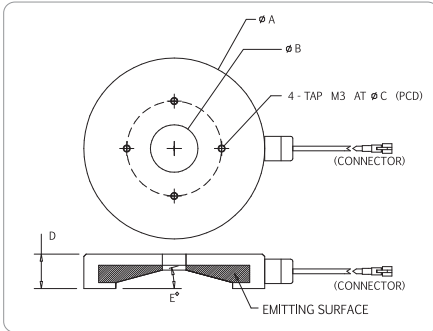
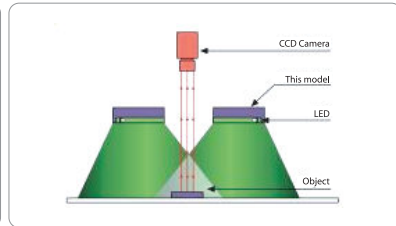
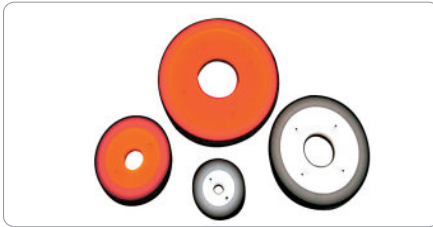


## DFR3 SERIES - Diffused Angular Illumination

DFR3 series provide diffused even illumination over a surface. A conical illumination surface makes it possible to illumination a work piece from almost any angle.

Application: printed character on IC chips, PCB component, printing on caps, and Wafer OCR inspection.

**Technical Specification:**

- Color Red, Green, Blue and White
- 24V DC Input Power
- Continuous and Strobe Applications
- Compact Size
- Lighting Cable 500mm

**Customize Lighting:**

- Customize Sizes, Mounting requirements
- Color and Voltage Available
- Consult Technical Sales for More Information

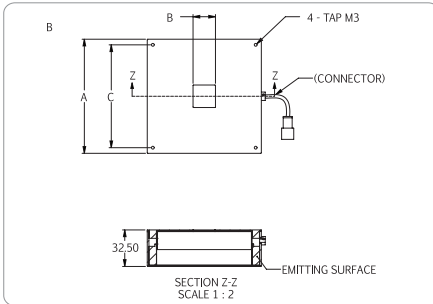
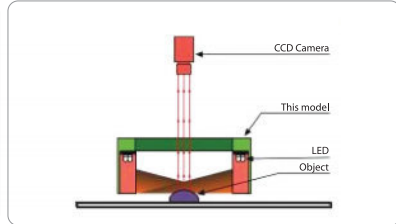
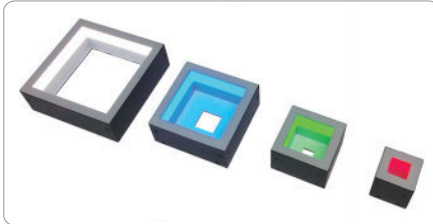
Model	Dimensions [MM]					Color	Voltage / Watt	Current
	$\phi A$	$\phi B$	$\phi C$	D	$E^{\circ}$			
DFR3-00-050-1-X	50.8	8.0	25.0	13.0	0	● ● ○ ● ● ○	24V / 1.80W 24V / 1.68W	75mA 70mA
DFR3-00-070-1-X	76.2	21.0	52.0	13.0	0	● ● ○ ● ● ○	24V / 2.88W 24V / 3.96W	120mA 165mA
DFR3-00-100-1-X	100.0	30.0	80.0	13.0	0	● ● ○ ● ● ○	24V / 3.96W 24V / 5.04W	165mA 210mA
DFR3-00-120-1-X	126.5	45.0	106.0	13.0	0	● ● ○ ● ● ○	24V / 5.04W 24V / 6.48W	210mA 270mA
DFR3-15-070-1-X	76.2	21.0	52.0	13.0	15	● ● ○ ● ● ○	24V / 2.88W 24V / 3.96W	120mA 165mA
DFR3-15-100-1-X	100.0	30.0	80.0	15.0	15	● ● ○ ● ● ○	24V / 3.96W 24V / 5.04W	165mA 210mA
DFR3-15-120-1-X	126.5	30.0	106.0	18.0	15	● ● ○ ● ● ○	24V / 5.04W 24V / 6.48W	210mA 270mA
DFR3-30-050-1-X	50.8	8.0	25.0	15.0	30	● ● ○ ● ● ○	24V / 1.80W 24V / 1.68W	75mA 70mA
DFR3-30-070-1-X	76.2	21.0	52.0	15.0	30	● ● ○ ● ● ○	24V / 2.88W 24V / 3.96W	120mA 165mA
DFR3-30-100-1-X	100.0	30.0	80.0	23.0	30	● ● ○ ● ● ○	24V / 3.96W 24V / 5.04W	165mA 210mA
DFR3-30-120-1-X	126.5	30.0	106.0	28.0	30	● ● ○ ● ● ○	24V / 5.04W 24V / 6.48W	210mA 270mA

Remark: The current of DFR3 is changed.

## DLQ2 & DLF2 SERIES - Diffused Square Illumination

DLQ2 & DLF2 series provide diffused even illumination over from sides. The even illumination is suitable for inspection of rectangular work-piece.

Application: BGA ball inspection and QFP lead inspection.



