CleanBox 400/600/800

Assembly, opperation instructions and safety instructions

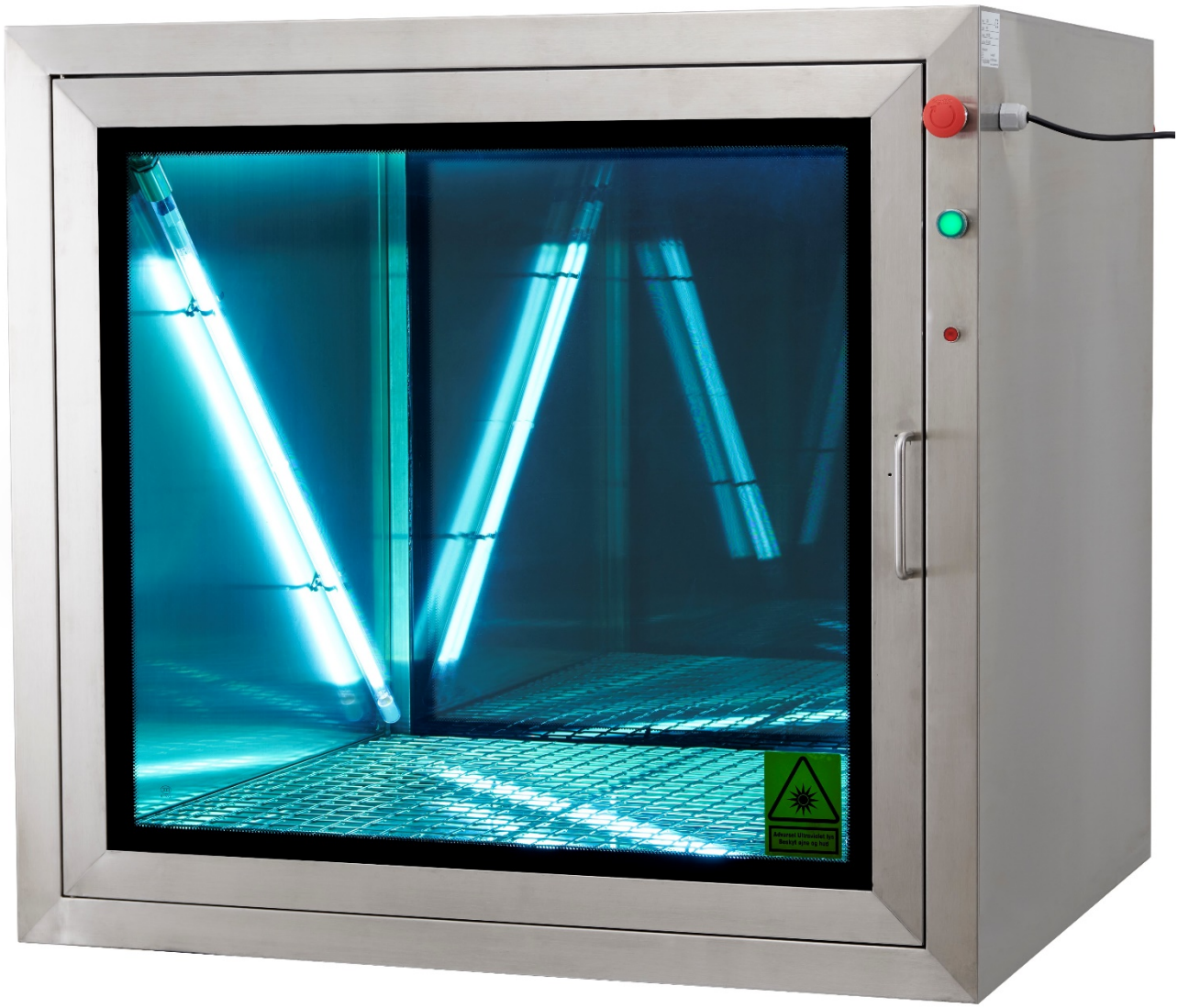


Table of contents

1. Revision overview

Revision	Date	Comments/Changes
Rev. 1	1905 2025	Document created

2. 2. EU- Declaration of conformity

According to the low voltage directive 2014/35/EU

Document number: Look at the bottom of the page

Producent: NATDIS Aps

Brunbjerg 70

6100 Haderslev

Hereby declares that UV equipment/par of the system for own installation:

