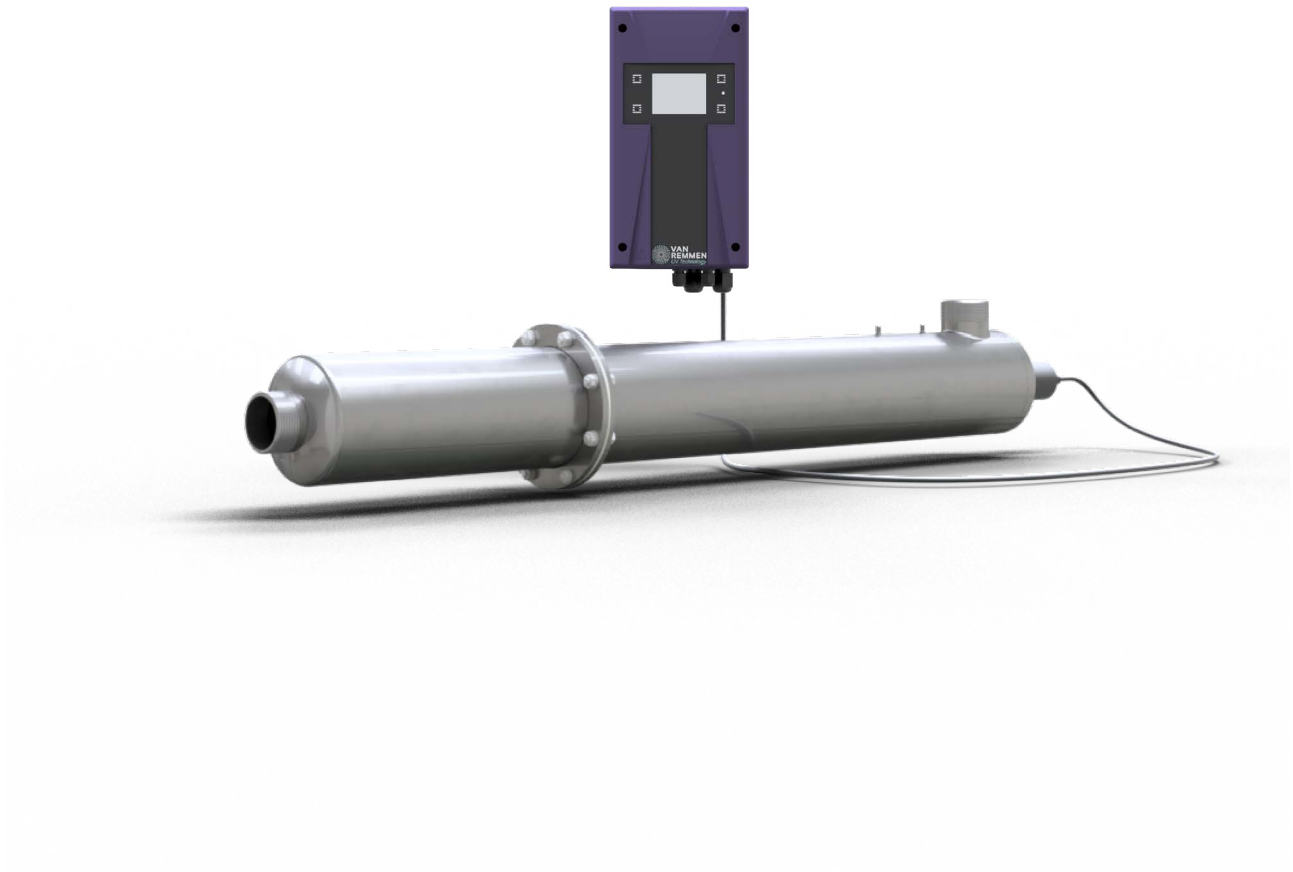
Manual

UV-C Unit



VAN REMMEN UV Technology

Hooglandweg 3a

8131 TE Wijhe

The Netherlands

Version number: V1.0

This manual is the:
“Original user manual”.

Foreword

This manual informs you about:

- Installing, operating and maintaining the *UV-C Unit*.

Keep this manual nearby the UV-C Unit.

Please read this manual carefully before using the *UV-C Unit*.This ensures maximum safety.Installing, operating, and maintaining the *UV-C Unit* may only be performed by suitably qualified installers.

Appendices at the end of this manual

This user manual has the following appendices:

- B1 'Technical Specifications'.
- B2 'Declaration of conformity'.

1 Introduction

This chapter provides general information about the UV-C Unit and the manual included.

1.1 Manufacturer

The UV-C Unit is manufactured by:

Van Remmen UV Technology
Hooglandweg 3a | 8131 TE Wijhe | The Netherlands
Telephone: +31 (0)570 521 890 | Website: www.vanremmen.nl | Email: info@vanremmen.nl

1.2 Identification

The name of the system is: UV-C Unit.

See the identification plate: this is attached to the reactor and the controller.

The UV-C Unit has the CE marking. This means that the basic safety and health requirements within the European Communities are met.

1.3 Warning

Only qualified installers are authorised to install, operate and maintain the UV-C Unit .

Optimal safety is only guaranteed if you read this manual carefully before using the UV-C Unit or operating any controls.

1.4 Documents

The UV-C Unit includes the following documents:

- This manual.
- Declaration of Conformity for electrical equipment, according to Directive 2014/35/EU, Attachment 2.

1.5 Liability

The manufacturer is not liable for damage, accidents and unsafe situations caused by:

- Insufficient maintenance of the *UV-C Unit*.
- Use of the *UV-C Unit* for other applications or under conditions other than those specified in this manual.
- Ignoring safety regulations and safety warnings for the *UV-C Unit* as indicated in this manual.
- Making changes to the *UV-C Unit*.

The manufacturer is not liable for any consequential damage in the event of malfunctions of the *UV-C Unit* such as damage to materials and/or reduced disinfection of the liquid.

1.6 Warranty conditions

The manufacturer uses the Metaalunie warranty conditions. The warranty lapses:

- If the *UV-C Unit* is installed, used and/or maintained by an unqualified person.
- If defects have occurred as a result of accident, misuse, modifications by unauthorised persons, transport damage, power failure, water leakage and/or damage resulting from use other than that for which the *UV-C Unit* was originally designed.
- If the *UV-C Unit* is not maintained within the replacement period and/or the original, prescribed replacement parts are not used.
- If no data can be supplied in the event of a defect or failure of the UV-C lamp(s). It must be possible for the manufacturer to inspect a defect or breakdown. For this reason, the manufacturer may request information when it comes to monitoring the maintenance intervals of the various deteriorating parts.

1.7 Replacement parts

The applied UV-C light accelerates the deterioration of various components installed in the reactor chamber. To ensure the safety and performance of the *UV-C Unit*, it is necessary to replace these components in a on time.

2 Safety

This chapter describes the applicable safety regulations regarding the *UV-C Unit*.

2.1 Pictograms

The following pictograms are used:

Pictogram	Description
	Warning for "HIGH VOLTAGE". • Near high voltage electrical parts.
	Warning for "HOT SURFACES". • Near parts with hot surfaces or hot liquids.
	Warning for "OPTICAL (UV) RADIATION". • Near optical (UV) components that generate dangerous radiation.

2.2 User

The users of the *UV-C Unit* are qualified installers.

Observe the safety instructions and warnings in this manual. Deviating from these regulations may cause unacceptable risks.

Installers must be skilled in the installation technique and must be fully aware of the contents in this manual and the safety instructions and warnings below before installing, operating or carrying out maintenance on the *UV-C Unit*.

2.3 Safety regulations

Observe the following general safety regulations:

- Wear the required personal protective equipment.
- Check the operation of the *UV-C Unit* regularly.
- Do not touch hazardous parts of the*UV-C Unit*.
- Observe local safety regulations and warnings.
- Never bypass or disable safety devices during installation.
- Switch off the *UV-C Unit* prior to carrying out maintenance.
- Never switch on the *UV-C Unit* when someone is carrying out maintenance.
- Carry out maintenance work in accordance with the safety regulations. Replace defective or damaged parts before putting the *UV-C Unit* into use again.
- Never make technical changes to the *UV-C Unit*, without prior written permission from the manufacturer.

Observe the following specific safety regulations:

- Install the *UV-C Unit* according to local safety standards.
- Clean the *UV-C Unit* in time for proper operation in case of any dirt buildup.
- For the operation of the *UV-C Unit*, use original replacement parts.
- Always replace the original spare parts within the replacement period.
- Avoid exposure to direct UV-C radiation during maintenance work.
- In case of malfunctions on the *UV-C Unit*, always investigate the causes before restarting.

UV-C light damages your skin and your eyes. Therefore avoid exposure to direct UV-C radiation during maintenance work.

2.4 Intended application

The *UV-C Unit* is intended for the disinfection of liquids with ultraviolet (UV-C) light.

The *UV-C Unit* may only be installed, operated and maintained as described in this manual. Any other application is NOT allowed.

3 Description

This chapter describes the use, components and operation of the *UV-C Unit*.

3.1 Overview

The *UV-C Unit* consists of the following components:

Item	Part	Item	Part
1.	Reactor	8.	Flow plate
2.	UV-C Lamp	9.	Control unit
3.	Quartz sleeve	10.	HMI-controller
4.	Safety spring	11.	On/Off switch
5	Reactor connector	12.	Connection for UV-C sensor
6.	Lamp connector	13.	Connection for safety grounding
7.	Lamp cable	14.	Connection for temperature sensor

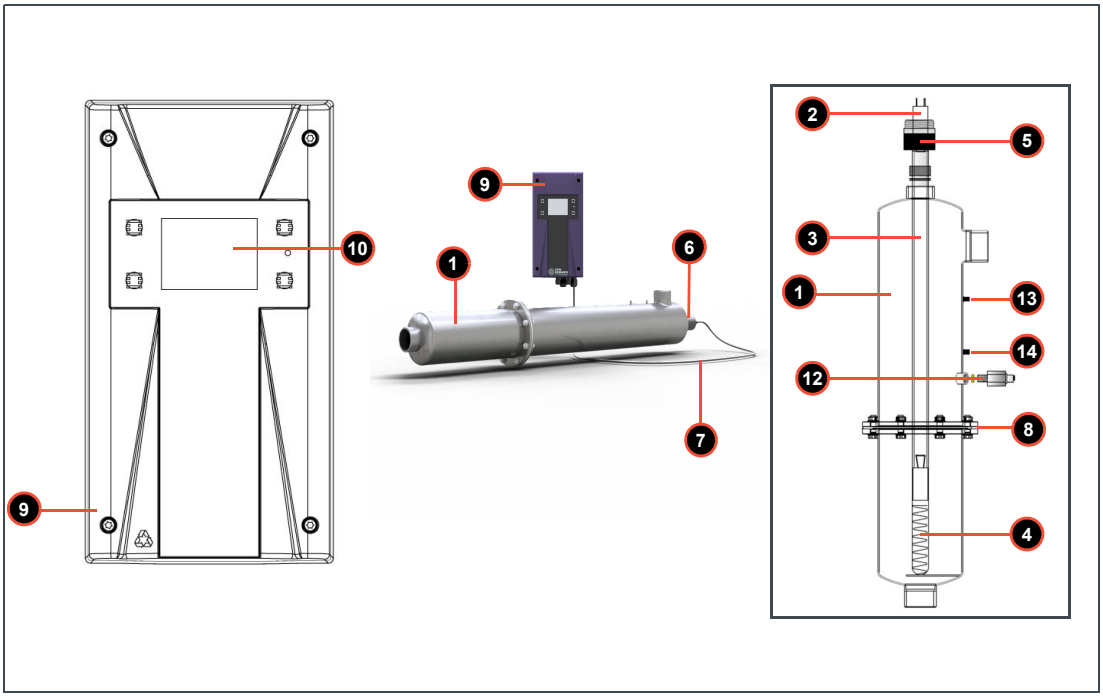


Figure 3? 1: Overview of the *UV-C Unit*

3.2 UV-C Unit

The liquid flows through the reactor chamber and is disinfected by the ultraviolet light from the UV-C lamp(s). Depending on the *UV-C Unit* it can involve one or more lamps. The design of the reactor chamber and the flow plate ensures an optimised flow profile. This ensures efficient and optimal disinfection of the liquid.

