SUNX

STATIC REMOVER

ULTRA-COMPACT IONIZER **High-frequency AC Method**

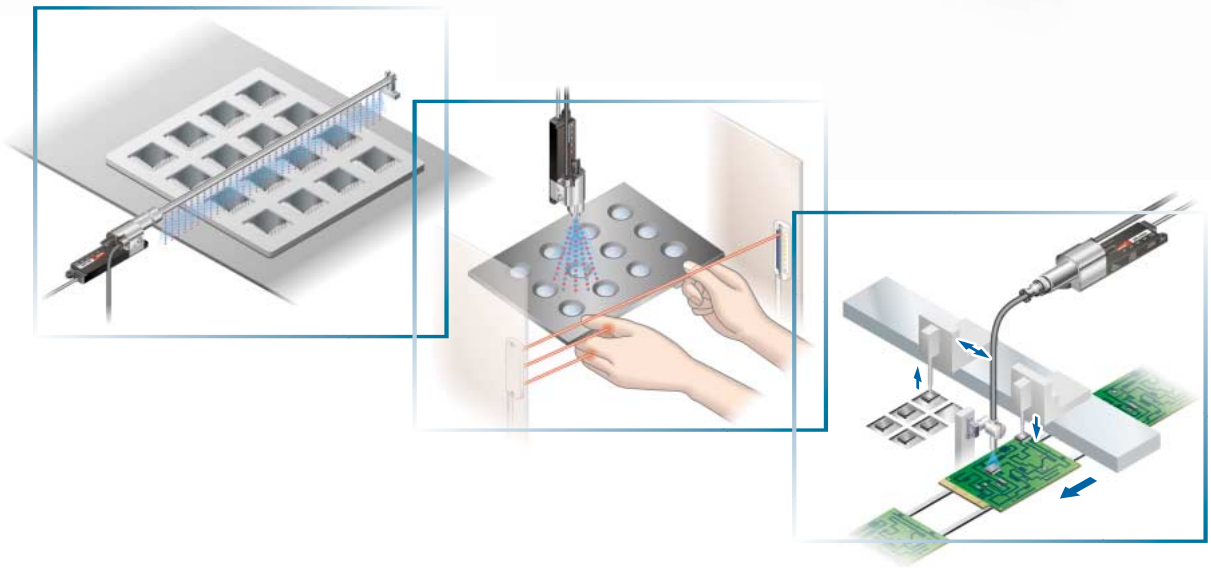
New

ER-V SERIES

CE Conforming to EMC Directive

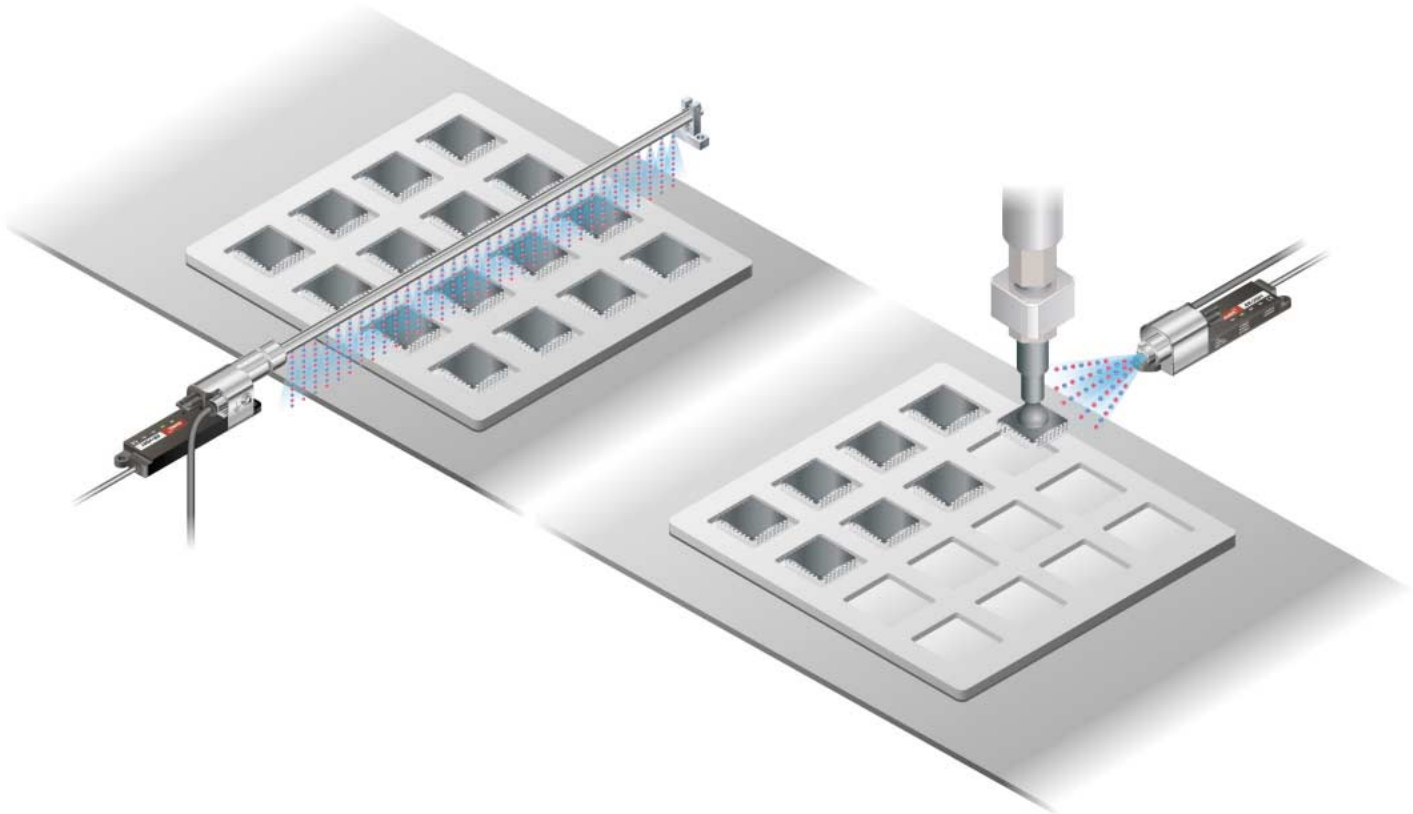
A new style of charge removal

New ultra-compact, high-performance ionizer!



A new style of ionizer

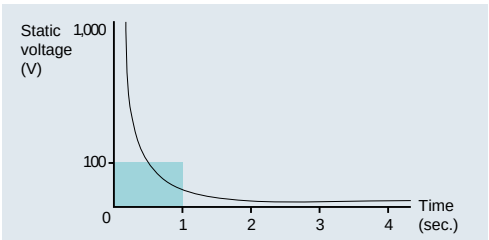
This compact ionizer has a full complement of functions.
Its charge removal performance produces excellent ion balance.
The compact design removes charges of objects even from narrow spaces.
Advanced functions developed with safety and easy maintenance in mind.
Nozzle variation allows charge removal for a variety of processes.
The SUNX ultra-compact, high-performance ER-V ionizer heralds a new style in charge removal.



