

# Illumination



## Broad range of lighting solutions

MORITEX has the most complete LED illumination portfolio in the industry with the **constant current controlled "MG-Wave®"** and **constant voltage controlled "CompaVis®"** providing support for the entire range of machine vision customers in various image processing environments.

## Image processing total system solutions support

Our total system solutions approach provides customers with the best performance & efficiency through consideration of the 3 essential imaging fields of illumination, lens, and peripherals.

## Making obscure and unrecognizable images become sharp and clear

Our comprehensive system solutions meet a wide range of needs for image processing applications.

### MG-Wave®

**Constant Current Control System /  
Extensive Product Variety /  
Unique, High End Solutions**

MG-Wave® is our original LED illumination product line designed with our patented highly sophisticated integrated constant current sensing control system that enables our LED controllers to identify the appropriate current value for each individual LED unit connected and control them separately. The constant current design successfully reduces heat generation to improve output intensity, efficiency, and stability.



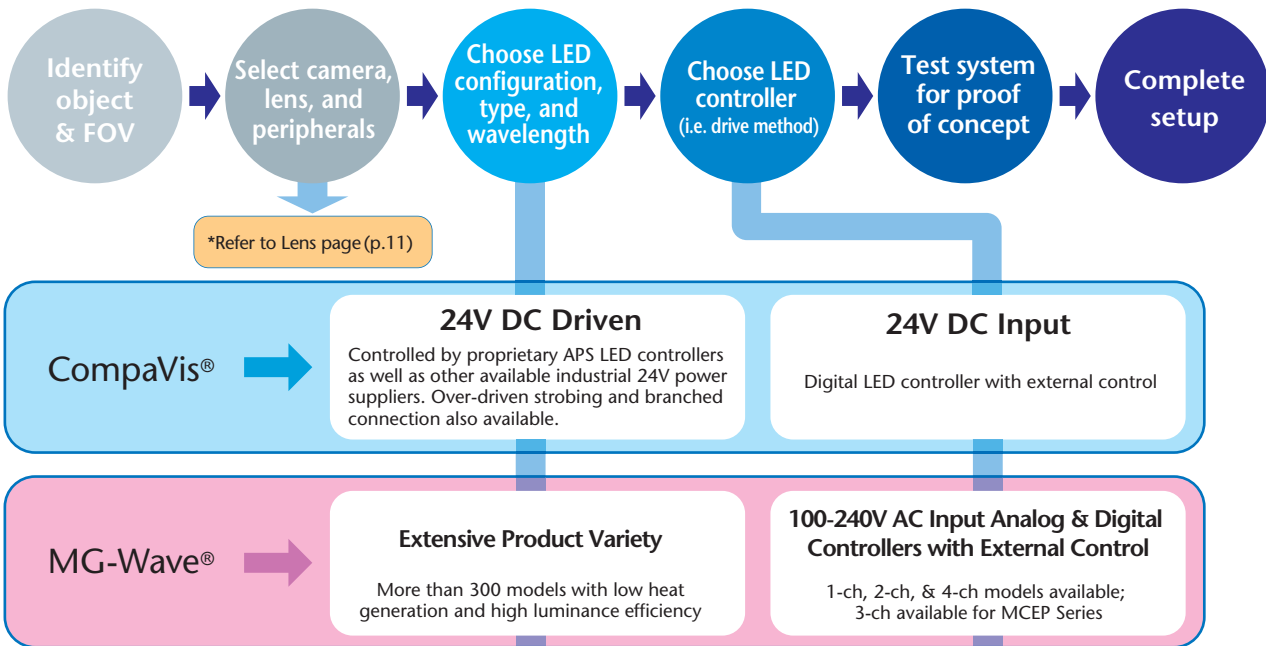
### CompaVis®

**Constant Voltage Control System / 24V DC**

CompaVis® constant voltage control LED illumination products are 24V DC driven and can be controlled by industrial 24V power supplies. Over-driven strobing is also possible for instantaneous, high intensity illumination. This series can be used in various machine vision imaging environments providing a broad range of lighting solutions.



### Selection flowchart



### LED Lineup Reference Table

Illumination Type	CompaVis® Series	MG-Wave® Series
Direct Ring Illumination	CV-R/SQ	MDRL
Low Angle Ring Illumination	CV-RLA/RLA-00	MLRL
Shadowless Illumination	CV-FR/DR/DSQ	MSRL/MSLL/MSQL
Bar Illumination	CV-BA	MBRL
High Power Bar Illumination	—	MHBC
Square Bar Type Illumination	CV-BAQ	MDQL
Dome Illumination	—	MSDC/MDML
Simulated Coaxial Illumination	CV-CX	MSCL
Direct Backlights (Chip Mount Type)	CV-FL	MDBC
Direct Backlights (Discrete Type)	—	MDBL
Edge Type Backlights	—	MEBL/MEBC
Collimated Backlights	—	MCBP
High Brightness LED Light Line	—	MLNC/HB-LED-LL
Diffuse Chip Type Bar Illumination	—	MBRC
High Power LED Spot Illumination	—	MCEP
Coaxial Illumination	CV-CE	MCEC/MCEL
LED Spot Projectors	—	MSPP
IR Illumination	IR	IR
UV Illumination	—	UV
Variable Color RGB Illumination	—	RGB

Input	CompaVis®	DC24V
	MG-Wave®	AC100V-240V
Channel	CompaVis®	2ch
	MG-Wave®	1ch, 2ch, 4ch
External Control	CompaVis®	Ethernet Digital (Pararell/8bit)
	MG-Wave®	Analog (0-5V) Digital (Pararell/8bit)

### LED Controller Lineup Reference



#### MLEF Series Digital LED Controllers for CompaVis®

For CompaVis™  
24V DC, DIN rail mountable



#### LED Controllers for MG-Wave®

Constant current sensing control system



#### LED Controllers for MCEP/MSPP Series

For high power LED spot illumination

### LED SAFETY STANDARD (CEI/IEC 62471:2006)

Groups	Definition and Emission limit
Exempt	Not more than 1.0 W·m <sup>-2</sup> . Small source defined as one with <0.011 radian.
Low Risk	Not more than 1.0 W·m <sup>-2</sup>
Moderate Risk	Not more than 400 W·m <sup>-2</sup>
High Risk	Higher than 400 W·m <sup>-2</sup>

Lamp Classification based on IEC standards are applicable to LED lighting units. Criteria for classification is shown above. LEDs are narrow bandwidth light sources with emission levels based on "Blue light, small source" where the wavelength is from 300nm to 700nm. The LED illumination products listed in the catalog are considered to be in either the low risk or exempt group.

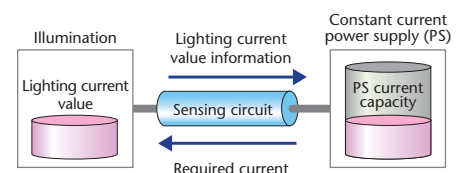


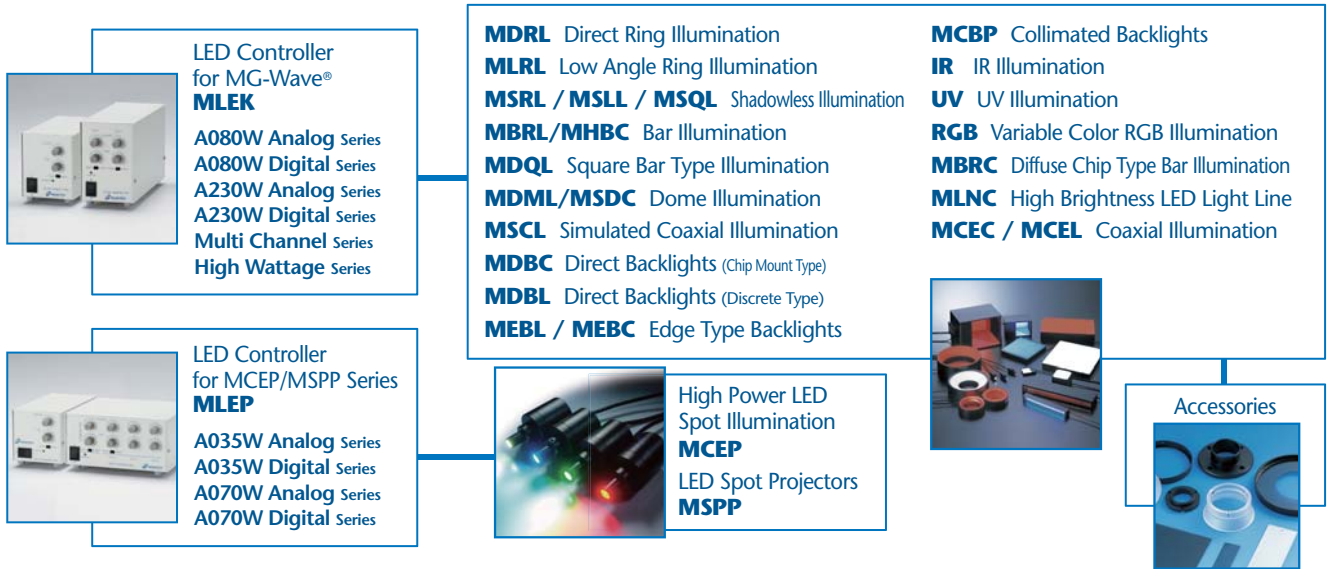
## Constant Current Control System

# MG-Wave®

The MG-Wave® is designed and manufactured for optimum performance in Machine Vision applications operating on high-performance processing equipment and inspection systems or in critical conditions in manufacturing facilities. The "Constant Current Control System" enables reduction of heat generation and provides high intensity and stable illumination when compared to other conventional LED illumination and halogen light source systems. The unique patented sensing circuit system addresses one of the most prominent disadvantages of versatility, which other current control systems suffer from, by automatically detecting the required current value of each individual illumination unit upon connection to the controller.

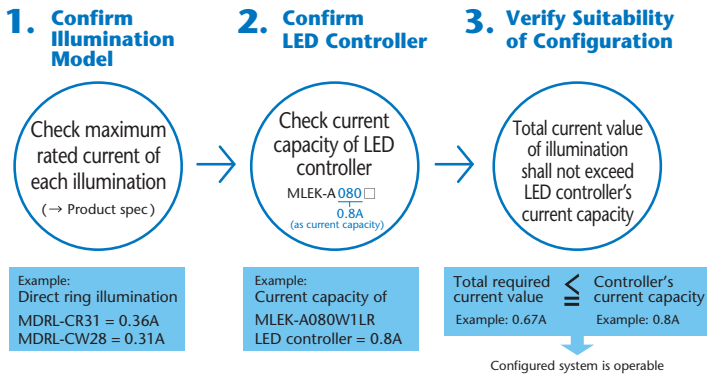
Schematic Diagram of Sensing Circuit System





Before using MG-Wave®

### Selection Criteria of LED Controller



● Note

- In the case of 2-channel LED controllers, they can work with up to 2 illumination devices simultaneously as long as the sum of rated current of the 2 devices stays within the current capacity of LED controller.
- Bifurcated or branch cables cannot be used.
- Custom-made devices and special design may be available on request.

**CE** CE Marking

**RoHS** RoHS Directive

**IP67** Protection of Products from Solid Foreign Objects and Water

**Digital** Digital Intensity Control

**Analog** Analog Intensity Control

**1ch** 1 Channel Output

**2ch** 2 Channel Output

**3ch** 3 Channel Output

**4ch** 4 Channel Output



# High Power LED Spot Illumination and Coaxial Illumination MCEP/MCEC/MCEL Series

Four product series ranging in level of intensity from the MCEP-070 Series to MCEL Series are available for customers diverse needs. The wide variety of choices can be used for applications requiring coaxial illumination (eg. MML Series) or spot illumination.



High Power LED Spot Illumination and Coaxial Illumination

MCEP/MCEC/MCEL Series

Ultra high intensity



### MCEP 070-3 Series

- Highest illumination in the industry ! By employing state of the art high-power LEDs and our unique heat dissipation technology that enhances luminance efficiency greatly, the series achieves triple illumination compared to our conventional models
- Newly developed collimator and light guiding rod ensure high illumination uniformity

### MCEP Series

- High power spot illumination also optimum for MML (Machine Micro Lens) Series coaxial illumination
- 4 colors available for various test objects and applications

### MCEC Series

- Optimized for MML Series with high uniformity
- Suitable for applications that require greater brightness than MCEL Series
- Space-saving design with competitive prices

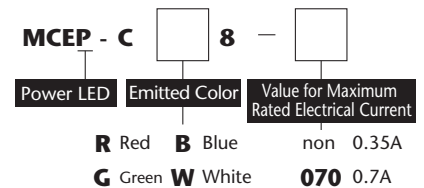
### MCEL Series

- Miniaturized coaxial illumination for MML Series
- Best suited for objects with high-reflection or specular surface
- Compact and low price

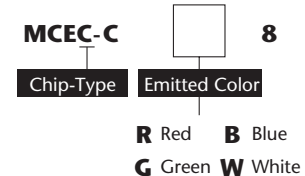
High intensity

#### Explanation of Model Code

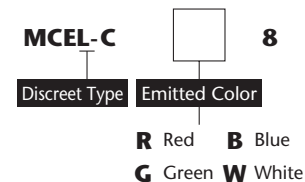
High Power LED Spot Illumination



Coaxial Illumination



Coaxial Illumination



### High Power LED Spot Illumination

Model	Emitted Color	Dominant Wavelength Range	Color Temperature	Maximum Rated Current IFM(A)	Weight (g)	LED Controller	Connector PIN
MCEP-CR8-070-3	● Red	620.5~645nm	—	0.7	45	MLEP-A070	3 Pin
MCEP-CG8-070-3	● Green	520~550nm	—	0.7	45	MLEP-A070	3 Pin
MCEP-CB8-070-3	● Blue	460~490nm	—	0.7	45	MLEP-A070	3 Pin
MCEP-CW8-070-3	○ White	—	4500~10000K	0.7	45	MLEP-A070	3 Pin

Model	Emitted Color	Dominant Wavelength Range	Color Temperature	Maximum Rated Current IFM(A)	Weight (g)	LED Controller	Connector PIN
MCEP-CR8	● Red	620.5~645nm	—	0.35	50	MLEP-A035	3 Pin
MCEP-CG8	● Green	520~550nm	—	0.35	50	MLEP-A035	3 Pin
MCEP-CB8	● Blue	460~490nm	—	0.35	50	MLEP-A035	3 Pin
MCEP-CW8-2N	○ White	—	4500~10000K	0.35	50	MLEP-A035	3 Pin

\* LED Controller on P.149~151

### Coaxial Illumination

Model	Emitted Color	Tip External Diameter(mm)	Maximum Rated Current IFM(A)	Weight (g)	LED Controller	Connector Pin
MCEC-CR8	● Red	∅8	0.14	35	MLEK-A080	4 Pin
MCEC-CG8	● Green	∅8	0.17	35	MLEK-A080	4 Pin
MCEC-CB8	● Blue	∅8	0.17	35	MLEK-A080	4 Pin
MCEC-CW8	○ White	∅8	0.17	35	MLEK-A080	4 Pin

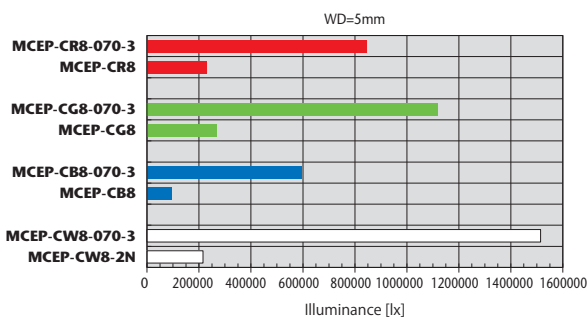
Model	Emitted Color	Tip External Diameter(mm)	Maximum Rated Current IFM(A)	Weight (g)	LED Controller	Connector Pin
MCEL-CR8	● Red	∅8	0.04	35	MLEK-A080	4 Pin
★ MCEL-CG8	● Green	∅8	0.03	35	MLEK-A080	4 Pin
MCEL-CB8	● Blue	∅8	0.03	35	MLEK-A080	4 Pin
MCEL-CW8	○ White	∅8	0.03	35	MLEK-A080	4 Pin

\* LED Controller on P.152~156

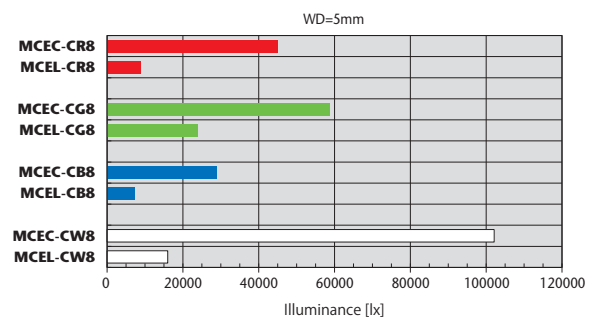
\* In case of a plurality of LED illuminations used, please check the "Selection Criteria LED Controller" on P.99.

★ Made-to-order products.

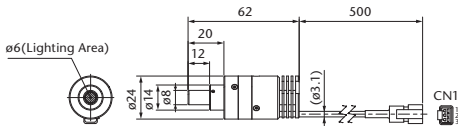
Illuminance Comparison Data  
High Power LED Spot Illumination



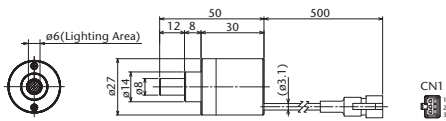
Illuminance Comparison Data  
Coaxial Illumination



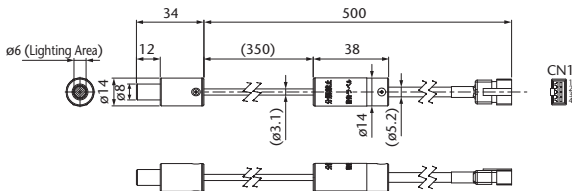
**MCEP-CR(CG,CB,CW)8-070-3**



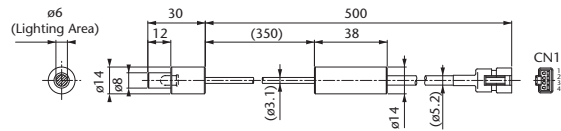
**MCEP-CR(CG,CB)8**  
**MCEP-CW8-2N**



**MCEC-CR (CG,CB,CW) 8**



**MCEL-CR (CG,CB,CW) 8**



# LED Controller

LED Controller  
for MCEP-070  
**MLEP-A070**

LED Controller  
for MCEP  
**MLEP-A035**

LED Controller  
for MCEC/MCEL  
**MLEK-A080**



(P.149)



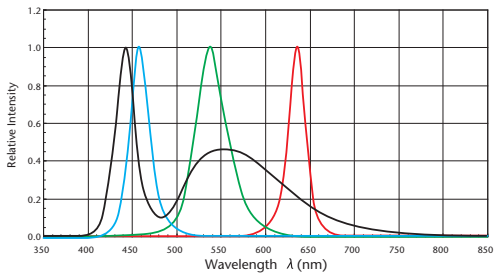
(P.149)



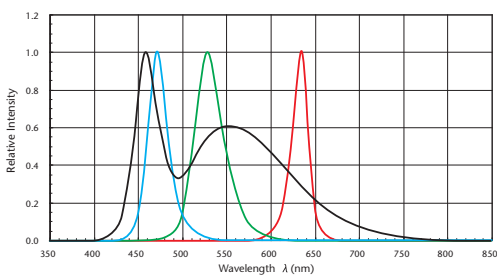
(P.152)



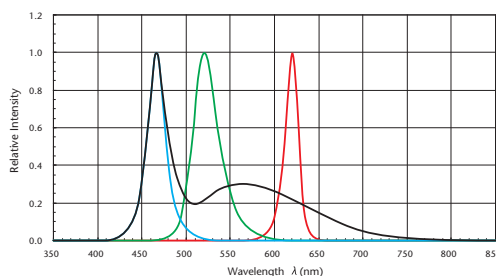
## Spectral Characteristic Data



R : Peak Wavelength  $\lambda_p$  = 636.9 (nm) Dominant Wavelength  $\lambda_d$  = 625.6 (nm)  
 G : Peak Wavelength  $\lambda_p$  = 538.1 (nm) Dominant Wavelength  $\lambda_d$  = 546.5 (nm)  
 B : Peak Wavelength  $\lambda_p$  = 459.0 (nm) Dominant Wavelength  $\lambda_d$  = 463.6 (nm)  
 — MCEP-CR8/070-3  
 — MCEP-CG8/070-3  
 — MCEP-CB8/070-3  
 — MCEP-CW8-2N/070-3

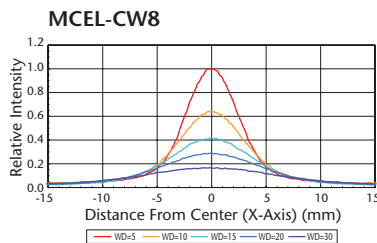
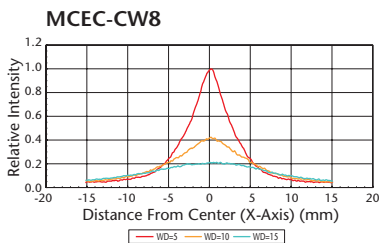
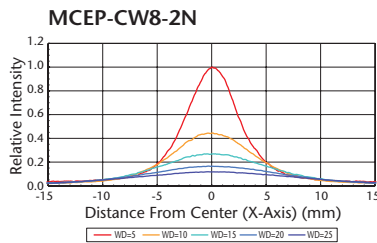
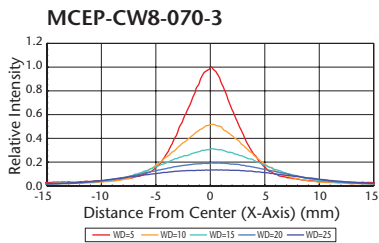


R : Peak Wavelength  $\lambda_p$  = 635.6 (nm) Dominant Wavelength  $\lambda_d$  = 625.2 (nm)  
 G : Peak Wavelength  $\lambda_p$  = 529.1 (nm) Dominant Wavelength  $\lambda_d$  = 537.2 (nm)  
 B : Peak Wavelength  $\lambda_p$  = 473.0 (nm) Dominant Wavelength  $\lambda_d$  = 473.6 (nm)  
 — MCEC-CR8  
 — MCEC-CG8  
 — MCEC-CB8  
 — MCEC-CW8



— MCEL-CR8  
 — MCEL-CG8  
 — MCEL-CB8  
 — MCEL-CW8

## Light Distribution Characteristics

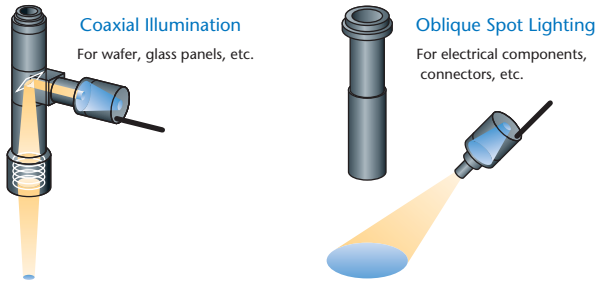


## Telecentric Lens

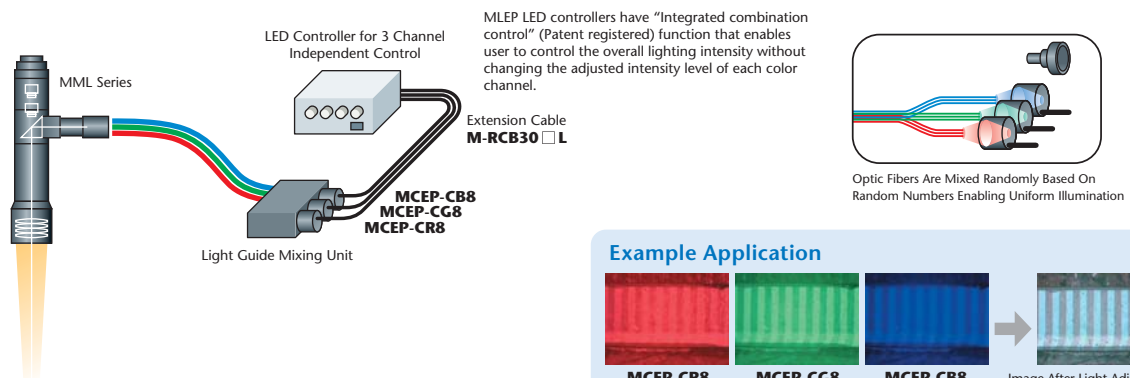


Use the MML Series for the optimal matching of high power LED spot LED illumination (MCEP Series) and a lens with coaxial incident illumination. Our telecentric optical systems with low image distortion offer a variety of supported number of pixels, magnifications, widths, and camera mounts (only with coaxial incidence function). An unparalleled variety of other illumination and lens products, along with technological know-how, is available to solve any problems that our customers may have.

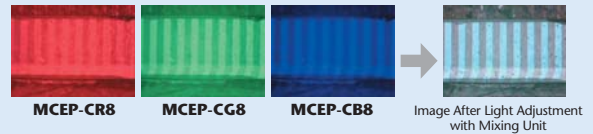
## Typical Applications of the MCEP Series



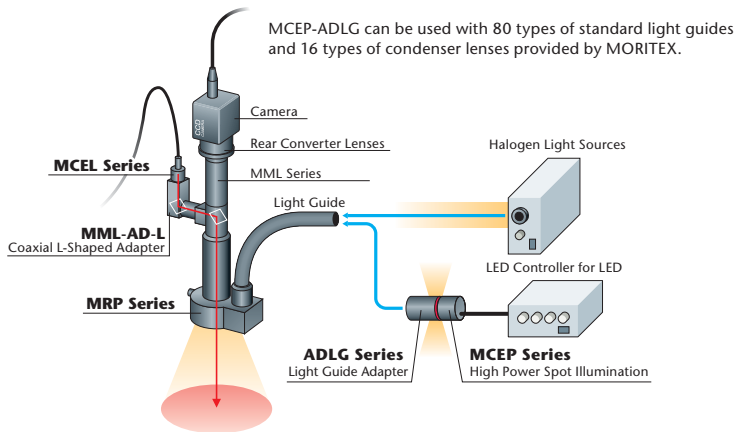
## Configuration and Example Application



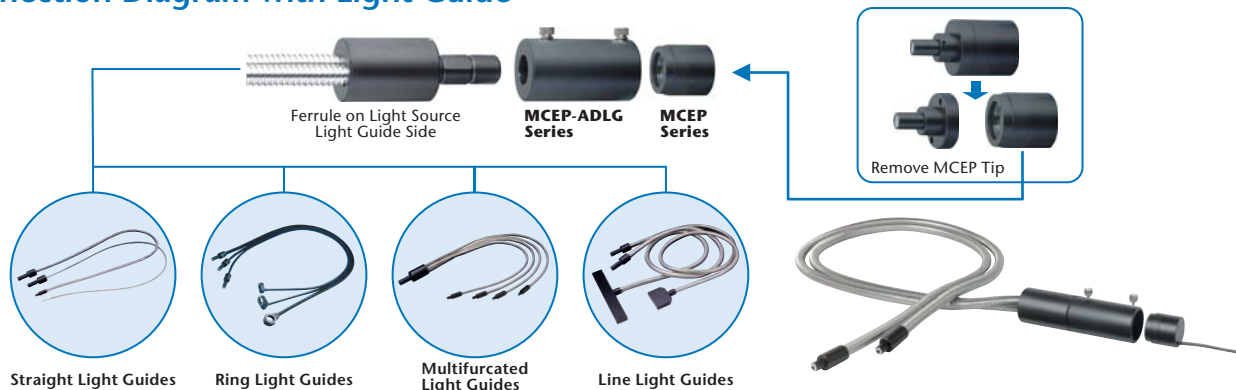
### Example Application



## Connection Diagram

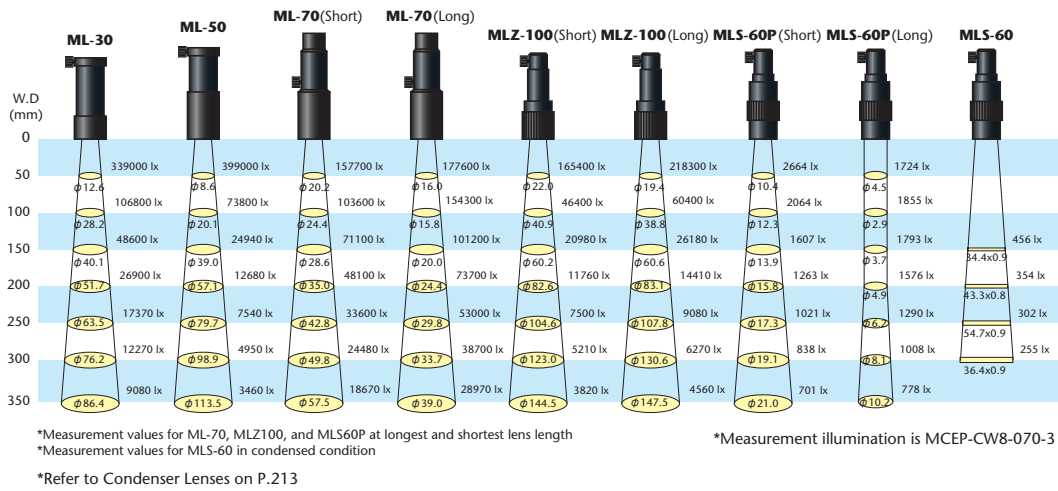


## Connection Diagram with Light Guide



Refer to Light Guide on P.202~P.215

## Condenser Lenses for Spot Illumination

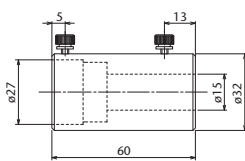


## Fiber Connection Options

The MCEP Series can be connected with an optical fiber light guide and used as a small light source. A small amount of light loss and high illuminance is achieved thanks to the use of MORITEX's optical fiber technology, which allows for the efficient introduction of light to the light guide. The multi-adapter unit supports all types of standard light guides manufactured by MORITEX.

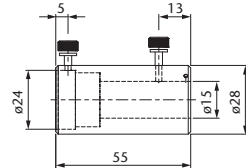
For use with MCEP-C□8

**MCEP-ADLG**  
Light Guide Adapter



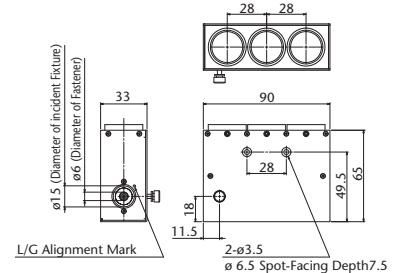
For use with MCEP-C□8-070

**MCEP-ADLG24**  
Light Guide Adapter



For use with both MCEP-C□8 and MCEP-C□8-070

**MCEP-AD3LGC**  
Light Guide Mixing Unit



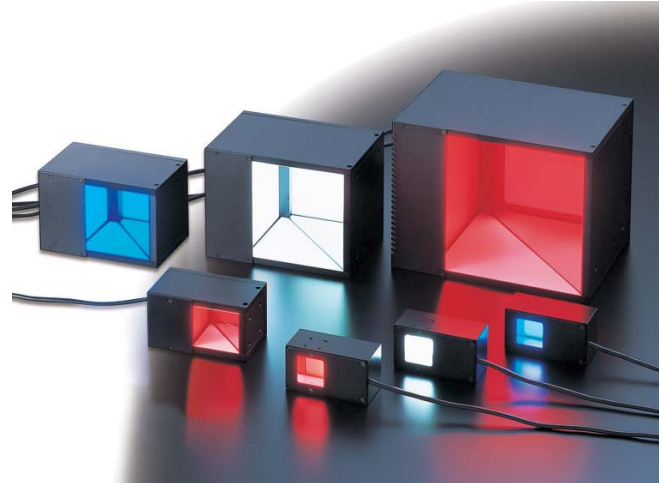
Model	Type	Weight(g)
MCEP-ADLG	1 Light Type	85
MCEP-ADLG24	1 Light Type	60
MCEP-AD3LGC	3 Light Type	200

\*Remove adapter from insertion area of illumination equipment when using MCEP-C□8

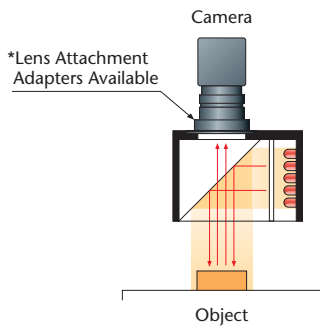
# Simulated Coaxial Illumination MSCL Series



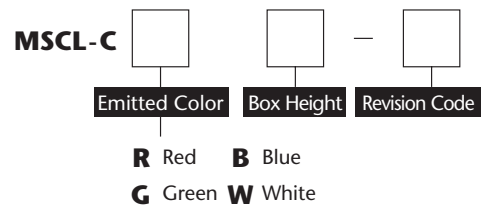
- Highly uniform pseudo-coaxial (on-axis) lighting
- Designed for use with our telecentric MML Series and other lenses without built-in coaxial illumination



## Illumination Structure



### Explanation of Model Code



Model	Emitted Color	Maximum Rated Current IFM(A)	Box Height (mm)	Window Size (mm)	Optical Path Length Extension (mm)	Weight (g)	LED Controller
MSCL-CR24	● Red	0.09	24	18 × 18	6.8	110	MLEK-A080
★ MSCL-CG24	● Green	0.20	24	18 × 18			MLEK-A080
MSCL-CB24	● Blue	0.20	24	18 × 18			MLEK-A080
MSCL-CW24	○ White	0.20	24	18 × 18			MLEK-A080
MSCL-CR39	● Red	0.16	39	∅28	1.2	160	MLEK-A080
★ MSCL-CG39	● Green	0.31	39	∅28			MLEK-A080
MSCL-CB39	● Blue	0.31	39	∅28			MLEK-A080
MSCL-CW39	○ White	0.31	39	∅28			MLEK-A080
MSCL-CR56-B	● Red	0.33	56	∅28	1.2	320	MLEK-A080
★ MSCL-CG56-B	● Green	0.66	56	∅28			MLEK-A080
MSCL-CB56-B	● Blue	0.66	56	∅28			MLEK-A080
MSCL-CW56-B	○ White	0.66	56	∅28			MLEK-A080
MSCL-CR74-B	● Red	0.62	74	50 × 50	1.2	520	MLEK-A080
★ MSCL-CG74-B	● Green	1.11	74	50 × 50			MLEK-A230
MSCL-CB74-B	● Blue	1.11	74	50 × 50			MLEK-A230
MSCL-CW74-B	○ White	1.11	74	50 × 50			MLEK-A230
MSCL-CR105-B	● Red	2.14	105	77 × 77	1.2	920	MLEK-A230
★ MSCL-CG105-B	● Green	2.07	105	77 × 77			MLEK-A230
MSCL-CB105-B	● Blue	2.07	105	77 × 77			MLEK-A230
MSCL-CW105-B	○ White	2.07	105	77 × 77			MLEK-A230

\* LED Controller on P.152-156

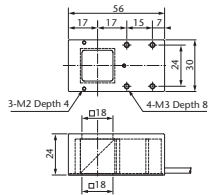
\* In case of a plurality of LED illuminations used, please check the "Selection Criteria LED Controller" on P.99.

\* MLM Series products (Light control film) on P.158 can be attached to MSCL-C \*\*-B products. Made-to-order products

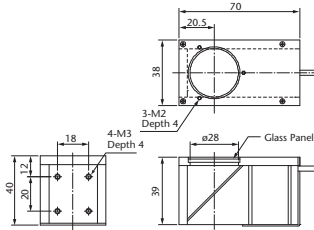
\* MSCL-CX105 comes with an air-cooling fan

★ Made-to-order products.

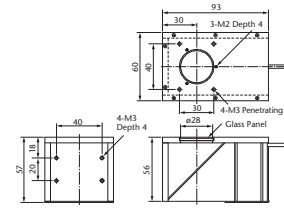
**MSCL-CR (CG,CB,CW) 24**



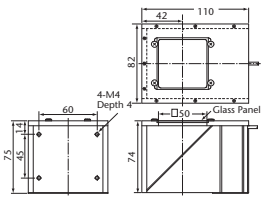
**MSCL-CR (CG,CB,CW) 39**



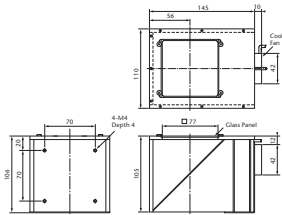
**MSCL-CR (CG,CB,CW) 56-B**



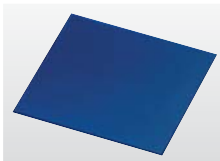
**MSCL-CR (CG,CB,CW) 74-B**



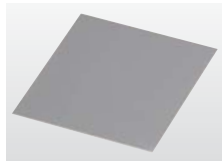
**MSCL-CR (CG,CB,CW) 105-B**



**Accessories**



**Polarizer**  
(P.158)



**Light Control Film**  
(P.158)

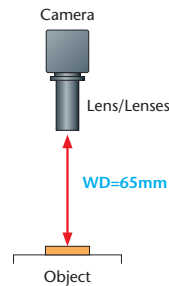


**Lens Attachment Adapter**  
(P.159)

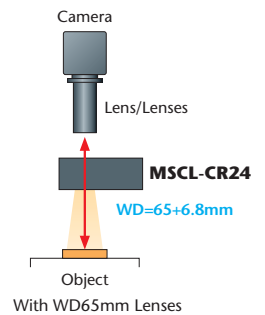
**About Installation**

Because glass components are used in the MSCL units, the internal optical path length will change when used. Be aware of the extended optical path when installing in a vision system.

