ELECTROSTATIC CHARGE REMOVERS

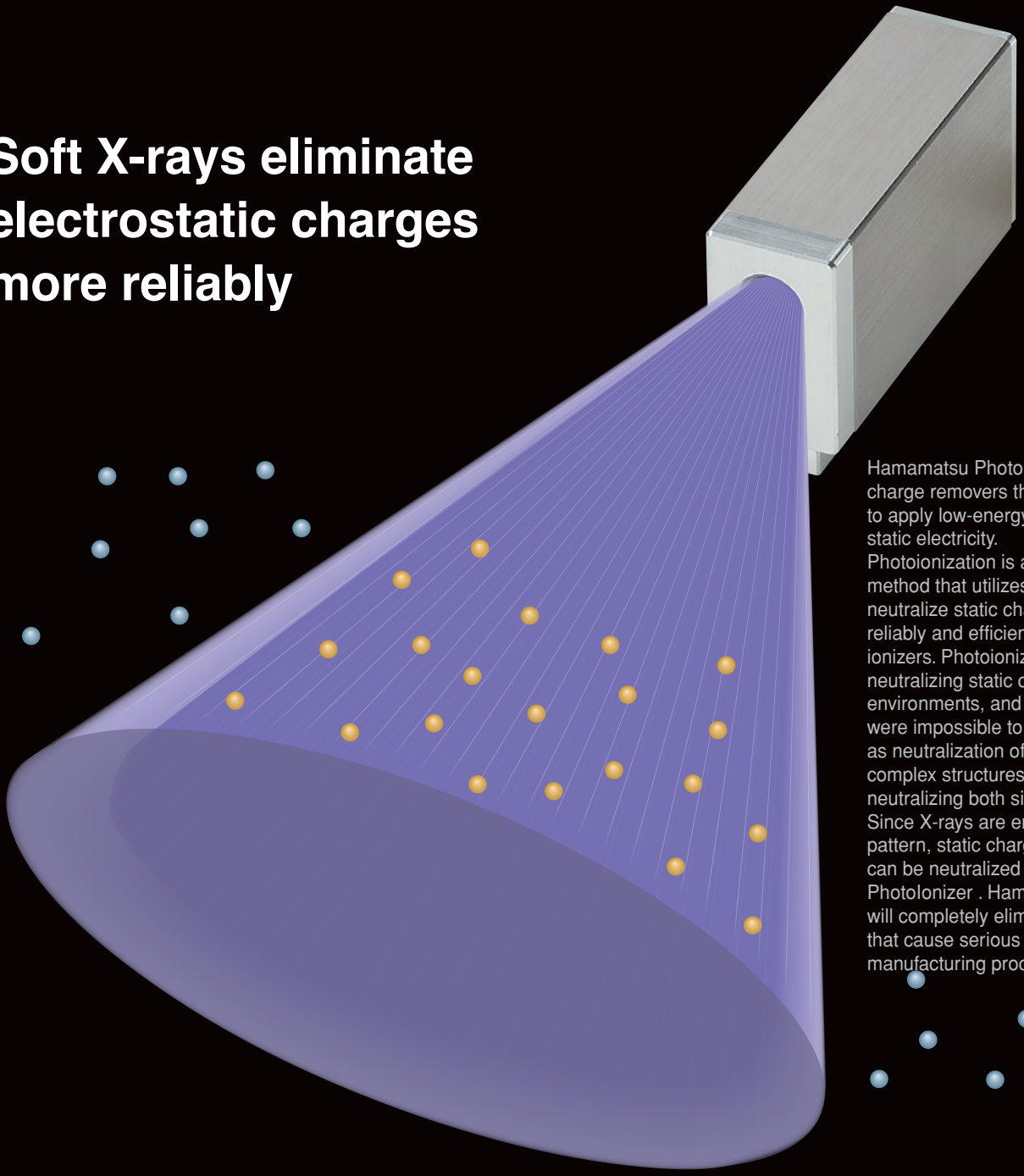
Photolonizer® × PhotolonBar®

New choices for removing static charges

HAMAMATSU

PHOTON IS OUR BUSINESS

Soft X-rays eliminate electrostatic charges more reliably



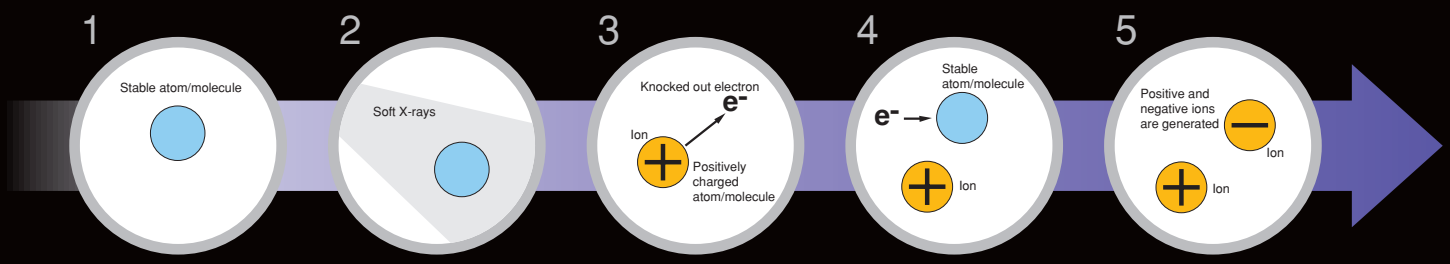
Hamamatsu PhotoIonizers are electrostatic charge removers that use “photoionization” to apply low-energy soft X-rays to remove static electricity.
Photoionization is an innovative ionization method that utilizes X-ray characteristics to neutralize static charges much more reliably and efficiently than other types of ionizers. Photoionization is effective in neutralizing static charges on objects, in environments, and under conditions that were impossible to treat up until now such as neutralization of static charges on complex structures and simultaneously neutralizing both sides of sheet materials. Since X-rays are emitted in a conical pattern, static charges over a wide area can be neutralized with just a single PhotoIonizer . Hamamatsu PhotoIonizers will completely eliminate static charges that cause serious problems in various manufacturing processes.

What are soft X-rays?

