

## SPECTRA INFINITY - MANUAL

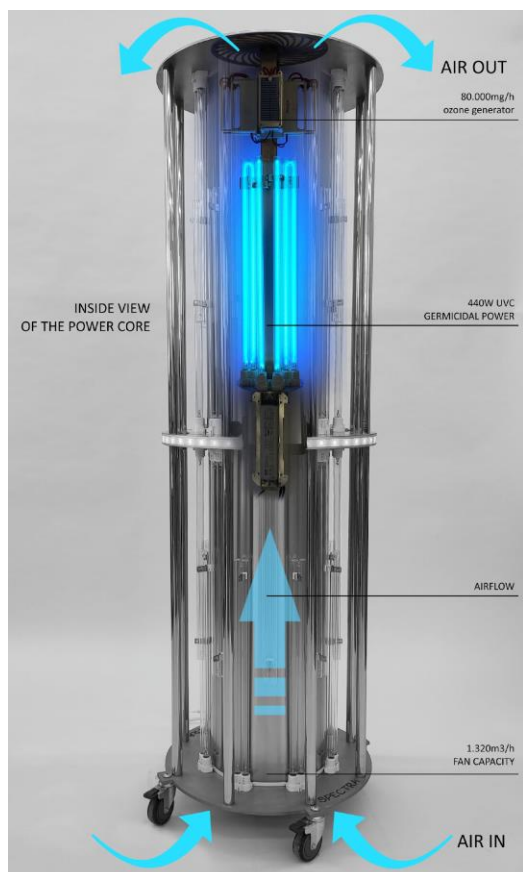
Dear customer, we would like to present this manual to you with a request that you pay close attention to it and familiarize yourself with its contents.

It is very important that you familiarize yourself with all the functional, rotating and control parts of the device before starting the device itself. This will prevent damage to the device or injury to the operating personnel.

The manual chronologically introduces you to the entire work process in individual steps, from safety instructions to final maintenance.

The device can only be operated by a person who has been properly trained and understands all safety instructions, as well as the actual operation and management of the device.

It is forbidden to modify the device yourself, or to change its function for which the device was designed. In other cases, we do not bear any blame for caused damages and problems. In case of confusion regarding any point of this manual, please contact our company GRIZZLY s.r.o. and we will be happy to advise you.



### Device description:

High-performance mobile disinfection system designed for professional use.

SPECTRA infinity is a professional device that combines 3 technologies.

1. Technology – open germicidal radiator with a power of 1,760 W (360° radiation)
2. Technology – closed germicidal radiator with a power of 440W with a fan with a power of 1,320 m3/h
3. Ozone generator with an output of 80,000 mg per hour with a fan with an output of 1,320 m3/h



The device can disinfect the entire space in a very short time using germicidal radiation.

If there are many obstacles in the space that create shadows, it is possible to activate the additional disinfection mode with ozone, which will complete the complete disinfection of the entire space.

During the presence of people, the device can be turned on in the mode of a closed germicidal radiator and thus ensure a safe environment for all persons in the space.

The device is equipped with safety sensors that deactivate the external UVC tubes in case of motion detection.

Control of the device is ensured using the supplied tablet. You can switch on any mode or a combination of them.

Thanks to the application, you can also set any time on and off. The entire device is made of high-quality AISI 304 stainless steel.

The device can be easily moved thanks to mobile wheels, which can be secured to block movement.

#### **PARAMETERS:**

Open UVC system:

Germicidal power of open UVC emitter: 1760W

Type of fluorescent lamps used: Philips PL-L 55 2G11 or OSRAM HNS 55 2G11

Number of pieces for open UVC emitter: 32

High-quality ballasts for the lifetime of fluorescent lamps up to 20,000 hours

Closed UVC system:

Germicidal power of the internal closed UVC emitter: 440W

Type of fluorescent lamps used: Philips PL-L 55 2G11 or OSRAM HNS 55 2G11

Number of pieces for open UVC emitter: 8

High-quality ballasts for the lifetime of fluorescent lamps up to 20,000 hours

Fan: SPAL with an output of 1,320m<sup>3</sup>/h

OZONE disinfection system (99.9% elimination of shadows compared to UVC)

Ozone generator output: 80,000mg/h (80g/h)

Number of ceramic ozone plates: 16

Service life: approx. 8,000 hours

Fan: SPAL with an output of 1,320m<sup>3</sup>/h

Supply voltage: 230V / 50Hz

Maximum rated power: 11.217 A

IP: 2X

Distance measurement: using the INFINITY laser module on top of the device.