**Without MSCL-CR24**



**With MSCL-CR24**



**Sample Images**

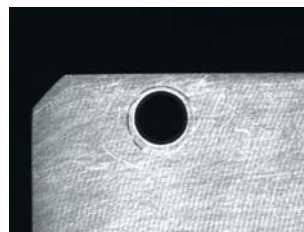
**MSCL**



Dry Cell



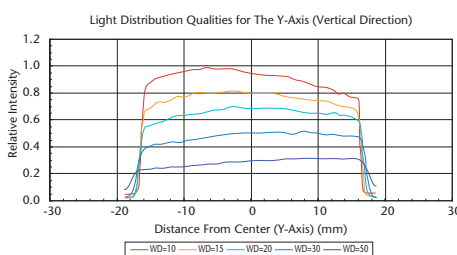
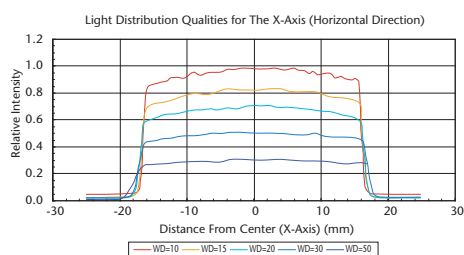
CD (Scratch)



Metal Parts

**Light Distribution Characteristics**

**MSCL-CW56-B**



# Direct Ring Illumination

## MDRL Series



- High intensity LEDs deployed in high density to provide uniform direct, bright-field 360-degree lighting
- Standard LED illumination for a wide range of applications
- Models can be selected to match the diameter of our lens models



Model	Emitted Color	Maximum Rated Current IFM(A)	Ring Internal Diameter (mm)	Ring External Diameter (mm)	Lighting Angle	Weight (g)	LED Controller
MDRL-CR10	● Red	0.11	ø10	ø32	70°	50	MLEK-A080
★ MDRL-CG10	● Green	0.17	ø10	ø32	70°	50	MLEK-A080
MDRL-CB10	● Blue	0.17	ø10	ø32	70°	50	MLEK-A080
MDRL-CW10	○ White	0.17	ø10	ø32	70°	50	MLEK-A080
MDRL-CR16	● Red	0.24	ø16	ø48	76°	65	MLEK-A080
★ MDRL-CG16	● Green	0.37	ø16	ø48	76°	65	MLEK-A080
MDRL-CB16	● Blue	0.37	ø16	ø48	76°	65	MLEK-A080
MDRL-CW16	○ White	0.37	ø16	ø48	76°	65	MLEK-A080
MDRL-CR28	● Red	0.20	ø28	ø50	75°	65	MLEK-A080
★ MDRL-CG28	● Green	0.31	ø28	ø50	75°	65	MLEK-A080
MDRL-CB28	● Blue	0.31	ø28	ø50	75°	65	MLEK-A080
MDRL-CW28	○ White	0.31	ø28	ø50	75°	65	MLEK-A080
MDRL-CR31	● Red	0.36	ø31	ø66	75°	130	MLEK-A080
★ MDRL-CG31	● Green	0.55	ø31	ø66	75°	130	MLEK-A080
MDRL-CB31	● Blue	0.55	ø31	ø66	75°	130	MLEK-A080
MDRL-CW31	○ White	0.55	ø31	ø66	75°	130	MLEK-A080
MDRL-CR36	● Red	0.36	ø36	ø66	75°	120	MLEK-A080
★ MDRL-CG36	● Green	0.55	ø36	ø66	75°	120	MLEK-A080
MDRL-CB36	● Blue	0.55	ø36	ø66	75°	120	MLEK-A080
MDRL-CW36	○ White	0.55	ø36	ø66	75°	120	MLEK-A080
MDRL-CR50	● Red	0.64	ø50	ø90	70°	180	MLEK-A080
★ MDRL-CG50	● Green	0.96	ø50	ø90	70°	180	MLEK-A230
MDRL-CB50	● Blue	0.96	ø50	ø90	70°	180	MLEK-A230
MDRL-CW50	○ White	0.96	ø50	ø90	70°	180	MLEK-A230
MDRL-CR56	● Red	1.12	ø56	ø120	55°	520	MLEK-A230
★ MDRL-CG56	● Green	1.55	ø56	ø120	55°	520	MLEK-A230
MDRL-CB56	● Blue	1.55	ø56	ø120	55°	520	MLEK-A230
MDRL-CW56	○ White	1.55	ø56	ø120	55°	520	MLEK-A230

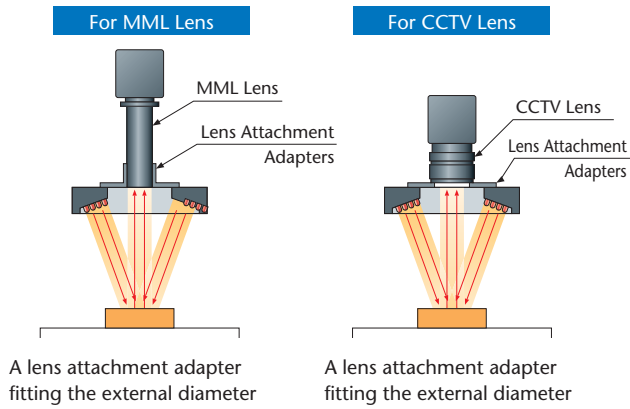
\* LED Controller on P.152-156

\* In case of a plurality of LED illuminations used, please check the "Selection Criteria LED Controller" on P.99.

★ Made-to-order products.



## Illumination Structure



## Sample Images

**MDRL-CB56**



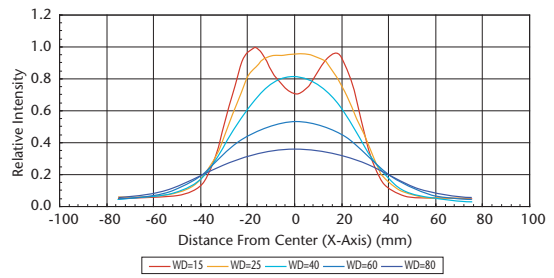
Button Components for Mobile Phone



Grooves on Top of a Pull-Top Can

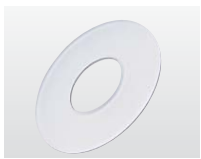
## Light Distribution Characteristics

**MDRL-CW31**

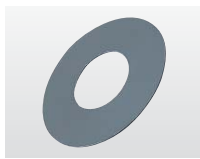


## Direct Ring Options

Diffuser and Polarizer are available to prevent the vignetting of images. Adapters for attachment to MORITEX Lenses are also available.



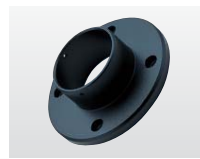
**Diffuser**  
(P.157)



**Polarizer**  
(P.158)

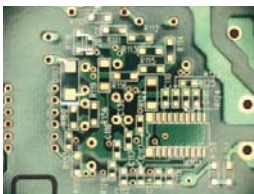


**Adapters**  
(P.157)



**Lens Attachment Adapter**  
(P.159)

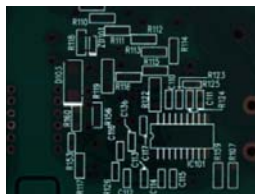
## Examples of PCB images with various accessories



**MDRL**



**With Diffuser**



**With Diffuser & Polarizer**

In the first image significant vignetting is seen. Attaching a Diffuser alone reduced the vignetting slightly and attaching an additional Polarizer removed it completely.



# Direct Ring Illumination

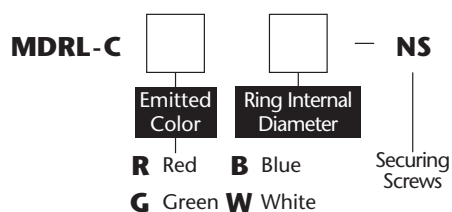
## MDRL-NS Series



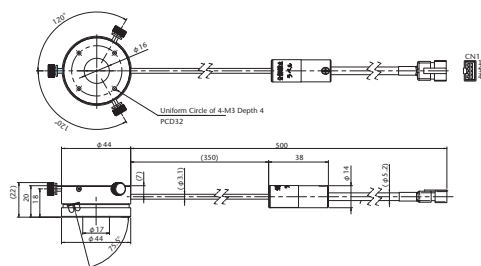
Securing screws allow these ring lights to be conveniently coupled with MORITEX MML lenses.



### Explanation of Model Code



### MDRL-CR (CG,CB,CW) 16-NS



Model	Emitted Color	Maximum Rated Current IFM(A)	Ring Internal Diameter (mm)	Ring External Diameter (mm)	Lighting Angle	Weight (g)	LED Controller
MDRL-CR16-NS	● Red	0.15	ø16	ø44	75.5°	70	MLEK-A080
★ MDRL-CG16-NS	● Green	0.24	ø16	ø44	75.5°	70	MLEK-A080
★ MDRL-CB16-NS	● Blue	0.24	ø16	ø44	75.5°	70	MLEK-A080
MDRL-CW16-NS	○ White	0.24	ø16	ø44	75.5°	70	MLEK-A080

\* LED Controller on P.152-156

\* In case of a plurality of LED illuminations used, please check the "Selection Criteria LED Controller" on P.99.

★Made-to-order products.

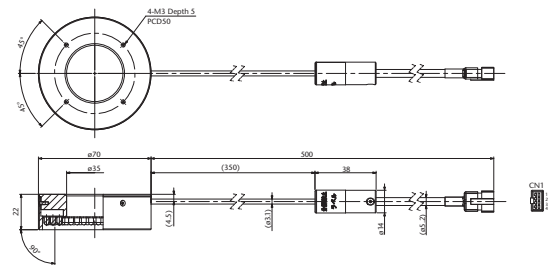
## Long working distances MDRL-C□35

- This fully direct, long working distance illumination design makes a clear distinction from the conventional direct ring series
- The recommended working distance is 65 mm or greater. If the object surface is reflective, a working distance of about 200 mm is recommended.

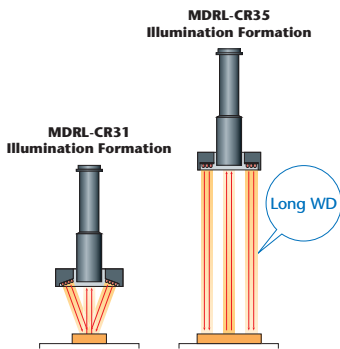
\* Be sure to check performance with a demonstration model before making a selection.



### MDRL-CR (CG,CB,CW) 35

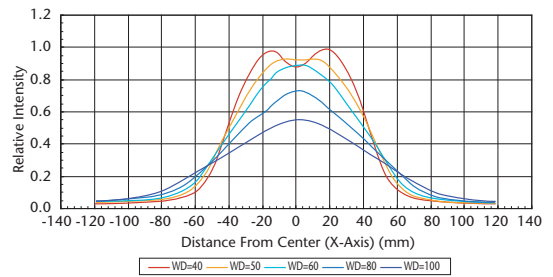


## Illumination Structure



### Light Distribution Characteristics

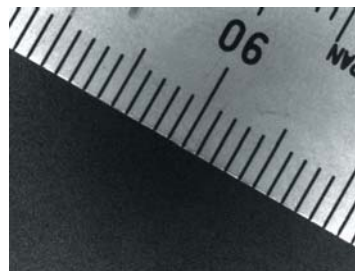
#### MDRL-CW35



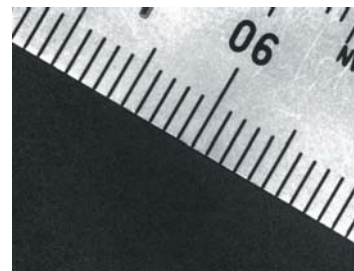
## Sample Images



WD=40mm **MDRL-CR31**  
Uniformly Illuminated



WD=40mm **MDRL-CR35**  
Not Much Light at Short WD



WD=60mm **MDRL-CR35**  
Full of Light at This WD

Model	Emitted Color	Maximum Rated Current IFM(A)	Ring Internal Diameter (mm)	Ring External Diameter (mm)	Lighting Angle	Weight (g)	LED Controller
MDRL-CR35	● Red	0.34	ø35	ø70	90°	150	MLEK-A080
★ MDRL-CG35	● Green	0.52	ø35	ø70	90°	150	MLEK-A080
MDRL-CB35	● Blue	0.52	ø35	ø70	90°	150	MLEK-A080
MDRL-CW35	○ White	0.52	ø35	ø70	90°	150	MLEK-A080

\* LED Controller on P.152-156

\* In case of a plurality of LED illuminations used, please check the "Selection Criteria LED Controller" on P.99.

★Made-to-order products.

# Low Angle Ring Illumination MLRL Series



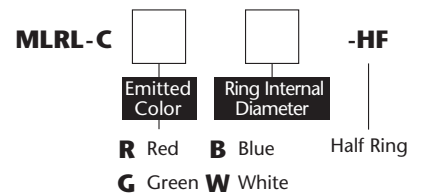
## Low Angle Half-Ring Type Illumination: MLRL-HF Series

- Reflection can be minimized by the low-angle, dark-field lighting configuration
- Ideal for shiny or uneven surfaces, eg. embossment and surface flaw detection
- MLRL-C\*46 has an illumination angle of 0 degrees for short WD indirect illumination

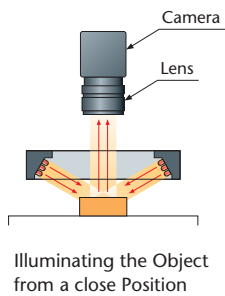
## Low Angle Ring Illumination: MLRL Series

- Ideal for applications where only one section of a surface must be illuminated or where space does not allow for a full ring

Explanation of Model Code



## Illumination Structure



## Sample Images

MLRL-CW100



Button Components for Mobile Phone

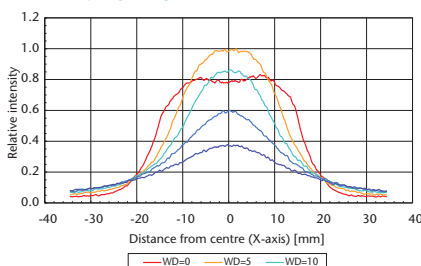
MLRL-CW68



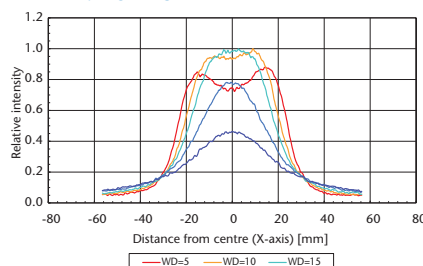
CD Inner Circumferential Scratch

## Light Distribution Characteristics

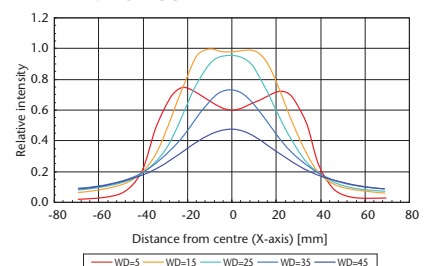
MLRL-CW25



MLRL-CW48



MLRL-CW38



### Lineup of Low Angle Ring Type LEDs

Model	Emitted Color	Maximum Rated Current IFM(A)	Ring Internal Diameter (mm)	Ring External Diameter (mm)	Lighting Angle	Weight (g)	LED Controller
MLRL-CR23	● Red	0.09	ø23	ø40	20°	40	MLEK-A080
★ MLRL-CG23	● Green	0.14	ø23	ø40	20°	40	MLEK-A080
MLRL-CB23	● Blue	0.14	ø23	ø40	20°	40	MLEK-A080
MLRL-CW23	○ White	0.14	ø23	ø40	20°	40	MLEK-A080
MLRL-CR25	● Red	0.15	ø25	ø50	30°	70	MLEK-A080
★ MLRL-CG25	● Green	0.24	ø25	ø50	30°	70	MLEK-A080
MLRL-CB25	● Blue	0.24	ø25	ø50	30°	70	MLEK-A080
MLRL-CW25	○ White	0.24	ø25	ø50	30°	70	MLEK-A080
MLRL-CR46	● Red	0.17	ø46	ø75	0°	80	MLEK-A080
★ MLRL-CG46	● Green	0.27	ø46	ø75	0°	80	MLEK-A080
MLRL-CB46	● Blue	0.27	ø46	ø75	0°	80	MLEK-A080
MLRL-CW46	○ White	0.27	ø46	ø75	0°	80	MLEK-A080
MLRL-CR48	● Red	0.30	ø48	ø74	30°	110	MLEK-A080
★ MLRL-CG48	● Green	0.47	ø48	ø74	30°	110	MLEK-A080
MLRL-CB48	● Blue	0.47	ø48	ø74	30°	110	MLEK-A080
MLRL-CW48	○ White	0.47	ø48	ø74	30°	110	MLEK-A080
MLRL-CR68	● Red	0.57	ø68	ø100	30°	190	MLEK-A080
★ MLRL-CG68	● Green	0.61	ø68	ø100	30°	190	MLEK-A080
MLRL-CB68	● Blue	0.61	ø68	ø100	30°	190	MLEK-A080
MLRL-CW68	○ White	0.61	ø68	ø100	30°	190	MLEK-A080
MLRL-CR100	● Red	0.96	ø100	ø140	15°	320	MLEK-A230
★ MLRL-CG100	● Green	1.03	ø100	ø140	15°	320	MLEK-A230
MLRL-CB100	● Blue	1.03	ø100	ø140	15°	320	MLEK-A230
MLRL-CW100	○ White	1.03	ø100	ø140	15°	320	MLEK-A230
★ MLRL-CR172	● Red	1.01	ø172	ø208	25°	420	MLEK-A230
★ MLRL-CG172	● Green	1.39	ø172	ø208	25°	420	MLEK-A230
★ MLRL-CB172	● Blue	1.39	ø172	ø208	25°	420	MLEK-A230
★ MLRL-CW172	○ White	1.39	ø172	ø208	25°	420	MLEK-A230

\* LED Controller on P.152-156

★ Made-to-order products.

\* In case of a plurality of LED illuminations used, please check the "Selection Criteria LED Controller" on P.99.

### Lineup of Low Angle Half Ring Type LEDs

Model	Emitted Color	Maximum Rated Current IFM(A)	Ring Internal Diameter (mm)	Ring External Diameter (mm)	Lighting Angle	Weight (g)	LED Controller
★ MLRL-CR100-HF	● Red	0.53	R50	R70	15°	170	MLEK-A080
★ MLRL-CG100-HF	● Green	0.80	R50	R70	15°	170	MLEK-A080
★ MLRL-CB100-HF	● Blue	0.80	R50	R70	15°	170	MLEK-A080
★ MLRL-CW100-HF	○ White	0.80	R50	R70	15°	170	MLEK-A080

\* LED Controller on P.152-156

★ Made-to-order products.

\* In case of a plurality of LED illuminations used, please check the "Selection Criteria LED Controller" on P.99.

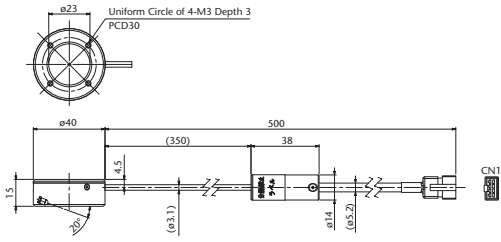


## Accessories for Low Angle Ring Lights

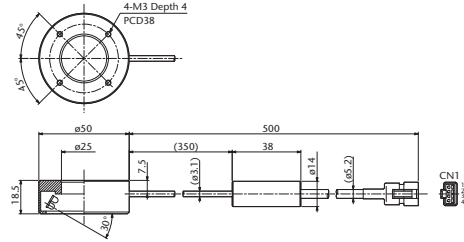
Good for producing more uniform illumination than with direct lighting and for reducing glare and reflections.

**Diffuser Ring** (P.157)

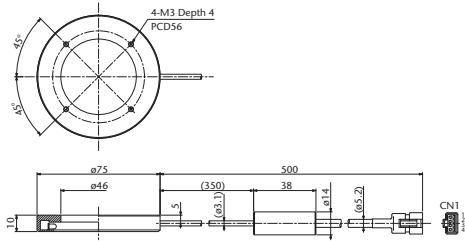
**MLRL-CR (CG,CB,CW) 23**



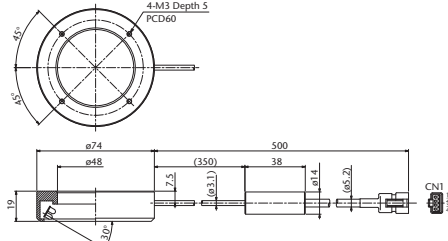
**MLRL-CR (CG,CB,CW) 25**



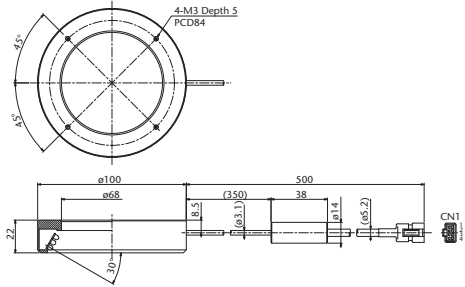
**MLRL-CR (CG,CB,CW) 46**



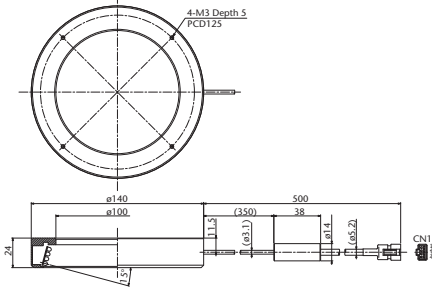
**MLRL-CR (CG,CB,CW) 48**



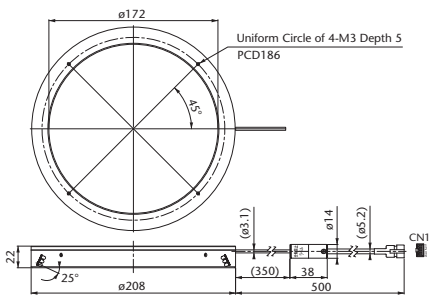
**MLRL-CR (CG,CB,CW) 68**



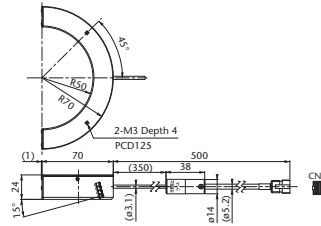
**MLRL-CR (CG,CB,CW) 100**



**MLRL-CR (CG,CB,CW) 172**



**MLRL-CR (CG,CB,CW) 100-HF**



# Shadowless Illumination MSRL/MSLL/MSQL Series



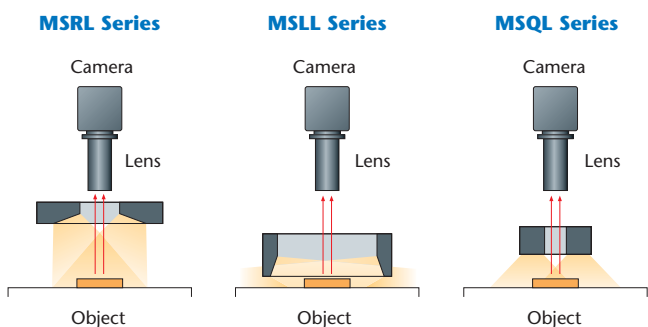
## Shadowless Ring Illumination: MSRL Series

- Diffuse, shadowless illumination preventing halation effect
- Optimal soft, uniform light for shiny surfaces

## Shadowless Low Angle Ring Illumination: MSLL Series

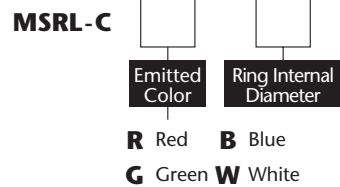
- Shallow angle LED illumination that provides very diffuse & uniform light ideal for reflective surfaces
- MSLL-HF (Half-Ring) Series available for applications where only one section of a surface must be illuminated or where space does not allow for a full ring
- MSQL Series is best suited for square shape objects, such as in BGA & QFPs

## Illumination Structure

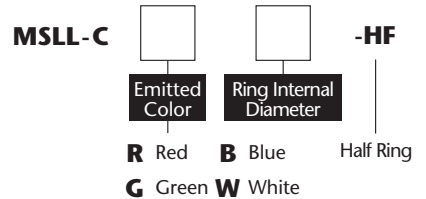


## Explanation of Model Code

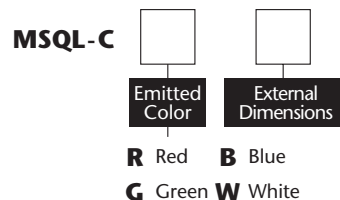
Shadowless Ring Type LEDs



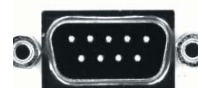
Shadowless, Low Angle Ring Type LEDs



Shadowless, Low Angle Square Type LEDs



## MSLL-CR109



D-Subconnector



Bottom of Can

### Lineup of Shadowless Ring Type LEDs

Model	Emitted Color	Maximum Rated Current IFM(A)	Ring Internal Diameter (mm)	Ring External Diameter (mm)	Weight (g)	LED Controller
MSRL-CR20	● Red	0.32	ø20	ø74	140	MLEK-A080
★ MSRL-CG20	● Green	0.50	ø20	ø74	140	MLEK-A080
MSRL-CB20	● Blue	0.50	ø20	ø74	140	MLEK-A080
MSRL-CW20	○ White	0.50	ø20	ø74	140	MLEK-A080
MSRL-CR33	● Red	0.45	ø33	ø104	210	MLEK-A080
★ MSRL-CG33	● Green	0.69	ø33	ø104	210	MLEK-A080
★ MSRL-CB33	● Blue	0.69	ø33	ø104	210	MLEK-A080
MSRL-CW33	○ White	0.69	ø33	ø104	210	MLEK-A080
MSRL-CR44	● Red	0.57	ø44	ø123	270	MLEK-A080
★ MSRL-CG44	● Green	0.80	ø44	ø123	270	MLEK-A080
MSRL-CB44	● Blue	0.80	ø44	ø123	270	MLEK-A080
MSRL-CW44	○ White	0.80	ø44	ø123	270	MLEK-A080

\* LED Controller on P.152-156

★ Made-to-order products.

\* In case of a plurality of LED illuminations used, please check the "Selection Criteria LED Controller" on P.99.

### Lineup of Shadowless, Low Angle Ring Type LEDs

Model	Emitted Color	Maximum Rated Current IFM(A)	Ring Internal Diameter (mm)	Ring External Diameter (mm)	Weight (g)	LED Controller
MSLL-CR109	● Red	0.62	ø109	ø136	320	MLEK-A080
★ MSLL-CG109	● Green	1.10	ø109	ø136	320	MLEK-A230
★ MSLL-CB109	● Blue	1.10	ø109	ø136	320	MLEK-A230
MSLL-CW109	○ White	1.10	ø109	ø136	320	MLEK-A230

\* LED Controller on P.152-156

★ Made-to-order products.

\* In case of a plurality of LED illuminations used, please check the "Selection Criteria LED Controller" on P.99.

### Lineup of Shadowless, Low Angle Square Type LEDs

Model	Emitted Color	Maximum Rated Current IFM (A)	External Dimensions (mm)	Weight (g)	LED Controller
★ MSQL-CR32	● Red	0.09	32×32	80	MLEK-A080
★ MSQL-CG32	● Green	0.14	32×32	80	MLEK-A080
MSQL-CB32	● Blue	0.14	32×32	80	MLEK-A080
MSQL-CW32	○ White	0.14	32×32	80	MLEK-A080
★ MSQL-CR48	● Red	0.13	48×48	120	MLEK-A080
★ MSQL-CG48	● Green	0.20	48×48	120	MLEK-A080
★ MSQL-CB48	● Blue	0.20	48×48	120	MLEK-A080
MSQL-CW48	○ White	0.20	48×48	120	MLEK-A080

\* LED Controller on P.152-156

★ Made-to-order products.

\* In case of a plurality of LED illuminations used, please check the "Selection Criteria LED Controller" on P.99.

### Lineup of Shadowless, Low Angle Half Ring Type LEDs

Model	Emitted Color	Maximum Rated Current IFM(A)	Ring Internal Diameter (mm)	Ring External Diameter (mm)	Weight (g)	LED Controller
★ MSLL-CR109-HF	● Red	0.30	R54.5	R70.5	250	MLEK-A080
★ MSLL-CG109-HF	● Green	0.47	R54.5	R70.5	250	MLEK-A080
★ MSLL-CB109-HF	● Blue	0.47	R54.5	R70.5	250	MLEK-A080
★ MSLL-CW109-HF	○ White	0.47	R54.5	R70.5	250	MLEK-A080

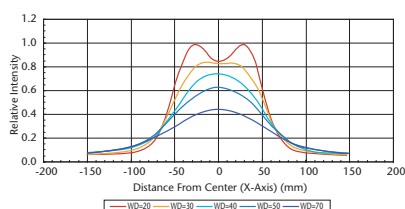
\* LED Controller on P.152-156

★ Made-to-order products.

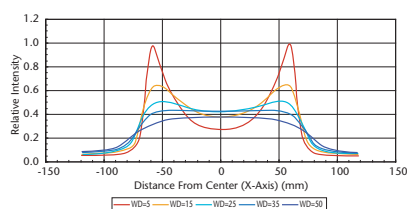
\* In case of a plurality of LED illuminations used, please check the "Selection Criteria LED Controller" on P.99.

### Light Distribution Characteristics

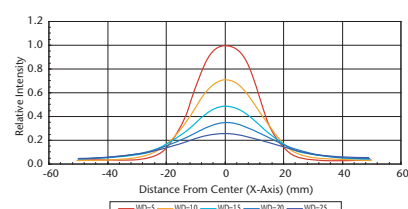
MSRL-CW44



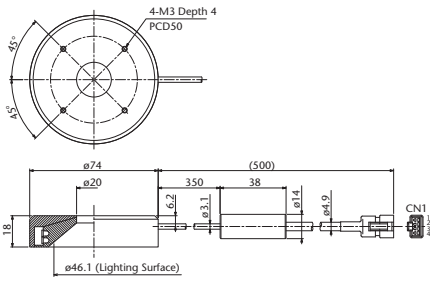
MSLL-CW109



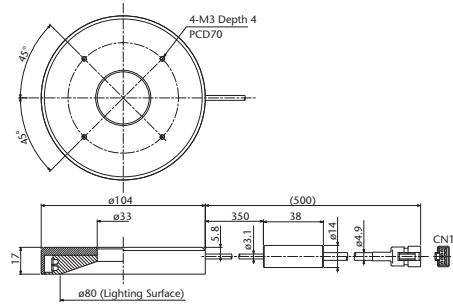
MSQL-CW32



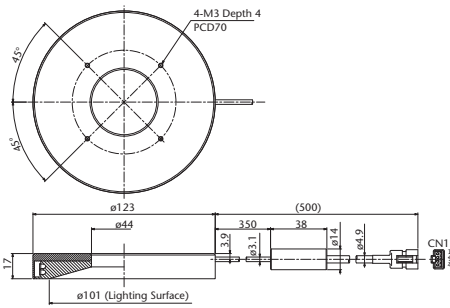
**MSRL-CR (CG,CB,CW) 20**



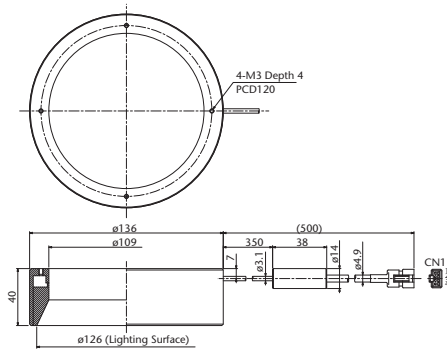
**MSRL-CR (CG,CB,CW) 33**



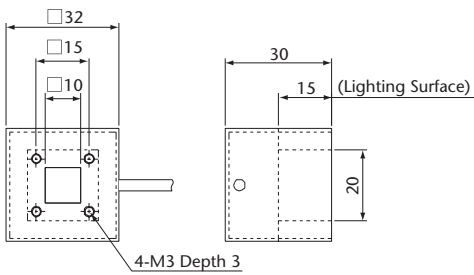
**MSRL-CR (CG,CB,CW) 44**



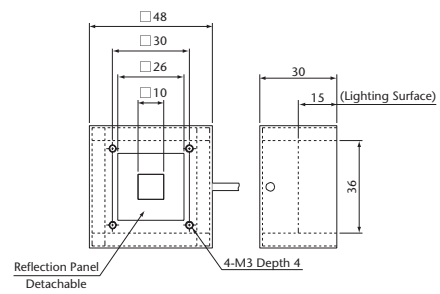
**MSLL-CR (CG,CB,CW) 109**



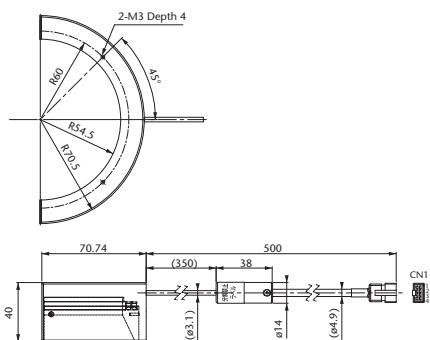
**MSQL-CR (CG,CB,CW) 32**



**MSQL-CR (CG,CB,CW) 48**



**MSLL-CR (CG,CB,CW) 109-HF**





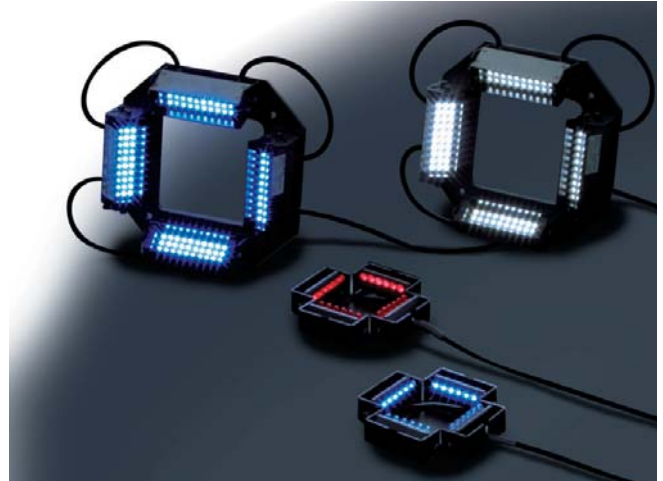
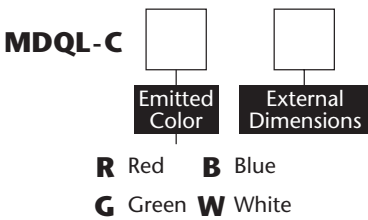
# Square Bar Type Illumination

## MDQL Series



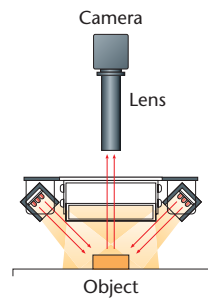
- Four high-intensity bar LED arrangement
- Direct & oblique lighting from adjustable lighting angles from bright to dark-field

### Explanation of Model Code



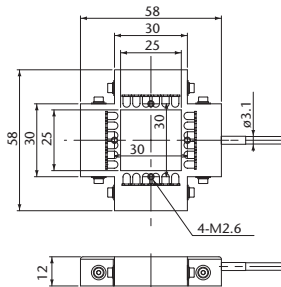
Model	Emitted Color	Maximum Rated Current IFM (A)	Internal Dimensions (mm)	External Dimensions (mm)	Weight (g)	LED Controller
MDQL-CR58	Red	0.09	□ 25	□ 58	55	MLEK-A080
★ MDQL-CG58	Green	0.17	□ 25	□ 58		MLEK-A080
★ MDQL-CB58	Blue	0.17	□ 25	□ 58		MLEK-A080
MDQL-CW58	White	0.17	□ 25	□ 58		MLEK-A080
MDQL-CR108	Red	0.42	□ 60	□ 108	210	MLEK-A080
★ MDQL-CG108	Green	0.84	□ 60	□ 108		MLEK-A230
★ MDQL-CB108	Blue	0.84	□ 60	□ 108		MLEK-A230
MDQL-CW108	White	0.84	□ 60	□ 108		MLEK-A230

### Illumination Structure

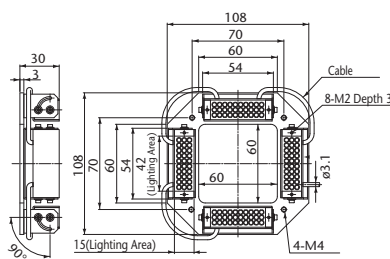


\* LED Controller on P.152-156      ★Made-to-order products.  
\* In case of a plurality of LED illuminations used, please check the "Selection Criteria LED Controller" on P.99.

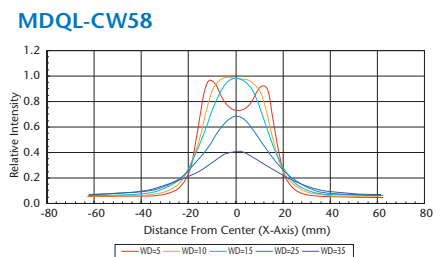
### MDQL-CR (CG,CB,CW) 58



### MDQL-CR (CG,CB,CW) 108

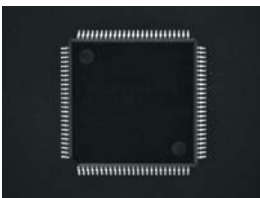


### Light Distribution Characteristics



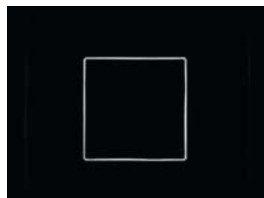
### Sample Images

MDQL-CR108+MSCL-CR74+MLMSC74



IC Pins

MDQL-CR108



Mirror Edge of Optical Part

### Accessories

#### Diffusion Plate



(P.157)

#### Polarizer



(P.158)

Diffuser and Polarizer are available to prevent the vignetting of images.

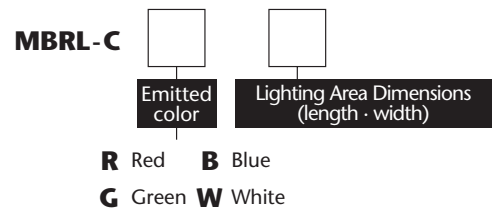
# Bar Illumination MBRL Series



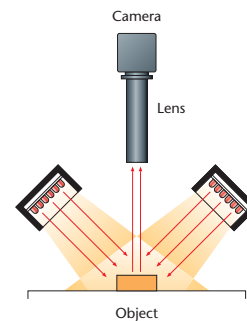
- High-intensity LED block array
- Can be directed at any angle to the surface for either direct, bright-field lighting or optimal oblique, dark-field lighting

Model	Emitted Color	Maximum Rated Current IFM(A)	Lighting Area Dimensions (mm)	Weight (g)	LED Controller
★ MBRL-CR3408	Red	0.09	34×8.4	35	MLEK-A080
★ MBRL-CG3408	Green	0.17	34×8.4		MLEK-A080
★ MBRL-CB3408	Blue	0.17	34×8.4		MLEK-A080
★ MBRL-CW3408	White	0.17	34×8.4		MLEK-A080
MBRL-CR5015	Red	0.13	50×15	50	MLEK-A080
★ MBRL-CG5015	Green	0.26	50×15		MLEK-A080
MBRL-CB5015	Blue	0.26	50×15		MLEK-A080
MBRL-CW5015	White	0.26	50×15		MLEK-A080
MBRL-CR7530	Red	0.36	75×30	120	MLEK-A080
★ MBRL-CG7530	Green	0.52	75×30		MLEK-A080
MBRL-CB7530	Blue	0.52	75×30		MLEK-A080
MBRL-CW7530	White	0.52	75×30		MLEK-A080
MBRL-CR13015	Red	0.32	130×15	85	MLEK-A080
★ MBRL-CG13015	Green	0.53	130×15		MLEK-A080
MBRL-CB13015	Blue	0.53	130×15		MLEK-A080
MBRL-CW13015	White	0.53	130×15	270	MLEK-A080
★ MBRL-CR24015	Red	0.60	240×15		MLEK-A080
★ MBRL-CG24015	Green	0.80	240×15		MLEK-A080
★ MBRL-CB24015	Blue	0.80	240×15		MLEK-A080
★ MBRL-CW24015	White	0.80	240×15	380	MLEK-A080
★ MBRL-CR36015	Red	0.80	360×15		MLEK-A080
★ MBRL-CG36015	Green	1.09	360×15		MLEK-A230
★ MBRL-CB36015	Blue	1.09	360×15		MLEK-A230
★ MBRL-CW36015	White	1.09	360×15	480	MLEK-A230
★ MBRL-CR48015	Red	1.06	480×15		MLEK-A230
★ MBRL-CG48015	Green	1.32	480×15		MLEK-A230
★ MBRL-CB48015	Blue	1.32	480×15		MLEK-A230
★ MBRL-CW48015	White	1.32	480×15	MLEK-A230	

### Explanation of Model Code



### Illumination Structure



### Sample Images

MBRL-CW7530 with MDF-BR7530



Wafer Characters

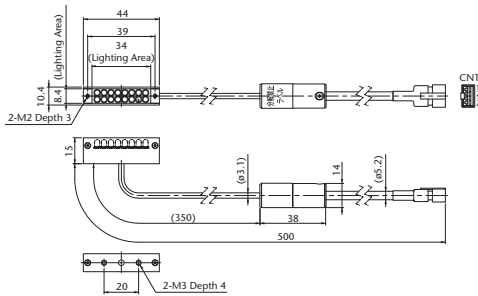
MBRL-CR7530



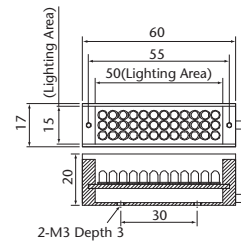
Razor Edge

\* LED Controller on P.152-156 ★Made-to-order products.  
 \* In case of a plurality of LED illuminations used, please check the "Selection Criteria LED Controller" on P.99.