Soft X-rays are the type of light with very low energy compared to other X-rays and artificial radiation used for medical diagnostic imaging such as CT (computed tomography), PET (positron emission tomography), and X-ray photography. Soft X-rays are easy to handle and used in a wide variety of applications.

PRINCIPLE OF STATIC CHARGE NEUTRALIZATION

Photoionization mechanism



When soft X-rays are emitted into air, they knock electrons out from stable atoms and molecules in the air leaving positive ions. These knocked out electrons then combine with other stable atoms and molecules to produce negative ions. Ions generated near an electrostatically charged target object are attracted to the target object by static electricity and neutralize the static charges on the target object. Other ions generated during this process return to their original atoms and molecules.

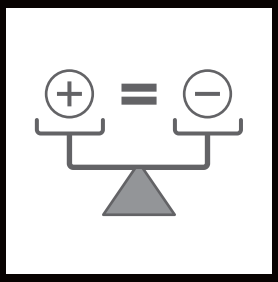
From static charge neutralization performance to maintainability, “photoionization” completely eliminates the root causes of problems thought impossible to solve up to now!

Static charge removal or neutralization using conventional corona-discharge ionizers brings problems such as residual static charges, dust generation, and frequently needed maintenance. Hamamatsu PhotoIonizers do not involve an electrical discharge to generate ions but directly ionize atoms and molecules in the air by irradiating them with soft X-rays. This eliminates all problems associated with conventional ionizers and ensures highly efficient and reliable removal of static charges.

Removes static charges to 0 V

Photoionization constantly generates ions over the entire range irradiated with soft X-rays. The high density of the generated ions helps remove all static charges to bring target objects to 0 volts.

No overshoot



Photoionization with good ion balance ensures an equal amount of positive and negative ions, so there is no need to adjust the ion supply amount and also no overshoot occurs.

Needs No air flow

Photoionization needs no air flow since ions are generated in the immediate vicinity of target objects. This means that no dust flies up and there are no bad effects on target objects, allowing static charge removal even from lightweight components and powdery materials.

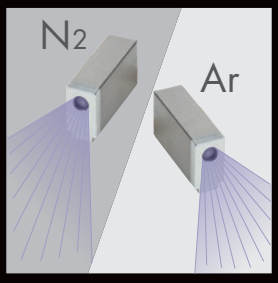
No dust and electromagnetic noise

Photoionization does not generate dust and electromagnetic noise which may cause foreign matter defects and malfunctions in peripheral electrical devices.

No maintenance required

Unlike corona-discharge ionizers with discharge electrodes which need frequent cleaning, photoionization requires no maintenance.

Works even in special environments



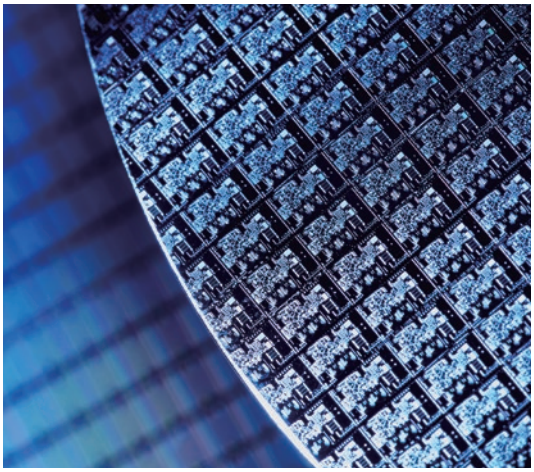
Photoionization works well even in special environments, such as in inert gases and dry air.

Effectively and reliably eliminates electrostatic charges in all types of applications.

PhotoIonizers can neutralize static charges on any object without causing any harmful effects.
These are widely used in a broad spectrum of industrial fields to improve yield and throughput in production processes.

Liquid crystal and organic EL displays

The size and resolution of liquid crystal and organic EL displays keep on increasing. This means effective measures must be taken to eliminate electrostatic charges across larger surface areas. PhotoIonizers neutralize static charges down to 0 volts over a wide area to solve problems such as defects caused by particle adhesion and destruction by electrostatic discharge (ESD) that might occur during component pickup.



Semiconductors

The ever-increasing degree of miniaturization and circuit integration of semiconductor devices makes them more vulnerable to static charges. PhotoIonizers are effective in solving such problems that include damage or destruction of internal circuits, defects due to particle adhesion, and destruction by electrostatic discharges (ESD) that might occur when during device pickup.

Printing

Static electricity charges on paper and films can cause ink to bleed and spatter as well as particle adhesion and paper alignment errors, creating serious printing problems. PhotoIonizers solve all of these problems stemming from static charges and improve the production efficiency and yield rate in the printing process.

Films

Static electricity accumulates on the surface of films when they repeatedly make and break contact. A large amount of static electricity accumulates especially on film near the film's feed and take-up rollers. PhotoIonizers prevent problems such as film damage (pinholes) caused by electrostatic sparks, defects due to particle adhesion, and poor conditions in the work environment.

Powder/particulates

Electrostatically charged powder and particulates tend to easily adhere to nozzles and containers, and prevent packing and conveying the powder and particulates in uniform amounts. Photoionization needs no air flow to neutralize static charges and so can eliminate static charges from powder and particulates, which has been an impossible task for conventional ionizers to handle.

Rechargeable batteries

Static electricity is likely to occur in low-humidity environments such as dry cleanrooms for producing rechargeable batteries, so sufficient measures must be taken to neutralize static electricity. PhotoIonizers are used in these places to remove static charges that might cause damage such as pinholes in separator films and particle adhesion, thus preventing product defects and increasing the yield rate.