**Technical Specification:**

- Color Red, Green, Blue and White
- 24V DC Input Power
- Continuous and Strobe Applications
- Compact Size
- Lighting Cable 500mm

**Customize Lighting:**

- Customize Sizes, Mounting requirements
- Color and Voltage Available
- Consult: Technical Sales for More Information

Model	Dimensions [MM]			Color	Voltage / Watt	Current
	A	B	C			
DLQ2-90-030-1-X	31.8	10	21	● ● ○	24V / 1.44W	60mA
DLQ2-90-050-1-X	50.8	10	40	● ● ○	24V / 2.88W	120mA
DLQ2-90-070-1-X	76.2	20	66	● ● ○	24V / 2.88W	120mA
DLQ2-90-100-1-X	101.6	20	91.5	● ● ○	24V / 4.32W	180mA
DLF2-90-050-1-X	50.8	26	40	● ● ○	24V / 2.88W	120mA
DLF2-90-070-1-X	76.2	55	66	● ● ○	24V / 2.88W	120mA
DLF2-90-100-1-X	101.6	80	91.5	● ● ○	24V / 4.32W	180mA
				● ● ○	24V / 5.76W	240mA

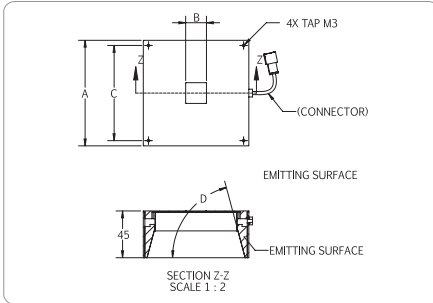
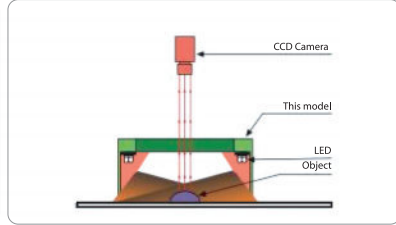
Remark: The current of DLF2 & DLQ2 are changed.

# Diffused Illumination

## DLS2 & DLW2 SERIES - Diffused Square Illumination

DLS2 & DLW2 series provide diffused even illumination over a surface. The even illumination prevents glaring for shining surface.

Application: character recognition on shining surface, lead inspection.



**Technical Specification:**

- Color Red, Green, Blue and White
- 24V DC Input Power
- Continuous and Strobe Applications
- Compact Size
- Lighting Cable 500mm

**Customize Lighting:**

- Customize Sizes, Mounting requirements
- Color and Voltage Available
- Consult Technical Sales for More Information

Model	Dimensions (MM)				Color	Voltage / Watt	Current
	A	B	C	D°			
DLS2-60-050-1-X	50.8	16.0	40.0	60	● ● ○	24V / 2.88W	120mA
DLS2-60-070-1-X	76.2	20.0	66.0	60	● ● ○	24V / 2.88W	120mA
DLS2-60-100-1-X	101.6	20.0	91.5	60	● ● ○	24V / 4.32W	180mA
DLW2-60-070-1-X	76.2	40.0	66.0	60	● ● ○	24V / 4.32W	180mA
DLW2-60-100-1-X	101.6	66.0	91.5	60	● ● ○	24V / 5.76W	240mA

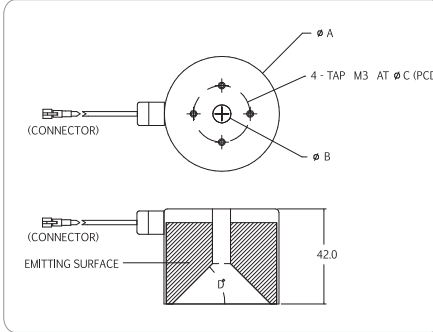
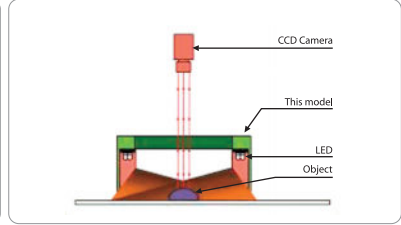
Remark: The current of DLS2 & DLW2 are changed.

# Diffused Illumination

## DLR2 SERIES - Diffused Angular Illumination

DLR2 series provide diffused even illumination over a surface. The even illumination prevents glaring for shining surface.

Application: character recognition on shining surface, lead inspection.



**Technical Specification:**

- Color Red, Green, Blue and White
- 24V DC Input Power
- Continuous and Strobe Applications
- Compact Size
- Lighting Cable 500mm

**Customize Lighting:**

- Customize Sizes, Mounting requirements
- Color and Voltage Available
- Consult Technical Sales for More Information

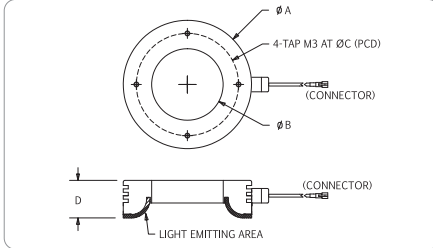
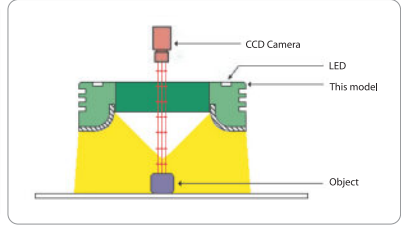
Model	Dimensions (MM)				Color	Voltage / Watt	Current
	ØA	ØB	ØC	D°			
DLR2-45-050-2-X	50.8	8	25	45	● ● ● ○	24V / 1,44W	60mA
DLR2-45-070-2-X	76.2	21	52	45	● ● ● ○	24V / 1,80W	75mA
DLR2-45-100-2-X	76.2	43	52	60	● ● ● ○	24V / 2,88W	120mA
DLR2-45-100-2-X	100	45	80	45	● ● ● ○	24V / 3,60W	150mA
DLR2-45-120-2-X	100	68	80	60	● ● ● ○	24V / 3,60W	150mA
DLR2-45-120-2-X	126.5	71	106	45	● ● ● ○	24V / 4,68W	195mA
DLR2-60-050-2-X	126.5	93	106	60	● ● ● ○	24V / 4,68W	195mA
DLR2-60-050-2-X	50.8	18	25	60	● ● ● ○	24V / 1,44W	60mA
DLR2-60-070-2-X	76.2	43	52	60	● ● ● ○	24V / 1,80W	75mA
DLR2-60-100-2-X	76.2	43	52	60	● ● ● ○	24V / 2,88W	120mA
DLR2-60-100-2-X	100	68	80	60	● ● ● ○	24V / 3,60W	150mA
DLR2-60-100-2-X	100	68	80	60	● ● ● ○	24V / 3,60W	150mA
DLR2-60-120-2-X	100	68	80	60	● ● ● ○	24V / 4,68W	195mA
DLR2-60-120-2-X	126.5	93	106	60	● ● ● ○	24V / 4,68W	195mA
DLR2-60-120-2-X	126.5	93	106	60	● ● ● ○	24V / 6,12W	255mA

Remark: DLR part numbers are changed to DLR2.

