

# AMR DISTRIBUTION

Decontamination Robot

**LADYBUG UVC® 100**

*A Feet Engineering Design*



Design and construction made in Europe 

# LADYBUG UVC ® 100

Our Ladybug\_UVC robot is used in regular and controlled cleaning cycles. Its function is to prevent and reduce the spread in the environment of infectious diseases, viruses, bacteria and other types of harmful microorganisms by acting directly on their nucleic structure (DNA & RNA). The robot is safe, reliable and eliminates human errors.

It is simple to operate and designed to assist the cleaning staff on a daily routine. Moreover, the machine's automatic technology renders it totally safe and enabling the complete traceability of the decontamination activities.



# WHAT IS THE **LADYBUG UVC** ® 100 ?

## Why the name Ladybug ?

Whilst this insect is cute, it is capable of effectively eliminating parasites.



Our Ladybug robot is an autonomous germicidal decontamination machine centred on UVC radiation technology for air and surfaces disinfection.

The Ladybug robot is available in two versions; autonomous and static.

This process, specially designed for the daily treatment of large surface areas, allowing the eradication of viruses and germs, thus preventing their spread.

The Ladybug robot does not use any chemicals and therefore it does not induce toxicity, nor does it generate residual product or leave deposits. The Ladybug robot uses only ultraviolet rays.

## What applications can Ladybug be used for ?

This robot can be used in all public places such as hospitals, shopping malls, nursing homes, airports, hotels, food and pharmaceutical industries, laboratories, universities, offices, etc...

Equipped with a motorised option to assist with movement, the decontamination robot is able to carry out its task in total autonomy and it does not require any human intervention for its operation.

**Thanks to its safety systems** the robot operates in complete autonomy the decontamination process without the need to delimit the intervention areas.



**Greater safety**, obtained through the autonomous human presence monitoring system. As soon as the system detects a presence, it automatically triggers a darkening process of the lamps, preventing them from turning off with a consequent increase in the life of the lamps and reduced energy consumption.

Thanks to the blackout blinds, people are protected from any negative effects of UVC radiation. Once an adequate safety distance has been re-established, the shutters open allowing the immediate restart of the decontamination phase without any loss of radiation power.

The robot is equipped with a system that controls the irradiation level of each of the UVC lamps installed, guaranteeing permanent monitoring of the efficiency of the decontamination process. Furthermore, the automated monitoring system ensures the traceability of the decontamination phases.

**The use is very simple** thanks to an intuitive control system.

Remote assistance is available through our hotline, always ensuring full availability of your decontamination robot, regardless of your skills and technical services at your disposal.



# WHAT IS DECONTAMINATION ?

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It is the **action of microbial reduction** (on all types of germs and viruses) according to the regulations in force that make the environment or the treated object safe and harmless. This preventive action therefore eliminates the so-called infectious risk.

The Ladybug decontamination robot is particularly suitable for passageways, such as elevators and corridors, « nests of potential bacteria ». It can work autonomously and can also be remotely controlled.

**UVC rays represent a real alternative** to chemical disinfection methods. They are simple to use and allow you to get results much faster.

The decontamination robot is ideal for the treatment of industrial production lines.

Because this is the central point of disinfection with ultraviolet light :

*« This chemical-free disinfectant solution can allow industries to decontaminate production, packaging and storage areas following suspicious cases or as a preventative measure »*

**« Once the area to be treated has been defined, the air and all physical surfaces exposed to UV rays are decontaminated ».**

The irradiation time can vary « from a few seconds to several minutes ». Therefore, to treat an operating theatre between two patients, ten minutes can be enough and less than a minute is sufficient for a hotel room.

The longer the robot exposes a surface area to ultraviolet light, the more harmful microorganisms are destroyed. An additional advantage considering that viruses can last up to several days on surfaces.

**« The robot can be programmed to adjust the irradiation time to obtain an effective decontamination at the requested level »**

To decontaminate a 22 square meters surface it takes 21 sec to obtain a decontamination of level 1 (log<sub>1</sub>), 69 sec for a decontamination of level 2 (log<sub>2</sub>) and 137 sec for a decontamination of level 3 (log<sub>3</sub>).

\* The calculation takes into consideration a viral reference of log 3 equal to 100J/m<sup>2</sup> (SARS COV<sub>2</sub>)

This equipment can, depending on the predefined parameters, carry out automatic disinfection according to an operator's choice of the range of actions depending on the configuration of the room in which the cycle will take place.

