



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



### Security of the user

- 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 0°C and +35°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.**

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## 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:

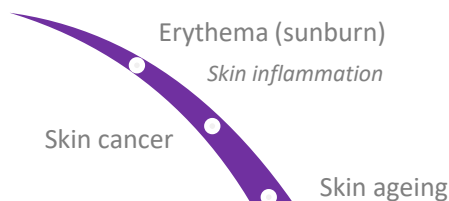
	Eyes	Skin
Optical Power (normalized for skin)	10 mW/cm <sup>2</sup>	4,7 μW/cm <sup>2</sup>
<b>Maximal exposure time per day</b>	<b>1 min 40 s</b>	<b>12 min</b>

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.



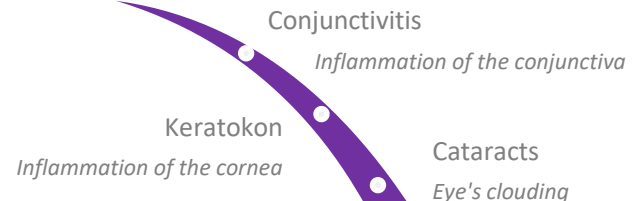
## Possible damages on health

### 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.**



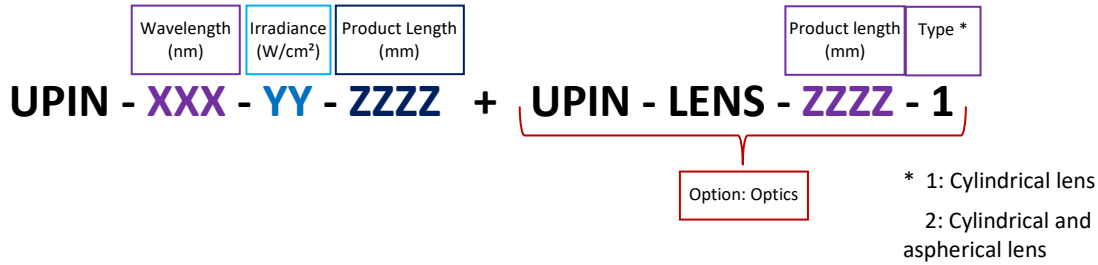
## Technical Overview

<b>Electronics</b>  	<i>Power supply</i>	48V DC
	<i>Illumination mode</i>	Continuous with a DIM process [0-10V]
	<i>Connector</i>	SubD 13W3
	<i>Power consumption</i>	~ 150W
<b>Optics</b>  	<i>Wavelength</i>	365 or 385 or 395 or 405 nanometers
	<i>Irradiance</i>	Up to 4000 mW/cm <sup>2</sup> for 385, 395 and 405 nm Up to 3200 mW/cm <sup>2</sup> for 365 nm
<b>Mechanics</b>  	<i>Width and height</i>	40,8 mm x 216 mm
	<i>Length</i>	78 mm
	<i>Material</i>	Device body: Aluminum alloy
<b>Thermal</b>  	<i>Cooling system</i>	Active air cooling with fan
<b>Environment</b>  	<i>Working temperature</i>	10°C to 50°C
	<i>Working humidity</i>	< 80% for temp < 30°C
	<i>IP code</i>	IP40





