Manual

Single/multi lamp

UV-C unit

VAN REMMEN UV Technology

Hooglandweg 3a

8131 TE Wijhe

The Netherlands

Version date: 06-02-2023

This manual is the: “Original user manual”.

Version date: 02-02-2023

Table of contents:

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.

UV-C unit
The *UV-C unit* consists of a UV reactor and a control unit. The UV reactor can be connected to the piping system. The control unit can be mounted on the UV reactor housing or on the wall near the UV reactor. Faults and desired periodic maintenance are reported.

Appendices at the end of this manual

This user manual has the following appendices:

- B1 'Technical Specifications and replacement parts'.
  - B1.1 'Specifications'.
  - B1.2 'Replacement interval parts'.
  - B1.3 'Cleaning agents to use '.
- B2 'Declaration of conformity'.

1. Introduction

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

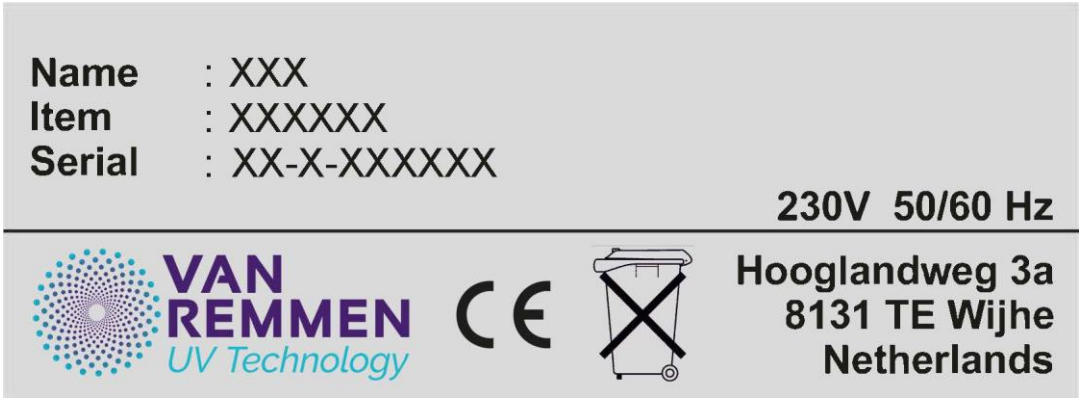
1.1 Manufacturer

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 re- actor chamber. To ensure the safety and performance of the *UV-C unit*, it is necessary to re- place 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:

- Provide clean and disinfected tools and clean hands before performing maintenance work. You will come into contact with drinking water.
- 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

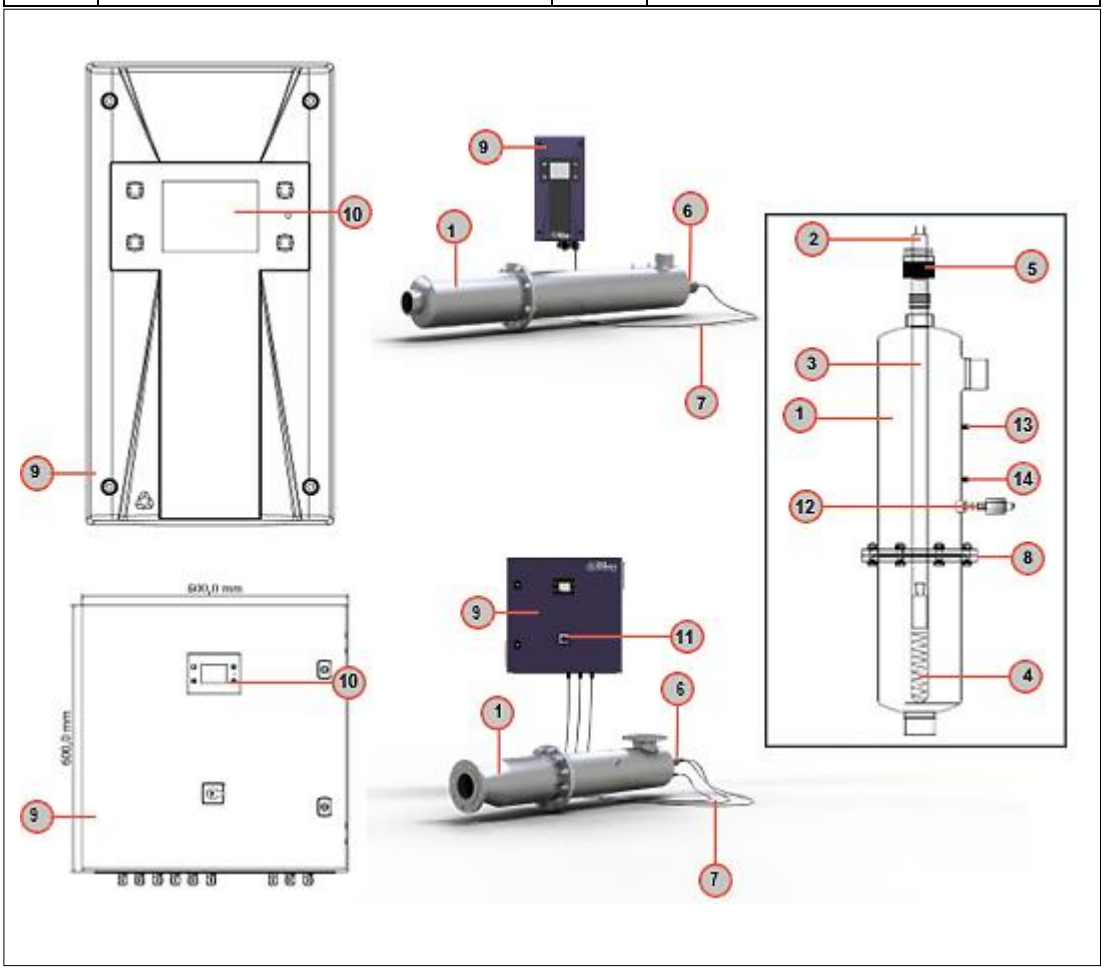


Figure 3.1: Overview of the *UV-C unit*

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.

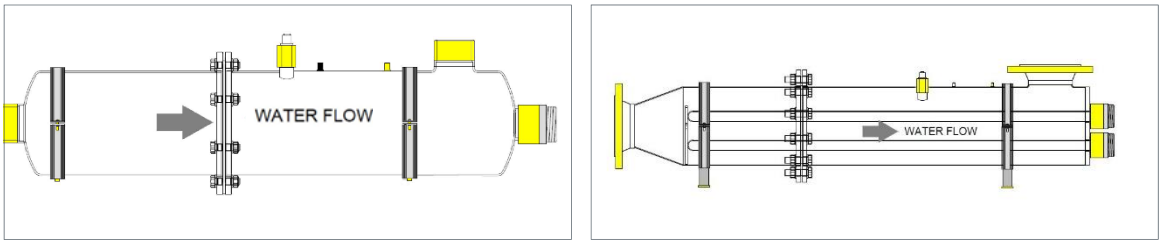


Figure 3.2: Flow of the *UV-C unit*

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 re- actor 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 reactor chamber and thus the water. Based on measurement, the UV-C lamp can be switched off. Or if installed, the discharge valve will open to prevent 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.

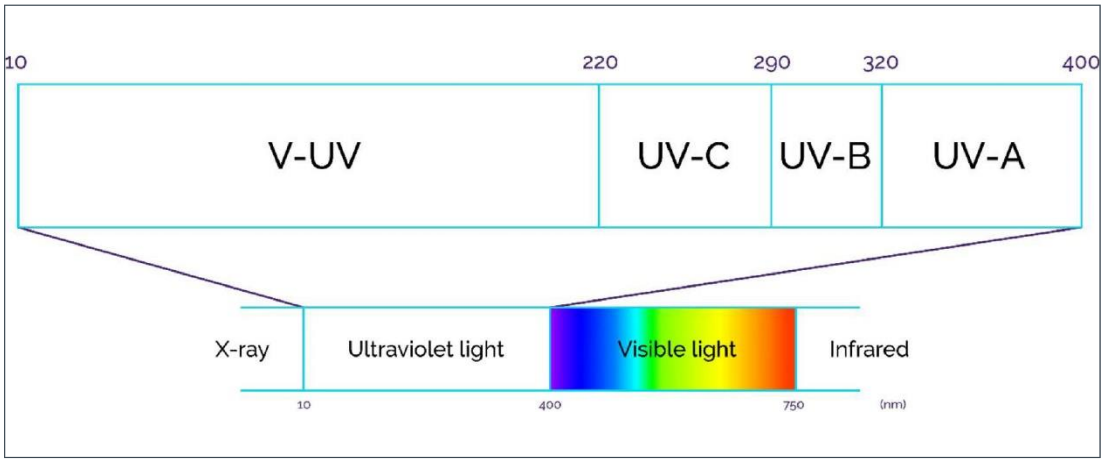


Figure 3.3: Ultraviolet (UV-C) light wavelengths

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.
- Actual flow/capacity of water to be treated is higher dan specified in the design of the *UV-C unit.*
- Excessive high temperature whether due to insufficient flow or not.
- Excessive low temperature of the supplied water.

After this chapter in this manual, we use "UV" with this we refer to UV-C light.

