

**Ionizer**





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- ER-F.** Fan-type ionizer . . . . .8
- ER-X.** Area ionizer for fast applications . . . . .10
- ER-VW.** Ionizer with adjustable nozzle angles . . . . .16
- ER-V.** Ultra compact high-performance ionizer . . . . .20
- EC-G.** Pulse air-gun ionizer . . . . .28
- EF-S1.** Constant monitoring of static charges on production lines . . . . .30

<b>EC-G02</b>	<b>ER-V</b>	<b>ER-VW</b>	<b>EF-S1</b>	<b>ER-X</b>
				
Neutralizing and cleaning of flat screens	Prevent discharge damage in circuit board LEDs	Freely selectable layout of area for charge removal	Surface potential measurement during loading and unloading	Fast charge removal for wide areas

### SERVICE HAS PRIORITY

We are constantly striving to optimize our service to enable us to react quickly to customer requests. Whether you have specific application requests or simply want technical information, we are always ready to advise and assist you; you only have to call. Our current product range is assembled for you in this ionizer overview. Besides the most important technical data, you will

find numerous illustrations of possible applications. Of course, detailed data sheets are available for download on our website [www.panasonic-electric-works.com](http://www.panasonic-electric-works.com). Our product managers, sales and application engineers will be happy to advise you.

### WHAT DO IONIZERS DO?

On neutral surfaces, the relationship between positive and negative charges is equalized. Through rubbing, pressure or separating two neutral non- or semiconductors, the surface can become either positively or negatively charged. Since such charges on non-conductors and semiconductors are static, the problem cannot be simply resolved by grounding. This is where ionizers, which neutralize electrostatic charge, come into play.

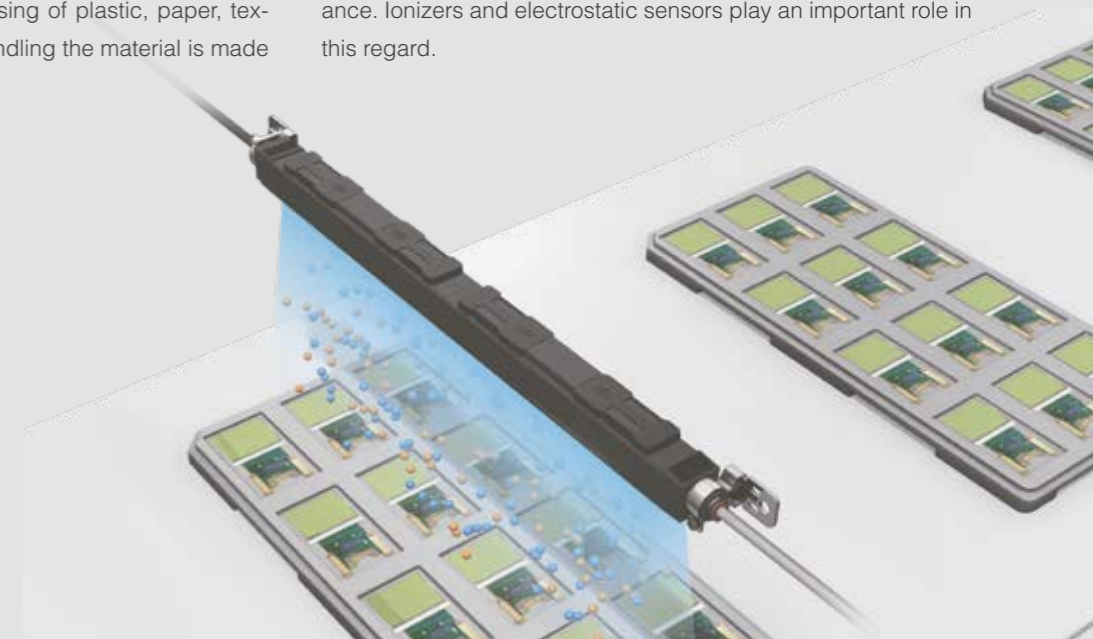
In the production and processing of electronic components, electrostatic charges (ESD) often damage the structure of the semiconductor. Especially ongoing miniaturization and ever increasing packing density lead to a continual decrease in electrostatic compatibility of electronic components. However, ESD also hinders the manufacture and processing of plastic, paper, textiles, and glass. On the one hand, handling the material is made

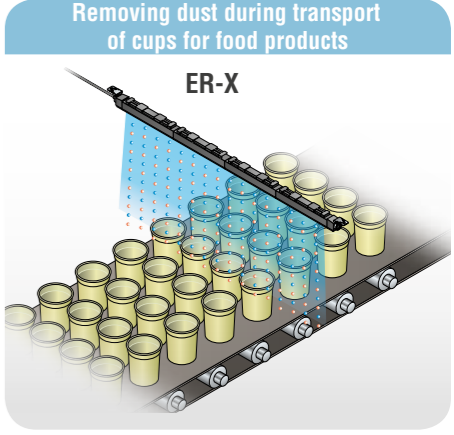
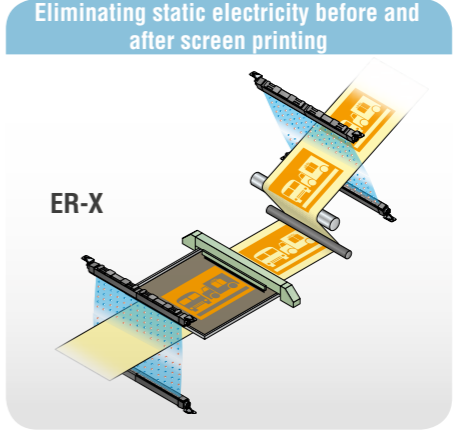
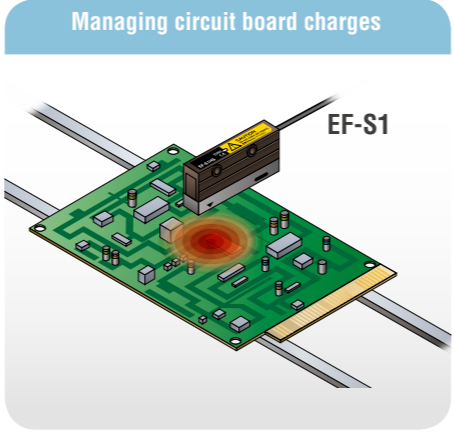
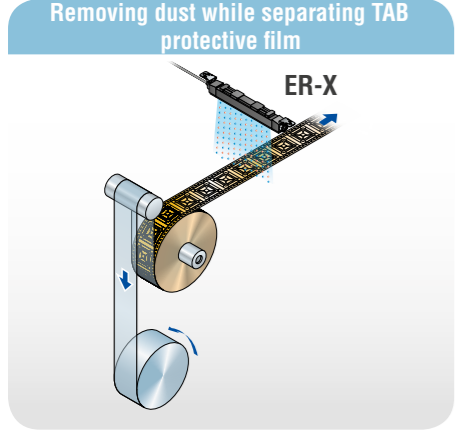
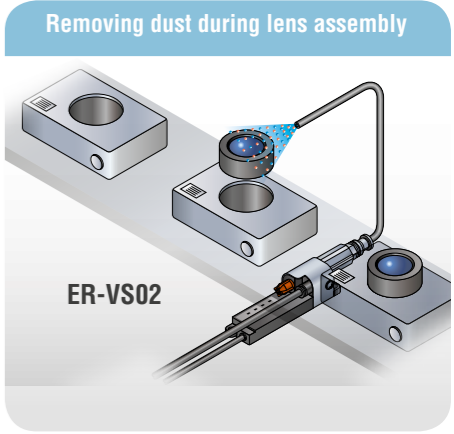
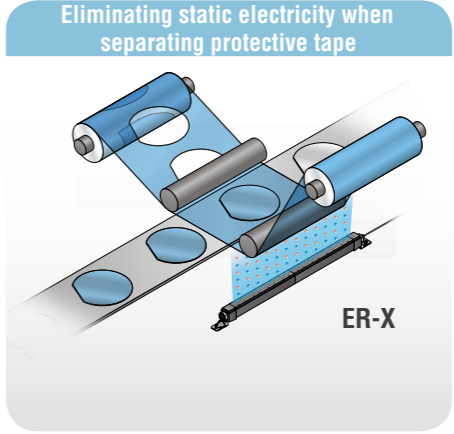
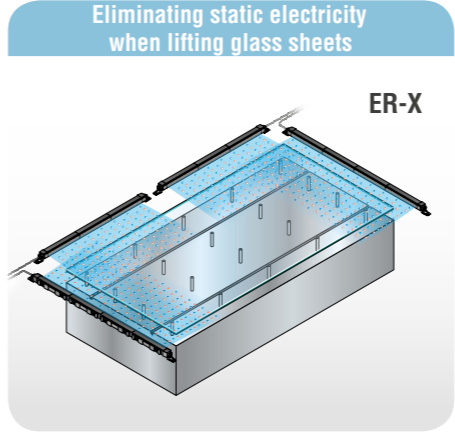
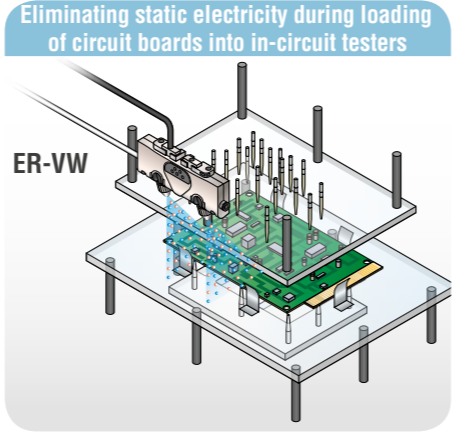
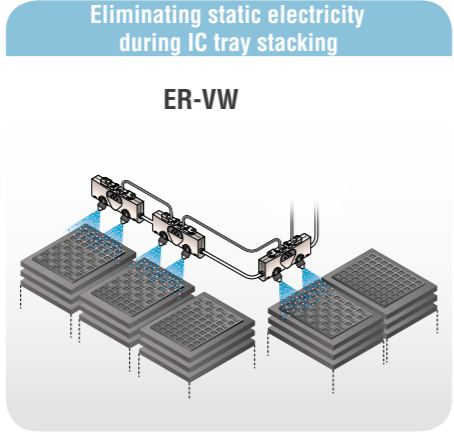
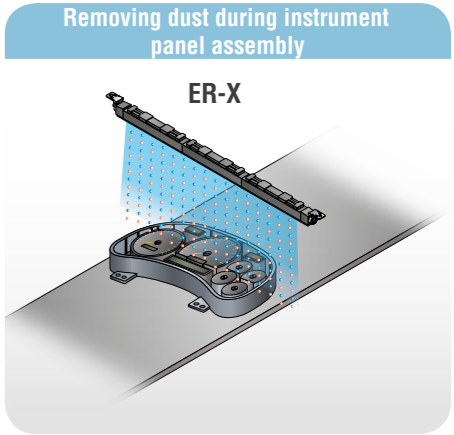
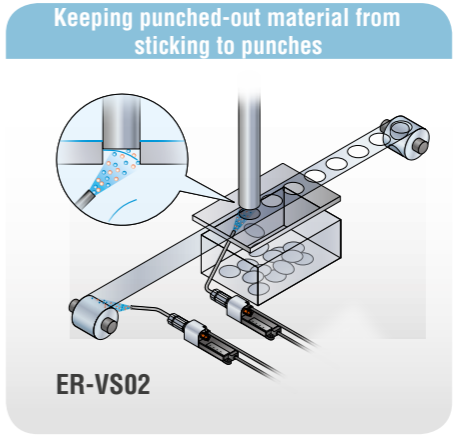
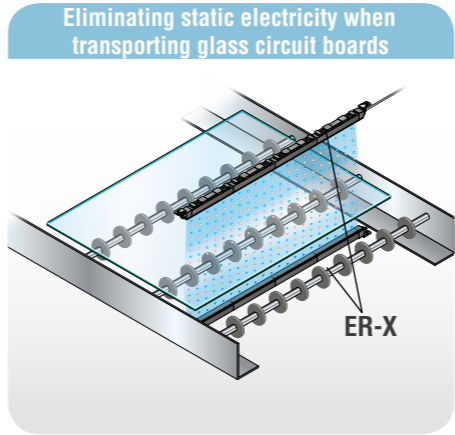
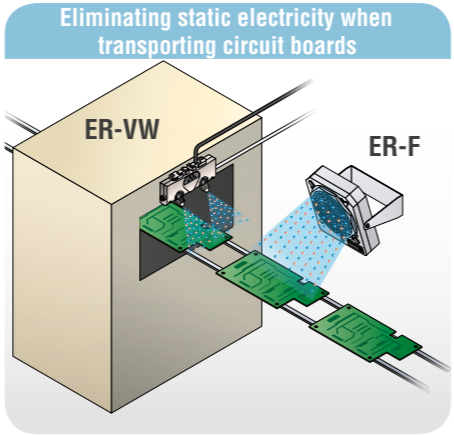
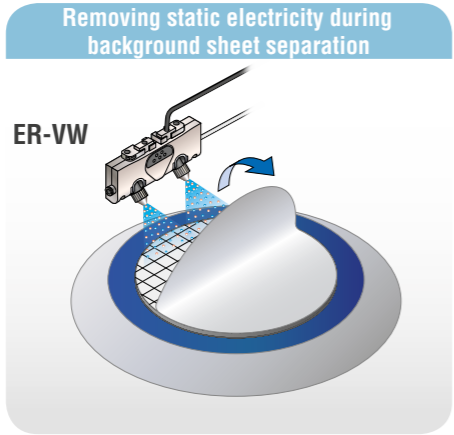
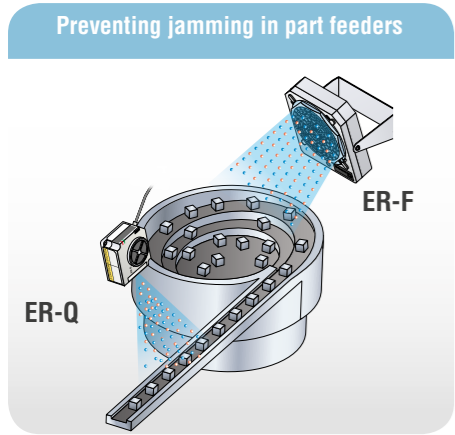
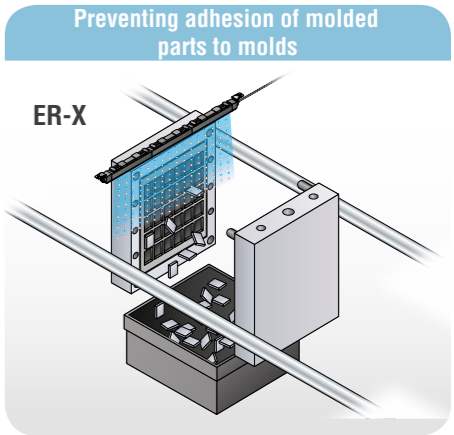
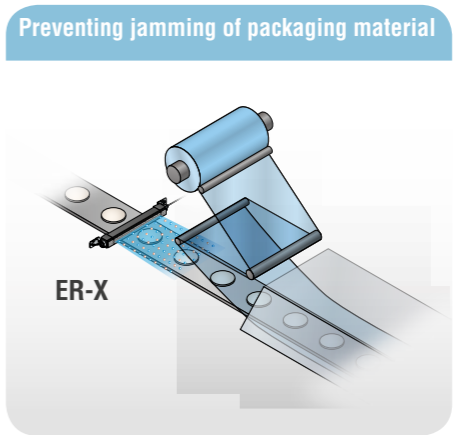
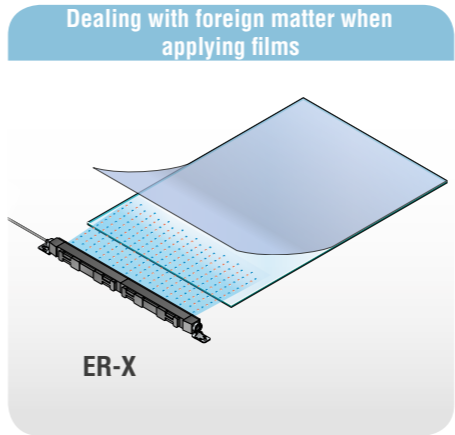
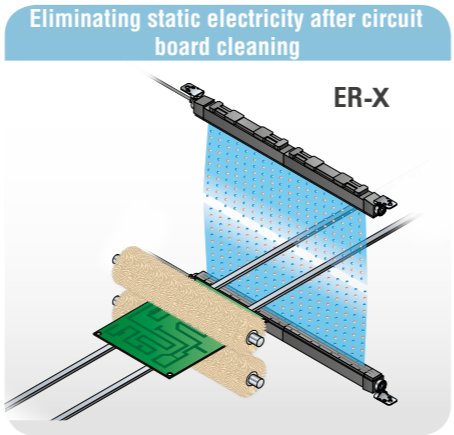
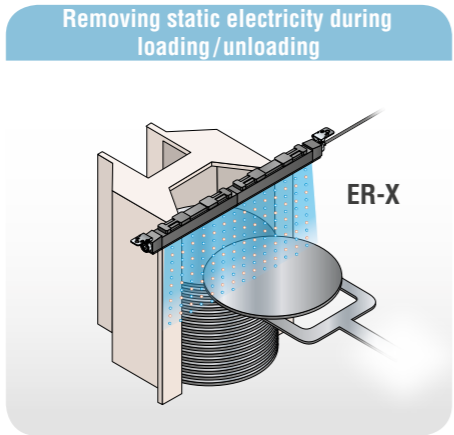
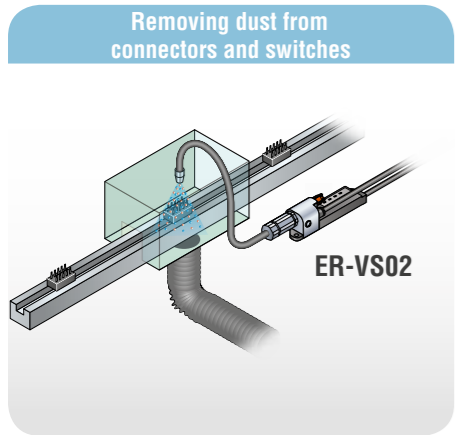
difficult. On the other hand, due to electrostatic charge, undesired particles such as dust and dirt stick to the material.