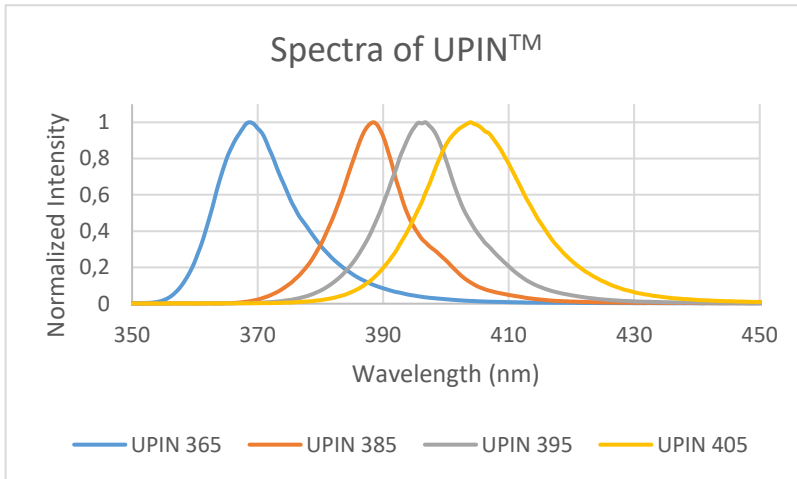
Product reference





**Optical characteristics**

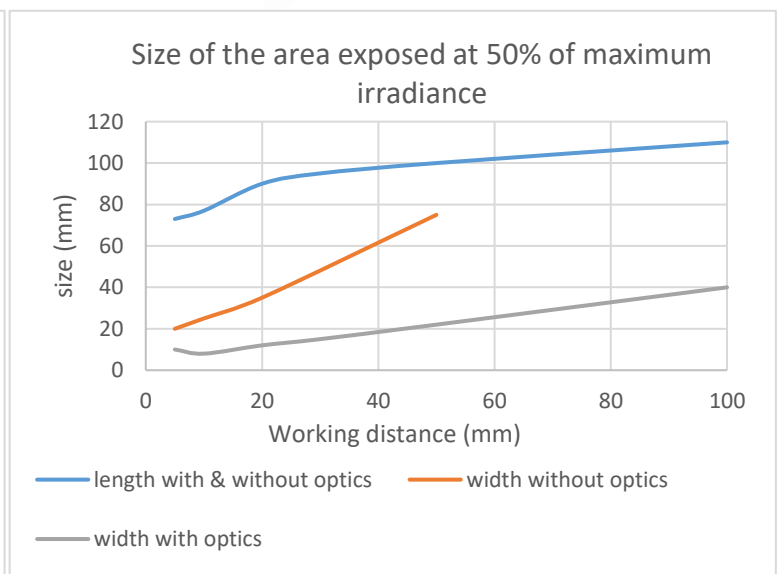
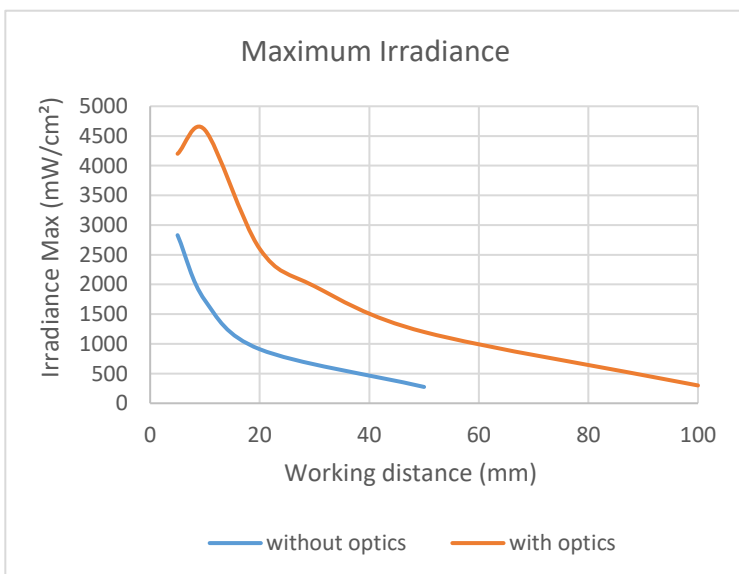
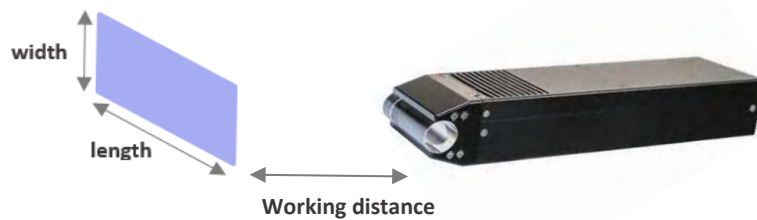
**Spectra**



	Pic Wavelength	Full width at half maximum
<b>UPIN 365</b>	368 nm	14 nm
<b>UPIN 385</b>	388 nm	10 nm
<b>UPIN 395</b>	397 nm	14 nm
<b>UPIN 405</b>	404 nm	18 nm

