A black and white photograph of a VCS-100Cr Decontamination Unit. The unit is housed in a black, textured carrying case with a white foam interior. A white plastic bottle with a white cap is connected to the unit via a clear plastic tube. The unit's control panel features a digital display, several buttons, and a dial. The background is dark and out of focus.

User Manual

VCS-100Cr

Decontamination Unit

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For the User

This manual is intended to provide the user with all necessary information for the appropriate, safe and independent operation of Cleamix VCS-100Cr device. Instructions contain information on technical features, maintenance, storage and disposal of the device.

Read the operating instructions carefully. In case of uncertainty regarding the interpretation of these instructions or if you require additional information, contact your local Cleamix dealer or

info@cleamix.com

Store operating instructions carefully with the Cleamix VCS-100Cr device.

Disclaimer

Given hydrogen peroxide vapour output and concentration values are indicative examples and are intended to help the planning and running of decontamination processes in different applications. The type and characteristics of the space and surfaces to be decontaminated have an impact on the actual process parameters. Hydrogen peroxide vapour is an effective biocide in a broad temperature range. Under certain circumstances it can create a condensate with water vapour unfavourable for the supposedly dry decontamination process.

High humidity rates and/or low temperatures are likely to cause condensation. This can be prevented by conducting dry, heated air through the space prior to hydrogen peroxide vapour production. The lower humidity permits a higher hydrogen peroxide concentration and a dry process.

Cleamix takes no responsibility for the process parameter choices applied in individual decontamination targets. The responsibility lies always with the user.

Cleamix reserves the right to make changes to the operating instructions.

VCS-100Cr and VCS-100Ext

Cleamix VCS-100Cr is a portable decontamination master unit designed for demanding hydrogen peroxide bio-decontamination processes capable of mastering numerous additional units (Ext, Cat, dryer and fan). Cleamix VCS-100Cr uses up to 50% aqueous hydrogen peroxide solution for generating hydrogen peroxide vapour capable of destroying even the most resistant microorganisms, like bacterial spores at room temperatures and low concentrations.

Hydrogen peroxide vapour has good material compatibility and it is residue free decomposing into water and oxygen only.



1. H2O2 Bottle holder
2. Liquid input
3. Liquid output
4. Vapour output
5. Air intake
6. Touch screen
7. Type plate, content:
 - Brand and model
 - Serial number
 - Production date
 - Power supply and consumption
 - Wireless SSID
 - WiFi password
 - IP-address
 - TCP-port
 - Manufacturer information
 - QR-code
 - CE-marking
 - Information for product disposal
8. Antenna
9. External fan-port
10. RS 485-port
11. Sensor-port
12. USB-port
13. WAN-port
14. Ethernet-port
15. Ethernet-port
16. Power switch
17. Fuses 1-4
18. Power plug
19. Brand and model

Cleamix VCS-100Ext is operated together with a VCS-100Cr master unit. VCS-100ExtU unit is a slave unit that receives commands from the master unit.

Cleamix VCS-100Ext uses up to 50% aqueous hydrogen peroxide solution for generating hydrogen peroxide vapour capable of destroying even the most resistant microorganisms, like bacterial spores at room temperatures and low concentrations.

Identification data

Model of the device, operating voltage, serial number and manufacturing year are recorded on the type plate.



1. H2O2 Bottle holder
2. Liquid input
3. Liquid output
4. Vapour output
5. Air intake
6. RS 485-port
7. Sensor-port
8. USB-port
9. WAN-port
10. Ethernet-port
11. Ethernet-port
12. Power switch
13. Fuses 1-4
14. Power plug
15. Connection indication lights
16. Type plate, content:
 - Brand and model
 - Serial number
 - Production date
 - Power supply and consumption
 - Wireless SSID
 - WiFi password
 - IP-address
 - TCP-port
 - Manufacturer information
 - QR-code
 - CE-marking
 - Information for product disposal
17. Brand and model

NATO Stock Number (NSN) for VCS-100Cr: 6840580013819

NATO Stock Number (NSN) for VCS-100ExtU: 6840580015373

Safety

Make sure there is no hydrogen peroxide liquid leakage out to the surroundings. Use protective clothes, glasses and appropriate protective clothing. Follow local safety precautions.

Remember the safety limits:

1 PPM = 8 h

3 PPM = 15 min

75 PPM = IDLH (Immediate Danger for Life and Health)



Hazard identification

Classification of the substance: The substance is classified as dangerous according to EU Regulation 1272/2008

Hazard Statements

H314 - Causes severe skin burns and eye damage

H302 - Harmful if swallowed

H332 - Harmful if inhaled

H335 - May cause respiratory irritation

H272 - May intensify fire; oxidizer



Precautionary Statements - Prevention

P271 - Use only outdoors or in a well-ventilated area

P260 - Do not breathe mist, vapours or spray.

P280 - Wear protective gloves/ protective clothing/ eye protection/ face protection

P210 - Keep away from heat/sparks/open flames/hot surfaces. - No smoking

P220 - Keep/Store away from clothing/flammable materials/combustibles

P221 - Take any precaution to avoid mixing with combustibles/flammables
Precautionary Statements - Response

P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing

P310 - Immediately call a POISON CENTER or doctor

P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower

P363 - Wash contaminated clothing before reuse

P304 + P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing

P312 - Call a POISON CENTER or doctor if you feel unwell

P301 + P330 + P331 - IF SWALLOWED: rinse mouth. Do NOT induce vomiting

P310 - Immediately call a POISON CENTER or doctor

P370 + P378 - In case of fire: Use water for extinction

Other information

Keep container in a cool place out of direct sunlight. Store only in vented containers. Do not store on wooden pallets. Do not return unused material to its original container. Avoid contamination - Contamination could cause decomposition and generation of oxygen which may result in high pressure and possible container rupture. Empty drums should be triple rinsed with water before discarding.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing. Seek immediate medical attention/advice.

Skin Contact Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for further treatment advice.

Inhalation Move to fresh air. If person is not breathing, contact emergency medical services, then give artificial respiration, preferably mouth-to-mouth if possible. Call a poison control center or doctor for further treatment advice.

Ingestion Rinse mouth. Do not induce vomiting. If conscious, give 2 glasses of water. Get immediate medical attention. Never give anything by mouth to an unconscious person.