## Proven technology

UV germicidal lamps have been used for many years for the disinfection of air, water and surfaces in hospitals, nursing homes, laboratories and many other industries where hygiene and cleanliness are of the utmost importance.



Table 1: Summary of Ultraviolet Studies on Coronaviruses

Microbe	D <sub>90</sub> Dose J/m <sup>2</sup>	UV km <sup>2</sup> /J	Base Pairs kb	Source
Coronavirus	7	0.35120	30741	Walkers 2007 <sup>a</sup>
Berne virus (Coronaviridae)	7	0.32100	28480	Weiss 1986
Murine Coronavirus (MHV)	15	0.15351	31335	Hirano 1978
Canine Coronavirus (CCV)	29	0.08079	29278	Saknimit 1988 <sup>b</sup>
Murine Coronavirus (MHV)	29	0.08079	31335	Saknimit 1988 <sup>b</sup>
SARS Coronavirus CoV-P9	40	0.05750	29829	Duan 2003 <sup>c</sup>
Murine Coronavirus (MHV)	103	0.02240	31335	Liu 2003
SARS Coronavirus (Hanoi)	134	0.01720	29751	Kariwa 2004 <sup>d</sup>
SARS Coronavirus (Urbani)	2410	0.00096	29751	Darnell 2004
<b>Average</b>	<b>308</b>	<b>0.00747</b>	including all studies	
<b>Average excluding outliers</b>	<b>58</b>	<b>0.03960</b>	excluding Walkers, Weiss & Darnell	

<sup>a</sup>(J ingwen 2020) <sup>b</sup>(estimated) <sup>c</sup>(mean estimate) <sup>d</sup>(at 3 logs)

The following information concerning the sensitivity of the coronavirus to UV rays has been published by **ResearchGate.net**

Table 1 summarizes the results of the studies that were carried out on coronaviruses under exposure to UV radiation, with the specific species indicated in each case.

The D90 value indicates the UV dose for 90% inactivation (decontamination level at log<sub>-1</sub>).

Although there is a wide range of variation in D90 values, this is typical of laboratory studies of UV sensitivity. The D90 value range for coronaviruses is 7 to 2410 J / m<sup>2</sup>, averaging 308 J / m<sup>2</sup>, should adequately represent the UV sensitivity of the SARS-CoV-2 (COVID-19) virus.

Also, based on the study « UV-C irradiation is highly effective in inactivating and inhibiting SARS-CoV-2 replication » (Bianco, Biasin, Pareschi et al.), 2020 :


A dose of 37 J / m<sup>2</sup> would be sufficient to achieve a reduction to log 3 level (99.9%) for a virus density comparable to the « low-level » contaminations observable in closed environments such as a hospital room : « At a virus density comparable to that observed in SARS-CoV-2 infection, an UV-C dose of just 3.7 mJ / cm<sup>2</sup> was sufficient to achieve a 3-log inactivation ».

Finally the study « Rapid and complete inactivation of SARS-CoV-2 » (A Griffiths, NEIDL Boston University & S), 2020 :

A dose of 50 J / m<sup>2</sup> would result in a reduction of the SARS-CoV-2 virus by 99% (Log<sub>2</sub>) : « The team applied a dose of 5mJ / cm<sup>2</sup>, resulting in a reduction of the SARS-CoV-2 virus of 99% ».

# LADYBUG UVC ® 100

## TECHNICAL FEATURES

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- 1 Software and sensor based safety functions. Equipped with emergency button
  - 2 360° UV emission
  - 3 UV wavelength 253.7 NM (UV-C light)
  - 4 Range of movement of 30 minutes
  - 5 Automatic darkening system of the lamps that is activated when the robot detects the presence of human being
  - 6 Real time monitoring system of the UVC irradiation level of each lamp to allow real control of the decontamination effectiveness
  - 7 Operation by mains power supply with a battery recharging system by mains power supply carried out during active disinfection phases
  - 8 Dimensions : 980x580x1800 (L x l x H -mm)  
Weight : 120kg
  - 9 Disinfection capacity within a radius of action max of 5.18m (meters linear), or the equivalent with a floor space of 84m<sup>2</sup>
  - 10 Touch screen detachable control interface Wi-Fi

## Options

**Electric motorization**  
to help the movement with forward / reverse and braking

**Thermal WIFI printer**  
for printing reports of decontamination after of each operation of disinfection

# AMR DISTRIBUTION

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