MS UV-Disinfector

UV Skid

Installation and user manual

Important safety notes:

Make sure, that all of the following safety rules are fulfilled.

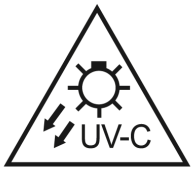
The device must only be installed by qualified personnel to make sure all applicable safety rules are fulfilled. Additional safety rules and legal restrictions may apply depending on the country of operation.

- Risk of electric shock!
  Lethal high voltage is present inside the unit and at the terminals. Due to high voltage storage devices lethal voltages may be present inside the unit and at the terminals if the unit is switched off or disconnected from supply voltage.
- The unit must not be operated if there is any damage (e.g. mechanical damage after transport).
- The electrical part is intended for use in dry and chemically and biologically inactive environment only. Keep water and humidity away from the whole electrical assembly. Lethal voltages across the complete system can result from contact between lamp and water. A separate protective earthing of the complete system is mandatory.
- Disconnect unit from mains before any maintenance operation.
  Dangerous voltage may be present inside the unit energy storage devices even if the unit is disconnected from mains. Wait at least 10 minutes after disconnecting the unit from mains voltage before starting any service actions.
- Repeated rapid switching might lead to a fault. Do not turn off and on the unit within less than 10 seconds.
- During ballast section start up, in case of lamp defects or due to wrong lamp wiring high voltages up to $1200V_{eff}$ may occur at the lamp terminals. This high voltage may be present for a couple of milliseconds until the internal protection circuits shuts down the ballast. At each ballast restart, after any temporary disconnection from mains voltage, the ballast will try to ignite the lamp once more, so again, high voltages may occur.
- The ballast does not provide galvanic insulation from mains at the lamp terminals.
- Harmful voltage occurs at the lamp terminals even if the ballast is in standby mode and the lamps are switched off.
- Never cut the lamp wires while the ballast is in operation. **Risk of serious injury or death!**
- The load for the fault detecting contacts has to be kept within the limits specified in the datasheet. It is recommended to use parallel operation of contacts instead of serial operation in case of summarizing fault detection.

This device produces harmful radiation. Direct contact can pose a hazard to eyes and skin. Only check the operation of the UV-C lamp through transparent parts, never in direct contact.

- Warning - Due to the risk of injury, this product is not suitable for use by children or persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience or knowledge, unless they are supervised or instructed on the use of the device by a person responsible for their safety.
- Warning - Risk of electric shock. If in doubt as to whether you have sufficient knowledge and experience, this device must always be connected by a certified electrician, according to the locally applicable standards and laws, with a properly earthed connection protected by a residual-current device.
- Warning - To reduce the risk of electric shock, a damaged cable should be replaced immediately if possible.
- Warning - To reduce the risk of electric shock, the use of an extension lead is not recommended. Connect the device to an easily accessible mains outlet.
- Do not bury the connection lead. Never share connections and/or connection leads with lawn mowers, hedge trimmers or other equipment.
- During and after commissioning, the unit is operating and filled with water. Therefore, to reduce the risk of electric shock, be careful during repairs and/or service work. If you lack the necessary knowledge and experience, repair and/or service activities should be performed by authorized/accredited technicians.
- The device must not be switched on if it has been damaged during or as a result of transport, a fall, a production defect or other cause (particularly the quartz glass sleeve and the UV-C bulb).
- Always connect the device to an undamaged, earthed mains outlet with hinged cover.
- To reduce the risk of electric shock, the plug must not be inserted into or removed from the mains outlet with wet hands and/or while you are standing in the water.
- The connection lead of the appliance may not be shortened and/or connected directly without a plug. If the lead becomes damaged, the entire device must be submitted to authorized/accredited technicians. Devices with cut-off/shortened cables are excluded from warranty coverage.
- After the device is switched off the bulb will remain warm for ten minutes.
- Use of the equipment for any purpose other than that for which it was designed or developed is not permitted. Use of the equipment for a purpose other than that for which it was developed by the manufacturer may lead to unsafe situations.

- If there is a seasonal risk of freezing of the device, or parts thereof, appropriate measures must be taken to prevent freezing damage. Damage caused by freezing is always excluded from warranty coverage.
- Devices with a stainless steel housing are not suitable for water with a high salt content. If the salt content is too high, the steel can oxidize and damage the housing.
- The unit should never be placed downstream of a heat exchanger or other heating source. If the bulb is not cooled by the water sufficiently, it may be damaged.
- This device may only be used in accordance with the guidelines described in this manual. You must also adhere to the instructions provided on the device.
- Unintended use of the device or damage to the housing can lead to the escape of harmful UV-C radiation. Exposure to UV-C radiation, even in small doses, cause damage to the eyes and skin.
- If you intend to use of the device in combination with chemicals and/or medications, always consult the manual(s) for this/these product(s). Pay particular attention to the safety instructions. When using medicines, the device must be disconnected.
- It is not permitted to flow an aggressive liquid through the reactor or add additives to the treated water which may have a negative effect on corrosion or degradation of the materials that are used. This to prevent dangerous situations and damage to the reactor and surrounding installations and / or flora and fauna.