Coating/painting

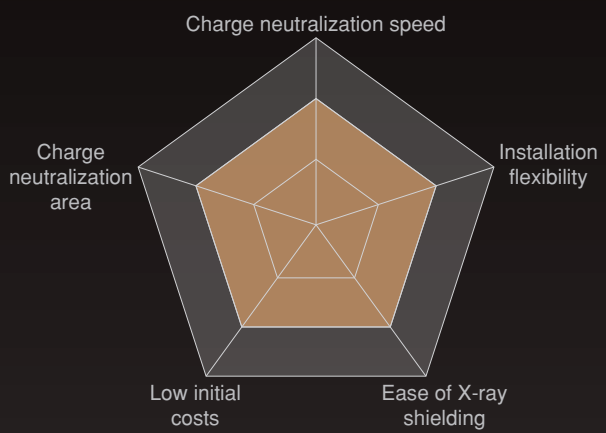
Coating and painting are utilized in countless applications that include metal and plastic automotive parts. Static charges on such parts cause coating materials to bleed and splatter around and also induce particle adhesion, creating problems with coating and painting. PhotoIonizers can prevent such problems and thus improve coating and painting quality.

PhotoIonizer® × PhotoIonBar®

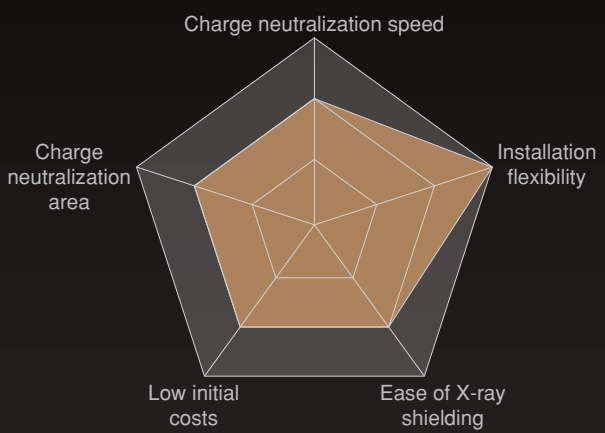
A wide lineup of electrostatic charge removers

Innovative electrostatic charge removers using “photoionization” by low-energy soft X-rays
Our lineup includes products with features optimized for various applications so choose the one that best suits your application.

