

CARTONI

PROFESSIONAL CAMERA SUPPORT

UV-C BOXER

USER'S MANUAL & Maintenance



PLEASE REFER TO THIS INSTRUCTION MANUAL BEFORE USE!



CERTIFICATO N. 19714/09/S
CERTIFICATE No.

SI CERTIFICA CHE IL SISTEMA DI GESTIONE PER LA QUALITÀ DI
 IT IS HEREBY CERTIFIED THAT THE QUALITY MANAGEMENT SYSTEM OF

CARTONI S.P.A.

VIA DI PORTONACCIO, 33/B 00159 ROMA (RM) ITALIA

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 PER LA CINEMATOGRAFIA E LA TELEVISIONE PROFESSIONALE

DESIGN, MANUFACTURE AND POST-SALE ASSISTANCE OF PROFESSIONAL BROADCAST AND FILM EQUIPMENT.
 MARKETING OF PROFESSIONAL BROADCAST AND FILM ACCESSORIES AND PRODUCTS AS LOCAL
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Reference is to be made to the
 relevant documented information
 for the requirements of the
 standard that cannot be applied to
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IAF:17
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1. INTRODUCTION

Thank you for choosing a **CARTONI UV-C BOXER** disinfection device.

WARNING!

! In order to operate your **UV-C BOXER** properly & safely it is essential to read this manual very carefully and follow the instructions. All back-up material, and this manual in particular, should be stored in a safe place for future reference.

The global pandemic has impacted the world in ways never before imagined. In addition to the need to avoid infected persons, global health experts have warned that the virus that causes COVID-19 can live on metal and plastic surfaces for up to 3 days. In response **CARTONI** introduces the **UV-C BOXER**, the first device specially designed & certified to disinfect Film & Video equipment as cameras, lens, Steadicam, batteries, monitors and microphones - just to name a few - from microorganisms, including COVID-19.

Tests performed by Texas-based Microchem Laboratory, found the **CARTONI UV-C BOXER to disinfect 99.985% of microorganisms and COVID-19 in just 3 minutes.**

1.1 THE CARTONI UV-C BOXER

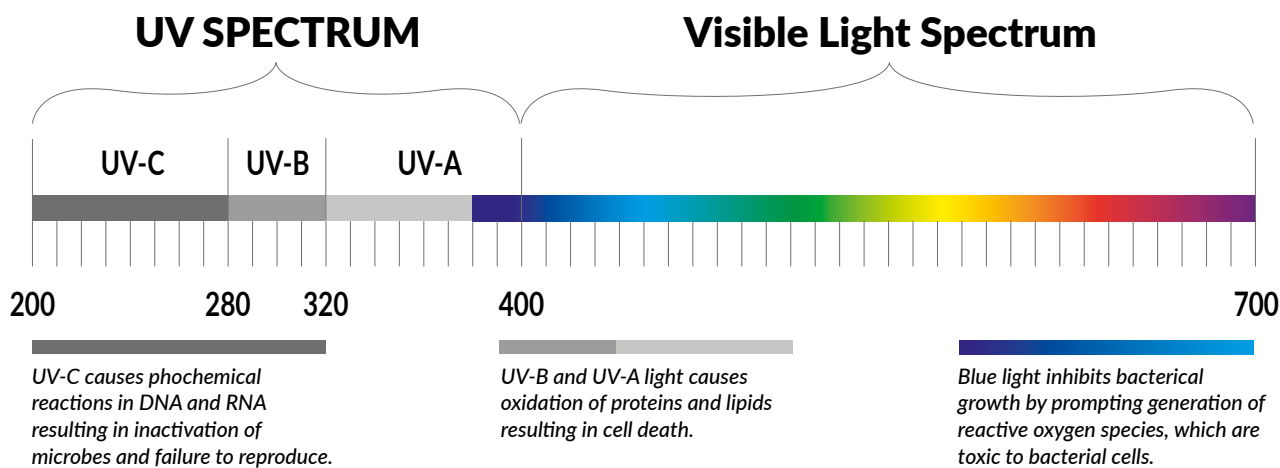
Studies have shown that environmental transmission of germs and viruses can be unwanted source of illness. The new **CARTONI UV-C BOXER** leverages the power of germicidal UV to safely sanitize the surface of Film, Video and Audio equipment without emitting moisture, gas or powders. Equipped with ten (10) medical-grade UV-C (100-280nm) lamps, the **BOXER** is designed to neutralize any microorganism, germ, including COVID-19, which may unknowingly contaminate Film & Broadcast sets.