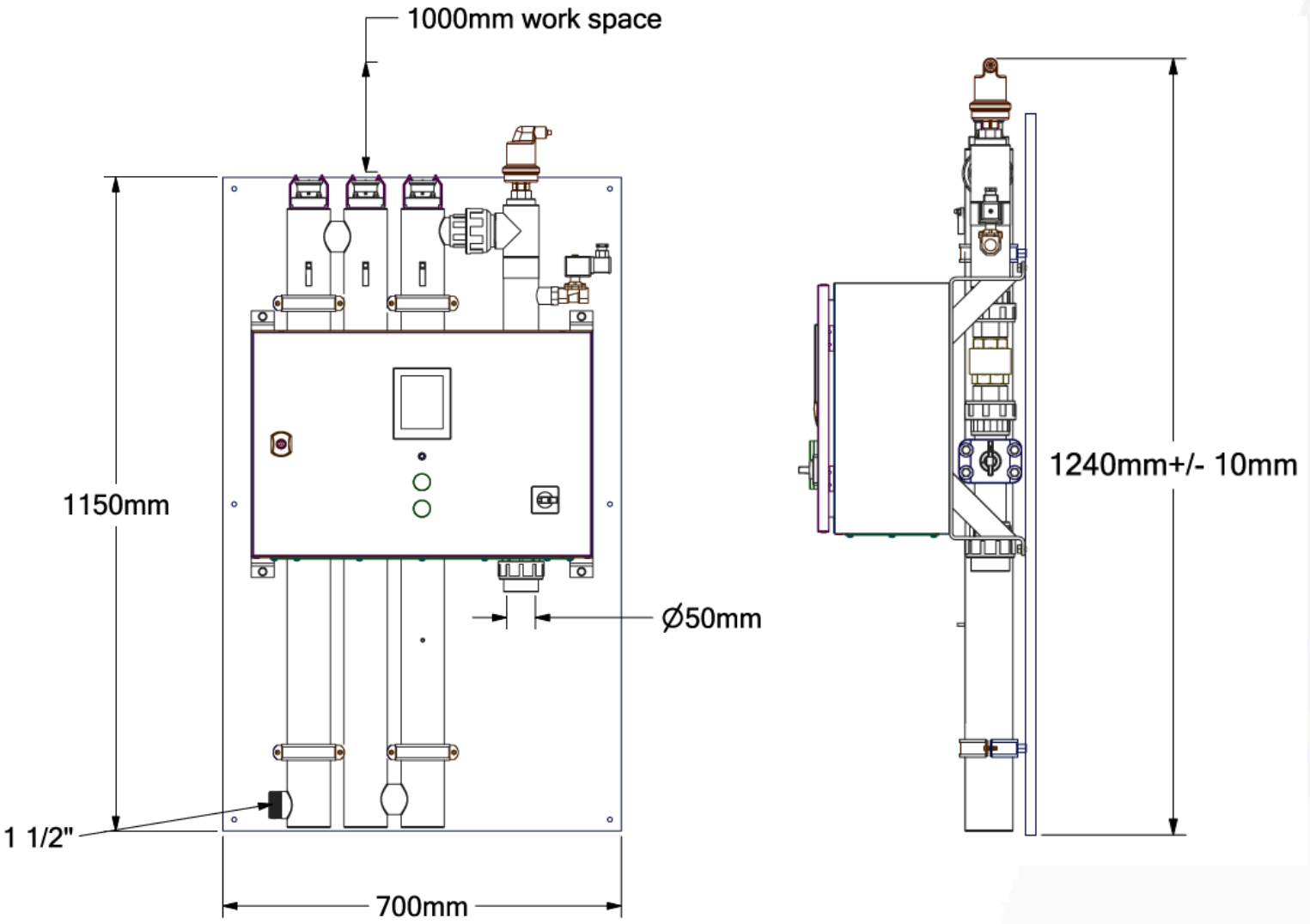
1 Index

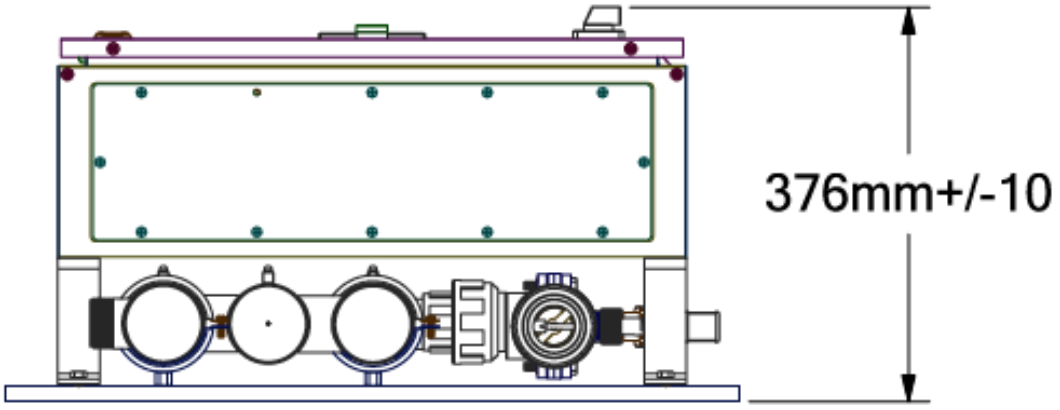
2 Technical specifications

Supply voltage	110 - 230V AC ± 10%, 3W, 55....65 Hz	
Ambient temperature	0 °C (32 °F) - 40 °C (113 °F) (to keep heat sink temperature below 70 °C (158 °F)	
storage temperature	0 °C (32 °F) - 40 °C (104 °F)	
IP protection cabinet	IP54	
IP protection UV system	IP54	
UV Type	**UV Skid Duplex**	**UV Skid Triplex**
Lamp type	Lamp VGE Pro T6 200W 1115 SPT	
Weight dry [kg]	47	
Total lamps	2	3
Lamp lifetime	16.000 hours	
Dimensions electrical part	400x600x210mm	
Dimensions UV skid	See page 6	
output power (limited to max. value)	2 x 200W	3 x 200W
mains voltage	110- 230 V AC ±10%, 55...65 Hz	
mains current (based on 10% losses)	2.1A	2.1A
mains power (based on 10% losses)	440W	660W
power factor	typical: 0.9 (min: 0.9)	
power loss	typical: 5% (max. 8%)	

