UV DISINFECTION SOLUTIONS

Installation & User Manual

VGE Pro UV INOX MP - Comfort

PARTNER IN UV-C SOLUTIONS

MEMBER OF: Sinvest Group BV

VGEM005-GB190

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Content

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1 Introduction

Thank you for choosing and purchasing a VGE B.V. UV system.
Our UV systems are designed to reliably and safely treat your water for a long time with UV-C radiation. A great deal of attention has also been paid to a service-friendly design so that it is easy for you as a user to install and maintain the UV system.

Before you start installing the UV system in your water treatment process, you must first have carefully read and understand the complete manual in order to use the system correctly and safely. Special attention must be given to safety instructions and comments. You then check whether the delivery has arrived complete and properly.

We wish you every success with the installation and use of your VGE Pro UV system!

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1.1 Company introduction

VGE B.V. is a prominent company focused on improving people's lives through timely innovations. As a manufacturer we provide high-quality UV-C equipment for the private, recreational and industrial sectors. As a manufacturer of a unique range of UV-C disinfection systems, we provide high-quality products and harmonious collaboration with customers from our newly build facility in industry area Duin III Noord Schijndel the Netherlands. We're proud to be a part of Holland's top technology region. We regularly introduce new products and we continuously improve our existing products. Environmental friendliness and saving energy are major points of interest at VGE B.V. Years of experience (since 1982) have resulted in technically advanced products that are used in more than 70 countries around the globe.

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1.2 Our passion

Combination of our passion for water and technology

Clean and safe water is of vital importance. Sustainable developments in the field of water disinfection is therefore an important theme worldwide. VGE B.V. is there as a producer of UV-C systems of awareness. As a company, we are therefore focused on new, sustainable developments, solutions and technologies in the field of water disinfection. We do this by combining our passion for technology and knowledge of water, which results in high-quality products and innovations.

VGE Pro: professional water disinfection systems
The VGE Pro range consists of a complete range of industrial UV-C disinfection systems.
The devices ensure reliable and efficient water radiation. VGE Pro UV-C disinfection systems are the finishing touch in your water irradiation installation; they ensure that the water is treated efficiently against bacteria, viruses, protozoa, algae and fungi. It is essential that the UV-C system seamlessly connects to the design and the other components of a water treatment system. When you choose VGE Pro UV-C, you choose guaranteed quality at a fair price.

What makes the VGE Pro UV-C systems unique?
- VGE Pro UV-C systems have a 316L stainless steel housing or a high quality HDPE housing;
- The lamp can be placed / replaced while the unit is under pressure (except for 3S / 3L / 8L);
- Each system is equipped with the possibility to visually check the irradiation chamber whether the UV lamp (s) are (are) in operation;
- VGE Pro systems can be equipped with a UV-C sensor and/or temperature sensor;
- VGE Pro systems with low pressure UV lamps are equipped with the unique Smart Pin Technology (S.P.T.) for easy and safe replacement/placement of the lamp without disconnecting the electrical connection;
- VGE Pro systems with medium-pressure UV lamps in the are equipped with the unique Single-end Bayonet Technology (S.B.T.) lamps, ensuring a safe and simple replacement/placement of the lamp without disconnecting the electrical connection;

Medium pressure UV lamp, Single-end Bayonet Technology (S.B.T.)

- Low pressure amalgam UV lamps have a high performance level in combination with a life expectancy of 16,000 hours;
- Our medium pressure UV lamps have a wide light spectrum and therefore many extensive applications, are water temperature independent and have a long life expectancy of 9,000 hours!
- Single systems can handle a flow from 0.5 m³/h to 550 m³/h;
- It is possible to adjust the devices to your own specifications

1.3 Manual is intended for

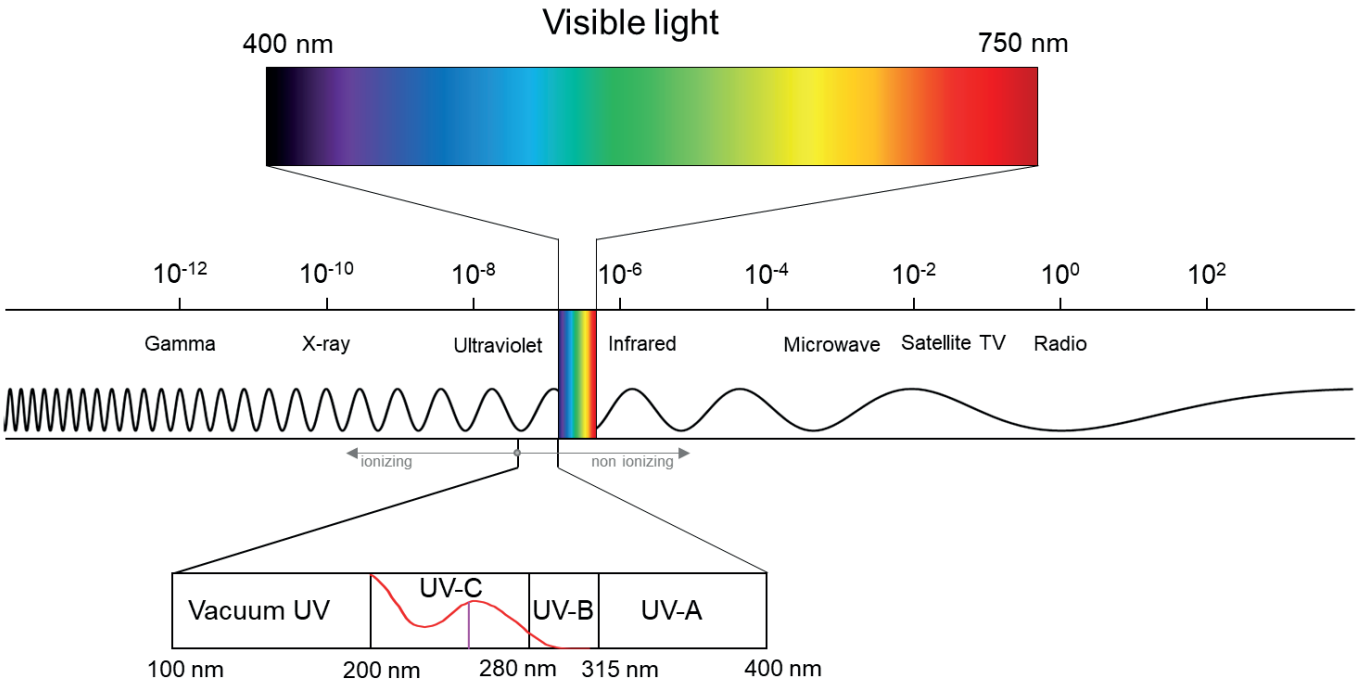
This manual is intended for everyone who has to work with and with the VGE Pro UV system such as:
- Installation staff;
- Operating staff;
- Service staff.

All persons who wish to work on or with the VGE Pro UV system must have carefully read and understood this manual before they can use the system in a correct and safe manner. Special attention must be given to safety instructions and comments.

1.4 Optical radiation

Light is essential for humans. However, in some cases employees may be exposed to too much "light" during their work, which may damage eyes and/or skin. For this type of situation, the EU Directive 2006/25/EC on artificial optical radiation (1) is intended. This describes what effects can occur and what the exposure limit values are. The term optical radiation includes the visible, ultraviolet and infrared spectrum. The term light is a looser term that generally refers to the visible part of the optical spectrum.

Optical radiation is part of the family of electromagnetic radiation (EM radiation). The electricity network emits EM-fields with a very large wavelength. If we shorten the wavelength, we end up with the long wave, medium wave, short wave, ultra short wave (FM radio) on TV, GSM, microwave and radar. The following is the optical area starting with the far infrared. After the infrared, the (fairly narrow) visible area follows, followed by the ultraviolet, which cannot be seen with the human eye. After the hard UV-C, the optical area and also the non-ionizing part of the EM-spectrum ends. This is followed by the ionizing region with X-ray, gamma and cosmic radiation.



Source: Optische straling in arbeidssituaties
Praktische aspecten bij implementatie in Nederland van de EU-richtlijn betreffende de blootstelling aan bronnen van kunstmatige optische straling
F.P. Wieringa, C.J.P.M. Teirlinck en J.W.A.M. Alferdinck
Review: prof. D. van Norren
30 juni 2006
TNO-Rapportnummer KZ/2005.190

(1) EU. 2006. Directive 2006/25/EC of the European Parliament and of the Council of 5 April 2006 on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (artificial optical radiation) (19th separate Directive in the meaning of Article 16 (1) of Directive 89/391/EEC). Official Journal of the European Union.

1.5 UV lamp types

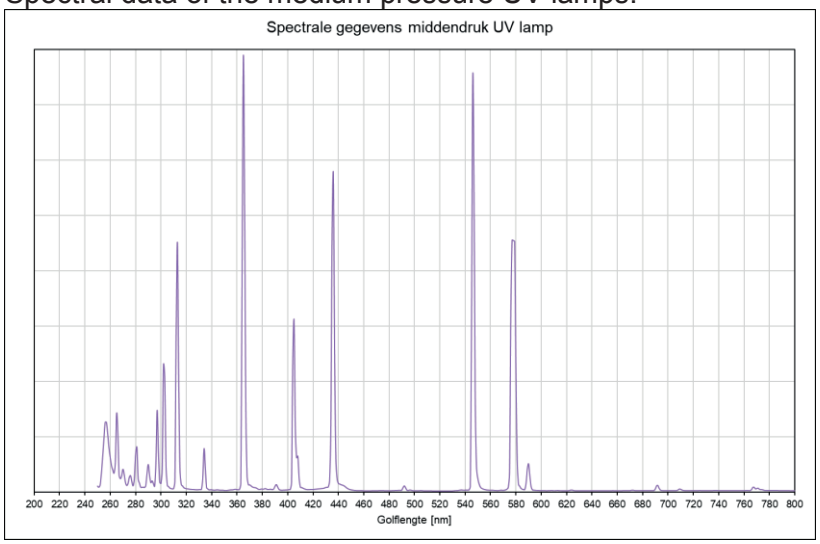
UV lamps (ultraviolet) radiate optical radiation in, among others, the range between 200 nm and 400 nm on which the name "UV lamp" is also based. Low pressure (incl. Amalgam) UV lamps produce UV radiation with a wavelength of 253.7 nm where medium pressure UV lamps radiate at a wide spectrum of wavelengths (see graph with spectral data). Depending on the type of UV lamp, energy is also emitted in the visible area of the electromagnetic spectrum:

- Low pressure (LP) UV lamps: blue light (400 nm)
- Low pressure (LPHO) UV lamps: blue light (400 nm)
- Amalgam UV lamps: blue light (400 nm)
- Medium pressure (MP) UV lamps: white light (400 nm - 750 nm)

UV lamps contain a small amount of mercury that is responsible for the UV radiation produced.
A properly working UV lamp needs a certain operating temperature in order to function reliably and efficiently, with the lamps used in the VGE Pro UV series these temperatures are as follows:

- Low pressure (LP) UV lamps: approximately 45 °C
- Low pressure (LPHO) UV lamps: approximately 45 °C
- Amalgam UV lamps: approximately 95 °C
- Medium pressure (MP) UV lamps: 600 °C - 900 °C.

Spectral data of the medium pressure UV lamps:



1.6 UV disinfection

For non-chemical disinfection of liquids, disinfection with UV-C radiation is a proven and reliable technology that has been used since the beginning of the 20th century. From around the middle of the 20th century, the application of UV disinfection on liquids has seen a sharp increase because it then became possible to produce good quality UV-C lamps on a large scale. The discovery of the by-products produced by chemical disinfection of water also led to a strong growth in the demand for UV-C radiation for the disinfection of (drinking) water.

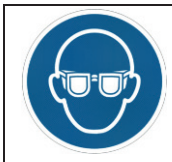
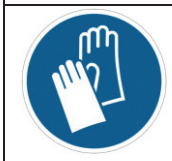
UV radiation (see also the section on optical radiation) can be divided into four main categories: UV-A, UV-B, UV-C and vacuum UV. The UV-C spectrum (wavelength range of 200 to 280 nanometre) is the most effective range for controlling microorganisms. UV-C radiation is capable of causing permanent damage to microorganisms. Each type of microorganism requires a certain amount of UV-C energy (UV fluence, also known as the UV dose) for the disinfection process to be successful. The microorganisms must be directly and long enough exposed to UV-C radiation, so that the radiation can penetrate the cell wall of the microorganism to damage the DNA (deoxyribonucleic acid).
Depending on the intensity of the UV-C radiation, it only takes a short time (in some cases a fraction of a second) to penetrate the cell wall, irreparably damage the DNA and inactivate the microorganisms in the water . This causes the reproductive mechanism of the microorganisms to be damaged and in some cases even killed.

UV-C disinfection is a non-selective process, as is the case with certain chemical disinfection processes. UV-C disinfection can be used against bacteria, viruses, fungi, yeasts, algae and (chlorine-resistant) protozoa.

1.7 Icons

This manual contains several comments with warnings that are marked with icons. Below the explanation of the icons used.

Icon	Status	Description
	Warning	Immediate danger to body and limbs. If the situation is not handled correctly, there is a risk of death and/or personal injury. Damage to the UV system can occur if the instructions are not properly followed.
	Danger	Electrical danger. Ensure that all metal parts of the VGE Pro UV installation are properly grounded, in accordance with local guidelines and laws. Before carrying out repairs or service work on the UV system, switch off the power at the main switch or remove the plug from the socket.
	Danger	Ensure proper grounding of the relevant metal parts in accordance with local guidelines and laws.
	Danger	Exposure to UV radiation (also short-term) can cause damage to the skin and eyes. Avoid contact with direct and indirect UV radiation. Wear protective, all-covering UV radiation blocking clothing to protect the skin and wear a UV radiation blocking face mask to protect the face and eyes.
	Danger	Risk of burns. Parts of the UV system and the UV lamps remain warm for a certain time after the system has been switched off. Wait long enough to touch these parts to prevent burns.
	Attention	These comments provide information to help you work on or with the UV system.
	Attention	Danger to the environment. The UV lamps contain mercury. Defective lamps must be processed by a chemical waste radiation point.
	Command	Wear UV-blocking face protection to prevent damage to eyes and skin.

	Command	Wear UV-blocking eye protection to prevent eye damage.
	Command	Use the supplied gloves to protect quartz tubes and lamps against fingerprints and dirt that may burn in if the UV system is in operation.
	Command	Wear protective clothing that blocks UV radiation to protect all skin against UV radiation.

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2 Safety instructions

Be sure to read and understand the instructions and instructions in this section carefully before the UV system is installed and commissioned.

2.1 Intended use

The VGE Pro UV systems have been developed for irradiating liquids with a low viscosity such as water. Irradiating a liquid with UV radiation serves as disinfection, photolysis or as an activator of an AOP (Advanced Oxidation Process). The VGE Pro UV systems are intended for the treatment of liquids that are permeable to UV-C radiation.
The VGE Pro UV systems may not be used for applications other than those mentioned above.
The operational safety of a VGE Pro UV system is only guaranteed if it is used as intended for the specific application. The VGE Pro UV system may only be used in accordance with the purpose specified in the order and within the technical specifications of the relevant system. The VGE Pro UV systems may only be used in non-standard applications after consultation with and with the written approval of VGE B.V .

Compliance with the intended use also includes reading this manual and complying with all instructions it contains. In addition, all inspection and maintenance work must be carried out at the prescribed intervals.

The user of a VGE Pro UV system bears full and exclusive responsibility if this device is used for any use that does not strictly and exclusively meet this intended use.

2.2 Safety instructions

VGE B.V. values great importance to safety when working with or on a VGE Pro UV system, safety measures are therefore integrated in the design.

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

The VGE Pro UV systems have been developed according to the latest state of the art taking into account the applicable safety standards. However, if a UV system is used by non-trained personnel or if the manual has not been fully read and understood by operating personnel, there may be danger to the body and members for the personnel or third parties concerned, and the UV system may also be damaged.
Installation and maintenance as well as work that is not described in this manual may only be carried out by trained and authorized technical personnel.
The relevant supervisor of the entire system is responsible for ensuring that only trained and authorized personnel may work on and with the UV system within their responsibility.

Trained and authorized technical personnel means:
- Installation: Technical staff trained and authorized by VGE B.V. or a hydrotechnical engineer;

- Operation: service staff who have received training and instruction from VGE B.V. or an authorized service partner;
- Maintenance: Technical staff trained and authorized by VGE B.V.;
- Electrical work: authorized and qualified electrician.

UV-C radiation can damage the retina of your eyes and unprotected skin. Ensure that you are not directly or indirectly exposed to UV radiation.
Everyone involved must be informed about the specific hazards associated with a VGE Pro UV system.

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

The metal control box and the irradiation chamber must be prohibited at all times with the protective ground in compliance with local rules and laws.

If, while the UV lamp is switched on, the flow of the irradiation chamber is cut off for any reason or if the irradiation chamber comes to dry completely or partially, the irradiation chamber will heat up very quickly, which may result in burning symptoms when touched. As standard, VGE Pro UV systems with medium pressure UV lamps are equipped with a temperature-sensitive monitoring switch (bimetallic switch) that moderately switches off the UC lamp (s) hardware in the event of overheating (approximately 60 °C).
The maximum irradiation chamber temperature is 60 °C, damage can occur above this temperature.

Correct operation of a VGE Pro UV system is only guaranteed if original spare parts and components are used as described in this manual. If the instruction is not followed, there is a risk of malfunction or damage to the UV system. The use of non-original spare parts and components will void the warranty on the entire UV system.

Applying modifications, modifications, changes and / or extensions to a VGE Pro UV-C system is not permitted without written permission from VGE B.V., this may have consequences for the operation and safety of the UV-C system.

Ensure that materials that have been replaced or system parts are disposed of and processed in an environmentally friendly manner in accordance with local and legal regulations.

2.3 Environmental conditions

For the installation, commissioning and use of a VGE Pro UV system, the following points must be observed and followed:
- protect against rain, direct sunlight and frost;

- do not use outside;
- the environment must be free of corrosive and/or explosive gases or gas mixes, steam, condensation, dripping liquids, salt-containing air and dust;
- the ambient temperature must not be lower than +5 °C and higher than + 40 °C;
- the relative humidity must not exceed 95 % and must not be condensing;
- the UV system must not be exposed to shocks and vibrations;
- the UV system must not be exposed to magnetic and/or electrostatic fields and not to ionizing radiation;
- the fluid pressure in the irradiation chamber must not exceed the maximum pressure specified in the technical specifications;
- the irradiation chamber must not be exposed to pressure surges of liquid (also known as water hammer);
- ensure that the environment of the UV system is clean and sufficiently lit.

2.4 Safety instructions on the UV-system

Everyone who is involved in working on or with the UV system must be informed of the dangers that may occur.

The following safety instructions and / or symbols are provided on the irradiation chamber and on / in the control box.

On the irradiation chamber:

<table>
<tr><td></td><td>Attentie!
Vorsicht!
Attention!</td></tr>
<tr><td> 
 
 
 
  </td><td>(NL) Lees de handleiding voor installatie, gebruik en onderhoud voor meer informatie!
• Schakel de spanning af voordat u aan onderhoud begint en/of de unit opent!
• Sluit de bestralingskamer af van de water toe- en afvoer en maak deze drukvrij voor begin van het onderhoud!
• Het oppervlak en UV-lamp kunnen heet zijn!
• Bij ingeschakelde UV-lamp(en) de bestralingskamer volledig met water doorstromen!
• UV-licht is schadelijk voor ogen en huid!
• In geval van toepassing in openbare zwembaden mag de UV-desinfectie alleen als aanvullende desinfectie gebruikt worden, gebruik in combinatie met een goedgekeurd desinfectie chemicaliën voor de vereiste restconcentratie!</td></tr>
<tr><td></td><td>(DE) Lesen Sie das Handbuch vor Installation, Bedienung und Wartung für weitere Informationen!
• Schalten Sie die Stromversorgung aus, bevor Sie mit der Wartung beginnen und/oder das Gerät öffnen!
• Schließen Sie die Bestrahlungskammer von der Wasser Zu- und Abfuhr und machen Sie sie druckfrei, bevor Sie mit der Wartung beginnen!
• Die Oberfläche und UV-Lampe können heiß sein!
• Bei Eingeschaltetem UV-Strahler der Bestrahlungskammer Komplet mit Wasser durchströmen!
• UV-Licht ist schädlich für Augen und Haut!
• Bei Verwendung in öffentlichen Schwimmbädern darf die UV-Desinfektion nur als zusätzliche Desinfektion verwendet werden. Verwenden Sie sie in Kombination mit einer zugelassenen Desinfektionschemikalie für die erforderliche Restkonzentration!</td></tr>
<tr><td></td><td>(GB) Read the manual before installation, use and maintenance for more information!
• Switch off the power before you start maintenance and/or open the unit!
• Close the irradiation chamber from the water supply and drain and make it pressure-free before starting maintenance!
• The surface and UV lamp may be hot!
• When the UV lamp (s) is switched on, water flow through the complete irradiation chamber must be ensured!
• UV light is harmful to eyes and skin!
• In case of use in public swimming pools, UV disinfection may only be used as additional disinfection, use in combination with an approved disinfection chemical for the required residual concentration!</td></tr>
</table>

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On the control panel:

	**Attentie!** **Vorsicht!** **Attention!**
	NL Voor het openen van de besturingskast de hoofdschakelaar uitschakelen!
	DE Vor dem Öffnen des Steuerschrankes den Hauptschalter ausschalten!
	GB Before opening the control panel switch off the main switch!

In the control panel:

	**Attentie!** **Vorsicht!** **Attention!**
	NL Bij uitgeschakelde hoofdschakelaar kunnen er externe vreemde spanningen aangesloten zijn!
	DE Auch beim ausgeschaltetem Hauptschalter können extern angeschlossen Fremdspannungen vorhanden sein!
	GB Other external voltages may be present when the main switch is switched off!

Make sure that the safety instructions are always and remain legible and easy to read!

2.5 Handling of UV lamps and quartz sleeves

The VGE Pro MP UV systems are equipped with medium pressure UV lamps and quartz tubes, the quartz parts must be clean when they are put into operation.
If a UV lamp comes in contact with the skin, traces of grease remain on the lamp. When the UV lamp is switched on, the traces of grease that remain behind block the light that wants to shine out of the lamp. Because light is converted to heat, it will become very hot at the location of the grease (or other contamination) and the lamp will burn out at this location.
To prevent the UV lamps and clean quartz tubes from being grabbed with bare hands, a set of white fabrics and lint-free gloves are included with every delivery of a new UV system.

The supplied gloves are intended to prevent UV lamps and quartz tubes from remaining clean. These gloves offer no protection against cuts due to breakage of a UV lamp or quartz tube.

Grasp UV lamps only at the ceramic parts to prevent contamination of the quartz!

2.6 Quartz tube breakage

To protect the UV lamps from the water, they are positioned in quartz tubes in the irradiation chamber. To ensure that the UV-C light emitted by the lamps is radiated in the liquid to be treated with minimal losses, high-quality quartz tubes have been used. Quartz tubes should be handled with care and should not be exposed to large forces due to the risk of breakage.
During service work with quartz tubes, protective gloves and eye protection (preferably a face mask) must be worn to prevent possible injury.

The quartz tubes built into the irradiation chamber are robust and can handle high water pressures. However, there are a number of reasons why quartz tubes can break during the UV-C treatment process:
- The water pressure is higher than the specified maximum pressure for the irradiation chamber;
- Water hammer, pressure change in a very short time;
- Fixed parts/objects that are led through the irradiation chamber with the water;
- Overheating of the irradiation chamber;
- Mechanical vibrations of the pipe network in which the irradiation chamber is mounted;
- At high water flow rates through the irradiation chamber, possibly causing vibrations due to cavitation.

If a quartz tube is damaged or broken, the UV system must be switched off by the main switch on the front of the control panel, switch it off and lock it to prevent unintentional switching on of the installation. Stop the flow of the irradiation chamber by turning off the pump and/or closing valves in front of and behind the UV irradiation chamber and draining the water from the irradiation chamber.
Follow the instructions in this manual for removing the quartz tube(s) and opening the irradiation chamber and carefully remove any possible quartz tube remains. Carefully follow the instructions for rebuilding the irradiation chamber and starting the process.

Warning!
Broken quartz tube parts can be very sharp and should not end up in the process water. The user of the UV installation must therefore take measures to ensure, in the event of a quartz tube break, that quartz tube parts cannot cause damage if they end up in the process water.

If a quartz tube (or several) in a UV system cracks or breaks, the quartz tube and the relevant UV lamp connector will be filled with water. The speed with which this happens depends on the water pressure and water supply. Since the UV-lamp connector cannot stop the water, water will flow out of the UV system. The amount depends on the water pressure and water supply, which means that the space where the UV system is mounted can be filled with water.
That is why we recommend the area where the UV system is located:
- regularly check (for example daily) for water;
- the UV system to be installed between 2 automatically controlled valves that are automatically closed in the event of a fault message from the "Comfort" control UV system;
- provide the room with a monitoring system that can register water on the floor with a reporting system and/or pump connected to it.

2.7 Lamp breakage

The UV lamps which are used in the VGE Pro UV systems that are fragile and therefore need to be treated with great care. The storage of UV lamps must also be done in the original packaging to protect the lamps.

UV lamps contain a small amount of mercury (milligrams). Mercury is a metal that is liquid at room temperature and is generally poorly absorbed when ingested. The mercury vapor, on the other hand, is well absorbed by inhalation and is very toxic. It is therefore important not to allow mercury to come into contact with skin or hair and to properly ventilate the area where mercury has been released and not to breathe the vapours.

When a UV lamp is broken, mercury can be released, this must be collected and processed as chemical waste. The droplets of mercury are difficult to collect, but with a special mercury collector (see chapter 'Mercury collector') this is possible. A mercury ball can also be covered with sulphur powder, which gives it a solid shape and can be easily cleaned up. In this state, evaporation no longer occurs.
Mercury can also be released with a special mercury sponge and disposed of as chemical waste.

During service work with UV lamps, protective gloves and eye protection (preferably a face mask) must be worn to prevent possible injury.

The UV lamps built into the irradiation chamber are properly mounted, but there are a number of reasons why UV lamps can break during the UV-C irradiation process:
- Fixed parts/objects that are passed through the irradiation chamber with the water;
- Overheating of the irradiation chamber;
- Mechanical vibrations of the pipe network in which the irradiation chamber is mounted;
- At high water flow rates through the irradiation chamber, possibly causing vibrations due to cavitation.

Follow the instructions in this manual for replacing a UV lamp, if the quartz tube is also damaged, follow the instructions for replacing a quartz tube as described in this manual.

2.8 Electrical isolation

The UV system works with a high voltage which can be life threatening when touched. If work is being carried out on the UV system, the system must be electrically isolated (de-energized) prior to commencement. The main switch, the operation of which is located at the front of the control panel, has an interlock with the door of the control panel. The control panel can therefore only be opened if the main switch is switched off.

When the control panel is open and the main switch is therefore switched off, the UV system is electrically isolated (de-energized). The only part that still carries voltage is the incoming side of the main switch to which the power cable is connected.

Pay attention! When the main switch is switched off, it is possible that strange external voltages are connected to the control panel. Before starting any work, check that no strange external voltages are present in the control panel.

2.9 Electrical grounding

The UV system, control panel and irradiation chamber must be earthed in accordance with local rules and laws.
In addition to good safety, good grounding of the irradiation chamber reduces the risk of possible electrolytic corrosion.

2.10 Operating conditions

The VGE Pro INOX MP series UV systems can operate at an ambient temperature between +5 °C and +40 °C and at a relative humidity of 10% to 95% (non-condensing).

Before switching on the UV lamps, the irradiation chamber must be completely filled with water. After heating the lamps and activating the "start flow" signal, the chamber must be immediately flushed with water. As long as the "start flow" signal is active, the chamber must remain completely filled and sufficiently flowed with water to ensure sufficient cooling. This is to prevent dangerous situations for the UV system, the environment and users.
The water that flows through the UV system may have a temperature between +1 °C and +45 °C. A bimetallic switch is mounted on the irradiation chamber as protection, which switches off the UV lamp (s) at a maximum irradiation chamber temperature of +60 °C. In the presence of an optional temperature sensor on the irradiation chamber, the maximum alarm temperature is set to +45 °C by default. The irradiation chamber can operate with a maximum operating pressure of the water of 10 bar. Water hammer can irreversibly damage the irradiation chamber or parts thereof.

The control panel and the irradiation chamber must not be mounted in direct sunlight and must be protected against rain and other moist precipitation. The environment must be free of chemical vapours, (liquids) substances and/or radiation that can damage the UV system. The control panel and irradiation chamber must also be mounted vibration-free.

3 Scope of delivery, transport and storage

3.1 Scope of delivery

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

The delivery of a UV system includes:
- Irradiation;
- Control panel (depending on the model with mounted or separately supplied cables);
- One or more UV lamps (depending on the model);
- Instruction manual;
- A set of gloves.

The following options and accessories may be supplied depending on the order:
- UV sensor with cable;
- Pt100 sensor with cable;
- Safety glasses;
- Lamp tester;
- Mercury collector;
- Torque screwdriver with suitable bit.

3.2 Transportation

The VGE Pro UV systems are packaged in a sound manner so that they are suitable for transport. Always transport the UV systems in the VGE B.V. packaging materials as supplied.
Always transport the product in a safe and responsible manner, the packaging must always be handled with care and not exposed to rain and moisture. Sensitive parts have been incorporated in the UV installation.

Check the packaging for damage immediately upon receipt of the UV system. If damage is found, it must be reported immediately to the transport company. Failure to do so will void the right to compensation.

There is a risk of (im)material damage if the UV installation (or part of it) falls or is damaged.

If the UV irradiation chamber has been dropped and/or damaged, the following parts may be damaged or defective:
- Irradiation chamber;
- UV lamp(s);
- Quartz sleeve(s);
- Ceramic lamp connection(s);
- Present sensor(s);
- Cables.

In the case of a damaged UV lamp or quartz tube, follow the instructions stated in the sections 'Lamp breakage' and 'Quartz tube breakage'.

Always wear cut protective gloves when clearing quartz fragments/residue!

The electrical connections are not suitable for mechanical loading.
The product must never be lifted or transported at the electrical connections.

The UV systems are supplied with the UV lamps packed separately.

If a UV system has to be moved to another location after installation, the following must be taken into account:

- Remove the UV lamps from the irradiation chamber and package them in their original packaging;
- Ensure that the cables connected to the UV system are completely disconnected;
- Pack the UV system in such a way that it cannot be damaged or contaminated during transport;
- If necessary, use properly maintained and approved lifting material to prevent damage to the irradiation chamber and/or control panel;
- Cables may not be used to lift or move the irradiation chamber and/or the control panel.

Upon receipt of the UV system, check whether the delivery is complete based on the waybill.

3.3 Storage

If possible, only unpack the product shortly before assembly.
Protect the product during storage against:

- Rain and moisture;
- Dust and dirt;
- Shocks and vibrations;
- Radiation (electromagnetic, electrostatic and ionizing);
- Temperatures outside the range of +1 °C to +60 °C.

If a UV system is (temporarily) taken out of operation, we recommend rinsing the irradiation chamber with clean water to remove sand, salt and other corrosive substances to prevent corrosion. Ensure that the irradiation chamber is dry and clean to prevent contamination, microbiological contamination and corrosion.

If a UV system is (temporarily) taken out of operation and dismantled, we recommend that the individual components are stored in their original packaging and that the above storage instructions are observed. Make sure the irradiation chamber is dry and clean to prevent contamination, microbiological contamination and corrosion.

3.4 Warranty

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

4 The UV system

4.1 UV applications

Irradiating water (and other liquids) with UV light has now become a proven and widely used environmentally-friendly way to achieve reliable disinfection without chemicals, especially in applications where no deposit operation is necessary. UV disinfection has the following advantages:
- Fast disinfection, no exposure time required (system dependent only a fraction of a second);
- No disinfection by-products;
- No odour and taste changes to the water;
- UV radiation is not corrosive.

With correct dimensioning, UV systems are also applied for reducing bound chlorine (chloramine) in swimming pool applications. This has the following positive effects:

- Decrease in the typical pool odour;
- Extra disinfection, also from chlorine-resistant organisms;
- Strong decrease in:
    - Red eyes;
    - Headache;
    - Skin and mucous membrane irritations;
    - Stress among swimming pool staff;
- Improved "wellness" effect:
    - Clearer water;
    - More pleasant indoor climate;
    - Enthusiastic swimmers and increase in visitor numbers.
- German DIN 19643 and Austrian M 5890 standards specify the use of medium-pressure UV lamps for breaking down bound chlorine in swimming pool applications.

Furthermore, there are also applications in which UV is used in combination with hydrogen peroxide (H2O2), ozone (O3) or other oxidizing agents to produce OH radicals that have a very high oxidation potential with which non-filterable, difficult-to-degradable substances can be oxidized. The collective name for this type of application is Advanced Oxidation Process (AOP).

Regardless of the application, it can generally be said that a UV system is positioned in the water treatment after filtration. If products still need to be added to the water or if the water needs to be heated, it is advisable to do this after the UV radiation of the water.