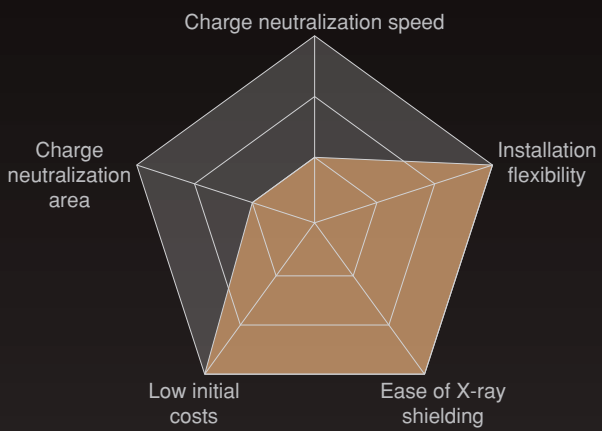
PhotoIonizer L12645



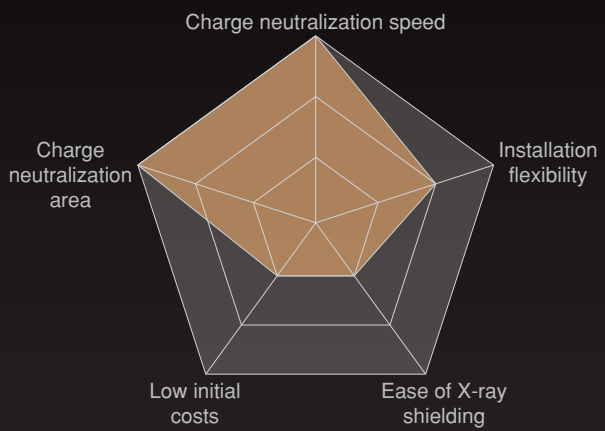
PhotoIonizer L9873



PhotoIonBar
L16653

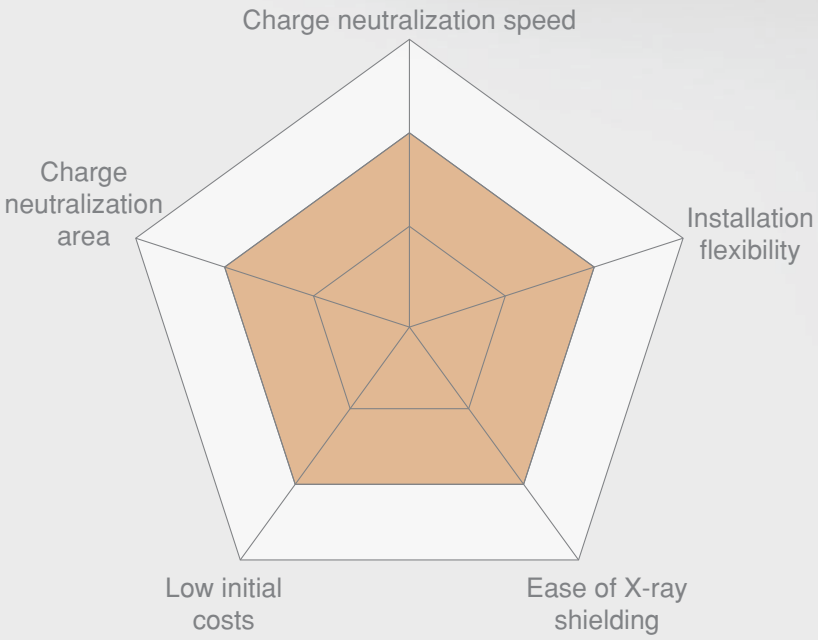


PhotoIonizer
L14471, C14546



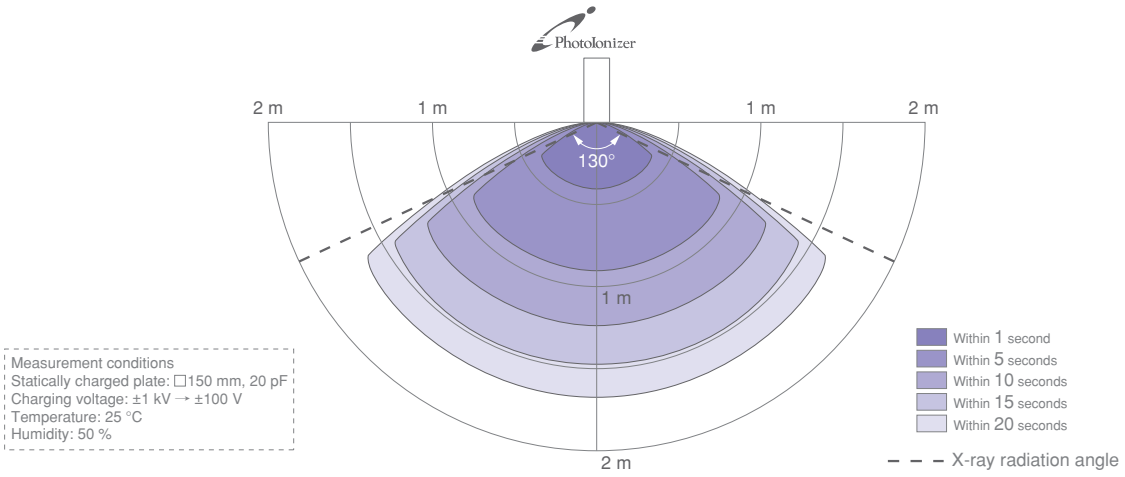
Photolonizer® L12645

Standard model having built-in reliability and long record of high performance



The L12645 is a standard model of PhotoIonizer that has eliminated many problems caused by static charges. The L12645 is designed to provide a good balance of charge neutralization speed, installation flexibility, low initial costs, and ease of X-ray shielding, making it ideal for removing static charges from a wide range of objects, in environments, and under conditions.

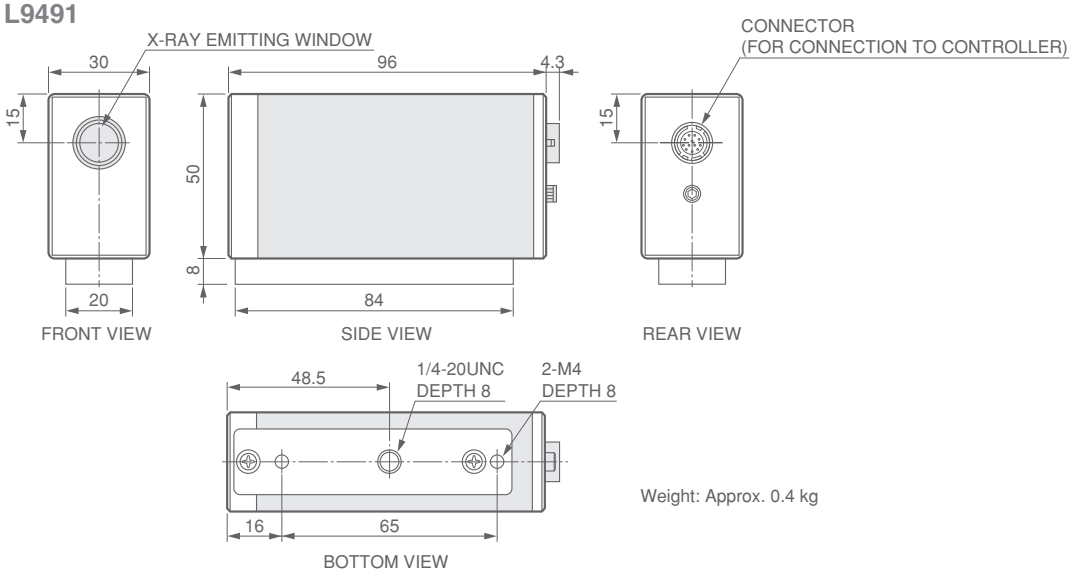
STATIC CHARGE REMOVAL PERFORMANCE



Measurement conditions
Statically charged plate: □150 mm, 20 pF
Charging voltage: ±1 kV → ±100 V
Temperature: 25 °C
Humidity: 50 %

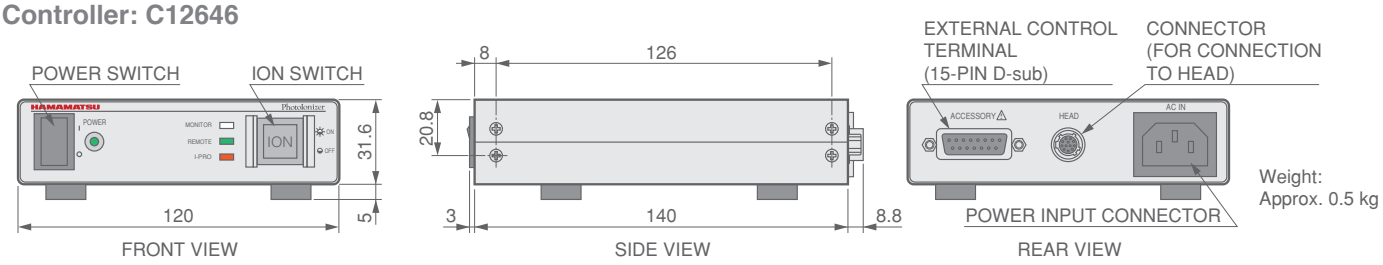
DIMENSIONAL OUTLINES (Unit: mm)

Photolonizer head: L9491



Weight: Approx. 0.4 kg

Controller: C12646



Weight:
Approx. 0.5 kg

Accessories

Control cable A9654-10 (10 m)
External control connector (15-pin D-sub)

OPTIONS

Four-head controller C11952

The C11952 controller is capable of controlling up to 4 PhotoIonizer heads (L9491) at the same time. It is ideal for removing static charges from large objects with large surface areas or for using multiple heads on multiple production lines.