Control unit of the establishment: ARDUINO INFINITY

Type of control: Using the supplied tablet

Security: 4x PIR sensor for 360° movement detection up to 8m

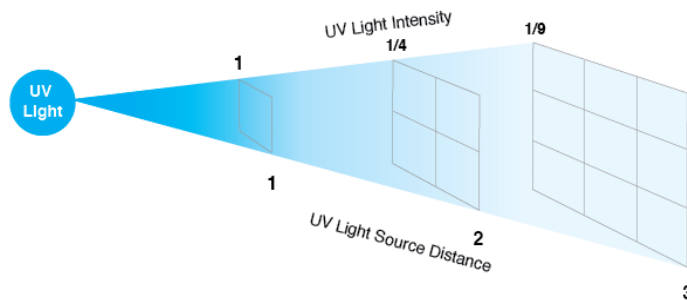
Maximum joint power of germicidal radiation: 2200W

Radiation wavelength: 253.7 nM

Beam angle: 360°

Weight: 76 kg  
 Device height 176 cm, base diameter 50 cm  
 Device type: Mobile with braked wheels with a diameter of 105 mm (bearings with a rubber ring)  
 Acoustic and optical signaling of ongoing disinfection  
 Color signaling of active disinfection mode  
 Loudness of the security siren: 68dB / siren deactivation option.  
 Suitable for spaces up to 200m<sup>2</sup>  
 Material: AISI 304 stainless steel

### Inverse-Square Law of Light



## INTRODUCTION

The most modern disinfection system on the market designed for hospitals, the military and other professional deployments.

The uniqueness of the device lies in the 3 most effective methods of chemical-free disinfection of surfaces, entire spaces and air.

Thanks to the powerful core, it is possible to activate the disinfection process using ozone.

The powerful core can generate up to 80,000 mg of ozone per hour, and with the help of a built-in fan with a capacity of 1,320 m<sup>3</sup>/h, it ensures the penetration of ozone into all parts of the space, even where normal germicidal radiation does not fall.

This combination of germicidal radiation and ozone is the only true disinfection method that can be described as shadowless disinfection.

The device is intended for very fast and effective disinfection of the entire space and this is ensured by means of UVC fluorescent lamps with a high power of 1,760W.

These UVC fluorescent lamps are located around the entire perimeter of the device, which ensures disinfection in all directions in a 360° angle.

SPECTRA infinity is equipped with safety sensors that deactivate the external UVC tubes in case of motion detection.

During the presence of people, the device can be turned on in the mode of a closed germicidal radiator.

SPECTRA infinity provides health protection at the workplace even during the presence of people, thanks to which the device can be used during the entire work operation.



The powerful core has a UVC power of 440W and a fan with a power of 1,320 m<sup>3</sup>/h

The entire device is easy to transport from room to room thanks to the mobile chassis with wheels.

The entire structure of the device is made of high-quality AISI 304 stainless steel.

SPECTRA infinity is controlled using the supplied tablet, where you can start any disinfection mode for the desired time with simple steps.

## **Installation and start-up of the device**

The device is intended for disinfection of air and spaces in the interior with IP 2X protection.

Transport of the device over longer routes using logistics is only possible using the original transport box.

With this box, the device can be transported in both a vertical and horizontal position.

After unpacking, the device is intended only for operation in a vertical position, so that the wheels move on the ground.

Transporting the device indoors is possible manually by pushing or pulling it on a flat surface.

When crossing bumps, make sure that the device is not subjected to strong shocks, otherwise the fluorescent lamp may jump out of the socket.

In case of damage to the device during transfer, contact your supplier or device manufacturer.

The device is supplied with a removable electric cord for a 230V/50Hz power supply.

During the transport of the device, it is always necessary to disconnect the electric cord.

When the device is in the desired location, it is necessary to secure at least 2 wheels with the built-in brake against accidental displacement.

You can then connect the device to the mains using the original power cord.

There is an ON/OFF switch above the electrical outlet of the device, which must be switched to the ON position.

## **Device control**

The device can be controlled using the supplied tablet or the buttons on the device.

When you connect the device to the electrical network and turn on the switch, you have to wait about half a minute until the software starts and the device is automatically paired with the tablet.

The device can then be started.

Next to the tablet holder, there are also 3 manual buttons for immediately starting any disinfection process.



