZJ-FA03
Discharge time (See note 1.)		1.5 s max. (at center of air outlet and distance of 300 mm)	3.0 s max. (at center of air outlet and distance of 300 mm)	3.0 s max. (at center of air outlet and distance of 150 mm)
Power supply voltage		24 VDC $\pm$ 10% ripple (peak-to-peak) 10% or less		
Current consumption (See note 2.)		900 mA max.	600 mA max.	600 mA max.
Discharge voltage		$\pm$ 5.0 kV max.		
Airflow		1.3 to 2.2 m <sup>3</sup> /min	0.47 to 0.8 m <sup>3</sup> /min	0.255 m <sup>3</sup> /min
Amount of generated ozone		0.01 ppm max. (measured at 10 mm from air outlet)		
Ambient temperature range		Operating: 5 to 40°C, storage: 0 to 40°C (with no icing or condensation)		
Ambient humidity range		Operating: 35% to 65%, storage: 35% to 85% (with no condensation)		
Indicators		Power indicator: green High-voltage output operation indicator: yellow (for both positive and negative sides)		
External outputs		Operation output: Signal output from photo-MOS relay (500 mA at 30 VDC)		
Functions		Automatic ion balance adjustment		
		Air filter provided		
		Fan speed adjustment function		
Weight (packed state)		Approx. 3.4 kg	Approx. 2.4 kg	Approx. 1.9 kg
Materials		Unit: SPCC melamine coating Air channel: ABS, Discharger: Tungsten		
Accessories		Instruction sheet, AC adapter		

Note 1. The plate (150 mm sq., 20 pF) of the charging plate monitor is charged to  $\pm$ 1000 V and the time it takes for the charge to decrease to  $\pm$ 100 V is measured.  
(The measurement method complies with EOS/ESD-S3.1-1991.)

2. Used to connect ZJ-MA01 Ion Monitor.

### AC Adapter (Provided: SA130A-2413V-S by SINO-AMERICAN JAPAN CO., LTD.)

Item	
Input voltage	90 to 240 VAC, 50/60 Hz
Input current	0.5 A max.
Output voltage	24 VDC
Output current	1.3 A max.
Operating ambient temperature	0 to 40°C
Operating ambient humidity	20% to 80% (with no condensation)
Weight	250 g (excluding power cable)
Dimensions	52 x 35.2 x 119 mm (W x D x H)

### Ion Monitor

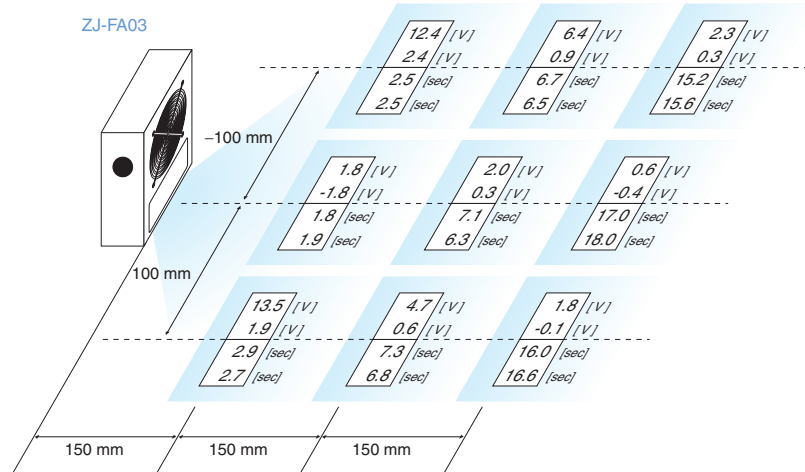
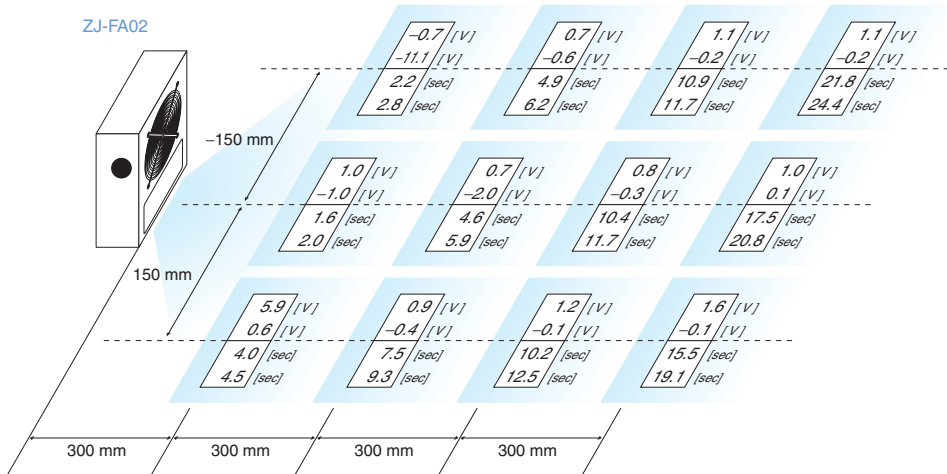
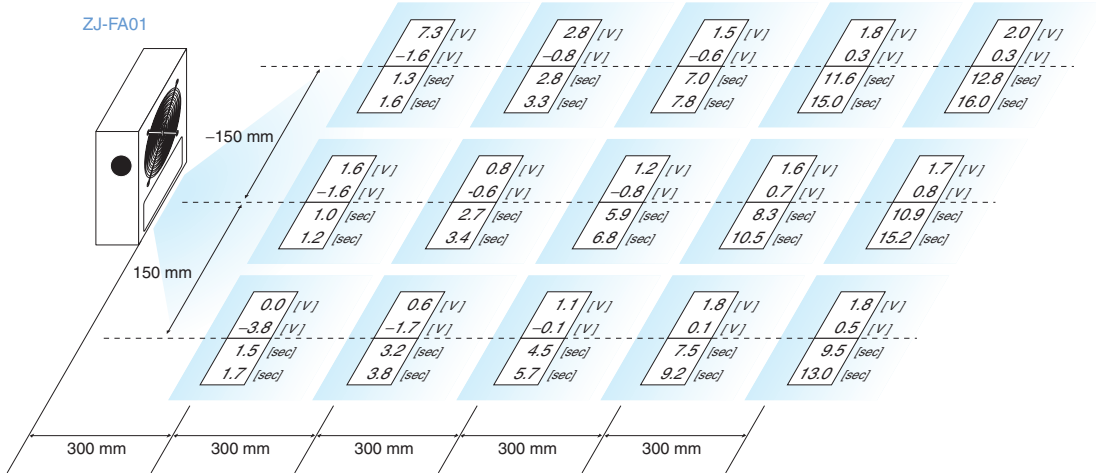
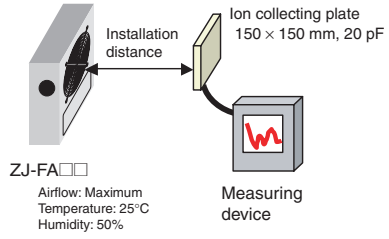
Item	Model	ZJ-MA01
Power supply voltage		Supplied from Ionizer (24 VDC $\pm$ 10%, ripple (p-p) 10% max.)
Current consumption		100 mA max.
Ambient temperature		Operating: 5 to 40°C, storage: 0 to 40°C (with no icing or condensation)
Ambient humidity		Operating: 35% to 65%, storage: 35% to 85% (with no condensation)
Weight (packed state)		Approx. 500 g
Indications		Power indicator: green Cleaning indicator: yellow (for both positive and negative sides) Ion balance indicator: Red, yellow, green, yellow, red (positive side $\leftarrow$ center $\rightarrow$ negative side)
External outputs		Cleaning output: Signal output from photo-MOS relay (500 mA at 30 VDC)
Materials		Unit top and bottom cover: A6063S-505 select ivory coating Unit front and rear panels: SPCC melamine coating
Accessories		Instruction sheet, relay cable: 3 m (two ferrite cores provided)

