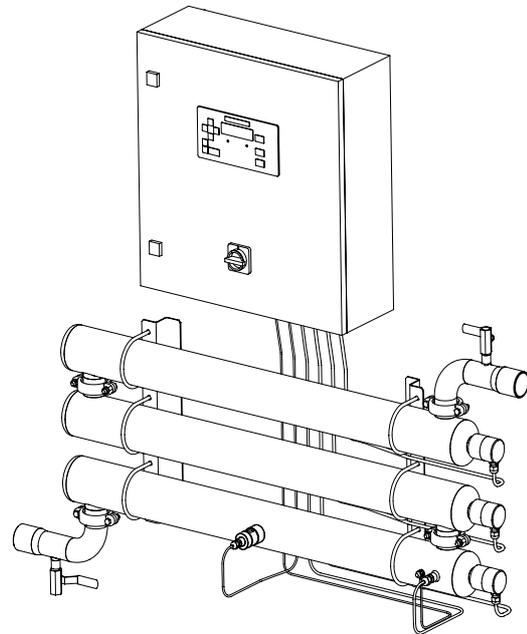




AQUA SYSTEM A/S

Instruction manual for Aqua System UV-disinfection unit

Type AQS-UV L Mn/200 ES



AQUA SYSTEM A/S

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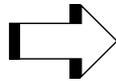
1 Safety instructions and warnings

The following symbols in this manual point out the safety precautions. It means that your attention is needed and that your safety is involved.



WARNING!

This symbol is used to indicate the presence of a hazard, which can or will cause severe personal injury, if the warning is ignored.



CAUTION!

This symbol indicates the presence of hazard, which will or can cause property damage if the instructions are not observed.



NOTE!

This type of instruction indicates a situation that if not avoided, could result in damage to the equipment.

It is the owner's and operator's responsibility to see that any person involved with the installation, use or operation of this equipment follows all safety instructions.

Read all safety instructions carefully and insist that those working with you and for you shall follow them. Not following the instructions may cause severe personal injury or damage the equipment beyond repair.

Before installing the unit please check for any possible transportation damage. In case of damage, this must be reported immediately upon receipt of the unit.

Do not allow this equipment to be used if it is faulty or the operator does not understand the proper use.

Only authorised persons must carry out service and maintenance. Great care must be taken when handling equipment for potable water.

Only original spare parts must be used. Use of other spare parts or unauthorised modifications of the unit will void the guarantee. Use of original spare parts ensures safe operation and durability of your plant. Original spare parts can be delivered by your local dealer or by Aqua System A/S. A maintenance contract is the best way to assure a long lifetime of the unit.



AQUA SYSTEM A/S

If you do not completely understand the information in this manual, do not hesitate to contact your local dealer or Aqua System A/S directly.

By enquiries please enclose information of type, serial no. and building year. This information is written on the nameplate of the unit.



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1 Purpose of AQS-UV disinfection units

The AQS-UV L Mn/200 units are intended to disinfect process water with low UV transmittance, which is not of bacteriological acceptable quality. The AQS-UV unit uses UV-C light with wavelength 254 nm, to kill or inactivate bacteria and viruses in the water.

For more details concerning UV-disinfection please refer to special Aqua System publications.

WARNING!



The UV-radiation is extremely harmful to all living organisms. Do not look at the burning lamp with the naked eye.

2 Limitations of use

Certain inorganic salts (e.g. of iron and magnesium) as well as organic matters absorb the UV-light and thus reduce the capacity of the unit. The water must be free of suspended solids. If necessary a fine filter must be installed. A high content of dissolved or suspended solids can result in rapid contamination of the quartz sleeve. The contamination must be removed mechanically or by e.g. nitric or citric acid to restore the unit's capacity.

NOTE!



Do not use hydrochloric acid or sulphuric acid for cleaning of the unit since it would lead to serious corrosion damage of the stainless steel.

The flow capacity of the unit depends on the UV-transmittance of the water. The flow must be limited according to the nominal capacity according to the capacity table in section G1. These capacities are based upon a guaranteed radiation dose of 400 J/m², even at the end of the lifetime of the UV-lamp. In units fitted with an UV-sensor (type S), the radiation intensity is constantly monitored and an alarm is given in case of malfunction.

WARNING!



Upon power failure the function of the unit stops immediately. It is therefore recommended to install a fail close valve (e.g. solenoid valve) that will disrupt the water supply from the unit in case of alarm or power failure.

WARNING!



Bacteria and viruses can grow in the purified water unless care is taken to prevent re-infection. If the unit is installed in an existing piping system it is recommended to disinfect the downstream piping system before taken the unit into use.



AQUA SYSTEM A/S

1 Scope of delivery

In the description of the type AQS-UV L Mn/200 ES the "n" indicates the number of UV reactors. Make sure that the following parts are included in the packing box.

- AQS-UV-reactors mounted on wall brackets (W) or as a unit (U)
- Electrical switchboard with GENO-UV-tronic2, cables for UV-lamps and UV-sensor
- Quartz sleeves
- UV-lamps
- Viton rubber gasket and sealing paste
- Wall brackets (W) or unit (U)
- This manual

2 Mechanical installation

An example of an installation AQS-UV L M3/200 ESW is shown in Figure 1:

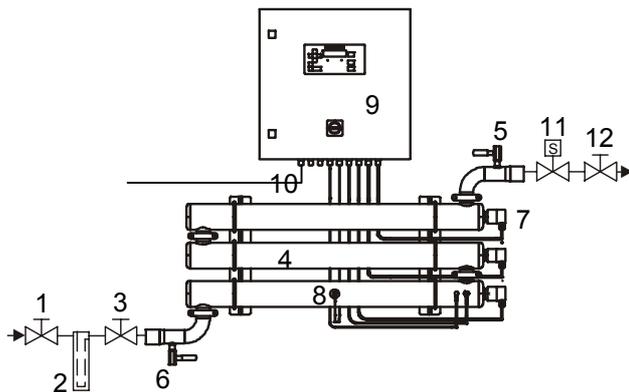


Figure 1: Installation

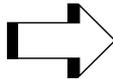


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1. Inlet shut off valve
2. Cartridge filter
3. Filter shut off valve
4. AQS-UV unit
5. Top flushing valve
6. Bottom flushing valve
7. PVC top
8. UV-sensor
9. Electrical switchboard
10. Electrical power (230 V/50 Hz)
11. Automatic shut off valve
12. Outlet shut off valve

Only Pos. 4 – 9 is included in the scope of delivery.

