

Operating Instructions



HP-120i

Version 2.0

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1 Symbol Overview



Meaning:
Non-observance of the mentioned instructions can result in injuries of the user.



Meaning:
Non-observance of the mentioned instructions can result in damages of the equipment.



Meaning:
The instructions must be observed for the regular operation.

*

Optional functions, which are not available for every device

2 Modification History

Version	Date	Changed by	Modifications
2.0	25.05.2016	Paravia	Control adjustment

3 Function Overview

The UV point source HP-120i is a microprocessor-controlled, reliable and economical “cold” light source for the irradiation of highly intensive UV-A radiation and blue light. The heat input into the material is minimized by the lack of ineffective red and near infrared radiation. The point source uses a light conductor in different configurations for the flexible irradiation of one or more points. Depending on the configuration of the light conductor, UVA irradiances of up to 15,000 mW/cm² are being achieved. In order to reach an equal irradiation, the lamp output is stabilized.

The irradiation period can be set by a digital timer with a time resolution of 0.1 s. via an external contact, the shutter can be operated via a foot switch or a system control. The following components are supplied:

- UV point source HP-120i
- Lamps
- Power supply cable
- Contact plug
- This documentation

4 Purpose

The HP-120i is a high intensity light source with a mercury lamp and a light conductor for the curing of UV adhesives and casting compounds.

5 Proper Use

A high-energy UV radiation is generated during operation.

Operation of the HP-120i is only authorized in a dry environment. The surface-mount position is horizontal.

At the output of the light conductor, an extremely high irradiance is reached, which can ignite inflammable material during a continuous irradiation. Remove inflammable material and pay attention to the irradiation period and the temperature of the material.

Before opening the system, please disconnected it from the mains and check that no voltage is applied.

Wear protective gloves for the maintenance, cleaning and replacement of UV lamps.

The system must not be cleaned while in operation.

Any other use than the one described above results in damage of this product. Furthermore, this involves the risks of short circuits, fire and electric shocks. The entire device must not be changed and/or modified! It is mandatory to observe the safety notes.

6 Safety Information

6.1 General

Low voltage equipment, such as the HP-120i, can generally have dangerous live parts and hot surfaces. All transportation, installation, commissioning, retracting, maintenance and service works must be performed by respectively trained and responsible, qualified personnel (according to EN 50110-1 (VDE 0105-100); IEC 60364). Inadequate conduct can result in injuries or damages.

6.2 Intended Use

The devices are exclusively intended for the industrial use. They meet the harmonized standards of the EN 60034 Series (VDE O53O). It is forbidden to use the devices in explosive environments.

- Installation, commission, operation, maintenance, and servicing must only be performed by respectively trained and skilled qualified personnel, who observe all safety regulations and standards.
- Responsibility: Damages, which result from unintended or unauthorized interventions, terminate each right to make any warranty or responsibility claims against the manufacturer.
- Warranty exclusion: Using any non-original parts will void this warranty.
- Environmental protection: Defect parts, which contain substances harmful to the environment, must be disposed respectively.

6.3 Radiation Safety

- The HP-120i contains a lamp which emits UV-A radiation, UV-B radiation and visible light. Please handle it in accordance with the safety regulations for UV radiation.
- UV radiation is invisible! The possibly visible light is only luminescence, which is stimulated by the UV. This luminescence is usually much weaker than the stimulating UV!
- UV radiation can cause cataracts in the eye lens and retinitis. Always wear appropriate UV safety glasses when operating the device. UV radiation also causes skin discoloration and skin aging. Please wear the appropriate clothing, protective gloves and/or sunscreens depending on the radiation dose. The UV irradiance of the device is several hundred times stronger than those of sunlight!

The HP-120i has been classified in risk group 3 in accordance with DIN EN 62471:2009-03 "Photobiological safety of lamps and lamp systems." Please also consider your national safety regulations.