# Discharge Characteristics (Typical)

## Meaning of Measured Values

1.6 [V]	Maximum value of ion balance (10-s measurement)
-1.6 [V]	Minimum value of ion balance (10-s measurement)
1.0 [sec]	Discharge time (from +1000 V to +100 V)
1.2 [sec]	Discharge time (from -1000 V to -100 V)

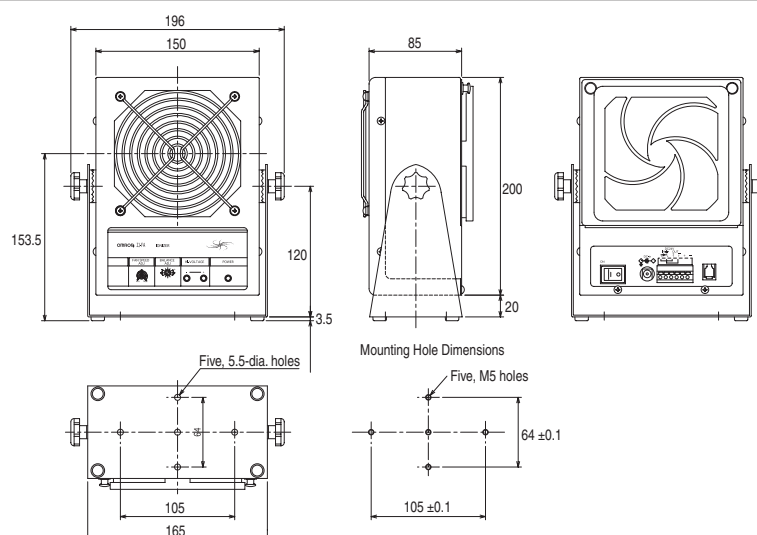
## Measurement Conditions



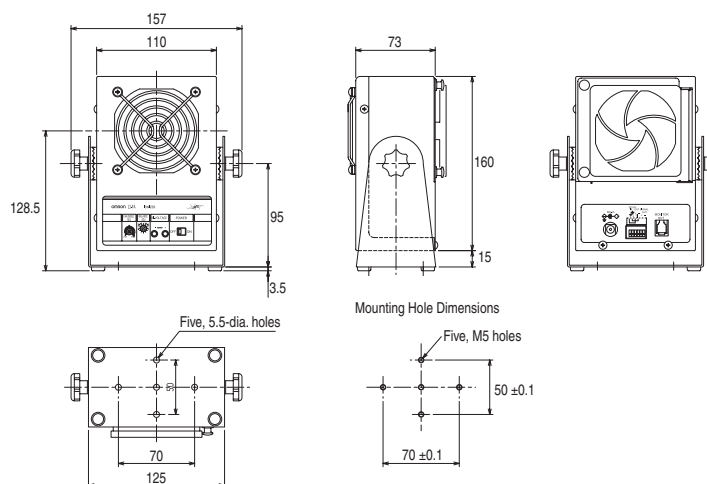
## Dimensions

### Ionizer Units

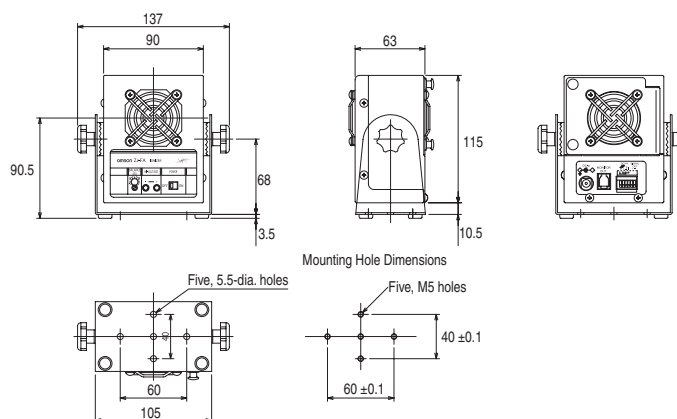
ZJ-FA01



ZJ-FA02

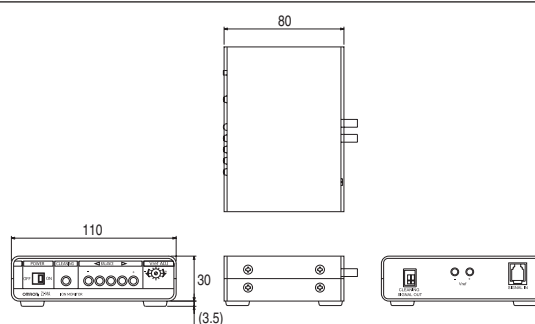


ZJ-FA03



### Ion Monitor

ZJ-MA01



# ZJ-BA



from the FACTORY

Ionizer

Bar Type

ZJ-BA

## High-performance, High-speed Ionization over a Wide Area

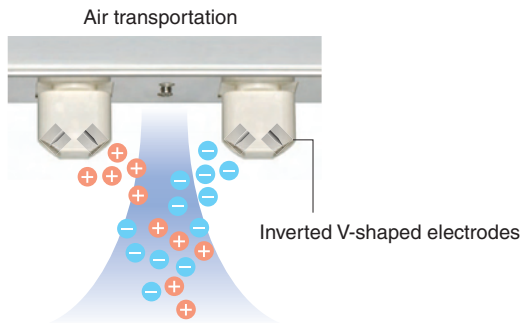
Three sensors enable automatically controlling the ion balance in realtime and maintain a constantly stable ion balance over a wide area.



## Pursuing the Ultimate in Ion Balance and Discharge Time

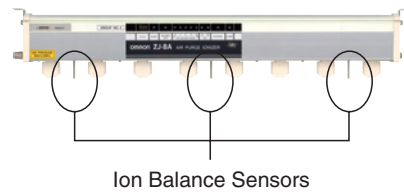
### Dual-mixing Variable-DC Method

DC ionization is used for high ion generation over a wide area. To achieve advanced ion balance, the ZJ-BA ionizer dischargers are positioned in an inverted V shape to mix positive and negative ions before transporting them by air.



### Automatic Ion Balance

Ion balance sensors are located in the middle and at both ends. The built-in automatic ion balance function automatically controls the positive and negative ion balance. A flat ion balance is achieved over the entire length of the ionizer by the three sensors.

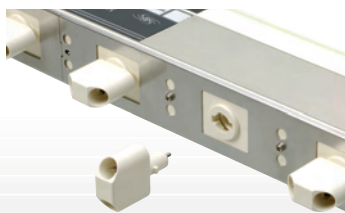


## Our Highest Priority: Easy Onsite Operation

### Dischargers Replaced in One Easy Step Easy Maintenance and Economical

A Discharger can be easily replaced when it is dirty or otherwise requires replacement.