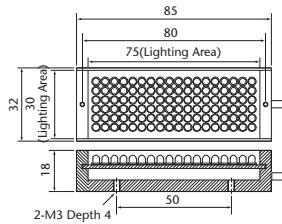
**MBRL-CR (CG,CB,CW) 3408**



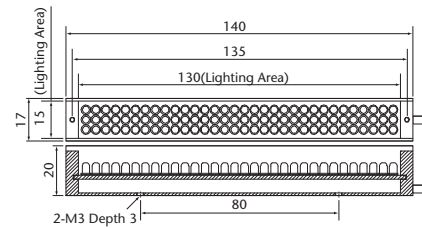
**MBRL-CR (CG,CB,CW) 5015**



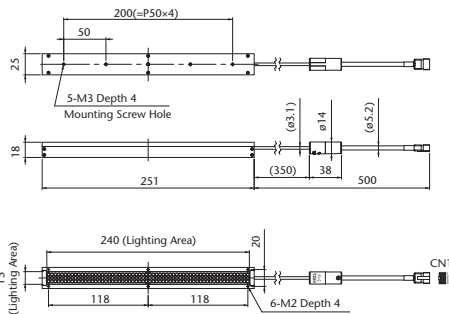
**MBRL-CR (CG,CB,CW) 7530**



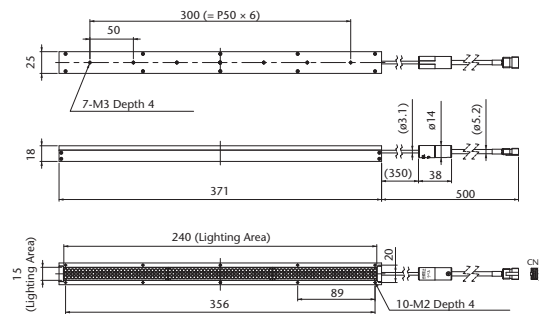
**MBRL-CR (CG,CB,CW) 13015**



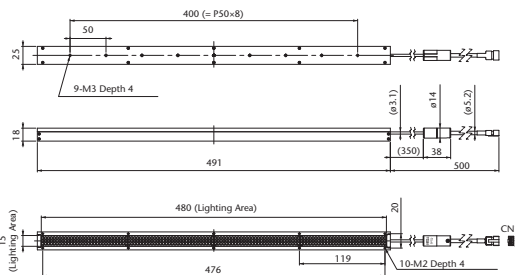
**MBRL-CR (CG,CB,CW) 24015**



**MBRL-CR (CG,CB,CW) 36015**



**MBRL-CR (CG,CB,CW) 48015**



**Accessories**

**Diffusion Plate**



(P.157)

**Polarizer**

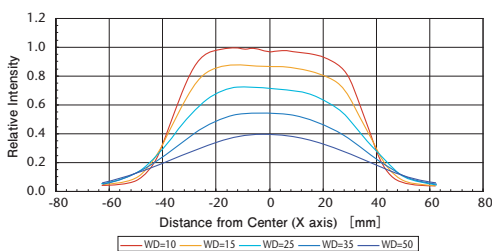


(P.158)

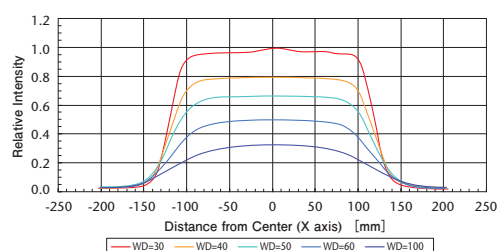
Diffuser and Polarizer are available to prevent the vignetting of images.

**Light Distribution Characteristics**

**MBRL-CW7530**



**MBRL-CW24015**



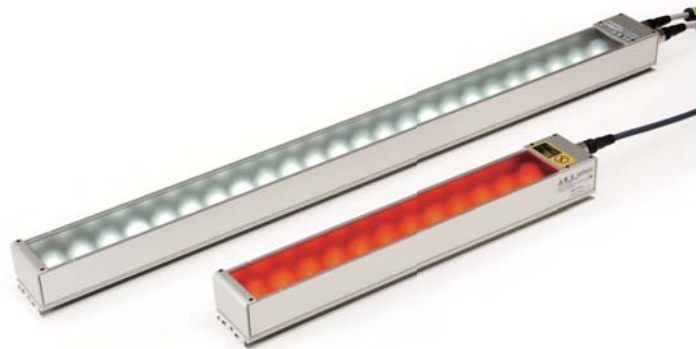
# High Power Bar Illumination

## MHBC Series



Bar illumination that provides high power and uniform light for large area applications.

- High intensity illumination over wide areas
- Compact body design, 50 mm (W) and 45 mm (H)
- Integrated mounting rail system for flexible installation



Model	Emitted Color	Maximum Rated Current IFM(A)	Lighting Area Dimensions (mm)	Weight (g)	LED Controller
MHBC-CW150-DF	○ White	1.15	42×150	450	MLEK-A230
MHBC-CW300-DF	○ White	2.3	42×300	850	MLEK-A230
MHBC-CW450-DF-2CH	○ White	3.45	42×450	1300	MLEK-D770
MHBC-CW600-DF-2CH	○ White	4.6	42×600	1600	MLEK-D770
★ MHBC-CR150-DF	● Red	1.15	42×150	450	MLEK-A230
★ MHBC-CR300-DF	● Red	2.3	42×300	850	MLEK-A230
★ MHBC-CR450-DF-2CH	● Red	3.45	42×450	1300	MLEK-D770
★ MHBC-CR600-DF-2CH	● Red	4.6	42×600	1600	MLEK-D770

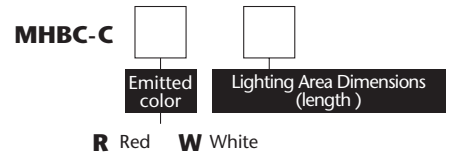


\* LED Controller on P.152~156 ★ Made-to-order products.  
 \* In case of a plurality of LED illuminations used, please check the "Selection Criteria LED Controller" on P.99.

### Conversion Cable

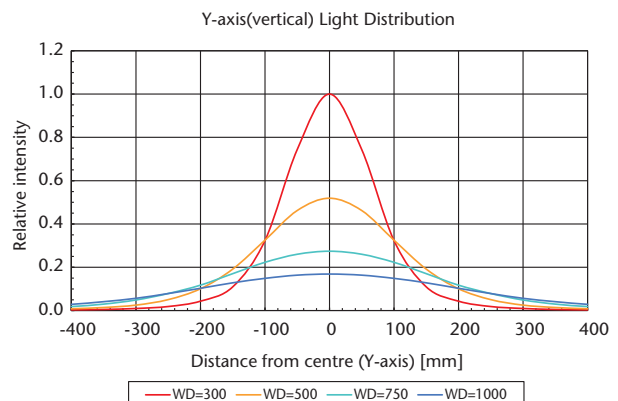
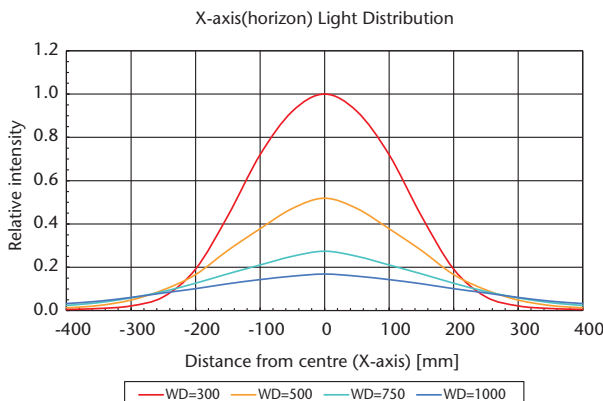
Model	Product Type	Length
M-RCB40018XS	MHBC Conversion Cable	180mm

### Explanation of Model Code

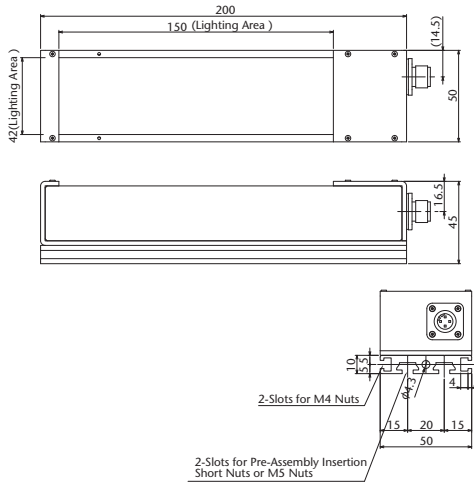


### Light Distribution Characteristics

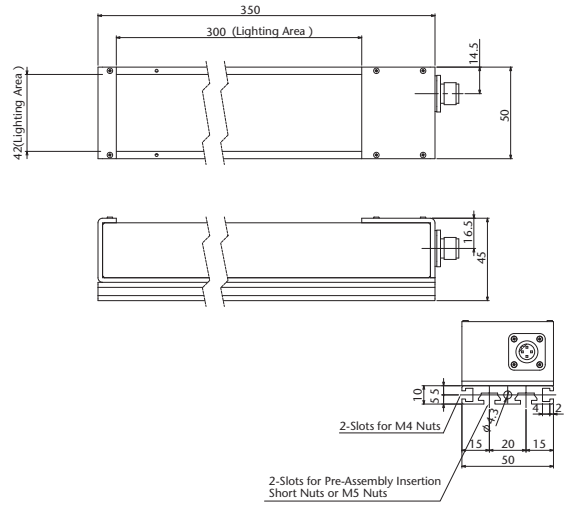
#### MHBC-CW300-DF



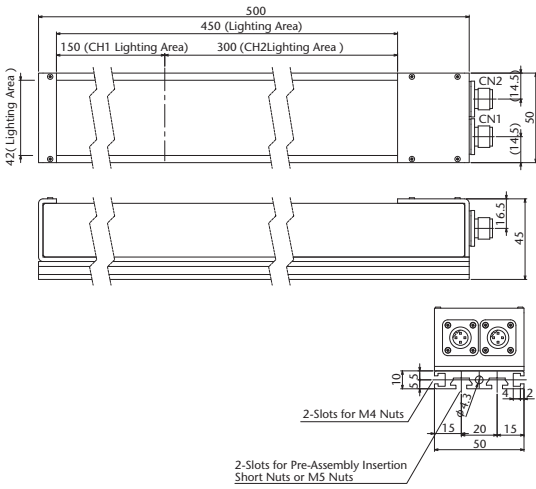
### MHBC-CW(CR)150-DF



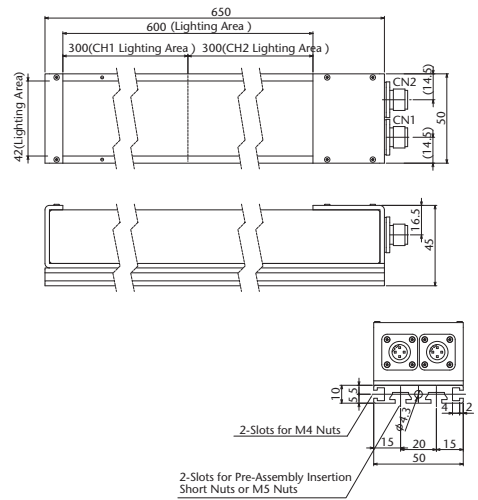
### MHBC-CW(CR)300-DF



### MHBC-CW(CR)450-DF-2CH

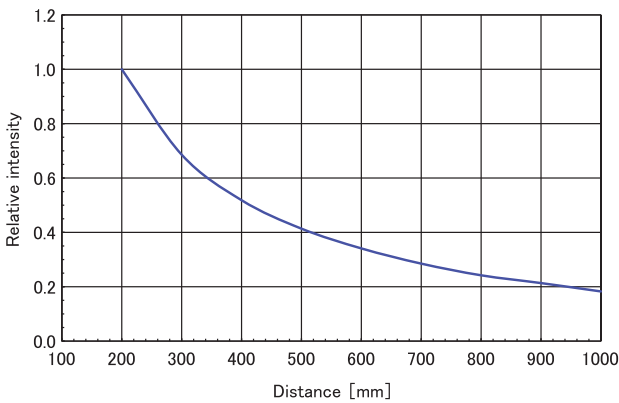


### MHBC-CW(CR)600-DF-2CH



### Light Intensity Characteristics

MHBC-CW600-DF-2CH  
Peak intensity: 46,800[lx]/200[mm]



# High Power Simple Dome Illumination

## MSDC Series



High power dome illumination achieving 3× increase in brightness while maintaining uniformity at a competitive price.

- Brightness has been increased by 3× from our conventional models with the latest, state-of-the-art high power LED chips
- Perfectly diffused light provides extremely uniform illumination without glare which is ideal for curved or glossy surface inspection
- Designed for reduced weight, the lightweight 156 mm diameter version is 1/6 the weight of our conventional models
- The 400 mm unit was designed for the inspection of large objects such as 300 mm wafers.

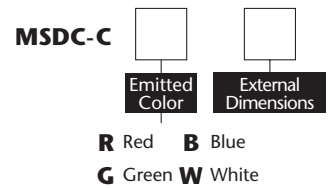


High Power Simple Dome Illumination

MSDC Series

Model Name	Emitted Color	Maximum Rated Current IFM (A)	Internal Diameter of Dome (mm)	Outside Diameter (mm)	Height (mm)	Weight (g)	LED Controller
MSDC-CR156	● Red	1.49	∅ 110	∅ 156	66	270	MLEK-A230
★ MSDC-CG156	● Green	1.49	∅ 110	∅ 156	66	270	MLEK-A230
★ MSDC-CB156	● Blue	1.49	∅ 110	∅ 156	66	270	MLEK-A230
MSDC-CW156	○ White	1.49	∅ 110	∅ 156	66	270	MLEK-A230
MSDC-CR400-3CH	● Red	1.78 each	∅ 360	∅ 424	207	2600	MLEK-D770
★ MSDC-CG400-3CH	● Green	1.78 each	∅ 360	∅ 424	207	2600	MLEK-D770
★ MSDC-CB400-3CH	● Blue	1.78 each	∅ 360	∅ 424	207	2600	MLEK-D770
MSDC-CW400-3CH	○ White	1.78 each	∅ 360	∅ 424	207	2600	MLEK-D770

### Explanation of Model Code



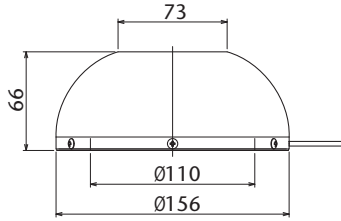
\* LED Controller on P.152-156

\* In case of a plurality of LED illuminations used, please check the "Selection Criteria LED Controller" on P.99.

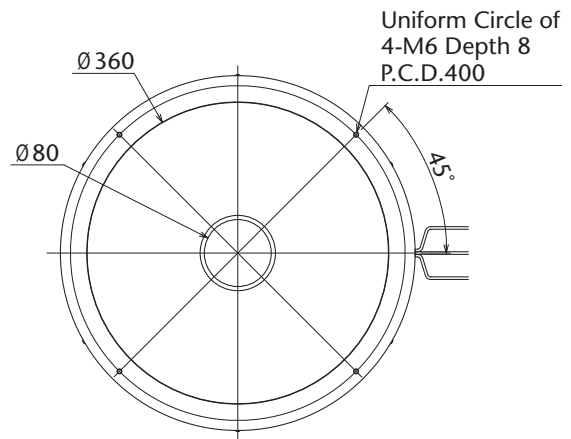
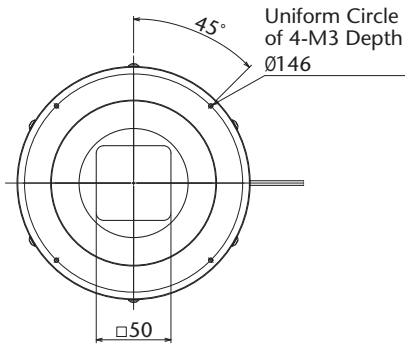
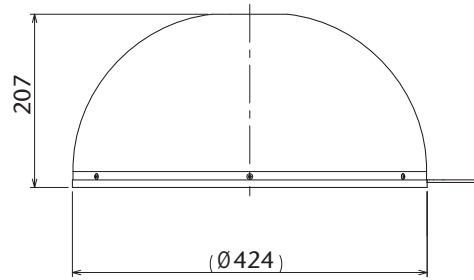
★ Made-to-order products.



MSDC-C□156



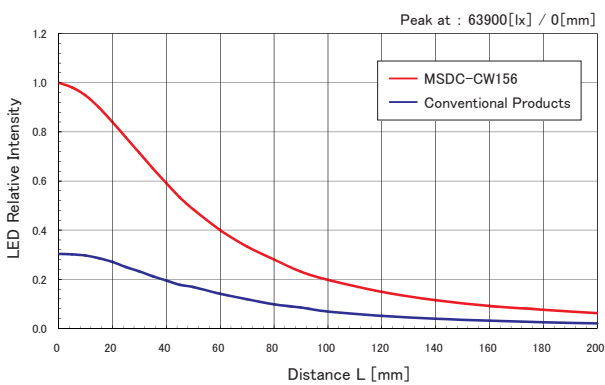
MSDC-C□400-3CH



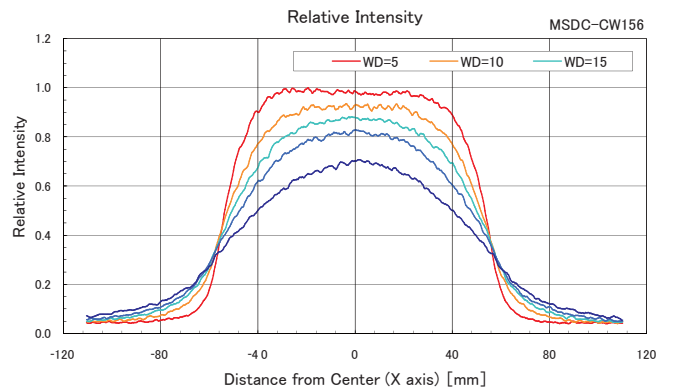
Sample Images



Light Intensity Characteristics



Light Distribution Characteristics



# Dome Illumination

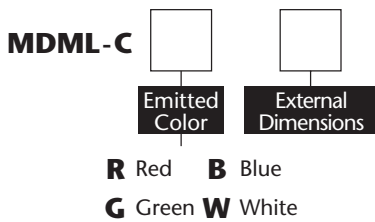
## MDML Series



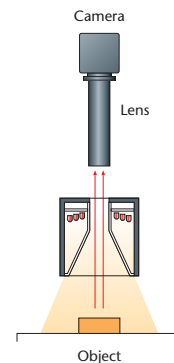
- Illuminates the surface of an object evenly by reflecting inbound light from the lower part of the dome onto the entire dome from 360°
- For large dome, a simulated coaxial box has been placed on the upper part of the dome and a low angle ring has been placed on the lower part of the dome to meet any lighting need.



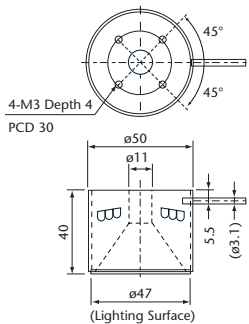
### Explanation of Model Code



### Illumination Structure

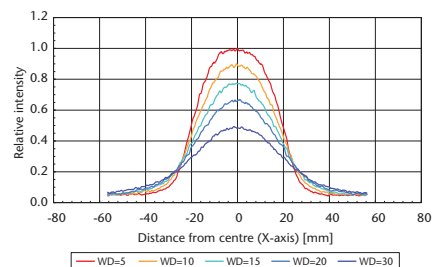


### MDML-CR (CG,CB,CW) 50



### Light Distribution Characteristics

#### MDML-CW50



Model	Emitted Color	Maximum Rated Current IFM(A)	Internal Diameter of Dome (mm)	External Diameter of Dome (mm)	Weight (g)	LED Controller
MDML-CR50	● Red	0.24	ø11	ø50	130	MLEK-A080
★ MDML-CG50	● Green	0.37	ø11	ø50	130	MLEK-A080
★ MDML-CB50	● Blue	0.37	ø11	ø50	130	MLEK-A080
MDML-CW50	○ White	0.37	ø11	ø50	130	MLEK-A080

\* LED Controller on P.152-156

\* In case of a plurality of LED illuminations used, please check the "Selection Criteria LED Controller" on P.99.

★Made-to-order products.



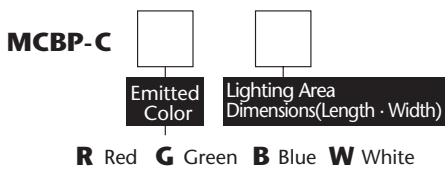
# Collimated Backlights

## MCBP Series



- Adjustable projected, collimated back light
- Capable of capturing the profile of an object with higher precision than other backlights

### Explanation of Model Code



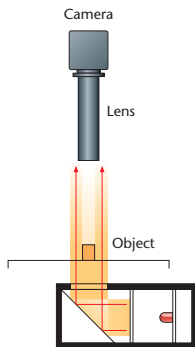
Model	Emitted Color	Maximum Rated Current IFM (A)	Dimensions of Lighting Surface (mm)	Weight (g)	LED Controller
★ MCBP-CR3430	● Red	0.07	34×30	260	MLEK-A080
★ MCBP-CG3430	● Green	0.07	34×30	260	MLEK-A080
MCBP-CB3430	● Blue	0.07	34×30	260	MLEK-A080
★ MCBP-CW3430	○ White	0.07	34×30	260	MLEK-A080

\* LED Controller on P.152~156

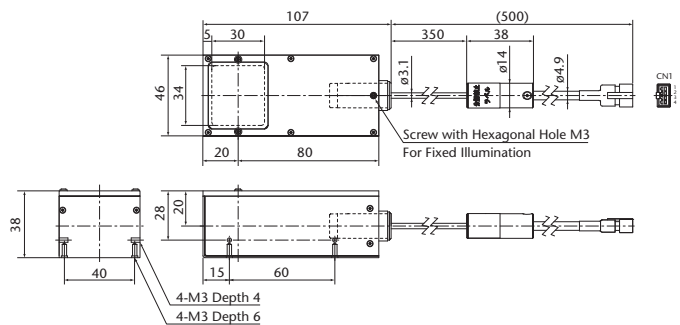
\* In case of a plurality of LED illuminations used, please check the "Selection Criteria LED Controller" on P.99.

★Made-to-order products.

### Illumination Structure



### MCBP-CR (CG, CB, CW) 3430



### Sample Images

Screw



**Direct Backlight (MDBL-CB70)**  
Shape unclear because of stray, direct light.



**Collimated Backlight (MCBP-CB3430)**  
Easy to identify shape because effect of stray, direct light is eased by the Collimated light.

Embossed Characters On Clear Resin



**Direct Backlight (MDBL-CB70)**  
Ordinary light transmitted evenly through the entire object.



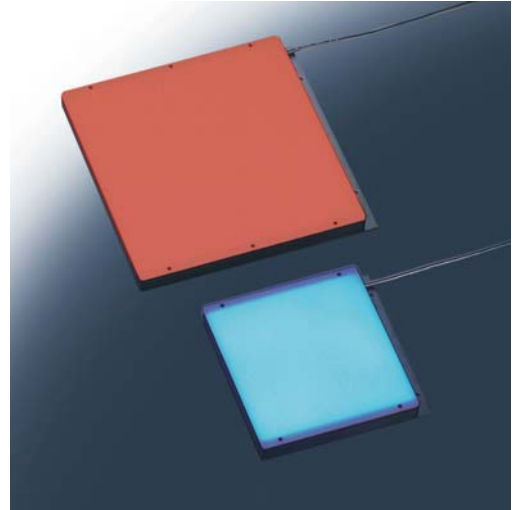
**Collimated Backlight (MCBP-CB3430)**  
Reflected light directed at characters for clear identification also makes external shape identification possible.

# Direct Backlights (Chip Mount Type)

## MDBC Series

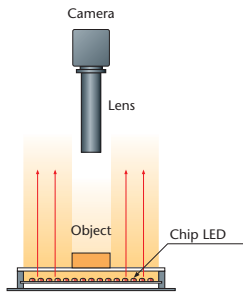


- Provide intense but diffused versatile lighting
- Because of the thin body design, these chip mounted units are ideal for saving space

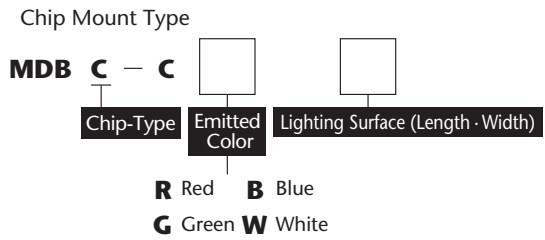


### Illumination Structure

#### MDBC Series



#### Explanation of Model Code



Model	Emitted Color	Maximum Rated Current IFM(A)	Dimensions of Lighting Surface (mm)	Weight (g)	LED Controller
★ MDBC-CR60	● Red	0.25	63×60	70	MLEK-A080
★ MDBC-CG60	● Green	0.39	63×60		MLEK-A080
★ MDBC-CB60	● Blue	0.39	63×60		MLEK-A080
★ MDBC-CW60	○ White	0.39	63×60		MLEK-A080
MDBC-CR100	● Red	0.80	100×100	170	MLEK-A080
★ MDBC-CG100	● Green	0.95	100×100		MLEK-A230
★ MDBC-CB100	● Blue	0.95	100×100		MLEK-A230
MDBC-CW100	○ White	0.95	100×100		MLEK-A230
MDBC-CR150	● Red	0.99	150×150	310	MLEK-A230
★ MDBC-CG150	● Green	2.14	150×150		MLEK-A230
★ MDBC-CB150	● Blue	2.14	150×150		MLEK-A230
MDBC-CW150	○ White	2.14	150×150		MLEK-A230

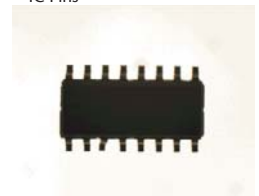
\* LED Controller on P.152-156      \* Made-to-order products.  
 \* In case of a plurality of LED illuminations used, please check the "Selection Criteria LED Controller" on P.99.

### Sample Images

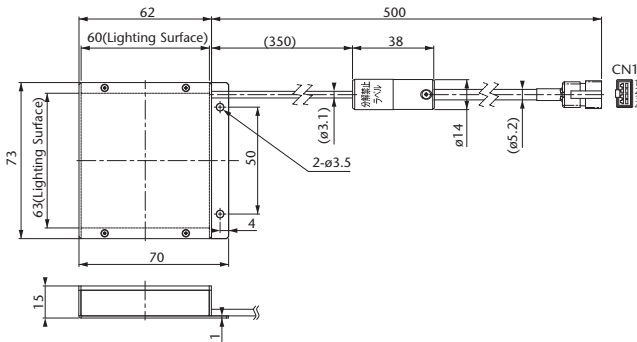
Beverage Bottle Liquid Level Detection



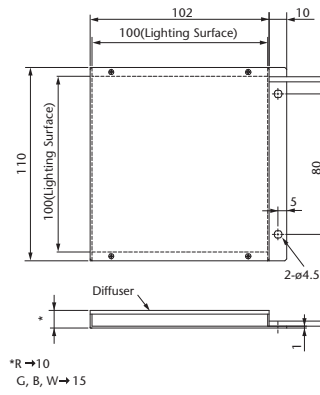
IC Pins



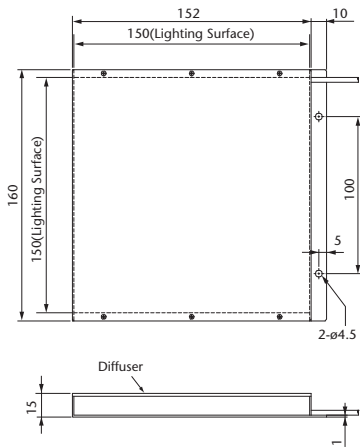
MDBC-CR(CG, CB, CW) 60



MDBC-CR(CG, CB, CW) 100

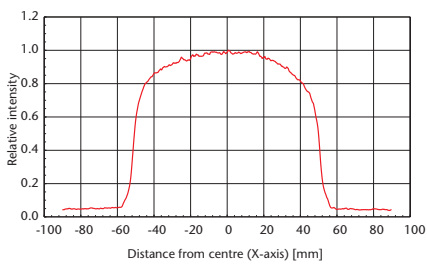


MDBC-CR(CG, CB, CW) 150

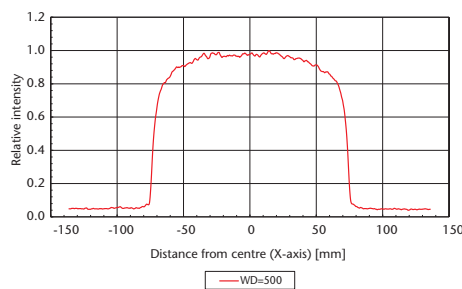


Light Distribution Characteristics

MDBC-CW100



MDBC-CW150

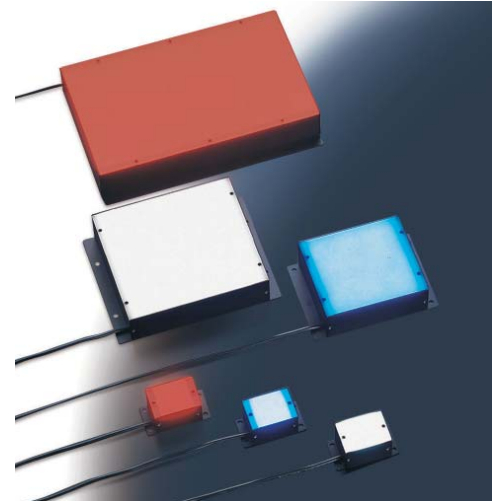


# Direct Backlights (Discrete Type)

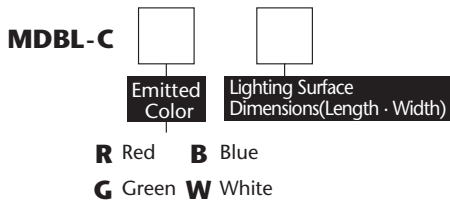
## MDBL Series



- Due to the LEDs mounted immediately beneath the diffusion plate surface, this unit achieves a higher luminance than the edge type backlights.
- Mount holds for easy installation



### Explanation of Model Code

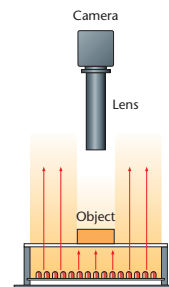


Direct Backlights (Discrete Type)

MDBL Series

Model	Emitted Color	Maximum Rated Current IFM (A)	Dimensions of Lighting Surface (mm)	Weight (g)	LED Controller
MDBL-CR25	● Red	0.14	25×25	60	MLEK-A080
★ MDBL-CG25	● Green	0.27	25×25		MLEK-A080
MDBL-CB25	● Blue	0.27	25×25		MLEK-A080
MDBL-CW25	○ White	0.27	25×25		MLEK-A080
MDBL-CR70	● Red	0.48	70×70	190	MLEK-A080
★ MDBL-CG70	● Green	0.96	70×70		MLEK-A230
MDBL-CB70	● Blue	0.96	70×70		MLEK-A230
MDBL-CW70	○ White	0.96	70×70		MLEK-A230
MDBL-CR100	● Red	1.43	100×100	290	MLEK-A230
★ MDBL-CG100	● Green	1.55	100×100		MLEK-A230
MDBL-CB100	● Blue	1.55	100×100		MLEK-A230
MDBL-CW100	○ White	1.55	100×100		MLEK-A230
MDBL-CR180100	● Red	2.30	180×100	520	MLEK-A230
★ MDBL-CG180100	● Green	2.30	180×100		MLEK-A230
MDBL-CB180100	● Blue	2.30	180×100		MLEK-A230
MDBL-CW180100	○ White	2.30	180×100		MLEK-A230

### Illumination Structure

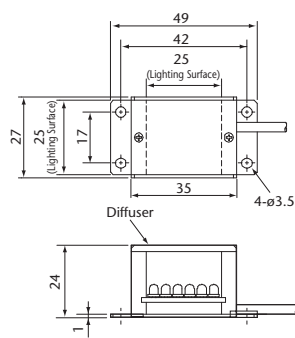


\* LED Controller on P.152-156

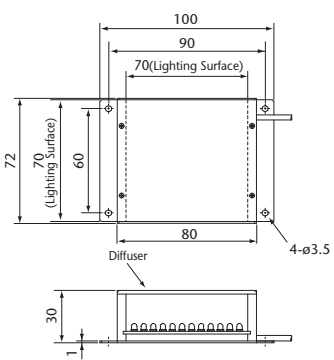
★ Made-to-order products.

\* In case of a plurality of LED illuminations used, please check the "Selection Criteria LED Controller" on P.99.

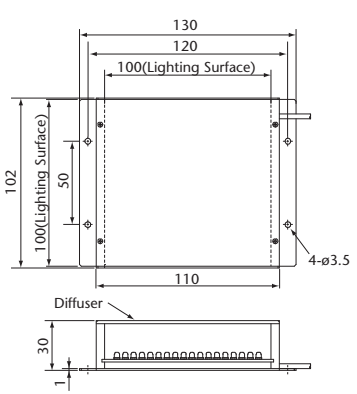
**MDBL-CR (CG,CB,CW) 25**



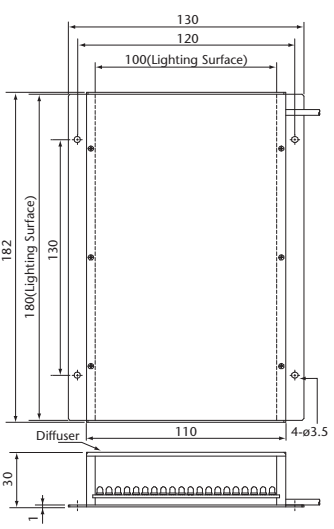
**MDBL-CR (CG,CB,CW) 70**



**MDBL-CR (CG,CB,CW) 100**



**MDBL-CR (CG,CB,CW) 180100**



**Sample Images**

Connector

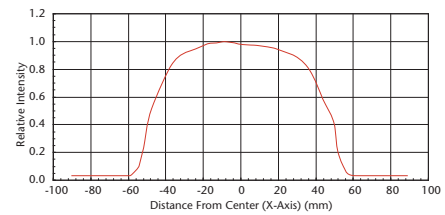


Plaster



**Light Distribution Characteristics**

**MDBL-CW100**

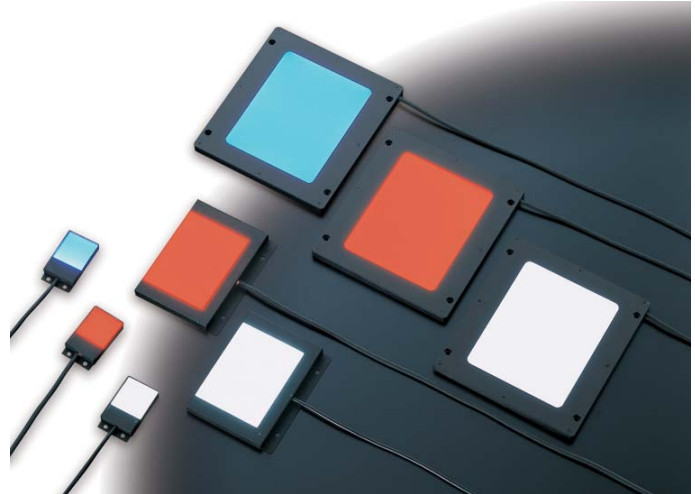


# Edge Type Backlights

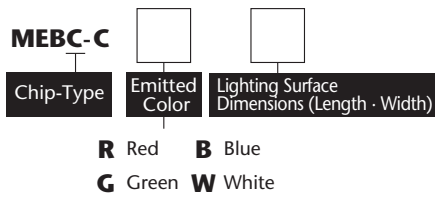
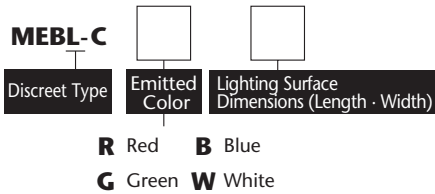
## MEBL/MEBC Series



- Requires very little space due to slim, compact design
- Provides very uniform, indirect light by means of a unique light transfer diffusion plate & additional diffusion sheets



### Explanation of Model Code



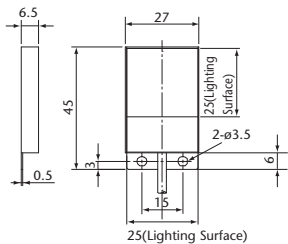
Model	Emitted Color	Maximum Rated Current IFM (A)	Dimensions of Lighting Surface (mm)	Weight (g)	LED Controller
MEBL-CR25	● Red	0.03	25×25	45	MLEK-A080
★ MEBL-CG25	● Green	0.04	25×25		MLEK-A080
MEBL-CB25	● Blue	0.04	25×25		MLEK-A080
MEBL-CW25	○ White	0.04	25×25		MLEK-A080
MEBL-CR50	● Red	0.17	50×50	110	MLEK-A080
★ MEBL-CG50	● Green	0.29	50×50		MLEK-A080
MEBL-CB50	● Blue	0.29	50×50		MLEK-A080
MEBL-CW50	○ White	0.29	50×50		MLEK-A080
MEBL-CR7050	● Red	0.15	70×50	140	MLEK-A080
★ MEBL-CG7050	● Green	0.25	70×50		MLEK-A080
MEBL-CB7050	● Blue	0.25	70×50		MLEK-A080
MEBL-CW7050	○ White	0.25	70×50		MLEK-A080
MEBL-CR10080	● Red	0.32	100×80	230	MLEK-A080
★ MEBL-CG10080	● Green	0.57	100×80		MLEK-A080
MEBL-CB10080	● Blue	0.57	100×80		MLEK-A080
MEBL-CW10080	○ White	0.57	100×80		MLEK-A080
MEBL-CR145	● Red	0.45	145×145	460	MLEK-A080
★ MEBL-CG145	● Green	0.8	145×145		MLEK-A080
MEBL-CB145	● Blue	0.8	145×145		MLEK-A080
MEBL-CW145	○ White	0.8	145×145		MLEK-A080
★ MEBC-CR360250	● Red	1.32	360×250	2500	MLEK-A230
★ MEBC-CG360250*	● Green	3.96	360×250		MLEK-A800
★ MEBC-CB360250*	● Blue	3.96	360×250		MLEK-A800
★ MEBC-CW360250*	○ White	3.96	360×250		MLEK-A800

\*LED Controller on P.152-156

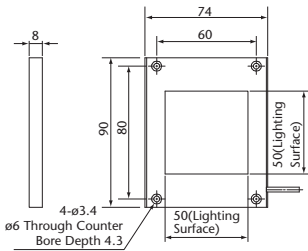
\* In case of a plurality of LED illuminations used, please check the "Selection Criteria LED Controller" on P.99.

★Made-to-order products.

