



**Before use, please take the time to read this datasheet and make sure you understood the advices and caution of use.**



### User security

- Do not watch directly the beam of light or through any optical instrument.
- Avoid any contact with the LEDs or its lens.
- Code IP40: protected against solid corpses larger than 1 mm and non-protected against water intrusion.
- Use the product in an environment where the working temperature is between +15°C and +45°C and there is little humid air (<80%): if those conditions are not respected the product can be damaged.
- Do not use the product in an environment where smokes and oil vapors are present.
- Never try to repair by yourself any potential damages on the product.
- Make sure to use the right power supply before connecting the product.
- Do not reverse the electrical polarity – check your connections and the conventions before turning on the product.
- Make sure you have the correct connector to link the product to the power supply.

**Any incorrect use cancels the warranty.**

## Table of contents

<b>User security</b>	1
<b>Eyes &amp; Skin Safety</b>	3
<b>Legal obligations</b>	4
<b>Possible damages on health</b>	4
<b>Protective equipment</b>	5
<b>Technical Overview</b>	8
<b>Product reference</b>	9
<b>Mechanical dimensions</b>	10
<b>How to use: with a power supply</b>	14
<b>How to use: with a PLC</b>	15
<b>Signals</b>	17
<b>Accessories</b>	18



## Eyes & Skin Safety



UWAVE products come under the standard DIN EN 62471:2008 which classified sources of optical radiation into risk groups subject to their potential photo biological hazard. Due to the emission of high UV irradiation, our products belong to Risk Group 3 (hazardous even for momentary exposure) therefore special safety measures, detailed in the following, must be observed.



To protect the eyes and skin staff everyone in the area must wear **protective equipment**. Protective **goggles** should comply with the standard EN 170 (Personal eye-protection - Ultraviolet filters - Transmittance requirements and recommended use). The goggles must protect eyes against direct and side irradiation.



Don't look directly at the product's output window because of a risk of becoming blind. Don't expose skin too long without protection to avoid skin burning or cancer.



Due to the high emission power, the area near the LEDs can reach high temperature during operation. Avoid touching directly the product and especially the output window.



## Legal obligations

Under the law at present, workers' exposure must be lower than the Exposure Limit Value (Directive 2006/25/EC of the European Parliament). Depending on the wavelength of the product and the body part insolated, **Limit Values are summarized in the tables below:**

	Eye	Skin
Wavelength	315 – 400 nm (UVA)	180 – 400 nm (UVA, UVB, UVC)
Exposure Limit Value	10 000 J/m <sup>2</sup>	30 J/m <sup>2</sup>

### Case study with a LED at 365 nm with an Optical Power of 10 mW/cm<sup>2</sup>:

For the **eyes**, the maximal exposure time ( $\Delta t$ ), the Exposure Limit Value ( $ELV$ ), and the Optical Power ( $P$ ) of a UV product are linked by the formula:

$$\Delta t = \frac{ELV}{P}$$

For **skin**, the Optical Power is normalized by skin's sensitivity factors for each wavelength.

The maximal exposure time per day is calculated below:

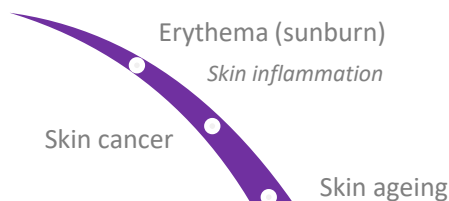
	Eyes	Skin
Optical Power (normalized for skin)	10 mW/cm <sup>2</sup>	4,7 μW/cm <sup>2</sup>
<b>Maximal exposure time per day</b>	<b>1 min 40 s</b>	<b>12 min</b>

Therefore, with a UV product with an optical power of 10 mW/cm<sup>2</sup>, the Exposure Limit Value per day is **reached in 2 minutes for eyes and 12 minutes for skin** without any safety equipment. Therefore, protective equipment is needed.



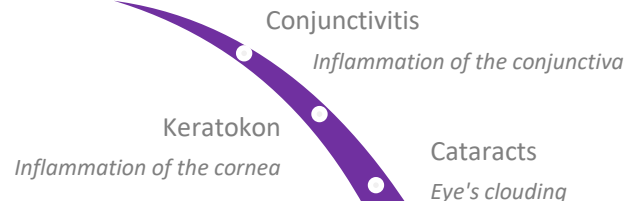
## Possible damages on health

### Effects on skin along unprotected UV exposure



**Burning, inflammation, chronic diseases**

### Effects on eyes along unprotected UV exposure



**Visual strain, inflammation, blindness**



## Protective equipment



### Eyes protection



**Safety goggles** prevent UV damages to eyes.

REF: UGLASS-02

- Certified NF EN 170 absorbing 99,9% of UV radiation and visible light up to 532nm
- Protect against side irradiation
- Resist to chemical products and scratches