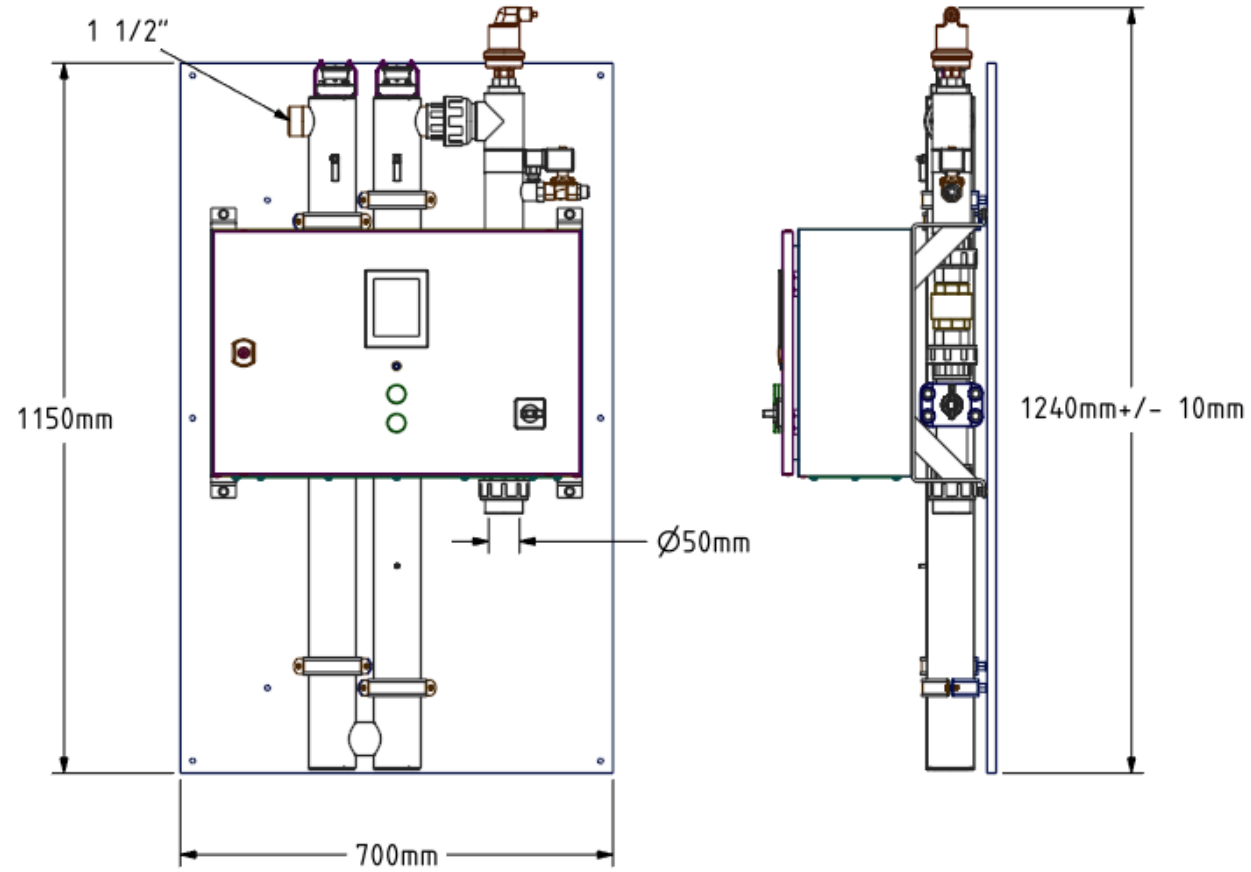
3 Dimensions

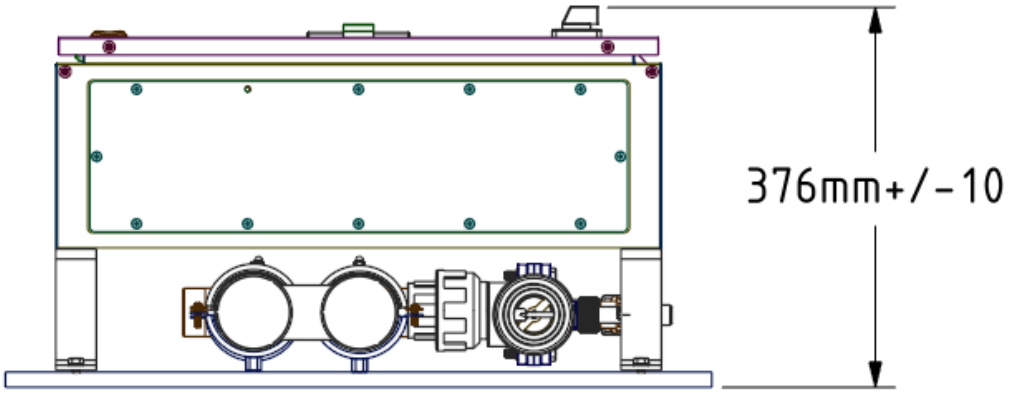
Triplex:





Duplex:





4 Scope of delivery

4.1 Check received goods.

Immediately after receipt and before installing the system, check the delivery for completeness and visible damage on the basis of the waybill. Contact the supplier immediately if the product is incomplete or damaged.

The delivery of a UV system includes:

1. Complete UV system including control consisting of two (Duplex) or three (Triplex) chambers with quartz glass and cables already fitted
2. UV-C lamps
   - Two (duplex version) or three (triplex version) 200W UV lamps depending on version, lamps are delivered in carton tube box
3. Automatic air vent
4. Gloves
5. Drain hose
6. Instruction manual

4.2 Warranty

The warranty period for the MS UV-Disinfector systems is twelve (12) months from the moment of acceptance (acceptance is the first use of the relevant UV system or a validated acceptance/start-up protocol). The moment of acceptance must be within three (3) months after shipment of the relevant product. If the acceptance is not realized within three (3) months after shipment, the warranty period starts on the date three (3) months after the shipment date. Consumables (for example: UV lamps, quartz tubes, O-rings, etc.) of the MS UV-Disinfector Skid systems are excluded from this warranty. A prerequisite for this guarantee period is error-free installation and start-up, fully documented periodic inspection and maintenance on a minimum of half a year and the operating instructions must be followed.

The UV disinfection system may only be installed by a qualified installer who follows local laws and regulations. Do not start the installation before you have read and understood this manual completely.

5 Installation

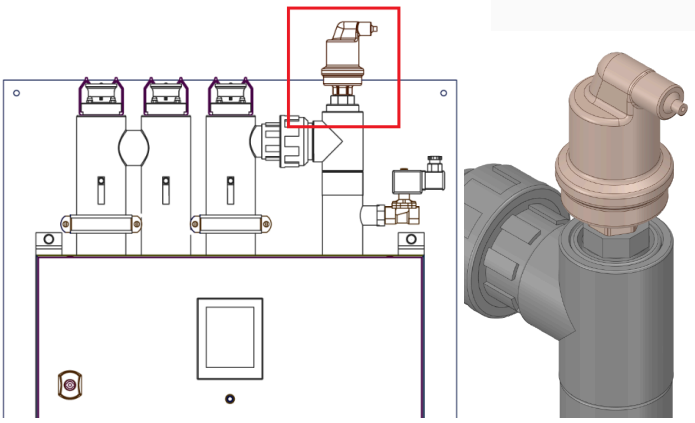
Place the UV skid on the wall, make sure the HMPE plate is fixed to the wall using 6 bolts or screws. Ensure sufficient space of approximately 1 meter available at the top for replacement of the UV-C lamp and quartz glass.

The entire UV skid must be placed in a dry position.

5.1 Connecting air vent

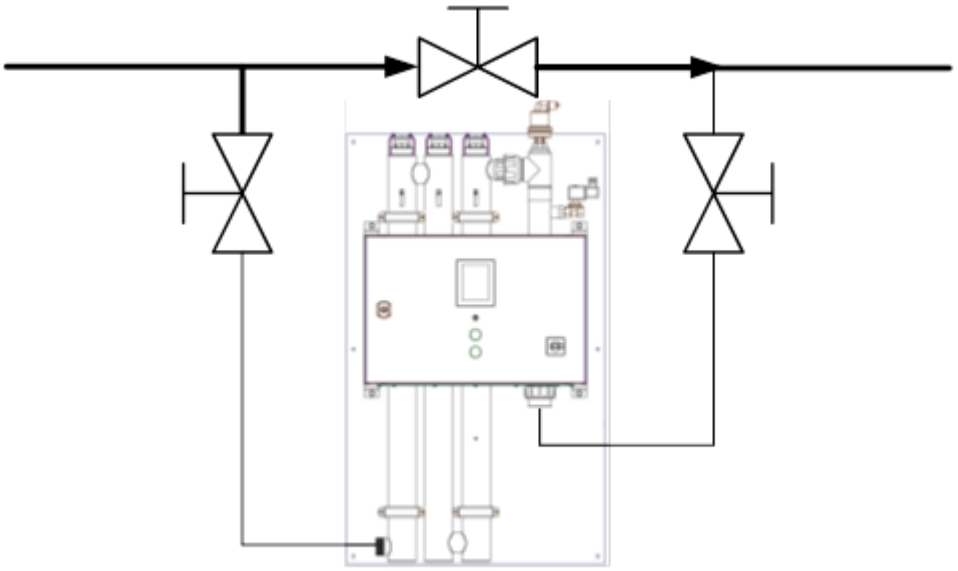
Connect the automatic air vent on the UV skid on the top right corner. Make sure that the air vent is screwed in completely and looks similar to that of the picture.

