smart vision lights™ MOBL-RGBW

Maximum Output
BACKLIGHT KIT
RGBW LIGHT / DRIVER

Digital/Analog Input Channels

Power In

DIN Rail Mount

Diffuse Panel

High-Intensity LEDs

Output Channels

4WMD-750 shown

10 - 100% intensity limiting potentiometer

45 mm Industrial Extrusion

5-Pin M12 Connector
(Male- Reverse Key)

multi drive™

Warranty	Tested	Compliant	Rated	Connector
10 YEAR*	**IEC** 62471	**CE** RoHS	**IP** 50	5-PIN M12

* see page 2 for details.

PRODUCT HIGHLIGHTS

- ✓ Kit available that includes a 4WMD for tuning individual wavelengths and a 5PM12-J2000-KR cable
- ✓ PNP and NPN high speed trigger signal input
- ✓ 45mm industrial extrusion for mounting
- ✓ 5-pin M12 quick connect (reverse key)

PRODUCT DESCRIPTION

MOBL (RGBW)

The MOBL (RGBW) Series backlight is designed for maximum output and includes four tunable wavelengths. Each wavelength is independent and can be tuned individually to output any color. Proper heat dissipation is achieved using the side extrusion. The 45 mm extrusion provides flexible mounting options using drop-in T-nuts.

4WMD

The 4WMD permits up to four individual channels to be tuned independently. The 4WWD has independent tuning controls and built-in Multi-Drive™, allowing for the intensity limit to be set from 10%–100% for continuous operation or OverDrive™ strobe mode. In addition, when in continuous operation mode, the intensity can be adjusted using the analog signal line. Disabling a channel will turn off the wavelength tied to that channel. Each output channel has its own tuning control located on the front of the driver. The size of the MOBL-RGBW determines which model of the 4WMD to use. See 4WMD Sizing for more details.

WHAT'S INCLUDED

When you order a MOBL (RGBW) light, such as the MOBL-150x150-RGBW, the following item is included:

MOBL (RGBW) requires an external constant current driver. See product specification for maximum input current.

MOBL-RGBW BACKLIGHT

When you order a MOBL (RGBW) kit, such as the MOBL-150x150-RGBW-KIT, the following items are included:

MOBL-RGBW BACKLIGHT

+

4WMD DRIVER

4WMD-750 shown

+

2 METER CABLE
5PM12-J2000-KR

RESOURCE CORNER

Additional resources, including CAD files, videos, and application examples are available on our website.

PRODUCT SPECIFICATIONS

MOBL (RGBW)

	MOBL-150x150-RGBW	MOBL-300x150-RGBW	MOBL-300x300-RGBW
Weight	~3.08 kg	6.8 lbs	~4.80 kg	~10.5 lbs	~8.39 kg	~18.5 lbs
INPUT PER CHANNEL (MAX VALUES)			
Maximum LED Continuous Current	750 mA	1 A	2 A
Maximum LED OverDrive™ Current	6 A	6 A	12 A

PER CHANNEL	CONTINUOUS OPERATION	OVERDRIVE™ STROBE MODE
Input Connector	5-pin M12 connector (male — reverse-key)	
Strobe	Not applicable	Max. 50 ms
Duty Cycle	Not applicable	Max. 10%
Ambient Temperature	0º–45ºC (32º–114ºF)	
IP Rating	IP50	
Warranty	10 year. For complete warranty information, visit smartvisionlights.com/warranty	
Compliances	CE, RoHS, IEC 62471	

NOTE:
The MOBL (RGBW) requires an external constant current driver, such as the recommended 4WMD drivers below.