CAUTION!



A qualified person according to local rules for drinking water installations must do the installation in the piping system.

Upstream and downstream of the unit, two manual valves must be installed in order to allow for chemical cleaning of the quartz sleeves.

The water flow through the unit must not exceed the nominal flow according to the technical specifications (see section G1)

In a distance of minimum 1 meter from both inlet and outlet the connecting pipe must be made from UV-resistant material (Common PVC is not UV-resistant) or a pipe bend of UV-resistant material must be fitted on the inlet and outlet.

The direction of the flow through the equipment must follow the arrow in order to ensure proper venting of the unit.

NOTE!



The lamps should only be switched on when the unit is filled with water to ensure proper cooling of the lamp.

This type of unit can only be mounted as shown. For vertical mounting please order a unit with type designation v (flushing valve fitted at the top for manual venting).

Enough space must be left for installation and change of quartz sleeve and UV-lamp (See Figure 5, section G).



AQUA SYSTEM A/S

The quartz sleeve is installed as shown on Figure 2 in the following steps:

- Remove the PVC nut (3).
- Insert the open end of the quartz sleeve (2) into the rubber gasket (4). The long cone of the gasket should be close to the end of the quartz sleeve. 2 – 4 mm of the quartz sleeve should extend through the rubber gasket.
- Apply the sealing paste on the outside of the viton rubber gasket only (4).

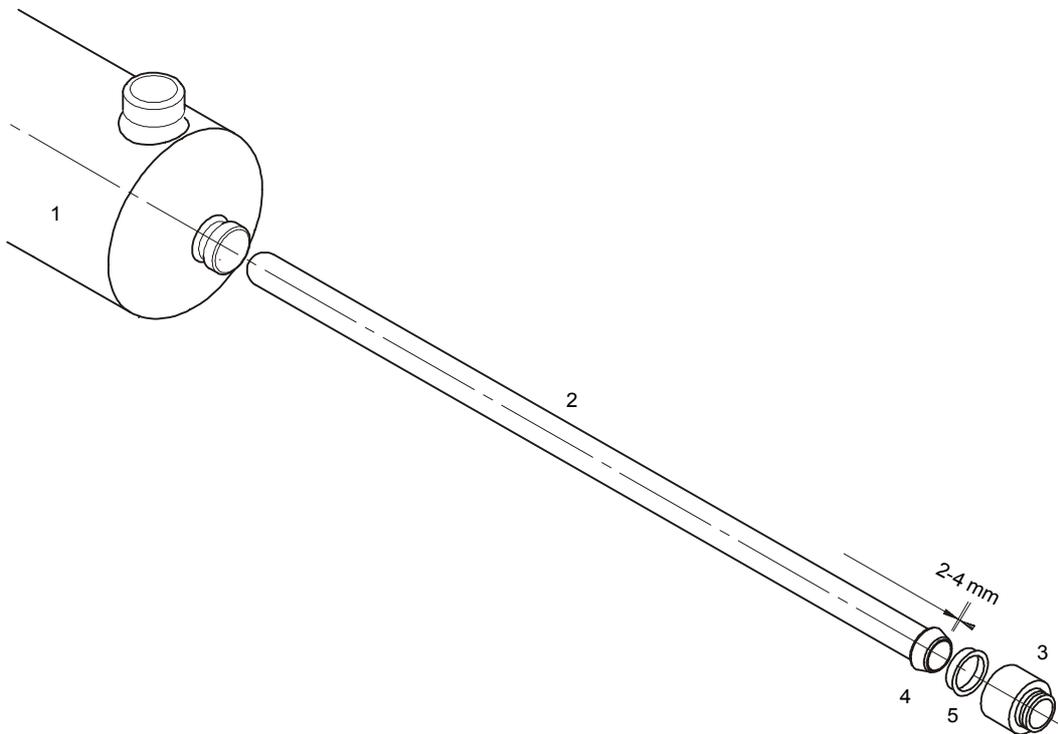


Figure 2: Installation of quartz sleeve



NOTE!

The quartz sleeve is fragile and may break if subjected to strain or impact.

- Insert the quartz sleeve into the reactor chamber (1). Be sure to fit the sleeve into the centre hole of the sleeve support inside the reactor.
- Mount the compression ring (5) onto the lamp-connecting branch.
- Mount the PVC nut (3) on the lamp-connecting branch.



AQUA SYSTEM A/S



NOTE!

Do not apply excessive torque on the nuts. Due to tolerances in the components used, it may happen that proper seal is obtained before the nut touches the reactor vessel.

- Test the vessel for tightness by filling it with water and applying pressure not exceeding the test pressure indicated on the nameplate.

3 Electrical installation

The GENO-UV-tronic2 is fitted with the necessary electrical cabling ready for mounting on the wall (type W) or mounted on a frame (type U).