Description: Cleanbox with build-in UVC lamps and power supply

Product type/ name Cleanbox 400/600/800

Description of product: UVC system for air/surfaces – own fitting

Product type: SUT 846X 230V

Build year: 2025

El symbols according to EN 60617

Lines and symbol according to EN 61082

It is in conformity with these directives

- 2014/30/EU EMC directive
- 2014/35/EU Low voltage directive
- 2011/65/EU Chemistry in electrical equipment
- 1935/2004 EU article 3, chemistry in FKM
- 2023/2006 Good manufacturing practice for FKM materials
- 10/2011 Plastic membranes intended for FKM
- BEK 681/2020 executive order for food contact materials

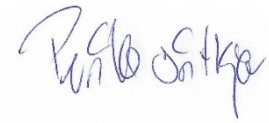
Standards used:

- EN 61000-6-2:2019 Electromagnetic compatibility generic standards
- En 61000-3-2:2019 Electromagnetic compatibility limit values for emission of harmonic current
- EN 6100-3-3:2013 +A1:2019+A2:2021 Electromagnetic compatibility
- EN 6100-6-4:2019 Electromagnetic compatibility, Emissions standard for industrial environments
- EN61347-1-2015 Ballast units for lamps
- EN61347-2-3-2011/A1:2017 Ballasts for lamps part 2-3
- 2015/863/EU RoHS3
- EN50525-3-11
- EN50525-2-51

The relevant technical documentation is available in accordance with annex.

This declaration is issued under the sole responsibility of the manufacturer or his authorized representative. It certifies compliance with the specified directives but does not imply any guarantee of properties.

Haderslev 05/2025



NATDIS Aps, Brunbjerg 70, 6100 Haderslev

Pernille Snitkjær, CEO

3. 3. Introduction

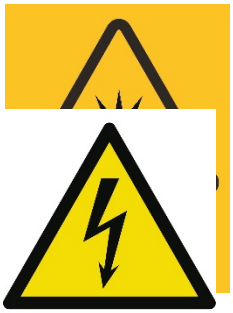
This folder has been prepared as a basis for functional description, service and maintenance.

The folder contains important information about the equipment, including service, maintenance and safety instructions.

It is recommended to keep the folder close to, and visible, the equipment and to inform personnel about it.

4. 4. Hazard markings and safety signs

The following warning labels may be used on/around the equipment. They are shown below and have the following meanings:



Danger Ultraviolet light **In this case UVC light.** **Attention:** Protect eyes and skin against UVC light.
Access only for authorized personnel.

Equipment supplied by NATDIS may only be cleaned when the system is switched off and in a secured state.

All work on UVC systems requires that the secured before work begins.
Cleaning may only be done when the system is stopped and cooled down!
Gloves required.

Equipment supplied by NATDIS may only be cleaned when the system is switched off and in a secured state.

All work on UVC systems requires that the system is secured before work begins.
Cleaning may only be done when the system is stopped and cooled down!
Wear clean gloves when working.

Attention:

Protect hands against heat, edges and glass splinters with gloves.

Must meet EN388:2019-4121X

5. 5. Information about the equipment

5.1 Purpose

The UV equipment aims to treat all light-accessible surfaces in the selected area in 4 minutes.

Danger: The lamps become hot during use and must therefore not be touched by:

- **People**
- **Topics to be treated**

5.2 Definition of UVC-dose:

UVC is designed to provide a UVC treatment/dose of J/m2 on all light-accessible surfaces after a full run of the specified time of 4 minutes.

The effect of UVC is calculated on the surfaces where the light can reach. That is, the places where the light can reach directly, which is why areas of shade, areas where direct light cannot reach or areas that are only reached by reflection, will not be considered treated areas.

A high efficiency of UV treatment is based on the surfaces not being contaminated with particles.

