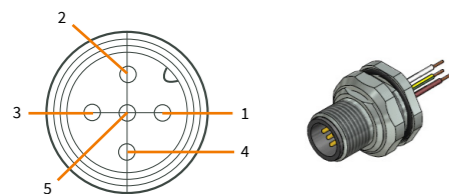


## Electrical Connection

The lighting is equipped with an 5 pin M12x1 connector.



Pin	Color <sup>1)</sup>	Standard (-s)	Direct (-x) <sup>2)</sup>
1	brown	24 VDC	LED (+)
2	white	Dim	LED (+)
3	blue	Trigger	LED (-)
4	black	Ground	LED (-)
5	green-yellow	not used	not used

1) Wire color of MBJ lighting cable

2) Connection to 24VDC without external LED controller may destroy the unit

### Additional information

Pin3 (Trigger) is an 'active high' input signal with 5...24 V = ON and 0..1 V = OFF, it is a high resistance current sink with 0.2 mA for 5 V and 5 mA for 24 V.

Pin2 (DIM) is used as brightness control and operation mode switch, it is a high resistance current sink with 0.2 mA for 5 V and 1 mA for 24 V.

For connection it is recommended to use the MBJ lighting cable with a maximum length of 10 m.

### Integrated Controller (-s)

Supported operation modes with the integrated LED controller.

Pin 2 (Dim)	Operation mode
24 V	steady light <sup>1)</sup>
1...10 V	steady light with brightness control <sup>2)</sup>
24 V	triggered light
GND	triggered flash light with max. 20 ms and up to 100 % more light intensity <sup>3)</sup>

1) Pin 3 (Trigger) needs permanent 24 V to activate steady light mode

2) PWM with 3.8 kHz clock is used, recommended minimal camera exposure is 5 ms

3) Latency between trigger and LED light ON is max. 30 µs, maximum recommended clock speed is 1 kHz maximum recommended duty cycle is 25 % minimum recommended flash time is 100 µs

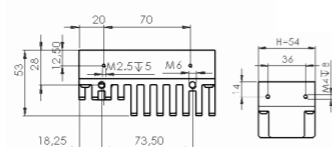
## Mechanical Integration

The light is equipped with M6 threaded holes or alternatively M4 threaded holes on the shorter sides, which can be used to fix the lighting to the specified position. In addition M2.5 threaded holes are provided at the two long sides to mount the foil and filter holder set. To secure a long lifetime additional heat transfer measurements at the holding positions are highly recommended.

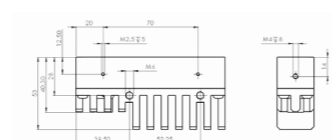
### Model Example

More 2D and 3D drawings can be found online: [www.mbj-imaging.com](http://www.mbj-imaging.com)

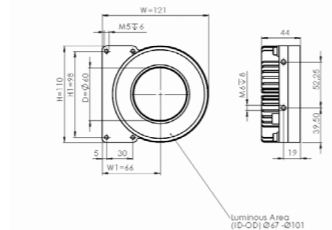
WBL-0410 Power+



MBL-0210 Power+



SRL-10 Power+



Specification	SWIR Power+ Series
Operating temperature	10°C to 30°C / 45°C <sup>1)</sup>
Certifications	CE, RoHS
Degree of protection	IP54 <sup>2)</sup>
Humidity	30 % to 70 %

- 1) Max. of 30°C is recommended for steady light operation w/o additional heat transfer measurements, for max. 45°C a thermal connection is mandatory. Max. of 45°C is also permissible for flash light operation with a max. 10% duty cycle.
- 2) Refers to light w/o attached heat sink. MBJ LED lights are protected against the ingress of solids and water in accordance with the selected protection class and applicable standards. Permanent protection against liquids containing solvents, such as cleaning agents, machine emulsions or other lubricants, cannot be guaranteed. IP is only valid with a connected cable (MBJ cable recommended).

## Safety Notes

Before working with this unit, read the warning and application instructions carefully and completely before operating the device.

Have the illuminators commissioned only in compliance with the specified protective measures. It is essential that you comply with the permissible ambient conditions. The lighting must be switched off before installation and/or maintenance. The device must not be used when a failure may cause personal injury.