These features make the **BOXER's UV-C** irradiation ideal as a sanitization process for delicate professional Film & Broadcast equipment as it does not affect - if used properly - electronic circuits & boards, Camera chips, memory cards, Camera & lenses body, monitors, microphones, etc.

1.2 WHAT IS UV-C LIGHT?

UV-C, or germicidal UV, is a wavelength of UV light, typically between 200 to 280 nanometers, that can inactivate pathogens like bacteria and viruses. UV-C light, in the right strength and dose, modifies the DNA structure of an infectious cell so it cannot reproduce and therefore cannot colonize and spread.

UV radiant energy was first used for disinfecting surfaces in 1877 and has since been used extensively, in disinfecting drinking water, wastewater, air, pharmaceutical products, and surfaces against a whole suite of human pathogens. UV-C has been used in hospitals and healthcare facilities for decades and is proven to be effective in both the reduction of hygiene failures and in control environmental contamination by high-concern microorganisms, such as COVID-19. Similar to UV-A and UV-B rays from the sun, exposure to UV-C can damage eyes and skin if overly exposed, so it is essential to follow the strict safety guidelines when UV-C devices are in use.



1.3 ADVANTAGES OF GERMICIDAL UV

Germicidal UV lamps are incredibly effective and have several significant advantages.

All bacteria and viruses tested to date (many hundreds over the years, including other coronaviruses) respond to UV disinfection. Some organisms are more susceptible to UV-C disinfection than others, but all tested so far do respond at the appropriate doses. On top of that, bacteria and pathogens cannot become resistant to UV like they can to certain antibiotics and antibacterial products.

1.4 HOW DOES UV-C DESTROY GERMS?

The high energy from short wavelength UV-C light is absorbed in the cellular RNA and DNA, damaging nucleic acids and preventing microorganisms from infecting and reproducing.

UV-C is strongly absorbed by RNA and DNA bases leading to molecular structural damage via a photo-dimerization process.

This results in virus inactivation, such that they are no longer able to replicate. The amount of inactivation is directly proportional to the UV-C dose, which is received, and this, in turn, is the result of its intensity and duration of exposure. The UV light emitted by a source is expressed in watts (W) and the irradiation density is expressed in watts per square meter (W/m^2).