4WMD Driver

PER CHANNEL	Standard	High-Current
Electrical Input	24VDC +/–5%	
Electrical Input Connector	2-position screw terminal blocks – 14 AWG max wire size	
Operating Current (No Load)	70 mA	110 mA
Number of Input Channels	4	
Input Connector	10-position screw terminal block – 14 AWG max wire size (4 for channel control, 4 for analog, and 2 for PNP/NPN strobing/trigger)	
Trigger Input	PNP trigger: +4VDC or greater to activate (max 26VDC) NPN trigger: GND (<1VDC) to activate	
Input Channel Current	PNP input: 4 mA @ 4VDC | 10 mA @ 12VDC | 20 mA @ 24VDC NPN input: 15 mA @ Ground (0VDC)	
Analog Intensity	Continuous Operation: The output is adjustable from 10%–100% of intensity by applying 1–10VDC signal OverDrive™ Strobe Mode: Apply 0VDC	
Output Channels	4 channels for LED tuning control	
Output Connectors	One 5-pin M12 reverse-key connector 5-position screw terminal block – 14 AWG max wire size	
Indicator Lights	Power on = Green light Individual channels = Yellow light Service = Red light	
Mounting	DIN rail	
Dimensions	H = 102 mm (4.0"), L = 119 mm (4.7"), W = 45 mm (1.8")	H = 102 mm (4.0"), L = 119 mm (4.7"), W = 70 mm (2.8")
Operating Temperature	10° to 40° C (14° to 104° F) | RH max 80% non-condensing humidity	
Ambient Humidity	0%–95% noncondensing	
Weight	~233 g	~425 g
Compliances	CE, RoHS	
Terminal Block Plugs (Included with 4WMD)	2-position terminal block plug 5-position terminal block plug 10-position terminal block plug	
Warranty	3 year. For complete warranty information, visit smartvisionlights.com/warranty	

| TOTAL INPUT PER UNIT (MAX)	4WMD-750	4WMD-1000	4WMD-2000
Continuous Input Current	2.1 A	2.7 A	5.4 A
Continuous Input Power	50.4 W	65 W	130 W
OverDrive™ Input Current	19 A	24 A	47 A
OverDrive™ Input Power	460 W	625 W	1130 W
Use With Light	**MOBL-150x150-RGBW**	**MOBL-300x150-RGBW**	**MOBL-300x300-RGBW**

NOTE:
The size of the driver is based on the size of the backlight. See 4WMD Sizing for more information.
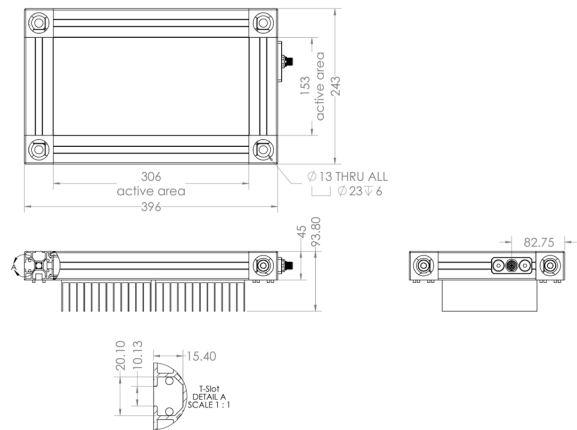
PRODUCT DRAWING

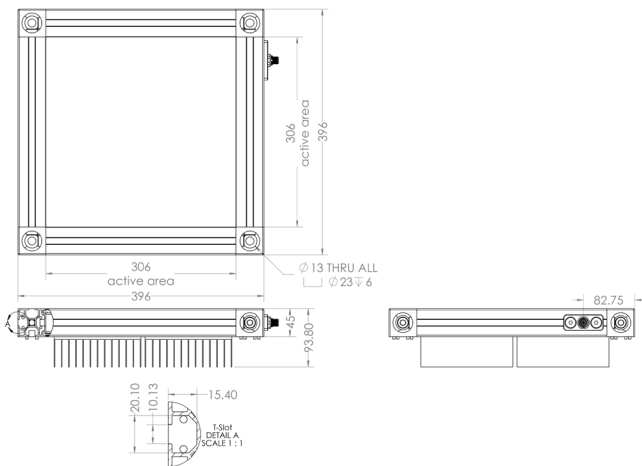CAD files available on our website.
Dimensions are in mm.

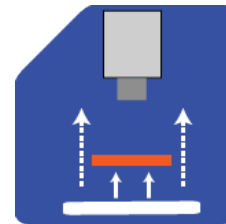### 150 mm x 150 mm
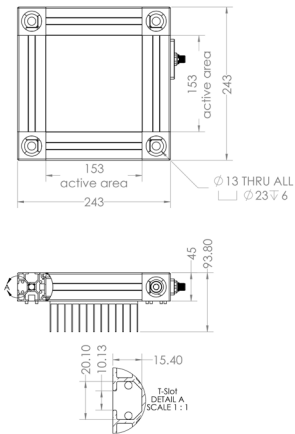
300 mm x 150 mm

300 mm x 300 mm

ILLUMINATION

MOBL (RGBW) Series of Backlights works best for:

Backlight

EYE SAFETY

According to IEC 62471: 2006. Full documentation available upon request.