**AIRFLOW UVC (green button) – closed UVC emitter**  
**OZONE (blue button) – ozone generator**  
**OPEN UVC (red button) – open UVC emitter**

**With the button to start the closed UVC lamp**, you can turn off or turn on the internal air circulation system with UVC lamps. This mode allows the presence of people, since radiation does not escape from the device.

This mode is manual. Press to turn it on and press again to turn it off.

Air regulation is possible using a lateral rotary potentiometer, which is located above the electric cord.

**The ozone generator button** activates the automatic 15-minute ozone disinfection process.

After pressing the button, you have 1 minute to leave the room and then the disinfection process using ozone will automatically start. This process will automatically shut down after 15 minutes.

Do not enter the space for the next 60 minutes so that the concentration of ozone in the space is not harmful to the human body.

**Open the UVC emitter with the button** to activate the automatic disinfection process of the entire space using germicidal light.

The necessary disinfection time will be calculated automatically using the lasers in the infinity modules.

After pressing the button, you have 1 minute to leave the area and then the disinfection process will automatically start using UVC light.



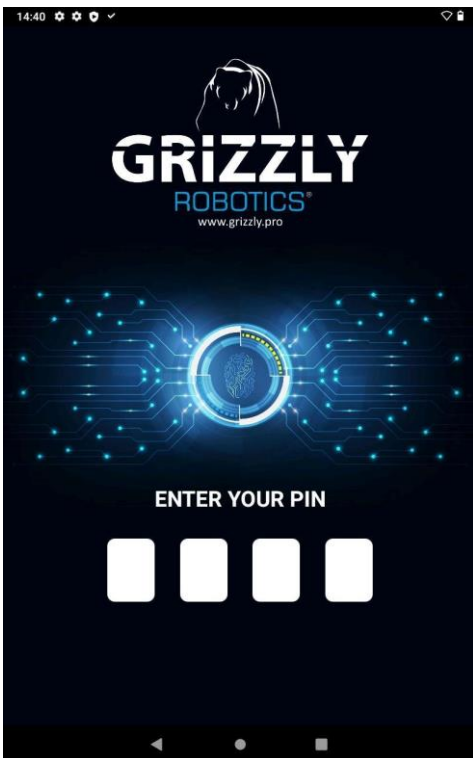
If you need to disinfect the space with the ozone generator at the same time as the external germicidal emitter, press the button of the ozone generator and then the open UVC emitter and then leave the area.

After pressing the buttons, you have 1 minute to leave the room and then the disinfection processes will start automatically. These processes are automatically shut down after 15 minutes.

### **TABLET control:**

The supplied tablet is required for fully functional control of the device.

The pairing of the tablet and the device should happen automatically after turning on the device.



The entry password for the tablet is 9999

You need to create users when you start using it.

In the main menu, click on the settings icon in the upper right corner and then select USERS and click ADD at the bottom.

Then enter the name and PIN for the new user.

This way you can create any number of users.

Subsequently, it will be possible to check the detailed history of processes.

Each user logs in with their own PIN code.



On the left of the picture is the main menu.

Device status indicates the current status of the device.

Disconnected – not connected to the device

Connected – connected to the device

There are also 3 device modes:

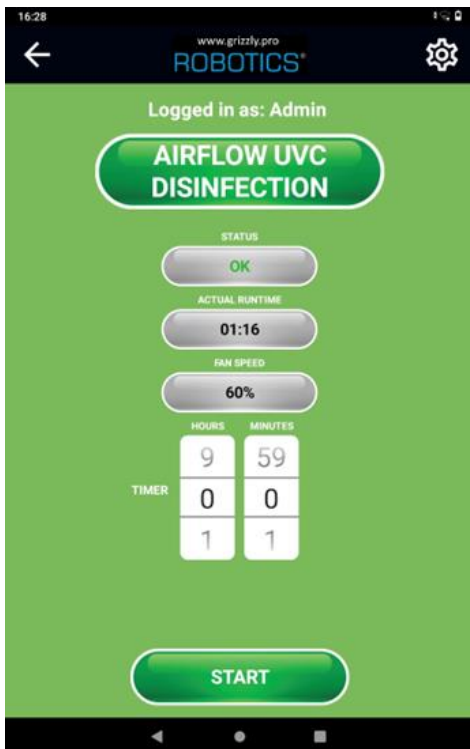
AIRFLOW UVC DISINFECTION - closed UVC emitter

UVC DISINFECTION – open UVC emitter

OZONE DISINFECTION – ozone generator

STOP - a central STOP that shuts down any running process.