4.2 Product overview

VGE Pro INOX MP UV product overview				
VGE Pro MP INOX unit	**MultiMax**	**600-85**	**600-85**	**1200-85**
Housing	SS 316L	SS 316L	SS 316L	SS 316L
Housing shape	inline	inline	inline	inline
Maximum working pressure	10 bar	10 bar	10 bar	10 bar
Connections	2" outside threat, male	DN80 flange	DN80 flange	DN80 flange
UV-C lamp type	Medium pressure	Medium pressure	Medium pressure	Medium pressure
Number of lamps	1	1	1	2
Lamp power	400 W	600 W	600 W	600 W
Lamp power supply	Electronic ballast	Electronic ballast	Electronic ballast	Electronic ballast
Lamp life	9000 h	9000 h	9000 h	9000 h
Flow rate (cooling - @ 3 m/s)	1 - 22 m³/h	1 - 22 m³/h	1 - 22 m³/h	1 - 22 m³/h
Featuring	Single ended lamp	Single ended lamp	Single ended lamp	Single ended lamp
	Compact controller	Compact controller	Comfort controller	Comfort controller
	Interlock remote control	Interlock remote control	Remote control	Remote control
			Optional UV sensor	Optional UV sensor
			Optional temperature sensor	Optional temperature sensor
			Optional ModBus	Optional ModBus

4.3 UV system composition

A VGE Pro UV system is always composed of a UV irradiation chamber and a control panel, both are interconnected with supplied cables for controlling the UV lamp (s), temperature monitoring of the irradiation chamber and optional for the UV sensor and Pt100 temperature sensor. The irradiation chamber must also be grounded.

The heart of the UV system is the irradiation chamber which is provided with one medium-pressure UV lamp which combine a compact design with a high lamp power. An inline design of the irradiation chamber has been chosen with a UV lamp placed perpendicular to the direction of the flow in order to obtain good irradiation of the water in combination with a very low hydraulic pressure loss.
The choice of the irradiation chamber, the UV lamp type and the number of lamps is tailored to the application in order to realize a reliable irradiation of the water with the least possible loss of pressure.

The control panel controls the UV lamp by means of an electronic ballast with high efficiency. The control panel ensures that the disinfection process runs smoothly and reliably and that the interface with the "outside world" runs smoothly. With the HMI (Human Machine Interface) you can start and stop the UV lamp manually, but this can also be done via an external contact. If one has a ModBus connection to a Scada system, the UV lamp can also be started and stopped via this route.

4.4 Irradiation chamber

4.4.1 Irradiation chamber

The heart of a VGE Pro MP UV system is the irradiation chamber which is currently available in two versions. The inline design in combination with the small number of medium pressure UV lamps gives a low pressure loss and is easy to install because the supply and discharge are in one line.
Because the irradiation chamber has the same diameter as the connecting flanges, when mounted in a horizontal pipe no air will collect in the irradiation chamber, which guarantees a high operational reliability. As a result, no venting and discharge connection is required on the irradiation chamber. Due to the compact design, there are also no sampling connections to the irradiation chamber, as these would be directly irradiated with UV light, which should not be the case with sampling connections.

Every UV lamp is mounted in its own lamp socket. To remove or mount a UV lamp, no cap and/or cable needs to be removed, the cable for controlling the UV lamp is connected to the lamp socket and remains connected to it.
The UV lamp comes with a lamp base with 2 contacts that make contact with the UV lamp socket. The UV lamp is equipped with a return wire so that only one-sided mounting of the UV lamp is required, this also saves installation and service space.

Optionally, the UV system can be equipped with a UV sensor, which can be mounted on a standard ¼" socket after removal of the blind stop.
Also optionally, a Pt100 temperature measurement can be applied to the irradiation chamber, which measures the irradiation chamber temperature on the outside of the chamber and is mounted on a wire end without coming into contact with the water to be treated.

As a basic protection against overheating of the irradiation chamber, a bimetallic switch is attached to the chamber by means of a wire end, which immediately switches off the UV lamp when the maximum irradiation chamber temperature is exceeded.

4.4.2 Bimetallic switch irradiation chamber

A bimetallic switch is provided as standard on the irradiation chamber to monitor the irradiation chamber temperature. The bimetallic switch is closed as standard so that the UV lamp can be switched on.

The irradiation chamber temperature can become too high (> 60 °C) if the irradiation chamber contains no water or is not completely filled with water or if there is no flow with an UV lamp switched on. If the bimetallic switch is activated, the UV lamp will be switched off immediately.

The bimetallic switch has an automatic reset function, as soon as the bimetallic switch has cooled down sufficiently (approximately 45 °C (irradiation chamber)), the contact will automatically close again.

4.4.3 Quartz tubes

Because UV lamps cannot be placed directly in the water (they do not reach their operating temperature, so the UV production does not reach the desired level or they switch off again), they are placed in a protective UV-C-permeable quartz tube in the irradiation chamber. In the VGE Pro UV MP series the quartz tubes are mounted in such a way that the UV lamp can be replaced without dismantling the quartz tube while the water pressure remains on the irradiation chamber. In order to have as few openings as possible in the irradiation chamber (better for hygienic applications), a quartz tube is used that is closed on one side. As a result, only on one side of the irradiation chamber free service space is required.

The quartz tubes are made of high quality quartz in order to allow the entire UV spectrum radiated by the UV lamp to pass through with the lowest possible losses.

Depending on the water quality, quartz tubes can become dirty. It is therefore important to ensure that, if necessary, the tubes are regularly cleaned or replaced. See the 'Maintenance' chapter for this.

4.4.4 UV lamps

The VGE Pro UV medium pressure UV lamps feature the unique S.B.T. (Single-end Bayonet Technology) concept. The lamps are one-sided (Single-end) installed. If the lamp is completely inserted in the quartz tube and the lamp socket, it can be fixed with a short rotation.

When working on the lamps, wait at least 15 minutes after switching off the UV system before dismantling the lamps. Before dismantling the lamps and/or quartz tubes after the lamps have been in operation, the temperature of the components must be checked to prevent burns.

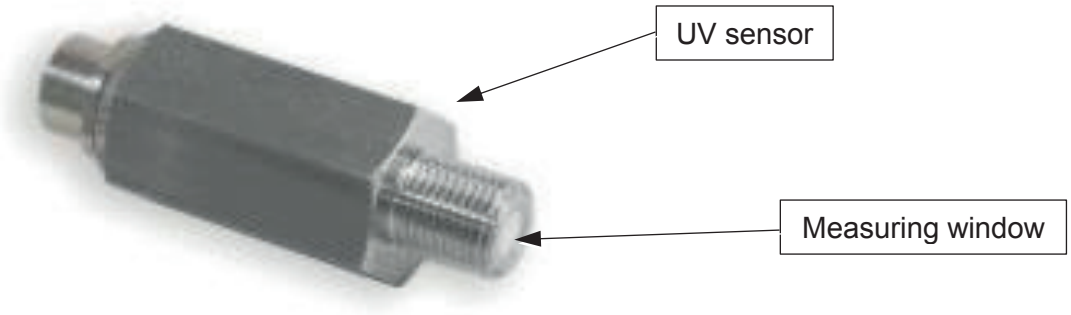
UV lamps, both low pressure (incl. Amalgam) and medium pressure, emit UV radiation which can cause damage to skin and eyes.

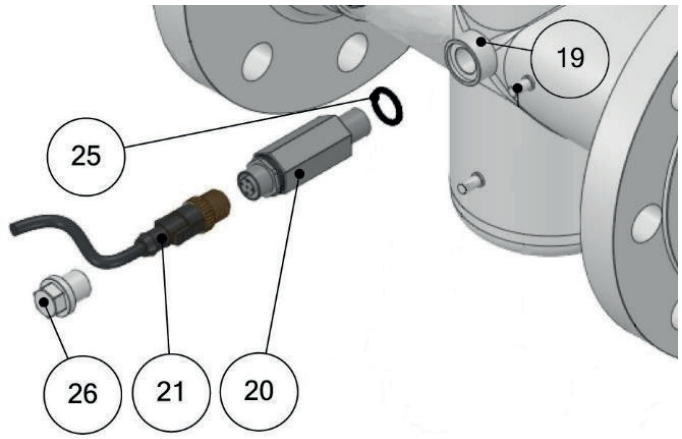
See the chapter 'Lamp breakage' in the event of a lamp breakage.

4.4.5 UV-sensor (optional)

The optional UV sensor is mounted in a ¼" sock on the irradiation chamber. It is a so called "wet" sensor, which means that the measurement window of the in the irradiation chamber installed UV sensor is in contact with the water being treated.

The UV sensor contains a specific optical filter so that only the strength of the UV-C light is measured which is responsible for the treatment process. The sensor is also absolutely calibrated to guarantee an accurate measurement. The UV sensor communicates with the control panel via a ModBus signal and is calibrated at a maximum intensity of 3000 W/m².



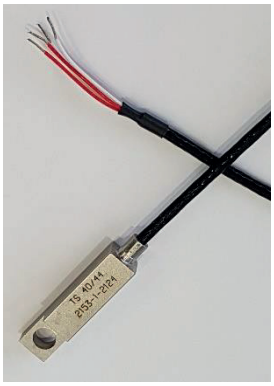


The control panel has to be turned off before connecting or disconnecting the sensor. The shielding connection in the connection cable may not be used as earth connection for safety reasons.
Handle the UV sensor, especially the window surface, with care. Be careful not to touch the window surface with any sharp object. If the window is scratched or damaged, accurate measurement cannot be warranted.

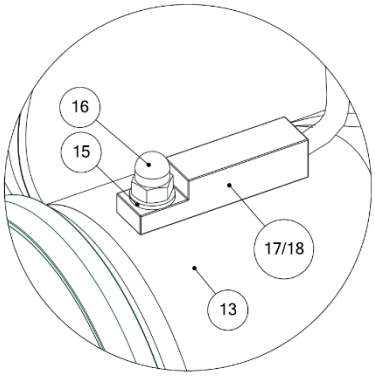
Item	Number	Art. number	Description
19	1		¼" sock for UV-sensor
20	1	B212105	Digital UV sensor MP
21	1	B212109	Cable for UV sensor M12 4-Pin 10 meter
25	1	B212104	O-ring EPDM 12 x 3 mm
26	1	B212103	Stainless steel 316L plug 1/4" with collar

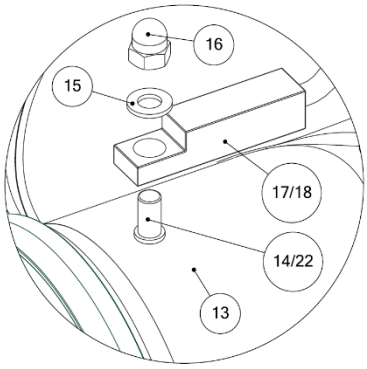
4.4.6 Temperature sensor

Optionally, the irradiation chamber temperature can also be monitored with a Pt100 temperature sensor. This sensor is mounted on the chamber according the "bold on" principle so that the sensor is not in direct contact with the liquid to be treated and no additional opening is required in the irradiation chamber.
This is an indicative temperature measurement of the irradiation chamber, depending on the set limit values, the control will make a "warning" or an "alarm" signal and indication active if these are exceeded.

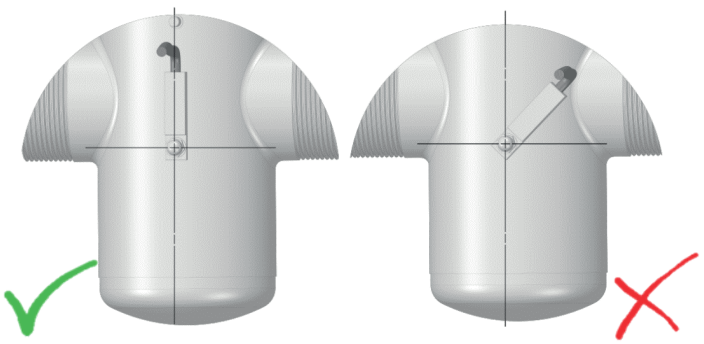


Item	Number	Art. number	Description
13	1	VIM00602H	Irradiation chamber VGE Pro UV INOX MP 600
15	1	4800040	Washer A2 M5
16	1	E831400	High cap nut M5 DIN 1587 A2 RVS
18	1	B290132	Temperature sensor MP Pt100 incl. 10 m cable





In drawing 48 it is indicated how the temperature sensor must be mounted correctly on the irradiation chamber.



Drawing 48 Correct assembly Wrong assembly

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4.5 Control

4.5.1 Operation

The control panel must be electrically connected by a recognized electrical installer. The operation of the UV system can be realized in various ways.

	Mode selection "HMI/extern" switch	Description
1	HMI	The process can be started and stopped using the keyboard.
2	HMI	With an optional ModBus connection, the process can be started and stopped and the operating parameters can also be viewed.
3	Extern	The process can be started and stopped via an external contact.

If a flow switch is connected to the flow switch input, this only serves as protection and not for process-dependent control.

The control panel contains a bimetallic switch for monitoring the control panel on too high temperatures. There is also a bimetallic switch on the irradiation chamber for monitoring the irradiation chamber temperature. Both bimetallic switches are closed as standard so that the UV lamp can be switched on.

The UV lamp has an operating temperature between 600 °C and 900 °C. Wait for a sufficient time after switching off the UV lamp. For a subsequent switch-on, you must wait around 10 minutes for the lamp to cool sufficiently before you can switch it on again.
When dismantling, it is advisable to wait at least 15 minutes for the UV lamp to cool in the irradiation chamber before dismantling it. Always carefully check the UV lamp temperature to prevent burns before handling the UV lamp (do not touch the quartz)!

4.5.2 Bimetallic switch control panel

A bimetallic switch is provided as standard in the control panel to monitor the temperature. The bimetallic switch are closed as standard so that the UV lamp can be switched on.

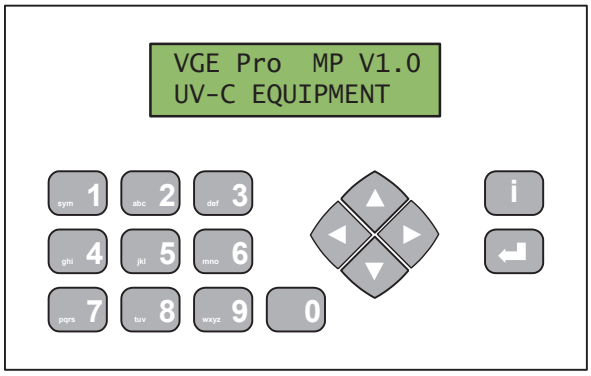
If the control panel temperature becomes too high (> 50 °C) due to a too high ambient temperature, the bimetallic switch will be activated and the UV lamp will switch off. If the bimetallic switch is activated, the UV lamp will be switched off immediately.

The bimetallic switches has an automatic reset function, as soon as the bimetallic switch has cooled down sufficiently (approximately 35 °C (control panel), the contact will automatically close again.

4.5.3 HMI (Human Machine Interface)

Visual display of the menu structure when all options are present and enabled.
If an option is not activated, the relevant display will be cancelled and the menu list will become shorter.

The information is displayed via an LCD display consisting of 2 lines with 16 characters each.



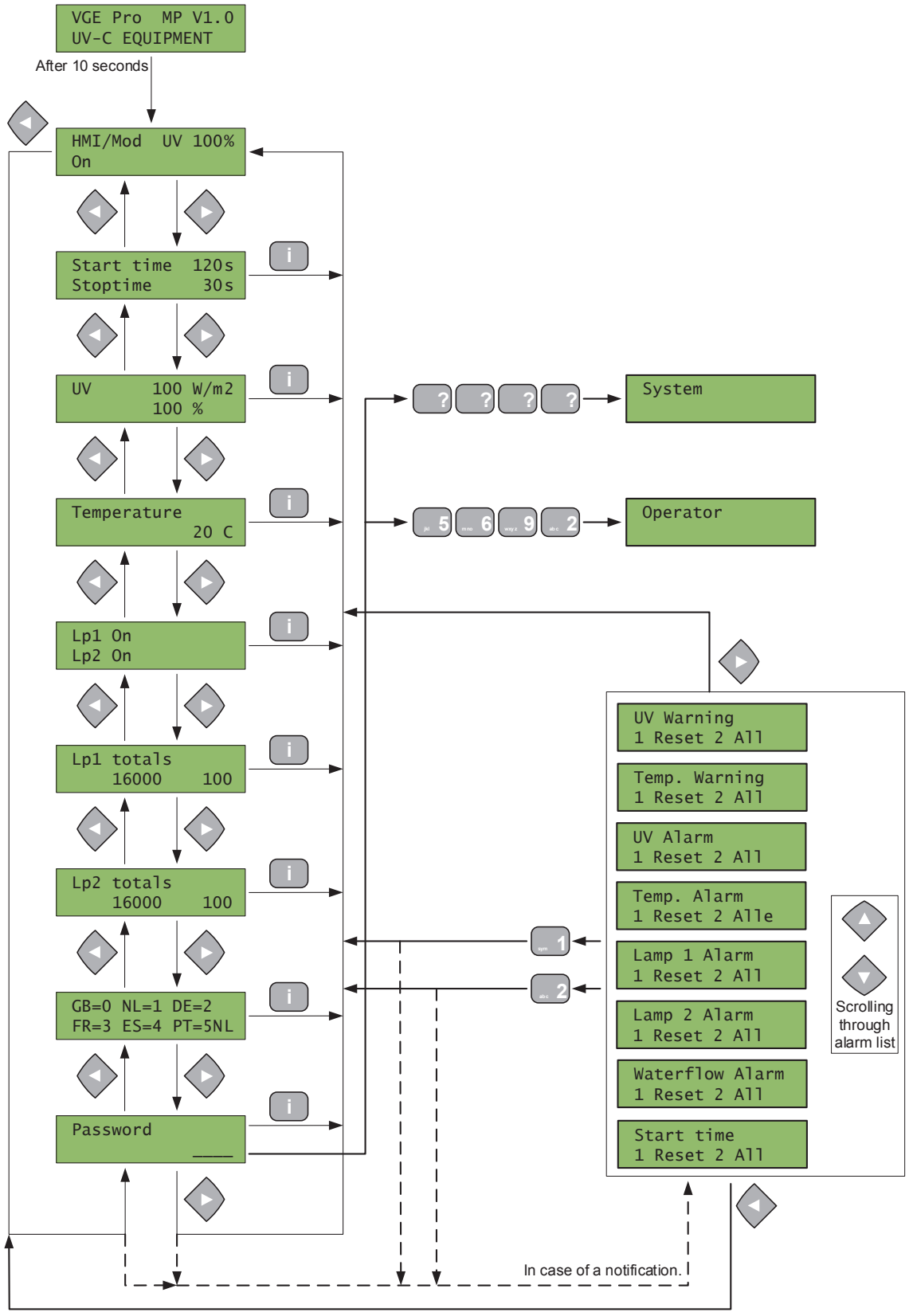
There is a numeric keyboard with 4 arrow keys, an "i" and a return key for operation. In the explanation below, the relevant buttons are visually indicated to make the operation clear.

4.5.4 Menu structure

The control menu of the control panel consists of three parts:
- User menu, for daily use and accessible to everyone;
- Operator menu, for setting the limit value by the user. Access via a password.
- System menu, for configuring the system during production. Access via a password.

4.5.4.1 User menu

The user menu is accessible to everyone, in this menu all process parameters can be read, but no changes can be made to the settings that can influence the process. Only the display language can be adjusted here and the UV lamp can be switched on/off manually.



4.5.4.2 Usage menu explanation

If a "lamp" is mentioned in the following explanation, this means that it can be 1 or 2 lamps depending on the UV system in question.

```
VGE Pro  MP V1.0
UV-C EQUIPMENT
```

After switching on via the main switch of the control, this appears on the display for 10 seconds, after this time the 1st menu display is automatically shown.

```
HMI/Mod  UV 100%
On
```

This display is shown during normal operation with an optional UV sensor. The relative UV intensity display shows the intensity measured by the UV sensor in percent, 100% corresponds to the set minimum UV intensity at which the system can still achieve the UV dosage specified in the order at the end of the lamp life.

```
HMI/Mod
On
```

```
External UV 100%
On
```

If no UV sensor is present, the intensity value will also not be shown on the display. This display also indicates whether an HMI or External on / off switch of the lamp (s) has been selected via the selector switch on the front of the control box.
HMI, Human Machine Interface, means that the lamp can be switched on/off. For switching on the lamp use V  d then  , for switching off this  and this  must be selected. If there is a ModBus connection with a Scada system, the lamp can be switched on / off in HMI mode via the ModBus connection.
If "External" is displayed, the lamp can be switched on / off via a potential-free contact that is connected to the terminal strip (see electrical diagram for correct connection).
The status is also indicated in the bottom line:

- Out : lamp is switched off;
- Start : lamp is switched on and heats up, non-critical alarms and warnings are suppressed during this condition;
- On : lamp is on and if there is a UV sensor, it is UV intensity 100% or higher;
- Stop : the stop procedure has started, first the "start flow" signal deactivated and a certain waiting time later the lamp switched off;
- Warning : if a temperature sensor and / or UV sensor is present, can depending on the measured irradiation chamber temperature and/ or UV intensity, a warning is triggered. The system continues to operate normally and is only an indication;
- Alarm : if a UV sensor is present, it can depend on the measured UV intensity the alarm can be made active. Also at a lamp malfunction also made the alarm active. An "alarm" activates the stop procedure and the lamp will turn off. The cause of the alarm is shown in the display until it is reset or the control system is de-energized;
- Critical alarm : if a temperature sensor is present, the critical alarm can be activated depending on the measured irradiation chamber temperature. Also, when the flow signal is lost (if activated in the system menu), the critical alarm is also activated. A "critical alarm" switches the lamp off immediately. The cause of the critical alarm is shown in the display until it is reset or the control is de-energized.

```
Start time  120s
Stoptime     30s
```

Here is indicated how much the remaining start time or stop time is if the relevant procedure has started. In combination with a UV sensor, the remaining start time will

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be visible here if the start-up procedure is shortened due to the achievement of the 100% UV intensity and an existing lamp to report.
The starting procedure means that the lamp can heat up during this time and that warnings and alarms (UV intensity, lamp and flow) are suppressed, critical alarms (temperature) are not suppressed and immediately switch off the lamp.
During the stop procedure the lamp remains switched on but the "start flow" signal is deactivated so that the remaining water that still flows through the radiation chamber during the pump shutdown or the closing of a valve is treated.
After the start time has elapsed, all alarms must be cancelled, which means that if a UV sensor is used, the UV intensity is 100% or higher and the lamp is lit. If the condition is met, the installation is released and the "start flow" signal is made active. If the conditions are not met, the lamp is immediately switched off and the "critical alarm" signal is made active.

```
Temperature
            20 C
```

If an optional temperature sensor is connected and activated in the system menu, the radiation chamber temperature is displayed here in degrees Celsius.

```
Lp1 Off
Lp2 Off
```

With a 2-lamp system, the status is displayed per lamp, with a 1-lamp system, line 2 is not displayed.

- Off: lamp is switched off;
- Start: lamp is switched on and heats up;
- On: lamp is operating;
- Alarm: lamp failure

```
Lp1 totals
    00000h    00
```

```
Lp2 totals
    00000h    00
```

The number of on/off switches and the number of burning hours are recorded per lamp.
For the VGE B.V. medium pressure UV lamps have an expected lifetime of 9000 h with 3 on / off switches per 24 hours.
With a 1-lamp system, the second screen is not displayed.

```
GB=0 NL=1 DE=2
FR=3 ES=4 PT=5NL
```

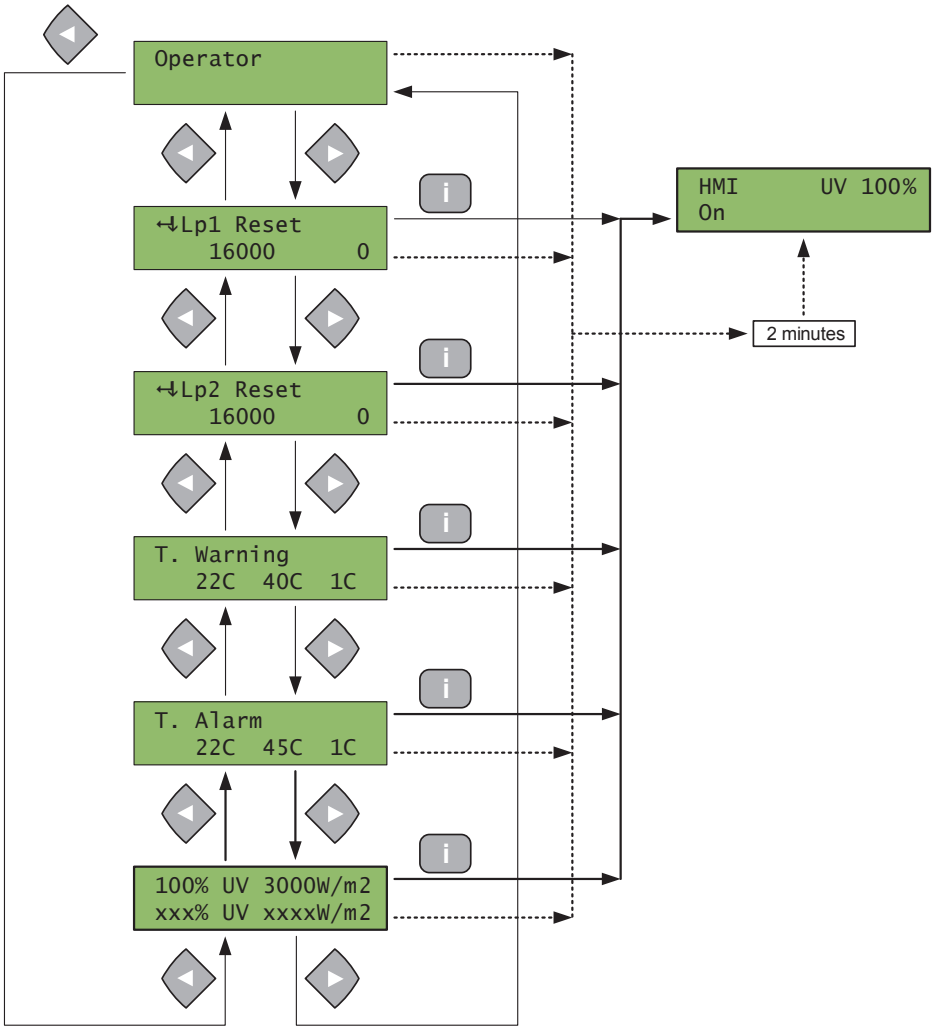
For the screen texts, you can choose from 6 different languages by entering the number of the language, the language is then immediately adjusted:
0 GB = English
1 NL = Dutch
2 DE = German
3 FR = French
4 ES = Spanish
5 PT = Portuguese

```
Password
            ____
```

Changing limit values and resetting counters can be done in the "Operator" menu, for this you have to enter the correct password. The "System" menu is for setting the factory setting for which a different password is required.
Once the correct password has been entered, you will be taken directly to the relevant menu.

4.5.4.3 Operator menu

In the operator menu, which can only be accessed by entering a password, counters can be reset and limit values can be set. Limit values only in consultation with VGE B.V. or by a VGE B.V. trained person.



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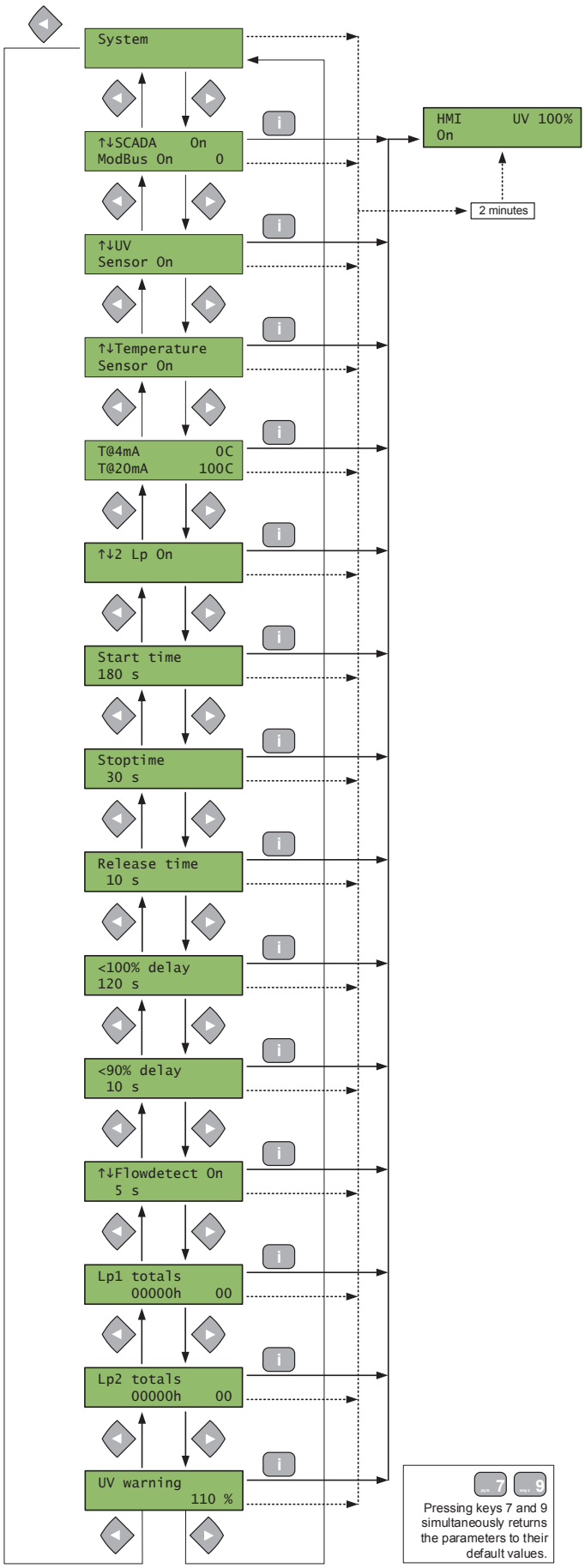
4.5.4.4 Operator menu explanation

Operator	Menu for adjusting limit values and resetting counters.
↤↓Lp1 Reset 16000 0	By pressing ↵ and then ◆ the operating hours counter and the on/off counter of the relevant lamp are set to 0.
↤↓Lp2 Reset 16000 0	
T. Warning 22C 40C 1C	Temperature warning. The current temperature, the limit value and the hysteresis are shown on the second line, respectively. By pressing ↵, the desired warning temperature, ↵, the desired hysteresis and then again ↵ one can change these parameters. The changes are processed immediately and the system will also respond immediately to the new settings. Warning temperature range: 0 ° C - 99 ° C. Hysteresis range: 1 ° C - 10 ° C.
T. Alarm 22C 45C 1C	Temperature alarm. The current temperature, the limit value and the hysteresis are shown on the second line, respectively. By pressing ↵ ,the desired warning temperature, ↵, the desired hysteresis and then again ↵ one can change these parameters. The changes are processed immediately and the system will also respond immediately to the new settings. Warning temperature range: 0 ° C - 99 ° C. Hysteresis range: 1 ° C - 10 ° C.
100% UV 3000W/m2 xxx% UV xxxxW/m2	Minimum UV intensity value. The first line shows the absolute minimum UV intensity value (100% level) in W / m², the second line shows the current relative UV intensity in% of the absolute UV alarm value and the absolute measured UV intensity. Changing the absolute minimum UV intensity value (also known as the UV alarm value), whereby the UV dose specified in the order is still achieved at the end of the lamp life, can be done by pressing ↵, the desired minimum UV intensity and then again ↵ to close. The changes are processed immediately and the system will also respond directly to the new settings. Minimum UV intensity (UV alarm) range: 0 - 9999 W / m². For the correct UV intensity alarm setting values, see the table with limit values for UV alarm settings.



4.5.4.5 System menu

The system menu is set at the factory depending on the options chosen and the process in which the system is applied. Changes can only be made after entering the correct password. Also in this menu all parameters can be reset to their default values by pressing the keys 7 and 9 simultaneously in this menu. See also section Default settings.

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4.5.4.6 System menu explanation

System	Menu for setting the correct system configuration that may only be carried out by authorized/trained persons. Access to this menu only via a special password.
↑↓SCADA On ModBus ON 0	The first line indicates whether the Scada connection is activated or not. With the ◆ button the Scada connection is switched on and switched off with the button ◆. The UV control always works as "Master", any Scada system to be connected must be set as "Slave". If the Scada system can only be configured as a "Master", a "Slave/Slave" converter must be used (e.g. HD67147-A1 from ADF-web). When activating the Scada mode, the ModBus is automatically activated. The second line indicates whether the ModBus status, "On" or "Off". If the Scada is not active but the UV sensor option is made active, the ModBus is also made active automatically. With ModBus communication functioning, the symbol in the lower right of the display will flash.
↑↓UV Sensor On	The second line indicates whether the UV sensor option is activated or not. With the ◆ button the UV sensor connection is switched on and switched off with the ◆ button. Communication with the UV sensor is via a ModBus connection, if the UV sensor option is activated, the ModBus communication is automatically activated.
↑↓Temperature Sensor On	The second line indicates whether the temperature sensor option is activated or not. The temperature sensor option is switched on with the ◆ key and switched off with the ◆ key.
T@4mA 0C T@20mA 100C	Setting screen to set the range of the built-in PT100 ➔ 4 mA converter in the PLC. You can change these parameters by keying in ↵, the temperature at 4 mA followed bij ↵, the temperature at 20 mA and then again ↵. The changes are processed immediately and the system will also respond immediately to the new settings.
↑↓Lp2 Off	If you have an irradiation room with 2 lamps and the control box extension for the 2nd lamp is installed then you must activate the monitoring for the 2nd lamp in the control in this menu with the ◆ key, this monitoring is switched off with the ◆ key.
Start time 180 s	Start time setting. The start time means that the lamp can heat up during this time and that warnings and alarms (UV intensity, lamp and flow) are suppressed, critical alarms (temperature) are not suppressed and the lamp switches off immediately. After the start time has elapsed, all alarms must be cancelled, which means that if a UV sensor is used, the UV intensity is 100% or higher and the lamp is burning. If the condition is met, the installation is released and the "start flow" signal is made active. If the conditions are not met, the lamp is immediately switched off and the "critical alarm" signal is made active. By pressing ↵, the start time in sec and then again ↵, the start time can be adjusted. Range start time: 0 s - 300 s.
Stoptime 30 s	Stop time setting. During the stop procedure the lamp remains switched on but the "start flow" signal is deactivated so that the remaining water, that still flows through the irradiation chamber when the pump is switched off or a valve is closed, will be treated.