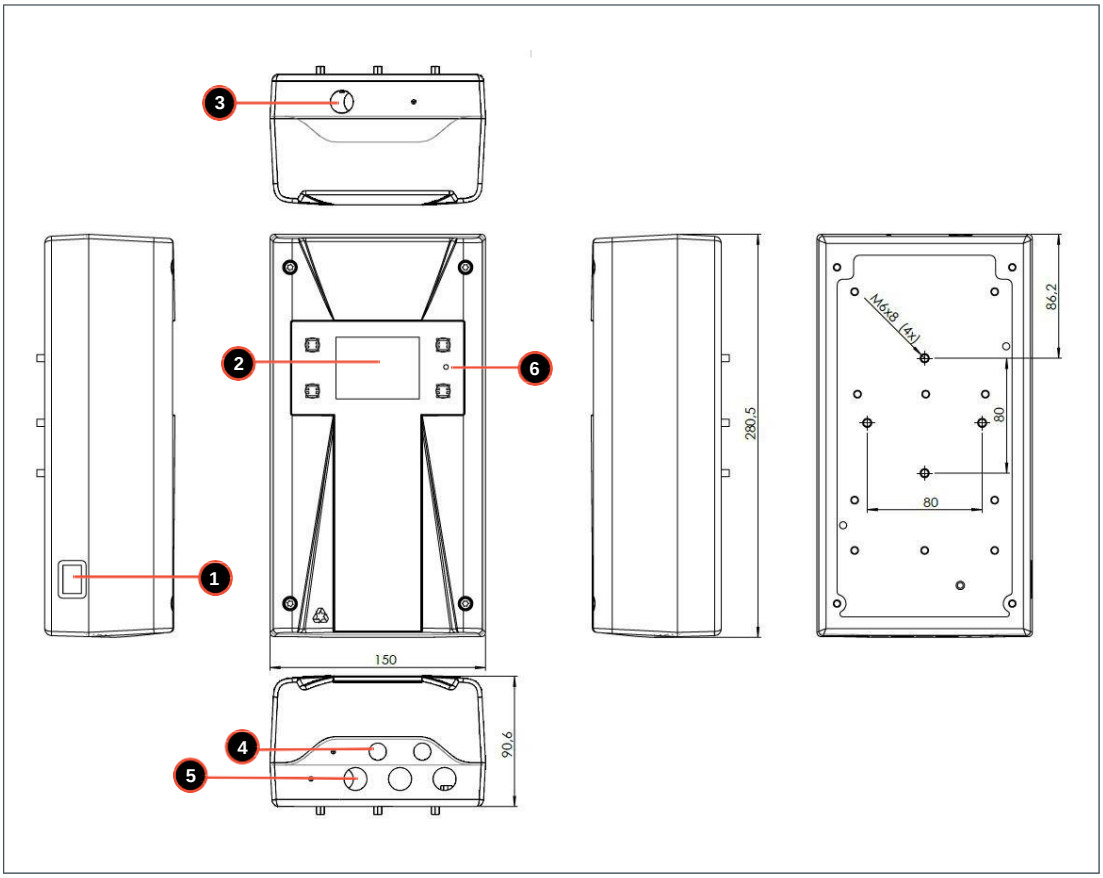
3.3 Controller

The *UV Unit* has a separate controller.

The controller consists of a lamp driver and HMI control PCB that are specifically designed for controlling the UV 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 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	6.	LED light



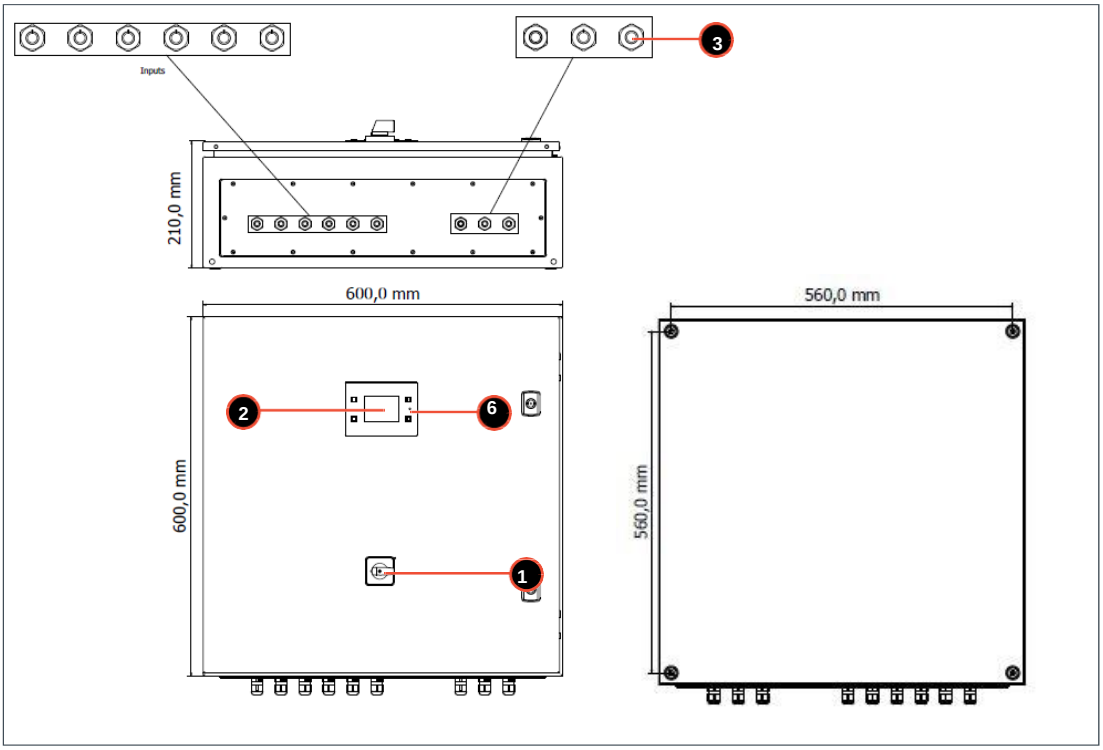


Figure 3.4: Overview of the controller

3.4 Controls

The *UV Unit* has the following controls:

- On/Off- switch.
- HMI-controller.
- HMI-control screen.

These controls are described in the following subsections.

3.4.1 ON/OFF- switch

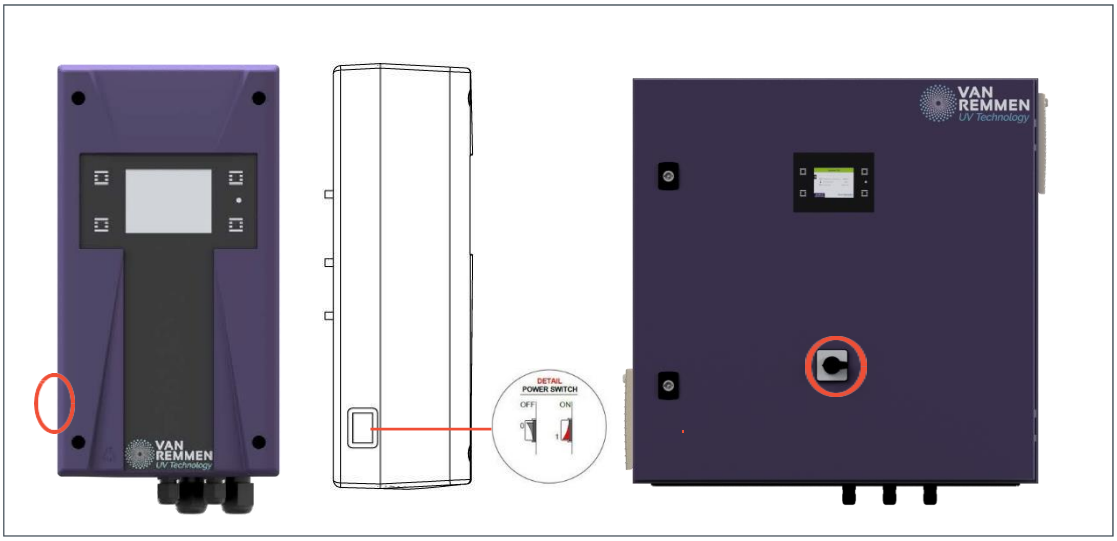


Figure 3.5: On/Off switch

The main switch has the following functions:

Item	***Functions***
ON/OFF switch	This switch the *UV Unit* on or off.

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

3.4.2 HMI-controller

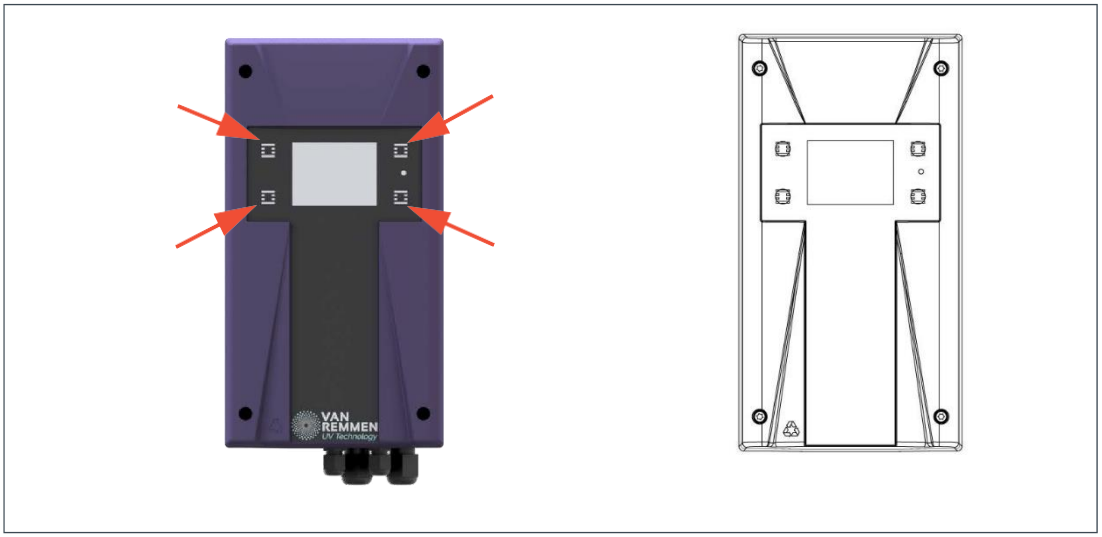


Figure 3.6: HMI-controller

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 Unit*.
Lamps screen	Read the remaining burning time of the UV lamp(s).
	Resetting or (re)starting the relevant UV lamp(s).
UV Sensors screen	Read absolute and relative UV sensor values.
	Setting alarm values for the UV 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 Unit*.
	Turning off the HMI display of the *UV Unit*.

LED light	***Meaning***
Green	System OK
Light blue	Warning
Red	Alarm

4. Installation

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

4.1 Safety regulations

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

4.2 Important installation work

The following work is important when installing the UV Unit.

Item	***Chapter***
Preparing for installation	4.2.1
Checking the parts	4.2.2
Installation of the *UV Unit*	4.2.3
Use of the *UV Unit*	4.2.6

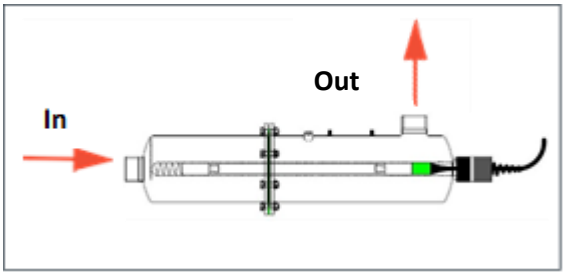
Observe the following installation instructions:

- Prevent water hammer and vibrations in the pipe circuit to prevent damage.
- Install the *UV Unit* strictly horizontally for lamp power > 120W.
- If installed horizontal, make sure the outlet is facing upwards for optimal aeration.
- 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 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 Unit* on the water side before installing the UV lamp(s). For more information, see chapter 6.2.1 for disassembling and reassembling the UV 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 Unit is provided with flanges, make sure to use the correct connectors to fit the UV 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 lamp is often pre-assembled. However, the UV lamp can also be supplied separately.