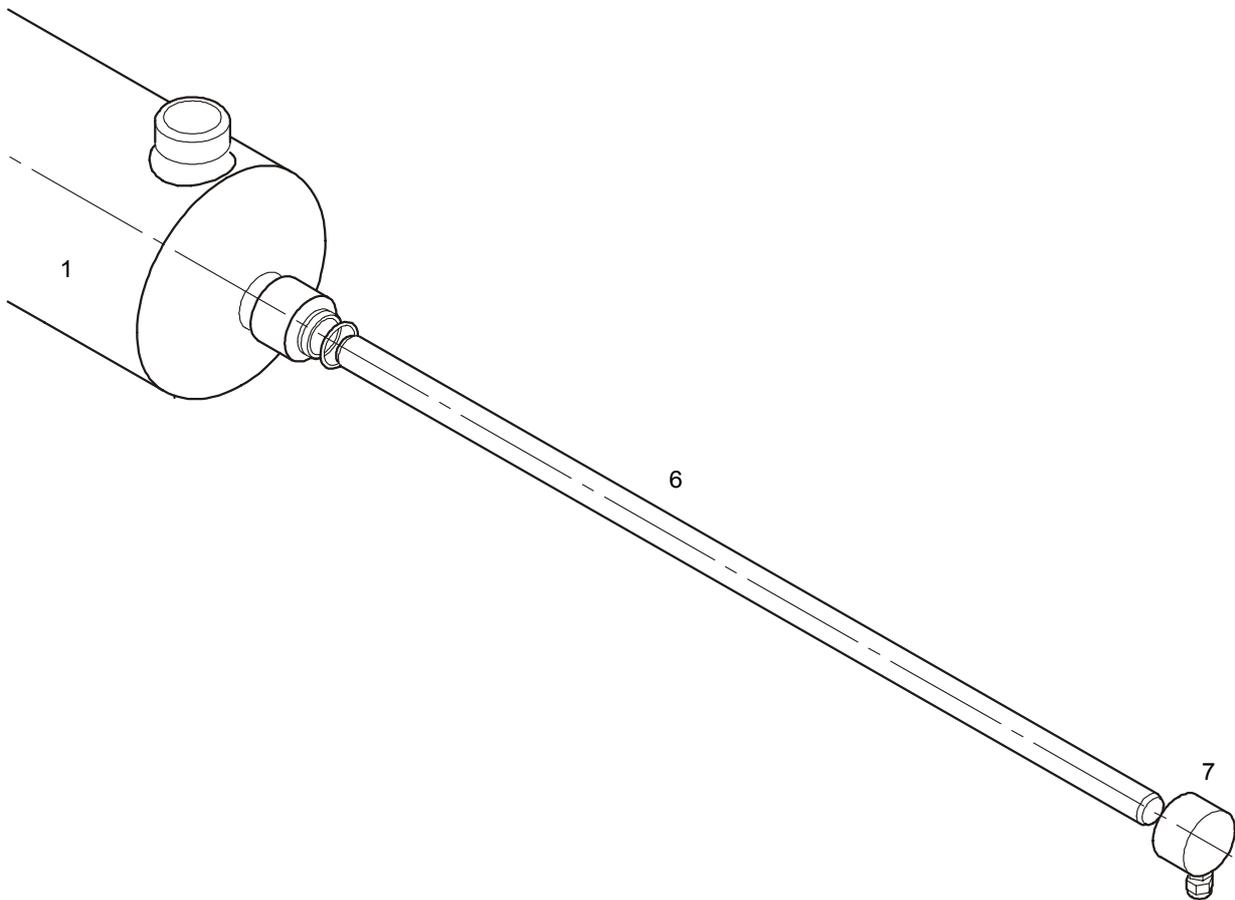


Figure 3: Installation of UV-lamp



WARNING!

Do not plug in the unit before properly assembled.

Always unplug the unit before doing any service jobs on the unit.



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- Select a place for the switchboard, taking the cable length in consideration (type W)

NOTE!



The cables for the lamp and for the sensor should not be lengthened.

-
- Mount the control box on the wall (type W)
 - Insert the UV-sensor into the measuring window. Secure it with the knurled nut (type W).

NOTE!



The knurled nut should be tightened by hand only. Do not use any tools.

-
- Mount the thermo sensor and the earth wire (type W)
 - Unpack the UV-lamp (6) and insert into the quartz sleeve. Do not touch the lamp glass with the fingers. The 4-pin end of the lamp has to stick out of the quartz sleeve

NOTE!



The UV-lamp is fragile and may break if subjected to strain or impact

-
- Place the PVC top (7) close to the compression plate. Insert the UV-lamp into the lamp socket.
 - Carefully push the lamp into the quartz tubes until it reaches the bottom of the quartz sleeve.
 - Mount the PVC top on the PVC nut with a firm pressure.
 - Switch on the power supply. The unit is now ready for switch on.



AQUA SYSTEM A/S

The GENO- UV-tronic₂ control box

Content

1 Introduction.....	D-1
2 Directions for use	D-2
2.1 Fundamental use	D-3
3 Control menu.....	D-4
3.1 Language	D-4
3.2 Unit	D-4
3.3 Type	D-5
3.4 Options.....	D-5
3.5 Failure memory	D-6
3.6 Diagnostics.....	D-6
3.7 Set time	D-8
3.8 Emergency operation	D-8
3.9 Service phone number	D-8
4 Unit menu	D-8
4.1 Configuration	D-9
4.2 Delays	D-12
4.3 Service data	D-13
4.4 Operation data	D-14
4.5 Basic settings	D-15
5 Factory values	D-16

1 Introduction

Chlorinator[®] Type IV and Industrial-UV-Units are controlled and supervised with the GENO[®]-UV-tronic₂.



Warning! If incorrect operation or incorrect settings are performed a hazard which can or will cause severe personal injury or damage the equipment is present.

Only perform the settings described in this chapter!

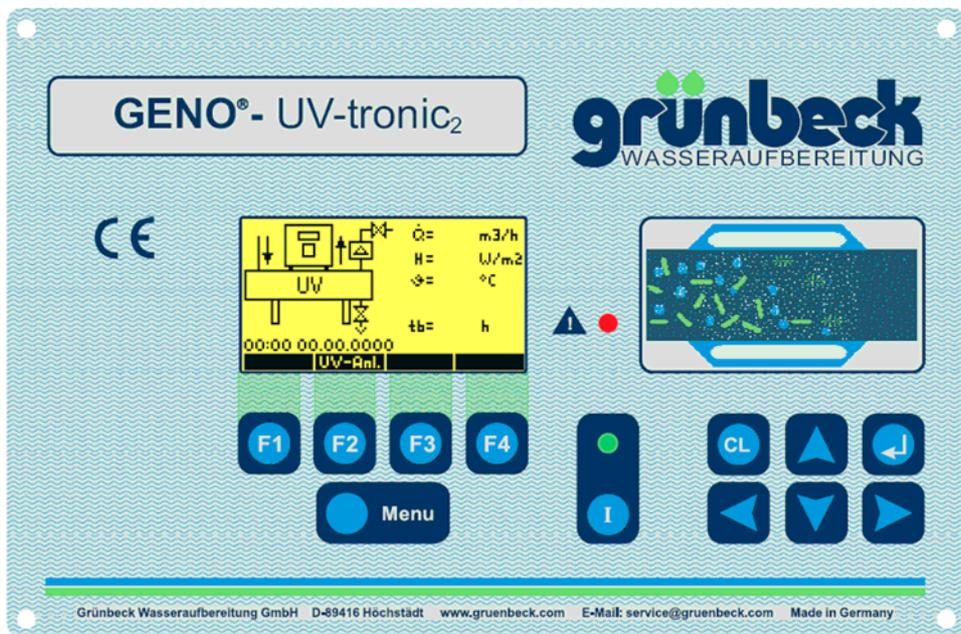


All work inside the unit including change of parameters must only be carried out by Aqua System A/S or by Aqua System A/S qualified and trained persons.