By pressing ↵, the stop time in sec and then again ↵ , the stop time can be adjusted.
Range stop time: 0 s - 300 s.

```
Release time
 10 s
```

If during the warm-up phase (with system with UV sensor), the start time counts down, the UV intensity reaches the 100% value and the lamp or both lamps have the status "On", then after a "Release time" delay the system released by making the "Start flow" signal active.
The realse time can be adjusted by keying in ↵, the release time in sec and then again ↵.
Release time range: 0 s - 300 s.

```
<100% delay
120 s
```

If the system is equipped with a UV sensor, the UV intensity is monitored. The limit value (see minimum UV intensity value in the "Operator" menu), also known as the UV alarm value, is the reference for UV intensity monitoring. The measured UV intensity is compared with the absolute minimum UV intensity value that has been set and is displayed as a current relative UV intensity in %. If both are equal, the current relative UV intensity will also be displayed as 100%, then the system will still meet the requested dosage. If the current relative UV intensity is lower than 100% but higher or equal to 90%, the delay time set here will start. After this delay time, the "Alarm" procedure will be started. If the current relative UV intensity becomes 100% or higher again during the delay time, the delay time will be stopped and the system will continue to operate normally..
By keying in ↵, the <100% delay time in sec and then again ↵, the delay time can be adjusted.
<100% range delay time: 0 s - 300 s.

```
<90% delay
 10 s
```

If the current relative UV intensity is lower than 90%, the delay time set here will start. After this delay time, the "Alarm" procedure will be started. If the current relative UV intensity becomes 100% or higher again during the delay time, the delay time will be stopped and the system will continue to operate normally.
By keying in ↵, the <90% delay time in sec and then again ↵, the delay time can be adjusted.
<90% % range delay time: 0 s - 300 s.

```
↑↓Flowdetect On
  5 s
```

If the flow through the irradiation chamber is monitored by means of a flow switch, then the "Flow detection" parameter must be switched on by means of the ▲ key, with the ▼ key the monitoring can be switched off again.
With set flow switch monitoring, after the "Start flow" signal, a water flow must be realized through the irradiation chamber to prevent overheating. The flow switch must be activated within the time set in the second line, if this is not the case, a "Critical Alarm" will be activated and the lamp (s) will be switched off immediately.
By keying in ↵, the flow detection delay time in sec and then again ↵, the delay time can be adjusted.
Flowdetect range delay time: 0 s - 300 s.

```
Lp1 totals
    00000h    00
```

Hour meter that registers the number of burning hours and on/off switches of Lamp 1 and displays them on the 2nd line. These counters cannot be reset.

```
Lp2 totals
    00000h    00
```

If the system contains 2 lamps, the number of burning hours and on/off switches of Lamp 2 will be recorded here and displayed on the 2nd line. These counters cannot be reset.

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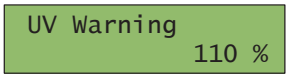


UV intensity warning.
If the relative UV intensity value comes below limit value set here, the warning signal is made active. The UV intensity warning is specified in relation to the minimum UV intensity value.
The second line specifies the relative value at which the UV warning signal is made active.
By entering ↵, the desired relative value, ↵, you can change this parameter.
The changes are processed immediately and the system will also respond immediately to the new settings.
UV intensity warning range: 101 % - 200 %.

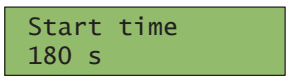
4.5.5 Notifications

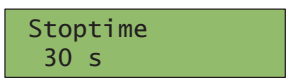
The controller monitors the functioning of the UV system on a number of basic functions and, if present and activated, a number of optional functions.

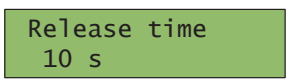
Notification	Explanation	Notification via		
		Contact	ModBus	Display
Ready	No alarms active, ready for use	yes	yes	no
Start flow	Start the pump and/or open valves so that sufficient water flows through the irradiation chamber	yes	yes	no
Warning	Temperature exceeds warning limit value, UV intensity is lower than warning limit value	yes	yes	yes
Alarm	Start time exceeded, lamp failure, UV intensity is lower than alarm limit value	yes	yes	yes
Critical alarm	Temperature exceeds alarm limit value, flow alarm	yes	yes	yes

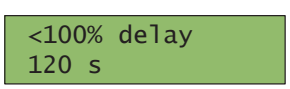
The "Warning", "Alarm" and "Critical alarm" messages are collective messages, the exact cause of the message can be read on the display as long as the control panel has not been switched off or the message is reset.

4.5.6 Default settings



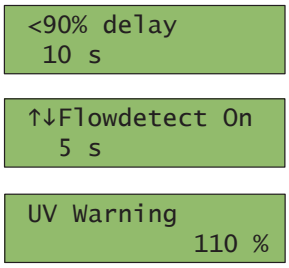






To be able to quickly restore the standard basic settings in the controller to their basic (default) values, a "hotkey" combination has been programmed that only works in the system menu.
By pressing keys 7 and 9 simultaneously in the System menu, the original values of the relevant parameters are reset.

On the left an overview of the relevant parameters with the default values.



Pay attention! After resetting the default parameter values, check these before proceeding with the UV radiation process.
In particular, the absolute minimum UV intensity in W/m² must be set again in the Operator menu.

4.5.7 Control options

Without the optional UV sensor and temperature sensor, the operating hours of UV lamps are tracked and the number of switching on and off of the UV lamps. The UV lamp(s) can be switched on and off manually via the HMI interface ("HMI / External" selector switch to "HMI"). If the "HMI / External" selector switch is set to "External", the UV lamp(s) can be switched on and off via an external potential-free contact.

The bimetal temperature switches mounted on the irradiation chamber and in the control panel serve purely as protection and moderately switch off the UV lamp(s) hardware wise if the limit temperature is reached.

Since with UV lamps switched on, the irradiation chamber must be completely filled with water and sufficient flow must be made, a flow switch can be connected as extra protection, for this purpose this function must be activated in the control. After the system has been released (after the heating-up time of the UV lamp(s)), a return signal must be received within a certain time that sufficient water flows through the irradiation chamber. If this is not the case, the UV lamp(s) will be switched off again.

With an optionally connected temperature sensor, the irradiation chamber temperature can be monitored. There are 2 adjustable limit values associated with the irradiation chamber temperature. A warning that the user is informed that the relevant limit value has been exceeded, this has no further effect on the functioning of the system. If the alarm limit value is exceeded, the critical alarm will be made active and the UV lamp(s) will be switched off immediately to protect the UV system and the environment

If an optional UV sensor is connected, the UV process can be optimally monitored. Changes in water quality (UV transmittance), the fouling of the quartz tubes and the aging of the UV lamp(s) have an influence on the measured UV-C intensity.
Two limit values are linked to the measured UV intensity, a warning that indicates that the UV intensity is lower than the relevant limit value (default 110% of alarm value). An alarm signal indicating that the set minimum UV intensity required for the specified process to achieve the specified UV dose is no longer being achieved.
If the UV signal is lower than 100% but higher than 90% of the alarm value, there is a default delay of 120 seconds before the alarm is made active and the UV lamp(s) is switched off. If the UV intensity is lower than 90% of the alarm level, the alarm becomes active after 10 seconds, with the UV lamp(s) turning off as a result.

4.6 Accessories

4.6.1 Lamp tester

The medium pressure UV lamps used in the VGE Pro MP UV systems have a long life expectancy of 9,000 hours.
However, it is possible that a lamp will not start, to be able to check whether a lamp can still start you can use our UV lamp tester.
By simply holding the metal tip of the lamp tester against the quartz of the lamp or pressing one of the electrical connections and then pressing the test button, this light will illuminate blue when the lamp is still functioning.
The lamp must be completely removed from the irradiation chamber for testing.
Article number: SP0055

4.6.2 Mercury collector

The UV lamps used in the VGE Pro MP UV systems contain a small amount of mercury. If a lamp breaks, this mercury can be released and since the mercury vapor is toxic, mercury released must be completely cleaned up as quickly as possible.
Because of its liquid properties, mercury is difficult to collect and pick up, we advise you to have a mercury collector ready and to use it to clean up spilled mercury.
Article number: SP0057

Ensure that when mercury is released, this is cleaned up as quickly as possible and that the room is well ventilated!

4.6.3 Face protection

With normal use of a VGE Pro UV system, UV light cannot escape. If a UV system is equipped with a UV sensor that is placed in a so-called measuring window, UV light can be radiated into the room during a reference measurement. This UV light can be harmful to the environment that is being radiated.
Because it is inevitable when carrying out a reference measurement that you come into contact with UV light, you should protect yourself well against this. See chapter "Safety instructions".

To ensure that the face is protected from UV radiation, we recommend that you use a polycarbonate face shield in addition to good, fully covering clothing. You can order this from us.

4.6.4 Gloves

The VGE Pro MP UV systems are equipped with medium pressure UV lamps and quartz tubes, the quartz parts must be clean when they are put into operation.
If a UV lamp comes in contact with the skin, traces of grease remain on the lamp. When the UV lamp is switched on, the traces of grease that remain behind block the light that wants to shine out of the lamp. Because light is converted to heat, it will become very hot at the location of the fat (or other contamination) and the lamp will burn out at this location.
To prevent the UV lamps from being grabbed with bare hands, a set of white fabrics and lint-free gloves are supplied as standard with every delivery of a new UV system. If these gloves are worn or dirty, new ones can be ordered with article number: B299800

4.6.5 Torque screwdriver

To be able to mount the ceramic lamp socket correctly, the screws must be tightened with a specified torque. If the correct torque is used, the ceramic lamp socket will not be damaged and the seal will get sufficient pressure to properly seal the irradiation chamber.

The torque screwdriver can be ordered from us with the article number: SP0058

5 Technical data

5.1 General

The VGE Pro UV INOX MP series UV systems have an radiation chamber with an inline design to create a compact design that is easy to install in existing but also new water treatment installations.

Description	Specifications
Material	316L Stainless steel
Maximum pressure	10 bar
Finish, internal	RA 0,8 µm (except weld seam, optionally possible)
Finish, external	Glass bead blasted
Protection	IP54
Environment temperature, storage	+1 °C tot +60 °C
Environment temperature, operation	+5 °C tot +40 °C
Max. relative humidity	95 %, not condensing

5.2 System specific

Description	Specifications for the VGE Pro UV INOX MP				
Type	600-85	1200-85			
Number of lamps	1	2			
Lamp type	600 W	600 W			
Lamp connection*	S.B.T.	S.B.T.			
Weight, dry	11 kg	13 kg			
Weight, wet	14 kg	18 kg			
Flange connection	DN80	DN80			
Installation length	280 mm	460 mm			

*S.B.T. Single-end Bayonet Technology

5.3 Control

The VGE Pro UV INOX MP series UV systems come standard with a controller for controlling the UV lamps, monitoring the process and the interface with the "outside world".

Description	Specifications
Mounting	Wall
Finish	Structure powder coating, RAL 7035
Protection	IP54
Ambient temperature, storage	-20 °C tot +60 °C
Ambient temperature, operation	+5 °C tot +40 °C
Maximum relative humidity	95 %, not condensing
Environment	Protected against direct sunlight and rain
Installation height	Max. 2,000 m

5.4 System specific

Description	Specifications for the VGE Pro UV INOX MP			
For irradiation chamber	600-85	1200-85		
Type, controller	Comfort	Comfort		
Material	Sheet steel	Sheet Steel		
Supply voltage	1/N/PE 180-264 Vac 50/60 Hz			
Power consumption [kW]	0,66	1,33		
Working factor, Cos φ	0,98	0,98		
Lifetime backup battery PLC	Typically 7 years at 25 °C			
Dimensions (H x W x D) [mm]	630 x 500 x 245	630 x 534 x 245		
Weight [kg]	23	24		

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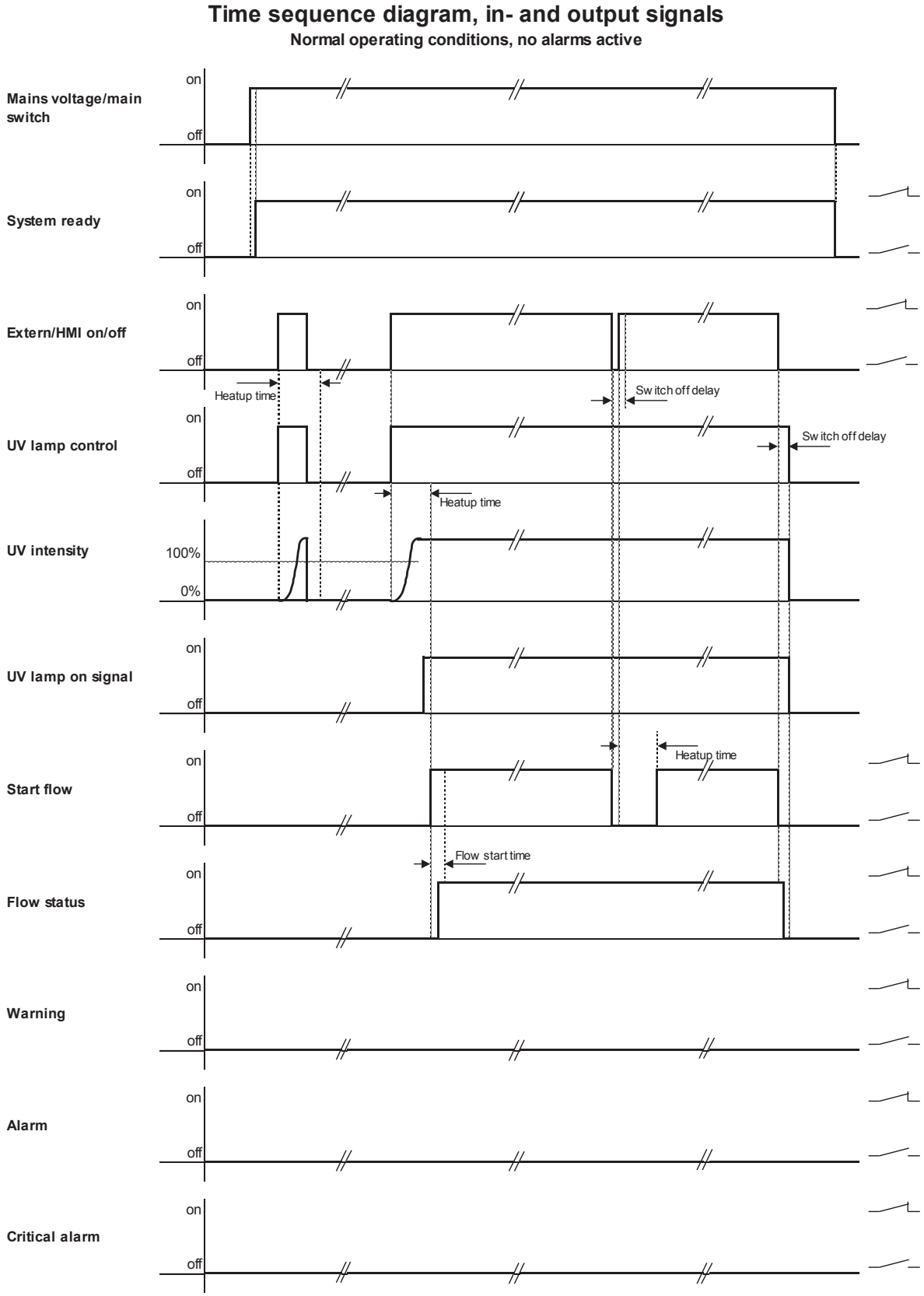
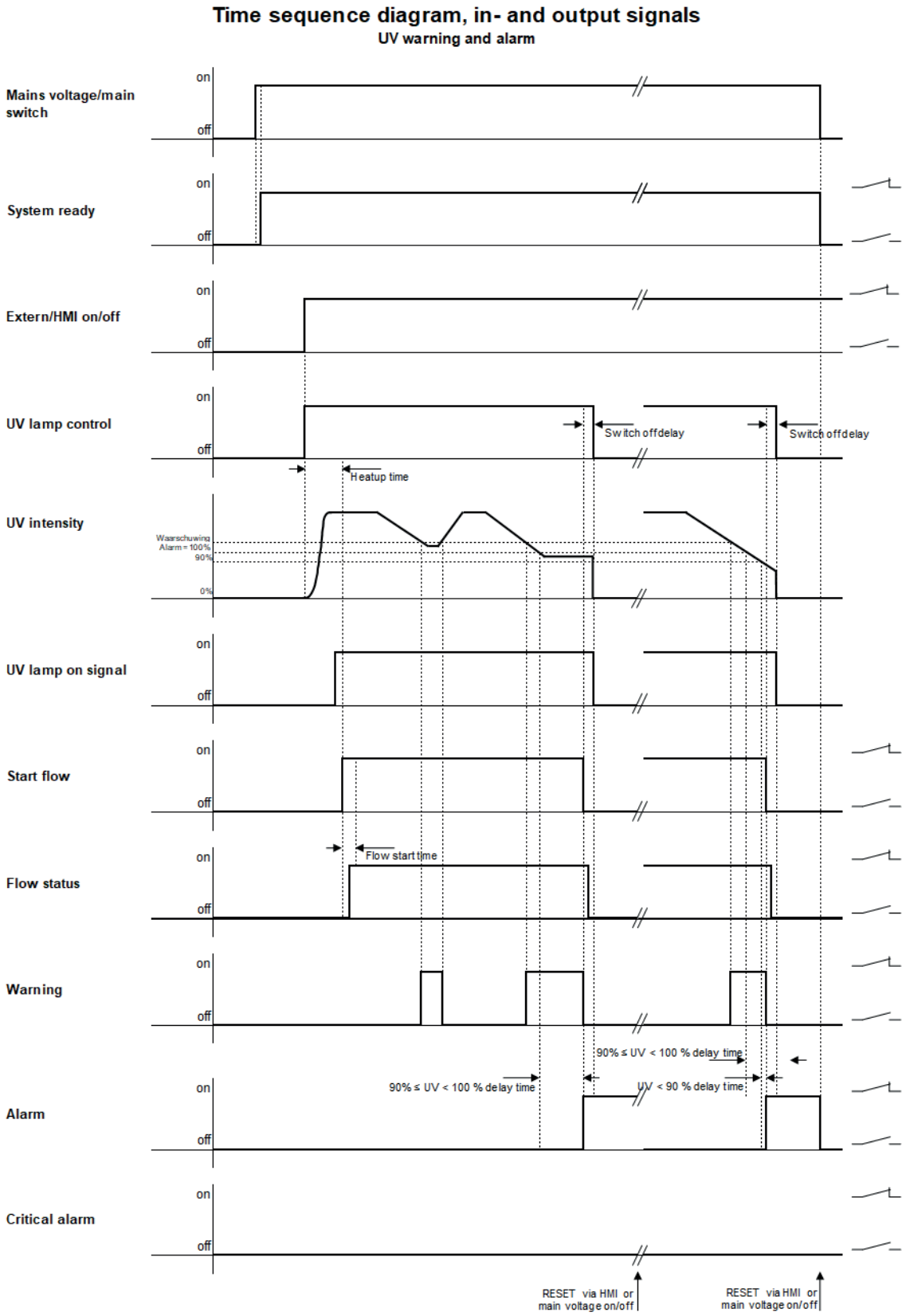
5.5 Time sequence diagram

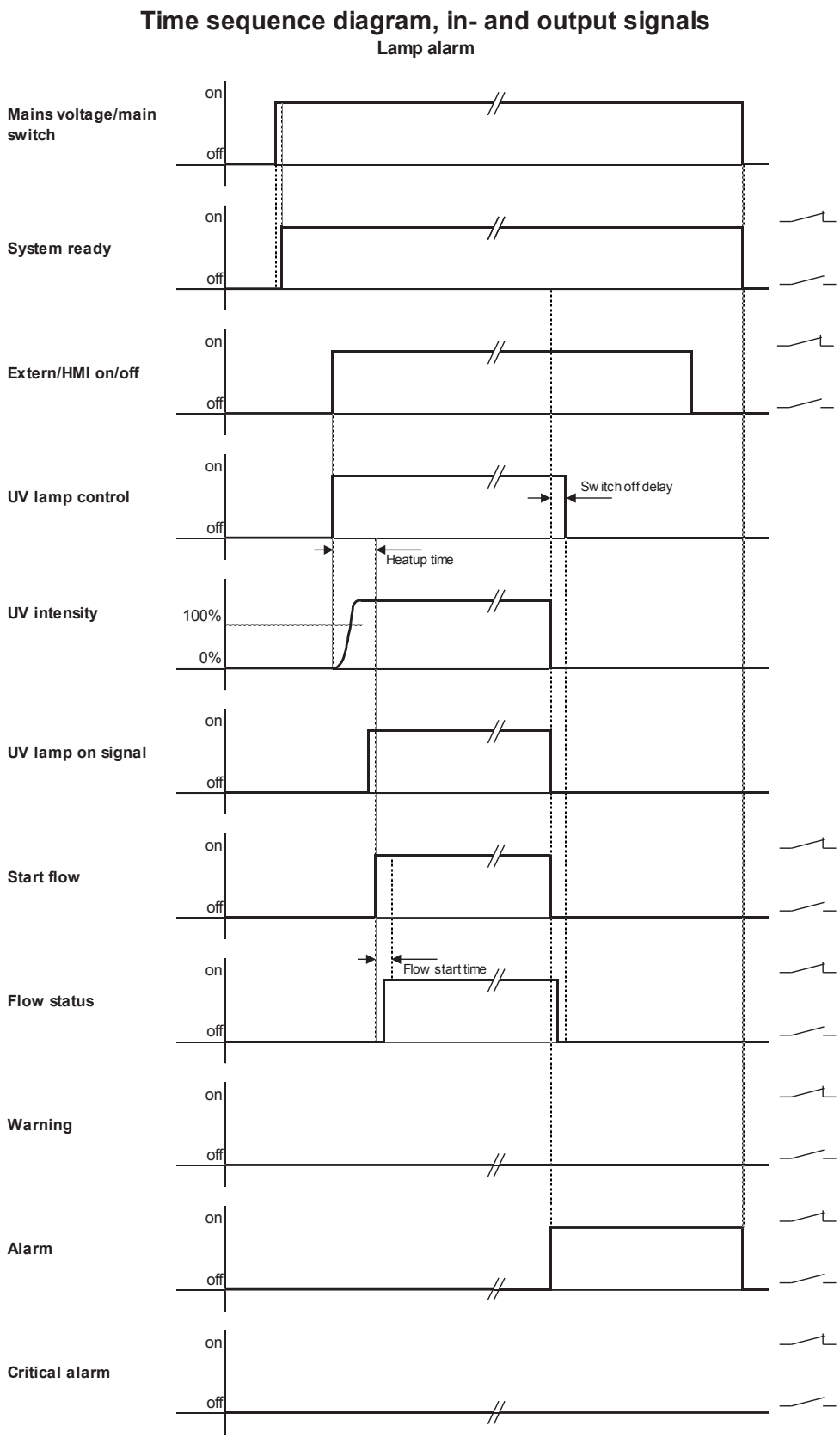
5.5.1 Normal conditions



5.5.2 UV warning and alarm

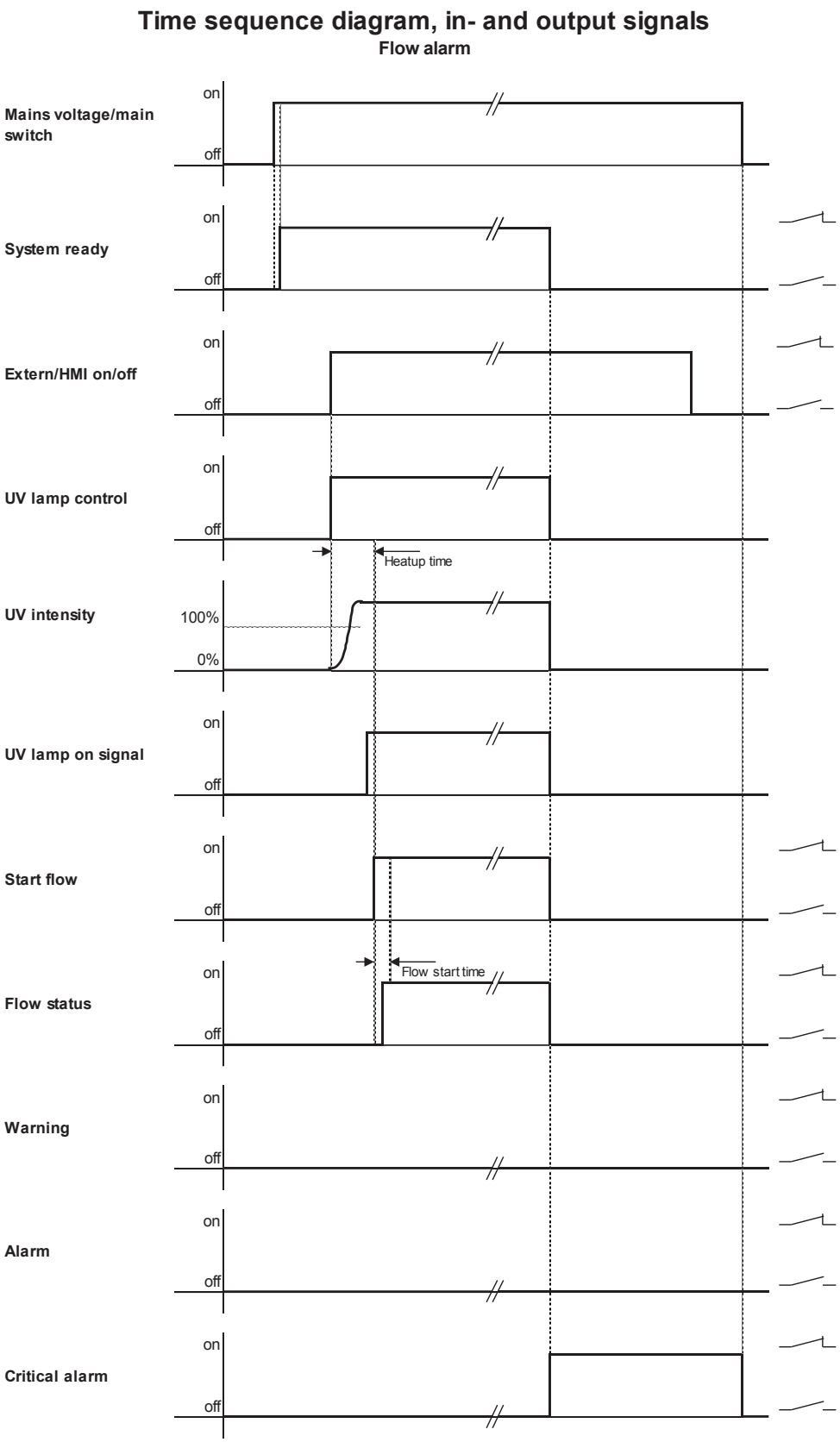


5.5.3 Lamp failure



A self-switching on and off as a result of an increasing irradiation chamber temperature must be prevented, therefore check the operation of the UV system regularly (daily).

5.5.4 No or stopped flow (with flow switch)

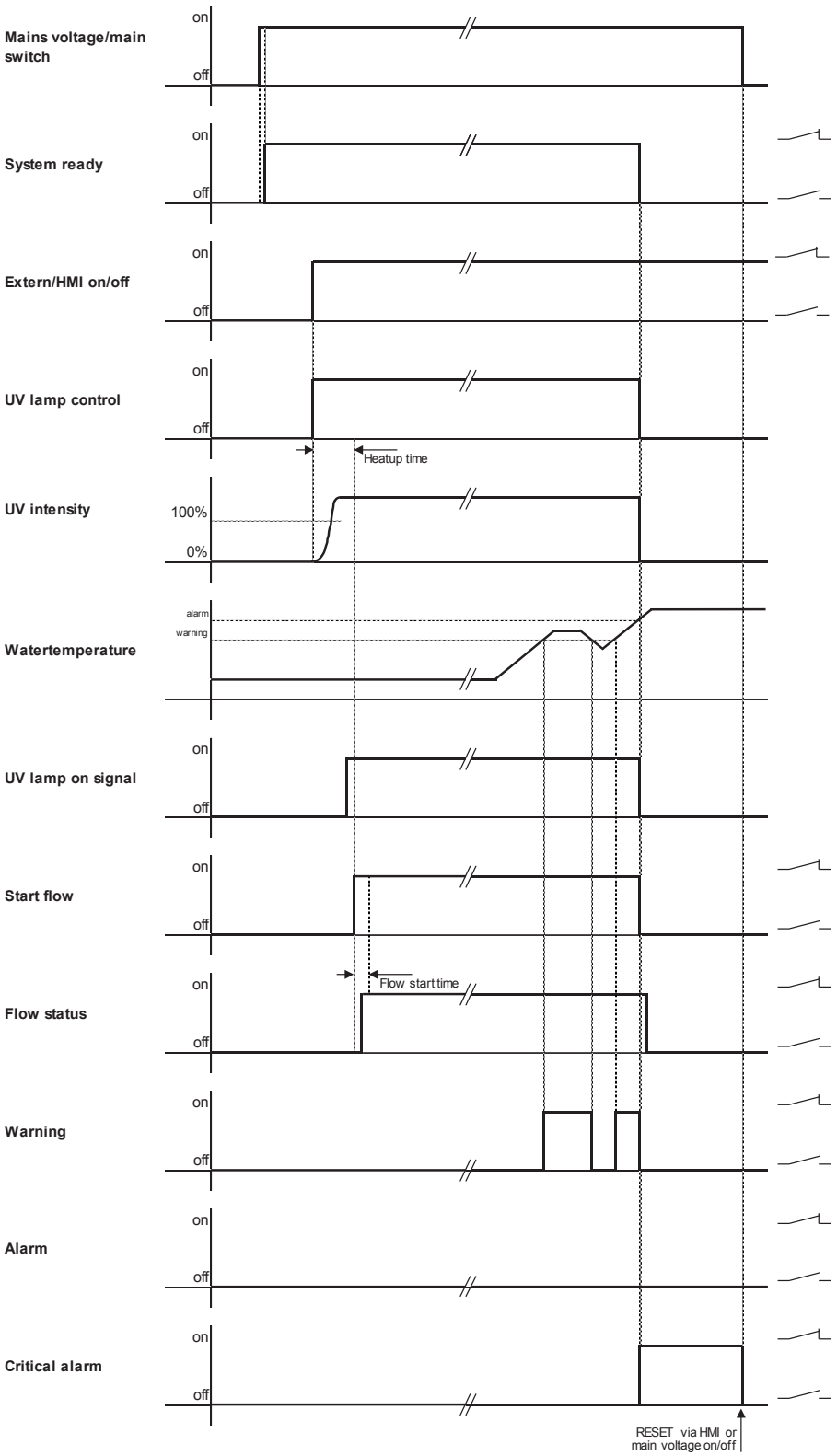


A self-switching on and off as a result of an increasing irradiation chamber temperature must be prevented, therefore check the operation of the UV system regularly (daily).