HISTORY OF DISINFECTION PROCESS - History of processes.



Mode: AIRFLOW UVC DISINFECTION

Closed UVC emitter.

You set the desired time on the timer and click on the start icon. The process will then start and you can see the remaining process time on the display. You can stop the process at any time by clicking on the stop icon.

In the upper part you can see a window: ACTUAL RUNTIME, where you know

monitor the lighting time of the fluorescent lamps.

The status of the device is displayed in the STATUS window.

You can set/regulate the fan power by clicking on the FAN SPEED window

### Mode: UVC DISINFECTION

Open UVC emitter

You set the desired time on the timer by clicking on the start icon  
The fluorescent lights are then switched on for the required time.

The time countdown is shown on the display.

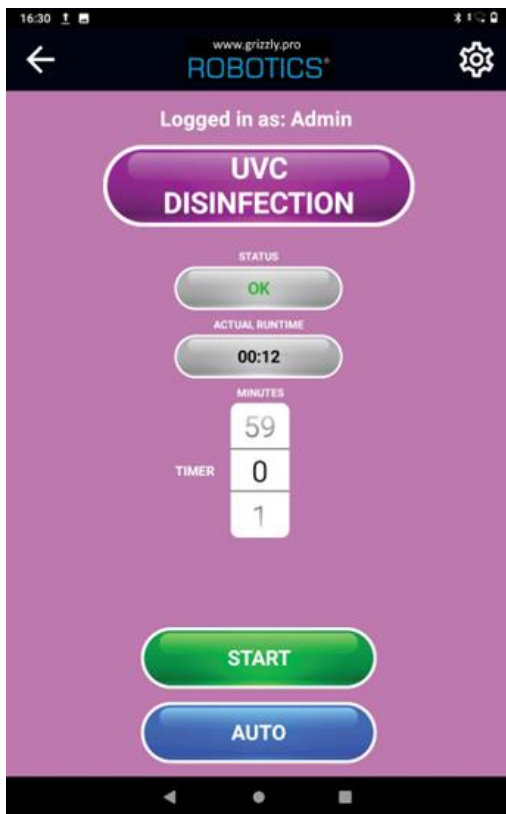
You can stop the process at any time by clicking the stop icon.

AUTO mode: If you want to turn on the process with automatic calculation the necessary time for disinfection, click on the icon:  
AUTO.

Subsequently, the proposed time is displayed and the process is activated.

If the device detects movement during disinfection, the whole process stops and the display shows: MOTION DETECTED

If you want to continue the process, you have to start it again.



### Mode: OZONE DISINFECTION

Ozone generator

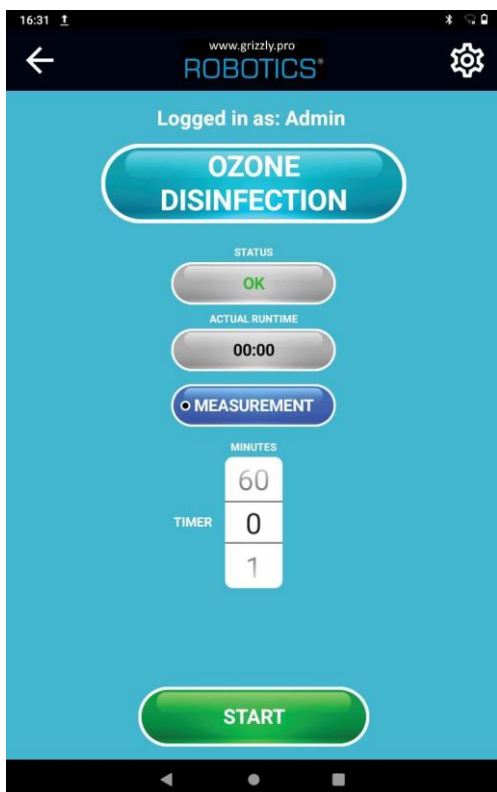
You set the desired disinfection time on the timer and click on the start icon. The ozone generator will then turn on for the desired time.

The time countdown is shown on the display.

You can stop the process at any time by clicking the stop icon.

If you need to measure the residual value of ozone in the space, click on the icon: MEASUREMENT

Subsequently, the one-minute measurement process will start and the value of ozone in the space will be displayed. During this process, the fan is active.