Individual Dischargers can be replaced using pin connectors. Both easy maintenance and economy have been considered.



### Only One Cable Even for Multiple Units Reduce Installation Time

The high-voltage power supply is built into the Unit, so only the Module Cable needs to be connected even when multiple Units are installed.



*High Speed, High Performance*



# High Performance and Easy to Use

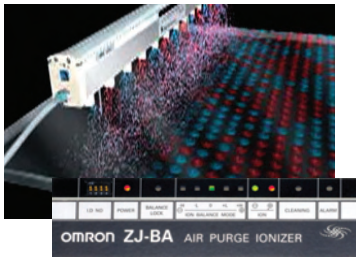
The ZJ-BA has an Ion Balance Mode for efficient, high-speed ionization and a remote control to make settings easily. No more time-consuming settings or handling. Optimal ionization has been achieved.

## Three Ionization Modes to Match Any Workpiece

In addition to zero balance mode, the ion balance mode can be set to positive mode, which emits more positive ions or negative mode, which emits more negative ions.

If it is known that the workpiece often has a positive or negative electrostatic charge, faster discharge is possible by emitting many ions of the opposite polarity.

Zero balance mode



Positive mode



Negative mode



## Simple Operation Settings Using Remote Control

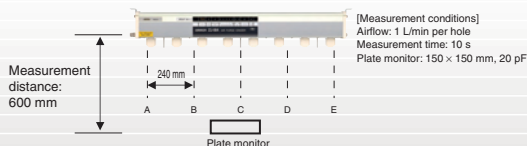
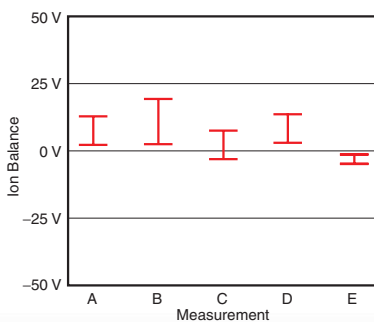
Once installed, the ZJ-BA Ionizer can be easily set up using a remote control.

ID numbers can be set to allow up to 16 ZJ-BA ionizers to be set using one remote control.



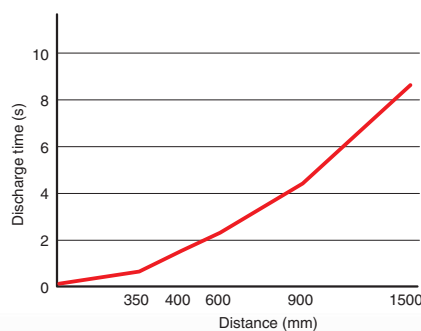
## Engineering Data

Ion Balance (Position Fluctuation Characteristics)



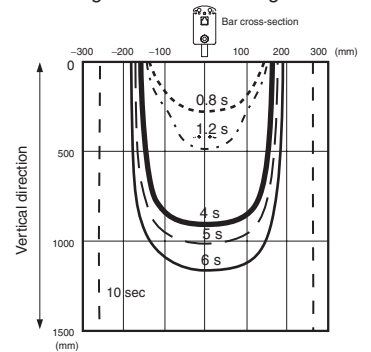
[Measurement conditions]  
Airflow: 1 L/min per hole  
Measurement time: 10 s  
Plate monitor: 150 x 150 mm, 20 pF