1. The device is designed for indoor use only.
2. **Light** - Due to the risk of irritation of or damage to the eyes or skin it is not recommended to look directly into the light source. Due to the non-visible property of SWIR wavelengths, the light is equipped with a green control diode. This is positioned in the LED field. A green glow of the diode signals that the light is in operation.
3. **Heat** - In case of insufficient heat dissipation or when running the light in flash mode with a too high duty cycle, the surface temperature may get hot. Do not touch the product during operation or immediately after it is turned off. Keep off flammable materials at any time and allow for sufficient heat dissipation.
4. **Electricity** - The housing is electrically isolated from the ground of the power supply. Exceeding the permissible input voltage  $U_{in}$  or using the  $U_b$  input for steady light can lead to the destruction of the device or to a significant shortening of the lifetime of the LEDs in the device.
5. **Usage** - Please prevent mechanical stress to the light surface during operation. This will lead to an inhomogeneous light emission.
6. **Cleaning** - The light emission surface has to be cleaned with a standard glass cleaner and a soft cleaning cloth. Do not use other material for cleaning as it will damage the device.

03589.00 Manual MBJ SWIR-Series, August 2023

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# SWIR Power+ Series



### Model Sizes in Series

The light is available in the following sizes <sup>1)</sup>

MBL-0210 Power+	WBL-0410 Power+	SRL-10 Power+
MBL-0220 Power+	WBL-0420 Power+	SRL-12 Power+
MBL-0230 Power+		

1) Size definition: WBL-0420 Power+ refers to a wide barlight with a luminous area of 45 mm x 200 mm, SRL-12 Power+ refers to a ringlight with an outer luminous area diameter of 121 mm.

### Possible LED Colors

LED	Abbr. <sup>1)</sup>	Peak Wavelength <sup>2)</sup>
Infrared 1050	-IR1050	near 1050 nm
Infrared 1200	-IR1200	near 1200 nm
Infrared 1300	-IR1300	near 1300 nm
Infrared 1450	-IR1450	near 1450 nm
Infrared 1550	-IR1550	near 1550 nm
Infrared 1650	-IR1650	near 1650 nm

1) Color option will be added to the model name after the size information. SWIR Power WBL-0420-IR1050 refers to a barlight with 1050 nm infrared light.

2) This is an approximated value. The exact value also depends on LED temperature and LED current.

Specification	MBL-0210 Power+	MBL-0220 Power+	MBL-0230 Power+	WBL-0410 Power+	WBL-0420 Power+	SRL-10 Power+	SRL-12 Power+
<b>Optical parameter</b>							
Luminous area (AxB) or (ID - OD)	17 mm x 100 mm	17 mm x 200 mm	17 mm x 300 mm	45 mm x 100 mm	45 mm x 200 mm	67 mm - 101 mm	87 mm - 121 mm
Light emission	rectangular or ring shaped light field with direct fired LED and 45° focussing beam						
Recommended use	commonly used as incident light in combination with a SWIR sensitive camera to inspect for non visible characteristics such as inspection through opaque materials (silicon wafer, plastics, ...), sorting tasks, inspection of moisture content, ...						
Recommended light working distance	50 mm - 300 mm	50 mm - 350 mm	50 mm - 400 mm	50 mm - 500 mm	50 mm - 600 mm	100 mm - 400 mm	100 mm - 500 mm
<b>Electrical parameter</b>							
Available interfaces	<b>-s with integrated LED Controller and 4 operation modes; -x with direct LED access (external LED control is required)</b>						
Uin for -s Version	24 VDC +/- 5%						
<b>General parameter</b>							
Dimension (H x W x D)	27 mm x 110 mm x 53 mm	27 mm x 210 mm x 53 mm	27 mm x 310 mm x 53 mm	54 mm x 110 mm x 53 mm	54 mm x 210 mm x 53 mm	121 mm x 110 mm x 44 mm	141 mm x 130 mm x 44 mm
Weight	250 g	450 g	650 g	450g	900 g	500 g	750 g
Material	Anodized aluminum housing with PMMA light cover						
Connector	M12x1 socket, 5 pin, male (for pinning details please refer to chart "Electrical Connection")						
Accessories	For cable, mounts and LED controller please check <a href="http://www.mbj-imaging.com">www.mbj-imaging.com</a>						