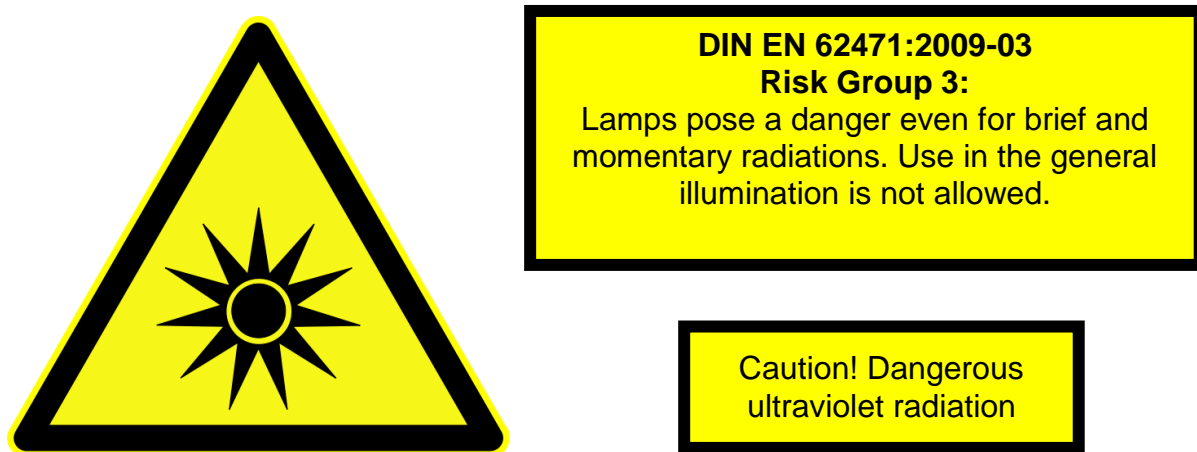



Figure 1: Safety information

6.4 Occupational Safety and Health - Notes

The risk evaluation of the workplace is in the responsibility of the client. For this, measurements/assessments in accordance with DIN EN 14255-1:2005-06 “Measurement and assessment of personal exposures to incoherent optical radiation – Part 1: Ultraviolet radiation at the workplace emitted by artificial sources” are necessary.

The DIN 14255-1 itself does not contain any limits. These are given in the directive “2006/25/EG of the European Parliament and the Council on the minimum health and safety requirements regarding the exposure of workers to risks arising from physical agents (artificial optical radiation)”.



There is a risk of photochemical or thermal damages to the eye, retinal damages and erythema. The operating personnel must be appropriately trained.

For the protection of the operating personnel, do not look into the radiation and do not expose the skin to UV radiation.

6.5 Occupational Safety and Health - Tips

The main emission of the HP-120i is the UV-A radiation. According to the directive “2006/25/EG” the limit for the UV-A radiation is 10^4 J/m². For a daily working time of 8 hours, this equals a continuous irradiance of 0.035 mW/cm².

Use a radiometer for measuring the irradiance. For short works on the system, the maximum irradiance can be higher. Example:

Scope of work: Daily cleaning

Duration: 10 min

Exposure dose: HUVA = 10^4 J/m².

Irradiance: 1.68 mW/cm².

The system should be designed in such a way that the irradiance, with regard to the duration of the work, does not exceed the exposure dose. Systems should always be checked if they expose the workers to a continuous radiation of more than 1-2 mW/cm². The following illustration shows the irradiance depending on the distance to the light conductor.

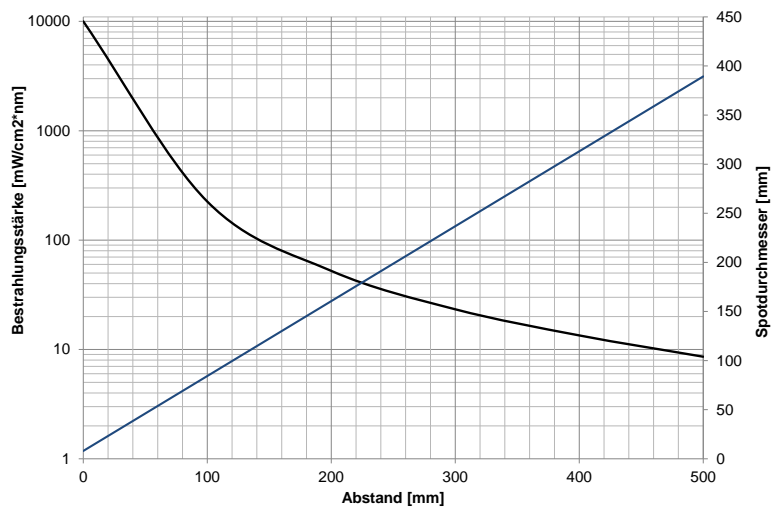


Figure 1: Irradiance and spot diameter vs. distance

6.6 Important Notes



Prior to commissioning and operation read the operating instructions completely.



Before opening the HP-120i disconnect it from the mains and check that there is no voltage applied.



The HP-120i is equipped with a high performance UV lamp. There is a risk of photochemical or thermal damages to the eye, retinal damages and erythema. The operating personnel must be appropriately trained. Recommended protective equipment:

- UV-absorbing protection gloves
- UV safety glasses
- If necessary, colored safety glasses to protect from bright light
- Non-fluorescent clothing

Do not expose skin and eyes to UV radiation!
Avoid reflections of the UV radiation into the eyes!



Skin lipids and dirt are absorbing in the UV spectral range. Avoid fingerprints on the optical window. If necessary, the components must be cleaned thoroughly with Isopropanol.



The mercury lamp used in the HP-120i cannot be re-ignited in a still hot condition. After switching the lamp off, let it cool down for at least 5 minutes until you re-ignite it.