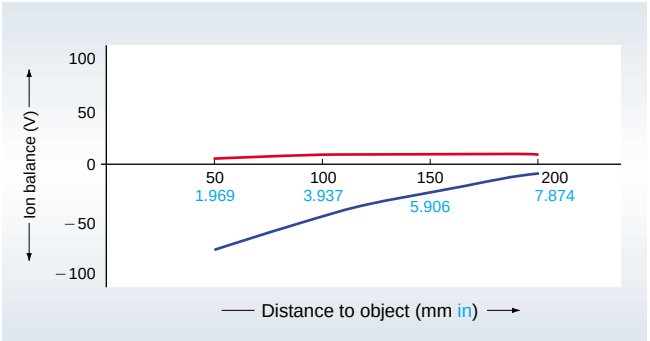
Produces excellent ion balance

The adoption of high-frequency AC method allows extremely stable ion balance to be achieved. Because the ion balance is not affected by the pressure of air supplied or by the setup distance, no troublesome adjustments are required after setup.

Charge removal time (typical)

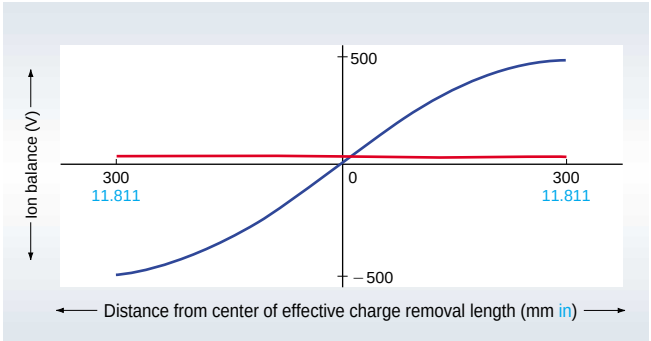


Spot type Ion balance comparison



※Comparison test carried out by SUNX

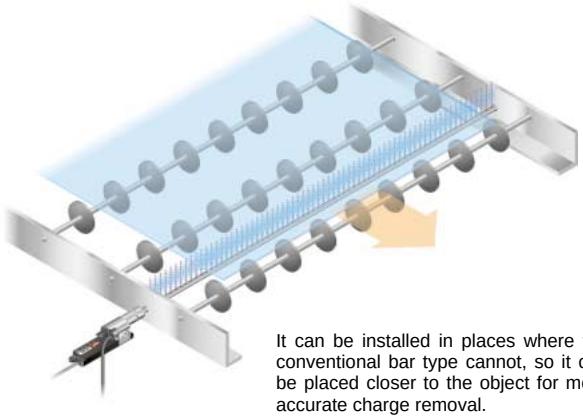
Bar type Ion balance comparison



※Comparison test carried out by SUNX

Ultra-compact design accurately removes charges of objects even from narrow spaces.

The main unit is merely 109×27×28 mm 4.291×1.063×1.102 in, so it can easily be combined with other devices and also be installed as an add-on. Furthermore, the high-voltage power supply is built-in, so no extra space is required except for the ionizer itself.



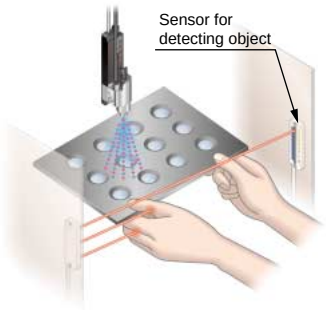
It can be installed in places where the conventional bar type cannot, so it can be placed closer to the object for more accurate charge removal.

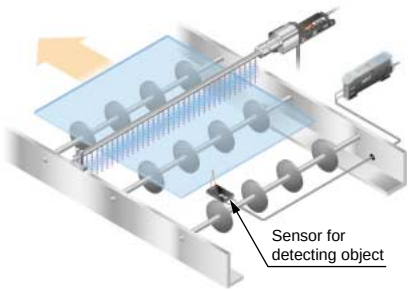
High performance with no controller needed

A full range of functions have been provided with full consideration given to ease of use in the workplace. No separate controller is needed.

Discharge halt input

A signal from an external device can be used to turn discharge ON and OFF. Sensors can be used to detect the objects so that the ion air is generated only when required.





Discharge indicator

The discharge ON / OFF status can be checked using an LED display. This lets you avoid problems such as when the power is on but no discharge is occurring.

Lights when power is on (Green LED)

DISCHARGE / Lights during discharge (Green LED)

Completely safe design and easy maintenance

Easy discharge needle maintenance

The discharge needle can be removed from the rear of the main unit, so there is no need to remove the nozzle when replacing the needle. Maintenance is easy even when the ion air outlet is located close to the object.

Low power consumption and low-voltage wiring

The power supply voltage is 24 V DC, and the power consumed is only 70 mA.
In addition, safety is enhanced because no high-voltage cables are required.

Safe design

A 'checking function' and an 'abnormal discharge monitoring function' are provided to notify the operator when it is time to clean or replace the discharge needle and to prevent discharge problems from occurring. Each function has an LED display to use for checking. The output from each function can also be used to externally monitor the status of the ionizer during operation.

[Checking function]
(Orange LED)
When lit, the discharge needle may be worn or dirty. Please check it.

[Abnormal discharge monitoring function]
(Red LED)
When lit, an abnormal discharge has been detected, e.g. due to a foreign substance, and discharge halted in order to maintain safety.

Discharge needle is covered by the nozzle

The discharge needle does not protrude from the main unit, so it cannot be touched by accident. Furthermore, no leaks can occur when it is brought close to metallic objects.

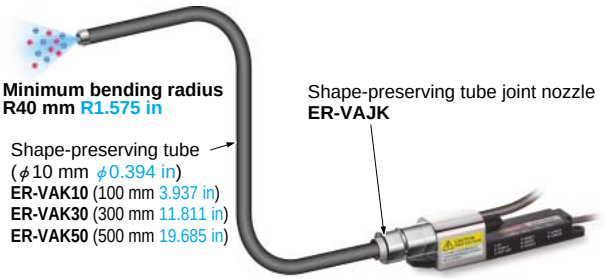
Nozzle variations can be selected to suit the application

A shape-preserving tube, a conductive tube and a exclusive joint nozzle are also available in the lineup in addition to the shower nozzle and straight bar nozzle.

Can be bent freely yet need not be affixed

Shape-preserving tube joint nozzle ER-VAJK
Shape-preserving tube ER-VAK□

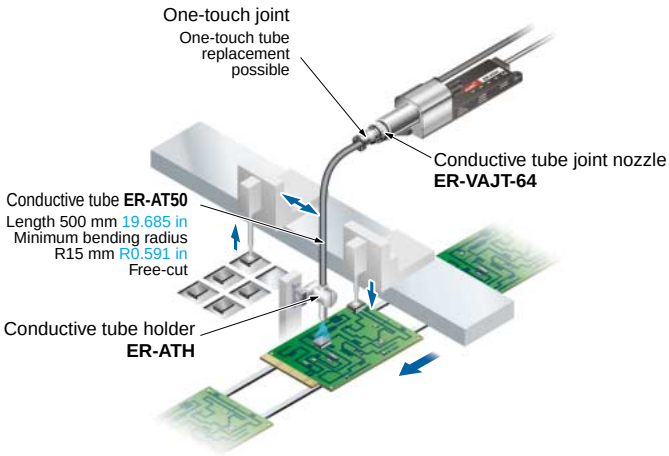
Easy shape-preserving flexibility renders anchoring unnecessary in most cases. Furthermore, can be set near the object from a narrow space enabling charge removal and dust removal at any targeted point.



