Assembly and operating instructions
Dulcodes S UV System
for the aquatics market

Please carefully read these operating instructions before use! Do not discard!
The operator shall be liable for any damage caused by installation or operating errors!
Technical changes reserved.
General non-discriminatory approach

In order to make it easier to read, this document uses the male form in grammatical structures but with an implied neutral sense. It is aimed equally at both men and women. We kindly ask female readers for their understanding in this simplification of the text.

Supplementary information

Please read the supplementary information in its entirety.

The following are highlighted separately in the document:

- Enumerated lists
- Instructions
  - Outcome of the instructions

Information

This provides important information relating to the correct operation of the device or is intended to make your work easier.

Safety notes

The safety information includes detailed descriptions of the hazardous situation, see Chapter 2.1 “Explanation of the safety instructions” on page 7.
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1 About this system

Application

The Dulcodes S UV systems are used for photochemical treatment and to support the disinfection of:

- Process water
- Swimming pool water

In the treatment of swimming pool water, harmful substances, such as chloramines, can be effectively reduced by UV radiation and also germs, which are difficult to inactivate with chlorine, can be safely killed.

The Dulcodes UV systems are supplied fully wired. They are available in different versions, which are defined by their identity code. The performance data can be found in the data sheet enclosed with the Dulcodes UV system.

Scope of supply

- Radiation chamber
- Lamp with lamp protection tube
- UV-C sensor
- Temperature switch
- Control cabinet with control
- Mounting materials
- Documentation

Dependent on the system type, the system is equipped with no wiper, a manual wiper or an automatic wiper. Retrofitting with a manual or automatic wiper is easily possible.

Allocation of wiper versions to the device types

<table>
<thead>
<tr>
<th>Device type</th>
<th>Without wiper</th>
<th>Manual wiper (manual wiper)</th>
<th>Automatic Wiper (automatic wiper)</th>
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<tbody>
<tr>
<td>1.00 kW</td>
<td>X</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>2.00 kW</td>
<td>X</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>3.00 kW</td>
<td>X</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>2x2.00 kW</td>
<td>----</td>
<td>----</td>
<td>O</td>
</tr>
<tr>
<td>3x2.00 kW</td>
<td>----</td>
<td>----</td>
<td>O</td>
</tr>
<tr>
<td>3x3.00 kW</td>
<td>----</td>
<td>----</td>
<td>O</td>
</tr>
</tbody>
</table>

X = standard; O = optional; ---- = not available
1.1 Correct and proper use

Correct and proper use

- The UV system is intended solely for the treatment of water.
- The UV system may only be used in accordance with the technical data and specifications outlined in the Operating Manual.
- Any other use or modification of the system is prohibited.
- The UV system must only be operated by trained and authorized personnel.
- You are obliged to observe the information contained in the operating instructions at the different phases of the device’s service life.

The operator shall be liable for any damage caused by installation or operating errors.
2 Safety chapter

2.1 Explanation of the safety instructions

Introduction

These operating instructions provide information on the technical data and functions of the product. These operating instructions provide detailed safety information and are provided as clear step-by-step instructions.

The safety information and notes are categorized according to the following scheme. A number of different symbols are used to denote different situations. The symbols shown here serve only as examples.

⚠️ DANGER

Nature and source of the danger

Danger!

– Denotes an immediate threatening danger. If this is disregarded, it will result in fatal or very serious injuries.

Consequence: Fatal or very serious injuries

Measure to be taken to avoid this danger.

⚠️ WARNING

Nature and source of the danger

Warning!

– Denotes a possibly dangerous situation. If this is disregarded, it could result in fatal or very serious injuries.

Possible consequence: Fatal or very serious injuries

Measure to be taken to avoid this danger.

⚠️ CAUTION

Nature and source of the danger

Caution!

– Denotes a possibly dangerous situation. If not avoided, it could result in slight or minor injuries. May also be used as a warning about material damage.

Possible consequence: Slight or minor injuries

Material damage.

Measure to be taken to avoid this danger.

NOTICE

Nature and source of the danger

Note!

– Denotes a possibly damaging situation. If not avoided, the product or an object in its vicinity could be damaged.

Damage to the product or its surroundings

Measure to be taken to avoid this danger.

Information!

– Denotes hints on use and other especially useful information. It does not indicate a hazardous or damaging situation.

Hints on use and additional information. Source of information.

Additional measures
2.2 Users' qualifications

**WARNING**

Danger of injury with inadequately qualified personnel!

- All work on the unit is to be conducted by qualified personnel only.
- Keep unqualified personnel away from the hazard zones.

The operator of the plant / device is responsible for ensuring that the qualifications are fulfilled. If inadequately qualified personnel work on the unit or loiter in the hazard zone of the unit, this could result in dangers that could cause serious injuries and material damage.

<table>
<thead>
<tr>
<th>Training</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructed personnel</td>
<td>An instructed person is deemed to be a person instructed and, if required, trained in the tasks assigned and possible dangers resulting from improper behavior, as well as having been instructed in the required protective equipment and protective measures.</td>
</tr>
<tr>
<td>Trained user</td>
<td>A trained user is a person who fulfills the requirements of an instructed person and who has also received additional training specific to the system from ProMinent or another authorized distribution partner.</td>
</tr>
<tr>
<td>Trained qualified person</td>
<td>A qualified employee is deemed to be a person who is able to assess the tasks assigned and recognize possible hazards based on his/her training, knowledge and experience, as well as knowledge of pertinent regulations. The assessment of a person's technical training can also be based on several years of work in the relevant field.</td>
</tr>
<tr>
<td>Electrician</td>
<td>Electricians are deemed to be people, who are able to complete work on electrical systems and recognize and avoid possible dangers independently based on their technical training and experience, as well as knowledge of pertinent standards and regulations. Electricians are specifically trained for the working environment in which they are employed and know the relevant standards and regulations. Electricians must comply with the provisions of the applicable statutory directives on accident prevention.</td>
</tr>
<tr>
<td>Service</td>
<td>Service refers to service technicians, who have received proven training and have been authorized by ProMinent to work on the system.</td>
</tr>
</tbody>
</table>

Note for the system operator

The pertinent accident prevention regulations, as well as all other generally acknowledged safety regulations must be observed.

2.3 Dulcodes safety information

**WARNING**

UV-C radiation

UV-C radiation is harmful to the eyes and skin.

- Only operate the UV lamp when it is fully fitted and installed
- Install the UV lamp into the UV system in accordance with the regulations prior to commissioning

Possible consequence: Serious injuries
Live parts!
– Measure: The device must be disconnected from the power supply before it is opened
– Disconnect damaged, defective or manipulated devices from the power supply
Possible consequence: Fatal or very serious injuries

Insufficient water treatment
Ensure that
– the maximum permissible water flow rate is not exceeded and
– UV transmission does not drop below the permissible level.
  – Otherwise adequate treatment cannot be guaranteed.
Possible consequence: Illness Please read the technical data sheet for your UV system

Overheating of lamp and treatment chamber
– Ensure that, with the exception of when the UV lamp is warming up, there is sufficient flow through the radiation chamber so that overheating of the radiation chamber is avoided.
– Only switch on the UV system after the radiation chamber has been filled with water.
– Switch the UV system off if the flow of water is interrupted.
Possible consequence: Material damage

Unauthorized operating parameter
Ensure that
– the installation place is dry and frost-proof,
– the protection of the UV system from chemicals, dyes and vapors is guaranteed,
– the ambient temperature and the radiation temperature in the direct vicinity of the system does not exceed 104.0°F,
– the maximum permissible operating pressure is not exceeded, and
– there are no solid particles or turbidity in the water to be treated.
– If necessary, install a suitable filter prior to the UV system.
Possible consequence: Material damage

2.4 Safety Equipment

Labels on radiation chamber
ATTENTION: Hazardous ultraviolet radiation

⚠️ UV-C radiation is harmful to the eyes and skin. The lamps may only be operated when installed. The system is to be installed in accordance with all pertinent regulations prior to commissioning the lamps.

ATTENTION: Hazard

⚠️ Disconnect the system from the power supply or switch off the main switch prior to commencing maintenance work on the system. Depressurize the radiation chamber prior to commencing maintenance work.

Labels on switch cabinet
⚠️ Disconnect the system from the power supply or switch off the main switch prior to opening the cabinet.
2.5 Information in the event of an emergency

In the event of an emergency, switch the red-yellow main switch on the side of the switch cabinet to \textit{OFF} or disconnect from the power supply.
3  Function

The water to be treated flows through the stainless steel chamber past the UV lamp. The UV radiation kills the germs and reduces substances, such as chloramines, in the swimming pool water.

The medium pressure UV lamp used generates very high UV-C radiation output, which is particularly effective for the treatment of water. The UV lamp is located in a lamp protection tube made of high-grade quartz with a high level of UV permeability.

The compact design of the radiation chamber and the optimum flow of radiation result in evenly distributed irradiation of the entire water flow.

A control monitors the UV system along with a UV sensor.

3.1  Commissioning

Once the Dulcodes UV system has been switched on, the UV lamp is ignited. Following ignition, the UV lamp needs approx 1 - 3 minutes until it has reached its operating temperature.

The UV-C sensor monitors the UV lamp: As soon as the UV-C output has exceeded the warning threshold, the system switches to normal operation.

If the safety threshold is not exceeded within the maximum permissible warm-up time, the control switches the UV system off and goes into fault mode.

3.2  Normal mode

In normal mode, the UV sensor continues to monitor the UV output:

If the UV output falls below the warning threshold: A warning is emitted.

If the UV output falls below the safety threshold: The control switches the UV system off and goes into fault mode.

3.3  Automatic wiper

Manually triggering a wiper cycle

During the wiping process, warning and safety thresholds are not monitored to prevent shadowing caused by the wiper from triggering a false alarm.

The wiping process is triggered upon pressing the "Enter" button in the "Wiper" display. This is independent from the system’s "ON" oder "OFF" settings.

If you start the wiping process in warm-up mode, the warm-up process is stopped; once the wiping process has ended, the warm-up time will be restarted.

Regular wiping

During the wiping process, warning and safety thresholds are not monitored to prevent shadowing caused by the wiper from triggering a false alarm.
If you activated interval wiping, a wiping cycle occurs automatically after the set interval has elapsed.

3.4 Temperature monitoring

The water temperature in the radiation chamber is monitored continuously while the UV lamp is in operation.

As soon as the water temperature exceeds the maximum temperature, the UV system goes into fault mode.

3.5 Switching off

When the OFF switch on the UV control is pressed, the UV lamp is switched off immediately.

3.6 Cool down

As the UV lamp can only be re-ignited after switching off the UV system and sufficient cooling, the system goes into cooling mode.

After the key has been pressed during cool-down, the UV system only restarts automatically after the remaining cooling time has elapsed. Even if pause mode is canceled during cool-down, the UV system only restarts after the cool-down period has elapsed.

Only during service work
During the cool-down period an attempt at ignition can be made by pressing the key.
4 Control

**NOTICE**
With the exception of sensor calibration, modifications to the settings should only be undertaken when the UV system is switched off.

**Version**
As the electronics and software are always subject to improvements, the version number has been introduced as a means of identification. This number must be provided with complaints. It can be called up on the display.

**Default settings**
The control used in the Dulcodes UV systems is reset in the factory. Therefore, with many applications a modification of the settings is not required.

### 4.1 Display

The system is provided with a graphical LCD display.

**NOTICE**

**START/STOP key**
Hold down the key for at least 2 seconds. The display will return to normal for the respective operating mode 5 minutes after the last time a key has been pressed.

In operating mode
- Display of the operating mode
- Warnings are indicated via flashing arrows and displays
- Faults are displayed by means of a flashing fault alert

In programming mode
- Flashing display of the numerical values and inputs that can be changed.

![Display and operating unit](image)

*Fig. 1: Display and operating unit*
<table>
<thead>
<tr>
<th>Position number</th>
<th>Key</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Housing</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>LCD display</td>
</tr>
<tr>
<td>5</td>
<td>🚠</td>
<td>UP key</td>
</tr>
<tr>
<td></td>
<td>🚠</td>
<td>In programing mode: Raises the displayed numerical value or changes an input</td>
</tr>
<tr>
<td>7</td>
<td>📤</td>
<td>BACK key</td>
</tr>
<tr>
<td></td>
<td>📤</td>
<td>Moves back one level in the menu</td>
</tr>
<tr>
<td>6</td>
<td>🚠</td>
<td>DOWN key</td>
</tr>
<tr>
<td></td>
<td>🚠</td>
<td>In programing mode: Lowers the displayed numerical value or changes an input</td>
</tr>
<tr>
<td>8</td>
<td>🚠</td>
<td>CHANGE key</td>
</tr>
<tr>
<td></td>
<td>🚠</td>
<td>In operating mode: Changes the display window</td>
</tr>
<tr>
<td></td>
<td>🚠</td>
<td>In programing mode: Changes adjustable parameters</td>
</tr>
<tr>
<td>3</td>
<td>🚠</td>
<td>START/STOP key</td>
</tr>
<tr>
<td></td>
<td>🚠</td>
<td>Switches the UV system on and off</td>
</tr>
<tr>
<td>4</td>
<td>🚠</td>
<td>ENTER key</td>
</tr>
<tr>
<td></td>
<td>🚠</td>
<td>In operating mode: Switches into programing mode or acknowledges a fault</td>
</tr>
<tr>
<td></td>
<td>🚠</td>
<td>In programing mode: Applies a set value or mode</td>
</tr>
</tbody>
</table>
4.2 Operating status display and parameter settings

![Diagram showing operating status display and parameter settings]

Fig. 2: Operating status display (with the system running)

- **A** = Back to Trend display
- **B** = Change to Programming mode
- **C** = Change to "Change Access Code" mode
Access code

Once the access code has been correctly entered, it is not necessary to re-enter the code for further programming processes; the flashing numbers or settings will appear directly as soon as the key is pressed. The enable code is automatically canceled 5 minutes after a key was last pressed or after a return to the Trend or Standard display.