7 Commissioning

7.1 Installation

Unpack all components and remove the packaging material.

Operate the HP-120i with 100-120VAC and/or 200-240 VAC with a frequency of 50/60 Hz. Connect the HP-120i with the mains voltage.

For the operation of the system close an earth contact, called INTERLOCK, potential-free. The operator is required to monitor the earth contact (see Interface Assignment).



When closing the Interlock contact, the operator must ensure an adequate protection of the employee or other persons. Please note that for the adherence to the exposure limits, effective protective measures are necessary.

By applying the INTERLOCK signal the operator confirms that all necessary protective measures for the protection of the operating personnel from direct and reflected UV radiation have been taken and are effective.

If necessary, connect the optional trigger input according to the interface assignment.



If necessary, connect the optional trigger output according to the interface assignment.

Connect the light conductor with the HP-120i. For this purpose, insert the end of the light conductor with the groove into the light source, as shown in figure 2.



Figure 2: Inserting the light conductor

The light connector is automatically locked. Bring the other end of the light conductor in the desired position with regard to the parts to be irradiated.



An appropriate ventilation of the HP-120i must be ensured at any time in order to avoid a thermal overheating. Please pay special attention to the fact that during operation the rear ventilation holes must not be covered and that an adequate cooling is ensured.

Please wear appropriate UV safety glasses. Gloves and long-sleeved clothing shall be worn, when you hold the light conductor or other parts in your hands.
Never look into the ray and never irradiate your skin directly!



Close the interlock only if an adequate cooling and personal protection are ensured.

The interlock is not intended for switching the HP-120i. For this purpose use the trigger input.

8 Technical Data

8.1 General Data

Ambient temperature	+5 to 40 °C
Storage temperature	-10 to +60 °C
Humidity	< 80%, non-condensing
Surface-mount position	horizontal
Configuration, control electronics	Table device
Dimensions, control electronics	36 x 34 x 14 cm
Max. housing temperature	<60 °C
Cooling	Air cooling
Display	Graphic display, 128 x 64 px

8.2 Mains Connection and Connections

Mains voltage and frequency	100-120VAC / 200-240VAC / 50/60 Hz
Input power	~ 150 W
I/O connection (optional)	Phoenix Contact MC 1,5/15-STF-3,81 Order number: 18 27 83 9

8.3 Lamp

Order designation	HP120W/45-UV
Lamp current	1,4 A
Lamp output	120 W
Voltage range	60 – 90 V
Ignition voltage	2 x 10 kV, symmetrical
Service life	typical 2000 h The economic service life depends on the mode of operation (ignitions, cooling and contamination) and can possibly be shorter.