Most important symptoms and effects, both acute and delayed

Hydrogen Peroxide irritates respiratory system and, if inhaled, may cause inflammation and pulmonary edema. The effects may not be immediate. Overexposure symptoms are coughing, giddiness and sore throat. In case of accidental ingestion, necrosis may result from mucous membrane burns (mouth, esophagus and stomach). Oxygen rapid release may cause stomach swelling and hemorrhaging, which may product major, or even fatal, injury to organs if a large amount has been ingested. In case of skin contact, may cause burns, erythema, blisters or even necrosis.

Indication of immediate medical attention and special treatment needed, if necessary

Hydrogen peroxide at these concentrations is a strong oxidant. Direct contact with the eye is likely to cause corneal damage especially if not washed immediately. Careful ophthalmologic evaluation is recommended and the possibility of local corticosteroid therapy should be considered. Because of the likelihood of corrosive effects on the gastrointestinal tract after ingestion, and the unlikelihood of systemic effects, attempts at evacuating the stomach via emesis induction or gastric lavage should be avoided. There is a remote possibility, however, that a nasogastric or orogastric tube may be required for the reduction of severe distension due to gas formation.

FIRE FIGHTING MEASURES

Suitable Extinguishing Media

Water. Do not use any other substance.

Specific Hazards Arising from the Chemical

In closed unventilated containers, risk of rupture due to the increased pressure from decomposition. Contact with combustible material may cause fire.

Hazardous Combustion Products

On decomposition product releases oxygen which may intensify fire.

Possibility of hazardous reactions

Risk of explosion with: permanganates, hydrazines, hydrides, metal oxides, metal salts, organic substances, alcohols, methanol, vinyl acetate, non-metals, non-metal oxides, lithium, magnesium, sodium, formaldehyde, acetic acid, combustible substances according to

Explosion data

Sensitivity to Mechanical Impact

Not sensitive.

Sensitivity to Static Discharge

Not sensitive.

HANDLING AND STORAGE

Handling

Use only in well-ventilated areas. Keep/Store away from clothing/ combustible materials. Wear personal protective equipment. Never return unused hydrogen peroxide to original container. Contamination may cause decomposition and generation of oxygen gas which could result in high pressures and possible container rupture. Empty drums should be triple rinsed with water before discarding. Utensils used for handling hydrogen peroxide should only be made of glass, stainless steel, aluminium or plastic. Pipes and equipment should be passivated before first use. Hydrogen peroxide should be stored only in vented containers and transferred only in a prescribed manner.

Storage

Keep containers in cool areas out of direct sunlight and away from combustibles. Provide mechanical general and/or local exhaust ventilation to prevent release of vapor or mist into work environment. Containers must be vented. Keep/store only in original container. Store rooms or warehouses should be made of non-combustible materials with impermeable floors. In case of release, spillage should flow to safe area. Containers should be visually inspected on a regular basis to detect any abnormalities (swollen drums, increases in temperature, etc.).

Incompatible products

Combustible materials. Copper alloys, galvanized iron. Strong reducing agents. Heavy metals. Iron. Copper alloys. Contact with metals, metallic ions, alkalis, reducing agents and organic matter (such as alcohols or terpenes) may produce self-accelerated thermal decomposition.

PERSONAL PROTECTION

Protection of eyes, face and respiratory: Whole face covering gas mask with category P3 NO-, CO-filter (EN143/14387).

Protection of hands: Gloves made of butyl rubber, natural rubber, nitrile rubber, neoprene rubber or fluoro rubber.

Protection of skin: Protective full body suit. Compatible materials: (Viton®), Tychem® CPF 3, Tychem® BR/LV, Tychem® Responder® and Tychem® TK. (EN 14605 / category III / EN 14126 / class 6)

Pouring liquid hydrogen peroxide from the 20 litre canister into the 1 litre bottle

1. Safety

Make sure that you are wearing the proper safety wear: non-flammable clothing, rubber boots, protective gloves and protective goggles.

Make sure that you have plenty of water available for rinsing in case the HP solution gets spilled. It's a good idea to keep an emergency kit and eyewash pack nearby too.

2. Equipment's

You will need a funnel with the maximum width of the funnel shaft of 4 cm to safely pour the 50% hydrogen peroxide liquid solution from the 20 L canister into the 1 L bottle.

3. Pouring

Pour the HP solution carefully from the 20 L canister to the 1 L bottle with using the funnel. When finished, make sure there isn't appearing any spilling of the HP solution. If so, carefully dilute it with using plenty of water.

4. After

Make sure to close the caps properly and store again the HP

solution according the instructions.

Accessories



SUCTION SET

Installed in a hydrogen peroxide bottle that dispenses liquid hydrogen peroxide into the apparatus for evaporation.



HYDROGEN PEROXIDE BOTTLE

Hydrogen peroxide bottle, which is placed to the device.



SENSOR

Vaisala HPP 272 hydrogen peroxide sensor.



ETHERNET-CABLE

For connecting the catalytic converter, master unit and extension units.



POWER CORD

Power cord for the VCS devices.



TABLET

Tablet for remote controlling and monitoring.



CATALYTIC CONVERTER

For vapor removal.



POWER CORD FOR CAT.C.

Power cord for the Catalytic Converter.

Technical Specification: VCS-100Cr

Physical data	Power data	Operating data
<p>Dimensions 557 x 420 x 220 mm (L x W x H)</p> <p>Weight 9,5 kg</p> <p>Ports WAN x1 LAN x2 USB x1</p> <p>Connections External dosing pump/24Vdc RS 485/H2O2 Sensor RS 485/24Vdc Option LAN/ExtEJ LAN/Dryer LAN/Heater LAN/Cat LAN/Eth-switch Power cord H₂O₂ bottle connector</p> <p>Other 7" touch screen Bottle holder Antenna x 2</p>	<p>Power supply 230 VAC/50Hz</p> <p>Consumption 800 W</p> <p>IP-Rating IP2X case open IP4X case closed</p> <p>Fuses F4 primary fuse 10A F3 heat cell 5A F2 power source 230V 3A F1 power source 24V 3A</p>	<p>Consumption Up to 60% hydrogen peroxide aqueous solution</p> <p>Primary fan 110 m3/h</p> <p>Control Touch screen and computer/ tablet/ phone via cable or WiFi.</p> <p>Hydrogen peroxide output 1725 ppm/min at rate 3 ml/min of H₂O₂ solution</p> <p>Temperature and humidity Recommended operating temperature 20-40 C. Real-time control of the vapour output is measuring hydrogen peroxide concentration, humidity, relative saturation and temperature.</p>
External addition units for VCS-100CR	Conformity to standards	Conformity to EU requirements:
<ul style="list-style-type: none"> External units Catalytic converter Air dryer Fan 	<p>EN 55011:2009+A1:2010 Industrial, scientific and medical equipment - Radio frequency disturbance characteristics - Limits and methods of measurement</p> <p>EN 61000-6-3:2007+A1:2011+A1:2012 Electromagnetic compability (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments</p> <p>EN 6100-6-2:2005+AC:2005 Electromagnetic compability (EMC) - Part 6-2: Generic standards - Immunity for industrial environments</p> <p>EN 301 489-1 V1.9.2 Electromagnetic compability and Radio spectrum Matters (ERM). Electromagnetic Compability (EMC) standard for radio equipment and services. Part 1: Common technical requirements</p>	<p>Cleamix VCS-100CR is in accordance with the following EU directives:</p> <ul style="list-style-type: none"> LVD EMC ROHS RED WEEE
		<p>NSN Number: 6840580013819</p>