4.2.1 Trend display

Display calibration

- Each calibration of the UV sensor is documented by a vertical continuous line in the trend display.
- The content of the trend display is deleted when the display range changes and when the operating hour counter is reset.

1 UV sensor signal
2 Warning threshold
3 Safety threshold
4 Switch on's/off's
5 Calibration

The trend display is used to monitor the aging of the UV-lamps, the formation of a film coating on the lamp protection tubes or changes to the water quality.

The progress of the UV sensor signal is shown in a time frame. Horizontal lines show the safety threshold and the warning threshold respectively. The short vertical lines show when the UV system is switched on. The display range of the sensor signal lies between 0% and the value, which has been assigned to the analogue output value of 20 mA. The time frame can be adjusted and guarantees an ongoing display: Once the selected time has expired, the oldest value is deleted and the new value is displayed.

Default setting

- Time frame: 100 days
- Maximum value of the UV sensor signal: 120%
4.2.2 Changing access code

To protect against unauthorized changes of the settings, the system control has an access code for the programming mode. It can be freely selected by the operator. The programming mode is still disabled after a change of the access code. It is only unlocked when the new access code is entered.

4.2.3 Set the local language

It is possible to select between different languages.

Language:

German

4.2.4 Calibrating the sensor

Default setting 1.000

100%
Cal. factor = 1,000
Time 5:00
Incorrect calibration caused by dirty components
Possible consequences: Insufficient irradiation due to inaccurate calibration. Ensure that the UV lamp and UV sensors are clean before starting the calibration, see Chapter 7.1.5 “Cleaning the UV Sensor” on page 50 and The UV sensor must be calibrated when a new UV lamp is installed.

Safety and warning thresholds are no longer monitored during calibration. For safety reasons, calibration is automatically interrupted after 5 minutes without the changes made being saved. The time count down can be seen in the display.

The UV sensor signal must be stable before the start of calibration. A changing UV sensor signal shows that the UV lamp has not yet warmed up sufficiently (5 to 10 minutes).

4.2.5 Triggering the wiper cycle

If an additional cleaning requirement exists, you can trigger a wiper cycle additional to those at the programmed intervals by pressing the key.

4.2.6 Setting the safety threshold

UV lamp replacement
– Check and possibly reset the safety and warning threshold when the UV lamp is replaced.
– Only a correctly set safety threshold will guarantee adequate UV radiation.

Possible consequence: Illness

Monitoring the safety threshold
During automatic wiper operation, the safety threshold is not monitored.

Reliable and safe water treatment can no longer be guaranteed if the UV-C output falls so low that the UV sensor signal falls below the safety threshold. When the signal falls below the safety threshold on the display, this is shown by two flashing arrows.
A signal device can be connected to the SAFETY THRESHOLD signal relay of the control. The relay is closed when the signal falls below the safety threshold.

Setting the safety threshold

**NOTICE**

The safety threshold must be below the warning threshold. It is not possible to set it above the warning threshold.

1. Switch on the UV system using the **STOP** button.
2. Wait until the UV lamp has reached its full capacity, i.e. the UV-C sensor signal must be stable.
3. Read the UV-C intensity displayed and note it down.
4. Switch off the UV system with the **STOP** button.
5. Set the safety threshold to 50%.
6. Now set the warning threshold.

**4.2.7 Setting the warning threshold**

60%

Warning threshold

*Fig. 10: Setting the warning threshold*

**WARNING**

UV lamp replacement

– Check and possibly reset the safety and warning threshold when the UV lamp is replaced.

Possible consequence: Illness

*Monitoring the warning threshold*

*During automatic wiper operation, the warning threshold is not monitored.*

The system issues a warning should the UV-C output drop so far that the UV sensor signal falls below the warning threshold. To prevent the signal from falling below the safety threshold, it is necessary to clean the UV lamp protection tube, replace the UV lamp, or improve the water quality improved by means of appropriate water treatment. When the signal falls below the warning threshold, this is indicated on the display by a flashing arrow.

A signal device can be connected to the WARNING THRESHOLD signal relay of the control. The relay is closed when the signal falls below the warning threshold.

Setting the warning threshold

**NOTICE**

The warning threshold must be above the safety threshold. It is not possible to set it below the safety threshold.
Requirements:
- The UV-C intensity is stable.
- The safety threshold has been set.
- Set the warning threshold to 60%

⇒ The safety and warning thresholds have been set, the system is now ready for operation and can be switched on using the key.

4.2.8 Adjusting the wiper interval
Default setting 2 hours

On systems with an automatic wiper, the interval (h:min) between wiping can be set between 1:00 and 9:59. Adjustment takes place in steps of one minute each.

Fig. 11: Adjusting the wiper interval

4.2.9 Adjusting the display range of the trend display
Default setting 100 days

The recording time of the UV sensor signal for the trend display can be adjusted. The value (in days) is interpreted as the time frame and thus guarantees a continuous display: Whenever the selected period has expired, the oldest value is deleted and the new value is displayed. The display range can be set between 4 - 100 days.

Fig. 12: Adjusting the display range of the trend display

4.2.10 Analogue output UV sensor signal: Assigning the standard signal
Default setting

0% = 0 mA
120% = 20 mA (depending on the settings)

Fig. 13: Analogue output UV sensor signal: Assigning the standard signal
Maximum value of the trend display
The UV sensor signal assigned to the 20 mA is simultaneously the maximum value of the trend display. Adjust this UV sensor signal value to 120 % of the maximum value so that the trend display can never "overflow".

The signal from the UV sensor can also be recorded for documentation purposes using a recorder. To do so, connect the recorder to the standard output of the control.

It is possible to choose a standard signal between 0 to 20 mA and between 4 to 20 mA:
- 0 or 4 mA correspond to the 0% UV sensor signal.
- The 20 mA value can be allocated to any maximum % value (0 % - 999 %).

4.2.11 Pause function
Default setting

Pause on
Pause contact

closed

Fig. 14: Pause function

4.2.12 Displaying/resetting the counter

OPERATING HOUR and CONNECTION counters cannot be reset.

LAMP HOUR and LAMP CONNECTIONS can be reset.

Fig. 15: OPERATING TIMES and CONNECTIONS

Fig. 16: LAMP HOURS and LAMP CONNECTIONS
4.2.13 Alarm signal relay

A signal device can be connected to the ALARM signal relay of the control. The relay drops out if there is a fault/malfunction or in the event of a power failure.
5 Mounting and installation

**WARNING**

Insufficient disinfection efficiency
Ensure that
– the maximum permissible water flow rate is not exceeded and
– UV transmission does not drop below the permissible level.
  – Otherwise adequate treatment cannot be guaranteed!

Possible consequence: Illness Please read the technical data sheet for your system.

**CAUTION**

Unauthorized operating parameter
Ensure that
– the installation place is dry and frost-proof,
– the protection of the UV system from chemicals, dyes and vapors is guaranteed,
– the ambient temperature and the radiation temperature in the direct vicinity of the system does not exceed 104.0°F,
– the maximum permissible operating pressure is not exceeded, and
– there are no solid particles or turbidity in the water to be treated.
  – If necessary, install a suitable filter in front of the UV system.

Possible consequence: Material damage.

**NOTICE**

Switching on and off
Possibility of increased wear on UV lamp Operate the UV system in such a way as to avoid switching the UV lamp on and off frequently.
5.1 Radiation chamber

Fig. 17: Layout of the radiation chamber with manual wiper

1 Mushroom knob
2 Clamping screw
3 Chamber cover
4 O-ring
5 Outlet
6 Centering bolt
7 Air vent/drain/flushing connection with O-ring (depending on installation location)
8 UV sensor
9 O-ring
10 Lamp protection tube
11 Lamp
12 Inlet
13 Wiper element
14 Bracket with wiper rod
15 Protective earth conductor cable
16 Temperature switch
17 Support plate for lamp protection tube
Fig. 18: Layout of the radiation chamber with automatic wiper

1. Motor
2. Protective cover
3. Chamber cover
4. O-ring
5. Outlet
6. Wiper rod
7. Air vent/drain/flushing connection with O-ring (depending on installation location)
8. UV sensor
9. O-ring

10. Lamp protection tube
11. Lamp
12. Inlet
13. Wiper element
14. Bracket
15. Protective earth conductor cable
16. Temperature switch
17. Support plate UV lamp protection tube

Mounting and installation
5.1.1 Assembly

Location

⚠️ CAUTION
Possibility of reduced power and premature failure of lamp. The UV system must be installed in such a way that the UV lamp lies horizontally.

⚠️ CAUTION
Maintenance work
Leave adequate room for maintenance work! The clearance required can be found in the dimensions sheet enclosed (replacement of lamp protection tube).

Attach the radiation chamber using appropriate fixing material (pipe clamp, frame). The installation position can in principle be chosen at random and, if required, can be adapted to conditions on site.

Ensure that the UV lamp lies horizontally. In the case of UV systems equipped with manual wipers, ensure that the wiper can be operated easily.

5.1.2 Attach the warning label

⚠️ NOTICE
The supplied self-adhesive warning label is to be attached to the radiation chamber so that it is clearly visible.

5.1.3 Hydraulic connectors

⚠️ CAUTION
Possibility of incorrect assembly
Implement the hydraulic connection of the radiation chamber in compliance with the applicable general guidelines and local installation regulations.

⚠️ CAUTION
Damage to lamp and wiper element
Possibility of damage to lamp and wiper element. The UV system may only be operated when the radiation chamber is completely filled with water. In the case of an empty or only partially filled radiation chamber there is a risk of damaging the lamp, radiation chamber and the wiper element. It must therefore be ensured that the radiation chamber cannot run empty when the pump is switched off.

NOTICE
- Provide valves upstream and downstream of the radiation chamber to shut off the radiation chamber for maintenance work.
- It is also recommended with radiation chambers, which are regularly cleaned by filling them with a cleaning solution, that the water drain and vent screws are replaced with suitable valves.
- With larger radiation chambers, it is recommended that they are filled through the water drain opening using an appropriate acid-resistant pump.
- If the radiation chamber is filled with a pump, it is also useful to circulate the cleaning solution through the air vent opening. This will shorten the cleaning time and achieve better results.
5.2 Control cabinet and control

5.2.1 Assembly

The connecting cable for the UV lamp and the UV sensor cable must not be extended!

The switch cabinet or the mounting panel with control and ballast should be mounted to the wall or a suitable frame in such a way that lamp and sensor can be connected to the cables provided.

5.2.2 Electrical connections

Electrical connections

– Please observe all generally applicable guidelines and local installation regulations.
– Only carry out maintenance work on the UV system when it has been disconnected from the power supply!
– Connect a protective earth conductor to both the radiation chamber and the cover of the chamber. Ensure a continuous power supply by means of a suitable fault current protection switch.
– Only an authorized electrician may open the switch cabinet.
– Do not extend the connecting cable for the UV lamp or the UV sensor cable.
– The electrical installation must be carried out by an authorized, qualified electrician using the documents supplied (wiring diagram).

Possible consequence: Fatal or very serious injuries.

5.2.3 Fitting the temperature sensor

Overheating of radiation chamber
Possible consequences: Serious injuries and property damage due to overheating. The radiation chamber may overheat if the temperature sensor is not fitted correctly.

The temperature sensor monitoring the water temperature must be screwed into the socket provided on the radiation chamber.

1. Carefully push the O-ring over the thread of the temperature sensor.
2. Screw the temperature sensor "finger-tight" into the sleeve.
3. Attach the connecting cable and fix in place.

5.3 Installing the UV lamp protection tube

5.3.1 Installing the UV lamp protection tube without the wiper

1. Using a face spanner wrench, loosen the lamp protection tube bracket and remove it (place on the holes, not on the threads).
2. Carefully pull the transport protection (gray plastic pipe) completely out of the radiation chamber.
3. Carefully push the UV lamp protection tube into the radiation chamber until it reaches its stop position.
4. Push a new O-ring onto the end of the UV lamp protection tube.

5. **CAUTION!**
   - Check the UV lamp protection tube for damage before fitting.
     - A damaged UV lamp protection tube must not be refitted.
   - Ensure that the UV lamp protection tube is seated correctly.
     - The UV lamp protection tube must not project out more than 0.5" nor be offset at an angle.

Ensure that the UV lamp protection tube is seated correctly. The UV lamp protection tube must not project out more than 0.5" nor be offset at an angle.

### 5.3.2 Installing the UV lamp protection tube with manual wiper.

#### Unsecured wiper rod

- An unsecured wiper rod can shoot out of the radiation chamber under operating pressure and cause injury.
- Therefore always lock the wiper rod in place with the fixing bushing.

#### Possible material damage and slight bodily injury

- **CAUTION**
- Wiper rod, manual wiper
- Possible material damage When working on systems with manual wipers, take care to avoid bending the projecting wiper rod.

1. Loosen the clamping screw slightly (approx. 1/4 turn in a counter-clockwise direction).

2. Loosen the fixing bushing from the locked position of the clamping screw.

3. Pull the wiper rod out to its stop position - it must remain in its stop position until it is pushed in again.

4. Tighten the clamping screw slightly using your fingers (approx. 1/4 turn in a clockwise direction).

5. Using a face spanner wrench, loosen the lamp protection tube bracket and remove it (place on the holes, not on the threads).

6. Carefully pull the transport protection (gray plastic pipe) completely out of the radiation chamber.

7. Carefully push the UV lamp protection tube into the radiation chamber until it reaches its stop position.

8. Push a new O-ring onto the end of the UV lamp protection tube.
9. **CAUTION!**
   - Check the UV lamp protection tube for damage before fitting.
   - A damaged UV lamp protection tube must not be refitted.
   - Ensure that the UV lamp protection tube is seated correctly.
   - The UV lamp protection tube must not project out more than 0.5” nor be offset at an angle.

Ensure that the UV lamp protection tube is seated correctly. The UV lamp protection tube must not project out more than 0.5” nor be offset at an angle.

10. **CAUTION!**
    - Push the wiper rod into the radiation chamber only if its surface is clean. Otherwise the O-ring could be damaged.

Loosen the clamping screw slightly (approx. 1/4 turn in an counter-clockwise direction).