**Photometry**

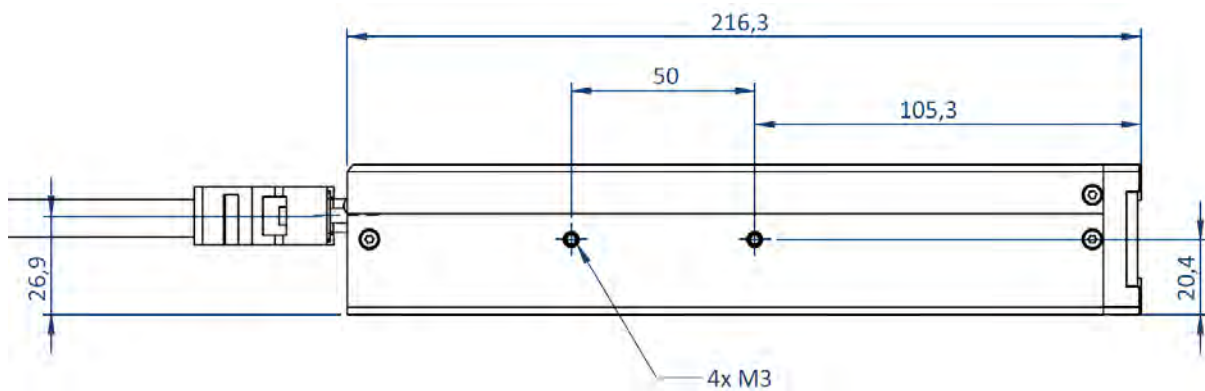
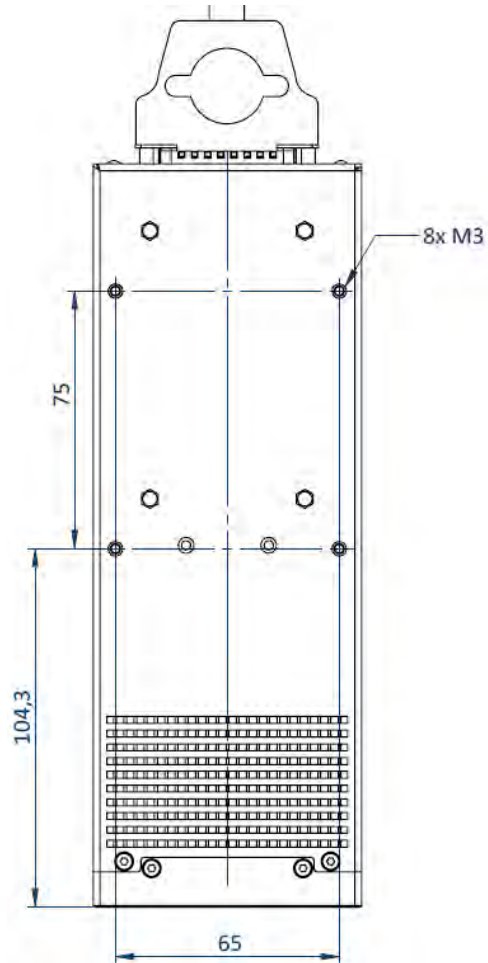
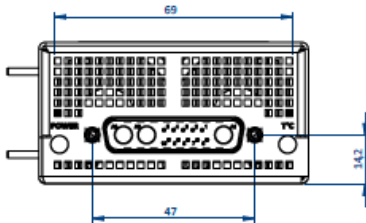
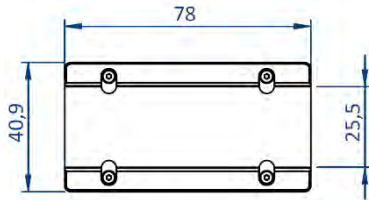
In the following graph, the area exposed is the area where the irradiance is higher than 50% of the maximum irradiance. The UPIN without optics is not usable for a working distance higher than 50 mm.