Installation Distance vs. Discharge Time



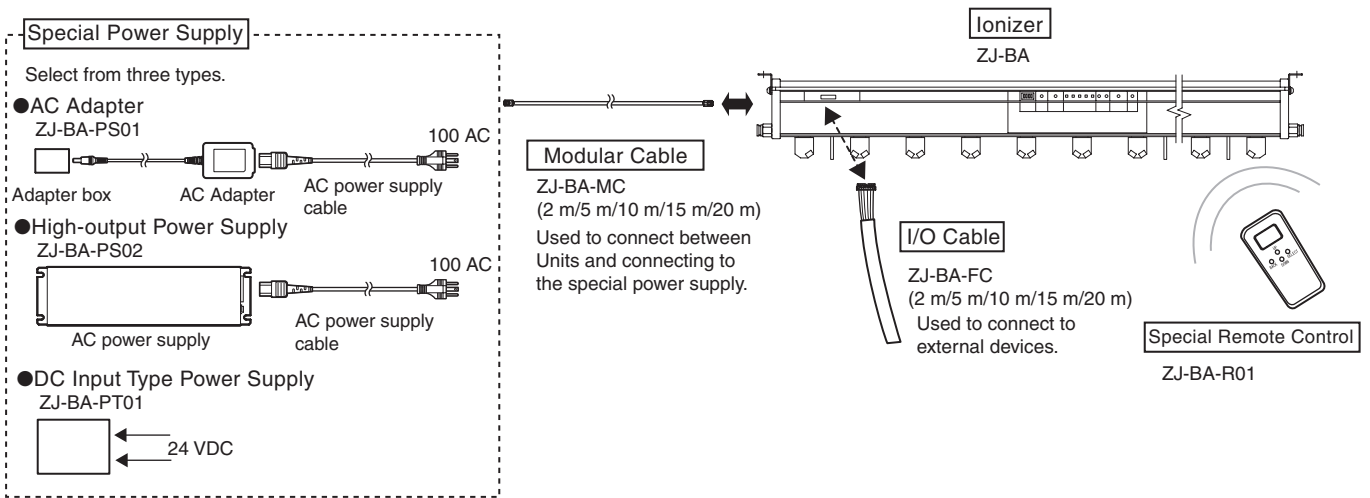
[Measurement conditions]  
Airflow: 1 L/min per hole  
Discharge time: From +1,000 V to +100 V  
Plate monitor positioned in center of unit  
Plate monitor: 150 x 150 mm, 20 pF

Discharge Area vs. Discharge time



## Smart Function, Easy Operation

## Product Configuration



The number of Units that can be connected depends on the type of power supply.

## Ordering Information

### Ionizers

Total length	Effective length	Model
490 mm	420 mm	ZJ-BA049
730 mm	660 mm	ZJ-BA073
970 mm	900 mm	ZJ-BA097
1210 mm	1140 mm	ZJ-BA121
1450 mm	1380 mm	ZJ-BA145
1690 mm	1620 mm	ZJ-BA169
1930 mm	1860 mm	ZJ-BA193
2170 mm	2100 mm	ZJ-BA217
2410 mm	2340 mm	ZJ-BA241
2650 mm	2580 mm	ZJ-BA265

### Modular Cables

Cable length	Model
2 m	ZJ-BA-MC02
5 m	ZJ-BA-MC05
10 m	ZJ-BA-MC10
15 m	ZJ-BA-MC15
20 m	ZJ-BA-MC20

### I/O Cables

Cable length	Model
2 m	ZJ-BA-FC02
5 m	ZJ-BA-FC05
10 m	ZJ-BA-FC10
15 m	ZJ-BA-FC15
20 m	ZJ-BA-FC20

### Special Power Supplies

Product	Model
AC Adapter	ZJ-BA-PS01
High-output Power Supply	ZJ-BA-PS02
DC Input Type Power Supply	ZJ-BA-PT01

### Special Remote Control

Model
ZJ-BA-R01

### Discharger Modules

Specifications	Model
Single-pole, set of 2	ZJ9-BA-NT102
Double-pole, set of 2	ZJ9-BA-NT202

### Replacement Dischargers

Specifications	Model
Set of 4	ZJ9-NDT04
Set of 8	ZJ9-NDT08

### Cleaning Jigs

Specifications	Model
Set of 20	ZJ9-BA-CT01

## Specifications

### Special Power Supplies

Item	Model	ZJ-BA-PS01 (AC Adapter)	ZJ-BA-PS02 (High-output Power Supply)	ZJ-BA-PT01 (DC-input Power Supply)
Number of connectable units		2	8	2
Input voltage		100 VAC $\pm$ 10%		24 VDC $\pm$ 10%
Input current		0.5 A max. (with 2 Units connected)	1.5 A max. (with 8 Units connected)	1.0 A max. (with 2 Units connected)
Output voltage		12 VDC		
Product Configuration		Adapter Box AC Adapter AC Power Supply Cable Instruction sheet	Power Supply Unit AC Power Supply Cable Instruction sheet	Power Supply Unit Instruction sheet
Weight (not including packaging)		Adapter Box: Approx. 30 g AC Adapter: Approx. 130 g AC Power Supply Cable: Approx. 250 g	Power Supply Unit: Approx. 1300 g AC Power Supply Cable: Approx. 250 g	Power Supply Unit: Approx. 220 g

### Special Remote Control

Item	Model	ZJ-BA-R01
Communications method		Wireless communications
Number of detectable Units		16
Power supply		Three AAA batteries
Weight (not including packaging)		Approx. 150 g
Accessories		Three batteries, instruction sheet

## Specifications

### Ionizers

Item	Model	ZJ-BA049	ZJ-BA073	ZJ-BA097	ZJ-BA121	ZJ-BA145	ZJ-BA169	ZJ-BA193	ZJ-BA217	ZJ-BA241	ZJ-BA265	
Power supply voltage		12 VDC ±10% ripple (peak-to-peak) 10% or less										
Current consumption		600 mA max.										
Discharge method		Dual-mixing variable-DC method										
Discharge voltage		±6.5 KV max.										
Discharger		Tungsten (See note 2.)										
Recommended installation distance		300 to 1500 mm										
Discharge time (See note 1.)		4.0 s max. (Zero balance mode)										
Ion balance (See note 1.)		±30 V max. (Zero balance mode)										
Power supply connector		Modular type, 4-pin connector (at both ends of Unit)										
Air inlet		6-dia. one-touch coupling (at right end of Unit)					6-dia. one-touch coupling (at both ends of Unit)					
Airflow		1 L/min. per hole (standard), Note: Air pressure: 0.3 Mpa										
External I/O	Inputs	Power ON/OFF inputs, Note: Switch inputs (Current when ON: Approx. 9 mA)										
	Outputs	Cleaning output, alarm output, and power output. Note: Signal output by photo-MOS relay (24 VDC, 100 mA max.)										
Indications		Power supply, ion output, cleaning, alarm, ion balance mode, and balance lock										
Group number		Fixed to 0 in factory settings.										
ID number		0 to 15 (Set via 4-position DIP switch)										
Ion balance mode		Select from zero balance, positive high, positive low, negative high, and negative low.										
Ion balance fine tuning function		Yes										
Ambient temperature		Operating: 5 to 40°C, storage: 0 to 40°C (with no icing or condensation)										
Ambient humidity		Operating: 35% to 65%, storage: 35% to 85% (with no condensation)										
Weight (Ionizer only)		Approx. 0.9 kg	Approx. 1.2 kg	Approx. 1.5 kg	Approx. 1.9 kg	Approx. 2.2 kg	Approx. 2.6 kg	Approx. 2.9 kg	Approx. 3.3 kg	Approx. 3.7 kg	Approx. 4.0 kg	
Accessories		Ionizer, 2 mounting brackets (with M4 screws), 2 brackets, User's manual, English warning label			Ionizer, 2 mounting brackets (with M4 screws), 3 brackets, User's manual, English warning label			Ionizer, 2 mounting brackets (with M4 screws), 4 brackets, User's manual, English warning label				