SMART VISION LIGHTS
IEC 62471
COMPLIANT

Notice
Exempt Group: No photobiological hazard to eyes or skin even for continuous, unrestricted use. Applicable for wavelengths: 470, 530, 625 and WHI when all four wavelengths are on at the same time.

MULTI-DRIVE™

Multi-Drive™ offers the best of both worlds. Continuous operation and OverDrive™ mode (HIGH output strobe/pulse) are available in a single light. Other advantages of Multi-Drive™ include faster imaging and capture/freeze motion on high-speed lines.
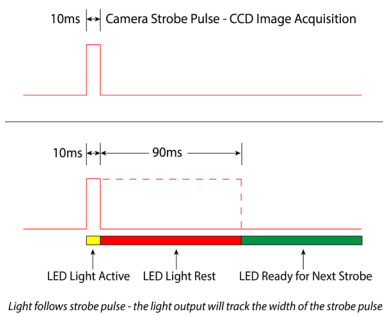
The Multi-Drive™ feature allows the user to run the light continuously or in OverDrive™ at the maximum allowed intensity by simply setting the product configuration. OverDrive™ strobe mode has **up to eight times** the power of continuous operation.

DUTY CYCLE (OVERDRIVE™ MODE ONLY)

This section applies only if light is in OverDrive™ strobe mode.

The Duty Cycle (D) is related to the Strobe Time (ST) and Rest Time (RT).

10ms ↔ Camera Strobe Pulse - CCD Image Acquisition

10ms ↔ 90ms

LED Light Active   LED Light Rest   LED Ready for Next Strobe

Light follows strobe pulse - the light output will track the width of the strobe pulse.

Calculating Rest Time

$$RT = \frac{ST}{D} - ST$$

RT = Rest Time
ST = Strobe Time
D = Duty Cycle

Example

$$90 \text{ ms} = \frac{10 \text{ ms}}{.1} - 10 \text{ ms}$$

Rest Time is 90 ms for 10 ms Strobe Time

Calculating Strobe Rate

$$SR = \frac{D}{ST}$$

SR = Strobe Rate (strobes per second)
ST = Strobe Time (seconds)
D = Duty Cycle

Example

$$1000 = \frac{0.1}{0.0001}$$

Strobe Rate is 1000 strobes per second

Calculating Duty Cycle

$$D = ST \times SR$$

SR = Strobe Rate (strobes per second)
ST = Strobe Time (seconds)
D = Duty Cycle

Example

$$0.1 = 0.0001 \times 1000$$

Duty Cycle is 10% (0.1)

Maximum Duty Cycle for OverDrive™ light is 10% (0.1)
Note: Strobe time is limited by the strobe rate.
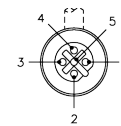
OUTPUT CONFIGURATION

Using the Reverse-Key 5-pin M12 Connector

When connecting a Smart Vision Lights™ RGBW light to the 4WMD, a reverse-key 5-pin M12 cable is required. All Smart Vision Lights™ RGBW lights come equipped with a 5-pin reverse-key connector.
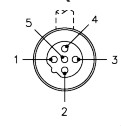
With very little wiring needed, the reverse-key 5-pin M12 connector simplifies connecting lights to the 4WMD.

4WMD

Reverse-Key 5-pin M12 Connector
(female)

MOBL (RGBW)

Reverse-Key 5-pin M12 Connector
(male)

5-pin M12 Connectors Pin Layout

Pin	Channel	Color
1	Common	Brown
2	1	White
3	2	Blue
4	3	Black
5	4	Gray

NOTE:

Smart Vision Lights™ uses reverse-key cables that have a blue-grey tip on the connectors. A 2 meter version of the cable is included when ordered (Part number: 5PM12-J2000-KR

DISABLE A CHANNEL

If one or more wavelengths are not needed, the channels associated with the wavelength can be disabled. Disabling a channel will turn off the wavelength. To disable a channel, connect that channel to ground (GND).