To reduce failure rates and the resulting costs, ionizers are used. By continuously generating positive and negative ions, ionizers neutralize object surfaces that are charged.

Also in the manufacture and processing of plastics, ionizers help equalize the charge on material surfaces. By eliminating electrostatic charge with ionizers, you can prevent not only dust from clinging to your products but also stop plastic parts and foil from sticking to each other.

For this reason, recognizing and eliminating electrostatic discharge is becoming increasingly important for quality assurance. Ionizers and electrostatic sensors play an important role in this regard.







# ER-Q

Miniature ionizer with fan

## Features

### Small dimensions

Simple and space-saving installation on production lines and manual workstations.

### Adjustable

The production of the required air volume can be adjusted any time during operation.

### Simple maintenance

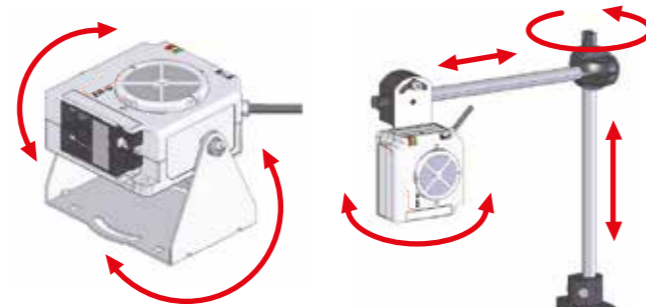
Assembled and disassembled in a single touch, reducing steps required to replace parts or clean filters.

### Unit for demanding industrial environments

The LED displays the required maintenance steps or failures; this also can be queried via PLC. Parts for maintenance are easy to get at and replace.

### Freely mounted: No air hoses necessary

Mountable like a sensor in cell workbenches or inside devices.



ER-QMS1 (optional mounting bracket)

MS-AJ1-A (optional universal sensor mounting stand)

## SPECIFICATIONS

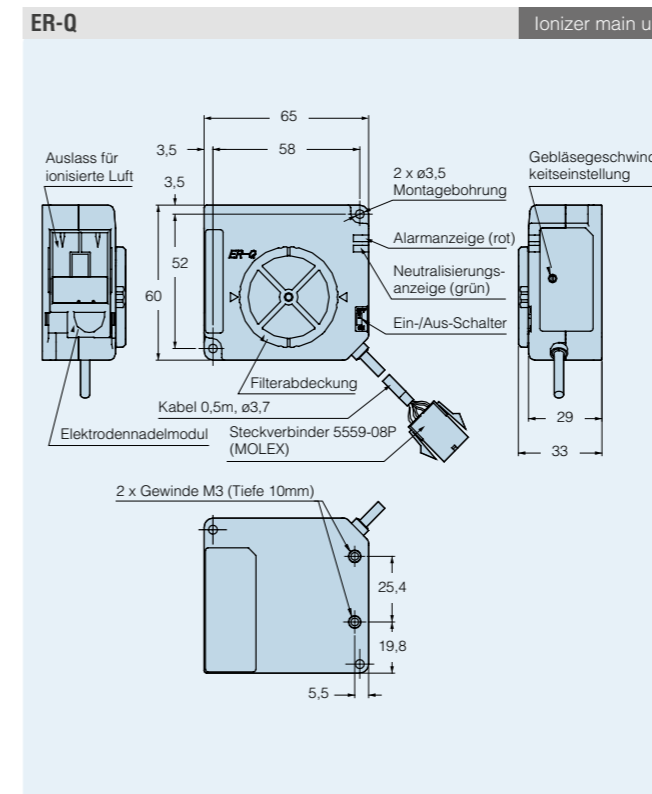
Type	Compact fan type
Model No.	ER-Q
Charge removal time	Approx. 1.5s (note)
Ion balance	Max. ±10 V (note)
Power supply voltage	24 VDC ± 10%
Power consumption	Max. 200mA
Discharge method	High-frequency AC method
Discharge output voltage	Approx. ±2kV
Max. fan speed	6.4m/s (note)
Max. fan volume	0.2m³/min
Main functions	Discharge check, discharge error, fan error, check output, error output
Indicators	Discharge (DSC): green LED, alarm (ALARM): red LED
Accessories	Connector for wiring: 1 set [manufactured by MOLEX: housing (5557-08P), terminal (5556T)]

Note: Typical value at 100mm from directly in front of air outlet, fan speed MAX, with no filter installed.

## OPTIONS

- ER-QMS1** / Mounting bracket  
The ER-Q mounting bracket. Adjust the air output direction.
- ER-QCC2** / Connector-attached cable  
Length 2m  
**ER-QCC5** / Connector-attached cable  
Length 5m  
  - > 0.13mm² 8-core connector cable
  - > Cable outer diameter: ø3.7mm
- ER-QFX5** / Air filter  
Fan intake filter (5 pcs. per set)
- ER-QANT** / Discharge needle unit  
Unit with tungsten needles (1 pc.)

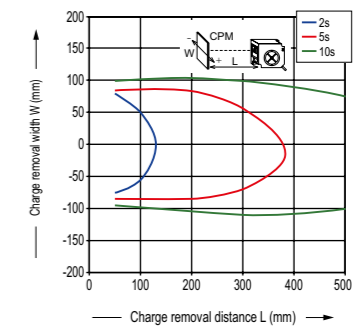
## DIMENSIONS (Unit: mm)



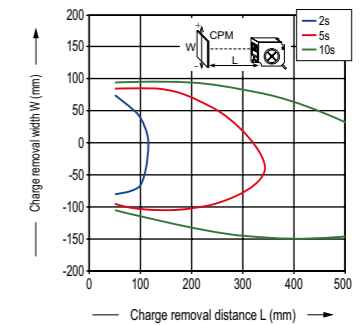
## CHARGE REMOVAL CHARACTERISTICS (TYPICAL)

Measured at center of a 150 x 150mm charge plate monitor.

Charge removal field (horizontal direction) (fan speed MAX, filter is mounted)



Charge removal field (vertical direction) (fan speed MAX, filter is mounted)





# ER-F

Fan type ionizer

## Features

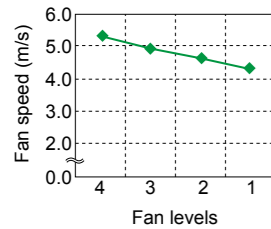
### Two types

The low volume fan type of the **ER-F** series generates only half the air volume of the standard type, which is required for small components and thin film. Four different speeds can be selected for the fan.

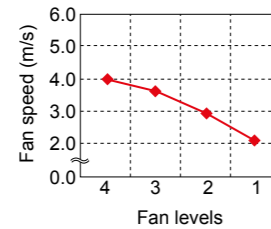
### Easy maintenance

Because the discharge needle unit is attached to the louver, exchange or maintenance of the needles is made easy without touching the main unit. A safe design: once the louver is removed, the high-voltage circuit is broken and the fan halts. Simply replace the louver to change configuration between long distance and wide area ionization. The two louvers come with the ionizer main body.