Can be cut anywhere at will for universal installation

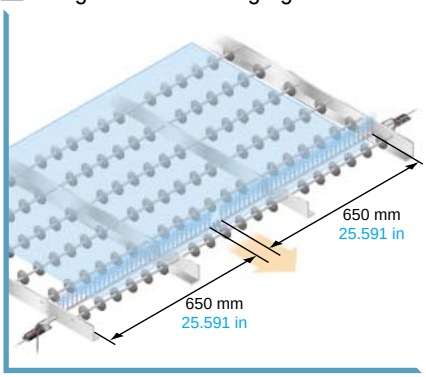
Conductive tube joint nozzle ER-VAJT-64
Conductive tube ER-AT50

The conductive tube can be cut wherever required, and it can be bent to a minimum radius of R15 mm R0.591 in, so that the tube tip can be positioned close to the objects for pinpoint charge and dust removal.

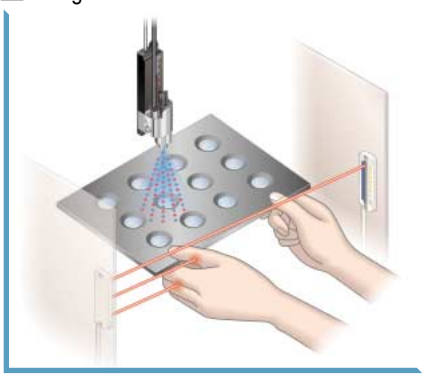


APPLICATIONS

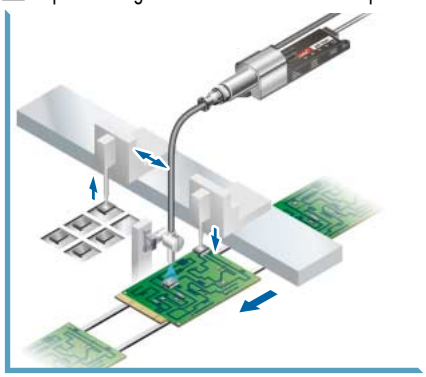
Charge removal of large glass substrate



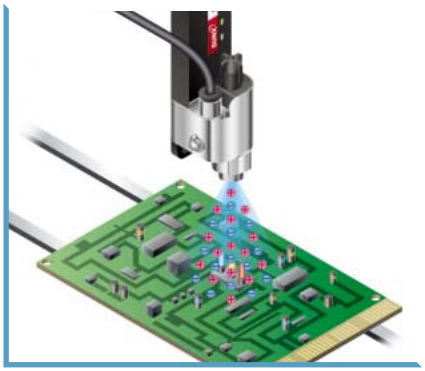
Charge removal and dust removal of lenses



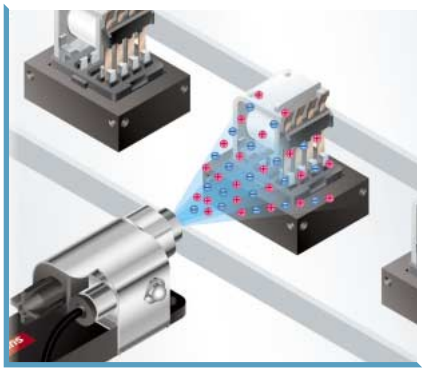
Pinpoint charge removal of electronic components



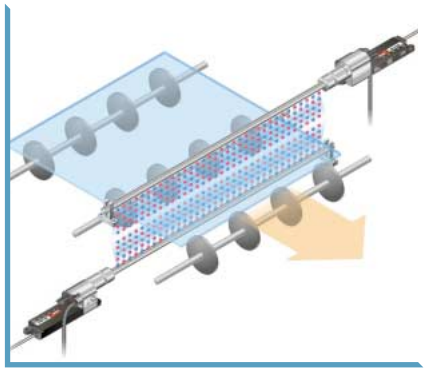
Prevent discharge damage in circuit board LEDs



Charge removal and dust removal of relay and switch contacts



Charge removal of FPD glass surfaces



ORDER GUIDE

Ionizer main unit

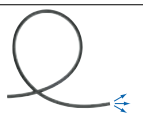
Nozzle and cable with connector are not supplied with the ionizer main unit. Please order them separately.

Type	Appearance	Charge removal time (±1,000 V→±100 V)	Ion balance	Model No.
Spot type	 ※The photograph shows the unit fitted with a shower nozzle.	1 sec. or less (Note)	±15 V or less (Note)	**ER-VS01**

Note: A typical sample applied with a supply voltage of 24 V, a distance of 100 mm 3.937 in from the front surface of the air flow outlet and a pressure of 0.25 MPa while the shower nozzle is in use. (Measured on a sample left in the atmosphere at a relative humidity of 65 % RH or less for 24 hours or more.)

Nozzles

Nozzle is not supplied with the ionizer main unit. Please order it separately.

Type		Appearance	Model No.	Description	
Shower nozzle			**ER-VAS**	Air dispersal type	
Straight bar nozzle			**ER-VAB020**	Effective charge removal length 200 mm 7.874 in	Straight-line bar containing a series of holes
			ER-VAB032	Effective charge removal length 320 mm 12.598 in	
			ER-VAB065	Effective charge removal length 650 mm 25.591 in	
Shape-preserving tube	Joint nozzle		**ER-VAJK**	Joint nozzle for ionizer main unit and shape-preserving tube	
			**ER-VAK10**	Tube length 112 mm 4.409 in	Bends easily and holds its bent shape so the tube does not need to be secured (Minimum bending radius: R40 mm R1.575 in)
			ER-VAK30	Tube length 312 mm 12.283 in	
			ER-VAK50	Tube length 512 mm 20.157 in	
Conductive tube	Joint nozzle		**ER-VAJT-64**	Joint nozzle for ionizer main unit and conductive tube	
			**ER-AT50**	Tube length 500 mm 19.685 in	Bends freely, and can be cut to different length (Minimum bending radius: R15 mm R0.591 in)

Cables with connector

Cable with connector is not supplied with the ionizer main unit. Please order it separately.

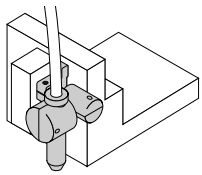
Appearance	Model No.	Description	
	**ER-VCCJ2**	Length: 2 m 6.562 ft, Weight: 52 g approx.	0.15mm² 8-core cabtyre cable with connector Cable outer diameter: ϕ4.2 mm ϕ0.165 in
	ER-VCCJ5	Length: 5 m 16.404 ft, Weight: 120 g approx.	
	ER-VCCJ9	Length: 9 m 29.528 ft, Weight: 240 g approx.	