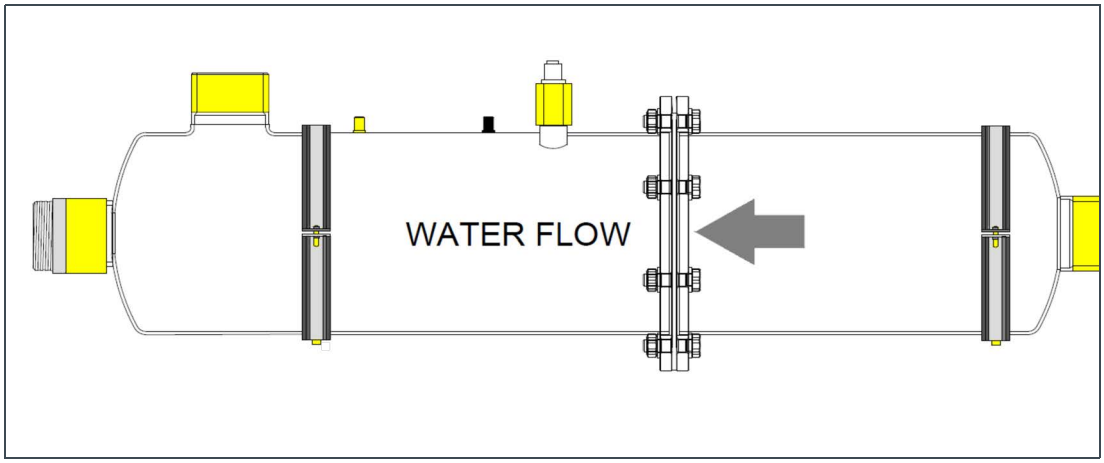


Figure 3? 2: Flow of the *UV-C Unit*

3.2.1 Optional UV-C sensor

The *UV-C Unit* can also be equipped with a UV-C sensor.

The UV-C sensor must be connected to the appropriate connection on the outside of the reactor chamber. With the UV-C sensor, the UV-C light output of the UV-C lamp(s) can be registered. This can serve as an indication of possible ageing of the UV-C lamp(s), contamination of the quartz sleeve or varying quality or transmission of the liquid.

3.2.2 Optional temperature sensor

The *UV-C Unit* can also be equipped with a temperature sensor.

This temperature sensor must be connected to the appropriate connection on the outside of the reactor chamber. The temperature sensor can be used to register the temperature of the liquid in the reactor chamber. Based on this measurement, the reactor can be switched off or the discharge valve opened to prevent any overheating of the UV-C lamp(s).

3.2.3 Disinfection with UV-C light

UV-C light with a wavelength of around 254 nm irreparably damages the DNA of micro-organisms, so that they no longer reproduce.

The *UV-C Unit* is highly efficient at killing or inactivating yeast, bacteria, fungi, and viruses in liquids.

The lamp configuration in combination with the optimised flow profile and the control options via the HMI control software, make the *UV-C Unit* extremely efficient as a disinfection system.

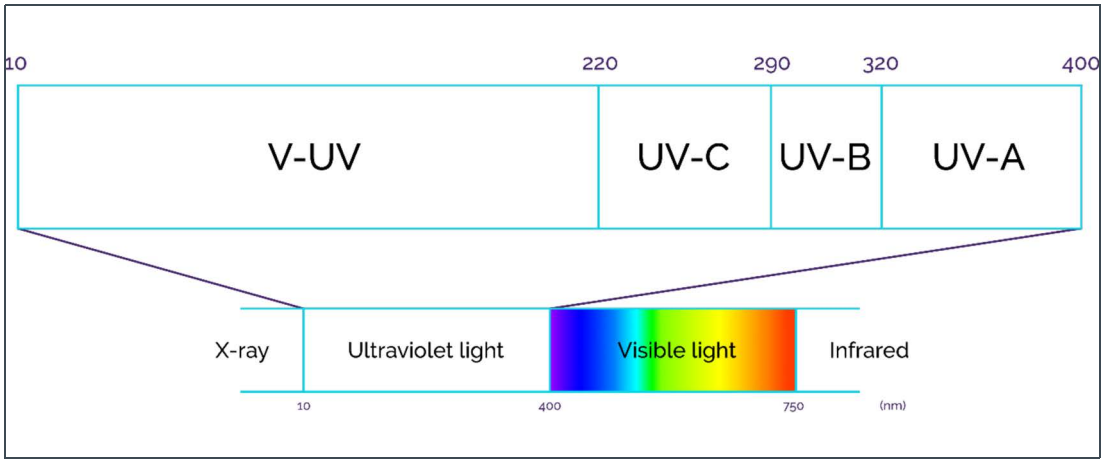


Figure 3? 3: Ultraviolet (UV-C) light wavelengths

The degree of disinfection depends on the UV-C intensity of the UV-C lamp(s).

Factors such as the power of the UV-C lamp(s), the distance from the UV-C lamp(s) to the wall of the reactor chamber and the distance from the UV-C lamp(s) to the liquid play a role in the degree of disinfection. Factors that can negatively influence disinfection are:

- Presence of air bubbles.
- Deterioration of the UV-C lamp(s).
- Contamination of the quartz sleeve(s) and or lens of the UV sensor.
- Decreased transmission value of the fluid.
- Excessive high temperature due to insufficient flow.

3.3 Controller

The *UV-C Unit* has a separate controller.

The controller consists of a lamp driver and HMI control PCB that are specifically designed for controlling the UV-C lamp(s) and controlling the disinfection process.

Furthermore, the controller is equipped with an ON/OFF switch, an HMI control panel, and cable glands for connecting various cables. See overview below.

Item	Part	Item	Part
1.	ON/OFF switch	4.	2x Cable gland (M12) for UV-C sensor and temperature sensor
2.	HMI-control panel	5.	3x Gland (M16) for discharge valve control, power supply and spare connection
3.	Gland (M16) for lamp cable		

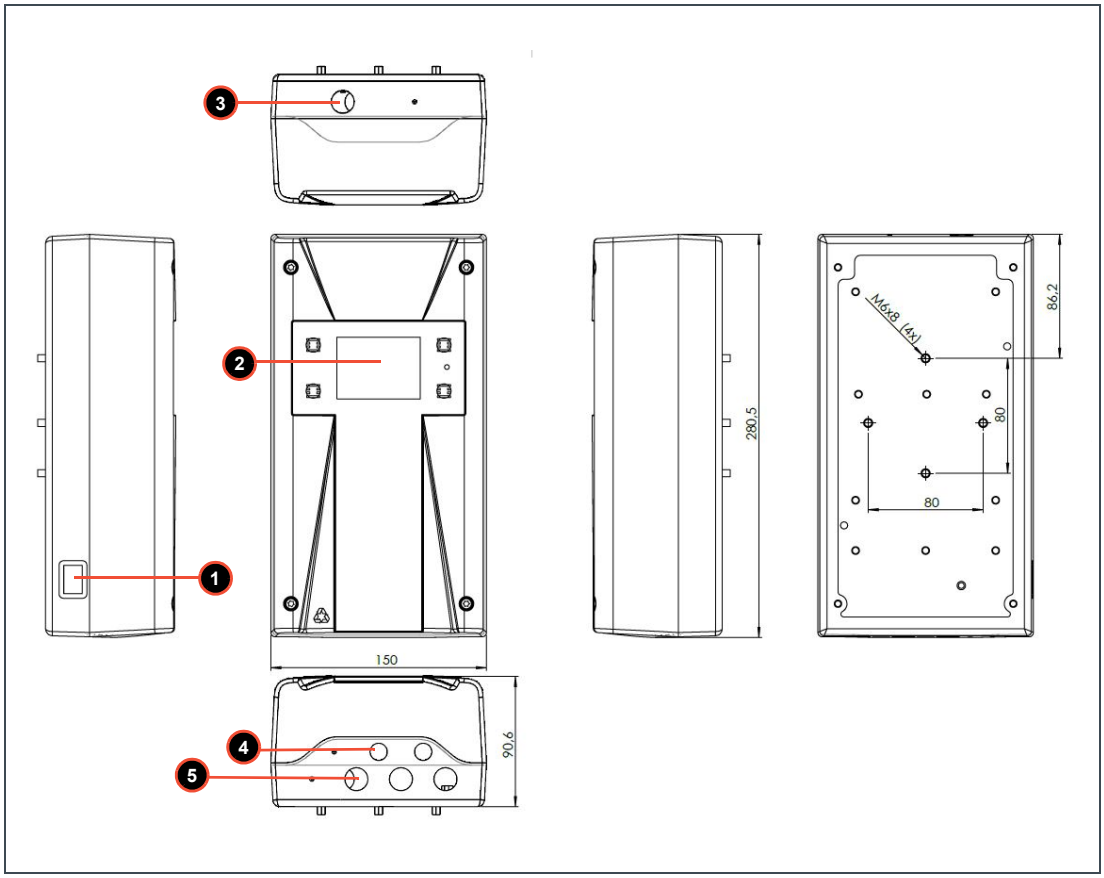


Figure 3? 4: Overview of the controller

3.4 Controls

The *UV-C Unit* has the following controls:

1. ON/OFF- switch.
2. HMI-controller.
3. HMI-control screen.

These controls are described in the following subsections.

3.4.1 ON/OFF- switch

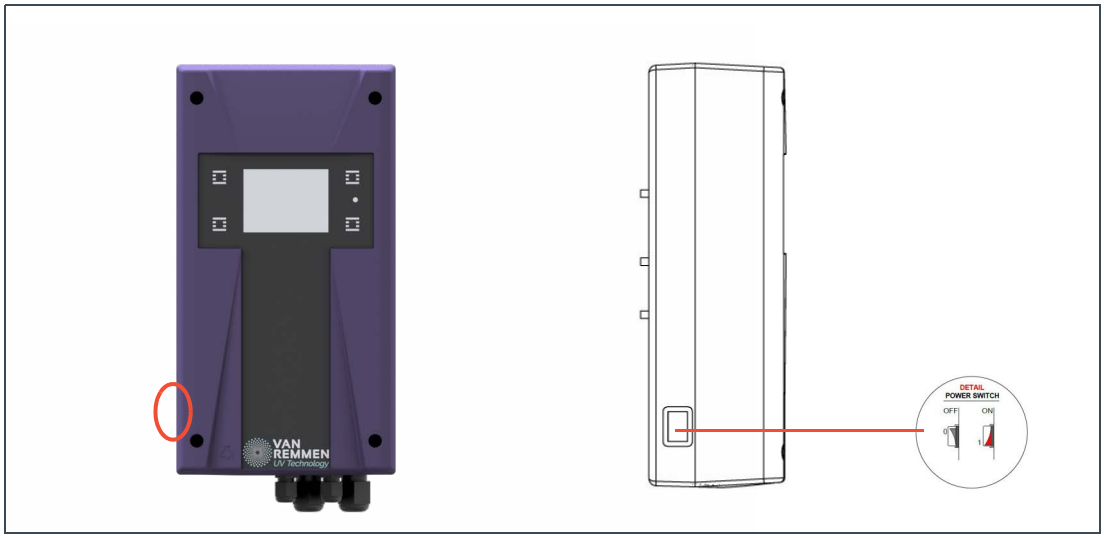


Figure 3? 5: ON/OFF switch

The main switch has the following functions:

Item	Functions
ON/OFF switch	This switch the *UV-C UNIT* on or off.

Switching on and off very frequently (Relatively excessively) shortens the lifespan of the UV-C lamp(s).

3.4.2 HMI-controller

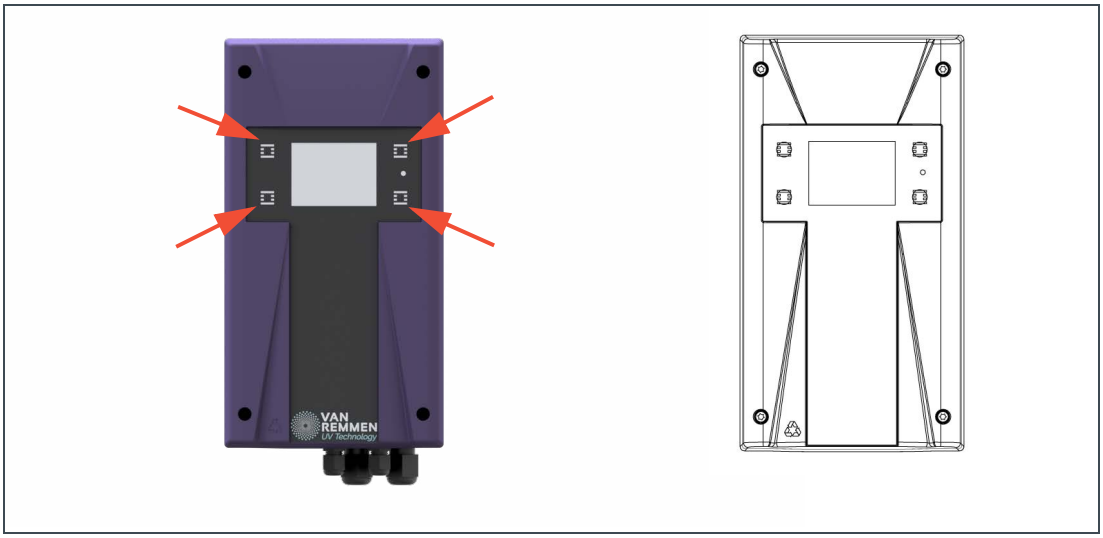


Figure 3? 6: HMI-controller

The HMI controller buttons have the following functions:

Item	Functions
Button ‹	Scroll left.
Button ›	Scroll right.
Button ^	Scroll up.
Button ⌄	Scroll down.
Button ↩	Scroll back in the menu.
Button ×	Cancel selected option or cancel set value.
Button ✓	Select chosen option or confirm set value.
Button ✎, ⊙ or ⚙	Edit or change selected option.
Button −	Decrease the value to be edited or modified.
Button +	Increase the value to be edited or changed.