11. Push the wiper rod completely into the radiation chamber.

12. Lock the fixing bushing in the clamping screw.

13. Tighten the clamping screw slightly using your fingers (approx, 1/4 turn in a clockwise direction).

5.3.3 **Fitting the UV lamp protection tube with automatic wiper**

1. Using a face spanner wrench, loosen the lamp protection tube bracket and remove it (place on the holes, not on the threads).

2. Carefully push the UV lamp protection tube into the radiation chamber until it reaches its stop position.

3. Push a new O-ring onto the end of the UV lamp protection tube.

4. **CAUTION!**
   - Check the UV lamp protection tube for damage before fitting.
   - A damaged UV lamp protection tube must not be refitted.
   - Ensure that the UV lamp protection tube is seated correctly.

Ensure that the UV lamp protection tube is seated correctly. The UV lamp protection tube may not project by more than 0.5” and must not be offset at an angle.

5. Insert the UV lamp with the cable clamp fully into the UV lamp protection tube.

6. Place the UV lamp cover onto the UV lamp protection tube bracket and, using the attachment screws provided, screw in and tighten with an Allen key.

7. Push the protective cover in the longitudinal direction over the motor up to the end position.
5.4 Assembly and connection of the UV Lamp

**WARNING**

UV-C radiation is harmful to the eyes and skin.
- Only start up the UV lamps when they are properly installed.
- Prior to commissioning, install the UV lamp into the UV system in accordance with the instructions.

Consequence: Serious injuries

**WARNING**

Live parts!
- Measure: The device must be disconnected from the power supply before it is opened.
- Disconnect damaged, defective or manipulated devices from the power supply.
- Do not modify the fitted UV lamp connection cable without authorization.
- Do not modify the distance between the plug and the UV lamp cover.
  - Otherwise, it cannot be guaranteed that the UV lamp lies against the closed end of the UV lamp protection tube.

Possible consequence: Fatal or very serious injuries

**CAUTION**

Fingerprints on the UV lamp
- Only touch the glass of the UV lamp with cotton gloves.
- Fingerprints or impurities burn into the glass and can result in premature failure.
- For this reason always clean the lamp thoroughly with a cloth moistened with alcohol before installing.
- Then wipe the UV lamp with a soft cloth.
- Also thoroughly clean the glass of the UV lamp return cable.

Possible consequence: Premature failure of the UV lamp

**NOTE**

Safety switch for the UV lamp cover
The UV lamp cover is protected by a safety switch. The safety switch has a reed switch and comprises two components. The safety switch ensures that the UV lamp only generates UV radiation when the switch is installed. If the safety switch is removed, the UV lamp switches off. If the safety switch is not installed and thus remains closed, e.g. after installation and maintenance work, the UV lamp cannot be started.

1. Check whether the O-ring on the lamp protection tube bracket is in the designated groove - the sealing surfaces of the O-ring must be completely smooth and clean.
2. Place the O-rings into the designated groove on the lamp protection tube bracket.
3. Remove protective packaging from UV lamp.
4. Wipe the UV lamp with the cleaning cloth provided.
5. Re-wipe the UV lamp with a soft cloth.
6. Insert the UV lamp into the UV lamp protection tube and allow it to project out approx. 3.9”.
7. Attach the UV lamp to the cable clamp using a Phillips head screwdriver.
8. Insert the UV lamp fully into the UV lamp protection tube.
9. Place the UV lamp cover onto the UV lamp protection tube bracket and, using the attachment screws provided, screw in and tighten using the supplied Allen key.
10. Install the safety switch of the UV lamp cover.
5.5 Retrofitting a manual wiper

Deposits of, for example iron, manganese or lime scale, can form on the lamp protection tubes during operation. As these deposits absorb UV radiation, they must be removed at regular intervals.

Should frequent cleaning of the lamp protection tubes be required, a manual wiper mechanism can be retrofitted for 1 kW, 2 kW and 3 kW system sizes.

For this purpose, the following retrofitting set is required:

<table>
<thead>
<tr>
<th>Material number</th>
<th>UV system type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1035800</td>
<td>Dulcodes 1x1 S</td>
</tr>
<tr>
<td>1035801</td>
<td>Dulcodes 1x2 S</td>
</tr>
<tr>
<td>1035802</td>
<td>Dulcodes 1x3 S</td>
</tr>
</tbody>
</table>

5.5.1 Removing the UV lamp protection tube with manual wiper

**Live parts!**
- Measure: The device must be disconnected from the power supply before it is opened.
- Disconnect damaged, defective or manipulated devices from the power supply.
- Do not modify the fitted UV lamp connection cable without authorization.

Possible consequence: Fatal or very serious injuries

**WARNING**

UV-C radiation is harmful to the eyes and skin.
- Only start up the UV lamps when they are properly installed.
- Prior to commissioning, install the UV lamp into the UV system in accordance with the instructions.

Consequence: Serious injuries

**CAUTION**

Fingerprints on the UV lamp
- Only touch the glass of the UV lamp with cotton gloves.
- Fingerprints or impurities burn into the glass and can result in premature failure.
- For this reason always clean the lamp thoroughly with a cloth moistened with alcohol before installing.
- Then wipe the UV lamp with a soft cloth.
- Also thoroughly clean the glass of the UV lamp return cable.

Possible consequence: Premature failure of the UV lamp

**CAUTION**

Wiper rod, manual wiper
- An unsecured wiper rod can shoot out of the radiation chamber under operating pressure and cause injury.
- Therefore always lock the wiper rod in place with the fixing bushing.

Possible material damage When working on systems with manual wipers, take care to avoid bending the projecting wiper rod.
Safety switch for the UV lamp cover

The UV lamp cover is protected by a safety switch. The safety switch has a reed switch and comprises two components. The safety switch ensures that the UV lamp only generates UV radiation when the switch is installed. If the safety switch is removed, the UV lamp switches off. If the safety switch is not installed and thus remains closed, e.g. after installation and maintenance work, the UV lamp cannot be started.

1. Close the shut-off valves upstream and downstream of the radiation chamber.
2. Switch off the UV disinfection system with the STOP button.
3. Switch off the main switch or disconnect from the power supply.
4. Drain the radiation chamber.
5. Loosen the clamping screw slightly (approx. 1/4 turn in an counter-clockwise direction).
6. Loosen the fixing bushing from the locked position of the clamping screw.
7. Pull the wiper rod out to its stop position - it must remain in its stop position until it is pushed in again.
8. Tighten the clamping screw slightly using your fingers (approx, 1/4 turn in a clockwise direction).
9. Remove the safety switch of the UV lamp cover.
10. Loosen the attachment screws of the lamp cover using an Allen key and remove the lamp cover and the lamp.
11. Put the UV lamp cover and the UV lamp aside completely.
12. Using a face spanner, loosen the UV lamp protection tube bracket and remove it (place on the holes - not on the threads).
13. Carefully remove the UV lamp protection tube completely from the radiation chamber and place on a suitable clean surface.
14. Remove the O-ring from the lamp protection tube.
15. Wash the UV lamp protection tube with cleaning solution or immerse it in cleaning solution until the film has been removed without leaving a trace.
16. Rinse the UV lamp protection tube with clean water and dry thoroughly with a soft cloth.
17. Carefully push the UV lamp protection tube into the radiation chamber until it reaches its stop position.
18. Push a new O-ring onto the end of the UV lamp protection tube - the sealing surfaces of the O-ring must be smooth and clean.
19. Loosen the attachment screws on the cover of the chamber.
20. Remove the cover of the chamber.
5.5.2 Assembly and installation of the manual wiper

Fig. 19: Components of the manual wiper on the chamber cover and lamp connection

1. Mushroom knob
2. Guide bolt
3. Fixing bushing
4. Clamping screw
5. Wiper rod
6. O-ring
7. Chamber cover
8. Lamp protection tube
9. O-ring
10. Lamp protection tube bracket
11. O-ring
12. Cable clamp

1. Insert the wiper rod with the wiper element through the fixing bushing of the chamber cover.
2. Attach a new O-ring to the cover of the chamber.
3. Screw the cover of the radiation chamber with the manual wiper to the radiation chamber so that it is moisture-proof.
4. Insert the clamping screw, but do not tighten.
5. Screw the mushroom knob (with fixing bushing) onto the wiper rod using an SW 11 open-jaw wrench.
6. Pull the wiper rod out to its stop position - it must remain in its stop position until it is pushed in again.
7. Tighten the clamping screw slightly using your fingers (approx. 1/4 turn in a clockwise direction).
8. **CAUTION!** Check the UV lamp protection tube for damage before fitting.
   - A damaged UV lamp protection tube must not be refitted.
   - Ensure that the lamp protection tube is seated correctly.
     - The UV lamp protection tube may not project by more than 0.5" and must not be offset at an angle.

Carefully push the UV lamp protection tube into the radiation chamber until it reaches its stop position.
Mounting and installation

9. Push a new O-ring onto the end of the UV lamp protection tube - the sealing surfaces of the O-ring must be completely smooth and clean.

10. Screw the UV lamp protection tube bracket into the cover of the chamber and tighten firmly (place on the holes - not on the threads!).

11. Loosen the clamping screw slightly (approx. 1/4 turn in a counter-clockwise direction).

12. **CAUTION!** The seal on the wiper rod can become damaged. Only push the wiper rod into the radiation chamber if the rod’s surface is clean.

   Push the wiper rod completely into the radiation chamber.

13. Lock the fixing bushing in the clamping screw.

14. Tighten the clamping screw slightly using your fingers (approx. 1/4 turn in a clockwise direction).

15. **CAUTION!** Wiper rod, manual wiper

   - An unsecured wiper rod can shoot out of the radiation chamber under operating pressure and cause injury.
   - Therefore always lock the wiper rod in place with the fixing bushing.

   Possible material damage When working on systems with manual wipers, take care to avoid bending the projecting wiper rod.

   Check whether the O-ring on the UV lamp protection tube bracket is in the designated groove - the sealing surfaces of the O-ring must be completely smooth and clean.

16. **CAUTION!** When installing the lamp, rotate it in such a way that the lamp return cable is pointing downwards (between 4 o’clock and 8 o’clock). Otherwise this may result in premature failure of the UV lamp.

   Insert the UV lamp into the UV lamp protection tube and allow it to project out approx. 3.9”.

17. Attach the UV lamp to the cable clamp using a Phillips head screwdriver.

18. Insert the UV lamp fully into the UV lamp protection tube.

19. Place the UV lamp cover onto the UV lamp protection tube bracket and, using the attachment screws provided, screw in and tighten with the Allen key.

20. Install the safety switch of the UV lamp cover.

21. Switch on the main switch or connect to the power supply.

22. Switch on the UV system with the **STOP** button.

23. Slowly open the shut-off valve upstream of the radiation chamber.

5.6 Retrofitting an automatic wiper

Deposits of, for example iron, manganese or lime scale, can form on the lamp protection tubes during operation. As these deposits absorb UV radiation, they must be removed at regular intervals.

Should frequent cleaning of the lamp protection tubes be required, an automatic wiper can be retrofitted.
For this purpose, the following retrofitting set is required: Automatic wiper

<table>
<thead>
<tr>
<th>Material number</th>
<th>UV system type</th>
</tr>
</thead>
<tbody>
<tr>
<td>on request</td>
<td>Dulcodes 1x1 S</td>
</tr>
<tr>
<td>on request</td>
<td>Dulcodes 1x2 S</td>
</tr>
<tr>
<td>on request</td>
<td>Dulcodes 1x3 S</td>
</tr>
<tr>
<td>on request</td>
<td>Dulcodes 2x2 S</td>
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<tr>
<td>on request</td>
<td>Dulcodes 2x3 S</td>
</tr>
<tr>
<td>on request</td>
<td>Dulcodes 3x3 S</td>
</tr>
</tbody>
</table>

5.6.1 Removing the UV lamp protection tube with automatic wiper

**Live parts!**
- Measure: The device must be disconnected from the power supply before it is opened.
- Disconnect damaged, defective or manipulated devices from the power supply.
- Do not modify the fitted UV lamp connection cable without authorization.

Possible consequence: Fatal or very serious injuries

**WARNING**

**CAUTION**
- Only start up the UV lamps when they are properly installed.
- Prior to commissioning, install the UV lamp into the UV system in accordance with the instructions.

Consequence: Serious injuries

**WARNING**
- Only touch the glass of the UV lamp with cotton gloves.
- Fingerprints or impurities burn into the glass and can result in premature failure.
- For this reason always clean the lamp thoroughly with a cloth moistened with alcohol before installing.
- Then wipe the UV lamp with a soft cloth.
- Also thoroughly clean the glass of the UV lamp return cable.

Possible consequence: Premature failure of the UV lamp

**CAUTION**

Safety switch for the UV lamp cover
The UV lamp cover is protected by a safety switch. The safety switch has a reed switch and comprises two components. The safety switch ensures that the UV lamp only generates UV radiation when the switch is installed. If the safety switch is removed, the UV lamp switches off. If the safety switch is not installed and thus remains closed, e.g. after installation and maintenance work, the UV lamp cannot be started.

1. Close the shut-off valves upstream and downstream of the radiation chamber.
2. Switch off the UV disinfection system with the button.
3. Switch off the main switch or disconnect from the power supply.
4. Drain the radiation chamber.
5. Remove the safety switch of the UV lamp cover.
6. Loosen the attachment screws of the lamp cover using an Allen key and remove the lamp cover and the lamp.
7. Put the UV lamp cover and the UV lamp aside completely.
8. Using a face spanner, loosen the UV lamp protection tube bracket and remove it (place on the holes - not on the threads).
9. Carefully remove the UV lamp protection tube completely from the radiation chamber and place on a suitable clean surface.
10. Remove the O-ring from the lamp protection tube.
11. Wash the UV lamp protection tube with cleaning solution or immerse it in cleaning solution until the film has been removed without leaving a trace.
12. Rinse the UV lamp protection tube with clean water and dry thoroughly with a soft cloth.
13. Carefully push the UV lamp protection tube into the radiation chamber until it reaches its stop position.
14. Push a new O-ring onto the end of the UV lamp protection tube - the sealing surfaces of the O-ring must be smooth and clean.
15. Loosen the attachment screws on the cover of the chamber.
16. Remove the cover of the chamber.
5.6.2 Assembly and installation of the automatic wiper

Fig. 20: Assembly and installation of the automatic wiper

1. Grease the X-ring (1) on the inside diameter using Carbaflo 2371 (TN1026526) and insert it into the cover (2).
2. Screw the bearing cover (3) onto the chamber cover (2) using the screws (4).
3. Push the O-ring (5) onto the spacer rod (6).
4. Press the spacer rod (6) into the chamber cover (2) and screw it in with the fastening set (7).
5. Push the wiper rod (8) through the chamber cover (2) into the bearing cover (3).
6. Secure the wiper rod (8) with the safety collar/supporting washer (9).
7. Push the bracket (10) onto the opposing spacer rod (6), so that the wiper cannot tilt.