**Beyond 2 minutes per day of eye UV LED exposure at 10 mW/cm<sup>2</sup>, protective goggles are necessary according to the European Directive 2006/25/EC.**



**Safety face shield** prevents UV damages to eyes and skin's face.

REF: UMASK-01

- Certified NF EN 170 absorbing 99,9% of UV radiation and visible light up to 400nm
- Protect against side irradiation
- Resist to scratches

**Beyond 12 minutes per day of face UV LED exposure at 10 mW/cm<sup>2</sup>, protective mask is necessary according to the European Directive 2006/25/EC.**



## Body protection



**Safety gloves** prevent UV damages to exposed skin.

REF: UGLOVE-01

- High protection against UV radiation
- Resist to chemical products and scratches

**Beyond 12 minutes per day of hands UV LED exposure at 10 mW/cm<sup>2</sup>, protective gloves are necessary according to the European Directive 2006/25/EC.**



**Safety jacket and trousers** prevent UV damages to exposed skin, especially arms & legs.

- Certified UPF 50+ absorbing more than 90% of UV radiation
- Durable and resistant

REF (jacket): UJACK-01

REF (trouser): UTROUS-01

**Beyond 12 minutes per day of arms & legs UV LED exposure at 10 mW/cm<sup>2</sup>, protective clothes are recommended according to the European Directive 2006/25/EC.**



**Protection suit** prevents UV damages to entire body, especially neck.

REF: USUIT-01

- Certified UPF 50+ absorbing more than 90% of UV radiation
- Resist to chemical products

**Beyond 12 minutes per day of neck UV LED exposure at 10 mW/cm<sup>2</sup>, protective suit is recommended according to the European Directive 2006/25/EC.**



## UV source isolation



**UV shields** are protective windows which isolate the UV insulated zone to protect all workers around.

They are made to measure to fit with your constraints.

REF: USHIELD-01

**Beyond 2 minutes per day of eye UV LED exposure and 12 minutes of skin UV exposure** at 10 mW/cm<sup>2</sup>, protective shields are necessary to protect staff without safety equipment according to the European Directive 2006/25/EC.



## Warning stickers



**Warning stickers** inform workers of radiation danger and invite them of wearing protection equipment. They are available in 3 sizes:

- 55 mm x 25 mm
- 165 mm x 75 mm
- 290 mm x 130 mm

REF: USTICK-01

REF: USTICK-02

REF: USTICK-03



## Expertise

Our UV LED experts from UWAVE can come and check your production lines to:



Measure UV irradiance to **determine the maximum UV personal exposure time** compared with limits (European Directive 2006/25/EC)



Determine the most **adapted solution** to protect workers' eyes and skin.








**Contact us to get our expertise. We will find together the equipment which fits with your application.**



**Technical Overview**

The ULINE™ exists in 4 standard versions corresponding to 4 different length: 75mm, 150mm, 225mm and 300mm. However, we can provide you custom products up to 900mm long depending on your needs.

		ULINE™ 75	ULINE™ 150	ULINE™ 225	ULINE™ 300
<b>Electronics</b> 	<b>Power supply</b>	48V DC			
	<b>Illumination mode</b>	Continuous with a DIM process [0-10V]			
	<b>Connector</b>	SubD 13W3		EPIC + M12 8 pins	
	<b>Power consumption</b>	500 W	1000 W	1500 W	2000 W
<b>Optics</b> 	<b>Wavelength</b>	365 or 385 or 395 or 405 nanometers			
	<b>Irradiance</b>	Up to 16.000 mW/cm <sup>2</sup> for 385, 395 and 405 nm Up to 14.000 mW/cm <sup>2</sup> for 365 nm			
<b>Mechanics</b> 	<b>Width and height</b>	50 mm x 166 mm			
	<b>Length</b>	100 mm	175 mm	250 mm	325 mm
	<b>Material</b>	Device body: Aluminum alloy Window glass type: Quartz			
	<b>Weight</b>	1.1 kg	2.0 kg	2.9 kg	3.8 kg
<b>Thermal</b> 	<b>Cooling system</b>	Water Cooling			
	<b>Chiller</b>	Depends on your process. We will determine with you the one adapted to your needs			
<b>Environment</b> 	<b>Working temperature</b>	+15°C to +45°C			
	<b>Working Humidity</b>	< 80% for temp < 30°C			
	<b>IP Code</b>	IP40			