OPTIONS

Type	Model No.	Description	
Conductive tube holder	**ER-ATH**	Used to secure conductive tubes	
Mini line filter	**ER-AF10**	Processed air volume 40 ℓ/min. (ANR)	Removes solid particles such as dirt and dust from air supply • Collected particle dia. 0.1 μm • Collection efficiency 99.9%
	ER-AF20	Processed air volume 80 ℓ/min. (ANR)	

Conductive tube holder

• **ER-ATH**



Mini line filter

• **ER-AF10**
• **ER-AF20**

※The photograph shows **ER-AF10**

SPECIFICATIONS

Main unit

Item \ Type		Spot type
Model No.		**ER-VS01**
Charge removal time (±1,000V→±100V)		1 sec. or less (Note 1)
Ion balance		±15 V or less (Note 1)
Ozone generation		0.03 ppm or less (Note 2)
Applicable fluid		Air (dried clean air)
Supplied air flow		500 ℓ/min. (ANR) or less (Note 3)
Air pressure range		0.05 to 0.7 MPa (Note 3)
Supply voltage		24 V DC ± 10 %
Current consumption		70 mA or less
Discharge method		High frequency AC method
Discharge output voltage		2,000 V approx.
Check output		NPN open-collector transistor • Maximum sink current: 50 mA • Applied voltage: 30 V DC or less (between check output and 0 V) • Residual voltage: 1 V or less (at 50 mA sink current)
	Output operation	ON when the discharge needle is dirty or worn, OFF when operation is normal
	Short-circuit protection	Incorporated
Error output		NPN open-collector transistor • Maximum sink current: 50 mA • Applied voltage: 30 V DC or less (between error output and 0 V) • Residual voltage: 1 V or less (at 50 mA sink current)
	Output operation	OFF when abnormal discharge is detected, ON when operation is normal
	Short-circuit protection	Incorporated
Discharge halt input		Short-circuit to 0 V: Discharge halt Open: Discharge allowed (operation start)
Reset input		When abnormal discharge is detected, discharge is halted due to an error. Reset the discharge halt by briefly shorting the power supply's 0 V line.
Indicators	Power	Green LED (lights up when the power is ON)
	Discharge	Green LED (lights up when discharging)
	Check	Orange LED (lights up when the discharge needle is worn or dirty, etc.)
	Error	Red LED (lights up when abnormal discharge is detected)
Environmental resistance	Ambient temperature	0 to +55 °C +32 to +131 °F (No dew condensation)
	Ambient humidity	35 to 65 % RH
	EMC	EN 61000-6-2
	Vibration resistance	10 to 150 Hz frequency, 0.75 mm 0.030 in amplitude in X, Y and Z directions for two hours each
Cable		Cable with a connector, 0.5 m 1.640 ft long
Material		Enclosure: PPS, Cover: Stainless steel, Discharge needle: Tungsten
Weight		120 g approx.
Accessory		Connector for wiring: 1 set [Manufactured by Molex: Housing (5557-08R), Terminal (5556TL)]

Notes: 1) A typical sample applied with a supply voltage of 24 V, a distance of 100 mm 3.937 in from the front surface of the air flow outlet and a pressure of 0.25 MPa while the shower nozzle is in use. (Measured on a sample left in the atmosphere at a relative humidity of 65 % RH or less for 24 hours or more.)
2) A typical sample applied with a power voltage of 24 V, a distance of 300 mm 11.811 in from the front surface of the air flow outlet and a pressure of 0.25 MPa while the shower nozzle is in use.
3) The applicable pressure range depends on the nozzle to be used.

Nozzles / Tubes

Item \ Type	Shower nozzle	Straight bar nozzle 200 mm 7.874 in	Straight bar nozzle 320 mm 12.598 in	Straight bar nozzle 650 mm 25.591 in
Model No.	**ER-VAS**	**ER-VAB020**	**ER-VAB032**	**ER-VAB065**
Supplied air pressure range	0.05 to 0.40 MPa			
Charge removal range	———	200 mm 7.874 in	320 mm 12.598 in	650 mm 25.591 in
Material	Stainless steel			
Accessories	Attachment and resin tube: 1 pc. each	Attachment and resin tube: 1 pc. each, Straight bar nozzle holder: 1 set		

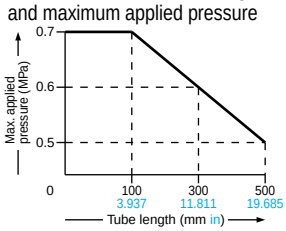
SPECIFICATIONS

Nozzles / Tubes

Item \ Type	Shape-preserving tube joint nozzle	Conductive tube joint nozzle
Model No.	**ER-VAJK**	**ER-VAJT-64**
Air pressure range	0.02 to 0.5 MPa	0.02 to 0.7 MPa (Maximum applied pressure depends on the tube length. Refer to the following figure)
Material	Stainless steel	Stainless steel
Consumption air flow	30 to 250 ℓ/min. (ANR)	20 to 160 ℓ/min. (ANR) (at applied pressure of 0.02 to 0.7 MPa)
Accessories	Attachment (White): 1pc., Resin tube: 1pc.	Attachment (White): 1pc., Resin tube: 1pc.

Item \ Type	Shape-preserving tube			Conductive tube
Model No.	**ER-VAK10**	**ER-VAK30**	**ER-VAK50**	**ER-AT50**
Tube length	112 mm 4.409 in	312 mm 12.283 in	512 mm 20.157 in	500 mm 19.685 in
Material	Tube interior: Aluminum, Tube sheath: High-density polyethylene, Terminal cap: Stainless steel			Urethane
Air pressure range	0.02 to 0.5 MPa			0.02 to 0.7 MPa
Minimum bending radius	R40 mm R1.575 in or more			R15 mm R0.591 in or more