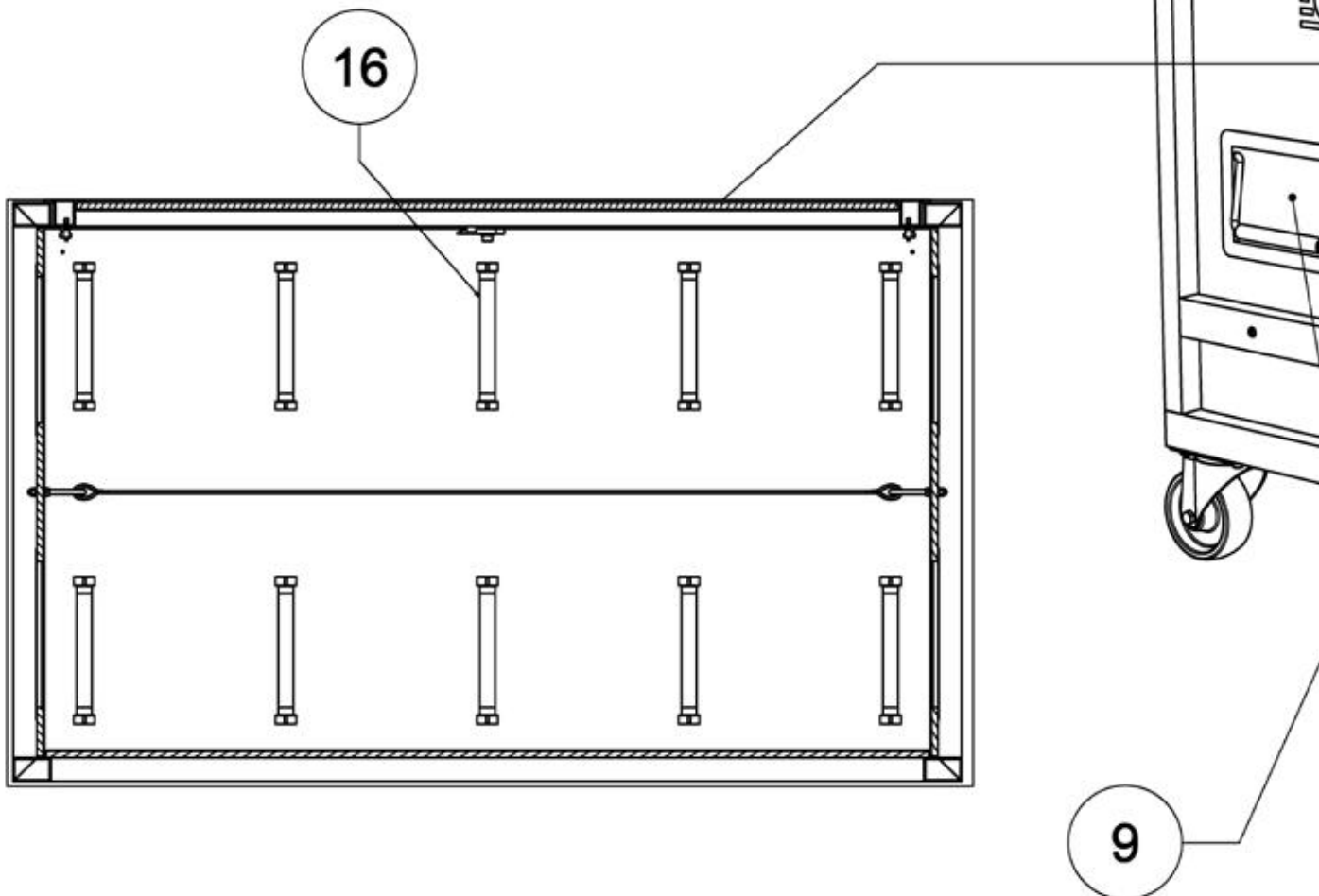
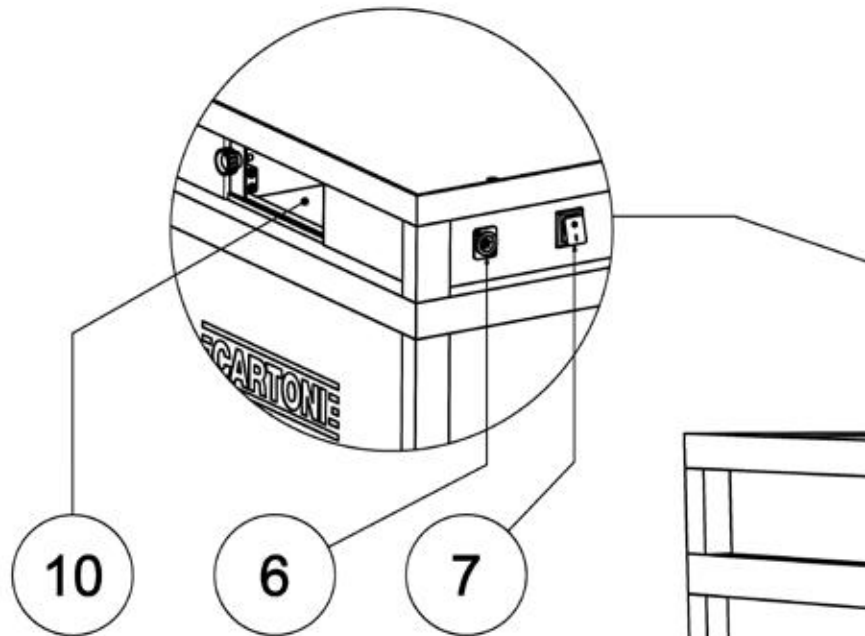
For germicidal action dose is important. The dose is the irradiation density multiplied by the time (t) in seconds and expressed in joules per square meter (J/m^2) (1 joule is 1W second). The most efficient source for generating UV-C is the low-pressure mercury discharge lamp, where on average 35% of input watts is converted to UV-C watts. The radiation is generated almost exclusively at 254 nm viz. at 85% of the maximum germicidal effect and 80% on IES curve.

UV-C light does not expose your equipment to moisture, heat, chemicals and does not produce ozone. Nevertheless, UV-C radiations can deteriorate the external surface of some polymers, plastics and rubbers according to the length of exposure. A reiterated exposure to UV-C disinfection radiation could cause surface brittle and color fading of certain composite materials.