**Security:**

There are 4 safety sensors in the upper part of the device.

These sensors detect movement up to 8 m. Safety sensors protect people from accidental exposure to germicidal light. The sensors are activated when the open germicidal emitter function is activated.

If during this process the sensors detect movement in the room, they deactivate the UVC tubes

Table of performance of germicidal radiation in open irradiation SPECTRA infinity.

Distance	mW/cm2	W/m2	mj/cm2x1s
1	1,332	13,32	1,332
2	0,62	6,2	0,62
3	0,3	3	0,3
4	0,193	1,93	0,193
5	0,126	1,26	0,126
6	0,09	0,9	0,09
7	0,069	0,69	0,069
8	0,052	0,52	0,052
9	0,043	0,43	0,043
10	0,032	0,32	0,032

**SPECTRA infinity ozone generator performance chart.**

The table shows the PPM value of ozone generated at different times.

Room temperature during tests 25°C

Room size in m3 - ozone destroys microorganisms when it reaches a minimum concentration 3 ppm

	10m3	25m3	50m3	75m3	100m3	125m3	150m3	200m3	250m3
5	12	5	2	2	1	1	1	1	0
10	26	10	5	3	3	2	2	1	1
15	35	14	7	5	3	3	2	2	1
20	42	17	8	6	4	3	3	2	2
25	52	21	10	7	5	4	3	3	2
30	56	22	11	7	6	4	4	3	2
35	61	24	12	8	6	5	4	3	2
40	60	24	12	8	6	5	4	3	2
45	62	25	12	8	6	5	4	3	2
50	60	24	12	8	6	5	4	3	2
55	65	26	13	9	6	5	4	3	3
60	64	25	13	8	6	5	4	3	3



Efficiency table of the open UVC emitter SPECTRA INFINITY.

The table shows the time required to kill different types of bacteria and viruses from different

Distance in meters

Type	1	2	3	4	5	6	7	8	9	10
Shigella dysenteriae	1,50	3,23	6,67	10,36	15,87	22,22	28,99	38,46	46,51	62,50
Vibrio cholerae	1,65	3,55	7,33	11,40	17,46	24,44	31,88	42,31	51,16	68,75
Yersinia enterocolitica	2,78	5,97	12,33	19,17	29,37	41,11	53,62	71,15	86,05	115,63
SARS-Cov-2	3,00	6,45	13,33	20,73	31,75	44,44	57,97	76,92	93,02	125,00
Aeromonas hydrophila	3,00	6,45	13,33	20,73	31,75	44,44	57,97	76,92	93,02	125,00
Campylobacter jejuni	3,00	6,45	13,33	20,73	31,75	44,44	57,97	76,92	93,02	125,00
Escherichia coli	3,00	6,45	13,33	20,73	31,75	44,44	57,97	76,92	93,02	125,00
Salmonella typhimurium	3,75	8,06	16,67	25,91	39,68	55,56	72,46	96,15	116,28	156,25
Cryptosporidium parvum	3,75	8,06	16,67	25,91	39,68	55,56	72,46	96,15	116,28	156,25
Giardia lamblia	4,50	9,68	20,00	31,09	47,62	66,67	86,96	115,38	139,53	187,50
Salmonella typhi	4,80	10,32	21,33	33,16	50,79	71,11	92,75	123,08	148,84	200,00
Shigella sonnei	4,88	10,48	21,67	33,68	51,59	72,22	94,20	125,00	151,16	203,13
Staphylococcus aureus	4,88	10,48	21,67	33,68	51,59	72,22	94,20	125,00	151,16	203,13
Influeza	5,11	10,97	22,67	35,23	53,97	75,56	98,55	130,77	158,14	212,50
Legionella pneumophila	5,26	11,29	23,33	36,27	55,56	77,78	101,45	134,62	162,79	218,75
Salmonella ententidis	6,76	14,52	30,00	46,63	71,43	100,00	130,43	173,08	209,30	281,25
Staphylococcus faecalis	7,51	16,13	33,33	51,81	79,37	111,11	144,93	192,31	232,56	312,50
X174	9,01	19,35	40,00	62,18	95,24	133,33	173,91	230,77	279,07	375,00
Hepatitis A	11,26	24,19	50,00	77,72	119,05	166,67	217,39	288,46	348,84	468,75
Salmonella anatum	11,26	24,19	50,00	77,72	119,05	166,67	217,39	288,46	348,84	468,75
Coxsackievirus B5	15,77	33,87	70,00	108,81	166,67	233,33	304,35	403,85	488,37	656,25
Hepatitis A, HM175	16,52	35,48	73,33	113,99	174,60	244,44	318,84	423,08	511,63	687,50
Poliovirus Type 1	17,27	37,10	76,67	119,17	182,54	255,56	333,33	442,31	534,88	718,75
B-40	17,27	37,10	76,67	119,17	182,54	255,56	333,33	442,31	534,88	718,75
Rotavirus SA11	17,27	37,10	76,67	119,17	182,54	255,56	333,33	442,31	534,88	718,75
PRD-1	18,02	38,71	80,00	124,35	190,48	266,67	347,83	461,54	558,14	750,00
MS-2	39,04	83,87	173,33	269,43	412,70	577,78	753,62	1 000,00	1 209,30	1 625,00
Bacillus subtilis spores	45,80	98,39	203,33	316,06	484,13	677,78	884,06	1 173,08	1 418,60	1 906,25
Adenovirus Type 41	60,06	129,03	266,67	414,51	634,92	888,89	1 159,42	1 538,46	1 860,47	2 500,00
Adenovirus Type 40	67,57	145,16	300,00	466,32	714,29	1 000,00	1 304,35	1 730,77	2 093,02	2 812,50