5.3. Function of UVC-system:

- UV system is controlled by door switch
    - When power is connected, UVC automatically turns on when one of the two doors is closed
    - The door has an interlock and therefore only one door can be open at a time
- The UVC lamps are turned on for the agreed time
- UVC lamps are turned off at
    - Expiration time
    - If the process stop is activated
    - Power is turned off
- Restart of light
    - Prerequisite for turning on must be present

5.4 Connecting and using the device

- Connect the plug to 230V.
- Door 1 (dirty side) can be opened by pressing the green button.
- When door 1 is closed, a cycle automatically starts, where both doors are locked.
- After the cycle is complete, door 2 can be opened (clean side) by pressing the green button.
- When door 2 is closed, a new cycle is run, after which door 1 can be opened.
- There is a process stop on both sides of the CleanBox. By pressing this, the cycle is stopped, and door 1 can be opened by pressing the green button.
- Reset process stop to resume normal operation.

5.4.1 Lamp meaning and function:

- When power is connected, the two green buttons will light up constantly when the unit is ready for use
- When a door is opened, the light goes out
- During operation, both lamps flash
- When using process stop, the red LED lights up permanently
- In case of lamp failure, the red LED flashes

5.5 Switch off the UV system

- The UV unit now lights up for the pre-programmed time and switches itself off when the set time has expired.
- If you want to switch off the UV system before the end of the time:
    - Switch off at process stop

    - Door 1 on the dirty side can be opened
- Power is disconnected.
    - Both doors remain locked

If you observe an error: turn off the main switch (switch off the system) and consult the service manual.

5.6 Emergency opening of doors

If you wish to open the doors without power to the unit, they can be opened by inserting a Ø 0.5 mm metal rod into the hole by the handle and releasing the door lock manually.

5.7 Use of unit:

The device can be used to disinfect items suitable for UVC lighting.

- Non-exhaustive list:
    - Electronic equipment
    - Tools
    - Container
        - If the container contains living organisms, it must be ensured that the container is UVC impervious
- Equipment for production such as consumables etc.

The device must never be used for:

- Living organisms
- Animals/people etc.
- Explosive liquids/gases/powders etc.

5.7.1 Procedure for use

Placement:

- Door 1 is opened by pressing the green button
- The item is placed in the middle of the grid
    - The item must not come into contact with the lamps
    - The item must not be able to contaminate the box
        - Liquid
        - Powder
        - Gas
    - The item must be placed in the middle
- It is recommended to only treat one item per cycle
- **The items must be placed in the middle of the room for good effect**
- **The items must at maximum take up 60% of the room volume LxWxH for good effect.**

Removal:

After the cycle is complete, the light in the button changes from flashing to permanent and the doors can be opened

- Opening from the clean side, door 2 by pressing the green button
- If door 1 is opened, the unit must complete a new cycle before door 2 can be opened

The item is carefully removed without touching the lamps
The door is closed; the cycle is repeated before door 1 can be opened

Malfunction:

If the lamps are on when the door is open, the unit must be switched off and an error message must be reported.

6. 6. Equipment overview

The UV equipment consists of:

Cleanbox as defined on the order confirmation.

6.1 Environment and surroundings for the equipment

Surface

The equipment must be mounted on a flat surface without a slope and secured according to instructions.
The surface must cover the entire bottom of the cabinet L x W

Fixation

The equipment may only be used in places where the surface is even, and it can be secured properly.

Temperature and humidity

The equipment can be used in temperatures between 10-40°C and max. 60% humidity.

Storage and environment

The equipment should not be left outdoors.
If the equipment encounters salty or acidic moisture or liquid, this should be removed from the system as soon as possible to prevent corrosion.

The equipment is IP 54

6.2 Requirements before commissioning

The equipment must be installed correctly at the buyer's premises:

- The equipment must not be put into operation until the system has been completely erected and installed in accordance with the regulations.
- The equipment must only be operated by personnel who have been properly instructed in its use.
- Repairs, service and maintenance must only be carried out by qualified personnel with proper training.
- If structural changes are made to the equipment, marking and declarations will be void.

6.3 Disposal of parts

Parts must be disposed of in accordance with applicable legislation.

- UVC lamps contain mercury and must be disposed of in accordance with the regulations for lamps containing mercury in force at any time.

6.3.1 Disposal at the end of its service life

- Before dismantling the equipment, a plan must be drawn up for dismantling.
- The plan must include a risk assessment for the work and for the disposal of the equipment.
- The plan and risk assessment must be drawn up in accordance with the regulations in force at the time of dismantling.