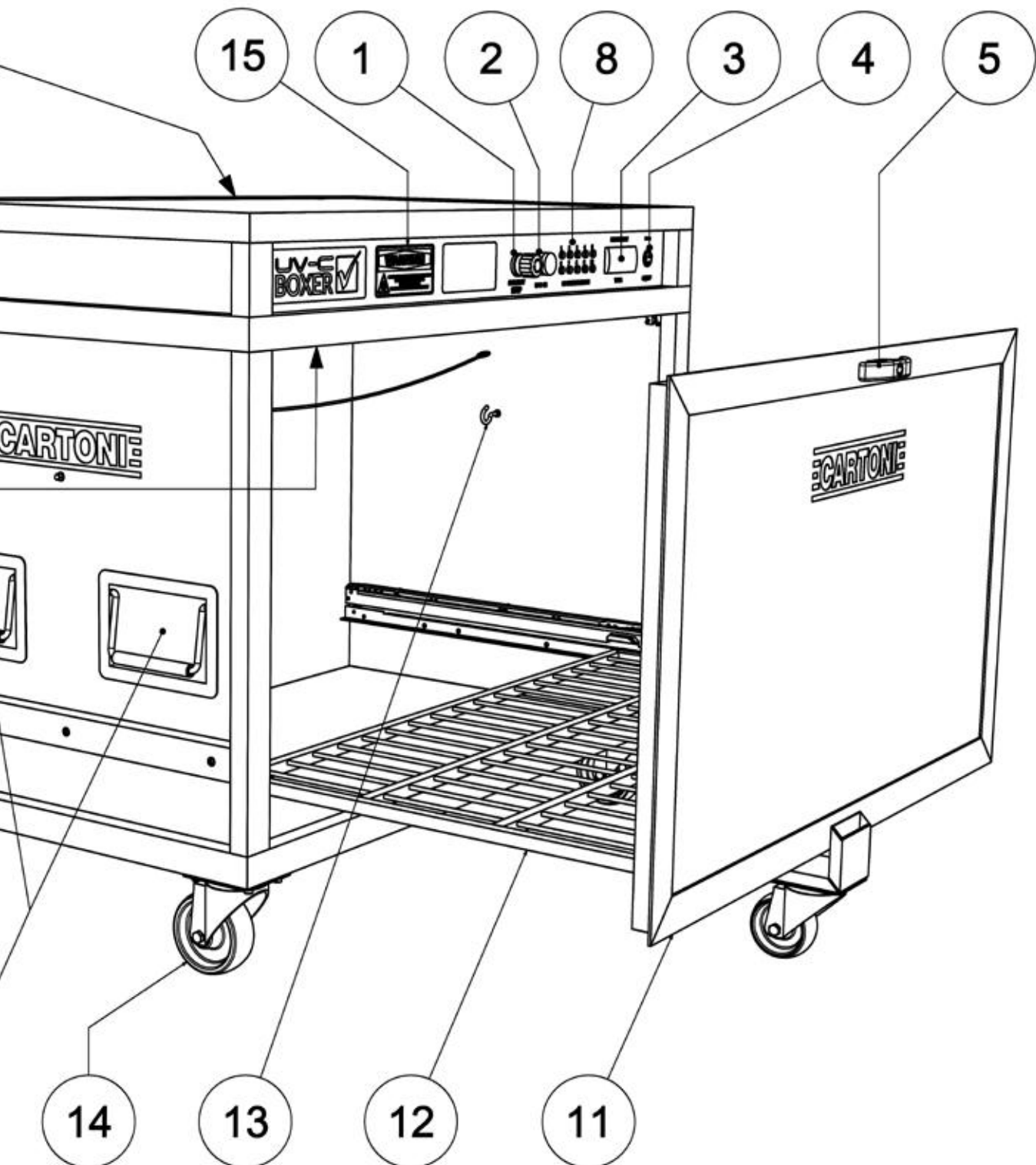
This effect is similar to the one produced by prolonged exposure to direct sun radiation. We highly recommend you protect your Camera sensor and the lenses by covering them with their caps. The damage on plastic and rubber surfaces is not exceeding the damage produced by sun irradiation during the use of the equipment outdoors and can be defined normal wear and tear in the lifetime of the equipment.