3.4.3 HMI Control Screens

The HMI control screens have the following control options:

Item	Control options
HOME screen	Basic data of the *UV-C Unit*.
LAMPS screen	Read the remaining burning time of the UV-C lamp(s).
	Resetting or (re)starting the relevant UV-C lamp(s).
UV SENSORS screen	Read absolute and relative UV-C sensor values.
	Setting alarm values for the UV-C sensor, if connected.
SYSTEM screen	Read current flow and set min/max values.
	Reading the current temperature setting min/max values.
DUMP VALVE screen	Reading the current status and activations of the flushing valve.
	Setting the time for opening and closing, if connected.
SETTINGS screen	Set the time and date.
	Reading the system information from the *UV-C Unit*.
	Turning off the HMI display of the *UV-C Unit*.

4 Installation

This chapter describes how the *UV-C Unit* must be installed.

4.1 Safety regulations

- Ensure that safety grounding is available.
- Make sure that electrical safety is in place at the installation site.
- Only qualified installers are authorised to install the *UV-C Unit*.

4.2 Important installation work

The following work is important when installing the *UV-C Unit*.

Item	Chapter
Preparing for installation	4.2.1
Checking the parts	4.2.2
Installation of the *UV-C Unit*	4.2.3
Use of the *UV-C Unit*	4.2.4

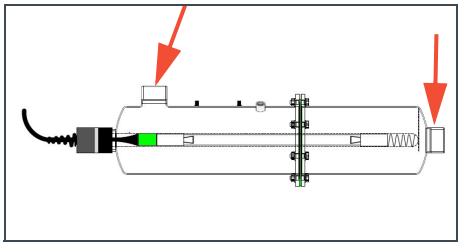
Observe the following installation instructions:

- Prevent water hammer and vibrations in the pipe circuit to prevent damage.
- Install the*UV-C Unit* strictly horizontally for lamp power > 120W.
- If possible, provide a drain and vent setup within the pipe circuit if the reactor chamber does not have this option.
- The recommendation is to install the *UV-C Unit* in a bypass, which allows the reactor chamber to be closed off within the pipe circuit for maintenance work.
- The recommendation is to install the *UV-C Unit* on the water side before installing the UV-C lamp(s). For more information, see chapter 6.2.1 for disassembling and reassembling the UV-C lamp(s).

4.2.1 Preparing installation

Check the installation specifications.

- Is there enough free space for maintenance?
- Are the measurements correct?
- Are the connections in accordance with specification?



If the UV-C Unit is provided with flanges, make sure to use the correct connectors to fit the the UV-C Unit to the pipe circuit.

4.2.2 Checking the parts

Check the scope of delivery.

- Are all parts present?
- Are all parts undamaged?

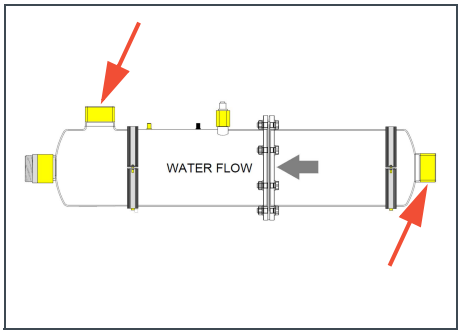
The UV-C lamp is often pre-assembled. However, the UV-C lamp can also be supplied separately.

The scope of delivery consists of the reactor, controller, manual, wall brackets, and gloves for (dis)assembling the UV lamp(s).

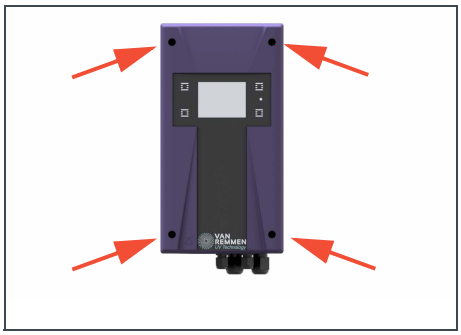
Depending on the version, the controller is equipped with the cabling of the optional UV-C sensor, temperature sensor, or discharge valve control.

4.2.3 Installation of the *UV-C Unit*

1. Mount the reactor using the supplied mounting brackets. Install the *UV-C Unit* with the following lamp power only horizontally; 205W, 325W, 350W, 600W. Make sure there is enough space to replace the UV-C lamp and quartz sleeve.
2. Connect the reactor on the water side to the pipe circuit and take the flow direction into account.



3. Remove the protective cover from the controller by unscrewing the appropriate screws.



Stay alert. Only carry out this work with a voltage-free controller.

4. Connect the power cable to the controller.
   - Unscrew the gland, feed the cable through, and then insert the wires into the connector.

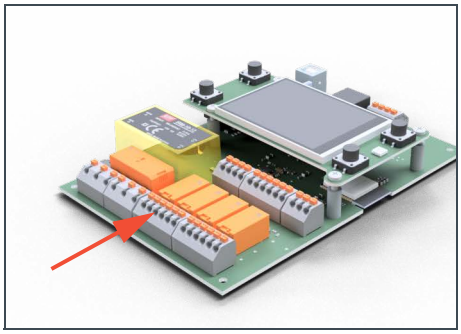
See the symbols on the connector for connection. The neutral wire (blue) in N, the ground wire (yellow/green) in PE and the phase wire (brown) in L.

Only if present:

5. Connect the external alarm.
   - Route the cables to the connectors.

Use the free glands to feed the cable for the external alarm.

- Connect the potential free connectors.
  - See ALARM0 connector: Warning.
  - See ALARM1 connector: Alarm.



External alarms can be set on the HMI via the menu SYSTEM --> TEMPERATURE --> ALARMS.

6. Replace the controller cover and retighten the appropriate bolts.

7. Connect the grounding cable to the reactor.

See the connection for the safety ground.

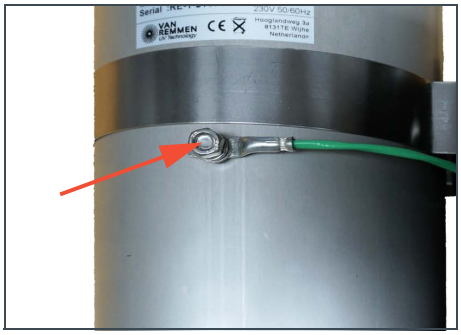
Only if present:

8. Connect the UV-C sensor cable to the reactor.

See chapter 6.2.3 to connect the UV-C sensor.

Only if present:

9. Connect the temperature sensor to the reactor.



See the connection for the temperature sensor.

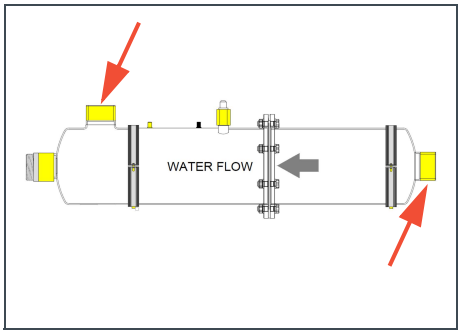
Only if present:

10. Connect the discharge valve control to the pipe circuit.

The (optional) discharge valve control must be installed in the pipe circuit after the reactor chamber of the UV-C Unit.

11. Fill the *UV-C Unit* with fluid, then perform a pressure test to check for leaks.

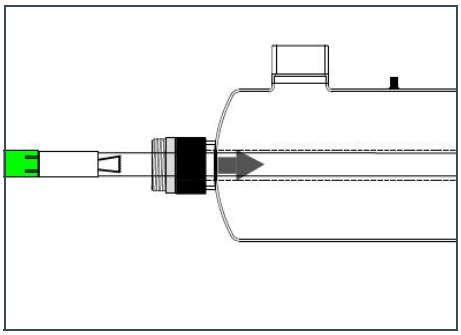
- Check that all connections and connectors in the pipe circuit are have no leakages.



Please note that the UV-C lamp must be disassembled to perform the pressure test. See chapter 6.2.1.

After performing the pressure test:

12. Mount the UV-C lamp in the quartz sleeve.

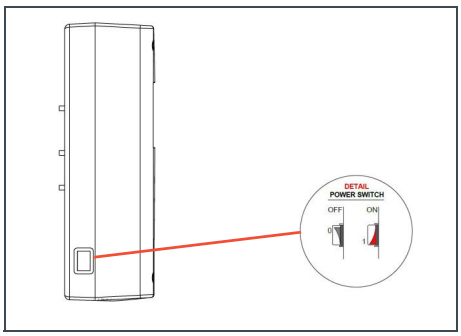


See chapter 6.2.1 for mounting the UV-C lamp.

Never touch the UV-C lamp with bare hands. Always use the gloves provided.

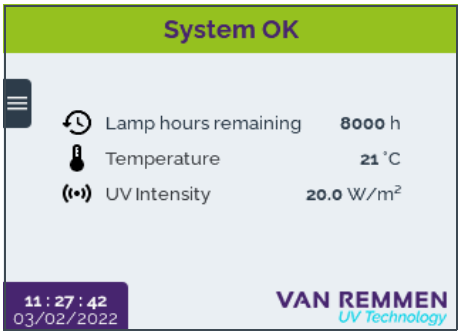
4.2.4 Commissioning of the *UV-C Unit*

1. Switch on the *UV-C Unit* by setting the switch on the controller to position "I ON".



Wait until the controller has started up. The notification SYSTEM OK will appear on the HMI screen.

The notification SYSTEM OK will appear on the HMI screen.That means there are no malfunctions.



After commissioning of the *UV-C Unit*:

2. Carry out the following two checks:

- Check that the flow capacity does not exceed the maximum treatment capacity, based on the design.
- Check if the power of the UV-C lamp(s) and the activated options (if installed) of the *UV-C Unit* are OK.

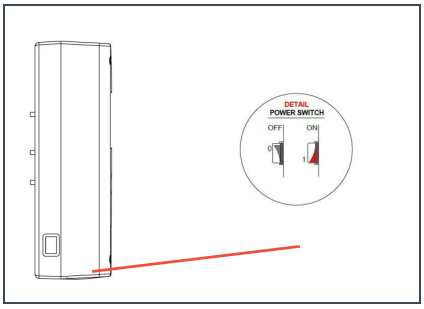
See chapter 5 for more information about HMI operation and checking the set parameters.

5 Controls

This chapter describes how the *UV-C Unit* operated.

5.1 Switching on/off

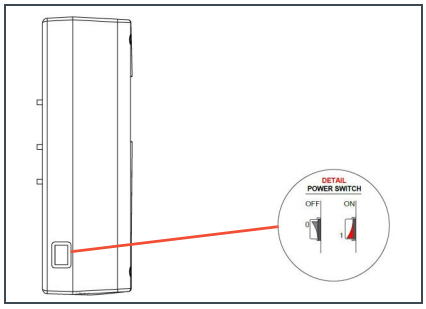
1. Switch on the *UV-C Unit* by setting the switch on the controller to the "I ON" position.



The UV-C lamp needs approximately 2 minutes to generate the maximum UV-C power.

Wailt until the *UV-C Unit* is active. The notification SYSTEM OK will appear on the HMI screen.

2. Switch off the *UV-C Unit* by setting the switch on the controller to the "0 OFF" position.



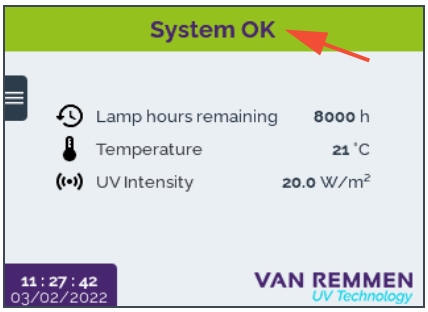
The UV-C lamp needs about 10 minutes after switching off to be able to cool down sufficiently.

Frequent (relatively excessive) switching on and off shortens the lifespan of the UV-C lamp.

5.2 HMI-control panel

After enabling the *UV-C Unit* the HOME screen appears.

If the notification SYSTEM OK appears, then the UV-C Unit has switched on successfull.This means that there are no malfunctions or alarms.

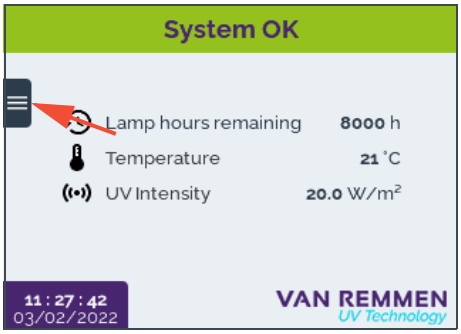


Item	Description
LAMP HOURS REMAINING	Remaining burning time until the UV-C lamp is to be replaced.
TEMPERATURE	Current temperature of the UV-C lamp.
UV INTENSITY	Current UV intensity of the UV-C lamp.