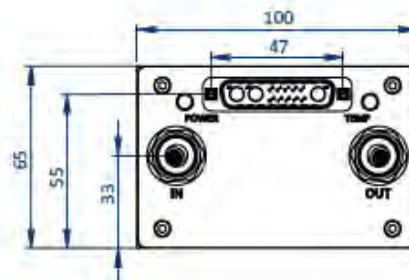
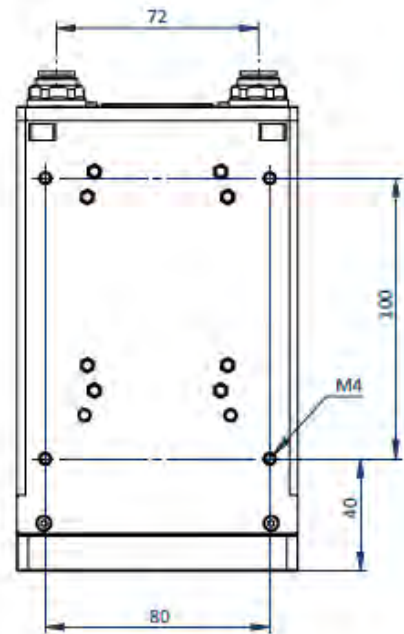
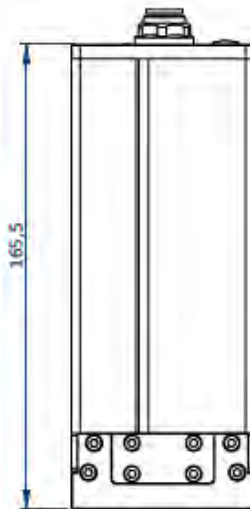
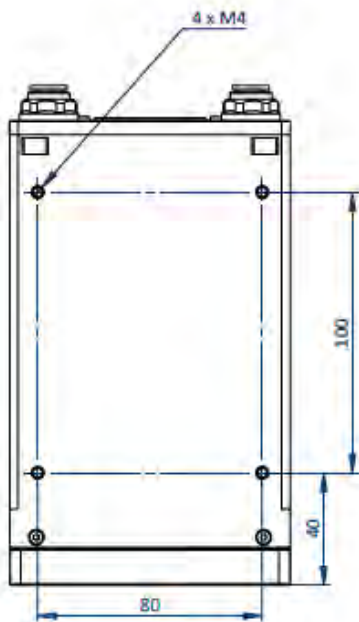
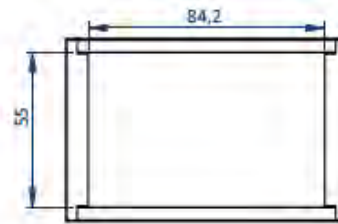
Product reference

Wavelength (nm)	Irradiance (mW/cm <sup>2</sup> )	Length (mm)
<b>XXX</b>	<b>YY</b>	<b>ZZZZ</b>
365	10	75
385	16	150
395		225
405		300