Scrapping:

- The system must be dismantled and sorted into categories as required by the applicable environmental requirements.
- The system is subject to Directive 2008/98/EC and Directive 2002/96/EC on waste.
- When the system has reached the end of its service life, all existing components must be sorted and handed in to an approved recycling site or an approved recycling company.
- The system must not be disposed of together with unsorted household waste. Use the local collection points for the disposal of electrical and electronic components and ensure that all relevant regulations are complied with.

The system consists of the following parts and must be sorted accordingly:

- Iron.
- Aluminium.
- Plastic. (Hard and soft)
- Rubber.
- Electrical components.
- Electronics
- Cobber
- Other metals.

If parts of the system are resold for purposes other than disposal, it is the owner's responsibility to make the recipient aware of disposal regulations.

6.4 Procedure for crushing a mercury-containing bulb

According to the buyer's environmental policy, but as a minimum:

- Evacuate people and animals from the room
- Ventilate the room for at least 15 minutes before starting the cleanup
- Use personal protective equipment such as gloves and safety glasses
- Pick up the broken pieces and dirt with two pieces of cardboard
- Use tape/adhesive if necessary to pick up any pieces and debris
- Clean the area after collecting the dirt with a damp cloth or towel to remove particles
- Collect all pieces and dirt in a sealed container and dispose of as special waste (recycling site)

7. Safety in and around UV equipment

7.1 UVC physical:

UVC is short-wave radiation that loses its energy rapidly in relation to the distance from the source. The type of UVC source used here loses its energy in relation to the distance (meters). UVC is effectively stopped by transparent materials such as ordinary glass, plexiglass, plastic. Opaque materials block UVC.

Risk factors have been assessed:

Cleanbox is assessed as safe in connection with normal and correct use.

Permitted dose:

The table below taken from "A Non-binding guide to the Artificial Optical Radiation Directive 2006/25/EC" indicates the recommended max. dose for "NON COHERT" radiation per day.

Duration of exposure per 8-hour day	Luminous irradiance (Effective) – W m^2
8 hours	0,002
4 hours	0,004
2 hours	0,008
1 hour	0,017
30 min.	0,033
15 min.	0,067
10 min.	0,10
5 min.	0,20
1 min.	1,0
30 sec.	2,0
15 sec.	4,0
1 sec.	60,0

7.2 General information about risk of UVC

When using fully covering work clothing and safety glasses, the risk of permanent damage from short-term exposure to UVC light is limited to the effect on the skin and minimal risk of damage to the eyes.

Warning signs should be placed when placing UVC systems to warn of the use of UVC. Systems may only be switched on when the room is secured. That is, it has been inspected and found empty.

People at and around UVC systems will therefore not be able to be surprised by exposure without knowing this. (Hidden damage). Look at the UV equipment must be assessed in specific cases.

7.3 Injuries from UVC

Possible injuries when exceeding the exposure times in UVC light according to the current guidelines, see section 7.1 above.

7.3.1 One-time damage

At minor exceedance, factor 4-6

Possibility of:

- Eyes, short-term irritation 24-48 hours (welder's eyes)
- Skin, slight redness

At moderate exceedance, factor 6-10

Possibility of:

- Eyes, severe irritation 24-48 hours (severe cases of welding eyes, with short-term loss of vision)
- Skin, severe redness corresponding to light to moderate sunburn

At severe exceedance factor +10

Possibility of:

- Eyes, Permanent damage, reduced vision.
- Skin, severe burn; 2nd degree.

7.3.2 Repeated exceedances of the daily dose:

- Eyes, permanent damage to the eye.
- Skin, development of various types of skin cancer (presumed, not proven).

In the situation in question, the assessment has taken into account that it is a production area with the use of full clothing in the work area.

7.4 Environment

7.4.1 Personnel

The UVC lamps are installed in a professional working environment, where instructions are part of daily work, and where nonauthorized personnel do not have access to turn on the UVC light.

7.5 Safety

The following safety systems may be installed in connection with UVC systems:

7.5.1 Activ safety

- Can be installed with a safety switch/door switch or similar that switches off the light when the door/hatch is opened.