2 COMPONENT LIST

- UV-C BOXER
- User's manual
- Set of Dosimeters
- Power converter & cables

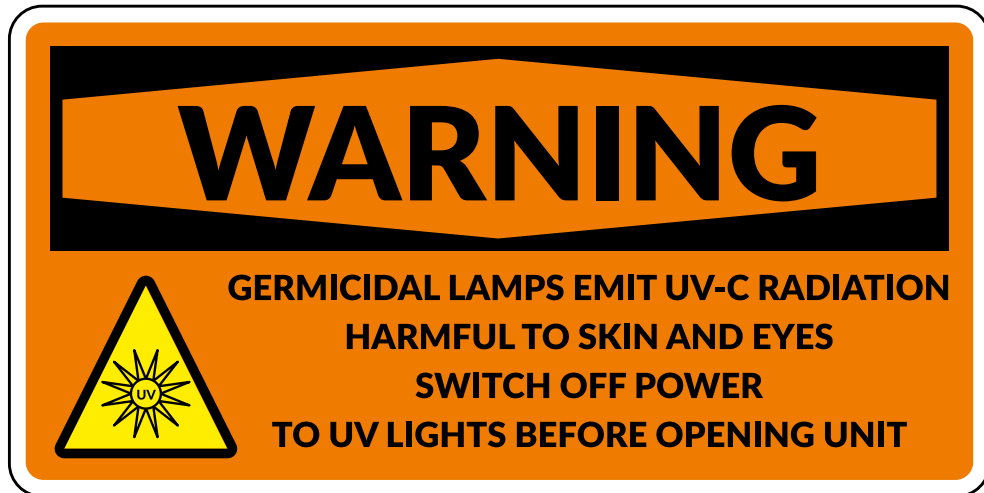


- 1 Emergency switch
- 2 Lamp on Led indicator
- 3 Timer
- 4 Switch On/Off
- 5 Drawer locking handle
- 6 (1: GND; 4: 24V@2A) power connector
- 7 Main switch
- 8 10 Lamps status Led indicator
- 9 Handles
- 10 Storage compartment
Power converter & cables
- 11 Sliding drawer
- 12 Grid
- 13 Cable hooks for hanging items
- 14 Five pivoting wheels, two with lock break
- 15 Warning & Caution signs
- 16 UV-C Lamps



3 WARNINGS & CAUTION RECOMMENDATIONS

CARTONI declines all responsibility if the consumer does not strictly observe the instructions, WARNING & CAUTION signs for use of the **UV-C BOXER**. It is therefore recommended that these instructions should be strictly observed in order to avoid any damage to people, animals or objects.



- Warning for UV-C radiation. The **UV-C BOXER** is equipped with safety switches which deactivate the disinfection cycle whenever the compartment door is open.
- Lens & Cameras should be capped before exposing to UV-C light.
- After removing the viewfinder's rubber or leather Camera Eyecup Eyepiece Eyeshade - to be sanitized separately by disinfectant Sprays or Sterilising fluid to avoid eye contamination - lenses, viewfinders or other optics should always have covers.
- Do not expose laminated or color filters to UV-C light.
- Direct radiation of UV-C lamps is harmful to skin and eyes. In case of improper function of the lamps which may stay on when the compartment door is open, immediately activate the safety switch, disconnect the machine and consult a **CARTONI** service.

- Carefully clean all objects from dust and moisture before sanitizing them.
- Do not overload the space on the drawer grid. Objects have to be separated from one another, never overlapped.
- Leave enough space between objects in order to allow reflection beams to reach every side of the object.
- If you are sanitizing a big piece of equipment which will produce a lot of shade on the reflective panels, it is advisable to run two consecutive cycles flipping the equipment to ensure each side direct exposure.
- Do not disassemble or modify the **UV-C BOXER**.
- Keep the **UV-C BOXER** away from children's reach.
- Delicately dust-off the lamps periodically - at least once a month - with a soft dry cloth or Air Spray as dust could reduce the radiation efficiency.
- The **UV-C BOXER** does not produce Ozone and leaves no residuals.
- Do not overload, stand or jump on **UV-C BOXER** upper plywood panel.
Maximum load: 50 kg. 110 lbs.

Always operate the UV-C BOXER on flat surfaces to avoid film gear scatter out of the sliding drawer.

4. MOVING & TRANSPORT

Before moving the **UV-C BOXER**, disconnect the power supply cable from the power connector **6**, store the converter and the cable in compartment **10**.

Do not leave any loose object inside the disinfection compartment to prevent accidental fatal damage to the lamps **16**.

Moving the **UV-C BOXER** must be done with care. To transport the **UV-C BOXER** from one location to another, you may carefully use a forklift. In case of manual operation use the side handles **9**. Lifting the **UV-C BOXER** requires at least 2 operators.