Standard fan type  
ER-F12A



Low-volume fan type  
ER-F12SA



Straight louver removes charges  
at great distances



Neutralizes static charges quickly from a great distance

Angled louver removes charges  
over wide area



Neutralizes static charges; wide area ionizer



## SPECIFICATIONS

Type	Standard fan type	Low-volume fan type
Model No.	ER-F12A	ER-F12SA
Charge removal time	Approx. 1s (note 1)	Approx. 1.5s (note 1)
Ion balance	Max. ±10V (note 2)	
Power supply voltage	24VDC ±10%	
Power consumption	Max. 700mA	Max. 400mA
Discharge method	High-frequency AC method	
Discharge output voltage	Approx. ±2kV	
Max. fan speed	5.3m/s (note 2)	4.0m/s (note 2)
Max. fan volume	3.68m³/min	2.50m³/min
Main functions	Error output, discharge halt input	
Indicators	Discharge error (red), fan error (red), power (green), discharge (green)	
Accessories	Straight louver: 1 pc. (note 3), angle louver: 1 pc. Caution label: 1 set, rubber cushion: 1 pc.	

### Notes:

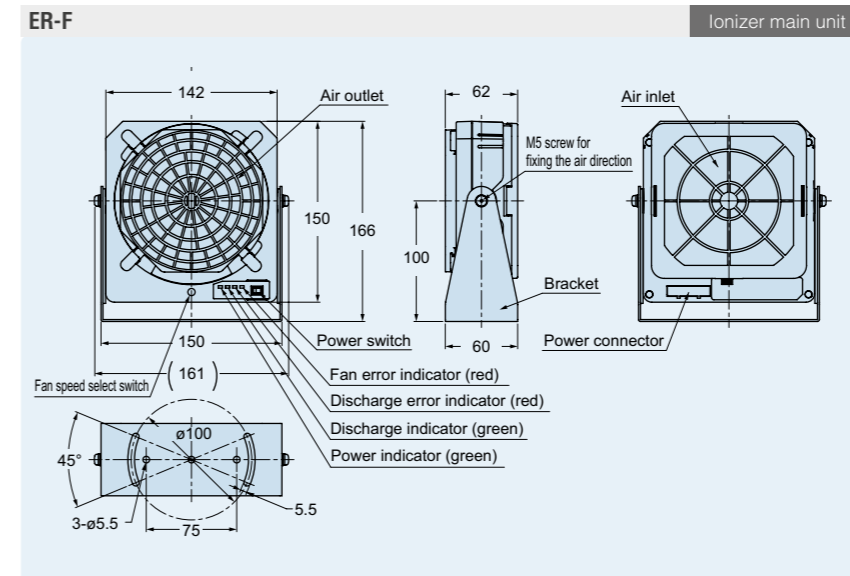
- 1) Typical value at 200mm from directly in front of air outlet, fan speed MAX, straight louver, with no filter installed.
- 2) Typical value at 300mm from directly in front of air outlet, fan speed MAX, straight louver, with no filter installed.
- 3) The discharge needle unit is loaded on the straight louver before shipment.

## OPTIONS

**ER-F12ANT** / Discharge needle unit  
Unit with tungsten needles (1 pc.)

**ER-F12FX5** / Air filter  
Replacement filter (5 pcs. per set)

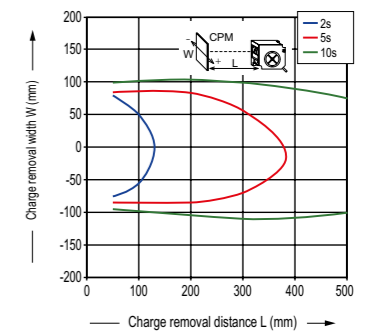
## DIMENSIONS (Unit: mm)



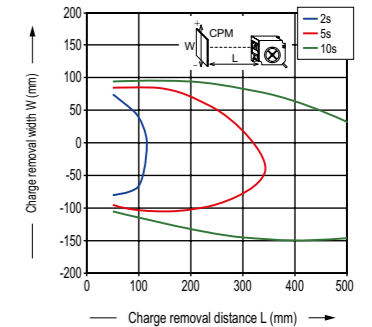
## CHARGE REMOVAL CHARACTERISTICS (TYPICAL)

Measured at center of a 150 x 150mm charge plate monitor.  
\* Solid lines in the graphs show **ER-F12A**.  
Dotted lines show **ER-F12SA**.

Charge removal field (horizontal direction) (fan speed MAX, filter is mounted)



Charge removal field (vertical direction) (fan speed MAX, filter is mounted)





# ER-X

Area ionizer for fast applications

## Features

### Quick charge removal

Thanks to the pulse AC method, the ER-X series is well suited for high-speed applications as found in the packaging and semiconductor industries, where charge removal time is directly linked to productivity. In addition, discharge frequencies can be adjusted from between 1 and 100Hz, maximizing flexibility. Thanks to a built-in feedback system, the ionizer can even adjust the discharge frequency automatically during operation.

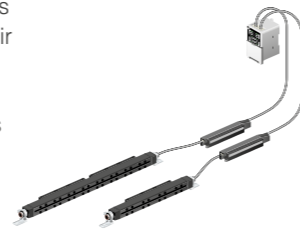


### Feedback system

Individual displays for discharge, error messages, and needle control are provided on the controller. Furthermore, you can activate settings for frequency, ion balance or limits directly via a potentiometer and DIP switches.

### Airless operation

The area ionizer of the ER-X series can be operated with or without air pressure. This technology is useful for applications in fields such as the coating industry, as well as the production and packaging of microelectronic components that otherwise are blown around by whirling air.



### Flexible system configuration

The system consists of a sensor head and a controller. The sensor head is available in different sizes. You can connect up to 2 heads simultaneously to the controller. This enlarges the working area of the system up to 1.2m.

## Typical applications

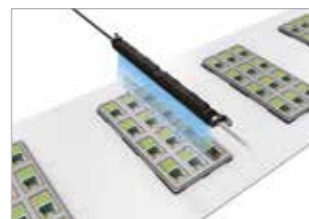
### Neutralization of foils



### Charge removal from ICs



### Charge removal from miniaturized electronic components



## ORDER GUIDE

### Heads

Head connection cable is not supplied with the head. Please order it separately.

Type	Product image	Charge removal time (±1000V→±100V)	Ion balance	Effective charge removal width	Model No.
Spot type		Max. 0.3s (note 3) Max. 0.5s (note 4)	Max. ±30V (note 4, 2)	Approx. 50mm	ER-X001
Bar type		Approx. 1s (note 1)	Max. ±30V (note 1, 2)	Approx. 80mm	ER-X008
				Approx. 160mm	ER-X016
				Approx. 320mm	ER-X032
				Approx. 480mm	ER-X048
				Approx. 640mm	ER-X064

#### Notes:

- The following conditions apply: discharge distance 100mm, center of the product, discharge wavelength 50Hz and no air supply.
- Ion balance is average of plus and minus. Also, the specification value is a typical value under the following conditions: max. ±10°C ambient temperature change, set the ion balance after 30 minutes of the discharge starting, switching on the ion balance control function.
- The following conditions apply: discharge distance 50mm, center of the product, discharge wavelength 50Hz and air supply 60 l/min (0.3mMPa).
- The following conditions apply: discharge distance 50mm, center of the product, discharge wavelength 50Hz and no air supply.

### Controller

Power cable is not supplied with the controller. Please order it separately.

Type	Product image	Output	Number of heads connected	Model No.
Standard type		PhotoMOS relay	Max. 2 units	ER-XC02

### Head connection cable

Head connection cable is not supplied with the head. Please order it separately.

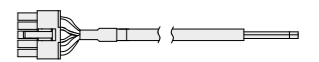
Appearance	Model No.	Description
	ER-XCCJ2H	Length: 2m, net weight: approx. 80g
	ER-XCCJ5H	Length: 5m, net weight: approx. 190g
		Cab tire cable with a connector at both ends

## OPTIONS

Item	Model No.	Description
Power cable	ER-XCC2	Length: 2m, Net weight: Approx. 80g
	ER-XCC5	Length: 5m, Net weight: Approx. 190g
Discharge needle unit	ER-XANT	Unit with replacement tungsten needles: 1 pc.

### Power cable

#### > ER-XCC□



### Discharge needle unit

#### > ER-XANT



**SPECIFICATIONS**

**Heads**

Model No.	ER-X001	ER-X008	ER-X016	ER-X032	ER-X048	ER-X064
Effective charge removal width	Approx. 50mm	Approx. 80mm	Approx. 160mm	Approx. 320mm	Approx. 480mm	Approx. 640mm
Charge removal time	Max. 1s (note 1)					
Ion balance	Max. ±30V (note 1, 2)					
Discharge method	Pulse AC method					
Discharge output voltage	Approx. 7000V					
Ozone generation	Max. 0.01ppm					
Maximum air pressure	0.5MPa					
Applicable fluid	Air (dried clean air) (note 3)					
Net weight	Approx. 370g	Approx. 330g	Approx. 410g	Approx. 530g	Approx. 650g	Approx. 780g

- Notes:**
- The following conditions apply: discharge distance 100mm, center of the product, discharge wavelength 50Hz and no air supply.
  - Ion balance is average of plus and minus. Also, the specification value is typical value in condition of max. ±10°C ambient temperature change, set the ion balance after 30 minutes of the discharge starting, switching on the ion balance control function.
  - The dried clean air is defined for air passing through air dryer (dew point: equivalent of -20°C) and air filter (mesh-size: equivalent of 0.01µm)

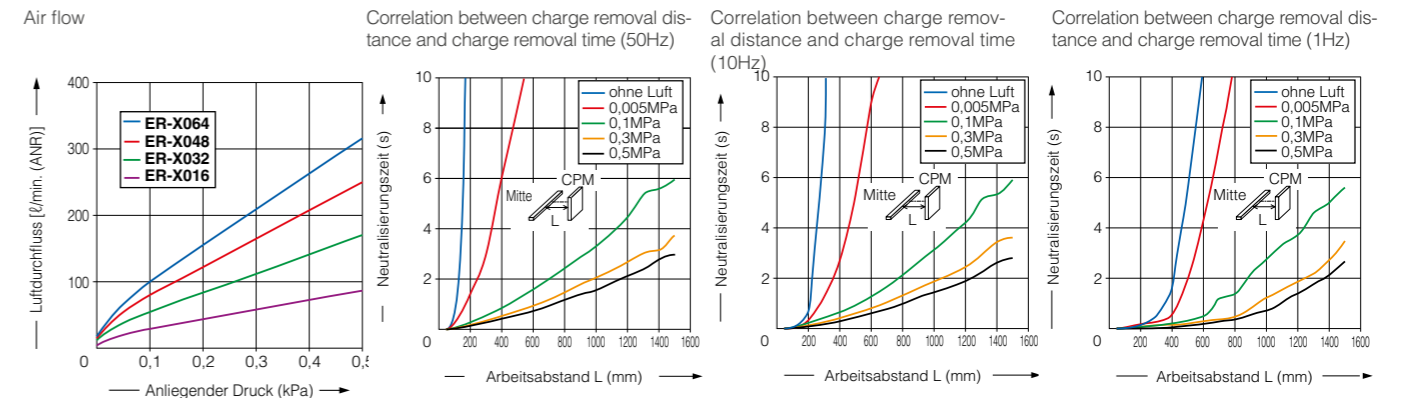
**Controller**

Model No.	ER-XC02	
Number of heads connected	Max. 2 units	
Supply voltage	24VDC ±10 %	
Current consumption	Max. 450mA when connecting 1 head, max. 800mA when connecting 2 heads	
Indicator	Displays status of head 1 and 2	
DSC (Discharge)	Green LED (lights up when ionizer discharges)	
CHECK	Orange LED (lights up when dirt, wear, is detected on the discharge needle)	
ERROR	Red LED (lights up when abnormal discharge is detected)	
Level meter	Green LED (5 levels, lights up depending on the amount of the charge or ion generated)	
Output [ALARM ERROR COM (Common)]	PhotoMOS relay output Max. load current: 100mA Applied voltage: max. 30VDC (between output-output common) Residual voltage: max. 1.5V(at load current of 100mA)	
Output operation	ALARM:	ON when dirt or wear of the discharge needle is detected. OFF when operation is normal.
	ERROR:	OFF when abnormal discharge is detected. ON when operation is normal.
Short-circuit protection	Incorporated (automatic reset type)	
Accessories	Power supply / I/O connector: 1 set (housing 5557-10R, terminal 5556TL [manufactured by Molex Inc.] Ground wire (approx. 3.7m): 1 pc.	