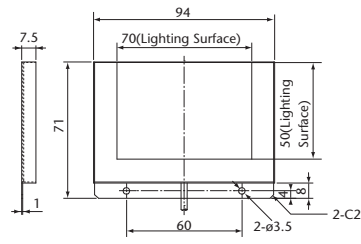
**MEBL-CR (CG,CB,CW) 25**



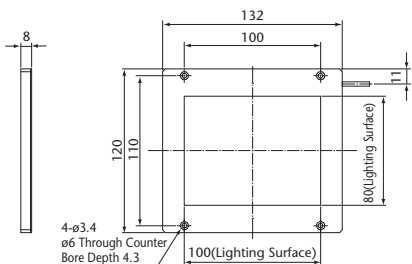
**MEBL-CR (CG,CB,CW) 50**



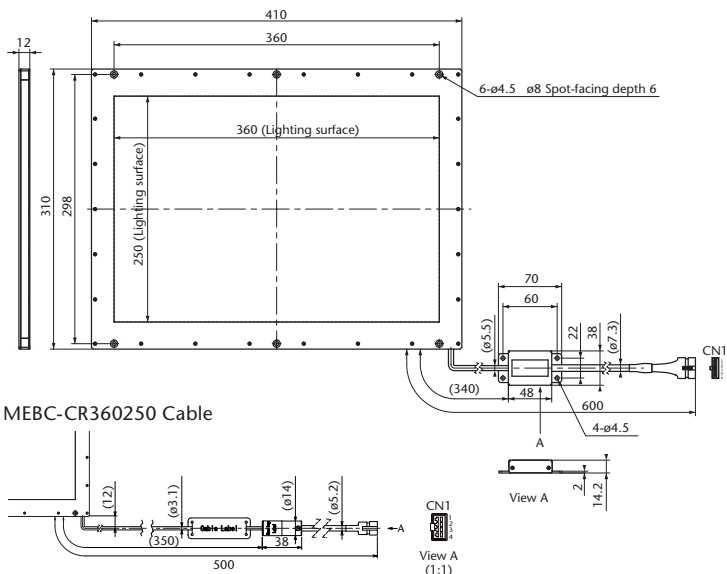
**MEBL-CR (CG,CB,CW) 7050**



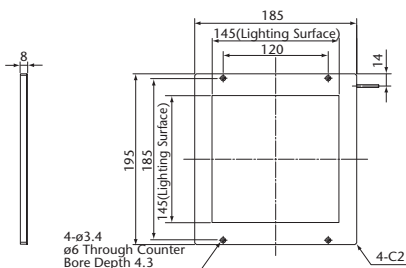
**MEBL-CR (CG,CB,CW) 10080**



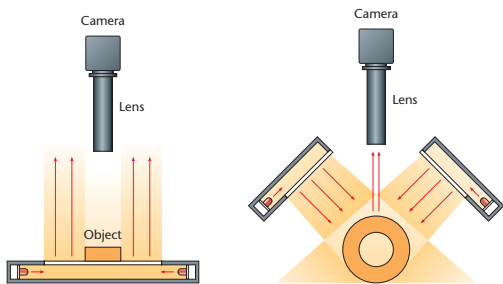
**MEBC-CR (CG,CB,CW) 360250**



**MEBL-CR (CG,CB,CW) 145**



**Illumination Structure**



The MEBL Series can also be used as a reflective light for samples with local reflection.

**Sample Images**

Bottle Liquid Level  
MEBL-CR145

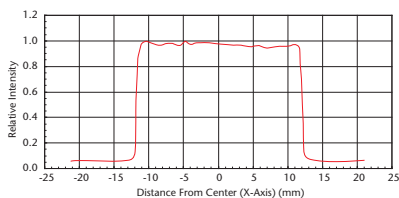


Electrodes on Liquid Crystal Glass  
MEBL-CW7050

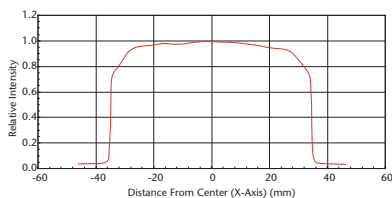


**Light Distribution Characteristics**

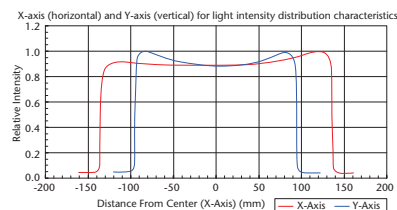
**MEBL-CW25**



**MEBL-CW7050**



**MEBC-CW360250**

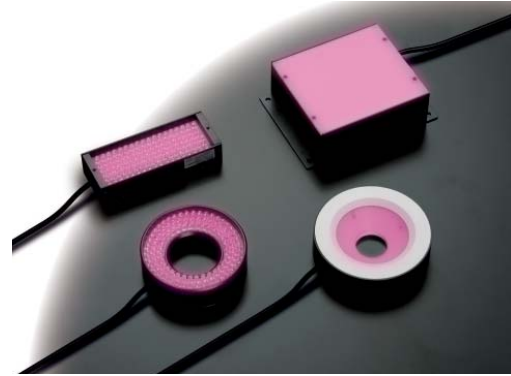


# IR Illumination IR Series

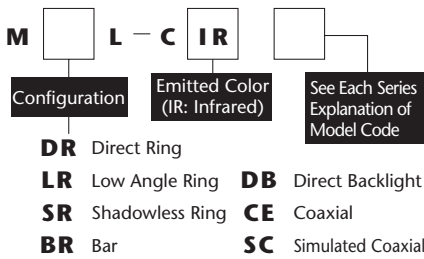


- Provides image recognition at high contrast especially for items that are difficult to view in visible light
- Lighting is also effective for materials that chemically react to visible light rays or allow IR wavelength transmission

Highly effective when used with an infrared lens and camera.  
 Approximately 1.7 times higher reflecting rate for 500nm and 850 nm gold (Au).  
 The peak wavelength is 850nm. (MCEL-CIR8-940 is 940nm)



### Explanation of Model Code



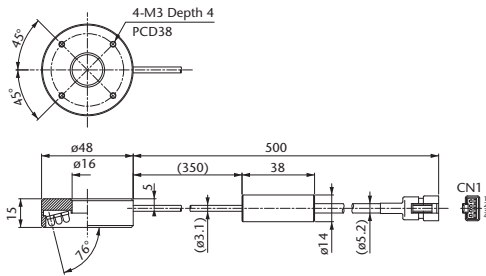
IR Illumination  
IR Series

Model	Emitted Color	Maximum Rated Current IFM (A)	Dimention (mm)		Lighting Angle	Window Size (mm)	Optical Path Length Extension (mm)	Weight (g)	LED Controller
★ MDRL-CIR16	Infrared	0.27	Internal Diameter ø16	External Diameter ø48	76°	—	—	65	MLEK-A080
MDRL-CIR31	Infrared	0.42	Internal Diameter ø31	External Diameter ø66	75°	—	—	130	MLEK-A080
★ MLRL-CIR25	Infrared	0.16	Internal Diameter ø25	External Diameter ø50	30°	—	—	70	MLEK-A080
★ MLRL-CIR46	Infrared	0.18	Internal Diameter ø46	External Diameter ø75	0°	—	—	80	MLEK-A080
★ MLRL-CIR48	Infrared	0.33	Internal Diameter ø48	External Diameter ø74	30°	—	—	110	MLEK-A080
MSRL-CIR20	Infrared	0.36	Internal Diameter ø20	External Diameter ø74	—	—	—	140	MLEK-A080
MBRL-CIR7530	Infrared	0.40	Lighting Area Dimensions 75x30		—	—	—	120	MLEK-A080
MDBL-CIR70	Infrared	0.53	Lighting Surface Dimensions 70x70		—	—	—	190	MLEK-A080
★ MDBL-CIR100	Infrared	1.35	Lighting Surface Dimensions 100x100		—	—	—	290	MLEK-A230
MCEL-CIR8-2	Infrared	0.06	Tip External Diameter ø8		—	—	—	35	MLEK-A080
★ MCEL-CIR8-940	Infrared	0.06	Tip External Diameter ø8		—	—	—	35	MLEK-A080
★ MSCL-CIR24	Infrared	0.09	Box Height 24		—	18x18	6.8	110	MLEK-A080
★ MSCL-CIR39	Infrared	0.16	Box Height 39		—	ø28	1.2	160	MLEK-A080
★ MSCL-CIR56-B	Infrared	0.33	Box Height 56		—	ø28	1.2	320	MLEK-A080
★ MSCL-CIR105-B	Infrared	2.14	Box Height 105		—	77x77	1.2	920	MLEK-A230

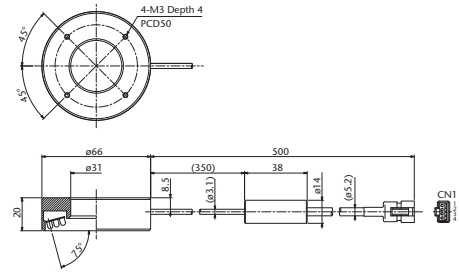
\* LED Controller on P.152-156  
 \* In case of a plurality of LED illuminations used, please check the "Selection Criteria LED Controller" on P.99. ★Made-to-order products.



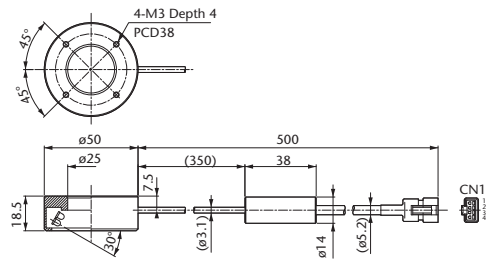
**MDRL-CIR16**



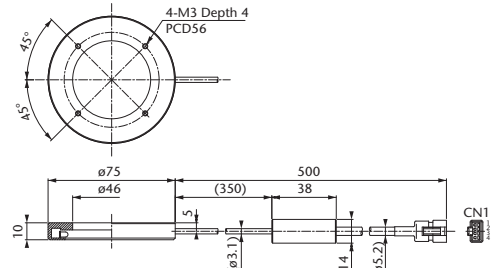
**MDRL-CIR31**



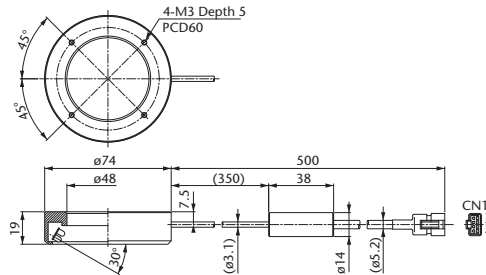
**MLRL-CIR25**



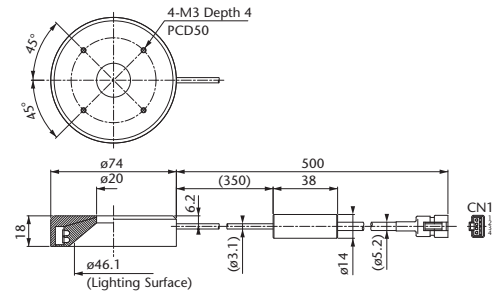
**MLRL-CIR46**



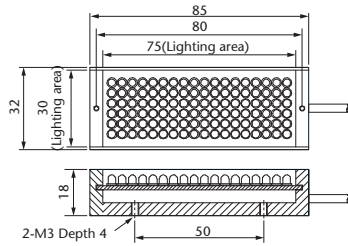
**MLRL-CIR48**



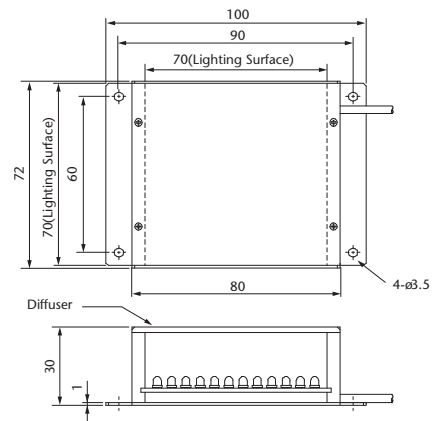
**MSRL-CIR20**



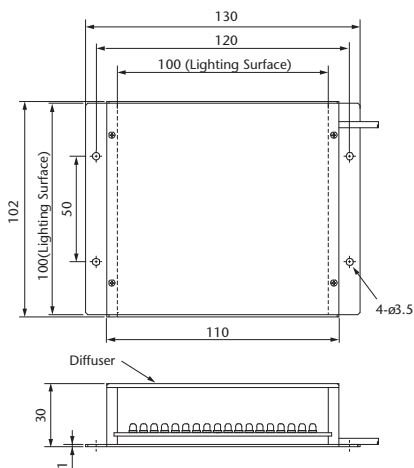
**MBRL-CIR7530**



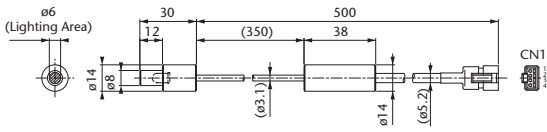
**MDBL-CIR70**



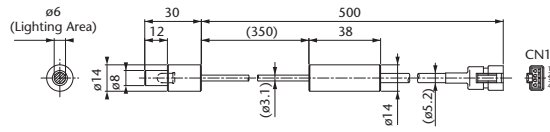
**MDBL-CIR100**



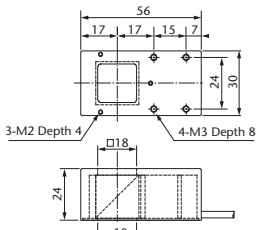
**MCEL-CIR8-2**



**MCEL-CIR8-940**

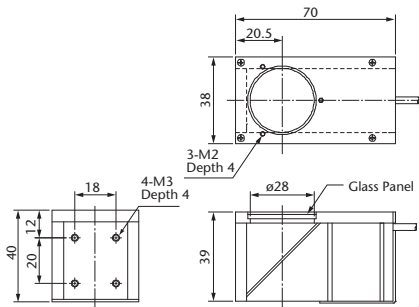


**MSCL-CIR24**

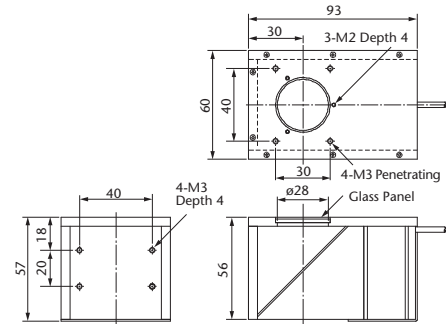


Because glass components are used in the case, the internal optical path length may change. Please refer to P.107 'About Installation'.

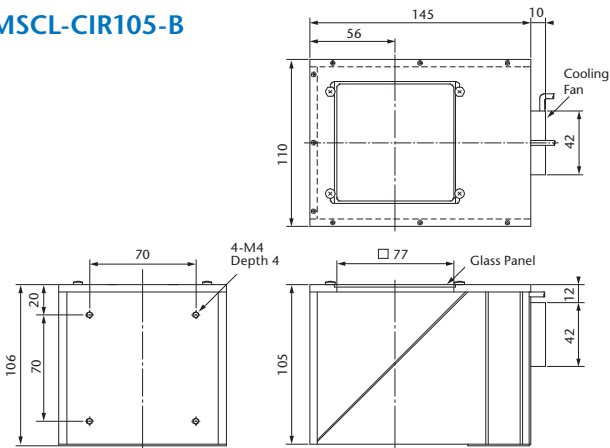
**MSCL-CIR39**



**MSCL-CIR56-B**



**MSCL-CIR105-B**

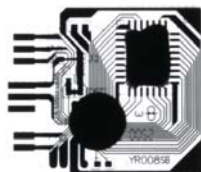


## Sample Images

### 1. Substrate Pattern Recognition

(For IR, only the pattern is recognized clearly)

With an IR backlight LED (MDBL-CIR70)



With a white backlight LED (MDBL-CW70)



### 2. Cheese Package Recognition

(For IR, specific patterns can be made invisible)

With an IR direct ring LED (MDRL-CIR31)

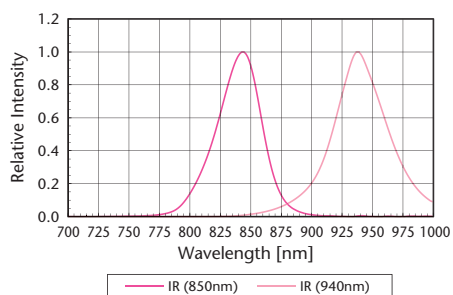


With a white, direct LED (MDRL-CW31)



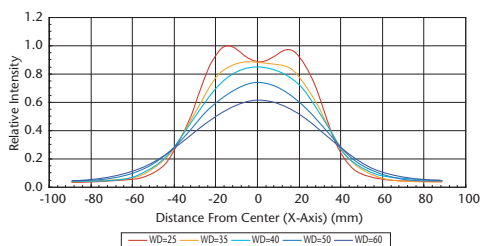
## LED Spectral Characteristics

IR Series

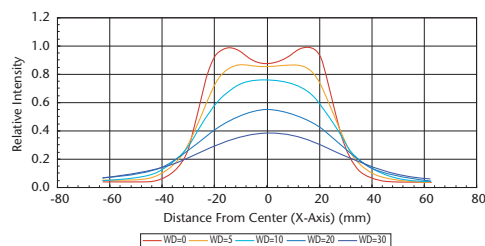


## Light Distribution Characteristics

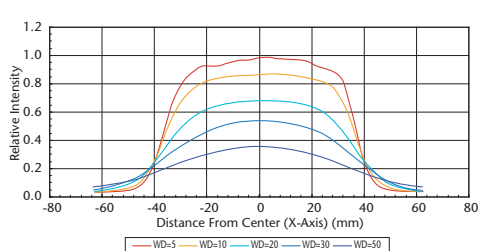
MDRL-CIR31



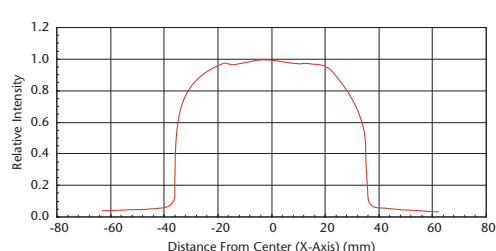
MSRL-CIR20



MBRL-CIR7530



MDBL-CIR70



# UV Illumination UV Series

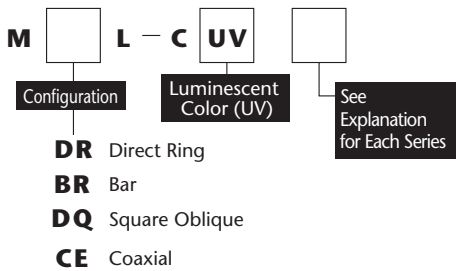


- Provides image recognition at high contrast levels especially for images that are difficult to recognize with visible light
- Can be used for fluorescence applications
- Use with a UV light range camera
- Effective in detection of dirt on glass substrates and dust on elements
- The peak wavelength is 365 nm for most models (MCELCUV8-405 and MBRL-CUV7530-405 are 405 nm)



\*Image of illumination condition

### Explanation of Model Code



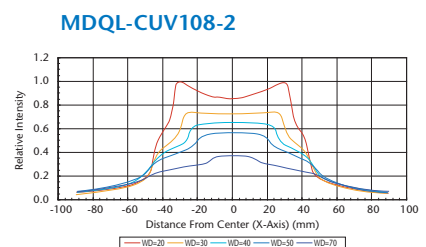
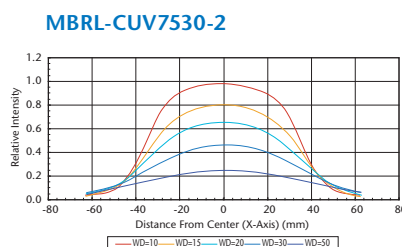
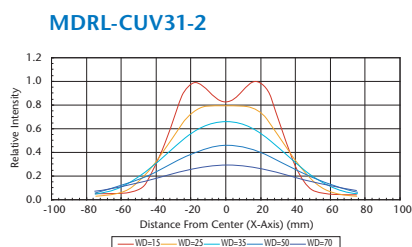
Model	Emitted Color	Maximum Rated Current IFM(A)	Dimensions (mm)		Weight (g)	LED Controller
			Internal Diameter	External Diameter		
MDRL-CUV31-2	● UV	0.36	Internal Diameter Ø31	External Diameter Ø66	130	MLEK-A080
MBRL-CUV7530-2	● UV	0.36	Lighting Area 75×30		120	MLEK-A080
★ MBRL-CUV7530-405	● UV	0.52	Lighting Area 75×30		120	MLEK-A080
★ MDQL-CUV108-2	● UV	0.36	Internal Dimensions □60	External Dimensions □108	210	MLEK-A080
★ MCEL-CUV8-405	● UV	0.03	Tip External Diameter Ø8		35	MLEK-A080

\* LED Controller on P.152-156

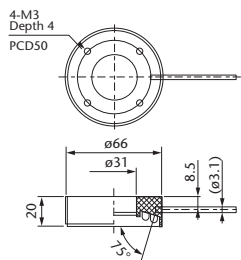
\* In case of a plurality of LED illuminations used, please check the "Selection Criteria LED Controller" on P.99.

★ Made-to-order products.

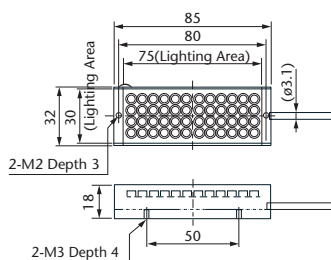
### Light Distribution Characteristics



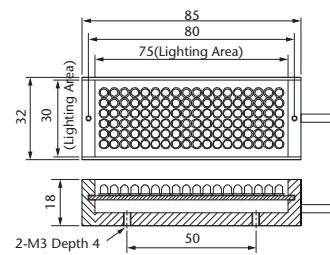
**MDRL-CUV31-2**



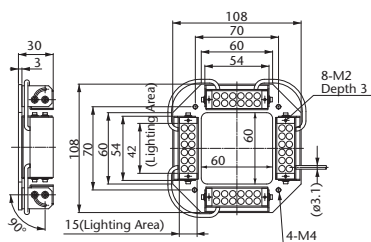
**MBRL-CUV7530-2**



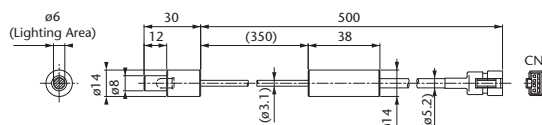
**MBRL-CUV7530-405**



**MDQL-CUV108-2**

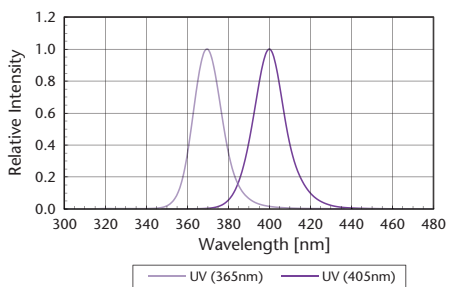


**MCEL-CUV8-405**



**LED Spectral Characteristics**

UV Series



**Sample Images**

Yogurt Package



Color camera with White LED



Visible, B/W camera with White LED



IR-camera with IR LED



UV-camera with UV LED

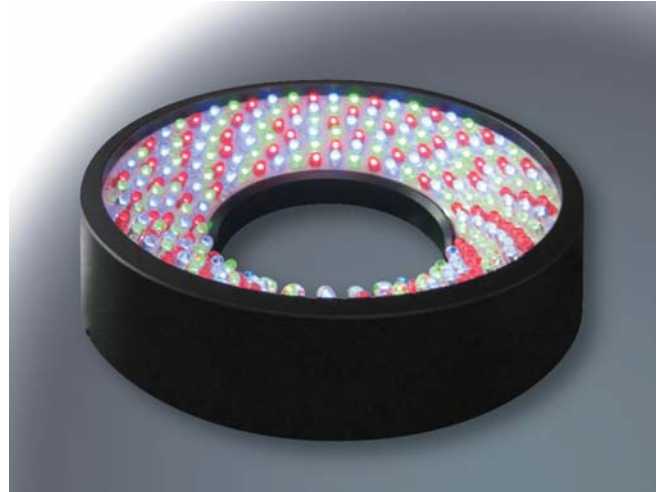
The print pattern not visible under IR can be seen clearly under UV

# Variable Color RGB Illumination

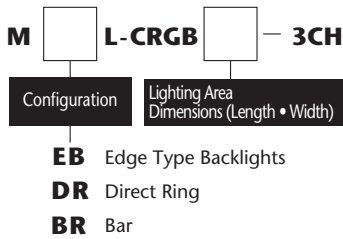
## RGB Series



- Discretely controllable RGB channels allow for the adjustment of wavelength combination and color temperature
- Ideal for applications where common wavelengths fail to provide contrast and multi-spectral imaging



### Explanation of Model Code



Variable Color RGB Illumination

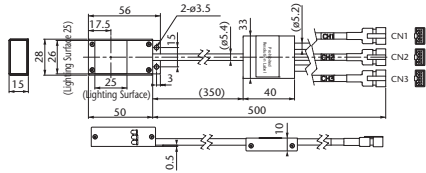
RGB Series

Model	Emitted Color	Maximum Rated Current IFM(A)	Dimensions (mm)		Lighting Angle	Weight (g)	LED Controller
★ MEBL-CRGB25-3CH	RGB	R : 0.03 G : 0.04 B : 0.04	Lighting Surface 25×25		—	80	MLEK-D770
★ MEBL-CRGB10080-3CH	RGB	R : 0.28 G : 0.49 B : 0.49	Lighting Surface 100×80		—	500	MLEK-D770
★ MDRL-CRGB56-3CH	RGB	R : 0.25 G : 0.37 B : 0.37	Internal Diameter Ø56	External Diameter Ø120	55°	530	MLEK-D770
★ MBRL-CRGB7530-3CH	RGB	R : 0.12 G : 0.18 B : 0.18	Lighting area 75×30		—	140	MLEK-D770

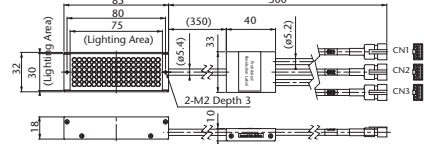
\* LED Controller on P.152-156

★Made-to-order products.

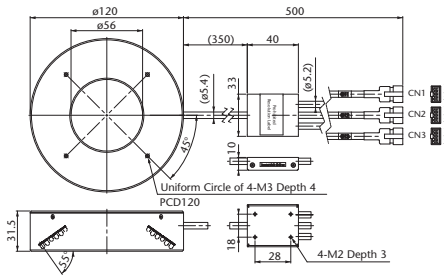
**MEBL-CRGB25-3CH**



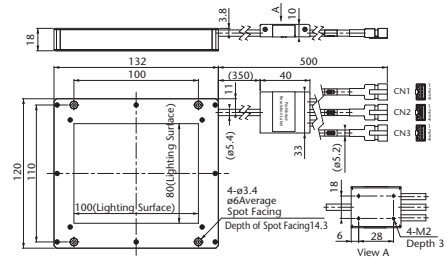
**MBRL-CRGB7530-3CH**



**MDRL-CRGB56-3CH**

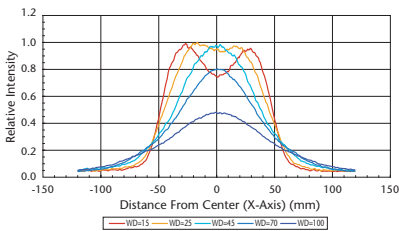


**MEBL-CRGB10080-3CH**

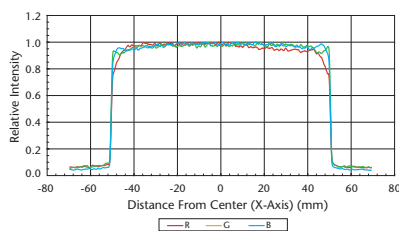


**Light Distribution Characteristics**

**MDRL-CRGB56-3CH**



**MEBL-CRGB10080-3CH**



# Diffuse Chip Type Bar Illumination

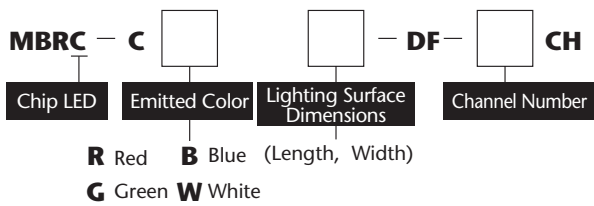
## MBRC Series



- High brightness and high uniformity achieved by high density mounting of chip type LEDs
- Available emission area lengths in 150 mm increments and can be extended to 900 mm
- Realization of a slim, lightweight compact design ideal for mounting in an imaging system



### Explanation of Model Code



Diffuse Chip Type Bar Illumination

MBRC Series

Model	Emitted Color	Dimensions(mm)		Maximum Rated Current IFM(A)	Weight (g)	LED Controller
		Lighting Surface	External Dimension			
★ MBRC-CR15012-DF	● Red	150	190	0.5	130	MLEK-A080
★ MBRC-CG15012-DF	● Green			MLEK-A080		
★ MBRC-CB15012-DF	● Blue			MLEK-A080		
MBRC-CW15012-DF	○ White			MLEK-A080		
MBRC-CR30012-DF	● Red	300	340	0.99	230	MLEK-A230
★ MBRC-CG30012-DF	● Green			MLEK-A230		
★ MBRC-CB30012-DF	● Blue			MLEK-A230		
MBRC-CW30012-DF	○ White			MLEK-A230		
★ MBRC-CR60012-DF	● Red	600	640	1.98	420	MLEK-A230
★ MBRC-CG60012-DF	● Green			MLEK-A230		
★ MBRC-CB60012-DF	● Blue			MLEK-A230		
MBRC-CW60012-DF	○ White			MLEK-A230		
★ MBRC-CR90012-DF-2CH	● Red	ch1 : 600 ch2 : 300	940	ch1 : 1.98 ch2 : 0.99	620	MLEK-D770
★ MBRC-CG90012-DF-2CH	● Green			MLEK-D770		
★ MBRC-CB90012-DF-2CH	● Blue			MLEK-D770		
MBRC-CW90012-DF-2CH	○ White			MLEK-D770		

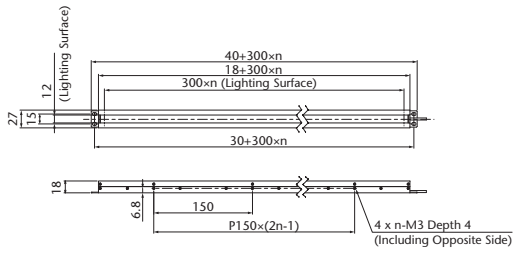
\* LED Controller on P.152-156

\* In case of a plurality of LED illuminations used, please check the "Selection Criteria LED Controller" on P.99.

★Made-to-order products.

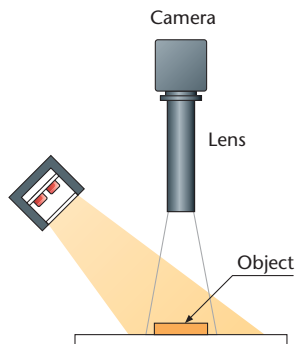


**MBRC-CR(CG,CB,CW)□□12-DF**



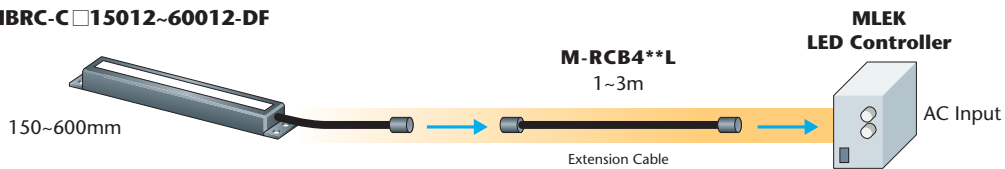
\*Cables with 2 branches are required for lines with a length of 900mm or greater.

**Illumination Structure**

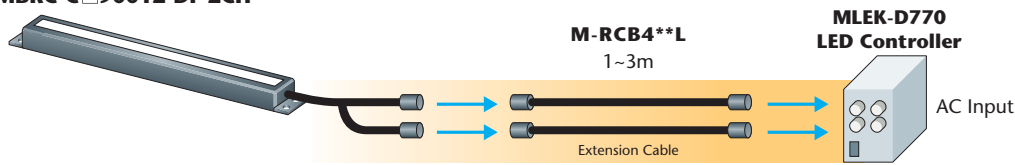


**Illumination Structure**

**MBRC-C□15012~60012-DF**

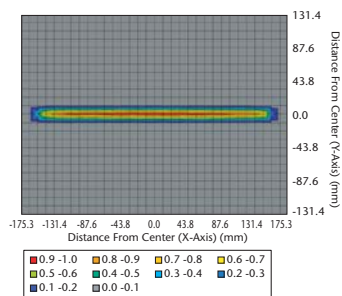


**MBRC-C□90012-DF-2CH**

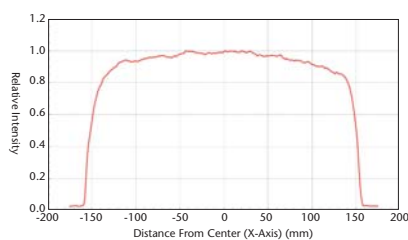


**Light Distribution Characteristics**

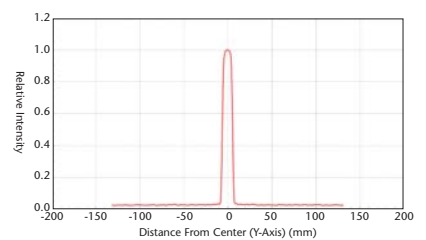
**MBRC-CW30012-DF**



**Light Distribution for the X-axis (horizontal)**



**Light Distribution for the Y-axis (vertical)**



# High Brightness LED Light Line MLNC Series

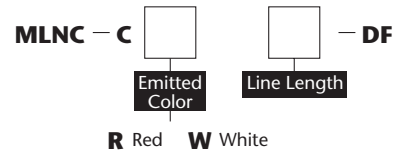


Heat-sink mounted LED light line with the highest brightness in the industry!

- **Brightest light line in the industry, 700,000 lux at W = 50 mm**
- **Equipped with a light focusing position adjustment mechanism, this unit is flexible to meet the user's requirements**
- **High power output is especially impressive considering that this unit has the thinnest body dimensions in the industry, with end width of only 25 mm**

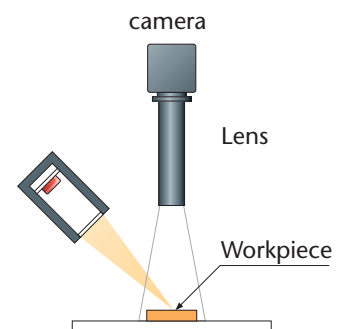


### Explanation of Model Code



Model	Emitted Color	Maximum Rated Current IFM (A)	Dimensions of Light Emitting Section (mm)	Weight (g)	LED Controller
MLNC-CW100-DF	○ White	2.3	100	580	MLEK-A230
MLNC-CW200-DF-2CH	○ White	Ch1 : 2.3 Ch2 : 2.3	200	1000	MLEK-D770
MLNC-CW300-DF-3CH	○ White	Ch1 : 2.3 Ch2 : 2.3 Ch3 : 2.3	300	1400	MLEK-D770
★ MLNC-CR100-DF	● Red	2.3	100	580	MLEK-A230
★ MLNC-CR200-DF-2CH	● Red	Ch1 : 2.3 Ch2 : 2.3	200	1000	MLEK-D770
★ MLNC-CR300-DF-3CH	● Red	Ch1 : 2.3 Ch2 : 2.3 Ch3 : 2.3	300	1400	MLEK-D770

### Illumination Structure

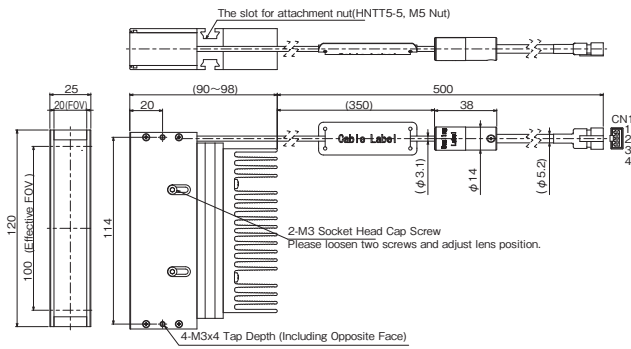


\* LED Controller on P.152-156

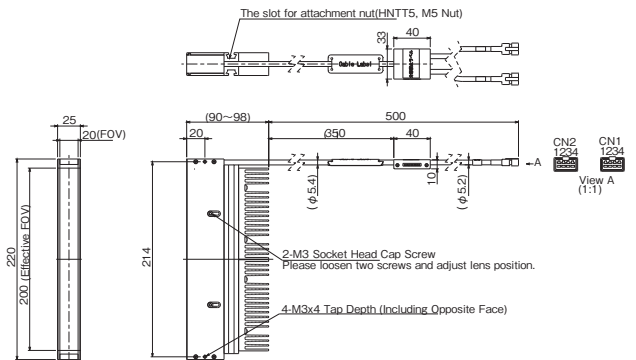
★ Made-to-order products.

\* In case of a plurality of LED illuminations used, please check the "Selection Criteria LED Controller" on P.99.

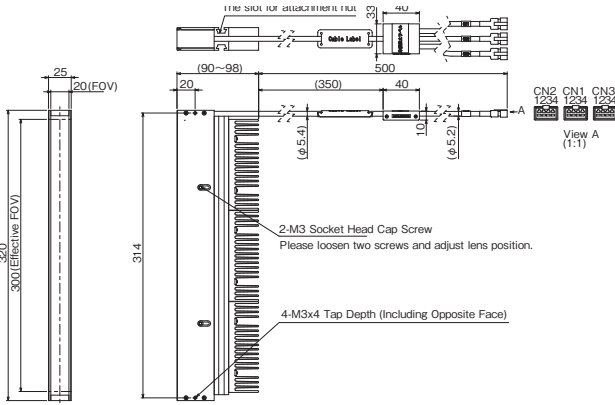
### MLNC-CW(CR)100-DF



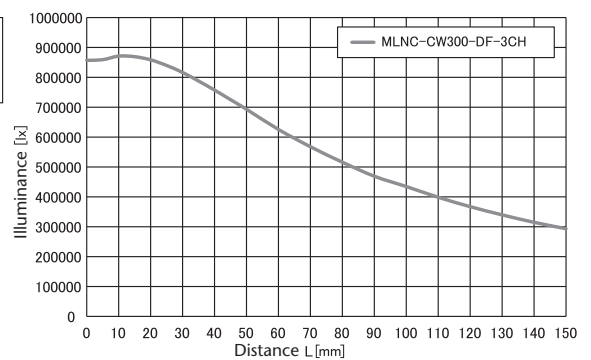
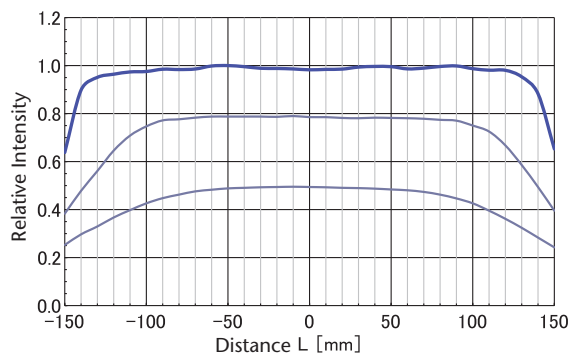
### MLNC-CW(CR)200-DF-2CH



### MLNC-CW(CR)300-DF-3CH



### Light Intensity Characteristics



# LED Spot Projectors

## MSPP Series



Assures safe installation under harsh environments with ingress protection (IP67) from dust and water droplets.