5.5.5 Water temperature warning and alarm

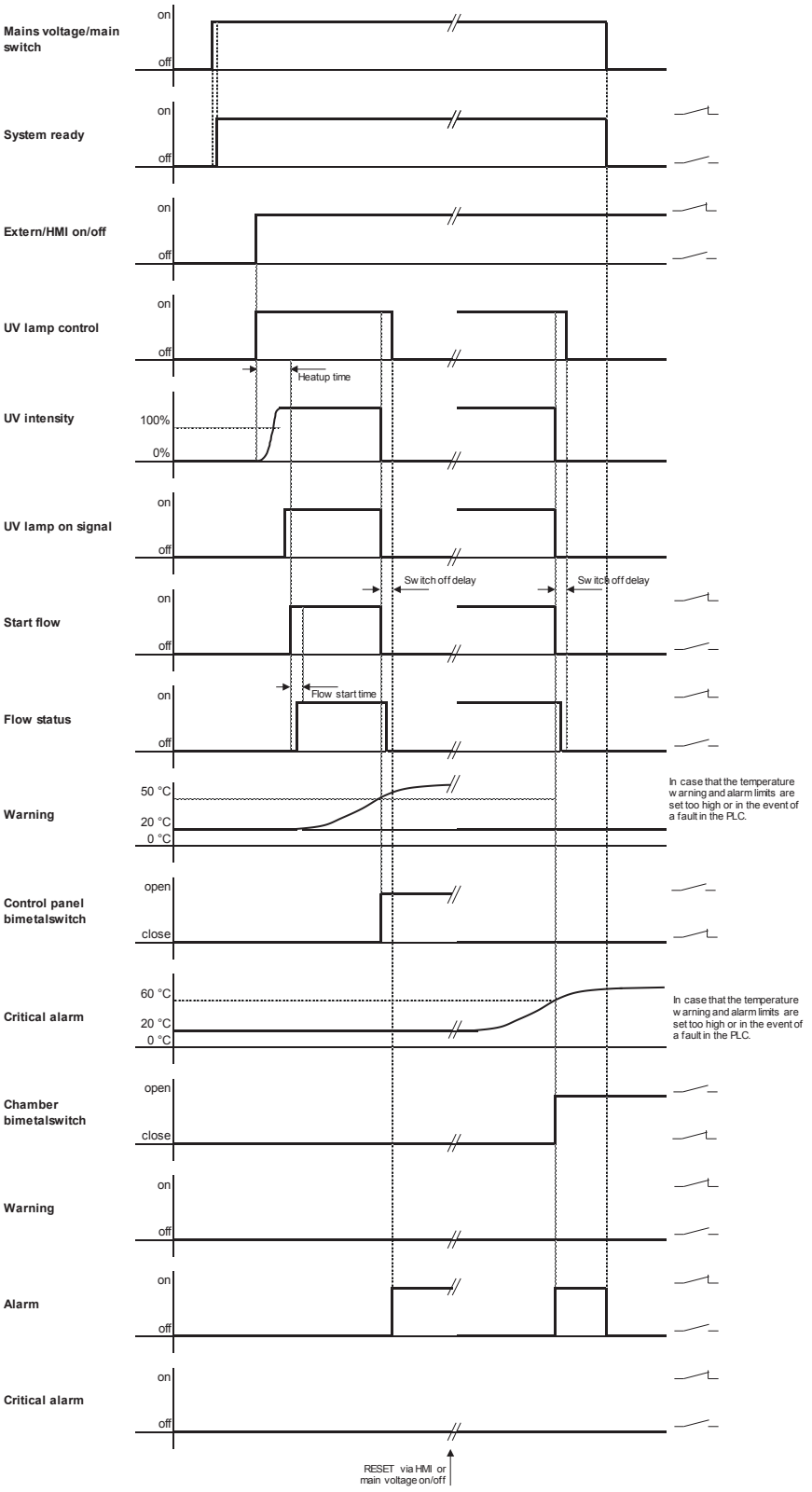
Time sequence diagram, in- and output signals

Watertemperature warning and alarm



5.5.6 Radiation chamber and/or control panel overheating

Time sequence diagram, in- and output signals
Irradiantion chamber and control panel bimetal switches alarms



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6 Installation

6.1 Application examples

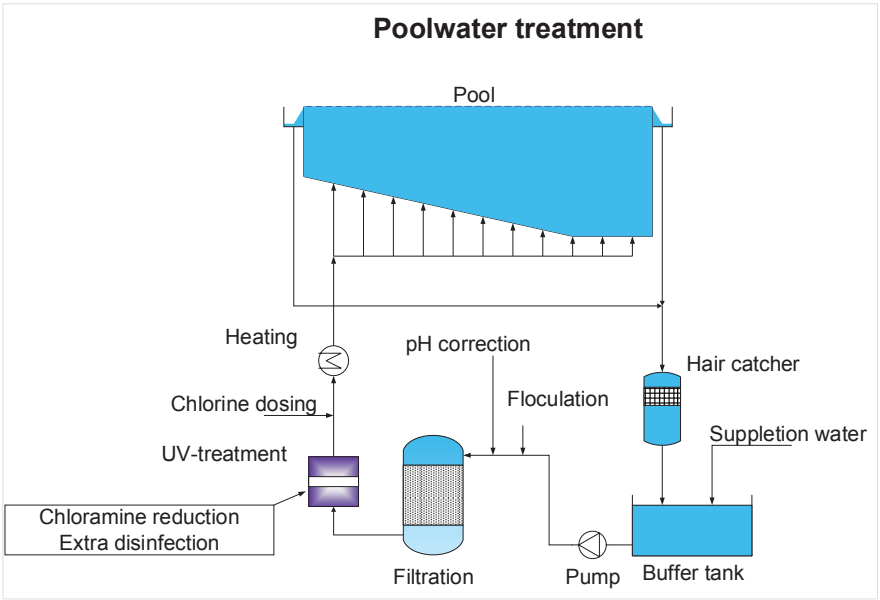
UV disinfection is a method for inactivating microorganisms in the water and thereby disinfecting the water without using chemicals and without influencing the odour and taste of the water. It is also a non-selective disinfection technique where the dose must be adjusted depending on the type of microorganism. As far as known, there are no UV-resistant microorganisms. Cryptosporidium and Giardia protozoa are known to have very high chlorine and ozone resistance but only require a low UV dose for inactivation.
UV disinfection can be applied effectively, including applications in:

- Drinking water;
- Waste water;
- Swimming pools (private);
- Soft drink industry;
- Breweries;
- Aqua culture;
- Horticulture;
- Food industry:
  - Washing water disinfection;
  - Transport water disinfection;
  - Packaging water disinfection;
  - Process water disinfection;
  - Product water disinfection;
- Offshore Industry, injection water;
- Electronics industry;
- Automotive industry;
- Irrigation water;
- Maritime applications;
- Paper industry;
- Petro and chemical industry;
- Snow production machines;
- Mobile applications such as in trains.

Furthermore, with correct dimensioning (higher UV doses than are necessary with disinfection), UV radiation can also be used for oxidative applications. Due to photolysis properties of UV radiation, UV systems can be used very effectively in the reduction of bound chlorine (chloramine) that has the so-called "swimming pool" odour and e.g. cause red eyes in swimmers.

UV radiation can also be used as a catalyst in so-called "Advanced Oxidation Processes" (AOP). The UV radiation is used to oxidize an oxidizing agent (e.g. H_2O_2, O_3, Cl, etc.) by means of photolysis. This process releases hydroxyl radicals (•OH) that have the second highest oxidation potential (2.80 V) which micro-contaminants can be broken down in the water.

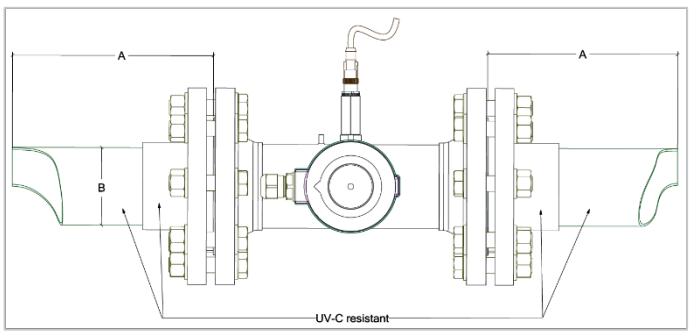
Below an typical pool water treatment process with the location of the UV system indicated.



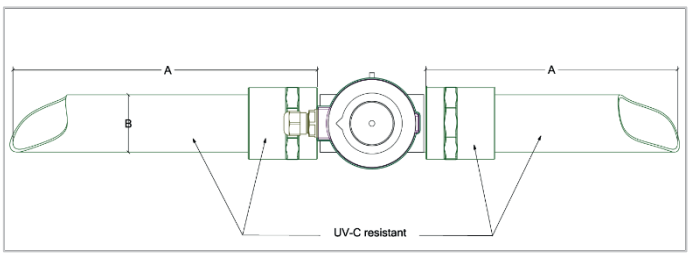
6.2 Mechanical installation

The following aspects must be taken into consideration when installing the irradiation chamber:

- The irradiation chamber must be mechanically fixed. This can be done by e.g. attaching the connecting flanges to a mounting frame or building by means of a console. With fixed metal pipes in which the irradiation chamber is mounted, no additional fixation of the irradiation chamber is usually required;
- The irradiation chamber must be mounted free of any mechanical stress;
- The irradiation chamber can be installed in both a horizontal pipe and a vertical pipe;
- It is necessary that the irradiation chamber is mounted in such a way that the UV lamp is always placed completely horizontally;
- If the irradiation chamber is mounted in a vertical line, it is recommended to flow through the irradiation chamber from bottom to top, in order to prevent air from remaining in the irradiation chamber;
- For an installation in a horizontal pipe, care must be taken to ensure that no air can remain in the pipe and irradiation chamber by installing a properly functioning ventilation system;
- The irradiation chamber can best be installed on the pressure side of a pump;
- In connection with the return wire of the UV lamp, there is a preferred flow direction, depending on how the lamp holder is mounted, it can be changed. The cable from the lamp holder indicates the flow direction, this means that the arrow on the lamp socket also points in the flow direction;
- The VGE Pro INOX MP systems are designed for a working pressure of up to 10 bar;
- The irradiation chamber may only be put into operation if it has been properly grounded by skilled personnel, for this the irradiation chamber is provided with a threaded end with an earth symbol. The earthing cable (not supplied) must be connected to the wire end, which must also be connected to the earthing terminal in the control box for this purpose;
- The irradiation chamber has been developed for installation in a dry and clean environment out of the direct sunlight. Humid air, dust particles and dirt in combination with aggressive vapours/air (such as chlorine vapor, hydrochloric acid vapor, salt air, etc.) can cause corrosion to the UV system, so ensure that your system remains clean;
- A irradiation chamber is made of 316L stainless steel and must therefore be mounted in a piping system in which other metal components are used that are also made of stainless steel 316L to prevent electrolytic corrosion;
- Use suitable UV-C resistant seals for mounting the irradiation chamber;
- All materials that are directly or indirectly exposed to UV light must be made of UV-C resistant material (think of plastic pipes, seals of valves, valves, flow meters, etc.). When using plastic pipes one can e.g. use black HDPE as a UV-resistant material. PVC is not UV resistant, the plasticizers present in the PVC are broken down by the UV light, making the material hard and brittle with an increased risk of breakage;
- The radiation depth of UV light in the pipes (radiation zone) before and after the irradiation chamber depends on the UV transmittance of the water. As a guideline, 5 x the pipe diameter with a minimum length of 0.5 m is used as the radiation depth where the material used must be UV-resistant;



Drawing 19



Drawing 35

A ≥ 5 x B (minimaal 0,5 m)

- Although the irradiation chamber is made of stainless steel 316L, it can still corrode. It is therefore important to regularly clean the irradiation chamber to prevent precipitated dirt from causing corrosion. Starting corrosion must be professionally removed and repaired;

- Never position sampling points on an irradiation chamber, the sampling connections must be outside the range of UV radiation. For this, the above-mentioned radiation depth can be used as a distance;
- When mounting the irradiation chamber, ensure that sufficient space is available around it for replacing quartz tubes and UV lamps and for safely performing maintenance and service work;
- For an ideal hydraulic installation, a straight pipe length of 7 x the pipe diameter before the irradiation chamber and 5 x the pipe diameter after the irradiation chamber is recommended;
- If you want to install 90° bends directly before and/or after the irradiation chamber, it is advisable not to choose a bend radius smaller than 1.5 x the pipe diameter;
- During the installation of the irradiation chamber, ensure that no objects remain in the pipes or irradiation chamber that could damage the UV system when starting the flow;
- After mounting the pipe, fill the irradiation chamber slowly to prevent damage due to water hammer;
- Before mounting the lamp and putting the UV system into operation, check the system for leaks and repair it before putting it into operation;
- After installation of the pipes and irradiation chamber, it is recommended to clean the entire hydraulic system before commissioning.

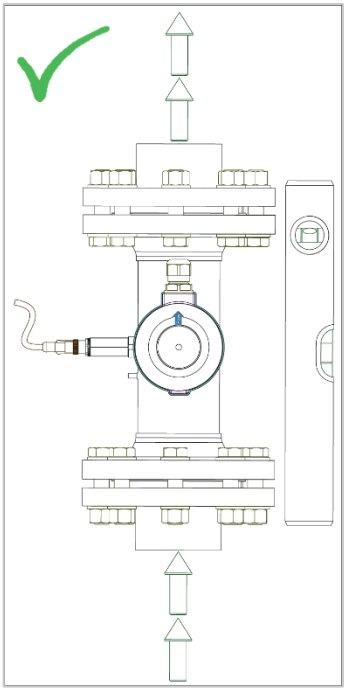
6.3 Installation drawings

The VGE Pro MP systems can be mounted in both horizontal and vertical pipes. When mounting, however, care must be taken that the UV lamp(s) are always placed horizontally. Below are some examples of how the UV system can be installed.

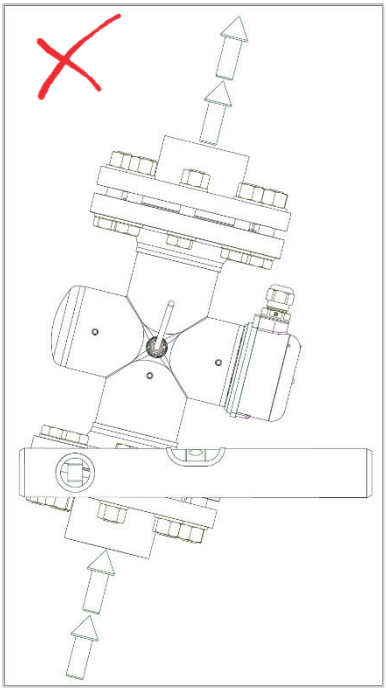
The UV systems can be flowed through in both directions, the lamp holder must be mounted depending on the flow direction. There is an arrow on the lamp base that must correspond to the flow direction and because the lamp can only be placed in the lamp holder in one way, it is important to position it correctly. With correct installation, the arrow on the lamp base points in the direction of the flow and in the direction of the cable gland of the lamp holder.
The cable gland in the lamp holder must therefore be mounted with the flow direction, see the examples below.

6.3.1 Vertical pipes

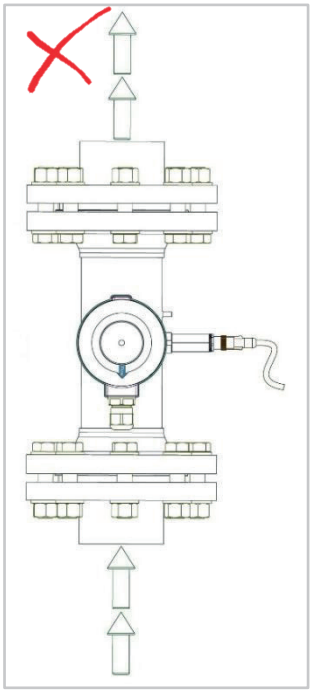
The VGE Pro MP systems are can be mounted in a vertical pipe. The recommended flow direction is upwards, as a result of which air is forced out of the irradiation chamber. With downward flow, there is a risk that air will remain in the irradiation chamber if the back pressure is too low. Note the direction of flow of the water and the position of the lamp holder (cable gland). With correct lamp holder mounting, the arrow points to the lamp base in the direction of the flow.



Correct vertical assembly.



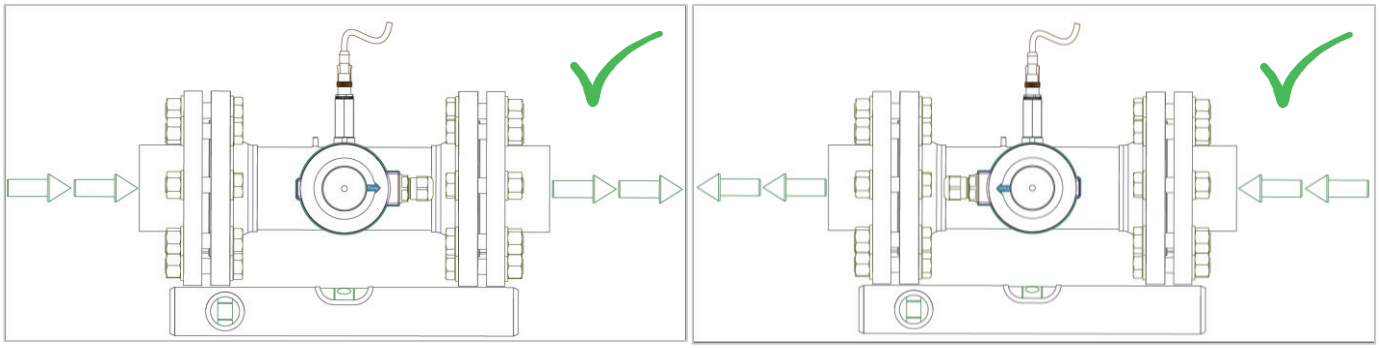
Incorrect vertical mounting, the lamp is not horizontal placed.



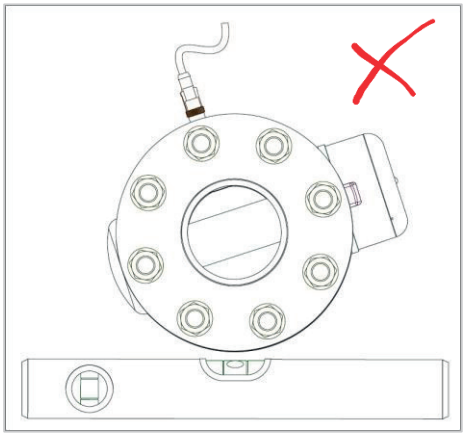
Incorrect mounting of the lamp holder, the arrow on the lamp base must point with the direction of flow and not as shown here against the direction of flow.

6.3.2 Horizontal pipes

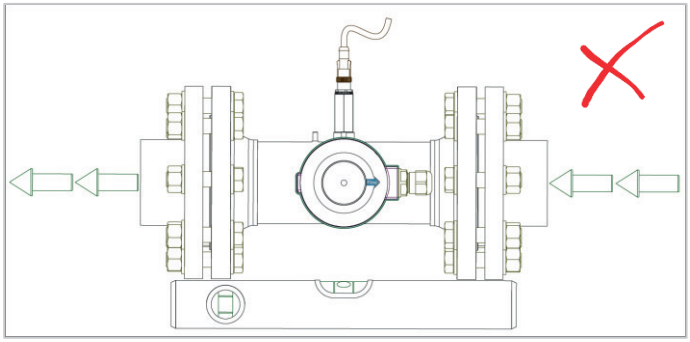
The VGE Pro MP systems can be flowed through in horizontal direction in both directions. Note the direction of flow of the water and the position of the lamp holder (cable gland). With correct lamp holder mounting, the arrow points to the lamp base in the direction of flow.



Correct horizontal mounting.



Incorrect horizontal mounting, the lamp is not placed horizontally.



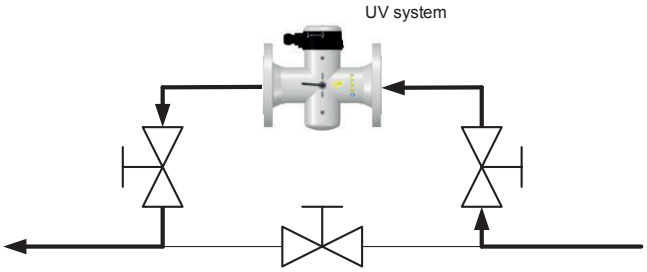
Incorrect mounting of the lamp holder, the arrow on the lamp base must point with the flow direction and not as here against the flow direction.

6.4 Bypass installation

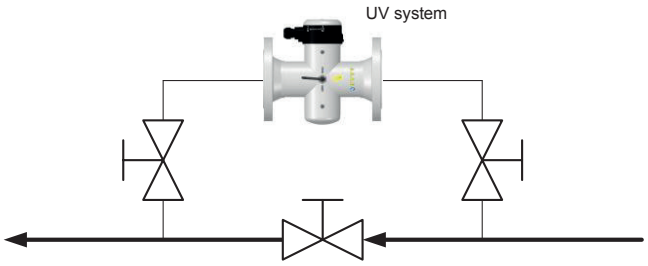
In order not to have to stop the operating process during service work on the irradiation chamber, which must be opened, it is advisable to place the UV system in a bypass.

If the water to be treated is no longer flowing through the UV irradiation chamber, this water is no longer disinfected/treated. The following measures must be taken:

- Alternative (chemical) disinfection of the water;
- Do not use and drain the water;
- Stop water flow;
- No UV irradiation of the water for a short time is no problem (circulation of swimming pool water where chloramine is reduced), no measures.



Bypass closed for UV system operation



Bypass open for UV system service

When disinfecting liquids, the full flow must flow through the UV system, if only 1% of the flow does not flow through the irradiation chamber, a log 2 reduction of microorganisms is the maximum attainable. An

exception to this is a process in which the water is circulated in which only a part flows through the UV system, which controls the amount of microorganisms required for the specific process.

When reducing the bound chlorine (chloramine) in swimming pool water, the UV system must be dimensioned for the total circulation flow that goes through the water treatment. If the UV system is dimensioned for a partial flow of the total flow, the reduction of the bound chlorine will take longer or even will be unrecordable. Always dimension a UV system to be used in swimming pools at the full circulation flow rate and install the UV system in such a way.

6.5 Corrosive water

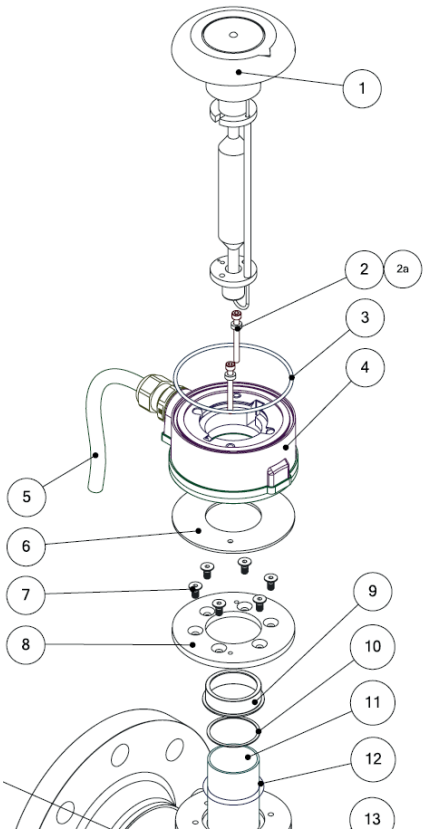
The VGE Pro INOX systems are made of stainless steel in the quality 316L, which is a material that is excellent for applications in, among other things, the drinking water industry or swimming pool installations due to the low corrosive properties of the water.

For applications with seawater or brine, stainless steel 316L may not be corrosion resistant enough, in this case we would like to point out that we have an extensive series of UV systems with an irradiation chamber made of HDPE for this type of application.

Up to a chloride content of up to 800 mg/l in the water to be treated, an irradiation chamber of stainless steel 316L can usually be used.

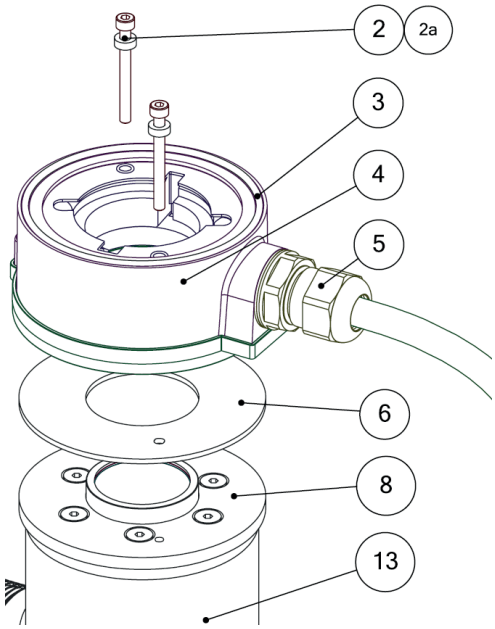
It is not permitted to allow a liquid to flow through the reactor, or to add additives to the water to be treated, which may have a negative effect on corrosion or degradation of the materials used. This to prevent dangerous situations, damage to the reactor and surrounding installations and/or flora and fauna.

6.6 Lamp socket assembly



Drawing 2

The lamp socket (4) is the electrical connection between the lamp and the lamp driver. It also plays an important role in the positioning and temperature management of the lamp. The lamp socket is mounted onto the mounting flange (8) by two screws and plastic spacers (2, 2a). The mounting holes are symmetrically positioned on the mounting flange, allowing the lamp socket to be mounted in two ways. In other words the socket can be rotated 180°.
The lamp socket must be mounted so that the cable(gland) (5) points in the direction of the water flow. (see Chapter 'Installation drawings' for correct and incorrect positioning)
If the lamp socket is mounted correctly in relation to the water flow, the return wire is always "downstream". This is important for optimum irradiation of the water.



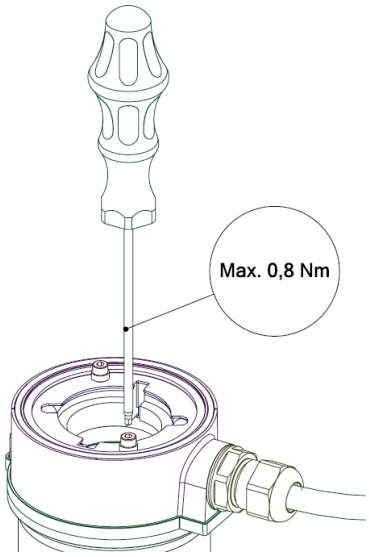
Drawing 28

Ensure that the O-ring (3) is not lost. Tip: store it temporarily.
Insert both M4x45 screws (2) with the spacers (2a) around them in the holes of the lamp socket. Place the foam gasket (6) at the ends of the screws so that it can be placed as a whole on the mounting flange.

Position the cable (cable gland) (5) in the direction of the water flow (see also chapter 'Installation drawings'), until the screws fall into the holes of the mounting flange (8).
The lamp socket (4) with foam gasket (6) can be secured by means of the supplied M4x45 screws and spacers (2 and 2a).

If the O-ring (3) has been taken out of the lamp socket, it can now be put back clean again. Check the O-ring and groove for contamination. If dirty, clean thoroughly with a brush or dry cloth.

Use only the original screws. These are provided with a special coating to prevent "solid eating" from stainless steel to stainless steel. Use a screwdriver with an adjustable torque (Nm) at all times. Also called torque screwdriver/key. Screw the screws into the mounting flange by hand. Do not screw in the screws by machine! It must be easy to screw in the screws. If this is not the case, check the thread for dirt or damage. Tighten the screws evenly using the torque screwdriver, with a maximum force of 0.8 Nm. (see drawing 29)



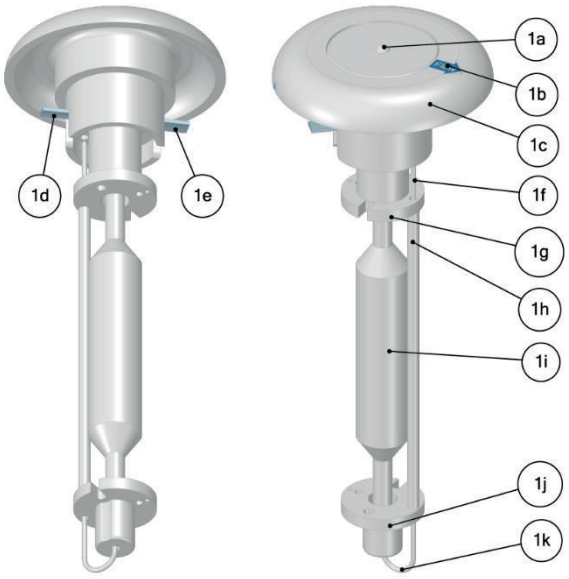
Drawing 29

6.7 Lamp installation

The lamp consists of a ceramic base, with the lamp attached to it. Together they form a lamp unit, which is placed in the UV-C system without tools.

Touching the quartz glass is not permitted and not necessary for placing the UV lamp. If fingerprints or dirt are present on the quartz parts, the UV-C radiation is negatively influenced, so that the UV-C treatment process is also negatively affected.

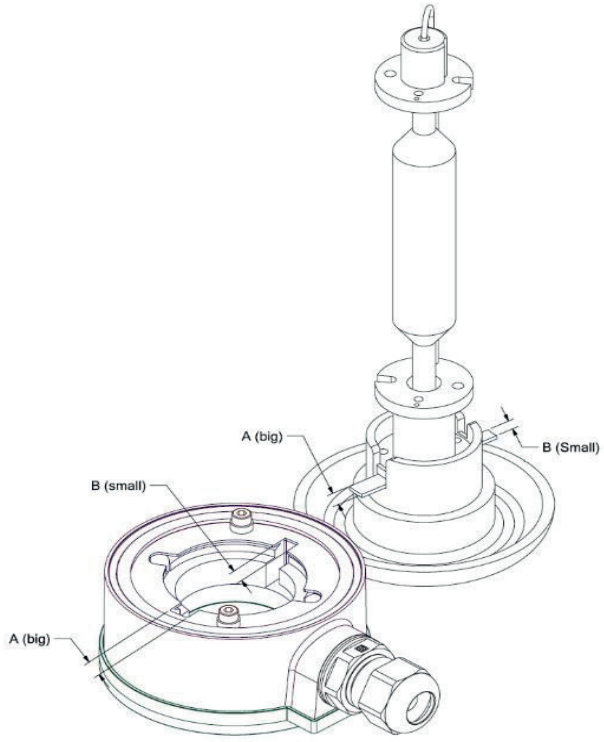
1a	Visible light window, to indicate the lamp operation. Window does not transmit UV-C radiation
1b	Arrow for the water flow direction. Ensure that this arrow always corresponds to the flow direction
1c	Ceramic lamp base
1d	Lamp contact small
1e	Lamp contact large
1f, 1k	Return wire (lamp power supply)
1g, 1j	Ceramic lamp spacer/temperature stabilizer
1h	Glass return wire stabilizer
1i	Lamp quartz tube



Drawing 39

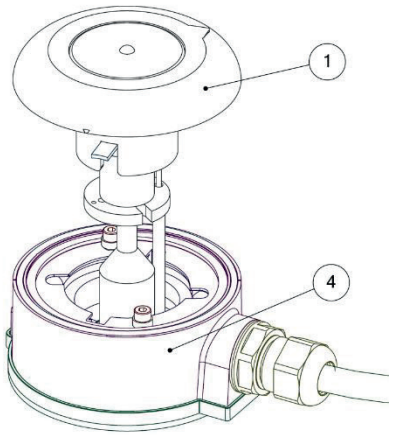
Placement of the UV lamp
Grasp the lamp by the base (1c) and guide it with the spacer (1j) through the lamp socket (4, drawing 2, chapter 'Lamp socket assembly') into the quartz tube (11, drawing 2, chapter 'Lamp socket assembly').

Due to the difference in size in the lamp contacts (1d and 1e), the lamp only fits into the socket in one way. Make sure that the contacts match the openings in the socket (see also drawing 10).

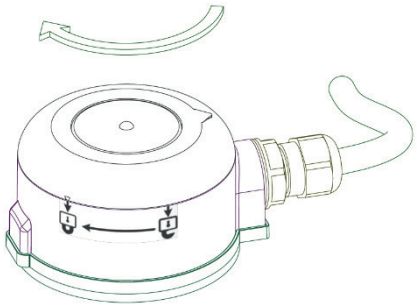


Drawing 10

If the lamp is fully inserted and the ceramic base touches to the O-ring all around (3, drawing 2, 'Lamp socket assembly' chapter), the lamp be secured via the "bayonet closure". Turn the lamp clockwise until it stops. There is an embossed arrow on two sides on the edge of the ceramic base. With correct locking, the arrow corresponds to the closed lock on the socket. (see drawing 12).



Drawing 11



Drawing 12

Ensure that the UV lamp is always in the closed position (arrow on the lamp base matches the position of the closed lock on the lamp socket) before switching on the UV lamp.

6.8 Electrical installation

The electrical installation of a UV system must be carried out by a qualified electrician who is authorized to do so in accordance with local rules and legislation. Making changes to the UV system is not permitted.

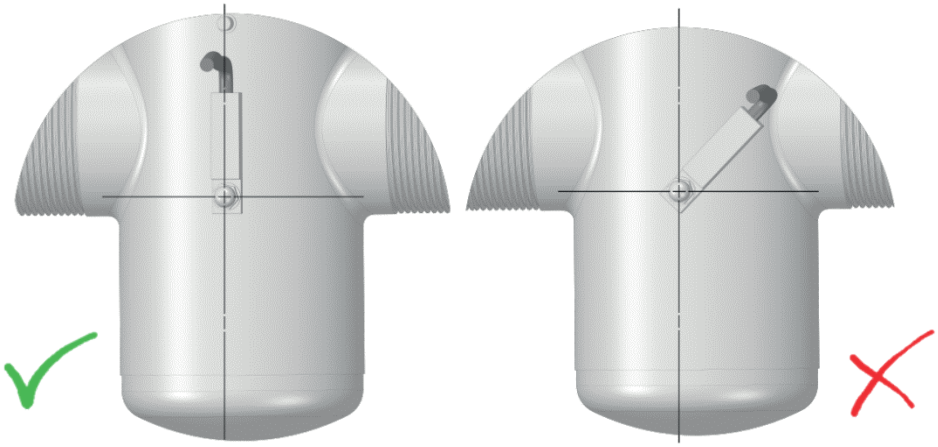
For the installation of the UV system and therefore also the control panel, follow the guidelines described in the chapter 'Environmental conditions'.

Also follow the instruction as described in the 'Safety instructions' chapter to work safely.

Ensure that the irradiation chamber is connected to the safety ground (in control panel) before the UV system is commissioned.

The power cable is not part of the delivery of VGE B.V.. Follow local rules and legislation for a suitable power cable with suitable fuse. The power cable must be connected directly to the corresponding connections on the main switch.

Before commissioning, for safe operation of the UV system, the Bimetal switch must also be correctly mounted on the irradiation chamber with the supplied cap nut as shown in drawing 48.



Drawing 48 Correct assembly Wrong assembly

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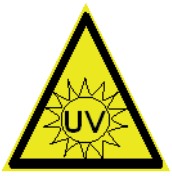
7 Starting up a VGE Pro UV system

Only by VGE B.V. trained and authorized persons may commission a UV system.

Danger of injury and damage to the UV unit!

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

Risk of skin and eye injury!



Only switch on the UV unit if all lamps are mounted. If in a multi-lamp system one lamp is not mounted in the irradiation chamber, UV light will radiate from the irradiation chamber if the system is switched on.