Be careful as the screw thread is very sensible for irreversible damage if the air vent is installed crooked!



5.2 Connecting to pipe works

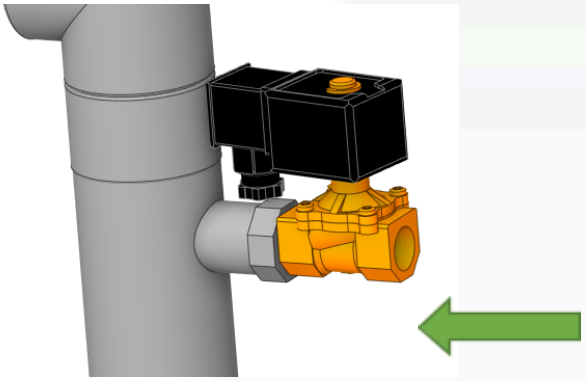
Connect the water pipe work to the connections of the UV skid. Follow the proper guide lines to connect the pipe work to 1 ½" SS threaded connection (left side) and 50mm diameter on the right side. Always make sure that the UV Skid is connected in an bypass with valves. Make sure that the valves are closed and no water can enter in the UV system.



Bypass closed for UV system installation

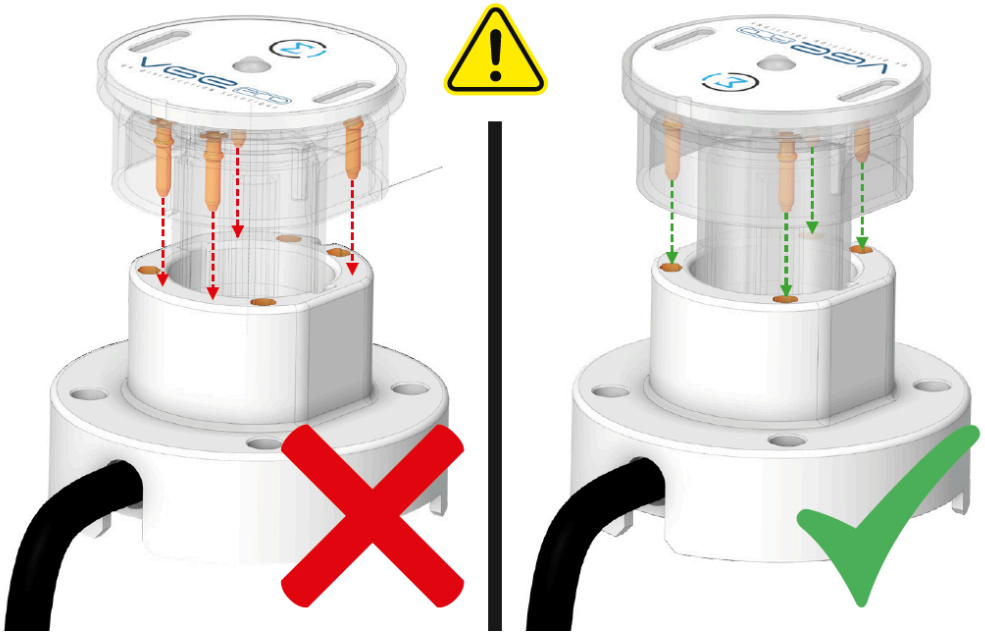
5.3 Magnetic valve

Connect one end of the drain hose to the magnetic valve and the other end to a water discharge point. The magnetic valve is activated when the water inside the stainless steel chamber reaches an temperature of 45 °C. This allows cool water into the stainless steel chamber which prevents the UV system from overheating. The UV lamps will remain on during this time.



5.4 Inserting UV-C lamp

To insert a new lamp align the 4 pins correctly with the connections of the ceramic socket. Carefully insert the new UV-C lamp without any force until you here a click.



See chapter “8.1 Replacing the UV-C lamp” for further instructions.

6 Starting procedure

Danger of injury and damage to the UV unit!

The UV unit may only be switched on if all lamps are mounted, the control cabinet is closed, all electrical connections are connected correctly and professionally, the UV irradiation chamber is correctly and professionally incorporated in a piping system, the UV irradiation chamber is completely filled with water. The control panel and the irradiation chamber must also be electrically earthed.

Danger of damaging the UV unit!

A UV unit is standard tested in the factory and set according to customer specifications as included in the order. Therefore no settings need to be adjusted by the user in the control panel. If adjustments are necessary due to, for example, changed process circumstances, this must always must be done in consultation with the supplier.

Water in the irradiation chambers

Before switching on the UV lamp, the irradiation chamber must be completely filled with water and continuously flow through with sufficient capacity!

An irradiation chamber fully or partially filled with air can become very hot locally after the UV lamp has been switched on, which can damage the UV installation and the environment of the UV installation. There is also a risk of injury to operating personnel.