N e e d e d t i m e i n s e c o n d s

5 minutes
10 minutes
15 minutes
20 minutes
25 minutes
25+ minutes

## GENERAL RULES AND WARNINGS

An open germicidal radiator is used for direct irradiation of a room without the presence of people.



Direct irradiation of the air in the room with UV radiation is the most effective way of sterilizing the air.

It contains the entire volume of air, destroys germs even on walls and floors.

It is homogeneous radiation,

which is capable of destroying germs even in places where conventional disinfectants have not been applied

(outside the shadow formed by obstacles).

Germicidal tubes have a lifetime of approx. 20,000 hours. After this time, they need to be replaced.

Exposure times for this distance are very short for disinfection in the irradiated zone to take place very effectively.

The operation should therefore take place repeatedly in short time intervals - e.g. after everyone leaves the client.

### **Safety requirements for the operation of an open radiator:**

1. Installation of the device may only be performed by competent, trained and familiar persons with possible risks. The structure of the device must be firmly secured. Location the equipment must ensure that direct exposure cannot occur under any circumstances operating personnel or clients of operations with dangerous UV radiation.
  2. During the operation of the device, it is necessary that there are no persons, plants or animals.
  3. The control allows you to set the time on and off.
  4. Germicidal emitters can only be operated by persons duly instructed in the operation and, if applicable risks.
  5. It is necessary to ensure regular (once a year) testing of the function of the emitters, control operating switches and other additional technical means.
  6. It is required to mark the emitters with warning labels about the danger of UVC radiation - warning signs are part of the package.
  7. It is necessary to observe the recommended exposure times. Due to the use of sources with hot cathode (relatively large power of UVC radiation within 0.5 m distance from the source) are not for destruction of microorganisms requires long exposure times.
- However, multiple exposures to radiation within 24 hours are required.

The effectiveness of UVC radiation decreases with the square of the distance. When using directly emitting germicides

emitters, it should be taken into account that at a certain temperature and air humidity, disinfection may be

rooms from a certain distance not very effective. A noticeable drop occurs from about three meters from the source of UVC radiation.

**WARNING:**



Since UV radiation is not accompanied by visible manifestations except fluorescent light - color, odor, thermal

action and impact by its exposure no warning signs, it is necessary at suspects of exposure to observe the manifestations in a span of up to several hours.

Damage to the organism by UV radiation can manifest itself in milder cases - within a few hours, severe burning in the eyes and

redness of the skin, with larger and long-term doses - damage to vision, skin burns, skin cancer.

Already in case of suspicion of possible exposure to UVC radiation and manifestations of UV exposure radiation, it is necessary to seek medical help and must be ensured by the operator immediate elimination of the cause and take effective measures and continue to monitor the safety of operation.

Tubes producing UVC radiation are linear discharge lamps containing mercury vapor without an inner layer luminophore.

If they are disturbed or broken, environmental contamination occurs mercury, which is a toxic substance for the human body.

Disposal of fluorescent lamps when damaged and after their useful life corresponds to the toxic waste disposal regime.