The maximum load safely operated by a single individual is 25 kg (55 lbs).

Use the pivoting wheels to move the **UV-C BOXER** around the studio or set. The two right wheels are equipped with a brake, make sure that the brake is on when the **UV-C BOXER** is positioned for operation and before starting the disinfection process.

5. PROCEDURES

5.1 PREPARATION

Before starting a disinfection cycle, make sure that:

- A. Lens & Cameras should be capped before exposing to UV-C light.
- B. After removing the viewfinder's rubber or leather Camera Eyecup Eyepiece Eyeshade - to be sanitized separately by disinfectant Sprays or Sterilising fluid to avoid eye contamination – lenses, viewfinders or other optics should always have covers.
- C. Do not expose laminated, color filters or photo sensible components to UV-C light.

5.2 THE DOSIMETRE CARD

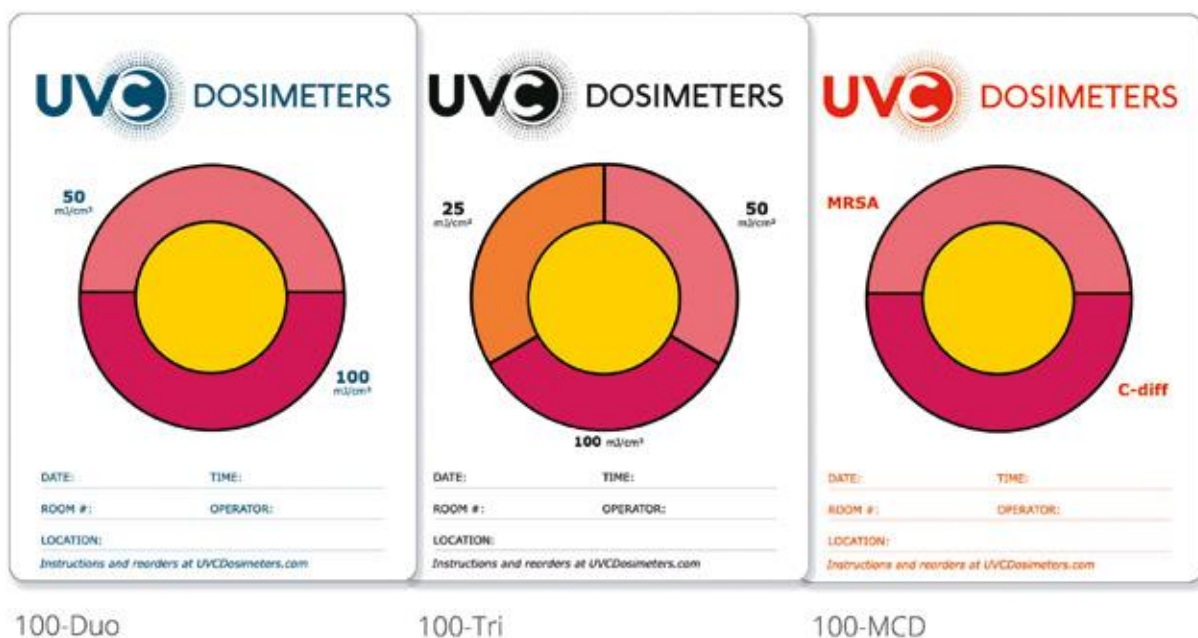
CARTONI recommends the patented UVC 100 Dosimeters from Intellego Technologies.

<https://uvcdosimeters.com/uvc-100-dosimeter/>

UVC Dosimeters change color when exposed to UV-C energy so you can independently validate your devices and procedures to see if an optimal dose of UVC has been delivered to a surface.

A recent study from Boston University and Signify has shown that SARS-CoV-2, the virus that causes COVID-19, can be inactivated by UV-C in 25 seconds with a dose of 22 mJ/cm². The **UV-C BOXER** can irradiate an average of 15mJ/cm² per minute so you can set the timer to 3 minutes to be in safety margin. For other types of viruses and bacteria consult the official channels. Having a visual indication of dose is critical for the success of your UV-C disinfection protocols. UVC Dosimeters are recommended for use during disinfection cycle to provide visible confirmation and confidence for staff and end users.

<https://www.researchsquare.com/article/rs-65742/v1>



WARNING!