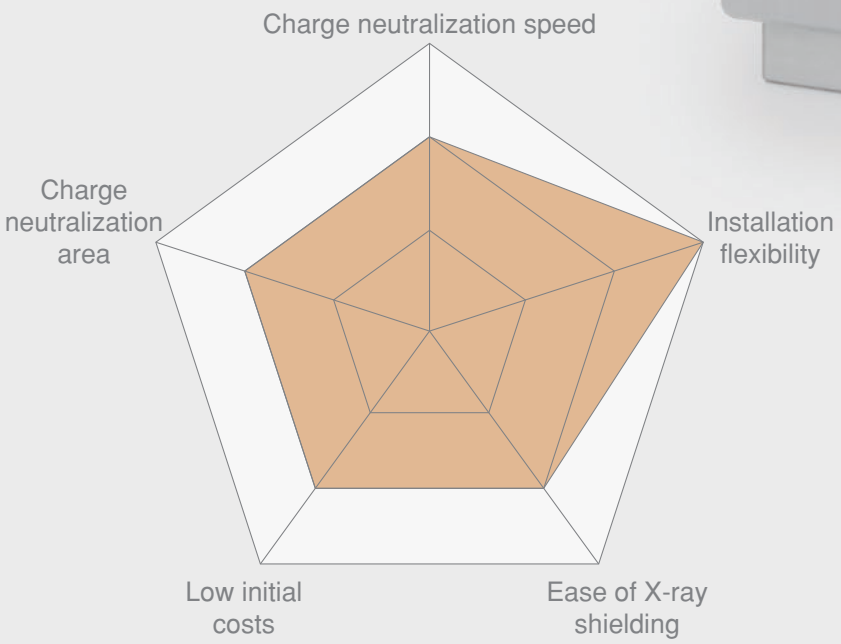
* The A9654 control cable is not supplied with the controller but is available as an option.

Control cable A9654 series

Type number	Cable length
A9654-05	5 m
A9654-10	10 m
A9654-15	15 m

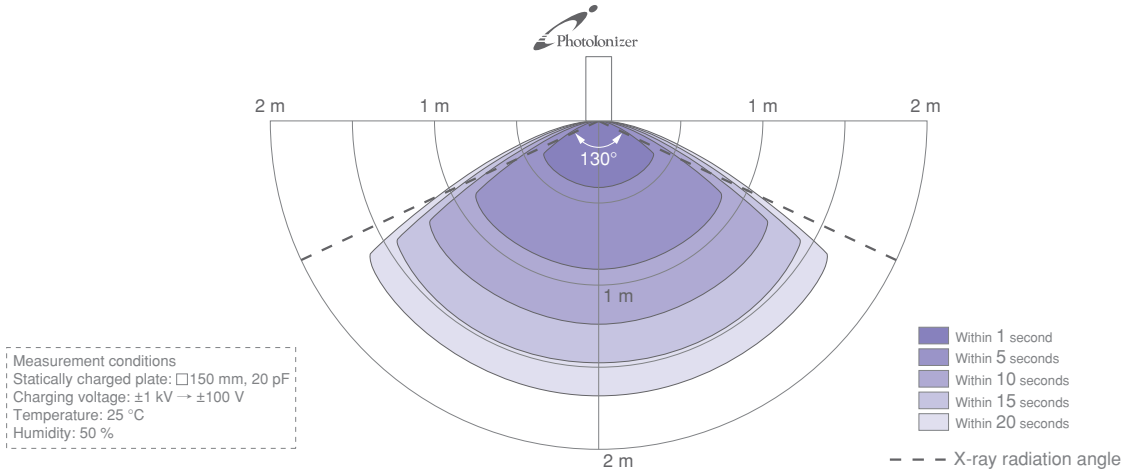
Photolonizer® L9873

DC (24 V) model that operates without a dedicated controller

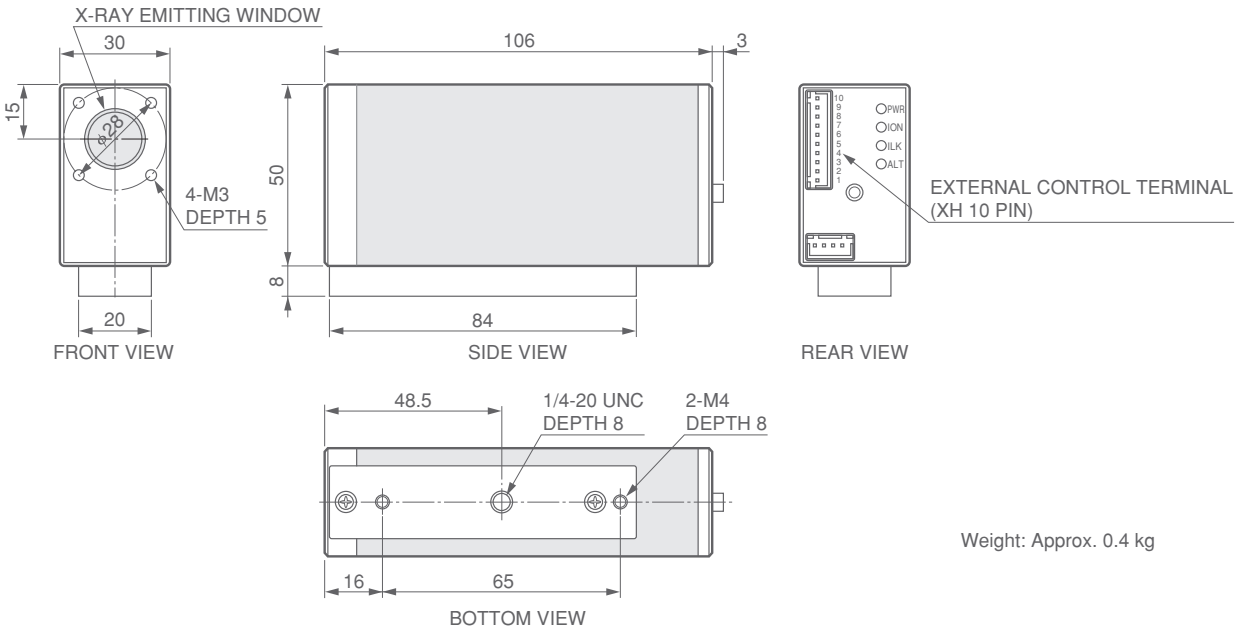


The L9873 is designed for mounting into manufacturing equipment. It operates on power supplied from the manufacturing equipment and is directly controllable by the manufacturing equipment controller or control system. So there is no need to prepare an additional controller and it easily mounts into small spaces.