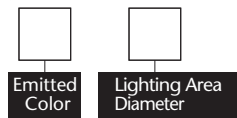
- **For use in long working distance applications (up to 2m)**
  - Can also be used at a short distance from inspection targets
  - Widens the operating range for robots and other automated tools
  - Can be installed to replace lights that produce large amounts of heat
- **Structure allows for a variable illumination area range. Installation distance and lighting area can be adjusted easily**
- **Two types offered for narrow and wide illumination areas, both with working distance and field of view adjustment**
- **Ease of maintenance possible with glass cover replacement**
- **Use of of a versatile connector makes it possible to use cables which resist spatter**
- **Low temperature emission and low energy consumption save power and reduce effects on the environment**



### Explanation of Model Code

LED Spot Projectors

**MSPP - C**



**R** Red **B** Blue  
**G** Green **W** White

LED Spot Projectors

MSPP Series

	Model	Emitted Color	Maximum Rated Current IFM(A)	Weight (g)	LED Controller	Notes
Illumination Area (Wide Type)	★ MSPP-CR42-2	● Red	0.7	460	MLEP-A070	
	★ MSPP-CG42	● Green	0.7	460	MLEP-A070	
	★ MSPP-CB42	● Blue	0.7	460	MLEP-A070	
	MSPP-CW42	○ White	0.7	460	MLEP-A070	
Replacement Cover Glass	MGA-SP42	—	—	—	—	Illumination Option
Illumination Area (Narrow Type)	MSPP-CR74	● Red	0.7	600	MLEP-A070	
	★ MSPP-CG74	● Green	0.7	600	MLEP-A070	
	★ MSPP-CB74	● Blue	0.7	600	MLEP-A070	
	MSPP-CW74-2	○ White	0.7	600	MLEP-A070	
Replacement Cover Glass	MGA-SP74	—	—	—	—	Illumination Option
Extension Cable	M-XS402C	—	—	—	—	L=2m (Waterproof)
	M-XS405C	—	—	—	—	L=5m (Waterproof)
	M-XS410C	—	—	—	—	L=10m (Waterproof)
MSPP-MLEP070 Replacement Cable	M-RCB301XS	—	—	—	—	L=1m(One Side Waterproof)

\* LED Controller on P.149~151

★Made-to-order products.

## MSPP-CR/G/B/W42

Wide Area Illumination Type

Wide lighting area range and uniformity

WD 2m.....  $\phi$ 300~800mm

WD 1m.....  $\phi$ 170~400mm

WD 0.5m .....  $\phi$ 80~230mm

(Tested Product: MSPP-CR42)



## MSPP-CR/G/B/W74

Narrow Area Illumination Type

Amazing brightness

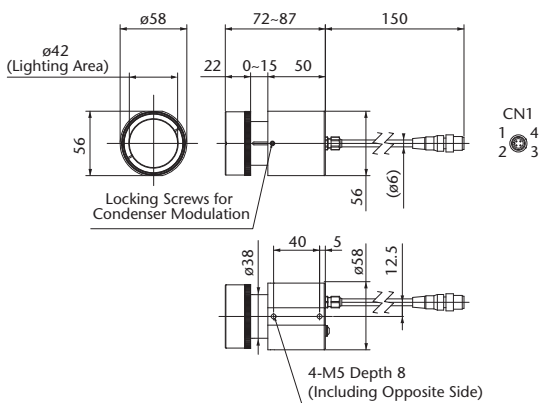
WD 2m At  $\phi$ 80mm..... 2,000Lx

WD 2m At  $\phi$ 200mm..... Approximately 800 Lx

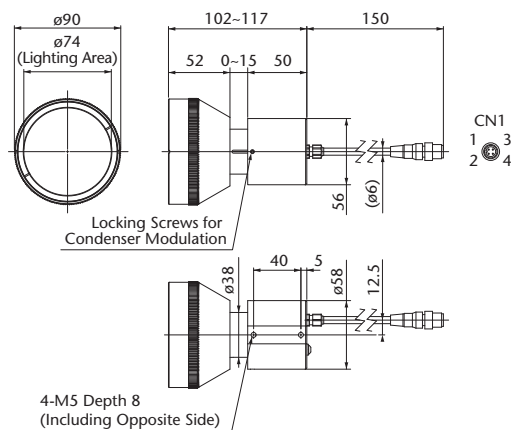
(Tested Product: MSPP-CW74)



### MSPP-CR42-2 MSPP-CG(CB,CW)42



### MSPP-CR(CG,CG)74 MSPP-CW74-2



## Intensity and Lighting Area Range \*Reference Values

### MSPP-CR42

WD	Lighting Area Range	Intensity
500	80~230	3790~754
1000	170~400	1070~207
1500	240~600	493~101
2000	300~800	290~57

### MSPP-CW42

WD	Lighting Area Range	Intensity
500	80~220	8700~1400
1000	100~470	2350~330
1500	150~680	1046~150
2000	200~1000	583~50

### MSPP-CR74

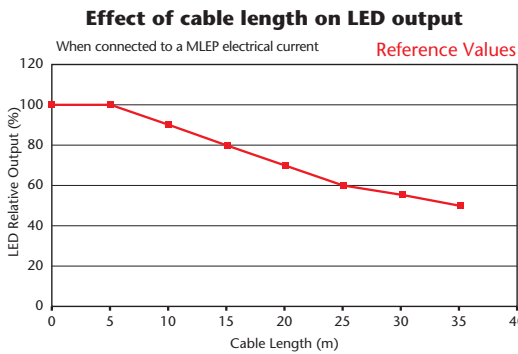
WD	Lighting Area Range	Intensity
500	30~130	8400~1760
1000	70~210	3020~580
1500	110~250	1380~260
2000	150~380	810~160

### MSPP-CW74

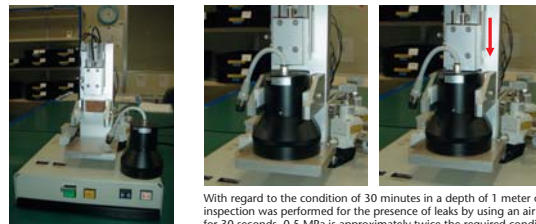
WD	Lighting Area Range	Intensity
500	35~100	15700~2600
1000	50~190	7600~840
1500	75~300	3300~390
2000	200~1000	2080~240

\*Lighting Area Range is 50% or greater for the maximum intensity

## Relation Between Cable Length and Intensity IP67 Leak Test

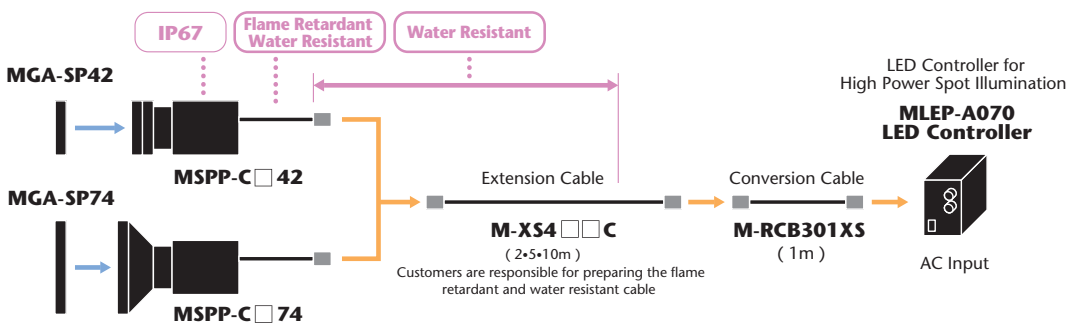


IP (Ingress Protection) is a set of standard measurements related to the protection of products from solid foreign objects and water. IP is prescribed by the Japanese Industrial Standards Committee (JIS C0920) and the International Organization for Standardization (IEC 60529). IP67 classification refers to a level of ingress protection for enclosures, to provide complete no ingress of dust and water under conditions of immersion at depth of 1m for 30 minutes.



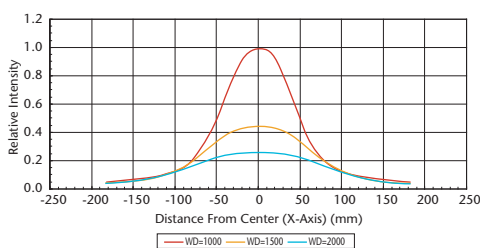
With regard to the condition of 30 minutes in a depth of 1 meter of water, a total inspection was performed for the presence of leaks by using an air pressure of 0.05 MPa for 30 seconds. 0.5 MPa is approximately twice the required condition

## MSPP Illumination System Connection Flow

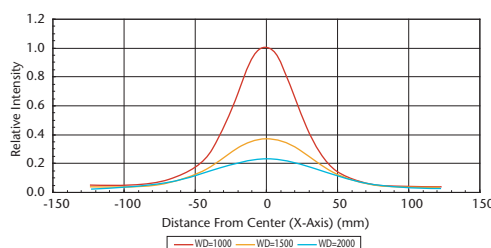


## Light Distribution Characteristics

### MSPP-CW42



### MSPP-CW74



# LED Controllers for MCEP/MSPP Series

## MLEP Series

Analog Digital

Completed Patent Registration

1ch

3ch

RoHS

CE

Supports up to 0.35A for MCEP-C 8 Series

**A035W Analog Series**

**A035W Digital Series**

Supports up to 0.70A

for MCEP-C 8-070/MSPP Series

**A070W Analog Series**

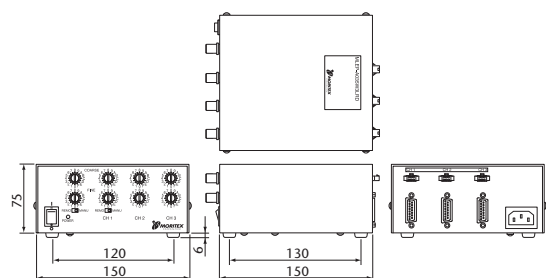
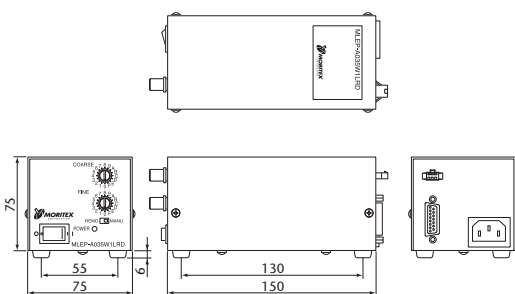
**A070W Digital Series**



- LED controllers exclusively for the MCEP/MSPP Series  
Choices are analog and digital intensity controls with universal voltage input (100 to 240V AC) 1-channel or 3-channel type. All models are RoHS compliant and CE marked
- 3-channel controllers have "integrated combination control" (patent registered) function that enables user to control the overall light intensity without changing the intensity of each individual channel. This function proves to be very useful for color lighting applications which need RGB color adjustment and reproducibility

MLEP-A035W1LR / 1LRD  
MLEP-A070W1LR / 1LRD

MLEP-A035W3LR / 3LRD  
MLEP-A070W3LR / 3LRD



### A035W Analog Series

Model	MLEP-A035W1LR		MLEP-A035W3LR	
	MLEP-A035W1LR-100V	MLEP-A035W1LR-200V	MLEP-A035W3LR-100V	MLEP-A035W3LR-200V
Order Code				
AC Type	100V	200	100V	200V
Output	1 channel output max. 350 mA		3 channel output max. 350 mA for each channel	
Input Voltage	AC100 - 240V 50/60Hz		AC100 - 240V 50/60Hz	
Input Current	0.07/0.06A (At AC100/ 240V)		0.14/0.09A (At AC100/ 240V)	
Surge Current	20A or less (at AC100V) 40A or less (at AC 240V)		20A or less (at AC100V) 40A or less (at AC 240V)	
Operating Temperature	0°C-45°C (Humidity: 80%RH below 31°C, decreases linearly to 50%RH from 32-40°C)			
Output System	DC Continuous output		DC Continuous output	
Output Control System	Constant current control (variable current)		Constant current control (variable current)	
External Light Control	Yes (0-5V intensity control)		Yes (0-5V intensity control)	
Output ON/ OFF Function	Yes (Photo-coupler insulation type)		Yes (Photo-coupler insulation type)	
Cooling System	Natural cooling by air		Natural cooling by air	
Installation	Rubber legs placed on flat surface		Rubber legs placed on flat surface	
Weight	0.9kg		1.4kg	

\*MLEP-A035 Series is for use only with MCEP-C□8

### A035W Digital Series

Model	MLEP-A035W1LRD		MLEP-A035W3LRD	
	MLEP-A035W1LRD-100V	MLEP-A035W1LRD-200V	MLEP-A035W3LRD-100V	MLEP-A035W3LRD-200V
Order Code				
AC Type	100V	200V	100V	200V
Output	1 channel output max. 350 mA		3 channel output max. 350 mA for each channel	
Input Voltage	AC100 - 240V 50/60Hz		AC100 - 240V 50/60Hz	
Input Current	0.07/0.06A (At AC100/ 240V)		0.14/0.09A (At AC100/ 240V)	
Surge Current	20A or less (at AC100V) 40A or less (at AC 240V)		20A or less (at AC100V) 40A or less (at AC 240V)	
Operating Temperature	0°C-45°C (Humidity: 80%RH below 31°C, decreases linearly to 50%RH from 32-40°C)			
Output System	DC Continuous output		DC Continuous output	
Output Control System	Constant current control (variable current)		Constant current control (variable current)	
External Light Control	Yes (8-bit digital)		Yes (independent 8-bit digital for each channel)	
Output ON/ OFF Function	Yes (Photo-coupler insulation type)		Yes (Photo-coupler insulation type)	
Cooling System	Natural cooling by air		Natural cooling by air	
Installation	Rubber legs placed on flat surface		Rubber legs placed on flat surface	
Weight	0.9kg		1.4kg	

\*MLEP-A035 Series is for use only with MCEP-C□8

LED Controllers for MCEP/MSP Series

MLEP Series

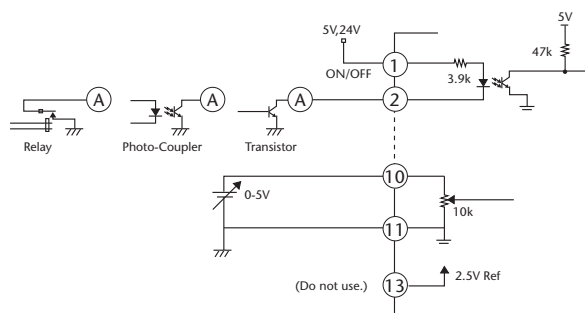
### Connection Specifications

With **MLEP-A035W1LR/3LR, MLEP-A070W1LR/3LR**

No.	Name	No.	Name
1	Output ON/ OFF signal +	9	NC
2	Output ON/ OFF signal -	10	External 0-5V analog intensity control signal input
3	NC	11	External input GND
4	NC	12	NC
5	NC	13	DC 2.5V bias LED controller unit output
6	NC	14	NC
7	NC	15	NC
8	NC		

### Input/Output Circuit Diagrams

With **MLEP-A035W1LR/3LR, MLEP-A070W1LR/3LR**





### A070W Analog Series

Model	MLEP-A070W1LR		MLEP-A070W3LR	
	MLEP-A070W1LR-100V	MLEP-A070W1LR-200V	MLEP-A070W3LR-100V	MLEP-A070W3LR-200V
Order Code				
AC Type	100V	200V	100V	200V
Output	1 channel output max. 700 mA		3 channel output max. 700 mA for each channel	
Input Voltage	AC100 - 240V 50/60Hz		AC100 - 240V 50/60Hz	
Input Current	0.11/0.07A (At AC100/ 240V)		0.25/0.14A (At AC100/ 240V)	
Surge Current	20A or less (at AC100V) 40A or less (at AC 240V)		20A or less (at AC100V) 40A or less (at AC 240V)	
Operating Temperature	0°C-45°C (Humidity: 80%RH below 31°C, decreases linearly to 50%RH from 32-40°C)			
Output System	DC Continuous output		DC Continuous output	
Output Control System	Constant current control (variable current)		Constant current control (variable current)	
External Light Control	Yes (0-5V intensity control)		Yes (0-5V intensity control)	
Output ON/ OFF Function	Yes (Photo-coupler insulation type)		Yes (Photo-coupler insulation type)	
Cooling System	Natural cooling by air		Natural cooling by air	
Installation	Rubber legs placed on flat surface		Rubber legs placed on flat surface	
Weight	0.9kg		1.4kg	

\*MLEP-A070 Series is for use only with MCEP-C 8-070-3 and MSPP LED controller

### A070W Digital Series

Model	MLEP-A070W1LRD		MLEP-A070W3LRD	
	MLEP-A070W1LRD-100V	MLEP-A070W1LRD-200V	MLEP-A070W3LRD-100V	MLEP-A070W3LRD-200V
Order Code				
AC Type	100V	200V	100V	200V
Output	1 channel output max. 700 mA		3 channel output max. 700 mA for each channel	
Input Voltage	AC100 - 240V 50/60Hz		AC100 - 240V 50/60Hz	
Input Current	0.11/0.07A (At AC100/ 240V)		0.25/0.14A (At AC100/ 240V)	
Surge Current	20A or less (at AC100V) 40A or less (at AC 240V)		20A or less (at AC100V) 40A or less (at AC 240V)	
Operating Temperature	0°C-45°C (Humidity: 80%RH below 31°C, decreases linearly to 50%RH from 32-40°C)			
Output System	DC Continuous output		DC Continuous output	
Output Control System	Constant current control (variable current)		Constant current control (variable current)	
External Light Control	Yes (8-bit digital)		Yes (independent 8-bit digital for each channel)	
Output ON/ OFF Function	Yes (Photo-coupler insulation type)		Yes (Photo-coupler insulation type)	
Cooling System	Natural cooling by air		Natural cooling by air	
Installation	Rubber legs placed on flat surface		Rubber legs placed on flat surface	
Weight	0.9kg		1.4kg	

\*MLEP-A070 Series is for use only with MCEP-C 8-070-3 and MSPP LED controller

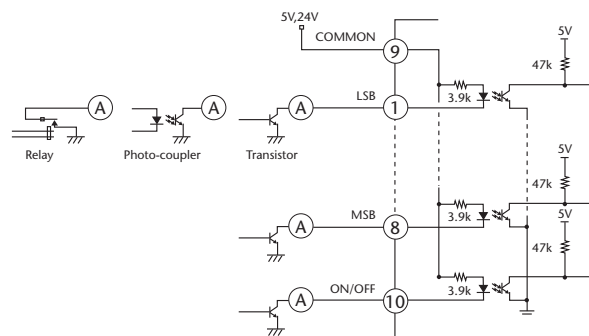
### Connection Specifications

With **MLEP-A035W1LRD/3LRD**, **MLEP-A070W1LRD/3LRD**

No.	Name	No.	Name
1	8-bit digital input 20 (LSB)	9	COMMON (+)
2	8-bit digital input 21	10	Output ON/ Off signal (input)
3	8-bit digital input 22	11	NC
4	8-bit digital input 23	12	NC
5	8-bit digital input 24	13	NC
6	8-bit digital input 25	14	NC
7	8-bit digital input 26	15	NC
8	8-bit digital input 27 (MSB)		

### Input/Output Circuit Diagrams

With **MLEP-A035W1LRD/3LRD**, **MLEP-A070W1LRD/3LRD**



# LED Controllers for MG-Wave®

## MLEK Series



Constant current LED controller designed for all MG-Wave® LEDs (except for the MCEP Series). As part of an initiative to address environmental issues, this model was designed in compliance with the Restriction of Hazardous Substances in Electrical and Electronic Equipment (RoHS directive) which was introduced in Europe in July 2006.

Supports up to 0.8A

**A080W Analog Series**  
**A080W Digital Series**

Supports up to 2.3A

**A230W Analog Series**  
**A230W Digital Series**



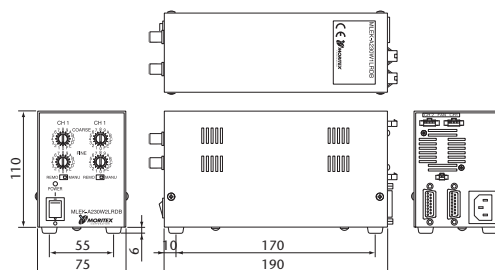
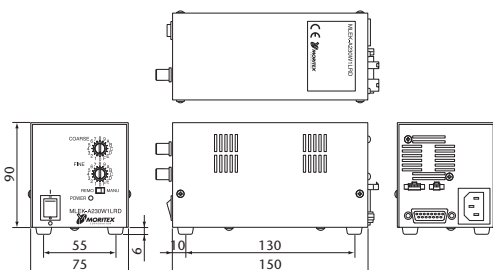
- 1 channel & 2 channel versions available in both analog and digital (8-bit, 256 level) external intensity control models
- Supports universal voltage input (100 to 240V AC) and is both RoHS compliant and CE marked

LED Controllers for MG-Wave®

MLEK Series

**MLEK-A080W1LR / 1LRD**  
**MLEK-A230W1LR / 1LRD**

**MLEK-A080W2LR / 2LRD**  
**MLEK-A230W2LR / 2LRDB**



### A080W Analog Series

Model	MLEK-A080W1LR		MLEK-A080W2LR	
	MLEK-A080W1LR-100V	MLEK-A080W1LR-200V	MLEK-A080W2LR-100V	MLEK-A080W2LR-200V
Order Code				
AC Type	100V	200V	100V	200V
Output	1 channel output max. 0.8A (Connects to all lights except MCEP Series only)		2 channel output max. 0.8A for each channel/ Total max. 0.8A (Connects to all lights except MCEP Series only)	
Input Voltage	AC100 - 240V 50/60Hz		AC100 - 240V 50/60Hz	
Input Current	0.3/0.15A (At AC100/ 240V)		0.3/0.15A (At AC100/ 240V)	
Surge Current	15A or less (at AC100V) 35A or less (at AC 240V)		15A or less (at AC100V) 35A or less (at AC 240V)	
Operating Temperature	0°C-45°C (Humidity: 80%RH below 31°C, decreases linearly to 50%RH from 32-40°C)			
Output System	DC Continuous output		DC Continuous output	
Output Control System	Constant current control (variable current)		Constant current control (variable current)	
External Light Control	Yes (0-5V intensity control)		Yes (0-5V intensity control)	
Output ON/OFF Function	Yes (Photo-coupler insulation type)		Yes (Photo-coupler insulation type)	
Error Output	Yes(Photo-coupler insulation, sensing error)		Yes(Photo-coupler insulation, sensing error)	
Cooling System	Natural cooling by air		Natural cooling by air	
Installation	Rubber legs placed on flat surface		Rubber legs placed on flat surface	
Weight	Approximately 1kg		Approximately 1.3kg	

### A080W Digital Series

Model	MLEK-A080W1LRD		MLEK-A080W2LRD	
	MLEK-A080W1LRD-100V	MLEK-A080W1LRD-200V	MLEK-A080W2LRD-100V	MLEK-A080W2LRD-200V
Order Code				
AC Type	100V	200V	100V	200V
Output	1 channel output max. 0.8A (Connects to all lights except MCEP Series only)		2 channel output max. 0.8A for each channel/ Total max. 0.8A (Connects to all lights except MCEP Series only)	
Input Voltage	AC100 - 240V 50/60Hz		AC100 - 240V 50/60Hz	
Input Current	0.3/ 0.15A (at AC100V/ 240V)		0.3/ 0.15A (at AC100V/ 240V)	
Surge Current	15A or less (at AC100V) 35A or less (at AC240V)		15A or less (at AC100V) 35A or less (at AC240V)	
Operating Temperature	0°C-45°C (Humidity: 80%RH below 31°C, decreases linearly to 50%RH from 32-40°C)			
Output System	DC Continuous output		DC Continuous output	
Output Control System	Constant current control (variable current)		Constant current control (variable current)	
External Light Control	Yes (8-bit digital)		Yes (8-bit digital for each independent channel)	
Output ON/OFF Function	Yes (Photo-coupler insulation type)		Yes (Photo-coupler insulation type)	
Error Output	Yes (Photo-coupler insulation, sensing error)		Yes(Photo-coupler insulation, sensing error)	
Cooling System	Natural cooling by air		Natural cooling by air	
Installation	Rubber legs placed on flat surface		Rubber legs placed on flat surface	
Weight	Approximately 1kg		Approximately 1.3kg	

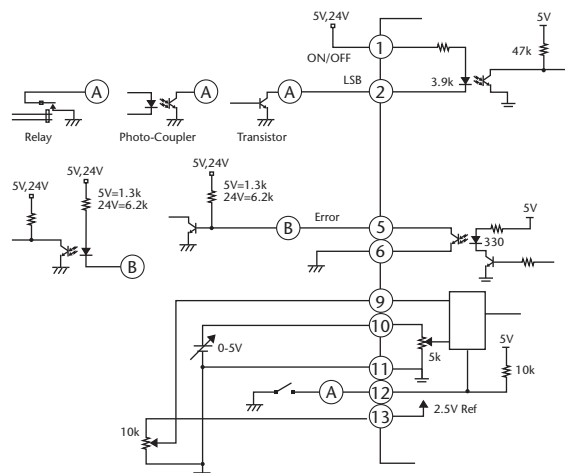
### Connection Specifications

For the MLEK-A080W1LR/2LR, MLEK-A230W1LR/2LR

No.	Name	No.	Name
1	Output ON/ OFF signal +	9	External VR intensity control signal input
2	Output ON/ OFF signal -	10	External 0-5V analog intensity control signal input
3	NC	11	External Input GND
4	NC	12	External 0-5V/ External VR Input Switch
5	Sensing error signal output (open collector)	13	DC2.5V/ Bias power output
6	Sensing error signal output (open emitter)	14	NC
7	NC	15	NC
8	NC		

### Input/Output Circuit Diagrams

With MLEK-A080W1LR/2LR, MLEK-A230W1LR/2LR



### A230W Analog Series

Model	MLEK-A230W1LR		MLEK-A230W2LR	
	MLEK-A230W1LR-100V	MLEK-A230W1LR-200V	MLEK-A230W2LR-100V	MLEK-A230W2LR-200V
Order Code				
AC Type	100V	200V	100V	200V
Output	1 channel output max. 2.3A (Connects to all lights except MCEP Series only)		2 channel output max. 2.3A for each channel/ Total max. 2.3A (Connects to all lights except MCEP Series only)	
Input Voltage	AC100 - 240V 50/60Hz		AC100 - 240V 50/60Hz	
Input Current	0.7/ 0.4A (at AC100/ 240V)		0.7/0.4A (at AC100/ 240V)	
Surge Current	15A or less (at AC100V) 30A or less (at AC240V)		15A or less (at AC100V) 30A or less (at AC240V)	
Operating Temperature	0°C-45°C (Humidity: 80%RH below 31°C, decreases linearly to 50%RH from 32-40°C)			
Output System	DC Continuous output		DC Continuous output	
Output Control System	Constant current control (variable current)		Constant current control (variable current)	
External Light Control	Yes (0-5V intensity control/ external VR intensity control)		Yes (0-5V intensity control/ external VR intensity control)	
Output ON/OFF Function	Yes (Photo-coupler insulation type)		Yes (Photo-coupler insulation type)	
Error Output	Yes (Photo-coupler insulation, sensing error)		Yes (Photo-coupler insulation, sensing error)	
Cooling System	Forcible air cooling		Forcible air cooling	
Installation	Rubber legs placed on flat surface		Rubber legs placed on flat surface	
Weight	Approximately 1.1kg		Approximately 1.4kg	

### A230W Digital Series

Model	MLEK-A230W1LRD		MLEK-A230W2LRDB	
	MLEK-A230W1LRD-100V	MLEK-A230W1LRD-200V	MLEK-A230W2LRDB-100V	MLEK-A230W2LRDB-200V
Order Code				
AC Type	100V	200V	100V	200V
Output	1 channel output max. 2.3A (Connects to all lights except MCEP Series only)		2 channel output max. 2.3A for each channel/ Total max. 2.3A (Connects to all lights except MCEP Series only)	
Input Voltage	AC100 - 240V 50/60Hz		AC100 - 240V 50/60Hz	
Input Current	0.7/ 0.4A (a AC100/ 240V)		0.7/ 0.4A (a AC100/ 240V)	
Surge Current	15A or less (at AC100V) 35A or less (at AC240V)		15A or less (at AC100V) 35A or less (at AC240V)	
Operating Temperature	0°C-45°C (Humidity: 80%RH below 31°C, decreases linearly to 50%RH from 32-40°C)			
Output System	DC Continuous output		DC Continuous output	
Output Control System	Constant current control (variable current)		Constant current control (variable current)	
External Light Control	Yes (8-bit digital)		Yes (8-bit digital for each independent channel)	
Output ON/OFF Function	Yes (Photo-coupler insulation type)		Yes (Photo-coupler insulation type)	
Error Output	Yes (Photo-coupler insulation, sensing error)		Yes (Photo-coupler insulation, sensing error)	
Cooling System	Forcible cooling by air		Forcible cooling by air	
Installation	Rubber legs placed on flat surface		Rubber legs placed on flat surface	
Weight	Approximately 1.1kg		Approximately 1.4kg	

LED Controllers for MCG-Wave®

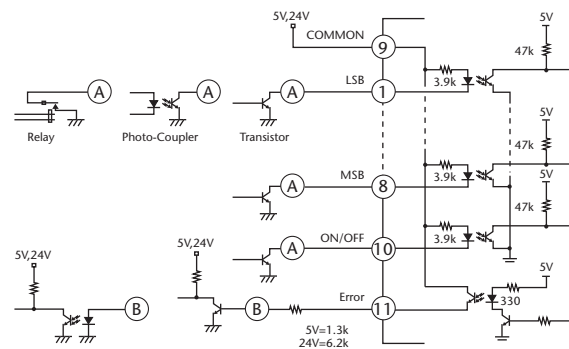
### Connection Specifications

For the MLEK-A080W1LRD/2LRD, MLEK-A230W1LRD/2LRD

No.	Name	No.	Name
1	8-bit digital input 2* (LSB)	9	COMMON (+)
2	8-bit digital input 21	10	Output ON/ OFF signal (input)
3	8-bit digital input 22	11	Sensing error signal output
4	8-bit digital input 23	12	NC
5	8-bit digital input 24	13	NC
6	8-bit digital input 25	14	NC
7	8-bit digital input 26	15	NC
8	8-bit digital input 27 (MSB)		

### Input/Output Circuit Diagrams

With MLEK-A080W1LRD/2LRD, MLEK-A230W1LRD/2LRD



MLEK Series

Supports up to 7.7A  
**Multi Channel Series**

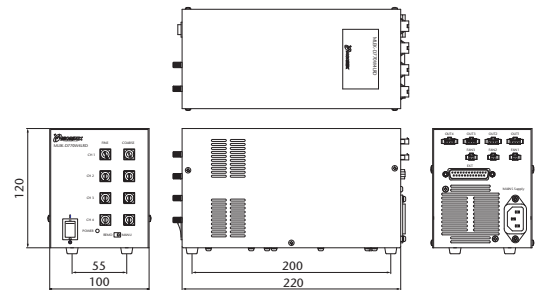


- Four independent channel digital controller
- External digital control with 10-bit, 1024 level capability
- Supports universal voltage input (100 to 240V AC) and is both RoHS compliant and CE marked.



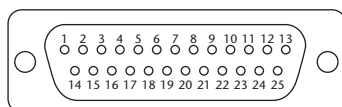
Model	MLEK-D770W4LRD	
Order Code	MLEK-D770W4LRD-100V	MLEK-D770W4LRD-200V
AC Type	100V	200V
Output	4 channel output CH1~CH3: 2.3A max. CH4: 0.8A max. Total max 7.7A (Connects to all lights except MCEP Series only)	
Input Voltage	AC100V-240V 50/60Hz	
Input Current	1.2/0.6A (at AC100/ 240V)	
Surge Current	18A or less (at AC100V) 41A or less (at AC230V)	
Operating Temperature	0°C-45°C Humidity: 80%RH below 31°C, decreases linearly to 50%RH from 32-40°C	
Output System	DC Continuous output	
Output Control System	Constant current control (variable current)	
External Light Control	Yes (8-bit or 10-bit digital for each independent channel)	
Output ON/OFF Function	Yes (Photo-coupler insulation type)	
Error Output	Yes (Photo-coupler insulation, control error)	
Cooling System	Forcible cooling by air	
Installation	Rubber legs placed on flat surface	
Weight	Approximately 2kg	

MLEK-D770W4LRD

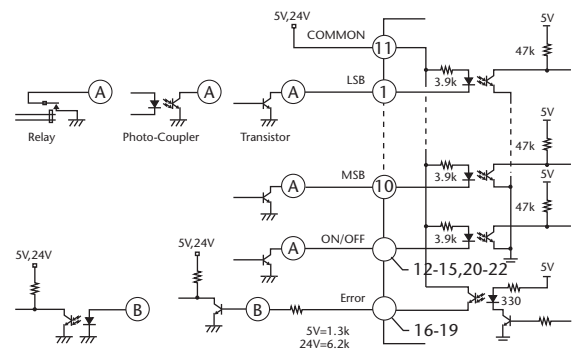


**Connection Specifications**

No.	Name	No.	Name
1	10-bit digital input 2 <sup>0</sup> (10-bit/ LSB)	14	CH3 Output ON/ OFF signal (input)
2	10-bit digital input 2 <sup>1</sup>	15	CH4 Output ON/ OFF signal (input)
3	10-bit digital input 2 <sup>2</sup> (8bit/LSB)	16	CH1 control error signal input
4	10-bit digital input 2 <sup>3</sup>	17	CH2 control error signal input
5	10-bit digital input 2 <sup>4</sup>	18	CH3 control error signal input
6	10-bit digital input 2 <sup>5</sup>	19	CH4 control error signal input
7	10-bit digital input 2 <sup>6</sup>	20	CH Select
8	10-bit digital input 2 <sup>7</sup>	21	CH Select
9	10-bit digital input 2 <sup>8</sup>	22	Write TRG
10	10-bit digital input 2 <sup>9</sup> (MSB)	23	NC
11	COMMON (+)	24	NC
12	CH1 Output ON/ OFF signal (input)	25	NC
13	CH2 Output ON/ OFF signal (input)		



**Input/Output Circuit Diagrams**



# High wattage Series

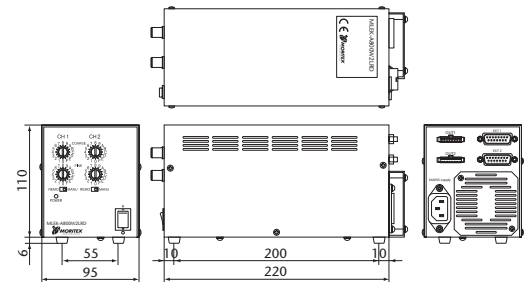


- High wattage LED controller with digital intensity control
- Supports universal voltage input (100 to 240V AC) and is both RoHS compliant and CE marked
- 8-pin output connector is equipped to support high current lighting systems. A conversion cable is available for standard illumination products with 4-pin connectors. (See Note below)



Model	MLEK-A800W2LRD	
Order Code	MLEK-A800W2LRD-100V	MLEK-A800W2LRD-200V
AC Type	100V	200V
Output	2 channel output (Max. 4A for each channel)	
Input Voltage	AC100V-240V 50/60Hz	
Input Current	1.2/ 0.6A (at AC100/ 240V)	
Surge Current	18A or less (at AC100V) 41A or less (at AC230V)	
Operating Temperature	0°C-45°C Humidity: 80%RH below 31°C, decreases linearly to 50%RH from 32-40°C	
Output System	DC Continuous output	
Output Control System	Constant current control (variable current)	
External Light Control	Yes (8-bit digital for each independent channel)	
Output ON/OFF Function	Yes (Photo-coupler insulation type)	
Error Output	Yes (Photo-coupler insulation, sensing error)	
Cooling System	Forcible cooling by air	
Installation	Rubber legs placed on flat surface	
Weight	Approximately 1.8kg	

MLEK-A800W2LRD

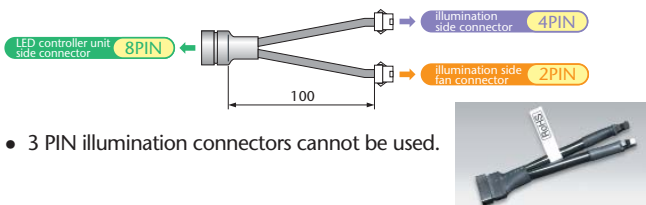


### Notes

- The specification for this LED Controller is an 8 PIN output.
- Please use the following cable when using standard illuminations. The specification for the large OEM illumination is designed for 8 PIN.
- For active illumination a conversion cable is essential when using connectors other than an 8 PIN.
- For illuminations with fans, the fan side connector (2 PIN) of the conversion cable must be connected.
- To extend the cable, use the appropriate extension cable for each connector.  
4 PIN extension cable for the illumination side: M-RCB4\*\*L  
2 PIN extension cable for the fan side: M-RCB0\*\*L

\* Complies with CE marking to a limit of 2 m.  
\*\* indicates a 2 digit length (e.g. 01=1m, 02=2m, 03=3m)

- M-RCB8R1LA (4 PIN)
  - The following cable is essential when connecting MLEK Series illumination with the LED controller.
  - Connect the 4 PIN connector of the illumination to the illumination side connector (4 PIN) of the conversion cable.

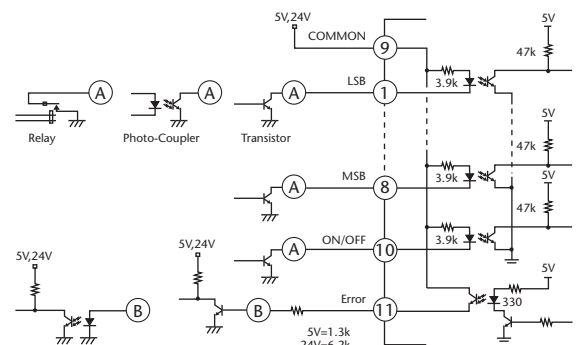


- 3 PIN illumination connectors cannot be used.

### Connection Specifications

No.	Name	No.	Name
1	8-bit digital input 2 <sup>0</sup> (LSB)	9	COMMON (+)
2	8-bit digital input 2 <sup>1</sup>	10	Output ON/ OFF signal (input)
3	8-bit digital input 2 <sup>2</sup>	11	Sensing error signal output
4	8-bit digital input 2 <sup>3</sup>	12	NC
5	8-bit digital input 2 <sup>4</sup>	13	NC
6	8-bit digital input 2 <sup>5</sup>	14	NC
7	8-bit digital input 2 <sup>6</sup>	15	NC
8	8-bit digital input 2 <sup>7</sup> (MSB)		

### Input/Output Circuit Diagrams



# MG-Wave® Accessories



## Accessories for Illumination

The following optional accessories are available to improve the functionality of the lighting devices.

### Diffuser Plates: MDF Series

These diffuser plates, which can be attached to the illumination using the dedicated adapters, help prevent unwanted lighting reflection.

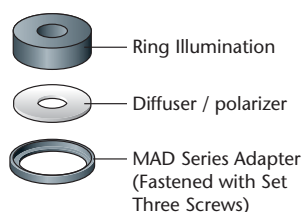
Model	Product Type	Compatible Light Models	Internal Diameter (mm)
MDF-DR10	Diffuser for Direct Ring Illumination	MDRL-CR(CG,CB,CW)for 10	ø9
MDF-DR16	Diffuser for Direct Ring Illumination	MDRL-CR(CG,CB,CW)for 16	ø14
MDF-DR28	Diffuser for Direct Ring Illumination	MDRL-CR(CG,CB,CW)for 28	ø26
MDF-DR31	Diffuser for Direct Ring Illumination	MDRL-CR(CG,CB,CW)for 31	ø28
MDF-DR35	Diffuser for Direct Ring Illumination	MDRL-CR(CG,CB,CW)for 35	ø35
MDF-DR36	Diffuser for Direct Ring Illumination	MDRL-CR(CG,CB,CW)for 36	ø36
MDF-DR50	Diffuser for Direct Ring Illumination	MDRL-CR(CG,CB,CW)for 50	ø46
MDF-DR56	Diffuser for Direct Ring Illumination	MDRL-CR(CG,CB,CW)for 56	ø54
MDF-LR25	Diffuser for Low Angle Ring Illumination	MLRL-CR(CG,CB,CW)for 25	ø18
MDF-LR48	Diffuser for Low Angle Ring Illumination	MLRL-CR(CG,CB,CW)for 48	ø40
MDF-LR68	Diffuser for Low Angle Ring Illumination	MLRL-CR(CG,CB,CW)for 68	ø54
MDF-LR100	Diffuser for Low Angle Ring Illumination	MLRL-CR(CG,CB,CW)for 100	ø82
MDF-BR5015	Diffuser for Bar Illumination	MBRL-CR(CG,CB,CW)for 5015	—
MDF-BR7530	Diffuser for Bar Illumination	MBRL-CR(CG,CB,CW)for 7530	—
MDF-BR13015	Diffuser for Bar	MBRL-CR(CG,CB,CW)for 13015	—
MDF-DQ108	Diffuser for Square Bar Type Illumination	MDQL-CR(CG,CB,CW)for 108, 4 pieces per set	—

### Adapters: MAD Series

Adapter for attaching dedicated diffuser plates and polarizing plate for MG-Wave ring illumination.