8. Push the support plate (11) with the slide bearing to the front onto the threaded rod.

9. Screw the support plate (11) on to the spacer rods (6) using the fastening set (12).

10. Clip the bearing ring (13) centrally on the support plate (11).
11. Screw the distance pin (14) into the chamber cover (2).
12. Screw the adapter plate (15) with the hexagon screws/lock washer onto the distance pin (14).
13. Push the hexagon sleeve (16) onto the hexagon axle of the wiper rod (8).
14. Screw the actuator drive motor (17) to the adapter plate (15) using the fastening set (18).
Place the fitted wiper unit on a support so that now the end position of the wiper when operated by the actuator motor can be defined.

![Diagram](image)

**Fig. 21: Adjustment instructions end stop (all dimensions in "mm")**

15. Now adjust the end position of the wiper. This is described in the adjustment instructions of the actuator motor. Adjust the wiper so that the wiper stops 0.4" or 0.2" in front of the stops as shown in Fig. 21.

⚠️ **CAUTION!** Inspect the UV lamp protection tube for damage.
- You must not refit a damaged UV lamp protection tube.
- Ensure that the UV lamp protection tube is seated correctly.
  - The UV lamp protection tube may not project by more than 0.5" and must not be offset at an angle.

16. Carefully push the UV lamp protection tube into the radiation chamber until it reaches its stop position.

17. Push a new O-ring onto the end of the UV lamp protection tube.
   - The sealing surfaces of the O-ring must be completely smooth and clean.

⚠️ **Place on the holes and not on the threads.**

18. Screw the UV lamp protection tube bracket into the chamber cover and tighten the screws.

19. **Condition of the O-rings** Check whether the O-ring on the UV lamp protection tube bracket is seated in the designated groove. The sealing surfaces of the O-ring must be completely smooth and clean.
   
   Insert the UV lamp into the UV lamp protection tube.
   
   - The UV lamp must project approx. 3.9".

20. Secure the the UV lamp to the cable clamp using a Phillips screwdriver.

21. Completely insert the UV lamp into the UV lamp protection tube.

22. Place the UV lamp cover onto the UV lamp protection tube bracket.

23. Screw the UV lamp cover onto the bracket using an Allen key.

24. Install the safety switch of the UV lamp cover.
25. Push the protective cover (19) in the longitudinal direction up to the end position over the actuator motor (17).

26. Switch the main switch on, or insert the plug in a power outlet.

27. Switch the UV system on using the STOP/START button.

28. Slowly open the shut-off valves upstream and downstream of the radiation chamber.
6 Commissioning

6.1 Leak testing and ventilation of the radiation chamber

*Using your fingers, tighten the clamping screw on the wiper rod just until water stops leaking under operating pressure.*

1. Open the air vent on the radiation chamber.
2. Slowly open the shut-off valve upstream of the radiation chamber.
3. Fill the radiation chamber until water emerges from the vent screw.
4. Close the air vent screw - this takes very little effort.
5. Check that the radiation chamber is not leaking.
6. Open the shut-off valve downstream from the radiation chamber (only necessary with a manual shut-off valve).

6.2 Switching on the UV system

*CAUTION*

Only switch on the UV system after the radiation chamber has been filled with water.

The power of system types Dulcodes 1x2 S to 3x3 S can be manually controlled in three steps by a step switch.

Setting the steps

- Step 1: 50% of the stated rated power in kW
- Step 2: 75% of the stated rated power in kW
- Step 3: 100% of the stated rated power in kW

Setting the power output allows the system to be adjusted to the load of the pool. If the chloramine contamination is low then the system power can be reduced.

1. Switch the main switch on.
2. Check the control parameters in programing mode. If necessary, change them.
3. **NOTICE!** Ensure that the UV lamp is started at maximum output. Set the manual step switch to the maximum UV lamp output (100%).

   Switch the UV system on using the key, keep the key pressed down for at least 2 seconds.

4. Should the control go into PAUSE mode, activate the Pause contact.
   - Once the lamp has ignited, it will take approx. 1 - 3 minutes until the full UV output has been reached.
6.3 Calibrating the UV sensor

**WARNING**

**Insufficient treatment**
- Only a correctly calibrated UV sensor will guarantee adequate treatment.
- Water must be flowing through the radiation chamber when calibrating the UV sensor.
- The UV sensor must always be calibrated with new UV emitters.
- The UV lamp must be operated at maximum output when calibrating the UV sensor.

**Possible consequence: Illness**

Safety and warning thresholds are no longer monitored during calibration. For safety reasons, calibration is automatically interrupted after 5 minutes without the changes made being saved. The time count down can be seen in the display.

The UV sensor signal must be stable before the start of calibration. A changing UV sensor signal shows that the UV lamp has not yet warmed up sufficiently (5 to 10 minutes).

6.3.1 UV Sensor calibration

**Calibration**

1. Press the 🔄 key to go to the SENSOR CALIBRATION display.
2. Confirm with the 🔄 key; REQUEST ACCESS CODE will appear on the display.
3. Enter the access code and confirm with the 🔄 key.
   - SENSOR CALIBRATION re-appears. Adjustable values are flashing.
4. Using the 🔄 and 🔄 keys to adjust the UV sensor value to 100%.
5. Confirm by pressing 🔄 key.
   - The message "Saving data" appears briefly. The UV sensor is now calibrated.
6. Use the 🔄 key to exit the programing mode.
   - The Dulcodes UV disinfection system is now ready for operation.
7 Maintenance

**WARNING**

**UV-C radiation**

- UV-C radiation is harmful to the eyes and skin.
- Only operate the UV lamp when it is fully installed.
- Install the UV lamp into the UV system in accordance with the regulations prior to commissioning.

**Possible consequence:** Serious injuries

**WARNING**

Live parts!

- Measure: The device must be disconnected from the power supply before it is opened.
- Disconnect damaged, defective or manipulated devices from the power supply.

**Possible consequence:** Fatal or very serious injuries

**CAUTION**

**General safety measures**

Depressurize the radiation chamber before commencing any maintenance work. Dirty filter mats on the fan and air outlet filter can lead to the control cabinet overheating and becoming damaged.

**NOTICE**

**Maximum permissible service life**

The UV lamps should be replaced at the latest after their maximum permissible service life. Otherwise, the operating safety of the UV system is no longer warranted. The maximum permissible service life is 8,000 operating hours, unless otherwise stated in the enclosed data sheet.

**Safety switch for the UV lamp cover**

The UV lamp cover is protected by a safety switch. The safety switch has a reed switch and comprises two components. The safety switch ensures that the UV lamp only generates UV radiation when the switch is installed. If the safety switch is removed, the UV lamp switches off. If the safety switch is not installed and thus remains closed, e.g. after installation and maintenance work, the UV lamp cannot be started.

The maintenance of the UV system is limited to cleaning the UV lamp protection tube and the sensor window as well as the replacement of the UV lamp at the end of its maximum permissible life time. On systems with manual wipers, the wiper element and the O-ring of the clamping screw must also be replaced.

On systems, which have a fan in the switch cabinet, the filter mats of the fan and the air outlet filter on the switch cabinet must be replaced regularly (normally once per year). An operating log should be kept as a record; a form is included in the Appendix.
7.1 Cleaning

7.1.1 Cleaning the UV lamp protection tube

Unsuitable cleaning agents

- Do not use corrosive acids or acids that could cause stress cracks, such as hydrochloric acid.
- Read the safety data sheet for the cleaning agent selected.
- Wear protective clothing when cleaning (protective eye wear, protective gloves, etc.).
- Ensure that no cleaning solution will penetrate the lamp protection tube.
- Ensure, when cleaning UV systems that no cleaning solution will enter the piping.

Possible bodily injury / material damage to the UV systems

Cleaning time

Clean the tube at the very latest when the UV sensor signal falls below the warning threshold, without this being based on other causes, such as aging of the UV lamp or significant deterioration of the UV transmission.

Disposal of cleaning agent

Possible environmental hazard Dispose of the waste cleaning solution in accordance with the pertinent guidelines and regulations.

Deposits of, for example iron, manganese or lime scale, can form on the UV lamp protection tubes during operation. As these deposits absorb UV radiation, they must be removed at regular intervals.

Annual cleaning of the UV lamp protection tubes when replacing the UV lamp suffices for many UV systems. Clean more frequently when operating with types of water that have a tendency to become dirty. The UV lamp protection tubes can be cleaned manually when dismantled or can be cleaned by filling the radiation chamber with a cleaning solution. Acids, such as diluted phosphoric acid, acetic acid or diluted nitric acid, are particularly suitable for cleaning.

Cleaning agents for manual cleaning

In spite of cleaning with a wiper, we recommend manual cleaning using cleaning solution, when you remove the UV lamp protection tube within the scope of UV lamp replacement.

On systems, which are fitted with manual wipers, the UV lamp protection tubes can be cleaned while still installed using the manual wiper.

In UV systems with automatic wipers, cleaning of the lamp protection tube while fitted is carried out every 2 years, dependent on the set wiper interval (presetting 2 h).

7.1.2 Cleaning with a manual wiper

Wiper rod, manual wiper

- An unsecured wiper rod can shoot out of the radiation chamber under operating pressure and cause injury.
- Therefore always lock the wiper rod in place with the fixing bushing.

Possible material damage and slight bodily injury When working on UV systems with manual wipers, take care to avoid bending the projecting wiper rod.
Cleaning with a manual wiper

1. Loosen the clamping screw slightly (approx. 1/4 turn in an counter-clockwise direction).
2. Secure the handle to prevent it from thrusting backwards.
3. Loosen the fixing bushing from the locked position of the clamping screw.
4. Pull or slide the wiper rod out of the radiation chamber until it reaches its stop position.
5. **CAUTION!** The seal on the wiper rod can become damaged. Possible consequence: Leakage Only push the wiper rod with a clean surface into the radiation chamber.
   - Push the wiper rod completely into the radiation chamber.
6. Repeat the wiping process as often as is necessary until the display of the UV intensity on the control indicates a sufficiently high value.
7. Push the wiper rod completely into the radiation chamber.
8. Lock the fixing bushing in the clamping screw.
9. Tighten the clamping screw slightly using your fingers (approx, 1/4 turn in a clockwise direction).
10. Flush the dissolved dirt and impurities out of the radiation chamber with clean water (flushing connections).
11. Connect the radiation chamber hydraulically to the complete system (shut-off valves).
7.1.3 Cleaning after dismantling the UV lamp protection tube

For systems without manual wipers, the irrelevant points can be skipped.

**WARNING**

UV-C radiation

- Only start up the UV lamps when they are properly installed.
- Install the UV lamp into the UV system in accordance with the regulations prior to commissioning.

Possible consequence: Serious injuries

**WARNING**

Live parts!

- Measure: The device must be disconnected from the power supply before it is opened.
- Disconnect damaged, defective or manipulated devices from the power supply.

Possible consequence: Fatal or very serious injuries

**CAUTION**

Wiper rod, manual wiper

- An unsecured wiper rod can shoot out of the radiation chamber under operating pressure and cause injury.
  - Therefore always lock the wiper rod in place with the fixing bushing.

Possible material damage When working on systems with manual wipers, take care to avoid bending the projecting wiper rod.

**CAUTION**

Fingerprints on the UV lamp

- Only touch the glass of the UV lamp with cotton gloves.
- Fingerprints or impurities burn into the glass and can result in premature failure.
- For this reason always clean the lamp thoroughly with a cloth moistened with alcohol before installing.
- Then wipe the UV lamp with a soft cloth.
- Also thoroughly clean the glass of the UV lamp return cable.

Possible consequence: Premature failure of the UV lamp

Cleaning the UV Sensor

Every time you clean the UV lamp protection tube, also clean the UV sensor.

Safety switch for the UV lamp cover

The UV lamp cover is protected by a safety switch. The safety switch has a reed switch and comprises two components. The safety switch ensures that the UV lamp only generates UV radiation when the switch is installed. If the safety switch is removed, the UV lamp switches off. If the safety switch is not installed and thus remains closed, e.g. after installation and maintenance work, the UV lamp cannot be started.

1. Close the shut-off valves upstream and downstream of the radiation chamber.
2. Switch off the UV system with the button.
3. Switch off the main switch or disconnect from the power supply.
4. Drain the radiation chamber.
5. Remove the safety switch of the UV lamp cover.
6. Loosen the attachment screws of the lamp cover using an Allen key and remove the lamp cover and the lamp.
7. Put the UV lamp cover and the UV lamp aside completely.
8. Loosen the clamping screw slightly (approx. 1/4 turn in a counter-clockwise direction).

9. Loosen the fixing bushing from the locked position of the clamping screw.

10. Pull the wiper rod out to its stop position - it must remain in its stop position until it is pushed in again.

11. Tighten the clamping screw slightly using your fingers (approx, 1/4 turn in a clockwise direction).

12. Using a face spanner wrench, loosen the UV lamp protection tube bracket and remove it (place on the holes - not on the threads).

13. Carefully remove the UV lamp protection tube completely from the radiation chamber and place on a suitable clean surface.

14. Remove the O-ring from the lamp protection tube.

15. Wash the UV lamp protection tube with cleaning solution or immerse it in cleaning solution until the film has been removed without leaving a trace.