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

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

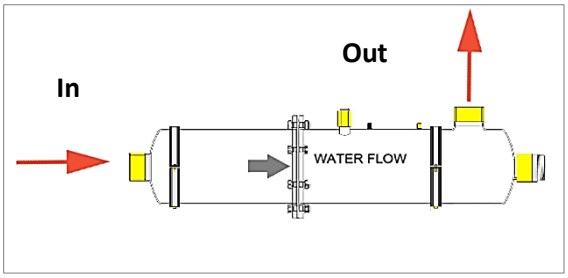
4.2.3 Installation of the *UV Unit*

1. Mount the reactor using the supplied mounting brackets.

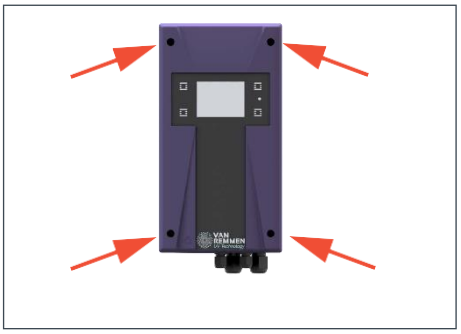
Install the *UV Unit* with the following lamp power only horizontally; 205W, 325W, 350W, 600W. Make sure there is enough space to replace the UV lamp and quartz sleeve.

If installed horizontal, make sure the outlet is facing upwards for optimal aeration.

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.



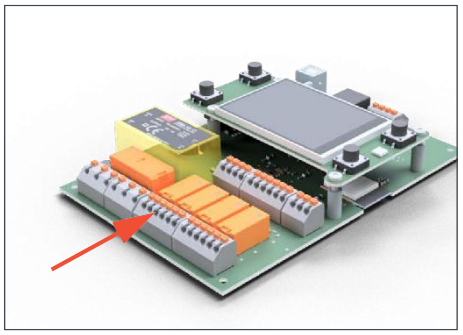
Stay alert. Only carry out this work with a voltage-free controller.

4. Connect the power cable to the controller.
   - Unscrew the gland, feed the cable through, and then insert the wires into the connector.
   - Please find the connection diagram in chapter 4.2.4.

Only if present:

5. Connect the external alarm.
   - Route the cables to the connectors.
   - Connect the potential free connectors.
   - Please find the connection diagram in chapter 4.2.4.

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



The external alarm is set on the HMI through the menu System --> Temperature --> Alarm

6. Replace the controller cover and retighten the appropriate bolts. Do not overtighten. Recommended tightening torque is a 7 of cordless drill.

7. Connect the grounding cable to the reactor.

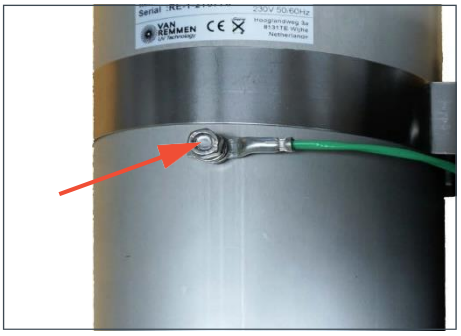
Only if present:

8. Connect the UV sensor cable to the reactor.

See chapter 6.2.3 to connect the UV sensor.

Only if present:

9. Connect the temperature sensor to the reactor. See the connection for the temperature sensor.



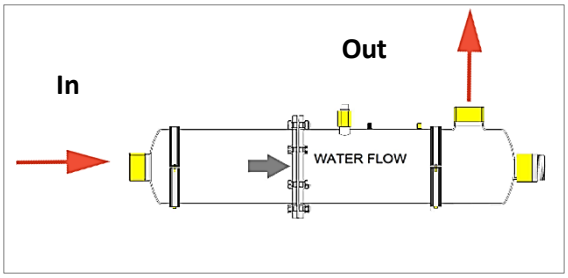
Only if present:

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 Unit.

11. Fill the UV 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.

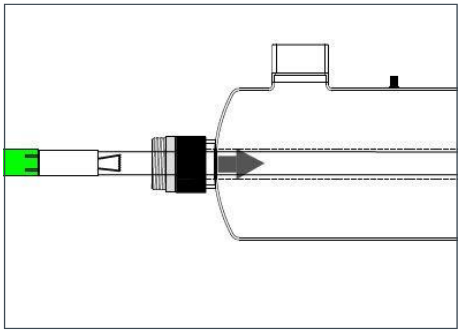


Please note that the UV lamp must be disassembled to perform the pressure test. See chapter 6.2.1.

After performing the pressure test:

12. Mount the UV lamp in the quartz sleeve.

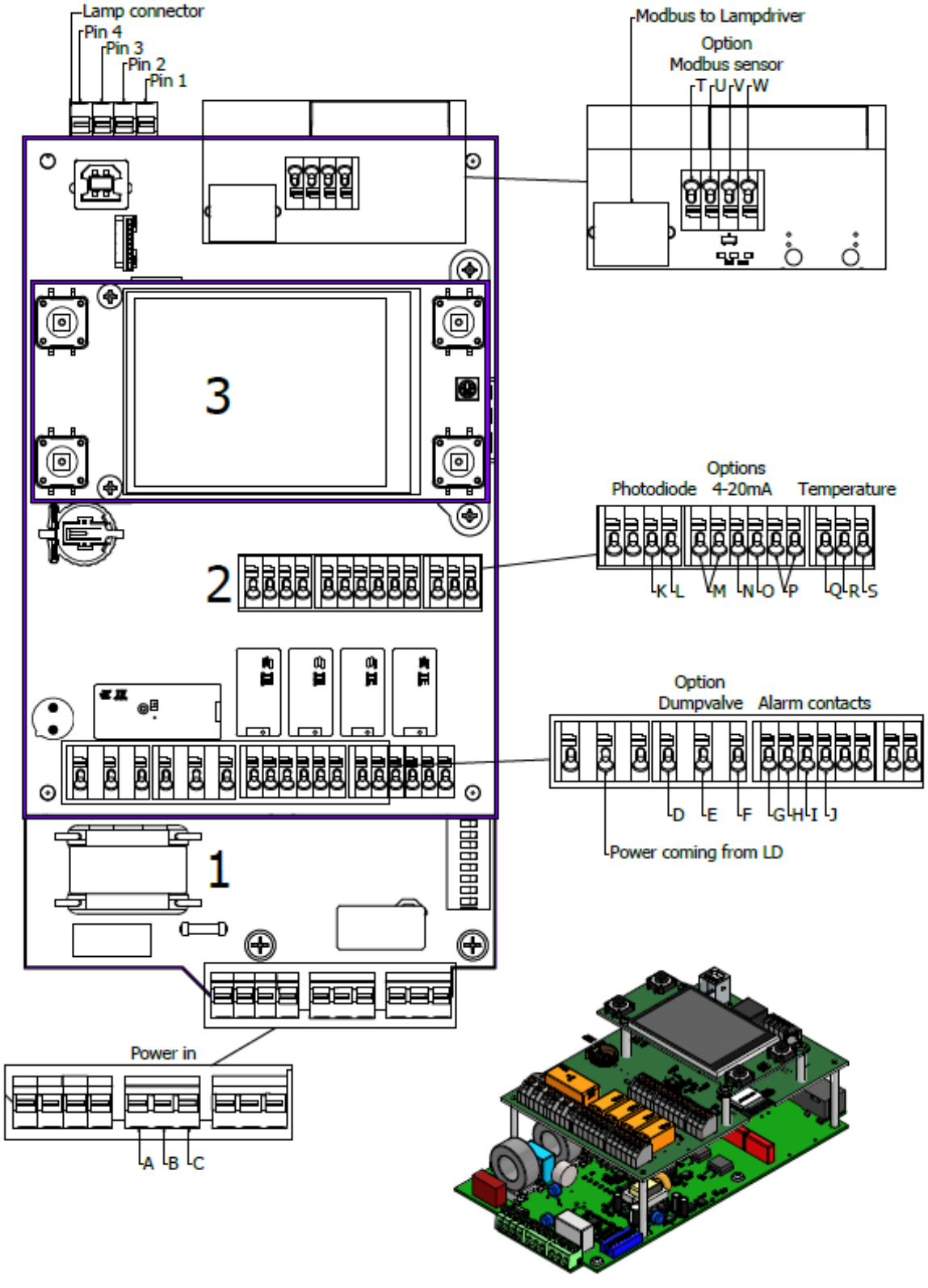
See chapter 6.2.1 for mounting the UV lamp.



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

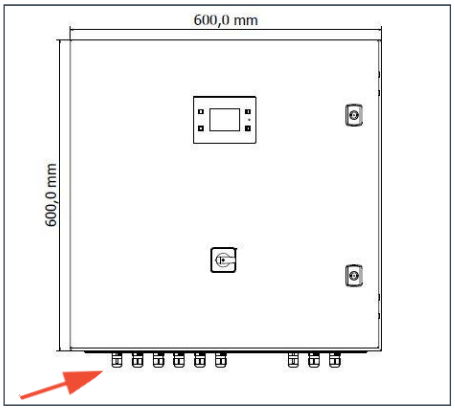
4.2.4 Connection diagram HMI and Lamp Driver

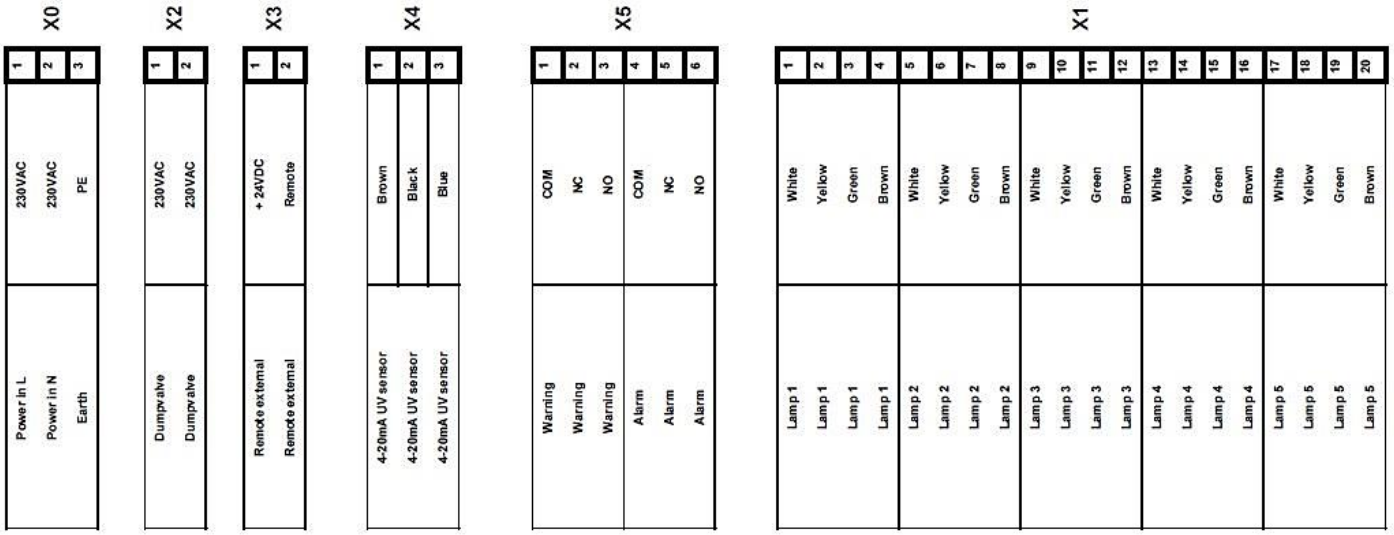
Below a drawing on how to make the connections for the HMI Controller and Lamp Driver.