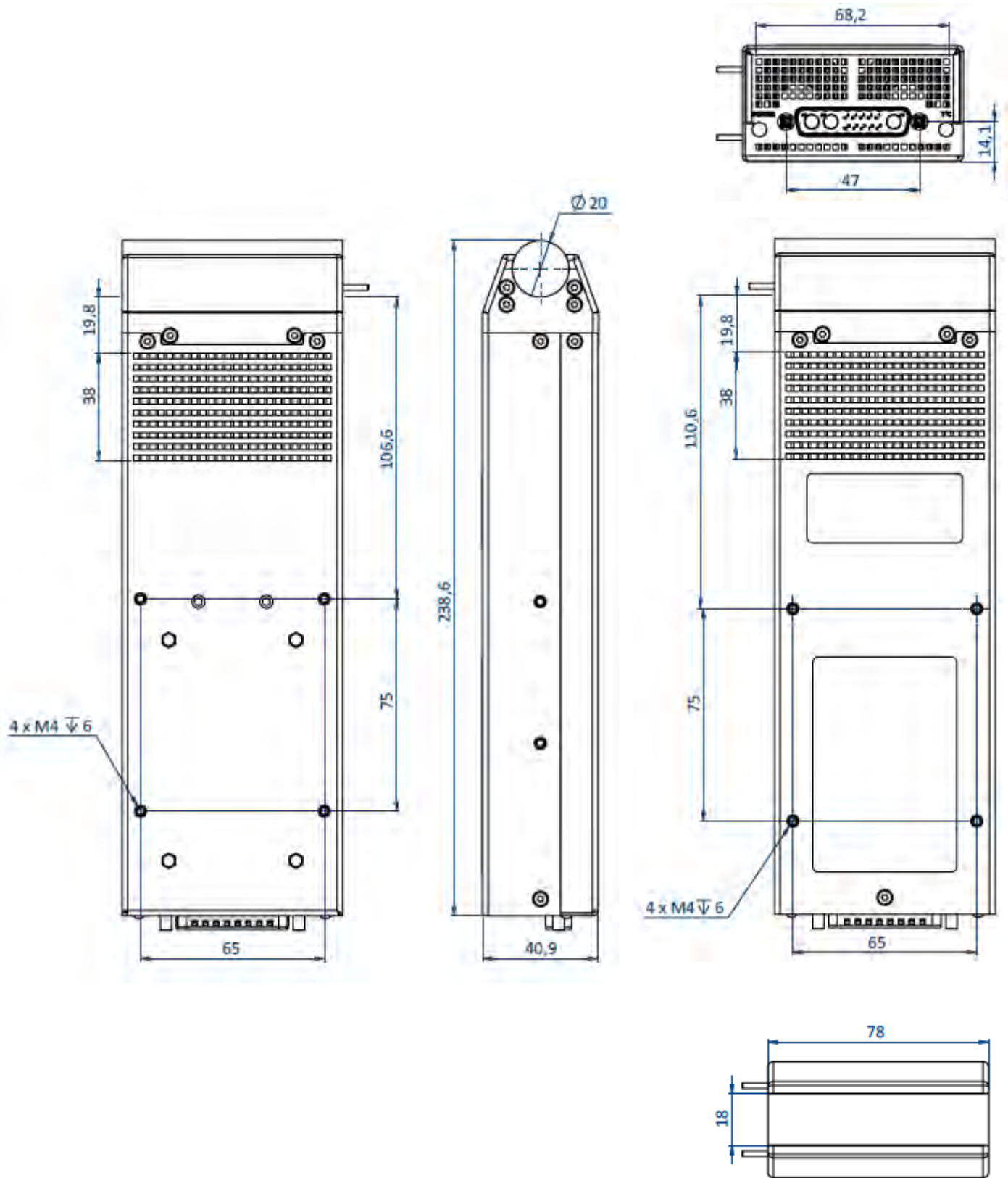


Mechanical dimensions

Without optics



With optics





**How to use: with the power supply UPOWER™**

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.	
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

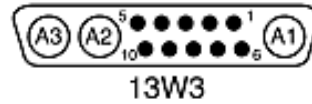


How to use: without the power supply UPOWER™

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



SubD 13W3 connector



Female SubD 13w3 Connector

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

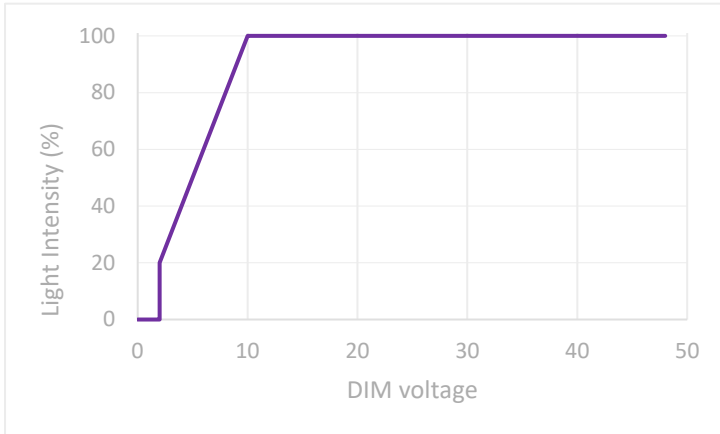
For more details about the several signals emitted, check out the section "signals"



## Signals

### Intensity control

*Intensity control - DIM*



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

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

- 0V to 2V – OFF
- 2V to 10V – 20% to 100%
- 10V to 48V – Full ON (100%)

### 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 the n° pin of the connector





**Accessories**

Description and Photo	Description
<p><b>Cables for the UPIN™</b></p> 	<p>Both sides connectors (UPOWER™ link):</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>One side with bare wire (towards automate):</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><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>