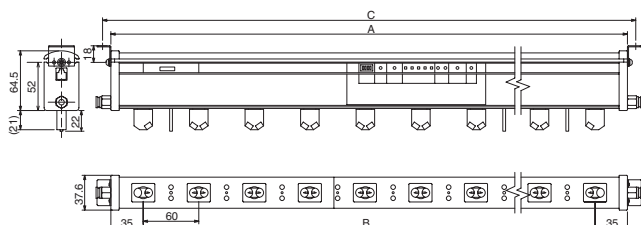
Note 1: Measurement conditions: Installation distance: 300 mm, Airflow: 1 L/min per hole (air pressure: 0.3 Mpa), Measurement location: Center and left and right ends of effective length of Ionizer, Discharge time: Ion balance measurement time from 1,000 V to 100 V/-1,000 V to -100V: 10 s, Plate monitor: 150 × 150 20 pF  
 2: Polysilicone Dischargers are also available. Contact your OMRON representative for details.

## Dimensions

(Unit: mm)

### Ionizers

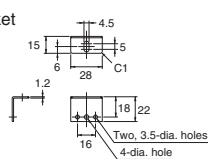
#### ZJ-BA



Note: The following table shows the differences in dimensions for each model.

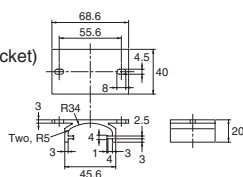
Model	A (mm)	B (mm)	C (mm)	Number of needles	Number of Discharger Modules
ZJ-BA049	490	420	508	14	8
ZJ-BA073	730	660	748	22	12
ZJ-BA097	970	900	988	30	16
ZJ-BA121	1210	1140	1228	38	20
ZJ-BA145	1450	1380	1468	46	24
ZJ-BA169	1690	1620	1708	54	28
ZJ-BA193	1930	1860	1948	62	32
ZJ-BA217	2170	2100	2188	70	36
ZJ-BA241	2410	2340	2428	78	40
ZJ-BA265	2650	2580	2668	86	44

### Mounting bracket



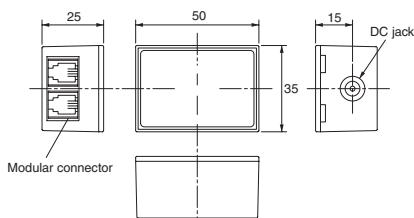
### Bracket

(Supplementary bracket)

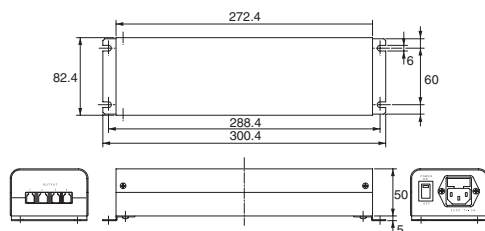


### Special Power Supplies

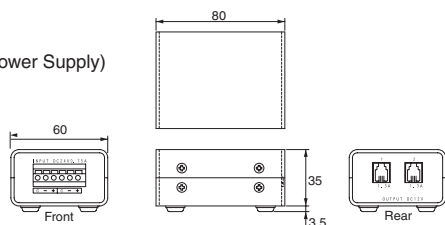
#### ZJ-BA-PS01 (AC Adapter/Adapter Box)



#### ZJ-BA-PS02 (High-output Power Supply)

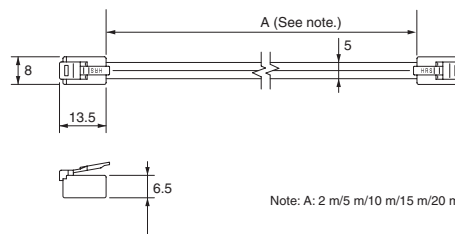


#### ZJ-BA-PT01 (DC-input Power Supply)



### Modular Cables

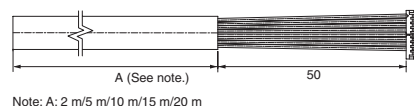
#### ZJ-BA-MC



Note: A: 2 m/5 m/10 m/15 m/20 m

### I/O Cables

#### ZJ-BA-FC□□



Note: A: 2 m/5 m/10 m/15 m/20 m

# KS1

from the FACTORY

**Ionizer**  
Air Push Type  
KS1

## Wide Range of Nozzles for Optimal Ionization

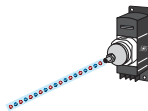
From pin-point to wide-area ionization, the optimal ionization for the application is now possible.



### Select the Nozzle for the Application

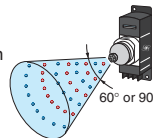
#### Standard Nozzle

- An application example of the basic standard nozzle.



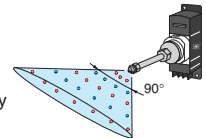
#### Shower Nozzle

- Injects ionized air over an angle of 60° or 90°.



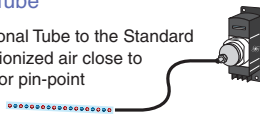
#### Flat Nozzle

- Injects ionized air over an angle of 90° to enable ionization of comparatively wide objects.