If you need to work on a UV unit that is switched on, you must protect yourself appropriately against the possible escaping UV radiation.

Danger of damaging the UV unit!

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

7.1 Mains voltage

The VGE Pro UV unit is designed to operate at a supply voltage of 230 Vac, 50/60 Hz.

Supply voltage limits:
- Minimum 180 Vac
- Maximum 264 Vac

Mains frequency:
- At least 47 Hz
- Maximum 63 Hz

Ensure that both the irradiation chamber and the control box are properly electrically grounded before the UV unit is switched on.

Before switching on the UV unit, check whether the connected mains voltage meets the above specifications, if the minimum limits are exceeded or the maximum limits are exceeded, serious damage to the UV unit will occur.

The mains voltage must be connected directly to the main switch.

7.2 Menu settings

Before commissioning the UV system, the menu settings must be checked and adjusted if required.
Ensure that the lights are not yet switched on by not activating an 'External start' or HMI (manual or via ModBus) command.
Go to the 'Menu structure' chapter and follow the instructions to check the menu settings.

7.3 Water in the system

Before switching on the UV lamp(s), the irradiation chamber must be completely filled with water! A irradiation chamber that is completely or partially filled with air can become very hot locally after switching on the UV lamps, which can damage the UV installation and the environment of the UV installation. There is also the risk of operating personnel being injured.

After the lamp(s) heat up and the "start flow" signal becomes active, the irradiation chamber must be immediately flushed with water. As long as the "start flow" signal is active, the irradiation chamber must remain completely filled and sufficiently flowed with water to ensure sufficient cooling, in order to prevent dangerous situations for the UV system, the environment and users.
The water that flows through the UV system may have a temperature between +1 °C and +45 °C. In the presence of a temperature sensor (optional), the maximum alarm temperature is set to +45 °C by default. As an extra protection, a bimetallic switch is mounted on the irradiation chamber which switches off the UV lamp(s) at a maximum chamber temperature of approximately +60 °C.
The irradiation chamber can work with a maximum operating pressure of the water of 10 bar, water hammer can irreversibly damage the irradiation chamber or parts thereof.

7.4 Cooling of the UV system

The entire lamp power is eventually converted to heat, which means that the irradiation chamber must always be completely filled when the UV lamps are in operation and that there must be a minimum flow to realize sufficient cooling to prevent overheating.

Quantity of cooling water (for a temperature increase of 10 °C in the water, a flow of 100 l/h per kW is required):
- Minimum flow with 1 x 400 W lamp = 0.04 m³/h;
- Minimum flow with 1 x 600 W lamp = 0.06 m³/h;
- Minimum flow with 2 x 600 W lamp = 0.12 m³/h.

If the UV system is included in a circulation process, it must be taken into account that the water is heated when the UV lamp is running. If the process cannot dissipate sufficient heat, a dangerously high water temperature can be achieved and additional protection/cooling must be provided.
The irradiation chamber temperature is monitored by a bimetallic switch that switches off the UV lamp at approximately +60 °C outside chamber temperature.

Above a temperature of ± 42 °C damage to the skin occurs after a while. The higher the temperature, the faster this damage will occur.

Attention!
With small water volumes, such as whirlpools or spa's, the heat from the UV lamp(s) can heat up the water to a higher temperature than the setpoint temperature of the concerning whirlpool or spa. In a situation such as a whirlpool, spa or other water basin where a high temperature can cause a risk of personal injury or material damage, the use of an additional temperature protection is obligated! The interlock connector (E) of the control panel can be used for this.
For your safety: This product should be preferably be installed by a professional service technician, qualified in hydrotherapy bath installation.

In case the UV system is controlled by a "Comfort" control panel and the optional Pt100 temperature sensor is installed and connected to the irradiation chamber and the control panel and this function is activated in the control panel, the UV lamp will be switched off standard at +45 °C outside chamber temperature.

7.5 Start-up procedure

If the UV system is completely mechanically, hydraulically and electrically installed, the UV system can be put into operation according to the instructions in the table below.

Nr.	Task description
1	Fill the piping system and the irradiation chamber complete with water, making sure that the system and the irradiation chamber are completely vented.
2	Measure the supply voltage and check whether it corresponds to the specification on the type plate.
3	Ensure that all fuses in the control cabinet are switched on.
4	Check that no external signals are active that can switch on the UV lamps.
5	Switch on the mains voltage by switching on the main switch.
6	Check the UV settings (100 % value) in the "operator" menu.
7	Go back to the main menu with the button.
8	Make sure that water flows through the irradiation chamber or that water can start flowing through the irradiation chamber when the "Start flow" signal is activated.
9	Switch on the UV lamp(s).
10	Wait until the warm-up time has elapsed, there are normally no alarms and the irradiation chamber will flow through with water.
11	Instruct the servant staff.

8 Maintenance

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

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

UV-C radiation can damage the retina of your eyes and unprotected skin. Ensure that you are not directly or indirectly exposed to UV radiation.
Everyone involved must be informed about the specific hazards associated with a VGE Pro UV system.

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

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

Quartz can cause serious cuts in the event of breakage.

General steps of maintenance:

1. Switch off the UV system and lock the main switch;
2. Shut off the hydraulic supply and discharge for the UV system;
3. Drain the water from the unit;
4. Perform the specific maintenance as described in this chapter;
5. Remove the lock on the main switch and switch on the UV system in accordance with the conditions described in the chapter 'Water in the system';
6. Check whether the UV lamp is burning.

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

8.1 Who can perform which actions

Trained and authorized technical personnel means:
- Installation: technical staff trained and authorized by VGE B.V .;
- Service: personnel who have received training and/or instruction from VGE B.V. or an authorized service partner;
- Maintenance: technical staff trained and authorized by VGE B.V .;
- Electrical work: authorized and qualified electrician.

The following activities fall under operation:
- Operating the control;
- Reading data.

The following activities fall under maintenance:
- Assembly UV-C system;
- Cleaning and/or replacing quartz glass;
- Replace UV lamp;
- General maintenance of the UV system;
- Clean UV sensor;
- Exchange O-rings;
- Inspection work.

The following activities fall under electro:
- All electrical work on the irradiation chamber and in the control.

8.2 Maintenance schedule

The maintenance schedule specified below can be used in regular processes. Based on the application, the interval period of inspection, cleaning and / or replacement must be increased or decreased.

It is important that a responsible person and a user are designated and described.

Record all activity carried out on a UV system in the logbook of the relevant UV system.

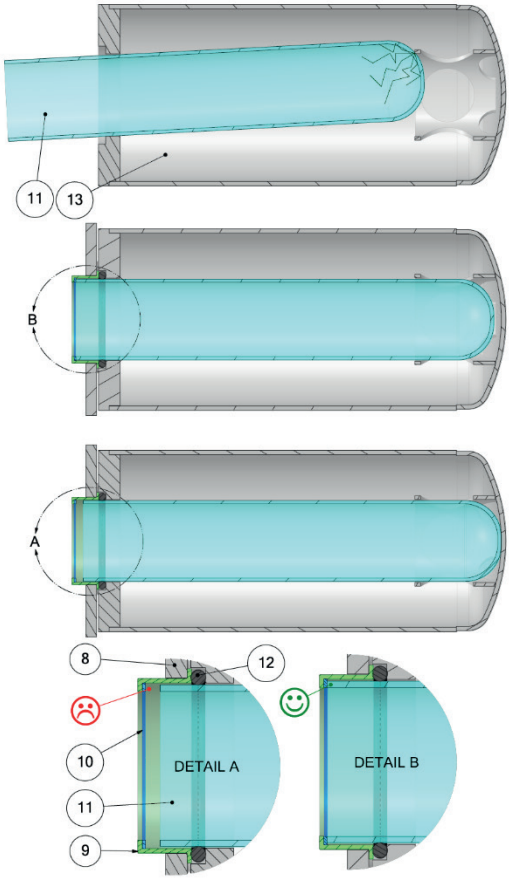
Point of time	Maintenance level	Activity
Daily	1	- Functional check: - Start the UV lamp(s); - Are there warnings active? - Are alarms active; - Checking for leaks; - The radiation chamber is completely filled with water.
Monthly	1	- Also perform the daily activities; - Check the number of burning hours of the UV lamp(s) and replace them if necessary; - Test the systems that are on standby by fully switching them on for at least one hour with water flow.
Annually	2	- Also perform the monthly activities; - Clean the quartz tube(s) and replace if necessary;

		- Clean the measuring window of the UV sensor if present;
2-yearly	2	- Have your supplier recalibrate the UV sensor(s).
3-yearly	2	- Replace the quartz tube(s).
5-yearly	2	- Replace the fan(s) in the control box.

Maintenance level 1 can be performed by operated personnel.
Maintenance level 2 must be performed by technical staff trained and authorized by VGE B.V. authorized service personnel.

Periodic maintenance extends the life of the device. Non-timely or non-maintenance of the system limits the service life of a number of components and the operation can no longer be guaranteed.

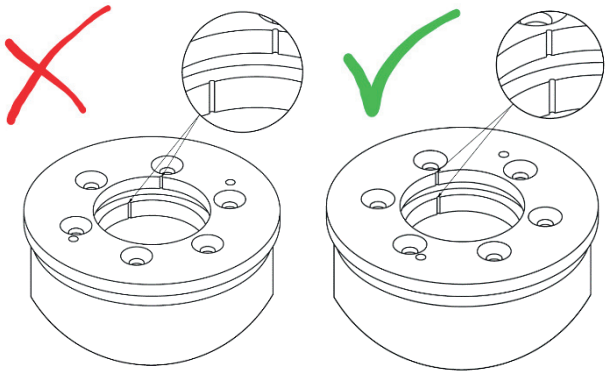
8.3 Quartz tube assembly



Drawing 4

Remove the quartz tube (11) from the packaging and carefully check it for damage. Damaged quartz tubes cannot be used due to the risk of leakage and / or short circuit.
At the end of the irradiation chamber there is a "quartz tube support". Carefully slide the quartz tube into this support, without bumping it into the edge. This could cause a break in the quartz tube. (see drawing 4)

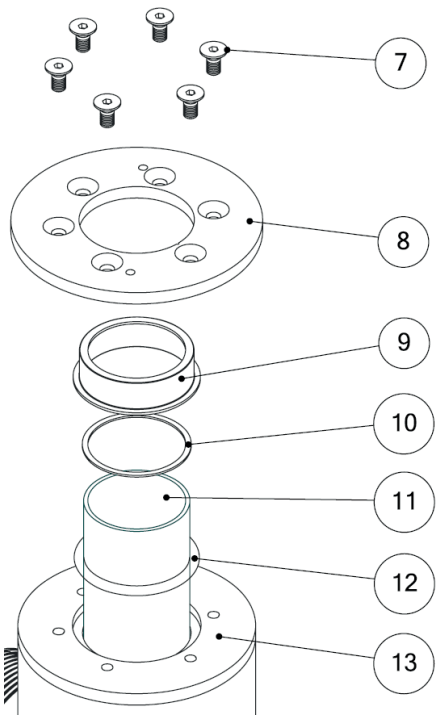
Carefully place the quartz tube (11) in the irradiation chamber (13) until it protrudes approximately two centimetres.
Slide the O-ring (12) over the quartz tube into the O-ring groove. Do not use grease, silicone or other means to lubricate the O-ring or to facilitate assembly. This is not necessary, it can damage the O-ring and moreover it leaves UV-C impervious pollution on the quartz glass. The O-ring forms the watertight connection between the quartz tube and the irradiation chamber.
Now place gasket (10) in the aluminium bush (9) and slide the bush with gasket over the quartz tube (11). The gasket (10) provides a protective layer between the quartz tube and the aluminium. The aluminium bushing can now be pushed over the quartz tube together with the gasket to the O-ring and irradiation chamber. The edge of the quartz tube (11) should touch the gasket (10) when everything is in the right place. (see figure 4)



Drawing 5

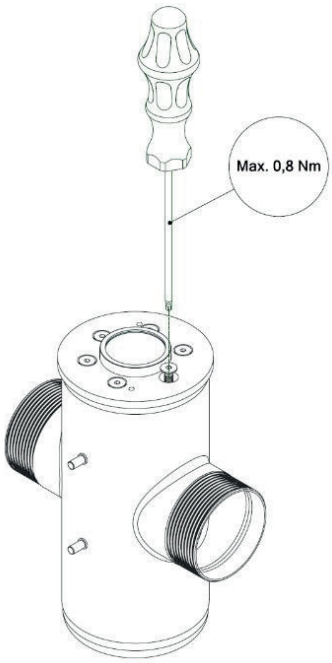
Drawing 6

The mounting flange (8) can now be positioned with respect to the hole pattern on the irradiation chamber (13). The mounting flange can only be positioned in one way. To simplify correct positioning, markings have been applied to the irradiation chamber and to the mounting flange. (see drawings 5 and 6) When the markings are in line, the holes correspond.



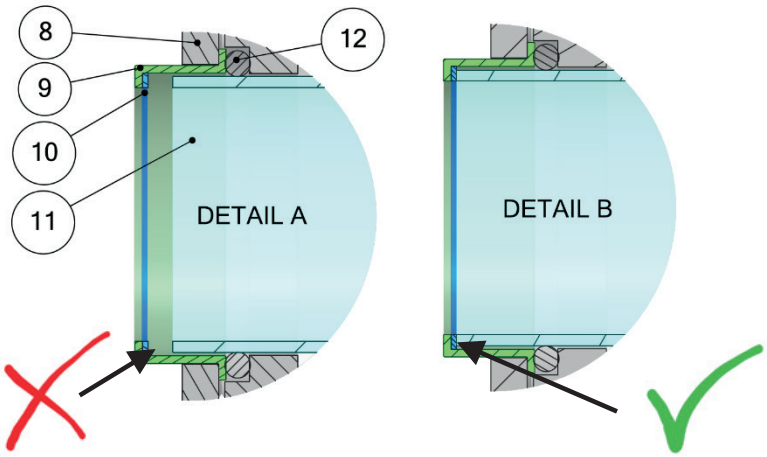
Drawing 26

The mounting flange can be fixed by means of the included M5x10 bolts (7).



Drawing 27

Use only the original screws. These are provided with a special coating to prevent high friction from stainless steel to stainless steel. The coating prevents the screws from blocking. Use a screwdriver with an adjustable torque (Nm) at all times. Also called torque screwdriver/key. Loosely screw in the screws by hand. Tighten the screws using the torque screwdriver crosswise, with a maximum force of 0.8 Nm (see drawing 27).
Do not screw in the screws by machine! It must be easy to screw in the screws.



Drawing 4

Check again if the gasket (10) is locked in by the quartz tube (11) and aluminium sleeve (9). Check the quartz tube again for damage.

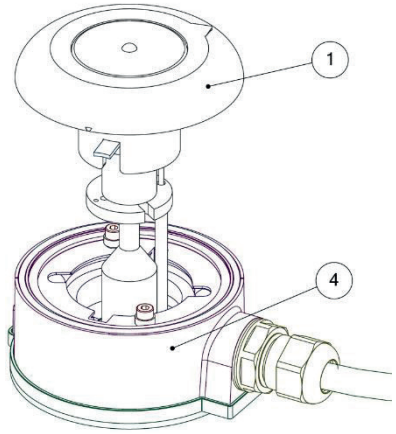
8.4 Lamp replacement

Because UV lamps age slowly as a result of use, with the result that the amount of UV energy produced decreases (the visible light remains practically the same), the dosage in the water to be treated decreases and must be replaced periodically. A UV lamp must also be replaced if it has defects or is defective.

1. Switch off the UV system and lock the main switch;
2. Wait at least 15 minutes until the UV lamp has cooled down sufficiently;

When handling a UV lamp, always wear the gloves supplied with the UV system.

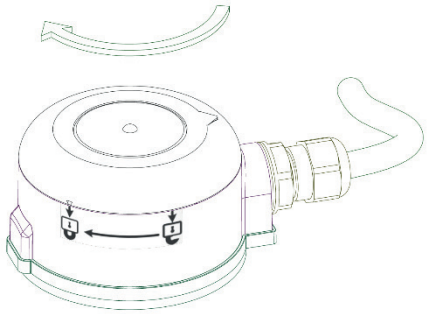
3. Disconnect the lamp by turning it counter clockwise and gently pulling it out of the irradiation chamber;
4. Remove the O-ring (3) on the socket (4);
5. Place the new O-ring (3) (supplied with the lamp) in the socket (4);



Drawing 11

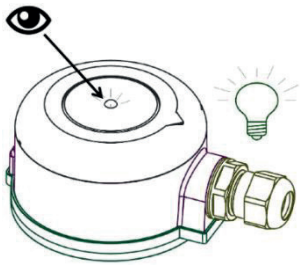
When replacing, always use the supplied components such as O-rings and gaskets.

6. Remove the new UV lamp from the packaging, note: the UV lamp is very fragile;
7. Place the new UV lamp (1) in the socket (4) (see chapter 'Lamp installation' for correct positioning). And turn it clockwise until the arrow is at the height of the lock (drawing 12);
8. Store the old UV lamp in the packaging of the new UV lamp;



Drawing 12

9. Remove the lock on the main switch and switch on the UV system in accordance with the conditions described in the chapter 'Water in the system';
10. Check if the lamp (1) is on (drawing 23a);
11. Dispose of the old one in compliance with local rules and laws. See also chapter 'UV lamp disposal'.



Drawing 23a

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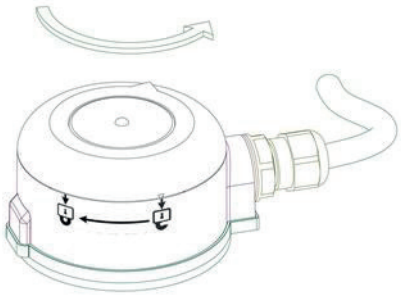
8.5 Cleaning the quartz tube

A quartz tube must be periodically checked, cleaned and replaced if necessary. The frequency is determined by the water quality. A quartz tube must also be replaced if it has defects or is defective.

1. Switch off the UV system and lock the main switch;
2. Wait at least 15 minutes until the UV lamp has cooled down sufficiently;
3. Close the water supply and drain of the UV irradiation chamber;
4. Empty the irradiation chamber;

Always wear the gloves supplied with the UV system when handling a UV lamp and quartz sleeve.

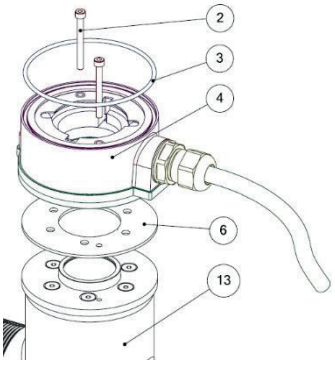
5. Disconnect the lamp by turning it counter-clockwise (drawing 38) and gently pulling it out of the irradiation chamber;
6. Store the lamp in the original packaging and ensure that it is not damaged;



Drawing 38

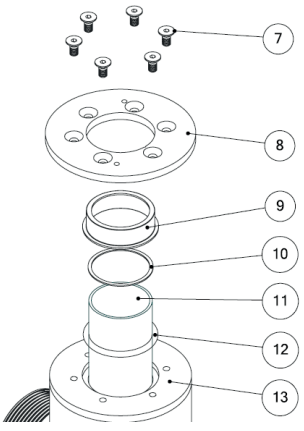
Always wear protective gloves against cutting when handling a quartz tube.

7. Remove the two screws (2). Disassemble the socket (4) and gasket (6);



Drawing 28

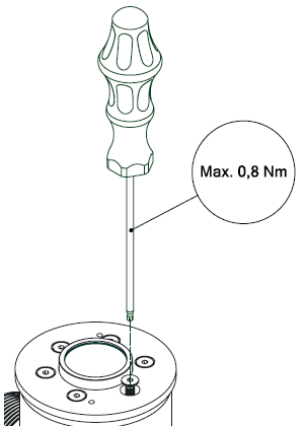
8. Remove the six screws (7);
9. Remove the clamping flange (8);
10. Remove the quartz tube (11), the quartz tube lock (9), the quartz cover (10) and the O-ring (12);



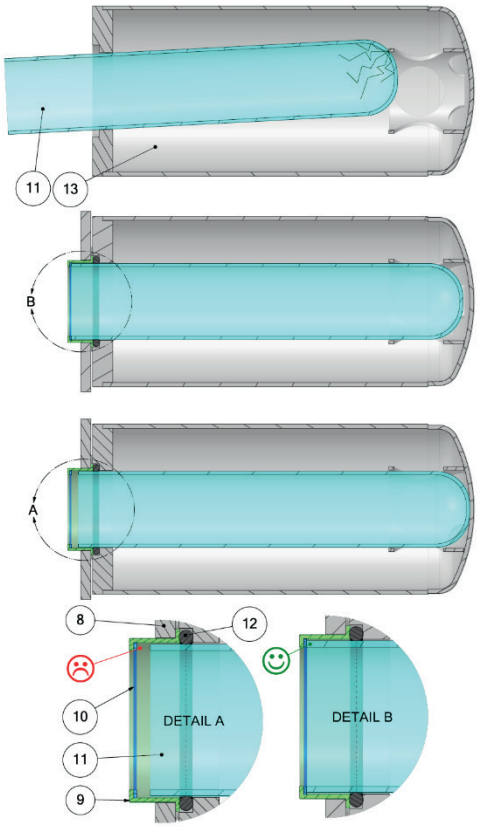
Drawing 26

When replacing, use the supplied components such as O-rings and gaskets.

11. Clean the quartz tube (11) with the correct cleaners or replace the quartz tube;
12. Place the O-ring (12) over the quartz tube (11) on the open side;
13. Place the quartz tube (11) in the glass container of the reactor (13). Do this carefully so that the quartz tube is not damaged by the quartz tube holder at the end of the irradiation chamber;
14. Place the quartz shield (10) in the quartz tube retainer (9) and then place it on the quartz tube;
15. Install the clamping flange (8). Tighten the six screws (7) on the left with a maximum force of no more than 0.8 Nm (drawing 27);

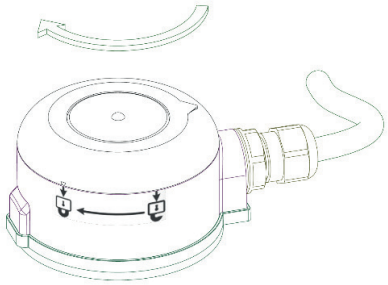


Drawing 27



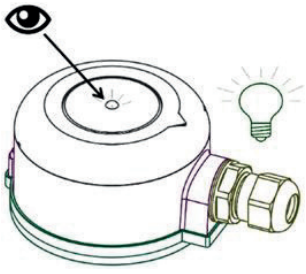
Drawing 4

16. Install the gasket (6;
17. Install the socket (4). Attention: make sure that the socket is mounted in the correct flow direction (See chapter 'Socket assembly');
18. Tighten both screws (2) with a maximum force of 0.8 Nm maximum;
19. Place the (new) lamp (1) in the socket (4). And turn it clockwise (Drawing 12. See also chapter 'Lamp assembly') until the arrow is at the position of the lock;
20. Remove the lock on the main switch and switch on the UV system in accordance with the conditions described in the chapter 'Water in the system';



Drawing 12

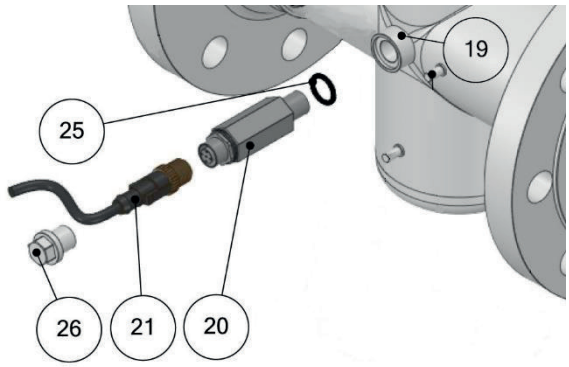
21. Check whether the lamp (1) is on (Drawing 23a).



Drawing 23a

8.5.1 Cleaning UV sensor (optional)

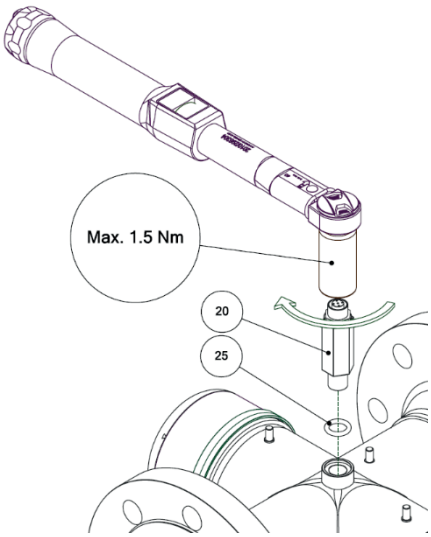
The UV sensor must be cleaned periodically. The frequency is determined by the water quality. The UV sensor must also be replaced if it is defective or defective.



Drawing 01

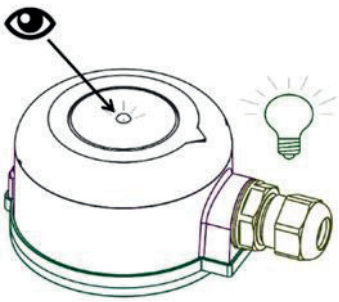
1. Switch off the UV system and lock the main switch;
2. Wait for at least 15 minutes until the UV lamp has cooled down sufficiently;
3. Close the water supply and drainage of the UV irradiation chamber;
4. Empty the irradiation chamber;
5. Remove the cable (21) from the UV sensor (20);
6. Disassemble the UV sensor (20);
7. Clean the UV sensor measurement window (20). Use ethyl alcohol and a cleaning cloth, an iron-free sponge or a soft brush to clean the window;
8. If cleaning is not possible, the UV sensor must be replaced;

When replacing, always use the supplied components such as O-rings and gaskets.



Drawing 22

9. Place the O-ring (25) around the thread of the UV sensor (20);
10. Turn the UV sensor (20) into the irradiation chamber, using a torque wrench with a maximum of 1.5 Nm as a torque (Drawing 22);
11. Remove the lock on the main switch and switch on the UV system in accordance with the conditions described in the chapter 'Water in the system';
12. Check whether the lamp is on (Drawing 23a).



Drawing 23a

8.6 Broken quartz tube

Read also the chapter 'Quartz tube breakage' were causes and warning are listed.

If the quartz tube does not seal properly or if a breakage has occurred. Then do the following:

22. Switch off the UV system;
23. Shut off the supply and drain of the irradiation chamber;
24. Drain the water from the unit;
25. Shut off the power supply to the UV system;

26. Disassemble the radiation chamber;
27. Remove the broken quartz;

Note: broken quartz is sharp. Use the correct protective equipment. (The included gloves don't protect against cutting)
Check the total system for quartz fragments. And take the right measures against this.

28. Clean the irradiation chamber;
29. Assemble the irradiation chamber and replace the quartz tube;
30. Reconnect the power supply to the UV system;
31. Fill the radiation chamber complete with water;
32. Switch on the UV system and ensure that the irradiation chamber is flowed through with sufficient water (see chapter 'Cooling the UV system');
33. Check whether the UV lamp is burning.

8.7 Lamp breakage

Also read the chapters 'UV lamp breakage' and 'Quartz tube breakage' where causes and warnings are described.

If a UV lamp is defective or broken but the quarter tube is not defective, do the following:
1. Switch off the UV system;
2. Shut off the power supply to the UV system;

8.7.1.1.1.1 Warning! Broken quartz is sharp. Use the correct protective equipment. (The gloves supplied do not protect against cutting). Check the total system for quartz fragments and take the right measures against this.

3. Remove the UV lamp (residues) from the irradiation chamber;
4. Collect any mercury released and dispose of appropriately;
5. If all remnants have been removed, a new lamp can be placed;
6. Switch on the UV system and ensure that the irradiation chamber is flowed through with sufficient water (see chapter 'Cooling the UV system');
7. Check whether the UV lamp is burning.

In the case of a broken quartz tube, the instructions in the 'Broken quartz tube' section must also be followed.

8.8 Temperature sensor maintenance

The optional temperature sensor is mounted outside on the irradiation chamber and does not normally require maintenance. It is, however, advisable to periodically check whether the sensor mounting is still in order, see the "Temperature sensor" section. Also make sure that the temperature sensor remains clean and that the connection cable is undamaged and not pinched.

8.9 Fan

With multi lamp control panels, the fan ensures that the heat developed in the control panel is dissipated. To prevent a lot of dust from being sucked into the cabinet, the air inlet and outlet are fitted with a dust filter. If these dust filters become contaminated, the air flow through the cabinet will be reduced so that the cabinet temperature will rise. When the internal control panel temperature has reached 50 ºC, the temperature protection (bimetal switch) will switch off the UV lamps, so it is important that the condition of the dust filters is checked regularly.
For contaminated dust filters, they must be cleaned or replaced.
Always ensure that there is a clean dust filter in the air vents.
Always ensure that there is a dust filter in the air vents, this prevents contamination of the control cabinet and ensures correct IP protection.

Picture 1: closed air vent
Picture 2: closed air vent with opened lock
Picture 3: open air vent with dust filter
Picture 4: open air vent with dust filter removed


Picture 1


Picture 2


Picture 3


Picture 4

The control panel fan is also a component that must be regularly checked for functionality. The specified lifetime L10 of the control cabinet fan is 80,000 hours at an ambient temperature of 40 ºC, the MTBF (Mean Time Between Failure) of the fan is approximately 5 x L10 lifetime.


Picture 5


Picture 6

Picture 5: fan in normal operation position
Picture 6: fan turned for disassembly

8.10 Decommissioning

If the UV system is not used for a longer period of time (more than two weeks), it must be switched off completely.

Concerns	Required work
Control panel	Switch off the main switch on the control panel of the UV system and lock it with a lockable lock
Irradiation chamber	Close the water supply and drain of the UV irradiation chamber
	Empty the irradiation chamber
	Clean the irradiation chamber internally
	Rinse the irradiation chamber with clean water
	Remove all water residues from the irradiation chamber

8.11 Problem solving

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

The table below is written in singular, if it concerns a UV system with several lamps, then all single lamp actions must be carried out for each lamp.

Problem	Possible cause	Solution
Warning	With optional UV sensor: UV warning limit value has not been reached.	Improve the UV transmittance of the water or select another (more powerful) UV system. Check UV sensor measuring window and quartz sleeve and clean them if necessary. Lamp is old, replace.
	With an optional temperature sensor: temperature warning limit value has been reached.	See "Irradiation chamber getting warm".
Alarm	With optional UV sensor: UV alarm limit value has not been reached.	Improve the UV transmittance of the water or select another (more powerful) UV system. Check UV sensor measuring window and quartz sleeve and clean them if necessary. Lamp is old, replace.
	UV lamp does not burn.	See 'Lamp does not start' and 'Lamp starts but switches off after the warm-up time'.
Urgent Alarm	With an optional temperature sensor: temperature alarm limit value has been reached.	See "Irradiation chamber getting warm."
	Flow switch option is active and there is no flow.	With a connected flow switch, ensure that a flow is realised that can be detected by the flow switch.
	Flow switch option is active and no flow switch is connected.	Deactivate the flow switch option in the control or connect a flow switch.
HMI display does not light up and no text is visible.	Main switch not switched on.	Switch on main switch.
	Power cable not connected.	Have an authorized installer connect a power cable.
	No supply voltage.	Provide power supply.
	Fuse terminal open in control panel.	Close fuse terminal X2.1.
	Control panel fuse defective.	Check the fuse in terminal X2.1 and replace if necessary.

Problem	Possible cause	Solution
Lamp does not start.	No external contact active while selector switch is set to "external".	Connect and activate an external contact or connect a wire bridge between terminals X5.3 and X5.4.
	Selector switch is set to "HMI"	Start lamp manually via keyboard or give a start signal via a ModBus connection.
	Lamp not properly placed in lamp socket.	Make sure that the marking on the lamp base is positioned opposite the closed lock symbol on the lamp socket.
	Lamp defective.	Place a new lamp or check the lamp with a lamp tester.
	Fuse terminal for lamp is open.	Close fuse terminal X2,x of the relevant lamp.
	Fuse of the lamp in question defective.	Check the fuse in terminal X2,x and replace if necessary.
	Lamp power supply or control panel defective.	Have an authorized installer check the control panel and repair if necessary.
Lamp starts but switches off again after warm-up time.	Flow switch option is active and there is no flow.	With a connected flow switch, ensure that a flow is realised that can be detected by the flow switch.
	Flow switch option is active and no flow switch is connected.	Deactivate the flow switch option in the control or connect a flow switch.
	With optional UV sensor: UV alarm limit value has not been reached.	Improve the UV transmittance of the water or select another (more powerful) UV system. Check UV sensor measuring window and quartz tsleeve and clean them if necessary. Lamp is old, replace.
Irradiation chamber becomes too hot.	No water in the irradiation chamber or not completely filled.	Fill the system completely with water and ensure sufficient flow.
	Water "pours" out of the pipe after the irradiation chamber, creating an air containment.	Ensure there is sufficient back pressure or flow through the irradiation chamber from the bottom up.
	No or insufficient flow through the irradiation chamber.	Ensure adequate flow through the irradiation chamber.