## HPD SERIES - Uniform Ring Light Illumination

Power LED with molded diffuses to achieves high uniform area with higher flexibility.

Application: shining surface and food packaging.



**Technical Specification:**

- Color Red, Green, Blue and White
- 24V DC Input Power
- Continuous and Strobe Applications
- Compact Size
- Lighting Cable 500mm

**Customize Lighting:**

- Customize Sizes, Mounting requirements
- Color and Voltage Available
- Consult Technical Sales for More Information

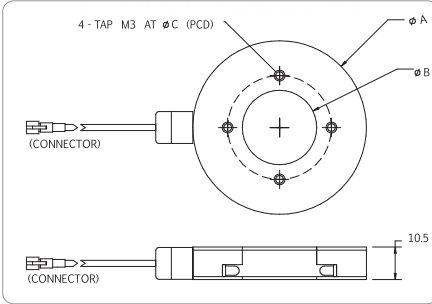
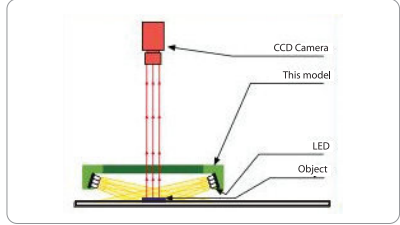
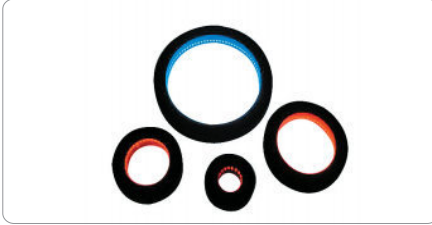
Model	Dimensions (MM)				Color	Voltage / Watt	Current
	ØA	ØB	ØC	D			
HPD-00-070-1-X	75.5	42	60	22	● ● ● ●	24V / 1.80W	75mA
HPD-00-110-2-X	114	68	90	22	● ● ● ●	24V / 2.16W	90mA
HPD-00-170-1-X	176.6	111	150	29.6	● ● ● ●	24V / 3.96W	165mA
HPD-00-170-1-X	176.6	111	150	29.6	● ● ● ●	24V / 4.37W	182mA
HPD-00-240-1-X	245	158.5	200	38	● ● ● ●	24V / 18.0W	750mA
HPD-00-240-1-X	245	158.5	200	38	● ● ● ●	24V / 18.0W	750mA
HPD-00-240-1-X	245	158.5	200	38	● ● ● ●	24V / 25.20W	1050mA
HPD-00-240-1-X	245	158.5	200	38	● ● ● ●	24V / 26.68W	1120mA

Remarks : The current of HPD are changed.

## LLA SERIES - Low Angle Illumination

LED are arrange in led angle to provide side illumination. LLA series are available in 1 row to suite different brightness requirements.

Application: edge detection, scratched on metal or glossy surface.



### Technical Specification:

- Color Red, Green, Blue and White
- 24V DC Input Power
- Continuous and Strobe Applications
- Compact Size
- Lighting Cable 500mm

### Customize Lighting:

- Customize Sizes, Mounting requirements
- Color and Voltage Available
- Consult: Technical Sales for More Information

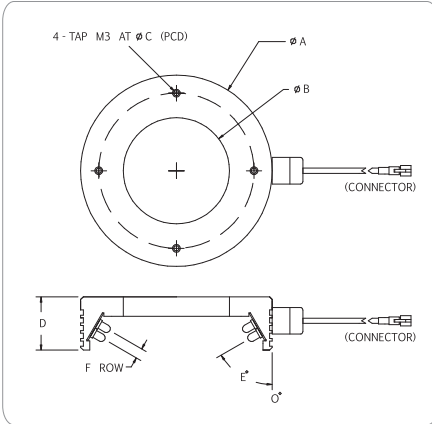
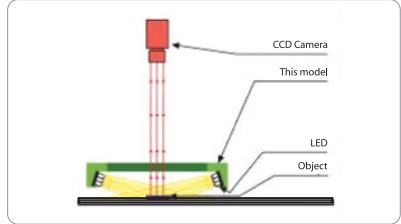
Model	Dimensions (MM)			Color	Voltage / Watt	Current
	ØA	ØB	ØC			
LLA-90-050-1-X	56	24	33,5	● ● ○ ● ● ○	24V / 1,08W 24V / 1,44W	45mA 60mA
LLA-90-080-1-X	80	50	56,5	● ● ○ ● ● ○	24V / 1,80W 24V / 2,52W	75mA 105mA
LLA-90-100-1-X	101	71	77,5	● ● ○ ● ● ○	24V / 2,52W 24V / 3,24W	105mA 135mA
LLA-90-150-1-X	151	121	127,5	● ● ○ ● ● ○	24V / 3,96W 24V / 5,04W	165mA 210mA
LLA-90-180-1-X	181	151	157,5	● ● ○ ● ● ○	24V / 4,68W 24V / 6,12W	195mA 255mA
LLA-90-210-1-X	211	181	187	● ● ○ ● ● ○	24V / 5,76W 24V / 7,20W	240mA 300mA

Remark: 2 types of white are available- W: Cool White WW: Yellowish White

## LLA SERIES - Low Angle Illumination

LED arrays are arranged in LED angle to provide side illumination. LLA series are available in 2 and 3 rows to suite different brightness requirements.

Application: edge detection, scratched on metal or glossy surface.