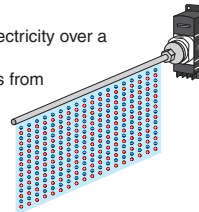
#### Combination of Standard Nozzle and Optional Tube

- Attach the Optional Tube to the Standard Nozzle to blow ionized air close to the workpiece for pin-point ionization.



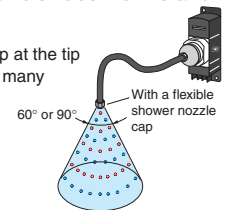
#### Straight Bar Nozzle

- Neutralizes static electricity over a wide area.
- Five ionization areas from 100 to 500 mm.



#### Combination of Flexible Tube Nozzle and Optional Cap

- Combine the nozzle cap at the tip of the nozzle to enable many ionization applications.



### Efficient Pin-point Ionization

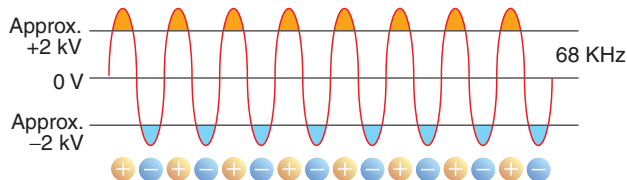
High-speed ionization of the target spot is possible by using a tube or metal pipe to get closer to the workpiece. The ionizer can be brought as close as 1 mm to the workpiece.

### 24-VDC Power Supply with No High-voltage Wiring Required

Only the 24-VDC power supply for the ionizer is needed. No dangerous high-voltage wiring is required.

### High-frequency AC Method with Excellent Ion Balance

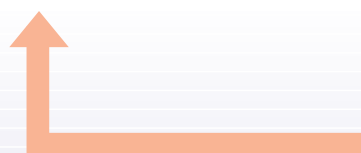
Uses more compact high-frequency AC method with excellent ion balance and stability.



### Compact Type with Built-in Controller

Controller section built in. Simple all-in-one Unit that installs easily just about anywhere.

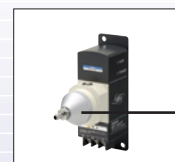
The ionizer oscillates at a much higher frequency (68 kHz) than the previous AC method to generate high-density ions. Noise generation is also reduced by a  $\pm 2$  kV low-voltage corona discharge.



Driven by 24-VDC power supply with no high-voltage wiring required

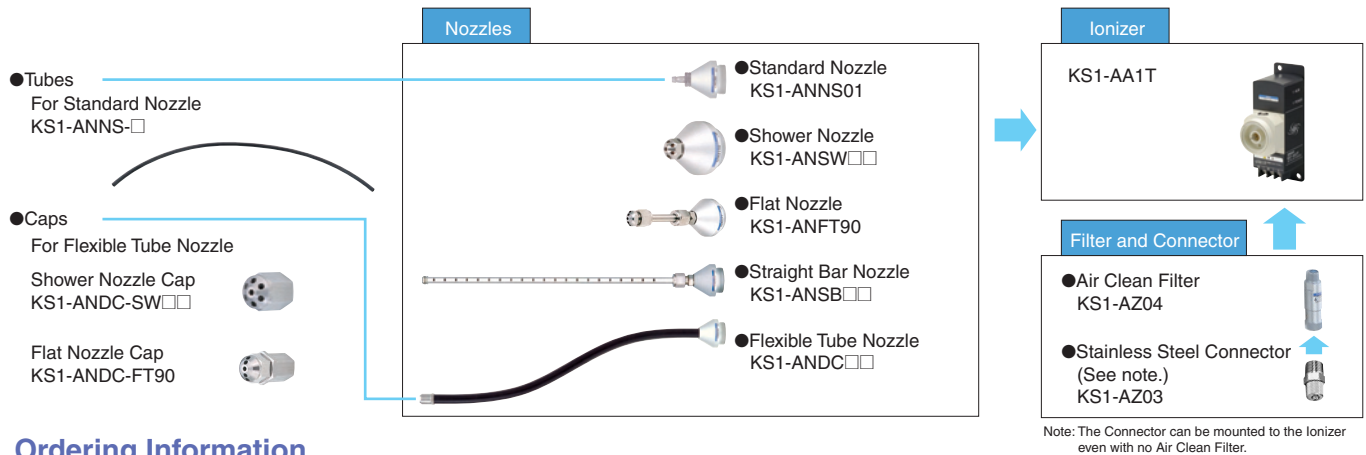


- With standard nozzle



Safe because the high-voltage parts are covered by the nozzle.

## Product Configuration



## Ordering Information

### Ionizer

Model
KS1-AA1T

### Nozzles

Product	Model	
Standard Nozzle	KS1-ANNS01	
Shower Nozzle	60°	KS1-ANSW60
	90°	KS1-ANSW90
90° Flat Nozzle	KS1-ANFT90	
Straight Bar Nozzle	100 mm	KS1-ANSB10
	200 mm	KS1-ANSB20
	300 mm	KS1-ANSB30
	400 mm	KS1-ANSB40
	500 mm	KS1-ANSB50
Flexible Tube Nozzle	100 mm	KS1-ANDC10
	200 mm	KS1-ANDC20
	300 mm	KS1-ANDC30
	400 mm	KS1-ANDC40
	500 mm	KS1-ANDC50

### Tubes

Product	Model
500-mm Conductive Urethane Tube	KS1-ANNS-U
500-mm Fluororesin Tube	KS1-ANNS-F
500-mm Silicone Tube	KS1-ANNS-S

### Caps

Product	Model
60° Flexible Shower Nozzle Cap	KS1-ANDC-SW60
90° Flexible Shower Nozzle Cap	KS1-ANDC-SW90
90° Flexible Flat Nozzle Cap	KS1-ANDC-FT90

### Optional Products

Product	Model
Replacement Dischargers (set of 5)	KS1-AZ01T
Tool for Replacing Dischargers	KS1-AZ02
Stainless Steel Connector	KS1-AZ03
Air Clean Filter	KS1-AZ04