Technical Specification: VCS-100Ext

Physical data	Power data	Operating data
<p>Dimensions 557 x 420 x 220 mm (L x W x H)</p> <p>Weight 9 kg</p> <p>Ports LAN x 4</p> <p>Connections H₂O₂ sensor Power cord H₂O₂ bottle connector</p> <p>Other Bottle holder</p>	<p>Power supply 230VAC/50Hz (-6% - +10%)</p> <p>Consumption 800W</p> <p>IP-Rating IP2X case open IP4X case closed</p> <p>Fuses F1 primary fuse 10A F2 heat cell 5A F3 power source 230V 3A F4 power source 24V 3A</p>	<p>Consumption Aqueous hydrogen peroxide solution up to 60%</p> <p>Primary fan 110m³/h</p> <p>Control via VCS-100Cr</p> <p>Hydrogen peroxide output 1725 ppm/m³/min at rate 3 ml/min of H₂O₂ solution</p> <p>Temperature and humidity Recommended operating temperature 20-40C.</p>
Conformity to standards	Conformity to EU requirements:	
<p>EN 55011:2009+A1:2010 Industrial, scientific and medical equipment – Radio frequency disturbance characteristics – Limits and methods of measurement</p> <p>EN61000-6 3:2007+A1:2011 +A1:2012 Electromagnetic compatibility (EMC) – Part 6-3: Generic standards – Emission standard for residential, commercial and light-industrial environments</p> <p>EN 61000-6-2:2005+AC:200 Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments</p> <p>EN 301 489-1 V1.9.2 Electromagnetic compatibility and Radio spectrum Matters (ERM). Electromagnetic Compatibility (EMC) standard for radio equipment and services. Part 1: Common technical requirements</p>	<p>Cleamix VCS-100EXT is in accordance with the following EU directives:</p> <ul style="list-style-type: none"> • • LVD • • EMC • • ROHS • • RED • • WEEE 	
	<p>NSN Number: 6840580015373</p>	

Cleamix VCS-100Cr Operation

Prior to decontamination:

1. Make sure the room has been properly cleaned.
2. No loose items are accepted in the decontamination space.
3. Open drawers and reposition items to decontaminate as much as possible.
4. For optimal air circulation, use additional fans securing vapour distribution. It is a good idea to place one additional fan next to the decontamination unit to blow from the unit's air input towards the vapour output. This will improve the efficient vapour circulation and the ventilation of the unit especially in a warm weather conditions.
5. Position indicators to places challenging for the hydrogen peroxide vapour to reach.
6. Cover/close fire alarms (find out proper procedures).
7. Seal ventilation, possible valves and holes.
8. Make sure there is no vapour leaking outside.
9. Hydrogen peroxide sensing devices are used to monitor the surrounding area during the decontamination cycle.
10. Keep the area clear from visitors.
11. Use warning signs in addition to upfront informing.
12. Position the device on a levelled surface in a central location so that the vapour can spread freely into the space.
13. Remove cushion from the case, it absorbs hydrogen peroxide.

Power cord

Plug in the power cord by pressing and rotating the socket clockwise to lock to the desired position. Power cord is detached by lifting the latch and turning the socket counter-clockwise until it gets loose.

Sensor

Attach the hydrogen peroxide sensor to the unit so that the two red dots are facing each other and press to lock. The sensor is detached by lifting it up with some force. Place the sensor far enough from the unit. Remove the protective cap from the sensor.

Power

Turn on the device by pressing the power switch. The switch will lighten up.

Hydrogen peroxide bottle

Remove the cap of the hydrogen peroxide bottle and replace it with ventilated cap. Attach the suction hoses properly to the bottle by pressing until you hear the sound of the locking system.

Catalytic Converter

Catalytic Converter can be used for dissolving the hydrogen peroxide vapour from the treatment area. Catalytic Converter is an air circulating fan, which is included with HEPA-filter and potassium permanganate filter that makes a chemical reaction with hydrogen peroxide vapour where the vapour decomposes into water and oxygen immediately.

Connect the ethernet cable between Catalytic Converter and VCS-100Cr or VCS-100ExtU.

Switch the power on at Catalytic Converter.



Operating with Extension Units

VCS-100Cr decontamination unit can be operated together with VCS-100Ext extension units for bigger decontamination volumes. VCS-100Ext has the same efficiency as the VCS-100Cr master unit. VCS-100Ext is controlled through VCS-100Cr. VCS-100Ext can be operated with or without HPP 272 probe. VCS-100Cr and Ext should be always operated inside the same area, never in separated rooms.

Attaching the extension units



Attach extension unit either to master unit or to Cat by placing the ethernet cable to the plug in the device.



Extension units should be connected like star-wired principle, i.e. the cords must not generate a loop.

Master units must not be connected together.

Settings

User interface for VCS-100Cr is created with different access levels of user ID's. Organisations can define personal ID's and this way control the users of the device. There is possibility to login as a guest, but this function can be disabled.

User ID levels:

Users = ID that can operate the device with own personal ID's and the name of the user will be written on the report.

Admin = ID that can modify the User-level ID's: create and delete users, edit passwords.

Service = ID for authorized service. This ID level can modify Admin- and User-level ID's.

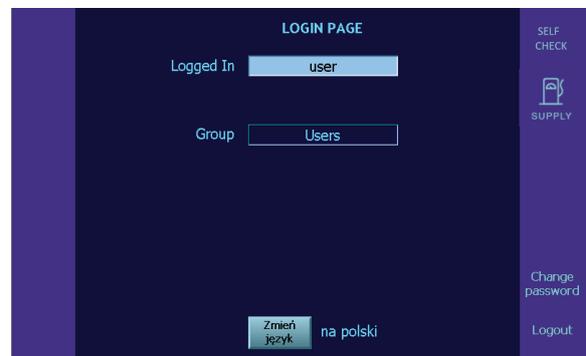
Login

When turning on the device, there will appear **LOGIN PAGE**.