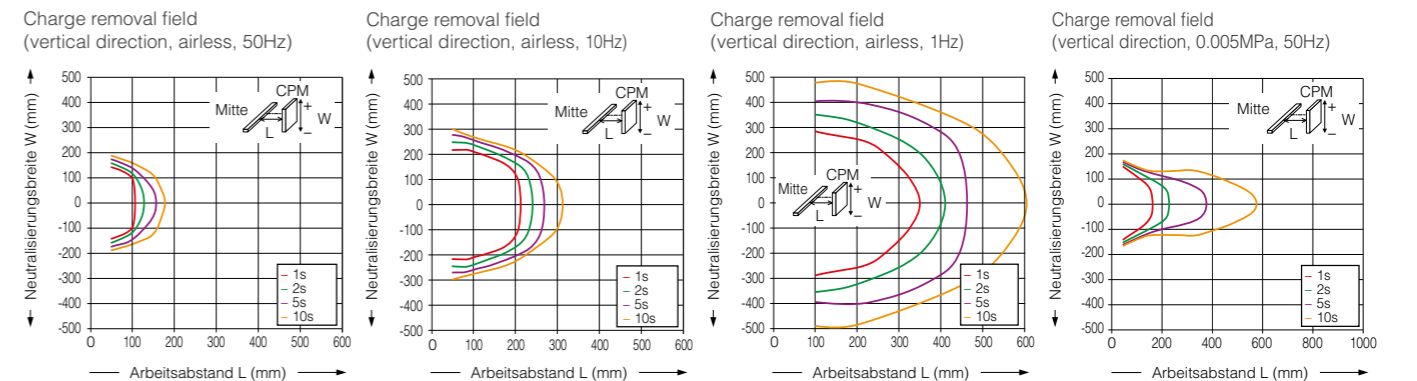
**CHARGE REMOVAL CHARACTERISTICS (TYPICAL)**

Measured at center of a 150 x 150mm charge plate monitor. Please contact our office for details on data that is not listed here.

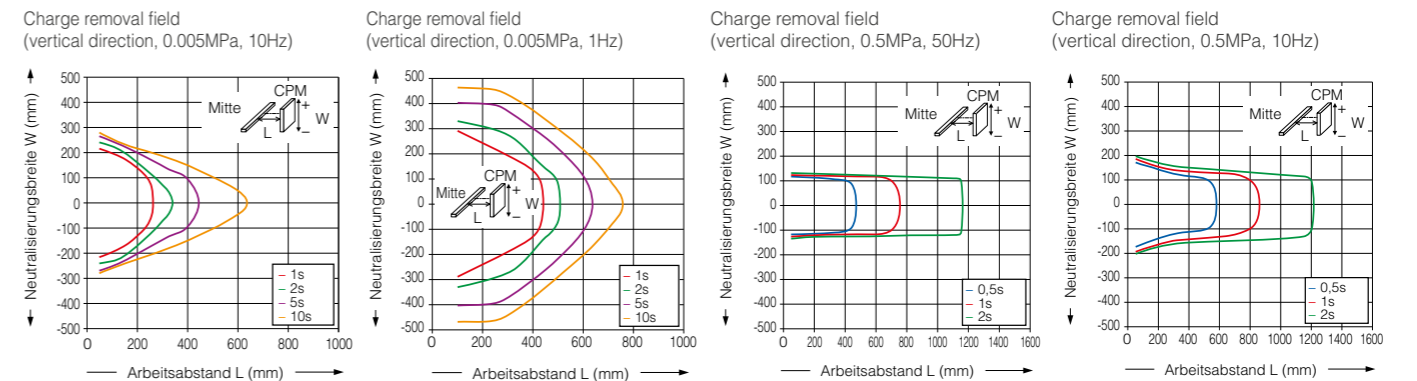
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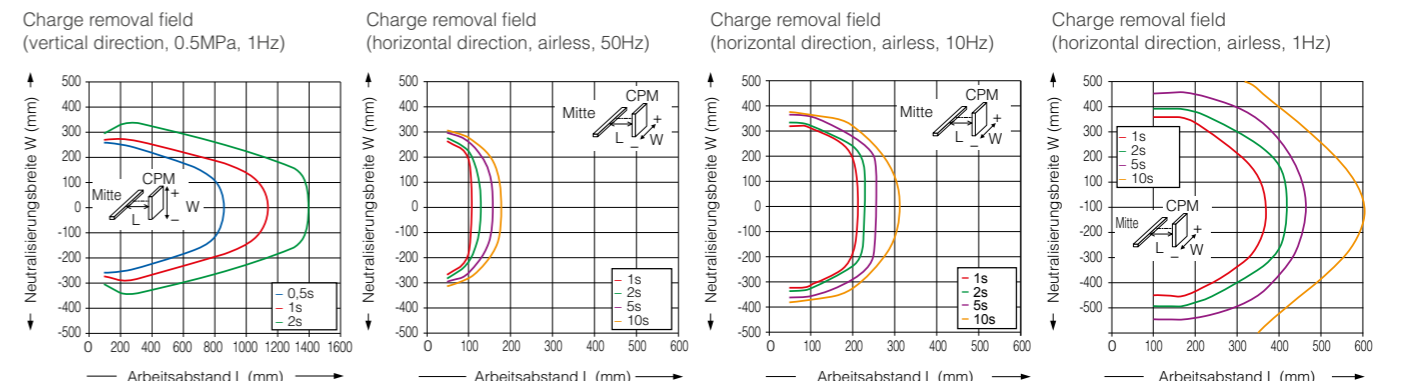
**Common**



**Common**



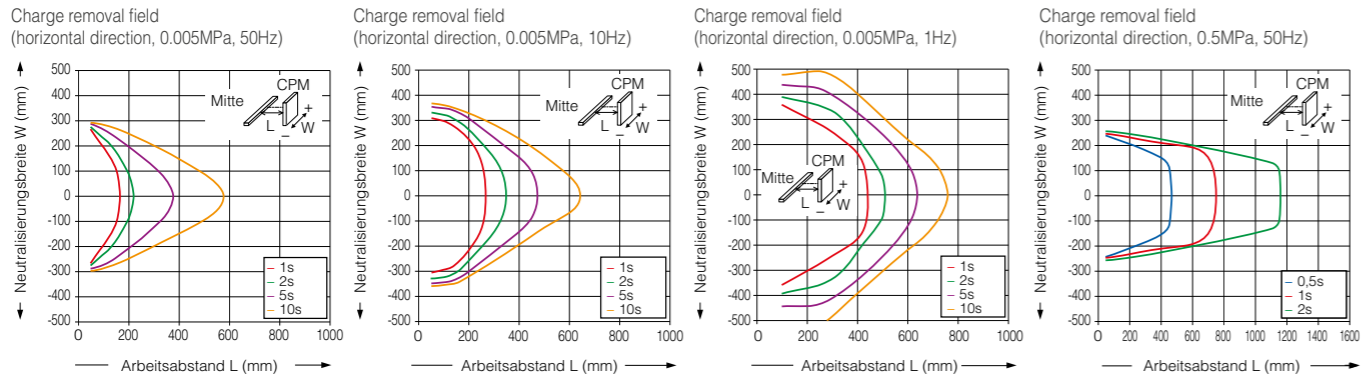
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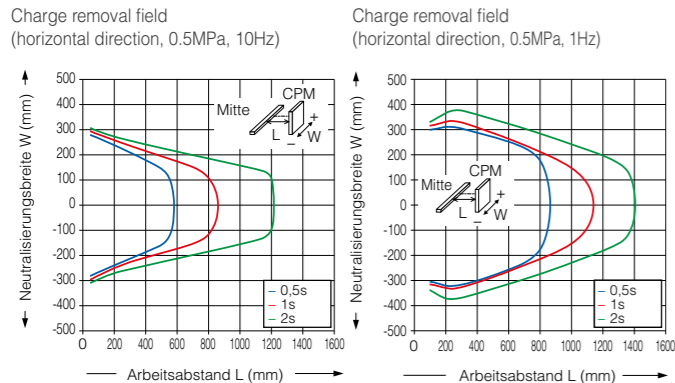
**CHARGE REMOVAL CHARACTERISTICS (TYPICAL)**

Measured at center of a 150 x 150mm charge plate monitor. Please contact our office for details on data that is not listed here.