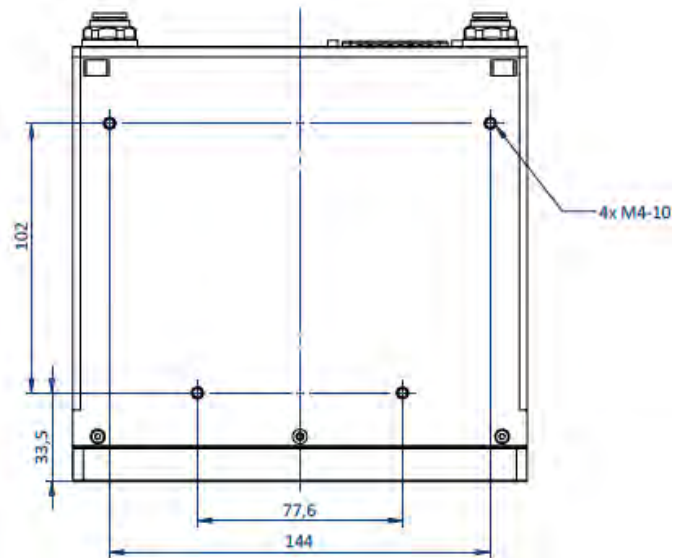
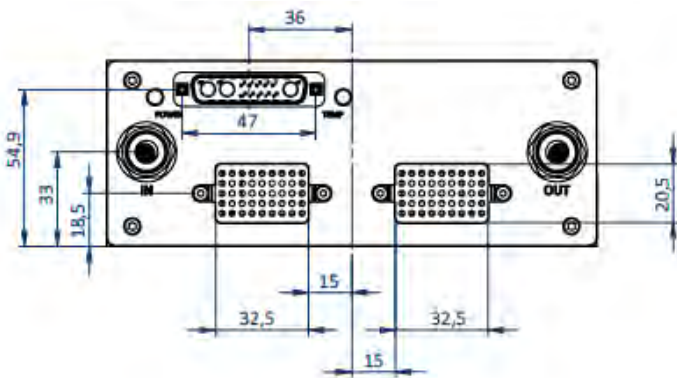
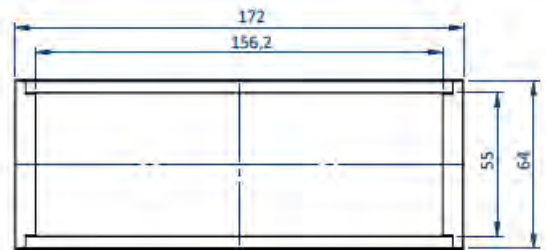
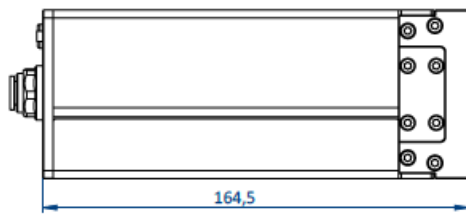
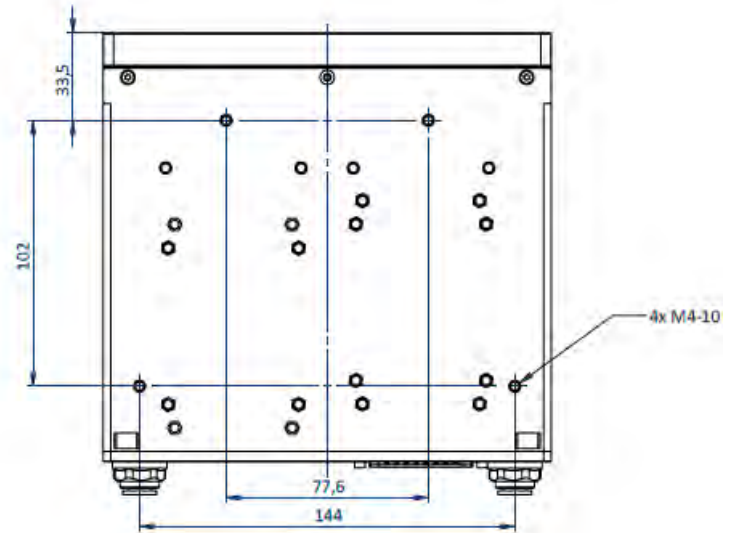
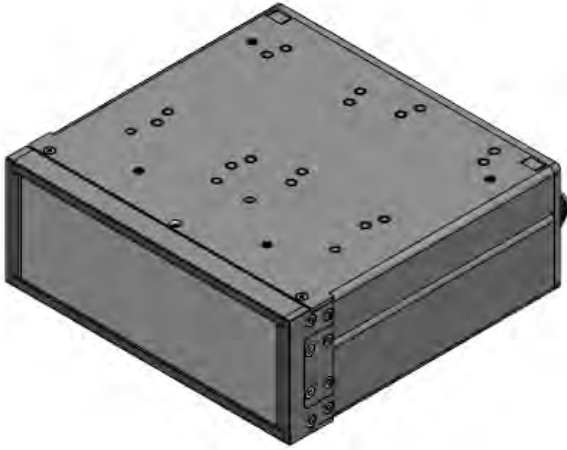