16. Rinse the UV lamp protection tube with clean water and dry thoroughly with a soft cloth.

17. Carefully push the UV lamp protection tube into the radiation chamber until it reaches its stop position.

18. Push a new O-ring onto the end of the UV lamp protection tube - the sealing surfaces of the O-ring must be smooth and clean.

19. **CAUTION!** Check the UV lamp protection tube for damage before fitting.
   - A damaged UV lamp protection tube must not be refitted.
   - Ensure that the lamp protection tube is seated correctly.
     - The UV lamp protection tube may not project by more than 0.5" and must not be offset at an angle.

   Screw the UV lamp protection tube bracket into the cover of the chamber and tighten firmly (place on the drill holes - not on the threads!)

20. **CAUTION!** The seal on the wiper rod can become damaged. Only push the wiper rod into the radiation chamber if the rod's surface is clean.

   Loosen the clamping screw slightly (approx. 1/4 turn in a counter-clockwise direction).

21. Push the wiper rod completely into the radiation chamber.

22. Lock the fixing bushing in the clamping screw.

23. Tighten the clamping screw slightly using your fingers (approx. 1/4 turn in a clockwise direction).

24. **CAUTION!** Wiper rod, manual wiper
   - An unsecured wiper rod can shoot out of the radiation chamber under operating pressure and cause injury.
     - Therefore always lock the wiper rod in place with the fixing bushing.

   **Possible material damage** When working on systems with manual wipers, take care to avoid bending the projecting wiper rod.

   Check whether the O-ring on the UV lamp protection tube bracket is in the designated groove - the sealing surfaces of the O-ring must be completely smooth and clean.
25. **CAUTION!** When fitting the UV lamp, rotate it so that the UV lamp return cable is directed downwards. Otherwise this may result in premature failure of the UV lamp.

   Insert the UV lamp into the UV lamp protection tube and allow it to project out approx. 3.9".

26. Attach the UV lamp to the cable clamp using a Phillips head screwdriver.

27. Insert the UV lamp fully into the UV lamp protection tube.

28. Place the UV lamp cover onto the UV lamp protection tube bracket and, using the attachment screws provided, screw in and tighten with the Allen key.

29. Install the safety switch of the UV lamp cover.

30. Attach the pin plug with the UV lamp connection cable to the terminal on the UV lamp cover and fix in place with the knurled nut.

31. Switch on the main switch or connect to the power supply.

32. Switch on the UV system using the **STOP** button.

33. Slowly open the shut-off valve upstream of the radiation chamber.

34. Open the shut-off valve downstream of the radiation chamber (only necessary with a manual shut-off valve).

### 7.1.4 Cleaning with a cleaning solution

**Handling the cleaning solution**

- It is also recommended with radiation chambers, which are regularly cleaned by filling them with a cleaning solution, that the water drain and vent screws are replaced with suitable valves.

- With larger radiation chambers, it is recommended that they are filled through the water drain opening using an appropriate acid-resistant pump.

- If the radiation chamber is filled with a pump, it is also useful to circulate the cleaning solution through the air vent opening.
  - This will shorten the cleaning time and achieve better results.

- If the cleaning solution is collected and stored in a suitable storage tank, it can be reused several times.

#### Cleaning the lamp protection tubes by filling the radiation chamber with a cleaning solution:

1. Switch off the UV system using the **STOP** button.
2. Switch off the main switch or disconnect from the power supply.
3. Close the shut-off valves upstream and downstream of the radiation chamber.
4. Drain the radiation chamber
5. Screw in the water drain screw again and tighten; this requires very little effort.
6. Fill the radiation chamber with the cleaning solution through the vent opening.
   - Allow the cleaning solution to work for at least 20 minutes.
7. Open and remove the water drain screw.
8. Drain the radiation chamber and dispose of the cleaning solution in accordance with the pertinent regulations.
9. Flush the radiation chamber thoroughly with clean water until any cleaning solution residue has been removed.
10. Screw in the water drain screw and tighten; this requires very little effort.
11. Slowly open the shut-off valve upstream of the radiation chamber.
12. Fill the radiation chamber until water emerges from the vent screw.
13. Close the air vent screw and tighten; this requires very little effort.
14. Open the shut-off valve downstream from the radiation chamber (only necessary with a manual shut-off valve).
   ⇒ Check that the radiation chamber is not leaking.
15. Switch on the main switch or connect to the power supply.
   ⇒ The UV system is again ready for operation.

7.1.5 Cleaning the UV Sensor

1. Loosen the sensor connection cable from the UV sensor.
2. Twist the UV sensor out of the radiation chamber.
3. Clean the quartz window with a cloth that has been saturated with cleaning solution until the coating has been removed without leaving a trace.
4. Rinse the quartz window with clean water and dry with a soft cloth.
5. Examine the O-ring for damage and replace any damaged seals.
6. Screw in the UV sensor again and tighten; this requires very little effort.
7. Connect the sensor connection cable to the UV sensor.
8. Slowly open the shut-off valve upstream of the radiation chamber.
9. Fill the radiation chamber until water emerges from the vent screw.
10. Close the air vent screw and tighten; this requires very little effort.
11. Open the shut-off valve downstream from the radiation chamber (only necessary with a manual shut-off valve).
   ⇒ Check that the radiation chamber is not leaking.
12. Switch on the main switch or connect to the power supply.
   ⇒ The UV system is again ready for operation.
7.2 Replacing the wiper elements (systems with manual wiper)

Maintenance interval: 1 - 2 years

**WARNING**

UV-C radiation is harmful to the eyes and skin.
- Only start up the UV lamps when they are properly installed.
- Install the UV lamp into the UV system in accordance with the regulations prior to commissioning.

Possible consequence: Serious injuries

**WARNING**

Live parts!
- Measure: The device must be disconnected from the power supply before it is opened.
- Disconnect damaged, defective or manipulated devices from the power supply.

Possible consequence: Fatal or very serious injuries

**CAUTION**

Wiper rod, manual wiper
- An unsecured wiper rod can shoot out of the radiation chamber under operating pressure and cause injury.
  - Therefore always lock the wiper rod in place with the fixing bushing.

Possible material damage and slight bodily injury When working on UV systems with manual wipers, take care to avoid bending the projecting wiper rod.

**CAUTION**

Fingerprints on the UV lamp
- Only touch the glass of the UV lamp with cotton gloves.
- Fingerprints or impurities burn into the glass and can result in premature failure.
- For this reason always clean the lamp thoroughly with a cloth moistened with alcohol before installing.
- Then wipe the UV lamp with a soft cloth.
- Also thoroughly clean the glass of the UV lamp return cable.

Possible consequence: Premature failure of the UV lamp

Replacing the wiper elements

1. Switch off the UV system using the button.
2. Switch off the main switch or disconnect from the power supply.
3. Close the shut-off valves upstream and downstream of the radiation chamber.
4. Drain the radiation chamber.
5. Remove the safety switch of the UV lamp cover.
6. Loosen the attachment screws of the UV lamp cover using the enclosed Allen key and remove the lamp cover and the UV lamp.
7. Put the UV lamp cover and the UV lamp completely aside.
8. Loosen the clamping screw slightly (approx. 1/4 turn in a counter-clockwise direction).
9. Loosen the fixing bushing from the locked position of the clamping screw.
10. Pull the wiper rod out to its stop position - it must remain in its stop position until it is pushed in again.
11. Tighten the clamping screw slightly using your fingers (approx, 1/4 turn in a clockwise direction).
12. Using a face spanner wrench, loosen the UV lamp protection tube bracket and remove it (place on the holes - not on the threads).

13. Carefully remove the UV lamp protection tube completely from the radiation chamber and place on a suitable clean surface.

14. Remove the O-ring from the lamp protection tube.

15. Wash the UV lamp protection tube with cleaning solution or immerse it in cleaning solution until the film has been removed without leaving a trace.

16. Rinse the UV lamp protection tube with clean water and dry thoroughly with a soft cloth.

17. Remove the screws of the cover of the radiation chamber.

18. Carefully place the radiation chamber cover and the fully removed wiper rod in a suitable, clean spot.

19. Remove one hexagonal screw from a wiper.

20. Remove the old wiper element from the side.

21. Insert the new wiper element from the side - the wiping lip must point away from the radiation chamber.

22. Insert the Allen screw with the socket into the wiper and tighten.

23. **NOTICE!** The wiper element must sit loosely in the wiper even when the Allen screw is tightened. If this is not the case, eliminate the cause or use another wiper element.

   Fit a new O-ring to the cover of the radiation chamber.

24. Carefully insert the radiation chamber cover with the wiper rod still fully pulled out into the radiation chamber - the wiper rod must sit in its fixture on the radiation chamber cover and remain there until the lamp protection tube is fitted.

25. Screw the cover of the radiation chamber onto the radiation chamber so that it is moisture-proof.

26. Carefully push the UV lamp protection tube into the radiation chamber until it reaches its stop position.

27. Push a new O-ring onto the end of the UV lamp protection tube - the sealing surfaces of the O-ring must be completely smooth and clean.

28. **⚠️ CAUTION!** Check the UV lamp protection tube for damage before fitting.

   - A damaged UV lamp protection tube must not be refitted.
   - Ensure that the lamp protection tube is seated correctly.
     - The UV lamp protection tube may not project by more than 0.5" and must not be offset at an angle.

   Screw the UV lamp protection tube bracket into the cover of the chamber and tighten firmly (place on the drill holes - not on the threads!)

29. **⚠️ CAUTION!** The seal on the wiper rod can become damaged. Only push the wiper rod into the radiation chamber if the rod’s surface is clean.

   Loosen the clamping screw slightly (approx. 1/4 turn in a counter-clockwise direction).

30. Push the wiper rod completely into the radiation chamber.

31. Lock the fixing bushing in the clamping screw.
32. Tighten the clamping screw slightly using your fingers (approx. 1/4 turn in a clockwise direction).

33. **CAUTION!** Wiper rod, manual wiper
   - An unsecured wiper rod can shoot out of the radiation chamber under operating pressure and cause injury.
   - Therefore always lock the wiper rod in place with the fixing bushing.

Possible material damage When working on systems with manual wipers, take care to avoid bending the projecting wiper rod.

Check whether the O-ring on the UV lamp protection tube bracket is in the designated groove - the sealing surfaces of the O-ring must be completely smooth and clean.

34. **CAUTION!** When fitting the UV lamp, rotate it so that the UV lamp return cable is directed downwards. Otherwise this may result in premature failure of the UV lamp.

Insert the UV lamp into the UV lamp protection tube and allow it to project out approx. 3.9”.

35. Attach the UV lamp to the cable clamp using a Phillips head screwdriver.

36. Insert the UV lamp fully into the UV lamp protection tube.

37. Place the UV lamp cover onto the UV lamp protection tube bracket and, using the attachment screws provided, screw in and tighten with an Allen key.

38. Install the safety switch of the UV lamp cover.

39. Switch on the main switch or connect to the power supply.

40. Switch on the UV system using the **STOP** button.

41. Slowly open the shut-off valve upstream of the radiation chamber.

42. Open the shut-off valve downstream of the radiation chamber (only necessary with a manual shut-off valve).

### 7.3 Replace the O-ring on the clamping screw.

Maintenance interval: 1 year

**CAUTION**

Wiper rod, manual wiper

Possible material damage and slight bodily injury When working on systems with manual wipers, take care to avoid bending the projecting wiper rod.
Fig. 23: Components of the manual wiper on the chamber cover and lamp connection

1. Mushroom knob
2. Guide bolt
3. Fixing bushing
4. Clamping screw
5. Wiper rod
6. O-ring
7. Chamber cover
8. Lamp protection tube
9. O-ring
10. Lamp protection tube bracket
11. O-ring
12. Cable clamp

1. Depressurize the radiation chamber.
2. Loosen the clamping screw slightly (approx. 1/4 turn in an anti-clockwise direction).
3. Loosen the fixing bushing from the locked position of the clamping screw.
4. Fully remove the wiper rod.
5. Unscrew the mushroom handle from the wiper rod using an SW 11 open-jaw wrench.
6. Push the wiper rod approx. 5.9” into the radiation chamber.
7. Remove the clamping screw.
8. Pull the wiper rod fully out again - it will pull out the O-ring at the same time.
   ⇒ Clean the wiper rod if required.
9. Replace the O-ring.
10. Fit the clamping screw but do not tighten firmly.
11. Screw the mushroom knob (with fixing bushing) onto the wiper rod using an SW 11 open-jaw wrench.
12. **CAUTION!** The seal on the wiper rod can become damaged. Possible consequence: Leakage Only push the wiper rod with a clean surface into the radiation chamber.
    Push the wiper rod completely into the radiation chamber.
13. Lock the fixing bushing in the clamping screw.
14. Using your fingers, tighten the clamping screw on the wiper rod just until water stops leaking under operating pressure.

Tighten the clamping screw slightly using your fingers (approx. 1/4 turn in a clockwise direction).

⚠️ CAUTION! Wiper rod, manual wiper
- An unsecured wiper rod can shoot out of the radiation chamber under operating pressure and cause injury.
- Therefore always lock the wiper rod in place with the fixing bushing.

Possible material damage and slight bodily injury When working on UV systems with manual wipers, take care to avoid bending the projecting wiper rod.

7.4 Maintenance of the automatic wiper

Maintenance interval: 1 year

![Spare parts kit TN1037735](image)

You must replace these components after an operating period of one year.

7.4.1 Replacing the wiper elements (UV systems with automatic wiper)

Maintenance interval: 1 year

⚠️ WARNING

- UV-C radiation
- UV-C radiation is harmful to the eyes and skin.
  - Only start up the UV lamps ▲ when they are properly installed.
  - Install the UV lamp into the UV system in accordance with the regulations prior to commissioning.

Possible consequence: Serious injuries
Live parts!

– Measure: The device must be disconnected from the power supply before it is opened.
– Disconnect damaged, defective or manipulated devices from the power supply.

Possible consequence: Fatal or very serious injuries

Fingerprints on the UV lamp
– Only touch the glass of the UV lamp with cotton gloves.
– Fingerprints or impurities burn into the glass and can result in premature failure.
– For this reason always clean the lamp thoroughly with a cloth moistened with alcohol before installing.
– Then wipe the UV lamp with a soft cloth.
– Also thoroughly clean the glass of the UV lamp return cable.