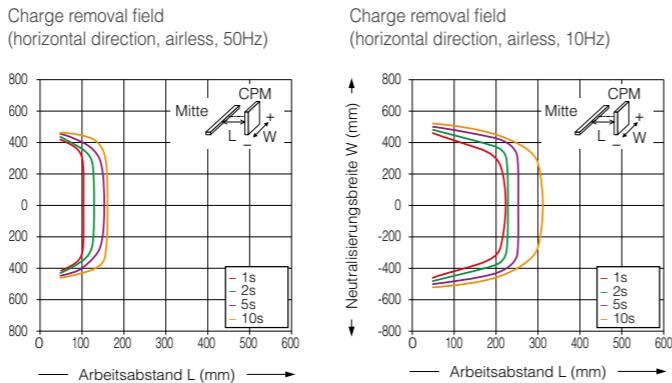
**ER-X032**



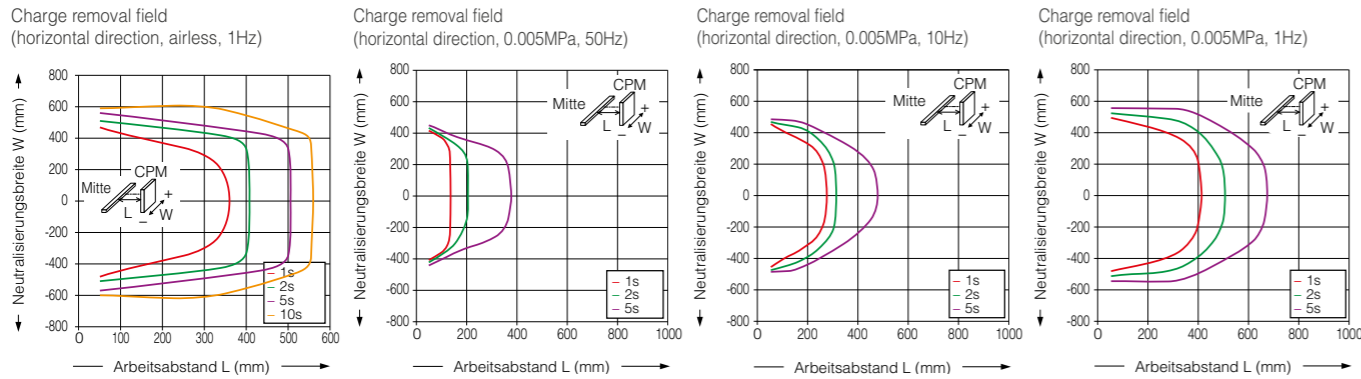
**ER-X032**



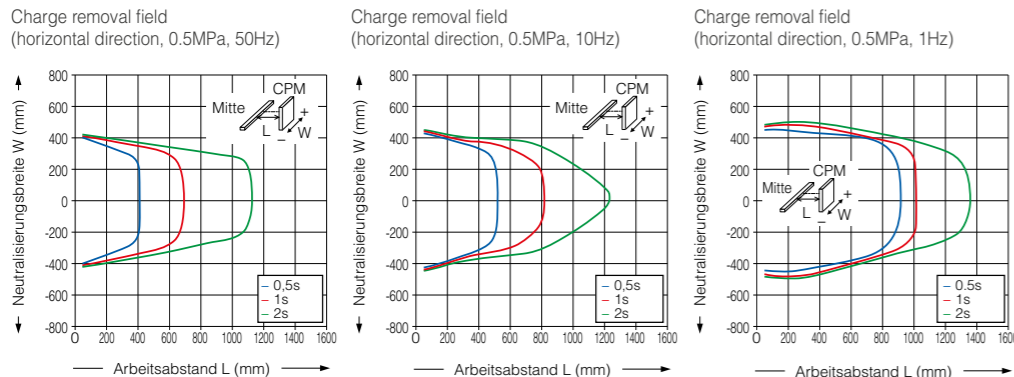
**ER-X064**



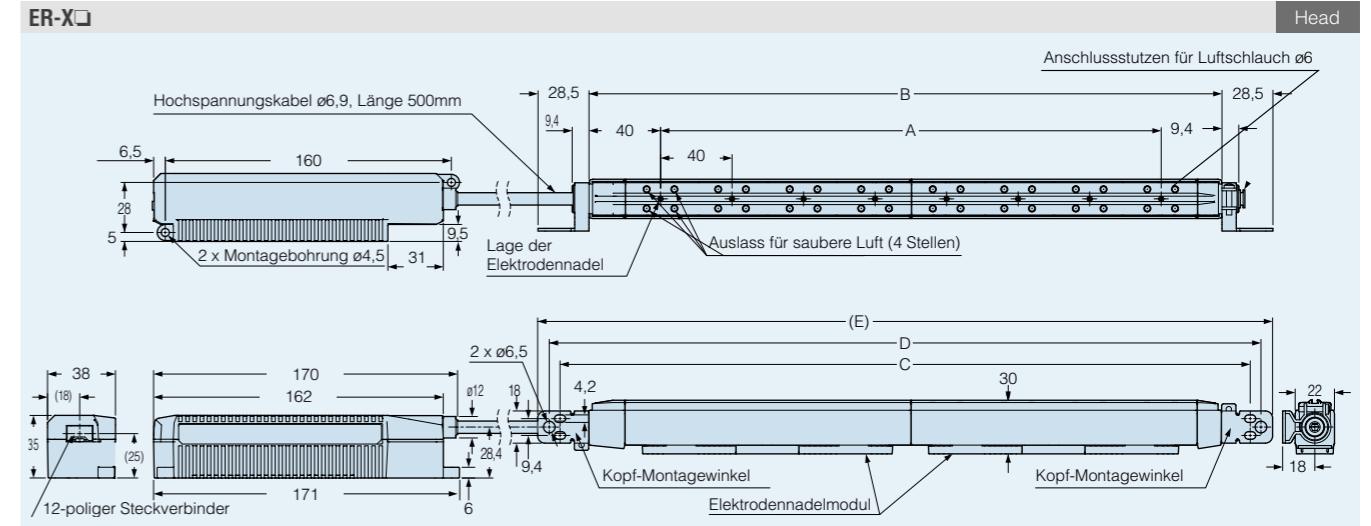
**ER-X064**



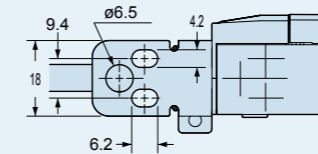
**ER-X064**



**DIMENSIONS (Unit: mm)** The CAD data in the dimensions can be downloaded from our website: <http://www.panasonic-electric-works.com>

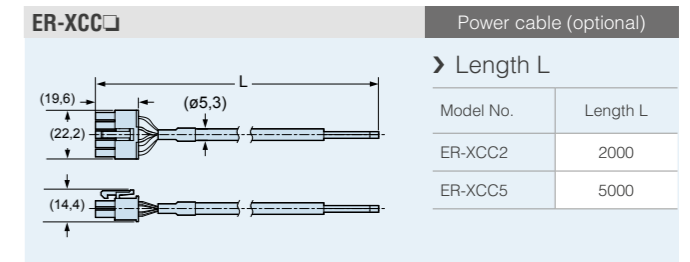
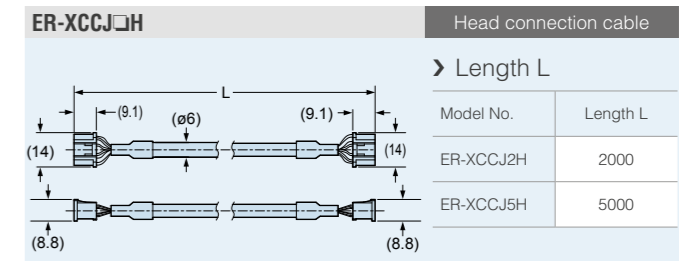
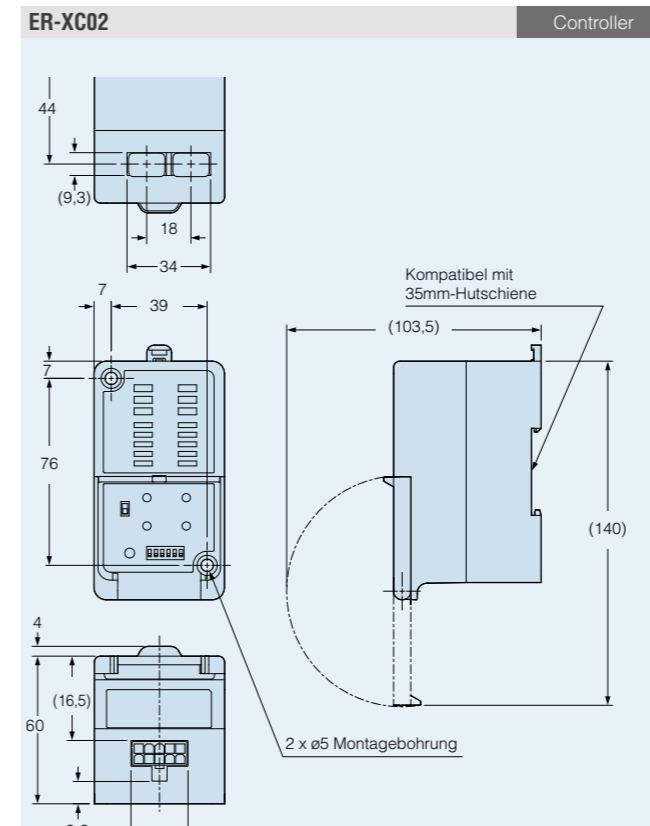


**Details of a head mounting bracket**



Model No.	A	B	C	D	(E)
ER-X008	40	106	138	150	163
ER-X016	120	194	226	238	251
ER-X032	280	354	386	398	411
ER-X048	440	514	546	558	571
ER-X064	600	674	706	718	731

**DIMENSIONS (Unit: mm)**



Model No.	Length L
ER-XCC2	2000
ER-XCC5	5000





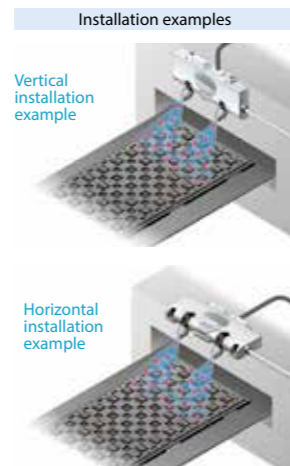
# ER-VW

Ionizer with adjustable nozzle angles

## Features

### Nozzle angle adjustment

The angles of the two nozzles can be adjusted within a range of approximately 190° by screwing down the ends of the nozzles.

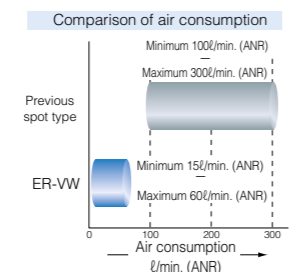


### Compact and ultrathin design

The thickness of the unit is 18.9mm. Since the nozzle angles can be adjusted, the unit can be installed even if there is little space due to the presence of other equipment.

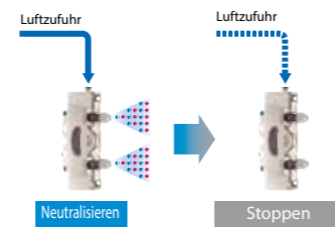
### Minimum air consumption ℓ/min.

The ER-VW series can utilize air flow levels starting from a minimum of 15 ℓ/min. Because the amount of air consumed is so low, the load placed on air supply equipment can be reduced.



### Air supply monitoring function

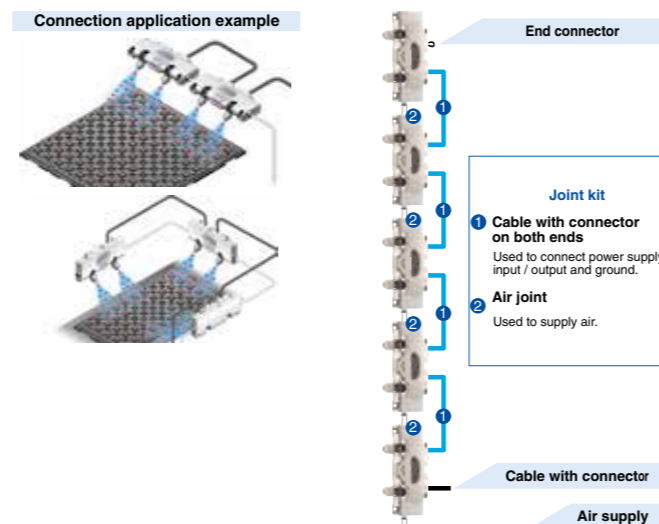
This function causes discharging to stop automatically if the supply of air drops below a certain pressure. When this happens, the AIR indicator lights up and the discharge output (DSC) turns off. This ensures a constant discharging.



### Easy connection possible

The joint kit (optional) can be used to connect up to a maximum of 5 ER-VW units. The air supply part is connected via quick connection joints, and the power supply and inputs/outputs can also be connected easily using connection cables with connectors at both ends.

Multiple ER-VW units can be connected to provide charge removal layouts that suit the target equipment.



## ORDER GUIDE

### Ionizer main unit

One connection cable (length 500mm), end connector and lead wire for connecting F.G. are supplied with the ionizer main unit.

Type	Product image	Charge removal time (±1000 V→±100 V)	Ion balance	Model No.
Spot type		Max. 1s (note)	Max. ±15 V (note)	ER-VW

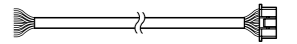
Note: A typical sample applied with a supply voltage of 24V, a distance of 100mm from the front surface of the air flow outlet and a pressure of 0.25MPa. (Measured on a sample left in the atmosphere at a relative humidity of max. 65% RH for at least 24 hours).

## OPTIONS

Item	Model No.	Description
Cables with connector (Note)	ER-VWCC2	Length: 2m, Net weight: approx. 52g
	ER-VWCC5	Length: 5m, Net weight: approx. 120g
	ER-VWCC9	Length: 9m, Net weight: approx. 240g
Discharge needle unit	ER-VWANT	Unit with replacement tungsten needles (2 needles per set)
Joint kit	ER-VWAR80	Connection cable (cable length 0.8m) and air tube joint: 1 pc. each

### Cable with connector

➤ ER-VWCC□



### Discharge needle unit

➤ ER-VWANT



Note: One connector cable (length 500mm) is supplied with the ionizer main unit.

## SPECIFICATIONS

Type	Spot type
Model No.	ER-VW
Charge removal time (±1000V→±100V)	Max. 1s (note 1)
Ion balance	Max. ±10 V (note 1)
Ozone generation	Max. 0.05ppm (note 2)
Applicable fluid	Air (dried clean air) (note 3)
Supplied air flow	Max. 60ℓ/min. (ANR)
Air pressure range	0.05 to 0.5MPa
Supply voltage	24 VDC ±10%
Current consumption	Max. 120mA
Discharge method	High frequency AC method
Discharge output voltage	Approx. 2000 V
Output	NPN open-collector transistor ➤ Maximum sink current: 50mA ➤ Applied voltage: max. 30 VDC (between check output and 0V) ➤ Residual voltage: max. 1V (at 50mA sink current)
Check (CHECK) Error (ERROR) Discharge (DSC)	Check output (CHECK): ON when the discharge needle is dirty or worn, OFF when operation is normal Error output (ERROR): OFF when abnormal discharge is detected, ON when operation is normal Discharge output (DSC): ON when discharging, OFF when discharge halts
Output operation	Incorporated
Short-circuit protection	Incorporated
Discharge halt input (DSC OFF)	Short-circuit to 0V: Discharge halt, Open: Discharge allowed (operation start)
Reset input (RESET)	Discharge halt and reset ERROR = 0 V; Discharge = open
Accessories	Connection cable: 1 pc. (length 500mm), End connector (9 pin): 1 pc., Lead wire for connecting F.G.: 1 pc.