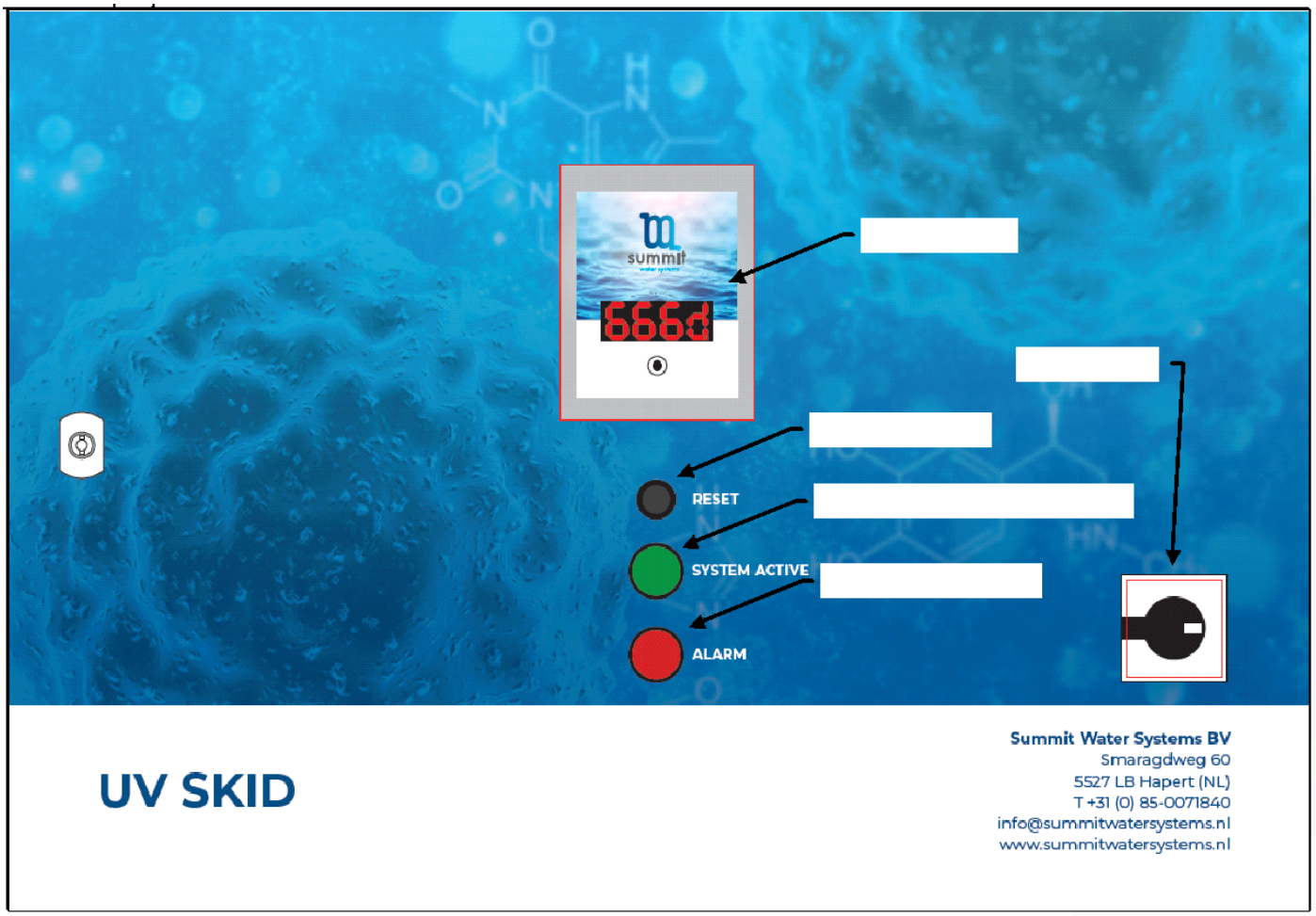
The water that flows through the UV system may have a temperature between +1 °C and +30 °C. A bimetallic switch is mounted on the irradiation chamber as protection, which flushes the chambers with cool water until an temperature of +30°C is reached.

The UV Skid can work with a maximum operating pressure of the water of 5 bar, water hammering can irreversibly damage the irradiation chamber or parts thereof.

Nr.	Task description
1	Fill the piping system and the irradiation chamber complete with water, making sure that the system and the irradiation chamber are completely vented.
2	Measure the supply voltage and check whether it corresponds to the specification on the type plate.
3	Make sure that the cool water flush coming from the magnetic valve can be safely discharged
4	Switch on the mains voltage by switching on the main switch.
5	If water is not yet flowing but system can be activated press the “RESET” button.
6	Wait for 3 minutes, if only “SYSTEM ACTIVE” indicator remains active no further action is needed.

7 Control

Timer display : showing remaining lifetime of lamps in days (start 666 days)
"RESET" button : activate lamps when no flow is detected
"SYSTEM ACTIVE" button : when activated system is in operation
"ALARM" button : when activated there is an lamp error
Main switch : Turning on the mains supply



7.1 Timer operation

If the UV Skid is switched on, the program will check itself. The display will automatically show the following, one after the other: 8888 (display test); r and software version number; 50H or 60H indication of the mains frequency. Following this, the display will show the meter reading. When the UVC lamp is switched on for the first time, or after the "reset" function has been used, the value '666d' will appear on the display. A dot next to the digit on the far right of the display will blink every second; this indicates that the counter is running.

The display is automatically set to the factory reading of 666 days. The UV-C lamp operates radiation for up to 16.000 hours. After 666 days, the radiation will weaken, and may become insufficient to obtain the desired results.

If the UV-C lamp had already been used previously, and is switched on again, the display will indicate the value it had at the time it was switched off earlier. If you had increased or reduced the value of the time meter yourself, the display will indicate the latest counter reading it had before it was switched off.

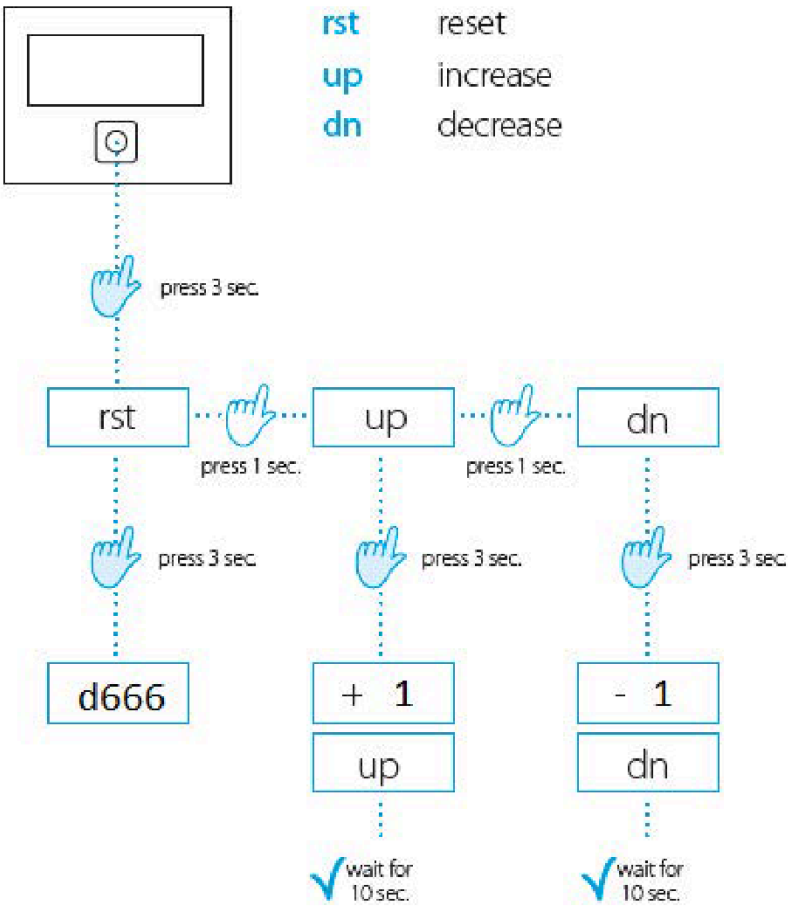
The settings of the time meter can be modified if you wish. This is carried out as follows: After holding down the switch underneath the display for 5 seconds, the display will show “rSt”, to indicate that the user menu has been selected. Once the switch has been released, the meter indication and “rSt” will blink alternately on the display. By briefly pressing the switch again, it is now possible to step through the menu options. There are 3 available setting options in the menu: “rSt” “up” and “dn”.