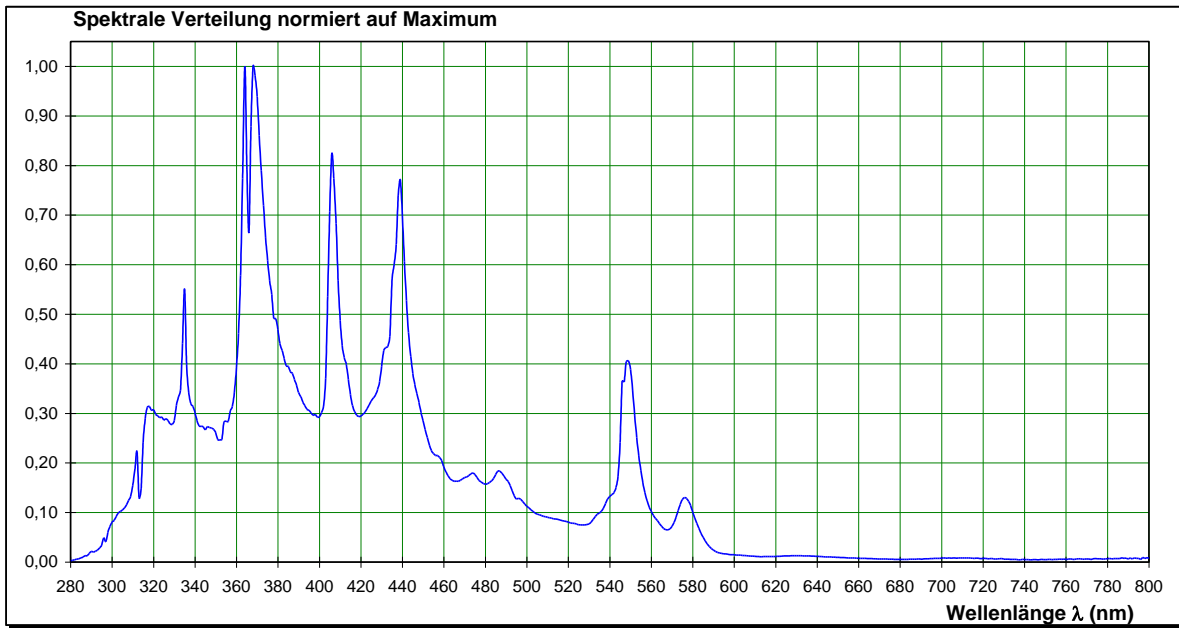
8.4 Password & Service

Password	7243
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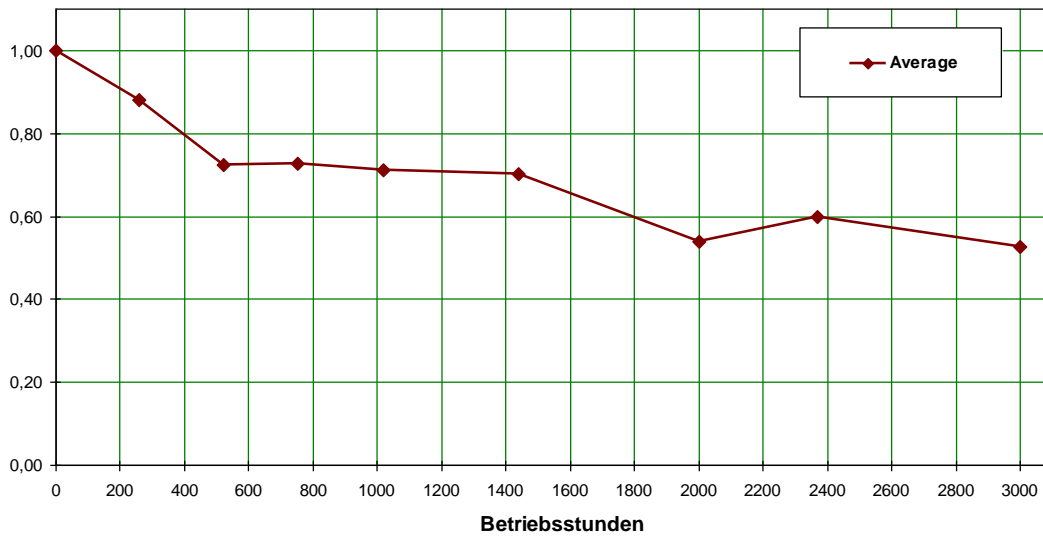


The password is needed to reset the operational hours and to end the slave mode.

8.5 Lamp Spectrum



8.6 Lifetime of the lamp



8.7 Interface Assignment

Interface, rear control	Signal	Function
Pin 1	Interlock Out (24V)	Interlock / safety circuit
Pin 2	Interlock In (24V)	
Pin 3	+24 V	Aux. voltage (max. 50 mA)
Pin 4	Reference Mass	
Pin 5	Status Lamp OUT	24 V = ON
Pin 6	Status Shutter OUT	24 V = open
Pin 7	Status Error OUT (24V)	An error (24 V) in the system is signaled by a high signal on this pin. A sum error is displayed. The possible error causes are: <ul style="list-style-type: none"> • Lamp does not ignite • Excessive temperature at the lamp block/cluster • Fan error
Pin 8	Trigger IN (24V)	(24V = Shutter open) Slave mode, Cont. On, Timer
Pin 9	Lamp On IN (24V)	24V = ON, only active in the SLAVE mode
Pin 10-15	Not Connected	-

8.8 Optional Accessory*

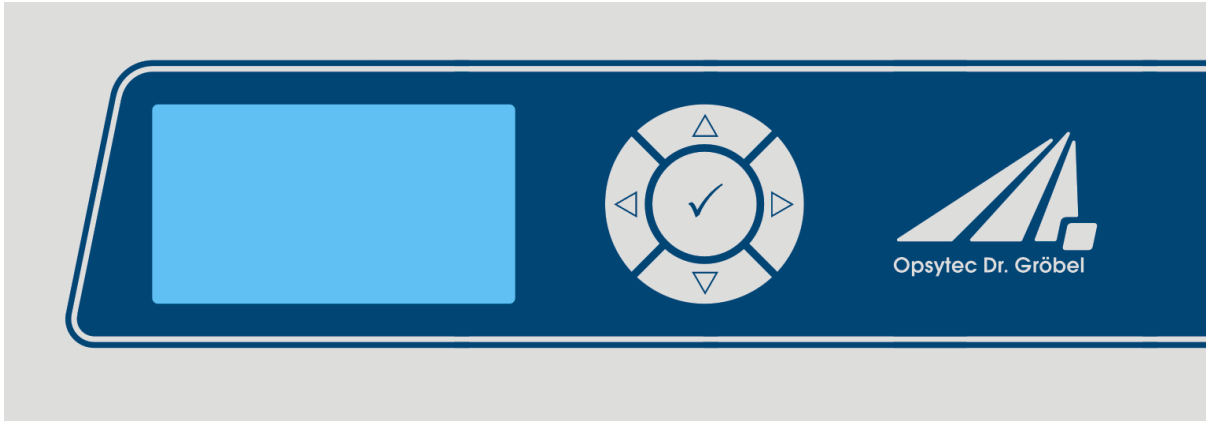
Order Number	Description
860514/FS	Foot switch
HP120W/45-UV	Spare lamp
918800	UV safety glasses