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2 Directions for use



GENO-UV-tronic₂ front layout.

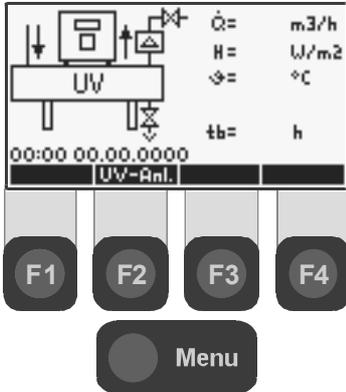
-  F1 Used in Menu's "Yes"
-  F2 Access the parameter menu for the unit or used in menu's "No"
-  F3 Not in use
-  F4 Used in Menu's "Exit"
-  Menu Access the control menu
-  Switches the unit on and off
(The green LED is lit when the unit is on. The green LED flashes during start-up and when the unit is in emergency operation mode)
-  CL Sign for alarms
Return without altering settings
-  Enter
-  Cursor left and right
-  Cursor up and down or settings up and down
-  The red LED is lit when an error is present



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2.1 Fundamental use

In the control menu (Menu) and in the parameter menu **F2** there is two possibilities to choose from, display and input.



- If “display” is selected all parameters are visible but no changes can be made
- If “input” is selected parameters can be altered depending on the code selected

Entering code:

Move cursor with **◀** or **▶** to select the digit wished to be altered then use **▲** or **▼** to select value. When finished confirm code by pressing **⏏**

Entering menu



Entering code

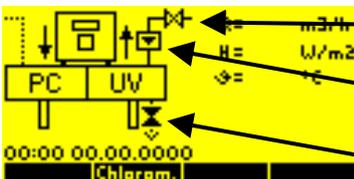
Codes:

The codes for altering values are for Aqua System or by Aqua System qualified and trained persons available only. The following codes are available for general use.

- | | |
|----------|---------------------|
| Code 95 | Normal operation |
| Code 156 | Emergency operation |

Display:

- PC and UV lamps are lit. (Photo chemical lamp and UV lamp) Unit is active.



Display, Exemple Chlorinator

- (Option) Solenoid valve is installed and closed.
- (Option) Water meter is installed
- (Option) Rinsing valve is installed and open. (Coloured black)



AQUA SYSTEM A/S

3 Control menu

In this menu is located the fundamental settings for the unit as language, unit type, accessories and so. The menu is accessible by first pressing the button  and hereafter the choice is between display  and input . Using exit  returns to the previous display. If display is chosen all parameters in the control menu can be viewed but no changes can be made. Using the input button a code is required (Only available for Aqua System A/S service personel) Type the code and enter with .

The control menu has the following choices:

> Language
Unit
Type
Options
Failure memory
Diagnostics
Set time
Emergency operation
Telephone no.: CS

The selection is made with the arrow keys  and  using the enter key  the submenu can be accessed. Using exit  returns to the previously display.

3.1 Language Choice of control menu language

Options
Language Deutsch
English
Francais
Italiano
Dansk

3.2 Unit Choose between UV unit or Chlorominator®

Options
Unit UV-Unit
Chlorominator



AQUA SYSTEM A/S

3.4.3 Alarm modem for GENO[®]-UV-tronic₂

Module for the possibility to have error reports via a Fax machine or as a text message.



Note: The configuration of the modem cannot be done by the GENO[®]-UV-tronic₂. A PC must be connected to the GENO[®]-UV-tronic₂ and the software following the alarm modem must be used for configuration.

3.5 Failure memory

The failure memory contains the last 16 errors placing the latest error in top (Position 1). Each position in the failure memory shows the error text and the date and time the error occurred. Reset of the failure memory can be done by pressing  (clear). A password will be required. When the 16 positions in the failure memory is full the newest error will then automatically delete the oldest one.

3.6 Diagnostics

The diagnostics menu can be used whilst tracing an error. The state of all the inputs and outputs can be read and furthermore the state of the outputs can be altered as a part of an easier error tracking. (Password is required for altering)

3.6.1 Digital inputs

The state of the digital inputs can only be shown. No change is possible.

Display

1-Water meter	ON / OFF
2-Remote control	ON / OFF
3-Monitor EVG 1	ON / OFF
4-Monitor EVG 2	ON / OFF
5-Monitor EVG 3	ON / OFF
6-Monitor EVG 4	ON / OFF
7-Monitor EVG 5	ON / OFF
8-Monitor EVG 6	ON / OFF
10-Thermostat	ON / OFF



AQUA SYSTEM A/S

3.6.2 Digital outputs

The state of the digital outputs can be shown and altering the output is possible. (For altering a password is required)

Display

1-Safety valve	ON / OFF
2-Rinsing valve	ON / OFF
3-Signal horn	ON / OFF
5-Activation EVG	ON / OFF
6-Activation Photochemical lamp	ON / OFF
7-Maintenance ↑↑	ON / OFF
8-Collective alarm	ON / OFF

Optional messages for GENO[®]-UV-tronic₂

1-Maintenance ↑	ON / OFF
2-Temperature ↑	ON / OFF
3-Irradiance ↓	ON / OFF
4-Flow ↑	ON / OFF
6-UV lamp	ON / OFF



Note: If a digital output is changed the unit automatically switches off. The unit switches not automatically back on when the digital output is reset. This must be done manually afterwards.

3.6.3 Analogue inputs

The state of the analogue inputs can only be shown. No change is possible.

Display

3-Irradiance	V
4-Temperature	°C
5-Water meter	Hz

3.6.4 Analogue outputs (Analogue module for GENO[®]-UV-tronic₂)

The state of the analogue inputs can be shown and altering the output is possible. (For altering a password is required). The type of signal is determined by the setting at point 3.4.2 (mA or V).

Display

1-Flow	XX mA / XX V
2-Irradiance	XX mA / XX V
3-Temperature	XX mA / XX V

3.6.5 Software version

Shows the version of the software installed.



AQUA SYSTEM A/S

3.7 Set time

The GENO[®]-UV-tronic₂ is equipped with a real time clock so normal no adjustment is required. If an adjustment is necessary it here can be carried out.