- “rSt” means (reset): This option enables you to reset the meter indication to the factory setting of 666 days. This selection is confirmed if the meter indication and “rSt” on the display blink alternately. If you hold down the switch for 5 seconds, after which the meter indication “666d” will be displayed, and then release it, the time meter will start counting down from the “666d” value. This selection is used if, for example, you have replaced the lamp, or if you have modified the meter indication yourself and you want to return it to the factory settings.

- “up” means (up): This option enables you to increase the meter indication to the desired hour indication. This selection is confirmed if the selected user setting ”up” and the meter indication on the display blink alternately. Following this, press the switch down for 5 seconds. After 5 seconds, the display will only indicate “up”. You can then release the switch. By briefly pressing the switch , the counter value can now be increased in steps of 20 days from the value of “666d” up to a maximum value of “999d”. The increased value and “up” will blink alternately on the display. After you have selected the desired hour indication, wait for 10 seconds. After 10 seconds, the selected hour indication will be displayed and the timer will start counting down. If you make a mistake while increasing the meter indication, it is possible to reset the counter to “666d” by keeping the switch pressed down for 5 seconds. The counter value will then be reset to “666d”, and a new value can be set.

- “dn” means (down): This option enables you to decrease the meter indication to the desired hour indication. This selection is confirmed if the selected user setting ”dn” and the meter indication on the display blink alternately. Following this, press the switch down for 5 seconds. After 5seconds, the display will only indicate “dn”. You can then release the switch. By briefly pressing the switch , the counter value can now be decreased in steps of 20 days from the value of “666d”down to a minimum value of “000d”. The decreased value and “dn” will blink alternately on the display. Once you have selected the desired hour indication, wait for 10 seconds. After 10 seconds, the selected hour indication will be displayed and the timer will start counting down. If you make a mistake while decreasing the meter indication, it is possible to reset the counter to “666d” by keeping the switch pressed down for 5 seconds. The counter value will then be reset to “666d”, and a new value can be set.

Flowchart



Status Indication

The time meter will indicate in the following manner that the lamp must be replaced:

- From day position “028d”; the display will blink every second. The lamp is to be replaced in 4 weeks’ time.
- From day position “014d”; the display will blink every half second; The lamp is to be replaced in 2 weeks’ time.
- From day position “007d”; the display will blink every . second; The lamp is to be replaced in 1 week time.
- At an day position of “000d”; the digits will blink continuously, and the meter will not continue to count down. The lamp must be replaced.

7.2 Switch cycle counter

Restarting a UV lamp is of negative influence to the lifetime of the lamp. To see how many on/off cycles the lamp has had there is an integrated counter on the inside of the control cabinet.

The number shows how many times the lamp has been turned on/off. When replacing the UV lamps reset this value by clicking the “reset” button on the bottom right of this component.

8 Maintenance

The correct functioning of the UV Skid is only guaranteed if original spare parts and components are used as described in this manual. The parts described must also be inspected, replaced or cleaned in a timely manner. If instructions are not followed, there is a risk of malfunction or damage to the UV system. If non-original spare parts and components are used or if the inspection, replacement or cleaning is not carried out in time, the warranty on the entire UV system will lapse.

Before performing any maintenance on the UV Skid, ensure that the main switch is off, the valves are closed and the unit is hydraulically de-pressured.

The safety instructions in this manual must be followed at all times, but they do not affect the local and/or legally applicable safety measures and instructions.

UV-C radiation can damage the retina of your eyes and unprotected skin. Ensure that you are not directly or indirectly exposed to UV radiation.

Everyone involved must be informed about the specific hazards associated with a VGE Pro UV system.

Installation, maintenance and service work must be carried out by VGE International B.V. trained and authorized persons.

Grasp all quartz glass parts only with clean gloves on, which do not leave any residues or prints (included). If fingerprints or dirt are present on the quartz parts, the UV-C radiation is negatively influenced, so that the UV-C treatment process is also negatively affected.

Quartz can cause serious cuts in the event of breakage.

Let the lamp cool down for at least 10 minutes before servicing.

General steps of maintenance:

1. Switch off the main switch;
2. Shut off the hydraulic supply and discharge for the UV system;
3. Let the lamp cool down for at least 10 minutes before servicing.
4. Perform the specific maintenance as described in this chapter;
5. Turn on the main switch and switch on the UV system if system is completely filled with water.
6. Check whether the UV lamp is burning.

All adjustments, actions and controls must be documented in the logbook.

8.1 Replacing the UV-C lamp

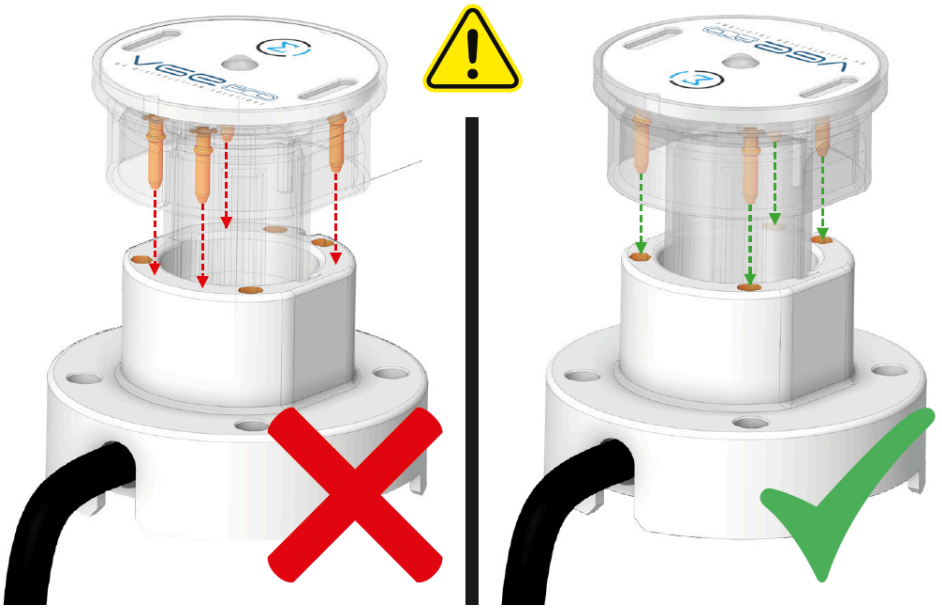
UV-C lamp replacement must take place with a maximum interval of 16.000 hours to ensure correct disinfection. After this period the level of UV-C being emitted by the lamp is insufficient. Make sure to never touch the UV-C lamp with bare hands. Wear the supplied gloves or use protective materials when handling UV-C lamps to prevent contamination of the lamp surface.