Letter	***Description***	***Wire***
A	[N] 230VAC Power in	Blue
B	[L] 230VAC Power in	Brown
C	[PE] Ground	Green/yellow
D	[N] 230VAC dump valve	2
E	[PE] Ground dump valve	Green/Yellow
F	[L] 230VAC dump valve	1
G	Warning contact	-
H	Warning contact	-
I	Alarm contact	-
J	Alarm contact	-
K	UV sensor (Photodiode)	Black (Ground)
L	UV sensor (Photodiode)	Blue (Signal)
M	Supply voltage 4-20 mA sensor	Brown (24VDC)
N	[I1] Output 4-20mA sensor	Blue
O	[I2] Output 4-20mA sensor	Blue
P	Ground 4-20 mA sensor	Black (Ground)
Q	Temperature sensor	White (-)
R	Temperature sensor	Green (+)
S	Temperature sensor	Grey (Shield)
T	Supply voltage Modbus sensor	Brown (24VDC)
U	RS485 Bus B	White
V	RS485 Bus A	Blue
W	Ground Modbus sensor	Black (Ground)

Type lamp cable	***Pin 1***	***Pin 2***	***Pin 3***	***Pin 4***
Normal	White	Yellow	Green	Brown
Marine	Grey	Black	Blue	Brown
Radox	Code 1	Code 2	Code 3	Code 4

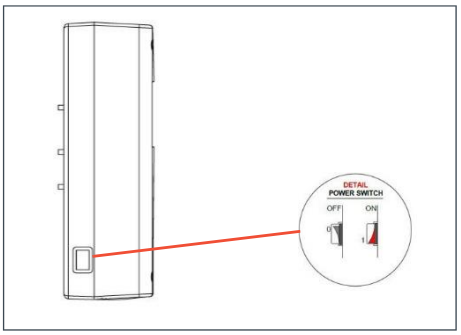




4.2.5 Commissioning of the *UV Unit*

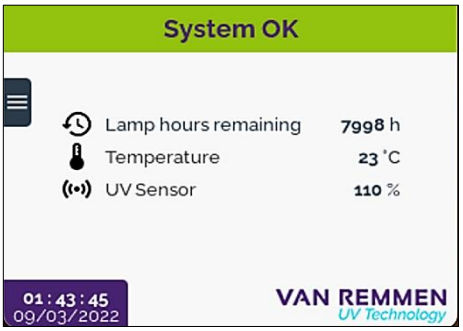
1. Switch on the UV Unit by setting the switch on the controller to position “I On”.

   Wait until the controller has started up. The notification System ok will appear on the HMI screen. That means there are no malfunctions.



After commissioning of the UV Unit, 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 lamp(s) and the activated options (if installed) of the UV Unit are OK.



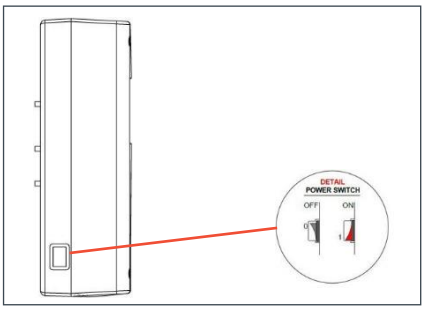
See chapter 5 for more information about HMI operation and checking the set parameters.

5. Controls

This chapter describes how the UV Unit operated.

5.1 Switching on/off

1. Switch on the UV Unit by setting the switch on the controller to the "I on" position.



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

Wait until the UV Unit is active. The notification System ok will appear on the HMI screen.

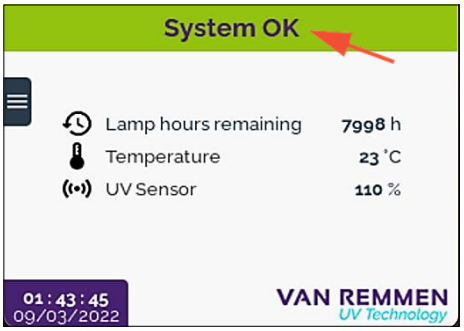
2. Switch off the UV Unit by setting the switch on the controller to the "0 off" position.

The UV 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 lamp.

5.2 HMI-control panel

After enabling the UV Unit the home screen appears.



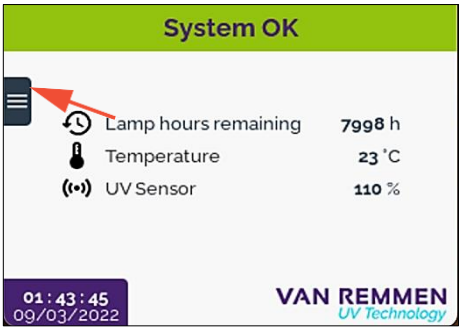
If the notification System ok appears, then the UV Unit has switched on successful. This means that there are no malfunctions or alarms.

Item	***Description***
Lamp Hours remaining	Remaining burning time until the UV lamp is to be replaced.
Temperature	Current temperature of the UV lamp.
UV Intensity	Current UV intensity of the UV lamp.

5.3 HMI-control structure

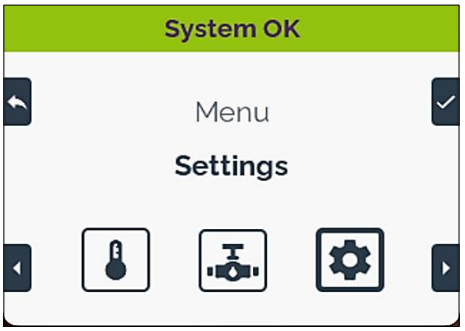
All available menus can be accessed from the home screen.

1. Press ☰ to access the menu.



2. Select the preferred screen option.

   Press ↩ to go to home screen.
   Press ‹ to go to previous menu.
   Press › to go to nest menu.
   Press ✓ to go to selected menu.

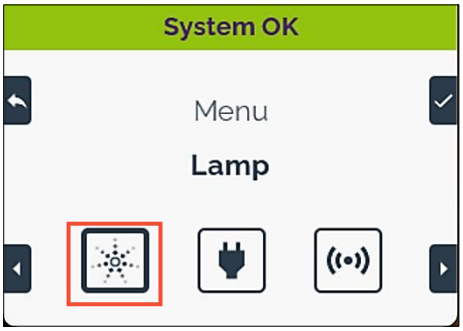


Menu	***Description***
Menu lamps	Select for menu lamps, see chapter 5.3.1.
Menu UV sensors	Select for menu UV sensors, see chapter 5.3.2.
Menu temperature	Select for menu temperature, see chapter 5.3.3.
Menu dump valve	Select for menu dump valve, see chapter 5.3.4.
Menu settings	Select for menu settings, see chapter 5.3.5.

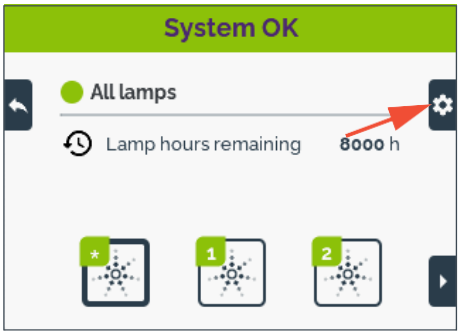
Below the Settings menu there is an option to access the installer functionality. In the maintenance screen you must enter the password. See chapter 5.3.6 step 19.
The password for installer is: 1891

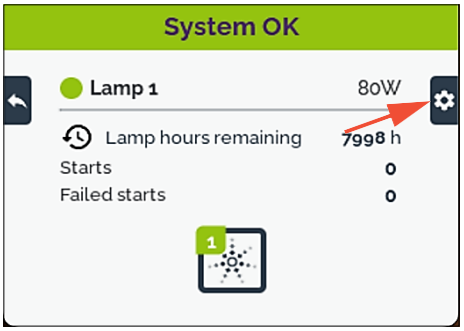
5.3.1 Control options in the lamps menu

1. Select menu and press .

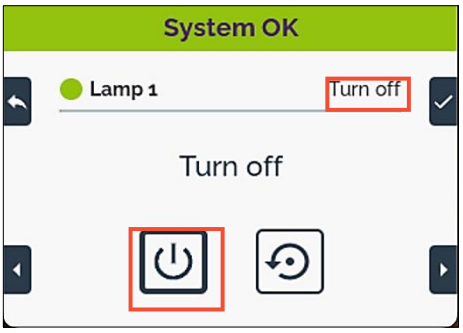


2. Press to access the settings.

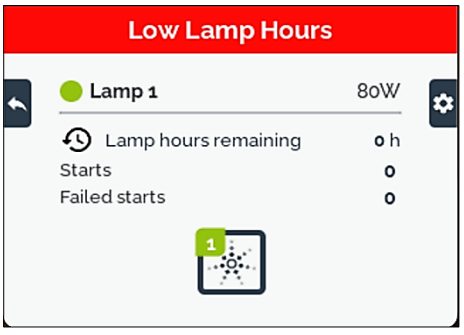


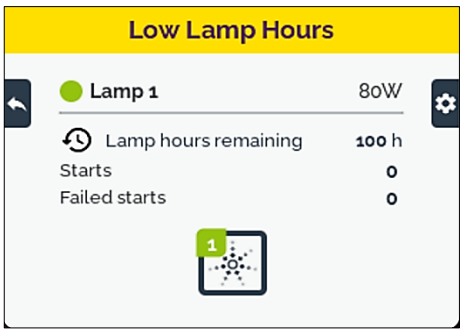


3. Select the on/off menu option.
   - Press or to select.
4. Press to confirm this option.

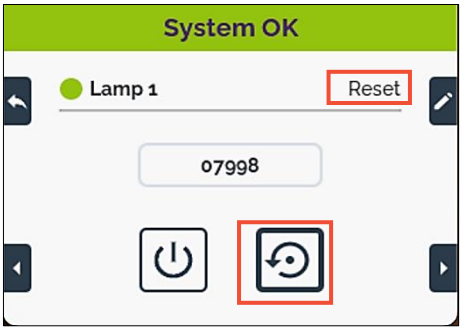


After replacing the UV lamp, the counter lamp hours remaining must be reset.