Model	Product Type	Compatible Light Models
MAD-DR10	Plate Attachment Adapter for Direct Ring Illumination	MDRL-CR(CG,CB,CW) 10
MAD-DR16	Plate Attachment Adapter for Direct Ring Illumination	MDRL-CR(CG,CB,CW) 16
MAD-DR28	Plate Attachment Adapter for Direct Ring Illumination	MDRL-CR(CG,CB,CW) 28
MAD-DR31	Plate Attachment Adapter for Direct Ring Illumination	MDRL-CR(CG,CB,CW) use with both 31/36
MAD-DR35	Plate Attachment Adapter for Direct Ring Illumination	MDRL-CR(CG,CB,CW) 35
MAD-DR50	Plate Attachment Adapter for Direct Ring Illumination	MDRL-CR(CG,CB,CW) 50
MAD-DR56	Plate Attachment Adapter for Direct Ring Illumination	MDRL-CR(CG,CB,CW) 56

#### How to Use MAD Series



## Polarizing Plate: MPL Series

Attaching these polarizing plates on the lens side (inside the polarizer) cuts specular reflection in particular areas and reduces glare in the resulting image.

Model	Product Type	Compatible Light Models	Internal Diameter (mm)
MPL-SC56	Polarizer for Simulated Coaxial Illumination	MSCL-CR(CG,CB,CW)for 56-B	—
MPL-SC74	Polarizer for Simulated Coaxial Illumination	MSCL-CR(CG,CB,CW)for 74-B	—
MPL-SC105	Polarizer for Simulated Coaxial Illumination	MSCL-CR(CG,CB,CW)for 105-B	—
MPL-DR10-B	Polarizer for Direct Ring Illumination	MDRL-CR(CG,CB,CW)for 10	ø9
MPL-DR16-B	Polarizer for Direct Ring Illumination	MDRL-CR(CG,CB,CW)for 16	ø14
MPL-DR28-B	Polarizer for Direct Ring Illumination	MDRL-CR(CG,CB,CW)for 28	ø26
MPL-DR31-B	Polarizer for Direct Ring Illumination	MDRL-CR(CG,CB,CW)for 31	ø28
MPL-DR35	Polarizer for Direct Ring Illumination	MDRL-CR(CG,CB,CW)for 35	ø35
MPL-DR36	Polarizer for Direct Ring Illumination	MDRL-CR(CG,CB,CW)for 36	ø36
MPL-DR50-B	Polarizer for Direct Ring Illumination	MDRL-CR(CG,CB,CW)for 50	ø46
MPL-DR56-B	Polarizer for Direct Ring Illumination	MDRL-CR(CG,CB,CW)for 56	ø54
MPL-BR5015-B	Polarizer for Bar Illumination	MBRL-CR(CG,CB,CW)for 5015	—
MPL-BR7530-B	Polarizer for Bar Illumination	MBRL-CR(CG,CB,CW)for 7530	—
MPL-BR13015-B	Polarizer for Bar Illumination	MBRL-CR(CG,CB,CW)for 13015	—
MPL-DQ108	Polarizer for Square Bar Type Illumination	MDQL-CR(CG,CB,CW)for 108, 4 pieces per set	—

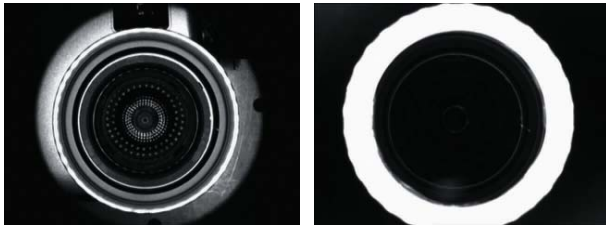
## Polarizer (Analyzer): ML-PL Series

Enhanced polarizing effect can be expected by using ML-PL Series second polarizer on lens side, in combination with MPL Series polarizer.

Screw Pitch		Polarizer (LB: with Securing Screw)	
255	Model	ML-PL255	ML-PL255LB
270	Model	ML-PL270	ML-PL270LB
305	Model	ML-PL305	ML-PL305LB



## Sample Images



Without polarizer

With polarizer (Sample image: A camera lens observed from the image side)

- ① Attach the polarizing plate to the light emitting part on the projection side.
- ② Attach the polarizer to the lens tip.
- ③ Rotate either of the polarizing plates (polarizer/analyzer) to change the luminance distribution of the image.

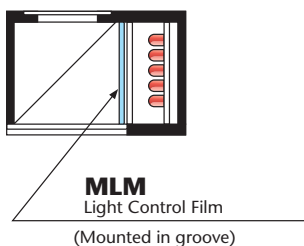
## Light Control Film: MLM Series

The MLM Series are resin films that transform diffused illumination into parallel illumination. Attaching to a simulated coaxial illumination makes the light distribution pattern smoother.

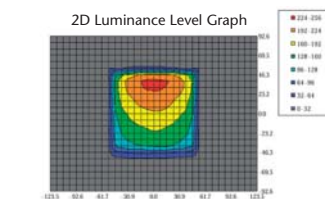
Model	Product Type	Compatible Light Models
MLM-SC56	Light Control Film for Simulated Coaxial Illumination	MSCL-CR(CG,CB,CW) 56-B
MLM-SC74	Light Control Film for Simulated Coaxial Illumination	MSCL-CR(CG,CB,CW) 74-B
MLM-SC105	Light Control Film for Simulated Coaxial Illumination	MSCL-CR(CG,CB,CW) 105-B

### How to Use MLM Series

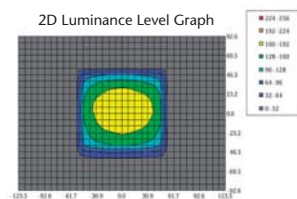
Cross-Section of Simulated Coaxial Unit



## Luminous Intensity Distribution Characteristics (for MSCL-CR105-B)



Luminous intensity distribution characteristics without a light control film



Luminous intensity distribution characteristics with a light control film (with power source volume increased)



## Illumination↔Lens Accessories

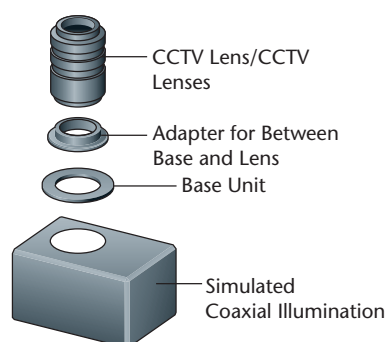
Use the options with MORITEX lenses.

### Simulated Coaxial Illumination↔Lens Adapter: MLA-SC Series

Enables small simulated coaxial illumination to be mounted at the end of CCTV lenses.

Model	Product Type	Compatible Light Models	Compatible Lenses
MLA-SCBS	Base for Simulated Coaxial Lens Attachment	MSCL-CR (CG,CB,CW) for 24/39/56	—
MLA-SCM255	Adapter for Between Simulated Coaxial Illuminating Base and Lens		M25.5P0.5 lens
MLA-SCM270	Adapter for Between Simulated Coaxial Illuminating Base and Lens		M27 P0.5 lens
MLA-SCM305	Adapter for Between Simulated Coaxial Illuminating Base and Lens		M30.5P0.5 lens

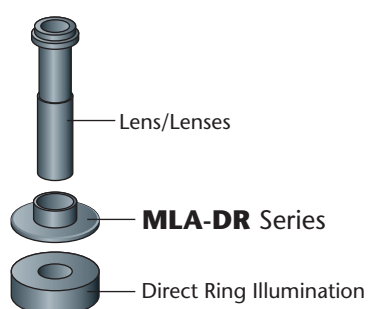
#### How to Use MLA-SC Series



### Direct Ring Illumination↔Lens Adapters for MLA-DR Series

Enables small ring illumination to be attached to lens tips.

#### How to Use MLA-DR Series



Model	Product Type	Compatible Light Models	Compatible Lenses
MLA-DR1616	Lens Attachment Adapter	MDRL-CR (CG,CB,CW) 16	Ø6 lenses
MLA-DR3125	Lens Attachment Adapter	MDRL-CR (CG,CB,CW) 31	Ø25 lenses
MLA-DR3130	Lens Attachment Adapter	MDRL-CR (CG,CB,CW) 35 MDRL-CR (CG,CB,CW) 36 MDRL-CR (CG,CB,CW) 20	Ø30 lenses
MLA-DR28M255	Lens Attachment Adapter	MDRL-CR (CG,CB,CW) 28	M25.5P0.5 lenses
MLA-DR28M270	Lens Attachment Adapter	MDRL-CR (CG,CB,CW) 28	M27P0.5 lenses
MLA-DR28M305	Lens Attachment Adapter	MDRL-CR (CG,CB,CW) 28	M30.5P0.5 lenses
MLA-DR31M255	Lens Attachment Adapter	MDRL-CR (CG,CB,CW) 31 MDRL-CR (CG,CB,CW) 35 MDRL-CR (CG,CB,CW) 36 MDRL-CR (CG,CB,CW) 20	M25.5P0.5 lenses
MLA-DR31M270	Lens Attachment Adapter		M27P0.5 lenses
MLA-DR31M305	Lens Attachment Adapter		M30.5P0.5 lenses

### Sharp Cut Filter ML-R Series

When using red illumination, attachment to the tip of the CCTV lens is effective in preventing ambient light.

Model	Product Type	Compatible Lenses
ML-R64-25	Sharp cut filter for attachment to end of lens	M25.5P0.5 lens
ML-R64-27	Sharp cut filter for attachment to end of lens	M27 P0.5 lens
ML-R64-30	Sharp cut filter for attachment to end of lens	M30.5P0.5 lens

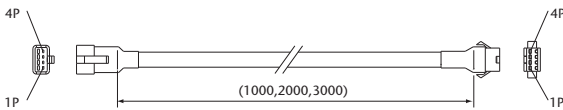
# Extension Cables

- Entire M-RCB Series meet robot cable requirements and all 1m & 2m products are CE compliant

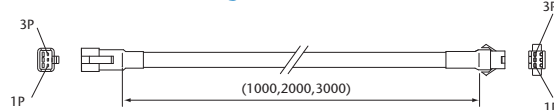
Model	Product Type	Application	Length
M-RCB401L	4-Pin Type Extension Cable	For all illuminations (except MCEP Series)	1m
M-RCB402L	4-Pin Type Extension Cable		2m
M-RCB403L	4-Pin Type Extension Cable		3m
M-RCB301L	3-Pin Type Extension Cable	For MCEP Series	1m
M-RCB302L	3-Pin Type Extension Cable		2m
M-RCB303L	3-Pin Type Extension Cable		3m
M-RCB001L	2-Pin Type Extension Cable	For illuminations with built-in fan	1m
M-RCB002L	2-Pin Type Extension Cable		2m
M-RCB003L	2-Pin Type Extension Cable		3m
★ M-RCB801L	8-Pin Type Extension Cable	For LED Controller MLEK-A800 Series	1m
★ M-RCB802L	8-Pin Type Extension Cable		2m
★ M-RCB803L	8-Pin Type Extension Cable		3m

★Made-to-order products.

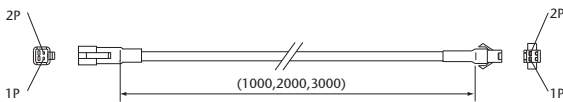
## M-RCB4□□L \*Straight Connection



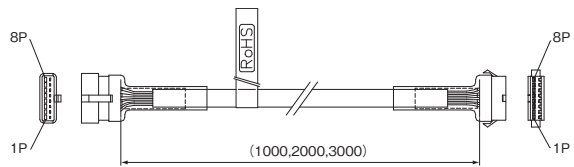
## M-RCB3□□L \*Straight Connection



## M-RCB0□□L \*Straight Connection



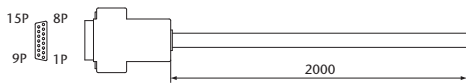
## M-RCB8□□L \*Straight Connection



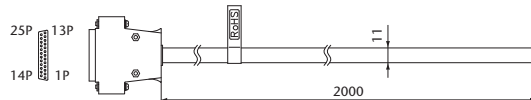
# External Control Cables

Model	Product Type	Length	Product Code
MC-EXC-02	Cable for External Control of DSUB15P	2m	A-8201
MC-EXC-07	Cable for External Control of DSUB25P	2m	A-9000

## MC-EXC-02



## MC-EXC-07



PIN No.	Color	PIN No.	Color
1P	purple	9P	brown
2P	gray	10P	red
3P	white	11P	black
4P	sky blue	12P	orange
5P	white / red	13P	yellow
6P	white / black	14P	green
7P	white / green	15P	blue
8P	white / yellow		

PIN No.	Color	PIN No.	Color	PIN No.	Color
1P	black	11P	sky blue	21P	orange / white
2P	white	12P	bright green	22P	orange / red
3P	red	13P	white / black	23P	orange / green
4P	green	14P	white / red	24P	orange / yellow
5P	yellow	15P	white / green	25P	orange / blue
6P	brown	16P	white / yellow	—	orange / purple
7P	blue	17P	white / brown	—	sky blue / black
8P	orange	18P	white / blue	—	sky blue / white
9P	purple	19P	white / purple	—	sky blue / red
10P	gray	20P	orange / black	—	sky blue / yellow

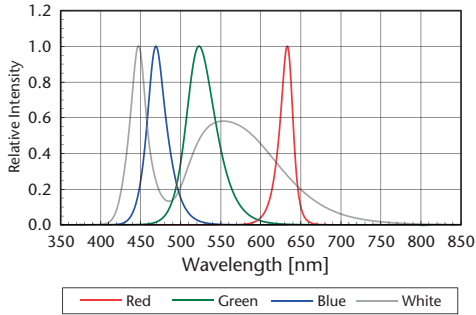
# LED Controller AC Cables/Brackets

Model	Product Type	Product Code
MC-AC200A-2.0M	European Plug Type AC Cable	A-2246
MC-AC200B-2.0M	JIAS Plug Type AC Cable	A-2247
LBK-001	Power Supply Unit Installation Bracket	A-2340
LBK-002	Power Supply Unit Installation Bracket	A-2341

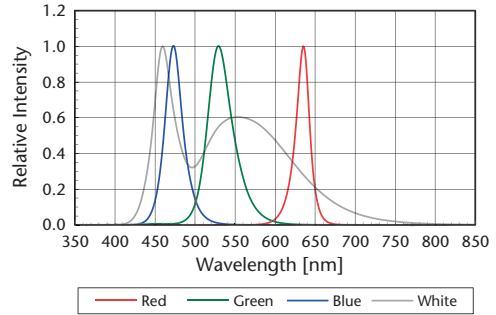
## LED Spectral Characteristics

The diagrams below illustrate the spectral characteristics of major LEDs used in the MG-Wave®. We can also manufacture other lighting devices with different wavelengths. Please feel free to contact us.

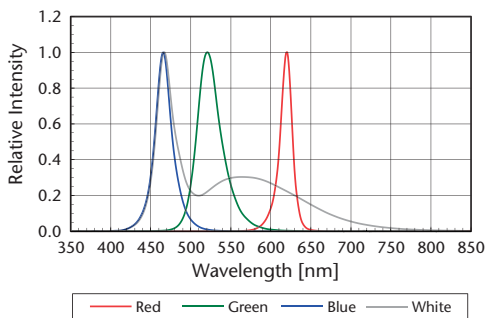
MCEP, MHBC, MLNC, MSPP Series



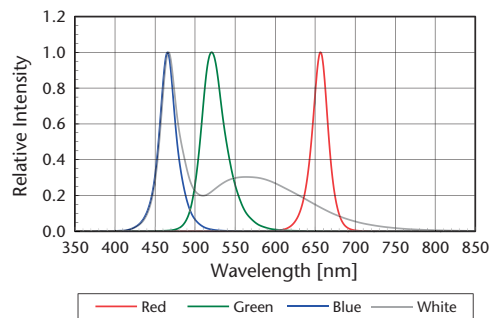
MCEC, MBRC, MCBP, MEBC Series



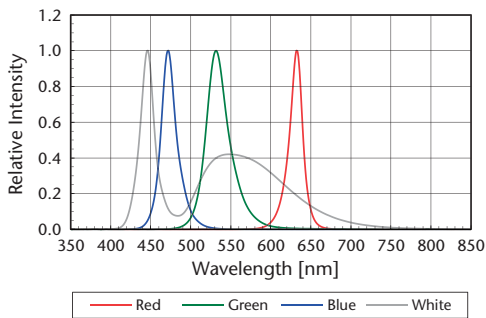
MCEL Series



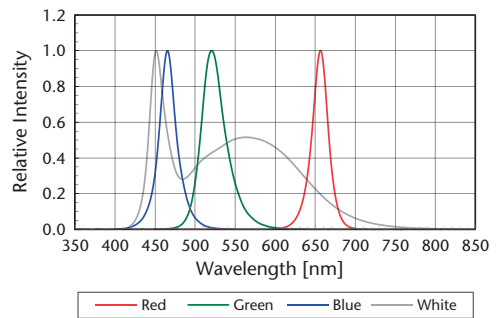
MDRL, MLRL, MSRL, MSL, MSQ, MDQL, MBRL, MDML, MSCL, MDBL, MEBL Series



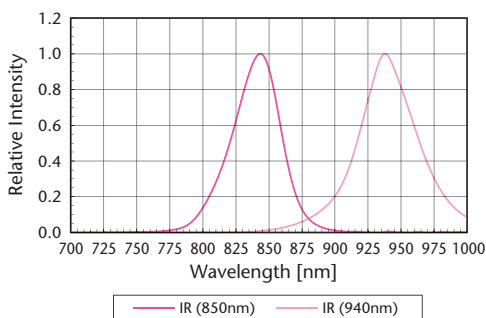
MSDC Series



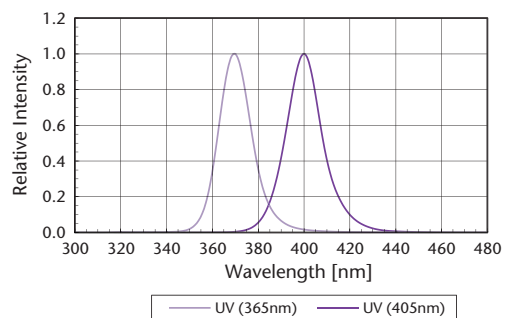
MDBC Series



IR Series



UV Series



24V DC Driven

# CompaVis®



CompaVis® employs the constant voltage control system that can be controlled not only by APS MLEF LED controllers but also by industry available 24V DC power supplies directly. Overdriven strobing for instantaneous high intensity illumination is also available. The series can support customer's various image processing environments with a broad range of lighting solutions.



**CE** CE Marking

**Digital** Digital Intensity Control

**2ch** 2 Channel Output

**RoHS** RoHS Directive

# Direct Ring Illumination CV-R/SQ Series



## Direct Ring Illumination: CV-R Series

- High intensity, uniform direct, bright-field 360-degree lighting
- Standard LED illumination for a wide range of applications

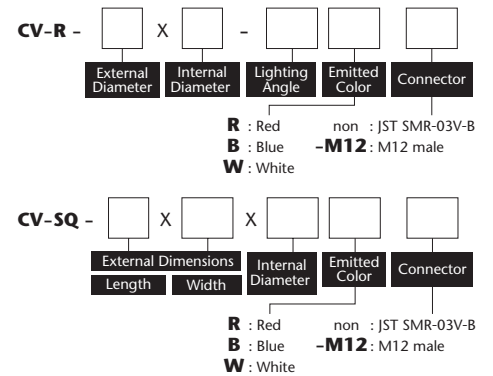
## Square Ring Illumination: CV-SQ Series

- Standard LED Illumination for a wide range of application

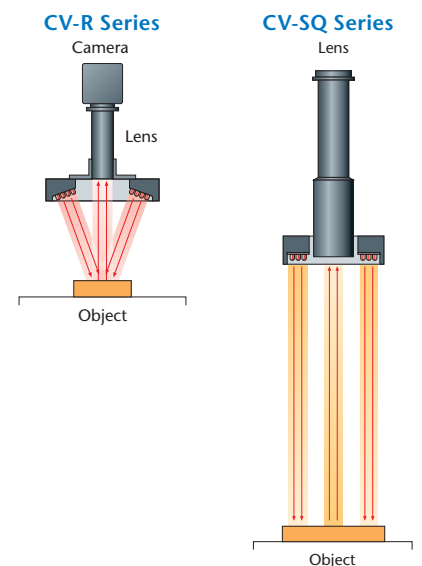


Model	Emitted Color	Power (W)	External Dimensions (mm)			Lighting Angle (Deg.)	Weight (g)*	Accessories
			External Diameter	Internal Diameter	Height			
CV-R-32X10-70R	● Red	0.9	32	10	16	70	35	CV-AD-R-32X10-70 CV-DF-R-32X10-70 CV-PL-R-32X10-70
CV-R-32X10-70B	● Blue	1.7	32	10	16	70	35	
CV-R-32X10-70W	○ White	1.7	32	10	16	70	35	
CV-R-42X18-65R	● Red	1.5	42	18	18	65	55	CV-AD-R-42X18-65 CV-DF-R-42X18-65 CV-PL-R-42X18-65
CV-R-42X18-65B	● Blue	2.7	42	18	18	65	55	
CV-R-42X18-65W	○ White	2.7	42	18	18	65	55	
CV-R-50X28-75R	● Red	0.7	50	28	16	75	55	CV-AD-R-50X28-75 CV-DF-R-50X28-75 CV-PL-R-50X28-75
CV-R-50X28-75B	● Blue	2.6	50	28	16	75	55	
CV-R-50X28-75W	○ White	2.8	50	28	16	75	55	
CV-R-70X35-90R	● Red	1.5	70	35	22	90	140	CV-AD-R-70X35-90 CV-DF-R-70X35-90 CV-PL-R-70X35-90
CV-R-70X35-90B	● Blue	5.5	70	35	22	90	140	
CV-R-70X35-90W	○ White	5.5	70	35	22	90	140	
CV-R-90X30-80R	● Red	5.3	90	30	20	83	260	CV-AD-R-90X30-80 CV-DF-R-90X30-80 CV-PL-R-90X30-80
CV-R-90X30-80B	● Blue	9.3	90	30	20	83	260	
CV-R-90X30-80W	○ White	10.3	90	30	20	83	260	
CV-R-90X50-70R	● Red	3.5	90	50	20	71	180	CV-AD-R-90X50-70 CV-DF-R-90X50-70 CV-PL-R-90X50-70
CV-R-90X50-70B	● Blue	6.2	90	50	20	71	180	
CV-R-90X50-70W	○ White	6.4	90	50	20	71	180	
CV-R-120X58-50R	● Red	3.1	120	58	31.5	52	560	CV-AD-R-120X58-50 CV-DF-R-120X58-50 CV-PL-R-120X58-50
CV-R-120X58-50B	● Blue	13.1	120	58	31.5	52	560	
CV-R-120X58-50W	○ White	13.5	120	58	31.5	52	560	

## Explanation of Model Code



## Illumination Structure

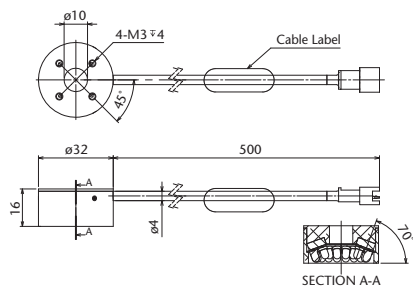


Model	Emitted Color	Power (W)	External Dimensions (mm)				Weight (g)*	Accessories
			Length	Width	Height	Internal Diameter		
CV-SQ-56X56X30R	● Red	1.0	56	56	18	30	85	CV-DF-SQ-56X56X30 CV-PL-SQ-56X56X30
CV-SQ-56X56X30B	● Blue	2.5	56	56	18	30	85	
CV-SQ-56X56X30W	○ White	2.6	56	56	18	30	85	

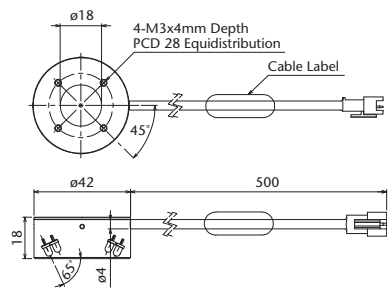
\* LED Controller on P.185

\* It is weighted 15g more in case "M12".

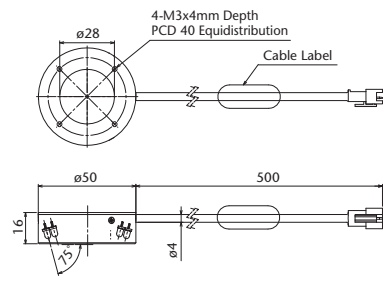
**CV-R-32X10-70R (B,W)**



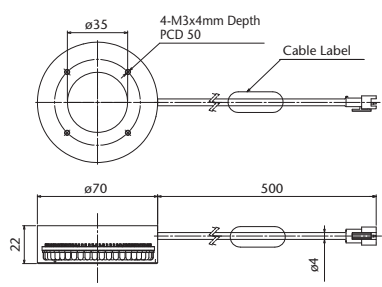
**CV-R-42X18-65R (B,W)**



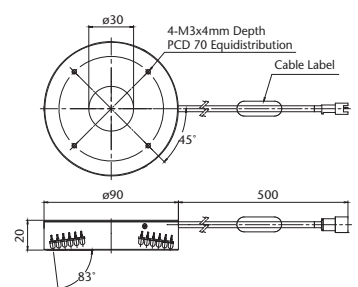
**CV-R-50X28-75R (B,W)**



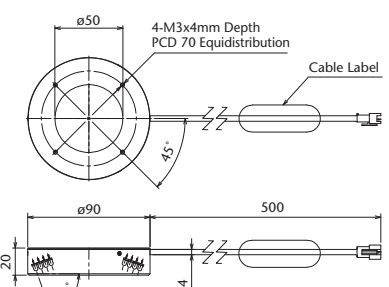
**CV-R-70X35-90R (B,W)**



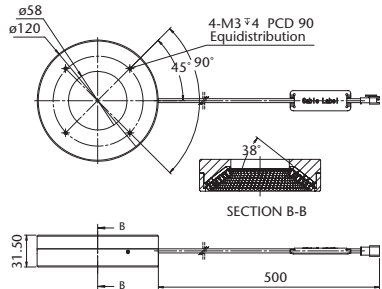
**CV-R-90X30-80R (B,W)**



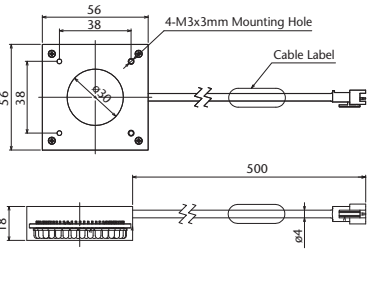
**CV-R-90X50-70R (B,W)**



**CV-R-120X58-50R (B,W)**

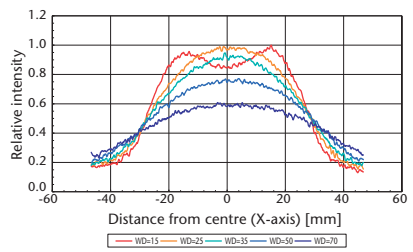


**CV-SQ-56X56X30R (B,W)**

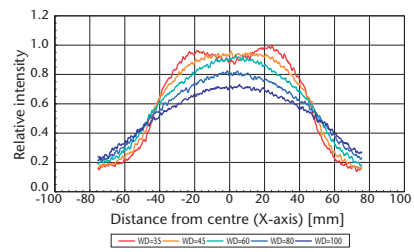


**Light Distribution Characteristics**

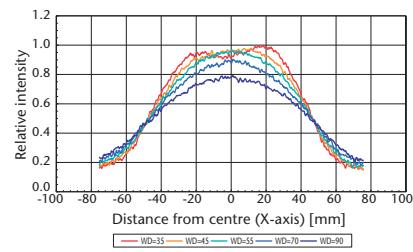
**CV-R-50X28-75W**



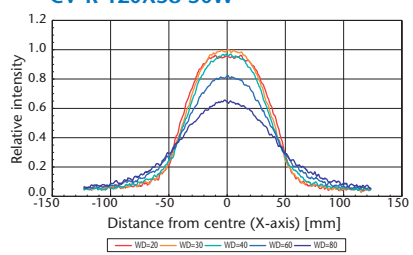
**CV-R-70X35-90W**



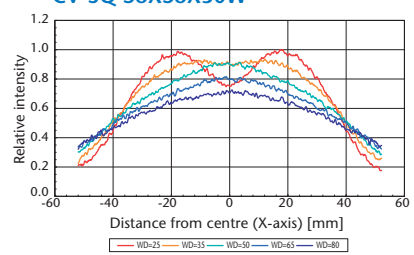
**CV-R-90X30-80W**



**CV-R-120X58-50W**

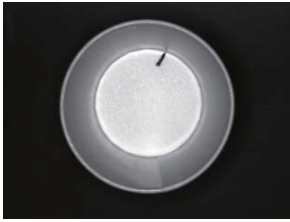


**CV-SQ-56X56X30W**

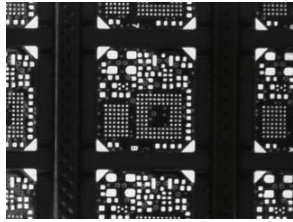


## Sample Images

### CV-R Series

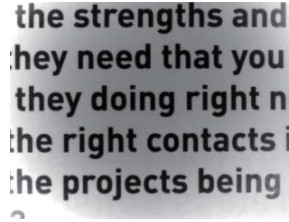


Foreign Object in Paper Cup

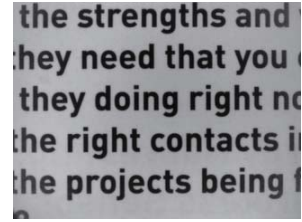


PCB Fabrication Inspection

### CV-SQ Series



Not Much Light at Short WD



Full Light at Longer WD

## Applications

- Lead frame inspection
- Electronic component appearance inspection
- QFP/SOP lead curve inspection
- Transparency film dirt inspection
- Various types of silhouette observation

## Accessories

### Adapter



(P.189)

#### CV-AD-Rxx

Used to mount the diffuser or polarizer onto the LED lighting.

### Diffusion Plate



(P.189)

#### CV-DF-Rxx

To be mounted in front of the LED lighting using the adapter. Used to soften the lighting output, so as to reduce the glares on specular surface.

### Polarizer Plate



(P.189)

#### CV-PL-Rxx

To be mounted in front of the LED lighting using the adapter. Used together with a Polarizer filter lens in front of the camera as a set. It helps to reduce glare.





# Low Angle Ring Illumination CV-RLA/RLA-00 Series

## Low Angle Ring Illumination: CV-RLA Series

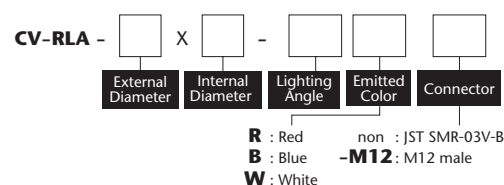
- Reflection can be minimized by the low-angle, dark-field lighting configuration
- Ideal for imaging of uneven surfaces, eg. Embossment and surface flaw detection

## Zero Angle Ring Illumination: CV-RLA-00 Series

- Indirect, horizontal 360-degree inner diameter illumination
- Used at a short WD to the test object



## Explanation of Model Code



Model	Emitted Color	Power (W)	External Dimensions (mm)			Lighting Angle (Deg.)	Weight (g)*	Accessories
			External Diameter	Internal Diameter	Height			
CV-RLA-74X48-30R	● Red	2.2	74	48	19	30	95	CV-DF-RLA-74X48-30
CV-RLA-74X48-30B	● Blue	5.6	74	48	19	30	95	
CV-RLA-74X48-30W	○ White	5.3	74	48	19	30	95	
CV-RLA-100X70-30R	● Red	1.8	100	70	22	30	170	CV-DF-RLA-100X70-30
CV-RLA-100X70-30B	● Blue	8.7	100	70	22	30	170	
CV-RLA-100X70-30W	○ White	8.4	100	70	22	30	170	
CV-RLA-132X96-15R	● Red	2.5	132	96	22	15	280	CV-DF-RLA-132X96-15
CV-RLA-132X96-15B	● Blue	7.1	132	96	22	15	280	
CV-RLA-132X96-15W	○ White	7.2	132	96	22	15	280	

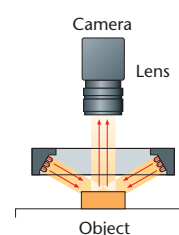
Model	Emitted Color	Power (W)	External Dimensions (mm)			Lighting Angle (Deg.)	Weight (g)*	Accessories
			External Diameter	Internal Diameter	Height			
CV-RLA-75X46-00R	● Red	0.5	75	46	10	0	70	
CV-RLA-75X46-00B	● Blue	2.5	75	46	10	0	70	
CV-RLA-75X46-00W	○ White	2.8	75	46	10	0	70	
CV-RLA-96X60-00R	● Red	0.7	96	60	10	0	110	
CV-RLA-96X60-00B	● Blue	3.1	96	60	10	0	110	
CV-RLA-96X60-00W	○ White	3.5	96	60	10	0	110	
CV-RLA-200X170-00R	● Red	2.0	200	170	10	0	160	
CV-RLA-200X170-00B	● Blue	5.9	200	170	10	0	160	
CV-RLA-200X170-00W	○ White	6.1	200	170	10	0	160	

\* LED Controller on P.185

\* It is weighted 15g more in case "M12".

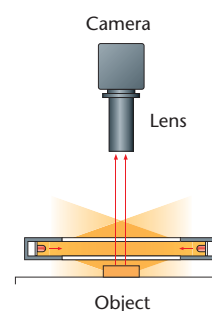
## Illumination Structure

### CV-RLA Series

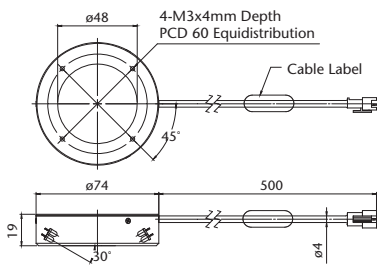


Illuminating the Object from a Low Position

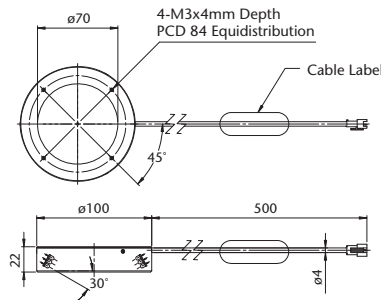
### CV-RLA-00 Series



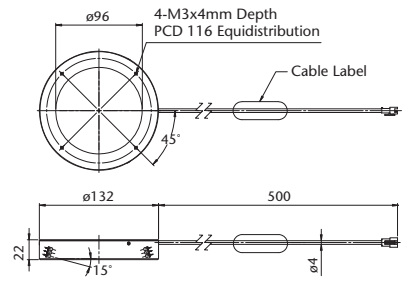
**CV-RLA-74X48-30R (B,W)**



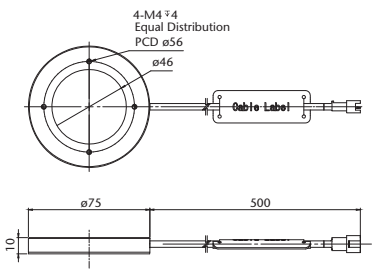
**CV-RLA-100X70-30R (B,W)**



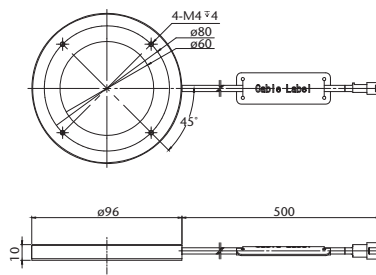
**CV-RLA-132X96-15R (B,W)**



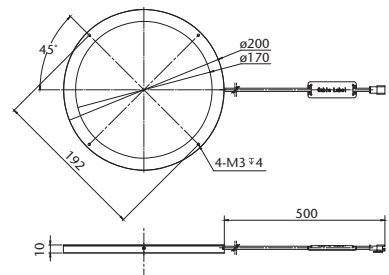
**CV-RLA-75X46-00R (B,W)**



**CV-RLA-96X60-00R (B,W)**



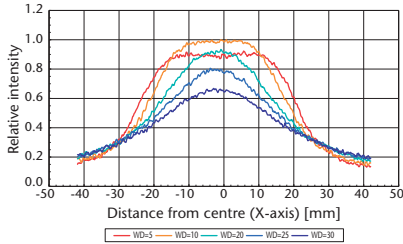
**CV-RLA-200X170-00R (B,W)**



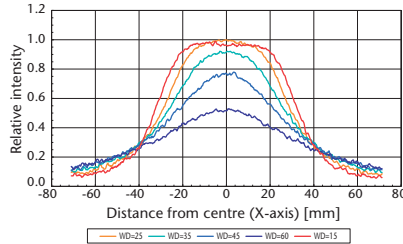
**Light Distribution Characteristics**

Low Angle Ring Illumination

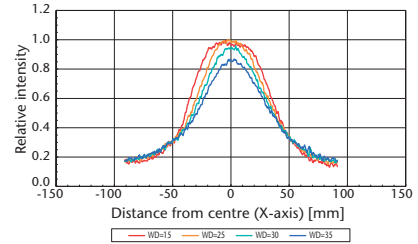
**CV-RLA-74X48-30W**



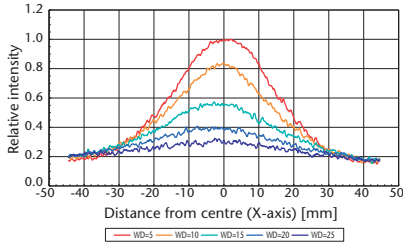
**CV-RLA-100X70-30W**



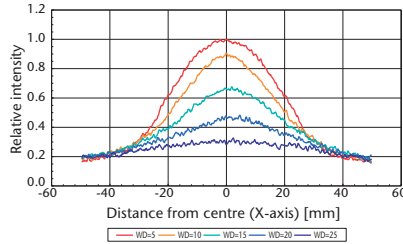
**CV-RLA-132X96-15W**



**CV-RLA-75X46-00W**



**CV-RLA-96X60-00W**



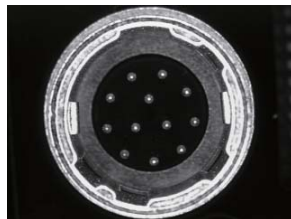
CV-RLA/RLA-00 Series

## Sample Images

### CV-RLA Series



Chamfer Checking on Metal Ring

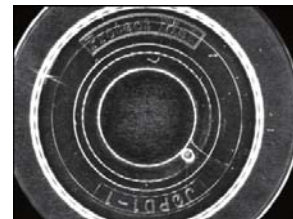


12-Pin Connector

### CV-RLA-00 Series



Scratch on Glass Plate



CD Imprint Inspection

## Applications

- Substrate and PCB positioning
- Chip component inspection
- LCD alignment
- Plastic container inspection
- Label inspection
- Mounter
- IC marking inspection, etc.