• Correlation between tube length and maximum applied pressure



Mini line filter

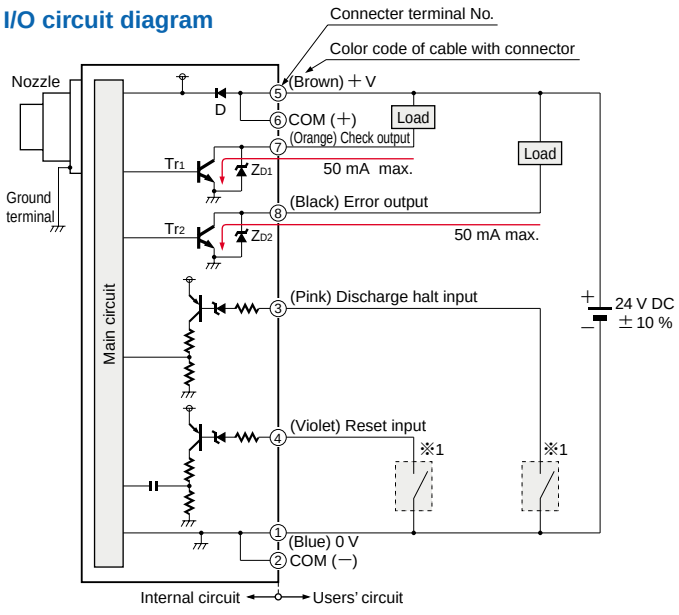
Item \ Designation	Mini line filter	
Model No.	**ER-AF10**	**ER-AF20**
Applicable ionizer	**ER-VS01, ER-SP□**	
Applicable fluid	Air	
Pipe connection port	R1/8, Rc1/8	R1/4, Rc1/4
Collected particle dia.	0.1 μm	
Collection efficiency	99.9 %	
Processed air volume (Note)	40 ℓ/min. (ANR)	80 ℓ/min. (ANR)
Membrane area	29.9 cm^2	68.7 cm^2
Max. operating pressure	0.97 MPa	
Warranted withstand pressure	1.47 MPa	
Ambient temperature	+5 to +45 °C +41 to +113 °F	
Material	Main body: Aluminum alloy (Almite processed), Element: Porous, hollow fiber membrane	
Weight	11 g approx.	18 g approx.

Note: Maximum processed air volume that the filter performance can be maintained.
Approximately 0.1 MPa of pressure drop occurs with the max. processed air volume.

I/O CIRCUIT AND WIRING DIAGRAMS

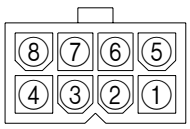
ER-VS01

I/O circuit diagram



Symbols... D: Reverse supply polarity protection diode
Z_{D1}, Z_{D2}: Surge absorption zener diode
Tr_1, Tr_2: NPN output transistor

Connector terminal arrangement



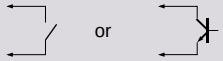
(Front view)

Terminal No.	Description	Color code of cable with connector
①	0 V	Blue
②	COM (−)	——
③	Discharge halt input	Pink
④	Reset input	Violet
⑤	24 V	Brown
⑥	COM (+)	——
⑦	Check output	Orange
⑧	Error output	Black

Note: ① and ② are short-circuited at the connector side.
⑤ and ⑥ are short-circuited at the connector side.

※1

Non-voltage contact or NPN open-collector transistor



• Discharge halt input
Low (0 V): Discharge halt
High (Open): Discharge allowed (Operation starts)
• Reset input
When abnormal discharge is detected, discharge is halted due to an error.
Reset the discharge halt by briefly shorting the power supply's 0 V line.

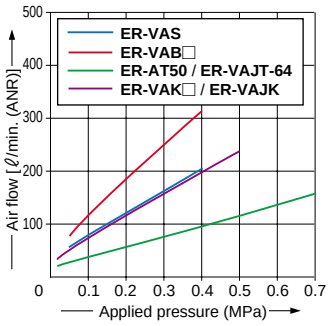
CHARGE REMOVAL CHARACTERISTICS (TYPICAL)

Please contact our office for details on data that is not listed here.

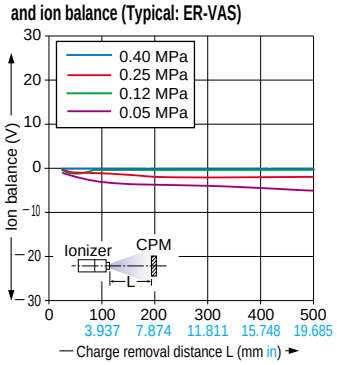
Measured using a □150 mm □5.906 in CPM (charge plate monitor). (At center of CPM)

Common to all nozzles

Air flow

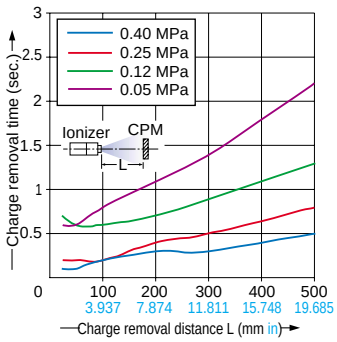


Correlation between charge removal distance and ion balance (Typical: ER-VAS)

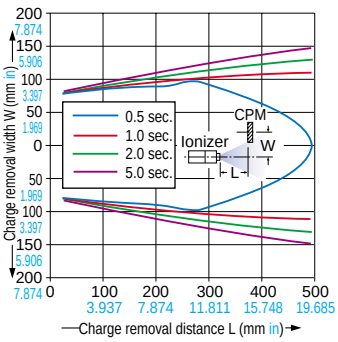


ER-VAS Shower nozzle

Correlation between charge removal distance and charge removal time

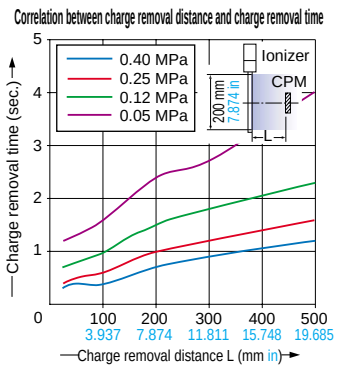


Charge removal field (0.40 MPa)

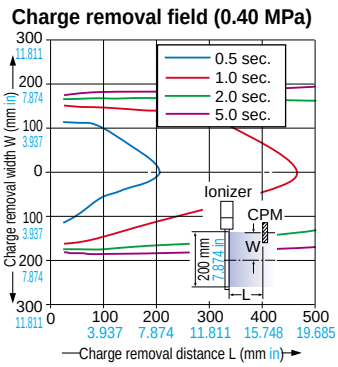


ER-VAB020 Straight bar nozzle

Correlation between charge removal distance and charge removal time

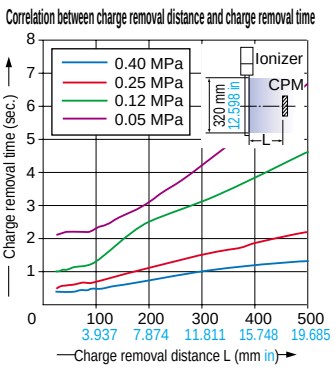


Charge removal field (0.40 MPa)

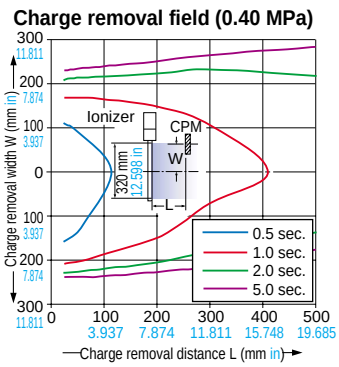


ER-VAB032 Straight bar nozzle

Correlation between charge removal distance and charge removal time

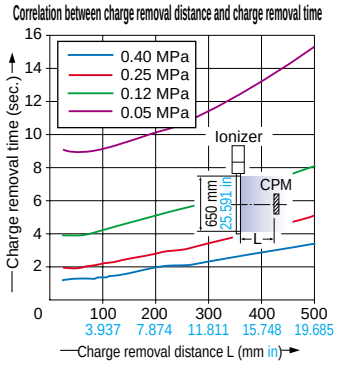


Charge removal field (0.40 MPa)