Note: There is no automatic change from summertime to wintertime and opposite.

3.8 Emergency operation (Code 156)

When emergency operation is chosen all error are ignored and the unit will be running without supervision. The safety solenoid valve will be opened if installed.



Warning! As all errors are ignored at emergency operation the possibility for not sufficient disinfection of the water is present. The emergency operation mode therefore must only be used in case of emergency and only for a short time. The decision to run in emergency operation mode demands competent valuation whether it is responsible or not.

3.9 Telephone no. CS

Here the telephone number for the costumer service can be displayed / entered.

4 Parameter menu

In this menu the specific settings for the chosen unit type are located. Pressing **F2** accesses the menu and hereafter the choice is between display **F1** and input **F2**. Using exit **F4** returns to the previous display. If display is chosen all parameters in the control menu can be viewed but no changes can be made. Using the input button a code is required (Only available for Aqua System A/S service personel) Type the code and enter with **F4**

The control menu has the following choices:

> Configuration
Delays
Service data
Operation data
Basic settings

The selection is made with the arrow keys **▲** and **▼** using the enter key **F4** the submenu can be accessed. Using exit **F4** returns to the previously display.



AQUA SYSTEM A/S

4.1 Configuration

In the configuration menu the components for the Unit type chosen in the Control menu can be installed and configured. E.g. temperature sensor, safety valve, UV-sensor and water meter.

4.1.1 Temperature sensor

The temperature sensor is for protecting the unit against overheating. All lamps will shut down when the set maximum temperature is reached to prevent overheating. When the temperature drops the unit will automatically turn the lamps on again when the restart temperature is reached.

Options

Existing	YES / NO
Maximum temperature	XX °C
Restart temperature	XX °C



Note: The restart temperature has to be at least 2°C below the maximum temperature.



Note: When the maximum temperature is exceeded the optional safety valve will be activated depending on the settings at point 4.1.5.

4.1.2 Rinsing valve

If an optional rinsing valve is available it here can be activated. When the “rinsing on” temperature is exceeded water will be lead to drain to obtain water flow to cool the unit. The rinsing valve will remain open until the “rinsing off” temperature is reached.

Options

Existing	YES / NO
Rinsing on	XX °C
Rinsing off	XX °C



Note: The rinsing valve will remain open even if the maximum temperature set in point 4.1.1 is exceeded to cool the unit by leading water flow to drain.



AQUA SYSTEM A/S

4.1.3 Water meter

If an optional rinsing valve is available (an option for UV units) it here can be activated and programmed as well as a setting for a maximum flow is available.

Options

Existing

Litre / Impulse

YES / NO

XXX.XXX l/Imp

Maximum flow

XXX m³/h



Note: When the maximum flow is exceeded the optional safety valve will be activated depending on the settings at point 4.1.5.

4.1.4 UV-Sensor

If an UV-sensor is available if here can be activated and programmed. A minimum value for the UV irradiation can be programmed and the reading of the UV-sensor can be adjusted within the range of $\pm 20\%$ of the displayed value.

Options

Existing

Minimum value

YES / NO

XX.X W/m²

Calibration →

- Setup
- Calibrated value

$\pm XX \%$

XX.X W/m²



Note: If the UV radiation is below the minimum value the optional safety valve will be activated depending on the settings at point 4.1.5.



Note: At the Chlorominator[®] setup no UV-sensor is used and therefore not available.

4.1.5 Safety valve

If an UV-sensor is available it here can be activated and programmed. The time can be set for the safeguard operation and it can be programmed whether the safety valve shall react to a specific error or not. Furthermore it can be controlled if an error has to be signed manually or automatically.

Options

Existing

Safeguard operation time

YES / NO

XX:XX

Close at temperature ↑↑

NO / MAN QUIT / AUT QUIT

Close at flow ↑↑

NO / MAN QUIT / AUT QUIT

Close at irradiance ↓↓

NO / MAN QUIT / AUT QUIT

Close at UV Lamp defect

NO / MAN QUIT / AUT QUIT

Existing

Safety valve is present or not.



AQUA SYSTEM A/S

Safeguard operation time

At the time sat the safety valve will be closed and opened three times in a row to prevent bounding. If the safety valve is closed due to an alarm at the time of safeguard operation no activation will take place. The safety valve will remain closed.

Close at temperature ↑↑

Maximum temperature at point 4.1.1 exceeded.

Close at flow ↑↑

Maximum flow at point 4.1.3 exceeded.

Close at irradiation ↓↓

Below minimum value at point 4.1.4.



Note: Close at irradiation ↓↓ is at Chlorominator® not active.

Close at UV Lamp defect

One or more UV lamp is defect or one or more electronic ballast for the UV lamps is defect.

NO (The safety valve is not activated)

For the chosen alarm the safety valve is deactivated and will not react if the alarm appears.

MAN QUIT (Manuel Quitting)

For the chosen alarm the safety valve will close if the alarm appears and the safety valve will remain closed until the alarm is signed for manually by pressing the button .

AUT QUIT (Automatic Quitting)

For the chosen alarm the safety valve will close if the alarm appears and the safety valve will automatically reopen 30 seconds after the alarm has disappeared.



Note: A special condition is present at Flow ↑↑ if AUT QUIT is selected. After 2 minutes the safety valve will reopen and the alarm condition for Flow ↑↑ is tested. If the flow still is to high the safety valve will again close and wait 2 minutes before testing again. This will be repeated five times and hereafter the valve will remain closed until the alarm is signed for using the button  as done by MAN QUIT.

4.1.6 Remote control

The remote control has to be activated at this point before the input can be used. It needs a potential free contact at the external equipment to work.

Options

Input connected

YES / NO



Note: If the remote control function is activated the unit can no longer be turned on and off using the button . If service is required the function must be deactivated.



AQUA SYSTEM A/S

4.2 Delays

At this menu point it is possible to delay the alarm messages 0 – 15 minutes (signal horn 0 – 30minutes) permitting a short time alarm condition.

Options

Temperature ↑↑	XX min
Flow ↑↑	XX min
Irradiance ↓↓	XX min
Signal-horn	XX min

4.2.1 Temperature ↑↑

If the maximum temperature at point 4.1.1 is exceeded for less than the delay time the alarm will only be shown at the display. The alarm contact and the safety valve will not be activated.