Mechanical dimensions

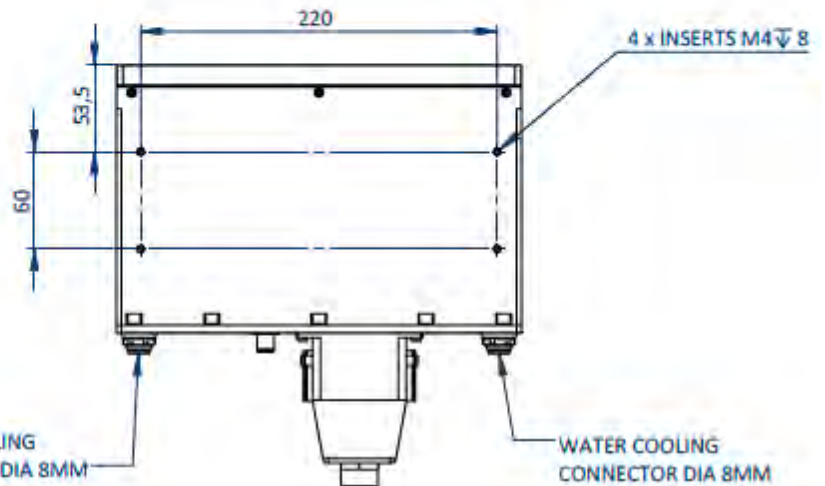
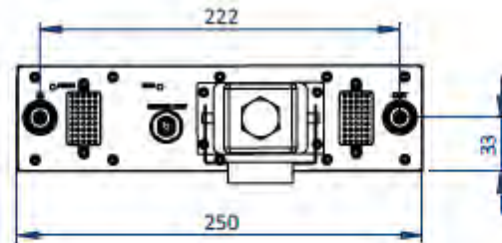
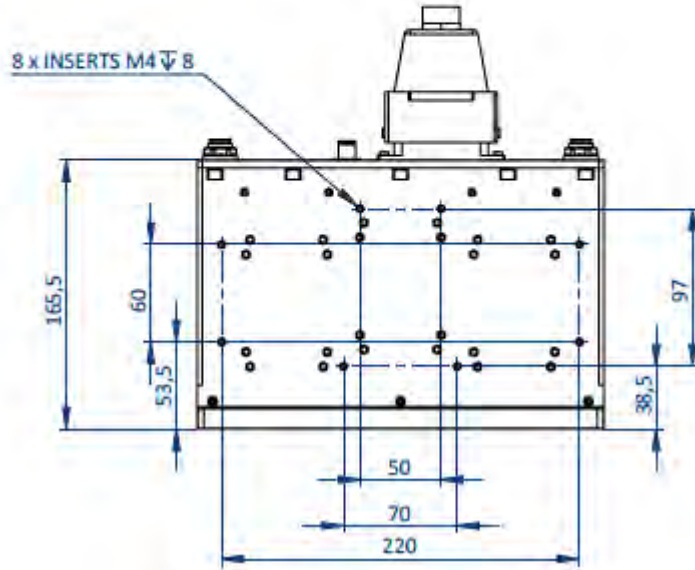
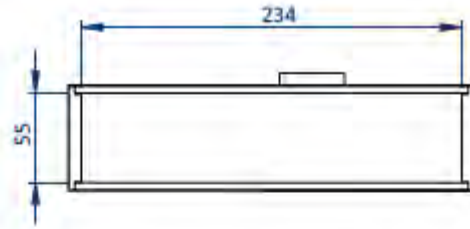
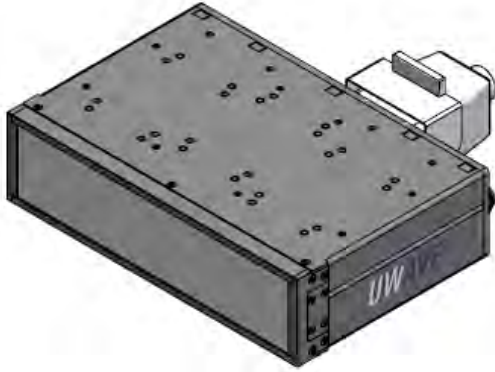
ULINE 75 mm