STATIC CHARGE REMOVAL PERFORMANCE



DIMENSIONAL OUTLINES (Unit: mm)



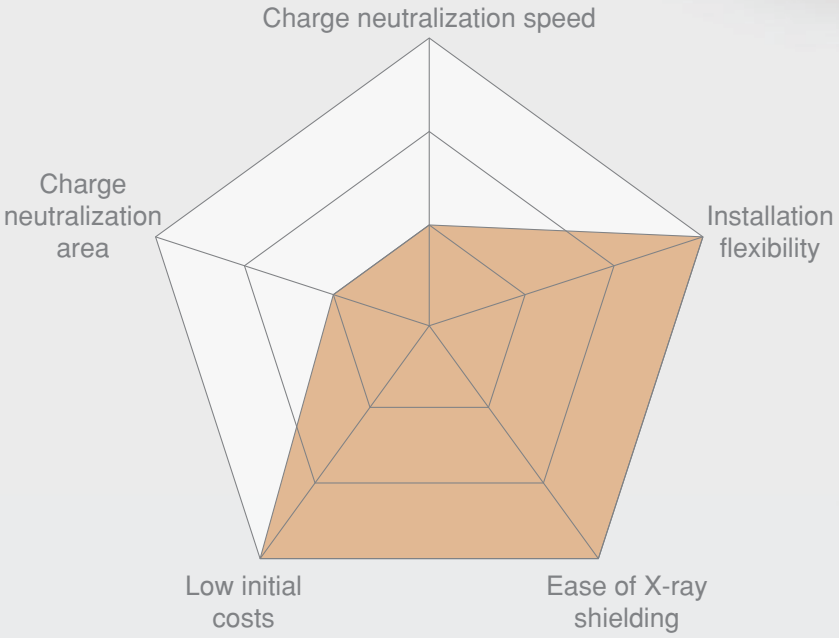
Weight: Approx. 0.4 kg

Accessories

Plug housing XHP-10
Contact pin BXH-001T-P0.6

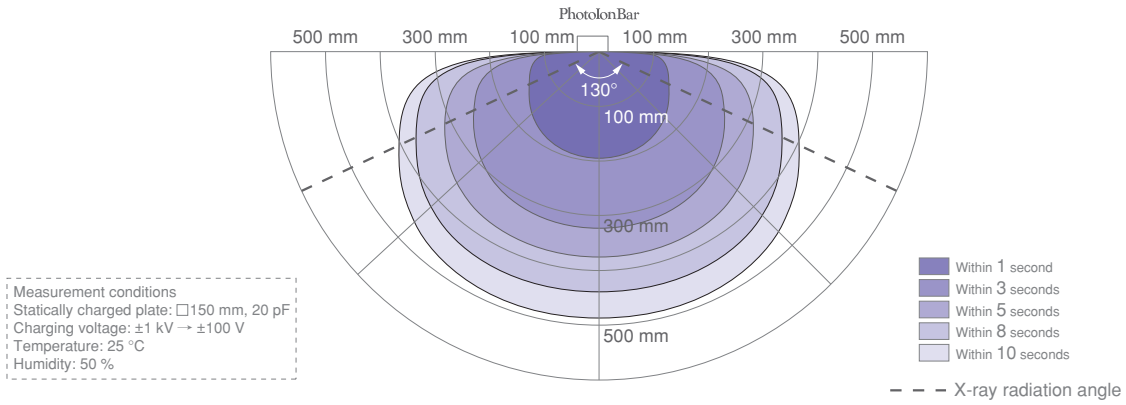
PhotoIonBar® L16653

DC (24 V) model that operates without a dedicated controller (Tube voltage 4.9 kV)