5.3 HMI-control structure

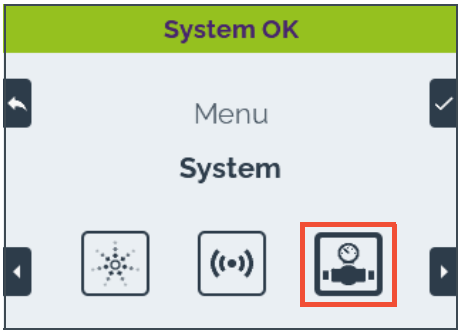
All available menus can be accessed from the HOME screen.

1. Press ☰ to access the menu.



2. Select the preferred screen option.

- Press ↩ --> Go to HOME screen.
- Press ‹ --> Go to PREVIOUS menu.
- Press › --> Go to NEXT menu.
- Press ✓ --> Go to SELECTED menu.



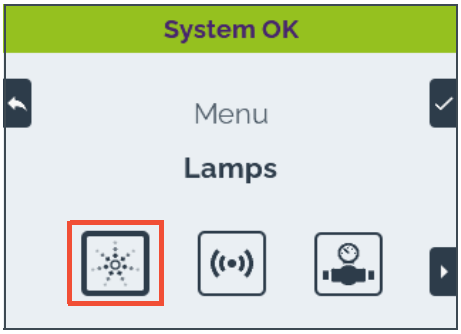
Menu	Description
Menu LAMPS	Select for menu LAMPS, see chapter 5.3.1.
Menu UV SENSORS	Select for menu UV SENSORS, see chapter 5.3.2.
Menu SYSTEM	Select for menu SYSTEM,see chapter 5.3.3.
Menu DUMP VALVE	Select for menu DUMP VALVE, see chapter 5.3.4.
Menu SETTINGS	Select for menu SETTINGS, see chapter 5.3.5.

Below the Settings menu there is an option to access the installer functionality. In the MAINTENANCE screen you must enter the password. See chapter 5.3.6 step 19.

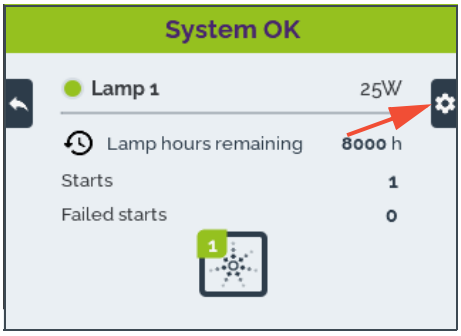
The password for installer is: **1891**

5.3.1 Control options in the LAMPS menu

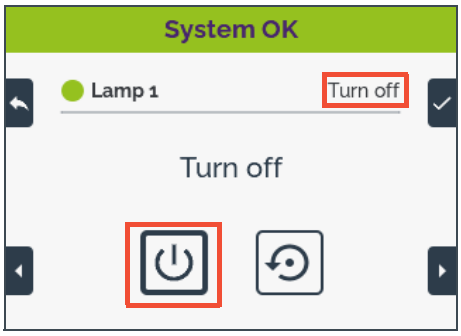
1. Select menu and press .



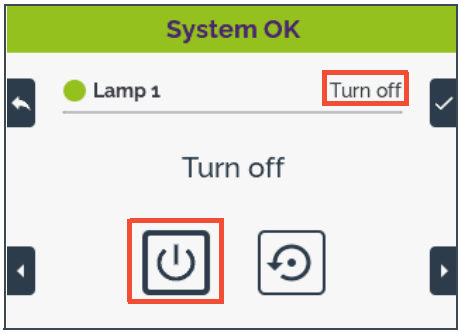
2. Press to access the settings.



3. Select the ON/OFF menu option.
   - Press or to select.
4. Press to confirm this option.



When the UV-C lamp is switched off, the TURN ON control option is available.



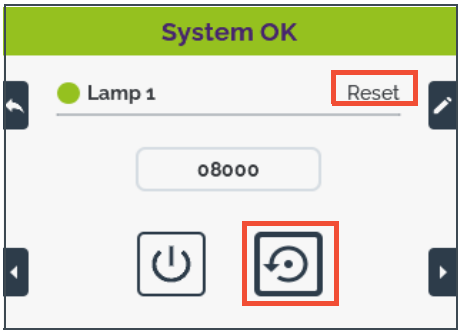
When the UV-C lamp is switched on, the TURN OFF control option becomes available.

After replacing the UV-C lamp, the counter LAMP HOURS REMAINING must be reset.

5. Select the RESET menu option.

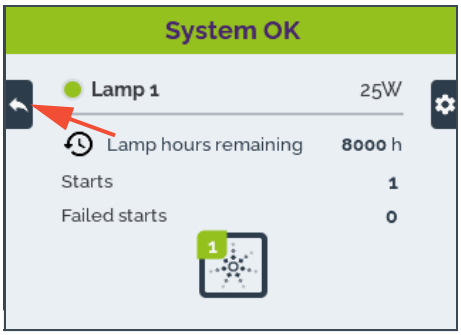
- Press ‹ or › to select.

6. Press ✓ to confirm this option.

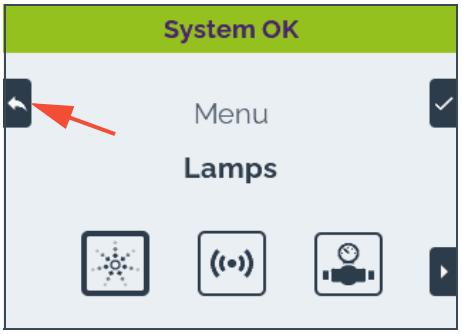


7. Press ↩ to go back in the menu.

8. Press ↩ to go back in the menu.

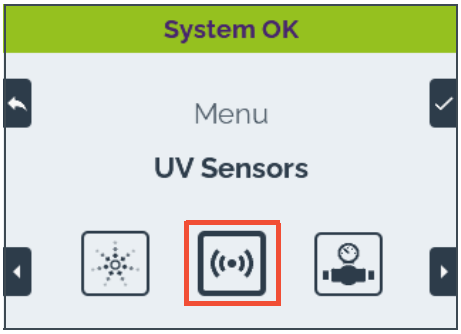


9. Press ↩ to go to the HOME screen.

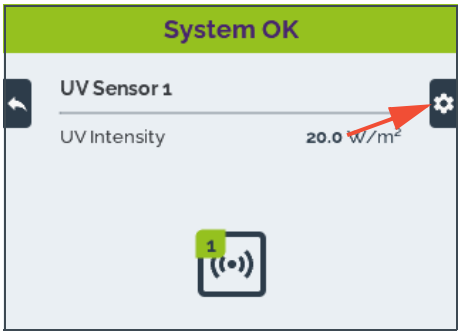


5.3.2 Control options in the UV SENSORS menu

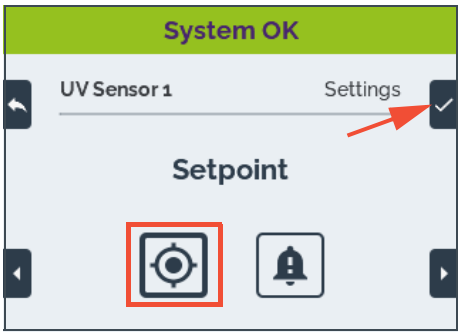
1. Select menu and press .



2. Press to access the settings.



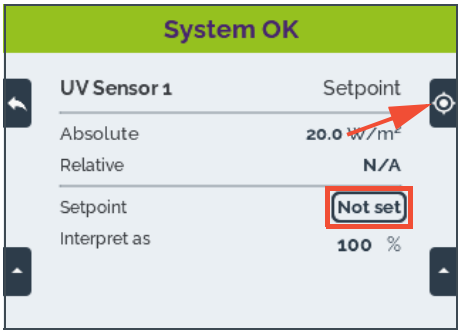
3. Select the SETTINGS menu option.
   - Press or to select.
   - Press to confirm this option.



Observe the following conditions before determining the setpoint:

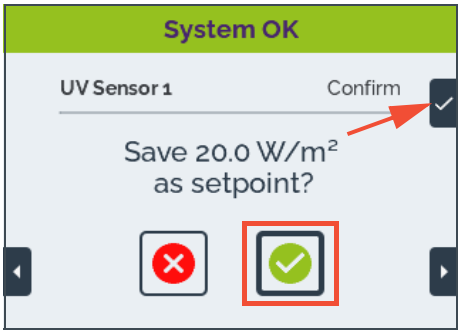
- Stable transmission value
- No air present in the reactor chamber
- UV-C lamp at temperature
- UV-C lamp wires not for the UV-C sensor

4. Select the SETPOINT menu option.
   - Press op or to select.
5. Press to confirm this option.

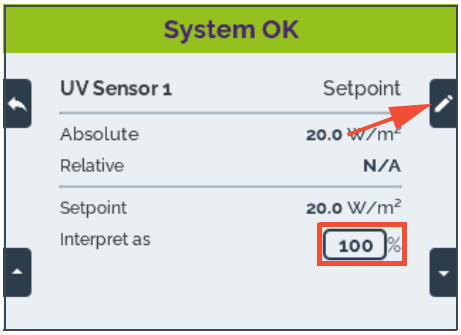


The setpoint must be set upon first time of use, after replacing the UV-C lamp or UV-C sensor, in combination with cleaning the quartz sleeve.

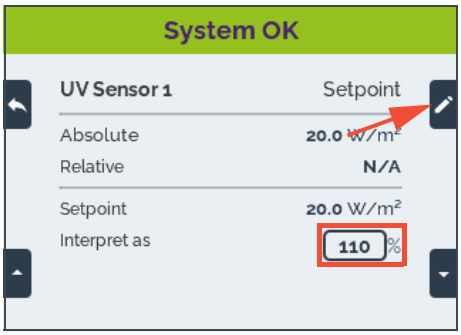
6. Select the measured SETPOINT setting.
   - Press ✓ to agree.
   - Press ‹ or × to cancel.



7. Select the INTERPRET AS menu option.
   - Press ^ or ˅ to select.
   - Press ✎ to change the setting.
   - Press ‹ or › to select the number.
   - Druk op ✎ to change the number.
   - Press − or + to increase/decrease.

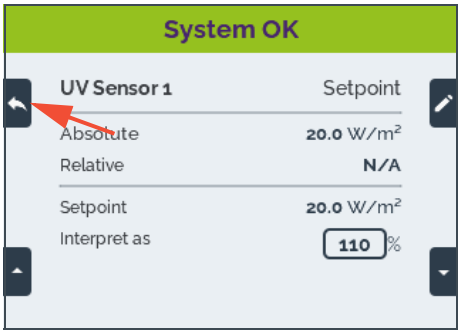


8. Press ✓ to confirm the number.

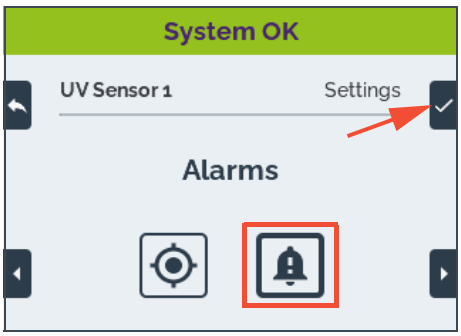


The setpoint must be set to 110% for each new UV-C lamp via the menu option INTERPRET AS. This is necessary because every new UV-C lamp has a burning-in period in which the output is higher than normal. After this burning-in period, the UV-C lamp stabilises at 100% output.

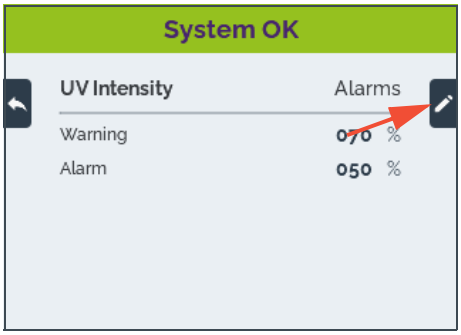
9. Press ↩ to go back in the menu.



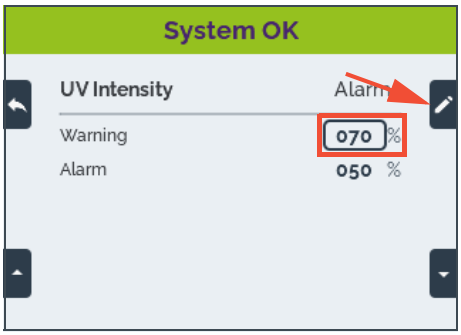
10. Select the CONFIGURE ALARMS menu option.
    - Press ‹ or › to select.
11. Press ✓ to confirm this option.