## Accessories

### Diffusion Ring



(P.189)

#### CV-DF-RLAxx

Used to create a relatively non-directional light. Reducing glare on specular surfaces. Easily mount onto a Low-Angle Ring Illumination.

# Shadowless Illumination CV-FR/DR/DSQ Series



## Shadowless Ring Illumination: CV-FR Series

- Diffuse, shadowless illumination\*
- Optimal soft, uniform light for shiny surfaces

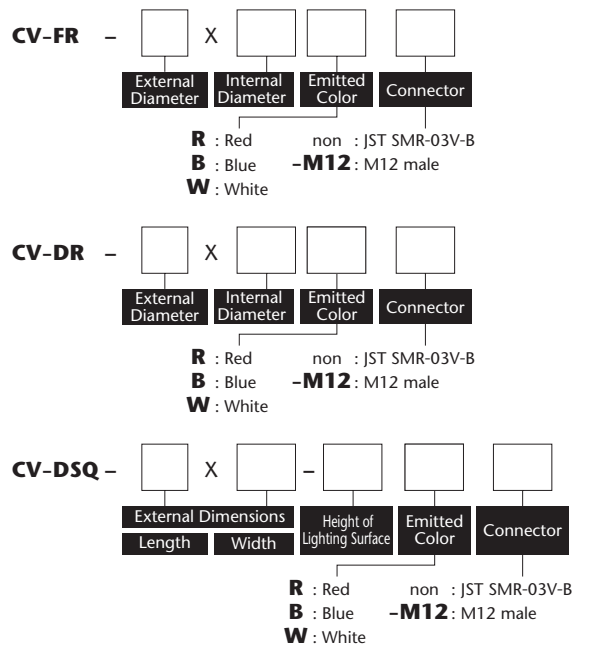
## Shadowless Low Angle Ring Illumination: CV-DR Series

- Shallow angle LED illumination that provides diffused, soft light
- Ideal for flaw or edge detection on reflective surfaces

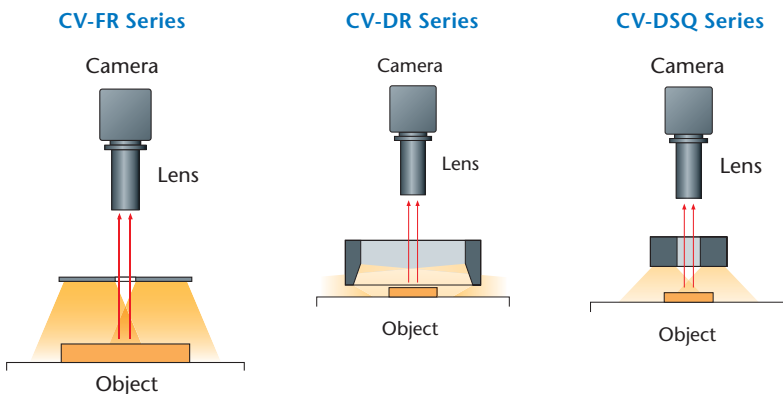
## Square Shadowless Low Angle Illumination: CV-DSQ Series

- Diffused illumination best suited for square shape objects, such as in BGA & QFP applications

## Explanation of Model Code



## Illumination Structure



Shadowless Illumination

CV-FR/DR/DSQ Series

Model	Emitted Color	Power (W)	External Dimensions (mm)			Emitting Diameter (mm)	Weight (g) *
			External Diameter	Internal Diameter	Height		
CV-FR-102X33R	● Red	1.2	102	33	12	80	190
CV-FR-102X33B	● Blue	3.3	102	33	12	80	190
CV-FR-102X33W	○ White	3.2	102	33	12	80	190
CV-FR-125X44R	● Red	2.3	125	44	12	102.5	280
CV-FR-125X44B	● Blue	3.8	125	44	12	102.5	280
CV-FR-125X44W	○ White	4.0	125	44	12	102.5	280

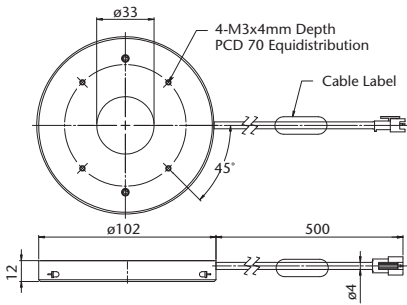
Model	Emitted Color	Power (W)	External Dimensions (mm)			Emitting Diameter (mm)	Weight (g) *
			External Diameter	Internal Diameter	Height		
CV-DR-100X73R	● Red	1.7	100	73	40	93.5	230
CV-DR-100X73B	● Blue	5.0	100	73	40	93.5	230
CV-DR-100X73W	○ White	5.8	100	73	40	93.5	230
CV-DR-136X109R	● Red	1.7	136	109	40	129.5	340
CV-DR-136X109B	● Blue	8.6	136	109	40	129.5	340
CV-DR-136X109W	○ White	8.4	136	109	40	129.5	340
CV-DR-180X153R	● Red	2.3	180	153	40	173.5	420
CV-DR-180X153B	● Blue	10.3	180	153	40	173.5	420
CV-DR-180X153W	○ White	11.6	180	153	40	173.5	420

Model	Emitted Color	Power (W)	External Dimensions (mm)				Emitting Area Dimensions (mm)			Weight (g) *
			External Diameter	Internal Diameter	Height	Inside Square	Length	Width	Height	
CV-DSQ-48X48-15R	● Red	0.4	48	48	30	10 / 26	36	36	15	110
CV-DSQ-48X48-15B	● Blue	1.0	48	48	30	10 / 26	36	36	15	110
CV-DSQ-48X48-15W	○ White	1.1	48	48	30	10 / 26	36	36	15	110
CV-DSQ-75X75-15R	● Red	0.7	75	75	30	20 / 53	64	64	15	180
CV-DSQ-75X75-15B	● Blue	2.6	75	75	30	20 / 53	64	64	15	180
CV-DSQ-75X75-15W	○ White	3.0	75	75	30	20 / 53	64	64	15	180
CV-DSQ-96X96-15R	● Red	0.9	96	96	30	74	84	84	15	190
CV-DSQ-96X96-15B	● Blue	3.8	96	96	30	74	84	84	15	190
CV-DSQ-96X96-15W	○ White	2.6	96	96	30	74	84	84	15	190
CV-DSQ-120X120-15R	● Red	1.1	120	120	30	98	108	108	15	240
CV-DSQ-120X120-15B	● Blue	5.2	120	120	30	98	108	108	15	240
CV-DSQ-120X120-15W	○ White	6.0	120	120	30	98	108	108	15	240

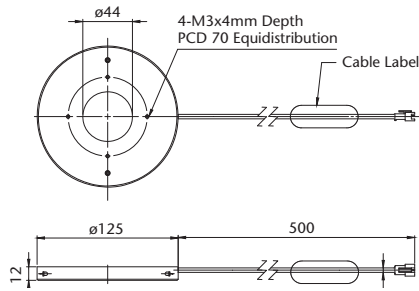
\* LED Controller on P.185

\* It is weighted 15g more in case "M12".

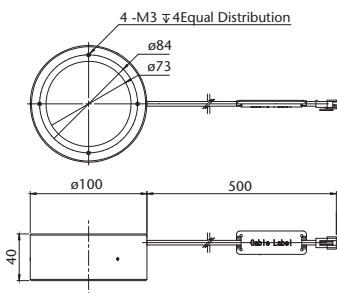
**CV-FR-102X33R (B,W)**



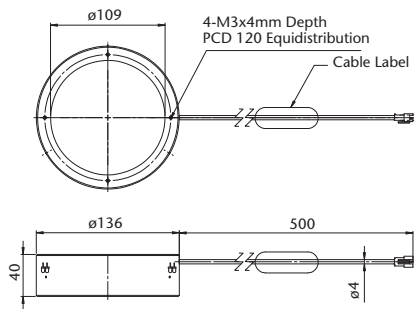
**CV-FR-125X44R (B,W)**



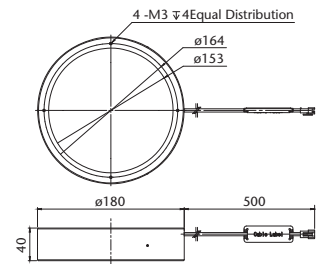
**CV-DR-100X73R (B,W)**



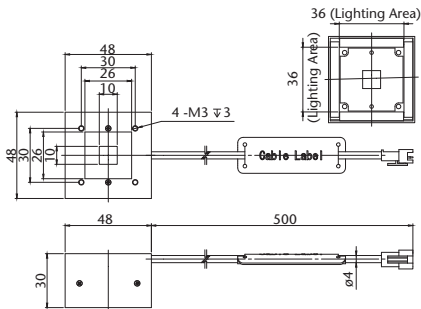
**CV-DR-136X109R (B,W)**



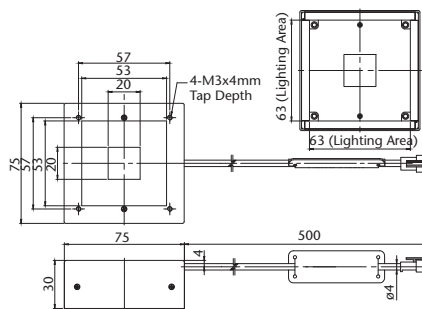
**CV-DR-180X153R (B,W)**



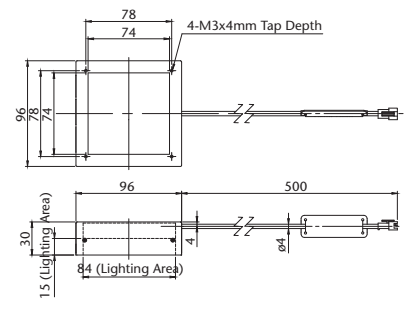
**CV-DSQ-48X48-15R (B,W)**



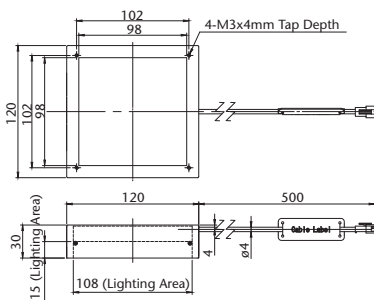
**CV-DSQ-75X75-15R (B,W)**



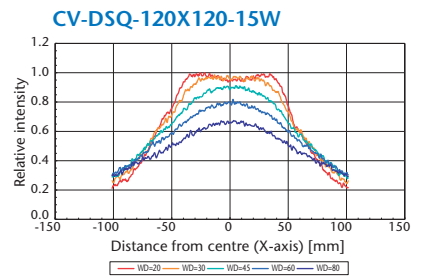
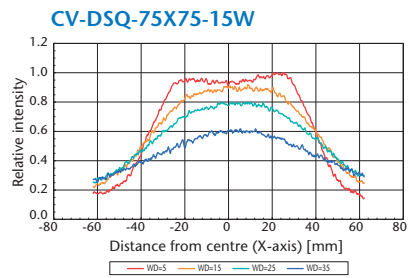
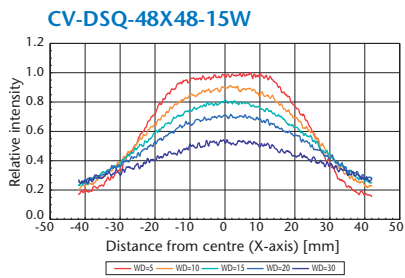
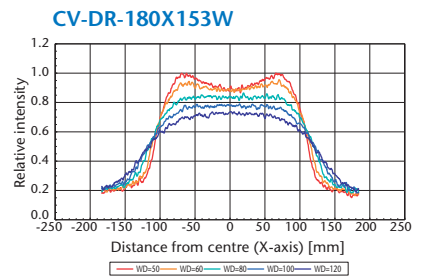
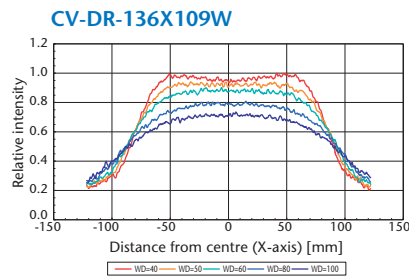
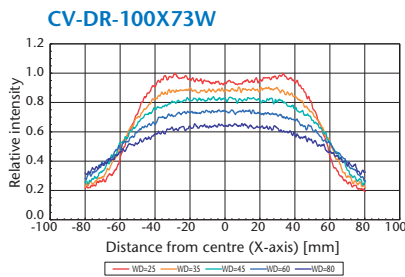
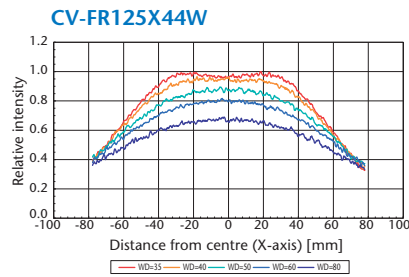
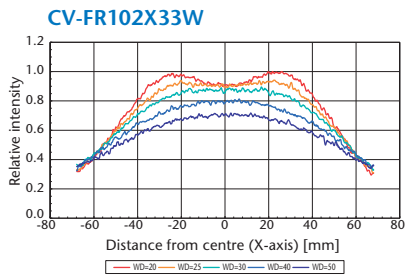
**CV-DSQ-96X96-15R (B,W)**



**CV-DSQ-120X120-15R (B,W)**



## Light Distribution Characteristics



## Sample Images

### CV-FR Series



CD Inspection



OCR on Brushed Metal Surface

### CV-DR Series



Cap Inspection



Silkscreen Printing Verification for Remote Control

### CV-DSQ Series



Connector Inspection

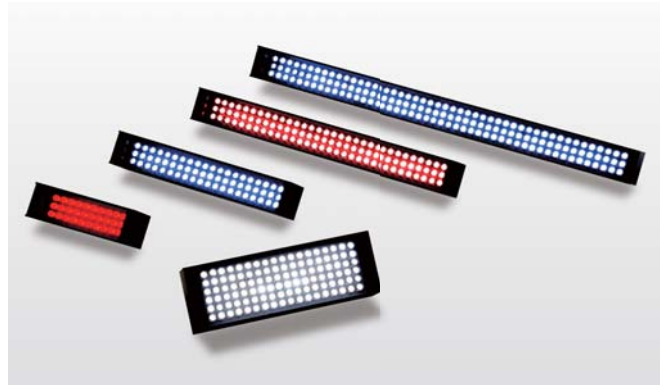


Ink Cartridge Print Head Inspection

# Bar Illumination CV-BA Series



- High-intensity LED block array
- Can be directed at any angle to the surface for either direct brightfield or optimal oblique darkfield lighting

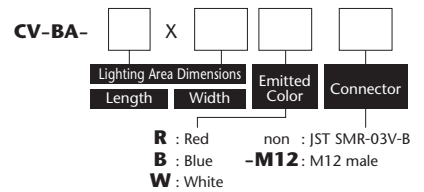


## Sample Images

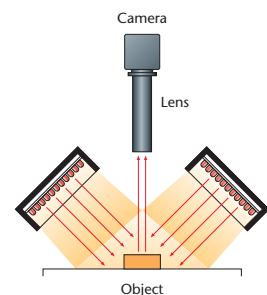


Character on Flexible Ribbon Cable    Silkscreen Printing on Faceplate

## Explanation of Model Code



## Illumination Structure



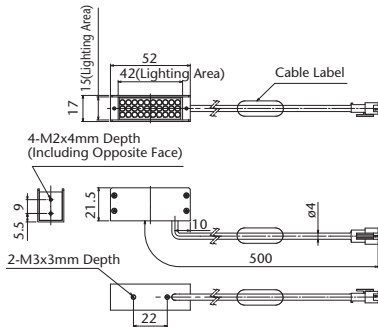
Model	Emitted Color	Power (W)	External Dimensions (mm)			Emitting Area Dimensions (mm)		Weight (g) *	Accessories
			Length	Width	Height	Length	Width		
CV-BA-42X15R	● Red	0.8	52	17	21.5	42	15	35	CV-DF-BA-42X15 CV-PL-BA-42X15
CV-BA-42X15B	● Blue	1.4	52	17	21.5	42	15	35	
CV-BA-42X15W	○ White	1.5	52	17	21.5	42	15	35	
CV-BA-74X27R	● Red	1.8	86	29	18.5	74	27	110	CV-DF-BA-74X27 CV-PL-BA-74X27
CV-BA-74X27B	● Blue	3.9	86	29	18.5	74	27	110	
CV-BA-74X27W	○ White	3.8	86	29	18.5	74	27	110	
CV-BA-82X15R	● Red	0.7	92	17	21.5	82	15	45	CV-DF-BA-82X15 CV-PL-BA-82X15
CV-BA-82X15B	● Blue	2.8	92	17	21.5	82	15	45	
CV-BA-82X15W	○ White	2.7	92	17	21.5	82	15	45	
CV-BA-130X15R	● Red	1.0	140	17	21.5	130	15	65	CV-DF-BA-130X15 CV-PL-BA-130X15 CV-SP-BA-130X15
CV-BA-130X15B	● Blue	4.5	140	17	21.5	130	15	65	
CV-BA-130X15W	○ White	4.4	140	17	21.5	130	15	65	
CV-BA-200X15R	● Red	1.7	204	17	21.5	194	15	80	CV-DF-BA-200X15 CV-PL-BA-200X15 CV-SP-BA-200X15
CV-BA-200X15B	● Blue	6.8	204	17	21.5	194	15	80	
CV-BA-200X15W	○ White	7.2	204	17	21.5	194	15	80	

\* LED Controller on P.185

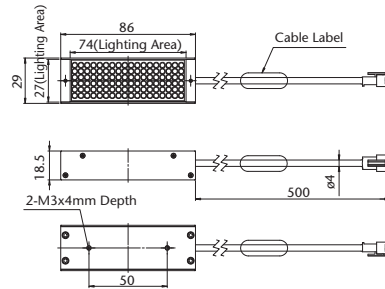
\* It is weighted 15g more in case "M12".



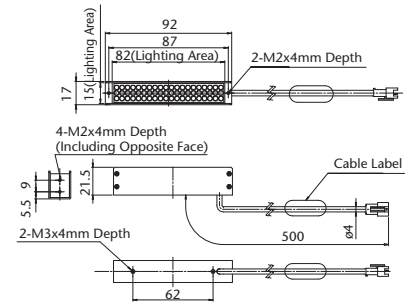
**CV-BA-42X15R (B,W)**



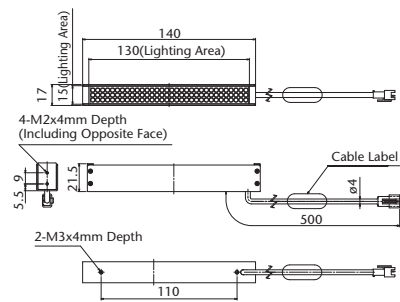
**CV-BA-74X27R (B,W)**



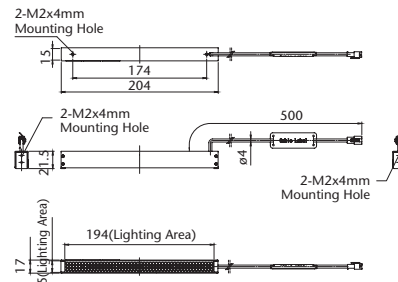
**CV-BA-82X15R (B,W)**



**CV-BA-130X15R (B,W)**

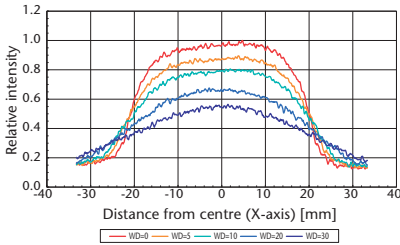


**CV-BA-200X15R (B,W)**

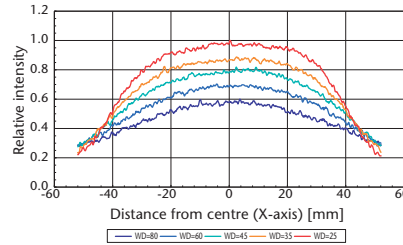


**Light Distribution Characteristics**

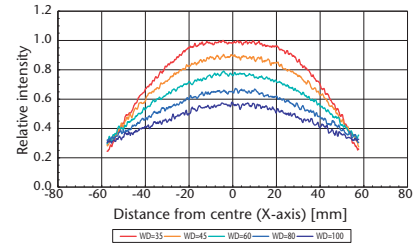
**CV-BA-42X15W**



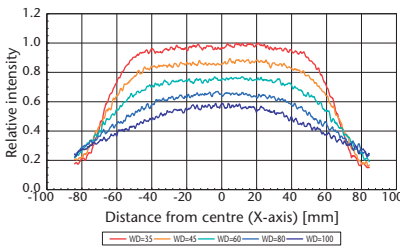
**CV-BA-74X27W**



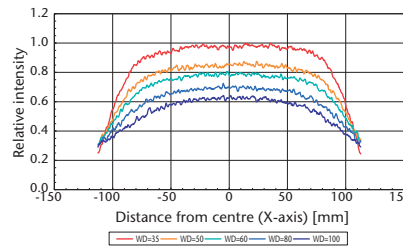
**CV-BA-82X15W**



**CV-BA-130X15W**



**CV-BA-200X15W**



**Applications**

- IC marking inspection, inspection of components on glass substrates
- Dirt inspection on cap sides and inside surfaces
- Wafer appearance inspection
- Solder inspection and connector pitch inspection
- Inspection, etc. of BGA, QFP, etc.

**Accessories**

**Diffusion Plate**



(P.189)

**CV-DF-BAxxx**

To be mounted in front of the LED lighting using screws provided. Used to soften the lighting output, so as to reduce the glares on specular surface.

**Polarizer**



(P.189)

**CV-PL-BAxxx**

To be mounted in front of the LED lighting using screws provided. Used together with a polarizer filter lens in front of the camera as a set. It helps to reduce glare.

# Square Bar Type Illumination

## CV-BAQ Series



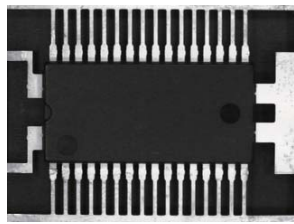
- Four high-intensity bar LED arrangement
- Optimal direct brightfield or oblique darkfield lighting from adjustable angles
- Can be controlled independently



### Sample Images

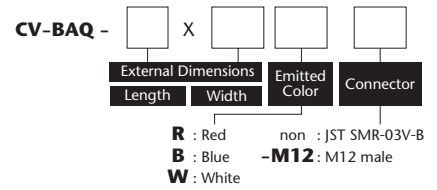


QFP Solder Inspection



SSOP Pre-cut IC Package Inspection

### Explanation of Model Code



Square Bar Type Illumination

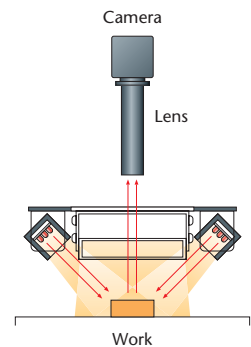
CV-BAQ Series

Model	Emitted Color	Power (W)	External Dimensions (mm)				Emitting Area Dimensions (mm)		Weight (g) *	Accessories
			Length	Width	Height	Inside Square	Length	Width		
CV-BAQ-108X108R	● Red	3.1	108	108	30	60	42	15	220	CV-DF-BA-42X15
CV-BAQ-108X108B	● Blue	5.7	108	108	30	60	42	15	220	
CV-BAQ-108X108W	○ White	6.0	108	108	30	60	42	15	220	
CV-BAQ-148X148R	● Red	2.6	148	148	30	100	82	15	290	CV-DF-BA-82X15
CV-BAQ-148X148B	● Blue	11.3	148	148	30	100	82	15	290	
CV-BAQ-148X148W	○ White	10.9	148	148	30	100	82	15	290	
CV-BAQ-200X200R	● Red	4.1	200	200	30	152	130	15	390	CV-DF-BA-130X15
CV-BAQ-200X200B	● Blue	18.1	200	200	30	152	130	15	390	
CV-BAQ-200X200W	○ White	17.5	200	200	30	152	130	15	390	

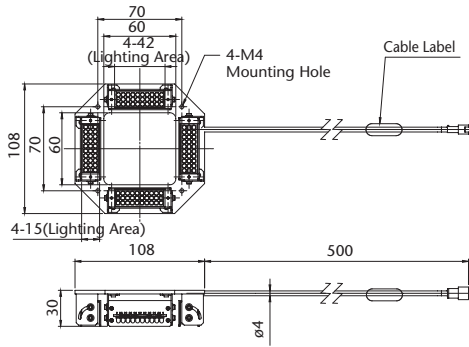
\* LED Controller on P.185

\* It is weighted 60g more in case "M12".

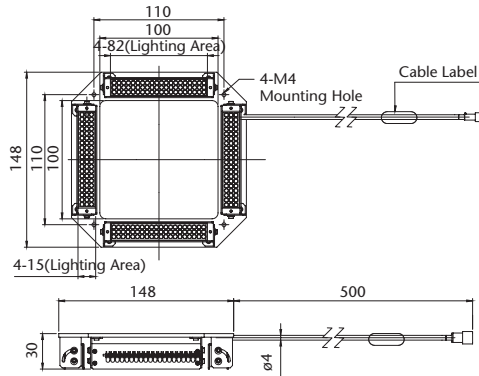
### Illumination Structure



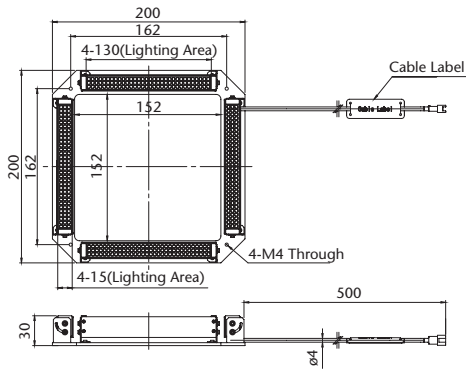
**CV-BAQ-108X108R (B,W)**



**CV-BAQ-148X148R (B,W)**

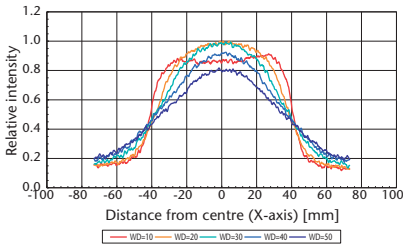


**CV-BAQ-200X200R (B,W)**

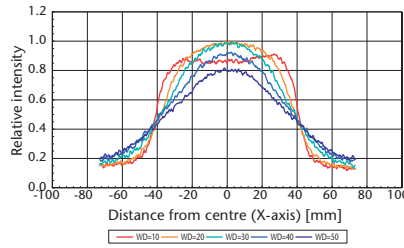


**Light Distribution Characteristics**

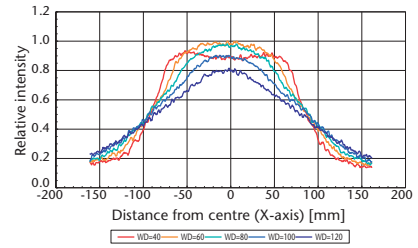
**CV-BAQ-108X108W**



**CV-BAQ-148X148W**



**CV-BAQ-200X200W**



**Accessories**

**Diffuser**



**CV-DF-BAxxx**

To be mounted in front of the LED lighting using the screws provided. Used to soften the lighting output, so as to reduce the glare on specular surface.

(P.189)

# Coaxial Illumination

## CV-CE Series

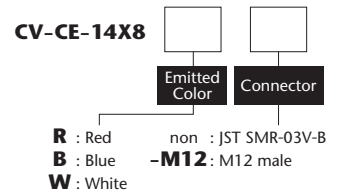


Compact coaxial LED that only requires minimal installation space.



- Fully compatible with our MML Series telecentric lenses that set the industry standard for coaxial illumination, these LEDs are a perfect match
- Body design has been miniaturized and this series is even smaller than its compact predecessors
- L-shaped (right angle) illumination cable design enables further space savings

### Explanation of Model Code

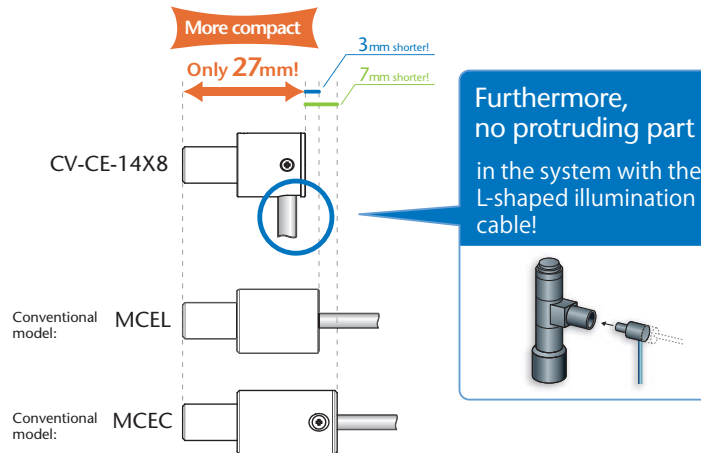


Model	Emitted Color	Power (W)	External Dimensions (mm)			Emitting Diameter (mm)	Weight (g)*
			Tip Diameter	Maximum External Diameter	Length		
CV-CE-14X8R	● Red	0.4	8	14	27	6	20
CV-CE-14X8B	● Blue	0.8	8	14	27	6	20
CV-CE-14X8W	○ White	0.8	8	14	27	6	20

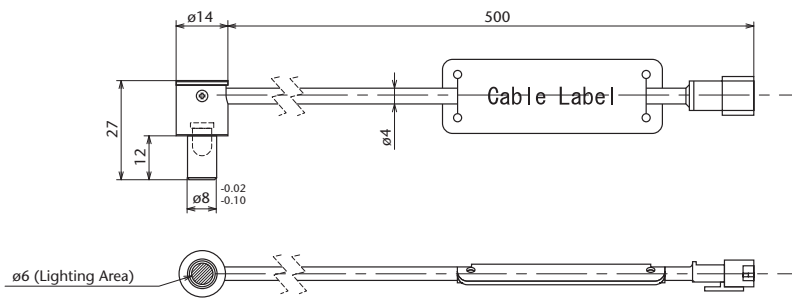
\* LED Controller on P.185

\* It is weighted 15g more in case "M12".

## Size Comparison with Conventional Models



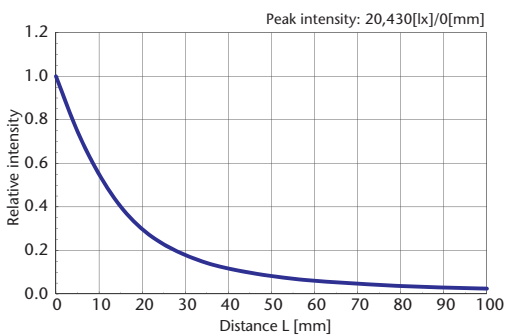
### CV-CE-14X8R (B,W)



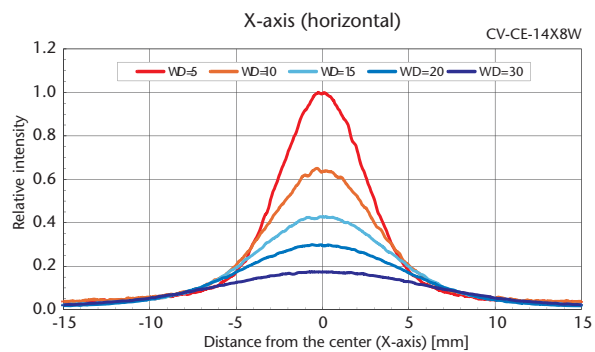
## Applications

- Alignment mark recognition on LCD
- Character recognition on wafer
- Other semiconductor and electronic component inspections

### Light Intensity Characteristics



### Light Distribution Characteristics



# Simulated Coaxial Illumination CV-CX Series



- Highly uniform pseudo-coaxial (on-axis) lighting
- Designed for use with our telecentric MML Series and other lenses without built-in coaxial illumination

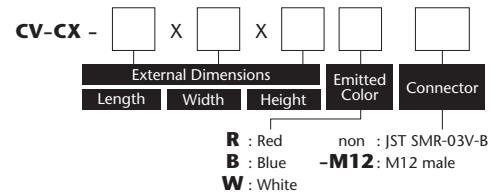


Model	Emitted Color	Power (W)	External Dimensions (mm)			FOV Dimensions (mm)		Weight (g) *
			Length	Width	Height	Length	Width	
CV-CX-75X46X40R	● Red	1.5	75	46	41	26	28	190
CV-CX-75X46X40B	● Blue	2.2	75	46	41	26	28	190
CV-CX-75X46X40W	○ White	2.1	75	46	41	26	28	190
CV-CX-94X60X58R	● Red	1.1	94	60	59	32	36	350
CV-CX-94X60X58B	● Blue	6.4	94	60	59	32	36	350
CV-CX-94X60X58W	○ White	6.2	94	60	59	32	36	350
CV-CX-120X84X79R	● Red	4.9	120	84	80	50	50	580
CV-CX-120X84X79B	● Blue	5.8	120	84	80	50	50	580
CV-CX-120X84X79W	○ White	6.1	120	84	80	50	50	580

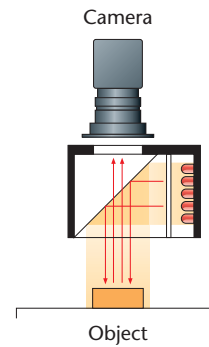
\* LED Controller on P.185

\* It is weighted 15g more in case "M12".

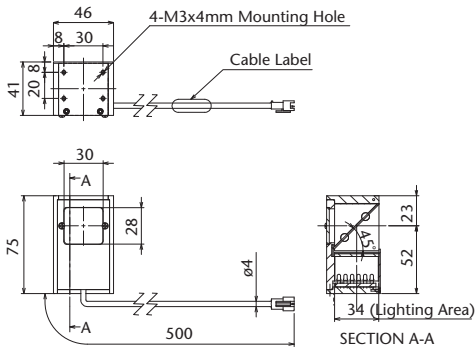
## Explanation of Model Code



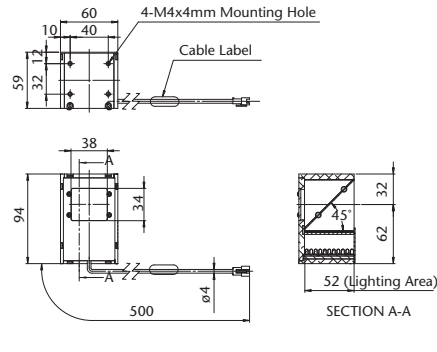
## Illumination Structure



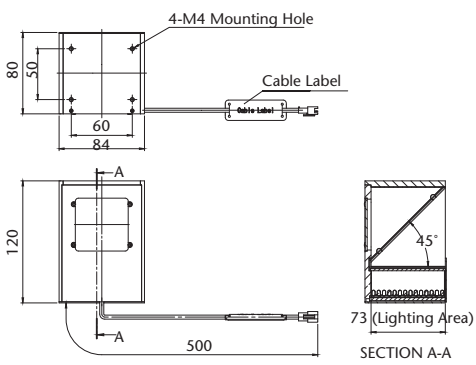
**CV-CX-75X46X40R (B,W)**



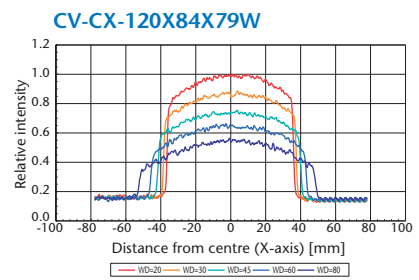
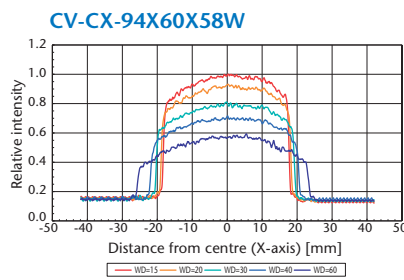
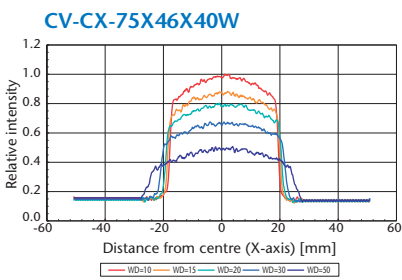
**CV-CX-94X60X58R (B,W)**



**CV-CX-120X84X79R (B,W)**



**Light Distribution Characteristics**



**Sample Images**



Screw Head Inspection



Glass Bottle Opening

**Applications**

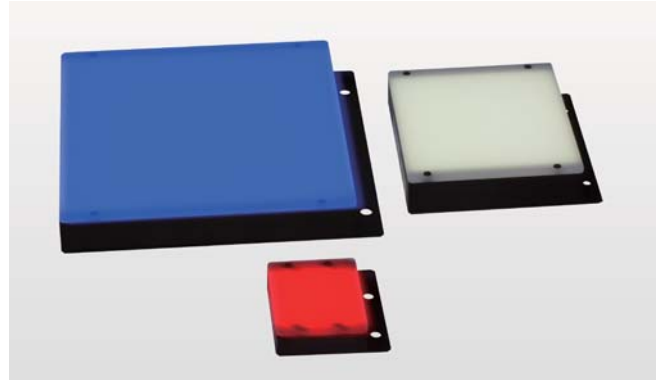
- QFP and SOP inspection
- Metal plate surface inspection
- Ceramic package appearance inspection

# Direct Backlights (Chip Mount Type)

## CV-FL Series



- Densely packaged chip LEDs in thin chassis (Height: 15 mm)
- Provides diffuse area lighting



### Sample Images

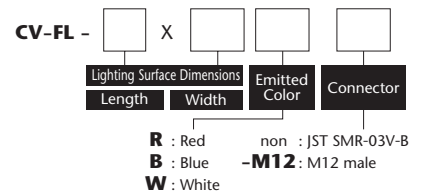


Cutter Disc Roundness Check

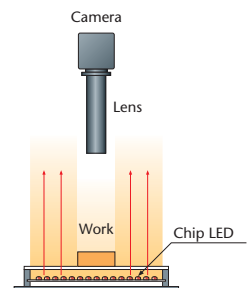


Candle Size Measurement

### Explanation of Model Code



### Illumination Structure



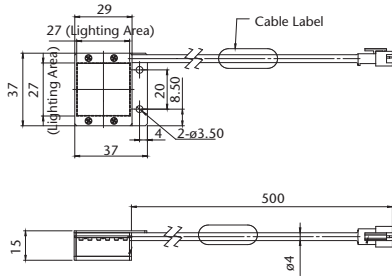
Model	Emitted Color	Power (W)	External Dimensions (mm)			Lighting Surface (mm)		Weight (g) *	Accessories
			Length	Width	Thickness	Length	Width		
CV-FL-27X27R	● Red	0.6	37	37	15	27	27	35	CV-LC-FL-27X27
CV-FL-27X27B	● Blue	1.4	37	37	15	27	27	35	
CV-FL-27X27W	○ White	1.5	37	37	15	27	27	35	
CV-FL-51X51R	● Red	4.5	61	61	15	51	51	70	CV-LC-FL-51X51
CV-FL-51X51B	● Blue	5.9	61	61	15	51	51	70	
CV-FL-51X51W	○ White	6.3	61	61	15	51	51	70	
CV-FL-63X60R	● Red	1.2	73	70	15	63	60	85	CV-LC-FL-63X60
CV-FL-63X60B	● Blue	3.4	73	70	15	63	60	85	
CV-FL-63X60W	○ White	3.2	73	70	15	63	60	85	
CV-FL-83X75R	● Red	4.7	85	95	15	75	83	110	CV-LC-FL-83X75
CV-FL-83X75B	● Blue	7.2	85	95	15	75	83	110	
CV-FL-83X75W	○ White	6.9	85	95	15	75	83	110	
CV-FL-100X100R	● Red	3.5	110	112	15	100	100	160	CV-LC-FL-100X100
CV-FL-100X100B	● Blue	10.4	110	112	15	100	100	160	
CV-FL-100X100W	○ White	9.9	110	112	15	100	100	160	
CV-FL-230X230R	● Red	25.0	240	268	15	230	230	760	CV-LC-FL-230X230
CV-FL-230X230B	● Blue	24.0	240	268	15	230	230	760	
CV-FL-230X230W	○ White	24.2	240	268	15	230	230	760	

\* LED Controller on P.185

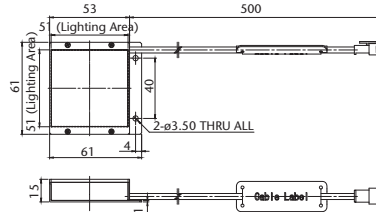
\* It is weighted 15g more in case "M12".