Problem	Possible cause	Solution
Control cabinet becomes too hot.	The ambient temperature is higher than 40 °C.	Ensure that the ambient temperature remains below 40 °C.
	Control cabinet hangs in sunlight.	Reposition the control panel so that it can no longer be irradiated by sunlight or ensure suitable sun protection.
	Control cabinet hangs too close or against a heat source.	Moves the controls to a cool place.
	With a multi lamp system: not enough air flow through the control box.	Check the dust filters in the inlet and outlet air vents and clean or replace them if necessary.
Lamp switches off after a certain time.	Irradiation chamber becomes too hot so that the thermal protection switches the lamp off.	See 'Irradiation chamber becomes too hot.'
	With optional temperature sensor: the irradiation chamber becomes too hot, so that the set limit value is exceeded.	See ' Irradiation chamber becomes too hot. Maximum temperature limit value is too low. Consult with the producer of the UV system whether it can be adjusted.
	The control panel becomes too hot, so that the thermal protection switches the lamp off.	See 'Control cabinet becomes too hot'.
	Internal fan for circulation is defective.	Have an authorized installer check the control panel and repair if necessary.
	UV lamp defective	Replace UV lamp and reset hour counter.
	With optional UV sensor: UV alarm limit value is no longer achieved.	Improve the UV transmittance of the water or select another (more powerful) UV system. Check UV sensor measuring window and quartz sleeve and clean them if necessary. Lamp is old, replace.
Water comes out of the irradiation chamber.	Damaged or incorrectly positioned O-ring that seals the quartz sleeve.	Replace O-ring.
	Damaged or broken quartz sleeve.	Replace quartz sleeve.
	Sealing 1/4" thread fitting on the chamber is leaking (at blind stop or UV sensor).	Replace O-ring.

Problem	Possible cause	Solution
Effect UV system is not good, not enough reduction of combined chlorine.	The UV transmittance of the water is too low.	Improve the UV transmittance of the water or select another (more powerful) UV system.
	The flow rate is too high.	Reduce the flow or select another (more powerful) UV system.
	Fouled quartz sleeve.	Clean or replace the quartz sleeve.
	UV lamp has too many operating hours.	Replace UV lamp and reset hour counter.
	UV-lamp defect.	Replace UV lamp and reset hour counter.
	Control panel defective.	Have an authorized installer check the control panel and repair if necessary.
	Incorrect sampling.	Ensure that the measuring equipment is properly calibrated and execute the measurement again in accordance with the applicable rules.
	Possibly an overload of the bath.	Wait until the UV system has done its work, reduce the number of visitors or select a more powerful UV system.
Effect UV system is not good, not enough disinfection.	The UV transmittance of the water is too low.	Improve the UV transmittance of the water or select another (more powerful) UV system.
	The flow rate is too high.	Reduce the flow or select another (more powerful) UV system.
	Fouled quartz sleeve.	Clean or replace the quartz sleeve.
	UV lamp has too many operating hours.	Replace UV lamp and reset hour counter.
	UV-lamp defect.	Replace UV lamp and reset hour counter.
	Control panel defective.	Have an authorized installer check the control panel and repair if necessary.
	Incorrect sampling.	Ensure that the measuring equipment is properly calibrated and execute the measurement again in accordance with the applicable rules.

8.12 Logbook

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

UV-system	
Serial number	
Date of installation	
Date of purchase	
Responsible user	
Main user	

The following items must be described in the logbook.
- Date of incident/check/serve;
- Reason for action/malfunction/maintenance;
- Work performed, comments;
- Operational hours;
- On/off switches;
- Flow rate;
- Water transmittance;
- UV intensity (if a UV sensor is present).

8.13 Logbook example

LOGBOOK

Nr.	Date	Problem/Error message	Level*	Work performed, comments	Hours run [h]	On/ off	Q [m³/h]	$T_{10\,mm}$ [%]	UV [W/m²]	Carried out by

*Maintenance level 1 can be performed by serviced staff
Maintenance level 2 must be carried out by VGE authorized service personnel

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9 Spare parts and maintenance schedule

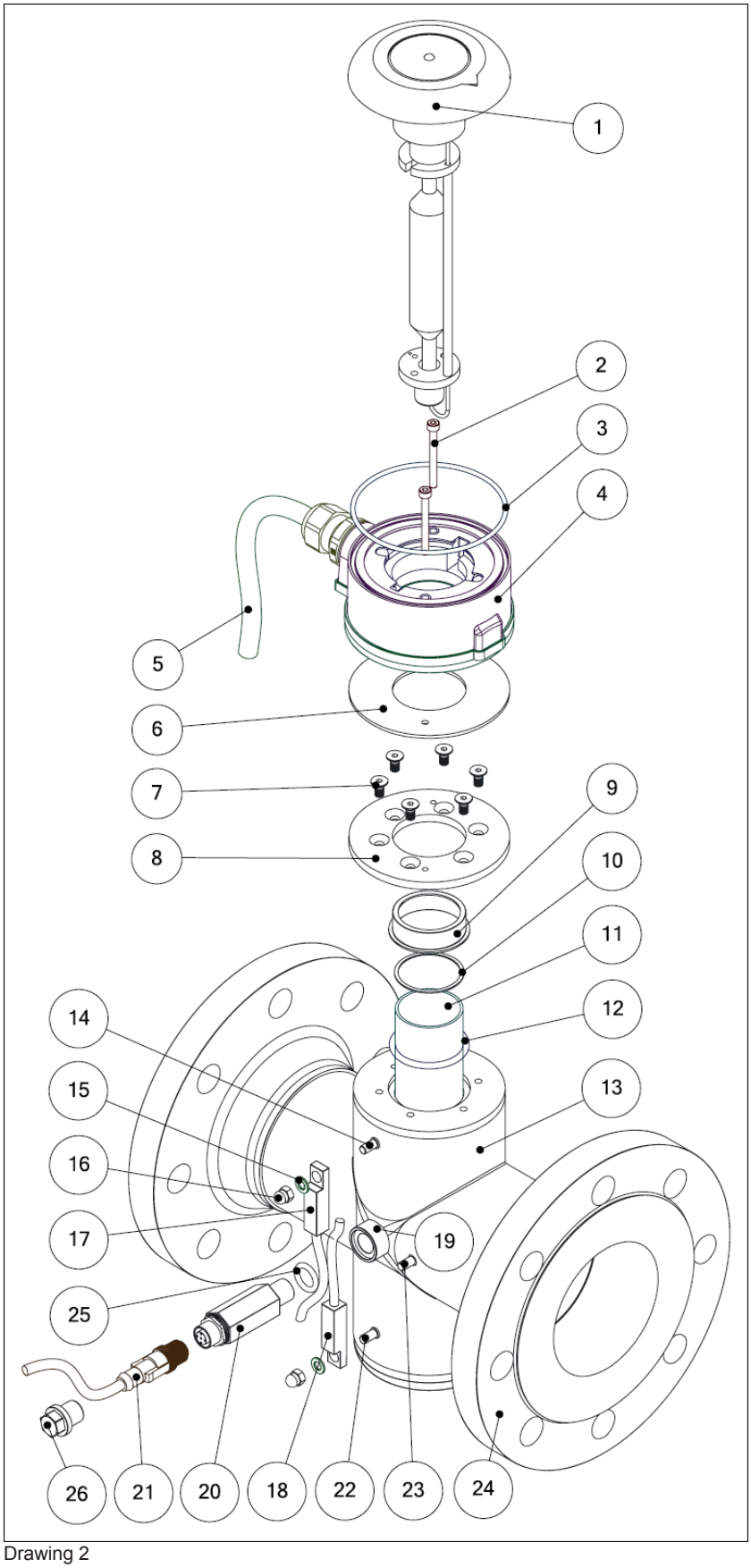
9.1 Spare parts

For safety reasons only use original spare parts. Contact your supplier's customer service if you need spare parts.

Register all changes and tasks performed in the logbook, an example of a logbook is attached in this manual.

The item numbers in the material lists correspond to the numbers in the exploded view of the relevant item.

9.2 Spare parts VGE Pro MP irradiation chamber

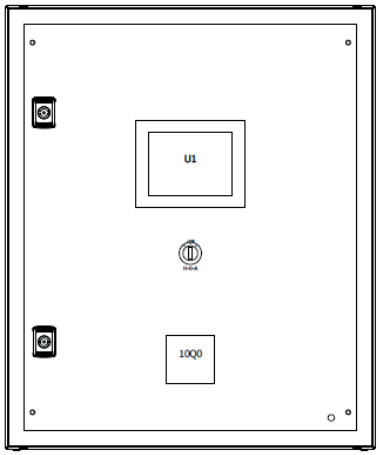


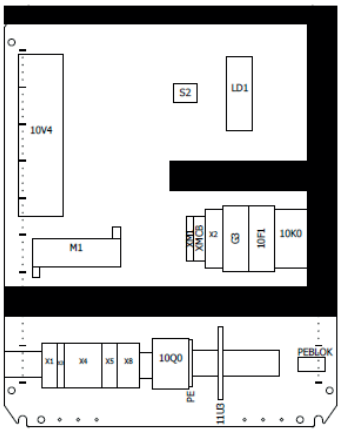
Drawing 2

Item	Number	Art. number	Description
1	1	F980505	Lamp VGE Pro MP 600W
2	2	F990898	Screw M4 x 40 mm A2 Stainless steel DIN 912
3	1	3902150	O-ring 83 x 2.5 mm
4	1	F990303	MP lamp socket
5	1	F990068	MP lamp cable 18AWG SOW 2C 600 V/10 A105 °C
6	1	3902170	Foam gasket EPDM clamping flange MP
7	6	F990899	Countersunk Allen screw M5 x 10 RVS A2 DIN 7991 LUBO
8	1	B212195	Clamping Flange Housing MP
9	1	B299616	Quartz tube assurance MP 38 mm
10	1	3902172	Quartz tube protection 39 x 35 x 1 mm EPDM
11	1	QG100	Quartz tube 38 x 1.5 x 195 mm
12	1	3902174	O-ring EPDM 37.69 x 3.53 mm
13	1	VIM00602H	Irradiation chamber VGE Pro UV INOX MP 600
15	1	4800040	Washer A2 M5
16	1	E831400	High cap nut M5 DIN 1587 A2 RVS
17	1	B290146	Bimetallic switch 60 ºC incl. 10 m cable
18	1	B290132	Temperature sensor MP Pt100 incl. 10 m cable
20	1	B212105	Digital UV sensor MP
21	1	B212109	Cable for UV sensor M12 4-Pin 10 meter
25	1	B212104	O-ring EPDM 12 x 3 mm
26	1	B212103	Stainless steel 316L plug 1/4" with collar

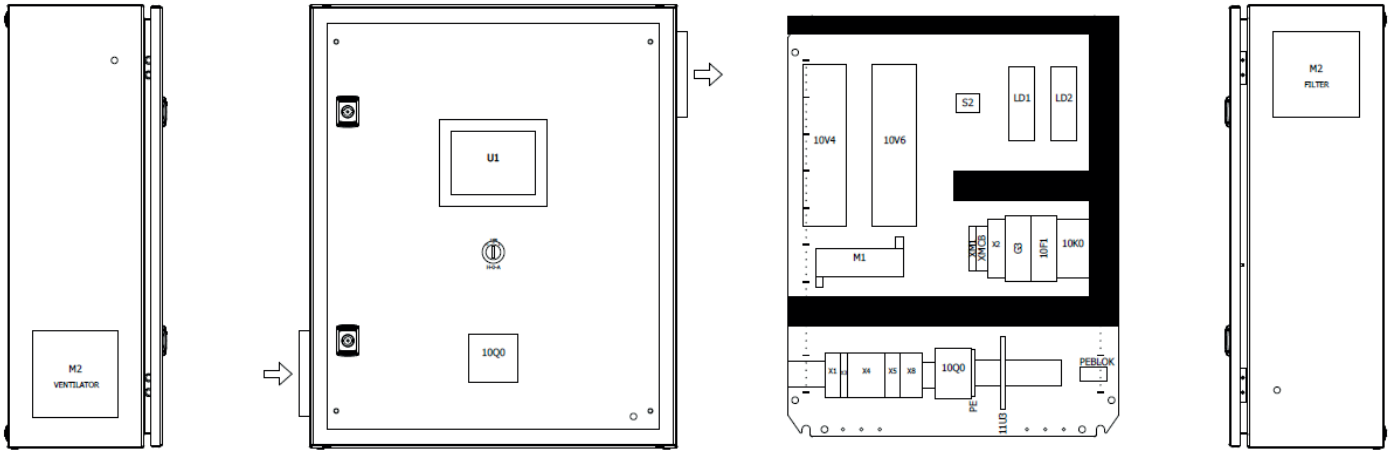
9.3 Spare parts VGE Pro MP control panel

Comfort 600 control panel





Comfort 1200 control panel



Item	Article number	Description
10V4	F990505	Lamp driver NMP 600 W
10V6	F990505	Lamp driver NMP 600 W
M1	B290156	Ventilator 80x80x25mm 230 Vac
11U3	B290147	Convertor Pt100 – 4-20 mA
S2	B290147	Bimetal switch 50 °C
LD1	F990506	Current detection PCB NMP
LD2	F990506	Current detection PCB NMP

9.4 Spare parts sets

Service set:
This set consists out of the following parts:
- O-ring for lamp socket/socket;
- Foam gasket for socket/RVS flange;
- Quartz tube protection ring;
- O-ring for sealing quartz tube/SS flange;
- O-ring for UV sensor/SS plug;
- Screws for mounting clamping flanges.

The following parts are available:
- UV-lamp;
- Quartz tube.
- UV sensor;
- Temperature sensor;
- Bimetallic switch.

UV-Lamp
This set consists out of the following parts:
- UV-lamp;
- O-ring for lamp socket/socket.

Quartz tube:
This set consists out of the following parts:
- Quartz tube;
- Service set.

UV-sensor:
This set consists out of the following parts:
- UV-sensor;
- O-ring for UV-sensor/SS plug.

Temperature sensor:
This set consists out of the following parts:
- Pt100 temperature sensor with 10 m cable;
- Cap nuts;
- Washers.

Bimetallic switch:
This set consists out of the following parts:
- Bimetallic switch 60°C with 10 m cable;
- Cap nuts;
- Washers.

Description	Spare parts VGE Pro UV INOX MP	
Type	MultiMax	600-85
Service set	SP0054	
Quartz tube	QG101	
UV lamp	F980500	F980505
UV sensor	B212165	
Temperature sensor	B290132	
Bimetallic switch 60 °C	B290146	

9.5 Consumables

The following items fall under consumable parts:
- UV lamp + mounting attributes;
- Quartz tube + mounting attributes;
- UV sensor + mounting attributes.

Follow the instructions as described in this manual for replacing these consumable parts.

10 UV intensity limit value

If the UV system is equipped with the optional UV sensor, the limit value must be set. By default this is set to 3000 W / m² which will always result in a UV alarm.
This correct setting of the UV intensity limit value normally is done during the final inspection at the factory if the process parameters are known. If systems are supplied without the process data being known then the UV intensity limit value must be set during commissioning, with the following formula one can determine the limit value of the relevant system:

$$\mathbf{I_{limit\ value}} = \left[\mathbf{I} \times \frac{\mathbf{Q_{process}}}{\mathbf{Q_{table}}} \times \frac{\mathbf{D_{process}}}{\mathbf{D_{calculation}}}\right]_{\mathbf{UVT}} \quad [\mathbf{W/m^2}]$$

$I_{limit\ value}$: UV intensity limit value that must be set
I: intensity at the end of the lamp life that applies to the UV system in question for a particular transmission
$Q_{process}$: flow rate of the process which flows through the UV system in question
Q_{table}: maximum flow that can flow through the system with a certain transmission and a UV dose of 400 J/m² according to the selection table. The correct table must be used for this, based on minimum intensity (one-off passage) or based on average intensity (recirculation process)
$D_{process}$: UV dosage specified for the process
$D_{calculation}$: UV dosage used to calculate the capacities in the selection table, usually this is 400 J/m²

Method:
1. In the chapter "UV intensity limit value table" a table is shown with in the two left-hand columns the water quality shown as transmittance (T_{10mm}) and spectral attenuation coefficient (SAtC);
2. Search for the relevant water quality value;
3. Go in the row of the water quality value to the right in the table up to the column with the code of the relevant UV system;
4. The value in the cell is the "I" value;
5. You can choose from two tables to determine the "Qtable" value:
    1. Chapter "Capacity table based on average intensity" shows the capacities if the UV system is dimensioned based on the average UV intensity in the irradiation chamber. This is usually applied with recirculation processes;
    2. Chapter "Capacity table based on minimum intensity" shows the capacities if the UV system is dimensioned based on the minimum UV intensity in the irradiation chamber (also called wall intensity). This is usually applied in processes where the water is only passed through the UV system once.
6. Determine which table applies to you and go to the relevant chapter;
7. Search for the relevant water quality value (in the first 2 columns);
8. Go in the row of the water quality value to the right in the table up to the column with the code of the relevant UV system;
9. The value in the cell is the "Qtable" value;
10. Enter the data in the above formula and calculate the UV intensity limit value to be set;
11. Set the calculated limit value in the Comfort controller as indicated in the chapter "Menu structure", "Operator menu explanation".

10.1 UV-intensity limit value table

Intensity limit value table VGE Pro UV INOX MD									
Water quality		Treatment chamer type							
T_{10mm}	SAtC	**600-85**	**1200-85**						
[%]	[1/m]	[W/m²]	[W/m²]	[W/m²]	[W/m²]	[W/m²]	[W/m²]	[W/m²]	[W/m²]
100	0,00	1013	1072						
99	0,44	992	1048						
98	0,88	971	1024						
97	1,32	950	1001						
96	1,77	930	978						
95	2,23	909	955						
94	2,69	889	933						
93	3,15	869	911						
92	3,62	850	889						
91	4,10	830	867						
90	4,58	811	846						
89	5,06	792	825						
88	5,55	774	805						
87	6,05	755	784						
86	6,55	737	764						
85	7,06	719	744						
84	7,57	701	725						
83	8,09	684	706						
82	8,62	666	687						
81	9,15	649	668						
80	9,69	632	650						
79	10,24	616	632						
78	10,79	600	614						
77	11,35	583	596						
76	11,92	568	579						
75	12,49	552	562						
74	13,08	536	546						
73	13,67	521	529						
72	14,27	506	513						
71	14,87	491	497						
70	15,49	477	482						
69	16,12	463	466						
68	16,75	449	451						
67	17,39	435	437						
66	18,05	421	422						
65	18,71	408	408						
64	19,38	395	394						
63	20,07	382	380						
62	20,76	369	367						
61	21,47	357	354						
60	22,18	344	341						
59	22,91	332	328						
58	23,66	321	316						
57	24,41	309	304						
56	25,18	298	292						
55	25,96	287	281						
54	26,76	276	269						
53	27,57	265	258						
52	28,40	255	247						
51	29,24	244	237						
50	30,10	234	227						

10.2 Capacity table based on average intensity

Capacity table VGE Pro UV INOX MD									
Water quality		Treatment chamber type							
T_{10mm}	SAtC	**600-85**	**1200-85**						
[%]	[1/m]	[m³/h]	[m³/h]	[m³/h]	[m³/h]	[m³/h]	[m³/h]	[m³/h]	[m³/h]
100	0,00	4,3	8,7						
99	0,44	4,2	8,4						
98	0,88	4,1	8,1						
97	1,32	3,9	7,9						
96	1,77	3,8	7,6						
95	2,23	3,7	7,4						
94	2,69	3,6	7,1						
93	3,15	3,4	6,9						
92	3,62	3,3	6,6						
91	4,10	3,2	6,4						
90	4,58	3,1	6,2						
89	5,06	3,0	6,0						
88	5,55	2,9	5,8						
87	6,05	2,8	5,5						
86	6,55	2,7	5,3						
85	7,06	2,6	5,1						
84	7,57	2,5	4,9						
83	8,09	2,4	4,7						
82	8,62	2,3	4,6						
81	9,15	2,2	4,4						
80	9,69	2,1	4,2						
79	10,24	2,0	4,0						
78	10,79	1,9	3,8						
77	11,35	1,8	3,7						
76	11,92	1,8	3,5						
75	12,49	1,7	3,4						
74	13,08	1,6	3,2						
73	13,67	1,5	3,0						
72	14,27	1,4	2,9						
71	14,87	1,4	2,7						
70	15,49	1,3	2,6						
69	16,12	1,2	2,5						
68	16,75	1,2	2,3						
67	17,39	1,1	2,2						
66	18,05	1,0	2,1						
65	18,71	1,0	1,9						
64	19,38	0,9	1,8						
63	20,07	0,8	1,7						
62	20,76	0,8	1,5						
61	21,47	0,7	1,4						
60	22,18	0,7	1,3						
59	22,91	0,6	1,2						
58	23,66	0,5	1,1						
57	24,41	0,5	1,0						
56	25,18	0,4	0,9						
55	25,96	0,4	0,7						
54	26,76	0,3	0,6						
53	27,57	0,3	0,5						
52	28,40	0,2	0,4						
51	29,24	0,1	0,3						
		Low w all intensity or not optimal intensity profile					Flow speed in chamber or connection > 3 m/s		

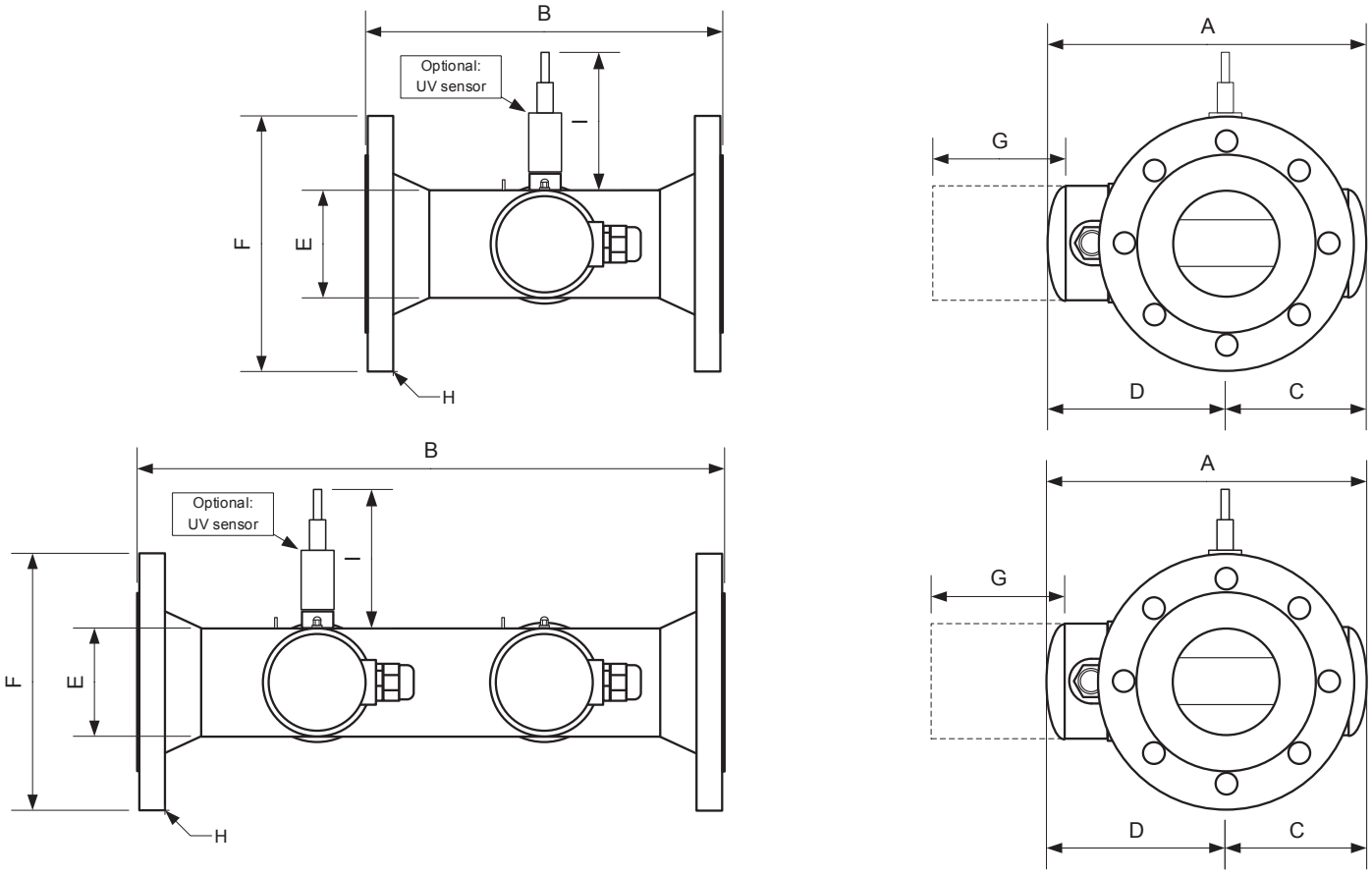
10.3 Capacity table based on minimum intensity

Capacity table VGE Pro UV INOX MD									
Water quality		Treatment chamber type							
T_{10mm}	SAtC	**600-85**	**1200-85**						
[%]	[1/m]	[m³/h]	[m³/h]	[m³/h]	[m³/h]	[m³/h]	[m³/h]	[m³/h]	[m³/h]
100	0,00	13,2	27,5						
99	0,44	12,6	26,2						
98	0,88	12,1	24,9						
97	1,32	11,6	23,7						
96	1,77	11,0	22,6						
95	2,23	10,5	21,6						
94	2,69	9,9	20,6						
93	3,15	9,5	19,6						
92	3,62	9,0	18,6						
91	4,10	8,6	17,7						
90	4,58	8,1	16,8						
89	5,06	7,8	16,0						
88	5,55	7,4	15,2						
87	6,05	7,0	14,4						
86	6,55	6,7	13,7						
85	7,06	6,4	13,1						
84	7,57	6,1	12,5						
83	8,09	5,8	11,9						
82	8,62	5,5	11,3						
81	9,15	5,3	10,8						
80	9,69	5,0	10,3						
79	10,24	4,8	9,8						
78	10,79	4,6	9,3						
77	11,35	4,3	8,9						
76	11,92	4,1	8,5						
75	12,49	3,9	8,1						
74	13,08	3,8	7,7						
73	13,67	3,6	7,3						
72	14,27	3,4	7,0						
71	14,87	3,3	6,6						
70	15,49	3,1	6,3						
69	16,12	3,0	6,0						
68	16,75	2,8	5,7						
67	17,39	2,7	5,5						
66	18,05	2,5	5,2						
65	18,71	2,4	4,9						
64	19,38	2,3	4,7						
63	20,07	2,2	4,5						
62	20,76	2,1	4,3						
61	21,47	2,0	4,1						
60	22,18	1,9	3,9						
59	22,91	1,8	3,7						
58	23,66	1,7	3,5						
57	24,41	1,6	3,3						
56	25,18	1,5	3,1						
55	25,96	1,5	3,0						
54	26,76	1,4	2,8						
53	27,57	1,3	2,7						
52	28,40	1,2	2,5						
51	29,24	1,2	2,4						
		Low wall intensity or not optimal intensity profile					Flow speed in chamber or connection > 3 m/s		

11 Drawings

11.1 Dimensions

11.1.1 Irradiation chamber, dimensions



VGE Pro UV INOX MD						Dimensions									
Type	Shape	Maximum working pressure	Connection	Weight dry	Weight wet	A	B	C	D	E	F	G	H	I	J
		[bar]		[kg]	[kg]	[mm]									
600-85	Inline	10	DN80	11	14	250	280	115	135	85	200	230	DN80	109	-
1200-85	Inline	10	DN80	13	18	250	460	115	135	85	200	230	DN80	109	-

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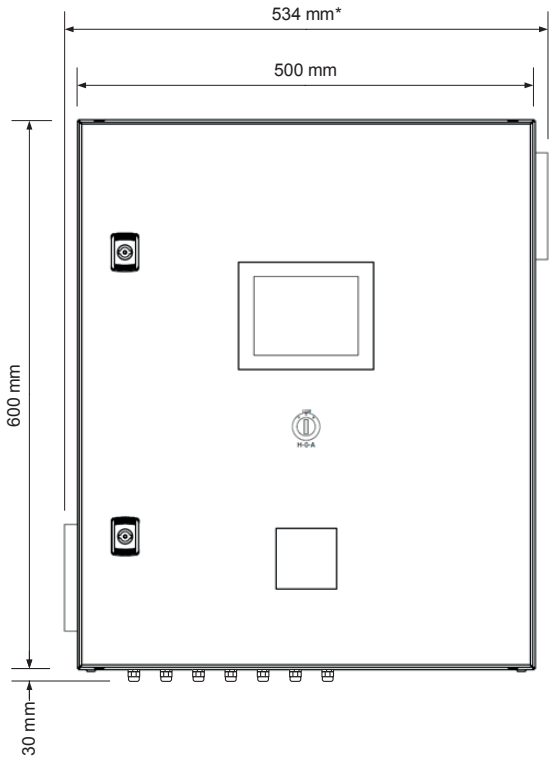
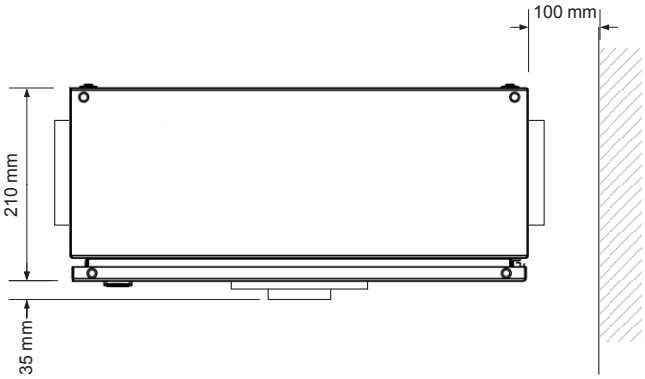
11.1.2 Control panel, dimensions

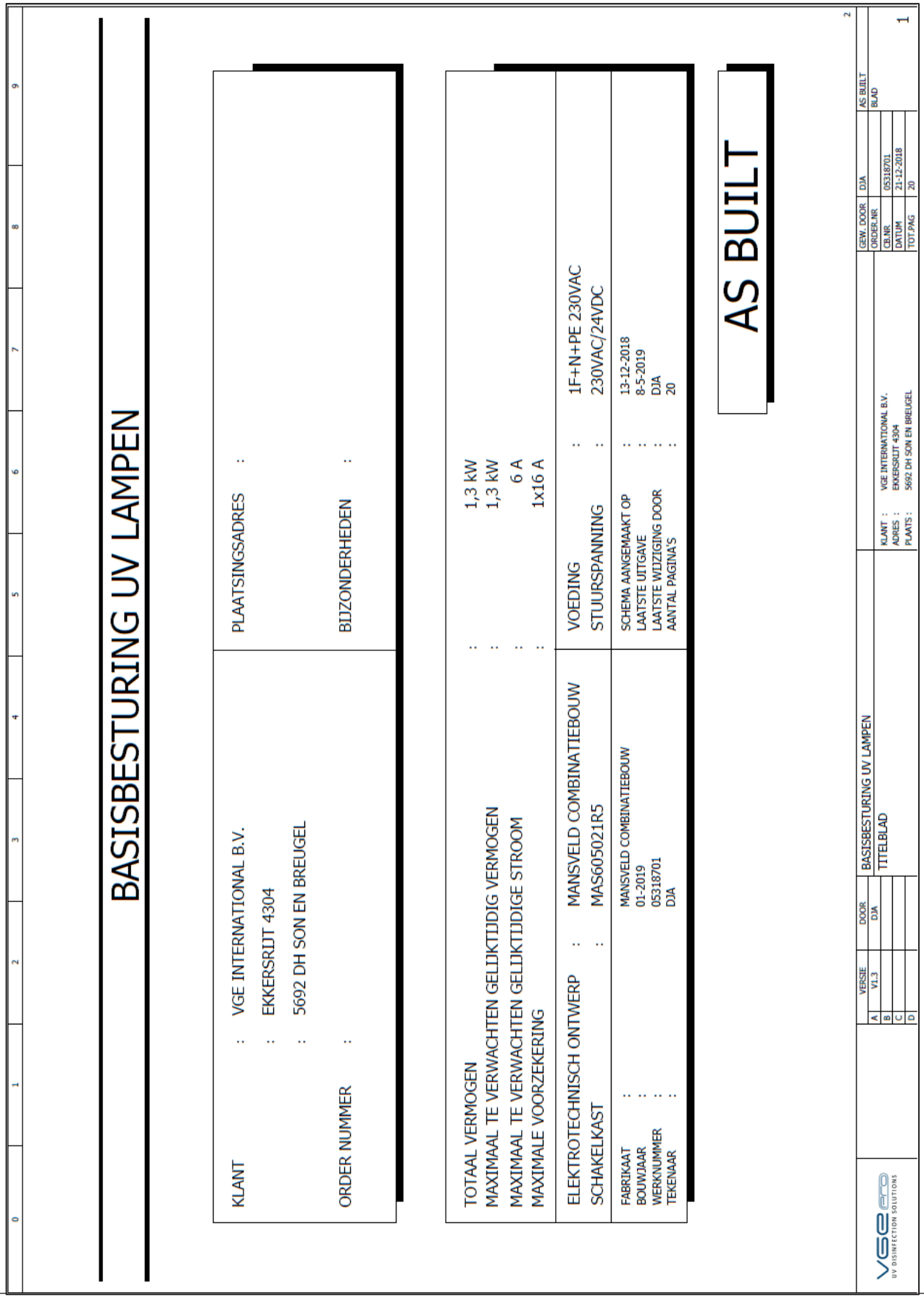
Ensure that there is at least 100 mm free space left and right of the control cabinet in for cooling the cabinet.