12. Press ✎ to change setting.

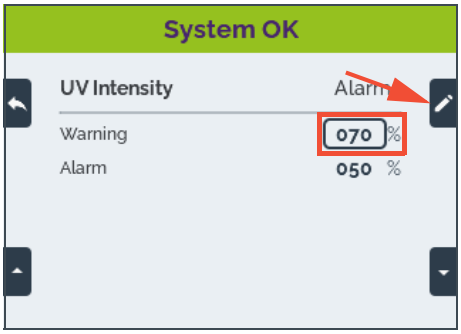


13. Select the WARNING menu option.
    - Press ^ or ˅ to select.
14. Press ✎ to confirm this option.



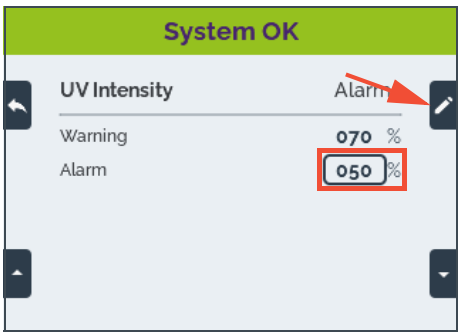
If the UV-C Unit has a UV-C sensor, a WARNING will be issued if the UV intensity of the UV-C lamp exceeds the set value. The base value is 70%.

15. Set the UV intensity in WARNING.
    - Press ‹ or › to select.
    - Press ✎ to change the number.
    - Press − or + to decrease/increase.
    - Press ✓ to confirm the number.



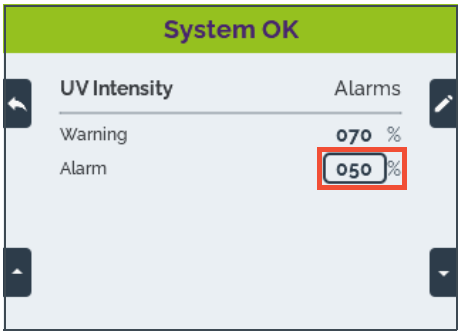
When there is a WARNING the UV-intensity of the UV-C lamp is 70% or less.The UV-C Unit must be cleaned. See chapter 6.

16. Select the ALARM menu option.
    - Press ^ or v to select.
17. Press ✎ to confirm this option.



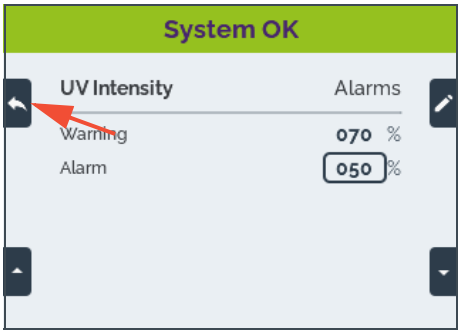
If the UV-C Unit has a UV-C sensor, an ALARM will be go off if the UV intensity of the UV-C lamp exceeds the set value. The base value is 50%.

18. Set the UV intensity in ALARM.
    - Press < or > to select.
    - Press ✎ to change the number.
    - Press − or + to decrease/increase.
    - Press ✓ to confirm the number.

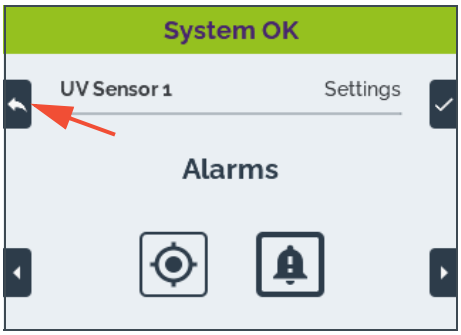


When a WARNING is issued, the UV-intensity of the UV-C lamp is 50% or less. The UV-C Unit must be cleaned. See chapter 6.

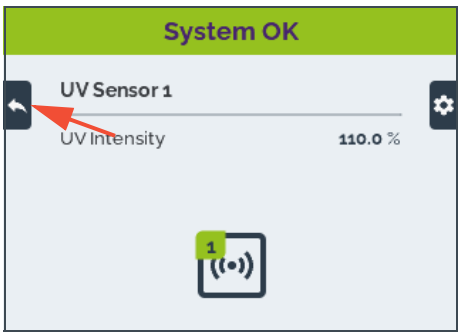
19. Press ↩ to go back in the menu.



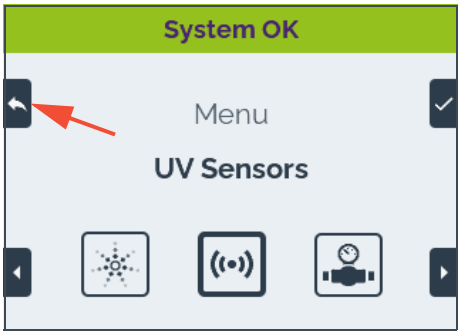
20. Press ↩ to go back in the menu.



21. Press ⮌ to go back in the menu.

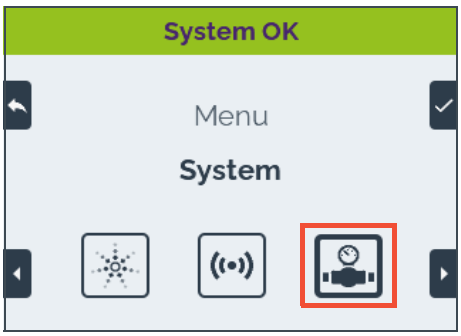


22. Press ⮌ to go to the HOME screen.



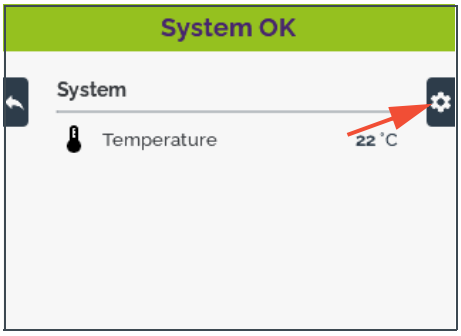
5.3.3 Control options in the SYSTEM menu

1. Select menu and then press .

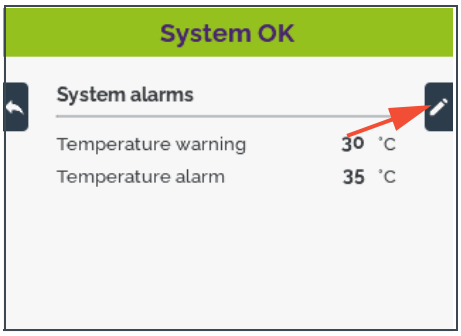


If the *UV-C Unit* has a temperature sensor:

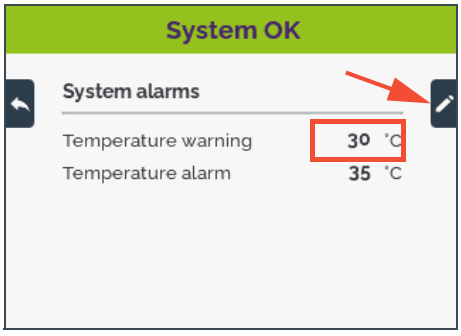
2. Select the TEMPERATURE menu option.
   - Press to access the settings.



   - Press to change.

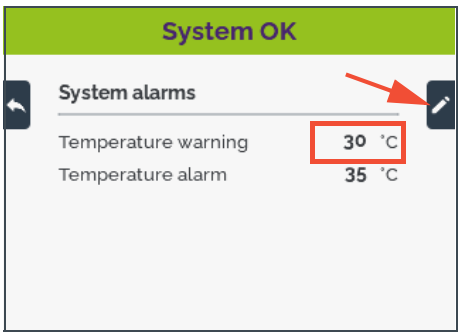


3. Select the de WARNING menu option.
   - Press or to select.
4. Press to confirm this option.



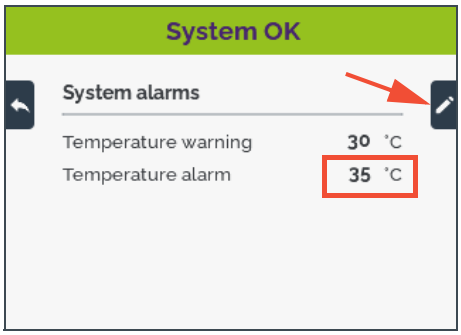
A WARNING is issued if the temperature in the reactor chamber rises above the set value.

5. Set the temperature in WARNING.
   - Press ‹ or › to select.
   - Press ✎ to change the number.
   - Press − or + to decrease/increase.
   - Press ✓ to confirm the number.



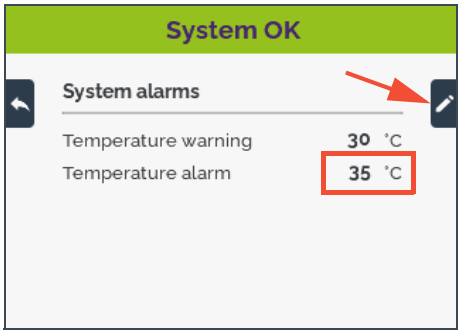
In case of a WARNING, the optional discharge valve will be activated. Besides that, the UV-C Unit keeps functioning.

6. Select the ALARM menu option.
   - Press ^ or ˅ to select.
7. Press ✎ to confirm this option.



An ALARM goes off if the temperature in the reactor chamber rises above the set value. The UV-C lamp will be switched off.

8. Set the temperature in ALARM.
   - Press ‹ or › to select.
   - Press ✎ to change the number.
   - Press − or + to decrease/increase.
   - Press ✓ to confirm the number.



In case of an ALARM, the optional discharge valve will remain activated. Furthermore, the UV-C lamp will be switched off.

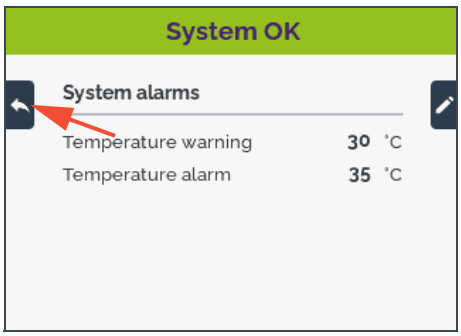
The default setting value:
With an optional Temperature sensor

- Warning: 30 °C
- Alarm: 35 °C

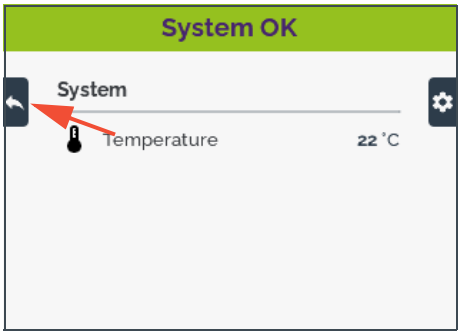
With an optional Temperature sensor with dump valve:

- Warning: 35 °C
- Alarm: 50 °C

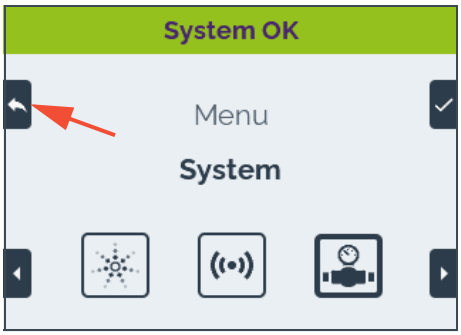
9. Press ↩ to go back in the menu.



10. Press ↩ to go back in the menu.

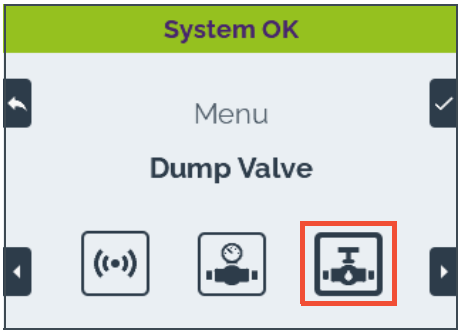


11. Press ↩ to go to the HOME screen.

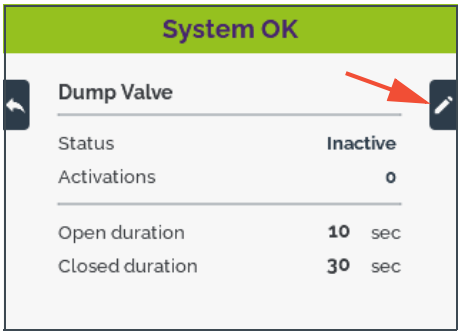


5.3.4 Control options in the DUMP VALVE menu

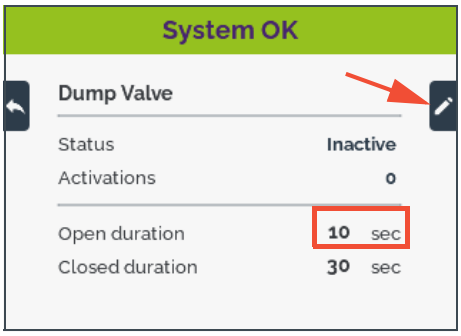
1. **Select** menu and **press** on .



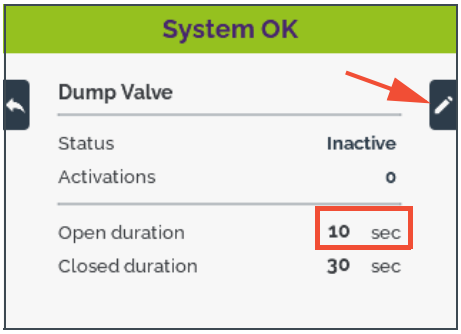
2. Press to change.