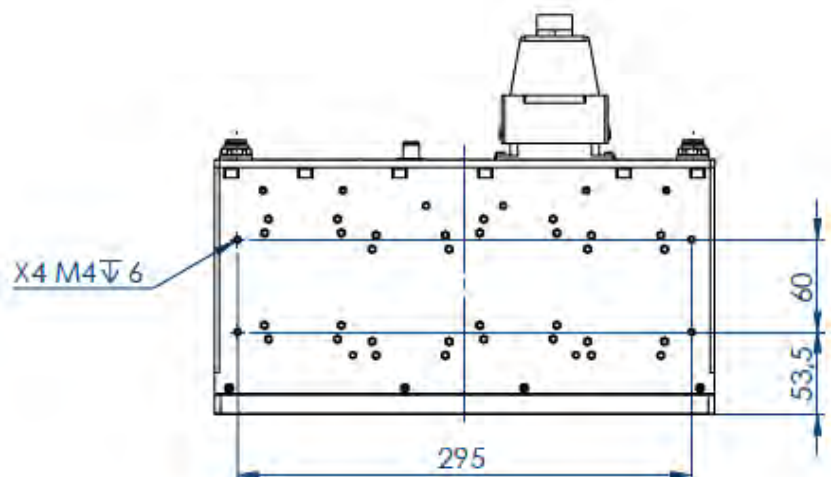
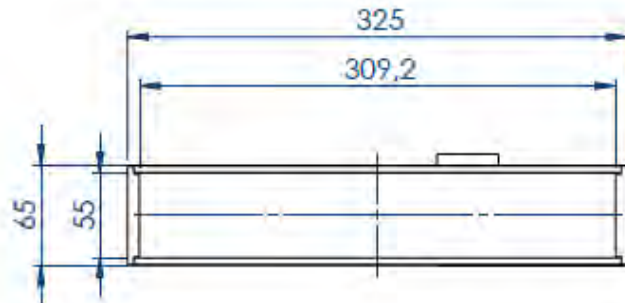
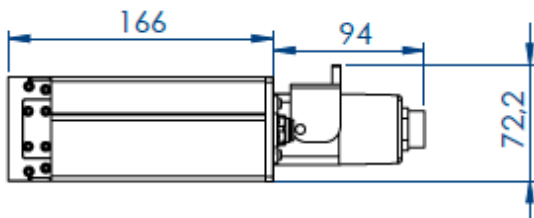
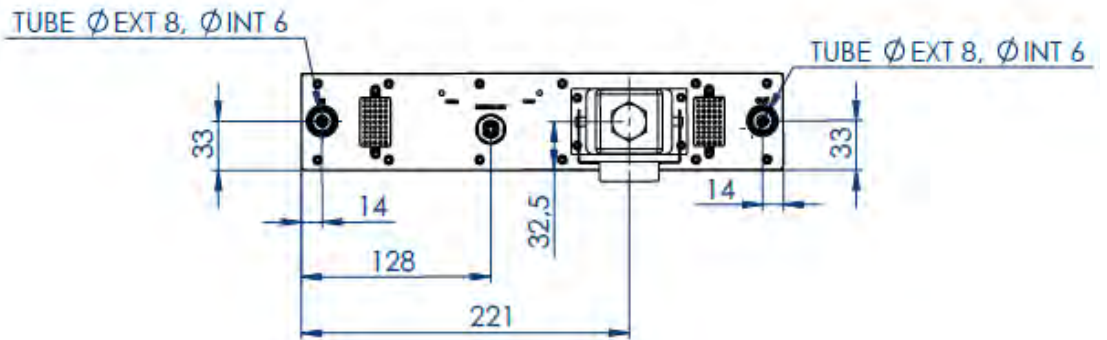
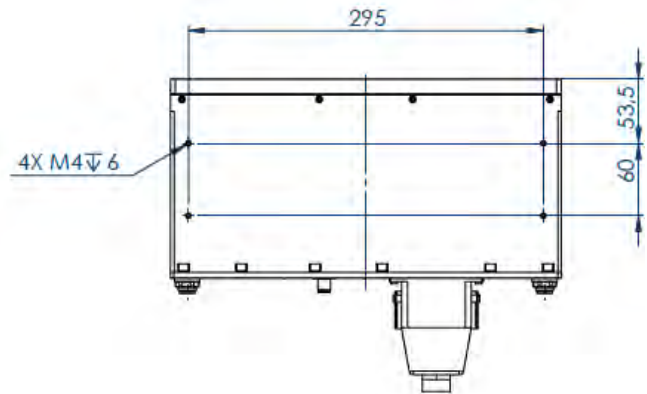
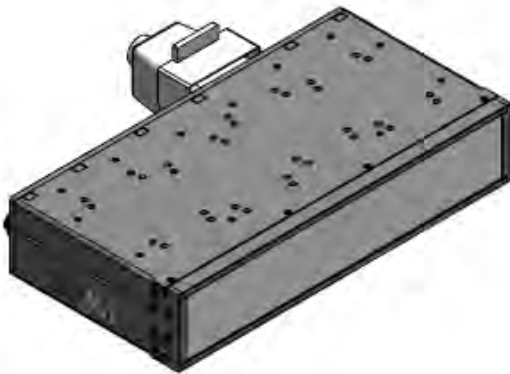
ULINE 150 mm



ULINE 225 mm





ULINE 300 mm





**How to use: with a power supply**

In order to correctly use the product, please read the following steps:

Steps	Photo description
Fix the product using the dimensions given in the previous sheet.	
Put the UPOWER™ in place. Pay attention to leave a 10cm space next to the ventilation.	
Link the product to the UPOWER™ with the cable. SUBD for ULINE 75 & 150 mm EPIC + M12 8pins for ULINE >150mm	
Make sure every security connector is plugged on the back of the UPOWER™ (dry contact, door security...)	
Plug the UPOWER™ into your power supply. The plug is located on the back side of the UPOWER™	
Press the red button behind the UPOWER™ to power it up. (State LEDs on the product must turn on)	
Set up the power and the insolation time on the UPOWER™. For more details refer to the UPOWER™ datasheet if needed	
In case of emergency, press the STOP button.	