* Only with a control panel for 2 lamps

11.2 Electrical diagram



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PAGINA-OVERZICHT

VERSIE		DOOR
A	V1.3	DJA
B		
C		
D		

BASISBESTURING UV LAMPEN

INHOUDSOPGAVE

KLANT : VGE INTERNATIONAL B.V.
ADRES : EKKERSRIJT 4304
PLAATS : 5692 DH SON EN BREUGEL

GEW. DOOR	DJA	AS BUILT
ORDER.NR		BLAD
CB.NR	05318701	
DATUM	26-4-2019	
TOT.PAG	20	

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VERKLARING

CODE

6 K 2
- 6 PADNUMMER
- K BENAMING
- 2 PAGINANUMMER

KABEL

W 1
- W VOLGNUMMER
- 1 BENAMING

CONTACTSPIEGEL

- (8.6) MAAKKONTAKT OP BLADNR. 8 IN PADNR. 6
- (9.4) VERBREEKKONTAKT OP BLADNR. 9 IN PADNR. 4
- (10.6) WISSELKONTAKT OP BLADNR. 10 IN PADNR. 6

- AANSLUITKLEMMEN
- MASSA VAN DE BEHUIZING
- AARDE ALGEMEEN
- AARDRAIL AANSLUITING

KLEUR BEDRADING

HOOFDSTROOM 400/230V~50Hz	FASE	- ZWART
	NUL	- L.BLAUW
BESCHERMINGSLEIDING (AARDE)		- GROEN/GEEL
STUURSTROOM 230V~50Hz	FASE	- BRUIN
	NUL	- L.BLAUW
STUURSTROOM230V~50Hz	FASE	- ROOD
(achter transformator)	NUL	- ROOD
STUURSTROOM 24V~50Hz	FASE	- ROOD
	NUL	- ROOD
STUURSTROOM 24VDC	+	- D.BLAUW
	-	- D.BLAUW
VREEMDE SPANNING (potentiaal vrij)		- ORANJE
ANALOGE SIGNALEN	-	- GRIJS
BIJZONDERE CIRCUITS	-	- VIOLET
ONDER SPANNING BLIJVENDE DELEN	-	- GEEL
KABELS IN DE KAST	-	- GRIJS

MINIMALE DRAADDOORSNEDE INDIEN NIET NADER AANGEGEVEN:

HOOFDSTROOMLEIDINGEN	- 2,5mm²
STUURSTROOMLEIDINGEN	- 1,0mm²
PLC BEDRADING	- 0,5mm²

CODERING SPANNING

HOOFDSTROOM 230/400V~50Hz	FASE	- L1/L2/L3, 1L1/1L2/1L3, ENZ...
	NUL	- N, 1N, 2N, ENZ...
STUURSTROOM 230V~50Hz	FASE	- AL, BL, CL, ENZ...
	NUL	- AN, BN, CN, ENZ...
STUURSTROOM 24V~50Hz	FASE	- I, III, V, ENZ...
	NUL	- II, IV, VI, ENZ...
STUURSTROOM 24VDC	+	- L+, 1L+, 2L+, ENZ...
	-	- L-, 1L-, 2L-, ENZ...

GEBRUIKTE MATERIALEN

BENAMING	MATERIALEN
Q	HOOFDSCHAKELAAR
F	MESPATROONLASTSCHEIDER
F	ZEKERINGAUTOMAAT
F	THERMISCHE BEVEILIGING
Q	MOTORBEVEILIGINGSCHAKELAAR
Q	VERMOGENSCHAKELAAR
Q	WERKSCHAKELAAR
Q	MAGNEETSCHAKELAAR
Q	AARDLEKSCHAKELAAR
K	HULPRELAIS
K	TIJDRELAIS
K	VEILIGHEIDSRELAIS
H	SIGNAALGEVER
S	BEDIENSCHAKELAAR
T	TRANSFORMATOR
V	GELIJKSPANNINGVOEDING
V	OMVORMER
V	PANEELMETER
E	VERWARMING
M	MOTOR/VENTILATOR
Y	KLEP/REM
H	KASTVERLICHTING
X	KLEMMEN
X	STEKERS
X	WANDCONTACTDOOS
C	CONDENSATOR
R	WEERSTAND
K	HALFGELEIDER
K	OVERSPANNINGBEVEILIGING
B	ANALOGE SENSOR
A	PLC-SYSTEEM
U	OVERIGE APPARATEN
	SCHAKELKAST

CODERING KLEMMEN

X1 = HOOFDSTROOM 400/230V~50Hz
X2 = STUURSTROOM 230V~50Hz
X3 = CLIXON
X4 = STUURSTROOM 24VDC
X5 = VREEMDE SPANNING
X8 = DATA
PE = AARDING
XMCB = UITBREIDING UV LAMP 2
XM1 = VENTILATOR

CB NORM

CODERING COMPONENTEN IN KAST/DEUR	:	STICKERS
CODERING COMPONENTEN OP DE DEUR	:	TEKSTPLATEN
AFDEKKING	:	IP20, GEEN AFDEKKING
AFDEKKING IN KAST EN DEUR	:	GRIJS PVC 1mm

BEDRADING VIA KORTSTE WEG, MAAR HOOFDSTROOM EN STUURSTROOM ZOVEEL MOGELIJK GESCHEIDEN
BIJ BEDRADING NAAR DE DEUR HOOFDSCHAKELAAR SPLITSEN VAN DE REST

OPMERKING:

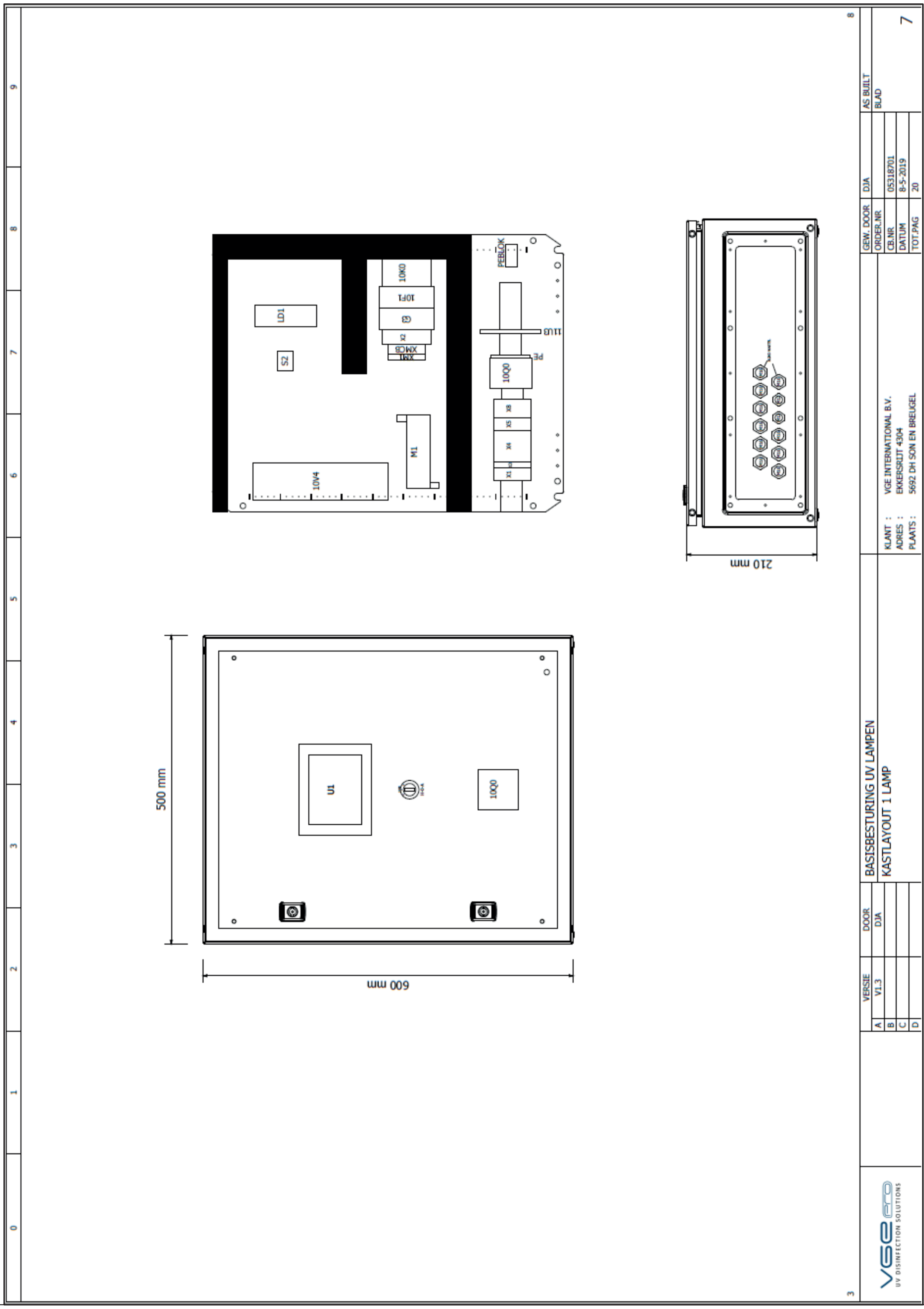
CODERINGEN EN SYMBOLEN OVEREENKOMSTIG : IEC 61346-1 / IEC 60617 / UL 508A
DRAADKLEUREN OVEREENKOMSTIG : NEN-EN 60204-1 / UL 508A

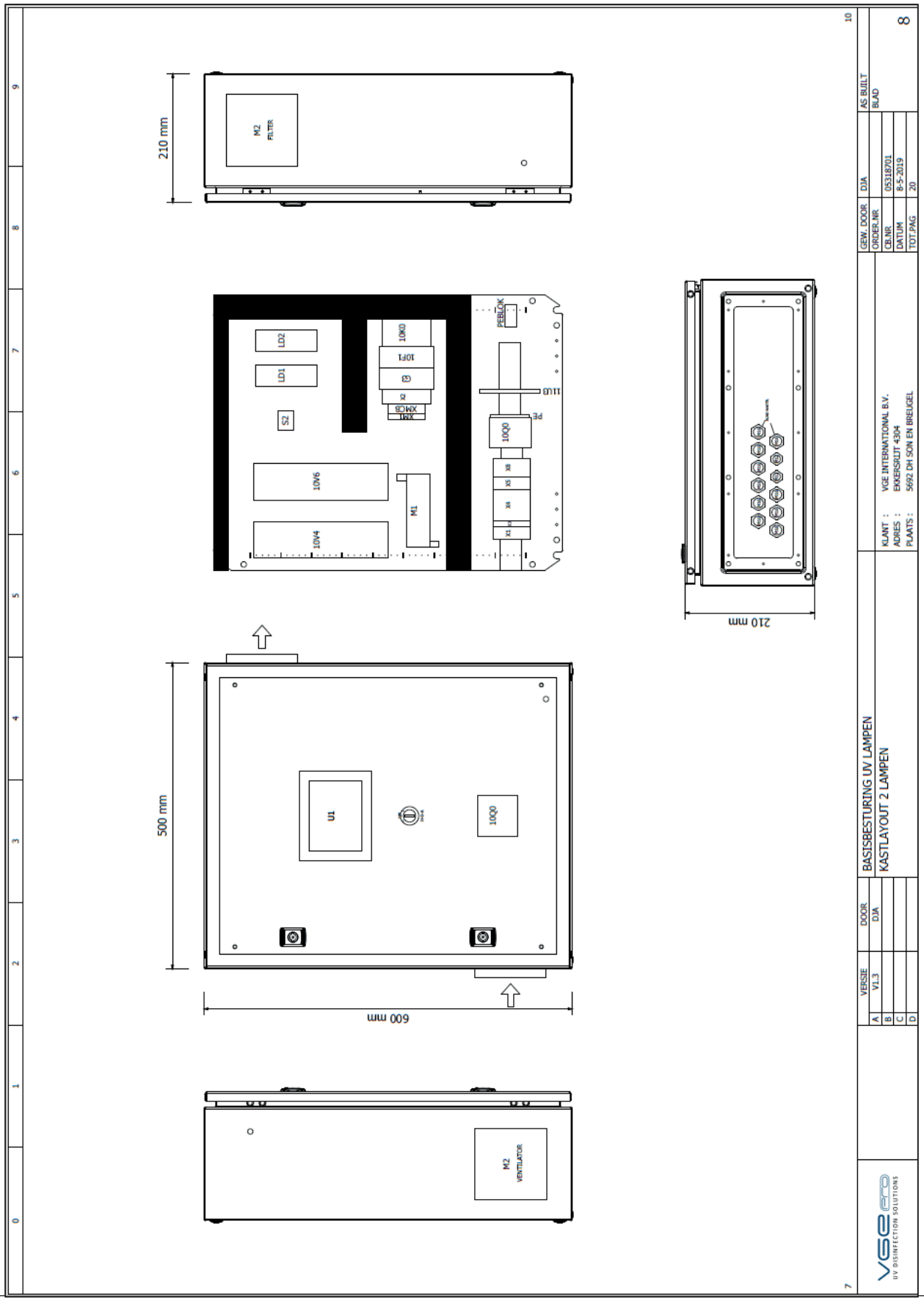
	VERSIE	DOOR
A	V1.3	DJA
B		
C		
D		

BASISBESTURING UV LAMPEN
VERKLARINGSBLAD

KLANT : VGE INTERNATIONAL B.V.
ADRES : EKKERSRIJT 4304
PLAATS : 5692 DH SON EN BREUGEL

GEW. DOOR	DJA	AS BUILT
ORDER.NR		BLAD
CB.NR	05318701	
DATUM	25-4-2019	
TOT.PAG	20	3


500 mm
600 mm
210 mm
U1
10Q0
LD1
S2
10K0
10F1
G3
XMCB
10V4
M1
PEBLOCK
11U3
PE
X8
X5
X4
X1
BASISBESTURING UV LAMPEN
KASTLAYOUT 1 LAMP
KLANT :
ADRES :
PLAATS :
VGE INTERNATIONAL B.V.
EKKERSRIJT 4304
5692 DH SON EN BREUGEL
GEW. DOOR
DJA
ORDER.NR
CB.NR
05318701
DATUM
8-5-2019
TOT.PAG
20
AS BUILT
BLAD
7
VERSIE
V1.3
DOOR
DJA



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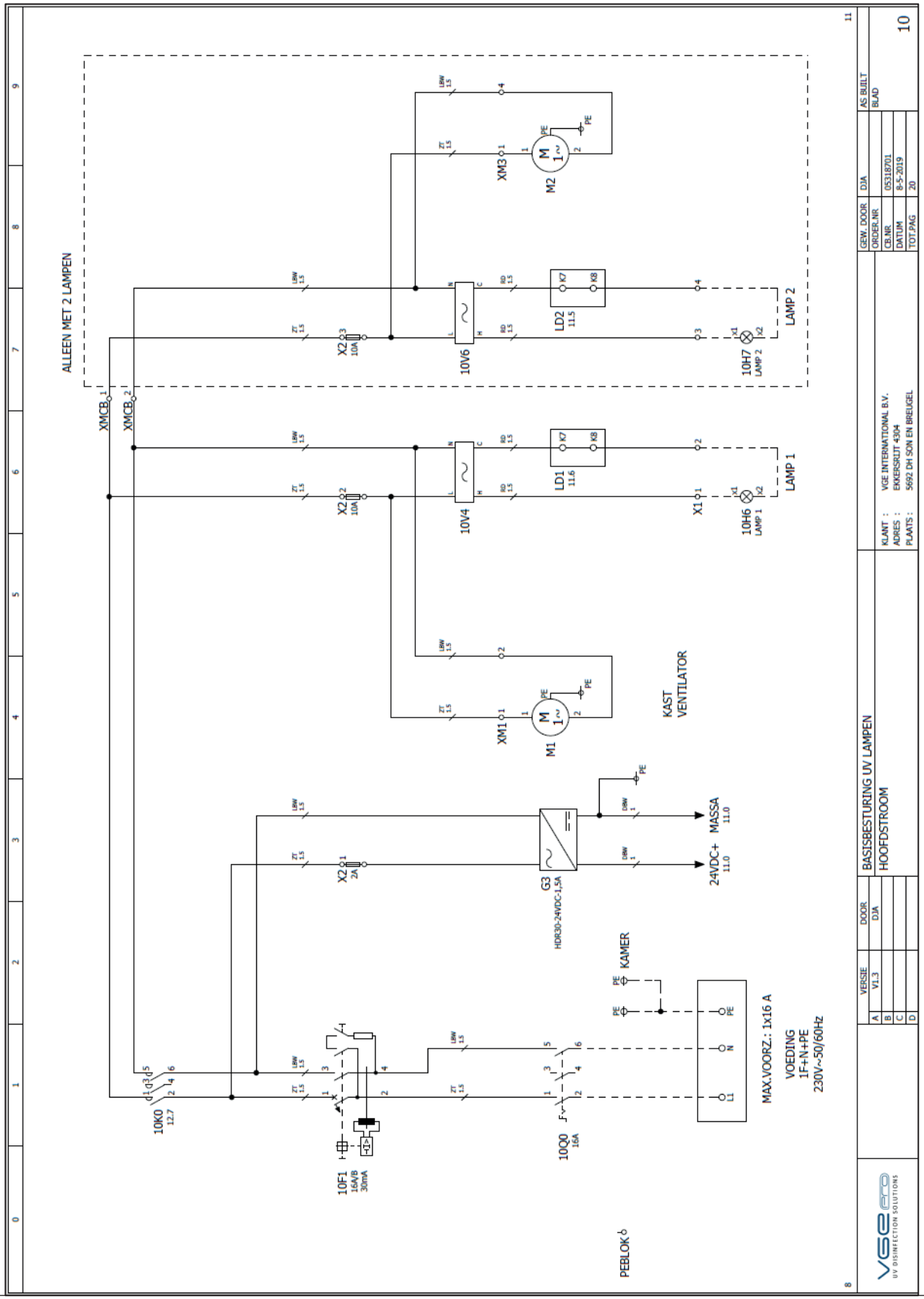
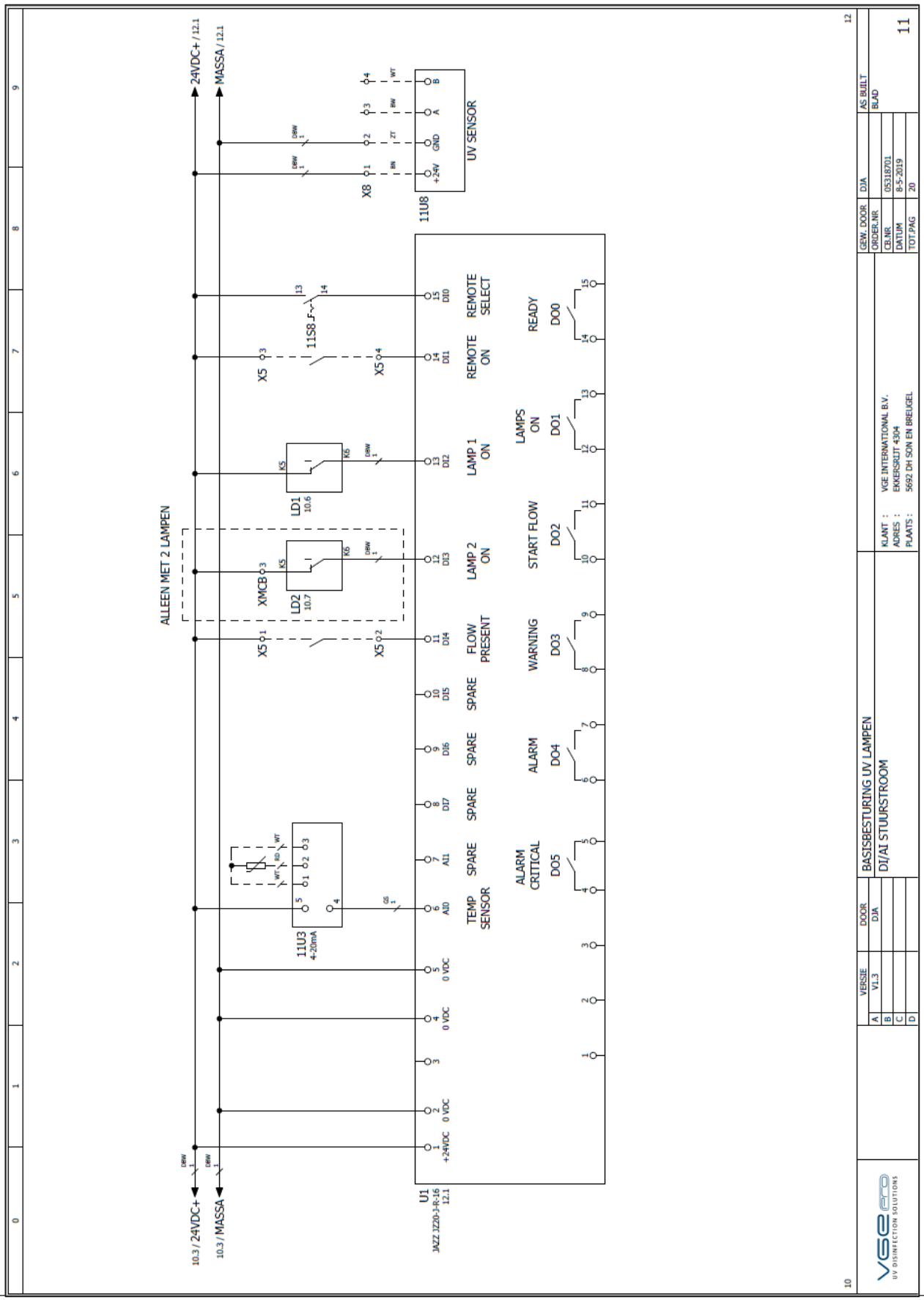
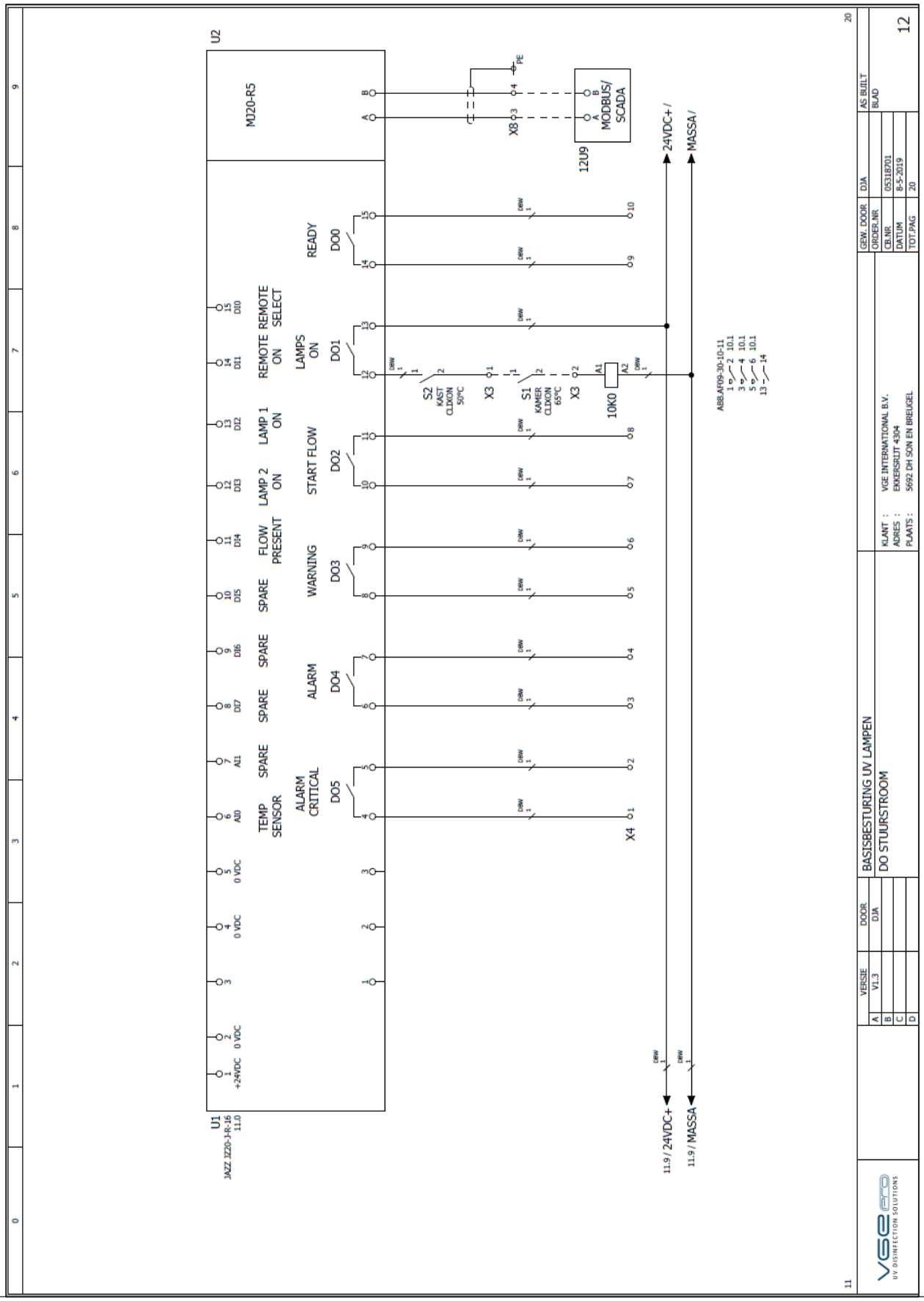

ALLEEN MET 2 LAMPEN
XMCB
LAMP 2
LAMP 1
10V6
10V4
10H7
10H6
LD2
LD1
XM3
XM2
XM1
M2
M1
KAST
VENTILATOR
G3
HDR30-24VDC-1,5A
24VDC+
MASSA
KAMER
10K0
10F1
10Q0
PEBLOK
MAX.VOORZ.: 1x16 A
VOEDING
1F+N+PE
230V~50/60Hz
BASISBESTURING UV LAMPEN
HOOFDSTROOM
VGE INTERNATIONAL B.V.
EKKERSRIJT 4304
5692 DH SON EN BREUGEL
AS BUILT
10


24VDC+ / 12.1
MASSA / 12.1
UV SENSOR
11U8
X8
ALLEEN MET 2 LAMPEN
XMCB
LD1
LD2
11S8
X5
REMOTE SELECT
REMOTE ON
LAMP 1 ON
LAMP 2 ON
FLOW PRESENT
SPARE
SPARE
SPARE
TEMP SENSOR
ALARM CRITICAL
LAMPS ON
START FLOW
WARNING
ALARM
READY
11U3
4-20mA
U1
10.3 / 24VDC+
10.3 / MASSA
BASISBESTURING UV LAMPEN
DI/AI STUURSTROOM
VGE INTERNATIONAL B.V.
EKKERSRIJT 4304
5692 DH SON EN BREUGEL
AS BUILT
11


U2
M320-RS
U1
JAZZ JZ20-J-R-16
11.0
+24VDC
0 VDC
TEMP SENSOR
ALARM CRITICAL
SPARE
SPARE
SPARE
SPARE
SPARE
WARNING
FLOW PRESENT
LAMP 2 ON
LAMP 1 ON
START FLOW
REMOTE ON
LAMPS ON
REMOTE SELECT
READY
DO5
DO4
DO3
DO2
DO1
DO0
X4
S2
KAST CLIXON 50°C
S1
KAMER CLIXON 65°C
X3
10K0
ABB.AF09-30-10-11
X8
PE
12U9
MODBUS/ SCADA
24VDC+ /
MASSA /
11.9 / 24VDC+
11.9 / MASSA
BASISBESTURING UV LAMPEN
DO STUURSTROOM
VGE INTERNATIONAL B.V.
EKKERSRIJT 4304
5692 DH SON EN BREUGEL
05318701
8-5-2019
BIJAD
12

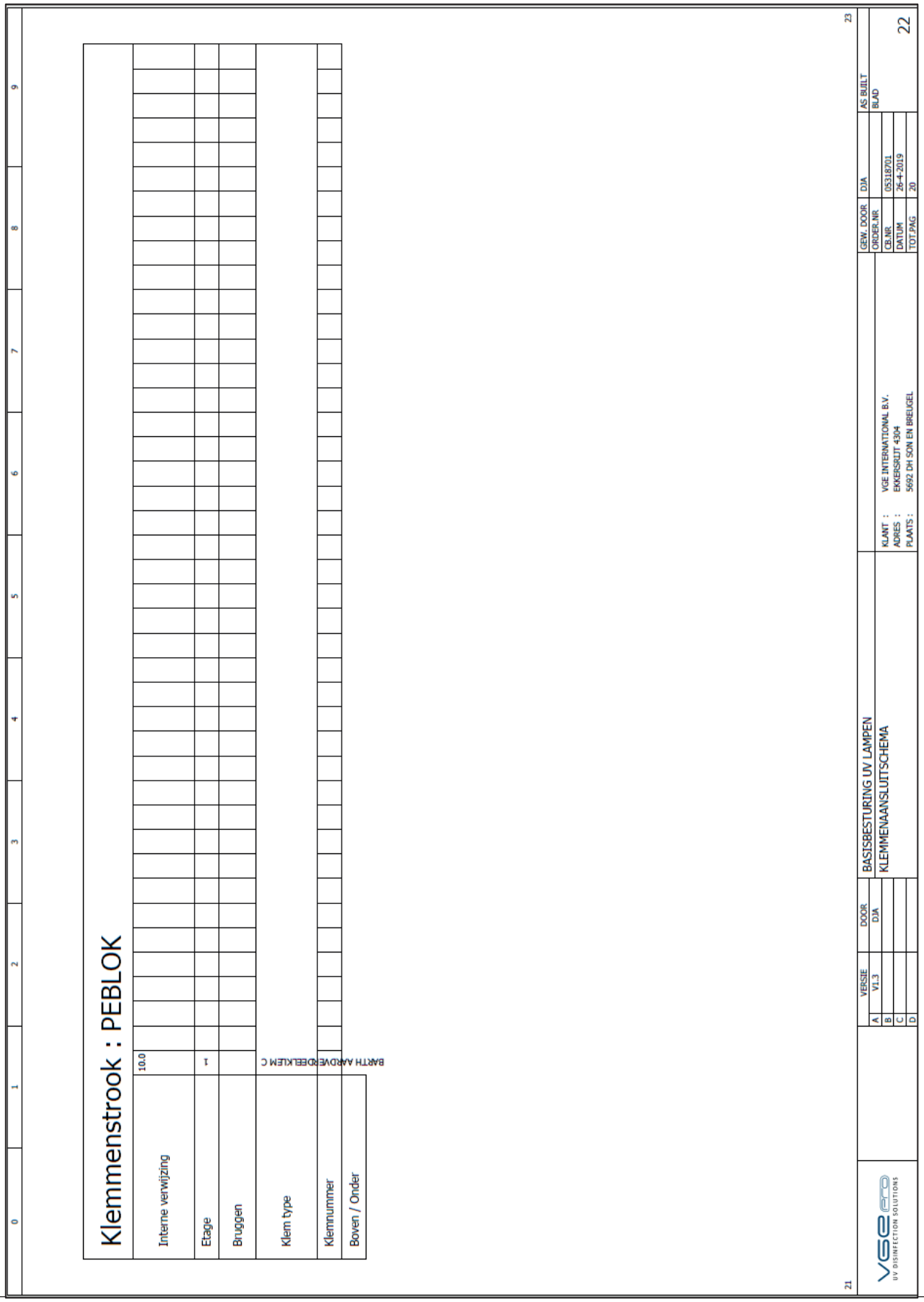
Artikellijst

F01_001

Onderdeelcode	Hoeveelheid	Code	Typenummer	Leverancier	Artikelnummer
10F1	1	Aardlekautomaat 1p+N 16A/B 0,03A	DS201 16A/B-0,03A	ABB	ABB.DS201 16A/B-0,03A
G3	1	30W single output industrial Power Supply - 2A	HDR-30-24	MEANWELL	MEAN.HDR-30-24
10K0	1	Magneetschakelaar 4kW	AF09-30-10-11	ABB	ABB.AF09-30-10-11
2KAST5	1	Wandmontagekast, 600x500x210	MAS0605021R5	ELDON	ELD.MAS0605021R5
LD1	1	Lampstroom detectie 400-1000W Nedap 7833784	7833784	NEDAP	NEDAP7833784
LD2	1	Lampstroom detectie 400-1000W Nedap 7833784	7833784	NEDAP	NEDAP7833784
M1	1	ventilator	4715FS-23T-B50-D00	SCHNEIDER ELECTRIC	NMB.4715FS
M2	1	SK Ventilator 20m³/h 230V 50/60	SK.3237100	RIT	RIT.3237100
M2	1	SK Ventilatierooster 116,5x116,5	SK.3237200	RIT	RIT.3237200
PE	2	Aardleiding-aansluitklem, 4 mm²	ZPE 4	WEI	WEI.ZPE 4
PEBLOK	1	potentiaalvereffeningsrail	BARTH AARDVERDEELKLEM C	BARTH	BARTH.C
10Q0	1	Lastscheider 16A 4p	OT16F4N2	ABB	ABB.OT16F4N2
10Q0	1	Knop geel/rood	OHYS2AJ	ABB	ABB.OHYS2AJ
10Q0	1	As (180mm)	OXS6X180	ABB	ABB.OXS6X180
S2	1	Thermal Cut-Out Thermostat	R28 03EN	ABB	MICRO.R28 03EN
11S8	1	Keuzeschakelaar 2 schakelstanden	C2SS2-10B-11	ABB	ABB.1SFA619201R1076
U1	2	JAZZ PLC + HMI	JZ20-J-R16	UNITRONICS	UNI.JZ20-J-R16
U1	1	JAZZ RS232/RS485 COM Port Kit	JZ-RS4	UNITRONICS	UNI.JZ-RS4
U2	1	MODBUS/SCADA Module	MJ20-R5	UNITRONICS	UNI.MJ20-R5
11U3	1	TRANSDUCER	P17	P17	LU.P17
10V4	1	Elektronische lampvoeding	NMP 620-M	NMP 620-M	NEDAP
10V6	1	Elektronische lampvoeding	NMP 620-M	NMP 620-M	NEDAP
X1	4	Doorvoer-aansluitklem, 2,5 mm²	ZDU 2.5	WEI	WEI.ZDU 2.5
X1	6	Eindsteun	ZEW 35	WEI	WEI.ZEW 35
X2	3	Zekeringklem, 2,5 mm²	ZSI 2.5	WEI	WEI.1616400000
X3	2	Doorvoer-aansluitklem, 2,5 mm²	ZDU 2.5	WEI	WEI.ZDU 2.5
X4	10	Doorvoer-aansluitklem, 2,5 mm²	ZDU 2.5	WEI	WEI.ZDU 2.5
X5	4	Doorvoer-aansluitklem, 2,5 mm²	ZDU 2.5	WEI	WEI.ZDU 2.5
X8	4	Doorvoer-aansluitklem, 2,5 mm²	ZDU 2.5	WEI	WEI.ZDU 2.5
XM1	4	Doorvoer-aansluitklem, 2,5 mm²	ZDU 2.5	WEI	WEI.ZDU 2.5
XMCB	3	Doorvoer-aansluitklem, 2,5 mm²	ZDU 2.5	WEI	WEI.ZDU 2.5