Example: To disable channel 4, connect NPN Disable IN 4 to GND.

NOTE:

All channels are enabled by default.

Input Connectors
(top of 4WMD)

HS IN	Analog 0–10 V	NPN Disable	Power In

PNP NPN | IN 4 IN 3 IN 2 IN 1 | IN 4 IN 3 IN 2 IN 1 | GND +24 V DC

TUNING WAVELENGTHS

The 4WMD allows for the tuning of up to four individual wavelength intensities from 10 - 100% or disabled. Depending on its configuration, a channel can tune the output intensity of a given wavelength for either continuous operation or OverDrive™ strobe mode. Each channel can be tuned for continuous operation or OverDrive™ strobe mode. **Continuous operation and OverDrive™ cannot be used simultaneously on a single channel**. Each channel has a yellow indicator light that illuminates when the channel is active.

Intensity Limit Potentiometer OverDrive™

Intensity Limit Potentiometer Continuous

Channel Indicator LED (yellow)
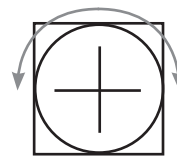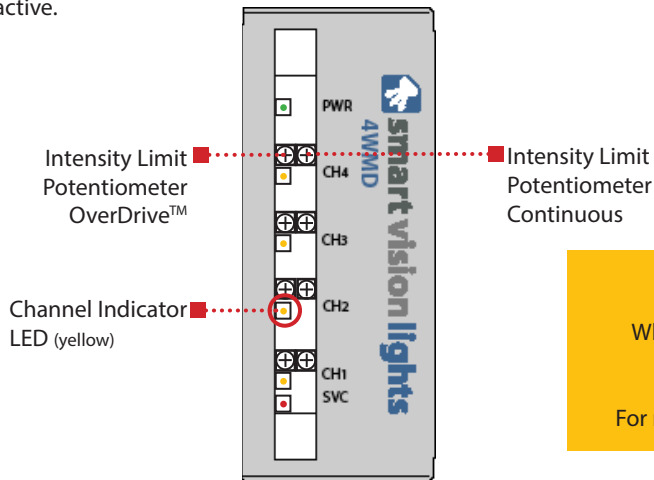
270° turn pot
Clockwise = Increase intensity
**Counterclockwise** = Decrease intensity

NOTE:

When in continuous operation, channel intensity can be individually adjusted using 1–10VDC on the analog input.

For maximum intensity, analog input can be tied to 24VDC.

WAVELENGTH ASSIGNMENT

When connecting the MOBL (RGBW) with the 4WMD using a Reverse Key cable, such as the 5PM12-J2000-KR, wavelength are set to be controlled as followed.

White (W)
Blue (B)
Green (G)
Red (R)
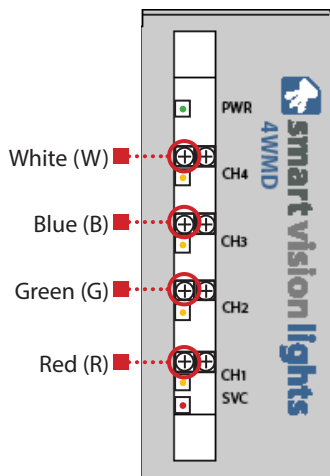
Pin	Channel	Wavelength
1	–	–
2	1	White (W)
3	2	Blue (B)
4	3	Red (R)
5	4	Green (G)

PART NUMBER

$$\text{MOBL} - \square\square\square \ \text{X} \ \square\square\square - \text{RGBW} - \square\square\square$$

SIZE (L x W):

150x150

300x150

300x300

Custom sizes upon request

The 5-pin M12 reverse-key connector is located on the width side of the light.
Sizes listed are in millimeters.

KIT

Kit includes light and external driver

Part Number Examples:

MOBL-150x150-RGBW	MOBL, 150x150 mm, RGBW (light only)
MOBL-300x150-RGBW-KIT	MOBL, 300x150 mm, RGBW, 4WMD driver and 2M jumper cable

4WMD SIZING

Using the correct size 4WMD with the MOBL (RGBW) ensures the light works properly. The chart to the right shows 4WMD sizes for standard MOBL (RGBW) lights. Custom size lights may vary.