Enter your user name and password. If you forget your password, you can enter using **Default User login** by pressing **GO**.

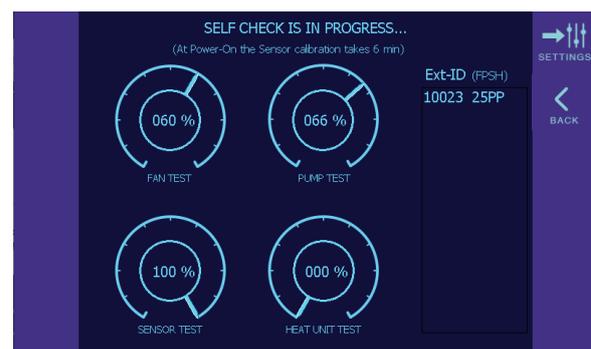
Change password by selecting the user and adding the current password. Then press **Change Password**. Admin-level user can **Manage Users**.

From login page it is possible to continue to **Supply** or to **Selfcheck**.



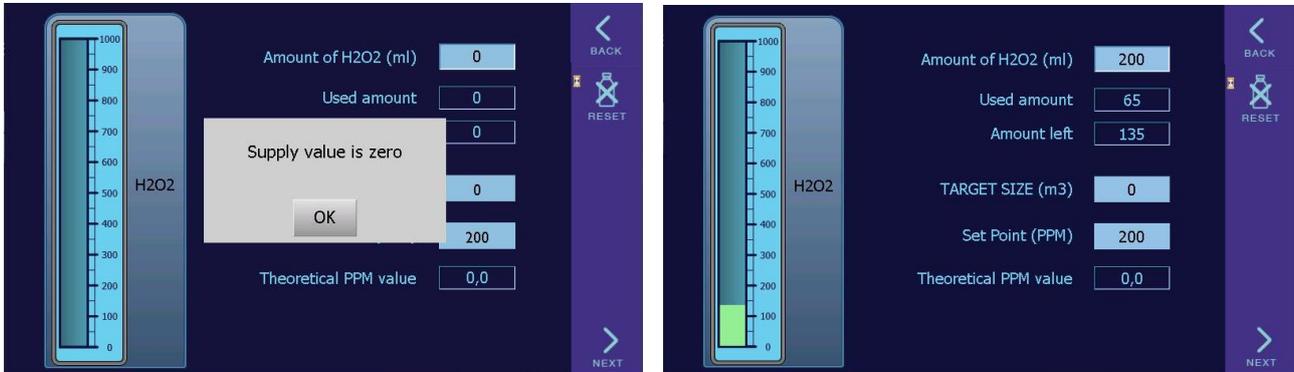
Selfcheck

In **Self check** the device will test all the critical parts of the device. It is possible to skip this phase with pressing **Settings** button. However, the Sensor will do its own 6 minutes start-up calibration procedure.



Supply

Set the **Amount of H2O2** in millilitres. Set the cubic meters of the **Target Size**. Set the desired PPM level on **Set Point**. The device will calculate the **Theoretical PPM value**. The amount of H2O2 can be **RESET**. The amount left will move to the field **Amount of H2O2 (ml)**. The **amount of H2O2**-value **cannot be 0**.



All the buttons with a picture of hourglass needs to be pushed for 2 seconds.

Set

Edit the treatment values on **Set** page.

Set the desired **Treatment time**. Set the **Target PPM level**. Specify RS value to field **RS Limit %**.

Set the lowest PPM level where the treatment time will start using the field **Start treatment time at**. The **Wi-Fi** is **ON**, when the background of the button is dark. When Wi-Fi is disabled, the WiFi-card is un-powered so that the device cannot be hacked. This might be needed in high security areas.

Circulate

Before start: Check the proper connection of the hoses from the HP-bottle to the unit. The hoses must be checked to be connected well before circulating the liquid or starting the treatment. Press **Circulate** before starting the decontamination process. The hoses will fill out with hydrogen peroxide. The circulation is finished automatically when time expires.



Attention! Hoses needs to be filled every time before treatment. Never run a treatment without circulating the hydrogen peroxide before start.

Cat

CAT AUTOMATIC CONTROL: The CAT can be controlled automatically. Set the **Automatic PPM Range** where the CAT will automatically turn ON and OFF. It doesn't matter which order the numbers will be entered, the device will always start the CAT from the highest value.

The CAT can also be controlled manually by switching **CAT Manual Override** ON / OFF.



Dash

On **DASH** page can be monitored:

- *Hydrogen peroxide level (PPM)*
- *Relative saturation of water and hydrogen peroxide (RS%)*
- *Relative humidity (RH%)*
- *Temperature (TEMP)*
- *Remaining content of H2O2 (LIQUID)*
- *Elapsed treatment time (TIME)*
- *Total time (TOTAL TIME)*
- *Possible alarm indicator, by pressing it the Alarm page is shown*



Buttons on right the side:

START **Press to start the decontamination process**

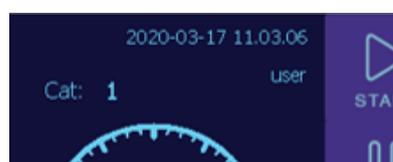
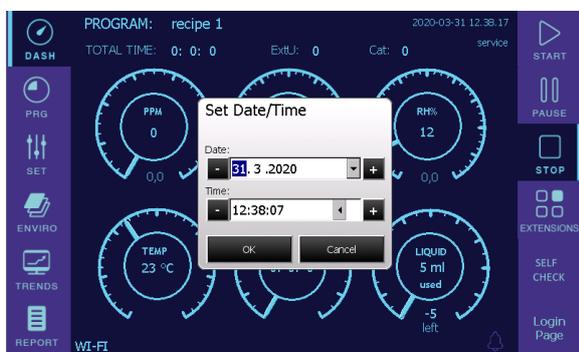
PAUSE **Press to pause the decontamination process**

STOP **Press to stop the decontamination process**

EXTENSIONS **External Units and CAT's**

SELF CHECK **Run the self-check process**

Date and time can be edited by pressing the text on the upper edge. Pause the decontamination process by pressing **Pause**, if there is need to change the hydrogen peroxide bottle. When the bottle is changed, continue the decontamination process by pressing again **Pause**.