3. Select the OPEN DURATION menu option.
   - Press or to select.
4. Press to confirm this option.

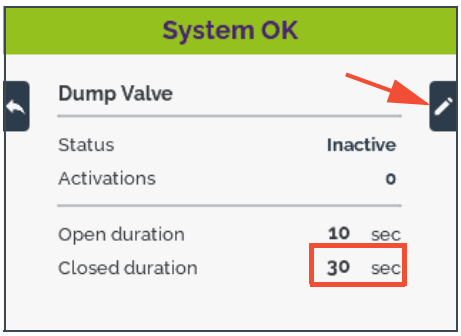


5. Set the OPEN DURATION in seconds.
   - Press or to select.
   - Press to change the number.
   - Press or to decrease/increase.
   - Press to confirm the number.

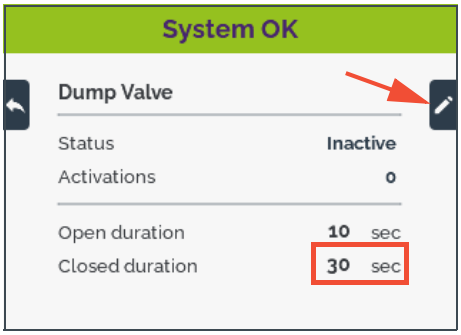


In case of a WARNING the optional discharge valve OPEN DURATION will open. After that, the optional discharge valve CLOSED DURATION will open, followed by a temperature check. If necessary, this check will be repeated.

6. Select the CLOSED DURATION menu option.
   - Press ^ or v to select.
7. Press ✎ to confirm this option.

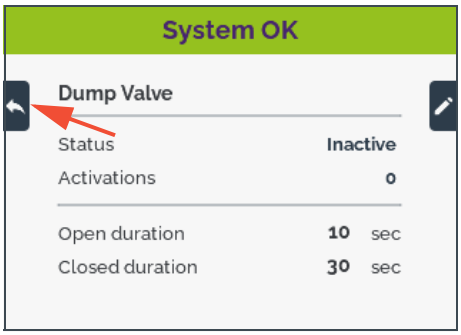


8. Set the CLOSED DURATION in seconds.
   - Press < or > to select.
   - Press ✎ to change the number.
   - Press − or + to decrease/increase.
   - Press ✓ to confirm the number.

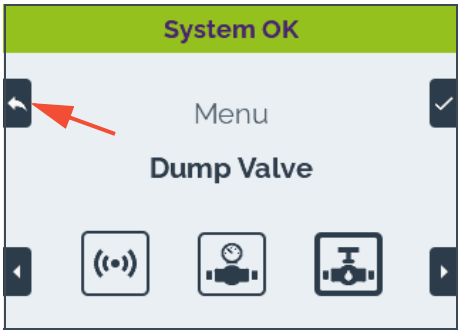


In case of an ALARM, the optional discharge valve will be permanently opened to protect the UV-C lamp from overheating. Furthermore, the UV-C lamp of the UV-C Unit will be switched off.

9. Press ↩ to go back in the menu.

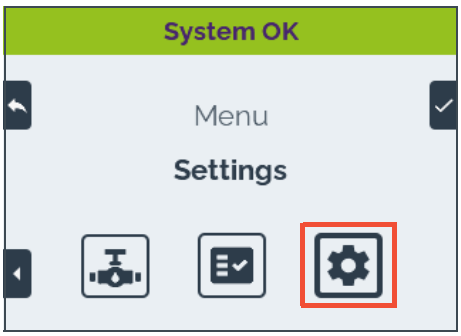


10. Press ↩ to go to the HOME screen.

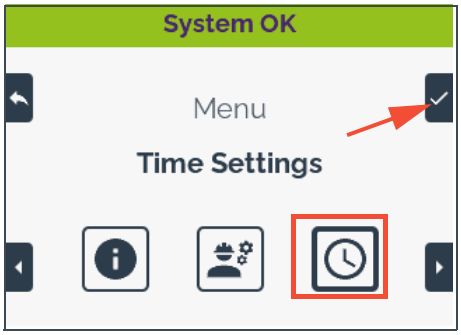


5.3.5 Control options in the SETTINGS menu

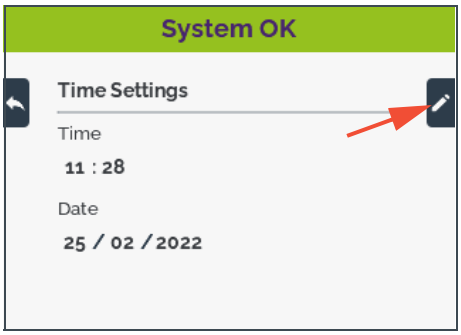
1. Select menu and press .



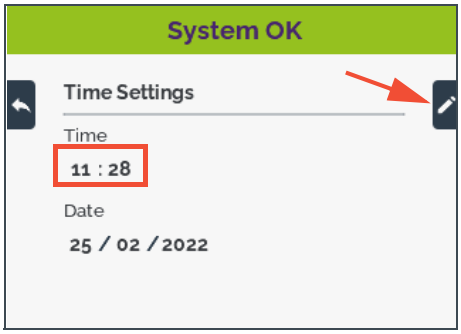
2. Select the TIME SETTINGS menu options.
   - Press or to select.
3. Press to confirm this option.



4. Press to change.

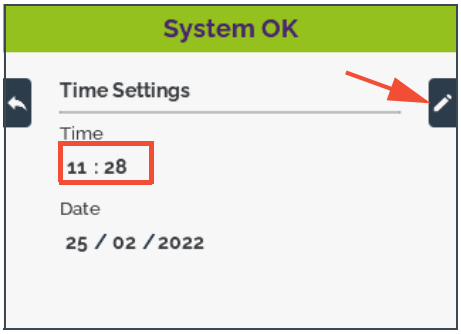


5. Select the TIME SETTINGS menu options.
   - Press or to select.
6. Press to confirm this option.

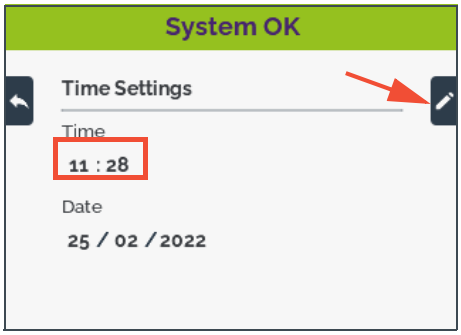


7. Set the current TIME.

- Press ‹ or › to select.
- Press ✎ to select the number.
- Press ‹ or › to select.
- Press ✎ to change the number.



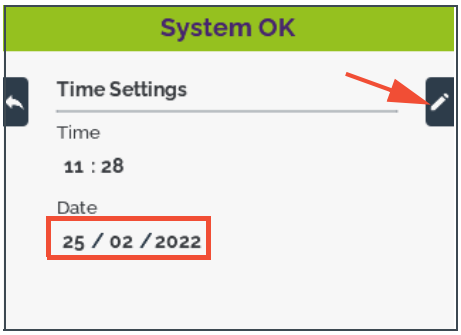
- Press − or + to decrease/increase.
- Press ✓ to confirm the number.



8. Select the de DATE SETTINGS menu option.

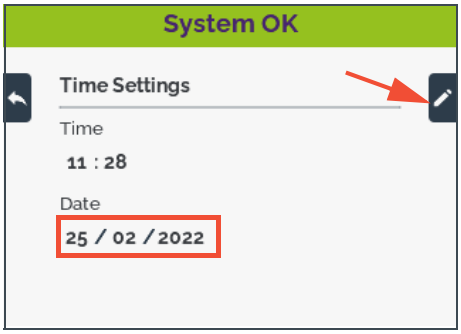
- Press ^ or ˅ to select.

9. Press ✎ to confirm this option.

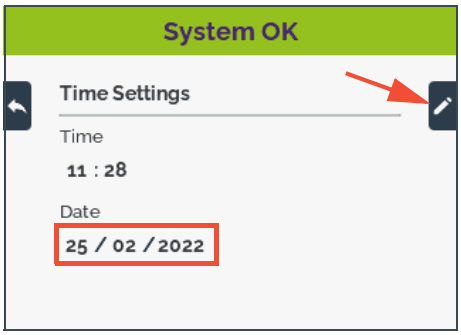


10. Set the current DATE.

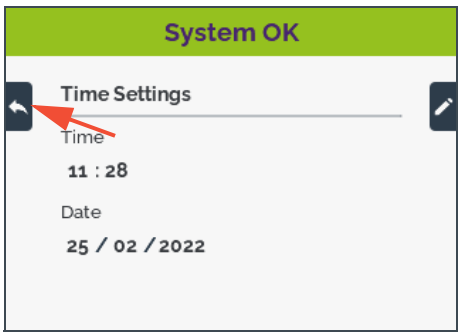
- Press ‹ or › to select.
- Press ✎ to select the number.
- Press ‹ or › to select.
- Press ✎ to change the number.



- Press − or + to decrease/increase.
- Press ✓ to confirm the number.



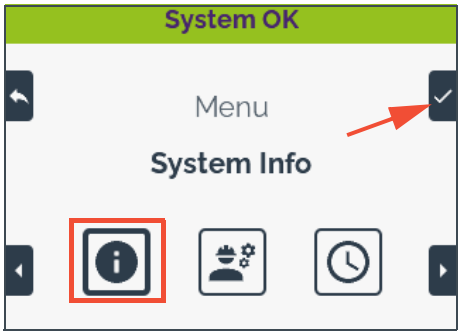
11. Press ◄ to go back in the menu.



12. Select the SYSTEM INFO menu option.

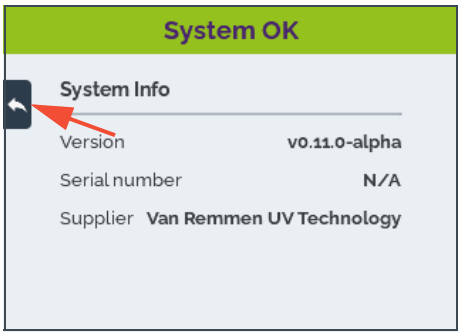
- Press ‹ or › to select.

13. Press ✓ to confirm this option.



14. Press ◄ to go back in the menu.

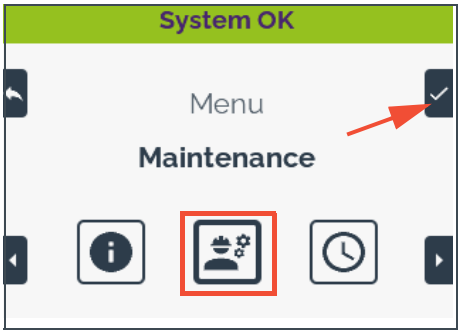
The SYSTEM INFO screen only displays standard information: VERSION, SERIAL NUMBER and SUPPLIER.



15. Select the MAINTENANCE menu option.

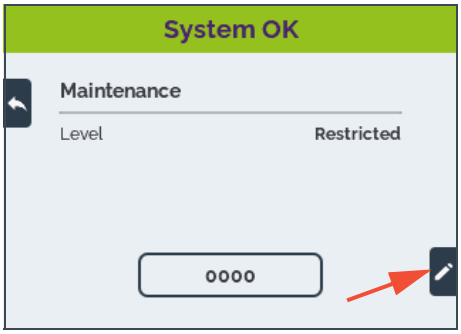
- Press ‹ or › to select.
- Press ✓ to confirm this option.

The MAINTENANCE screen provides access to certain user functionality. **The password for the installer is: 1891**

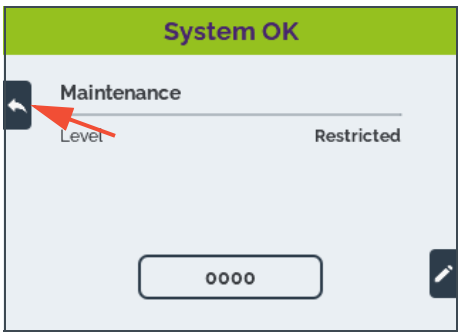


16. Set the user password.

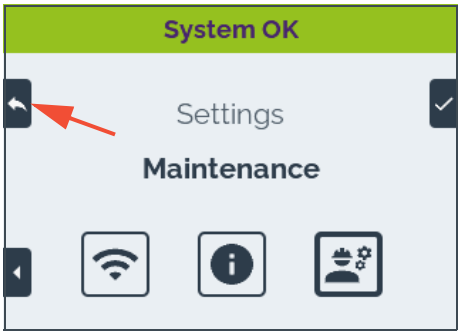
- Press ‹ or › to select.
- Press ✎ to change the number.
- Press − or + to decrease/increase.
- Press ✓ to confirm the number.



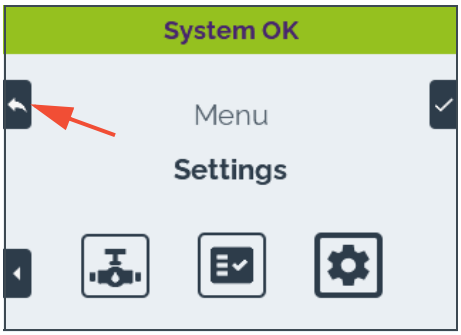
17. Press ◄ to go back in the menu.