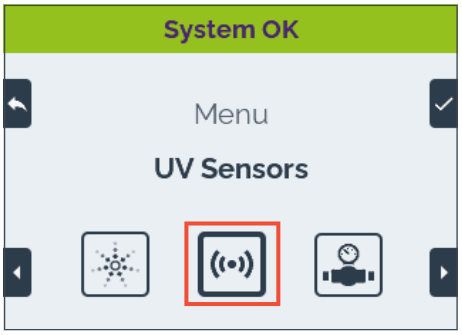


5. Select the reset menu option.
   - Press or to select.
   - Press to confirm this option.

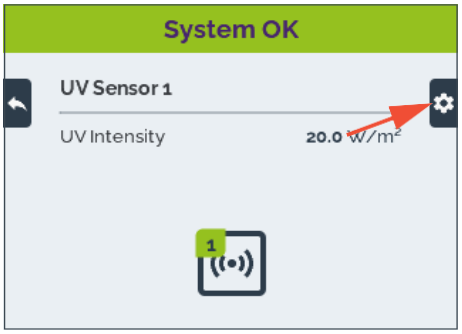


5.3.2 Control options in the UV sensors menu

1. Select menu and press .

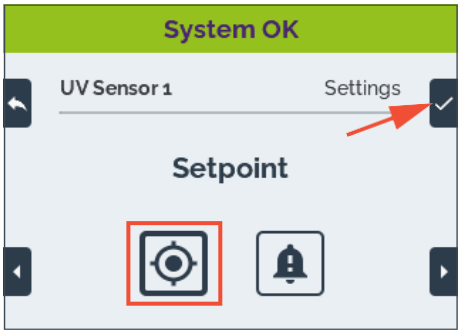


2. Press to access the settings.



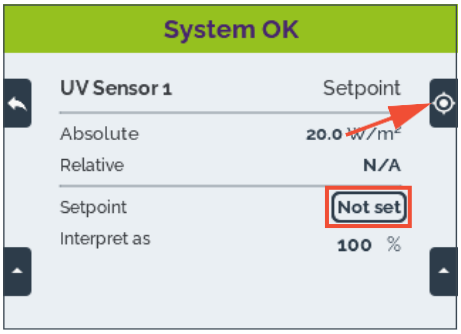
3. Select the settings menu option.
   - Press or to select.
   - Press to confirm this option.

   Observe the following conditions before determining the setpoint:
   - Stable transmission value
   - No air present in the reactor chamber
   - UV lamp at temperature
   - UV lamp wires not for the UV sensor



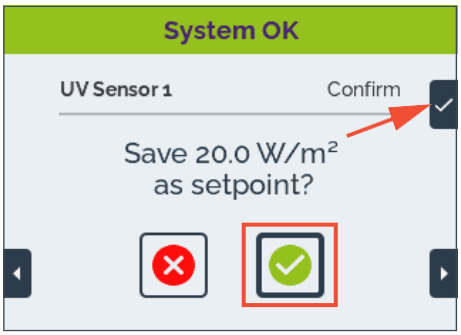
4. Select the setpoint menu option.
   - Press or to select.

5. Press to confirm this option.

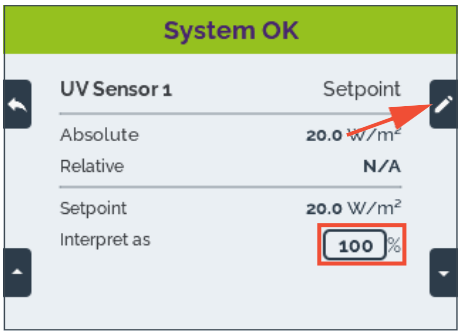


The setpoint must be set upon first time of use, after replacing the UV lamp or UV sensor, in combination with cleaning the quartz sleeve.

6. Select the measured setpoint setting.
   - Press to agree.

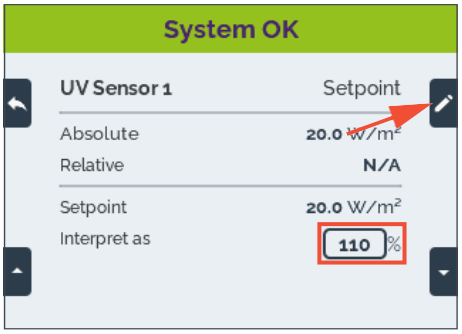


7. Select the interpret as menu option.
   - Press ^ or v to select.
   - Press ✎ to change the setting.
   - Press − or + to increase/decrease.

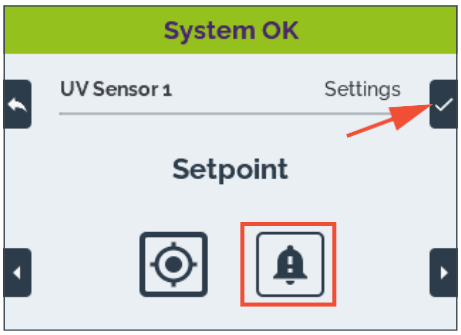


8. Press ✓ to confirm the number.

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

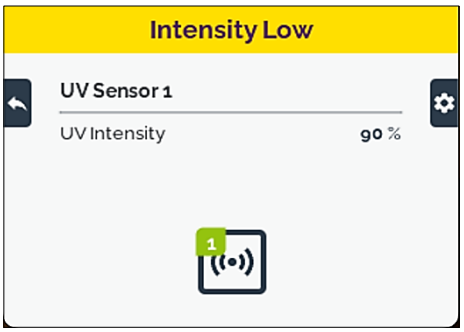


9. Select the configure alarms menu option.
   - Press < or > to select.
   - Press ✓ to confirm this option.
10. Press ✎ to change setting.

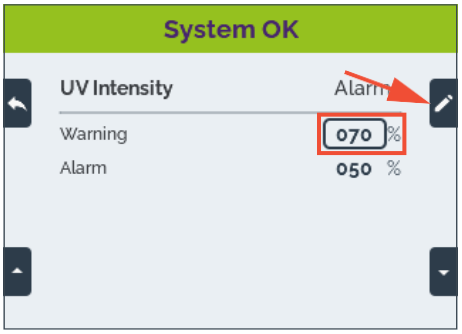


11. Select the warning menu option.
    - Press ^ or v to select.
    - Press ✎ to confirm this option.

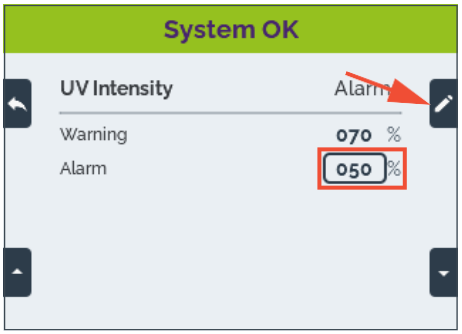
If the UV Unit has a UV sensor, a warning will be issued if the UV intensity of the UV lamp exceeds the set value. The base value is 70%. The UV Unit must be cleaned. See chapter 6.



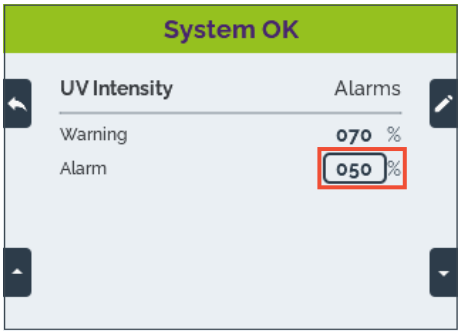
12. Set the UV intensity in warning.



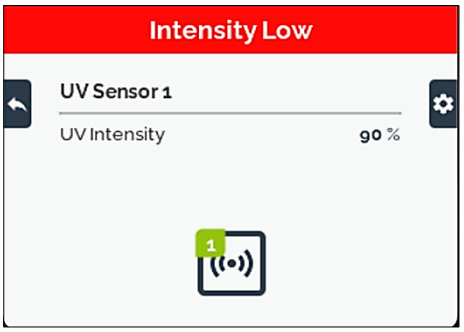
13. Select the alarm menu option.
    - Press ^ or v to select.
    - Press ✎ to confirm this option.



14. 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.



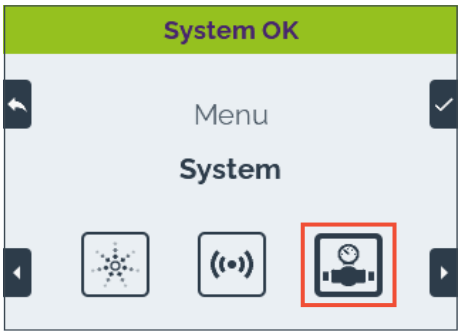
If the UV Unit has a UV sensor, an alarm will go off if the UV intensity of the UV lamp exceeds the set value. The base value is 50%. The UV Unit must be cleaned. See chapter 6.