UVC radiation causes aging and yellowing of plastics within the reach of the radiation.

### **INFLUENCE AND EFFECTS OF OZONE**

The built-in ozone generator produces ozone. Ozone is one of the most effective disinfectants known. The bactericidal and virucidal effect occurs when the concentration is approximately at the level of 13  $\mu\text{g}/\text{dm}^3$ .

It is about 50 times more effective and 300 times faster than the effect of chlorine.

Ozone is an irritating gas that damages biological membranes through free radical reactions with membrane components. Once ozone reaches living cells, it inhibits the action of cellular enzymes and stops intracellular respiration. The first symptoms of ozone irritation (observable already at the level of 0.1  $\mu\text{g} / \text{dm}^3$ ) are cough, sore throat, drowsiness or headache.

The half-life of ozone is approx. 30 minutes, therefore its primary concentration drops to approx. 6% in two hours.

After ozonization, ventilate all rooms and use a respirator. If you need to stay in disinfected areas. An ozone concentration of 0.1 ppm is harmless for humans up to a maximum of 8 hours of exposure. An ozone concentration of 10 ppm is dangerous after only a few minutes of exposure. (and the higher the concentration, the faster the half-life).

**Operation of ozone generators requires professional or trained operators.**

**It is absolutely necessary to avoid staying in a room that is ozonated for more than a few minutes.**



Professional application requires the use of a concentration in the range of 2.5 ppm.

The concentration threshold at which ozone disinfection begins is 1 g of ozone per 10 m<sup>3</sup> in the treated room.

#### Ozone toxicity:

Regardless of the exposure limits, there is a risk of inflammation of the upper respiratory tract. Ozone has been proven to have a negative effect on people suffering from asthma. No person suffering from asthma should enter a room which has recently been saturated with ozone, unless the remaining ozone has been completely dispersed and the room well ventilated. Ozone has a specific pungent odor, making it easily detectable even at concentration levels significantly below the above exposure limits. Most people can smell ozone at one-tenth of the 15-minute limit. A very pungent smell of ozone in the air usually means that the concentration exceeds the 15 minute exposure limit value.

#### **Warning.**



**Before switching on the device, leave the space around the machine free.**

**Do not check if the generator is producing ozone by sniffing at the generator outlet!!!  
Short-term inhalation of ozone at high concentration or long-term inhalation of ozone at low concentrations may result in adverse effects.**

#### GENERAL SAFETY PRECAUTIONS:

This device is not waterproof and may only be used indoors.

Water damage is not covered by the warranty.

Do not open the cover or perform any mechanical intervention.

**May only be used by persons over 18 years of age.**

Do not touch the machine or open it while the machine is running.

Do not touch this machine with damp or wet hands.

Keep the device out of the reach of children.

Unplug the heater from the power source when not in use.

The company GRIZZLY s.r.o. is not responsible for damage to persons or property caused by this product nor for damages that may arise when handling this product by the user or others persons. The user is responsible for the correct installation, operation and storage of this product.

#### SECURITY:

**For safety reasons, arbitrary setting or modification of the device is not allowed.**

**Prevent minors from handling the device!**



### Liquidation



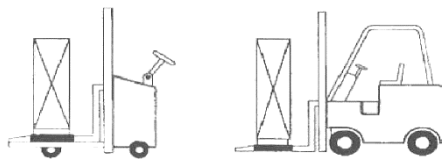
All products marked with this symbol belong to waste from electrical and electronic equipment (WEEE according to European Parliament and Council Directive 2012/19/EU) and should not be thrown away together with unsorted municipal waste. Instead, in order to protect human health and the environment, you should take the waste from your device to a collection point for the recycling of waste electrical and electronic equipment established by your government or local authorities. Proper disposal and recycling will help prevent potential negative consequences for the environment and human health.

### Tours and exams

During the use of the device, professional tests and professional inspections of the electrical installations of the device must be carried out, according to the relevant guidelines of the countries in which the device is used and by technicians with professional competence for the given activity (SR - STN 33 1610). Repeated professional examinations and professional inspections must be carried out on the dates according to the relevant guidelines.