Extensions and Info

Extensions and Info page shows the information about the **Master** unit and the additional **Extension Units** and **CAT's**.

Each Ext has it's own ID. The ID's last four numbers are the same as the last four numbers in the Ext serial number, that can be found on the device's register plate. From the ID you can recognize the external units from each other.

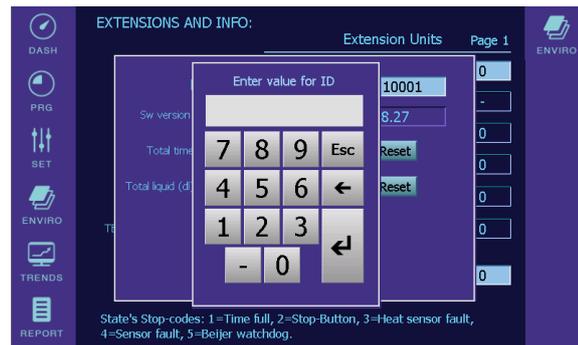
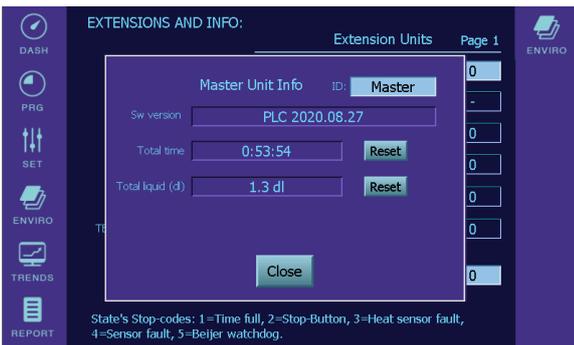
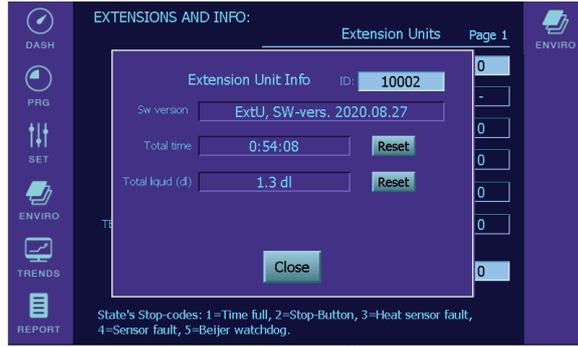
ID's for the CAT's and the Ext can be modified by clicking the cell. ID-numbers has to be something between 100 and 65 000.

The ID-numbers 1...99 has special functions:

1: The information of Extension Unit is shown

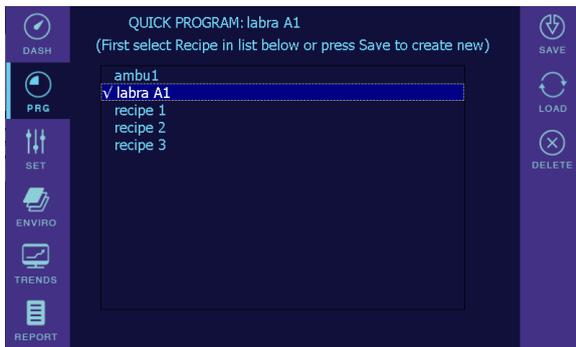
2...99: For future extensions

Table of the Extensions shows the state of the device: whether it's heating, producing gas or cooling down.



Prg

The values that are already set can be saved as a **quick program** for further use. This function can be used for example in situation where we have area that needs to be decontaminated on regular basis. With quick programs, we can make the regular basis decontamination sessions faster and more efficient since we don't need to set up the settings every time.



Save and Load

Save recipe with the set treatment values. Press **Save** and Enter the Recipe Name. **Load** saved **recipes**. Select the saved recipe from list and press **Load**.



Delete

Delete recipe by selecting the saved recipe and press **Delete**.



Enviro

Environment page shows the parameters of the surrounding environment.



Trends

Trends page shows the trends and graphics.

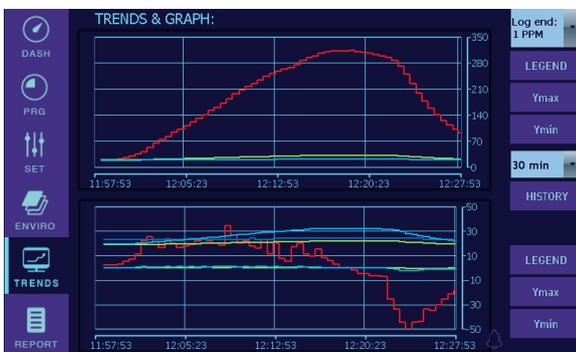
LOG END Specify the PPM value up to where the log is captured.

YMAX Set the value for graphics high scale.

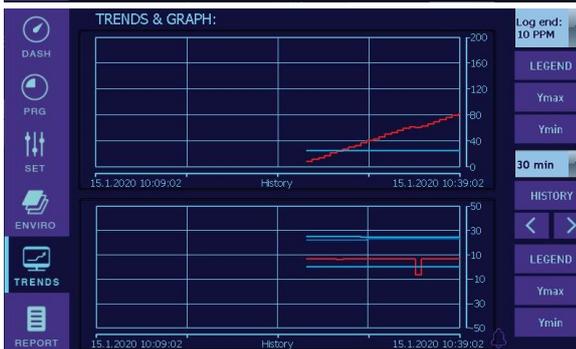
YMIN Set the value for graphics low scale.

HISTORY Selects the History mode, i.e. earlier captured data can be viewed and scrolled by left/right arrow buttons

LEGEND Shows the curve colours and to select which curves are shown
 Upper graph: PPM, RS%, RH%
 Lower graph: PPM-, RH%- and RS%-change rate, and TEMP, RH%, RS%



The PPM at upper graph has auto-scale, the ymax value is increased automatically by steps of 50. If ymin/ymax-values were changed for manual scale, the auto-scale is re-activated by entering "-" to the value.

Importing of measured data

Measured data can be imported by different ways.

PRINT Printing option is not available yet.

USB Place the USB-memory to the device and wait a few seconds. Press the **USB**-button and select the report format. Report name can't be modified with USB-data transfer. The screen will show a text *Saving report* for a few seconds. USB-memory can be removed once it's gone.

Select the report format. The report can be imported as Excel table or as PDF document.