Typical values -x version	1050 nm	1200 nm	1300 nm	1450 nm	1550 nm	1650 nm	
<b>MBL-0210 Power+</b>	Uled(+) steady light <sup>3)</sup>	9.2 V	8.0 V	7.8 V	7.8 V	7.7 V	7.3 V
	Uled(+) range flash light	6.4 V -11.8 V	5.2 V -11.0 V	5.0 V -10.8 V	4.6 V -10.7 V	4.0 V -10.5 V	3.8 V -10.2 V
	Steady light (100% duty cycle)	750 mA					
	Flash light (10% duty cycle, < 20 ms pulse)	1200 mA					
	Flash light (1% duty cycle, < 200 µs pulse)	1800 mA					
<b>MBL-0220 Power+</b>	Uled(+) steady light <sup>3)</sup>	9.2 V	8.0 V	7.8 V	7.8 V	7.7 V	7.3 V
	Uled(+) range flash light	6.4 V -11.8 V	5.2 V -11.0 V	5.0 V -10.8 V	4.6 V -10.7 V	4.0 V -10.5 V	3.8 V -10.2 V
	Steady light (100% duty cycle)	1500 mA					
	Flash light (10% duty cycle, < 20 ms pulse)	2400 mA					
	Flash light (1% duty cycle, < 200 µs pulse)	3600 mA					
<b>MBL-0230 Power+ WBL-0410 Power + SRL-10 Power +</b>	Uled(+) steady light <sup>3)</sup>	13.4 V	11.6 V	11.4 V	11.3 V	11.1 V	10.6 V
	Uled(+) range flash light	9.3 V -17.4 V	7.5 V -16.1 V	7.1 V -15.8 V	6.6 V -15.6 V	5.7 V -15.4 V	5.4 V -15.0 V
	Steady light (100% duty cycle)	1500 mA					
	Flash light (10% duty cycle, < 20 ms pulse)	2400 mA					
	Flash light (1% duty cycle, < 200 µs pulse)	3600 mA					
<b>SRL-12 Power+</b>	Uled(+) steady light <sup>3)</sup>	17.6 V	15.2 V	15.0 V	14.9 V	14.6 V	13.9 V
	Uled(+) range flash light	12.1 V -22.9 V	9.7 V -21.2 V	9.2 V -20.9 V	8.5 V -20.6 V	7.3 V -20.3 V	6.9 V -19.8 V
	Steady light (100% duty cycle)	1500 mA					
	Flash light (10% duty cycle, < 20 ms pulse)	2400 mA					
	Flash light (1% duty cycle, < 200 µs pulse)	3600 mA					
<b>WBL-0420 Power+</b>	Uled(+) steady light <sup>3)</sup>	13.4 V	11.6 V	11.4 V	11.3 V	11.1 V	10.6 V
	Uled(+) range flash light	9.3 V -17.4 V	7.5 V -16.1 V	7.1 V -15.8 V	6.6 V -15.6 V	5.7 V -15.4 V	5.4 V -15.0 V
	Steady light (100% duty cycle)	3000 mA					
	Flash light (10% duty cycle, < 20 ms pulse)	4800 mA					
	Flash light (1% duty cycle, < 200 µs pulse)	7200 mA					

3) Please see max. allowed current in the rows below.

Typical Values -s version	1050 nm	1200 nm	1300 nm	1450 nm	1550 nm	1650 nm	
<b>MBL-0210 Power+</b>	Radiant Intensity <sup>1)</sup>	5.8 W/sr	1.2 W/sr	1.2 W/sr	1.0 W/sr	0.6 W/s	0.5 W/sr
	Steady light operation	8 W	7 W	7 W	6 W	6 W	6 W
	During ON time at flashed light operation <sup>2)</sup>	18 W	18 W	18 W	48 W	17 W	17 W
<b>MBL-0220 Power+</b>	Radiant Intensity <sup>1)</sup>	11.5 W/sr	2.5 W/sr	2.3 W/sr	2.0 W/sr	1.2 W/s	1.1 W/sr
	Steady light operation	15 W	13 W	13 W	6 W	13 W	12 W
	During ON time at flashed light operation <sup>2)</sup>	29 W	25 W	25 W	25 W	24 W	23 W
<b>MBL-0230 Power+ WBL-0410 Power+ SRL-10 Power+</b>	Radiant Intensity <sup>1)</sup>	17.3 W/sr	3.7 W/sr	3.5 W/sr	3.0 W/sr	1.9 W/s	1.6 W/sr
	Steady light operation	22 W	19 W	19 W	19 W	19 W	18 W
	During ON time at flashed light operation <sup>2)</sup>	42 W	37 W	36 W	36 W	35 W	34 W
<b>SRL-12 Power+</b>	Radiant Intensity <sup>1)</sup>	23.0 W/sr	5.0 W/sr	4.6 W/sr	4.0 W/sr	2.5 W/s	2.1 W/sr
	Steady light operation	29 W	25 W	25 W	25 W	24 W	23 W
	During ON time at flashed light operation <sup>2)</sup>	56 W	48 W	47 W	47 W	46 W	44 W
<b>WBL-0420 Power+</b>	Radiant Intensity <sup>1)</sup>	34.6 W/sr	7.5 W/sr	6.9 W/sr	6.0 W/sr	3.7 W/s	3.2 W/sr
	Steady light operation	45 W	39 W	38 W	38 W	37 W	35 W
	During ON time at flashed light operation <sup>2)</sup>	85 W	73 W	72 W	72 W	71 W	67 W

1) Values are approximate with a +/- 7% tolerance.

2) Triggered flash light with max. 20 ms and up to 100% more light intensity.

### Application Samples for (-s) controller