4.2.2 Flow ↑↑

If the maximum flow at point 4.1.3 is exceeded for less than the delay time the alarm will only be shown at the display. The alarm contact and the safety valve will not be activated.

4.2.3 Irradiance ↓↓

If the irradiance at point 4.1.4 is below the minimum value for less than the delay time the alarm will only be shown at the display. The alarm contact and the safety valve will not be activated.



Note: Irradiance ↓↓ is at Chlorominator® not active.

4.2.4 Signal-horn

The signal-horn can be delayed for until 30 minutes and especially when automatic quitting for errors is chosen unnecessary activation can be avoided.



Note: If a safety valve is present and programmed to close when flow ↑↑ is exceeded a delay for signal-horn is not possible.

Reason:

The closing solenoid valve prevents the flow through the unit and thus terminates the possibility for the flow alarm to be short timed.



AQUA SYSTEM A/S

4.3 Service data

At this menu the service intervals can be programmed and furthermore the dates of service, cleaning and change of lamps can be noted.

Options

Intervals:

- Maintenance XXXXX h
- UV-change XXXXX h
- PC-change XXXXX h

Dates:

- Last maintenance XX.XX.XXXX
Accept actual date? YES / NO
- Last rinsing customer service (CS) XX.XX.XXXX
Accept actual date? YES / NO
- Last rinsing customer XX.XX.XXXX
Accept actual date? YES / NO
- UV-change XX.XX.XXXX
Accept actual date? YES / NO
- PC-change XX.XX.XXXX
Accept actual date? YES / NO

4.3.1 Intervals

In this menu the maintenance interval and lamp change intervals can be entered.

Maintenance

Maintenance interval for the unit entered in hours.

UV-change

Maximum amount of working hours for the UV-lamp.

PC-change

Maximum amount of working hours for the photochemical-lamp.



Note: Photochemical lamps are for the Chlorominator[®] only available.



AQUA SYSTEM A/S

4.3.2 Dates

This menu point is used as a protocol for dates where maintenance and lamp changes have been carried out. The “accept actual date” function writes the date at the chosen line at the display.

Last maintenance

Displays the date of when the last maintenance was carried out.

Last rinsing customer service (CS)

Displays the date of when the last rinsing performed by the customer service was carried out.

Last rinsing customer

Displays the date of when the last rinsing performed by the customer was carried out.

UV-change

Displays the date of when the last UV lamp change was performed.

PC-change

Displays the date of when the last photochemical lamp change was performed.



Note: Photochemical lamps are for the Chlorominator[®] only available.

4.4 Operation data

Operation data is used as a protocol for the UV-lamps displaying the operation times and number of times the UV-lamps has been switched on and off. This menu is not changeable.

Options

UV-Lamps

XXXXX h

On-off counter

XXXXX

4.4.1 UV-Lamps

Displays the operation time for the UV-lamps

4.4.2 On-off counter

Displays the number of times the UV-lamps has been switched on and off.



AQUA SYSTEM A/S

4.5 Basic setting

In the basic settings all parameters can be reset to the factory default for the chosen operating mode. Parameters can be saved for a later recovery.

Options

Save parameter:

Save actual parameters for later recovery?

YES / NO

Load parameter:

recover previous saved parameters?

YES / NO

Parameter default:

Recover default values of chosen operating mode?

YES / NO

4.5.1 Save parameter

When the configuration of the unit has been completed the entire configuration made in the parameter menu can here be saved.

4.5.2 Load parameter

This function reloads the configuration saved at point 4.5.1.

4.5.3 Parameter default

This function resets the unit to factory defaults for the chosen operation mode.



Note: If the function “parameter default” is used the factory default settings are loaded, not the saved parameters at point 4.5.1. The function is not reversible with “load parameter” at point 4.5.2.



AQUA SYSTEM A/S

5 Basic settings

The factory defaults that will be loaded if “parameter default” described at point 4.5.3 are used is listed below.

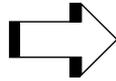
Table F-1: Basic settings			
		UV-unit	Chlorominator
Temperature sensor			
Existing	[Y / N]	Y	Y
Maximum temperature	[°C]	40	50
Restart temperature.	[°C]	38	47
Rinsing valve			
Existing	[Y / N]	N	N
Rinsing on	[°C]	38	45
Rinsing off	[°C]	36	42
Water meter			
Existing	[Y / N]	N	N
Litre/Impulse	[L/imp]	0,213	0,098
Maximum flow	[M ³ /h]	29	6
UV-Sensor			
Existing	[Y / N]	N	-
Minimum value	[W/m ²]	11,8	-
Calibration	[%]	0	-
Calibrated value	[W/m ²]	0	-
Safety valve			
Existing	[Y / N]	N	N
Safeguard operation time		02:00	02:00
Close at Temperature ↑↑		AUT QUIT	AUT QUIT
Close at flow ↑↑		AUT QUIT	AUT QUIT
Close at irradiance ↓↓		AUT QUIT	-
Close at UV-Lampe defect		AUT QUIT	AUT QUIT
Remote control			
Input connected.	[Y / N]	N	N
Delays			
Temperature ↑↑	[min]	2	2
Flow ↑↑	[min]	2	2
Irradiance ↓↓	[min]	2	2
Signal-horn	[min]	2	2
Service data			
Intervals			
Maintenance	[h]	8.760	8.760
UV-change	[h]	18.000	18.000
PC-change	[h]	-	4.500
Dates			
Last maintenance		00.00.0000	00.00.0000
Last rinsing CS		00.00.0000	00.00.0000
Last rinsing customer		00.00.0000	00.00.0000
UV-change		00.00.0000	00.00.0000
PC-change		00.00.0000	00.00.0000
Operation data			
UV-Lamps	[h]	0	0
On-off counter		0	0



AQUA SYSTEM A/S

1 Maintenance

It is possible for the user to do certain service jobs on the unit.



CAUTION!

Locale rules may forbid unauthorised persons to do certain jobs.

It is recommended, however, only to allow authorised persons from Aqua System or our authorised dealers to do the service. In this way use of proper equipment and spare parts is guaranteed.

1.1 Flushing of the unit

The flushing of the unit requires that it has been taken out of service. A flushing is carried out through following steps (the numbers refers to Figure 1 in section C1).