**Technical Specification:**

- Color Red, Green, Blue and White
- 24V DC Input Power
- Continuous and Strobe Applications
- Compact Size
- Lighting Cable 500mm

**Customize Lighting:**

- Customize Sizes, Mounting requirements
- Color and Voltage Available
- Consult: Technical Sales for More Information

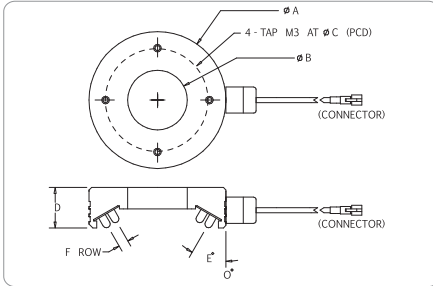
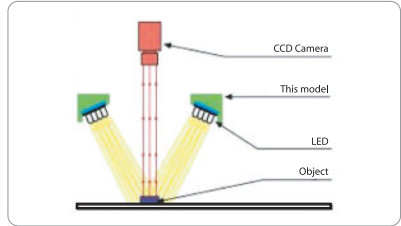
Model	Dimensions (MM)						Color	Voltage / Watt	Current
	ØA	ØB	ØC	D	E°	F (ROW)			
LLA-60-070-2-X	74	41	60	20.5	60	2	● ● ○ ● ● ○	24V / 3,60W 24V / 4,68W	150mA 195mA
LLA-60-090-2-X	90	57	75	20.5	60	2	● ● ○ ● ● ○	24V / 4,32W 24V / 5,76W	180mA 240mA
LLA-60-150-3-X	151	114	136	23.5	60	3	● ● ○ ● ● ○	24V / 11,88W 24V / 15,12W	495mA 630mA
LLA-60-200-2-X	202	167	186	20.5	60	2	● ● ○ ● ● ○	24V / 10,80W 24V / 14,04W	450mA 585mA
LLA-75-130-3-X	131	94	116	24.5	75	3	● ● ○ ● ● ○	24V / 10,08W 24V / 12,96W	420mA 540mA
LLA-75-170-3-X	175	136	159	24.5	75	3	● ● ○ ● ● ○	24V / 13,68W 24V / 17,64W	570mA 735mA

Remark: 2 types of white are available- W: Cool White WW: Yellowish White

## LSW SERIES - High Density, Concentrated Light Output

LED arrays are arranged such that the light arrays are concentrated to a spot for extreme bright light. Using flexible PCB board, the product quality and efficiency improves. Flexible boards are able to achieve optimized angle with variation of outer and inner diameter to target a work piece.

Application: substrate inspection, label inspection, flat surface, fiducially recognition.



- Technical Specification:**
- Color Red, Green, Blue and White
  - 24V DC Input Power
  - Continuous and Strobe Applications
  - Compact Size
  - Lighting Cable 500mm

- Customize Lighting:**
- Customize Sizes, Mounting requirements
  - Color and Voltage Available
  - Consult: Technical Sales for More Information

Model	Dimensions (MM)					F (ROW)	Color	Voltage / Watt	Current
	ØA	ØB	ØC	D	E*				
LSW-00-040-2-X	43	15	28	20	0	2	● ● ○ ● ● ○	24V / 1,44W 24V / 1,80W	60mA 75mA
LSW-00-050-2-X	54	23.5	41	20	0	2	● ● ○ ● ● ○	24V / 2,16W 24V / 2,88W	90mA 120mA
LSW-00-070-3-X	70	26	56	20	0	3	● ● ○ ● ● ○	24V / 4,32W 24V / 5,40W	180mA 225mA
LSW-00-090-4-X	92	40	70	20	0	4	● ● ○ ● ● ○	24V / 6,48W 24V / 8,28W	270mA 345mA
LSW-15-050-2-X	50	28	40	16	15	2	● ● ○ ● ● ○	24V / 2,16W 24V / 2,52W	90mA 105mA
LSW-15-070-3-X	70	32	56	20,5	15	3	● ● ○ ● ● ○	24V / 4,32W 24V / 5,76W	180mA 240mA
LSW-15-090-4-X	92	47	70	20,5	15	4	● ● ○ ● ● ○	24V / 7,92W 24V / 10,08W	330mA 420mA
LSW-15-100-5-X	103	48	80	22	15	5	● ● ○ ● ● ○	24V / 10,80W 24V / 13,68W	450mA 570mA
LSW-30-040-2-X	46	20	35	16	30	2	● ● ○ ● ● ○	24V / 1,80W 24V / 2,52W	75mA 105mA
LSW-30-050-2-X	54	23.5	41	18	30	2	● ● ○ ● ● ○	24V / 2,16W 24V / 2,88W	90mA 120mA
LSW-30-070-3-X	70	32	56	20	30	3	● ● ○ ● ● ○	24V / 4,32W 24V / 5,40W	180mA 225mA
LSW-30-090-4-X	92	48	70	22	30	4	● ● ○ ● ● ○	24V / 8,28W 24V / 10,44W	345mA 435mA
LSW-45-050-2-X	54	25	44	20	45	2	● ● ○ ● ● ○	24V / 2,16W 24V / 2,88W	90mA 120mA
LSW-45-070-3-X	70	35	60	21	45	3	● ● ○ ● ● ○	24V / 4,68W 24V / 5,76W	195mA 240mA
LSW-45-090-4-X	92	52	70	24	45	4	● ● ○ ● ● ○	24V / 8,28W 24V / 10,44W	345mA 435mA
LSW-45-100-5-X	100	48	80	30	45	5	● ● ○ ● ● ○	24V / 11,16W 24V / 14,40W	465mA 600mA

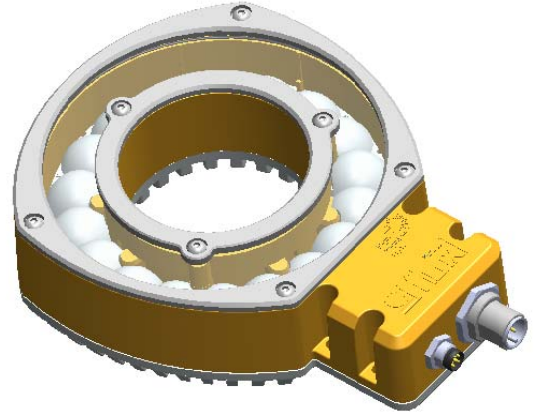
Remark: 2 types of white are available- W: Cool White WW: Yellowish White