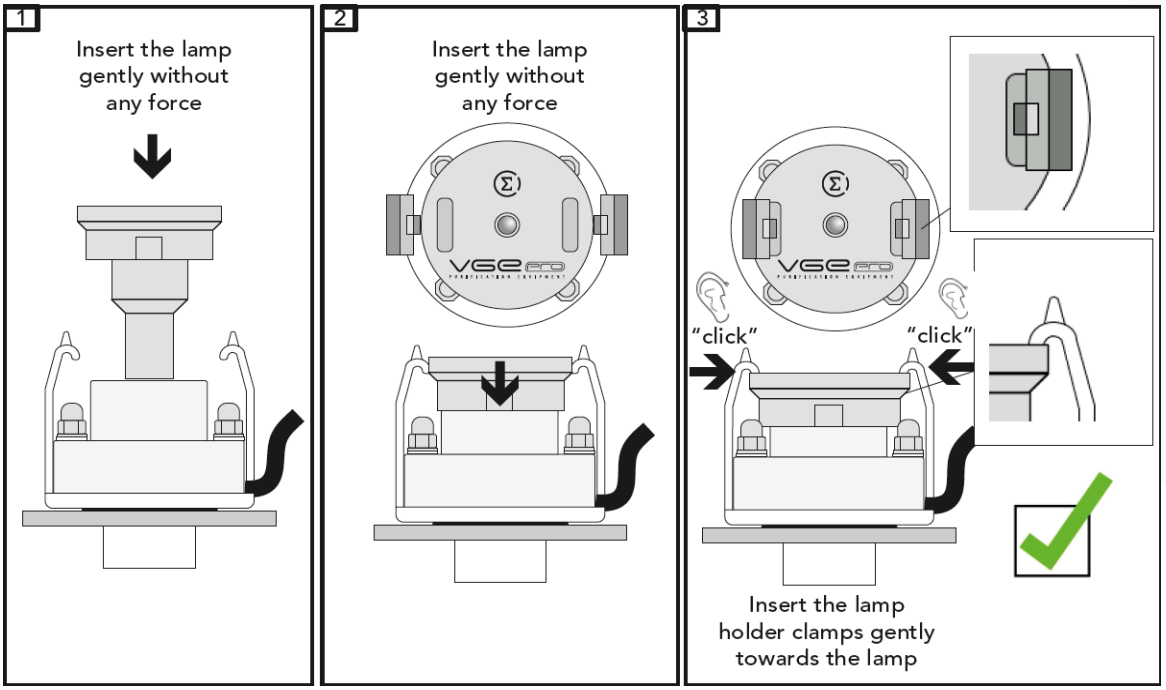
UV-C lamps are fragile, support the UV-C lamp always with two hands. Take care when handling them to avoid breakage.

To remove the lamp open up the transparent clamps and slide the lamp out.

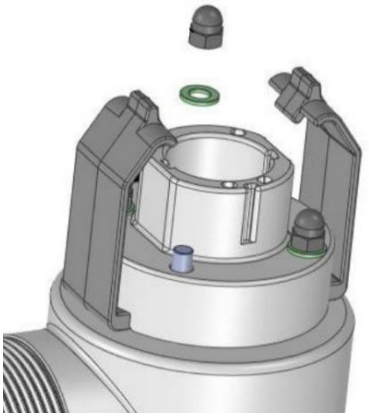
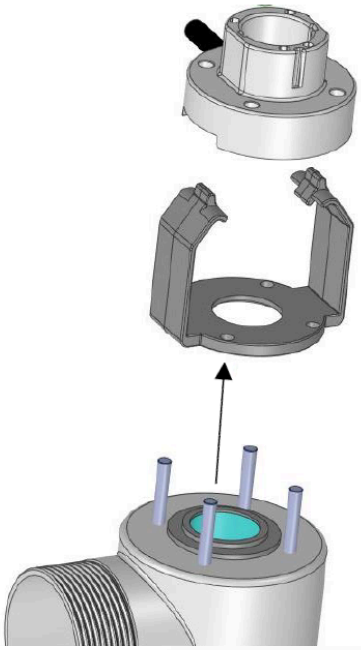
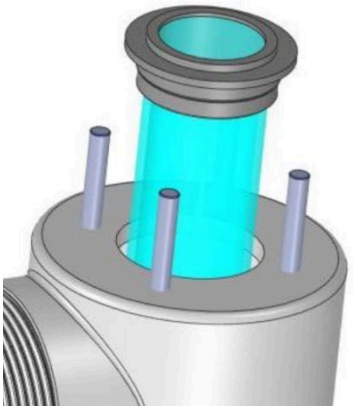
To insert a new lamp align the 4 pins correctly with the connections of the ceramic socket. Carefully insert the new UV-C lamp without any force until you here a click.

After replacing the lamp reset the Switch cycle counter, see chapter 7.2 Switch cycle counter.





8.2 Removing the quartz glass

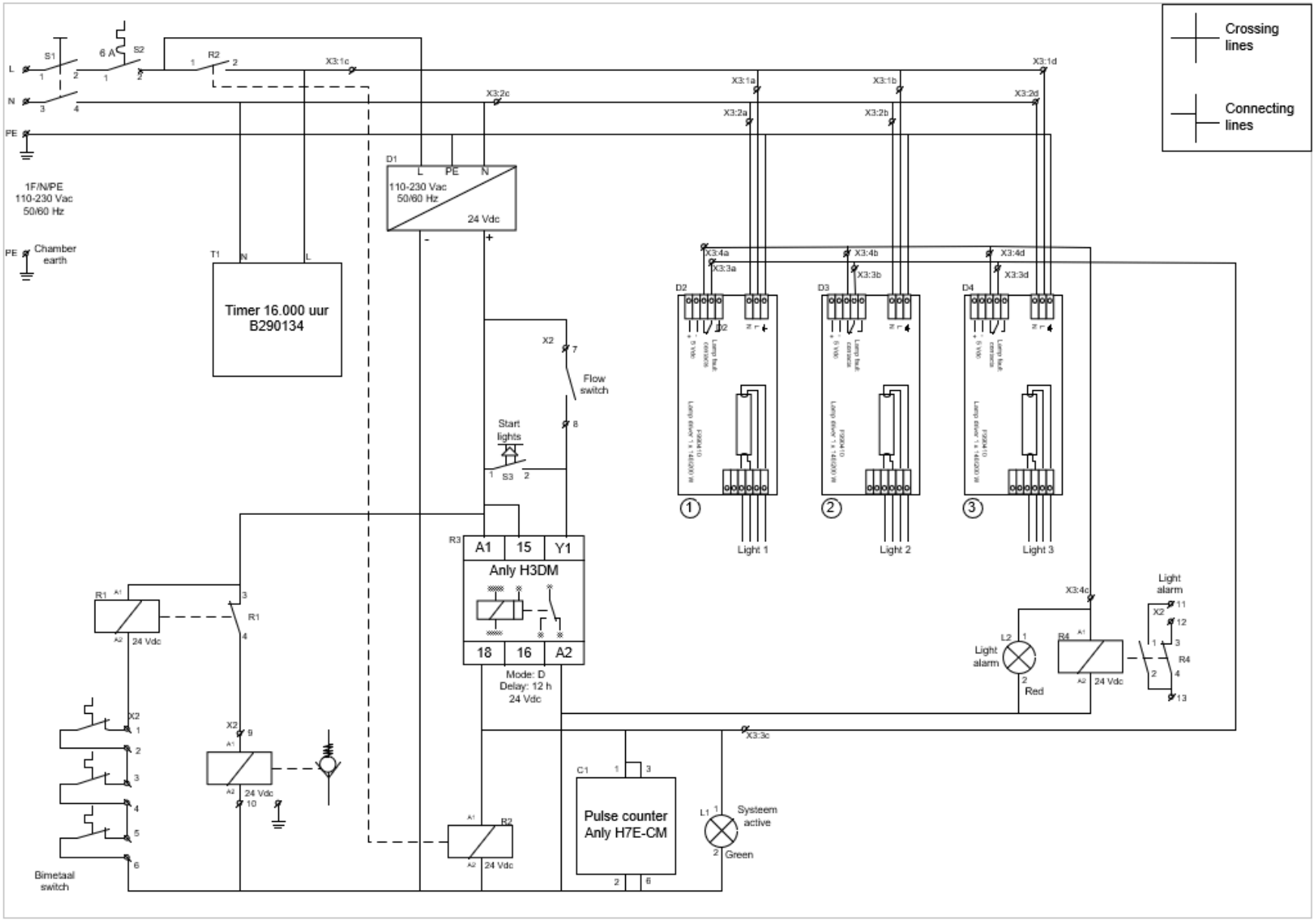
Descriptions	Drawings
Step 1. Remove the UV-C lamp.	
Step 2. Remove the four cap nuts using the specific torque screwdriver delivered with the installation. Place the cap nuts and rings on top of the control cabinet. **When reinstalling the socket do not use more force than 0,8nm!**	
Step 3. Slide the ceramic socket from the four threaded pins. Let the ceramic socket hang from the lamp cable. Remove the transparent clamp and place this on the control cabinet.	
Step 4. Take out the quartz-glass by grabbing the sides of the seal ring with your fingers. Leave the seal ring on the quartz tube.	