## Specifications

### Ionizer

Item	Model	KS1-AA1T
Power supply voltage		24 VDC ±5%
Current consumption		Approx. 100 mA
Discharge method		High-frequency AC (Approx. 6.8 kHz)
Output voltage		±2 kV
Safety circuit		Outputs alarms for ionization errors
Discharge time		0.8 s max. (at a distance of 50 mm from air outlet)
Ion balance		±15 V or less (at a distance of 50 mm from air outlet)
Fluid used		Air (refer to Applicable Air)
Amount of generated ozone		0.04 ppm or less (when standard nozzle used, at a distance of 300 mm from air outlet and primary side voltage of 0.25 MPa)
Supplied air flow		Approx. 100 L/min (ANR) (when standard nozzle used, at primary side voltage of 0.15 MPa)
Indicators		Green POWER indicator lit while Ionizer ON, red ALM indicator lit for ionizing errors.
Air pressure range	When Standard Nozzle or Flexible Tube Nozzle is used.	0.02 to 0.25 MPa
	When Standard Nozzle Tube is attached.	0.02 to 0.12 MPa
	When Shower Nozzle, Flat Nozzle, or Straight Bar Nozzle is used.	0.05 to 0.40 MPa
Operating ambient temperature		0 to 40°C (with no condensation or icing)
Operating ambient humidity		35% to 65% (with no condensation)
Weight		235 g (Ionizer only)
Accessories		One ground lead (2 m)

### Air Clean Filter

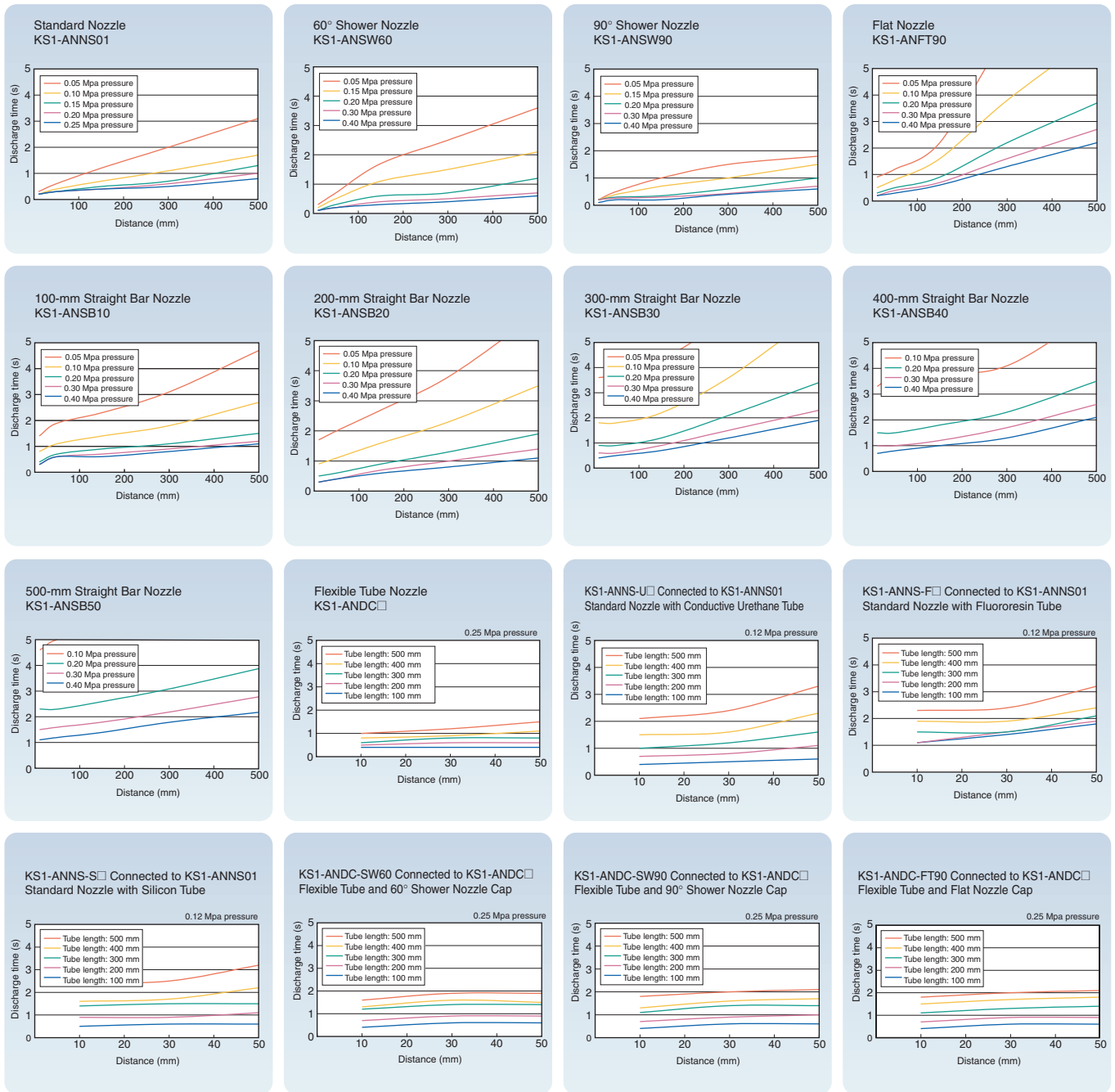
Item	Model	KS1-AZ04
Fluid used		Air
Connection aperture		R(Rc)1/8
Collected particle size		0.1 μm
Collection efficiency		99.9%
Volume of air processed		40 l/min (ANR) (See note.)
Film area		29.9 cm <sup>2</sup>
Max. voltage used		0.97 MPa
Withstanding pressure		1.47 MPa
Operating temperature range		5 to 45°C
Weight		11 g
Recommended tightening torque		400 to 600 N-cm
Unit material		Aluminum alloy (alumite treated)
Element material		Porous, hollow thread membrane

Note: At 0.7 MPa (pressure drop of 0.03 MPa)

### Air Used

1. Make sure the pipes are adequately flushed with compressed air before connection. The pipes may become clogged or malfunctions may occur if the air in the pipes is contaminated by chips, sealing tape, rust, or other impurities.
2. Use air that does not contain oil or water. We recommend using clean dry air with a dew point of -10°C or lower and a maximum collected particle size of 0.01 μm.
3. Application is not possible if the air or the surrounding atmosphere contains organic solvents, phosphate hydraulic oil, sulfur dioxide, chlorine gas, acid or similar substance.