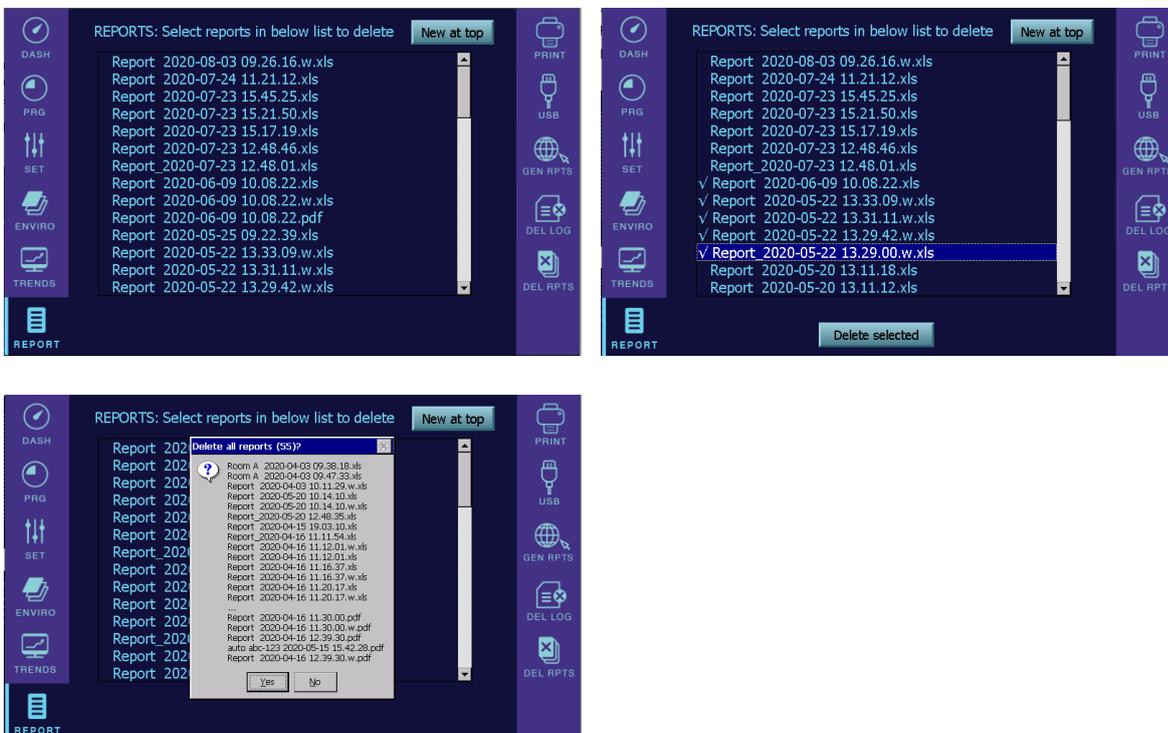
Pressing **Update time** the time on the report filename will be updated.

When generating the reports, must wait that the message on the left upper corner has disappeared. If new report is chosen too early, the created file might be faulty.

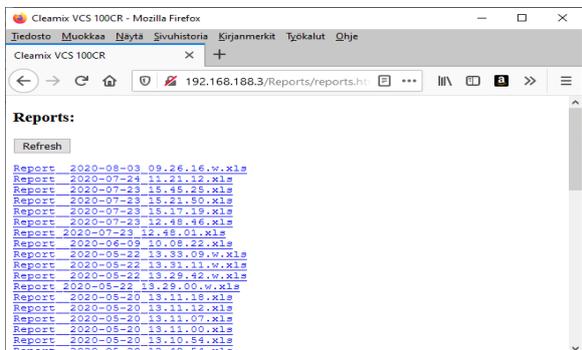
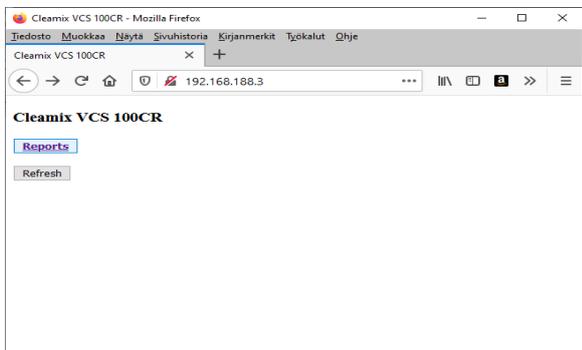
DEL LOG Press to empty the log.

DEL RPTS Select the reports to delete from list. Then press **Delete selected**.

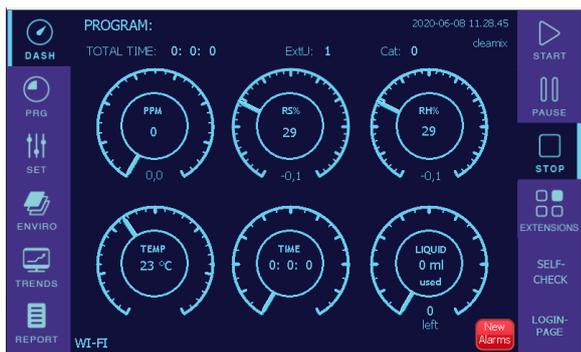
GEN RPTS The computer or tablet that is used to open the report must be connected to the decontamination unit via Wi-Fi. Open the Mozilla Firefox web browser and enter the address field the following text **192.168.188.3** and press enter. This will open a website where the reports are saved.



This (tiny) web server communication is not encrypted. Access to it done via direct cable or via Wi-Fi. The Wi-Fi connection has own password, i.e. unauthorized remote/wireless access to device is not possible.



Alarms and notifications

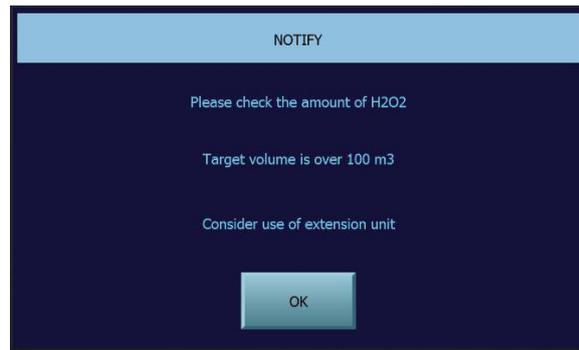


The unit will send alarms if there is something working unwell with the unit. Alarms can be found on the Alarms page.

The unit will send notifications if there is something critical that has been overlooked.