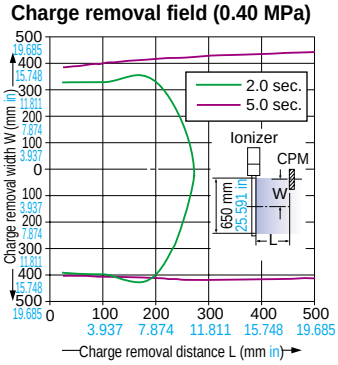


ER-VAB065 Straight bar nozzle

Correlation between charge removal distance and charge removal time



Charge removal field (0.40 MPa)



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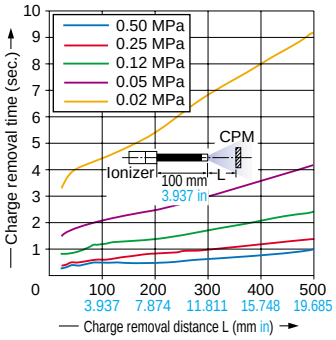
CHARGE REMOVAL CHARACTERISTICS (TYPICAL)

Please contact our office for details on data that is not listed here.

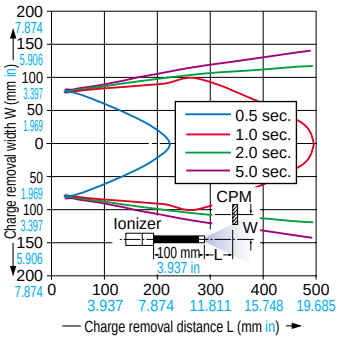
ER-VAJK ER-VAK10

Shape-preserving tube joint nozzle, Shape-preserving tube

Correlation between charge removal distance and charge removal time



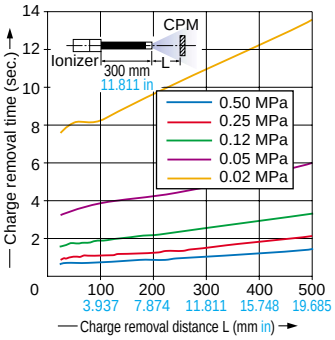
Charge removal field (0.50 MPa)



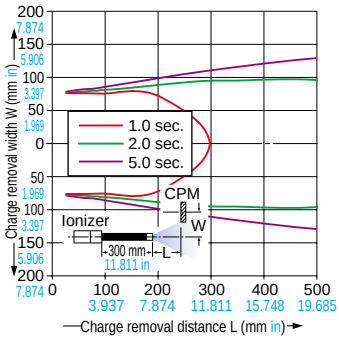
ER-VAJK ER-VAK30

Shape-preserving tube joint nozzle, Shape-preserving tube

Correlation between charge removal distance and charge removal time



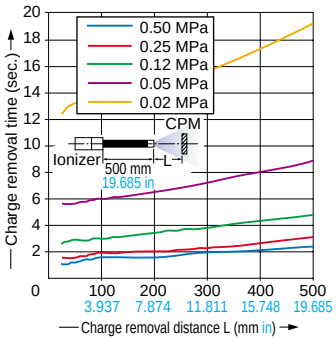
Charge removal field (0.50 MPa)



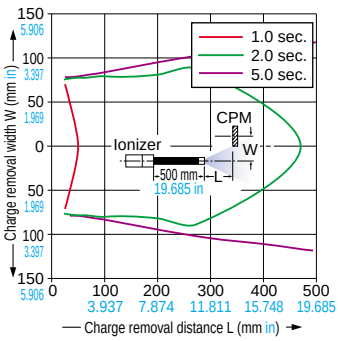
ER-VAJK ER-VAK50

Shape-preserving tube joint nozzle, Shape-preserving tube

Correlation between charge removal distance and charge removal time



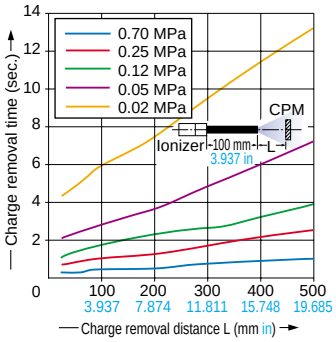
Charge removal field (0.50 MPa)



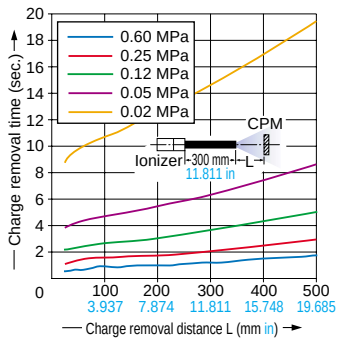
ER-VAJT-64 ER-AT50

Conductive tube joint nozzle, Conductive tube

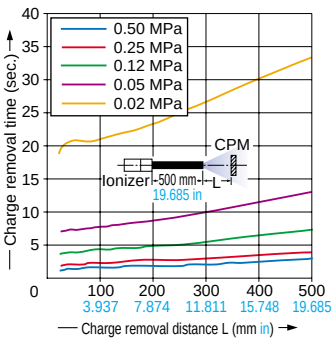
Correlation between charge removal distance and charge removal time (Tube length 100 mm 3.937 in)



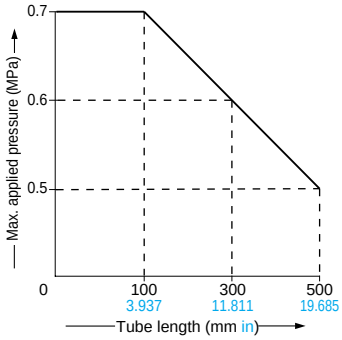
Correlation between charge removal distance and charge removal time (Tube length 300 mm 11.811 in)



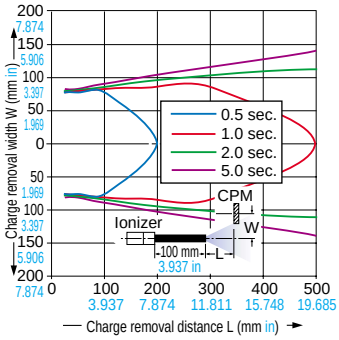
Correlation between charge removal distance and charge removal time (Tube length 500 mm 19.685 in)



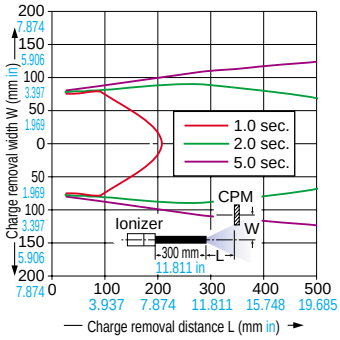
Correlation between tube length and max. applied pressure



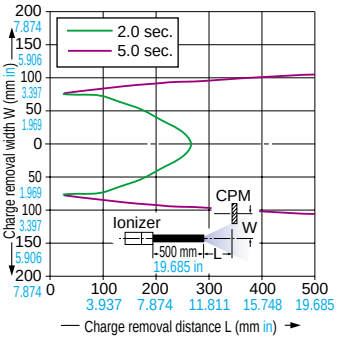
Charge removal field (0.70 MPa) (Tube length 100 mm 3.937 in)



Charge removal field (0.60 MPa) (Tube length 300 mm 11.811 in)



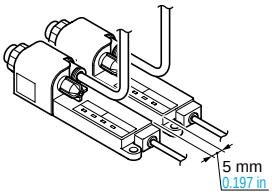
Charge removal field (0.50 MPa) (Tube length 500 mm 19.685 in)



PRECAUTIONS FOR PROPER USE

This product is designed to remove static electricity for industrial use. It is not intended to be used to prevent accidents, either to humans or properties, or for safety maintenance.