Possible consequence: Premature failure of the UV lamp

Safety switch for the UV lamp cover
The UV lamp cover is protected by a safety switch. The safety switch has a reed switch and comprises two components. The safety switch ensures that the UV lamp only generates UV radiation when the switch is installed. If the safety switch is removed, the UV lamp switches off. If the safety switch is not installed and thus remains closed, e.g. after installation and maintenance work, the UV lamp cannot be started.

Replace the wiper elements.

1. Switch off the UV system using the STOP button.
2. Switch off the main switch or disconnect from the power supply.
3. Close the shut-off valves upstream and downstream of the radiation chamber.
4. Drain the radiation chamber.
5. Remove the safety switch of the UV lamp cover.
6. Loosen the attachment screws of the UV lamp cover using the enclosed Allen key and remove the lamp cover and the UV lamp.
7. Put the UV lamp cover and the UV lamp completely aside.
8. Pull off the protective cover over the motor in the longitudinal direction
9. Using a face spanner wrench, loosen the UV lamp protection tube bracket and remove it (place on the holes - not on the threads).
10. Carefully remove the UV lamp protection tube completely from the radiation chamber and place on a suitable clean surface.
11. Remove the O-ring from the lamp protection tube.
12. Wash the UV lamp protection tube with cleaning solution or immerse it in cleaning solution until the film has been removed without leaving a trace.
13. Rinse the UV lamp protection tube with clean water and dry thoroughly with a soft cloth.
14. Remove the screws of the cover of the radiation chamber.
15. Carefully lay the radiation chamber cover and the wiper unit in a suitable, clean place.
16. Remove one hexagonal screw from a wiper.
1. Remove the old wiper element (1) from the side.

2. Insert the new wiper element (1) from the side - the wiping lip must point away from the radiation chamber.

3. Insert the Allen screw with the socket into the wiper and tighten.

4. **NOTICE!** The wiper element must sit loosely in the wiper even when the Allen screw is tightened. If this is not the case, eliminate the cause or use another wiper element.

5. Fit a new O-ring to the cover of the radiation chamber.

6. Carefully insert the radiation chamber cover with the wiper unit into the radiation chamber.

7. Screw the cover of the radiation chamber onto the radiation chamber so that it is moisture-proof.

8. Carefully push the UV lamp protection tube into the radiation chamber until it reaches its stop position.

9. Push a new O-ring onto the end of the UV lamp protection tube - the sealing surfaces of the O-ring must be completely smooth and clean.

10. **CAUTION!** Check the UV lamp protection tube for damage before fitting.

   - A damaged UV lamp protection tube must not be refitted.
   - Ensure that the lamp protection tube is seated correctly.
   - The UV lamp protection tube may not project by more than 0.5" and must not be offset at an angle.

   Screw the UV lamp protection tube bracket into the cover of the chamber and tighten firmly (place on the drill holes - not on the threads!)

11. Insert the UV lamp with the cable clamp fully into the UV lamp protection tube.
27. Place the UV lamp cover onto the UV lamp protection tube bracket and, using the attachment screws provided, screw in and tighten with an Allen key.

28. Install the safety switch of the UV lamp cover.

29. Push the protective cover in the longitudinal direction over the motor up to the end position.

30. Switch on the main switch or connect to the power supply.

31. Switch on the UV system using the button.

32. Slowly open the shut-off valve upstream of the radiation chamber.

33. Open the shut-off valve downstream of the radiation chamber (only necessary with a manual shut-off valve).

7.5 Replacing the lamp

**WARNING**

Live parts!
- Measure: The device must be disconnected from the power supply before it is opened.
- Disconnect damaged, defective or manipulated devices from the power supply.

Possible consequence: Fatal or very serious injuries

UV-C radiation
- UV-C radiation is harmful to the eyes and skin.
- Only start up the UV lamps when they are properly installed.
- Install the UV lamp into the UV system in accordance with the regulations prior to commissioning.

Possible consequence: Serious injuries

Insufficient treatment efficiency
- The UV lamps must be replaced with new lamps as soon as:
  - The sensor signal approaches the minimum safety threshold unless traced back to another cause, such as formation of a coating on the lamp protection tubes or a serious deterioration of the UV transmission;
  - The operating life of the UV lamp is approaching or has exceeded its maximum service life.

Possible consequence: Illness Please read the Technical Data Sheet enclosed with the respective UV system.

**CAUTION**

Fingerprints on the UV lamp
- Only touch the glass of the UV lamp with cotton gloves.
- Fingerprints or impurities burn into the glass and can result in premature failure.
- For this reason always clean the lamp thoroughly with a cloth moistened with alcohol before installing.
- Then wipe the UV lamp with a soft cloth.
- Also thoroughly clean the glass of the UV lamp return cable.

Possible consequence: Premature failure of the UV lamp

**NOTICE**

Clean the lamp protection tubes each time a lamp is replaced. Dispose of used lamps in accordance with the applicable guidelines and directives. Usually these can be disposed of together with used fluorescent tubes.
Safety switch for the UV lamp cover

The UV lamp cover is protected by a safety switch. The safety switch has a reed switch and comprises two components. The safety switch ensures that the UV lamp only generates UV radiation when the switch is installed. If the safety switch is removed, the UV lamp switches off. If the safety switch is not installed and thus remains closed, e.g. after installation and maintenance work, the UV lamp cannot be started.

1. Switch off the UV system using the STOP button.
2. Switch off the main switch or disconnect from the power supply.
3. Close the shut-off valves upstream and downstream of the radiation chamber.
4. Remove the safety switch of the UV lamp cover.
5. Loosen the attachment screws of the lamp cover using an Allen key, remove the lamp cover and pull out the lamp by approximately 3.9".
6. Loosen the UV lamp at the cable clamp using a Phillips head screwdriver.
7. Fully remove the UV lamp and lay it aside.
8. Check whether the O-ring on the UV lamp protection tube bracket is in the designated groove - the sealing surfaces of the O-ring must be completely smooth and clean.
9. **CAUTION!** When fitting the UV lamp, rotate it so that the UV lamp return cable is directed downwards. Otherwise this may result in premature failure of the UV lamp.
   Insert the UV lamp into the UV lamp protection tube and allow it to project out approx. 3.9".
10. Attach the UV lamp to the cable clamp using a Phillips head screwdriver.
11. Insert the UV lamp fully into the UV lamp protection tube.
12. Place the UV lamp cover onto the UV lamp protection tube bracket and, using the attachment screws provided, screw in and tighten with an Allen key.
13. Install the safety switch of the UV lamp cover.
14. Switch on the main switch or connect to the power supply.
15. Switch on the UV system with the STOP button.
16. Slowly open the shut-off valve upstream of the radiation chamber.
17. Open the shut-off valve downstream of the radiation chamber (only necessary with a manual shut-off valve).

**WARNING**

Insufficient treatment efficiency
Possible consequence: Death or Illness
Check safety and warning threshold. Check and possibly reset the safety and warning threshold when the UV lamp is replaced. Only a correctly adjusted safety threshold will guarantee adequate treatment.

1. With the system switched off, use the key to display the UV lamp hours and UV lamp connections.
2. Confirm using the key - the "Request Access Code" display will appear.
3. Enter the access code and confirm with the key - the "Reset" display will appear.
4. Confirm with the key - the display will now be reset.

7.6 Calibrating the UV sensor

Calibrate the UV-C sensor compliant to the specifications, see Chapter 6.3 “Calibrating the UV sensor” on page 43

7.7 Replacing the filter mats

Replacement of the filter mats on the fan and the air outlet filter

General safety measures

Dirty filter mats on the fan and air outlet filter can lead to the control cabinet overheating and becoming damaged.

Replace the filter mats on the fan and the air outlet filter at least once per year. The filter mats must be replaced at shorter intervals in unfavorable ambient conditions.

1. Switch off the UV system using the button.

2. Switch off the main switch

3. Remove the cover of the fan. To do so, insert your fingers into the recesses on the bottom of the cover and remove the cover

4. Remove the dirty filter mat and insert a new filter mat with the white side facing inwards (control cabinet side).

5. Replace the filter mat on the air outlet filter as described above

6. Switch on the main switch.
8 Troubleshooting

Live parts!
- Measure: The device must be disconnected from the power supply before it is opened.
- Disconnect damaged, defective or manipulated devices from the power supply.
- Troubleshooting on the open control cabinet and the replacement of components may only be done by an authorized electrician.

Possible consequence: Fatal or very serious injuries

After acknowledging the fault message
If you have acknowledged a fault, the UV system will switch from the [Fault] state to the [Off] state. Before starting the UV system, you must check whether possibly implemented troubleshooting measures were successful. Only after clearing all fault-related errors does a new start make sense.

Fault alert*

<table>
<thead>
<tr>
<th>Possible cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lamp output too low</td>
<td>Increase lamp output (using the manual rotary dial on systems with output control).</td>
</tr>
<tr>
<td>Coating formed on the lamp protection tube and/or the UVC sensor</td>
<td>Clean lamp protection tube and UVC sensor.</td>
</tr>
<tr>
<td>Deterioration in the UV-transmission of the water to be treated</td>
<td>Improve water quality Possible cause UV lamp at the end of its service life</td>
</tr>
<tr>
<td>UV lamp at the end of its UV emission service life</td>
<td>Replace the UV sensor.</td>
</tr>
<tr>
<td>UV sensor not calibrated</td>
<td>Calibrating UV Sensor, see Chapter 6.3 “Calibrating the UV sensor” on page 43</td>
</tr>
</tbody>
</table>

*Acknowledge the fault alert with the key.
### Fault alert

<table>
<thead>
<tr>
<th>Possible cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>UV lamp defective</td>
<td>Replace UV lamp.</td>
</tr>
<tr>
<td>Starters defective</td>
<td>Replace starters.</td>
</tr>
</tbody>
</table>

*Acknowledge the fault alert with the key.

---

#### Safety threshold transgressed

**Message:** Lamp fault; UV sensor 0%

**Possible cause:**
- UV lamp defective
- Starters defective

**Remedy:**
- Replace UV lamp.
- Replace starters.

*Acknowledge the fault alert with the key.

---

#### Excess temperature

**Possible cause:**
- Temperature switch defective
- Water flow rate too low

**Remedy:**
- Replace temperature switch.
- Increase water flow rate.

*Acknowledge the fault alert with the key.

---

#### Display

**Possible cause:**
- UV lamp protection tube and/or UV sensor are dirty
- UV sensor defective

**Remedy:**
- Clean UV lamp protection tube and/or UV sensor.
- Use a new UV sensor.

If a flashing double arrow appears in the calibration display instead of the sensor signal, the sensor signal is too weak for correct calibration. Calibration cannot be performed.

---

#### Other Faults

**Possible cause:**
- External fault signal device triggered
- No external fault signal device connected and the contacts at the fault input are not bridged

**Remedy:**
- Eliminate cause of external fault.
- Bridge contacts at fault input.

*Acknowledge the fault alert with the key.
Fault alert*

Message: Memory error or Message: Default setting

During self-testing, the control has detected an error in the memory.

Replace the control (only an electrician is authorized to do so).

*Acknowledge the fault alert with the key.

Fig. 32: Message: Memory error

Fig. 33: Message: Default setting
## 9 Technical data

### Performance data

**NOTICE**

Data sheet

This technical data supplements the enclosed data sheet. If in doubt, the information on the data sheet applies.

<table>
<thead>
<tr>
<th>Type</th>
<th>Number of lamps</th>
<th>Lamp output</th>
<th>Power input</th>
</tr>
</thead>
<tbody>
<tr>
<td>1x1S</td>
<td>1</td>
<td>0.78 kW</td>
<td>0.90 kW</td>
</tr>
<tr>
<td>1x2S</td>
<td>1</td>
<td>2.00 kW</td>
<td>2.10 kW</td>
</tr>
<tr>
<td>1x3S</td>
<td>1</td>
<td>3.00 kW</td>
<td>3.20 kW</td>
</tr>
<tr>
<td>2x2S</td>
<td>2</td>
<td>4.00 kW</td>
<td>4.20 kW</td>
</tr>
<tr>
<td>2x3S</td>
<td>2</td>
<td>6.00 kW</td>
<td>6.20 kW</td>
</tr>
<tr>
<td>3x3S</td>
<td>3</td>
<td>9.00 kW</td>
<td>9.20 kW</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>Max. flow*</th>
<th>Connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>1x1S</td>
<td>1,871.7 cubic feet/h</td>
<td>DN 100/125</td>
</tr>
<tr>
<td>1x2S</td>
<td>3,143 cubic ft/h</td>
<td>DN 125/150</td>
</tr>
<tr>
<td>1x3S</td>
<td>6,250.1 cubic ft/h</td>
<td>DN 200/250</td>
</tr>
<tr>
<td>2x2S</td>
<td>8,475.5 cubic ft/h</td>
<td>DN 200/250</td>
</tr>
<tr>
<td>2x3S</td>
<td>11,653.1 cubic ft/h</td>
<td>DN 250</td>
</tr>
<tr>
<td>3x3S</td>
<td>17,657.3 cubic ft/h</td>
<td>DN 250/300</td>
</tr>
</tbody>
</table>

* 98%/0.4" transmission; 600 J/10.8 square ft

<table>
<thead>
<tr>
<th>Type</th>
<th>Pressure loss at maximum flow</th>
<th>Minimum clearance for Maintenance work</th>
<th>Net weight / Operating weight</th>
<th>Radiation chamber</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>1x1S</td>
<td>7 mbar 0.1 psi</td>
<td>15.76&quot;</td>
<td>68.2 lbs. / 103.4 lbs.</td>
<td>4.2 gal.</td>
<td></td>
</tr>
<tr>
<td>1x2S</td>
<td>6 mbar 0.1 psi</td>
<td>19.7&quot;</td>
<td>83.6 lbs. / 143 lbs.</td>
<td>7.1 gal.</td>
<td></td>
</tr>
<tr>
<td>1x3S</td>
<td>4 mbar 0.05 psi</td>
<td>23.6&quot;</td>
<td>114.4 lbs. / 259.6 lbs.</td>
<td>17.4 gal.</td>
<td></td>
</tr>
<tr>
<td>2x2S</td>
<td>6 mbar 0.1 psi</td>
<td>39.4&quot;</td>
<td>171.6 lbs. / 365.2 lbs.</td>
<td>26.4 gal</td>
<td></td>
</tr>
<tr>
<td>2x3S</td>
<td>10 mbar 0.15 psi</td>
<td>39.4&quot;</td>
<td>171.6 lbs. / 365.2 lbs.</td>
<td>26.4 gal</td>
<td></td>
</tr>
<tr>
<td>3x3S</td>
<td>25 mbar 0.5 psi</td>
<td>39.4&quot;</td>
<td>171.6 lbs. / 365.2 lbs.</td>
<td>DN 250 = 26.4 gal.</td>
<td></td>
</tr>
</tbody>
</table>
Permissible operating temperatures:
- Water temperature: 5 ... 104.0°F
- Ambient temperature: 5 ... 104.0°F

Operating pressure*
The permissible operating pressure is possibly lower with systems that have a non-standard design.