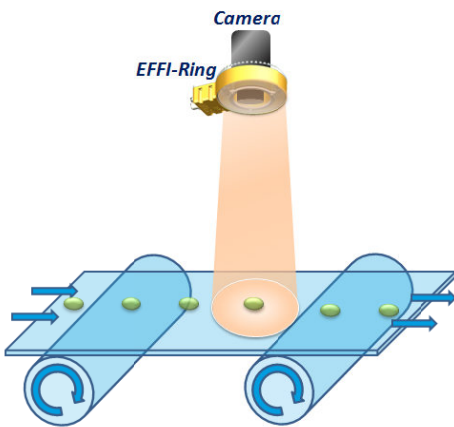
# EFFI-Ring

## High power LED ring light

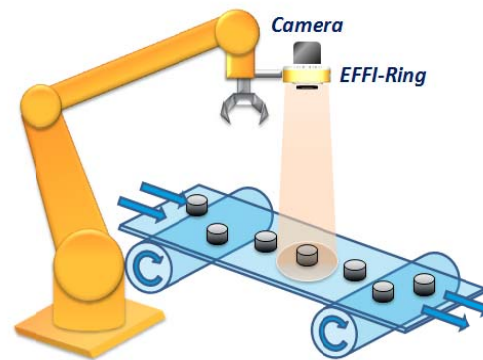
- **Very intense and uniform** illuminated area
- **Full range of colors:** from UV to IR, white, tricolor
- **Long lifetime** and few maintenance
- **Compatible** with most objectives



### APPLICATIONS:



Quality control



Pick and place

### OVERVIEW OF THE CHARACTERISTICS

<b>Electronics</b>	<i>Connectors</i>	M12 - 5 pins	M8 - 4 pins
	<i>Power supply</i>	24V DC	Direct current (⚠ No driver = No protection)
	<i>Illumination mode</i>	Continuous or strobe mode	Continuous or strobe mode
	<i>Power consumption</i>	72W	Depends on your configuration
<b>Optics</b>	<i>Wavelength</i>	Single (from UV to IR, white) or three different (RGB or WUI) wavelengths	
<b>Mechanics</b>	<i>Weight</i>	400 g	
	<i>Width x length x height</i>	117 mm x 151 mm x 40 mm	
	<i>Inside diameter</i>	58 mm	
	<i>Fastener</i>	M4 screw (4 on heat sink & 4 on outgrowth)	
	<i>Material</i>	Device body : Aluminum alloy & ABS ; Window : PMMA	
<b>Environment</b>	<i>Working temperature</i>	-10°C to 50°C	
	<i>IP code</i>	IP65	

## TECHNICAL CHARACTERISTICS

### How to create the EFFI-Ring ?

EFFI-Ring XXX(YZ)

Wavelength (nm) → XXX

Window → Y

Lens position → Z

#### Available wavelengths:

- White : **000**
- Near UV : **405**
- Blue : **465**
- Green : **525**
- Red : **625**
- Far Infrared : **850**
- Red/Green/Blue : **RGB**
- White/UV/IR : **WUI**

*Other wavelengths are available upon request*

#### Window:

- **T** : Transparent
- **D** : Semi-diffuse
- **O** : Opaline

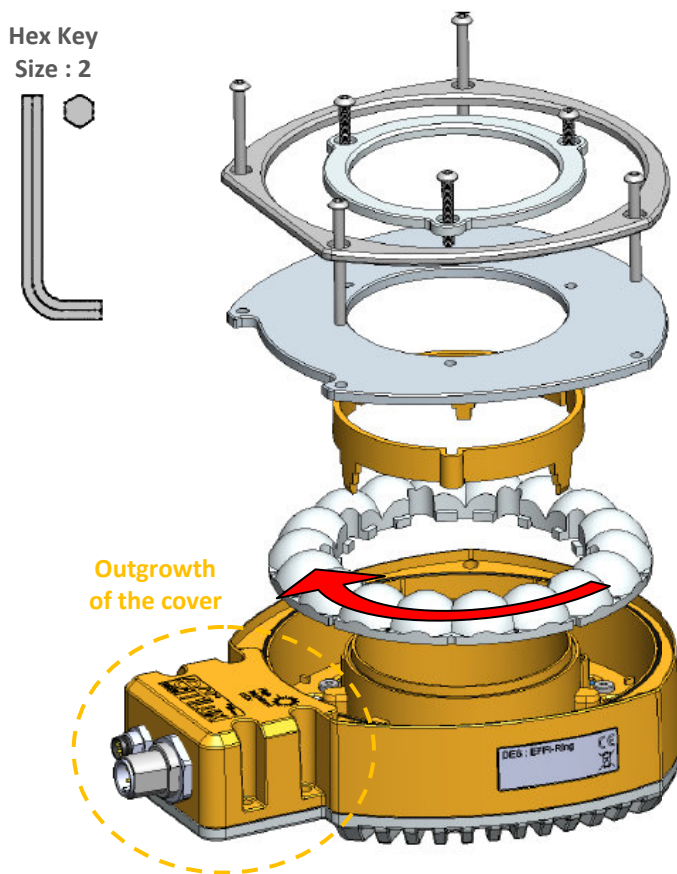
#### Lens position:

- **0** : 90° (Without lens)
- **1** : 45°
- **2** : 25°
- **3** : 10°

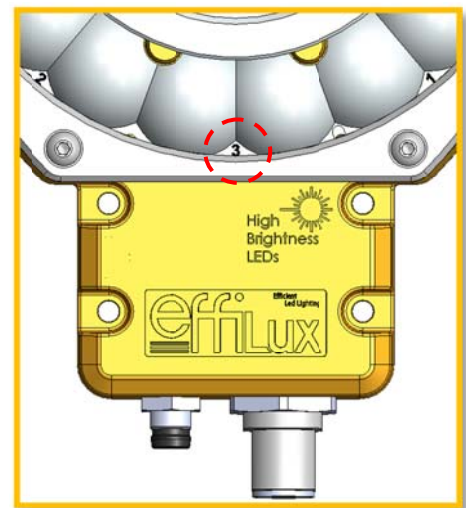
Available options : Add '**\_Pol**' to integrate a polarizer

### How to use the EFFI-Ring ?

The numbers 1, 2 and 3 are inscribed in the lens and correspond to the lens position. Match the number of the desired position lens with the outgrowth of the cover.