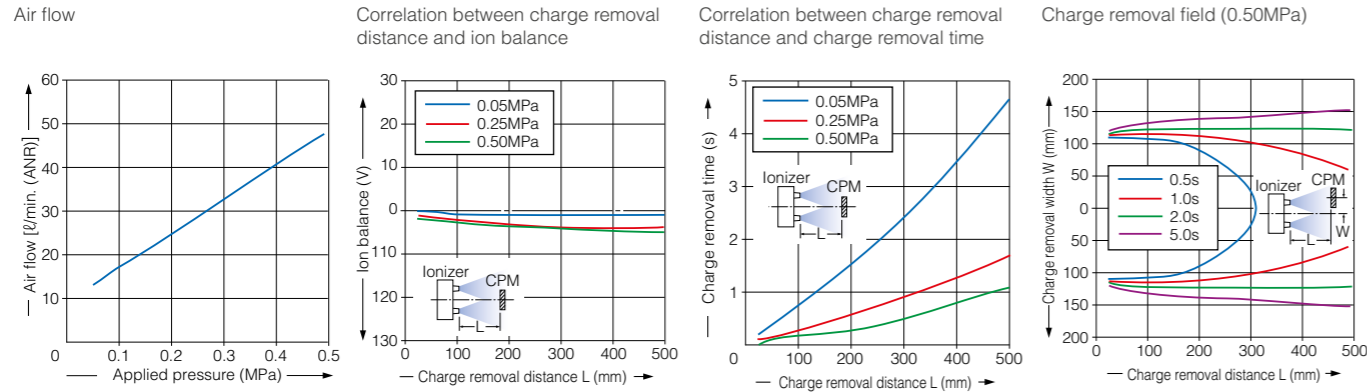
### Notes:

- 1) A typical sample applied with a supply voltage of 24V, a distance of 100mm from the front surface of the air flow outlet and a pressure of 0.25MPa. (measured on a sample left in the atmosphere at a relative humidity of max. 65% RH for at least 24 hours).
- 2) A typical sample applied with a supply voltage of 24 V, a distance of 300mm from the front surface of the air flow outlet and a pressure of 0.25MPa.
- 3) The dried clean air is defined for air passing through air dryer (dew point: equivalent of -20°C) and air filter (mesh-size: equivalent of 0.01μm).

**CHARGE REMOVAL CHARACTERISTICS (TYPICAL)**

Measured at center of a 150 x 150mm charge plate monitor.

**Common**

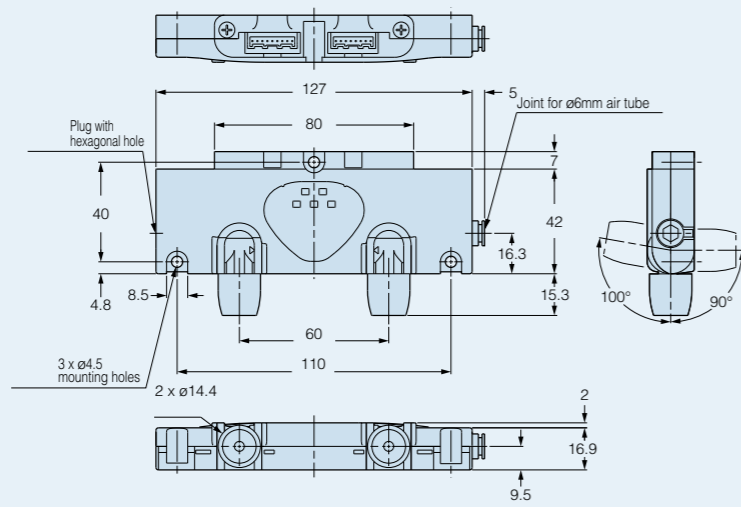


**DIMENSIONS (Unit: mm)**

The CAD data in the dimensions can be downloaded from our website: <http://www.panasonic-electric-works.com>

**ER-VW**

Ionizer main unit



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or call us:

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# ER-V

Ultra compact high-performance ionizer

## Features

### ■ Produces excellent ion balance

The adoption of high-frequency AC method helps to achieve an extremely stable ion balance. 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.

### ■ High performance without need for controller

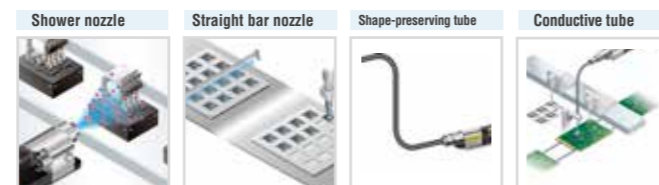
A full range of functions have been provided with full consideration given to ease of use in the workplace. No separate controller is needed.

### ■ Nozzle variations can be selected to suit the application



### ■ Ultra compact design fits even into narrow spaces

The main unit is merely 109x27x28mm 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.

## Typical applications

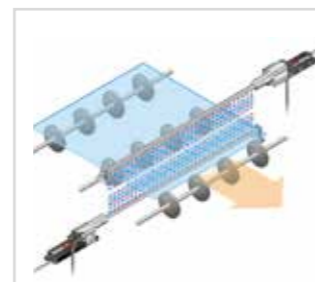
### Change removal and dust removal of lenses



### Prevent discharge damage in circuit board LEDs



### Charge removal of flat panel display (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	Product image	Charge removal time (±1000 V→±100 V)	Ion balance	Model No.
Spot type	 *The photograph shows the munit fitted with a shower nozzle.	Max. 1s (note)	Max. ±10 V (note)	ER-VS02

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

### Nozzles

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

Type	Product image	Model No.	Description
Shower nozzle		ER-VAS	Air dispersal type
Straight bar nozzle		ER-VAB020	Effective charge removal length 200mm
		ER-VAB032	Effective charge removal length 320mm
		ER-VAB065	Effective charge removal length 650mm
Shape-preserving tube		Tube nozzle adapter	Tube nozzle adapter for ionizer main unit and shape-preserving tube
		ER-VAK10	Tube length 112mm
		ER-VAK30	Tube length 312mm
Conductive tube		ER-VAK50	Tube length 512mm
		Tube nozzle adapter	Tube nozzle adapter for ionizer main unit and conductive tube
		ER-VAJT-64	Tube length 500mm
		ER-AT50	Bends freely, and can be cut to different length (minimum bending radius: 15mm)

### Cables with connector

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

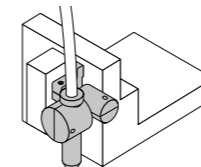
Product image	Model No.	Description
	ER-VCCJ2	Length: 2m, weight: approx. 52g
	ER-VCCJ5	Length: 5m, weight: approx. 120g
	ER-VCCJ9	Length: 9m, weight: approx. 240g
		0.15mm <sup>2</sup> 8-core cab tire cable with connector Cable outer diameter: Ø 4.2mm

## OPTIONS

Type	Model No.	Description
Conductive tube holder	ER-ATH	Used to secure conductive tubes
Mini line filter	ER-AF10	Processed air volume 40ℓ/min. (ANR)
	ER-AF20	Processed air volume 80ℓ/min. (ANR)
Discharge needle unit	ER-VANT	Unit with tungsten needle (1 set)

### Conductive tube holder

> ER-ATH



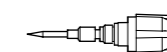
### Mini line filter

> ER-AF10 (image)  
> ER-AF20



### Discharge needle unit

> ER-VANT



■ SPECIFICATIONS

Type	Spot type	
Model No.	ER-VS02	
Charge removal time (±1000V ±100V) (note 1)	Max. 1s (note 2)	
Ion balance	Max. ±10V (note 2)	
Ozone generation	Max. 0.03ppm (note 3)	
Applicable fluid	Air (dried clean air) (note 4)	
Supplied air flow	Max. 500ℓ/min. (ANR) (note 5)	
Air pressure range	0.05 to 0.7MPa (note 5)	
Supply voltage	24VDC ±10 %	
Current consumption	Max. 70mA	
Discharge method	High frequency AC method	
Discharge output voltage	Approx. 2000V	
Check output	NPN open-collector transistor • Maximum sink current: 50mA • Applied voltage: max. 30VDC (between check output and 0V) • Residual voltage: max. 1V (at 50mA sink current)	
	Output operation	ON when dirt on or wear of the discharge needle is detected for 1.5s or more continuously, OFF when operation is normal. (Note 6)
	Short-circuit protection	Incorporated
Error output	NPN open-collector transistor • Maximum sink current: 50mA • Applied voltage: max. 30VDC (between error output and 0V) • Residual voltage: max. 1V (at 50mA 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 0V: 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 0V line.	
Accessories	Connector for wiring: 1 set [manufactured by Molex: Housing (5557-08R), Terminal (5556TL)]	

- Notes:**
- Where measurement conditions have not been specified precisely, the conditions used were at an ambient temperature of +20°C.
  - A typical sample applied with a supply voltage of 24V, a distance of 100mm from the front surface of the air flow outlet and a pressure of 0.25MPa while the shower nozzle is in use. (Measured on a sample left in the atmosphere at a relative humidity of max. 65% RH for at least 24 hours).
  - A typical sample applied with a power voltage of 24V, a distance of 300mm from the front surface of the air flow outlet and a pressure of 0.25MPa while the shower nozzle is in use.
  - The dried clean air is defined for air passing through air a dryer (dew point: equivalent of -20°C) and air filter (mesh-size: equivalent of 0.01μm)
  - The applicable pressure range depends on the nozzle to be used.
  - To test whether the check output works properly, the ionizer needs to discharge for at least 2 seconds.

■ SPECIFICATIONS

Nozzles / Tubes

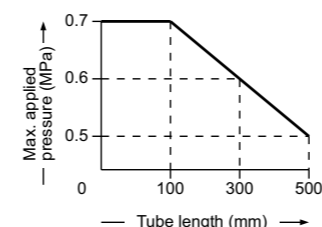
Type	Shower nozzle	Straight bar nozzle 200mm	Straight bar nozzle 320mm	Straight bar nozzle 650mm
Model No.	ER-VAS	ER-VAB020	ER-VAB032	ER-VAB065
Supplied air pressure range	0.05 to 0.40MPa			
Charge removal range	————	200mm	320mm	650mm
Material	Stainless steel			
Accessories	Attachment and insulation pipe: 1 pc. each	Attachment and insulation pipe: 1 pc. each, straight bar nozzle holder: 1 set		

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

Type	Shape-preserving tube			Conductive tube
Model No.	ER-VAK10	ER-VAK30	ER-VAK50	ER-AT50
Tube length	112mm	312mm	512mm	500mm
Material	Tube interior: aluminum, tube sheath: high-density polyethylene, terminal cap: stainless steel			Urethane
Air pressure range	0.02 to 0.5MPa			0.02 to 0.7MPa
Minimum bending radius	Min. 40mm			Min. 15mm

**Note:** Where measurement conditions have not been specified precisely, the conditions used were at an ambient temperature of +20°C.

➤ Correlation between tube length and maximum applied pressure

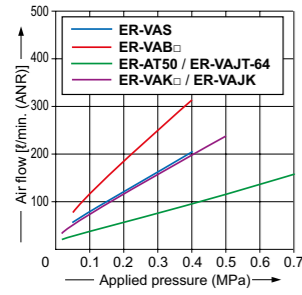


**CHARGE REMOVAL CHARACTERISTICS (TYPICAL)**

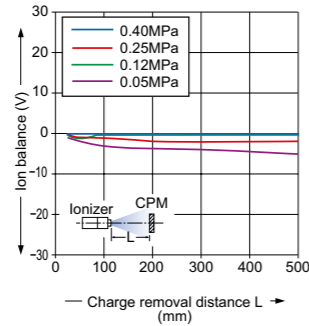
Measured at center of a 150 x 150mm charge plate monitor. Please contact our office for details on data that is not listed here.