Requirements of the water to be treated:
- Maximum temperature: 104.0°F
- Maximum operating pressure: 6 bar*
- No corrosive or abrasive properties, chloride content < 250 ppm
- No tendency for sedimentation

9.1 Dimensions sheet

Fig. 34: Dulcodes 1 kW - 3 kW dimensions sheet (drawings not to scale) (all dimensions in "mm")

<table>
<thead>
<tr>
<th>Typ</th>
<th>1x1 S DIN</th>
<th>1x1 S ANSI</th>
<th>1x2 S</th>
<th>1x3 S</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1</td>
<td>168,3</td>
<td>6.63&quot;</td>
<td>219,1</td>
<td>323,9</td>
</tr>
<tr>
<td>L1</td>
<td>700,0</td>
<td>27.56&quot;</td>
<td>700,0</td>
<td>800,0</td>
</tr>
</tbody>
</table>

Drawings not true to scale.
(All dimensions in "mm")
## Technical data

<table>
<thead>
<tr>
<th>Typ</th>
<th>1x1 S DIN</th>
<th>1x1 S ANSI</th>
<th>1x2 S</th>
<th>1x3 S</th>
</tr>
</thead>
<tbody>
<tr>
<td>L2</td>
<td>425,0</td>
<td>16.73&quot;</td>
<td>525,0</td>
<td>625,0</td>
</tr>
<tr>
<td>L3</td>
<td>208,0</td>
<td>8.19&quot;</td>
<td>258,0</td>
<td>308,0</td>
</tr>
<tr>
<td>L4</td>
<td>579,0</td>
<td>22.80&quot;</td>
<td>679,0</td>
<td>779,0</td>
</tr>
<tr>
<td>L5</td>
<td>819,0</td>
<td>32.24&quot;</td>
<td>1019,0</td>
<td>1219,0</td>
</tr>
<tr>
<td>L6</td>
<td>230,0</td>
<td>9.06&quot;</td>
<td>230,0</td>
<td>280,0</td>
</tr>
<tr>
<td>L7</td>
<td>500,0</td>
<td>19.68&quot;</td>
<td>600,0</td>
<td>600,0</td>
</tr>
<tr>
<td>L8</td>
<td>500,0</td>
<td>19.68&quot;</td>
<td>600,0</td>
<td>600,0</td>
</tr>
<tr>
<td>Ø</td>
<td>139,7</td>
<td>29.92&quot;</td>
<td>139,7</td>
<td>139,7</td>
</tr>
</tbody>
</table>

I. Cable length approx. 16.4’

**Drawings not true to scale.**

*(All dimensions in "mm")*
Fig. 35: Dimensions sheet Dulcodes 2x2 kW, 2x3 kW, 3x3 kW, multiple UV lamp systems (drawings not to scale) (all dimensions in "mm")

<table>
<thead>
<tr>
<th>Type</th>
<th>2x2 kW</th>
<th>2x3 kW</th>
<th>3x3 kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN</td>
<td>200</td>
<td>250</td>
<td>250</td>
</tr>
<tr>
<td>DN</td>
<td>250</td>
<td>---</td>
<td>300</td>
</tr>
</tbody>
</table>

9.2 Electrical data

**NOTICE**

Fuses

The fuses are located in fuse boxes with a bayonet lock, on the right in the terminal box of the control.
### Technical data

<table>
<thead>
<tr>
<th>Type</th>
<th>Voltage</th>
<th>Frequency</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1x1S</td>
<td>230 V AC</td>
<td>50 Hz</td>
<td>60 Hz*</td>
</tr>
<tr>
<td></td>
<td>460 V AC*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1x2S</td>
<td>400 V AC</td>
<td>50/60 Hz</td>
<td>50/60 Hz*</td>
</tr>
<tr>
<td></td>
<td>480 V AC*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1x3S</td>
<td>400 V AC</td>
<td>50/60 Hz</td>
<td>50/60 Hz*</td>
</tr>
<tr>
<td></td>
<td>480 V AC*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2x2S</td>
<td>400 V AC</td>
<td>50/60 Hz</td>
<td>50/60 Hz*</td>
</tr>
<tr>
<td></td>
<td>480 V AC*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2x3S</td>
<td>400 V AC</td>
<td>50/60 Hz</td>
<td>50/60 Hz*</td>
</tr>
<tr>
<td></td>
<td>480 V AC*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3x3S</td>
<td>400 V AC</td>
<td>50/60 Hz</td>
<td>50/60 Hz*</td>
</tr>
<tr>
<td></td>
<td>480 V AC*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* = Alternative power supply. Observe the supplied system circuit diagram.

<table>
<thead>
<tr>
<th>Fuse</th>
<th>Version</th>
<th>Spare parts number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper fuse (self-supply by the control)</td>
<td>0.16 A slow</td>
<td>712048</td>
</tr>
<tr>
<td>Lower fuse (switched power outputs) (XR1-XR3)</td>
<td>2.50 A slow</td>
<td>712033</td>
</tr>
</tbody>
</table>

Control cabinet

- **Inputs**
  - Contact inputs (-X3:1 ... -X3.6):
    for contacts or switching transistors:
    - Open circuit voltage: 5V ± 0.5 V
    - Input resistance: 10 kOhm
- **Outputs**
  - Voltage outputs (-X1:1 ... -X1.10):
    - Type of contact: NOC
    - Load capacity: 250 V AC / 3 A / 100 VA
    - With inductive loads provide RC protection circuits
  - Relay outputs (-X4:1 ... -X4.6):
    - Type of contact: NOC
    - Load capacity: 250 V AC / 3 A / 100 VA
    - With inductive loads provide RC protection circuits
  - Alarm relay (-X4:7 ... -X4.9):
    - Type of contact: Changeover contact
    - Load capacity: 250 V AC / 3 A / 100 VA
    - With inductive loads provide RC protection circuits
  - Standard signal output mA (-X3:7 ... -X3.8):
    - 0/4...20 mA, potential-free
    - Maximum load: 600 Ohm
10 Appendix

10.1 Spare parts 1 kW - 3 kW single UV lamp system without wiper or manual wiper

Fig. 36: Spare parts drawing Dulcodes S single UV lamp system with manual wiper
### Spare parts list 1 kW - 3 kW single UV lamp system without wiper or manual wiper

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Spare parts number</th>
<th>Replacement interval</th>
<th>each</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>UV lamp protection tube d1.6x0.1x15” Q, 1 kW</td>
<td>1035166</td>
<td>2 - 3 years</td>
<td>1</td>
</tr>
<tr>
<td>101</td>
<td>UV lamp protection tube d1.6x0.1x19” Q, 2 kW</td>
<td>1035041</td>
<td>2 - 3 years</td>
<td>1</td>
</tr>
<tr>
<td>101</td>
<td>UV lamp protection tube d1.6x0.1x22.9” Q, 3 kW</td>
<td>1035193</td>
<td>2 - 3 years</td>
<td>1</td>
</tr>
<tr>
<td>102</td>
<td>UV lamp 0.65 kW, 1 kW</td>
<td>1035179</td>
<td>max. 8,000 h</td>
<td>1</td>
</tr>
<tr>
<td>102</td>
<td>UV lamp 2 kW</td>
<td>1035057</td>
<td>max. 8,000 h</td>
<td>1</td>
</tr>
<tr>
<td>102</td>
<td>UV lamp 3 kW</td>
<td>1035180</td>
<td>max. 8,000 h</td>
<td>1</td>
</tr>
<tr>
<td>104</td>
<td>UV lamp protection tube bracket</td>
<td>1035059</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>105</td>
<td>Retainer 1.9/1.5 x 0.12” PTFE white</td>
<td>1035074</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>113</td>
<td>Temperature switch G 3/4</td>
<td>1035104</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>114</td>
<td>Bearing ring D 2.1/1.6 x 0.5” PTFE</td>
<td>1035058</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>120</td>
<td>Locking screw DIN 910 G 3/4</td>
<td>1002753</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>130</td>
<td>UV sensor M G 3/4 1.4539</td>
<td>1034147</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>132</td>
<td>UV sensor connection cable 32.8”</td>
<td>1028063</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>141</td>
<td>O-ring 5.9” - 0.2” EPDM</td>
<td>1027463</td>
<td>after opening chamber</td>
<td>1</td>
</tr>
<tr>
<td>150</td>
<td>O-ring 1.6” - 0.2” EDDM</td>
<td>1023569</td>
<td>on request</td>
<td>2</td>
</tr>
<tr>
<td>153</td>
<td>O-ring/M 0.9” - 0.1” EPDM</td>
<td>1002175</td>
<td>on request</td>
<td>2</td>
</tr>
<tr>
<td>154</td>
<td>O-ring/M 1” - 0.08” EPDM</td>
<td>792872</td>
<td>on request</td>
<td>2</td>
</tr>
<tr>
<td>301</td>
<td>Turning mushroom knob GN 597-45-M10</td>
<td>1027877</td>
<td>on request</td>
<td></td>
</tr>
<tr>
<td>310</td>
<td>Guide bolt M0.3/M0.4x2.6”</td>
<td>1027931</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>311</td>
<td>Complete clamping screw for wiper rod</td>
<td>1027975</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>312</td>
<td>Fixing bushing with pins</td>
<td>1027930</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>316</td>
<td>O-ring 0.5” - 0.1” EPDM</td>
<td>790410</td>
<td>1 year</td>
<td>1</td>
</tr>
<tr>
<td>320</td>
<td>Complete bearing flange for wiper rod</td>
<td>1024944</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>340</td>
<td>Wiper rod compl. UVS 1KW</td>
<td>1035177</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>340</td>
<td>Wiper rod compl. UVS 1KW</td>
<td>1035131</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>340</td>
<td>Wiper rod compl. UVS 1KW</td>
<td>1035178</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>860</td>
<td>Face spanner wrench for Ø 0.6” - 3.9”</td>
<td>409805</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>900</td>
<td>Wiper element</td>
<td>1027879</td>
<td>1 - 2 years</td>
<td>1</td>
</tr>
<tr>
<td>901</td>
<td>Retaining ring d2.4”/1.8”x0.2”</td>
<td>1028100</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>No.</td>
<td>Description</td>
<td>Spare parts number</td>
<td>Replacement interval</td>
<td>each</td>
</tr>
<tr>
<td>-----</td>
<td>--------------------------------------------------</td>
<td>--------------------</td>
<td>----------------------</td>
<td>------</td>
</tr>
<tr>
<td>--</td>
<td>Filter mat each 3322/700 Control cabinet ventilation</td>
<td>1004212</td>
<td>1/2 - 1 year</td>
<td>2</td>
</tr>
<tr>
<td>--</td>
<td>Lamp cable ÖLFLEX® 540 P, 0.08&quot;x0.1&quot;</td>
<td>1035509</td>
<td>on request</td>
<td>1</td>
</tr>
</tbody>
</table>
10.2 Spare parts 1 kW - 3 kW single UV lamp system with automatic wiper

Fig. 37: Spare parts drawing Dulcodes S single UV lamp system with automatic wiper
Fig. 38: Spare parts drawing Dulcodes S single UV lamp system with automatic wiper, detail "A" and "B"

I. As supplied

Spare parts list 1 kW - 3 kW single UV lamp system with automatic wiper

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Spare parts number</th>
<th>Replacement interval</th>
<th>each</th>
</tr>
</thead>
<tbody>
<tr>
<td>90</td>
<td>Spare parts kit UVS 1 ... 3 kW</td>
<td>1037735</td>
<td>1 year</td>
<td>1</td>
</tr>
<tr>
<td>95</td>
<td>Installation tool for UVS motor bearing bush</td>
<td>1036907</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>96</td>
<td>Installation tool for UVS motor threaded sleeve</td>
<td>1037738</td>
<td>on request</td>
<td>1</td>
</tr>
</tbody>
</table>