Possible notifications:

- "Sensor not connected"
- "Supply value is zero"
- "Treatment time is zero"
- "Target PPM is zero"
- "Liquid circulation was not done"
- If the temperature is less than 17 C°: "Warning: Temperature is low, start treatment anyway?"
- The unit will warn if the Hydrogen Peroxide bottle is getting empty.
- The unit will notice if the amount of H2O2 is too low for the target space.



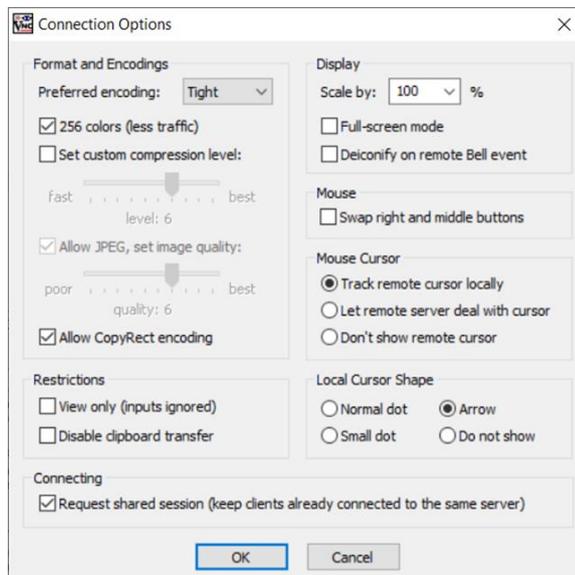
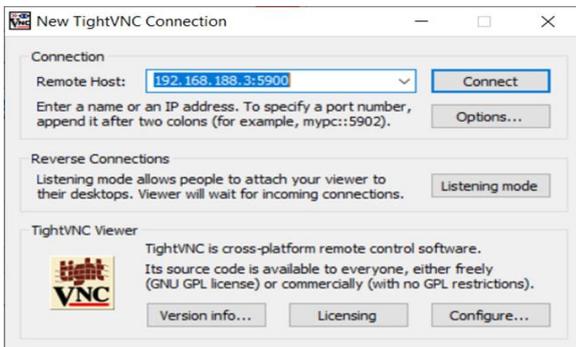
Tightvnc viewer installation and configuration guide for controlling VCS-100Cr

Start TightVNC.

Remote Host: **192.168.188.3:5900**

Options: **256 colors**, Local Cursor Shape "**Arrow**"

Press **OK** and then press **Connect**.



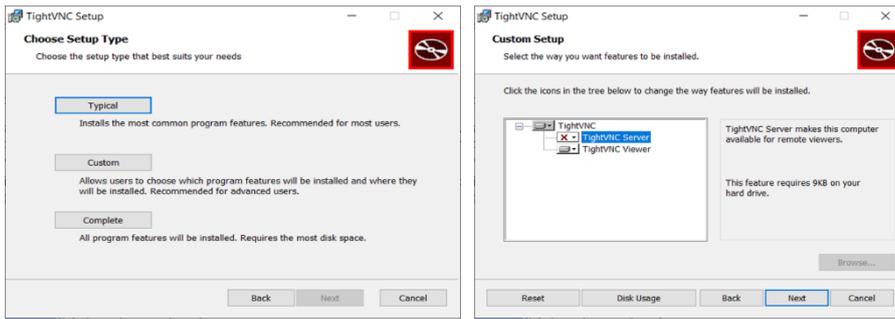
(This is for Windows only)

Load the TightVNC installation package from the link below and start the installation.

<https://www.tightvnc.com/download/2.8.27/tightvnc-2.8.27-gpl-setup-64bit.msi>

Steps: Next, Accept license, Next, Choose **Custom** setup type.

Do not install Server, select "**Entire feature will be unavailable**"



Steps: Next, Next, Install, Finish

Create network connection to VCS-100Cr device with cable or WLAN.

Ending operation



When the targeted time is reached, the process shuts down.

Do not switch off the device while the cooling indication is still in the screen.

- The hydrogen peroxide concentration in the decontaminated space must be less than 1 PPM, before entry without the necessary protective equipment. The concentration must always be checked using a detector.
- The decomposition of hydrogen peroxide vapour can be accelerated with an external catalytic converter.
- The ventilation of the space must be planned case-specifically and in accordance with valid regulations. Note that porous materials within the decontaminated space may increase the hydrogen peroxide aeration time.
- Switch off the device, detach the power cord by lifting the latch and turning the socket counter-clockwise until it gets loose
- Detach the hydrogen peroxide sensor by lifting it up with some force.
- Remove the hydrogen peroxide bottle.
- Close the case.

Detaching the hydrogen peroxide bottle

1. Detach both of the suction hoses first from the unit and next from the bottle.
2. Remove the ventilated cap from the bottle and replace it with a cap for storage.
3. If the bottle is empty rinse it with clean, cold water.
4. Use appropriate personal protective equipment (PPE).

Cleaning the device. The device can be cleaned using damp, soft wipes. Cleaning the hoses: Fill an empty, rinsed hydrogen peroxide bottle with distilled water. Place it to the device. Press **Circulate** to clean the hoses. This should be done after treatment when it's known that the device is not being used for a while.

Transportation and storage. Store the device case closed at room temperature, protected from excess moisture. Note that some of the hydrogen peroxide solution will remain inside the feeding system.

Troubleshooting



The main switch doesn't lighten up? Make sure the device receives power. Check fuse F1.

The process does not start?

- Check the connection of the hydrogen peroxide sensor
- Check the volume of the space, it can't be 0
- Hydrogen peroxide bottle is getting empty
- Check fuses F2-F4.

Note! If the same fuse blows again, the device should be delivered to a country-specific authorized distributor or the manufacturer for service.

Heat plate stops heating?

In case that the heat plate stops heating, the unit must be delivered to a country-specific authorized distributor or to the manufacturer. The device contains an overheating protection that will be discharged if the surroundings temperature is too hot or the fan isn't working and the cell is overheated.

Disposal?

Before disposal the device it has to be decontaminated. Send the device to the manufacturer for decontamination. The device can also be scrapped following local regulations. Note that the device may contain traces of hydrogen peroxide.

Appendix I

Cleamix VCS-100Cr bio-decontamination solution

Cleamix VCS-100Cr unit is a very powerful hydrogen peroxide vapour generator. It is designed for effective bio-decontamination, its hydrogen peroxide vapour output exceeding $650 \text{ ppm/m}^3 / \text{min}$ at 5ml/min injection rate of 50% w/w aqueous H₂O₂ solution.