### Transportation, assembly, storage

#### Transportation



#### Obligations before transportation:

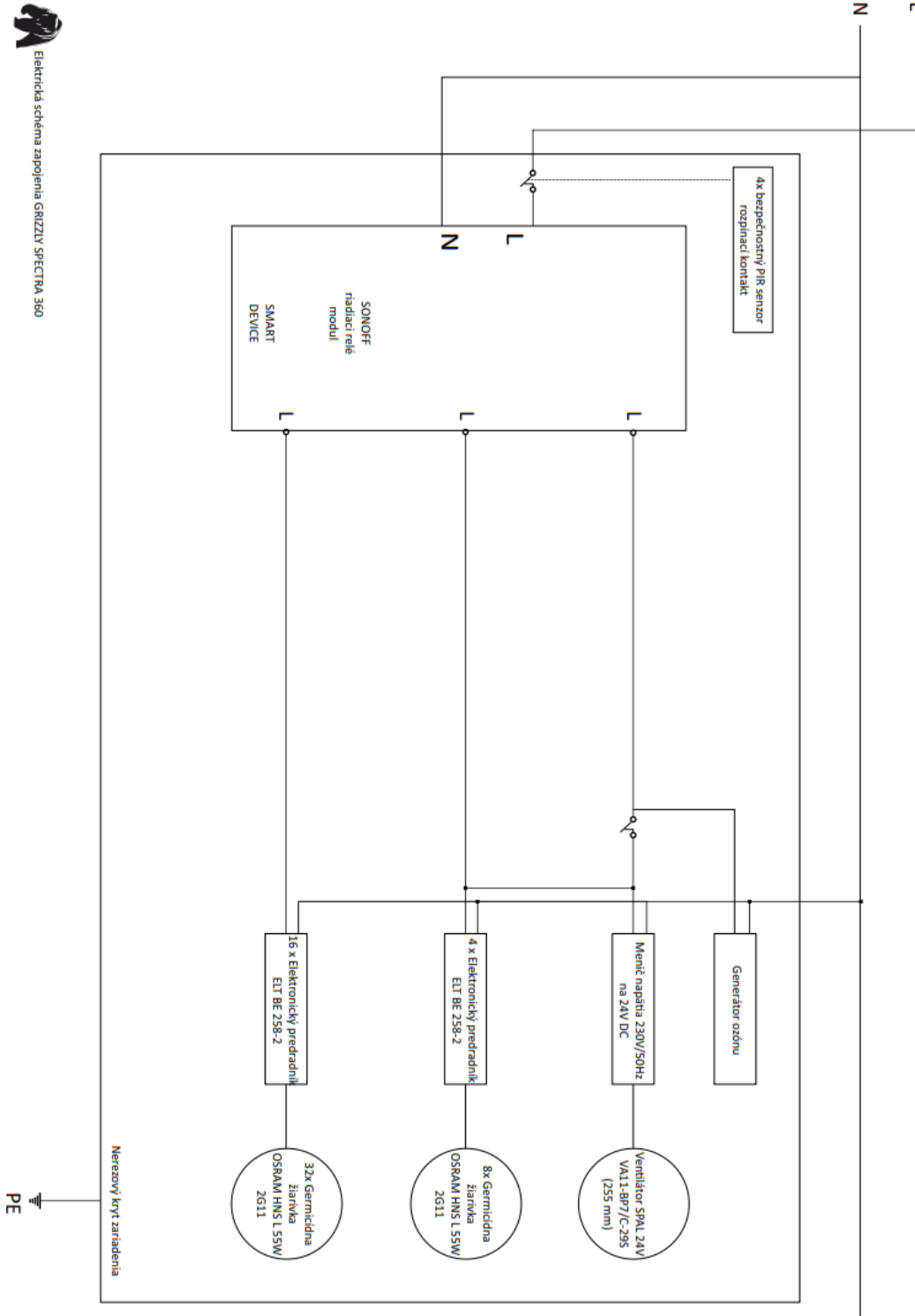
- turn off the electricity supply, thus achieving a state without voltage,
- separate the power supplies from the power grid,
- secure all moving parts of the device against movement,
- load the device onto the means of transport with maximum caution using the prescribed handling mechanization

#### Obligations during transportation:

- properly secure the equipment on the means of transport against shifting or tilting,
- handle the device with maximum caution - without shaking,
- move the means of transport at step speed; the device may be damaged during fast driving, especially when going through bends, during rapid acceleration, or braking means of transport to overturn, or fall or slip • avoid bumps or inclined routes during transport,

- unload the device from the means of transport with maximum caution using the prescribed handling mechanization

### Connection







**Trained persons with the contents of the instruction manual**

Name and surname	Signature	Date

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