Mounting



- When this product is mounted in a housing, use M4 screws (please arrange separately).
- If more than 2 units are mounted close together, keep 5 mm 0.197 in or more between them. If used at distances of less than 5 mm 0.197 in, performance may be affected.
- Ensure sufficient space for daily check and maintenance.
- Make sure to ground this product. If the grounding is not proper, charge removal may be impaired. (Direct earth or power supply common earth)
- If an electrostatically charged object is in contact with or near another object, charge removal may be impaired. Install this product such that ions are blown against the electrostatically charged object, when the object is at a distance from other objects or is floating in mid-air.

Nozzle

The ionizer main unit cannot be used by itself. Always be sure to attach a nozzle (optional) before use.

- There are 8 nozzle models available (as of September 2003). Select the suitable model for your application.
- Appropriate air pressure for each nozzle should be used.
- To fit the air nozzle, screw it to the product till it stops.

Piping

- The outer diameter of the air tube for the air inlet of this product should be ϕ6 mm ϕ0.236 in.
- Make sure that clean air (air containing no water, no oil and no dust) should be supplied.

Maintenance

- Always be sure that the power supply and the air supply are both turned off before inspection and cleaning.
- Since the tip of the discharge needle is pointed, take sufficient care when cleaning.

- The charge removal effect will deteriorate if dirt is stuck to the tip of the discharge needle. If a check signal is output, clean the discharge needle.
- Clean the discharge needle periodically even if no check signal is output.
- The discharge needle's life-time is approximately 10,000 hours. Please change it after this period has elapsed. Use only **ER-V** discharge needle **ER-VANT** (optional).
- If a check signal is output even after the discharge needle has been cleaned, replace the discharge needle.
- If an error signal is output, it may indicate an abnormal discharge. Check the following points:
  ①Make sure that the supply voltage is within the tolerance as per specifications.
  ②Make sure that the discharge needle unit is mounted correctly on the main unit. Check the tip of the discharge needle for a chip or contamination. If the discharge needle is chipped or dirty, clean it or replace it with a new needle.
  ③Check that no foreign materials are inside the nozzle, that the nozzle is mounted correctly and that the ionizer is set up correctly.
  ④Make sure that the ground terminal is connected completely.
- To reset the ionizer after an error signal has been output, input a reset signal.

Procedure for cleaning

①Check that the power supply and the air supply are both turned off.
②Remove the discharge needle from the rear of the main unit.
③Remove the dirt on and around the discharge needle with a cotton swab soaked in alcohol.
④Check the discharge needle once more to make sure it is free from foreign particles such as thread scraps.
⑤After cleaning the discharge needle, mount it.

Replacing the discharge needle

①Check that the power supply and the air supply are both turned off.
②Remove the discharge needle from the rear of the main unit.
③After checking the there is no contamination on or around the new discharge needle, mount the nozzle.

Wiring

- Make sure that the power supply is off while wiring. Otherwise, there is a danger of electric shock.
- After wiring, reconfirm the wiring connections before switching on the power supply.
- Note, wrong wiring will damage the product.
- Verify that the supply voltage variation is within the rating.
- Do not run the wires together with high-voltage lines or power lines or put them in the same raceway. This can cause malfunction due to induction.

Others

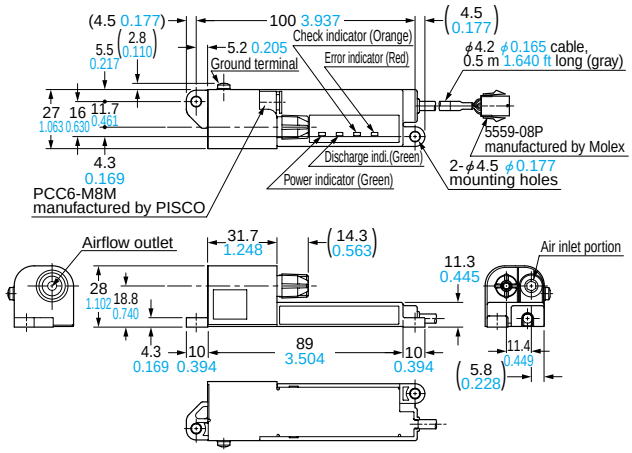
- Make sure to use the DC power supply insulated by an isolation transformer, etc. for this product.
- If an auto-transformer, etc. (single winding transformer) is used, this product or the power supply may be damaged due to short-circuit.

- Do not use this product beyond its rated specifications. Doing so can cause product breakdown, non-function, or damage. Furthermore, it will also cause a marked reduction in product life.
- Never disassemble, repair, modify, or misuse this product, as this can cause an accident or malfunction.
- Do not throw this product into fire: it may explode or generate poisonous gas.
- Since high voltage is applied to the discharge needle, keep your fingers, body, metal, e.g. wires or tools, etc., away from the needle. If you fail to keep away from the needle, electric shock or malfunction may be the result.
- This product is not explosion-proof. Do not use it in places where combustible or flammable material is present. There is a danger of catching fire.
- Since this product emits ozone into the atmosphere, circulate air to prevent foul smells. If ozone lingers for long periods, metals, etc. may oxidize / decay. Furthermore, do not try to confirm that foul smells are caused by the ozone by drawing your face near the nozzle outlet and air outlet: you may hurt your nose, throat, etc.
- Do not use this product in steamy or dusty places, in places where water and oil splash, or where spatter flies when welding.
- If the power supply is switched on immediately after being switched off, fault output may be generated. After the power supply is switched off, wait at least 1 sec. before switching it on again.
- Confirm the wiring and piping state before supplying power or air. Wrong wiring and piping may cause malfunction.
- Do not use this product for any purpose other than charge removal.
- When this product is no longer usable or required, dispose of properly as industrial waste.
- If the air supplied to this product is turned ON / OFF by a solenoid valve, for example, make sure to turn the discharge halt input ON / OFF simultaneously.
- Use air (dry, clean air) for the fluid. Any fluid other than air (dry, clean air) or even air containing corrosive gas may cause an accident or malfunction.
- Do not use air that contains foreign particles, e.g. carbon dust, dust, water or oil. Since these substances may cause electric shock or malfunction, take appropriate countermeasures, e.g. install an airfilter, air-drier, etc.