* = forms part of the spare parts kit UVS 1 - 3 kW (1037735)
<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Spare parts number</th>
<th>Replacement interval</th>
<th>each</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>UV lamp protection tube d1.6x0.1x15” Q, 1 kW</td>
<td>1035166</td>
<td>2 - 3 years</td>
<td>1</td>
</tr>
<tr>
<td>101</td>
<td>UV lamp protection tube d1.6x0.1x19” Q, 2 kW</td>
<td>1035041</td>
<td>2 - 3 years</td>
<td>1</td>
</tr>
<tr>
<td>101</td>
<td>UV lamp protection tube d1.6x0.1x22.9” diameter, 3 kW</td>
<td>1035193</td>
<td>2 - 3 years</td>
<td>1</td>
</tr>
<tr>
<td>102</td>
<td>UV lamp 0.65 kW, 1 kW</td>
<td>1035179</td>
<td>max. 8,000 h</td>
<td>1</td>
</tr>
<tr>
<td>102</td>
<td>UV lamp 2 kW</td>
<td>1035057</td>
<td>max. 8,000 h</td>
<td>1</td>
</tr>
<tr>
<td>102</td>
<td>UV lamp 3 kW</td>
<td>1035180</td>
<td>max. 8,000 h</td>
<td>1</td>
</tr>
<tr>
<td>104</td>
<td>UV lamp protection tube bracket</td>
<td>1035059</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>105</td>
<td>Retainer 1.9”/1.5“ x 3 PTFE white</td>
<td>1035074</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>113</td>
<td>Temperature switch G 3/4</td>
<td>1035104</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>114</td>
<td>Bearing ring D 2.1”/1.6“ x 12 PTFE</td>
<td>1035058</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>115</td>
<td>Washer ø2.7” x 0.8” - M 0.6” x 0.06”</td>
<td>1035004</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>120</td>
<td>Locking screw DIN 910 G 3/4</td>
<td>1002753</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>121</td>
<td>Complete cable clamp, ø1.35” x 1.4”</td>
<td>1035011</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>122</td>
<td>Safety collar DIN 471, 0.31” x 0.03”</td>
<td>467238</td>
<td>1 year</td>
<td>1</td>
</tr>
<tr>
<td>130</td>
<td>UV sensor M G 3/4 1.4539</td>
<td>1034147</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>131</td>
<td>UV sensor connection cable 32.8’</td>
<td>1028063</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>141</td>
<td>O-ring 5.9” - 0.2” EPDM</td>
<td>1027463</td>
<td>after opening chamber</td>
<td>1</td>
</tr>
<tr>
<td>150</td>
<td>O-ring 1.6A” - 0.2” EPDM</td>
<td>1023569</td>
<td>on request</td>
<td>2</td>
</tr>
<tr>
<td>152</td>
<td>O-ring/M 0.24” - 0.1” FPM-B</td>
<td>740331</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>153</td>
<td>O-ring/M 0.9” - 0.1” EPDM</td>
<td>1002175</td>
<td>on request</td>
<td>2</td>
</tr>
<tr>
<td>154</td>
<td>O-ring/M 1” - 0.08” EPDM</td>
<td>792872</td>
<td>on request</td>
<td>2</td>
</tr>
<tr>
<td>316</td>
<td>X-ring 0.5 x 0.2x 0.2” 70 EPDM 281</td>
<td>1010384</td>
<td>1 year</td>
<td>1</td>
</tr>
<tr>
<td>320</td>
<td>Bearing cover complete UVS motor wiper</td>
<td>1037028</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>340</td>
<td>Wiper rod complete UVS 2 kW automatic wiper</td>
<td>1037069</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>340</td>
<td>Wiper rod complete UVS 3 kW automatic wiper</td>
<td>1037680</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>353</td>
<td>Motor actuator D714s</td>
<td>1037490</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>360</td>
<td>ÖLFLEX® Classic 100 4 G 0.75 gray</td>
<td>1024879</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>361</td>
<td>Contact box STAK 3N gray</td>
<td>1037535</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>362</td>
<td>Slide bearing 0.3 x 0.4 x 0.4” Iglidur H1</td>
<td>1037033</td>
<td>1 year</td>
<td>1</td>
</tr>
</tbody>
</table>

* = forms part of the spare parts kit UVS 1 - 3 kW (1037735)
<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>363</td>
<td>Bearing D 0.6&quot; x 0.7&quot; PVDF</td>
</tr>
<tr>
<td>364</td>
<td>Threaded sleeve Tr0.5&quot; x 0.1&quot; POM</td>
</tr>
<tr>
<td>365</td>
<td>Slide bearing D 0.67&quot; x 0.6&quot; Iglidur A500</td>
</tr>
<tr>
<td>860</td>
<td>Face spanner wrench for Ø 0.6&quot; - 3.9&quot;</td>
</tr>
<tr>
<td>880</td>
<td>Filter mat each 3322/700 Control cabinet ventilation</td>
</tr>
<tr>
<td>900</td>
<td>Wiper element</td>
</tr>
<tr>
<td>901</td>
<td>Retaining ring d2.4&quot; / 1.8&quot; x 0.2&quot; for UVR PTFE pure white</td>
</tr>
<tr>
<td>---</td>
<td>Lamp cable ÖLFLEX® 540 P, 0.08&quot;x0.1&quot;, 18.0'</td>
</tr>
</tbody>
</table>

* = forms part of the spare parts kit UVS 1 - 3 kW (1037735)
10.3 Spare parts 2x2 kW, 2x3 kW, 3x3 kW multiple UV lamp system with automatic wiper

Fig. 39: Spare parts drawing Dulcodes S multiple UV lamp system with automatic wiper
Spare parts list 2x2 kW, 2x3 kW, 3x3 kW multiple UV lamp system with automatic wiper

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Spare parts number</th>
<th>Replacement interval</th>
<th>each</th>
</tr>
</thead>
<tbody>
<tr>
<td>090</td>
<td>Spare parts kit UVS 3x3 kW</td>
<td>1037757</td>
<td>1 year</td>
<td>1</td>
</tr>
<tr>
<td>090</td>
<td>Spare parts kit UVS 2x2 kW, 2x3 kW</td>
<td>1037756</td>
<td>1 year</td>
<td>1</td>
</tr>
<tr>
<td>095</td>
<td>Bearing bush installation tool</td>
<td>1036907</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>096</td>
<td>Threaded sleeve installation tool</td>
<td>1037738</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>101</td>
<td>UV lamp protection tube d1.6&quot;x0.08&quot;x18.9&quot;, 2 kW</td>
<td>1035041</td>
<td>2 - 3 years</td>
<td>1</td>
</tr>
<tr>
<td>101</td>
<td>UV lamp protection tube d1.6&quot;x0.08&quot;x22.9&quot;, 3 kW</td>
<td>1035193</td>
<td>2 - 3 years</td>
<td>1</td>
</tr>
<tr>
<td>102</td>
<td>UV lamp 2 kW</td>
<td>1035057</td>
<td>max. 8,000 h</td>
<td>1</td>
</tr>
</tbody>
</table>

✱ = forms part of the spare parts kit UVS 3x3 kW (1037757) or spare parts kit UVS 2x2 kW, 2x3 kW (1037758)
<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Spare parts number</th>
<th>Replacement interval</th>
<th>each</th>
</tr>
</thead>
<tbody>
<tr>
<td>102</td>
<td>UV lamp 3 kW</td>
<td>1035180</td>
<td>max. 8,000 h</td>
<td>1</td>
</tr>
<tr>
<td>104</td>
<td>UV lamp protection tube bracket</td>
<td>1035059</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>105</td>
<td>Snap ring 1.9”/1.5” x 3 PTFE white</td>
<td>1035074</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>113</td>
<td>Temperature switch G 3/4</td>
<td>1035104</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>114</td>
<td>Bearing ring D 2.1”/1.6” x 12 PTFE</td>
<td>1035058</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>115</td>
<td>Washer D 2.7” x 0.8”; M0.6” x 06”</td>
<td>1035004</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>120</td>
<td>Locking screw DIN 910 G 3/4</td>
<td>1002753</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>121</td>
<td>Complete cable clamp; D34; 5 x 36</td>
<td>1035011</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>122</td>
<td>Safety collar DIN 471; 0.3” x 0.03”</td>
<td>467238</td>
<td>1 year</td>
<td>1</td>
</tr>
<tr>
<td>130</td>
<td>UV sensor M G 3/4 1.4539</td>
<td>1034147</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>131</td>
<td>UV sensor connection cable 10 m</td>
<td>1028063</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>141</td>
<td>O-ring 149.2 - 5.34 EPDM</td>
<td>1027463</td>
<td>after opening chamber</td>
<td>1</td>
</tr>
<tr>
<td>150</td>
<td>O-ring 40 - 5 EPDM</td>
<td>1023569</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>152</td>
<td>O-ring 6 - 3 FPM-B</td>
<td>740331</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>153</td>
<td>O-ring/M 22.00 - 3.00 EPDM</td>
<td>1002175</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>154</td>
<td>O-ring/M 1” - 0.08” EPDM</td>
<td>792872</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>316</td>
<td>X-Ring 13; 75 x 5; 3 x 4; 75 70 EPDM 28</td>
<td>1010384</td>
<td>1 year</td>
<td>1</td>
</tr>
<tr>
<td>320</td>
<td>Bearing cover complete with UVS motor</td>
<td>1037028</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>340</td>
<td>Wiper rod complete for 2x2 kW, 2x3 kW</td>
<td>1037485</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>340</td>
<td>Wiper rod complete for 3x3 kW</td>
<td>1037522</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>353</td>
<td>Motor actuator</td>
<td>1037490</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>360</td>
<td>Ölflex Classic 100 4 G 0.75 gray</td>
<td>1024879</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>361</td>
<td>Contact box STAK 3N gray</td>
<td>1037535</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>362</td>
<td>Slide bearing F 0.3”x0.4”x0.4” Iglidur</td>
<td>1037033</td>
<td>1 year</td>
<td>1</td>
</tr>
<tr>
<td>363</td>
<td>Bearing D16x17; PVDF</td>
<td>1037100</td>
<td>1 year</td>
<td>1</td>
</tr>
<tr>
<td>364</td>
<td>Threaded sleeve Tr 12 x 3 POM</td>
<td>1037070</td>
<td>1 year</td>
<td>1</td>
</tr>
<tr>
<td>365</td>
<td>Slide bearing D16, 0.3” x 0.6”, Iglidur</td>
<td>1037575</td>
<td>1 year</td>
<td>1</td>
</tr>
<tr>
<td>860</td>
<td>Face spanner wrench for ⊙ 0.6” - 3.9”</td>
<td>409805</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>880</td>
<td>Filter mat each 3322/700 Control cabinet ventilation</td>
<td>1004212</td>
<td>1/2 - 1 year</td>
<td>2</td>
</tr>
</tbody>
</table>

* = forms part of the spare parts kit UVS 3x3 kW (1037757) or spare parts kit UVS 2x2 kW, 2x3 kW (1037756)
<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Spare parts number</th>
<th>Replacement interval</th>
<th>each</th>
</tr>
</thead>
<tbody>
<tr>
<td>900</td>
<td>Wiper element</td>
<td>1027879</td>
<td>1 year</td>
<td>1</td>
</tr>
<tr>
<td>901</td>
<td>Holding ring d2.4&quot;/1.8&quot; x 0.2&quot;</td>
<td>1028100</td>
<td>on request</td>
<td>1</td>
</tr>
<tr>
<td>--</td>
<td>Lamp cable ÖLFLEX® 540 P, 0.08&quot;x0.1&quot;, 18.0'</td>
<td>1035504</td>
<td>on request</td>
<td>2-3</td>
</tr>
</tbody>
</table>

✱ = forms part of the spare parts kit UVS 3x3 kW (1037757) or spare parts kit UVS 2x2 kW, 2x3 kW (1037756)
10.4 Dulcodes S Terminal Wiring Diagram

**WARNING**

Power supply at protective low voltage
Possible consequence: Fatal or very serious injuries. If connecting the protective low voltage (SELV) to one of the X4 terminals, the X4 terminals must not be connected to the power supply!

![Dulcodes S Terminal Wiring Diagram](image)

Fig. 41: Dulcodes S Terminal Wiring Diagram
## Dulcodes UV system unit operating log

<table>
<thead>
<tr>
<th>Date</th>
<th>Turn-ons UV lamp</th>
<th>Operating hours UV lamp</th>
<th>Signal display Sensor [%] // [w/ft.²]</th>
<th>UV-transmission [%/1 cm]</th>
<th>Flow [cubic ft./h]</th>
<th>Maintenance work</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
</tr>
</tbody>
</table>
11 EC Declaration of Conformity

EU Declaration of Conformity

We, hereby declare that,

ProMaqua GmbH
Maaßstraße 32/1
D - 69123 Heidelberg

on the basis of its functional concept and design and in the version marketed by us,
the product specified in the following complies with the relevant, fundamental safety and health stipulations
laid down by EC regulations.
Any modification to the product not approved by us will invalidate this declaration.

Product description: UV disinfection system Dulcodes

Product type: UVCa...

Serial number: Please refer to the type plate on the device

Relevant
EC regulations

EU - Low Voltage Directive (2006/95/EC)
EU Pressure Equipment Directive (97/23/EC)

Harmonised standards applied, in particular:
EN 60204-1, EN 60335-1, EN 60529
EN 61000-3-2, EN 61000-6-1/2/3/4

Harmonised national standards and other technical specifications applied, in particular:

Technical documents have been compiled by documentation specialists:
Dr. W. Waibling
Maaßstraße 32/1
D - 69123 Heidelberg

Date / Manufacturer's signature: 7.6.2010

The undersigned:
Ralf Kiermaier, Managing Director of ProMaqua GmbH

Fig. 42: EC Declaration of Conformity / Dulcodes without wiper or with manual wiper
EU Declaration of Conformity

We, hereby declare that,

ProMaqua GmbH
Maaßstraße 32/1
D - 69123 Heidelberg

on the basis of its functional concept and design and in the version marketed by us, the product specified in the following complies with the relevant, fundamental safety and health stipulations laid down by EC regulations.

Any modification to the product not approved by us will invalidate this declaration.

Product description: UV disinfection system Dulcodes

Product type: UVCa - ---- - 7 -----

Serial number: Please refer to the type plate on the device

Relevant EC regulations

EU - Machinery Directive (2006/42/EC)
EU Pressure Equipment Directive (97/23/EC)
Compliance with the protection targets of the Low Voltage Directive 2006/95/EC according to Appendix I, No. 1.5.1 of the Machinery Directive 2006/42/EC

Harmonised standards applied, in particular:

EN ISO 12100-1, EN ISO 12190-2
EN 60204-1, EN 60335-1, EN 60529
EN 61000-3-2, EN 61000-6-1/2/3/4

Harmonised national standards and other technical specifications applied, in particular:

Technical documents have been compiled by documentation specialists:

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Date/Manufacturer's signature: 7.5.2010

The undersigned: Ralf Kienmaier, Managing Director of ProMaqua GmbH

Fig. 43: EC Declaration of Conformity / Dulcodes with automatic wiper
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