8.9 Operating Mode

“Manual” and “Continuously On”	Requirement: Only via the front keyboard and trigger input and trigger output (only shutter)
Timer, setting “Trigger”	Applying the trigger (“positive edge”) starts the irradiation with the set duration. After the irradiation time has exceeded, the irradiation ends. Another trigger also ends the irradiation.
Timer, setting “Trigger + Hold”	Applying the trigger (“positive edge”) starts the irradiation with the set duration. A negative edge at the input ends the irradiation.
Slave	In the slave mode, the trigger input is active and the shutter opens, if a trigger signal is applied.

9 Operation

The HP-120i is operated via five buttons, which are arranged on the right side of the display. The buttons and functions are illustrated below:

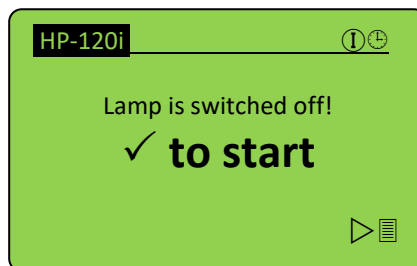


Button	Function
▽	Down
△	Up
◁	Left
▷	Right
✓	Confirm / OK

After switching on, the start logo appears followed by a short initialization sequence.



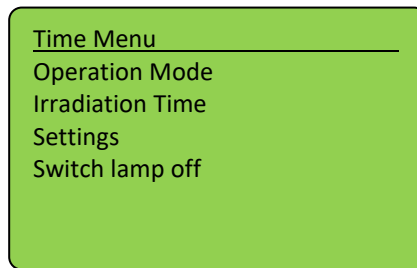
After a few seconds the device is in standby mode and the status screen is displayed.



In the status screen, the lamp status, the internal or external control and error messages are displayed. In the upper right corner, the status is displayed with the following meaning:

- ⏻ Lamp On
- ⏻ Lamp Off
- ⌚ Timer Mode
- ⌋ Continuous Operation
- S Slave Mode

With the button ▷ you enter the main menu:



In the main menu and all other menus, select the active menu item by using the buttons ▾ and △. With ✓ you confirm the selected menu item. With ◀ you return to the previous menu.

The selected menu item has a black background and is displayed in an inverted way.

The menu items in the main menu depend on the settings. That means, e.g. the menu item “irradiation time” is only displayed when the respective mode “Timer” has been selected / the lamp is active.

9.1 Switching the lamp on

After the initialization the lamp can be switched on from the status screen by pressing the button ✓. Afterwards the ignition sequence is initialized. A warm-up phase follows the ignition of the lamp. During that time irradiations are impossible.



When the lamp is switched on, the button ✓ automatically controls the shutter.

9.2 Switching the lamp off

Switch off the lamp as follows:

- With the button ▷ select the main menu.
- Now the lamp can be switched off via the menu item “Switch lamp off” with the button ✓, confirm with◁.

A cooldown phase with maximum ventilation follows. This serves for a quick cooldown of the lamp.



In order to avoid a thermal overheating, the fan keeps running for about a minute after the lamp has been switched off. Switching the lamp back on during that time is impossible.

Do not switch off the HP-120i during that time.

Re-igniting the lamp after a cooldown phase of 5 minutes is then possible again.



You can also switch off the lamp by pressing the button ◁ for some time.

After the cooldown phase you can switch off the point source with the power switch on the backside of the device.

9.3 Operating Mode

The HP-120i has four operating modes, which can be changed in the menu “Operating Mode”:

Operating Mode:

Timer
Manual
Cont. On
Slave

Depending on the operating mode, the operating options are as follows:

Mode	Front, buttons		Rear, interfaces	
	Switch lamp on	Open shutter	Switch lamp on	Open shutter
Cont. On	active	active	blocked	active
Manual operation	active	active	blocked	active
Timer	active	active	blocked	active
Slave	blocked	blocked	active	active

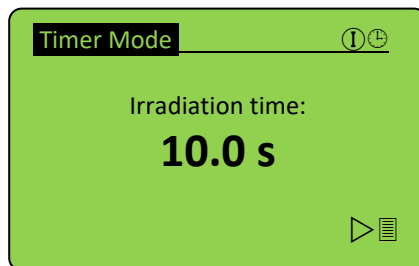
Select the operating mode in the main menu:


- In the mode “Cont. On”, the shutter opens after pressing the button ✓ quickly. Pressing the button ✓ once again will close the shutter.
- In the mode “Manual Operation” the shutter is open as long as the button ✓ is pressed. The same applies for the shutter input.
- In the mode “Timer” the shutter is controlled by the timer. With the button ✓ the shutter is started and stopped. See also the settings of the trigger functions.
- In the mode “Slave” the front buttons are locked.