Example : Lens position n°3



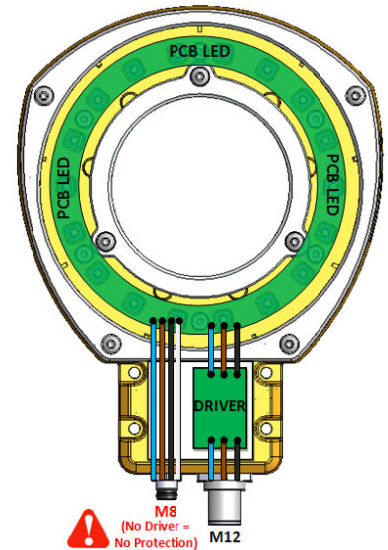
## Electrical characteristics

### Connectors

#### M12 CONNECTOR – Driver control

The EFFI-Ring is supplied with a 24V constant voltage source

Pin number	Contact arrangement	Cable color	Designation	
			Single Color Version	RGB/WUI Version
1		Brown	+24V (common)	+24V (common)
2		White	n.a.	DIM Blue/White - max 24V
3		Blue	GND	GND
4		Black	DIM - max 24V	DIM Red/UV - max 24V
5		Grey	n.a.	DIM Green/IR - max 24V



#### M8 CONNECTOR – Direct control



A current source, with the correct settings can be used to supply EFFI-Ring with M8 connector

Please, contact EFFILUX technical support for complete details



Pin number	Contact arrangement	Cable color	Designation	
			Single Color Version	RGB/WUI Version
1		Brown	6*LED Forward Voltage (common) <sup>1</sup>	6*LED Forward Voltage (common) <sup>1</sup>
2		White	GND 1	GND Red/UV
3		Blue	GND 2	GND Blue/White
4		Black	GND 3	GND Green/IR

(1) See ANNEX for more information

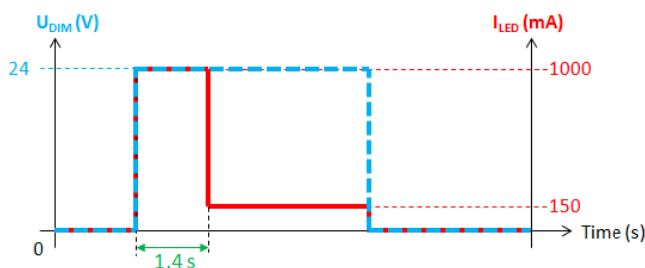
Be aware that the maximum current for a given frequency and a given  $T_{pulse}$ , in the following table, cannot be exceeded

$T_{pulse}$ ( $\mu$ s)	F (Hz)				
	1	5	10	15	20
100 000	1.0 A				
50 000	1.2 A				
10 000	1.5 A		1.0 A		
1 000	2.0 A				
100	2.5 A				

### Dimming control (M12 connector)

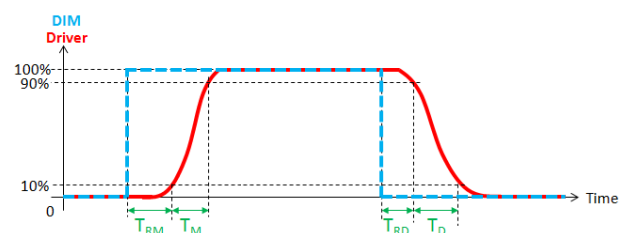
DIM Voltage $U_{DIM}$ (V)	Light intensity	DIM consumption
0 – 3	OFF	0,1mA@3V
5 – 24	ON	0,8mA @24V

Strobe mode : Respect a duty cycle lower than 0.15



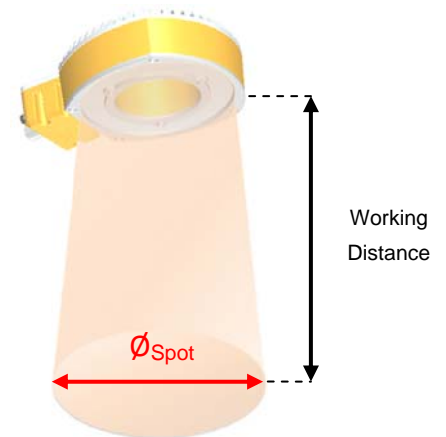
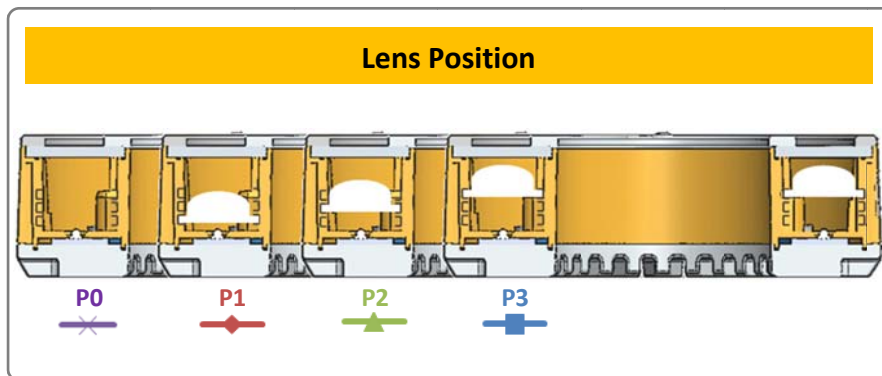
### Characteristics of the pulse(M12 connector)#

Designation	Time ( $\mu$ s)
Rise Time ( $T_M$ ) <sup>1,5</sup>	4-15
Response Rise Time ( $T_{RM}$ ) <sup>2</sup>	25
Fall Time ( $T_D$ ) <sup>3</sup>	10
Response Fall Time ( $T_{RD}$ ) <sup>4</sup>	5