18. Press ◄ to go back in the menu.



19. Press ◄ to go to the HOME screen.



6 Maintenance

This chapter describes how the *UV-C Unit* must be maintained.

6.1 Safety regulations

- Make sure the *UV-C Unit* is turned off prior to carrying out maintenance.
- Isolate the reactor chamber from the pipe circuit prior to maintenance.
- Only qualified installers are authorised to carry out maintenance on the *UV-C Unit*.

6.2 Important maintenance work

The following is important for maintaining the *UV-C Unit*.

Item	Chapter
Replacing the UV-C lamp	6.2.1
Cleaning or replacing the quartz sleeve	6.2.2
Cleaning or replacing the UV-C sensor	6.2.2

Observe the following maintenance instructions:

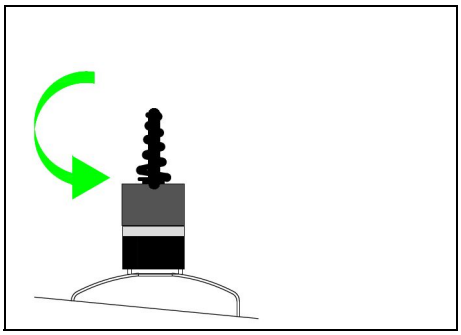
- Let the UV-C lamp cool down for at least 10 minutes after switching off.
- Avoid exposure to direct UV-C radiation during maintenance work.
- Depressurise the reactor chamber and drain the liquid present in the reactor chamber. Note: This is not necessary when only replacing the UV-C lamp
- In case of dirt buildup, clean the *UV-C Unit* in time to ensure proper functioning and always replace the original replacement parts within the replacement period.

The UV-C light accelerates the degradation of various components in the reactor chamber. As a result of the UV-C radiation, the material properties decrease in a qualitative sense. In order to guarantee functioning and safety, it is necessary to replace the relevant components in time.

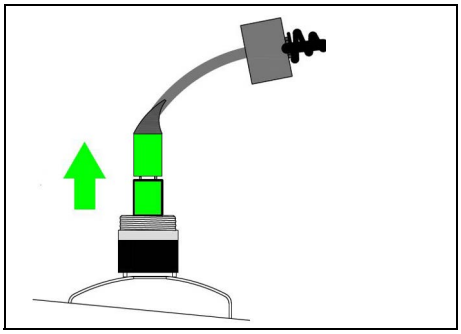
6.2.1 Replacing the UV-C lamp

Only use original replacement parts. See appendix 1 for an overview of the replacement parts.When replacing the UV-C lamp, we recommend cleaning the quartz sleeve and using a new O-ring. See chapter 6.2.2.

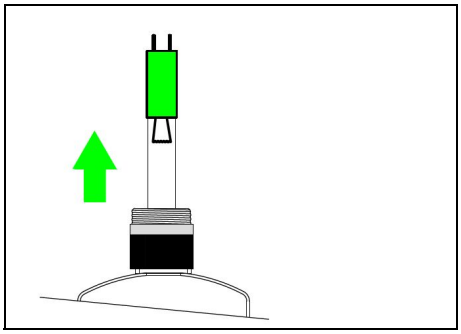
1. Unscrew the gland and lamp connector.



2. Pull the lamp cable out of the quartz sleeve and then disconnect the lamp cable from the UV-C lamp.



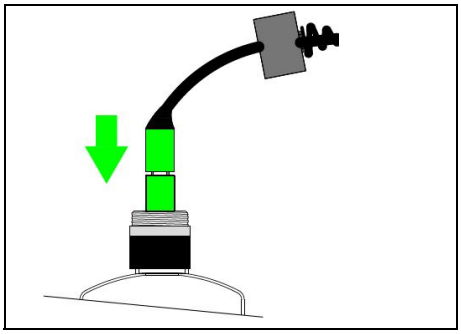
3. Pull the UV-C lamp out of the quartz sleeve and then slide the new UV-C lamp into the quartz sleeve.



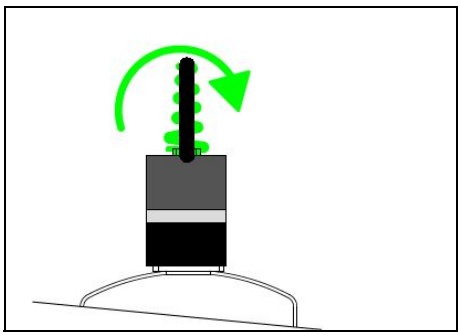
Make sure that the safety spring is in the quartz sleeve. After this, the UV-C lamp can be placed.

Never touch the UV-C lamp with bare hands. Always use the gloves provided.

4. Reconnect the lamp cable to the UV-C lamp and then tighten the lamp connector again.

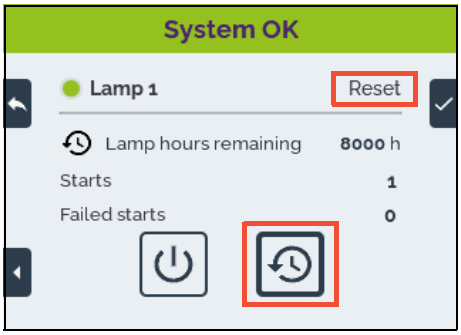


5. Press the lamp cable with the lamp into the quartz sleeve until you can feel resistance against the safety spring.
6. Tighten the swivel while you feel the resistance of the lamp against the safety spring.



After replacing the UV-C lamp:

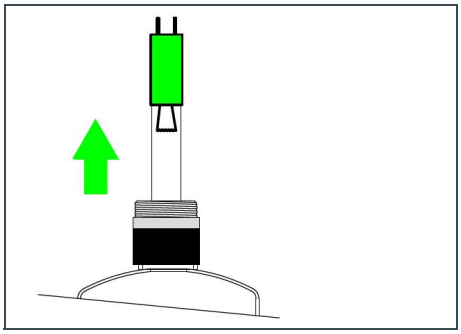
7. Reset the LAMP HOURS REMAINING, see chapter 5.3.1.



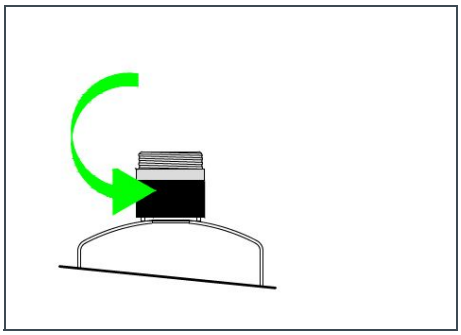
6.2.2 Cleaning or replacing the quartz sleeve

Only use original replacement parts. See appendix 1 for an overview of the replacement parts.

8. Disassemble the UV-C lamp, see chapter 6.2.1.

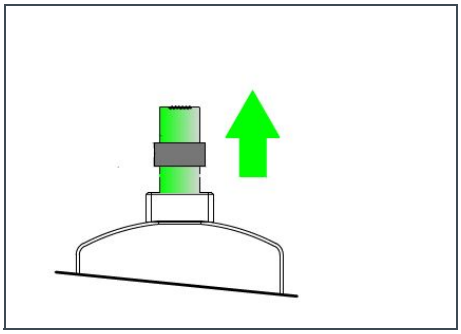


9. Unscrew the reactor connector counter-clockwise.



10. Pull the quartz sleeve out of the reactor chamber.

11. Pull the pressure sleeve and O-ring out of the quartz sleeve.

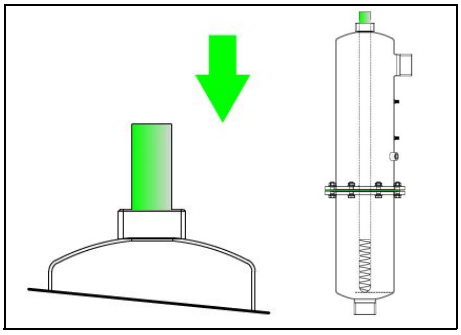


Never touch the quartz sleeve with bare hands. Always use the gloves provided.

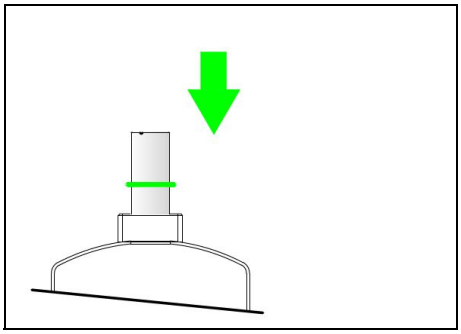
12. Remove the safety spring from the quartz sleeve.

13. **Clean** or **replace** the relevant quartz sleeve.

14. Slide the quartz sleeve into the reactor chamber.Push the quartz sleeve through the hole of the flow plate into the back of the reactor chamber.

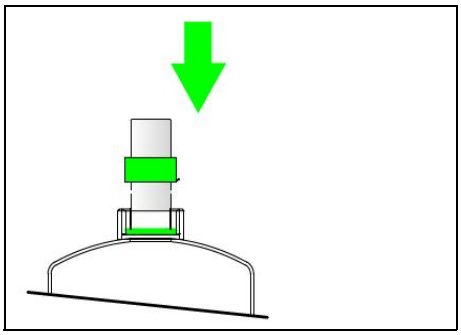


15. Place a new O-ring on the quartz sleeve.



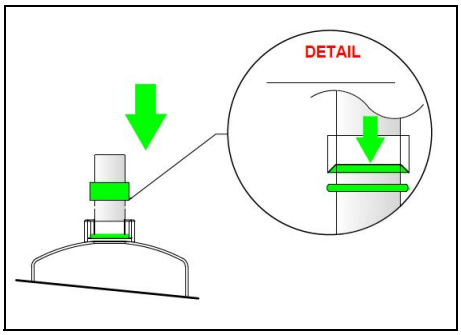
Always use a new O-ring both after cleaning and when replacing the quartz sleeve.

16. Push the O-ring with the flat side of the pressure sleeve onto the quartz sleeve, up to the stop.



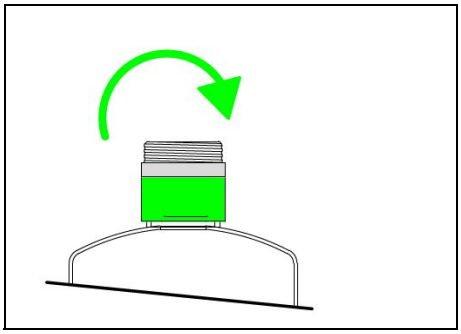
17. Hold the pressure bush against the stop and pull the quartz sleeve about 50 mm out of the reactor chamber, so that the quartz sleeve is up against the reactor connector.

18. Remove the pressure sleeve, turn the pressure sleeve over and slide the pressure sleeve back with the slanted side.



Push the pressure bush with the slanted side onto the quartz sleeve until it abuts against the O-ring.

19. Screw the reactor coupling clockwise.



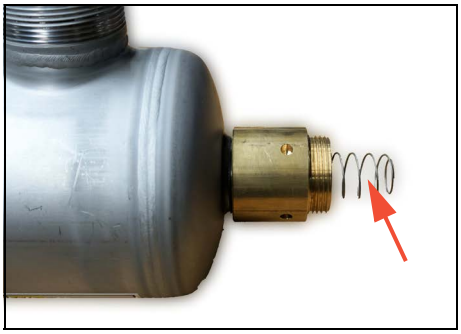
Note that the reactor coupling must be tightened clockwise.

We recommend de below:

M8 - 10 to 14,5 Nm

M16 - 80 to 120 Nm

20. Place the safety spring in the quartz sleeve.



Make sure that the safety spring is in the quartz sleeve. After this, the UV-C lamp can be placed.

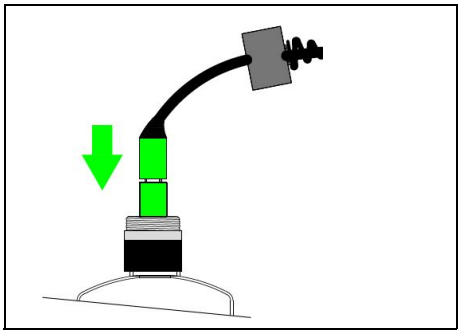
After cleaning/replacing the quartz sleeve:

1. Fill the *UV-C Unit*.

2. Switch on the *UV-C Unit*.

3. Check for leaks, see chapter 4.2.4.

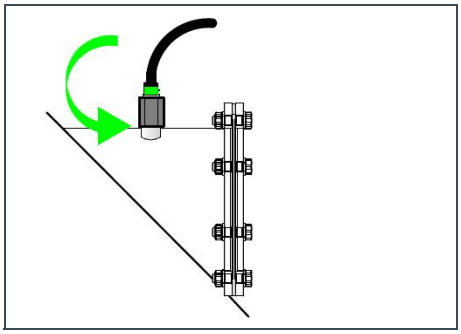
Then mount the UV-C lamp again, see chapter 6.2.1.