By pressing ◀ you return to the main menu. By pressing ◀ once again you navigate to the status screen.

9.3.1 Irradiation Time (only in Timer mode)

In the menu “irradiation time” the irradiation time for the timer mode can be set. Here you can select the decimal with the buttons ◀ or ▶ and set the time with the buttons △ or ▽ to the desired value. Confirm with OK (✓) in order to return to the main menu.





Tip: In the operation mode “Timer”, the irradiation time can be changed in the status screen with the buttons ▽ and △.

With◀, you return to the main menu. By pressing ◀ again, you navigate to the status screen.

9.3.2 Slave Mode

In the slave mode the trigger input is active and the lamp is switched on if there is a signal (see chapter Technical Data).



It is possible to cascade any number of HP120i's.

Use one HP120i as a Master and all the others as Slave. Connect the trigger output of the Master with the trigger input of the first Slave device. With more than 2 devices, connect the trigger output of the Slave with the trigger output of another Slave device.

In the slave mode the lamp cannot be switched on via the display.

The slave mode is only stopped after entering the password.

9.4 Settings

9.4.1 Settings, trigger function

This menu item enables the setting of the trigger function in the timer mode. Here you have the following options:

Trigger*	Applying a trigger (“positive edge“) will start the irradiation for the set duration. After the irradiation time has expired the irradiation stops. Another trigger stops the irradiation.
Trigger + Hold (Standard)	Applying a trigger (“positive edge“) will start the irradiation for the set duration. A negative edge at the input stops the irradiation.

9.4.2 Settings, language

The menu languages German and English are available. The setting can be done in the menu “Settings”, then select “Language”.

9.4.3 Settings, version

The firmware version and the maximum reached temperature are displayed at the lamp block.

9.4.4 Settings, operating hours

The operating hours and the number of ignitions since the last lamp replacement are displayed.

With ✓ you can reset the operating hours and the number of ignitions.

With ◀, you navigate to the main menu without any changes.

9.4.5 Settings, temperature display

The temperature display in the status screen can be switched on and off.

9.4.6 Settings, internal

Password-protected functions for the maintenance by the manufacturer.

10 Handling of Lamps

Prior to replacing the lamp, please read the safety regulations which are enclosed with the lamp.

10.1 Handling of lamps in a cold state

- Cold lamps have no gas overpressure and can be handled without any problems.
- The lamp can be touched at the outer surface of the reflector and at the ceramic parts.
- Do not contaminate the lamp bulb (discharge bulb) and the internal surface of the reflector with fingerprints, grease stains or other dirt. Prior to using the lamp, please remove possible contaminations with Isopropanol or ethanol, or with other appropriate agents that do not leave any residues on the bulb. During cleaning please take care not to break out the lamp bulb and not to tear off the auxiliary ignition wire, which is wrapped around it.



When replacing the lamp, wear safety gloves.

- The lamps contain mercury. If the lamp breaks, it can be released into the atmosphere. In this case, please proceed as described below.



Do not operate the lamp, if it shows visible breaks or tears or if the lamp bulb is loose in the reflector.

10.2 Release of Mercury

In the unlikely case that the lamp breaks up in its hot state, mercury is being released. The following precautions must be taken in that case:

- The persons in the direct proximity must leave this area immediately, so that they don't inhale any toxic mercury vapor.
- The room must be ventilated thoroughly for at least 30 minutes.
- After the lamp housing has cooled down, residues of mercury, which are trapped inside the lamp housing, must be removed with an adsorbent that is available at specialist trades for chemicals. Ideal are standard preparations, such as Mercurisorb by the company Karl Roth GmbH & Co. KG, Karlsruhe.

11 Replacing the Lamp

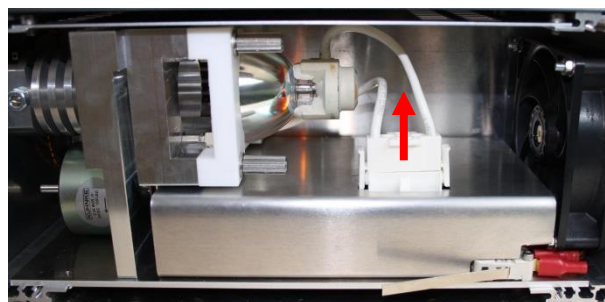
1. Switch off the device and let it cool down.
2. Disconnect the power plug from the device.