7.5.2 Passive safety

- Warning signs warning of the use of "Ultraviolet light" (in this case UVC light).
  - Around the equipment.
  - Instructions for personnel using the system.

8. Guidance for risk assessment for the use of UVC

8.1. Description of UVC and critical exposure time

UVC is short-wave radiation that loses its energy rapidly in relation to the distance from the source. The type of UVC source used here loses its energy in relation to the distance (meters). UVC is effectively stopped by transparent materials such as ordinary glass, plexiglass, plastic. Opaque materials block UVC.

Risk factors that should be assessed:

- Access to UVC lamps in the unit during operation.

- Exposure to residual light outside the area.

Critical exposure time according to current guidance (according to A Non-binding guide to the Artificial Optical Radiation Directive 2006/25/EC indicates the recommended maximum dose for “NON COHERT” radiation per day.) depends on how the UVC equipment is installed.

8.2. Safety in and around UV equipment

UV systems should be built and monitored in accordance with:

EN 14255-1; Measurement and assessment of personal exposures to incoherent optical radiation – Part 1: Ultraviolet radiation emitted by artificial sources in the workplace.

ISO 15858:UV-C Devices – Safety information – Permissible human exposure.

Recommended permissible EN 15858 on protection against exposure to artificial optical radiation in connection with work, is stated at max. 60 j/m2 in an 8-hour working day.

Dose: UV dose is found by measuring on and around the current setup.

8.3. General information about the risk of UVC

When using full-coverage clothing for both skin and eyes, there is no impact from UVC light.

Warning signs must be placed in connection with the placement of UVC systems, warning about the use of UVC.

If necessary, look at the UV equipment, reflection or residual light must be assessed in specific cases.

8.4. Description of risk assessment of UVC installation

Risk Assessment should include the UVC installation from the UVC control box to the UVC lamps. The risk assessment does not include the supply installation.

The risk assessment can be made as an adapted risk assessment based on AT instruction 8.2 Risk assessment of machinery and technical aids, despite the fact tat UVC lamps do not fall under the Machinery Directive. There is currently no separate guidance for the use of UVC.

9. Service and maintenance

When changing a bulb, broken glass or similar, use gloves:

- Gloves must comply with EN388:2019-4121X.
- All service and maintenance must be carried out without danger.
- The system must be switched off and cooled down before servicing.

9.1 Changing the bulb:

1. Ensure that the system has cooled down and the process stop has been pulled.

2. Loosen the screw connection
3. Carefully pull the bulb backwards until 1/3 of the bulb is free
4. Carefully tilt the plug free from the bulb and carefully pull the bulb completely out of the quartz glass.
5. Change to a new bulb and insert it in the same location
6. Attach the plug to the new bulb and place the bulb in the same position.
7. Tighten the screw connection, finger-tight only.
8. Reset the process stop.

9.2 Changing the quartz glass:

1. Ensure that the system has cooled down.
2. Carefully tilt the quartz glass free from the clip.
3. Pull (turn) the quartz glass free from the flange.
4. Clean/ if necessary, change the O-rings in the flange and carefully insert new glass.
5. Place in the clip and install the bulb with the plug.

9.3 Bulb replacement Plan

Why change the UV bulb?

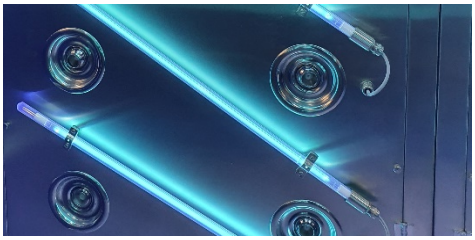
- The UV bulb contains gases that wear out with use. If it is not changed according to the recommendations, the effect will be worse than expected.
- The UVC rays are outside the visible spectrum, and therefore it is not possible to see if the bulb emits UVC radiation. It can only be measured with special measuring equipment.
- Our UVC bulbs have a very well-defined lifespan curve and should be replaced according to the recommendations below:

Change when:	
• System that light 24/7 in normal temperature range	• Change after 14 months of operation
• Systems that light 24/7 in temperature >40C or <10C	• Change after 12 months of operation
• Systems that have many On/Off cycles	• Max. 3000 On/Off
• Systems with other types of use	• Max. 2 years from the time of delivery

In the present installation, we recommend that the UV bulbs be changed after 2 years.