**Common to all nozzles**

Air flow



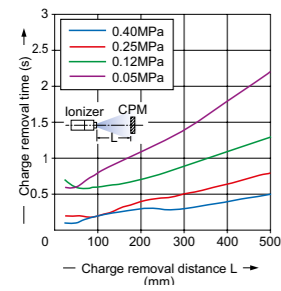
Correlation between charge removal distance and ion balance (typical: ER-VAS)



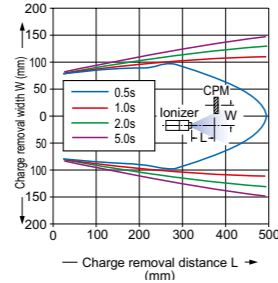
**ER-VAS**

Shower nozzle

Correlation between charge removal distance and charge removal time



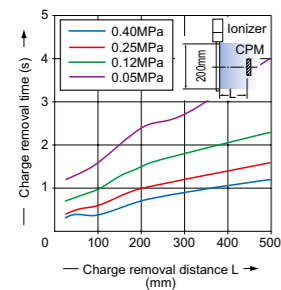
Charge removal field (0.40MPa)



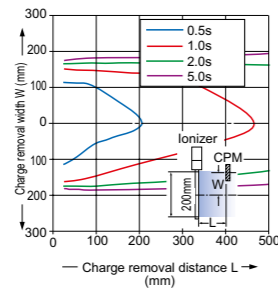
**ER-VAB020**

Straight bar nozzle

Correlation between charge removal distance and charge removal time



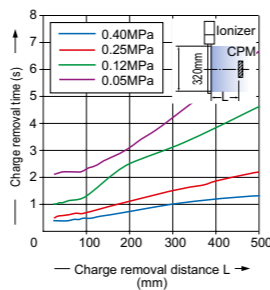
Charge removal field (0.40MPa)



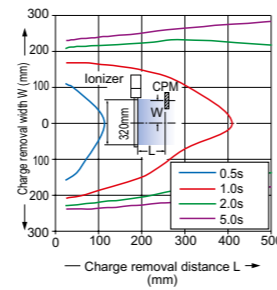
**ER-VAB032**

Straight bar nozzle

Correlation between charge removal distance and charge removal time



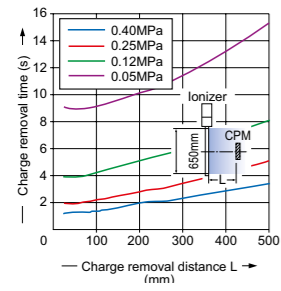
Charge removal field (0.40MPa)



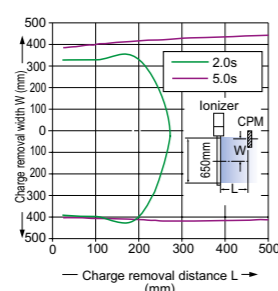
**ER-VAB065**

Straight bar nozzle

Correlation between charge removal distance and charge removal time



Charge removal field (0.40MPa)



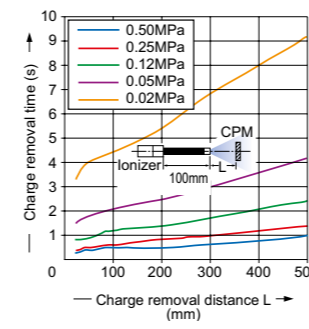
**CHARGE REMOVAL CHARACTERISTICS (TYPICAL)**

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

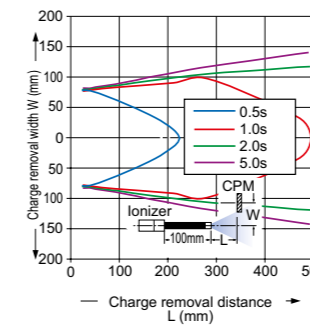
**ER-VAJK ER-VAK10**

Shape-preserving tube nozzle adapter, shape-preserving tube

Correlation between charge removal distance and charge removal time



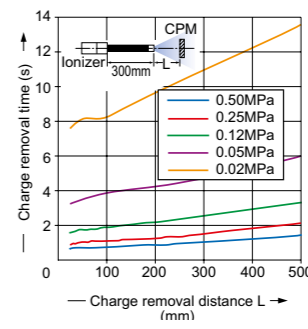
Charge removal field (0.50MPa)



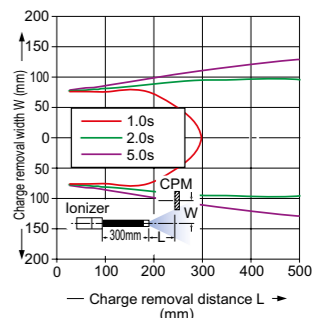
**ER-VAJK ER-VAK30**

Shape-preserving tube nozzle adapter, shape-preserving tube

Correlation between charge removal distance and charge removal time



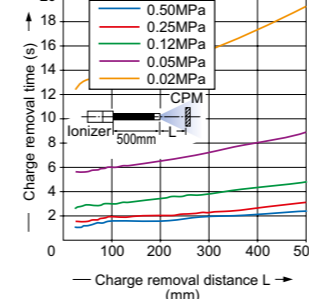
Charge removal field (0.50MPa)



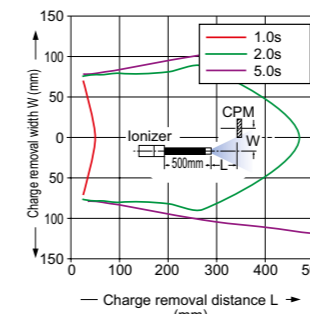
**ER-VAJK ER-VAK50**

Shape-preserving tube nozzle adapter, shape-preserving tube

Correlation between charge removal distance and charge removal time



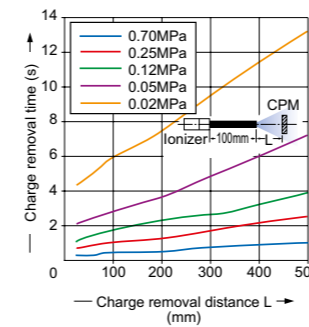
Charge removal field (0.50MPa)



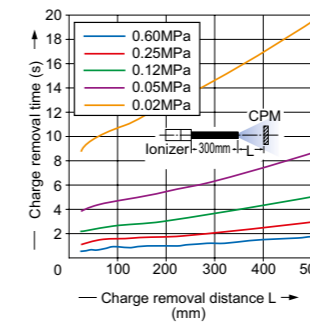
**ER-VAJT-64 ER-AT50**

Conductive tube nozzle adapter, conductive tube

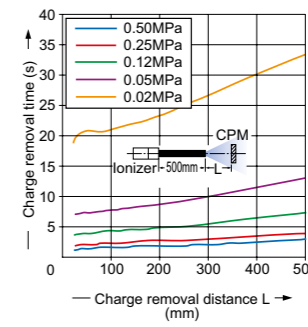
Correlation between charge removal distance and charge removal time (tube length 100mm)



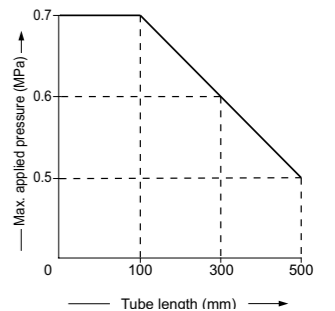
Correlation between charge removal distance and charge removal time (tube length 300mm)



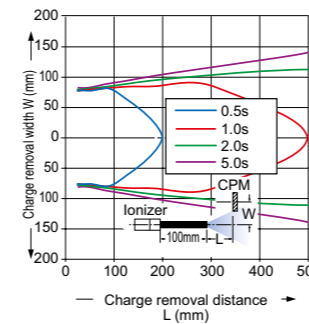
Correlation between charge removal distance and charge removal time (tube length 500mm)



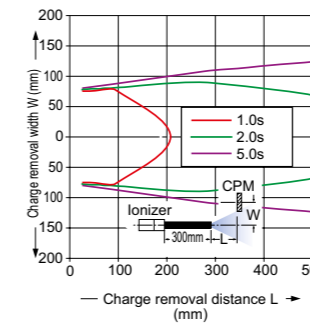
Correlation between tube length and max. applied pressure



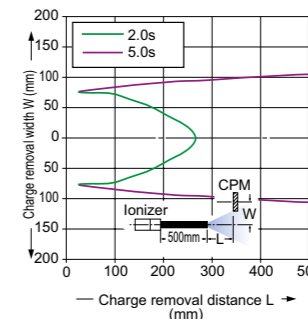
Charge removal field (0.70MPa) (tube length 100mm)



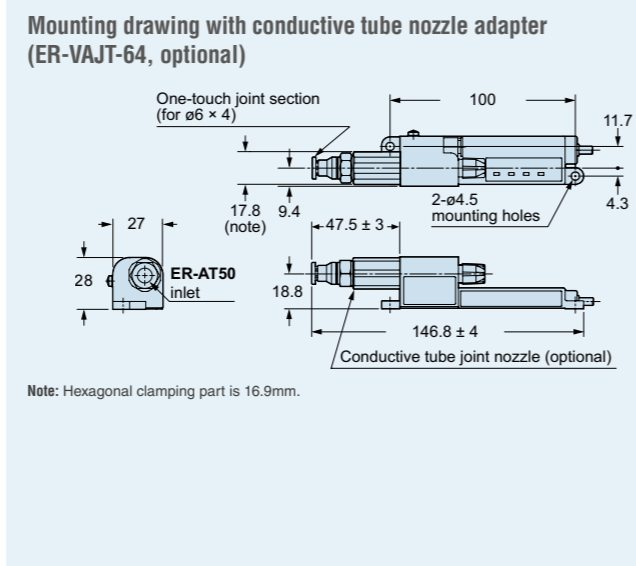
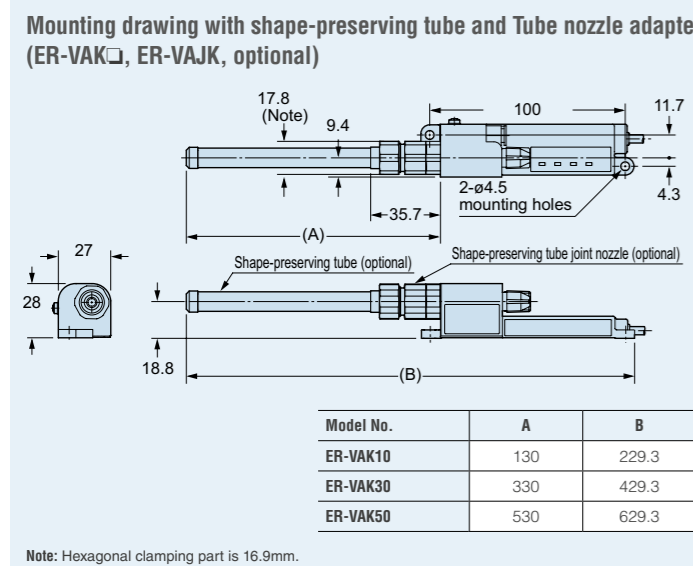
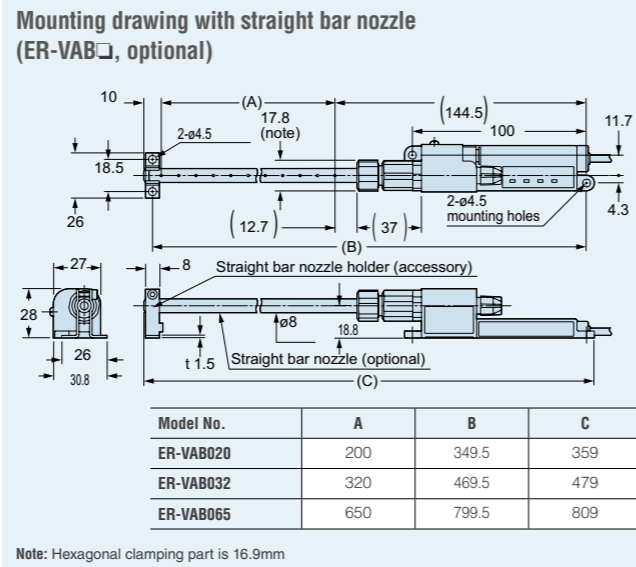
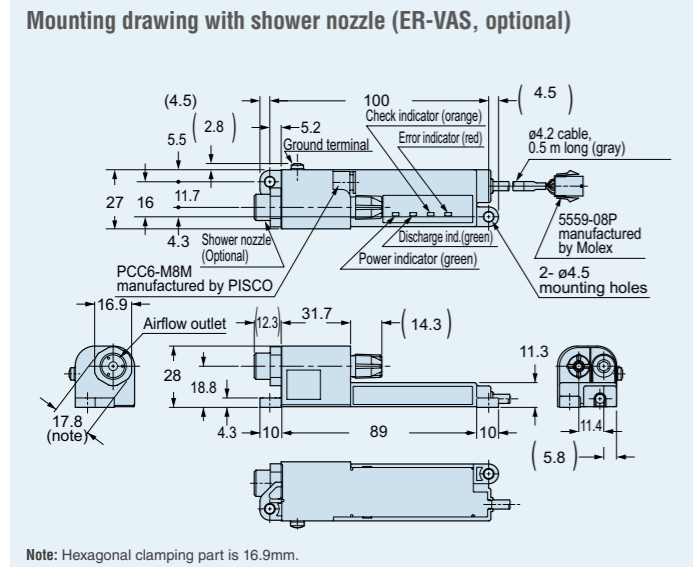
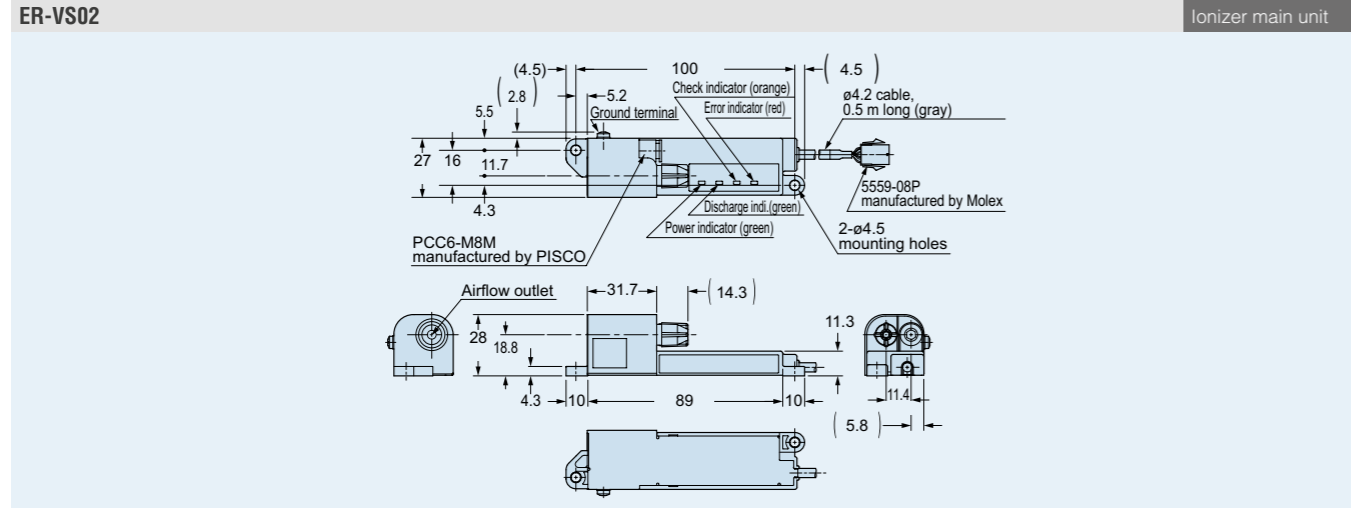
Charge removal field (0.60MPa) (tube length 300mm)