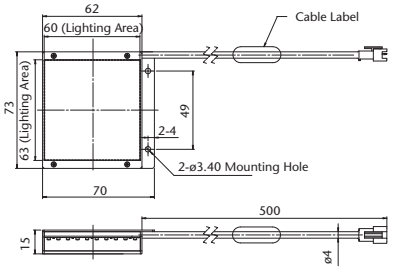
**CV-FL-27X27R (B,W)**



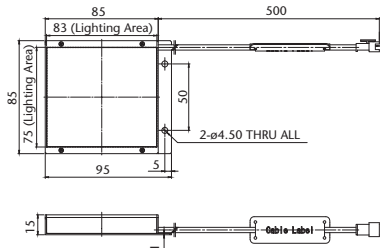
**CV-FL-51X51R (B,W)**



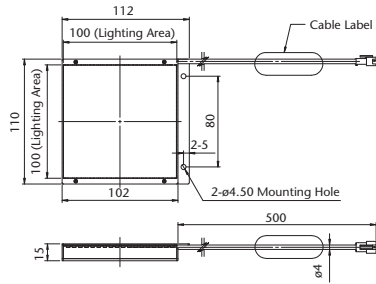
**CV-FL-63X60R (B,W)**



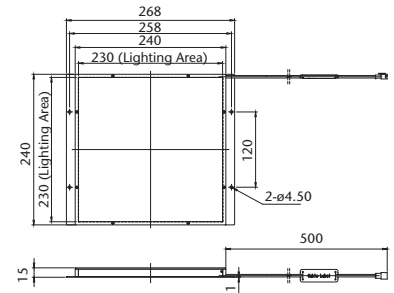
**CV-FL-83X75R (B,W)**



**CV-FL-100X100R (B,W)**

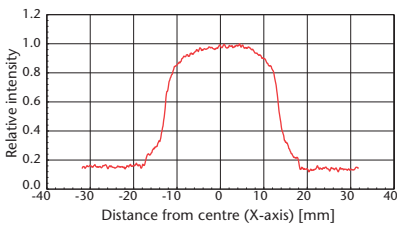


**CV-FL-230X230R (B,W)**

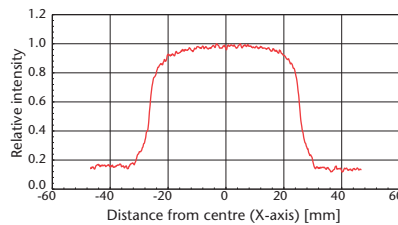


**Light Distribution Characteristics**

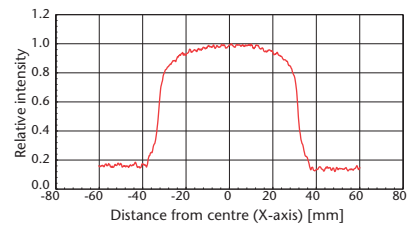
**CV-FL-27X27W**



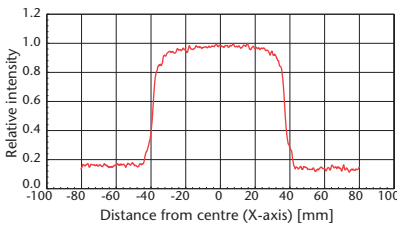
**CV-FL-51X51W**



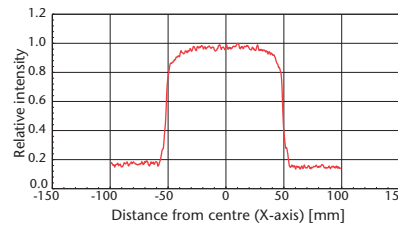
**CV-FL-63X60W**



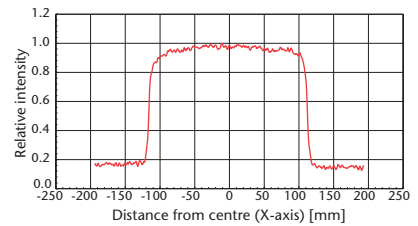
**CV-FL-83X75W**



**CV-FL-100X100W**



**CV-FL-230X230W**

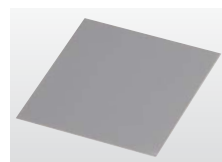


**Applications**

- Alignment inspection on specular surfaces, including wafers, metal surfaces, film, liquid crystal, and glass
- PCB pattern work

**Accessories**

**Light Control Plate**



(P.190)

**CV-LC-FLxxx**

To be mounted on the top of the LED lighting using the screws provided. To collimate the light from the flat light so as to produce a sharper edged image.

# IR Illumination

## IR



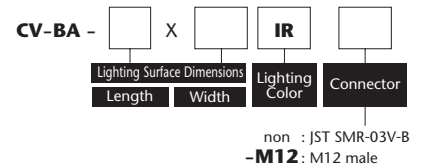
- Provides image recognition at high contrast especially for items that are difficult to view in visible light
- Lighting is also effective for materials that chemically react to visible light rays or allow IR wavelength transmission



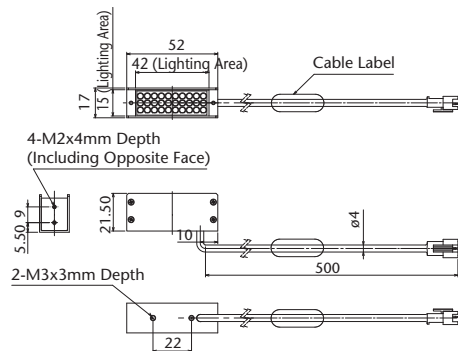
Model	Emitted Color	Power (W)	External Dimensions (mm)			Emitting Area Dimensions (mm)		Weight (g)*
			Length	Width	Height	Length	Width	
CV-BA-42X15IR	IR	0.9	52	17	21.5	42	15	35

\* LED Controller on P.185  
 \* It is weighted 15g more in case "M12".  
 \* IR is currently available for bar illumination, and other illumination types are under consideration.

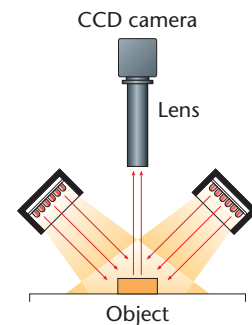
### Explanation of Model Code



### CV-BA-42x15IR



### Illumination Structure

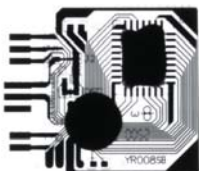


### Sample Images

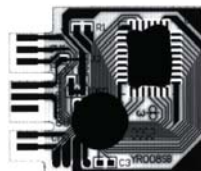
#### 1.Substrate Pattern Recognition

(For IR, only the pattern is recognized clearly)

With an IR backlight LED



With a white backlight LED



#### 2.Cheese Package Recognition

(For IR, specific patterns can be made invisible)

With an IR direct ring LED



With a white, direct LED



# Dedicated LED Digital Controller

## MLEF Series



### Two-in-one multifunctional digital controllers for Strobe/PWM

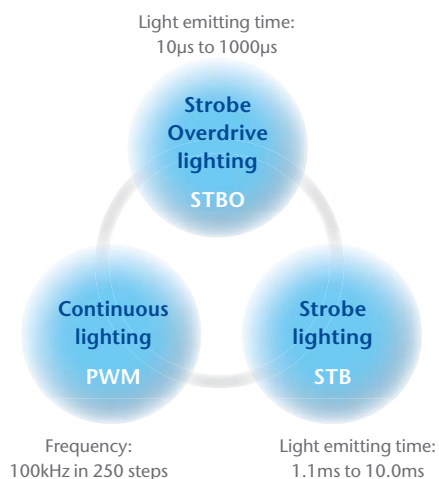
LED controllers compatible with lighting modes from strobe overdrive to continuous lighting. Allows adjustment of not only light emitting time but also voltage for dimming control in strobe overdrive mode—invaluable for maintaining a constant light emitting time for setting cameras. This proprietary function is an industry first for DIN-rail-mountable compact controllers.

- **Mode selectable between strobe overdrive, strobe, and PWM**  
Adaptable to various lighting modes ranging from strobe overdrive to continuous lighting
- **Ethernet communication**  
Ethernet/parallel (8-bit) port provided for external interfacing
- **Strobe dimming control**  
Allows adjustment of not only light emitting time but also voltage for dimming control in strobe overdrive mode. This proprietary function is an industry first for DIN-rail-mountable compact controllers
- **Compact, lightweight body design**  
Compact and lightweight body allows flexible installation to a DIN rail or direct mounting
- **Panel indication for easy operation**  
User-friendly panel indication allows easy operation



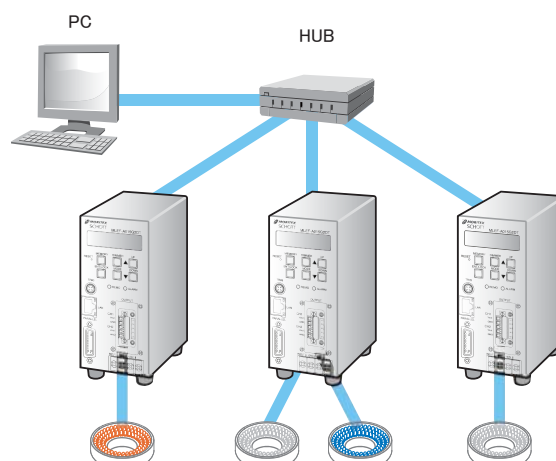
### Selectable 3 Lighting Modes

Selectable three LED lighting modes, Strobe Overdrive, Strobe and PWM are available for user's precise lighting adjustment.



### Ethernet LAN/Parallel Digital Networking

The Ethernet port and conventional parallel port interfaces are equipped as standard. Setting up a LAN can be made by using the existing IT assets, e.g. cabling, without additional cost.



## Easy Operation

### Simple push-button operation makes settings easy

User-friendly and informative front display panel indicates the current operation mode.

**Lighting mode!**  
Changing  
Pulse Width Modulation (PWM) mode is selected. The display shows: CH1: 50 MODE [PWM], CH2: 250 [STBO].

**Control type!**  
Changing  
Control type is selected. The display shows: CTRL TYPE SEL [MANU] PARA LAN.

**Light emitting time and lighting setting**  
Changing  
Light emitting time and intensity are set. The display shows: CH1: 1000u MODE [STBO], CH2: 10u [STBO].

Buttons: RESET, MEMORY, DIMMER, UP, ENT/LOCK, MODE, DOWN, TRIG.

Control types: Manual, Parallel, Ethernet.

Long push: Jump  
Short push: Steps

### Lighting/dimming level repeatability

Repeating previous lighting/dimming settings can be perfectly done with the digitalized setting values.

## Strobe Overdrive Feature

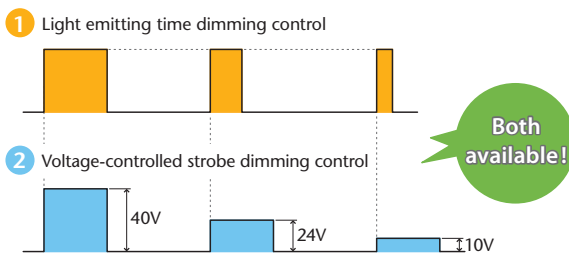
### Feature 1 Voltage-controlled dimming control available!

Using both the light emitting time dimming control and voltage-controlled strobe dimming control are possible for lighting control under the Strobe Overdrive (STBO) mode. It saves the trouble of light emitting time adjustment with multiple cameras, since the user can change the light intensity only with the power (load voltage).

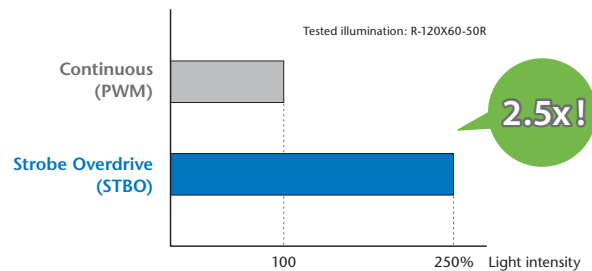
### Feature 2 2.5x brighter!

The Strobe Overdrive can give out about 2.5x brightness instantaneously compared to the PWM continuous lighting. This is desirable for high-speed machine vision image processing such as an IC chip appearance inspection.

#### Two strobe dimming methods available (STBO mode)



#### Light intensity comparison



## Adjustment Range

### Strobe Overdrive lighting STBO

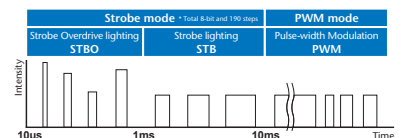
Trigger synchronization with signal shall be set for the Strobe Overdrive lighting. Light emitting time (i.e. duration) range is 10μs to 1000μs in 100 steps with 10μs increments, also the variable output voltage ranges from 10V-40V.

### Strobe lighting STB

Trigger synchronization with signal shall be set for the Strobe lighting. Light emitting time range is 1.1ms to 10.0ms in 90 steps with 100μs (0.1ms) increments.

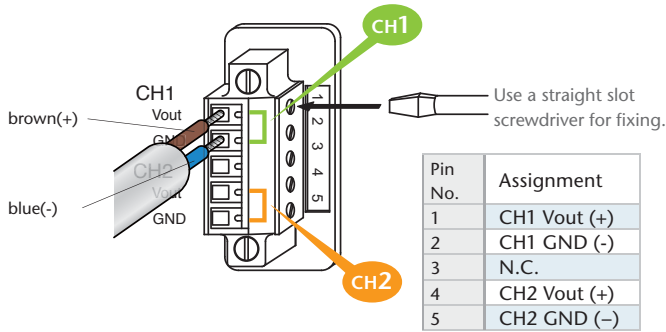
### Continuous lighting PWM

250 control steps at 100kHz. Continuous DC lighting with the control value range from (light off) 0 to 250 (maximum).



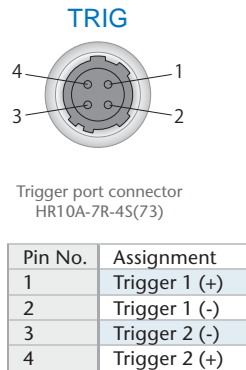
## Connecting with LED Illumination

The dedicated extension cable is available for connecting the terminal with each LED illumination.



## Trigger Input

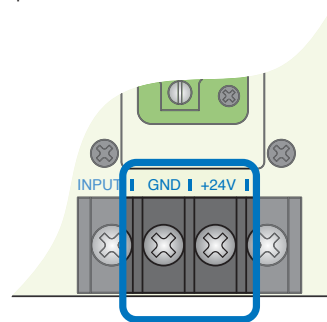
Trigger signal setting is necessary for both Strobe Overdrive and Strobe modes. Recommended trigger cable connector: HR10A-7P-4P(73), Hirose, or equivalent product.



## 24 VDC Input Terminal Block

Use the boxed terminals for connecting 24 VDC input as shown below. M3-type round crimping terminal is recommended for connection.

\*Using an excessively large crimping terminal may damage the terminal block and its resin screw part.



## External Interface

### Parallel interface

Pin assignment details for parallel connection.

\* External control cable MC-EXC-02 is available on request.

Pin No.	Signal	I/O	Note
1	CH	Input	Designate output channel; L: CH1, H: CH2
2	MODE0	Input	Lighting mode selection between PWM, STB, VoutADJ and MEMORY
3	MODE1	Input	
4	D0	Input	Function changes according to selected mode
5	D1	Input	
6	D2	Input	
7	D3	Input	
8	D4	Input	
9	D5	Input	
10	D6	Input	
11	D7	Input	D0-D7 Used for indicated values in PWM or STB mode D0-D7 Used for indicated values in VoutADJ mode D1-D2 Used for address indication when MODE is MEMORY
12	WE	Input	Used for writing and fixing settings onto internal register
13	COMMON	—	5 to 24V can be applied, but no input variation while in use
14	ERRc	Output	Alarm when controller operates abnormally
15	ERRe	Output	Normal operation: PD off / Abnormal operation: PD on

### Ethernet LAN

Communication protocol for external control through Ethernet LAN.

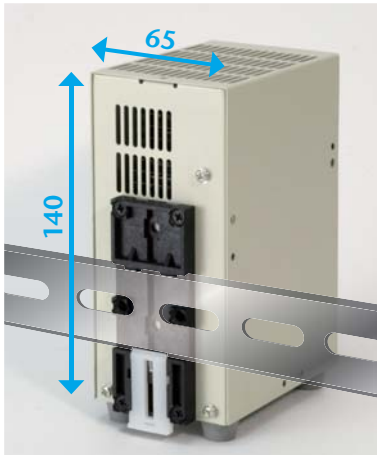
Protocol hierarchy	Specification	
TCP protocol	Applicable standard	RFC793
IPv4 protocol	Applicable standard	RFC791
Ethernet	Applicable standard	IEEE 802.3 IEEE 802.3u IEEE 802.3x
	Transfer rate (automatic detection)	10Mbps 100Mbps
	Data transmission media	10BASE-T 100BASE-TX

\* Automatic negotiation compatible

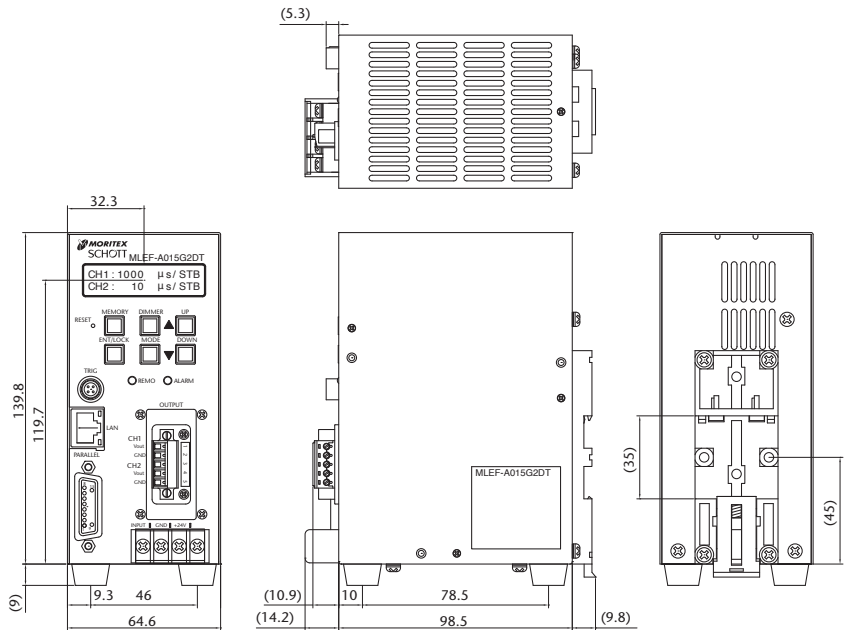
## Small and Lightweight Design

### 65mm slimline body

Small and lightweight body (only 800g weight and 65mm width) makes it easy to fix onto DIN rail or simply use standalone.

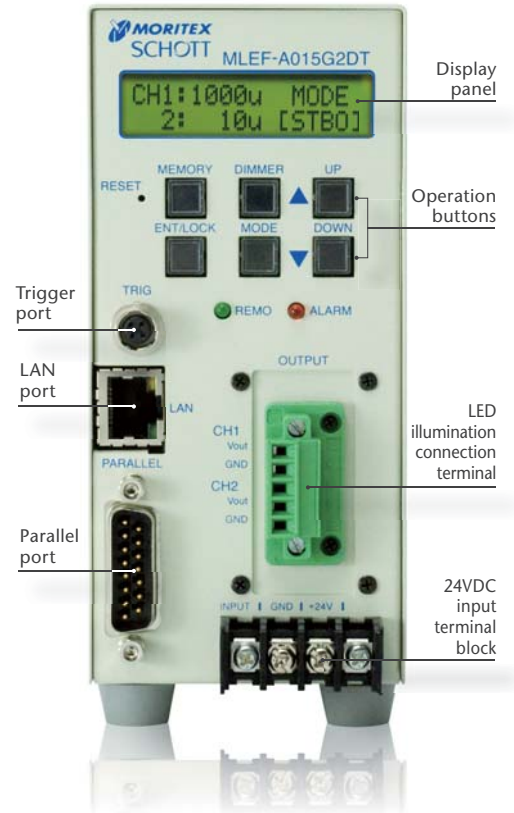


### External View



## Specifications

Model name	MLEF-A015G2DT
Input voltage	24VDC +/-10% (21.6-26.4V)
Input current	1.8A (Maximum)
Output channel	2 channels
Output power	PWM : 30W (Two channel total), STB : 15W (Maximum for a channel)
Output voltage	PWM/STB : 24Vp-p, STBO : 40Vp-p
Output current	PWM/STB : 1.25Ap-p, STBO : 4.0Ap-p
Variable output range	PWM/STB : 0 to 100%, STBO : 10 to 40V *1
Remote control	Ethernet LAN port / Parallel port
PWM mode	PWM frequency: 100kHz (Control step: 250 steps)
STB mode	Light emitting time: 1.1 to 10.0ms (90 steps in 0.1ms increments) * Effective bit setting: From 101 to 190 among the 8 bits
STBO mode	Light emitting time: 10 to 1000μs (100 steps in 10μs increments) Flashing duty cycle limit: 10% * Effective bit setting: From 0 to 100 among the 8 bits Vout adjustment : 0 to 100% (256 steps)
Trigger input range	5 to 24VDC STB/STBO_TRG Input response time : Less than 10μs PWM_ON/OFF Input response time : Less than 10μs
Setup mode	STB : 5ms / 10ms, STBO : 10μs / 1000μs
Memory function	Manual memory (ROM) : Up to 3 memory settings Remote LAN memory (RAM) : Up to 3memory settings Remote parallel memory (RAM) : Up to 4 memory settings
Safety feature	Overcurrent / Overvoltage / STB(O) output overtime protection Fuse rating: 4.0A (input) *2
Set reclosing interval	Not less than 1 second
Operating condition	Indoor use only, Maximum altitude for use : 2000m above sea level, Operating temperature : 0 to 45°C Operating humidity limits : Less than 80% RH until 30°C, then decline linearly to 50% RH at 40°C. Pollution level 2
Storage temperature/humidity range	-20 to 80°C / 20 to 85% RH (No condensation)
Cooling method	Natural cooling
Ingress Protection code	IP20 (EN 60529) *3
External dimensions	W655 x H140 x D99mm (Projecting parts excluded)
Weight	Approx. 800g
CE-Marking	EMC Directive: EN55011:2009+A1:2010, EN61000-6-2:2005 *4



\*1 The minimum voltage is a reference value.  
 \*2 To reset a protection function (but not applicable to blowout of a fuse), restore the main supply with a 2 to 3 second interval after turning it off.  
 \*3 Protected against a solid object greater than 12.5mm in diameter, such as a finger. No protection against ingress of water.  
 \*4 Compatible with an extension or branch cables (for CompaVis®) of up to 10m.

# CompaVis®

## Accessories

### Diffuse Plates: CV-DF Series

These diffuser plates, which can be attached to the illumination using the dedicated adapters, help prevent unwanted lighting reflection.

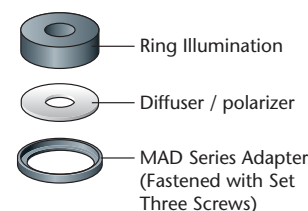
Model	Product Type	Compatible Light Models	Internal Diameter (mm)
CV-DF-R-32X10-70	Diffuser for Direct Ring Illumination	CV-R-32X10-70R(B,W)	ø10
CV-DF-R-42X18-65	Diffuser for Direct Ring Illumination	CV-R-42X18-65R(B,W)	ø14
CV-DF-R-50X28-75	Diffuser for Direct Ring Illumination	CV-R-50X28-75R(B,W)	ø25
CV-DF-R-70X35-90	Diffuser for Direct Ring Illumination	CV-R-70X35-90R(B,W)	ø35
CV-DF-R-90X30-80	Diffuser for Direct Ring Illumination	CV-R-90X30-80R(B,W)	ø30
CV-DF-R-90X50-70	Diffuser for Direct Ring Illumination	CV-R-90X50-70R(B,W)	ø40
CV-DF-R-120X58-50	Diffuser for Direct Ring Illumination	CV-R-120X58-50R(B,W)	ø60
CV-DF-SQ-56X56X30	Diffuser for Square Ring Illumination	CV-SQ-56X56X30R(B,W)	ø30
CV-DF-RLA-74X48-30	Diffuser for Low Angle Ring Illumination	CV-RLA-74X48-30R(B,W)	ø40
CV-DF-RLA-100X70-30	Diffuser for Low Angle Ring Illumination	CV-RLA-100X70-30R(B,W)	ø56
CV-DF-RLA-132X96-15	Diffuser for Low Angle Ring Illumination	CV-RLA-132X96-15R(B,W)	ø82
CV-DF-BA-42X15	Diffuser for Bar Illumination	CV-BA-42X15R(B,W)	—
CV-DF-BA-74X27	Diffuser for Bar Illumination	CV-BA-74X27R(B,W)	—
CV-DF-BA-82X15	Diffuser for Bar Illumination	CV-BA-82X15R(B,W)	—
CV-DF-BA-130X15	Diffuser for Bar Illumination	CV-BA-130X15R(B,W)	—
CV-DF-BA-200X15	Diffuser for Bar Illumination	CV-BA-200X15R(B,W)	—

### Adapters: CV-AD Series

Adapter for attaching dedicated diffuser plates and polarizing plate for CompaVis® ring illumination.

Model	Product Type	Compatible Light Models
CV-AD-R-32X10-70	Plate Attachment Adapter for Direct Ring Illumination	CV-R-32X10-70R(B,W)
CV-AD-R-42X18-65	Plate Attachment Adapter for Direct Ring Illumination	CV-R-42X18-65R(B,W)
CV-AD-R-50X28-75	Plate Attachment Adapter for Direct Ring Illumination	CV-R-50X28-75R(B,W)
CV-AD-R-70X35-90	Plate Attachment Adapter for Direct Ring Illumination	CV-R-70X35-90R(B,W)
CV-AD-R-90X30-80	Plate Attachment Adapter for Direct Ring Illumination	CV-R-90X30-80R(B,W)
CV-AD-R-90X50-70	Plate Attachment Adapter for Direct Ring Illumination	CV-R-90X50-70R(B,W)
CV-AD-R-120X58-50	Plate Attachment Adapter for Direct Ring Illumination	CV-R-120X58-50R(B,W)

#### How to Use CV-AD Series



### Polarizing Plate: CV-PL Series

Attaching these polarizing plates on the lens side (inside the polarizer) cuts specular reflection in particular areas and reduces glare in the resulting image.

Model	Product Type	Compatible Light Models	Internal Diameter (mm)
CV-PL-R-32X10-70	Polarizer for Direct Ring Illumination	CV-R-32X10-70R(B,W)	ø10
CV-PL-R-42X18-65	Polarizer for Direct Ring Illumination	CV-R-42X18-65R(B,W)	ø14
CV-PL-R-50X28-75	Polarizer for Direct Ring Illumination	CV-R-50X28-75R(B,W)	ø26
CV-PL-R-70X35-90	Polarizer for Direct Ring Illumination	CV-R-70X35-90R(B,W)	ø35
CV-PL-R-90X30-80	Polarizer for Direct Ring Illumination	CV-R-90X30-80R(B,W)	ø30
CV-PL-R-90X50-70	Polarizer for Direct Ring Illumination	CV-R-90X50-70R(B,W)	ø40
CV-PL-R-120X58-50	Polarizer for Direct Ring Illumination	CV-R-120X58-50R(B,W)	ø60
CV-PL-SQ-56X56X30	Polarizer for Square Ring Illumination	CV-SQ-56X56X30R(B,W)	ø30
CV-PL-BA-42X15	Polarizer for Bar Illumination	CV-BA-42X15R(B,W)	—
CV-PL-BA-74X27	Polarizer for Bar Illumination	CV-BA-74X27R(B,W)	—
CV-PL-BA-82X15	Polarizer for Bar Illumination	CV-BA-82X15R(B,W)	—
CV-PL-BA-130X15	Polarizer for Bar Illumination	CV-BA-130X15R(B,W)	—
CV-PL-BA-200X15	Polarizer for Bar Illumination	CV-BA-200X15R(B,W)	—

### Support Plates: CV-SP Series

This supporter plate to reduce the deflection of polarizing plate for bar.

Model	Product Type	Compatible Light Models
CV-SP-BA-130X15	Support Plate for Bar Illumination	CV-BA-130X15R(B,W)
CV-SP-BA-200X15	Support Plate for Bar Illumination	CV-BA-200X15R(B,W)

### Light Control Film: CV-LC Series

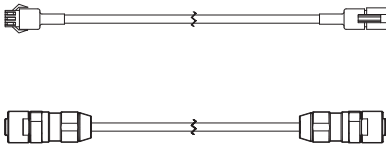
Diffused illumination are transformed into collimated illumination by this films.

Model	Product Type	Compatible Light Models
CV-LC-FL-27X27	Light Control Film for Back Lights	CV-LC-FL-27X27R(B,W)
CV-LC-FL-51X51	Light Control Film for Back Lights	CV-LC-FL-51X51R(B,W)
CV-LC-FL-63X60	Light Control Film for Back Lights	CV-LC-FL-63X60R(B,W)
CV-LC-FL-83X75	Light Control Film for Back Lights	CV-LC-FL-83X75R(B,W)
CV-LC-FL-100X100	Light Control Film for Back Lights	CV-LC-FL-100X100R(B,W)
CV-LC-FL-230X230	Light Control Film for Back Lights	CV-LC-FL-230X230R(B,W)

## Cable

The cable of M12 connector also is possible provided.

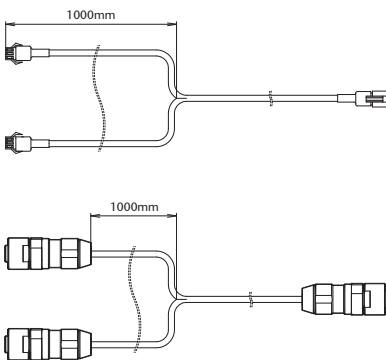
### Extension Cable



Model	Product Type	Length	Connector
JST-1M-JST-1W	Extension Cable	1m	SM(3P) to SM(3P)
JST-2M-JST-1W	Extension Cable	2m	SM(3P) to SM(3P)
JST-3M-JST-1W	Extension Cable	3m	SM(3P) to SM(3P)
JST-5M-JST-1W	Extension Cable	5m	SM(3P) to SM(3P)
★ M-JST-1M-JST-1W	Extension Robot Cable	1m	SM(3P) to SM(3P)
★ M-JST-2M-JST-1W	Extension Robot Cable	2m	SM(3P) to SM(3P)
★ M-JST-3M-JST-1W	Extension Robot Cable	3m	SM(3P) to SM(3P)
★ M-JST-5M-JST-1W	Extension Robot Cable	5m	SM(3P) to SM(3P)
★ M12-1M-M12-1W	Extension Cable	1m	M12 to M12
★ M12-2M-M12-1W	Extension Cable	2m	M12 to M12
★ M12-3M-M12-1W	Extension Cable	3m	M12 to M12
★ M12-5M-M12-1W	Extension Cable	5m	M12 to M12
★ M-M12-1M-M12-1W	Extension Robot Cable	1m	M12 to M12
★ M-M12-2M-M12-1W	Extension Robot Cable	2m	M12 to M12
★ M-M12-3M-M12-1W	Extension Robot Cable	3m	M12 to M12
★ M-M12-5M-M12-1W	Extension Robot Cable	5m	M12 to M12

★Made-to-order products.

### Branch Cable - 2 Way

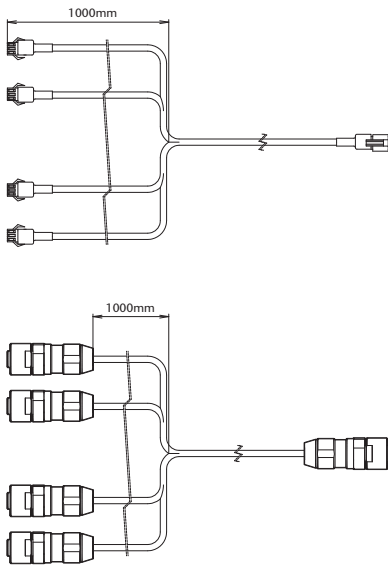


Model	Product Type	Length	Connector
JST-2M-JST-2W	Branch Cable - 2 Way	2m	SM(3P) to SM(3P)
JST-3M-JST-2W	Branch Cable - 2 Way	3m	SM(3P) to SM(3P)
JST-5M-JST-2W	Branch Cable - 2 Way	5m	SM(3P) to SM(3P)
★ M-JST-2M-JST-2W	Branch Robot Cable - 2 Way	2m	SM(3P) to SM(3P)
★ M-JST-3M-JST-2W	Branch Robot Cable - 2 Way	3m	SM(3P) to SM(3P)
★ M-JST-5M-JST-2W	Branch Robot Cable - 2 Way	5m	SM(3P) to SM(3P)
★ M12-2M-M12-2W	Branch Cable - 2 Way	2m	M12 to M12
★ M12-3M-M12-2W	Branch Cable - 2 Way	3m	M12 to M12
★ M12-5M-M12-2W	Branch Cable - 2 Way	5m	M12 to M12
★ M-M12-2M-M12-2W	Branch Robot Cable - 2 Way	2m	M12 to M12
★ M-M12-3M-M12-2W	Branch Robot Cable - 2 Way	3m	M12 to M12
★ M-M12-5M-M12-2W	Branch Robot Cable - 2 Way	5m	M12 to M12

★Made-to-order products.



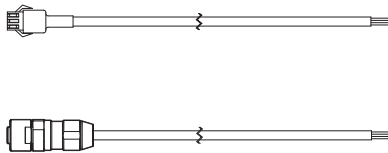
### Branch Cable - 4 Way



Model	Product Type	Length	Connector
JST-2M-JST-4W	Branch Cable - 4 Way	2m	SM(3P) to SM(3P)
JST-3M-JST-4W	Branch Cable - 4 Way	3m	SM(3P) to SM(3P)
JST-5M-JST-4W	Branch Cable - 4 Way	5m	SM(3P) to SM(3P)
★ M-JST-2M-JST-4W	Branch Robot Cable - 4 Way	2m	SM(3P) to SM(3P)
★ M-JST-3M-JST-4W	Branch Robot Cable - 4 Way	3m	SM(3P) to SM(3P)
★ M-JST-5M-JST-4W	Branch Robot Cable - 4 Way	5m	SM(3P) to SM(3P)
★ M12-2M-M12-4W	Branch Cable - 4 Way	2m	M12 to M12
★ M12-3M-M12-4W	Branch Cable - 4 Way	3m	M12 to M12
★ M12-5M-M12-4W	Branch Cable - 4 Way	5m	M12 to M12
★ M-M12-2M-M12-4W	Branch Robot Cable - 4 Way	2m	M12 to M12
★ M-M12-3M-M12-4W	Branch Robot Cable - 4 Way	3m	M12 to M12
★ M-M12-5M-M12-4W	Branch Robot Cable - 4 Way	5m	M12 to M12

★Made-to-order products.

### Connection Cable for MLEF



Model	Product Type	Length	Connector
JST-0.1M-1W	Connection Cable for MLEF	0.1m	SM(3P) to Free
JST-1M-1W	Connection Cable for MLEF	1m	SM(3P) to Free
JST-2M-1W	Connection Cable for MLEF	2m	SM(3P) to Free
JST-3M-1W	Connection Cable for MLEF	3m	SM(3P) to Free
JST-5M-1W	Connection Cable for MLEF	5m	SM(3P) to Free
★ M-JST-1M-1W	Connection Rbot Cable for MLEF	1m	SM(3P) to Free
★ M-JST-2M-1W	Connection Rbot Cable for MLEF	2m	SM(3P) to Free
★ M-JST-3M-1W	Connection Rbot Cable for MLEF	3m	SM(3P) to Free
★ M-JST-5M-1W	Connection Rbot Cable for MLEF	5m	SM(3P) to Free
★ M12-0.1M-1W	Connection Cable for MLEF	0.1m	M12 to Free
★ M12-1M-1W	Connection Cable for MLEF	1m	M12 to Free
★ M12-2M-1W	Connection Cable for MLEF	2m	M12 to Free
★ M12-3M-1W	Connection Cable for MLEF	3m	M12 to Free
★ M12-5M-1W	Connection Cable for MLEF	5m	M12 to Free
★ M-M12-1M-1W	Connection Rbot Cable for MLEF	1m	M12 to Free
★ M-M12-2M-1W	Connection Rbot Cable for MLEF	2m	M12 to Free
★ M-M12-3M-1W	Connection Rbot Cable for MLEF	3m	M12 to Free
★ M-M12-5M-1W	Connection Rbot Cable for MLEF	5m	M12 to Free

★Made-to-order products.

## Pin Assign

### Illumination Connector

JST SMR-03V-B Connector			
Ref. Drawing	No.	Assign	Wire Color
	1	+V	Red / Brown
	2	NC	
	3	-V	Black / Blue

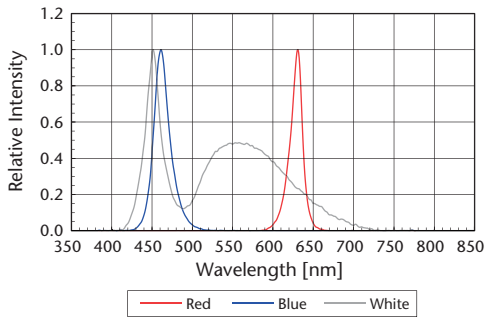
  

M12 Male Connector			
Ref. Drawing	No.	Assign	Wire Color
	1	+V	Red / Brown
	2	NC	
	3	-V	Black / Blue
	4	NC	

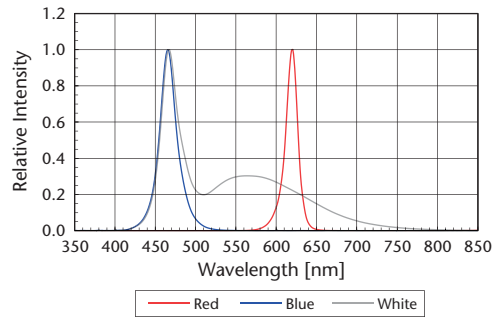
## LED Spectral Characteristics

The diagrams below illustrate the spectral characteristics of major LEDs used in the CompaVis®. We can also manufacture other lighting devices with different wavelengths. Please feel free to contact us.

CV-R, CV-SQ, CV-RLA, CV-FR, CV-DR, CV-DSQ, CV-BA, CV-BAQ, CV-CX, CV-FL Series



CV-CE Series



IR Series