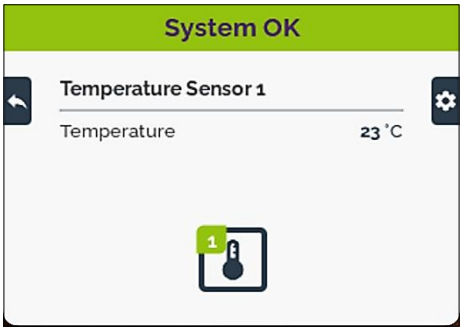
5.3.3 Control options in the Temperature Sensor menu

If this UV unit has a temperature sensor:

1. Select menu and then press ✓.

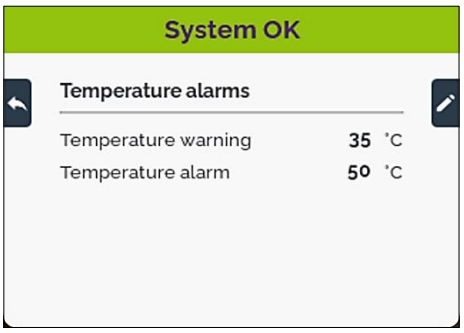


2. Press ⚙ to access the settings.
3. Press ✎ to change.



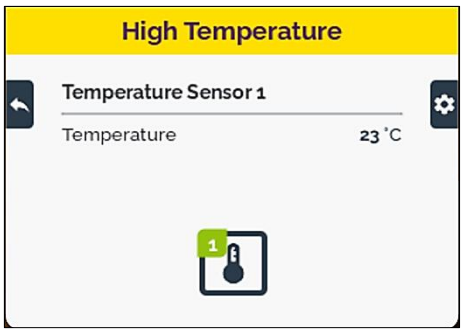
4. Select the de warning menu option.
   - Press ^ or v to select.
   - Press ✎ to confirm this option.

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



5. Set the temperature for warning.

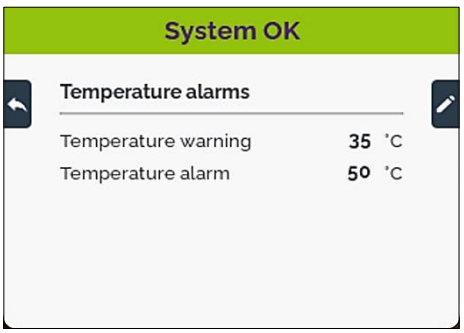
In case of a warning, the optional discharge valve will be activated. Besides that, the UV Unit keeps functioning.



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

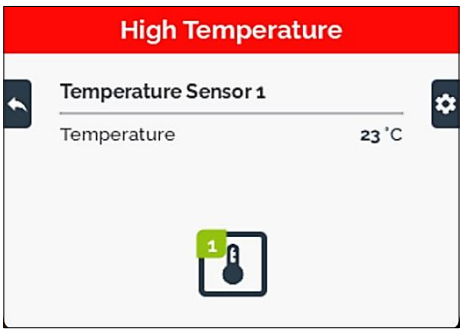
7. Set the temperature in alarm.

An alarm goes off if the temperature in the reactor chamber rises above the set value. The optional discharge valve will remain activated and the UV lamp will be switched off.



The default settings:
With an optional Temperature sensor
- Warning: 30 °C
- Alarm: 35 °C

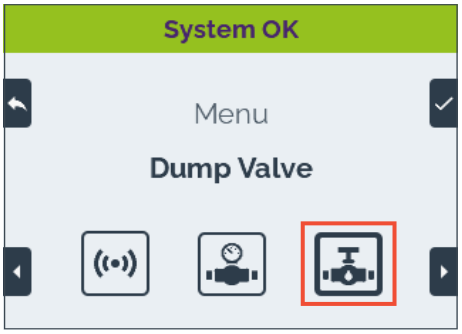
With an optional Temperature sensor with discharge valve:
- Warning: 35 °C
- Alarm: 50 °C



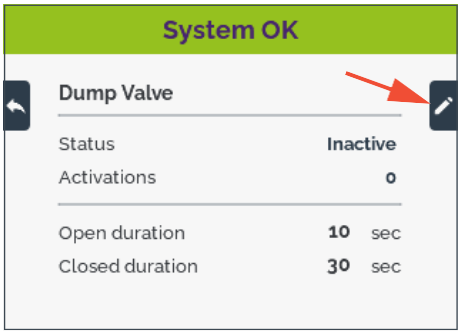
The alarm temperature should always be set higher than the warning temperature.

5.3.4 Control options in the dump valve menu

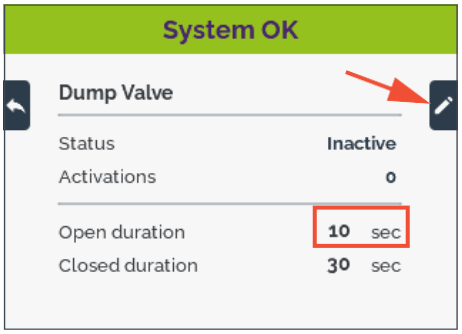
1. Select menu and press on .



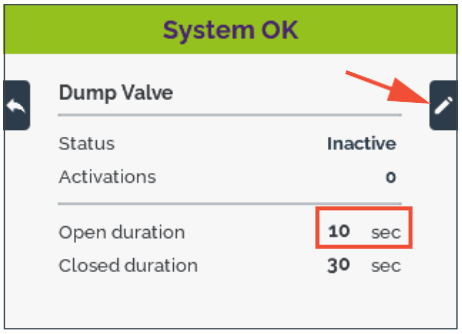
2. Press to change.



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

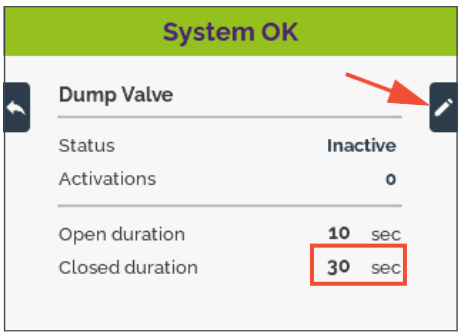


4. Set the open duration in seconds.

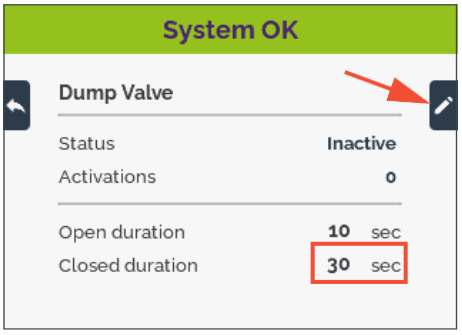


In case of a warning, the optional dump valve will open for the set time. After the set time has elapsed, the optional dump valve will be closed. After the closed set time has expired, a temperature check will follow. If necessary, this cycle will be repeated.

5. Select the closed duration menu option.
   - Press ^ or v to select.
   - Press ✎ to confirm this option.



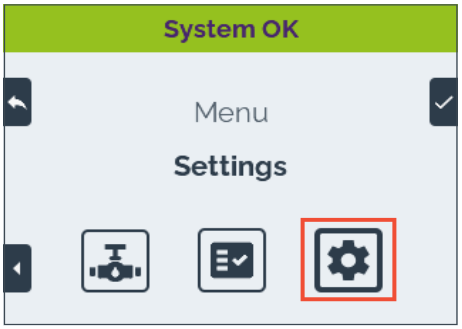
6. Set the closed duration in seconds.



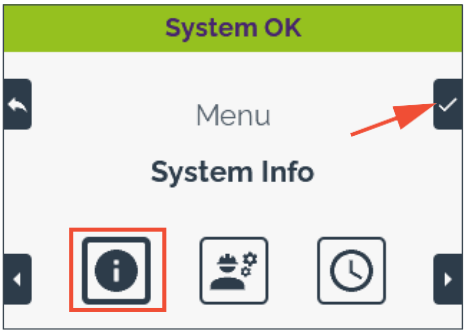
In case of an alarm, the optional discharge valve will be permanently opened to protect the UV lamp from overheating. Furthermore, the UV lamp of the UV Unit will be switched off. When the UV lamp is switched off, the automatic valve on the output side of the reactor controls closed.

5.3.5 Control options in the settings menu

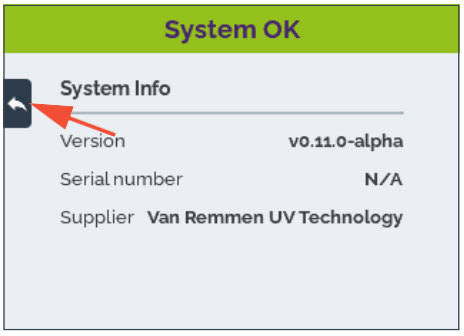
1. Select menu ⚙ and press ✓.



2. Select the system info menu option.
   - Press < or > to select.
   - Press ✓ to confirm this option.

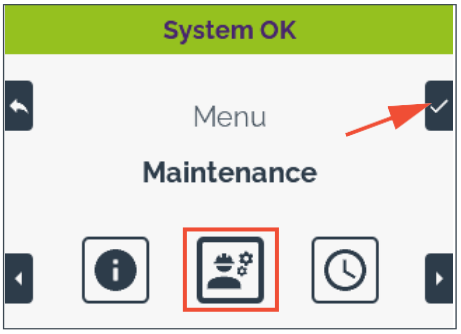


The system info screen only displays standard information: Version, Serial number and supplier.

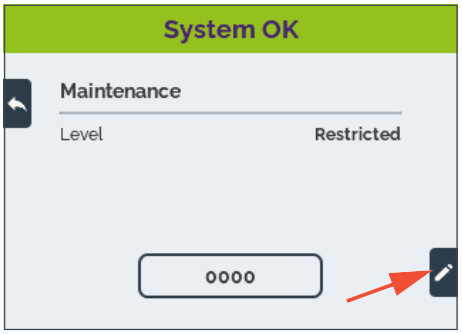


3. Select the maintenance menu option.
   - Press ‹ or › to select.
   - Press ✓ to confirm this option.

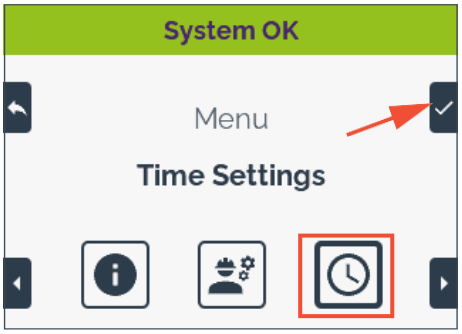
   The maintenance screen provides access to certain user functionality. **The password for the installer is: 1891**



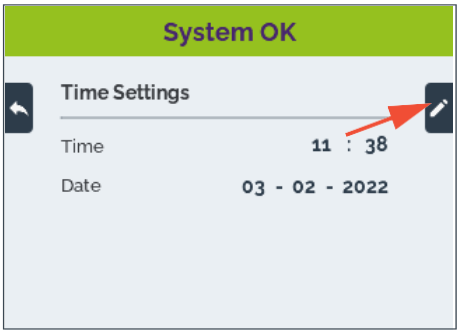
4. Set the user password.