Something about blue light:

The blue light from a UVC lamp is a residual product and has no relation to the UVC effect.
The only way to verify the UVC effect is with special measuring equipment. Contact us if you want a control measurement.



10. Cleaning of UVC systems

10.1 Purpose

Systematic cleaning is part of the maintenance of the equipment and contributes to the optimal functioning of the equipment, at the same time cleaning will ensure continuous inspection of the equipment's condition.

The following sections contain procedures that describe how routine cleaning is carried out for the equipment provided by NATDIS.

10.2 Precautions

Warning!

Danger of non-coherent radiation

In this case, UVC light.

Attention:

Protect eyes and skin from UVC light.

Equipment supplied by NATDIS ApS may only be cleaned when the system is switched off and the process stop has been triggered.

All work on UVC systems requires that the process stop is triggered before the work begins.

Cleaning may only be done when the system has stopped and cooled down!

Gloves required

Attention:

Protect hands from heat, sharp edges and glass splinters with gloves.

Must meet EN388:2019-4121X

Always comply with local legal regulations when choosing a cleaning agent. Follow the warnings and safety descriptions on the individual containers and the safety data sheets. No abrasive agents must be used.

10.3. Dry cleaning

Dry cleaning involves a thorough vacuuming of the components. A vacuum cleaner equipped with a suitable filter for product and material residues must be used.

Never wipe product dust off dry and never use compressed air for dry cleaning, as the product dust will not be removed by these methods; instead, the product dust will simply be distributed around the area.

10.3.1 Cleaning frequency

	Daily	Monthly	Annually
General	Visual inspection of glass and bulbs. Inspect that operation is normal through the window, if possible		Control measurement of UVC effect, depending on the number of hours and application in general
Quartz glass	Inspection for dirt and dust. Action if there's coating: vacuuming and wiping		Inspection for damage. Action in case of damage; Change the glass
Flange	Inspection for dirt and dust. Action if there's coating: vacuuming and wiping	Inspect for damage from UVC light. Action in case of damage; change Flanges	

The frequency of cleaning depends on the production conditions. The cleaning intervals may therefore vary from the above.

It is also recommended to minimize the general amount of particles around UVC systems, as this can result in coating on the bulb and quartz glass and thereby impair UVC function and shorten the life of the lamps.

Vacuuming can be supplemented with wiping with a soft cloth and detergent. The local legal regulations in this area must be complied with.

No abrasive agents must be used.

10.3.2 Cleaning supplies

Always comply with the legal regulations when choosing a cleaning agent. Follow the warnings and safety descriptions on the individual containers and the safety data sheets.

Information on suitable cleaning agents can be found in the following table:

Materials	Suitable cleaning agents	Important instructions
Teflon (coating on glass)	Isopropanol or other non-abrasive cleaner for metal and glass, avoid products that leave a film on the surface	Use a soft cloth
Stainless steel	Isopropanol or other non-abrasive cleaner for metal and glass, avoid products that leave a film on the surface	Use a soft cloth
Glas	Isopropanol, avoid products that leave a film on the surface	Use a soft cloth

10.4. Cleaning procedure

Cleaning instruction should ensure efficient daily operation.

Gloves must be worn.
Cleaning is carried out at least 1 time per month, or at the assessment of the customer.
UV equipment cooled and ready for cleaning

Step 1: Vacuuming the glass and flanges
Step 2: UV tubes are wiped with a dry cloth (antistatic cloth or hard-wrung cloth)

10.5. Inspection

In connection with cleaning, the UV equipment must be inspected for breakages and defects.

Check the following:

- Glass is intact without cracks and breakage
- Wires are correctly seated and mounted correctly
- Metal grate at the bottom must not touch the bulb

11. Liability and Warranty

For warranty claims, we are only liable under national law. The following warranty is given as standard on bulbs; 8,000 hours of burn time in continuous mode or 3000 on/off or max. 2 years from the time of delivery.

Breakage and glass damage are not covered by the warranty.

Our general terms and conditions of sale and delivery apply at all times.