\*The version of the UPOWER™ is not furnished with the product

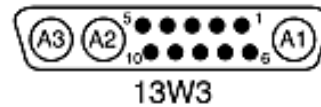


How to use: with a PLC

**ULINE 75 mm and ULINE 150 mm**

The ULINE 75 and the ULINE 150 can be used without the UPOWER™ in order to directly supply it by yourself by using a PLC. To connect your PLC to the UV product, use the cable by following the board below.

The connector for the ULINE 75 mm and the ULINE 150 mm is a SubD 13W3 connector.



**Female SubD 13w3 Connector**

<i>Cable number/Color</i>	<i>Pin number</i>	<i>In / Out signal</i>	<i>Designation</i>	<i>Signal</i>
<b>1</b>	A1	In	Power supply +	48V
<b>2</b>	A3	In	Common Ground	0V
<b>3</b>	Pin 1	In	Intensity Control - DIM	0-10V or look at the graph in section "signals"
<b>5</b>	Pin 6	Out	Temperature Default	<b>0V to 6V: Fault / 16V to 24V: No Fault</b>
<b>6</b>	A3	In	Common ground	0V
<b>7</b>	Pin 4	In	Enable +	Dry contact CLOSED: UV emission allowed; OPEN: UV emission stopped
<b>8</b>	Pin 5	In	Enable -	
<b>Yellow and Green</b>			Protective Ground	

For more details about the several signals emitted, check out the section "signals".

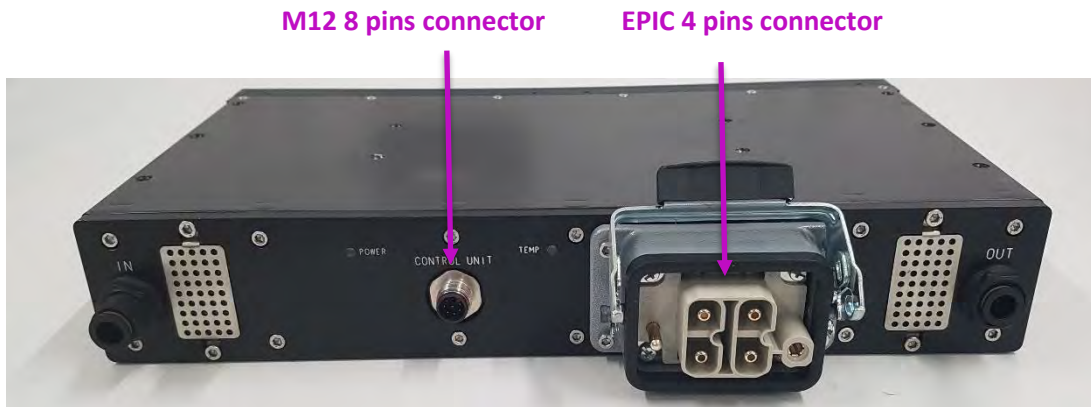
**ULINE 225 mm and 300 mm**

The ULINE 225 and the ULINE 300 can be used without the UPOWER™ in order to directly supply it by yourself by using a PLC. To connect your PLC to the UV product, use the cable by following the board below.

The connectors for the ULINE 225 mm and the ULINE 300 mm are :

- One EPIC 4 pins for the power signal
- One M12 8 pins for the control signal

To connect the product into an automate, use the cable by following the board below.

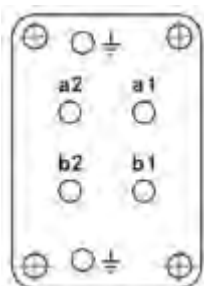


**M12 8 pins connector**



Pin number	Cable color	Designation	Signal
1	White	DIM	0 – 10V or look at the graph in section “signals”
2	Brown	Common ground	0V
3	Green	Temperature +	Reading of the thermistor value For more information, contact us.
4	Yellow	Temperature -	
5	Gray	Enable +	Dry contact
6	Pink	Enable -	
7	Blue	Default Temperature	0 – 6V -> Default; 16 – 24V -> No Default
8		Do not use	