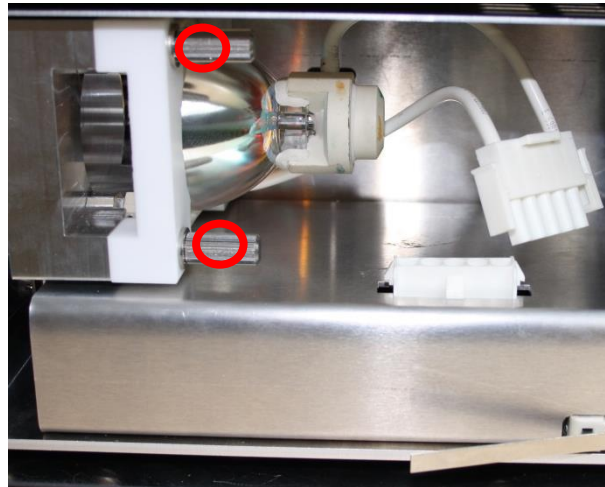
3. Loosen the four screws of the lateral housing wall (front right).



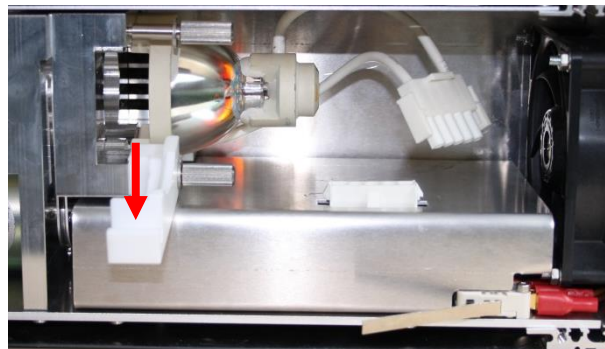
4. Remove the lateral housing wall. Now the lamp is visible in the lamp holder.
5. Loosen the lamp socket by pushing the engagement hooks slightly together.



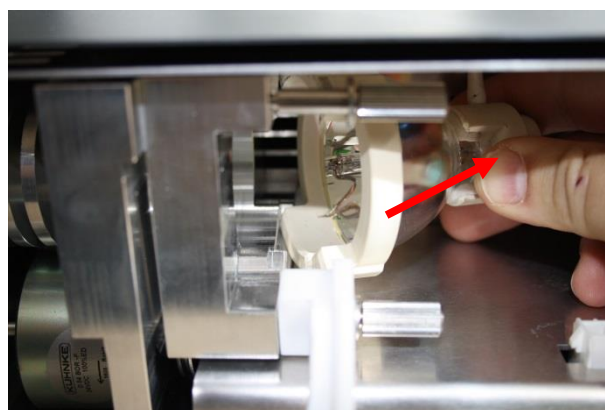
6. Loosen the two knurled screws of the lamp holder slightly, do not remove them.



7. Turn the lamp holder downwards. In doing so, hold the lamp, so that it won't fall out of the lamp holder.



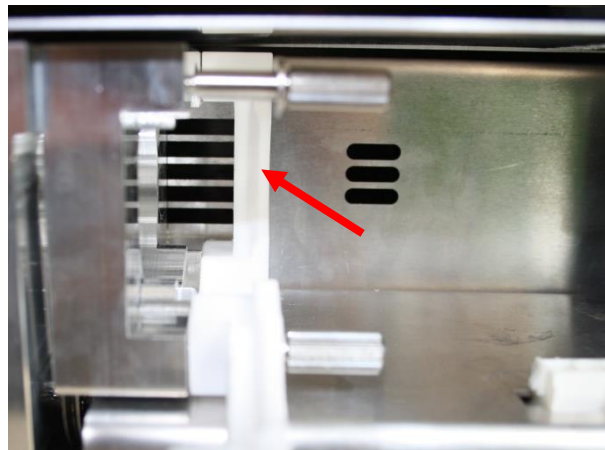
8. Take the lamp out of the lamp holder at the back. Tip: First loosen the lamp on the side facing you.