VERSIE	DOOR					
A V1.3	DJA	BASISBESTURING UV LAMPEN		GEW. DOOR	DJA	AS BUILT
B		ARTIKELLIJST	KLANT : VGE INTERNATIONAL B.V.	ORDER.NR		BLAD
C			ADRES : EKKERSRIJT 4304	CB.NR	05318701	
D			PLAATS : 5692 DH SON EN BREUGEL	DATUM	26-4-2019	20
				TOT.PAG	20	

Klemmenstrook : PE
Interne verwijzing
Etage
Bruggen
Klem type
Klemnummer
Boven / Onder
VERSIE
DOOR
A V1.3 DJA
BASISBESTURING UV LAMPEN
KLEMMENAANSLUITSCHEMA
AARDING
KLANT : VGE INTERNATIONAL B.V.
ADRES : EKKERSRIJT 4304
PLAATS : 5692 DH SON EN BREUGEL
GEW. DOOR DJA
ORDER.NR
CB.NR 05318701
DATUM 24-4-2019
TOT.PAG 20
AS BUILT
BLAD
21



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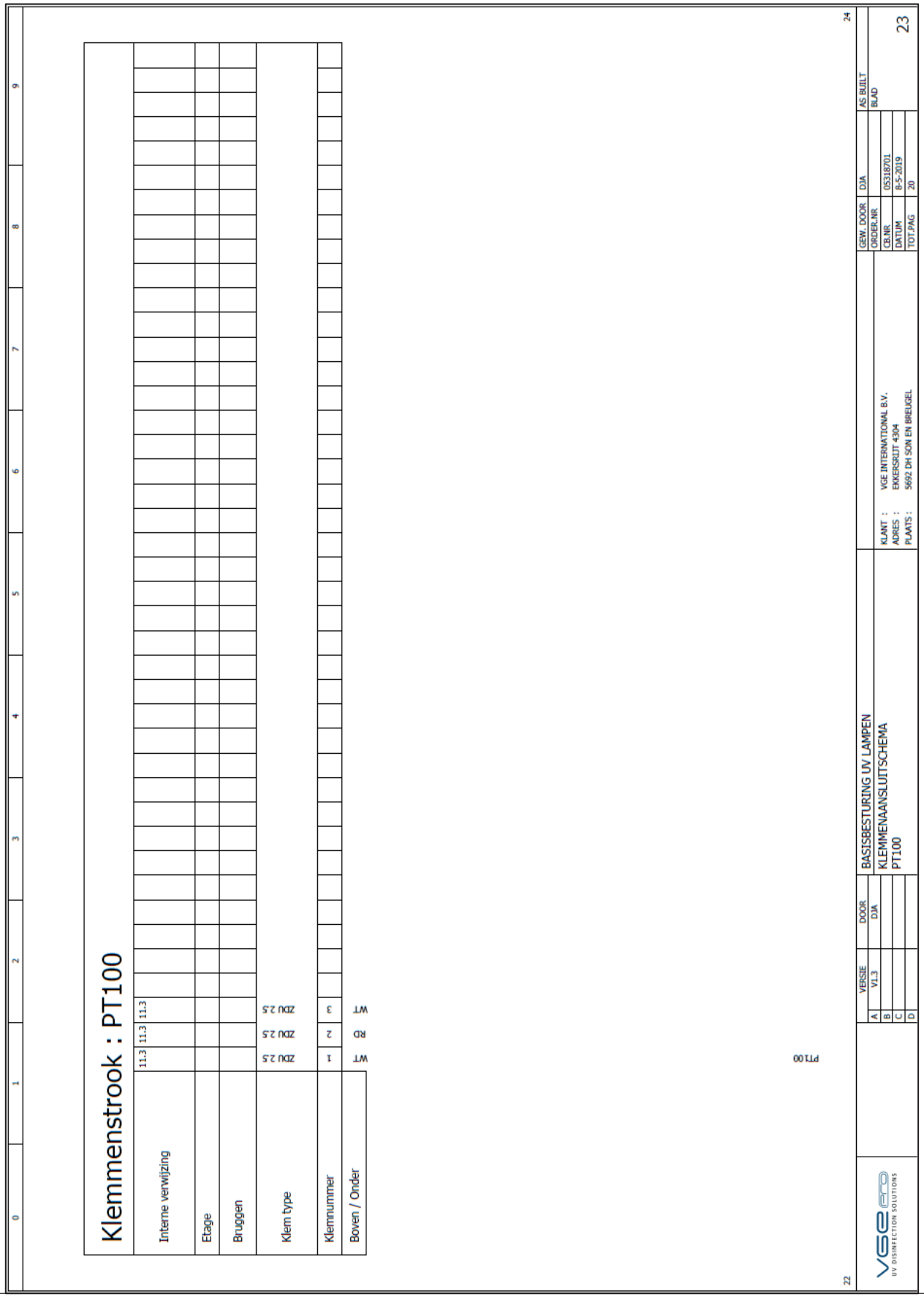
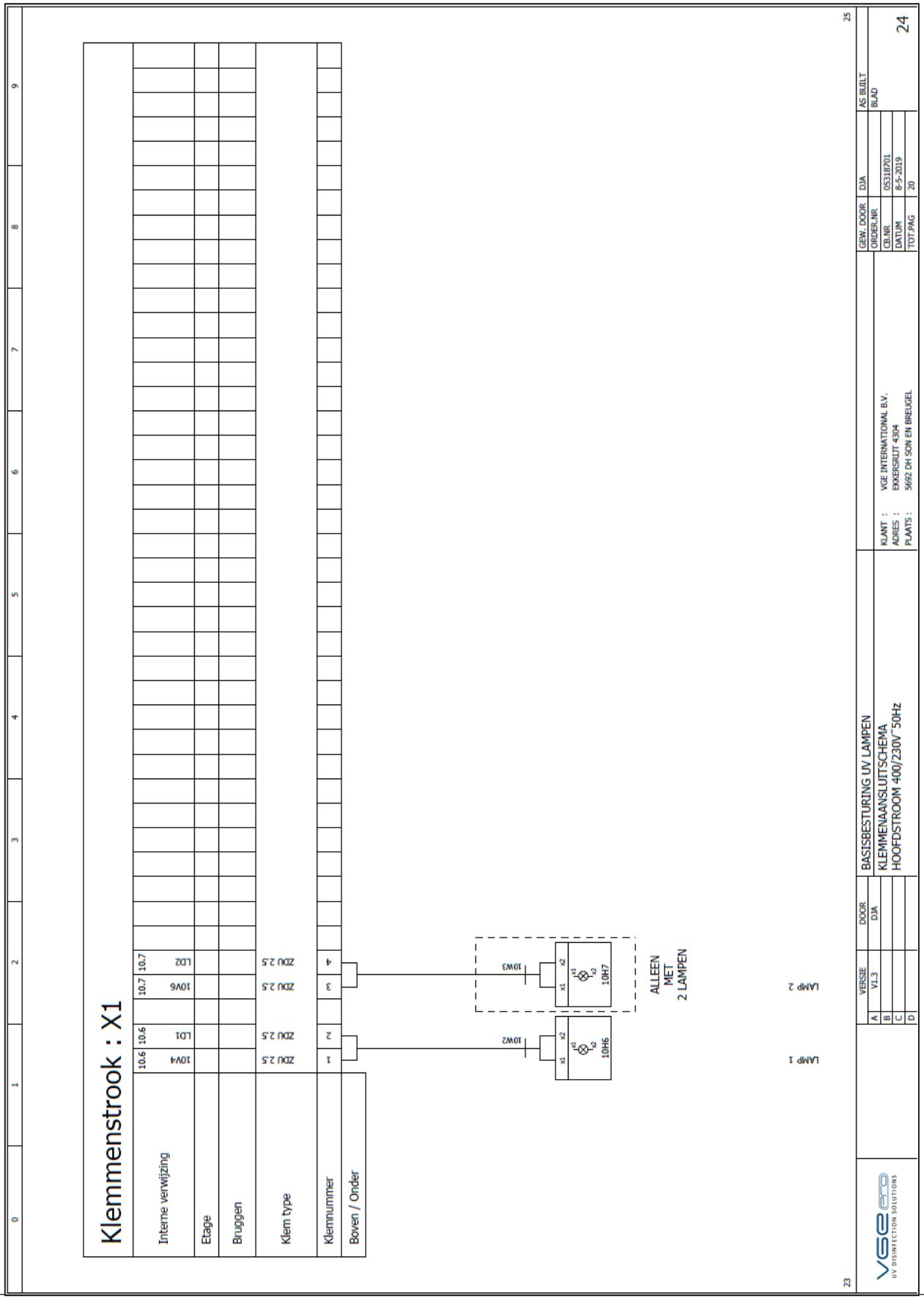

Klemmenstrook : PT100
Interne verwijzing
11.3
11.3
11.3
Etage
Bruggen
Klem type
ZDU 2.5
ZDU 2.5
ZDU 2.5
Klemnummer
1
2
3
Boven / Onder
WT
RD
WT
PT100
BASISBESTURING UV LAMPEN
KLEMMENAANSLUITSCHEMA
PT100
VERSIE
DOOR
A V1.3 DJA
KLANT : VGE INTERNATIONAL B.V.
ADRES : EKKERSRIJT 4304
PLAATS : 5692 DH SON EN BREUGEL
GEW. DOOR
ORDER.NR
CB.NR 05318701
DATUM 8-5-2019
TOT.PAG 20
DJA
AS BUILT
BLAD
23
22
24



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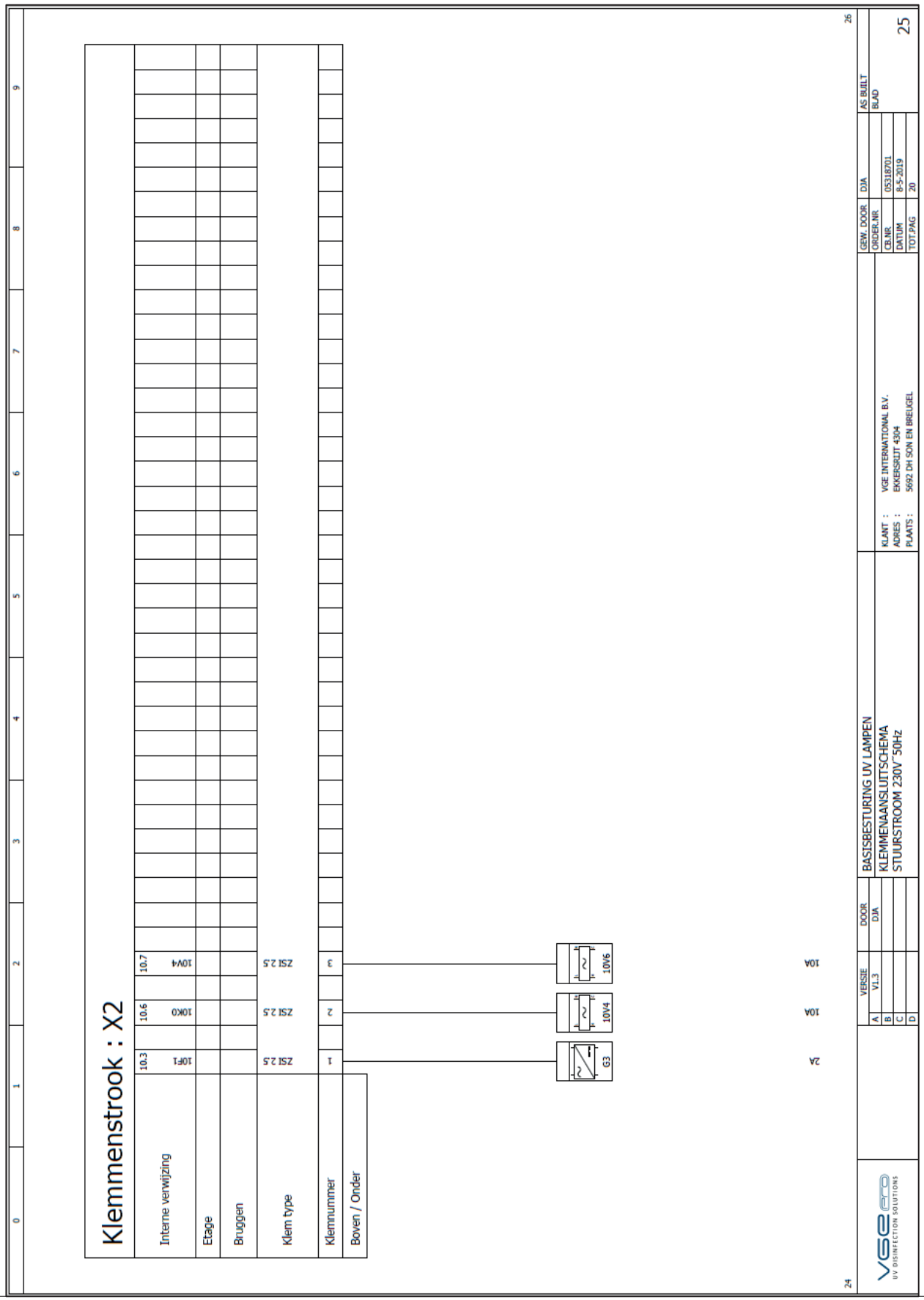
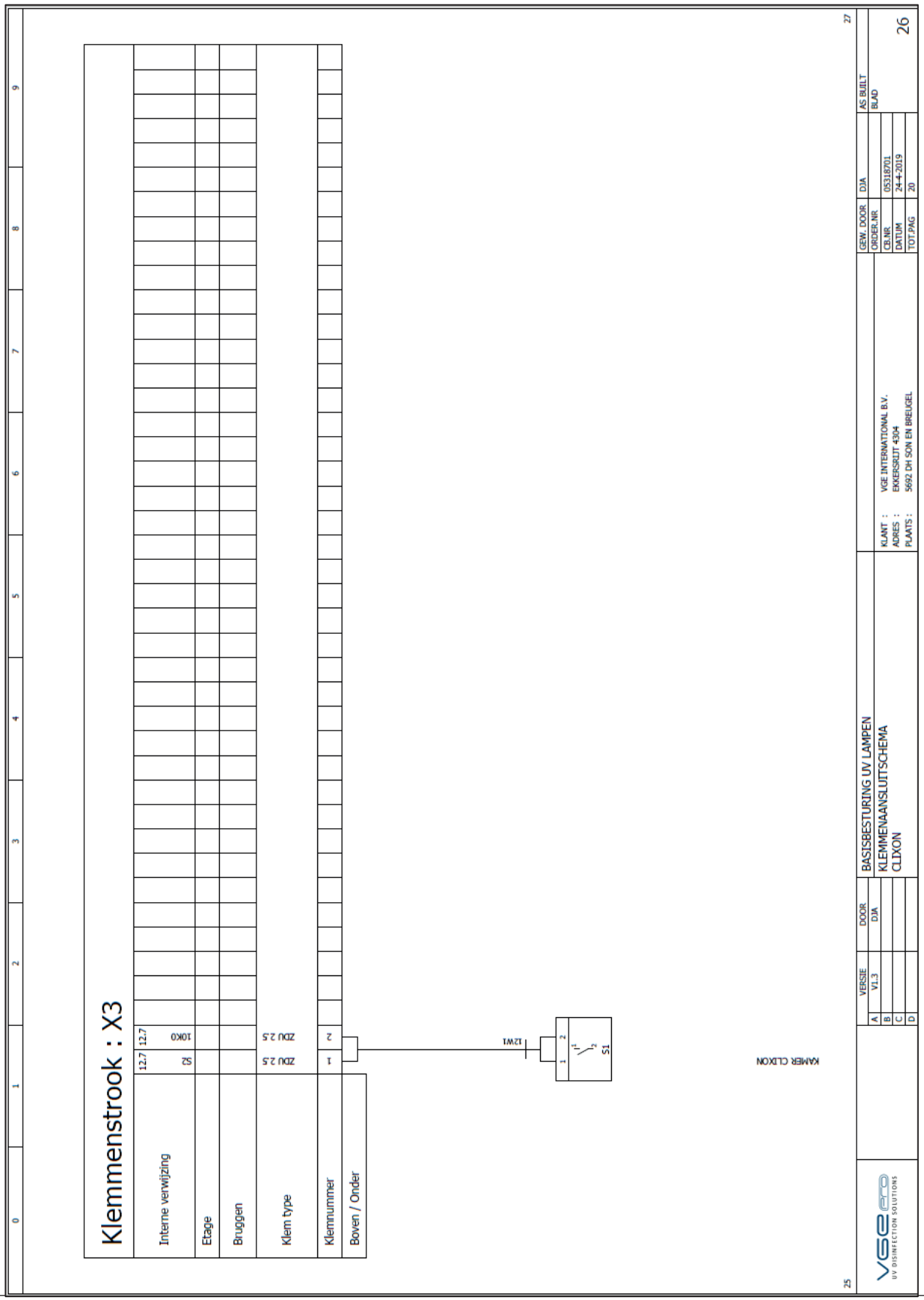

Klemmenstrook : X2
Interne verwijzing
Etage
Bruggen
Klem type
Klemnummer
Boven / Onder
10F1
10K0
10V4
10.3
10.6
10.7
ZSI 2.5
1
2
3
G3
10V4
10V6
2A
10A
10A
BASISBESTURING UV LAMPEN
KLEMMENAANSLUITSCHEMA
STUURSTROOM 230V 50Hz
VERSIE
V1.3
DOOR
DJA
KLANT : VGE INTERNATIONAL B.V.
ADRES : EKKERSRIJT 4304
PLAATS : 5692 DH SON EN BREUGEL
GEW. DOOR DJA
ORDER.NR
CB.NR 05318701
DATUM 8-5-2019
TOT.PAG 20
AS BUILT
BLAD
25



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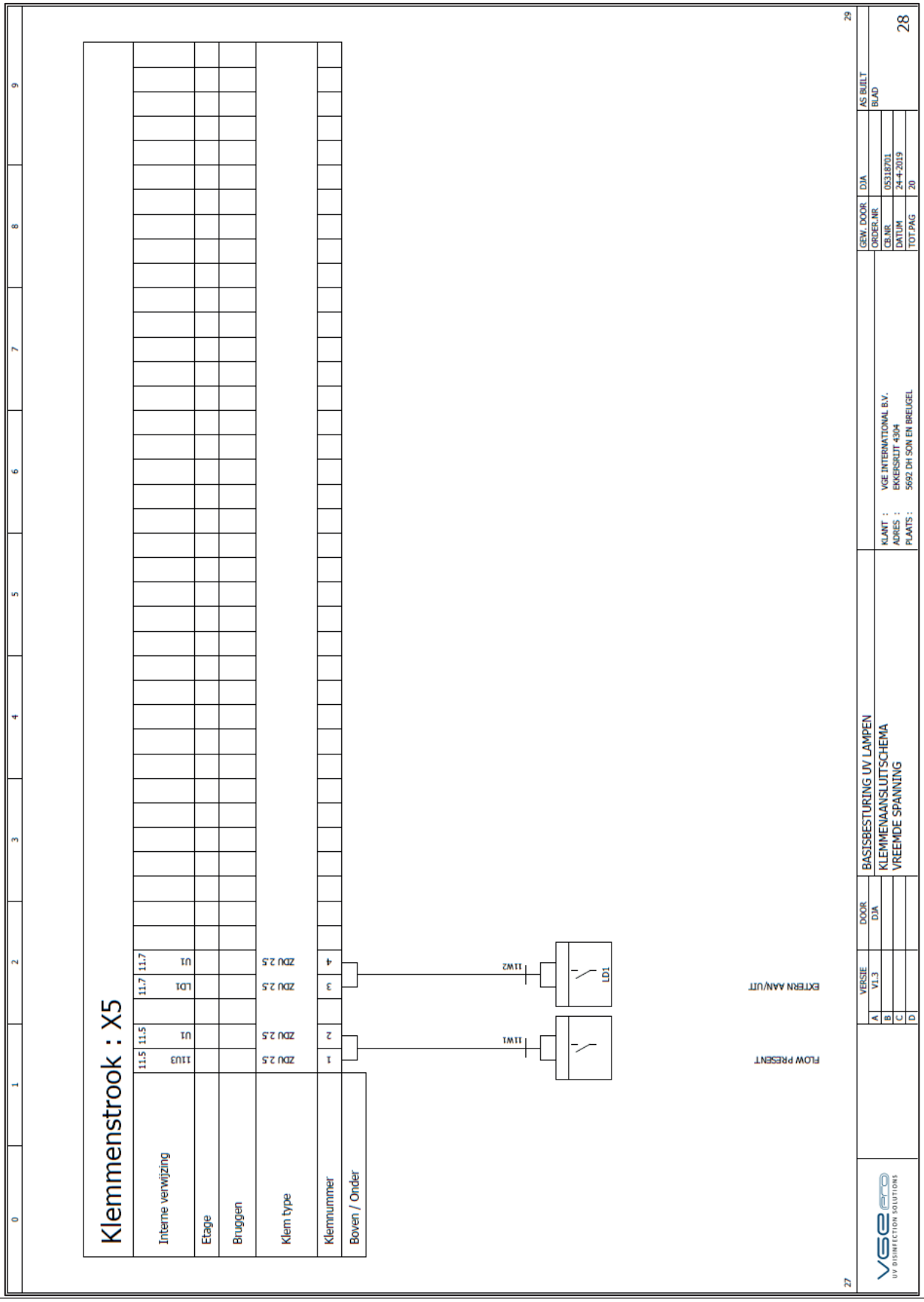
Klemmenstrook : X4
Interne verwijzing
Etage
Bruggen
Klem type
Klemnummer
Boven / Onder
ALARM CRITICAL
ALARM
WARNING
START FLOW
READY
BASISBESTURING UV LAMPEN
KLEMMENAANSLUITSCHEMA
STUURSTROOM 24VDC
VERSIE
DOOR
GEW. DOOR
DJA
AS BUILT
ORDER.NR
CB.NR
DATUM
TOT.PAG
05318701
8-5-2019
20
BLAD
27
KLANT :
ADRES :
PLAATS :
VGE INTERNATIONAL B.V.
EKKERSRIJT 4304
5692 DH SON EN BREUGEL



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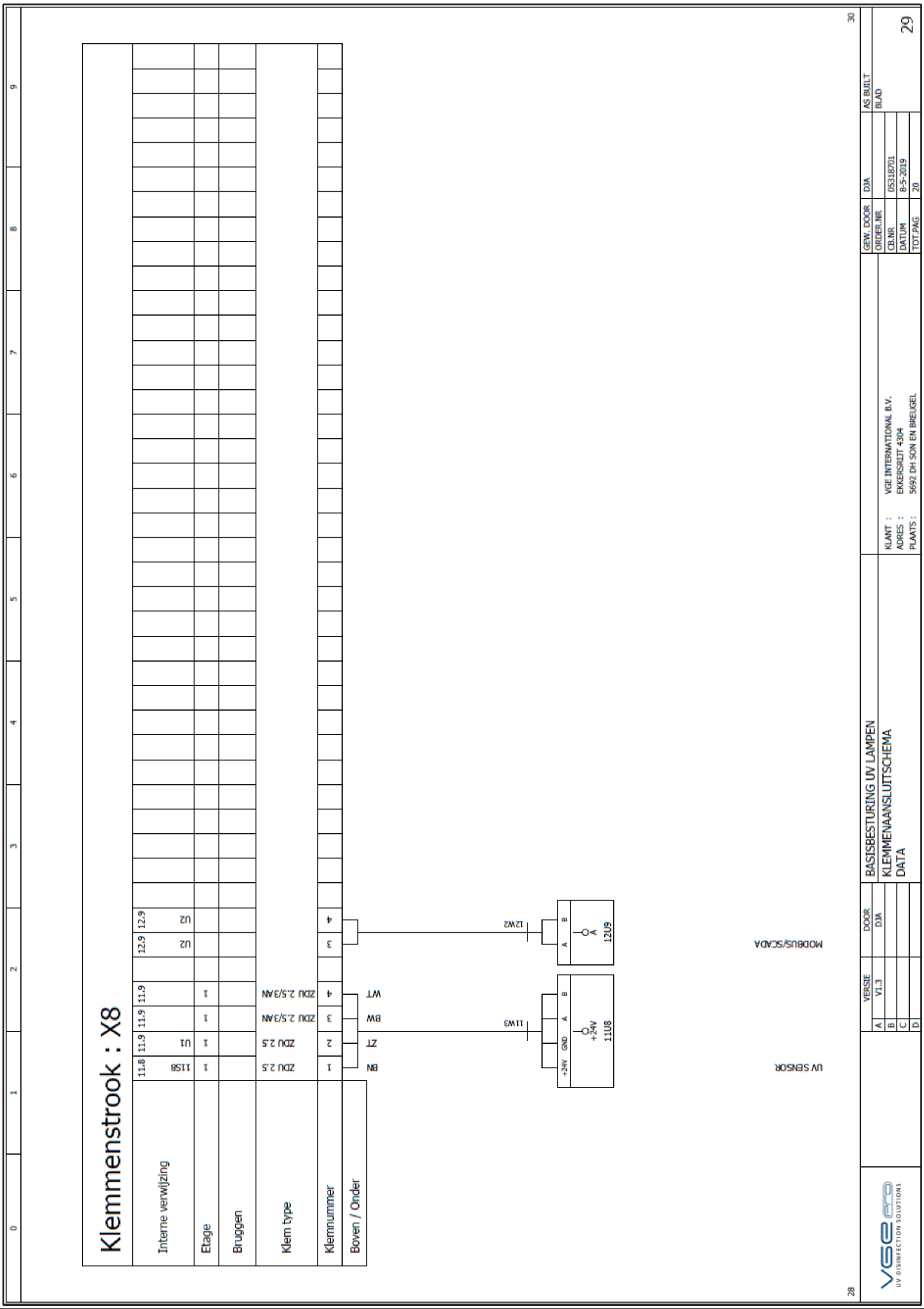
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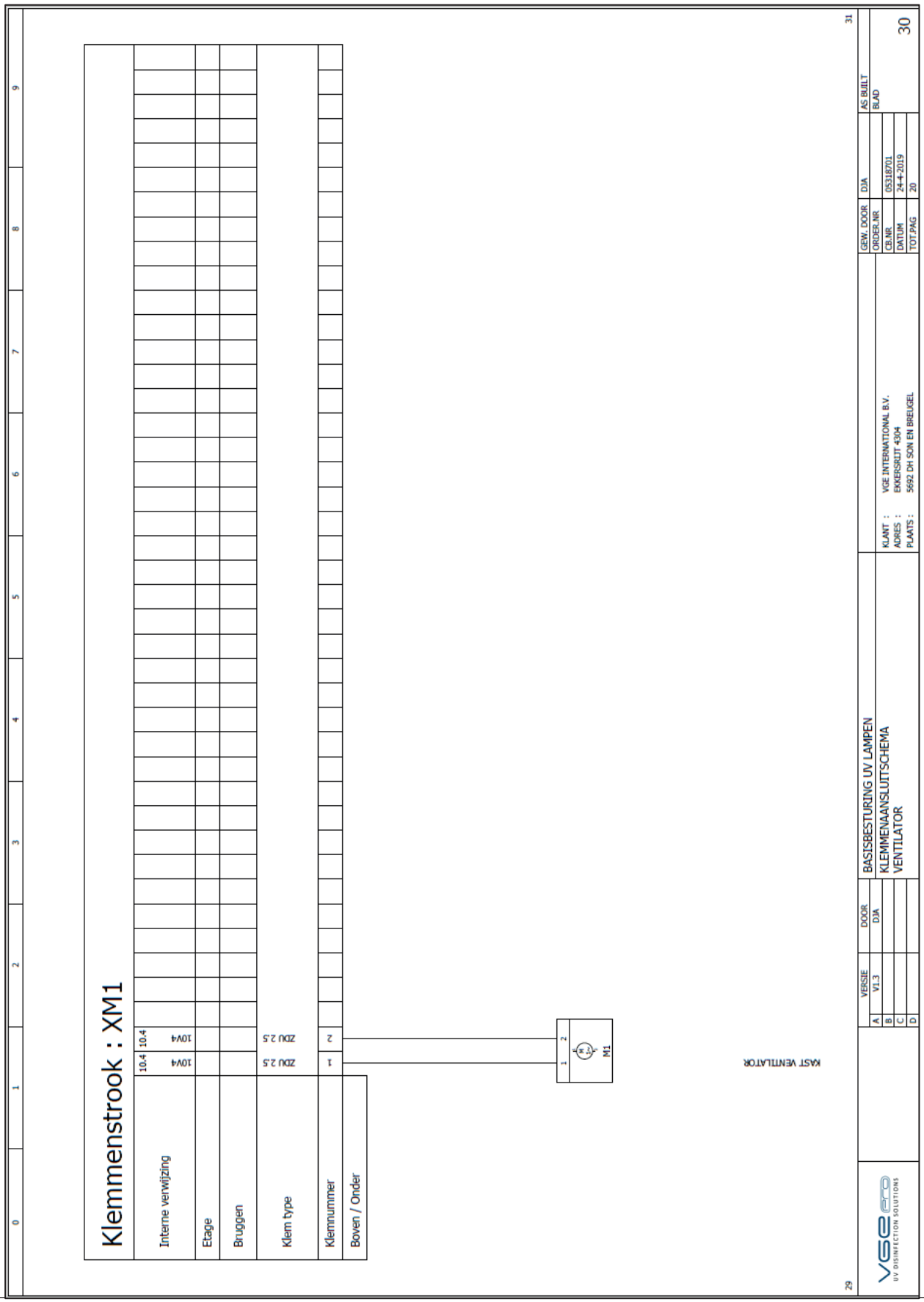
Interne verwijzing
Etage
Bruggen
Klem type
Klemnummer
Boven / Onder
11.8
11.9
11.9
11.9
12.9
12.9
11S8
U1
U2
U2
1
ZDU 2.5
ZDU 2.5/3AN
2
3
4
BN
ZT
BW
WT
11W3
12W2
+24V
GND
A
B
11U8
12U9
UV SENSOR
MODBUS/SCADA
VERSIE
V1.3
DOOR
DJA
BASISBESTURING UV LAMPEN
KLEMMENAANSLUITSCHEMA
DATA
KLANT : VGE INTERNATIONAL B.V.
ADRES : EKKERSRIJT 4304
PLAATS : 5692 DH SON EN BREUGEL
GEW. DOOR DJA
ORDER.NR
CB.NR 05318701
DATUM 8-5-2019
TOT.PAG 20
AS BUILT
BLAD
29
28
30



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11.3 CE declaration

EC DECLARATION OF CONFORMITY

We, VGE International BV
Ekkersrijt 4304
5692 DH Son
The Netherlands

Declare under our responsibility for the product(s):

Product Range:	UV-C radiation water radiation appliances
Product code:	Please refer to attached appendix

The designated product(s) is (are) in conformity with the essential requirements of the following European Directives and harmonized standards:

Low Voltage Directive (LVD), 2006/95/EC, date issue 12 December 2006	
• EN 60335-1:202 • EN 60335-2-55:2003 • EN 60335-2-109:2010	• EN 61000-3-2 • EN 61000-3-3 • EN 55014-1/2 • EN 55015-1/2

Restriction of the use of certain Hazardous Substances in electrical and electronic equipment Directive (RoHS), 2011/65/EU
• EN 50581:2012

Full compliance with the standards listed below proves the conformity of the designated product with the provisions of the above-mentioned EC Directive:

Signature:	
Name:	Arjan van der Spank
Function:	General Manager
Contact address:	Nieuwe Eerdsebaan 26 5482 VS Schijndel The Netherlands
Date:	2019-04-15

Appendix: Specific products that includes the CE-declaration Issue date appendix: 2019-04-16

Product code	Product name
VIM00401	VGE Pro UV MP MultiMax 400
VIM00601	VGE Pro UV MP 600 basic
VIM00602H	VGE Pro UV MP 600
F980500	Lamp VGE Pro MP 400W
F980505	Lamp VGE Pro MP 600W
EPM00401	VGE Pro UV Electrical Part MP MultiMax 400
EPM00601	VGE Pro UV Electrical Part MP Basic 600
EPM00602	VGE Pro UV Control Monitor MP 600

Signature:

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