We cannot be held responsible for damage caused by:

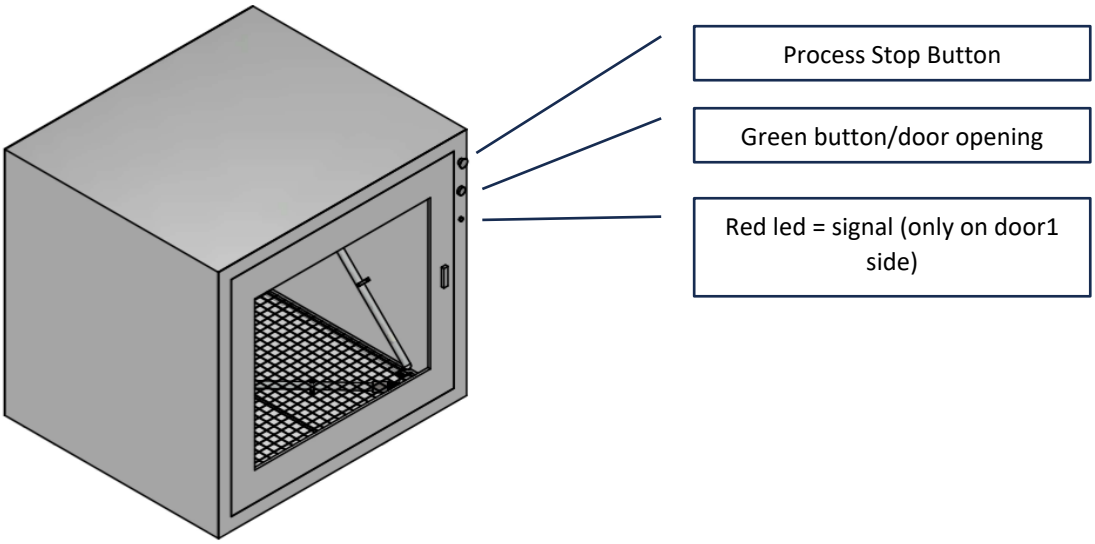
- Operating errors caused by failure to follow these or the guidelines below.

Warranty is void if:

- Operation with spare parts that are non-original.
- Inadequate or incorrect installation
- Installation of unsuitable accessories
- Incorrect operation
- Removal, manipulation and removal of safety equipment
- Improper performance of service and maintenance
- Wear and lack of maintenance
- Effects of vibration from the installation location
- Impacts on the environment or installation that we were not able to foresee at the time of dimensioning

12. Debugging

Error message/signal	Cause	Remedy
Light in green button off	A door is open	Close door
Red led flashing	Faults on one or more lamps	Change the bulb and restart the system
Red led lights up	Processtop is pressed in	Trigger (turn) process stop and open and close door 1
No light in buttons or UV lamps	Power cable is broken	Contact supplier for assistance
No lights in some lamps	Faults on lamps	Change the bulb and restart, contact the supplier for assistance if necessary



13. Spareparts

Used in	Item number	Item Name	Quantity per unit
Cleanbox 400/600/800	N4462522RINGSO_MT	O-ring Ø22 Thickness 2,5 FPM75 black	8
Cleanbox 400/600/800	N1460023RINGHV	O-ring Ø23 white	4
Cleanbox 400/600/800	A62200UVCKABEL	UVC Cabel 1, 1,5, 2 METER	4
Cleanbox 400/600/800	I412FATUVLYSPO	4-pin Connectors for UV light porcelain	4
Cleanbox 400/600/800	E118KROG000000	Circuit board for hook lock	1
Cleanbox 400	I831001428715S	UVC lamps 287_14_LP	4
Cleanbox 400	E2160001120425	11-20W/425mA ballast, 1 Outlet	4
Cleanbox 400	I9330312022500	Quartz Glass for UVC lamps L:312mm D:22,5mm	4
Cleanbox 600	I9330480022500	Quartz Glass for UVC lamps L:480mm D:22,5mm	4
Cleanbox 600	I431004843615X	UVC lamps 436_48_HOX	4
Cleanbox 600/800	E4150009028001	2 x 50 - 90 ballast, 2 Outlet, Instant 800 mA	2
Cleanbox 800	I9330920022500	Quartz Glass for UVC lamps L:920mm D:22,5mm	4
Cleanbox 800	I431009084615S	UVC lamps 846_90 HOX	4