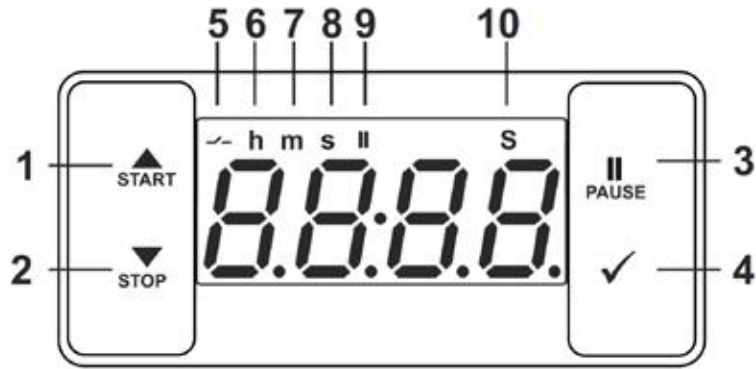
! Always operate the **UV-C BOXER** in a clean and dry location. Do not expose to rain, humidity, saline water, sand or dust.

- Connect the power cable to the power connector **6**.
- Connect the power supply to the main power or to a battery.
- Select ON on the main switch **7**.
- To optimize the UV-C lamps efficiency - at first daily use - let them run for a preliminary 5-minute cycle with no equipment in the compartment, this will bring the transformers to the optimum operating temperature. The efficiency of UV-C irradiation is reduced of 25% on the first run with cold transformers.
- Open the sliding drawer. Place the objects to be disinfected on the grid (Do not exceed the weight of 50 kg – 110 lbs).
- Place the Dosimeter card on the grid near the equipment
- Slide in the drawer **11**. Shut the compartment and lock the handle **5**.
- Set the timer (as per 5.5), for COVID disinfection the minimum recommended exposure of 22mJ/cm² can be achieved in 3 minutes.
- Activate the on/off switch **4**, the red led indicator will light up.
- Wait until the completion of the disinfection cycle, the red Led indicator will switch off.
- In case the compartment is opened before the completion of the disinfection cycle the lamps will switch off and the timer will reset to zero.

WARNING!

! To ensure the correct disinfection process, the cycle of radiation has to be continuous. In case of any interruption the cycle should be repeated entirely.

5.4 HOW TO SET TIMER EZM-3735



- 1. START Button**
Use it as a **START** button or to increase the value on the four digit display.
- 2. Gradual silencing BUZZER & STOP button:**
Use to decrease the value on the four digit display;
Use to silence the **BUZZER**;
Use to stop the timer display.
- 3. PAUSE Button**
When the digital timer is running, if **PAUSE** button is pressed the countdown stops (while the lamps are still on). If the **PAUSE** button is pressed again the counting starts running again.
- 4. ENTER Button:**
If **ENTER** button is pressed set values will be displayed on the main display.
- 5. Led Output:**
Indicates output is active.
- 6. Hour Led:**
Indicates device is in hour mode.
- 7. Minute Led:**
Indicates device is in minute mode.
- 8. Second Led:**
Indicates device is in second mode.
- 9. PAUSE Led:**
Indicates **PAUSE** is on.
- 10. Set Led:**
Indicates device is in **SET** value changing mode.

5.5 CHANGING TIMER VALUES

- Press button ENTER (4), Led Set-Up (10) will activate;
 - Press gradual increment button (1) or decrease (2) until the desired value is SET;
 - Press ENTER button (4) to confirm, Led Set-Up (10) will switch off.

6. MAINTENANCE

6.1 ROUTINE MAINTENANCE

To clean the exterior casing of the **UV-C BOXER** use a damp soft cloth. Hygienizing hydro-alcoholic detergents are also suitable.

To clean the inside reflecting panels, use a soft damp cloth. For more thorough operation wash with neutral soap and warm water. Make sure the reflecting panels are without halos.

Do not use abrasive cloth or products as they may damage the polished surfaces and affect the reflective power.

6.2 LAMP EFFICIENCY CONTROL

During a disinfection cycle the 10 Led on the front panel **8** should be on. In case one or more Led are off, it indicates that the corresponding lamp (numbered from 1 to 10) is not operational.

The lamps are powered in couples by 5 power units. If one of the 2 coupled lamps is dead both lamp pair indicators will be off.

Visually examine both lamps to detect the faulty one, double check installing the lamp on another socket.

6.3 LAMP REPLACEMENT

Failure of one or more lamps reduces the **UV-C BOXER**'s disinfection power.