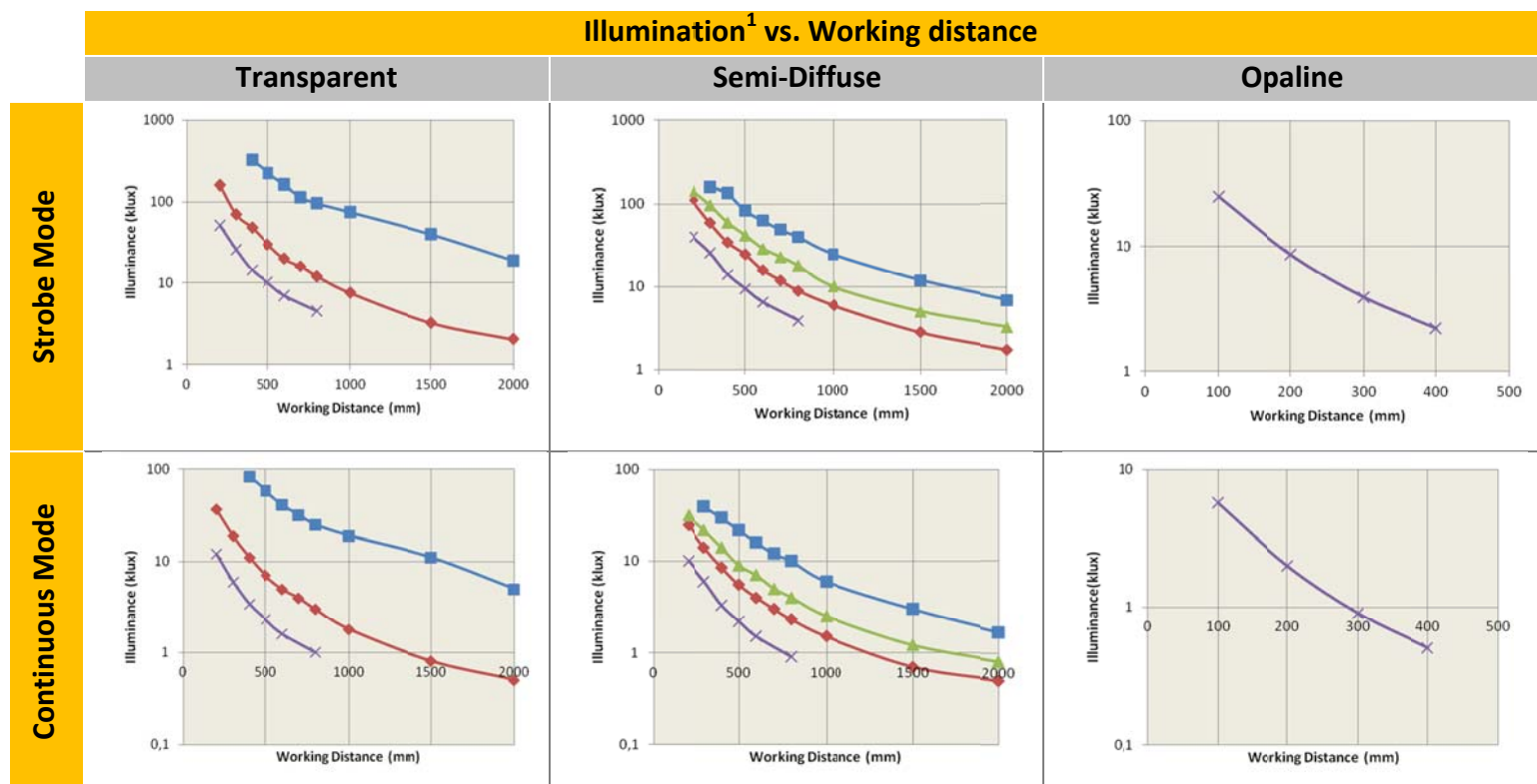


- (1) From 10% to 90% of the peak value of driver signal
- (2) From 90% to 10% of the peak value of driver signal
- (3) From the beginning of the DIM signal to 10% of the peak value of driver signal
- (4) From the ending of the DIM signal to 90% of the peak value of driver signal
- (5)  $T_M$  increases when  $U_{DIM}$  or/and the frequency increases