Standard   **High-Current**

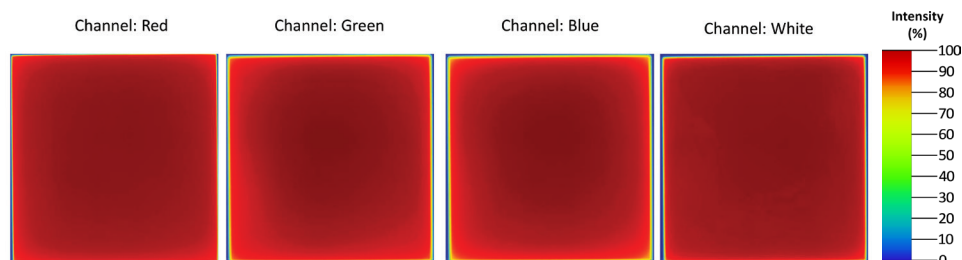| Backlight	Driver
MOBL-150x150-RGBW	4WMD-750 (Standard)
MOBL-300x150-RGBW	4WMD-1000 (Standard)
MOBL-300x300-RGBW	4WMD-2000 (High-Current)

CUSTOMIZE

ADDITIONAL WAVELENGTH
The MOBL (RGBW) can be customize to include one additional wavelength. Additional wavelength options including IR, SWIR, UV or any available LED color. This additional wavelength brings the total wavelength options built into the light to five. *Additional wavelength will require an additional external driver.*

LIGHT PATTERNS*

*Based on the MOBL-150x150-RGBW with 4WMD-750 Driver. Driver output set to max for each color channel in continuous mode. Output measured at surface of diffuser.

Channel: Red   Channel: Green   Channel: Blue   Channel: White

Intensity (%)
100
90
80
70
60
50
40
30
20
10
0

LIGHT PATTERNS, CONTINUED*

*Based on the MOBL-150x150-RGBW with 4WMD-750 Driver. Driver output set to max for each color channel in continuous mode. Output measured at surface of diffuser.

Color Channel	CIE 1931			Approximate values at surface of output diffuser		
	x	y	CCT	Dominant Wavelength (nm)	Irradiance (mW/cm^2)	Illuminance (Lux)
Red	0.698	0.302	NA	623	6.3	11000
Green	0.174	0.712	NA	527	6.6	32000
Blue	0.130	0.083	NA	472	12	10000
White	0.328	0.346	5700	527	9.5	30000

MOBL RGBW 150X150
Spectral Irradiance at output surface
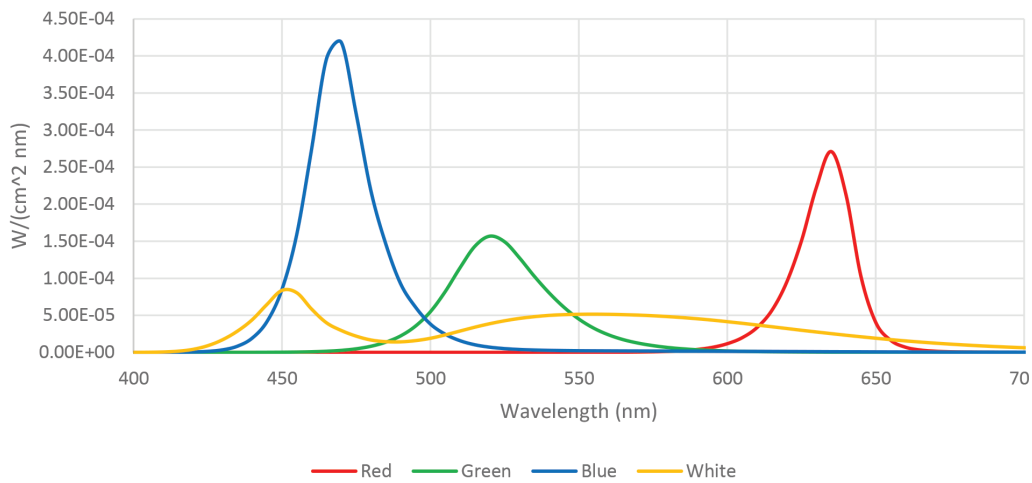
OPTICAL PERFORMANCE