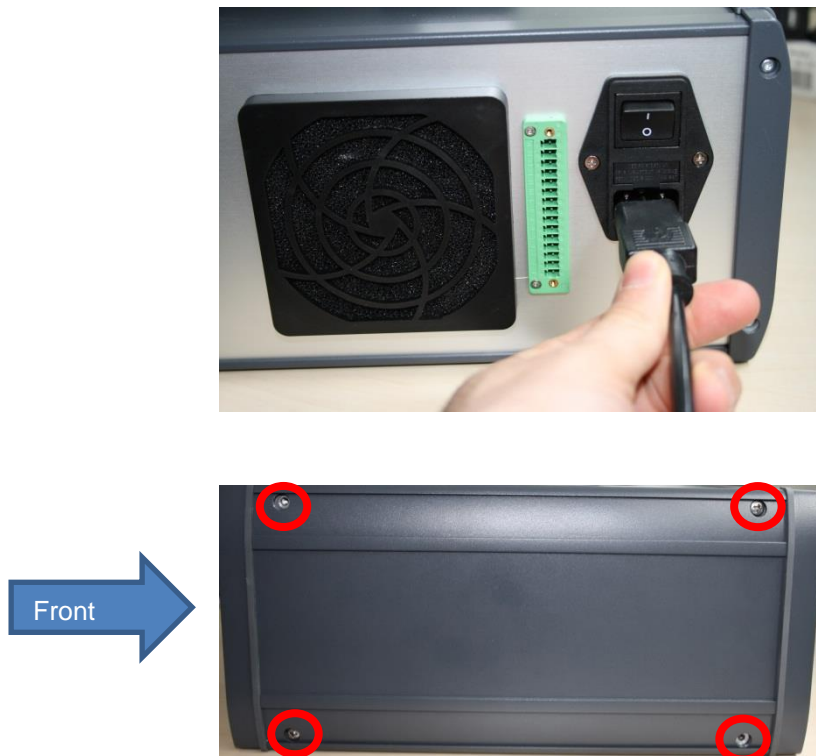
9. Take the new lamp out of its packaging. Check the new lamp for damages and dirt. Pay attention to polystyrene flakes from the packaging and remove them if necessary.
10. The groove of the new lamp must face downward. Pay attention that the groove on the front ceramic ring of the lamp fits to the marking in the housing.



11. Insert the new lamp first at the back of the holder. For this purpose, insert the lamp bulb first between the aluminum block and the rear white holder.



12. Recheck that the lamp is not tilt and that the positioning aid at the lamp block protrudes in the groove in the ceramic ring. The lamp must fit parallel on the lamp block.
13. Turn the lamp holder upwards and fix it by tightening the knurled screws. In doing so, hold the lamp so that it won't fall out of the lamp holder.
14. Plug the lamp connector with slight pressure in the socket. Pay attention to the markings of the outer contacts.
15. Reattach the housing wall. Tip: Lift up the HP-120i slightly.
16. Mount the four screws back to the lateral housing wall.



17. Reconnect the mains plug to the device.
18. Switch the device on.
19. Reset the operating hours in the menu Settings => Operating Hours.
20. Dispose of the old lamp professionally.
21. The lamp replacement is completed.

12 Spare Parts

For spare part orders please contact:

Opsytec Dr. Gröbel GmbH
Goethestrasse 17
76275 Ettlingen
Germany
Phone +49 - 7243 - 94 783 - 50
Fax +49 - 7243 - 94 783 - 65

Visit our website at: www.opsytec.de

13 Errors

The notes and error messages below are addressed to the user. The explanations shall help to ensure the appropriate operation. For this purpose, the causes and measures are indicated.

Function / Display	Meaning	Measures
Fan does not start after the power switch is switched on. Display is without any function	No mains voltage.	Switch off power switch. Check cables and connections. Check mains voltage. Disconnect the power plug and check fuse above the power switch. Check case cover for correct seat.
An Interlock error is displayed.	Interlock is not connected	Connect Interlock
Shutter does not open.	Lamp is in warm-up phase.	None. Wait until the warm-up phase has finished. The lamp is then ready for operation.
Shutter does not open.		Check, if the light conductor is installed.
Timer does not start.		Check, if the light conductor is installed.
Error output indicates an error (24V).	General error	The device has detected an error. The following sources are possible: <ul style="list-style-type: none"> • Lamp does not ignite • Fan does not reach speed • Overheating at the lamp holder
Overtemperature fault	Temperature too high at the lamp block	Clean air filters Avoid heat accumulation Do not clog the air outlet
The irradiance is too low	The lamp ages The light conductor is contaminated The light conductor is not correctly inserted	Replace lamp Clean light conductor (e.g. with ISOPROPANOL) Insert light conductor until it locks in place

14 Declaration of Conformity

We,

**Opsytec Dr. Gröbel GmbH
Goethestr. 17
76275 Ettlingen**

hereby declare that the following product

UV Point Source

type designation:

HP-120i

is developed, constructed and produced by us in sole responsibility and that the product meets the following standard(s) or directives in this declaration:

2006/95/EG

“Directive of the European Parliament and Council on the harmonization of the laws of member states relating to electrical equipment and electrical appliances designed for use within certain voltage limits (Low-Voltage Directive)”.

2006/42/EG

“Directive of the European Parliament and Council on machinery and for the modification of directive 95/16/EG (Machinery Directive)”.

The conformity of the designated product with the regulations of the directive is established by the complete compliance with the following standards:

DIN EN 60204-1: Safety of Machinery – Electrical Equipment of Machinery –
Part 1: General Requirements (IEC 60204-1:2005, modified)

Karlsruhe, 25.05.2016

Dr. Mark Paravia
Management