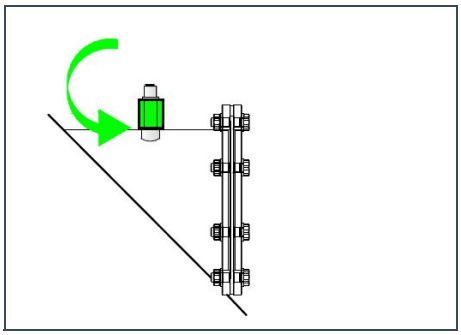
6.2.3 Cleaning or replacing the UV-C sensor

Only use original replacement parts. See appendix 1 for an overview of the replacement parts.

1. Unscrew the safeguard and pull out the plug.

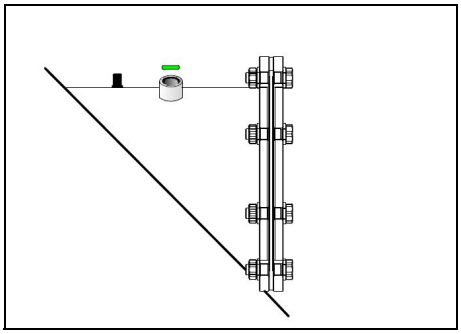


2. Unscrew the UV-C sensor from the sensor chamber.



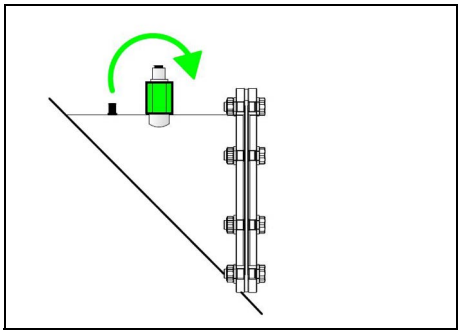
Make sure the reactor chamber is empty. There should be no more liquid in the reactor chamber.

3. Clean the window on the inside of the UV-C sensor or replace the relevant UV-C sensor.
4. Place a new O-ring in the sensor chamber.



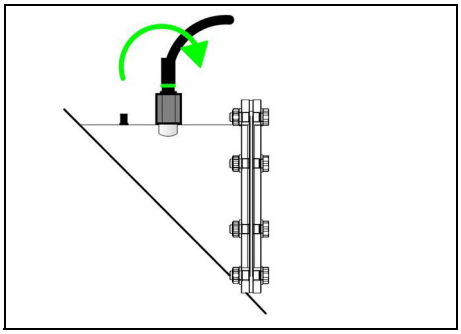
Always use a new O-ring both after cleaning and when replacing the UV-C sensor.

- Screw the UV-C sensor hand-tight.



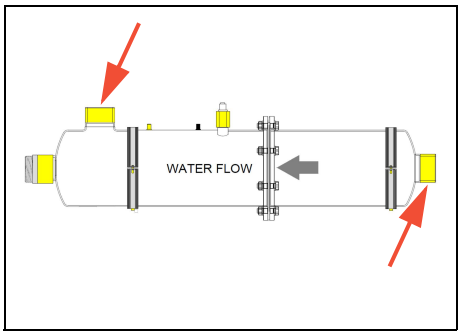
Coat the wire of the UV-C sensor with mounting paste to prevent it getting jammed. Note: not on the grid of the UV-C sensor.

5. Insert the plug straight into the UV-C sensor and retighten the safeguard on the plug.



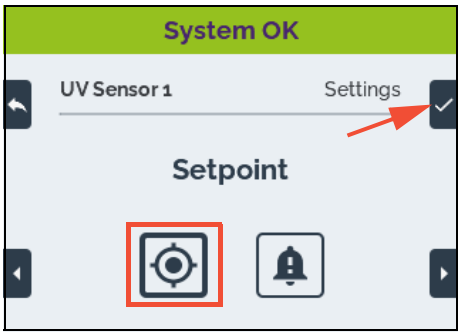
After cleaning/replacing the UV-C sensor:

1. Fill the *UV-C Unit*.
2. Switch on the *UV-C Unit*.
3. Check for leakage, see chapter 4.2.4.



After cleaning/replacing the UV-C sensor:

4. Enter the SETPOINT of UV-C sensor, see chapter 5.3.2.



7 Troubleshooting

This chapter describes how malfunctions can be resolved.

The *UV-C Unit* uses software and electronics that respond to various situations. Therefore, it is recommended to check the causes of any malfunctions before repair or replacement. Please make sure that the parameters of the *UV-C Unit* are known before contacting the supplier. The table below provides a brief overview of malfunctions with possible causes and solutions.

Malfunction	Possible causes	Possible solutions
[UV-C lamp not lighting up]	Lamp defect	Replace lamp according to procedure.
	Lamp Driver temperature too high	Compare system specifications with environment. Check notification displayed on the HMI.
	Reactor chamber temperature too high	Check if alarm settings are sufficient. Compare system specifications with environment. Check notification displayed on HMI. Check whether there is liquid and/or flow in the reactor chamber.
	Discharge valve active	Check operation and connection of the discharge valve. Check is the discharge valve is activated by excessively high temperature.
	Deteriorated lamp cable	Check the clamping force and lamp socket connector. Replace damaged lamp cable.
	Damaged lamp cable	Shut down system immediately. Replace damaged lamp cable.
	Assembly lamp cable not installed correctly	Assess whether lamp cable has been installed according to instructions.
	Malfuntion HMI	Determine what error message means. Check notification displayed on HMI.
	No supply voltage	Check incoming supply voltage.
	Main switch not enabled	Switch on system with main switch.

Malfunction	Possible causes	Possible solutions
[No UV-intensity]	UV-C sensor defective	Replace UV-C sensor.
	UV-C sensor cable damaged	Replace UV-C sensor cable.
	UV-C sensor not configured correctly	See chapter 6.2.3 for procedure.
	Interference due to signals	Inspect environment for disturbance factors. Mount UV-C sensor directly to monitor if possible.
	UV-C lamp defective	Inspect operation and replace UV-C lamp.

Malfunction	Possible causes	Possible solutions
[UV-intensity too low]	Dirt buildup	Clean quartz sleeve and UV-C sensor lens.
	Filament cables UV-C lamp for sensor lens mounted	Mount all UV-C lamps in such a way that the filament cables are not positioned on the side of the UV-C sensor.
	Transmission of fluid decreased	Set up inspection for transmission value stability. If possible, improve transmission value of fluid.
	Fluid temperature decreased or increased	Check fluctuation of temperature. If consistent, determine set point again.
	Degradate of spare parts	UV-C lamp degradated and needs to be replaced. - Note! Lifespan depends on number of lamp hours. UV-C sensor and/or quartz sleeve not replaced within the replacement period.
	Set point not implemented after installation	Then, input set point according to procedure.

Malfunction	Possible causes	Possible solutions
[Disinfection insufficient]	Dirt buildup	Clean quartz sleeve and UV-C sensor lens.
	Water flow too high	Set up water flow inspection. Adjust water flow according to specifications.
	Transmission too low	Set up inspection for transmission value stability.If possible, improve transmission value of fluid.
	Depreciation	UV-C lamp depreciated and needs to be replaced. - Note! Lifespan depends on number of lamp hours. UV-C sensor and/or quartz sleeve not replaced within the replacement period.
	Set point not implemented after installation	Then, input set point according to procedure.

Malfunction	Possible causes	Possible solutions
[Leakage in system]	Reactor connector not attached correctly	Tighten reactor connector by hand. - Note! Use mounting equipment with metal connector.
	Leakage in quartz sleeve	Replace quartz sleeve O-ring. - Note! O-ring must be replaced with each (dis)assembly.
	Broken quartz sleeve	Replace quartz sleeve with a new one. Check pipe circuit for glass particles and remove them.
	Pressure bush mounted incorrectly	Mount the pressure bush with the bevel towards the O-ring.
	flow plate not attached correctly	Check fastening by tightening bolts/nuts with correct torque.
	Leakage along UV-C sensor	Attach UV-C sensor by hand. - Note! Replace O-ring of UV-C sensor and apply mounting paste.

8 Packaging

This chapter provides information on the packaging and transporting of the *UV-C Unit*.

8.1 Delivery management

Depending on the type *UV-C Unit* the packaging can change. The scope of supply can consist of one or more boxes with individual components.

The *UV-C Unit* is packaged with the utmost care to ensure that it arrives without damage. Damage can occur during transport.Therefore, check the packaging and the *UV-C Unit* for damage. Report damage to the transporter and your supplier.

8.2 Storage and transport

If applicable, store the *UV-C Unit* and its individual parts in a dry, dust-free location with adequate ventilation. Do not place parts in direct sunlight and keep the various parts in the original packaging for as long as possible before installation.

Pay attention to safety when loading, unloading, and transporting the *UV-C Unit*.Consider the potential hazards such as falling and accidental damage of the supplied components. Only use means of transport that are suitable for transporting the *UV-C Unit*. Also consider weight and center of gravity.

9 Environment and disposal

This chapter provides information about the environment and disposal of the *UV-C Unit*.

9.1 Environmental aspects

Dispose of harmful, hazardous, and contaminated parts, materials and/or (liquid) substances in an environmentally friendly way, in accordance with local and (inter)national regulations.

9.2 Disposal of the *UV-C Unit*

The following components of the *UV-C Unit* must be disposed of separately:

- UV-C Lamp.
- Quartz tube.
- Controller.

Decommissioning the *UV-C Unit* must be carried out as follows:

- Check if the *UV-C Unit* has been shut down.
- Isolate the *UV-C Unit* from the pipe circuit and, through this, the liquid supply.
- Disconnect the electricity and remove the existing cables from the controller.
- Empty the *UV-C Unit* and collect the contents of the reactor chamber.
- Dispose of the collected liquid in a responsible and environmentally friendly way.
- Disconnect the reactor chamber from the pipes on the water side.
- Finally, disassemble the *UV-C Unit*.

B1 Technical Specifications

This appendix contains the technical specifications of the *UV-C Unit*.

B1.1 Specifications

Item	Type
Mass	See flyer
Dimensions	See flyer
Voltage	230 Vac ± 10%
Frequency	50 / 60 Hz
Ground leakage circuit breaker	Circuit breaker with overload protection • Fused with characteristic C 10A or characteristic D 4A
Humidity	Min 10% - Max 95%, non condensing
Room temperature	approx. 5 °C - 35 °C
Maximum system pressure	10 bar
Recommended water temperature	approx. 5 °C - 30 °C
IEC protection class	IP 55
UV-C lamp type	Low pressure UV-C lamp
Type of lamp cable	Colour code WH-YE-GR-BR (4 x 1 mm^2) - water block
Type of UV-C sensor	Photodiode
Type of lamp power	Van Remmen Lamp Driver
Type of reactor connector	High-pressure, RVS - Brass
Contact outputs	Potential free alarm contacts for Warning and Alarm

Lamp power	Average lifespan
18W, 25W, 50W, 80W	Approx.8000 hours
60WLL, 120WLL, 205WLL, 325WLL	Approx.16000 hours

Switching on and off very frequently (relatively excessively) shortens the lifespan of the UV-C lamp(s).

B1.2 Replacement parts

Item	Replacement term
UV-C Lamp	See HMI-control. Differs for each type of device. In many cases approx.8,000 or approx.16,000 hours.
UV-C sensor	The UV-C sensor must be replaced once every 4 years.
Quartz sleeve	The quartz sleeve must be replaced at least once every 4 years, depending on the condition, i.e. the degree of wear or contamination.
Lamp cable	The lamp cable must be replaced at least once every 4 years. The lamp cable must also be replaced after water leakage. If this is not done, the operation of the UV-C lamp is not guaranteed.
Rubber O-Ring	If the quartz sleeve or UV-C sensor is disassembled, the associated O-ring must always be replaced to prevent leakage.
Lamp connector	The lamp connector must be replaced at least once every 4 years. • The stainless steel/brass reactor connector has no replacement interval.
Flow plate	The flow plate must be replaced at least once every 6 years.

B1.3 Cleaning agents to use

Detergent	Cleaning application
Acetic acid < 20% solution	Removes oil and fat.
Sulphuric acid < 10% solution	Removes oil and fat.
Sodium hypochlorite < 6% solution	Removes oil and fat.
Innosoft B570 Viscose liquid	Removes surface rust.
Citric acid < 20% solution	Removes mineral limescale.
Phosphoric acid < 30% solution	Removes limescale, calcium, rust, and colour stains.
Lactic acid < 20% solution	Removes limescale, calcium, rust, magnesium, and other dissolved minerals.
Sulphamic acid < 10% solution	Removes limescale, calcium, rust, magnesium, and other dissolved minerals.

The above cleaning agents are only suggestions for cleaning various components.

B2 Declaration of conformity

This product complies with the:

- Low Voltage Directive 2014/35/EU[LVD]
- Electromagnetic Compatibility Directive2014/30/EU[EMC]
- Machinery Directive 2014/42/EC

If desired, the statement can be provided on request.