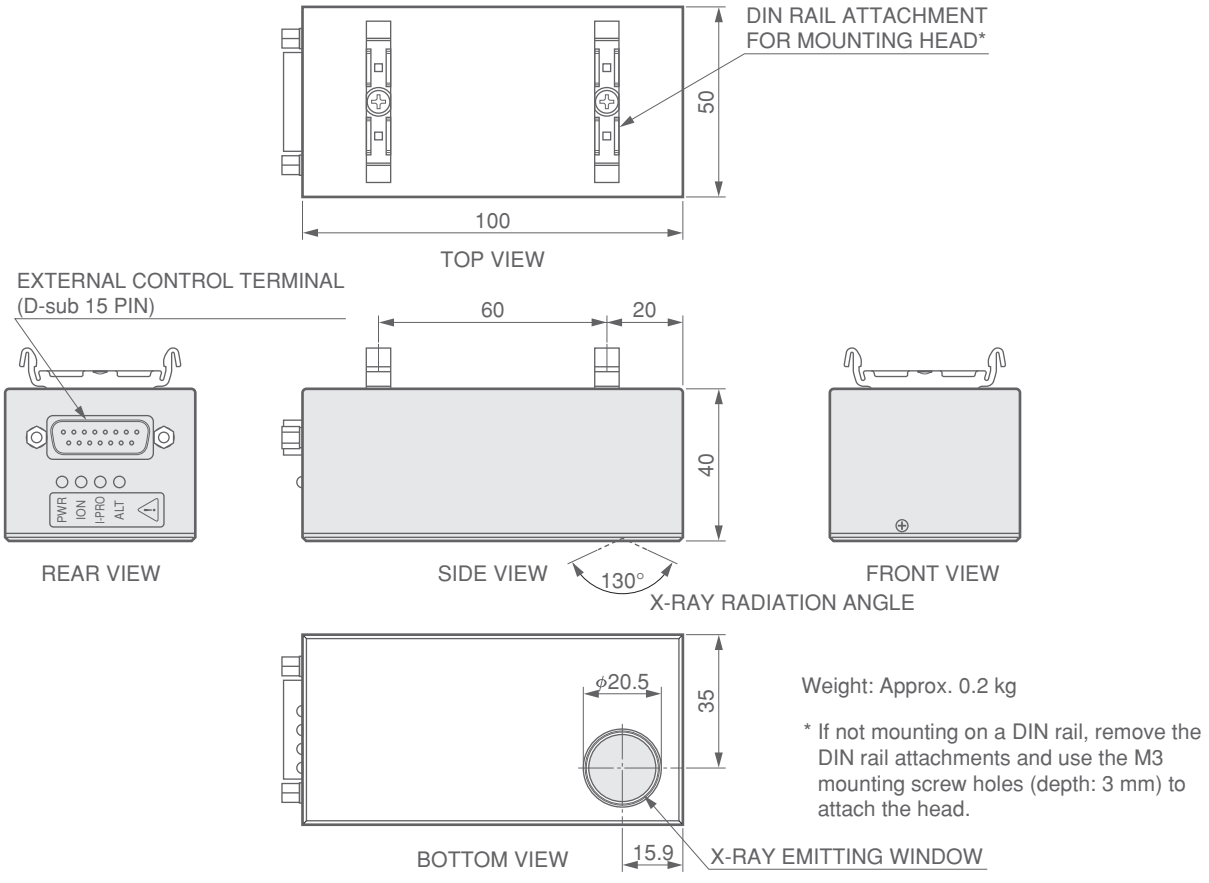


Like the L9873, the L16653 can be powered from the manufacturing equipment and directly controlled by the manufacturing equipment control system. There is no need to prepare an additional controller, and this feature enables installation even into limited spaces.
Compared to the L9873, X-ray shielding becomes easier and L16653 makes installation easier, including initial cost.

STATIC CHARGE REMOVAL PERFORMANCE



DIMENSIONAL OUTLINES (Unit: mm)



Weight: Approx. 0.2 kg

* If not mounting on a DIN rail, remove the DIN rail attachments and use the M3 mounting screw holes (depth: 3 mm) to attach the head.

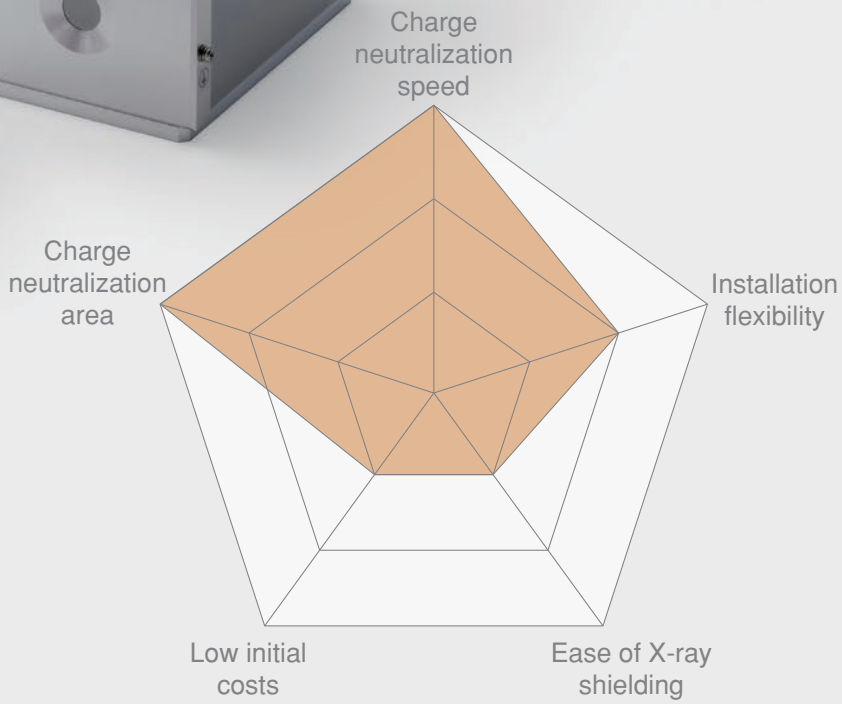
OPTION

Control cable A17272-05

Type No.	Cable length
A17272-05	5 m

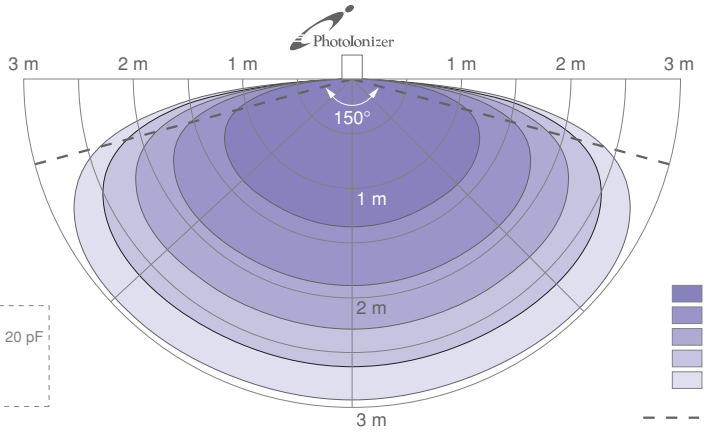
Photolonizer® L14471, C14546

High-end model (Operating four-heads type) with the highest static charge removal performance



The L14471 PhotoIonizer is designed to boost static charge removal performance up to the maximum. This allows removing static charges on large objects with large surface areas in a short time. In addition, the four-heads controller enables operation in multiple production lines. These features lead to big gains in productivity in the manufacturing process.