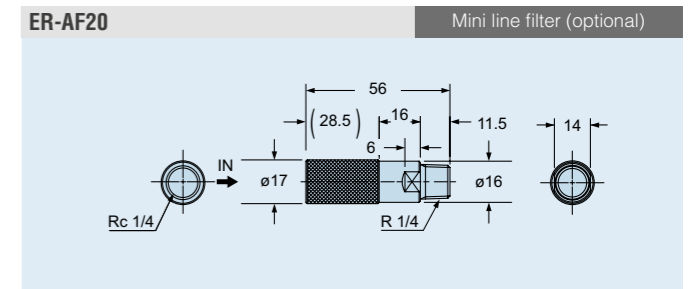
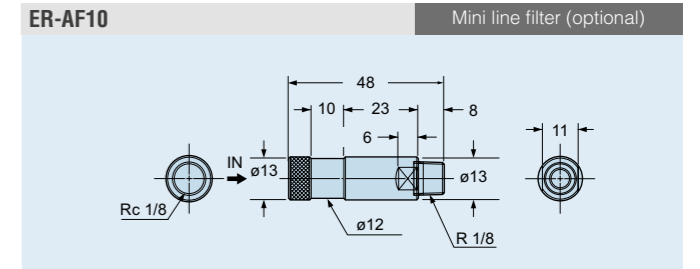
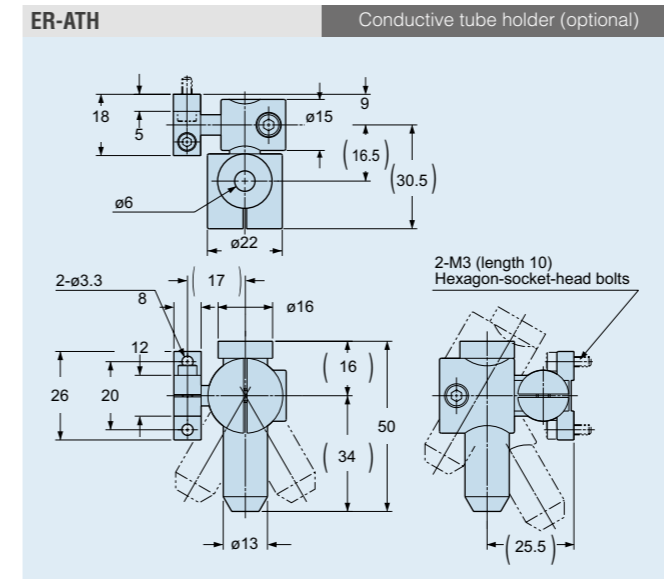
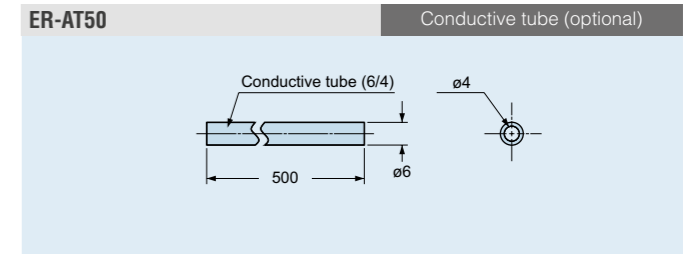
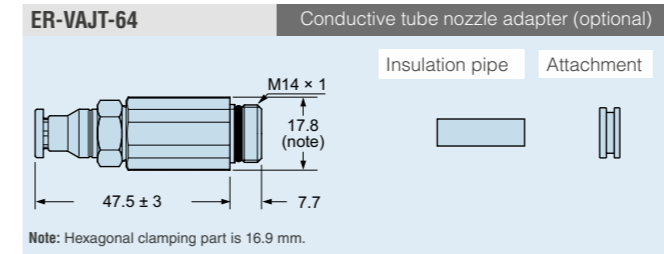
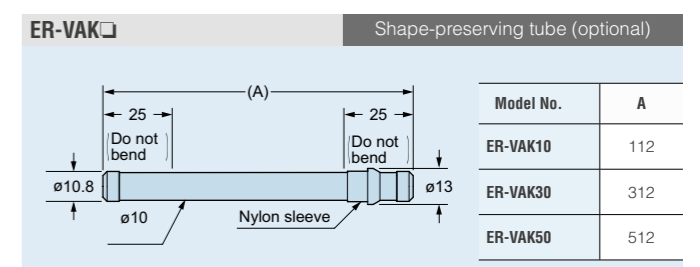
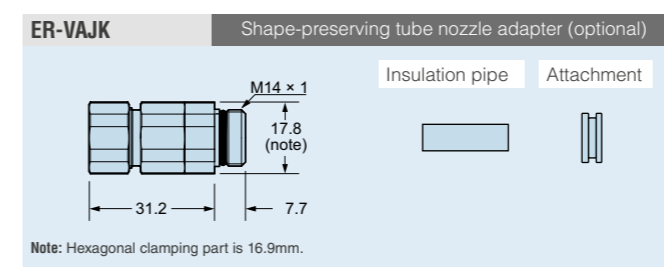
Charge removal field (0.50MPa) (tube length 500mm)



**DIMENSIONS (Unit: mm)** The CAD data in the dimensions can be downloaded from our website: <http://www.panasonic-electric-works.com>



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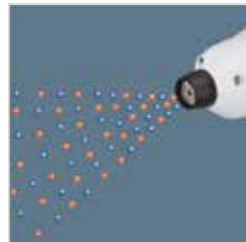




# EC-G

Pulse air-gun ionizer

## Features



### Pulsed ionized air

Instant pulse air emission with high air pressure removes dust all at once. Its lightweight construction, ergonomic design and 2m cable make the air gun the perfect ionizer for manual jobs.



### Direct ionized air emission from air gun

With the new pulse air-gun ionizer operators can comfortably neutralize static electricity while manually cleaning.



### White LED illumination

A white LED on the front of the gun conveniently illuminates target objects.

## Typical applications

Remove charge and dust on PCB



Remove charge and dust on flat screens



Remove dust before painting screens



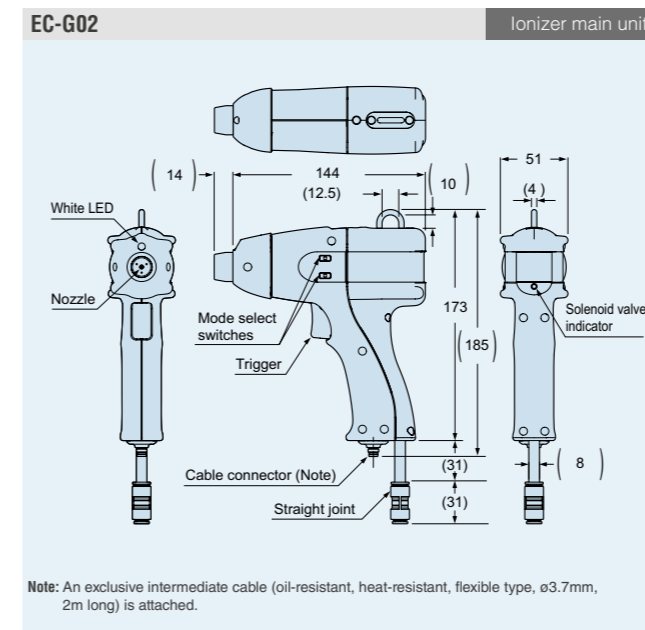
## SPECIFICATIONS

The CAD data in the dimensions can be downloaded from our website: <http://www.panasonic-electric-works.com>

Type	Gun type
Model No.	EC-G02
Charge removal time ( $\pm 1000\text{ V} \rightarrow \pm 100\text{ V}$ )	Approx. max. 0.5s (note 1)
Applicable fluid	Air (dried clean air) (note 2)
Supplied air flow	Max. 300ℓ/min. (ANR)
Air pressure range	0.05 to 0.50MPa
Power supply voltage	Accessory AC adapter INPUT: 100 to 240VAC $\pm 10\%$ , 50/60Hz (OUTPUT: 24VDC)
Power consumption	Max. 30VA
Discharge method	High-frequency AC-method
Pulse air mode	Pulse 1 (long) / Pulse 2 (short) / CONT (continuous) selectable by switch
LED illumination mode	ON (always ON) / SYNC (synchronized with trigger) / OFF (always OFF)
Weight	Approx. 270g (main unit only)

Notes: 1) Typical value for pulse air mode: CONT at 100mm from the front of discharge nozzle at an applied air pressure of 0.50MPa.  
2) The dried clean air is defined for air passing through an air dryer (dew point: equivalent of  $-20^{\circ}\text{C}$ ) and air filter (mesh-size: equivalent of  $0.01\mu\text{m}$ ).

## DIMENSIONS (Unit: mm)





# EF-S1

Constant monitoring of static charges on production lines

## Features

### ■ Maintains and regulates product quality by preventing damage from static electricity

Static electricity that can build up in various places along a process line can be monitored constantly so that abnormalities can be prevented before they occur, ensuring quality.

### ■ Reduces time for ionizer inspections

The de-ionizing effectiveness of ionizers can be understood in real-time so that things such as ionizer damage and the replacement period for worn components can be checked objectively, reducing the time required for inspection and testing.

## Technical specifications

### Sensor head

Type	Spot type
Model no.	EF-S1HS
Measuring range	8.0 to 20.5mm (±1kV) 21.0 to 100mm (±2kV)

### Controller

Type	Spot type
Model no.	EF-S1C
Power supply voltage	24VDC ±10%
Display range (measurement range)	-1000 to 1000 (±1kV) -1999 to 1999 (±2kV)
Judgment output	NPN open-collector transistor, max. 100mA
Analog voltage output	Output voltage 1 to 5V Output impedance approx. 100Ω

## Typical applications

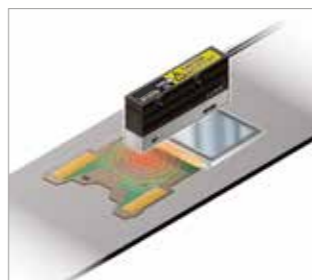
Measuring surface potential when removing back grinding sheets



Measuring static electric charge in lead frames



Measuring frictional electrification of LCD modules



Panasonic Electric Works offers a wide product range from one source, from individual components to complete systems. Technology support for advice, design-in, installation and commissioning by our qualified application engineers round off the Panasonic service profile.



## Human machine interfaces

Our compact size, bright and easy-to-read human machine interfaces can be used to visualize inspection results. Touch panels can even replace the standard keypad if you so desire.



## Eco-POWER METERS

Energy saving and electric power quality monitoring with Panasonic energy management solution.



## ACD components

Components such as **Eco-POWER METERS**, timers/counters, temperature controllers, limit switches and fans round off our wide factory automation product range.



## Sensors

As a pioneering manufacturer of sensors, Panasonic provides high performance sensors for a wide range of applications, facilitating factory automation in various types of production lines, such as those used for the manufacturing of semiconductors.



## Laser Markers

Panasonic Laser Markers are ideal for non-contact, permanent labeling of most materials, e.g. metal, plastics, glass, paper, wood and leather. Several CO<sub>2</sub> laser marking systems and a unique FAYb fiber laser marker can be easily integrated into existing production systems for a great variety of marking tasks.





North America

Europe

Asia Pacific

China

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