**EPIC 4 pins connector**



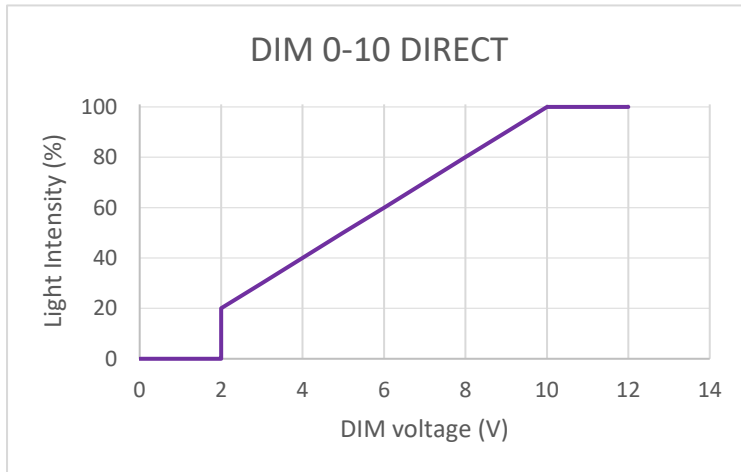
Pin number	Cable color	Designation
<b>A1</b>	Gray	48V
<b>A2</b>	Black	GND
<b>B1</b>	Brown	48V
<b>B2</b>	Blue	GND





**Signals**

**Intensity Control**



The ULINE™ is supplied with a 48V constant voltage source.

Using the DIM pin, the light intensity can be controlled:

- 0V to 2V – OFF (0%)
- 2V to 10V – ON (20% to 100%)
- 10V to 24V – ON (100%)

Max DIM power consumption: 50 mW

**Temperature Default**

If the temperature of the LED is too high, probably because the cooling system has a problem, the product puts itself in temperature safety in order to prevent any damage on the LEDs.

- The LED of temperature state turn red
- A signal is sent to the automate

**Thermistor Value**

This product has a thermistor giving the temperature value near the LEDs. The thermistor value can be read using the pins 2 and 5. You can find the board of conversion on the manufacturer website: Vishay, using the reference of the supplier: NTCS0805E3103JMT.

**Status LEDs**



Two status LEDs 'Power' and 'Temp' can be found on both sides of the SubD connector. This LEDs give information about the proper functioning of the product.






STATUS	MEANING
POWER off	The product is not under voltage
POWER red	The product is under voltage but do not emit UV light
POWER green	The product is emitting UV light
TEMP green	The temperature inside the product is OK: the product can be turned on
TEMP red	The temperature of the LED is too high for the product to be turned on



**Accessories**

Description and Photo	Description
<p><b>Cables SubD 13W3 for the ULINE™ 75/150</b></p> 	<p>Both sides connectors (UPOWER™ link):</p> <p style="text-align: right;">2 } Reference: <b>UCAB-SUBD-FM-5-DD-L5</b> } Depending on 10 } the length you want (in meters)</p> <p>One side with bare wire (towards automate):</p> <p style="text-align: right;">2 } Reference: <b>UCAB-SUBD-FD-5-D-L5</b> } Depending on 10 } the length you want (in meters)</p>
<p><b>Cables M12 for the ULINE™ 225/300</b></p> 	<p>Both sides connectors (UPOWER™ link):</p> <p style="text-align: right;">2 } Reference: <b>UCAB-SUBD-FM-8-DD-L5</b> } Depending on 10 } the length you want (in meters)</p> <p>One side with bare wire (towards automate):</p> <p style="text-align: right;">2 } Reference: <b>UCAB-M12-FD-8-D-L5</b> } Depending on 10 } the length you want (in meters)</p>

<p><b>Cables EPIC for the ULINE™ 225/300</b></p> 	<p>Both sides connectors (UPOWER™ link):</p> <p>Reference: <b>UCAB-SUBD-FM-5-DD-L5</b> }  <span style="margin-left: 150px;">2</span>  <span style="margin-left: 150px;">10</span> } Depending on the length you want (in meters)</p> <p>One side with bare wire (towards automate):</p> <p>Reference: <b>UCAB-SUBD-FD-5-D-L5</b> }  <span style="margin-left: 150px;">2</span>  <span style="margin-left: 150px;">10</span> } Depending on the length you want (in meters)</p>
<p><b>UPOWER™</b></p> 	<p>We are able to provide you with any kind of power supply you need, different IHM, power, control and connectors.</p> <p>To build the one adapted to your needs please contact us at <a href="mailto:sales@uwave.fr">sales@uwave.fr</a></p>
<p><b>Chiller</b></p> 	<p>The ULINE™ is cooled down by a water system for a better stability over time and a higher irradiance. Depending on the length of the product, UWAVE is able to provide you the right chiller from SMC company.</p> <p>References: <b>CHILLER-HRS012-AF-20</b> } Power: 1200W  <b>CHILLER-HRS018-AF-20</b> } Power: 1800W  <b>CHILLER-HRS024-AF-20</b> } Power: 2400W</p>