The MOBL (RGBW) offers a diffuse light pattern.
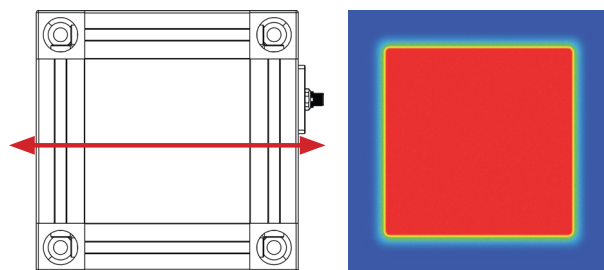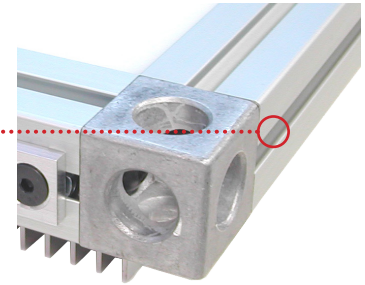

MOBL-150x150-RGBW

MOUNTING

Smart Vision Lights™ recommends using **drop-in T-nuts** for mounting a MOBL Backlight. T-Slot size on MOBL (RGBW) extrusion is Bosch size 10 T-nut channel.

NOTE

Removing cover cubes of light will void the warranty.

Bosch size 10 T-nut channel

ACCESSORIES

Jumper Cable	
Length	Part Number
2000 mm	5PM12-J2000-KR

GLOSSARY

This glossary covers all Smart Vision Lights™ product families; some content in this section may not apply to this specific light.

TERMINOLOGY

OverDrive™ Lights include an integrated high-pulse driver for complete LED light control.

Continuous Operation Lights stay on continuously.

Multi-Drive™ Combines continuous operation and OverDrive™ strobe (high-pulse operation) mode into one easy-to-use light.

Built-In Driver The built-in driver allows full function without the need of an external controller.

Camera to Light Connecting the light directly to the camera, without the need for additional controllers or equipment.

**Polarizers** Filters that reduce reflections on specular surfaces.

Diffuser Used to widen the angle of light emission, reduce reflections, and increase uniformity.

TYPES OF ILLUMINATION

Projector

Dark Field

Radial

Bright Field

Direct

Axial

Line

Diffuse Panel

Backlight
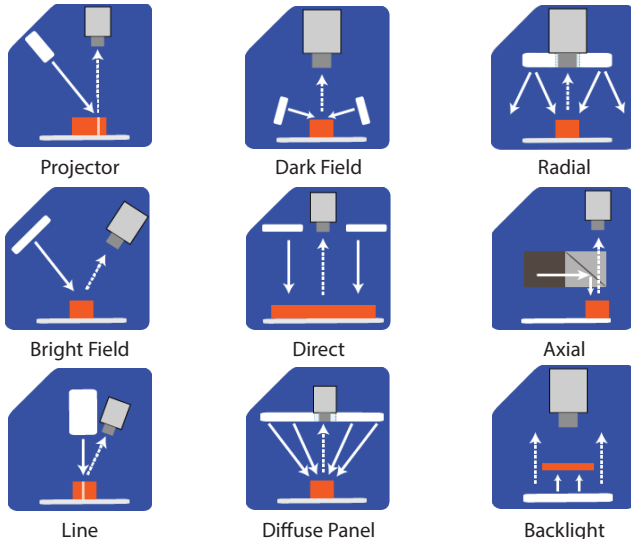
COMMON COLOR/WAVELENGTHS LEGEND

Wavelengths options range from 365 nm to 1550 nm.
Additional wavelengths available for many light families.

365 395 470 505 530 625 850 940 WHI
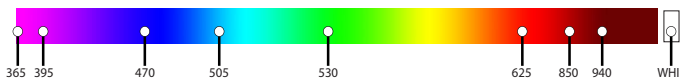
See Part Number section for **this light's available standard wavelengths.*

SWIR SHORTWAVE INFRARED

Shortwave Infrared LEDs are available in 1050 nm, 1200 nm, 1300 nm, 1450 nm, and 1550 nm.*

Check Part Number section to see if **this light is available in SWIR wavelengths.*