1. Lamp replacement should be carried out by trained personnel.
2. Replace the failing lamp with the same type (as per 7.2).
3. Before replacing a lamp, always disconnect the power.
4. Gently remove the dead lamp and replace it with a new one.
5. Led indicator on the front panel detects lamp operation

<https://www.fda.gov/medical-devices/coronavirus-covid-19-and-medical-devices/uv-lights-and-lamps-ultraviolet-c-radiation-disinfection-and-coronavirus>

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7273323/>

<https://www.ncbi.nlm.nih.gov/research/coronavirus/publication/32547908>

7. TECHNICAL SPECIFICATIONS

7.1 DIMENSIONS

Width:	100 cm	39.4 in.
Depth including handle:	66 cm	26 in.
Depth excluding handle:	61 cm	24 in.
Height including wheels:	88 cm	34.6 in.
Height excluding wheels:	76 cm	30 in.
Weight:	60 kg	132 lbs
Access:	Front sliding drawer	
N° wheels:	5 (2 pivoting w/brake + 2 pivoting + 1 pivoting on the drawer)	
Wheel diametre:	4 x 10 cm	3.9 in.
	1 x 8 cm	3.1 in.
Maximum supported weight on top pannel:	50 kg.	110 lbs

Sliding drawer inner chamber:

Width	93 cm	36.6 in.
Height:	50 cm	19.6 in.
Depth:	57 cm	22.44 in.
Irradiated zone (from panels):	5 cm	1.9 in.
Grid height from chamber's floor:	10 cm	3.9 in.
Grid rods separation:	5 cm x 18 cm	2 in. x 7.1 in.
Grid max. capacity:	50 kg	110 lbs
Inner chamber surface:	aluminum mirror plates	
Lamps position:	Ceiling of inner chamber	

7.2 ELECTRICAL

Lamps:

• Lamp type:	OSRAM PURITEC HNS UV-C	
• Average wave lenght:	254 nm	
• Ozone release:	None	
• Power consumption:	4 W	
• Irradiation power (UVC):	0.9 W	
• Attachment:	G5	
• Diametre:	16 mm	0.6 in.
• Lenght:	136 mm	5.3 in.
• lifetime:	6000 hrs	
• N° of lamps:	10	

Functions:

- Recommended dosage: From 22 mJ/cm² (2 min) to 40 mJ/cm² (4 min)
- Recommended sanitation time: From 2 min to 4 minutes
- Timer w/countdown: Yes
- Starting button: Yes
- Main Switch: Yes
- Power: 24 V
- Optional power supply: 110/220 V
- Battery & power bank compatible: Not included

7.3 SAFETY DEVICES

- Emergency **STOP** button
- Sensor switch on the drawer
- Led display for each one of the 10 lamps

7.4 ENVIRONMENS

- Operating temperature from 0 to 50 °C (32 to 122 °F)
- Humidity: Max 90%

7.5 CERTIFICATION

CARTONI UV-C BOXER is CE certified and comply with EN 61326-1 (2013) (Electromagnetic compatibility); EN 61010-2-040 (2015), EN 61010-1 (2010) (Electrical safety).



Biological Tests & Certifications by MICROCHEM Laboratory, Round Rock, Texas (USA)

www.microchemlab.com

and University of Siena Department of Molecular Biology, Siena (Italy)

www.dmms.unisi.it/en

8. WARRANTY

CARTONI warrants the **UV-C BOXER** against manufacturing defects for 2 years from the date of shipment.

The warranty covers replacement of any defective component and the labour required, excluding transport/duty costs.

CARTONI warrants that the product supplied will – under proper use – be free from defects in workmanship and materials and agrees that it will, as its option, either repair or replace any defective part during the duration of the warranty from date of purchase.

The warranty only applies if the **UV-C BOXER** has been used properly as outlined in the manufacturer's instructions manual and has not been exposed to any mishandling. The warranty will be immediately invalid if modifications and/or repairs are carried out by unauthorized persons otherwise authorized by **CARTONI**.

The warranty does not apply in case the **UV-C BOXER** has been damaged in shipping or handling, abused, misused, operated contrary to the instructions for use, neglected, normal wear and tear, modified or changed in design or construction or serviced by unauthorized parties.

The warranty does not cover the lamps.

Warranty claims must be submitted – in writing – to the factory for verification or to an authorized distributor/dealer designated by **CARTONI**.

All freight of products sent to **CARTONI** must be prepaid. All implied warranties are limited to the period of time set herein and subject to change without notice.

No liability can be accepted for any variation.



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