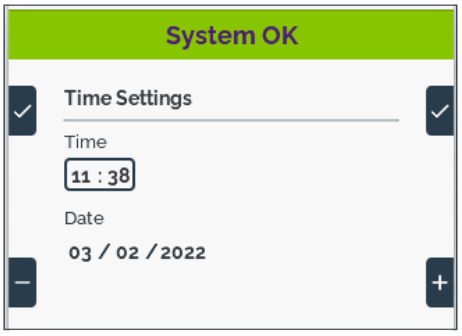
5. Select the time settings menu options.
   - Press ‹ or › to select.
   - Press ✓ to confirm this option.



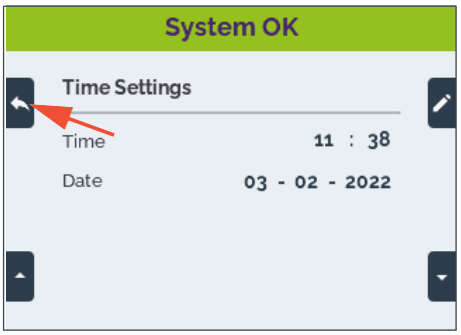
6. Press ✎ to change.



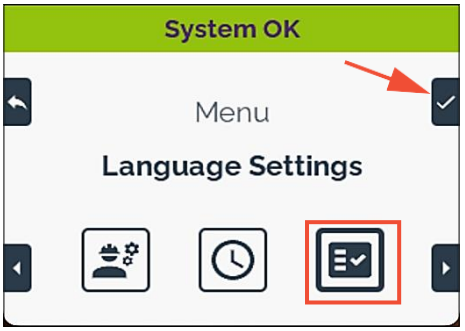
7. Select the time settings menu options.

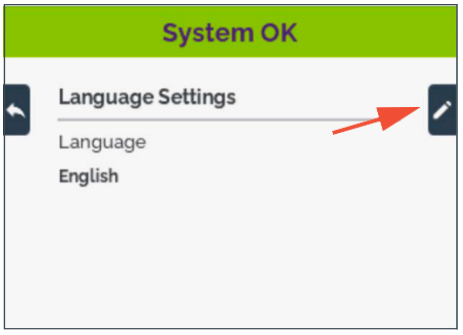


8. Select the date settings. This is done in the same way as time.
   - Press to go back in the menu.



9. Select the language settings in menu options.
   - Press to change the language.
   - Press to go to the settings menu.





6. Maintenance

This chapter describes how the UV Unit must be maintained.

6.1 Safety regulations

- Make sure the UV 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 Unit.

6.2 Important maintenance work

The following is important for maintaining the UV Unit.

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

Observe the following maintenance instructions:

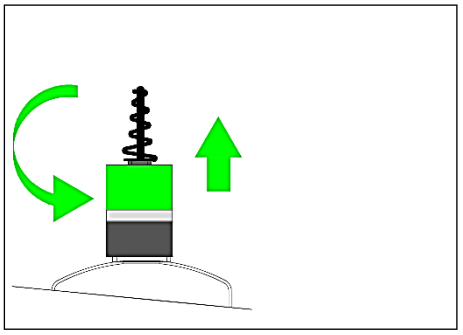
- Let the UV lamp cool down for at least 10 minutes after switching off.
- Avoid exposure to direct UV radiation during maintenance work.
- Depressurise the reactor chamber and drain the liquid present in the reactor chamber. Note: This is not necessary when only replacing the UV lamp
- In case of dirt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

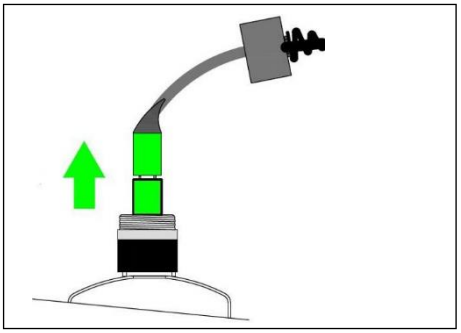
Only use original replacement parts. See appendix 1 for an overview of the replacement parts. When replacing the UV lamp, we recommend cleaning the quartz sleeve and using a new O-ring. See chapter 6.2.2.

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

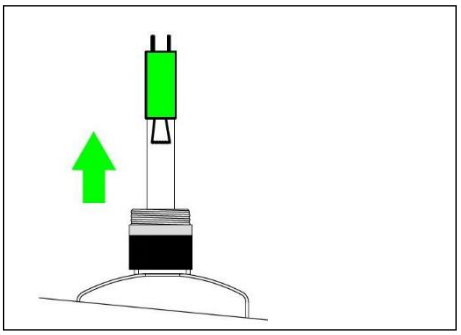
1. Unscrew the gland and lamp connector.



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

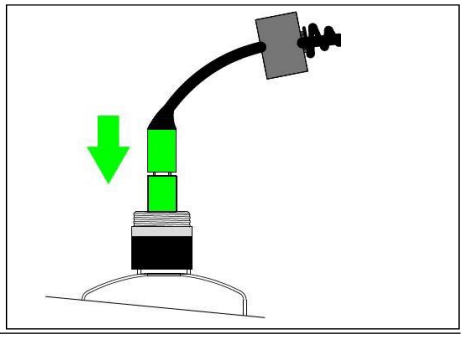


3. Pull the UV lamp out of the quartz sleeve and then slide the new UV lamp into the quartz sleeve.



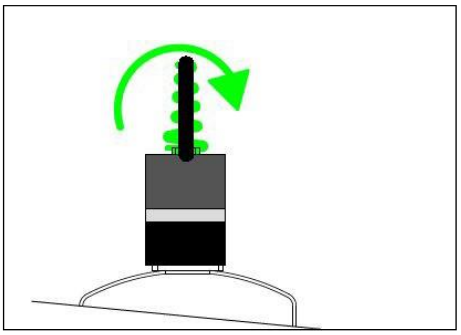
Make sure that the safety spring is in the quartz sleeve. Also make sure that the connecting wires running past the UV lamp are not in front of the UV sensor. After this, the UV lamp can be placed.

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



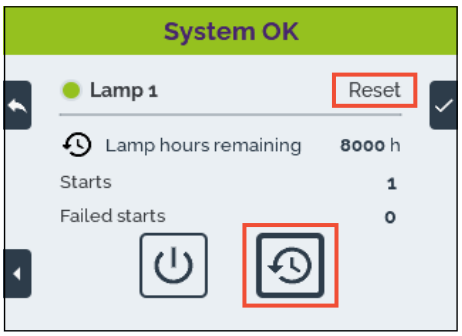
5. Press the lamp cable with the lamp into the quartz sleeve until you can feel resistance against the safety spring.

6. Tighten the swivel while you feel the resistance of the lamp against the safety spring.



After replacing the UV lamp:

Reset the lamp hours remaining, see chapter 5.3.1.

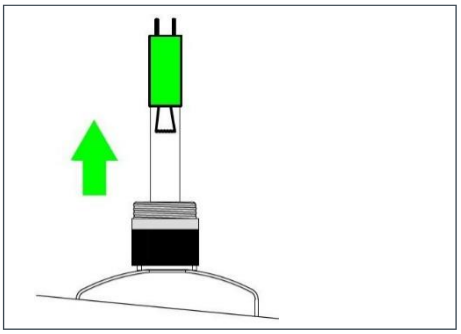


6.2.2 Cleaning or replacing the quartz sleeve

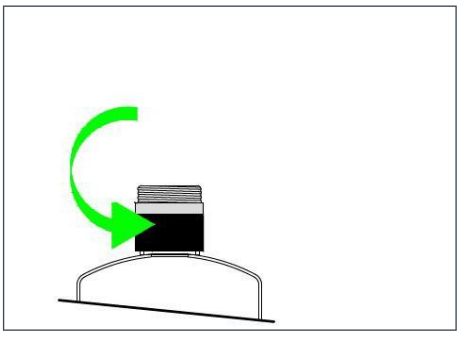
Only use the right cleaning products and original replacement parts. See appendix 1 for an overview of the right cleaning products and replacement parts.

Depressurize the reactor chamber and drain the liquid present in the reactor chamber.

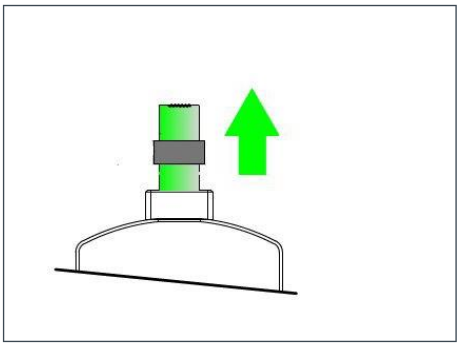
1. Disassemble the UV lamp, see chapter 6.2.1.



2. Unscrew the reactor connector counter-clockwise.



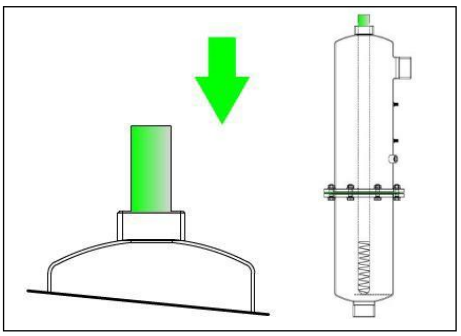
3. Pull the quartz sleeve out of the reactor chamber.
4. Pull the pressure sleeve and O-ring out of the quartz sleeve.



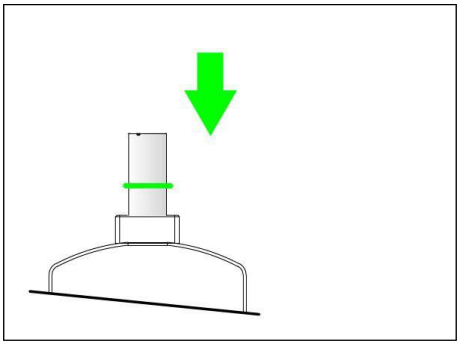
Never touch the quartz sleeve with bare hands. Always use the gloves provided.

5. Remove the safety spring from the quartz sleeve.
6. Clean or replace the relevant quartz sleeve.

7. 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.