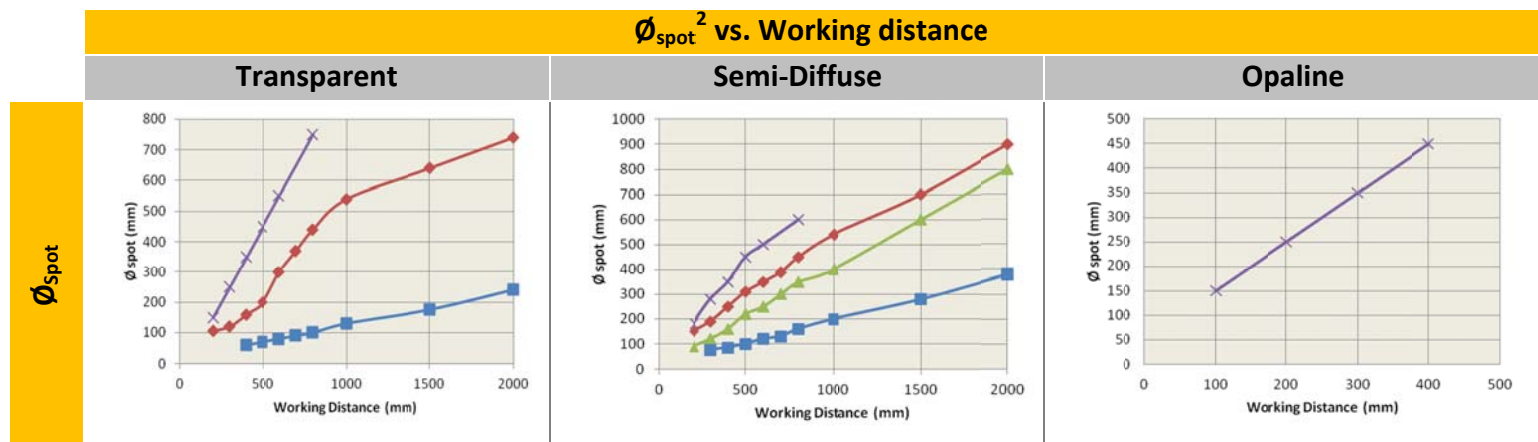
## Optical characteristics



### Illumination<sup>1</sup> vs. Working distance



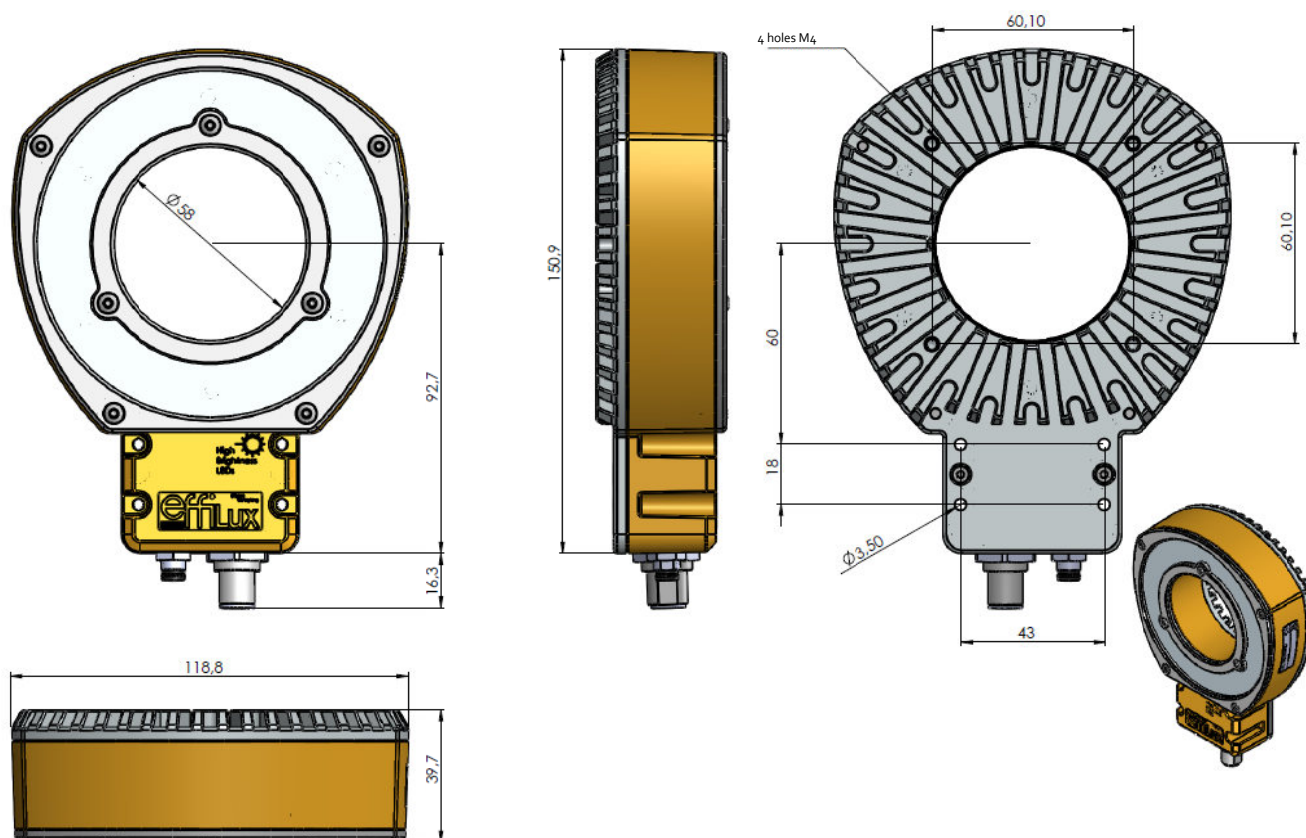
### Ø<sub>spot</sub><sup>2</sup> vs. Working distance






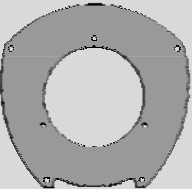
- (1) Maximum illumination at the center of the spot
- (2) From 50% to 100% of the peak value of illumination



## Mechanical considerations



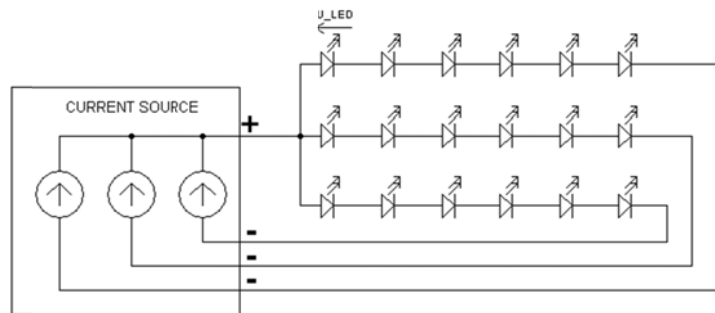
## ACCESSORIES

	EFFILUX reference	Description
Mechanics	EFFM_	Camera bracket
	EFFM_	Camera bracket
	EFFM_	Camera bracket
Electronics	EFFC-Cable_M12_000X Binder : 79-3440-12-05	 M12 cable – 5 pins – 2m long
	EFFC-Cable_M12_000X Binder : 79-3440-15-05	 M12 cable – 5 pins – 5m long
	EFFC-Cable_M8_0005 Binder : 79 3382 42 04	 Female Cable M8 – straight – 4 pins – 2m long
Optics	EFFO-Polariser_0006	 Optical sheet to polarize the output light

## ANNEX

Block circuit diagram of M8 connector #

LED	Forward Voltage $U_{LED}$ (V)
UV	3.50 - 4.30
Blue	2.80 - 3.50
Green	2.90 - 3.70
Red	1.90 - 2.70
IR	1.50 - 2.00
White	3.10 - 3.70



Block circuit diagram of M12 connector #