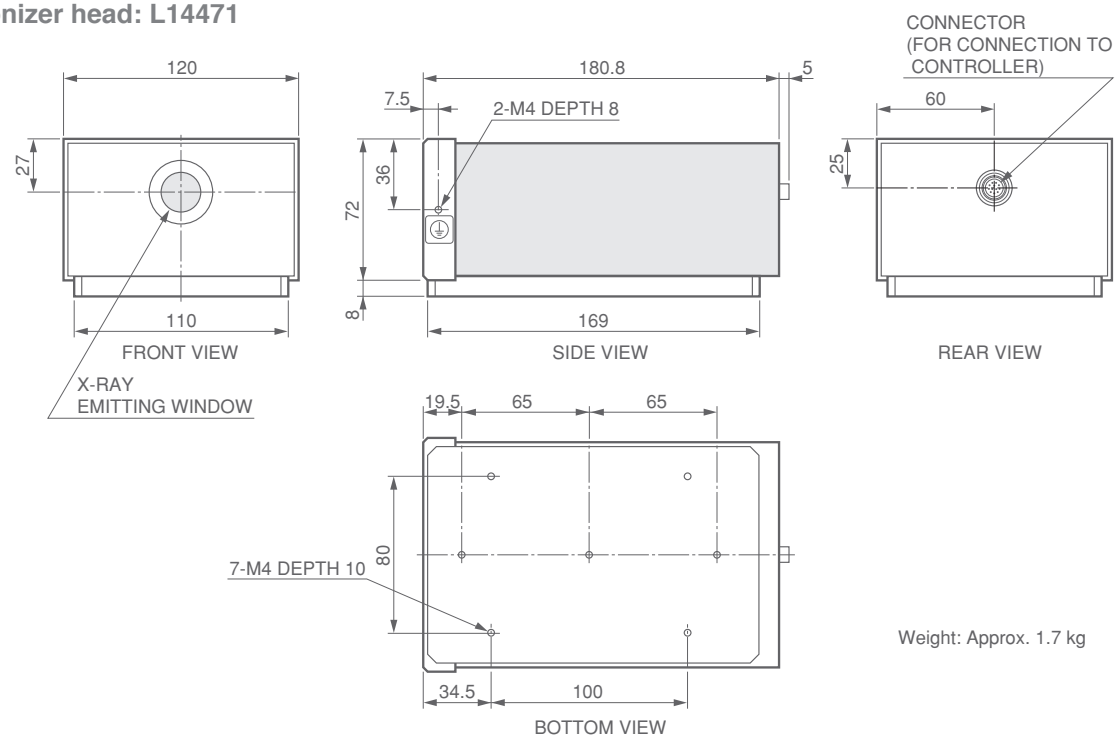
STATIC CHARGE REMOVAL PERFORMANCE



Measurement conditions
Statically charged plate: □150 mm, 20 pF
Charging voltage: ±1 kV → ±100 V
Temperature: 25 °C
Humidity: 50 %

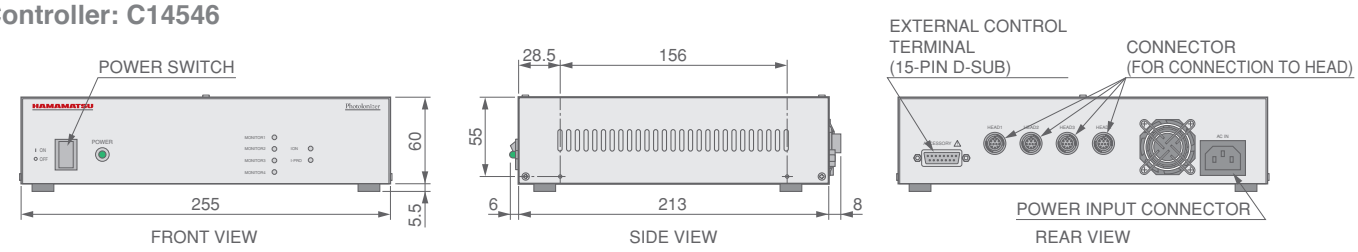
DIMENSIONAL OUTLINES (Unit: mm)

Photolonizer head: L14471



Weight: Approx. 1.7 kg

Controller: C14546



Weight: Approx. 1.9 kg

Accessories

External control connector (15-pin D-sub), Short Plug

OPTIONS

Two-head controller C14472

Use this controller when controlling up to two heads.
W255mm × H55.5 mm × D202 mm weight 1.5 kg

Control cable A10885 series

Type number	Cable length
A10885	20 m
A10885-25	25 m

SPECIFICATIONS

Parameter	L12645	L9873	L16653	L14471 C14546	Unit
Tube voltage	9.5		4.9	15	kV
Tube current	200		300	1000	µA
X-ray radiation angle	130			150	°
Input voltage	AC100 V to AC240 V Single phase 50 Hz / 60 Hz	+24 V		AC100 V to AC240 V Single phase 50 Hz / 60 Hz	—
Operating temperature range	0 to +40				°C
Storage temperature range	-10 to +60				°C
Operating humidity range	Below 60 % (no condensation)				—
Storage humidity range	Below 85 % (no condensation)				—
External control	Ion ON/OFF control, Ion ON signal output, Error signals				—
EMC standards	IEC 61326-1 Group 1, Class A				—
Safety standards	IEC 61010-1/A1	—		IEC 61010-1/A1	—
Environment standards	RoHS directive, WEEE directive				—
FCC standards	FCC 47 CFR Part 15 Subpart B Class A				—

PREVENTIVE MEASURES FOR X-RAY EXPOSURE

Key points for avoiding X-ray exposure are to isolate the X-ray irradiation area and not to enclose it. It is important that operators can visually recognize the X-ray irradiation area but cannot physically enter that area. When these conditions are met, X-ray shielding will prove sufficient even if there is an opening in the irradiation area.
To avoid inadvertent exposure to X-rays, be sure to provide a safety interlock function that immediately cuts off X-ray emissions when the X-ray shielding door or panel is opened.

●Shield thickness

Shielding material	L12645	L9873	L16653	L14471 C14546	Unit
SUS304 stainless steel	0.22		0.11	0.4	mm
Aluminum	1.3		0.23	7	
PVC (polyvinyl chloride)	2.2		0.65	10	

* To check X-ray leakage from the shield, use a radiation detector such as a survey meter. Please consult us for details.

⚠ Safety precautions

· Soft X-rays emitted from this product are harmful to human health. Handle carefully and never allow yourself get exposed to X-rays.
· When using this product, place the head unit inside an X-ray shielded area and always install a safety interlock.

Legal regulations involving this product

This product must be used in compliance with health and safety regulations enforced to prevent bodily harm caused by ionizing radiation. Users of this product must be familiar with applicable laws that regulate use of X-ray emission devices. To obtain more information, refer to international or domestic laws and regulations on ionizing radiation and comply with the required procedures listed there.

Warranty period

This product is guaranteed for one year from the date of delivery. The warranty is limited to replacement of the product. Even if within the warranty period, the warranty does not cover damage caused by misuse or accidents such as natural disasters.

RELATED PRODUCTS

Electrostatic charge remover VUV Ionizer L12542

The L12542 is a VUV Ionizer designed to remove static charges in a vacuum which up to now has been very difficult. “Photoionization” by vacuum ultraviolet light ensures high static charge removal performance even in a vacuum and contributes to a better throughput and yield rate in various types of production processes.

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