Cleamix VCS-100Cr bio-decontamination solution

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H_2O_2 vapour like any other gas has good penetration into hard to reach locations and the sporicidal efficiency of H_2O_2 vapour is activated already at $100\text{-}700 \text{ ppm}$ concentrations. Stable generation and adequate distribution of the active H_2O_2 agent together with high quality process parameter monitoring allow accurate and repeatable decontamination conditions ensuring correct contact times for $>6\text{-log}$ microbial reduction. It has been shown that a wide variety of interior configurations with sealed enclosures can be successfully bio-decontaminated by hydrogen peroxide vapour.

Facility	PPM-target	Treatment time	Aeration time
Ambulance, 20 m^3	300	40 min	20 min
Single bed hospital room, 70 m^3	300	45 min	30 min
Tent, 36 m^3	300	30 min	20 min
Laboratory room, 55 m^3	250	30 min	20 min

NOTE! Every facility is unique and this indicative table may not be applicable to all situations. The success of the decontamination process should always be ensured with biological or chemical indicators.

Appendix II

Controlling a Cleamix VCS-100Cr bio-decontamination process

When optimizing a decontamination process the importance of continuous measurement of the bio-decontamination process parameters can't be over emphasized. The maximum achievable H_2O_2 vapour concentration is highly dependent on the existing environmental conditions - therefore temperature and relative humidity (%RH) need to be taken into account when planning a decontamination process using H_2O_2 vapour. The targeted H_2O_2 ppm level shall be estimated in accordance with the needed exposure time.

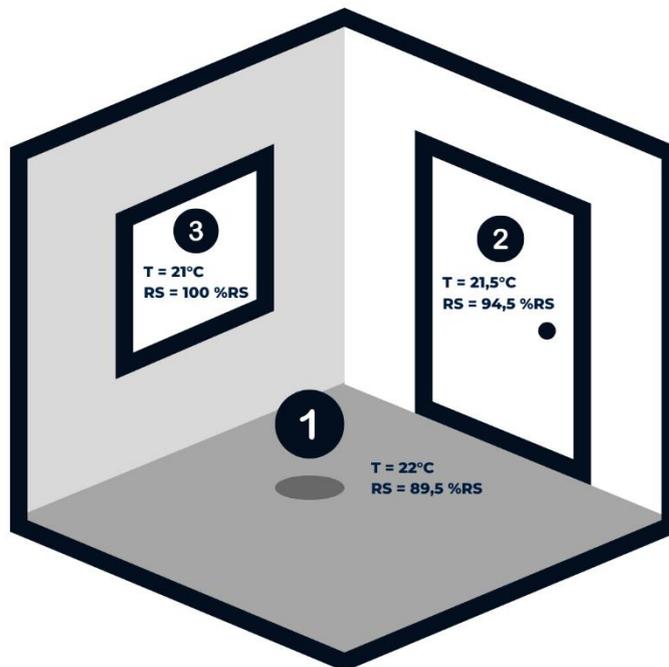
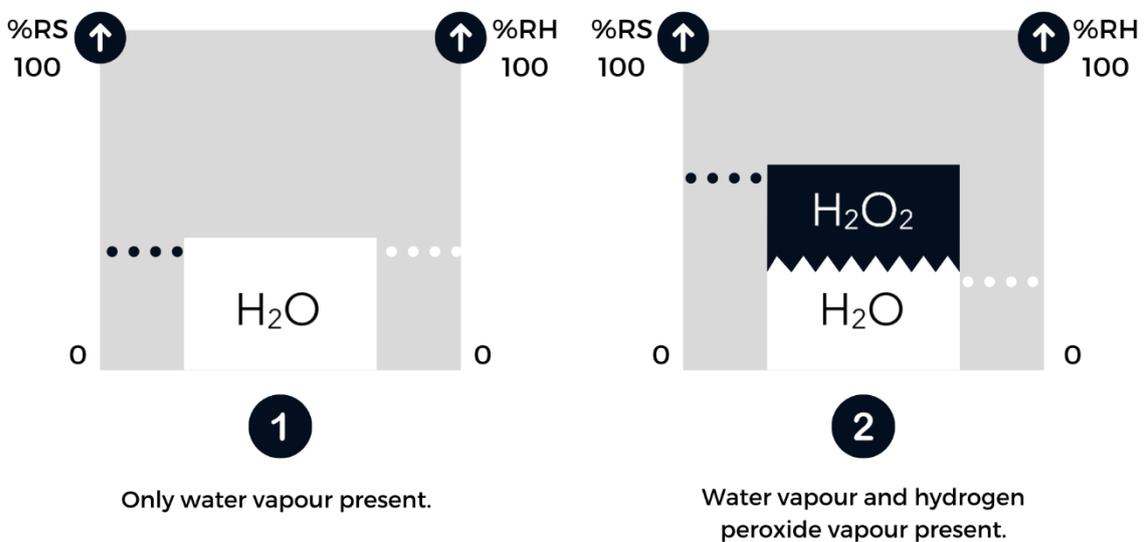
When %RH is very high the amount of H_2O_2 vapour injected to the space is quite limited, but is related to the temperature. The colder the space the quicker the saturation point is achieved. This fact makes the relative saturation (%RS) value the only parameter meaningful for controlling condensation when H_2O_2 vapour is present. Continuous measurement of both, water and H_2O_2 vapour, **enhances the process from monitoring to controlling.**

How temperature affects %RS?

Saturation begins at the coolest spot, so the temperature differences within the decontaminated space need to be taken into account. When the event of condensation must be avoided the sensor is located to the coldest spot where the %RS value would reach a 100 first (see picture 4).

Sophisticated control software of Cleamix VCS-100Cr enables hydrogen peroxide- and water vapour levels to be maintained below saturation point in various bio-decontamination situations and risk of hydrogen peroxide condensation accumulating on surfaces can be minimized.

Relative saturation vs. relative humidity



Appendix III

Cleamix VCS-100Cr bio-decontamination processes optimization

The outcome of a bio-decontamination process depends not only on the chosen process parameters, but a variety of other factors within the decontaminated space. Rooms with complex geometric layout and/or surfaces covered with porous materials challenge the optimal distribution and delivery of the bio-decontamination agent. Typical non-condensing decontamination cycle is divided into three phases.

Once the targeted parameters of a decontamination process have been attained for a sufficient exposure period the space has to be properly aerated. It is possible to enter the space safely only when the H₂O₂ vapour concentration gets below 1 ppm. If a direct ventilation of the hydrogen peroxide vapour into outdoor air is not feasible, the breakdown of H₂O₂ can be accelerated by a catalytic converter.

Example Bio-Decontamination Cycle