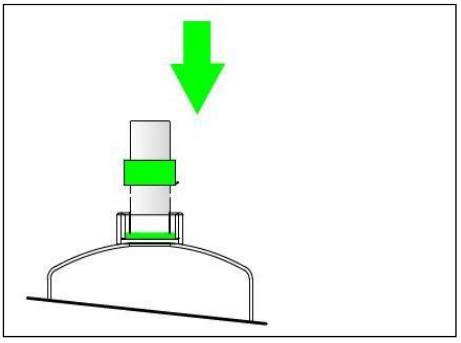


8. Place a new O-ring on the quartz sleeve.



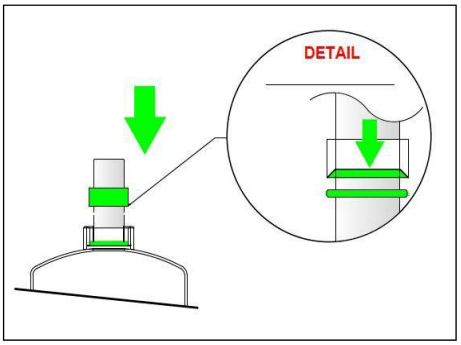
Always use a new O-ring both after cleaning and when replacing the quartz sleeve.

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



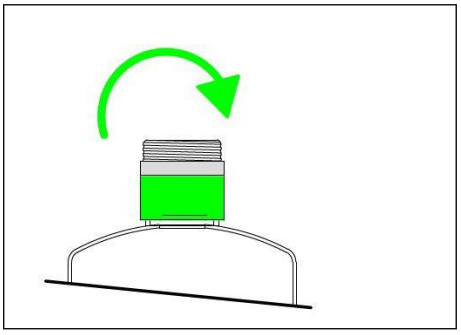
10. Hold the pressure bush against the stop and pull the quartz sleeve about 50 mm out of the reactor chamber, so that the quartz sleeve is up against the reactor connector.

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



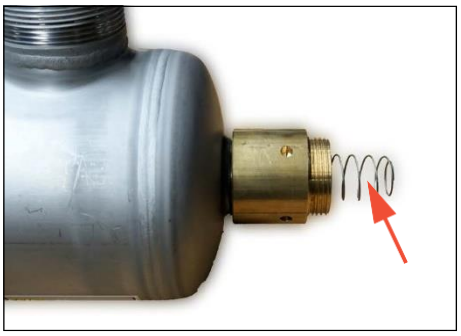
Push the pressure bush with the slanted side onto the quartz sleeve until it abuts against the O-ring.

12. Screw the reactor coupling clockwise.



Note that the reactor coupling must be tightened clockwise (max 25Nm)..

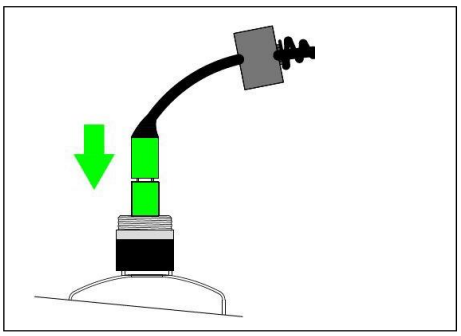
13. Place the safety spring in the quartz sleeve.



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

After cleaning/replacing the quartz sleeve:

1. Fill the *UV Unit*.
2. Switch on the *UV Unit*.
3. Check for leaks, see chapter 4.2.6.
4. Mount the UV lamp again, see chapter 6.2.1.

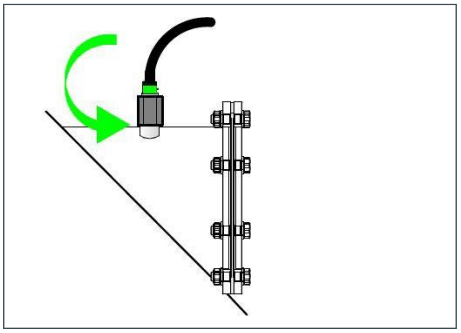


6.2.3 Cleaning or replacing the relative UV sensor

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

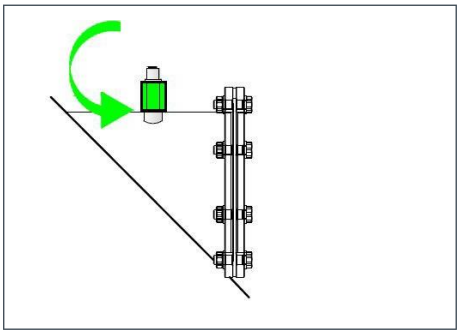
Depressurize the reactor chamber and drain the fluid. We recommend removing the UV lamp from the system and keeping it in a safe place while performing maintenance.

1. Unscrew the safeguard and pull out the plug.



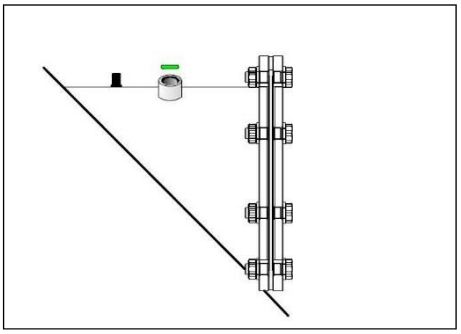
2. Unscrew the UV sensor from the sensor chamber.

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



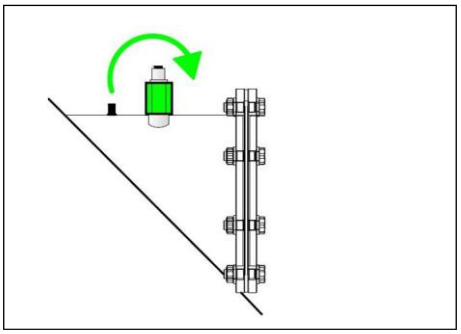
3. Clean the window on the inside of the UV sensor or replace the relevant UV sensor.
4. Place a new O-ring in the sensor chamber.

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

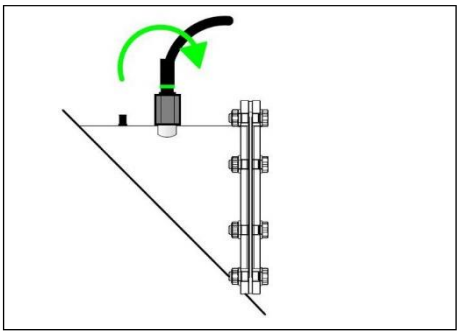


5. Screw the UV sensor hand-tight.

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

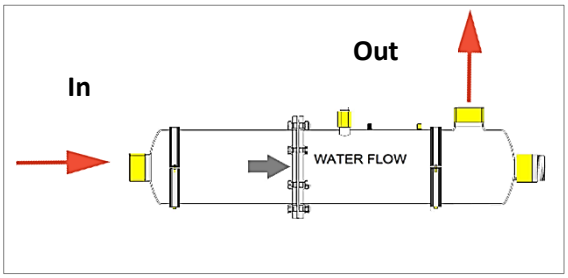


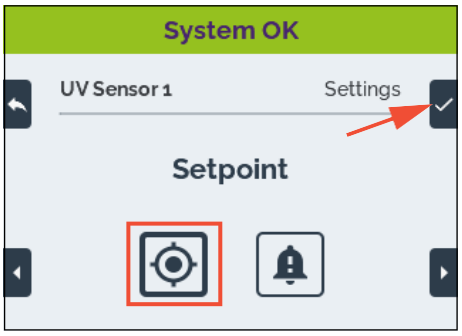
6. Insert the plug straight into the UV sensor and retighten the safeguard on the plug.



After cleaning/replacing the UV sensor:

1. Fill the *UV unit*.
2. Switch on the *UV unit*.
3. Check for leakage, see chapter 4.2.6.
4. Mount the UV lamp again, see chapter 6.2.1.
5. Enter the setpoint of the UV sensor, see chapter 5.3.2.





7. Troubleshooting

This chapter describes how malfunctions can be resolved.

The *UV 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 (serial number, type name) of the *UV 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 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.
	Malfunction 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 sensor defective	Replace UV sensor.
	UV sensor cable damaged	Replace UV sensor cable.
	UV sensor not configured correctly	See chapter 6.2.3 for procedure.
	Interference due to signals	Inspect environment for disturbance factors. Mount UV sensor directly to monitor if possible.
	UV lamp defective	Inspect operation and replace UV lamp.

Malfunction	***Possible causes***	***Possible solutions***
[UV-intensity too low]	Dirt buildup	Clean quartz sleeve and UV sensor lens.
	Filament cables UV lamp for sensor lens mounted	Mount all UV lamps in such a way that the filament cables are not positioned on the side of the UV 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 lamp degradated and needs to be replaced. - Note! Lifespan depends on number of lamp hours. UV sensor and/or quartz sleeve not replaced within the replacement period.
	Set point not implemented after installation	Then, input set point according to procedure.
	Condensation in the sensor housing	Remove the UV sensor. Clean the glass of the sensor housing.

Malfunction	***Possible causes***	***Possible solutions***
[Disinfection insufficient]	Dirt buildup	Clean quartz sleeve and UV 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 lamp depreciated and needs to be replaced. - Note! Lifespan depends on number of lamp hours. UV sensor and/or quartz sleeve not replaced within the replacement period.
	Set point not implemented after installation	Then, input set point according to procedure.
	Condensation in the sensor housing	Remove the UV sensor. Clean the glass of the sensor housing.

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 sensor	Attach UV sensor by hand. - Note! Replace O-ring of UV sensor and apply mounting paste.

8. Packaging

This chapter provides information on the packaging and transporting of the *UV unit*

.

8.1 Delivery management

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

The *UV 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 Unit* for damage. Report damage to the transporter and your supplier.

8.2 Storage and transport

If applicable, store the *UV 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 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 unit. Also consider weight and center of gravity.

9. Environment and disposal

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

The following components of the UV Unit must be disposed of separately:
- UV lamp.
- Quartz tube.
- Controller.

Decommissioning the UV Unit must be carried out as follows:
- Check if the UV Unit has been shut down.
- Isolate the UV 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 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 Unit.

B1 Technical Specifications and replacement parts

This appendix contains the technical specifications of the UV Unit.

B1.1 Specifications

Item	***Type***
Weight	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 lamp type	Low pressure UV lamp
Type of lamp cable	Colour code WH-YE-GR-BR (4 x 1 mm²) - water block
Type of UV 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, 120W	Approx.8000 hours
60WLL, 120WLL, 205WLL, 325WLL	Approx.16000 hours

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

B1.2 Replacement interval parts

Item	*Replacement term*
UV Lamp	See HMI-control. Differs for each type of device. In many cases approx.8,000 or approx.16,000 hours.
UV sensor	The UV 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 lamp is not guaranteed.
Rubber O-Ring	If the quartz sleeve or UV 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.