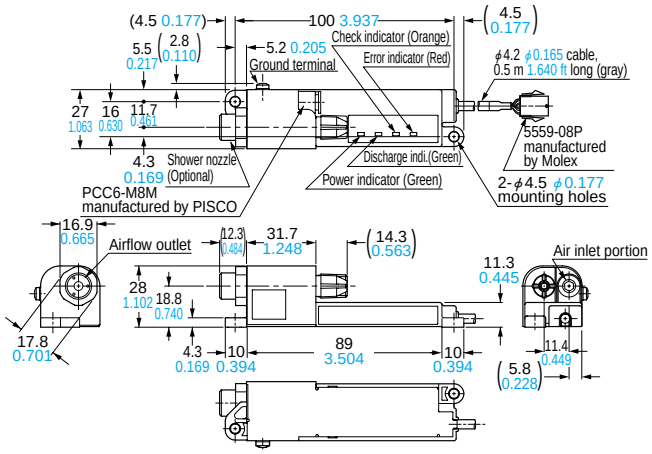
DIMENSIONS (Unit: mm in)

The CAD data in the dimensions can be downloaded from the SUNX website: http://www.sunx.co.jp/

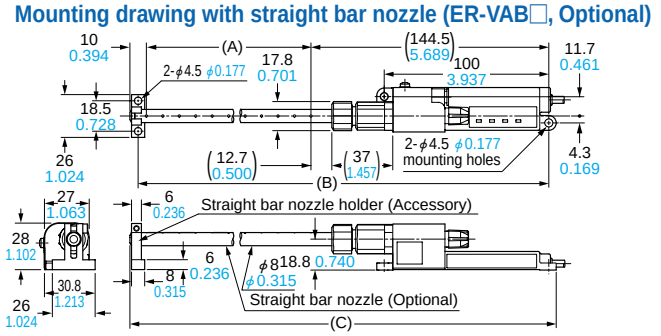
ER-VS01 Ionizer main unit



Mounting drawing with shower nozzle (ER-VAS, Optional)

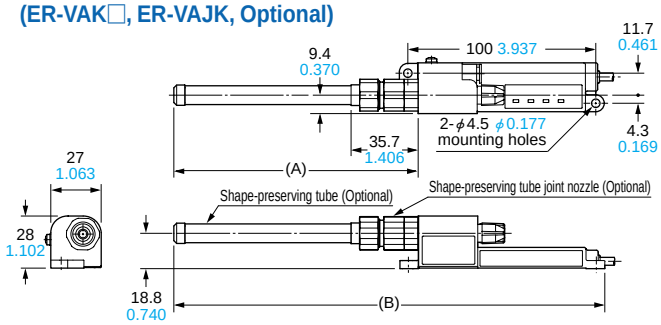


Mounting drawing with straight bar nozzle (ER-VAB□, Optional)



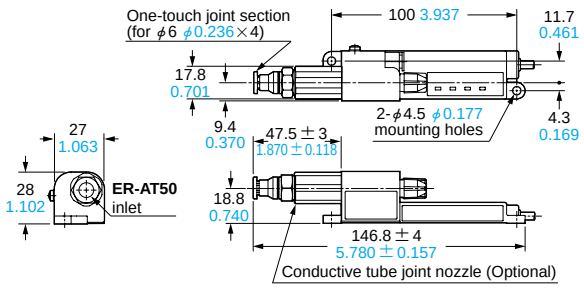
Model No.	A	B	C
ER-VAB020	200 7.874	349.5 13.760	359 14.134
ER-VAB032	320 12.598	469.5 18.484	479 18.858
ER-VAB065	650 25.591	799.5 31.476	809 31.850

Mounting drawing with shape-preserving tube and joint nozzle (ER-VAK□, ER-VAJK, Optional)

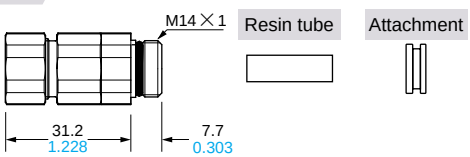


Model No.	A	B
ER-VAK10	130 5.118	229.3 9.028
ER-VAK30	330 12.992	429.3 16.902
ER-VAK50	530 20.866	629.3 24.776

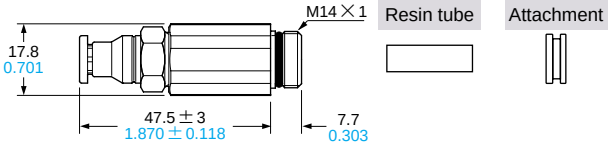
Mounting drawing with conductive tube joint nozzle (ER-VAJT-64, Optional)



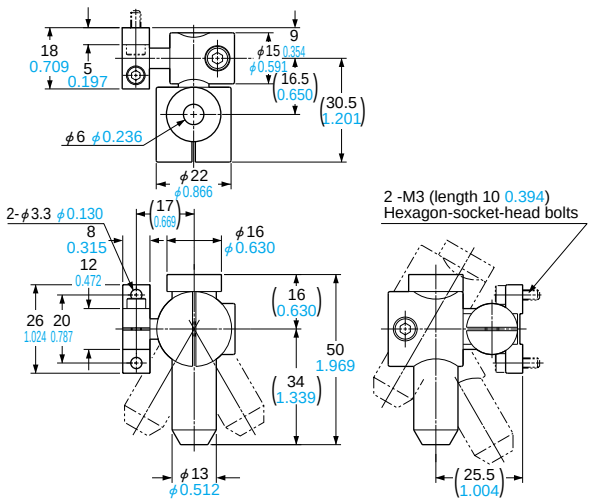
ER-VAJK Shape-preserving tube joint nozzle (Optional)



ER-VAJT-64 Conductive tube joint nozzle (Optional)

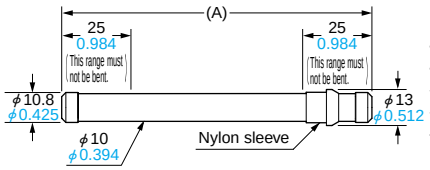


ER-ATH Conductive tube holder (Optional)



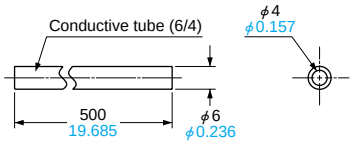
DIMENSIONS (Unit: mm in)

ER-VAK□ Shape-preserving tube (Optional)

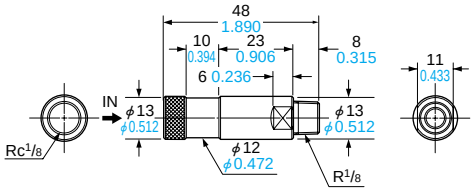


Model No.	A
ER-VAK10	112 4.409
ER-VAK30	312 12.283
ER-VAK50	512 20.157

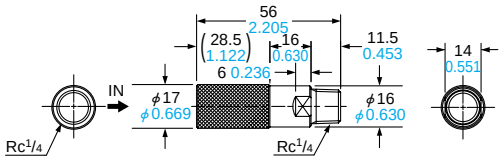
ER-AT50 Conductive tube (Optional)



ER-AF10 Mini line filter (Optional)



ER-AF20 Mini line filter (Optional)



All information is subject to change without prior notice.

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Sensing the Future

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No. CE-ERV-5 May, 2004