- Close the valves (3) and (12).
- Stop the unit. Unplug the power cable.
- Drain the unit by opening the flushing valves (5) and (6).
- Connect a flushing unit to the two flushing valves. (Aqua System can supply such a unit consisting of a container, a circulation pump and necessary hosepipe connections).
- Prepare the flushing agent in the tank. The agent can be nitric acid (3-5 %) or citric acid (50 g/litre water) or another suitable cleansing agent.



WARNING!

Nitric acid must be handled with care according to the labelling on the container.

-
- Let the acid circulate through the unit for 20-30 minutes
 - Fill the acid container with the used acid
 - Fill the UV-unit with clean water by opening valve (3) a bit with the lower valve (6) closed and upper valve (5) open. When the unit is full close valve (3) and open the lower valve (6). Empty the unit. Repeat this procedure 2 times to secure, that all the acid is out of the unit.
 - Dispose the spent acid according to local regulations.
 - Fill the unit with water as described above. Close the upper flushing valve (5) and close the valve (3) and (11)
 - Reconnect the power cable and switch on the unit.



AQUA SYSTEM A/S

1.2 Exchange of lamp

The expected lifetime of the lamp is 8000 hours or more. As long as the UV meter shows sufficient UV radiation the lamp can be used.

Exchange of the lamp requires that it have been taken out of service. The exchange is carried out through following steps

- Close the valves (3) and (12).
- Stop the unit. Unplug the power cable.
- Pull of the PVC top.
- Disconnect the lamp from the socket.
- Insert a new lamp as described at page C5.

1.3 Exchange of quartz sleeve and viton gasket

The quartz sleeve will normally last as long as the unit, unless broken accidentally. It may be removed for mechanical cleaning instead of flushing with acid. (In this case it is also recommended to remove and clean the UV measuring window).

The removal of the quartz sleeves takes place using the description at page C3 backwards. Refitting is as described at page C3. The UV light will gradually destroy the viton gasket. If it has become hard, it must be replaced.

NOTE!



It can cause some difficulties to de-mount the quartz tube, if it has been in the unit for a long time. Our authorised staffs have a special tool to pull out the quartz tube.

1.4 Re-calibration of UV sensor

Due to the high energy in the UV light, the sensing element (SiC-diode) in the UV sensor will be gradually changed and therefore the sensor must be re-calibrated with intervals. It is recommended to control the sensor once a year by comparison of the reading of the UV sensor with a calibrated reference instrument. Our authorised dealers can do this. If the sensor needs re-calibration, it will be exchanged by another sensor, which has been re-calibrated in an authorised workshop.



AQUA SYSTEM A/S

1 Water transmittance and capacity

The capacity of the unit depends on the transmittance τ of the water for UV light with the wavelength 254 nm.

1.1 Radiation dose

The radiation dose (measured in J/m^2), necessary for inactivating different types of bacteria, virus and spores varies a lot. Spores for example needs a higher radiation dose than most of the bacteria. Because of this the demands for radiation doses used for drinking water varies from country to country.

The capacities in the table below are based on the German regulations for disinfection of drinking water, which demands 400 J/m^2 as radiation dose.

In some cases this radiation dose will not be sufficient to obtain the wanted reduction in e.g. spores in re-cycling water in greenhouses. Please contact Aqua System A/S or our authorised agent to get the right dimensioning of unit.

1.2 Transmittance

The transmittance of the water can be measured with an UV spectrophotometer. (It is necessary to specify the length of the measuring cuvette used. 10, 50 or 100 mm measuring length is commonly used. The corresponding transmittance is designated $\tau(10)$, $\tau(50)$ and $\tau(100)$ respectively.

It is not possible to estimate the UV-transmittance of the water with the eye. Certain dissolved substances will not be visible but will reduce the UV transmittance substantially.

As a rough guideline it can be assumed that drinking water will have $\tau(10)=0,9$ or higher. The AQS-UV L units are to be used for water with lower transmittance.