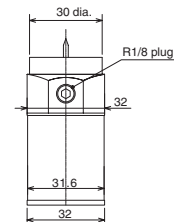
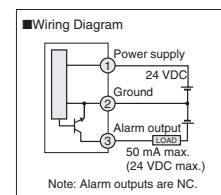
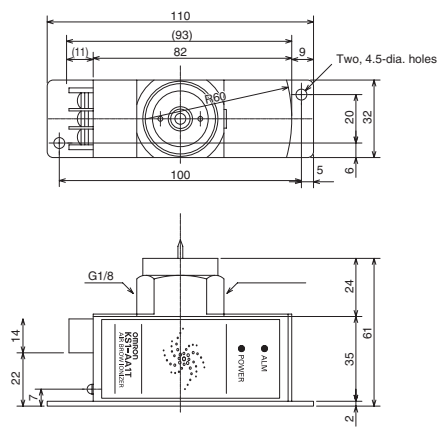
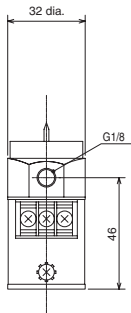
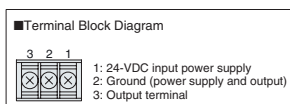
# Discharge Characteristics (Typical)



## Dimensions

(Unit: mm)

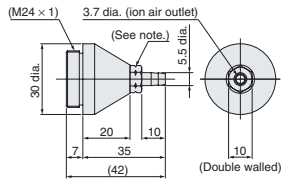
### Ionizer



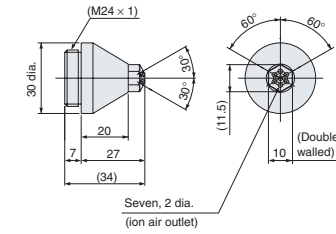
Nozzles and Optional Products Used with the Ionizer

Nozzles

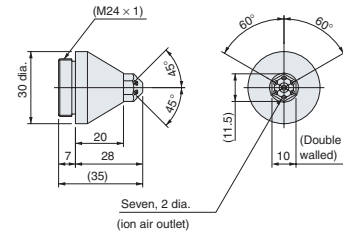
Standard Nozzle  
KS1-ANNS01



60° Shower Nozzle  
KS1-ANSW60

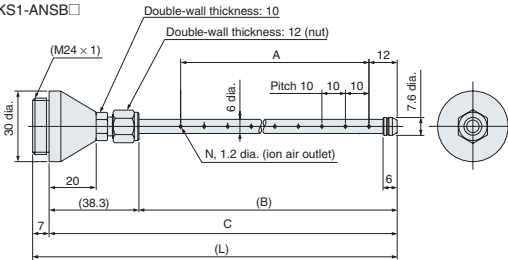


90° Shower Nozzle  
KS1-ANSW90



Straight Bar Nozzles

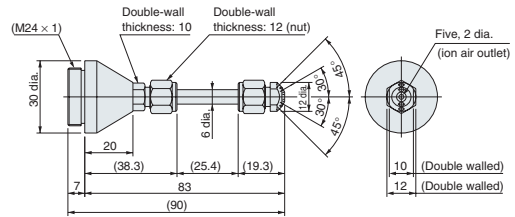
KS1-ANSB□



Model	A	B	C	L	N
KS1-ANSB10	100	129.7	168	175	11
KS1-ANSB20	200	229.7	268	275	21
KS1-ANSB30	300	329.7	368	375	31
KS1-ANSB40	400	429.7	468	475	41
KS1-ANSB50	500	529.7	568	575	51

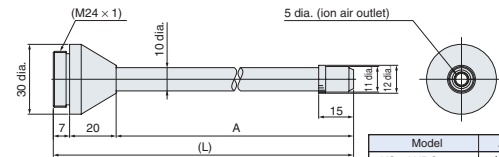
Flat Nozzle

KS1-ANFT90



Flexible Tube Nozzles

KS1-ANDC□

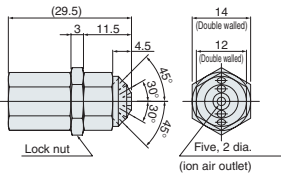


Model	A	L
KS1-ANDC10	102	129
KS1-ANDC20	202	229
KS1-ANDC30	302	329
KS1-ANDC40	402	429
KS1-ANDC50	502	529

Caps

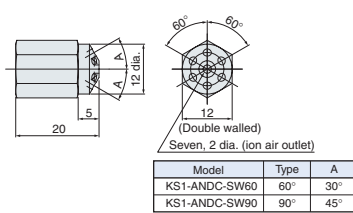
Flexible Flat Nozzle Cap

KS1-ANDC-FT90



Flexible Shower Nozzle Caps

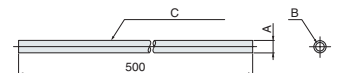
KS1-ANDC-SW□



Optional Tubes

Optional Tubes for Standard Nozzles

KS1-ANNS-□

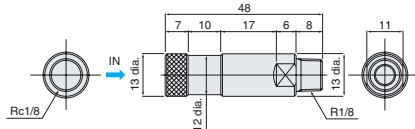


Model	A	B	C
KS1-ANNS-U	6 dia.	4 dia.	Conductive Urethane Tube
KS1-ANNS-F	7 dia.	5 dia.	Fluororesin Tube
KS1-ANNS-S	7 dia.	4 dia.	Silicon Tube

Optional Products

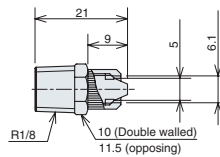
Optional Air Clean Filter

KS1-AZ04



Stainless Steel Connector

KS1-AZ03



- Attached to the Ionizer for air tube connection.
- If using products from other manufacturers, consider using stainless steel products for less impact on the ozone layer.

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To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

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**OMRON**<sup>®</sup>**OMRON ELECTRONICS LLC**

One Commerce Drive  
Schaumburg, IL 60173

**847-843-7900**

For US technical support or other inquiries:

**800-556-6766****OMRON CANADA, INC.**

885 Milner Avenue  
Toronto, Ontario M1B 5V8

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