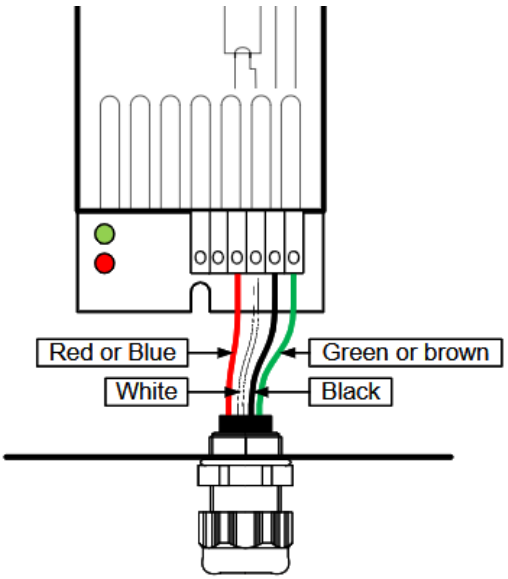
8.3 Cleaning the quartz glass

A quartz tube must be periodically checked, cleaned and replaced if necessary. The frequency is determined by the water quality. When there is hardness or organic material in the water a scale deposit may be formed on the quartz sleeve. This obstructs the UV-C radiation and subsequently adversely affects disinfection. If fouling is present on the quartz sleeve, carefully clean the quartz sleeve with a proper descaler or industrial acid e.g. citric acid.

Ensure that the correct safety measures are taken and the correct personal protective equipment is used during this operation.

9 Wire diagram




Red or Blue
White
Green or brown
Black

10 Problem solving

If malfunctions occur during the water treatment process with the UV system, the overview below can be used to determine and resolve the cause of the malfunction or problem.

Problem	Possible cause	Solution
Lamp is not burning. Indicators on control panel do not light up.	No flow is detected	Press “RESET”, only if system is filled with water and lamps can be turned on.
	Main switch not activated	Activate main switch.
	No supply voltage	Provide power supply.
Lamp is not burning. “ALARM” indicator is activated.	Lamp not properly placed in lamp socket.	Make sure the lamp connected properly in the socket.
	Lamp defective.	Place a new lamp or check the lamp with a lamp tester.
	Lamp cable is defective	Replace the lamp cable
Lamp is not burning. “SYSTEM ACTIVE” indicator is activated “ALARM” indicator is not activated.	No flow is detected for a longer period of time	Press “RESET”, only if system is filled with water and lamp has to be on
	“RESET” only works one time, lamps are not restarted with flow	Check flow switch, repair or replace if necessary
	Lamp driver is defective	Replace lamp driver
Control panel becomes too hot.	The ambient temperature is higher than 40 °C	Ensure that the ambient temperature remains below 40 °C.
	Control cabinet hangs in sunlight	Reposition the control so that it can no longer be irradiated by sunlight or ensure suitable sun protection.
	Control panel hangs too close or against a heat source	Move the control panel to a cool place.
UV chamber temperature > 45 °C	Thermal switch is not working	Check thermal switch on chamber, replace or repair if necessary
	Magnetic valve is non-functional	Check magnetic valve, replace or repair if necessary
	24DC power supply is defective	Check 24DC power supply, replace or repair if necessary
Water comes out of the irradiation chamber.	Damaged or incorrectly seal ring around the quartz tube.	Replace seal ring
	Damaged or broken quartz tube.	Replace quartz tube.
	Ceramic socket not tightened	Tighten socket using torque screwdriver using 0,8 nm force

Problem	**Possible cause**	**Solution**
Effect UV system is not good, not enough disinfection.	Polluted quartz tube	Clean or replace the quartz tube
	The UV transmittance of the water is too low	Improve the UV transmittance of the water, decrease flow or expand UV system
	UV lamp(s) have too many operating hours	Replace UV lamp(s) and reset Timer.
	Incorrect sampling	Ensure that the sampling points are properly disinfected before taking the water samples and repeat the measurement
“Timer” display is flashing	From day position “028d”; the display will blink every second	Replace the lamp within 4 weeks and reset Timer
	From day position “014d”; the display will blink every half second	Replace the lamp within 2 weeks and reset Timer
	From day position “007d”; the display will blink every second	Replace the lamp within 1 weeks and reset Timer
	The digits will blink continuously and not longer counts down	Immediately replace lamps and reset Timer

11 Logbook

Complete this document and ensure that this document is physically placed with the device.

UV-system	Duplex	Triplex
Date of installation		
Responsible user		
Main user		

The following items must be described in the logbook.

- Date of incident/check/serve;
- Work performed;
- Comments, such as;
  - Remaining life time lamp
  - Total switch cycle count

Performed work can consist of;

1) Cleaning of Quartz Glass
2) Replacing UV-C Lamp
3) Replacing Quartz Glass

Nr.	Date	Work performed	Comments	Carried out by