AQUA SYSTEM A/S

1 Technical specifications

1.1 Dimensions and Capacities AQS-UV L Mn/200

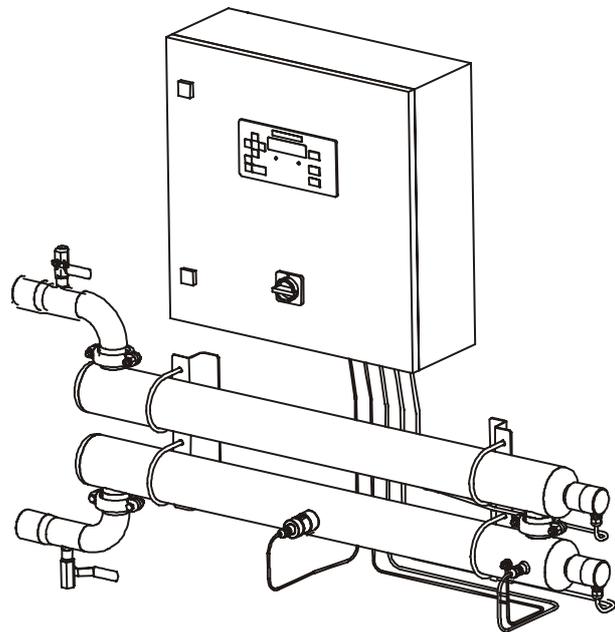
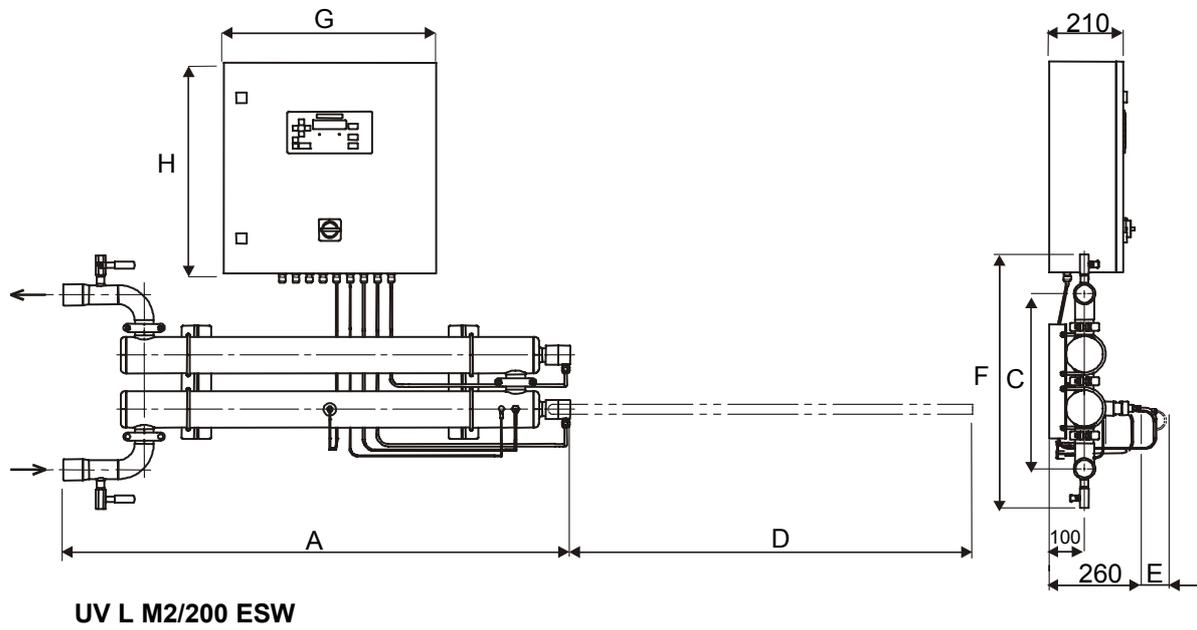
UV reactor type		LM2	LM3	LM4	LM5	LM6	LM7	LM8
Article number wall mounted (code ESW)		30007802	30007803	30007804	30007805	30007806	30007807	30007808
Article number unit mounted (code ESU)		30008002	30008003	30008004	30008005	30008006	30008007	30008008
Inlet and outlet connections	BSP	2"						
Flushing- and test cocks	BSP	1/2"						
Length	A mm	1432						
Horizontal dist. inlet – centreline outlet	B mm	0	1506	0	1506	0	1506	0
Vertical dist. centreline inlet – outlet	C mm	499	654	809	964	1119	1274	1429
Space for exchange of lamp	D mm	1150						
Space for exchange of UV-sensor	E mm	80						
Height wall mounted (code ESW)	F mm	723	878	1033	1188	1343	1498	1653
Height unit mounted (code ESU)	F mm	1831						
Control box width	G mm	600	600	600	600	760	760	760
Control box height	H mm	760	760	760	760	760	760	760
Total volume of reactors	Litre	18	27	36	45	54	63	72
Operation weight wall mounted	Kg							
Steel quality UV-reactor		AISI 316L, W1.4404						
Material quartz sleeve		Pure quartz						
Material rubber gasket		Viton rubber						
Max. Operating pressure	kPa	1000 (10 bar)						
Test pressure	kPa	1300 (13 bar)						
Max. differential pressure	kPa	20	40	60	80	100	120	140
Water temperature range	°C	15-40						
Max. Ambient temperature	°C	25						
Electrical connection	V, Hz	230 V, 50 Hz						
Electrical power consumption	W	360	530	700	870	1040	1210	1360
Capacities Q [m ³ /h] As a function of water transmittance At radiation dose 400 J/m ²	$\tau(10)=0,8$	10,2	17,4	26,2	36,4	45	54	61
	$\tau(10)=0,7$	6,9	12,7	20,1	29,0	35,9	43	49
	$\tau(10)=0,6$	4,6	9,2	15,3	22,9	28,6	34,7	39,6
	$\tau(10)=0,5$	3,0	6,6	11,6	18,0	22,6	27,6	31,5
	$\tau(10)=0,4$	1,9	4,7	8,7	14,0	17,7	21,7	24,8

1.2 Spare parts

UV lamp	07220390
Quartz sleeve	07020022
Viton gasket	07606005
Sealing paste	07905800
Compression ring	07601100
UV sensor	20000100
Electronic ballast	25096038

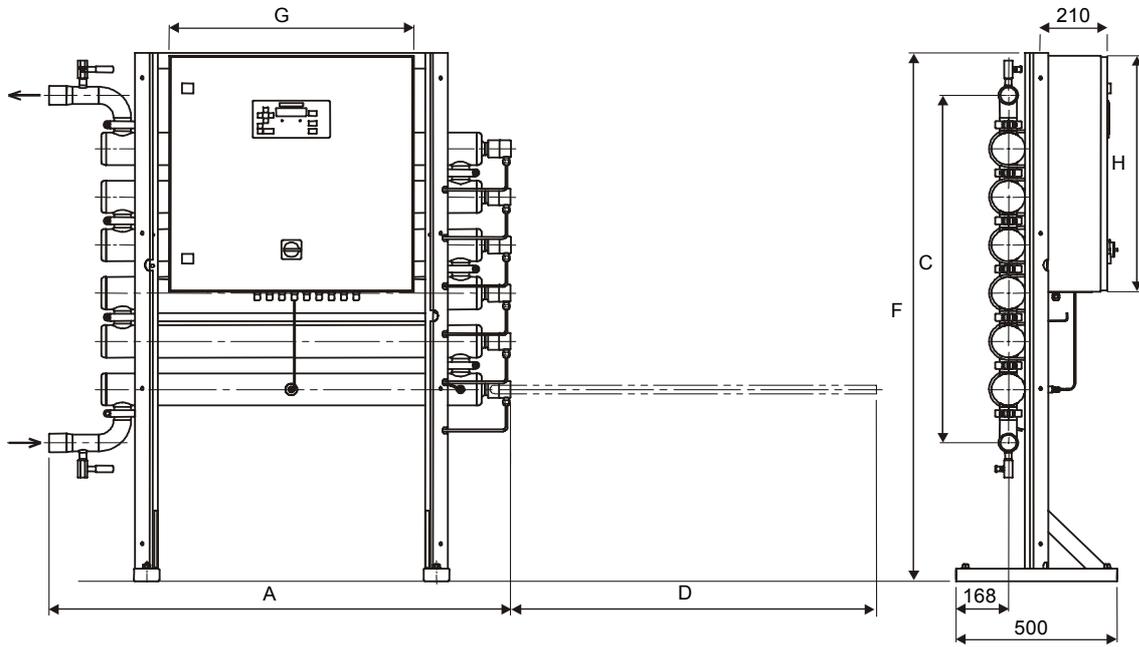


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UV L M6/200 ESU

